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ANALYSIS AND RECONSTRUCTION IN STAGES OF THE DESIGN AND CONSTRUCTION PROCESS OF THE OLD AND NEW BASILICA OF S. PETER IN VATICAN, AND ITS SURROUNDINGS

DOCTORAL THESIS

Programa de doctorado 3130 Historia del Arte

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Introducción resumen

1. Objetivos

El objetivo general de esta Tesis Doctoral es reconstruir el proceso de diseño y construcción de la antigua y nueva basílica de San Pedro en el Vaticano, y de su entorno cercano. De forma complementaria, se reconstruye la evolución de la trama urbana del área del Vaticano, desde su origen hasta la actualidad.

La reconstrucción del proceso de diseño y construcción se realizará de forma descriptiva y, especialmente, de forma gráfica. Los planos se realizarán con gran detalle, a escala y con gran precisión, utilizando las más avanzadas herramientas de dibujo digital.

La reconstrucción de las diferentes etapas del proceso de diseño y construcción de la antigua basílica se realizará por medio de planos de planta, alzados, y secciones del edificio, junto con algunos detalles constructivos.

Por otro lado, debido a la enorme magnitud y complejidad del edificio, el análisis y reconstrucción de las diferentes etapas del proceso de diseño y construcción de la nueva basílica se ejecutará únicamente mediante planos de planta.

Finalmente, la representación de la evolución de la trama urbana del área del Vaticano se realizará mediante planos de planta, y con dos escalas métricas (en *palmi* y metros).

Además de estos objetivos generales, con la presente Tesis Doctoral se han conseguido otros sub-objetivos:

1. Recopilar, ordenar y clasificar, por etapas consecutivas, las referencias bibliográficas disponibles sobre la actividad constructiva en el área del Vaticano.

2. Recopilar información sobre los edificios más representativos del área del Vaticano. Se ha recopilado información sobre la fecha de la construcción y del derribo de cada edificio; información sobre su forma y estructura arquitectónica; así como información sobre las modificaciones más importantes que han tenido a lo largo de su historia.

3. Recopilar la máxima información posible sobre la forma y estructura arquitectónica de la antigua basílica de San Pedro. Se ha compilado información

sobre los materiales y técnicas de construcción utilizadas en su construcción; sobre las dimensiones de los diferentes elementos y espacios arquitectónicos; sobre los diferentes espacios interiores; sobre los edificios colindantes; y en general cualquier información sobre la antigua basílica de San Pedro.

4. Recopilar, ordenar y clasificar, por etapas consecutivas, las referencias bibliográficas disponibles, relacionadas con el proceso de construcción de la antigua basílica de San Pedro.
5. Recopilar información sobre todos los proyectos ejecutados para la nueva basílica de San Pedro, por todos los arquitectos involucrados en su proceso de diseño.
6. Analizar todos los proyectos de la nueva basílica de San Pedro para reconstruir, etapa por etapa, el proceso de diseño realizado en cada uno de ellos.
7. Recopilar, ordenar y clasificar, por etapas consecutivas, las referencias bibliográficas disponibles, relacionadas con el proceso de construcción de la nueva basílica de San Pedro.
8. Reconstruir históricamente el proceso de diseño y construcción de la nueva basílica de San Pedro, especialmente en su etapa inicial.

2. Metodología

Identificar el proceso de diseño y construcción de cualquier edificio es una tarea compleja, pero analizándolo en profundidad se puede obtener la información adecuada para lograrlo.

Al analizar un determinado edificio se puede identificar un conjunto de patrones utilizados de forma reiterada, ya sean proporciones geométricas, como dimensiones, como pautas de actuación. Por consiguiente, se puede identificar un conjunto de reglas compositivas que brindan pistas valiosas para identificar su proceso de diseño. Este se compone de una secuencia de etapas. Se pasa de una a otra al tomar ciertas decisiones, de tal manera que el edificio a diseñar evoluciona paso a paso, y se va perfilando, desde la primera decisión, hasta que esté completamente definido.

Para que un determinado edificio se diseñe de forma correcta y armónica se debe aplicar de forma recurrente en todas las etapas del proceso de diseño un determinado conjunto -homogéneo y bien definido- de reglas compositivas. Es decir, durante todo el proceso de diseño, se debe utilizar un mismo conjunto de proporciones geométricas, dimensiones y estrategias compositivas. Como resultado, se obtendrá un objeto arquitectónico en el que no sobre ni falte nada, y en el que todos sus componentes se relacionan perfectamente entre sí por medio de un mismo conjunto de relaciones, proporciones y dimensiones. En otras palabras, un determinado objeto arquitectónico estará mejor diseñado y será más atractivo y armonioso si se usa el mismo conjunto de reglas, de forma recursiva, en todas las etapas del proceso de diseño.

La relación armónica entre los diferentes elementos arquitectónicos entre sí, y con el conjunto arquitectónico general, fue denominada *“concinnitas”* por el arquitecto renacentista Leon Battista Alberti. En su tratado *De Re Aedificatoria*, describía la belleza en la arquitectura como *"concinnitas"*. Y en el Libro IV de este tratado declara que: "Juzgamos óptimo lo que se hace de tal manera que no se puede cambiar a menos que se empeore" (IV: 277).

Para identificar el conjunto de etapas del proceso de diseño de un determinado edificio, primero se debe analizar de manera exhaustiva. El análisis debe incluir multitud de aspectos, como, por ejemplo, la identificación de las relaciones geométricas y proporcionales existentes en las dimensiones de cada uno de los diferentes elementos arquitectónicos, las relaciones geométricas y proporcionales entre diversos elementos arquitectónicos, las relaciones geométricas y proporcionales entre un determinado elemento y el conjunto total, etc. También deben identificarse determinadas dimensiones que son importantes o relevantes en el diseño del edificio, ya sea desde un punto de vista simbólico o funcional. Finalmente, y lo más importante, se deben identificar las reglas compositivas por las cuales se pasa de cada una de las etapas de diseño a la siguiente.

Por tanto, para conocer el proceso de diseño que se siguió en la basílica de San Pedro, lo primero que se ha realizado es un análisis profundo el edificio en busca de determinadas dimensiones y proporciones geométricas para identificar un conjunto de reglas tentativas de composición y, con ello, averiguar la secuencia correcta de etapas de diseño y las reglas que le permiten pasar de una etapa a la siguiente.

Sin embargo, el análisis de la nueva basílica de San Pedro es más complejo que el análisis de la mayoría de los edificios por varias razones:

1. La basílica de San Pedro ha sido el resultado de la concatenación temporal de partes de proyectos completos realizados secuencialmente por varios arquitectos en diferentes etapas históricas.

2. En cada etapa del proceso de diseño (correspondiente a diferentes etapas históricas) varios arquitectos trabajaron al mismo tiempo, colaborando y compitiendo entre sí.
3. La construcción del edificio se prolongó durante muchos años, por lo que las reglas de composición utilizadas inicialmente diferían significativamente de las reglas que se usaron en etapas sucesivas. De hecho, incluso los objetivos deseados para el edificio eran sustancialmente diferentes en cada época.
4. Los primeros diseños de la nueva basílica de San Pedro mostraban un deseo de respetar e integrarse con la antigua basílica que se pretendía reemplazar.

Del mismo modo, el análisis de la antigua basílica de San Pedro también tiene importantes dificultades:

1. La antigua basílica de San Pedro no existe, ya que había comenzado a construirse en 324 y terminó siendo demolida por completo en 1610. Por lo tanto, su diseño no se puede analizar midiendo directamente
2. Solo existe un plano válido de la antigua basílica, que también se realiza mezclando el estado que tenía a finales del siglo XVI con el estado que pudo haber tenido en base a indicaciones y conjeturas.
3. En los años 40 del siglo pasado se realizaron determinadas excavaciones para llegar a los cimientos y la parte inferior de algunos muros y columnatas de la antigua basílica de San Pedro, por lo que se tomaron medidas directas. Estas medidas, aunque similares a los señalados en las fuentes históricas, no coinciden con ellos.

2.1. Dificultades para reconstruir la evolución, etapa por etapa, de la trama urbana del Área Vaticano

La reconstrucción de la evolución de la trama urbana del área del Vaticano (utilizando planos a escala) es una tarea extraordinariamente compleja. El objetivo es reconstruir la trama urbana del área Vaticana en las diferentes etapas representativas de su historia, mediante planos realizados a escala y con la mayor precisión posible.

Existen algunos planos realizados con posterioridad al siglo XVII, pero tan solo algunos se han hecho con precisión. Hasta el siglo XVII solo se realizaron planos muy burdos, y muchos de ellos apenas son bocetos, ya que los edificios están representados de manera desproporcionada y poco realista. A medida que nos adentramos en el pasado, los dibujos son cada vez más toscos, esquemáticos y desproporcionados.

La tarea parece por tanto imposible de realizar. Sin embargo, se ha diseñado una estrategia que permite reconstruir con bastante precisión los planos de la trama urbana del área Vaticana, en las fechas en las que apenas se hicieron planos, o eran apenas unos bocetos. La estrategia se basa en tomar como referencia los edificios que todavía existen, que sirven de referencia para ubicar otros edificios que no han sobrevivido hasta la actualidad. Tomando como punto de partida la situación actual de la trama urbana del área Vaticana, se puede ir hacia atrás en la historia y reconstruir la etapa inmediatamente anterior, realizando las modificaciones oportunas en base a las referencias históricas disponibles. En base a esta etapa se puede ir de nuevo hacia atrás y reconstruir del mismo modo la etapa inmediatamente anterior. Y así sucesivamente.

De este modo, y tomando como referencia los edificios históricos que aún sobreviven, y en base a las referencias históricas existentes, es posible reconstruir con cierta precisión, la trama del tejido urbano del área del Vaticano, desde sus orígenes hasta la actualidad.

Los planos a escala resultantes son de gran importancia para la Historia del Arte, y pueden ser de gran utilidad en varios aspectos, y permiten una mejor comprensión de la historia del área del Vaticano, y especialmente su desarrollo social, artístico, arquitectónico y urbanístico.

Estos planos detallados también permiten contextualizar hechos aislados de la historia del arte en el área vaticana y su entorno inmediato, permiten visualizar el tejido urbano en cada una de sus etapas históricas. Igualmente, proporcionan un contexto adecuado para el análisis de la evolución histórica de los edificios más importantes del área, tales como la antigua basílica de Constantino, la nueva basílica de San Pedro, el Mausoleo de la dinastía Severa, el Mausoleo de Honorio, el Circo de Nerón, y muchos otros.

Por supuesto, los planos reconstruidos no pretenden ser definitivos, ya que se pueden mejorar con futuras investigaciones de estudiosos de cualquier edificio del área vaticana. A partir de nuevas investigaciones, estos planos pueden enriquecerse, proporcionando información cada vez más precisa y detallada sobre el estado de la trama urbana en las diferentes etapas de su evolución histórica.

2.2. Dificultades para identificar el proceso de diseño de la antigua basílica de San Pedro

Para identificar el proceso de diseño de la antigua basílica de San Pedro, teniendo en cuenta la poca información disponible, se ha diseñado una estrategia compleja, basada en la propuesta reiterada de hipótesis tentativas del proceso de diseño.

Esta estrategia consiste en tres etapas.

1. En primer lugar se deben recopilar información sobre todas las dimensiones disponibles en las diferentes fuentes históricas de los diferentes elementos arquitectónicos de la antigua basílica.
2. En segundo lugar, se deben identificar de forma provisional varias estrategias del proceso de diseño.
3. En tercer lugar, se deben evaluar todas las posibles estrategias de diseño tentativas, hasta encontrar una en la que las dimensiones de los diferentes elementos arquitectónicos difieran lo menos posible del conjunto total de mediciones disponibles en las referencias históricas.

Cada estrategia de diseño tentativa tiene una forma diferente de generar las dimensiones de los diferentes elementos arquitectónicos, por lo que cada vez que se define un determinado elemento arquitectónico se debe comparar con las medidas históricas disponibles. Si las dimensiones son similares, el proceso de diseño continúa, pero si las dimensiones de los elementos arquitectónicos generados difieren de las mediciones históricas, se debe rechazar la estrategia tentativa de diseño y se debe seguir otra. De esta forma, se ejecutan secuencialmente diferentes estrategias tentativas de diseño hasta encontrar una en la que las dimensiones de los elementos arquitectónicos generados coincidan aproximadamente con las dimensiones disponibles en las referencias históricas.

2.3. Dificultades para identificar el proceso de construcción de la antigua basílica de San Pedro

La principal dificultad para identificar el proceso de construcción de la antigua basílica de San Pedro es la falta de referencias históricas y la poca fiabilidad de las primeras referencias existentes (como es el caso de las primeras biografías papales del *Liber Pontificalis*).

Sin embargo, los hallazgos arqueológicos basados en excavaciones realizadas en la década de 1940 pueden complementar la información histórica.

De forma complementaria, el conocimiento de los detalles constructivos, las soluciones constructivas y los materiales empleados en cada época implica un cierto orden cronológico previsible, así como unos plazos lógicos en el proceso constructivo. Por tanto, el conocimiento arquitectónico y constructivo permite complementar la evidencia arqueológica y la evidencia histórica. De este modo se puede determinar con considerable certeza el proceso de construcción de la antigua basílica desde el inicio hasta el final de su construcción. Del mismo modo, es posible determinar de manera confiable la evolución del aspecto de la antigua basílica desde su finalización hasta el momento en que fue demolida, para dar paso a la construcción de la nueva basílica.

2.4. Dificultades para identificar el proceso de diseño de la nueva basílica de San Pedro

Como consecuencia del apartado anterior, para deducir el proceso de diseño de la nueva basílica de San Pedro, se deben recopilar todos los proyectos de todos los arquitectos involucrados en las diferentes etapas de su proceso construcción.

Cada proyecto es válido ya que proporciona información valiosa. Es cierto que algunos proyectos fueron redactados para ser ejecutados; otros fueron simplemente propuestas tentativas que mostraban una determinada idea o un camino a seguir; otros eran descabellados, ya que eran enormemente grandes (fuera de las posibilidades económicas reales y fuera de plazos manejables), o se basaron en ideas personales sin tener en cuenta el entorno real construido; y otros fueron simplemente tratados teóricos hechos como resultado de lo aprendido, y que poco tenían que ver con proyectos encargados y reales.

En cualquier caso, se deben analizar todos los proyectos disponibles, y a partir de la concatenación de sus aportaciones individuales se puede elaborar una trama capaz de integrar cronológicamente los diferentes proyectos entre sí, y capaz de relacionarlos de una forma u otra con el avance de las obras.

Para iniciar el proceso de construcción, es fundamental identificar geométricamente el "núcleo central de Bramante" para comprender el resto de proyectos y establecer un hilo narrativo secuencial para reconstruir lo que podría denominarse "el proceso del proceso de diseño". No hay una sola referencia histórica sobre la existencia del proyecto de este "núcleo central de Bramante" (que incluye los cuatro grandes pilones centrales y los contra-pilones correspondientes), pero sin duda debe haber existido ya que se construyó, por lo que se pueden realizar y reconstruir mediciones directas.

Una vez identificado y reconstruido el "núcleo central de Bramante", se pueden entender los proyectos realizados por los sucesores de Bramante, ya que todos lo respetaron y lo integraron en sus propuestas. Y de esta forma se puede deducir el complejo proceso de diseño seguido en la nueva basílica de San Pedro.

2.5. Dificultades para identificar el proceso de construcción de la nueva basílica de San Pedro

Con la finalidad de identificar el proceso de construcción de la nueva basílica de San Pedro, dando respuesta a muchas preguntas que aún existen, se han analizado todos los proyectos conocidos llevados a cabo por todos los arquitectos implicados. Se han analizado tanto los proyectos destinados a ser ejecutados, como los proyectos que simplemente expresan una idea y que estaban destinados a seducir a los clientes, como los proyectos de obra, bocetos de obra, bocetos de resolución de problemas específicos, etc.

Se ha dado una especial importancia y dedicación al período comprendido entre los años 1504 y 1520, y en especial al análisis de los primeros bocetos de Bramante, Giuliano da Sangallo y Fra Giocondo, con el fin de reconstruir adecuadamente el proceso de diseño inicial y tener una idea correcta de las primeras intenciones y, con ello, reconstruir adecuadamente el proceso de construcción de la nueva basílica, especialmente en su primera etapa.

Evidentemente el trabajo tiene un alcance gigantesco, y en esta Tesis, por razones de limitación de la información máxima admisible (50 MB), solo se incluye una pequeña parte del trabajo realizado.

3. Conclusiones

El objetivo general de esta Tesis Doctoral es determinar el proceso de diseño y proceso constructivo de la antigua y de la nueva Basílica de San Pedro, y la evolución temporal de la trama urbana del área Vaticana.

Este objetivo general consta de tres objetivos principales:

a. Reconstrucción por etapas de la evolución de la trama urbana del área del Vaticano, desde su origen hasta la actualidad.

b. Reconstrucción del proceso de diseño y construcción de la antigua basílica de San Pedro

c. Reconstrucción del proceso de diseño y construcción de la nueva basílica de San Pedro

Cada uno de estos objetivos principales se ha logrado a través de los diferentes capítulos de esta Tesis, junto con otros objetivos complementarios, como se muestra a continuación.

Objetivo a

Reconstrucción por etapas de la evolución de la trama urbana del área del Vaticano, desde su origen hasta la actualidad.

Este objetivo se ha logrado en el Capítulo 2 de la Tesis Doctoral.

En este capítulo se ha creado un relato histórico básico, y se han descrito secuencialmente los eventos más importantes que ocurrieron en el área del Vaticano desde su origen hasta el presente. El relato se ha estructurado en 29 etapas consecutivas, correspondientes a las etapas más significativas de la historia del Vaticano.

Del mismo modo, se ha realizado una reconstrucción gráfica de la evolución de la trama urbana del área del Vaticano en 29 etapas consecutivas. Para ello, se han realizado 29 planos a escala, correspondientes al estado de la trama urbana en las 29 fechas más representativas de su historia.

Objetivo b

Reconstrucción por etapas del proceso de diseño y construcción de la antigua basílica de San Pedro

Este objetivo se ha logrado en los capítulos 3, 4, 5, 6 de la Tesis Doctoral.

En el capítulo 3 se ha realizado un relato histórico sobre el proceso de construcción de la antigua basílica de San Pedro, así como su evolución temporal, desde su construcción hasta su demolición.

Para realizar este relato histórico, en primer lugar, se han identificado el inicio y el final de las obras, así como las etapas más características del proceso constructivo de la antigua basílica de San Pedro. Del mismo modo, se han identificado las etapas más características de su evolución temporal, desde que se construyó hasta que fue derribada.

Las diferentes referencias históricas disponibles se han recopilado, clasificado e integrado por etapas. A partir de estas referencias y a partir del análisis de los diferentes dibujos históricos disponibles se ha realizado un relato básico sobre el proceso de diseño y construcción de la antigua basílica de San Pedro.

Sin duda, tuvo que haber un proyecto completo para la antigua basílica de San Pedro, ya que inicialmente se construyó una enorme plataforma sobre la que se construyó la antigua basílica.

En el capítulo 4 se ha podido reconstruir todas las etapas del proceso de diseño del proyecto de la antigua basílica de San Pedro, probando con diferentes escenarios compositivos y contrastando los resultados obtenidos con la evidencia histórica disponible.

La antigua basílica de San Pedro tuvo que ser cuidadosamente diseñada por su importancia social, y especialmente por su importancia religiosa y política. Por lo tanto, los diferentes componentes del edificio no se pudieron diseñar al azar. Como en todo buen proyecto arquitectónico, los diferentes elementos arquitectónicos de la antigua basílica debían estar perfectamente relacionados geométricamente entre sí, como resultado de la aplicación redundante del mismo conjunto de estrategias compositivas y del mismo conjunto de relaciones geométricas. Las reglas compositivas y las relaciones geométricas utilizadas en el diseño de la antigua basílica se han deducido a partir de una estrategia compleja, pero eficaz.

Inicialmente, se han probado tentativamente diferentes combinaciones entre ciertas estrategias compositivas y ciertas relaciones geométricas. A partir de ellas, se ha reconstruido un proceso de diseño tentativo, definiendo tanto el punto de partida como el camino a seguir. Durante este proceso de diseño se obtienen las diferentes partes de la basílica, cuyas dimensiones deben ser comparadas con las dimensiones conocidas a partir de la evidencia histórica disponible. Si alguna dimensión no coincide, es necesario retroceder y seguir probando un nuevo conjunto de relaciones geométricas con una nueva estrategia compositiva. Con este nuevo proceso de diseño, se vuelven a obtener las diferentes partes de la basílica, cuyas dimensiones deben ser comparadas, una vez más, con la evidencia histórica conocida. Continuando con este proceso, llegará un momento en el que sea posible definir un determinado proceso de diseño que da como resultado una basílica en el que las dimensiones de sus diferentes elementos arquitectónicos resultantes coincidan con las dimensiones de la evidencia histórica disponible.

A partir de esta metodología se ha reconstruido el proceso de diseño de la antigua basílica de San Pedro, tanto en planta como en sección, y se han identificado todas sus etapas, desde la primera decisión, hasta la finalización del proyecto.

La identificación del proceso de diseño permite reconstruir con precisión la forma y dimensiones exactas de todos los componentes de la antigua basílica de San Pedro, y en base a esto ha sido posible reconstruir su proyecto ejecutivo (plano de planta y plano de sección).

La planta reconstruida en el capítulo anterior debió coincidir básicamente con la planta que pudo haber tenido la antigua basílica hacia el año 514 cuando se terminó su construcción. Por tanto, a partir de esta planta se pueden identificar las etapas más importantes tanto de su proceso constructivo como de su evolución temporal, desde que se construyó hasta que se derribó.

En el capítulo 5 se ha identificado el proceso constructivo de la antigua basílica, reconstruyendo gráficamente el estado del edificio en cada una de sus etapas más características, teniendo en cuenta las referencias históricas disponibles. A partir del estado de la edificación en 514 se ha vuelto a rastrear las principales actuaciones constructivas realizadas en cada etapa, por lo que cada una de las etapas se ha definido gráficamente con bastante precisión.

De forma complementaria, en este capítulo se han identificado las etapas más importantes de la evolución de la antigua basílica de San Pedro a lo largo de la historia, desde que se construyó en el 514 hasta 1505, poco antes de empezar a ser derribada para dar paso a la construcción de la nueva basílica.

Cada etapa del proceso constructivo y de la evolución temporal de la antigua basílica de San Pedro se ha representado por medio de planos de planta a escala con el mayor detalle posible. Los planos de planta no solo muestran la evolución de la antigua basílica, sino también la evolución de los edificios en su entorno.

En este capítulo también se han logrado dos objetivos secundarios.

1. En primer lugar, y como consecuencia de la reconstrucción de las etapas más importantes del proceso constructivo y de la evolución temporal, se ha podido completar un relato histórico detallado sobre la evolución de la antigua basílica desde el inicio de su construcción hasta que finalmente fue derribada.
2. En segundo lugar, se ha podido recopilar una bibliografía muy extensa y completa, relacionada con el proceso de diseño y construcción de la antigua basílica, y que sin duda puede facilitar el trabajo de los historiadores que deseen realizar investigaciones específicas sobre determinados aspectos relacionados con la antigua basílica de San Pedro.

En el capítulo 6, a partir de la información generada en los capítulos 4 y 5, y teniendo en cuenta la documentación histórica y los dibujos históricos disponibles, se ha podido reconstruir el aspecto de la antigua basílica de San Pedro en tres etapas fundamentales de su existencia:

- Año 514. Cuando la antigua basílica se construyó de forma completa
- Año 1003. Hacia la mitad de la existencia de la antigua basílica
- Año 1505. Cuando la antigua basílica comenzó a ser derribada

La reconstrucción del aspecto de la antigua basílica en estas tres etapas se ha realizado mediante planos de planta a escala, con el mayor detalle posible y con las dimensiones más importantes. Uno de los aspectos más destacados de los dibujos realizados es la reconstrucción de la variación de nivel del terreno circundante a cada lado de la antigua basílica. Se observa cómo con el paso del tiempo el nivel del terreno en el lado sur de la basílica fue subiendo paulatinamente como consecuencia de la recurrente pavimentación del terreno.

Los planos realizados para cada etapa han sido los siguientes:

- Planta
- Sección transversal
- Sección longitudinal
- Fachada sur
- Fachada este
- Fachada este al Atrio
- Fachada oeste

Los planos se han realizado con todo rigor y precisión, y representan en detalle las diferentes partes de la antigua basílica de San Pedro y los edificios de su entorno inmediato. Por este motivo, estos planos pueden resultar de gran utilidad para los historiadores que deseen investigar un aspecto concreto de la antigua basílica y su entorno.

Objetivo c

Reconstrucción por etapas del proceso de diseño y construcción de la nueva basílica de San Pedro

Este objetivo se ha logrado en los capítulos 7, 8, 9 de la Tesis Doctoral.

En el Capítulo 7 se ha realizado un relato histórico completo del proceso de diseño y construcción de la nueva basílica, desde su inicio en la época del papa Nicolás V (1447-1455) hasta su finalización en la época del papa Alejandro VII (1655-1667). Para la realización del relato histórico se han agrupado, clasificado e integrado un gran número de referencias históricas y estudios históricos relacionados con el proceso de diseño y el proceso de construcción de la nueva basílica.

El relato histórico se ha estructurado en base a los períodos históricos consecutivos identificados en el proceso de diseño y construcción. Estos períodos se han delimitado, a su vez, en base a la presencia de los actores más importantes en el proceso de diseño (papas y arquitectos), cuya actividad ha influido directamente en la evolución del proceso de construcción de la nueva basílica de San Pedro.

Sin duda, este relato histórico tiene un gran valor histórico ya que permite conocer con el mayor rigor posible el proceso de diseño y construcción de la nueva basílica, y contiene una enorme cantidad de referencias históricas para aquellos estudiosos que deseen indagar en detalle algún aspecto específico de la misma.

El relato histórico realizado ha complementado los relatos previamente existentes debido a la exhaustiva recogida de datos históricos, y especialmente por las conclusiones obtenidas en el análisis realizado de los diferentes proyectos de la nueva basílica de San Pedro. El análisis riguroso de estos proyectos ha permitido complementar los vacíos existentes en los relatos históricos parciales previamente existentes y ha proporcionado un hilo conductor sólido para la génesis de un relato completo.

Por supuesto, el relato histórico confeccionado no pretende ser exhaustivo, y seguramente contiene deducciones que, en base a nueva información que pueda aparecer en el futuro, pueden modificarse parcialmente. Sin embargo, estos pequeños cambios posibles sin duda pueden enriquecer este relato, pero creemos que no alterarían su vigencia, su esencia y su estructura básica.

En el capítulo 8, a partir del relato histórico completo que se ha realizado en el capítulo anterior, se puede deducir que el proceso de diseño de la nueva basílica fue sumamente complejo e involucró la actividad de varios arquitectos en diversas etapas históricas.

El proceso de diseño se originó en la voluntad de Nicolás V de llevar a cabo una importante renovación de la antigua basílica de San Pedro. Sin embargo, apenas realizó pequeñas obras en la zona occidental que supusieron la construcción de los cimientos de un nuevo ábside occidental. Sin embargo, tuvieron una enorme importancia en el futuro del edificio debido a la voluntad de Julio II de que estos cimientos sirvieran para construir un nuevo ábside que albergaría su propia capilla funeraria.

Julio II creó una estrategia de diseño complicada basada en la creación de un equipo formado por tres arquitectos que competían y cooperaban entre sí, y no se construiría nada sin el acuerdo de los tres arquitectos. Siempre debería haber tres arquitectos, y tras la muerte de un arquitecto otro ocuparía su lugar. En general, cada arquitecto puede realizar propuestas de forma independiente, que deben integrar las partes ya construidas. De todas las propuestas realizadas, solo se construyeron parcialmente aquellas que contaron con el consenso de los tres arquitectos. De esta forma se iba avanzando en la obra, construyendo solo algunos fragmentos incluidos en alguno de los proyectos realizados por alguno de los arquitectos del grupo. En ocasiones, incluso se decidió demoler algunas piezas ya construidas para que se pudieran llevar a cabo los proyectos que más gustaban a todos.

Este proceso general tuvo algunas excepciones. Por ejemplo, al inicio del proceso de diseño, Bramante tuvo un gran protagonismo sobre sus competidores. Como era de esperar, Miguel Ángel destruyó por completo esta estructura, ya que no aceptaba ningún colaborador. Después de Miguel Ángel, la estructura ideada por Julio II se mantuvo, pero el arquitecto principal tuvo un papel más importante sobre los demás, que se convirtieron simplemente en sus colaboradores. En resumen, se llevaron a cabo un gran número de proyectos a lo largo del proceso de diseño, pero solo algunos de ellos se utilizaron para la construcción.

En este capítulo se han analizado y reconstruido los proyectos que se utilizaron en la construcción del edificio, o que al menos fueron vinculantes en ciertos aspectos de su construcción. Especialmente importante ha sido la reconstrucción del "núcleo central de Bramante", cuyo proyecto no nos ha llegado, pero que sin duda existió, ya que necesariamente tuvo que ser utilizado para el inicio de la construcción de la nueva basílica de San Pedro.

Se han analizado todos los proyectos realizados para la nueva basílica de San Pedro y se han reconstruido etapa a etapa. Sin embargo y debido a la limitación de tamaño de 50 Megabytes que debe tener una Tesis Doctoral en España, en este capítulo solo se muestran los proyectos más importantes, y de todos ellos solo se muestra una etapa inicial y la etapa final, junto con la superposición con el dibujo histórico que se ha reconstruido. Los proyectos directamente utilizados en el proceso de construcción son los siguientes:

- Proyecto de reforma de Nicolás V
- Proyecto del “Núcleo Central Bramante”
- Proyecto del ábside de Julio II
- Proyectos del deambulatorio Bramante-Raffaello-Antonio Sangallo
- Proyecto de Michelangelo
- Proyectos de Maderno

Se ha prestado especial atención al análisis y reconstrucción de los primeros proyectos realizados por Bramante y Giuliano da Sangallo. Además, se ha realizado un análisis exhaustivo sobre las diferentes tipologías arquitectónicas que se pueden conseguir con estos proyectos iniciales, así como la evolución de un proyecto a otro. Todo ello con el propósito de demostrar la génesis de una nueva tipología arquitectónica creada por Giuliano da Sangallo y Bramante, y que a lo largo de esta Tesis se ha denominado "tipología mixta de *quincunx*-naves".

Con esta tipología mixta se puede hacer un edificio con la pureza de una tipología centralizada, pero al mismo tiempo se puede alargar en dirección este, donde se ubicaba la Plaza Vaticano, y donde debería ubicarse una nueva Loggia de las Bendiciones.

La secuencia de los diferentes proyectos ejecutivos permite una reconstrucción detallada de todas las decisiones de diseño tomadas por los diferentes arquitectos involucrados en el proceso de diseño. De esta forma, se ha podido reconstruir el proceso de diseño, como si lo hubiera realizado de principio a fin, por un solo arquitecto.

Como resultado final del proceso de diseño se han obtenido los planos detallados del edificio final existente hoy. Las dimensiones deducidas de los diferentes elementos arquitectónicos generados durante el proceso de diseño deducido de la nueva basílica coinciden casi exactamente con las medidas realizadas directamente sobre el edificio. Esto legitima que el proceso de diseño deducido coincide básicamente con el proceso de diseño secuencial llevado a cabo por los diferentes arquitectos involucrados en el diseño de la nueva basílica.

En el capítulo 9, a partir de la reconstrucción de los diferentes proyectos directamente vinculados al proceso constructivo, se ha podido reconstruir la forma y dimensiones exactas de la actual basílica de San Pedro. Estas dimensiones coinciden casi exactamente con las mediciones realizadas directamente en el edificio actual, con tecnologías avanzadas de medición láser.

Por tanto, en este capítulo, y en base a los planos obtenidos en el capítulo anterior, se ha identificado el proceso constructivo de la nueva basílica, reconstruyendo gráficamente el estado del edificio en cada una de sus etapas más significativas, teniendo en cuenta las referencias históricas disponibles.

A partir del estado actual del edificio, se han vuelto a rastrear las principales actuaciones constructivas realizadas en cada etapa, y con ello se ha podido definir gráficamente el estado de las obras en cada una de ellas.

Cada etapa del proceso constructivo de la nueva basílica de San Pedro se ha realizado mediante planos de planta a escala, con el mayor detalle posible. Los planos de planta no solo muestran la evolución de la nueva basílica, sino también la evolución de los edificios en su entorno inmediato.

Valor y utilidad de los resultados obtenidos

Los resultados de esta Tesis Doctoral pueden ser de gran utilidad para los historiadores que deseen investigar ciertos aspectos específicos de la antigua y de la nueva basílica de San Pedro.

1. En primer lugar, los planos a escala del área del Vaticano son de gran importancia para la Historia del Arte, y pueden ser de gran utilidad en varios aspectos, entre los que destacan los siguientes:

   1. Permiten una mejor comprensión de la historia del área del Vaticano, y especialmente su desarrollo social, artístico, arquitectónico y urbano.
   2. Permiten contextualizar hechos aislados de la historia del arte en la zona del Vaticano y su entorno inmediato.
   3. Permiten la visualización de la trama urbana del área del Vaticano en cada una de sus etapas históricas.
   4. Permiten conocer mejor las acciones arquitectónicas y urbanísticas más importantes que se llevan a cabo en cada etapa
   5. Permiten identificar los principales trazados urbanísticos que, como cicatrices históricas, han caracterizado la evolución del área del Vaticano.
   6. Proporcionan un contexto adecuado para el análisis de la evolución histórica de los edificios más importantes de la zona del Vaticano, como la antigua basílica de Constantino, la nueva basílica de San Pedro, el Mausoleo de la dinastía Severa, el Mausoleo de Honorio, el Circo de Nerón y muchos otros
   7. Proporcionan un contexto gráfico detallado para enmarcar la investigación futura sobre aspectos específicos, o edificios específicos, incluidos en el área del Vaticano.

2. En segundo lugar, la identificación de todas las etapas del proceso de diseño y construcción de la antigua basílica de San Pedro es de gran importancia para la Historia del Arte, y puede ser de gran utilidad en varios aspectos, entre los que destacan los siguientes:

   1. Proporciona una mejor comprensión de la historia de la antigua basílica de San Pedro.
   2. Proporciona una mayor comprensión de la metodología de diseño arquitectónico en la antigua Roma.

3. Permite conocer con más detalle, la forma y dimensiones de la antigua basílica de San Pedro.
4. Ofrece un marco general para el estudio detallado de ciertos aspectos de la antigua basílica de San Pedro.
5. Permite la visualización de todos los hechos históricos relacionados con la antigua basílica de San Pedro, desde el inicio de su construcción hasta su derribo.
6. Permite conocer en detalle los edificios anexos a la antigua basílica de San Pedro
7. Permite conocer en detalle el proceso de diseño de la antigua basílica de San Pedro.
8. Permite conocer la evolución del proceso de construcción de la antigua basílica de San Pedro.
9. Permite conocer la evolución de la antigua basílica a lo largo del tiempo, especialmente las modificaciones, ampliaciones y reformas de su estructura arquitectónica.

3. En tercer lugar, la identificación de todas las etapas del proceso de diseño y construcción de la nueva basílica de San Pedro es de gran importancia para la Historia del Arte, y puede ser de gran utilidad en varios aspectos, entre los que destacan los siguientes:

1. Proporciona una mejor comprensión de la historia de la nueva basílica de San Pedro.
2. Proporciona una mejor comprensión de la metodología de diseño arquitectónico en el Renacimiento.
3. Ofrece un marco general para el estudio detallado de ciertos aspectos de la nueva basílica de San Pedro.
4. Permite la visualización de todos los hechos históricos relacionados con la nueva basílica de San Pedro.
5. Permite conocer en detalle los edificios anexos a la nueva basílica de San Pedro
6. Permite conocer en detalle el proceso de diseño de la nueva basílica de San Pedro
7. Permite conocer la evolución del proceso constructivo de la nueva basílica de San Pedro.

Sin duda, el trabajo realizado en esta Tesis Doctoral puede ser de utilidad para muchas personas y en muchos aspectos. Sin embargo, quizás su mayor aporte es que permite la creación de un relato más completo de la historia de la basílica de San Pedro en el Vaticano, que evidentemente se ha convertido en uno de los mayores símbolos de la cultura occidental, y que ha sido efecto y causa de una forma de pensar que ha ido evolucionando con el tiempo.

La Basílica de San Pedro, más que un símbolo de una determinada religión, se ha convertido en el símbolo del poder humano.

A mis padres

“Il lavoro nobilita l'uomo e arricchisce qualcun altro.”

Michelangelo Buonarroti

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CHAPTER 1

"If I make the lashes dark
And the eyes more bright
And the lips more scarlet,
Or ask if all be right
From mirror after mirror,
No vanity's displayed:
I'm looking for the face I had
Before the world was made.

What if I look upon a man
As though on my beloved,
And my blood be cold the while
And my heart unmoved?
Why should he think me cruel
Or that he is betrayed?
I'd have him love the thing that was
Before the world was made"

William Butler Yeats

Chapter 1. Introduction

1.1. Delimitation of the research topic

This Doctoral Thesis focuses on the reconstruction of the design process, and construction process of the old basilica and the new basilica of S. Peter in the Vatican, as well as the evolution of the urban structure of the Vatican area throughout history.

The delimitation of the research work carried out in five fundamental sections:

1. Reconstruction of the evolution of the urban structure of the Vatican Area, from its origins to the present day.

The evolution of the urban structure of Vatican Area will be carried out by showing its status in the 28 most significant stages of its evolution. Each stage is defined by means of scale plans layouts (scale in meters and in *palmi*), made with the maximum possible detail, and with more advanced digital tools. Each plan is commented adequately, according to the most important historical references, while highlighting the most important historical events that occurred in each stage, as well as reviewing in detail the most important urban and architectural changes.

2. Reconstruction of the design process of the old basilica of S. Peter

The design process of the Old S. Peter's Basilica has been rebuilt, step by step, from the first idea, until the project was completed. The design process will be reconstructed in plan and also in section.

3. Reconstruction of the construction process of the old basilica of S. Peter

The construction process of the old S. Peter's Basilica has been rebuilt, from the beginning until the building was completed. In the same way, it is intended to reconstruct the evolution of the building, since it was built until it was demolished, to make way for the construction of the new basilica. The construction process is shown by means of scale plans, made with great precision, of the most significant stages. Each of these stages is adequately commented on, describing the most important construction actions executed in each stage, according to the bibliographic references collected. Finally, and as a consequence of the research work, the appearance of the old basilica is shown on three significant dates in its history: year 514, year 1003 and year 1505, by means of plans to scale and with all precision. Each plan is discussed in detail, taking into account the historical references gathered.

4. Reconstruction of the design process of the new basilica of S. Peter

It involves rebuilding the design process for the new S. Peter's Basilica. The design process was very stormy and was executed by various architects, both initially and throughout the construction process. The reconstruction of the design process includes the reconstruction of the most important theoretical projects carried out by the architects involved in the design process. Many of these projects have not been taken into account for the construction of the building, but they are key to understanding the design process. Finally, the final design process is reconstructed, in a concatenated and sequential way, taking into account parts of projects executed by the different architects involved in the design process.

5. Reconstruction of the construction process of the new basilica of S. Peter

The construction process of the new basilica has been rebuilt, from the beginning of the works, until the construction was completed. The construction process is shown by means of scale plans, made with great precision, of the most significant stages. Each of these stages is discussed in detail, describing the most important construction actions carried out in each stage, according to the bibliographic references collected.

All the plans layouts have been set to scale and have been exhaustively dimensioned in the same units of measurement that were used in both the old basilica (*roman foot*) and the new basilica (*palmo*).

1 *roman foot*(*Vatican area*) = 4/3 *palmo*

1 *palmo* ‘*di architetti’* = 22.34 cm.

1 *roman foot* (*Vatican area*) = 29.78 cm.

1.2. State of art

The Basilica of S. Peter is undoubtedly the most studied building on the planet. However, there are hardly any references regarding the research topic that is the subject of this Doctoral Thesis.

1. Reconstruction of the evolution of the urban structure of the Vatican area throughout history

With regard to the reconstruction of the evolution of the urban structure of the Vatican area there are hardly precedents. These only focus on a small part of the urban mesh of the Vatican area (the area near the basilica), and also refer to only a few historical stages.

These precedents include the works of Paul Letarouilly (1795-1855), Rodolfo Amedeo Lanciani (1847-1929), Giovanni Battista Piranesi, etc. and more recently the fabulous work of Leonardo Benevolo. The latter has reconstructed with great precision, and detail, the surroundings near the basilica, in the time of Pius IV and Paul V, and also in the time of Bernini. It has also rebuilt the state of the Borgo urban mesh in 1930, as well as the *Borgo restauro urbano* project.

Undoubtedly, this information is very valuable, despite the fact that the reconstructed area is small and refers to very few historical stages.

2. Reconstruction of the design process of the old basilica of St. Peter

There is no precedent for the design process of the old basilica of St. Peter. Historians and researchers who have reconstructed the plans of the old basilica have done taking into account the plans of Alfarano, slightly modified and using measurements provided in other historical references, and some partial measurements made in the excavations of the 40s of the twentieth century.

However, no researcher has tried to reconstruct the design process carried out in the project of the old basilica. And this is very important, given that in an architectural project (and especially in ancient Rome and the Renaissance) the different architectural elements are intertwined with each other in a geometric way, thus if these geometric relationships are known, and the dimensions of some architectural elements, the dimensions of the rest of architectural elements can be deduced.

3. Reconstruction of the image of the old basilica of S. Peter

There are several proposals for rebuilding the appearance that the old basilica must have had just at the end of its construction. Without a doubt the most successful proposals are those made by Bruno Maria Apollonj Ghetti, Hugo Brandenburg, Ralf Biering, Paolo Liverani, Alberto Carlo Carpiceci and G. Dibenedetto.

These proposals are very valid and help to better understand what the old basilica must have looked like just when it was built. However it is possible to provide more detail, correct certain errors and omissions, and slightly correct its dimensions.

Among the inaccuracies, errors or omissions that still exist to date, the following should be highlighted:

- The atrium, the side wings, and the rooms adjacent to the gate house must be defined in detail.
- The different relative unevenness between the floor levels of the warehouses, the narthex, the atrium and the gate house must be located and quantified.
- The design and architectural structure of the exedras must be corrected so that their design corresponds to those shown in a wide variety of historical references.
- The columns placed by Nicholas V on the piers of the Arch of Constantine must be defined.
- The general dimensions of the basilica must be corrected and completed so that they correspond to a greater number of historical references, and also be consistent with the design practice carried out in the design of a basilica typology. For this, it is vitally important that the design process carried out in the initial project can be properly deduced.
- The different dimensions of the different architectural elements of the basilica must be precisely defined.
- The buildings that have been attached to the basilica throughout history must be properly reconstructed, since they are so closely linked to the basilica that their presence is essential to understand its history.

In a complementary way, only Letarouilly has made proposals for the reconstruction of the possible aspect that the old basilica of S. Peter could have had in the Middle Ages and in the Renaissance. His proposals are valuable, but in many cases, they do not coincide with various existing historical documents, perhaps because Laterouilly was not aware of them. In any case, their proposals only serve as a starting point to more accurately reconstruct (taking into account the historical documents available today) the appearance that the old basilica could have had in the Middle Ages (more or less half of its history) and in the Renaissance (shortly before its destruction had started).

4. Reconstruction of the construction process of the old basilica of S. Peter

Various historians and researchers have compiled historical information on certain construction activities in the old basilica of S. Peter and its nearby surroundings, such as Richard Krautheimer, Alberto Carlo Carpiceci, Hugo Brandenburg, Antonella Ballardini, Christof Thoenes, Paolo Liverani, Richard Gem, Rosamond Mckitterick, John Osborne, Pietro Zander, etc.

However, these researchers have hardly made specific graphic diagrams of certain parts of the old basilica, corresponding to a certain historical stage.

In addition, in the interpretation of several historical events there are discrepancies between some of these historians, so it has not yet been possible to make a sufficiently complete narrative to understand the construction process of the old basilica. Sometimes the positions between them seem forcibly opposed, and this makes it impossible to create a continuous story that can bring together and contextualize the available information.

5. Reconstruction of the design process for the new St. Peter's Basilica

The design process for the new basilica has been extensively studied in recent years, and countless historians and researchers have made contributions.

Among all these historians are Franz Wolff Metternich, Christoph Luitpold Frommel, Arnaldo Bruschi, Christof Thoenes, Franz Krauss, Federico Bellini, William Tronzo, etc.

Without a doubt, the most important graphic contributions are the drawings made by P. Foellbach, under the direction of Christoph Luitpold Frommel. This is the reconstruction to scale of some drawings made by Giuliano da Sangallo, Bramante and Fra Giocondo, representing their first projects for the new basilica of S. Peter.

6. Reconstruction of the construction process of the new basilica of S. Peter

The construction process of the new basilica has been described in considerable detail by several current historians, including Hugo Brandenburg, Antonella Ballardini, Christof Thoenes and Arnaldo Bruschi.

At present there is not a complete historical account that perfectly describes the construction process, but it can be considerably enriched based on the results and conclusions of the analysis of the different projects carried out, especially in the period between the years 1505 and 1520.

On the other hand, there is not a detailed graphic description showing the construction process of the new basilica, step by step, during its most significant stages. Undoubtedly, this graphic reconstruction would allow a better understanding of the construction process of the new basilica and adequately contextualize it in its built environment.

1.3. Objectives

The general objective of this Doctoral Thesis is to reconstruct the design and construction process of the old and new basilica of S. Peter in Vatican, and its close surroundings. In a complementary way, it is intended to reconstruct the evolution of the urban structure of the Vatican area, from its origin to the present day.

The reconstruction of the design and construction process will be carried out both in a descriptive way, and especially in a graphic way. The graphic representations will be made with great detail, and enormous precision, using the most advanced digital drawing tools.

The analysis and representation of the different stages of the design and construction process of the old basilica will be done using graphic representations in floor plans layouts, elevation layouts and section layout of the building, together with some construction details.

On the other hand, due to the enormous magnitude and complexity of the building, the analysis and representation of the different stages of the design and construction process of the new basilica will be executed only by means of a graphic representation in floor plan layouts.

Finally, the representation of the evolution of the urban structure of the Vatican area will be carried out using plan layouts, on a larger scale (in *palmi* and meters).

In addition to these general objectives, it is intended to achieve other particular sub-objectives, no less important.

1. Compile, sort and classify, by consecutive sequential stages, the bibliographic references available on construction activity in the Vatican area.
2. Collect information on the most representative buildings in the Vatican area. This includes information on the date of construction and demolition of each building, information on its architectural structure and its appearance, as well as information on the most important modifications they have had throughout their history.
3. Gather the available information on the architectural structure and appearance of the old basilica of S. Peter. This includes information on the materials and construction techniques used in its construction; and also information on the dimensions of the different architectural elements and spaces, information on the different interior spaces, information on the adjoining buildings, and in general information that helps define the old basilica of S. Peter.
4. Compile, sort and classify, by consecutive sequential stages, the bibliographic references related to the construction process of the old basilica of S. Peter.
5. Collect information on all the projects executed for the new basilica of S. Peter, by all the architects involved in the design process.
6. Analyze all the projects for the new basilica of S. Peter, to reconstruct, stage by stage, the design process carried out in each one of them.
7. Compile, sort and classify, by consecutive sequential stages, the bibliographic references related to the construction process of the new basilica of S. Peter
8. Reconstruct historically the design and construction process of the new basilica of S. Peter, especially from its initial stage.

1.4. Sources

To meet the objectives indicated in this Doctoral Thesis, the following sources have been used:

- Acquisition of a large number of books and specialized magazines.
- Compilation and acquisition of more than 230 historical articles published in different specialized magazines.
- Purchase of copies of several original drawings, in order to analyze the plans in detail, avoiding the mistakes that are usually made in regular publications, when making sequential copies or photographs of the same drawing. The acquisition of the drawings has been made mainly at the *Gallerie degli Uffici*.
- Direct measurements in the new basilica of S. Peter. The measurements have been made by conventional means (tape measures and laser meters), and also by a laser total station “Leica Viva TS16”, in order to make an exact model of the measurements of what is called "central nucleus of Bramante". That is, the dimensions and exact shape of the 4 crossing piers, and the adjacent counter-piers, as well as the separation between them.
- Acquisition of the cadastral plan of the urban area of the Vatican City, in digital format at very high resolution.
- Google Earth measurements of the Vatican City, and especially of the surroundings of the basilica.
- Direct analysis of several original archival documents, during an international stay at the Bibliotheca Hertziana (Max-Planck Institut für Kunstgeschichte), in Rome.

1.5. Methodology. Difficulties in analyzing the design and construction process of the basilica of S. Peter

Identifying the design and construction process of any building is a complex task, but by analyzing it in depth, the appropriate information to achieve it can be obtained. When analyzing a certain building, a set of geometric proportions and a set of determined dimensions can be identified and, as a consequence, a set of compositional rules can be identified, which provide valuable clues to identify its design process.

The design process of any architectural object is made up of a sequence of stages, and each stage corresponds to a certain state of the problem and the solution. At each stage, a set of decisions is made to move to the next stage, in such a way that the object to be designed evolves step by step, and it is outlined, from the first decision, until it is completely defined. In a complementary way, and in order to ensure that a given architectural object is designed correctly and harmoniously, a certain set -homogeneous and well defined- of compositional rules must be applied on a recurring basis at all stages of the design process. Therefore, throughout the design process, the same set of geometric proportions, the same set of dimensions, and the same set of compositional strategies must be used. As a result, an architectural object will be obtained in which all its components are perfectly related to each other, and to the whole, through the same set of relationships, proportions and dimensions. In other words, a certain architectural object will be better designed, and it will be more attractive and harmonious, if the same set of rules are used repeatedly at all stages of the design process.

The harmonic relationship between the different architectural elements among themselves, and with the general architectural ensemble, that is, the harmonic relationships between the whole and the parts, was called "*concinnitas*" by the Renaissance architect Leon Battista Alberti [1]. Furthermore, in his architectural treatise, *De Re Aedificatoria*, described beauty in architecture as "*concinnitas*", alluding to the harmony or congruence of the various parts of an assembled building according to principles summarized in three categories: *numerus*, *finitio* and *collocation* [2].

In reality Alberti did not invent anything new with the term *concinnitas*, since in fact all the good architects in history had already been designing that way. And not only architects, but also writers and philosophers. For example, *Cicero* regarded the term *concinnitas* as the supreme quality of speech. A good speech is one in which not a single word is given more, nor less, and each and every one of the words is in its right place. And that is what Alberti declared in Book IV of his treatise that: "We judge optimal that thing that is made in such a way that it cannot be changed unless it is made worse" (IV: 277).

In general, the notion of beauty in Alberti is referred to the *concinnitas*, because beauty is a concinity (*composure?)* of all parties in relation to what they belong to and because *concinnitas* is a quality of the object that detracts when something is added to it, taken from it, or changed. The right object is the *probabilius*, the most approved of all, so that of the variations, *probatius*, of such an object, only in one is the *concinnitas* fulfilled (VI, I, 447).

Ut sit pulchritudo
quidemcerta cum rationeconcinnitas
universarumpartium in eo, cuiussint
itautaddi
autdimini
autimmutanpossit nihil,
quin improbabiliusreddatur. Alberti (VI, I, 447)

Therefore, it will be easier to identify the design process in a correctly designed building, than in a poorly designed building, and therefore it will have lower architectural quality. In a properly designed building, a set of compositional rules, geometric relationships and specific dimensions have been applied correctly and recurrently, and therefore it will be easier to discover them. On the other hand, if these compositional rules, proportions and dimensions have not been applied recurrently and properly, it will be more difficult to discover them.

The general methodology described has already been successfully applied in previous investigations, and the design process of some of the most attractive and relevant buildings in the history of architecture have been deduced [3]. In the analysis of these buildings, a set of sequential stages have been identified, from the first decision, up to when the building is completely designed. The first decision leads to the first stage, the second decision leads to the second stage, and so on. In general, each decision creates a new stage of the design process, so that the final stage coincides with the complete design of the building.

It is evident that in order to identify the set of stages, and therefore the design process followed in a given building, it must first be exhaustively analyzed. The analysis must include a multitude of aspects, such as, for example, the identification of the geometric and proportional relationships existing in the dimensions of each of the different architectural elements, the geometric and proportional relationships between various architectural elements, the geometric and proportional relationships between a certain element and the total set, etc. Certain dimensions that are important or relevant in the design of the building must also be identified, either from a symbolic or functional point of view. Finally, and most importantly, the compositional rules by which one passes from each of the design stages to the next must be identified.

Therefore, if you want to discover the design process followed in the basilica of S. Peter, the first thing to do is analyze the building in search of certain dimensions and geometric proportions, and as a result identify a set of tentative compositional rules, to find out the correct sequence of design stages, and the rules that allow you to go from one stage to the next.
However, the analysis of S. Peter's basilica is more complex than the analysis of most buildings for several reasons.

1. The basilica of S. Peter has been the result of the temporary concatenation of parts of complete projects carried out sequentially by various architects at different historical stages. Each architect carried out one or several projects, and of which only some parts were built. In the same way, the following architects carried out one or several projects respecting and integrating all or part of what was already built, but also of these new projects, only some parts were built. Thus, the process was repeated continuously until the building was completed.
2. At each stage of the design process (corresponding to different historical stages) several architects worked at the same time, collaborating and competing with each other.
2. The construction of the building took many years, so the compositional rules used initially differed significantly from the rules that were used in successive stages. In fact, even the desired objectives for the building were substantially different in every age.
3. The first designs of the new basilica of S. Peter showed a desire to respect and integrate with the old basilica which it was intended to replace. As evidenced in the *GDSU 20 A* drawing, Bramante, the first architect involved in the design process, wanted the width of the main nave and the transversal arms to correspond with the width of the central nave of the old basilica of S. Peter. In the same way, he wanted the main nave and the transverse arms to be geometrically related to each other by means of a regular octagon. This means that the genesis of the design process of the new basilica is based on some characteristics of the old basilica since it was desired, in a certain way, both were integrated. This means that to deduce the design process of the new basilica the design of the old basilica must be analyzed, and therefore its design process must also be deduced.

4. The old basilica of S. Peter does not exist, since it had started to be built in 324 and ended up being completely demolished in 1610. Therefore, its design cannot be analyzed by measuring directly

5. There is only one valid plan of the old basilica, which is also made by mixing the state that it had at the end of the 16th century, with the state that it might have had initially based on indications and conjectures. In addition, there are certain references and drawings and partial measurements in various historical sources. To make matters worse, each historical source provides a different set of measurements, and the measurements that are common to various historical sources are different from each other, and in many cases contradictory.

6. In the 40s of the last century, certain excavations were carried out to reach the foundations and the lower part of some walls and colonnades of the old basilica of S. Peter, so direct measurements were taken [4]. These measurements, although similar to those indicated in the historical sources, do not coincide with them (for reasons that will be indicated later).

With this large set of difficulties, it might seem impossible to deduce the design and construction process of both the old basilica and the new basilica. However, despite numerable obstacles, they have been overcome.

The specific difficulties related to the deduction of the design and construction process of the old and new basilica of S. Peter are set out below, and the work methodology that has been followed to resolve them and to achieve the proposed objective.

1.5.1. Difficulties in reconstructing the evolution, stage by stage, of the urban structure of the Vatican Area

The reconstruction of the evolution of the urban structure of the Vatican area (using scale plans) is extraordinarily complex. Its intention is to rebuild the urban mesh in the different representative stages of the Vatican's history by means of plans made to scale, and with the greatest possible precision.

There are hardly any plans since the 17th century, and only some have been done with precision. Previously, there were only rough drawings, and many of them are hardly conjecture, since the buildings are disproportionately and unrealistically represented. As we go into the past, the drawings are increasingly crude, schematic and disproportionate.

The task seems impossible to accomplish. However, taking as reference the historical buildings that still survive, and based on the existing historical references, it is possible to reconstruct with some precision, the structure of the urban mesh of the Vatican area, from its origins to the present day.

The resulting scale plans are of great importance for the History of Art, and can be very useful in several aspects, and they allow a better understanding of the history of the Vatican area, and especially its social, artistic, architectural and urban development. These plans also allow contextualizing isolated events in the history of art in the Vatican area and its immediate surroundings.They allow the visualization of the urban mesh of the surroundings of the Vatican area in each of its historical stages, provide a suitable context for the analysis of the historical evolution of the most important buildings in the Vatican area, such as the old Constantinian basilica, the new basilica of S. Peter, the Mausoleum of the Severan dynasty, the Mausoleum of Honorius, the Circus of Nero, and many others.

Of course, the reconstructed plans are not intended to be definitive, but rather a graphic environment that can be improved upon with future research by scholars of any building in the Vatican area. Based on new research, these plans can be enriched, and they can be modified, providing increasingly accurate and detailed information on the state of the urban structure of the Vatican area, in the different stages of its historical evolution.

1.5.2. Difficulties in identifying the design process of the old basilica of S. Peter

The old basilica of S. Peter probably began to be built in the year 324 (founding platform) by Constantine, in the time of Pope Sylvester I (314-335). It began to be demolished in 1505 and was demolished in 1610. Therefore, the building does not currently exist, and measurements cannot be directly made in order to analyze it properly as previously described. Fortunately, a drawing by Alfarano has been preserved, made in 1571 when the western part of the old basilica had already been demolished. In addition, several perspective drawings are available, and several texts describing some aspects and measurements of the building, although the dimensions provided by the historical sources often differ from each other, and in some cases are even contradictory.

To identify the design process of the old basilica of S. Peter with so little information available, a complex and slow strategy has been designed based on the repeated proposal of tentative hypotheses of the design process.

This strategy consists first in listing all the dimensions available in the different historical sources of different architectural elements of the old basilica. Remember that the measurements included in the historical documents could have been inaccurately and partially taken, or that there could even have been significant discrepancies between the project and the final execution of the building. The list of measurements must be made without initially rejecting any measurement, even though the dimensions for the same architectural element may be very different from each other.

Second, certain sequential compositional strategies of the design process should be roughly outlined. Different options should be identified to start the design process, and different alternatives for each specific stage of the design process.

Finally, all possible design strategies should be checked until one is found that differs as little as possible from the total set of measurements available in the historical references. Each tentative design strategy has a different way of generating the dimensions of the different architectural elements, so each time a certain architectural element is defined it must be compared with the available historical measurements. If the dimensions are similar, the design process continues, but if the dimensions of the generated architectural elements differ from the historical measurements, the tentative design strategy should be rejected, and another should be followed. In this way, different tentative design strategies are executed sequentially, until one is found in which the dimensions of the generated architectural elements coincide with the dimensions available in historical references. Logically, not all the dimensions generated will coincide with the dimensions of the historical references (since they differ from each other in the different historical texts). Therefore it is necessary to make estimates and determine which historical dimensions are viable (because they are compatible with the different design strategies), and which dimensions are not viable (because they cannot be generated geometrically through any design process). In this case these dimensions can be rejected, and other alternative measurements from other historical texts must be considered. Similarly, each historical reference has differences in credibility, since, for example, a writer's measurements cannot bear the same weight as an architect's.

1.5.3. Difficulties in reconstructing the construction process of the old basilica of S. Peter

The main difficulty in identifying the construction process of the old basilica of S. Peter is the lack of historical references, and the reliability of early historical references (such as the first papal biographies of the *Liber Pontificalis*).

However, archaeological findings based on excavations done in the 1940s can complement the historical information. In addition, the knowledge of the construction details, the construction solutions and the materials used implies a certain foreseeable chronological order, as well as certain logical deadlines in the construction process. This architectural and constructive knowledge allows complementing archaeological evidence and historical information, and thus the construction process of the old basilica can be determined with considerable certainty from the beginning to the end of its construction.

Using the same strategy, it is possible to reliably determine the evolution of the old basilica's appearance from completion up to the point it was demolished, done to make way for the construction of the new basilica.

1.5.4. Difficulties in identifying the design process of the new basilica of S. Peter

In most buildings, and as in the case of the old basilica of S. Peter, the design process of a building precedes the construction process, and in any case, it takes place at different stages. However, the same has not happened in the case of the new basilica of S. Peter.

Visitors of the new basilica may have the feeling that all its spaces were designed at the same time and by the same architect, since apparently no substantial differences are observed in the architectural style or structure of the spaces. Many buildings whose construction has been prolonged seem like an incongruent concatenation of spaces made at different times and in different styles. On the other hand, and although the construction of the new basilica of S. Peter also lasted a long period of time, the building seems to have been designed once and built continuously. However, that was not the case.

Visitors of the new basilica of S. Peter walks through its spaces from west to east, but the history of its design and construction has been reversed, that is, it has passed from east to west. Its design and construction process were very tortuous and were plagued by all kinds of vicissitudes, and in total lasted about 200 years, from its beginning, in the time of Pope Nicholas V (1447-1455), to its end, in the time of the Pope Alexander VII (1655-1667).

For this reason, when narrating the history of the building, it may seem sound to adopt a logic of development from west to east. However, this would be a mistake, for three main reasons.

1. The first reason has to do with the fact that the construction process has resulted in a building that hides its genesis. From the beginning, in the days of Nicholas V, only a reform was desired that implied the temporal continuity, although transformed, of the old basilica. Notwithstanding, it mutated at the time of Julius II (1503-1513), and the idea of building a new building emerged. However, it was never clear to all those involved if a reform of the existing basilica was being carried out, or if a new basilica was being built, since the construction proceeded slowly from west to east, as parts of the old basilica were being demolished. Therefore, both basilicas (the old one and the new one) were linked throughout the construction process, and as the new one appeared, the old one disappeared. At the beginning of construction, in the time of Julius II, the new basilica was meant to testify to the primacy of the Bishop of Rome, constituting a *Templum Petri*. And this fact acquired more evidence as the work progressed, and even the counter-reform ideologues went so far as to deny any essential difference between the old and the new building, since although the *struttura* of the basilica was changing, it was not changing its essence [5]. Therefore, each new project aimed at the construction of a new basilica in its entirety, and the conceptions of the building did not proceed from each other, but overlapped and diluted each other, until they even reached to the physical destruction of certain parts already built [6]. Throughout the ages it has been known that only a homogeneous architecture could highlight the power of the Church of Rome, centered on the figure of the pope. Therefore, the chronology of the construction of S. Peter cannot be illustrated based on the evolution of the form, such as the growth of the trunk of a tree with its annual rings. The description remains linked to the narration, and vice versa. In other words, the design and construction process were continuously intertwined, and it is very difficult to be able to completely differentiate between them.

2. The second reason has to do with the long duration of the construction process. While the huge building was advancing very slowly (in the 16th century it was on average 1.4 m. per year), new popes and new architects had to replace those who already perished, and each had their own ideas, which simultaneously competed and collaborated at every moment. Consequently, an *eccedenza d'idee* was generated, which in some cases generated a huge gap between the design process and the construction process, and in a certain way generated a *virtuale* architecture by S. Peter, compared to the which material building appears as a weak image, containing only a fraction of the architecture that its designers had in mind. At certain stages of the process (for example, while Antonio da Sangallo was working on his latest wood model), the link between the design process and the construction project appears to have been completely disrupted. In addition, the already completed parts of the building put limits on the design process, since supposedly each project should respect and integrate what was built. However, this was not always the case. From the beginning of the design and construction process, Bramante started a double game, building at the same time the robust genesis of its project, "the central nucleus of Bramante", and its greatest obstacle: the apse of Julius II. Many later architects created a multitude of projects trying to integrate the apse of Julius II into them, so the result was not particularly attractive. Undoubtedly, the solution was to knock it down, as it was done years later. The same happened with Fra Giocondo niche, and with the southern ambulatory of Raffaello and Antonio da Sangallo, or with the construction of the first longitudinal body of Maderno.

Initially, the new architects, urged by the popes, tried to respect everything that was already built, but when analyzing their proposals, they realized how unattractive they were, so the solution was to demolish part of what was already built. That is, although in every era great effort was made to integrate what was previously built (based on projects by previous architects and previous ideas), the new projects (based on new ideas by new architects and new popes) were not adequate and there was no other choice but to demolish part of what was already built. In fact this was continuously the case, each stage of construction was followed by a stage of partial demolition, in order to continue construction based on a new project.

3. The third reason has to do with the enormous variations in the balance of decision-making powers over the work. Usually, there is a tendency to describe historical events from a general development perspective, and they narrate the facts in a simplified way. However, moments of unanimity between the actors involved in the construction of the

new basilica of S. Peter are very rare, and on the contrary, the general rule was antagonisms, or even conflicts, whose traces are found throughout its history.

On the one hand there were the popes, some very politically active, and endowed with great determination, and who indicated the direction to follow, such as Nicholas V, Julius II, Paul II, Sixtus V, Paul V, Urban VIII, or Alexander VIII. But also, in the *pontificati intermedi*, events of great importance for the future of construction occurred (for example, after the papacy of Julius II, a compromise was reached between innovators and conservatives, between desire and reality; or after the papacy of Paul III, the return to the ecclesiastical tradition and the cult of memory was agreed).

On the other hand, there were the architects who, during some pontificates, came to the fore, and in some cases, claimed command, as happened with Bramante, Michelangelo and Bernini, who led the construction under the power of their own arts. On the other hand, other architects had less character, and proceeded in a more or less creative way, under the directives of the papacy, such as Antonio da Sangallo or Maderno (Maderno was very flexible and not a fighter, but he had enormous talent and enormous capacity for work).

However, both popes and architects were involved in a company whose spatial and temporal magnitude went beyond their personal capabilities, even beyond the economic resources at their disposal. It was ultimately an impossible battle to win, and of which even the founding pope, Julius II, had realized in his last years of his life [7]. In fact, in the sixteenth century none of the protagonists of this story was destined to achieve the goal. Only in the 17th century were the means found to carry out the building according to its concept. Perhaps it is no coincidence that this coincided with the time when a great architect and a great pontiff (Bernini and Alexander VIII) were able to constructively collaborate.

The design process of the new basilica was formed by the sequential and additive concatenation of various projects carried out by various architects, making it a "process of design process". The first designs were made by Bramante, who also hurried to make the works progress as quickly as possible. He also began to build from the inside out, consolidating what I personally call "the central nucleus of Bramante" so his successors had no choice but to respect it, and thus safeguard the essence of his project. And indeed, it happened.

Therefore, the study of Bramante design process is of special importance for the identification of the design process of the new basilica of S. Peter. But the identification of Bramante's design process, in addition to being the initial and essential part, is the most complex, both due to the absence of historical references and the characteristics of its own project methodology [8].

Bramante used a pyramid design methodology, during his stay in Milano and later in Rome. At first he only determined the location and general characteristics of the architectural elements, and later he would define them throughout the process, thus allowing him to gradually make substantial variations on them, and only in the details, but also in some parts of the floor plan. As if that were not enough, not only did he make changes before the works began, but he also made them throughout the execution of the works.

As he did in several of his buildings such as Belvedere, the Palazzo dei Tribunali, or the fortress of Civitavecchia, in Loreto, Bramante projected the entire building roughly, but geometrically defined its different components precisely.

Some parts of this project are susceptible even to considerable changes throughout the design process, not only from program reviews but also from new ideas that he himself may be generating (since, as Vasari says, Bramante is: "*risoluto, presto e bonissimo inventore*").

Bramante's design process before and after the start of the works was very tormented due undoubtedly to the discrepancies between his ideas and the requirements of Pope Julius II [9]. Based on the analysis of the drawings attributed to him, Bramante wanted to make a great building, in which all the architectural components were closely related to each other, forming a hierarchy of intertwined spaces. This objective was clearly utopian since the building had to consider on the one hand the requirements of Pope Julius II, and on the other hand seamlessly integrate with the old basilica all while taking into account a complex built environment. Therefore, once his first ideas were rejected by the pope, Bramante focused on achieving a new typology by integrating a quincunx typology with a typology of naves. In this way the building was reborn from the essence of the old basilica, retaining its own integrity and architectural purity while still extending longitudinally to the square. However, the biggest problem, unsolvable I would say, was the fact that the Pope wanted the foundations of Nicholas V to be used to house his own tomb. Clearly, this requirement was incompatible with Bramante's ideas, thus a stormy and ambiguous design process began. Of course, as he makes changes, new problems of all kinds arise, which Bramante tries to resolve by making new changes, and so on. In fact, the known projects of Bramante *GDSU 3*

A; GDSU 1 A; JSM codex Coner, f. 18; GDSU 7945 and GDSU 20 A do not correspond to what had started to be built, as represented in the famous *JSM drawing, codex Coner, F. 24v, ed. Ashby, n. 31*. This drawing shows the state of the works between the years 1515 and 1516, although Metternich and Frommel correctly point out that it also shows parts of the construction planned, but not yet built in 1515 [10].

Bramante did not completely define any project, nor did it define any project as definitive. However, it is obvious that he had to project its "central nucleus" in detail, as he began to build it immediately, and today it remains in the central part of the new basilica. This “central nucleus” was generated geometrically from the heart of the old basilica, and made possible both a centralized quincunx typology, as well as a longitudinal typology of naves.

After Bramante's death, and once the "central nucleus of Bramante" had been built, their successors had no choice but to adopt the same methodology. No project carried out was definitive, since all were, to paraphrase Arnaldo Bruschi, "*ipotesi di progetto*" [11]. Both the drafts, preparatory projects, discarded projects, definitive projects, delayed projects, approved projects, *ufficiali* projects made in parchment ... all are only "*ipotesi di progetto*". These hypotheses should be presented as possible solutions of maximum use for the execution, capable of being developed and deepened with the clarification of the details, but which could also be reviewed or discarded later. Furthermore, as is well known, it would not even be enough for Antonio da Sangallo, at the time of Paul III (1534-1549), to implement a grandiose and very expensive model and to advance considerably in construction to prevent Michelangelo from proposing a very different solution, and to initiate a process of enormously expensive and long-lasting demolition.

This singular way of working may have begun, at the will of Julius II, already in the period of intense planning activity that precedes the laying of the first stone, with the competence of Giuliano da Sangallo and Bramante and with the initial consultation of Fra Giocondo [12].

As a consequence of the above to deduce the design process of the *new S. Peter basilica*, all the projects of all the architects involved in the different stages throughout its construction must be compiled. Each project is valid as it provides valuable information. It is true that some projects were written to be executive, other projects were simply tentative proposals that showed a certain idea or a way forward, while others were farfetched, since they were enormously large (outside the real economic possibilities and outside manageable deadlines), or were based on personal ideas without taking into account the real built environment, or the plans did not respect what was already built, or were simply theoretical treatises made as a result of what was learned, and which had little to do with real projects or with a commission. In any case, all the available projects must be analyzed, and based on the concatenation of their individual contributions, a plot line can be elaborated capable of chronologically integrating the different projects with each other, and capable of relating them in one way or another with the progress of the works. In addition, it is essential to geometrically identify the "central nucleus of Bramante" in order to understand the rest of the projects and establish a sequential narrative thread to define what has been called the "process of design process". There is not a single historical reference to the existence of the project for this "central nucleus of Bramante", but it undoubtedly must have existed since this nucleus was built, and therefore direct measurements can be made and reconstructed.

Once the "central nucleus of Bramante" has been identified and rebuilt, the projects carried out by *Bramante*'s successors can be understood, since they all respected it and integrated it into their proposals. And in this way the complex design process followed in the *new basilica of S. Peter* can be deduced.

1.5.5. Difficulties in reconstructing the construction process of the new basilica of S. Peter

The deduction of the construction process has the same difficulties already mentioned with respect to the design process since, as has been said, both were intertwined in time, with the additional difficulties indicated. Contrary to what happened with the old basilica, there are a large number of historical references documenting the different stages of the construction process, and there is only one large gap, corresponding to the most complex period, and at the same time the most attractive, which runs from the year 1504 (two years before the start of construction) until the year 1520. Precisely for this reason much more work has been dedicated to this crucial period, and especially to the period in which *Bramante* incubated his fabulous project, between the year 1504 and the start of construction in 1506.

The new basilica of S. Peter is a global reference for humanity in many ways, and its construction began thanks to the joint dream of two outstanding personalities, Pope Julius II (1503-1513) and Bramante. As Jacok Bruckhardt summarizes in a sublime way: "*Giulio trovó nella riedificazione di San Pietro il grandioso simbolo visible del proprio orientamento; l'impostazione voluta da Bramante è forse la massima espressione che si conosca di un potere accentrato*" [13].

The construction of the new basilica of S. Peter was full of all kinds of problems and vicissitudes, but the end result was great. Perhaps this is why many historians and researchers have been interested in reconstructing the construction process of the new Basilica of S. Peter.

Perhaps the first source that tries to give an idea of the chronology of the construction of the new Basilica is the book by Filippo Buonanni, *Numismata Summorum Pontificium Templi Vaticani Fabricam indicata, Chronologica ejusdem Fabricae narratione, ac multiplici eruditione explicate*, first published in Rome 1696 [14]. In this book an account is made of the papal medals related to the new basilica of S. Peter, complemented by different historical reviews and exhaustively documented. Thanks to this book, for example, Johann Wolfgang Goethe was able to get a very exact idea of the history of the new basilica and published it in 1786 in his work *Sämtliche Werke nach Epochen seines Schaffens. Münchener Ausgabe* [15].

Years later, researchers like Paul-Marie Letarouilly or Heinrich Geymüller did a fabulous job collecting, analyzing and classifying the enormous number of drawings from the *Uffici Gallery* in Florence. Letarouilly had to work in the *Uffici* before Geymüller although her work was published a little later. Geymüller published his work *Die ursprünglichen Entwürfe für Sanct Peter in Rom* in 1875 [16], while Letarouilly's work, *Le Vatican et la Basilique de Saint-Pierre de Rome*, began to be sold in 1878 edited by Alphonse Simil (architect assigned to the *Commission of Historical Monuments*) [17]. Geymüller had an important follower and collaborator in his time, Constantin Jovanotis, who remained in his shadow at all times, but published several works such as *Forschungenüber den Bau der Peterskirchezu Rom* [18], and *Zu den streitfragen in der Baugeschichte der Peterskirchezu Rom* [19]. Letatouilly's work continued to be investigated at all times although it caught the attention of the historian *Hubert*, who published *Bramantes St. Peter-Entwürfe und die Stellung des Apostelgrabes*, in 1988 [20].

In the 60s and 70s of the last century, historians Franz Wolf Metternich and Christoph Luitpold Frommel, among others, stood out. In fact, Frommel considering all the data previously collected and in order to illuminate Raffaello's intervention, proposed a great analytical reconstruction of the design activity carried out until 1520, the year of Raffaello's death [21].

Their keen observations provide an overview that can appear almost complete and exhaustive. But in reality, Frommel's proposal constitutes a more fundamental approach for the reconstruction of the tormented process of design and construction of the basilica between the years 1505 and 1520. It should not be forgotten, however, that the conceptual reconstruction of the different projects is based on scant historical data, and on a series of inductions and hypotheses from graphics and fragmentary texts that are sometimes apparently contradictory, and often imprecise or generic, and therefore susceptible to doubtful interpretations, and in many cases equivocal.

Metternich correctly observed that the most obvious gap in the graphical data runs from the studies of the drawing *GDSU 1 A* to the *JSM drawing, codex Coner, F. 24v, ed. Ashby, n. 31,* which records at least in part what had been built until the year 1515-1516 [22].

In the 80s and 90s researchers such as Franz Wolf Metternich, Christoph Luitpold Frommel, Arnaldo Bruschi, Christof Thoenes and some others, continued the conceptual and historical reconstruction of the design and construction of S. Peter in Vatican [23]. These researchers continued with the data collection process, which was still scarce and fragmentary, and with the process of creating a historical account that would attempt to coherently group these fragments.

To complement these fabulous works and enrich the identification of the construction process, answering many questions that still exist, all the projects carried out by all the architects involved in the construction process of the new basilica of S. Peter have been analyzed. Both the projects destined to be executed have been analyzed, as well as the projects that simply express an idea and that were destined to seduce clients, such as work projects, work sketches, specific problem-solving sketches, etc. analyzed all available graphic historical documents.

I have had a special dedication to the period between the years 1504 and 1520, and especially to the analysis of the first sketches by Bramante, Giuliano da Sangallo and Fra Giocondo, in order to adequately reconstruct the initial design process, and as a consequence have a correct idea of the first intentions and in this way am able to adequately reconstruct the construction process of the new basilica, especially in its first stage.

Evidently the paper has a gigantic scope, and in this Thesis, for reasons of limitation of the maximum admissible information, only a small part of the work carried out is shown.

1.6. Justification of the Doctoral Thesis structure

To meet the objectives set, the Thesis has been structured in three main parts.

a. Urban structure

Chapter 2. Reconstruction in stages of the urban structure of the Vatican area, from its origin to the present day

The first part identifies the evolution of the urban structure of the Vatican area in 28 stages, corresponding to significant historical dates. The reconstructed Vatican area integrates the entire current Vatican City, and part of the urban mesh of Rome around it.

Each stage is defined by means of scale plans (in meters and *palmi*) taken with the greatest possible detail. In the present Thesis they have been printed to occupy the dimension of a DIN A-4 sheet, although they can be reproduced on a larger and different scale, so that all the details can be appreciated. The graphics have been made for easy reading printed in a DIN A-3, or DIN A-2 size.

At each stage, the most relevant historical events that occurred in it are discussed, as well as the consequences they had on the urban structure of the Vatican area. All kinds of historical drawings and plans are provided, as well as the most important bibliographic references considered.

b. Old basilica

In the second part of the Doctoral Thesis, the old basilica of S. Peter is studied, based on four fundamental parts:

Chapter 3. Historical analysis of the design and construction process of the old basilica of S. Peter

In this chapter, a sequential reconstruction of the most relevant historical events regarding the process of design and construction of the old basilica is carried out, compiling and ordering all possible references from different bibliographic sources. In addition, and in order to be able to conveniently reconstruct its design, the functionality of the building throughout the Middle Ages is analyzed, as well as its relationship with its surroundings.

Chapter 4. Reconstruction in stages of the design process of the old basilica of S. Peter

In this chapter a sequential reconstruction of the design process carried out in the realization of the architectural project of the old basilica is done.

In order to properly reconstruct the design process, all possible information regarding the dimensions of the different architectural elements of the old basilica must be previously collected, based on the available bibliographic references. A compilation of the different available historical graphic references should also be made, to serve as a guide while reconstructing the design process.

The different stages of the design process will be made to scale, drawn with precision and bounded in the same units of measure standard in the Vatican area, and in which the project was initially realized (*roman feet*). Later converted to the standard units in the Vatican area during the Middle Ages and the Renaissance (*palmi "di architetti").*

In the first place, the design process in floor plan layout will be reconstructed, and secondly the design process in section. The design process of a building in Ancient Rome was basically done in floor plan layout, and then an elevation was made. Hardly any additional plans were made, due to various factors including the scarcity of paper or papyrus. Therefore, the floor plan layout and

section design process has been rebuilt, since they were probably the only plans that were made. In any case with these plans the project is sufficiently defined.
As a result, the plan and the main section of the old basilica will be completely and precisely defined, so it can be reconstructed as it might have looked just when it was finished.
To demonstrate the validity and veracity of the reconstructed design process, the dimensions of the different architectural elements built are compared with the dimensions specified in the different previously collected historical graphic documents, and it is evidenced that they basically coincide in their entirety.

Chapter 5. Graphic reconstruction of the most significant stages of the construction process and evolution of the old basilica of S. Peter (324-1503)
This chapter is divided into two main parts.
In the first part, a graphic and descriptive reconstruction of the construction process of the old basilica is carried out, from the beginning of the works, until it was completely built (as can be seen in Alfarano drawing).
In the second part, a graphic and descriptive reconstruction of the architectural evolution of the old basilica is carried out, from the completion of its construction until just before it was demolished, to make way for the construction of the new basilica.
The construction process will be carried out by drawing on the plan the state of the works in each of the most significant stages of the same. In the same way, the evolution of the state of the basilica over time will be carried out by drawing the appearance of the basilica in plan in each of the most significant stages of its history. The drawings have been made to scale and in full detail, showing not only the evolution of the basilica, but also the evolution of the buildings in its immediate surroundings. For the reconstruction of these buildings, a compilation and classification of the historical documents available in each era will be made again.
At the end of the process, the appearance of the old basilica in 1505 is obtained, drawn in plan and in full detail, together with the buildings in its nearby surroundings.

Chapter 6. Graphic reconstruction of the appearance of the old basilica of S. Peter, in the years 514, 1003 and 1505

Once the floor plan layout of the old basilica has been rebuilt in various stages of its history while considering the reconstructed section in chapter 4, it is possible to reconstruct in some detail what the old basilica might have looked like at different stages of its history.

In this chapter the complete appearance of the basilica is built in three fundamental stages of its existence: when its construction finished (year 514), in the middle of its existence (year 1003), and shortly before it began to be demolished (year 1505).

The reconstruction of the appearance of the old basilica in each of these stages will be carried out using the following plans: Floor plan layout, Cross section, Longitudinal section, South facade, East facade, East facade to the Atrium, West facade and virtual perspective images. All the plans will be drawn to scale, with the greatest possible detail, and with the most important dimensions in *roman feet* and in *palmi*. In a complementary way, the most important construction aspects shown in each plan will be justified based on the different historical references previously collected.

c. New basilica

In the third part of the Doctoral Thesis, the new basilica of S. Peter is studied, based on three fundamental parts:

Chapter 7. Historical analysis of the design and construction process of the new basilica of S. Peter

In this chapter, a historical reconstruction of the design and construction process is carried out, based on all the historical references collected. The design and construction process of the new basilica of St. Peter was extremely complex, and there are still many questions, especially in its first stage, from 1506 to 1520.

For this reason, in the first place, an exhaustive compilation of all available historical references has been made, and a first analysis of them has been carried out. Based on this analysis, a detailed classification has been made, showing the most significant stages of the design and construction process of the new basilica. Finally, an exhaustive literary story has been made, sequentially describing in detail the design and construction process of the new basilica of S. Peter, according to all available historical references.

This detailed literary story allows us to adequately understand the complex framework of the design and construction process of the new basilica, considering not only the available historical references, but also the partial conclusions of the analysis of the projects of the architects involved. Therefore, the literary story in this chapter should be completed with the analysis of all the projects carried out in chapter 8, as well as in the reconstruction of the construction process carried out in chapter 9.

Chapter 8. Reconstruction in stages of the design process of the new basilica of S. Peter

This chapter reconstructs the design process for the new basilica of St. Peter. The design process was extremely complex and convoluted, and it is difficult to provide a sequential story so that it can be understood.

In general, the design process was carried out based on a group of architects who collaborated and competed, developing a huge number of proposals, which were mostly rejected by the promoter popes.

The different architects involved in the design process made a huge number of proposals. Most of the proposals were rejected, but even if they were accepted, in the best of cases, they were only partially built. As the design and construction process dragged on in time, the approved projects were systematically questioned by the following responsible popes and/or architects. In many cases, part of the previously built was demolished. Therefore, the design process for the new basilica is based on an enormous sequence of projects, but only some of them were partially built.

Therefore, to identify the design process of the new basilica, two complementary actions have been carried out.

1. On the one hand, all the projects of all the architects involved in the design process have been analyzed. Based on this analysis, the design process of all these projects has been reconstructed. The task has been very arduous and extensive, and due to space restrictions, the present doctoral thesis has only incorporated the reconstruction of the design process of the most important

projects in the design process of the new basilica of S. Peter. The sequence of these projects allows us to understand the evolution and transformation of architectural ideas that gave rise to the different executive projects.

2. On the other hand, the projects that in some of its parts were built have been analyzed. The sequence of these executive projects makes it possible to understand the executive design process of the new basilica. As a result of this analysis, this chapter reconstructs the stages of the design process of each project of chain of executive projects, directly involved in the design process of the new basilica of S. Peter.

Chapter 9. Graphic reconstruction, description and justification, of the most significant stages of the construction process of the new basilica of S. Peter

This chapter reconstructs the construction process in stages of the new basilica of St. Peter. The construction process will be carried out by drawing on the plan layouts the state of the works in each of its most significant stages. The floor plans layouts corresponding to the state of the works in each specific stage are drawn to scale, with all precision, and bounded in *palmi*. In each floor plan layout, not only the state of the works of the new basilica is shown, but also the state of the demolition of the old basilica, as well as the most important changes that have occurred in the buildings in its immediate surroundings.

The different floor plans layouts have been made considering the reconstruction of all the projects involved in the design process (and of which some part was built), as well as all the available historical references, shown in chapter 7.

As a result, a precise historical account (narrative and graphical) of the evolution of the construction process of the new basilica has been achieved, from the beginning of the construction process up to its completion.

Notes

[1] *Leonbattista Alberti, L'architettura* (*De re aedificatoria*), ed. e trad. di G. Orlandi, introduzione e note di P. Portoghesi, 2 vol. (Milano: Il Polifilo, 1966)

[2] One of the best references to illustrate the indicated concepts can be seen in: Robert W. Tavernor, *Concinnitas in the architectural theory and practice of Leon Battista Alberti.* PhD Thesis (Cambridge: University of Cambridge, 1985)

[3] This strategy has been widely used successfully, and documented in: Luis De Garrido, *Applications of Artificial Intelligence in the composition of architectural objects*. PhD. Thesis (Valencia: Universidad Politécnica de Valencia, 1989); Luis De Garrido, *Geometric relationships, dimensional deduction and sequential stages of the design process followed by Apollodorus of Damascus in the project of the Pantheon of Rome*. 2020. Submitted and under review.**;** Luis De Garrido, *Identification of the design process and the compositional mesh of the 'Vitruvian man', by Leonardo da Vinci. Applications for architectural design*. 2020. Submitted and under review; Luis De Garrido, *Reconstruction of the stages of the design process and architectural definition of the project of the old basilica of Saint Peter in Vatican*. 2020. Submitted and under review.

[4] There are several references to the excavations carried out under the current *new basilica of S. Peter*. Many of these references include certain measurements made of some architectural elements of the *old basilica of S. Peter*, especially the separation between the bases of the columns of the five naves, and their separation with the side perimeter walls: Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, Prefazione di Mons, L. Kaas (eds.), Appendice numismática di C. Serafini, 2 vols. (Città del Vaticano: Tipografia Poliglotta Vaticana, 1951); Richard Krautheimer, Spencer Corbett, Alfred K. Frazer, and Wolfgang Frankl (eds.), *Corpus Basilicarum Christianarum Romae. The Early Christian Basilicas of Rome* (IV-IX cent.), 5 vols. (Vatican City, 1937-77); Alberto Carlo Carpiceci and Richard Krautheimer, 'Nuovi dati sull'antica basilica di S. Pietro in Vaticano', in *Bollettino d'Arte* 93-4, (1995), 1-70, 95; (1996), 1-84; Jocelyn Mary Catherine Toynbee, and John Brian Ward-Perkins, *The Shrine of Saint Peter and the Vatican Excavations* (London: Pantheon Books,, 1956); Engelbert Kirschbaum, *The Tombs of Saint Peter and Saint* Paul, John Murray S. J. (Translator), CBCR, V., 165-279, (London: St. Martin's Press, 1959); Jonathan M. Hall, 'The Bones of Sant Peter', in *Artifact and Artifice. Classical Archeology and the*

Ancient Historian (Chicago and London: The University of Chicago Press, 2014), 187-206; Pietro Zander, *La Necropoli di San Pietro. Arte e Fede nei sotterranei della Basilica Vaticana* (Fabbrica di San Pietro in Vaticano: Elio de Rosa Editore, 2014)

[5] Christof Thoenes, 'Il nuovo S. Pietro', in Hugo Brandenburg, Antonella Ballardini, and Christof Thoenes, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), p. 165

[6] See Horst Bredekamp, *St. Peter in Rom und das Prinzip der produktiven Zerstörung* (Berlin: Einaudi, 2000)

[7] Christoph Luitpold Frommel, 'Die Peterskirche unter papst Julius II, Im Licht neuer Dokumente', in *Römisches Jarbuch fÜr Kunstgeschichte*, XVI (1976), pp. 82, 109

[8] Arnaldo Bruschi, 'Problemi del San Pietro bramantesco', in Arnaldo Bruschi, Christoph Luitpold Frommel, Franz Graf Wolff Metternich, Christof Thoenes (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.) (Milano: Electa, 1996), p. 119

[9] Arnaldo Bruschi, *Problemi del San Pietro bramantesco*, 120

[10] Christoph Luitpold. Frommel, 'San Pietro, Storia della sua construzione', in C.L. Frommel, L. Christph, S. Ray, M. Tafuri, *Raffaello architetto* (Milano, 1984), p. 264

[11] Arnaldo Bruschi, 'Le idée del Peruzzi per il nuovo San Pietro', in Arnaldo Bruschi, Christoph Luitpold Frommel, Franz Graf Wolff Metternich, Christof Thoenes (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.) (Milano: Electa, 1996), p. 201

[12] Franz G. Wolff Metternich, and Christof Thoenes, *Die frühen St. Peter-Entwürfe*, 1505-1514 (Tübingen, 1987)

[13] Christof Thoenes, 'Nuovi rilievi sui disegni bramanteschi', in Arnaldo Bruschi, Christoph Luitpold Frommel, Franz Graf Wolff Metternich, Christof Thoenes (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.) (Milano: Electa, 1996), p. 294

[14] There are several editions of Buonanni's work, such as: Filippo Buonanni, "*Numismata Summorum Pontificum Templi Vaticani Fabricam Indicantia*", Chronologica ejusdem Fabricae narratione, ac multiplici eruditione explicata. Opus secundò impressum cum correctione, & aditamento (Roma: Ed. Imp. Domenico Antonio Herculi, 1696); Filippo Buonanni, Numismata Pontificum Romanorum, 2 voll. (Roma: Ercoli, 1699 and 1706); Filippo Buonanni, "Numismata summorum pontificum temple vaticani fabricam indicantia", Chronologica eiusdem Fabricae narratione, ac multiplici

eruditione explicate. Opus tertio impressum cum correctione & aditamento (Rome: Ex tipographia Georgi Plachi, 1715)

[15] Johann Wolfgang Goethe, 'Sämtliche Werke nach Epochen seines Schaffens. Münchener Ausgabe', Herausgegeben von Karl Richter in Zusammenarbeit mit Herbert G. Göpfert, Norbert Müller und Gerhard Sauder, Edith Zehm // Band 2.2 Erstes Weimarer Jahrzehnt 1775 - 1786 2 / Band 9 Epoche der Wahlverwandtschaften 1807 - 1814 / Band 10 Zur Farbenlehre / Band 15 Italienische Reise / Band 16 Aus meinem Leben. Dichtung und Wahrheit / Band 18.2 Letzte Jahre 1827 - 1832 // 6 Bände (München: Carl Hanser Verlag, 1985)

[16] Heinrich von Geymüller, *Les projects primitives pour la basilique de Saint-Pierre de Rome. Die ursprünglichen Entwürfe für Sanct Peter in Rom* (Wien-Paris, 1875-1880)

[17] Paul-Marie Letarouilly, *Le Vatican et la Basilique de Saint-Pierre de Rome* (Paris: VTE A. Morel et CIE Éditeurs, 1882); Paul-Marie Letarouilly, Le Vatican, preface by A. E. Ricardson (London: Alec Tiranti, 1953-1963); Paul-Marie Letarouilly, *Il Vaticano e La Basilica Di San Pietro,* Di Luggo Aversa Antonella (ed.) (Novara: De Agostini, 1999)

[18] Constantin A. Jovanotis, *Forschungen über den Bau der Peterskirche zu Rom* (Wien, 1877)

[19] Constantin A. Jovanotis, *Zu den streitfragen in der Baugeschichte der Peterskirche zu Rom* (Wien, 1878)

[20] Hans Hubert, Bramantes St. Peter-Entwürfe und die Stellung des Apostelgrabes, in *Zeitschrift für Kunstgeschichte*, 51 (Berlin, 1988), pp. 195-211

[21] Christoph Luitpold Frommel, *San Pietro, Storia della sua construzione*, 241-310

[22] Franz G. Wolff Metternich, *Die Erbauung der Peterskirche zu Rom im 16. Jahrhundert I* (Wien-München, 1972), p. 13

[23] There is an innumerable amount of work by these researchers, but to get a general idea of their research and especially during the less known period on the design and construction process of the new basilica, between the years 1505 and 1520, the best reference is: Arnaldo Bruschi, Christoph Luitpold Frommel, Franz Graf Wolff Metternich, Christof Thoenes (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.) (Milano: Electa, 1996), To have a general idea about the design and construction of the new basilica without a doubt the most complete reference is: Hugo Brandenburg; Antonella Ballardini; and Christof Thoenes, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015)

CHAPTER 2

"Jesus himself, and most of the message of the Gospels, is a message of service to the poor, a critique of the rich and powerful, and a pacifist doctrine. And it stayed that way, that's how Christianity was ... until Constantine"

Noam Chomsk

Chapter 2. Reconstruction in stages of the urban structure of the Vatican area, from its origin to the present day.

2.1. Objectives

This chapter reconstructs the evolution of the urban structure of the Vatican area at different dates throughout history, from the time there are historical references to the present day.

In the first place, the most characteristic dates of the evolution of the urban structure of the Vatican area have been identified, coinciding with some of the most important events that took place in it throughout its history.

The situation of the urban structure in each of the chosen historical stages is represented graphically, making scale plans (with measurements in meters and palmi) with all possible precision, detailing the state of the different constructions, public spaces, gardens, roads and fields, and describing the most important changes that have occurred from the previous stage.

The most important and representative buildings are represented on the ground floor, showing the distribution of their spaces in detail. On the other hand, the rest of the buildings will be represented only as a plot, with the sole purpose of delimiting the built part from the non-built part.

In a complementary way, for each stage a compilation of the most important historical events related to the Vatican area has been made, making special reference to the construction and demolition of the most important buildings, walls, roads, paths, and in general, to the most important changes that may have occurred in the urban structure.

2.2. Identification of the most relevant historical dates in the evolution of the urban structure of the Vatican area

The dates have been chosen for their relationship with the most relevant historical events that have occurred throughout history and that, in one way or another, have been able to influence the evolution of the urban structure of the Vatican area.

At least one date per century has been chosen, although the speed of the changes has been very different throughout history in each stage. In the High Middle Ages, the changes in the urban structure of the Vatican area were very slow and there were hardly any relevant historical milestones (especially between the 10th and 12th centuries), for this reason an indeterminate date was simply chosen more or less in the middle of each century. In other cases, as in the Renaissance, the built environment underwent major changes in a short period of time, and therefore the dates associated with these changes have been chosen, and in some cases several dates per century.

The most recent historical dates correspond to the existence of historical plans of the urban structure of the Vatican area. Therefore, in the first place, these historical plans have been rebuilt to scale and with all possible precision. In this way, this scale plan serves as a reference to reconstruct the previous stage, based on the historical information available at that stage. Following this process, each scale plan that is made serves as a reference to draw the previous plan to scale. And so on until the first stage.

The dates chosen are the following:

Stage 1. 100 B.C. *Etruscan necropolis* along *Via Triunfalis* and *Via Cornelia*
Stage 2. 50 B.C. Settlement of houses of noble families in the area
Stage 3. 33 A.D. Beginning of the construction of *circus of Caligula*
Stage 4. 64 A.D. *Peter* (30?-64?). Great fire of Rome
Stage 5. 117 A.D. *Alexander I* (107-115). *Vaticanus necropolis* construction
Stage 6. 139 A.D. *Pius I* (140-155). Construction of *Mausoleum of Hadrian*
Stage 7. 217 A.D. *Zephyrinus* (199-217). Construction of *Severan Mausoleum*
Stage 8. 325 A.D. *Sylvester I* (314-335). Construction of platform and *Constantine Arch*
Stage 9. 399 A.D. *Siricius* (384-399). Construction of *Mausoleum of Honorius*
Stage 10. 484 A.D. *Simplicius* (468-483). Construction of lateral wings of the atrium
Stage 11. 514 A.D. *Symmachus* (498-514). O*ld basilica of S. Peter* finished
Stage 12. 650 A.D. *Martin I* (649-655). Expansion of Christian pilgrimage
Stage 13. 852 A.D. *Leo IV* (847-855). *Leonine walls*
Stage 14. 1003 A.D. *Silvester II* (999-1003). Beginning of the *late middle ages*
Stage 15. 1124 A.D. *Callixtus II* (1119-1124). 1123. First *council of the Lateran*
Stage 16. 1216 A.D. *Innocent III* (1198-1216). Beginning of the *Apostolic palace*
Stage 17. 1280 A.D. *Nicholas III* (1277-1280). Extension of the *Apostolic palace*
Stage 18. 1378 A.D. *Gregorius XI* (1370-1378). Re-establishing of pontifical see in Rome
Stage 19. 1464 A.D. *Nicholas V* (1447-1455). Reform project *old basilica of S. Peter*
Stage 20. 1503 A.D. *Alexander VI* (1492-1503). Opening of *Via Alessandrina*
Stage 21. 1514 A.D. *Leo X* (1513-1521). Death of *Bramante*
Stage 22. 1564 A.D. *Pius IV* (1560-1565). Death of *Michelangelo*
Stage 23. 1589 A.D. *Sixtus V* (1585-1590). The dome of *new S. Peter* is finished
Stage 24. 1667 A.D. *Alexander VII* (1655-1667). New *basilica of S. Peter* is finished
Stage 25. 1748 A.D. *Benedict XIV* (1740-1758). Plan by *Giambattista Nolli*

Stage 26. 1883 A.D. *Leo XIII* (1878-1903). First urbanistic plan of Rome
Stage 27. 1950 A.D. *Pius XII* (1939-1958). Inauguration of *Via della Conciliazione*
Stage 28. 2020 A.D. *Francis I* (2013-)

2.3. Methodology followed for the graphic reconstruction in stages of the evolution of the urban structure of the Vatican area

In order to describe and graphically represent the state of the urban structure of the Vatican area in each of the previously chosen stages, a somewhat complex methodology based on the following stages has been followed:

Stage 1. Collection of information and preparation of work plans

This stage includes 7 consecutive actions:

1. Compilation of graphic material classified by stages (urban plans, aerial views, engravings, sketches, drawings, paintings ...).
2. Compilation of the most important bibliography referring to each stage.
3. Classification of the most important historical events that occurred in each stage.
4. Obtaining the “cadastral plan” of the current urban structure of the Vatican City, in the year 2020 (Fig. 2.1).
5. Superimposition to scale of the current cadastral plan with the “plan of archaeological excavations” carried out by Paolo Liverani [1] (Fig. 2.2).
6. Preparation of the “work plan” for each stage, superimposing the cadastral plan of the current urban structure with the plan of archaeological excavations by Liverani. The "work plan" of each stage must be complemented, superimposing the already defined plan layout corresponding to the one consecutively later in time, and highlighting the buildings that have survived to this day and that already existed in each stage.
7. Location of buildings, constructions, roads, urban elements and geographical elements that have survived to this day, in the work plan of the stages in which these constructions and geographical elements existed.

Stage 2. Realization of the urban plans, stage by stage, inversely in time from the present day to the most remote stage.

This stage consists of a reverse design process, from the current stage to the first stage.

First of all, the urban plan corresponding to the current stage (year 2020) must be carried out, starting from the cadastral plan of the Vatican area, and carrying out all the measurements considered necessary in situ.

Starting from the plan of the current stage, the plan corresponding to the previous stage (year 1950) can be made, adding, eliminating or modifying details with respect to the current plan. To carry out this transformation work, all the graphic material available from the previous stage must be analyzed (urban plans, photographs, drawings, building plans, paintings, etc.), in order to know all the changes that have occurred between them.

Starting from this stage (1950), the plan of the immediately previous stage (year 1883) can be reconstructed, taking into account the first urban planning plan of Rome, carried out in that same year, and all the historical information available, regarding the changes that have occurred between these two stages.

Following this process, starting from this stage (1883), the immediately preceding stage (year 1748) can be reconstructed, since the map of Giambattista Nolli (1748) and others, are available, and all the historical information collected between these two stages.

To draw up the map corresponding to the immediately preceding stage (1667), the map drawn up by Giovanni Battista Falda in 1676 is especially useful. The information contained in this map must be supplemented with other available maps and the historical information collected.

The drawing made by Antonio Tempesta in 1593 is very useful for drawing up the corresponding plan for the immediately preceding stage (year 1589). Again, the information contained in this drawing must be supplemented with other maps and drawings, and the available historical information

In order to draw up the plan corresponding to the immediately preceding stage (year 1564), the drawing made by Étienne Dupérac and Antonio Lefreri, in 1577, is especially useful. The plan made by Leonardo Bufalini, in 1551, also helps, supplemented with other maps and all available historical information.

To make the plan corresponding to the immediately preceding stages (year 1514 and year 1503), it can be used the drawing made by Hartmann Schedel, in 1493, together with all available historical references.

In order to carry out the plans corresponding to the previous stages, no historical plans are available, so they must be made taking into account only the historical information available, so that their precision and reliability is becoming less and less. However, following this methodology, to make the plans for each stage, the plans for the immediately subsequent stages are arranged, which have been prepared with the greatest possible rigor.

In general, once the map corresponding to the urban situation of each stage has been drawn, it is used as a starting point to draw up the map of the consecutively previous stage, taking into account all the available historical information. Therefore, each new plane will serve as a starting point to elaborate the plan of the consecutively previous stage, and so on, until the plan of the first stage is reconstructed.

Following this strategy, the plan of each stage can be reconstructed based on making small changes with respect to the immediately later stage, taking into account all the historical information and graphic material available for each stage.

Obviously, as we go into the past, the available historical and graphic material is less and less reliable. At a certain point, photographs cease to exist and are replaced by scale plans, scale plans are replaced by approximate plans, plans become drawings of aerial views, and as we move into the past, aerial views are becoming more rudimentary and fanciful. In this way, the level of error in the information available increases, and it accumulates slightly as we go back into the past.

Despite this level of error or incremental inaccuracy as we go into the past (both the graphic material and the historical references), it is compensated by the designed work methodology, since some buildings are represented in a crude way and disproportionate in the old graphic material, corresponding to a certain stage, it was already fully located and precisely defined in the later stage.

The buildings that have survived to the present day must be located in all the stages in which these buildings existed. Once correctly located, these buildings become an immovable reference for the location of the rest of the buildings that are shown in the historical drawings corresponding to each stage. Therefore, the available historical drawings, even if they have been made in a crude, disproportionate or imprecise way, serve as a script to locate the buildings and objects represented in them. Historical drawings contain all kinds of references that allow the buildings represented in them to be located and drawn precisely, once the reference buildings have been drawn correctly.

That is to say, the buildings represented in the historical graphic material available for each stage, become perfect references to locate the rest of the buildings represented and that have not survived to the present day.

In the Vatican area there are several references that have remained immovable with the passage of time and that serve as a great help to relocate, and draw to scale, the buildings represented in the different engravings of the time, which were often made simply documentary or symbolic. These references are: The Castel Sant'Angelo, the Leonine wall (Leo IV), the wall of Pius IV, and the basilica of S. Peter.

It is true that the new basilica of S. Peter has a recent existence, but since the exact and precise relationship it had with respect to the old basilica of Constantine is known, it can be located with all precision, and therefore the adjacent imperial mausoleums can also be located (In addition, the eastern mausoleum can be perfectly located since there are archaeological remains).

Triangulating the relative position of all the buildings with respect to these "reference-buildings", and with the help of the available historical plans and Liverani's excavation plan, you can be sure that you are making plans with enough precision.

2.4. Strategy to make accurate and scaled plans for each stage

As has been indicated, some of the relevant dates in the evolution of the urban structure of the Vatican area have been chosen because urban plans were made on those dates. This is the case, for example, of stages 25 and 26, corresponding respectively to the plan by Giambattista Nolli, made in 1748, and to the plan of the first urban planning of Rome, made in 1883.

The reconstruction of these stages has been very simple, since they were drawn with enormous precision, so that, starting from the current topographic plans, proceeding in the way indicated, they have been reconstructed with precision, and hardly any minor tweaks have been made with respect to the historical plans. Small dimensional adjustments have simply been made, small inaccuracies have been corrected, and the graphics used have been changed (so that all stages have the same graphics).

However, in most of the historical dates chosen, no detailed plans were made and there are hardly any engravings in distorted perspective, paintings, or partial drawings without scale. In these cases, this graphic material must be analyzed in detail and a list of the changes that can be seen in them with respect to the scale plan already made corresponding to the immediately subsequent period must be done.

In some specific aspects, for which there is no graphic material, reliable historical assumptions must be made, and appropriately graphed (for example, on the size of the vineyards, the position of the agricultural houses associated with them, the position of the trees, etc. …).

The historical plans corresponding to each stage provide general information on the situation of the Vatican area at the time they were made. However, these plans are not to scale, and show serious dimensional errors. Some buildings are too big, others too small, others simply deformed ... Generally, the most important buildings are usually drawn larger, instead, the less important buildings were drawn smaller than they were. These plans and drawings are actually approximate and distorted representations of the reality they represented. Narrow streets are represented smaller than they were, trees are usually graphed with a larger relative size, and in many cases less important buildings were not even represented.

Therefore, to redraw these historical plans to scale and represent truthfully the built environment of a certain period, three complementary actions have been carried out:

1. Confirm the existence of the represented buildings, and find out if there were more buildings than those represented at the time. To do this, the graphic documentation that has been collected from each period must be carefully examined (including plans, perspective engravings, paintings, sketches, etc.). It is usual for a certain building to appear represented in a certain way in one drawing, and in a different way in another drawing. Furthermore, the same building may appear with one size in one drawing, and with another size in another; it may even appear in some drawings and not appear in others. Therefore, it is important to know the expertise of the author, as well as his training, his specific interests, his cultural background and even his specific interests when drawing. Based on this information, credibility criteria can be established, and therefore each of the collected drawings can be properly assessed.

2. Carry out an intense documentary investigation, compiling as many historical references as possible about the reality represented in each one of the planes that are intended to be reconstructed to scale. This allows knowing details of some buildings that existed at that time, and that from their written description could be represented graphically with some precision.

3. Carry out a dimensional and proportional adjustment in each historical stage with respect to the reference-buildings, and with respect to the immediately later

stage, previously drawn to scale. The objective is to reconstruct and redraw the existing historical plans, but to scale and in a proportional and precise way. Based on the scale plan already made corresponding to an immediately later stage, the appropriate changes are made, having as a script the available historical plans corresponding to the current stage. As the reference-buildings are know in detail, and also all the buildings of the immediately later stage, the buildings of the current stage can be drawn with certain precision.

2.5. Reconstruction of the most important stages of the evolution of the urban structure of the Vatican area

Based on the methodology described, it has been possible to identify the state of the urban structure of the Vatican area in each stage. Obviously these plans, although they are represented to scale and with all precision, contain certain inaccuracies and errors, which increase when the stages are older, since much less historical material is available.

The plans corresponding to each stage are shown below, describing the most relevant historical events, and the most important changes in the urban structure.

Stage 1. 100 B.C.

Etruscan necropolis along Via Triunfalis and Via Cornelia (Plan layout UE 1)

The appearance of the urban structure of the Vatican area in 100 B.C. it is uncertain, since there is hardly any information about it, and the same can be said even about the origin of the name *Vaticanus*. Some researchers are of the opinion that the name comes from the Etruscan goddess *Vatica,* to whom a temple was erected in the area. On the other hand, other researchers think that the name comes from a hallucinogenic herb that grew on the slope of *Mons Vaticanus* [2]. A third theory is that the Etruscan people who occupied the area were called *Vatucum*.

This hill, located to the west of the Tiber river and outside the city limits, has housed a necropolis since Etruscan times. There are hardly any remains of this necropolis, but as is known, in an approximate way, the route of the path that connected the Etruscan necropolis with the city of Rome, and how we have certain information about the structure of other Etruscan necropolis whose remains have reached our days, it is possible to at least hint what this necropolis looked like.

On the other hand, it is known that near the necropolis, there were several temples, such as the *Templus Martius*, or the temple dedicated to the goddess *Cybele* (*Phrygianum*) [3] built around 191 BC, which had to be demolished in the construction of the great foundation platform from the old basilica, in the year 324 [4]. The location of this temple is known, located at point 51 of the archaeological plan of Paolo Liverani (Fig. 2.2). To the east of the river was the *Campus Martius*, an area located to the north of the Servian walls, and which was so named because from very ancient times there was an altar dedicated to Mars, mentioned in the laws attributed to *Numa Pompilius*, second king of Rome, after *Romulus*. In the year 388 B.C. the consular tribute Tito Quincio Cincinato Capitolino, erected a new temple to this god, to fulfill a vow made on the occasion of the invasion of the Gauls. At the time of the Republic it was a place for armies to camp, and for military exercises. Chariot races were also held on *Campus Martius*, and horse stables were located. There was also the *Trigarium* pool, a public beach where you could go swimming, and right at the bend of the river there were springs of thermal mineral water with healing properties, called *Tarentum*. In 5th century B.C. a temple dedicated to *Apollo*, who was considered the protector of health, was built in *Campus Martius*.

Stage 2. 50 B.C.

Settlement of houses of noble families in the area (Plan layout UE 2)

The grounds of the *Mons Vaticanus*, close to the Etruscan necropolis, were used basically for growing vineyards and as a burial area, and there were hardly any small buildings for agricultural use. For this reason, several noble families acquire land in the area, seeking to escape the bustle of the city, in which they build large gardens with weekend houses, such as the *Horti Agrippina* and the *Horti Domitiae*.

Funerary monuments were also built at this time, such as the Meta *Romuli* pyramid (at the crossroads between Via *Cornelia* and Via *Triumfalis*), and the *Terebinthus Neronis* [6] mausoleum, which soon became a symbol of the *Vatican area*. These constructions appear in various drawings and plans, for example in the fresco *Visione della croce* from the school of Raffaello Sanzio, dating from 1520-1524, located in the Sala di Constantino in the Vatican, and attributed to Giulio Romano and Raffaellino del Colle (Fig. 2.3). The *Meta Romuli* can also be clearly seen in Leonardo Bufalini's plan, made in 1551 (Figs. 2.4a and 2.4b).

During this time, a wooden bridge was most likely built, undoubtedly a precursor of the *Pons Neronianus* [7], in order to communicate the area of *Campus Martius* with the Vatican fields where the imperial family had properties along the *Via Cornelia*. There is no evidence of this wooden bridge, nor is there any evidence that Nero built the bridge that bears his name in stone, as a substitute for the wooden bridge.

The region near the bridge had the name "the plain(s) of Nero" until the middle ages. For this reason, the citizens of Rome, without knowing the origin of the ruined bridge, named it after the area in which it was located, and not after the name of the emperor that it supposedly built. In any case, it is evident that if some of the most powerful families in Rome built their mansions on the other side of the river, would demand that a bridge be built with all immediacy in order to access them. It is possible that initially a temporary wooden bridge was built, and that a few years later, another stone bridge was built to replace the previous one made of wood. However, both had to be done quickly and hastily, since the *Pons Neuronianus* sank by itself in the fourth century, and was never rebuilt.

The *Pons Neuronianus* is mentioned in *Mirabilia* (II) (Graphia 10) *"...pons Neronis id est pons ruptus ad s. Spiritum in Sassia...*" (Anon. Magi. 158, Urlichs), and it was already in this ruinous in the fifteenth century, and probably already in the fourth century, since it has not been mentioned again since then in any text. Still today there are remains of the pillars in the lower part of the river (NS 1909, 13; BC 1909, 124-125), and they can be seen when it has little water [8].

Stage 3. 33 A.D.

Beginning of the construction of *circus of Caligula* (Plan layout UE 3)

On the Vatican hill, outside the city of Rome, the construction of the Circus of Nero began on what was formerly the Etruscan necropolis. The work begins with Caligula (37-41) and ends with Nero (54-68). The circus was private and there were horse and chariot races, and only on some occasions was it open to the public. At the end of the construction of the circus, in AD 37, the emperor Caligula transported an obelisk from Alexandria to Rome, as described by Pliny the Elder in his *Naturalis Historia* (16.76.201), and later it was installed in the *spina* of the circus, where it would remain until 1586, when it moved to the place where it is today [9].

The circus was built longitudinally along an east-west axis, with the entrance on the east side (as the west side was partially carved into the hill). The exact dimensions and position of the circus are not known exactly, but it can be deduced based on the archaeological plan of Paolo Liverani, in "*La topografia antica del vaticano*" (Fig. 2.2 detail). This map shows archaeological evidence of the circus prisons at point 21 on the map. In the same way, evidence of a wall structure is shown at point 79, which could be from the circular west wall of the circus (as Magi thinks [10]), and at point 78 there are mosaics, which agree with the mosaic of the perimeter gallery of the circus in the western part. The distance between points 78 and 79 with point 21 agrees with the measurements assumed for a circus, based on the architectural structure of Roman circuses that have survived to this day. The location of the obelisk is also precisely known, located on the *spina* of the circus (point 57).

For the location of some roads, both in the Vatican area and on the other side of the river, the plan made by Rodolfo Amedero Lanciani in 1901[11] has been taken into account (Figs. 2.5a and 2.5b), and also the fabulous plane "*View of Ancient Rome*", by Étienne Dupérac (Figs. 2.6a and 2.6b). Along the road that runs along the north face of the circus, warehouses for construction materials and auxiliary activities began to be built, due to the construction activity promoted by the circus.

Stage 4. 64 A.D. Peter (30?-64?) (Plan layout UE 4)

Great fire of Rome

For the reconstruction of the urban mesh of the Vatican area this year, the plan *Le piante di Roma* made by Giuseppe Luigi and Italo Gismondi, of *Roma Antica*, made in 1949 (Figs. 2.7a and 2.7b), the drawing *Antiquae Urbis Romae Imago accuratissime ex vetustis monumentis formata* made by Pirro Ligorio *i*n 1551, which shows the Circus of Nero (also named Circus of Caligula), the Circus of Hadrian, and the Mausoleum of Hadrian (Figs. 2.8a, 2.8b), and also the drawing *Urbis Romae totius olim orbis domitricis situs, cum adhuc extrantibus sacrosanetae vetustatis monumentis*, made by Pirro Ligorio in 1570 (Figs. 2.9a, 2.9b).

On the other hand, and with respect to the Circus of Nero, Christian tradition assures that the Apostle Peter arrived in Rome between the years 64 and 68, under the mandate of Nero, and that he was martyred in the circus and buried near it and near of the imperial villa. Although these facts have been continuously refuted and doubted by scholars and historians, Christians assure that the remains of the Apostle Peter lay in a small tomb in the *Vaticanus necropolis*, and from the moment of his death many Christians began an incessant pilgrimage until this place.

While the circus was still standing, a series of small funerary buildings began to be built on its north side, as can be seen in the plan of the Liverani excavations in 1999 (Fig. 2.2).

After the great fire in Rome, many of those affected (who lost their houses in the fire) were temporarily housed in buildings within *Campus Martius*. Many of these refugees, whether poor or rich, were eventually forced to reside outside the city [12]. For this reason, the *Campus Martius* was rapidly urbanized, especially in the northern area adjacent to the river, streets were laid out orthogonally, in north-south and east-west directions, and a large number of buildings began to be built temporarily. The most important road, in an east-west direction, and very close to the river, was the *Via Recta*, whose layout was barely altered and became Via dei Coronari in the Renaissance, and which has been preserved to this day.

Stage 5. 117 A.D. *Alexander I* (107-115) (Plan layout UE 5)

***Vaticanus necropolis* construction**

The construction of the *Vaticanus Necropolis* begins along the north face of the Circus Gai Et Nerons, when it fell into disuse at the end of the second century [13]. The area was divided and assigned to individuals for the construction of tombs belonging to the necropolis.

At this time, burials within the walls were prohibited, and for various reasons, freedmen (slaves who had obtained freedom and had small fortunes) were the social group that preferred to be buried in this area, since although it was on the other side from the river, it remained connected to the city by two bridges [14].

Stage 6. 139 A.D. *Pius I* (140-155)

Construction of *Mausoleum of Hadrian* (Plan layout UE 6)

The work of the Mausoleum of Hadrian began in the year 135 by the emperor Hadrian, with the aim of making it his personal and family mausoleum, although it was completed by Antonio Pio in 139 [15]. The mausoleum was built north of the *Campus Martius*, on the other side of the river, and to communicate directly with the city, the *Pons Elius* was built in the year 134 [16].

According to the drawings made by Letarouilly (Fig. 2.10), it appears that in those times there were few constructions in the area, and the great constructions that occupy the urban landscape are the Circus of Nero, the Circus of Hadrian, the Mausoleum of Hadrian and the great gardens of *Agrippina*. *Pons Neronis* was the only link and connection with the city of *Rome* until the construction of the *Pons Elius*, it crosses the river and adjoins two major avenues, the *Via Triunphais* in a north direction and the *Via Cornelia* that goes west in the direction of the *circus of Nero*. Very close to the south face of the circus is the old *Templus Martius* that later fell into disuse. Along the *Via Cornelia*, small constructions for the sale of construction materials and crafts continue to be consolidated, due to the increase in construction activity in the area. Along the north face of the circus the *Vaticanus Necropolis* continues to grow.

Stage 7. 217 A.D. *Zephyrinus* (199-217)

Construction of *Severan Mausoleum* (Plan layout UE 7)

Between the years 212 and 217 the circus had been almost completely dismantled, and its own rubble had partially filled it, so the soil was compacting little by little, and it recovered the natural slope that it had before its construction. As a consequence, new access roads began to be consolidated from the west, crossing the *Mons Vaticanus*.

In these years, the *Severan Mausoleum* was built, right next to the west face of the obelisk and aligned to the *spine* of the *old Circus of Nero*. Some stamps found inside indicate that it was initially built in the time of Emperor Caracalla of the Severan dynasty (193-235), which follows that the circus had already fallen into disuse at the end of the second century [17] and that the Vatican area was beginning to have already a funerary character. In the times of Pope *Symmachus* (498-514), the mausoleum was renamed the Church of S. Andrea, and in the 14th century it was renamed Santa Maria delle Febbre.

Due to the construction of the circuses and the funerary character of the area, the area began to lose residential appeal, and little by little the large mansions were dismantled. When the *Horti Agrippina* was dismantled, transversal communication routes were created, which directly connected the *Pons Neronis* and the *Pons Elius* with the southern part of the dismantled circus, and with the Via Aurelia Nova. In this way, a network of roads was created that allowed a rapid urbanization of the Vatican area.

Stage 8. 325 A.D. *Sylvester I* (314-335)

Construction of platform and *Constantine Arch* (Plan layout UE 8)

The Emperor Aurelian ordered the Aurelian walls to be built in order to defend the city of Rome against barbarian invasions. The construction of the walls begins in the year 271, and its length was 19 kilometers [18]. For this reason, the urbanization of *Campus Martius* accelerated considerably and the city began to compact in this area.

Later, during the papacy of Sylvester I, the Emperor Constantine greatly helps the Christian church, performs great works of charity both for priests and the faithful in need, and builds several basilicas in Rome, among which is the Lateran basilica.

As a result of this collaboration, the Vatican area was chosen as the appropriate place to build a large basilica, with the aim of becoming a benchmark for Christianity.

In the year 324 the great horizontal foundational platform was built, on which the enormous basilica building had to be built, since a year later, in the year 325 there are indications that the Arch of Constantine was built. This large construction generated great economic and labor expectations, attracted a huge number of businesses (builders, craftsmen, vendors, etc.), and prompted the construction of a growing number of buildings related to the construction sector, such as brick factories. construction warehouses, artisan workshops. These buildings began to be built mainly along and on both sides of *Via Cornelia*, on the roads of the north face of the platform, and on the roads in the southern part of the ancient Circus of Nero (since they were the places more suitable). As a consequence, a network of roads began to be developed and consolidated around the platform and the ruins of the ancient Circus of Nero.

Stage 9. 399 A.D. *Siricius* (384-399)

Construction of *Mausoleum of Honorius* (Plan layout UE 9)

To roughly reconstruct the state of the urban structure of the *Vatican area* in this year, the most important construction activity of the previous years has been taken into account, and of which there are concrete references.

The narthex and the perimeter wall of the anterior body were completed in the time of Pope *Siricius* (384-399), as narrated by *Paulinus de Nola* about the funeral of Paulina in the year 395-396 [19]. Before the year 393, the *Anicii Probi mausoleum* was built in the western part (attached to the apse), built by the Sixth Consul *Petronio Probo*, who died in that same year [20]. Some years later, around 400, *Honorius* (384-423), son of *Theodosius* I, built the *Mausoleum of Honorius*, a dynastic mausoleum for the

Theodosian section of the western imperial family [21]. Years later this mausoleum will be renamed the Chapel of Santa Petronilla [22]. The mausoleum was connected by a small portico to the southern exedra of the basilica, had the same ground level as the basilica, and was almost aligned to the west of the *Severan Mausoleum*, so it had privileged access to the sanctuary and the tomb of *Peter.*

In the 4th century, the *Pons Neronis* collapsed, and it would never be rebuilt, so the connection of the Vatican area with *Rome* would only be made through the *Pons Elius*. For this reason, the only connection with the Vatican area is through the *Via Cornelia* that extends to the Mausoleum of Hadrian, which stimulated the compaction of the building along its route, and especially to the south of *Meta Romuli*.

Stage 10. 484 A.D. *Simplicius* (468-483)

Construction of lateral wings of the atrium (Plan layout UE 10)

To roughly reconstruct the state of the urban mesh of the Vatican area this year, the most important construction activity of the previous years has been taken into account, and of which there are concrete references.

In the times of Pope Leo I (440-461) the first monastery of the place was built and the Church of Santo Stefano degli Abissini, initially known as Santo Stefano Maggiore, built on the ruins of a pagan temple dedicated to Vesta [23].

Leo I established for the first time the need for a papal residence, and also built the *Secretarium* on the outside of the basilica and attached to the south face of the narthex, a kind of sacristy in which the bishop prepared for access to the basilica [24].

In the times of Pope Simplicius (468-483) the lateral wings of the atrium were completed, as well as the anterior body, which includes the gate house, which was initially simply equipped with lateral columns [25].

Hadrian's mausoleum partially loses its function, since by connecting with the Aurelian walls it becomes part of the defensive system of the city. In fact, at this time the first reference to the building was made as a *Castellum*, and it was reinforced to be able to withstand all kinds of attacks [26].

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Stage 11. 514 A.D. *Symmachus* (498-514)

O*ld basilica of S. Peter* finished (Plan layout UE 11)

To roughly reconstruct the state of the urban structure of the Vatican area this year, the most important construction activity of the previous years has been taken into account.

In the time of *Symmachus* (498-514) the lateral rooms of the gate house were completed, including the *Episcopal Palace* and the papal residential building (called *Episcopia* in the *Liber Pontificalis*) *"nello stesso luogo a destra ea sinistra"* of the main entrance [27], as well as a team to attend to the pilgrims, a fountain in front of the access stairs and some latrines [28]. Therefore, it can be said that with the construction activity carried out by *Pope Symmachus* until the end of his days, the construction of the old basilica of S. Peter, begun in the time of *Constantine*, is finished.

In the days of *Symmachus*, several colonnaded porticoes were also built on the main avenues that led from the *Tiber River* (the northern end of the *Pons Aelius*) to the basilica. These porticoes protected the pilgrims from the sun and the rain. The covered porticoes were first referenced by *Procopius* in the 6th century, as they were used to hide in the attack of the Ostrogoth's in the year 537 [29]. Some historians believe that these porticoes were not an independent structure, but were arcaded spaces existing in the adjacent constructions on both sides of the avenues, since in the excavations carried out so far no traces of this structure have been found.

The last surviving large villas near the Mausoleum of Hadrian fall into disuse and are abandoned by their owners. The materials that remain of the constructions are looted, and are used in the construction of other houses that are being built around the *Via Cornelia*.

Stage 12. 650 A.D. *Martin I* (649-655)

Expansion of Christian pilgrimage (Plan layout UE 12)

The approximate state of the urban plot this year has been rebuilt taking into account the most important construction activity carried out previously, and for which there are references.

During these times the pilgrimage activity to the basilica of S. Peter increased, perhaps as a consequence of the general state of confusion after the fall of the Roman Empire. For this reason, among other things, Gregory I (590-604) began the construction of a small chapel as soon as he began his mandate, which in the 12th century was consecrated as Santa Maria in Vallicella. This church would undergo numerous modifications throughout the years acquiring more and more importance [30].

Gregory I also reorganized the interior of the basilica, and made a semi-annular passage to the crypt, which allowed pilgrims to venerate Apostle Peter without interrupting the services of the upper altar. Until then, a mobile altar was used to celebrate Mass, but it seemed less and less suitable for the performance of rituals increasingly marked by an orderly, hierarchical and noble conception of the liturgical scene, which is why it became essential an intervention in the apse [31].

In these years, Hadrian's circus fell into disuse and was abandoned, and this caused the access road network to be modified in the northern part of the Vatican area. In general, construction activity slowed enormously within the Vatican area.

Stage 13. 852 A.D. *Leo IV* (847-855)

Leonine walls (Plan layout UE 13)

To roughly reconstruct the state of the urban plot of the Vatican in this year, the most important construction activity of the previous years, and of which there are references, has been taken into account.

Starting in the 8th century, certain settlements arose in the Vatican, each characterized by having its own military and civil organization made up of people from northern Europe who lived in the Vatican. These organizations are known as *scholae*, and their goal was to assist the pilgrims [32]. Currently the location of four of them is known: the *scholae Longobardorum*, the *scholae Saxonum*, the *scholae Frisonum* and the *scholae Francorum*, as well as that of several churches and chapels that existed during the Middle Ages within the Leonine walls (Fig. 2.11).

The first *scholae* was that of the Saxons, founded between 726 and 728. With the approval of Pope Gregory II, the Santa Maria in Sassia church dedicated to the Virgin was built. Between 817 and 852 the church had to be rebuilt due to fires in the area that seriously damaged it [33].

Several churches are also built, such as the Church of San Peregrino, dedicated to San Peregrino de Auxerre, a Roman priest [34]. The church of Santo Stefano Minore, known as Santo Stefano degli Ungheresi, is also built. Located to the south of the basilica, the construction remains until the year 1776, when it was demolished due to the extension of the new basilica of S. Peter. The exact location is known thanks to Rodolfo Amedero Lanciani's plan (Fig. 2.5b), since it superimposes buildings from different periods and gives us a reference to where it was located.

After the sack of the basilica by the Saracens in 846, Pope Leo IV (847-855) surrounded the entire area by means of a defensive wall [35], later known as *Mura Leoniane*, which was the only significant change of the defensive perimeter of Rome, after the Aurelian walls of the late 3rd century. The interior area was renamed the *civitas Leoniana*[36].

The defensive wall was built between 848 and 852, it was three kilometers long and completely surrounded the Vatican area at that time for the first time in its history, in fact, it was the only extension of the Aurelian walls of Rome. A few years earlier, by order of Pope Leo III, a similar wall began to be built, but the disturbances in the city forced the work to be suspended, and the sections already built were dismantled to be used in private buildings.

The wall ran from the Mausoleum of Hadrian, later called Castel San Angelo, to the slopes of the Vatican Hill located to the west, surrounding the basilica from west to south, and descending again in an easterly direction to the river. The wall was built from tufa (a soft porous rock consisting of calcium carbonate deposited from springs rich in lime) and tile, and was twelve meters high with 44 strong towers at arc-throw intervals. The wall had three doors to access the interior space. Two gates were in the northern part of the wall: the smallest was located behind the fortified mausoleum, called Posterula San Angeli and later called (due to its proximity to the castle) Porta Castelli, and the largest, the main gate to through which the emperors passed was located near the church of San Peregrino, called Porta Peregrini, later Porta San Petri. A third gate was located to the south, and connected the Leonine city to the Trastevere river. In addition, chain towers were built on both sides of the Tiber river to repel Saracen assaults by water. The wall was officially completed on June 27, 852.

Stage 14. 1003 A.D. *Silvester II* (999-1003)

Beginning of the *late middle ages* (Plan layout UE 14)

In the 10th century, construction activity in the Vatican area slowed down again, so that hardly any notable constructions were made, and the existing urban mesh was simply compacted little by little, and very slowly.

Nor was there any pope with constructive ambitions, and among all of them only Pope Silvester II stood out, since he was known as "the light of the church and the hope of his century" due to his great erudition. His studies in theology, philosophy, grammar, rhetoric, dialectics, astronomy, arithmetic, geometry and music allowed him to make changes during his papacy such as the use of the decimal system by clergymen. On the other hand, he invented Gerbert's abacus, introduced the pendulum and the invention of a cogwheel clock, and was the forerunner of a kind of shorthand system.

Stage 15. 1124 A.D. *Callixtus II* (1119-1124)

First *council of the Lateran* (Plan layout UE 15)

In the 11th century there is no news of any construction activity in the basilica, or in its close surroundings. These are turbulent times, and the different popes are focused on their struggles for power, leaving aside notable constructive activities in the basilica of S. Peter.

Callixtus II was a great defender of the reform of the church started by Gregory VII. He manages to return to Rome after forcing Antipope Gregory to flee. He is dedicated to solving the dispute of the investiture for which the papacy and the empire had been facing more than fifty years. With the support of Henry V, they sign the Concordat of Worms (1122) in which the emperor renounced the right of investiture, and became recognized as exclusive to the church, and the Pope recognized the emperor his right to attend the investiture. In 1123 the pope convened the First Lateran Council, in which the agreements reached in the Concordat of Worms were confirmed and sanctioned.

Stage 16. 1216 A.D. *Innocent III* (1198-1216)

Beginning of the *Apostolic palace* (Plan layout UE 16)

The approximate state of the urban plot in this year has been reconstructed taking into account the most important construction activity carried out in previous years, of which there are references.

With Innocent III (1198-1216) the papacy reached a great apogee, since this pope acted as a true feudal emperor and almost all the kingdoms and princes of Western, Central and Northern Europe were recognized as vassals.

During his papacy the San Lorenzo in *Piscibus* Church was built on what was formerly a small church dedicated to San Stephen. It was first mentioned in the *Ordo Romanus of Benedict the Canon*. It takes the name of *Piscibus* in 1205 since the construction is located in a fishing district during the Middle Ages [37].

In the times of Innocent III, a good initial part of the Vatican Palace was also built [38], located on the outskirts of the basilica in the northern area at the height of the atrium. The building included a prominent tower (later to be known precisely as “Torre di Innocenzo III”) [39].

Stage 17. 1280 A.D. *Nicholas III* (1277-1280)

Extension of the *Apostolic palace* (Plan layout UE 17)

To roughly reconstruct the state of the urban structure of the Vatican area in this year, the most important construction activity of the previous years has been taken into account, and of which there are specific references.

The greatest previous constructive activity was carried out in the time of Nicholas III (1277-1280), who was elected thanks to the influence of his powerful family and his papacy, despite being short, was characterized by his attempts to reinforce the position of the church in front of European princes. Part of this power involved continuing the constructions of the previous papacy and starting new ones.

As described by Carroll William Westfall (Fig. 2.12), during the papacy of Nicholas III the Vatican Palace was expanded. The Cappella Magan (later Sistine Chapel), the Aula Prima (Sala Reale), the Aula Seconda (Sala Ducale, Seconda Sala), the east facade and the Torre di Niccolo III were built [40].

The Passetto di Borgo was built in 1277, which is an 800-meter-long elevated walkway that connects the Vatican with Castel San Angelo that allows the pope to escape the Vatican and take refuge in the castle if he is in danger. It was built on a section of the Vatican murals during a restoration that took place at the time, as they were in very poor condition [41].

It is important to note that the existing porticoes on the main avenues since the imperial era continue to stand, although they begin to deteriorate over time. These porticoes were built in the imperial era on the main avenues in order to protect pilgrims.

Stage 18. 1378 A.D. *Gregorius XI* (1370-1378)

Re-establishing the pontifical see in Rome (Plan layout UE 18)

It has been possible to reconstruct in an approximate way the state of the urban structure of the Vatican area in this year, taking into account the most important previous construction activity, and of which there are references.

During the papacy of Boniface VIII (1294-1303) the east wing of the Vatican Palace was extended. The Hall of Constantine and a tower to the north are built. The Parva Chapel (piccola capella) is also built next to the primary classroom [42]. Due to the great extension that the Vatican Palace had reached, the wall is extended in the north and east.

Some years later, Gregorius XI (1370-1378) is appointed pope at only 18 years of age, and during his papacy he tried to reconcile the Christian kingdoms in order to launch a crusade against the Turks. France and England did not participate as they were involved in the Hundred Years War, so it only managed to resolve some of the territorial disputes through marriages.

Due to all the disputes that existed at the time due to the war, the defenses of Castel San Angelo were reinforced, a moat and a single entrance were built, and it is used as a strategic military and protection point for the pope.

During the 14th century the Church of Santa Andrea was renamed Santa Maria delle Febbre, in order to provide protection and hope to the inhabitants of Rome against a Malaria epidemic that since then began to spread throughout Rome.

Stage 19. 1464 A.D. *Nicholas V* (1447-1455)

Reform project *old basilica of S. Peter* (Plan layout UE 19)

In order to roughly reconstruct the state of the urban mesh of the Vatican area in this year, the most important construction activity has been taken into account, and of which there are references.

With the election of Nicholas V as pope, it was believed that there would be a major change in S. Peter, as he set out to make Rome a city of monuments, home of literature and art, stronghold of the pope and the capital of the Christian world. Their main concerns focused on five main activities:

1. The restoration of the urban walls
2. The renewal of the forty "*stazionali*" churches
3. The founding of a new neighborhood, between *Mole Adriana* and *old S. Peter*
4. The fortification and ornamentation of the Papal Palace
5. The reconstruction of the basilica of S. Peter.

With regard to the surroundings of San Pietro, the construction of the Santa Maria della Grazie alle Fornaci Church began at the beginning of the 15th century. Its name is due to the brick and clay construction materials factories that were located in the area [43].

Papal plans for the reconstruction of Rome were based largely on facilitating the mobility of groups of pilgrims. In the year 1450 many pilgrims arrived in Rome due to the Holy Year, this was an opportunity to restructure the Germanic cemetery within Vatican City. As part of the project, the Church of Santa Maria della Pietá, in Camposanto dei Teutonici, is built at the end of the 15th century. The site belongs to the hospice for the german pilgrims of the ancient *Schola Francorum* [44].

During the papacy of Nicholas V, the north wing of the Vatican Palace was built, including the Estancia di Eliodoro, the Estancia della Segnatura, and the Estancia dell´Incendio (Fig. 2.12). The Borgia Tower (1494) is also built, and the enveloping wall is built from east to north, which converges with the Tower of Nicholas V. This space between the wall and the palace would later become the Cortile San Damaso. The construction of the southern part of the Vatican Palace continues, the Cortile del Maresciallo and the Curia prima are formed. The Muro di Bonifacio IX was built which adjoins the Porta San Pietro and the Capella Magna at one end [45].
As can be seen in Bramante's drawing GDSU 287 Ar (Fig. 2.13), the union between the basilica and the Vatican Palace is consolidated through a porticoes patio and a series of rooms that close the space to the public. This construction comes to join with the already existing wall of Nicholas V.

Stage 20. 1503 A.D. *Alexander VI* (1492-1503)

Opening of *Via Alessandrina* (Plan layout UE 20)

It has been possible to reconstruct the state of the urban plot of this year taking into account the most notable construction activity of the previous years.
The papacy of Innocent VIII (1484-1492) was a period of insecurity in Rome due to insufficient punishment for crime. The most important architectural work of the papacy was the construction of the Palazzetto of Innocent VIII, begun in 1487, which probably included an earlier construction from the times of Nicholas V, and which, according to Vasari, was designed by Antonio del Pollaiolo [46]. The palazzetto, known as Villa del Belvedere, was a suburban villa with a loggia open to the countryside. In Letarouilly's drawing from 1503 (Fig. 2.14) you can see the advance of the Vatican Palace, and on the right side you can see the villa of Innocent VIII. Both buildings would be joined years later.
Hartmann Schedel's drawing in 1493 (Fig. 2.15) shows that the construction of the Vatican Palace was already quite advanced, and clearly shows the 3 towers that constitute it, as well as the Tower of Nicholas V, which articulates the expansion of the Leonine wall, which goes up to the Mons Vaticanus. The drawing shows that the constructions outside the wall were minimal, in the case of small country houses. The drawing also shows, on the west face of the river meander, the *Santo* Spirito in Sassia hospital, which was part of the *Schola Saxonum*, the largest of the four *scholas*, and the one that had the most importance over the years.

The successor of Innocent VIII, Alexander VI (1492-1503) came from an important family, well positioned and with influences, but being Spanish he generated important discrepancies from other powerful Italian families. Therefore, in order to ensure political stability, and given that he was a good administrative officer, he decided to reorganize the city of Rome dividing it into four districts, with a person in charge in each. In this way it would be easier to control the high crime rate that the city suffered since the papacy of Innocent VIII.

Pope Alexander VI carried out innumerable constructive activities in the Vatican area and in Rome in general, and the collaboration with Bramante was very fruitful. For example, and regarding the basilica of S. Pietro, the pope completed the Loggia della Benedizione, started by Pius II, and built the Porta di San Pietro ("Porta di Sancti Petri"), also known as "Viridiana Gate" or "Porta degli Svizzeri". However, the most important activity that he carried out in the Vatican area was the opening of the Via Alessandrina. In preparation for the jubilee of 1500, Alexander VI, in the consistory of November 26, 1498, ordered the construction of the first rectilinear route of Rome between Castel Sant'Angelo and the main entrance of San Pietro, called Via Alessandrina, or Via Recta. The works began in April 1499 under the orders of Cardinal Raffaele Riario, and the road was inaugurated on December 24, 1499 [48].

The objective of Via Alessandrina was to alleviate the large influx of pilgrims that was generated in the processions to the basilica [49]. This street followed the layout of an old road that was partially obstructed by the "Meta Remuli" pyramid [50], which, along with other buildings adjoining the street, had to be demolished on December 24, 1499. To develop the area quickly, facilities and privileges were given to those who wish to build buildings that are at least 11 meters high, so that Via Alessandrina is surrounded by noble families and wealthy bourgeois who build palaces and houses [51].

The successor of Alexander VI, Pope Julius II, had an even greater construction activity, and without a doubt the most important was the beginning of the construction of the new basilica of S. Peter. However, the pope promoted many other construction activities in the Vatican area, among which, for example, the San Giovanni dei Fiorentina Church, started in 1509, and whose construction lasted until the beginning of the 18th century, dedicated to Saint John the Baptist, the protector of Florence [52].

Stage 21. 1514 A.D. *Leo X* (1513-1521)

Death of *Bramante* (Plan layout UE 21)

To roughly reconstruct the state of the urban structure of the Vatican area in this year, the most important construction activity of the previous years, and of which there are references, has been taken into account.

Pope Leo X (1513-1521), a member of the Medici family, was educated at the Florentine court from a young age and began his ecclesiastical career with only seven years. Having had an erudite and artistic training according to the Medici tradition, during his papacy he spent large sums of money on projects by masters such as Rafael and Bramante, giving great importance to the arts.

The expansion of the Vatican Palace begins, the east arm of the Vatican Palace is built, a corridor of conjunction between the Vatican Palace and the Belvedere Palace that would connect these two buildings despite being at different levels. A corridor that would serve as a direct connection and be part of the museum, as seen in Letarouilly's 1558 drawing (Fig. 2.16) and the GDSU 2559A plan, by Dosio Giovani, (Fig. 2.17) of the Belvedere construction.

Pope Julius II (1503-1513) commissioned Bramante to build the lodges within the Vatican Palace, private and exclusive places, accessible only to the Pope and his closest collaborators. After Bramante's death, Leo X asks Raphael to finish the construction and decoration of the Vatican Lodges [53].

In 1512 the Bramante Staircase was built in the Palace of Innocenzio to communicate with the city and to be able to transport the construction materials up [54].

Taking as a reference the plans made by Frommel (Figs. 2.18a, 2.18b, 2.18c), one can have an approximate idea about the structure and internal distribution of the Vatican Palace in 1521 [55]. The palace had 3 levels that adapt to the topography from the place through long stairs that in turn connect it with S. Peter's Basilica.

Stage 22. 1564 A.D. *Pius IV* (1560-1565)

Death of *Michelangelo* (Plan layout UE 22)

It has been possible to reconstruct the approximate state that the urban plot of the Vatican area had in the year 1564 thanks to the fabulous plan by Leonardo Bufalini (Figs. 2.4a and 2.4b), supplemented with information from Muster's drawing of 1549 (Fig. 2.19), and the drawing by Dupérac in 1577, edited by Antonio Lafreri (Figs. 2.20a and 2.20b). The article *Lo sviluppo urbanístico dei Borghi from 1500 to 1870* has also been of great importance for the reconstruction of the state of the urban structure of the Borgo, from 1500 to 1870 [56].

According to Muster's drawing of 1549 (Fig. 2.19), the Borgo was already quite consolidated, the church of Santa Spirito in Sassia stands out, the largest construction in the Borgo. Over the years the Church of Santa Maria in Sassia had deteriorated, so the reconstruction works began in 1538. The works were concluded in 1545, from this moment the church took the name of Santo Spirito in Sassia [57].

Outside of this densified area, the rest are small isolated houses, and outside the walls there are few buildings that existed, the security and stability that living within the walls implied was always sought. Castel S. Angelo had already been reinforced, looking more like a fortification and strategic military point. In this drawing, the Vatican Palace and the Palace of Innocenzio III are still separated, although years later they would end up being united.

Leonardo Bufalini's woodcut *Pianta di Roma*, from 1551 (Figs. 2.4a and 2.4b), is the first iconographic plant in Rome and constitutes a document of great value for understanding the state of the urban structure of the Vatican area at that time. The plan is made up of 24 woodcuts and was edited by Antonio Blado in 1551, although the edition that has come down to us (supposedly identical, since Bufalini died in 1552 and could not make relevant changes) was the one made in 1560 by Antonio Trevisi di Lecce [58]. The plan shows the Vatican area in the state it had around the year 1550 when Michelangelo had assumed the direction of the works. The representation is in many cases schematic, sometimes very distorted and even incorrect in some respects.

However, although schematically, the drawing shows important details to take into account when reconstructing the state of the urban structure in those years. The drawing shows how the southern ambulatory of S. Peter was already demolished, and in the western part something similar to an ambulatory appears, although in reality it is a retaining wall of lands that was made to build the Bramante apse and thus create a flat area around it, since the terrain in the western area had an upward slope. The intermediate section and the dividing wall of Sangallo, and the eastern surviving section of the longitudinal body of the old basilica are recognized. Also visible are the Tegurium de Bramante, the old eastern mausoleum (now called Santa Maria delle Febbre) and the obelisk in its original position (the western mausoleum had to be demolished to make way for the construction of the new basilica). You can also see the great staircase to the east, the square *(Forum S. Petri*) containing the fountain of the pilgrims built by Innocent VIII (1484-1492) and the new wall of Paul III (1534-1549) inside which is appreciate the Vatican Palace and areas of agricultural use, such as *Pratum*, *Viridarum* and *Galinaria*. The drawing also provides information on the name of the gates of the wall, the streets and the churches existing in 1551. To get a detailed idea of the built environment near S. Pietro, Antonio Lafreri's drawing, *Disegno della Benedittione del papa alla Piazza di San Pietro* (Fig. 2.21), made between 1567 and 1572, few years after Michelangelo's death in 1564. This is an anonymous engraving, published by Antonio Lafreri, that shows Pope Pius V (1565-1572) blessing a hurrying crowd in Piazza S. Pietro. The drawing was published for the first time in 1567 and a replica is published in 1572. You can see how the front of the basilica to the square retains its medieval structure. On the left is the Palazzo dell'arciprete with the coat of arms of the reigning pontiff, on the right the vestibule (Santa Maria in Turri), with the three doors giving access to the atrium, on the right the Lodge of Blessings, from three floors, with the pope and his entourage on the noble floor. Then the Palazzo di Paolo II and Innocenzo VIII, with the *portone di bronzo*. In the projecting body of the factory in the northern part the balcony of the papal trumpeters is shown in the foreground, and in this building on the first floor is the residence of the Swiss Guard. In the farthest part you can see the cortile di San Damaso, with the front of the Logge di Raffaello. A little to your left is the roof of the Cappella Sistina. A little further to the left you can see the pediment of the old basilica and a little further back the second outstanding pediment of the intermediate body of Antonio da Sangallo. Finally, you can see the huge drum in the dome, almost finished.

As most notable events up to that time, it is worth noting the activity of Pope Pius IV (1559-1565). He dedicated a large part of his papacy to resolving political disputes of his predecessors and strove to generate an amnesty that would give stability to Rome. On the other hand, he incurred in the fortification and beautification of Rome, dedicating resources to fix the churches in the area. With regard to S. Pietro, Pope Pius IV incessantly protected Michelangelo against the attacks of the clan of Sangallo, so that he could continue with his work.

Stage 23. 1589 A.D. *Sixtus V* (1585-1590)

The dome of *new S. Peter* is finished (Plan layout UE 23)

To reconstruct with some precision, the urban structure of the Vatican area in 1589, basically the plan of Étienne Dupérac and Antonio Lafreri, *"Pianta di Roma"*, made in

1577 (Figs.2.20a and 2.20b), also the drawing made by Leon Pitor, in 1568 (Fig. 2.22), as well as Mario Cartaro's plan, “*Le piante di Roma*” from 1576 (Figs.2.23a and 2.23b).
Dupérac's plan has many inaccuracies, the streets excessively wide and the buildings distorted and disproportionate. However, the layout of some roads (especially those that have evolved to date, and those that appear in the plane of Nolli and later) is known quite precisely, so it is possible to proceed in the reverse way and correctly locate most of the buildings and streets that appear in the drawing. This is possible since the dimensions and location of certain outstanding monuments and buildings are precisely known, such as the new basilica and the old basilica of S. Peter, the obelisk, the Castel Sant'Angelo, the Church of Santa Maria delle Febbre, as well as other churches and monasteries. If the exact position and dimensions of these monuments are known, estimates and triangulations can be made, and in this way all the constructions shown in the drawing can be located, and as a consequence Dupérac plan can be reconstructed to scale, in a sufficiently proportionate and dimensioned way. On the other hand, the urban structure of the Vatican hardly changed from the year 1577 until 12 years later, when the dome of S. Peter was completed. For all these reasons, the urban mesh of the Vatican area can be reconstructed with certain certainty and precision in the year 1589.
To see the evolution of the urban structure, the drawing by Antonio Tempesta, “*View of S. Peter’s square*“ (Fig. 2.24), which shows its state four years later, has also been used.
The work carried out by Leonardo Benevolo has also been especially useful (Fig. 2.25), reconstructing the urban structure in the vicinity of the ancient basilica of S. Peter in the times between Pope Pius IV (1559-1565) and Pope Paul V (1605- 1621) [59].
In Dupérac's drawing the intermediate section, the dividing wall and the surviving part of the longitudinal body of the old basilica, as well as the surrounding buildings, are perfectly recognized. With respect to Bufalini's plan, it can be seen that some buildings have been demolished in order to expand the square to the south by orders of Pius IV (1559-1565).
The Tempesta drawing shows the Vatican area as seen from the Gianicolo, and the buildings appear even more deformed than in Dupérac's drawing. For example, the surviving longitudinal body of the old basilica appears extremely reduced, and the atrium has almost disappeared. There are buildings that do not appear in Dupérac's drawing and vice versa. However, there are buildings that appear in the two drawings, which mean that they were outstanding constructions, and therefore they have been the first to be rebuilt in the plan. Tempesta's drawing is of great pictorial interest and

provides an enormous amount of information and details of all kinds. However, the buildings, streets and public spaces appear distorted, which is why an exhaustive dimensional restructuring work has had to be carried out to prepare the map of the situation of the urban structure of the year 1589. In any case, the graphic information has been completed with the historical information available about the most outstanding construction activity in the environment.

It should be noted that, in these times, and once Rome was established as the pontifical see, a plan was initiated to recover the lost prestige of the city through its beautification and magnificence. The transformation of the city began in the Borgo Nuovo.

For this purpose, several churches were built, such as the Santa Anna dei Palafrenieri, in 1565, commissioned by Pope Pius IV, the design was by Jacopo Barozzi da Vignola [60]. The new Santa Maria in Transpontina church was also built in 1566 by the Pope Sixtus IV as a replacement for an old chapel located closer to the river that had to be demolished for blocking the views and hindering the military protection strategies of the city. The dome had to be built as low as possible so as not to fall into the same problem as the previous chapel [61]. Years later, the San Salvatore in Lauro Church was built in 1587 together with a convent of S. Gregorio. In 1591 the church is destroyed by fire and needed to be rebuilt [62].

Despite the fact that the Leonine wall falls into disuse, it is preserved. Doors are opened in the wall to communicate the roads from one side to the other as seen in Dupérac's plan of 1577 (Figs. 2.20a and 2.20b) and in Mario Cartaro's of 1576 (Figs. 2.23a and 2.23b). The lands of the northern part of the interior of the wall built by Pius IV in 1565, are preserved as a cultivation area.

From 1587 to 1588 a new building was built to house the Apostolic Library and the secret archive located between the two great corridors from the Vatican Palace to the Belvedere, by the architect Domenico Fontana, for which two separate courtyards were created, the Cortile del Belvedere and the Cortile della Pigna [63].

The Tower of the Winds, or Gregorian Tower, is built in the Vatican Palace (1578-1580), located on one of the corridors that connect the Belvedere Palace with the Vatican Palace [64].

Regarding the new basilica of St. Peter, it should be noted that Pope Sixtus V (1585-1590) proposed to finish the body of the new basilica according to the design of Michelangelo.

In his first intervention he decided to demolish the choir of Bramante, and the new western arm, identical to the transversal ones, was completed in 1587. In the same year the preparatory work for the construction of the dome began by Giacomo Della Porta and Domenico Fontana. Della Porta modifies Michelangelo's wooden model, giving the dome a sharp arched profile, and in accordance with this project the structure is built. Work began in July 1588, and in May 1590 the construction of the ring at the base of the lantern was completed.

Sixto V also makes an impressive reform of the Piazza S. Pietro. In 1585 he commissioned Domenico Fontana to move the obelisk from its former location on the south side of the basilica to Piazza S. Pietro, and to raise it on the axis of the old basilica (which at that time was still believed to coincide with the axis of the new basilica that he was building right behind). The works began in April 1586 and on September 10 the obelisk was erected in the center of the Plaza. In 1592, the Church of Santa Maria delle Febbre was connected to the Clementine Chapel.

Via Alessandrina changed its name to Nuovo Borgo in 1570, as another street was inaugurated in Rome by Cardinal Alessandrino, which would bear his name [65].

Stage 24. 1667 A.D. *Alexander VII* (1655-1667)

New *basilica of S. Peter* is finished (Plan layout UE 24)

To reconstruct with some precision, the urban layout of the Vatican area in 1667, the plan made by Giovanni Battista Falda, *"Pianta di Roma"*, made just 9 years later, in 1676 was used (Figs. 2.26a and 2.26b). This plan was made when the main monuments of Baroque Rome had been completed. You can see the great building with the giant order of Michelangelo, almost isolated from the built environment, and emerging from the labyrinthine framework of the Vatican buildings. The building uses the Church of Santa Maria delle Febbre as a sacristy, which has survived in time almost miraculously. The enormous arms of Bernini are appreciated opening to the network of small houses of the Borgo. In the background you can see the Castel Sant'Angelo whose dimensions rival those of the new San Pietro. The drawing shows the new compact urban structure of the former *Campo Marcio*, which is connected to the Vatican area through a single bridge. The urban structure inside the Vatican also appears very compact, contrasting with the little existing building on the other side of the walls.

In 1643 Pope Urban VIII (1623-1644) ordered the construction of the Janiculum wall, as an extension of the Leonine wall. This new wall would provide better protection for the southern area near the river [66].

Later, Pope Alexander VII (1655-1667) promoted the architecture and general beautification of Rome, where houses were demolished to make new avenues and new buildings. He became a great patron, especially of Bernini.

As seen in the Tempesta plan of 1593 (Fig. 2.24), the construction of both arms of the Vatican Palace was completed, and the design of the interior gardens of the palace was adapted. The northern lands that were previously used for agriculture are subdivided and built, new roads appear in this area: The Borgo Angelico, the Borgo Vittorio and the Borgo Pio. In the northern part of the Vatican Palace, renovations were carried out to the Palace of Innocenzio VIII, and constructions were added that would later make up the Pio Clementino Museum [67].

In the preparation of the map corresponding to this period, the anonymous drawing dated between 1660-1699, “La pianta del Borgo di Roma”, Biblioteca Nacional de España, cod. bica0000055287, and the drawing “Plan of Rome in the XVII century”, made by Antonio Tempesta, and edited by Giovanni Giacomo De Rossi, 1661-1662. A Pietro Frutaz. “Le piante di Roma”. Rome: Instituto di Studi Romani (1962). Tav. 338.

Stage 25. 1748 A.D. *Benedict XIV* (1740-1758)

Plan by *Giambattista Nolli* (Plan layout UE 25)

The reconstruction of the urban structure of the Vatican area this year is very simple, since it basically must coincide with the plan of Giambattista Nolly (Figs. 2.27a and 2.27b).

Gianbattista Nolli (1701-1756) was an architect and worked in Milan as a surveyor, and with a group of assistants he drew up the plan of all of Rome and its surroundings. This work was carried out by himself, without the financial help of anyone, not even the pope, and published it in 1748, under the name *"Nuova topografía di Roma"*. The plan of the city of Rome consists of 12 boards and covers an area of 30 km^2. The accuracy of the drawing is surprising and not only the buildings and streets are graphed, but also details of the interior courtyards of the buildings, and even details of the terrain. The accuracy is so great that you can even see the eccentricity of the obelisk with respect to the axis of the new basilica (about 3.8 m.). The work was not republished since Nolli could not find a buyer, and he died practically destitute in 1756.

In the plan it is clearly seen how the concentration of constructions occurs mainly within the walls and on the river bank, while the land outside the walls is preserved as an area of crops with very few houses that are distributed along the roads that existed.
The construction activity carried out until 1748 was quite remarkable, and one of the most relevant events was the construction of the Santa Maria Annunziata in Borgo church, between 1742 and 1745, by the architect Pietro Passalacqua as an oratory for the brotherhood of the Hospital di Santo Spirito in Sassia [68].

Stage 26. 1883 A.D. *Leo XIII* (1878-1903)

First urbanistic plan of Rome (Plan layout UE 26)

To reconstruct the state of the urban structure of the *Vatican* area in 1883, the year in which the first urban regulation plan was made, the plan of Pietro Ruga of 1823 has been taken into account (Fig. 2.28a and 2.28b), the Letarouilly plan of 1838 "Plan of Rome moderne" (Figs. 2.29a and 2.29b), the Letarouilly plan "Guide to Rome" of 1841-1852 (Figs. 2.30a and 2.30b), and especially the plan of development and expansion of the city of Rome, of Augusto Thiollet in 1873 (Figs. 2.31a and 2.31b). Finally the plan developed by an anonymous author, in 1884 (Figs. 2.32a and 2.32b).), as well as the plan of the "Extension of the Borgo District city plan", with provisions of the 1883 plan, by Virano 1888 (Fig. 2.33),
Ruga's 1823 plan (Fig. 2.28a and 2.28b) shows the advance of the Vatican Palace, and the construction of the northern area is not yet fully consolidated. The expansion of the Belvedere and the construction of the 2 corridors that would later link the Belvedere with the rest of the Vatican Palace are not yet finished. Another thing that Ruga's plan shows is the use of the lands at the rear of the basilica, these lands are kept as agricultural use just like all the other lands outside the walls.
Pope Pius VII (1800-1823) ordered the construction of the new arm of the Chiaramonti Museum inside the Vatican Palace, inaugurated in 1822. A new area was needed to reorganize the pontifical collections that were recovered from France. This new construction communicates in a perpendicular way the 2 great corridors of the Vatican Palace [69].
In 1777 the Church of Santa Maria delle Febbre was demolished. Between the years 1792-1793 the vestibule of the Four cancelas in the Vatican Palace was built by Giuseppe Camporese, which was the old entrance to the Vatican Museums [70].

As can be seen in the Letarouilly plans of 1838 (Figs. 2.29a and 2.29b) and 1852 (Figs. 2.30a and 2.30b), the church of Santo Stefano Minore collapses, giving rise to another construction in its place south of the basilica. The Schola Francorum cemetery also undergoes some modifications due to this.

Thiollet in 1873 (Figs. 2.31a and 2.31b) like an anonymous author in 1884 (Figs. 2.32a and 2.32b), they make plans that include the name of avenues, squares, gardens, doors, villas and churches, as well as a shading that represents the topography that helps to understand why the city developed in this way.

In the preparation of the plan corresponding to this time, also has been taken into account the drawing “Roma in the XVIII century”, made by Giuseppe Vasi, in 1781, A Pietro Frutaz. “Le piante di Roma”. Rome: Instituto di Studi Romani (1962). Tav. 447.

Stage 27. 1950 A.D. *Pius XII* (1939-1958)

Inauguration of *Via della Conciliazione* (Plan layout UE 27)

To reconstruct the state of the urban structure of the Vatican area in 1950, the current situation of the urban structure of Rome has been taken into account (Fig. 2.1), as well as the plan of the “Extension of the Borgo District city plan”, with provisions of the 1883 plan, by Virano 1888 (Fig. 2.33), and a large number of photographs, building plans and partial topographic studies. To reconstruct the urban structure in the vicinity of the basilica of S. Peter, the work carried out by Leonardo Benevolo on the evolution of the Borgo district in the 1930s has been of special importance [71] (Fig. 2.34).

Among the most important construction activity in the Vatican area, it is worth highlighting the construction, in 1886 of the Vittorio Emanuele II bridge, and inaugurated in 1911. The bridge connects through the Tiber river, the historic center of Rome with the Borgo and Vatican City. It is located very close to where the *Pons Neronianus* was formerly located. A few years later, the Principe Amadeo Savoia Aosta bridge was built between 1939 and 1942.

The plan of Virano of 1883, shows the three bridges that connect the Vatican with Rome: Ponte Sant Angelo, Ponte Vittorio Emanuele II and Ponte Principe Amedeo Savoia Aosta.

Inside the Vatican gardens, in 1926, the Church of Santa Maria Regina della Famiglia was built. It was ordered to be built by Pope Pius XI (1922-1939) behind the basilica of S. Peter to be the new headquarters of the Pontifical Romano Minor Seminary along with a chapel dedicated to Saint Martha [72].

In 1936, the construction of *Via della Conciliazione* began, which connects Piazza S. Pietro with Castel Sant'Angelo. It is concluded in 1950 for the Jubilee. This intervention caused the loss of a large part of the Borgo's urban structure. The palaces and churches that were affected were later built using some of their original features [73].
After the signing of the Lateran pacts, on February 22, 1929, between the Kingdom of Italy and the Holy See, it was established that the government of Italy would build and finance a railway line that would connect a station to be built within the City of Vatican [74]. That same year the works began and were concluded in 1932.
In 1927 Pope Pius XI founded the Ethnological Missionary Museum in the Vatican. Due to the large number of works of art that the Vatican had and the need for a new site with the proper conditions and care to ensure its conservation, in 1932 the Vatican Pinacoteca was ordered to be built [75].

Stage 28. 2020 A.D. *Francis I* (2013-) (Plan layout UE 28)

The situation of the current urban structure of the *Vatican* area is perfectly defined, and has been carried out by means of high-tech topographic studies, and using satellite photographs.

2.6. Historical value of the urban plans made

The urban plans made correspond to different consecutive stages in the evolution of the urban structure of the Vatican area, and have been drawn up based on all the information gathered. However, no matter how extensive the information collected has been, it is always insufficient, and errors of interpretation or deduction can always be made. As a consequence, the drawings produced may contain errors and inaccuracies, which can certainly be easily corrected in the future. Obviously, these possible errors and inaccuracies are greater the further we go in time.
Despite this, these scale plans are of great importance for the History of Art, and can be very useful in several aspects, among which the following stand out:

1. They allow a better understanding of the history of the Vatican area, and especially its social, artistic, architectural and urban development.
2. They allow contextualizing isolated events in the history of art in the Vatican area and its immediate surroundings.

3. They allow the visualization of the urban mesh of the Vatican area in each of its historical stages.
4. They allow a better understanding of the most important architectural and urban actions carried out at each stage.
5. They make it possible to identify the main urban plan layouts that, like historical scars, have characterized the evolution of the Vatican area.
6. They provide a suitable context for the analysis of the historical evolution of the most important buildings in the Vatican area, such as the old Constantinian basilica, the new basilica of St. Peter, the Mausoleum of the Severan dynasty, the Mausoleum of Honorius, the Circus of Nero, and many others.
7. They provide a detailed graphic context to frame future research on specific aspects, or specific buildings, included in the Vatican area.

Therefore, the plans made are not intended to be definitive, but rather a graphic environment that can be improved with future research by scholars of any building in the Vatican area. Based on new research, these plans can be enriched, and they can be modified, providing increasingly accurate and detailed information on the state of the urban structure of the Vatican area, in the different stages of its historical evolution.

Notes

[1] This archaeological plan by Paolo Liverani is located in: Paolo Liverani, *La topografia antica del Vaticano* (Città del Vaticano: Edizioni Musei Vaticani, 1999)

[2] To know the possible origins of the word *Vaticanus* (Vatican) can be consulted: Benjamin Blech, *The sistine secrets, Michelangelo's forbidden Messages in the Heart of the Vatican* (New York: Harper Collins, 2009)

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[4] The most complete reference on the details of the construction of the foundation platform is: Richard Gem, 'From Constantine to Constans. The chronology of the construction of Saint Peter's basilica', in McKitterick, Rosamond; Osborne, John; Richardson, Carol M.; Story, Joanna (eds.). *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013), p. 46

[5] Samuel Ball Platner and Thomas Ashby, *A Topographical Dictionary of Ancient Rome*, (London: Humphrey Milford. Oxford University Press, 1929)

[6] The most complete reference on the *Meta Romuli* and the *Terebinthus Neronis* is: Laura Petacco, 'La Meta Romuli y Terebinthus Neronis', in *Prima della Spina. Dall´agro vaticano a via della Conciliazione*, Parisi Presicce, Laura Petacco (a cura di) (Roma: Gangemi, 2016), pp. 33-41; For more information on the *Horti di Agrippina* see in the same book: Maddalena Cima, 'Horti di Agrippina', in *Prima della Spina. Dall´agro vaticano a via della Conciliazione*, Parisi Presicce, Laura Petacco (a cura di) (Roma: Gangemi, 2016), pp. 41-47

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[10] Filippo Magi, 'Il Circo Vaticano in base alle più recenti scoperte, il suo obelisco e i suoi carceres', in *Rend Pont Acc, XLV* (1972-73), pp. 37 ss.

[11] In the plans made by Rodolfo Lanciani his deductions on the urban structure of the Vatican City in three historical periods are superimposed: ancient Rome, the Middle Ages and the present. The Lanciani plans have multiple inconsistencies, as for example, they show Nero's circus with the entrance facing west, which is impossible as this part was partially excavated into the hill and was on the opposite side of the access road (which came from the east). However, some aspects of the Lanciani drawings are correct and very useful. These plans are included in the following publications: Rodolfo Amedero Lanciani, *The ruins and excavations of ancient Rome. A companion book for students and travellers* (London: Macmillan, 1897); Rodolfo Amedero Lanciani, *Forma Urbis Romae*, Istituto Nazionale di Archeologia s Storia dell Arte (Roma, 1901); Rodolfo Amedero Lanciani, *Storia degli scavi di Roma e notizie intorno le collezioni romane di antichità*, I, (Roma: E. Loescher, 1902)

[12] Miriam Griffin, *Nero: The End of a Dynast* (New Haven, 1984), p. 239

[13] Ferdinando Castagnoli, *Circo di Neron in Vaticano*, Atti della Pontificia Academia Romana di Archeologi (Roma, 1959)

[14] Pietro Zander, *The Necropolis Under St. Peter´s Basilica in the Vatican* (Fabbrica di San Pietro, Roma: Elio de Rosa Editore, 2009), p. 73; See also Italian edition: *La Necropoli sotto la Basilica di San Pietro* (Roma: Elio de Rosa Editore, 2007)

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[22] Giuseppe Zecchini, *Attila en Italia: ragioni politiche e sfondo ideológico*, L´Erma di Bretschneider (Roma, 1994), p. 162

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[30] Édouard De Bleser, *Rome et ses monuments. Guide du voyageur catholique* (Paris: Wenteorth Press, 1870), p. 467

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[35] Sheila Gibson and Bryan Ward-Perkins, *The surviving remains of the Leonine wall,* PBSR 47 (London: British School of Rome, 1979), pp. 30-57; Sheila Gibson and Bryan

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[41] Detailed information can be found at: Cesare D´Onofrio, *Castel Sant´Angelo e Borg otra Roma e Papato* (Roma: Romana Societá Editrice, 1978)

[42] Carrol William Westfall, *L´invenzione della cittá, L´evoluzione del palazzo del vaticano (XII-XV secolo),* p. 377

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[49] Marcello Fagiolo and Maria Luisa Madonna, 'Lo sviluppo urbanístico dei Borghi dal 1500 al 1870', in *La Spina. Dall´agro vaticano a via della Conciliazione*, Parisi Presicce, Laura Petacco (ed.) (Roma: Gangemi, 2016), pp. 85-97

[50] The best reference for the study of the construction and evolution of the Meta Romuli is: Laura Petacco, 'La Meta Romuli y Terebinthus Neronis', in *Prima della Spina. Dall´agro vaticano a via della Conciliazione*, Parisi Presicce, Laura Petacco (a cura di) (Roma: Gangemi, 2016), pp. 33-41

[51] There is complete information in: Laura Gigli, *Guide Rionali di Roma, Borgo III* (Roma: Fratelli Palombi Editori, 1994)

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[53] Pierluigi De Vecchi, *Raffaello* (Milano: Rizzoli, 1975), p. 267

[54] Christiane Denker, *Bramante´s spiral staircase* (Cittá del Vaticano, 1996)

[55] See: Christoph Luitpold Frommel, 'San Pietro, Storia della sua construzione', in Frommel, C. L., Ray, S., Tafuri, M., *Raffaello architetto* (Milano, 1984), pp. 241-310; It is also very interesting: Flavia Cantatore, "In margine alla vita di Giannozzo Manetti: scrittura e architettura nella Roma di Niccolò V", in *Leon Battista Alberti. Architetture e Committenti*, a cura di Arturo Calzona, Joseph Connors, Francesco Paolo Fiore, Cesare Vasoli (Firenze-Rimini-Mantova: Leo S. Olschki Editore, 2009)

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[62] Arnaldo Morelli, *I Tronci, I Priori e gli organi di San Salvatore in Lauro a Rome*, Amici dell´organo, serie II, Associazione Musicale Romana, (Roma, 1982), p. 421

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FIGURES 2

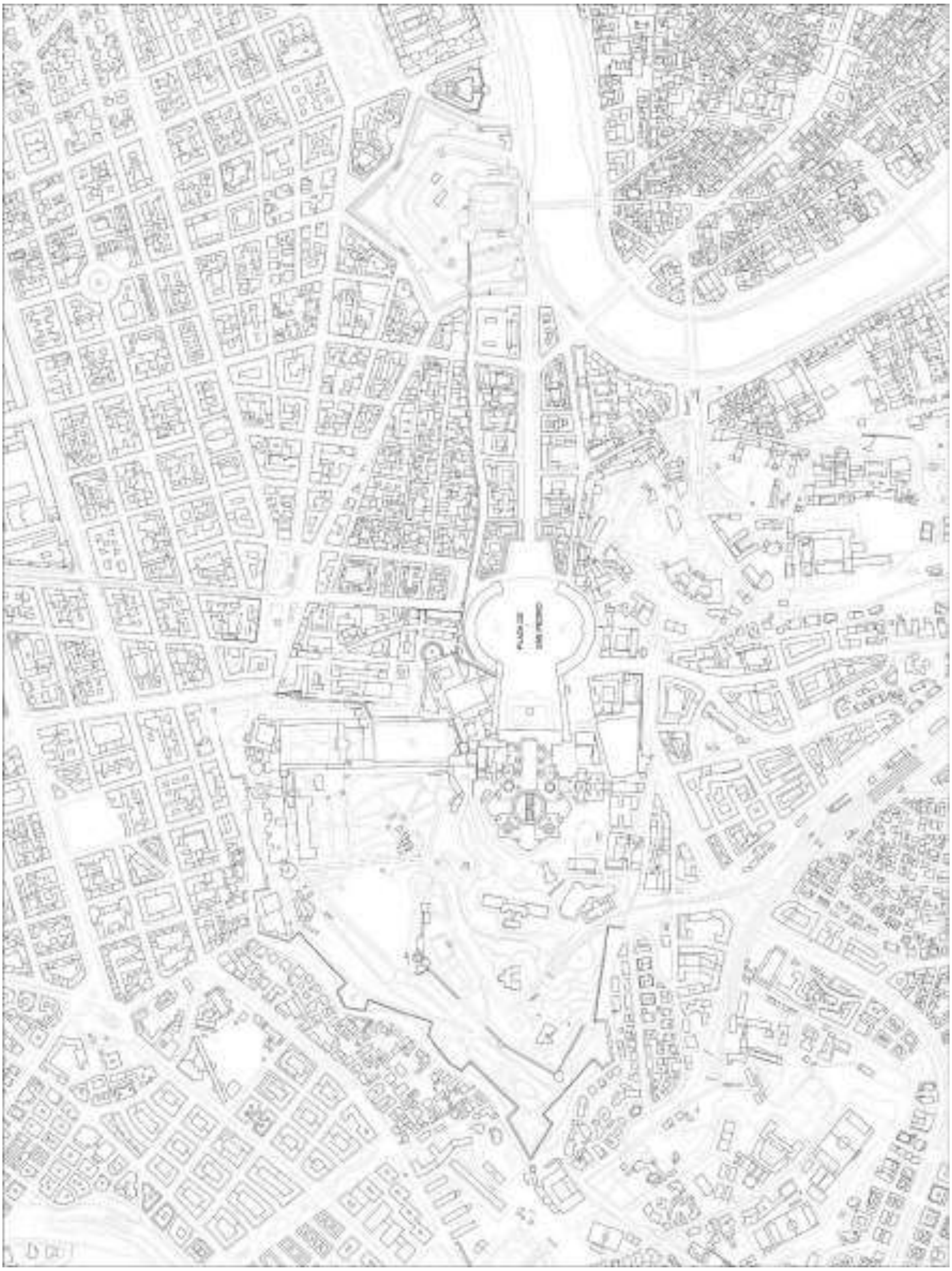
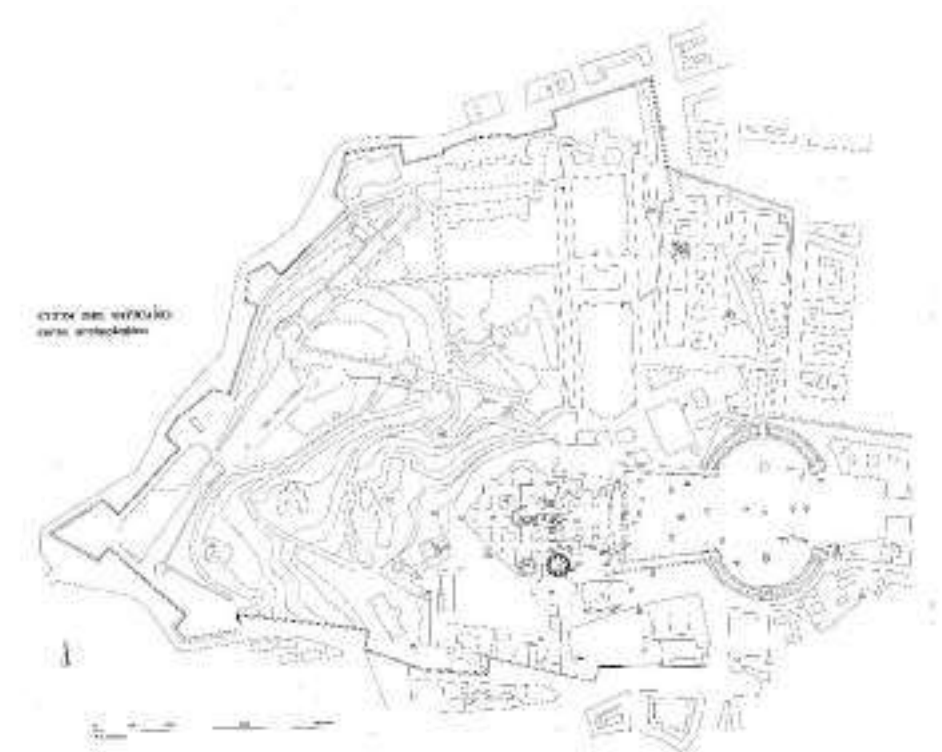
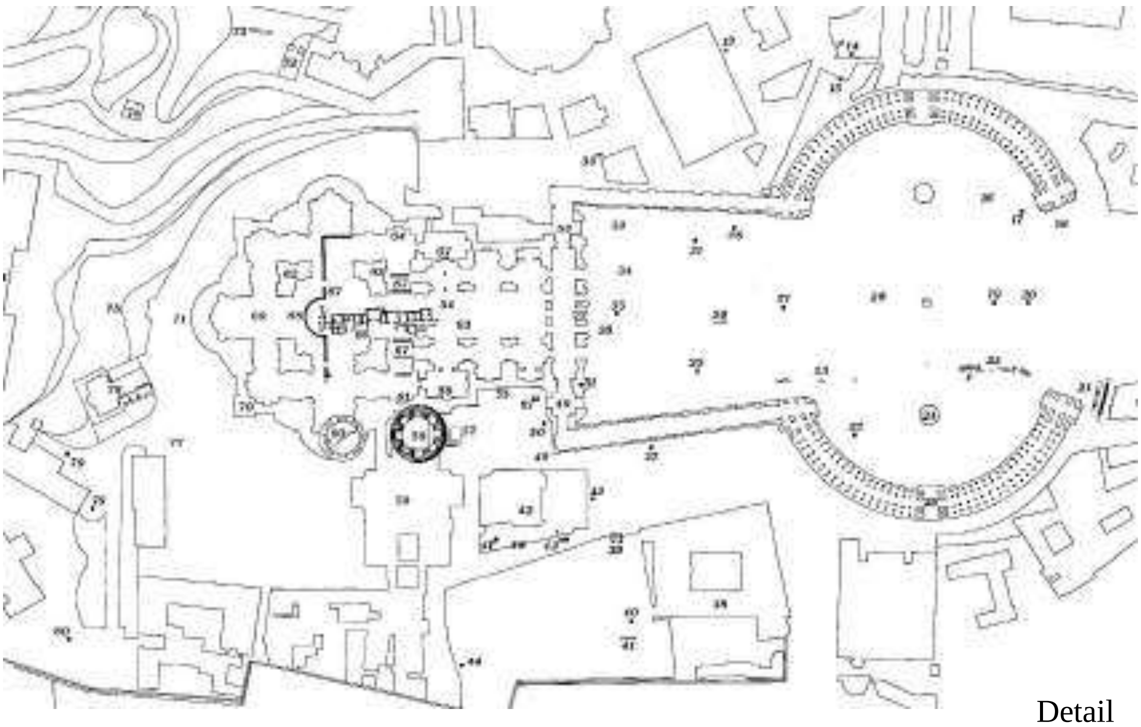


Figure 2.1

Cadastral map of Rome, 2020





Detail

Figure 2.2

Citta del Vaticano, carta archeologica

Paolo Liverani, 1999

Paolo Liverani. *La topografía antica del vaticano*. Vatican City: Monumenti, musei e gallerie pontificie (1999), p. 181

Detail

Figure 2.3

Visione della croce, Fresco

Giulio Romano and Raffaellino del Colle (Scuola di Raffaello), 1520-1524

Sala di Costantino, Musei Vaticani

Figure 2.4a

Roma nel sec. XVI.

Leonardo Bufalini, 1551

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 210-221

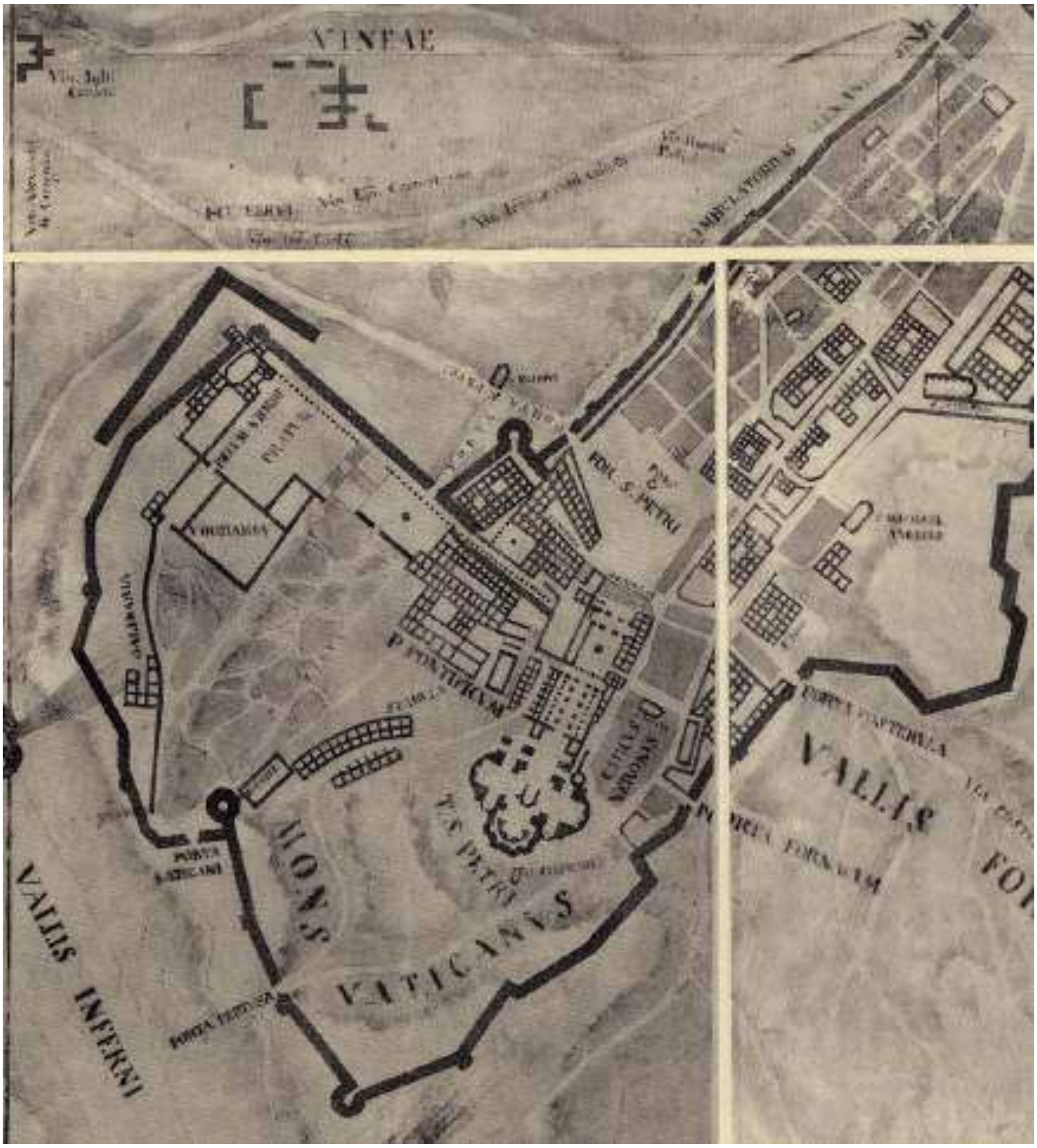


Figure 2.4b

Roma nel sec. XVI. Detail

Leonardo Bufalini, 1551

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 210-221

Figure 2.5a

Roma antica

Rodolfo Lanciani, 1893 - 1901

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 102-109

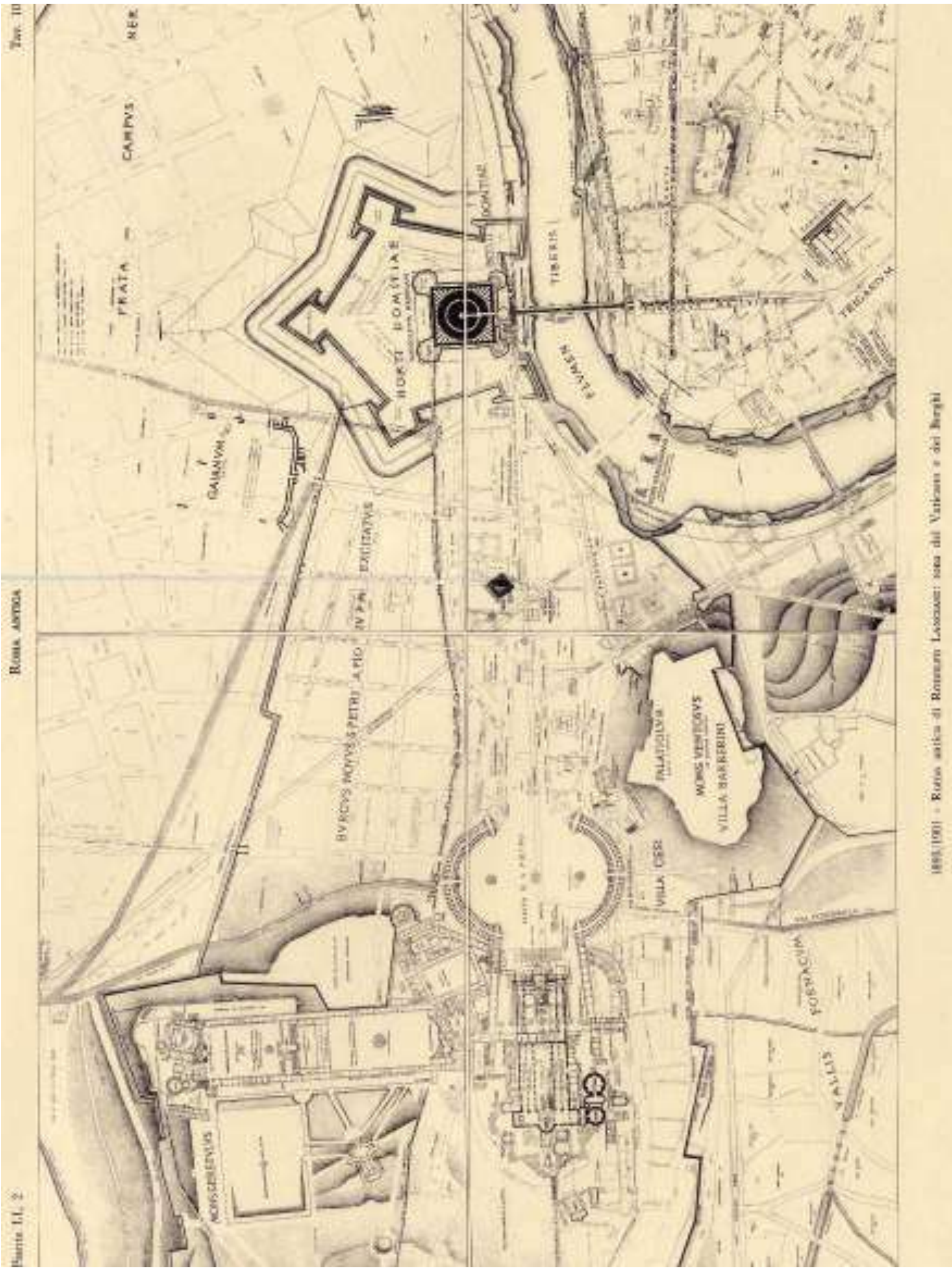


Figure 2.5b

Roma Antica. Zona del Vaticano e dei Borghi

Rodolfo Lanciani, 1893 - 1901

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 103

Figure 2.6a

Roma antica

Stefano Duperac, 1574

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 37

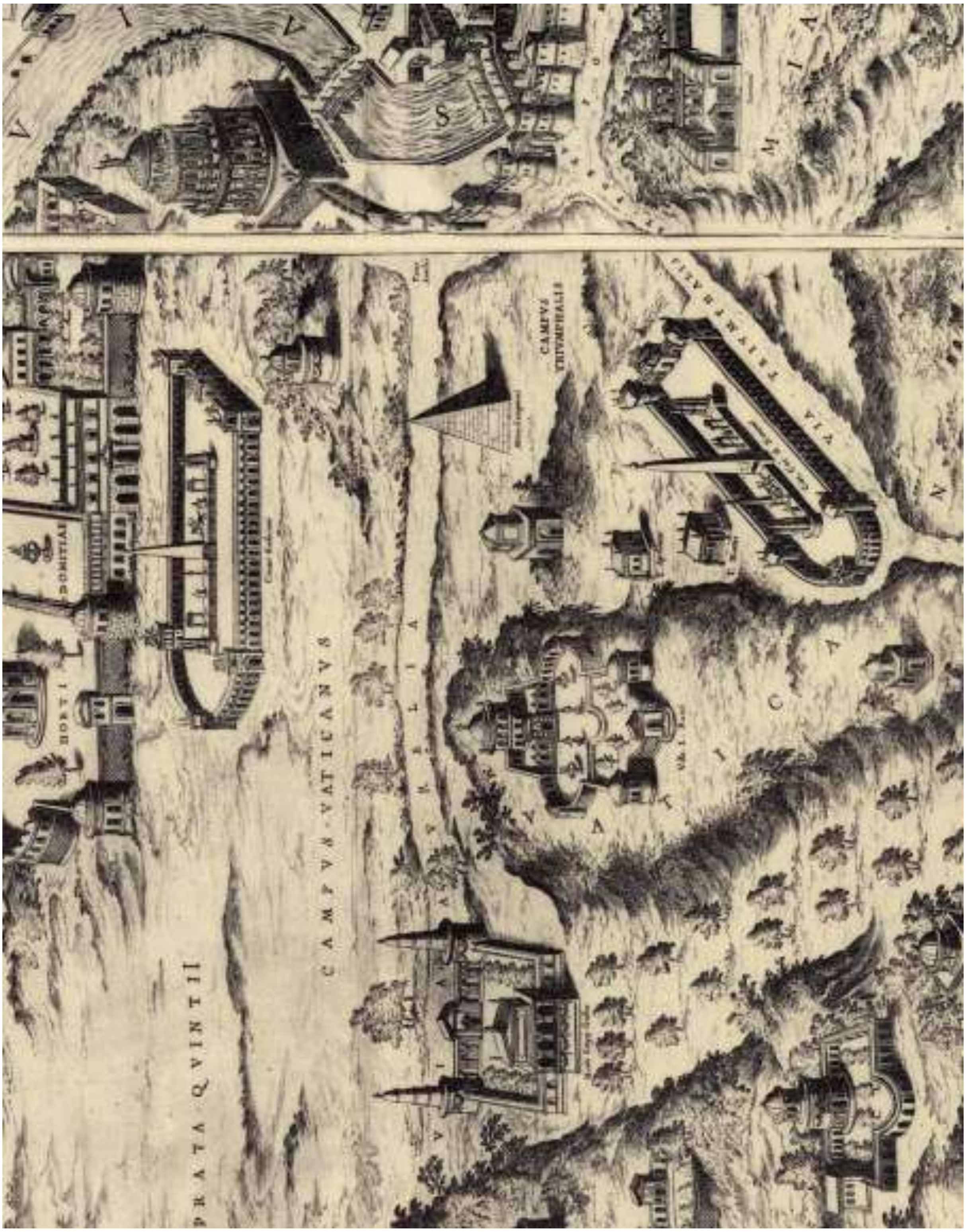


Figure 2.6b

Roma antica. Detail

Stefano Duperac, 1574

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 37

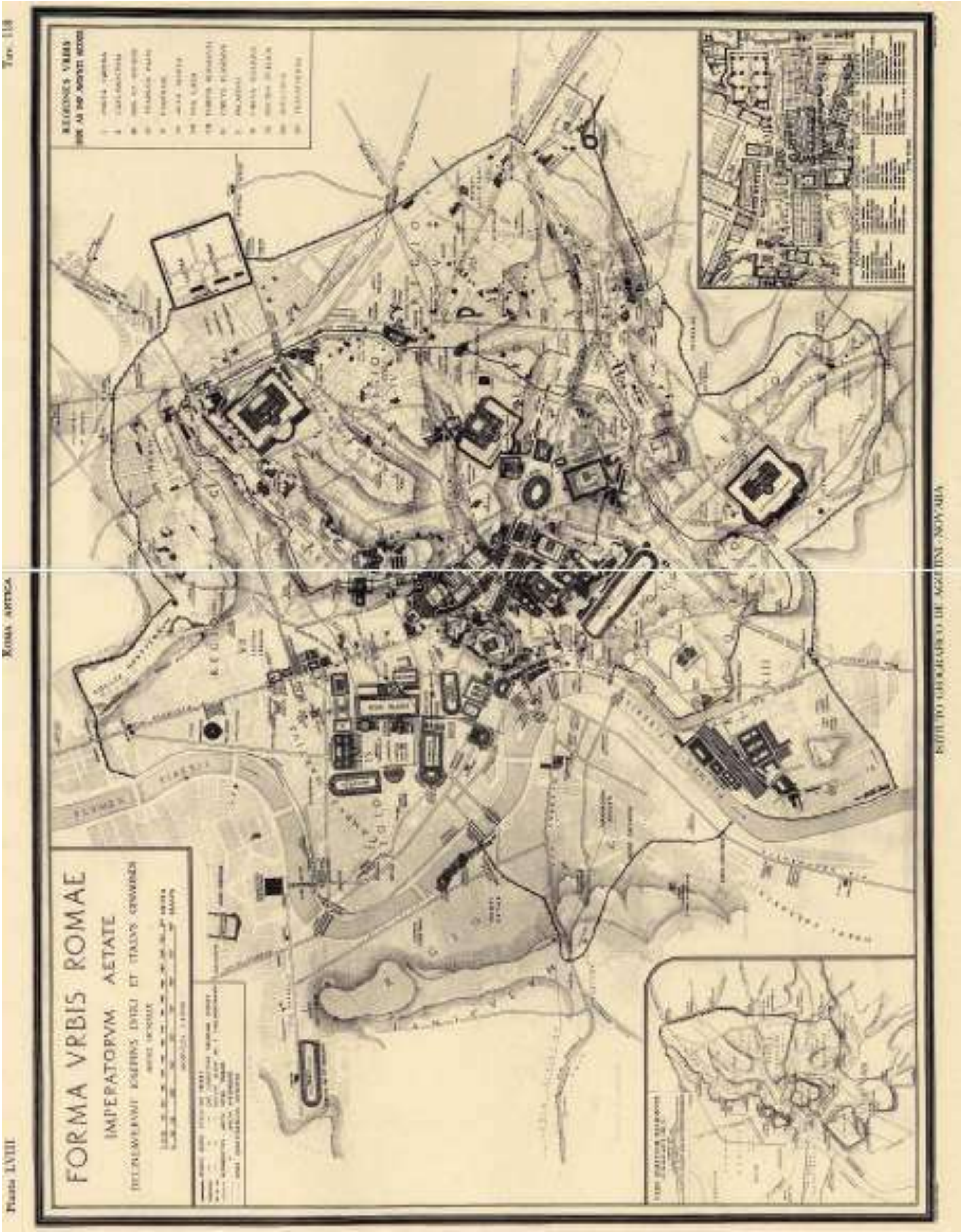


Figure 2.7a

Roma antica. *Forma Urbis Romae.* Detail.

Giuseppe Lugli and Italo Gismondi, 1949

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 118

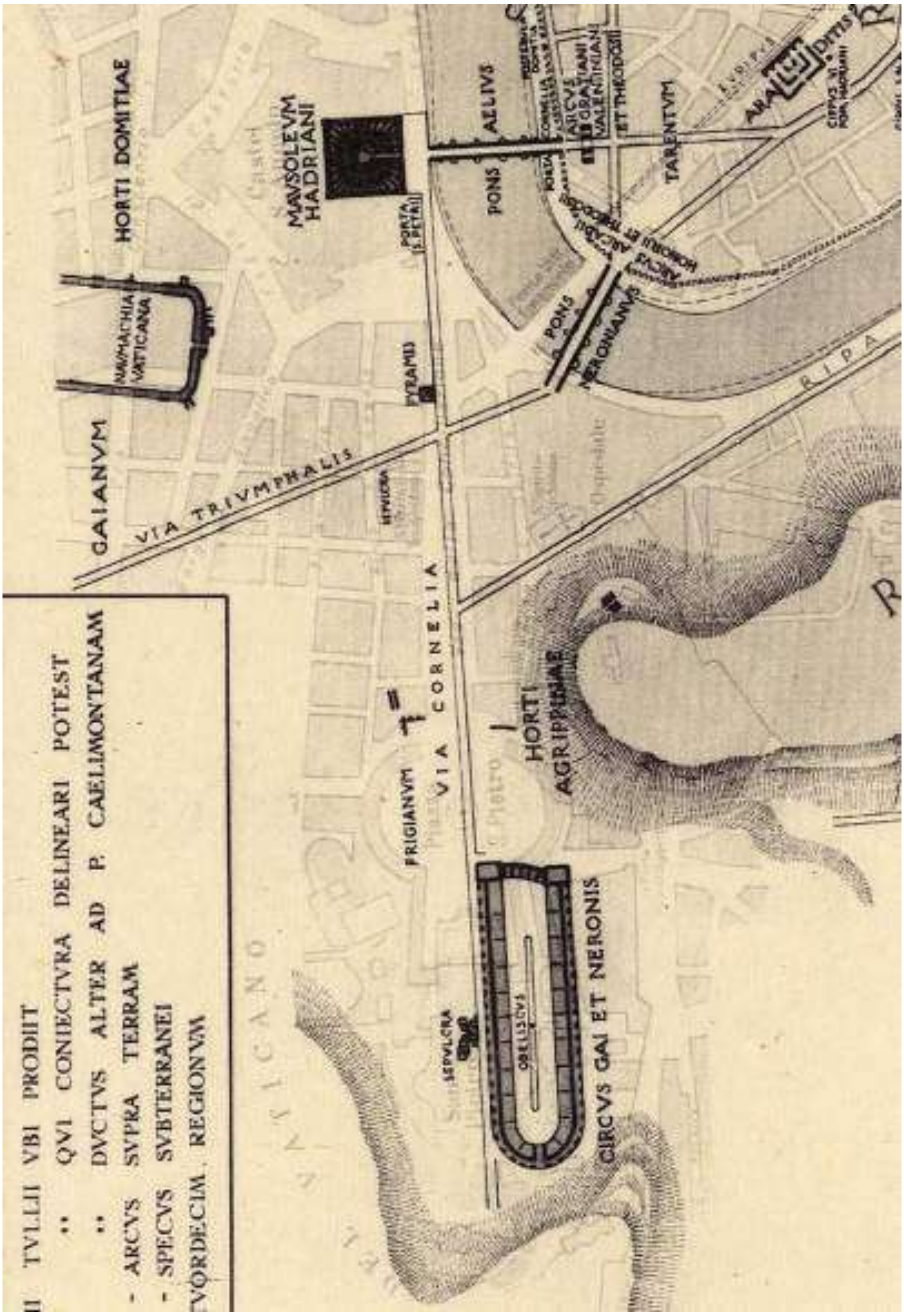


Figure 2.7b

Roma antica. Forma Urbis Romae. Detail

Giuseppe Lugli and Italo Gismondi, 1949

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 118

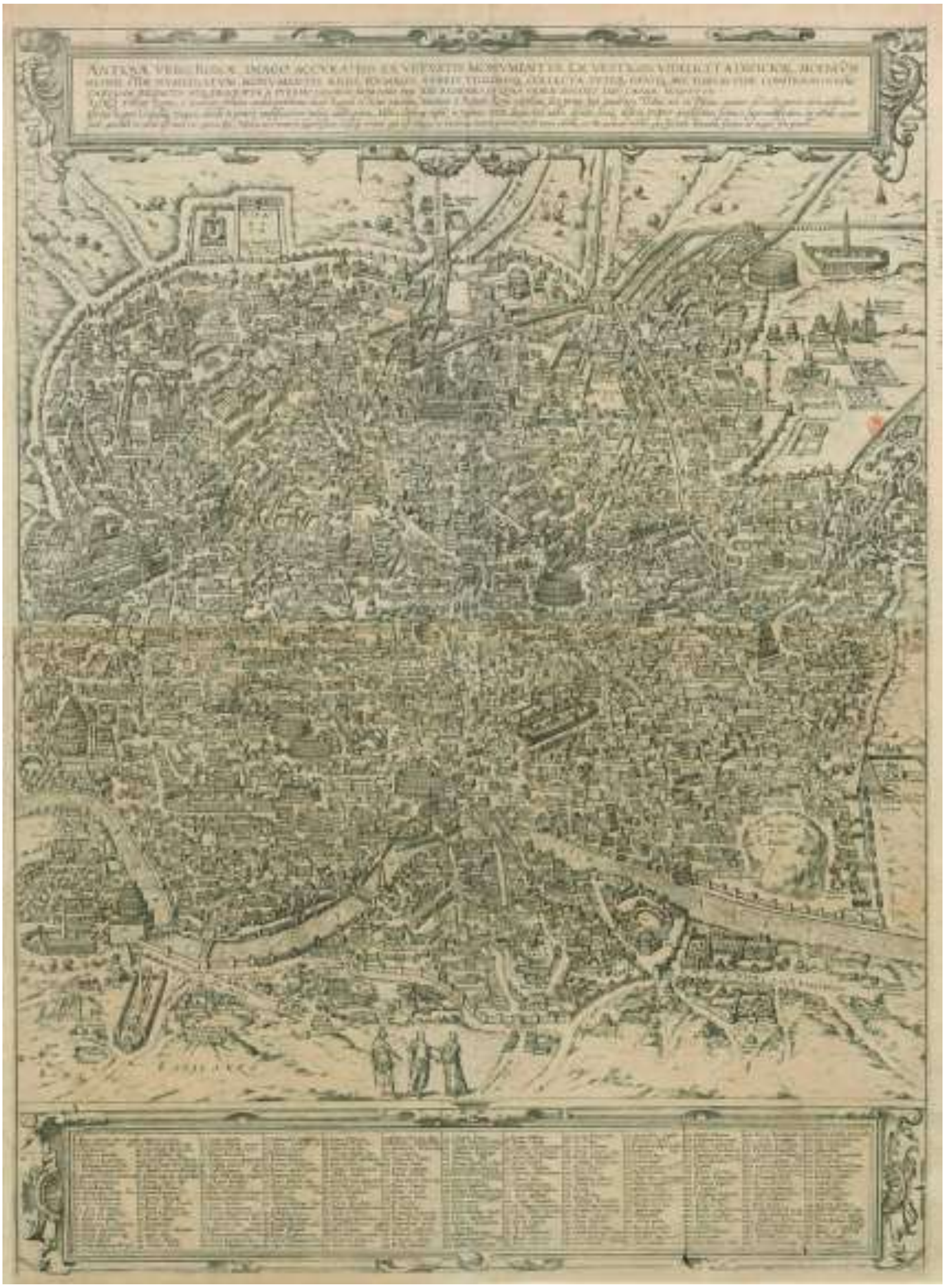


Figure 2.8a

Antiquae Urbis Romae Imago accuratissime ex vetustis monumentis formata

Pirro Ligorio in 1551, printed by Jacopo Rossi in 1561

Bibliothèque Nationale de France, cod. GE BB-246 (XII,158-159RES)

Figure 2.8b

Antiquae Urbis Romae Imago accuratissime ex vetustis monumentis formata. Detail

Pirro Ligorio in 1551, printed by Jacopo Rossi in 1561

Bibliothèque Nationale de France, cod. GE BB-246 (XII,158-159RES)

Figure 2.9a

Urbis Romae totius olim orbis domitricis situs, cum adhuc extantibus sacrosanetae vetustatis monumentis

Pirro Ligorio, 1570

Bibliothèque Nationale de France, cod. GE D-17740

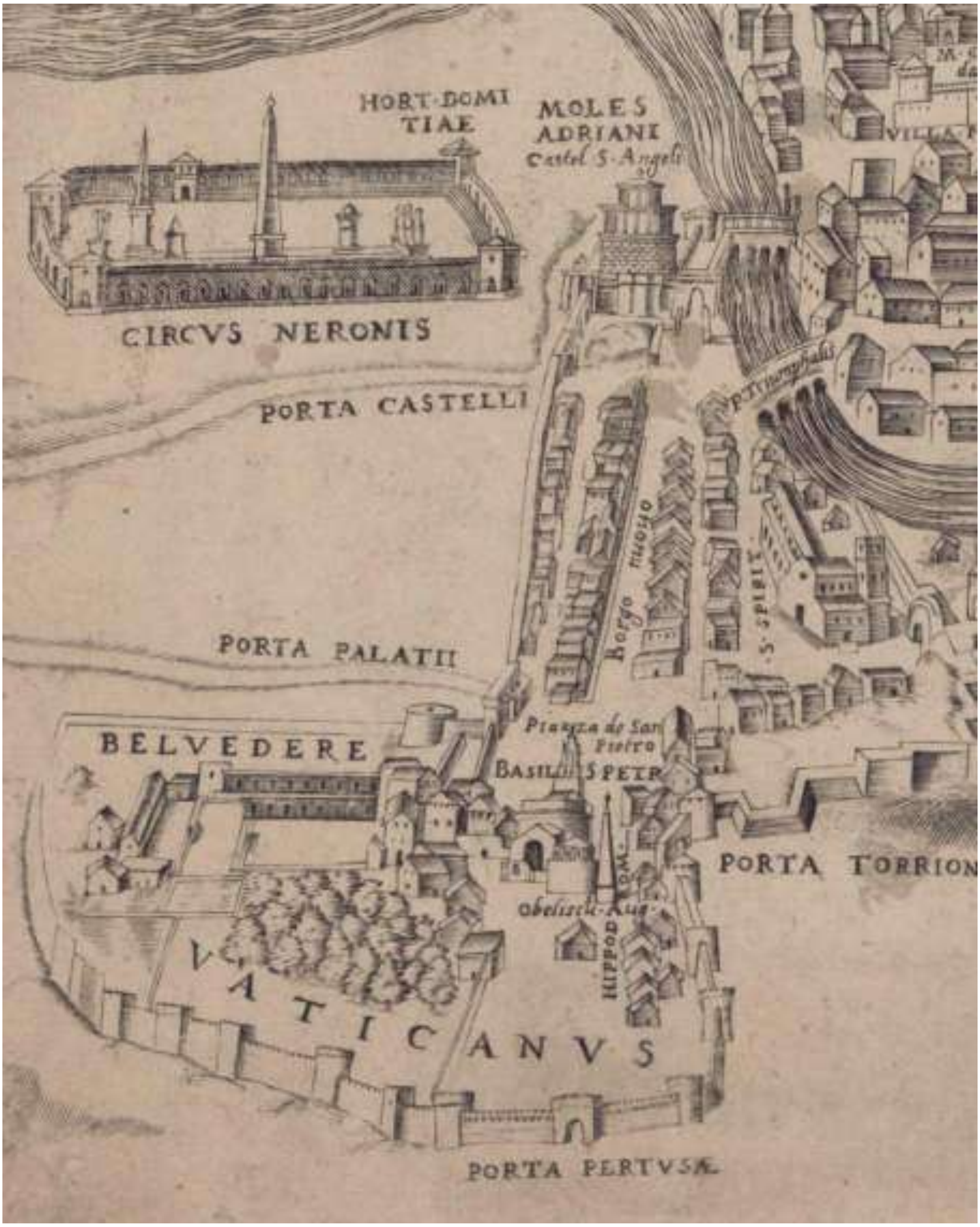


Figure 2.9b

Urbis Romae totius olim orbis domitricis situs, cum adhuc extantibus sacrosanetae vetustatis monumentis. Detail

Pirro Ligorio, 1570

Bibliothèque Nationale de France, cod. GE D-17740

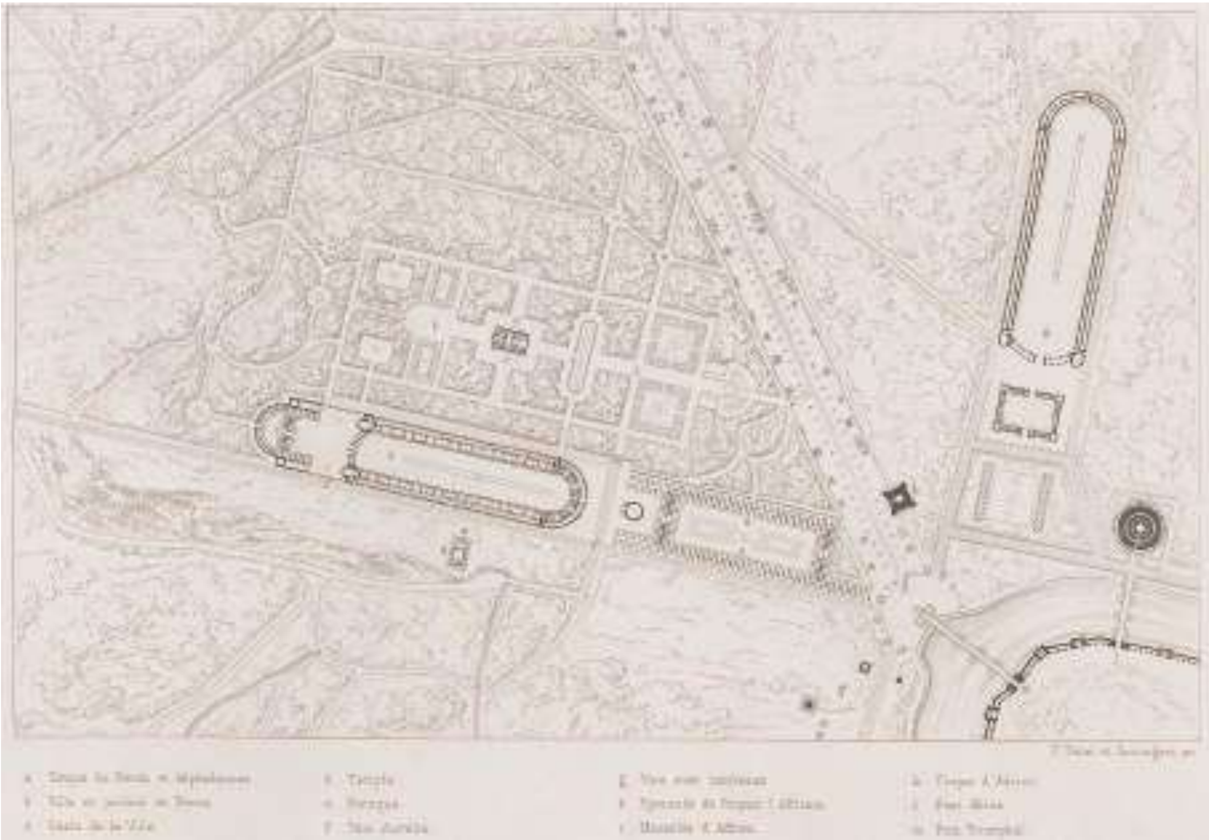


Figure 2.10

General plan of the ancient Vatican district in the 2nd century

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Chapter Cirque de Caius Caligula et Neron, PL1, fig. 2

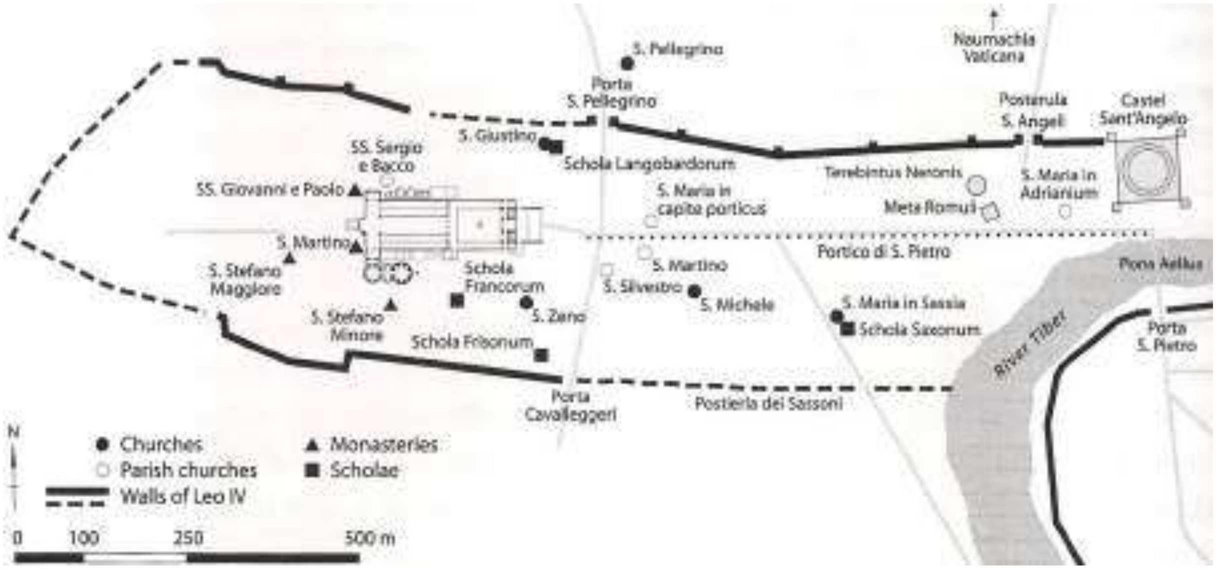


Figure 2.11

The medieval ecclesiastical institutions and classical structures in the environs of S. Peter´s

Rosamond McKitterick

Old Saint Peter´s Rome. Rome (2013), p. 274

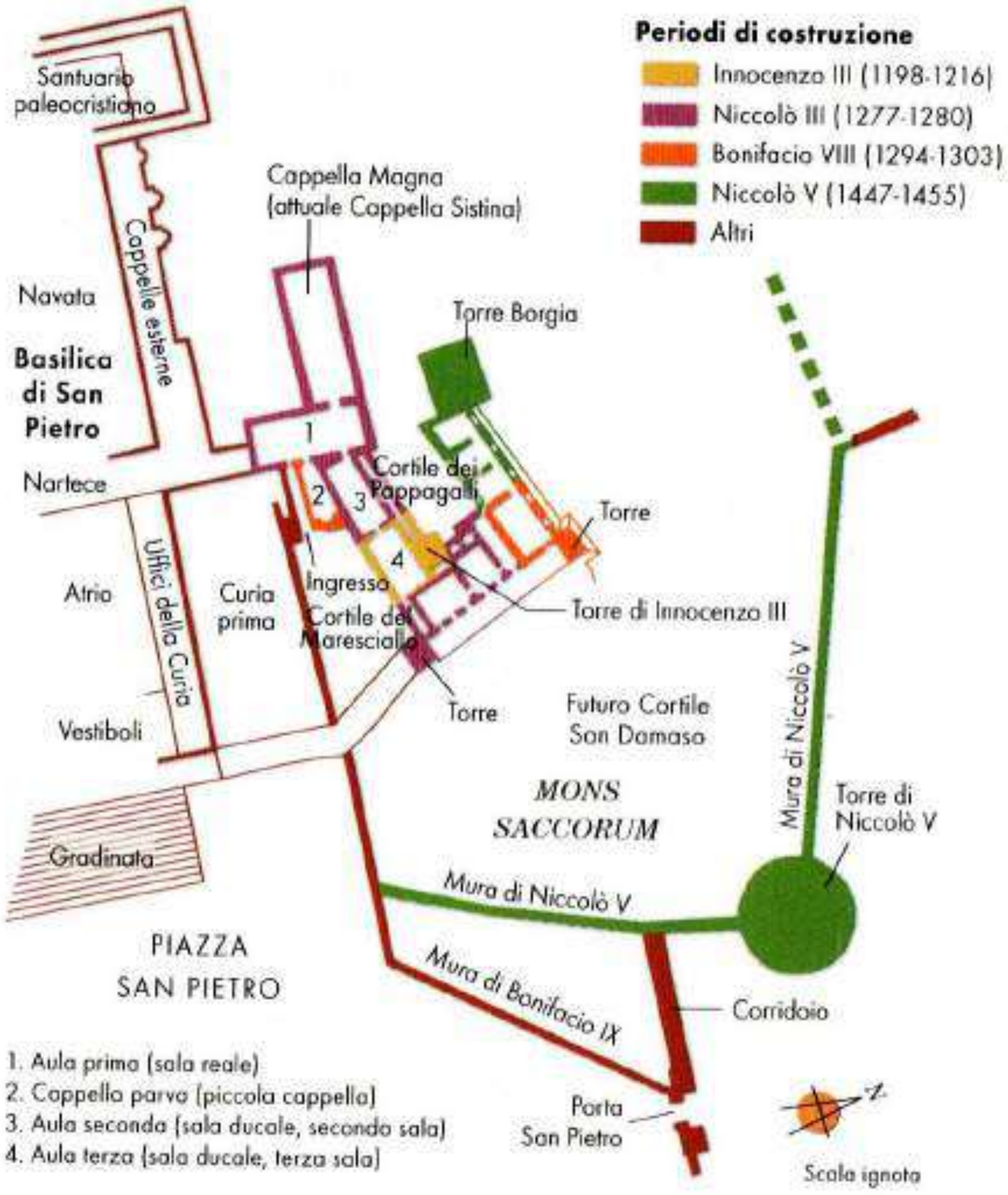


Figure 2.12

The evolution of the Vatican Palace (XII-XV century)

C. W. Westfall

C. W. Westfall. *L´invenzione della cittá* NIS La Nuova Italia Scientifica. Rome (1984), p. 76

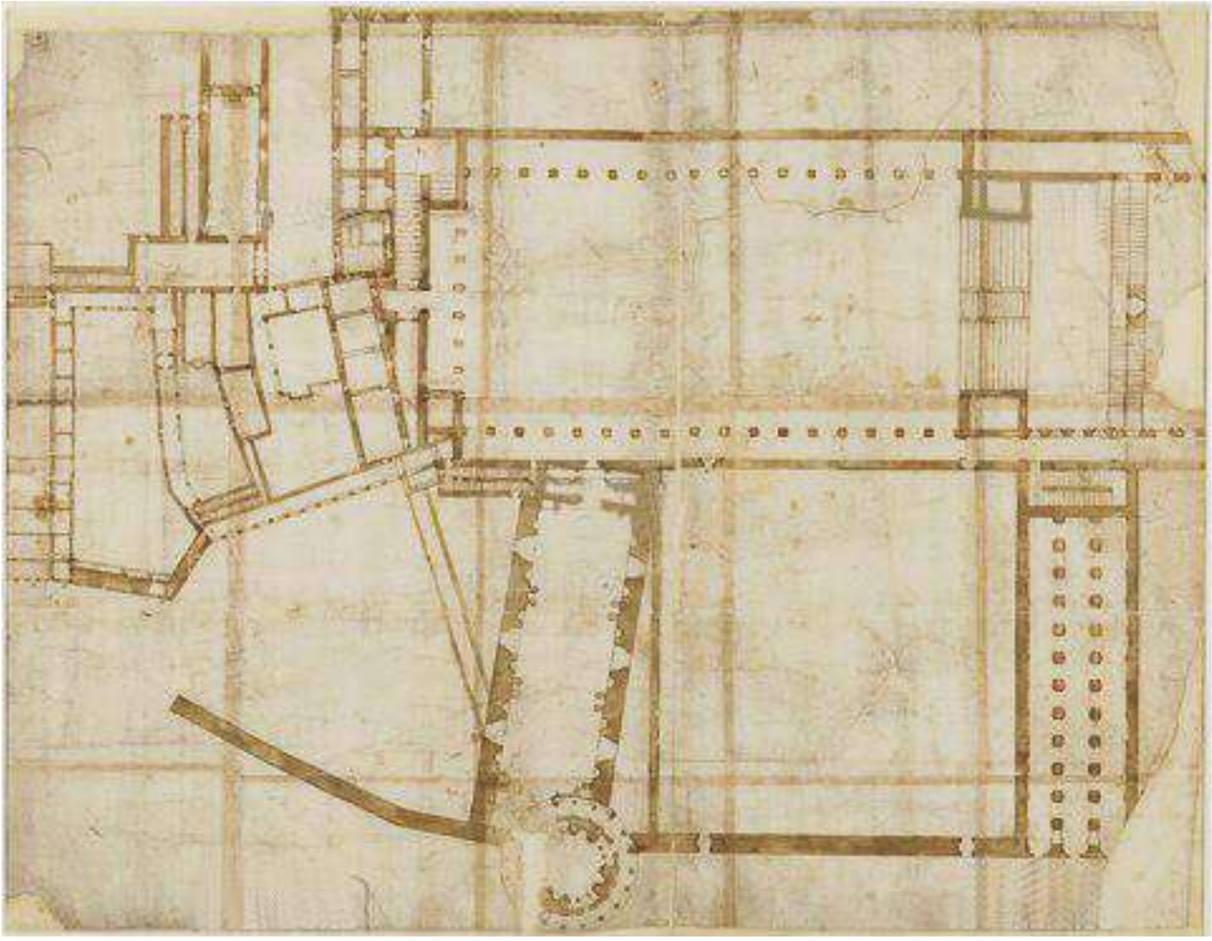


Figure 2.13

Plan of the Palazzo Vaticano in Rome

Donato Bramante

GDSU 287 Ar

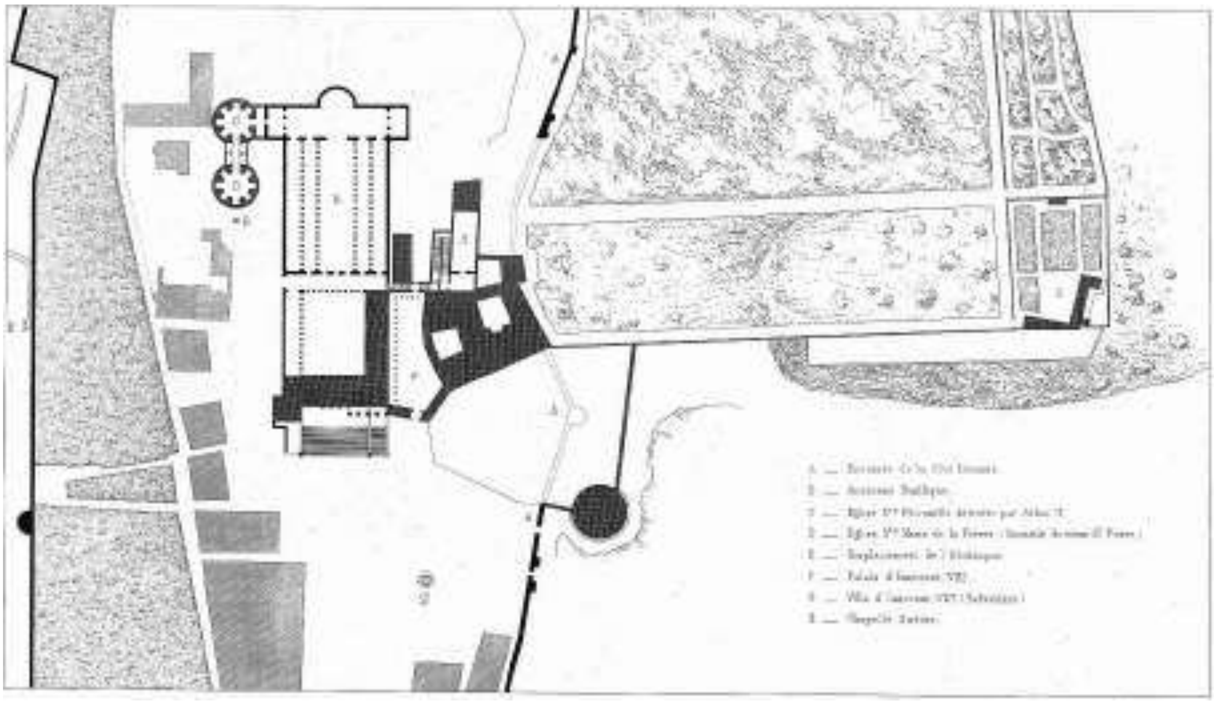


Figure 2.14

General plan for the Basilic of S. Peter in vatican, final of XV century

Paul Marie Letarouilly

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Chapter, Projets divers pour la basilique de St. Pierre, PL 1

Detail

Figure 2.15

View of Rome, detail of Borgo, the Basilica of Saint Peter and the Papal Palace

Michael Wolgemut and Wilhelm Pleydenwurff

Hartmann Schedel. *Liber Chronicarum*, (1493), f. LVII verso and LVIII recto

Figure 2.16

Fac-simile d'une gravure conserve á la Bibliothéque Ste. Geneviéve, 1558

Paul Marie Letarouilly

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Chapter, Ancienne Basilique de Saint-Pierre, PL9

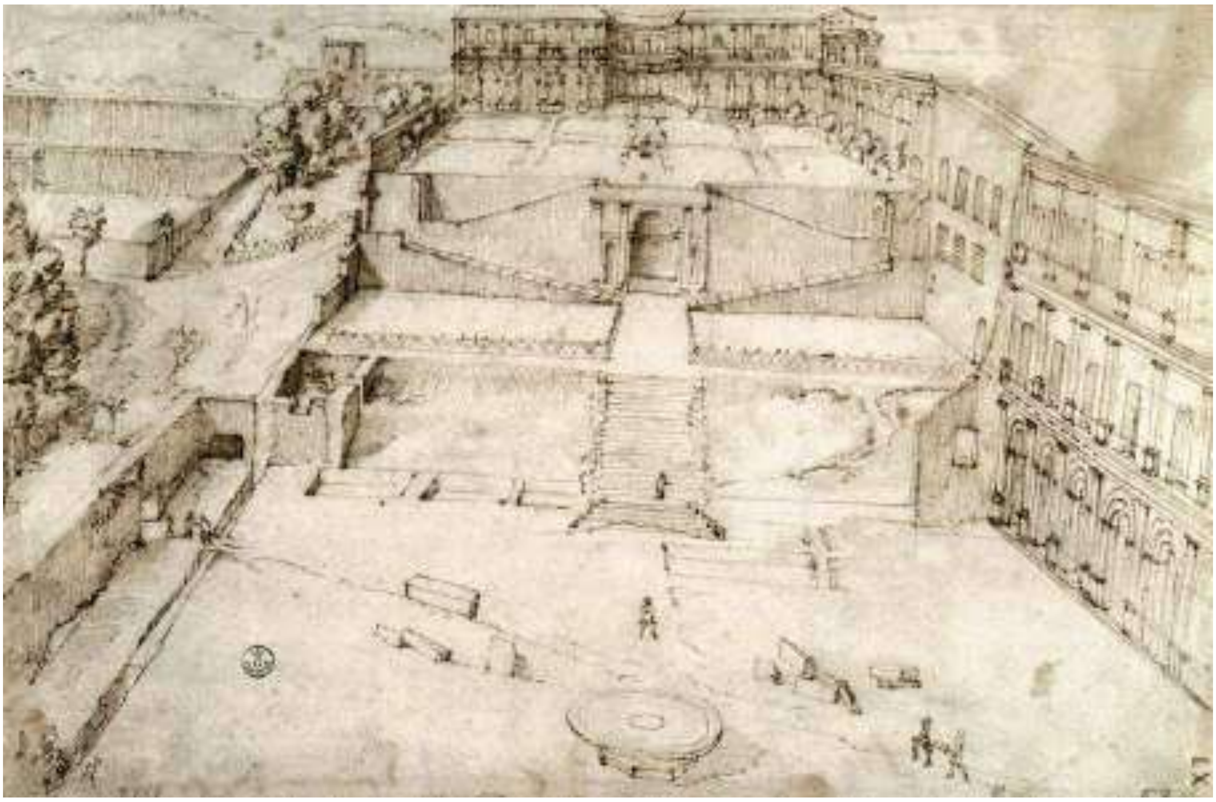


Figure 2.17

Belvedere courtyard according to the Bramante project

Dosio Giovanni Antonio, 1558-1561

GDSU 2559 A

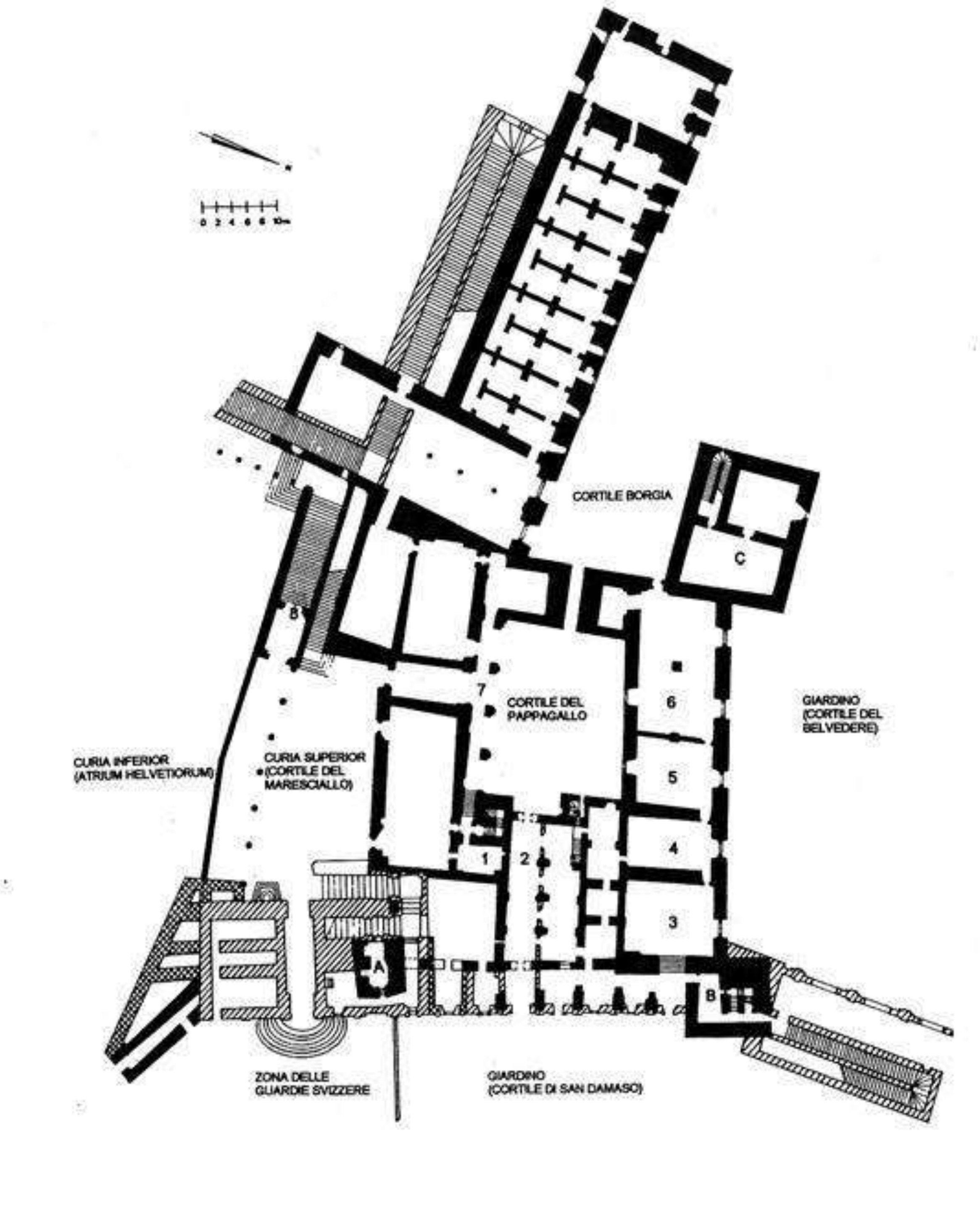


Figure 2.18a

The Vatican Palace, ground floor (reconstruction of the level, with connecting spaces, openings and passages, in the year 1521). A) south-east medieval tower, B) north-east medieval tower, C) Borgia tower, 1) Innocenzo III tower, 2) kitchens, 3) dining rooms (Sisto IV, Bibliotheca Pontificia o Magna secreta), 4) Bibliotheca secreta, 5) Bibliotheca greca, 6) Bibliotheca latina, 7) medieval loggia, 8) Turris scalarum

Christoph Luitpold Frommel, 1984

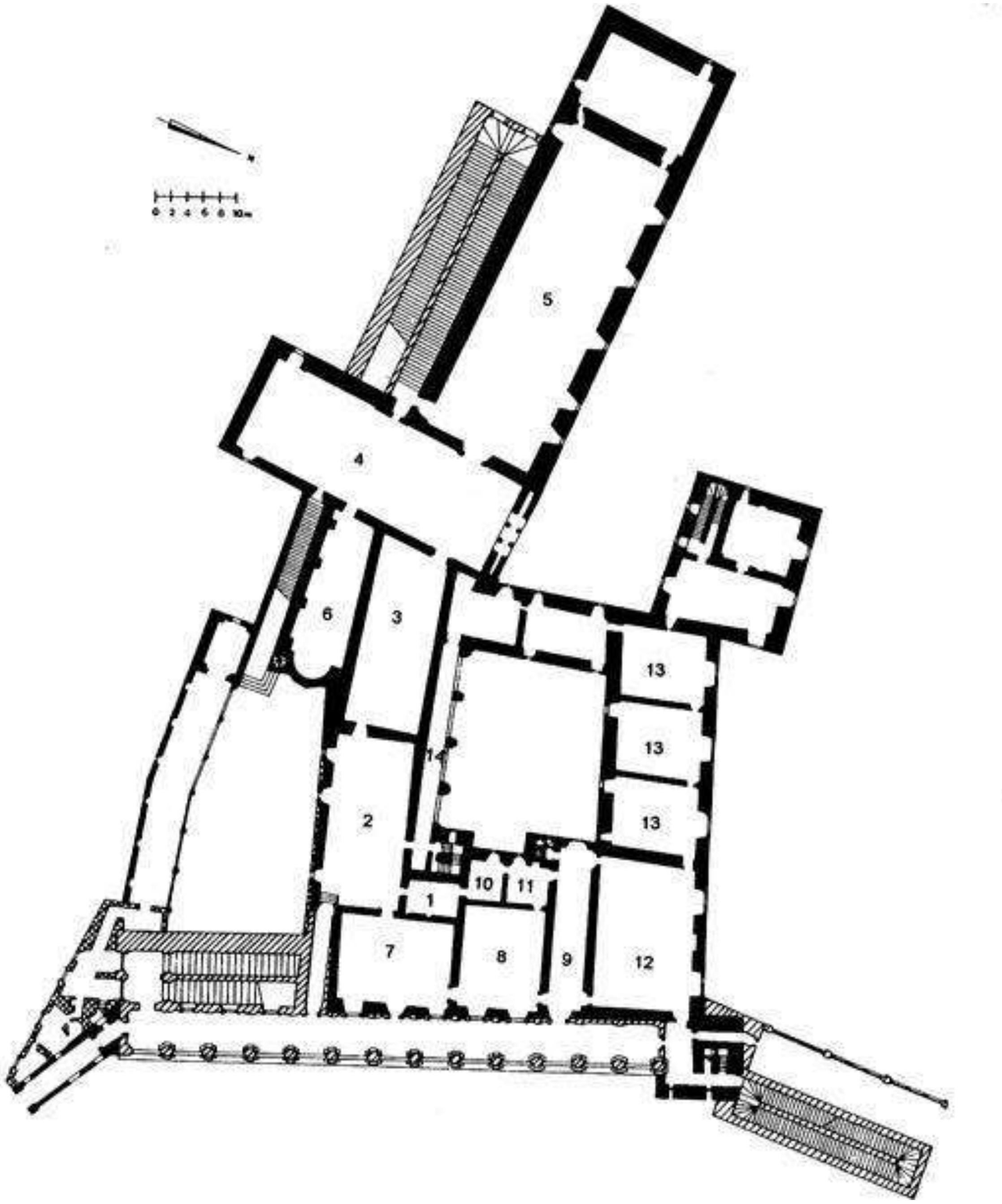


Figure 2.18b

The Vatican Palace, first floor (reconstruction of the level, with connecting spaces, openings and passages, in the year 1521). 1) tower of Innocenzo III, 2) Ducale room (aula tertia), 3) Ducale room (aula secunda), 4) Sala regia (aula prima), 5) Palatine Chapel (cappella magna), replaced and enlarged in the time of Sixto IV with the Sixtine Chapel, 6) Chapel of San Nicola (cappella parva). 7) room of the vestments, 8) camera del pappagallo, 9) Galleriola, 10) Cubicolo de Niccolò V, 11) stanza della falda, 12) room of the pontiffs, 13) Borgia apartment, 14) medieval loggia

Christoph Luitpold Frommel, 1984

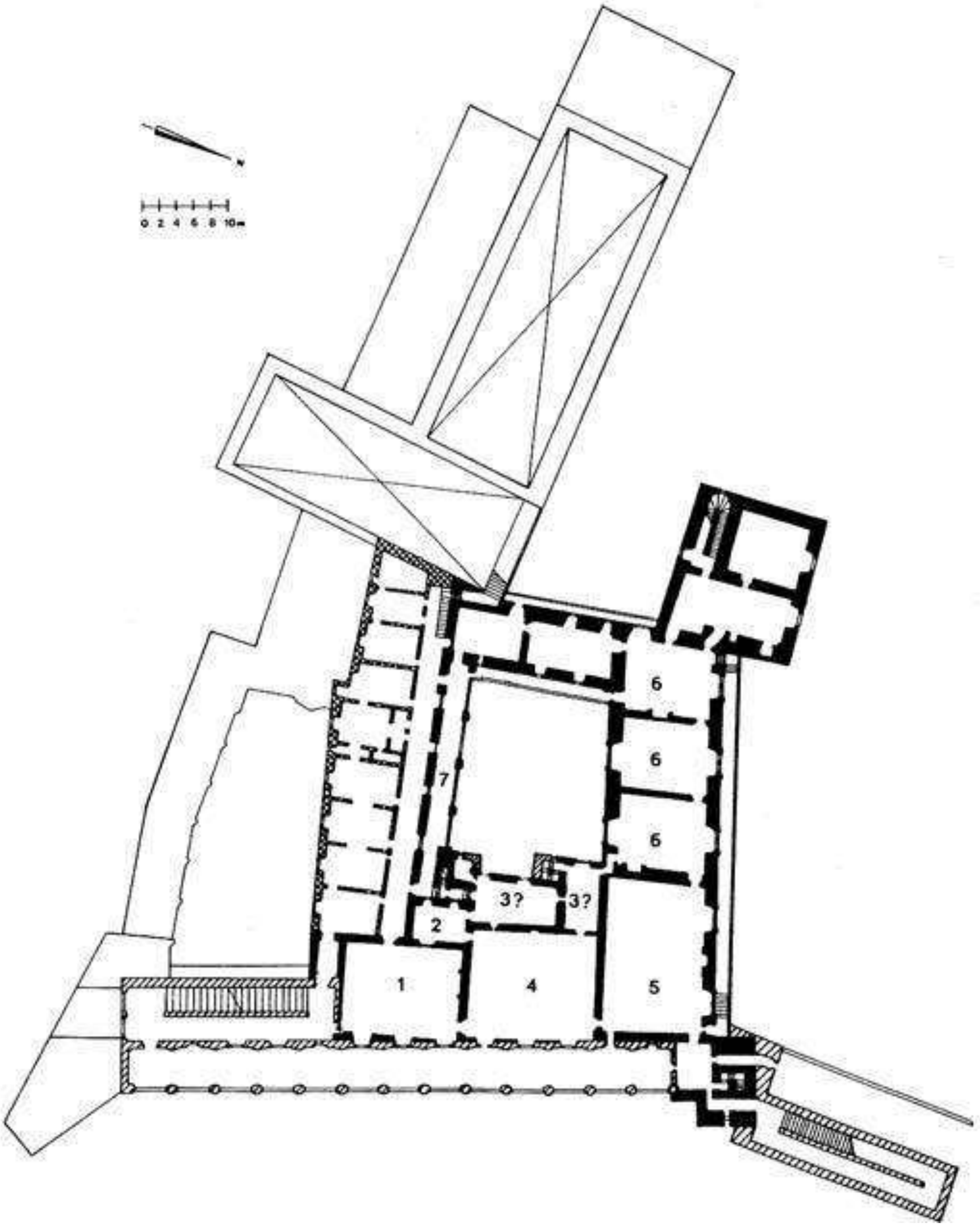


Figure 2.18c

The Vatican Palace, second floor (reconstruction of the level, with the connecting spaces, the openings and the passages, in the year 1521). 1) old room of the Swiss, 2) Chapel of Niccolò V, 3) Studio of Niccolò V, 4) Sala dei chiaroscuri, 5) Sala de Costantino, 6) rooms of Raffaello, 7) medieval loggia

Christoph Luitpold Frommel, 1984

Detail

Figure 2.19

The situation of the city of Rome, in year 1549

Sebastian Münster, 1550

Sebastian Münster. *La Cosmographie Universelle, contenant la situation de tout es les parties du monde, avec leur propietez & appartenances.* Basel: H. Pierre (1552), f. 158-159

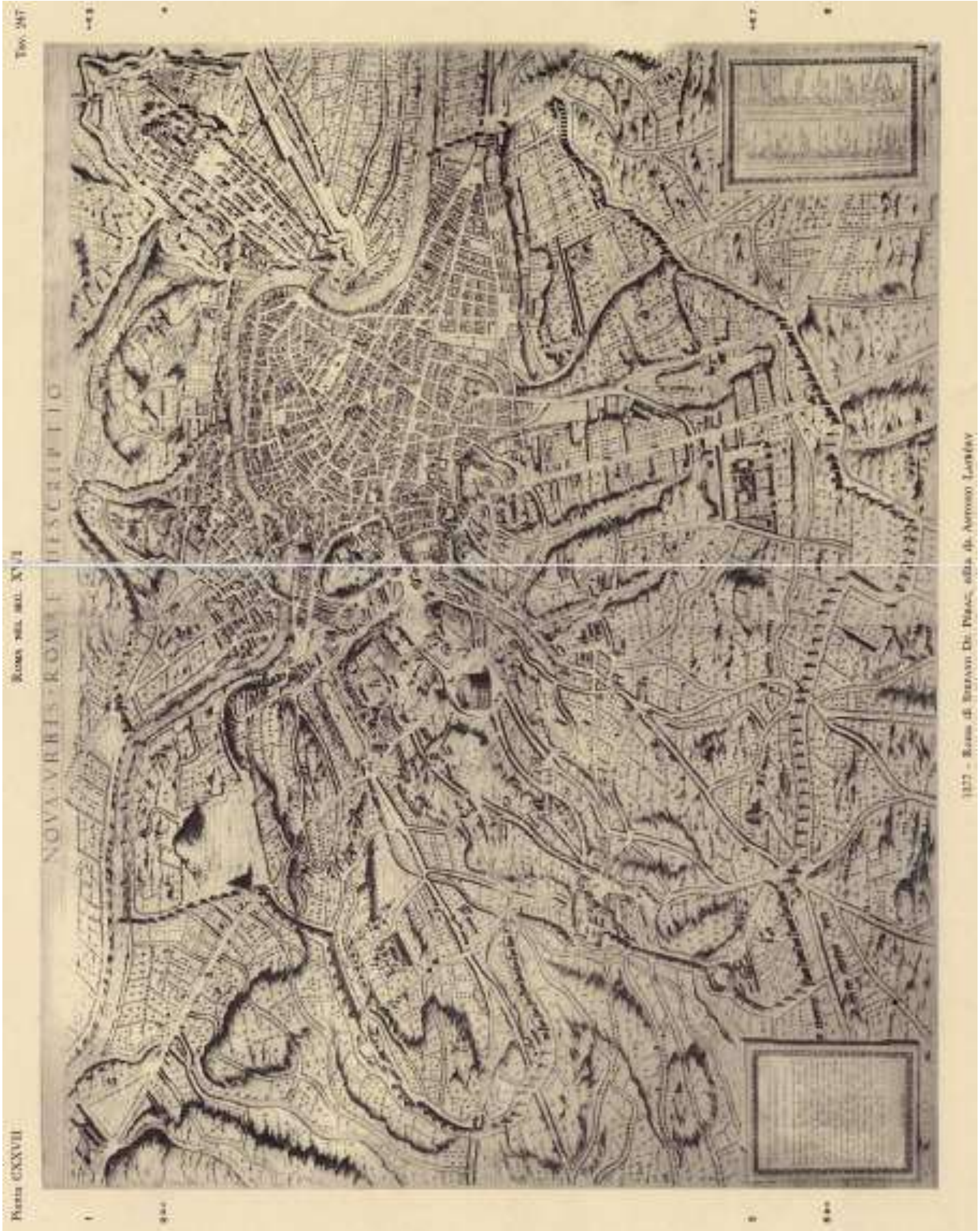


Figure 2.20a

Roma nel sec. XVI

Stefano Duperac, 1577, edited by Antonio Lafreri

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 247

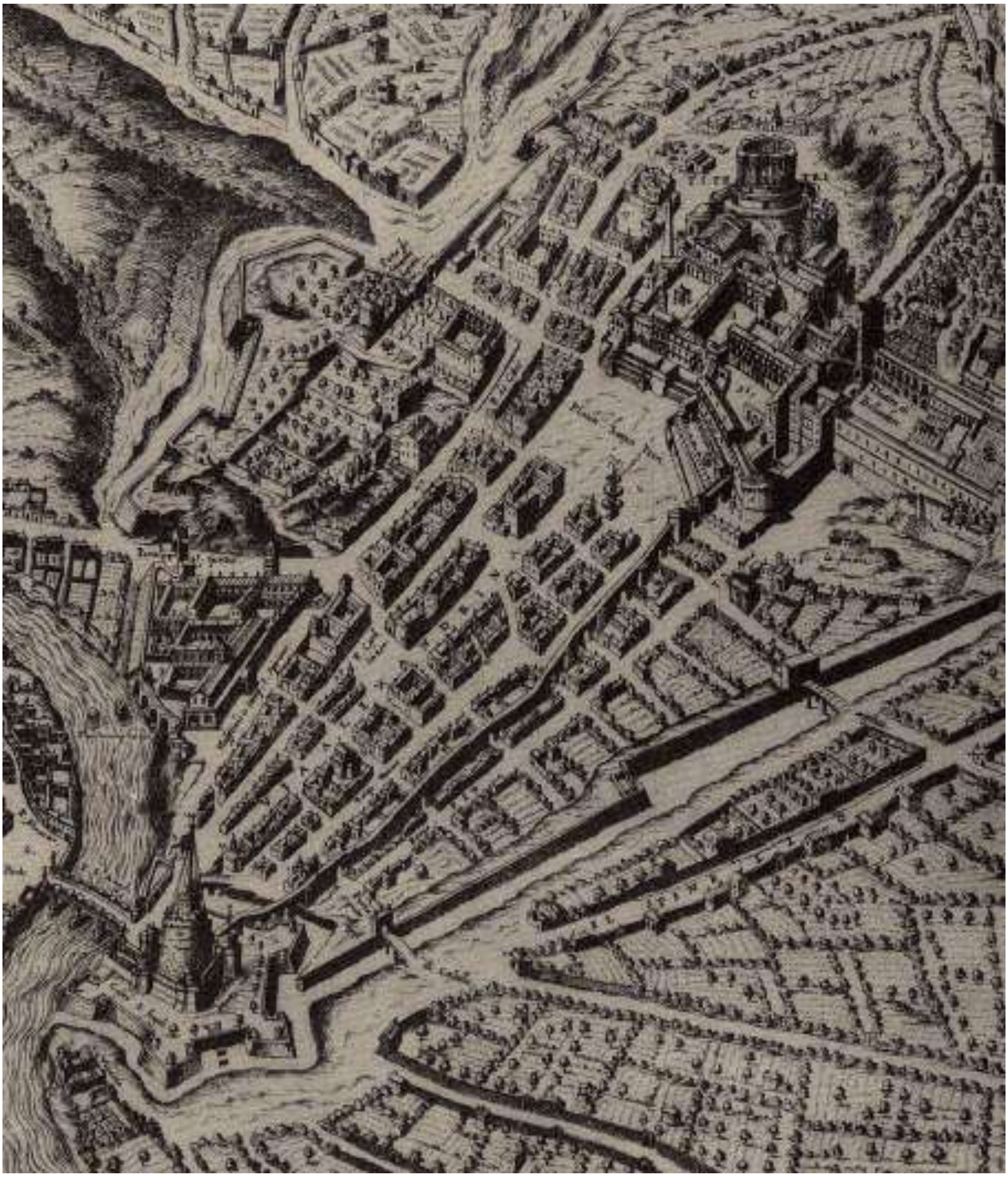


Figure 2.20b

Roma nel sec. XVI. Detail

Stefano Duperac, 1577, edited by Antonio Lafreri

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 247

Figure 2.21

View of S. Peter's square. Engraving

Antonio Lafreri, 1567-1572

The British Museum, nro. 1871,0812.774

Detail

Figure 2.22

The bird's-eye view is derived from Fabio Licinio's view of Rome, dated 1557

Leon Pitor, 1568

Anna Laetitia Pecci-Blunt print collection of views of Rome

Repositary: The Getty Research Institute, cod. P850002** (6)

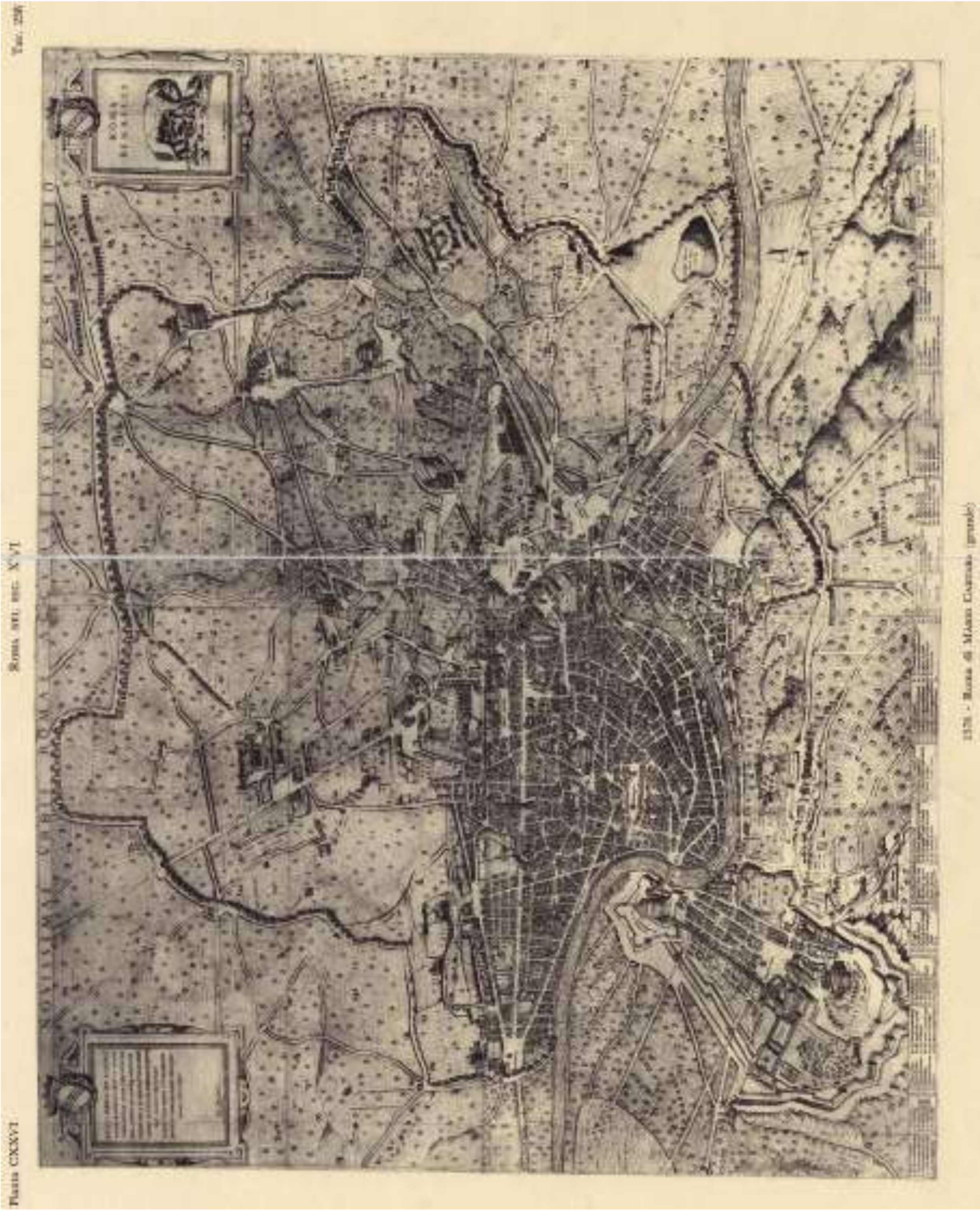


Figure 2.23a

Roma nel sec. XVI

Mario Cartaro, 1576

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 238

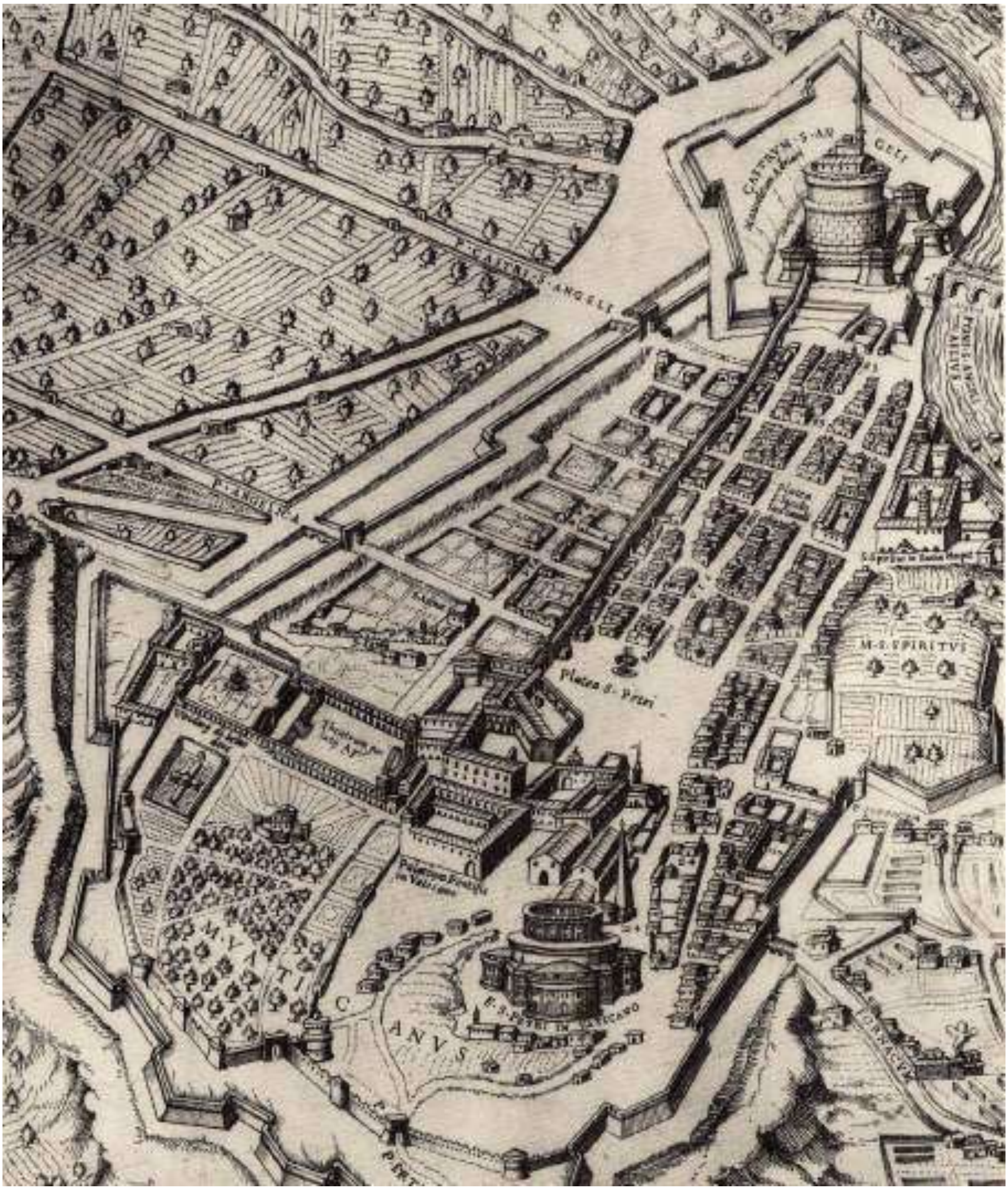


Figure 2.23b

Roma nel sec. XVI. Detail

Mario Cartaro, 1576

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 238

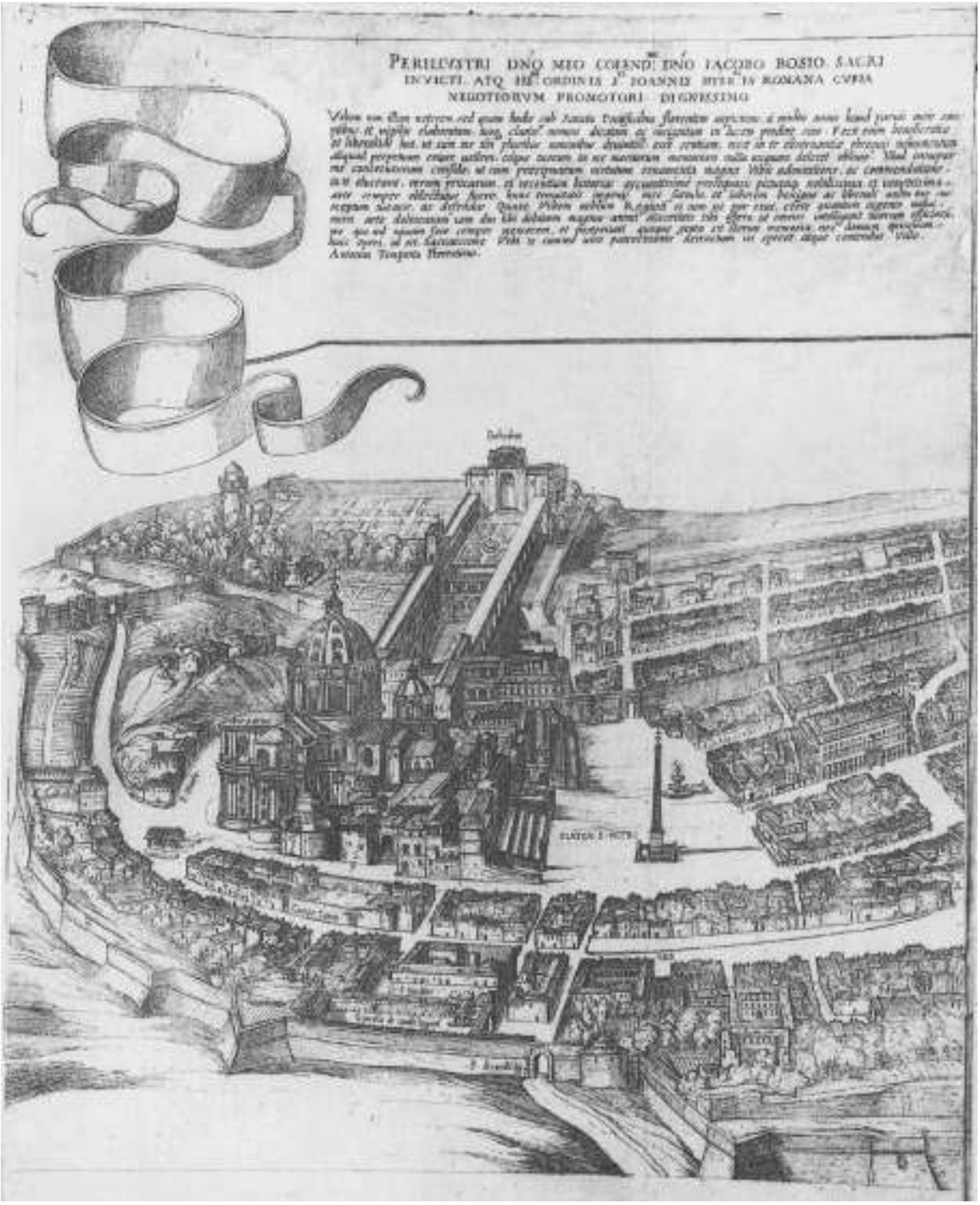


Figure 2.24

View of S. Peter’s square

Antonio Tempesta, 1593

Christof Thoenes. *Fabbrica di San Pietro nelle incisioni dal Cinquecento all’Ottocento*

Italy: Edizioni il Polifilo (2000), p. 75

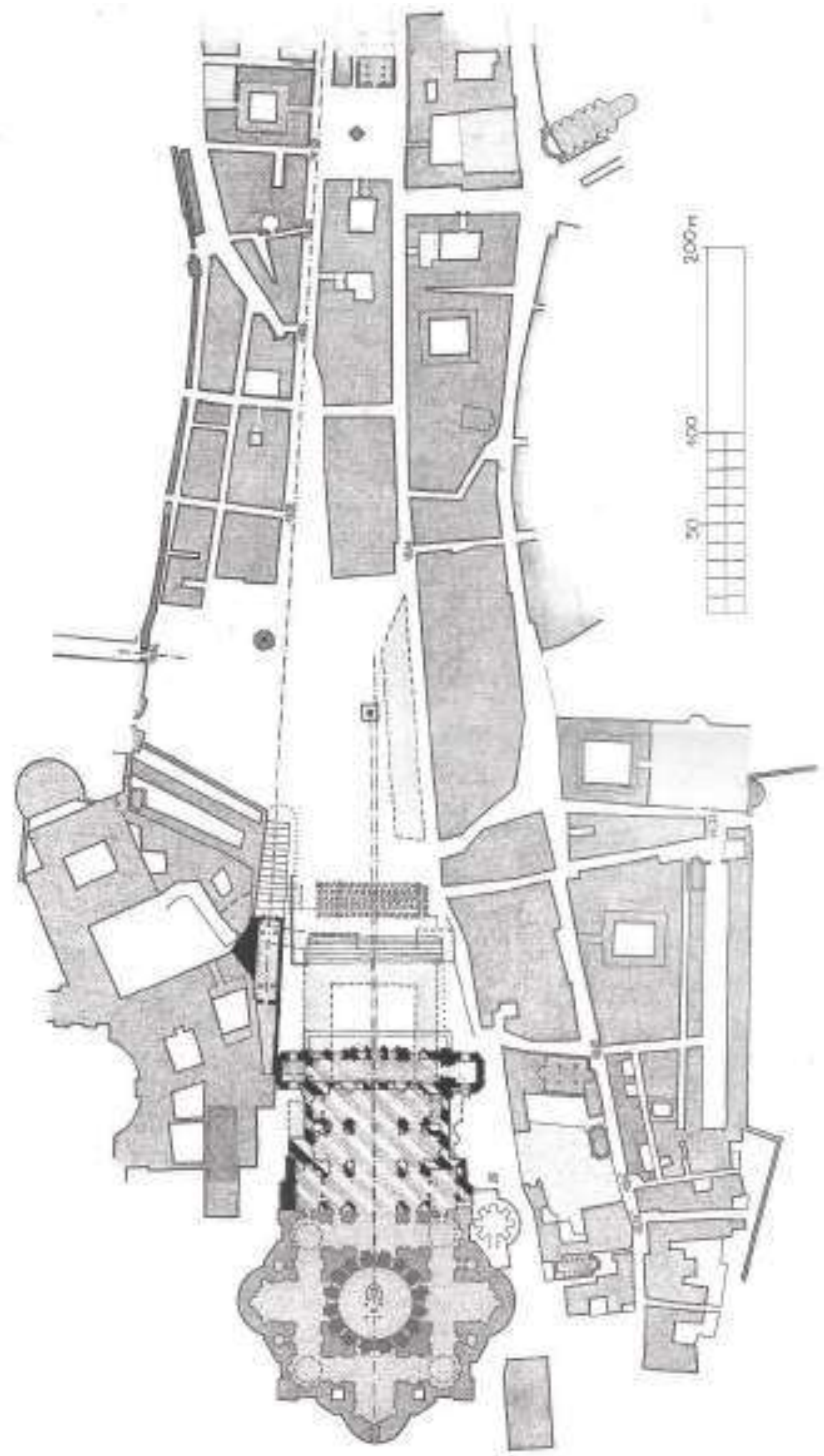


Figure 2.25

The interventions in S. Peter’s square from Pio IV to Paolo V (drawing by the author)

In dark gray the preserved buildings, in black those added and in light gray those demolished

Leonardo Benevolo. *San Pietro e la città di Roma*. Ed. Laterza, (2004), p. 36-37

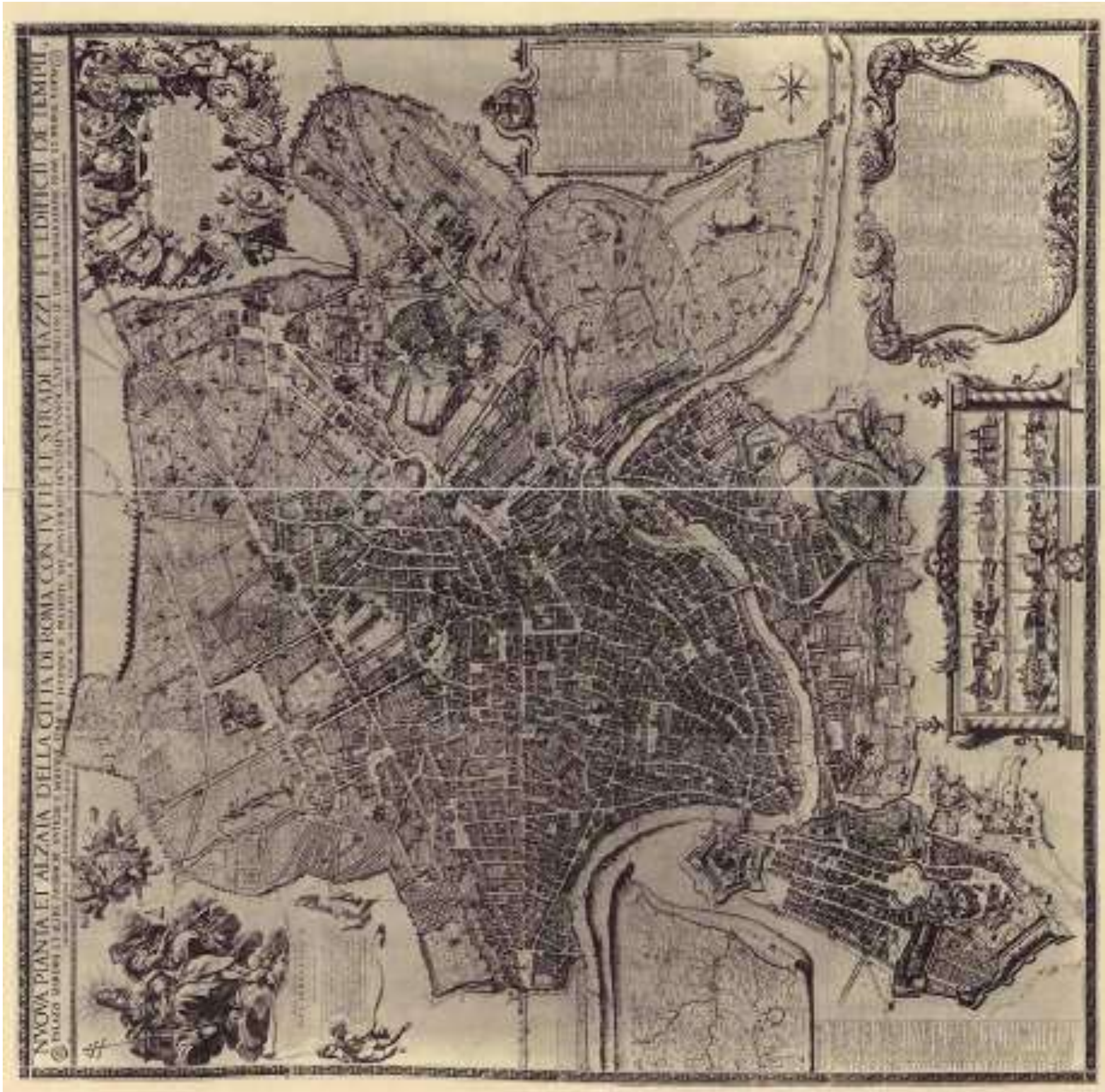


Figure 2.26a

Roma nel sec. XVII

Giovanni Batista Falda, 1676

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 357

Figure 2.26b

Roma nel sec. XVII. Zona del Vaticano e di piazza Navona. Detail

Giovanni Batista Falda, 1676

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 361

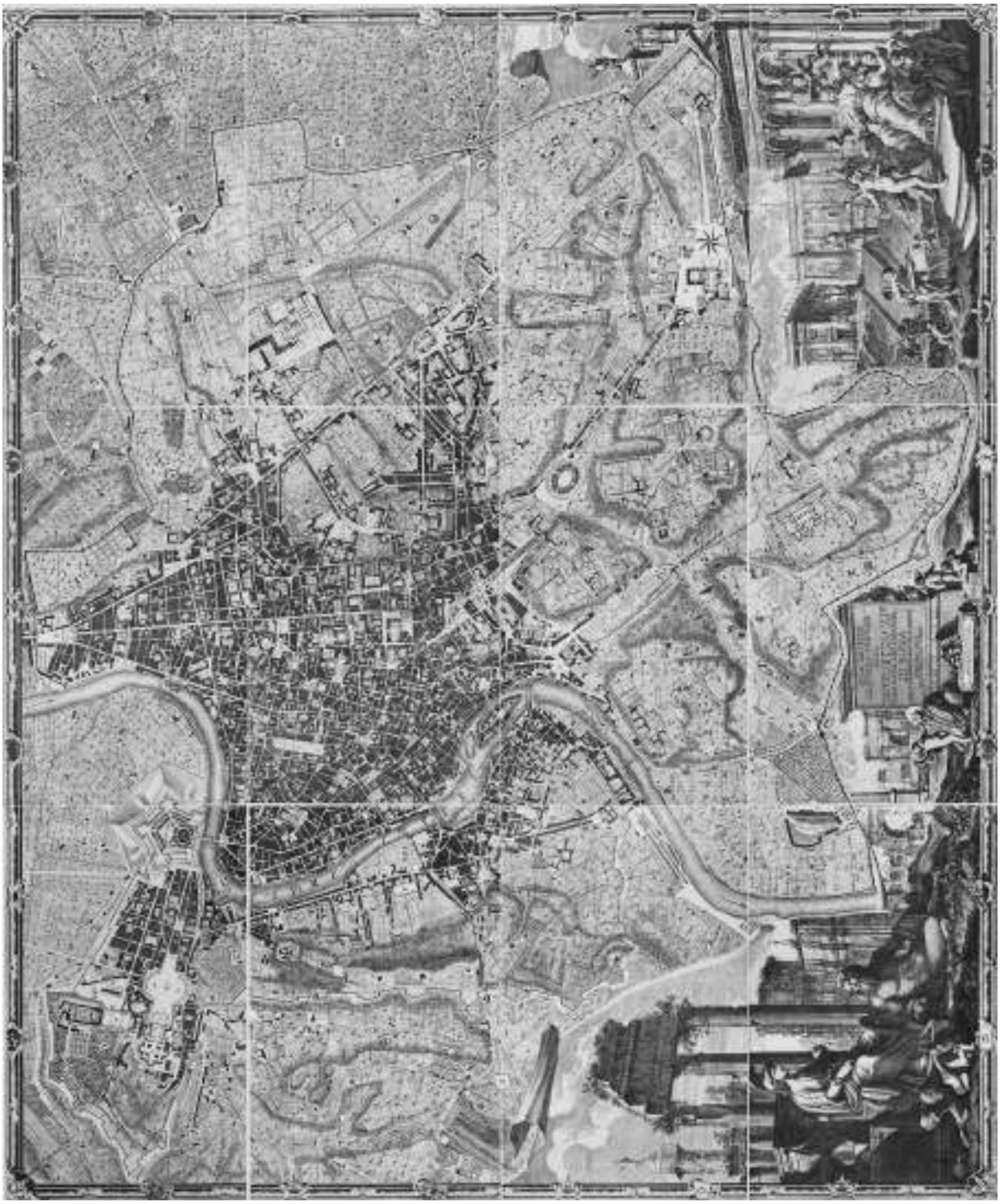


Figure 2.27a

Nuova pianta di Roma, data in luce da Giambattista Nolli, L'Anno MDCCXLVIII

Plan of Rome

Giovanni Batista Nolli, 1748

Biblioteca Nacional de España, bdh0000241493

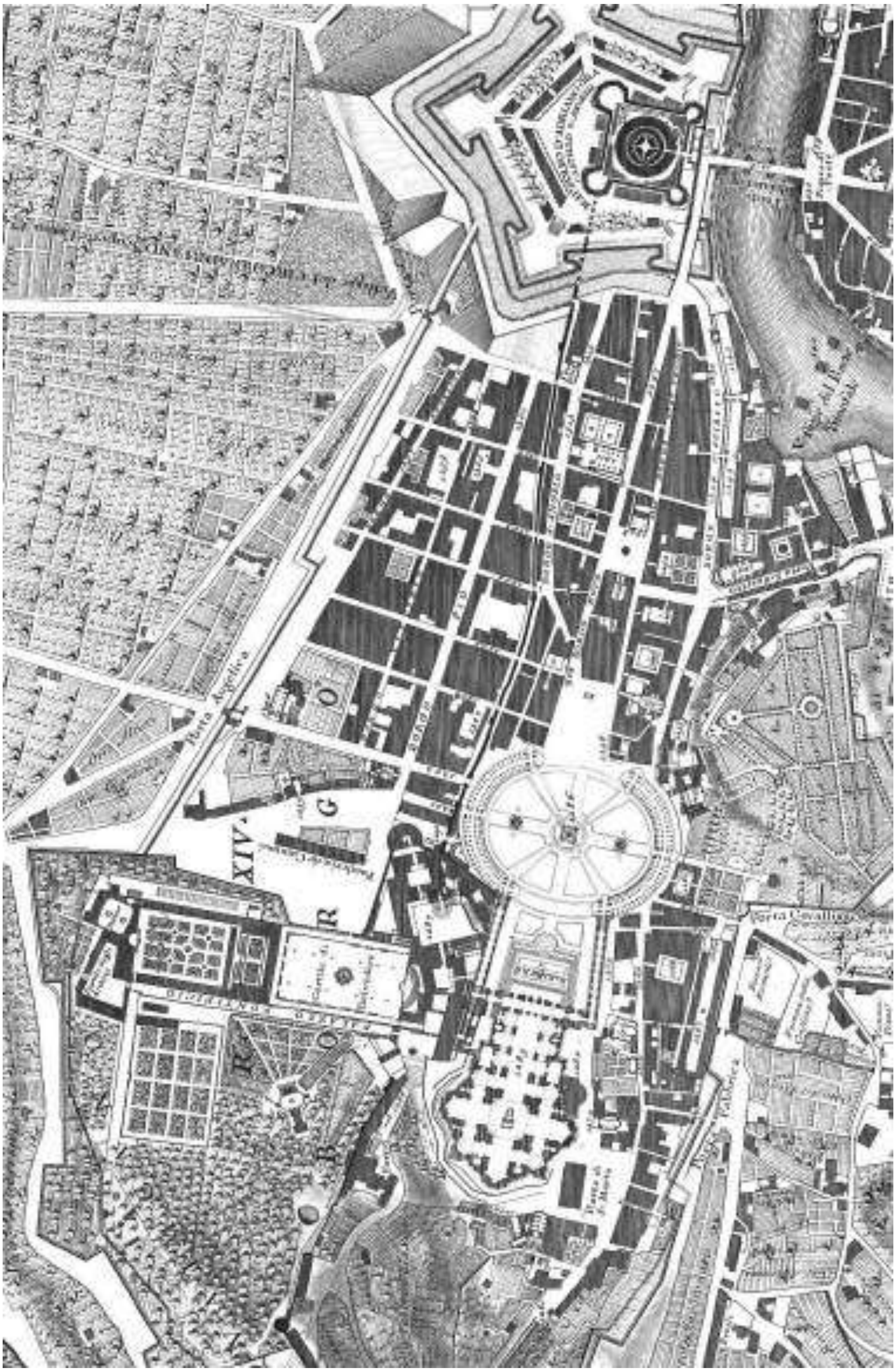


Figure 2.27b

Nuova pianta di Roma, data in luce da Giambattista Nolli, L'Anno MDCCXLVIII

Plan of Rome. Detail

Giovanni Batista Nolli, 1748

Biblioteca Nacional de España, bdh0000241493

Figure 2.28a

Pianta topografica della città di Roma dell'anno 1823

Pietro Ruga, 1823

Yale University (2019): Yale University Library, Beinecke rare book & manuscript library (EUA), cod. 40 R66 1823

Figure 2.28b

Pianta topografica della città di Roma dell'anno 1823. Detail

Pietro Ruga, 1823

Yale University (2019): Yale University Library, Beinecke rare book & manuscript library (EUA), cod. 40 R66 1823

Figure 2.29a

Plan de Rome modern

Paul Marie Letarouilly, 1838

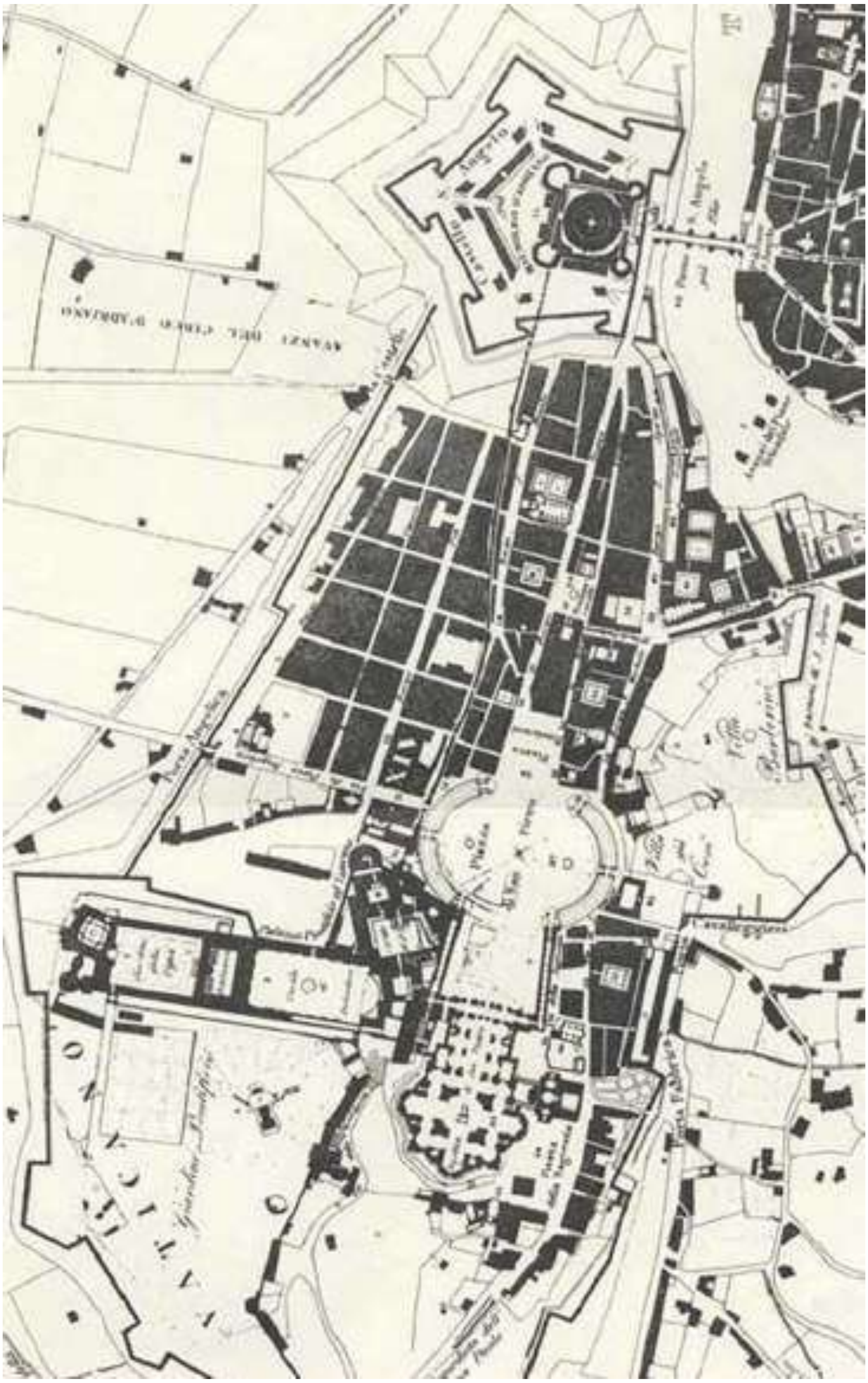


Figure 2.29b

Plan de Rome modern. Detail

Paul Marie Letarouilly, 1838

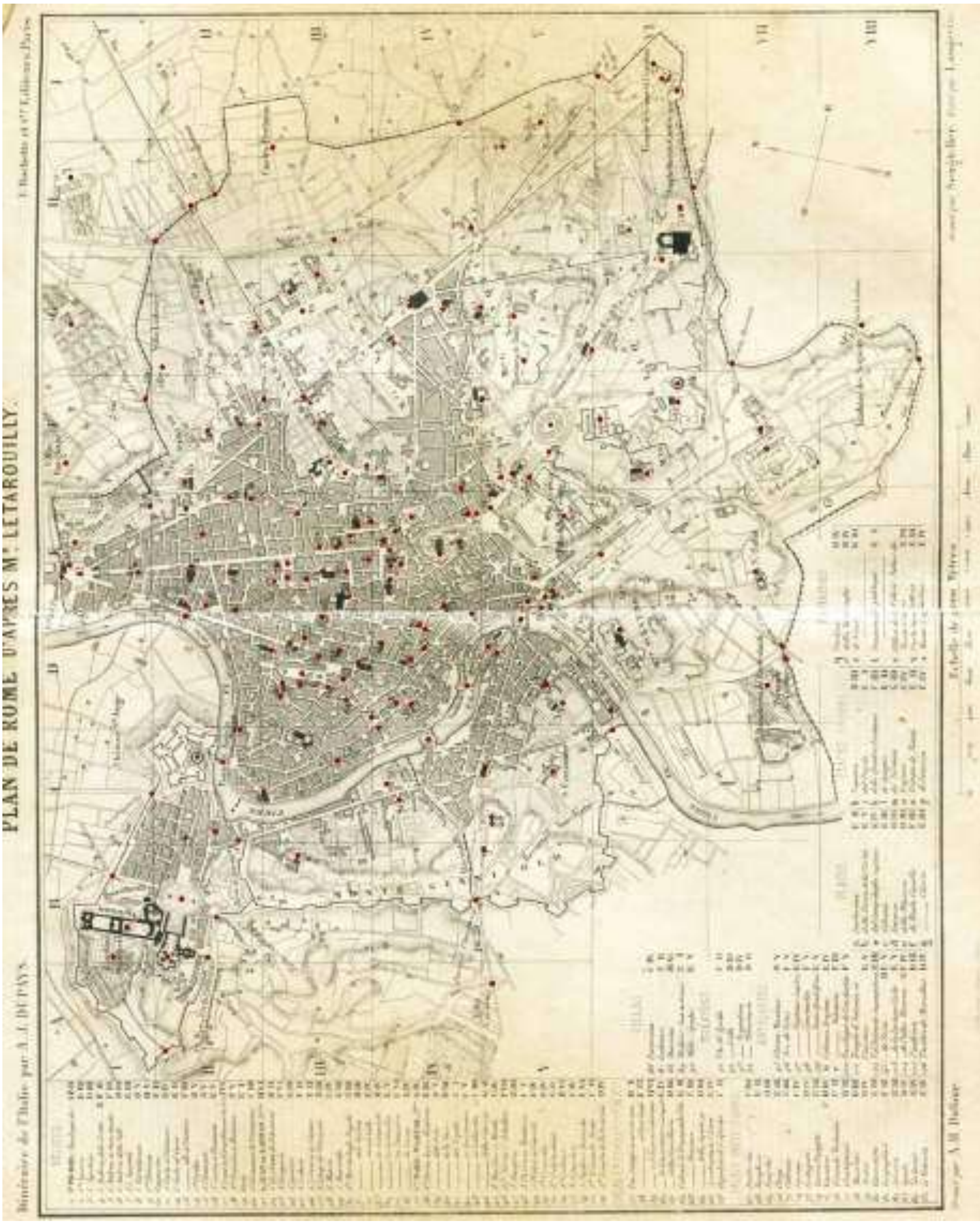


Figure 2.30a

This map of Rome was included in a French Guide to Rome of 1852 and is based on a larger 1841 map by Paul Letarouilly. It shows Rome as it was before the development of railway and the annexation of 1870 to the kingdom of Italy

Paul Marie Letarouilly, 1852

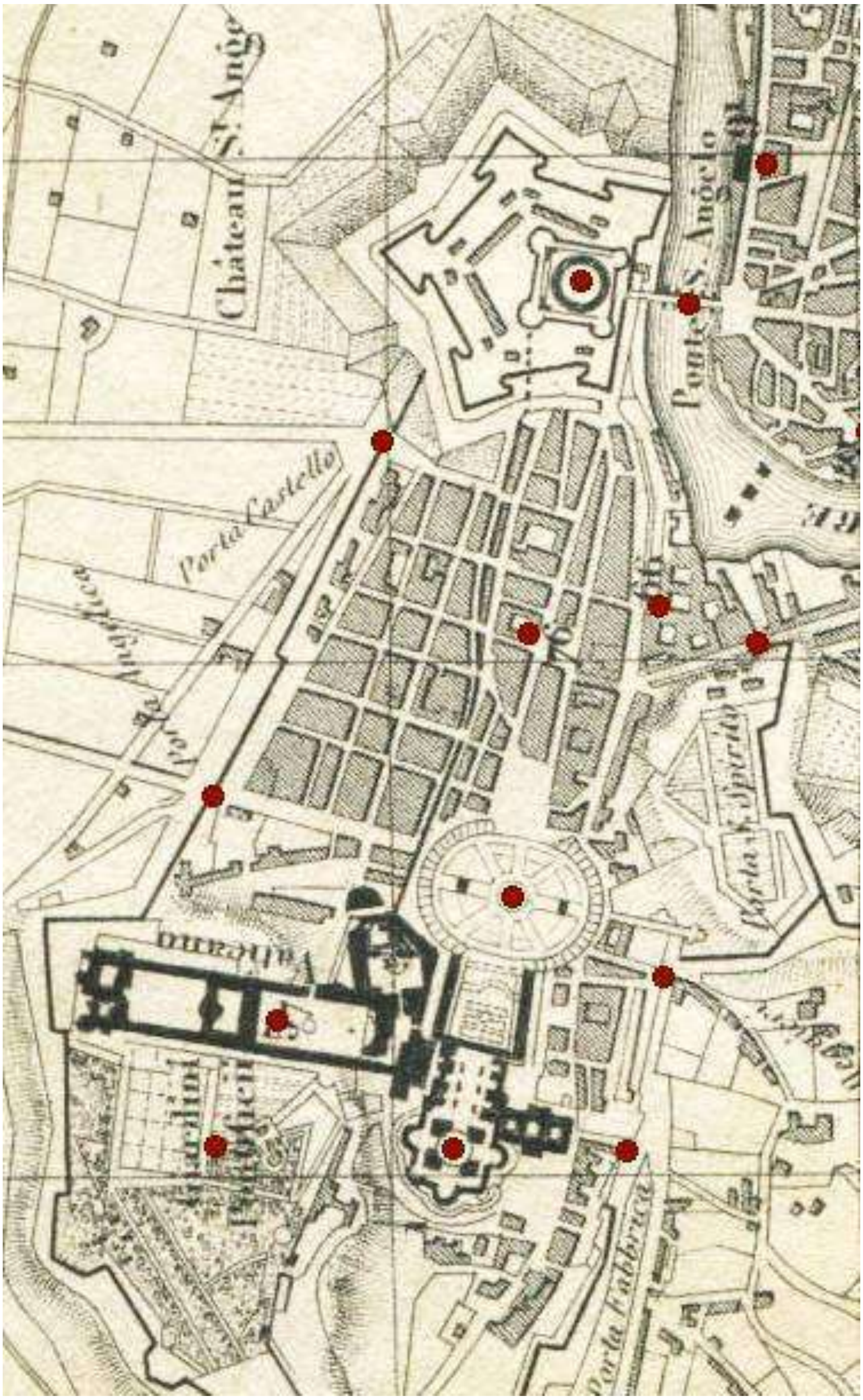


Figure 2.30b

This map of Rome was included in a French Guide to Rome of 1852 and is based on a larger 1841 map by Paul Letarouilly. It shows Rome as it was before the development of railway and the annexation of 1870 to the kingdom of Italy. Detail

Paul Marie Letarouilly, 1852

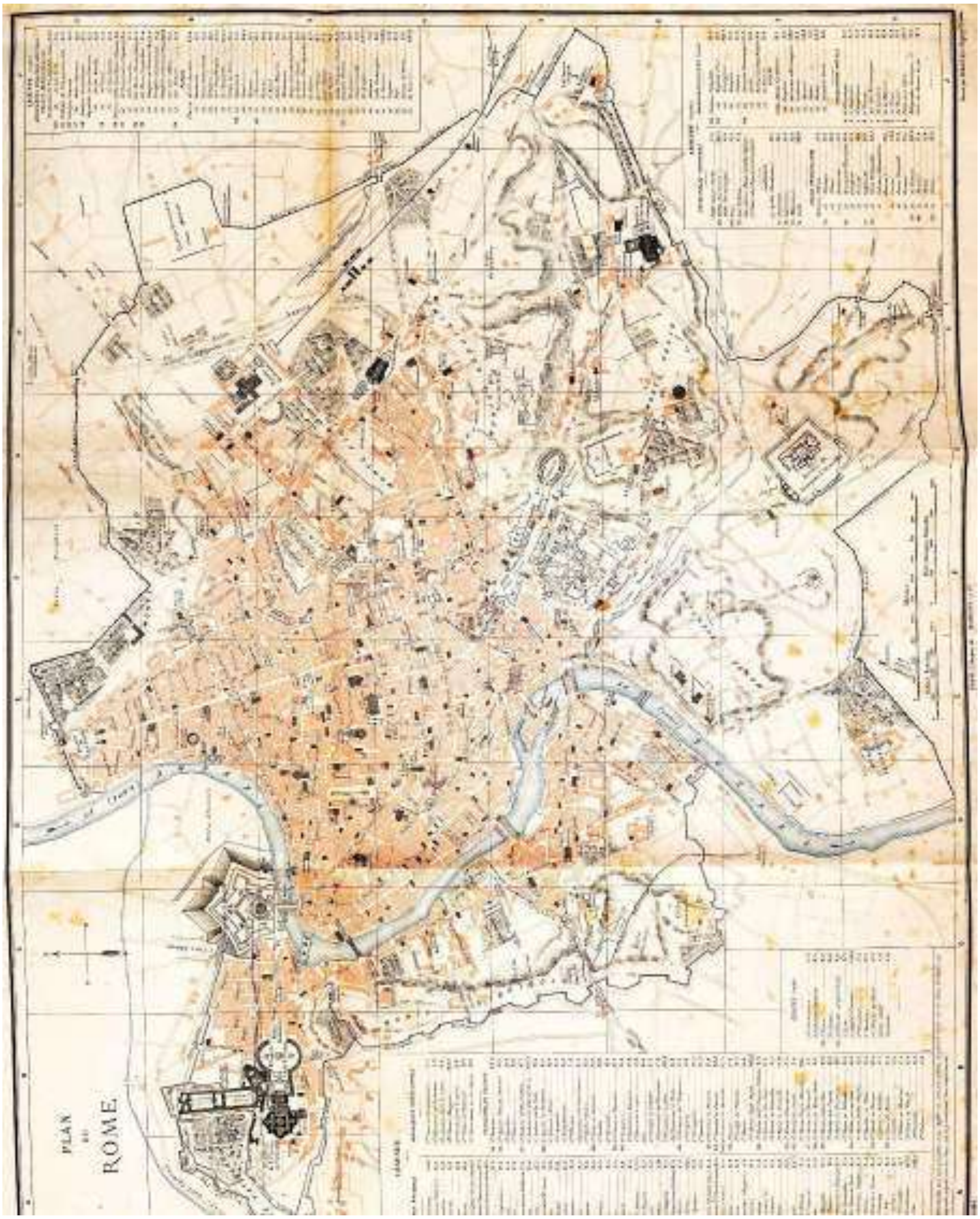


Figure 2.31a

Town development and expansion plan

Augusto Thiollet, 1873

Librairie Hachette et Cie Editeurs (Ed.), Paris

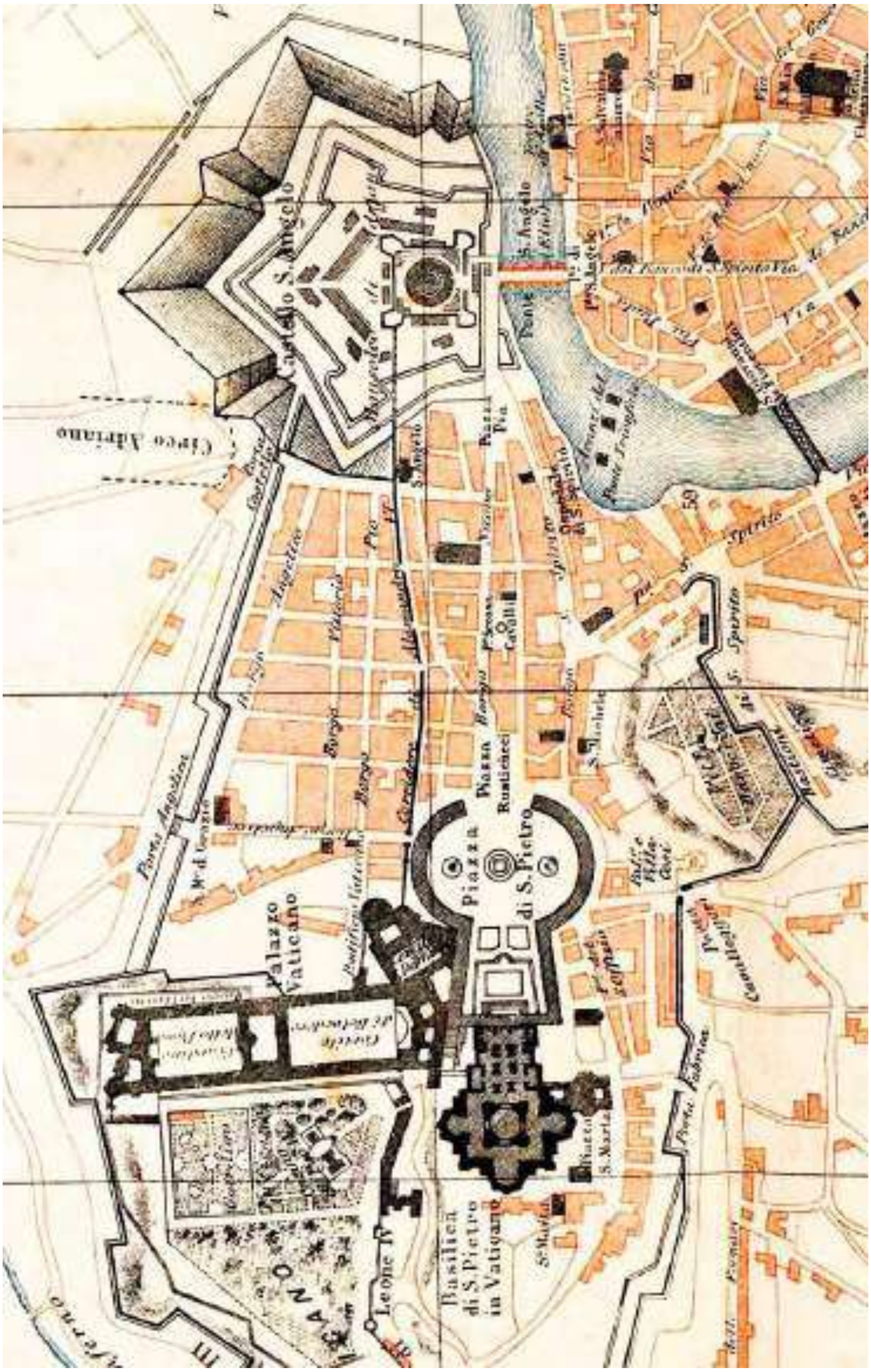


Figure 2.31b

Town development and expansion plan. Detail

Augusto Thiollet, 1873

Librairie Hachette et Cie Editeurs (Ed.), Paris

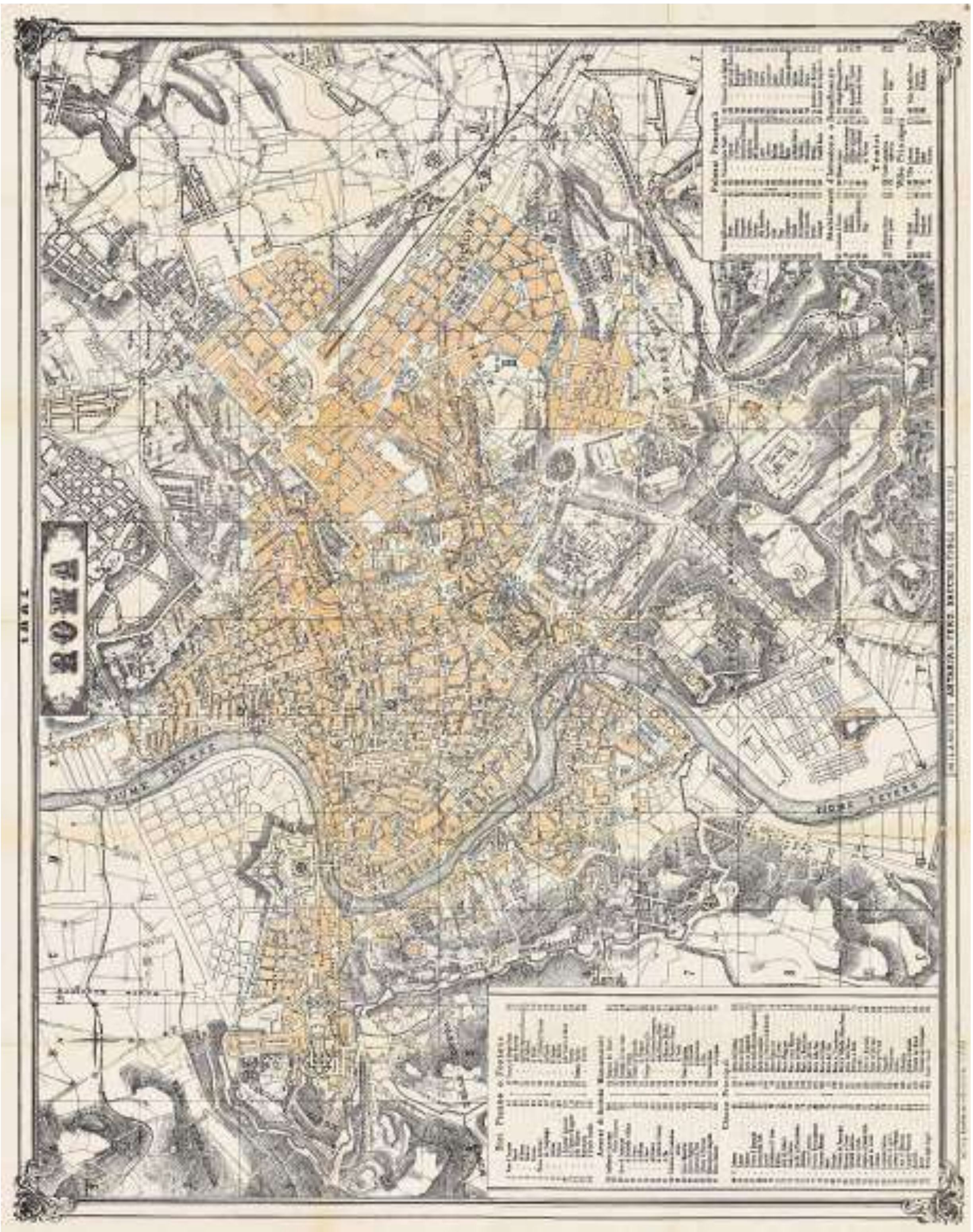


Figure 2.32a

Plan of Rome, 1884

Publisher Artaria di Ferd. Sacchi e Figli

Yale University (2019): Yale University Library, Beinecke rare book & manuscript library (EUA), cod. 40 R66 1884

Figure 2.32b

Plan of Rome, 1884. Detail

Publisher Artaria di Ferd. Sacchi e Figli

Yale University (2019): Yale University Library, Beinecke rare book & manuscript library (EUA), cod. 40 R66 1884

Figure 2.33

Extension of the Borgo District city plan with provisions of the 1883 plan

R. Stab- Cartogr. C. Virano, Rome, 1888

A. Pietro Frutaz. *Le piante di Roma*. Rome: Istituto di Studi Romani (1962), tav. 536-537

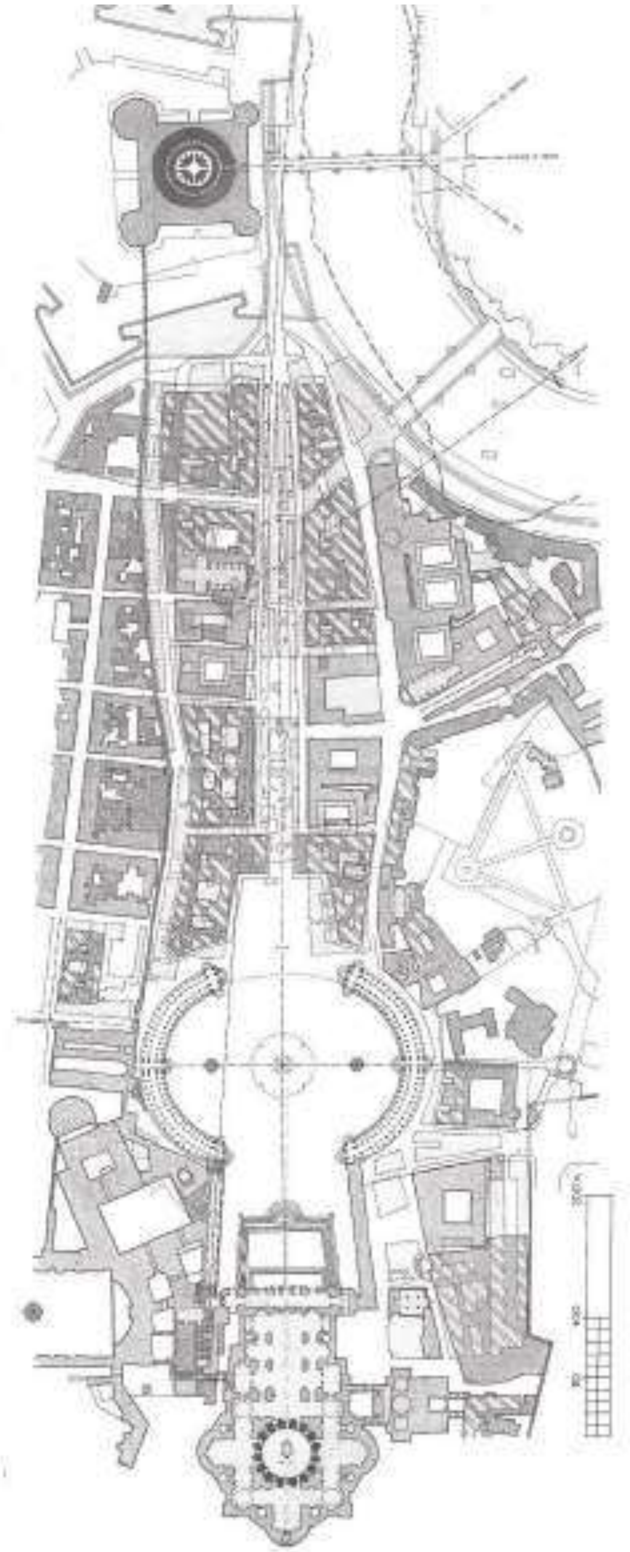
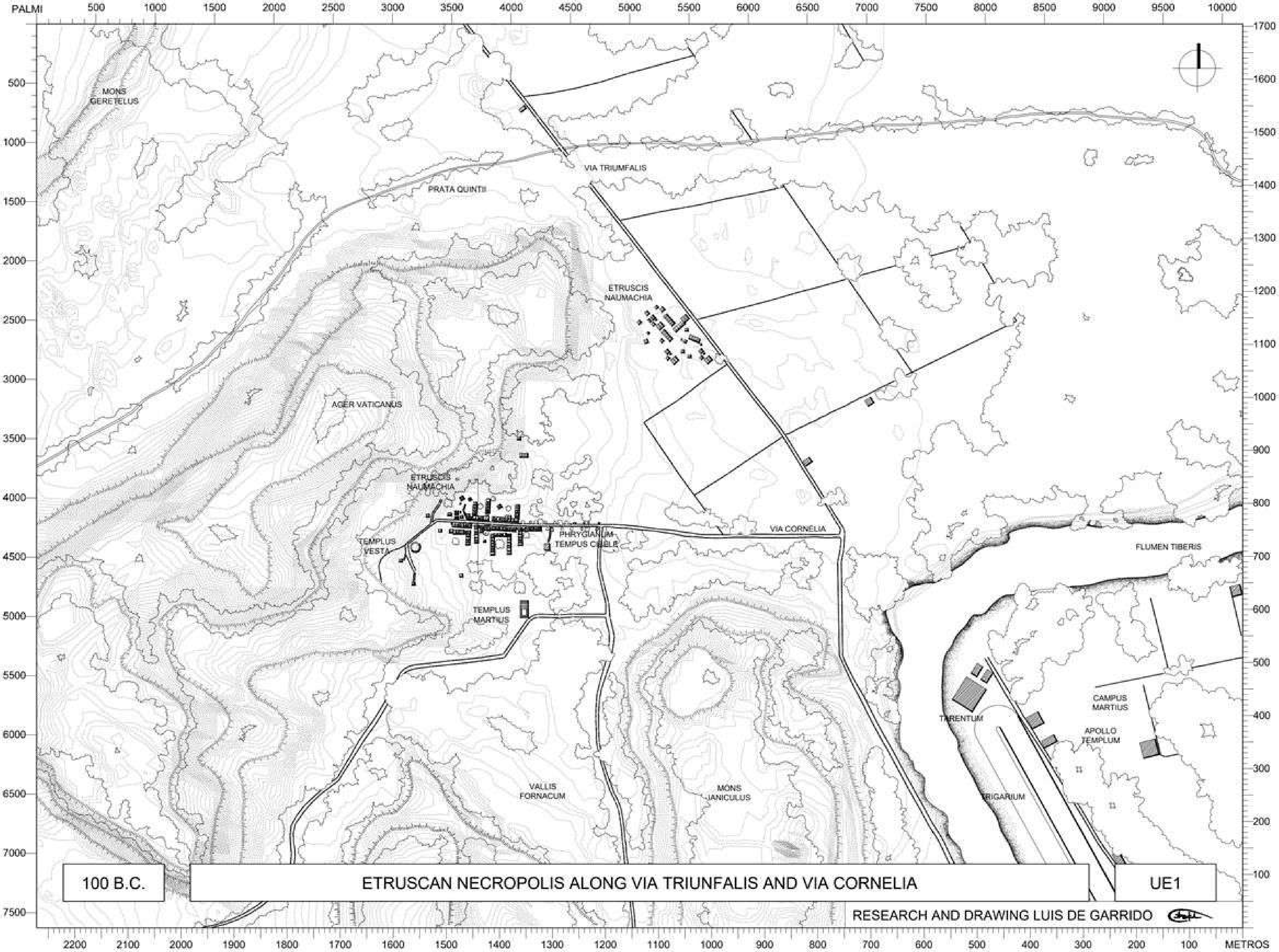


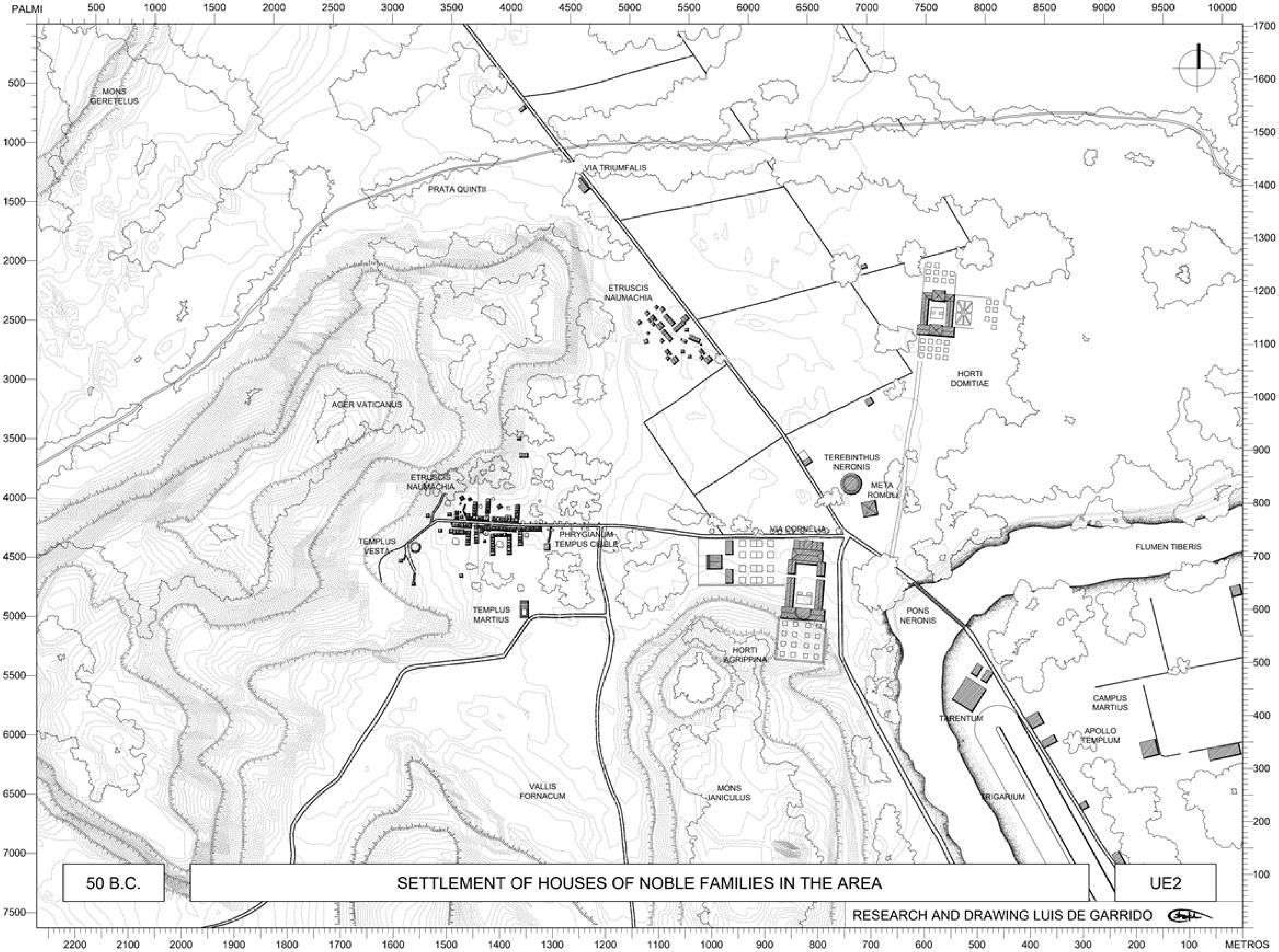
Figure 2.34

The gutting of Borgo in the 1930s. The surviving buildings are in gray, those added in dark gray, those demolished in light gray

Leonardo Benevolo. *San Pietro e la città di Roma*. Ed. Laterza, (2004), p. 92-93

LAYOUTS 2


PALMI
METROS
MONS GERETELUS
VIA TRIUMFALIS
PRATA QUINTII
ETRUSCIS NAUMACHIA
AGER VATICANUS
ETRUSCIS NAUMACHIA
TEMPLUS VESTA
PHRYGIANUM TEMPUS CIBELE
VIA CORNELIA
TEMPLUS MARTIUS
FLUMEN TIBERIS
CAMPUS MARTIUS
APOLLO TEMPLUM
TARENTUM
TRIGARIUM
VALLIS FORNACUM
MONS IANICULUS
100 B.C.
ETRUSCAN NECROPOLIS ALONG VIA TRIUNFALIS AND VIA CORNELIA
UE1
RESEARCH AND DRAWING LUIS DE GARRIDO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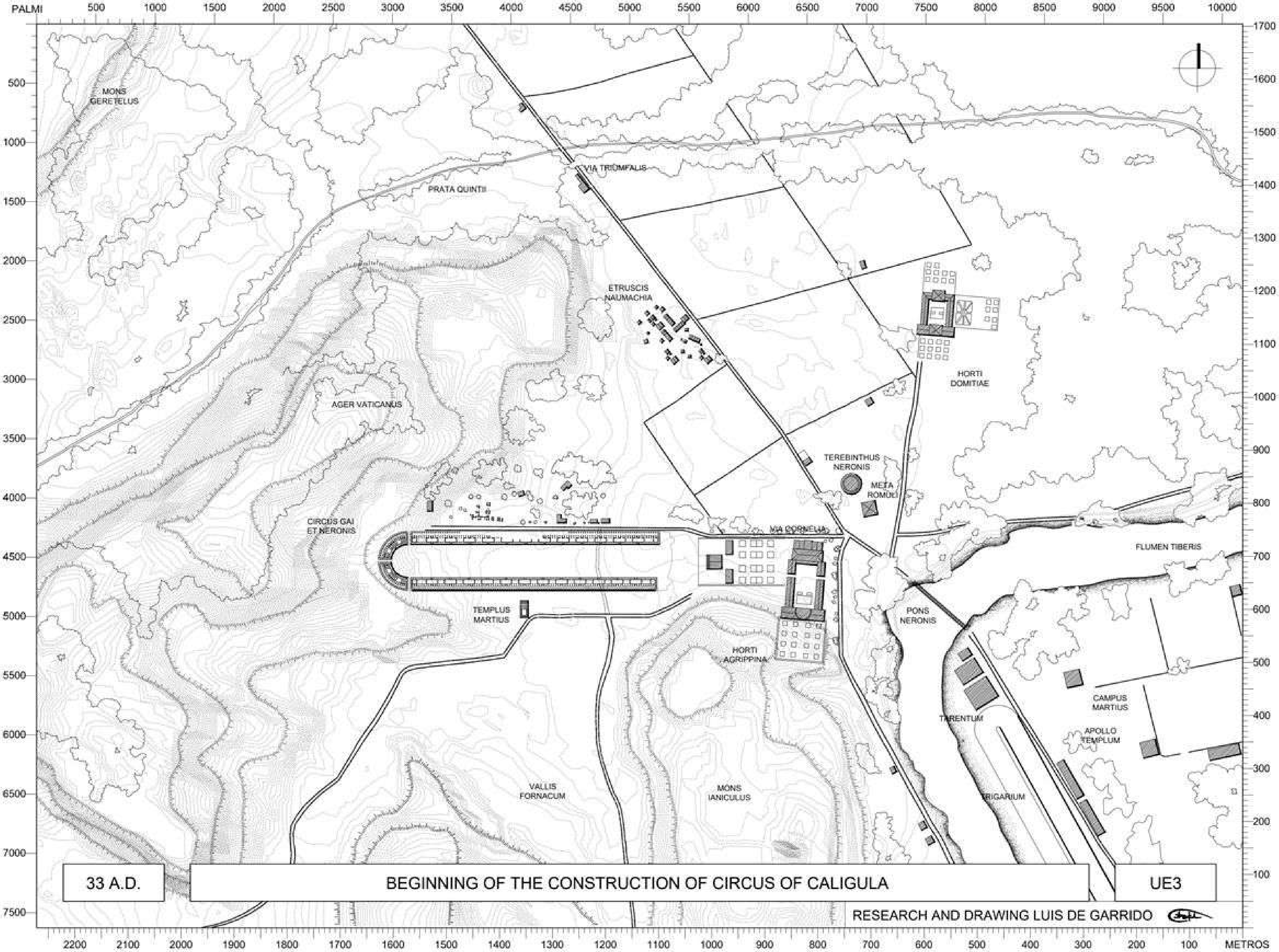
VIA TRIUMFALIS
PRATA QUINTII
ETRUSCIS NAUMACHIA
AGER VATICANUS
ETRUSCIS NAUMACHIA
TEMPLUS VESTA
PHRYGIANUM TEMPUS CIBELE
TEMPLUS MARTIUS
VIA CORNELIA
TEREBINTHUS NERONIS
META ROMULI
HORTI DOMITIAE
FLUMEN TIBERIS
PONS NERONIS
HORTI AGRIPPINA
TARENTUM
CAMPUS MARTIUS
APOLLO TEMPLUM
TRIGARIUM
VALLIS FORNACUM
MONS IANICULUS
50 B.C.
SETTLEMENT OF HOUSES OF NOBLE FAMILIES IN THE AREA
UE2
RESEARCH AND DRAWING LUIS DE GARRIDO


33 A.D.
BEGINNING OF THE CONSTRUCTION OF CIRCUS OF CALIGULA
UE3
RESEARCH AND DRAWING LUIS DE GARRIDO
PALMI
METROS
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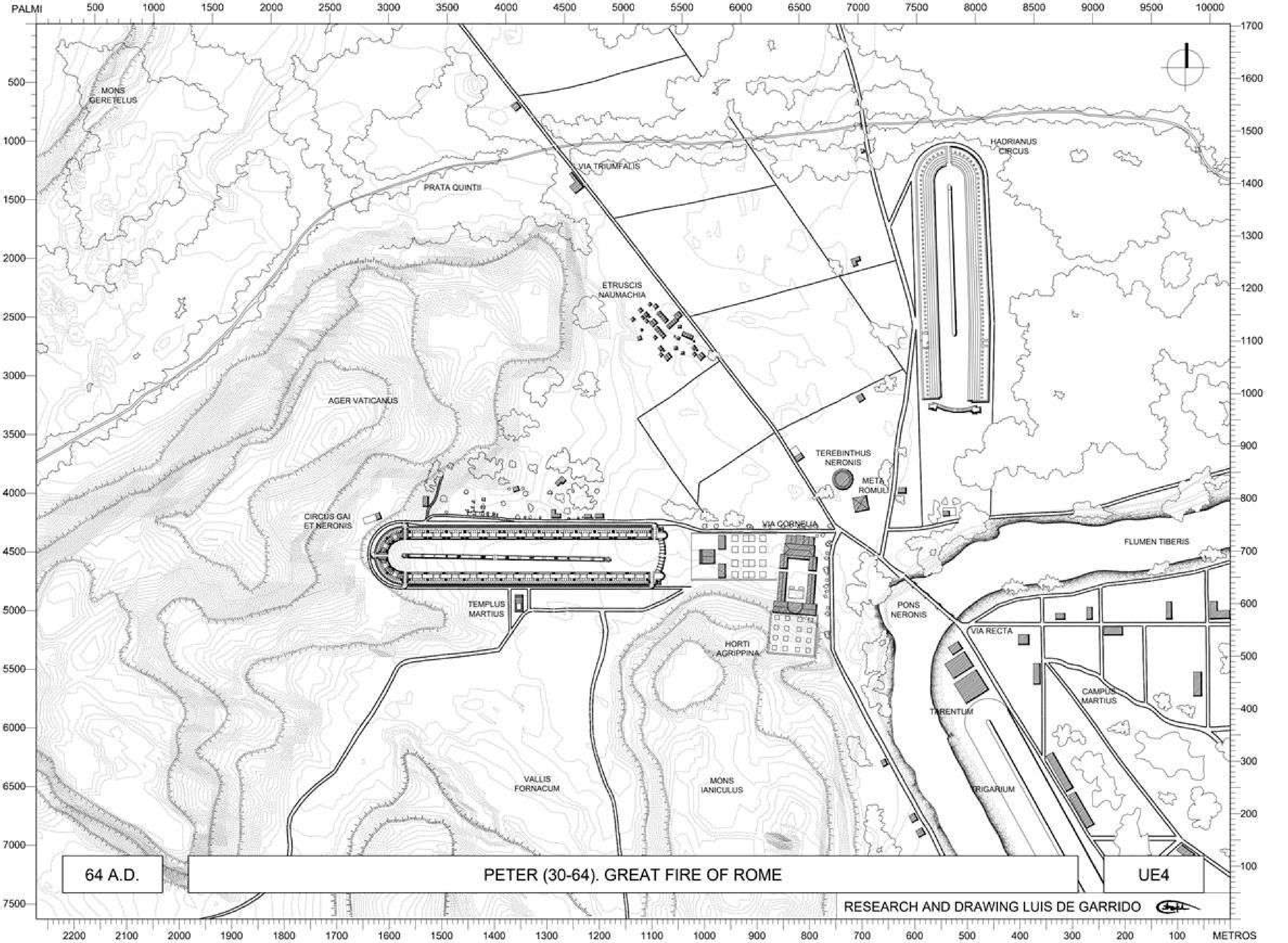
PRATA QUINTII
VIA TRIUMFALIS
ETRUSCIS NAUMACHIA
AGER VATICANUS
CIRCUS GAI ET NERONIS
TEMPLUS MARTIUS
VIA CORNELIA
TEREBINTHUS NERONIS
META ROMULI
HORTI DOMITIAE
HORTI AGRIPPINA
PONS NERONIS
FLUMEN TIBERIS
CAMPUS MARTIUS
APOLLO TEMPLUM
TARENTUM
TRIGARIUM
VALLIS FORNACUM
MONS IANICULUS


MONS GERETELUS
PRATA QUINTII
VIA TRIUMFALIS
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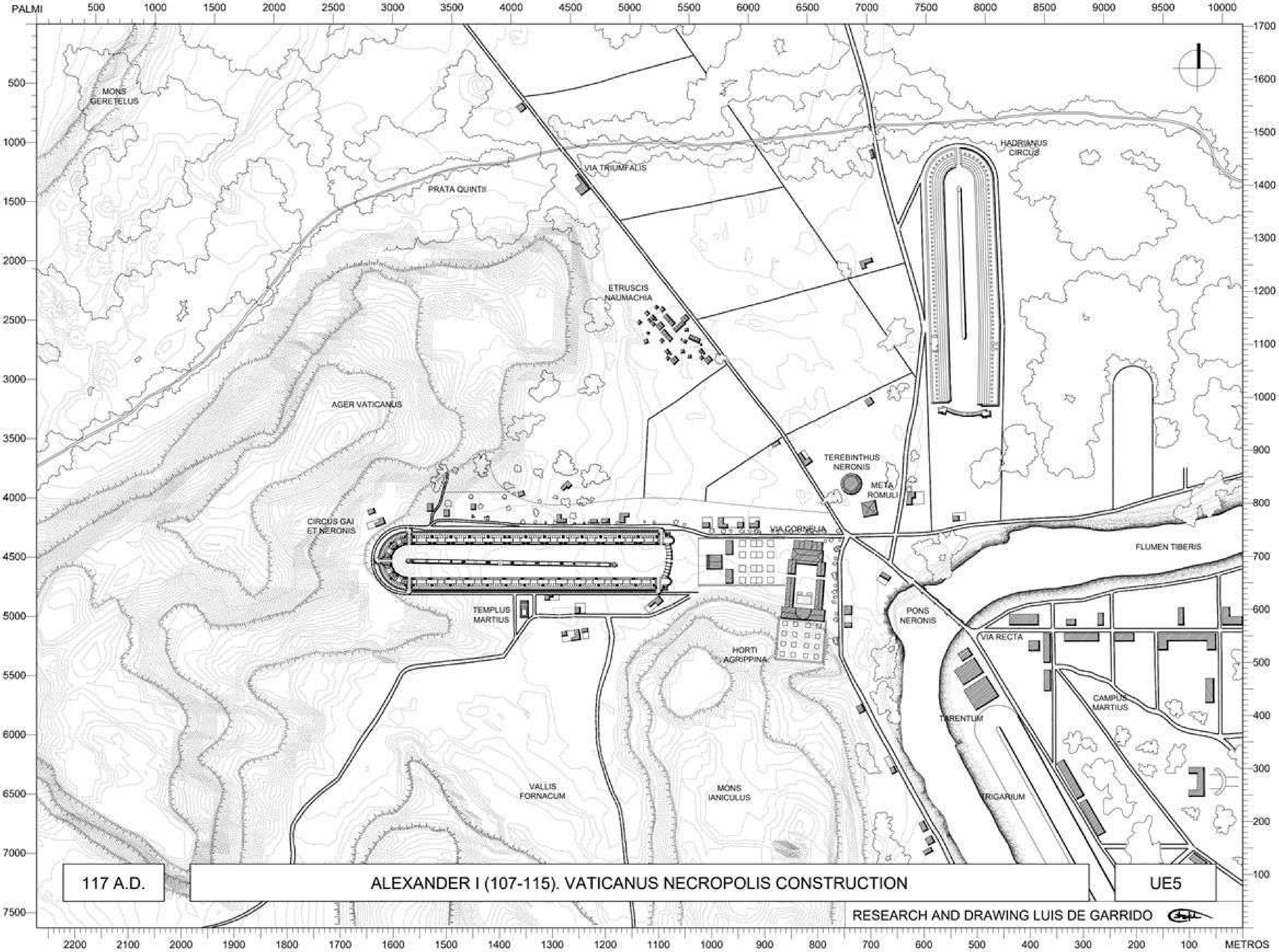
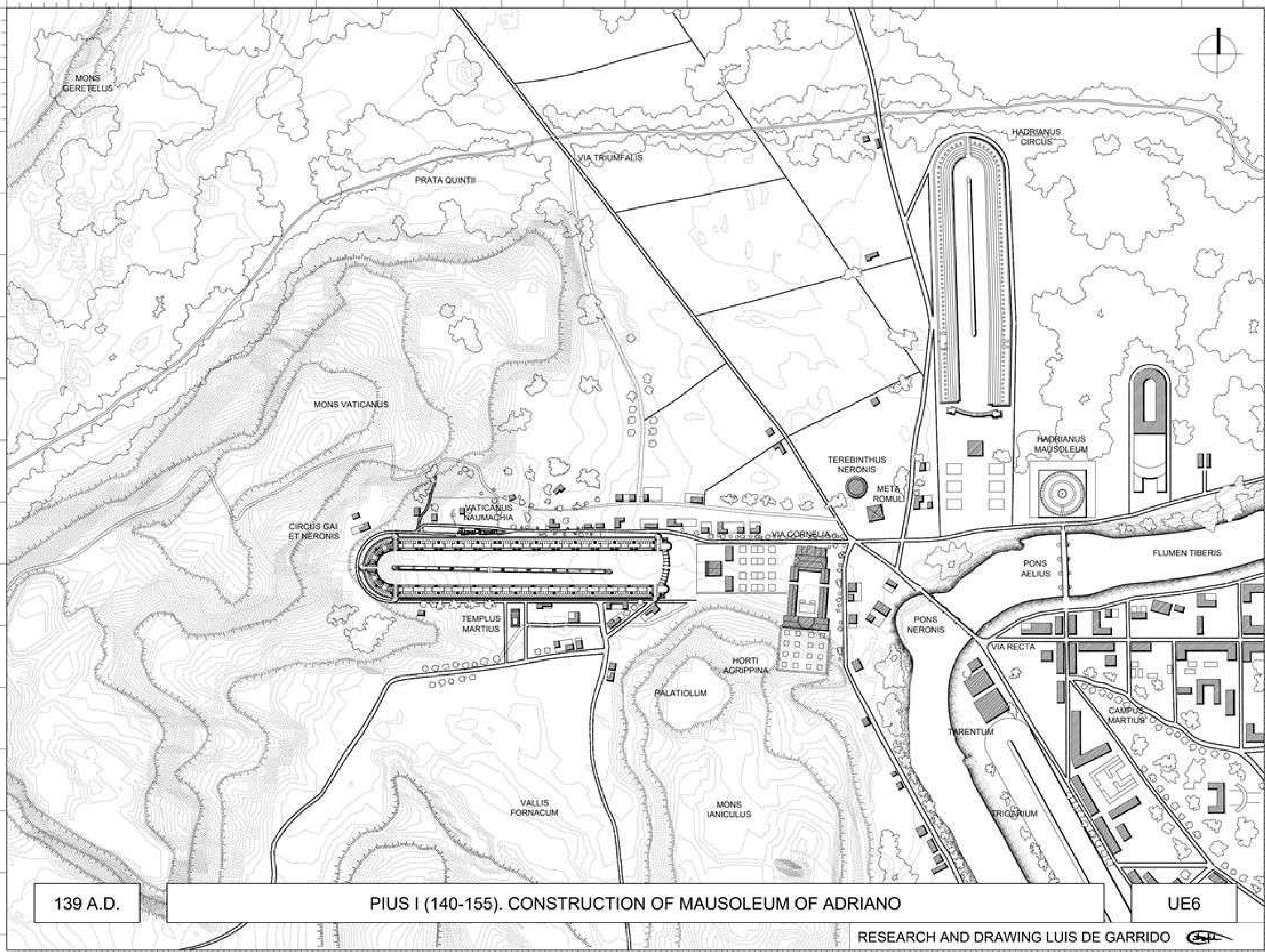
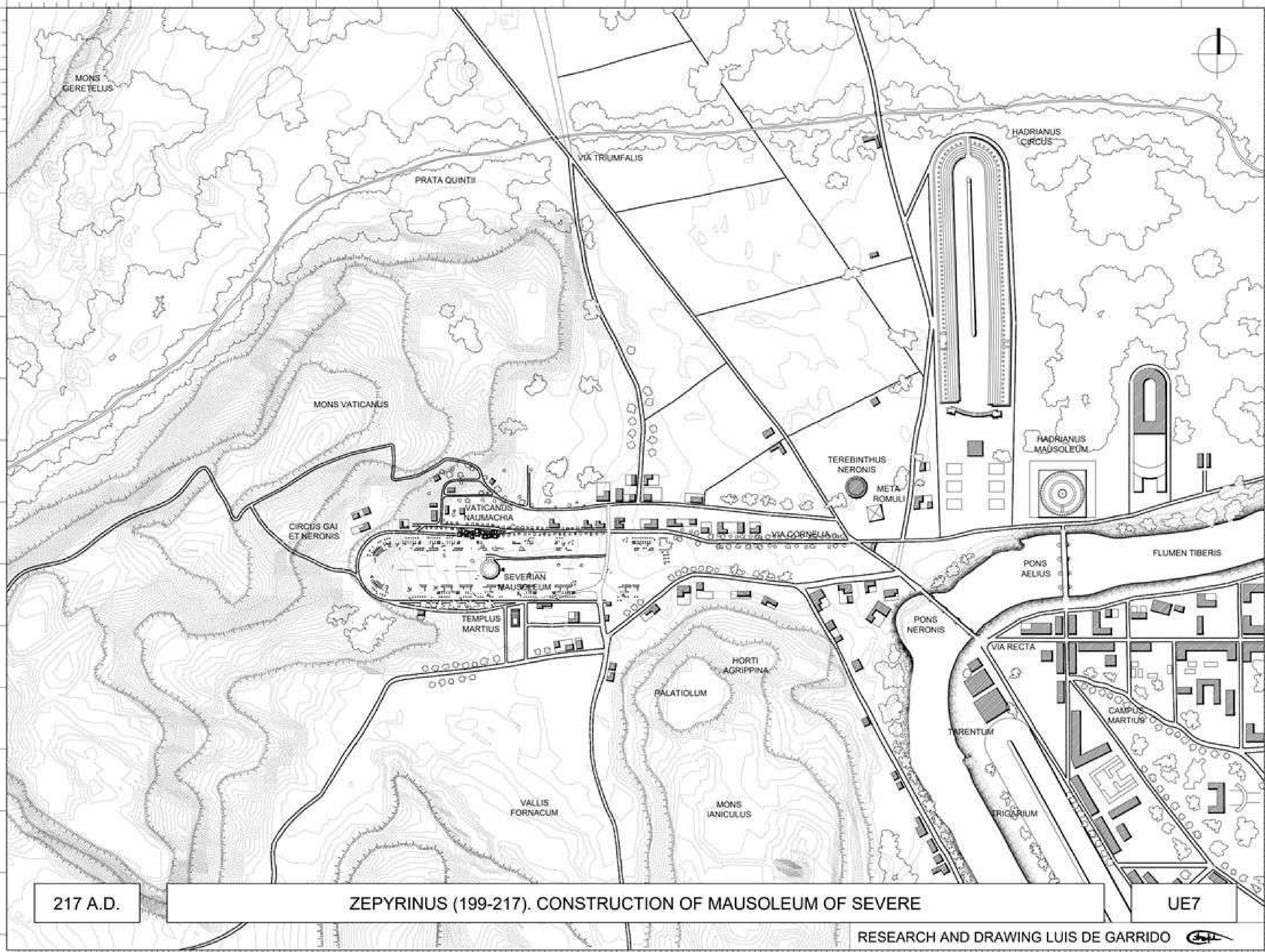
ETRUSCIS NAUMACHIA
AGER VATICANUS
TEREBINTHUS NERONIS
META ROMULI
CIRCUS GAI ET NERONIS
VIA CORNELIA
FLUMEN TIBERIS
TEMPLUS MARTIUS
PONS NERONIS
VIA RECTA
HORTI AGRIPPINA
CAMPUS MARTIUS
TARENTUM
VALLIS FORNACUM
MONS IANICULUS
TRIGARIUM
PALMI
METROS
64 A.D.
PETER (30-64). GREAT FIRE OF ROME
UE4
RESEARCH AND DRAWING LUIS DE GARRIDO


117 A.D.
ALEXANDER I (107-115). VATICANUS NECROPOLIS CONSTRUCTION
UE5
RESEARCH AND DRAWING LUIS DE GARRIDO
PALMI
METROS
MONS GERETELUS
PRATA QUINTII
VIA TRIUMFALIS
HADRIANUS CIRCUS
ETRUSCIS NAUMACHIA
AGER VATICANUS
TEREBINTHUS NERONIS
META ROMULI
CIRCUS GAI ET NERONIS
VIA CORNELIA
FLUMEN TIBERIS
TEMPLUS MARTIUS
PONS NERONIS
VIA RECTA
HORTI AGRIPPINA
CAMPUS MARTIUS
TARENTUM
VALLIS FORNACUM
MONS IANICULUS
TRIGARIUM



PALMI
METROS
MONS GERETELUS
VIA TRIUMFALIS
PRATA QUINTII
HADRIANUS CIRCUS
MONS VATICANUS
HADRIANUS MAUSOLEUM
TEREBINTHUS NERONIS
META ROMULI
VATICANUS NAUMACHIA
CIRCUS GAI ET NERONIS
VIA CORNELIA
FLUMEN TIBERIS
PONS AELIUS
PONS NERONIS
TEMPLUS MARTIUS
VIA RECTA
HORTI AGRIPPINA
PALATIOLUM
CAMPUS MARTIUS
TARENTUM
TRIGARIUM
VALLIS FORNACUM
MONS IANICULUS
139 A.D.
PIUS I (140-155). CONSTRUCTION OF MAUSOLEUM OF ADRIANO
UE6
RESEARCH AND DRAWING LUIS DE GARRIDO

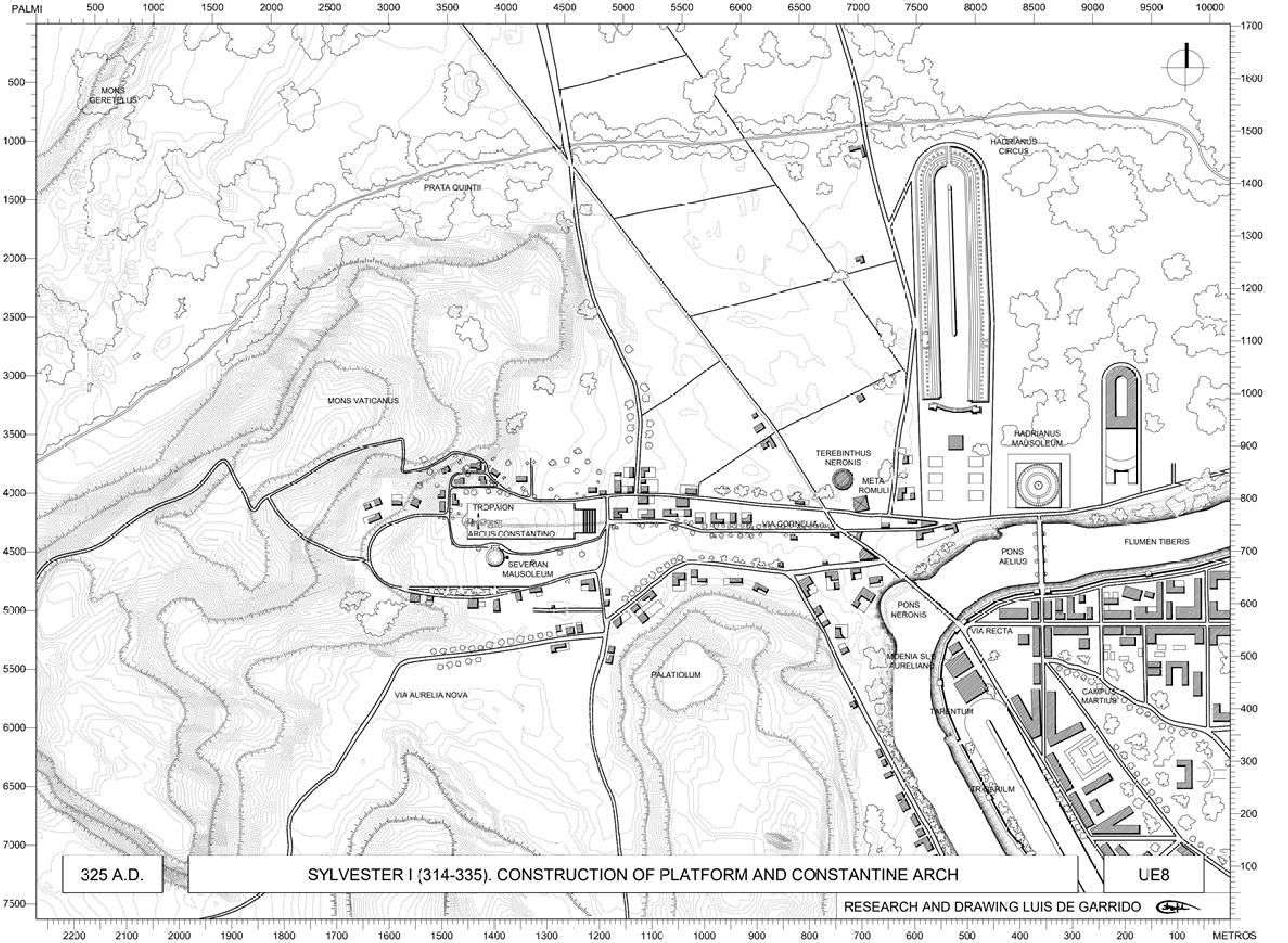


217 A.D.

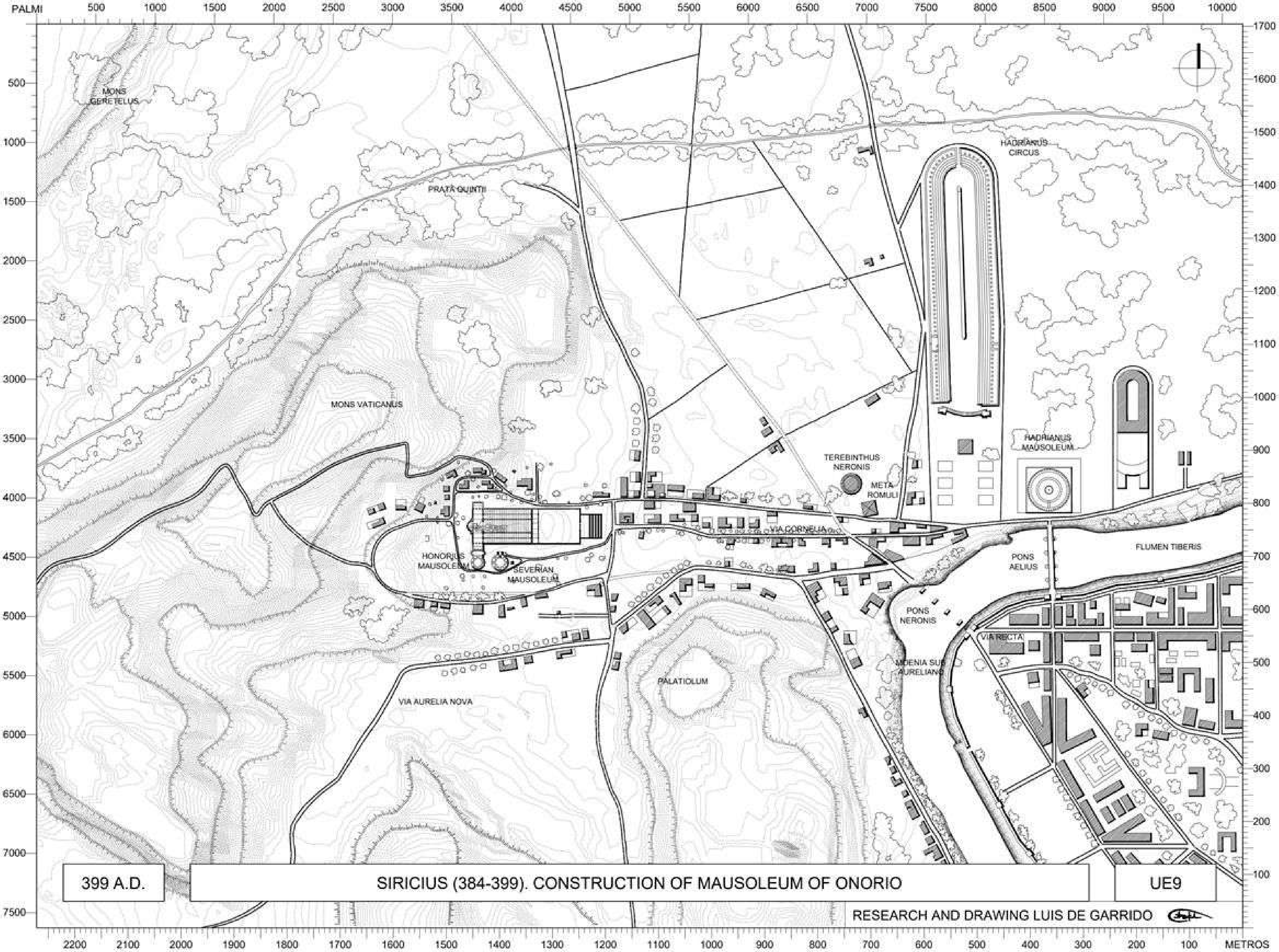
ZEPYRINUS (199-217). CONSTRUCTION OF MAUSOLEUM OF SEVERE

UE7

RESEARCH AND DRAWING LUIS DE GARRIDO



PALMI
METROS
MONS GERETELUS
PRATA QUINTII
MONS VATICANUS
HADRIANUS CIRCUS
HADRIANUS MAUSOLEUM
TEREBINTHUS NERONIS
META ROMULI
TROPAION
ARCUS CONSTANTINO
SEVERIAN MAUSOLEUM
VIA CORNELIA
FLUMEN TIBERIS
PONS AELIUS
PONS NERONIS
VIA RECTA
MOENIA SUB AURELIANO
CAMPUS MARTIUS
TARENTUM
TRIGARIUM
PALATIOLUM
VIA AURELIA NOVA
325 A.D.
SYLVESTER I (314-335). CONSTRUCTION OF PLATFORM AND CONSTANTINE ARCH
UE8
RESEARCH AND DRAWING LUIS DE GARRIDO

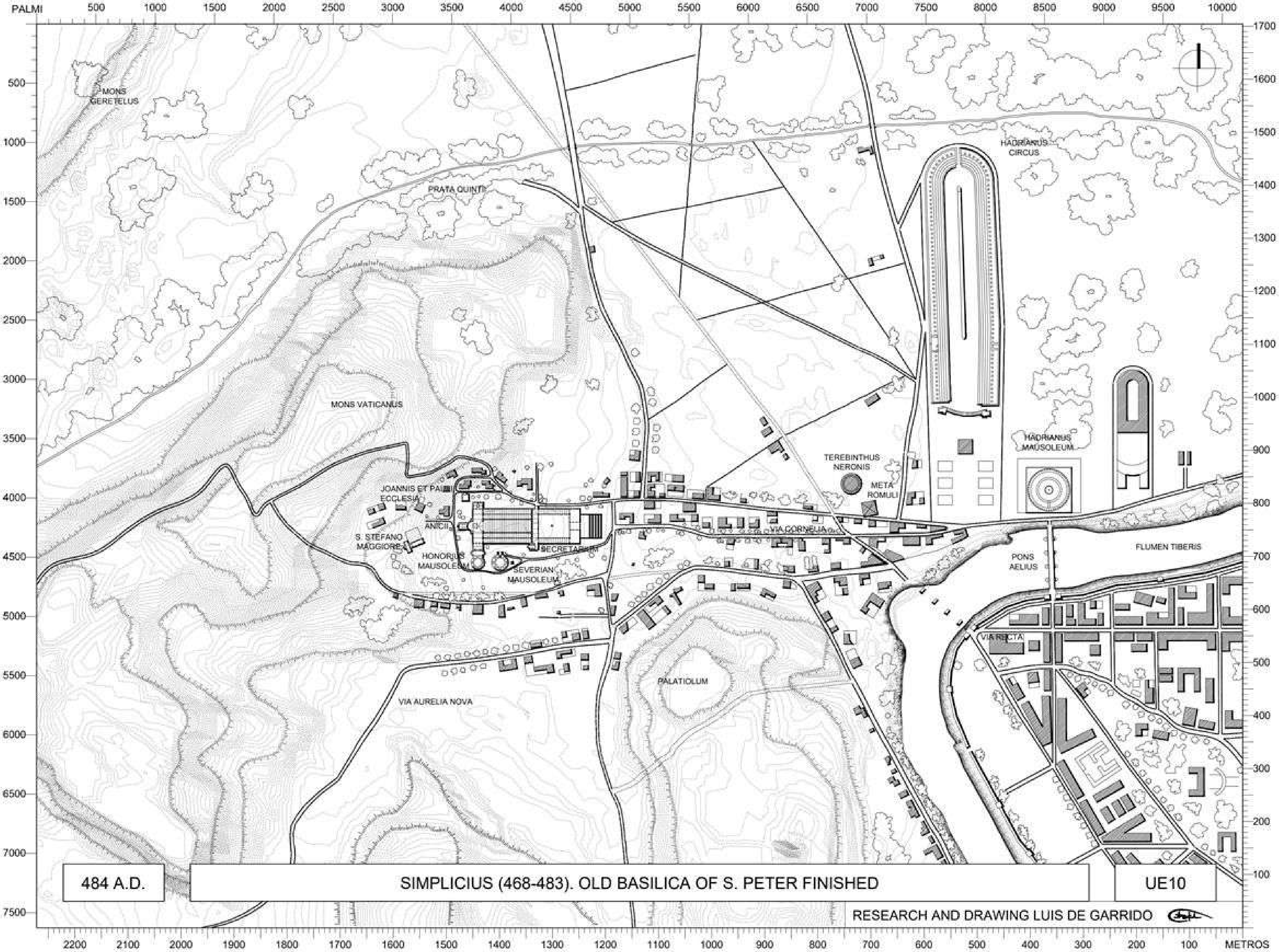


399 A.D.

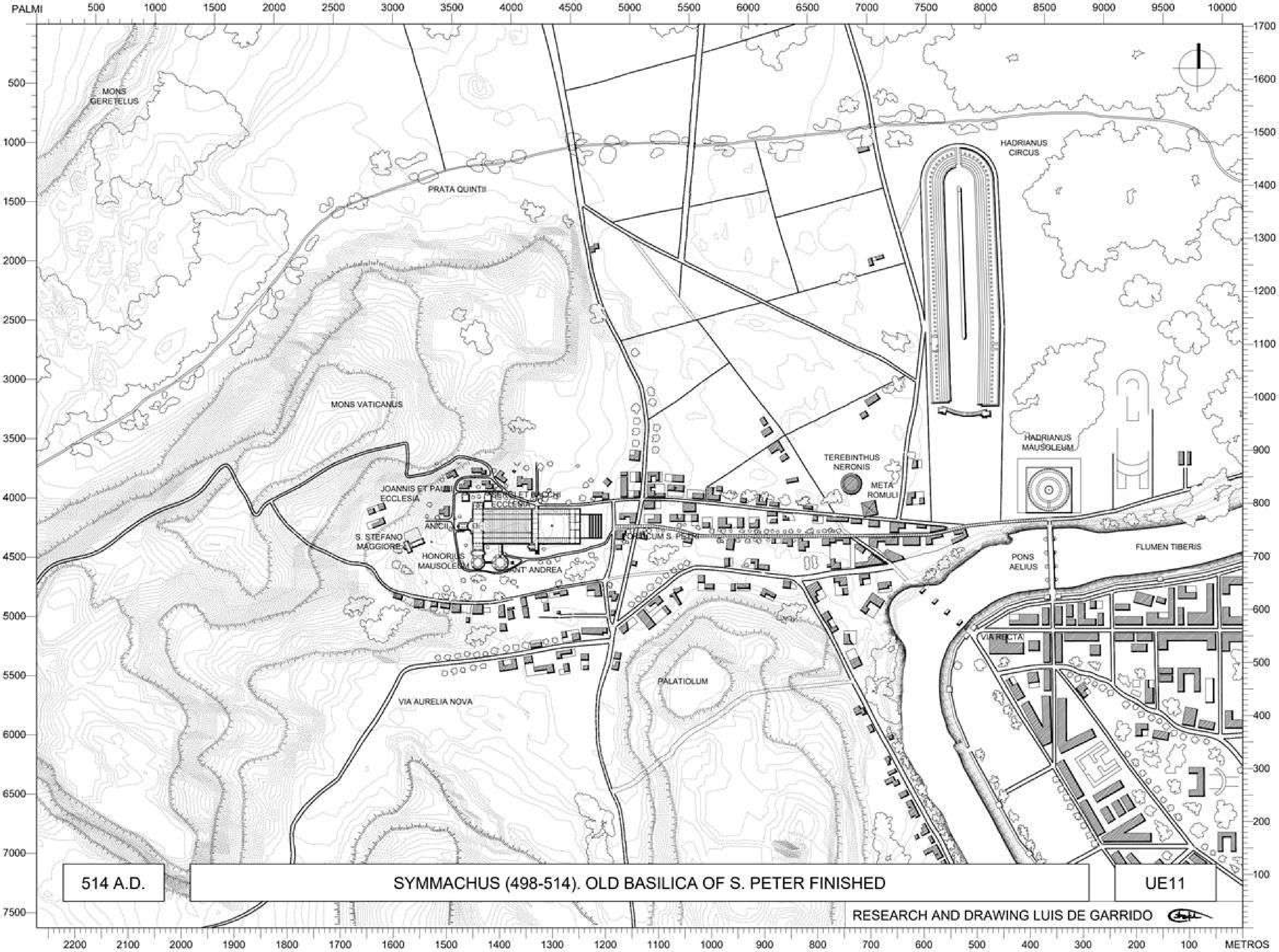
SIRICIUS (384-399). CONSTRUCTION OF MAUSOLEUM OF ONORIO

UE9

RESEARCH AND DRAWING LUIS DE GARRIDO



PALMI
METROS
MONS GERETELUS
PRATA QUINTI
MONS VATICANUS
JOANNIS ET PAULI ECCLESIA
ANICII
S. STEFANO MAGGIORE
HONORIUS MAUSOLEUM
SECRETARIUM
SEVERIAN MAUSOLEUM
VIA AURELIA NOVA
PALATIOLUM
VIA CORNELIA
TEREBINTHUS NERONIS
META ROMULI
HADRIANUS CIRCUS
HADRIANUS MAUSOLEUM
PONS AELIUS
FLUMEN TIBERIS
VIA RECTA
484 A.D.
SIMPLICIUS (468-483). OLD BASILICA OF S. PETER FINISHED
UE10
RESEARCH AND DRAWING LUIS DE GARRIDO

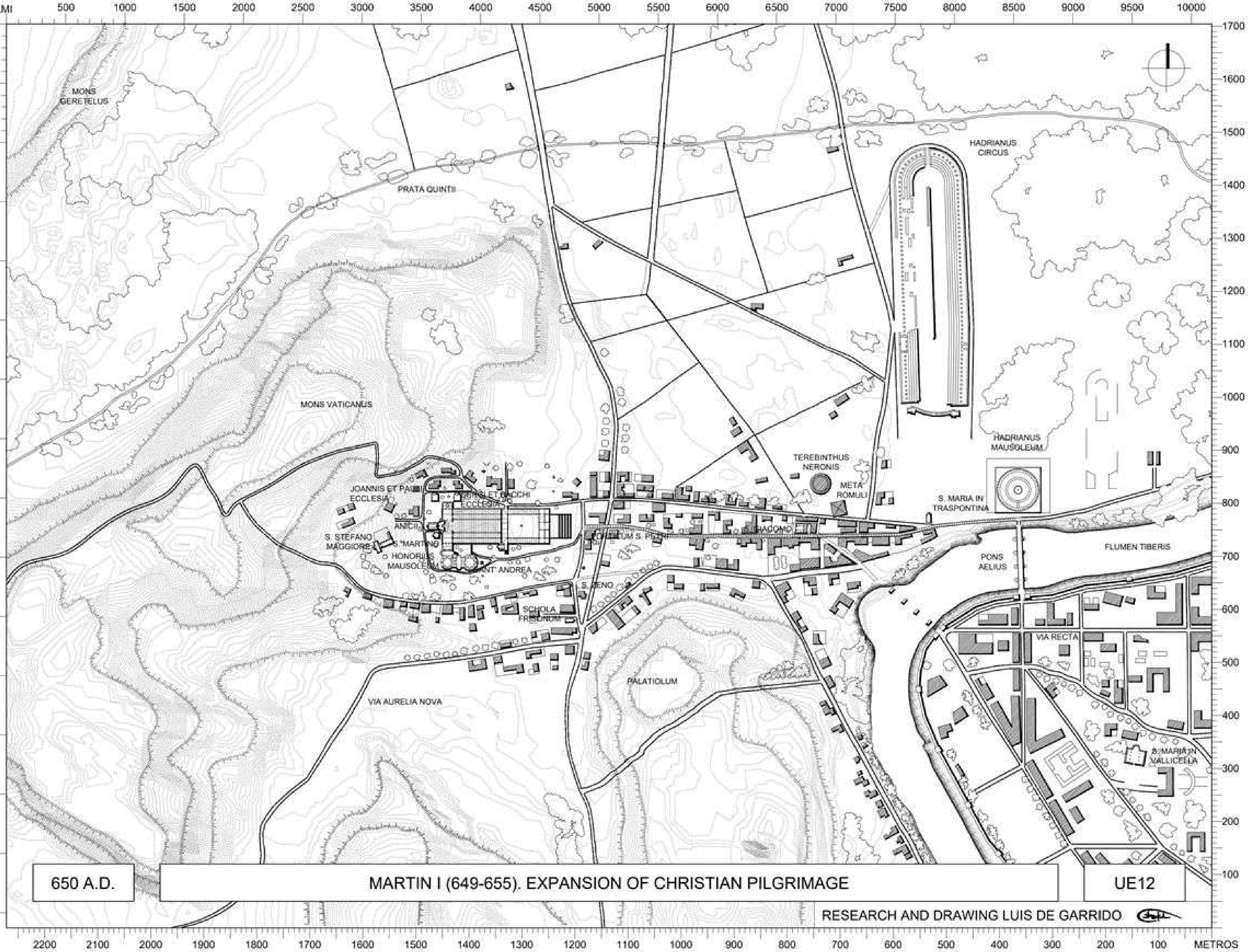


514 A.D.

SYMMACHUS (498-514). OLD BASILICA OF S. PETER FINISHED

UE11

RESEARCH AND DRAWING LUIS DE GARRIDO

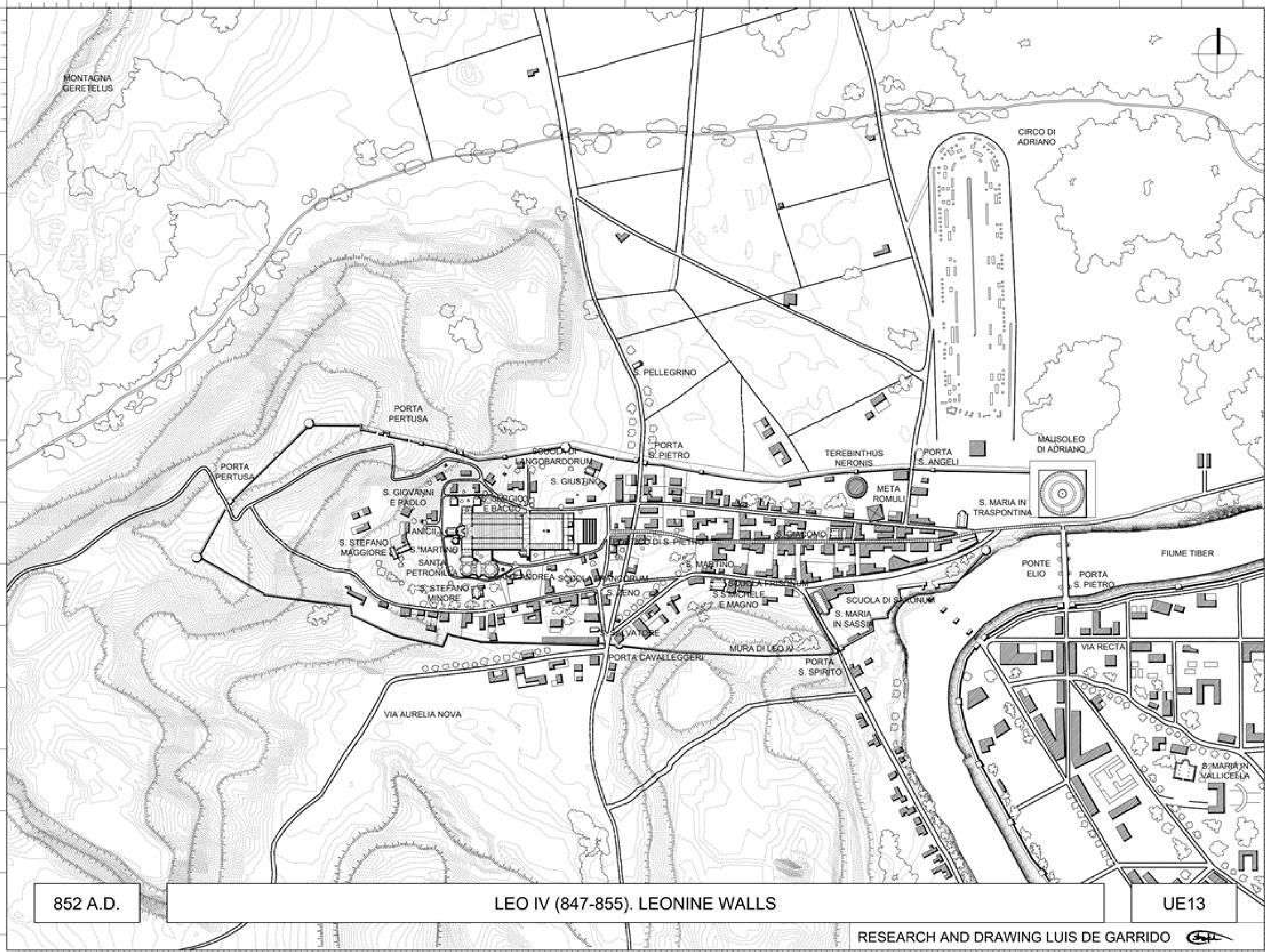


650 A.D.

MARTIN I (649-655). EXPANSION OF CHRISTIAN PILGRIMAGE

UE12

RESEARCH AND DRAWING LUIS DE GARRIDO

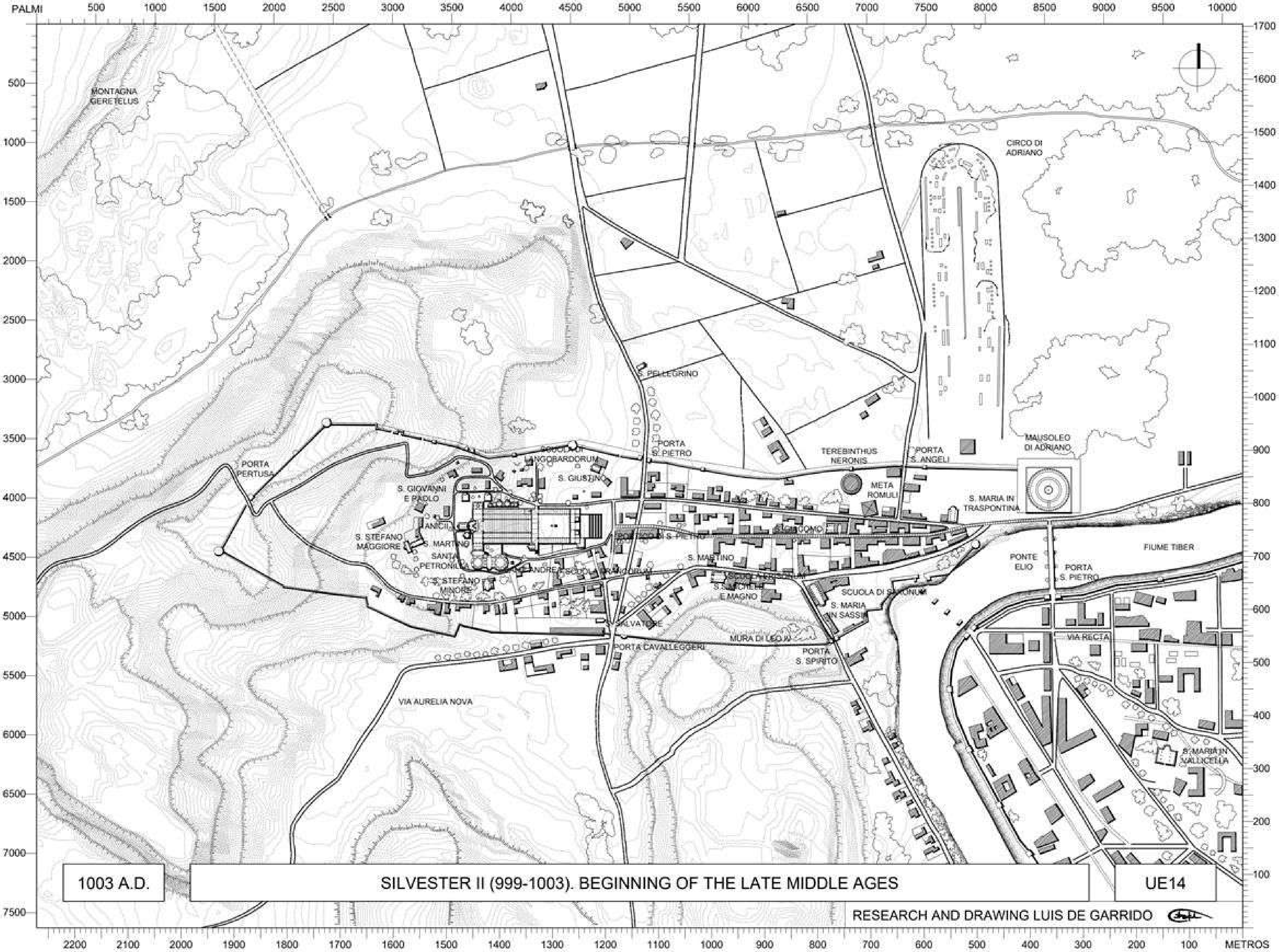


852 A.D.

LEO IV (847-855). LEONINE WALLS

UE13

RESEARCH AND DRAWING LUIS DE GARRIDO

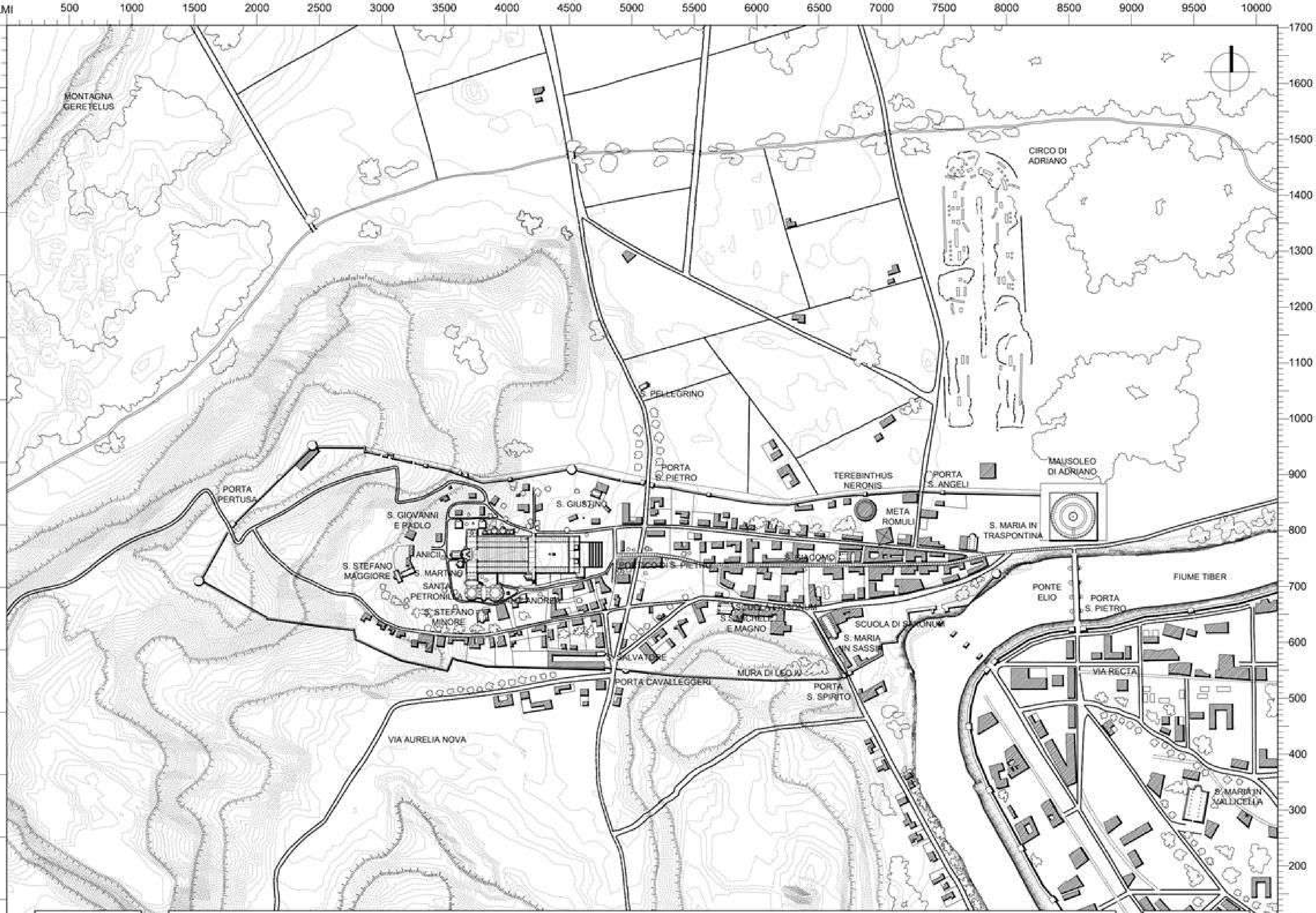


1003 A.D.

SILVESTER II (999-1003). BEGINNING OF THE LATE MIDDLE AGES

UE14

RESEARCH AND DRAWING LUIS DE GARRIDO

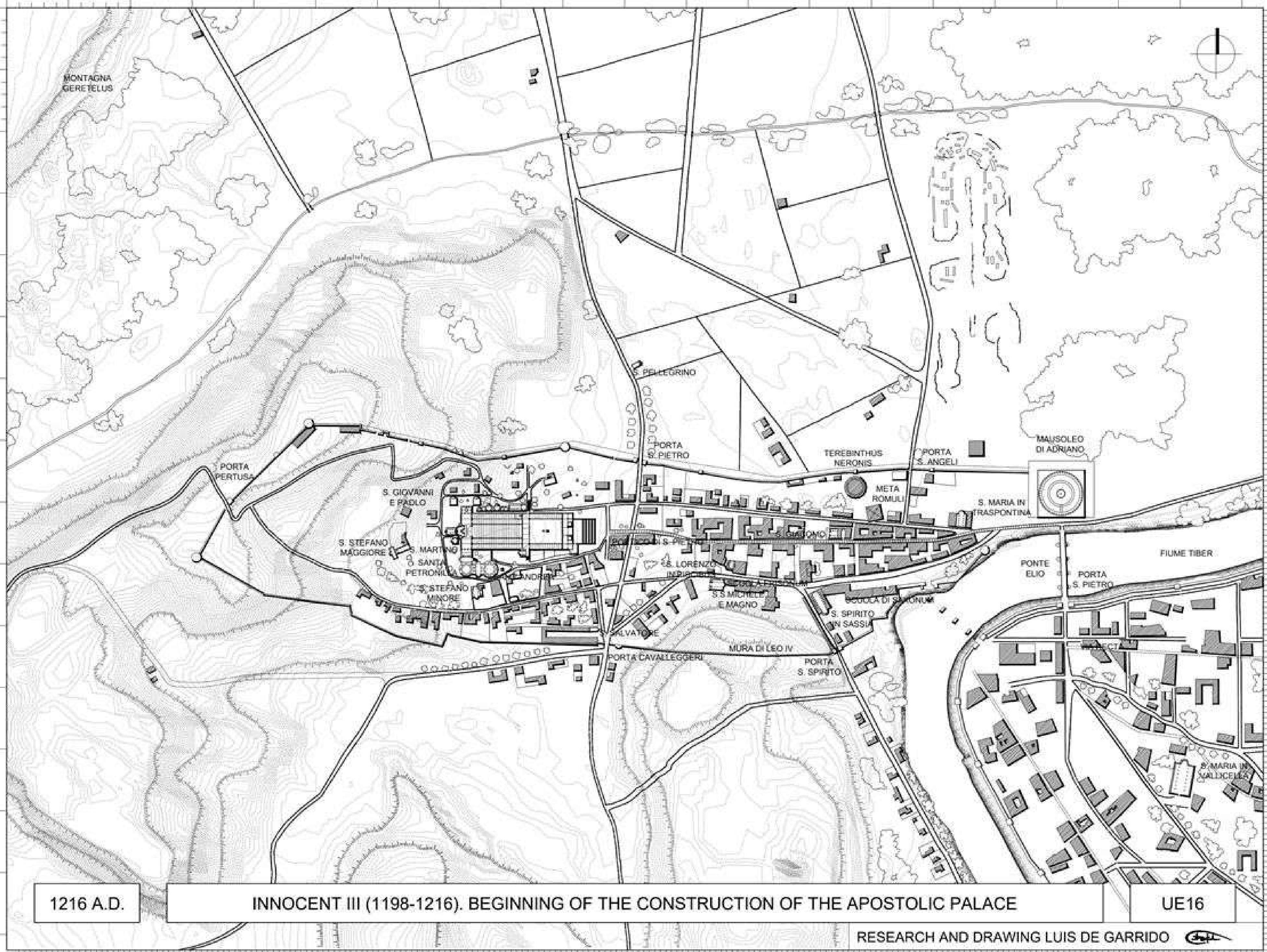


1124 A.D.

CALLIXTUS II (1119-1124). 1123. FIRST COUNCIL OF THE LATERAN

UE15

RESEARCH AND DRAWING LUIS DE GARRIDO

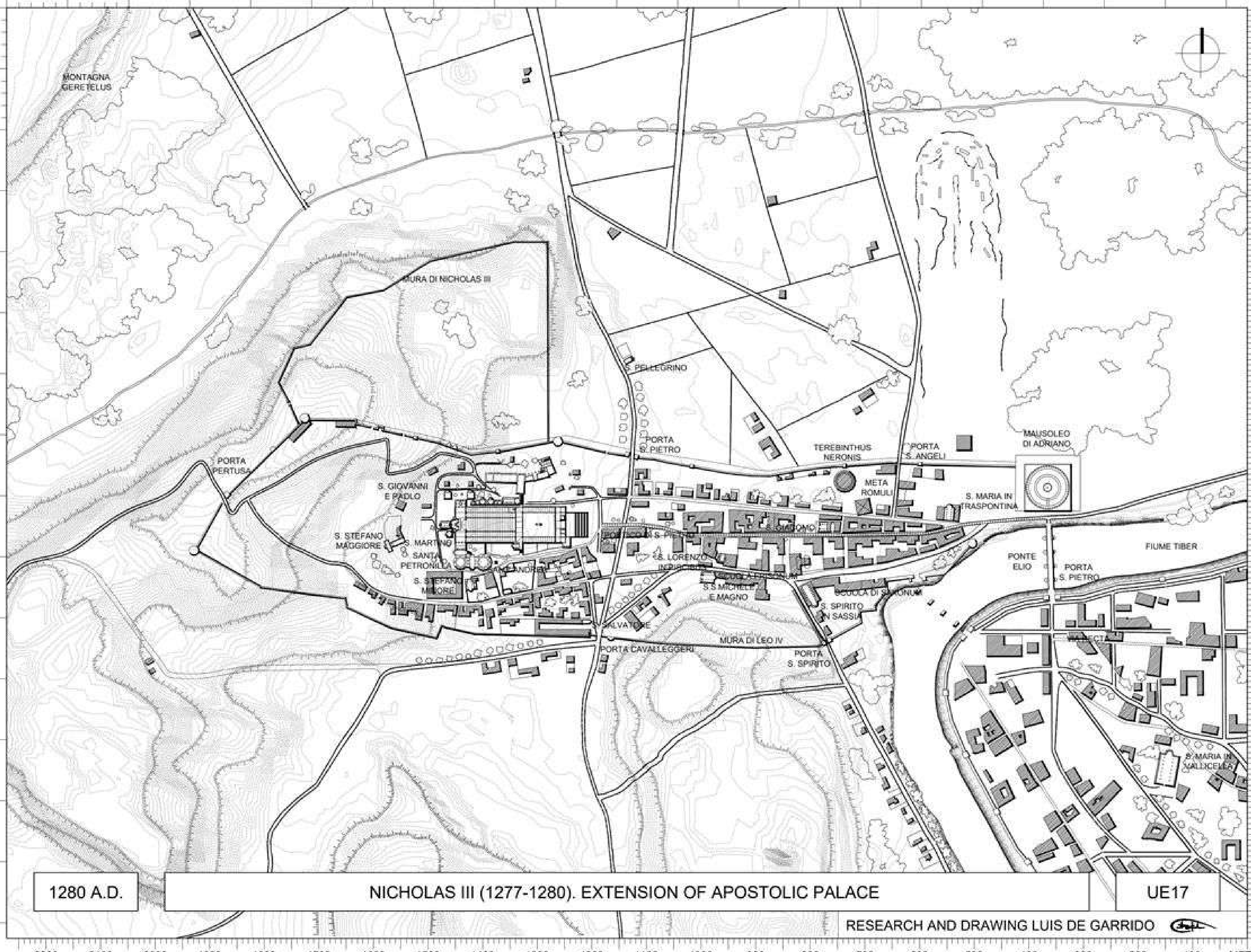


1216 A.D.

INNOCENT III (1198-1216). BEGINNING OF THE CONSTRUCTION OF THE APOSTOLIC PALACE

UE16

RESEARCH AND DRAWING LUIS DE GARRIDO

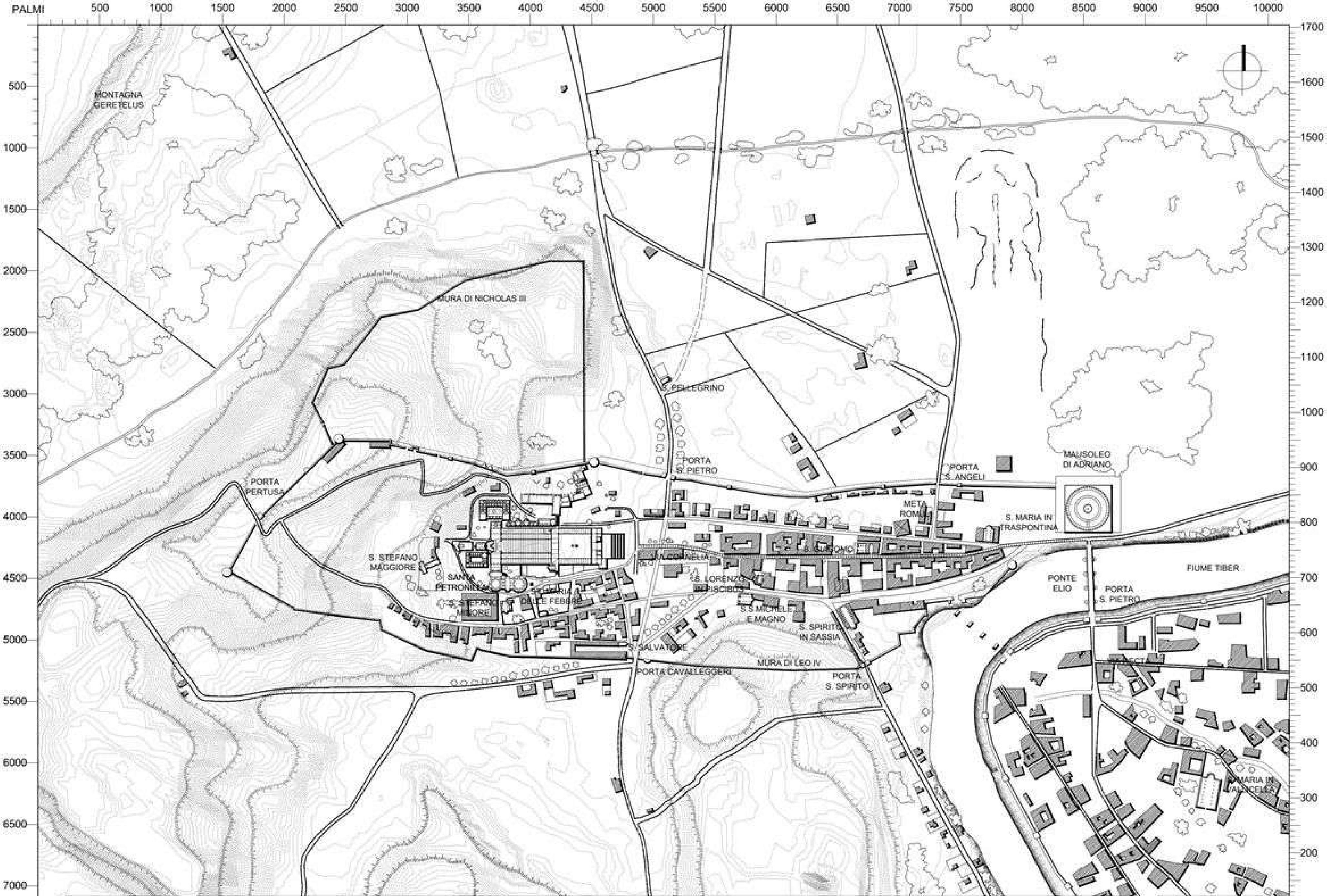


1280 A.D.

NICHOLAS III (1277-1280). EXTENSION OF APOSTOLIC PALACE

UE17

RESEARCH AND DRAWING LUIS DE GARRIDO

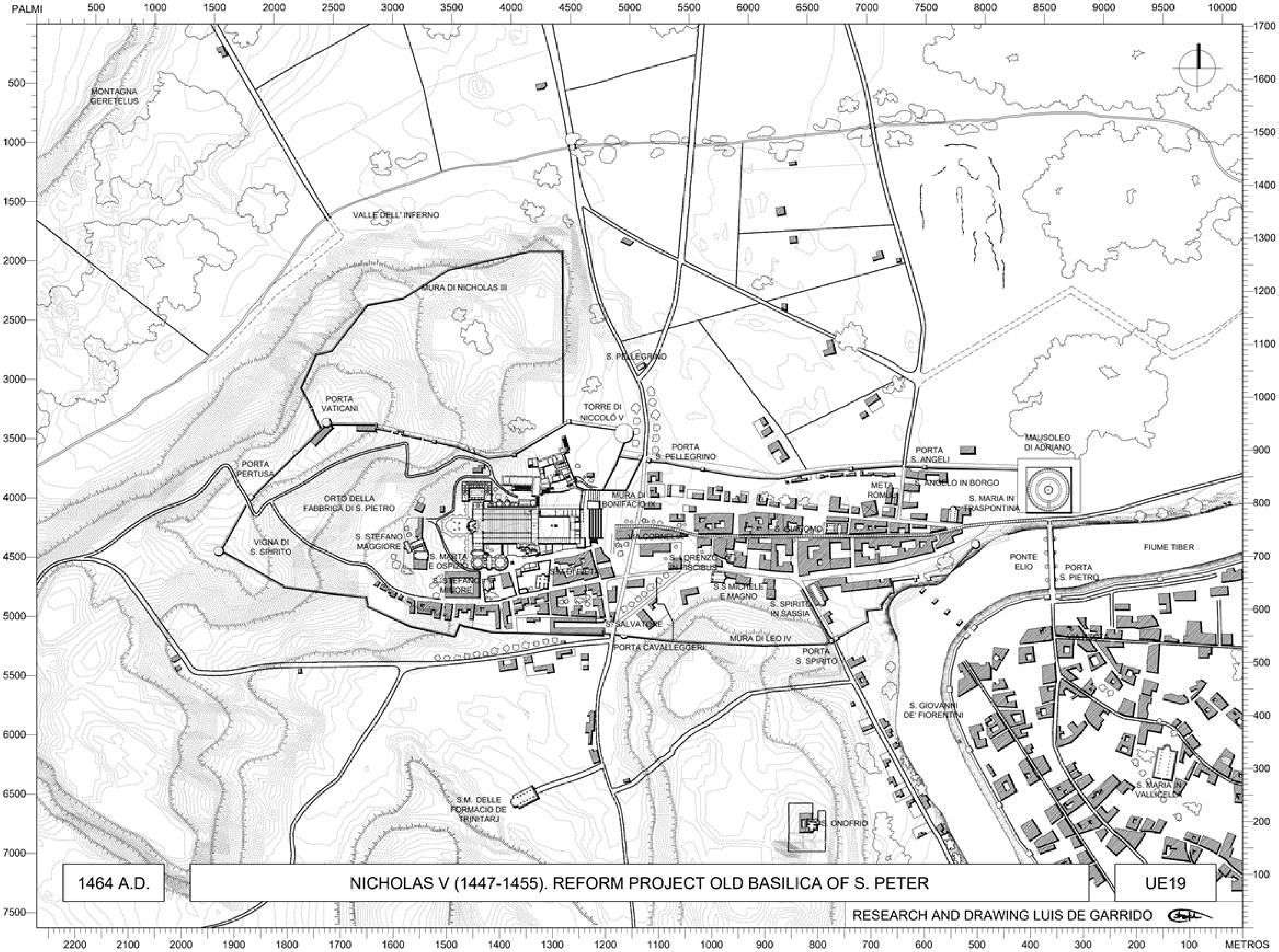


1378 A.D.

GREGORIUS XI (1370-1378)

UE18

RESEARCH AND DRAWING LUIS DE GARRIDO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ORTO DELLA FABBRICA DI S. PIETRO
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S. STEFANO MAGGIORE
S. MARTA E OSPIZO
S. STEFANO MINORE
MURA DI BONIFACIO IX
VIA CORNELIA
S. LORENZO IN PISCIBUS
S.S MICHELE E MAGNO
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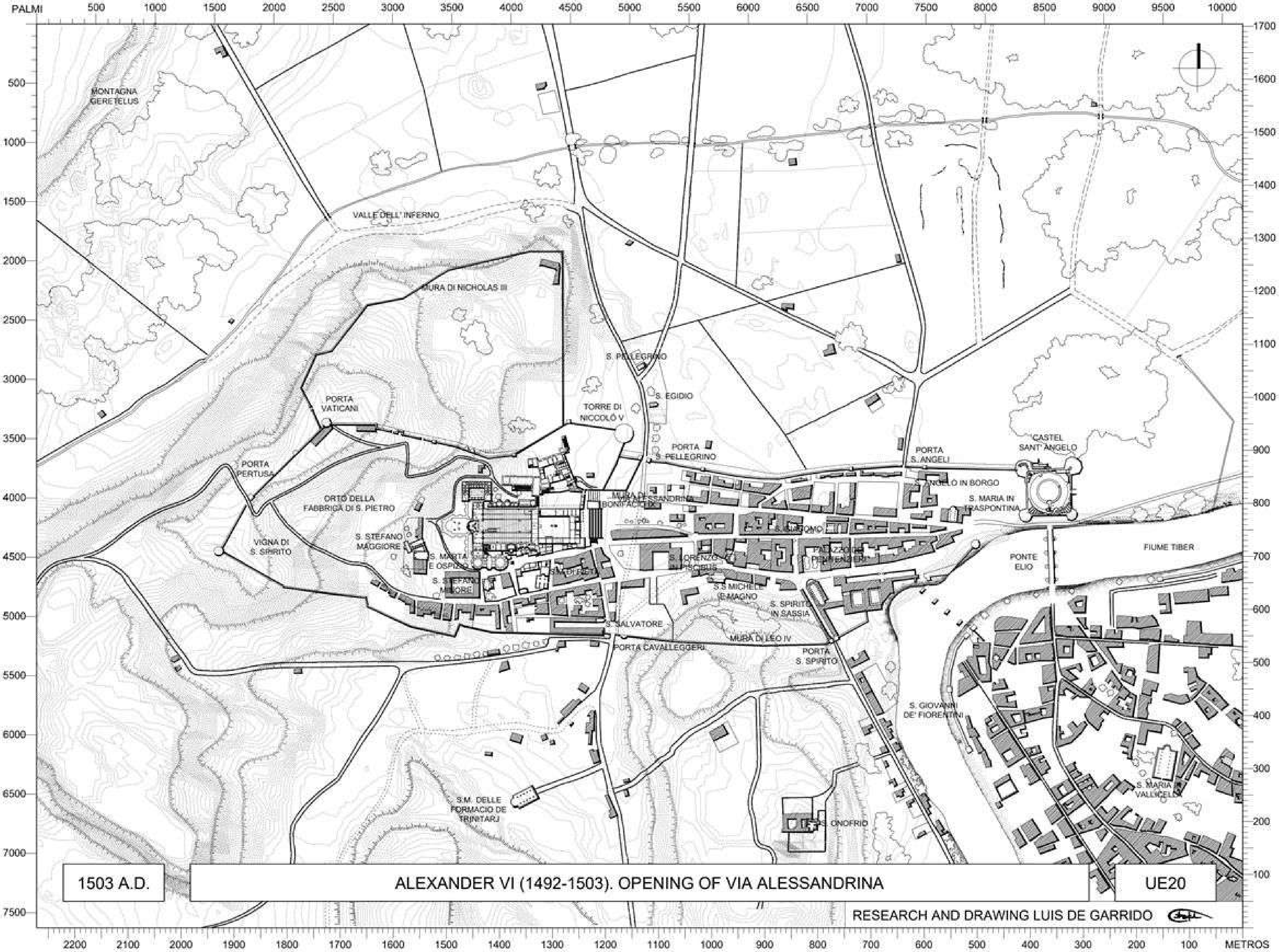
META ROMULI
S. ANGELO IN BORGO
S. MARIA IN TRASPONTINA
MAUSOLEO DI ADRIANO
PONTE ELIO
PORTA S. PIETRO
FIUME TIBER
S. GIOVANNI DE' FIORENTINI
S. MARIA IN VALLICELLA
S.M. DELLE FORMACIO DE TRINITARJ
S. ONOFRIO
1464 A.D.
NICHOLAS V (1447-1455). REFORM PROJECT OLD BASILICA OF S. PETER
UE19
RESEARCH AND DRAWING LUIS DE GARRIDO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S. EGIDIO
TORRE DI NICCOLÒ V
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S.M. DELLE FORMACIO DE TRINITARJ
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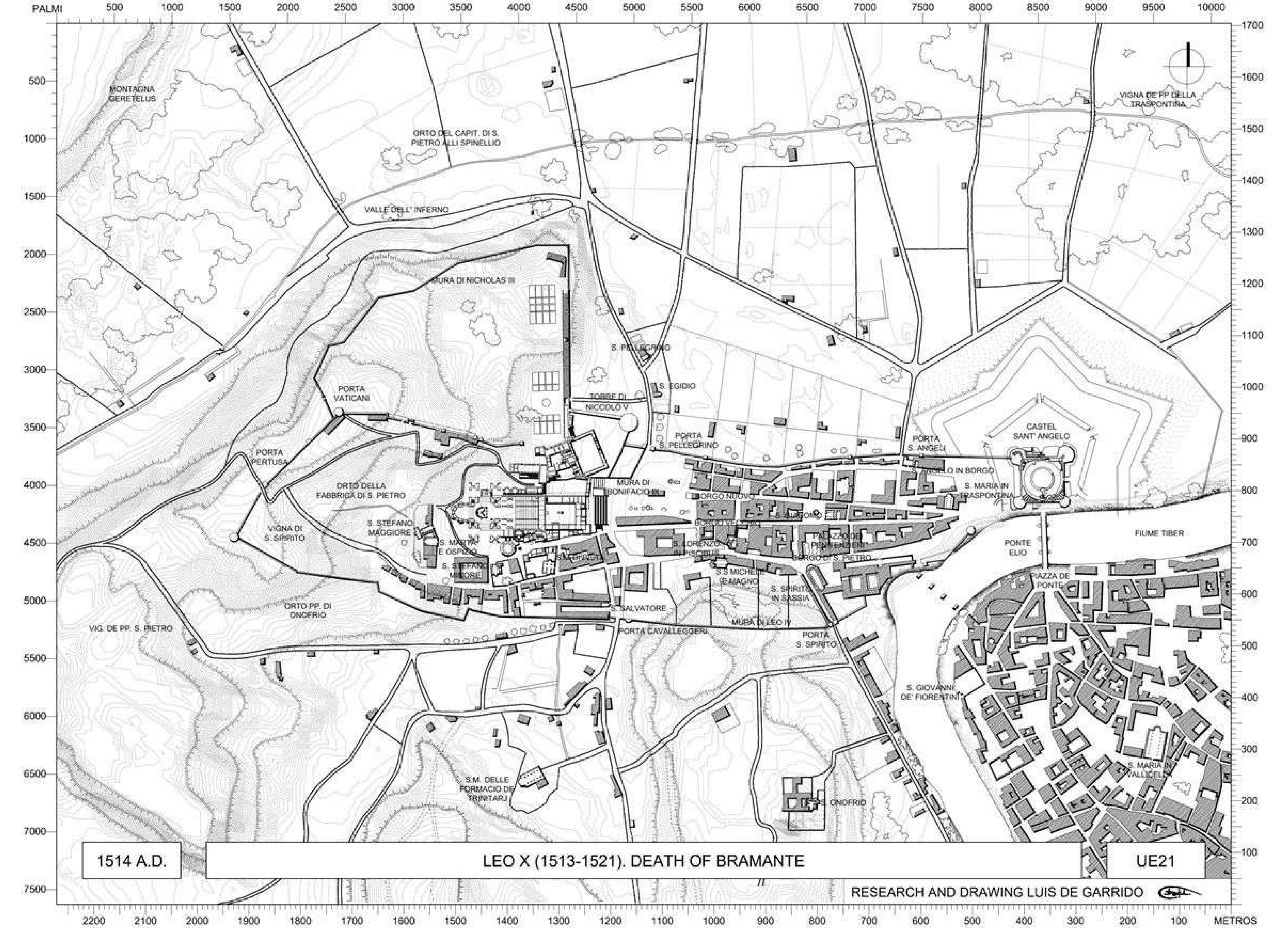
1503 A.D.
ALEXANDER VI (1492-1503). OPENING OF VIA ALESSANDRINA
UE20
RESEARCH AND DRAWING LUIS DE GARRIDO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TORRE DI NICCOLO V
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PORTA PERTUSA
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S. MARIA IN TRASPONTINA
MURA DI BONIFACIO IX
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BORGO VECCHIO
S. GIACOMO
PALAZZO DEI PENITENZIERI
BORGO DI S. PIETRO
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PORTA CAVALLEGGERI
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PIAZZA DE PONTE
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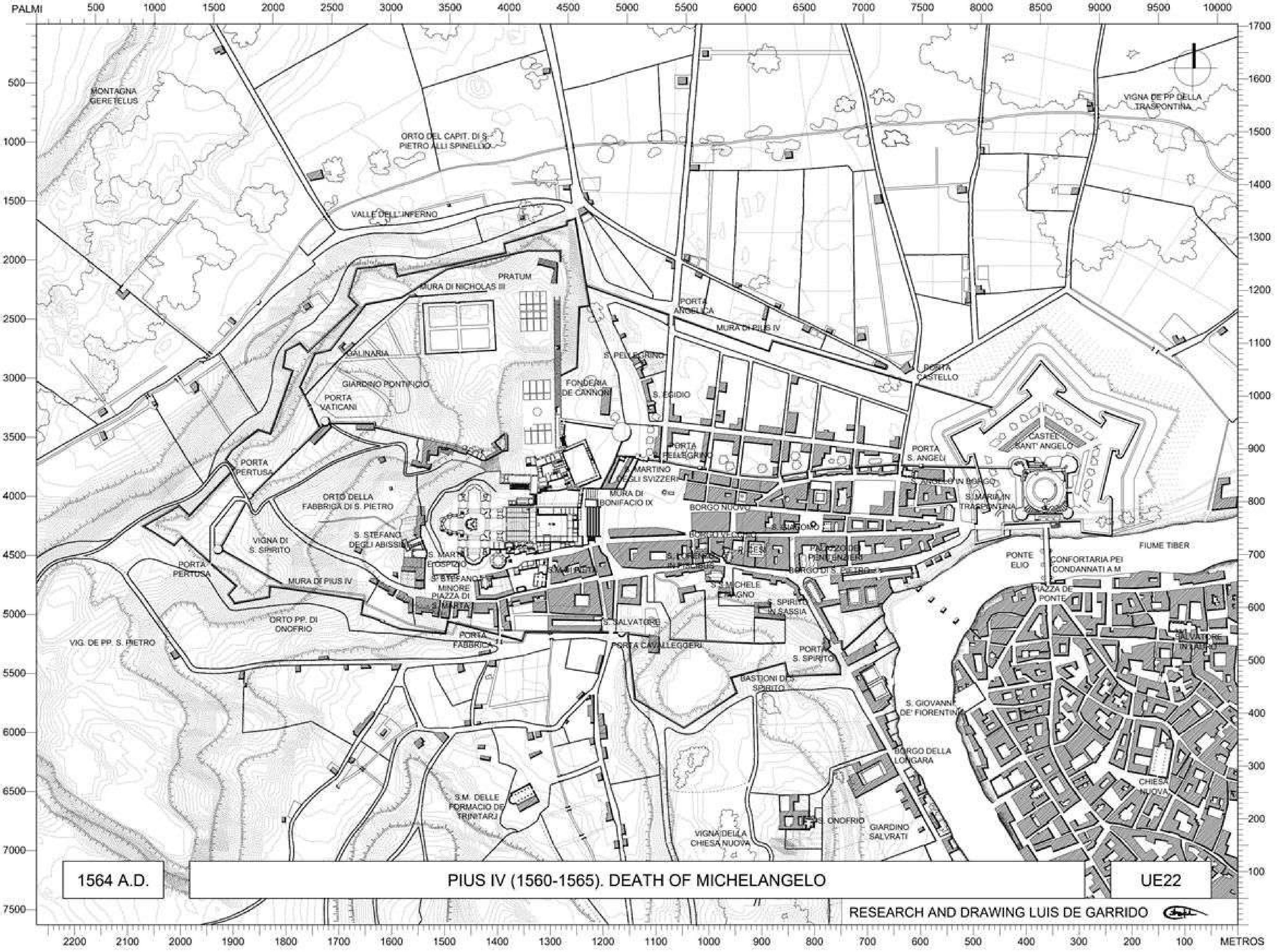
S. MARIA IN VALLICELLA
S.M. DELLE FORMACIO DE TRINITARJ
S. ONOFRIO
1514 A.D.
LEO X (1513-1521). DEATH OF BRAMANTE
UE21
RESEARCH AND DRAWING LUIS DE GARRIDO


1564 A.D.
PIUS IV (1560-1565). DEATH OF MICHELANGELO
UE22
RESEARCH AND DRAWING LUIS DE GARRIDO
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GALINARIA
GIARDINO PONTIFICIO
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ORTO PP. DI ONOFRIO
VIG. DE PP. S. PIETRO
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S. STEFANO MINORE
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FONDERIA DE CANNONI
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S. EGIDIO
PORTA PELLEGRINO
MARTINO DEGLI SVIZZERI
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PORTA CASTELLO
PORTA S. ANGELI
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BORGO VECCHIO
S. GIACOMO
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BORGO DI S. PIETRO
S. MICHELE
S. SPIRITO IN SASSIA
S. SALVATORE
PORTA CAVALLEGGERI
PORTA S. SPIRITO
BASTIONI DI S. SPIRITO
S.M. DELLE FORMACIO DE TRINITARJ
VIGNA DELLA CHIESA NUOVA
S. ONOFRIO
GIARDINO SALVRATI
BORGO DELLA LONGARA
S. GIOVANNI DE' FIORENTINI
CASTEL SANT' ANGELO
S. MARIA IN TRASPONTINA
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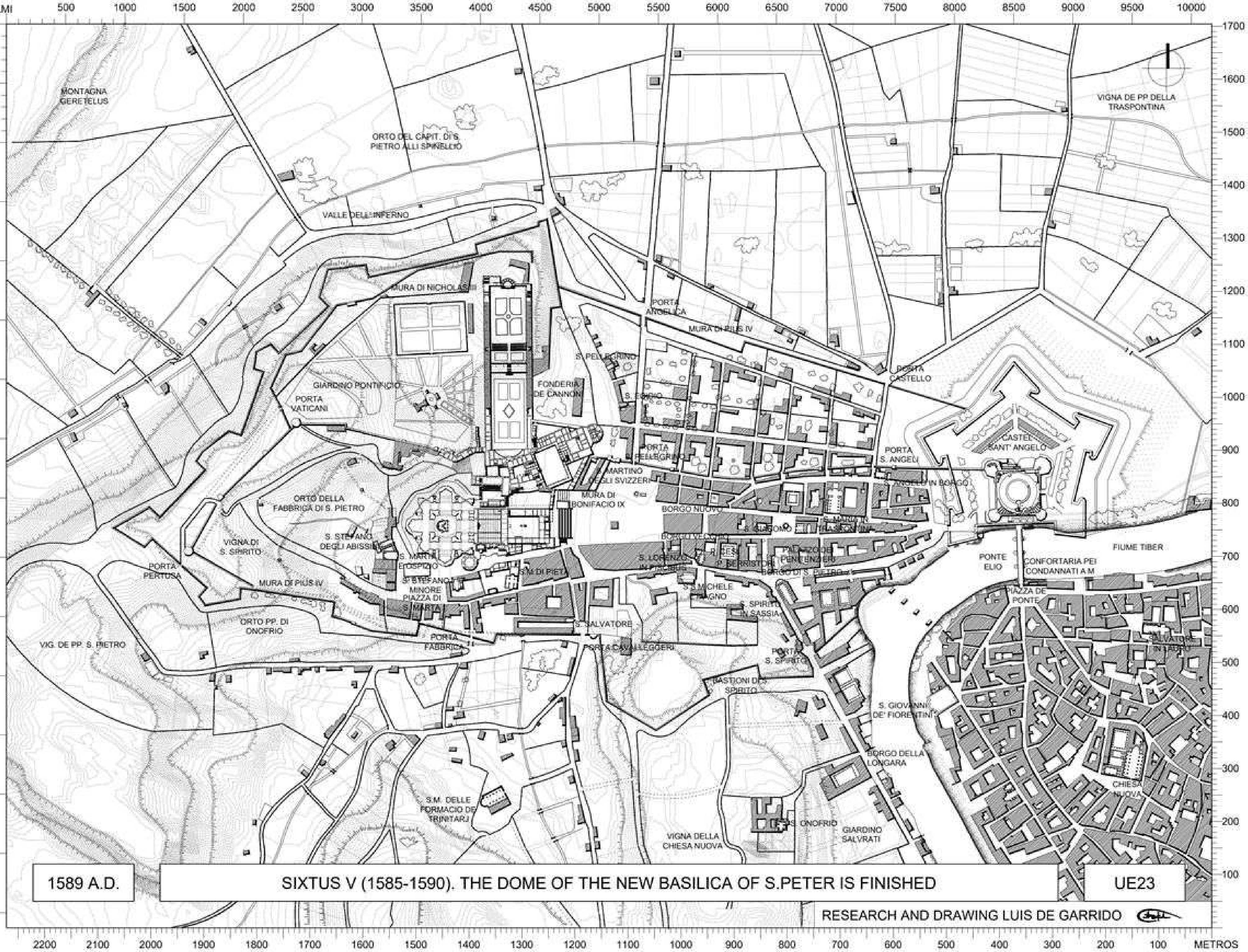
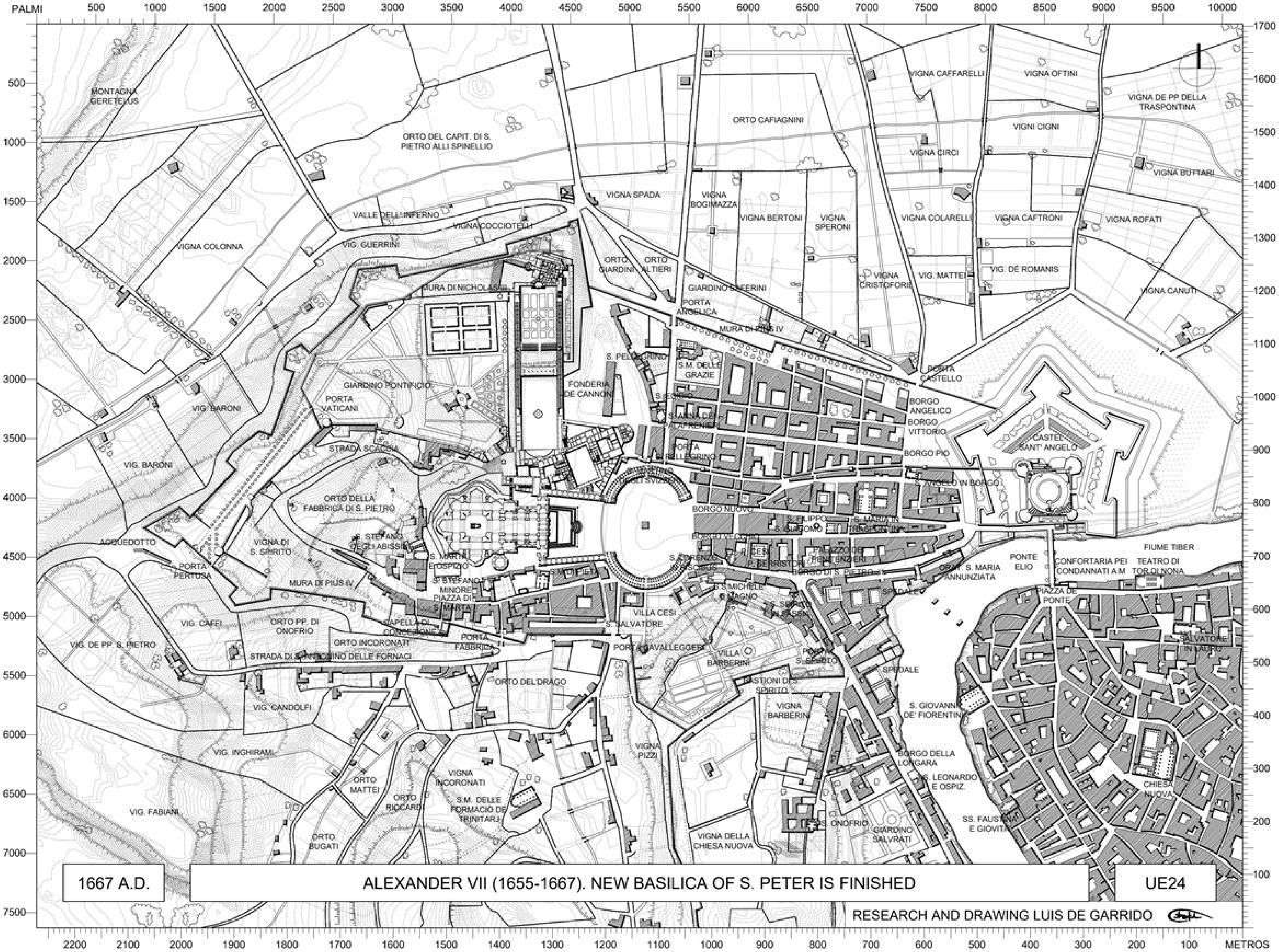
PONTE ELIO
CONFORTARIA PEI CONDANNATI A M
PIAZZA DE PONTE
S. SALVATORE IN LAURO
CHIESA NUOVA



1589 A.D. | SIXTUS V (1585-1590). THE DOME OF THE NEW BASILICA OF S.PETER IS FINISHED | UE23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VIGNA DE PP DELLA TRASPONTINA
VIGNI CIGNI
VIGNA CIRCI
VIGNA BUTTARI
VIGNA SPADA
VIGNA BOGIMAZZA
VIGNA BERTONI
VIGNA SPERONI
VIGNA COLARELLI
VIGNA CAFTRONI
VIGNA ROFATI
VALLE DELL' INFERNO
VIGNA COCCIOTELLI
VIGNA COLONNA
VIG. GUERRINI
ORTO GIARDINI
ORTO ALTIERI
VIGNA CRISTOFORI
VIG. MATTEI
VIG. DE ROMANIS
VIGNA CANUTI
MURA DI NICHOLAS V
GIARDINO CAFFERINI
PORTA ANGELICA
MURA DI PIUS IV
S. PELLEGRINO
S.M. DELLE GRAZIE
PORTA CASTELLO
GIARDINO PONTIFICIO
PORTA VATICANI
FONDERIA DE CANNONI
BORGO ANGELICO
BORGO VITTORIO
VIG. BARONI
STRADA SCACCIA
PORTA PELLEGRINO
BORGO PIO
CASTEL SANT' ANGELO
ORTO DELLA FABBRICA DI S. PIETRO
BORGO NUOVO
S. FILIPPO
S. GIACOMO
S. STEFANO DEGLI ABISSINI
ACQUEDOTTO
VIGNA DI S. SPIRITO
PORTA PERTUSA
S. MARTA E OSPIZIO
PALAZZO DE PENITENZIERI
BORGO DI S. PIETRO
FIUME TIBER
CONFORTARIA PEI CONDANNATI A M
TEATRO DI TOR DI NONA
PONTE ELIO
S. MARIA ANNUNZIATA
MURA DI PIUS IV
S. STEFANO MINORE
PIAZZA DI S. MARTA
S. MICHELE E MAGNO
SPEDALE
PIAZZA DE PONTE
VIG. CAFFI
ORTO PP. DI ONOFRIO
CAPELLA DI CONCEZIONE
VILLA CESI
S. SALVATORE
ORTO INCORONATI
PORTA FABBRICA
PORTA CAVALLEGGERI
VILLA BARBERINI
VIG. DE PP. S. PIETRO
STRADA DI S. ANTONINO DELLE FORNACI
S. SALVATORE IN LAURO
ORTO DEL DRAGO
SPEDALE
BASTIONI DI S. SPIRITO
VIG. CANDOLFI
VIGNA BARBERINI
S. GIOVANNI DE' FIORENTINI
VIG. INGHIRAMI
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ORTO MATTEI
ORTO RICCARDI
S.M. DELLE FORMACIO DE TRINITARJ
S. LEONARDO E OSPIZ.
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S. ONOFRIO
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ORTO BUGATI
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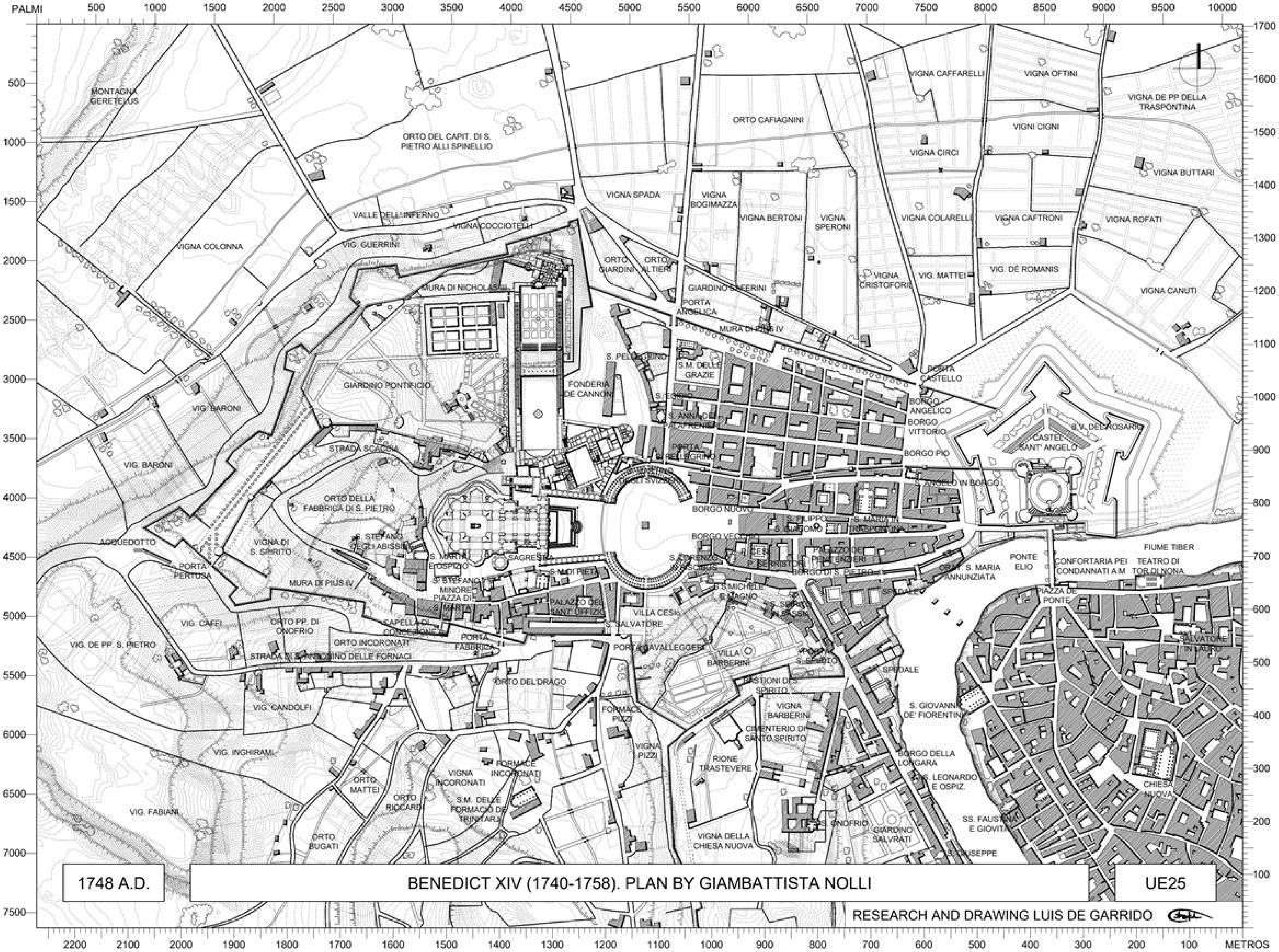
GIARDINO SALVRATI
1667 A.D.
ALEXANDER VII (1655-1667). NEW BASILICA OF S. PETER IS FINISHED
UE24
RESEARCH AND DRAWING LUIS DE GARRIDO


1748 A.D.
BENEDICT XIV (1740-1758). PLAN BY GIAMBATTISTA NOLLI
UE25
RESEARCH AND DRAWING LUIS DE GARRIDO
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METROS
MONTAGNA GERETELUS
ORTO DEL CAPIT. DI S. PIETRO ALLI SPINELLIO
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ORTO DELLA FABBRICA DI S. PIETRO
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BORGO VECCHIO
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ACQUEDOTTO
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S. SALVATORE
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ORTO INCORONATI
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ORTO DEL DRAGO
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FORNACE PIZZI
VIGNA PIZZI
VIG. INGHIRAMI
RIONE TRASTEVERE
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S. LEONARDO E OSPIZ.
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FORNACE INCORONATI
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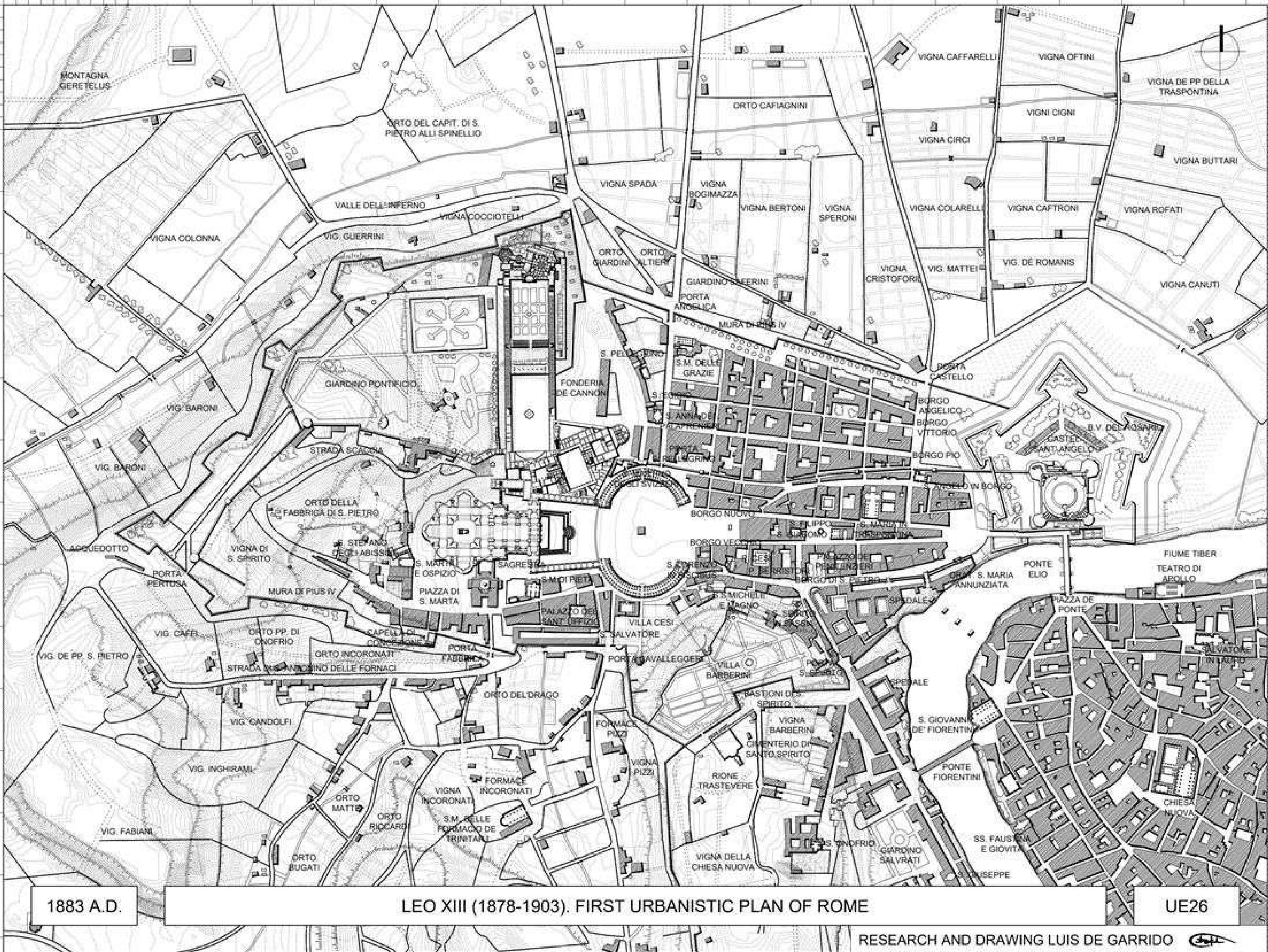
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FIUME TIBER
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SAGRESTIA
PORTA PERTUSA
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GIARDINO SALVRATI
SS. FAUSTINA E GIOVITA
ORTO BUGATI
VIGNA DELLA CHIESA NUOVA
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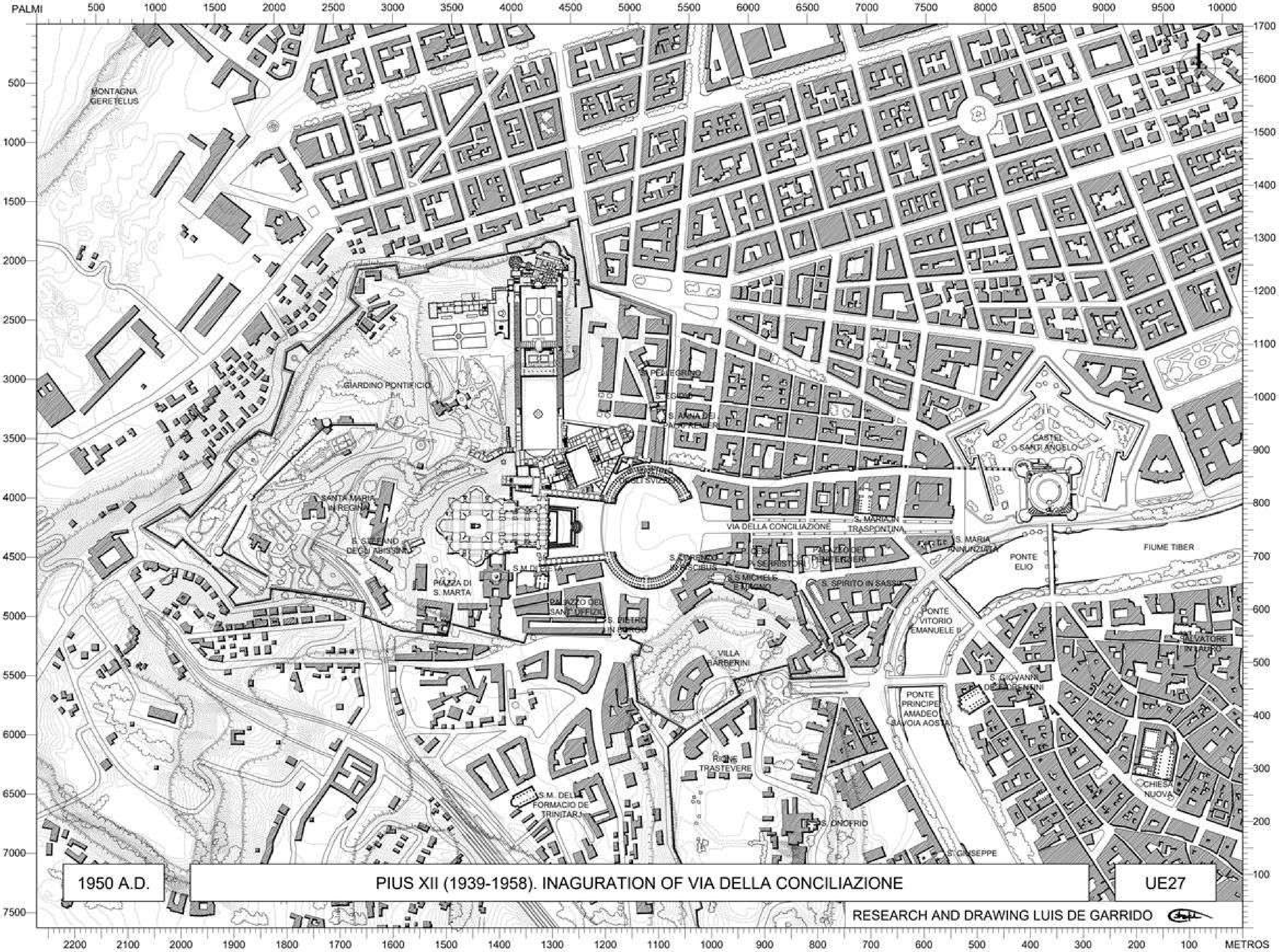
1883 A.D.
LEO XIII (1878-1903). FIRST URBANISTIC PLAN OF ROME
UE26
RESEARCH AND DRAWING LUIS DE GARRIDO

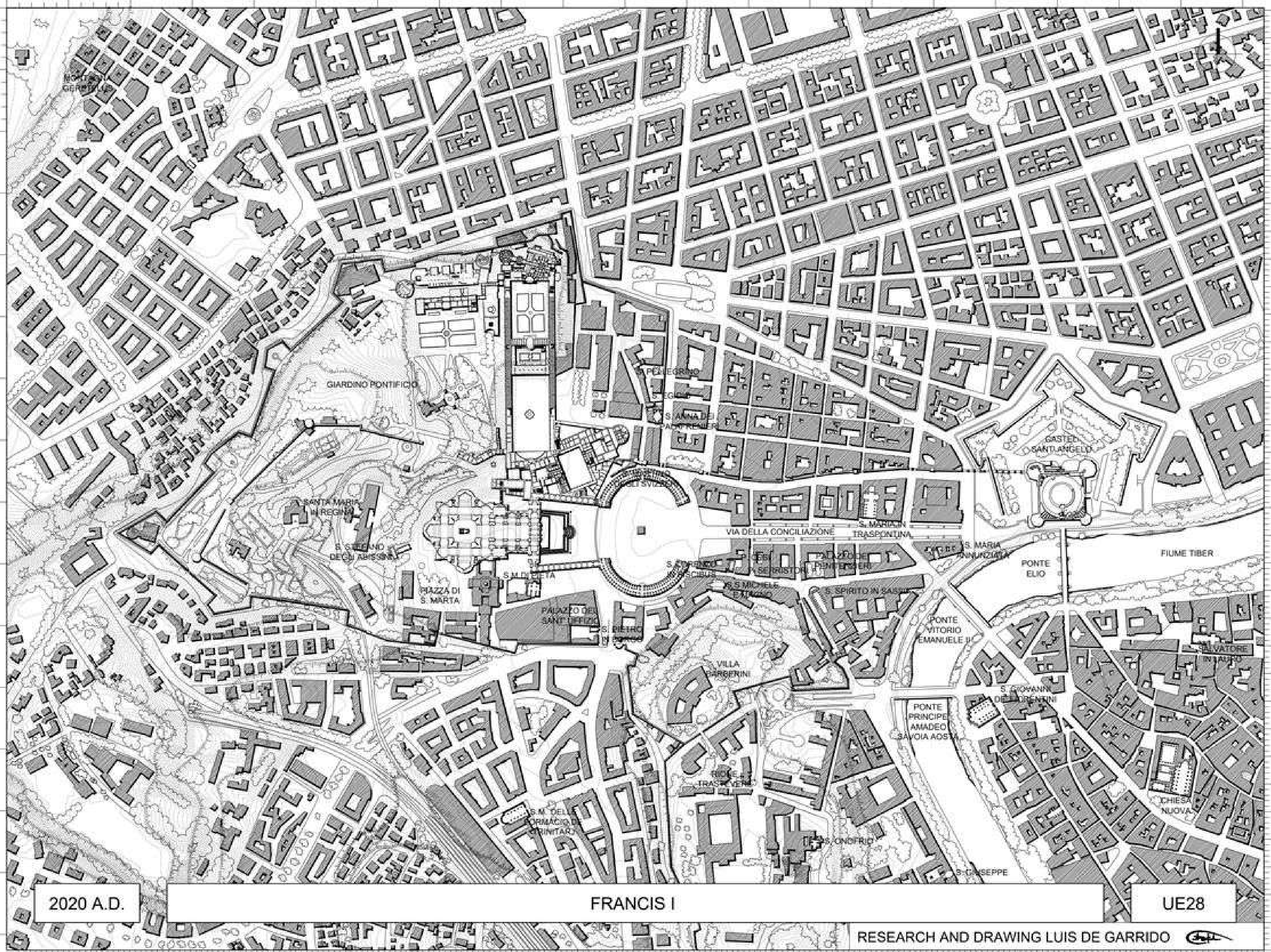


1950 A.D.

PIUS XII (1939-1958). INAGURATION OF VIA DELLA CONCILIAZIONE

UE27

RESEARCH AND DRAWING LUIS DE GARRIDO



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FIUME TIBER
PONTE ELIO
CASTEL SANT'ANGELO
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S. MARIA IN TRASPONTINA
VIA DELLA CONCILIAZIONE
S. SPIRITO IN SASSIA
PONTE VITORIO EMANUELE II
S. GIOVANNI DEI FIORENTINI
PONTE PRINCIPE AMADEO SAVOIA AOSTA
CHIESA NUOVA
S. GIUSEPPE
S. ONOFRIO
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VILLA BARBERINI
S. PIETRO IN BORGO
PALAZZO DEL SANT'UFFIZIO
PIAZZA DI S. MARTA
S. M. DELLA PIETA
S. STEFANO DEGLI ABISSINI
SANTA MARIA IN REGINA
GIARDINO PONTIFICIO
S. PELLEGRINO
S. ANNA DEI PALAFRENIERI
S. M. DELLE FORNACI DE TRINITARI
2020 A.D.
FRANCIS I
UE28
RESEARCH AND DRAWING LUIS DE GARRIDO

CHAPTER 3

"*Emperor Constantine, who raised Christianity to power, assassinating his wife Fausta, and his eldest son Crispus, the same year that he summoned the Council of Nicea to decide whether Jesus Christ was a man or the Son of God.*
... The council decided"

Robert G. Ingersoll

Chapter 3. Historical analysis of the design and construction process of the old basilica of S. Peter

In this chapter an initial summary historical account of the construction process of the old basilica of St. Peter, as well as its evolution over time, has been created based on a large number of previously collected and classified historical references. This account is very important as it provides an initial script to reconstruct the design process and the construction process of the ancient basilica, as will be done in the next three chapters.

3.1. Main historical sources referring to the old basilica of S. Peter

At present there are two main documentary sources for the study of the old basilica of S. Peter.

1. Archaeological excavations

These excavations were carried out in the 40s of the 20th century, and allowed to have a more complete idea of the structure of the old basilica of S. Peter. The results of these excavations have been documented by various authors, especially Richard Krautheimer.

2. Historical documents

A set of historical documents that describe the old basilica between the 7th and 14th centuries has survived to this day.

The most important source of the early history of the old Constantinian basilica is the *Liber Pontificalis*, also called "Book of the Popes" which is a compilation of biographical reviews of the first popes, from St. Peter, to Stephen V (885-891) [1].

The initial drafting of the *Liber Pontificalis* was composed during the mandate of Pope Hormisdas (514-523) taking into account the existing documentation in the church of Rome. The first section of the *Liber Pontificalis* was completed in 535, and shows the history of the popes, from S. Peter, to Pope Silverius (536-537), as a biographical sequence [2].

The document has a distorted historical value since the biography of the first 36 popes took into account the *Catalogus Liberanus* appeared in 354, just when the construction of the main body of the basilica had been completed. The *Catalogus Liberanus* owes its name to the last para on the list, *Liberius* (352-366). In turn, this papal catalog took the

data for the first 18 popes, from the work *Cronica* by Hippolytus of Porto, which has practically no historical value, since it is based exclusively on the Christian tradition [3].
The information contained in the *Liber Pontificalis* between Pope Hormisdas (514-523) and Pope Boniface V (619-625) is more reliable from a historical point of view, although they continue to present errors, since the biographical compilation continued to be made with a significant time delay with respect to each pontificate reviewed.
The situation changes from the pontificate of Honorius I (625-638) since the entries to the *Liber Pontificalis* are made very shortly after the death of each pontiff, so the data are more exact, although they were not free of prejudices from the compilers. In any case, it should be noted initially that the book presents the Constantinian basilica as a place of pilgrimage [4].
Other more recent historical sources are the writings of the canons and clerics of the ancient basilica such as Petrus Mallius (11th century) [5], Maffeo Vegio (15th century) [6], Tiberio Alfarano (1525-1596) [7], and Giacomo Grimaldi (1568-1623) [8]. Therefore, there is hardly any information about the history of the basilica from the end of the *Liber Pontificalis* (year 891) until the 11th century. In the same way, there is hardly any information from the 11th to the 15th century.
The most important documentation that has come down to us are the texts and drawings made both by people who were able to visit the basilica, such as Martin van Heemskerck (1498-1574) [9]; Onofrio Panvinio (1530-1568) [10]; Giovanni Antonio Dosio (1533-1609) [11]; Domenico Tasselli da Lugo [12], etc., or people who lived in later times, and therefore could not visit the basilica, but who supposedly could have access to ancient documents and drawings of the basilica, such as Paul Letarouilly (1795-1855) [13], or Rodolfo Amedeo Lanciani (1847-1929) [14].
The greatest source of information about the building is the writings and drawings of Alfarano.
At the time of Alfarano, the transept and the western section of the naves had already been demolished, with the exception of the apse that the cleric could observe inside the Tegurium of Bramante. Therefore, Alfarano's plans have various conjectures, although not arbitrary, since he was able to observe the treads of the walls in the pavement among the ruins, and measure them directly. In addition, Alfarano was able to remember certain parts of the basilica still standing when he was a child. In fact, when the Arch of Constantine fell (1544-1545) Alfarano was 19 years old. In fact, some of the greatest historians and researchers of the old basilica of S. Peter, such as Ktautheimer and Frazer,

consider the plan layout and writings of Alfarano the most reliable source to get an idea of what this building was like [15].

Alfarano made several handwritten notes and at least three plans. The first of them, probably from 1571, shows the plan of the old basilica and on it pasted the plan of the new basilica by Michelangelo, made by Dupérac a few years earlier (1569). In fact, Alfarano, by scraping the ink, modified the position of the altar, which Dupérac drew in the geometric center of Michelangelo's project [16].

In 1589 Alfarano commissioned the engraver Natale Bonifacio to make a copper engraving of the plans of the old basilica based on the graphic documentation that he had previously prepared.

Alfarano made a second floor plan layout in 1576 of which there are only references of the title and its dedication to Cardinal Alesandro Farnese (archpriest of San Pietro from 1543 to 1589) [17].

There are also some anonymous graphics, or of uncertain authorship, most of which are of poor quality or are mere copies of some of the drawings mentioned. These documents do not provide information on the proportions and measurements of the old basilica, however, once the project strategy followed in its design has been identified, these documents allow the project to be properly completed.

However, and among all the graphic documentation that has survived to this day, there are some documents that do provide more exact information on the specific dimensions of the old basilica. These documents were made by Bramante (1443? -1514) (*GDSU 20 A*); and Baldasarre Peruzzi (1481-1536), (*GDSU 11 Ar "Pianta dell'Atrio e della Navata di S. Pietro"*, made in the year 1518, although some historians date it between the years 1520-1521).

3. Contemporary studies

Finally, it should be noted that there have been multiple proposals from various contemporary historians, based on the analysis of previous documents, and also taking into account the excavations carried out in the 1940s. These researchers include the following: Alberto Carpiceci, Ann Van Dijk, Christoph Jobst, Filippo Bonanni, Hugo Brandenburg, Jocelyn Mary Catherine Toynbee, John Osborne, Lex Bosman, Paolo Liverani, Richard Gem, Richard Krautheimer, Rosamond McKitterick, William Tronzo, among others.

3.2. Chronological summary of the construction of the old basilica of S. Peter

Based on the analysis of all available historical information, and on the basis of the latest research by authoritative historians on the subject, it is possible to determine a tentative sequence of the most important stages of the construction of the old basilica of S. Peter [18].

Initially, this sequence of construction stages can be classified into four large consecutive periods:

3.2.1. Built environment

It is the period from the beginning of the construction of the Circus of Nero and surrounding constructions, until the beginning of the construction of the great platform needed to build the basilica on it.

3.2.2. Period 1 (324-351). Sylvester (314-335) - Julius I (337-352)

It is the period from the beginning of the great horizontal platform to the completion of the construction of the main body, comprising the transept, the two exedras, the apse and the five naves.

3.2.3. Period 2 (352-514). Liberius (352-366) - Symmachus (498-514)

It is the period between the completion of the main body until the completion of the anterior body, comprising the narthex, the lateral wings, and the anterior rooms.

3.2.4. Period 3 (515-1503). Hormisdas (514-523) - Juluis II (1503-1513)

It is the period between the completion of the basilica until it began to fall to give way to the construction of the new basilica.

In chapter 5, all the consecutive construction stages of these four periods are reconstructed, and for this purpose, all the actions related to the construction of the old basilica must be previously collected, classified and analyzed. For this reason, it is convenient to know the motivations that prompted its construction, the vicissitudes in the construction process, and also the evolution of the basilica throughout the Middle Ages. The reconstruction of the pilgrimage ritual allows a broad overview of the state of the old basilica, as well as the most important buildings in its surroundings.

3.3. Brief historical reconstruction of the construction process of the old basilica of S. Peter

When Constantine entered Rome in the year 312 (Fig. 3.1), the annual commemoration of the *depositio* [19] of S. Peter and S. Paul had been celebrated since the middle of the third century on June 29 in the cemetery ad Catacombs of the *Via Appia*. The authority was interested in helping Christians in their liturgical activities and especially in this type of public, visible and influential events, so the construction of a basilica was a priority [20]. Emperor Constantine, who was a pagan until the time of his death allowed freedom of worship and even offered Christians buildings and grounds for their meetings and the celebration of their liturgical activity, and for this he proclaimed the edict of Milan (313 AD).

The construction of the basilica was part of a general plan to help the Christian community in Rome to build functional meeting places, together with the Lateran Cathedral [21], and other buildings. The construction of the basilica on the Vatican hill posed many difficulties since the terrain had great unevenness, and it also had to be built over a necropolis, just off the north face of Nero's circus (Figs. 3.2 and 3.3). Inside this necropolis was located what was believed to be the tomb of Peter, surrounded by the tombs of influential families. However, as Eusebius relates, in 325 there was already a huge number of pilgrims who crowded the access roads to the Vatican, especially the only access bridge over the Tiber River, and who collapsed the surroundings of the tomb, so urgent action was needed [22]. These events may have coincided with Constantine and Helen's new imperial policy of honoring Christian holy sites with imperial splendor.

Just after the Battle of Chrysopolis in September 324, and perhaps in commemoration of it, Constantine gave orders for the construction of a basilica in the Vatican, with non-state funds, personally donating marbles to beautify the tomb monument, and gold to adorn its roof [23]. The decisions to establish this basilica were made in parallel with the establishment of other sacred buildings, such as the complex of the Basilica of the Martyrdom in Jerusalem, on the site of Christ's tomb.

Constantine wanted these constructions to be in keeping with an imperial munificence, since from his perspective, an isolated and huge basilica, decorated with marbles and gold, could be the establishment of an imperial generosity of a traditional architectural type, in a traditionally minded city. And this could mark in the city the reunification of the empire under a Christian emperor.

Pope Sylvester I (314-335) would undoubtedly demand certain functional elements from the basilica, and especially on how it could incorporate the tomb of Peter. As there were no precedents, it was decided to adopt the same configuration, in the transept of the new basilica, as that existing in the original tomb, within the cemetery courtyard.

The place chosen for the construction of the basilica dedicated to S. Peter was just above what was considered his tomb, in the Vatican necropolis, and this created several construction and legal problems [24]. The land had a slight slope and welcomed a necropolis that was in use at the time. Roman law guaranteed the inviolability of the graves, but the emperor managed to impose his will and authorized the works, since he had a great interest in building just above the tomb of the Apostle Peter, the father of the church [25]. Constantine ensured, however, that the tombs were not damaged, and so a huge flat horizontal platform was built on which the building would later be built [26]. The platform, in its highest part, had an approximate height of 26.25 *roman feet* (1 *roman foot* = 29.7866 cm.), judging by the number of steps of the main access ladder to the platform (35 risers of approximately 0.75 *roman feet* each riser and 1.5 *roman feet* each tread).

The construction of the basilica was carried out in several stages [27]. The platform was built in 324, in the time of Pope Sylvester), and the triumphal arch of Constantine in 325 [28]. In fact the name of Constantine appears on the triumphal arch [29], and furthermore, in the year 325, Eusebius, and other writers, reported the large number of pilgrims who crossed the river to visit the most important sanctuary in Rome [30].

In July and August 326 Constantine was in Rome with his mother Helen for the celebration of their anniversary, and perhaps it was on this occasion that he presented the golden cross or, at the latest, in 329. It is also possible that it was in these years, at the end of the 320s, when the dedicatory inscription was made on the triumphal arch, which is proof that it was already built at this time. However, many researchers think that the construction of the foundation platform was the responsibility of his son Constans, and therefore the arch was also built by his order, although it was dedicated to his father [31]. Other historians do not think so, and they think that both, the platform, the arch and the apse, were the work of Constantine [32].

Be that as it may, since the imperial visit in 326, work continued regularly, although some researchers think that some changes were made to the design of the basilica's transept before its construction was completed. The apse was completed in the year 326 in the time of Sylvester I (314-335), according to the inscriptions found on some of its bricks.

A few years after the start of the works, the apse was modified, probably around the year 337, on the occasion of the ascent to the wheel of Constans, the son of Constantine, whose seal was probably used in the construction. The mosaic in the apse could have been completed in 340 as a *piaculum* on the occasion of the war waged against Constans by his brother Constantine II [33].

The transept was completed in 327. During the construction of the transept, several alternative proposals would undoubtedly be formulated on how to integrate the tomb of Apostle Peter with the central area of the transept (in the transept with the central nave), and the way of access to the same, in the same way that later did the popes Mark (336-336) and Julius I (337-352). At the beginning, the complex combined two practical functions: as a *martyrium* of the apostle, and as a covered cemetery, but with the passage of time other liturgical uses were required. The transept of the basilica was in practice very poor compared to the later basilica of S. Peter (in the design of the new basilica the narrow transept was rejected in favor of another the same width as the main nave, creating a wider transept and with the apostolic tomb located just behind the Triumphal Arch. This arrangement provides more space for liturgical activities and for pilgrims to access the Apostle's tomb).

The lateral exedras to the transept would be completed around the year 330. The main body (containing the transept, exedras, apse and five naves) would be built during the Liberius papacy (352-366). The elongated typology of naves was made in order to sequentially house an enormous amount of treasures associated with the Christian liturgy, and those that were allegedly desired to be accumulated and exhibited. So in reality a certain polytheism was maintained from the beginning (with the passage of time, a huge number of saints would be named, some of whom would have a reserved place in the basilica (ssauland in all Christian buildings). In this sense, the initial polytheism was consolidated, creating a special form of monotheistic syncretism -polytheistic, necessary to replace the old polytheistic traditions).

There is no evidence of the act of formal dedication of the basilica by the emperor (a mandatory requirement as it is an imperial construction, however it is known that the basilica was in use in 352 and 354, when Pope Liberius celebrated Christmas there [34]. The year 353 can be considered as the “official completion of the building”, since that same year the *Catalogus Liberanus* appears, promoted by Liberius, which although it does not have much historical value, constitutes an attempt to value the biography of the different consecutive popes, from S. Peter to Liberius, placing it inside the building.This information was the starting point of the *Liber Pontificalis*, which was intended to compile the biographies of all successive popes, as an attempt to provide greater value to the Christian church.

The narthex and the perimeter wall of the anterior body were built in the time of Pope Siricius (384 - 399), the lateral wings to the atrium, and the gate house (which was initially equipped with lateral columns) was completed in the time of Simplicius (468-483). Pope Leo I (440-461) gave sermons in the almost finished basilica, developing the ideology of Peter and Paul replacing Romulus and Remus as guardians of the city of Rome [35] (Fig. 3.4). Thereby exalting Christianity, and bringing it to the level of classical Roman times. Leo I established the first monastery of the place, and the need for a papal residence.

Lastly, in the time of Symmachus (498-514) the side rooms of the gate house were completed, including the Episcopal Palace and the papal residential building (called *Episcopia*), "*nello stesso luogo a destra ea sinistra*" of the main entrance. It can therefore be said that the basilica was already completely finished in the year 514 (although it would have continuous extensions and reforms, for a thousand years until it began to be demolished in the 16th century).

Once completed, the basilica of Constantine had five longitudinal naves and a single transept. On the main facade, a staircase led to a large access platform to the hall of the complex.

The facade had three front doors, but it was not particularly attractive. However, when crossing the gate house, you entered the portico of the atrium, so beautiful that in the Middle Ages it used to be known as “*il paradiso*“. The heart of the church was a small temple where it was believed that the remains of S. Peter lay. The emperor locked him in a funeral monument of precious marble and red porphyry. The monument was crowned by a baldachin with four solomonic columns from the 2nd century.

3.4. Brief historical reconstruction of the evolution of the old basilica of S. Peter

To correctly understand the architectural evolution of the ancient Constantinian basilica, it is necessary to know that it had always been considered a place of pilgrimage, and therefore was part of a ritual journey. Therefore, the knowledge of this pilgrimage ritual around the basilica can help to know the evolution of the architectural structure both of the interior spaces of the basilica and of the annex buildings located in its surroundings.

The basilica was built on the tomb of the Apostle, which was the goal of a large number of pilgrims since the second century, so from the beginning of its construction it would become the new place of pilgrimage.

Initially the pilgrims climbed the great east staircase and accessed the founding platform. According to Brandenburg, the transept was consecrated immediately after its construction, and immediately destined for worship [36]. Therefore (and according to constructive logic), in these years the pilgrims had to cross the foundational platform from east to west until they reached the transept where the Apostle's tomb was located.

Years later, when the anterior body of the basilica was finished, the pilgrims climbed the main staircase until they reached the entrance platform and entered the complex through one of the three main doors. Then they accessed the atrium through the gate house, and crossed it walking one of the two wings, until they reached the naves through one of the side doors. They went through the aisles and finally reached one of the sides of the transept where the Constantinian canopy was to venerate the tomb of the apostle under the auspices of the bishop with songs and collective prayers [37]. Before entering the naves of the basilica, the pilgrims wandered through the atrium where, since the 4th century, there was a great fountain, the *cantharus*, which quenched their thirst and served for their ablutions. Paulinus of Nola, who visited the basilica at the end of the 4th century, describes it in its essential parts

Years later, in the Middle Ages, the surroundings of the ancient Constantinian basilica were surrounded by a large number of other buildings and monuments, including churches, monasteries, xenodochia, and hospitals. Some of these buildings were part of the legacy of the ancient city, predating the construction of the Constantinian basilica in the early 4th century, although most were built later, in the Middle Ages, to serve crowds of pilgrims [38].

In the middle of the 9th century, after the impact of the Saracen sacking of the basilica in 846, Pope Leo IV (847-855) built a wall surrounding the entire area of the "*borgo*", as it was known, and thus creating the "*civitas Leoniana*" [39] (Figs. 3.5 and 3.6).

In these times, the pilgrimage route had already changed substantially (probably the change took place at the end of the 7th century, or the beginning of the 8th century, at the same time that the church of Sant'Andrea was united with the church of Santa Petronilla), and the pilgrims who wanted to venerate the relics of Peter had to cross the surroundings of the basilica following a new ritual route, which in those times had a relevant meaning. The layout of this route was not accidental, and it was undoubtedly the logical consequence of the desire to intertwine the threads of the ancient and Christian history of Rome, initiated by Leo I (440-461). In this sense, it is worth mentioning that Pope Sergius I (687-701) dedicated a large part of his life to restoring and redecorating the basilica. Among the activities of Sergius I, indicated in the *Liber Pontificalis*, is the intentional relocation of the remains of Pope Leo I (440/10-461) in a prominent new tomb on the south transept [40].

The concept of “ritual tour” through the built space is ancient, and has its origins in pre-Christian religious traditions and processions [41] (Fig. 3.7). Long before the year 600 there are references to public Christian rituals that were performed in the urban landscape of the city of Rome, incorporating churches and other landmarks. In fact, this was the activity that led to the growth of the national liturgy, in which the pope moved daily through the spaces of the city, spaces increasingly endowed with symbolic meaning [42].

One of the first records of this type is that of the penitential procession led by Pope Gregory I (590-604) in the year 590, who sought divine intervention to end a certain devastating plague [43]. In this regard, it should be remembered the well-known story of the vision of Gregory I of the Archangel Michael, in which he appeared at a certain moment at the highest point of the Mausoleum of Hadrian, in the act of sheathing his sword, and thanks to this vision the mausoleum It was later known as the Castel Sant'Angelo (Fig. 3.8) [44].

This was certainly a good papal strategy, as it has an important meaning, which is sometimes overlooked. The result of Gregory I's vision was to appropriate a imposing monument, previously associated with Rome's imperial past, incorporating it into the city's Christian present narrative, while at the same time reinforcing the role of the popes in ensuring the health and safety of its citizens. In fact, and obviously more deliberately, the same thing happened two decades later with the conversion of another grand and significant pagan building such as the Pantheon, which became a church dedicated to Mary and all the martyrs, an act of Pope Boniface IV (608-615) in the year 609 [45].

These types of actions aimed to reinvent the symbolism of ancient buildings for the benefit of Christianity. Rome was replete with relics of earlier times in the form of buildings, statues and other public monuments that stood the test of time, constituting a mute testimony to the beliefs and achievements of an earlier age, and which were gradually appropriated by Christianity (Fig. 3.9).

Much of this situation was clearly deliberate, as revealed by the sermons of Pope Leo I (440-461) in the mid-fifth century, and not only as a simple appropriation, but rather as a conscious construction of a Christian Rome, as the fulfillment of the intended destiny of the city. Pagan Rome was seen as a shadow of Christian Rome, in the same way that the Old Testament was seen as a shadow of the coming of Christ [46].

All pilgrims who went to Rome to visit the Constantinian basilica of S. Peter had to cross the Ponte Sant'Angelo, the ancient Pons Aelius [47], since it was the only bridge that crossed the Tiber in the Middle Ages on the stretch between the Ponte Milvio and the Isola Tiberina. The nearby Pons Neronianis appears not to have been used by Late Antiquity, as it is not mentioned in any source and there was no corresponding gate in the Aurelian wall.

Therefore, this single bridge became a nerve center for access to the city, and its inability to accommodate the volume of traffic often led to congestion of crowds attempting to cross it, sometimes with tragic results. In *Inferno* (XVIII, 28-33), Dante records the decision in the first papal jubilee, in the year 1300, to divide those who cross the bridge into two large groups, one in each direction, something that Dante would probably have witnessed first hand, since he made a pilgrimage to Rome that year.

When crossing the Tiber River, just to the right of the bridge head, the pilgrims could see the imposing Mausoleum of Hadrian. Its strategic location had prompted its early conversion into a fortress, and over the centuries it often played a role in defending the city, and specially the pope, from the 6th century "gothic wars" to the famous *Sacco di Roma*, by the troops of Carlos V in 1527 [48] (Fig. 10).

Despite the name and function changes, it was never forgotten that the original purpose of the building was an imperial tomb, which is recorded, for example, in the medieval description in the most influential treatise on the city and its buildings, the *Mirabilia. Urbis Romae*, from the 12th century, who was perhaps most responsible for creating a new perception of the ancient monuments of Rome [49] (the monument was still known as *Adrianium* in the time of Pope Hadrian I).

After crossing the bridge to go to the Constantinian basilica, you had to turn left -heading west- and walk through a covered portico, designed to offer visitors some protection against the sun and rain, and in parallel others that led from the doors of the Aurelian walls to the suburban sanctuaries of Saints Paul and Lawrence, located near the north transept. This portico may have been a project of Pope Simplicius (468-483) [50], but it is documented for the first time in Procopius's testimony of assault on Rome by Ostrogoths, in 537, when it was used to hide, in order to attack the adjacent fortress.

Along this arcaded path, between Castel Sant'Angelo and San Pietro, the medieval visitor could see two very prominent ancient monuments, which were also considered to be the tombs of ancient powerful Romans. The first was a large stone pyramid (resembling that of Senator Gaius Cestius Epulo that still survives at *Porta San Paolo* on the south side of the city) and which probably also dates from the time of Augustus [51].

There is no doubt that it was built to be a tomb, and while the name of the original occupant is not known today, in the Middle Ages the pyramid was known as the tomb of Romulus, one of the legendary founding twins of the city, and as a result it was known as *Meta Romuli* [52] (Figs. 2.6b and 2.8b). Similarly, in the southern part of Rome, at the Porta San Paolo, a twin pyramid has survived to this day, and was once known as the tomb of *Remus*. These two structures served to reinforce the concept of “Christian succession” expressed in the sermon of Pope Leo I (440-461) in the fifth century, and which also gave the convenient coincidence that a pyramid marked the way to the sanctuary of Saint Peter, and the other pyramid the way to the sanctuary of Saint Paul.

The *Meta Romuli* was largely demolished by Pope Alexander VI (1492-1503) in 1499, to widen the access roads to San Pietro, in anticipation of the large Jubilee crowds expected for the following year. However, the *Mirabilia* points out that at a much older date, at the beginning of the 8th century, the marble cladding had been removed and used to pave the atrium of the Constantinian basilica. Its base was rediscovered in the excavations carried out in 1948-1949 at the beginning of the modern Via della Conciliazione [53].

Finally, already at the end of the road and in the southern part of the basilica, the pilgrim could see another supposed pre-Christian tomb, a large Egyptian obelisk, made of red granite, and it was popularly believed that the bronze orb on its top contained the remains of Julius Caesar (Fig. 3.11) [54].

The obelisk, generally known in the Middle Ages as *agulia* (spire) was moved by Pope Sixtus V (1585-1590) in 1586 (Fig. 3.12), to the center of the square, aligned with the axis of the old basilica, and in charge of the works was Domenico Fontana [55]. Of the many Egyptian obelisks that had been brought to Rome in ancient times, the Vatican obelisk was the only one that remained standing throughout the course of the Middle Ages. Its original location in Egypt is not recorded and, unusually, there are no surviving inscriptions in the hieroglyphs. However, it is believed that this obelisk was moved to Alexandria shortly after the Roman conquest of Egypt by Augustus (27 BC-14), where it was established in the *Forum Julium* by the prefect Cornelius Gallus [56].

An inscription in Latin, still preserved and easily visible, was added in the time of the Emperor Tiberius (14-37), or that of his adopted son and successor, Caligula (37-41), and refers to both Tiberius and Augustus [57]. In AD 37, at the beginning of his mandate, Emperor Caligula transported the obelisk from Alexandria to Rome, as described Pliny the Elder in his *Naturalis Historia* (16.76.201), and later settled in the spina of the circus, where he would remain until 1586 [58] (Figs. 3.2 and 3.3).

Medieval city guides of Rome also refer to the obelisk as the *"agulia"* of S. Peter, no doubt based on its proximity to the basilica, along with the belief that Peter had suffered his martyrdom in the Vatican circus, already either in this place or near it. But there was also a second popular understanding regarding this object: not simply that it had been erected to honor Julius Caesar, but perhaps more significantly that it functioned as his tomb. The precise origins of this identification are unknown, but can be found in a variety of medieval texts.

At *Mirabilia*, the obelisk is known as the *memoria Caesaris, id est agulia*, and the passage goes on to report that its charred remains were contained in the large bronze sphere placed on top: "where his ashes rests splendidly in his sarcophagus" [59]. The etymology and meaning of *agulia*, a term that is also repeated in other sources, is far from true, but it is possibly a corruption of "*acus Iulia*" (that is, Julius's needle).

This association with Julius Caesar persisted until the 16th century, and some authors, for example Andrea Palladio, in his *Antichità di Roma* (1554), argue that the bronze sphere contained the ashes of Caesar [60]. Similarly, when describing the removal of the bronze palla before moving the obelisk, Fontana also notes the same common belief [61]. Just before the obelisk was moved to its current location in 1586, the palla was knocked down and taken to a room in the Belvedere so that a rudimentary form of forensic examination could be performed. The results were published that same year by Filippo Pigafetta, a Venetian diplomat living in the papal court, who reports that the orb was not found to contain human remains, but only rust fragments, and some earth, which he considers to belong to the original formwork process [62]. This association with Julius Caesar seems to have given the obelisk a special meaning, and from the time of Nicholas V (1447-1455) onwards it figured prominently in schemes to rebuild and reconfigure the old basilica of S. Peter and its surroundings [63]. According to Egidio da Viterbo [64], in 1505, Bramante suggested to Pope Julius II (whose choice of the papal name may indicate a possible predilection for the idea) that the new basilica of St. Peter be rotated 90 degrees, so that the tomb of his imperial namesake can be at the entrance of the basilica [65]. But in the end it was easier to move the obelisk than to rotate the basilica.

The medieval pilgrims (and also the papal processions) followed the path marked by the "*agulia*", but before reaching San Pietro they were forced to pass two other ancient imperial monuments, now Christianized: The church of Sant'Andrea and the church of Santa Petronilla.

The church of Sant'Andrea was the medieval name given to the first of two ancient circular mausoleums, the Mausoleum of the Severan dynasty, located adjacent to the church on the south side, and linked to an entrance in the south transept (Figs. 3.11 and 3.13) [66].

Although this building was long thought to have been from the early 400s, archaeological excavations have revealed brick seals dating mostly to the reign of Caracalla (212-217), and this suggests that the circus had already fallen into disuse at the end of the 2nd century [67]. The mausoleum was converted into the church of Sant'Andrea by Pope Symmachus (498 - 514), who also built a set of stairs to provide access [68], somewhere west of the obelisk [69]. Thus, in the same neighborhood, "*iuxta ecclesiam beati Petri en Acoli",* Pope Leo III (795-816) built a *Triclinium* decorated with marble and mosaics, to which Gregory IV (827-844) would add a small hospice "*iuxta Accolam*", in which the pope could rest after mass [70]. If these references really derive from the term *cagulia*, and if this term is a corruption of *acus Iulia*, then the association of the obelisk with Julius Caesar may perhaps be delayed at least to the eighth century. In what could be said to be a clearer reference to the obelisk, it is also recorded that Leo III has reconstructed a reception room and a bathroom "*iuxta columnam maiorem*" [71].

The church of Santa Petronilla is the last monument that pilgrims could see, just before entering the basilica of S. Peter. Santa Petronilla is the name that Pope Stephen II (752-757) gave to the Mausoleum of Honorus, a dynastic mausoleum built by Honorius (384-423), son of Theodosius I, around the year 400 [72]. This mausoleum was aligned to the axis of the transept of S. Peter, and was attached to both the basilica and the first mausoleum of the Severan dynasty.

Having passed through these two buildings, full of altars and reliquaries, the medieval visitor then entered the south transept of the basilica, perhaps significantly a space filled with tombs of popes who had paid special attention to Saint Peter, before descending the staircase leading to the ring crypt of Gregory I (590-604). Finally, the pilgrims traveled eastward through the naves located to the north of the basilica, and went out into the atrium. They walked through the atrium through the north arm, and finally left the basilica, through the gate house, and down the great stairs until they reached the square [73].

With the design of this pilgrimage route, the association of the most important buildings of ancient Rome with a new Christian reality was desired. On the other hand, it was intended that a personal mimesis of the pilgrims be generated with the new divine history of the city. Third, it was desired to create a new sacred story, associated with a new sacred geography.

Following these goals, the pilgrimage to Saint Peter evolved and medieval Romans tried to identify and explain the permanent remains of the ancient world, under a christian convenience, and a critical stage in this process was reached in the 7th century.

The beginning of that century witnessed the restructuring the apse by Gregory I (590-604) and the consequent establishment of a definitive path for pilgrims within the church. Years later, Pope Sergius I (687-701) reformed and redecorated a good part of the basilica, and among many other things he transferred the remains of Pope Leo I (440-461) to a tomb located in the south transept [74]. This fact has a great significance when considered in terms of the sequence of important Roman tombs found by medieval visitors. The choice of the place of the tomb in the south transept was very convenient, since of all successors of Apostle Peter, it was probably Leo I who put the most effort in intertwining the history of ancient Rome with the Christian history of Rome, and thereby legitimize the power of the Church, and the power of the pope as *pontifex maximus*.

The old basilica remained standing throughout the Middle Ages and hardly had any significant changes in its architectural structure, although multiple repairs and touch-ups were carried out. In addition, over time the basilica was acquiring greater functionalities and had to be expanded by means of a series of buildings attached to its south side. In the same way, and supported by these constructions and on the south wall of the atrium, a great conglomeration of constructions and houses were attached, in a chaotic and piled-up way, and along the path that led to the interior of the two ancient imperial mausoleums.

3.5. The architectural project of the old basilica of S. Peter

Undoubtedly there must have been a single initial executive project [75], which defined all the details of the design of the ancient basilica. The existence and need for a huge platform (about 686 *roman feet* long, and about 227 *roman feet* wide) to build a huge basilica on top of it is more than enough proof that the old basilica of S. Peter was designed in one go, and that therefore an initial project necessarily had to exist.

However, and based on the previously shown chronology, it can be deduced that the building could have been built in two stages.

Stage I: 324 - 352

In the first stage, the transept, the apse, the two lateral exedras and the set of five naves were built, and it lasted approximately 28 years. In this first stage, changes were even made to the apse and consequently to its foundations.

Stage II: 352 - 514

In a second, longer stage, the narthex, the atrium, the lateral arms and the gate house were built, and it lasted about 162 years.

Given the speed of the first stage, and given that what was built is the main body of the building, it can be deduced that it was built following a single perfectly defined project. However, after the year 352, the works that remained to be done were not so urgent (the atrium, the lateral arms and the gate house), there was no emperor interested in accelerating the works, and there was less money available, so the construction was carried out in a slower way. Also, it is very possible that small changes were made from the original project.

The general design of the building was very simple, and as will be seen in the next chapter, it was generated based on an equilateral triangle of 82 *roman feet* in base and 71 *roman feet* in height [76]. What generated a transept of 224 *roman feet* (82 + 71 + 71) that together with the lateral exedras would reach a dimension of 306 *feet* long (224 + 41 + 41). This same dimension of 306 *roman feet* was chosen for the length of the naves and also of the anterior body (both with the same width of the transept, that is, 224 *feet*).

The simplicity of the design strategy used makes it possible that, once the main body has been built, a later architect can deduce the most suitable harmonic proportions so that the anterior body is perfectly integrated with the main body already built. The initial project, once the proportions and dimensions of the most important architectural elements have been established, leaves little room for freedom for the design of the remaining architectural elements. That is, once the platform, the main body, and the perimeter wall of the anterior body have been built, its internal design has few valid compositional alternatives. That is, there are few compositional alternatives to integrate with the main body the design of the nartex, the atrium, the lateral arms and the gate house.

On the other hand, and no less important, it should be taken into account that the initial project should not have been carried out in too much detail, due to the enormous magnitude of the building, the speed with which it had to be built and especially (and as a result of these two factors) to the use of elements previously used, half-manufactured, of varied origin, and with different sizes, shapes and materials (*spolia*).

As a consequence, the initial project must have been very simple, and some of its architectural elements (columns, architraves, bases, ...) should not have been very defined, since they were not going to be made to order according to exact specifications, but were to be use those that are most readily available, coming from municipal quarries, from other more distant quarries, from other buildings in poor condition or even from building ruins.

The project had to indicate the approximate dimensions of the different architectural elements (which were defined on the fly) and their exact location in the complex. It should also indicate the architectural strategies necessary to integrate architectural elements with varied dimensions, varied materials, varied textures, from different places, and with completely different levels of finishes. For example, it would indicate that the capitals of the columns should have similar dimensions (since it was easy to build capitals intended exclusively for the basilica), and because the shafts of the columns could vary in thickness and length, the bases should have a variety of dimensions, so that the capital+shaft+base set always had the same dimension indicated in the project, and deduced geometrically from the plan (so that the elevation would be perfectly integrated with the floor plan).

It should also be noted that in the two stages of the construction process changes were made to the original project.

In the first stage, and based on the analysis of the excavations carried out in the foundations of the walls of the transept, exedras and apse, it can be deduced that at the time of construction certain changes were made in the original project. It is very likely that the apse would have been designed with a light covering, probably based on concentric wooden beams, and that finally it was decided to build an apse with a solid vaulted ceiling, much more robust and elegant, but heavier [77]. These changes on the fly to improve the initial project had a necessary impact on the design of the foundations, since they had to be improved shortly after being started.

It should also be noted that the apse was built directly on the ground, that is, outside the horizontal platform previously built. For this reason, it was necessary to make several different types of foundations, and at the same time an integration system of the different types of foundations had to be designed [78].

Other small changes of this first stage were, for example, relative to the thickness of the east wall of the main body (adjacent to the nartex) that was built with a dimension of 6 1/3 *palmi* (as Peruzzi indicates in *GDSU 11 Ar* drawing), instead of the 5 *feet* (6.66 *palmi*) initially projected. This change was perhaps made to lower costs, although it left the building with less transversal resistance. In fact, shortly after the dividing wall was made by Antonio da Sangallo, this transversal wall had to be reinforced by means of two huge curved scrolls, as can be seen in Heemskerck's drawings.

In the second stage, small changes were also made with respect to the original project, but these new changes were not made as a consequence of changes in ideas, but in order to adapt the building to changing needs over time. The building was designed in a generic and simple way, with the purpose that the Christian rites were coupled to a previously defined general architectural structure. However, the Christian rites were evolving and also the needs of the clergy who had to live continuously in the building. This generated that in the second stage of the construction of the basilica small adjustments were made to the original project. These adjustments referred, for example, to the thickness of the enclosure perimeter walls (which were designed and built 5 feet thick, instead of 6 feet thick). The changes were also related to the design of the main facade and the dimensions of the atrium gate house, and the rest of the rooms of the access body.

3.6. Typological background of the old basilica of S. Peter

In order to reconstruct the design process of the old basilica of St. Peter, it is important to know that for its design a typical typology was chosen in the great civil buildings of Rome.

The term “basilica” comes from the Latin *Basilica* which in turn derives from the Greek *Basilikè*, which means "royal or regal", and the complete expression "*Basiliké Oikía*" is actually an ellipsis, which therefore means "royal house". The basilica was an important public civil building with a diverse functionality (the most important use in Greece and

Rome was as a court of law), and with great importance for the community and the urban structure of the city (in Roman cities it occupied a preferred place in the Forum).

After the Edict of Milan of 313 promulgated by Constantine (313–337) the Roman Empire allowed the cult of the Christian religion. From then on, the Christians took advantage of several existing Roman basilicas to use them as religious premises for the celebration of their liturgy, and in addition they used their typology to build new buildings of worship. After the Roman Empire became officially Christian, the term basilica was also used to refer to churches, generally large or important, which had been granted special rites, or privileges in matters of worship. In this sense, the denomination is used today, both from an architectural and religious point of view.

The Roman basilica had multiple uses: market, place of financial transactions, worship, and especially as an administration of justice. It was also used as a meeting place for citizens to discuss common issues.

Regarding its architectural conception, it was a large rectangular room composed of one or more naves (always in an odd number). When it had more than one nave, the central one was wider and taller and was supported by columns. The difference in heights was used to open lighting holes in the upper part of the walls. At one end of the main nave there was an exedra or apse, where the presidency was installed, while the entrance was made from the opposite end through a portico.

Some examples of basilicas built with it in the Roman Forum are the following:

- Basilica Porcia, built in 184 BC, by Marco Porcio Catón.
- Basilica Emilia, built in 179 BC, by the censor Marco Emilio Lépido.
- Basilica Opimia, built in 169 BC, by the consul Opimio.
- Basilica Sempronia, built in 169 BC, by Tiberio Sempronio Graco.
- Basilica Julia, started in 54 BC, by Augustus, on the remains of the ancient Sempronia basilica.
- Basilica of Maxentius, started by the Emperor Maxentius between 307 and 310, and finished by Constantine after 313.

The adoption of the basilical typology by Christians undoubtedly had two compelling reasons.

In the first place, something common in Christianity, due to a desire to reuse everything that already exists and take it as one's own. A way of legitimizing the new doctrine and incidentally providing it with historical roots that it did not have. Renaming important dates and existing rites, and reusing existing buildings, stretched a recently invented and adopted ideology to the end of time. The best way to control citizens and encourage them to adopt new beliefs is to let them continue with their customs, rites and beliefs, but convince them that in reality those customs, rites and beliefs in which they believe are just a part of something bigger, and therefore they will assume them with ease.

Therefore, in the Roman Empire it was not difficult to use the basilicas for the new Christian cult. The new cult was easily adapted to the spaces of a basilica (which had been designed for another purpose) and the spaces of the basilicas were renamed to embody the new Christian rites. By renaming the spaces the cult was legitimized and it was given greater antiquity and ancestry.

Second, reusing existing buildings, hardly modifying them, is the best option to immediately promote the new cult, make it universal in a short period of time, and at the lowest possible cost.

Therefore, if Christians begin to use the existing basilica buildings for their own worship, the most effective future strategy is to continue with the same structure when constructing new buildings. The typology should not have major changes, and the same structure should be repeated over and over again, which would hardly change very slowly, adapting to variations in beliefs, and to the social, political and economic conditions of each place and country. And that's what they did.

In this sense, a Christian basilica proper in the architectural sense is understood to be any rectangular plant with one or more apses in the front and with aisles along the length separated by columns (or pilasters), on which their corresponding roman arches or architraves rest. The referred naves (three usually) end in the apse. In the apse the altar is placed and the officiants are arranged around it. In front, in the presbytery, are the priests, while the faithful occupy the rest of the nave or naves.

The basic basilica typology consists of longitudinal naves without a transept. But many basilicas have a transept. Frequently the transept hardly highlights the sides of the nave. The early Christian basilicas did not have a pointed transept. Although initially the Christian temples followed the construction guidelines of the basilicas, they soon gave way to other forms, such as the Latin cross plan or the Greek cross plan, which became generalized, without the basilical typology disappearing.

The naves' roof usually consists of an artistically decorated wooden frame that is visible from the inside or hidden by a coffered ceiling: sometimes they have a vault in the lateral naves and the apse always ends in a quarter-sphere vault.

The illumination of the basilicas is obtained by open windows in the upper part (clerestory) of the central nave which is higher than the lateral ones and by other windows that are located in the apse and on the front of the building. All the windows used to be closed with perforated or openwork marble sheets to let in the light and prevent the action of destructive elements. But transparent sheets of unperforated alabaster and even stained glass windows were also used in sumptuous basilicas as inferred from some texts by Saint John Chrysostom and Prudentius. The interior decoration is achieved by the same architectural lines of the building with its classic moldings and by different ornaments of paintings and mosaics, especially on the upper wall of the triumphal arch and in the always magnificently decorated apses.

The basilicas are usually oriented with the main axis of the nave so that the apse is oriented towards the west. But from the 6th century, the Byzantine churches, giving an example, were oriented in the opposite direction since the priest (who when offering the sacrifice looked to the east) no longer celebrated facing the people as before.

The Basilica of Constantine was designed taking into account this basilica typology, although major construction challenges had to be solved due to its enormous dimensions, and also due to the fact that it should be built on sloping land, on top of an existing necropolis, while respecting the maximum its architectural structure.

3.7. General strategy to identify the design process of the old basilica of S. Peter

As mentioned in the previous section, and without a doubt, there must have been an initial project [79]. It is not conceivable to design and build such a large and important building on the fly, also bearing in mind that a huge initial horizontal platform had to be built. An initial project had to exist in which at least the dimensions of the most important architectural elements of the building and their geometric relationship with the others were defined.

The original project of the old basilica was based on a civil basilica typology since it was the most suitable for a building that could gather a large number of people and that had colossal dimensions, just as Constantine wanted.

A simple basilica typology was designed since the initial Christian liturgical activities could be accommodated in any large meeting building. With the passage of time the needs changed, and the building had to be gradually reformed (some of the reforms carried out became references to create new types of Christian buildings), until finally it had to be demolished (at the beginning of the century XVI), since the Christian ritual had evolved over time, and its spatial structure was not adequate.

Following the wishes of Constantine, the building should have large dimensions, and its design should be solemn and impressive, and it should have great symbolic value. These requirements undoubtedly must have had a huge impact on the final design of the ancient basilica in several respects.

In the first place, the fact that the building should have large dimensions and with a basilical typology made it necessary to build a huge horizontal platform since the land had a slight upward slope in a west direction, and it also had to be built on the old necropolis.

Secondly, due to its great importance and its great symbolic value, the building had to be designed with great care and its dimensions could not be arbitrary in any way. It is obvious that if you wanted to build a monumental and symbolic building (which would also be the first building in Christendom) its dimensions should be perfectly studied, and its architectural elements should be perfectly integrated with each other, through unique and harmonic proportions.

Third, the design of the building should be very simple, since despite its large dimensions, it should be built in the shortest possible time. Constantine wanted the building to be built quickly for his own glory, and for the glory of his children. Therefore, this alleged speed of construction did not give rise to assessing the details, since it was more important to finish the building as soon as possible than to complete all the details of its gigantic internal and external spaces.

Fourth, repetitive architectural elements should be used with few variations, that is, the same approximate size should be indicated for the columns, for the windows, for the niches, for the walls, etc.

Fifthly, and as a consequence of all the above, and following a common technique for the construction of large buildings of the time, the building should be built (as it was built) using the technique that would later be named as *spolia*. The *spolia* was a rational and common sense constructive practice based on the reuse in a building of architectural elements previously used in other buildings, or elements destined for other buildings. In these times, with so many changes and so much construction activity, it was common in Rome to use sculptures, reliefs, parts of architraves, columns, pieces of columns, capitals ... from certain buildings in poor condition, to build new buildings. This technique was used repeatedly throughout the Middle Ages and the Renaissance [80].

Likewise, and due to the enormous scale of the building, and the speed with which it had to be built, half-built architectural elements should be used, and from different sites and quarries, and therefore they would have a huge variety of sizes, shapes, materials, textures and colors. In many cases, half-built architectural elements were obtained (usually from the imperial quarries) and they had just been finished in the building, sometimes even once it was in place.

The anonymous author of the project was undoubtedly well aware of all these circumstances and had to decide that the design of the building should be simple, and not fully detailed, since he could not know in advance all the architectural elements that would end up being used. In this sense, for example, in the design of the building, columns with standard sizes had to be specified, and that also could have variations between them, being able to be valid any shaft with diameters of approximately 3.75 *feet*, and 2.25 *feet*. Therefore, it was more important to define in the project the position of the axes of the columns and the separation between them than the exact dimensions of their diameter.

Taking these considerations into account, and thoroughly analyzing Alfarano's drawings, as well as all the historical references that have come down to us, it has been possible to identify the design process of the old basilica of S. Peter, as it will be seen in the next chapter.

3.8. General strategy to identify the construction process of the old basilica of S. Peter

Although the building was initially projected as a whole, it had to be built in parts since there are historical references indicating that independent parts of the building were used as it was being built.

As seen in the previous sections, and as will be seen in chapter 6, initially the entire foundation platform had to be built with the large access staircase. Immediately afterwards the Arch of Constantine had to be built. The transept was then finished and used. Later the main body was completed in its entirety, including the transept, the exedras, the apse and the five naves, and it also began to be used as a whole. Finally the building was completed as we know it from Alfarano's drawings.

In the next chapter, the stages of the design process of the old basilica will be reconstructed, and as a consequence its exact dimensions will be reconstructed with precision, both in plan and elevation.

Based on these plans, and taking into account all available historical references, in another later chapter all the stages of the construction process of the old basilica will be graphically reconstructed.

Notes 3

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[16] Antonella Ballardini, 'La basilica di S. Pietro nel Medioevo', in *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), p. 38

[17] Antonella Ballardini, 'La basilica di S. Pietro nel Medioevo', p. 38

[18] Hugo Brandenburg, 'L'antica basilica constantiniana di S. Pietro', in *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), pp. 9-34 (p. 14). Hugo Brandenburg is of the logical opinion that the existence of a huge horizontal platform, to build the old basilica of St. Peter, is the best proof that the building had to be initially designed in its entirety, regardless of whether with the passage of the time small changes were made. This fact is indisputable. It is unthinkable to carry out the platform in stages in Roman times. Making a platform of such a size in stages would generate innumerable constructive defects, it would be very expensive and would not ensure its own stability and uniform behavior, and of course it would not ensure the stability of the basilica that would be built on it. Therefore, it must be visualized in a first stage with only the *Tropaion* protruding from the platform and in the *arch of Constantine*. To access these monuments, you should climb the great stairs and walk from east to west along the great platform. The same would occur as the apse, the transept, the exedras, the naves, the nartex, the atrium, the atrium gate house and the entrance rooms to the complex were built sequentially, in different historical stages.

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FIGURES 3

Figure 3.1

Virgin Mary Amid the Emperors Justinian and Constantine. Detail southwestern entrance mosaic

Byzantine mosaicist, ca. 1000

Basilica Hagia Sophia of Constantinople (Istanbul, Turkey)

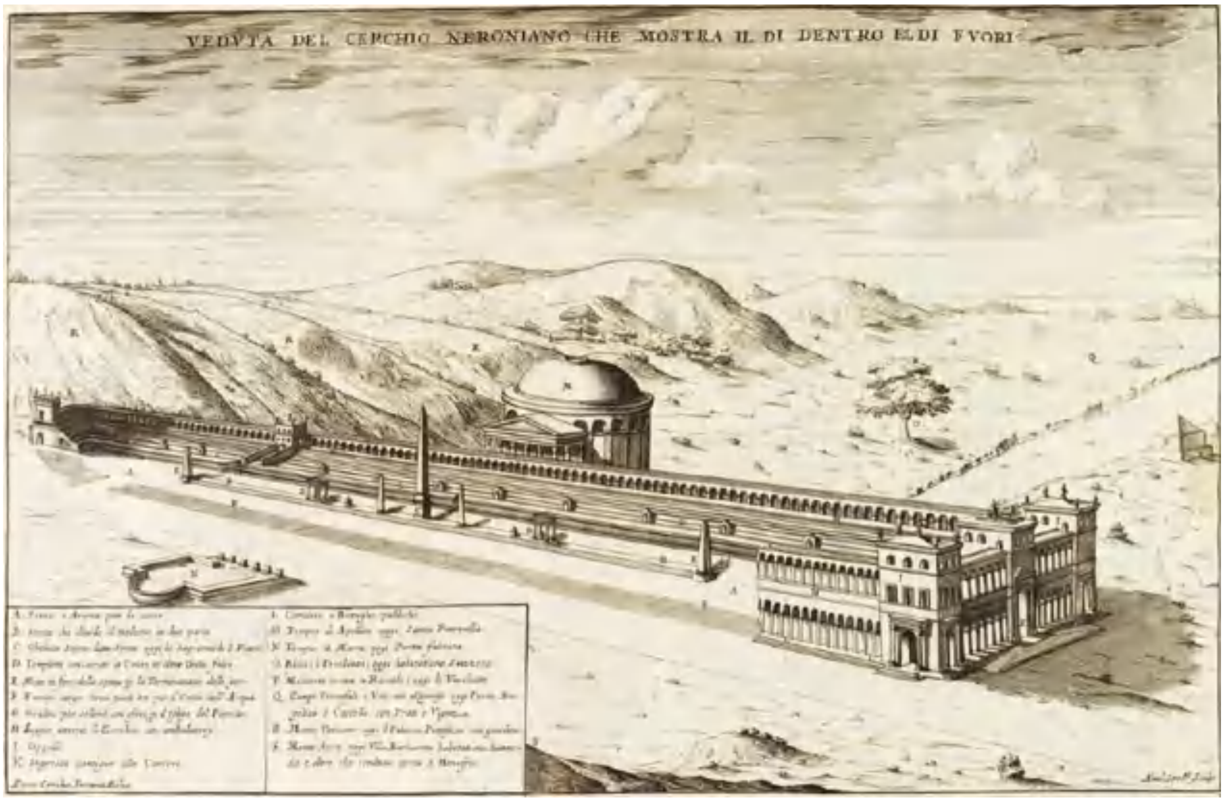

Figure 3.2

Veduta del cerchio Neronian oche mostra il di dentro el di fuori

Carlo Fontana

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), p. 29

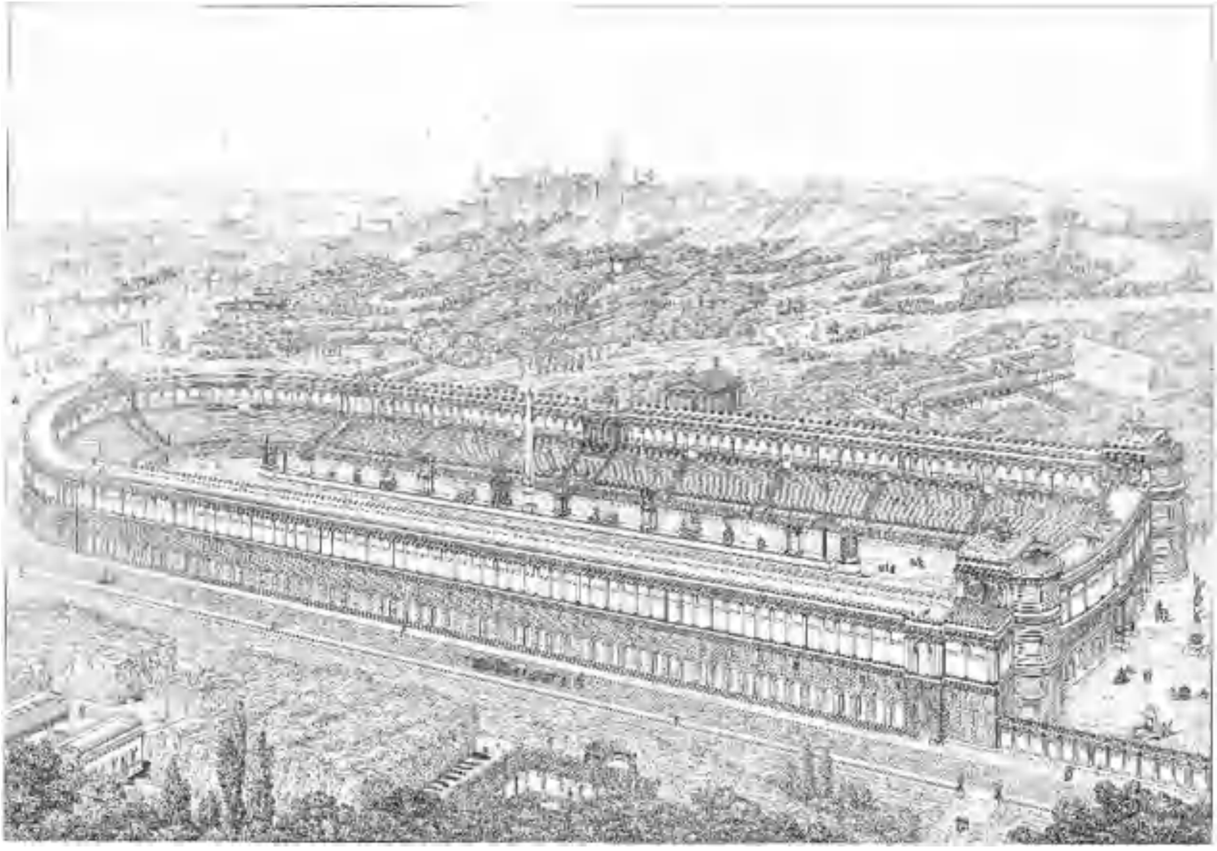

Figure 3.3

Neron Circus, between I – IV century

Paul Marie Letarouilly, 1882

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Cap. Cirque de Caíus Caligula et Neron, PL4

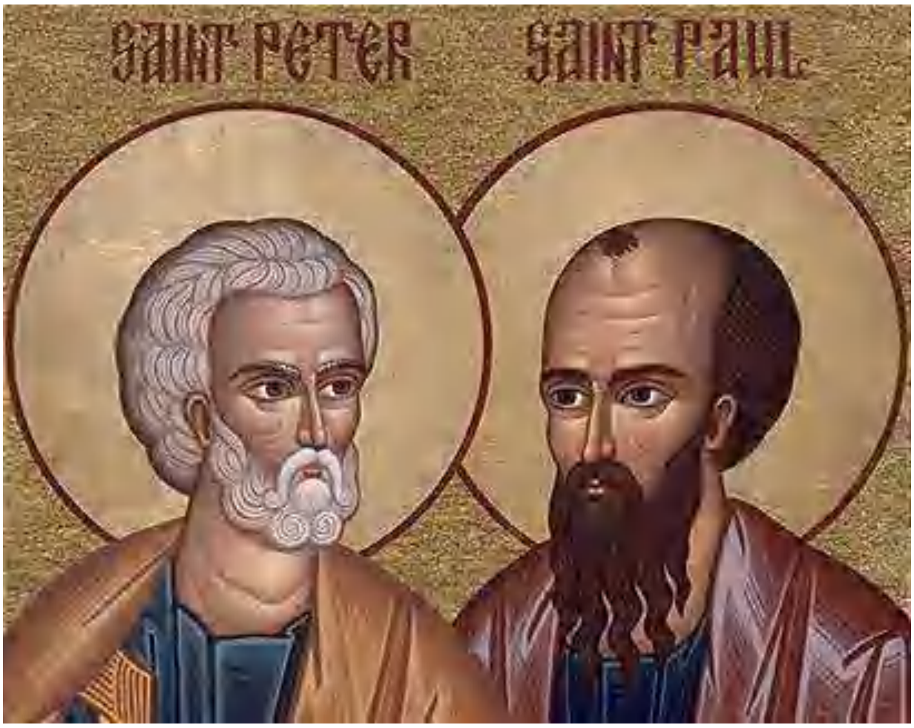

Figure 3.4

Lupa Capitolina. *Lupa con Romolo e Remo.* Bronze sculpture from the 5th c. or middle age

Sala della Lupa, Palazzo dei Conservatori; accession number MC 1181

Saint Peter and Saint Paul

Figure 3.5

Saint Peter's and the city of Rome

Rosamond McKitterick

Rosamond McKitterick. *Old Saint Peter´s Rome.* Rome (2013), p. 22

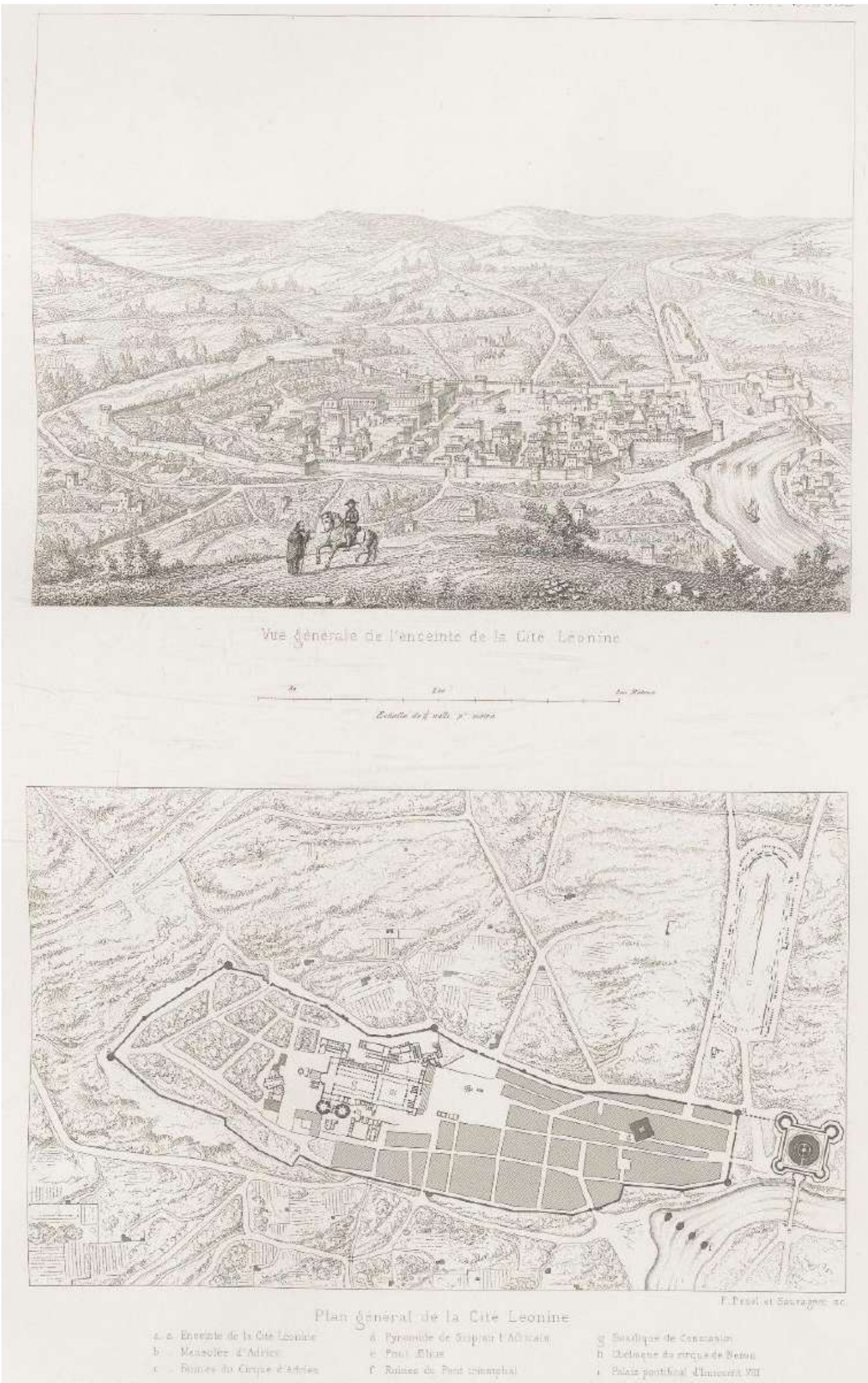

Figure 3.6

Ancient Basilica of S. Peter in Rome, IV – XVI century

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL1

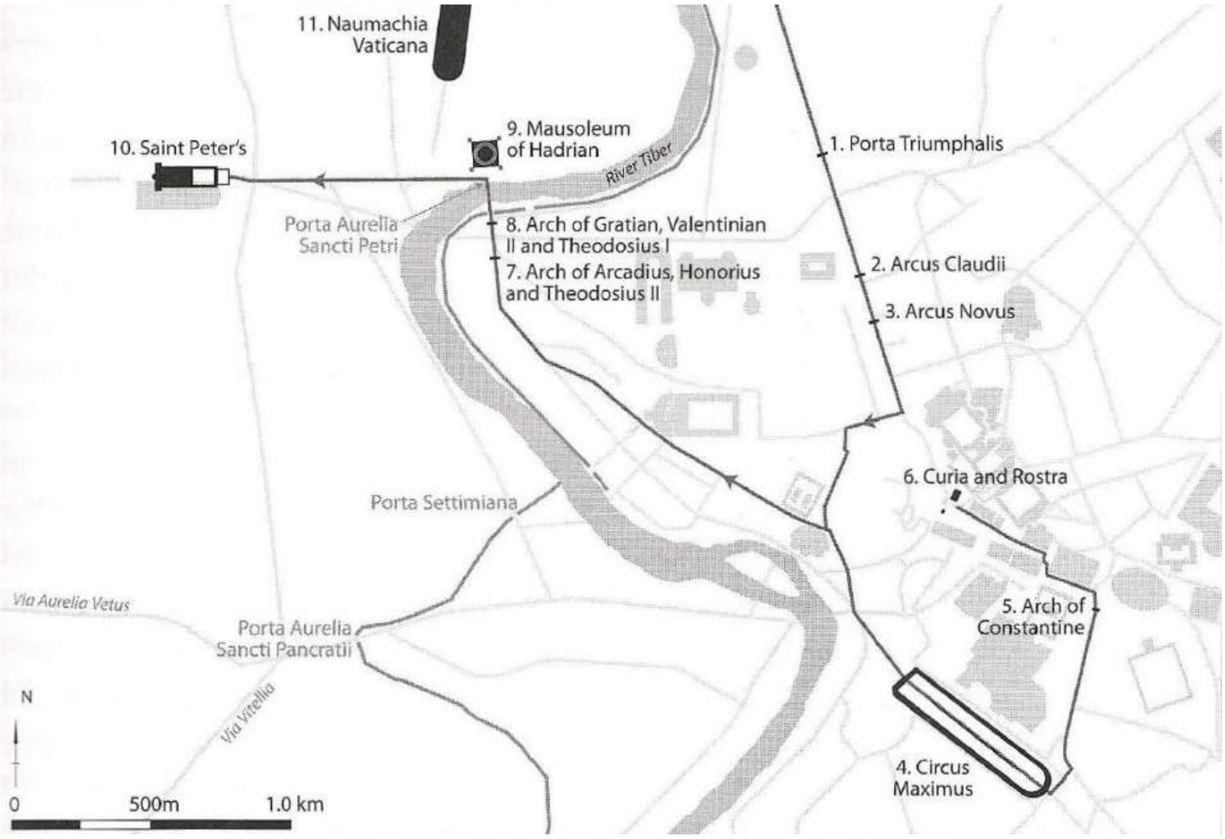

Figure 3.7

The imperial processions of the late antique adventus and of the visit to Saint Peter's

Rosamond McKitterick

Rosamond McKitterick. *Old Saint Peter´s Rome*. Rome (2013), p. 29

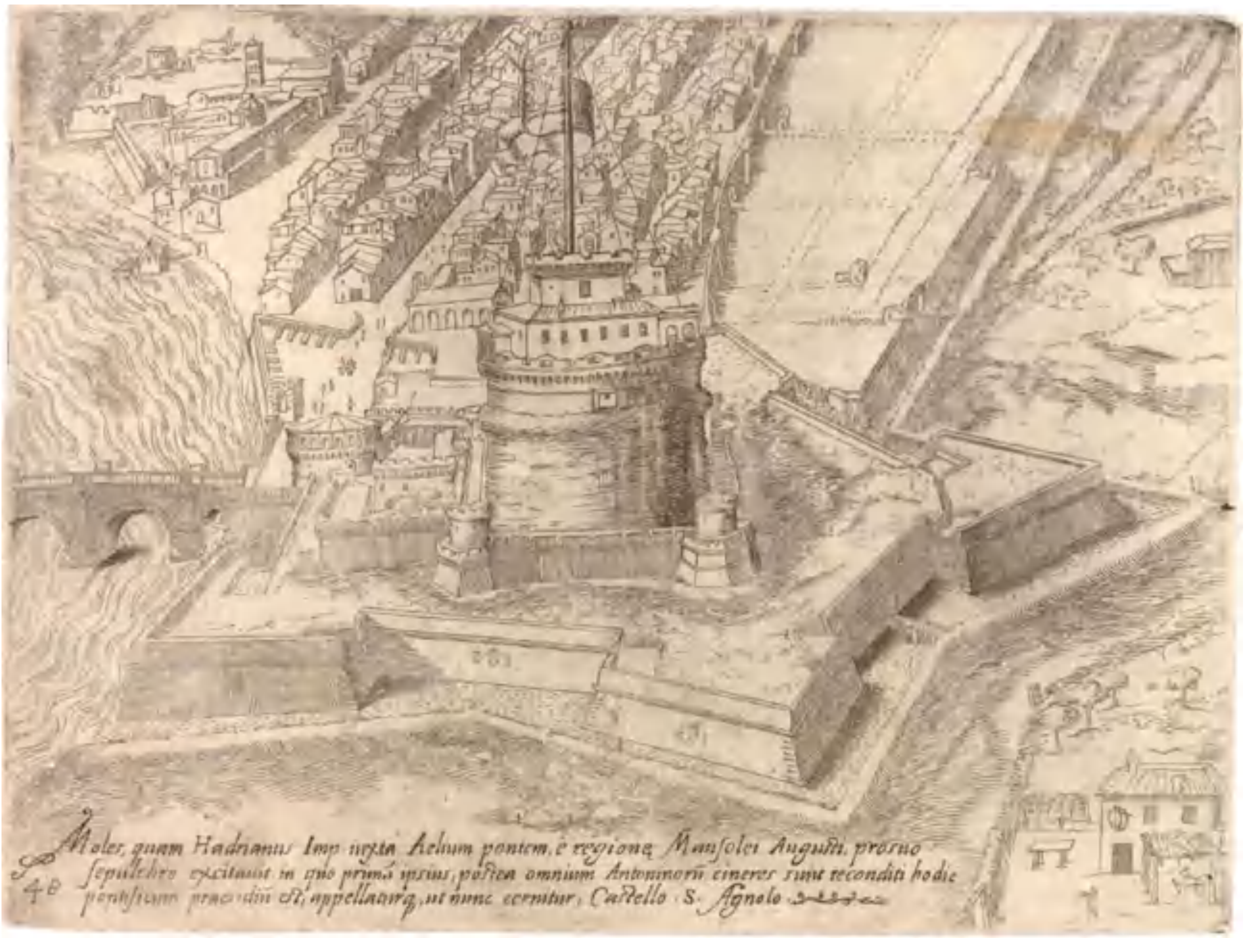

Figure 3.8

Moles quam Hadrianus Imp. Iuxta Aelium pontem

Giovanni Antonio Dosio, 1569

Giovanni Battista Cavalieri and Giovanni Antonio Dosio. *Urbis Romae aedificiorum ilustrium quae supersunt reliquiae.* Rome, 1569. Plate 48

Figure 3.9

Bird's-eye view of ancient Rome. In that earlier view the imprint (which appears following title at center right) had Rome as place and Pius IV as pope

Onofrio Panvinio, 1565

Onofrio Panvinio. *De Ludis Circensibus, libri II*. Venice: Giovanni Baptista C. (1681), p. 7

Figure 10

The victories of Emperor Charles V. The death of Charles, Duke of Bourbon, and the capture of Rome; the Duke falls backwards from a ladder against a tower to the alarm of a soldier; in the distance Rome is in flames, including the Castel Sant' Angelo

Dirk Volkertsz Coornhert, after Maarten van Heemskerck, published by Hieronymus Cock, 1565

The British Museum, cod. 1868,0208.59

Figure 3.11

The Obelisk of Cesare in S. Peter's square in Rome with surrounding buildings

Giovanni Antonio Dosio, 1569

Giovanni Antonio Dosio; Giovanni B. de Cavalieri. *Cosmo Medici DVCI Florentinor. Et Senens. Urbis Romae Aedificiorum Illustriumquae Supersunt Reliquiae.* Rome (1569), p. 34

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Figure 3.12

State of the Vatican Basilica after the transport of the obelisk, Fresco

Giovanni Guerra, 1587-88

Sixtine Chapel, Vatican Library

Figure 3.13

Model of the Old Basilica of St. Peter

Alberto and Mauro Carpiceci

CHAPTER 4

"*Haec autem ita fieri debent, ut habeatur ratio firmitatis, utilitatis, venustatis. Firmitatis erit habita ratio, cum fuerit fundamentorum ad solidum depressio, quaque e materia, copiarum sine avaritia diligens electio; utilitatis autem, cum fuerit emendata et sine inpeditione usus locorum dispositio et ad regiones sui cuiusque generis apta et commoda distributio; venustatis vero, cum fuerit operis species grata et elegans membrorumque commensus iustas habeat symmetriarum ratiocinationes*"

Marco Vitruvio Pollione

Chapter 4. Reconstruction in stages of the design process of the *old basilica of S. Peter* Objective

4.1. Objectives

In this chapter it is desired to reconstruct the complete project of the old basilica of S. Peter as initially conceived. In the same way it is desired to identify the consecutive stages of the design process from the first decision until the project was finished.

In ancient Rome, very few plans were made to project a building for very different reasons (modularity of the process, existence of architectural orders, scarcity of paper or papyrus, etc.). The most important thing was the realization of a floor plan, which was complemented with one or more sections, or even some elevations, perfectly integrated with the floor plan.

Initially, the floor plan layout was designed, with a certain geometric structure such that all its elements were geometrically related to each other. When the plan was almost finished, the sections were drawn based on the geometric structure of the floor plan. The definition of the building was completed with indications on the order that should be used and the proportions of the columns and other modular elements. Finally, the new architectural elements defined in section were moved to the floor plan, creating a certain transformation in its structure. In this way, the floor plan influences on the section, and the section pan in turn on the floor plan, generating a perfect integration between all the elements of the building.

Therefore, for the reconstruction of the design process of the old basilica, first the design process in floor plan will be reconstructed, and based on the resulting floor plan layout, the design process in section will be also reconstructed. Once the plan and the main section layouts have been defined, the facades can be reconstructed, taking into account the historical information available, and therefore the appearance that the old basilica could have in different historical periods. This complete reconstruction of the appearance of the building, and at different stages of its history, will be done in Chapter 6.

Therefore, it is not desired to draw the old basilica once it was built, since in its construction, as in the construction of any building, small errors and deviations were made regarding the original project.

No doubt there was an initial project, possibly carried out in 324, during the time of Sylvester and Constantine. This original project was followed - quite accurately - during the construction of the main body of the basilica, including the apse, the transept, the two side exedras and the five naves, since its construction took less than 30 years. There are two huge proof of the existence of this project. On the one hand the fact that a foundational platform was built that included all the spaces of the basilica although they were built many years later [1]. On the other hand, and as shown in this chapter, all the architectural spaces of the building are geometrically related, which shows that they were designed together and at the same time.

However, once the main body was finished it is possible that a new project based on the already built basilica had been carried out, and perhaps this new project had light deviations from the original project. This second project, if there was one, could have been carried out at the time of Liberius (352-366), and would regulate the construction of the anterior body (including the nartex, the atrium, the lateral wings, the gate house and its adjacent rooms), which would end completely in the time of Symmachus (498-514) [2]. However, this second project (if there was one) would greatly resemble the initial project, since in reality, once defined the main body, there are few alternatives to correctly project the narthex, the lateral wings of the atrium and the rooms adjacent to gate house.

Therefore, there was a project or two, the present work aims to reconstruct all the consecutive stages of the global design process, from the first decision, until the project was perfectly defined.

4.2. Units of measurements in *Ancient Rome* and in the *Renaissance*

For the identification of the design process and the deduction of all the dimensions of the old basilica of S. Peter there is an important problem to solve. The units of measurement existing in Rome in the fourth century were not the same as the units of measurement that existed in Rome in the Middle Ages, and in the Renaissance.

In ancient Rome, the most common units of measurement in building construction were *cubitus*, *pes*, and *palmus*.

1 *cubitus*:	6 *palmus*	1 *cubitus*:	44.68 cm.
1 *pes* (feet):	4 palmus	1 *pes*:	29.7866 cm. (Vatican)
1 *palmus*:	4 *digitus* (1 *digitus* = 1 finger)	1 *palmus*:	7.4466 cm.

In the Renaissance, in Rome, the most common units of measurement were:

1 *palmo 'di architetti'*: 12 *once*	1 *palmo 'di architetti'*: 22.34 cm.
1 *palmo 'di architetti'*: 3 *palmas*	1 *palma*: 7.446 cm.
1 *palma*: 4 *once* (1 *once* = 1 finger)	1 *once*: 1.8616 cm.
1 elbow: 2 *palmi 'di architetti'*	1 elbow: 44.68 cm.

In the Renaissance, in Florence, the most common units of measurement were:

1 *braccia fiorentine* (1 bf = 2.61 *palmi* = 0.5836 m.)

As expected, the units of measurement had some dispersion over time and across different regions. However, the old Roman *palmus* and the Renaissance *palma* were equivalent, so it can be said that the old Roman *pes* (*roman foot*), the most common unit of measurement, was quite exactly equivalent to 4/3 of the Renaissance *palmo di architetti* [3].

Measurements made in the old basilica in the Renaissance were made mostly in *palmi*, as were most of the projects for the new basilica. Bramante, Giuliano da Sangallo, Fra Gicondo, Antonio da Sangallo, Peruzzi, MIchelangelo, and several other Renaissance architects took measurements of the ancient basilica in *palmi*. And based on these measurements and these units of measurement they carried out their projects.

However, the project of the old basilica was made based on *pes* (from now on it will be called *roman feet*, or simplifying, *feet*) as a unit of measurement. And this fact is important, since a dimension that corresponds to a whole number (and perhaps has a certain symbolic character) made with a certain unit of measurement, corresponds to a decimal number, without any type of symbolic character, in another unit of measurement.

This means that the reconstruction of the dimensions of the old basilica of S. Peter, as well as the identification of the stages of its design process must be carried out on *pes* (*roman feet*). The internal coherence and the geometric relationships between the different architectural elements must be realized and understood in *feet*. Furthermore, these measurements must resemble the measurements made in the Renaissance (made in *palmi*), which were probably rounded.

Leonardo da Vinci also provides a graphic scale in his drawing "The Vitruvian man", and in the text a set of units of measurement with which he describes the dimensions of the human body:

"Vetruvio, architetto, mette nella sua opera d'architectura, chelle misure dell'omo sono dalla natura disstribuite in quessto modo cioè che 4 diti fa 1 palmo, et 4 palmi fa 1 pie, 6 palmi fa un chubito, 4 cubiti fa 1 homo, he 4 chubiti fa 1 passo, he 24 palmi fa 1 homo ecqueste misure son ne' sua edifiti…".

4.3. Identification of the stages of the design process of floor plan of the old basilica of S. Peter

4.3.1. Objectives

In this section the design process of the floor plan of the old Basilica of S. Peter is reconstructed in a similar way to how it should have been originally carried out in the realization of the executive project.

As mentioned, the floor plan layout was the fundamental part of the design of a building in ancient Rome, and the elevation design was done next, although undoubtedly certain decisions made in the section design could have an impact on the floor plan design.

When the plan of a certain building is projected, a sequential set of decisions are taken that allow the project to evolve, stage by stage, from the first decision to the end of the project. The decisions that are made at a certain stage make the project evolve until it reaches a new stage, so that the realization of a project becomes a sequence of clearly defined stages.

In this way, this section identifies the stages of the design process that were originally carried out in the elaboration of the project for the old basilica of S. Peter. It is not intended to emulate the same design process that was carried out initially, since, as in any design process, decisions were not made only sequentially, since they were also made in parallel. In addition, at each stage of the design process, there were several suitable alternatives, so several of them had to be explored, until their validity was verified, continually returning to previous stages of the process, in order to explore new paths in the decision-making tree. In general, it can be said that the design process of any building is a complex process, full of uncertainties, and its reconstruction equally complex.

However, an architect who has previously designed a building could easily recompose the sequential stages that he carried out in his project, sequentially and without uncertainties, since he can remember the successful decisions that were made, when going from one stage to another, until it was completely finished.

Taking into account these clarifications, in this section the sequential set of stages of the project of the old basilica of S. Peter is reconstructed, based on the final successful decisions.

The procedure to identify these stages is the same as an expert chess player would do when seeing the position of the pieces on the board at a certain stage of the game. The chess player could reconstruct the sequential stages of the game, including the position of all the pieces in each stage. That is, he could reconstruct the sequence of stages from the beginning of the game, to the stage in which the pieces occupied certain positions.

Taking these considerations into account, the reconstruction of the design process of the plan of the old basilica has a special importance since it allows reconstructing with precision the shape and dimensions that the original building could have had.

4.3.2. Archaeological excavations and measurements of the old basilica of S. Peter

In the 40s of the 20th century, excavations were carried out under the new basilica of S. Peter in order to analyze vestiges and make measurements of the old basilica of S. Peter and the Necropolis [4] (Fig. 4.1). Of course these measurements have been taken into account in this work, although with certain reservations.

It must be considered that it is very difficult to stake out exactly a foundation in an irregular terrain, and instead the walls (and colonnades) can be set out more accurately drawing them on the foundation surface. Therefore, there are always differences and eccentricities between the paths of the foundation walls and the upper walls (or colonnades).

In addition, in the particular case of the old basilica of S. Peter, heterogeneous bases and columns were used, with different sizes and shapes, and often half finished (*spolia*) [5]. Therefore, the measurement from a specific base, or from a specific column, is not significant, since the same measurement made from a base or an adjacent column could vary up to half a *palmi*, or perhaps more.

Therefore, simple and limited measurements, although they are binding, do not have definitive validity to reconstruct exactly the original project of the old basilica of S. Peter. Therefore, it is very important to know precise measurements made in situ by architects.

4.3.3. Historical graphics and measurements of plan layout of the old basilica of S. Peter

There are three main historical sources (texts and graphics) containing measurements of the old basilica of S. Peter. The historical references available that contain measurements of the old basilica are from the 15^{th} century, so measurements are made in *palmi* (1 *palmo* = 22.34 cm.), and eventually in *braccia fiorentine* (1 bf = 2.61 *palmi* = 0.5836 m.).

Two sources are very reliable because they were made by talented architects such as Donato Bramante (1443?-1514) and Baldasarre Peruzzi (1481-1536), who were also involved in the design and construction of the new basilica. The third source is not so reliable, since the measurements were made by a cleric, Tiberio Alfarano (1525-1596), not well versed in architecture, and also, at the time of making the measurements, a considerable part of the old basilica had already been torn down, on the occasion of the construction of the new one, so in many cases he could not make direct measurements on the building, and had to be guided by vestiges on the ground, and by his imagination.

There are also historical documents with comparative tables of measurements supposedly made by Alfarano, Fontana, Oldoino, Ferrabosco and Severano, compiled by Filippo Buonanni in his work *Numismata Summorum Pontificum Templi Vaticani Fabricam Indicatia* [6].

In addition, texts and graphic documents are preserved, without measurements, made by people who visited the basilica, such as Maarten van Heemskerck (1498-1574) [7], Onofrio Panvinio (1530-1568) [8], Giovanni Antonio Dosio (1533-1609) or Giacomo Grimaldi (1568-1623) [9], or people who lived in later times, and therefore could not visit the basilica, but who were supposed to have access to documents and ancient drawings of the basilica, such as Paul Letarouilly (1795-1855) [10], or Rodolfo Amedeo Lanciani (1847-1929) [11]. There are also some anonymous graphics, of difficult authorship, which mostly have poor quality, or are only copies of some of the mentioned drawings

These documents do not provide information on measurements of the old basilica, however, once the project has been reconstructed, these documents allow it to be properly completed.

Finally, in recent years, a set of works and considerations of several contemporary researchers have been accumulating, which have been able to take into account both the previous documents and the excavations carried out in the 40s [12].

Of course, all these works have been taken into account to carry out this research, however, most of them do not go beyond conjecture or interpretation, so the three most important sources for the study of the old basilica of S. Peter are the work of Bramante, Peruzzi and Alfarano.

1. Donato Bramante

Currently, several drawings made by *Bramante* for the design of the new basilica of S. Peter are preserved: *GDSU 3 A, JSM Codex Corner f.18, GDSU 1 A, GDSU 7945 Av, GDSU 7945 Ar, and GDSU 20 A*. But only one shows dimensions and proportions of the old basilica, the *GDSU 20 A* drawing.

When analyzing the *GDSU 20 A* drawing, (Fig. 4.2) can be observed a set of marks made by Bramante in order to make a scale drawing of the old basilica, and the project of Nicholas V; and also to capture his architectural ideas on a scale, integrated into the built environment. Some types of marks are usually called as "compositional marks", and are necessary to compose adequately the different architectural elements of a given project. And other types of marks are “scale marks”, necessary to measure directly on the plane and to draw to scale throughout the design process.

Scale marks are more or less straight lines that are found throughout the drawing, and are spaced a distance of 5 *palmi*. On the other hand, the compositional marks are very short, are separated by a distance of 10 *palmi*, and are only drawn in certain specific parts of the drawing. There are also drawn shorter compositional marks separated by a half distance, that is, a distance of 5 *palmi*.

The dimensions of these marks are deduced from the analysis of Alfarano's drawings, where there is drawn a graded scale. If measured on the layout of Alfarano it can be seen that the size of the transept of the old basilica is about 408 *palmi*, and the width of the central nave is approximately 110 *palmi*. By carefully analyzing *Bramante*'s *GDSU 20 A* drawing, there is evidence of 11 marks drawn across the central nave, and a total of 41 marks along the transept.

If the Alfarano drawing is superimposed with the Bramante *GDSU 20 A* drawing, it is clear that they do not match exactly, and the Alfarano drawing does not have the exact proportions, and even it does not exactly match the dimensions written by Alfarano in some cases. So some exact measurements of some architectural elements that can serve as a reference are needed. For this reason, other complementary strategies must be used to deduce the exact dimensions of the old Basilica of S. Peter in Vatican. Fortunately, there is a plan, made by Peruzzi, which provides certain exact measurements.

2. Peruzzi

The most reliable measurements of the old basilica of S. Peter are the texts and the *GDSU 11 Ar* drawing (*Pianta dell'Atrio e della Navata di S. Pietro*) made by Peruzzi (Fig. 4.3), perhaps about the year 1518 (according to my own research), although many researchers think that made between 1520 and 1521 [13].

This drawing is of vital importance since it was made by Peruzzi in order to measure the already built part of Bramante's project for the new basilica, and its relationship with the still standing part of the old basilica. Therefore, the measures had to be done with great diligence and precision.

In *GDSU 11 Ar* several measures are perfectly appreciated. The length of the atrium is 26 *canne*, that is, 260 *palmi*. The depth of the gate house is 92 1/6 *palmi* (5 1/2 + 81 2/3 + 5 = 92 1/6), indicating that the outer wall is 5 *palmi* and the wall adjacent to the patio of 5 1/2 *palmi*. The width of the basis of the atrium colonnade is 5 *palmi*. The size of the narthex counting the wall is 57 *palmi*, and the adjoining wall of 6 1/3 *palmi*. The distance from the axis of the basilica to the wall of the main body (inside the narthex) is 143 *palmi*. The separation between columns of the internal lateral naves is 39.5 *palmi*. The drawing shows a dimension of the stairway access platform of 77 2/3 *palmi*.

Peruzzi also indicates, in a pencil drawing, that the interior width of the main body of the naves is 284 *palmi* [14].

3. Alfarano

Tiberio Alfarano (1525-1596) in his work *De basilicae Vaticanae antiquissima et nova structura* of 1582 [15] describes the *old basilica* before being demolished. This work (published in 1914) was accompanied by three precise drawings, dated respectively 1571 (Fig. 4.4), 1576 (lost) and 1582, the last of which, engraved in copper by Natale Bonifacio and published in 1590 (Fig. 4.5), is a precise graphic description of the basilica and the annexed buildings. These drawings, together with written descriptions and measurements (Fig. 4.6), represent one of the best sources for general knowledge of the ancient basilica, according to Krautheimer and Frazer [16]. Although, Alfarano's references are not a reliable source of "accurate" measurements of the architectural elements of the old basilica of S. Peter.

Alfarano was not a construction professional so he would not have rigor or thoroughness when taking measurements. In fact, the measurements indicated in his writings show an ambiguity that an architect would not have. For example, when talking about the distance between columns, Alfarano does not specify whether the measurements have been made from the widest part of the respective shafts, or from the lower part, or from the bases.

Finally, mention should be made of the drawing made by Francesco Cancellieri (Fig. 4.7). This drawing was made by almost literally copying Alfarano's drawings, however Carcellieri improved the position and design of the buildings adjacent to the old basilica, and this has been a great help in chapter 2 and chapter 5, to rebuild the state of the urban structure in the vicinity of the old basilica.

4.3.4. Methodology followed to reconstruct the design process of floor plan of the old basilica of S. Peter

Once that all the historical references have been compiled, an exhaustive analysis of it has been carried out in order to tentatively identify any type of dimensional relationships of the architectural elements that could apparently be contained in the design of the building. Based on it, what could be the first action in the design process of the old basilica of S. Peter must be identified, as well as a causality relation with the rest of actions, from those carried out with greater promptness, to those that were clearly carried out later.

Among all the tentative design strategies that are being proposed, there comes a time when one of them is capable of providing results with partial coincidences with the dimensions and historical information collected. This strategy is gradually polishing, until finally one is reached that has almost total coincidences with the information collected [17].

The compositional strength of this strategy is such that it can even reject certain commonly accepted measurements. It must be remembered that the architectural design process has its own harmonic rules, so that all architectural elements must be geometrically related to each other, so if a given dimension is dissonant with respect to the others, it is most likely that this dimension, although historically accepted, could be false.

The deduced compositional strategy also allows us to identify the consecutive design stages that the architect made from his first stroke, until the project was complete. Next, the different identified stages are specified and explained, testing with different compositional strategies, until identifying one whose final result coincides with the historical evidence, and also has an enormous internal coherence, a great simplicity and great compositional strength.

4.3.5. Stages of the design process of floor plan layout of the old basilica of S. Peter

The big problem in the genesis of any project is what should be the first action to be taken to start the design process. This first geometric action is always generated based on the initial idea of the architect.

In the case of the old basilica of S. Peter it is evident that a simple basilica typology was desired. They did not want to innovate, on the one hand the concrete needs of the Christian liturgy were unknown, and on the other they were in a hurry.

The most appropriate thing was to build a large building with a basilical typology, which was capable of housing a multitude of people. For this reason it was decided to build a huge basilica, composed of two main parts: an anterior body that should contain the gate house, the atrium and the narthex, and a main body that should contain the five naves (a central nave of great width, and four equal side aisles with a smaller width). The main body should articulate with a transept with exedras, and a circular apse. In other words, it was thought of a building with a simple and conventional structure, but of enormous dimensions.

A first decision that was made is that both the main architectural body and the anterior architectural body have the same dimensions; but these dimensions should be chosen appropriately.

The second decision to be made was to identify the geometric relationship between the transept and the main body. Therefore, a geometric strategy should be thought of that would relate the dimensions of the body of the naves with the dimensions of the transept with the exedras, in such a way that if the dimension of one is modified, the dimension of the other is proportionally modified, with the purpose that they were harmoniously united.

The best way to integrate the transept with the set of naves is that both have the same dimension, in such a way that from the set of naves only the exedras stood out. Therefore, it only remained to relate the depth of the transept with the naves.

The most important element of the main body is the central nave (which should also be closely linked to the transept), so a simple formula should be chosen to geometrically relate the depth of the transept to the width of the central nave. A rectangle should be chosen in such a way that the ratio of its long side to its shortest side, is the ratio of the width of the central nave to the depth of the transept. This rectangle would not correspond to any architectural element of the basilica, but it would constitute its generating core. Therefore, and simply for the purpose of explaining the design process, this rectangular generating space will be referred to as the “transept core”.

Stage 1 (Layout OSP-F1)

Without doubt, the first architectural element that was defined was the “transept core”, since it represents the connection between the main nave and the transept, the two main architectural spaces of a basilica. In addition, the “transept core” would be the first space that was desired to build since in its east side it would include the Arch of Constantine, and in its west side it would integrate the apse.

Given its special importance for Christian worship, the building should have a special symbolism and therefore the shape of the “transept core” should be studied with great care. Therefore, the architect author of the project chose an equilateral triangle as the generator of the “transept core”, because the equilateral triangle perfectly symbolized the concept *Trinitas*, initially formulated by *Tertullian* in the year 215 (*Adversus Praxeam II*) to refer to a God that exists as three different people: father, son and holy spirit: “*… the three are one, due to the fact that all three come from one, per unit of substance*” [18].

This concept was slowly and gradually taking shape by Christians in the third century and it was at the *council of Nicea*, in 325, when it was formally raised by the Christian church. The concept was questioned by a generation of debates, until the faith of *Nicea* was definitively reaffirmed in Constantinople in 381 [19].

It is more than likely that the architect author of the project of the old basilica of S. Peter had knowledge of the recent *Trinitarian dogma*, as well as its representation by means of a triangle, and decided to use this concept, and its symbolism, as the generating essence of the project. Nothing better than an equilateral triangle, representing the Christian Trinity, as a source of inspiration and generating geometric figure of the architectural structure of the basilica.

However, this equilateral triangle must be very well chosen since it will be the generator of the central rectangular space of the basilica, that is, the “transept core”.

It is clear that the architect was commissioned by Constantine to make a large building in the shape of a basilica, so the main nave should have a significant width. Surely the architect will try several especial dimensions, such as 75 *feet*, 80 *feet*, 85 *feet*, 90 *feet*, etc., that is, all round numbers. However, and to ensure the compositional success of his project (*concinnitas*) he decided that the lateral spaces of the transept had the same dimension as its depth. Therefore, the total length of the transept would be the width of the central nave plus twice its depth.

The height of an equilateral triangle is calculated by multiplying its base by the sine of 60º (√3/2). Therefore, the height corresponding to the successive tentative triangles would be: 64.9519 *feet* (base 75 *feet*); 69.2820 *feet* (base 80 *feet*); 73.6121 *feet* (base 85 *feet*); etc. All these dimensions have decimals and are inexact, and therefore not very suitable to constitute the genesis of an important and symbolic project. In addition, the resulting length of the transept (the sum of the base of the central triangle plus two heights), would generate unattractive numbers, and also decimals.

The author of the project had to look for suitable numbers, so that they had a certain beauty, and also generated functional spaces. In addition, many resulting transepts were too small, and others were too large. And the same would happen with the length of the naves, whose length should be equivalent to the length of the transept plus that of the lateral exedra.

After doing several tests, one number stood out above the rest: 82 *feet*.

If an equilateral triangle is drawn with 82 *feet* of base, its height is a nearly whole number, 71 *feet*. Also, the resulting length of the transept is now 224 *feet* (71 + 82 + 71), which is an attractive number (7 * 2 * 2 * 2 * 2 * 2) and loaded with symbolism.

The author of the project therefore determined that the equilateral triangle generating the “transept core” had dimensions of 82 *feet* base, and 71 feet high. The equivalence of these dimensions in *palmi* is 109.33 *palmi* base, and 94.66 *palmi* high, which are almost equivalent to the rounded measurements that were made on the monument in the Renaissance, and which were rounded to 110 *palmi* and 95 *palmi* (although others would round to 109 *palmi* and 94 *palmi*, generating confusion to current historians).

Stage 2 (Layout OSP-F2)

Once the “transept core” was determined, the transept was projected by adding two squares to each side of the "transept core". The squares would have their sides with the dimension of the depth of the transept, that is, 71 *feet* * 71 *feet*. The resulting transept would therefore have a length of 224 *feet* (82 + 71 + 71), that is, 298.66 *palmi*.

The dimension of the sides of the lateral squares must coincide with the dimension of the two lateral naves of the main body, and 71 *feet* is an adequate dimension.

Stage 3 (Layout OSP-F3)

Once the transept was determined, the lateral exedras were projected. To create a harmonic ensemble, it was decided that the best option was that the exedras had a width half of the main nave, that is, 41 *feet*. In this way the transept-exedra set would have a compositional rhythm of 41 - 71 - 41 - 41 - 71 – 71 (all prime numbers), and therefore would have a total length of 306 *feet* (408 *palmi*).

Stage 4 (Layout OSP-F4)

The length of the main body (naves) is determined by coinciding with the length of the transept plus the two exedras, that is, 306 *feet* (408 *palmi*). The main body is collateral to the transept, and therefore has its same dimension, that is 224 *feet* (298.66 *palmi*).

Stage 5 (Layout OSP-F5)

The length of the anterior body (which includes narthex, lateral wings, atrium, gate house and adjacent rooms) is determined by coinciding with the length of the main body, that is, 306 *feet* (408 *palmi*). The width of the anterior body is also 224 *feet* (298.66 *palmi*).

Stage 6 (Layout OSP-F6)

The central nave is determined. At the beginning of the design process the dimensions of the "transept core" had already been determined so that its width coincided with that of the central nave. Therefore, the central nave is determined by lengthening the compositional lines of the "transept core", splitting the main body into three parts. The lateral spaces are reserved for the four lateral naves and the central space is the central nave. The central nave therefore has a width of 82 *feet* (109.33 *palmi*) and an initial length of 306 *feet* (408 *palmi*), regardless of the thickness of the walls (to be determined later).

Stage 7 (Layout OSP-F7)

In stage 2 a dimension of 71 *feet* (94.66 *palmi*) was reserved for the space that includes the two lateral naves. This space must include the main colonnade, the inner lateral nave, the lateral colonnade, the outer lateral nave and the outer wall.

The architect divided this space into two equal spaces, therefore each part with a width of 35.5 *feet* (71/2 = 35.5). The interior space is used to locate the main colonnade 3.75 *feet* (5 *palmi*), the inner lateral nave and the lateral colonnade 2.25 *feet* (3 *palmi*). The outer space is used to locate the outer lateral nave and the perimeter wall 6 *feet* (8 *palmi*). In order to achieve a harmonious design, it is logical that the dimension of the side wall is the sum of the dimensions of the columns (6 = 3.75 + 2.25) creating a coherent compositional rhythm. As a result, the interior width of the main body of the basilica is 212 *feet* (224 - (6 + 6) = 212), that is, 282.66 *palmi*, a dimension very close to the dimension of 284 *palmi* indicated by Peruzzi [20].

In this way the two naves are with the same width de 29.5 *feet* (35.5 - 6), that is, 39.33 *palmi*, which is a dimension almost identical to the 39.5 *palmi* indicated by *Peruzzi* in *GDSU 11 Ar*. The inner lateral nave has a width of 29.5 *feet* (39.33 *palmi*) from column to column (35.5 - (3.75 + 2.25) = 29.5); and the outer lateral nave has a width of 29.5 *feet*, from column to wall (35.5 - 6 = 29.5).

It should be noted that the basilica was built based on the "*spolia*" of materials, very common at the time and especially in large buildings with repetitive elements [21]. Therefore, the dimensions of the bases and columns are merely indicative, and the initial dimensioning would simply serve to circumscribe in its interior the columns and bases that could be obtained, both from municipal quarries, as well as from other buildings. Many of these architectural elements would be placed in the building even without being completely finished, in a somewhat precarious way. In this sense, the measurements made by Antonio da Sangallo the Younger are explained, since in his *GDSU 119 Ar* drawing, it indicates that the separation between the columns of the central nave is 108 *palmi*, and that the separation between the columns of the lateral naves is 40 *palmi*. This measurement error is undoubtedly due to three reasons. On the one hand, what is indicated regarding the *spolia*, on the other hand it is possible that the columns near the main door were narrower, and lastly, it is possible that *Antonio da Sangallo* was less rigorous with the measurements, since his objective was not it was to mediate the central nave, but only part of the narthex and the staircase of connection with the papal palace.

In this stage the axes of the colonnades are therefore defined. The separation between axes of the colonnades of the central nave is 85.75 *feet* (82 + (3.75/2) + (3.75/2) = 85.75), that is 114.33 *palmi*. The separation between the axes of the colonnades of the central nave and the lateral colonnades is 43.5 *feet* (29.5 + (3.75/2) + (2.25/2) = 32.5), that is, 43.33 *palmi*. The separation between the axes of the lateral colonnades and the perimeter wall is 30.625 *feet* (29.5 + (2.25/2) = 30.625), that is, 40.83 *palmi*.

The columns of the main nave had variable diameter (*spolia*) although all of them close to 3.75 *feet* (5 *palmi*), as shown in the drawings (*GDSU 108 Ar, GDSU 108 Av, GDSU 120 Ar*) by Peruzzi, and in the drawings (*GDSU 1079 Ar* and *GDSU 1079 Av*) by Giovan Battista da Sangallo il Gobbo. Likewise, the bases of the columns of the central colonnades have an approximate width of 6 *feet* (8 *palmi*), that is, 1.125 *feet* (1.5 *palmi*) protrude on each side of the columns (although due to the *spolia*, some bases had a variable dimension between approximately 5.5 and 6 *feet*). The columns of the lateral naves had a variable diameter, but close to 2.25 *feet* (3 *palmi*), and their bases had a dimension of about 3.75 (5 *palmi*), that is, 0.75 *feet* (1 *palmo*) protruding on each side of the columns.

Thus the distance between bases of the main nave is 79.75 *feet* (82 - (1.125 + 1.125)), that is, 106.33 *palmi*. The distance between bases of the central colonnade and the lateral colonnade is 27.625 *palmi* (29.5 - (1.125 + 0.75), that is, 36.83 *palmi*. The distance between the base of the lateral colonnades and the perimeter walls is 28.75 *palmi* (29.5 – 0.75), that is 38.33 *palmi*.

The 106.33 *palmi* (79.75 *feet*) dimension for the width of the old basilica (from base to base) was rounded to 107 *palmi* by the architects involved in the design of the new basilica of S. Peter (Bramante, Giuliano da Sangallo, Peruzzi, Antonio da Sangallo,...) [22], not only because it is the distance between the bases of the columns of the central nave, but also because this dimension, 107 *palmi*, was the ideal side of an octagon to design the big central dome pillars with the compositional sequence 12 - 15 - 12 (39 *palmi*). In fact, Bramante respected this rounded dimension, and when designing the "central nucleus" of the new basilica he separated the great central dome piers (crossing piers) from each other a distance of 107 *palmi*, as they are preserved in the present.

Finally, the width of the perimeter wall was projected to be 6 *feet* thick (8 *palmi*), to create a symmetrical compositional rhythm (3.75 - 29.5 – 2.25 / 29.5 - 6), and therefore create two lateral naves with the same width of 29.5 *feet* (39.33 *palmi*). The perimeter wall should have this high thickness (6 *feet* = 8 *palmi* = 1.78 m.), not only to support its own weight and that of the roofs, but especially the lateral thrust of the wind. A typology of roman basilica usually had only 3 transverse walls (2 in the transept and 1 in the narthex) so that its resistance to the lateral resistant moments caused by the wind is small. That is why the side walls were primarily responsible for enduring wind blows, and therefore they should be very thick.

Stage 8 (Layout OSP-F8)

At this stage the dimensions of the perimeter walls and columns are determined. The transept was the first architectural element to be built (integrating the previously constructed apse and Constantine arch), and liturgical activities were carried out inside it for quite some time, when the naves were not built yet.

Based on the constructive experience in basilicas of similar dimensions, a thickness of 6 *feet* (8 *palmi*) for the perimeter walls was determined, and built by *opus listatum* (using tuffs and brick bands), and in some places, *opus caementicium* [23]. Due to architectural recurrence with the main nave, the existing columns between the transept and the lateral exedras are sized with 3.75 *feet* (5 *palmi*), and their respective bases with 6 *feet* (8 *palmi*). As a result, the transept (including exedras) is with internal dimensions of 212 *feet* long (224 - (6 + 6)), by 59 *feet* wide (71 - (6 + 6)) (that is, 282.66 *palmi* long, by 78.66 *palmi* wide).

The transverse wall of the main body (where the 5 access doors were located) was designed with a thickness of 5 *feet* (that is 6.66 *palmi*), that is, one foot less than the thickness of the north and south perimeter walls. *Peruzzi* confirms in his *GDSU 11Ar* drawing that the thickness of this wall was 6 1/3 *palmi*, which is a dimension equivalent to 5 *feet*. Therefore, the internal length of the naves was 306 - 5 = 301 *feet* (401.33 *palmi*).

Stage 9 (Layout OSP-F9)

Apse dimensions are determined. The inner diameter results from discounting the width of the main nave (82 *feet*), on each side of the width of the main body, that is, 60 *feet* (224 - (82 + 82)), that is, 80 *palmi*. It can be also deducted when discounting three times the dimension of the exedra, by means of two compass spins. That is, at a distance of 123 *feet* (41 * 3 = 123) from the outside of the exedras on both sides. The resulting dimension is 60 *feet* (306 - (2 * (3 * 41))). Therefore, with a center on the axis of the perimeter wall, a semicircle of 30 *feet* inner radius (40 *palmi*), and 36 *feet* outer radius

(48 *palmi*) is drawn, and the apse is determined. Therefore, the apse protrudes from the east wall of the transept a dimension of 33 *feet* (36-3), that is, 44 *palmi*.

It is therefore clear that the apse can only be determined once the transept and lateral exedras have been designed and once the thickness of the perimeter walls has been calculated. However, the apse had to be built first, at the beginning of the architectural process, as reflected in the inscriptions on the bricks discovered in recent excavations [24].

Once the horizontal platform was built, the next constructive problem was the construction of the apse and the lateral exedras, located outside the platform. Therefore, several technical problems had to be solved, such as changes in construction techniques in the lower foundation base, and the need for a superior unifying longitudinal foundation [25].

In this stage the general dimensions of the building have been determined, which basically coincides with the *GDSU 20 A* drawing of Bramante.

Stage 10 (Layout OSP-F10)

The narthex of access to the main body of naves is determined. With the purpose of integrating properly the anterior body with the main body (*concinnitas*), it is determined that the narthex has an external dimension equivalent to half the wheelbase of the colonnades of the central nave. The separation between axes of the colonnades of the central nave is 85.75 *feet* (82 + (3.75/2) + (3.75/2) = 85.75), that is 114.33 *palmi*.

Therefore, the width of the narthex (including the bases of columns) is 42.875 *feet* (85.75 / 2), that is, 57.16 *palmi*, a dimension very similar to that indicated by Peruzzi in the *GDSU 11 Ar* drawing (57 *palmi*). According to the measurements made by Peruzzi and the identified design strategy, the atrium was initially designed by means of the interior alignment of the column bases. To determine the interior free width of the narthex (from base to wall), the dimension of the column bases must be discounted, obtaining 39.125 *feet* (42.875 - 3.75), that is, 52.16 *palmi*. Therefore, the interior width of the narthex, from column to wall, was 39.875 *feet* (39.125 + 0.75), that is, 53.16 *palmi*.

Stage 11 (Layout OSP-F11)

In this stage the dimensions of the entrance building (including gate house and adjacent rooms) are determined. As a compositional resonance with the main nave and the narthex, the best option is that the total width of the entrance building has the same dimension as the distance between the axis of the central colonnades and the outer wall, that is, 69.125 *feet* (224 – 85.75)/2), equivalent to 92.16 *palmi*, and that exactly matches what *Peruzzi* specifies in his *GDSU 11Ar* drawing (*Peruzzi* specifies an internal wall thickness of the lobby of 5 1/2 *palmi*, an external wall thickness of 5 *palmi*, and an internal dimension of the lobby of 81 2/3 *palmi*, which in total amounts to exactly 92.19 *palmi*).

In this way the main nave becomes the generating space for both the atrium and the lobby.

As a result of determining the size of the narthex and the entrance rooms, the length of the atrium is also determined. The length of the atrium (base to base of columns) results from deducting the length of the main body, the dimensions of the narthex and the dimensions of the lobby, resulting in a dimension of 194 *feet* (306 – (42.875 *feet* + 69.125 *feet*)), that is, 258.66 *palmi*. However, the distance from the central wall of the lobby to the columns of the narthex is somewhat higher, since it must be added the dimension that the bases of the narthex protrude from the columns (0.75 *feet*), so the resulting dimension is 194.75 *feet*, that is 259.66 *palmi*. This dimension is equivalent to the one specified by *Peruzzi* in the *GDSU 11 Ar* drawing of 26 *canne* (260 *palmi*), which shows that the design process followed up to here is correct.

It should be noted that on the sides of the internal rooms adjacent to the gate house (and adjacent to the atrium) there were columns of 2.25 *feet*, with bases of 3.75 *feet*, so that the length of the atrium from column to column was 195.5 *feet* (194.75 + 0.75), that is, 260.66 *palmi*.

Stage 12 (Layout OSP-F12)

The width of the atrium (from column to column) and the north and south covered wings are determined. To properly integrate the anterior body with the main body (*concinnitas*) these spaces are formed simply by lengthening the compositional lines of the lateral colonnades and their bases. As a result, the northern and southern colonnades of the atrium have 3.75 *feet* bases (5 *palmi*), and 2.25 *feet* columns (3 *palmi*).

The perimeter walls could have been designed the same thickness as the main body (6 *feet*), but the architect determined that 5 *feet* (6.66 *palmi*) would be enough, since the walls were subjected to less gravitational loads and less horizontal wind loads. In this way, the lateral walls of the anterior body have the same thickness as the access wall. Thus the interior width of the anterior body of the basilica is 214 *feet* (224 - (5 + 5)), that is 285.33 *palmi*. Therefore, the distance between the axis of the basilica and the inner face of the perimeter walls is 142.66 *palmi* (285.33 / 2), which coincides basically with the dimension of 143 *palmi*, indicated by *Peruzzi* in the *GDSU 11 Ar* drawing (Peruzzi specifically notes 14 *canne* 3 *palmi*).

The width of the lateral wings to the atrium is 37.75 *feet* (2.25 + 35.5), including the column and the perimeter wall, therefore the width of the lateral wings including the bases is 38.5 *feet* (0.75 + 37.75), that is, 51.33 *palmi*. In the same way, its internal width was 30.5 *feet* (37.75 - (5 + 2.25)) from column to wall, that is, 40.66 *palmi*. That is, a dimension of 29.75 *feet* (30.5 - 0.75) from base to wall, that is 39.66 *palmi*. Therefore, the width of the atrium was 148.5 *feet* (224 - (37.75 * 2)), from column to column, that is 198 *palmi*, and 147 *feet* (148.5 - (0.75 * 2)), from base to base, that is say, 196 *palmi*.

The colonnade between the narthex and the atrium should have the same dimensions than northern and southern colonnades, that is, 2.25 *feet* (3 *palmi*) columns on 3.75 *feet* (5 *palmi*) bases. To determine the interior free width of the narthex (from base to wall), the dimension of the column bases must be discounted, obtaining 39.125 *feet* (42.875 - 3.75), that is, 52.16 *palmi*.

As a result, the atrium dimensions are, from base to base, 194 *feet* (258.66 *palmi*) long * 147 *feet* (196 *palmi*) wide. And, from column to column, 195.5 *feet* (260.66 *palmi*) long * 148.5 *feet* (198 *palmi*) wide.

Stage 13 (Layout OSP-F13)

At this stage the dimensions of the large staircase to the building are determined. In the drafting of the original project, it was necessary to foresee that the entrance staircase had a large horizontal platform, as a prelude to the entrance of the gate house, in order to house a large number of pilgrims, and to give the building magnificence. Therefore, this horizontal platform had to be correctly dimensioned, at the same time that the set of flights of steps and stair landings was dimensioned (which should bridge the gap between the ground and platform on the east side).

The unevenness between the ground and the foundational platform was about 26.25 *feet* (35 *palmi*) in the east, so about 35 risers were needed, with 3/4 *foot* (1 *palmo*) each riser. To make the staircase as comfortable as possible, 5 flights with 6 steps each one (that is, 7 risers per flight) were projected, as indicated by Alfarano [26].

Making a rough estimate for the dimension of the access platform and for the set of flights and landings, it was estimated that the depth of the staircase was twice the depth of the reception block (69.125 *feet*), that is 138.25 *feet* (69.125 * 2) (184.33 *palmi*). For the horizontal access platform, a dimension equivalent to a quarter of the total width of the anterior body of the basilica was chosen, that is, 56 *feet* (74.66 *palmi*) (224/4). In this way a dimension of 82.25 *feet* (109.66 *palmi*) for the set of stairs and stairwells is obtained (138.25 - 56 = 109.66). This dimension is equivalent to the width of the central nave of the basilica, which is a compositional wink of the total set, and is the best possible compositional option (*concinnitas*).

Peruzzi noted in the *GDSU 11 Ar* drawing (probably made in 1518) the dimension of 77 2/3 *palmi* for the entrance platform. This dimension is 3 *palmi* higher than estimated in this design process (74.66 *palmi*). However, it should be remembered that pope *Pius II* (1458-1464) extended the front of the stairs and made it more comfortable, prior to the measurements of Peruzzi [27]. The reform undoubtedly meant building on the existing platform and steps, so when adding new stones carved on the steps, the distance of the first step from the wall of the main facade had to be extended considerably.

It only remained to determine the width of the staircase. For this, the compositional lines of the lateral columns of the lateral naves of the main body were simply lengthened, as was done in the atrium. In this way the columns of the lateral naves of the main body were aligned with the columns of the atrium and with the parapets of the staircase. Thus the width of the staircase is 147 feet (196 *palmi*), and each parapet has a width of 2.25 feet (3 *palmi*). Therefore the total width of the staircase including the two parapets is 151.5 feet (202 *palmi*).

In the times of Pius II, the stairs were extended northwards, up to the line formed by the outer face of the north perimeter wall of the old basilica. The stairway, which originally had a width of 147 feet, became 185.5 feet (147 38.5 feet) (38.5 feet is the distance between the interior face of the north parapet and the north face of the north perimeter wall). 185.5 feet equals 247.33 *palmi*.

These measurements deduced in the identification of the design process coincide with those provided by Maderno, who indicates that the width of the staircase was 248 *palmi* [28]. Based on these facts, it can be concluded that the project to reform the stairs of Pius II would suppose that the steps of the stairs had a total width coinciding with the width of the basilica, that is, 224 feet (298.66 *palmi*). The parapets would protrude on both sides of the basilica, so the total width of the staircase including the parapets is 228.5 feet (224 + 2.25 + 2.25), that is, 304.66 *palmi*.

In the documents of control of work and payments to the mason Manfredino da Como, of the year 1462, a length is indicated for the north parapet of the basilica of 12 "*passi*", that is, 120 *palmi*, and for the south parapet of 113 *palmi* [29]. *Maderno* points out in the drawing *GDSU 263 A* approximate dimension of 100 and 110 *palmi* respectively for these parapets [30]. These dimensions substantially coincide with the dimensions deduced geometrically here (82.25 *feet* = 109.66 *palmi*). Undoubtedly, the parapets would have been repaired on a regular basis throughout the middle age, so their length could have lengthened when they were measured in the Renaissance. But without a doubt the parapets had 109.66 *palmi* in the original project, since no other dimension has any compositional, geometric and projective sense.

In the same way, in the documents of mason Manfredino, the parapets of the stairs are 3 *palmi* wide, which considering the marble covering, reach the 4 *palmi* measured by *Maderno*. The reform of Pius II meant the coating of marble plates of the parapets, so its thickness became 4 *palmi*, as *Maderno* later pointed out [31]. This 3 *palmi* dimension coincides with the dimension deduced here.

To deduce the number of steps and their dimensions, as well as the dimensions of the staircase, certain clues are available. Alfarano indicates that the staircase had 5 flights of 7 steps each flight [32]. This information contrasts with the one provided by an English traveler, John Capgrave (after 1447) declared that 29 were the steps [33], and Nicolaus Muffel (in 1452) remembers 28 steps [34]. The only way to integrate this information so dispersed is that Alfarano was referring to the "risers" of the steps, while John Capgrave and Nicolaus Muffel were undoubtedly referring to the "treads" of the steps. Defining the number of steps of a staircase always generates this type of confusion, since for a staircase with several landings the number of treads and risers is not the same (they differ in the number of landings). It should also be taken into account that around the stairs there were several piles of land, for the part of this land could be covering the first or even the second of the steps, which justifies the discrepancies between Capgrave and Muffel with Alfarano.

On the other hand, the dimension of 82.25 *feet* (109.66 *palmi*) is perfect to house 5 flights of steps with 6 treads per flight (7 risers per flight) and four landings. Assuming treads of 1.5 *feet* (2 *palmi*) wide and risers of 0.75 foot (1 *palmo*) high -as was later recommended by Alberti, and as those that were made a little later in the Venezia Palace [35]- it is a width of 9 *feet* (12 *palmi*) for each flight of 6 treads (6 * 1.5 = 9), so the dimension occupied by the five flights is 45 *feet* (5 * 9 = 45).

This leaves 37.25 *feet* available (82.25 - 45) for the 4 landings. The logical decision to achieve a functional and harmonious result is to provide in this case also 9 *feet* each landing, that is to say 36 *feet* in total (9 * 4). Thus there is a perfect rhythm of 9 flights of 9 *feet* (12 *palmi*) each flight (5 flights for steps and 4 flights for landings). And the remaining dimension, 1.25 *feet* (1.66 *palmi*), would be the setback of the first flight of steps with respect to the lateral parapets.

The dimensions of the staircase indicate that the foundational horizontal platform would have an approximate height of 26.25 *feet* (35 *palmi*) above ground level on the east side, which gives an idea of the difference between the terrain of the west and east sides of the basilica. This unevenness, if continuous, implies that the slope of the ground of the imperial mausoleum located further east (*Severan Mausoleum*) is 8.25 *feet* (11 *palmi*) below the level of the foundational platform, and that the slope of the southern lateral staircase of access to the narthex from the outside (collateral to the *Secretarium*) is 15 *feet* (20 *palmi*). This gives an idea of the number of steps that had the access stair to the mausoleum and the south lateral stair to access the narthex.

The mason indicates a height of 33 *palmi* (presumably for the south side parapet) and 22 *palmi* (presumably for the north side parapet), and both parapets protruded a height that "exceeded the height of a man" on the steps [36], and that can be equivalent to approximately 8 *palmi* (3 *feet*), so from the lowest level of the terrain (beginning of the steps) the height of the south parapet would be 43 *palmi* (35 + 8), that is, 32.25 *feet*. However, the land piled up on the east side of the original foundational platform could have perfectly reduced the height of the south parapet by 10 *palmi* on the west side of the staircase, leaving a free height of 33 *palmi*, which is what the mason measured when making the marble coating. The north parapet would be much smaller due to the upward slope of the terrain towards the north side and also due to the piles of land that accumulated throughout the middle ages on the east side of the foundational platform. Therefore, it would reach the height of 22 *palmi*, measured by the mason in the west part of the staircase.

Stage 14 (Layout OSP-F14)

Entrance building, including gate house, is determined. The entrance building had five sections, and each section had two rooms. These rooms were the last to be built several years after the start of construction, but they were undoubtedly determined in the initial project, since they constitute access to the basilica, and its design had to be done precisely. In addition, although it was built years later, and therefore the original project could have been lost, the design of the entrance rooms is so simple that the architects responsible for finishing the building did not have many compositional alternatives to integrate these rooms with the previously built part.

It is determined that the exterior rooms of the entrance building have a depth equivalent to the width of the outer side naves, with respect to the outer wall, that is 34.75 *feet* (46.33 *palmi*) counting the thickness of the walls. The thickness of the facade walls and the interior wall to the atrium was about 5 *palmi* (3.75 *feet*), as specified by Peruzzi in *GDSU 11 A* drawing. Therefore, the interior dimension of the exterior rooms of the entrance building is 27.25 *feet* (34.75 - (3.75 + 3.75), that is 36.33 *palmi*. In this way the interior rooms of the entrance building are 34.375 *feet* deep (69.125 – 34.75) including the wall. Therefore, its internal dimension is 30.625 *feet* (34.375 – 3.75), that is 40.83 *palmi*.

Finally, the width of the gate house (the central room of the entrance building) is designed with an internal dimension equivalent to a fifth of the width of the east facade, that is, 44.8 *feet* (224/5 = 44.8), that is 59.73 *palmi*. So the lateral rooms have a width of 47.35 *feet* (63.13 *palmi*) and 29.75 *feet* (39.66 *palmi*) respectively (5 + 29.75 + 3.75 + 47.35 + 3.75 + 44.8 + 3.75 + 47.35 + 3.75 + 29.75 + 7 = 224 *feet*).

Stage 15 (Layout OSP-F15)

In this stage the position of the 22 columns of the longitudinal naves is determined. The 5 naves have an exact internal length of 301 *feet*, from wall to wall (306 - 5), and in the four colonnades that separate the five naves 22 columns must be located. No doubt the number 22 was a requirement of the commission, although it is also a desirable decision by the architect, both for functional reasons, as well as tectonic, and also symbolic.

The number 22 was highly valued by the Christian community of those times. Initially because dividing 22 by the 7 days of creation there is a very exact approximation of the number pi (22/7 = 3.1428, number pi: 3.1416), so it was widely used by scholars and geometers of the time. In fact, achieving the “quadrature of the circle” was a challenge always present in the architecture workshops for at least two millennia.

In addition, there are several coincidences in the Bible with the number 22, although I will only cite a few: The Bible is composed of 3 sections (the first from *Genesis* to the *Songs of Solomon*, the second from *Isaiah* to *Acts* and the third from *Romans* to the

Apocalypse) of 22 books each. The *Apocalypse* ends in chapter 22. 22 are the letters of the Hebrew alphabet. And the chronology of men from *Adam* to *Jacob* is 22 names.

Perhaps today the recurrent use of this number might seem far-fetched, as well as its symbolic justification by Christians. However, in the early years of Christianity this type of symbols was of great importance to justify the designs and actions of greater importance for the community.

By arranging 22 columns between the two transverse walls 23 intercolumns are created. Therefore, since the length of the longitudinal naves is 301 *feet*, the distance between columns would be 301/23 = 13.087 *feet*, which is a non-exact number. This dimension is unacceptable for a Roman intercolumn, which should have a rounded dimension, since in the design of colonnades, simplicity, repetition and beauty were always sought on the basis of simple numbers and proportions. It is desirable that the separation between columns be an integer, or at least a round, middle decimal number. In addition, pilasters must be arranged at the junction of the intercolumn with the walls. However, this number 13.087 provides a valuable clue: the 23 intercolumns of the 22 columns should have a dimension of 12 3/4 *feet* (12.75 *feet* = 51 *palmus* = 17 renaissance *palmi*).

The architect arranged an intercolumn of 12.75 *feet* (with columns of approximately 3.75 *feet* (= 15 roman *palmus* = 5 renaissance *palmi*) in the colonnades of the main nave, and approximately 2.25 *feet* (9 *palmus* = 3 *palmi*) in the colonnades of the lateral naves), so that the total size of the colonnade (from axis to axis of the extremes) is 391 *palmi* (23 * 12.75 = 293.25 *feet*).

So, there are 7.75 *feet* (301 – 293.25) available for the 2 lateral pilasters, that is 3.875 *feet* from the last axis to the wall. As a result, the pilasters of the central colonnades have a dimension of 5.75 *feet* (3.875 + 1.875), that is, 7.66 *palmi* (since the average radius of the central columns is approximately 3.75 *feet*). The pilasters of the colonnades of the lateral naves have a dimension of 5 *feet* (3.875 + 1.125), that is, 6.66 *palmi* (since the average radius of the lateral naves columns is approximately 2.25 *feet*).

Stage 16 (Layout OSP-F16)

In this stage the position of the columns of the lateral naves of the atrium is determined. The total length of the atrium is 194 *feet* (258.66 *palmi*) from base to base, or what is the same, 195.5 *feet* (260.66 *palmi*) from column to column. It was also desirable that the separation of columns in these two lateral colonnades be similar to the separation of columns from the naves and at the same time that the number of columns has a certain symbolic character. Therefore, initially it was tested with 13 columns (and therefore 14 intercolumns).

When dividing the dimension 194 *feet* by 14 (number of intercolumns), the result is 13.85 *feet*, which suggest that the separation between axes of the columns must be 13.5 *feet* (18 *palmi*). Thus the size of the colonnade (from external axis to external axis) is 189 *feet* (13.5 * 14), that is, 252 *palmi*. Therefore, there are 5 *feet* (194 - 189) available for the 2 lateral pilasters, that is 2.5 *feet* (3.33 *palmi*) from each external axis to the walls. As a result, the pilasters of the longitudinal colonnades of the atrium have a dimension of 3.625 *feet* (2.5 + 1.125) (since the average radius of the atrium columns is approximately 1.125 *feet*). This is the dimension that the pilasters protrude above the base line, but an additional 0.75 *feet* protrude above the column line, therefore the total dimension of the pilasters is 4.375 *feet* (3.625 + 0.75), that is, 5.83 *palmi*.

Stage 17 (Layout OSP-F17)

In this stage, the narthex columns are arranged. The available dimension is 147 *feet* (196 *palmi*) from base to base, or what is the same, 148.5 *feet* (198 *palmi*) from column to column. In this way, 10 columns can be arranged, and therefore 11 intercolumns. When dividing 147 by 11, a dimension of 13.36 is obtained, which suggests that the separation between axes should be 13.125 *feet* (17.5 *palmi*), in order to leave space available to dimension the lateral pilasters.

The 11 intercolumns have a dimension of 144.375 *palmi* (11 * 13.125) between extreme axes, that is, 192.5 *palmi*. Therefore, 2.625 *feet* (147 - 144.375 = 2.625) remain available for the 2 lateral pilasters, that is, 3.25 *palmi* from each external axis to the walls (2.625 / 2 = 1.312). As a result, the pilasters of the frontal colonnade of the narthex have a dimension of 2.43 *feet* (1.312 + 1.125 = 2.43) (since the average radius of the atrium columns is approximately 1.125 *palmi*). This is the dimension that the pilasters protrude above the base line, but an additional 0.75 *feet* protrude above the column line, therefore the total dimension of the pilasters is 3.18 *feet* (2.43 + 0.75), that is, 4.25 *palmi*.

Stage 18 (Layout OSP-F18)

The niches and columns of the transept and lateral exedras are determined. The access holes of the transept to the lateral aisles are sized with 22.5 *feet* (30 *palmi*), centered on each of the lateral naves, separated 3.5 *feet* (4.66 *palmi*) from the lateral columns ((29.5-

22.5) / 2), and therefore separated from each other 9.25 *feet* (3.5+2.25+3.5), that is 12.22 *palmi*. The axes of the two interior columns are 11.25 feet apart, that is, 15 *palmi*. These columns have a diameter of approximately 3.75 feet, or 5 *palmi*.

Constantine's arch has a dimension equal to the internal diameter of the apse, that is, 60 *feet* (80 *palmi*), so that the side walls of the arch have a total dimension of 18.25 feet (11 + 3.75 + 3.5), that is, 24.33 *palmi*; and protrude from the columns of central nave 11 feet, that is, 14.66 *palmi*.

The columns of the portico between the transept and the exedras have the same dimensions as those of the central nave, that is, bases of approximately 6 feet (8 *palmi*), and columns of approximately 3.75 feet (5 *palmi*). The interior width of the transept is 59 feet (71 – (6 + 6)), that is 78.66 *palmi*. So if pilasters of 4 feet (5.33 *palmi*) are arranged, as they are in the collateral wall between transept and lateral aisles) on each side, a dimension of 51 *feet* is left (59 - (4 + 4)), that is 68 *palmi*. Based on this dimension, the most appropriate is to locate the columns separated 14.25 *feet* (19 *palmi*) to the pilasters; and 15 feet (20 *palmi*) to each other (14.25 + 3.75 + 15 + 3.75 + 14.25 = 51 *feet*). Therefore, the distance between the central bases is 12.75 *feet* (15 - (1.125 + 1.125) = 17.5), and the distance from the column bases to the pilasters bases is 12 *feet* (14.25 - (1.125 + 1.125)). Therefore, the separations are equivalent, with a slightly wider width in the center.

The niches of the perimeter wall located in the east of the transept have a diameter of 7.5 *feet* (10 *palmi*) and are aligned to the access porches to the side aisles and to the axis of the colonnade between them.

The 5 windows of the apse are centered on radial axes every 30º, and are separated by a double dimension of their width. As the size of the outer semicircle of the apse is 113.09 *feet* (150.79 *palmi*), the outer width of each hole is 6.28 *feet* (150.79 / 18 parts), that is, 8.37 *palmi*; and the gap between gaps is 12.56 *feet* (6.28 * 2).

The windows of the north and south side walls of the main nave are centered on the even columns, counted from the transept, so a total of 11 windows were projected, as Alfarano indicated [37]. The architect wanted to create a compositional rhythm based on the proportion of 1:2 between its width and its separation, that is, the width of each window would have a half dimension to the separation between them. Therefore, since the distance between three columns is 25.5 *feet* (12.75 + 12.75), that is, 34 *palmi*, the width of the windows is 8.5 *feet* (25.5/3 = 11.33), that is 1.33 *palmi*, and the separation between windows is 17 *feet* (8.5 * 2).

Stage 19 (Layout OSP-F19)

In this stage the archs of the north and south perimeter walls of the anterior body of the basilica are determined. The architect wanted to create an arrangement of very narrow holes centered on each intercolumn of the lateral wings of the atrium. It was decided to give a width to the holes similar to the width of the perimeter walls, that is, 6 *feet* (8 *palmi*). In this way they were separated from each other a distance of 7.5 *feet* (10 *palmi*).

In this stage, the doors, windows and columns of the 9 lobby rooms are also delimited. The central space is framed laterally by very wide load-bearing walls and pilasters, and the lateral rooms adjacent to the atrium are the only ones that have columns, with the purpose of being integrated into the colonnades of the lateral arms to the atrium.

Stage 20 (Layout OSP-F20)

From the beginning the transept was designed in such a way that its western wall was located just above the wall in which the tomb of the apostle was [38]. In this way the special relationship between the tomb and the building was perfectly established [39]. The emerging protective podium that was built on the *Tropaion* was framed by the western apse, and some type of structure capable of articulating the spaces should be designed, allowing the visit of the pilgrims, and at the same time the front celebration of the liturgy.

Therefore, Constantine raised a canopy that would improve the tomb as an object of devotion included in the transept [40]. The Constantine Canopy was raised on marble slabs and was composed of four *Vitinee* columns whose axes are 22.5 *feet* (30 *palmi*) apart, and with an approximate diameter of 2.25 *feet* (3 *palmi*) in its widest part. On the columns rested an entablature based on two cross arches, and at its intersection hung a large lamp [41].

4.3.6. Reconstruction and measurements of floor plan of the old basilica of S. Peter

In the last stage of the reconstructed design process, the project of the old basilica of S. Peter is perfectly defined, with all its architectural elements dimensioned and bounded in *palmi* (Layout OSP-F21)

It can be verified that the dimensions of the architectural elements deduced geometrically throughout the design process reconstructed here, basically coincide with the dimensions indicated in the available historical references, as well as with those indicated by specialist historians. Additionally, the rebuilt plant has been superimposed with Bramante's *GDSU 20 A* drawing and it is observed that they practically coincide (Layout OSP-F22).

Finally, on the plan, the ancient necropolis can be located with all precision, taking into account the work carried out by Krautheimer (Layout OSP-F23).

Once the plan of the old basilica has been rebuilt, it is ready to rebuild the design process carried out in the section project of the building. And with this it can be said that the project of the old basilica of S. Peter would have been rebuilt.

As has been said, the constructive practice of projecting a building by means of plan design, and possibly accompanied by a section or elevation, avoiding perspective drawings, was a common practice in ancient Rome and lasted until the Renaissance. This practice, as will be seen later, was also used in the design of the new basilica of S. Peter [42].

The original development of the project for the floor plan of the old basilica was carried out using a sequence of stages similar to those shown in this section. However, and in parallel, decisions were being made in the design of the sections and elevation, decisions that would also have an impact on the design of the plan layout (such as dimensions of windows, doors, niches, etc.). These decisions about the section drawing are shown in the next section of this chapter.

4.3.7. Conclusions

Although there is little historical information available, it has been possible to reconstruct the exact dimensions of the floor plan layout of the old basilica of S. Peter, as well as all the design stages from the first stroke to the final project.

This has been possible due to the knowledge of the compositional characteristics of the design process in architecture. To achieve a good architectural project a design strategy must be established in whose consecutive stages recurrent and coherent actions must be adopted, based on the same architectural rules, as well as the same set of geometric relationships between the different architectural elements. In this way, each architectural element has a specific geometric relationship with the rest of the architectural elements, so if the exact dimension of a given element is known, the dimension of other elements can be deduced, and based on the information of the new stage the dimensions of other elements can be deduced, and so on.

Based on this, the dimensional information contained in the drawings of Bramante, Peruzzi, Antonio da Sangallo the Younger, Alfarano and Maderno have been sufficient to deduce all the dimensions of the different architectural elements, as well as the consecutive stages of old S. Peter design process.

In any case, the identification of the stages of the design process of the floor plan layout of the old basilica of S. Peter has a great value, in architecture and history of art, since it allows reconstructing with precision the dimensions of a monument that has not been able to survive the passage of time. It also allows knowing the motivations, ideals and compositional strategies of the design of the first Christian basilica, and reveals the secrets of its beauty and architectural quality.

4.4. Identification of the stages of the design process of section plan of the old basilica of S. Peter

4.4.1. Objectives

In this chapter the complete project of the old basilica of S. Peter in Vatican, as originally conceived, is reconstructed. In the previous section, the floor plan layout design process was already reconstructed, and in this section it is desired to deduce the design process, step by step, in section in order to identify all the spaces of the old basilica.

The reconstruction of the design process of the section of the old basilica of S. Peter will be carried out with the same methodology used for the reconstruction of the floor plan layout. It should be taken into account that in the design of any building the decisions made in the design of the section plan have an impact on the design of the floor plan layout, and vice versa, so the floor plan and section plan design are not independent processes. Although the floor plan design is done first, there comes a time when the section plan must be completed to complete the floor plan layout.

These considerations have been taken into account in the reconstruction of the design process in floor plan, and in the same way are taken into account in the reconstruction of the design process in section plan.

Once the floor plan layout and the section plan layout of the old basilica have been obtained, it is ready to reconstruct all the elevations, and make three-dimensional views. This will be done in Chapter 6.

4.4.2. Historical graphics and measurements relating to the section of the old basilica of S. Peter

In order to be able to draw up the plans of sections and elevations of the old basilica, there are also several historical drawings made by people who were able to visit the old S. Peter directly (although it was already partially demolished), such as the drawings by Maarten van Heemskerck (the most important drawings are: "View of S. Peter Square", Vienna, Albertina, n. 31681 (Fig. 4.8); "View of the basilica from the southeast, showing the buried obelisk and the Church of S. Andrea (Santa Maria della Febbre)", Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n. 79, D.2a, fol. 22v (Fig. 4.9); "View of the interior towards the south transept". Stockholm, Nationalmuseum (Fig. 4.10); "S. Peter's Square with the statue of Marco Aurelio (1532-1536)", Staatliche Museen zu Berlin, n. 79, D.2a fol. 53r (Fig. 4.11); "View of the construction of the new basilica from the northwest, showing the remains of the old basilica", Staatliche Museen zu Berlin, n.79, D.2a fol. 15v (Fig. 4.12); "Interior of the old basilica, showing the new building", Staatliche Museen zu Berlin, n. 79, D.2a fol. 52r (Fig. 4.13)); Pieter Coecke van Aelst ("View of the basilica from the southwest", Biblioteca Apostolica Vaticana, coll. Ashby 329 (Fig. 4.14)); Domenico Tasselli da Lugo (plate 10 (Fig. 4.15), plate 12 (Fig. 4.16), plate 17 (Fig. 4.17) and plate 18 (Fig. 4.18), Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro A. 64 ter.); Giovanni Antonio Dosio ("Construction of the dome of the new basilica of S. Peter, and view of the facade to the atrium of the old basilica, XVI-XVII century", GDSU 2555 A (Fig. 4.19)); "View of the obelisk from the east", GDSU 2536 A (Fig. 4.20)), and Giacomo Grimaldi ("The front of S. Maria in Turri and the access doors to the atrium of S. Peter", Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro, H.2, f. 62r (Fig. 4.21); "Atrium of old S. Peter", Barb. Lat. 2733, 133v and 134r, Biblioteca Apostolica Vaticana (Fig. 4.22); "Interior of S. Peter, showing the internal part of the dividing wall, with the access stairs to the new basilica with the raised floor", Barb. Lat. 2733, 115v and 116r, Biblioteca Apostolica Vaticana (Fig. 4.23); "Interior of old basilica of S. Peter", Barb. Lat. 2733, 104v and 105r, Biblioteca Apostolica Vaticana (Fig. 4.24)).

Finally, the engraving made by Natale Bonifacio da Sebenico and Giovanni Guerra, in 1586 ("The transport of the Vatican obelisk", The Bristish Museum, nº 1892,0714.41 (Fig. 4.25)) [43] that is especially important, because it shows the plan of the perimeter of the existing buildings in the southern area of the basilica, around the street that connected the square with the obelisk.

There are also some paintings available, such as the painting by the Scuola di Raffaello (Gianfrancesco Penni, or Gulio Romano), “The Donation of Costantino”, Musei Vaticani. Sala di Costantino (Fig. 4.26)); the painting by A. Tempesta and M. Bril “The transfer of San Gregorio Nazianzeno”, 1580 ca. Palazzo Apostolico Vaticano, III Loggia nord (Fig. 4.27)); or the fresco made by Giovanni Guerra, “The transport of the Vatican obelisk”, 1586, Palazzo Apostolico Vaticano, Biblioteca Sistina, II sala (Fig. 4.28) [44].

These documents do not provide information on proportions and section measurements of the old basilica, but do provide information on the approximate proportions of the different architectural elements, elevation and section. However, as the floor plan layout has been previously identified with precision, these drawings constitute a very valuable tool to accurately identify the project's sections and elevation.

When identifying all the stages of the sectional and elevation design process, even the smallest detail of all these historical graphic references will be taken into account. Some drawings are more accurate in some respects, and less accurate in other respects, so all the drawings complement each other and provide a general idea of the building in all its aspects.

There is also graphic material made by people who lived in later times, and who therefore could not visit the basilica, although they were able to access documents and old drawings of the basilica, such as the drawings by Paul Letarouilly (1795-1855) [45].

Paul Letarouilly was not able to directly measure the old basilica, but perhaps he was able to have access to additional graphic material when drawing his drawings, and he made some scale drawings, with full precision in elevations and sections. Some drawings represent the supposed appearance of the old basilica immediately after it was built, “Le Vatican et la Basilique de Saint-Pierre de Rome”, vol. 1, Cap. Ancienne Basilique de Saint Pierre, planche 3 (Fig. 4.29), planche 5 (Fig. 4.30), and planche 7 (Fig. 4.31), and other drawings show how, according to Letarouilly, the basilica looked like between the 4th and 16th centuries, “Le Vatican et la Basilique de Saint-Pierre de Rome”, vol. 1, Cap. Ancienne Basilique de Saint Pierre, planche 6 (Fig. 4.32) and planche 8 (Fig. 4.33). He also made perspective drawings of the supposed appearance of the basilica and its surroundings, between the 4th-16th centuries (planche 1) (Fig. 4.34) and another view with the supposed appearance of the basilica in the year 1558 (planche 9) (Fig. 4.35).

Based on the historical references available today, Letarouilly's drawings are known to be fanciful in many respects, especially in the least historically documented aspects, such as, for example, the definition of the facade to the square, the design of the bell tower, or the decorative elements of the basilica. For this reason, these drawings are usually undervalued from a historical point of view.

However, Letarouilly's drawings are very well projected and proportionate, and he was the only one that carried out a similar work (although much simpler, and without detailing stages) to the one that has been carried out in this section. Letarouilly made his drawings taking into account innumerable historical references, and applying rational and coherent compositional rules, just as any architect in old Rome would have done. In fact, once Letarouilly's drawings have been analyzed, it can be seen that he used the most logical, rational and appropriate geometric rules in each case on a recurring basis. Without a doubt, Letarouilly did a great job, re-composing and re-proportioning the available historical graphics, and that is why his drawings have been chosen as a "script" to recompose the different stages of the design process of the project of the old basilica of S. Peter.

However, it should also be noted that Letarouilly's drawings have quite a few errors, which must first be detected and corrected.

First, they have proportional errors with respect to the position and dimensioning of the main elements, such as the colonnades of the central nave, the colonnades of the perimeter naves and the perimeter walls. However, as the floor plan layout of the old basilica has been precisely reconstructed previously, Letarouilly's drawings can be adapted and rescaled to the correct ground plan dimensions, so that these main architectural elements are perfectly located. The drawing of the Letarouilly section of the old basilica has been superimposed on the scaled floor plan layout of the old basilica (reconstructed in previous section). In this way, as the different architectural elements present in the sectional drawing are reconstructed, they will be placed in their proper place, following the compositional lines of the reconstructed floor plan layout.

Second, Letarouilly's drawings have certain errors due to the form of graphic reproduction, as well as the inevitable photographic errors of the original drawings. However, these errors can be easily corrected throughout the design process deduction process.

Third, the drawings have certain historical and architectural inconsistencies of all kinds, such as, for example, the presence of arches between the transept and the lateral naves (since these arches are incompatible with the existence of columns, as described by Alfarano, and as can be seen in the *GDSU 20 A* drawing by Bramante), the incorrect design of the bell tower, the incorrect design of the east facade, the presence of decorative elements for which no historical evidence is available, etc. All these errors will be corrected as the design process of the old basilica is rebuilt.

Therefore, and as has been said, the Letarouilly sectional drawing will be used as a "script" to reconstruct geometrically, and correctly, all the architectural elements visible in the collected historical documents.

Of course there will always be the doubt of being rebuilding the design process that was followed in the project of the old basilica, or instead, of being rebuilding the design process that Letarouilly followed.

For this reason, at each stage of the reconstruction of the design process, the different existing compositional alternatives are evaluated, and the most appropriate is chosen, regardless of the decisions that Letarouilly might make when he made his drawing.

The reality is that at every stage of the design process there are few valid alternatives, making it relatively easy to choose the most suitable one. Also, when in doubt, the appropriate alternatives hardly differ one or two *palmi* from each other. So in any case, the correct reconstruction of the design process will result in a section very similar to the one made by Letaouilly.

But of course at no time has it been attempted to reconstruct the Letarouilly section. Instead, based on Letarouilly's drawing (as a script), the rational design process of the section of a basilica whose ground plan layout is previously known in detail has been reconstructed.

4.4.3. Methodology followed to reconstruct the design process of section of *old S. Peter*

There are no vestiges of the old Basilica of S. Peter, just remains of the foundations and the bases of a few columns of the naves. On the other hand, there are hardly any historical documents that describe the building and that provide measurements of it. However, with the little documentation available, a general strategy can be devised to reconstruct the original project. Similarly, it is possible to identify the stages of the design process carried out to carry out the architectural project.

The key to identify the stages of the design process, and therefore rebuild the original project, lies in the knowledge of the characteristics that a "good architectural project" must have, to achieve what Alberti called by the term "*concinnitas*". With this term Alberti described the beauty and quality of an architectural design, based on the compositional coherence carried out in the development of a good architectural project, and the harmonious relationship between the different architectural elements with each other, and with the whole, so that nothing is left over, and nothing is missing. To achieve this compositional coherence that every good architectural project must have, at the beginning of its design process certain architectural strategies, based on certain compositional rules and certain mathematical and geometric relationships, must be tentatively established. These rules and these proportions must be applied consistently and recurrently in each stage of the design process until reaching the final project. Once a certain compositional strategy has been established (which includes a certain set of compositional rules and a certain set of geometric proportions), it must be applied recurrently and without variations throughout the architectural process. As a consequence, a coherent, harmonious and beautiful result will be obtained at the end of the process [46].

Conversely, when analyzing a certain building, it is possible to identify both the compositional rules and the geometric and mathematical relationships between the different architectural elements. And as a result, the compositional strategy that has been used in the realization of the project can be identified. Therefore, the higher the quality of an architectural project, the easier it is to identify the strategy followed in its design, including the harmonic relationships between its elements and the compositional rules used. On the other hand, if the project has not been correctly and coherently projected, it would be very difficult to identify the design strategy, since recurring compositional patterns could not be detected.

The geometric and mathematical relationships used in a good architectural project accurately relate the different architectural elements to each other, and to the whole. Therefore, if the dimensions of some architectural elements are known, the dimensions of the other elements can be deduced.

Fortunately, when analyzing the available historical documents, it is easy to verify that the old basilica of S. Peter was well designed, that is, certain compositional rules and certain relationships between each of the architectural elements had been applied correctly and recursively. And for this reason it is possible to identify each and every one of the decisions that the author of the project was able to make throughout the design process, and finally identify the architectural project quite accurately. In the same way it is also possible to identify the dimensions of all the architectural elements, as they are designed at each stage of the design process.

4.4.4. Stages of the design process of section plan layout of the old basilica of S. Peter

For the reconstruction, step by step, of the design process in section of the *old basilica of S. Peter*, the previously deduced plan layout of the old S. Peter has been used (Layout OSP-F20), and a "work environment" has been generated, as a backdrop, on which the different stages of the design process will be drawn. This work environment (Layout OSP-S0) consists of the sectional drawing of Letarouilly "Le Vatican et la Basilique de Saint-Pierre de Rome", vol. 1, Cap. "Ancienne Basilique de Saint Pierre", planche 5) (Fig. 4.28) drawn, in a blurred and scaled way, on top of a small part of the floor plan layout of the old basilica. Only a small part of the naves and the transept have been drawn from the reconstructed floor plan of the old basilica, since only the compositional lines used in the floor plan are needed to rebuild the sections.

It should be noted that the old basilica of S. Peter was designed in *pes* (*roman feets*), although many later measurements have been made in *palmi*. For this reason, the conversion factor must be taken into account. In Rome, and in the Vatican, the exact conversion was 1 *pe* (*roman foot*): 0.2978 meters (D'Anville). The *palmi "di architetti"* used in the Renaissance in Rome, and in the Vatican, was equivalent to 22.34 cm. Therefore, 1 *pe* (*roman foot*) is equivalent to 4/3 *palmi*. And conversely, 1 *palmi* is equivalent to 3/4 *feet* [3].

On this work environment, the ground level line is initially drawn, and the most important compositional lines of the plan design are projected on the drawing in order to be used for the reconstruction of the different architectural elements.

Stage 1 (Layout OSP-S1)

The first action that was usually carried out in order to design the section of a basilica typology was to define the maximum height of the building. Usually the maximum height was determined based on the dimensions of the floor plan layout, and a triangulation used to be carried out among its most representative architectural elements.

In the case of the old basilica of S. Peter, with 5 naves, the usual possibilities were to make a triangulation with the axes (or sides) of the internal colonnades, or the edges of the perimeter walls. Usually circles were also made with a center on the axis of the basilica and with radius the distance to the internal -or external- face of the perimeter walls, or to the axes of the colonnades.

By testing all these possibilities, some resulting dimensions (for the total height) are too large, and instead other dimensions are too small to correctly design a basilica. However, one possibility stands out above the others, and therefore seems the most appropriate, since the resulting proportions of the building (relationship between the height of the roof with the width) are assimilated to the dimensions that are perceived in the watercolors and historical drawings, and in the Letarouilly section.

To obtain the exterior height, two arcs of a circle are drawn with a center on the axis of the lateral colonnades, with a radius the distance between these axes (150.75 *feet*), and consequently, an exterior height of 130.55 *roman feet* (174.07 *palmi*) is obtained. In the same way, to obtain the interior height, two arcs of a circle are drawn, centered on the inner face of the bases of the columns of the central colonnades, with a radius the distance between these faces (147 *roman feet*), and consequently, an internal height of 127.30 *roman feet* (169.74 *palmi*) is obtained. The distance between the exterior height and the interior height (3.25 *feet*, 4.33 *palmi*) is perfect as the thickness of the roof, including the wooden cross beams, the longitudinal straps and the covering with tiles included.

Stage 2 (Layout OSP-S2)

The next habitual decision in the design of a basilica was the determination of its central nucleus, that is, the central nave. For this reason, and since the width of the central nave had already been previously determined in the floor plan layout design process, the first thing to do is determine the height of its walls, which also coincides with the top of the main beams of the roof structure.

A common practice in the design of a basilica typology was that the height of the walls of the central nave was similar to the distance between the axis of the basilica and the inner sides of the perimeter walls. This way of determining the height makes a lot of sense, and great functionality, since the observer who walks along the axis of the central nave could perceive the same distance both vertically (to the beams ceiling) and horizontally (to the perimeter walls), and he would feel a completely balanced space around him.

Therefore, the architect of the old basilica drew a circle with center on the axis of the basilica and radius the distance from the axis to the inner face of the perimeter walls. Therefore, the height of the walls of the central nave is 106 *feet* (141.33 *palmi*). This dimension coincides with that usually referenced by the specialist historians in old basilica of S. Peter [47].

Stage 3 (Layout OSP-S3)

In this stage, the height of the north and south perimeter walls of the basilica is determined. This height should also be related to some of the most characteristic dimensions of the basilica floor plan layout, in order to integrate the elevations with the plan. Furthermore, since the perimeter walls are the architectural elements furthest from the nucleus of the basilica, they should be directly related to the central nucleus, and have an entire and characteristic dimension.

After testing various alternatives, the most suitable dimension for the height of the perimeter walls is half the width of the central nave, counted from the exterior face of the walls of the central nave (coincident with the exterior face of the columns of the central nave), that is to say 44.75 *feet* ((82 + 3.75 + 3.75) / 2) (59.66 *palmi*).

Stage 4 (Layout OSP-S4)

This stage does not constitute a design stage as such, since it is a verification that the design process followed in the first stages is adequate, and that the dimensions initially determined are correct. However, it has been included as a design stage, since in many cases, in order to verify the correct relationship between the whole and the parts, these types of checks are usually carried out, in order to make sure that it is going the way appropriate, within the decision-making tree.

It can be verified that the perceptual distance from the axis of the basilica to the top of the walls of the central nave is the same as the perceptual distance to the top of the perimeter walls. This geometric verification indicates that although they have been designed differently, the internal and external walls of the basilica are directly related geometrically. Therefore, the compositional process followed so far, as well as the dimensions obtained, can be considered as correct.

At this stage, the way in which complex systems are analyzed and designed is evidenced, as is the case of architectural design. Apparently the actions that are carried out to create a certain architectural project are simple, just a twist of compass, centered at a certain characteristic point, and with radius a certain characteristic dimension. In this way, the work environment is being filled with what are called “compositional lines”. These compositional lines involve simple design actions, but in reality regulate the different design alternatives in a complex way. In fact, to achieve a harmonious design, all the architectural elements must be related to each other through the same set of geometric relationships. Therefore, the compositional lines previously drawn to design a certain architectural element should be used to design new architectural elements. In this way the different architectural elements are closely linked to each other, which ensures the harmony and beauty of the final result (*concinnitas*). The total set of “compositional lines” creates what usually is called “compositional mesh”, which regulates the design of all the architectural elements of a given architectural object. These compositional meshes allow the control of a complex system such as architectural design.

Stage 5 (Layout OSP-S5)

At this stage, the roof of the lateral naves of old St. Peter's is determined. To determine the roof, the bottom point of the roof must first be identified (the roof overhang), and it is determined that it is separated from the perimeter walls by a dimension equivalent to its width (6 *feet*). Therefore, joining this point with the outer vertex of the walls of the central nave, the roof inclination is obtained, and therefore the dimension of the height of the roof of the perimeter naves.

In the compositional network created so far, it can be verified that the drawn line passes through the point of union between the lines that determine the maximum internal height and the internal width of the basilica. Therefore, the roof line can be determined in two different ways and is always the same result. This coincidence confirms that the decision made is correct, since it constitutes evidence that a harmonious relationship has been created between the different architectural elements designed so far (*concinnitas*).

Stage 6 (Layout OSP-S6)

At this stage the position of the lower beams of the deck of the main nave is determined. This dimension is important perceptually, and is closely related to the structural dimensioning of the load beams. That is, as long as the beam section dimension is greater than a structural minimum, the dimension is geometrically adapted to meet the compositional and perceptual geometric requirements.

To determine the position of the beam bases, a circle is drawn with a center on the axis of the central nave, and with a radius the distance from the axis to the outer side of the perimeter wall (112 *feet*). Its encounter with the external part of the walls of the central nave determines the location of the beam seats, and its intersection with the internal part of the walls of the central nave determines the dimension of the section of the beams.

Stage 7 (Layout OSP-S7)

The height and position of the clerestory windows of the central nave and transept are geometrically determined. The upper part is determined by the intersection of the line that determined the height of the central nave (*Stage 1*) with the outer side of the walls of the central nave. The lower part of the windows is determined by drawing a circle with center on the axis and radius the distance to the internal sides of the lateral colonnades, that is, 74.25 *feet* (99 *palmi*). To adequately integrate the windows with the whole, they are positioned with respect to the walls of the central nave at a distance equivalent to the distance between the inner sides of the central and perimeter walls, that is, 65 *feet* (3.75 + 29.5 + 2.25 + 29.5) (86.66 *palmi*).

In this way, the windows are projected as a compositional reflection in the section of the lateral colonnades and of the perimeter walls in the floor plan layout. In other words, the windows are thus perfectly integrated in section with the floor plan layout of the side colonnades and the perimeter walls. This stage shows how the compositional mesh is becoming increasingly complex, in order to integrate the different architectural elements with each other, and therefore the floor plan layout with the section layout. In this way, this compositional mesh will be enriched step by step, and will determine the elevation design of all the architectural elements down to the last detail.

Stage 8 (Layout OSP-S8)

In this stage, the height of the columns of the central nave is determined (the lenght of the base+shaft+capital set). The dimension is equivalent to the distance between the internal side of the walls of the central nave and the axis of the lateral colonnades, that is, 34.375 *feet* (3.75 + 29.5 + 1.125) (45.83 *palmi*). In this way the central nave is integrated in height with the lateral naves since they share common dimensions.

According to measurements made by Baldassarre Peruzzi (*GDSU 108 Ar* (Fig. 4.36), *GDSU 108 Av* (Fig. 4.37), *GDSU 120 Ar* (Fig. 4.38)), and by Giovan Battista da Sangallo il Gobbo (*GDSU 1079 Ar* (Fig. 4.39) and *GDSU 1079 Av* (Fig. 4.40)) it is known that the shafts of the columns of the central nave had variable dimensions, but all measured a little more than 39 *palmi* (29.25 *feet*), and most had dimensions that ranged from 39.2 *palmi* (29.4 *feet*), and 39.4 *palmi* (29.55).

Therefore, a dimension of 34.375 *feet* (45.83 *palmi*) matches perfectly, because it provides a variable dimension between 4.825 *feet* (34.375-29.55) and 4.975 *feet* (34.375-29.4) to size the capital and the base. As the column shafts all had different dimensions, due to their indeterminate origin (*spolia*), and since the capitals should be made uniformly and with a dimension of approximately 4.2 *feet* (5.6 *palmi*) (1/7 the height of the column shaft), each base of the columns should have different dimensions (between 0.625 and 0.775 *feet* high), so that the base+shaft+capital set always had a dimension of 34.375 *feet* (45.83 *palmi*). These measurements of bases and capitals coincide with those outlined in the design drawing of two bases of the colonnades, a column with capital, and a fraction of the architrave of the old basilica of S. Peter, probably made by Alberto Alberti (Rome, Istituto Nazionale della Grafica, n. 2402 fol. 9r.) (Figs. 4.41 and 4.42). These deduced dimensions also coincide with the dimensions of the columns that are still preserved today (since they were reused in the construction of the new basilica), and with the dimensions of the bases discovered in the archaeological excavations of the 1940s (Figs. 4.43 and 4.44).

Stage 9 (Layout OSP-S9)

At this stage the height of the Arch of Constantine is determined, which coincides with the height of the lower part of the clerestory windows of the central nave (determined in stage 7). Therefore, to determine its height, a circle is drawn with the center on the axis of the central nave and with radius the distance from this center to the internal sides of the lateral colonnades, 74.25 *feet* (99 *palmi*) [48]. To determine the position of the arc starting line, a circle with a center on the axis of the central nave is drawn at the top of the arc and with radius the distance to the arc springs. Therefore, the height of the center of the arc circle is 44.25 *feet*, which is the same height of the arch stirrups (74.25 – 30 = 44.25 *feet*) (59 *palmi*).

At this stage the dimension and position of the upper part of the entablature of the central colonnade are also determined, and therefore the position of the perimeter balcony of the central nave. For this, a circle is drawn with a center on the axis of the central nave and with radius its distance to the axis of the walls of the central nave. Therefore, its height is 42.875 *feet* (41 + (3.75/2)) (57.16 *palmi*), and its total dimension is 8.5 *feet* (42.875 – 34.375 = 8.5) (11.33 *palmi*). These dimensions of the entablature coincide with those indicated in the drawing by Alberto Alberti (Rome, Istituto Nazionale della Grafica, n. 2402 fol. 9r.) (Fig. 4.41), and with the approximate proportions that are evident in the drawings of Domenico Tasselli da Lugo (plate 13 (Fig. 4.44) and plate 15 (Fig. 4.45), Vatican Apostolic Library, Arch. Cap. S. Pietro A. 64 ter.). Once the dimensions of the entablature have been determined, the dimension of the architrave and all the desired moldings can be detailed, as well as the protruding dimension at the top of the entablature, in order to create a continuous balcony.

Stage 10 (Layout OSP-S10)

At this stage the roof of the central nave is determined. The interior face of the roof is obtained by joining the point that determines the maximum internal height (determined in stage 1) with the upper exterior point of the walls of the central nave. The exterior face of the roof of the central nave is obtained by drawing a parallel from the point of the maximum exterior height. The overhang of the roof extends to the intersection with the height line of the central walls.

In this stage it is evident how the compositional mesh is being completed, superimposing the compositional lines previously drawn in the previous stages.

Stage 11 (Layout OSP-S11)

At this stage the height of the transept is determined. The transept must be perfectly integrated with the central nave, so its elevation must be directly related to it, and must be generated based on some of its fundamental dimensions. And the best option is to design it based on the side walls of the central nave.

In this way, the maximum height of the transept roof is determined by drawing a circle with a center on the outside of the walls of the central nave, and with radius its distance from the internal side of the exedras 102.25 *feet* ((71-3.75) + (41-6)), that is, 136.33 *palmi*. In this way the central nave is integrated with the transept, and also with the exedras. Following this same process, the height of the transept's side walls is determined by drawing a circle with the same center and with radius its distance to the inner side of the opposite wall of the central nave 85.75 *feet* (82 + 3.75), that is 114.33 *palmi* [49].

Stage 12 (Layout OSP-12)

At this stage the height of the exedras is determined. The exedras must be integrated with the transept, and also, with the central nave, so the best option to design it is to take the side walls of the central nave as a reference.

To determine the height of the cover of the exedras, a circle is drawn with a center on the outer side of the walls of the central nave, and radius its distance to the inner side of the perimeter walls, that is, 61.25 *feet* (71 – (3.75 + 6), that is, 81.66 *palmi*.

The height of the perimeter walls of the exedras coincides with the height of the perimeter walls of the lateral naves, 44.75 feet (59.66 *palmi*). In this way the exedras are perfectly integrated with the lateral naves, and also with the central nave.

Stage 13 (Layout OSP-13)

At this stage the upper frieze of the Arch of Constantine is determined. The frieze plays an important role in the harmonic composition of the arch and serves to integrate the elevation and plan of the central nave with the whole.

As it has been said, to design a certain building in a beautiful and harmonious way, all its elements must be perfectly related to each other. All architectural elements must form a harmonious ensemble, and therefore when there are no primary architectural elements in a given part of a building, secondary architectural elements must be used in order to make a well balanced composition. These secondary architectural elements can be of all kinds, such as moldings, gaps, friezes, finishes, etc. and they have an especially important role in completely balancing a certain architectural composition.

The design of the basilica was very simple, given its enormous size, and the speed with which it was desired to be built. Therefore, perhaps above the Arch of Constantine it was not planned to have any important architectural element. In this way the central nave and the arch were weakly integrated with the total set, and the general composition was unbalanced. For this reason, a secondary architectural element such as a simple frieze was used, and therefore its location should be very special, and should be determined based on the dimensions of the most important architectural elements on the ground.

In other words, the frieze must constitute a compositional reflection of some important relationships in the plan, and without a doubt, the most important is the width of the Arch of Constantine.

The upper part of the frieze is determined by drawing a circle of Euclid with respect to the square inscribed between the walls of the central nave (width of the Arch of Constantine), that is, a square of 82 *feet* on each side. In the same way, the lower part of the frieze is obtained by means of the diagonal of half of this square.

Stage 14 (Layout OSP-S14)

The height of the transept columns is determined. Columns do not appear in Letarouilly's drawing, but Alfarano mentions them, and Bramante also draws them in *GDSU 20 A* drawing. The height of these columns could be equivalent to the height of the columns of the colonnades of the central nave, or be slightly lower. Either option may be correct, although these columns probably had dimensions equivalent to those of the central nave, and probably they did not have bases in order to facilitate passage through them. Therefore, it would be necessary to look for a geometric form to achieve geometrically a height slightly less than the columns of the central nave.

The height could be equivalent to the distance between the internal side of the lateral columns and the internal side of the columns of the perimeter colonnades 31.75 *feet* (29.5 + 2.25), that is, 42.33 *palmi*.

Stage 15 (Layout OSP-S15)

The height of the columns of the lateral naves is determined. This height is equivalent to the height of an equilateral triangle with side the distance between the internal face of the lateral columns and the internal face of the perimeter walls (31.75 *feet*). As a result, a height of 27.5 *feet* (36.66 *palmi*) is obtained for the base+shaft+capital set. This indicates that the columns of the lateral colonnades were exactly 20% smaller than those of the central nave (34.375 * 0.8 = 27.5). Furthermore, correctly dimensioning according to their order, it follows that the capitals of the columns had an approximate dimension of 2.7 *feet* (3.6 *palmi*), the shafts 22.3 *feet* (29.73 *palmi*), and the bases about 2.5 *feet* (3.33 *palmi*) (whose dimension coincides with the dimension of the base preserved today of a lateral column). The lateral colonnades, unlike the central colonnades, had large bases, as shown in the drawings cited above and photographs taken in the excavations of the 1940s (Figs. 4.40 and 4.41).

In this way the lateral colonnades are perfectly integrated with the lateral naves located on each of its sides.

These dimensions also basically coincide with what is indicated in the drawing by Alberto Alberti, Rome, Istituto Nazionale della Grafica, n. 2402 fol. 9r. (Fig. 4.39), And the drawing of de Letarouilly (*Le Vatican et la Basilique de Saint-Pierre de Rome*, vol. 1, Cap. Ancienne Basilique de Saint Pierre, plance 5) (Fig. 4.28).
The lateral colonnades had arches on the columns. Throughout the plan design process, the distance between the columns of the lateral intercolumns was determined, and based on this, the radius of the arches that rested on these columns was also determined. The wheelbase of the columns was 12.75 *feet* (17 *palmi*), and the separation between the arches was the same as the dimension of the bases, 3.75 *feet*, that is, 5 *palmi*. Therefore, the diameter of the arches was 9 *feet* (12.75 – 3.75), that is, 12 *palmi*, and the radius 4.5 *feet*.

Stage 16 (Layout OSP-16)

The height and position of the transept windows are determined, based on the height of the perimeter walls. Alfarano points out that in the transept there were 16 windows, so they were undoubtedly distributed in two groups of three windows on each side of the apse and a pair on each of the side walls of the exedras [50]. The width had been previously determined in plant and height is determined at this stage. At this stage, it is highly likely that design work will be carried out in parallel with the corresponding stage in the floor plant design process. Obviously, when the architectural project was carried out, several geometric relationships between the height and width of the windows had to be tested (which should undoubtedly be similar to the proportions of the windows of the clerestory of the central nave), and therefore various ways of determining the height of the windows.
At this stage, and since the most important aspects of the section design of the old basilica have been completed, the plan and section design of the Constantine Canopy is determined. The Canopy had six *vitinee* columns about 2.25 *feet* (3 *palmi*) in diameter. Four of the six columns formed a square, and their axes were 22.5 *feet* apart (30 *palmi*). Two of the four columns were aligned to the inner face of the west wall of the transept, and equally aligned to the other two columns located at the vertices of the apse.

Stage 17 (Layout OSP-S17)

In this last stage, the upper windows of the clerestory of the lateral naves are determined based on the height of the columns of the central nave, and the height of the perimeter wall.

4.4.5. Reconstruction and measurements of section of the old basilica of S. Peter

Based on the 17 stages, previously identified, with which the design process carried out in the project of the section of the old basilica of S. Peter has been reconstructed, all the dimensions of all the architectural elements of section layout have been identified (Layout OSP-S18). Based on this drawing, the complete construction section of the building has been reconstructed in detail, including the structure and the foundation, as well as its precise integration into the terrain of the Vatican hill (Layout OSP-S19).

As has been commented throughout the different stages of the reconstruction process of the design process, the dimensions of the different architectural elements that have been obtained geometrically basically coincide with the dimensions indicated in the available historical references, as well as with the estimates of specialist historians. In a complementary way, the section obtained has been superimposed with the section made with Letarouilly, and it can be seen that they practically coincide (Layout OSP-S20).

Therefore, it can be concluded that the geometrically reconstructed section in this chapter coincides with the section projected in its day, and used for the construction of the old basilica of S. Peter.

The next chapter reconstructs the building process of the old basilica of S. Peter, as well as the evolution of its architectural structure from its completion until it finally began to be demolished, to make way for the construction of the new basilica. Next chapter also analyzes not only the construction stages of the construction process of the old basilica of S. Peter, but also the materials and construction solutions used.

4.4.6. Conclusions

Although there is little historical information available, it has been possible to reconstruct the exact dimensions of the section of the old basilica of S. Peter, as well as all the stages of the design process, from the first stroke to the final project.

Therefore, once the ground plan and section plan have been accurately reconstructed, and with the help of all available historical references, it is relatively easy to reconstruct the elevations and other sections of the old basilica of S. Peter, and as a result, show

how it might have looked throughout history. In fact, chapter 6 reconstructs the appearance that the old basilica may have had at three fundamental moments in its history: when the construction work was completed, in the year 514; in the middle of its existence, in the year 1003; and when it began to be demolished, in the year 1505.

Furthermore, once the floor plan of the old basilica has been reconstructed, and with the help of all available historical references, it is relatively easy to reconstruct the construction process of the old basilica, as well as its evolution throughout history, until it began to be demolished. The identification by stages of the construction process of the ancient basilica, as well as its evolution over time, will be carried out in the next chapter 5.

The identification of the stages of the design process of the old basilica of S. Peter in Vatican has a great value in architecture and in art history since it allows reconstructing with precision the dimensions of a monument that has not been able to survive the passage of time. It also allows knowing the motivations, ideals and compositional strategies of the design of the first Christian basilica, and reveals the secrets of its beauty and architectural quality. In the same way it has an enormous value in architecture and artificial intelligence, since it allows knowing the process carried out by creative architects, and in this way to be able to emulate them by means of artificial intelligence algorithms.

Notes 4

[1] Regarding the construction of the foundational platform on which *the old basilica of S. Peter* was built, the following references are especially interesting: Richard Gem, ‘From Constantine to Constans. The chronology of the construction of S. Peter’s basilica’, in Rosamond McKitterick; John Osborne; Carol M. Richardson and Joanna Story (eds.) *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013), pp. 35-64; Antonella Ballardini, ‘La basilica di S. Pietro nel Medioevo’, in Hugo Brandenburg; Antonella Ballardini and Christof Thoenes, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), pp. 35-75; Richard Krautheimer, Spencer Corbett, Alfred K. Frazer, and Wolfgang Frankl (eds.), *Corpus Basilicarum Christianarum Romae. The Early Christian Basilicas of Rome* (IV-IX cent.), 5 vols. (Vatican City, 1937-77)

[2] It can be considered that the old basilica of S. Peter was completed at the end of the lateral accesses and the paving of the atrium was completed in times of *Symmachus*, although in times of *Liberius* there are references that the anterior body was already built, including the two lateral wings of the atrium and much of the vestibule. To get an idea of the chronological sequence of the construction of the ancient basilica, the following references are especially interesting: Antonella Ballardini, ‘La basilica di S. Pietro nel Medioevo’, p. 44; Hugo Brandenburg, ‘L’antica basilica vaticana costantiniana di S. Pietro’, in Hugo Brandenburg; Antonella Ballardini and Christof Thoenes, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), p. 27; Paolo Liverani, ‘Saint Peter’s and the city of Rome between Late Antiquity and the early Middle Ages’, in Rosamond McKitterick; John Osborne; Carol M. Richardson and Joanna Story (eds.), *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013), pp. 21-34

[3] There is a huge amount of proposals regarding the exact dimension of the *Roman foot*. In the year 1862, Hultsch established, a commonly accepted conversion, 1 *Roman foot*: 0.2957 meters. The best references are: Friedrich Otto Hultsch, *Griechische und römische Metrologie* (Berlin: Weidmannsche Buchhandlung, 1862), Liz Guiral, *El puente de Alcantara. Arqueología e historia* (Madrid: Centro de estudios y experimentación de obras públicas, 1988), p. 149. However, in Rome, and in the Vatican, the exact conversion was 1 *Roman foot*: 0.2978 meters (D’Anville), as specified by Gabriel Puig y Larraz. See: Gabriel Puig y Larraz, *Valor métrico de la milla romana* (Madrid: Boletín de la Real Academia de la Historia, 24 junio 1898),

Tomo 33, p. 88. The *palmi "di architetti"* used in the Renaissance in Rome was equivalent to 22.34 cm. Therefore, a *Roman foot* was exactly equal to 4/3 *palmi*. And conversely, a *palmi* was equivalent to 3/4 *feet* (*Roman feet*).

[4] There are several references to the excavations carried out under the current new basilica of S. Peter. Many of these references include certain measurements made of some architectural elements of the *old S. Peter*, especially the separation between the bases of the columns of the five naves, and their separation with the side perimeter walls: Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, relazione a cura di B. M. Apollonj Ghetti, A. Ferrua, S. J. E. Josi, E. Kirschbaum, Prefazione di Mons, L. Kaas, Appendice numismática di C. Serafini, 2 vols. (Città del Vaticano: Tipografia Poliglotta Vaticana, 1951); Richard Krautheimer, Spencer Corbett, Alfred K. Frazer, and Wolfgang Frankl (eds.), *Corpus Basilicarum Christianarum Romae. The Early Christian Basilicas of Rome* (IV-IX cent.), 5 vols. (Vatican City, 1937-77); Alberto Carlo Carpiceci and Richard Krautheimer, 'Nuovi dati sull'antica basilica di S. Pietro in Vaticano', in *Bollettino d'Arte* 93-4, (1995), pp. 1-70, 95; (1996), pp. 1-84; Jocelyn Mary Catherine Toynbee, and John Brian Ward-Perkins, *The Shrine of Saint Peter and the Vatican Excavations* (London: Pantheon Books, 1956); Engelbert Kirschbaum, *The Tombs of Saint Peter and Saint* Paul, John Murray S. J. (Translator), CBCR, V., pp. 165-279, (London: St. Martin's Press, 1959); Jonathan M. Hall, The Bones of Sant Peter, in *Artifact and Artifice. Classical Archeology and the Ancient Historian* (Chicago and London: The University of Chicago Press, 2014), pp. 187-206; Pietro Zander, *La Necropoli di San Pietro. Arte e Fede nei sotterranei della Basilica Vaticana* (Fabbrica di San Pietro in Vaticano: Elio de Rosa Editore, 2014)

[5] Details of the use of *spolia* in the *old basilica of S. Peter* can be found in the following references: Lex Bosman, '*Spolia* in the fourth-century basilica', in Rosamond McKitterick; John Osborne; Carol M. Richardson and Joanna Story (eds.), *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013), pp. 65-80; Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro', in Brandenburg, Hugo; Ballardini, Antonella; and Thoenes, Christof, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), pp. 9-34

[6] Filippo Buonanni, *Numismata Summorum Pontificum Templi Vaticani Fabricam Indicantia*, Chronologica ejusdem Fabricae narratione, ac multiplici eruditione explicata. Opus secundò impressum cum correctione, & aditamento (Rome: Ed. Imp.

Domenico Antonio Herculi, 1696)

[7] Alberto Carlo Carpiceci, ‘La Basilica Vaticana vista da Martin van Heemskerck’, in *Bollettino d’Arte*, 44-45, Instituto Poligrafico e Zecca dello Stato, (1987), pp. 67-128

[8] Onofrio Panvinio, *De rebus antiques memorabilibus, et praestantia basilicae Sancti Petri* (1560s)

[9] Giacomo Grimaldi 1972: *La Descrizione della basilica antica di S. Pietro in Vaticano, Codice Barberini latino 2733*, Grimaldi, Giacomo and edited by Reto Niggl (Vatican City: Biblioteca Apostolica Vaticana, 1972)

[10] See Paul-Marie Letarouilly, *Le Vatican et la Basilique de Saint-Pierre de Rome* (Paris: VTE A. Morel et CIE Éditeurs, 1882); Paul-Marie Letarouilly, *Il Vaticano e La Basilica di San Pietro*, Di Luggo Aversa Antonella (ed.) (Novara: De Agostini, 1999)

[11] Rodolfo Amedeo Lanciani, *The ruins and excavations of ancient Rome. A companion book for students and travellers* (London: Macmillan, 1897)

[12] There are many historians and publications related to the old basilica of S. Peter, but especially interesting are the following: Christoph Jobst, ‘La Basilica di S. Pietro e il dibattito sui tipi edili, Onofrio Panvinio e Tiberio Alfarano’, in Gianfranco Spagnesi (ed.), *L'architettura della basilica di San Pietro, Storia e costruzione* (Roma, 1997); Richard Krautheimer, Spencer Corbett, Alfred K. Frazer, and Wolfgang Frankl (eds.), *Corpus Basilicarum Christianarum Romae. The Early Christian Basilicas of Rome* (IV-IX cent.); Brandenburg, Hugo; Ballardini, Antonella; and Thoenes, Christof, *San Pietro. Storia di un Monumento*; Paolo Liverani, ‘Saint Peter’s and the city of Rome between Late Antiquity and the early Middle Ages’, 21-34; Rosamond McKitterick; John Osborne; Carol M. Richardson and Joanna Story (eds.), *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013)

[13] Regarding this *GDSU 11Ar* drawing by Peruzzi, see: Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante* (Mantova: Leo S. Olschki, 2006), pp. 116-119; About *Peruzzi* projects for the new basilica of S. Peter is especially interesting: Arnaldo Bruschi, ‘Le idee del Peruzzi per il nuovo San Pietro’, in Arnaldo Bruschi, Christoph Luitpold Frommel, Franz Graf Wolff Metternich, Christof Thoenes (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.), Cristiano (Milano: Electa, 1996), pp. 197-248

[14] Turpin C. Bannister, ‘The Constantinian basilica of St. Peter al Roma’, *Journal of the Society of Architecural Historians, JSAH* 27, no. 1 (1968), pp. 3-32

[15] *Alfarano* points out different measurements of the *old S. Peter*: Tiberio Alfarano, m.

1596, and Michele Cerrati, *Tiberii Alpharanii. De Basilicae Vaticanae Antiquissima et Nova Structura* (Roma: Tipografia Poliglotta Vaticana, 1914); Enzo Bentivoglio, "Tiberio Alfarano: Le piante del vecchio San Pietro sulla pianta del nuovo edita dal Dupérac", In *L'Architettura della Basilica di San Pietro Storia e Costruzione*, edited by Gianfranco Spagnesi (Roma: Bonsignori, 1997), pp. 247-254

[16] Richard Krautheimer, Spencer Corbett, Alfred K. Frazer, and Wolfgang Frankl (eds.), *Corpus Basilicarum Christianarum Romae. The Early Christian Basilicas of Rome* (IV-IX cent.), 5 vols. (Vatican City, 1937-77)

[17] This strategy has been widely used successfully, and documented in: Luis De Garrido, *Applications of Artificial Intelligence in the composition of architectural objects*. PhD. Thesis (Valencia: Universidad Politécnica de Valencia, 1989)

[18] Tertuliano, *Adversus Praxeam* (year 215). English translation: Peter Holmes (The Ante-Nicene Christian Library 15, 1870), pp. 333-409; reprinted (ANF 3, 1885), 597-627. Traducción en español: Julio Cesar Clavijo Sierra (2017)

[19] Kenneth Scott Latourette, *A history of Christianity,* with a new foreword and supplemental bibliographies by Ralph D. Winter (New York: HarperCollins Paperback, 1975)

[20] Turpin C. Bannister, *The Constantinian basilica of St. Peter al Roma*, pp. 3-32

[21] L. Bosman, '*Spolia* in the fourth-century basilica', pp. 65-80

[22] There are several plans of *Antonio da Sangallo the Younger* and *Peruzzi* in which a separation of 107 *palmi* between the 4 large crossing piers of *Bramante* is indicated, just as it was built. *Bramante* used an octagon for the integration of the dome with the main nave of the *old basilica of S. Peter*. And for the dome diameter to be 185 1/3 *palmi* (as it was finally built), the octagon side would necessarily have to be 107 *palmi* in dimension. In this regard, the following references can be consulted in general: Christoph L. Frommel, La chiesa di San Pietro sotto papa Giulio II alla luce di nuovi documenti, in Bruschi, A.; Frommel, C.L.; Wolff Metternich, F.G.; Thoenes, C. (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.) (Milano: Electa, 1996), pp. 23-49; Christoph L. Frommel, Capella Iulia: la cappella sepolcrale di papa Giulio II nel nuovo San Pietro, in Bruschi, A.; Frommel, C.L.; Wolff Metternich, F.G.; Thoenes, C. (coords.), *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, Cristiano Tessari (ed.) (Milano: Electa, 1996), pp. 85-118

[23] In order to know the different construction techniques used in the construction of the

old basilica of S. Peter, the following references are very useful: Richard Gem, ‘From Constantine to Constans. The chronology of the construction of Saint Peter’s basilica’, p. 50; Hugo Brandenburg, ‘L’antica basilica vaticana costantiniana di S. Pietro’, pp. 9-34

[24] Richard Gem, ‘From Constantine to Constans. The chronology of the construction of Saint Peter’s basilica’, p. 42

[25] Richard Gem, ‘From Constantine to Constans. The chronology of the construction of Saint Peter’s basilica’, p. 54

[26] Tiberio Alfarano, m. 1596, and Michele Cerrati, *Tiberii Alpharanii. De Basilicae Vaticanae Antiquissima et Nova Structura*

[27] To know the details of the reform of the stairs and the access platform carried out by Pius II, see: Hugo Brandenburg, ‘L’antica basilica vaticana costantiniana di S. Pietro’, pp. 9-34; Antonella Ballardini, ‘La basilica di S. Pietro nel Medioevo’, p. 44

[28] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante*, (Mantova: Leo S. Olschki, 2006), pp. 116-117

[29] ASR , Camerale I, vol. 1503, f. 57v sg.

[30] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante*, pp. 116-117

[31] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante*, pp. 117-118

[32] Tiberio Alfarano, m. 1596, and Michele Cerrati, *Tiberii Alpharanii. De Basilicae Vaticanae Antiquissima et Nova Structura*

[33] John Capgrave, *Ye Solace of Pilgrimes. Una guida di Roma per i pellegrini del Quattrocento*, (written in the middle of the XV century), Introduzione e traduzione integrale a cura di Daniela Giosuè (Roma: Roma nel Rinascimento, 1995), p. 100

[34] Nikolaus Muffel, *Descrizione della città di Roma nel 1452. Delle indulgenze e dei luogi sacri di Roma (Der Ablas und die Heiligen Stet zu Rom)*, G. Wiedmann (ed. And trans.) (Bologna, 1999), p. 47

[35] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante*, p. 117

[36] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante*, p. 118

[37] Tiberio Alfarano, m. 1596, and Michele Cerrati, *Tiberii Alpharanii. De Basilicae Vaticanae Antiquissima et Nova Structura*

[38] The exact relationship between the old red retaining wall -within which the apostle's tomb is said to have been- with the west wall of the transept of the *old S. Peter* can be seen exactly in: Richard Gem, 'From Constantine to Constans. The chronology of the construction of Saint Peter's basilica', p. 45

[39] Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro', pp. 9-34

[40] Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*; A. Arbeiter, *Alt-St. Peter in Geschichte und Wissenschaft. Abfolde der Bauten, Reconstruktion, Architekturprogramm* (Berlin: Mann, 1988)

[41] Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro', pp. 9-34

[42] Ann C. Hupert, 'Envisioning New St. Peter's. Perspectival Drawings and the Process of Design', *Journal of the Society of Architecural Historians, JSAH* 72, no. 2 (2013), pp. 166-188

[43] Domenico Fontana, *Della trasportatione dell'Obelisco vaticano et delle fabriche di nostro signore Papa Sisto V* (Roma: D. Basa, 1590)

[44] Giovanni Guerra made this fresco in the Palazzo Apostolico Vaticano, Biblioteca Sistina, sala II, in the year 1586, faithfully following an engraving that he made previously, in the same year 1586, together with Natale Bonifacio da Sebenico, (which is preserved in The British Museum, nº 1892,0714.41.

[45] Paul-Marie Letarouilly, *Le Vatican et la Basilique de Saint-Pierre de Rome* (Paris: VTE A. Morel et CIE Éditeurs, 1882)

[46] Luis De Garrido, *Applications of Artificial Intelligence in the composition of architectural objects*, PhD. Thesis, Escuela Técnica Superior de Arquitectura, Universidad Politécnica de Valencia (Valencia, 1989); Luis De Garrido, *Geometric relationships, dimensional deduction and sequential stages of the design process followed by Apollodorus of Damascus in the project of the Pantheon of Rome* (2020). Submitted and under review; Luis De Garrido, *Identification of the design process and the compositional mesh of the 'Vitruvian man', by Leonardo da Vinci. Applications for architectural design* (2020). Submitted and under review. Luis De Garrido, *Reconstruction of the stages of the design process and architectural definition of the project of the old basilica of Saint Peter in Vatican* (2020). Submitted and under review.

[47] The commonly accepted dimensions of the most important elements of *the old basilica of S. Peter* can be found in the following references: Jürgen Christern, 'Der Aufriß von Alt-St. Peter', *in Römische Quartalschrift*, 61 (1967), pp. 133-183; Jürgen

Christern, and Katharina Thiersch, ‘Der Aufri*ß* von Alt-St. Peter II, Ergänzungen zum Langhaus, Querschiffhöhe’, in “*Römische Quartalschrift*”, 64 (1969), pp, 1-34; Richard Krautheimer, Spencer Corbett, Alfred K. Frazer, and Wolfgang Frankl (eds.), *Corpus Basilicarum Christianarum Romae. The Early Christian Basilicas of Rome* (IV-IX cent.), 5 vols. (Vatican City, 1937-77), vol. V, pp. 251-256; Achim Arbeiter, *Alt-St. Peter in Geschichte und Wissenschaft. Abfolde der Bauten, Reconstruktion, Architekturprogramm* (Berlin: Mann, 1988), pp. 144-166. They indicate a dimension of 32 m. (143.24 *palmi*) for the height of the central nave, which basically coincides with the dimension deduced geometrically at this stage of 142 *palmi*.

[48] *Brandenburg* indicates that the *Arch of Constantine* had dimensions of 17 * 22 m, that is, 76 *palmi* * 98.47 *palmi* in: Hugo Brandenburg, L’antica basilica constantiniana di S. Pietro, in *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), p. 14). These dimensions basically coincides with the dimensions that have been deduced geometrically in this work. Previously it has been deduced that the width of the arch was 80 *palmi*, and at this stage it has been deduced that the height of the arch was 99 *palmi*

[49] Jürgen Christern, and Katharina Thiersch, ‘Der Aufri*ß* von Alt-St. Peter II, Ergänzungen zum Langhaus, Querschiffhöhe’, in “*Römische Quartalschrift*”, 64 (1969), pp. 1-34*;* Richard Krautheimer CBCR V, vol. V, pp. 251-263; Achim Arbeiter, *Alt-St. Peter in Geschichte und Wissenschaft. Abfolde der Bauten, Reconstruktion, Architekturprogramm*, pp. 144-154. These references indicate a height of 30 meters (134.28 *palmi*) for the maximum height of the roof deck of the transept and a height of 25 meters (111.90 *palmi*) for the height of the walls of the transept, which basically coincide with the geometrically deduced dimensions in this stage of 136.33 *palmi* and 114.33 *palmi* respectively.

[50] Hugo Brandenburg, ‘Die Architektur der Basilika S. Paolo fuori le mura. Das Apostelgrab als Zentrum der Liturgie und des Märtyrerkultes’, in *Römische Abteilungen*, 112 (2005/6), p. 240; Hugo Brandenburg, *Le prime chiese di Roma* (Milano: Jaca Book, 2013), p. 313; Richard Krautheimer CBCR V, vol. V, p.18

FIGURES 4

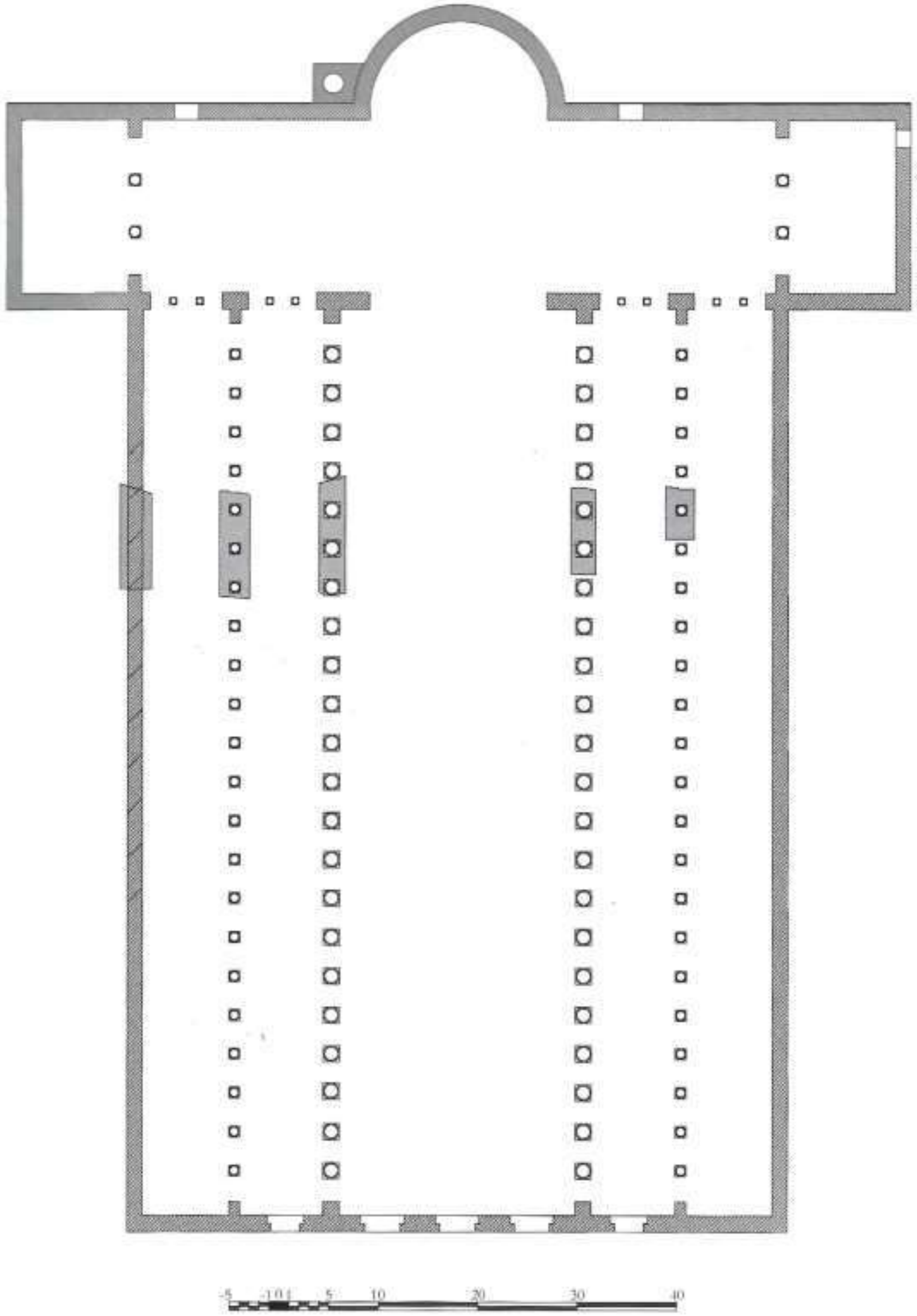


Figure 4.1

Plan of the Basilica with the features of the original walls detected by the excavations

K. Brandenburg from Apollonj Ghettiet al 1951

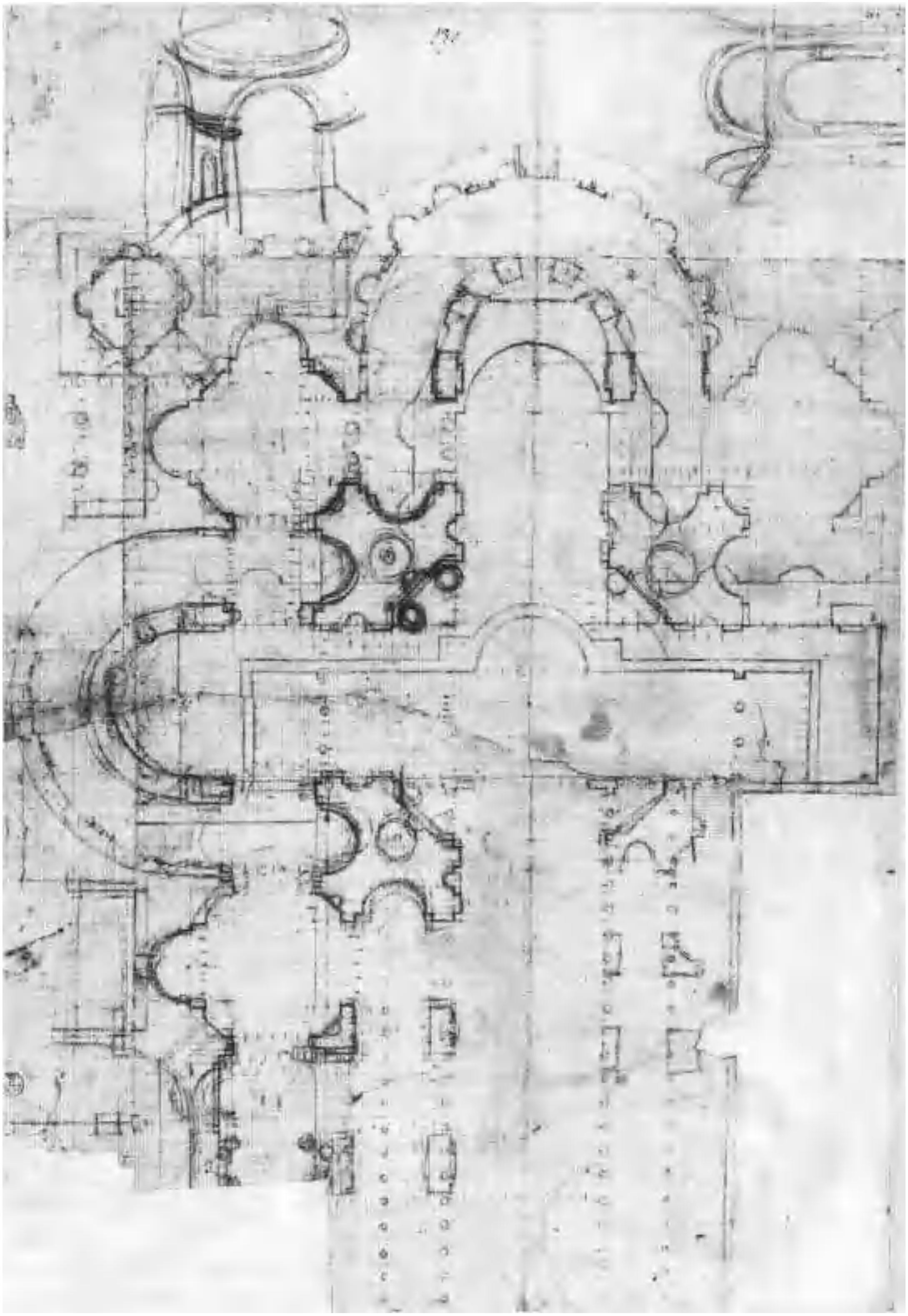


Figure 4.2

Three superimposed plans and two internal elevations for St. Peter's Basilica

Donato Bramante, autum-winter of 1505

GDSU 20 Ar

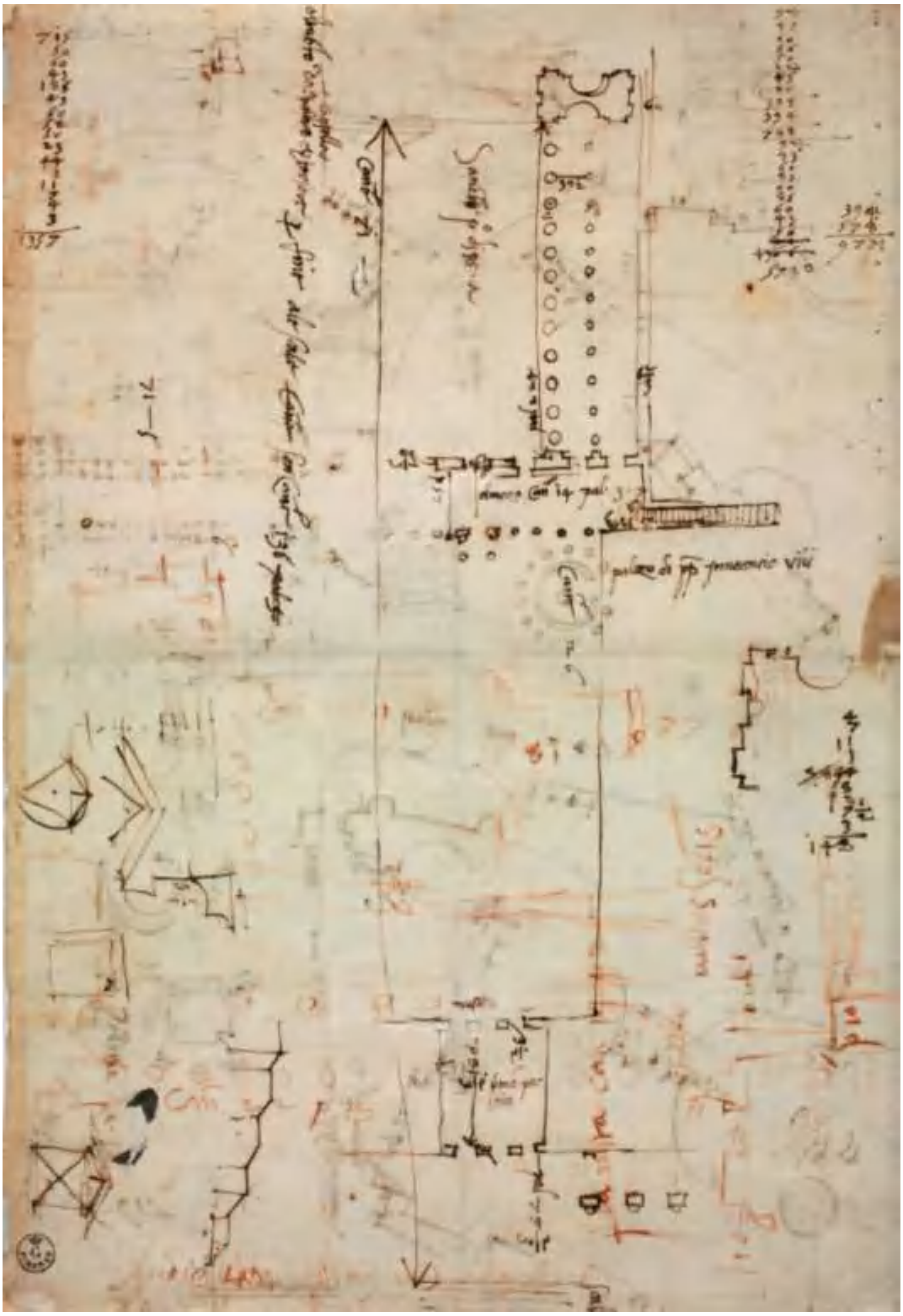


Figure 4.3

Sketch of a floorplan for S. Peter in Rome

Baldasarre Peruzzi (made in 1518 according to Luis de Garrido)

GDSU 11 Ar

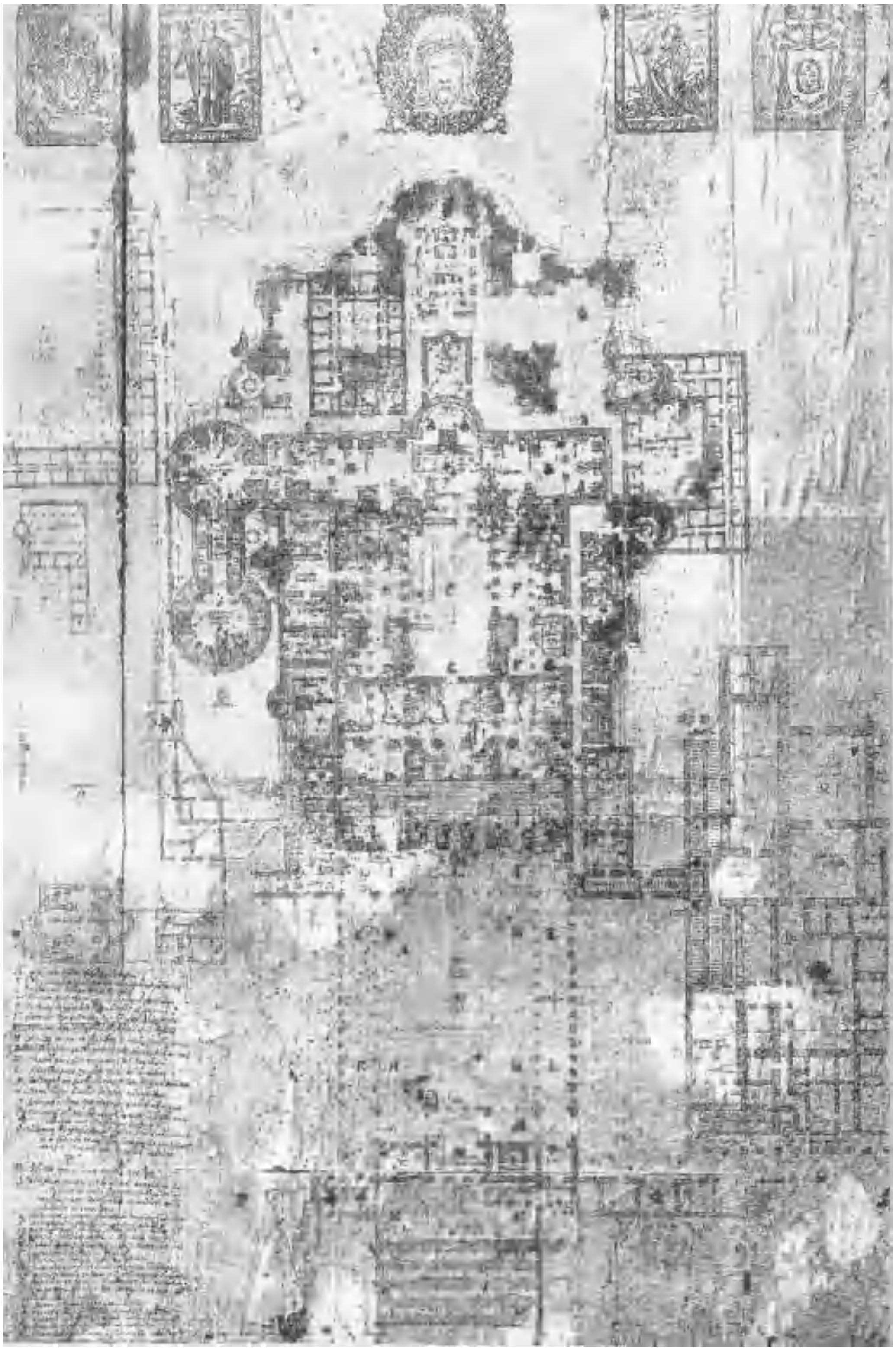


Figure 4.4

Ichonographia of the ancient basilica designed in 1571 by Tiberio Alfarano above the Michelangelo's plant of the new San Pietro

Historical archive of the Fabbrica di San Pietro

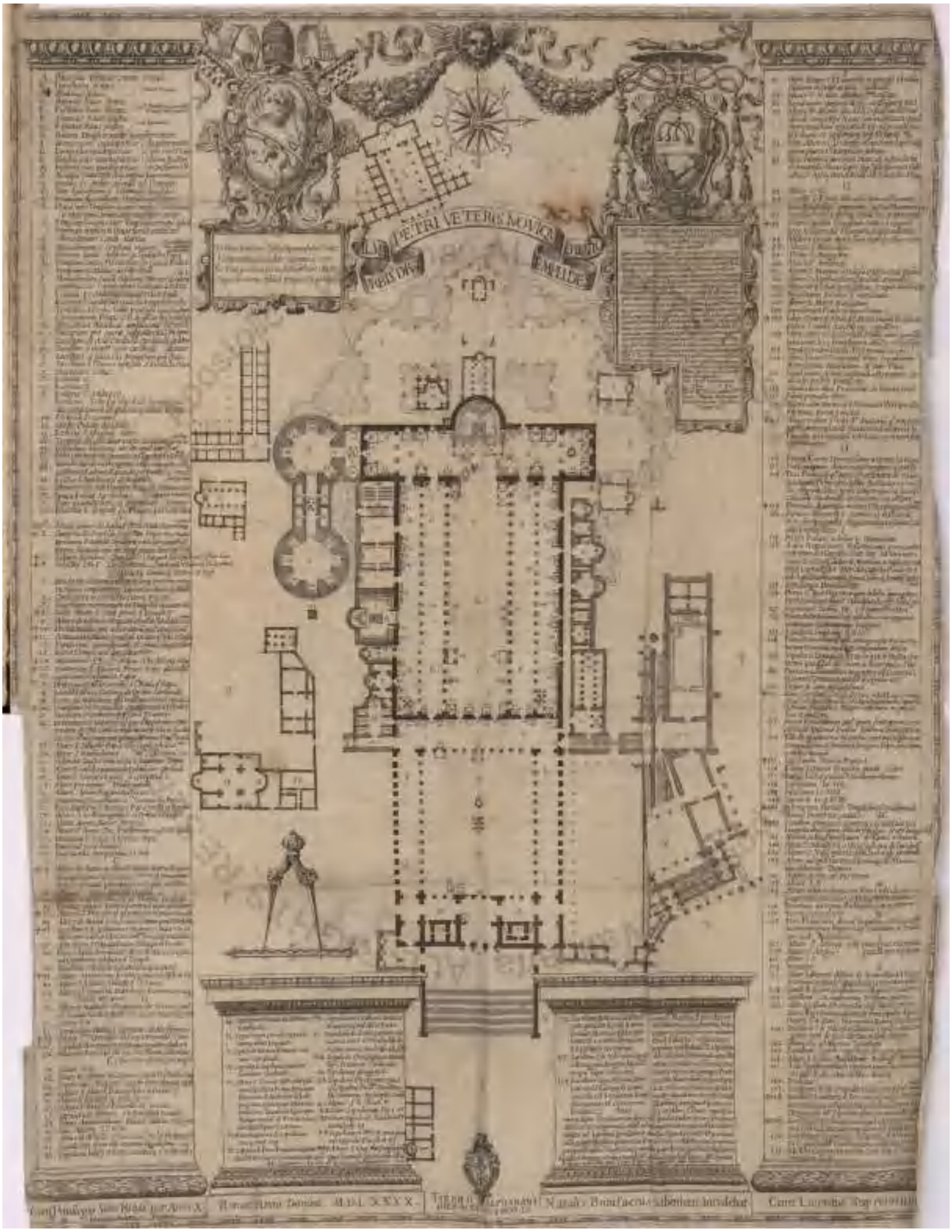


Figure 4.5

Plan of old S. Peter

Tiberio Alfarano and Natale Bonifacio da Sebenico, 1590

Biblioteca Apostolica Vaticana, Arch.Cap.S.Pietro.H.3, f. 206r

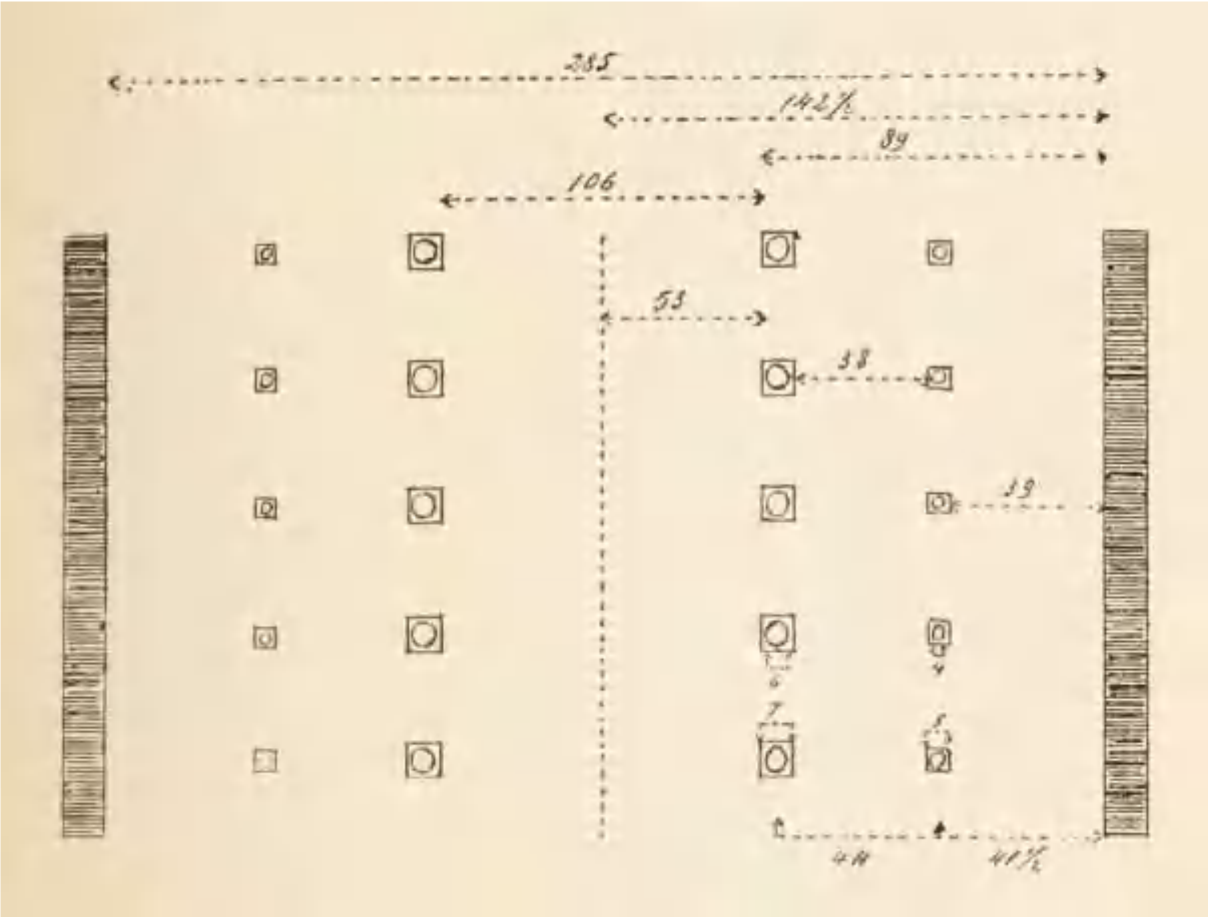


Figure 4.6

Summary of dimensions indicated by Alfarano, drawn by Cerrati

Michele Cerrati, 1914

Tiberio Alfarano; Michele Cerrati. *De Basilicae Vaticanae Antiquissima et nova structura*. Roma: Tipografia poliglotta vaticana, (1914), p. XXXV

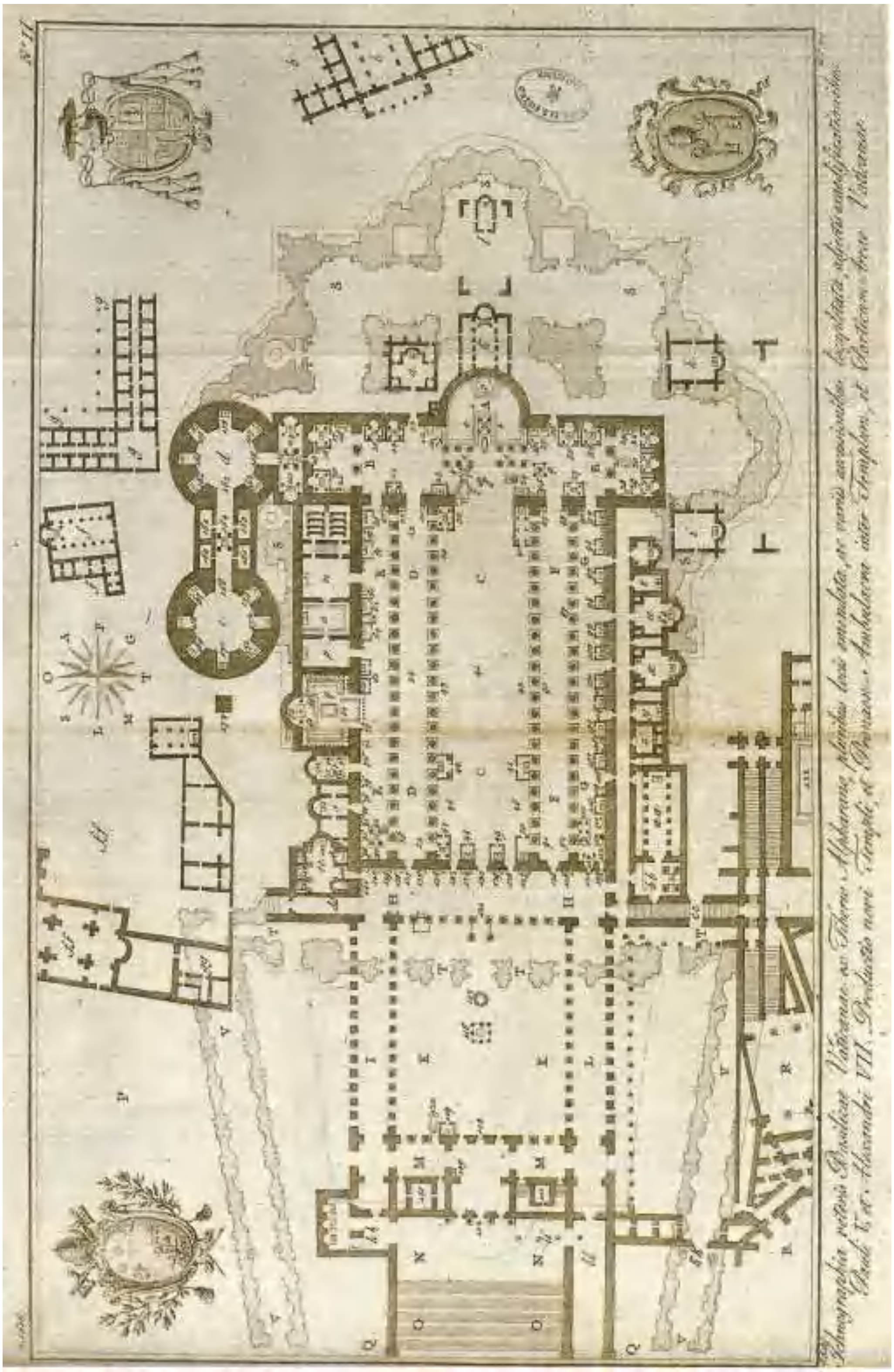


Figure 4.7

Plan of the ancient basilica of S. Pietro

Francesco Cancellieri, 1786

Francesco Cancellieri. *De secretariis novae Basilicae Vaticanae*, Liber II, vol. III, ex Officina Salvioniana ad lyceum sapientiae, Rome 1786, pag. 1616, tav. II

Detail

Figure 4.8

St. Peter's square. The work shows the conformation of the square and the building in front of the large atrium of the ancient basilica in relation to the Vatican palace. On the left, the facade is right, a small portion of the new Bramante building at the beginning of its construction

Maarten van Heemskerck, 1532-1534

Graphische Sammlung Albertina, nro. 31681

Figure 4.9

View of the basilica from the southeast, showing the obelisk and Santa Maria della Febbre

Maarten van Heemskerck, 1532-1536

Staatliche Museen zu Berlin, Kupferstichkabinett, no. 79 D 2 a, f. 22 verso

Figure 4.10

Interior view towards the left transept. In the heart of the Bramante building (in the center the tegurio above the tomb of Peter) still survive parts of the old building

Maerten van Heemskerck, 1536

Stockholm, Nationalmuseum, NMH, collection Anckarvärd, nro. NMH Anck 637

Detail

Figure 4.11

San Peter's square with the statue of Marco Aurelio

Maarten van Heemskerck, 1532-1536

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 53 recto

Figure 4.12

View of the northern side of St. Peter from the Vatican; the detail of the counter piers, visible in front of the dividing wall of the Constantinian Basilica

Maarten van Heemskerck, 1541

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2, f. 15 verso

Figure 4.13

Interior of the old Basilica, with the new building in sight

Maarten van Heemskerck, 1534-1535

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 52 recto

Figure 4.14

View of the basilica from the south-west (from the apse). On the left is visible the choir of Julius II built by Bramante. Through the arched windows you can recognize, inside, one of the great parasite bramantesche of the pillars of the dome. Outside the building is divided by pairs of parasite very thin, always bramantesche. Between the pillars of the dome is also bramantesca the formwork of the cross arch. Still visible on the right, the ancient longitudinal body of the basilica, the ancient mausoleum of San Andrea and the medieval bell tower. According to Karel Van Mander, Coecke made a trip to Italy between 1525 and 1526. Bottom right in pencil: Briquet 761 / year: 1533, lower #153

Pieter Coecke van Aelst, 1525-1526

Biblioteca Apostolica Vaticana, cod. Ashby 329 r-v

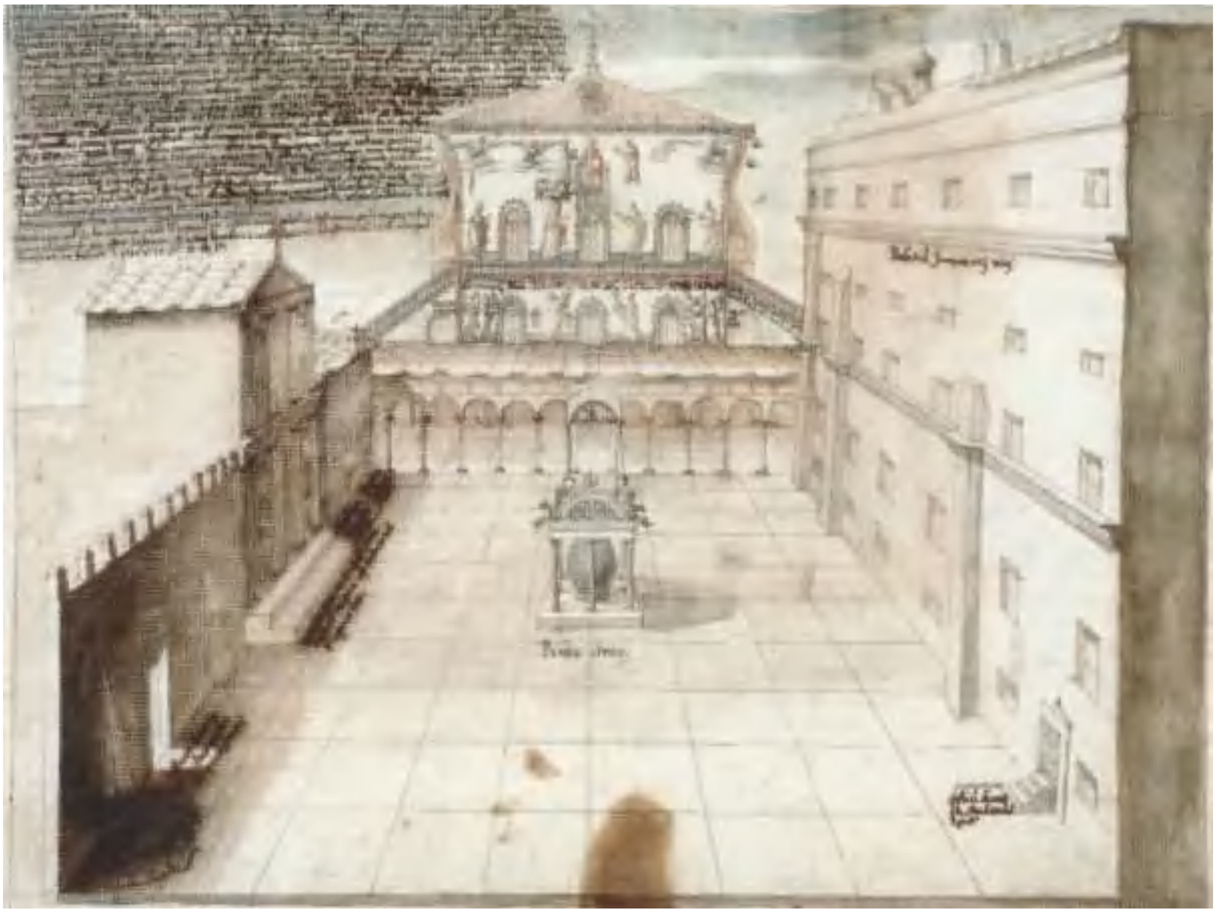


Figure 4.15

Facade of the Ancient Basilica of Saint Peter in Rome

Domenico Tasselli da Lugo, 1609

Biblioteca Apostólica Vaticana, Arch. Cap. S.Pietro A.64, ter 025, f. 10r

Figure 4.16

The interior of the Ancient Basilica of Saint Peter in Rome. Section of the hall of the ancient S. Pietro up to the partition wall of Paolo III

Domenico Tasselli da Lugo, 1500-50

Biblioteca Apostólica Vaticana, Arch. Cap. S.Pietro A.64, ter 029, f. 12r

Figure 4.17

Partition wall of Paolo III erected in 1538 between the old S. Peter and the new building site

Domenico Tasselli da Lugo, 1538

Biblioteca Apostólica Vaticana, Arch. Cap. S.Pietro A.64, ter 039, f. 17r

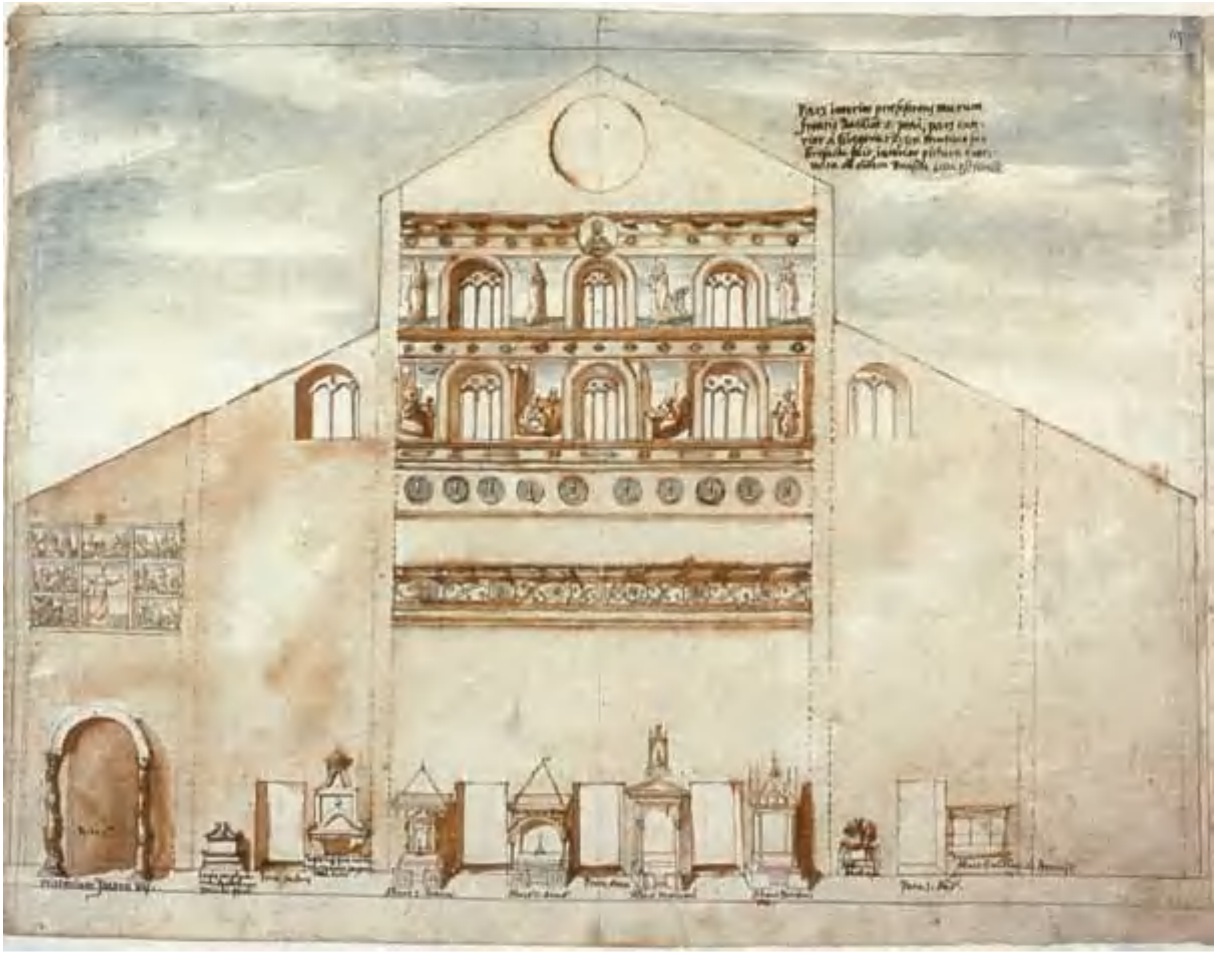


Figure 4.18

The counter-facade of the ancient S. Pietro with the five doors of the basilica.

Watercolour drawing of the inner facade of old St. Peter's Basilica

Domenico Tasselli da Lugo, 1600-1610

Biblioteca Apostólica Vaticana, Arch. Cap. S.Pietro A.64, ter 041, f. 18r

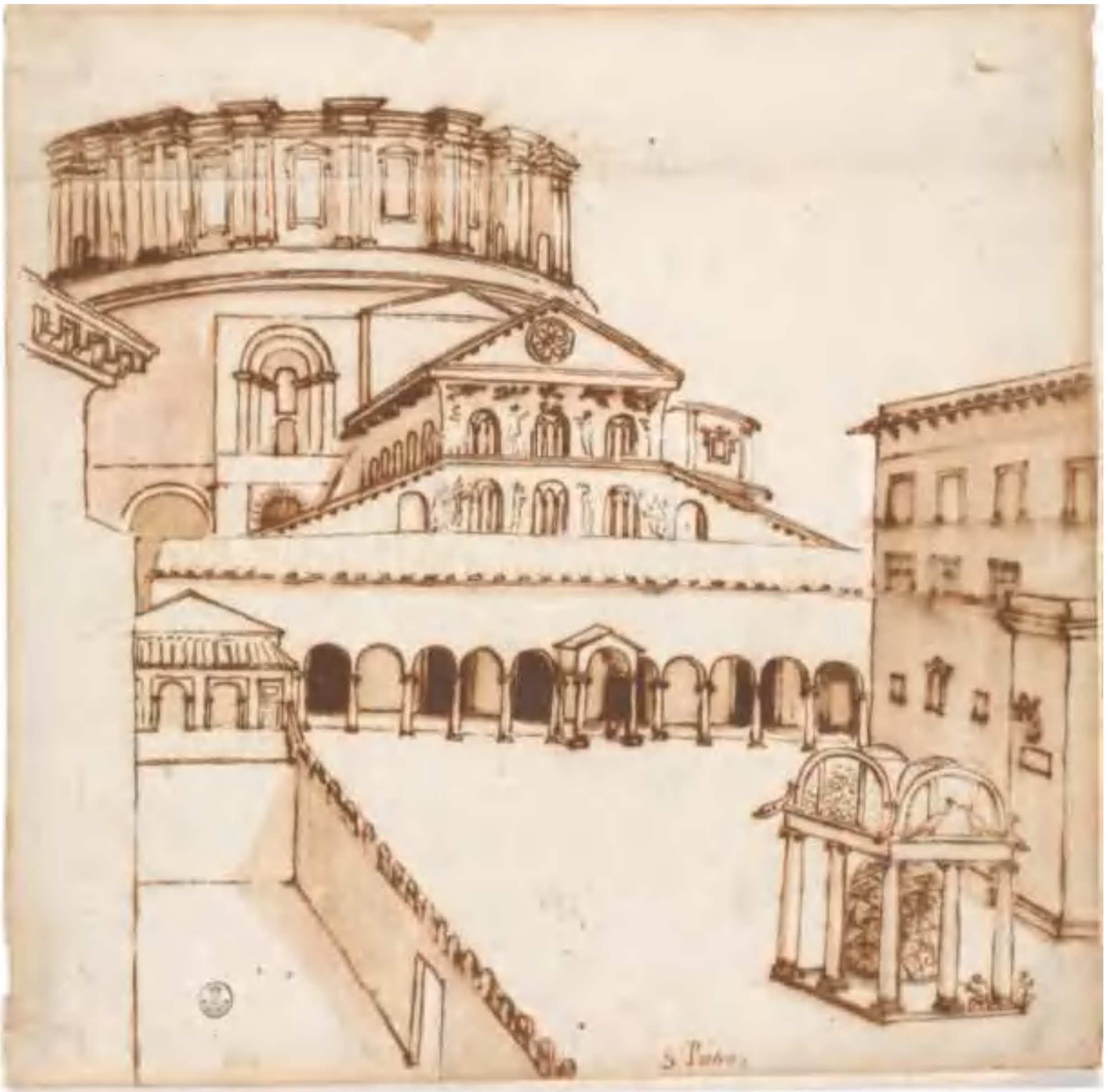


Figure 4.19

Construction of the dome of the basilica of S. Peter, in front of it the longitudinal body of the Constantinian church and the atrium

Giovanni Antonio Dosio, 1569 (?)

GDSU 2555 A

Figure 4.20

The Obelisk of Cesare in S. Peter’s square in Rome with surrounding buildings

Giovanni Antonio Dosio, 1569

GDSU 2536 A

Figure 4.21

The front of Santa Maria in Turri and the access passages to the atrium of San Peter

Giacomo Grimaldi, XVII century

Biblioteca Apostolica Vaticana, Arch. Cap. S.Pietro, H. 2, f. 62r

Figure 4.22

Atrium of old St. Peter

Giacomo Grimaldi, XVII century

Biblioteca Apostolica Vaticana, Barb. Lat 2733 fig. 133 v and 134 r

Figure 4.23

Sketch of the interior of S. Peter's internal side during its reconstruction, showing the temporary placement of some of the papal tombs

Giacomo Grimaldi, late 16th century

Biblioteca Apostolica Vaticana, Barb. Lat. 2733, f. 115v and 116r

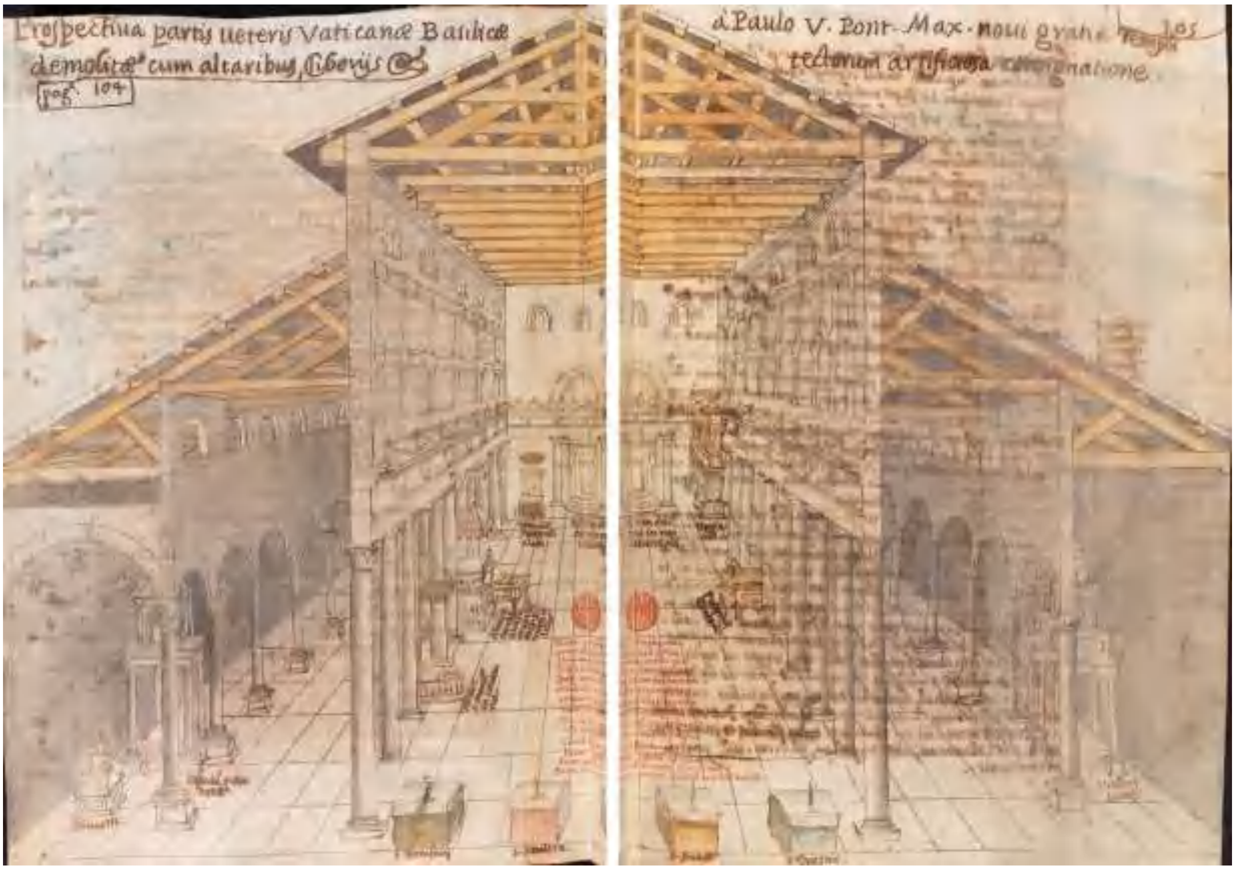


Figure 4.24

Old St. Peter’s interior

Giacomo Grimaldi, 17th century

Biblioteca Apostolica Vaticana, Barb. Lat 2733, f. 104 v and 105 r

Figure 4.25

The transport of the Vaticano obelisk, engraving

Natale Bonifacio da Sebenico and Giovanni Guerra, 1586

The British Museum, nro. 1892,0714.41

Detail

Figure 4.26

La Donazione di Costantino. In this work is reproduced the basilica in the sixth century, in wich is visible the transformation of the altar of the apostle, wich was partially disassembled and whose columns vitinee were aligned on the source of the podium and crowned by a beam

Giulio Romano (Scuola di Raffaello), 1520-1524

Musei Vaticani, Stanze di Raffaello

Detail

Figure 4.27

La traslazione di san Gregorio Nazianzeno. Fresco

A. Tempesta and M. Bril, ca. 1580

Palazzo Apostolico Vaticano, III Loggia Nord

Figure 4.28

Veduta della Fabbrica nuova e dell'antico S. Pietro al tempo del trasferimento dell'obelisco. Behind the body in front of the atrium of the ancient basilica income the drum of the dome

Fresco by Giovanni Guerra, 1586

Palazzo Apostolico Vaticano, Biblioteca Sistina, II sala

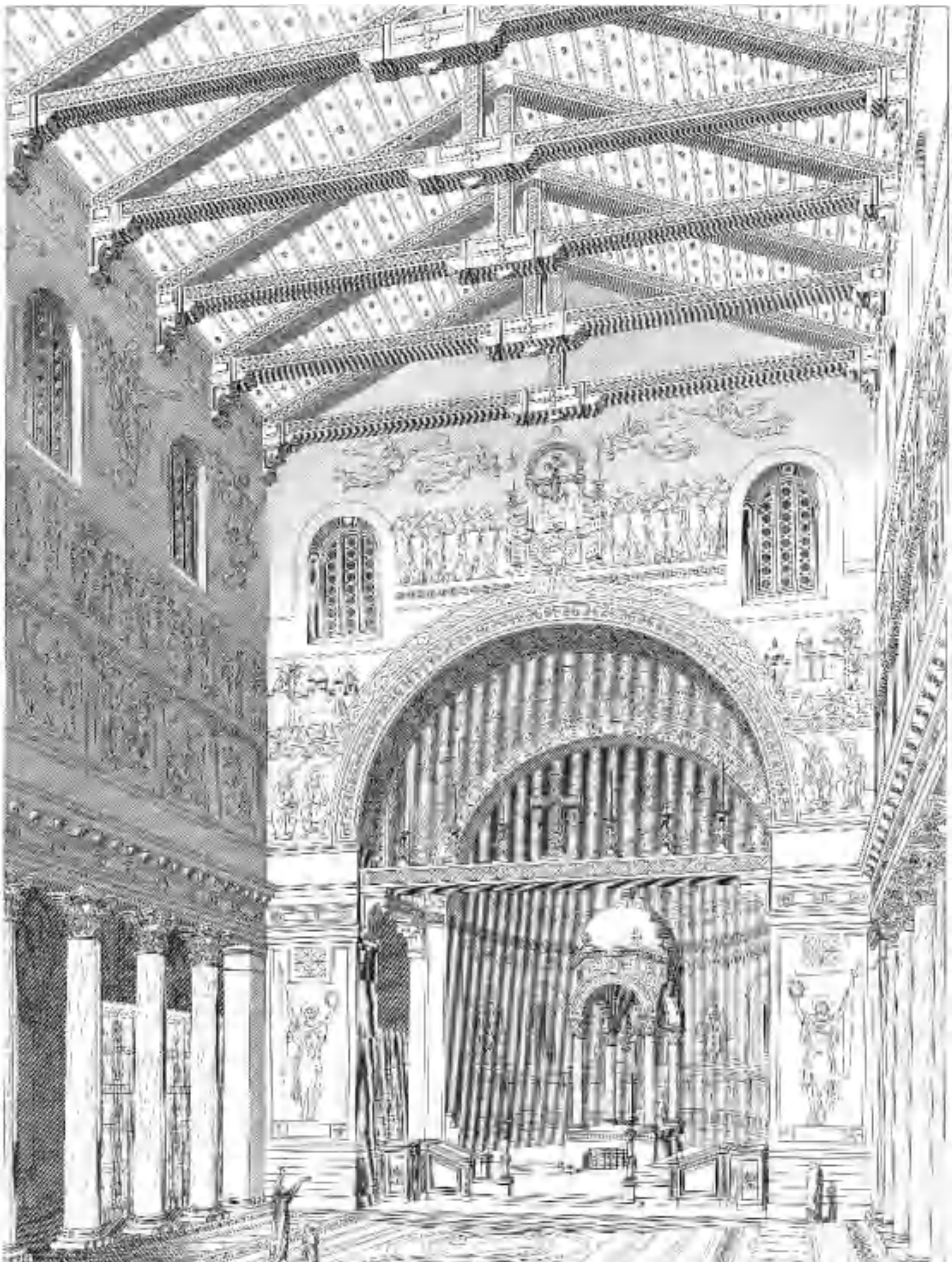


Figure 4.29

Interior view of Old San Pietro, restauration by Constantino, in the year 326

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL3

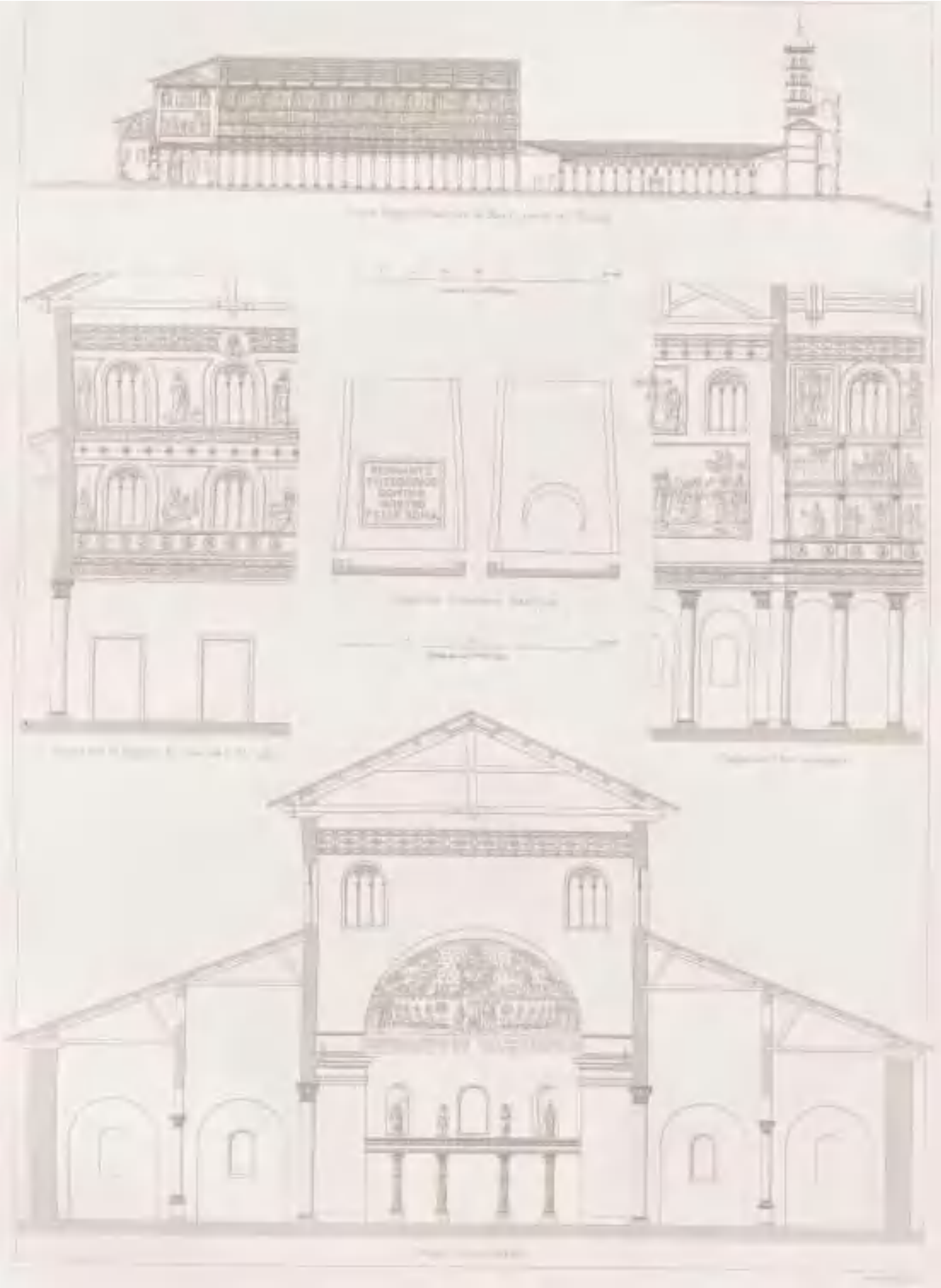


Figure 4.30

Longitudinal and transverse section of the Basilica. Section of the Triumphal arch and the atrium, in the year 326

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL5

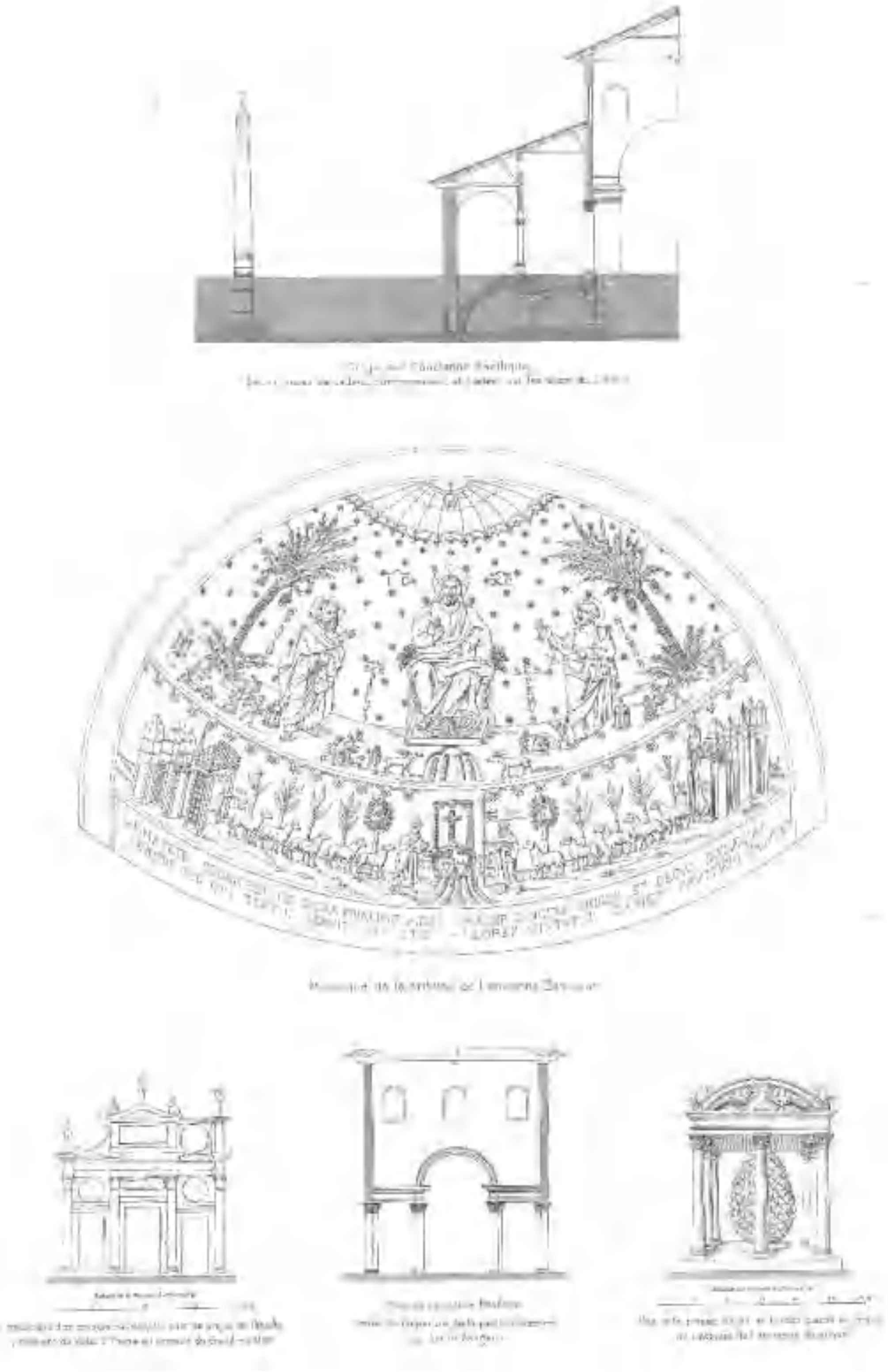


Figure 4.31

Ancient Basilica of S. Peter in Rome, between the years 300-350

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL7

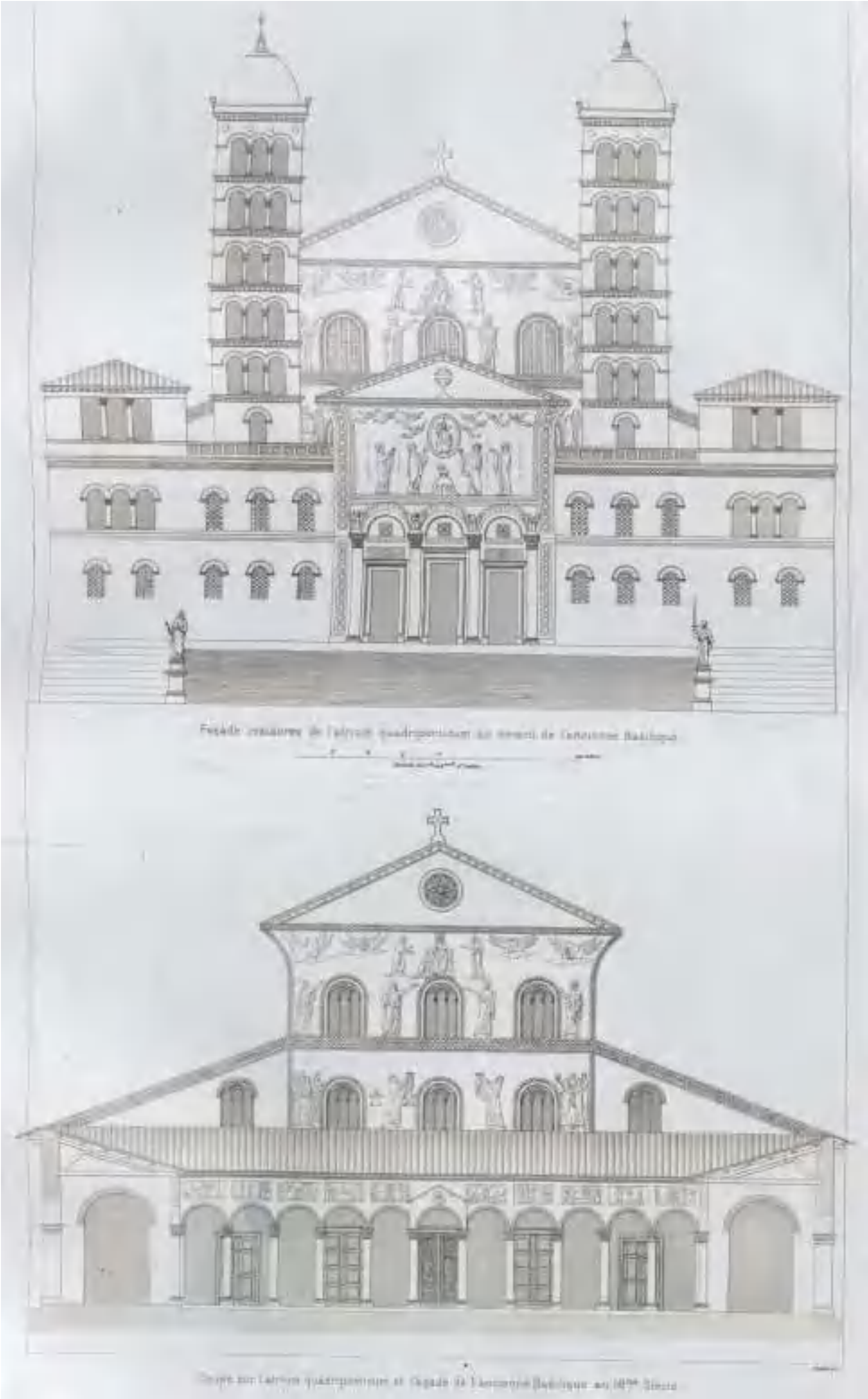


Figure 4.32

Ancient Basilica of S. Peter in Rome. IV- XVI century

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL6

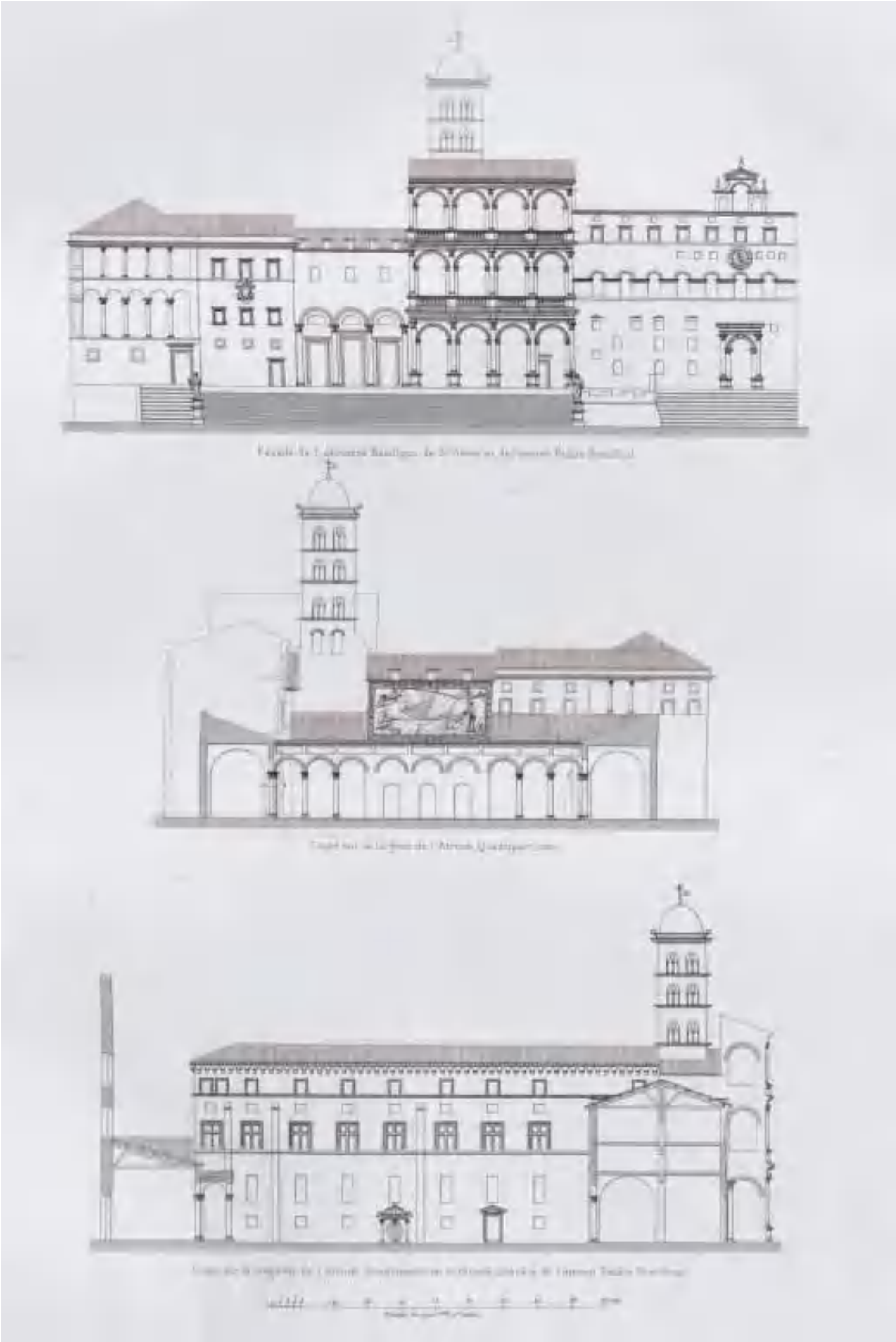


Figure 4.33

Ancient Basilica of S. Peter in Rome. IV- XVI century

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL8

Figure 4.34

Ancient Basilica of S. Peter in Rome, IV – XVI century

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL1

Figure 4.35

Ancient Basilica of Saint Pietro in Rome, in 1558

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Ancienne Basilique de Saint-Pierre, PL9

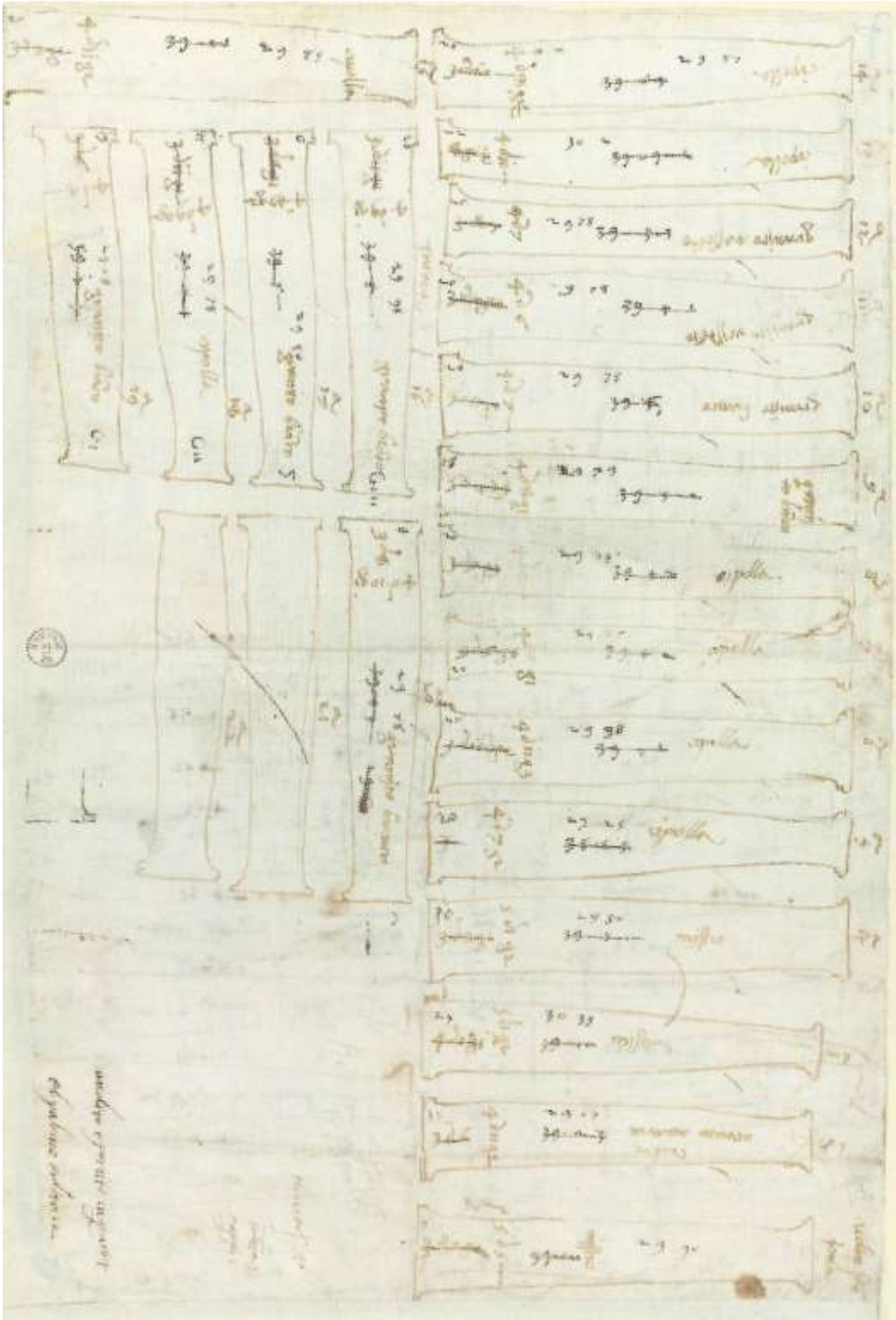


Figure 4.36

Sketch of ancient columns of Saint Peter in Rome

Baldassarre Peruzzi, 1515-1520

GDSU 108 Ar

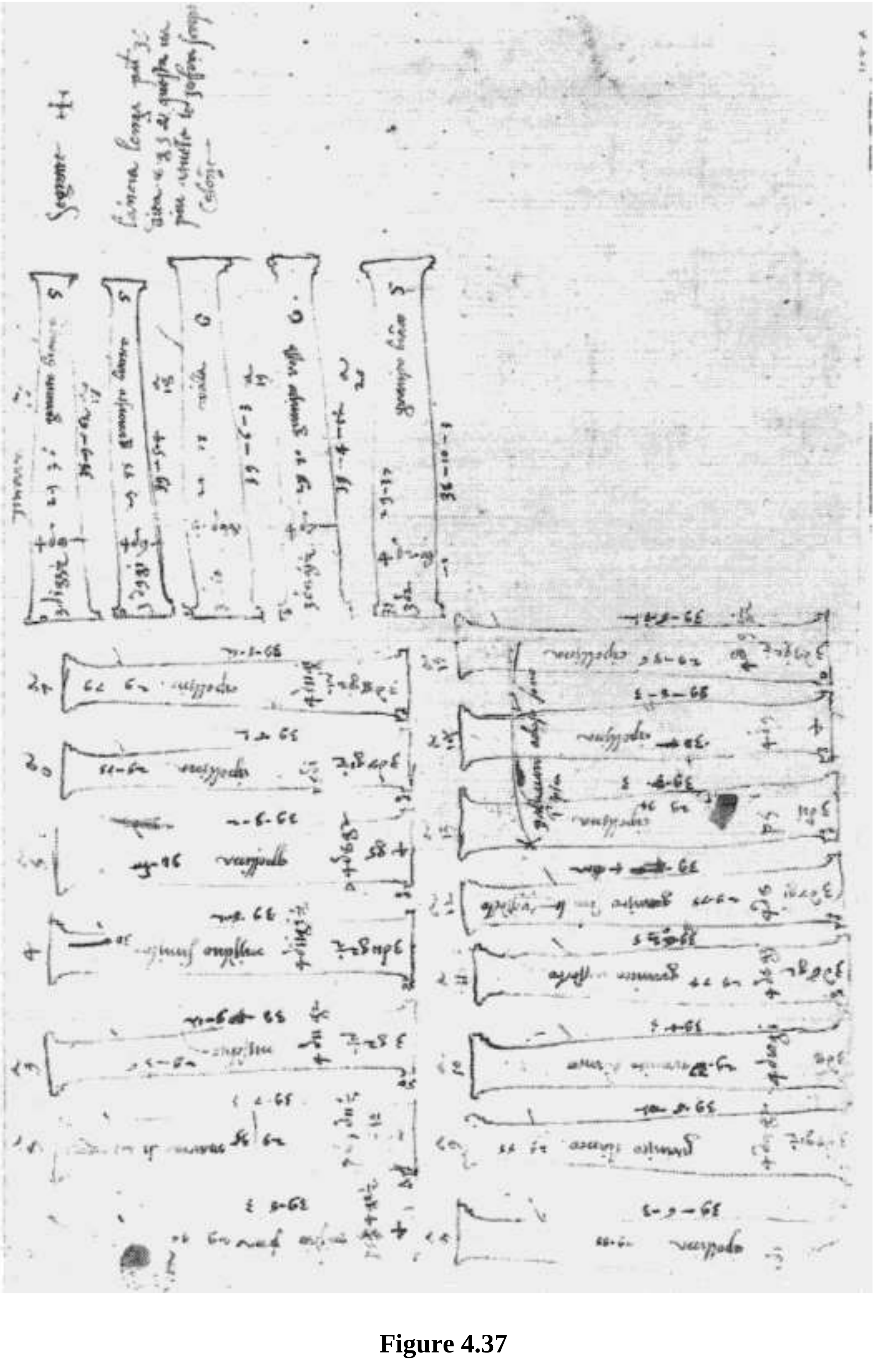


Figure 4.37

Sketch of ancient columns of Saint Peter in Rome

Baldassarre Peruzzi, 1515-1520

GDSU 108 Av

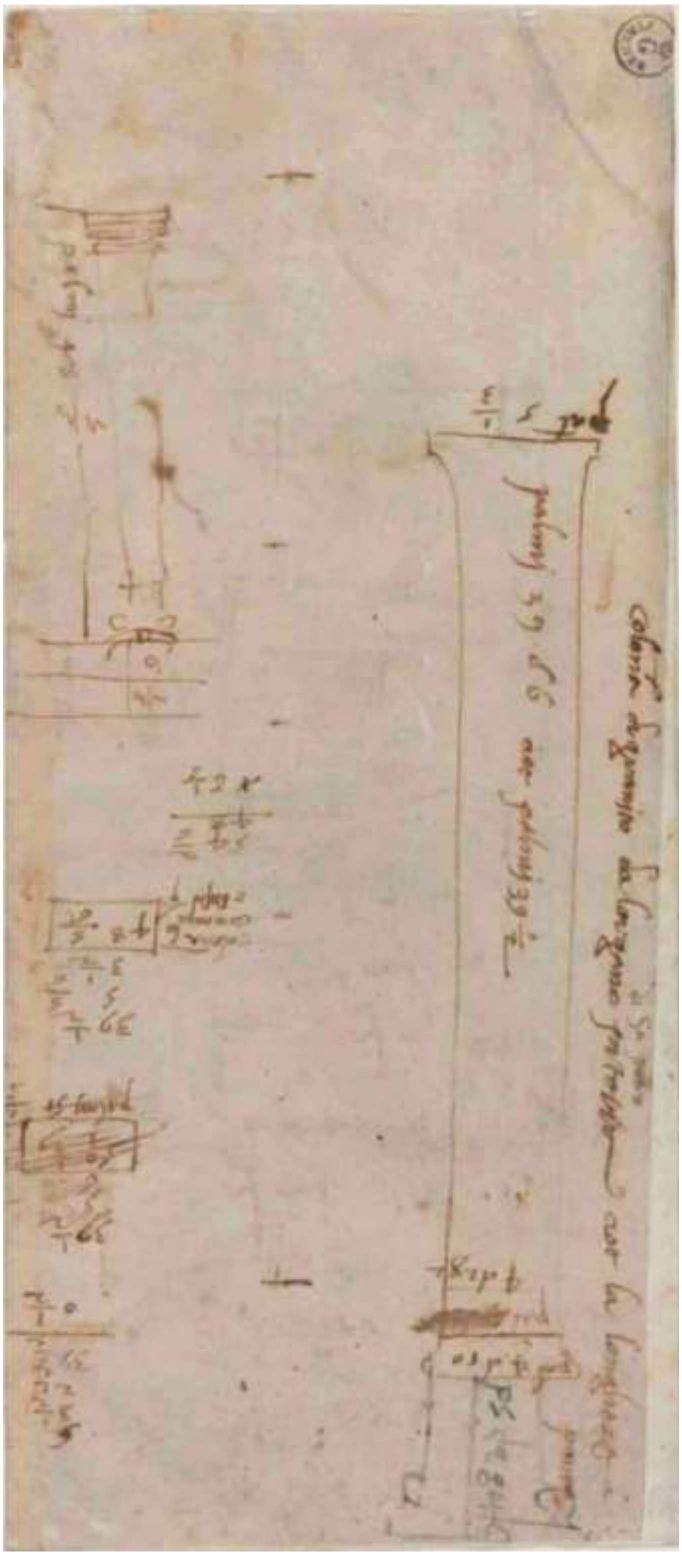


Figure 4.38

Sketch of a column

Baldassarre Peruzzi, 1515-1520

GDSU 120 Ar

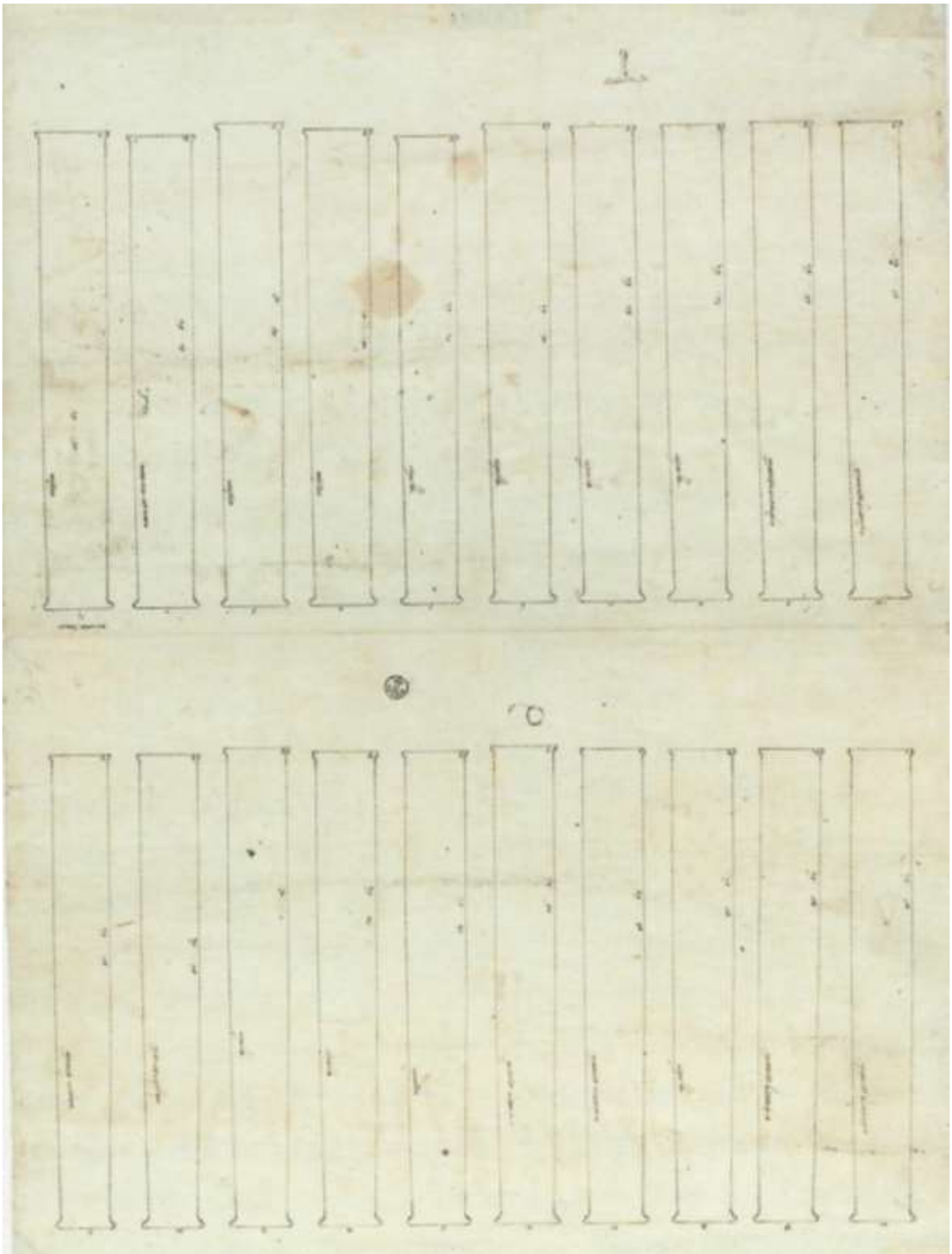


Figure 4.39

Drawing of the columns of the Constantinian basilica

Cordini Giovan Battista called Giovan Battista da Sangallo il Gobbo, 1515-1520

GDSU 1079 Ar

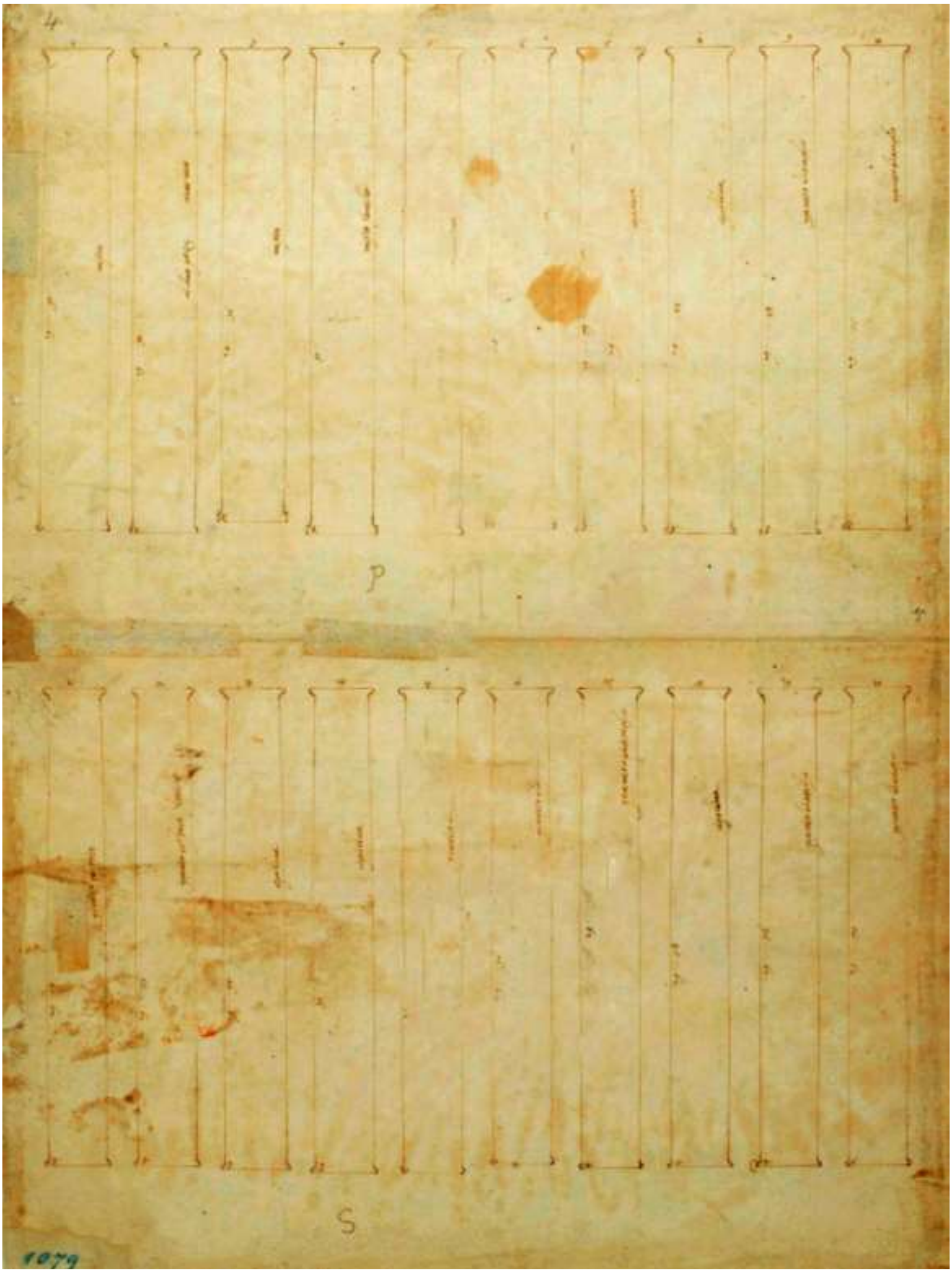


Figure 4.40

Twenty ancient columns existing in the church of San Peter in Rome

Cordini Giovan Battista called Giovan Battista da Sangallo il Gobbo, 1515-1520

GDSU 1079 Av

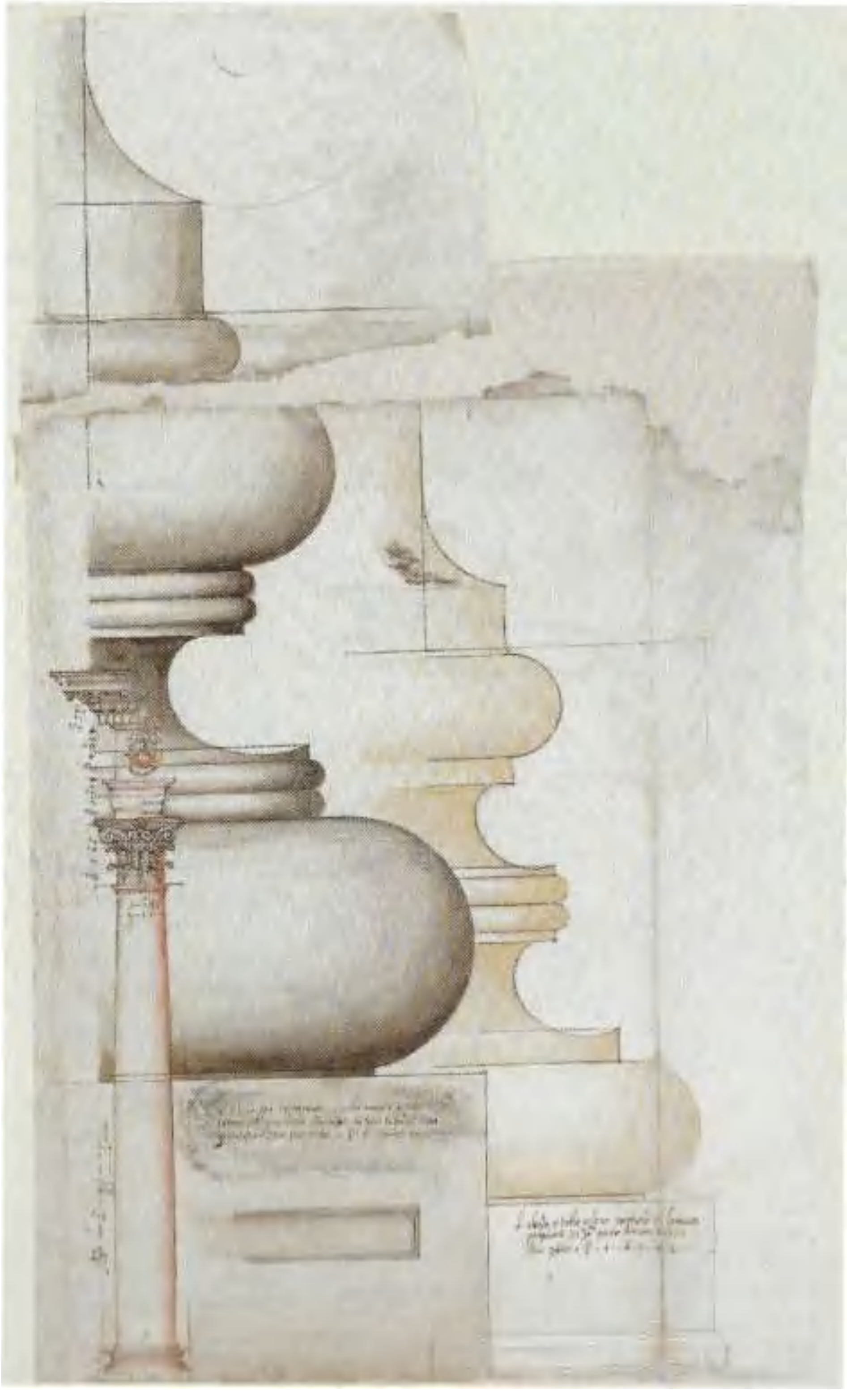


Figure 4.41

A drawing of two bases of the colonnades, a column with a capital and a trabeation trunk of the Old basilica of S. Peter

Alberto Alberti, 1526-1599

Rome, Istituto Nazionale della Grafica, nro. 2402, f. 9r

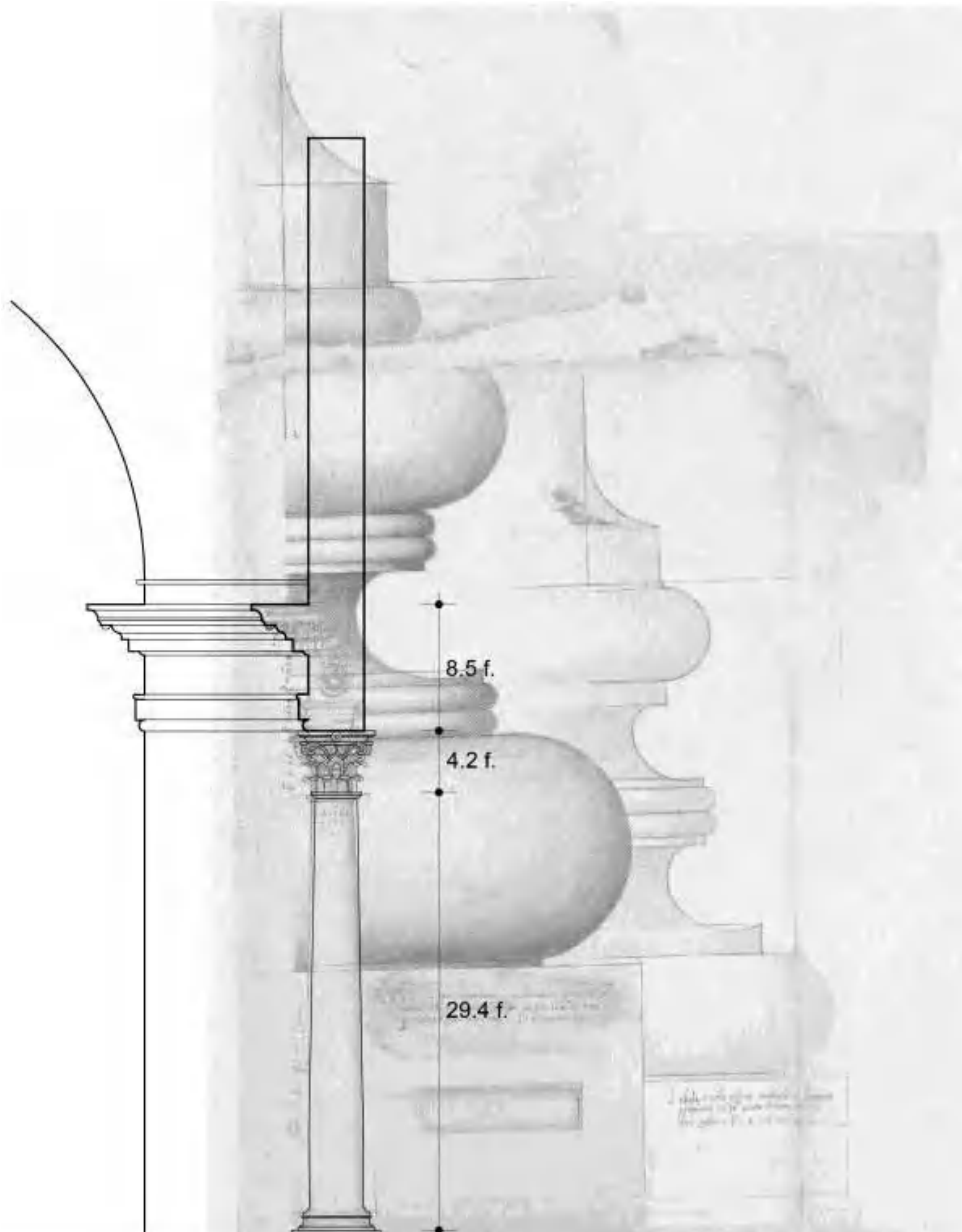


Figure 4.42

Reconstruction of the dimensions of the columns and architraves

Drawing by Luis de Garrido, 2020

Figure 4.43

Base of the eleventh column of the northern colonnade of the median nave in situ

Vatican Grottoes (Fabbrica di San Pietro, photo of the excavations)

Figure 4.44

Base of the eleventh column of the colonnade of the northern secondary naves in situ

Vatican Grottoes (Fabbrica di San Pietro, photo of the excavations)

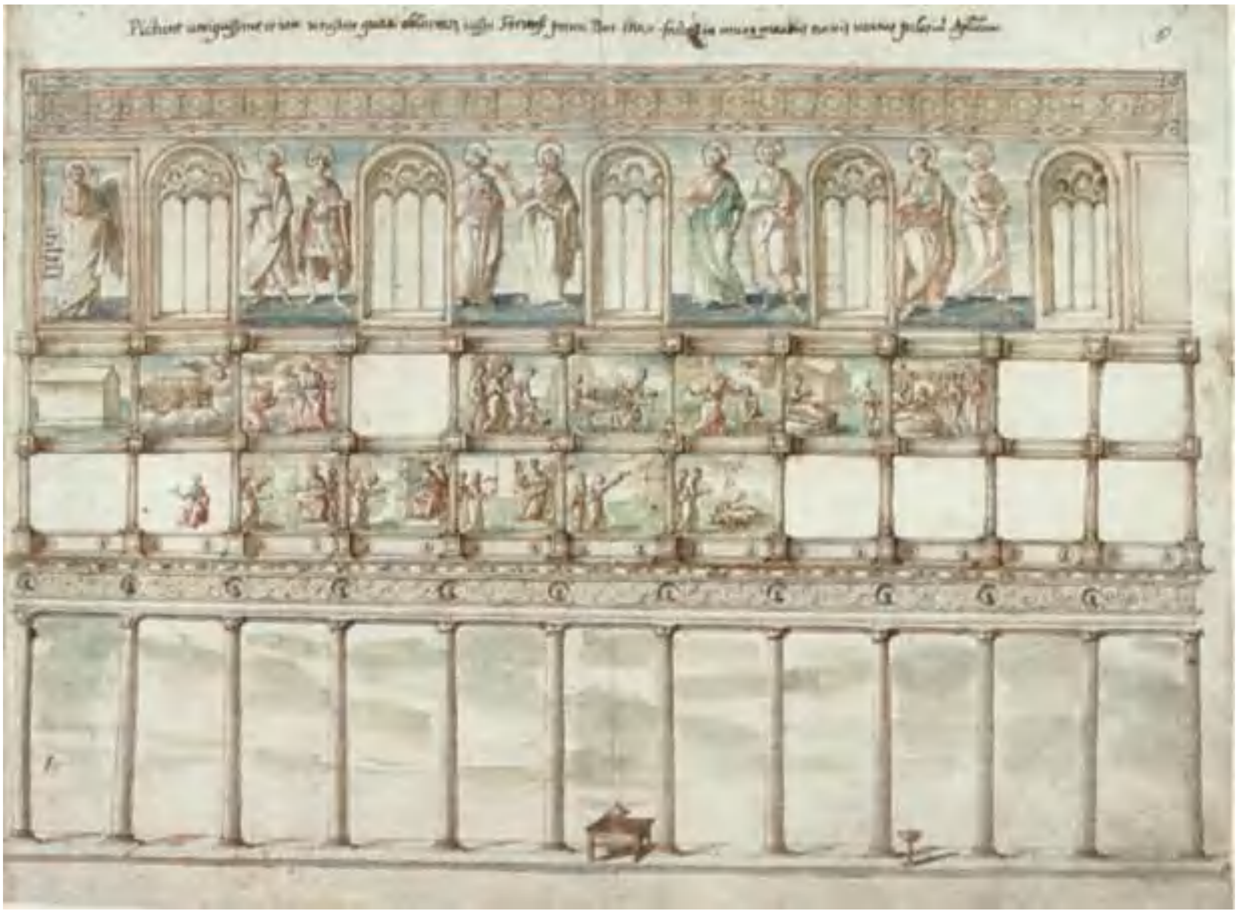


Figure 4.45

The northern colonnade from the eleventh column to the counter-facade; the frieze with the clipeate portraits of the popes; the paintings of the old testament; Giotto's angel and the figures of prophets between the windows with gothic tracery

Domenico Tasseli da Lugo, 1605

Biblioteca Apostolica Vaticana, Arch. Cap. S.Pietro A. 64 ter, f.13

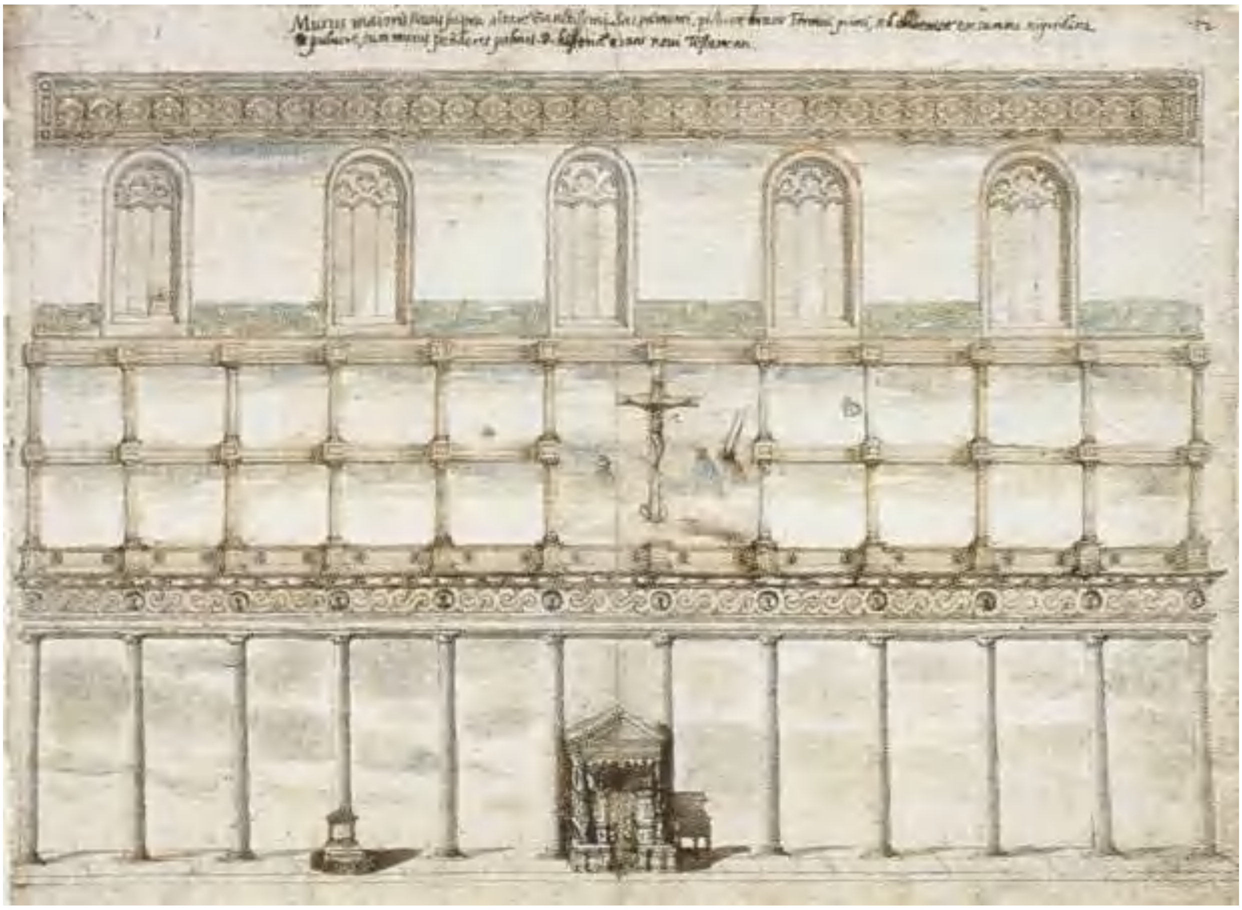


Figure 4.46

The southern colonnade up to the eleventh column with the altars of the Madonna of the column and the Blessed Sacrament; the frieze with the clipeate portraits of the popes; the great crucifixion; the lost paintings of the new testament; the windows with gothic tracery

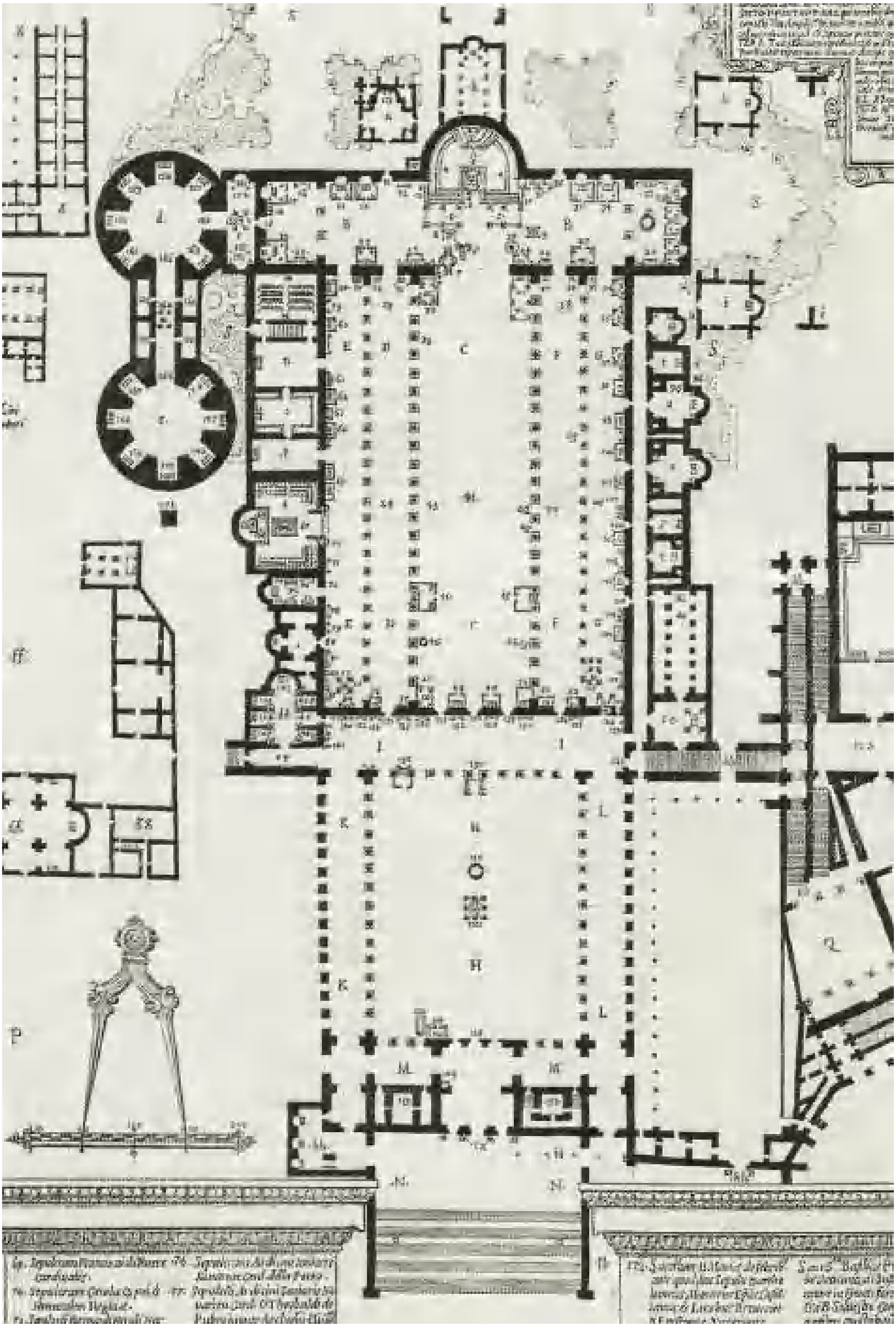
Domenico Tasseli da Lugo, 1605

Biblioteca Apostolica Vaticana, Arch. Cap. S.Pietro A. 64 ter, f.15

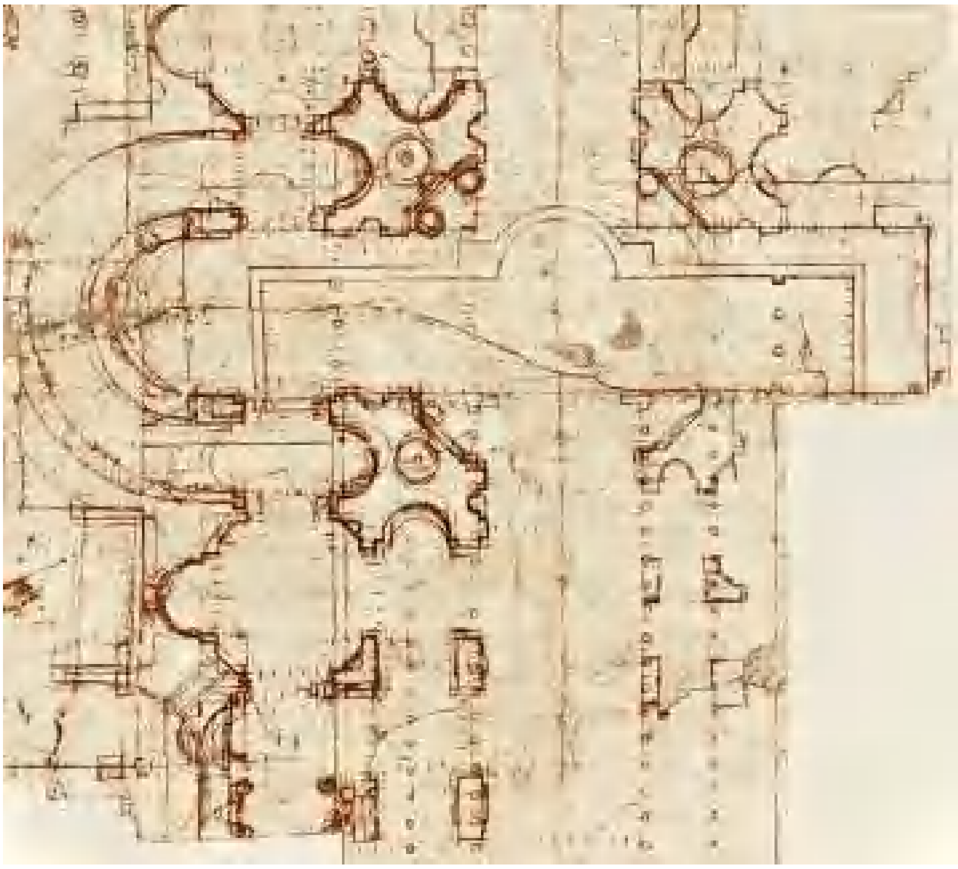
LAYOUTS 4

RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF THE OLD BASILICA OF S. PETER IN VATICAN

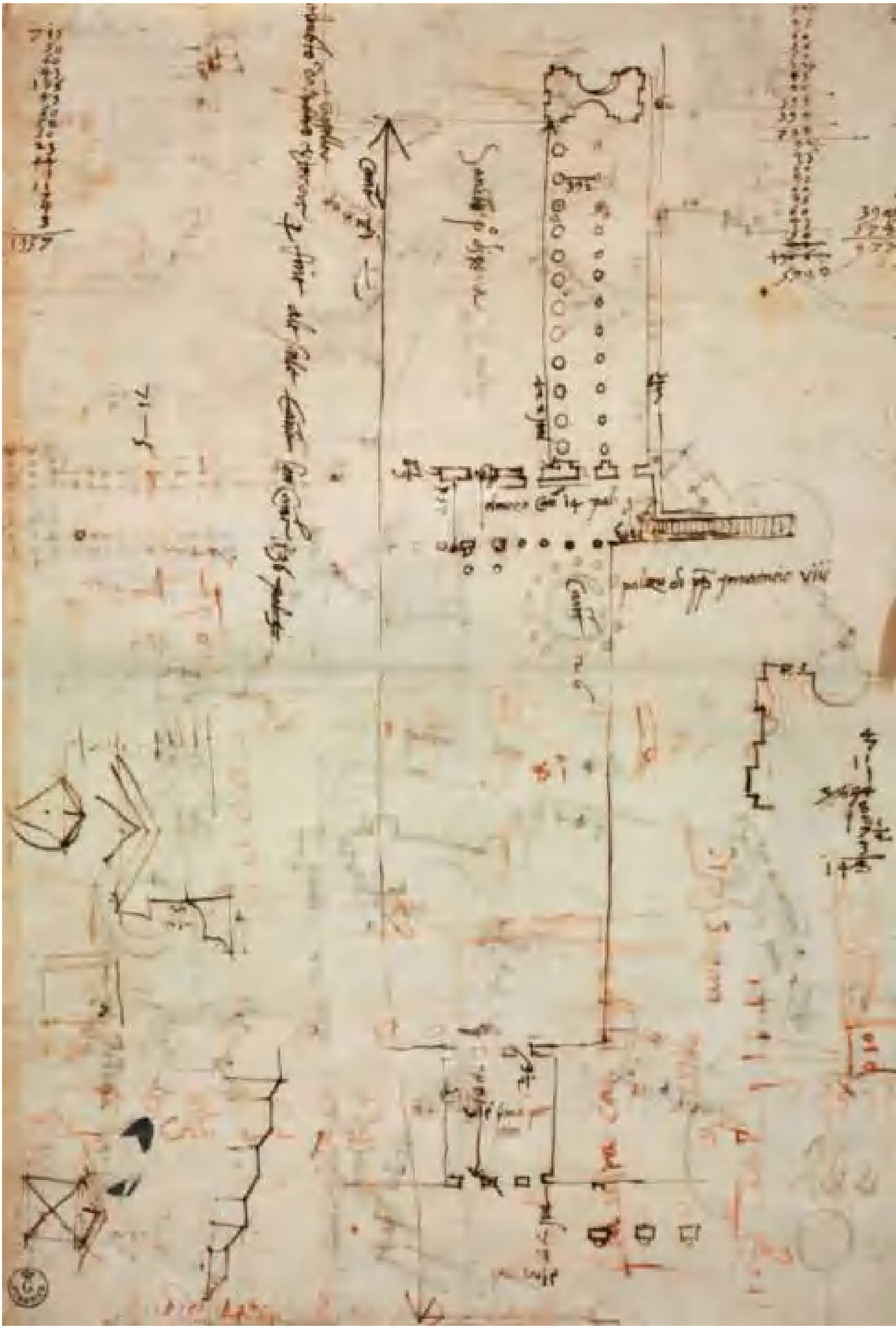
Plan of old S. Peter. Tiberio Alfarano and Natale Bonifacio da Sebenico, 1590
Biblioteca Apostolica Vaticana, Arch.Cap.S.Pietro.H.3, f. 206r



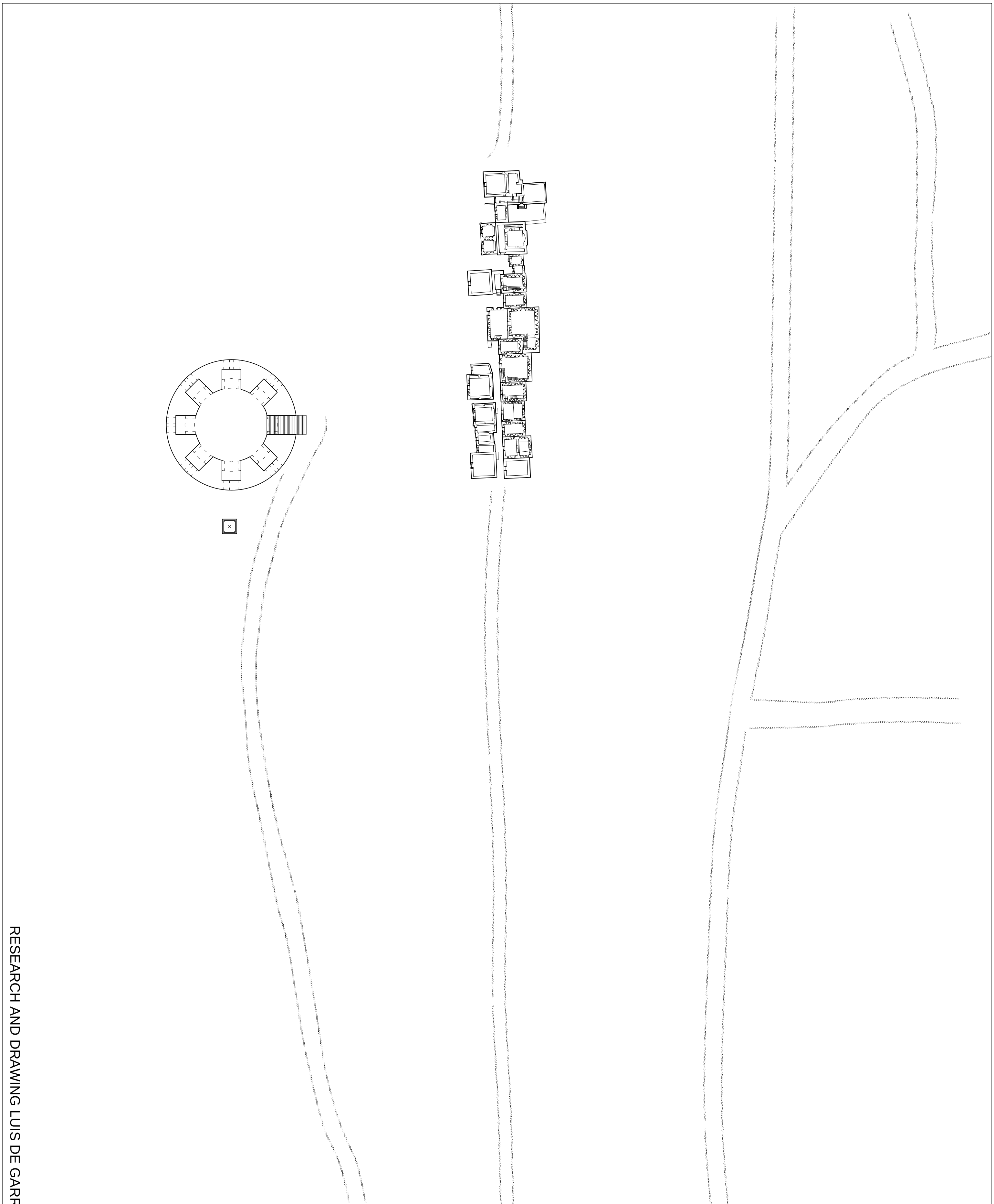
RESEARCH AND DRAWING LUIS DE GARRIDO



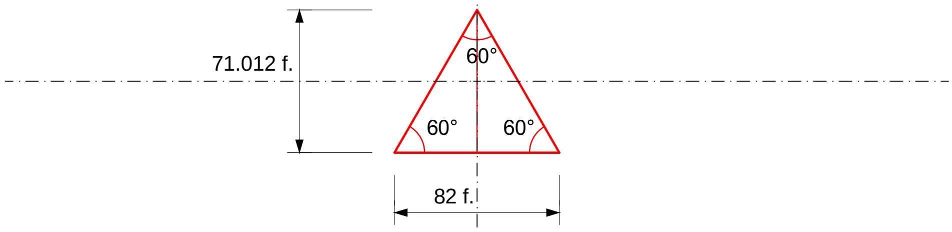
RESEARCH AND DRAWING LUIS DE GARRIDO

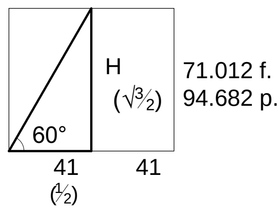


RESEARCH AND DRAWING LUIS DE GARRIDO



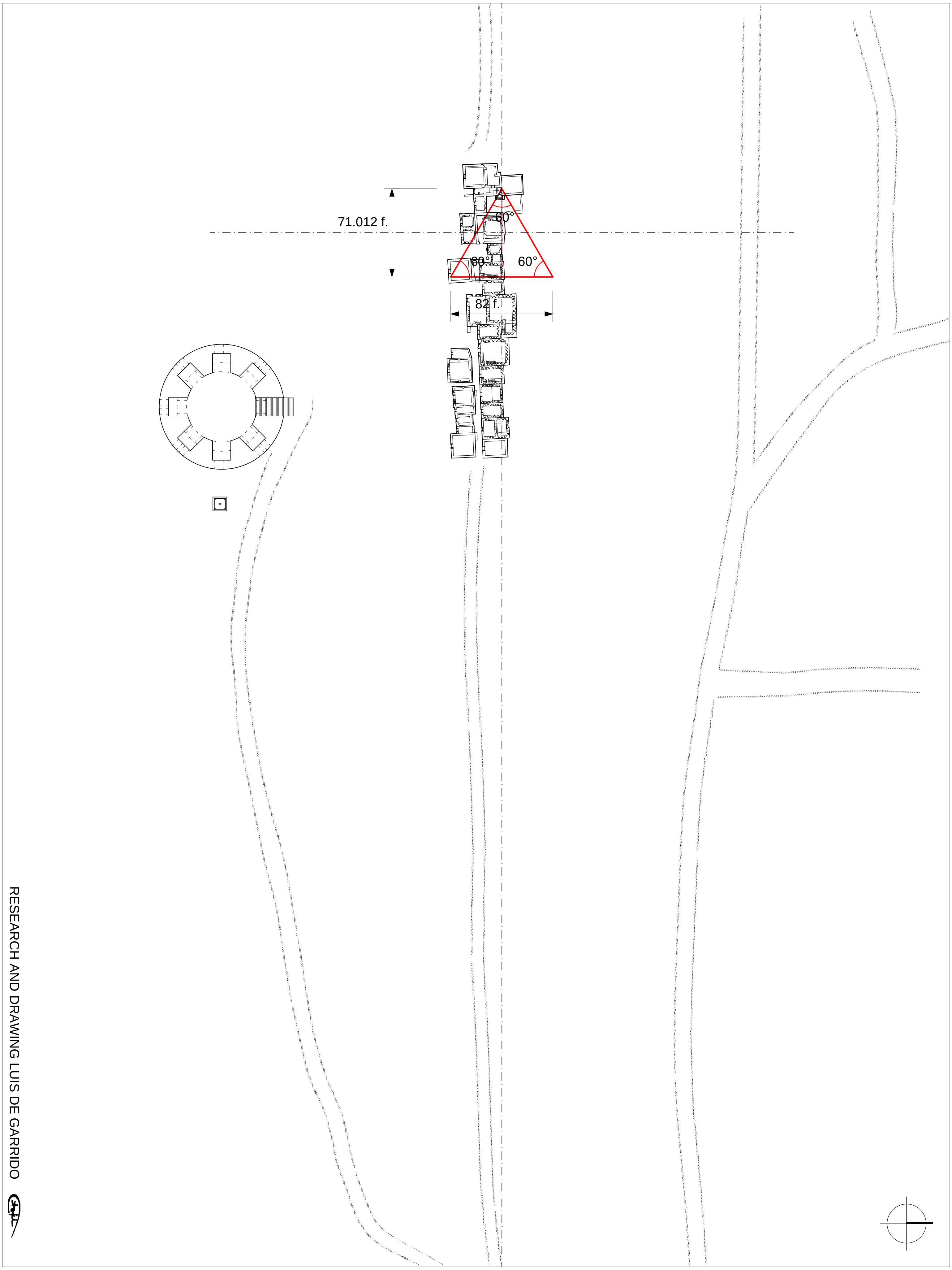
ANCIENT NECROPOLIS



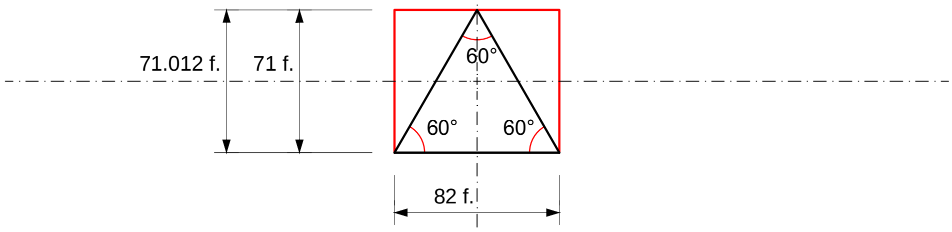


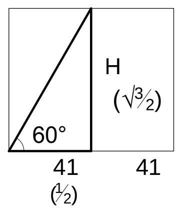
tg 60° = √3
tg 60° = H / 41
H = tg 60° * 41
H = 1.732 * 41
H = 71.012 feet (94.682 p.)

RESEARCH AND DRAWING LUIS DE GARRIDO



ORIGINAL COMPOSITING TRIANGLE SUPERPOSE WITH NECROPOLIS

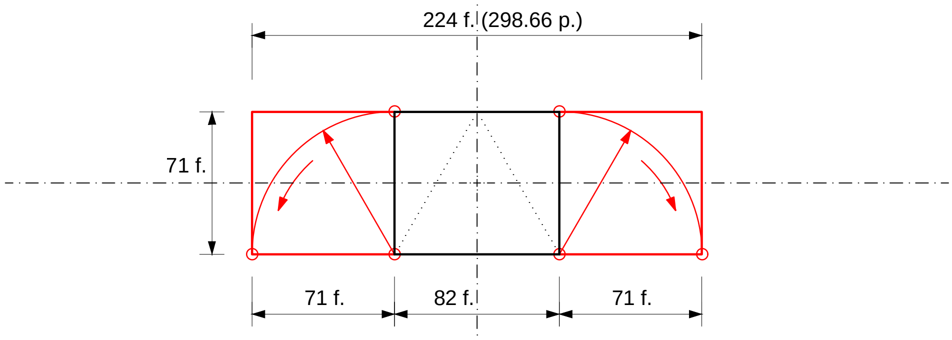




tg 60° = √3
tg 60° = H / 41
H = tg 60° * 41
H = 1.732 * 41
H = 71.012 feet (94.682 p.)

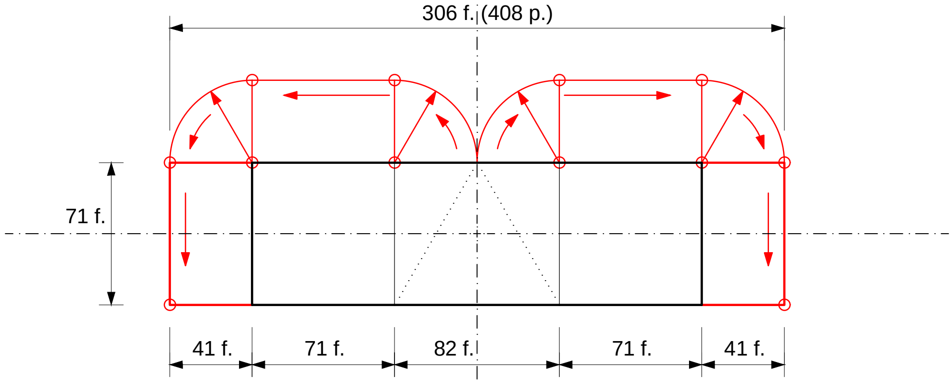
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE CROSSING



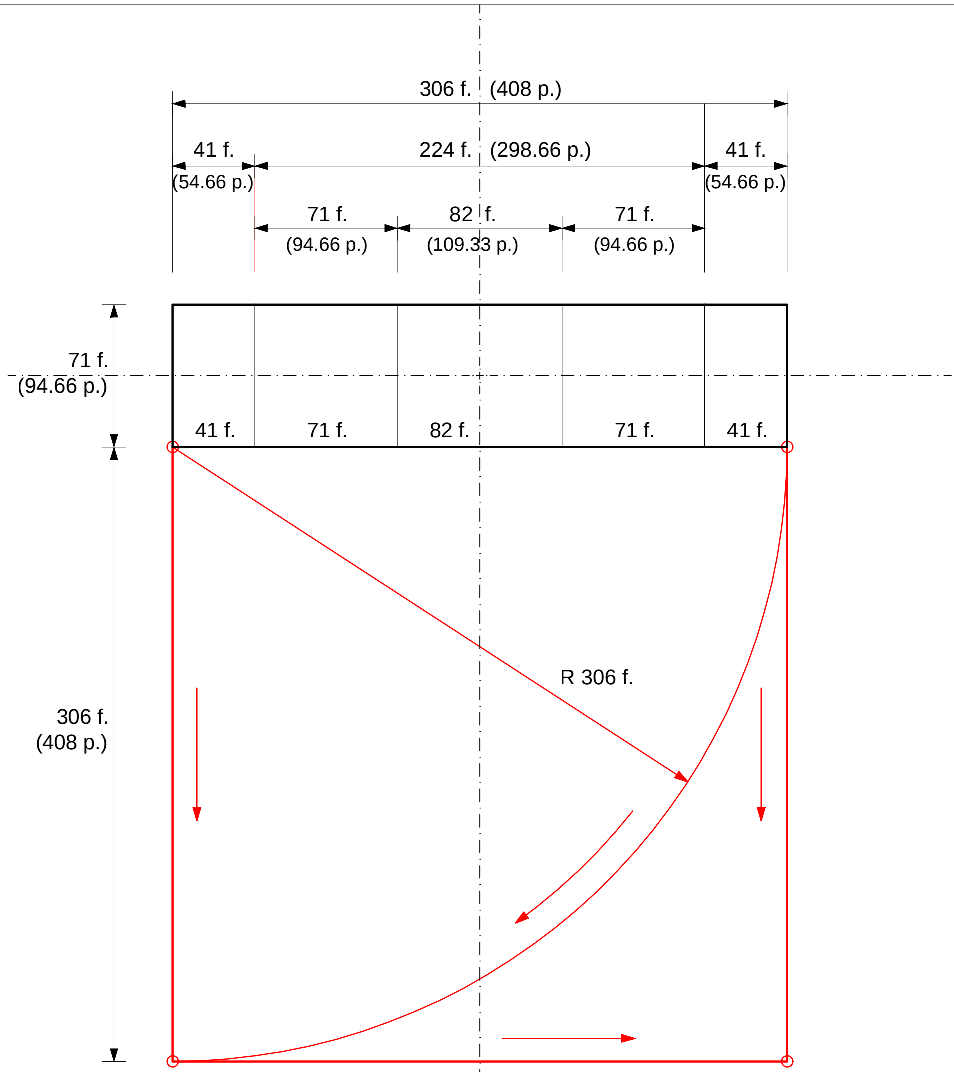
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE TRANSEPT



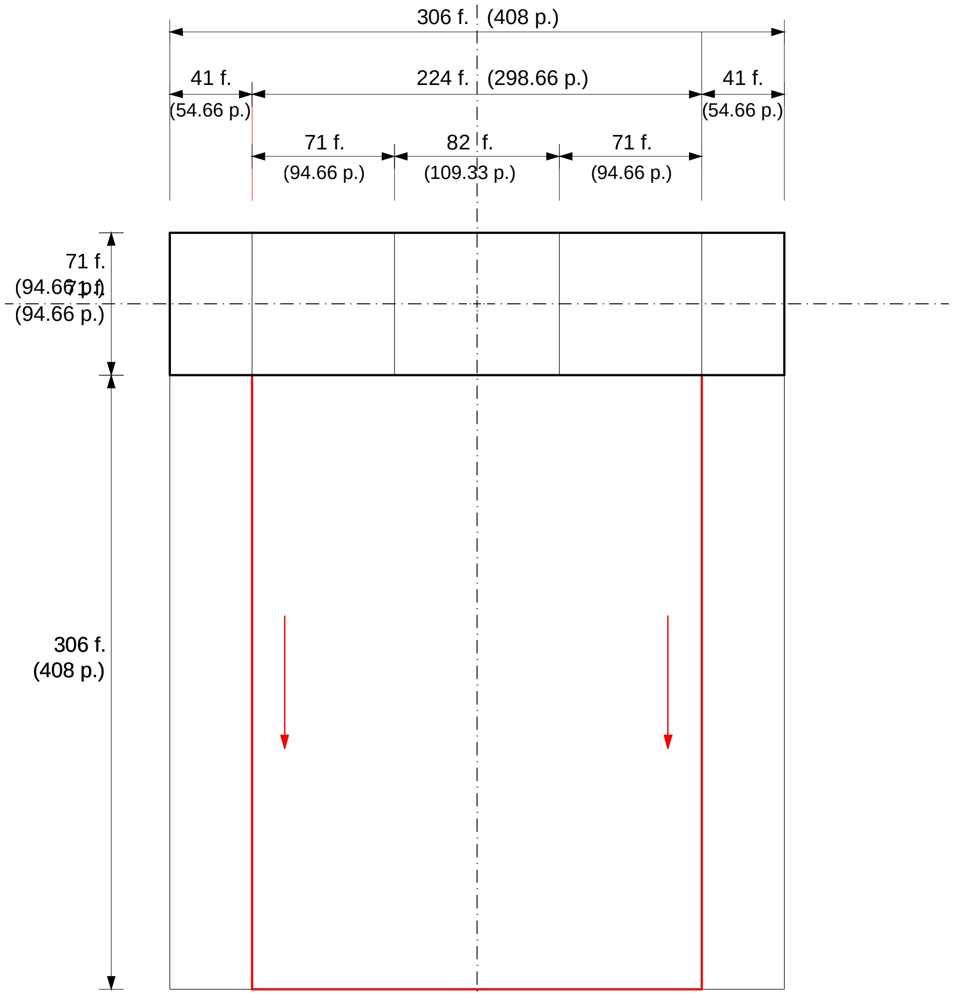
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE EXEDRAS

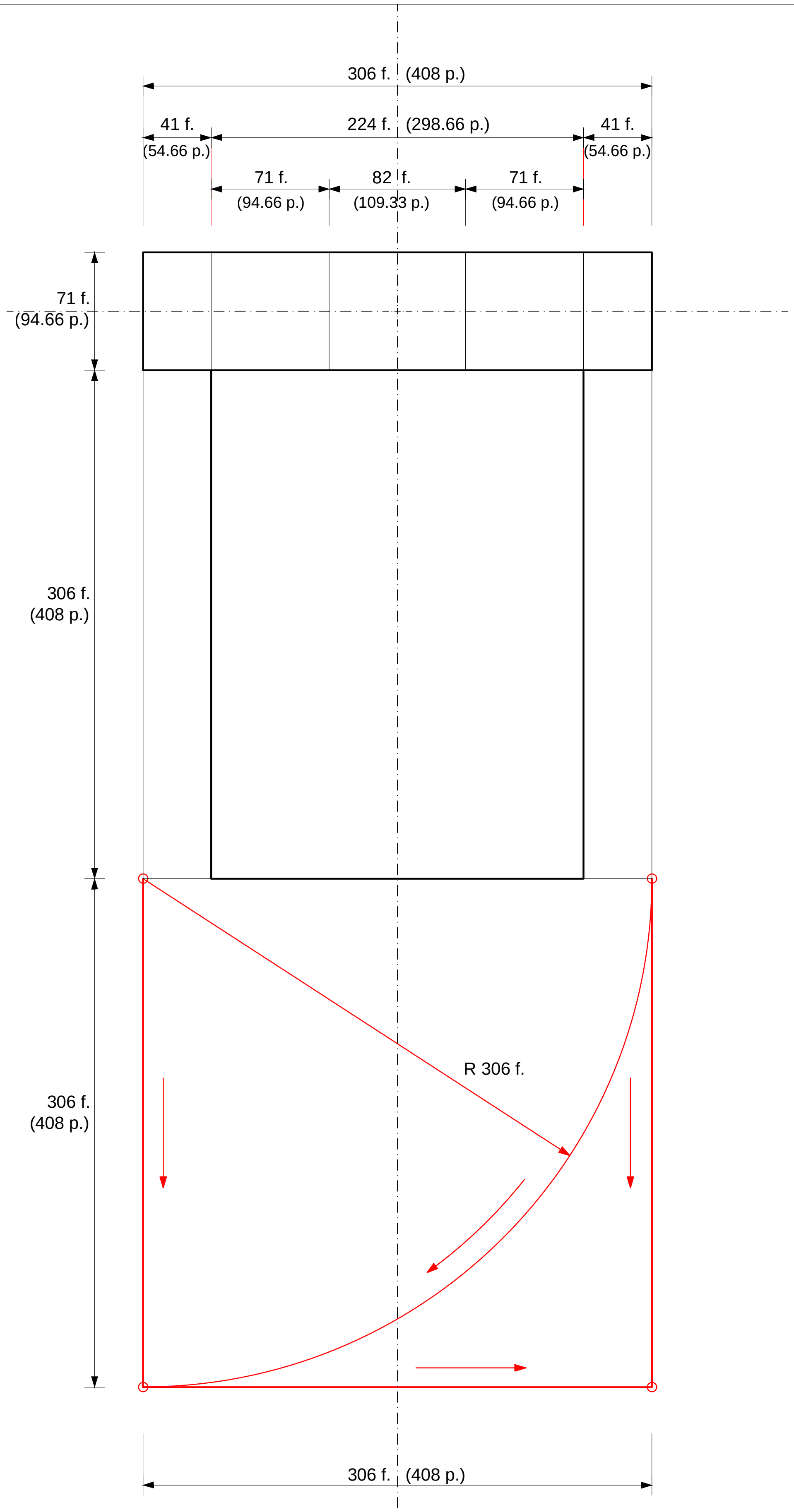


RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE MAIN BODY (I)

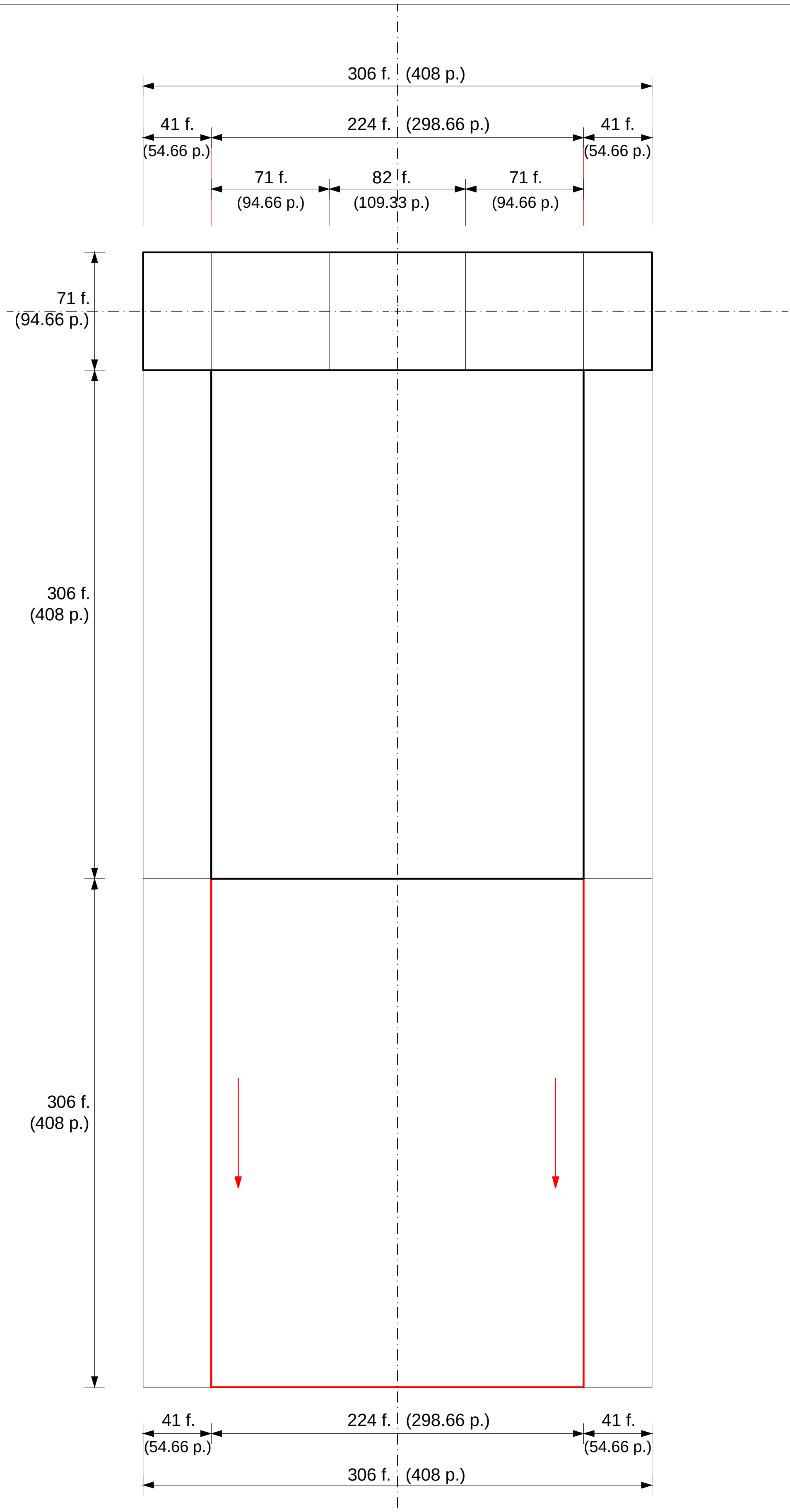


RESEARCH AND DRAWING LUIS DE GARRIDO



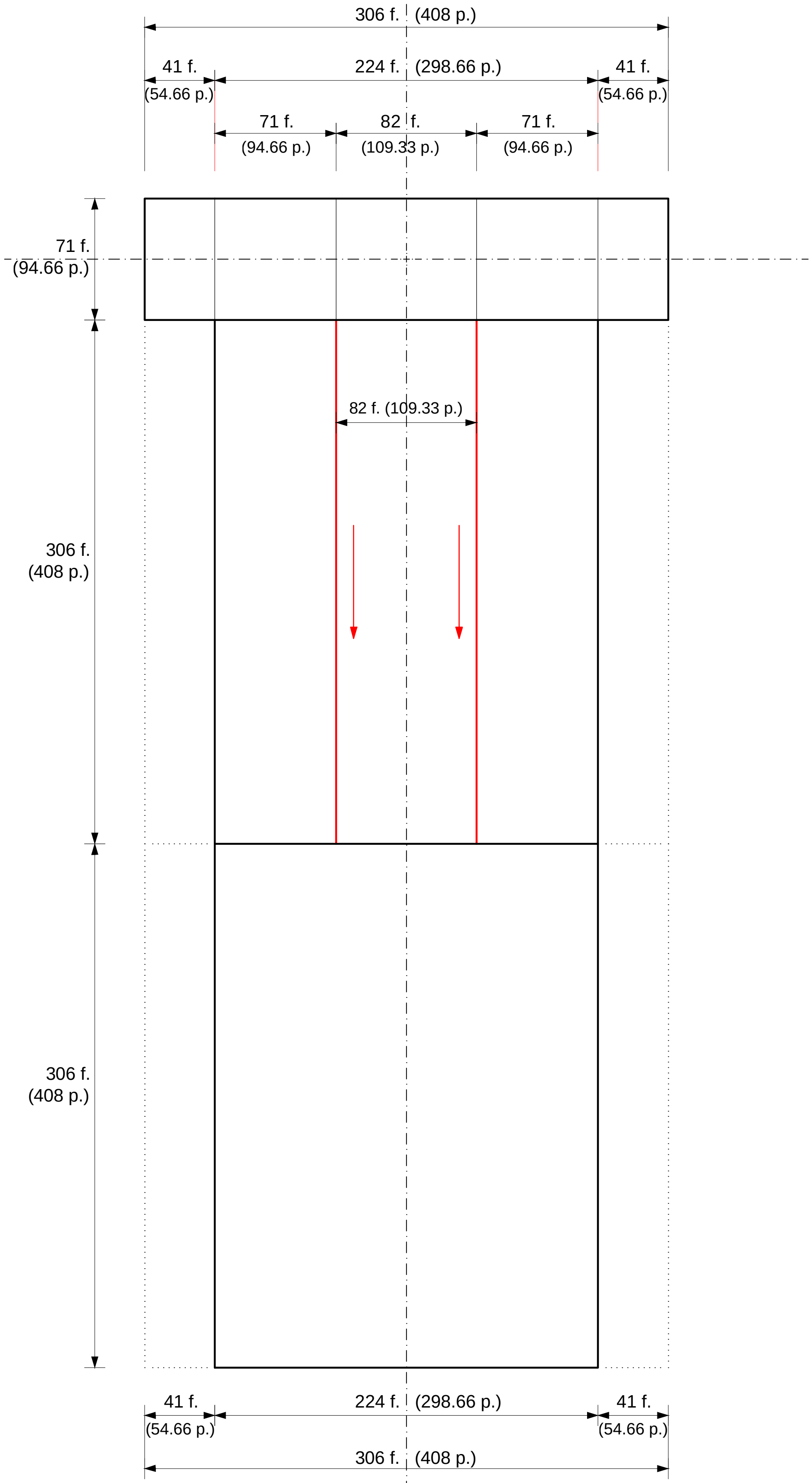
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE ANTERIOR BODY (I)



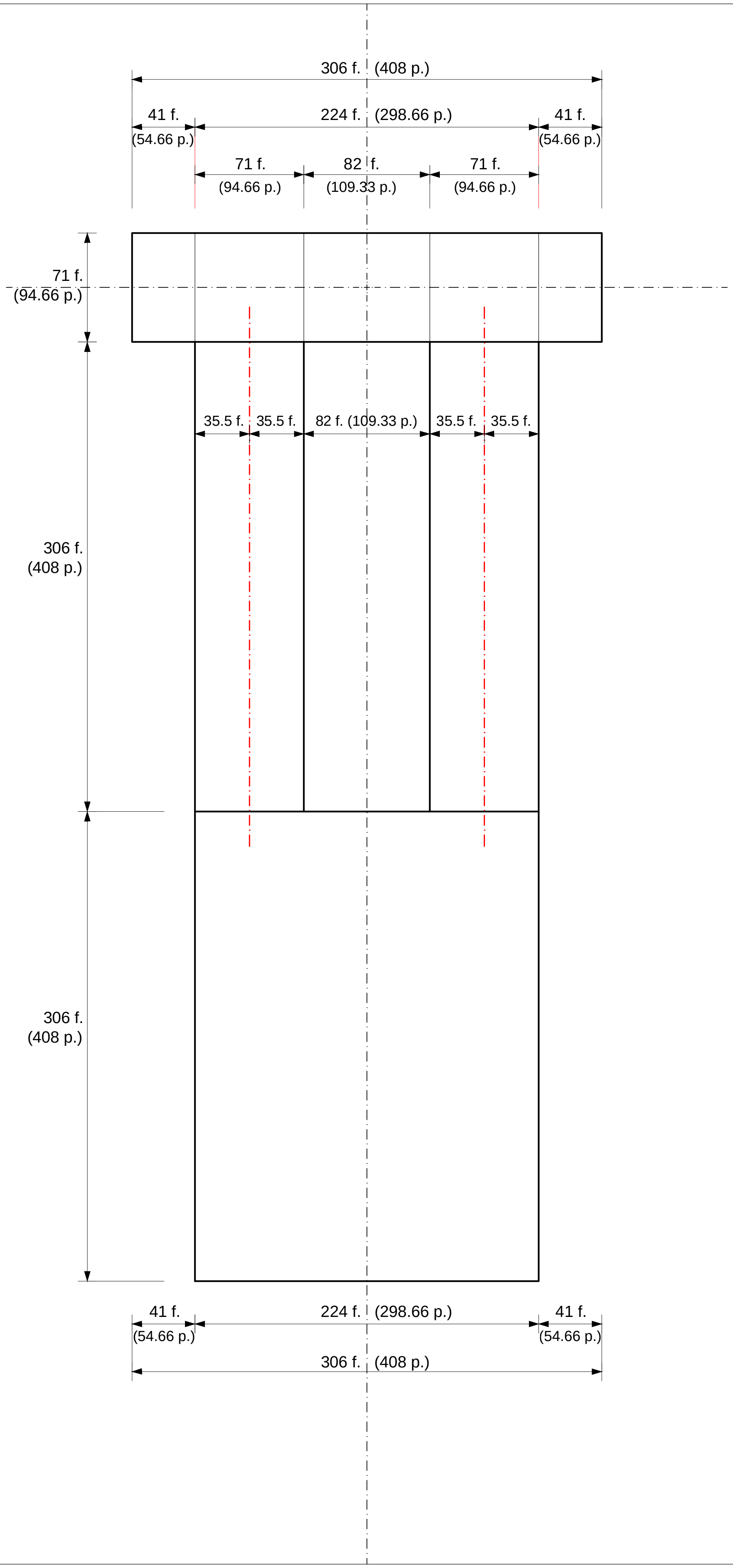
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE ANTERIOR BODY (II)



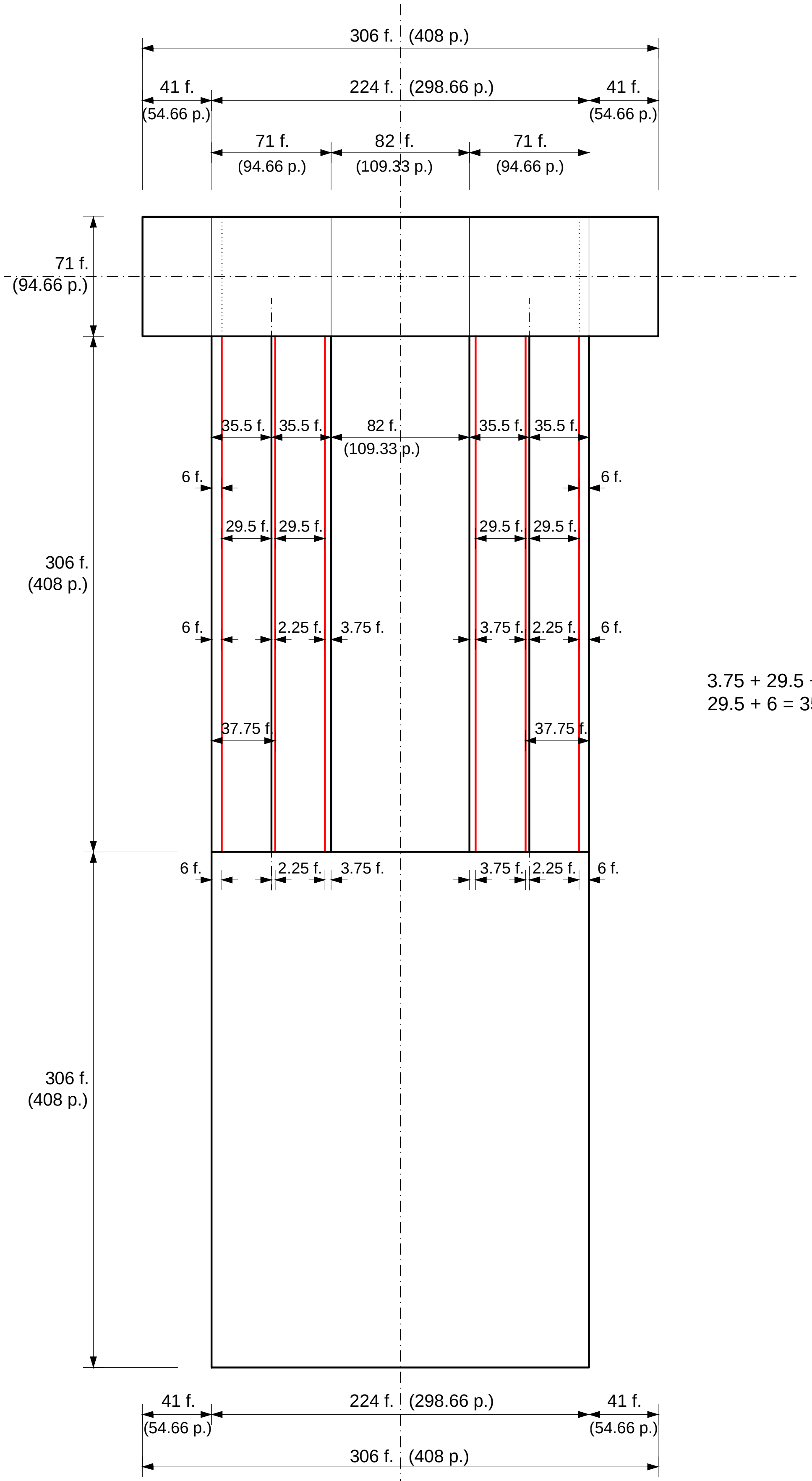
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE MAIN NAVE AND THE CROSSING



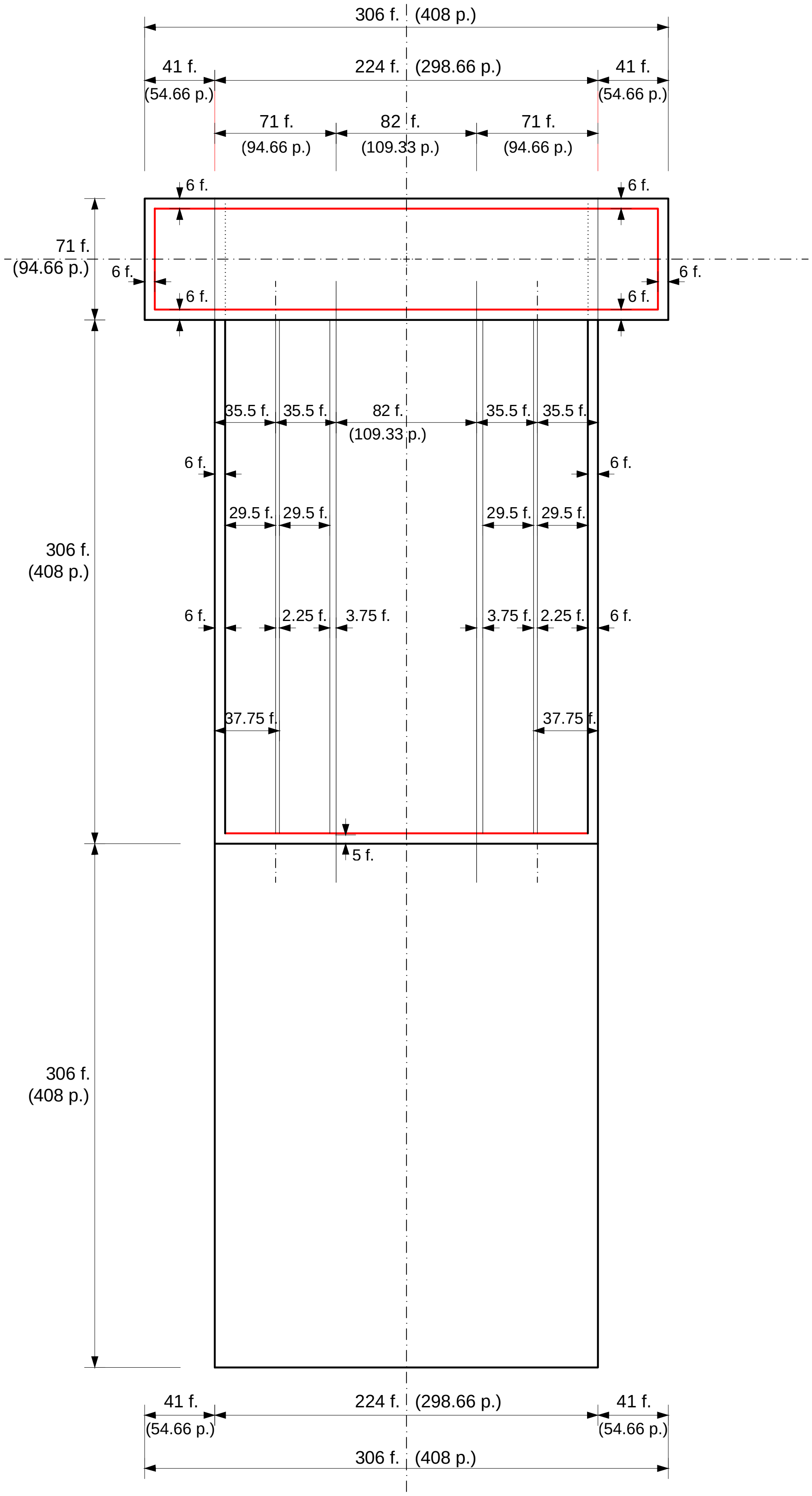
RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE AXES OF LATERAL SPACES

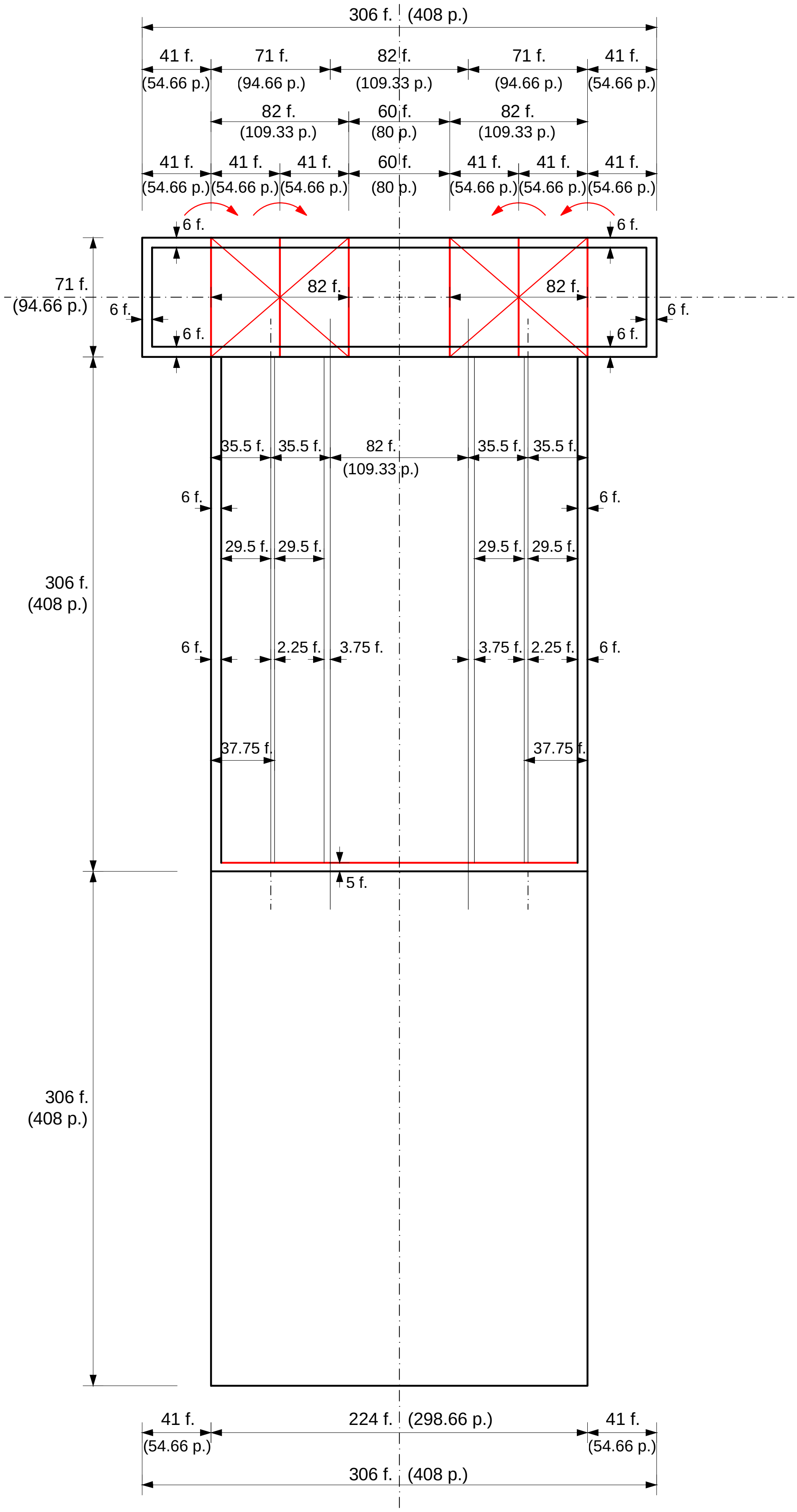


3.75 + 29.5 + 2.25 = 35.5 f.
29.5 + 6 = 35.5 f.

RESEARCH AND DRAWING LUIS DE GARRIDO

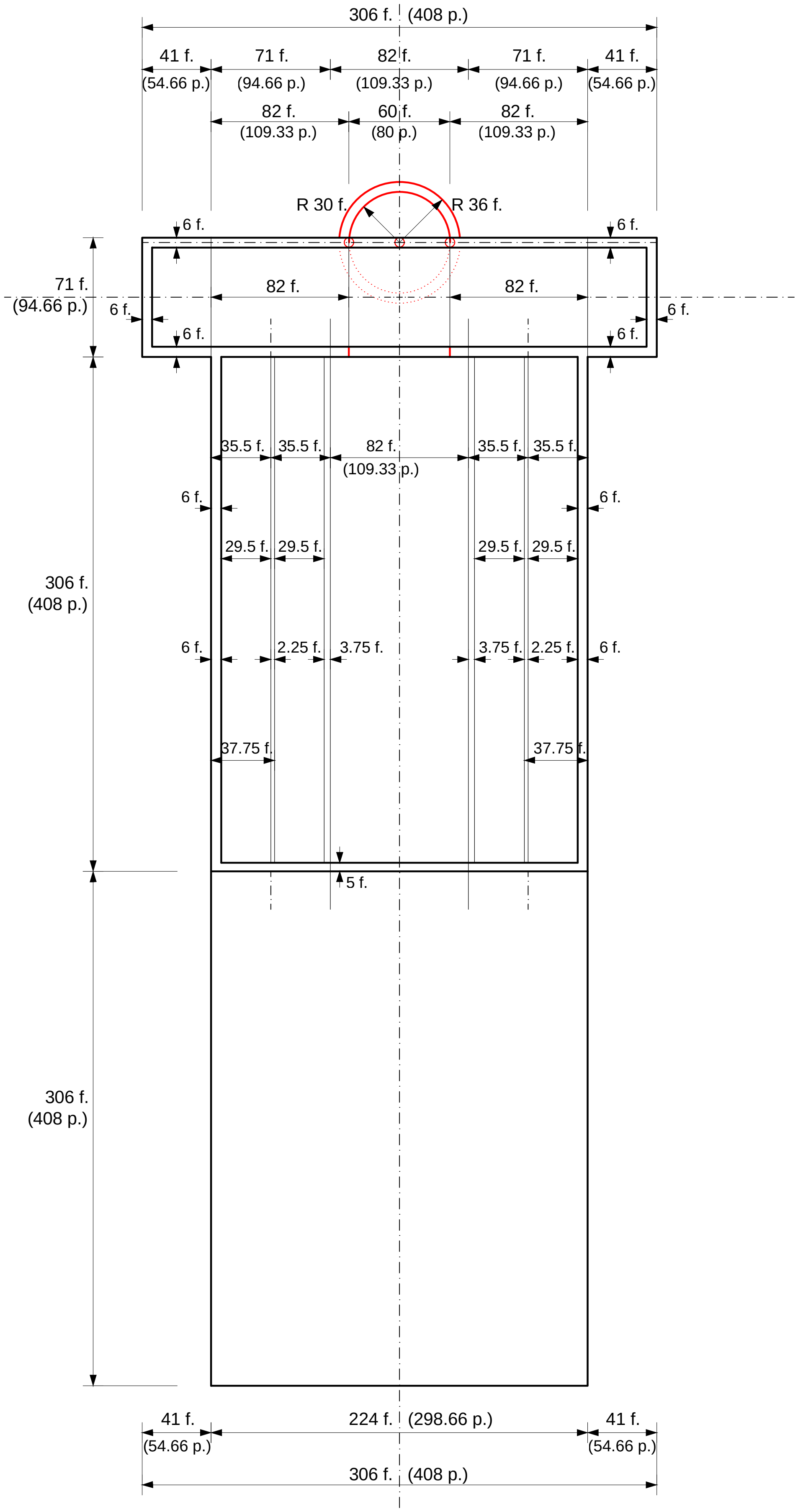


RESEARCH AND DRAWING LUIS DE GARRIDO

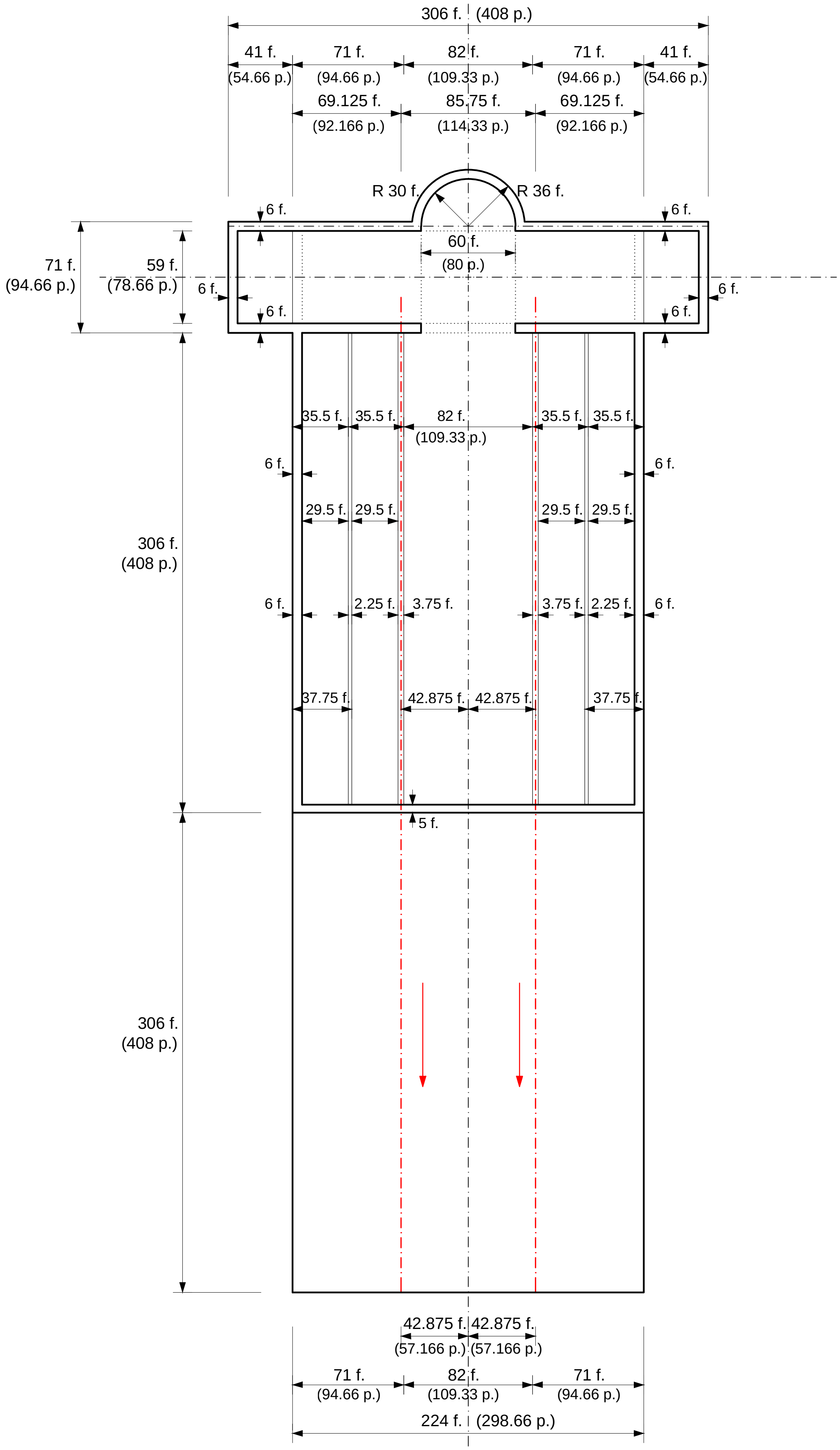


RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE WIDTH OF CONSTANTINE ARCH AND APSE

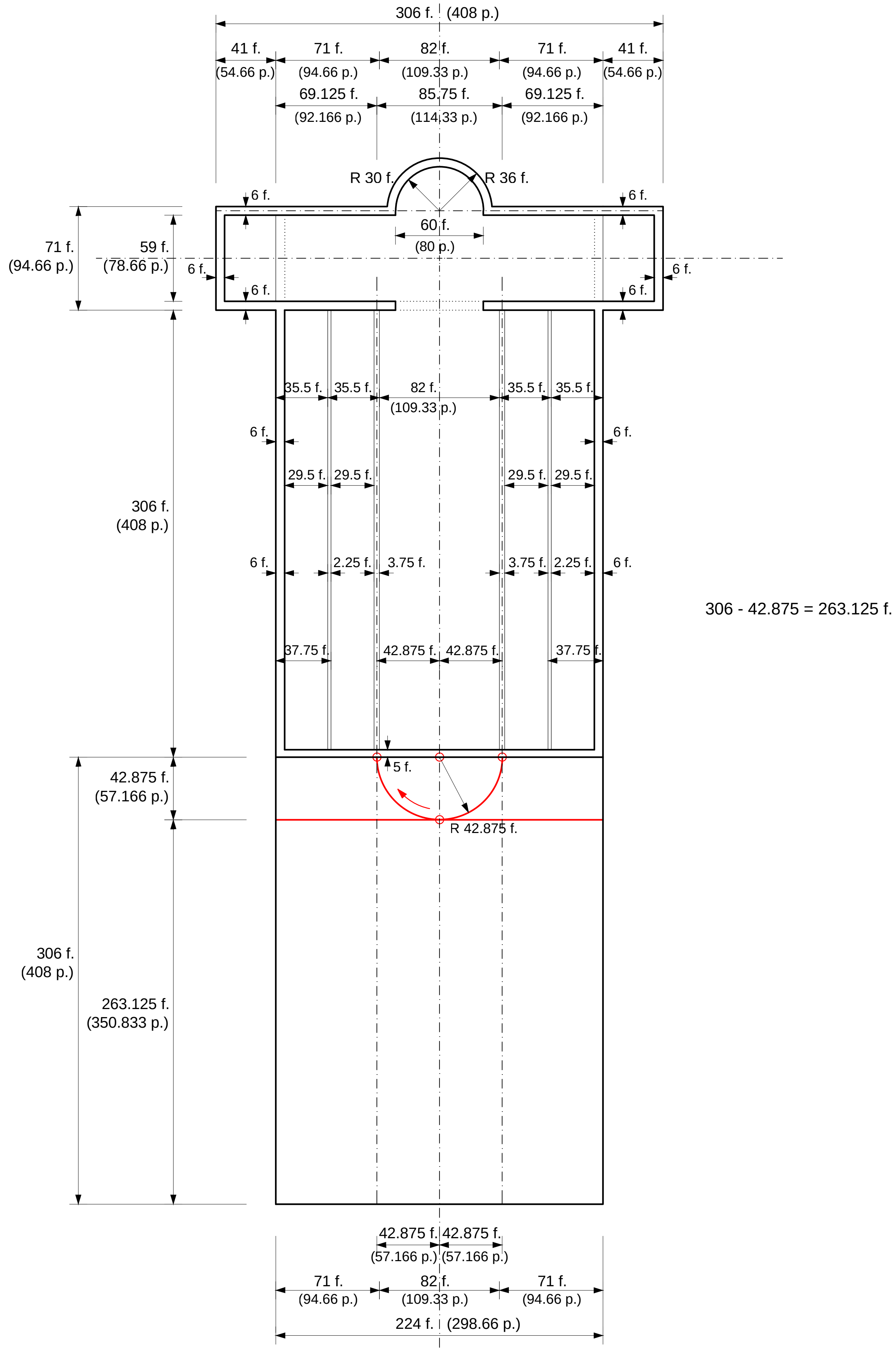


RESEARCH AND DRAWING LUIS DE GARRIDO

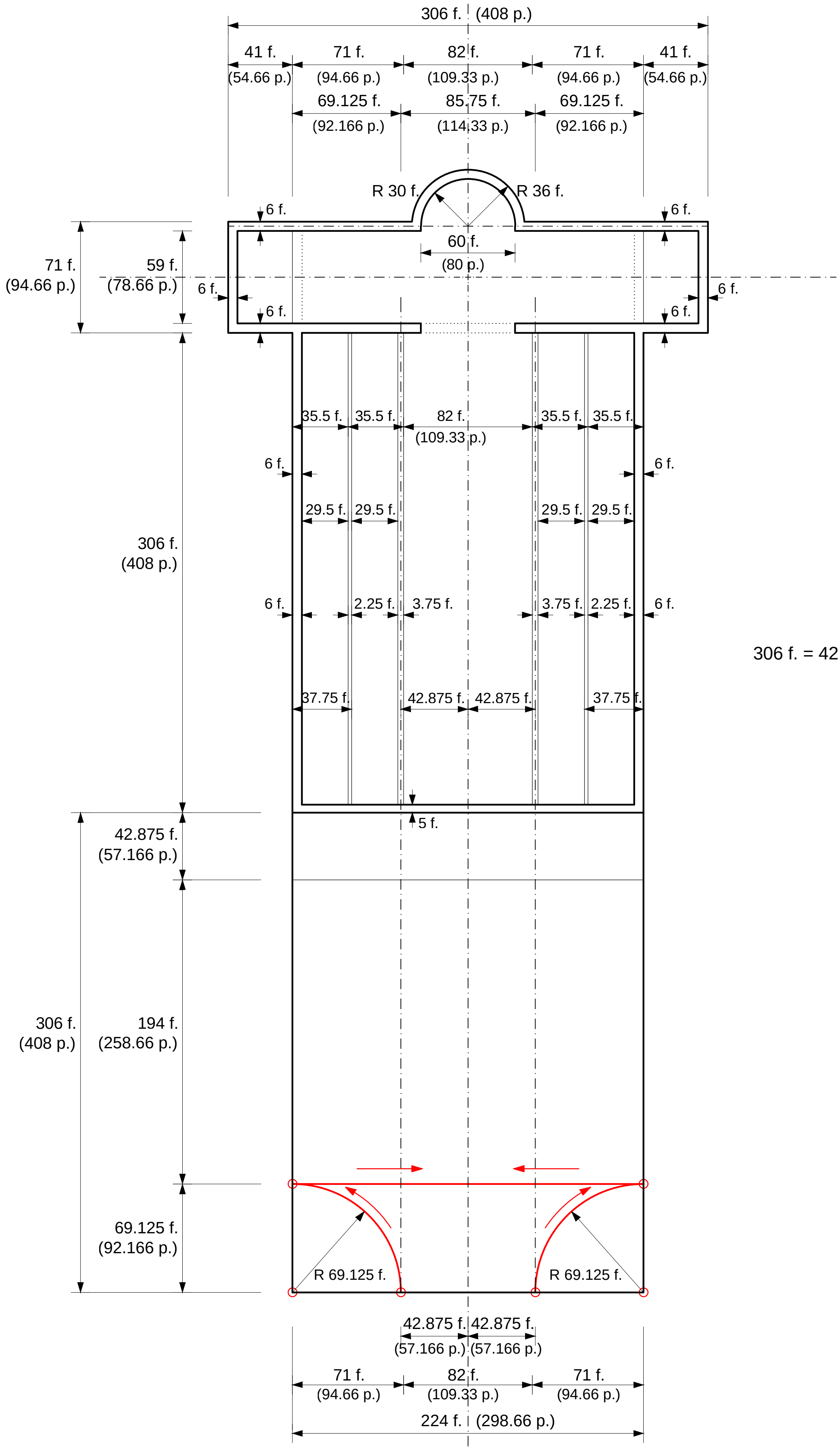


RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE AXES OF THE CENTRAL NAVE

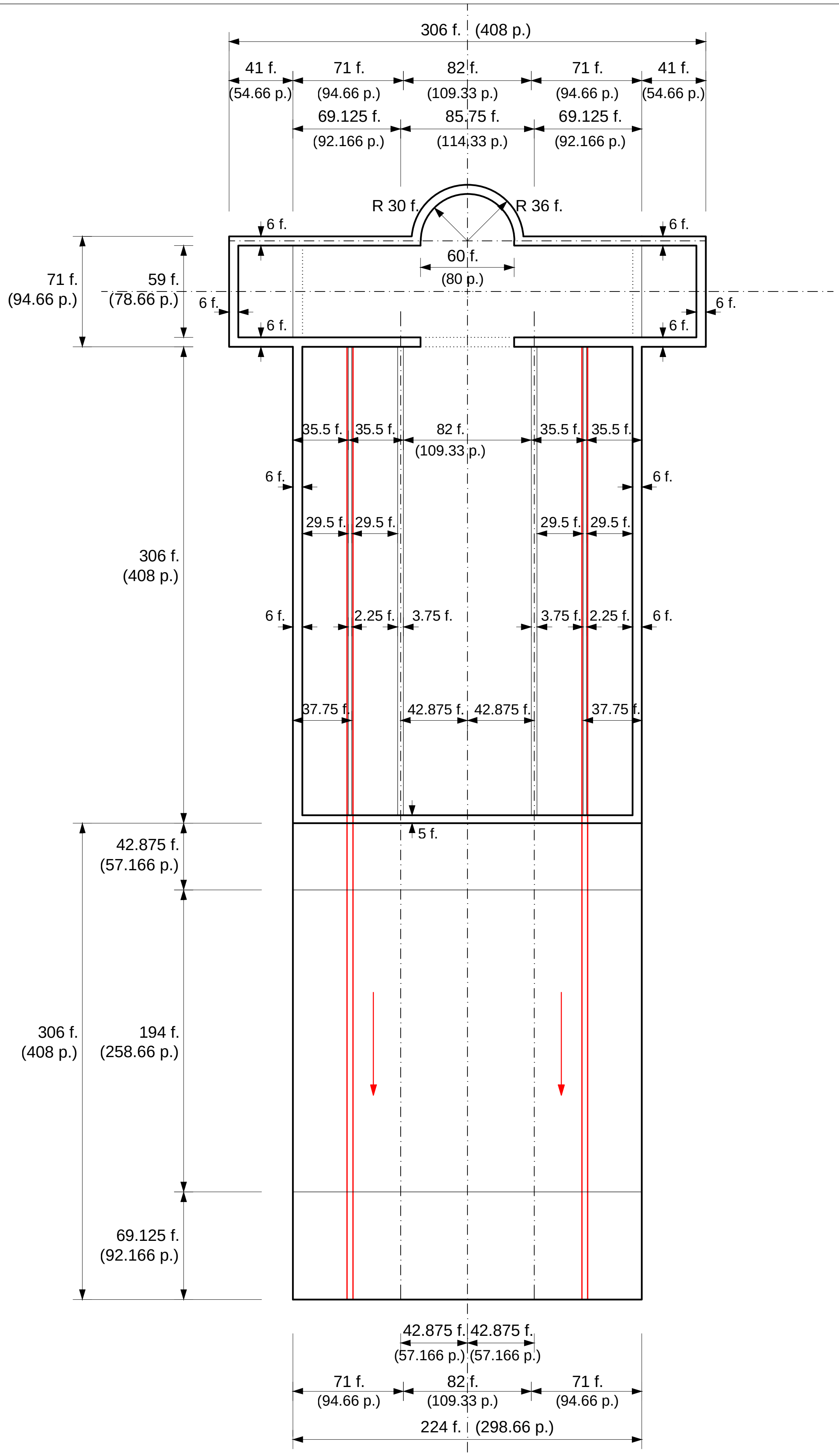


RESEARCH AND DRAWING LUIS DE GARRIDO

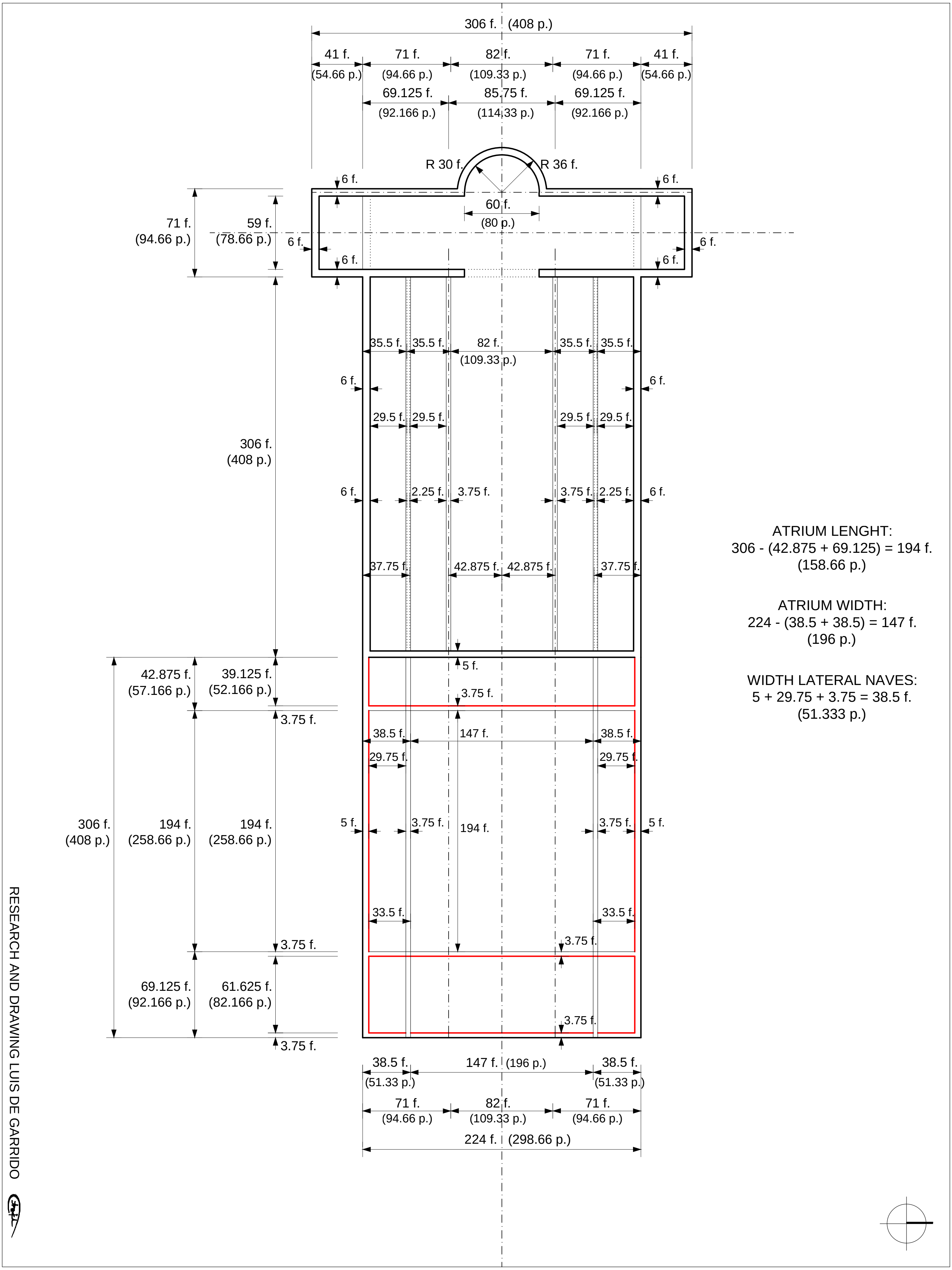


306 f. = 42.875 + 194 + 69.125

RESEARCH AND DRAWING LUIS DE GARRIDO



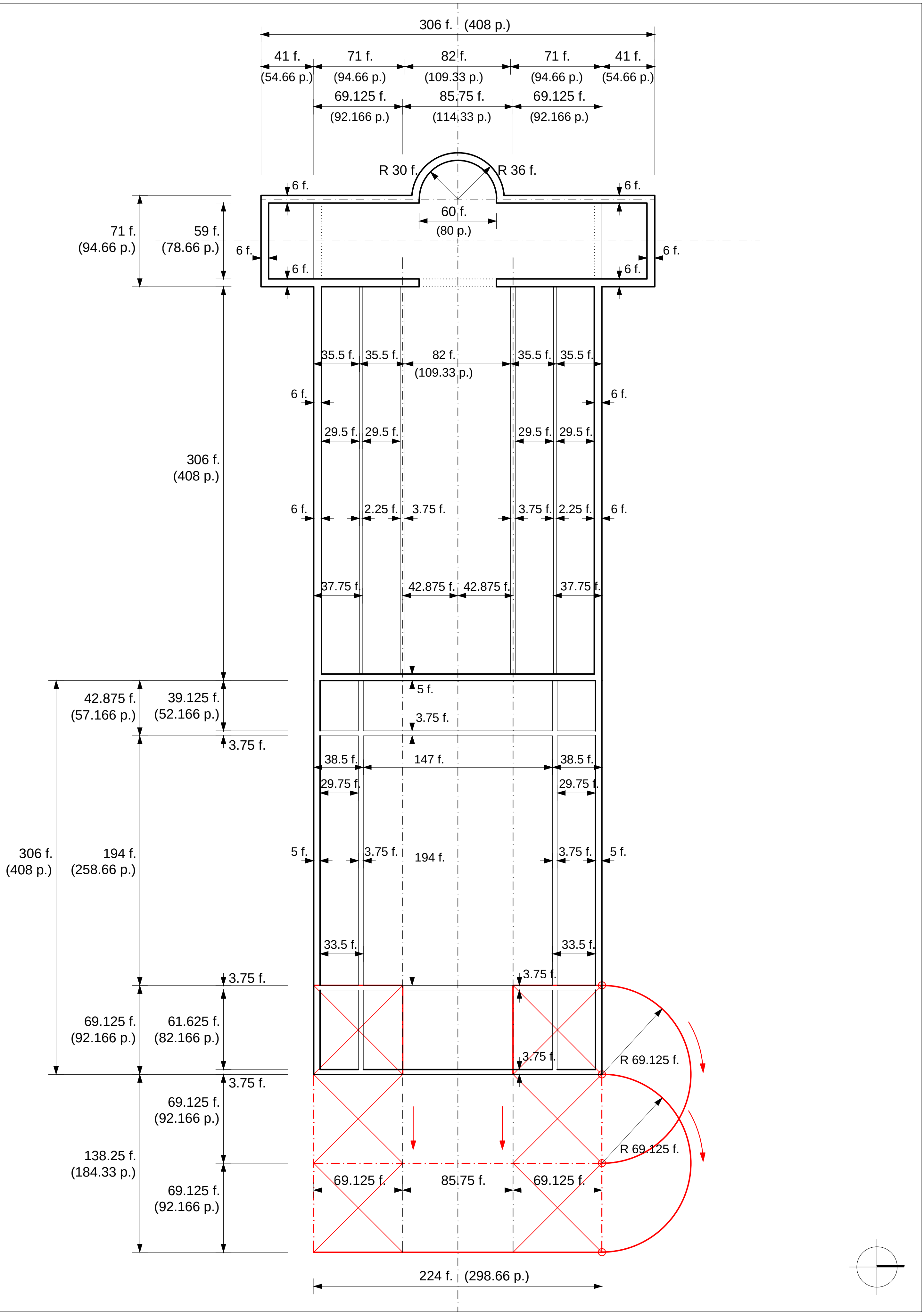
RESEARCH AND DRAWING LUIS DE GARRIDO



ATRIUM LENGHT:
306 - (42.875 + 69.125) = 194 f.
(158.66 p.)

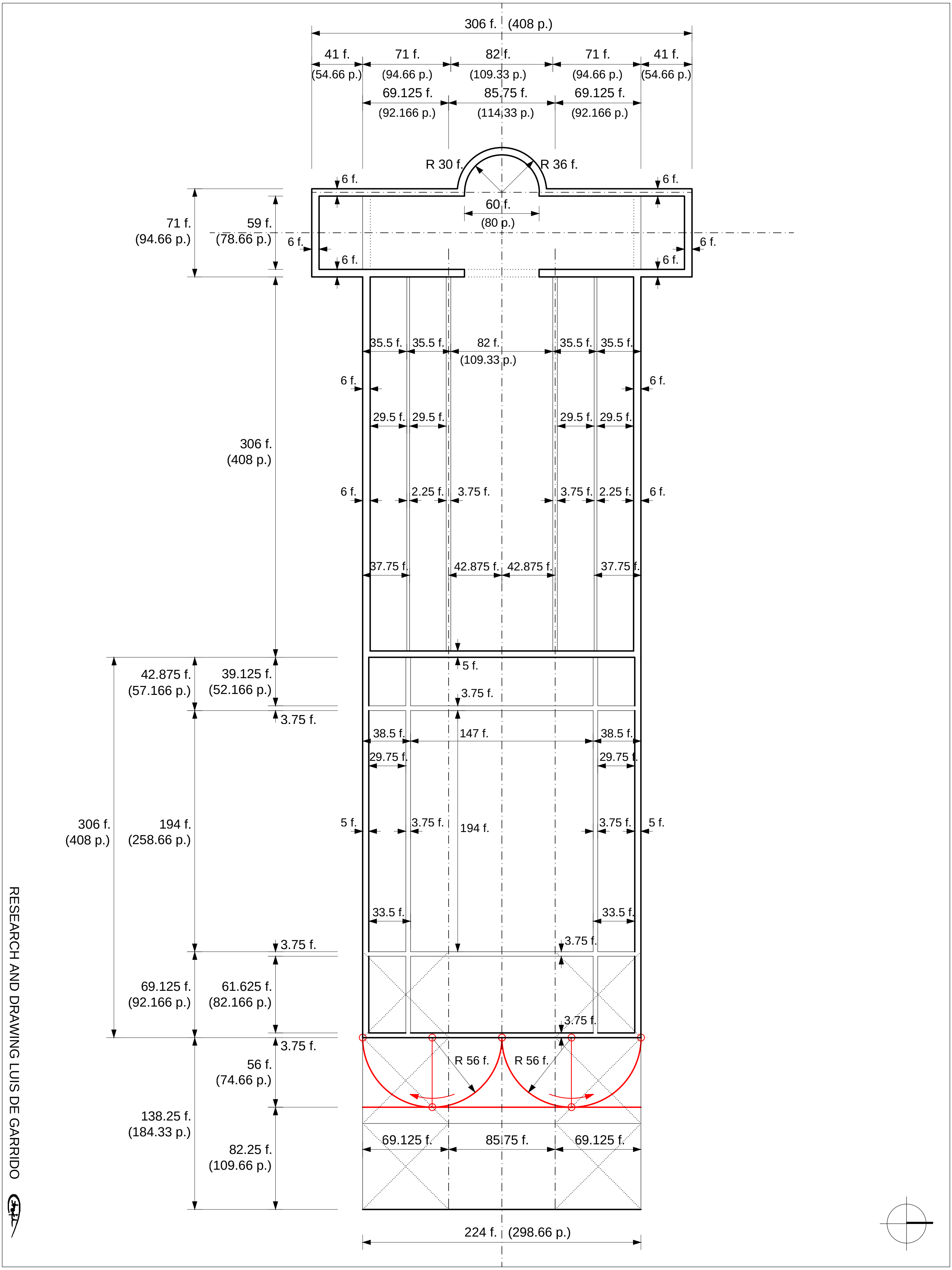
ATRIUM WIDTH:
224 - (38.5 + 38.5) = 147 f.
(196 p.)

WIDTH LATERAL NAVES:
5 + 29.75 + 3.75 = 38.5 f.
(51.333 p.)

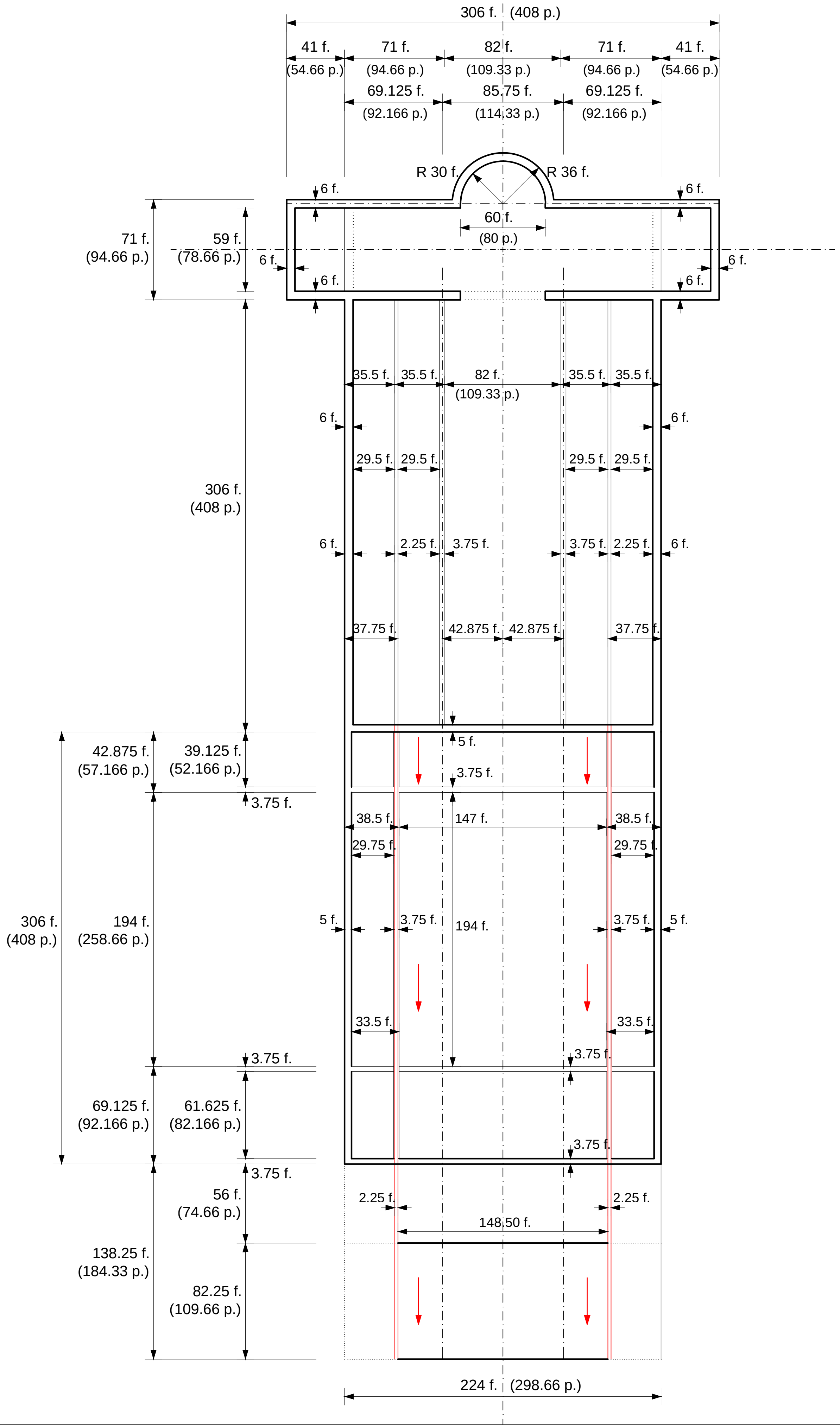


RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE LENGHT OF THE STAIRCASE

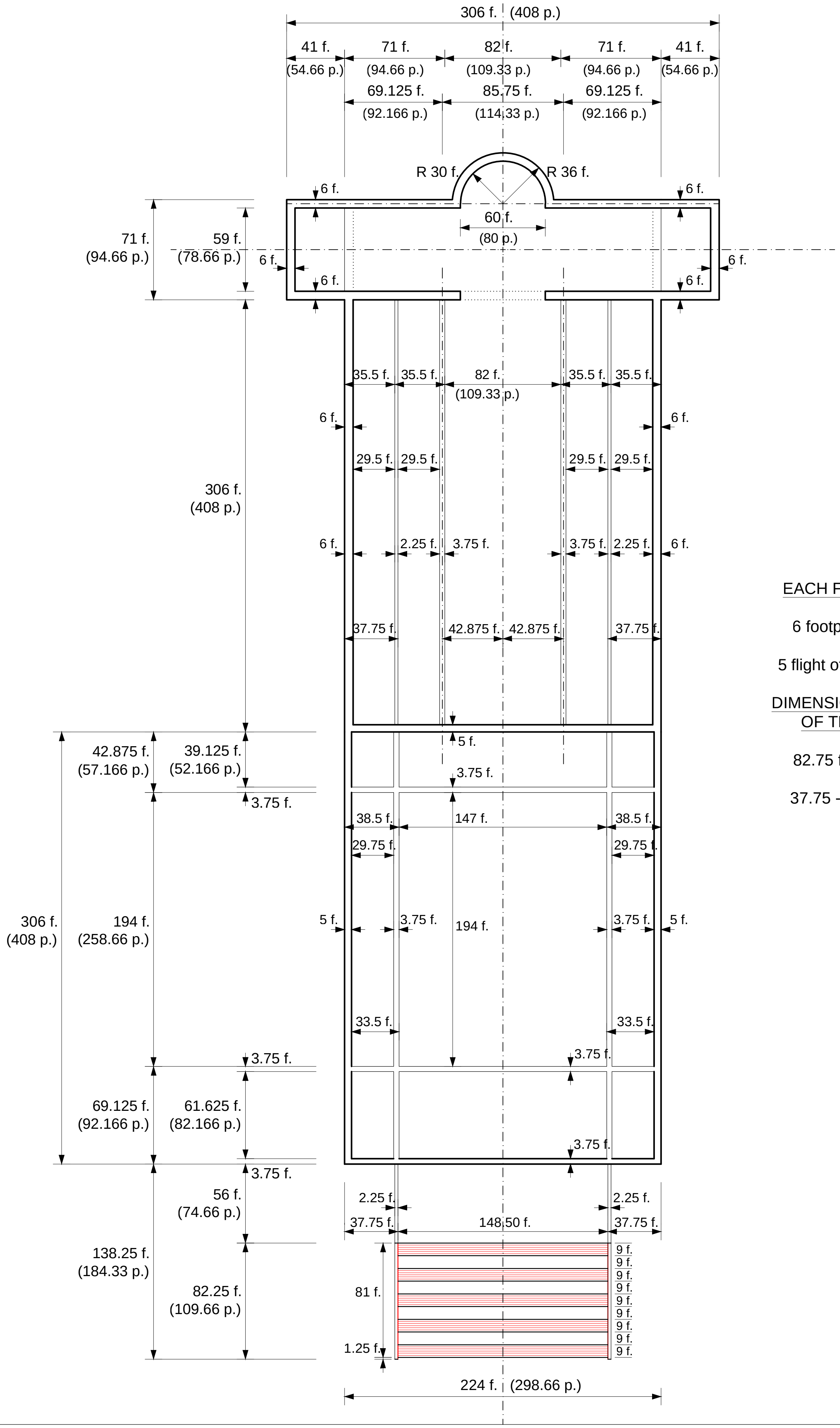


DETERMINATION OF THE ACCESS PLATFORM OF THE STAIRCASE



RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE WIDTH OF THE STAIRCASE



EACH FLIGHT OF STEPS

6 footprints x 1.5 f. = 9 f.

5 flight of steps: 9 x 5 = 45 f.

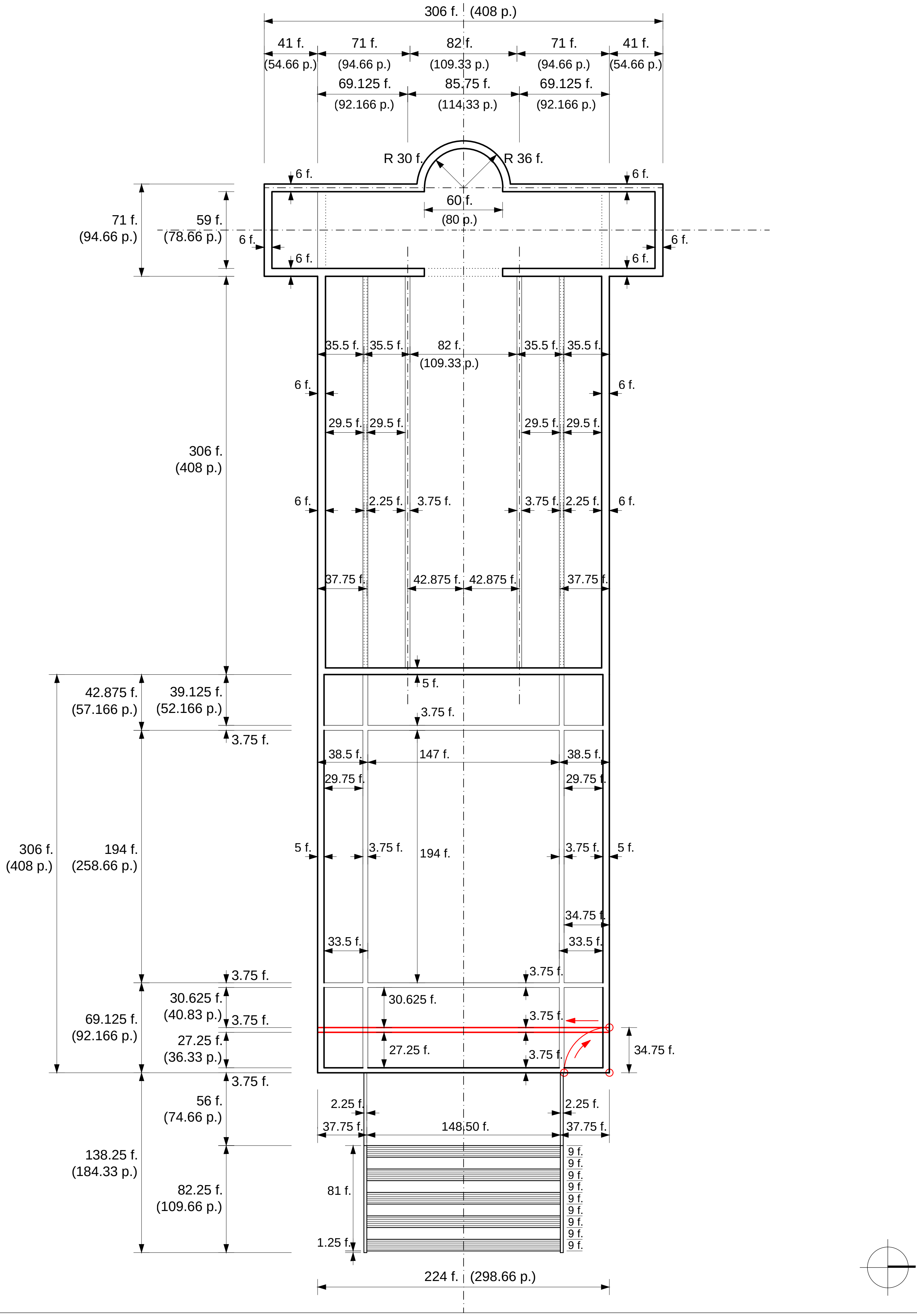
DIMENSION OF THE RESTS OF THE STAIRCASE

82.75 f. - 45 f. = 37.75 f.

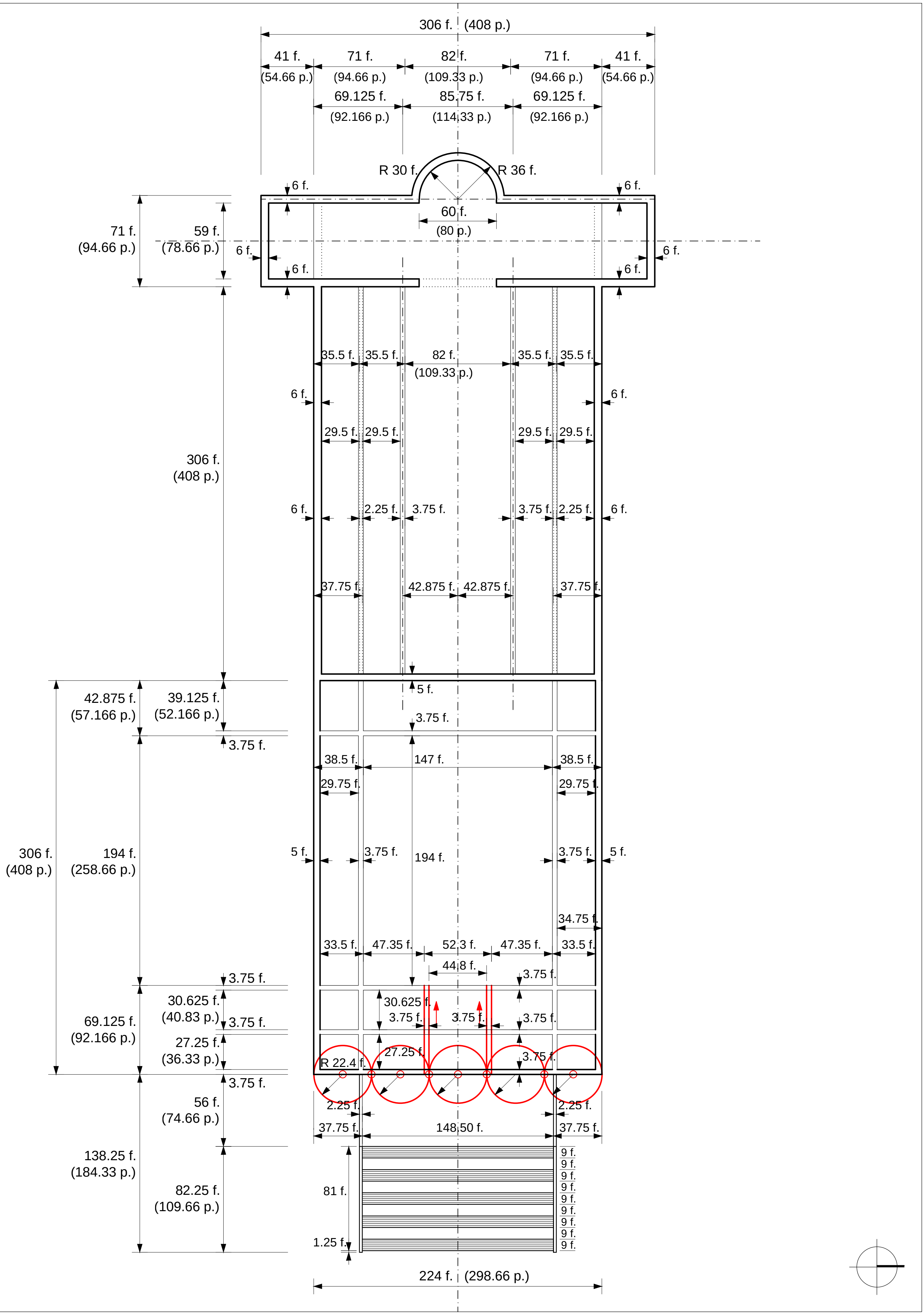
37.75 - (4 x 9 f.) = 1.25 f.

RESEARCH AND DRAWING LUIS DE GARRIDO

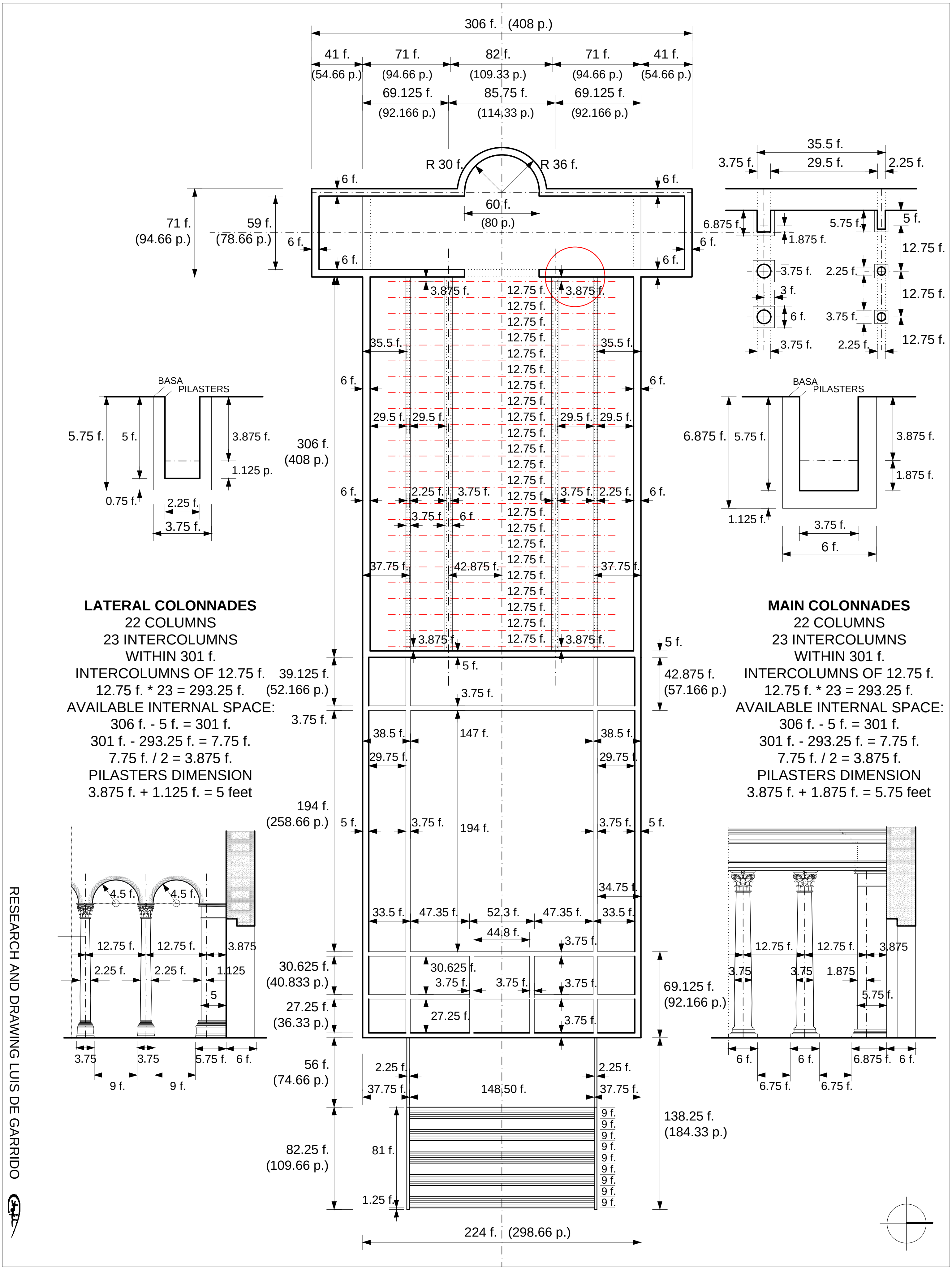
DETERMINATION OF THE ENTRANCE STAIRS



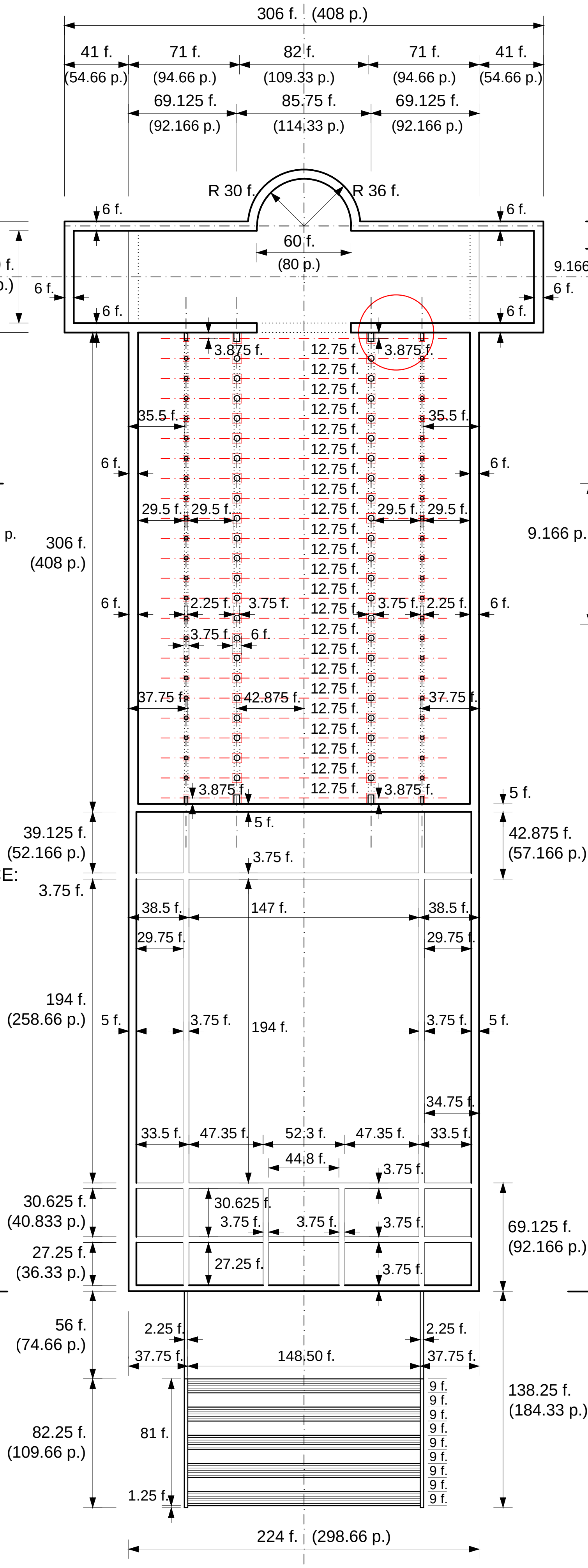
RESEARCH AND DRAWING LUIS DE GARRIDO

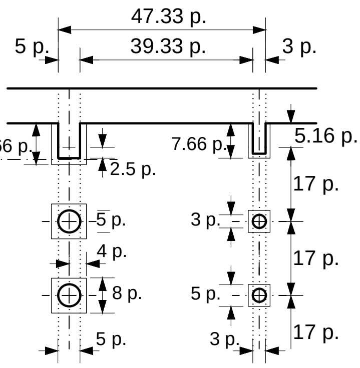


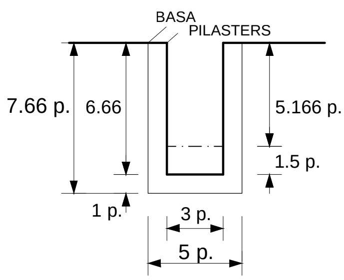
RESEARCH AND DRAWING LUIS DE GARRIDO

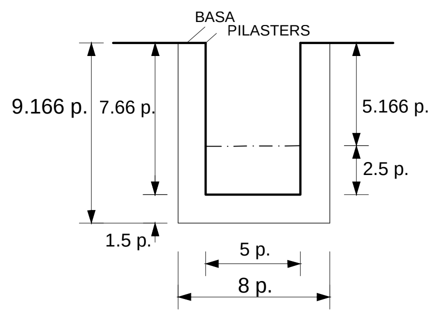


DETERMINATION OF THE AXES OF THE COLUMNS OF THE NAVES







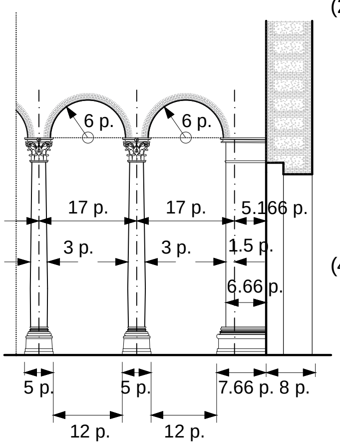


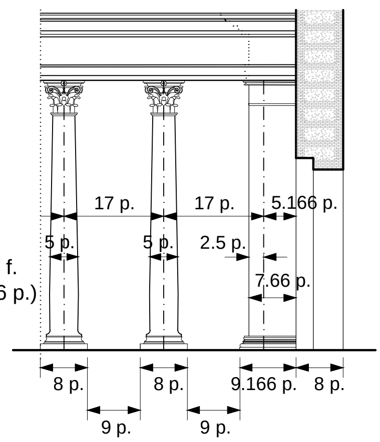
LATERAL COLONNADES

22 COLUMNS
23 INTERCOLUMNS
WITHIN 401.33 p.
INTERCOLUMNS OF 17 p.
17 p. * 23 = 391 p.
AVAILABLE INTERNAL SPACE:
408 p. - 6.66 p. = 401.33 p.
401.33 - 391 p. = 10.33 p.
10.33 p. / 2 = 5.166 p.
PILASTERS DIMENSION
5.166 p. + 1.5 p. = 6.666 p.

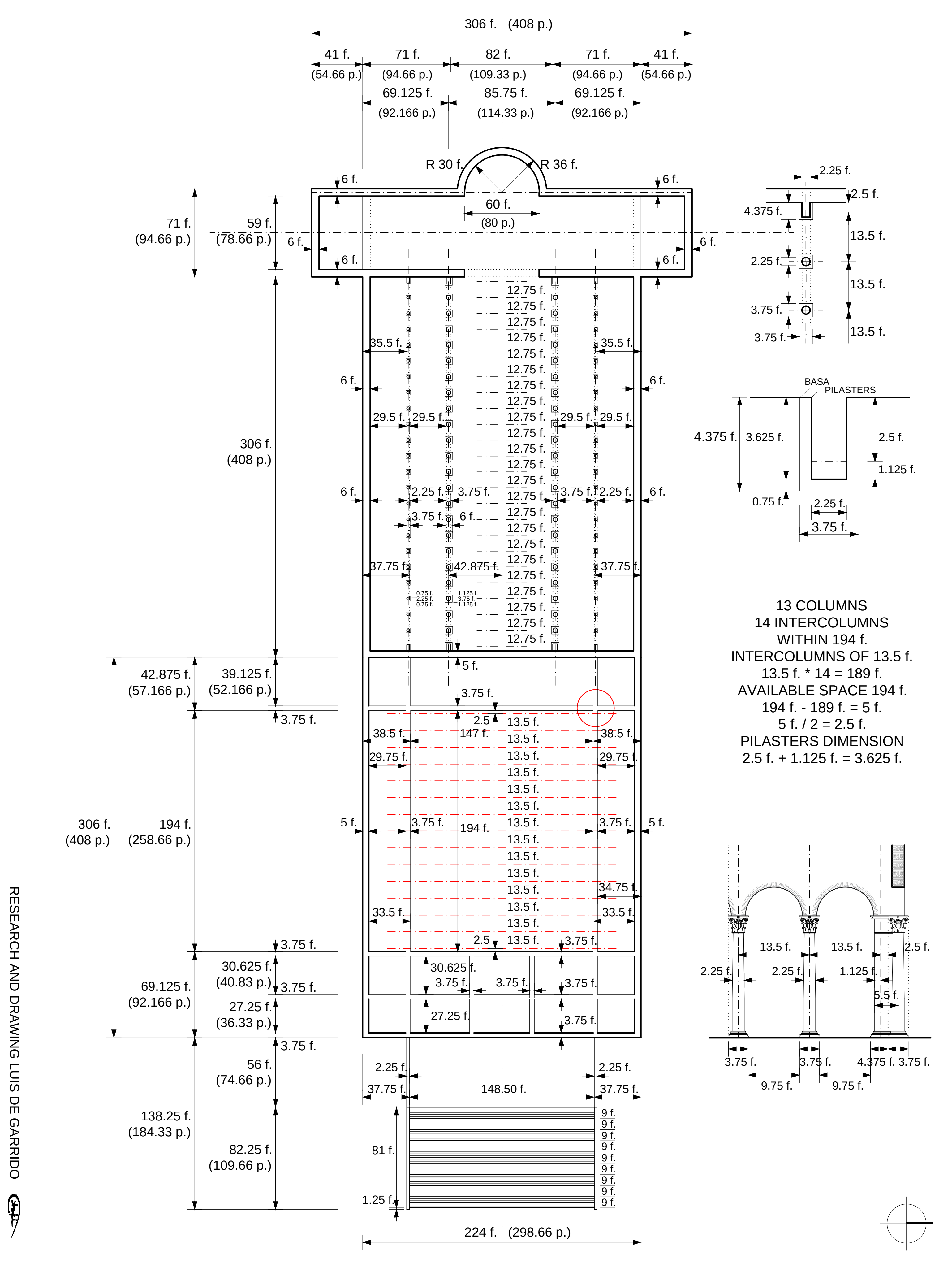
MAIN COLONNADES

22 COLUMNS
23 INTERCOLUMNS
WITHIN 401.33 p.
INTERCOLUMNS OF 17 p.
17 p. * 23 = 391 p.
AVAILABLE INTERNAL SPACE:
408 p. - 6.66 p. = 401.33 p.
401.33 - 391 p. = 10.33 p.
10.33 p. / 2 = 5.166 p.
PILASTERS DIMENSION
5.166 p. + 2.5 p. = 7.66 p.



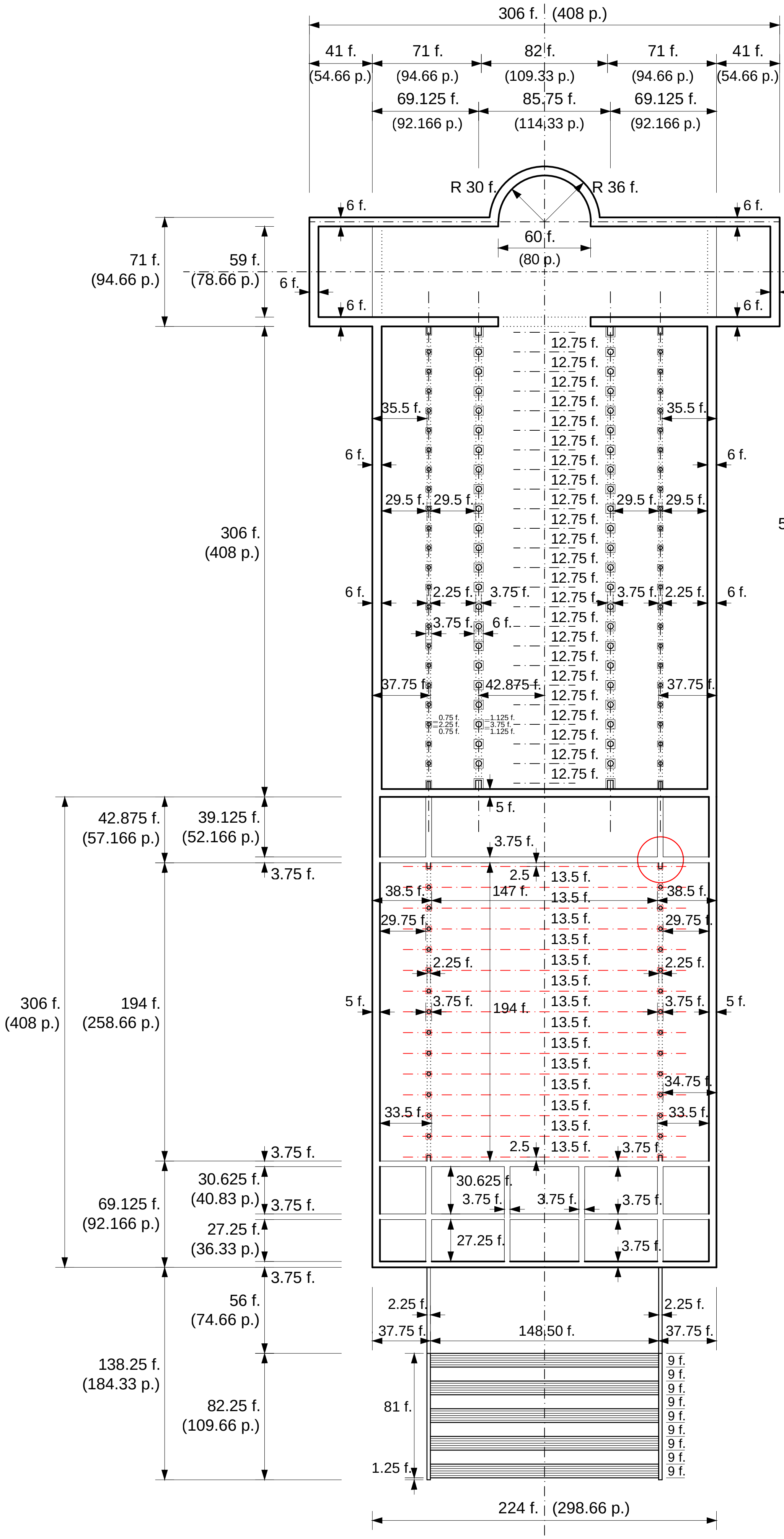


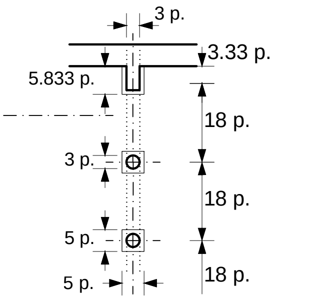
RESEARCH AND DRAWING LUIS DE GARRIDO

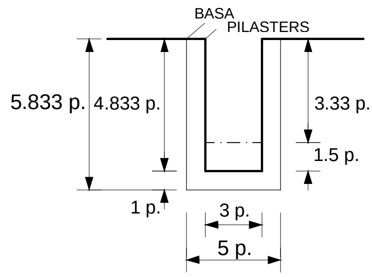


13 COLUMNS
14 INTERCOLUMNS
WITHIN 194 f.
INTERCOLUMNS OF 13.5 f.
13.5 f. * 14 = 189 f.
AVAILABLE SPACE 194 f.
194 f. - 189 f. = 5 f.
5 f. / 2 = 2.5 f.
PILASTERS DIMENSION
2.5 f. + 1.125 f. = 3.625 f.

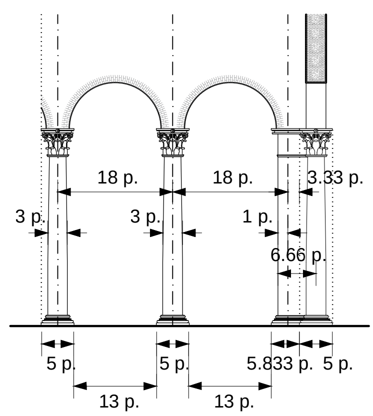
DETERMINATION OF THE AXES OF THE COLUMNS OF THE ATRIUM





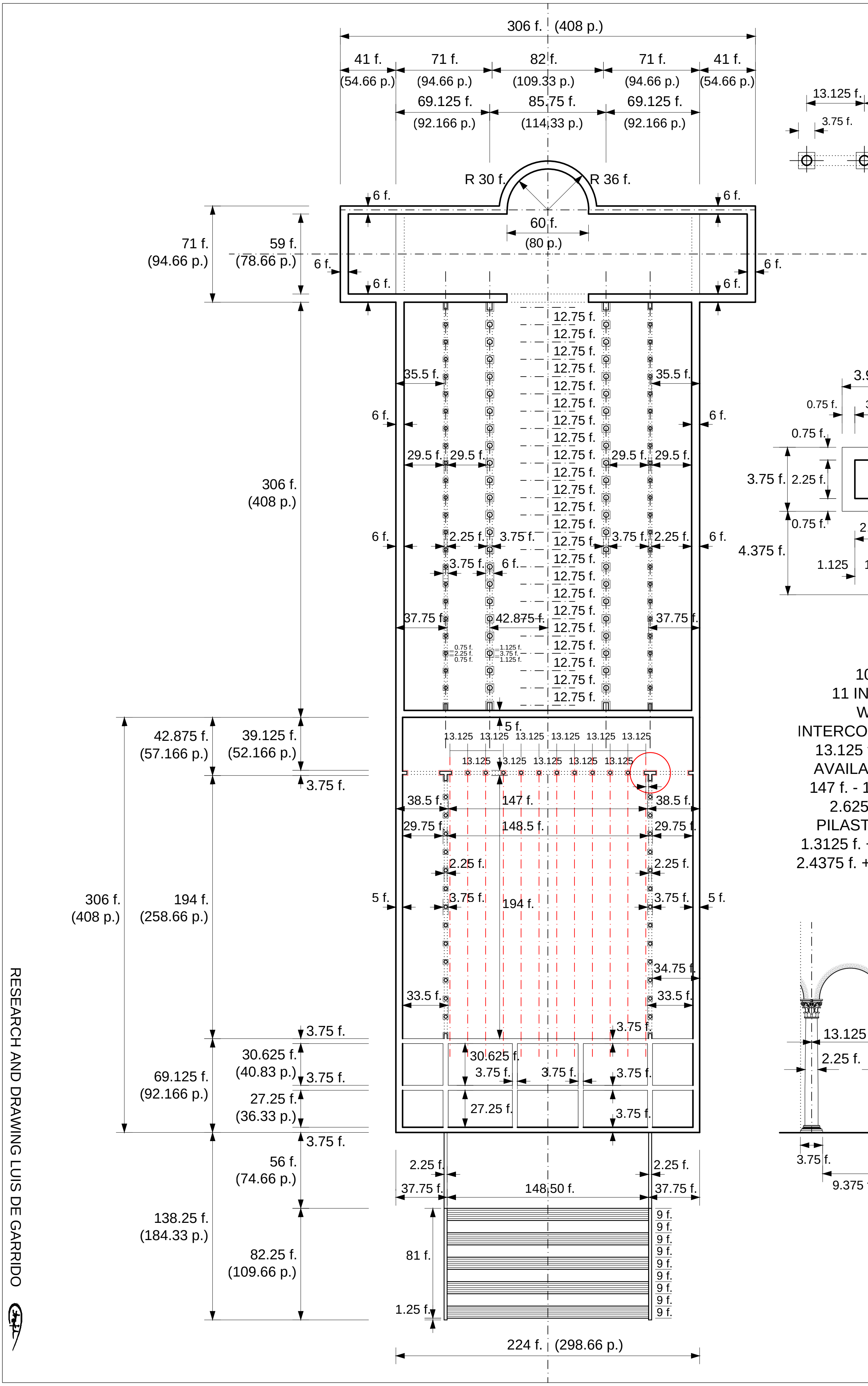


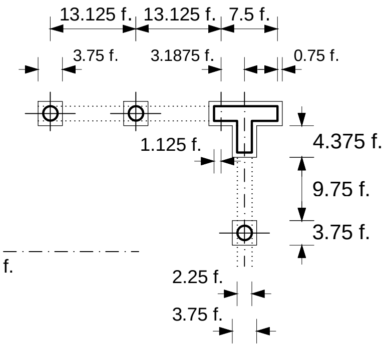
13 COLUMNS
14 INTERCOLUMNS
WITHIN 258.66 p.
INTERCOLUMNS OF 18 p.
18 p. * 14 = 252 p.
AVAILABLE SPACE 258.66 p.
258.66 - 252 = 6.66 p.
6.66 p. / 2 = 3.33 p.
PILASTERS DIMENSION
3.33 p. + 1.5 p. = 4.833 p.

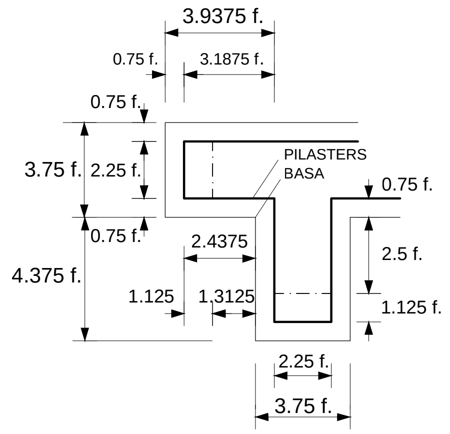


RESEARCH AND DRAWING LUIS DE GARRIDO

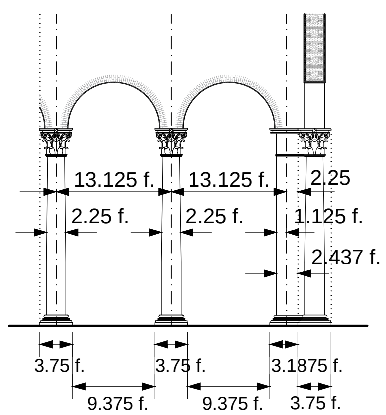
DETERMINATION OF THE COLUMNS OF THE ATRIUM (I)

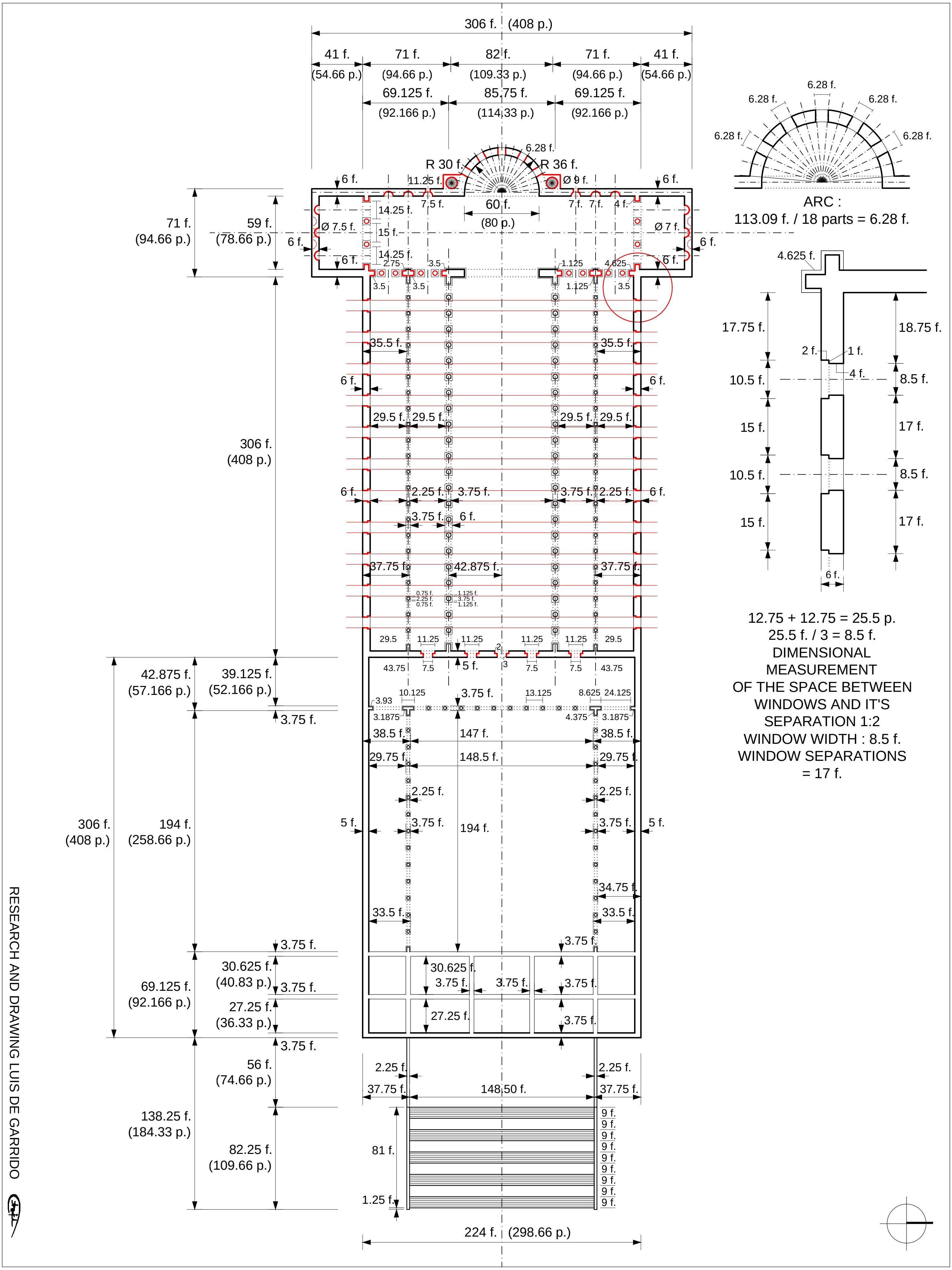




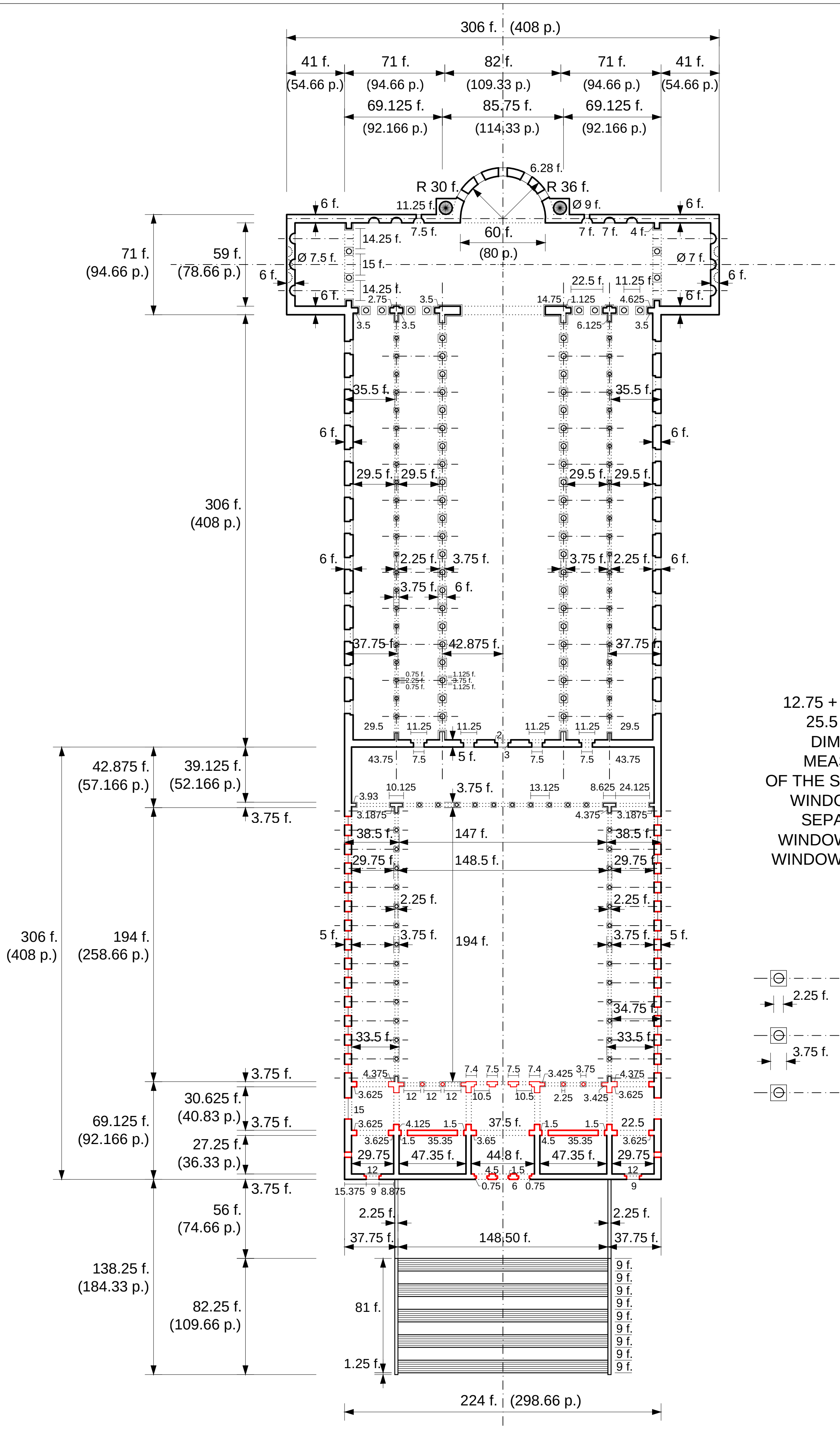


10 COLUMNS
11 INTERCOLUMNS
WITHIN 147 f.
INTERCOLUMNS OF 13.125 f.
13.125 f. * 11 = 144.375 f.
AVAILABLE SPACE 147 f.
147 f. - 144.375 f. = 2.625 f.
2.625 f. / 2 = 1.3125 f.
PILASTERS DIMENSION
1.3125 f. + 1.125 f. = 2.4375 f.
2.4375 f. + 0.75 f. = 3.1875 feet

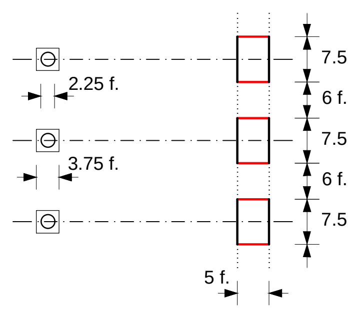




306 f. (408 p.)
ARC :
113.09 f. / 18 parts = 6.28 f.
12.75 + 12.75 = 25.5 p.
25.5 f. / 3 = 8.5 f.
DIMENSIONAL MEASUREMENT OF THE SPACE BETWEEN WINDOWS AND IT'S SEPARATION 1:2
WINDOW WIDTH : 8.5 f.
WINDOW SEPARATIONS = 17 f.
224 f. (298.66 p.)
RESEARCH AND DRAWING LUIS DE GARRIDO

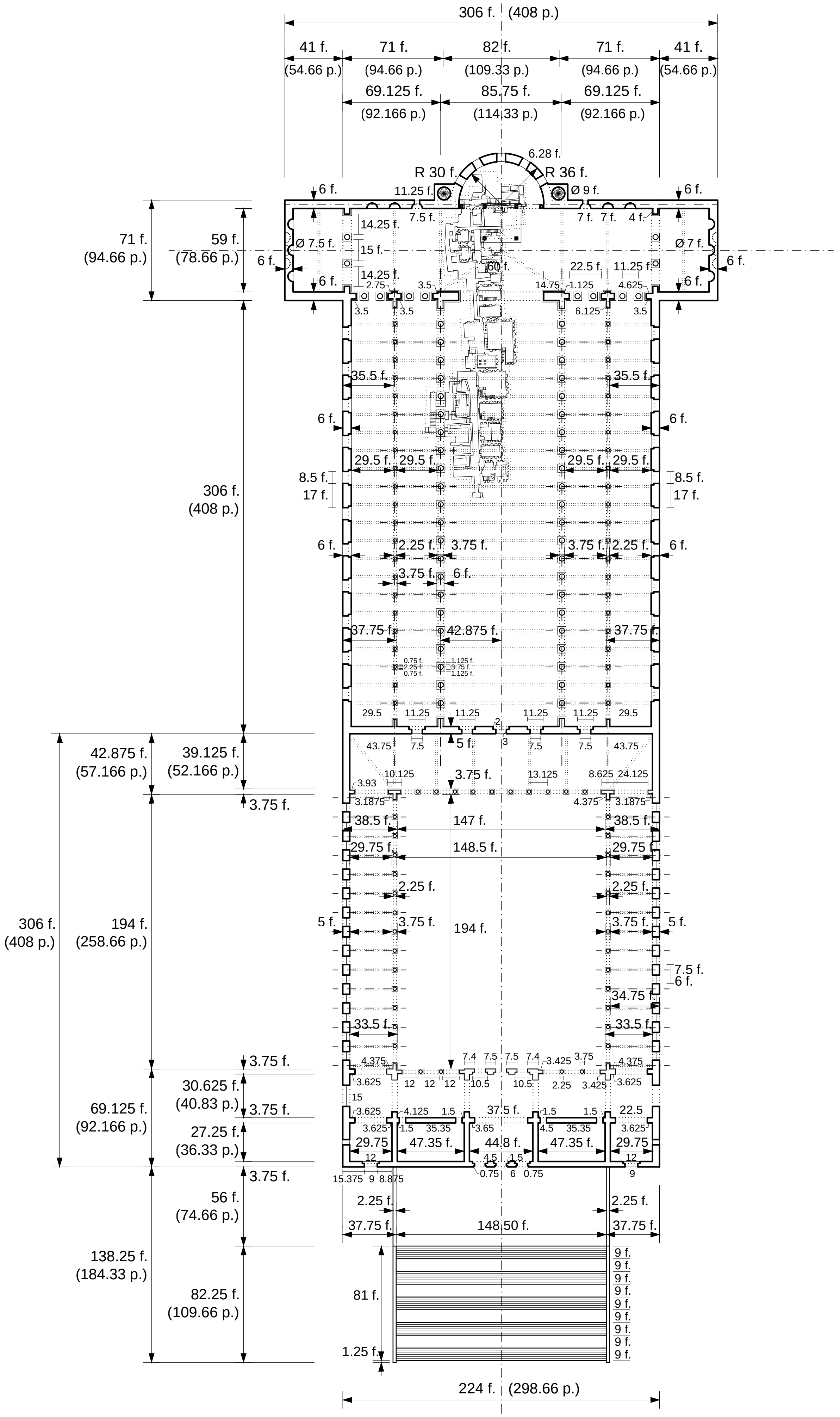


12.75 + 12.75 = 25.5 p.
25.5 f. / 3 = 8.5 f.
DIMENSIONAL MEASUREMENT
OF THE SPACE BETWEEN WINDOWS AND IT'S SEPARATION 1:2
WINDOW WIDTH : 8.5 f.
WINDOW SEPARATIONS = 17 f.

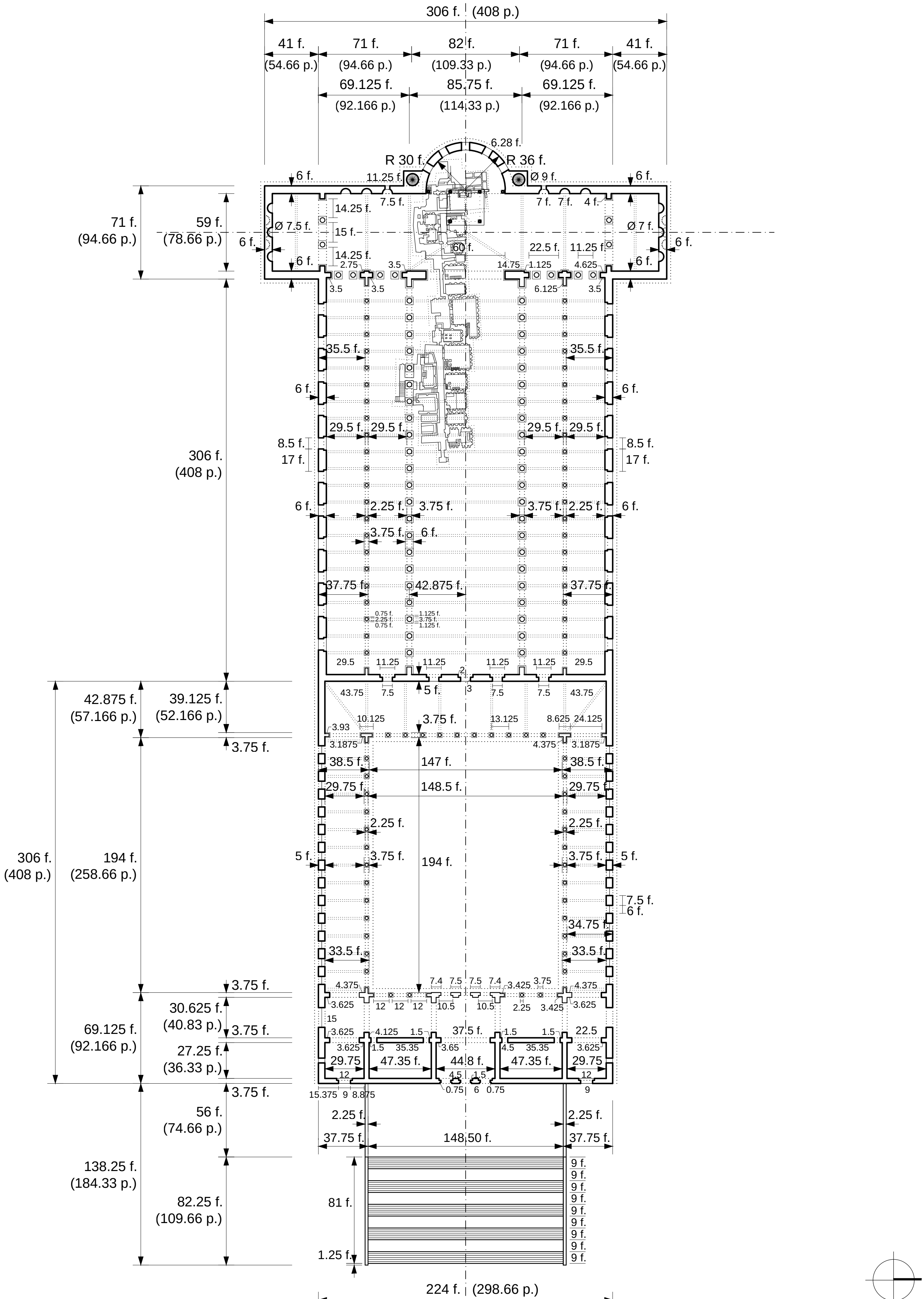


RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE OPENINGS OF THE ATRIUM

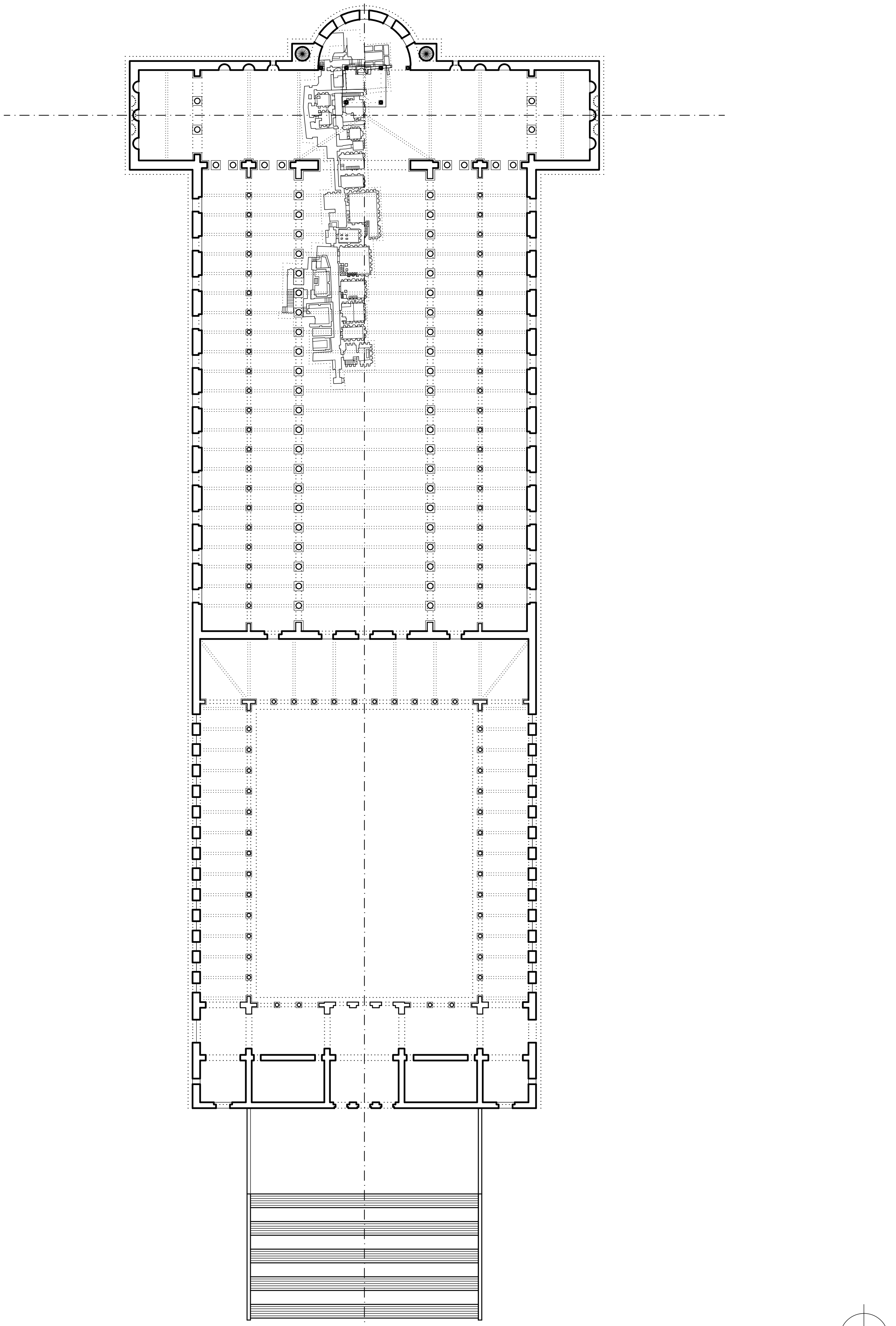


RESEARCH AND DRAWING LUIS DE GARRIDO



RESEARCH AND DRAWING LUIS DE GARRIDO

COMPLETE PLAN LAYOUT (WITH MEASUREMENTS)

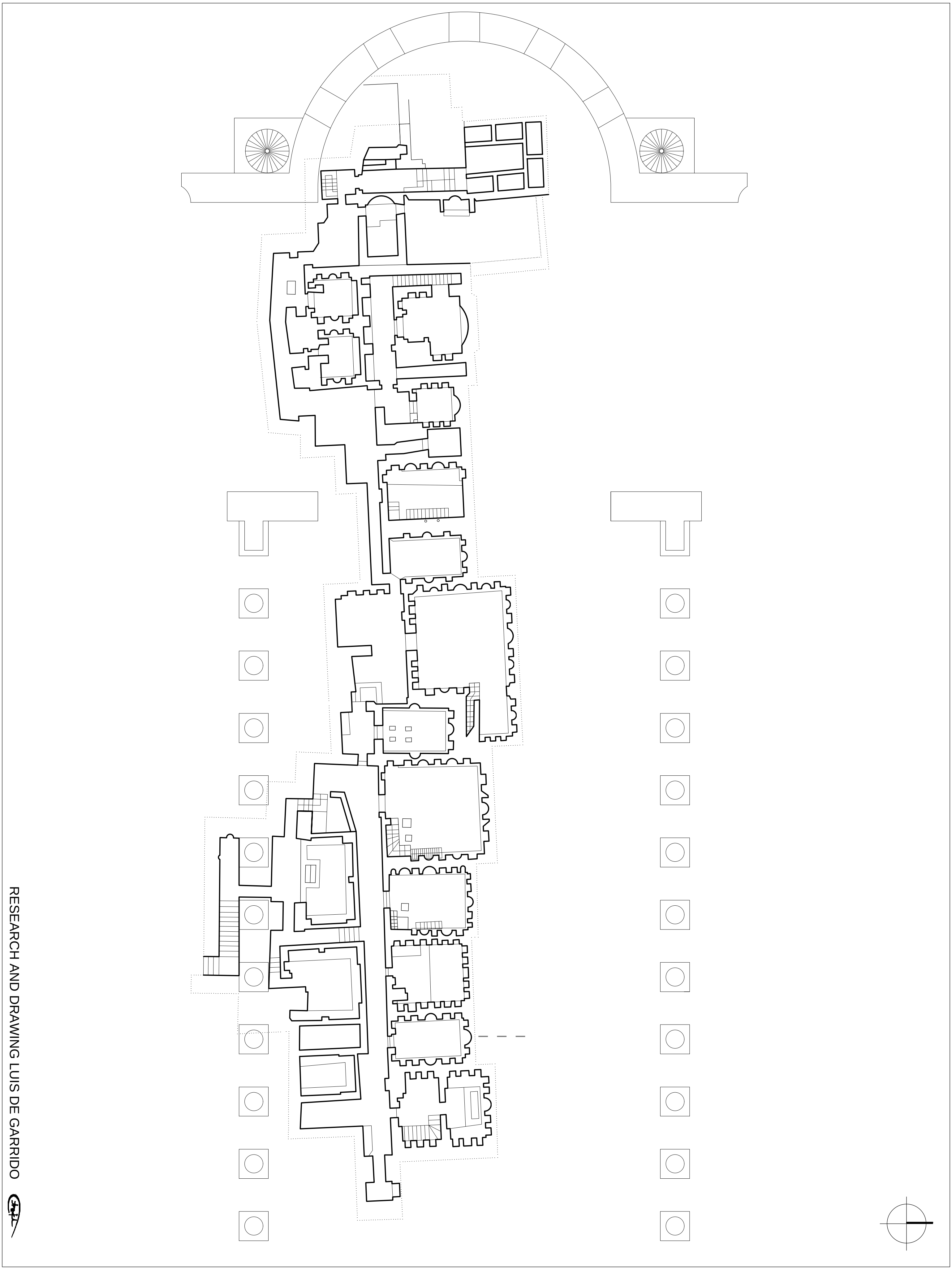


RESEARCH AND DRAWING LUIS DE GARRIDO

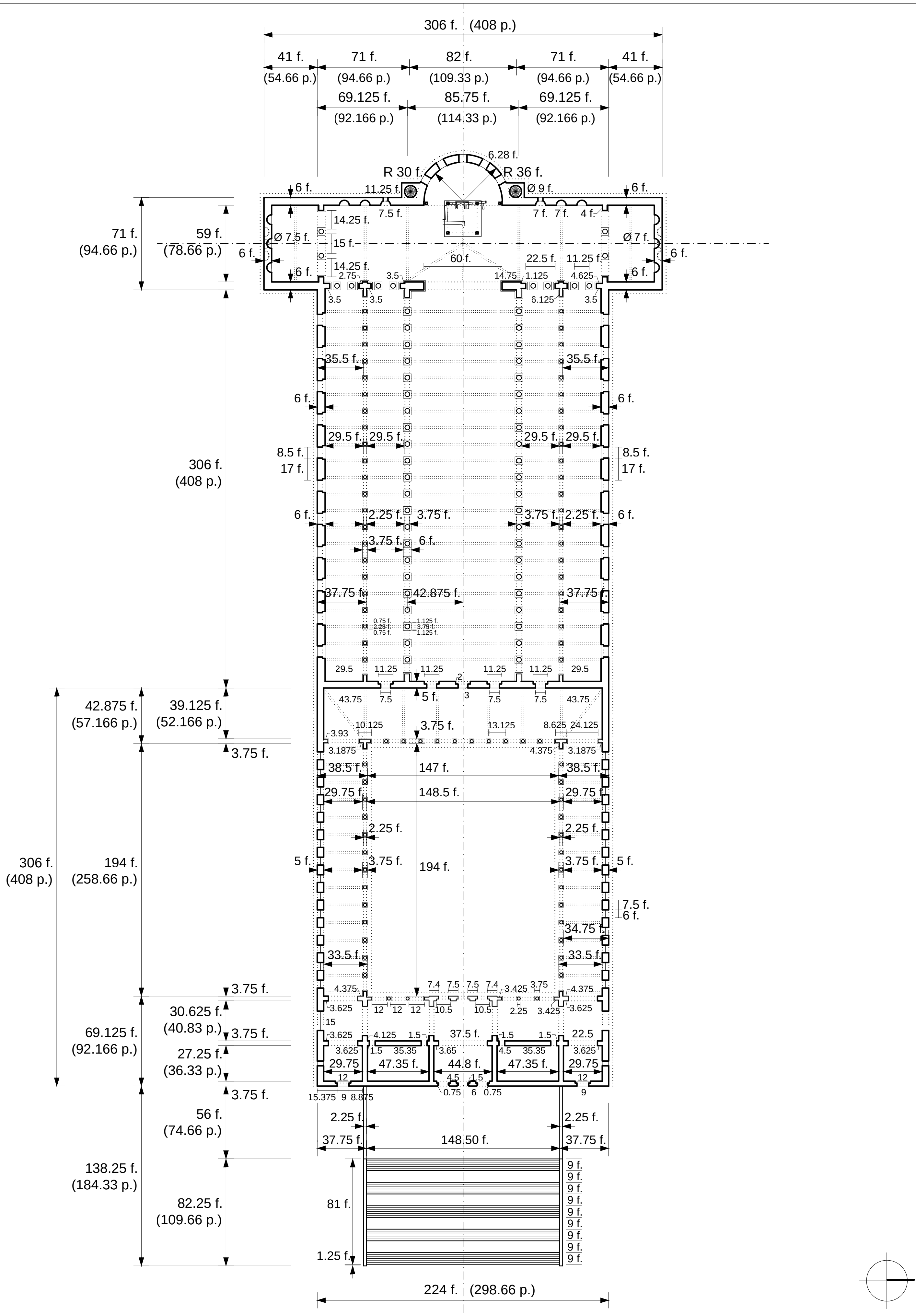
COMPLETE PLAN LAYOUT (WITHOUT MEASUREMENTS)

OLD S. PETER

OSP-F40

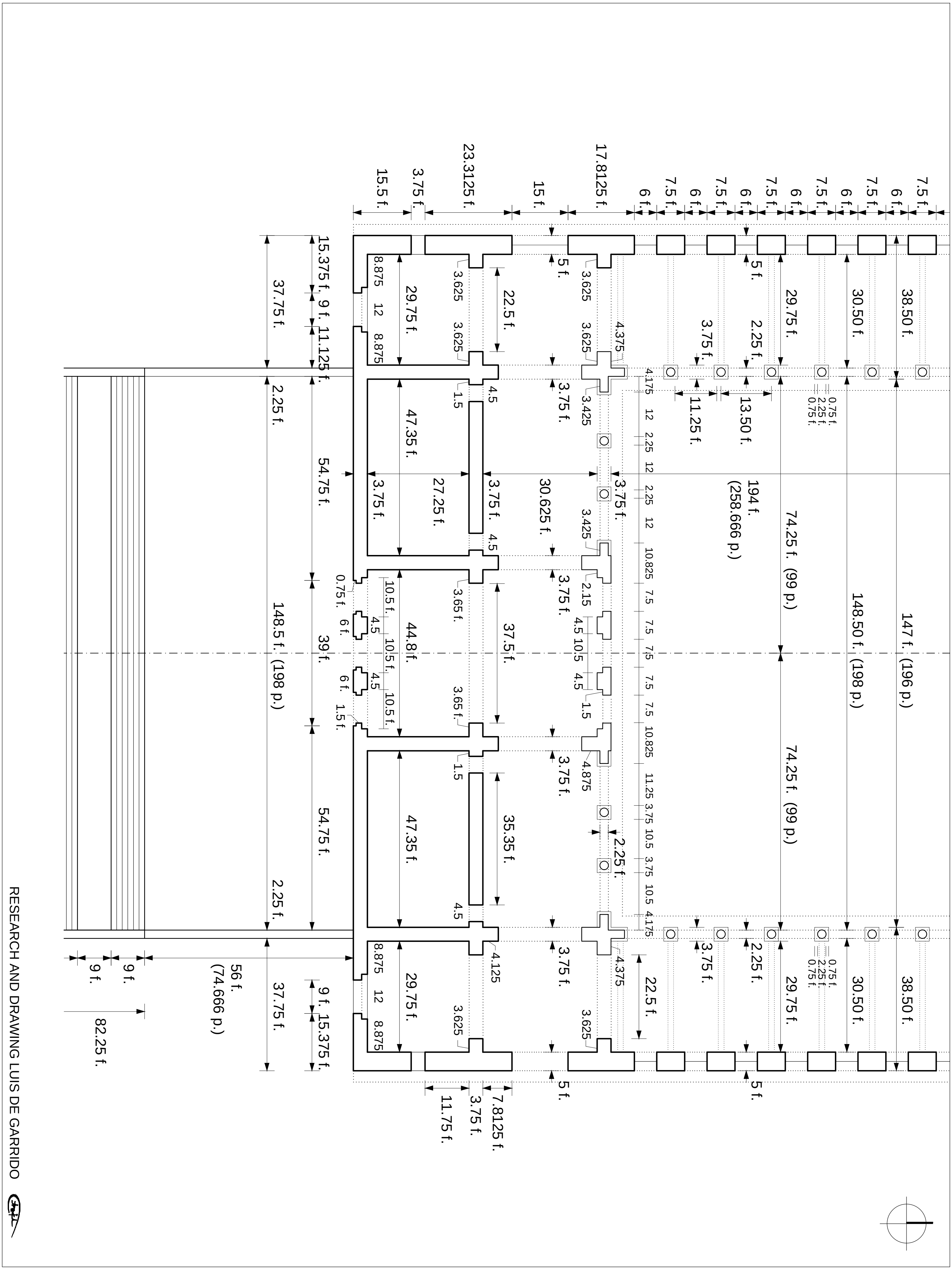


DETAIL OF THE NECROPOLIS

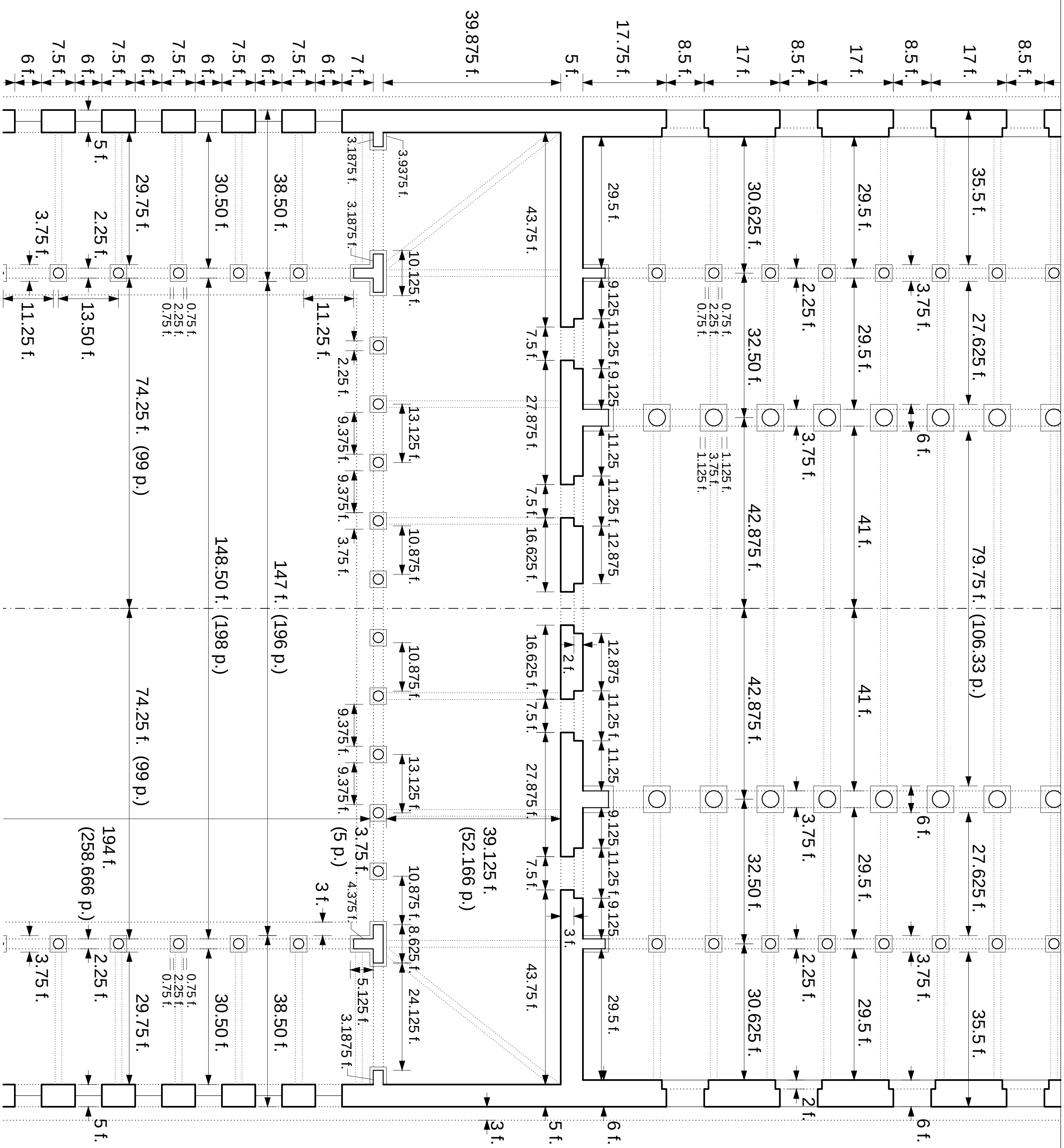


RESEARCH AND DRAWING LUIS DE GARRIDO

COMPLETE PLAN LAYOUT WITHOUT NECROPOLIS (WITH MEASUREMENTS)

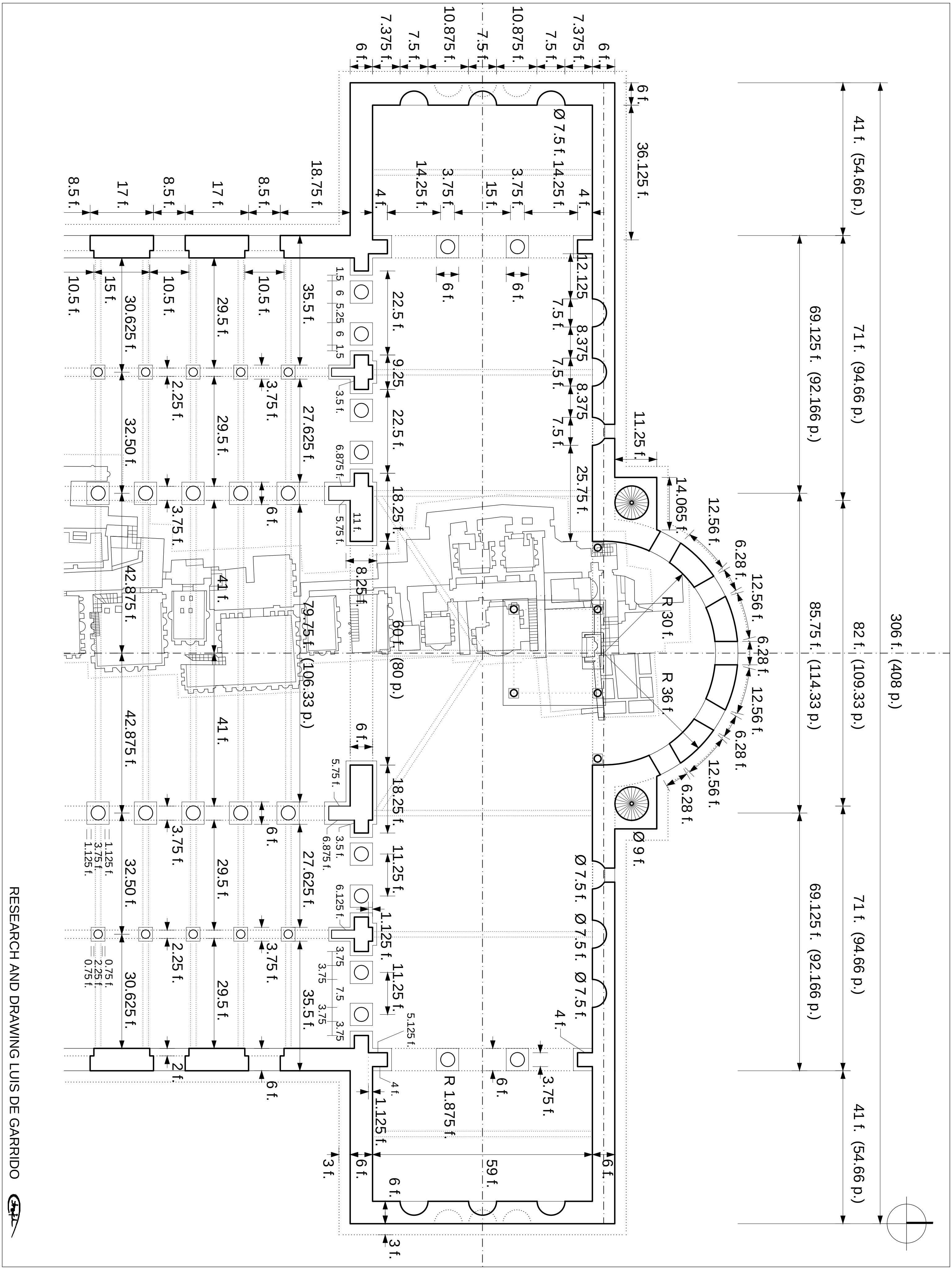


DETAIL OF THE OPENINGS OF THE ATRIUM

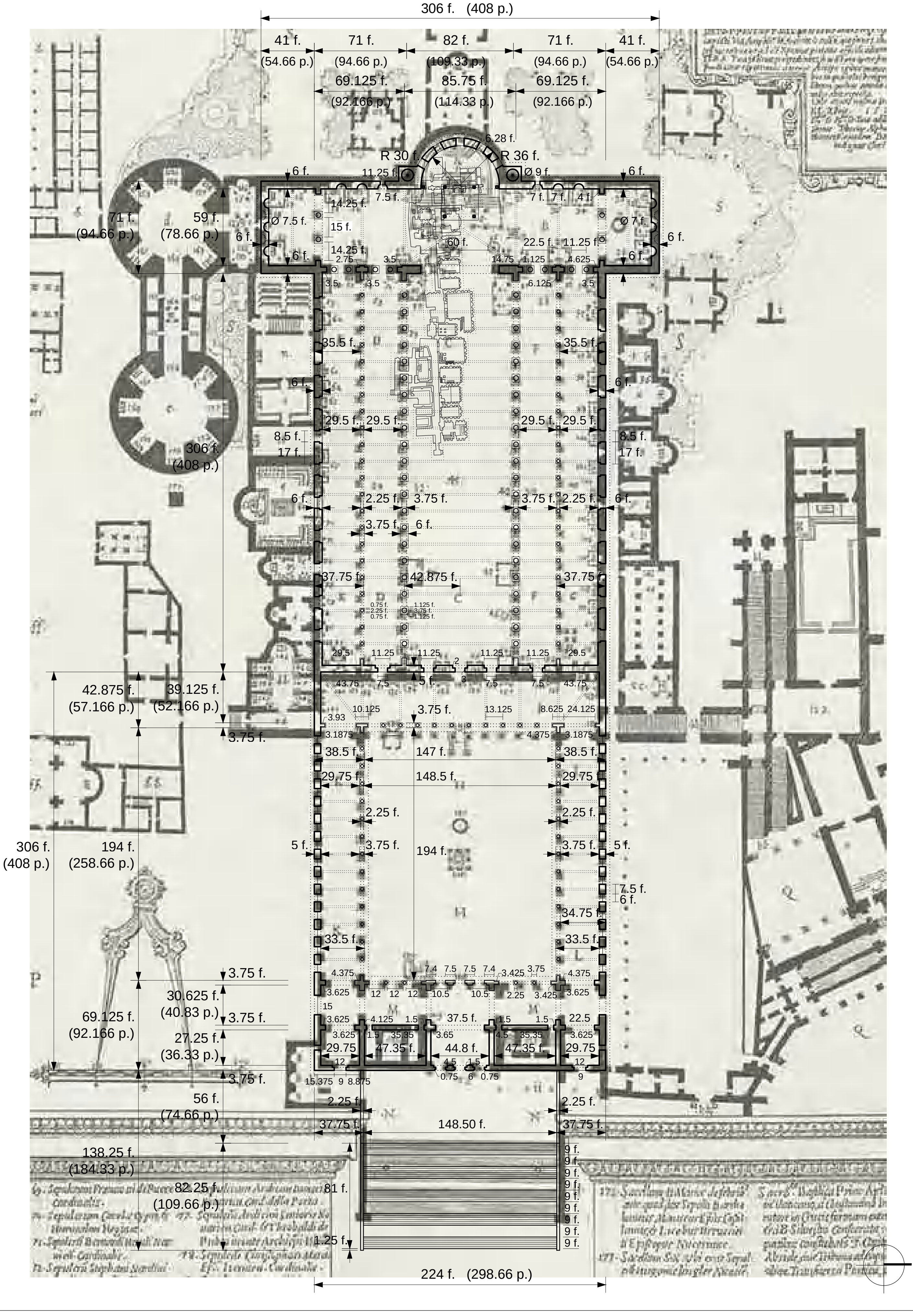


RESEARCH AND DRAWING LUIS DE GARRIDO

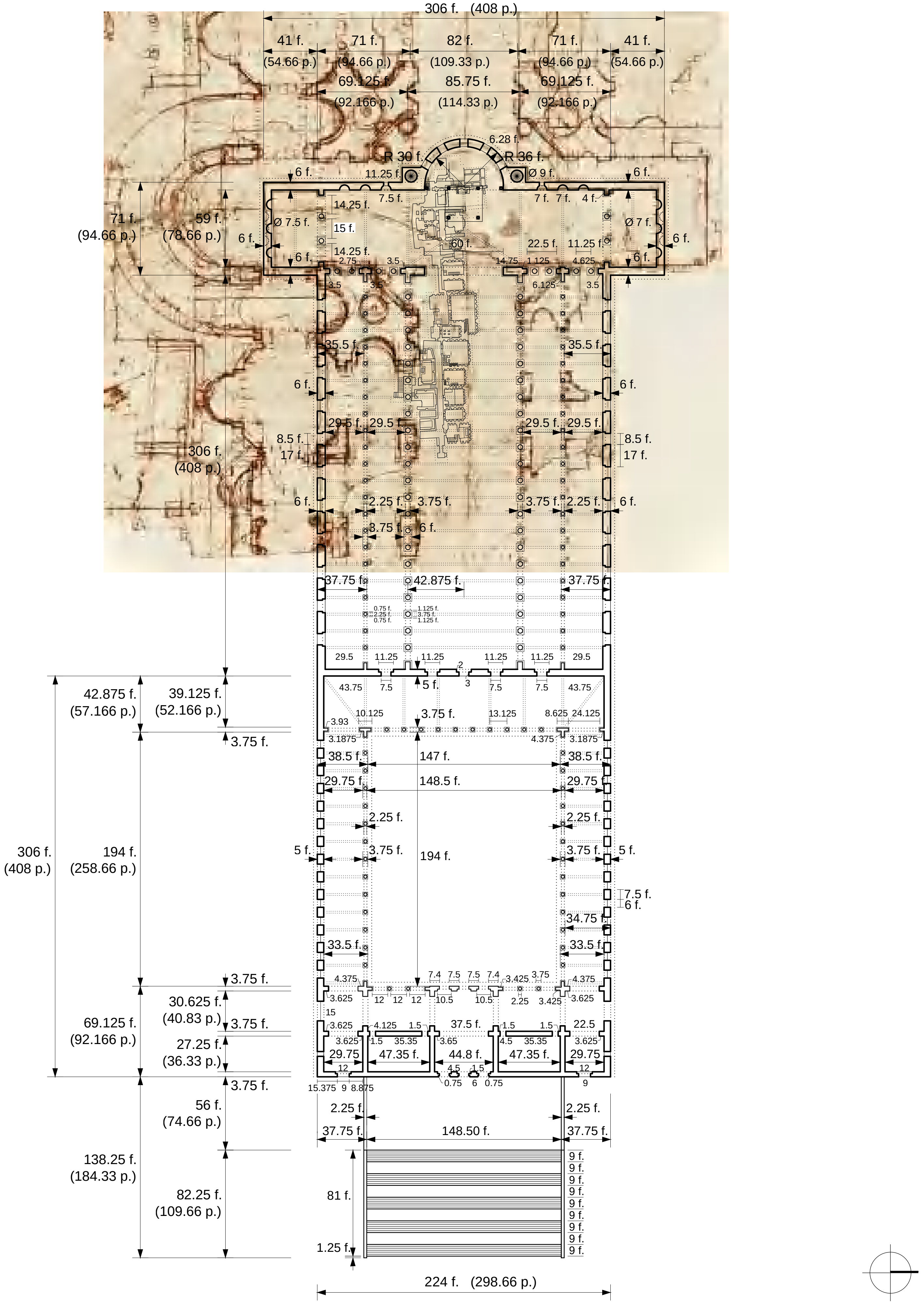
DETAIL OF THE NARTHEX



DETAIL OF THE APSE



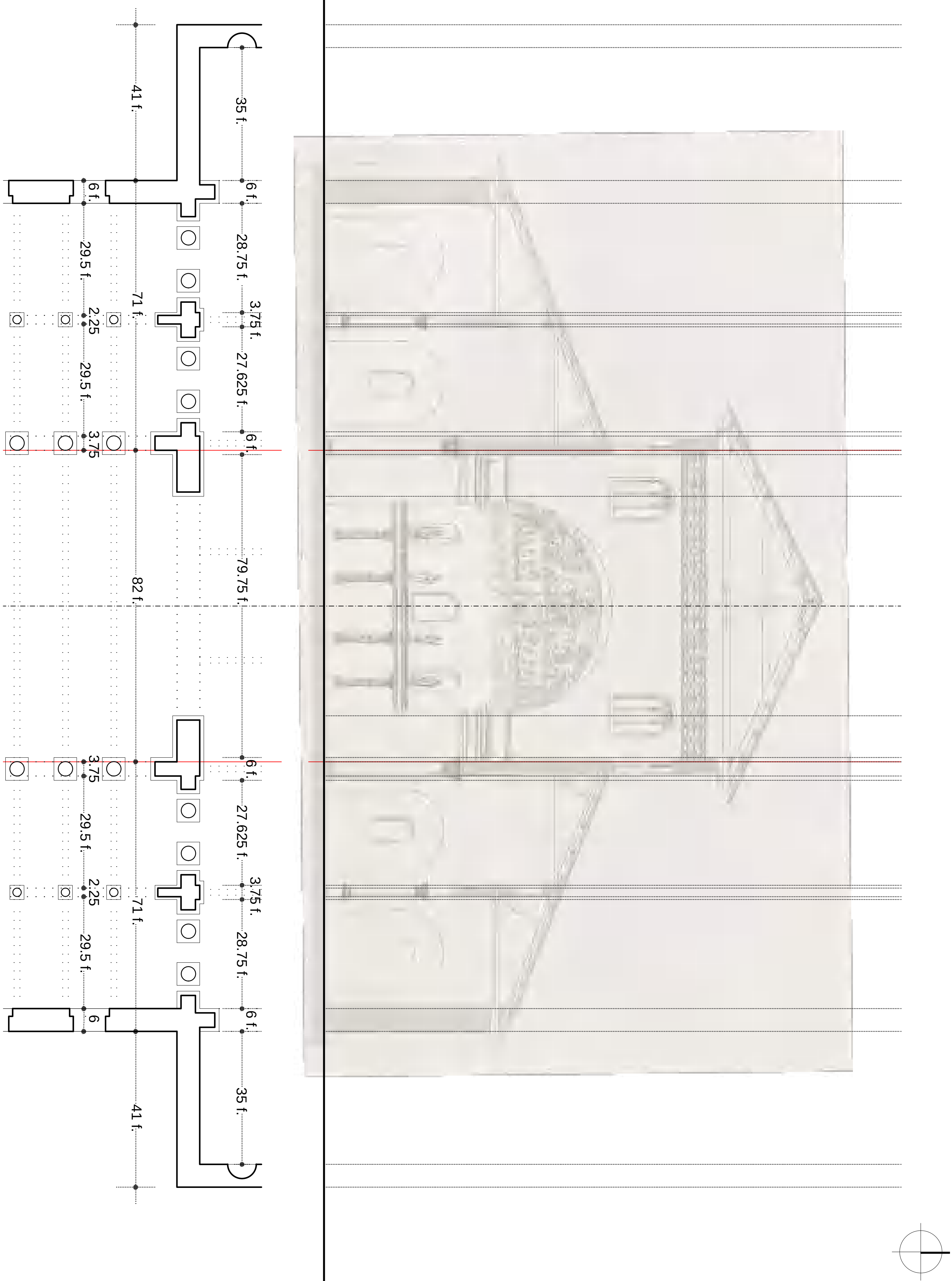
RESEARCH AND DRAWING LUIS DE GARRIDO



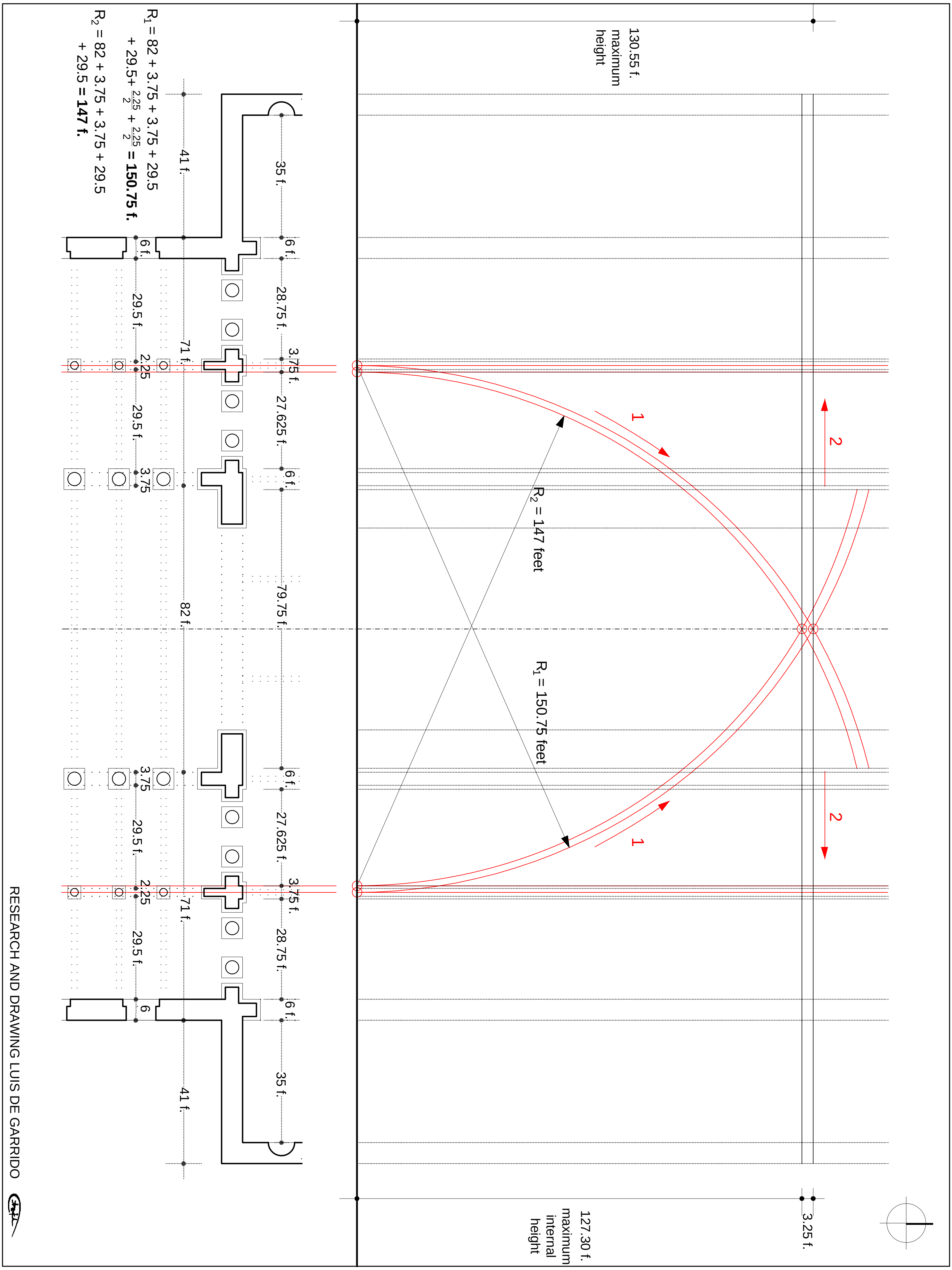
RESEARCH AND DRAWING LUIS DE GARRIDO

OVERLAY FINAL PROJECT WITH BRAMANTE'S LAYOUT

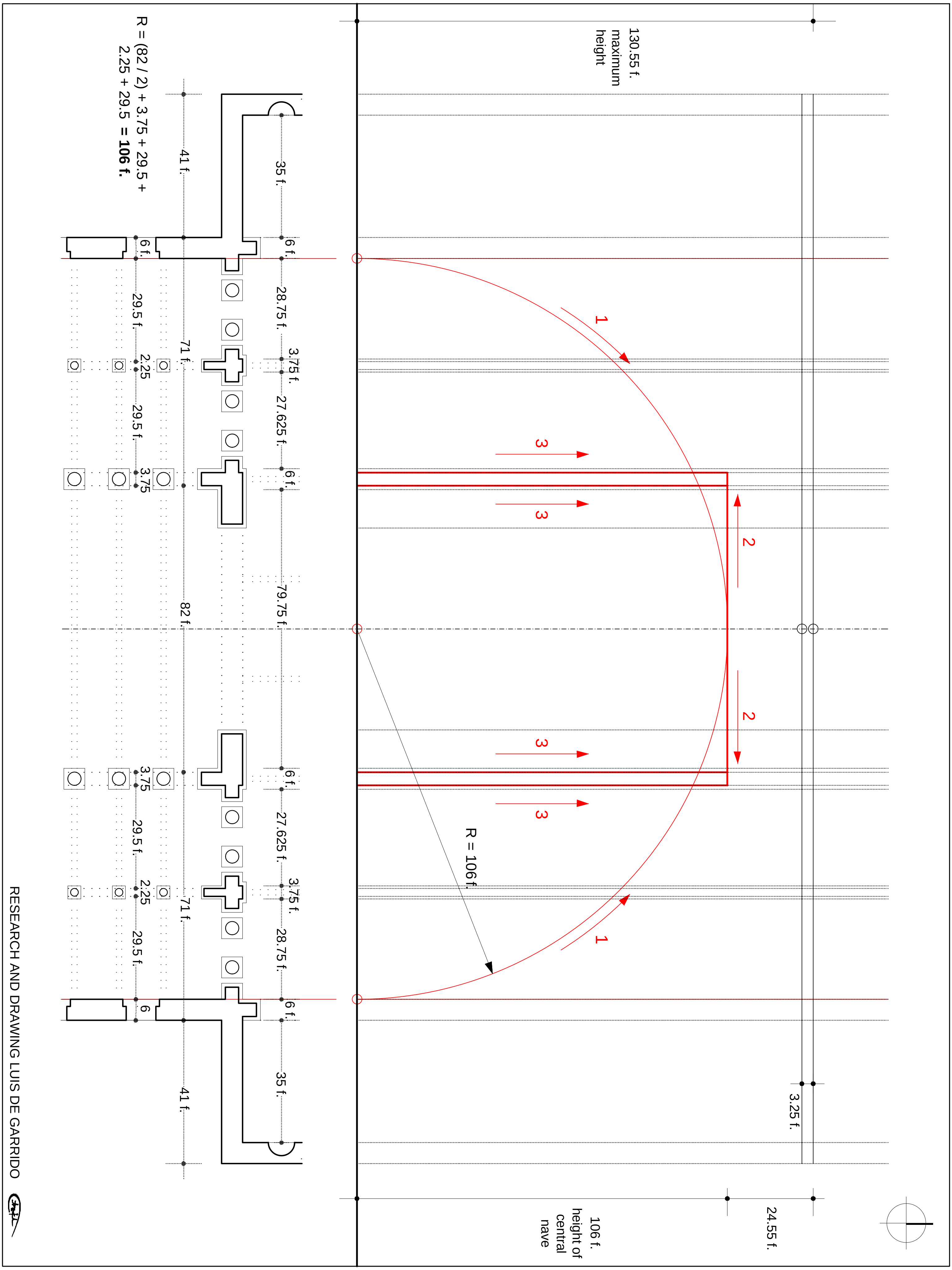
ANALYSIS OF THE CROSS SECTION OF THE OLD BASILICA OF S. PETER IN VATICAN 324 A.C IDENTIFICATION OF ALL DESIGN STAGES UP TO THE FINAL RESULT



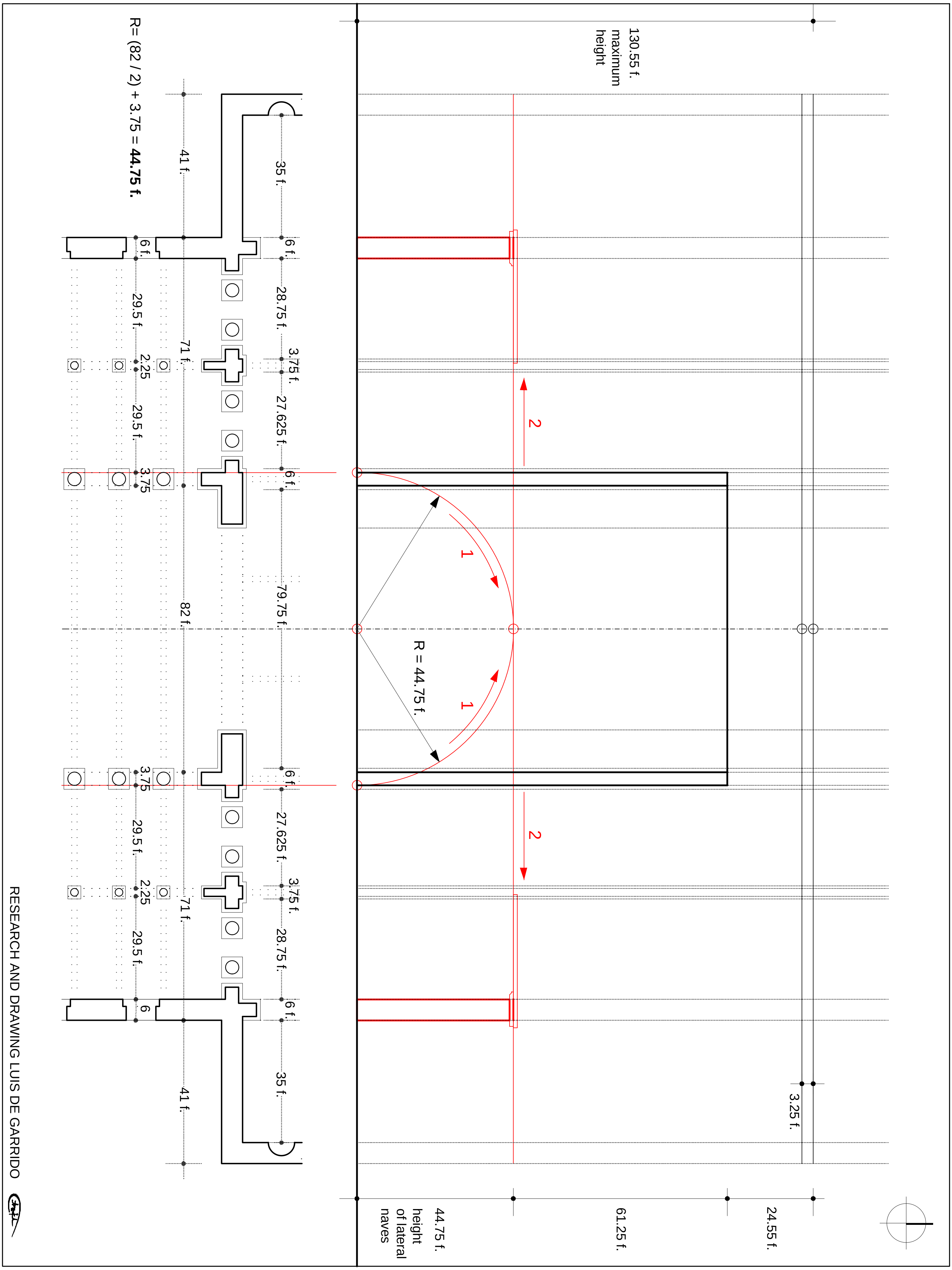
RESEARCH AND DRAWING LUIS DE GARRIDO



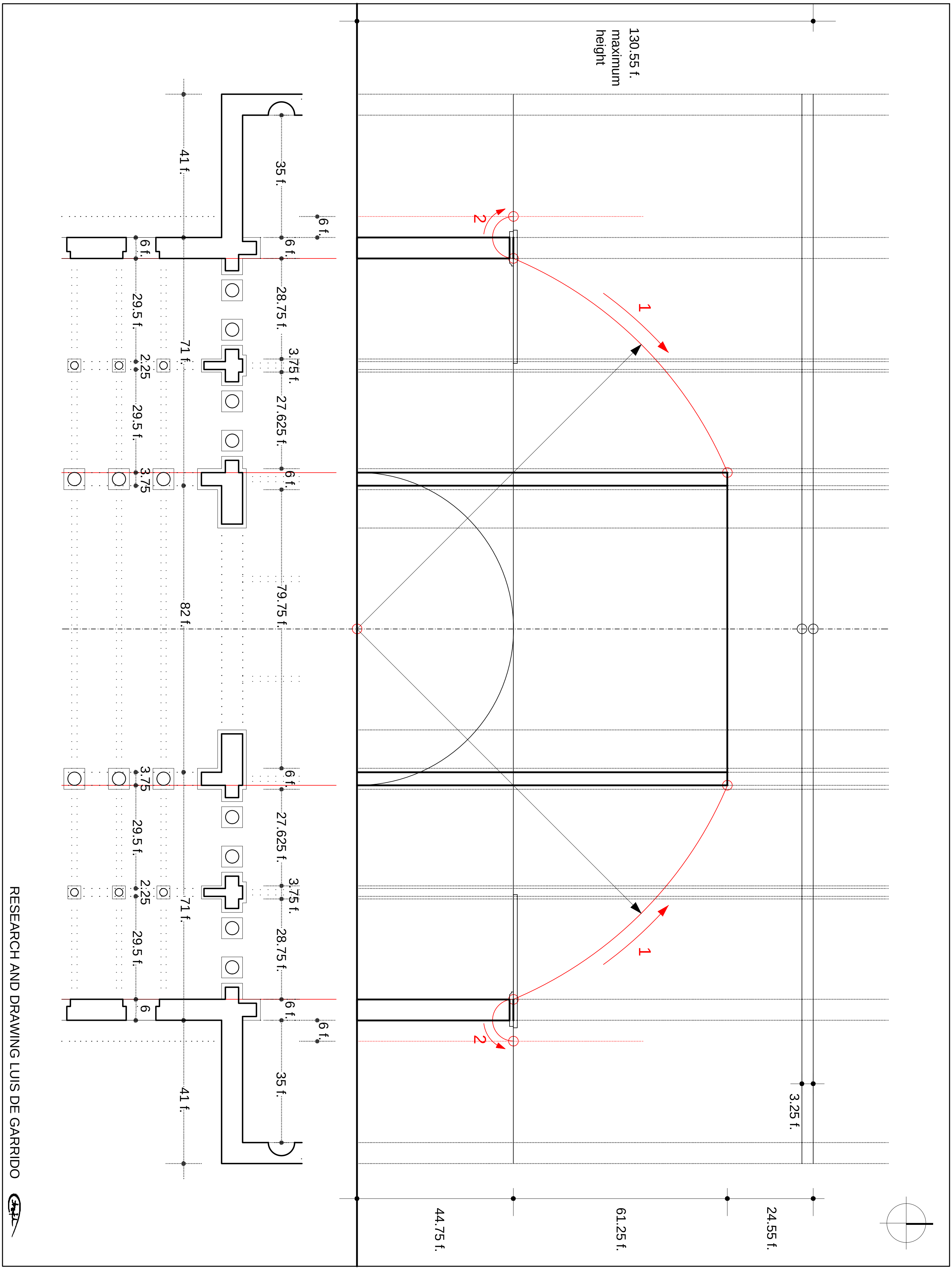
DETERMINATION OF THE MAXIMUM HEIGHT (INTERIOR AND EXTERIOR)

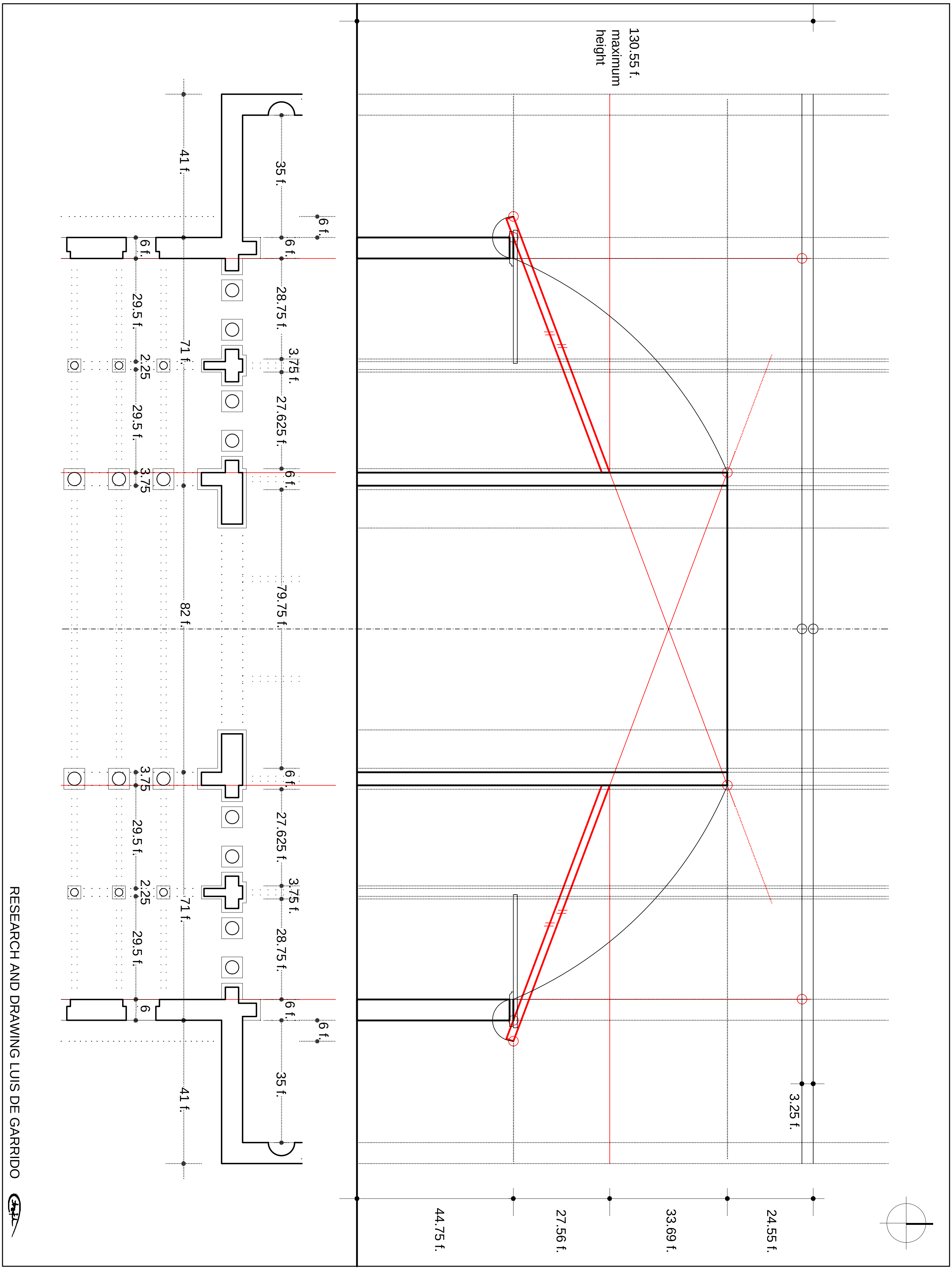


DETERMINATION OF THE HEIGHT OF THE WALLS OF THE CENTRAL NAVE

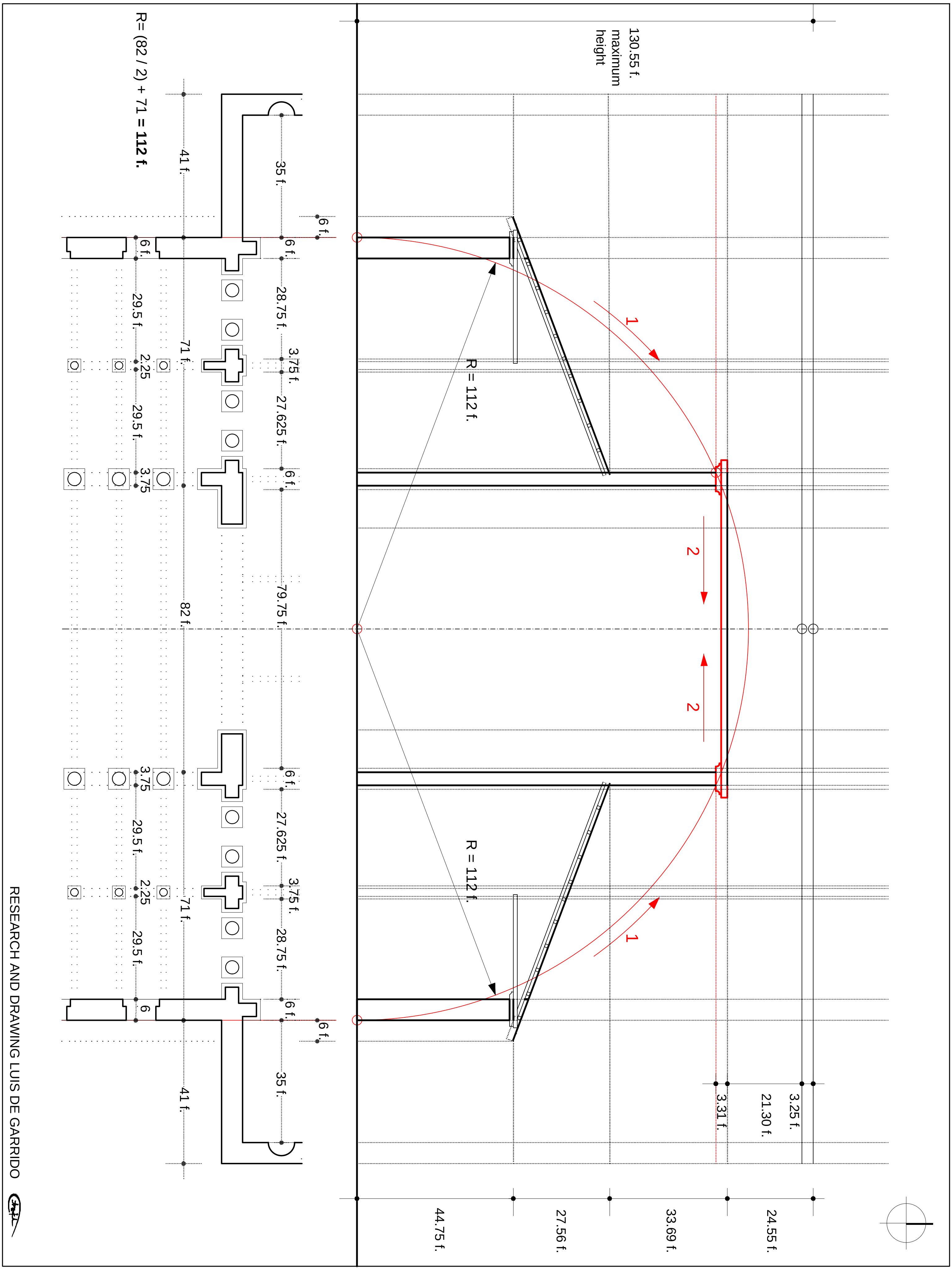


DETERMINATION OF THE HEIGHT OF THE WALLS OF THE OUTER SIDE NAVES

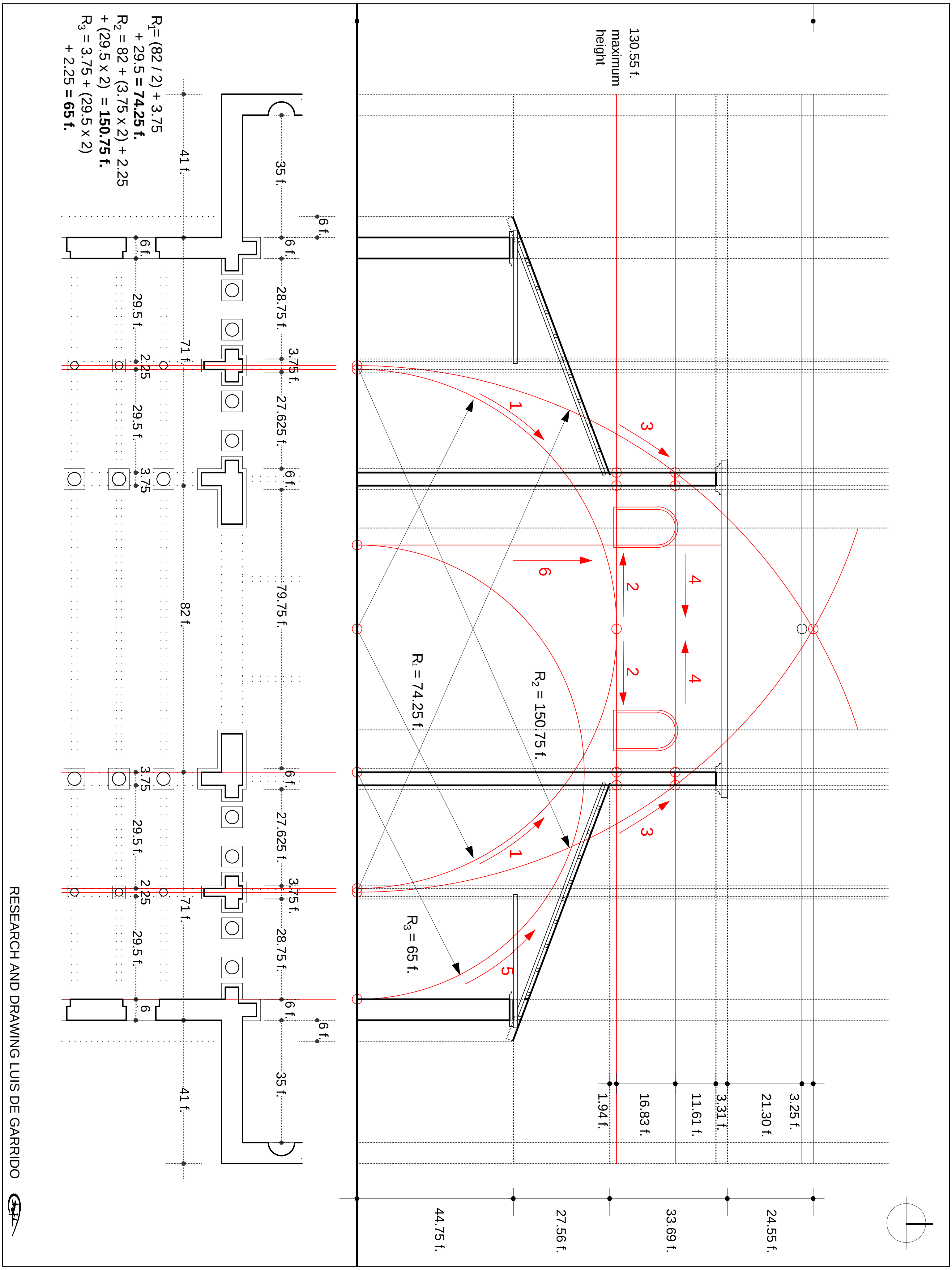

130.55 f.
maximum
height
41 f.
35 f.
6 f.
6 f.
6 f.
29.5 f.
28.75 f.
71 f.
2.25
3.75 f.
29.5 f.
27.625 f.
3.75
6 f.
82 f.
79.75 f.
1
2
3.25 f.
44.75 f.
61.25 f.
24.55 f.
RESEARCH AND DRAWING LUIS DE GARRIDO



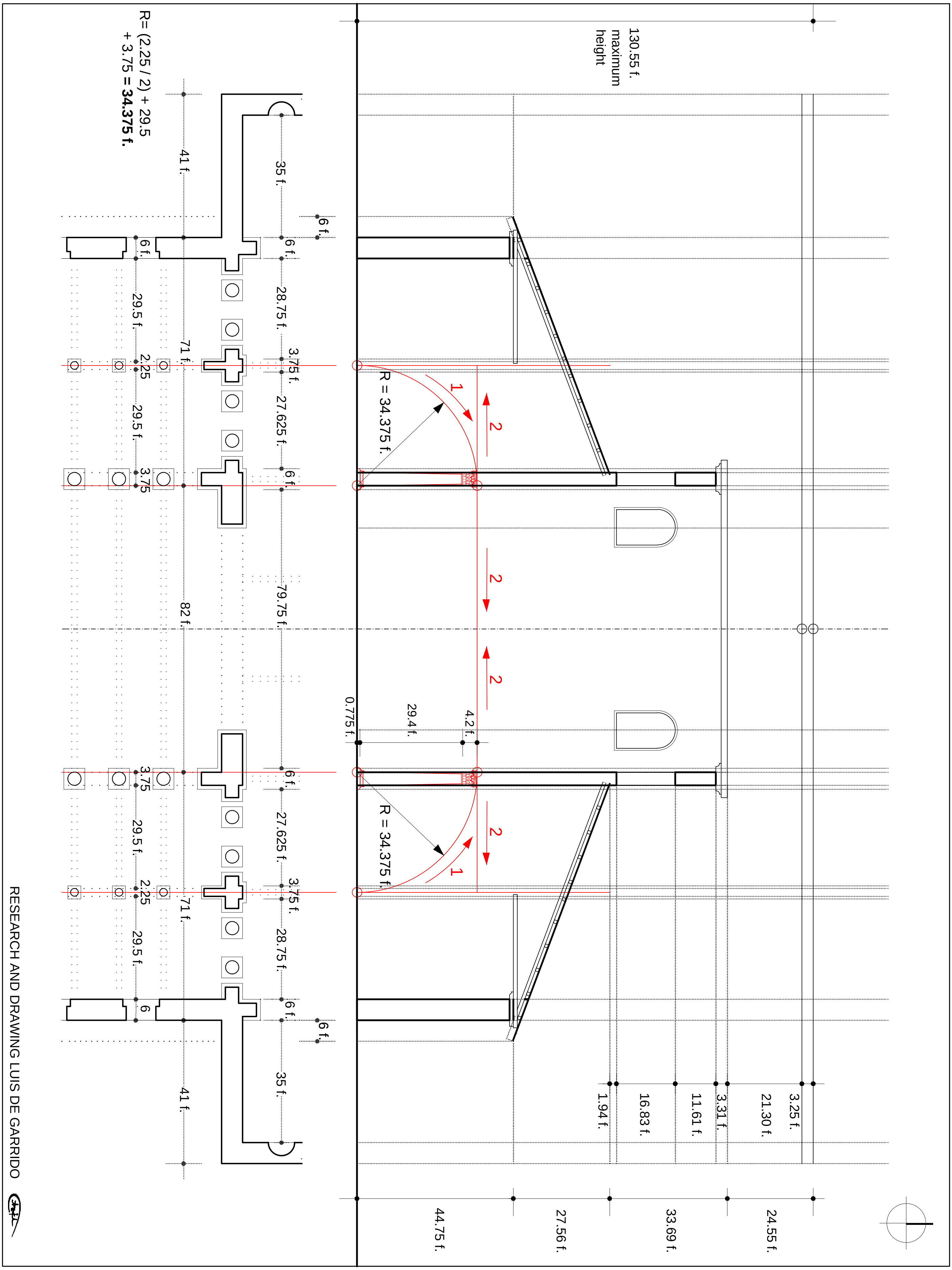
DETERMINATION OF THE SIDE NAVE'S ROOFS

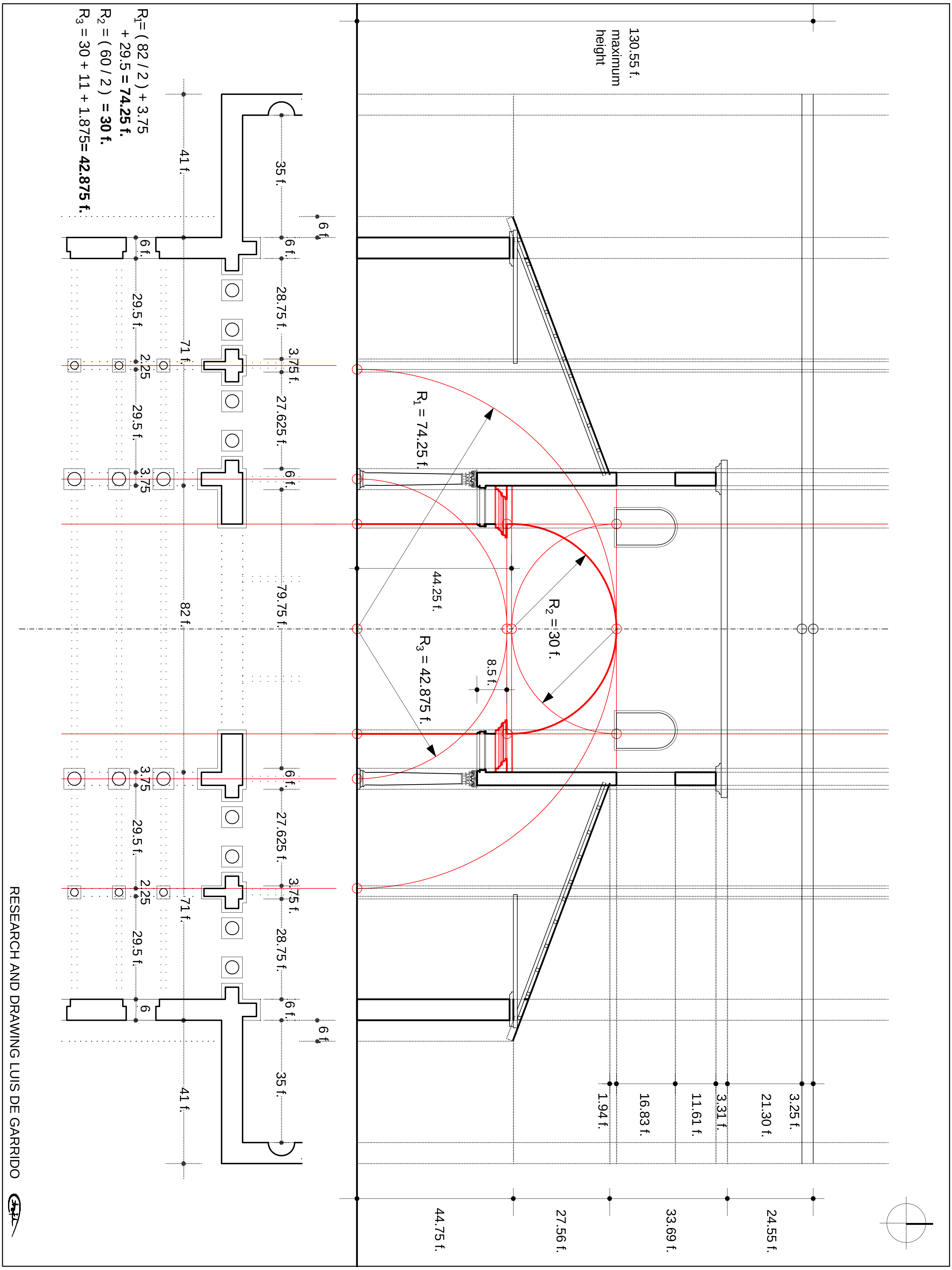


DETERMINATION OF THE HEIGHT AND DIMENSIONS OF THE CENTRAL NAVE BEAMS

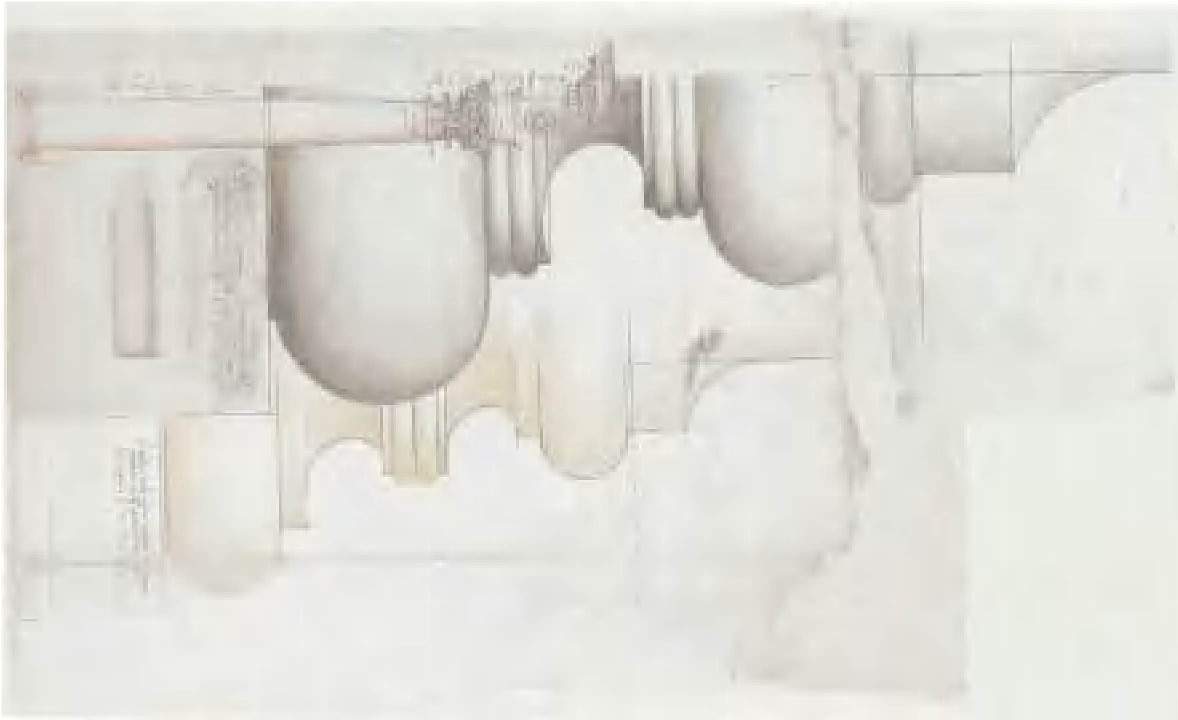


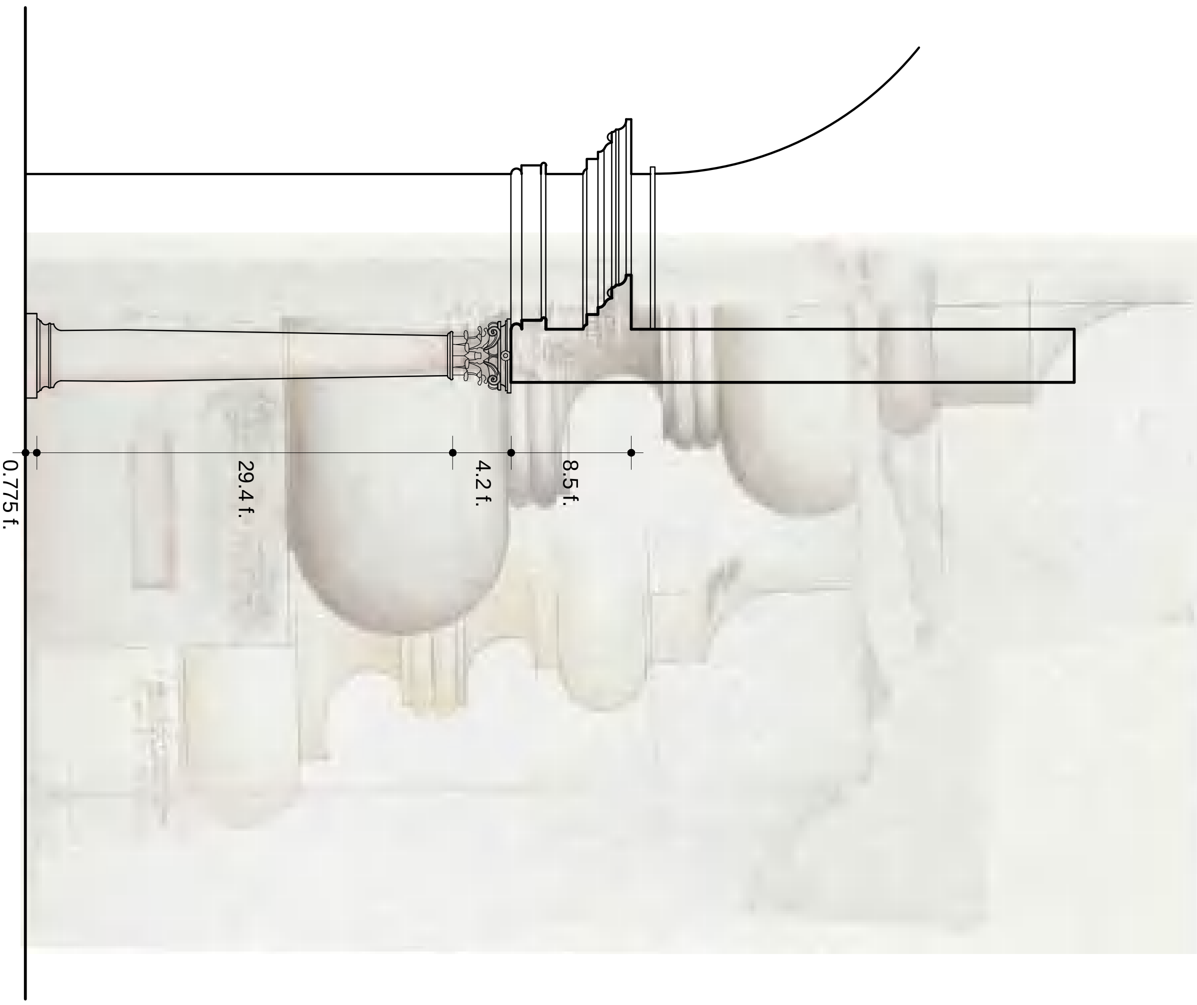
DETERMINATION OF TRANSEPT'S INTERIOR WINDOWS


R= (2.25 / 2) + 29.5
+ 3.75 = **34.375 f.**
130.55 f.
maximum
height
41 f.
35 f.
6 f.
28.75 f.
29.5 f.
71 f.
3.75 f.
2.25
27.625 f.
3.75
82 f.
79.75 f.
R = 34.375 f.
1
2
0.775 f.
29.4 f.
4.2 f.
1.94 f.
16.83 f.
11.61 f.
3.31 f.
21.30 f.
3.25 f.
44.75 f.
27.56 f.
33.69 f.
24.55 f.
RESEARCH AND DRAWING LUIS DE GARRIDO

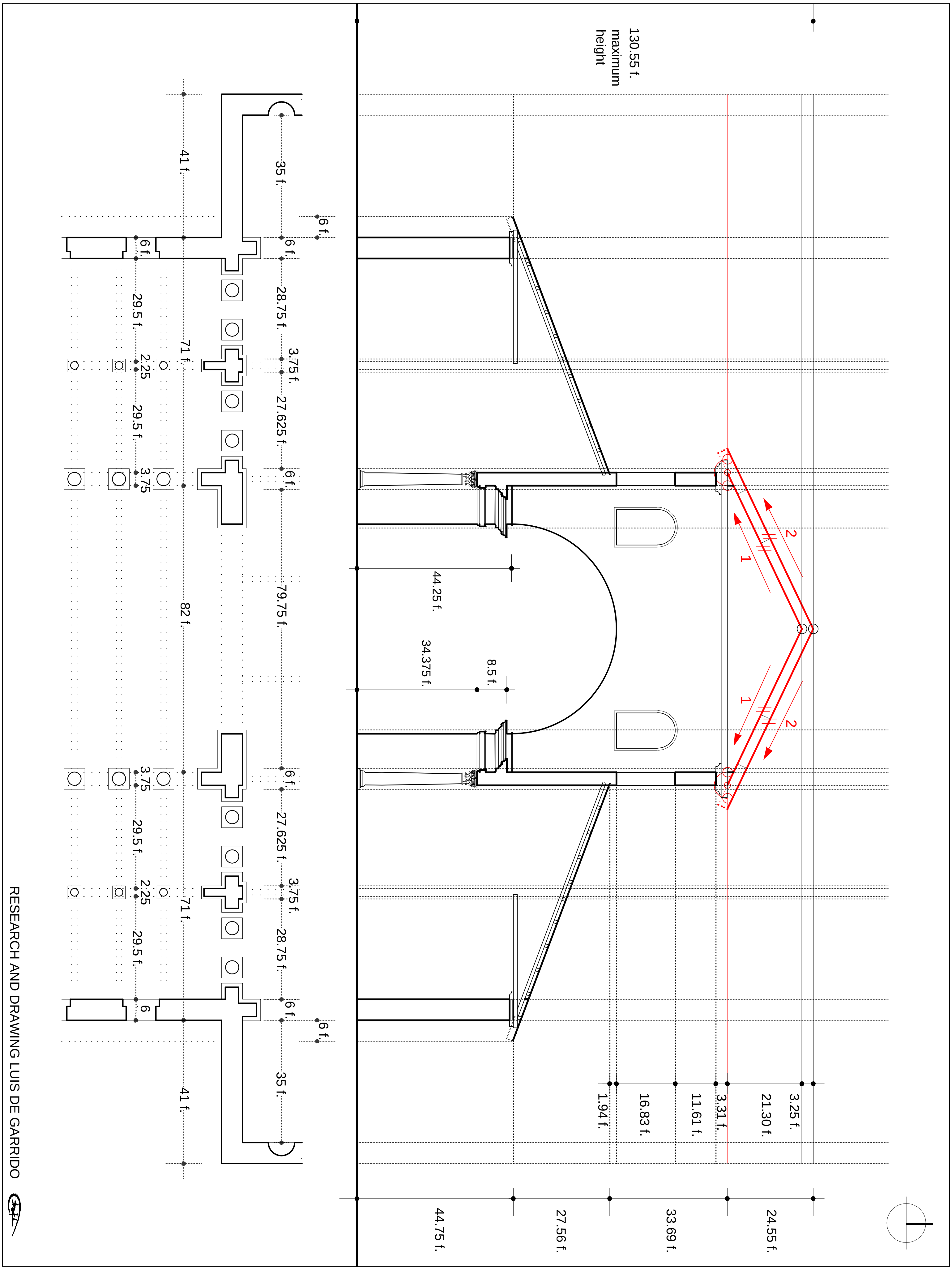


DETERMINATION OF THE ARCH OF CONSTANTINE



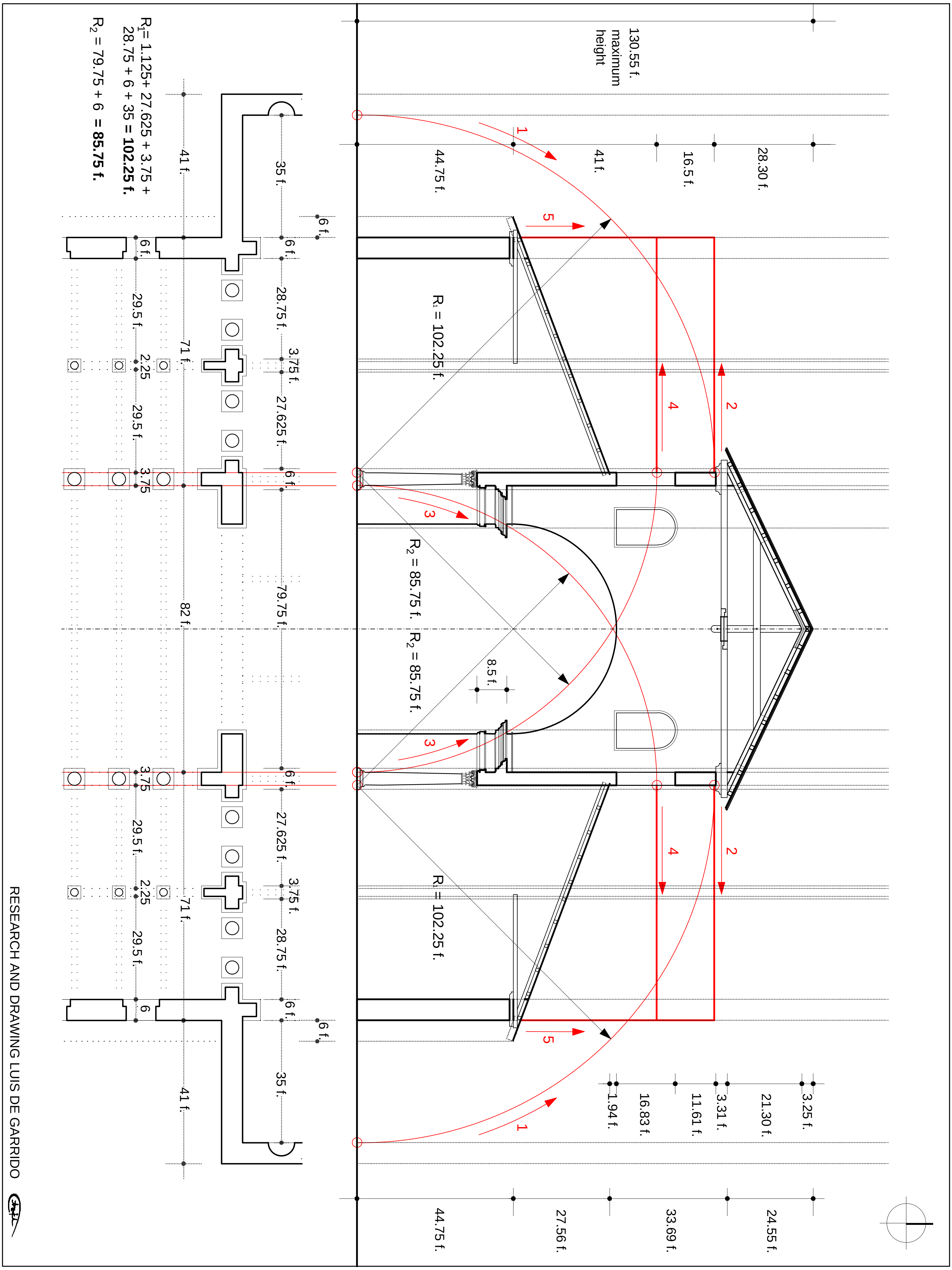


RESEARCH AND DRAWING LUIS DE GARRIDO

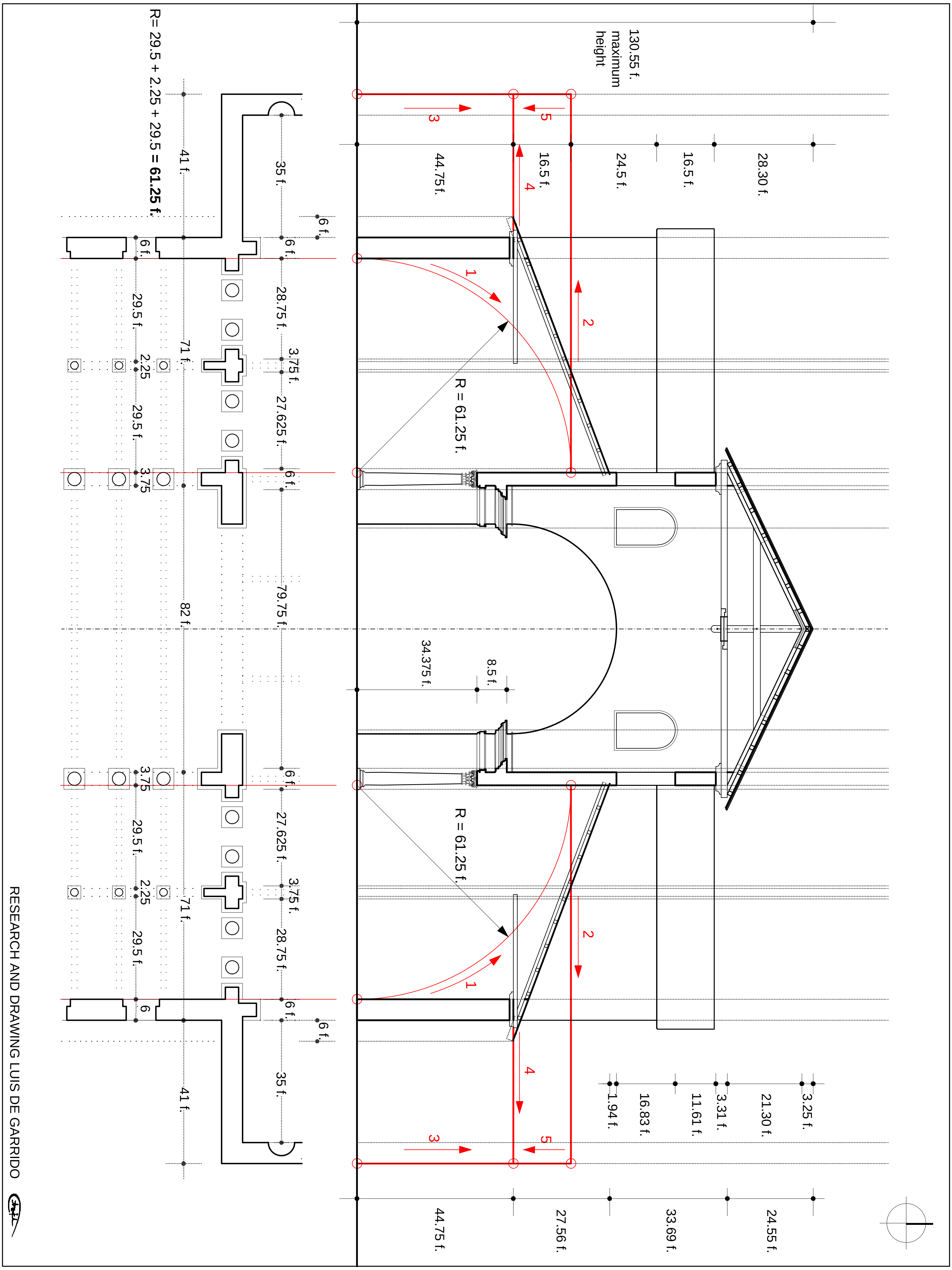


RESEARCH AND DRAWING LUIS DE GARRIDO

DETERMINATION OF THE CENTRAL NAVE'S ROOF



DETERMINATION OF TRANSEPT'S HEIGHT AND ROOF



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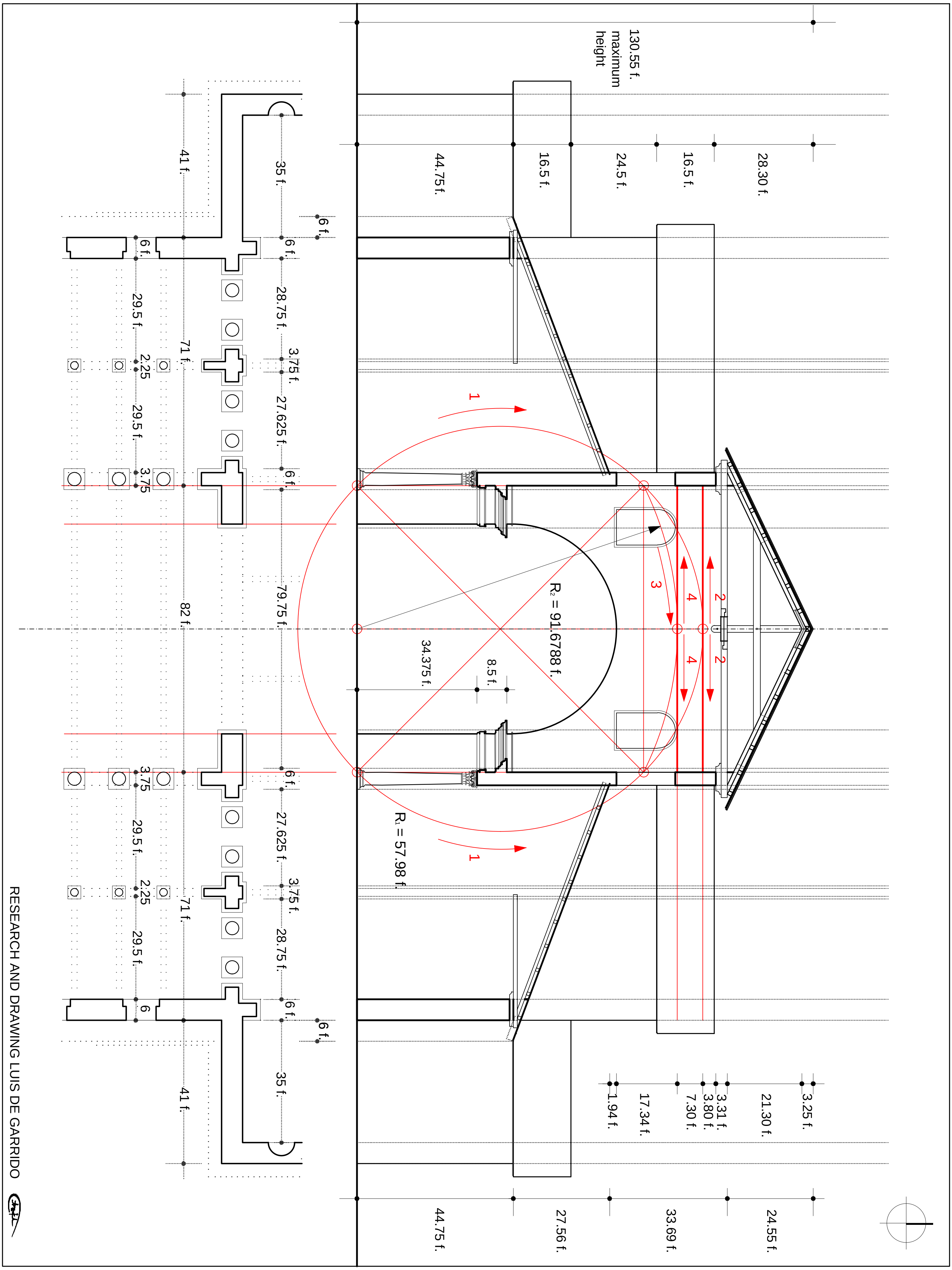
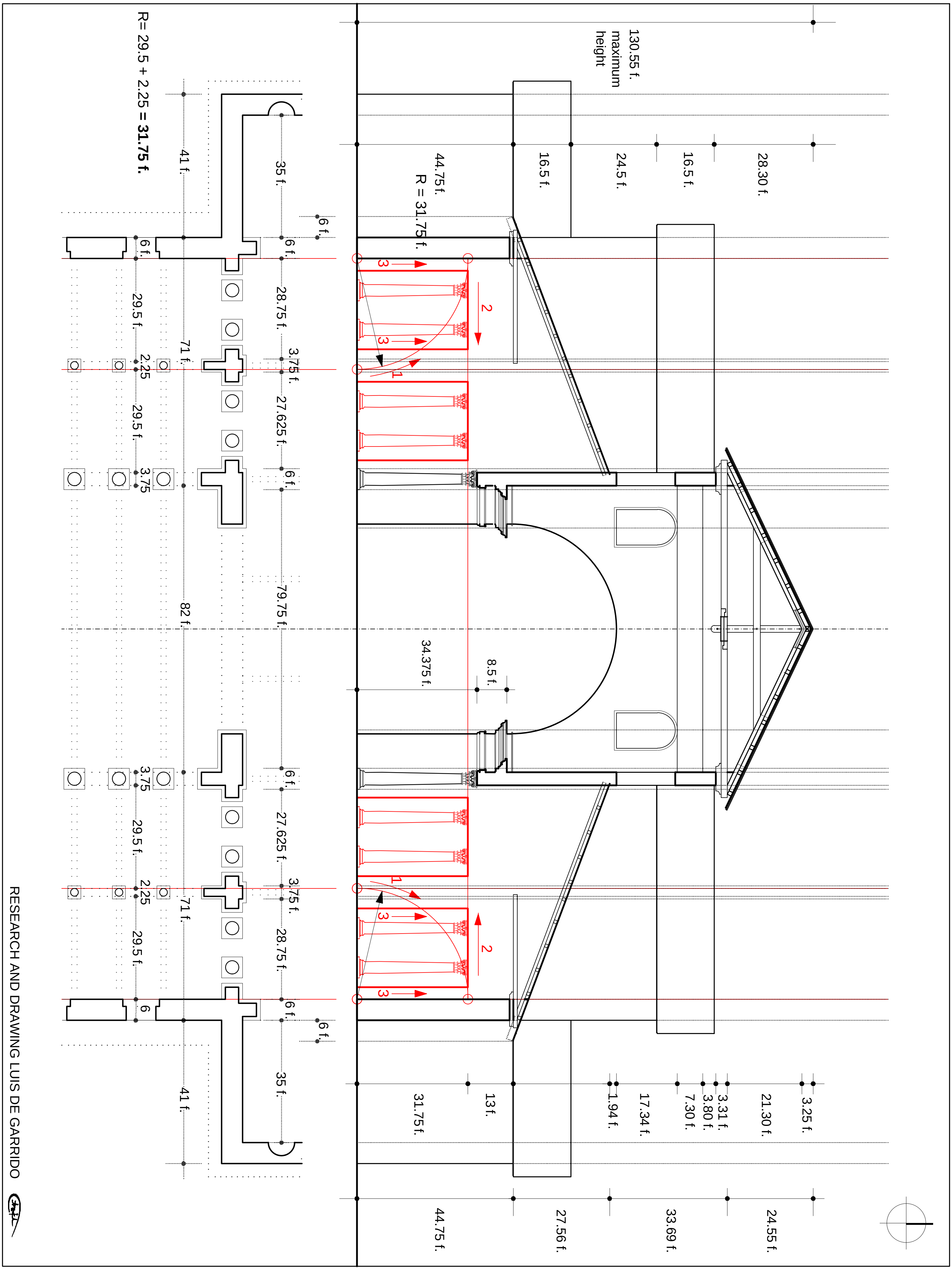
DETERMINATION OF LATERAL EXEDRAS HEIGHT AND ROOF

OLD S. PETER

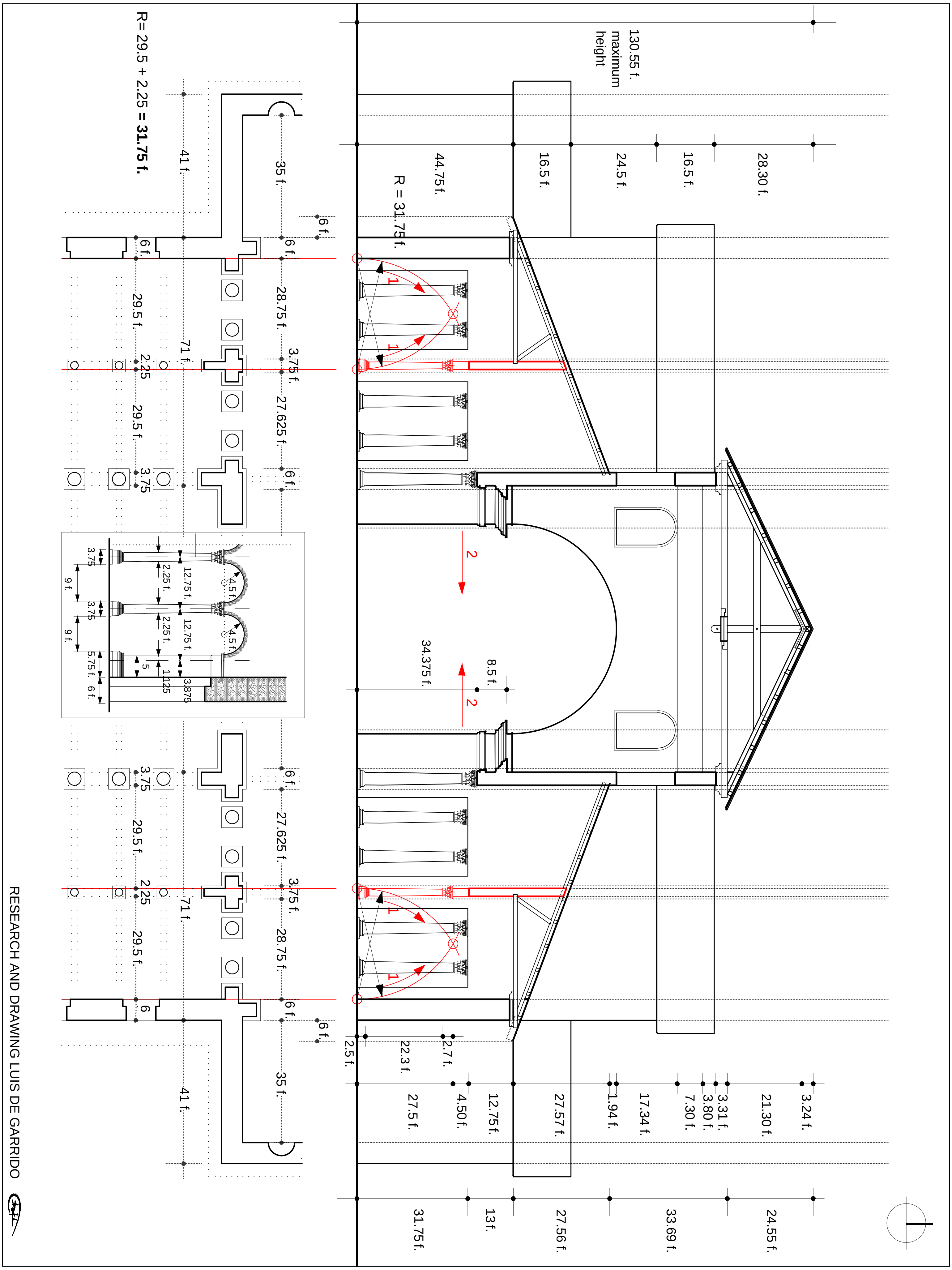
OSP-S13



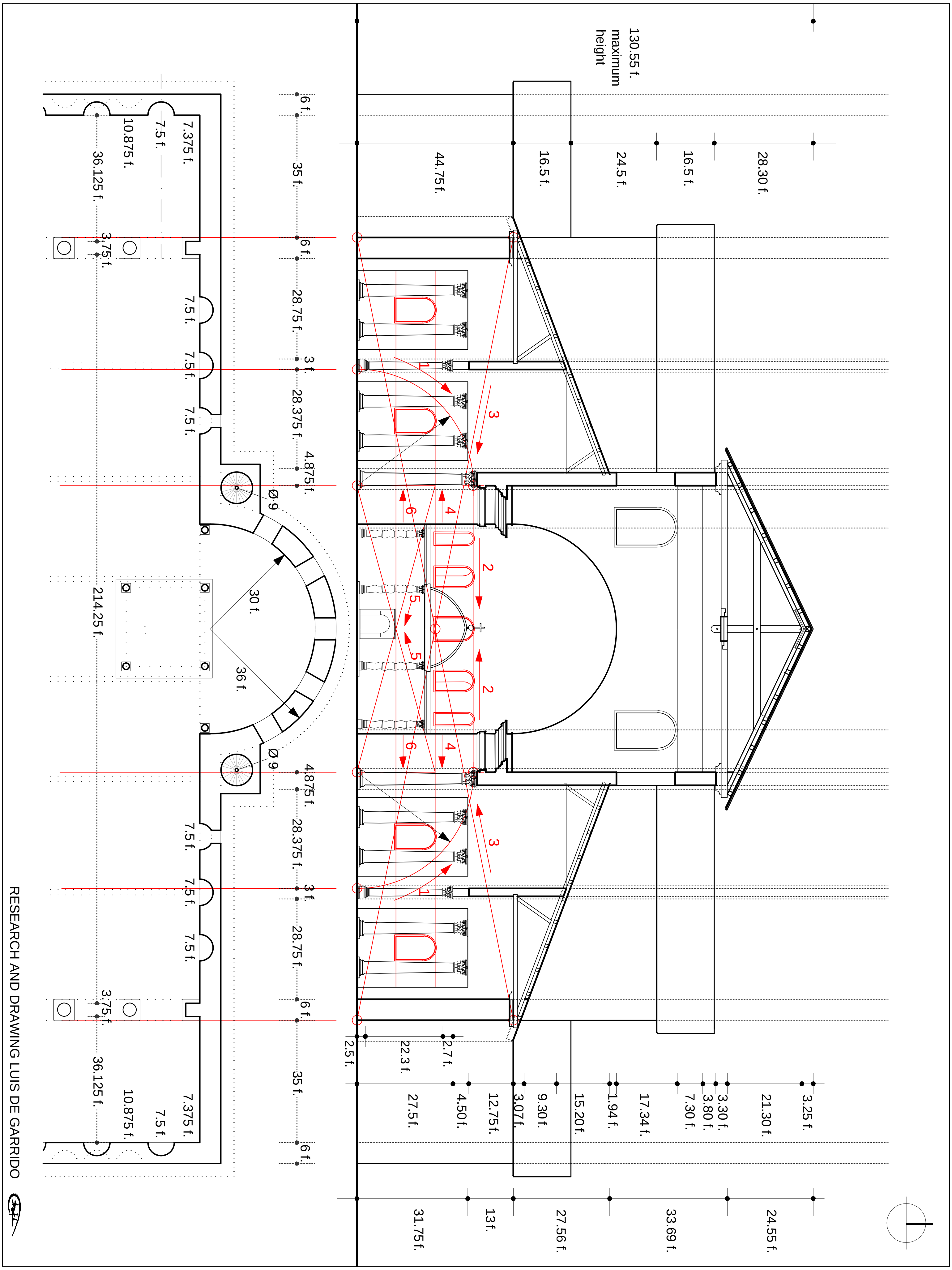
DETERMINATION OF THE FRIEZE'S HEIGHT AND DIMENSIONS



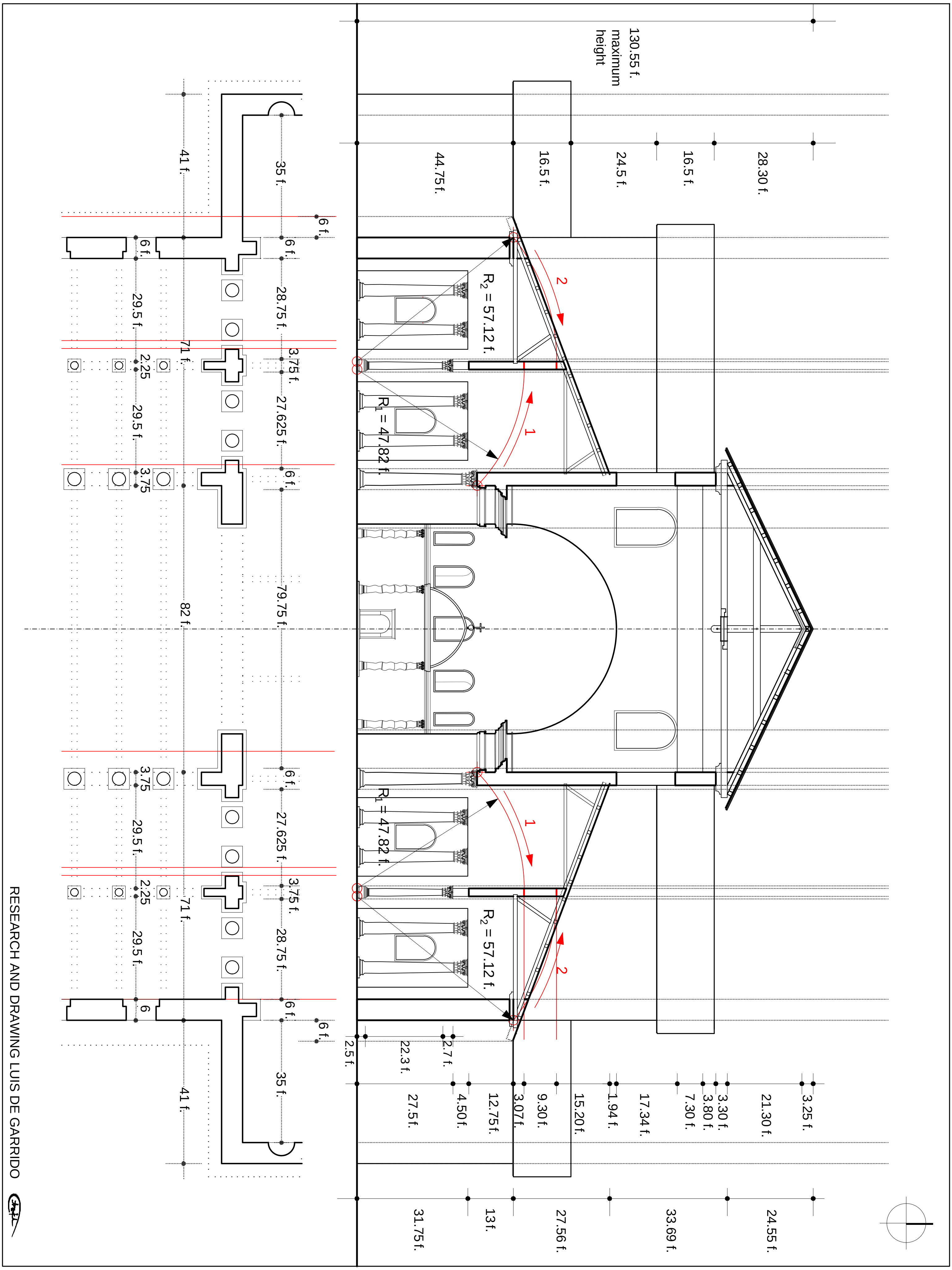
DETERMINATION OF THE HEIGHT OF TRANSEPT'S COLUMNS



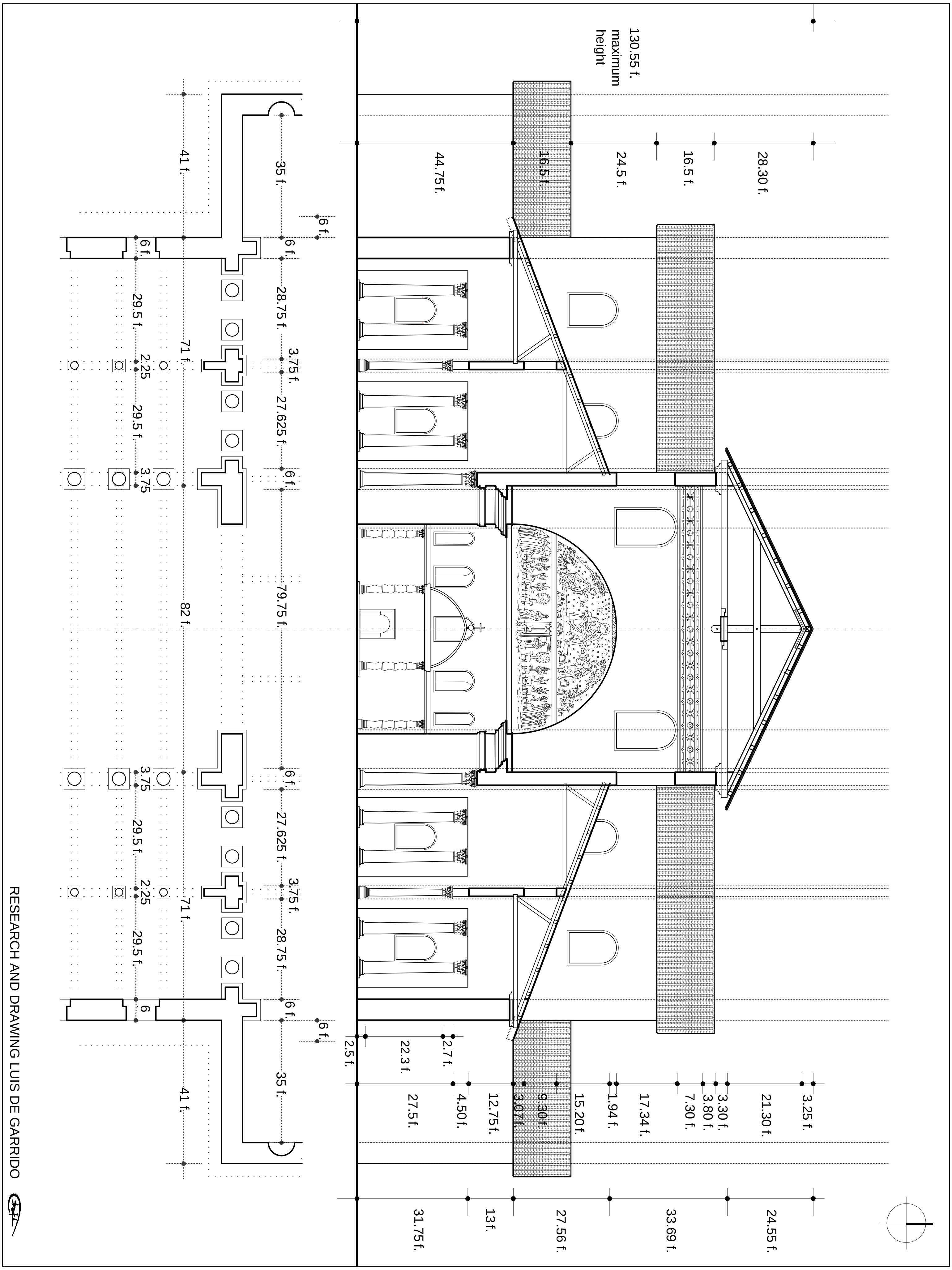
DETERMINATION OF THE HEIGHT OF THE COLUMNS OF THE SIDE NAVES



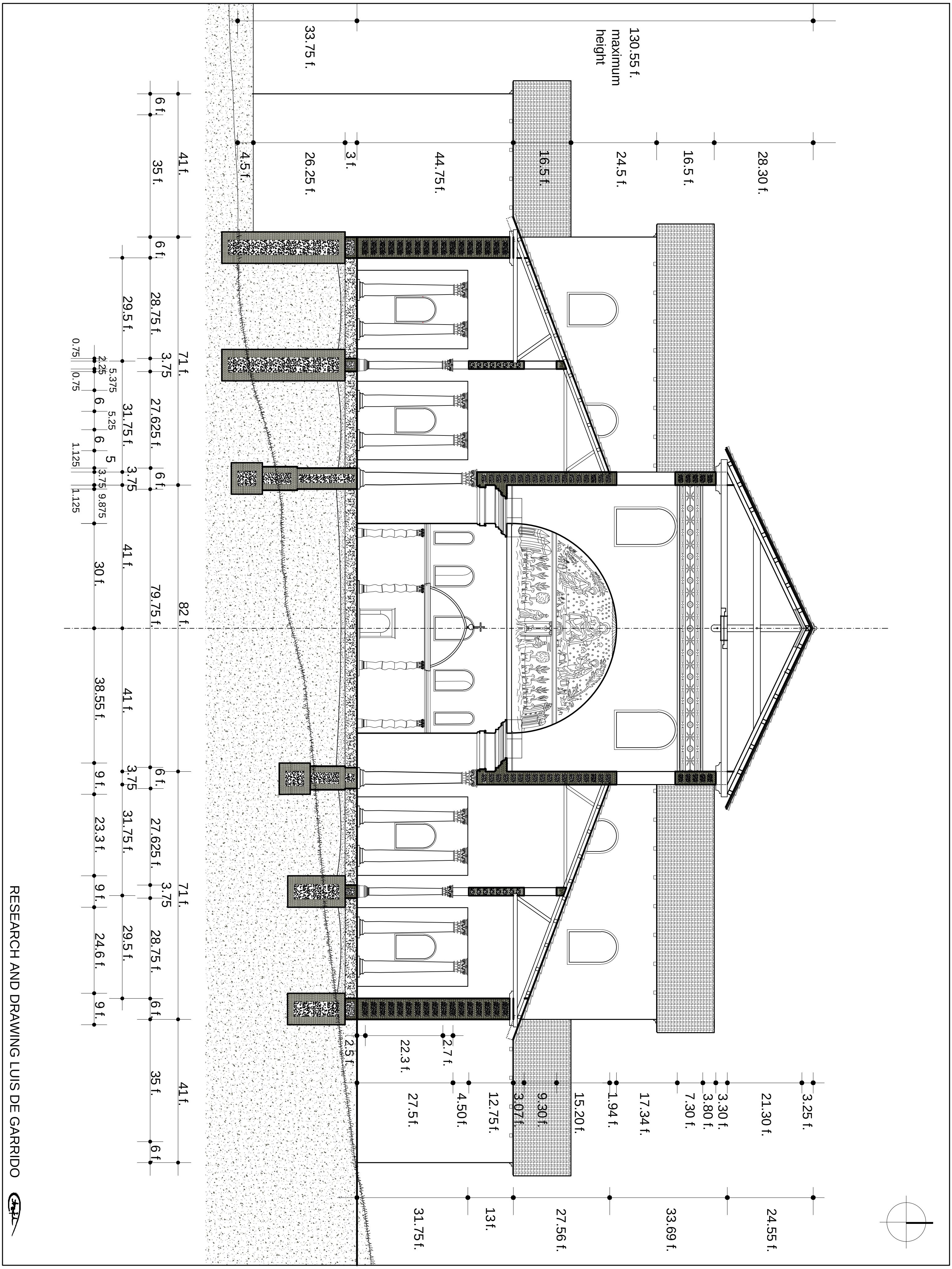
DETERMINATION OF THE HEIGHT OF TRANSEPT NICHES AND APSE WINDOWS



DETERMINATION OF SUPERIOR WINDOWS OF THE INTERMEDIATE WALL OF SIDE NAVES



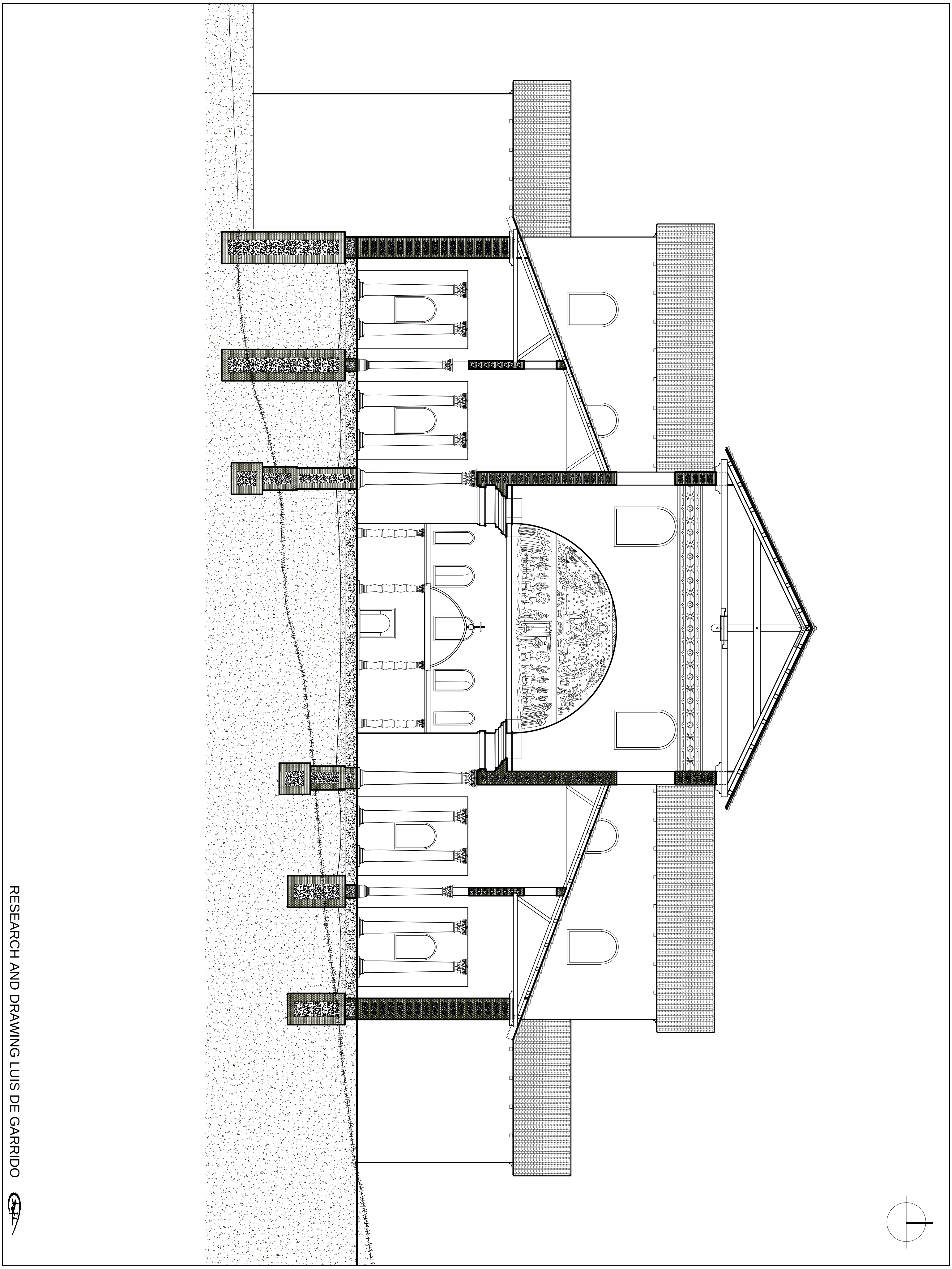
DETERMINATION OF SUPERIOR WINDOWS OF THE TRANSEPT



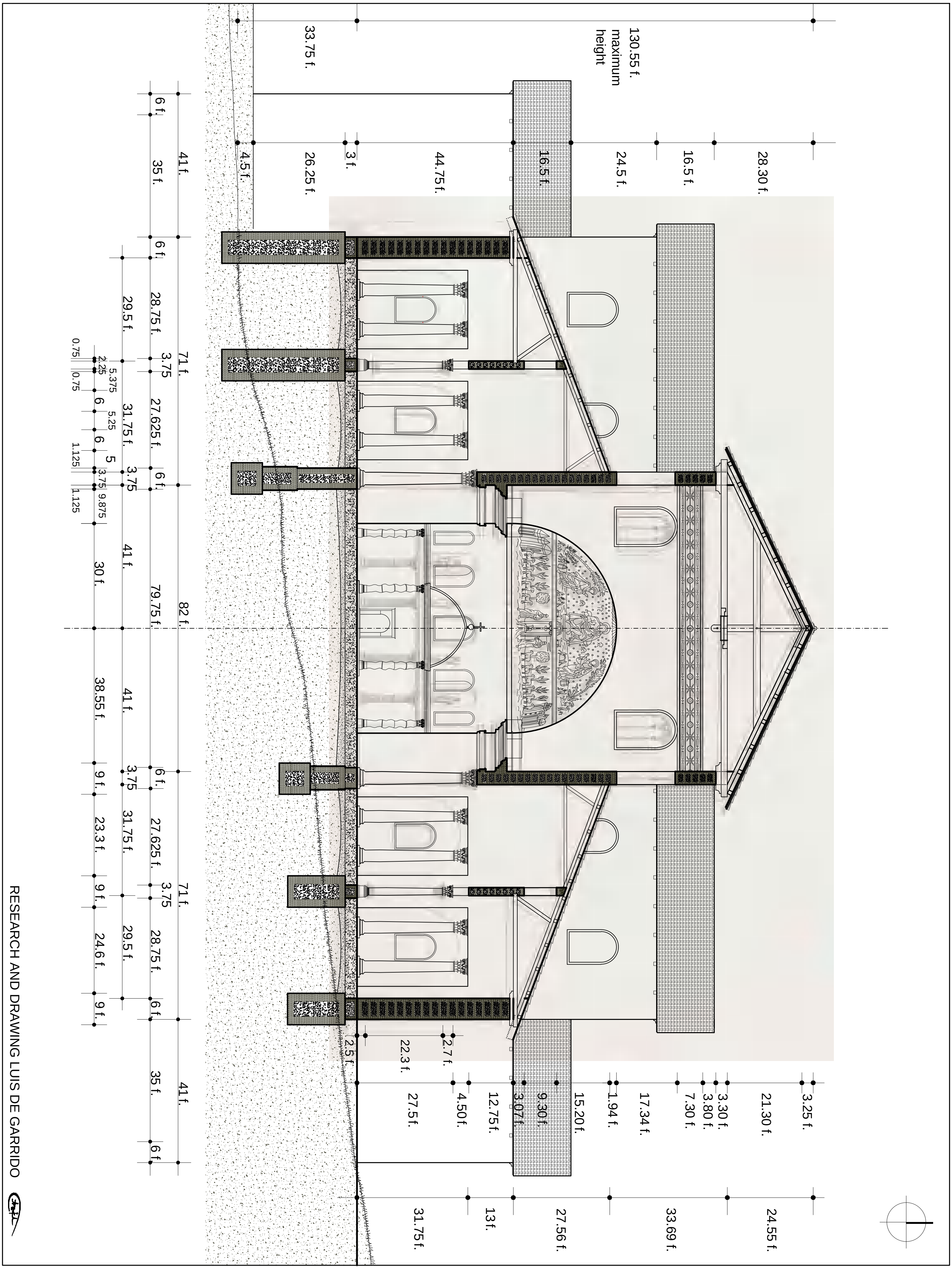
CROSS SECTION OF SAINT PETER'S BASILICA OF CONSTANTINO (WM)

OLD S. PETER

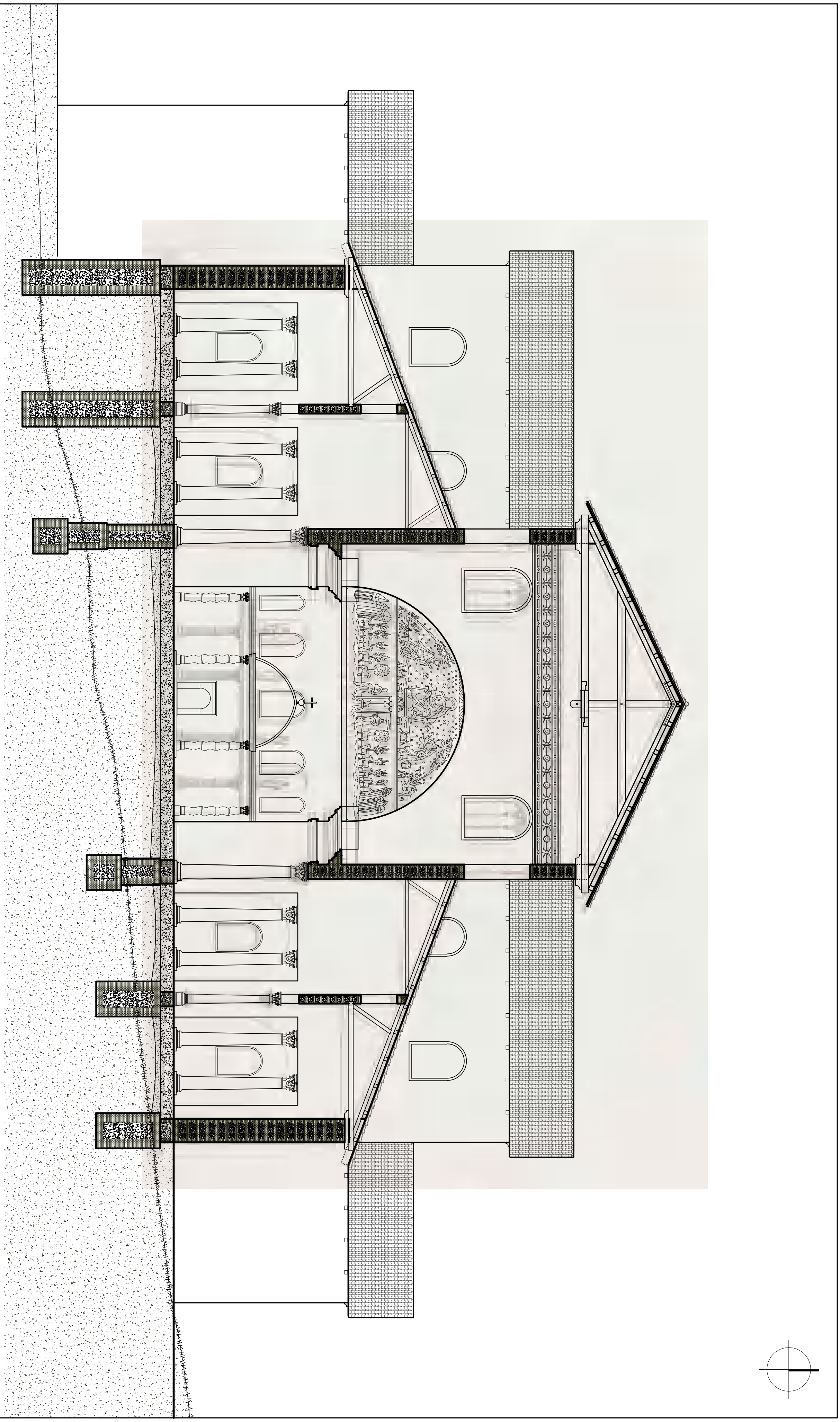
OSP-S20



CROSS SECTION OF SAINT PETER'S BASILICA OF CONSTANTINO



COMPLETE CROSS SECTION AND SUPERPOSITION WITH LETAROUILLY'S DRAWING (WM)



RESEARCH AND DRAWING LUIS DE GARRIDO

COMPLETE CROSS SECTION AND SUPERPOSITION WITH LETAROUILLY'S DRAWING

CHAPTER 5

“*Quello a cui corrispondono, in modo che nulla possa essere aggiunto, o ridotto, o cambiato, senza che sia meno approvato*”

Leon Battista Alberti

Chapter 5. Graphic reconstruction of the most significant stages of the construction process and evolution of the *old basilica of S. Peter* (324-1503)

5.1. Objectives

This chapter has two objectives. On the one hand, the most significant stages of the construction process of the old basilica of S. Peter are reconstructed, from the beginning to the end of its construction. On the other hand, the most significant stages of the evolution of the architectural structure of the old basilica are reconstructed, from the completion of its construction to the beginning of its demolition. The reconstruction is carried out graphically, using floor plans to scale and in full detail, and describing the most important architectural actions carried out at each stage.

- In the first part of this chapter the most significant stages of the construction process of the old basilica of S. Peter are reconstructed since the beginning of the construction of the founding platform in the year 324, in the time of Pope Sylvester I (314-335), until it can be given as completed in the year 514, in the time of Pope Symmachus (498-514). However, to correctly understand the construction process of the old basilica, it is advisable to go back in time, so in this chapter the most important stages of the state of the existing constructions in the area occupied by the old basilica, since 100 BC, have also been reconstructed. In the previous chapter, the initial project of the old basilica has been reconstructed, both in floor plan and in section, based on the identification of all the architectural decisions made in the different stages of its design process. In the same way, it has been possible to demonstrate that the construction process essentially respected all the guidelines of the initial design project, since the dimensions of the different architectural elements that have been generated in the reconstruction of the design process stages coincide with the available historical references, as seen in the previous chapter. Based on these previous investigations, and taking into account the available historical information, the status of the construction process can also be identified with enough precision in the most significant stages of the construction process of the old basilica of S. Peter.

- In the second part of this chapter the most significant stages of the evolution of the architectural structure of the old basilica are reconstructed, from the completion of its construction (514), until shortly before the start of its demolition (1503). It is possible that the old basilica was completed prior to the year 514, but in any case this year it was already finished, since there is news that in the time of Pope Symmachus (498-514) the rooms adjacent to the gate house were completed, including the Episcopal Palace and the papal residential building. Therefore, it can be considered that the old basilica was completely finished, as it appears in the floor plan layout made by Alfarano, in the year 514. In the previous chapter the design process of the old one has been reconstructed basilica, and in the first part of this chapter the plan structure that it could have in the year 514 is reconstructed. Therefore, and based on existing historical information, it is possible to rebuild the appearance that the old basilica could have had, throughout the most characteristic stages of its historical evolution.

5.2. Graphic reconstruction, description and justification, of the most significant stages of the construction process of the *old basilica of S. Peter* (324-514)

The state of the old Basilica of S. Peter in the most significant stages of its construction process is shown below. At each stage, the most important actions carried out have been justified and documented, as well as the most relevant historical events related to them. In the first place, each of the stages has been identified, coinciding with the most relevant historical dates, taking into account the most important historical references [1]. Second, each stage has been defined by collecting, classifying, ordering and evaluating a large number of references. Finally, the status of the works in each of these stages has been graphically represented.

Both the description of each stage, and especially its graphic representation, constitutes information of great historical value, since it allows researchers and historians to know the appearance of the old basilica of S. Peter at each stage of its construction process. On the other hand, this information constitutes a conceptual and graphic framework of great value that facilitates specialized research related to specific details of each of the defined stages.

Stage 1 (Layout OSP-CP1)

100 B.C. Etruscan necropolis

The old basilica of S. Peter was built on the side of a hill called *Mons Vaticanus* long before the beginning of Christianity.

There is no unanimity on the origin of the name *Vaticanus*. Some researchers are of the opinion that the name comes from the Etruscan goddess *Vatica*, to whom a temple was erected in the area. Other researchers think that the name comes from a hallucinogenic herb that grew on the slope of *Mons Vaticanus* [2]. A third theory is that the Etruscan people who occupied the area were called *Vatucum* (Fig. 5.1).

This hill, located to the west of the Tiber river and outside the city limits, has housed a necropolis since Etruscan times. There are hardly any remains of this necropolis, but as it is known, in an approximate way, the route of the path that connected the Etruscan necropolis with the city of Rome, and as there is certain information on the structure of other Etruscan necropolis whose remains have reached our days, it is possible to suggest what this necropolis looked like.

On the other hand, it is known that near the necropolis, there was a temple dedicated to the goddess Cybele (*Phrygianum*) [3] built around 191 BC, which had to be demolished in the construction of the great foundational platform of the ancient basilica, in the year 324 [4]. The location of this temple is known, located at point 51 of the archaeological plan of Paolo Liberani [5] (Fig. 2.2). Undoubtedly the path that led to the temple was the same that passed through the necrópolis, so this path became the first urban landmark in the Vatican area.

Stage 2 (Layout OSP-CP2)

37 A.D. S. Peter (37-53). Construction of the Calígula circus

The land of the *Mons Vaticanus* was used basically for the cultivation of vineyards and as a funeral area, so there were hardly any small buildings for agricultural use. As these lands were barely built, at the beginning of the 1st century they were chosen to build a circus, although this had to compact and flatten the soil, and excavate part of the hill in the western part of the circus (Fig. 5.2).

At the end of the construction of the circus, in AD 37, the Emperor Caligula transported the obelisk from Alexandria to Rome, as described by Pliny the Elder in his *Natural History* (16.76.201), and later it was installed in the *spina* of the circus, where it would remain until 1586 [6], therefore the circus must have started to be built a few years before. The original site is now marked by a stone situated in the pavement of the Piazza dei Protomartiri Romani, where excavations in 1958-1959 revealed remains of its marble base [7].

The circus was built longitudinally along an east-west axis, with the entrance on the east side (since the west side was partially carved into the hill) (Fig. 5.3). The dimensions and

the specific position of the circus are not known exactly, but it can be deduced based on the archaeological plan of Liberani [8] (see chapter 2).
Obviously the location of the circus had to be chosen correctly, but due to its large dimensions, significant earthworks had to be carried out, the ground had to be compacted and the Vatican hill had to be slightly excavated. In this way the circus was slightly embedded in the hill on its west side, while the main entrance was at ground level, on the east side.
Based on Liberani's excavation plan, and taking into account all available historical references, it has been possible to reconstruct the architectural structure of the circus, and even make virtual images (Figs. 5.4, 5.5, 5.6, 5.7 and 5.8).
Christian tradition assures that Apostle Peter arrived in Rome between the years 64 and 68, under the mandate of Nero, and that he was martyred in the circus and buried near it and the imperial villa. Although these facts have been continuously refuted and doubted by scholars and historians, Christians began to assure that the remains of the Apostle Peter lay in a small tomb in the Vatican Necropolis, "*iuxta Palatium Neronieanum, in Vaticano*" [9] and from the time of his death many Christians began a continuous pilgrimage activity to that place.
In the 2nd century, while the circus was still standing, a series of small funerary buildings began to be built along its north side. These funerary buildings were built in a somewhat disorderly way, gradually consolidating a small necropolis that stretched from east to west along the way. At a certain point, the slope of the hill began to grow and this put a limit to the growth of the necropolis. In fact, in order to make the most of the land, a small earthwork was carried out at the western end of the necropolis to create flat ground, so it was necessary to build a retaining wall so that the land would not collapse (*muro rosso*). According to Christian tradition, the remains of Peter rest in a small tomb located on this wall [10].

Stage 3 (Layout OSP-CP3)
138 A.D. Hyginus (136-142). Road consolidation

By the end of the second century the Caligula circus had almost completely disappeared, and there were hardly any ruins left. Some of its materials were reused in other constructions and the useless rubble remained piled up, mixed with the undergrowth. As a consequence the ground level of the circus began to rise.

The ancient Etruscan necropolis had already completely disappeared, although the roads in the area continued to be used and consolidated over time.

Stage 4 (Layout OSP-CP4)

217 A.D. Zephyrinus (199-217). Vatican necropolis and Severan mausoleum

Between the years 212 and 217 the *Severan Mausoleum* [11] was built precisely centered on the old *spina* of the circus. Some seals found inside indicate that it was initially built in the time of Emperor Caracalla, of the Severan dynasty (193-235), which suggests that the Vatican circus had already fallen into disuse at the end of the 2nd century [12], and the Vatican area began to have a funerary character. The mausoleum was circular in shape and built with thick laterizio walls, and had an outside diameter of about 116 *feet* (154.66 *palmi*), and an inside diameter of about 90 *feet* (120 *palmi*), so the perimeter wall had a thickness of 13 *feet* (17.33 *palmi*). The height of the perimeter walls should presumably be about 90 *feet* (120 *palmi*), equal to the internal diameter, and would be crowned with a large dome [13]. The enormous thickness of the perimetral wall and its great height are not necessary for a simple mausoleum, and cast doubt on its original functionality.

The entrance to the mausoleum must have been on the north side, adjacent to the only path that was created on the north street of the circus, more or less parallel to the *spina*. It does not make sense that the entrance was on the west or south side, in the opposite direction to the access, and also not on the east side, since it would be a few *feet* from the obelisk, and would impede access. Undoubtedly the entrance was on its north side and had a few steps, so that the level of the interior floor was slightly elevated with respect to the level of the circus esplanade.

To build the circus, the land was first cleared until it reached solid ground. Afterwards the ground filled with firm stone was leveled, on which the foundations of the obelisk were raised. Afterwards, a compacted earth filling was made, about 9.75-10 *feet* thick (13-13.33 *palmi*), which would constitute the floor of the circus streets, and therefore would completely cover the foundation of the obelisk (see chapter 6).

The Vatican necropolis had been consolidated and was made up of a succession of small buildings lined up on both sides of the access road [14] (Figs. 5.9, 5.10, 5.11, 5.12 and 5.13). Eusebius, in his *Historia Ecclesiastica* [15], in 313, affirms that the earthly remains of S. Peter were buried in the Vatican, in a place marked by a *Tropaion*, a monument of victory. It also narrates that the apostle was offered *prosresis* (greetings) in the necropolis. A few years later, in 325, Eusebius narrates in his Theophany that large crowds flocked to the tomb of S. Peter on the outskirts of the city, like a great sanctuary [16].

At the end of the necropolis, this *Tropaion,* located in a small rectangular courtyard to the west, was already known since the 2nd century, and was considered the tomb of the Apostle Peter (Figs 5.14). The *Tropaion,* a monument barely one meter high, was located on the west wall of the courtyard (*muro rosso*), which was thick enough to contain the lands on the west slope. In order for the final part of the necropolis (where the courtyard is located) to have a horizontal floor, the Vatican hill had to be slightly excavated. In addition, a retaining wall had to be built, which at the same time served to channel and divert the rainwater coming from hill [17].

Some pieces of brick date the monument to the year 160 [18], probably raised by the Christian community of Rome, it was constantly maintained, preserved from the erosion and adorned by columns, a simple mosaic and some marble slabs (Fig. 5.15).

Stage 5 (Layout OSP-CP5)

296 A.D. Caius (283-296). Tropaion reform

At the end of the 3rd century the appearance of the final courtyard of the Vatican necropolis was improved, covering the floor with mosaic and embellishing the *Tropaion* and it continued to be used for burials until the beginning of the 4th century [19] (Fig. 5.16).

At this time, in the northern area of the circus and near the necropolis, there was a temple dedicated to the mystery cult of the goddess Cybele (*Phrygianum*) in full use [20], and it had to be demolished due to the construction of the great horizontal platform that it would serve to flatten the ground and as a foundation for the gigantic basilica that would begin to be built in 324 [21].

The Caligula circus, which had fallen into disrepair at the end of the 2nd century, gradually collapsed throughout the 3rd century. It is logical to think that the debris accumulated in the western part of the circus, in the area embedded in the hill and less accessible. It is also logical to think that the eastern part of the circus, which was shown above ground level, was gradually being dismantled and spoiled, in order to reuse its valuable materials in other constructions (*spolia*). In other words, the eastern part of the circus was gradually dismantled, while the western part was filled with its own rubble, and it was compacted due to the discharge of other rubble, earth and weeds. In this way, little by little, the shape and unevenness of the original soil of the hill was recovered.

Stage 6 (Layout OSP-CP6)

324 A.D. Sylvester I (314-335). Construction of platform

In the times of Pope Sylvester I, and Emperor Constantine, perhaps in 323 or early 324, in any case immediately before the beginning of the construction of the great horizontal foundational platform, the *Tropaion* was isolated over the tomb of the Apostle Peter and a protective casing was built [22] (Fig. 5.17). For this, the immediately surrounding structures were demolished and the remaining masonry was transformed into a marble-covered monument, with an open niche on its eastern side (Fig. 5.18). Immediately afterwards, a new marble-paved podium was placed around the monument, and pedestals were placed on that podium to place the *colonne vitinee* decorated with creepers, to hold a thrush that covered the monument. The podium on the west, north, and south sides occupied the same area as the pre-existing courtyard, but extended further east in front of the monument. It is evident that what was intended with this design was to preserve the memory of the design of the patio, in such a way that the podium became a metaphor for it [23] (Fig. 5.19).

The new level around the monument would be the reference to calculate the upper part of the platform as a foundation for the basilica to be built. During its construction, the monument was isolated, and the tombs in the surrounding area were beheaded, their covers being removed, so that the platform covered them in a unified upper part. In this way the platform became the new common roof of the tombs, and the funerary monument of Peter would emerge on it.

Liber Pontificalis provides a list of donations from Constantine for the maintenance of the Church and worship [24], but it should be noted that Constantine was not in a position to make such donations until after his victory over Licinius at the Battle of Chrysopolis in September of the year 324. And it is reasonable to assume that it was this same year that the construction works began.

In 324 the horizontal platform was built, on which the enormous building of the Constantinian basilica was to be built. Several alternatives have been suggested on the possible dimensions of this platform [25], although, based on the investigations carried out in the previous chapter, slightly different and more exact dimensions are deduced. The platform's perimeter load-bearing walls had a dimension of about 9 *roman feet*, that is, they would be about 3 *feet* thicker than the perimeter load-bearing walls of the old basilica (which had a thickness of about 6 *roman feet*), in order to reduce the transmission of loads to firm ground. Therefore, the foundation platform would protrude perimeter from the building of the old basilica by a dimension of about 1.5 *feet* (2 *palmi*) around its perimeter. For this reason, it can be deduced that the platform had an approximate length of 686 *roman feet* (1.5 + 71 + 306 + 306 + 1.5), that is, 914.66 *palmi*; and a width of approximately 227 *roman feet* (1.5 + 224 + 1.5), that is, 302.66 *palmi*.

The height of the platform at its highest midpoint (on the east side) was approximately 26.25 *roman feet* (35 *palmi*), given that the access ladder had 30 steps grouped into 5 flights [26], that is, 35 risers of 0.75 *foot* (one *palmo*) each riser.

Regarding the number of steps and their dimensions, Alfarano indicates that the staircase had 5 flights of 7 steps each flight [27]. This information contrasts with the information provided by an English traveler, John Capgrave -after 1447- stated that the staircase had 29 steps [28], and Nicolaus Muffel, in 1452, recalls 28 steps [29]. Undoubtedly John Capgrave and Nicolaus Muffel were referring to the “treads” of the steps, and Alfarano was referring to the “risers”. The dimensions of the staircase were deduced in the previous chapter, based on available historical references.

The foundational platform was built on the basis of perimeter walls, and internal longitudinal walls, with an enormous thickness (between 6 *feet* and 9 *feet*) and with a variable height. The foundation platform was built on the basis of perimeter walls, and internal longitudinal walls of great thickness and with a variable depth until reaching the ground level. The lowest wall, along the north side of the platform, was at least about 12 *feet* high, and 9 *feet* wide, and would be almost entirely underground. The tallest wall, located along the south side of the platform, was at least 30.75 *feet* high (41 *palmi*), and was buried at least about 4.5 *feet* (6 *palmi*) below the ground level of the circus [30]. The walls under the lateral colonnades were about 9 *feet* wide, and the walls under the central colonnades had a complex structure, and with various thicknesses, since the lower part was approximately 9 *feet* wide, the central portion approximately 6.75 *feet* wide, and finally the highest portion approximately 6 *feet* wide. This was undoubtedly done because these walls barely had to withstand lateral thrusts, thus saving material (Layout OSP-S21).

When the circus was built it had to be excavating on the hill and in some places earth fillings had to be raised on the rock level of the land in order to create a completely horizontal platform. At the height of the obelisk, the thickness of the fill with compacted earth was about 9.75-10 *feet* (13-13.33 *palmi*), so when building the south wall, this layer of earth had to be excavated until reaching a firm level, and in this way the south wall emerged about 26.25 *feet* (35 *palmi*) on the level of the ground of the circus. The set of walls of the foundational platform would become the foundations for the walls and colonnades of the basilica that would be built on them [31].

The primary longitudinal walls were made in *opus listatum* and *opus testaceum* [32]. These walls were interlocked by other transverse walls, with the same construction technique, creating compartments, many of which were filled with earth and rubble to increase the robustness and stability of the complex. Some of the secondary walls were made in *opus caementicium*. The set of foundation walls created a grid, so some foundation walls crossed the existing tombs. There is the case of one of the tombs, "tomb T", which was incorporated into the foundations in this way, was still in use immediately before the works. In fact, the cremation urn of Trebellena Flacilla was placed in it, which included a coin in the Arles mint c. 317/18, which provides an idea about the dating of the works [33]. The longitudinal foundation walls (on which the north and south perimeter walls would rest, and the four interior colonnades) were built on the floor of the Vatican hill in *opus listatum* (using tuffs and brick bands) and in *opus testaceum* (using only bricks). Using these same techniques, the transverse walls were built in such a way that interlocked the main walls and served to make a stabilizing and retention lattice structure of the fill within the foundation platform. However, and what is still unknown, some foundation walls were built using a completely different technique, *opus caementicium* (using irregular fragments of marble, tuff and travertine in mortar, using formwork [34] (Fig. 5.20). Undoubtedly the existence of various types of walls was due to a chronological sequence in the construction, but also to the testing of the best construction technique and the achievement of specific structural objectives, as the work progressed (Fig. 5.21).

The foundation platform should logically have been rectangular, but three additions were made when it was about to be completed: two rectangular-shaped additions, to support the north and south exedras, and a semicircular-shaped addition, to support the apse. These additions would be works to the perimeter walls of the platform and on top of them a continuous superstructure was built, as observed in the excavations, which joined the exedras with the west wall of the transept, and the screen walls with columns between the transept and exedras [35].

On these walls, barrel vaults were built with the same level that when filled in from the top would form the huge platform.

Initially this platform had a single perforation, through which the podium built just above the tomb of the Apostle Peter protruded, and probably two perforations in the west perimeter wall to access the ancient necropolis under the platform, which was buried under it. There must have been two accesses to the lower part of the platform, since the *GDSU 20 A* drawing by Bramante clearly shows two staircases. These western stairs must have been made when the apse was built, and they would undoubtedly also serve to reinforce and stabilize the union between the apse and the west perimeter wall. The platform would not constitute the ground level of the basilica, and as Grimaldi points out (who observed in 1608 the dismantling of the basilica's atrium) it would have a simple finish using a filling of stones and mortar (on the barrel vaults made brick-based), a layer of impermeable clay and finally a layer of lithostratum. It is therefore possible that as the basilica was being built, the final floor was made based on a leveling filling of stones with mortar and marble slabs. The clergyman also provides some specific references: a layer of clay on which the lithostratum rests, and finally a filling and the marble slabs [36]. Grimaldi thought that the lithostratum was from the time of Constantine, and therefore belonged to the upper finish of the platform. On the other hand, other authors think that they probably belonged to the works of beautification of the atrium by Pope Symmachus (498-514) [37]. Alfarano in his writings also observes that under the marble slabs there were padding “a few *palmi* thick”, and under which a modest layer of original white stones from platform [38].

Based on this description, it can be estimated that the infill layer and the marble slabs together would have a thickness of approximately 3 *feet*, so that the floor of the basilica would be approximately 3 *feet* above the platform. Therefore, when the building of the basilica was completed (around year 352) and the narthex still did not exist, the basilica had to be accessed by means of three steps (that is, 4 risers of 0.75 *foot* each riser).

The narthex was built in the time of Pope Siricius (384-399), its floor was still at the level of the atrium. In the times of Pope Donus (676-678) there are historical references that the narthex was paved with large marble slabs [39], so the steps were moved and were located between the narthex and the atrium, leaving the narthex at a higher level than the pavement of the atrium and the lateral wings of the anterior body of the old basilica [40]. There is also information that until the pontificate of Pope Hadrian I (772-795) the narthex was accessed through some steps [41].

In the times of Symmachus (498-514) the rooms adjacent to the gate house were completed (including the Episcopal Palace and the Papal Residential Building), so the floor of these rooms would be raised above the entrance platform and most likely some steps are needed to access them. Between the times of Pope Stephen II (752-757) and

Hadrian I (772-795), two bell towers were built in the rooms adjacent to the gate house, so later repairs to the pavement would be needed. Hadrian I also restored the main access ramp for the first time. Perhaps in the times of Pope Leo III (795-816) a complete paving of the atrium and the access body was made, so the narthex, the atrium, the lateral arms and the access body were leveled and the three steps were moved staggered to the gate house. Finally, already in the Renaissance, Pope Pius II (1458-1464) raised the paving of the platform of the entrance staircase to the complex and reformed the entrance staircase by adding new stone slabs on the steps and landings. As a consequence, the entrance platform (between the last step to facade) went from having 56 *feet* (74.66 *palmi*) (*Stage 13*, chapter 4), as it was in the initial project, to having 77 2/3 *palmi*, as *Peruzzi* clearly specifies in its *GDSU 11 Ar* drawing. By covering all the steps with thick marble slabs received with mortar, the steps necessarily had to be moved away from the facade, and a dimension of 2 2/3 *palmi* is reasonable.

Stage 7 (Layout OSP-CP7)

325 A.D. Sylvester I (314-335). Construction of Constantine Arch

The Arch of Constantine was the first structure to be built on the foundation platform, although it was probably not fully completed in 325.

The foundation discovered in the excavations of the Arc of Triumph is essentially a dormant foundation, made by means of a sleeper, or chain, built between the two piers of the arch. It was built in *opus caementicium* of marble and travertine, while in its lower part the section had an *opus incertum* cladding (using pieces of tuff) [42]. Krautheimer suggested that the reason why the construction technique was varied in the realization of this foundation is because the decision to link the foundations of the north and south arms of the east wall of the transept was taken on the fly, once construction had begun [43].

The existence of this type of sleeper foundation has implications for establishing the initial intended relationship between the naves and the transept of the basilica. If no foundations were laid in this part at first (it is highly unlikely that the excavated foundations were a replacement for the previous foundations), it is because a closing wall was most likely never designed in this place, and from the beginning it was planned that there would be an important opening between the nave and the transept. Therefore, the Arc of Triumph had to be planned at the time when the first phase of the foundations was made. However, since the arch piers must have been on some kind of foundation, and if the sleeper wall in an anomalous technique is secondary, there must be other primary foundations for the piers. In fact, the excavated line from the base of the sleeper does not reach the point where the piers were located, so it can be assumed that the piers were initially built on independent foundations. In this case, the sleeper would have been inserted later to lock and strengthen the independent foundations of the piers.

It is logical to assume, in the absence of any indication, that the Arc of Triumph initially did not have columns adjacent to the piers, and that these were introduced, as has been customarily suggested, in the time of Leo I (440-461) as part of a consolidation of the arch after damage caused by an earthquake or lightning [44], although this interpretation has been questioned, and it is thought that the Arc of Triumph had columns from the beginning of its construction [45].

It should be clarified that Nicholas V (1447-1455) arranged some large columns (possibly larger than the original ones) facing the piers of the arch, as a result of his project to reform the basilica, which includes a transept of the same dimensions as the central nave, and a square transept of 110 * 100 *palmi* [46]. But this fact has nothing to do with the existence of columns, perhaps smaller in size, in the piers of the arch, either from the beginning of its construction (as Brandenburg thinks), or from the time of Leo I (440-461), when there is news of the existence of columns in the piers of the arch.

Finally, it should be noted that an inscription on the arch unequivocally refers to Constantine as the founder of S. Peter, and relates the founding of the basilica to the fulfillment of a vow, in relation to the battle of Chrysopolis [47].

Stage 8 (Layout OSP-CP8)

326 A.D. Sylvester I (314-335). Construction of apse

There are two probable and alternative dates for the construction of the apse. For some historians, the apse would be built around the year 337 [48], coinciding with the rise to power of Constans, the son of Constantine, whereas for other historians it was built more or less around the year 326, in the time of Constantine [49].

In the times of Pope Julius I, around the year 337, on the occasion of the ascent to the lathe of Constans, the son of Constantine, a semicircular apse began to be built. During the demolition of the apse walls in 1594, a series of stamped sesquipedal bricks were discovered, containing an incomplete inscription. Caesare Baronio, at that time, attributed this incomplete inscription to an abbreviation of "*Constantine*" [50]. However, in excavations of 1940 two tiles with the inscription "*Constantis AV*" were recovered, which seems to imply a complete inscription of "*D. N. Constantis AVG*" which could be the name of Emperor Constans in genitive. These two tiles therefore raise a more than reasonable doubt about the interpretation of the incomplete inscription of Baronio, and the bricks in the apse could belong to Constans, and not to Constantine. It is very likely that Baronio expanded the incomplete name of the bricks to correspond with the then universally accepted belief that Constantine was the founder of S. Peter's Basilica, although everything indicates that it was actually his son Constans. An inscription in the apse discovered in the 15th century said: "*Constantini… expiata hostili incvrsione…*", clearly indicates that the visible name is in the genitive and therefore refers to the father of the person actually commemorated, and therefore must have been a son of Constantine [51].

However, other historians do not believe that these inscriptions indicate that the apse was built by Constans, and they think that it was built by Constantine [52].

The apse could therefore have been built by Constans, and it is also likely that it was modified as soon as the work began, since there is evidence that the foundations were reinforced [53]. In the original project, perhaps the apse was less important and designed with a light roof, based on concentric wooden beams. However, and given that the apse would remain isolated for a few years (in which one would like to take advantage of it to carry out some type of Christian cult) it was decided that its design should be more robust to stand on its own, until the western wall of the transept was built.In this way an apse with a hemispherical vault was designed, and with a considerable thickness so that it could remain upright, and thus be able to wrap and protect the *Tropaion* podium. Two spiral staircases were probably built on both sides of the apse to access the necropolis, which was buried under the huge flat platform built in 324.

The foundation wall of the apse was built in its upper part in *opus incertum* (using pieces of tuff), and in its lower part almost exclusively in *opus caementicia* (using marble and travertine) in a similar way to the foundation walls of the Arch of Constantine and the clear contrast with the foundations of the west wall of the transept on both sides of the apse, which was made of a correct brickwork [54].

For this reason, and as with the Arch of Constantine, it seems that the foundations of the apse in its present form indicate a change at some point after the foundations of the west wall had been made. In this case, however, the change appears to be due to quite a different situation. The main foundation of the west wall of the transept was aligned with the monument of the Apostle's tomb and was interrupted to avoid impacting the monument. This fact suggests that the existence of some kind of apse or exedra was always foreseen behind the tomb of the apostle, and most probably it was always intended to have a semicircular shape. But this raises new questions about why and when the initial foundation of the primary apse was replaced by the secondary foundation. Krautheimer thought that this was due to a decision on the fly to reinforce the critical point at the foot of the arch to the apse. Another explanation would be that initially it was planned to make a less heavy apse, with a roof made of wooden trusses, and finally it was decided to make a heavier apse, based on a hemispherical vault [55].

In any case, the apse was finished soon, since there is news that the mosaic of the apse could have been completed in the year 340 as a *piaculum* on the occasion of the war waged against Constans by his brother Constantine II [56].

Stage 9 (Layout OSP-CP9)

327 A.D. Sylvester I (314-335). Construction of transept

The transept should have been completed after the year 326 [57], although Brandenburg points out that that same year it was already completed, to make it coincide with the donation of the golden cross by Constantine and his mother Elena [58]. However, and due to the large number of technical difficulties involved in the construction of the apse (since it had to be built outside of the foundational platform, but at the same time perfectly integrated with it), it is not likely that the transept could be completed that same year, and it is much more accurate to think that the transept could have been completed between the year 327 and the year 330 (not including exedras). The exedras necessarily had to be completed much later than the transept, due to the enormous technical difficulties involved in building, again, outside the founding platform, and at the same time that they remain perfectly integrated into it. In any case, it is reasonable to assume that the transept was completely completed around 330.

During the construction of the transept, several alternative proposals would undoubtedly be formulated on how to integrate the tomb of the Apostle Peter with the central space of the basilica, and how to access it. When the original project was drawn up, the exact functionality of the transept was not known, since it would surely not have the same use as it had in the pre-existing Roman civil basilicas. Initially the building would have two main functions: as a *martyrium* of the apostle, and as a covered cemetery, but with the passage of time a huge number of liturgical activities would take place in the building. For this reason, very soon the transept would turn out to be very narrow since there was no way to locate the altar, since access to the Apostle's tomb left very little space available in the central space.

The transept was built on the basis of load-bearing walls 6 *feet* thick, and integrated the Arch of Constantine and the apse into the same architectural element. For this reason, previously, several types of special linear foundations had to be made, with different materials, and these different foundations had to be unified on the basis of continuous foundation strips. When making the transept, both the access porticoes to the lateral naves were made, as well as the lateral porticoes that later they should connect with the two lateral exedras.

There are some doubts between the junction between the apse and the west wall of the transept at superstructure level [59]. The lower part of the apse wall survives in the caves below the basilica, enclosed in the wall between the 6th century annular crypt of Gregory I (590-604) and the 16th century ring corridor of Clement VIII (1592-1605), where it can be seen that it is built with a well-built brick cladding, but the real point of union between the apse wall and the west wall of the transept was crossed by the “Clementine corridor”. Therefore, it was only the "shoulders" of the face brick-based transept wall that rested on the apse and that could be observed during the excavations of the 1940s. It is still uncertain whether the superstructure of the apse and the west wall of the transept were built in the same phase, or in two different phases corresponding to the two phases of their respective foundations [60]. However, the semicircular apse can remain upright without any special need for shoring, so it seems logical to think that The apse was initially built, followed by the west wall of the transept, and later the east wall of the transept, joining the existing Triumphal Arch.

The transept was lower than the height of the main body and had 16 windows, according to Alfarano [61]. These windows could be distributed in two groups of three on the sides of the apse and a pair on each of the eastern walls. No doubt the unusual abundance of windows in a basilica building was due to the need to provide as much natural lighting as possible around the tomb of Aposte Peter [62].

On the tomb of Peter, covered with precious marble, porphyry and *pavonazzetto*, Constantine had previously built a canopy that would enhance the tomb as an object of devotion included in the great transept [63]. The canopy was raised on marble slabs and consisted of four Solomonic columns whose axes are separated by 22.5 *feet* (30 *palmi*), and with a diameter of approximately 2.25 *feet* (3 *palmi*) at their widest part (Fig. 5.22). An entablature based on two cross arches rested on the columns, and at their intersection hung a large lamp [64] (Fig. 5.23). It is conceivable that the pilgrims of the early years would access the transept through the aisles and could even access the canopy from the sides [65]. Just in front of the canopy was a silver altar weighing 750 pounds [66] to celebrate the worship. The area enclosed in the canopy undoubtedly offered little space for the celebration of the Eucharist, so it should have been located outside the Canopy and the most suitable area would be right in front of it in an easterly direction [67].

Stage 10 (Layout OSP-CP10)

330 A.D. Sylvester I (314-335). Construction of exedras

There are references that in the year 350 liturgical functions were already carried out with the complete transept, including the two north and south lateral exedras [68], which is why the exedras had to have been built long enough. It is reasonable to assume that if the transept was completed in the year 327, the exedras were completed around the year 330. Therefore, the transept, the apse and the exedras would be completed within a more than reasonable period of five years from the beginning of the construction.

Liber Pontificalis indicates that Constantine had the dome of the apse covered with gold [69], and such a sumptuous decoration only made sense that it should be done when the entire transept and the exedras had already been completed [70]. Furthermore, the work necessarily had to begin before the death of Constantine, in the year 337. It is very likely that this mosaic showed the image of Christ sitting on the throne, as shown in a watercolor ("Drawing of the mosaic of the apse of the old basilica of S. Peter decorated by Innocent III", Biblioteca Apostolica Vaticana, Barb. Lat. 2733, fols. 158v and 159r) by Grimaldi from 1594 [71], and without a doubt the mosaic reform under Pope Innocent III (1198-1216) essentially kept the original design.

The construction of the exedras necessarily had to take some time since they had to be built outside the initial horizontal platform, and at the same time they had to be built perfectly integrated into the transept. This was a constructive challenge, and a different foundation had to be used and also tie bands with the already built walls of the transept. Despite this, it is to be assumed that Constantine urged that the complete construction of the transept and lateral exedras be completed as soon as possible, due to his advanced age

(Constantine died in 337). In fact, in Brandenburg's opinion the transept was consecrated immediately after its construction, and immediately destined for worship [72].

With respect to the nature of the foundations of the execution of the cruise terminal there are some doubts. Only the northern exedra has been examined archaeologically, and here the evidence is complicated by the subsequent construction of a vault over a 16th century lime pit, which according to the excavation report concealed the 4th century walls. Krautheimer noted that although the west side was hidden by the vault, part of the north wall and its foundations were visible, but did not comment on the nature of the foundations [73]. However, Carpiceci stated that the foundations could be inspected on three sides of the lime pit, and that they were of a very similar type to those below the apse. He further compared the well-built foundations on the south and west sides of the exedra with the foundations on the north side, and suggested that the latter were reinforced and propped up when the cal pit was built [74]. Without further investigation, no safe conclusions can be drawn. However, it seems clear that the exedras were built after the transept.

As indicated above, the entire basilica building was built on a foundation platform that, as a whole, forms a uniform rectangular block. The exedras collateral to the transept in the north and in the south, were left of the rectangular platform. This was a constructive challenge to unify and integrate its foundation walls with the walls of the platform. Some researchers suggest that the fact that the exedras protrude from the rectangular platform implies a change in the original idea of the project, perhaps without exedras [75]. However, it makes no sense to build a foundation platform with a complex shape and two additions for the exedra, since the additions can be built later. It is much easier, faster and cheaper to make a rectangular platform and later add the apse and the two additions for the exedras. Furthermore, and as seen in the previous chapter, the set formed by the transept (with exedras) and the naves, constitute a harmonic set, in which the dimensions of all its components are geometrically related to each other. For this reason, the exedras were designed from the beginning, although they were built outside the rectangular foundational structure.

Another point that must be taken into account is that, above their respective foundations, it has been observed in the excavations that the superstructure of the exedras and the superstructure of the west wall of the transept constitute a single structure, together with the walls with columns between the transept and exedras [76]. Logically, then, if the foundations of the exedras are secondary, the uniformity of the superstructure suggests that before building the walls of the transept the foundations of the exedras were built. After the common superstructure was built, then the transept walls were built, and finally the exedras.

Alfarano points out that there were 16 windows in the transept, so they were undoubtedly distributed in two groups of three windows on each side of the apse and a pair on each of the side walls of exedras [77].

Stage 11 (Layout OSP-CP11)

352 A.D. Liberius (352-366). Construction of main body of naves

The main body (including transept, exedras, apse and five naves) was already built before the papacy of Liberius (352-366), and the complete decoration was completed in the time of the emperor Honorius (393-423) [78]. The main body of the basilica was higher than the transept (reason why they seemed separate buildings) and consisted of five naves, such as the Basilica Ulpia of the Trajan's Forum, from the beginning of the second century, whose architectural structure seemed adequate for the Basilica of Constantine, conveniently adapted to the few initial requirements of the Christian liturgy [79].

According to information from Alfarano, the facade of the basilica had two rows of three windows, one above the other, and a round window at the top [80]. The 22 large windows of the classroom's clerestory illuminated the central nave, as if it were a ceremonial hall. In contrast, the aisles were darker and had 11 windows of a smaller size. The clerestory of the central nave was supported by two architrave colonnades of 22 columns each. In the same way, the aisles were also separated by colonnades of 22 columns each, but smaller in size. In this case the columns were joined by means of arches (and they were not architrave as in the main nave) due to technical needs, and to reduce the high weight that an entablature would suppose.

The entablatures of the central nave were built from blocks of various shapes and sizes, which suggests that they had not been specifically made for this building, and probably came from imperial marble deposits [81]. One of the blocks had remains of a Trajan's inscription, indicating that it had been used in another building and reused in the basilica. It was common for architectural components, previously used in other buildings, to be stored in marble warehouses, to be used again in the construction of new public buildings. It was also common to store half-made elements in imperial warehouses, and that these were just made once they had been taken to a certain building (*spolia*). The entablatures of the central nave had a considerable height (8.5 *feet*, that is 11.33 *palmi*), and were equipped with an architrave of about 3 *feet* wide (4 *palmi*) wide that had a railing, as can be seen in the drawing by Alberto Alberti (Roma, Istituto Nazionale della Grafica, n.2402 fol. 9r.). The architrave was designed with a great width so that it could be walked on, and thus be able to maintain the numerous lamps that illuminated the central nave [82].

The columns of the colonnades of the main nave, the aisles and the transept were of different varieties of granite and marble from Greece, Asia Minor and Egypt [83]. We have a fairly precise description of the column shafts in Baldassarre Peruzzi's drawings (*GDSU 108 Ar*, *GDSU 108 Av*, and *GDSU 120 Ar*), and by Giovan Battista da Sangallo il Gobbo (*GDSU 1079 Ar* and *GDSU 1079 Av*), in which it can be seen that they all had slightly different dimensions from each other. The shafts, made with red and gray granite, and with marbles of different qualities and colors, were arranged in consecutive pairs along the central nave [84]. The smaller columns of the lateral naves were arranged in a less orderly, almost chaotic manner, and were made of red granite and gray marble. The size of the small columns in the aisles varied more than the large columns in the central nave, and this was undoubtedly due to the lack of adequate and more homogeneous pieces of the imperial warehouses [85], and for this reason their bases had a variable height, so that all the capitals reached the same height.

Grimaldi also points out that both the capitals and the columns used finished and unfinished pieces, which indicates the speed with which the works were executed and the low level of demand in their construction [86]. In general pieces in different stages of processing from the imperial warehouses were used. Another proof is the base of the eleventh column that is conserved today, which has a rough and unfinished appearance, and is barely sketched possibly because they came from warehouses in which partially processed pieces were stored, to waiting for a specific and detailed later processing, depending on the order. The same can be said of some blocks used in the architrave of the central nave, made from raw blocks and processed in situ, and placed together with older pieces. All this indicates that the construction of the old basilica of S. Peter had to compete with other important public buildings of the empire, for which reason it had to make use of existing pieces, and sometimes half-elaborated [87].

At this time, the basilica had to be accessed by means of three steps according to previously made estimates (that is, 4 risers of 0.75 *foot* (1 *palmo*) each riser), since the level of the basilica was approximately 3 *feet* above the level of the foundation platform.

During these years the Severan Mausoleum was reformed, although it is not known who could have been the owner who resided in a privileged position next to the basilica, although it is known that he was no successor to Constantine [88]. Over time, due to the accumulation of rubble from the circus and natural compaction over the years, the ground level was recovering the natural slope that it had before the construction of the circus. For this reason, the Severan Mausoleum was gradually remaining below ground level, so it stopped being functional and had to be reformed. The thick walls that remained under the ground (116 *feet* in diameter, that is 154.66 *palmi*) were preserved, cutting them to the level of the ground (at this time the level of the ground, at the height of the mausoleum, would be about 15 feet below the level of the foundation platform), and the rest were demolished. Its interior was filled in, and a new mausoleum was built on this platform, based on a circular wall with an outer diameter of 102 *feet* (136 *palmi*), therefore a dimension of 7 *feet* ((116 - 102) / 2 = 7) was set back on the old base wall.This new mausoleum was formed by a circular wall of variable section, since it was formed by a sequence of niches and low walls, and had an internal diameter of 86 *feet* (114.66 *palmi*) (from the bottom of the niches), and a free inner diameter of 57 *feet* (76 *palmi*). The circular wall was raised about 25.5 *feet* (34 *palmi*) above the level of the basilica, that is, about 28.5 *feet* (38 *palmi*) (57 / 2 = 28.5) above the level of the foundation platform [89]. On this wall a circular clerestory was built and, in this way, the building adopted a typology frequently used in Constantinian times for imperial mausoleums, such as the Mausoleum of Elena (Tor Pignatara) in Rome [90].
Years later, the mausoleum was called the Church of Sant'Andrea, in the time of Pope Symmachus (498-514) [91].

Stage 12 (Layout OSP-CP12)
399 A.D. Siricius (384-399). Construction of narthex and perimeter wall

As the poet Prudentius points out in his visit to Rome in the year 402 [92], in the time of Pope Damasus I (366-384) several hydraulic works were carried out to collect rainwater from the hill through marble channels in a cistern (*colymbus*) inside a cave with a mosaic ceiling. It is possible that Damasus I, within his hydraulic works, built the *cantharus* in the middle of the atrium, since when Paulinus of Nola visited the basilica at the end of the 4th century the *cantharus* was already in use [93]. This *cantharus* was a fountain made in a kind of bronze, called *spoglio*, which gave it a very attractive beauty and rarity.

There is also news that a baptistery [94] was built in these times, possibly in the form of an isolated construction located outside, near the north exedra, although to date it is not known where it was located for sure, and only has the complementary information provided by Alfarano. However, the baptistery of S. Peter remains an open matter and an important topic of debate, since the steep slope of the terrain on the northwest side of the basilica must be taken into account [95]. Therefore, it is most likely that the baptistery was inside the north exedra.

A few years later, in 391 Theodosius outlawed pagan worship, Christianity was consolidated in the Roman Empire, and this probably was a final impetus for the completion of the basilica [96].

The narthex and the perimeter wall of the previous body were built in the time of Pope Siricius (384-399), as narrated by Paulinus of Nola about Paulina's funeral in 395-396 [97]. The floor level of the narthex remained a little lower than the level of the basilica, so to access it some steps should be climbed [98]. Based on Grimaldi's description of the structure and materials of the basilica's floor, and Krautheimer's investigations [99], it can be estimated that the unevenness was about 3 *feet*, therefore to access the basilica, 4 steps would have to be climbed (that is, four risers of 0.75 *foot* each riser).

The ground level of the narthex was the same as the ground level of the atrium, although it is known that in the days of Pope Donus (676-678) the narthex was paved so the steps were moved and were located between the narthex and the atrium [100]. There is no clear evidence on whether initially the foundation platform was already built with several levels (the highest level for the main body of the basilica and the narthex, and the lowest level for the atrium, side wings and vestibule), or if it was made with the same level and later it was raised when building the basilica. But the most likely thing is that the platform was flat, and that the ground was being completed (and raised) as the works progressed.

The perimeter wall was not a continuous wall, but the north and south faces were made up of a wall perforated by a sequence of arches on quadrangular pilasters, as can be seen in the floor plan of Alfarano [101], instead the north face could have been initially a wall. In any case, the north and south porticoed walls were already perfectly defined in the times of Simplicius (468-483) [102].

Before the year 393, the Anicii Probi mausoleum was built in the west exterior part (attached to the apse), by consul Sexto Petronio Probo, who died in that same year [103]. The mausoleum had a privileged location since it was attached just behind apse of the basilica, demonstrating the desire of members of the ruling class to be buried near the tomb of the Apostle Peter. It had an unusual structure since it was quadrangular and had three naves. The dimensions of the mausoleum were 62 *feet* long, by 45 *feet* wide. Brandenburg points out that it had approximate dimensions of 18.5 m. long by 11.5 m. wide (that is, 62.1 *feet* * 38.6 *feet*), although in Alfarano's plan it is clearly observed that the mausoleum had approximate dimensions of 82.66 *palmi* long (62 *feet*), by 60 *palmi* wide (45 feet), and the central nave had a width of 20 *palmi* (15 *feet*). It was demolished in the year 1450 due to the works carried out by Nicholas V for the extension of the basilica, although shortly before its demolition the humanist Matteo Vegio was able to describe it in some detail [104].

Some years later, around 400, Honorius (384-423), son of Theodosius I, built the Mausoleum of Honorius, a dynastic mausoleum for the Theodosian section of the western imperial family [105]. It is a political event of the utmost importance, which confers on S. Peter the rank of principal sanctuary of the Western Empire, extolling Rome as the spiritual and religious capital of the empire. Here the first two wives of the emperor were initially buried, in 407 and 415, and Honorius himself in 423.

The mausoleum was connected by a small portico to the southern exedra of the basilica; it had the same ground level as the basilica, and was almost aligned to the west with the new Severan Mausoleum, so it had a privileged access to the sanctuary and the tomb of Apostle Peter. The Mausoleum of Honorius was demolished in 1514 [106]. At this time therefore the two mausoleums located to the south of the basilica were separated, and had no connection. The Mausoleum of Honorius apparently only had access from the inside of the basilica, while the new Severan Mausoleum still had the entrance on its north side, adjacent to the access road. Averaging between the ground level in the western part of the basilica (presumably at an elevation similar to that of the basilica floor, and therefore 3 *feet* above the platform elevation), and the ground level in the eastern part (26.25 *feet* below the level of the platform), at the height of the renovated Severan Mausoleum, the level of the land was about 15 *feet* below the level of the platform. For this reason, at this time the renovated Severan Mausoleum had to have a staircase with about 20 risers of 0.75 *foot* each.

Stage 13 (Layout OSP-CP13)

483 A.D. Simplicius (468-483). Construction of lateral wings of the atrium

Pope Leo I (440-461) restored the mosaic of the triumphal arch that was already deteriorated [107], and it is known that he already gave sermons in the basilica that was almost finished, developing the ideology of "Peter and Paul" replacing "Romulus and Remus" as guardians of the city of Rome [108], thereby exalting Christianity, putting it at the height of classical Roman times [109]. Leo I established the first monastery in the place, and the need for a papal residence. He also built the *secretarium* on the outside of the basilica and attached to the south face of the narthex, a kind of sacristy in which the bishop prepared to access the basilica. Pope Leo I was buried in this *secretarium*, where later Simplicius (468-483), Gelasius I (492-496), Symmachus (498-514), Benedict I (575-579), Gregory I (590-604) were also buried, and possibly other 5th and 6th century popes [110].

The lateral wings of the atrium, and the access body, which includes the gate house (equipped with lateral columns) was completed in the times of Simplicius (468-483) [111], as attributed by an inscription in the old basilica of S. Peter [112]. The *Liber Pontificalis*, when referring to the biography of Pope Simplicius, also mentions the existence of a baptistery [113], made in the time of Pope Damasus I (366-384).

Stage 14 (Layout OSP-CP14)

514 A.D. Symmachus (498-514). Old basilica of S. Peter finished

In the time of Symmachus (498-514) the rooms adjacent of the gate house were completed, including the Episcopal Palace and the papal residential building (called *Episcopia* in the *Liber Pontificalis*) "*nello stesso luogo a destra ea sinistra*" of the main entrance [114], as well as a equipment to attend to the pilgrims, a fountain in front of the access stairs and some latrines [115]. The gate house also had two floors, the ground floor was an open space behind the three access arches, and the upper floor was an oratory (oratory of S. Maria in Turri) [116].

The atrium is called at this time for the first time "*quadriporticus*", a term that authorizes to imagine it as "*uno spazio sub divo coelo*", delimited on its four sides by means of columns [117]. It can therefore be said that the basilica was already completely completed in the year 514 (although it would have continuous extensions and reforms, for a thousand years until it began to be demolished in the 16th century).

Alfarano provides in his plan layout an idea of how the walls of the lateral arms of the atrium could have been, perhaps made by thick pilasters with arches in their upper part. The same is evident in the watercolors by Tasselli of the "altarista's house" (in the south arm) where three arches are clearly evident (Domenico Tasselli da Lugo (plate 10, Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro A. 64 ter.).

Symmachus showed great commitment to the completion of the basilica and its decoration, as he had a strong need to live there. His term as pope coincided with a painful period for the city caused by the *Cisma Laurenziano*. For many years the clergy and aristocracy were divided in their support for Symmachus, or his antagonist Lorenzo. The need to reside in the basilica was induced by the occupation, in 502, of the episcopio de Letran by his opponents [118].

Within his actions, and as indicated in an inscription on the southern side of the atrium, he improved the atrium with an *opus sectile* decoration on the pendentives of the arches, and ordered *compaginare* the pavement of the atrium -*ad cantharum*- and the adjacent rooms, as is narrated in the *Liber Pontificalis* [119]. Symmachus also carried out a reorganization of the entrances to the basilica complex, structuring the first residential buildings (called *Episcopia* in the *Liber Pontificalis*), which could be considered as the oldest nucleus of the Palazzi Pontifici (also called Palazzi Apostolici, or Palazzi Papali, or Palazzi Vaticano) in the Vatican [120]. In addition to the expansion of the main stairs, he built two side staircases, protected with wooden roofs [121], next to *secretarium* built by Leo I, and which, historically, is said to have some relationship with the papal residential building, perhaps to facilitate access to the monasteries and buildings that since the pontificate of Leo I, 50 years ago, were being built in the southern part of the basilica [122]. Krautheimer and Frazer think that the two access stairs correspond to those indicated by Alfarano: "*l'una che da sud saliva alla piattaforma che precedeva l'atrio, l'altra che proseguiva da li verso nord e sulla collina*" [123].

According to Liverani [123b], and making an average between the ground level on the east side and the east side of the platform, it can be estimated that the ground level at the narthex was about 16.5 *roman feet* (22 *palmi*) below the level of the platform. At this time the narthex had the same level as the atrium, and coincided with the level of the founding platform. Therefore, the lateral staircase made by Symmachus had to have about 20 steps. Later, in the times of Pope Donus (676-678) the narthex was paved, so the steps were moved, and they were located between the narthex and the atrium. For this reason, the floor level of the narthex was raised and without a doubt, during this time, the staircase built in the days of Pope Symmachus had to be extended by about 4 steps (4 risers of 0.75 *foot*), leaving approximately 24 risers (in the year 1000 the level of the ground of the street rose about 4 *palmi*, so the staircase was left with 20 risers).

Symmachus was also the person in charge of the consecration of the cult of Sant Andrea (the brother of Apostle Peter) of the mausoleum of times of Severus (the oldest, and located to the southeast of the basilica), reason why the building happened to be called Church of Sant'Andrea.

To access the Church of Sant'Andrea, Pope Symmachus built some steps [124], and an access located somewhere in the western area of obelisk [125], and most likely it was in the northern part of it. The level of the Church was the same as the level of the platform, and about 15 *roman feet* (20 *palmi*) above ground level. Therefore, from the beginning, the old imperial mausoleum (now Church of Sant'Andrea) had to have a staircase with 20 risers, probably in the northern part, adjacent to the access road. Therefore, Symmachus had to reform this access, presumably to make it more comfortable for visitors from the access road.

Finally, it is worth mentioning that at this time several colonnaded porticoes were built in the main streets that ran from east to west from the Tiber river (at the north end of the *Pons Aelius*) to the basilica and to the sanctuaries of Paul and Lawrence. The main portico began at the Mausoleum of Hadrian and reached the basilica, by way of Via Triumphalis, to protect the pilgrims from the sun and rain [126]. These porticoes were first referenced by Procopius in the 6th century. There are also later references in the narratives of the Gothic wars of the 6th century, since these covered porticoes were used to hide, in the attack of the Ostrogoths of the year 537 [127].

5.3. Reconstruction, in plan layout, of the most significant stages of the evolution of the *old basilica of S. Peter*, from its construction to the beginning of its demolition (514-1503)

This chapter shows the evolution of the state of the old basilica of S. Peter in different stages throughout its history, represented in plan layout. In the first place, the most representative historical dates have been chosen, and at least one per century, and all available historical information has been compiled, classified and ordered according to the previously chosen stages.

Next, all the information available in each stage has been evaluated and it has been represented graphically, sequentially modifying the structure of plan layout that the old basilica of S. Peter had in the year 514 (OSP-F21), until reaching the year 1503, shortly before starting to be demolished

Stage 1 (Layout OSP-E1)

604 A.D. Gregory I (590-604). Apse restructuring. Gregorian canopy

Gregory I, or Gregory the Geat (590-604) reorganized the interior of the basilica, and made a semi-annular passage to the crypt, which allowed pilgrims to venerate Apostle Peter without interrupting the services of the upper altar. This structure was copied in the sanctuaries of several later churches built throughout Europe. Until then, a mobile altar was used for the celebration of Mass, which seemed less and less suitable for the performance of rituals increasingly marked by an orderly, hierarchical and noble conception of the liturgical scene, which is why it became essential an intervention in the apse [128].

The architects of the time faced the challenge of maintaining the immobility of historical memory (the vision and access to Peter's tomb) and at the same time providing sufficient space for the normal development of liturgical celebrations [129]. The result was a brilliant and simple idea [130]. The ground was lowered about 2 *feet* (2.66 *palmi*) (it could not be lowered further since the Constantinian platform would be perforated), and a raised podium was built about 5 *feet* (6.66 *palmi*) above the ground, thus creating an intermediate space of about 7 *feet*, enough to walk upright, and in this way the area inscribed in the apse was doubled [131]. The upper part of the historical memory of the apostle continued to emerge on the new floor the transept, a perfect height to place a fixed altar, with approximate dimensions of 8 3/4 *feet* long, 5 *feet* wide, and 4 1/5 *feet* high (aprox. 2.6 * 1.5 * 1.25 m.). The eastern front (towards the transept) of the raised podium was left free and accessible through a *fenestella confessionis* at the height of the old pavement. Under the podium, the front part of the aedicule was accessible thanks to a partial disassembly of the Constantinian canopy, whose *vitinee* columns were aligned in the front part of the podium crowned by a latch (a lectern donated Pelagius II), creating a *pergula* [132]. The word “*pergula*” was not used in the times of Gregory the Great, and even

in the times of Sergius I (687-701) it was called "*trabes ad ingressum confessionis*" [133]. Inside the crypt an altar was built at the foot of Constantinian memory while on the podium, the main altar was immobile and permeated with the tomb of the apostle, protected by a ciborium on four *porfiretiche* columns [134].
Perhaps in the times of Gregory the Great (590-604), or Pelagius II (579-590), the pope's Cathedra, the seats for the clergy, were built concentrically and attached to the inside of the apse [135] (Fig. 5.24).

Stage 2 (Layout OSP-E2)
741 A.D. Gregory III (731-741). Realization of 12-column canopy-presbyter

Pope Honorius I (625-638) ordered that the central access door to the central nave of the basilica be covered with 975 pounds of silver plate and other metals, reason why the door was called *Porta Argentea* [136]. Recent estimates indicate that the surface of that door was 22.5 m^2, and thanks to this information its dimensions have been identified. This pope covered the roofs of the basilica with bronze tiles (*tegulas aereae*) taken from buildings from the imperial era. In fact, with the permission of the Emperor Heraclius, he stripped the Temple of Venus in Rome of its gilt bronze tiles and brought them to cover the roof of the main body of the basilica [137]. In the times of Honorius I, the Chiesa di S. Apollinare was built around the southeast corner of the old basilica.
In the times of Donus (676-678) there is news that the narthex was paved, so the steps were moved and were located between the narthex and the atrium [138]. There is also information that until the pontificate of Hadrian I (772-795) the narthex was accessed by some steps [139]. Based on the descriptions of Grimaldi and Alfarano, it can be deduced that the floor of the narthex was raised by about 3 *feet* (4 *palmi*), so that necessarily about 4 steps had to be added to the lateral access staircase built by Symmachus (498-514). As the staircase built by Symmachus had 20 risers, at this time it ended up having about 24 risers. This staircase would undergo different changes in the following years, and would end up intermingling with the buildings that began to be built throughout the late Middle Ages.
Pope John VII (705-707) built the chapel dedicated to Mary, at the north and east end of the external lateral nave (occupying the space between the three exterior columns and the north perimeter wall). This pope was the first to decide to be buried inside the basilica and was in fact buried in this chapel [140].

During these first years of the 8th century, a new paving was added in the atrium, unifying its level with that of the narthex and with that of the interior of the basilica. The steps between the atrium and the narthex (possibly four risers and three treads) were moved to the gate house to the atrium. Years later, Pius II (1458-1464) raised the pavement of the entrance platform to the complex and reformed the entrance staircase by adding new stone slabs over the steps and landings. In this way, at the entrance of the complex, there was possibly only one step and two risers, facilitating the entrance to the whole complex but protecting it from rising water.

In fact, when the atrium was destroyed in 1608 it looked like a square paved with marble. Grimaldi, during the dismantling work, reported in detail that under a fill a few feet thick there was a modest layer of white stones, which was undoubtedly the original paving of the atrium. The marble used almost in all probability was extracted from the *Meta Romuli* pyramid, perhaps from the east and west sides that were soon embedded in a new medieval urban structure, since the south side protruded from between the buildings, and partially invaded the street. Years later, in 1499, the pyramid was largely demolished by Alexander VI (1492-1503), to widen the access roads to S. Peter in anticipation of the large Jubilee crowds expected for the following year.

At the beginning of the 8th century, or perhaps at the end of the 7th century, the two imperial mausoleums (now called Chiesa di Sant'Andrea and Chiesa di Santa Petronilla), were joined. It is very likely that from the beginning of its construction it was planned to join both mausoleums to the basilica, since they were built in such a way that the ground level of both mausoleums was more or less the same (It is likely that the level of the floor of the Severan mausoleum was the same as the level of the foundation platform, while the level of the floor of the Mausoleum of Honorius was 3 *feet* higher, so possibly there should be 4 steps to go from one to other).

The union of both churches would undoubtedly be carried out to create a new pilgrimage route in order for the pilgrims to observe a greater number of imperial monuments, now included in the Christian “memorial landscape” of the city. The union between the churches therefore took place after the eastern mausoleum was named Church of Sant'Andrea by Symmachus (498-514) [141], and perhaps a little before the western mausoleum became the Church of Santa Petronilla by Stephen II (752-757) [142]. In any case, in the 8th century there are already reports that pilgrims accessed the basilica by passing near the obelisk (since it was considered the tomb of Julius Caesar, possibly for act as a needle -thorn- for Peter's tomb) and through the two churches [143] full of reliquary altars. The pilgrims then entered the south transept of the basilica, perhaps significantly a space filled with tombs of popes who had paid special attention to S. Peter, before descending the staircase leading to the annular crypt of Gregory I (590-604), and finally they left the basilica through the north corridor to the atrium [144]. In an anonymous drawing by a Florentine draftsman, made around the year 1514, and at the latest, from the second half of the 16th century [145], the two churches joined by middle of some intermediate chapels (Fig. 5.25). It is very possible that in the western part of the Church of Sant'Andrea an access chapel was built to emulate the access chapel that the Chuch of Santa Petronilla had, and that connected it with the old basilica of S. Peter. In addition, in the anonymous drawing, these two chapels appear united by means of a circular space, which undoubtedly must be a vestibule that allows separate access to both one church and another, therefore this space could be the entrance through which the pilgrims from the 8th century to visit the two mausoleums internally, before entering the old basilica, and reaching the *fenestella confessioni* (Fig. 5.26). By making an average between the level of the terrain in the west and in the east of the basilica, it can be deduced that the level of the ground at the height of the eastern part of Santa Petronilla is about 2 *palmi* below the level of the foundational platform, that is to say about 6 *palmi* below the level of the basilica floor. This means that to access the circular vestibule there should be a small staircase of about 6 risers, one *palmo* each riser.

Under the pontificate of Gregory III (731-741) six columns were added, donated by the governor of Ravenna, in front of the six *vitinee* Constantinian columns of the Gregorian baldachin [146]; in the biography of Gregory the Great these columns are called *volutile onychinae*. These new six columns were finished off by means of a beam covered with a silver sheet, thus creating, with this new canopy, a double pergola according to its current conception. In this way, a very special architectural structure was created and it was renamed "*Presbyterium*", meaning a fenced area reserved for the lower choir, or for the lower clergy and singers [147]. This presbytery soon became a true myth, inspiring even Bernini's later Baroque canopy (Figs. 5.27 and 5.28).

In the middle of the 8th century, perhaps in the times of the Popes Gregory III (731-741) or Zacharias (741-752), and in any case before the year 752, the space adjacent to the north of the entrance hall served base to build a bell tower. The construction must have been carried out before the year 752 since, since there is news that Stephen II (752-757) decorated the existing bell tower, and equipped it with bells [148]. In fact, when in 1610 the bell tower of the old basilica (Grimaldi witnessed this demolition) coins from the 7th and

10th centuries were found in the rubble [149]. However, it cannot be ruled out that two towers were actually built, in both rooms lateral to the access body, symmetrically with respect to the axis of the basilica [150]. These bell towers were undoubtedly built improperly since there is news that the north tower was subject of continuous repairs over time, to such an extent that in approximately the 12th century the south bell tower could have fallen [151]. On the other hand, the north bell tower remained standing until 1610, when it was demolished for the construction of the longitudinal body of the new basilica of S. Peter [152].

In the drawing of the Alfarano floor plan, a quadrangular body with large walls is observed in the two collateral rooms to the gate house. The quadrangular body located to the north corresponds to the base of the known bell tower, while the quadrangular body located to the south corresponds to the Casa dell'Arciprete, whose strange design suggests that it was perhaps built taking advantage of the base of an earlier southern bell tower. This suggests two possibilities, either there were two bell towers, and the south bell tower collapsed before the 12th century, and was never rebuilt [153], or the north bell tower was built and the south bell tower was started but never finished (which is less likely).

The biographies of the successors of Gregory I (590-604), in the 7th, 8th and 9th centuries contain numerous references to donations of objects of great value to the basilica, and to the construction of numerous chapels inside it. Since the 8th century the pilgrimage route also passed through the obelisk, since it was considered the tomb of Julius Caesar, possibly to act as a needle (a thorn) for the tomb of Peter [154]. As has been commented, the obelisk was considered as one of the three pre-Christian monuments considered tombs of prominent Romans and formed part together with the old basilica of S. Peter of a "memorial landscape" of the sanctuary. The pilgrimage path of the obelisk continued towards the interior of the basilica through the imperial mausoleum of Honorius, thus forming, from the 8th century, a sacred path for the cult of S. Peter [155].

Stage 3 (Layout OSP-E3)

855 A.D. Leo IV (847-855). Reform of apse podium

Stephen II (752-757) consecrated the Mausoleum of Theodosius (built at the beginning of the 5th century) where he transferred the remains of Petronilla, the supposed daughter of Peter, which is why the building was called the Church of Santa Petronilla, which in times of Paul I (757-767) was also known as Chapel of the King of France [156].

In the days *of Stephen II*, the *cantharus* in atrium was also reformed and embellished [157], a large spoglio bronze pinecone, from which multiple streams of water flowed. The fountain was covered by a fanciful bronze pavilion, about 18 *palmi* high, crowned by a cristogram and supported by 8 porphyry columns, two of which with an imperial bust as relief. Assembled with ancient semicircular grids fixed to the marble entablatures, the pavilion was decorated by leaves, dolphins and a pair of gilt bronze peacocks [158]. The fountain acquired the appearance shown in the drawings by Simone del Poppaiolo detto il Cronaca (*GDSU Santarelli 17v.)* and Francisco d'Olanda and was preserved at over time, until it finally had to be dismantled on the occasion of the construction of the new basilica in 1608 [159] (Fig. 5.29). Stephen II also built several fountains and hostels in the southern area of the basilica, reestablishing the scope of the *acquedotto Sabbatino* (*Aqua Traiana*) from which a secondary derivation fed the hydraulic installations of S. Peter, including the baths for the clergy and the poor, the baptistery of the basilica and the *cantharus*. It also made a new golden access road [160].

In the 8th century, in the eastern and southern areas around the basilica, hospices, hospitals, and houses began to be built on a massive scale by people from the north, from cities whose names ended in "burgh", so this area began to be called "Borgo" [161].

In the time of Hadrian I (772-795) the three arches of the facade, to access the interior of the basilica through the gate house, were closed, *a tutto sesto*, with architrave portals and three bronze doors brought from Perugia were arranged, and which the pope's biographer describes as "*maiores et mire magnitudinis decorates*" [162], and between 774 and 776 the main staircase was restored [163]. Therefore, it is to be assumed that it was at this time that the facade was reformed, probably years after the two bell towers were built [164].

In the times of Leo III (795-816) the podium area was enlarged, possibly in the year 800 on the occasion of Charlemagne's coronation, eliminating the front entrances, building stairs perpendicular to the axis of the confessional [165]. The resulting structure was preserved practically in its entirety throughout the Middle Ages [166]. He also built a *Triclinium* near the obelisk in the urban area located south of the basilica [167].

Over time the basilica continued to be embellished by successive popes, and around it all kinds of buildings began to rise, and not only monasteries, but also hospices, hospitals for the care of the faithful and pilgrims [168].

In the 9th century, after the sack of the basilica by the Saracens in 846, Leo IV (847-855) surrounded the entire area by means of a defensive wall [169], later known as "*mura Leoniane*", which it was the only significant change in the defensive perimeter of Rome, after the Aurelian walls of the late third century. The interior area was renamed the "*civitas Leoniana*" [170]. Leo IV repaired the central door of the basilica (*porta Argentea*), seriously damaged by the Saracens, as well as the roof of the narthex [171].

Stage 4 (Layout OSP-E4)
1003 A.D. Silvester II (999-1003)

Pope Sergius III (904 - 911) began to dedicate funds to rebuild the Lateran Palace, which had been destroyed by an earthquake in 896, and to rebuild other churches, so that during the 10th century there were hardly any reforms in the Constantinian basilica. This pope inaugurated what in the nineteenth century came to be called "pornocracy" or "government of harlots", a time when women held power in Rome. In these times, for example, Teodora stands out, together with her daughter Mazoria, lover of Sergius III (904-911), and mother of John XI (931 - 935) last pope of the era of "pornocracy".
Sylvester II (999-1003) was a pope of great erudition and was known as "the light of the Church and the hope of his century", and among many things, he used his position as pope to make the decimal system to be used by western clergymen, which greatly enriched the mathematical calculation. He invented an abacus, made a new type of monochord, and came up with a new shorthand language, among many other things. He achieved great renown as a theologian and as a philosopher, and also had knowledge of mathematics, music, astrology and alchemy, among many other disciplines [172]. However, despite his dynamism and erudition, it is not known that he had performed any action on the basilica, for what can be assumed that during this time there were no major changes.
The later popes of this century, embroiled in their own disputes for power, did not carry out any notable activity on the basilica and there is also no record of anything remarkable happening in its immediate architectural surroundings.

Stage 5 (Layout OSP-E5)
1124 A.D. Callixtus II (1119-1124). Reform of Cathedra

In the 11th century there is no news that there was any notable activity on the Constantinian basilica, nor in its close surroundings. These are turbulent times, and the different popes are focused on their struggles for power, leaving aside notable constructive activities in the building (Fig. 5.30). The economy has been stagnant for a long time, and changes are taking place normally slowly. It is possible that the lack of maintenance of the basilica during the last 4 centuries was the cause that led to the collapse of the southern bell tower (if it was ever built), so the basilica was left with a single tower, until October 1610, when it was demolished to build the eastern body of the new basilica [173].

Among the few interventions on the basilica in these times, those promoted by Callixtus II (1119-1124) stand out and, among other renovation actions of the basilica, modernized the *Cathedra Petri*. In the same way, he covered the floor of the apostle's altar with new tiles, which, being deprived of the valuable late medieval metallic coating, appeared to be battered and "*da indurre il pensiero che fosse stato violato*". Barely larger than the Gregorian altar, it remained framed between porphyry columns of the late medieval ciborio, equipped at that time with metal doors [174]. The renovated altar was re-consecrated on Sunday, the day of the Annunciation, March 25, 1123 [175].

Stage 6 (Layout OSP-E6)

1241 A.D. Gregory IX (1227-1241). Comprehensive reform and decoration

Due to the visible deterioration of the basilica, at the end of the 12th century and the beginning of the 13th century an intense work of reform, updating and new decoration of the basilica was carried out. The reform works began by Innocent III (1198-1216) in the apse area, and continued by his nephew Gregorio IX (1227-1241) in the naves and the facade. During these years the most important and noble parts of the basilica, such as the apse and the facade, were renovated. In the facade to the atrium a pediment with rose window was arranged, and the tympanum was renewed to have a prominent *cavetto* under the frame of the cornice for the protection of the mosaics against the rain [176]. It is also known that in the 13th century, and perhaps in the time of Pope Gregory IX (1227-1241), the bronze doors of the facade were incorporated into the quadriplegic of the basilica, and Pietro Mallio describes that on these doors there was an epigraph listing the donations of Carlo Magno to the Church, in the Umbria and Alto Lazio areas [177]. Above the three doors the facade was decorated with a mosaic of figures, which at the time of Alfarano and Grimaldi, was very deteriorated. The Roman arched windows, both front and side, were completed by Gothic triforiums [178].

It is also possible that, judging by the architectural style of the decoration, during the 13th century, and perhaps by Innocent III (1198-1216) the Church of Sant'Andrea (the mausoleum from Severan dynasty) was reformed, and that its appearance internal outside like the one seen in the fresco *Veduta della Fabbrica nuova e dell'antico S. Pietro al tempo del trasferimento dell'obelisco*, made by Giovanni Guerra (Vatican Apostolic Palace, Biblioteca Sistina, room II), made in the year 1586) (Fig. 4.26).

Innocent III also intervened in the liturgical furniture of the basilica, providing the papal throne with the typical coronation (inspired by the inheritance of the *Cathedra Petri*), that from then on would symbolically represent the "*pienezza del potere*" of the Roman pontiff [179].

In times of Innocent III, the initial part of the Vatican Palace was also built [180], located on the outskirts of the basilica in the north area at the height of the atrium. The building included a prominent tower (later to be known precisely as “Torre di Innocenzo III”) [181].

Stage 7 (Layout OSP-E7)

1280 A.D. Nicholas III (1277-1280). Apostolic palace ampliation

During this time, and once the old Basilica of S. Peter had been renovated, the interest of the popes focused on the expansion of the Apostolic Palace, initiated by Innocent III. Nicholás III (1277-1280), despite the short duration of his papacy, had a fervent constructive activity, considerably expanding the small building of Innocent III (1198-1216), in a northeast and west direction.

Stage 8 (Layout OSP-E8)

1378 A.D. Gregorius XI (1370-1378). Narthex tabernacle

In the times of Pope Nicholas III (1277-1280) the construction of the Vatican Palace was considerably expanded, specifically the *Cappella Magna* (which was later reformed and became the current Sistine Chapel), the *Aula Prima*, the *Aula Seconda*, the east facade and a tower located in the southeast part of the complex (Tower of Nicholas III).

In the times of Pope Boniface VIII (1294-1303) the *Cappela Parva* (*piccola cappella*) was built next to the *Aula Seconda*, and some rooms in the northern area of the Vatican Palace, including the north tower (Tower of Boniface VIII).

At some point, in the late 13th century or early 14th century, a statue of S. Peter was located in the middle of the narthex. This statue was made using the bust of an ancient philosopher to which and added the head of Apostle Peter. The sculpture occupied an elevated position in the protyrus of the narthex, aligning itself with the *Porta Argentea*, located in the center of the main facade to the atrium [182]. The protyrus of the narthex would be called by Grimaldi, centuries later, as a "*tabernacle*" since it had a singular structure [183] (fig. 5.31). Two red marble columns supported a cuspidate pavilion that protrudes into the atrium. Inside, between the central white marble columns of the narthex and over an African marble threshold, a portal with jambs and an architrave decorated with interlaced flowers was prepared. Two bronze swing doors were arranged, coming from some old building. The statue of S. Peter was located above the architrave of the portal, and therefore below the middle arch of the narthex. The fact that the protyrus was attached to the armored arch of the bronze swing doors forms a kind of "hut", which could be called a "tabernacle" [184].

During the first decade of the 14th century Giotto made the famous mosaic of the *Navicella* on the west facade of the atrium, replacing an old image of the *Savior*[185]. The mosaic was commissioned in 1298 by Cardinal Jacopo Caetani Stefaneschi, Canon of S. Peter, whose donor portrait was to the right of Christ's feet. Giotto's mosaic belonged to Saint Peter's preparations for the holy year in 1300 [186]. Around the year 1320 the cardinal donated to the basilica a new altarpiece for the main altar, the so-called *polyptych* or *triptych Stefaneschi*, painted by Giotto and his workshop, and creating a double-sided altar.

In the 14th century the Church of Sant'Andrea was renamed Santa Maria delle Febbre. Its name was due to a sacred image invoked as a protector against malaria fever [187].

During the exile of the papacy in Avignon (1304-1374), partially coinciding with the Black Death that swept through Europe in the mid-fourteenth century (it began in 1348), the basilica began to slowly deteriorate again due to lack of proper maintenance, despite the fact that it had recently been renovated, and until then it had withstood earthquakes and passage of time very well [188].

The insurrection of the pontifical dominions, caused by the war with Florence, threatened with the total loss of the pope's power. For this reason, Gregory XI (1370-1378) decided to return to Rome and, convinced by Saint Catherine, decided to re-establish the pontifical see in Rome. In the same way he was the first to permanently reside in the Vatican, thus abandoning the traditional papal residence in the Lateran Palace.

Stage 9 (Layout OSP-E9)

1404 A.D. Boniface IX (1389-1404). Walls of Bonface IX

After the exile of the papacy to Avignon, the Vatican palace was in the sights of the successive popes, since they wanted to create a permanent papal residence with all kinds of equipment. In addition, and as the building was growing, it began to be aware that it should be defended.

The Vatican Palace began to be built in a strategic location on the top of a small adjacent hill in the northern part of the old basilica. The location, shape and strange orientation of the initial buildings of the palace were mainly due to the shape of the hill, and this explains the complex and strange structure of the current Vatican Palace. The group of buildings occupied a high position, making it easy to defend them, but as it expanded and acquired value, the need to build defensive walls arose. In the northern part of the ancient basilica, and connected by the northern access initially built by Pope Symmachus (498-514), a conglomerate of buildings of great value had been built, such as the Cappella Magna, the Aula prima and the Aula seconda, connected with the papal edifice begun by Pope Innocent III (1198-1216), and continued by Nicholas II (1277-1280). The group of valuable buildings had grown and needed a greater defense. For this reason Pope Boniface IX (1389-1404) created the first defensive wall, which surrounded the Vatican Palace in its southern and eastern part. The wall started from the Aula Prima and reached the Porta San Pietro.

The wall surrounded the small hill at the bottom and had a capricious shape due to the orography of the land and the existence of buildings of a certain value.

With the return of the papacy to Rome under Martin V (1417-1431) in 1420, the Vatican became the first papal residence, and it has remained that way to this day.

Stage 10 (Layout OSP-E10)

1455 A.D. Nicholas V (1447-1455). Start of the old basilica reform

In the times of Pope Nicholas V (1447-1455), a vast restructuring of the *civitas Leoniana* (between the old basilica of S. Peter and Castel Sant'Angelo) and also of the Vatican Palace was planned. The project is exhaustively described in the pope's biography, written by his friend and court humanist Giannozzo Manetti. The north wing of the Vatican Palace (north of the *Cortile dei Pappagalli*) was built, including a tower (Borgia Tower).

An enveloping wall was also built, extending to the east and north (wrapping what in the future would be known as *Cortile San Damaso*), and converging on a large tower (Torre di Niccolo V) [189].

With respect to the basilica, in 1449, in view of the Jubilee of Pope Nicholas V (1447-1455), 4 granite columns were placed framing the three portals that had previously been built within the three original Roman arches of the basilica in times of Hadrian I (772-795). These columns were removed in 1612 as the construction of the new basilica continued eastwards [190] (Fig. 5.32).

Due to the poor state of conservation of the basilica, Nicholas V decided to carry out an important reform project. It is not known for sure which architect was responsible for the works, although Rossellino, a disciple of Alberti, is often cited as the author of the project. According to a testimony of the chronicler Mattia Palmieri, Alberti would have even advised against the pope to reform the basilica, so we can hardly think that the project had any kind of participation. On the other hand, at that time, from 1451, the Florentine architect Bernardo Rossellino was in the service of Nicholas V, who undoubtedly participated in the design. However Vasari affirms that Rossellino's project for S. Peter "*andato male*", and other "*architetti*" (whose names he does not mention) carried out new projects. For all this, nothing can be categorically affirmed about the author of project [191].

According to the writings of Mattia Palmieri, with the reform project of Nicholas V the transept and the apse of the old basilica would be replaced by a square transept and three arms of equal magnitude. The western arm will end in a semicircular apse on the inside and polygonal on the outside. In the transept a dome will rise; the transverse arms would be flanked by columns next to the walls, and would be covered by ribbed vaults. The longitudinal body would be restructured although the shape of a basilica with five naves with columns, with a wooden roof, would be preserved; only the side aisles would be covered only by vaults, and the side chapels adjacent to the basilica would be torn down and others built with a regular shape. In the walls of the central nave, round windows will open in the upper part. Two bell towers would be built on the sides of the main portico, and the atrium would be transformed into a regular four-sided portico.

Based on this description, and based on the *GDSU 20 A* drawing by Bramante, the reform project of Nicholas V. Bramante made a large number of plans and sketches for the design of the new basilica with little margin of error. In one of them, *GDSU 20 A*, he made a fairly accurate measurement of the walls of the north, south and west arms of the basilica. For this reason, and taking into account the exact shape of the old basilica deduced above,

and taking into account the construction practices of the time, the reform project of Nicholas V can be reconstructed.
The reform desired by Nicholas V would extend to the exterior of the basilica. The square outside the basilica would have an elongated rectangular shape, and would be linked to the one in front of Castel Sant'Angelo by three parallel streets.
According to the accounting documents, in June 1452 work began on the *Tribuna grande di San Pietro*, behind the apse of the old basilica. But payments ceased at theend of 1455, and the works were suspended no later than March of that same year, upon the death of the pope.
The construction came only slightly above the foundation. In order to undertake the renovation works, in 1450, the *Anicii Probi mausoleum*, built by the consul Sexto Petronio Probo, located in the western part of the basilica, attached to the apse, as well as other existing buildings in the part west of the basilica [192].
The land to the west of the basilica had an upward slope, so once the land was cleared, it had to be flattened and leveled, carrying out some earth movement, and it is not ruled out that a small earth retaining wall was built that envelop the new apse. It is possible that this wall was the forerunner of another that was later made when Michelangelo's western apse was executed, and that clearly remains in the plan of Leonardo Bufalini, in the year 1551.
The successor of Nicholas V, Pope Callixtus III (1455-58) did not continue with the works of the basilica, since he invested all available resources in arms against the Turks, who after the conquest of Constantinople by Sultan Maometto ll (1453), directly threatens Europe.

Stage 11 (Layout OSP-E11)

1464 A.D. Pius II (1458-1464). Lodge of blessings

The successor of Calixto III, Pope Pius II (1458-1464) did not carry out any work on the basilica, but ordered the reform of the main facade to build what would later be called the Lodge of Blessings. Its architect Francesco del Borgo designed a building as a loggia on three floors, with arches over pilasters to which he attached an order of semi-columns, following the model of Roman theaters [193]. The reform includes a structure of eleven sections through the width of the front, hiding the medieval buildings in front of the atrium (Fig. 5.33). The main staircase that connects the new loggia with Piazza San Pietro is also reformed.

The stairway was completed in 1462, and two colossal statues of the Apostles Peter and Paul are placed at its sides, the statue of S. Peter on the left and the statue of S. Paul on the right [194]. The upper part of the pedestal of the sculptures has a width of respectively 1.37 m and 1.38 m, and a depth of 0.81 m and 0.865 m [195].

At the death of Pius II, on August 15, 1464, only the three northern sections of the ground floor had been built with the corresponding arches, columns and back walls, a fourth section on the ground floor was being built, while the foundations, piers, entablature and columns of at least three other sections are in preparation [196].

There is a lot of information about the dimensions of the Lodge of Blessings and the surrounding architectural elements, including the access stairway to the old basilica of S. Peter, so it is relatively easy to make detailed plans of it.

The most important sources are Peruzzi's drawing *GDSU 11 Ar* (Fig. 5.34), and Maderno's drawing *GDSU 263 A* (Fig. 5.35). Other drawings are *GDSU 787 A* drawing, by Antonio da Sangallo (Fig. 5.36), *GDSU 287 A* drawing, by Bramante (Fig. 5.37), the anonymous *GDSU 4170 Ar* drawing (Fig. 5.38), and the *Atrium drawing of San Pietro*, by anonymous author, kept in the Österreichische Staatsbibliothek in Vienna (Fig. 5.39).

Complementarily there are perspective drawings, without dimensions, but that complement the previous drawings to help understand the evolution of the design of the Lodge of Blessings. Among these is the drawing by C. Duchet,*"*View of the square of S. Peter*"* (A. Lafrérie, Speculum) (Fig. 5.40), the anonymous drawing, *"*View of the square of S. Peter*",* made in the middle of the 16th century (Zurigo, Collezione Schraft) (Fig. 5.41), the anonymous drawing, *"*View of the Piazza San Pietro*",* made in the middle of the 16th century (Ehrle-Egger) (Fig. 5.42), the painting by G. M. Zoppelli of the Lodge of Blessings (Palazzi Vaticani, Sala Regia (Fig. 5.43), the drawing by Maarten van Heemskerck,*"*View of the Piazza San Pietro*"*, about the year 1535 (Berlin, Staatliche Museum Preussischer Kulturbesitz, Gabinetto delle Stampe) (Fig. 5.44), and the anonymous drawing, *"*View of the Piazza San Pietro*"* (Dresden, Gabinetto delle Stampe) (Fig. 5.45).

In Peruzzi's *GDSU 11 Ar* drawing the distance 77 2/3 *palmi* is indicated between the outer wall of the gate house and the beginning of the staircase. In drawing *GDSU 787 A*, by Antonio da Sangallo, of the restructuring project of the Sacra Rota of the Palace of Innocent VIII, a depth of the colonnade of the Lodge of the Blessings of about 30 *palmi* between the wall of the facade and the front columns (including the thickness of the columns), and a width of 48 *palmi*.

In the construction control documents and payments to the bricklayer Manfredino da Como, from the year 1462, a length for the north parapet of the basilica of 12 *passi* is indicated (120 *palmi*), and for the south parapet of 113 *palmi* [197]. Maderno indicates in drawing *GDSU 263 A* dimensions of approximately 100 and 110 *palmi* respectively for these parapets. In the payment documents of the bricklayer, the parapets of the staircase are 3 *palmi* wide, which considering the marble coating, they reach 4 *palmi* measured by Maderno.

As shown in a previous chapter, the entrance esplanade of the staircase (between the facade and the steps) was initially designed in the 4th century with a dimension of 56 *roman feet* (74.66 *palmi*), equivalent to a quarter of the outer width of the main body of the basilica (224 *roman feet*). This dimension is 3 *palmi* less than the dimension indicated by Peruzzi in drawing *GDSU 11 Ar* (77 2/3 *palmi*), and this is undoubtedly due to the reform carried out by Pius II, in which he added new marble slabs on the battered steps of the old Constantinian staircase. By adding these marble slabs, the steps were separated from the facade, and 3 *palmi* is a correct dimension according to the reform carried out.

The parapets of the staircase were initially projected with a dimension of 82.25 roman feet (109.66 *palmi*), and could have been repaired at different times in the Middle Ages and finally repaired by Pio II (as Alfarano points out), which would explain the small variations with respect to what was measured by the masons, as well as by Maderno or Alfarano (whose measurements all vary slightly around 110 *palmi*).

The width of the parapets was initially 2.25 feet (3 *palmi*) (as measured by the mason Manfredino da Como), corresponding to the width of the columns of the atrium (*concinnitas*), although being covered by marble plates in times of Pius II, its thickness would increase until reaching the 4 *palmi* measured by Maderno. Maderno also indicates the width of the staircase of 248 *palmi*. In the previous chapter, the implications of these magnitudes have been exhaustively discussed.

Stage 12 (Layout OSP-E12)

1484 A.D. Sixtus IV (1471-1484). Chapel of Sixtus IV

Paul II (1464-71) wishes to continue with the construction of the choir of Nicholas V, probably on the occasion of the Jubilee year of 1475, which he himself proclaimed in

1470. On this date, payments are made for works in the *Tribuna di San Pietro*, and Giuliano da Sangallo and Meo del Caprina are mentioned as architects [198]. The pope has a medal struck showing the interior of the new apse, but already in the year of his death the works were suspended again.

His successor, Sixtus IV (1471-1484) seems to have definitively renounced the idea of a renaissance or a transformation of the basilica, although he does promote some constructive activity in its close surroundings. For example, Sixtus IV built, attached to the south-south side of the longitudinal body of the old basilica, a new and spacious chapel for the choir, also destined to house his tomb.

The most important construction activity of Sixtus IV was the construction of the *Cappella Sistina*. The *Cappella Sistina* was built on the same site and replacing an older chapel, the *Cappella Maggiore*, which existed since the time of Pope Nicholas III (1277-1280). The *Cappella Maggiore* received this name (*Cappella Magna*) since it was the most important and there was a secondary chapel (*Cappella Nicolina*) used by the pope and his entourage for daily worship. According to a statement from Andreas de Trebisonda to Sixtus IV, at the time of its demolition, to make way for the current chapel, the Cappella Maggiore was in a state of ruin, with the sloping walls [199].

The Cappella Sistina was designed by Baccio Pontelli for Sixtus IV, from whom it takes its name, and built under the supervision of the architect Giovanni de Dolci between 1473 and 1481 [200]. Once completed, the chapel was decorated with frescoes by some of the most famous artists of the High Renaissance, which made it a privileged place for art.

Stage 13 (Layout OSP-E13)

1503 A.D. Julius II (1503-1513). Start of the new basilica project

The popes Innocent VIII (1484-1492), Alexander VI (1492-1503) and Pius III (1503-1503) did not carry out any works in the basilica. Only in the times of Pope Alexander VI (1492-1503) did the construction of the second floor continue (begun in the time of Paul II (1464-1471)) of the four sections already begun of the Lodge of Blessings.

In 1505 Bramante built the third floor of these four sections, which remain isolated, since due to the beginning of the construction of the new basilica, it was decided to stop the renovation works of the old basilica and not continue with the construction of the loggia.

It is worth mentioning that throughout the Middle Ages (and as has been shown in the last 7 stages) all kinds of houses and precarious buildings were attached to the south face of the basilica. As has been seen, over time the basilica was enlarged on its south face, since it was easier to build than on the north face since the land had less slope and two floors could also be built. These constructions had noble floor at the height of the basilica floor level, and a lower floor, between the ground floor and the basilica floor. Over time the basilica was expanded in the southern area, between the staircase of Symmachus (498-514) and the southern exedra, and in this way the Secretarium antiquum, and the Secretarium novellum were built, and after in a western direction (and already in the 15th century), the oratorio di S. Tommaso poi battistero, the cappella di Sisto IV, e nuovo coro dei canonici, the Coro d'inverno, the Sacrestia maggiore and the library. Between these last two rooms there was a staircase to descend to the rooms on the ground floor.

Between these buildings attached to the old basilica and the two imperial mausoleums there was a corridor, through which it was possible to access both the two imperial mausoleums, as well as the rooms on the ground floor.

On the other hand, from the Secretarium antiquum to the Chiesa di S. Apollinare, various constructions to extend the basilica, and several courtyards, were attached to the south face of the atrium. All these buildings were accessed from the upper floor of the basilica and the lower floor was descended by means of internal stairs. There were hardly any exits to the outside on the ground floor, as secondary emergency exits. These constructions left blind walls in the southern part so that, throughout the Middle Ages, private houses and all kinds of constructions attached to these walls were built and up to the path that connected the square with the entrance of the two imperial mausoleums. These attached buildings were precarious and arranged in a disorderly way, forming a chaotic set of buildings.

Some historical documents provide an idea of what these chaotic buildings might have looked like in the middle of the 16th century). For example, the engraving made by Natale Bonifacio da Sebenico and Giovanni Guerra, in 1586 (“The transport of the Vatican obelisk”, The British Museum, nº 1892,0714.41 (Fig. 4.23), and also the fresco made by Giovanni Guerra, “The transport of the Vatican obelisk”, 1586, Palazzo Apostolico Vaticano, Biblioteca Sistina, II sala (Fig. 4.26).

In order to reconstruct the architectural structure of this chaotic conglomerate of constructions, one drawing of Domenico Fontana has been especially taken into account: “Della transportatione dell´obelisco vaticano e della fabriche di nostro signore Papa Sisto V”, libro primo, engraver Natale Bonifacio, Roma (1590), f. 15 recto (Fig. 5.46) [201]. This drawing shows the outline on the ground floor of the buildings on both sides of the road in the situation in which they were when the obelisk began to move. It also shows the access stairs to the upper floor of the buildings and especially to the narthex of the old basilica. Therefore it is to be assumed that at some point in the Middle Ages, the stairs built by Pope Symmachus (498-514) were demolished, and in their place the stairs that can be seen in this engraving (and in the fresco and engraving by Giovanni Guerra) were built.

Notes 5

[1] There is a large number of general references, although the ones that best show the sequence of the construction of the old basilica are the following: Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro', in Hugo Brandenburg, Antonella Ballardini, and Christof Thoenes, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), pp. 9-34; Antonella Ballardini, 'La basilica di S. Pietro nel Medioevo', in Hugo Brandenburg, Antonella Ballardini, and Christof Thoenes, *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), pp. 35-75; G. W. Bowersock 'Peter and Constantine', in J. M. Carrie and R. Lizzi Testa (eds.), *Humana Sapit*. Etudes d'antiquité tardive offertes à Lellia Cracco Ruggini (Bibliotheque de l'Antiquité Tardive 3) (Turnhout, 2002), pp. 209-17, Reprinted in Tronzo, William (ed.), *Saint Peter's in the Vatican*, (Cambridge, 2005), pp. 5-15.; Richard Gem, 'From Constantine to Constans. The chronology of the construction of Saint Peter's basilica', in Rosamond McKitterick; John Osborne; Carol M. Richardson and Joanna Story (eds.), *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013), pp. 35-64

[2] To know the possible origins of the word "Vaticanus" (Vaticano) can be consulted: Benjamin Blech, *The sistine secrets, Michelangelo's forbidden Messages in the Heart of the Vatican* (New York: Harper Collins, 2009)

[3] Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro', 12

[4] The most complete reference on the details of the construction of the foundation platform is: Richard Gem, 'From Constantine to Constans', 46

[5] Paolo Liverani, *La topografia antica del Vaticano* (Vatican City: Edizioni Musei Vaticani, 1999)

[6] Flavio Biondo, *Roma instaurata. Liber I*, A. Raffarin-Dupuis (ed.) (Paris, 2005), pp. 68-71

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[8] The archaeological plan of Paolo Liverani is located in: Paolo Liverani, *La topografia antica del Vaticano* (Vatican City: Edizioni Musei Vaticani, 1999). Certain aspects of the plans made by Rodolfo Lanciani have also been taken into account, in which his ideas about the urban structure of the Vatican City in three historical periods are superimposed: ancient Rome, the Middle Ages and today. Lanciani's plans have multiple inconsistencies, such as the fact that it oriented the main entrance of the circus to the west, which was impossible since this part was partially dug into the hill and was on the opposite side of the access road (which was to that). However, some aspects of the Lanciani drawings are correct and very useful. These plans are included in the following publications: Rodolfo Amedero Lanciani, *The ruins and excavations of ancient Rome. A companion book for students and travellers* (London: Macmillan, 1897); Rodolfo Amedero Lanciani, *Forma Urbis Romae*, Istituto Nazionale di Archeologia s Storia dell Arte (Roma, 1901); Rodolfo Amedero Lanciani, *Storia degli scavi di Roma e notizie intorno le collezioni romane di antichità*, I (Roma: E. Loescher, 1902)

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[11] Ralf Biering and Henner von Hesberg, 'Zur Bau und Kultgeschichte von St. Andreas apud S. Petrum. Vom Phrygianum zum Kenotaph Theodosius d. Gr.?', in *Römische Quartalschrift*, 82 (1987), pp. 145-182

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[19] Richard Gem, 'From Constantine to Constans', p. 46

[20] Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro', p. 13

[21] Richard Gem, 'From Constantine to Constans', p. 46

[22] Hugo Brandenburg, 'L'antica basilica vaticana costantiniana di S. Pietro',pp. 10-11

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[131] As a consequence of the excavations carried out in the 40s of the 20th century, it was published that the upper level of the podium was 1.45 m. (4.86 *feet*) above the ground level of the basilica, and the lower level about 0.64 m., (2.14 *feet*) thus leaving a total height of 2.09 m. (so that it was possible to walk easily inside). It is evident that what was intended is that there should be 7 *feet* of difference (4.86 + 2.14 = 7 *feet*), and the construction orders would undoubtedly be to excavate about 2 *feet* below the level of the basilica and to build the podium at a height of about 7 *feet* above the level of the basilica (I can't imagine giving constructive orders to excavate exactly 2.14 *feet* and build exactly at 4.86 feet). For more information, see: Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, vol. 1, pp. 173-193

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FIGURES 5

Figure 5.1

Roma Antica

Giovanni Battista Piranesi, 1756

Frutaz, Amato Pietro. *Le piante di Roma*. Rome, Istituto di Studi Romani (1962), tav. 69

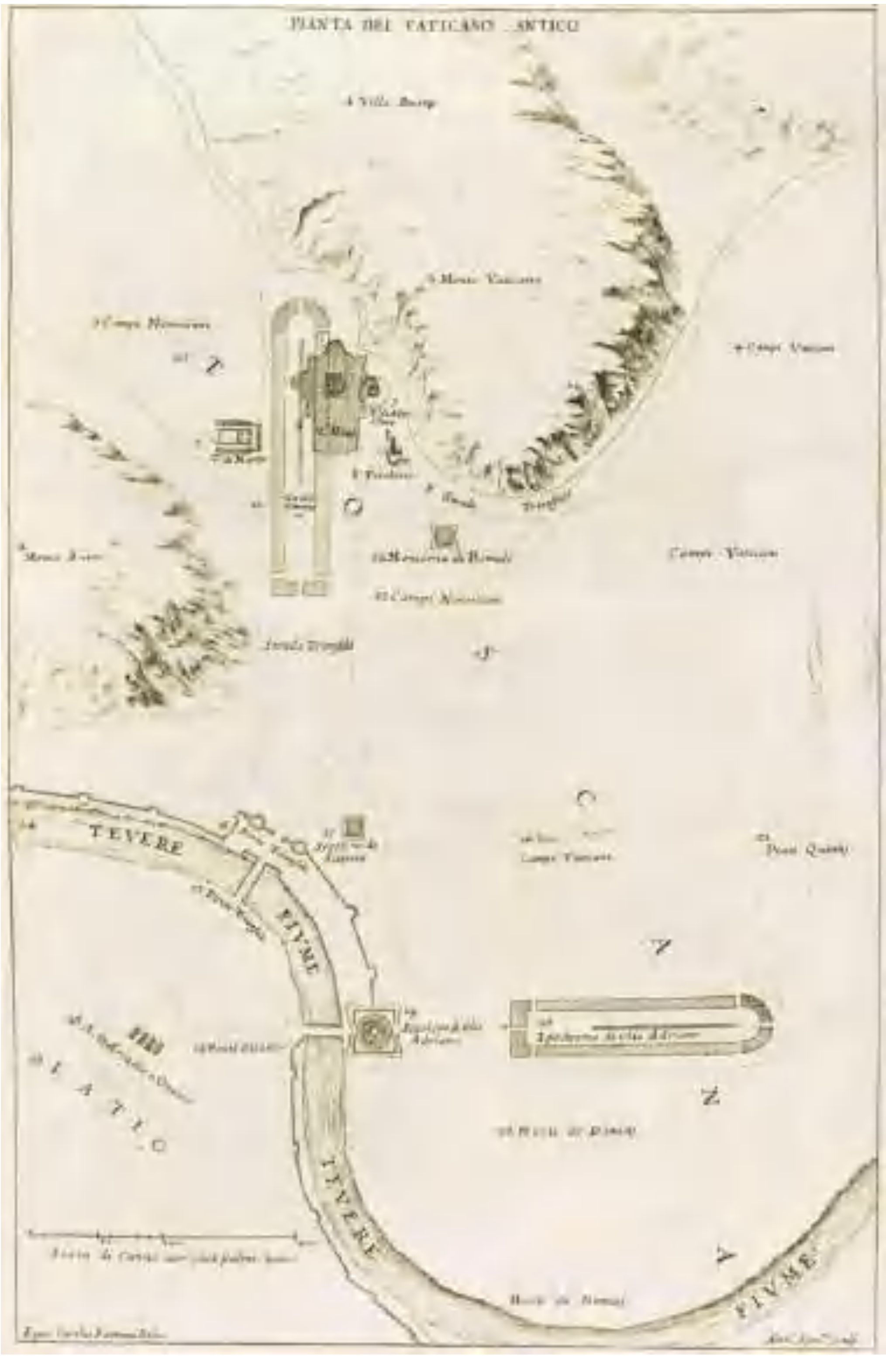


Figure 5.2

Plan of the Ancient Vatican

Carlo Fontana, 1694

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), p. 15

Figure 5.3

Vue Génerale du quartier du Vatican antique au II siècle, 115-125

Paul Marie Letarouilly

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Chapter Cirque de Caius Caligula et Neron, PL1, f. 1

Figure 5.4

3D reconstruction of Neron circus

Drawing by Luis de Garrido, 2020

Figure 5.5

3D reconstruction of Neron circus

Drawing by Luis de Garrido, 2020

Figure 5.6

3D reconstruction of Neron circus

Drawing by Luis de Garrido, 2020

Figure 5.7

3D reconstruction of Neron circus

Drawing by Luis de Garrido, 2020

Figure 5.8

3D reconstruction of Neron circus

Drawing by Luis de Garrido, 2020

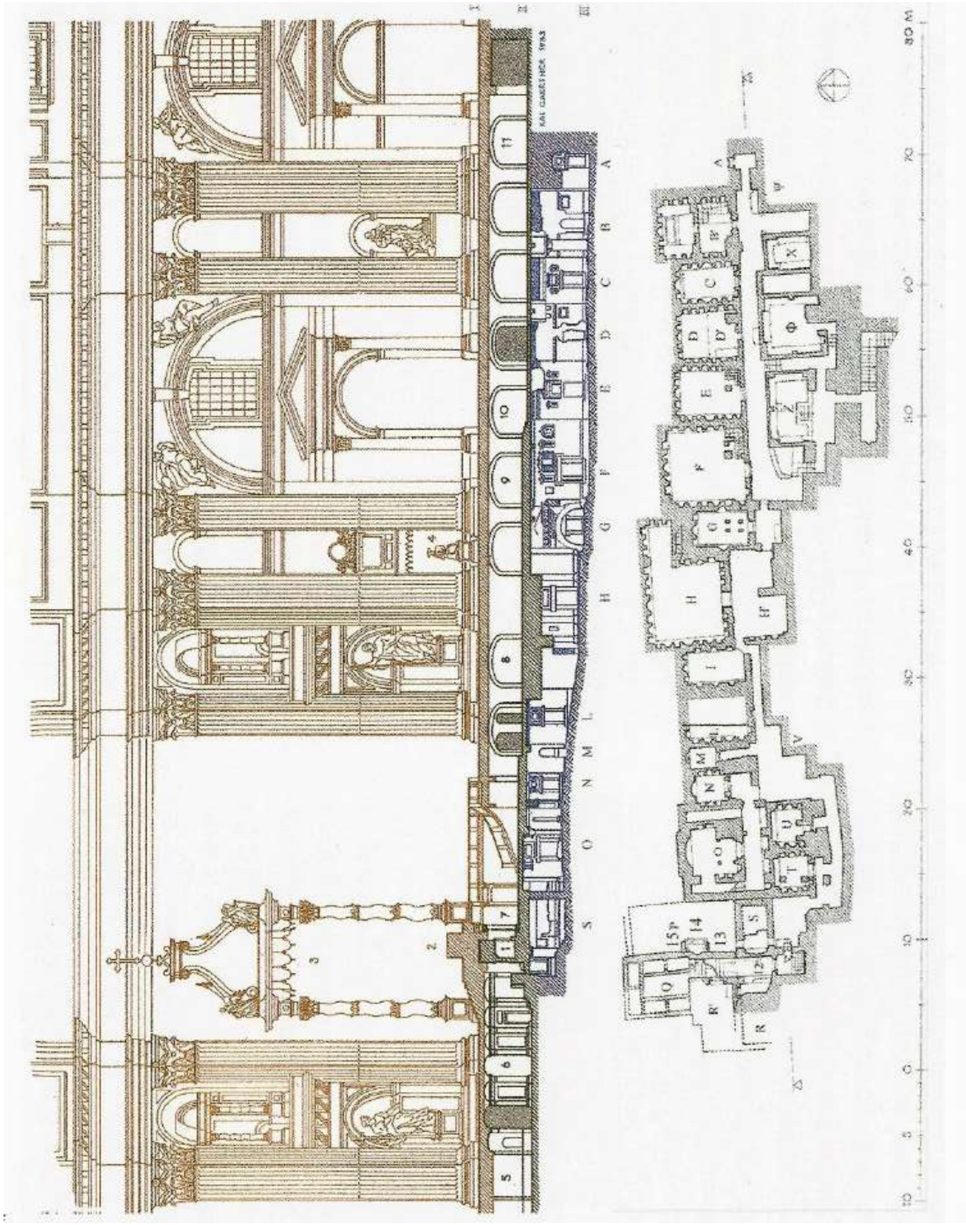


Figure 5.9

Spaccato della basilica moderna e della necropoli sotto la basilica e pianta della medesima necropoli. Section of the modern basilica and the necropolis under the basilica and a plan of the same necropolis. (Design K. Gaertner). A) C. Popilius Heracla; B) Fannia Redempta; C) L. Tullius Zethus; D) Opus Reticulatum; E) Aelii; F) Tulli e Caetenni; G) Docente; H) C. Valerius Herma; I) Quadriga; L. Caetennia Higia; M) Lulii; N) Aebutii; O) Matucci; P) Campo P; Q) Area per inumazione; R1. Tomba R1; S) Tomba S; T) Traebellena Flaccilla; U) Lucifer; V) Tomba V; Z. Egizi; X. Tomba Chi; Φ Marci; Ψ Tomba Psi; 12. Clivus; 13. Muro rosso; 14. Trofeo; 15. Muro dei graffiti Brandernburg, H.; Ballardini, A.; Thoenes, Ch. *San Pietro storia di un monumento.* Vatican City: Elio de Rosa Editore, Fabbrica di San Pietro in Vaticano (2014). p. 11

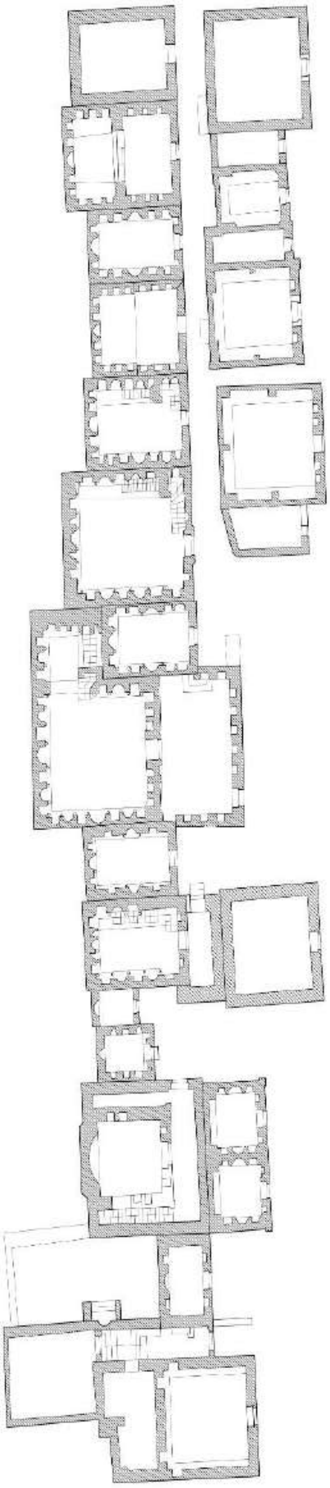


Figure 5.10

Graphic reconstruction of necropolis in 3rd century

Drawing by Luis de Garrido, 2020

Figure 5.11

Graphic reconstruction and evolution of the Z-Psi and H-A tombs. A) C. Popilius Heracla; B) Fannia Redempta; C). L. Tullius Zethus; D) Opus Reticulatum; E) Aelii; F) Tulli e Caetenni; G) Docente; H) C. Valerius Herma; Z) Egizi; Phi Marci; Tomba Chi; Tomba Psi

Mielsch – Hesberg – Gaertner, 1985-1986

II CENTURY (Hadrianus-Aurelio)

III CENTURY

Figure 5.12

Graphic reconstruction and evolution of the Z-Psi and A-H tombs

Drawing by Luis de Garrido, 2020

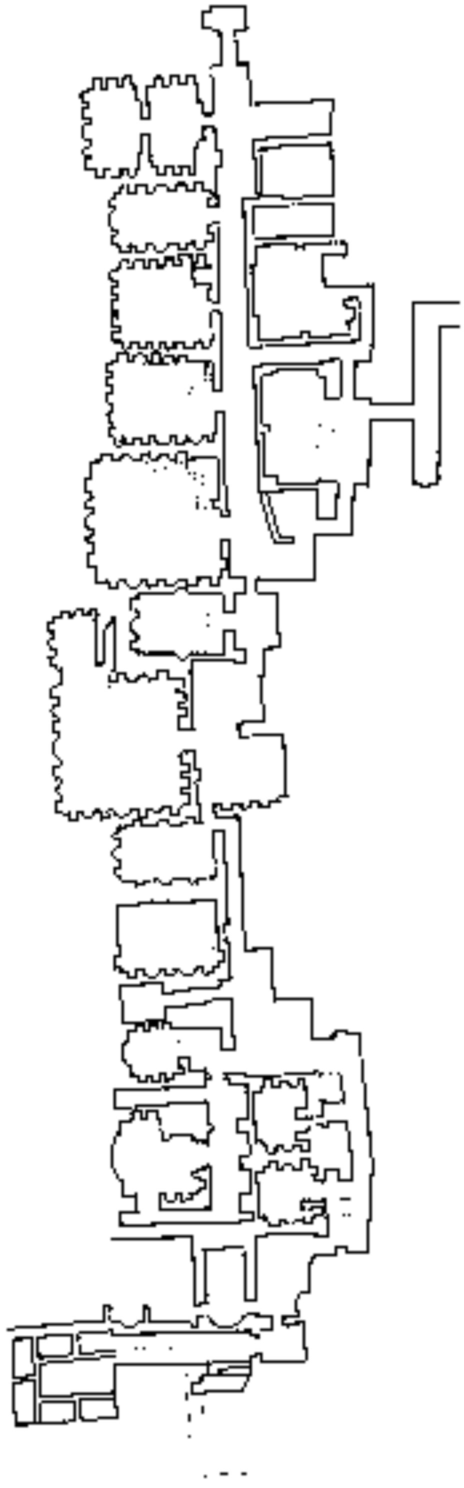


Figure 5.13

Graphic reconstruction of necropolis, XX century

Drawing by Luis de Garrido, 2020

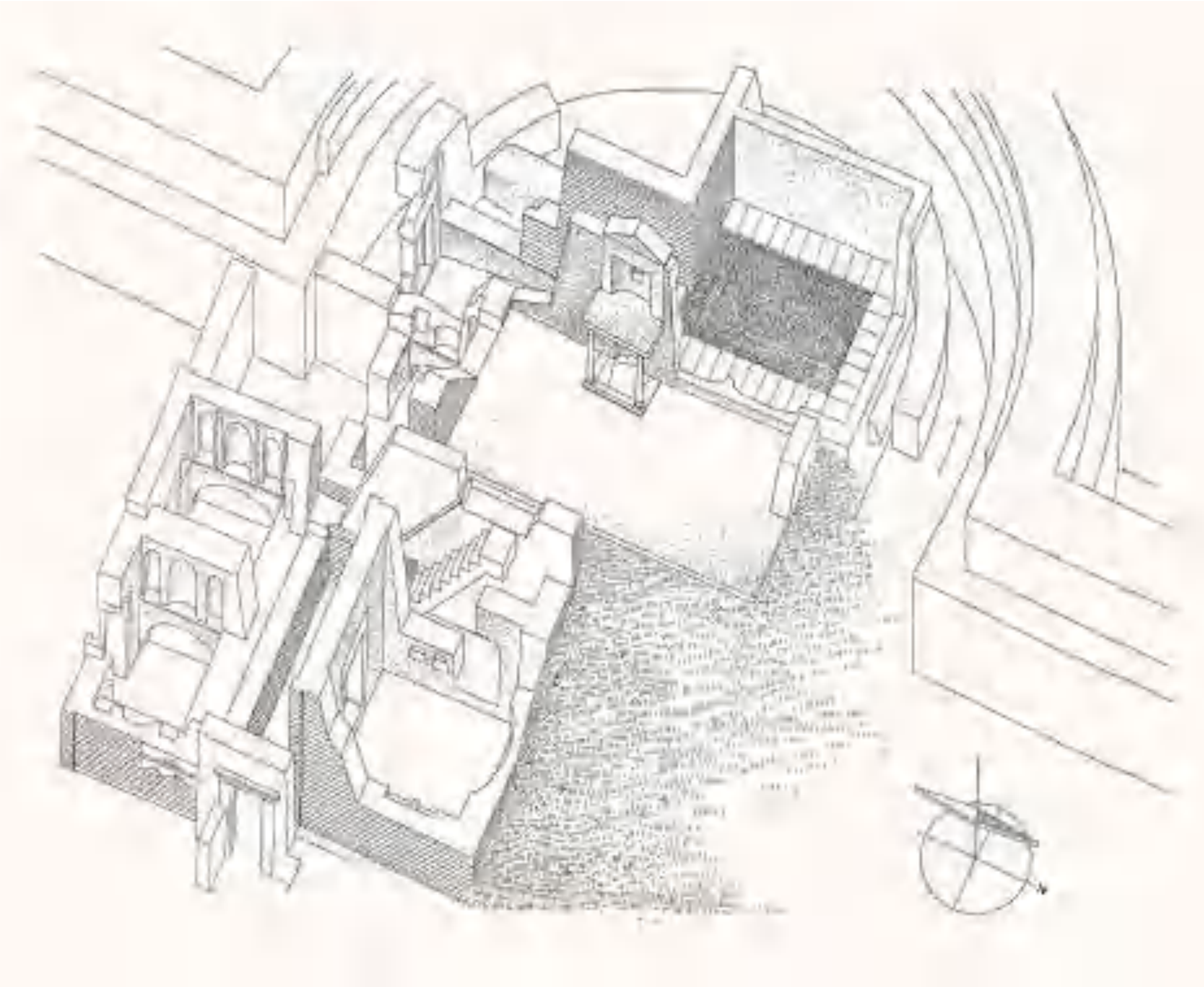


Figure 5.14

Roman tomb buildings around the camp, with the memory of the tomb monument of Peter in the apse of the Basilica of Constantine

Apollonj Ghetti, 1951

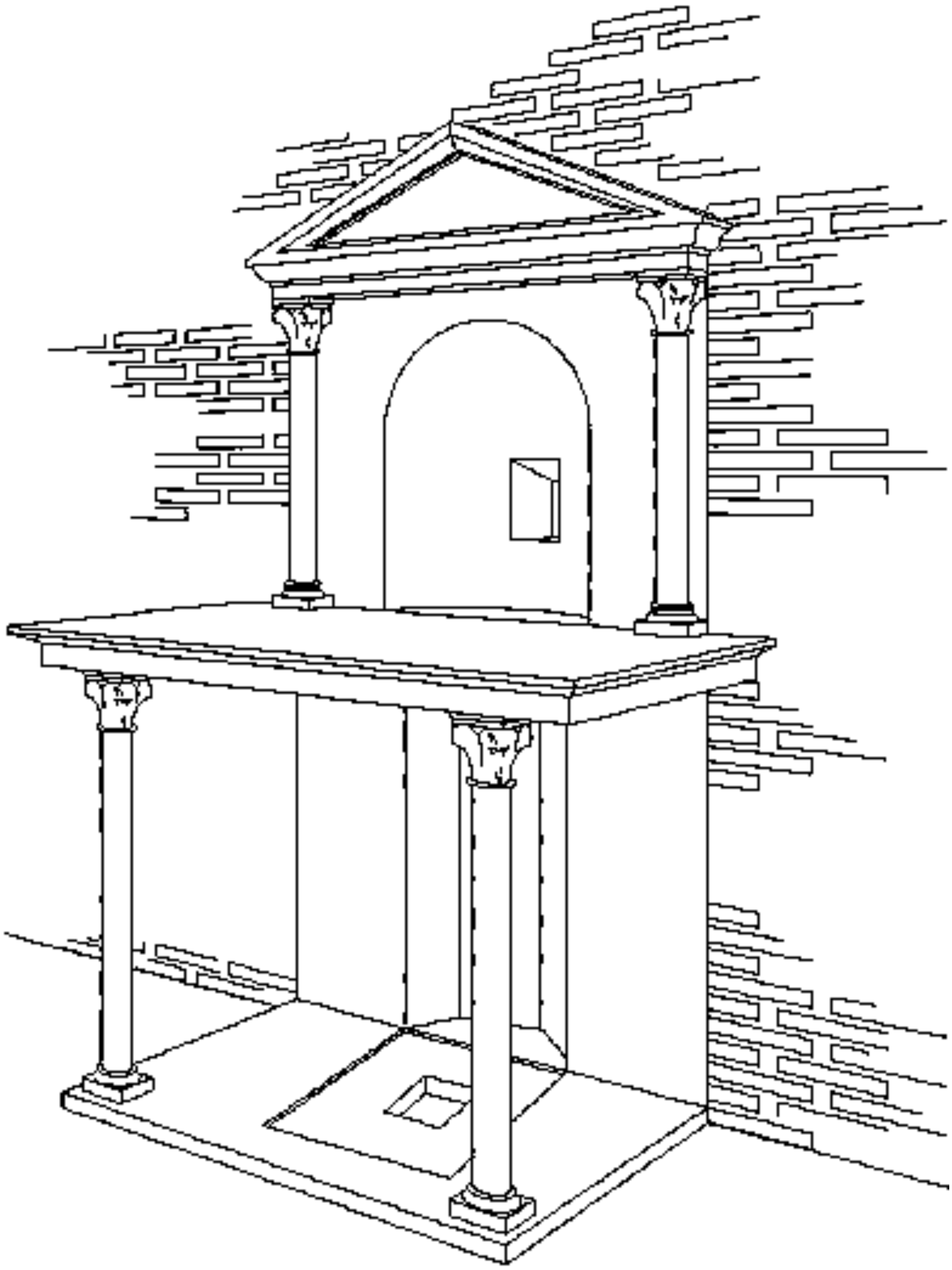


Figure 5.15

Mid-second-century funerary monument of S Peter standing in an open courtyard; reconstruction drawing

G.U.S Corbett. After Toynbee and Ward-Perkins, *The Shrine of Saint Peter*

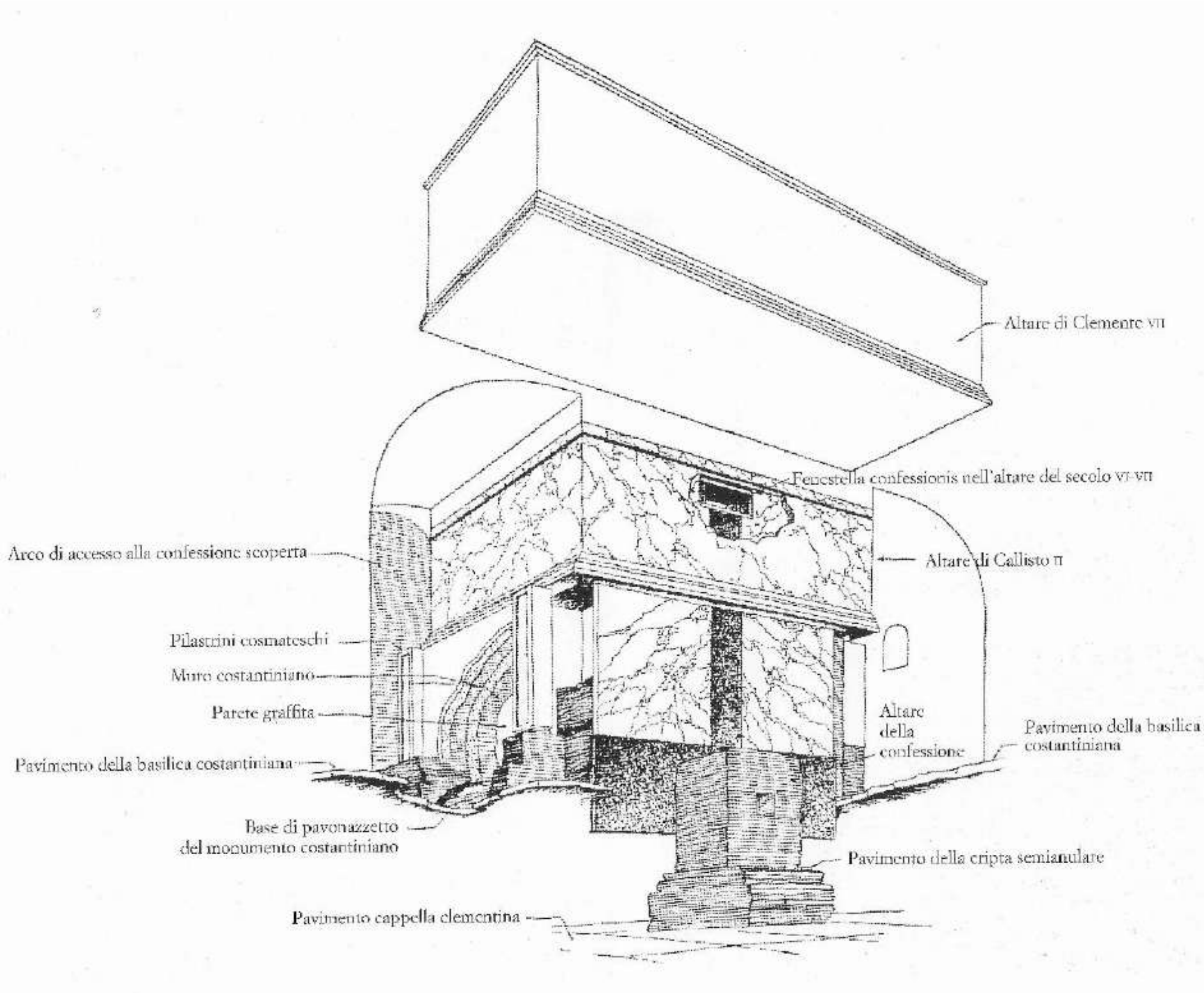


Figure 5.16

Stratigraphy of the altar of the Apostle

Apollonj Ghetti, 1951

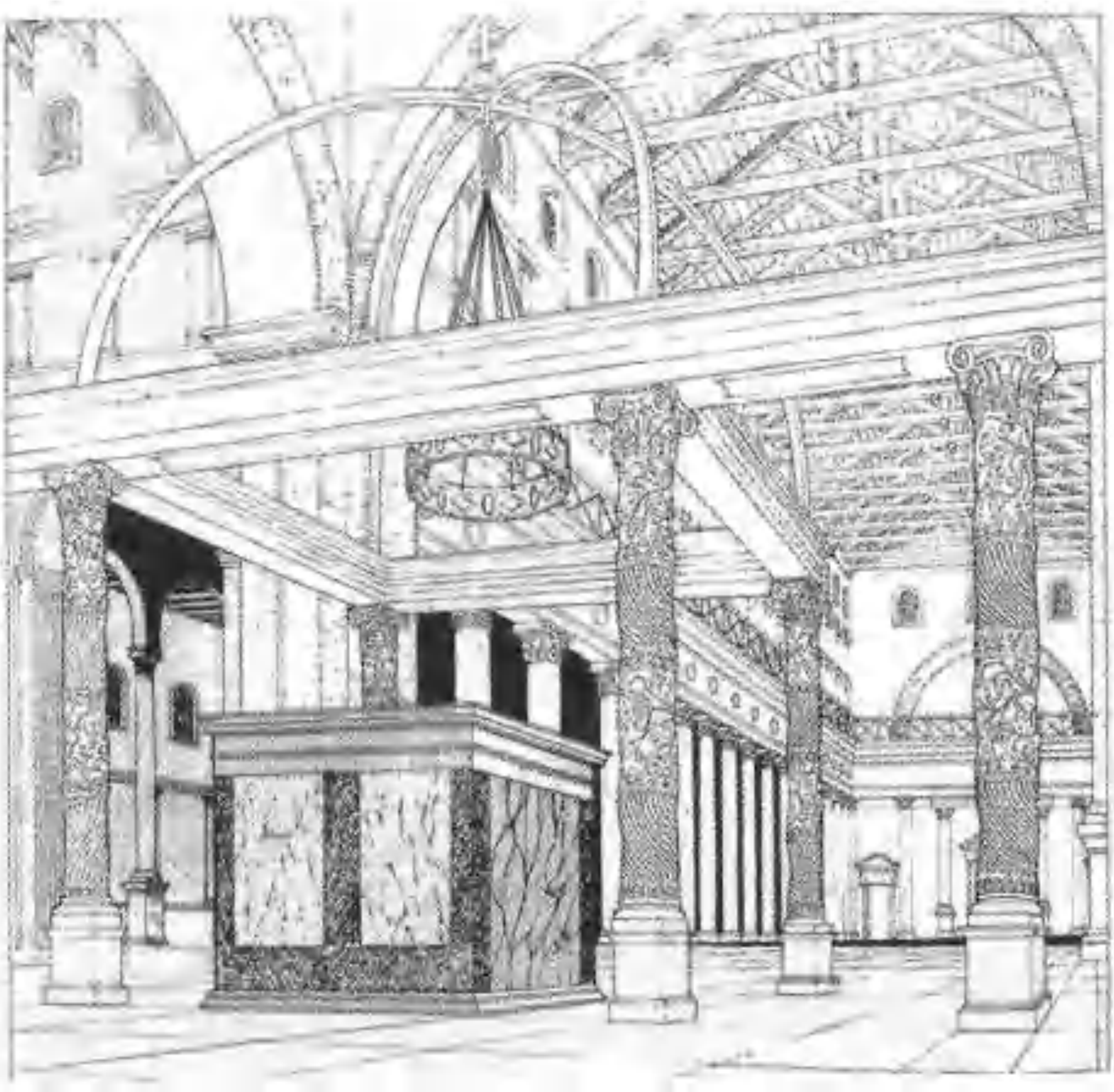


Figure 5.17

Reconstructive drawing of the *Memoria Apostolica* seen from the west with the Constantinian monument under the ciborium supported by the twisted columns from wich the large cross-shaped chandelier takes

P. Zander. *La Necropoli di San Pietro. Arte e Fede nei sotterranei della Basilica Vaticana.* Vatican City: Elio de Rosa Editore, Fabbrica di San Pietro in Vaticano (2014), p. 61

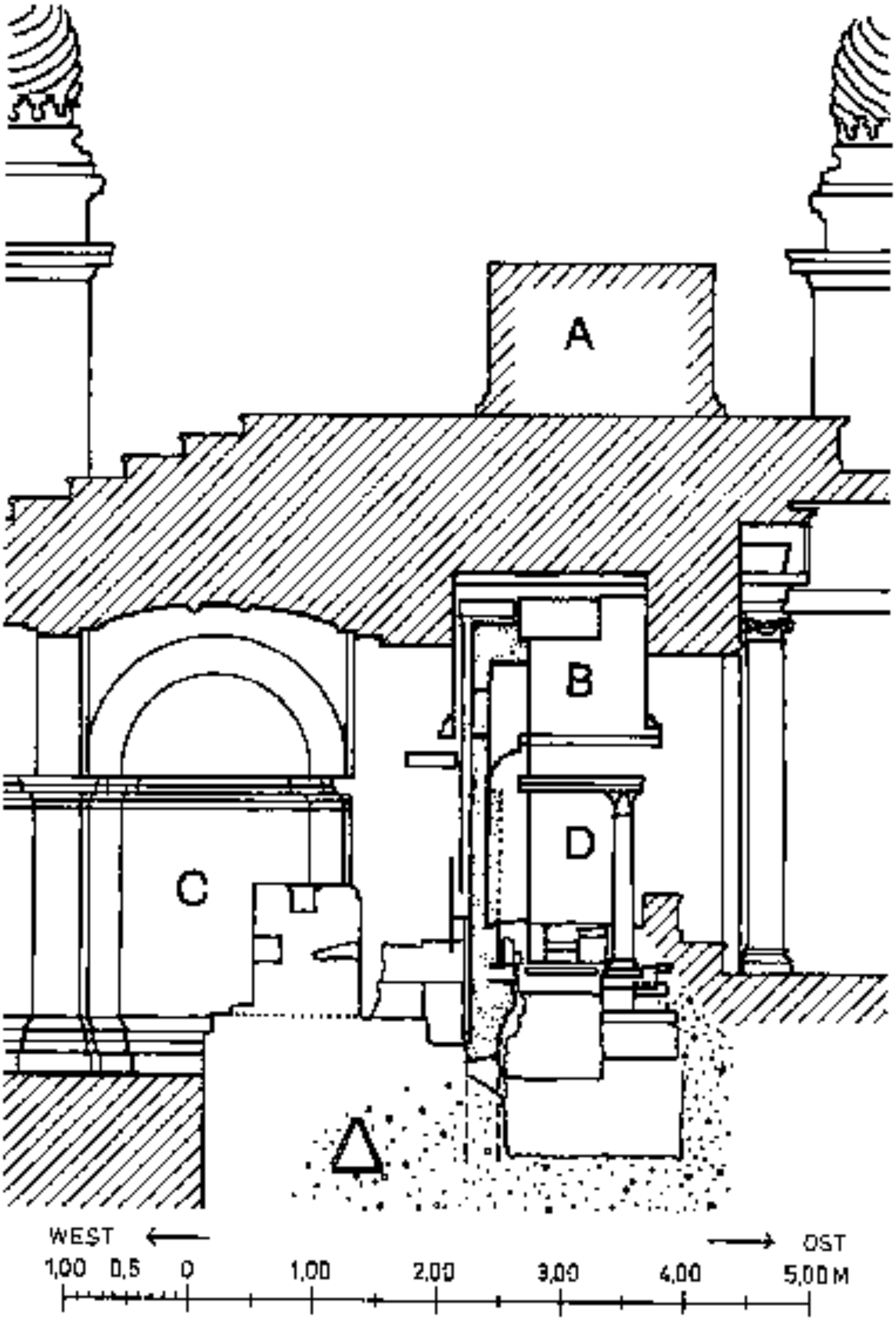


Figure 5.18

Cutaway of the current papal altar and the underlying memory

Brandernburg, H.; Ballardini, A.; Thoenes, Ch. *San Pietro storia di un monumento.* Vatican City: Elio de Rosa Editore, Fabbrica di San Pietro in Vaticano (2014), p. 17

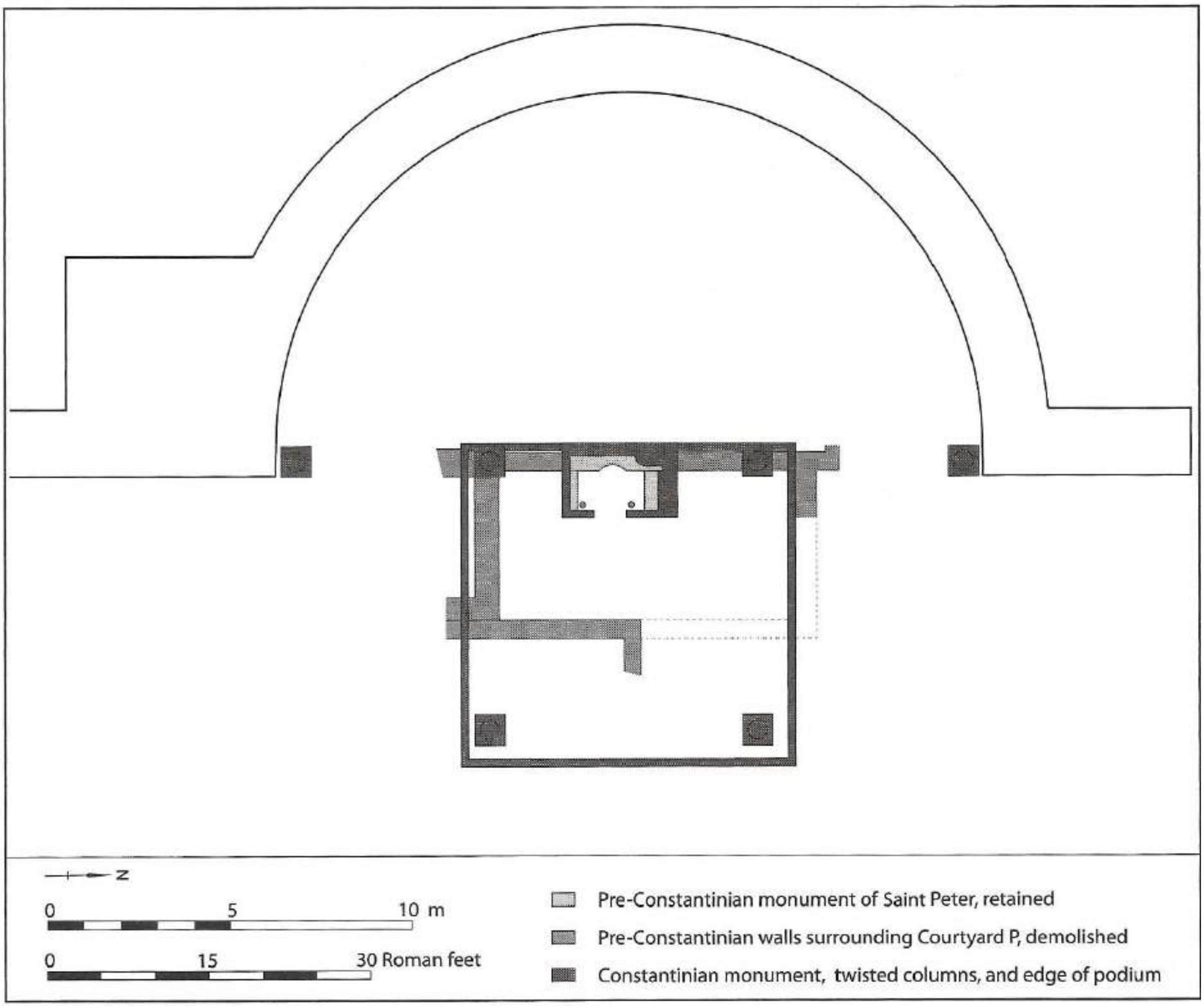


Figure 5.19

Plan based on excavated evidence, showing the Constantinian monument, podium edge (exaggerated for clarity) and column bases, in relation to the earlier monument and courtyard marking St. Peter's grave. Reconstruction by Richard Gem

Rosamond McKitterick. *Old Saint Peter´s Rome*. Rome (2013), p. 48

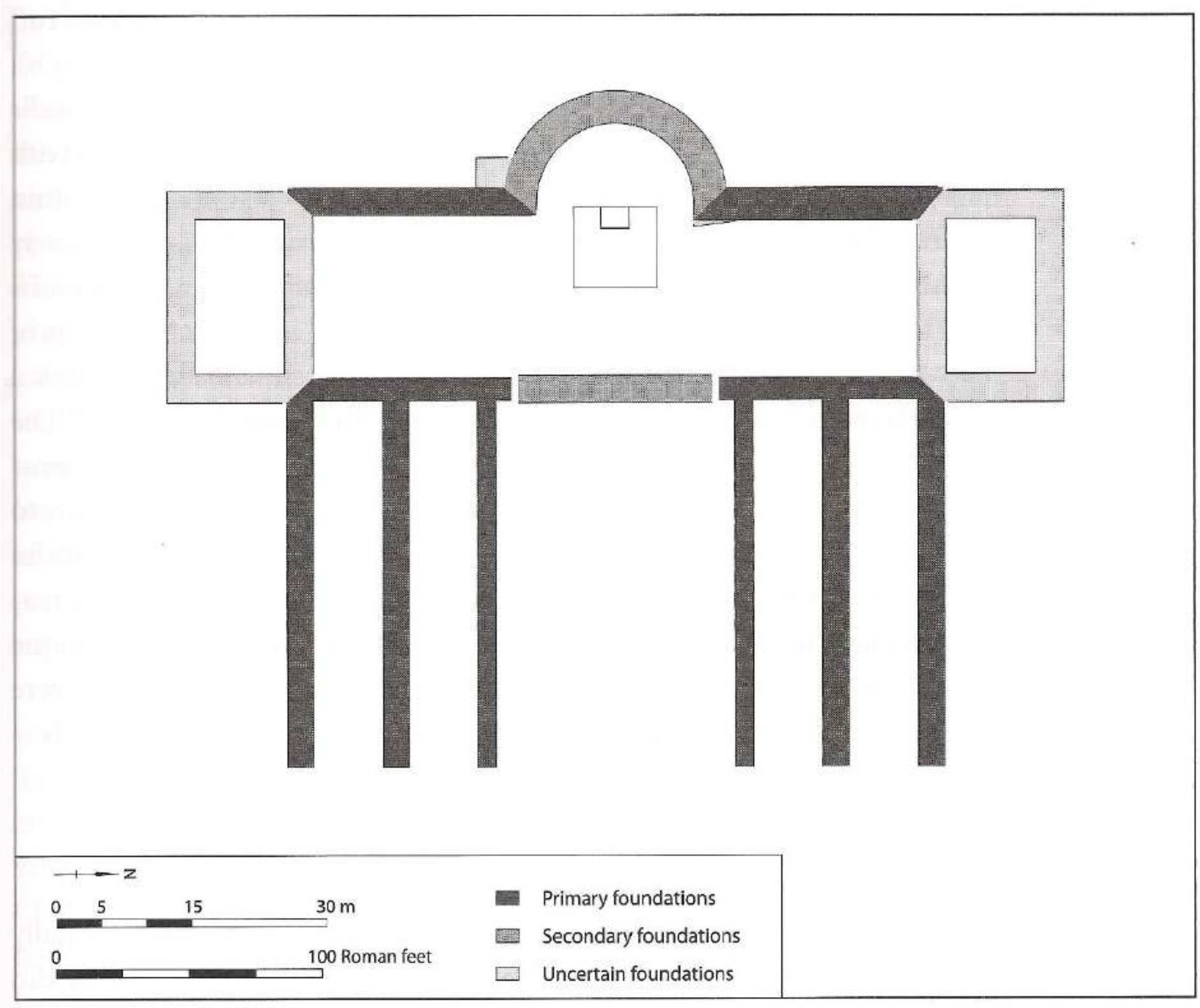


Figure 5.20

Plan of the foundations for the west end of St. Peter’s basilica, based on the excavated evidence. Primary foundation walls faced in *opus listatum* and *opus testaceum*; secondary foundations of *opus caementicium*. Reconstruction by Richard Gem Rosamond McKitterick. *Old Saint Peter´s Rome*. Rome (2013), p. 49

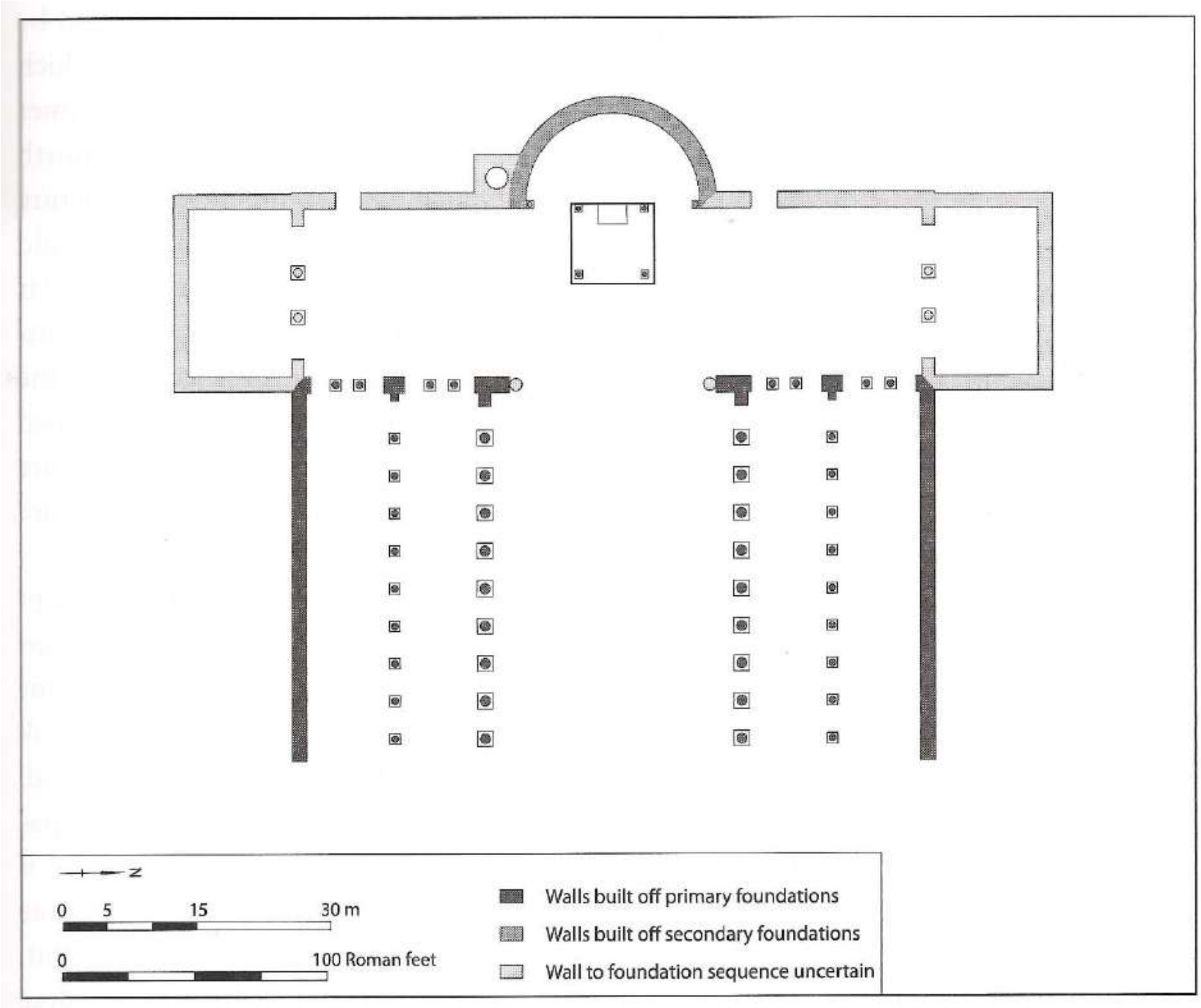


Figure 5.21

Plan showing the relationship of the superstructure to the foundations, based on the limited excavated evidence. Reconstruction by Richard Gem

Rosamond McKitterick. *Old Saint Peter´s Rome.* Rome (2013), p. 53

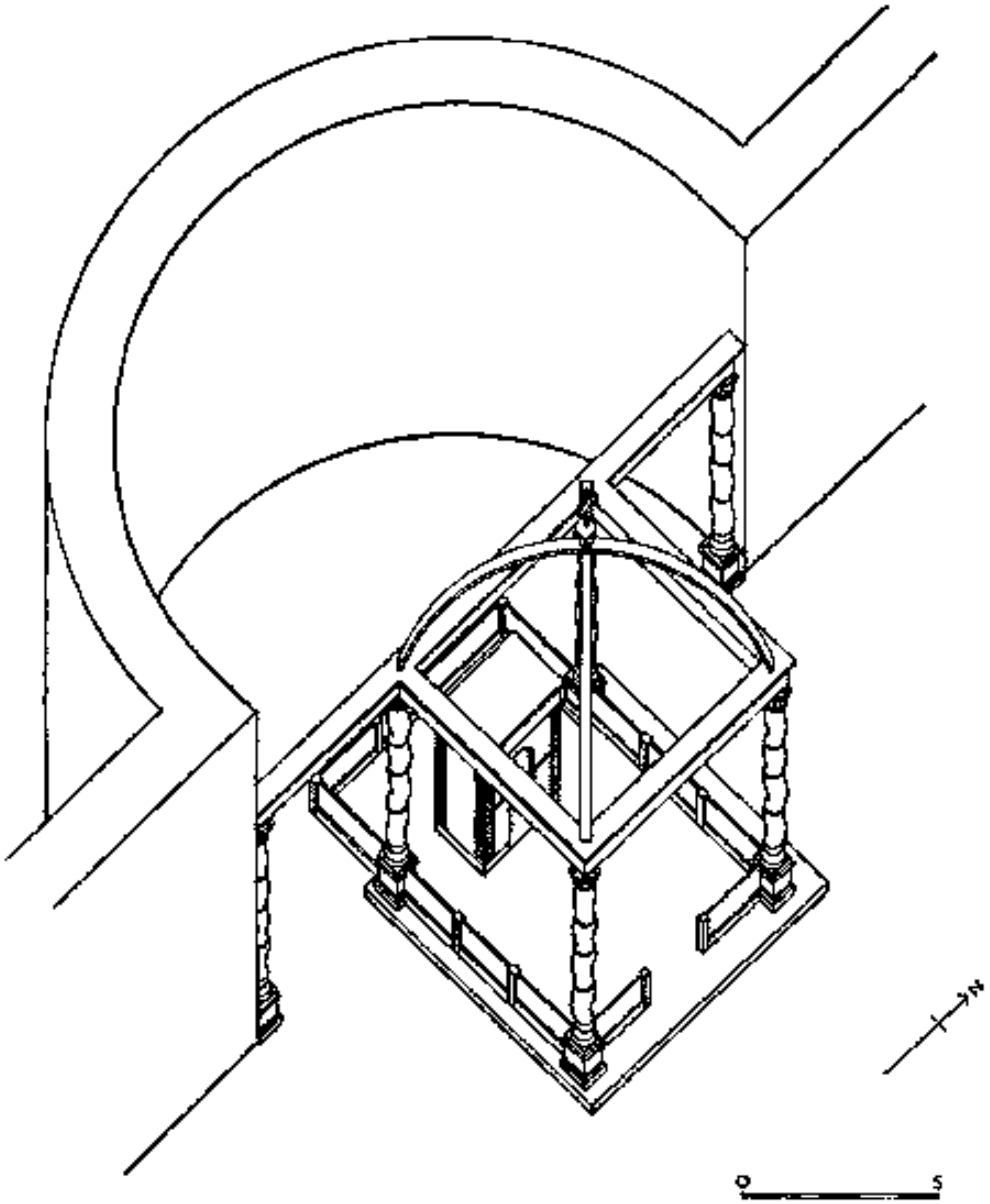


Figure 5.22

Reconstruction of the memory of the tomb with canopy in front of the apse

Kirschbaum, 1974

Figure 5.23

Reconstruction of the apsidal area in the transept of the basilica

Fabbrica di San Pietro

Brandernburg, H.; Ballardini, A.; Thoenes, Ch. *San Pietro storia di un monumento.* Vatican City: Elio de Rosa Editore, Fabbrica di San Pietro in Vaticano (2014), p. 17

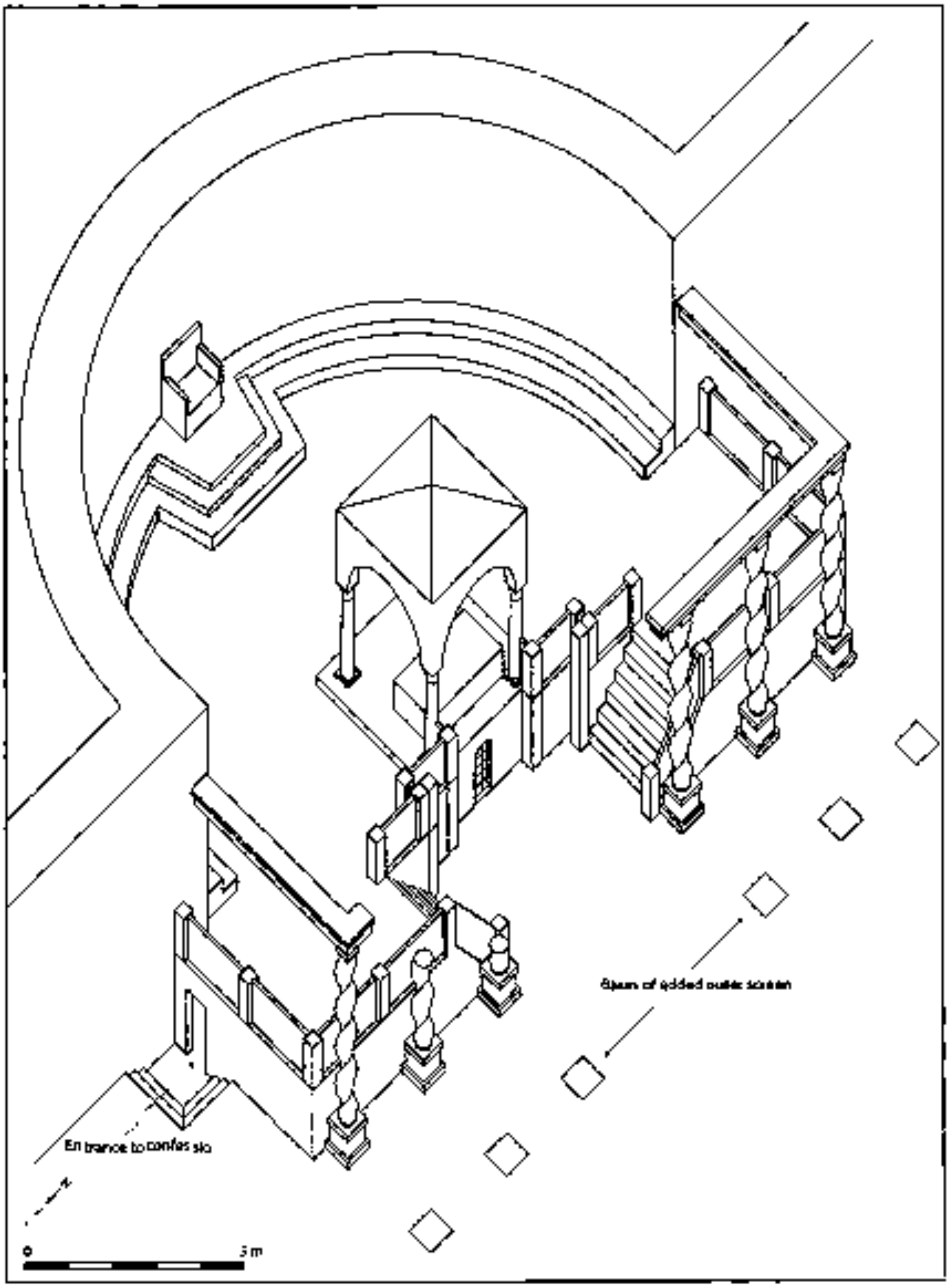


Figure 5.24

Axonometric reconstruction of the *memoria apostolica* and annular crypt at the time of pope Gregorio Magno, with the placement of additional vitinee columns under Pope Gregorio III in the 730's

Toynbee-Ward Perkins, 1956

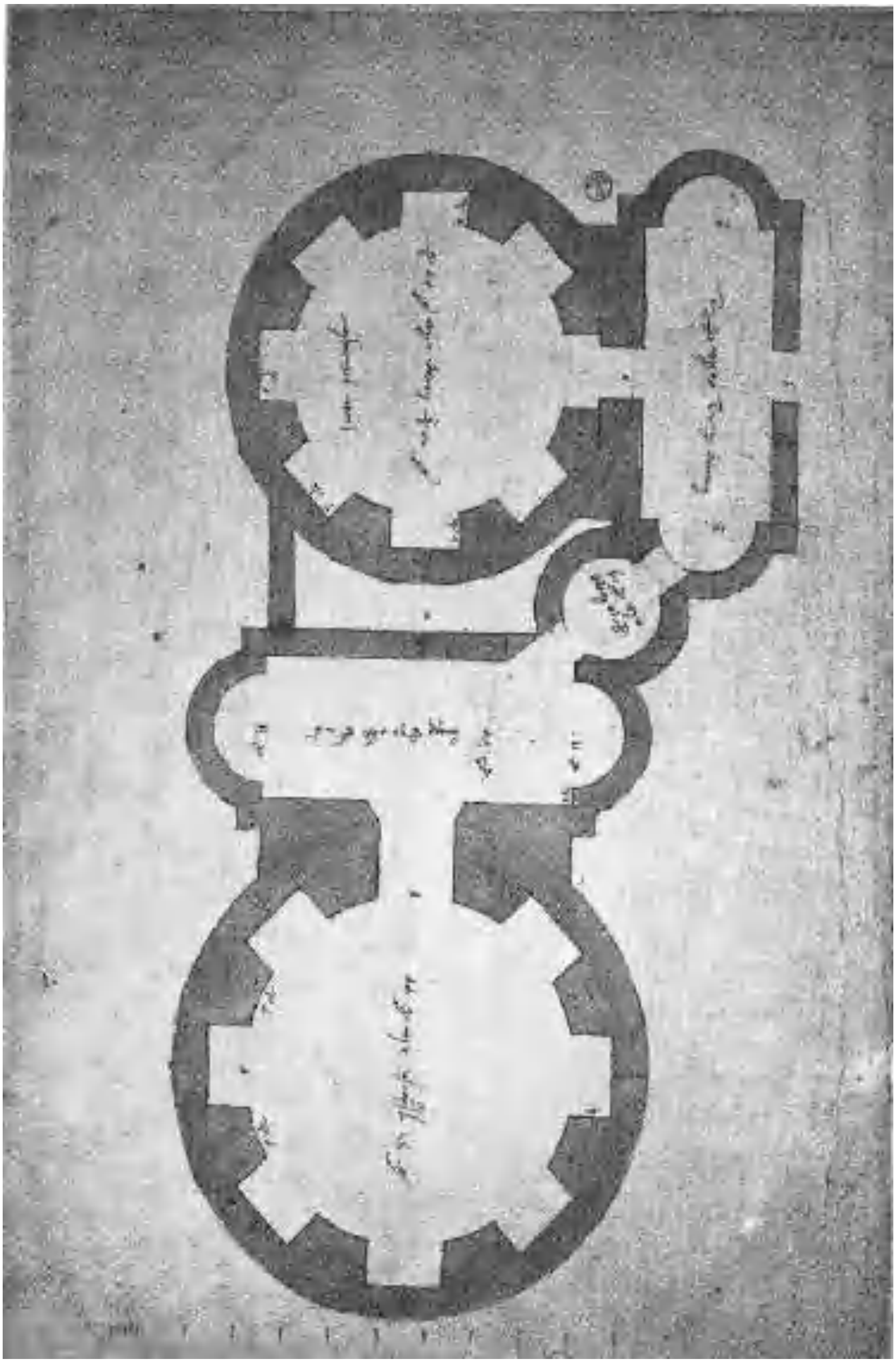


Figure 5.25

Plan layout of the rotundas of S. Andrea and S. Petronilla. Drawing of the second half of the 16th century. In the lower part of the drawing there are some scale lines 10 feet apart

Tatti Jacopo detto Sansovino

GDSU 4336 A

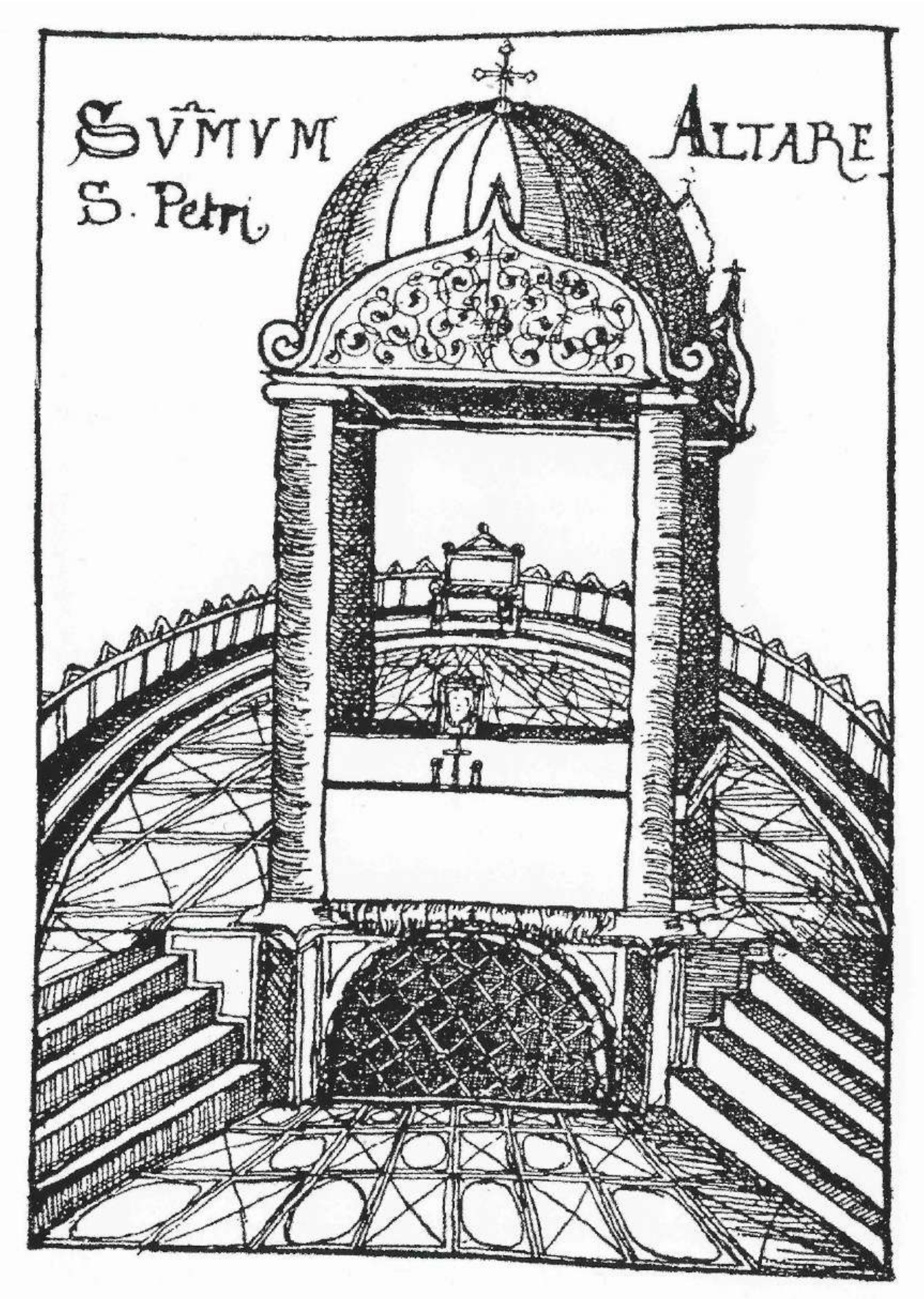


Figure 5.26

Liturgical order of the apsidal hemicycle in the ancient S. Peter's at the time of the pilgrimage

Sebastian Werro, 1581

Fribourg, Bibliothèque Cantonale et Universitaire

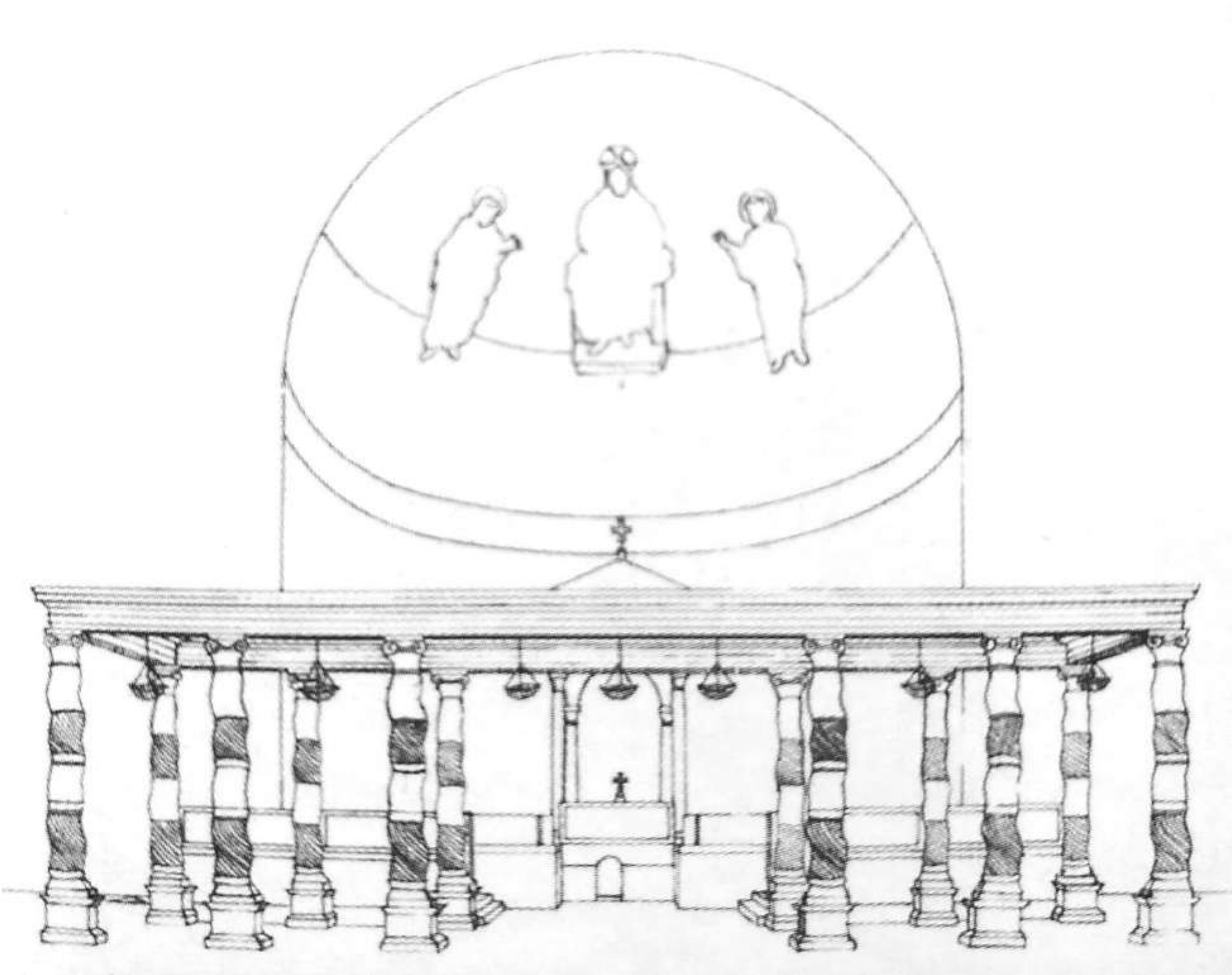


Figure 5.27

Reconstruction of the *pergula* of Gregorio III in front of the Confessione di San Peter

Giuseppe Tilia

P. Zander. *La Necropoli di San Pietro. Arte e Fede nei sotterranei della Basilica Vaticana.* Vatican City: Elio de Rosa Editore, Fabbrica di San Pietro in Vaticano 2014), p. 63

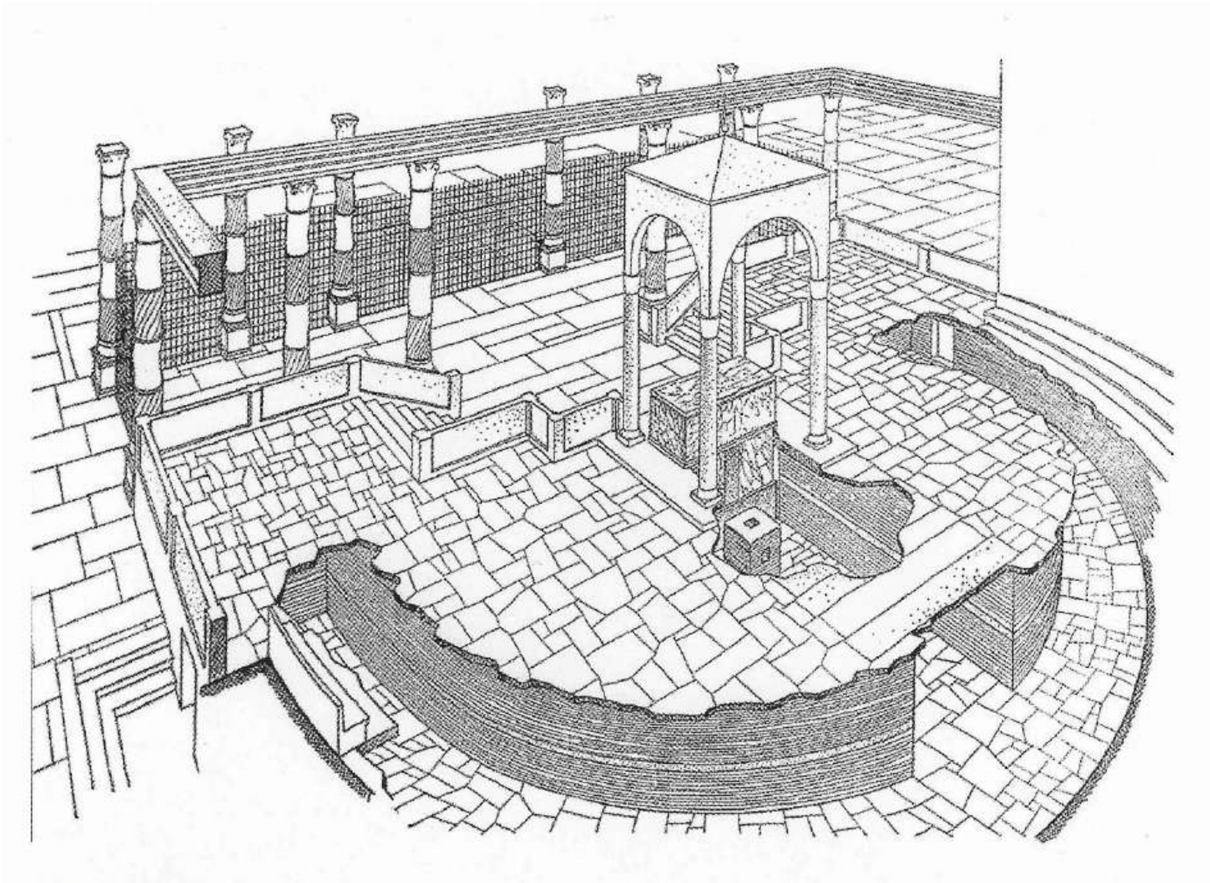


Figure 5.28

Reconstructive drawing of the raised presbytery at the time of Pope Gregorio Magno, with the crypt ("subterranea Confessio") connected to the Old Basilic by the semi-annular peribulum (from explorations in 1951). According to Apollonj Ghetti, Ferrua, Josi, Kirschbaum

Figure 5.29

Il cantharus of S. Peter in a drawing

Simone del Pollaiolo called the Cronaca, 1480

GDSU Santarelli, 157 v

Figure 5.30

Pen drawing depicting the facade of the Constantiniana Basilica before the reconstruction of Gregorio IX, last quarter of the 11th century. Windsor, Eton College, Cod. Farf. 124, f. 122r

Anonymous

Biblioteca di Archeologia e storia dell'arte, Rome; Rodolfo Lanciani Collection

Figure 5.31

The protiro with the bronze door and the marble San Peter

Giacomo Grimaldi, XVII century

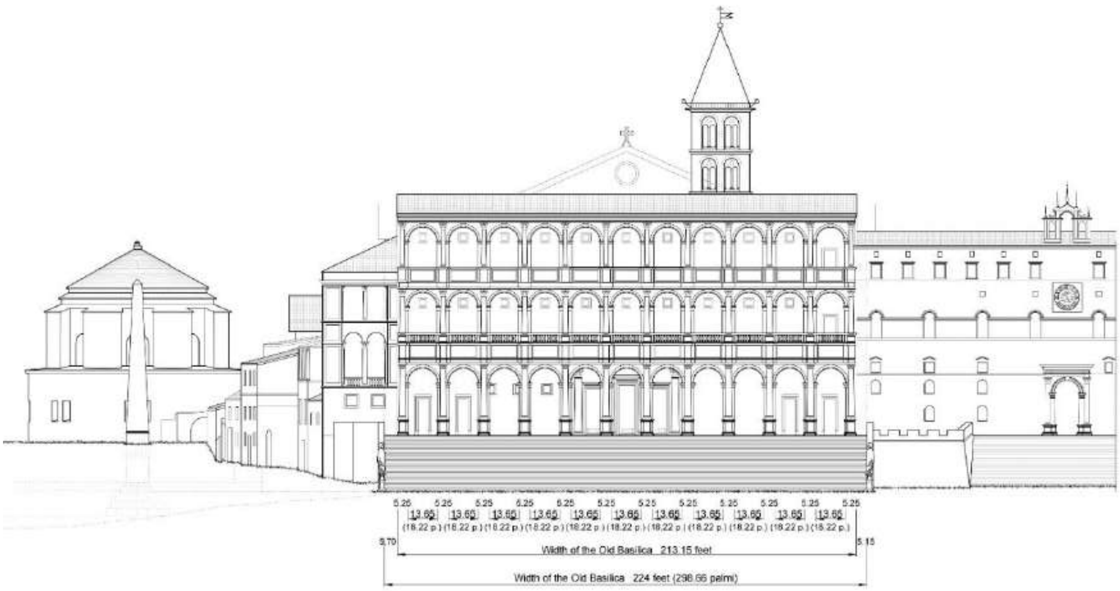
Biblioteca Apostolica Vaticana, Barb. Lat. 2733, f. 145r

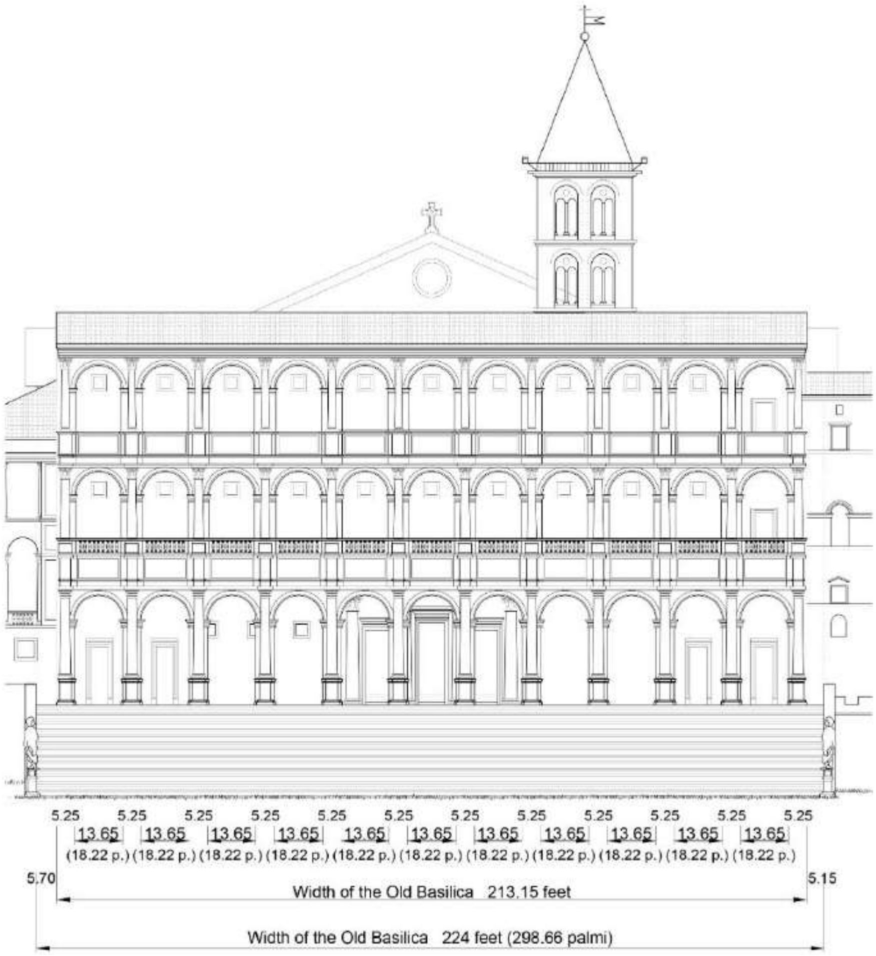
Figure 5.32

The front of Santa Maria in Turri and the access passages to the atrium of San Peter

Giacomo Grimaldi, XVII century

Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro, H. 2, f. 62r





Detail

Figure 5.33

Project by Franceso del Borgo for the lodge of Blessings of Pope Pius II (1458-1464)

Drawing by Luis de Garrido, 2020

Figure 5.34

Sketch of a floorplan for S. Peter in Rome

Baldasarre Peruzzi, 1520-1521, (made in 1518 according to Luis de Garrido)

GDSU 11 Ar

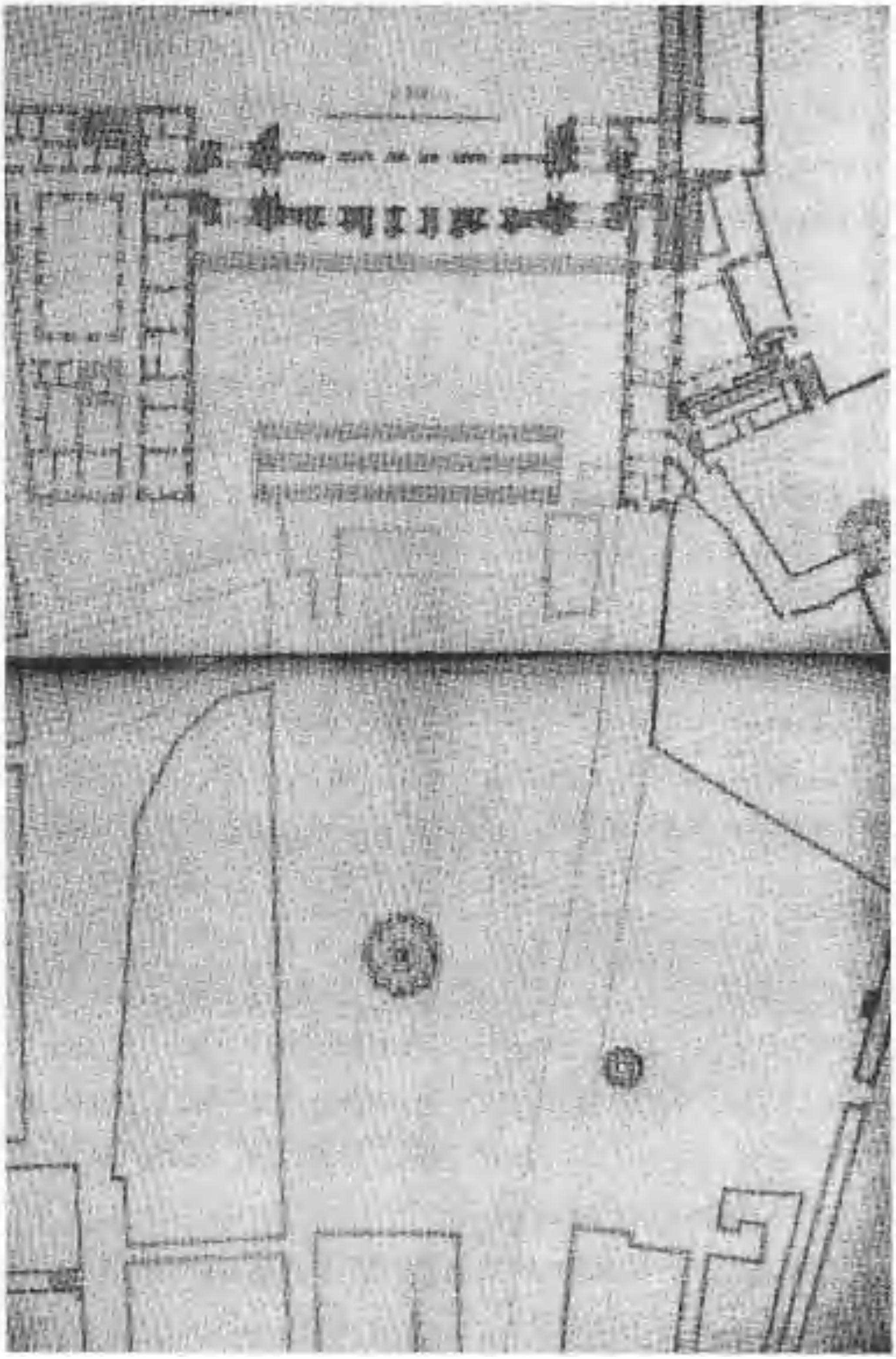


Figure 5.35

Project for St. Peter´s square

Carlo Maderno

GDSU 263 A

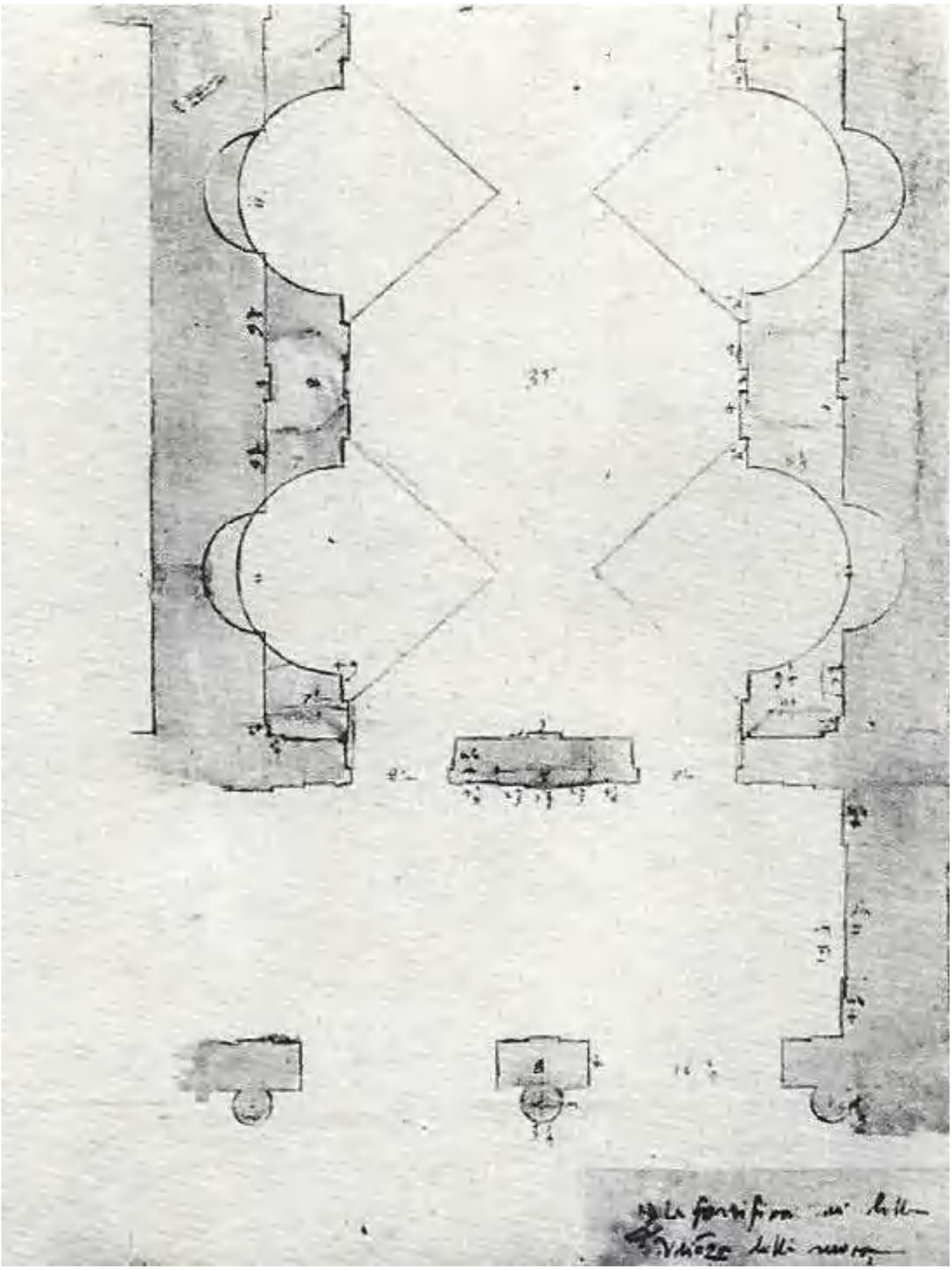


Figure 5.36

Project for the renovation of the Sacra Rota in the Palazzo di Innocenzo VIII

Antonio da Sangallo

GDSU 787 Ar

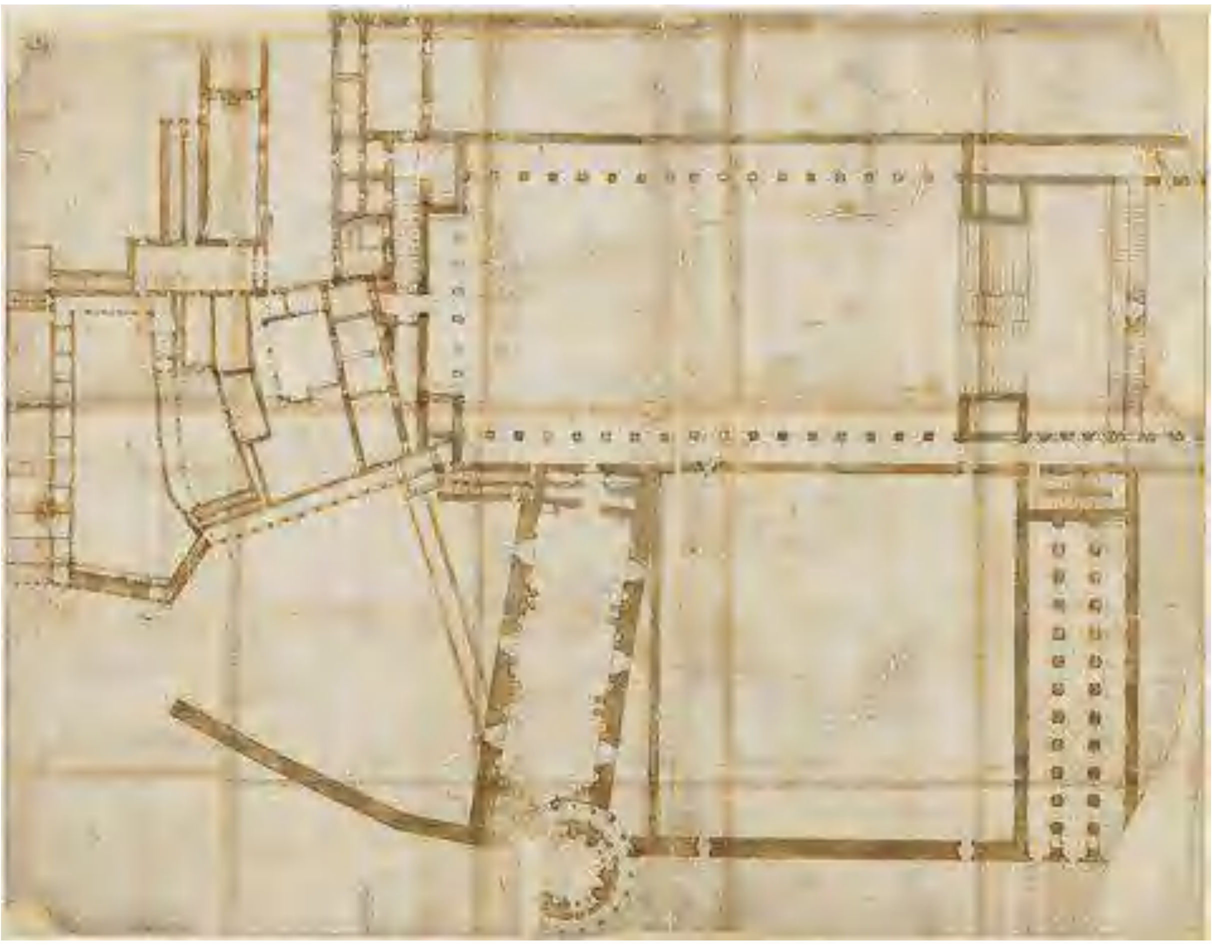


Figure 5.37

Floor plan of the Vatican Palace, Rome

Bramante Donato

GDSU 287 Ar

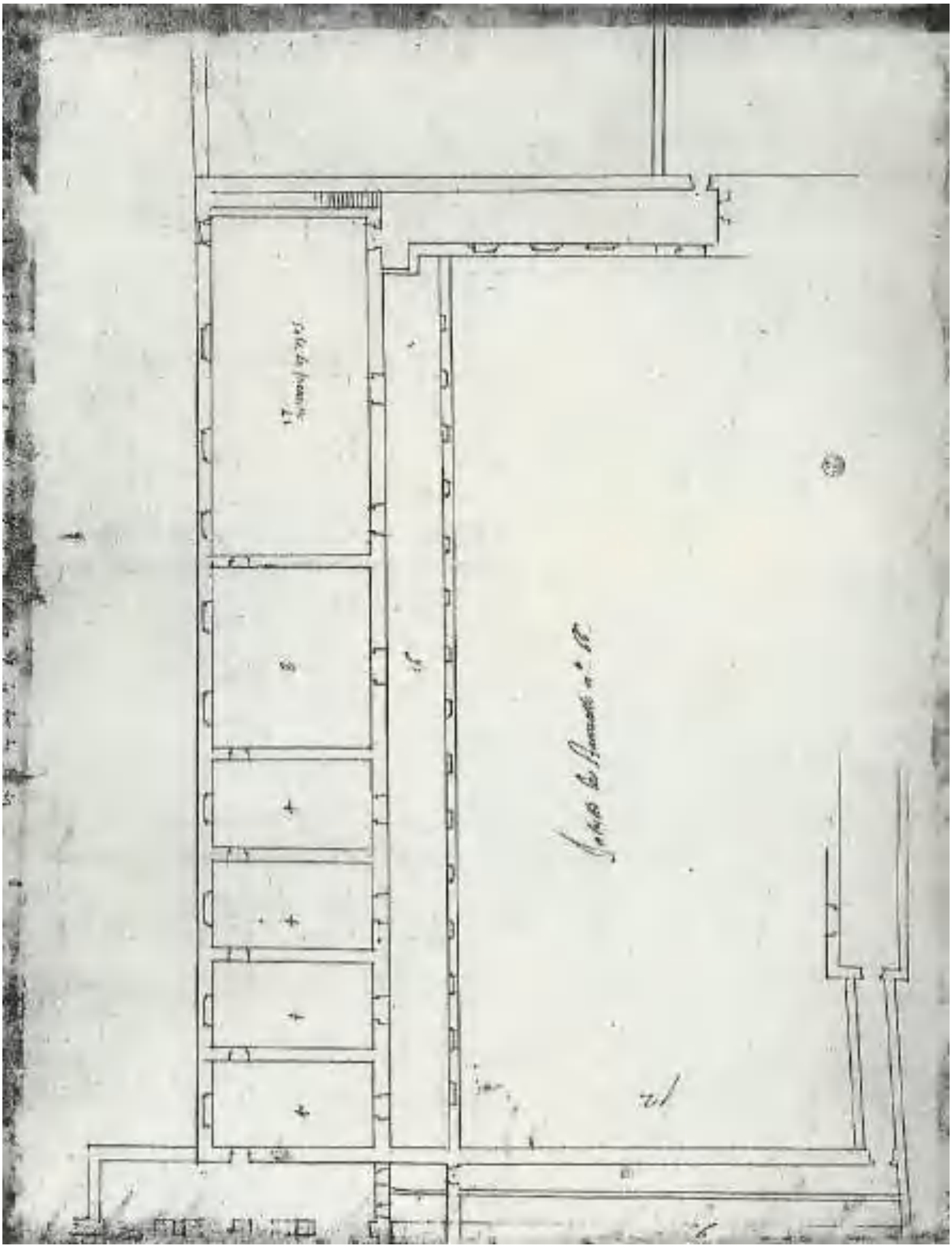


Figure 5.38

Plan of the upper floor of the Palazzo di Innocenzo VIII

Anonymous, 15th century

GDSU 4170 Ar

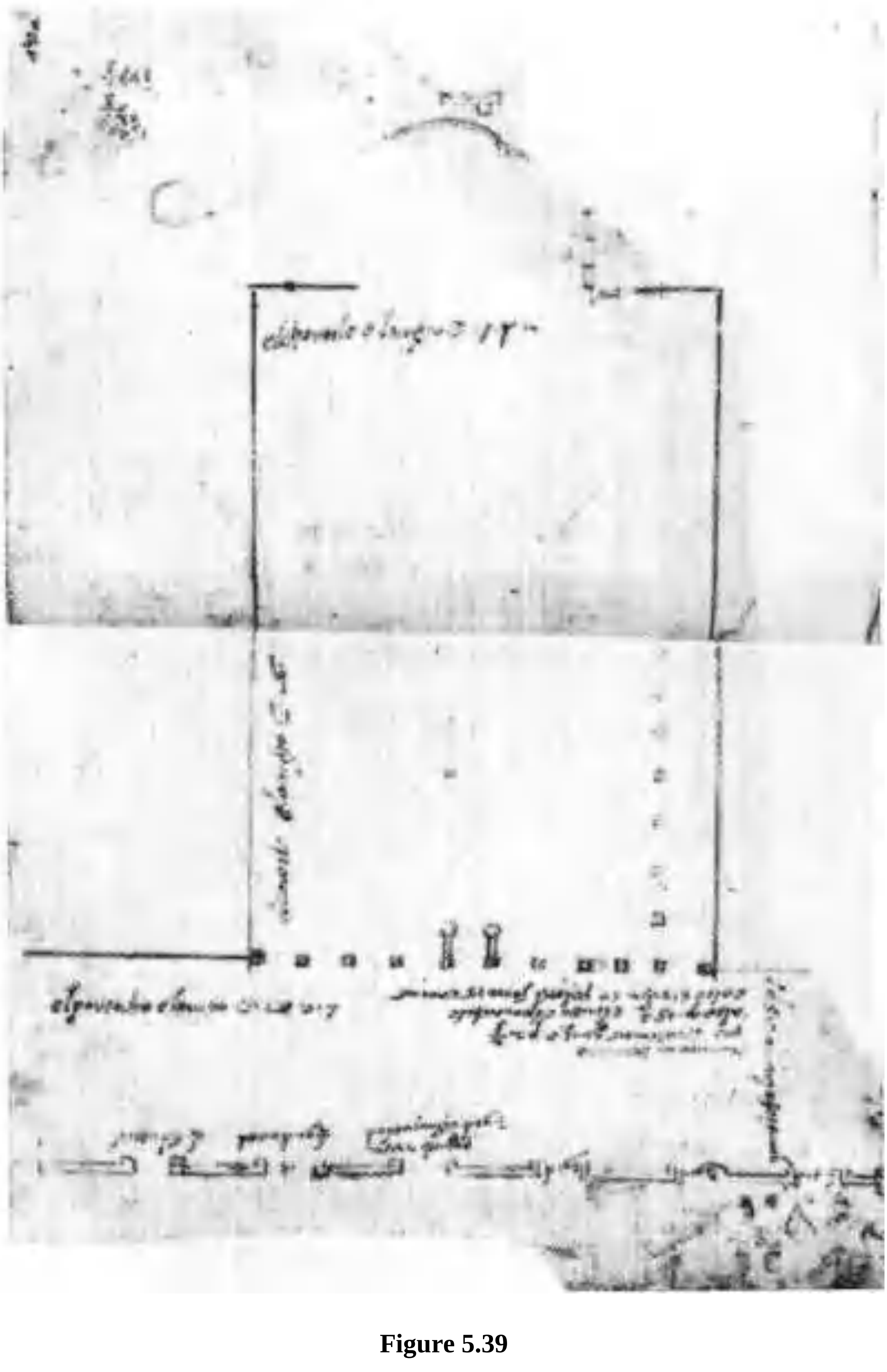


Figure 5.39

Plan of the atrium of St. Peter

Anonymous, 16th century

Vienna, Österreichische Staatsbibliothek

Detail

Figure 5.40

Drawing of the pontiff’s blessing in the piazza of S. Peter

Giovanni Ambrogio Brambilla and Claudio Duchetti, late 16th century

The Metropolitan Museum of Art, cod. 41.72(3.69)

Figure 5.41

View of St. Peter's square

Anonymous, 15th century

Zurich, Schraft collection

Figure 5.42

View of St. Peter’s square, (by Ehrle-Egger)

Anonymous, 15th century

Frommel, Cristoph Luitpold. *Architettura e Commitenza da Alberti a Bramante*

Editorial Leo S. Olschki Editore (2006), p. 122

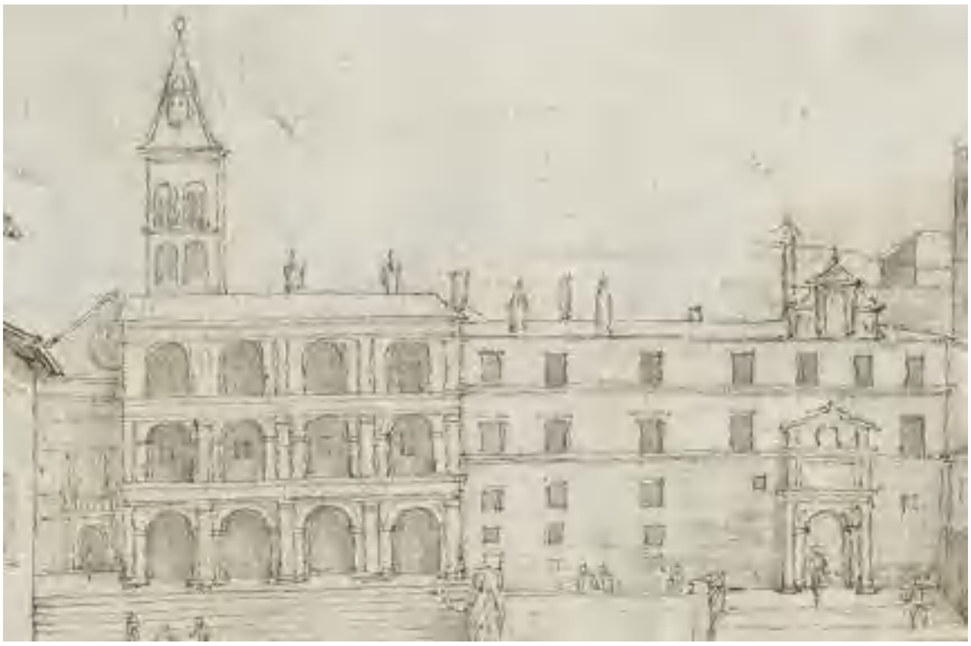
Detail

Figure 5.43

Accordi nuziali di Gaspard de coligny davanti alla loggia delle benedizioni. Detail with the view of the Blessing Loggia. Fresco

Giovanni Maria Zoppelli, 1565-1567

Palazzo Vaticano, Sala Regia



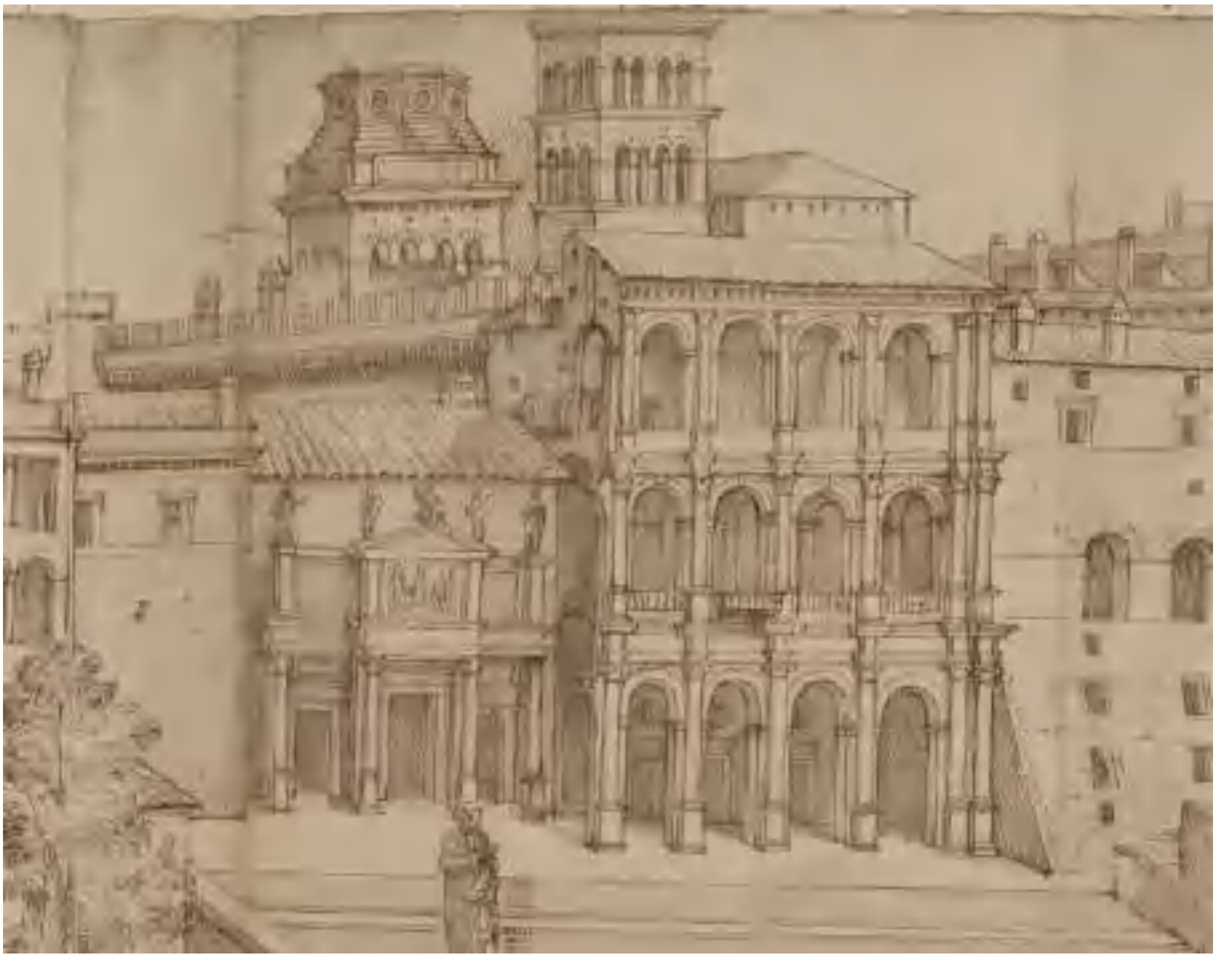
Detail

Figure 5.44

San Peter's square with the statue of Marco Aurelio

Maarten van Heemskerck, 1532-1536

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 53 recto



Detail

Figure 5.45

San Peter from borgo Santo Spirito, with the Sangallesco shipyard, early 1545. The drawing combines studies of the basilica with various architectural projects that were planned but never built, such as the tower at left

Anonymous (Flemish?), 1550-1560

The Courtauld Institute of Art, cod. D.1984.AB.83

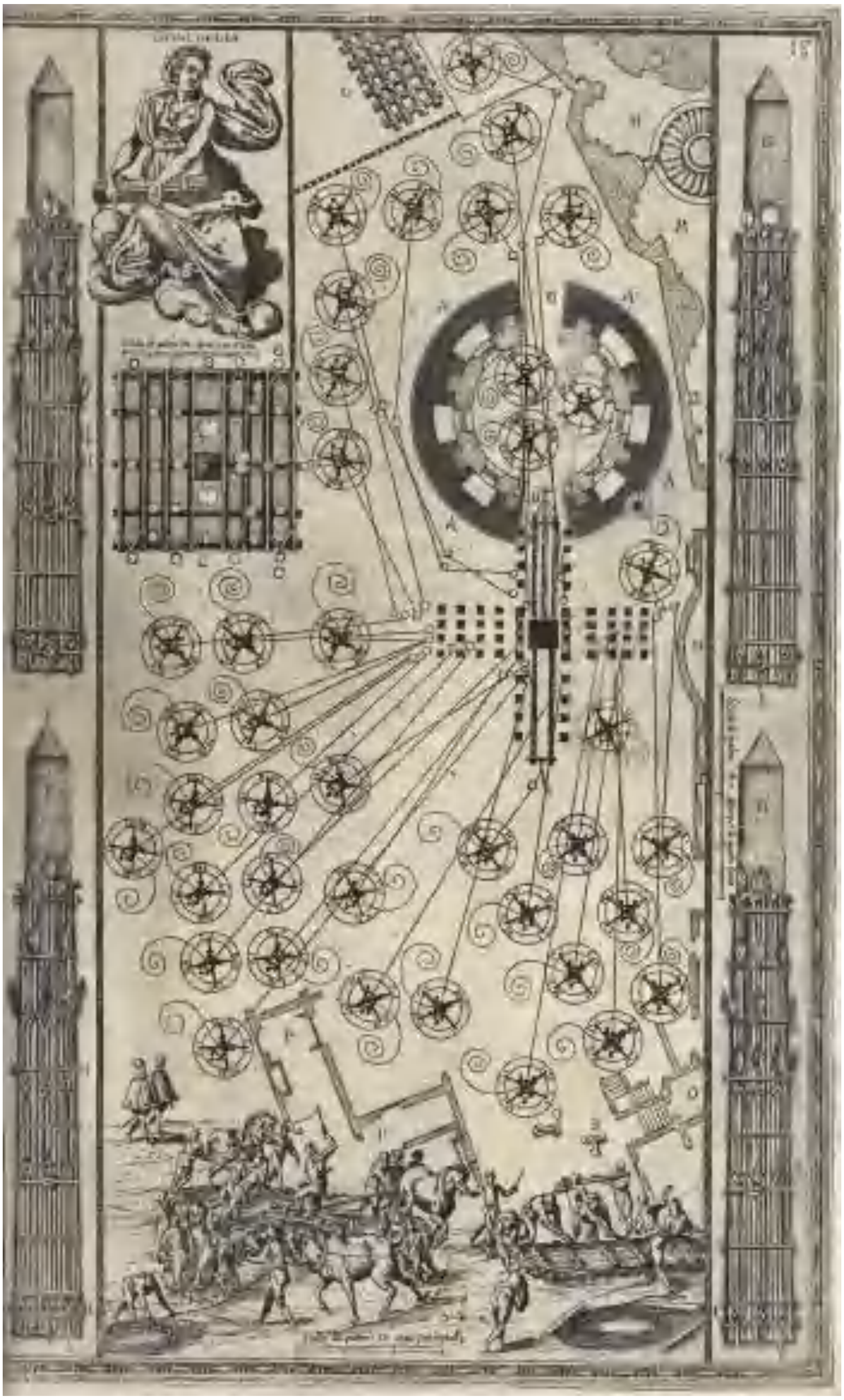
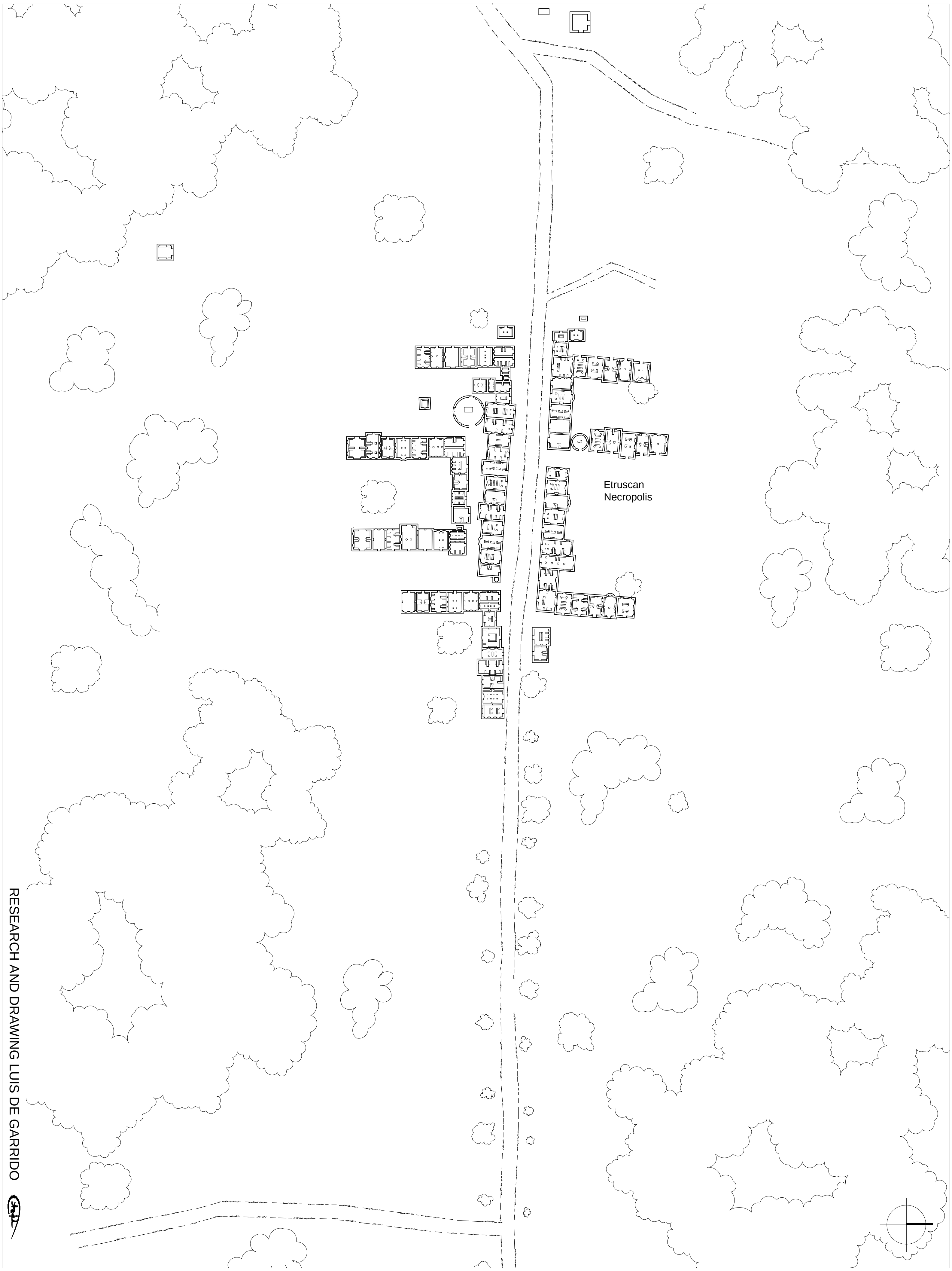


Figure 5.46

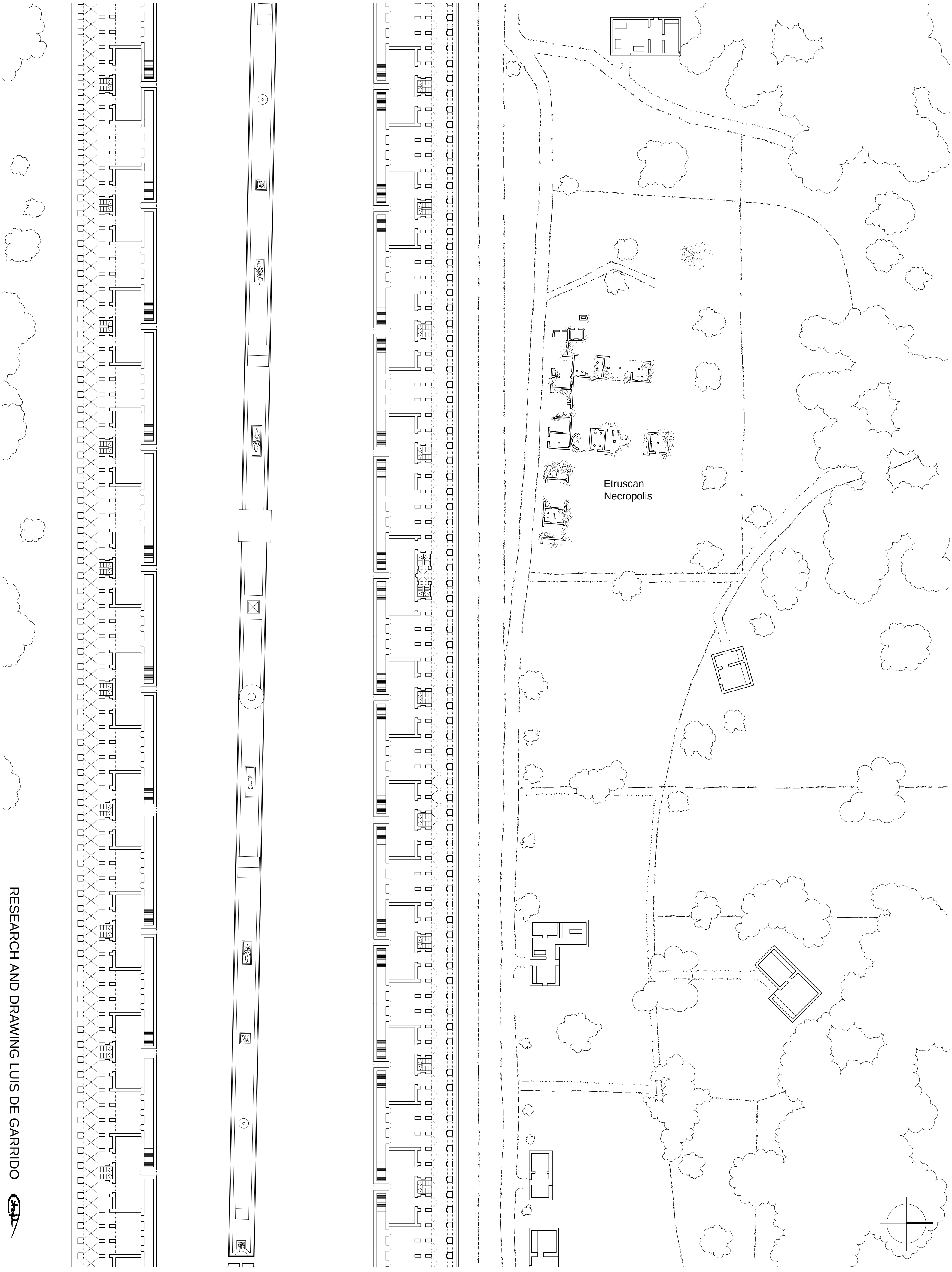
Domenico Fontana, 1590

Fontana, Domenico. *Della trasportatione dell'obelisco vaticano et delle fabriche di nostro signore Papa Sisto V*, libro primo. Engraver Natale Bonifacio. Roma (1590), f. 15 recto

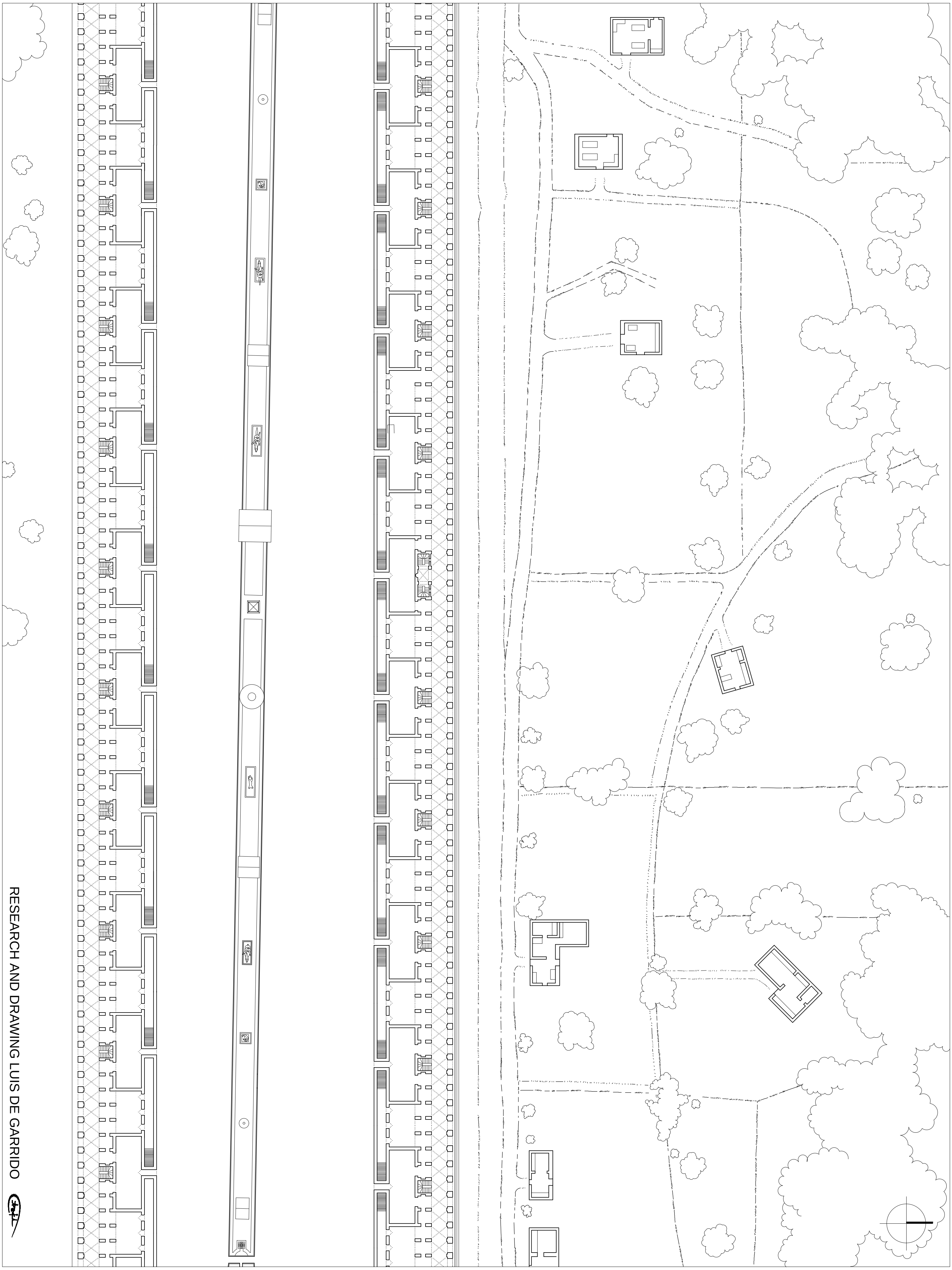
LAYOUTS 5



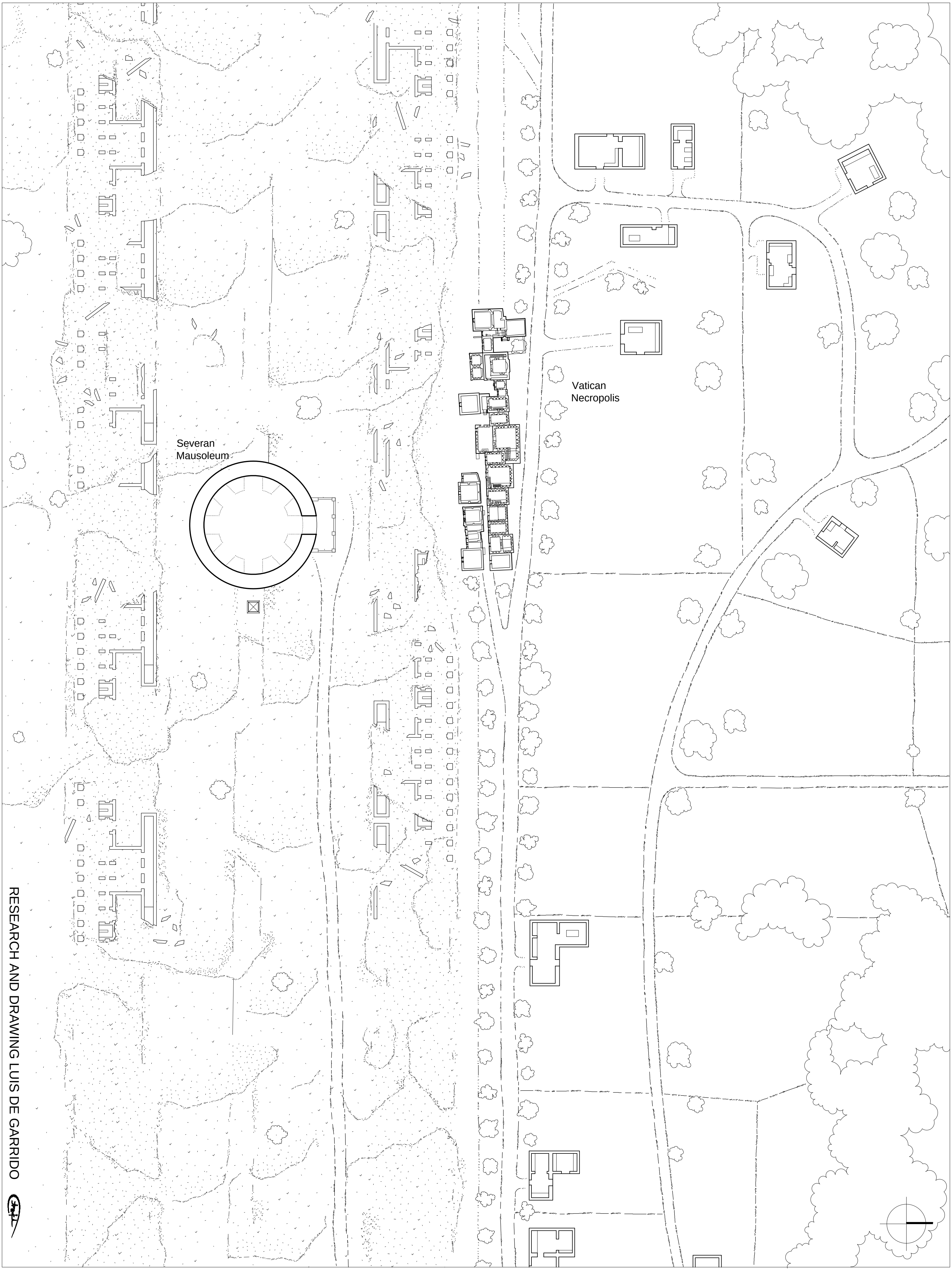
100 BC	ETRUSCAN NECROPOLIS	OSP	CP1



37 A.C	CONSTRUCTION OF THE CALIGULA CIRCUS	OSP	CP2

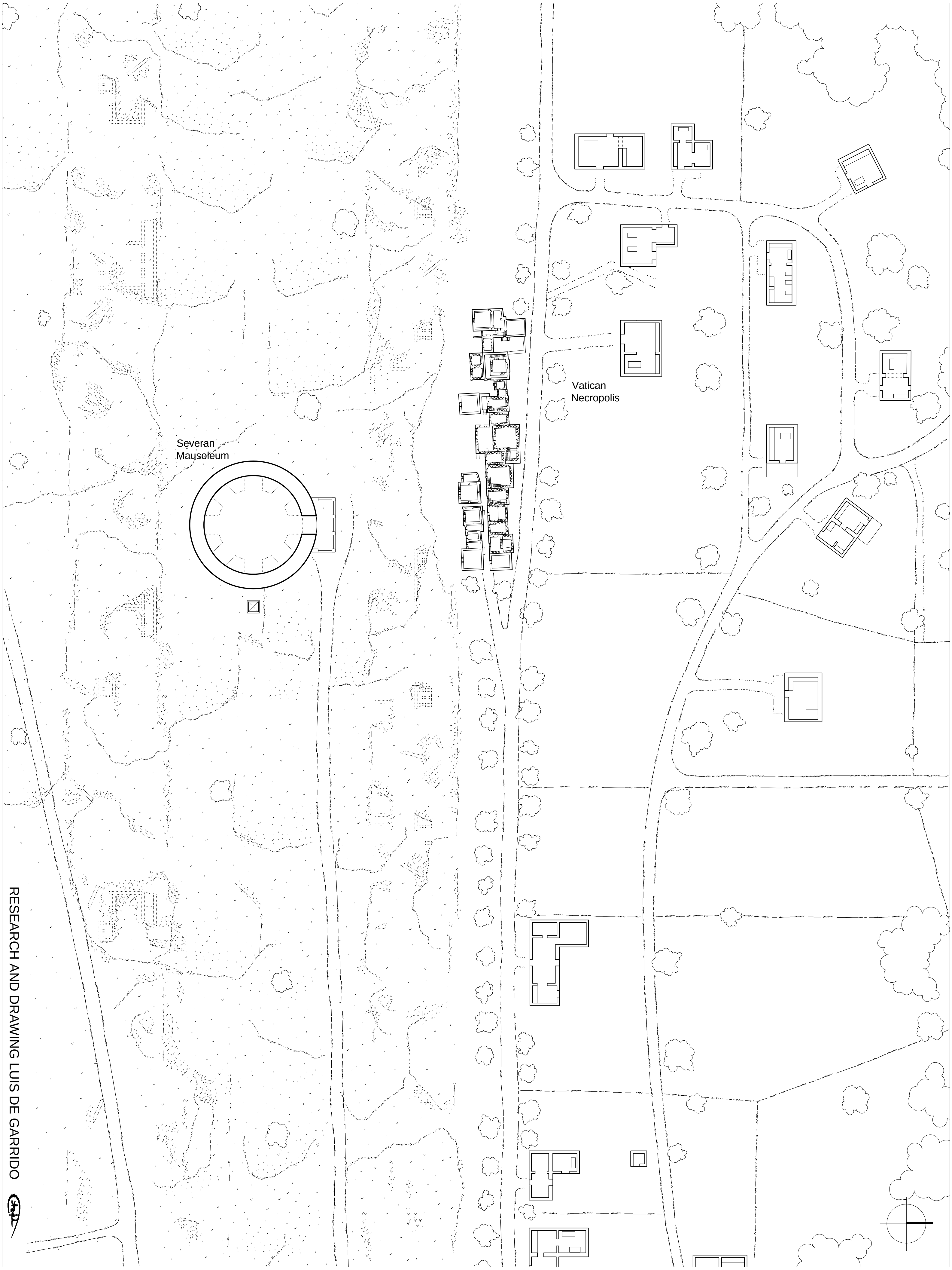


138 A.C	HYGINUS (136 - 142). ROAD CONSOLIDATION	OSP	CP3



RESEARCH AND DRAWING LUIS DE GARRIDO

217 A.C	ZEPHYRINUS (199-217). VATICAN NECROPOLIS AND SEVERAN MAUSOLEUM	OSP	CP4

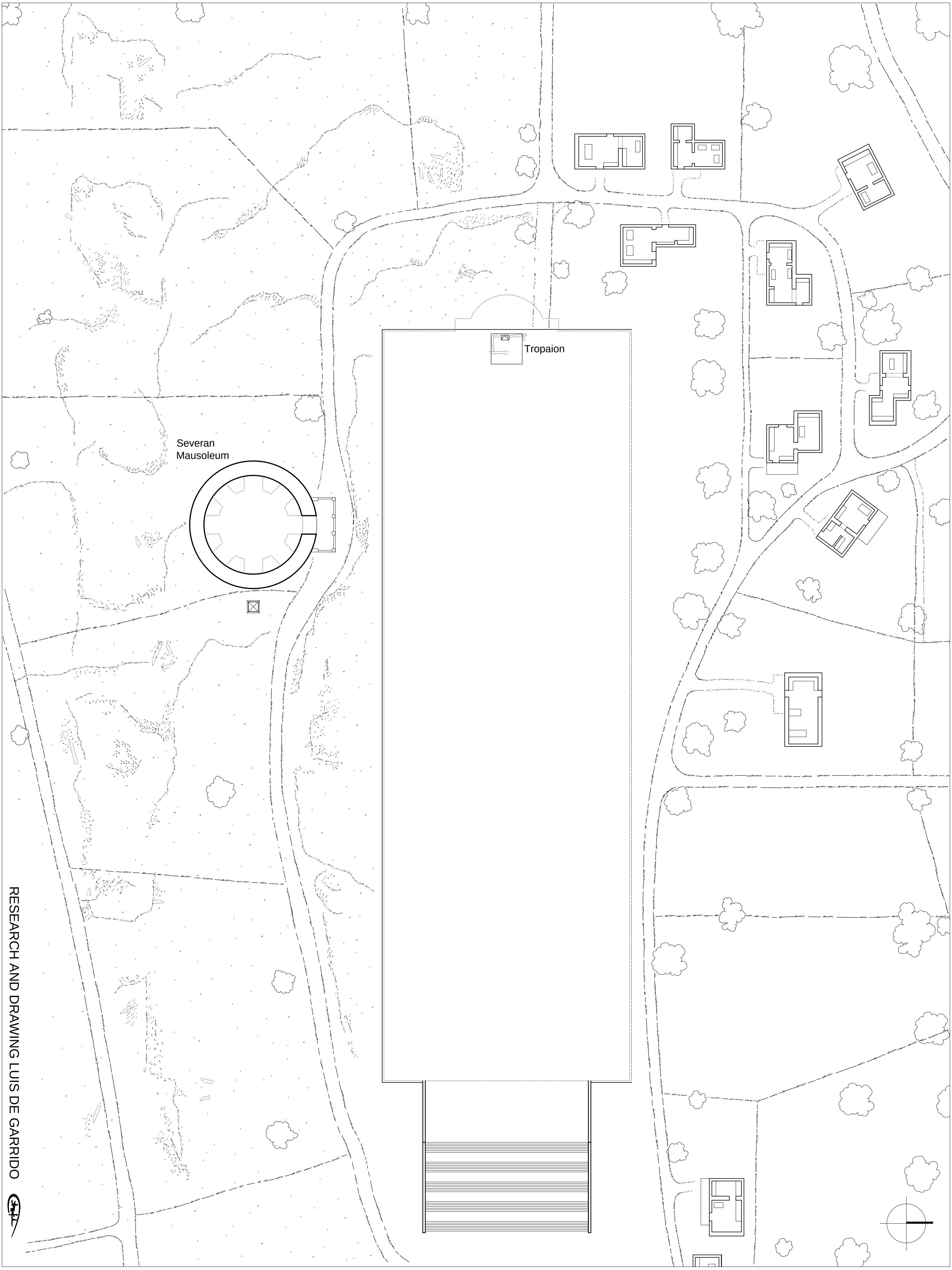


296 A.C

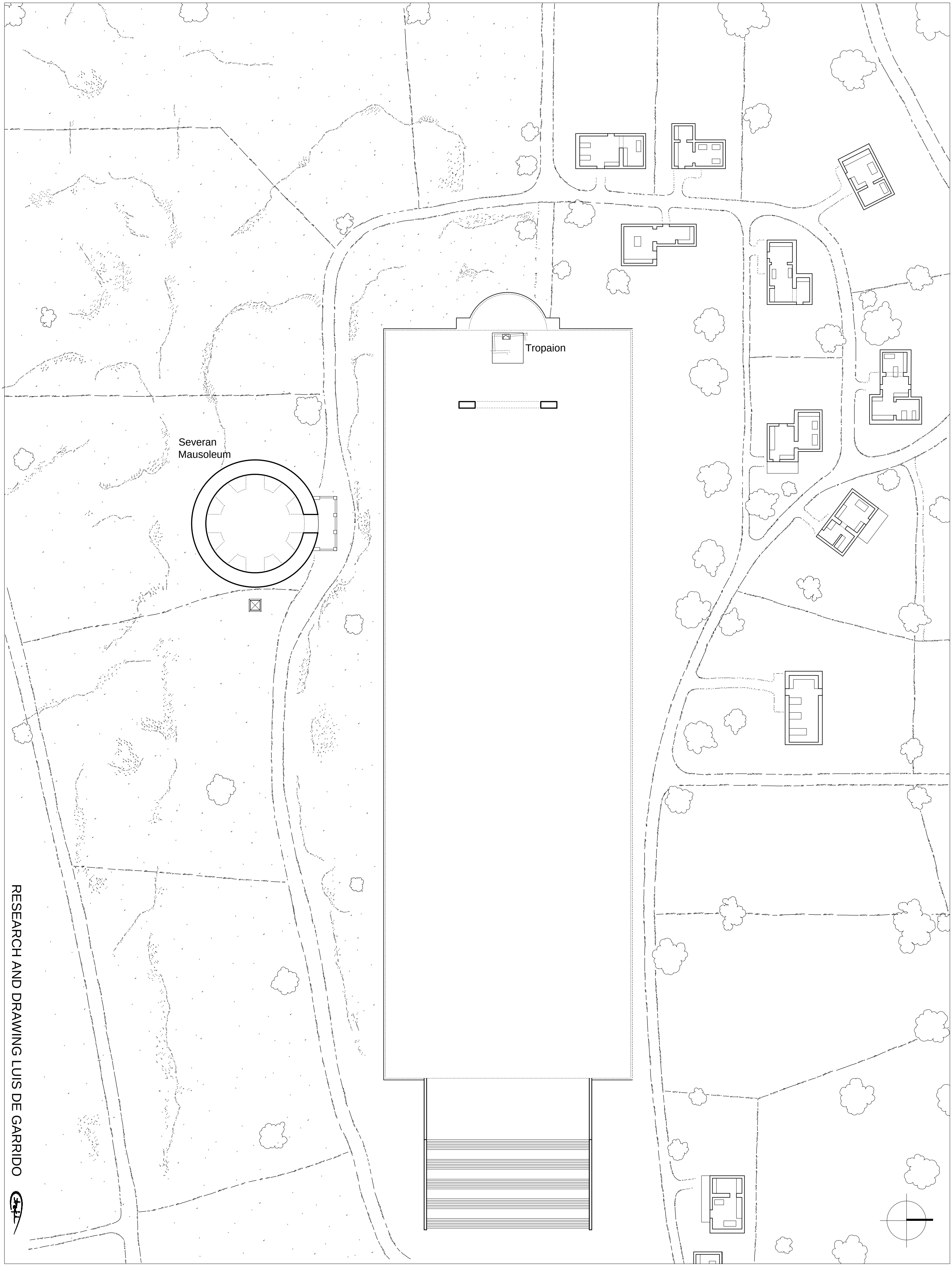
CAIUS (283-296). TROPAION REFORM

OSP

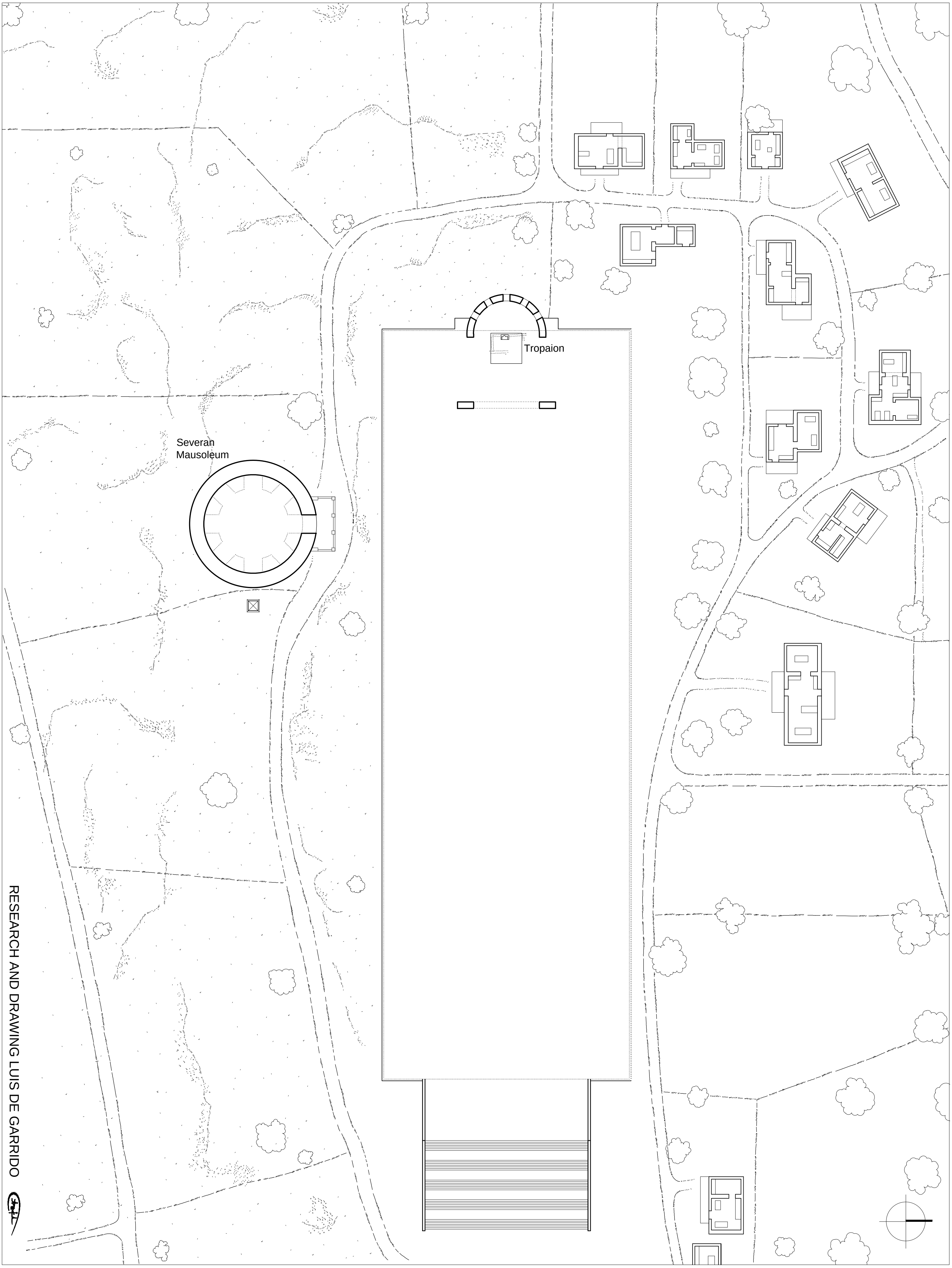
CP5



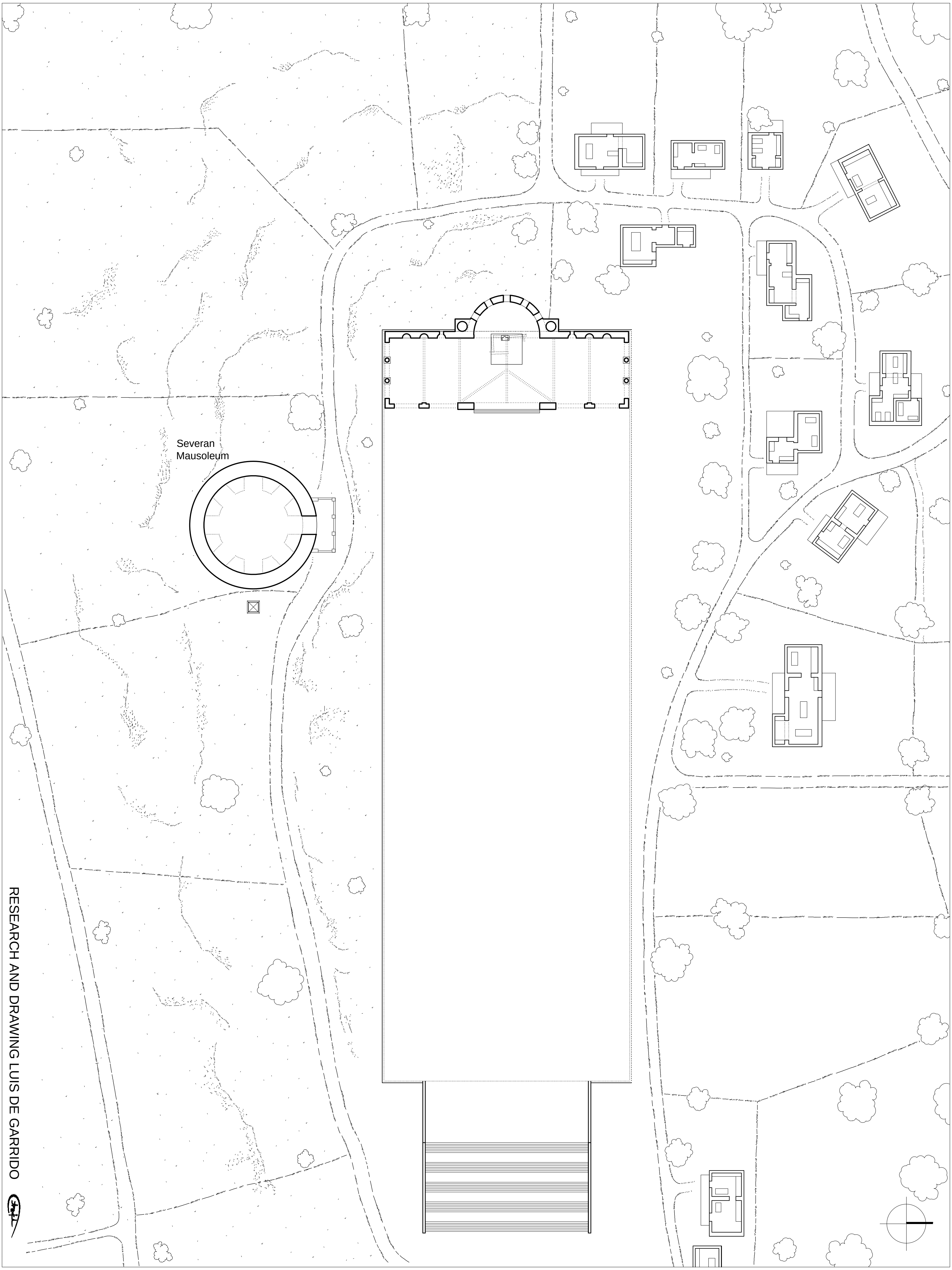
324 A.C	SYLVESTER I (314-335). CONSTRUCTION OF PLATFORM	OSP	CP6



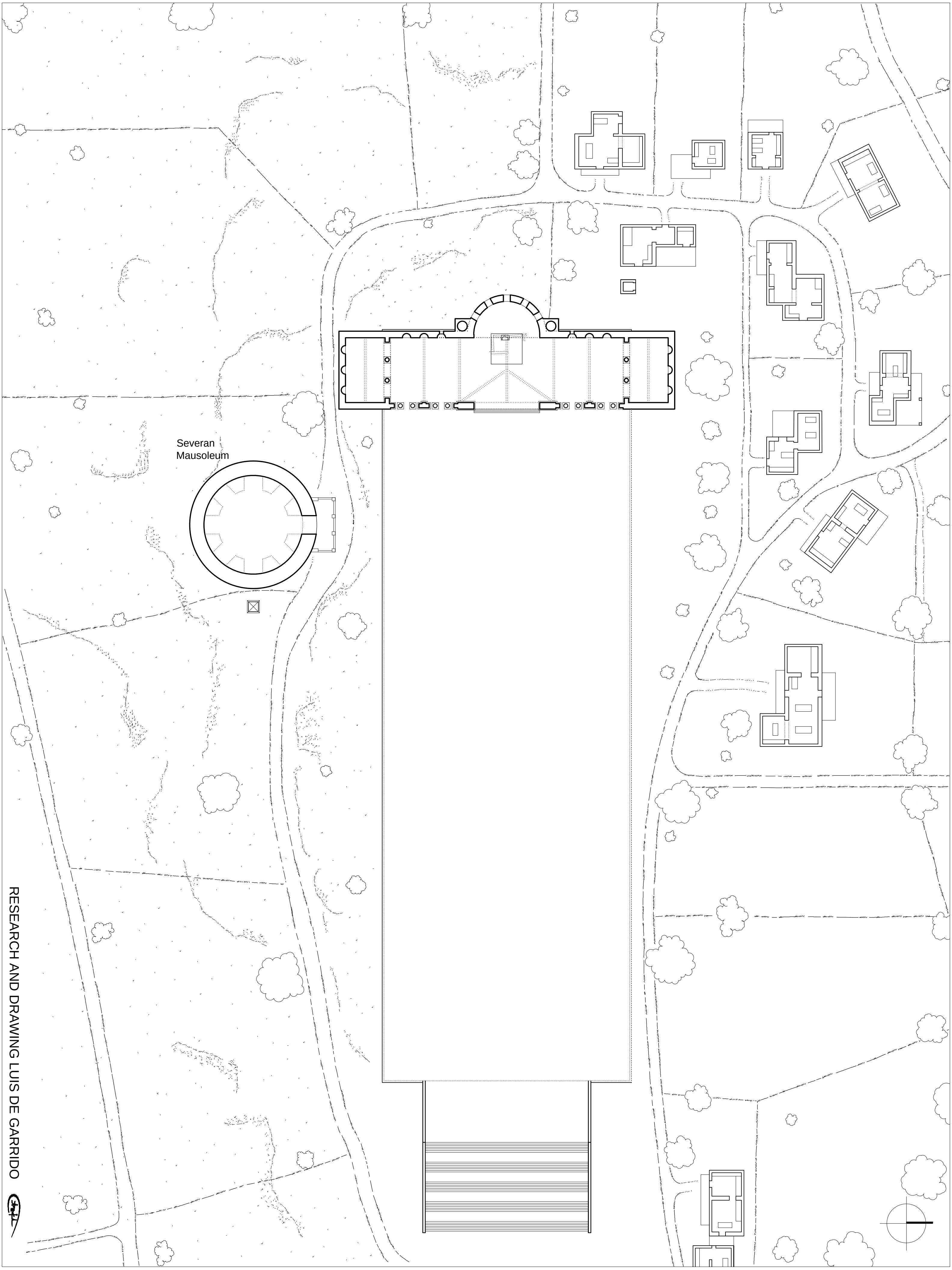
325 A.C	SYLVESTER I (314-335). CONSTRUCTION OF CONSTANTINE ARCH	OSP	CP7



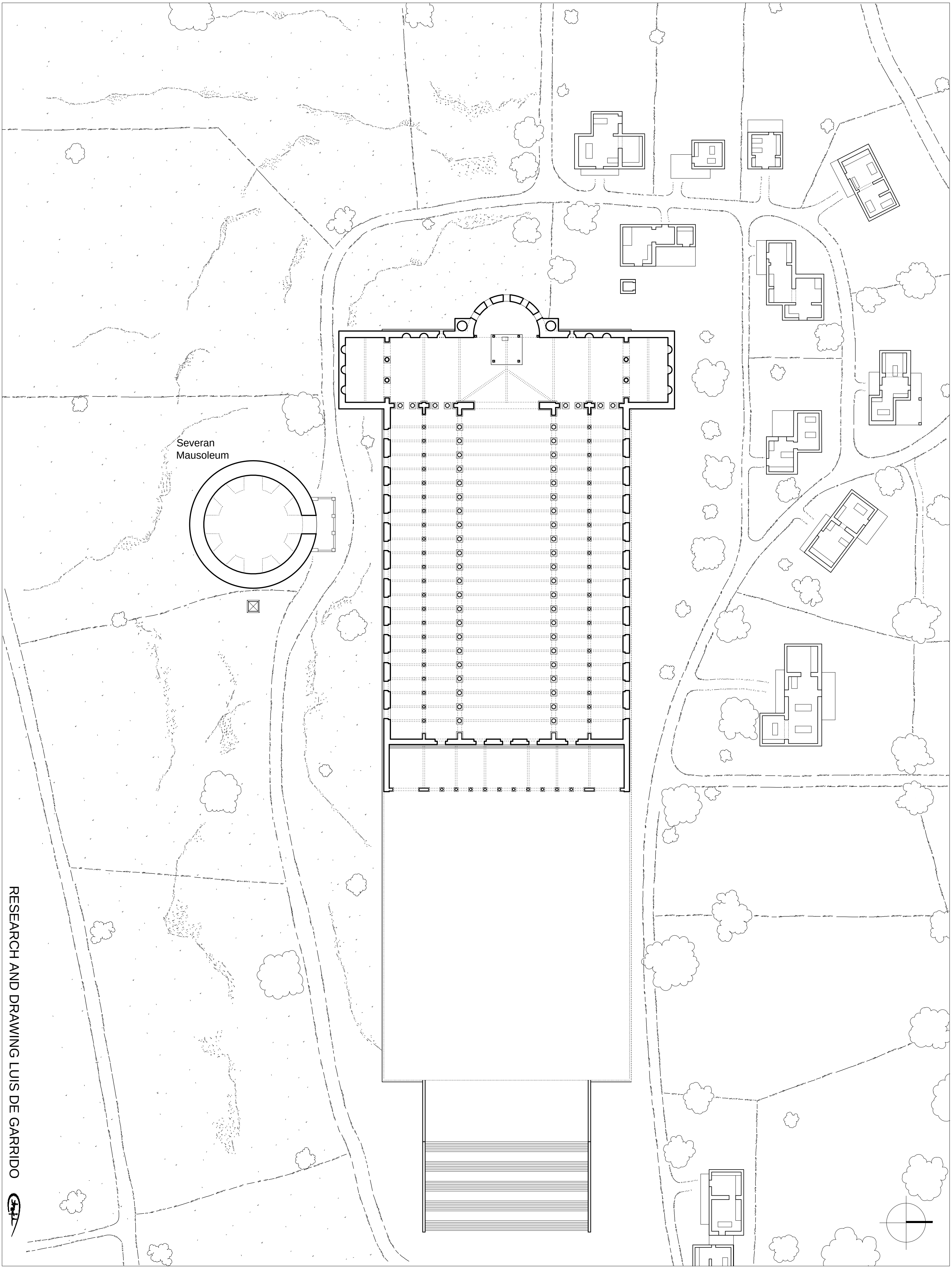
340 A.C	JULIUS I (337-352). CONSTRUCTION OF APSE	OSP	CP8



345 A.C	JULIUS I (337-352). CONSTRUCTION OF TRANSEPT	OSP	CP9

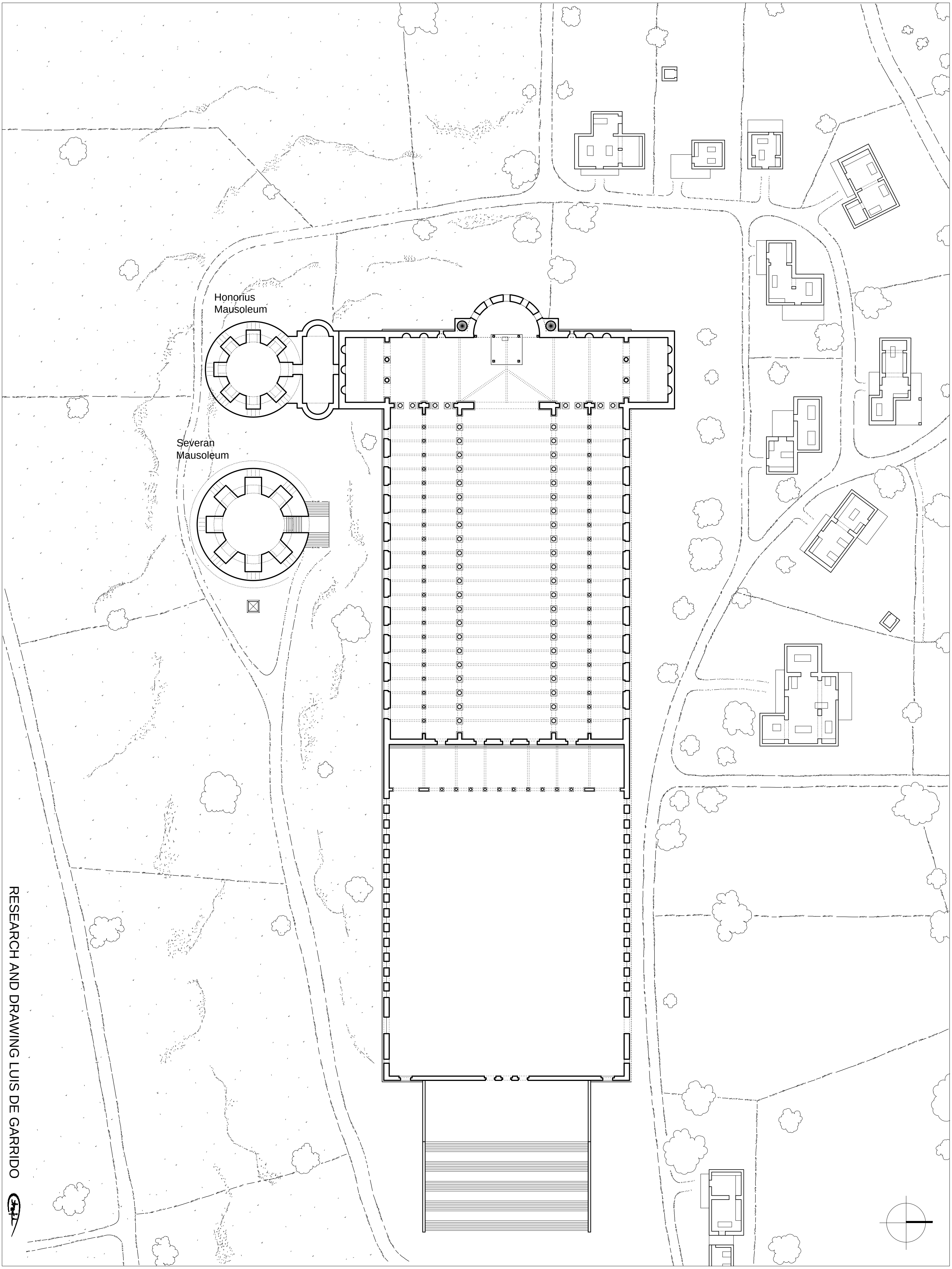


350 A.C	JULIUS I (337-352). CONSTRUCTION OF EXEDRAS	OSP	CP10

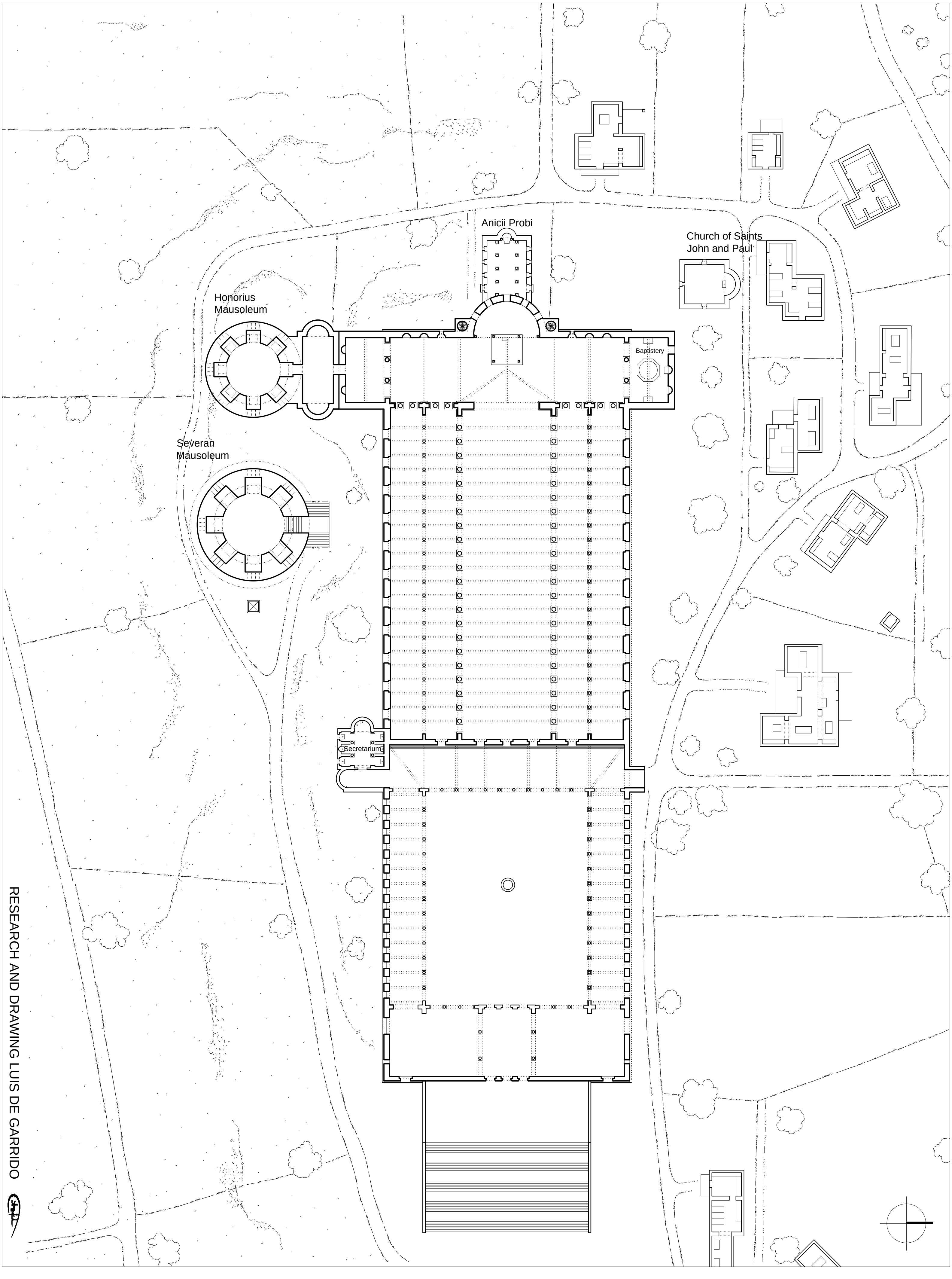


RESEARCH AND DRAWING LUIS DE GARRIDO

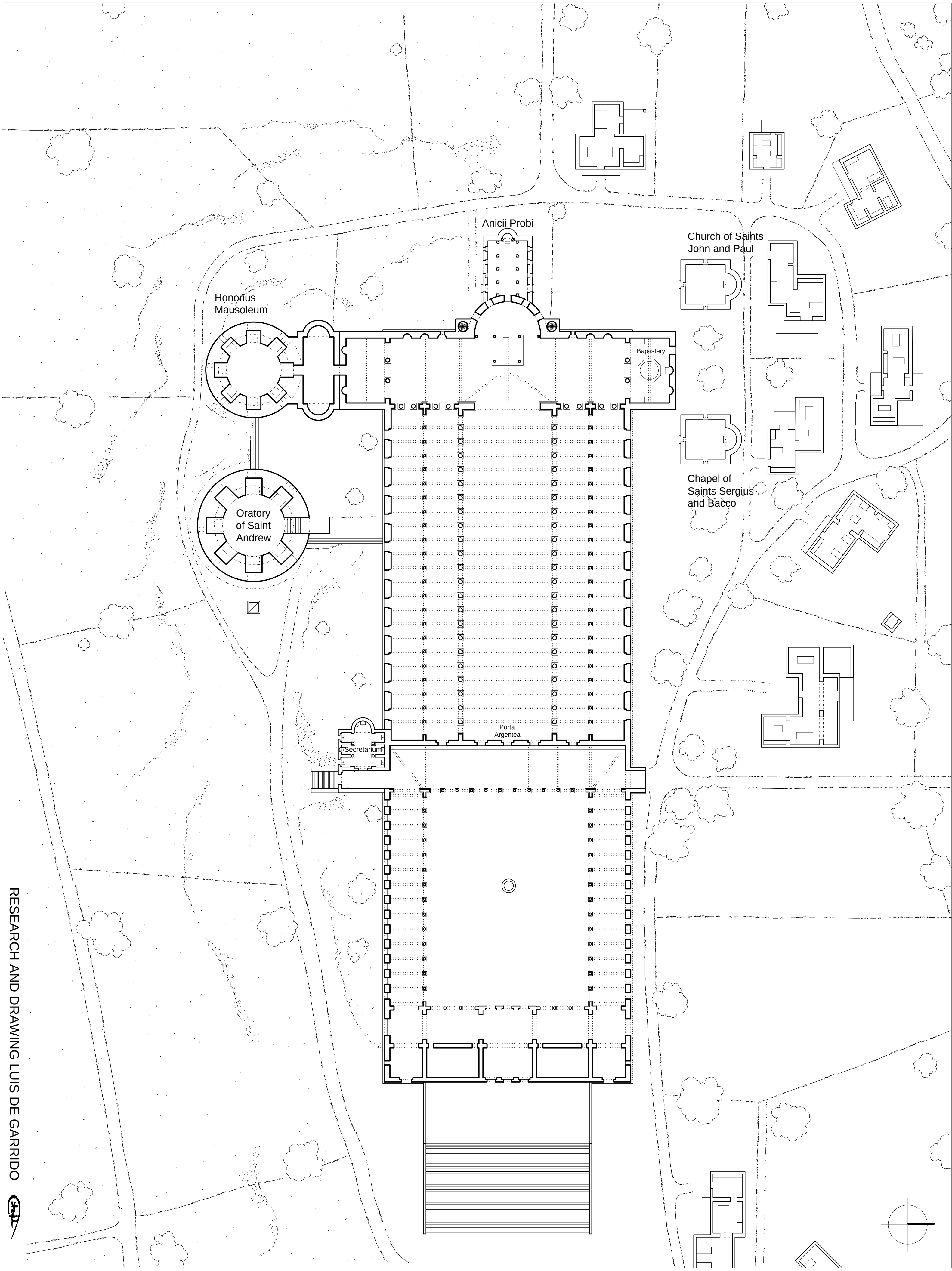
354 A.C	LIBERIUS (352-366). CONSTRUCTION OF MAIN BODY OF NAVES	OSP	CP11



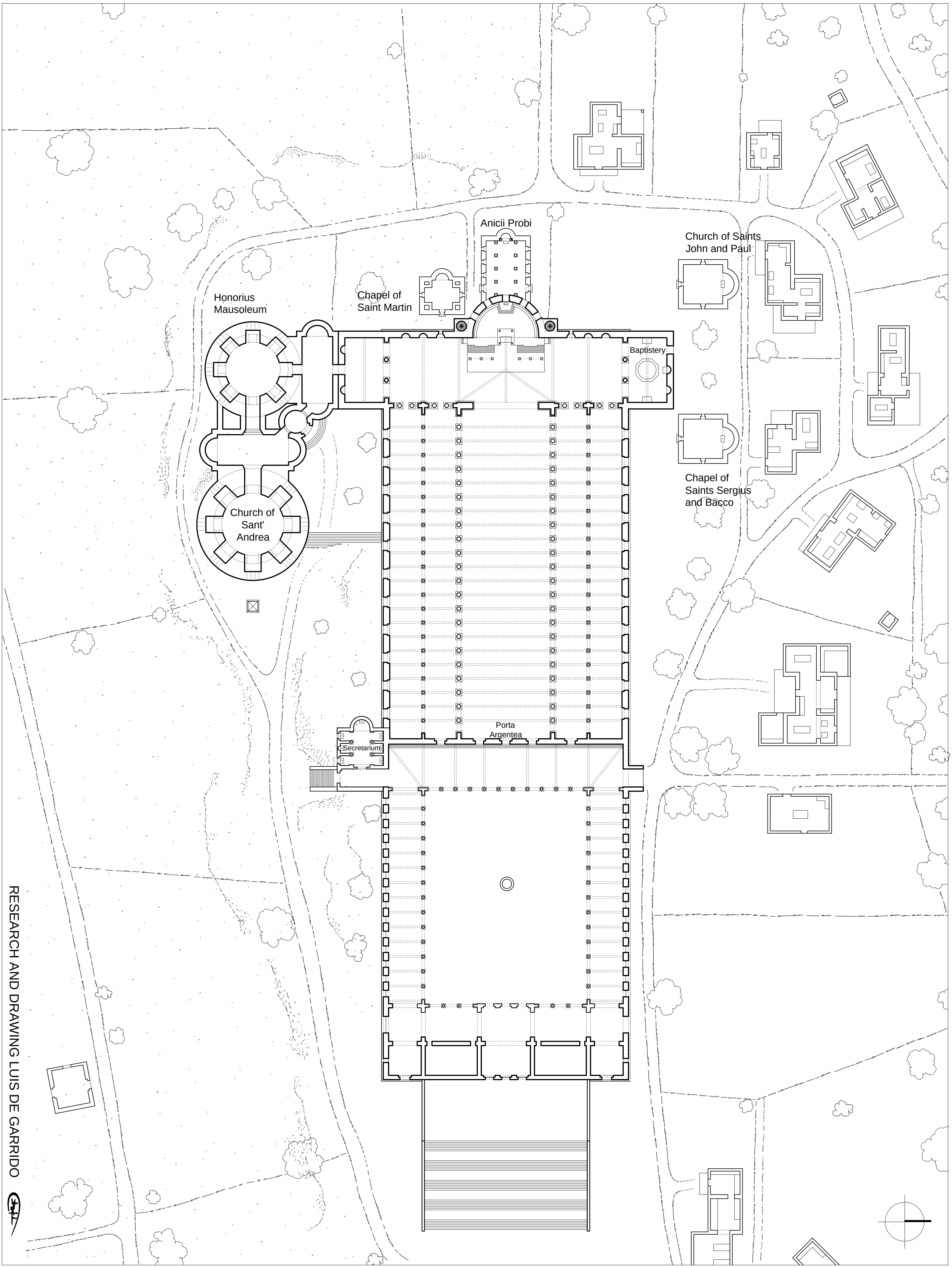
399 A.C	SIRICIUS (384-399). CONSTRUCTION OF NARTHEX AND PERIMETRAL WALL	OSP	CP12



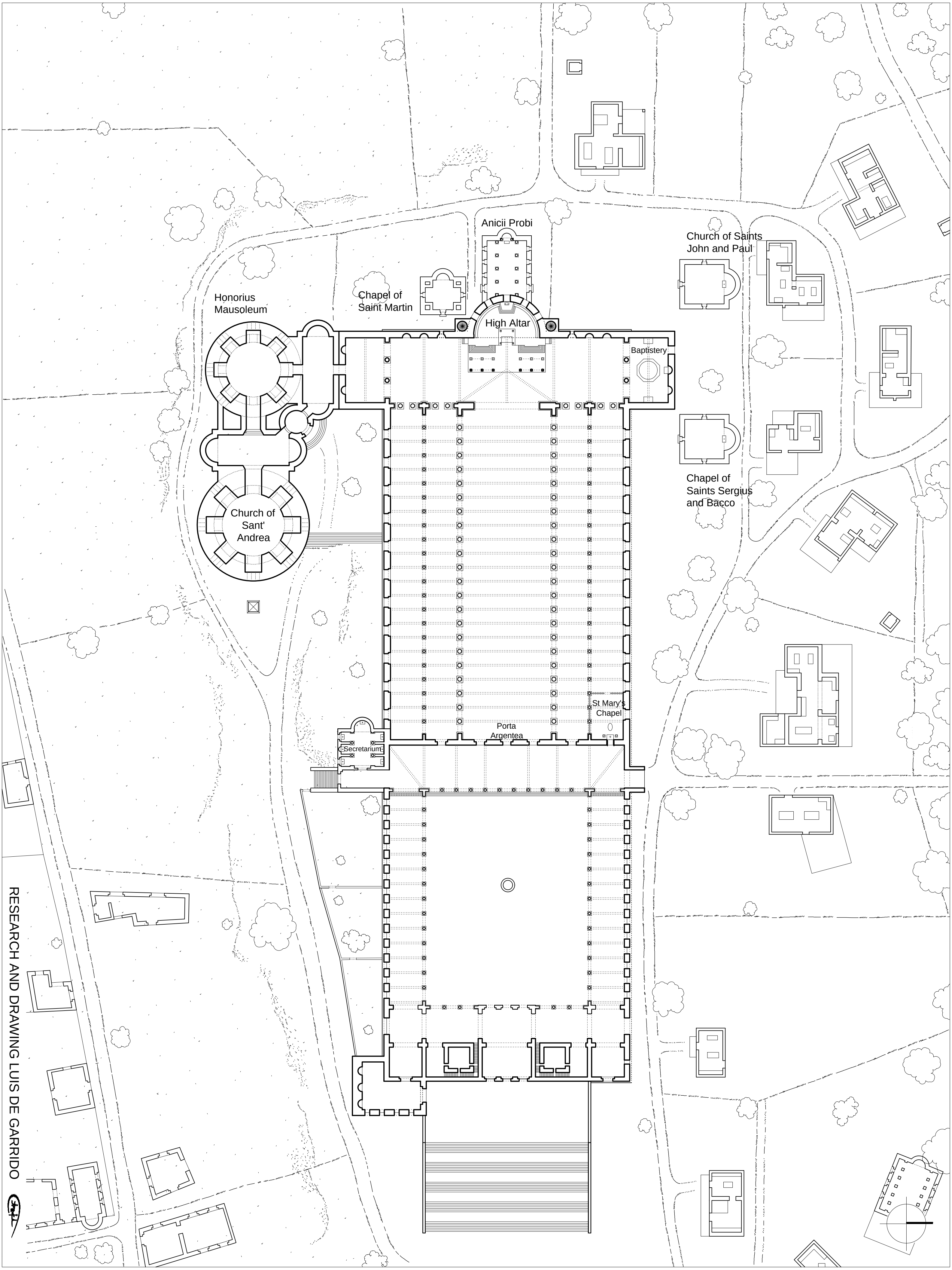
483 A.C	SIMPLICIUS (468-483). CONSTRUCTION OF LATERAL WINGS OF THE ATRIUM	OSP	CP13



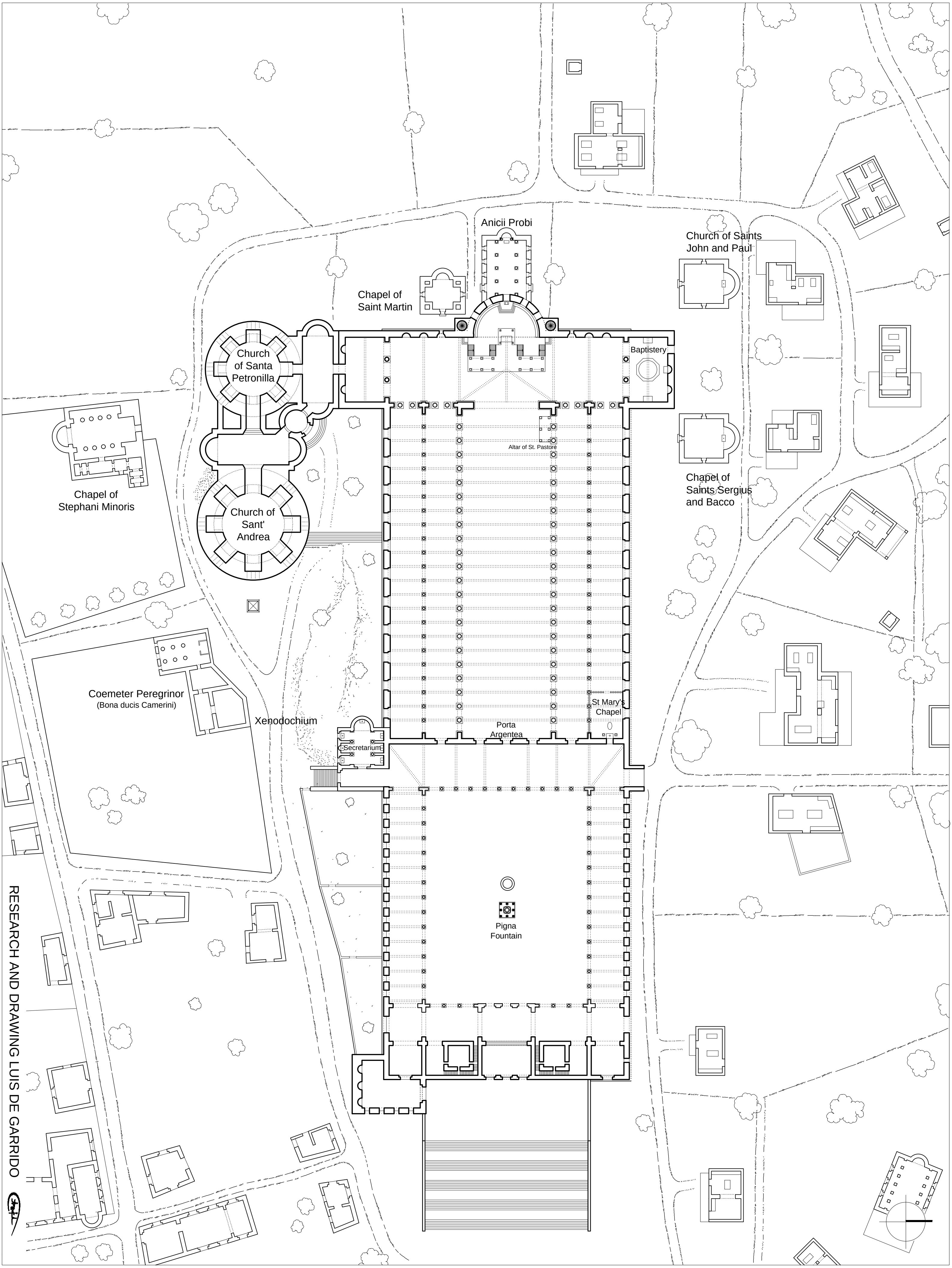
514 A.C	SYMMACHUS (498-514). OLD BASILICA OF S. PETER FINISHED	OSP	CP14



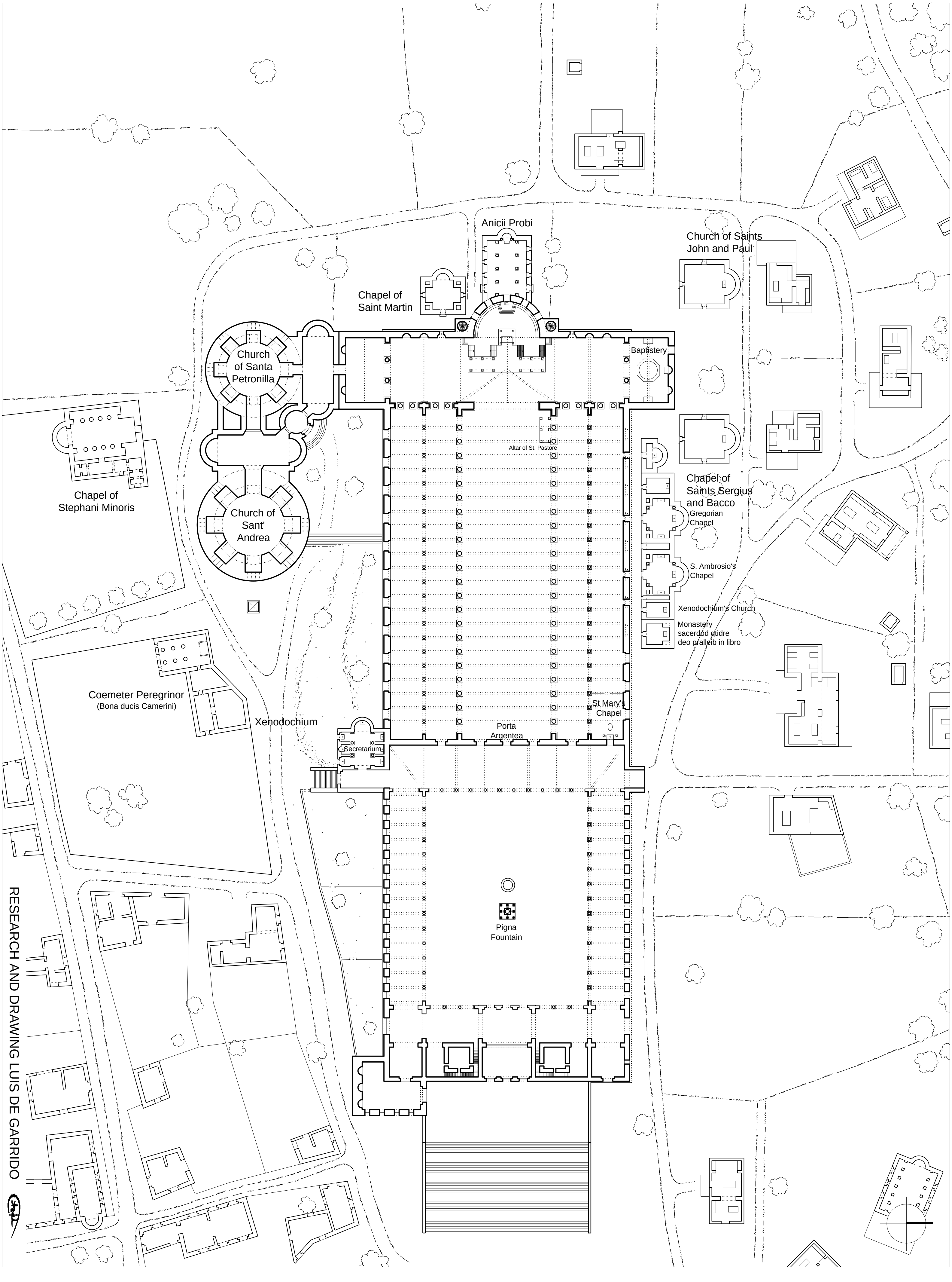
604 A.C	GREGORY I (590-604). APSE RESTRUCTURING. GREGORIAN CANOPY	OSP	E1



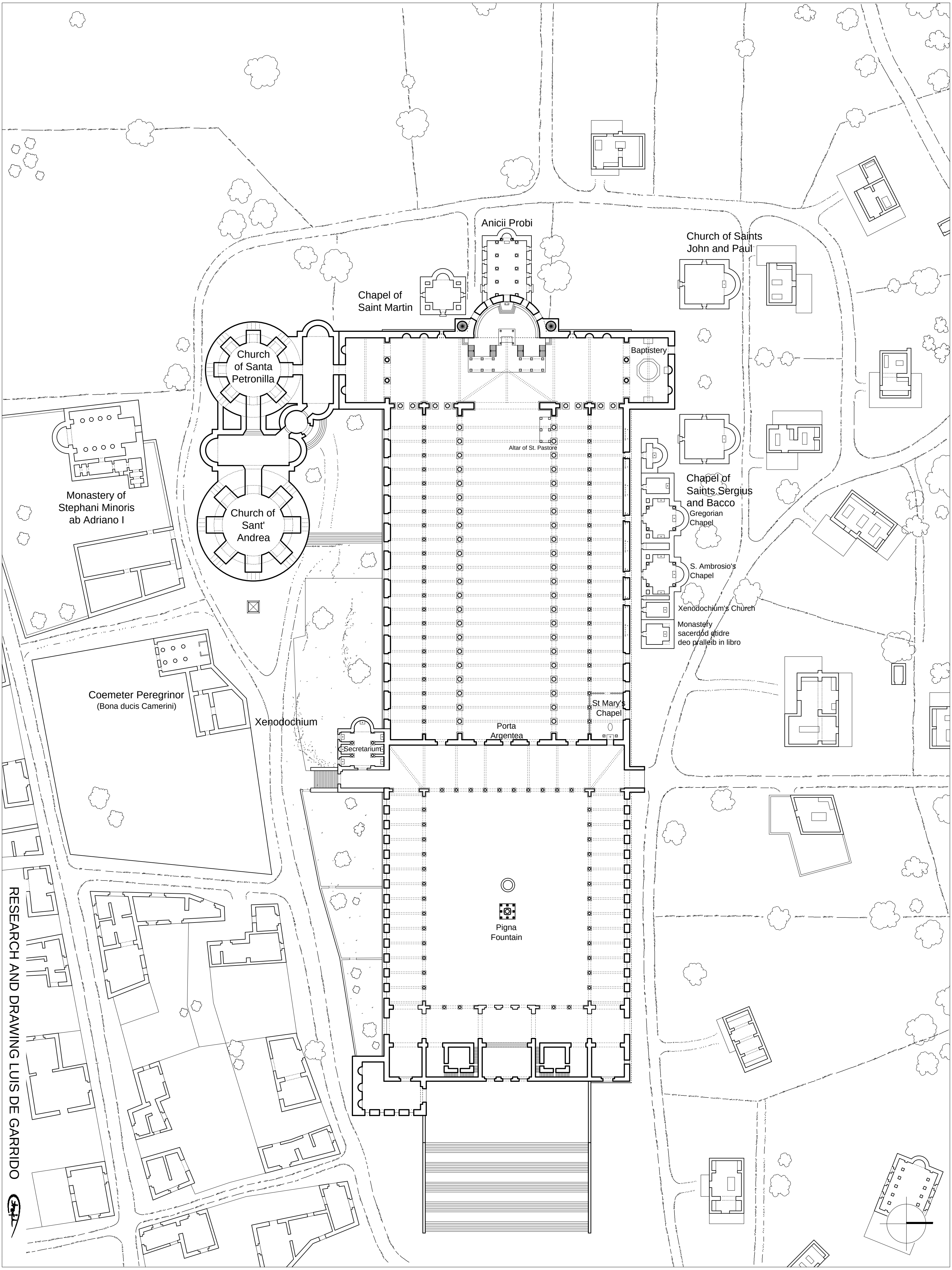
741 A.C	GREGORY III (731-741). REALIZATION OF 12-COLUMN CANOPY-PRESBYTER	OSP	E2



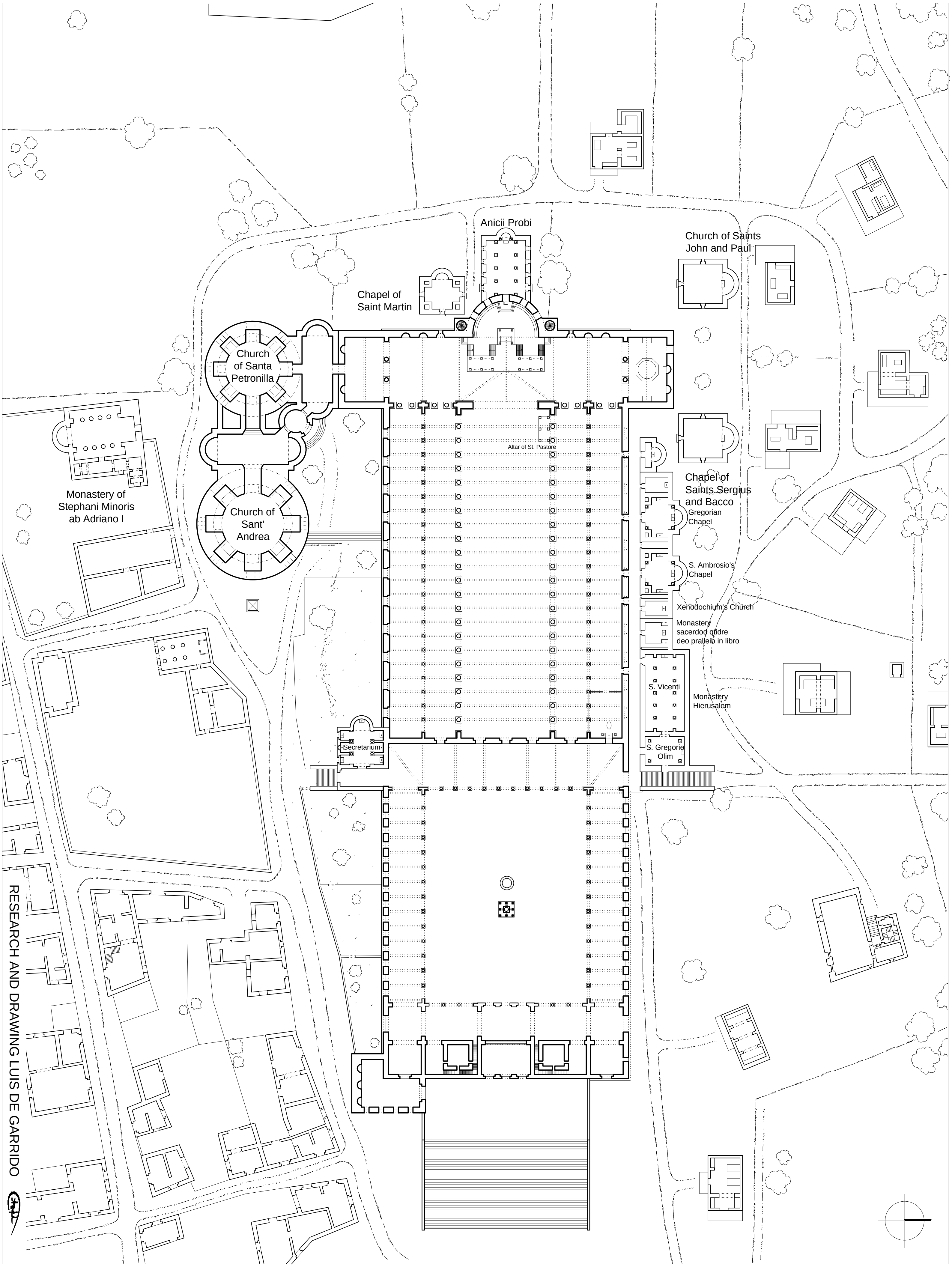
855 A.C	LEO IV (847-855). REFORM OF APSE PODIUM	OSP	E3



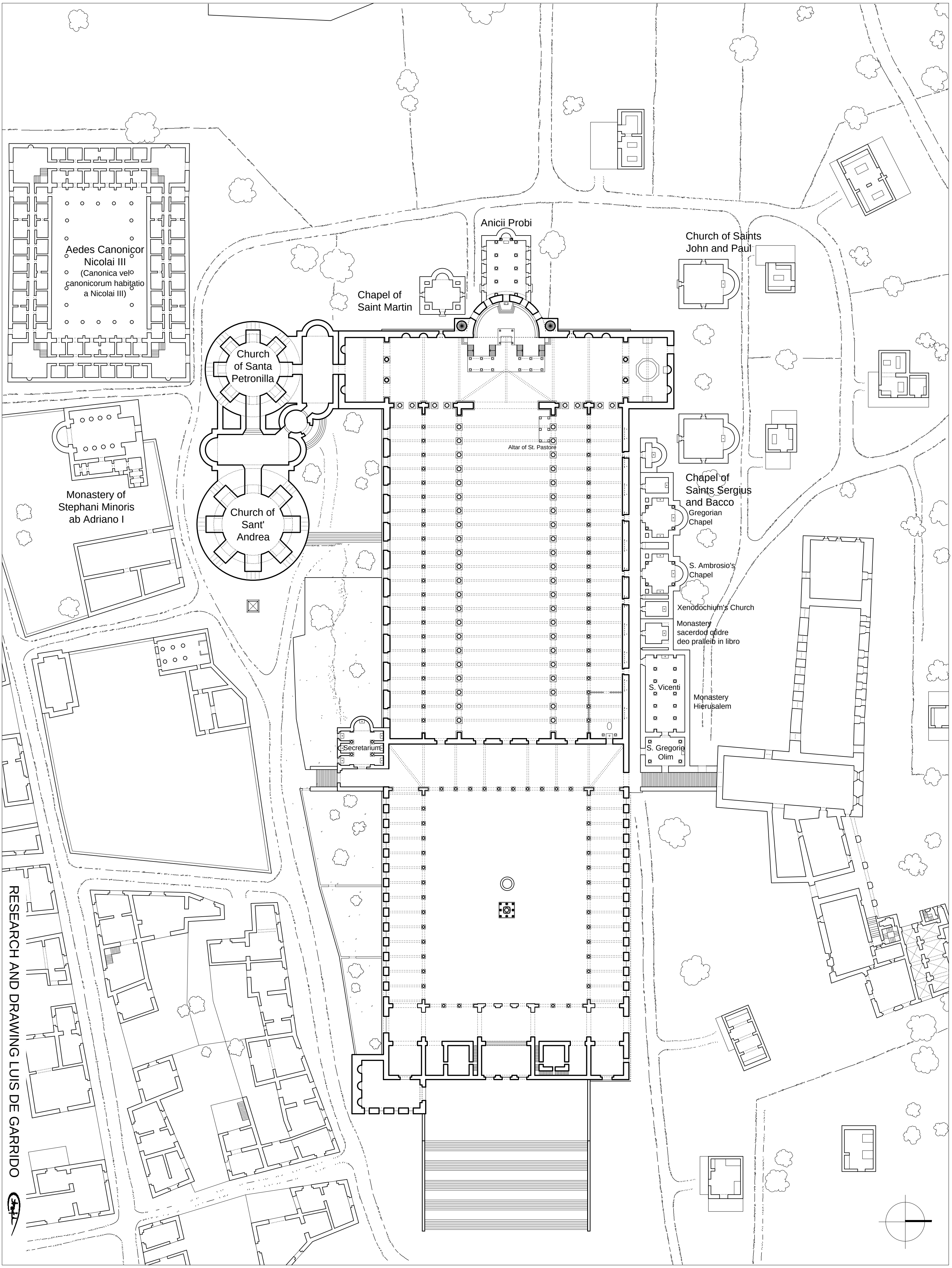
1003 A.C	SILVESTER II (999-1003)	OSP	E4



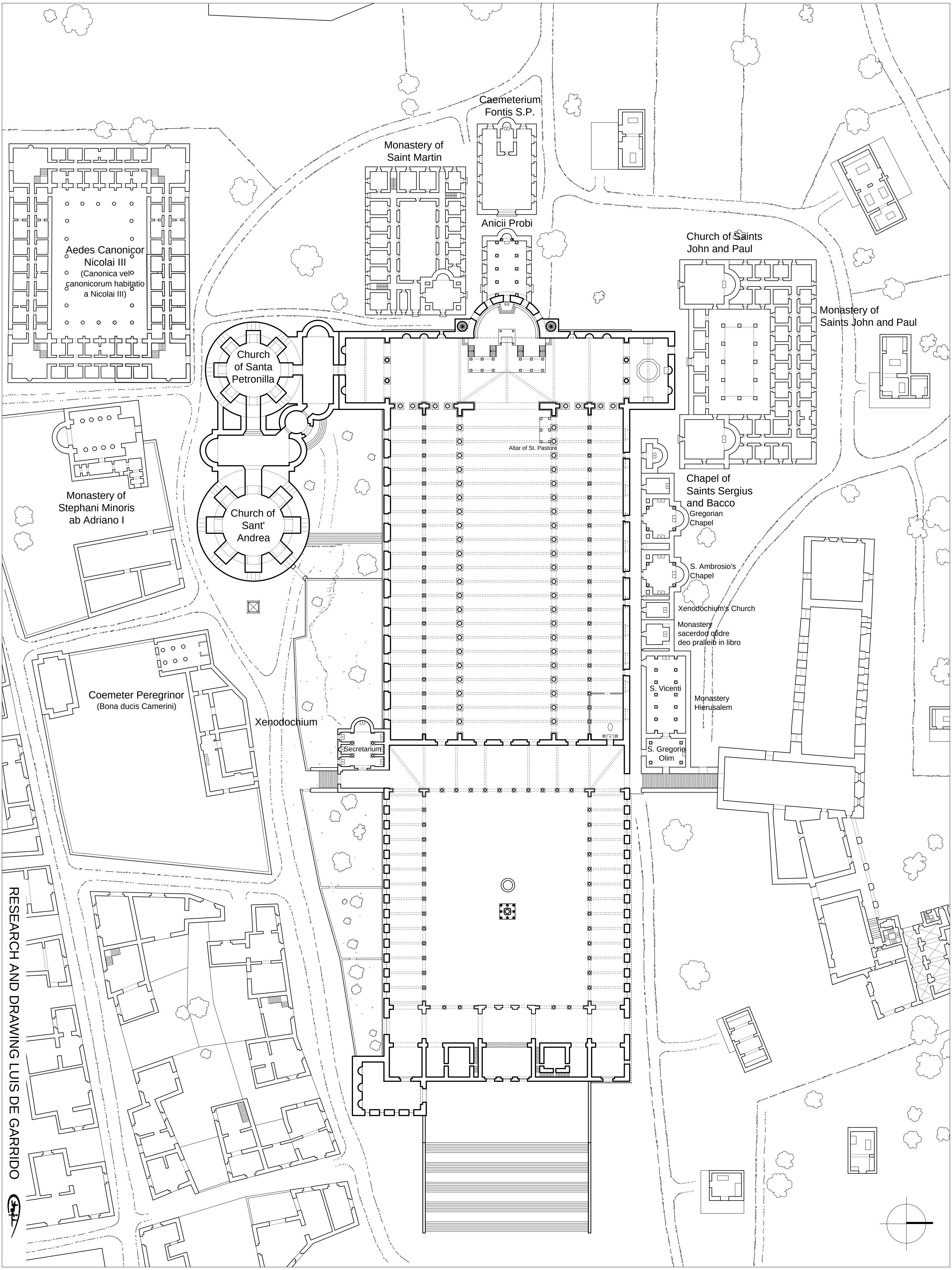
1124 A.C	CALLIXTUS II (1119-1124). CHAIR REFORM	OSP	E5



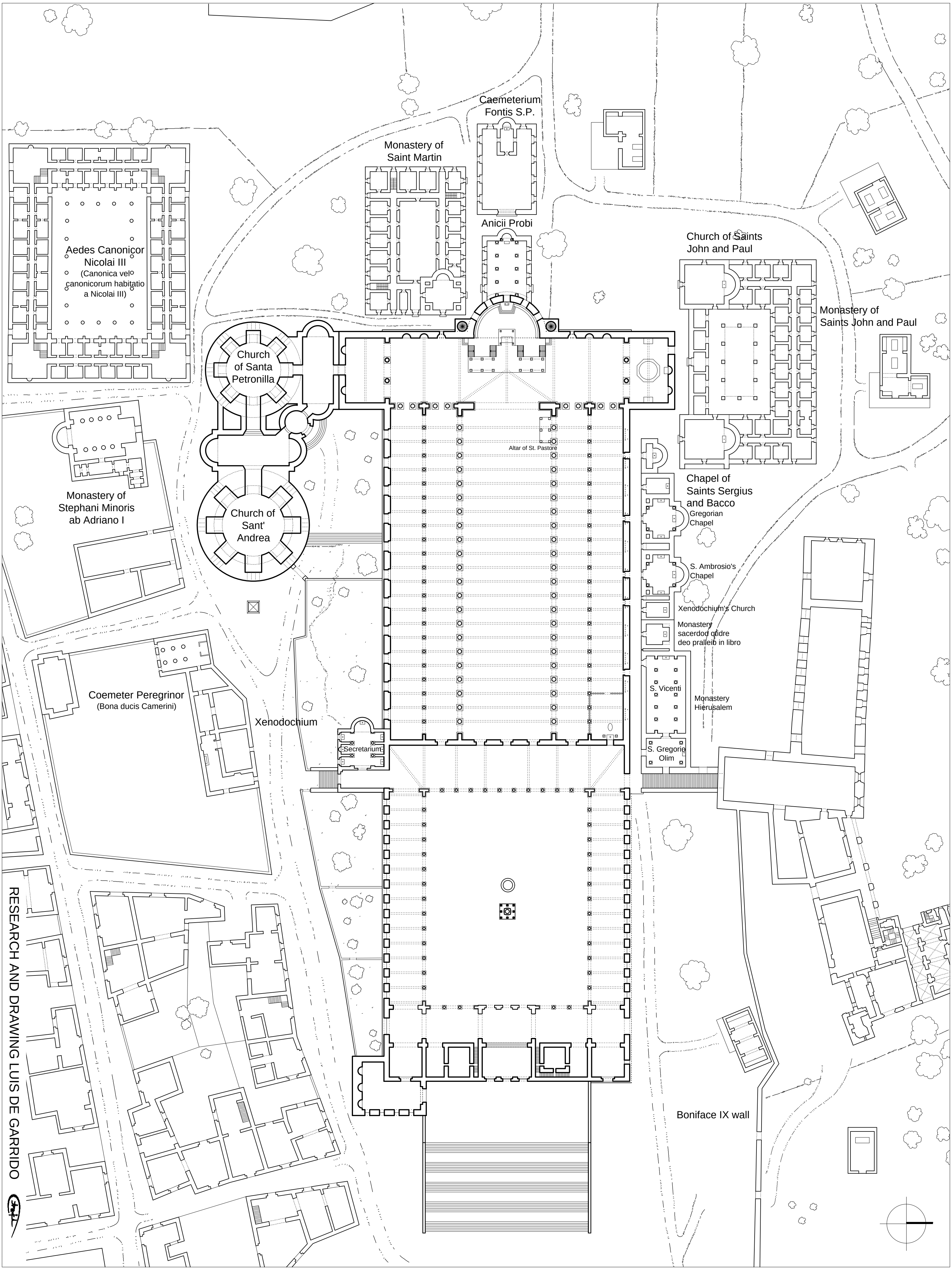
1241 A.C	GREGORY IX (1224-1241). COMPREHENSIVE REFORM AND DECORATION	OSP	E6



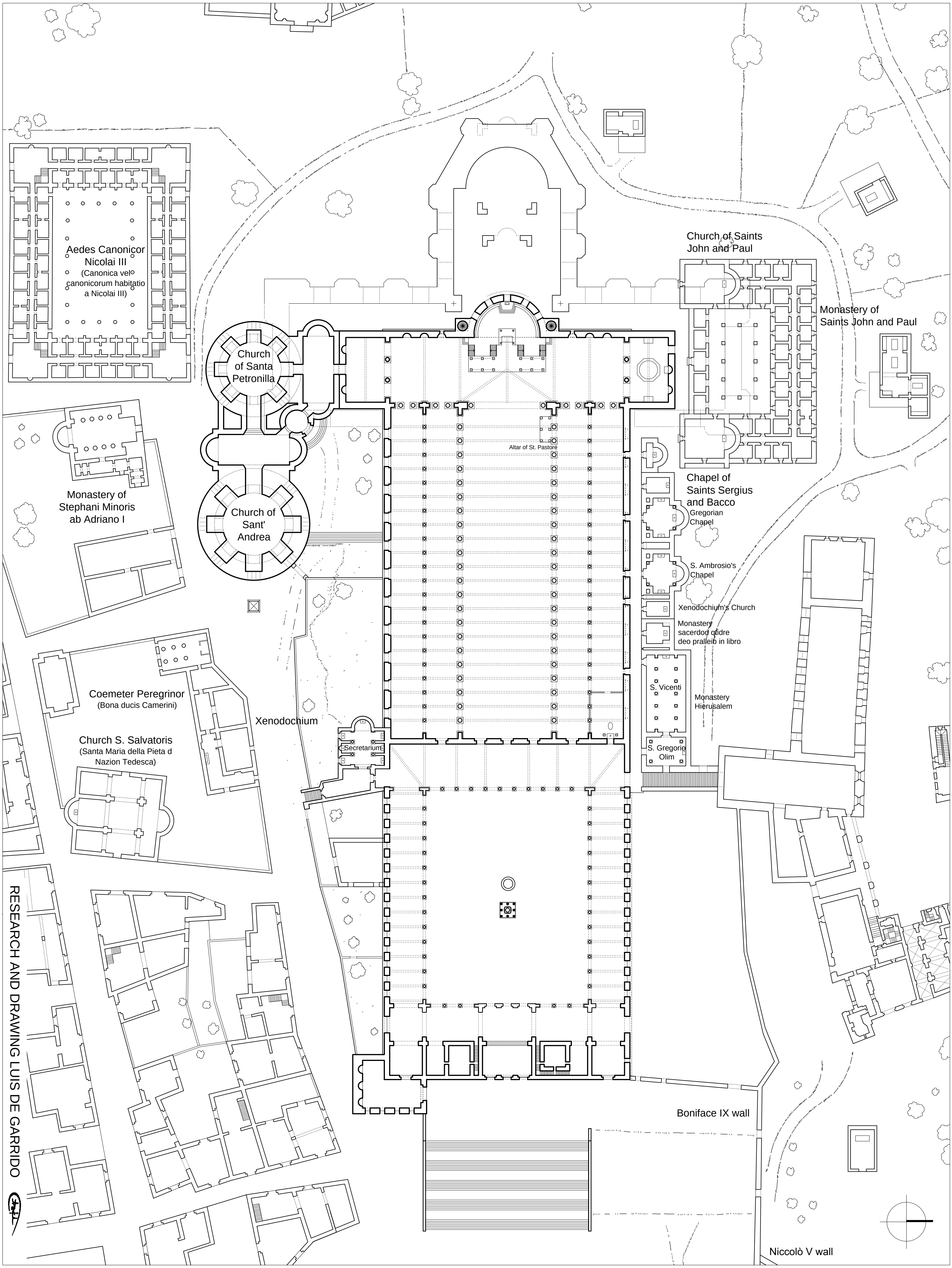
1280 A.C	NICHOLAS III (1277-1280). APOSTOLIC PALACE AMPLIATION	OSP	E7



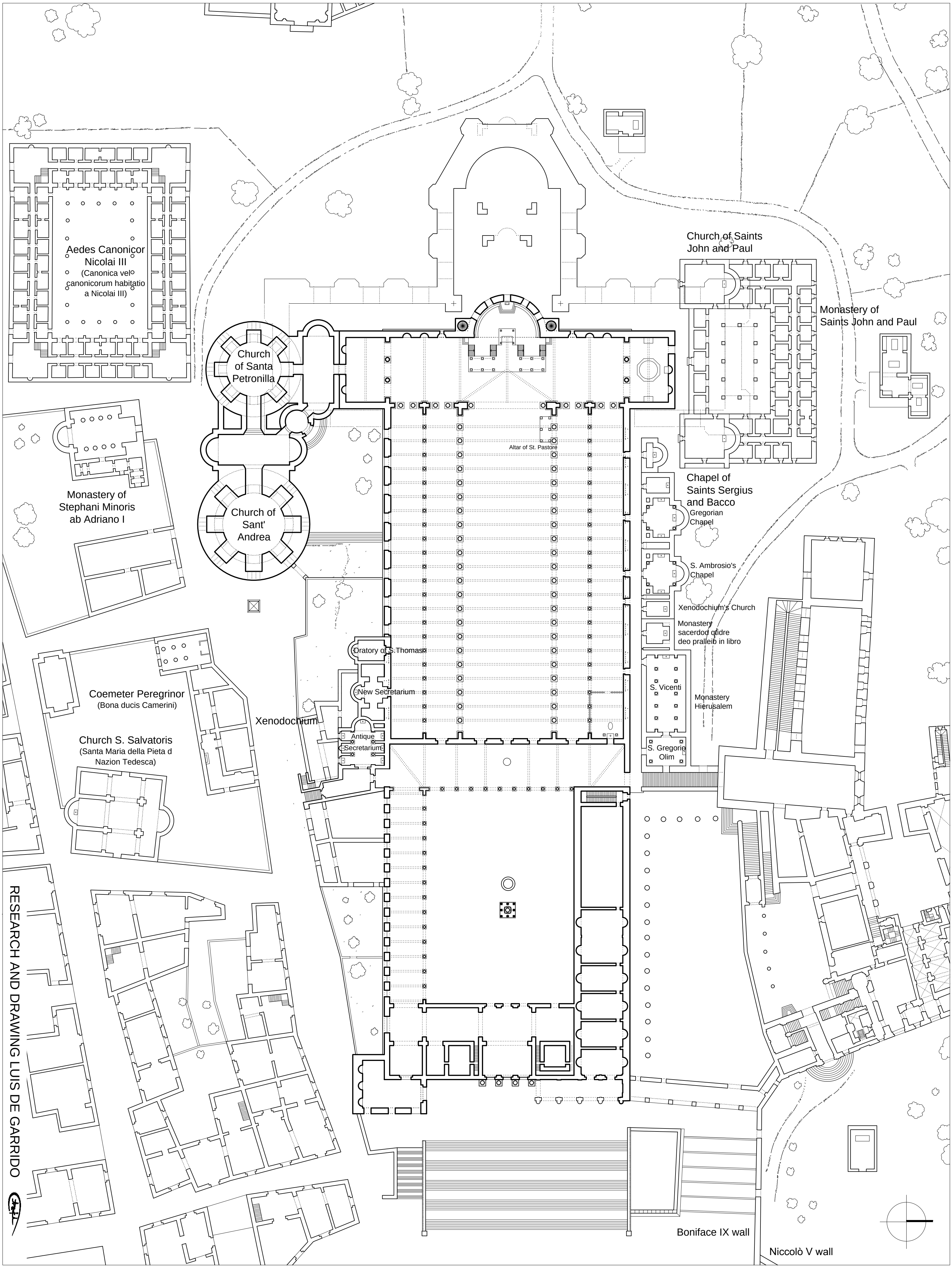
1378 A.C	GREGORIUS XI (1370-1378). NARTHEX TABERNACLE	OSP	E8



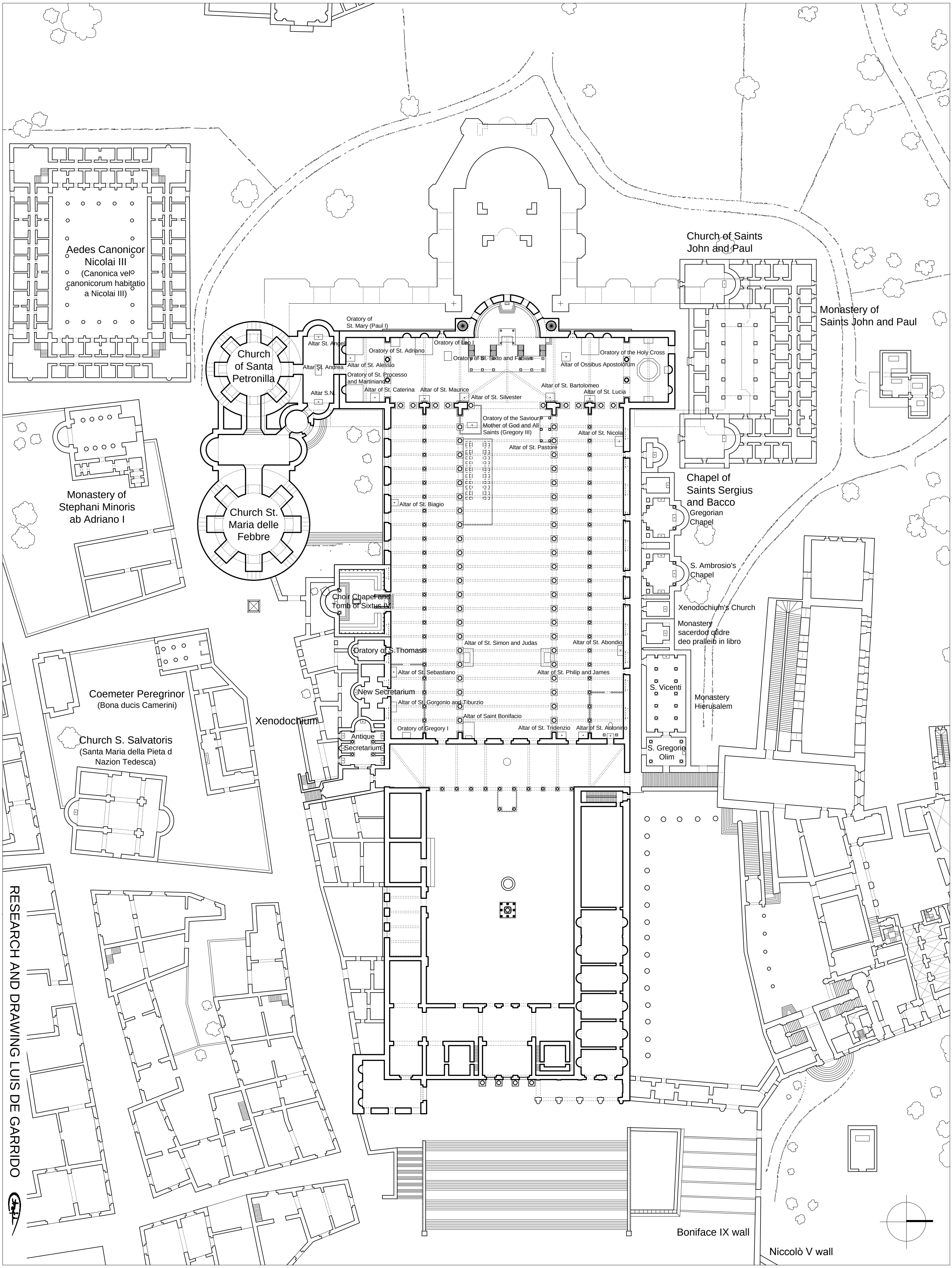
1404 A.C	BONIFACE IX (1389-1404). WALLS OF BONIFACE IX	OSP	E9



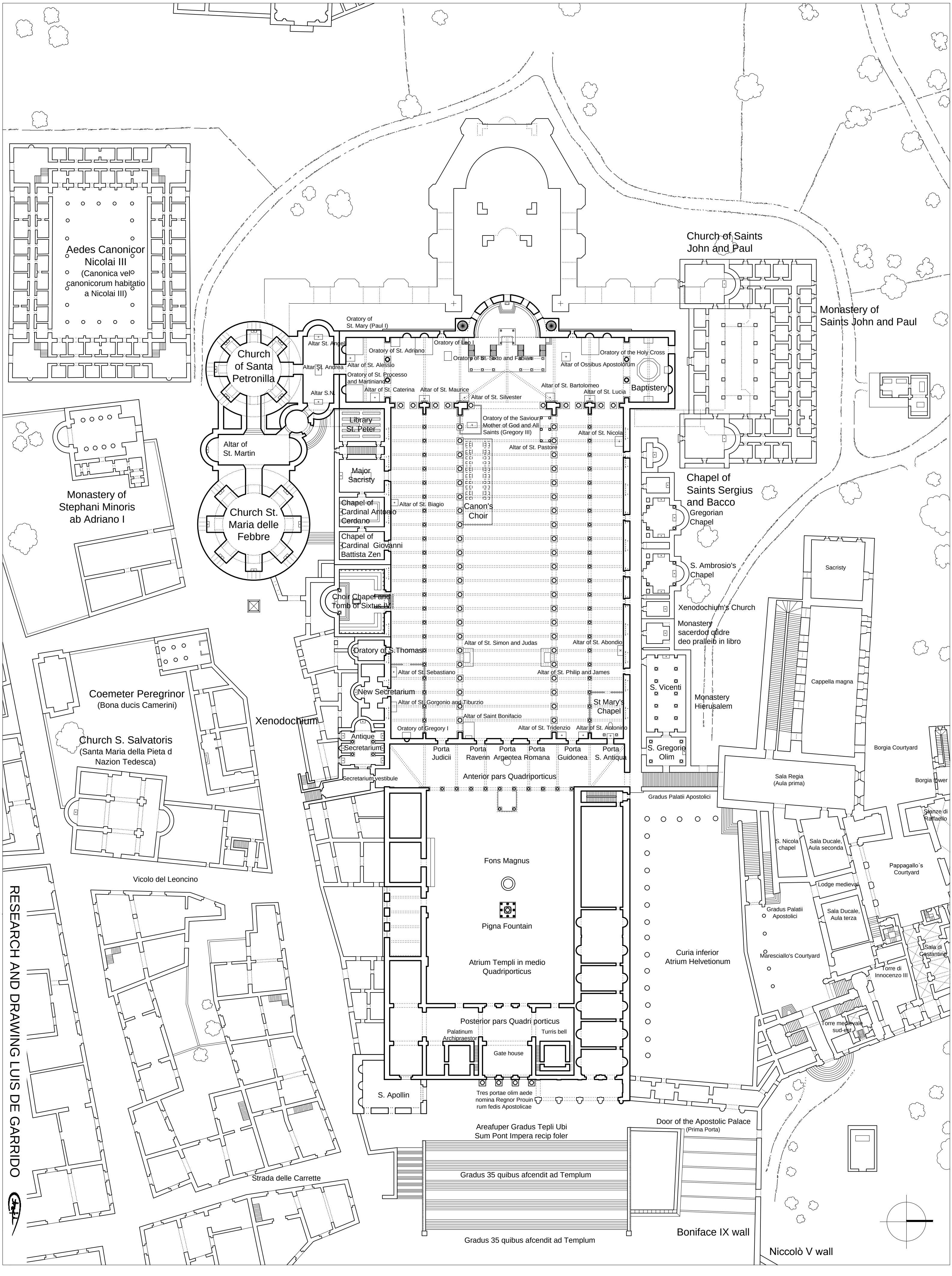
1455 A.C	NICOLAS V (1447-1455). START OF THE OLD BASILICA REFORM	OSP	E10



1464 A.C	PIUS II (1458-1464). LODGE OF BLESSINGS	OSP	E11



1484 A.C	SIXTUS IV (1474-1484). CHAPEL OF SIXTUS IV	OSP	E12



1503 A.C	JULIUS II (1503-1513). START OF THE NEW BASILICA PROJECT	OSP	E13

CHAPTER 6

“*Giudichiamo ottimale quella cosa che di per sé è fatta in modo tale da non poter essere modificata se non peggiorandola*”

Leon Battista Alberti

Chapter 6. Graphic reconstruction of the appearance of the old basilica of S. Peter, in the years 514, 1003 and 1503

6.1. Objectives

This chapter reconstructs the appearance that the old basilica of S. Peter might have had, at three key moments in its history.

1. In the year 514, when it was completely finished, including the atrium, the gate house and its side rooms.
2. In the year 1003, right in the middle of its existence, with a certain state of abandonment
3. In 1503, shortly before starting to be demolished in order to begin the construction of the new basilica of S. Peter.

To give an idea of its appearance in each of these years, the plan, the cross section through the naves, the cross section through the atrium, the longitudinal section, the east elevation, the south elevation and the west elevation have been reconstructed.

In order to carry out the reconstruction of these plans, we will start from the floor plans of the years 514, 1003 and 1503, together with the section in the year 514, reconstructed in the previous chapters. Based on these reconstructed plans and taking into account the available historical information, it is possible to reconstruct -in considerable detail- the appearance that the old basilica of S. Peter could have had in these three representative years of the three most important stages of its existence.

6.2. Reconstruction of the appearance of the old basilica of S. Peter in 514

In the last stage of the reconstructed design process, the most important architectural elements of the section of the old basilica of S. Peter are defined. As can be seen, it coincides enormously with the Letarouilly section, and also the dimensions of the most important architectural elements basically coincide with the dimensions specified in available historical references and by expert historians [1], which proves that the design process identified in this work is correct. Therefore, and based on the architectural structure of the section, and the available historical information, it is possible to reconstruct the other sections and facades.

There is no historical information that describes what the basilica looked like when it was completely finished in 514. However, there is quite a lot of graphic information on how it looked throughout the 16th century. And with this information it is possible to deduce the appearance that it could have had in the year 514.

The methodology followed is based on rationally reconstructing the evolution of the architectural elements of the old basilica in reverse, based on the available historical information.

On the one hand, the geometric and dimensional structure deduced in this work serves to correctly dimension and proportion the available historical graphic information. In this way, it is possible to reconstruct to scale, and quite accurately, what the old basilica looked like before it began to be demolished in 1506 [2].

On the other hand, there is a set of historical references that describe the most important actions that were carried out in the old basilica, as for example, the inclusion of triforiums in the clerestory windows, the closing of the arches of the gate house to create three rectangular doors, etc. Therefore reversing the sequential actions that were carried out throughout history, it is possible to induce the appearance that the basilica could have had in the year 514.

Take, for example, the case of the openings in the main facade of the S. Peter square. The appearance of the three entrance doors is known in various drawings and paintings, and based on the methodology described in chapter 4, they can be dimensioned quite accurately. Once dimensioned, the 4 granite columns and architraves arranged by Nicholas V, in the year 1449 [3] can be eliminated, and in this way reconstruct the appearance that the facade might have had prior to the intervention. Undoubtedly this appearance coincides with what the facade may have had after the times of Hadrian I (772-795), when the old original Roman arches were closed, *tutto sesto*, and an architraved portal, with three bronze doors, was built [4]. In the same way, by eliminating the closing of the arches, the architraved portal and the three bronze doors, the three original Roman arches can be obtained, perfectly dimensioned.

The same can be said regarding the windows of the main facade. Over time the old Roman windows were framed, lengthened, decorated with pediments, etc. So simply by reversing the process, and taking into account the historical references available, the aspect they had to have in 514 can be deduced.

As a result of applying this methodology, it has been possible to reconstruct the appearance that the old basilica had in 514, and which basically coincides with the appearance that the architectural project might have.

6.2.1. Floor Plan of the old basilica of S. Peter (Layout FP-514)

The plan layout of the old basilica of St. Peter and its surroundings, in the year 514, was already reconstructed in *stage 13* of the previous chapter. It is included here again in order to have an overview of the appearance that the old basilica of St. Peter could have had in this year. In order to be able to measure properly in the deduced planes, the conversion factor between *roman feet* (*pes*) and *palmi* must be taken into account.

6.2.2. Cross section of the old basilica of S. Peter (Layout CS-514)

In the section the first thing that is appreciated is the complexity of the levels of the terrain around the old basilica of S. Peter. To reconstruct the ground levels, several studies have been taken into account, among which the works of Liverani stand out [5].

As mentioned, the hill on which the foundation platform was built had a gentle upward slope in a westerly direction (Fig. 6.1) and a steeper slope in a north direction (Fig. 6.2). Therefore, the ground level is completely different at each point on the platform. Usually the east face (at the beginning of the great staircase) and the south face (at the height of San Andrea and at the height of the Narthex) are taken as references for the slopes, and reference levels.

To provide an idea of the unevenness of the terrain with respect to the new basilica Liverani provides some important indications, taking as a reference the current Piazza dei Protomartiri Romani (near the old *Severan Mausoleum*). In Caligula's time (37 AD) the terrain was about 9 m. deep. In the time of Caracalla (200 AD) the terrain was filled in to create a flat surface for the circus, so the ground level was about 6 m. deep. In the year 1200 the terrain rises (as a result of the fillings made to consolidate the roads) and it was about 3.5 m. deep. Finally, in the year 1500, the terrain was about 2 meters deep with respect to the current level of the square.

Obviously, the levels will change from one point to another, so the dimensions shown in this chapter (and in the previous chapter) are always approximate, with an estimated error of +/- 3 *palmi*.

The section shows the different levels of the terrain in the years 37, 200, 500, 1000-1200 and 1500. It should be noted that Pope Symmachus (498-514) filled in the terrain in the northern part of the *Severan Mausoleum*, so the section shows the level of the natural terrain in the southern part, and the level of the compacted terrain in the northern part.

In general, it can be said that at the height of the *Severan Mausoleum*, the ground was at a depth of 41.60 *palmi* (+/- 3 *palmi*) with respect to the level of the foundation platform. To build the circus, in the year 200, a filling of about 13 *palmi* thick was made, so the level of the circus was about 28.60 *palmi* below the level of the foundation platform.

Around the year 514, the ground level rose by 8.60 *palmi*, as a result of the demolition of the circus and the compaction of the ground. Therefore in the year 514 the ground level was about 20 *palmi* below the level of the foundation platform.

In the year 1000-1200, the ground level rose again by 2.60 *palmi* (as a consequence of the removal of compaction actions from the roads), so that its level was 17.40 *palmi* below the level of the foundational platform.

In 1505 the land had risen by about 6.60 *palmi* (as a consequence of the repeated compaction and paving actions of the roads), so its level was about 10.80 *palmi* below the level of the foundational platform.

It should be taken into account that the ground level rose in a north direction, so the walls of the foundational platform had a variable height, as well as its foundations. The highest wall was the south wall, which had its greatest height in the eastern part, projecting about 35 *palmi* from the ground, and with a foundation about 6 *palmi* deep, so the wall would have a total height of 41 *palmi*.

Once the cross section of the old basilica of S. Peter has been reconstructed (chapter 4), it can be completed with all kinds of details to show the exact shape of the foundations, walls, arches, roofs and, in general, the construction technique used.

The section drawing especially shows details of the structure and the foundation, reconstructed taking into account all available historical references. The walls of the foundation platform had a variable thickness, according to measurements made in the excavations of the 1940s. As described in chapter 5, the wall below the south central colonnade was approximately 6 *roman feet* (8 *palmi*) thick, and was expanded to about 7 *feet* (9.33 *palmi*) near the ground. The foundation of the wall under the ground was about 9 *feet* thick (12 *palmi*). The wall below the north central colonnade was about 6 *feet* thick (8 *palmi*), and its foundation under the ground was about 9 *feet* (12 *palmi*). The walls below the side colonnades and the perimeter walls were approximately 9 *feet* thick (12 *palmi*). These side walls were thicker because they were higher, and had to withstand lateral thrusts. The underground foundation of these four walls has the same thickness, that is, 9 *feet* (12 *palmi*).

Taking into account the dimensions of the perimeter foundation walls, it follows that the foundation platform would slightly protrude from the perimeter of the old basilica, approximately 1.5 *feet* (2 *palmi*) on each side. Therefore, it can be deduced that the platform had an approximate length of 686 *feet* (1.5 + (71 + 306 + 306) + 1.5), that is 914.66 *palmi*; and an approximate width of 227 *feet* (1.5 + 224 + 1.5), that is, 302.66 *palmi*.

The height of the platform at its highest midpoint (on the east side) was approximately 26.25 *feet*, that is, 35 *palmi*, given that the access staircase had 35 risers of 0.75 *foot* each riser (1 *palmo*) [6].

The drawing shows all the details of the foundation and the structure, as well as its dimensions and construction details.

The foundational platform was built based on perimeter walls, and internal longitudinal walls of great thickness and with a variable depth until reaching the ground level. The lowest wall, along the north side of the platform, was at least about 9 *feet* high (12 *palmi*) and would be almost entirely underground. The tallest wall, located along the south side of the platform, reached at least about 30.75 *feet* in height (41 *palmi*), part of which was 4.5 *feet* (6 *palmi*) underground, and 26.25 *feet* (35 *palmi*) above ground, at its southeast end.

The set of walls of the foundational platform would become the foundations of the walls and colonnades of the basilica that would be built on them [7]. The main walls were made in *opus listatum* (using tuffs and bands of bricks) and *opus testaceum* (using only bricks), and many of the secondary walls usually were made in *opus caementicium* (using irregular fragments of marble, tuff and travertine in mortar, using formwork) [8].

Longitudinal walls and transverse walls were built (many of which crossed through the existing tombs in the necropolis (as is the case, for example of the tomb T [9]) creating a grid of walls, and whose compartments were filled in many cases with earth and rubble to increase robustness and stability of the platform.

The existence of various types of walls is due to a chronological sequence in construction, but also to the testing of the best construction technique and the achievement of specific structural objectives, as the work progressed [10].

Finally, on the framework of the walls, barrel vaults were built with the same level that when filled by the upper part, the enormous platform would be formed.
The drawing shows that the platform is not the ground level of the basilica. As Grimaldi points out (who observed in 1608 the dismantling of the basilica's atrium) it would have a simple finish with a filling of stones and mortar (on the barrel vaults made brick-based), a layer of impermeable clay and finally a layer of *lithostratum*. It is therefore possible that as the basilica was being built the final floor was made based on a leveling stone filling with mortar and marble slabs. The cleric also provides specific references: a layer of clay on which the lithostrat rests, and finally a filler and the marble slabs [11]. Grimaldi thought that the *lithostrat* was from the time of Constantine, and therefore belonged to the superior finish of the platform. On the other hand, other authors think that they probably belonged to the works of beautification of the atrium by Pope Symmachus (498-514) [12]. Alfarano in his writings also observes that under the marble slabs there were "some palmi" of filler and under which a modest original layer of white stones from platform [13].
Based on this description, it can be estimated that the filler layer and the marble slabs together would have an approximate thickness of about 3 *feet*, so that the floor of the basilica would be about 4 *palmi* above the platform. Therefore, when the building of the basilica was completed (approximately 352) and the narthex did not yet exist, the basilica should be accessed by means of 4 steps (that is, 4 risers of 0.75 *foot* each riser).
In the cross section the old Christian necropolis can be seen, which was just below the foundation platform. For this, all the roofs of the small mausoleums had to be dismantled and only the walls were left standing, which were now crowned by the foundation platform.
The section also shows also the decapitated base of the old *Severan Mausoleum*, originally built between the years 212 and 217, centered on the old *spina* of circus [14]. The mausoleum was circular in shape and was built with thick laterizium walls, and had an outer diameter of about 116 *feet* (154.66 *palmi*), and an inner diameter of about 90 *feet* (120 *palmi*). The height of the perimeter walls should presumably be about 90 *feet* (120 *palmi*), equal to the internal diameter, and would be crowned with a large dome [15]. The entrance to the mausoleum must have been on the north side, adjacent to the only path that was created in the 4th century on the north street of the circus, more or less parallel to the *spina*. The ground level of the mausoleum must have been a little above the ground level of the circus in order to preserve it from the rising waters, so presumably its northern access should have had a few steps. The *Severan Mausoleum* was built above the ground

level of the circus, so it follows that in the early 3rd century the circus was in disuse but had not yet been demolished. The *Severan Mausoleum* was modified just when the construction of the basilica was finished, that is, in the middle of the 4th century, as it was partially buried. Over time, from the beginning of the 3rd century to the middle of the 4th century, due to the gradual deterioration and demolition of the circus, the consequent accumulation of its debris, and the natural compaction of the terrain over the years, the ground level was recovering the natural slope that it had before the construction of the circus. For this reason, the mausoleum gradually fell below ground level, ceased to be functional, and had to be renovated. The part that protruded from the ground was demolished, but the thick walls that remained under the ground were preserved, cutting it to the ground level (the ground level at that time).

Its interior was filled, and a new mausoleum was built on this compacted platform, by means of a circular wall with a diameter of about 102 *feet* (136 *palmi*), that is, about 14 *feet* (18.66 *palmi*) less than the previous mausoleum, so that the circular wall was set back about 7 *feet* from its foundation base.

This new mausoleum was formed by a circular wall of variable section, since it was formed by a sequence of niches and low walls inside, and had an internal diameter of 86 *feet* (114.66 *palmi*) from the bottom of the niches, and a free internal diameter 57 *feet* (76 *palmi*). The wall rose about 25.5 *feet* (34 *palmi*) above the level of the basilica (that is, about 28.5 *feet* (38 *palmi*) above the level of the founding platform) [16], and a circular clerestory with a smaller diameter was built on it. Due to increased ground level, the obelisk was also gradually buried from the 3rd century to the 15th century.

To reconstruct the external appearance of the mausoleum, several drawings (listed in chapter 5) have been taken into account.

The most important drawing is the one made by Carlo Fontana "Section of Madonna della Febbre" (Royal Collection Trust, RCIN 909784), since approximate dimensions are provided (in *palmi*), based on which the whole dimensions have been deduced (in *feet*) with which the building was designed and constructed (Fig. 6.3).

It has also been especially taken into account the drawing made by Maarten van Heemskerck's, “View of the basilica from the southeast, showing the buried obelisk and the Church of S. Andrea (Santa Maria della Febbre)”, Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n.79, D.2a, fol. 22v) (Fig. 4.9).

To reconstruct the interior of the basilica, including the Arch of Constantine, several drawings and paintings have been taken into account, and especially: the painting by the

Scuola di Raffaello (Gianfrancesco Penni, or Giulio Romano), "The Donation of Costantino" (Musei Vaticani. Sala di Costantino) (Fig. 4.26); and the painting of Jean Fouquet, “The coronation of Carlo Magno in S. Pietro” (in Grandes chroniques de France, 1455-60, Bibliothèque Nationale de France, Fr. 6465, f. 89v.) (Fig. 6.4). The lateral columns to the docks of the Arch of Constantine have not been rebuilt, as there are no direct historical references to their existence.

To reconstruct the appearance of the apse mosaic, two drawings have been taken into account: the drawing of the Biblioteca Apostolica Vaticana, Barb. Lat. 4410, fol. 26r. (Fig. 6.5); the drawing made by the notary Quintiliano Gargario, en 1592, Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro A. 64 ter, f. 50 (Fig. 6.6); and the drawing made by Giacomo Grimaldi in 1594, Biblioteca Apostolica Vaticana, Barb. Lat. 2733, fols. 158 v and 159 r (Fig. 6.7)

6.2.3. Longitudinal section of the old basilica of S. Peter (Layout LS-514)

In the longitudinal section, the appearance of the Vatican necropolis, covered by the founding platform and by the elevated floor of the basilica, is particularly appreciated. The Constantine Canopy is also appreciated, framing the open niche in the eastern part, built in order to be able to observe, from the basilica, the entrance to Peter's tomb, located at the western end of the necropolis.

The section shows the *Tropaion* just below the Constantine Canopy.The *Tropaion*, immediately before the start of the construction of the great horizontal foundational platform, was isolated on the tomb of the Apostle Peter and a protective casing was built for it [17].

The immediately surrounding structures were demolished and transforming the remaining masonry into a monument covered in marble, with an open niche on its east side. Immediately afterwards a new marble-paved podium was placed around the monument, on which, later, the Canopy of Constantine was erected, to improve the tomb as an object of devotion [18].

The Canopy of Constantine was built on marble slabs and was composed of four Solomonic columns whose axes are 22.5 *roman feet* apart, and with an approximate diameter of 2.25 *feet* in its widest part. On the columns rested an entablature based on two cross arches, and at its intersection hung a large lamp [19].

The section drawing also shows the naves' floor level 3 *feet* (4 *palmi*) higher than the atrium floor level, which at this time coincided with the level of the platform. Therefore there were about 4 steps (4 risers) between the narthex and the naves.

To reconstruct the internal appearance of the exedras, the drawing of Maarten van Heemskerck “View of the interior towards the south transept” (Stockholm, Nationalmuseum) (Fig. 4.10) has been taken into account. To reconstruct the interior appearance of the naves various historical drawings and paintings have been taken into account, especially: the drawing of Maarten van Heemskerck “Interior of the old basilica, showing the new building” (Staatliche Museen zu Berlin, n. 79, D.2a fol. 52r) (Fig. 4.13); the painting by the Scuola di Raffaello "The Donation of Costantino" (Fig. 4.26); the painting of Jean Fouquet “The coronation of Carlo Magno in S. Pietro” (Fig. 6.4), in which a huge amount of details can be seen, including the "rotae" that adorned the pavement of the old basilica).

6.2.4. South facade of the old basilica of S. Peter (Layout SF-514)

On the south facade the upward slope of the ground, from east to west, can be seen. Initially the ground had more or less this same slope, but when the circus was built the hill had to be partially excavated to create a flat surface. When the circus fell into disuse (perhaps in the middle of the 2nd century) the area regained its funerary character, and for this reason a laterizio-based mausoleum would be built between the years 212 and 217, in the Severan dynasty. For this reason it could be called *Severan Mausoleum*.

Over time the circus was deteriorating, and it began to collapse little by little. It is conceivable that it would be dismantled progressively and its materials would be reused in other buildings, especially in the closest ones, especially dedicated to the construction sector. The area located to the east of the circus, the most accessible, would be the most looted, while the western area of the circus, which was partially buried in the hill, would collapse and become a pile of rubble that, with the passing of time would be compacting. In this way, when the foundational platform of the basilica began to be built in 324, the original slope of the land had been recovered, which facilitated the creation of access trails. The *Severan Mausoleum* was partially buried, which prompted the construction of a new mausoleum. For this, the part that protruded from the floor of the old mausoleum was demolished, and the buried part was filled in with the purpose of becoming the base of a new mausoleum.

To reconstruct the appearance of the southern facade and the southern exedra of the old basilica and the *Severan Mausoleum*, the drawings of Maarten van Heemskerck ("View of the works of the new basilica from the south-east, showing the choir of Bramante, remains of the southern exedra of the old basilica, the south arm of the new basilica under construction, the obelisk and the rotunda of Santa Maria della Febbre", Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n. 79, D.2a, fol. 13 recto (Fig. 6.8); “View of the basilica from the southeast, showing the buried obelisk and the Church of S. Andrea (Santa Maria della Febbre)”, Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n.79, D.2a, fol. 22v (Fig. 4.9); “View from the southeast of the old basilica and the works of the new basilica”, Berlin, Stftung Preussicher Kulturbesitz, Kupferstichkabinett, Berliner Skizzenbücher, II, 51 recto (Fig. 6.9); the drawing made by Pieter Coecke van Aelst “View of the basilica from the southwest”, Biblioteca Apostolica Vaticana, coll. Ashby 329 (Fig. 4.14), and the drawing made by Heemskerck in 580, “View of the construction of the new basilica from the southeast”, Frankfurt, Staedelsches Kunstinstitut, 814 (Fig. 6.10). Anonymous drawing has also been taken into account “View of San Peter da Borgo Santo Spirito”, late 1544, Biblioteca Apostolica Vaticana, coll. Ashby 330) (Fig. 6.11).

The west side of the platform was flush with the ground of the hill, while the east side protruded about 26.25 *feet* (35 *palmi*), with respect to the height of the circus floor (the wall had to be excavated about 4.5 *feet* (6 *palmi*) to reach firm ground, so its total length was about 30.75 *feet* (41 *palmi*) until reaching firm ground), for which a large staircase with 35 risers had to be built.

As mentioned, the level of the reclaimed land at the *Severan Mausoleum* was at this time, about 15 *feet* (20 *palmi*) below the level of the foundation platform. Therefore the staircase made by Pope Symmachus (498-514) should have about 20 steps. Later, during the time of Pope Donus (676-678), the narthex was paved and the steps were moved and located between the narthex and the atrium. For this reason, the floor level of the narthex was raised and, without a doubt, the staircase made in the time of Symmachus had to be extended with about 4 steps, until it remained with about 24 steps.

The *Secretarium*, built by Leo I (440-461) on the outside of the basilica and attached to the south face of the narthex, is also seen on the southern elevation, a kind of sacristy in which the bishop prepared for the access to the basilica. On the south face of the central nave, 11 clerestory windows, as indicated by Alfarano, are shown.

In the western part of the south elevation, the *Honorius Mausoleum*, built around the year 400, is shown [20]. The mausoleum was connected by a small portico to the south exedra of the basilica, had the same ground level as the basilica, and It was almost aligned to the west with the *Severan Mausoleum,* so it had privileged access to the sanctuary and the tomb of Apostle Peter.

Finally, at the western end, the reconstructed drawing of the south facade shows the Anicii Probi mausoleum.

6.2.5. East facade of the old basilica of S. Peter (Layout EF-514)

The exterior facade was characterized above all by the presence of the large staircase leading to the foundation platform seen. The architectural structure of the facade must have been extremely simple, since initially the building was isolated and about 26.25 *feet* (35 *palmi*) emerged from the ground and was not intended to be viewed from the outside, but from the atrium and from the inside. This facade therefore must have been very austere, and consisted basically of five sections, as a reflection of its internal architectural structure. The corner sections of the facade would undoubtedly be the simplest and would hardly have certain windows for the surveillance and custody of the building. The lateral sections would have windows to illuminate and ventilate the rooms on the two internal rooms. The central part, the gate house, with a second higher floor that protruded from the lateral parts, was composed of three large, very slender arches in the lower part, and three smaller rectangular vindows at the height of the protruding second floor. The three arches had a very simple design, and invited to enter the interior of the basilica, through the gate house. The upper floor was an oratory (later called oratory of S. Maria in Turri) [21], and it was accessed by means of the stairs located in the lateral sections.

To reconstruct the appearance of the facade in 514, numerous historical drawings made in the 16th century have been compiled, and the facade has been rebuilt in 1505 taking into account the dimensions deduced in chapter 4. Subsequently, the appearance of the different architectural elements of the facade has been modified, going back - inversely in time - all the constructive actions that have been carried out on the facade over time, until reaching the year 514

6.2.6. East facade to the atrium of the old basilica of S. Peter (Layout EFA-514)

The east facade shows, in the foreground, the narthex colonnade (with 2.25 *feet* diameter columns, and bases with a height just over 3 *feet* (4 *palmi*), and a width of 3.75 *feet* (5 *palmi*) wide, and the ground at the level of the founding platform. It is possible that the bases of the colonnades served as a guide for the elevation of the pavement of the atrium, and also the naves. Initially, therefore, the bases of the columns were larger and after the growth of the pavement they had a minimal expression. Behind the narthex colonnade the five large entrance doors to the naves are shown. The east facade of three windows, one on top of the other, and a round window at the top, as described by Alfarano [22]. The original windows (stripped of interior elements), the mosaics of the facade and the Constantinian cross topping off the roof, are also shown.

6.2.7. West facade of the old basilica of S. Peter (Layout WF-514)

The reconstructed west facade of the basilica shows the Honorius Mausoleum connected to the southern exedra of the transept by means of a small chapel. The apse stairs can be seen on both sides of the apse (whose plan dimensions are defined in Bramante's *GDSU 20 A* drawing), as well as the five windows of the apse, and the logical interconnection details of the different covers of the apse, transept and main nave. The logical articulations of the mausoleum roofs, and the auxiliary constructions are also appreciated.

The ground in this area had recovered its original level and was almost horizontal with a gentle slope to the south, and a significant slope to the east.

The drawing shows in the central part the Anicii Probi mausoleum, that was built attached to the west apse, before 393, by the consul Sesto Petronio Probo, who died in the same year [23]. It had an unusual structure since it was quadrangular in shape and had three naves, with approximate dimensions of 62 *feet* long by 45 *feet* wide, and a central nave of 15 *feet* wide. It was demolished in 1450 due to the expansion works of the basilica of Nicholas V [24].

6.3. Reconstruction of the appearance of the old basilica of S. Peter in 1003

From 514 to 1003 there were not many significant changes in the architectural structure and appearance of the old basilica of S. Peter. Without a doubt the most important was the construction of the bell tower, to the north of the gate house, at the main entrance of the architectural complex. During these years the most important changes took place in the urban structure around the basilica.

6.3.1. Floor plan of the old basilica of S. Peter (Layout FP-1003)

The plan layout of the old basilica of St. Peter and its surroundings, in the year 1003, was already reconstructed in (stage 17) of the previous chapter. It is included here again in order to have an overview of the appearance that the old basilica of St. Peter could have had in this year.

6.3.2. Cross section of the old basilica of S. Peter (Layout CS-1003)

The most important changes that can be seen in the cross-section of the naves with respect to the year 514 is the enlargement of the podium area, carried out at the time of Leo III (795-816), possibly in the year 800, on the occasion of the coronation of Charlemagne, eliminating the frontal accesses and building perpendicular stairs to the axis of the confessional [25]. The resulting structure was practically preserved in its entirety throughout the Middle Ages [26].

Also visible are the six columns added during the pontificate of Gregory III (731-741), donated by the governor of Ravenna, in front of the six Constantinian *vitinee* columns of the Gregorian baldachin [27]. These new six columns were finished off by means of a coated beam of a silver sheet, thus creating, with this new canopy, a double pergola according to its current conception. In this way, a very special architectural structure was created and it was renamed "*Presbyterium*", meaning a fenced area reserved for the lower choir, or for the lower clergy and singers [28].

In the southern part of the old basilica you can see the common entrance to the two old imperial mausoleums (now called Chiesa di Sant'Andrea and Chiesa di Santa Petronilla), which were joined in the late 7th or early 8th century. The single entrance allowed independent access to each church, and at the same time to the southern exedra of the old basilica of St. Peter.

6.3.3. Longitudinal section of the old basilica of S. Peter (Layout LS-1003)

The longitudinal section shows the semi-annular passage to the crypt, made by Gregory I, called Gregory the Great (590-604), and which allowed pilgrims to venerate Peter without interrupting the services of the upper altar. The ground was lowered about 2 *feet* (it could not be lowered further since the Constantinian platform would be drilled) and a raised podium was built about 5 *feet* above the ground, thus creating an intermediate space of about 7 *feet*, enough to walk upright, and in this way the area inscribed in the apse was doubled [29]. The upper part of the historical memory of the apostle continued to emerge on the new floor the transept a perfect height to place a fixed altar on top, with dimensions of approximately 8 3/4 *feet* long, 5 *feet* wide, and 4 1/5 *feet* high.

The section also shows the new flooring added in the atrium, in the early eighth century, unifying its level with that of the narthex and with that of the interior of the basilica. The steps between the atrium and the narthex (possibly four risers and three treads) were moved to the gate house to the atrium. Already in the days of Donus (676-678) the narthex was paved, so the steps were moved and were located between the narthex and the atrium [30]. There are historical references that until the pontificate of Hadrian I (772-795) the narthex was accessed through “some steps” [31].

The longitudinal section also shows the *cantharus* of atrium [32], reformed and embellished by Stephen II (752-757), a large *spoglio* bronze pinecone, from which multiple jets of water flowed. The fountain was covered by a fanciful bronze pavilion, about 13.5 *feet* high (18 *palmi*), crowned by a cristogram and supported by 8 *porphyry* columns, two of which with an imperial bust as relief. Assembled with ancient semicircular grids attached to the marble entablatures, the pavilion was decorated with leaves, dolphins and a pair of gilt bronze peacocks [33]. The fountain acquired the appearance shown in the drawings by Simone del Pollaiolo detto il Cronaca (*GDSU Santarelli, 157v.*) (Fig. 5.29) and Francisco d’Olanda and was preserved in over time, until it finally had to be dismantled when the new basilica was built in 1608 [34].

6.3.4. South facade of the old basilica of S. Peter (Layout SF-1003)

The south facade shows a subtle rise in ground level (which at the height of the *Severan Mausoleum* was about 2.6 *palmi*) due to the successive compaction and paving works of the roads over time.

The drawing also shows the two imperial mausoleums (now called Chiesa di Sant'Andrea and Chiesa di Santa Petronilla) joined since the beginning of the 8th century, or perhaps the end of the 7th century. Based on the plan structure of the access chapels to the churches, it has been possible to rebuild the appearance of the elevated construction.

A little further east is the access staircase built by Symmachus (498-514). The staircase now has 4 new steps due to the elevation, of about 3 *feet* (4 *palmi*), of the narthex pavement, made in the time of Donus (676-678). The original staircase built by Symmachus had approximately 20 risers, so after Donus it had about 24 risers. However at this time, and due to the rise in ground level, the access ladder to the narthex happened to have about 20 or 21 raisers.

To reconstruct some details of the southern facade of S. Pietro, and especially the appearance of the exterior of the southern exedra, the following drawings have been taken into account: drawing of Hieronymus Cock, “View from the north to the works of the new basilica showing the already built Bramante choir, and the north exedra of the transept of the old basilica” (Herzog Anton Ulrich Museum, cod. No. HCock-Verlag WB 3.91) (Fig 6.12), and drawing of Maarten van Heemskerck, "View of the construction of the new basilica from the northwest, showing the remains of the old basilica" (Staatliche Museen zu Berlin, n.79, D.2a fol. 15v) (Fig 4.12). These drawings show the north facade, however with this information the south facade can be reconstructed.

6.3.5. East facade of the old basilica of S. Peter (Layout EF-1003)

The drawing of the east facade stands out for the two large towers, although it is only certain that the north tower existed. The north tower was built in the middle of the 8th century, perhaps in the times of the popes Gregory III (731-741) or Zacharias (741-752), and in any case before the year 752, when there is news that the Pope Stephen II (752-757) decorated the existing bell tower, and endowed it with 24 bells. However, it cannot be ruled out that two towers were built, in both lateral rooms to the gate house, symmetrically about the axis of the basilica [35].

In the drawings of the Alfarano, quadrangular stays with large walls are observed inside the two collateral rooms to the gate house to the atrium. The quadrangular stay located to the north corresponds to the base of the known bell tower, while the quadrangular body located to the south corresponds to the *Casa dell’Arciprete*, whose strange design suggests that it was perhaps built taking advantage of the base of an earlier southern bell tower. This suggests two possibilities, either two bell towers were built, and the south bell tower collapsed before the 12th century [36], or the north bell tower was built and the south bell tower was started, but never finished (which, in my opinion understand, it is less likely).

The Romanesque architectural structure of the bell towers has been rebuilt taking into account specially the fresco “Coronation ceremony of Pope Sixtus V Peretti, 1585, Palazzo Apostolico Vaticano, Salone Sistino (Fig. 6.13); and also the fresco made by Giovanni Guerra, "View of the new basilica of S. Peter at the time of the beginning of the transfer of the obelisk", 1586, Palazzo Apostolico Vaticano, Biblioteca Sistina, sala II (Fig. 4.28), as well as the design of similar towers built around this time and that have survived to this day. The drawings proposed by Letarouilly (Le Vatican et la Basilique de

Saint-Pierre de Rome, vol. 1, Cap. Ancienne Basilique de Saint Pierre, planche 6 (Fig. 4.32), and planche 8 (Fig. 4.33)) of the two towers are quite distant from these historical references, so they have no historical validity.

The drawing shows the original access arches to the gate house, already closed, a tutto sesto, in the time of Hadrian I (772-795). The arches were converted into architrave portals and three bronze doors [37]. Between 774 and 776 the main staircase was restored [38]. For this reason, it is to be assumed that it was at this time that the facade was reformed, probably a few years after the two bell towers had been built [39].

In the foreground, on the left side of the main facade, the drawing also shows the Chiesa di S. Apollinare, built in times of Honorius I (625-638) around the southeast corner of the old basilica.

6.3.6. East facade to the atrium of the old basilica of S. Peter (Layout EFA-1003)

The east facade to the atrium barely had any modifications over time. The access doors to the naves were subtly modified, and the mosaics on the facade were repaired. Furthermore, as the paving of the atrium was raised, the columns of the atrium were left without bases.

To reconstruct the appearance of the facade to the atrium, the anonymous drawing, made in the last quarter of the 11th century, has been taken into account (Windsor, Eton College, Cod. Farf. 124, f. 122r.) (Fig. 5.30). This drawing shows the Constantinian facade in the state it had before the reforms carried out by Gregory IX (1227-1241).

6.3.7. West facade of the old basilica of S. Peter (Layout WF-1003)

The west facade of the old basilica did not have important alterations either, with the exception of the union of the two imperial mausoleums to the southern exedra.

6.4. Reconstruction of the appearance of the old basilica of S. Peter in 1505

The most important changes in the architectural structure and appearance of the old basilica of St. Peter took place in the old atrium, now converted into a square surrounded by buildings that were built throughout the late Middle Ages. Important changes were also made to the east facade, especially with the construction of the Lodge of Blessings. On the other hand, in the western part of the old basilica there were the foundations and the lower part of the walls of a new western arm, whose works began in the time of Nicholas V (1447-1455), and were interrupted after his death.

6.4.1. Floor plan of the old basilica of S. Peter (Layout FP-1505)

The plan layout of the old basilica of St. Peter and its surroundings, in the year 1503, was already reconstructed in (stage 23) of the previous chapter. It is included here again in order to have an overview of the appearance that the old basilica of St. Peter could have had in this year.

6.4.2. Cross section of the old basilica of S. Peter (Layout CS-1505)

The section drawing shows, inside the basilica, the modernization changes made to the apse in the time of Innocent III (1198-1216).

The section also shows the two columns to support the Arch of Constantine, badly damaged after a seismic movement, and built in the time of Nicholas V. There is, at the moment, no historical graphic reference to its possible appearance, and in fact neither Alfarano he places them in his drawings. However, Alfarano clearly mentions them in his writings: "*... parastatas duabus etiam magnis columnas ipsis parastatis adhaerentibus suffulciebatur, quem quidem fornicem antiqui arcum triumphalem vocabant…"*. The Arch of Constantine was demolished between the years 1544-1545, when Alfarano (1525-1596) was 19 years old, so he had previously been able to personally see the columns of Nicholas V.

There is no news of what kind of damage the Arch of Constantine suffered, but if the solution was to place some columns, it is most likely that the arch needed a better base of support. It is possible that the arch piers were damaged, so the solution would consist of replacing the inner part of the two piers of the arch with two robust columns, similar to the columns of the central nave. These columns would only replace part of the piers in order to make them more robust and with greater load capacity. Therefore, the piers would cut about 8 palmi in their internal part, and in their place the columns attached to the pier would be located. This is why Alfarano would not draw the columns, since their bases were immediately attached to the surviving part of the piers, forming a compact set. These columns of the arches can be clearly seen in the Fresco made by Giulio Romano (Scuola di Raffaello), "Donazione di Costantino", in 1520-1524, Musei Vaticani, Stanze di Raffaello (Fig. 4.26).

The drawing also shows the section of the winter choir attached to the south wall of the basilica (built in the 15th century).

Outside the basilica, in the southern part, the drawing shows the internal changes of the Church of Santa Maria delle Febbre (Cappella di Sant'Andrea), reformed in the 13th century, and perhaps by Innocent III (1198-1216). The renewed appearance of its interior, with a clear Gothic style, can be clearly seen in the fresco “Veduta della Fabbrica nuova e dell’antico S. Pietro al tempo del trasferimento dell’obelisco”, made by Giovanni Guerra (Palazzo Apostolico Vaticano, Biblioteca Sistina, sala II, made in the year 1586) (Fig. 4.28). The drawing also shows the entrance to the Santa Petronilla and Santa Maria delle Febbre churches.

Sant'Andrea was renamed Santa Maria delle Febbre in the time of Pius II (1458-1464) during whose pontificate the image of the Madonna della Febbre was introduced, to protect the population from malaria, which was a serious threat for the health of the inhabitants of the city from this time to the 19th century. In 1450, the church changed its functions again and became the sacristy of the basilica, a role it played for almost two centuries.

Shortly before the demolition of the Church of Santa Petronilla on the occasion of the beginning of the construction of the new basilica, the rotunda was isolated for a time. In 1575 the building was used as a sacristy by Gregory XIII (1572-1585), who ordered the construction of a corridor that connected the rotunda with the basilica. In 1592-1605 Clement VIII (1592-1605) ordered to connect the sacristy directly to the new basilica through the Clementine Chapel. Michelangelo was very interested in preserving this construction and not demolishing it, and requested that his masterpiece, *La Pietà*, be on this site. Finally, in 1777, Pius VI (1775-1799) decided to demolish the building due to the impossibility of adapting it to new needs.

6.4.3. Longitudinal section of the old basilica of S. Peter (Layout LS-1505)

The longitudinal section shows on the left side the walls of the western arm made by Nicholas V, and inside the basilica, the modernization changes made in the apse in the time of Innocent III (1198-1216). To reconstruct the final appearance of the presbytery has taken into account the drawing of the apsidal hemicycle of the pilgrim Sebastian Werro, en 1581, Friburg, Bibliothèque Cantonale et Universitaire (Fig. 5.26).

To reconstruct the appearance of the interior colonnade, and the north clerestory, has been taken into account the drawing of Domenico Taselli da Lugo (plate 13 and plate 15, Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro A. 64 ter.) (Figs. 4.45 and 4.46). These drawings show the 11 arches, and the 11 oriental columns (attached to the east counter facade) of the old basilica, the frieze with the clip-on portraits of the popes, the Old Testament paintings, Giotto's angel and the figures of prophets between the windows with Gothic clerestory. Also has been into account the drawing made by Domenico Taselli da Lugo, in 1600-1610, Biblioteca Apostolica Vaticana, Barb. Lat. 2733, fols. 108 v and 109 r (Fig. 6.14).

In the atrium the Palace of Innocent VIII (1484-1492) is shown, built surpassing the old north wing of the atrium. To reconstruct the appearance of this building, the following drawings have been taken into account: Pieter Coecke van Aelst, “View of the basilica from the southwest” (Biblioteca Apostolica Vaticana, coll. Ashby 329) (Fig. 4.14); Domenico Taselli da Lugo (plate 10, Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro A. 64 ter.) (Fig. 4.15); Giovanni Antonio Dosio ("Construction of the dome of the new S. Peter, and view of the facade to the atrium of the old basilica (XVI-XVII century)", *GDSU 2555 A* (Fig. 4.19); "View of the obelisk from the east", *GDSU 2536 A* (Fig. 4.20); and Giacomo Grimaldi, “The front of S. Maria in Turri and the access doors to the atrium of S. Peter” (Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro, H.2, f. 62r (Fig. 4.21), and “Atrium of Old S. Peter”, (Barb. Lat. 2733, 133v and 134r, Biblioteca Apostolica Vaticana) (Fig. 4.22). Finally the anonymous drawing “Detail with atrium of St. Peter, made in 16th century (Palazzi Vaticani, apartment of Giulio III) has been taken into account (Fig. 6.15).

Of course, Letarouilly drawings have also been taken into account, showing the appearance of the basilica between the 4th and 16th centuries (Le Vatican et la Basilique de Saint-Pierre de Rome, vol. 1, Cap. Ancienne Basilique de Saint Pierre, planche 6 (Fig. 4.32), and planche 8 (Fig. 4.33)). Although when comparing with the previous historical references it is confirmed, again, that Letarouilly's drawings are very fanciful and have little historical value.

In the atrium the *cantharus* is shown, as it was represented by Simone Pollaiolo detto il Cronaca, en 1480 (*GDSU Santarelli, 157v*) (Fig. 5.29).

In the area of the facade, the drawing shows the different levels of the Lodge of Blessings, the raised floor of the gate house, and the access stairway, once renovated, with the statue of Saint Paul at the beginning of the north parapet.

6.4.4. South facade of the old basilica of S. Peter (Layout SF-1505)

The south facade shows a subtle rise in ground level (which at the height of the *Severan Mausoleum* was about 6.6 *palmi*) due to the successive compaction and paving works of the roads over time. Thus, the access stairway to the narthex, whose configuration has changed over time, now has about 14 steps.

The drawing also shows the Roman windows of the basilica, with the Gothic clerestory added in the 13th century [40].

In the lower part of the drawing can be seen the conglomeration of buildings that were attached and accumulated around the south wall of the old basilica, throughout the late Middle Ages. Near the obelisk the drawing shows the arch through which the pilgrims accessed to visit the two imperial mausoleums, before entering the basilica through the southern exedra. It has been possible to reconstruct the appearance of these buildings taking into account the fresco made by Giovanni Guerra, "View of the new basilica of S. Peter at the time of the beginning of the transfer of the obelisk", 1586, (Palazzo Apostolico Vaticano, Biblioteca Sistina, sala II) [41] (Fig. 4.28), and also the engraving that he made previously, in the same year 1586, together with Natale Bonifacio da Sebenico, "The transport of the Vatican obelisk" (The British Museum, nº 1892,0714.41) [42] (Fig. 4.25).

The elevation design of these buildings corresponds to the reconstructed plan design in the previous chapter, and which has been based mainly on the precise measurements of the drawing made by Domenico Fontana "Della transportatione dell´obelisco vaticano e della fabriche di nostro signore Papa Sisto V", libro primo, engraver Natale Bonifacio, Roma (1590), f. 15 recto (Fig. 5.46).

To complete details, have also been taken into account the anonymous drawing edited by Lafréry in the 16th century (Metropolitan Museum of Art, cod. 41.72(1.111) (Fig. 6.16); Carlo Fontana's drawing "Templum Vaticanum et ipsus origo", Roma 1694, f. 93 (Fig. 6.17) [43,] and the drawing made by Domenico Fontana "Della transportatione dell´obelisco vaticano e della fabriche di nostro signore Papa Sisto V", libro primo, engraver Natale Bonifacio, Roma (1590), f. 8 recto (Fig. 6.18).

To rebuild the south facade of the basilica it has been very useful the drawing made by Maarten van Heemskerck's "View of the works of the new basilica from the southwest, showing the obelisk and Saint Andrea" (1532-1536) (probably 1534-1535) (Staatliche Museen zu Berlin, n. 79, D.2a fol. 7 r) (Fig. 6.19). In this drawing, the possible common entrance to the two imperial mausoleums (now converted into churches) is clearly appreciated, as well as the chaotic buildings that were attached to the south face of the basilica throughout the Middle Ages. The new and old ruins of this drawing inspired the Painter Pieter Jansz Saeredam to make a painting, almost exact to the drawing, in the year 1629 (National Gallery of Art, cod. 1961.9.34 (Fig. 6.20). To reconstruct the perimetral shape of the attached buildings to the south of the basilica, it has been of special importance the drawing made by Carlo Fontana "Pianta e situatione dell'argani serviti a l'evare d'opera l'obelisco (Il Tempio Vaticano e sua Origine. Rome, 1694, f. 131) (Fig. 6.21).

6.4.5. East facade of the old basilica of S. Peter (Layout EF-1505)

To reconstruct the appearance of the east facade, the following drawings of Maarten van Heemskerck have been taken into account: "View of S. Peter Square" (Vienna, Albertina, n. 31681) (Fig. 4.8), and "St. Peter's Square with the statue of Marco Aurelio (1532-1536)" (Staatliche Museen zu Berlin, n. 79, D.2a fol. 53r) (Fig. 4.11). It has been very important the fresco painted by Giorgio Vasari "Ritorno di Gregorio XI da Avignone, in 1377 (in 1571-1574) (Fig. 6.22); and the drawing made by Giacomo Grimaldi in 1619 "Old St. Peter façade" (Biblioteca Apostolica Vaticana, Barb. Lat 2733, f. 152v, and 153r) (Fig. 6.23).

The left part of the east facade shows the set of chaotic buildings that were attached to the southern part of the old basilica throughout the Middle Ages.

In the foreground, on the left side of the main facade, the drawing shows the Palace of cardinal Ippolito d'Este, which was built on the Chiesa di S. Apollinare, built in times of Honorius I (625-638) around the southeast corner of the old basilica. This privileged situation for a palace is due to the power that was accumulating over the years. Alexander VI appointed Hippolytus, just 12 years old, cardinal deacon in 1493. Years later, in 1498 he was appointed Archbishop of Milan, in 1502 Archbishop of Capua, and in 1503 Bishop of Ferrara.

In the central part of the facade, granite columns are shown framing the three portals that had previously been built within the three original Roman arches of the basilica in the time of Hadrian I (772-795). The columns were arranged in 1449, because of the Jubilee of Nicholas V (1447-1455).

The drawing also shows four of the eleven sections of the Lodge of Blessings designed by Francesco del Borgo, and whose works began in the time of Pius II (1458-64). The second floor of these sections began in the time of Alexander VI (1492-1503). In 1505 Bramante built the third floor of these four sections, which remain isolated, since due to the beginning of the construction of the new basilica, it was decided to stop the renovation works of the old basilica and not continue with the construction of the loggia.

The drawing shows in the foreground the recently renovated staircase. In 1462 it was completed, and two colossal statues of the apostles Peter and Paul were placed at its sides [44], the statue of Saint Peter on the left and the statue of Saint Paul on the right. The upper part of the pedestal of the sculptures has a width of respectively 1.37 m and 1.38 m, and a depth of 0.81 m and 0.865 m [45].

At the top of the facade also can be seen the bell tower, recently renovated in 1464, with the new 8-sided pyramid-shaped roof, with a ball, a cross and a gilt-iron flag pole.

6.4.6. East facade to the atrium of the old basilica of S. Peter (Layout EFA-1505)

The east facade shows a pediment with a rose window, and the tympanum renewed to have a prominent cavetto under the cornice frame to protect the mosaics from the rain [46]. The facade reform was carried out in the days of Gregory IX (1227- 1241).

The drawing also shows the *protyrus*, between the central white marble columns of the narthex. Inside the *protyrus* was placed the statue of Saint Peter, made at the end of the 13th century, or the first years of the 14th century. This sculpture was made using the bust of an ancient philosopher to which and added the head of Apostle Peter. The sculpture occupied an elevated position in the protrusion of the narthex, aligning itself with the porta Argentea, located in the center of the main facade to the atrium [47].

The drawing also show, attached to the south perimeter wall of the atrium, a chaotic group of houses and precarious constructions had been built, with direct access to the path that went from San Pietro square to the obelisk

To rebuild the appearance of the south facade to the atrium, several historical drawings have been taken into account, among which the following stand out: the drawing of Giovanni Antonio Dosio ("Construction of the dome of the new S. Peter, and view of the facade to the atrium of the old basilica, XVI-XVII century", *GDSU 2555 A*) (Fig. 4.19); the drawing of Domenico Taselli da Lugo (plate: 10, Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro A. 64 ter.) (Fig. 4.15); and the drawing Giacomo Grimaldi "Atrium of Old S. Peter" (Barb. Lat. 2733, 133v and 134r, Biblioteca Apostolica Vaticana) (Fig. 4.22).

6.4.7. West facade of the old basilica of S. Peter (Layout WF-1505)

The drawing of the west facade shows the low walls made in the time of Nicholas V, for the construction of a new western arm. The works were interrupted on the death of the Pope, although it is possible that they were resumed briefly in the time of Paul II (1464-1471), probably on the occasion of the Jubilee year of 1475.

Julius II wanted to take advantage of these walls, and especially the foundations, in order to quickly build the western arm of a new building and locate his tomb there. Bramante finally built an apse following the shape of the walls already built at the same time as the "central nucleus" of a new building with an architectural structure incompatible with it. This was the origin of a tortuous design process, trying ways to integrate both constructions. Given the impossibility of this task, finally the apse of Bramante was demolished by Sixtus V, in 1585.

Notes 6

[1] Some dimensions have been extrapolated by measuring the remains of archaeological excavations from the 40s of the last century. Other measurements are probable conjectures based on Alfarano's writings, and direct measurements on Letarouilly's drawings. The most important dimensions proposed can be found in: Jürgen Christern, ‘Der Aufri*ß von Alt-St. Peter’, pp. 133-183;* Jürgen Christern and Katharina Thiersch, ‘Der Aufri*ß von Alt-St. Peter II’,* Richard Krautheimer CBCR V, vol. V, pp, 251-256; Achim Arbeiter, *Alt-St. Peter in Geschichte und Wissenschaft. Abfolde der Bauten, Reconstruktion, Architekturprogramm*, pp. 144-166

[2] In a previous work (and in a previous chapter) it has been possible to reconstruct to scale, and with great precision, the project of the *old basilica of S. Peter*: Luis De Garrido, *Reconstruction of the stages of the design process and architectural definition of the project of the old basilica of Saint Peter in Vatican*. 2020. Submitted and under review.

[3] These columns were removed in 1612 as the construction of the new basilica was extended eastward. See: Antonella Ballardini, ‘La basilica di S. Pietro nel Medioevo’, in *San Pietro. Storia di un Monumento* (Milano: Jaca Book, 2015), p. 45

[4] *Le Liber Pontificalis. Texte, introduction et commentaire par L. Duchesne*, I-II t., Paris 1886-1892 e III t., Additions et corrections de Mgr L. Duchesne, C. Vogel ed. (Paris: Boccard, 1955-1957), p. 97 c. 96; Antonella Ballardini, ‘La basilica di S. Pietro nel Medioevo’, in *San Pietro. Storia di un Monumento*, p. 46

[5] Paolo Liverani, ‘La basilica di San Pietro e l’orografia del colle Vaticano’, in *Acta Congresus Internationalis XIV Archaeologie Christianae* (Vienna and Vatican City, 2006), pp. 502-503

[6] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante* (Mantova: Leo S. Olschki, 2006), p. 117

[7] Hugo Brandenburg, ‘L’antica basilica constantiniana di S. Pietro’, image in page 90; Richard Gem, ‘From Constantine to Constans. The chronology of the construction of Saint Peter’s basilica’, in Rosamond McKitterick; John Osborne; Carol M. Richardson and Joanna Story (eds.), *Old Saint Peter's, Rome* (Cambridge: Cambridge University, 2013), p. 50

[8] Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, pp. 33-4, 79-81, 153; Richard Krautheimer CBCR V, vol. V, pp. 187-8; Richard

Gem, 'From Constantine to Constans. The chronology of the construction of Saint Peter's basilica', p. 50

[9] Patrick M. Bruun, 'Constantine and Licinius, AD 313-337', in C.H.V. Sutherland and R.A. G. Carson (eds.), *The Roman Imperial Coinage, VII* (London, 1966), p. 249 nº 148; Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, relazione a cura di Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, Prefazione di Mons, L. Kaas, Appendice numismática di C. Serafini, 2 vols. (Vatican City: Tipografia Poliglotta Vaticana, 1951), vol. 1, pp. 55-148

[10] Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, pp. 156, 157-8; Richard Gem, 'From Constantine to Constans. The chronology of the construction of Saint Peter's basilica', p. 54

[11] Giacomo Grimaldi, *La Descrizione della basilica antica di S. Pietro in Vaticano, Codice Barberini latino 2733*, Giacomo Grimaldi and edited by Reto Niggl (Vatican City: Biblioteca apostólica Vaticana, 1972); BAV, Barb. Lat. 2733, f. 149v, Reto Niggl (ed.), *Giacomo Grimaldi. Descrizione della Basilica Antica di S. Pietro in Vaticano (1619). Codice Barberini Latino 2733, Vatican City, 1972*, p. 185; Richard Krautheimer CBCR V, vol. V, pp. 171-285

[12] Federico Guidilbaldi and Alessandra Giuglia, *Pavimento marmorei di Roma dal IV al IX secolo*, Pontificio Istituto di Archeologia Cristiana (Vatican City, 1983), pp. 199-201

[13] Tiberio Alfarano, m. 1596, and Michele Cerrati, *Tiberii Alpharanii. De Basilicae Vaticanae Antiquissima et Nova Structura*

[14] Ralf Biering and Henner von Hesberg, 'Zur Bau und Kultgeschichte von St. Andreas apud S. Petrum. Vom Phrygianum zum Kenotaph Theodosius d. Gr.?', in *Römische Quartalschrift*, 82 (1987), pp. 145-182; Ferdinando Castagnoli, *II Circo di Nerone in Vaticano*, Atti della Pontificia Accademia Romana di Archeologia. Rendiconti 32 (1959-60), pp. 97-121

[15] *Le Liber Pontificalis. Texte, introduction et commentaire par L. Duchesne*, I, p. 261; Ralf Biering and Henner von Hesberg, Zur Bau und Kultgeschichte von St. Andreas apud S. Petrum. Vom Phrygianum zum Kenotaph Theodosius d. Gr.?', pp. 145-182; Jens Niebaum, 'Die spätantiken Rotunden an Alt St. Peter in Rom', in *Marburger Jahrbuch für Kunstwissenschaft*, 34 (2007), pp. 101-161; Nancy Rasch, 'Boniface VIII and

honorific portraiture: observations on the halflenght image in the Vatican', in *Gesta*, 26 (1987), pp. 47-58

[16] Hugo Brandenburg, 'L'antica basilica constantiniana di S. Pietro', p. 29

[17] Hugo Brandenburg, 'L'antica basilica constantiniana di S. Pietro', pp. 10-11

[18] Bryan Wards-Perkins, 'The Shrine of St. Peter and Its Twelve Spiral Colums', in *Journal of Roman Studies,* 42 (1952), pp. 21-33; Barbara Nobiloni, 'Le colonne *vitinee* della basilica di San Pietro a Roma', in *Xenia Antiqua* 6 (1997), pp. 81-142

[19] Hugo Brandenburg, 'L'antica basilica constantiniana di S. Pietro', p. 16

[20] Hugo Brandenburg, 'L'antica basilica constantiniana di S. Pietro', p. 29

[21] Jean Charles Picard, 'Les origines du mot Paradisus-Parvis', in *Melanges de l'Ecole Française de Rome. Moyen age, temps moderns,* 83 (1971), pp. 171-72

[22] Tiberio Alfarano, m. 1596, and Michele Cerrati, *Tiberii Alpharanii. De Basilicae Vaticanae Antiquissima et Nova Structura*

[23] Gabriele Bartolozzi Casti, *La Basilica Vaticana tra Medioevo e Rinascimento: la distruzione del Mausoleo degli Anici,* in Atti della Pontificia Accademia romana di archeologia, rendiconti in serie (2010/2011), pp. 427-455

[24] Hugo Brandenburg, 'L'antica basilica constantiniana di S. Pietro', p. 29

[25] *Liber Pontificalis. Texte, introduction et commentaire par L. Duchesne*, I-II t., Paris 1886-1892 e III t., Additions et corrections de Mgr L. Duchesne, C. Vogel ed. (Paris: Boccard, 1955-1957), I, p. 98 c. 28; Vittorio Lanzani, *"Gloriosa Confessio". Lo splendore del sepolcro di Pietro da Constantino al Rinascimento, in La Confessione nella basilica di San Pietro,* a cura di Alfredo Maria Pergolizzi (Milano: Silvana Editoriale, Cinisello Balsamo 1999), pp. 10-41

[26] Sible De Blaauw, *Cultus et decor. Liturgia e architettura nella Roma tardoantica e medievale. Basilica Salvatoris, Sanctae Marie, Sancti Petri,* 2 voll., Biblioteca Apostolica Vaticana (Vatican City, 1994), pp. 579, 659

[27] Liber Pontificalis 1957, p. 34, c. 16

[28] Liber Pontificalis 1957, vol. I, p. 176 (*Silvestro*), p. 312 (*Gregorio Magno*); Richard Krautheimer, *Roma: Profile of a city, 312-1308* (Princeton, 1980), p. 263

[29] Bruno Maria Apollonj Ghetti, Antonio Ferrua, Enrico Josi, Engelbert Kirschbaum, *Esplorazioni sotto la confessione di San Pietro in Vaticano eseguite negli anni 1940-1949*, vol. 1, pp. 173-193

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[31] Liber Pontificalis 1957, p. 97, c. 57

[32] Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 46

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[34] Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 47

[35] Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 35

[36] Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 45

[37] Liber Pontificalis 1957, p. 97 c. 96; Antonella Ballardini, ‘La basilica di S. Pietro nel Medioevo’, p. 46

[38] Liber Pontificalis 1957, p. 97 c. 57

[39] Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 46

[40] Eugène Müntz, *Les arts à la cour des papers pendant le XVe e le XVIe siècle*, 3 voll, in 1, Olms Zürich (New York: Hildesheim, 1983), pp. 112-114

[41] Giovanni Guerra made this fresco in the Palazzo Apostolico Vaticano, Biblioteca Sistina, sala II, in the year 1586, faithfully following an engraving that he made previously, in the same year 1586, together with Natale Bonifacio da Sebenico, (which is preserved in The British Museum, nº 1892,0714.41.

[42] Domenico Fontana, *Della transportatione dell´obelisco vaticano e della fabriche di nostro signore Papa Sisto V* (Roma: Domenico Basa, 1590)

[43] The original edition of this book in which this image is: Carlo Fontana, ‘*Il Tempio Vaticano e sua origine. Con gli edifici più cospicui antichi e moderni fatti dentro, e fuori di esso*’ (Roma 1694), Stamperia di Gio, impresor *Giovanni Francesco Buagni*; There is also a recent literal reprint: Carlo Fontana, “*Il Tempio Vaticano e sua origine. Con gli edifici più cospicui antichi e moderni fatti dentro, e fuori di esso*”, *Giovanni Francesco Buagni* (Roma 1694), reprinted by Isha Books (New Delhi, 2013); and also a current edition: Carlo Fontana, m. 1694, and Giovanna Curcio, *Il Tempio Vaticano 1694* (Milano: Electa, 2003)

[44] Christoph Luitpold Frommel, *Architettura e Committenza, Da Alberti a Bramante*, p. 118

[45] Vincenzo Forcella, *Iscrizioni delel chiese e d’altri edifici di Roma* (Roma, 1869-1884), XII, p. 143

[46] Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 48

[47] Angiola Maria Romanini, *Roma anno 1300*, pp. 57-89; Antonella Ballardini, *La basilica di S. Pietro nel Medioevo*, p. 50

FIGURES 6

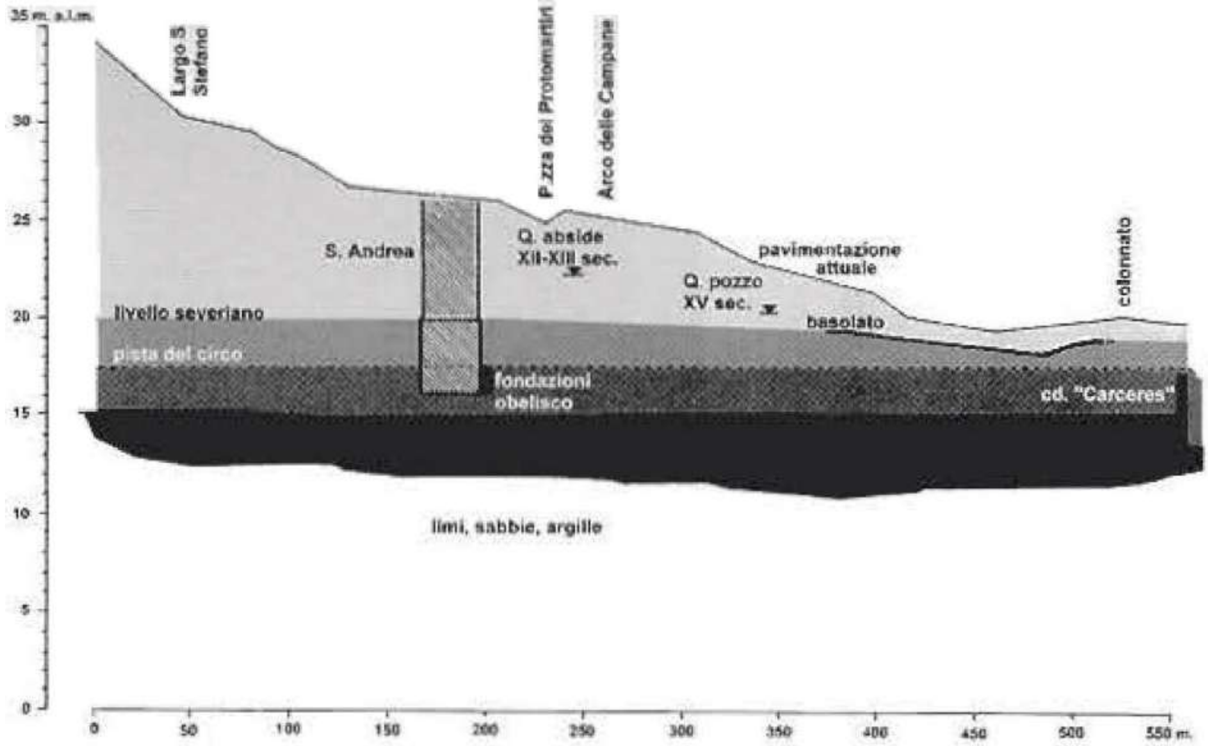


Figure 6.1

Magi section revised and corrected (to highlight the differences in height and the abscissas have different scales)

Paolo Liverani

Liverani, Paolo. *La Basilica di S. Pietro e l'orografia del colle Vaticano*. Vatican City: Monumenti, musei e gallerie pontificie (2006), tafel 173

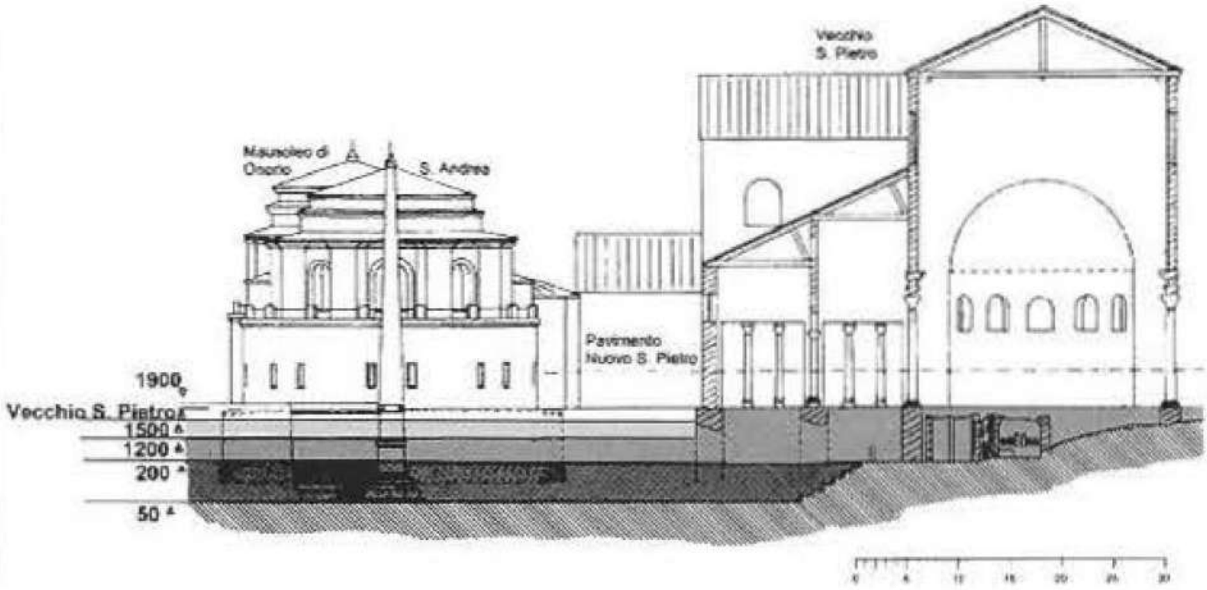


Figure 6.2

Succession of levels downstream of the Basilica

Paolo Liverani

Liverani, Paolo. *La Basilica di S. Pietro e l'orografia del colle Vaticano*. Vatican City: Monumenti, musei e gallerie pontificie (2006), tafel 173

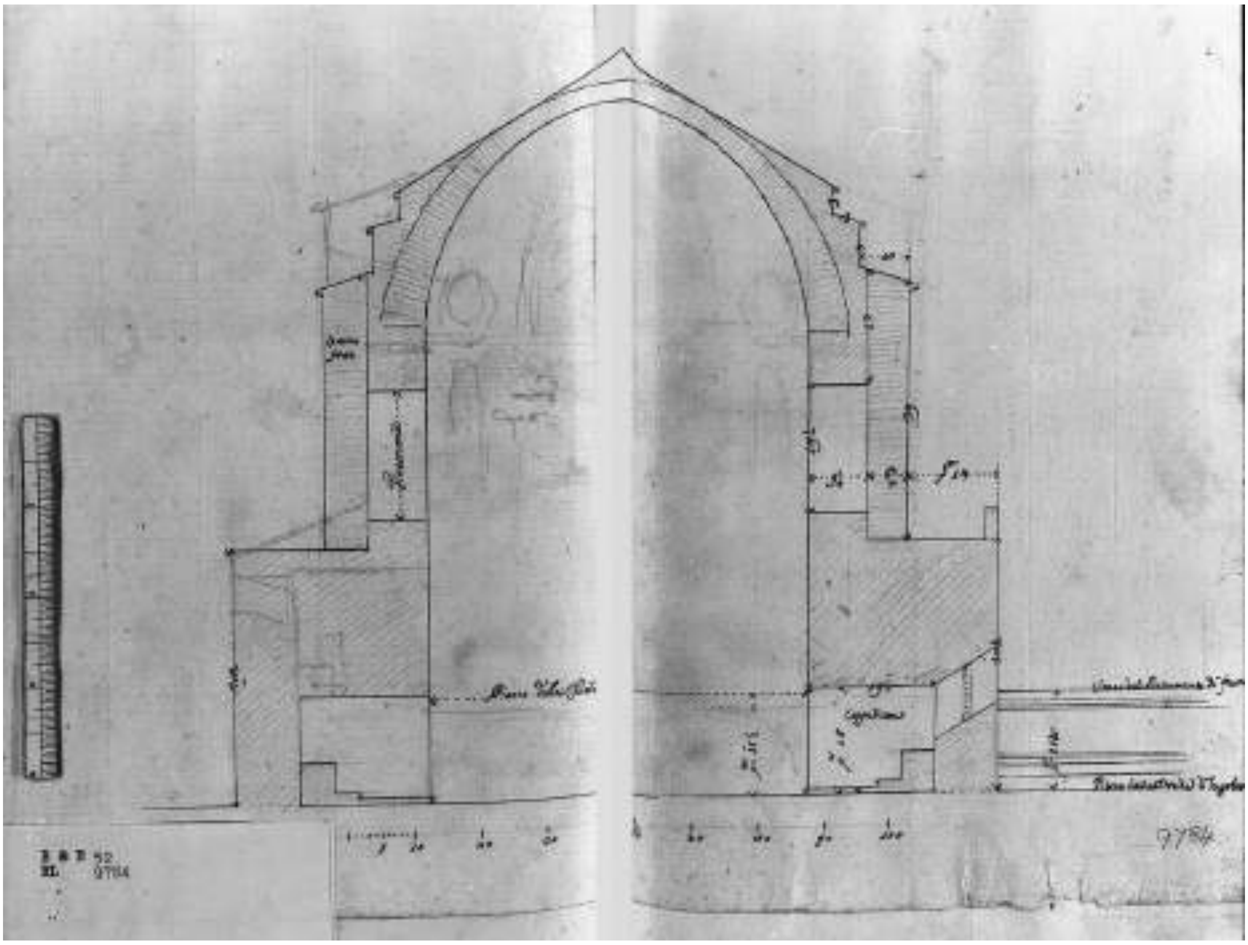


Figure 6.3

Section of *Madonna della Febbre*

Carlo Fontana

Royal Collection Trust, RCIN 909784

Figure 6.4

Sacre de Charlemagne. The coronation of Carlo Magno in San Peter in the 800's, In the medieval conformation of the basilica the rotae that adorned the floor are visible

Jean Fouquet, 1460

Grandes Chroniques de France. Bibliothéque National de France, Fr. 6465, f. 89v

Figure 6.5

Drawing of the mosaic of the Apse of the Old Basilica of S. Peter

Biblioteca Apostolica Vaticana, Barb. Lat. 4410, f. 28r

Figure 6.6

The apse mosaic of S. Peter before its destruction in the parchment signed by the notary Quintiliano Gargario, 1592

Biblioteca Apostolica Vaticana, Arch. Cap. S.Pietro A. 64ter, f.50

Figure 6.7

Apsida veteris Vaticanum ab Inocentio III. Watercolor mosaic of the apse of the Old Basilica

Giacomo Grimaldi, 1594

Biblioteca Apostolica Vaticana, Barb. Lat. 2733, f. 158v and 159r

Figure 6.8

Crossing pillars of new San Peter and the rest of the northern cross arm of the old Basilica

Maarten van Heemskerck, 1532-1536

Staatliche Museen zu Berlin, Kupferstichkabinett, no. 79 D 2, f. 13 recto

Figure 6.9

View of San Peter's Basilica from the left side

Maarten van Heemskerck, 1534-1535

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 51 recto

Figure 6.10

View of S. Peter from the south-east, towards the Cappella del Re and the sacristy, in the summer of 1580 (view of Francoforte)

Attributed to Maarten van Heemskerck (16th century Netherlandish school), 1580-1582

Frankfurt, Städelsches Kunstinstitut, cod. 814

Figure 6.11

View of San Peter from borgo Santo Spirito

Anonymous, Flemish (16th century Netherlandish school), late 1544

Biblioteca Apostolica Vaticana, cod. Ashby 330

Figure 6.12

San Peter in construction

Hieronymus Cock, 1561

Heinrich von Geymüller. *Die ursprünglichen Entwürfe für Sanct Peter in Rom von Bramante, Raphael Santi, Fra Giocondo, den Sangallo's u.a.m*. Wien, (1875). Planche 49, fig 2

Herzog Anton Ulrich Museum, Virtuelles Kupferstichkabinett, cod. HCock-Verlag WB 3.91

Detail

Figure 6.13

Coronation ceremony of Pope Sisto V Peretti. In the image, wich shows the left side of the basilica, is visible the obelisk that will be slowly transported to the front at the behest of Pope Sisto V, Fresco

Giovanni Guerra, 1585

Palazzo Apostolico Vaticano, salone Sistino

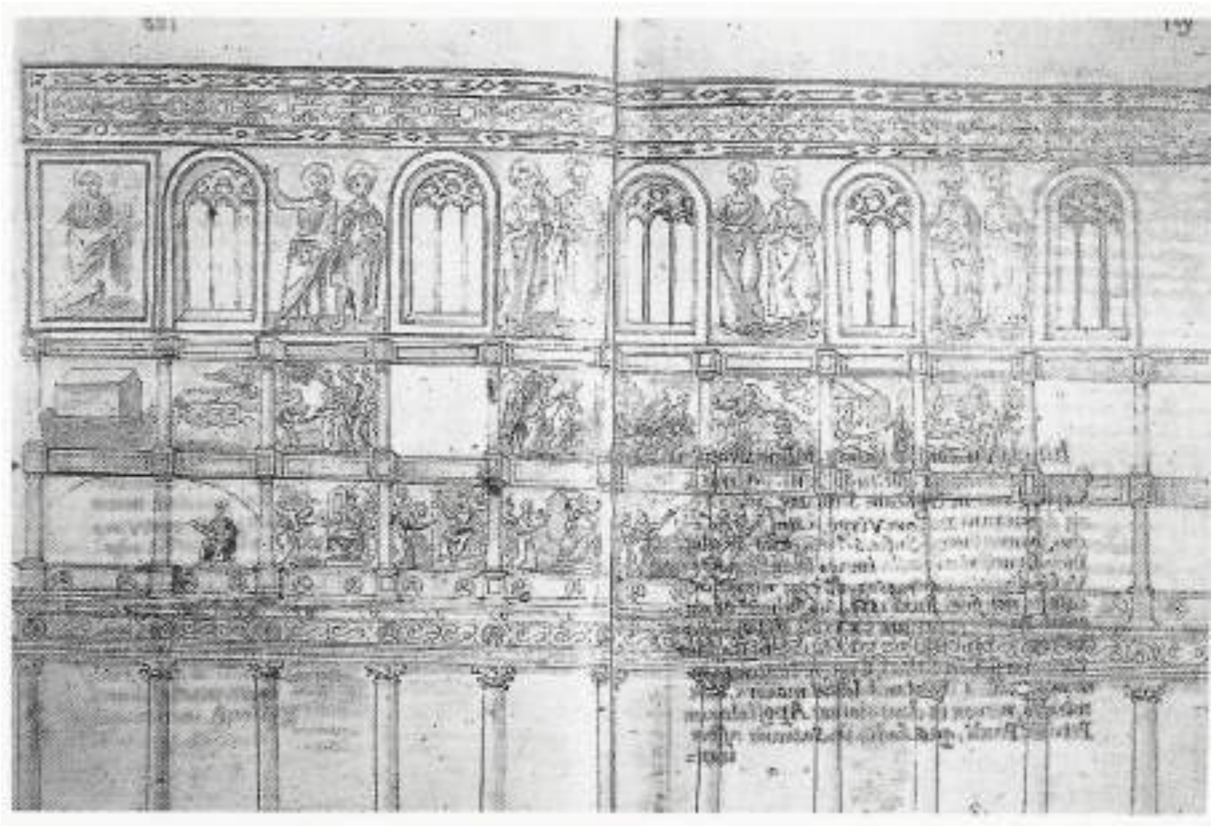


Figure 6.14

The northern colonnade from the eleventh column to the counter-facade; the frieze with the clipeate portraits of the popes; the paintings of the old testament; Giotto's angel and the figures of prophets between the windows with gothic tracery

Domenico Taselli

Biblioteca Apostolica Vaticana, Barb. Lat. 2733, f. 108v y 109r

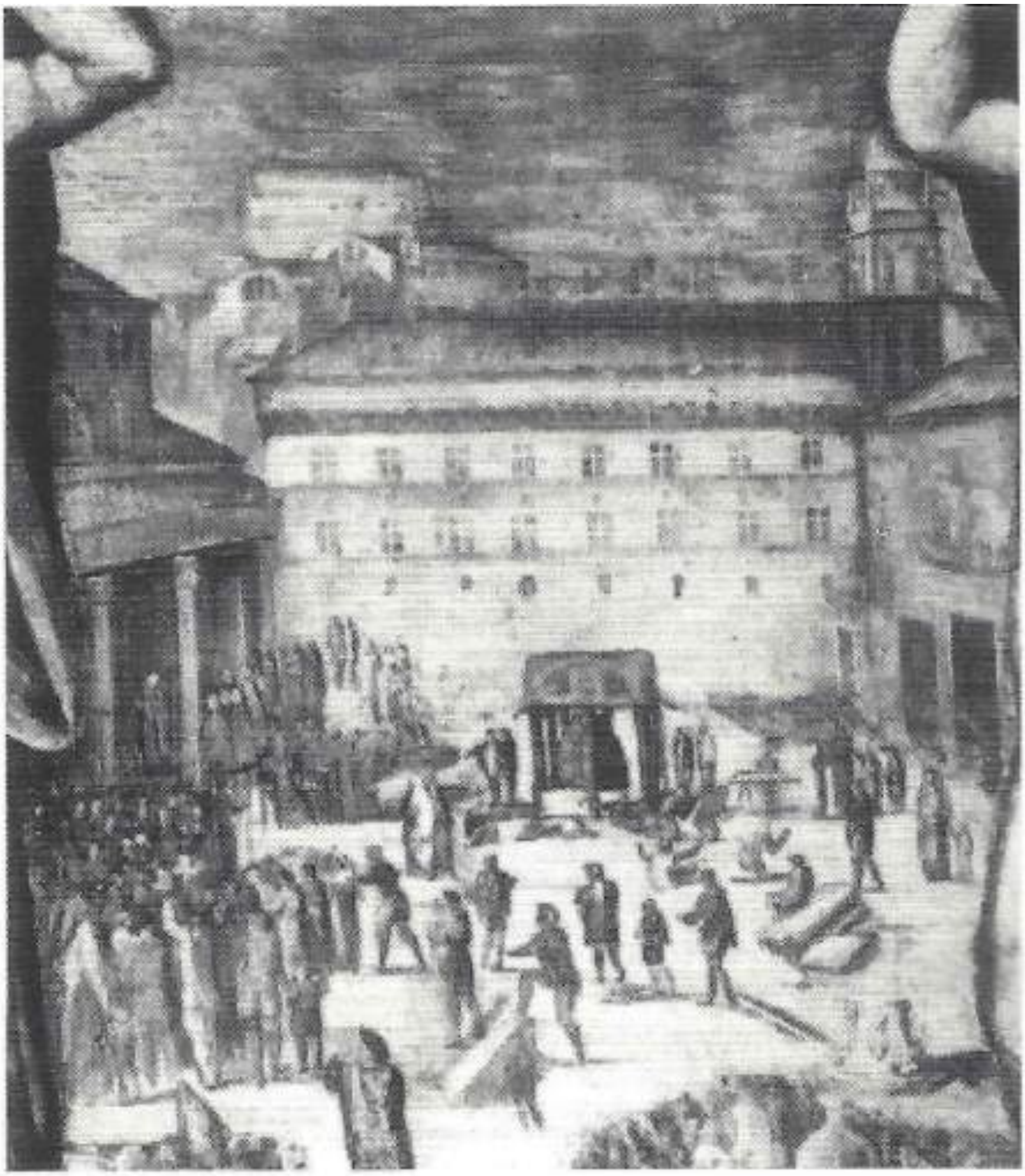


Figure 6.15

Detail with atrium of St. Peter

Anonymous, 16th century

Palazzi Vaticani, apartment of Giulio III

Figure 6.16

The Vatican obelisk

Anonymous and Antonio Lafréry, 16th century

The Metropolitan Museum of Art, cod. 41.72(1.111)

Figure 6.17

Carlo Fontana

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), p. 93

Figure 6.18

Domenico Fontana

Domenico Fontana. *Della trasportatione dell'obelisco vaticano et delle fabriche di nostro signore Papa Sisto V*, libro primo. Engraver Natale Bonifacio. Roma (1590), p. 8 recto

Figure 6.19

View of the works of the new basilica from the southwest, showing the obelisk and S. Andrea

Maarten van Heemskerck, 1534-1535

Staatliche Museen zu Berlin, Kupferstichkabinett, no. 79 D 2 a, f. 7 recto

Figure 6.20

Church of Santa Maria della Febbre. Saenredam did not paint the state of things in 1629 (then, saint Peter's was completed, and the obelisk had been transferred to the Piazza). He rather used a drawing by Maarten van Heemskerck from about 1532 and unhistorically stressed the romanticism of ruins. Even on the new substruction of Sant Peter's he placed weeds

Pieter Jansz Saenredam, 1629

National Gallery of Art, cod. 1961.9.34

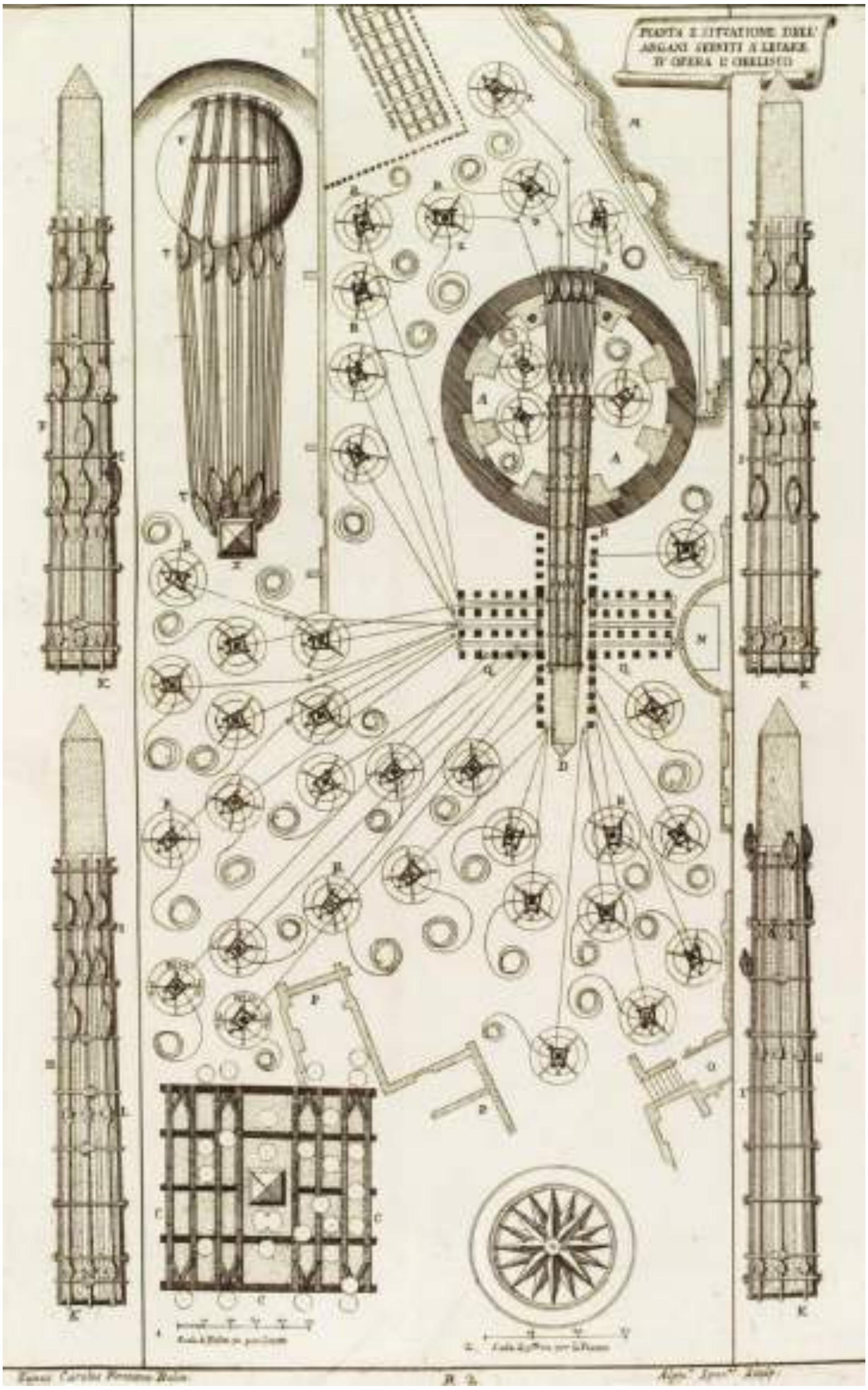


Figure 6.21

Pianta e situatione dell'argani serviti a'levare d'opera l'obelisco

Carlo Fontana e Alessandro Specchi

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694). f. 131

Figure 6.22

Ritorno di Gregorio XI da Avignone, in 1377

Fresco by Giorgio Vasari. 1571-1574

Sala Regia, Palazzo Apostolico, Rome

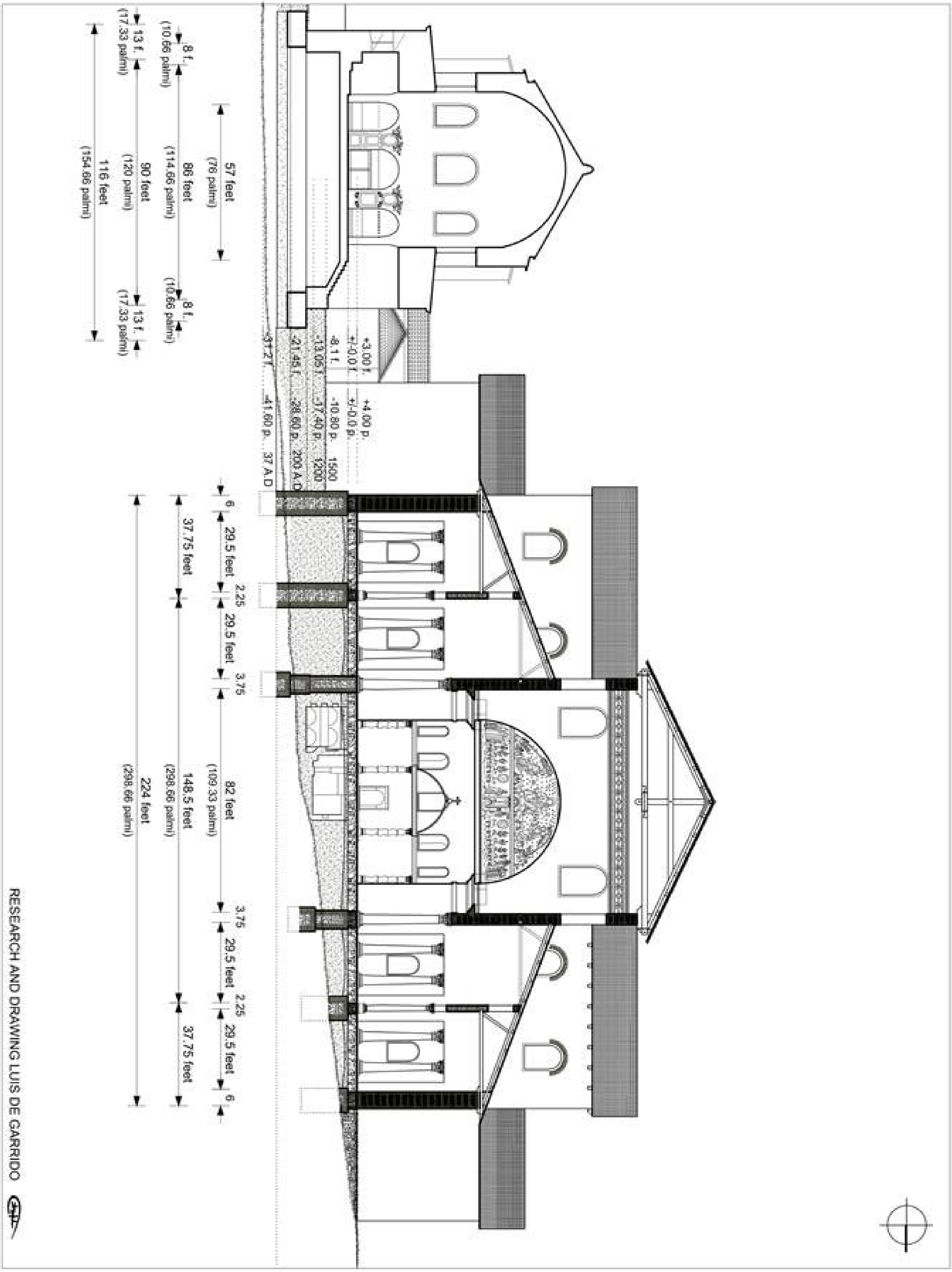
Figure 6.23

Old St. Peter’s facade

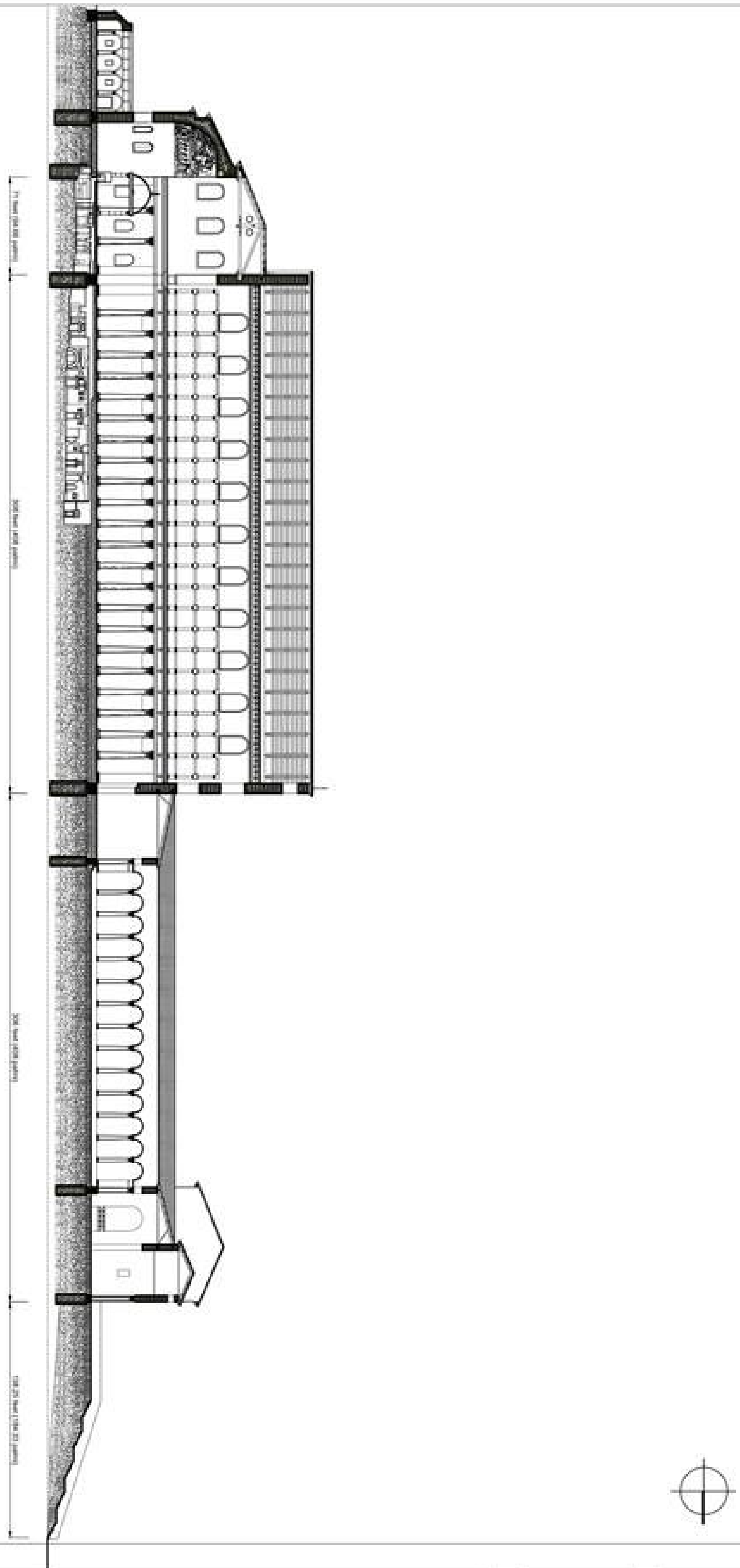
Giacomo Grimaldi, 1619

Biblioteca Apostolica Vaticana, Barb. Lat 2733, f. 152 v and 153 r

LAYOUTS 6

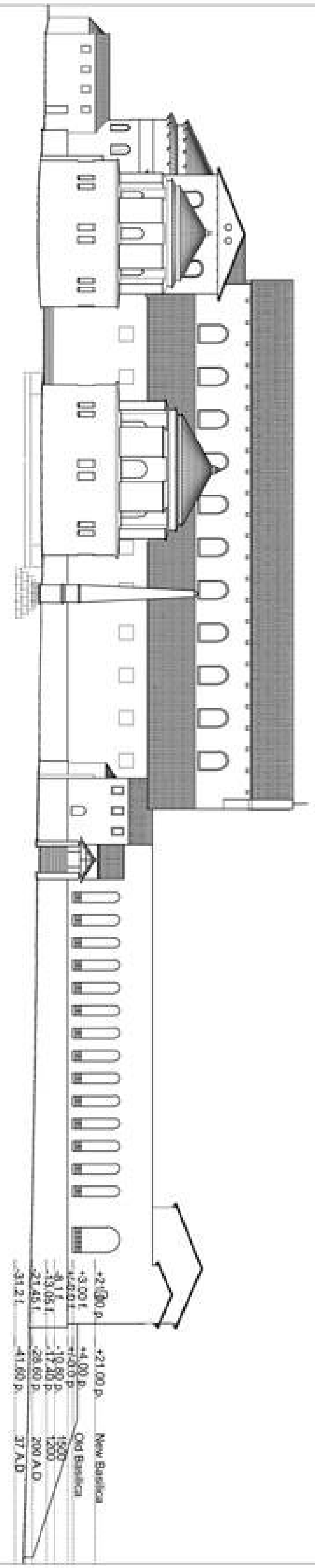


Cross section of the old basilica of S. Peter



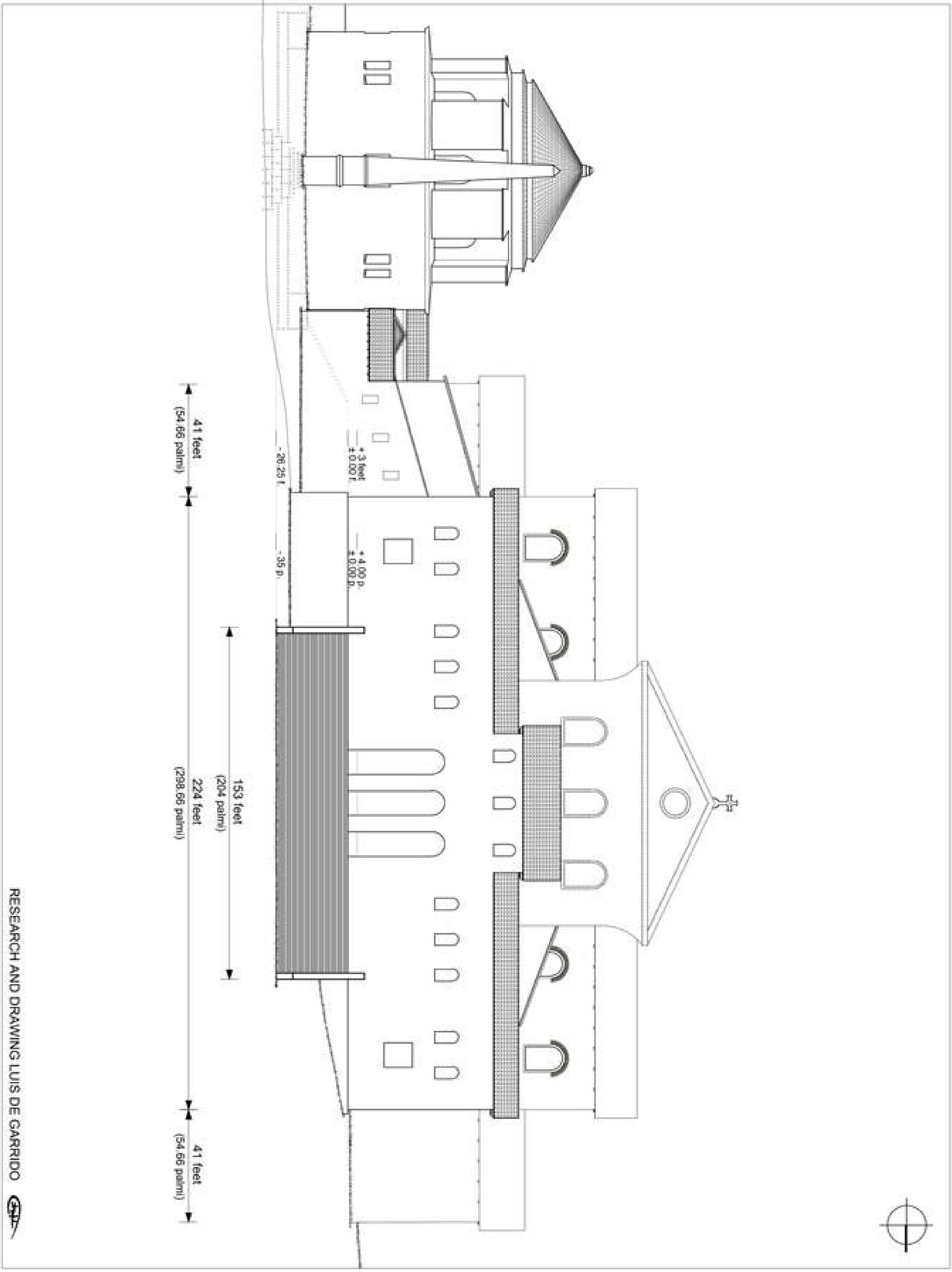
RESEARCH AND DRAWING LUIS DE GARRIDO

514	Longitudinal section of the old basilica of S. Peter, in 1003	OSP	LS-514

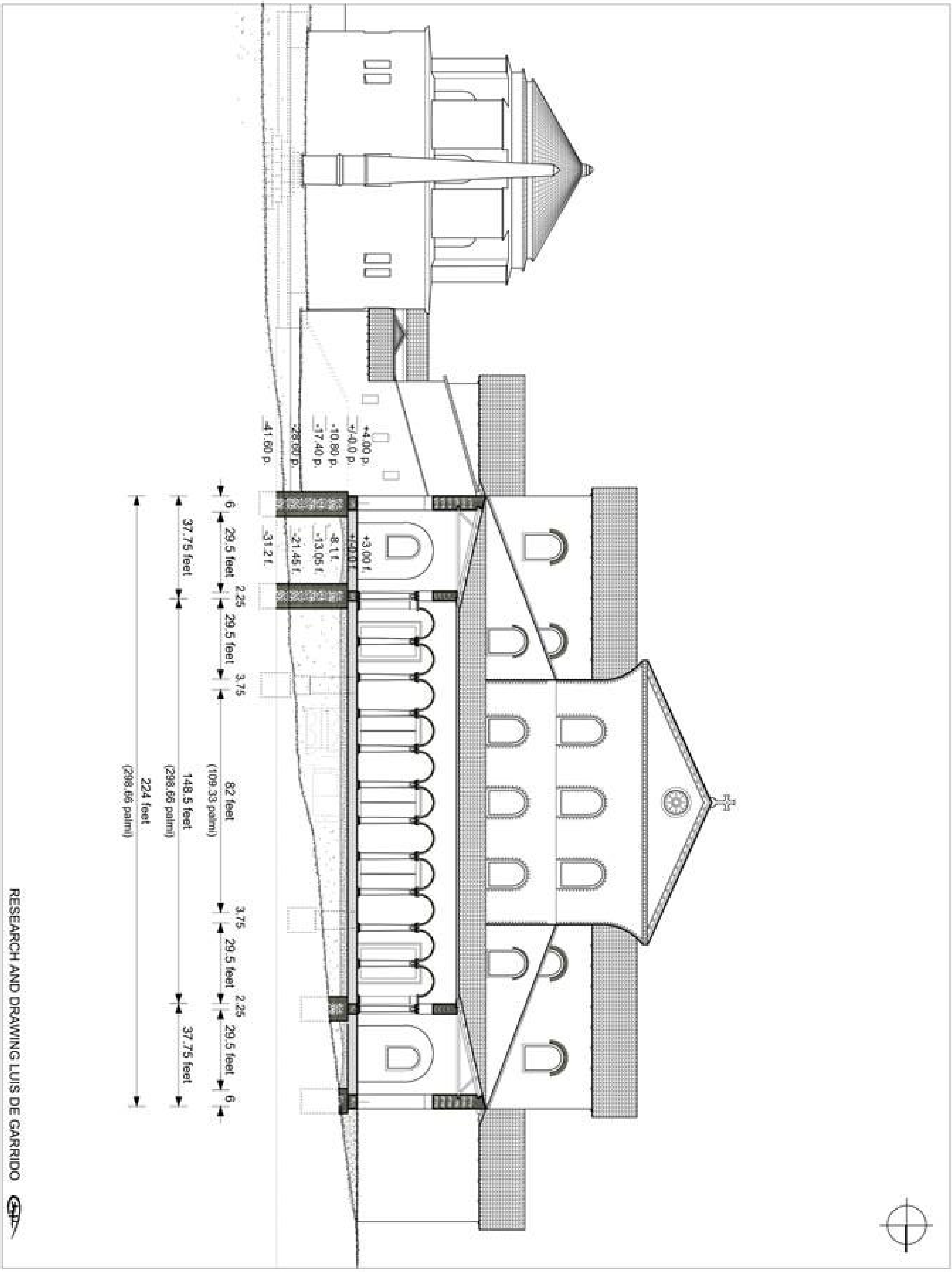


RESEARCH AND DRAWING LUIS DE GARRIDO

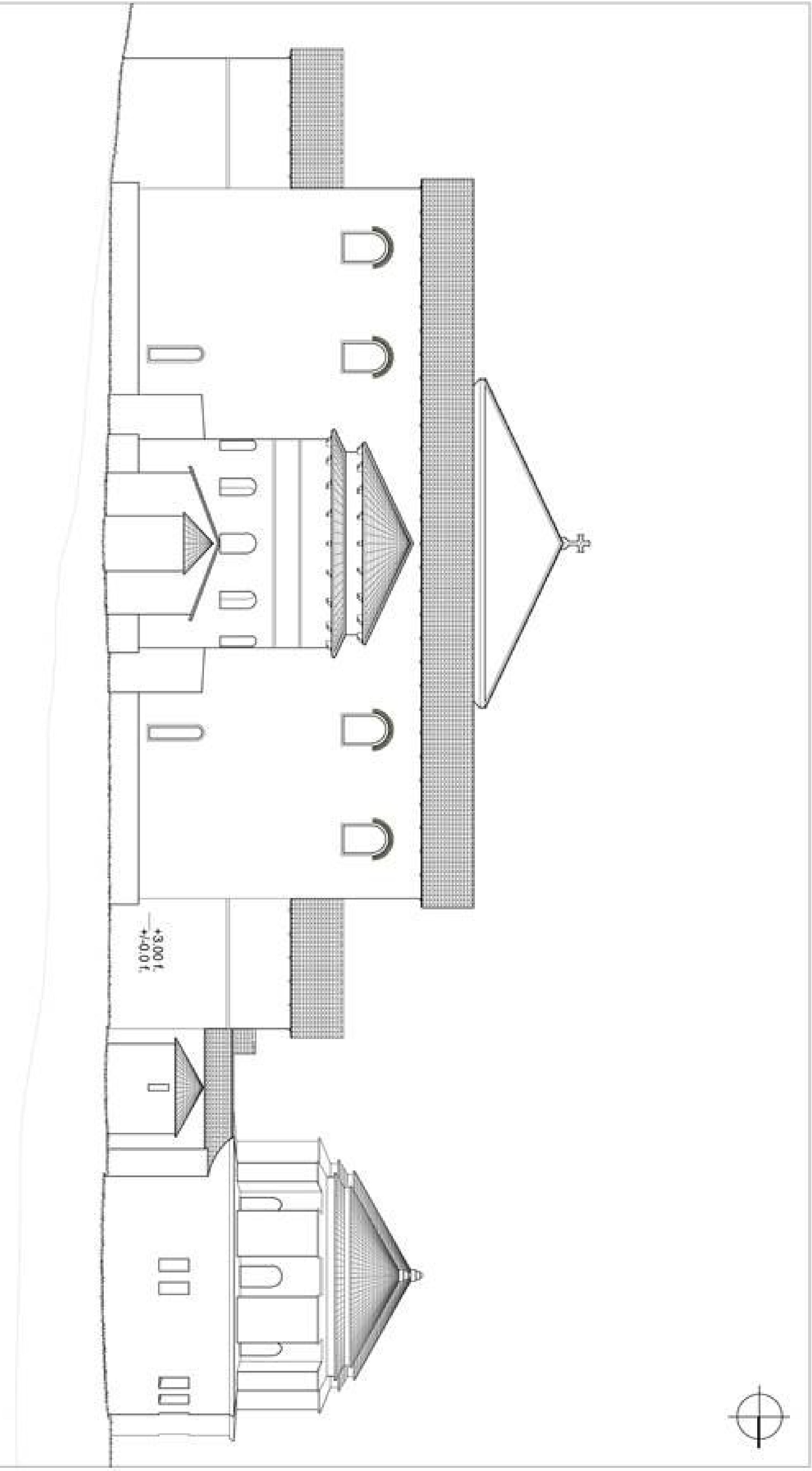
514	South facade of the old basilica of S. Peter	OSP	SF-514



514	East Facade of the old basilica of S. Peter	OSP	EF-514

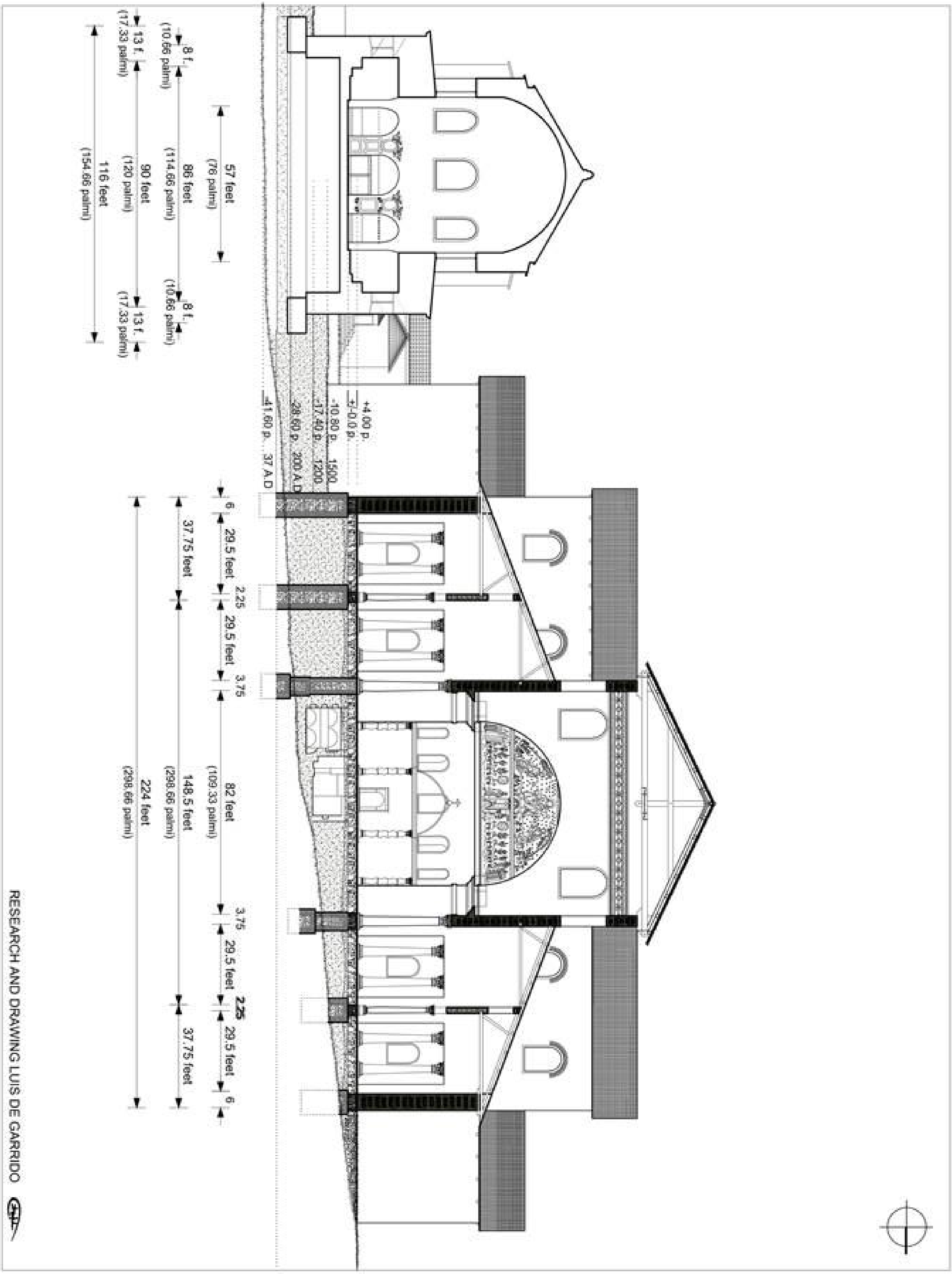


514	East facade of the atrium of the old basilica of S. Peter	OSP	EFA-514

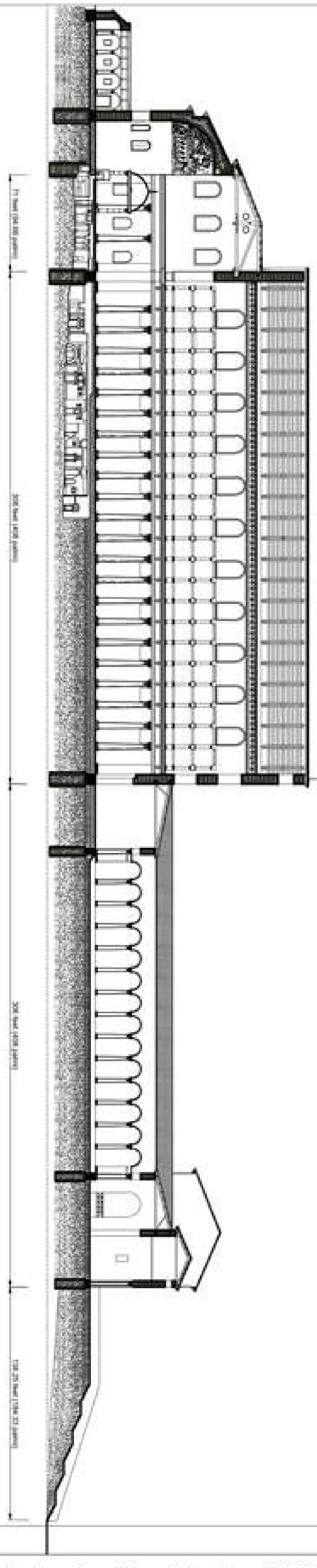


RESEARCH AND DRAWING LUIS DE GARRIDO

514	West Facade of the old basilica of S. Peter	OSP	WF-514

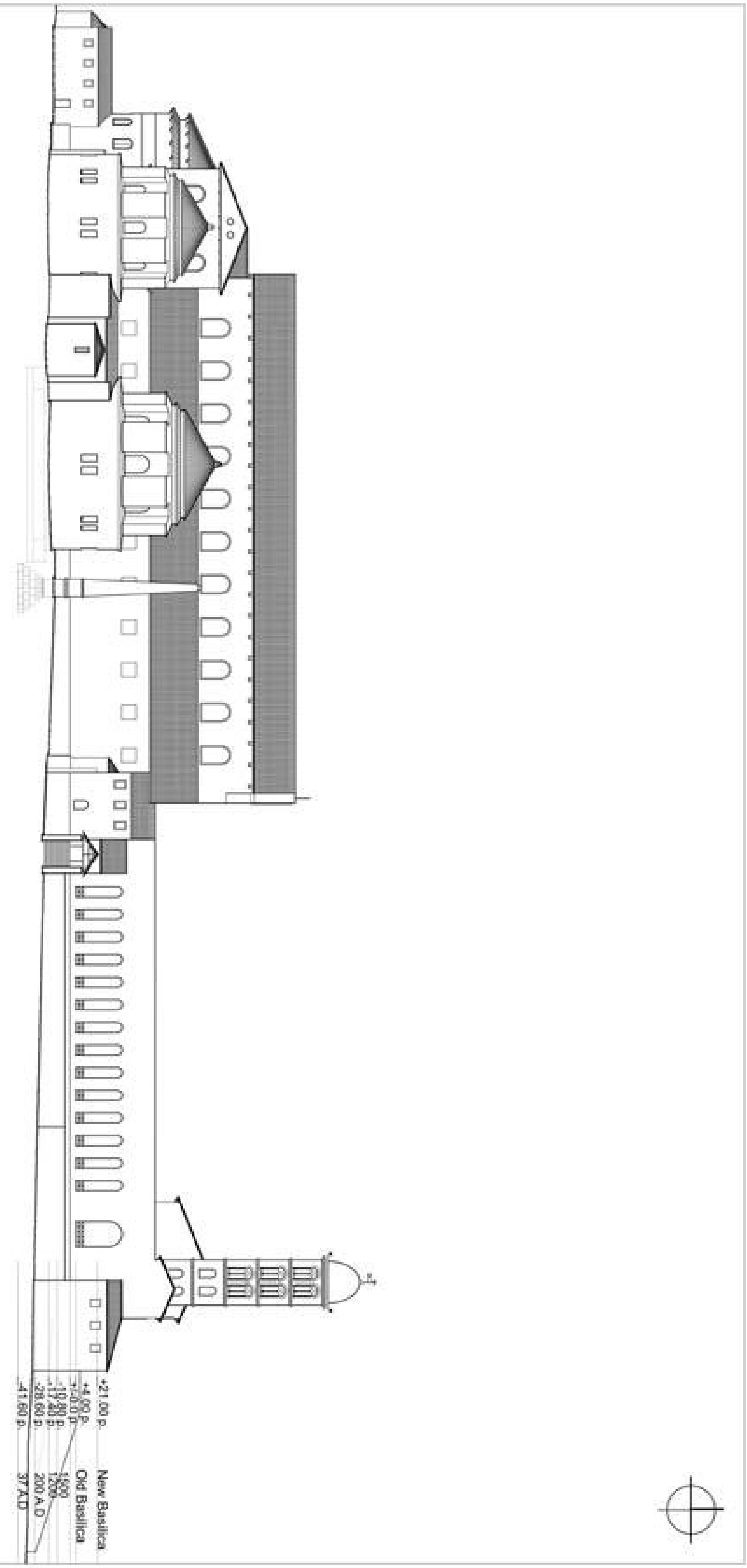


1003	Cross section of the old basilica of S. Peter	OSP	CS-1003



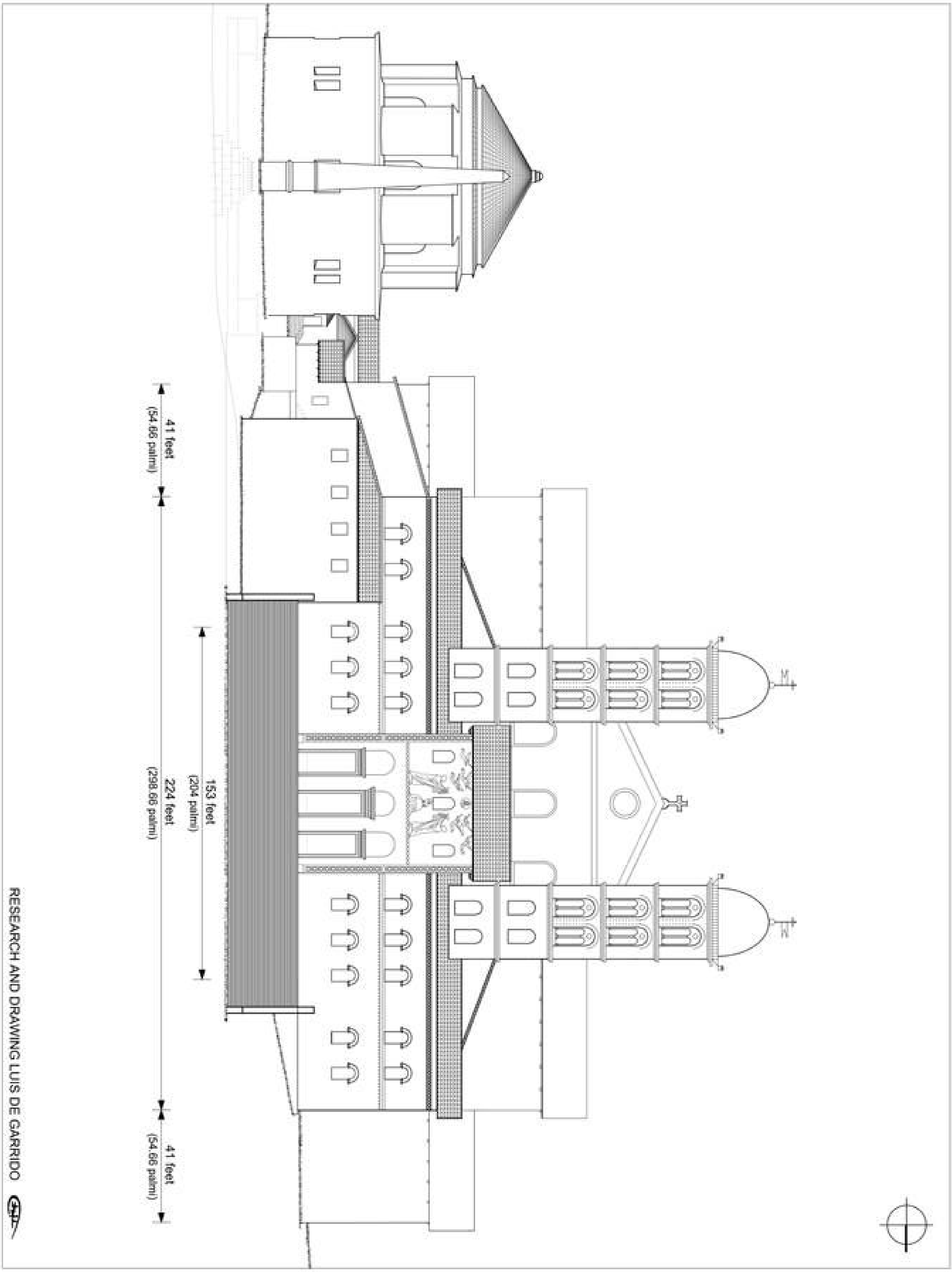
RESEARCH AND DRAWING LUIS DE GARRIDO

514	Longitudinal section of the old basilica of S. Peter, in 1003	OSP	LS-514

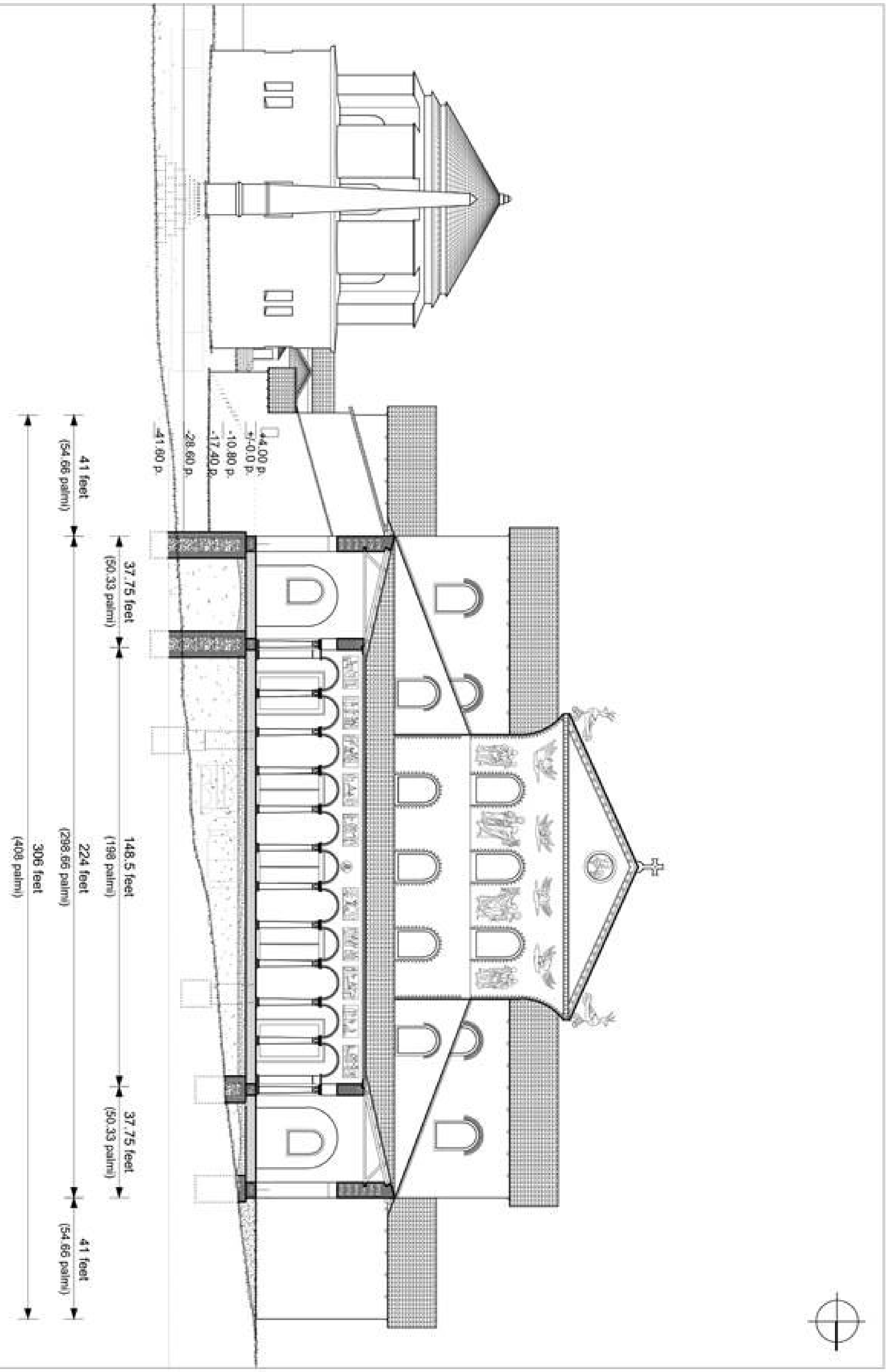


RESEARCH AND DRAWING LUIS DE GARRIDO

1003	SOUTH FACADE OF THE OLD BASILICA OF S. PETER	OSP	SF-1003

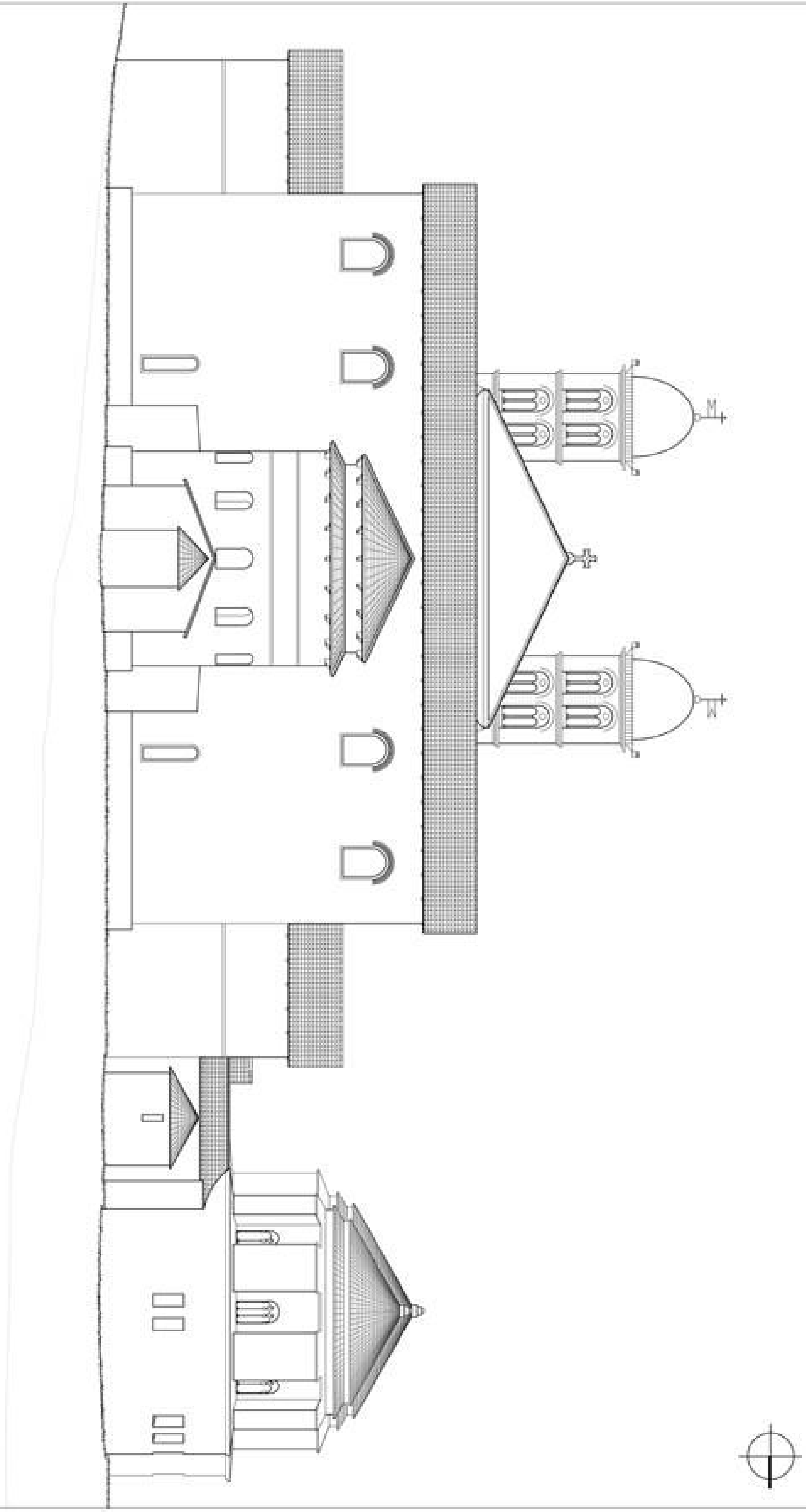


1003	EAST FACADE OF THE OLD BASILICA OF S. PETER	OSP	EF-1003



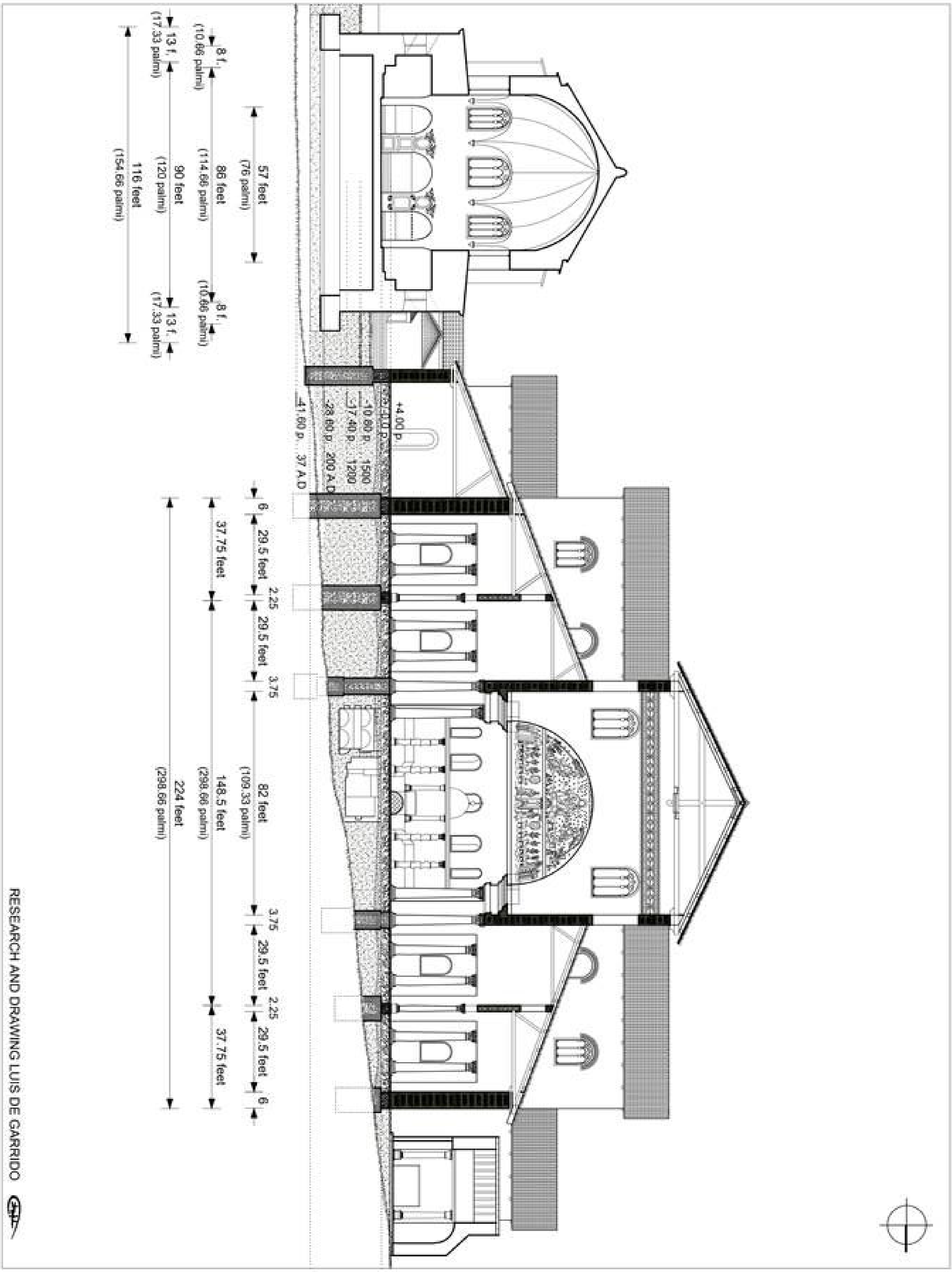
RESEARCH AND DRAWING LUIS DE GARRIDO

1003	East facade of the atrium of the old basilica of S. Peter	OSP	EFA-1003

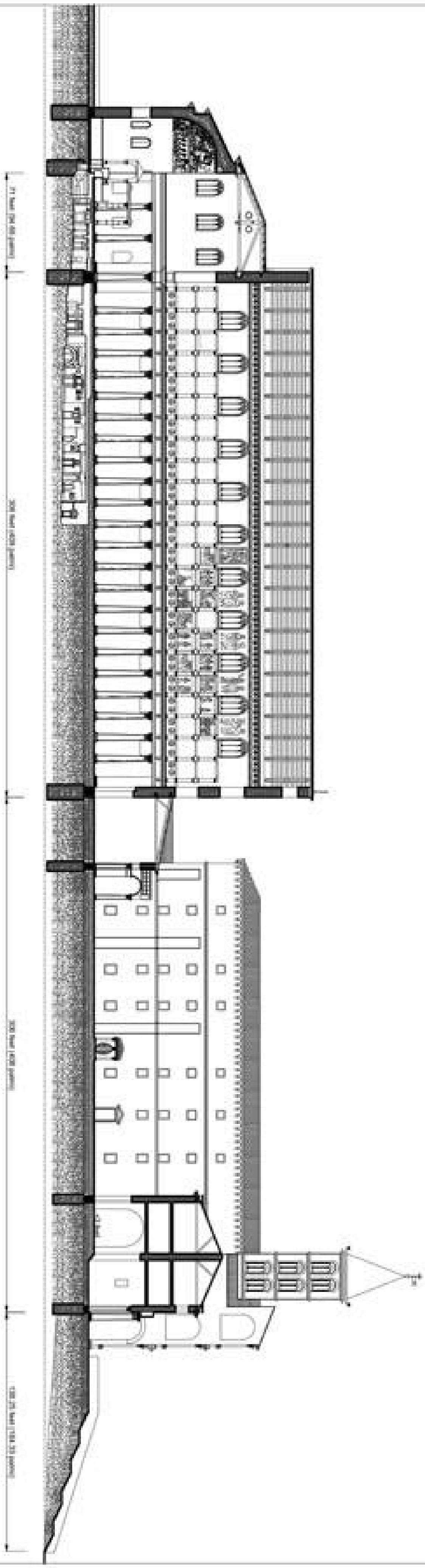


RESEARCH AND DRAWING LUIS DE GARRIDO

1003	West Facade of the old basilica of S. Peter	OSP	WF-1003



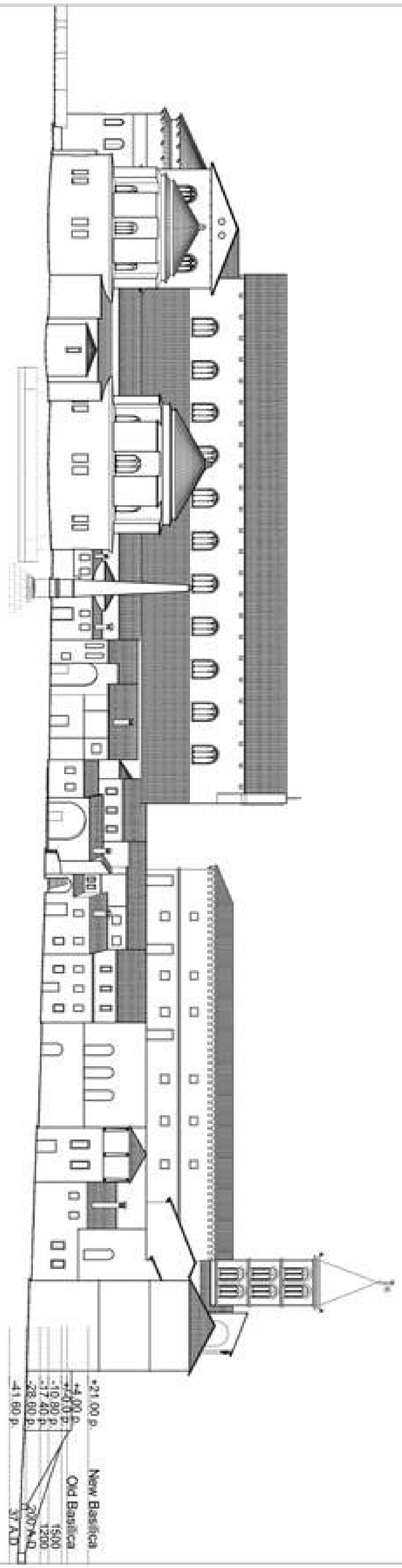
1505	Cross section of the old basilica of S. Peter	OSP	CS-1505



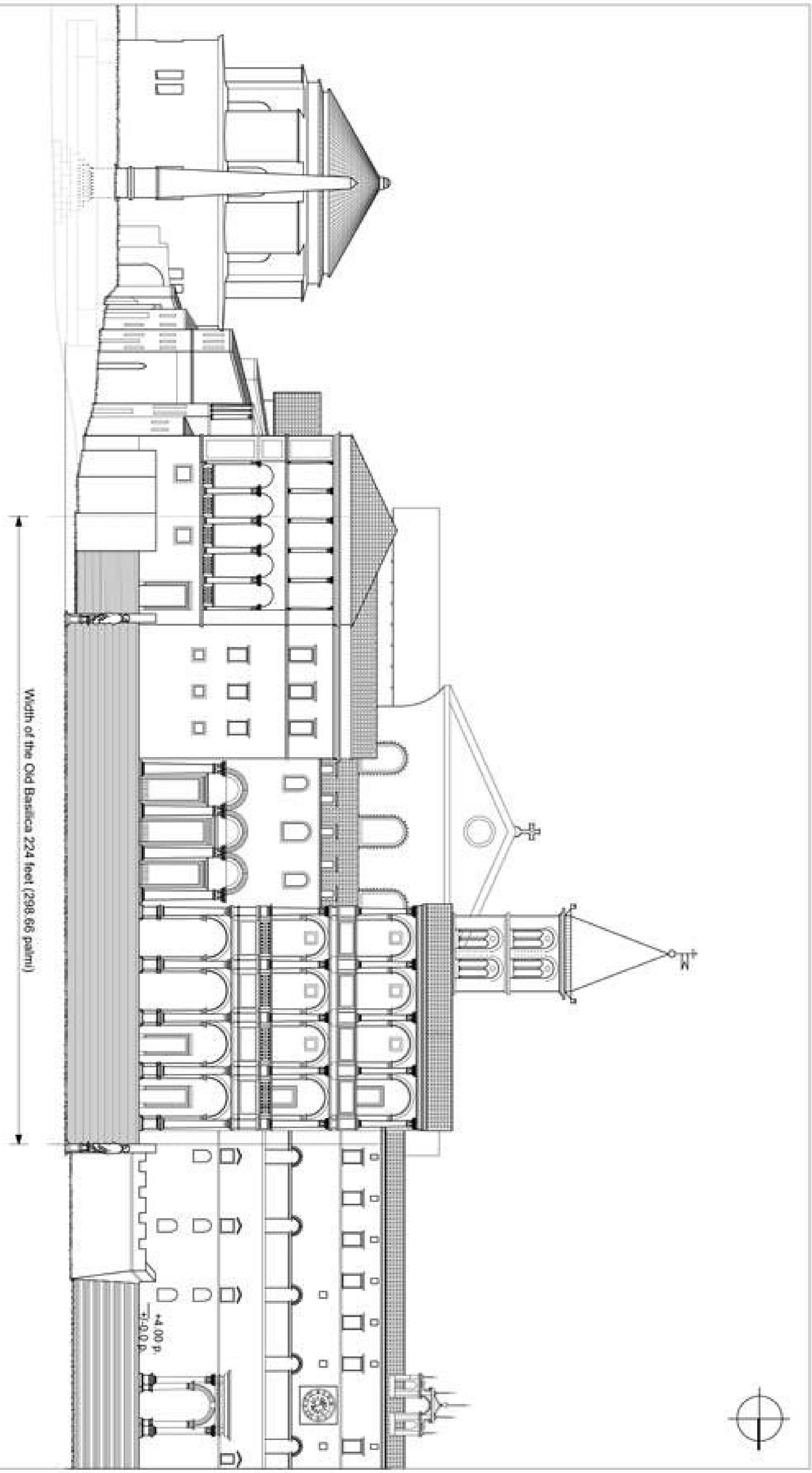
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	Longitudinal section of the old basilica of S. Peter	OSP	LS-1505

RESEARCH AND DRAWING LUIS DE GARRIDO

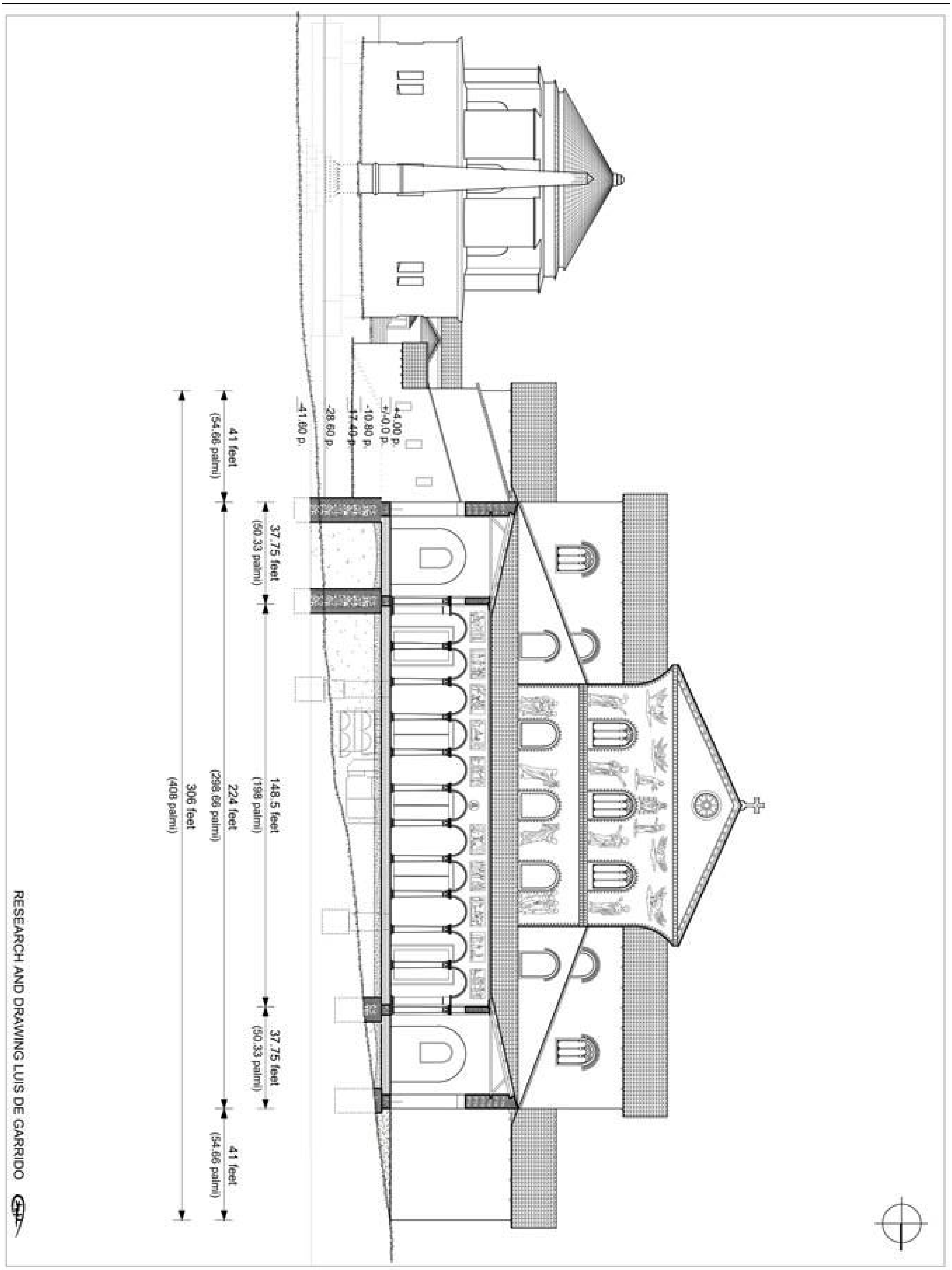


1505	South facade of the old basilica of S. Peter	OSP	SF-1505

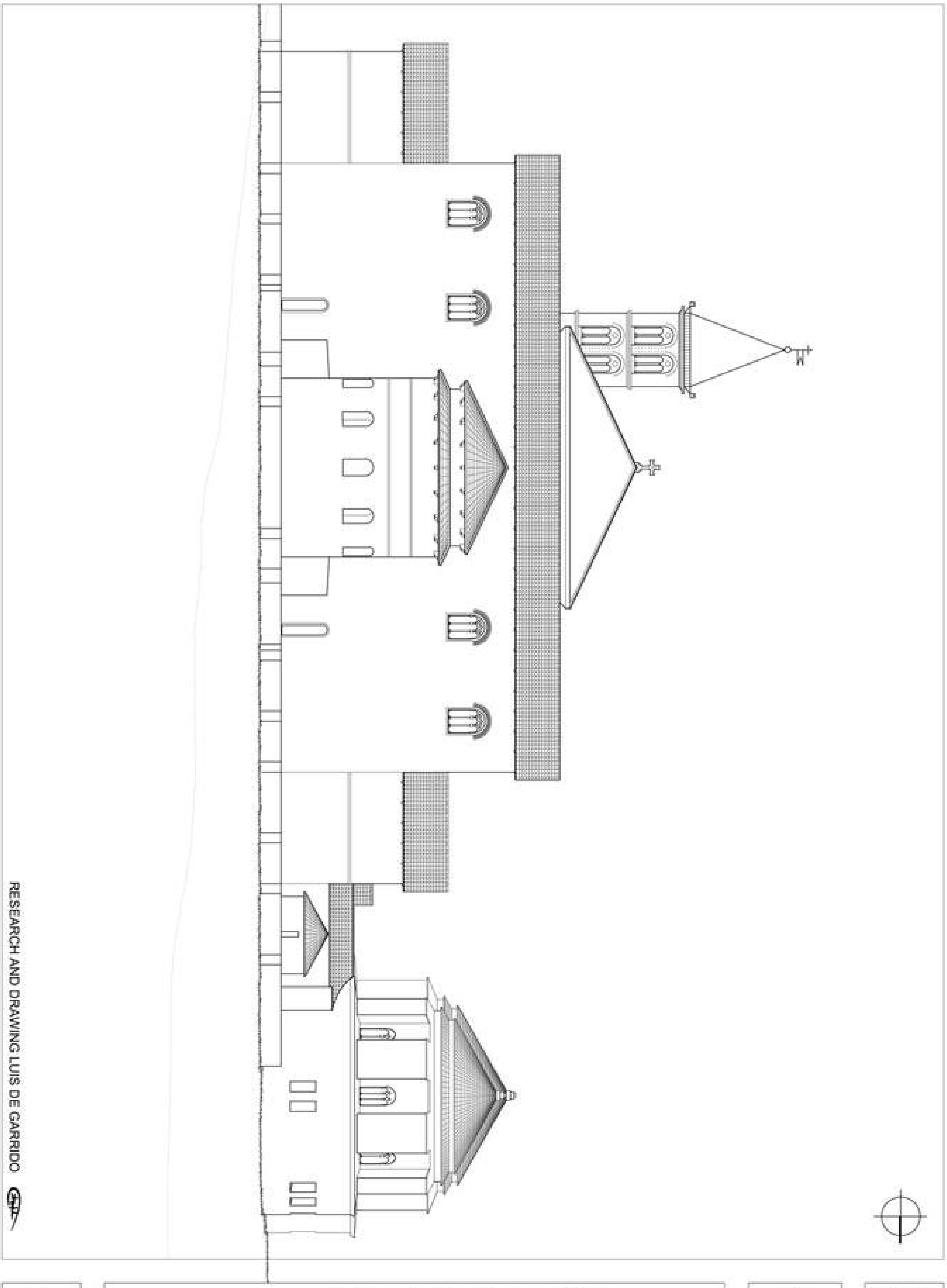


RESEARCH AND DRAWING LUIS DE GARRIDO

1505	East Facade of the old basilica of S. Peter	OSP	EF-1505



1505	East facade of the atrium of the old basilica of S. Peter	OSP	EFA-1505



1505	West Facade of the old basilica of S. Peter	OSP	WF-1505

CHAPTER 7

“*Come el tempo se muta in un momento, se muta el mio pensier che gli è sequace. Or ch'io credea solcar tal mar in pace, veggio alla vella*“

Bramante

Chapter 7. Historical analysis of the design and construction process of the new basilica of S. Peter

7.1. Difficulties in identifying the design process and construction process of the new basilica of S. Peter

7.1.1. Background in the identification of the design process and construction process of the new basilica of S. Peter

The basilica of S. Peter is a global reference for humanity, and its construction began thanks to the joint dream of two outstanding personalities, as Jacok Bruckhardt sublimely describes: "*Julius trovó nella riedificazione di San Pietro il grandioso simbolo visible del proprio orientamento; l'impostazione voluta da Bramante è forse la massima espressione che si conosca di un potere accentrato*" [1].
The design and construction of the new basilica of S. Peter was fraught with all kinds of problems and vicissitudes, but the result was great. Perhaps because of this, and beyond the great existing difficulties, many historians and researchers have been interested in reconstructing the design and construction process of the new basilica of S. Peter.
Perhaps the first time that attempts are made to give an idea of the chronology of the construction of the new basilica of S. Peter is the book by Filippo Buonanni, *Numismata Summorum Pontificium Templi Vaticani Fabricam indicata, Chronologica ejusdem Fabricae narratione, ac multiplici eruditione explicate,* appeared in Rome in 1696 [2]. This book provides an account of the papal medals related to the new basilica of S. Peter, completed with various sources and extensively documented [3]. Thanks to this book, for example, Johann Wolfgang Goethe was able to get an idea of the history of the new basilica, and published it in 1786 in his work *Sämtliche Werke nach Epochen seines Schaffens. Münchener Ausgabe* [4].
Years later, researchers such as Paul-Marie Letarouilly or Heinrich Geymüller did a fabulous job collecting, analyzing and classifying the enormous quantity of drawings in the Uffici Gallery in Florence. Letarouilly had to work at the Uffici before Geymüller, although his work was published a little later. Geymüller published his work *Die ursprünglichen Entwürfe für Sanct Peter in Rom*, in 1875 [5], while Letarouilly's work, *Le Vatican et la Basilique de Saint-Pierre de Rome*, began to be sold in 1878, edited by Alphonse Simil (architect assigned to the Commission on Historical Monuments) [6].

Geymüller had an important supporter and collaborator in his time, Constantin Jovanotis, who remained in his shadow at all times, but published several works such as *Forschungen über den Bau der Peterskirche zu Rom* [7] and *Zu den streitfragen in der Baugeschichte der Peterskirche zu Rom* [8]. Letatouilly's work continued to be investigated throughout, although it recently came to the attention of the historian Hubert, who published *Bramantes St. Peter-Entwürfe und die Stellung des Apostelgrabes*, in 1988 [9].

In the 60s and 70s of the last century, Franz Wolf Metternich and Christoph Luitpold Frommel stood out, among some others. In fact, Frommel, taking into account all the data previously collected and in order to illuminate the intervention of the project by Rafael, proposed a great analytical reconstruction of the design activity carried out until 1520, the year of Rafael's death [10].

His insightful observations provide an overview that can appear to be nearly complete and comprehensive. But, in reality, Frommel's proposal constitutes a more fundamental approach to the reconstruction of the tormented process of design and construction of the basilica between 1505 and 1520. It should not be forgotten, however, that the conceptual reconstruction of the different projects is based in little historical data, and in a series of inductions and hypotheses based on graphs and fragmentary texts that are sometimes apparently contradictory, and often imprecise or generic, and therefore susceptible to doubtful interpretations, and in many cases equivocal. Metternich correctly observed that the most obvious gap in the graphical data runs from the post-GDSU 1A studies to the drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31, which records at least in part what had been built up to the year 1515-1516 [11]. It is for this reason that this period has been given special importance in this thesis.

In the 1980s and 1990s researchers such as Franz Wolf Metternich, Christoph Luitpold Frommel, Arnaldo Bruschi, Christof Thoenes and some others, continued the conceptual and historical reconstruction of the design and construction of S. Peter [12]. These researchers continued with the process of data collection, which remained scarce and fragmentary, and with the process of creating a historical account that tried to coherently group these fragments.

7.1.2. General difficulties for understanding the design process and construction process of the new basilica of S. Peter

To understand the process of design and construction of the new basilica of S. Peter, we must first understand the design process in the Renaissance, as well as its relationship with the basic foundations of ancient architecture [13]. Once immersed in Renaissance design dynamics it is possible to understand the concrete process carried out in the design and construction of the new basilica of S. Peter, taking into account its enormous number of singularities.

Although the visitor to the new basilica of S. Peter walks its spaces from west to east, the history of its construction has been the other way around, that is, it has passed from east to west. Its design and construction process was very tortuous and plagued with all kinds of vicissitudes, and, in total, it lasted about 200 years, from its beginning, in the time of Pope Nicholas V, until its end in the time of Pope Alexander VII.

For this reason, when narrating the history of the building it may seem a good idea to adopt a logic of development from west to east. However, this would be a mistake, for three main reasons.

1. The first reason has to do with the fact that the construction process has resulted in a building that hides its genesis. From the beginning, in the time of Nicholas V, only a reform was desired that implied the temporal continuity, although transformed, of the old basilica of Constantine. However, this fact mutated in the time of Julius II, and the building acquired character, although it was not clear whether the reform of the existing basilica was being built, or the beginning of a new basilica, completely different from the existing one, already that the works proceeded slowly from west to east, and as they advanced, parts of the old one were demolished, with which it was linked throughout the construction process. At the beginning of the works, in the time of Julius II, the new basilica should at all times testify to the primacy of the Bishop of Rome, constituting a *Templum Petri*. And this fact acquired greater evidence as the work progressed, and even the Counter-Reformation ideologues went so far as to deny any essential difference between the old and the new building, since although the architectural structure of the basilica was changed, it was not changing its essence. Therefore, each new project had as its objective the construction of a new basilica in its entirety, and the conceptions of the building did not proceed from one another, but rather overlapped, erasing each other, even reaching the physical destruction of parts already completed. In each era it was known that only a homogeneous architecture in itself could be able to

highlight the power of the Church of Rome, centered on the figure of the Pope. Therefore, the chronology of the construction of San Pietro cannot be illustrated on the basis of the evolution of an architectural shape, such as the growth of the trunk of a tree with its annual rings. The description remains linked to the narrative, and vice versa.

2. The second reason is related with the long duration of the construction process. While the enormous building advanced very slowly, new architects succeeded each other, each with their own ideas, who also competed and collaborated with each other at all times. As a consequence, a *sovrabbondanza di idee* was generated, greatly distancing the design process from the construction process, and generating in a certain way a *virtuous* architecture of S. Peter, in front of which the material building appears as a weak image, it contains only a fraction of the architecture that its designers had in mind. In certain phases of the process (for example, while Antonio da Sangallo was working on his latest wooden model), the link between the design process and the construction project appears to have been completely broken. In addition, the already completed parts of the building set limits to the design process, since each project was supposed to respect and integrate what was built. However, this was not always the case. From the beginning of the design and construction process, Bramante began a double game, building at the same time the robust genesis of his project, the "central core of Bramante", and its greatest obstacle, the apse of Julius II. Many later architects created a multitude of projects integrating the apse of Julius II (and therefore reducing the quality of their projects), although the solution was to tear it down, as was done years later. The same happened with the "niche of Fra Giocondo", and with the southern ambulatory of Rafael and Antonio da Sangallo, or with the construction of the first longitudinal building of Maderno. Many projects were made trying to integrate these already built parts into a complete and coherent project. However, after countless unsuccessful attempts, the only valid solution was to tear down those parts. In fact, until the end of the S. Peter works, it was continuously decided to demolish part of what was built, to advance the construction based on a new project.

3. The third reason has to do with the enormous variations in the balance of decision-making powers over the work. Usually there is a tendency to describe historical events from a general development perspective, and they narrate the events in a simplified way. However, the moments of unanimity between the actors involved in the construction of the new basilica of San Pietro are very rare, and on the contrary, the general rule were antagonisms, and even open conflicts, whose traces are found

throughout its history. On the one hand there were pontiffs, some very active politically, and endowed with great determination, who indicated the direction to follow, such as Nicholas V, Julius II, Paul III, Sixtus V, Paul V, Urban VIII, or Alexander VIII. But also in the *pontificati intermedi*, events of great importance for the future of construction occurred (for example, under the successors of Julius II, the compromise reached between innovators and conservatives, between desires and the principle of reality; or after Paul III, the return to the ecclesiastical tradition and the cult of memory). On the other hand, there are the architects who, in the course of some pontificates, emerged to the fore, and in some cases, claimed command, as happened with Bramante, Michelangelo and Bernini, who led the construction under the power of their own arts. On the other hand, other architects had less character, and proceeded in a more or less creative way, to the directives of the papacy, such as Antonio da Sangallo or Maderno. But, popes and architects were involved in a commitment, whose spatial and temporal magnitude went beyond their personal capabilities, even beyond the economic resources at their disposal. Ultimately, it was an impossible battle to win, and of which even the founding pope, Julius II, had to recognize in the last years of his life. In fact, in the 16th century none of the protagonists of this story was destined to achieve the goal. Only in the seventeenth century were the means found to carry out the building according to its concept. Perhaps this coincided with the moment when an architect and a pontiff (Bernini and Alexander VIII) were able to collaborate jointly and constructively.

7.1.3. Difficulties in identifying Bramante design process

Some researchers are of the opinion that, in addition to the mentioned difficulties, the initial stage of the design process for the new basilica was also hampered by the unusual characteristics of Bramante's design method [14].

During his stay in Milan, and also later in Rome, Bramante used a pyramidal design methodology in which initially he only determined the location and general characteristics of the architectural elements, and later he was defining them, being able to gradually make even substantial variations, not only in the details, but also in some parts of the floor plan structure. As if that were not enough, the changes were made both before and after the execution of the works had begun.

The first idea of some of his projects, such as the Belvedere, the Palazzo dei Tribunali, or the fortress of Civitavecchia, in Loreto, is roughly expressed, geometrically locating all the architectural elements of the complex in its most important characteristics. Some parts of this project are even susceptible to considerable changes throughout the design process, not only from program reviews but also from new ideas that it may generate itself (since, as Vasari says, Bramante is "*risoluto, presto e bonissimo inventore*").

Bramante's design process before and after the start of the works of the new basilica was very tormented, no doubt due to the discrepancies between his ideas and the requirements of Pope Julius II [15]. Based on the analysis of the drawings attributed to him, Bramante wanted a novel, compact and resounding building, in which all the architectural components were intimately integrated and related to each other, forming a hierarchy of interlocking spaces. This objective was clearly utopian since it had to take into account the requirements of Pope Julius II and the solution should be integrated into a complex and chaotic built environment. For this reason, once his first ideas were rejected by the pope, Bramante focused on achieving a new typology that would integrate a quincunx typology with a typology of naves, in such a way that the building would preserve its architectural purity and at the same time could extend longitudinally up to Square. However, the biggest problem, perhaps unsolvable, was the fact that the Pope wanted the foundations of Nicholas V to be used to house his own tomb. Clearly, this requirement was incompatible with Bramante's ideas, and a stormy and ambiguous design process began. There was no possible way to integrate Bramante's sublime architectural proposal with the partial mediocrity built by Nicholas V, that only made sense within the framework of his reform project, and therefore it was perceived as a strange, vulgar and unwanted object.

Bramante's design process was very dynamic, since as he made changes, new problems of all kinds arose, which he in turn tried to solve by making new changes, and so on. In fact the projects that are known from Bramante GDSU 3A; GDSU 1A; JSM, codex Coner, f. 18; GDSU 7945 and GDSU 20A do not correspond to what was started to build, as represented in the famous drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31. This drawing shows the state of the works between 1515 and 1516, although Frommel and Wolff Metternich rightly point out that it also shows parts of the construction planned, but not yet built in 1515 [16].

7.1.4. Difficulties in identifying the design process of the new S. Peter after Bramante

After Bramante's death the problems multiplied. Bramante had the reins of the process, and his biggest problem (perhaps the only important one) was the desire of Julius II to take advantage of the foundations and the shape of the arm partially built by Nicholas V. Despite the fact that Julius II inaugurated a form of collaboration-competition between three architects, this was not a problem for Bramante, since he knew how to handle and control Giuliano da Sangallo and Fra Giocondo.

However, since the death of Bramante, the collaboration-competition between three architects did not suppose any advantage, since hardly any agreements were reached between them. Bramante's successor, Raffaello, despite enjoying the favoritism of Leo X, was unable to defend Bramante's ideas with enough strength, despite having everything in his favor. Antonio da Sangallo's lack of talent and Peruzzi's meekness didn't help either, and the design and construction process slowed down, and in many cases stalled. Only in the short period of time in which Antonio da Sangallo had a certain role did the construction process accelerate a bit. But fortunately Antonio da Sangallo seemed to be more concerned with building a wood model than with the real building. And this gave rise to a new overwhelming personality, Michelangelo, taking command of the construction, and respecting the essence of Bramante's project, he provided an unparalleled boost to the design and construction process, demolishing the little that Antonio da Sangallo had built. Michelangelo evidently ignored his supposed collaborators and ended the collaboration-competition strategy between three architects devised by Julius II. The impetus he provided to the works was sufficient that his successors had no choice but to accept his ideas, and continuing the works according to Michelangelo's project. However, some years after Michelangelo's death the functionality of his building was questioned and its centralized architectural structure was modified and extended by means of a typology of naves in the direction of the square.

No project carried out by Bramante's successors was *definitivo*, since all of them are, paraphrasing Arnaldo Bruschi, *ipotesi di progetto* [17]. Both the drafts, preparatory projects, discarded projects, definitive projects, delayed projects, approved projects, *ufficiali* projects carried out on parchment ... all were simply *ipotesi di progetto*.

These *ipotesi di progetto* had to be presented as possible solutions of maximum use for the execution, capable of being developed and deepened with the clarification of the details, but they could also be revised or discarded later. Furthermore, as is well known, not even Antonio da Sangallo's twisted strategy, consisting of making a grandiose and very expensive model and speeding up the works as much as possible, was a guarantee of success to safeguard his proposal, and defend it from the proposals of Michelangelo. In fact, Michelangelo proposed a very different solution and demolished everything built by Antonio da Sangallo, which meant a huge economic cost and a significant delay in the construction process.

This singular and tortuous way of working was created by Julius II, with the competence of Giuliano da Sangallo and Bramante and with the initial consultation of Fra Giocondo [18]. And in one way or another it continued until the end of construction.

History seems to have given the reason to Bramante, Michelangelo and Bernini, since under their mandate the works progressed adequately and at an enormous rate. It seems proof that the genius cannot work in a team since the team hinders the creativity and work capacity of the genius. The team, far from helping the genius, hinders him.

7.1.5. Stages in the construction of the new basilica of S. Peter

Many historians have proposed several stages in the design process of the new basilica of San Pietro in Vaticano [19]. Thoenes's classification is especially interesting, establishing three periods. The first from 1503, until the sack of Rome in 1527. The second from the resumption of work under Pope Paul III (1538) until the appointment of Pope Paul V (1605). The third from 1605 until the completion of the works.

Without a doubt, several types of classifications can be established, and in this work I have proposed an exhaustive classification, very detailed, including the period of Nicholas V, whose modest initial works were decisive and very binding in the first years of the construction of the new basilica. , and emphasizing the key period.

Period 1 (1447-1503)	Nicholas V - Pius III
Period 1.a. (1447-1455)	Nicholas V, Bernardo Rosellino, Alberti
Period 1.b. (1455-1503)	Francesco del Borgo, Giuliano Sangallo, Meo del Caprina
Period 2 (1503-1534)	Julius II - Clement VII
Period 2.a. (1503-1513)	Bramante
Period 2.b. (1513-1514)	Bramante, Fra Giocondo, Giuliano da Sangallo

Period 2.c. (1514-1515)	Fra Giocondo, Giuliano da Sangallo, Raffaello
Period 2.d. (1515-1520)	Raffaello, Antonio da Sangallo, Baldassarre Peruzzi
Period 2.e. (1520-1534)	Antonio da Sangallo, Baldassarre Peruzzi
Period 3 (1534-1605)	Paul III - Paul V
Period 3.a. (1534-1546)	Antonio da Sangallo, Baldassarre Peruzzi
Period 3.b. (1546-1564)	Michelangelo
Period 3.c. (1564-1602)	Giacomo della Porta
Period 3.d. (1602-1605)	Carlo Maderno
Period 4 (1605-1667)	Paul V - Alexander VII
Period 4.a. (1605-1629)	Carlo Maderno
Period 4.b. (1629-1667)	Gian Lorenzo Bernini

Stages in the construction of the *new basilica of S. Peter*

PERIOD 1. 1447–1503

Period 1: **(1447-1503)** From Pope Nicholas V to Pope Pius III

Period 1.a: **(1447-1455)** Nicholas V, Bernardo Rosellino, Alberti

Nicholas V (1447-1455)

Nicholas V (1397-1455) was appointed pope on March 6, 1447, at the age of 49, and turned out to be a true *Papa del Rinascimento*, since under many aspects he can be considered the founder of the papal patronage of the modern age. However, given his age, he had little time left to carry out his ambitious projects, which we know thanks to a kind of testament that his biographer, the florentine humanist *Giannozzo Manetti*, wrote in the form of a speech spoken by the pope to the cardinals on the deathbed [1].

The biographer of *Nicholas V*, *Giannozzo Manetti* describes the pope as the cultural founder of Rome as the center of Christianity and as the capital of a new absolute *signoria*. *Nicholas V* therefore appears as a prince-pope who uses his patronage to exercise political control over the city and the State, and to increase the authority of the Church [2].

In his work *Vita Nicolai quinti* he describes the enormous construction activity of the pope, which "*era portato per natura*" [3] and which includes several cities of the *Estado Pontificio* such as Fabriano, Gualdo, Assisi, Civitavecchia, Civita Castellana, Narni, Orvieto , Spoleto, and of course Rome.

Manetti does not describe all of his works in Rome, but instead focuses on a few in order to effectively convey the distinctive *ethos* of *Nicholas V.*

The program of *Nicholas V* is articulated in five points.

1. The restoration of the urban walls
2. The renewal of the forty *stazionali* churches (Roman churches that meet in the *Lenten Itinerary*, where, during the Holy Week period, the faithful go to pray, each time in a different one; a tradition that began with *Pope Gregory the Great* in the years 590-604)
3. The founding of a new neighborhood, between *Mole Adriana* and *old S. Peter*
4. The fortification and ornamentation of the *Papal Palace*
5. The reconstruction of the *basilica of S. Peter*.

Manetti notes that the first two goals were largely accomplished, but the other three, concentrated in the Vatican area, were not completed. Something that seems logical, since when Manetti's description of Nicholas V's projects is read in full, one easily gets

the impression that it was actually a more or less fantastic *progetto ideale*, the realization of which was not seriously feasible, neither at that time, nor later. Nevertheless, Nicholas V did begin the construction work, both on the Vatican Palace and on the old basilica of S. Peter, and, with better health and a longer life, he would surely have achieved greater results. However, the disproportion between the immensity of the works he wanted to undertake, and the life expectancy of any person at that time was enormous, and especially with the average duration of any pope in office.
However, Manetti points out that the constructive and entrepreneurial spirit of Nicholas V was unstoppable, since it was not due to personal ambitions, but was due solely to his desire to reinforce the authority of the Church of Rome, and increase the prestige of the apostolic cast. In this sense, and as the great politicians of any era know, Nicholas V knew that the most effective way to reach this goal was through monumental and grand architecture. In fact, according to Manetti, the common people could be confused with a faith founded only on words, if they do not have before their eyes some monuments that may seem almost eternal, that is, as if they had been built by God himself (*monumenta paene sempiternas, quasi a Dio fabricata*) [4].

The following is a brief summary of the construction activity of the pope, emphasizing his project to reform the old basilica of S. Peter.

1. Restoration of the walls

The restoration of the walls was centered between the Porta del Popolo and the Porta di San Pablo, although it also extended to the Mole Adriana and the Sant'Angelo bridge, and new fortifications were built around the Vatican, from the top beyond the Porta Pertusa to the Santo Spirito hospital [5].
The important renovation of the walls is due to the fact that Nicholas V is the first pope who decides to definitively establish the pontifical residence in the Vatican. A decision of great symbolic charge that [6], at a time of political friction and strong internal and external threats, is facilitated by the existence of the Leonine walls, the first defensive belt.

2. Renovation of 40 "stazionali" churches

The renovation of the forty churches comprised San Giovanni in Laterano, Santa Maria Maggiore, Santo Stefano Rotondo, Santi Apostoli, San Pablo fuori le mura and San

Lorenzo fuori le mura, and aimed to transform all of Rome into a *Pauperum Bible*, to testify in each place the authority of the pontiff and the Church [7].

3. Foundation of a new neighborhood

The third construction activity included a new neighborhood between Castel Sant'Angelo and San Pietro, intended as a courthouse, but was not carried out (Fig. 7.1 and 7.2).

The new urban area should have been developed around a ternary road structure that from a wide square next to Castel Sant'Angelo headed towards the front area of San Pietro, a vast esplanade with in the center an immense obelisk, transported there from its original position next to the basilica [8].

The three streets, partly already existing, would have organized the new urban structure due to the fervent activity of the residents -the employees of the *Curia*- and the merchants [9]. Manetti does not describe the architectural aspect of the buildings, and we only know that on the ground floor on each of the sides facing the three streets there would have been continuous porches behind which the workshops were placed, while the houses were placed on the upper plan.

The streets with side arcaded spaces were a new solution for Rome, since, although there were buildings with a cantilevered part, this was mainly used for private use by the family nucleus and they were also placed in discontinuous mode along the roads, so they did not offer shelter, but were like an envelope that reduced visibility, making the streets unsafe.

The itinerary of the Borgo Porticus, the arcaded street between the Sant'Angelo bridge and San Pietro and probably of late imperial origin, is reused, although its new architectural structure, which disappeared between the 12th and 13th centuries, maintains a great fascination for what ancient, as can be deduced from the words of Leon Battista Alberti: "…*Apprendiamo che a Roma, tra le altre, vi erano due strade di questo genere, degne della più grande meraviglia: l'una andava dalla porta fino alla basilica di S. Pablo, per una lunghezza approssimativa di cinque stadi; l'altra dal ponte alla basilica di S. Pietro, lunga 2500 piedi e ricoperta da un porticato di colonne di marmo con copertura di Piusmbo*…" [10] ("We know that in Rome there were two streets of this type, worthy of the greatest marvel: the first went from the gate to the basilica of S. Paul, with an approximate length of 5 stadiums; the second went from the bridge to the basilica of S. Peter, 2,500 feet long and covered by a portico of marble columns with lead finish).

Within the reform plans of Nicholas V (1447-1455) was the restructuring of the square in front of San Pietro. According to its construction program, three streets lined with porticoes should have converged in the area that, with its 100 x 500 arms (58.60 x 293 m), would have reached the size of the current Bernini Square. The square had the Vatican obelisk located in its center, and it merged with the staircase decorated with polychrome marble [11]. According to the project, two marble-inlaid bell towers should have flanked the five marble portals of the atrium, and the two fortified towers They should have flanked the access to the Pontifical Palace (towards which the north street was heading), resembling a triumphal arch, while the building of the canons of San Pietro formed the perspective background of the southern street. But despite everything, this project - as evidenced by the remains of the wall made of *peperino* (dark volcanic stone), which ran diagonally towards the atrium from the great circular tower of Nicholas V, and which undoubtedly should constitute the northeast border of the Papal Palace [12], was far from the axial and symmetrical structure of the current S. Peter square. In the project of Nicholas V, the splendor of the marble of the palace portal and its side towers would have contrasted with the bare and fortified wall, as will be done later in the New Castle in Naples. In this sense, the biographer of Nicholas V, Manetti, and also Enea Silvio Piccolomini, sees in this program the will of the pope to confront the ancients: "*... se (Pius II) avesse potuto completare le sue opere, ese non sarebbero stat in niente inferiori alla grandiosità degli antichi imperatori. Ma oggi i suoi edifici stanno lì comme enorme muri in rovina...*" [13].

4. The fortification and ornamentation of the Papal Palace

With the fourth point we reach the top of the curial quarter, where the Papal Palace emerges.

Although it was partially built, the building represents the most integrated and fulfilled example of the architectures loved by Nicholas V.

Developed as a continuation of an architectural complex that began to be built around the year 1200, the wing of *Nicholas V* has closed the *Cortile dei Pappagalli* to the north, making the first extension of a certain importance to the medieval building

The palace was accessed through an entrance adjacent to that of the basilica, and included the pre-existing rooms for ceremonies, rooms of the eastern pavilion (private rooms of the pope, followed by rooms for the ceremonial of clothing, rooms for the daily consistories and for the private, semi-public audiences) and the rooms of the new wing (semi-public rooms for stay and delegation), hosting multiple functions.

Manetti's text does not mention the interventions carried out on the pre-existing constructions and, although the elements described are generic, it suggests that the pope had projects on a broader scale (including rooms for members of the curia, with patios and gardens, with a large library, kitchens, stables, and residences).

Nicholas V managed to carry them out only in part with the extension to the west of the north pavilion, which had an envelope that already delimited and defined the *Cortile dei Pappagalli* and the current *Cortile del Belvedere*.

The appearance of the building can be appreciated as it is represented in a portrait by Ghirlandaio (Fig. 7.3) [14], which shows a fortified architecture, with guelph battlements at its coronation and a powerful slanted plinth.

The facades are quite poor, and with a modest language, more suitable for a fortress than for a stately residence, and it is a reflection of the climate of cultural delay that Rome has with respect to the influence of the new architecture of Humanism, even in the middle 15th century. However, there is an important presence of vestiges of the past in the activity of some local sculptors and architects, who seem interested in a critical, artificial and rational recovery of the vocabulary of the ancients, which had already found a new expression in Florence for a long time, especially in the works of Brunelleschi, and later in different cities and the central and northern government courts of Italy [15].

The north wing is composed, above the underground cellars, by the ground floor and two upper floors (Borgia Apartment and Raffaello's Rooms), with three rooms each, covered by vaults, and with the same floor level as the old palace (Figs. 2.18a, 2.18b and 2.18c).

The library is located on the ground floor, with rooms that will be called *Bibliotheca Graeca*, *Bibliotheca Latina* -or *communis*- and *Parva secreta* during the pontificate of *Sixtus IV*. Of these rooms, Nicholas V built only the *Bibliotheca Graeca*, leaving Sixtus IV a structure already completed and articulated in three sections, which, between the years 1480-1481, will have only the Bibliotheca nova -or addita- built later called Magna secreta [16]. The library is barely defined by *Manetti* as "*una biblioteca molto grande e spaziosa, illuminata da due file di finestre disposte sui due lati*" [17].

5. The reconstruction of the Basilica of S. Peter

The fifth important construction activity of Nicholas V was the reform of the old basilica of S. Peter.

Manetti comments that Nicholas V would have been interested since ever in the intervention on the old basilica, although he makes a very ambiguous and insidious statement (*a fundamentis* […] *reedificare*), implying that S. Peter should have been rebuilt *ex novo* eliminating everything pre-existing [18]. This type of *Topos* would be very frequent in the following years with a meaning of praise that is often distorted, so that, in this sense, Manetti's texts will deeply condition the following historiography.

The old basilica of Constantine was still the largest and most richly endowed church in Christendom, but despite this it did not fully satisfy the demands of Nicholas V. After many years in exile of the popes in Avignon, the building had remained neglected until the deterioration, and therefore Nicholas V thought that the time had come for a substantial renovation of the building.

Reasons that prompted the reform of the old basilica

The decision of Nicholas V to carry out a major reform of the basilica was due to the confluence of three fundamental reasons [19].

1. Supposed dilapidated state of the building

In 1451, Nicholas V declared in a bull that the basilica was in danger of collapsing, "*ut ruinam minetur*" [20], which was undoubtedly an exaggeration or a perfect excuse for a frantic pope to build. In fact the old longitudinal body never fell (neither at that time, nor later), indeed, it had to be dismantled by Bramante, and its eastern half remained standing even after the hasty, and neglected, demolition of the transept and the western part of the naves (when the part that remained standing had hardly any transverse moment of inertia to face the wind). Furthermore, the eastern part remained standing (and was still being used to celebrate masses) until February 1606, when Paul V began its demolition to allow the progress of the works of the new basilica.

However, Alberti affirmed that the upper part of the south wall of the longitudinal body, remained standing only due to the bracing that the large roof beams supposed, so that a minimum lateral push could have collapsed the building [21]. It is possible that the danger was real, but to avoid it other measures could have been taken instead of building a new arm of the choir. Therefore, if the construction of the western arm was given priority, it is because clearly they wanted to build something new, instead of keeping something of the past standing.

2. Inadequate architectural typology

The fundamental problem of the building consisted of a liturgical deficiency inherited from the origin of its project. From the beginning, the transept was designed narrower (78.66 *palmi*) than the central nave (106.66 *palmi*, from base to base, and 109.33 *palmi* from column to column), and also with a lower height. When the building was designed in the times of Pope Sylvester I and Emperor Constantine, it was not known in advance what kind of liturgical acts would take place inside, and also these evolved and changed with the passage of time. In the year 325, a building with a typology of Roman civil basilica was projected, and with a large size so that inside there would be space for many pilgrims and for the celebration of any type of activities, about which there was no exact knowledge. In addition, it should not be forgotten that the main objective of the building was to house an enormous number of pilgrims who each year would go to visit the tomb of the Apostle Peter, while exalting the figure of Constantine.

However, the Christian liturgy evolved with the passage of time, and the architectural structure of the building was not adequate. The transept should have a mobile altar in front of the apostle's tomb every time mass was officiated, and there was not enough space to perform all the liturgical acts that had evolved over time in other Romanesque and Gothic buildings. The eastern part of a Christian church must be destined for the faithful, and the western part must be destined for the pope and his priests, as well as the choir, so it must have a greater role from an architectural point of view. The old Constantinian basilica did not have enough space in the western part, and therefore there was no other solution than to tear down this part and build *ex novo*. And now the role of principal -unlike what had happened in the time of Constantine- corresponded to the pope himself, in his new role as *soberano pontifice* [22], so Nicholas V decided that it was time to act.

3. Internal saturation of altars, tombs and memorials of any kind

The interior of the old basilica also did not offer a convincing appearance for Nicholas V, since it included all kinds of annexes, compartments, remodeling, etc., that over the centuries had blurred the outline of the original imperial architecture. In fact, the road to the apostle's tomb had become a labyrinth full of the most unexpected reliquaries. In the western part of the central nave the choir of the chapter had been widened and prevented the vision of the presbytery, in front of which were seated the bronze statue of

San Pietro and the great organ. All kinds of altars, tombs, and memorials had been built in the side corridors, and chapels and adjoining premises had been built on the inside of the perimeter walls, with the strangest purposes imaginable. All this constituted an enormous repertoire of the history of the Church and of the faith, which the historiographers of later times would evoke with nostalgia, but which at that time must also have a suffocating and oppressive character. The building undoubtedly did not like Nicholas V, as evidenced by his *Desiderio*, transmitted by Manetti, to keep the new building completely free of graves [23].

The old basilica therefore contained an immense repertoire of religious and ecclesiastical history, so there was no space available. The old basilica was a museum of the past in which there was no room for the present. This motif became even more important years later for Julius II, who wanted to build for himself a new chapel to erect his own sepulchral monument, commemorating his own family, as did his uncle Sixtus IV [24].

Reform project of Nicholas V

Two historical sources are available that provide information on the shape of the planned building: the *GDSU 20 A* drawing by *Bramante*, and the description by the biographer Manetti.

As previously mentioned, drawing *GDSU 20 A* shows in a superimposed way the plan of the old basilica of Constantine, the reform plan of Nicholas V (including parts already built such as the foundations and walls of the western apse, and parts only projected as the transept), and Bramante's sketches for the new basilica of S. Peter. Undoubtedly, the fact that *Bramante* drew not only the perimeter of *Nicholas V*'s choir, but also the transept, which had not yet been started, means that *Bramante* probably had at his disposal a plan of the reform projected by Nicholas V [25].

Based on this drawing, together with complementary historical information, it has been possible to determine the exact dimensions of the old basilica of Constantine (see chapter 4) and also all the sequential stages followed throughout its design process. And this has been possible due to the enormous precision of Bramante's drawing, in which scale lines (every 5 *palmi*) and compositional lines (every 10 *palmi*) are clearly appreciated. In fact, he did this drawing to fit and dimension his ideas about the design of the new basilica, integrating them into the architectural structure of the old basilica.

Therefore, and in the same way that it has been possible to accurately reconstruct the dimensions of the old basilica, it has also been possible to reconstruct the typology and dimensions of the Nicholas V reform project (see chapter 8). And for that the description of the project made by Manetti has been essential.

However, in order to make correct use of the information provided by Manetti, two fundamental issues must be taken into account. In the first place it must be remembered that Manetti was a man of letters, and not an architect, so that some of the dimensions he provides are clearly incorrect, and others are contradictory to each other. However, and based on the fact that previously the old basilica of S. Peter has been dimensionally reconstructed with all its details, it can be determined which dimensions provided by Manetti are correct, and which dimensions are incorrect. Secondly, it must be taken into account too that Manetti's texts are aimed at praising the figure of Nicholas V, and he does not hesitate to exaggerate the facts, or to use symbolic and grandiloquent descriptions. For this reason Manetti, in describing the reform of Nicholas V, is more interested in demonstrating the presence of certain harmonic relationships (sometimes interpreted by himself) on several occasions, than in providing exact dimensions. This description can be summarized as follows:

The transept and the apse of the old basilica were destined to be demolished, and replaced by a cross-shaped transept, and 3 arms of equal length. The length of the sides of the square (110 *palmi*) corresponded to the rounded width of the old central nave (109.33 *palmi*); the new square transept, therefore, extended to the west a good distance beyond the old wall of the transept and in such a way the altar above the tomb lost its dominant position in the center of the apse, ending under the dome; but not the center of that one, but slightly eccentric, as it still is today. The inner length of the arms of the cross was 150 *palmi*, and the length of the apse was 50 *palmi*, that is, 200 *palmi* in total. In this area there were no side chapels or other secondary openings. The perimeter walls were exceptionally robust, in part to ensure the durability of the building, and in part because the respective spaces should have been topped by heavy vaults. On the square transept a hemispherical dome should have been erected; the arms of the cross should have been topped by transept vaults supported on colossal columns, arranged freely on the wall, as in the *Terme di Diocleziano*, such as in the *Massenzio basilica* (*Manetti*'s description here is not entirely clear). In the area of the longitudinal body, the five naves of the ancient basilica were kept intact, although consolidated from a structural point of view and accompanied on the sides by a series of chapels in a uniform way. The side corridors should have been topped by transept vaults, and in the *claristori* large *oculi* should have been opened. The lobby was flanked by two steeples and the atrium had been regularly retouched.

Manetti's description is of vital importance, as he praises the projected building as if it were a new building, forgetting that it is only a reform. In fact, the project has two very different parts. On the one hand, the centralized part that is built again (made up of the transept and the three arms) and on the other hand, the longitudinal building that remains intact (made up of the naves and the atrium). And this differentiation between a “centralized” part and a “longitudinal” part will be the origin of all the tensions that would subsequently be generated throughout the history of the design process of the new basilica, up to the moment of its completion.

The essence of the reform project was not new and was based on the usual typology of western sacred architecture in the Middle Ages, in the shape of a cross. In fact, Manetti compares Nicholas V's project to the shape of a man lying on the ground with his arms wide open (although Manetti, some years before, had described the architectural typology of the Florence Duomo in almost the same words).

Nicholas V's project was therefore quite traditional, but it had a completely new and innovative little aspect, since it was not simply a question of *rinnovare* the old, but of replacing it with something new [26], integrating the new spaces with the existing spaces through the same compositional structure, using the same set of proportions and dimensions to achieve a harmonious and well-proportioned set.

Another aspect to take into account are the dimensions of the reform project, which if, as *Manetti* suggests, it comprised the entire old basilica, *Nicholas V* would be aware that he would only see the beginning of the works. In fact, this was the origin of a second source of conflicts related to the construction of the new basilica: the discrepancy between the ambitions of the promoters and the ambitions of the architects. Following the project of Nicholas V, the dimensions of the new basilica would have exceeded the dimensions of the old imperial building, so with the available budgets the construction would necessarily take a long time, so it would be necessary to establish priorities. For this reason, Nicholas V decided to start the work where it was easiest, that is, at the western end, and outside the old foundational platform of the old basilica. Therefore, the work would then be carried out on the transept, then on the longitudinal body, and finally on the facade. Therefore, Nicholas V established a constructive dynamic "from west to east" (perhaps the only possible strategy), and that would continue throughout the construction process for two centuries, until Alexander VII. However, there was an attempt to carry out the reform works in the opposite direction, from east to west, years later by Pius II (1458-1464), but the works were paralyzed and the attempt had no consequences.

Starting to build from the west had enormous advantages since it was easier (the old Roman foundation platform should not be drilled), and the number of buildings that had to be demolished was minimized, since the old basilica was gradually attached a large number of buildings around its perimeter throughout the Middle Ages. In fact, for the construction of the choir of *Nicholas V*, only two satellite buildings from the IV and V century had to be demolished, the *Probus mausoleum* and the *San Martino oratory*.

The author of the Reform project of Nicholas V

It is not known who was the author of the reform project of Nicholas V. Although, in the oldest biography the opinion prevails that a project of this magnitude should be under the direction of Leon Battista Alberti [27]. In fact, between the year 1443 and 1452 Alberti lived in Rome, was part of the papal court and was *familiaris* with Nicholas V, whom he had known from the time of common studies in Bologna. Furthermore, in the year 1452, the year of the beginning of the works on the new tribune, Alberti provided the Pope with the first version of his treatise *De re aedificatoria*. However, neither Manetti, nor other authors of the time, relate Alberti to the project to reform the Constantinian basilica in the time of Nicholas V, with the exception of the chronicler Mattia Palmieri, who says that *Alberti, quell'uomo acuto e sapiente in tutte le arti, avrebbe sconsigliato al papa la prosecuzione dell'edificio* [28].

In Alberti's treatise, the basilica is mentioned in several times, but only according to aspects of construction techniques. Alberti criticizes the construction of the longitudinal body, since according to him, the colonnade with architrave is not appropriate to support the weight of the high wall that rests on it, and describes the damage that this poor solution has caused to the basilica. The architect's observations, derived from direct knowledge of the building and from an exhaustive examination of the solutions, make the case of the old basilica one of the most argued in the treaty and attest to the specifically proactive role of Leon Battista Alberti in the matter of the rehabilitation of the old basilica of S. Peter. This role could have been occupied by Alberti prior to the year 1451, when Rossellino is mentioned as an engineer of the Vatican palace [29]. At the end of his treatise, Alberti makes some proposals for its consolidation, and also analyzes the function of the side chapels taking into account note the stability of the longitudinal body [30].

For the above reasons, it is difficult to relate Alberti to the reform of the old basilica, without also forgetting that Alberti, in general, considered the basilica form a wrong path in the evolution of sacred architecture [31]. This could explain his reservations regarding the intentions of the pope, since the old building could not be improved by a partial reform since, in any case, a *templum* could not be achieved according to Alberti's radically humanist theory. A second motivation could be Alberti's general rejection of large buildings, which are beyond the control of a single architect, damaging his fame since the building would also necessarily be left unfinished, due to lack of funding, or worse, disfigured, in the hands of his successors [32].

Among the other candidate architects for the authorship of the Nicholas V project, the florentine Bernardo Rossellino (1409-1464) stands out, since he traveled to Rome called by the Pope in 1451, who granted him a position similar to that of chief architect of the Vatican buildings [33]. In Rossellino's biography, Vasari attributes to him the construction projects of Nicholas V, but is ambiguous about the old basilica of S. Peter, saying that the drawings were incredibly magnificent, but the model had *andato male* and other *architetti* carried out new projects. Vasari does not mention the names of these architects, although perhaps other names could be taken into account among those who are mentioned that they were involved in the construction (Beltrame de Martino, Amadei, Nello, Spinelli), although the position they occupied within the subdivision of the roles between the papal principal and his consultants, architects, master builders and city businessmen is not known. Each of these could, in its own way, have influenced the project, although the figure of the *architetto autore*, as Alberti imagined and projected in the past by Vasari, seems to have not existed in the construction process of Nicholas V. Moreover, it is quite possible that the pope himself acted as the responsible architect.

In the words of Manetti, Nicholas V was an expert in ancient architecture and therefore, with full rights, was the architect of its very design and program. Manetti also does not provide any reference on the contribution of any architect in the works, and only mentions a professional consultation to Bernardo Rossellino, regarding the old basilica of S. Peter as *grandissimo maestro di pietra* (*peregregius latomorum magister*) responsible for the supervisors of the works and the sole reference of the pontiff for the works of the factory [34].

Therefore, the biographer, drawing on a parallel with the biblical example of Hiram of Tire, although he was not the creator, but the sculptor of the Temple of Solomon, distinguishes the pope as creator and direct executor. Nicholas V is described as an architect who in his building work acts in the image and likeness of God. By the way, *Manetti* suggests the figure of the alter Christus already when he speaks of his birth, being "*non nato secondo la comune e normale legge di natura, ma piuttosto creato, o prescelto, da Dio omnipotente*" [35].

The amplification technique used by the humanist does not prevent us from considering in an alternative way that, in reality, the works planned by Nicholas V did not necessarily require the help of any architect, but could be carried out by personalities capable of performing different tasks as mediators (able to use financial resources adequately), entrepreneurs and coordinators of works, such as Nello de Bologna [36].

Scope of the construction of the reform project of Nicholas V

Archaeological remains are not available to know the scope of the works of *Nicholas V*, so it is necessary to get hold of a few historical references. From the witnesses of the time we know that between 1452 and 1454 the work on a "*Tribuna de S. Pietro*" was underway. The result was a *fundamenta altissima* to the west of the apse of the old building. The existence of these foundations (and a small elevation of the walls) is documented when Michelangelo visited Julius II in 1505. There is no more news, and from the following year when the works of the Julius II choir began, their traces disappeared forever [37].

It should be noted that the archival sources do not speak of major demolitions during the pontificate of Nicholas V, and the expenses recorded in this regard are limited to the area of the new tribune [38]. On the other hand, Poggio Bracciolini refers only to the construction of the foundations limited to the tribune, and not to the entire basilica: "*Testudinem quoque quam tribunam appellant super altare sancti Petri operis magnificentissimi a fundamentis aedificare agressus est, muto octo cubitis lato; sed norte intermissa est aedificatio*" [39]. And not only that, according to the chronicler of Pisa Mattia Palmieri, in the *Opus de temporibus suis*, it is mentioned that a witness (who perhaps was Alberti) affirms that the works were interrupted very soon (he does not speak of the causes, but perhaps they would be economic), before the death of the pope [40].

Therefore the works did not have a great depth and were interrupted soon, so the words of the biographer Manetti (who does not say anything about this interruption) undoubtedly wish to strongly enhance a great and radically innovative project, perhaps with the intention of counteracting the stagnation of the works and the difficulties of the last year of the pontificate, and at the same time, they try to build an even brighter, more excellent image of the "papa-creatore", even greater than that of Solomon, who had built the palace and temple.

It is very probable that the real scope of the reform works of Nicholas V was quite modest, and consisted of the construction of the transept and the choir of the paleo-Christian building, and the consolidation of the walls of the central naves, and the rearrangement of the chapels side, which can be confirmed in the accounting of the records of the *Tesoreria Segreta*, since between 1452 and 1454 expenses had only been recorded for the realization and placement of the marble windows in the basilica and in the early Christian rotunda of Santa Maria de la Febbre, and for the *ex novo* works in tribune [41].

In any case, and perhaps because of Alberti's objections, the building activities in Nicholas V's choir were decreasing, as could be observed in 1454, and after the death of the pope, in 1455, the works did not they continued.

Intervention on the Facade to the square

Nicholas V wanted to improve the sad facade of the basilica, framing the three great doors inscribed in the ancient Roman arches with four great columns. Muntz reports that between 1451 and 1452 Aristotele Fioravanti received payments for the transportation of four columns from the Baths of Agrippa to the Vatican and connects these witnesses to those notified by Nikolaus Muffel in his description of Rome written in 1452 [42].

Nicholas V died on March 24, 1455, and Calixto III, as his successor, was named on April 8, 1455.

Period 1.b: (1455-1503) Francesco del Borgo, Giuliano da Sangallo, Meo del Caprina

Callixtus III (1455-1458)

Callixtus III was not interested in continuing the works started by Nicholas V, and prevented any constructive activity, so the constructive activity was paralyzed.

The pope was forced to use the available resources to finance the war against the Turks, who directly threatened Europe, since the conquest of Constantinople carried out by Sultan Mehmet II in 1453.

Callixtus III died on August 6, 1458, and Pius II, as his successor, was appointed on August 19, 1458.

Pius II (1458-1464)

Pius II acceded to the papacy in troubled times since the Christian Church, were in a critical situation. Since the conquest of Constantinople, the Turks have moved closer to the Adriatic coast and an immediate expansion into Italy is feared. This threat, both military and religious, characterizes the six years of the pontificate of Pius II and prompts him, immediately after his election, to summon the European princes to the Diet of Mantua, to prepare a common action against the Turks.

However, despite the considerable expenses that this policy implies, Pius II was also an active promoter from the beginning of his pontificate. In fact, in the early years, Pius II reformed the Cortile dei Pappagalli and some adjacent rooms, damaged shortly before by a fire [43].

Pius II had a great friendship with Leon Battista Alberti, who could have advised him on the Vitruvian readings and with whom he shared many ideas, however he will never appoint him as a pontifical architect, perhaps because Alberti was only interested in commissions that fit his own ideas. That is why the pope chose Francesco del Borgo, perhaps the most outstanding architect of those times. In any case, Pius II is more interested in the construction of splendid buildings than in professing himself in favor of a certain artistic tendency, and this impression is reinforced by reading the description of European cities and their valuable monuments, which must have awakened his ambitions. This is perhaps what led him to take up the projects of Nicholas V for the restructuring and renovation of the Piazza San Pietro the most important forum in the entire Christian world [44].

The Piazza San Pietro at that time offered a chaotic and desolate image: it was not paved, on rainy days it filled with mud and puddles and ruins emerged (Figs. 4.11 and 5.41) [45]. The Constantinian staircase, located in front of the old facade of the basilica facing the square, was corroded and under the predecessor of Pius II had suffered damage. The facade (from which few structural and organic elements emerged, such as the bell tower of Leo III, the portal of Nicholas V -with three arches framed by columns-, or the tower with the portal of the Papal Palace) was a chaotic conglomeration of walls and buildings from different eras. To the north, the tripartite portal connected a Lodge of Blessings made of wood, and probably modest in size, which was in communication with the palace through an equally wooden corridor [46]. The remaining buildings had grown more or less arbitrarily, and the situation was not at all comparable to the carefully designed squares of Siena, Florence or Bologna that Pius II had been able to admire on his travels.

In Piazza San Pietro, many paths converged and the sumptuous and varied ceremonial of the papal court took place. In the same way, the square was a destination and meeting point to which a multitude of faithful and pilgrims converged on the occasion of Easter, Christmas and other festivals, but especially during the Holy Year, to receive the *Urbi et Orbi* blessing, to obtain the final indulgences, The square was also organized, for example, during Carnival, tournaments and games, and was frequented by religious, soldiers and artisans in the service of the *Curia*, as well as by merchants and merchants who conducted their own business there.

Pius II now has the opportunity, not only to continue the construction program of Nicholas V, but also to verify its functionality and, at this moment, the ideas of Alberti, whose critical advices had previously influenced Nicholas V regarding the reform of the old Constantinian basilica [47].

However, the project of Pius II for the reform of the Piazza San Pietro, unlike the project of Nicholas V, is inspired not so much by the utopian concept of an ideal square, but is inspired by traditional functions and existing topographic conditions. The new staircase should replace the ruined staircase of Emperor Constantine, the access tower should replace the medieval Porta Prima of the Pontifical Palace, possibly located on the same site, and the Lodge of Blessings should replace the ephemeral and removable wooden loggias, used by successive popes to impart blessings and indulgences. The fountain, in an eccentric position, also corresponds more to a need of the visitors than to an ideal urban model. On the other hand, the marble Lodge of Blessings should conceal everything that had been built or started under Nicholas V.

To imagine the appearance of the actions carried out by Pius II, one can use the accounting description of the payments to the masons and the successive descriptions of some floor plan layouts drawn by the architects of San Pietro in the 16th century and at the beginning of the century XVII, as well as in a series of drawings that date back to the restructuring of the square in 1616.

There are references that Pius II reformed the staircase, the statues, the Lodge of Blessings, the bell tower, the access tower to the Pontifical Palace, especially through the accounting books, and specifically by vol. 1503 of the Camerale I of the Archivo de Estado de Roma, biographer of the architect Francesco del Borgo, which collects all the important expenses from the beginning of construction until the death of Pius II with detailed specifications. In addition, for the period from December 1462 to August 1464, other volumes of the Camera Apostolica have been preserved.

Few construction companies of the Roman Renaissance before Paul III have been documented in such detail, with data that provide a broad picture not only of the nature and evolution of the works, the amount of expenses, the size of the buildings and the personnel competent, but also of the organization of the construction activity.

Seventeen days after the return of the pope from Mantua, the renowned sculptor and stonemason Isaía de Pisa delivers a receipt for 28 gold *ducati* for 180 marble *bracci* destined for the new staircase that goes up to the atrium and that, reproducing its same shape, which undoubtedly constitutes the initial phase of the project.

The demolition of the houses in Piazza San Pietro, and the construction of a fountain in the northeast corner, first cited on October 24, 1460, presuppose only a plan of the general arrangement of some individual components, but not yet a detailed project. In any case, these data testify to the incredible speed with which the work begins and the urgency that the Pope demands to his architect [48].

Francesco del Borgo's designs should have been completed around March 1461, when the sculptor Pablo Romano begins the apostles for stairway [49], and at the latest, the month of June of the same year, when the first columns for the Lodge of Blessings arrive. Its characteristics have perhaps already been established in the autumn of 1460, with the probable exception of the access tower to the pontifical palace, which there is news only as of January 1462 [50].

The projects are carried out in different phases and with partial interventions; the access tower to the palace, the two chapels of San Andrea and the embellishment of the bell tower are later additions. In the summer of 1464, the works were suddenly interrupted due to the death of the pope, and there is not subsequent documentation on other actions of the pope's construction, such as the placement of the obelisk in the center of the square, or the eventual continuation of the choir of Nicholas V in San Pietro. But, it is known that the pope gave priority to restructuring the western front of the square. In general it can be said that the pope's activities focus on the great staircase, the memory of San Andrea in Ponte Milvio, the chapel of San Andrea in San Pietro, the Lodge of Blessings, the access tower, the bell tower, the fountain and the Piazza San Pietro [51].

1. The great access staircase

In September 1461, barely 11 months after the start of the work, the great access staircase is in such a state that Flavio Biondo can walk through it and begin a scholarly correspondence on the location of the two statues of the apostles. This is why Alfarano speaks not only of the renovation, but also of the expansion of Constantine's staircase by Pius II, and he certainly understands this expansion beyond the sides of the old basilica [52].

In March 1461, Pablo Romano received the marble for the statue of Saint Paul and for the two baseboards, and immediately afterwards he went to work. In November 1461, after having placed the statue of Saint Paul on the pedestal, he was given the marble for the statue of Saint Peter which was arranged in the month of March 1462, the date on which (the two statues) remain unfulfilled. In fact, the payments for the two statues, for their attributes and their plinths continue until 1464.

In any case, the work on the staircase lasted until the spring of 1462. In February, the stonemason Pagno de Settignano was paid for the moldings of the parapets and for the travertine of the arrival shelf, of which it follows speaking in April 1462 and, after that date, no longer appears in the accounts [53].

The most reliable historical references for the study of the relationship between the staircase and the vestibule are the drawing *GDSU 11 Ar*, by Peruzzi (Fig. 5.34) and the drawing *GDSU 263 A*, by Maderno (Fig. 5.35). Peruzzi indicates in 77 2/3 palmi the distance from the wall of the vestibule to the beginning of the staircase, that is, the existing depth of the level of arrival of the travertine and the Lodge of Blessings. On the other hand, the last two sections to the north of the Lodge of Blessings are exactly defined in the restructuring project of the Palatium Innocentianum in drawing *GDSU 787 Ar* by Antonio de Sangallo (Fig. 5.36). In this drawing it is observed that the loggia occupies a total depth of almost 30 *palmi*, including the columns located in front. Also particularly useful are the drawing *GDSU 287 Ar* by Bramante (Fig. 5.37), and the drawing *GDSU 4170 Ar* (anonymous, late 16th century) (Fig. 5.38), which shows the upper floor of *Palace of Innocent VIII*.

In the documents of control of work and payments to the mason *Manfredino da Como*, of the year 1462, a length of 12 “passi” (that is, 120 *palmi*) is indicated for the north parapet of the basilica, and 113 *palmi* for the south parapet [54]. *Maderno* points out in the drawing *GDSU 263 A* approximate dimensions of 100 and 110 *palmi* respectively for these parapets [55]. These dimensions substantially coincide with the dimensions geometrically deduced in chapter 4 (82.25 feet = 109.66 *palmi*). Undoubtedly, the parapets would have been repaired on a regular basis throughout the middle age, so their length could have lengthened when they were measured in the Renaissance. But without a doubt the parapets had 109.66 *palmi* in the original project, since no other dimension has any compositional, geometric and projective sense.

According to *Alfarano*, the staircase was made up of 5 sectors, each of which has 7 steps, interrupted by 4 landings [56], that is, 35 steps with a 1 *palmo* riser, and 2 *palmi* tread, as *Alberti* will later suggest, and just as they will later be built in the *Palazzo Venezia* [57].

In the same way, in the documents of mason *Manfredino*, the parapets of the stairs are 3 *palmi* wide, which considering the marble covering, reach the 4 *palmi* measured by *Maderno*. The reform of *Pius II* meant the coating of marble plates of the parapets, so its thickness became 4 *palmi*, as *Maderno* later pointed out [58].

Its total height is indicated respectively as 3 *passi* plus 3 *palmi* (33 *palmi*), and 2 *passi* plus 2 *palmi* (22 *palmi*), to which, on both sides, substructures of different heights must be deducted that, in the views, seem to protrude a dimension equivalent to the height of a man. The parapets are decorated with marble cornices and, in the lower part, they have a sculpture, the statue of *Saint Peter* on the left, and the statue of *Saint Paul* on the right. The upper part of the pedestal of the sculptures has a width of respectively 1.37 m and 1.38 m, and a depth of 0.81 m and 0.865 m [59].

Maderno indicates the total width of the staircase in 248 *palmi* and, of these, almost 84 *palmi* are in the southern part with respect to the central axis of *Saint Peter*, while the remaining 164 *palmi* are in the northern part. Consequently, the staircase is asymmetrical with respect to the *Lodge of Blessings*, the vestibule and the basilica. This asymmetry is perhaps due to the fact that near the southern parapet of the staircase begins the area of the *Palace of the Archpriest* of *S. Peter,* inhabited mainly by eminent cardinals and used occasionally also as a residence for important visitors of Pope [60]. In fact, from 1456 onwards, *Richard Olivier Longueil*, bishop of *Countances*, cardinal of *San Eusebio* and archpriest of *San Pietro*, stayed here; so, not by chance, he will later renovate the palace "*a fundamentis*", during the pontificate of *Paul II.*

In chapter 4, and in a previous research work [61], the geometric design process carried out by the author of the old basilica project has been reconstructed, and it was been determined that the total width projected by the staircase was 147 feet (196 *palmi*), and each parapet has a width of 2.25 feet (3 *palmi*). Therefore the total width of the staircase including the two parapets is 151.5 feet (202 *palmi*). In the times of Pius II, the stairs were extended northwards, up to the line formed by the outer face of the north perimeter wall of the old basilica. The stairway, which originally had a width of 147 feet, became 185.5 feet (147 38.5 feet) (38.5 feet is the distance between the interior face of the north parapet and the north face of the north perimeter wall). 185.5 feet equals 247.33 *palmi*.

These measurements deduced in the identification of the design process coincide with those provided by Maderno, who indicates that the width of the staircase was 248 *palmi* [62] Based on these facts, it can be concluded that the project to reform the stairs of Pius II would suppose that the steps of the stairs had a total width coinciding with the width of the basilica, that is, 224 feet (298.66 *palmi*). The parapets would protrude on both sides of the basilica, so the total width of the staircase including the parapets is 228.5 feet (224 + 2.25 + 2.25), that is, 304.66 *palmi*.

It should be taken into account that the width of the *Lodge of Blessings* would be the same as the width of the facade of the imperial building, that is, 298.66 *palmi*, in order not only to create a uniform front to the square, but also to evoke the old facade, which had been disfigured by successive interventions throughout the Middle Ages.

Undoubtedly, the project of 1460 also had to contemplate a leveling of the surface of the square in front of the staircase, and also had to include the ramp to the palace, since, as can be seen in the views of the 16th century, the pedestals of the two statues (especially that of *S. Peter* to the north) are surrounded by heaps of earth and undulations in the terrain (Figs. 5.41 and 5.42).

The travertine landing level between the stairway and the *Lodge of Blessings* should probably have been finished off on both sides with parapets. To the north is the guard post of the palace sentries, which according to *Maderno* has a width of almost 50-55 *palmi* and a depth of almost 100 *palmi*, thus occupying the land between the staircase and the street leading to the access tower (Fig. 5.35). From the guard post, both the access level of the staircase and the portal of the palace can be accessed through openings in the walls (similar to doors), which offers the guards the possibility of controlling the square, the arrival level of staircase, the *Lodge of Blessings* and the ramps to the palace portal.

2. The Lodge of Blessings

The construction of the *Lodge of Blessings* was delayed by the construction of the monumental *Rocca de Tivoli*, which has been built, starting in August 1461, in a very short time, and by the unforeseen execution of the memory and of the chapel of *San Andrea* in the years 1462-1463, also taking into account that the finances of *Pius II* in 1462 were not in good condition [63].

The works of the *Lodge of the Blessings* begin soon, in fact we have news that wood is received, to make a prototype to work with the columns, on April 30, 1462 [64]. In February 1462, the first columns from the *Portico d'Ottavia* arrived in *Piazza San Pietro*. The works proceed slowly, until in 1462 the supply of materials was abruptly interrupted, perhaps because they were being destined for the hasty completion of the staircase, the construction of the memory of *Saint Andrea* and the construction of the *Rocca de Tivoli* [65].

Based on the accounting books it is known that the foundation wall for the bases of the "*colonne piccole*" had a length of 23 *passi* and 7 *palmi* (237 *palmi*) (one *passo* = 10 *palmi*), a height of 2 *passi* (20 *palmi*) and a width of 6 *palmi*. On the other hand, the foundation wall of the "*colonne grandi*" (*colonne grosse*) had a length of 4 *passi* (40 *palmi*), a height of 4 *passi* (40 *palmi*) and a width of 1 *passo* (10 *palmi*).

In the language of the time the pillars are also called columns, therefore the name of "*colonne piccole*" refers to the robust pillars of the arcades of the *Lodge of Blessings* and the name of "*colonne grandi*" refers to the columns of the *Portico d'Ottavia*, which are placed before the walls (first the columns were placed and then the walls were built partially holding them) [66]. Therefore, in the *Lodge of Blessings* two adjoining foundation walls were built, and with the necessary height to cross the great *Constantinian foundational platform*, until reaching the firm ground. Due to the inclination of the ground in the northern part, the platform was closer to the firm ground than in the southern part. For this reason, it was convenient to start the works in the northern part because it was cheaper, since as the building was built in a southern direction, the foundation walls would have to be increasingly deep, and therefore more expensive.

The 237 *palmi*-long foundation was enough to build about 8 sections of the loggia (Fig. 5.33). In the view of *Heemskerck* (drawn perhaps in the year 1535) the pedestals of 7 sections are recognizable, the last of which is almost in front of the southern parapet of the staircase, on the side of the tripartite portal of *Nicholas V* (Fig. 4.8). Therefore, it should be foreseen that the deep and wide foundation walls of the columns in front of the large central pillars will be made through autonomous sectors in front of the foundation walls of the pillars. The length of 4 *passi* (40 *palmi*) of each sector is sufficient to support the substructure of the two columns of a section and consequently of two columns. This way of constructing the foundations by means of autonomous sectors for two columns (and their corresponding pillars), has the advantage of creating more stable constructions with lower costs than a continuous wall, and it would also surely be the only possibility since drilling the almost The entirety of the Roman foundational platform from north to south would carry enormous risk.
If *Manfredino*'s listing is complete, the amount of travertine received in during that time should not exceed the fourth section, from right to left. On February 27, 1463, there are references that *Manfredino* has been paid for the foundations of the north wall, between the loggia and the palace portal, so it can be deduced that the works are being carried out jointly, and perhaps also together with the reform of the entrance tower, so there was surely a joint project from the beginning [67].
The works of the *Lodge of Blessings* resumed immediately in the spring of 1463. In January of 1463 there is news that the transport of large shafts of ancient columns and of nine small shafts of columns, from *San Giovanni in Laterano*, is paid; intended for the articulation of the upper level. On July 12, 1643, other large columns were transported from the *Portico d’Ottavia* to *Piazza San Pietro*, together with capitals and other marbles taken from *San Agnilo*. Thus, a total of at least 11 large shafts are available from the *Portico d’Ottavia*, one less than was needed for the possible 12 arches on the ground floor [68].
In August 1463 the *ursis columnarum* are mentioned, probably the risers for the columns. In May 1464, while proceeding to the placement of the columns and the

completed voussoirs, the wooden scaffolds (*pontes*) were paid. In August 1464, the four columns that flank the tripartite portal of *Nicholas V* and that interfere with the articulation of the wall of the lodge were surely removed [69].

Finally, it is possible that the "*statua seu imago marmorea… pro pulpito benedictionis*" was completed on June 16, 1464, since on that date *Pablo Romano* issued a receipt for 100 *ducati* to collect his works. Consequently, at the death of *Pius II*, on August 15, 1464, the three northern sections of the ground floor have been erected with the corresponding arches, columns and back walls, a fourth section on the ground floor is being built, while the foundations, pillars, entablature and columns of at least three other sections are in preparation [70].

A fairly approximate idea of the shape of the *Lodge of Blessings* can be obtained based on a drawing of the detailed plan of the first two sections of the ground floor made by *Antonio da Sangallo* (Fig. 5.36), also based on different drawings from the *Piazza San Pietro* (Figs. 4.11, 5.40, 5.43, 5.44, 5.45) [71], and taking into account what was done in similar loggias in the vestibule of *San Marco* and in the courtyard of *Palazzo Venezia*, which were made a little later. With all this information it has been possible to reconstruct the architectural structure of the Lodge of Blessings (Fig. 5.33).

The *Lodge of Blessings* was largely conditioned by the surrounding topography and by the architectural emergencies of the vestibule of *old S. Peter* and the adjacent buildings. The bounded floor *GDSU 787Ar*, by *Antonio da Sangallo* (Fig. 5.36) shows the consolidation project of the *Audiences Hall* of the *Sacra Rota*, a room that occupies the eastern part of the ground floor of the *Palace of Innocent VIII*. Probably on the site of the former northern porch of the vestibule of *San Pietro* a larger structure was located, but, since in the financial records of *Pius II* there is no mention of openings between the loggia and the *Audiences Hall*, the gates listed in *GDSU 787 A* will probably only be added after 1483.

In this drawing it can be seen that the *Lodge of Blessings* has a depth from the pillar to the wall of almost 22 *palmi*, a span of the arches of 16 3/4 *palmi*, and with the width of the pillars of 8 *palmi*, which are relatively small and elegant dimensions and, in any case, clearly smaller compared to the *Lodge of Blessings* of *San Marco*, both following the model of the *Colosseum*, the *Tabularium* and the *Theater of Marcello*.

The order of the loggia was made on the basis of slightly honeycombed semi-columns, almost 3 *palmi* in diameter, embedded in the pillars, similar to the *Lodge of San Marco*. To this external order of columns of the loggia there corresponds an order of *paraste* (pillars included in a wall, from which it protrudes only slightly) of width of 2 2/3 *palmi* that subdivides the inner side of each of the pillars in three equal sectors (8 / 3 = 2 2/3). This syntactic articulation of the pillars, which is repeated along the interior walls of the loggia and in the corners of the perimeter, is articulated at the corners by means of duplicate angular *paraste*. *Antonio da Sangallo* also draws on the outside of the wall of the facade of the old basilica two *lesenas* to support a blind arcade, with dimensions corresponding to the pillars of the arcades. The order of the *paraste* of the *lesenas* repeats the exterior order of the columns with the entablature without frieze. In the masons' accounts from 1464 it is indicated a tripartite entablature on the outside, but only "*architravj (di) dentro*" are indicated on the inside. As in the *Colosseum* and as in the *Theater of Marcello*, the barrel vault began immediately above the crossbars and probably had plaster on the outside, as well as the walls between the marble moldings.

On the outer facade, reproduced in *Heemskerck*'s view of 1535, (Fig. 4.11) the pillars are equipped with bases, imposts and simple archivolts, and are topped by a continuous cornice. If its proportions had been slender like those of the *Palazzo Venezia* courtyard, and as represented by *Heemskerck*, its height would have reached almost 37-40 *palmi*. And if you add, always in analogy to the patio of the *Palazzo Venezia*, 2 *palmi* for the arches seals and almost 3-4 modules for the tripartite entablature of the order, you get approximately the total height of the ground floor of almost 45-50 *palmi*, corresponding to that of the *Palace of Innocent VIII*. The level of the second floor of the *Lodge of Blessings* probably corresponds to the level of the *Sistine Chapel*. In this sense, the *GDSU 60 Ar* drawing by *Antonio da Sangallo* should be remembered, in which it is indicated that the level of the *Pauline Chapel*, and therefore the level of the main plan of the *Palazzo Venezia*, was 88 1/2 *palmi* above the level of the *old basilica of S. Peter*. With a ratio between the width of the shafts and the height of the columns of approximately 1:10, there remains, for the pedestals, a height of 6-8 *palmi*, less than that of the courtyard of *Palazzo Venezia*, as can also be seen in the view of *Heemskerck*. Some gray marble columns have been preserved in their original location near the *Portico d'Ottavia* and their diameter, of about 3 *palmi*, corresponds to that of the columns of the *Lodge of Blessings* measured by *Antonio da Sangallo*.

The analogies of the *Lodge of Blessings* with the *lodge of San Marco* and with the courtyard of *Palazzo Venezia* go even down to the detail. The lodge is meticulously reproduced in the 1565 *Zoppelli* mural in the *Sala Regia* (Fig. 5.43) [72], in which the columns are clearly located in front of the pillars; the capitals are typologically similar to those of the *lodge of San Marco*; the tripartite entablature is the same in the cantilever and the archivolts. Inside, in the view of the ground floor, the doors to the *Sacra Rota*, the blind arcades and the synthetic order of the *paraste* are identifiable. Outside, above the entablature, there is a high parapet with pedestals and, even higher, a balustrade. The level of the pavement of the second floor therefore corresponds almost to the upper cornice of the pedestal. In other available images these details are reproduced in a less exact way than in the *Zoppelli* image, for example *Heemskerck* eliminates in his drawings the entire area of the entablature, which is clearly documented in the accounting books [73].

Heemskerck, however, gives a more precise idea of the northern angle, where he places a median *paraste* between the honeycombed column and the wall of the *Papal Palace*, a more convincing solution with respect to that of the *lodge of San Marco*, and perhaps inspired by the ancient triumphal arches.

The vault on the ground floor is represented in an anonymous view made in the middle of the 16th century, perhaps around the year 1550 (Fig. 5.45) [74]. This allows a lateral view of the fourth section of the loggia where the order of the *paraste* clearly supports a simple lintel, above which the barrel vault begins, whose height, at least half the width of 20 *palmi*, reaches at least 5-6 *palmi* above the entablature, which explains why the level of the pavement the area of the pedestals stands out from the upper floor and, for this reason, the viewpoint must have a protective balustrade, but in this way it cannot be conveniently connected to the pillars. This constructive solution is the same that can be seen, for example, in the *Colosseum* or in the *Marcelo Theater*, in which the barrel vault of the ambulatory begins directly on the lintel and reaches the area of the pedestals on the upper floor.

The description of the upper floor, probably the only floor on the ground floor that has been planned by *Pius II*, is also difficult since it is made after the death of the first architect, and it may even have moved away from the initial project. The interior height of this floor should correspond to that of the first loggia of the adjacent *Papal Palace*, with a height close to 37 *palmi*, and *Paul II* will ask that it be connected through a corridor to the same loggia [75]. Thanks to the pedestals, the exterior height of the upper level is almost 43 *palmi* and it is distinguished from the lower one above all by the shorter length of the column shafts. In the views of *Heemskerck* the pedestals are adorned with papal shields, probably of *Alexander VI Borgia*, who will complete it. The most important difference with respect to the ground floor consists in the installation of the vaults, a transept with lunettes, which come out directly from the impost, and which hardly reach beyond the entablature. In *Heemskerck*'s drawing, the wall is interrupted by openings of different sizes and arrangements; In the 1550 drawing (Fig. 5.45), individual *lesenas* can be seen on the walls connected directly to the vaults, while in the *Zoppelli* (Fig. 5.43) mural bundles of *lesenas* with continuous impost cornice are seen. In this last view it is clearly deduced that the balustrade, on the third section, protrudes from the level of the loggia by means of cantilevered corbels, forming the Pope's rostrum, on whose rear wall, a door opens, in clear correspondence, perhaps made after the year 1509, when no longer thinking about finishing the entire lodge.

The third floor of *Bramante* differs from the second above all by a simpler and less plastic joint. *Heemskerck* again indicates the shields on the pedestals, which undoubtedly belong to the *Rovere* family, and furthermore, a balustrade which is in fact superfluous, which also appears in the views of *Vasari* and *Guerra* [76]. Instead of the columns, *Bramante* uses *parasti* of corinthian order, with an entablature composed of an architrave and a cornice on corbels. The last *paraste* is distinguished from the others by the cantilever in the entablature, a cantilever that is already present in the two lower floors. What's more, *Bramante* reinforces the corner by repeating both the *paraste* and the entablature on the side wall. On the other side, the fourth section ends with a tooth that, as in the two lower levels, certifies the will to continue the structure towards the south.

In the transition from the two orders of columns on the lower floors to a *parasti* order with shelves, *Bramante* of course follows the model of the *Colosseum* (that is, on the ground floor a doric order with columns, on the first floor a corinthian order with columns and on the second floor a corinthian order with *parasti*), a model that had already been decisive in the conception under *Pius II*. The system of the vaults appears more or less identical to that of the first floor represented by *Zoppelli* and some doors connect the loggia with the connecting corridor of *Paul II*, even with the adjacent hall of the festivals in the house for visitors. *Bramante*'s 4-seater roof is probably final, but it is unclear whether the small wall protruding from the first pillar to the left of the roof (in *Heemskerck*'s view) can be interpreted as the beginning of an attic.

Therefore, there is enough material to know what the interior and exterior of the three floors were like, but there are still doubts about the planned expansion of the *Pius II Lodge of Blessings*. That this, not only under *Pius II*, but also under *Alexander VI* and under *Julius II*, should have continued to the south, beyond the four sections made, is detected by the provisional tooth of the first section on all floors and by the pedestals, drawn by *Heemskerck*, emerging in at least 3 further sections. But the columns carried from the *Portico d'Octavia* under the papacy of *Pius II*, as well as the total length of the cornice and entablature sections carved at that time would have been sufficient for the ground floor of an 11-section loggia (Fig. 5.33). It is possible that the architect made a modulation of 11 sections (and not nine or seven) to achieve a correct integration with the existing buildings, and for this same reason it is possible that the total width and height were solidly related from the beginning. An initial analysis allows us to discover that perhaps the width and height were designed under a 3:1 ratio, so if the width is 286 *palmi*, the height should be 95.3 *palmi*, hypothesis that, at the current time of the research, can not be excluded.

Finally, it should be added that the *statua seu ymago* that *Pablo Romano*, executed in 1464 for the loggia (and not for the staircase), was perhaps destined to be located in the center of the upper level of a loggia of 11 sections. Perhaps it was a representation of the Christ or the praying pope, according to the model of the *Lodge of Blessings* of *Boniface VII* in the *Lateran*, where, on the pediment, the two princes of the apostles were also located [77].

3. Access tower to the pontifical palace

Pius II wanted to give a better appearance to the portal of the *Papal Palace* on the occasion of the transfer of the relic of *Saint Andrea*, so the construction of the access tower was a priority, perhaps because it required a relatively low cost in terms of time and money. Starting in 1462, the supplies for the new tower and the access ramp began and, in April 1462, when the materials for three windows arrived, for the travertine steps of the ramp, including bricks and wood, not yet work had begun [78]. In December 1462, other supplies of bricks continue, for the spiral staircase and for the chimney, and a still greater quantity of bricks are paid for in June 1463. The builder *Manfredino* issues, for the first time, in December 1426, a receipt for 30 *ducati* for certain works on the access tower. In one of his first specific invoices from April 1463, a frontispit, a "*porta marmorea, merli, parapecti*" and the "*componitra dela porta marmórea verso il pozo ala torre*" are cited, that is, for the construction of a marble portal facing the *Atrio degli Svizzeri*, and sculpted by the mason *Andrea de Verona*. In February 1463 there is news of "*arcus et pontes*", which evidently refers to the falsework for the vault of the tower and the openings in the walls. In May 1463, the grilles were placed on four windows, the wooden doors were placed, and the colors were supplied to paint the intrados of the portal vault. In August a marble pontifical emblem backed by *spiritelli* (winged cherubs in the keystone of the arch) is mentioned, and also a supply of blue and gold leaves, for the decoration made by the painter *Pietro Giovenale*. In January 1464 the pope's *caput marmoreum* over the entrance portal is completed with gilding, while the large wooden gate is adorned by the gilt copper moons of the *Piccolomini* shield. In the spring of 1464 *Manfredino* was paid for the work on the ceiling and for the interior plaster on the tower, including the spiral staircase, and these works continued until the end of the pontificate of *Pius II*. Since the financial records do not mention the demolition work anywhere, but only mention the elevation of small sections of wall, it may be that parts of the existing constructions have been preserved [79].

The access building, the *Porta Prima* of the *Vatican Palace*, under *Paul II* is connected, through a two-story loggia, to the *Lodge of Blessings*, in such a way that it loses its tower character (Fig. 6.20). According to financial records, the walls have been built exclusively of bricks, probably plastered. The upper termination, which can be almost as high as the parapet of the second floor of the *Lodge of Blessings*, is made up of battlements and, next to the rectangular marble portal, by some windows with a *peperino* (volcanic tuff) frame, partly provided with grids, which illuminate both the spiral staircase with travertine steps and the rooms. The connecting wall, towards the *Lodge of Blessings*, ends at the portal. The latter -on which are placed the coat of arms of the Pope and the golden marble portrait of *Pius II*- has wooden frames decorated with large nails and with the golden moons of the *Piccolomini* coat of arms, while the intrados of the vault also has marble shields of the pope and ornaments in the expensive blue and gold colors made by the painter *Pietro Giovenale*. Both externally and internally, the frames of the rectangular portal of the tower can present the same typology used by *Pius II* in 1460 for the passage to the *Cortile dei Pappagalli* [80].

Two historical sources confirm that the marble portal in the access tower was enlarged and adorned under *Innocent VIII*. Thus *Cardinal Marco Barbo* wrote in a letter dated October 4, 1487 from Rome: "…*ad palatium accessi et casu pontifici occurri qui cum paucissimis fabricas corcuibat; hinc vero opus anteriores ianue qua in palatium intratur et augustiore ornatu instauratur, diligentius considerabat*...". And *Grimaldi*, perhaps based on an inscription, comments: "…*porta autem palatii ab ipso Paulo (sic!) quadra constructa inde ab Innocentio in meliorem formam mutate*…" [81].

The *GDSU 2044 Ar* drawing, attributable to *Antonio da Sangallo*, and dating back to the years 1503-1506, includes a text in which it is said that "*queste sono le chornjcje de la porta del palazzo dell papa*", and reproduces the richly decorated detail that, by typology and by linguistic resolution, can be attributed to the papal architect of that time, *Baccio Pontelli* [82].

4. The bell tower

The project to reform the square also included the completion of the medieval bell tower located to the right of the vestibule, at the height of the first sections of the *Lodge of Blessings* [83] (Figs. 5.43, 5.44 and 5.45). In this case the official principal is the *Capitolo* of *San Pietro* (the college of priests established in the eleventh century for the government of the *Vatican Basilica*), whose expenses were received in the form of the final payment on October 1, 1464.

Among other things, the construction of a new 8-sided pyramid-shaped roof is documented, with a ball, a cross and a gilt-iron flag pole. In the four corners, on which the cusp rests, and on the connecting cymbal (curved cantilevered molding in the shape of an s), there are four gilt iron lanterns or chandeliers [84].

The bell tower was reformed again around 1540 by *Antonio de Sangallo*, so there are few graphic sources to try to identify and deduce what it might have looked like in the time of *Pius II*. *Heemskerck* represents the bell tower twice before its reform, and in both a very prominent ledge is seen over the medieval body of the bells and a slender 8-sided pyramidal roof, on which, on the side of the square, appears a large pontifical shield (Figs. 4.8, 4.11) [85]. In his drawing of the square, four lanterns can be seen fixed to the corners of an iron railing, while in the view to the south a ball and a cross can be seen on the top. However, other representations show (and perhaps because they have been drawn in a simplified way) the pinnacle as a four-sided pyramid [86]. The flagpole, as can be deduced from the successive restructurings [87], could connect the sphere and the cross together, and from them it follows that the lantern also remains unaltered [88].

5. The Fountain

In 1462, while the works of the *Lodge of Blessings* were temporarily suspended and many other projects were started, the installation of a large fountain in *San Pietro Square* also began.

In May, *Mastro Cornelio* from Germany needs "185 *libbre* de plomo y de 20 *libbre* de zinc *in fabrica fontis"* [89]. In July 1462, 2000 bricks were delivered for the vault of the "*fontana della piazza*", in January 1463 some subsequent works were paid for, and on May 31, 1463, there is news about some works in the "*conducto dela fontana dela piazza*". Obviously, in principle, these works concentrate on the indispensable facilities such as the well and the water pipe, since nowhere are there any allusions to an architectural or sculptural structure. It is probably the same source that will later take its final form under the pontificate of *Innocent VIII* and *Alexander VI*. But it is possible that already under *Pius II* a marble tank had been contemplated whose construction would have been interrupted at the death of the pope. The great collection well of the *Vatican*, from which this source collects water, is located "*parum extra portam viridariam*", that is, in the immediate vicinity [90].

6. The square

While bricklayers, stonemasons, blacksmiths and carpenters work on the new buildings, slowly, but without interruption, the square is also leveled, and there are news about payments to carters "*ad deportandum terrenum et explanandum plateam Sancti Petri*" since the month April 1462, until May 1464 [91]. It is possible that the masons initially focused on establishing the space near the two stairways, respectively towards the *Lodge of the Blessings* and towards the access tower, as well as near from the source, to then also deal with the remaining areas of the large area. Only when a certain uniformity had been achieved in the level of the square, would it have been considered to undertake other works, for example, the placement of the *Vatican obelisk* in its center, already planned by *Nicholas V* and reaffirmed by *Paul II* shortly before his death. This is how *Raffaele de Volterra* relates: in August 1471, *Paul II* would have asked the bolognese engineer *Aristotele Fioravante* (called to Rome precisely because of that commission) for advice on the displacement of the obelisk and during the colloquy the engineer would have had ischemia [92]. According to a letter on October 17, 1471, he received 70 *ducati* from the *Cardinal College* "*per transportare la guglia di Giulio Cesare a san Pietro*", but already *Pius II* and his architect could have thought of planning the square in the same way.

Paul II (1464-1471)

After the death of *Pius II*, *Paul II* (1464-1471) was appointed pope, dedicated *himself “in primis*” to the enlargement and transformation of his cardinal palace into a complete papal residence and, to this end, transferred there not only all the teams of craftsmen, but also the architect who created the project for the square and, only in 1469, after the death of *Francesco del Borgo*, did he start to take an interest in the *Vatican* area again.

On the one hand, there is news that *Paul II* made an attempt to retake the building from *Nicholas V* [93], and in 1470 he would invest considerable sums of money for the continuation of the work on the *Sancti Petri Tribune*. The impulse was probably generated by the Holy Year of 1457, proclaimed by *Paul II* in 1470, and in that year the works began, and *Giuliano de Sangallo* and *Meo de Caprina* are mentioned as responsible architects, although it is not known if these The works followed what was established in the *Nicholas V* project. In any case, the works will be interrupted again with the death of the pope in 1471 [94]. *Paul II* had planned to build at least this part of the new building before the Jubilee, and connect it in somehow uncertain to the existing basilica. Here, therefore, the gap between project and reality is manifested for the first time, destined to be a constant in the construction history of the *new basilica of S. Peter*, in which the projects remain on paper, and what it is finally built, they are only a few fragments, forced to coexist with the old building until the proposal of a new project that satisfies and gives continuity to said fragments built. *Paul II* was undoubtedly very optimistic as he had a medal issued representing the interior of the new arm of the choir, although the works did not progress much and under his successor *Sixtus IV* (1471-1484) the works did not continue. Therefore this could be considered as the first failed attempt at the construction of a new basilica. It could be said that the times were not yet ripe, and that the forces were not enough to start a monumental work of that caliber. And throughout the entire sixteenth century, things were not very different.

However, the greatest construction activity of *Paul II* focused on the eastern part, and there are several historical notes that testify to it. For example, the builder *Manfredino*, on May 8, 1469, issues a receipt for 200 *ducati* for works designed and carried out for the *Lodge of the Blessings of S. Peter* and, more or less in the same period, four iron anchors are paid (*catene*) for the lodge, which indicates the completion of the vaults of the four existing sections on the ground floor. *Manfredino*'s construction activity should be very intense since on September 14, 1470, he delivered an invoice for 700 gold *ducati*, so the amount of the works must have been very large. At this time, work is being done on the completion of the sections started on the ground floor, which is confirmed by the payment of 6 capitals in August 1469. These works were carried out under the direction of *Francesco del Borgo*'s successor, probably *Antonello de Albano*, also responsible for the design of the connecting corridor between the upper level of the *Lodge of Blessings* and the *Papal Palace*, built at that time [95]. This corridor covers the access tower and therefore it is difficult to go back to the design of *Pius II* and, where a "mezzanine" (secondary, service floor, placed between the ground floor and the noble bread in the stately palaces) is planned on the level of the third floor of the lodge. *Pius II* should have reached the top level via ladder [96].

After the “rustic” completion of the four sections of the ground floor of the *Lodge of Blessings*, a search for a new master mason began. On November 10, 1470, *Giuliano de Francesco de Firenze*, who has worked in the *Venezia Palace*, agrees with *Antonello de Albano*, to complete the four existing arcades and to build another four on the second floor, with the available columns and with the voussoirs found on the arrival floor of the staircase. The vaults on the ground floor should be plastered and the walls of the interior elevation towards the bell tower should be covered, as on the ground floor, with “*pianelle*” and with “*coccyx marmoreis*”, probably they are marble *lesenas*. In order to be able to use the loggia as soon as possible for its intended purpose, the continuation of the ground floor to the south is waived with all the evidence and its construction is reduced to those four sections, beyond which it will never go, until demolition definitive at the beginning of the seventeenth century.

Paul II died on July 26, 1471, and apparently the agreements of November 1470 were not respected, since the four existing arches were not completed, as can be seen in the drawings of the plant by *Mantova* and *Hartmann Schedel* from 1490, which show a temporary wooden ceiling over the only floor of the *Lodge of Blessings,* evidently installed to protect from the elements (Fig. 2.15).

The works to the *Lodge of Blessings* are suspended under the papacy of *Sixtus IV* (1471-1484), and under the papacy *Innocent VIII* (1484-1492). *Alexander VI* (1492-1503), immediately after his election, imposed the payment of 500 *ducati* to the chief builder *Graziadei* "*pro building benedicitionis in ipso palatio construendo*" and, for that reason, probably only at this time are the voussoirs placed on the second level [97].

In June 1500, the pope went to the *Piazza di San Pietro* to witness a bullfighting show, "*supra logiam que est supra locum publicae benedictionis*", and managed to save himself from the impact of an iron chandelier, built in the time of *Pius II*, which had fallen from the bell tower. It seems therefore that the loggia also served him to see the shows in the square and anticipates the lower courtyard of the *Cortile del Belvedere*, which *Julius II* will begin a few months after the death of *Alexander VI*, as a site for bullfighting and other shows [98].

Therefore, at that time, the ground floor was called the *Lodge of Blessings* and, on the second floor, there is only one floor without a vault. Even in 1505, there is talk of "*discoperta lodge, quequa est supra logim benedictionis*". The *Julius II* project, carried out by *Bramante* from the autumn of 1505, envisages not only a third level, but also the extension of the *Lodge of Blessings* over the entire width of the square and, therefore, the destruction of a part of the palace of cardinal *Ippolito d'Este*, at that time in Ferrara, for which the ambassador of Ferrara communicates (with a clear ironic tone) on September 6, 1505: "*...Tornato a Roma da Nepi ho trovato in casa Mastro Bramante ingegnero, quale ha la intrapresa de la loggia de la benedizione del papa a finirla. Dice la vole stendere fino alla nostra casa (il palazzo del cardinale d'Este), et secondo el disegno andrà in terra la meza de la sala seconda ne la colonne. Principia bene, che stimo non se farà cosi presto*…" [99].

The main reason for adding a third level would undoubtedly be to match the construction with the height of the *Palace of Inocencio VIII*, built around 1480, whose profile looms above the upper level of the *Lodge of Blessings*. And since *Julius II*, already near 1505, plans to move from the *Borgia apartment* to the *Stanze apartment*, it could be possible that he commissioned *Bramante* to plan a coplanar connection with the *Lodge of Blessings* [100]. At last, in anticipation of the prolonged by 11 sections, the third floor would have given this loggia a harmonious ratio and more similar to the old prototypes.

Bramante had initially projected a centralized structure for the *new basilica of S. Peter*, as it was represented in the drawing *GDSU 1 A*, or in the *Cardadoso* medal, so it would be located behind the *Lodge of Blessings*. This project required not only the destruction of the ancient vestibule, the *Palace of Innocent VIII* and the *Vestibule of the Swiss*, but also required the extension of the *Lodge of Blessings* on both sides.

But *Bramante* does not go beyond the fourth northern section either, as the *Heemskerck* drawings show, in fact on June 23, 1507, *Bramante* informs the Ferrara ambassador that his new project for San Pietro foresees the destruction of the *Lodge of Blessings*: "…*sua santita elvorare per finire: lo edificio dela benedictione: el che non credo si mova a questo efecto: atento quella parte: ha seguito de Alexandro non e pure stabilita: ne se* *vede preparamentj da volerla altramente finire: ne condurla piu avante: e questo me conferma mastro bramante: piu zorni sonno: me diceva non li se fare altro: anzi quello glie facto ha de andare per terra: secondo el nuevo disegno de la fabbrica de san pietro*…” [101].

The construction of the new basilica began in April 1506, with a basilical structure, and with a set of three naves that extended eastwards [102]. In June 1507, if not before, *Bramante* decided to finish the building with a facade facing *Piazza San Pietro*, and integrating into it, for the first time, the *Lodge of Blessings*. In any case, even around 1507-1508 *Laurentius Parmensius* praises previously Pope *Julius II* who, along with other new constructions, has also completed ”*...speculam, qua benedictio populo dari solet, a nunnullis pontificibus marmoreis columnas, et quadratis lapidibus excoli coeptam magna ex parte, quo invenisti ornatu...*” [103]. Additionally, in his 1510 guide to Rome, *Francesco Albertini* urges the pope to complete the work begun by *Pius II* and continued by *Alexander VI* and *Julius II* himself, and suggests that spread it over the entire width of the Square: “…*oportet enim septum princiupium cum platae latitudine adimplere, quod quidem esset opus praeclarum*…” [104].

Therefore, since 1506 it is widely estimated that the *Pius II* loggia is not compatible with the project for the *new basilica of S. Peter*. However, in 1507, Pope *Julius II* still believes that it could be maintained and ends according to new ideas for *San Pietro*. Finally, *Leo X* wants to expand the nave of the basilica by taking it to 5 sections and it seems that he wants to connect, through the north bell tower, the *Lodge of Blessings* with the *Lodges of the Papal Palace*. All this remains a utopia and the *Lodge of Blessings* will retain its status for about 110 years, from 1506 until its demolition in 1616 [105].

Stages in the construction of the *new basilica of S. Peter*

PERIOD 2. 1503–1534

Period 2: **(1503-1534)** From Pope Julius II to Pope Clement VII

Period 2.a: **(1503-1513)** Bramante

Julius II (1503-1513)

Giuliano della Rovere arrived in Rome on November 1, 1503, after Alexander VI fell, after several years in exile, since his escape in 1494, closely linked to the royalty of France. He had lived for many years in France, where he would have had the opportunity to see its most outstanding cathedrals and castles. Giuliano da Sangallo (1443-1516) followed him to France for a time, and through his mediation he even had the opportunity to present a model palace to the King of France. Therefore, it is supposed that Giuliano della Rovere had been in continuous contact with the architect and that visited the ancient monuments of southern France with him, even being able to talk about the possible construction of buildings, once he had been elected pope [1].

Already in Rome and appointed pope, during his still difficult first weeks of pontificate, Julius II wanted to reform the medieval palace, the basilica and the entire Vatican quarter, just as Nicholas V had done. This was an ambitious attempt to mix tradition of the Roman imperial age with the new tendencies of the European courts, and in this way elevate the Vatican as the most magnificent residence in the West [2].

With regard to the old Constantinian basilica, Julius II wanted to continue with the reform works, begun by Nicholas V, of the old basilica of S. Peter. In fact, in 1505 he commissioned Michelangelo with his own funerary monument, and according to later testimonies (Condivi, Vasari) the search for a suitable site to erect this monument encouraged Julius II to finish the construction of the west choir, taking advantage of the foundations of Nicholas V. However, and as it was projected by Nicholas V, the construction of the choir also implied the construction of new transversal arms for the basilica [3].

Julius II could have met his future architect, Bramante, perhaps in the late summer of 1503 in Rome. The few Roman buildings that Bramante had started up to that point, such as the cloister of Santa Maria della Pace, the Tempietto of S. Pietro in Montorio and the Caprini palace, could have impacted him, but what definitely convinced him to have it immediately under his service [4]. It was, without a doubt, an extraordinary convergence of his architectural concepts [5].

Although Julius II simply wished to transform the basilica in the same terms that Nicholas V did years ago, the poor condition of the basilica and its functional deficiencies for the celebration of the evolved Christian liturgy, led Bramante to suggest to the Pope the construction of a new basilica. This construction fit perfectly with the Pope's ambition and constructive eagerness, although his ideas differed substantially from Bramante's. Panvinio around 1560 highlighted Bramante's influence on the pope, since he would have been able to convince him to carry out a new project, and even presented him with a wooden model [6].

According to Panvinio, Bramante had to convince the pope to build a new basilica and demolish the old one, since he agreed to hire him, "*Avendo trovato (in Julius II) a pontefice secondo le sue esigenze, (Bramante) man hand persuade him, with great abilità, to build the Vatican Basilica in the form of the magnificence of the nome papale and della maestà dell'Apostolo. Gli faceva vedere now piante, now altri disegni dell'edificio, continually raising it, and affirming that this apporrebbe perpetual glory to the Pontiff. The Pope, of eccellent and vast spirit in the cui not seen spazio per se piccole, always avid of grandi moli, dava retta to the peritissimo architect and decise to erect a new and straordinary basilica all'Apostolo, demolishing quella vecchia*" [7].

There is no news about how the design process started and how the initial iteration between client (Julius II) and architect (Bramante) was. Obviously, there had to be several work meetings in order to exchange opinions so that the pope expressed his wishes to Bramante, and so that he began to generate ideas. These initial meetings are necessary and in all of them, simple sketches begin to be created in order to integrate the client's requirements in a blurry and initial way, and based on them generate ideas, to later refine them.

Undoubtedly, the *GDS 20 Av* drawing belongs to that initial stage.

Bramante. GDSU 20 Av

The *GDSU 20 Av* drawing (Fig. 7.4) is made on the back of the *GDSU 20 Ar* drawing, and is displayed on a special support in the Uffici Gallery so that the back can be seen. The drawing is barely perceptible, and the photographs taken cannot be reproduced, for this reason a traced copy made by Geymüller is always reproduced [8]. The plan of the drawing is drawn on the left side and is partly covered by the union of two of the pieces of the *GDSU 20 Ar* drawing, so it was clearly done before the union, that is, before the development of the *GDSU 20 Ar* drawing, which will be discussed later.

The drawing is hastily done and shows a plan and elevation. The first thing that strikes you is that the plan and elevation do not correspond. The plan shows a large square transept with three rectangular arms almost half the size of the side of the transept. Apparently, the western arm must correspond to the arm of Nicholas V, and therefore it must have a width of about 110 *palmi* (although it has a rectangular and non-polygonal shape, so it must be only the materialization of an idea, since Julio II at all times wanted to use the foundations and part of the walls built by Nicholas V). As a consequence, the transept drawn should have about 200 *palmi* on a side, or perhaps more, and the dome should have an approximate diameter of 180 *palmi*. The north and south arms are identical to the western arm. Of course, it is only a sketch that expresses an idea, so trying to elucidate dimensions is sterile, but it only serves to have an approximate idea of magnitude. In the transept there are four circular staircases that would surely be topped by 4 perimeter towers. The fourth arm does not appear on the plan, so it is assumed that what is drawn would be an extension of the main body of the old basilica, in the same way that years ago Nicholas V.

The elevation on the other hand does not seem to correspond to the plan of the drawing since it shows a central body of a large square shape on which 4 towers and a large central dome stand out. On the north, south and west sides some small apses stand out. Undoubtedly, it is the rapid evolution of an idea, which led Bramante to go from a cruciform structure to a square quincunx structure. In fact, this elevation corresponds quite exactly to Bramante's next known project, the *GDSU 3 A*. This means that from the beginning Bramante wanted to move away from the cruciform structure of Nicholas V and move towards a more compact structure with a quadrangular plan.

GDSU 3 A

Later there is news in a well-known passage in the *Historia Viginti Saeculorum*, by Egidio da Viterbo [9], that Bramante proposed to the Pope the construction of a new basilica, with an entrance facing south and aligned on its north-south axis to the Roman obelisk, and located in the naves of the ancient Constantinian basilica [10]. The pope rejected the idea probably for various liturgical reasons, and especially not to move the tomb of the apostle. There is no news of what this project was, Frommel thinks that this project would be previous and different from the GDSU 3 A, although personally I am inclined to think that it was the GDSU 3 A project (Fig. 7.5), or a very similar one

carried out in those initial moments. In any case, it would have to be a project without longitudinal body since it would collide with the obelisk.
The GDSU 3 A proposal could have been drawn by Antonio di Pellegrino, Bramante's closest assistant in those years [11], and it is difficult to date [12]. It can be deduced that it must have been done between the end of 1503 and the middle of 1504 (when Bramante was 60 years old), but in no case after the winter of 1504 (or early 1505), when the project for S. Peter had reached a concrete phase [13]. It remains a mystery what this proposal was.
The GDSU 3 A project would be perfectly valid, as long as it was developed with a centralized structure, since the small fraction of the drawing made does not allow us to know for sure if Bramante was thinking of a centralized quincunx typology, or an elongated typology of naves, or perhaps in a mixed typology. However, if the building should face the obelisk (as indicated by Egidio da Viterbo), and with its center in the axis of the old basilica, it is evident that it could not be lengthened, so we can only think that it was of a centralized building with a quincunx typology.
Some researchers think that this Bramante drawing was not refered to the new basilica of S. Peter, but instead for the reform of the Church of Saints Celsus and Giuliano, by a commission from Julius II that was never built due to lack of funds [14]. In fact, according to my own analysis (see chapter 8), although it is a quincunx architectural typology, the architectural shapes have been achieved through other types of geometric relationships. While in the rest of later drawings by Bramante (and also by Giuliano da Sangallo) the architectural elements of the "central nucleus" (the four great crossing piers, the central dome and the two naves) have been generated based on an octagon, in this GDSU 3 A drawing the central architectural elements have been obtained by drawing circles, obtained using golden proportions on a square formed by the intersection of two naves. However, the coherence of the geometric relationships in the drawing means that it must necessarily have been made on the basis of naves that had a with of 110 *palmi*, that is, dimensions similar to the width of the central nave of the old basilica of S. Peter, which was 109.33 *palmi* with, from column to column (see chapter 8). This detail suggests that drawing *GDSU 3 A* refers to a project by Bramante for the new basilica of S. Peter. However, it is a very early solution, since Bramante took another path to generate its geometric structure.
The proposal, although very attractive, must have seemed too unreal to the pope, for various liturgical reasons, but mainly because it involved moving the tomb of the

apostle. No doubt, the pope greatly valued Bramante's talent and passion for architecture. Bramante's Milanese constructions had already been distinguished by their unusual spaciousness, their geometric coherence, their organic hierarchy and their skillful lighting. Once in Rome, its architecture was also characterized by a singular proximity to the ancient.

Therefore, this new order for a building that was assimilated to a new temple of Solomon (of which Julius II himself was seen as the successor), had to satisfy Bramante's wildest dreams. On the other hand, this building could also satisfy the dreams of Pope Julius II, since a new consciousness of power gave him the strength to unite the secret of the Christian religion with the monumentality of the imperial era [15].

Julius II, however, was thrifty and, as Sixtus IV's nephew and cardinal for so many years, he was a profound connoisseur of the institutions, ceremonies, and multiple functions of the church. Obviously, he would insist mainly to orient the project on a Latin cross and on the measurements of the Constantinian basilica, to include the fragmented walls of the choir of Nicholas V in the new construction, and to bear in mind the many characteristics and traditions not only of the church itself, but also the atrium, the Lodge of Blessings, and the passages that connected it to the adjacent Papal Palace. It is also possible that, from the beginning, Julius II must have planned to transfer the choir chapel of his uncle Sisto IV to the new arm of the choir, joining his own sepulchral chapel [16].

Not in vain, Julius II had begun his ecclesiastical career as a Franciscan novice, and as a cardinal he had continued to live in close contact with the Franciscans of S. Peter in Vincoli and the Holy Apostles [17]. In both churches had had the choir area expanded to create space for the monks and ensured a more solemn performance of the ceremonies.

Therefore, it seems that he had the presbytery open towards the longitudinal body (as did the Franciscans of the thirteenth century and then Brunelleschi and his followers), so that the multitude of the faithful could follow the liturgical celebrations. In this sense, the Cathedral of Florence was for the pope the best reference to build a great and functional cathedral. Such a large space under the dome represented an ideal setting for the staging of papal ceremonies and its exterior dominated the city landscape more strongly than any previous building [18].

Therefore, and thanks to some of his previous constructions, such as the choir of Santa Maria delle Grazie in Milan, Bramante seemed perfectly suited for this task. Since then Bramante seemed to be interested, and prepared, to surpass Brunelleschi, but by means

of a self-supporting dome, capable of providing a large amount of natural lighting, and also with a classic vocabulary and a more organic connection of the individual areas [19].
However, and despite the fact that Bramante may seem to the pope as an enormously talented and passionate architect, they had a different vision of the real purpose of the commission.
The main interest of the pope was the construction of the western choir, to house his funerary monument. Therefore, the design of the new building should integrate this choir, in the same way that the project of Nicholas V did, and should have a longitudinal structure, integrating with the Vatican Palace, up to the square where the access to the old basilica was.
However, Bramante's main interest was to take the opportunity to design a new and impressive building, which would become the reference of Christianity, housing a huge dome, similar to that of the Pantheon, but supported by 4 huge crossing piers. In fact, there is a tradition that assures that Bramante wanted a building that integrated the Pantheon dome over the Tempio della Pace. The architectural design of this new basilica should reflect the new ideals of the Renaissance, of course its revolutionary architectural ideas. Bramante had made it clear in his previous projects (especially in S. Pietro in Montorio) that he did not want to simply follow strict classical architectural canons, but, based on them, create new architectural structures, based on strong geometric relationships between all parts of the building, generating spaces that are strictly organized in perspective ("*matematici e prospettici*", from Urbino's humanism).

GDSU 1 A

Bramante continued to present different proposals to the pope, among which was the drawing GDSU 1 A (*piano pergamena*) (Fig. 7.6), which he probably presented to the pope just at the beginning of the year 1505. This drawing has an enormous quality, and it was quite well outlined, so it was certainly made to be shown to the pope and to convince him of the quality of its design. The project was grandiose and with an architectural and geometric quality without equal, and it also had dimensions that would undoubtedly attract the attention of the Pope.
However, the pope again rejected the project, as he had predictably done previously on several occasions with various projects. In fact, the drawing has on its back the annotation by Antonio da Sangallo: "*pianta di Sto. Pietro di mano di Bramante che non*

ebbe effect" [20], so it was clearly known at that time that the project was rejected by the pope.

The reasons for the rejection could be structural and functional, but it is most likely that the project could seem unreal to the Pope, since it was a new floor plan project, with a too radical design, and not integrated into the environment. Furthermore, it did not integrate what had already been built by Nicholas V.

It should be noted that in April 1505 Julius II approved Michelangelo's project for the sculptural monument in his tomb, probably giving impetus to a new planning phase [21]. Bramante surely took advantage of the new impulse of the pope to try again to convince him of the goodness of his centralized project, and therefore on that date Michelangelo could have the opportunity to see and examine Bramante's project to choose the right place for his sculpture.

He should not have convinced him since, perhaps in the spring of 1505, the pope requested the help of two other great architects.

In the first place, Giuliano da Sangallo (62 years old), with whom he had direct contact during his stay in France, developing a strong friendship. Second to Fra Giocondo (72 years old), whose knowledge and experience in great works was well known [22].

There are no references to the reason why the pope summoned these two architects. It is possible that the pope thought that the magnitude of the work required several architects, and in this sense the presence of Fra Giocondo would be justified, since he had experience in major architectural and civil engineering works. However, the presence of Giuliano da Sangallo was not so justified, and if he called him it would be out of friendship, and perhaps also to compensate for Bramante's stubbornness, because he seemed not to have understood that the works already begun by Nicholas V should be used.

The GDSU 1 A drawing is drawn in great detail on expensive parchment and in sepia ink, so it was certainly intended to be presented to the pope. However, the drawing has some inaccuracies since it only corresponds to the representation of an idea, and although it has very well outlined shapes, it does not have indications of measurements, nor preparatory lines, nor compositional lines, nor compositional meshes, and they are barely perceived compass point holes, which makes dimensional reconstruction and identification of geometric relationships more difficult.

We have only a part of the drawing, because it was clearly cut and we do not know what was in the other part. It is evident that the drawing was much larger because to draw it with a ruler and compass, one must start from the center, that is, at least the central dome and the surrounding architectural structures must be drawn. It is not known who could have cut it, but there are suspicions that Vasari could have done it, since the drawing was very attractive to him, as can be deduced from its inscription near the current lower margin [23], so that Perhaps it was he who made the cut, perhaps to insert the sheet, conveniently folded, in his book, or perhaps because he wanted to imagine a building with pure central symmetry, and not mixed by including a longitudinal typology of naves.

Half of this drawing has given much to talk about. And there are many who think that Bramante wanted to realize a pure and centralized plan. And it is possible. However, based on the analysis of the drawing in order to reconstruct its design process, it must be concluded that in the other half there could be anything (see chapter 8). But that provides an idea of what Bramante was looking for, a powerful generator nucleus, capable of generating both a centralized typology and a longitudinal typology with naves. In this way he could satisfy his Renaissance architectural claims, and at the same time the claims of the pope and the demands of the built environment. The result could be centralized, but it could also be flattered without losing its architectural purity.

Giuliano da Sangallo arrived in Rome in the spring of 1505, when Bramante had already begun the first of the great Vatican projects, the courtyard of Belvedere [24]. So if the pope supposed that Bramante was capable of undertaking a work as large as that of the Belvedere ensemble, he presumably called Sangallo for other reasons as well. However, Guliano da Sangallo was slow to settle in, and he moved permanently to Rome on October 22, 1505 [25]. Therefore, it is more than probable that prior to his definitive transfer to Rome Giuliano had already developed some of his ideas, and that they undoubtedly culminated in the autumn of 1505 when they were presented to the pope, along with those of Fra Giocondo [26].

It seems therefore that, from the autumn of 1505, the three architects were collaborating in the development of projects that were to the liking of the Pope. In this way the pope, without being aware of it, created an operative structure between the three great architects of "collaboration-competence", which would be preserved until the end of the construction of the new basilica. Within this operational structure, each of the three architects could present individual and independent proposals, which in turn could serve as inspiration to the others. Each one could defend their ideas, however, the three collaborating architects (*coaudiutore*) had to reach consensus in order to make a definitive proposal to the pope, who would have the last word for its execution. The design and construction process would be led by the main architect, who acts as the sole master builder. Obviously in some cases major clashes could be generated between the architects, although they were obliged to reach an agreement before presenting a final proposal to the pope.

GDSU 6 A y GDSU 8 Ar

Be that as it may, in the autumn of 1505, Fra Giocondo presented to the Pope his GDSU 6 A project (Fig. 7.7), and Giuliano da Sangallo presented his GDSU 8 Ar project (Fig. 7.8), as an alternatives to the GDSU 1 A project by Bramante.

Fra Giocondo's proposal, GDSU 6 A, was very rational and similar to the proposal that Leonardo da Vinci had made years before for the Church of the Holy Sepulcher in Milan (1487-1490 approx.). It had a huge body with 7 domes and a large final ambulatory in the style of French cathedrals.

On the other hand, Giuliano da Sangallo's proposal, GDSU 8 A, was much more innovative, and curiously, it closely resembles Bramante's GDSU 1 A drawing (*piano pergamena*), and also creates a hierarchical succession of spaces that seem to flow orthogonally from the four axes as if it were a fractal structure. Sangallo's drawing is even more radical than Bramante's project, which it also surpasses in bearing capacity. It is evident that Giuliano da Sangallo was already aware of the criticisms that may have been made of Bramante's elegant project in terms of its lack of bearing capacity of the immense central dome, and for this reason he projects a central space based on the octagon, thus approaching the dome of the Florence cathedral [27].

It is not known with certainty what type of collaboration existed between the three architects, and especially between Bramante and Guliano da Sangallo whose proposals were so similar.

Thoenes, against the more consensual hypothesis, thinks that there was no collaboration whatsoever and that even Giuliano da Sangallo's proposal GDSU 8 A was a counterproposal to the drawing GDSU 1 A that Giuliano could have seen when Bramante presented it to the pope, and the imprinted on his memory [28]. Thoenes also thinks that Giuliano's proposal was totally independent of Bramante's research, and was related only to his own professional background, such as the noblest of his sacred buildings, Santa Maria delle Carceri a Prato [29].

Personally, I do not agree with this statement based on the exhaustive analysis made of both projects (see chapter 8), and I think that initially at least Giuliano da Sangallo and Bramante collaborated and iterated for a long time. In any case, and even if Giuliao had a photographic memory, there is no point in presenting the pope again with a solution very similar to the one he had previously rejected. In addition, both architects should compete with each other, and therefore should be aware of what the others were doing, since they also collaborated, and were not enemies who worked in isolation

Without a doubt, and although they both worked independently, they had to have direct contact from time to time to exchange experiences and results of their research. In fact, I think that Giuliano provided Bramante in his GDSU 8 Av proposal, the way forward to achieve a mixed quincunx-naves typology, as I will analyze later.

Similarly, some researchers think that Giuliano's proposal did not influence Bramante [30], but based on my research I disagree, and I think that Giuliano influenced Bramante a lot, and that he even showed him the way to go.

Apparently, the pope rejected the proposals of the three architects, but curiously while Giuliano da Sangallo and Fra Giocondo apparently separated from the project, Bramante continued to carry out new projects, completely different from the previous ones, and adapting his ideas both to the reality of the environment, as well as to the true interests of the pope.

From my point of view, it is very likely that the project of Fra Giocondo seemed to the Pope little innovative and too crude for the new emerging Renaissance ideals. However, the Sangallo GDSU 8 Ar project, from my point of view, was superior to the Bramante GDSU 1 A project in several aspects. First, the central dome was smaller and its construction could be simpler. Second, the four central crossing piers were more robust and therefore more appropriate to withstand the enormous loads of the gigantic dome. Third, the hierarchy of spaces was clearer, purer and more elegant than Bramante's project.

The pope should have suggested specific changes to both Giuliano da Sangallo and Bramante and, as a consequence, both were obliged to change their centralized proposals based on a quincunx typology, and transform them so that they could include a longitudinal body with naves, extending in an eastern direction, much more real and suitable for the architectural environment of the basilica. And as a result, both Bramante and Giuliano da Sangallo improved their proposals, but there is no news of the subsequent activity of Fra Giocondo, despite the fact that his proposal, although not very innovative, was liked by the pope, and undoubtedly influenced so much in Giuliano da Sangallo as in Bramante, and later to Antonio da Sangallo.

JSM, codex Coner, f. 17

Bramante continued making proposals to the pope, among which is the JSM, codex Coner project, f. 17 (Sir John Soane's Museum Collection (cod. 115/17) (Fig. 7.9), clearly influenced by the GDSU 6 A proposal, and which in any case had to be carried out after the GDSU 1 A project [31].

Bramante's proposal was the first immediate response to try to meet the demands of the pope and the built environment in an integrated way, at the same time trying to respect the basic premises of Bramante's architectural ideals, based on a quincunx typology. The proposal is undoubtedly influenced by the well-known drawing by Francesco di Giorgio (BNCF, cod. Magl., II, 1, 141, f. 42v.) (Fig. 7.10), which provides an example of the way in which it was solved the problem by the theorists of the time, and which was called *figura composta* because it is formed integrally by a body with a central plan and a body with a longitudinal plan, or what is the same as a *figura rotunda* and a *figura angulare*, in the terminology of Francesco di Giorgio [32].

The *figura composta* inspired many architects in the late 15th and late 16th centuries, and had a special impact on the cathedral of Pavia, in which Franceso di Giogio, Leonardo da Vinci and Bramante collaborated. In fact, Leonardo da Vinci met Francesco di Giorgio Martini during a trip from Milan to Pavia in 1490, as both were called in to give their opinion on the founding of the Cathedral of Pavia (Fig. 7.11) [33]. At this time, Francesco di Giorgio informed him about his treatise *De Architectura*, in which he had already begun to translate Vitruvius' texts. As a result of this meeting, in 1490 Leonardo drew the famous drawing "The Vitruvian Man".

Bramante was undoubtedly able to test new ideas in this cathedral, helping to form a new typology, which Thoenes calls *pianta composta* [34], and which he would later use again from the drawing JSM, codex Coner, f. 17, to meet the demands of the pope and the built environment, in the project of the new basilica of S. Peter.

The initial typology of *pianta composta* from the drawing JSM, codex Coner, f. 17, will mature a little later in the proposal GDSU 7945 A, consolidating a typology that Thoenes calls "*basilica con corpo cruciforme a cupole"* [35].

GDSU 7945 Ar

The GDSU 7945 Ar drawing (Fig. 7.12) is a more mature proposal than the previous ones in several ways. In the first place, the design is more detailed since a compositional mesh module has been used to establish the geometric relationships between the different parts of the four great crossing piers. Secondly, the design of the crossing piers is perfectly defined, based on a compositional module of reduced dimensions (see chapter 8). Third, the drawing includes a ring of large columns in the transept to help support the enormous loads on the dome, as a result of an initial analysis of the loads that the four central piers could support.

In the early solution GDSU 1 A, the enormous loads on the dome are supported by the four crossing piers, but due to the special design of the building, the loads are also distributed in a distributed way by the set of projected architectural elements. The GDSU 1 A project, structurally speaking, resembles a network of load-bearing walls that is distributed in space forming a beautiful architectural network, but ultimately the loads that fall on a specific part of this network are distributed through the central part of the network. But when the proposal was rejected, Bramante decided to change it, in search of a new typology, and give more prominence to the 4 central crossing piers, detaching them a little from the rest of the whole, and in this way all the loads should now be absorbed by central piers.

Perhaps because of this, in this early solution, Bramante suspected that the four central piers might not be able to support the immense loads of the dome, and that they needed the help of a ring of columns. This ring of columns was perhaps not to Bamante's liking since it took away purity from his proposal, and for that reason he barely outlined it in his proposal, and he did it simply to keep it in mind and also perhaps to appease the criticism of his colleagues. It is possible that Bramante did not know the weight of the dome (since he had not designed it), nor was he sure of the bearing capacity of the four piers (since he was in the process of designing it). Therefore, he began to integrate a ring of columns simply in case he finally needed to have it, in the event that the 4 central piers were not enough.

In addition, it is possible that when making this drawing with a ring of columns, Bramante was inspired by the drawings of Francesco di Giorgio (Fig. 7.10) in the codex Saluzziano 148 of the Biblioteca Nazionale di Torino, fol. 12 r and v, and Magliabechiano II.I. 141, from the Biblioteca Nazionale di Firenze, fol. 42 v [37].

GDSU 8 Av

From my point of view Giuliano da Sangallo and Bramante apparently collaborated closely between the autumn and winter of 1505. Both were rejected for having presented a very similar project. That may mean that they collaborated by sharing ideas, but that each one developed them separately, and presented them to the pope.

However, if the pope rejected both projects (the drawings GDSU 1 A and GDSU 8 Ar) it means that although he liked both, neither of them matched directly with the premises of his commission. The two projects were great, but they just didn't fit the site.

Undoubtedly, the pope should have given both architects premises to develop more successful proposals. And based on the analysis of the projects developed later (see chater 8), perhaps two of the suggestions they received were that on the one hand the new building should have a longitudinal structure with naves, and on the other hand the building should have a large central dome, but the already built by Nicolas V should be used.

However, the pope was able to verify that the relationship between the two architects, apparently and initially, seemed harmonious and was bearing fruit. Both architects present very similar proposals based on very similar concepts. They were undoubtedly two variations on the same architectural research theme.

However, now both architects should change their proposals.

The two architects made alternate drafts, although their quality suggests that they were never presented to the pope. Both architects set to work to subtly transform their ideas, and as a result, mutating their projects towards a new typology. Neither of the two architects wanted to renounce their pure and attractive proposals, which were based on a "central nucleus", including four large piers that generated a centralized and symmetrical typology on the four axes. But they had to be able to design a “new central nucleus" capable of generating an elongated typology of naves. Therefore, the solution consisted in modifying the design of the four crossing piers, so that, in addition to being able to generate a centralized and symmetrical typology in four axes, they could also allow a typology of naves, and therefore that it could be extend longitudinally on one of the axes. In other words, they should achieve a “central nucleus” capable to generate a “quincunx-naves mixed typology”.

Based on the analysis of their projects (see chapter 8), I think that the first to react was Giuliano da Sangallo, who in drawing GDSU 8 Av (Fig. 7.13) (drawn on the back of his

previous GDSU drawing 8 Ar), modified his own proposal, so that it was valid both for a quincunx typology, and for a typology of naves. And the result was simply fabulous.
Giuliano had created an unprecedented new typology, with which he could adapt his extraordinary previous proposal (GDSU 8 Ar) to a new mixed proposal, which would accommodate the demands of the pope and the demands of the built environment.
The key was on the beveled side of the four large crossing piers, that is, on the side opposite the dome. The larger this beveled side, the less chance the "central nucleus" has of generating a typology of naves. Therefore, the common challenge for Giuliano da Sangallo and Bramante was to design the four central crossing piers with the beveled side with the smallest possible dimension.
Undoubtedly, and as has been said, Bramante was also familiar with the mixed quincunx-naves typology (in fact he had used it in his previous known proposal (JSM, codex Coner, f. 17), but what he wanted to do is achieve this mixed typology quincunx-naves, based on his favorite proposal GDSU 1 A. That is, Gilulíano da Sangallo should modify his proposal GDSU 8 Ar and Bramante should modify his proposal GDSU 1 A, in order to achieve a new mixed typology quincunx-naves. Based on the analysis of the available drawings, I think that the first to react was Giuliano da Sangallo, who showed Bramante the way forward in his drawing GDSU 8 Av.
The drawing was only a working sketch in order to express a new path of architectural research, and it was obviously not shown to the pope, but it had an extraordinary influence on Bramante, since, with this new perspective, Bramante developed, perhaps among many others, the GDSU 7945 Av project, (and later it would do the same with the GDSU 20 Ar project).

GDSU 7945 Av

The decisive contribution of the GDSU 7945 Av plan (Fig. 7.14) is the achievement of a new typology that integrates two previous apparently opposite typologies: the "quincunx" typology and the longitudinal naves typology (see chapter 8).
However, when trying to create a new typology that integrates the quincunx typology with a typology of naves, Giuliano da Sangallo (in GDSU 8Av) and Bramante realized that now the large central crossing piers should have a greater role and should increase in size (decreasing the dimension of the beveld side and increasing the dimension of the lateral sides). In this way, the crossing piers were isolated from the rest of the

architectural elements, and as a consequence they would have to support the enormous loads of the great central dome by themselves.

As a result of the transformation of the four central piers, the building has five naves, like the old basilica. In addition, a total integration is achieved between a centralized basilica typology and a longitudinal typology, and therefore the transition from the *pianta composta* to a new typology, which could be defined, as Thoenes calls it "*basilica con corpo cruciforme a cupole*" [36].

From this new proposal by Bramante, no new proposals by Giuliano da Sangallo are known, and based on this, the possible collaboration-competition between the two architects raises three major questions:

- First of all, why does the GDSU 8 Ar drawing by Sangallo look so much like the GDSU 1 A drawing by Bramante? Were they initially working in such close collaboration? (because, as Thoenes suggests [38] just a glance in an audience with the pope is not enough at all to retain in memory Bramante's GDSU 1 A project, to develop an alternative). Apparently, both architects collaborated closely and seemed to have the same concerns.
- Secondly, it seems that Giuliano da Sangallo knew how to create a magnificent solution to transform his own project in order to integrate both a centralized quincunx typology and a typology of naves. Bramante did the same, but apparently with some delay, which also suggests that he was very close to Sangallo. Therefore, why did the Pope choose Bramante and not Giuliano? Why didn't Giuliano da Sangallo continue to develop new proposals for the pope?
- In third place, Bramante continued to generate proposals based on Sangallo's great guidance, and apparently alone. Why did Giuliano da Sangallo disappear?

There are not definitive answers to these questions, but without a doubt Bramante knew how to get rid of his great competitor through non-architectural strategies, since Giuliano de Sangallo apparently was equal or more talented in his initial proposal, and faster and more visionary in its transformation. However, another question remains: If Giuliano was so talented, why did he carry out, years later, for Pope Leo X, the clumsy projects represented in the GDSU 9 A; GDSU 7A and BAV, cod. Barb. Lat. 4424, f. 56v drawings? Did Giuliano let himself be carried away years later by the pope's preferences without questioning its architectural quality?

In any case, the Pope did not value the GDSU 8 Ar project, and apparently Giuliano did not return to present a new project to the Pope, despite the fact that he indicated to Bramante the way forward to create a new mixed typology, integrating a quincunx typology with a typology of naves, as apparently the pope wished.

GDSU 20 Ar

Once the way forward was envisioned, Bramante continued generating proposals, among which the GDSU 20 Ar (Fig. 7.15) has come to us. This project shows for the first time a desire for complete integration of the new mixed typology with the built environment. His ideas about the new mixed quincunx-naves typology were already mature, and with this the building did not lose its purity and at the same time it fulfilled the requirements of Pope Julius II. Therefore Bramante had to start incorporating his ideas into a new project that was already integrated into the built environment.

To create a new project integrated with the real built environment, the first thing Bramante does is draw the old existing basilica, including the works already carried out by Nicholas V, which the pope wanted to take advantage of (out of economic conscience, and to speed up the work as much as possible).

This new drawing is hardly a scale sketch, since to make it Bramante drew compositional lines every 5 *palmi* (see chapter 8). This means that he decided to use a compositional module of 5 *palmi*, since all the architectural elements would be multiples of 5 *palmi*, and therefore its design would be very rough. Therefore, the drawing would only involve the expression at certain scale of an idea, and not the realization of a detailed project. It would undoubtedly be the first drawing made of a set of drawings, more detailed, that Bramante necessarily had to make later, before the start of the works.

The compositional lines every 5 *palmi* are generated as a consequence of a compositional half-modulus, derived from a compositional modulus of 10 *palmi*. The separation between columns of the old basilica of S. Peter was 109.33 *palmi*, a dimension that is compositionally rounded to 110 *palmi* in order to make a quick sketch. Dividing 110 *palmi* by 10 *palmi*, it is obtained that the central nave of the ancient basilica had a width of 11 compositional modules, and each module had a dimension of 10 *palmi*.

So making sketches based on 5 and 10 *palmi* modules was a good idea in order to start a process of integrating Bramante's new ideas in the built environment. Bramante undoubtedly wanted to make a new building with a central nave of similar dimensions to the central nave of the old basilica (which was 106.33 *palmi* wide from base to base and 109.33 *palmi* wide from column to column, and that Bramante rounded 110 *palmi* in this drawing, and 107 *palmi* in his later proposals respectively). In fact, Nicholas V also wanted his new basilica to have arms with a rounded width of 110 *palmi*, and with these dimensions he began to build the west arm.

Some researchers think that this drawing shows two different projects since there are two different types of crossing piers [39]. The crossing pier that is located to the northeast is smaller and different from the other three that are apparently identical, despite the fact that the drawing is only a draft and the lines of the sketch are repeated with different sizes on each pier. These researchers even see the large northeast crossing pier similar to the large central crossing piers in the GDSU 1 A drawing.

I don't see any of that. I see the rapid materialization of an idea that Bramante had been maturing for several months, and in this sense it is logical that the piers resemble each other. In fact, all the piers that Bramante designed are similar since they all have the same origin, as shown in the analysis of all the projects he carried out. As shown in the next chapter, from the beginning of the design process, and especially from the GDSU 7945 Av drawing, Bramante was trying to create a very special design for the crossing piers, so that the set of the four central crossing piers would form a very special “central nucleus”, capable in turn of creating a mixed quincunx-naves typology, and at the same time capable of generating the four perimeter domes, the counter-piers, the ambulatory, and all the perimeter spaces.

In general, the set of 4 crossing piers should have the following characteristics:

1. The crossing piers must generate a dome geometrically integrated with the main naves, which in turn must have the same width as the ancient basilica of Constantine. In fact, Bramante tested with two dimensions, initially in his first proposals he tested with 110 *palmi* (corresponding, in a rounded shape, to the width of the central nave from column to column, that is, 109.33 *palmi*), and finally he would opt for 107 *palmi* (this dimension corresponds to the rounded width of the central nave from base to base, that is, 106.33 *palmi*). Bramante initially attempted this integration by means of circles and golden proportions, and finally decided that the best way was to use a nearly regular octagon (see chapter 8).

2. The crossing piers must generate four perimeter domes geometrically integrated with the central dome, in order to achieve a quincunx typology. In this sense, the dimension of the beveled side, opposite to the central dome, takes on special importance. The bigger the beveled side, the bigger the perimeter domes, and there are fewer possibilities of achieving a typology of naves.
3. The crossing piers must generate the specular design of the counter-piers that extend along the new building, forming a typology of naves.
4. The crossing piers, together with the specular counter-piers, must generate side chapels.
5. Crossing piers must be able to generate, as an extension of their design, perimeter ambulatory.

Based on these considerations, the large northeast crossing pier in GDSU 20 Ar is an attempt by Bramante to design a crossing piers integrated with the architectural structure of the ancient Basilica of Constantine. He drew a large pier in which the pilasters of the side faces were aligned with the central colonnade and lateral colonnade of the old basilica (therefore, the shape of this large pier is reminiscent of the shape of the central crossing piers of the GDSU 1 A it's just a coincidence). But in doing so he realized that the resulting pier was too small, and what is worse, although a pier of this size could generate a quincunx typology, it was not capable of designing a typology of naves. In fact, I think that Bramante made this drawing not only as a design attempt, but to explain to someone something that he already knew.
He then began to draw a new crossing pier, on the southeast side, which he repeated, now more safely, on the southwest and northwest sides respectively.
This new design was perfect. It had the diagonal side opposite the central dome with reduced dimensions, so at the same time it allowed a quincunx typology, and allowed a typology of naves. In fact, Bramante began to draw longitudinal counter-piers creating a longitudinal sequence of sections in the five generated naves. In the same way, the external lateral sides of the large central crossing piers could both generate a sequence of counter-piers to achieve a set of naves heading east, and at the same time they could generate ambulatory on the north, west and east sides. Therefore, the design of the crossing piers had been designed to generate ambulatory. In other words, Bramante wanted to create a building with ambulatory.

Lastly, Bramante designed a compositional structure for the ambulatory with 10 interior niches, and with a design that does not allow access doors to be located on the axes (later Bramante will change this basic design, and will locate 11 internal niches, an odd number that allows the central niche becomes an access door). The ambulatory had a huge number of columns located in pairs and for which Bramante planned to reuse the columns of the old Constantinian basilica.

Bramante had already used shafts from ancient Roman columns at S. Pietro in Montorio, and probably also some Doric parts from ancient buildings adjacent to the Aemilia basilica were used in his first project for the Castellesi palace in Borgo [40]. And in the same way, and surely he would have planned to reuse the columns of the old basilica in the construction of the new basilica of S. Peter. The old basilica had 56 large columns, made of cipollino, and white, pink and red granite, approximately 5 *palmi* in diameter, 44 of them located in the central nave, 8 located between the aisles and the transept, and 4 between the transept and the exedras. It also had 44 smaller columns, about 3 *palmi* in diameter, placed between the smaller naves [41]. According to Bramante's intentions, these columns could have been used, at least, in the ambulatory, in the windows of the choir of Julius II, and in the drum of the dome [42].

The GDSU 20 A drawing also takes into account an important detail that had not been previously contemplated, neither by himself, nor by Giuliano da Sangallo nor Fra Giocondo, and is the integration of the design of the new basilica with the existing obelisk.

Bramante realized that the obelisk was located almost on a perfect diagonal drawn from the center of the square transept he had projected. This transept now has rounded dimensions of 110 *palmi* per side (corresponding to the rounded width of the central nave of the ancient basilica, measured from column to column, 109.33 *palmi*). In this way, and by chance, the obelisk was perfectly located in the mixed quincunx-naves typology that he had just designed. In fact, the drawing shows Bramante's will to integrate said obelisk into the architectural structure of his proposal, since he designs towers on the western side equidistant from the obelisk with respect to the north-south axis. The western towers on the west side are perfectly integrated into both the ambulatory and the quincunx structure, and their center corresponds approximately to the mirror image of the obelisk with respect to the north-south axis. In fact, Bramante designs some walls around the obelisk to replace the corresponding towers that should be located in that place if the building had axial symmetry. These walls serve as an

architectural framework to integrate the external obelisk inside the architectural structure and also create a new diagonal access to the new basilica.
Therefore, it can be said that at this point Bramante was quite clear about the architectural structure of his new building, which was also perfect in every way.
The only problem that remained was how to integrate this wonderful new typology with Julius II's incessant demands to take advantage of the foundations and walls of the western choir to build a western apse, with the shape predetermined by Nicholas V, to house the *Capella Iulia*.
It is logical to think, based on the analysis of his projects (se chapter 8), that Bramante would do everything possible to dissuade Pope Julius II from the inappropriateness of his decision, but it is evident that he could not do so. And this was Bramante's real nightmare. Bramante had come a long way in creating a new building design based on a new mixed typology, and had apparently gotten rid of his competitors, but he was aware that in such a design it was absolutely impossible to integrate the apse of Nicholas V.
It was practically impossible to integrate two architectural objects that had been projected with different typologies, with different compositional strategies, with different compositional modules, with different geometric and dimensional structures. The apse of Nicholas V was presented by twine as a strange object that he must necessarily integrate in his new design, but whose integration was clearly impossible, since it would distort the purity of his design and would clearly provide an unattractive result (as shown in the later proposals of Giuliano da Sangallo). Bramante was therefore forced to design an ambiguous executive strategy in which he would work separately on the design of the Julius II apse, and on the design of a new building with the mixed typology he had just created.
To carry out this strategy, he would have to give the pope a long run without doing any full executive project. Instead he would make detailed drawings, and even models of both sides of the building (on the one hand the central part of the building, and on the other hand the apse of Nicholas V), and would also carry out one or more general basic projects of the complete building to convince to the pope, although Bramante would always present ideas that he should complete. In this way the pope would get an idea of the whole, but without Bramante having to commit himself, and would focus on the complete detail of both the apse and the central part of the building.

It is very probable that this basic general project, and without detail, resembled the drawing of Serlio 1544, f. 37 (Serlio 1540, f. 36), who years later would present Raffaello to Pope Leo X (Julius II's successor) after Bramante's death.

Bramante had to make several partial projects for the construction to progress, some of these drawings would have the purpose of pleasing the pope, and others would serve to begin the construction of the central part of the building on the one hand, and the apse of Julius II on the other hand. With some of these partial drawings, Bramante would try to provide some kind of solution to the integration of Julius II's apse, at least with the transept and the ambulatory. And without a doubt, the drawings GDSU 4 A and DSGU 5 Ar correspond to this period.

GDSU 4 A y *DSGU 5 Ar*

Drawings GDSU 4 A (Fig. 7.16) and DSGU 5 Ar (Fig. 7.17) represent the interior of the new choir in elevation, and in any case, as Frommel correctly proposed, these drawings are very important and seem to reproduce, with some inaccuracies in perspective projection, the structures of a probable wooden model of the *Capella Iulia* [43]. By the way, the facade drawn at the bottom of the GDSU 5 A drawing may not correspond at all to the drawing at the top (that is, a basilica with a prominent choir or with a choir included in an ambulatory), instead it could correspond to an earlier idea that could still be in Bramante's mind, and which could correspond to a plan similar to GDSU 8 A, which is attributed to Giuliano da Sangallo. This drawing is very similar to the image of the basilica of St. Peter that can be seen in the painting “Madonna delle Rovine”, from the Scuola di Raffaello (Fig. 7.18), which means that a building like this caused enormous admiration in his time, even if he was rejected by the pope. The fact that the lower part of the drawing does not correspond to what is drawn on the upper part means, on the one hand, that Bramante used very well a scarce resource, such as paper, and on the other hand, it shows that the design process was stormy, creating a huge brainstorming and going from one solution to another in a short space of time.

These drawings show a solution very similar to the one that was finally built, integrating the *Capella Iulia* with the four large central crossing piers. The drawings show columns on pedestals with a single great Corinthian order, which act as an impost for the covering vaults and the choir, characterized by large openings protected by columns.

The drawing is very imprecise and some historians see ambulatory and others do not. Personally, I think that the drawing indicates that the *Capella Iulia* could be surrounded by an ambulatory, similar to those existing in the north and south part of the transept. That is, creating a "compromise solution" to integrate a strange architectural element (the *Capella Iulia*) with Bramante's building, creating something similar to the one represented in the drawing PML, codex Mellon, f.72v, by Raffaello.

Although these GDSU 4 A and GDSU 5 A drawings do not correspond to what was finally built, they illustrate the will of Julius II to finish the choir as soon as possible, like *Capella Iulia*, using the foundations made by Nicholas V, to house the sculpture funeral home commissioned to Michelangelo.

Therefore, it is likely that these drawings were made shortly before or shortly after the start of the works (April 1506), but were later partially modified and used for the construction of the western apse. This certifies, in any case, that the development of the project was very tormented, and that the definitive especification of the individual parts almost immediately precedes the execution of the works. I personally think that the final solution developed by Bramante for the western apse has the same architectural structure as that shown in drawing GDSU 44 A (Fig. 7.19), with a three-span apse. Of course, with this design, Bramante made a fabulous architectural exercise, creating an apse perfectly integrated into the two large western crossing piers, and using the foundations made by Nicholas V. However, the problem was not the integration of the apse in the two great crossing piers, the problem was the integration of the apse with the central nucleus of Bramante and Bramante's ideas.

Drawing GDSU 5 A shows an apse with five openings, but Bramante had to change its design quickly just at the beginning of its construction. In fact, a design with five openings would have produced very elongated proportions of the compartments and great difficulties in placing them in pairs of columns. For this reason, perhaps after the beginning of the works Bramante changed the design and arranged only three openings in the apse, geometrically related to the two lateral openings (see chapter 8) [44].

Bramante had to review the Julius II choir project. The semi-cylindrical apse was pierced by three arches, instead of the five previously designed arches, and between the arches, as there was now more space, Bramante placed two combined paraste, instead of individual paraste, as they existed in drawing GDSU 5 A (as can also be seen in drawing GDSU 44 A by Antonio da Sangallo).

No other drawings by Bramante are known despite the fact that, according to Vasari, he made *infiniti disegni* for the new basilica of S. Peter [45]. However, there are references to what was finally built, and it does not correspond to any of the drawings that are preserved by Bramante. This means that Bramante had to carry out many more projects both before and after the GDSU 20 A drawing, and that of course he had to have finally come up with both a project to his liking, as well as a strategy to carry it out.

In the famous drawing JSM, codex Coner, F. 24v, ed. Ashby, Sir John Soane's Museum. London. cod. Vol 115/31 (Fig. 7.20), the state of the works between the years 1515 and 1516 can be appreciated, although Frommel rightly points out that it also shows parts of the planned construction, but not yet built in 1515 [46]. Similarly Metternich is of the opinion that in 1515 the western niches (Fra Giocondo's niches) had not been made, the great southern counter-piers had not been made, and the eastern counter-piers had been built in shaped like 2 rectangular paired septa, and not like lenticular piers with circular niches on either side [47] (7.21).

This means that Bramante had to come up with a solution, having matured his ideas based on a sequence of a large number of successive studies. Therefore, it is more than likely that the design process had to be stormy, since as Bramante made changes, new problems of all kinds arose, he tried to solve them with new changes, and so on. However, at the end of the process, Bramante had to have achieved a wonderful project based on the "criteria of his art", paraphrasing Michelangelo's well-known answer to Giulio II, on the vault of the Sistine Chapel: "*che ella sarebbe finita quando io avrò sattisfatto a me nelle cose d'arte*" [48]. It should be remembered that in Italian Renaissance the consciousness of autonomy of Italian artists was manifested with special acuity.

It is therefore possible that, at the beginning of the works, Bramante had not carried out any complete project with all its details, and would only have enhanced detailed and executive projects of the four great crossing piers, and of the apse of Julius II, together with some basic project, little detailed, of the complete building, similar to the drawing Serlio 1544, f. 37 (Fig. 7.22), presented by Raffaello years later in the time of Leo X.

In fact, this drawing by Serlio has been commonly considered in ancient literature as "*pianta di Bramante*" [49], as for example Grimaldi [50] who calls this drawing as "*pianta templi vaticani… Bramatis*", or also Filippo Bonanni [51], who refers to the drawing as "*ichonographia basilicae a Bramante delineata*". Goethe also refers to this plan saying that "*Julius ubertragt Bramante, einen Riss zu der neuen Kirche zu machen, grosse Eleganz, Heiterkeit und Leichtigkeit desselben…*" [52].

The architectural solution is very attractive, and represents the perfect integration between a centralized quincunx typology with a longitudinal typology of naves.

Metternich named this drawing as "Bramante-Raffael-Plan" [53], and Serlio refers to it as "*il qual Bramante al suo tempodette principioalla stupenda fabrica del tempio di S. Pietro a Roma: ma interrotto dala morte lasciò non solamente la fabrica imperfetta, ma ancora il modello rimase imperfeto in alcune parti: per il ché diversi ingengi si affaticarono intorno tal cosa: et fra li altri Raffaello da Urbino pittore, et ancho inteligente nel architettura, seguitando però I vestige di Bramante, fece questo disegno*" [54].

It is possible that the final solution devised by Bramante at the beginning of the works included the "central nucleus" that generates the architectural forms, a mixed quincunx-naves typology including four perimeter domes, three ambulatory to the north, south and west, and five naves with five sections (navate) heading east. This solution could generally coincide with Raffaello's drawing, although it would have only two differences, corresponding to Raffaello's personal contributions. On the one hand, Bramante's final basic project would not have the large colonnades in the portico of the facade (which Raffaello must have added to appease Leo X's grandiloquent anxieties), and on the other hand, Bramante's project had 5 naves (and not three, as is the case with Raffaello's project) since Bramante arranged small counter-piers grouped in pairs, and not large lenticular counter-piers, as he would later think and as reflected in Raffaello's projects. It is very probable that at the end of his days Bramante decided to join the pairs of septa, forming lenticular counter-piers, and in this way the basilica would go from having 5 naves to having only 3 naves. It is very likely that initially Bramante would have thought about having these lenticular counter-piers, but did not dare to because of the enormous strangulation that occurs inside.

Frommel is of the opinion that the ambulatory was devised by Raffaello [55], however, Metternich [56] pointed out that the ambulatory had already been designed by Bramante in the GDSU 20 A drawing, who was also perfectly aware of San Lorenzo de Milan, unlike Raffaello. However, and based on the analyzes made of Bramante's projects and those of his followers (see chapter 8), it is evident that Bramante completely defined the ambulatory down to the smallest detail, and that his followers respected their architectural structure modifying only small details (such as the size of the interior niches, the definition of parastes or columns on the outside, the existence of access doors, etc). The architectural structure of the ambulatory designed by Bramante is shown in a general way in the drawing by Serlio 1544, f. 37 (Serlio 1540, f. 36), and the specific dimensions in drawings GDSU 45 A and GDSU 46 A by Antonio da Sangallo. Without a doubt, Antonio da Sangallo had access to some of Bramante's plans and respected its essential architectural structure, making small modifications of his own invention. However, the fundamental aspects of the ambulatory design were undoubtedly carried out by Bramante.

On the other hand, it must be taken into account that the large number of drawings with ambulatory, at least in the transverse arms, that appear in the time of Julius II (GDSU 8 Av de Giuliano da Sangallo, codex Coner No. 17 and GDSU 20A de Bramante) and in the times of Leo X, made by his collaborators and followers (Giuliano da Sangallo, Raffaello, Antonio da Sangallo and Peruzzi), evidence that this was Bramante's favorite idea. It is possible that it was an attractive idea both for Bramante and for Pope Julius II, and that it was present in various references such as the Lateran Cathedral, the Church of the Holy Apostles, or the prestigious Santa Sofia in Constantinople. Bramante could also have been inspired by San Lorenzo in Milan (in fact, it is mentioned in GDSU 8 Av drawing). Therefore, it is probable that Bramante, after the GDSU 20 A proposal, wished to keep the ambulatory, also dimensioning them as an extension of architectural structure of the large central crossing piers.

However, despite the enormous architectural quality of his project, and despite the work involved in getting it, there was a problem that he could not solve: the apse of Julius II.

Bramante had no choice but to give in with the construction of the choir so as not to end the pope's patience [57]. It is very reasonable to think that Bramante would do everything possible to convince the pope not to build on the choir of Nicholas V, since this was incompatible with its ideas, and with the new Renaissance motivations. However, the pope knew that that his days were numbered, and he wanted to build his own funeral chapel as soon as possible, so the most convenient thing would be to take advantage of the foundations of the apse of Nicholas V. He must have challenged Bramante more than once to find a solution. However, Bramante, like any good architect, knew that such a solution could not exist.

Therefore, Bramante had to devise a strategy for both the design and the construction of the new basilica.

1. With regard to design, Bramante adopted a strategy based on ambiguity, letting time pass without showing the pope any complete project in all its details. Instead Bramante made perfectly defined projects only for the central part of the building (the “central nucleus of Bramante”), and for the Julius II choir, knowing that the integration of these two parts would always be unsatisfactory.

To integrate the apse with the "central nucleus of Bramante" there could only be three solutions:

- The first consisted of leaving the apse free, without surrounding constructions (only integrated into the four large western central crossing piers), which provided a disastrous result (as can be seen in Giuliano's proposals GDSU 9 A, GDSU 7 A in the time of Leo X).
- The second was to surround the choir with an ambulatory similar to those of the north and south, which provided a good result, similar to the proposal of Giuliano da Sangallo BAV, cod. Barb. Lat. 4424, f. 56v, and that of Raffaello and PML, codex Mellon, f. 72v.
- The third was not to build the apse, or when it was built to try to tear it down as soon as possible, which provided an excellent result, similar to Raffaello's proposal in Serlio 1544, f. 37, just as Bramante would have liked.

This is why Bramante should focus on building the central nucleus as quickly as possible.

Bramante would show innumerable partial designs to the pope, and even make partial models, showing him only solutions related to the central nucleus, the apse, and eventually the ambulatory ones, and in the case of presenting a complete solution to the pope, he would do so by indicating that it is only one tentative idea that should be improved. Bramante knew that the construction of the central nucleus of his new mixed typology, such as the apse, would take several years, so he would have time (and hope) to take advantage of any circumstance that could happen in the meantime.

2. With regard to construction, Bramante designed a construction strategy completely different from the logic of any construction. Any construction usually begins by making the foundations of all the load-bearing elements, to later make the structure and then the covers. Instead, Bramante devised a completely different "centrifugal" construction process, with which the new basilica would be built "inside out". In fact, it did so, since when the four huge crossing piers were finished, the foundations of the peripheral elements had not yet been made. It is evident that he had to put the construction of the naves until last, due to the enormous amount of treasures that he housed inside, but he could build perfectly in a north, south and west direction. But it did not. And he did not do so mainly because he wanted to finish the central nucleus so that it would never be taken down, and in the hope that his successor, Raffaello, would properly finish what he had started. In fact, around 1513-1514, the “central nucleus” was completely built, even in the details, down to the capitals and the entablature of the great Corinthian order and the dome, without even the foundations of the ends of the transverse arms being made, from the sides of the choir and the naves.

Start of Works

Many researchers [58] have suggested that the building that began to be built was made on the basis of a certain project, either complete or partial, with a longitudinal nave. In my opinion, at the beginning of the works, Bramante's favorite solution should be something very similar to Serlio's drawing of Serlio 1544, f. 37, by Raffaello, (although without the frontal colonnade and with 5 naves formed by pairs of counter-piers). However, it is possible that he had also sketched some integrating solution of two almost impossible to integrate realities, a "compromise solution", similar to the one represented in the drawing PML, codex Mellon, f. 72v, also by Raffaello.

However, it is possible that Bramante intuited that the true solution would come several years after his death, and that it involved the demolition of the *Capella Iulia*. Something that would happen a few years later, and that, in my opinion, Bramante planned, or at least did everything in his power to make it happen.

To commemorate the start of construction, Cristoforo Caradosso made a medal (*Medaglia di fondazioni del nuovo S. Peter*, BNP, Cabinet des Medailles), following the project that they would have provided (Fig. 7.23). The project and the image that should be given to the engraver would have to be recent, since it does not make sense to provide it with the image of an old project and by all discarded. Unless Bramante never made a complete image of the facade again, so he would not have any other image and he had to provide Caradosso with the only image he had, even if it did not correspond to the project that was going to be built. If Caradosso was provided with a recent image it means that Bramante had to make some huge changes, completing several projects in a few days and making substantial changes as soon as the works began. This doesn't seem to make sense. Personally, I am inclined to think that Bramante began the construction of the new basilica with a very mature idea, and having perfectly designed the central nucleus and the choir of Julius II, but had not decided anything else. Therefore, he did not have any representative image of the facade, for what he provided Caradosso with an ancient image of a discarded project.

The image of the medal could correspond to a facade of the GDSU 1 A floor plan, or very similar. And that solution had already been rejected. However, it is very likely that Julius II liked the idea reflected in the facade, with four central blocks and four corner towers, reflecting the hierarchy of spaces that was shown in GDSU 1 A. Surely Bramante could tell him that he would try to do something similar following his new requirements, although with a longitudinal ship, the image on the medal could only reflect the west face. However, I think that the medal is actually just a symbolic image, an announcement by the pope of the *instauracio* that was about to begin. On the small surface of the medal the idea of the facade of a project is roughly represented, so it is not a project, nor does it intend to be, and therefore trying to analyze it in detail does not make much sense. Of this same opinion is Thoenes [59] who correctly points out that this same situation was repeated when Paul

III prepared a medal for the Holy Year of 1550, and represented in it the image of a project by Sangallo already discarded in 1546. Similarly, the medals of Gregory XIII and Paul V offer other parallels. The analysis of the medals does not make much historical or architectural sense.

In short, the medal simply indicates a certain facade corresponding to a certain stage of the design process, perhaps slightly later than the design of the GDSU 1 A drawing. This suggests that Bramante did not make any other facade drawings prior to the start of the works.

The works begin immediately after the opening ceremony, on April 18, 1506, starting from the existing foundations of Nicholas V "*pro structura novi chori*", and which comes from one of the four *columne* that should support the "*chorum sive ciborium basilicae*", that is, the large central dome [60].

Bramante had to demolish only half of the old nave, thus saving the sepulchral chapel of Sixtus IV. This may have been one of the Pope's essential points: the new choir that should be built on the existing foundations of the Nicholas V, should be completed before continuing the demolition, so that the relics of his uncle should be transferred there before being demolished.

The project responsibility was in the hands of Bramante, the direction of the work corresponded to Giuliano Leno, while the administration was in the hands of the clergy closest to the pope, such as Cardinal Fazio Santoro, treasurer Enrico Bruni and two canons of S. Peter, Mario Maffei and Bartolomé Ferratici.

Between 1506 and 1511, Julius II spent a little over 80,000 ducats for the new construction, much of which came from indulgences [61]. The work began in the choir area and at the western crossing piers of the dome, that is, in *Capella Iulia*, without touching the old basilica or disturbing the ceremonies.

The works were carried out at a very rapid pace, in fact despite the uncertainties that would continue to accompany Bramante also during the construction process, in fact they progressed more rapidly than under any of his successors, even perhaps at some point under the direction of Sangallo [62].

There are references that in April 1506 the *tribuna*, whose *fenestre* were explicitly mentioned in the contract (at the beginning of April 1506) for the beginning of construction. In this case, it is probably the choir of Julius II or

Capella Iulia even if the approximate or inappropriate use of the terms (*chorum, ciborium, tribune*) does not always ensure the identification of the works.

Since only the choir, among the works object of the contract, had to have windows, the expression *fenestre* and *tribuna* should refer to this part of the construction. However, if the term *tribuna* referred to the span of the dome, it could be the openings and corridors open at the crossing piers of the dome and visible in the views of Heemskerck [63] (Figs. 4.12, 6.5 and 6.9).

There are references that two crossing piers "*iuxta formam modellij*" [64] must be founded on February 12, 1507. This term indicates that there was a model, although it was probably restricted to only some specific parts of the building (and probably the parts shown in the drawings GDSU 4 A and GDSU 5 A. In any case, the model most likely showed the four large central crossing piers and the walls of the new choir.

In April 1507 Julius II ordered the construction of the two western crossing piers of the dome and, therefore, the destruction of the last sections (*navate*) of the longitudinal body and east wall of the transept of the old basilica of S. Peter [65]. Evidently the pope urgently requested the completion of the *Capilla papalis* and the *Capella Iulia*. To the horror of one witness the destruction of the longitudinal body, by November 1507 perhaps had already reached the point described in the Heemskerck drawings [66]. In general, Bramante was blamed for the dismantling of holy sites, tombs and monuments. However, the promoter was undoubtedly the Pope, aware that his years were numbered and that his successors would hardly have the courage to make such a new construction.

While the body of the building had already been largely fixed through the crossing piers and the choir, it seems that during the years 1506-1507 there were obvious discrepancies between Bramante and the pope about the shape the facade should have.

On September 6, 1505 and again on April 16, 1506, that is, two days before the laying of the first stone, Julius II wanted to extend the Lodge of Blessings of Pius II over the entire width of the old basilica [67]. Furthermore, the facade of the final project would initially have to be separated from the Piazza di S. Peter by an atrium. There are references that in May 1507 this idea of a facade with atrium still had to be valid, since it was assumed that Bramante had to organize a path from the Piazza di S. Peter to the obelisk, to improve its contemplation [68].

On April 16, 1507, there are references that Enrico Bruno, Archbishop of Taranto, placed on behalf of the Pope the tombstones "*in fundamentiis duobus* *pilastris*" of the new temple that is being erected "*in dignorem amplioremque formam*" [69].

In May 1507 the area between the old apse and the apse of Nicholas was demolished, and on which even after the foundations, a part of the early Christian cemetery was preserved [70]. At the end of May 1507 a large crack opened - perhaps because both crossing piers rested in part on the foundation of Nicholas V [71].

On the other hand, on May 13, we have references that the Lodge of Blessings, begun by Pius II and continued by Paul II and Alexander VI (in which Bramante was still working in September 1505) "has given andare per terra secondo el novo disegno de la fabbrica" [72], although the demolition did not proceed. It is therefore possible that it was already decided previously that the new building should extend longitudinally towards the square (as could also be suspected with the expression "*in dignorem amplioremque formam*"), and maybe according to "*el novo disegno*" [73]. Bramante in any case speaks at the same time of a "new design of the S. Peter factory", a new project that would force the destruction of the existing *campate* of the Lodge of Blessings. Only from the summer of 1507 was the project to expand the Piazza S. Peter to the facade of the new basilica and the southern area of the papal palace was also destroyed. Contrary to all previous projects Bramante now had to conceive an atrium with the Lodge of Blessings, which would have dominated a huge square some 250 meters deep. In this context, it is foreseeable that Bramante would distance himself from a project with towers at the vertices, for a project with a large front portico, as appears in Serlio 1544, f. 37 drawing.

Meanwhile, construction is progressing rapidly. In 1508 there are references to the capitals of the Corinthian pilasters of the crossing piers and in 1509 to the cornices of the *tribuna* (supposedly referring to the *Capella Iulia*).

The construction generated a huge amount of problems and uncertainties (building in such a complex environment full of buildings was not an easy task) and that without a doubt was a complementary reason for Bramante to hesitate on how to complete the project of the building, especially in its peripheral parts. Around 1510, before February 18, 1512, an eyewitness, Sigismondo dei Conti, observed that "*in capite... basilicae testudo futura est latior et altior templo Pantheon; cuius aedificii, dum haec scribebam, spes magis, quam res laudari* *poterat, centro enim admodum surgebat non inopia pecuniae, sed cunctatione Bramantis"* [74].

In 1510-1511, with the participation of Antonio da Sangallo the younger, still *carpentiere*, the ribs were made and in 1511 the "*ciborij*" arches (of the dome) [75].

In 1511 the vaults of the transept were built, and the design of the dome entered a specific phase [76]. In the summer of 1511, when all the economic funds went to the ill-fated northern Italian campaign, the pope's building activity slowed. In fact in the *Liber Mandatorum*, where all expenses are recorded up to that moment, the annotations are interrupted [77]. But in September 1511, as soon as Julius II recovered from a serious illness, his old impatience was also awakened. In the sacristy he made two new foundations, probably the two halves of the southwest pier of the longitudinal body. Again he continued to monitor the work closely, and even appointed a clergyman to torch down into the excavations of the foundations and retrieve the remains of the dead.

During the last years Julius II paid special attention to the completion of his mortuary chapel and acquired marble for his interior furniture [78].

The pace of construction was at all times very intense, since Bramante wanted to advance the construction of the "central nucleus" as much as possible, in order to have the maximum possible probability that what was built would be respected and binding on the completion of the building by his successors, who would have no choice but to respect his ideas, even partially. For this reason, at all times, he followed the centrifugal constructive strategy designed in 1506, on the basis of which he would build "inside out", to minimize conflicts with the pope, since otherwise he could see something that would not liked, and could interrupt the works. The "central nucleus" was the most important part of Bramante's project and it also pleased the pope, therefore he would devote the maximum attention and haste to its construction. Construction speed and its "*tanta voglia di vedere questa fabrica andare inanzi*" was such that, according to *Vasari* and *Michelangelo* (*Condivi*), it was the cause of the structural defects that little later began to be seen in the building [79].

The state of the works shortly after the death of Bramante, represented in the drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31 (taking into account Metternich's considerations), proves Bramante's strategy since only the "central nucleus" and the apse that would house the *Capella Iulia* were built (Figs. 7.20 and 7.21). It is possible that during the construction process Bramante did not show the Pope any fully detailed and complete project, and instead was showing him cocrete parts, with the purpose that the Pope believed that they were part of his desired and imagined project, but that in reality they were part of the project desired and imagined by Bramante. It is possible that based on the same fragments, both had different projects in mind.

Once the four large central crossing piers were constructed, it is possible that Bramante constructed the counter-piers as small rectangular paired septa aligned to the sides of the large central crossing piers [80]. In fact these counter-piers already appear built, up to half a height, in Martin van Heemskerck's drawing, "View of the construction of the new basilica from the northwest, showing the remains of the old basilica" (Staatliche Museen zu Berlin, n .79, D.2a fol. 15v) (Fig 4.12). Bramante already used this type of piers in previous projects such as GDSU 20 A, and they also appear in drawings GDSU 7 A (right side) and BAV, Cod Barb. Lat. 4424, f. 56v (left side) by Guliano da Sangallo, and also in drawing GDSU 14 A by Peruzzi (left side), since five naves were generated based on them, as in the old basilica (perhaps as a consequence of a *instauratio programatica*). A solution and conceptually similar but with paired separated septa also appears in the JSM, codex Coner f. 17 drawing. These rectangular septa face the lateral pilasters of the four large central crossing piers, and each one has, on the face of the central nave, two 12-*palmi* Corinthian pilasters, equal to the pilasters of the 4 large central crossing piers. In any case, there is no doubt that the counter-piers were built in the time of Julius II [81].

These piers, however, do not appear in this form in the drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31 (showing parts already built, but others projected but not yet implemented) in which they appear joined two by two, forming large counter-piers with a lenticular shape, with two opposite niches of 40 *palmi*, similar to those existing on the sides of the four great central crossing piers. It is possible that Bramante, at the end of his days, implement this solution to create three naves instead of five, and to form a structurally more efficient central nucleus. In any case, these large counter-piers were probably built before 1514 on the north and south sides, as an initial part of the ambulatory, as they clearly appear in various drawings by Heemskerck (such as the mentioned drawing "View of the construction of the new basilica from the northwest, showing the remains of the old basilica" (Staatliche Museen zu Berlin, n.79, D.2a fol. 15v) (Fig 4.12).

The fusion of the small paired septa, forming large lenticular counter-piers with facing niches, automatically modified the number of naves, and therefore the number of doors on the facade, which also increased from five to three.

It is possible that there were repeated uncertainties in the design of the counter-piers –as well as the design of the rest of the building- between the years 1511 and 1514, and that therefore they became popular, to such an extent that they could have caused Andrea Guarna's comments in the satirical dialogue *La Scimmia*: "*ancora non si sa neppure dove debbano porsi le porte della mia chiessa*" [82].

Guarna's text can also be interpreted differently, for example that Bramante had not decided, before he died, how much to extend the naves towards the square to the east. He had designed the central nave with a width of 107 *palmi*, equivalent to the width of the central nave of the ancient basilica (106.33 *palmi*), and based on this dimension, and by means of the four crossing piers, he designed the crossing and the dome with a dimension of little more than 185 *palmi*. Therefore the longitudinal naves could be very high and very narrow, and the longer the ships were, the narrower they would seem (as it seems that Leo X desired) [83]. This height could be valid for short naves (such and as Michelangelo did years later) but perhaps not for naves of great length (as Bramante would imagine at all times, and as he would later torment Carlo Maderno. Everything also seems to indicate that Leo X wanted a wide and very long building, given that all the proposals at the beginning of his papacy were very long (Giuliano da Sangallo and later Raffaello), so the problem became evident. In fact, years later, Antonio da Sangallo, in his famous *memoriale*, harshly criticized Raffaello's proposals for this same reason (although logically he did not criticize those of his uncle Giuliano da Sangallo, whose naves were as wide, tall and long as those of Raffaello). Antonio da Sangallo, in his *memoriale* (GDSU 33 Ar y GDSU 33 Av) (Figs. 7.24 and 7.25), referred to the central nave of Raffaello's project, and literally wrote that "*sarà lunga e stretta e alta che parerà uno vicholo*", and will be also "*ischurissima*" [84].

Fortunately, in the BAV drawing, cod. Barb. Lat. 4424, f. 56v, by da Sangallo there is a text on the edge that indicates the dimensions of each component of the pilasters (base of 12 *palmi*, shaft of 86 *palmi*, capital of 14 *palmi*, and an entablature of 27 *palmi*), which makes a total of 139 *palmi*. The height of the arches was 216 *palmi* from the ground, so it had to have pedestals of an approximate size between 22 or 25 *palmi*, so the total height of the order would oscillate between 115 and 117 *palmi*. Giuliano could have taken measurements of the already built, or Bramante could have provided these measurements.

These dimensions provide an idea of the magnitude of the spaces designed by Bramante. The main nave had a width of 107 *palmi*, and a double height (216 *palmi*) and a perimeter order of columns of 158 *palmi*. The aisles had a lower width of 59.89 *palmi* (see chapter 8). These are not disproportionate dimensions for the main nave, and since the side naves are not perceived in isolation, but rather formed a continuous interior space, they do not seem disproportionate.

Therefore, Antonio da Sangallo's criticism lacks foundation, and perhaps it was only due to professional jealousy, or because he never understood Bramante's objectives. Bramante undoubtedly wanted to create a strong scenography in his project, and decided to create an elongated central nave so that the faithful could walk through it and once they reached the crossing they would notice how the space was spreading everywhere, and especially upwards. In fact, this is what happens today in the building finally constructed, even with the raised floor.

The "central nucleus" of Bramante and the Capella Iulia

Analysis of today's four great crossing piers shows that Bramante created a masterpiece like no other.

It is true that the 40 *palmi* niches were later filled by Antonio da Sangallo, creating a secondary order. But the general dimensions, setbacks and stops of the 4 large crossing piers remain the same as those designed and built by Bramante. Therefore you can know the exact shape of the piers, as well as the distance between them and with the counter-piers. In other words, based on what has been built, the "central nucleus of Bramante" can be reconstructed, and in the same way, and as will be seen in the next chapter, the stages carried out in its design process can be reconstructed.

The "central nucleus" integrated in an extraordinarily perfect way all the ingredients of a project based on a new typology that Bramante had been maturing for more than a year, before the start of the works. The "central nucleus" includes the four great crossing piers, the transept, the central dome, the main aisles, the perimeter aisles, the four perimeter domes and the eight chapels adjacent to the four central crossing piers. Bramante devised a perfect geometric structure that integrated all these architectural elements in an extraordinary way. Nothing was left over or missing. Everything fit together like the pieces of a complex winding watch (see chapter 8).

The central nucleus allowed any design to be made by integrating a centralized quincunx typology with a typology of naves. This new architectural typology devised by Bramante made it possible to satisfy his own Renaissance architectural ideals and preserved the purity of his ideal projects; and at the same time it satisfied the demands of the pope, it satisfied the liturgical requirements, and it allowed the continuity of the building to the east, allowing integration with the Piazza di S. Peter.

The central nucleus was very versatile and Bramante also used it to generate the apse of Julius II (see chapter 8).

From the design of the crossing piers, Bramante designed the Capella Julia with a shape very similar to the existing foundations. The architectural structure and compositional process of Nicholas V was completely different from the architectural structure and design process followed by Bramante, but despite this, the resulting shape of the floor plan was very similar. Nicholas V used a simple module of 10 *palmi* for the design of the transept and the arms, and the western apse was made with a very simple geometry (see chapter 8). Instead Bramante used compositional modules taken from the design of the crossing piers. And yet the resulting shape greatly resembled that of Nicholas V (see chapter 8).

Therefore Bramante did a good architectural exercise, and took advantage of the foundations of Nicholas V with unsurpassed mastery. Therefore it can be affirmed that the apse of Julius II was perfectly integrated with the central nucleus of Bramante, but its presence did not allow Bramante to carry out an exemplary project.

The apse of Nicholas V only made sense in his project to reform the old basilica, in which he left the naves intact and had three identical arms instead of the transept. The western arm was projected polygonal so that it was slightly different from the other two, and marked the west-east axis of the basilica. Therefore, the whimsical shape of Nicholas V's apse only made sense in the environment of his reform project. In other words, the construction of the apse made it necessary to build two other similar arms, since otherwise the apse would become a strange object. If no other two arms were built, the shape of the apse would be capricious and undesirable, since it could not be integrated into any project that was substantially different from Nicholas V. For this reason, some researchers have suggested that Bramante carried out an executive project with two other arms similar to the apse of Julius II. In chapter 8 this same project has been rebuilt, but in a more optimized way, eliminating compositional errors. The result of such a reconstruction of this alleged executive is simply embarrassing. Bramante would never do a similar project, and neither would any worthy architect (see chapter 8, Layout EPFrommel).

Based on the analysis of all the known projects for the new basilica of S. Peter in Vaticano, it is to be assumed that Bramante tried all kinds of solutions to integrate what was apparently unintegrable. It is reasonable to think that the essence of all the integration proposals made after Bramante's death by Giuliano da Sangallo and Antonio da Sangallo had actually already been contemplated and rejected by Bramante. These architects demonstrated years later that any type of attempt to integrate the apse of Julius II with any project that could be generated from the central nucleus of Bramante would be unsatisfactory and deficient.

In this sense, it is highly probable that the solution proposed by Raffaello several years after Bramante's death, in the PML, codex Mellon, f. 72v drawing, although perhaps presented and drawn by Raffaello, was a solution devised years ago by Bramante, as a "compromise solution" to show the papacy that it was the the only decent possibility to integrate the western apse with Bramante's final project (Serlio 1544, f. 37).

Obviously the best solution was that the apse of the *Capella Iulia* had never been built. Since that was not possible, since it was the first wish of Pope Julius II, the best solution was for the apse to be demolished as soon as possible. This explains the speed with which the works progressed until the death of Bramante, and the little real control that Bramante carried out on the workers. The materials used in the construction of the *Capella Iulia* were common, so it cannot be said that Bramante used poor quality materials (in addition, Pope Julius II would not have allowed it), but the works could be carried out with precariousness, little control and speed. In this way, very soon, important construction pathologies would appear and, since the apse was an annoying element, the popes and the architects who succeeded it could decide to tear it down (as it happened). Therefore, it is quite possible that Bramante solved the problem caused by the *Capella Iulia* with a magnificent job of “planned obsolescence”.

Obviously, Julius II supervised the works continuously and would not have invested thousands of ducats if he had doubted the firmness of the construction [85]. Furthermore, the thickness of the apse walls was very high (24 *palmi* in its thinnest sections, and almost 45 *palmi* in the widest section). However, Julius II did not have exactly an economic abundance (one of the reasons for having rejected Bramante's more ambitious projects) and this also influenced the choice of construction materials. The lack of economic resources forced him to dose the materials and to use cheaper materials, such as *breccia* (very porous tuff from Lazio) [86]. The vaults were partially poured and bricks were used mainly to obtain precise surfaces, edges, or the complex curvature of the pendentives [87]. Travertine marble was used only for the bases, capitals and the entablature of the orders. The very renunciation of the secondary domes, the continuous pedestals and cornices, or the desire to reuse the columns of the lateral naves of the ancient basilica of Constantine, seem to be decisions derived from economic problems. Even for the wall surfaces it was planned to use false travertine, already skillfully used by Bramante in the Palazzo Caprini. In addition, it must be taken into account that the foundation of the large crossing piers had to be joined with the existing foundation of the apse (to avoid differential settlement), and it is very likely that this union was not made or was made poorly (especially in the southwest pier), so there would end up having differential seats and cracks (as it happened).

Therefore, the use of cheap materials, the high speed of construction, Bramante's little interest in this apse (which would translate into less control of the construction process), and perhaps some construction defect of integration of the foundations of Nicholas V (perhaps warned and silenced) was undoubtedly a strategy fostered by Bramante to accomplish his goals even after his death.

Julius II and especially Bramante were aware that only a small fraction of the works would be built while alive. And from the beginning, Bramante already had all kinds of strategies so that what he could not do in life, perhaps his successors could do. That included the election of Raffaello.

The fact is that just one year after the death of Pope Julius II, the survival of the choir began to be questioned, initially by Bramante and then by his successor Raffaello, to try to safeguard a design with ambulatory in the western part, demolishing the apse. Even years later, in 1538, after an innumerable number of projects that tried unsuccessfully to integrate the apse of Juluis II with the building, it had been decided to demolish the apse.

After the construction of the apse the design of S. Peter took two directions: one realistic, where the western arm was accepted as it was, and another utopian (which ended up being realistic), where architects dreamed of destroying the choir and providing the new basilica with symmetry and beauty of the original project. In fact, under Paul III, with the approval of Antonio da Sangallo's wooden model, utopia became official policy and fifty years later (in 1586) the choir was demolished. As a 1586 chronicler related: "*E tutta was dell'opera di Bramante, che non serviva*" [88]. Furthermore, according to this and other testimonies of the time, the choir was already "totally cracked" [89].

On the two western crossing piers, large square staircases were built, and on the two eastern crossing piers, two spiral staircases were built. These large square staircases appear -as already built- in drawings GDSU 7 A and GDSU 9 A by Giuliano da Sangallo, in drawing JSM, codex Coner, f. 24v, ed. Ashby, b. 31, in the drawing PML, codex Mellon, f. 72v, by Raffaello, etc. These stairs are connected to the narrow disconnection corridor practiced inside the perimeter wall of the Julio II choir. It is probable that they also gave access to the attic rooms or structures over the arches of the naves and that they reached the dome.

The works advanced, and in July 1511, Julius II declared that "*novam capillam ... construi facimus*". It is evident therefore that the *Capella Iulia* (the new western choir) was already built in January-February 1512, according to the final design, in its main structures (minimum necessary for Pope Julius II to declare "*construi facimus*"), and that it was probably completed in February 1513, at the time that Michelangelo was working on the papal sepulcher [90]. Before the death of Julius II, work began on the *Capella Iulia* vault, the construction of which was completed shortly before April 1514, when Bramante died [91].

Period 2.b: (1513-1514) Bramante, Fra Giocondo, Giuliano da Sangallo

Julius II died on February 21, 1513, and was succeeded by 37-year-old Leo X, who was appointed pope in March 1513 [92]. Leo X was son of Lorenzo the Magnificent, and he knew ancient buildings well from his childhood and was young and optimistic enough to want to surpass Julius II in his most ambitious project.

The works continue with apparent normality. Between March 1513 and March 1514, orders were drawn up to carry out "*chapitelli de fora de la tribuna desso... sancto Petro"* (referred more safely to the exterior of the new choir, than to the exterior of the body with the dome) and also to "*lo cornixone de dentro, dove comenzerà poy a voltare la cupola"* [93].

It is more than likely that in the first weeks after the death of Julius II a great state of confusion was generated. On the one hand, Bramante no longer had the continued pressure of Julius II and could perhaps convince his successor, Leo X, to give a suitable turn to the project, and to get much closer to his ideas. But on the other hand his health was getting worse day by day, and he was less and less interested in the control of the works.

During the first 8 months of the new papacy, Bramante was the only architect of S. Peter, but given his advanced age and his increasingly notorious health problems, Leo X called again his two former "collaborators", Fra Giocondo (80 years old) and Giuliano da Sangallo (70 years old), in order to collaborate with him, and guarantee the correct development of the works [94]. Both were also very old and had great professional experience, and especially Fra Giocondo had great experience in structural matters. Specifically, on November 15, 1513, Fra Giocondo was called, but Rome arrived just after Bramante's death [95]. He could hardly work in S. Peter since he died the following year, on July 1, 1515. On the other hand, it is known that Giuliano da Sangallo works in S. Peter from January 1, 1514, until July 1, 1515, as he returns to Florence, where he died on October 20, 1516.

Fra Giocondo was probably named *administer*, and was noted as a theorist and an excellent connoisseur of the ancients thanks to his edition of Vitruvius of 1513 dedicated to the brother of Leo X, but he was also one of the first engineers in Europe and, therefore, essential for the imminent bending of the dome, and also to solve the foundation problems of the southwest pier.

Giuliano da Sangallo was appointed *coadiutore*, that is, second architect, already on January 1, 1514, when Bramante was about to die. This was very significant, as he was a compatriot of the Medici and their trusted man for years and had moved to Rome shortly after the election of Leo X, to be compensated for the disappointments obtained under the previous pontificate.

None of them, therefore, acquired significant influence on the design while Bramante was alive.

Some researchers [96] think that Bramante carried out a new project in the last years of his life. But it is possible that he actually did several tentative projects, trying to integrate the *Capella Iulia* with the central nucleus, and actually went from one to another, without completing any of them definitively. Finally, it is possible that he wrote basic projects, without defining all the details, similar to the two that Raffaello would later present to Leo X.

In fact, there are testimonies that Bramante never fully defined a project or a model of the new Saint Pietro. Among these testimonies are those of Sebastiano Serlio (Serlio 1540, c. 33), certainly well informed by Peruzzi and almost a witness because he was in Rome between the years 1518 and 1519; also those of Onofrio Panvinio in his work *De rebus antiquis memorabilius, et praestantia basilicae ancti Petri*, sheet 401 [97].

Serlio informs that "*il modelo rimase imperfetto in alcune parti: perilché diversi ingegni si affaticarono intorno a tal cosa…".* He also claims that Bramante "*venendo a norte, e non avendo possuto finire la sua bella tribuna di S. Peter, se bene aveva gittato tutti gli archi, e per non si vedere resoluto modelo di detta tribuna…"*, something really surprising, given that from the beginning of the works, Bramante had more than eight years to finish the work. It should be clarified that the term *tribuna* should not be understood as referring only to the dome (the drawing of the dome collected by Serlio in his book III), but to the entire "central nucleus" of the building.

On the other hand Serlio also reports that Bramante defined the dome completely "*prima ch'ei morisse*", although he also reported its structural deficiencies [98], saying that Bramante's heavy dome was "*più animoso che considerativo*", probably based on the opinions disseminated in the Roman context and transmitted by Peruzzi [99].

The comments of Andrea Guarna [100] point in the same direction that in the satirical dialogue La Scimmia tells San Pedro that "*ancora non si sa neppure dove debbano porsi le porte della mia chiessa*"; and Demetrius, called Scimmia, confirms: "*È vero. Dicono infatti che Bramante, morendo, prescrisse che nessuna decisione fosse presa per le porte, finché egli stesso non risorgesse dal mondo de morti; nel frattempo avrebbe pensato dove meglio Collocarle*" [101]. This text constitutes an important proof of the enormous uncertainties of Bramante, and of the great time that he reserved to try to solve them.

Therefore, it is highly probable that, during the papacy of Julius II, there was no executive and complete project, fully specified in all its parts and valid for its execution. Bramante could be constantly shuffling various alternatives, especially concerning the western choir, and the design of the piers of the naves, the design of the towers, and of course the connection with the square and the design of the main facade. It is also possible that Bramante was showing the pope all kinds of partial projects in order to satisfy his demands (liturgical, economic, ideological, etc.), but Bramante was modifying them before the execution in favor of alternatives that he considered more attractive since an architectural point of view.

And it is also very likely that something similar would have happened in the time of Pope Leo X, whose ambition, at least between the years 1516 and 1517, would urge him to build a very large building, dilated both in width and length, and emphasize the importance of the facade, generating some problems to which Antonio da Sangallo will be sensitive in his famous "*memoriale*" (GDSU 33 Ar, and GDSU 33 Av) [102], and which will result in some of his proposals made between 1516 and 1520 (GDSU 254 A, GDSU 252 A, GDSU 255 A, GDSU 35 A, GDSU 34 A, GDSU 37 A, etc.).

Nor is there any sure and definitive project attributable to his collaboration with Fra Giocondo and Giuliano da Sangallo, although all those that were carried out during that time, and in a period immediately after, conserve their "central nucleus" intact. Certainly, in the drawings by Giuliano de Sangallo (GDSU 9 A, GDSU 7 A, and BAV, cod. Barb. Lat. 4424, f. 56v), in those by Raffaello (Serlio 1544, f. 37, and PML, codex Mellon, f. 72v), those of Peruzzi (GDSU 14 A, and Serlio 1544, f. 38) and, for some parts, some of Antonio da Sangallo (GDSU 34 A, GDSU 252 A, etc.) respect for the Bramante's proposals, prior to

1514, since they all include the already built “central nucleus”, the counter-piers, the ambulatory and some other details.
The projects carried out before July 2015 (before the death of Fra Giocondo and before Giuliano da Sangallo returned to Florence), and some carried out later, have as an invariant that they respect the Cepella Iulia, without ambulatory, but flanked on both sides (north and south) by a set of sacristies, adjacent to the large western crossing piers of the dome. These chapels were certainly not designed by Bramante, but by his followers, who tried to project an alternative to integrate the apse of Julius II with the entire project. Bramante would flatly reject such a flawed solution.

Giuliano da Sangallo and Fra Giocondo's projects
Giuliano da Sangallo's ideas are well known as he carried out at least three alternative projects to finish S. Peter: drawing GDSU 9 A (Fig. 7.26), drawing GDSU 7A (Fig. 7.27) and drawing BAV, cod. Barb Lat. 4424, f. 56v (Fig. 7.28). Less well known are the ideas that Fra Giocondo had for S. Peter, since he dedicated himself above all to reinforcing the foundations and the already built crossing piers to ensure that they could withstand the enormous loads of the gigantic dome designed by Bramante. However, his ideas should have been very similar to those of Giuliano da Sangallo, since under his supervision the niche that bears his name was partially executed, and whose design coincides with the designs made by Giuliano da Sangallo, between the summer of 1514 and the summer of 1515. This fact is certain since in drawing GDSU 44 A (Fig. 7.19) Antonio da Sangallo writes the text about the design of the niche: “*frajochondo*”, that without a doubt it would be part of a sacristy begun but not finished.
The execution of the "niche of Fra Giocondo" could have been carried out after the death of Bramante (April 11, 1514) and before the death of Fra Giocondo (July 1, 1515), since a few days later Giuliano da Sangallo moves to Florence. It should be noted that on November 15, 1513, Fra Giocondo was summoned, but he arrived in Rome just after Bramante's death [103]. In any case, it is highly probable that the “niche of Fra Giocondo” must have been built during the months of June and July 1514, taking advantage of Raffaello's initial confusion (confessed on July 1, 1514 in the letter to Uncle S. Ciarla) [104]. Raffaello was appointed *primo architetto* on April 1, 1514, but the resolution was confirmed on August 1, 1514 [105]. Undoubtedly, this niche already built was the partial implementation of the sacristies shown in Giuliano

da Sangallo's projects, and perhaps in some Fra Giocondo project that we do not know. The presence of such spaces in these projects prevents the placement of the dome-shaped angular chapels placed on the diagonals, according to a quincunx typology, invariant from the first projects. This solution, with different variations of the same idea, is found in the three well-known drawings by Giuliano da Sangallo, which in chronological order, as suggested by Frommel [106], are: GDSU 9A; GDSU 7A; and BAV, cod. Barb. Lat. 4424, f. 56v. It is also found in the drawings by Antonio da Sangallo GDSU 34 Ar and GDSU 252 A middle left, dated between December 1, 1516, when he was appointed coadiutore of Raffaello in San Pedro, and the year 1518. It could also be seen in later projects (1520-1521), such as f. 1 of cod. Icon. Staatsbibliothek of Monaco.

There is no known drawing by Fra Giocondo that contains these sacristies, instead the three drawings by Giuliano from this time contain them. It could therefore be deduced that Giuliano da Sangallo worked closely with Fra Giocondo, and was able to get him to accept his proposals. Based on the documentation we have, it could also be deduced that Giuliano generated a greater number of proposals for the new Pope Leo X, while Fra Giocondo acted as the executing arm. Perhaps that is why Giuliano was later named *coadiutore* and Fra Giocondo *administer*.

The existence of these sacristies was an invariant of the projects of Giuliano da Sangallo, who undoubtedly tried to make a compromise solution to integrate the Bramante apse with the central nucleus of Bramante. It can therefore be deduced that Giuliano da Sangallo took advantage of Bramante's poor health in the last months of his life to agree on an “easy solution”, although not very talented. Once Pope Julius II died, and taking advantage of the initial confusion of the new Pope Leo X, Bramante could have taken advantage of and accelerated those works that were more in line with his interests, and stop the undesirable initiatives of his supposed collaborators. However, Bramante's health began to deteriorate in his last days, and those who took advantage of the occasion were the newcomers Giuliano da Sangallo and Fra Giocondo. Both architects would have the opportunity to create their own ideas, integrating the already built parts (initially reflected in the GDSU 9 A and GDSU 7 A drawings) and to disseminate them in the papal environment, since Bramante was in poor health, and would not offer as much resistance. These two drawings were made initially and in a short space of time, since they do not show an enveloping ambulatory in the western apse, and include measurements in Florentine arms. On the other hand, the drawing BAV, cod. Barb. Lat. 4424, f. 56v, clearly made later, is much more mature and complete. This drawing shows an enveloping ambulatory in the western apse, and includes measurements in *palmi*. Undoubtedly, the first two drawings were made very quickly, and if they included measurements in Florentine arms, it is because Bernardo della Volpaia must have provided them at Giuliano's request to be able to draw what was already built, and based on that draw his two proposals. Without a doubt the BAV project, cod. Barb. Lat. 4424, f. 56v, was done later, and already has executive measures in *palmi*.

It is therefore possible that the decision to start building the “niche of Fra Gionodo”, continuing the works according to the philosophy of Giuliano da Sangallo's projects, was made before Bramante's death (April 11, 1514), and Against his will. It is also possible that these works were made immediately after the death of Bramante, and before July 1515 (before the death of Fra Giocondo and before Giuliano da Sangallo returned to Florence). Although the most probable is that the works were done during the summer and autumn of 1514, taking advantage of Raffaello's initial disorientation (confessed in the letter of July 1, 1514 to Uncle S. Ciarla) [106].

It should be noted that Raffaello was appointed *primo architetto,* with a salary of 300 gold ducats per year (25 ducats per month), on April 1, 1514, but the resolution was confirmed on August 1, 1514 as *primo architetto* (At the same time that Fra Giocondo was named as *administer* and Giuliano da Sangallo was renewed as *coadiutore*, on August 1, 1514, since he had been named thus on January 1, 1514, during the lifetime of Bramante) [107].

Bramante's latest ideas

Bramante would surely taking advantage of the opportunity to show his ideas to Leo X as soon as he took office, and it would most likely not take long to suggest the demolition of the western choir. Leo X never attached much importance to the Julius II chorus, but apparently Bramante did not convince him. It is possible that Leo X was more interested in creating a great building, based on what was already built, so starting his papacy by demolishing part of what was built by the immediately previous pope was not the most sensible thing to do. He probably shared Bramante's ideas, but it was not a pressing issue for him.

It is also evident that Leo X knew that the construction would take longer than what Julius II and Bramante had perhaps anticipated, and furthermore, from the beginning, he gave more importance to the expansion and beautification of the new basilica project than to the protection of the identity of the ancient basilica. This is why Leo X commissioned Bramante, at the latest in October 1513, to design a small *Tegurium* to cover the area of the apse and the main altar, until now subjected to the elements [109].

It is difficult to reconstruct the possible ideas that Bramante had in this period, and perhaps they were not very different from what he might have had a few years ago. Most likely, Bramante would continue to defend a project similar to Serlio's drawing of Serlio 1544, f. 37, with lenticular piers, and that Raffaello would present years later to Pope Leo X. Therefore, during this period, or perhaps a little earlier, Bramante decided to join the paired septa (creating five naves and five *campate*) and transform them into lenticular piers (creating three naves with five campate). However, the Raffaello project would have some differences with respect to the Bramante project regarding the design of the perimeter towers and the large colonnade on the facade.

It is possible that Bramante, based on the grandiose ideals of Leo X, had been designing a great portico for the east facade, which must have meant to the pope the quintessence of proximity to ancient Roma. It is possible that Bramante wished to lengthen the shafts that were too subtle, as Raffaello and Antonio da Sangallo would later have proposed around 1518-1519 [110]. Probably with the help of three pediments he would have differentiated - as Peruzzi later in his projects for Paul III - a large central front of Templar typology with two narrower lateral fronts, also of Templar typology [111]. During this time, Bramante would have already designed the north and south ambulatory with complete precision, as an extension of the counter-piers, which in turn are an extension of the large crossing piers of the “central nucleus”.

Undoubtedly the architectural structure created by Bramante for the ambulatory is the same as that shown in drawings GDSU 45 A (Fig. 7.29) and GDSU 46 A (Fig. 7.30), made by Antonio da Sangallo. These drawings are a proposal by Antonio da Sangallo, based on the dimensions of what has already been built, and in which, comparing with Serlio's drawing of Serlio 1544, f. 37, it hardly modifies the dimensions of the entrances, pillars and pilasters exteriors and some small variation of the interior niches of the ambulatory, but the architectural structure was exactly the same as previously designed by Bramante, since it was unsurpassed by my point of view. Therefore, these drawings by Antonio da Sangallo are a perfect tool to reconstruct the design of Bramante's ambulatory, and by the way know the architectural details of what all his successors did until they reached Michelangelo (see chapter 8).

Tegurium

The Tegurium was built in order to carry out the liturgical functions at the altar of the old basilica, the *capella papalis*, during the construction of the new basilica [112]. The roof of the western part of the ancient basilica of S. Peter in Vaticano was torn down in 1506, leaving the altar exposed to natural elements, and according to the papal master of ceremonies, Paride de Grassis, the cappella papalis had to be suspended countless times due to wind, rain and cold [113].

The Tegurium was built after Pentecost 1513 and Easter 1514, during the papacy of Leo X and at the end of the days of Bramante [114]. Bramante's original project for the Tegurium is not known and its design undoubtedly underwent various changes over time. It is known that in 1519 Giovanni Francesdo da Sangallo was commissioned to “adconciare” (decorate) the tribune of the Chapel of S. Peter. In 1526 Giuliano Leni added a wall above the cornice and with a *tetto rustico* [115]. Years later, in 1538, windows were added [116]. Therefore, the building as can be seen in the drawings by Heemskerck, Dosio, Naldini and Duperac, was not a unitary work, but was the result of various changes over time. This suggests that it was a temporary building, and not a permanent structure intended to remain inside the new basilica, as suggested by Howard Saalman [117].

From a functional and harmonious point of view, and based on the analysis made of the “central nucleus of Bramante”, it can be deduced that it is impossible that such a building would have been designed by Bramante to remain permanently in the center of the basilica. The design of the Tegurium is not integrated neither with the design of the *Capella Iulia*, nor with the design of the central nucleus; neither does it follow Bramante's general compositional strategy for the design of the new basilica; and it does not respect any of its geometric and harmonic relationships. The *Tegurium* as we know it consists of the union of the apse of the old basilica (even preserving its roof) with a rectangular structure attached to its east side, covering the stairs, the altar and the historical memory. The architectural structure of the *Tegurium*, as observed in the different existing drawings and as observed in the excavations of the 1940s [118], was tripartite, with three gaps and six Doric columns on the west side, and a single gap with three Doric columns on the north side and the south side (Fig. 7.31).

The *Tegurium* was designed based on the dimensions of the apse of the ancient basilica. At first glance, the structure suggests that only one half was built, and that once the apse was demolished, the other identical half would be built, and specularly, on the west side. The result would be a small square-plan building with three openings on each side, and six Doric columns on each side with a hipped roof. However, a similar structure would be too large, and by not being located in the geometric center of the transept under the dome, its southwest and northwest corners would be too close to the large southwest and northwest crossing piers of the new basilica, creating enormous functional and aesthetic problems. Bramante would certainly never do a similar thing.

On the other hand, if the *Tegurium* as we know had been built to be as it is known (that is, in the case that it was not desired that there was a symmetrical part in the west), it would look unfortunate, and it was certainly a temporary construction.

On both sides of the *Tegurium*, pieces of the north and south part of the west wall of the transept stood out, without having been cut in a linear way, or floated, or painted. The most probable thing therefore is that it was a temporary construction, and was destined to remain only few years. It should not be forgotten that the pace of the works while Bramante was alive was very fast, and everyone expected to cover the new building, with the fabulous dome long before it was finally covered.

No doubt the *Tegurium* was designed by Bramante with little interest, as a purely temporary structure, until the new building was covered. But, despite this, Bramante made a very successful design since it resembled an arch of Triumph (as the arches of the triumph of Titus, Settimio Severo or Constantine could be). This arch of triumph would act as a substitute for the Arch of Constantine, recently demolished to build the great eastern crossing piers of the new basilica. Like any arch of Triumph, the *Tegurium* was designed to be seen only from the front, that is, from the eastern entrance of the central nave that still remained standing. But the most interesting thing is that from another point of view the *Tegurium* could recall, with its six front columns, the Gregorian canopy, conveniently adapted to its function of protecting the altar and historical memory [119].

It is not possible to know what the original design of Bramante could have been, since the available drawings are after the beginning of the works. The oldest available drawing is the codex Mellon fol. 7v (Fig. 7.32) showing a design attributed to Domenico da Varignano da Bologna, and dated between 1513 and 1521. There are also later ones such as the drawing attributed to Battista Naldini, or perhaps Antonio Dosio (Fig. 7.33), the drawing from the Anckarvärd collection, n. 637 (Fig. 4.10), and the drawing by Antonio Dosio, Uff. 91 A (Fig. 7.34), all of them dated around 1560 [120].

When analyzing these drawings, it appears that Bramante's design must have been very simple. The floor plan must have been as identified in the excavations [121] (Fig. 7.31), and it had an architectural structure of high quality and designed in detail, which is further proof that the *Tegurium* was not designed to be a provisional structure, as has been suggested [122]. The elevation must have been made up of an architrave structure with three equal arches, with six Doric columns, a column between arches, two columns at the corners, and an entablature that would have a frieze with 12 triglyphs. Based on my research, and taking into account that the *Tegurium* should be perfectly integrated into the architectural composition of the apse of the ancient basilica of S. Peter, it has been possible to reconstruct the stages of its design process (Fig. 7.35). As a consequence it has been possible to reconstruct the plan in plan, as well as the exact dimensions that the Tegurium could have in Bramante's time, with the arches open (Fig. 7.36), as well as in 1518, when the arches were closed (Fig. 7.37).

The original design of the *Tegurium* was very good, and its architectural compositional structure was generated as an extension of the pre-existing architectural structures. In fact, the two corner columns are located as an extension of the width of the canopy of Gregory III (731-741) [123] and the width of the apse of Constantine. In this way Bramante creates an order between the columns in the corner from which an order between the *colonne grandi* and the *colonne piccole* is derived, which he will use in the two central columns, placing them in an averaged manner between the interior columns of the corners, and creating the order of the main facade. After designing the east side (the main facade facing east), Bramante designed a building with a square plan, with all sides identical to the east side, and places it in the center of the circle of Constantine's apse, that is, on the half of the western wall of the old transept. Once located, Bramante removed the western half of the *Tegurium* that remains behind the building. The result could give the impression that Bramante hoped to tear down the western apse and what was left of the western wall of the transept, thus completing a completely symmetrical square-plan *Tegurium*. However, this is just a feeling that is due to the good exercise of architectural integration that Bramante did. A square *Tegurium* would strangle the space below the great dome, as its western side would be very close to the two large western crossing piers. Undoubtedly, the "half" of the built *Tegurium*, like the apse of Constantine, formed a strange architectural object that had been designed to be ephemeral, although they were exceptionally integrated with each other.

The problem of the choice of Bramante's successor

It is evident that after the death of Pope Julius II, in the year 1513, Bramante (who was 69 years old and with significant health problems) should be continually thinking about the the most suitable person to succeed him, to ensure that the works of the new basilica followed his plans and proceeded according to his ideas.

In his close environment were his competitors Fra Giocondo (80 years old) and Giuliano da Sangallo (70 years old), who were even older than him, and who were also generating proposals that were contrary to his ideas, and with poorer architectural quality. Therefore, Bramante could not count on them, and should search among his younger collaborators.

His collaborators and employees included Antonio Pellegrino, Domenico Antonio de Chiarellis (Menicantonio), Antonio da Sangallo, and Baldasarre Peruzzi.

- Antonio Pellegrino, started working with Bramante as soon as he settled in Rome. He was undoubtedly a trusted man of Bramante but he never showed any talent, nor did he show leadership qualities, and what is worse, he did not have the necessary character to defend Bramante's architectural ideas against the confident criticism of both the papacy as of its competitors. For all this, Bramante could not consider him as his possible successor.
- Domenico Antonio de Chiarellis, called Menicantonio, Bramante's intimate assistant, had an enormous interest in architecture, even in 1513 he made the codex Mellon, but he did not have decisive capacity in work, nor leadership skills, nor the necessary character. For this reason, Bramante could not consider him as a successor.
- Antonio Da Sangallo had been an assistant in Bramante's study at least since 1508 [124], he could have been aware of Bramante's ideas (as much as Raffaello could be) and of the possible alternatives that he had studied for S. Peter. In the same way, he would also be aware of everything through his uncle Giuliano, and since then he could have developed his own ideas about it. Bramante did not trust Antonio for various reasons.

He had ideas of his own in the first place, and showed neither the loyalty nor the respect necessary to assimilate, embrace, and protect Bramante's ideas. Second, Antonio was protected by a powerful family clan of architects who would support him at all times. Finally, Bramante did not consider him especially talented, so he could destroy his project, diverting it from its essence (as he later tried to do). Therefore, not only could he not trust Antonio da Sangallo as his successor, but he should also keep him away from his project.

- Baldasarre Peruzzi may have been a collaborator of Bramante in his study, although this is not sure. However, between 1513 and 1515 he had an accurate knowledge of the projects of Bramante and Raffaello, since, at the express request of Alberto Pio, he should have taken their system into account when designing the new Cathedral of Carpi [125]. Peruzzi was especially talented, purist and meticulous, he had a talent similar to that of Bramante, and judging by his later proposals, he seemed to have perfectly assimilated the essence and purity of Bramante's ideas. However, he came from a humble family outside of Rome, so he had no contacts, he had no power, and he lacked the character necessary to safeguard the essence of Bramante's project against the safe attacks of the Sangallo clan. Bramante therefore did not have a suitable person who could succeed him in the construction of the new basilica of S. Peter, who had the necessary talent, trade and character. As a consequence, Bramante had to sharpen his wits and find a completely different strategy in order to find a suitable successor outside his environment.

Therefore, Bramante thought of Raffaello.

- Raffaello was very young, in 1513 he was only 30 years old, but he was not much younger than Antonio da Sangallo, with 31 years of age, or Baldasarre Peruzzi, with 33 years of age. Furthermore, Raffaello was not particularly well versed in architectural design and had little experience controlling and directing the constructors of the works. However, Raffaello had three great qualities. In the first place he was loved and respected by all, due to his magnificent and balanced character, and therefore he could not have enemies. Secondly, he had an enormous talent with painting, so even if he had no experience as an architect, everyone would give him a chance, as long as it came from the great Bramante. Finally, Raffaello had enormous physical and spiritual attractiveness, so his company was desired by many powerful people, and especially by the new Pope Leo X. Bramante thought that Pope Leo X, as long as he was in constant contact with Raffaello, would grant him many privileges and protect him against safe attacks from his rivals.

Therefore Bramante undoubtedly began to train Raffaello, in order to make his own ideas his own and defend his projects after his death. The fact that Raffaello was named *primo architetto* and successor to Bramante eleven days before his death, partially confirms these claims (Raffaello was named *primo architetto* on April 1, 1514 and Bramante died on April 11 of 1514).

Bramante's legacy through Raffaello

It is very likely that Bramante showed Raffaello a certain operational strategy, with possible alternatives to follow, with the aim that he could adequately defend his ideas.

In the first place, Raffaello should try to have the recently built western apse demolished as soon as possible, and to continue the construction of his favorite project without any strange element. This project would undoubtedly be something very similar to Serlio 1544, f. 37 drawing, which Raffaello would later present as his own, since Serlio not in vain commented: "*Raffaello da Urbino pittore, et ancho inteligente nel architettura, seguitando però i vestigi di Bramante, fece questo disegno*" [126]. That is, Raffaello had the firm intention of materialize the ideas of Bramante, which he had previously made his own.

In the event that the chapel showed no signs of premature deterioration, or in the event that Raffaello was unable to convince the pope to tear it down, he should show him a second project, as a "compromise solution", in which the *Capella Iulia* would remain standing, but camouflaged within of the building, since it would be surrounded by an ambulatory, similar to those arranged for the north and south

This "compromise solution" would undoubtedly be something similar to the drawing PML, codex Mellon, f. 72v, which years later Raffaello would present as his own.

Bramante's legacy through Peruzzi

Bramante's legacy through Raffaello has been argued and might even seem evident. However, Peruzzi played a fundamental role so that Bramante's ideas were prolonged in time, sice suitably renovated and transformed, they were absorbed by all subsequent architects with constructive responsibility. Peruzzi absorbed Bramante's ideas when he was a simple young collaborator in Bramante's workshop (1513-1514). In his theoretical work of this time (PML, codex Mellon, fol. 71r, and perhaps GDSU 2 A) he knew how to collect Bramante's ideals and represent them theoretically at their highest level of purity, without the limitations of the built environment and the intransigence of the pope. Later, between 1520-1521 he resurrected these ideas in Serlio's project 1544, f.38, when he had direct responsibilities in the design and construction of the new basilica. Finally in his grandiose project of the White collection of the Americam Academy of Rome, possibly made in the year 1535, as his own legacy for the history of architecture, he returned to take up these same ideas, somewhat adulterated due to the accumulation of conditioning factors and the passage of time.

And without a doubt this sequence of purist projects undoubtedly woke up the beast: Michelangelo.

Michelangelo greatly valued Bramante's ideas, which he perhaps he could observe not so much in what was being built, but especially in Peruzzi's reiterated purist proposals. Therefore it was Peruzzi who carried the torch from Bramante to Michelangelo.

Thanks to his ideas and his continued work, Peruzzi greatly influenced Michelangelo, who created a new project, simple and pure, and terribly creative, based on the ideals of Bramante.

Baldassarre Peruzzi. PML, Codex Mellon, fol. 71r

The PML, codex Mellon, fol. 71r drawing (Fig. 7.38) was probably made by Peruzzi in the year 1513, when he was in Bramante's workshop, and due to its enormous quality it was published by his coworker Domenico Antonio de Chiarellis.

Undoubtedly the drawing was made from the beginning with a certain utopian character since the work was in progress, and with the paired septa counter-piers initiated. Thus it is possible that the drawing represents a desired purity that could never be achieved.

The drawing reflects in a pure way the initial ideals of Bramante, and with enough probability this project would be carried out jointly between the two. As mentioned, this project may be contemporary with the GDSU 2 A, and both could have been the germ of the project repeated in Serlio 1544 f. 38, made between 1520 and 1521.

The drawing shows how all the existing compositional problems have been solved, such as the generation of the ambulatory from the crossing piers, the compositional structure of the ambulatory, the articulation of the ambulatory with the lateral chapels of the perimeter domes, the integration with the four perimeter towers, etc. (see chapter 8).

It is important to appreciate that this project identifies a facade in the east, while in the 1520-1521 proposal, the symmetry is total.

Period 2.c: (1514-1515) Fra Giocondo, Giuliano da Sangallo, Raffaello

Bramante died on April 11, 1514, at the age of 70. He is succeeded by Raffaello, 31 years old, who was elected on April 1, 1514, that is, eleven days before Bramante's death [127]. Giuliano da Sangallo and Fra Giocondo were collaborating with Bramante during the last months of his life, specifically Giuliano began on January 1, 2014. After Bramante's death, they both continued working in S. Peter, together with Raffaello, until the day of Fra Giocondo's death on July 1, 1515. A short time later, Giuliano da Sangallo returned to Florence, where he died on July 20. October 1516.

State of the works

It is not known exactly how advanced the works were at that time, but the famous JSM drawing, codex Coner, F. 24v, ed. Ashby, b. 31 (Fig. 7.20), made by Bernardo della Volpaia, provides an idea of what was built around 1515, although as mentioned, this drawing could contain approved elements, but not yet executed, so the state of the works could be less advanced than the drawing shows [128]. The drawing by Metternich provides a more accurate idea of the state of the works at Bramante's death (Fig. 7.21).

The drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31 shows that the “central nucleus of Bramante” had been built, and therefore the margin of freedom of the architects who succeeded him was absolutely restricted, and that they would be forced to respect it, and to project something similar to his ideas. The drawing also provides valuable clues as to what Bramante's basic project might have looked like, carried out shortly before April 1506, and on the basis of which work began.

The drawing is bounded in florentine *braccio* (1 bf = 0.583 m.), as is the GDSU 3 A drawing by Antonio Pellegrino for Bramante (according to Frommel), and the GDSU 9 A and GDSU 7 A plans by Giuliano da Sangallo (who could be Bernardo della Volpaia's uncle). This fact suggests that between them there could have been an exchange of information about S. Peter. In fact, the elderly Giuliano da Sangallo, after the rise of Pope Leo X, still insisted, while creating his projects, on knowing the size of the parts built in Bramante's time (regardless of the measurements that he could made). These measurements could have been provided by Bernardo, who at that time was studying, in Florentine units, along with measurements of ancient and modern Roman buildings. In the same way it is also possible that Giuliano provided material to Bernardo della Volpaia for his studies [129].

The successive projects for the basilica also provide an idea of what had been built so far (and which successive architects would therefore have to respect), especially the projects drawn up between the years 1513 and 1520. Among these projects three drawings are known GDSU 9 A, GDSU 7 A, and BAV, cod. Barb. Lat. 4424, f. 56v, by Giuliano da Sangallo (in chronological order according to Frommel) [130]. Giuliano died in Florence on October 20, 1516, but he was in Rome working on S. Peter from January 1, 1514 to July 1, 1515. There are also the two drawings already mentioned Serlio 1544, f. 37, and PML, codex Mellon, f. 72v, by Raffaello, and the first drawings GDSU 252 A, GDSU 35 A and GDSU 34 A, by the young Antonio da Sangallo.

The western part of the drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31, is very reminiscent of the western part of the three drawings GDSU 9 A, GDSU 7 A, and BAV, codex Barb. Lat. 4424, f. 56v, by Giuliano da Sangallo; as well as the GDSU 252 A drawing by Antonio da Sangallo, which suggests, as will be analyzed later, that Bramante began the works having projected in detail both the "central nucleus" and the *Capella Iulia*.

All the projects differ somewhat from each other in their perimeter development, and undoubtedly incorporate new requirements of Pope Leo X. However, all these projects have an important common characteristic since they respect and integrate the “central nucleus” of Bramante, as a generator nucleus of their projects. In the same way, they all have a longitudinal structure, extending towards the east, that is, towards the square.

The analysis of these projects, together with the analysis of the design process of the Bramante and Giuliano da Sangallo projects (see chapter 8), together with all the fragmentary information available, provides an approximate idea, as a portrait-robot, of the architectural project to be It was agreed upon at the beginning of the works, and it was undoubtedly not materialized in all its aspects and details, and was subject to substantial changes by Bramante while he was in charge of the works between 1506 and 1514.

The partial projects for the beginning of the works.

Central nucleus of Bramante

As has been said, it is very likely that there would never be a complete executive project with which the works would begin. However, the works began, so there had to be at least partial projects fully defined in all their details.

- A partial project completely and precisely defined Bramante's “central nucleus” as the generating element of the architectural structure. This "central nucleus" allowed both a centralized quincunx structure and a longitudinal type of naves. The central nucleus perfectly defined the shape and dimensions of the four large crossing piers, the central dome, the four perimeter domes and the chapels and aisles. The central nucleus forced the design of counter-pilars generated in a specular way by the four large central crossing piers, and separated by a certain distance determined a priori. In the same way, the central nucleus forced the apses or deambilatories that could be designed to have certain geometric characteristics.

- A second partial project completely defined the *Capella Iulia*.

- Finally, there had to be a basic project based on the "central nucleus", which was defined only in a basic way, without having defined all its details. This project had three ambulatory on the north, west and south sides, and was developed towards the east based on paired septa, generating 5 naves. Later Bramante modified this basic project and changed the paired septa for lenticular piers, generating only three naves. The result of this second modified project would resemble the drawing by Serlio 1544, f. 37 (Serlio 1540, f. 36, c.65).

It is very likely that neither the facade, nor the possible perimeter towers, nor certain details were defined in any project.

There is no evidence to suggest that the ambulatory were not considered at the beginning of the works. Certain historians such as Frommel [131], or Arnaldo Bruschi [132] are of the opinion that there was an “executive project” at the beginning of the works, and that this executive project had three apses, without ambulatory, on the north sides, south and west. These researchers reach this conclusion based on the existence of the Bramante choir on the western side, as it appears in the drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31, and in the Heemskerck engravings. These historians think that a project with an apse on the western side and ambulatory on the north and south sides does not make any sense, therefore, and since the western choir was built, they think that an executive project had to exist in which, in the north and south part, there was an apse similar to the one in the west part. The reasoning has some logic, but it places this supposed Bramante proposal above the proposals of Giuliano de Sangallo (GDSU 7 A and GDSU 9 A) and Antonio da Sangallo (GDSU 252 A, GDSU 35 A and GDSU 34 A), since they all had a choir on the western side, and ambulatory on the north and south sides. Did neither Raffaello, Giuliano, nor Antonio think of putting apses on the north and south sides? Why is there no project with apses in the north and south? A building with three apses similar to the western apse would be really poor, and something similar was only projected in the reductionist proposals, forced and ugly, that were designed after the Sacco di Roma, in the middle of the financial crisis (see chapter 8).

Bramante's late proposals (drawings GDSU 7945 A and GDSU 20 A) include ambulatory. And these ambulatory were respected by all the architects who succeeded him (and all had collaborated with him, or worked for him), therefore there is no trace that Bramante had no ambulatory planned at the beginning of the works.

It is possible that Bramante also planned to surround the *Capella Iulia* with an ambulatory similar to those projected in the north and south, and that he developed a basic project, very similar to the PML, codex Mellon, f. 72v drawing, that, years more later, Raffaello introduced Leo X.

From among the architects who succeeded Bamante, only Giuliano da Sangallo (BAV, cod. Barb. Lat. 4424, f. 56v) makes a similar proposal, and if it is unattractive, it is not due to the existence of an ambulatory that surrounds the western apse, but above all because of the excessive width of the body of the basilica, since it incorporates seven naves. The result is certainly very unattractive.

On the other hand, Raffaello's proposal (drawing PML, codex Mellon, f. 72v) is really attractive, and it is very likely that it was based on Bramante's last solution, which he probably designed years after the works had begun.

Finally there is a matter to deal with. If Bramante did not carry out any general executive project and defined in all its parts, how the famous phrase of Michelangelo should be understood?: Donato "*pose la prima pianta di S. Pietro, non piena di confusione, ma chiara e schietta, luminosa e isolata atorno... fu tenuta cosa bella... in modo che chiunque s´è discostato da detto ordine di Bramante, come* *à fatto il Sangallo, s'è discotato della verità… Lui (il Sangallo) con quel circolo che e'fa di fuori, la prima cosa toglie tutti lumi a la pianta di Bramante…"* [133].

To understand these statements by Michelangelo, it must be remembered that in March 1505 he was commissioned to design the tomb of Julius II (approved in May), and he moved to Carrara, where he remained until December of that same year to choose the most suitable marble. Returning to Rome and not having an audience with the Pope, he returned to Florence, just when (April 18, 1506) the first stone of S. Peter was laid. And again in Rome, in April 1508, he started to paint the ceiling of the Sistine Chapel, in which he worked until October 1512.

Therefore, which Bramante project was Michelangelo referring to?

Some researchers [134] think that Michelangelo could refer to the GDSU 1 A project, and it is true, in the month of March it is very likely that Bramante had already carried out this project and Pope Julius II could have shown it to Michelangelo.

However, Micheangelo, in April 1506, was also able to see a new project by Bramante just on the day of the inauguration, and therefore he could be referring to the "central nucleus" of Bramante, or even to a basic project similar to the drawing of Serlio 1544, f. 37 made by Bramante-Raffaello. And therefore, seeing that the project had changed was the reason for his anger and his flight from Rome.

In any case, from 1508 to 1512, Michelangelo was a direct witness of what was being built and was able to contact on numerous occasions with Bramante himself, who may well have taught him not only partial executive projects, but also the basic projects mentioned.

Therefore, and from my point of view, the conclusion is clear, Michelangelo was referring more than to a specific executive project, to clear compositional ideas embodied in basic projects, which would closely resemble Serlio 1544, f. 37, and that they would be based on the "central nucleus" of Bramante.

For some researchers such as Frommel [135], or Arnaldo Bruschi [136], Michelangelo's statement suggests that the project to which Michelangelo refers did not have ambulatory, since years later, when he assumed the direction of the works of S. Peter demolished the ambulatory already built, and which were essentially designed by Bramante (with minor modifications by Antonio da Sangallo). However, one thing has nothing to do with the other.

After 1508, before having made these declarations, and before Antonio da Sangallo became involved in the project, Michelangelo was busy with the Sistine Chapel, and without a doubt he was continuously watching what was being built in S. Peter. He could have seen several partial drawings, including the parts of the wooden model, and they should match, at least partially, what was being built. It is also possible that Bramante, since he was not a match for him, had shown him basic projects, with ambulatory, similar to the Serlio 1544, f. 37 and PML, codex Mellon, f. 72v.

The solution had ambulatory, but that would not stop Michelangelo from liking it. I think that what actually horrified Michelangelo were "… *Lui (il Sangallo) con quel circolo che e'fa di fuori, la prima cosa toglie tutti lumi a la pianta di Bramante*", that is the circular and octagonal protrusions (with inner circles) that appear everywhere in Antonio da Sangallo's projects, both in the corners and in the middle of the sides of the body of the naves. These strange elements rival in prominence with the ambulatory, disrupt the compositional structure of the building, nullify its purity and completely distort the resounding and clear ideas known to Bramante, and his admiring successors Raffaello and Peruzzi.

Therefore, it is possible that Michelangelo criticized Antonio da Sangallo's projects not because he had ambulatory, but because of the poor compositional quality of his projects. And this has nothing to do with the fact that, years later, in order to reduce costs and reduce the built surface of the basilica, he eliminated the ambulatory in his proposal to complete the basilica of S. Peter.

Continuing to analyze Michelangelo's text, the expression "... *prima pianta ..."* could be referring to Bramante's "central nucleus", and the expression "... *isolata atorno* ..." could reinforce this idea. Therefore, this is another reason why which Michelangelo was not referring to the GDSU 1 A floor plan, but posterior partial plane, or to the nucleus of Bramante.

To conclude with the analysis of Michelangelo's account, it must be remembered that the main reason why he fled to Florence in 1506 was his dissatisfaction with the place where his sculpture should be placed. Therefore, if the sculpture was planned to be placed in the choir, his anger is not understood, since the choir would be the most important place after the tomb of the apostle. Why was he angry then?

Only two reasons can be assumed. In the first place, Julio II could have previously indicated that his sculpture would be inside a large apse, as perhaps even he could see in the GDSU 1 A drawing, or similar, and on his return he saw another project with a much longer and narrower choir. However, if pope told him that his sculpture would be placed in the choir, which is more likely and as Frommel thinks [137], his anger could be due to the fact that the choir did not finally have the right characteristics, perhaps because the space reserved for the singers would confine the sculpture to a reduced place, perhaps because the choir was closed, and it was not open and surrounded by an ambulatory, as shown in the PML codex Mellon, f. 72v drawing. The second, less likely reason, and as Metterncih [138] thinks, is that it was desired to place the tomb in one of the large chapels in the domed domes. In any case, this fact does not change the deductions made so far in order to reconstruct the puzzle of the first stage of the design and construction process of the old basilica of S. Peter.

Bramante-Raffaello Project. Serlio 1544, f. 37

Raffaello was appointed *primo architetto*, with a salary of 300 gold ducats per year (25 ducats per month), on April 1, 1514 and confirmed in August 1514 as *primo architetto* [139].

Raffaello had the firm intention of fully respecting Bramante's ideas and continuing to build the essential parts of his project, as apparently had been agreed years ago with Bramante, who chose him as his successor. This fact is evident in Serlio's texts: "… *il qual Bramante al suo tempo dette principio alla stupenda fabrica del tempio di S. Pietro a Roma: ma interrotto dalla morte lasciò non solamente la fabrica imperfetta, ma ancora il modello rimase imperfetto in alcune parti: per il ché diversi ingegni si affaticarono intorno a tal cosa: et fra li altri Raffaello da Urbino pittore, et ancho inteligente nel architettura, seguitando però i vestigi di Bramante, fece questo disegno*" [140]. This text reinforces the hypothesis that the drawing Serlio 1544, f. 37 (Fig. 7.22) may be made by Raffaello, but what he drew was not entirely his own but Bramante's "*...seguitando però i vestigi…*", at least in its fundamental aspects (since the facade with columns must be influenced by Fra Giocondo or Giuliano da Sangallo).

It is more than probable that even before being named *primo architetto* and successor of Bramante, at the beginning of the summer of 1514, Raffaello already carried out the well-known project represented by Serlio several years later, Serlio 1544, f. 37, and made in 1514. It should be remembered that Sebastiano Serlio was in Rome in the years 1518-1519 and therefore was well informed, especially by Peruzzi, of the projects that were being carried out [141]. Therefore, this project could be considered a materialization, or a continuity, of Bramante's ideas for S. Peter just before his death [142]. In fact Serlio stated: "*il qual Bramante al suo tempo dette principio alla stupenda fabrica del tempio di S. Pietro a Roma: ma interrotto dalla morte lasciò non solamente la fabrica imperfetta, ma ancora il modello rimase imperfetto in alcune parti: per il ché diversi ingegni si affaticarono intorno a tal cosa: et fra li altri Raffaello da Urbino pittore, et ancho inteligente nel architettura, seguitando però i vestigi di Bramante, fece questo disegno*" [143]. It follows therefore that it is a drawing by Raffaello, but what he drew was not of his invention but of Bramante "*...seguitando però i vestigi…*", at least in its fundamental aspects.

The project had enormous appeal among contemporary scholars, due to its beauty, roundness, balance, lightness and serenity, as is the case with Goethe, who shows the Serlio plan as "*ichnographia basilicae a Bramante delineata*" [144].

The project was certainly fantastic, and well suited to Leo X's architectural aspirations, but Raffaello would have to deal with the two collaborators that Julius II had called to collaborate with Bramante in his last days. And unfortunately both Fra Ciocondo and Giuliano da Sangallo had their own ideas, and what is worse, Giuliano would be resented being rejected several years earlier, in 1505, early in the design process for the new basilica, and for uncertain reasons.

As has been said, Fra Giocondo arrived in Rome towards the end of May 1514, even before Raffaello's appointment, and soon had to acquire overwhelming influence over the project of the new basilica [145]. According to Vasari's information, Fra Giocondo connected the foundations of the crossing piers of the dome and the counter-piers begun in 1513. In July 1514 it seems that he was already working on the foundations of the niche named after him and, therefore, he had closed the south-west chapel of the transept and started the sacristies adjoining the west [146].

Therefore, if the construction of Fra Giocondo's niche and the adjacent sacristy were not continued, it means that Raffaello should have been respected and that he achieved greater influence even before Fra Giocondo's death on July 1, 1515 [147]. Therefore, during this uncertain period, the works designed by Bramante for the central nucleus and the counter-piers were simply continued, and although the “Fra Giocondo niche” was also built because it was included in the projects of Giuliano da Sangallo (and accepted by Fra Giocondo). It is evident that Raffaello was able to control the situation and stop the works.

In fact, years later, Fra Giocondo's niche would end up being demolished. It is known that between 1532 and 1536 Fra Giocondo's niche was still standing, as it appears in Martin van Heemskerck's drawing "View of the south tribune of the new basilica of S. Peter from the inside", Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n. 79, D.2a, fol. 8 r (Fig. 7.39). Therefore, the niche of Fra Giocondo will be demolished later, perhaps by Antonio da Sangallo, or by Michelangelo.

Period 2.d: (1515-1520) Raffaello, Antonio da Sangallo, Peruzzi

After the death of Fra Giocondo on July 1, 1515, Raffaello remained alone in charge of the design and construction management of the new basilica of S. Peter, given that a few days after the death of Fra Giocondo, in the In July 1515, Giuliano da Sangallo moved to Florence. The reasons why Giuliano da Sangallo moved to Floencia are unknown but it is imaginable that his health was not good due to his advanced age (70 years old), so he would surely decide to move permanently to his hometown, given that he imagined that his stay in Rome would not bring him any kind of rewards, since Raffaello was in command of the works of S. Peter, and did not seem to take his proposals into account.

Raffaello had already overcome his initial stage of disorientation and seemed to have the reins of the future of S. Peter, with the help perhaps of a young, purist and meticulous architect such as Baldasarre Peruzzi.

Baldassarre Peruzzi was collaborating in S. Peter since December 1514, although it is not known exactly what his tasks were, but they should only be of assistance to Raffaello, Giuliano da Sangallo and Fra Giocondo, since his salary was not very high. The first payment to Peruzzi was 168 ducats for a 28-month contract that began in December 1514, and ended on August 1, 1517, with a salary of 6 ducats per month [148], although it was renewed until the end of 1520 [149].

Antonio da Sangallo, was appointed on December 1, 1516, successor to his uncle Giuliano da Sangallo (who died on October 20, 1516) and from that day until March 1520, he received a salary of 12.5 per month, as *coadiutore*, or *secondo architetto*. Years later, in April 1520, when he was appointed *primo architetto*, his salary increased to 25 ducats per month [150]. It is known that Antonio da Sangallo had worked for two years (1510-1512) as a master carpenter, on the construction site of S. Peter, and previously he had been Bramante's assistant, at least during 1508-1509 [151].

However, at the end of 1516, and as Giuliano da Sangallo's nephew, he must have been aware of the problems related to the design of the new basilica of S. Peter, the design practice that was being carried out, and the enormous quantity of projects that had been carried out [152].

On the other hand, it must be taken into account that, in 1516 (and although his activity as an independent designer had only begun around 1512-1513) he was already a professionally established architect and endowed with serious practical and theoretical training in the various fields of architecture. In fact, the powerful Cardinal Alessandro Farnese had already called him to his palace and, according to Vasari, had recommended that he be hired in S. Peter as Raffaello's *coadiutore*, since Raffaello had requested a collaborator. Raffaello, was certainly suspicious of Antonio da Sangallo since he had undoubtedly been warned by Bramante, but he had no choice to accept it [153].

Therefore, Raffaello worked alone, with some eventual help from Peruzzi, from July 1515 to December 1, 1516. However, after December 1, 1516, Raffaello had to defend his ideas (in essence Bramante's, embodied in the 1514 drawing Serlio 1544, f. 37) in front of Antonio da Sangallo, since although Peruzzi apparently shared his ideas, his *mite* character did not suppose much help [154].

Regarding the development of the construction process, we do not know what project was being followed in the works carried out around 1515-1518. This project had to represent a strange synthesis, by way of a compromise solution, between the ideas and the project of Bramante-Raffaello and some small concession to Antonio da Sangallo.

In any event, regardless of Sangallo's multiple proposals in this period, construction basically followed Bramante's projections for the ambulatory and transverse arms, with some minor concessions to Antonio da Sangallo. It is known that during this period a large part of the cornices of the imposts, and of the cornices of the large 40 *palmi* niches, were later criticized by Antonio da Sangallo in his *memoriale* of 1520 (GDSU 33 Ar and GDSU 33 Av) [155].

The marble supplies of 1517-1518 could have been intended for the marble frames protruding from the niches, which had been executed under the papacy of Leo X [156]. It is possible that, as is logical, Raffaello suggested from time to time to Leo X the possibility of demolishing the Julius II apse, however that was not the priority, and although it was not to his liking, he decided to continue keeping it standing. Construction should move forward.

Regarding the development of the project activity, after the death of Bramante, and once the “central nucleus of Bramante” was built, the main problem that Raffaello and Antonio da Sangallo would have to face was how to complete the building to the east, is that is, the longitudinal body and the facade. The issue was so complex that even after Raffaello's death, it remained the main problem to be solved, as Raffaello and Antonio da Sangallo could only agree on the executive definition of the structure of the transept and the ambulatory.

Initially Antonio da Sangallo, perhaps before his appointment, would make independent proposals, and clearly influenced initially by Fra Giocondo and later by his uncle Giuliano da Sangallo, but over time he gradually and partially accepted some ideas of Raffaello, and finally, between 1518 and 1519 jointly decided on certain aspects, even if only the executive definition of ambulatory and little else [157]. Years later something similar happened with Peruzzi, who retained considerable independence in relation to the proposals of the *primo architetto* Antonio da Sangallo.

Antonio da Sangallo had an incredible project activity in S. Peter, judging by the enormous number of drawings that have reached us. However, although quantity is abundant, quality is not, and although all his drawings at all times show an attempt to find an alternative solution to that of Bramante and Raffaello, the truth is that all their proposals show a disorganized character, and convey the idea of a continuous search, but without getting anywhere. Only at the end of his career did he come up with an interesting solution, perhaps heavily influenced by Peruzzi.

On the other hand, of the countless projects by Antonio da Sangallo, it is not certain how many belong to this period [158]. However, an analysis of the most probable candidates is carried out below, and based on it, they will be arranged chronologically according to the design advances achieved at each moment.

It should be noted that Raffaello only made one proposal during this period (Fig. 7.54), as he was very sure of its architectural quality. And he did so at a crucial moment, after the crisis of the papacy of 1517-1518, when perhaps he had already reached some kind of agreement with Antonio da Sangallo, no doubt forced by Pope Leo X [159]. In his project of 1518, he concentrated for the first time on restructuring the exterior [160], based on the great Doric order created by Bramante, and which was reflected in a more modest way in his previous proposal.

In this new project, the order goes far beyond the chapels of the longitudinal body, the domes of the lateral naves, and perhaps the ambulatory ones. Raffaello wanted to use the columns of the old basilica, and he did so, not only in the ambulatory, but also in the facade, placing them aligned with the pilasters [161]. In this way he was able to move the area of the windows of the chapels inwards and articulate it with a second order. Even more convincing than these new side fronts appears the facade of the square, in which Raffaello took up Bramante's ambulatory system. The Lodge of Blessings would be located on the columns of 5 *palmi* from the old basilica and inserted there. In all aspects of the building it is felt that Raffaello sought the plasticity that he admired so much in the buildings of the imperial age.

The building has a strong plastic character and consists of a rectangle from which three ambulatory stands out on three of its faces, and a colonnade runs along the front of its fourth face. This apparent simplicity masks an enriching interior complexity, where the four central crossing piers generate the four perimeter counter-piers. Six of them generate the three ambulatory, while the two easternmost are repeated to the east, forming three naves with five sections, and in turn are projected against the north and south walls, creating a well-articulated set of chapels.

Undoubtedly these ideas were generated by Bramante who, after a stormy design process, came up with a brilliant solution, which Raffaello would have to defend years later (although enriched with some details of his own invention, such as the prominent bell towers).

It is true that Antonio da Sangallo in his projects adhered to the domes of the longitudinal body, but at Raffaello's request he resumed the quincunx system, the arms of the transept in the form of segments, as well as the integration of the towers and sacristies in a closed body. At the same time, he used semi-columns with a 9 *palmi* wide shaft, as can be seen in drawing GDSU 122 Ar (Fig. 7.40). This medium order acts as a bridge between the colossal Bramante order of 12 *palmi* and the small Raffaello order of 5 *palmi*. It seems that Sangallo himself began the insertion of this new external order in his own proposals, and then he would develop it definitively in the summer of 1519, modifying Raffaello's project of 1518 in a consensual way (PML, codex Mellon, f. 72v) [162]. The 9 *palmi* order complied with the pilasters of the nave and side chapels and at the same time found correspondence with important elements of the interior. This order allowed the area of the chapel windows to recede and, interestingly, had a much more monumental effect than Raffaello's project of 1518. This detail brings it closer to the Palazzo Farnese than to Raffaello's earlier buildings.

Antonio da Sangallo, throughout this period, and always maintaining a marked independence with Raffaello's ideas, will be making increasingly refined and simplified proposals, until he reaches his final project (of which a model was made). This final project was probably carried out between the years 1520-1521, after the death of Raffaello, and we have received some of his preparatory drawings, such as the six well-known drawings of the codex Icon. 195, of the Baverische Staatsbibliothek of Monaco, BSB, cod. Icon. Mon. 195, f. 1st, f. 1v, f. 2r, f. 2v, f. 3r, f. 3 V. (Figs. 7.41, 7.42, 7.43, 7.44, 7.45 1nd 7.46)

The evolution of the design and construction process of S. Peter in Vaticano in this period is shown below, analyzing the architectural evolution of some of the most important projects by Antonio da Sangallo, trying to date them in the correct way, and integrating his analysis sequential with Raffaello's proposal and with the development of the works.

Initial projects bay Antono da Sangallo

Among the initial projects of Antonio da Sangallo, two groups must be distinguished, carried out before and after the political and economic crisis of the papal state that began in February 1517, with the revolt of the Romagnes promoted by the overthrown Francesco Maria della Rovere. In fact, the works at S. Peter almost came to a halt in early March 1517, and only since the spring, or summer, of 1518 an improvement in the pope's political and financial situation has been perceived.

The first group of initial proposals by Antonio da Sangallo (before the crisis of 1517) includes large-scale projects, comparable to the projects of Giuliano da Sangallo and Raffaello, and corresponds to the ambitious programs of Leo X.

The second group of initial projects of Antonio da Sangallo (from 1517 to 1521) includes more modest projects, in accordance with the new financial reality of the papacy [163].

First group of projects by Antonio da Sangallo (before 1518)

Antonio da Sangallo. GDSU 254 Ar

Perhaps the first project carried out by Antonio da Sangallo for the new basilica of S. Peter is drawing GDSU 254 Ar (Fig. 7.47). This project is drawn on parchment, and therefore intended to be shown to the pope, and it is usually agreed that it was carried out immediately after his appointment, perhaps in January or February 1517. Although personally I think, like Bruschi [164], and based on the analysis of its architectural structure (with clear influences from his uncle Giuliano da Sangallo and Fra Giocondo) that this project is slightly prior to his appointment, perhaps from October or November 1516, and that perhaps it was made precisely to obtain the position of *coadiutore* or

even with the intention of defeating Raffaello, and taking his place as the *primo architetto*.
The GDSU 254 Ar project has a clear utopian character, and represents a large longitudinal building that, despite preserving the “central nucleus of Bramante”, and therefore a mixed quincunx-naves typology, has no relationship with its proposals, nor with those of Giuliano da Sangallo, and much less with those of Raffaello. Instead it has many similarities with drawing GDSU 6 A (Fig. 7.7) in which Antonio da Sangallo writes "*opinione e disegno di Fraiocondo per Santo Pietro di Roma*". In fact, it is so similar that it is not surprising that Geymüller attributed it to Fra Giocondo [165].
It is a basilica with an extraordinary length and only three naves. The central nave has a spectacular sequence of large domes (about 147 *palmi* in diameter) that, interspersed with barrel vaults, generates a sequence of transverse and longitudinal arms in the shape of a cross. The same strategy is repeated in the secondary naves, articulating with transverse arms of the same width and therefore creating a beautiful two-dimensional frame, articulated by an enormous number of domes located at each intersection. To generate the structure of spaces, Antonio da Sangallo uses a specular sequence of large piers, whose design is based on the large central crossing piers of Bramante, modifying only their beveled side in order to create transversal spaces of 107 *palmi*, which will be reduced to 60 *palmi* when crossing with the lateral naves.
The two-dimensional pattern of these large modified piers creates an architectural mesh that closely resembles the one made years ago by his uncle Giuliano da Sangallo in GDSU 8 Ar (Fig. 7.8), but extending in space forming a cross, instead of forming a square. Undoubtedly, the interior of this proposal may recall the image of the temple represented by Raffaello (1511-1512 approx.) in the *Cacciata di Eliodoro*. The drawing shows a large free-standing facade, creating a transversal corridor, and flanked by isolated bell towers, creating a big portico. This entrance portico is divided by three entrances with colonnades, of which the central one forms a vestibule, articulating the transversal corridor, creating an architectural structure that Antonio da Sangallo likes very much, which he will use again in future projects, and that he had already screened at the Palazzo Farnese [166]. Without a doubt Sanaglo the Younger in this drawing makes several concessions to the architecture of Fra Giocondo [167].

Antonio da Sangallo. GDSU 252 A (left side)

The left part of the drawing GDSU 252 Ar (Fig. 7.48) (the part on the right was scraped to later use the parchment and make a new solution, perhaps two years later, in 1519) has certain similarities with the GDSU 254 Ar drawing. Although this proposal is more realistic, and with a much more disorganized structure, evidencing the inability to satisfy the multiple requirements, sometimes contradictory, existing in the design of the new basilica, which Bramante and Giuliano da Sangallo had already faced.

According to Arnaldo Bruschi this proposal was made after the GDSU 254 Ar and perhaps before the spring of 1517 [168], since its size is still considerable, and therefore it certainly precedes the financial crisis of the papacy. Wolff Metternich even argues that this project may be a little earlier and may have been carried out before April 1516, that is, well before Sangallo was hired [169]. I personally think that the drawing was made after the hiring of Antonio da Sangallo, and before the spring of 1517.

Antonio da Sangallo was interested in defining a new type of facade (which was the main gap in Bramante's proposals), but he was also interested in proposing a new type of longitudinal body, integrated with the already built “central nucleus” of Bramante. The proposal of the GDSU 252 A drawing, although not very attractive, is particularly imaginative, both in the interior and in the volumetric system that would be generated outside, with the large Bramante dome at the back, three domes a little smaller, two bodies that emerge in the transverse axis of the nave, and eight small domes in the naves.

In this proposal we can see the same longitudinal structure of three naves, the same type of facade and the two external bell towers. The proposal is also based on the creation of an architectural structure based on large piers, but now it makes two types of alterations to the large central crossing piers of Bramante, thus eliminating the beautiful spatial mesh obtained in the previous proposal GDSU 254 Ar, which now looks disorganized. The narrow central nave is this proposal a little more dilated and strongly illuminated by the insertion of three large domes (about 147 *palmi*), similar to drawing GDSU 254 Ar. However, this project is more real since on the one hand it incorporates the north and south ambulatory, desired by Bramante and Raffaello, and on the other hand it incorporates the undesirable choir of Julius II, which for now remains respected by Leo X, although he may not have liked it. To integrate the central nucleus of Bramante with the naves, the Julius II choir and the ambulatory, Antonio da Sangallo makes use of the proposals of his uncle Giuiano da Sangallo, so that the design of the western part closely resembles the drawing GDSU 7 A (Fig. 7.27), which his uncle made some years ago. Therefore, it conserves the Fra Giocondo niche and completes it by forming two octagonal chapels at the end of the side aisles. Under these premises, the result is a kind of “Franquenstein”, made from architectural remnants joined together, without a clear and coherent structure, and without forming an integral and harmonious architectural typology (something that will be a general invariant in all of Antonio da Sangallo's proposals for S. Peter).

An important aspect of this project is the architectural structure of the ambulatory. Bramante created a perfect rhythmic structure for the ambulatory, since they were generated from the counter-piers, which in turn were generated from the four central crossing-piers. For this reason, he expanded its compositional order 12 *palmi*-15 *palmi*-12 *palmi* (39 *palmi*), adding a new 12 *palmi* pilaster, projecting a dimension of 2 *palmi* from the line of pilasters, and therefore strangling the width of the the central nave, leaving an interior apse of the ambulatory at 99 *palmi*. From these enlarged counter-piers the compositional structure of the ambulatory was generated (see chapter 8). The result was perfect, and with the passage of time it proved to be unsurpassed.

Giuliano da Sangallo, trying to compete with Bramante, in his three known proposals, created another compositional structure, less fortunate, to generate the ambulatory, leaving a dimension for the apse of the ambulatory not of 99 *palmi* (as Bramante did), but 103, *palmi* (see chapter 8). As a result the ambulatory is 4 *palmi* narrower than that of Bramante and Raffaello (103 - 99 = 4). As if that were not enough, the geometric center of the interior apse of the ambulatory was arranged far apart from the center of the basilica and destroying the compositional rhythm achieved by Bramante. Giuliano da Sangallo never designed an ambulatory that even rivaled Bramante's solution, and the same thing happened with Antonio da Sangallo.

The GDSU drawing 252 (left part) shows an unstructured ambulatory, since it has been generated by counter-piers arranged without any rhythm, and with an arbitrary width. Antonio da Sangallo duplicated the compositional order of Bramante (12-15-12), incorporating a strange element that strangles access to the ambulatory, which later widens again to 103 *palmi*. In this way, the ambulatory protrudes from the lateral perimeter more than the ambulatory of Bramante subtly protruded. And with this, the internal compositional rhythm is broken, because too much compositional importance is given to the ambulatory.

However, and with the aim of trying to provide a minimum of coherence to the whole, Antonio da Sangallo tries to give a rectangular shape to the building envelope, undoubtedly influenced by the ideas of Bramante, and collected by Raffaello in Serlio 1544, f. 37 drawing. However, it does not succeed, since the perimeter rectangle is crossed by several types of protrusions, with different shapes, so it does not manage to provide a clear compositional structure.

This project, although less graceful, is less opulent and a little less expensive than the previous one, despite being very long, 1360 *palmi*. From this drawing, the successive proposals of Antonio da Sangallo will continue to be increasingly simplified and economical, since he seems to have found a way forward, with which he can eliminate parts that are not strictly necessary, and can drastically reduce costs. The reason for this marked change, not only of the project, but mainly of the program, is not only due to the dramatic financial crisis of the papal state (which began in the early spring of 1517 and ended around the summer or late 1518), but it is also due to the evolution of Antonio da Sangallo's own architectural ideas. Sangallo was very stimulated as he tried to compete with the proposals and ideas of Raffaello (almost equivalent to those of Bramante), and he continued to study new solutions of his own independently, exploring new compositional paths.

Antonio da Sangallo. GDSU 37 Ar

The GDSU 37 Ar proposal was made on parchment, so it was made not as a study but as a proposal to be shown to the pope, and it was drawn with considerable probability in the spring of 1517, coinciding with the beginning of the financial crisis of the papacy (Fig. 7.49).

The longitudinal body is reduced to three *campate*, so that the building is not only cheaper than Raffaello's proposal but, above all, Antonio da Sangallo was able to achieve in this way a materialization closer to his own ideas. Consistent with his ideas, the transverse axis of the longitudinal body definitely stands out for a large dome with an intermediate diameter between the diameter of the central Bramante dome and the perimeter domes of the mixed quincunx-naves typology. This new large central dome is located in the central part of the main nave, in turn dilated on the sides by two barrel vaults. At the end of this new central axis there are two circular chapels surrounded by an annular arcade with arches framed by semi-columns. These large chapels are placed in a symmetrical position with respect to similar sacristies, also surrounded by porticoes, placed at the western diagonal vertices of the quincunx. In this way, two round bodies frame, on each side, the large external hemicycles of the ambulatory, with which the south and north arms of the transept are completed. The attempt to create an organic structure is evident, even on the sides of the building, beyond the great facade in the form of a portico, divided by colonnades and framed by large octagonal bell towers.

The compositional rectangle in plan that was still appreciated in drawing GDSU 252 A, is now destroyed with the inclusion of the two side chapels, which do not seem integrated into the whole and dilute the compositional structure and the unitary character of the proposal. Without a doubt, Antonio da Sangallo locates these side chapels (with axis in the centers of the ambulatory) to create a subtle symmetry by additionally placing two other twin chapels in the western vertices, but failing to do so, he creates a complex and disorderly structure. And it does not achieve symmetry because the side facades in which the side chapels are embedded continue to extend in an easterly direction until they reach completely different new elements (the ends of the east facade) that are also articulated with other elements that are also completely different (the bell towers). In total there are four different protrusions on the north and south sides of the basilica, and each one with different compositional rules. Of course this project, again, was not up to the proposals of Bramante and Raffaello.

For the generation of the interior spaces, a single large pier is used, as was the case in the GDSU 254 Ar project, to avoid the confusion generated in the previous GDSU 252 A project (left part). On the other hand, outpatient clinics are generated in the same way as in the previous proposal GDS 252 A (left part).

On the outside, precisely to visually unify the perimeter, a single architectural style had to appear. In the original draft of the drawing (very precise, but still under study, full of erasures, corrections and modifications) a small order of 5 *palmi* in diameter appears in the hemicycle of the ambulatory to the north (and also within the ambulatory itself, in the loggias of the sacristy and on the columns of the facade portico), as shown in the almost contemporary project PML, codex Mellon, f. 72v, by Raffaello. These are undoubtedly the reused columns of the ancient Constantinian basilica. However, at the beginning of the lateral facades of the longitudinal body, an order of 8 or 9 *palmi* in diameter is used on the outside, framing a set of niches.

This new proposal more clearly shows the compositional intentions of Antonio da Sangallo, who worked incessantly to achieve a personal proposal, and an alternative to the proposals of Bramante and Raffaello. However, the solution continues to seem

confused and dispersed, and it continues to seem like a moderately structured concatenation between different parts, far from the forcefulness, elegance and complex simplicity of Bramante and Raffaello's proposals.
To get an idea of the appearance of this architectural proposal, the drawings made bay Sangallo GDSU 70 Ar (Fir. 7.50), GDSU 54 Ar (Fig. 7.51) and GDSU 60 A, can be useful. Although it is not certain whether these drawings correspond to the GDSU 37 Ar proposal, they have obviously been made prior to the GDSU 34 Ar drawing, since they show an ambulatory with the initial structure of Antonio da Sangallo, and not that of Bramante , as it would finally adopt from drawing GDSU 34 Ar. These three drawings are elevation and sectional studies and belong to a serie of studies and projects aimed at clarifying the traces and individual elements of Bramante's incomplete transept and the ambulatory.

Antonio da Sangallo. GDSU 35 Ar

The GDSU 35 A project (Fig. 7.52) is extremely important since it implies an evolution of the ideas embodied in GDSU 252 A (left part), and carried out perhaps in the autumn of 1517, since it again shows a significant reduction in surface area of the new basilica. This drawing is a new stage in the design process followed by Antonio da Sangallo at this time, through a series of very tormented studies, which intersect and overlap, which also correspond to a project of reduced dimensions, and which later it would be cleared on GDSU 34 A.
In the upper part, in the right half of drawing GDSU 35 Ar, a solution for the longitudinal body similar to drawing GDSU 252 A (left part) with three naves is represented, in an incomplete way, and in which, however, in addition to contract and simplify the whole part with the smaller naves and the perimeter chapels, it only has two domes (or vaults) in the central nave.
Partially superimposed on this solution, another is made, very different and even shorter in length, in whose central nave (12 *palmi* wider) there are no longer domes. The central nave is also covered by three large ribbed vaults that rest on piers with pairs of semi-columns to replace the paraste designed by Bramante.
A third alternative, in the lower left part, even more reduced, maintains the piers in pairs of pilasters, but widens the central section of the nave with large barrel vaults that flank only a probable cross vault and establishes a transversal axis that concludes on the perimeter with large octagonal chapels, probably inspired by and replacing the two large

old roundabouts of Santa Petronilla and Santa Maria della Febbre. These octagonal chapels will be an invariant of Antonio da Sangallo's proposals from now on and, from my point of view, they are one of the main reasons for the formal dispersion of Antonio da Sangallo's architectural proposals. Surely they represent an alternative research for a new typology and a new formal architectural structure, but without a doubt they make it impossible to achieve a pure, different, harmonious and structured solution. Personally I think that these protruding chapels would be the main reason of displeasure, among many others, for Michelangelo of Antonio da Sangallo's proposals.

This lower left part is very important, since for the first time Antonio da Sangallo uses the compositional structure of Bramante for the ambulatory, which means that actually he would not make concessions to Raffaello, two years later, in the year 1519 (as has always been mentioned), since he had realized long before that he was incapable of providing a worthy alternative to Bramante's design. For this reason, from now on, as can be seen in drawing GDS 34 Ar (left side), Sangallo would always use the Bramante ambulatory.

In any case, it is evident that in these new studies Antonio da Sangallo attempts to provide new solutions for both the facade and the longitudinal body, while also worrying about reducing the dimensions and costs of the project. All this without forgetting the practical and functional problems, and to enlarge and illuminate the central nave as much as possible, which Bramante wanted to be of high proportions and less illuminated. Based on these studies, it clearly reached its following proposal GDSU 34 Ar.

Antonio da Sangallo. GDSU 34 Ar

The GDSU 34 Ar project (Fig. 7.53) could have been completed a little before Raffaello presented his PML, codex Mellon, f. 72v drawing, and, from my point of view, it is the beginning of the probable partial collaboration with Raffaello, since now the ambulatory have, definitively, the same compositional structure as the Bramante and Raffaello projects, and therefore have a completely different compositional structure than the one used in the GDSU 252 A (left side) and GDSU 37 Ar projects.

Due to its small size, this drawing was undoubtedly made during the economic crisis of the papacy, perhaps before the spring of 1518.

The GDSU 34 Ar project is the result of the design process carried out during 1517, which could have included several previous drawings, such as the already examined

GDSU 35 Ar. The drawing has two proposals in one. Without a doubt, the right part is the starting point, and the left part is a next mature proposal. The drawing shows a last desperate effort to find an alternative to Bramante's ambulatory design. For this reason Antonio da Sangallo abandoned his own proposals, which he finally considers inappropriate, but instead of directly embracing Bramante's proposal, he makes one last attempt and draws a new proposal to the right, integrating the ambulatory design of his drawing GDSU 37 Ar, with one of the designs for the ambulatory that his uncle Giuliano da Sangallo made years ago, represented in drawing GDSU 7 A. But again the result is not attractive, and even Sangallo realized that this proposal does not lead him anywhere.

So Antonio da Sangallo finally gives up and accepts the obvious. He accepts Bramante's ambulatory design, and although adulterated by his own ideas, he draws it on the left side. And he would never draw a different proposal than Bramante's.

The GDSU 34 Ar drawing (left part) represents a very short basilica, 1030 *palmi* in length, also with three naves, and with a design far removed from the ideas of Bramante and Raffaello. The central nave is about 12 *palmi* wider than those proposed by Bramante and Raffaello, and is covered with three equal ribbed vaults and is extended at the sides of each of the three *campate* with barrel vaults. In the central section, the transversal axis of the longitudinal body, which tends to assume its autonomy, is marked on the perimeter by two large octagonal chapels. The internal structure now abandons the quincunx typology, and alters even the central nucleus of Bramante, as the shape of the four large central crossing piers is altered differently to both east and west. As if that were not enough, the structure of the counter-piers that generate the sections of the naves is no longer even based on the form, order and architectural structure of the four central crossing piers. Which is nonsense.

As usual in Antonio da Sangallo, this new proposal shows a disorganized structure, and is very reminiscent of the proposals of his uncle Giuliano da Sangallo GDSU 9 A, GDSU 7 A, and cod. Barb. Lat. 4424, fol. 56v. From my point of view, when trying to reach a solution different from that of Bramante and Raffaello, trying to solve the supposed “problems” that he wanted to see in Raffaello's project, Antonio da Sangallo could not find a genuine solution, with character and well structured, with a pure and well defined typology. The project appears to the viewer as a whole without compositional unity, in which the different parts are concatenated among themselves by means of different architectural structures and forms, without a common compositional nexus, which gives it a disorderly character, and that would displease so much. Michelangelo.

The compositional rectangle in plan is still visible, as was the case in drawing GDSU 252 A, although now in a very subtle way since its western vertices are ignored by the western chapels and the ambulatory. Again there is no unitary character in this new proposal and the perimeter compositional rectangle is continuously dotted with different architectural elements. In total there are four different protrusions on the north and south sides of the basilica, and each one with different compositional rules: the octagonal western chapels, the semicircular ambulatory, the octagonal side chapels (larger than the western ones), the protrusions on the sides of the facade and the square bell towers. The *concinnitas* was not achieved at all, and the solution, again, was no up to the proposals of Bramante and Raffaello.

The apse of Julius II is kept for reasons of economy, and the ambulatory now have the same architectural structure as Bramante, it includes pillars with pairs of columns of different sizes, and its structure of niches and aedicules is very different from that proposed by Raffaello. The facade is reduced in depth compared to his early projects, but it is still masonry, and in the shape of a triumphal arch, with a central tympanum and a giant order, and the lateral bell towers remain isolated.

Raffaello's compromise project

Based on the analysis of Antonio da Sangallo's first proposals, it is concluded that, instead of collaborating with Raffaello, he tried by all means to try to find a new alternative project at the height of the Bramante-Raffaello proposal, but he did not succeed. Raffaello maintained his position firmly against Antonio da Sangallo, since his proposals were unfortunate. However, to calm down and show the pope his good will, he prepared a new project. This project was almost identical to his previous project, and Bramante's authorship is evident, since it supposes a “compromise project”, in which the *Capella Iulia* is maintained, and in the process certain adjustments are made to increase the magnificence of the building, close to the personality of the pope.

Raffaello's new Project

Raffaello. PML, Codex Mellon, f. 72v

With the aim of giving a coup of authority to the misguided proposals of Antonio da Sangallo, in the autumn of 1518, once the political and economic crisis of 1517-1518 had been overcome, and surely as a result of new requirements from Pope Leo X, Raffaello presented his new project, PML, codex Mellon, f. 72v (Fig. 7.54)

Based on the analysis of the different projects made by Bramante and Raffaello, it is very possible that Bramante had already envisioned a solution in which the *Capella Iulia* was surrounded by an ambulatory, only in the event that Raffaello could not convince Leo X to shoot it down. And the moment had come.

Raffaello was alone, since Peruzzi did not suppose much help to face Sangallo, who insisted on making unfortunate proposals, and very far from Bramante's ideals.

Peruzzi's first contract ended on August 1, 1517 [170], although it was renewed until the end of 1520, the day he was appointed *coaudiutore* [171], but his activities as third architect did not suppose much help for Raffaello. Therefore, and as time passed and Antonio da Sangallo insisted on elaborating misguided solutions, Raffaello decided to give in a bit in his position, in order for him to do the same. For this reason, Raffaello made this new proposal, which was probably planned years ago, together with Bramante.

This project has only four substantial differences with the project that Raffaello presented four years ago, in 1514, and that he had been defending with determination.

- In the first place it includes the apse of Julius II, something that had undoubtedly been planned by Bramante, for which he decided to incorporate it and surround it with an ambulatory similar to those existing in the north and south, to preserve the purity of the solution.

- Secondly, it highlights the west corner towers and creates new towers of similar size on the east face, which is undoubtedly a concession for Antonio da Sangallo.

- Thirdly, the east facade incorporates two lateral bell towers integrated into a portico with smaller columns, clearly influenced by Antonio da Sangallo's GDSU 252A proposal from 1517, to which he had to make this small concession indirectly, since that the giant columns that he had drawn in his earlier proposal were undoubtedly too costly to support the recently renewed finances of the Papal state.

- Fourth, there is a very important difference, which has to do with the compositional and tectonic structure of the building.

In his previous proposal of 1514 (Serlio 1544, f. 37) the internal face of the counter-piers (adjoining the main nave) had the same order that Bramant used in the four large central crossing piers, that is (12 *palmi* -15 *palmi* - 12 *palmi*), that is 39 *palmi*. To this dimension, the dimension of the 2 lateral setbacks of 4 *palmi* must be added, obtaining a total width of 47 *palmi* (39 + 4 + 4).

The 20 *palmi* niches of the counter-piers are set back a distance of 3 *palmi* from the sides. For this reason, in their interior part, the counter-piers are strangled, with a thickness of only one *palmi* (47 - (20 + 20 + 3 + 3) = 1 *palmi*). As a consequence, cracks could appear in the central part of the counter-piers, which structurally would not behave as a single pier, but as two separate semi-piers.

Bramante would surely have already realized this problem, but there was no solution. It should be borne in mind that probably for the same reason Bramante initially built pairs of septa instead of lenticular piers, and later he decided to join them together to create lenticular piers. Bramante thought that joining the septa, to form lenticular counter-piers, generated a purer and more attractive architectural structure.

To increase the robustness of the counter-piers, and increase the thickness in their central part, there was only one solution, which consisted in breaking the rhythm of the paired paraste, and separating them a little more. Bramante would undoubtedly have already envisioned a similar solution, and communicated it to Raffaello, in case he might need it.

In the new proposal of 1518 PML, codex Mellon, f. 72v, Raffaello designed wider counter-piers, separating the 12 *palmi* paraste a distance of 20 *palmi*, instead of 15 *palmi*. Thus the piers had a width of 52 *palmi* (4 + 12 + 20 + 12 + 4), and therefore the constriction of the piers had a dimension of 6 *palmi* (52 - (20 + 20 + 3 + 3) = 6 *palmi*), and it was no longer a problem. However, the compositional rhythm was altered. The central crossing piers had an order of 12-15-12 *palmi*, and the piers of the naves had an order of 12-20-12 *palmi*. And that was the object of a new criticism by Antonio da Sangallo, documented in his famous *memoriale,* written in the GDSU 33 Ar (Fig. 7.24) and GDSU 33 Av (Fig. 7.25) [172], indicating that *"li pilastre della nave"* (as is the case in Raffaello's new proposal) "*sono più grossi che quelli / della trebuna*", that is, from the dome,"*che voriano essere ma(n)cho o alma(n)cho equali*".

Need for an agreement between Raffaello and Antonio da Sangallo

After the crisis of the papacy, towards the autumn of 1518, it was necessary to resume work, and Pope Leo X asked his architects to reach a certain consensus.

Antonio da Sangallo, faced with the need to define the parts of the most urgent execution, had no choice and gradually accepted some Raffaello ideas, and began to

collaborate with him, perhaps between the autumn of 1518 and the spring of 1519 [173]. In fact, as Frommel has pointed out, more or less at the same time, Antonio da Sangallo had to collaborate with Raffaello also on the Villa Madama project.
This collaboration will probably last until the death of Raffaello (April 6, 1520), but, according to what can be deduced from the analysis of the drawings (see chapter 8), it will be restricted to the definition of some parts (perhaps only the ambulatory). Despite from some concessions by Antonio da Sangallo to the ideas of Raffaello, the disagreement on the general development of the building was total. In fact, Raffaello did not make any additional proposals, since he considered that it was good enough (and in fact it was). On the other hand, Antonio da Sangallo would continue to make proposal after proposal, although he would never get a minimally valuable one.
Initially, they agreed at least on the executive definition of ambulatory, since Antonio da Sangallo could not find an alternative at the level of Bramante's and had no choice but to accept it [174]. In fact, in his last proposal of this stage, the GDSU 34 Ar drawing, he used Bramante and Raffaello's ambulatory. These ambulatory were designed by Bramante and their architectural structure had been respected by all his successors, although always with small syntactic variations related to the designs of the niches and aedicules inside, and the arrangement of columns or pilasters outside.
In the same way, Raffaello had to make small concessions to Antonio da Sangallo regarding the shape of the niches and aedicules inside, and the order of semi-columns of 9 *palmi* on the outside (initially Sangallo assigned a diameter of 8 *palmi* to the exterior semi-columns, as seen in drawings GDSU 45 A and GDSU 46 A, although later I design them with a diameter of 9 *palmi*, as seen in drawing GDSU 122 Ar) (Fig. 7.40).
These drawings by Antonio da Sangallo were analyzed with little luck by Geymüller, since he incorrectly deduced the dimensions of the different architectural components of the ambulatory. Therefore, in the following chapter, an exhaustive analysis of the drawings GDSU 45 A and GDSU 46 A has been carried out, in order to reconstruct the correct dimensions of the new Raffaello-Sangallo ambulatory design from 1519 (in chapter 9).
Obviously the architectural structure of the counter-piers (deduced respectively from the architectural structure of the four large central crossing piers) is the generatrix of the architectural structure and shape of all the components of the ambulatory. Therefore, and taking this into account, it has been possible to reconstruct Antonio da Sangallo's drawings, as well as all the stages of his design process (see chapter 8). Based on the

reconstruction of these drawings, and taking into account the GDSU 122 Ar drawing, it has been possible to reconstruct the shape of the ambulatory that began to be built in 1519 (see chapter 9).
On the basis of this new design, construction of the southern ambulatory began at the end of 1518 (or perhaps the beginning of 1519) [175], as the drawing JSM, codex Coner, F. 24v, ed. Ashby, b. 31 (1514-1515) [176] and in various drawings by Heemskerck.

State of the works

The last two years of his life Leo X built the south arm of the transept, he probably had several reasons for doing so. Once the choir was finished, the arms of the transept and the first sections (navate) of the longitudinal body, constituted the most important elements to raise the dome, and as it is a highly visible element it would show that the works were progressing at a good pace. In addition, the construction of the north and south side was simpler since the Constaninian platform should not be drilled until reaching firm ground, as it must be done to build in an easterly direction. It was also the logical solution to preserve the enormous amount of treasures that were housed in the naves of the old basilica. The southern arm of the transept extended to the land on which the Chapel of Santa Petronilla was built, whose patronage was ceded by Innocent VIII to the kings of France and for this reason it was then known as *Cappella del Re di Franza* [177].
Later, from 1514 onwards, Leo X extended this name to the new arm of the transept (for whose southeast counter-pillar Bramante had to demolish a part of the old mausoleum, since as a member of the Medici family the pope was traditionally linked to the French crown. Similarly, years later [178] under the papacy of Paul III the north arm of the transept will be called *Cappella dell'Imperatore*, in commemoration of Charles V's visit to Rome in 1536 [179]. These symbolic names of the different chapels of the new basilica were very convenient since Leo X thus expected the financial participation of the European princes. No payment document is known, however in a letter dated November 1519 from the Mantua business manager to Isabel de Este, a "*cappella che fa fare il Re di Franza*" [180]. However, this situation has another interpretation, and it is logical to think that those parts of the new basilica were built, the design of which had been agreed jointly by Raffaello and Antonio da Sangallo. And they had to reach an agreement, since in the late autumn of 1519 the foundations of the southern ambulatory were worked on.

It is likely that work on the stone blocks for the external cladding, now made entirely of travertine, began, and work is proceeding apace. Beginning in 1519, when his two grandchildren died and the costly war in Urbino ended, Leo X intensified his efforts to finance the new construction. In fact, since Bramante's death it has never been worked with such tenacity and perseverance [181]. In fact, when Raffaello died, on April 6, 1520, the walls of the south apse already protruded from the level of the pavement.

Tegurium

It is known that in 1519 Giovanni Francesdo da Sangallo was commissioned to *adconciare* the tribune of the chapel of S. Peter [182]. The fact that in 1519, just five years after its construction, new decorations had to be made indicates that Bramante's original design had to be very simple and had to be improved to better fulfill its function.

Furthermore, it is known that Domenico da Varignano da Bologna (between 1513 and 1521) carried out a project to reform the *Tegurium* [183], after Bramante's death, and that it probably consisted of the construction of a semi-dome on the basis of Bramante, as a mirror of the semi dome of the apse, since the ceiling must have seemed too low. It is possible that Bramante projected a classical tympanum on an entablature and a cornice, on open arches (three front arches and one arch in each side), like a classical temple. The entablature would have a frieze with 12 triglyphs. However, this project should not have seemed adequate, since, as Vasari writes [184], *Peruzzi* "*fini in San Piero la facciata della cappella maggiore di pepetrigni, gia stata cominciata da Bramante*".

Peruzzi, perhaps in the year 1518 (a year before the decoration work of Giovanni Francesdo da Sangallo), and in any case before August 1520, when he was appointed *coadiutore* or *secondo architetto* [185] built, by means of stone ashlar masonry, a parapet in the form of a *specchiature*. The design of this *specchiature* was perfectly integrated into the architectural structure of Bramante, with three squares following the rhythm of the columns and with harmonic proportions. I personally think that adding this new element could have only two advantages. On the one hand, it would be interesting to raise the height of the *Tegurium* so as not to be insignificant between the four huge crossing piers of the new basilica. On the other hand, it was desirable that at the entrance to the *Tegurium* there was a certain spiritual sensation that could be proportional and a much higher ceiling. Finally, it is very probable that the introduction of the *specchiature* was intended to create a new architectural structure that would resemble the classic triumphal arches.

Another complementary matter is relative to the opening or closing of the arches of the *Tegurium*. In the drawing codex Mellon fol. 7v (Fig. 7.32) it is observed that the three arches are clearly open. However, in Naldini's drawing (or perhaps made by Dosio) (Fig. 7.33) it can be seen that the three arches are clearly closed. Similarly, in the drawing of the Anckarvärd collection (Fig. 4.10) it is observed that the north arch is closed, and in Dosio's drawing (Fig. 7.34) it is seen that the south arch is also closed.
This suggests that Bramante built all the arches open (in the arrangement observed in the excavations and as seen in the codex Mellon fol. 7v drawing), and that they were all immediately closed, perhaps in 1518 by Peruzzi, or perhaps in 1519 by Giovanni Francesco da Sangallo. Without a doubt, the open arches did not sufficiently protect the historical memory from dust and possible theft.

Second group of projects by Antonio da Sangallo (after 1518)

The "memoriale" and the new proposals of Antonio da Sangallo

Although Raffaello and Antonio da Sangallo reached an agreement for the hemicycle, their positions regarding the architectural structure of the building remained very distant, and Antonio da Sangallo continued to make new proposals. But first he made a harsh criticism of Raffaello's projects in his famous *memoriale*.

Antonio da Sangallo. GDSU 33 Ar and GDSU 33 Av (“memoriale”)

It is very likely that, like the previous one, Raffaello's new project, represented in PML, codex Mellon, f. 72v was the favorite of Leo X, compared to the various proposals presented by Antonio da Sangallo. And it is also very probable that Antonio da Sangallo, exasperated by his limited success and by Raffaello's implacable resistance to his ideas, has tried, at this time (and not after Raffaello's death, as is thought) to present the pope with his famous *memoriale*. This is a signed letter that was probably never sent to the addressee, found in drawings GDSU 33 Ar (Fig. 7.24) and GDSU 33 Av (Fig. 7.25), and in which he lists the *difetti* of the factory and the *errori* supposedly made by the primo architect, in that moment of antagonism.
Although the *memoriale* does not cite a specific project, its criticisms fit perfectly with a project such as the PML, codex Mellon, f. 72v. At the same time, it refers to problems that, curiously, appear supposedly solved in Antonio da Sangallo's projects.

In general, the *memoriale* suggests the need to "*chonchordare la pianta la uale/e tutta difforme*" due to the presence of different parts, especially on the external perimeter. It is observed that no *"vi / sia qualche / chappella gra(n) / deoltre alla / maggiore / p(er) che no(n) cie / senone cha / pellette".* It highlights the fact that *"li pilastre della nave"* (as is the case in Raffaello's new proposal) "*sono più grossi che quelli / della trebuna*", that is, from the dome,"*che voriano essere ma(n)cho o alma(n)cho equali*".

The *memoriale* also refers to problems that, after the collaboration between the two architects between 1519 and 1520, will no longer be such, such as the clarification of the style of the hemicycle (which seems not yet definitively designed), to prevent what "*resta li I eno(n) seguita e schompagnia l'op(er)a*"; as the reduction to Vitruvian relations from 1 to 7 the gigantic Doric pilasters *di fuora* what "*sono più di dodici teste*" (like those made by Bramante) that will be partially covered by the new, and smaller, external order of the hemicycle with an order not of 12 *palmi* parasite order, but semi-column order of 8 or 9 *palmi*, later designed in collaboration by Antonio da Sangallo and Raffaello; like deciding where a pedestal should be placed on the large internal pilasters, although it was later designed jointly by the two architects.

The *memoriale* should undoubtedly refer to Raffaello's new project, but in any case, the clarifications of Antonio da Sangallo's ideas for S. Peter are, above all, observations that fully explain the expressive intentions that he pursues in his projects [186].

On the other hand, Antonio da Sangallo states that he is not satisfied with the solution for the leadership of the *trebuna grande* that was designed by Bramante, and without substantial variations had been taken up by Raffaello in the PML, codex Mellon, f. 72v drawing. Antonio da Sangallo ensured that the wall ring of its drum, adorned on the outside by a row of columns, would support *in falso* (resting on the projection of the pendants) the weight of the enormous dome and the whole would subject the *pilastri* to greater efforts than "*possino chomportare sendo fatti nel modo che sono fatti*". It is possible to think of another solution regarding *gli ornamenti*", and "*se ne puo fare quanto lomo vole sechondo la voluntà del patrone*". In fact, Antonio da Sangallo, taking into account the dome of the Pantheon, will study in the drawing GDSU 85 Ar several possibilities that are, in his opinion, more statically satisfactory and perhaps also visually preferable [187].

However, and above all else, Antonio da Sangallo considers that the longitudinal naves were unacceptable. In fact, "*se segue chome y chominciato la nave grande sera lunga e stretta e alta che parera una vicholo*" and also "*sara ischurissima*"; and there will also be an unsatisfactory lighting "*in molti altri luogi della chiesa (se) seguita chosi perche non li possono dare lumj buonj*".

Finally, it should be mentioned that in the *memoriale* Antonio da Sangallo states that the enormous sums of money that such a project would have devoured would have been *buttate via*. No doubt drastic words analogous to those that, some twenty five years later, Michelangelo would use against him, and in similar circumstances.

Obviously, it is a conflict between his own conception of the image and, above all, the interior spaces of the new basilica of S. Peter and the one followed by Raffaello in his projects. For this reason *Antonio da Sangallo* strives to enlarge and illuminate, as much as possible, the great nave of the new building by introducing domes or rib vaults, expanding the central spans with longitudinal vaults on the sides, introducing secondary transverse axes and (taking advantage of the need to reduce costs) by significantly reducing the length of the naves. Without a doubt Antonio da Sangallo was unable to understand the expressive intentions of Bramante and Raffaello, and at all times he showed great obstinacy, and forced a clear critical awareness of the alleged *errori* of his colleague, the desire to *rimediare e choregiere*, the syntactic mismatches, when breaking the rules of Vitruvius, or even *falsità* according to the rules of the ancients, especially in the central nave too *lunga e stretta e alta* and also *ischurissima*, which, from of the arches of the dome built by Bramante, Raffaello intended to implement.

Undoubtedly, too much importance has been given to the text of Antonio da Sangallo's *memoriale,* since Raffaello, and later Peruzzi (since later Michelangelo probably had no need to write them), could have made alternative "*memoriali"*, longer and more critical of Antonio da Sangallo's solutions. Since, based on the analysis of all the projects made by Bramante, Raffaello, Antonio da Sangallo and Peruzzi (see chapter 8), it can be concluded that Antonio da Sangallo was very critical of the proposals of others, and called *errori* to any solution that he he did not share, either because it generated a problem, or because he did not like them personally, or even because he simply did not understand the objectives and the essence of Bramante and Raffaello's proposals.

On the other hand, when trying to *rimediare e choregiere* these supposed *errori*, Antonio da Sangallo repeatedly proposes solutions with a greater number of errors than he intended to correct.

In addition, as he tried to resolve each alleged *errori* in a partial and individualized way, and not in an integrated way, he was never able to achieve an an alternative with a quality similar to that of Bramante and Raffaello's projects. On the contrary, all his proposals were scattered, disintegrated and not very harmonious.

Bramante and Raffaello wanted to obtain a harmonious solution according to the principles *concinnitas,* in which all the architectural elements were perfectly related to each other, and at the same time with the whole, applying in a recurrent way the same defined series of architectural strategies, proportions geometric and architectural forms. Therefore they worked transversally at all times.

On the other hand, Antonio da Sangallo's way of working was linear, so he was unable to interweave the different elements together, forming a harmonious and compact whole. Therefore, and regardless of other social vicissitudes, such as the crisis of the papacy of 1517-1518, or the Sacco di Roma in 1527, it is not surprising that none of Antonio da Sangallo's proposals were ever built, despite the long duration of his position. And most of the little that was built based on their designs (the hemicicle of Bramante-Raffaello, polished by his own ideas) was demolished by Michelangelo.

Michelangelo made his opinion quite clear regarding the work of Bramante and regarding the work of Antonio da Sangallo [188], and said that Donato "*pose la prima pianta di S. Pietro, non piena di confusione, ma chiara e schietta, luminosa e isolata atorno... fu tenuta cosa bella... in modo che chiunque s´è discostato da detto ordine di Bramante, come à fatto il Sangallo, s'è discotato della verità… Lui (il Sangallo) con quel circolo che e'fa di fuori, la prima cosa toglie tutti lumi a la pianta di Bramante…".*

Antonio da Sangallo. GDSU 252 Ar (Right part)

Apparently Antonio da Sangallo accepted the architectural structure of the ambulatory of Raffaello's second proposal (although, as has been seen, he had been using them in his proposals since 1517), and perhaps other small additional aspects of the building, he stubbornly continued to insist on his own ideas with respect to the whole of the building.

In fact, in 1519 he made several proposals, among which is the drawing GDSU 252 Ar (right side) (Fig. 7.55), made with complete security in the first months of 1519, since it includes Bramante's ambulatory, and which undoubtedly it was the answer to Raffaello's proposal made the previous year.

This drawing was made by scratching the parchment of the drawing that he had made two years ago, since what he wanted was to make only some compositional modifications in his own proposal.

The proposal shows some partial concessions to Raffaello's ideas. The most important concession is the ambulatory, which includes the compositional structure of Bramante. In his initial proposals, GDSU 254 Ar and GDSU 252 Ar (left part), Antonio da Sangallo designed an ambulatory, with a compositional structure completely different from that designed by Bramante. These initial proposals sought to resolve the thin existing between the final niches of the ambulatory and the niches of the perimeter domes of the *quincunx*. The space was small, just 3 *palmi* in the narrowest section, but Bramante considered it enough and never proposed an alternative solution to extend this thickness (on the other hand, the purist Peruzzi would design a solution years later to extend this thickness a little more (see chapter 8), barely, a *palmi*, but enough, although ultimately this issue will lead him to have depressed niches in his final proposal for the *White Collection*).

However, Antonio da Sangallo tried to make new proposals, although all of them were unfortunate since they were based on a strange design of the counter-pilasters that generated the beginning of the ambulatory. Instead of using a joint with a third pilaster (as Bramante did), Antonio da Sangallo added an additional and recessed foreign body creating an excessive constriction in the ambulatory apse. This solution is observed in the initial proposals GDSU 254 Ar and GDSU 252 Ar (left part), but is no longer observed in their later proposals GDSU 35 Ar, GDSU 34 Ar, and GDSU 252 Ar (right part). Without a doubt, Antonio da Sangallo could not find an alternative with the same level of quality as Bramante and Raffaello's projects, and ended up accepting it, although with small changes. The construction of this final version of the ambulatory began in late 1518 (see chapter 8).

Drawing GDSU 252 Ar (right side) has a large porticoed block on the facade, which despite being designed according to Antonio da Sangallo's own guidelines, based on a typology of the Arc de Triomphe, also shows bell towers integrated into its sides, just as Raffaello proposed in his second project.

However, the structure of the longitudinal body is, how could it be otherwise, completely different from Raffaello's proposal. The central nave is of great length and is extraordinarily dilated and illuminated by two enormous domes (the same size as that projected by Bramante), interspersed three times by transverse barrel vaults.

Consequently, the walls of the central nave open alternately in large and small arches to access the smaller side aisles. The lateral naves, therefore, are articulated in turn, through the rhythmic succession of three small domes, equal to those of the chapels on the diagonal axis of the quincunx, of two large transverse barrel vaults, equal to those of the transept, and in correspondence to the two new large domes of the nave, and six transverse vaults in correspondence to the piers of the nave.

In relation to the two new large domes of the nave, Antonio da Sangallo establishes two new important transverse axes, respectively, corresponding to lateral entrances to another space (specified only at its beginning in the incomplete design, perhaps a large sacristy or better, a second ambulatory) that would have to be rebalanced volumetrically and spatially, to the east, with the ambulatory of Bramante. In this way, the whole system would have to be structured by the succession of three identical domes, very large in length, and each dome would articulate a transverse arm. The two new transverse arms establish two new axes to articulate two new lateral entrances. In this way, two important lateral facades are created, instead of the two walls without access of the Bramante-Raffaello projects.

To ensure the unity and the *chonchordanza* of the various and different architectural elements (and avoiding *che l'emicichlo… resta li e non seguita e schompagnia l'opera*) the entire perimeter is now articulated in an order of pillars and semi-columns of (about 8 or 9 *palmi* in diameter) that frame niches and aedicules with small columns.

It was a megalomaniacal project, substantially incomparable to Raffaello's, and probably unacceptable to the pope, not only because of its enormous cost but also because the proposal still seemed cluttered and not very purist, and as if that were not enough, it would have lengthened the duration of the works. It is logical to think that this project was never presented to the pope.

Antonio da Sangallo. GDSU 255 Ar

Much more realistic than the previous one is the draft made on parchment, in two opposite alternatives, in drawing GDSU 255 Ar (Fig. 7.56), probably prepared to be presented to the pope, during the period of collaboration with Raffaello, perhaps around the summer 1519, or even early 1520.

In both alternatives, the ideas and the architectural structure of Bramante and Raffaello both of the quincunx typology and the ambulatory solution are now definitely accepted, although these have an external partition with a Doric order of 8 or 9 *palmi* in diameter.

The hemicicle has, in its internal side, a rhythmic sequence of aedicules and niches (again, as in the first studies, alternating rectangular and circular niches) and smaller columns that, probably at the suggestion of Raffaello, Antonio da Sangallo already studied it in the previous drawings, such as GDSU 60 Av and GDSU 45 A, with the intention of extending it to the sides of the building. However, and again, in both alternatives, the layout of the plan strongly insists on Antonio da Sangallo's recurring idea of expanding the space of the central nave.

The right side alternative (which certainly was drawn first) constitutes a more mature, controlled and simplified development of the GDSU 37 Ar project. The drawing shows two large symmetrical roundabouts with respect to the ambulatory, probably replacing, and to give continuity, the chapel of the King of France and the chapel of the Emperor. The western roundabouts are inserted at the end of a transverse axis within the longitudinal body. This axis stands out on the sides with two large barrel vaults and is dominated by the new dome in the central nave. The placement of these two rounds also tends to establish a centered image with the set of perimeter bodies, concluded by the large dome on Bramante's crossing piers. The ideal centrality of the area around the great dome of Bramante is eclipsed and contradicted by the insertion of the new dome in the central nave and with the succession of small domes in the aisles. In other words, there is a forced attempt to fit into a complex, compact, concentrated but spatially and volumetrically rich, centered and longitudinal typology, with an even more ambiguous result due to the insertion of small bell towers, protruding in a backward position with respect to the large porticoed facade. The result, again, is confused and unstructured.

The alternative on the left side follows, in a much more pronounced way, Raffaello's proposal (which continued to be the favorite of Leo X). However, a less complex structure is manifested than in the proposal on the right side and there is evidence of a concern to reduce costs, and provide maximum functionality to the building. The possibility of keeping the apse of Julius II is observed again.

The two western sacristies are simplified and reduced, and on the perimeter there are three chapels and two small sacristies. Even here, as in the version on the right, the bell towers, although large and incorporated at the beginning of the longitudinal body (as Raffaello would insist) are in a backward position with respect to the facade.

The great facade, of a type very similar to the last alternatives studied in drawing GDSU 37 A, had a portico with a colossal order, as seen in drawing GDSU 252 Ar (right part), contrary to what happened in previous projects, such as GDSU 37 A, GDSU 33 Av and

GDSU 70 A. The facade is organized with domes and the central are is structured with a large barrel vault, as in drawings GDSU 70 A, GDSU 72 Ar (Fig. 7.57) and GDSU 73 Ar (Fig. 7.58) obviously accessible by means of large spiral staircases.

Undoubtedly this new proposal helped to mature Antonio da Sangallo's ideas, and because of that he was able to carry out his “project of 1521”, and “1521 model”. .

Antonio da Sangallo. 1521 model and previous drawings

Codex Icon. 195 de la Baverische Staatsbibliothek de Monaco,

BSB, cod. Icon. Mon. 195, f. 1r, f. 1v, f. 2r, f. 2v, f. 3r, f. 3v.

Antonio da Sangallo’s model, corresponding to the drawings: BSB, cod. Icon. Mon. 195, f. 1r, f. 1v, f. 2r, f. 2v, f. 3r, f. 3v (Figs. 7.41 to 7.46) was carried out probably in the summer of 1521, since there are references of related payments immediately before the summer of 1521 [189].

It must be remembered that Raffaello died on April 6, 1520, and that Antonio da Sangallo was appointed *primo architetto* in April 1520, and his salary increased to 25 ducats per month [190]. Similarly, in the month of August 1520 Baldassarre Pruzzi is appointed *coadiutore* or *second architetto*, with a salary of 12.5 ducats per month [191].

Taking into account the personality of Peruzzi, and the short the short time he had been in office since his hiring, and taking into account the character of Antonio da Sangallo, it must be assumed that he made this new proposal independently, and without taking into account neither Bramante, nor Raffaello, nor Peruzzi. Therefore this drawing reflects, perhaps in the most mature and evolved way, the ideas that Antonio da Sangallo made throughout this period.

The "model of 1521" was especially based on the parchment drawing GDSU 255 Ar (left part) (drawn after the right part), which was closer to the ideas of Bramante and Raffaello, and perhaps to the preferences of Pope Leo X. The ambulatory has the compositional structure of Bramante but the internal crossing piers have a single pilaster, and are interspersed with pairs of columns 5 *palmi* in diameter. The internal part of the ambulatory, which was probably already built, shows two aedicules, and rectangular and circular niches arranged alternately. On the other hand, the external part has an order of semi-columns in whose interior rectangular niches are arranged framed by small columns, as shown by the final project GDSU 122 Ar (Fig. 7.40), which probably had been prepared in collaboration with Raffaello. The arrangement of the three large perimeter chapels of the nave, alternating with two service areas and without lateral niches of 40 *palmi* in diameter, follows the system, already planned by Antonio da Sangallo, perhaps in contrast to Raffaello, in the GDSU drawing 252 Ar (right part) and resumed in the GDSU project 255 Ar (left part).

Drawing BSB, cod. Icon. Mon. 195, f. 1r (Fig. 7.41) shows the interior elevation of a chapel. This is characterized, more than by the dome with a drum that, with eight windows, had to illuminate the minor nave, by a large niche at the end above a large window, from side walls to blind arches and a vaulted ceiling with coffered ceiling. Some disagreements in the representations, especially those raised in an incorrect perspective, do not seem to be attributed all to the skill of the designer, but they may indicate that the Sangallo model proposed to compare different alternatives.

The “model of 1521” was the mature result of a laborious planning process carried out in a dialectical relationship with Raffaello. That is why he incorporated some of his proposals, such as the structure of the ambulatory. However, it constituted, in essence, the formulation, clarified, simplified and decanted, of a specific idea of the new basilica of S. Peter, completely personal, and very different from those of Bramante, Giuliano da Sangallo, Raffaello and Peruzzi. However, the project of 1520-1521 remains disorganized and incomplete, and the different elements of the architectural composition are artificially and forcefully disrupted. The stylistic unity of the whole is imperfect and does not show a pure idea, not even a clear idea. This proposal, like all the proposals made by Antonio da Sangallo, gives the impression of being provisional, and of not having reached an alternative typology. Instead it seems like a collage in which the different pieces have tried to integrate without success, without having achieved a new typology that acts as the common thread of the whole and that achieves the necessary *concinnitas* that every good project must have.

Raffaello died on April 6, 1520, at the age of 37. Just over a year later, Pope Leo X died, on December 1, 1521, and the works had to be greatly slowed down, so there was no need to make any decision regarding the choice of the most suitable project for the new basilica of S. Peter.

Period 2.e: (1520-1534) Antonio da Sangallo, Baldassarre Peruzzi

As mentioned, Antonio da Sangallo, was appointed on December 1, 1516, successor to his uncle Giuliano da Sangallo (who died on October 20, 1516) and from that day until March 1520, he received a salary of 12.5 ducats per month, as *coadiutore* or *secondo architetto*. In April 1520, when he was appointed *primo architectto*, it increased to 25 ducats per month [192].

On the other hand, Peruzzi had previously been hired for a period of 28 months (for a total of 168 ducats, that is, 6 ducats per month), from December 1514, until August 1, 1517 [193], although it was renewed until late 1520s [194]. In the month of August 1520, he was named *coadiutore* or *secondo architetto*, with a salary of 12.5 ducats per month [195].

Peruzzi immediately went to work, and in 1521 he made an alternative proposal to the Antonio da Sangallo model of 1521. It is not known for sure if Pope Leo X, in his last days of life, preferred the Sangallo model of 1521, or the one that Peruzzi made. It is easy to imagine that if Antonio da Sangallo tenaciously defended his proposals in the face of Raffaello's great proposal, he would adopt a greater position of power, and would defend his proposals even more after Raffaello's death. The newcomer Baldassarre Peruzzi was not an obstacle for Antonio da Sangallo, since he had just taken up his position as *coadiutore*, and had a *mite* character (Bruschi frequently uses the word *mite*, which means meek, good-natured, cordial, loving, when referring to Peruzzi) [196]. Therefore, although Peruzzi's ideas were more attractive, pure and elegant, Antonio da Sangallo would not accept them. As a consequence, the same uncertainty regarding the longitudinal body that accompanied Bramante and Julius II for 8 years, would continue after Raffaello's death.

Pope Leo X died on December 1, 1521, and on January 9, 1522, his successor, the austere Pope Adriano VI, was appointed. However, the mandate of Hadrian VI was very brief, since he died prematurely on September 14, 1523.

Therefore the works hardly progressed between 1521 and 1523.

The successor of Hadrian VI was Clement VII, who was elected pope on November 26, 1523, and confirmed the authority of Antonio da Sangallo, as the first person in charge of the works of the new basilica of S. Peter.

In the first year of his pontificate, Pope Clement VII created the *Collegium fabricae basilicae Beati Petri*, which is an entity consisting of 60 deputies from the *Curia*, and who should oversee the management of the business of the *Fabbrica*, which was the entity in charge of the construction of the new basilica of S. Peter.

Therefore, once Raffaello could no longer defend Bramante's fabulous legacy, everything was left in the hands of Antonio da Sangallo. Therefore, since the works were resumed, in the year 1524, both his project and his model of 1521 (similar to that represented in the six drawings BSB, cod. Icon. Mon. 195, f. 1r, f. 1v, f. 2r, f. 2v, f. 3r, f. 3v.), must have constituted the executive project (at least until the year 1527). And his *coadiutore*, Baldassarre Peruzzi, while carrying out a new personal project of remarkable quality and originality, had to adapt to a great extent (as perhaps his first project GDSU 14 A suggests) to the guidelines established by the Antonio da Sangallo model of 1521. Therefore, it is highly probable that this same model had also been the point of departure projects in the time of Paul III.

State of the works

As has been said, Raffaello and Antonio da Sangallo jointly agreed on the shape of the ambulatory, and the construction of the southern ambulatory began in late 1518 (or perhaps early 1519) and until 1520 [197] as a compositional extension of the counter-piers that Bramante began to build, and as shown in the JSM, codex Coner, F. 24v drawing, ed. Ashby, b. 31, (1514-1515) [198] and also Heemskerck's drawings.

In February 1521, Giuliano Leno, administrator and director of the *Fabbrica*, had already spent "*per le mura della cappela del Re di Francia (abside meridional) et conci et pilastri et capitelli ... duc.14.000*", as well as another 2,000 ducats for the "*chiavica tutt'intorno*" [199]. Also in October 1519, M. A. Michiel recalls the excavation of a pillar from the same apse. Therefore, the beginning of the construction of this part, according to the designs of Raffaello and Antonio, probably dates to the second half of 1519 [200].

A drawing made between the years 1523-1524 by Pieter Coecke van Aelst ("View of the basilica from the southwest", Biblioteca Apostolica Vaticana, coll. Ashby 329) (Fig. 4.14) shows the situation of the construction at the beginning of the pontificate of Clement VII [201]. On the other hand, the drawing by Martin van Heemskerck "View of the works of the new basilica from the southwest, showing the obelisk and Saint Andrea" (1532-1536) (Staatliche Museen zu Berlin, n. 79, D.2a fol. 53r) (Fig. 4.11), about 12 years later, shows the state of the works at the time of the Sacco di Roma [202].

The comparison between the two drawings shows that under Clement VII the works had progressed from the apse of the south arm of the transept to its main section [203]. Around

1523-1527, not only the barrel vaults and the annexed bays of the southern arm of the transept were executed, but also the elevations of the walls up to the entablature of the great order. In some points Antonio da Sangallo made the walls of the lower Bramante niches, reduced the cornice of the fascia and eliminated the pilasters, in order to place the pedestals approved in 1519, the bases and the pillars.

Tegurium

During the papacy of Clement VII (1523-1534), in the year 1526, the *Tegurium* was modified, and Giuliano Leni added a *tetto rustico* above the *specchiature* of Peruzzi [204]. The result was very unappealing. Not only was it outside of any canon of classical construction, and lacked any harmony with what was already built, but it was also extraordinarily ugly. The use of *laterizi* (fired clay tiles) increased the ugliness of the *tetto rustico* which, as if that were not enough, had small perforations distributed on its surface in an irregular shape [205].

It is possible that this *tetto rustico* was carried out in a rudimentary way since the *Tegurium* was destined - sooner or later - to be demolished, and the small perforations were made to facilitate ventilation, since when the arches were closed (possibly in 1518 by Peruzzi, or perhaps in 1519 by Giovanni Francesco da Sangallo) the interior was left without any ventilation.

New projects for S. Pietro in times of crisis and the Sacco di Roma

It is possible that Pope Clement VII, a good connoisseur of construction, could share Antonio da Sangallo's doubts about the usefulness of expensive ambulatory. In any case, it does not seem that there was any new proposal during those years, and both the longitudinal body and the north arm of the transept, towards the year 1540 had progressed a lot with respect to the year 1514 [206].

The *Sacco di Roma* by the imperial troops in May 1527, and the following long crisis of the curia, generated a new stage in the construction process of the new basilica. After his return to Rome, Clement VII gave instructions to his two architects, around 1531, to proceed with a drastic reduction of the project, limiting it to its most important elements for functionality. However, it is more than likely that both architects, Peruzzi, and Antonio da Sangallo had made scaled-down proposals themselves, prior to being formally urged to do so.

In the most radical version of his reduction project, Sangallo was content even with a longitudinal body of a nave, without a central dome, and renounced the quincunx system, the ambulatory and a facade itself [207]. In a drastic reduction proposal Peruzzi came to reduce the total cost to about 420,000 ducats (GDSU 18 Ar) which is five times more than what Julius II had spent, but less than half the amount budgeted by Leo X in 1513- 1514 [208].

These projects were of particular interest due to the fact that, even without the quincunx typology, their volume is only slightly lower than it is today. In other projects, the two masters tried at least to save the aisles, the chapels and the pronaos. [209].

During these critical years, Peruzzi moved to Siena, but developed an incredible number of alternative projects, as he made numerous trips to Rome [210]. Beginning for the most part with a longitudinal body with three sections (*navate*) with a central dome, he did not follow so much the Sangallo model of 1521, but rather the preferences of the Medici pope, who had evidently favored longitudinal construction with three navate [211].

However, Peruzzi later went on completely new ways taking into consideration, for example, the possibility of raising the pavement of the new basilica (by about 30 *palmi*), and with this not only the space is provided in a less steep way and, with a ratio of 1: 8, the pilasters are more in accordance with the canons, but the whole system is also modified [212]. Like Bramante in some of his first projects, he continued the colonnades of the ambulatory continuously in the transept and in the central nave. Assuming the lateral naves and the substantially lower secondary areas, he transformed the broadly branched and hierarchically graduated Bramante organism into a unitary, homogeneous space without dynamic oscillations.

These unifying, static and resounding principles go hand in hand with a new closeness to classical architecture. Therefore, Peruzzi tried to imitate the old models even more literally and gave the column an even more dominant position, thus being one step closer to Palladio and classicism, compared to Bramante or Raffaello. However, as he already did in his 1520 project Peruzzi lost a bit of a sense of reality based on feasibility and functionality (even in most of his reduction projects). In any case, not a single one of Sangallo's *Progetti di Riduzione* was carried out until the death of Clement VII.

Peruzzi's projects

Next, various proposals by Peruzzi and some by Antonio da Sangallo made at this time will be analyzed. If in the previous period 1514-1520 Sangallo had to carry out an enormous number of projects to compete with the only two known proposals of Raffaello, in this new stage 1520-1534, the same happens with Peruzzi, who had the leading role, carrying out an enormous quantity of proposals, taking up the purest spirit of Bramante, to compete with Antonio da SangalloWithout a doubt Peruzzi won this battle indirectly, since although not a single part of his proposals was built, they were so good that they greatly influenced the new projects of Antonio da Sangallo. As if that were not enough, the talent and proposals of Peruzzi, fostered the doubt of the papacy about the marriage of Antonio da Sangallo's proposals, for which Peruzzi was appointed as his equal, receiving the same fees. No doubt the papacy was buying time, waiting for some extraordinary outcome.

Peruzzi initially takes up the idea of a possible centralized solution (influenced by the idea that can be generated when contemplating the half GDSU 1 A drawing) and presents, although based on Bramante's latest ideas with deambulaorios, a new central symmetry floor plan [213]. Just as Bramante Peruzzi had to reuse the 56 columns of the old basilica of S. Peter, in the case of all of them they were reusable. Peruzzi, not by chance, carefully draws and classifies many columns of the ancient basilica of S. Peter (GDSU 11 Ar, GDSU 11 Av, GDSU 108 Ar, GDSU 108 Av, GDSU 120 Ar, GDSU 130 Av, etc.) marking measurements and materials obviously thinking about their reuse. Especially interesting are its measurements on GDSU 108 A [214]. The control of the columns could be part of the tasks of the "third architect", and therefore these drawings could be early (perhaps around 1520). Giovan Battista da Sangallo il Gobbo also notes the measurements of the old columns for reuse in the internal hemicycle of the ambulatory drawings (GDSU 1079 Ar and GDSU 1079 Av) [215].

Baldassarre Peruzzi. Serlio 1544, f. 38

The plan reported by Serlio in his third book, Serlio 1544, f. 38, (Fig. 7.59) both in the texts and in graphic form, refers to the Peruzzi model made perhaps in the year 1521 [216]. This project undoubtedly is a continuation of the project made in 1513, PML, codex Mellon, fol. 71r. The few differences are that now there is no facade, the ambulatory has a new order, and the towers are more prominent. There is also another important difference in the way of articulating the ambulatory with the counter-piers that originate them.

The drawing is likely to be a copy of one of several projects drawn up at this time by Peruzzi for the purpose of building his model, but it need not necessarily have been chosen directly for this purpose [217]. In fact, it is logical to think that the model would have been built after this plan and that all its details would have been defined.

Serlio refers to this drawing (in the same way he did with Raffaellolo's first proposal) that Peruzzi "*il quale, seguitando però i vesgi di Bramante, fece un modelo nel modo qui sotto dimosrato*" [218]. It is therefore possible that this drawing is Serlio's copy of a Peruzzi design to make a model to compete with Antonio da Sangallo's model, immediately after Raffaello's death, between the second half of 1520 and the first months of 1521. In fact, there are some references in the files regarding certain payments, indicating that at "*maestro Baldassarre pero conto del modello dee dare 15 giugno 1521 ducati 30 e addi 19 luglio 1520 ducati 15*" [219].

Like Serlio, Vasari also makes reference to Peruzzi's "model" in his texts dedicated to the Life of Peruzzi, "*Avvenne che Leoe X voleva finire la fabbrica di S. Peter, da Giulio II pero ordine di Bramante incominciata, perche pareva loro troppo grande edificio e da reggersi poco insieme, onde Baldasarre fece un modelo molto ingenioso e magnifico, d'alcune parti del quale si sono poi serviti questi altri architetti. En el vero che Baldassarre era di giudizio e di dilienza e di sapere talmente ordinato nelle cose sue, che mai non s'è veduto pari a lui nella professione dell'architettura per esser quello dalla pittura accompagnato*" [220].

Be that as it may, the project clearly displays a great knowledge of antiquity and a compositional ability worthy of an experienced and confident master.

Perhaps this drawing by Sebastiano Serlio corresponds to Baldassarre Peruzi's counterproposal to Raffaello's proposals (PML, codex Mellon, f. 72v) made in 1518, and to Antonio da Sangallo's proposal (BSB, cod. Icon. Mon. 195, f. 1r, f. 1v, f. 2r, f. 2v, f. 3r, f. 3v), made shortly before the summer of 1521. It is possible that the wooden model of Antonio da Sangallo (at 1: 120 scale) was made in the summer of 1521, since there are references to related payments immediately before the summer of 1521, and in the archives it is indicated that a "*Antonio Santo Gallo dee avere addi 27 aprile 1520 ducati per prezo del modello di S. Peter*" [221].

Peruzzi seems to reaffirm, with resolute and simple rigor, apparently almost simplistic, the naturalness, the basic idea of Bramante. In a way, an *instauratio* of the idea of the teacher, so to speak in its pure state, since now it did not have to be adulterated by the

reticent demands of Julius II, and its structure could be shown pure for the first time, since it existed the real possibility of the *Capella Iulia* being shot down.
Ultimately, his proposal implies a return to the purist idea of the GDSU 1 A drawing, but with the new and advanced mixed typology quincunx-naves, and including the refined ambulatory that Bramante devised at the end of his compositional process, and which are inherent with this new architectural typology.
It is very probable that Peruzzi began to carry out "theoretical projects" together with Bramante when he collaborated with him, perhaps between 1513 and 1514, and from there several projects arose, such as PML codex Mellon, fol. 71r drawing, and GDSU 2 A drawing. It is possible that, given the impossibility of creating a “pure” building, Bramante and Peruzzi fantasized about carrying out theoretical projects around the new S. Peter, and with them testing project and constructive solutions, in order to put some of them into practice. And based on these ideas Peruzzi made the project of Serlio 1544, f. 38 (between 1520-1521), to prepare his model, as a counterproposal to Raffaello's.
It is possible that Bramante, in his last days, between 1513 and 1514, wanted to build a theoretical legacy through Peruzzi, with which he would make different theoretical proposals, knowing that they would not be accepted by Julius II, and that he showed them to Michelangelo, who will refer to it, years later, as “*cosi come avrebbe voluto Bramante che, pose la prima pianta di S. Peter, non piena di confusione, ma chiara e schietta uminosa e isolata atorno*” [222]. Perhaps the fact that Bramante carried out both “real” projects and “ideal” projects, encouraged Peruzzi years later to do the same, experimenting with S. Peter, to make theoretical and ideal proposals in his treatise on architecture.
In this purist proposal by Peruzzi, the spaces and volumes of that central image of the *ideale* temple that, in different versions, Leonardo da Vinci had already sought in Milan are shown in a very expressive way (Fig. 7.60 and 7.61). A temple, as pointed out by Leonardo, "*sempre uno edificio vuole essere spiccato dintorno a voler dimostrare la sua vera forma*" referring significantly to downtown church studies [223]. It should be noted that there are important concomitances between some studies by Leonardo, who was a friend of Francesco di Giorgio, and others by Peruzzi, with whom he probably coincided in Rome between 1513 and 1516 [224].
With a mature and critical lucidity, Peruzzi seemed to have been aware of the problems of St. Peter that must have plagued Bramante, who despite everything knew how to create a wonderful project, and also knew how to modify it to satisfy the demands of

Julius II, without losing his purity. Bramante's ideas were maintained in time through Raffaello (especially in his proposal of 1514), and finally they reached Peruzzi, on the basis of which he created another wonderful proposal.

This idea of the temple, of a centralized sanctuary, without a doubt must have seemed to Peruzzi, and also to Michelangelo, the most appropriate for the new basilica of S. Peter, although later he will be forced to study other solutions. However, this pure idea, perhaps also motivated by personal religious convictions [225], will return later, as will be seen later, shortly before his death, in the time of Paul III.

Although only the Serlio floor plan layout is available, it is possible to imagine what its spaces would be like both inside and outside. The building would show a mixed quincunx-naves structure, and it would definitely be dominated, inside and out, by the great dome, located at a great height and supported by narrow and high arms, topped by ambulatory made up of pairs of columns. Outside, four smaller domes, 59.83 *palmi* in diameter (the same diameter as Bramante's), framed at the corners by four large bell towers (or sacristies), similar to those that Raffaello had already highlighted in the PML, codex Mellon, f. 72v drawing.

Serlio, when describing this plan, emphasizes its centralized structure, and says "*che'l tempio havesse quattro porte, e che l'altar maggiore fusse nel mezzo, et a i quattro angoli ci andavano quattro sacristie, sopra le quali si potevano fare i campanilli per ornamento, e massimamente ne la faccia dinanzi, che guarda verso la città*" [226].

Despite the inaccuracies in Serlio's drawing, it has been possible to reconstruct the exact plans for this project, as well as the stages of the design process (see Chapter 8).

To compose the facades and ambulatory Peruzzi apparently uses 12 *palmi* wide Doric pilasters, in the same way as Bramante and Raffaello [227]. Bramante also used this 12 *palmi* width for the Doric pilasters on the outside of the Julius II choir, and for the Corinthian pilasters inside. However, it should be remembered that between the years 1518 and 1519, Antonio da Sangallo and Raffaello organized the external part of the ambulatory in a different way and used recessed Doric order semi-columns 9 *palmi* in diameter, as shown in the drawing GDSU 122 Ar (Fig. 7.40). The southern ambulatory, with this new design, began to be built between 1518 and 1519 [228]. Therefore, in the year 1521, when Peruzzi made this proposal, he was able to see the half-built ambulatory. For this reason, Peruzzi's drawing shows a rejection of the already-built design (forcedly agreed between Raffaello and Antonio da Sangallo) and his desire to return to the external composition based on 12 *palmi*-wide Doric paraste. In any case, in general, especially in the interior, the precision of the individual elements -as a consequence of the need to propose a realistic solution, acceptable for execution- corresponds to what Bramante had begun to build, and in essence continued by Antonio da Sangallo and Raffaello. However, there are some differences in the definition of outstanding steeples, which seems like a personal choice for Peruzzi, as he will reuse them in later proposals.

The outer hemicycle of the ambulatory is divided into nine sections separated by pilasters instead of seven sections separated by semi-columns (9 *palmi* in diameter). And, again, in the corresponding internal perimeter wall there is a semicircular niche, of equal dimensions to the adjacent ones, placed on the axis with the pilasters with the great Corinthian order of 12 *palmi* in diameter, of the internal hemicycle of the ambulatory. Therefore, the internal perimeter wall is articulated in a uniform and continuous sequence of 11 niches (instead of 9) separated by individual pilasters, in contrast to the solution developed by Raffaello and Antonio da Sangallo, of three triads of niches to axis with the intercolumniations, separated by pairs of pilasters, corresponding to the pilasters of the internal crossing piers. Peruzzi locates rectangular shaped niches in the axes of the intercolumniations, in order to emphasize them, and to order the final space between the central pillars of the internal hemicycle. Following this logic, it transforms the niche corresponding to the central intercolumnium into access. The other niches have a semicircular shape.

Serlio's design therefore does not include the complex articulation of small niches framed by small Doric columns inserted in the sections of the external order of 9 *palmi*, which definitely characterize the image of the ambulatory and the entire perimeter of the building in the solutions studied by Raffaello and Antonio da Sangallo. Undoubtedly, this fact shows that Peruzzi did not share the idea of uniformly characterizing the entire external perimeter of the building (with the exception of the facade) with a cumbersome and monotonous mechanical repetition. In addition, this architectural partition based on niches and columns would be very expensive, as it appeared, for example, in the GDSU 255 A design by Antonio da Sangallo and probably also in his model of 1521 (BSB, cod. Icon. Mon. 195, f. 1r, f. 1v, f. 2r, f. 2v, f. 3r, f. 3v).

Baldassarre Peruzzi. GDSU 27 Ar

Drawing GDSU 27Ar (Fig. 7.62) provides an approximate idea of the development in elevation of Peruzzi's 1521 model, although it does not correspond directly to it, since it most likely was made years later, in the time of Paul III [229]. The drawing may correspond to a new project for S. Peter, although it cannot be ruled out that it is one of the *studi teorici* made later by Peruzzi.

This drawing has a clear correspondence with the Serlio plan in its centralized structure with an articulated ambulatory based on 12 *palmi* paraste. Perhaps to make clear, by means of a quick sketch, the development and adhesion of the volumes of the dome and the arms of the cross, the elevation development of the quincunx domes and of the angular sacristies above the ambulatory is omitted. From here clearly emerge the volumes of the arms of the cross and their hemicycle-shaped terminations (the external part of the ambulatory). In the enormous cube formed by the great central towers, the dome takes up the type established by Bramante and already proposed by Raffaello in the PML design, codifies Mellon, f. 72v, but instead of columns, robust pillars or pilasters appear. In fact the drawing GDSU 27 A seems almost the translation in terms of pillared walls of the image proposed by Bramante and Raffaello.

This is confirmed by the sketch of the rear face, in which it seems to be mentioned a masonry dome (as Antonio da Sangallo would have liked) with pilasters instead of columns and windows, on the internal level, shielded by pillars. Undoubtedly, this design reveals an attempt to solve the static and constructive problems generated by a dome of this size [230]. Serlio had already referred to these problems [231], saying that Bramante's heavy dome was, "*più animoso che considerativo*", probably based on the opinions disseminated in the Roman context and transmitted by Peruzzi [232], who therefore had to share some of the concerns that Sangallo expressed in his famous *memoriale* (GDSU 33Ar and GDSU 33Av).

The Serlio 1540, f. 38 drawing appears to have a centralized symmetry and does not have a distinct facade. It is possible, as has been said, that it is only a preparatory drawing of his model, but it is clearly indicative that, at least at this time, he did not wish to have a differential facade, and he was more interested in achieving a new typology, which could later be subtly modified to generate a possible facade on the east side. Even the GDSU 27 Ar drawing does not seem to differentiate a facade. Certainly the subject of the design of a facade was secondary and could be delayed. In fact, years before, in his theoretical project of 1515 (between 1513 and 1515) PML, codex Mellon,

f. 71r drawing, Peruzzi differentiated a facade, although years later, in 1521 (between 1520 and 1521), in his Serlio 1544, f. 38 drawing he does not project any facade.

Baldassarre Peruzzi. GDSU 113 A

In addition to developing its proposal for a centralized plan, Peruzzi was also developing its own ideas for the facade. In fact, and possibly around the year 1519, Peruzzi made the facade drawing GDSU 113 A (Fig. 63). It is possible that this drawing is one of the first by Peruzzi [233], made in the same period in which both Raffaello and Antonio da Sangallo were also generating ideas about the exterior appearance of the building and especially the facade. Drawing GDSU 113 A shows a facade that is quite directly recreated to the type represented in Raffaello's project drawn in the PML, codex Mellon, f. 72v. But Peruzzi gives it a highly personal version, which has all the air of a "criticism", and in fact departs considerably from the proposals of Antonio da Sangallo.

As in Raffaello's proposal of 1518, the facade is articulated in 5 volumes corresponding to the architectural structure of the building, so the central portico corresponds to the central part of the building, and is organized in the form of a temple, based on masonry, with a great order, probably 12 *palmi* diameter pilasters on high pedestals, placed in a paired manner on both sides, and in correspondence with the large internal pillars that delimit the nave. The same great order, with the same width and height and framed by identical 12 *palmi* pilasters, is used to project the lateral bell towers, about 170 *palmi*. It must be taken into account that the Doric order projected by Bramante for the exterior of the Julius II choir [234], had to be about 176 *palmi* high. It is foreseeable that he wanted to continue with this dimension around the perimeter, which undoubtedly conditioned the height of the facade (as probably happens in the drawing of the GDSU 257 A facade by Antonio da Sangallo).

An architrave order of columns resting on the ground (perhaps 5 *palmi* in diameter) forms the portico of the facade, and extends towards the lateral vestibules and the lower part of the bell towers. The structure of the bell towers has the same architrave order that now forms a portico leaning against the large pilasters on a pedestal and crowned by an opening with a large window with a triangular tympanum, outlining in a surprising way the composition adopted, much later, by Michelangelo for the Palazzo dei Conservatori.

At the front, the Lodge of Blessings is made up of a *serliana multipla*, as in the Villa Lante al Gianicolo Lodge [235]. Regarding this Villa, it should be remembered that it can be dated "*non più tardi del 1521*" [236]. It follows that this drawing GDSU 13 A, by Peruzzi could be practically contemporary or even a little earlier, around 1519. The *serliana multipla* has three arches interspersed with architrave arches, which are the only architrave structures visible on the entire front. The unity of the ensemble is ensured by the prevalence of the giant order and by the recurrence in the lower part of the small architrave order, by way of resonance with the order of the dome drum, and is not compromised by the elevation development of the bell towers that in the two upper floors acquire a different character, become octagonal and are adorned with statues and pinnacles.

Despite the quick, almost careless summary of the GDSU 113 A sketch, Peruzzi here reveals a clarity and logical rationality that is almost schematic, which runs counter to both the ideas of Raffaello and those of Antonio da Sangallo. The reduction of the image to a few repeated and strongly characterized elements, the selection of elements, the enhancement of the architrave colonnades, the type of bell tower with superimposed prisms indicate the emergence of a personal *maniera* that was reflected in all the works later Peruzzi for S. Peter. However, this personal style had already germinated previously in the *sala delle Colonne* of the *Farnesina* [237] (Fig. 7.64), and will mature a little later, for example, in the tower represented in the background of the *Presentazione al tempio* de *Santa Maria della Pace* (Fig. 7.65).

There are no known floor plans corresponding to this drawing GDSU 113 A, although the setbacks of the lobbies and the bell towers with respect to the facade line and the access door, suggests a longitudinal plan similar to the drawing by Raffaello PML, codex Mellon, f. 72v. This detail again shows new evidence that the drawing could have been made between the years 1518-1519, in which Raffaello and Antonio da Sangallo were making proposals about the longitudinal development of S. Peter.

Baldassarre Peruzzi. GDSU 31 Ar

The GDSU 31 Ar design (Fig. 7.66) is precisely defined, prior to the level of execution, and is marked by a *stella a cinque punte* (as Baldassarre Peruzzi usually did to mark satisfactory solutions), although it is difficult to date. Wolf Metternich and Wurm date it to around 1520 [238]; Frommel dates it between 1520 and 1521 [239]; and Bruschi dates it between 1518-1519, or perhaps also 1521 [240].

The drawing shows a configuration of the facade that will be characteristic of Peruzzi and will use it with different variations. The facade is resolved in the form of a large portico, placed only in the central part of the front, but protrudes from the body of the sacristy (or bell towers) and, unlike what was envisioned by Raffaello and Antonio da Sangallo, continues orthogonally along the lateral facades, like a parallelepiped, wrapping the eastern apse. Therefore, this organization of the facade seems to presuppose a *quincunx* typology, like the drawing Serlio 1540, f. 38. In fact, the GDSU 31 Ar design also shows, in the upper left part, the reference to the east arm of the southeast diagonal chapel, to the left of the main entrance, which forms the side vestibule of the temple; and that on this floor, it is easily accessible from the orthogonal arm to the front part of the portico, which forms the facade. Therefore, the facade extends along the sides, as well as the pillars that delimit the eastern arm of the cross, to encompass the spaces under the smallest domes of the *quincunx* with its U-shaped enveloping system.

The use of a large order of half columns of 12 *palmi* in diameter between which a smaller order of columns of 5 *palmi* is inserted, refers to Raffaello solution PML, codex Mellon, f. 72v, and also to numerous proposals by Antonio da Sangallo, such as those studied in the drawings GDSU 70 A, GDSU 35 A, GDSU 37 A, etc., which probably date back to a period before 1520, between the years 1518-1519. However, despite the obvious connections with the ideas of Raffaello and Antonio da Sangallo, this Peruzzi proposal is very different and highly personalized.

The main structure based on masonry is distinguished by the great order of half columns of 12 *palmi* in diameter, which clearly articulate the enveloping arch in a U-shape, in nuclei and sectors (fronts, angles and sides) identified and separated by sections of walls and connecting spaces accompanied by pairs of small isolated columns. The spaces of the angular sectors on the sides of the lateral entrance to the temple are square (61 *palmi* on the inner side).

Most likely this drawing is one of several attempts that Perucci made to provide a facade on the east side of the centralized model that he previously made (*Serlio 1540, f. 38*). Therefore, it is possible that it was carried out after the initial proposals of Antonio da Sangallo of the years 1517 and 1518, and after the crisis of the papacy (February 1517-spring 1518), since such a grandiloquent entry in the middle of a crisis would be unthinkable. Therefore, the drawing must have been made between 1519 and 1520, before the death of Leo X. In fact, finally, and based on these studies, Peruzzi ended up making a complete proposal, extraordinarily brilliant, in his drawing of the *White* *collection*, of the *Americam Academy of Rome*, in the time of Paul III, and possibly in the year 1535.

However, it is possible that this drawing, like the GDSU 26 Ar, could be dated to the time of Paul III, as Bruschi thinks [241], despite the use of a large external order of 12 *palmi* and columns of 5 *palmi* in diameter (as in the projects of Raffaello and Antonio da Sangallo in the time of Leo X). It is also possible to think that the spatial-structural organization studied by Peruzzi before the drafting of his model (carried out after the consensus design of the ambulatory by Raffaello and Antonio da Sangallo) was paralyzed, and was taken in another way in the new solution centralized from the time of Paul III. However, the facade solution that appears on the floor plan of the *White Collection* shows a greater mature and ingenious compositional ability, than in the GDSU 31 A drawing, in addition to a greater awareness of practical.

Therefore, and from my point of view, it is more than likely that the drawing was made between 1519 and 1520, although the same conceptual bases -more mature and pure- were rematerialized in the time of Pablo III.

Baldassarre Peruzzi. BCS, TS IV 7, F. 28r

This arcaded facade project (Fig. 7.67) is a copy, with minor modifications, of *foglio 28r* of the *taccuino Senese*, *S IV7,* in the *Biblioteca Comunale di Siena*, (*taccuino* was made after 1545) [242]. The drawing is dated early 1520 [243].

This drawing, complemented by the small sketches of the plan of drawing GDSU 31 A, gives some indications regarding the development of the elevation of the shown portico. The sketch on the left, in the center of the sheet, indicates that Peruzzi was designing the square nuclei of the portico by means of a roof with vaults and sails supported on the sides by barrel vaults in whose impost the continuous architrave would be located.

Baldassarre Peruzzi. BCS, TS IV 7, F. 36v

This is the sketch of a facade with a portico of five U-shaped bodies (Fig. 7.68), which corresponds substantially to the plan previously examined in drawing GDSU 31 Ar. This BCS sketch, TS IV 7, F. 36v, belongs to the *taccuino Senese*", [244] and illustrates Peruzzi's intentions in more detail. The copyist also reflects faithfully a *stella a cinque punte* marked on the tympanum, indicating that this was a satisfactory solution for Peruzzi.

Unlike the GDSU 113 A sketch, the proposal is very rational and very consistent with the centralized plan structure, and its corresponding spatial structuring. Contrary to what Bramante, Raffaello and Antonio da Sangallo had proposed, the arched interconnection elements between the three sectors of the facade (vestibules), defined by the rear lock, do not correspond to the empty spaces of the interior structure, but to the large internal pillars that delimit the eastern arm of the cross. In turn, the three sectors detected by the colossal order of semi-columns and topped by pyramidal roofs with the corners framed by statues, allude to the voids of the great nave and side chapels. Among the 12 *palmi*-diameter semi-columns that define a Templar structure, a single group of three inter-columns in pairs of small free architrave columns, probably those of the old basilica of S. Peter, is repeated on two floors in each section, unifying the entire facade, both on the front and on the north and south sides.

The use of small orders of columns (probably 5 *palmi* and from the old basilica) in contrast to the large order of 12 *palmi* diameter, probably made in *travertino* marble, would enhance the unusual dimensional scale, and introduce a chromatic aspect, contrasting with the image of the dome. On the other hand, the rigid repetition of the same architrave order (with a peculiar *neoclassico* or *purista* Peruzzi style, in a sense almost *prepalladiano*) within a large Templar framework, simple, almost schematic, it would avoid distracting the observer from the spectacular organization of the whole.

The use of a large order of 12 *palmi* in diameter, a smaller order of 5 *palmi* in the lower level, and probably a 3 *palmi* order in the upper level, as shown in the designs of Antonio da Sangallo and Raffaello, approximately before 1518 (before the decision to adopt Doric order columns with 9 palmi in diameter for the exterior of the ambulatory) may indicate that both this drawing and GDSU 31 A drawing were enhanced at the same time as Antonio da Sangallo's proposal of 1521 [245].

It is also possible that Peruzzi, in his model of 1521, used a facade of this type, or perhaps something more traditional with an architectural structure similar to that represented in Cristoforo Caradosso's medal of 1506, with small coupled columns, insinuated on the east side of PML, codex Mellon, f. 71r drawing. It should be noted that the facades of pairs of columns, semi-columns or pilasters were in fashion in those times, between 1515 and [246].

Although it can be dated to 1521, this project could also correspond to the time of Pope Paul III, since this U-shaped eastern body cannot adhere directly to the circular wall of the eastern hemicycle but, due to its extension in continuity needs to include intermediate structures, similar to those existing in the GDSU 29 Av and GDSU 2 A drawings made later, in the time of Paul III [247]. Therefore, the dating of this design, in any case, is very uncertain, since Peruzzi could have tested these structures before, and have matured them in the time of Paul III.

In any case, it seems that Sangallo's model of 1521 was chosen and not Peruzzi's model, and for this reason, it seems that Antonio da Sangallo's model of 1521 constituted the reference project for the completion of the building under Leo X (died December 1, 1521), at the time of Hadrian VI (1522-1523) and also during the pontificate of Clement VII, from November 1523 to at least the Sacco di Roma of 1527 [248].

As an architect *coadiutore*, after his model was discarded, Peruzzi should not have insisted on the centralized plan typology. It was not the moment. It only had to adapt to the fundamental characteristics of the Antonio da Sangallo project of 1521.

Baldassarre Peruzzi. GDSU 38 Ar

This GDSU 38 Ar drawing (fig. 7.69) also has an uncertain dating, since some historians think it was made by Antonio da Sangallo, while others assure that it was made by Peruzzi [249]. It could perhaps be argued that this proposal by Peruzzi was made as an alternative to Antonio da Sangallo's GDSU 255 Ar drawing, in early 1520, when Raffaello was still alive. On the other hand, other historians even refuse to attribute this drawing to Peruzzi, since it completely departs from his projectual dynamics, and instead closely resembles the drawings of Antonio da Sangallo, especially the drawing GDSU 37 Ar, or even the drawing GDSU 255 Ar [250]. For this reason they refuse to attribute this drawing to Peruzzi [251]. Personally, I think that Antonio da Sangallo did it as a preparatory drawing for GDSU 255 Ar, and in the unlikely event that Peruzzi drew it, it would be to explain some detail to Antonio da Sangallo, but in no case can this drawing be accepted as a Peruzzi proposal.

Baldassarre Peruzzi. GDSU 14Ar

The GDSU 14 Ar drawing (Fig. 7.70) is perhaps Peruzzi's first proposal made after the Antonio da Sangallo model of 1521 (for which some of the preparatory drawings would be BSB, cod. Icon. Mon. 195, f. 1r, f. 1v, f. 2r, f. 2v, f. 3r, f. 3v), perhaps at the beginning of the pontificate of Clement VII, and quite probably carried out prior to the Sacco di Roma of 1527 (perhaps even in 1525) [252]. However, some historians date it after the Sacco di Roma of 1527 [253].

Peruzzi abandoned in this proposal the pure structure of a centralized plan typology, and substantially conforms to the GDSU 255 A project (left part) and to the 1521 model of Antonio da Sangallo, accepting his basic idea of placing a smaller dome (or vault) in the center of the nave. It is therefore clear from the analysis of this drawing that Peruzzi had to share the well-known criticisms of Antonio da Sangallo, in his *memoriale*, towards Raffaello's project, whose central nave extended in five sections, and its width was completely determined by Bramante's large central crossing piers, and to some it might seem like a *vicolo*.

Undoubtedly, with the passage of time, both Antonio da Sangallo, and perhaps Peruzzi, tended to forget that the naves designed by Bramante (also the separation of the crossing piers) had a width of 107 *palmi*, to be perfectly integrated with the old basilica, since the main nave of the ancient basilica had a width of 106.33 *palmi* (from base to base).

Therefore, if the nave could appear high, it depended only on the height that it was desired to provide, since altering the width would mean not respecting the legacy of the old basilica that, if only for these details, would survive in time, being assimilated by the new basilica.

In this design (with an alternative for the naves, in a sheet added to the right) the central nucleus of Bramante are obviously preserved and probably also those recently started by Raffaello and Antonio da Sangallo. The Julius II apse is also preserved, but surrounded by an ambulatory (like Raffaello's "compromise solution" from 1518 PML, codex Mellon, f. 72v), advanced construction work as far as possible, and hoping it would be torn down soon.

GDSU 14Ar (left side) (Fig. 7.70)

The drawing also shows important personal proposals by Peruzzi. The ambulatory show the outer semi-columns according to the project of Raffaello and Antonio da Sangallo. But these semi-columns, as already mentioned in Serlio's plan, as in GDSU 46 A and GDSU 47 A, by Antonio da Sangallo [254], with two alternatives, perhaps shortly after Raffaello's death, articulate the outer wall of the ambulatory in nine, instead of seven sections.

But the fundamental innovation lies above all in the organization of the longitudinal body. The lenticular counter-piers that sequentially flanked the proposed PML, codex Mellon, f.72v, by Raffaello (and generated, as compositional extension of the large central crossing piers), split and become pairs of longitudinal septa**.** This proposal had already been made by Bramante, in drawing GDSU 20 A and by Giuliano da Sangallo in proposal GDSU 8 A, GDSU 7A and cod. Barb. 4424, f. 56v.

The perimeter chapels have also been removed, and they have interconnected with each other forming two new naves, thus now creating a set of seven naves. As in Antonio da Sangallo's model of 1521, the transverse axis of the longitudinal body, divided transversely into only three sections, is marked in the center of the nave by a dome, or probably by a vault. This is placed in the two transverse arches and, probably, in other longitudinal arches or barrel vaults in the two pairs of lateral piers divided and connected by arches. But contrary to the provisions of the Antonio da Sangallo model, the four piers that support this minor dome (or vaulted ceiling) did not have to interrupt the continuity of the nave.

The introduction of three naves on each side of the main nave, with the division of the counter-piers corresponding to the great crossing piers and the abolition of the chapels, leads Peruzzi to a completely new typology of the longitudinal body, although integrating the mixed typology quincunx-naves.

The structure and dimensioning of the three smaller naves are generated through a rigorous and logical strategy with respect to the "central nucleus of Bramante", and in general a logical set of spaces and structures is perceived with enormous simplicity and conceptual clarity, completely unrelated to Antono da Sangallo's forms are heavy and powerful, in a fluid and woven sequence of multiple spaces clearly marked and defined by the structures, but joined together to form a rationally readable complex whole.

But what characterizes this Peruzzi project in a very personal way, compared to those of Raffaello and Antonio da Sangallo (and their own previous proposals), is above all the presence of an incredible number of pairs of columns to enrich and delimit the different spaces. Bramante already proposed for the first time the reuse of the columns of the old Constantinian basilica in some parts of the new basilica. Bramante also already had experience because he had reused shafts of ancient Roman columns in S. Pietro in Montorio, and probably also used some parts of the Doric order from ancient buildings adjacent to the Aemilia basilica, in his first project for the Castellesi palace in Borgo [255].

After Bramante, both Raffaello and Antonio da Sangallo also proposed the reuse of the old columns in the internal and external parts of the ambulatory. However, one of Peruzzi's criticisms of his projects was that, in its longitudinal plans, the group in pairs of architraved columns appeared only as an ornament of the ambulatory, without repeating its use in other parts of the interior [256].

The drawing also shows one of the *anticas* architectural structures that Peruzzi always fascinated, and that he was able to appreciate in Vitruvius' treatises, and he could directly observe between the surviving monuments of Rome. This structure consisted of an architrave order, supported by columns that rest directly on the ground and without a pedestal. These structures had already been studied especially in the 15th century by Francesco di Giorgio, and they often had twin columns [257]. Finally, Peruzzi was able to see that this order had been used by Bramante in S. Pietro in Montorio and in some parts of the new basilica of S. Peter. However, the decisive aspect that most influenced Peruzzi, as if it were a revelation of immense possibilities, was the vision of the fresco by Raffaello *l'Incendio di Borgo* (Fig. 7.71), where a new and inventive *archeologica* image, which proposed ancient temples, characterized by orders with support columns without bases [258].

But in particular, Peruzzi had to be fascinated, in these years, by the grouping of free columns, duplicated in depth, as Bramante had proposed in the windows of the Julio II choir, in the ambulatory and in the big dome. It is not a coincidence that before the summer of 1519, and perhaps around 1517-1518, in the *grande stanza* of the Farnesina, Peruzzi painted his country houses in perspective with a pair of architrave columns resting directly on the ground, between walls with niches and pilasters, very similar to that established by Bramante in the ambulatory of S. Peter.

Presumably, the 228 columns in this project were 5 *palmi* in diameter, so Peruzzi was undoubtedly counting on reusing the 56 old columns from old basilica of S. Peter, in the case of all of them being reusable. In this sense, Peruzzi carefully classified, mesured and drawed many columns of the old basilica, as seen in GDSU 11 Ar, GDSU 11 Av, GDSU 108 Ar, GDSU 108 Av, GDSU 120 Ar, GDSU 130 Av, etc., obviously thinking about their reuse. Especially interesting are his measurements on GDSU 108 A [259]. The control of the columns could be part of the tasks of the *terzo architetto*, and therefore these drawings could be from an early time (perhaps around the year 1520). Giovan Battista da Sangallo il Gobbo also takes note of the measurements of the old columns for their reuse in the internal hemicycle of the ambulatory drawings (GDSU 1079 Ar, and GDSU 1079 Av) [260].

The uniform division with semi-columns is also indicated in the southwestern angular body that would contain a sacristy. This angular body would be modified later,

enlarging its surface, and framing itself with pairs of semi-columns in the corners that frame niches. It is the same idea that, although with pilasters, appeared in the floor plan of Serlio 1540, f. 38, and that it will take up in the presumed final project of the time of Paul III (GDSU 29 Ar, and the project of the *White collection*).
And certainly not by chance, the same pair of columns, even with pilasters, will use it in the early twenties in the first order of the tower represented at the bottom in the *Presentazione al tempio* of Santa Maria della Pace. This drawing can give an idea of the elevation development of the angular elements that Peruzzi imagines for the new basilia.

GDSU 14Ar (right part) (Fig. 7.70)
Undoubtedly, an important flaw in Peruzzi's left-wing proposal is the total absence of chapels, which do appear in the projects by Raffaello and Antonio da Sangallo from the same time. Perhaps he canceled the chapels in order to find a new architectural typology with open and fluid spaces, but certainly not very functional. It is for this reason that perhaps Peruzzi could suffer criticism that would encourage him to later study a version with chapels on the right side of the drawing, using an additional sheet that he had to adhere to the initial sheet.
The architectural program on the right side is substantially different and totally resized. There are only two lateral aisles, corresponding to the space of the crossing piers of the great dome and the double counter-piers, in which a series of seven perimeter chapels is inserted directly. The latter have very varied geomatrical shapes (rectangular, oval, etc.) based on different wall organizations, and by different types of vaulted ceilings, probably designed in order to create different alternatives from which to choose.
Inserting a pair of hoods also in correspondence with the dome on the diagonal of the piers, shows that in this right variant of the GDSU 14 Ar drawing the quincunx typology is abandoned, but the idea is preserved using a large amount of columns placed near the wall in order to enclose the spaces. This right part of the drawing GDSU 14 Ar seems to have been designed to dramatically reduce the area of the floor plan, apparently to reduce costs. Therefore, it must have been carried out at a time of scarce financial possibilities, most probably in the year 1528, after the great crisis generated after the Sacco di Roma of 1527 [261]. From my point of view and since Peruzzi had gone to Siena in 1527, the right part of the GDSU 14 Ar plan could have been drawn in Siena or, more likely, in one of his eventual visits to Rome.

Sacco di Roma

The serious economic crisis caused by the Sacco di Roma of 1527 must have imposed the need to reduce the program and to reduce the size and cost of the building, seeking less ambitious solutions, and even eliminating those spare parts of imminent construction, or even those that had been partially executed, and whose execution would have delayed time and increased expenses.

It is not known with certainty if the projects carried out during the Sacco di Roma and later years were presented to Pope Clement VII (1523-1534), or were simply autonomous proposals from the architects. However, during this period some *Progetti di Riduzione* were carried out by both Antonio da Sangallo and especially Peruzzi, making *di minima* proposals, significantly reducing the surface of the new building. For example, the GDSU 256 A project by Antonio da Sangallo corresponds to this period. The project is very well done, and perhaps can be also dated even to the time of Pope Paul III.

Peruzzi and the Sacco di Roma

After the crisis of the papacy (February 1517-spring 1518) a continuous constructive work began in S. Peter until the death of Pope Leo X, on December 1, 1521. The activity was interrupted later but it was resumed in the first years of the pontificate of Clement VII, elected on November 19, 1523. The works were temporarily suspended in 1525 due to lack of funds and lack of decisions [262], and they were resumed in 1526, although the following year 1527 they were interrupted again due to the Sacco di Roma, and will not be resumed until shortly after 1530.

Peruzzi works in S. Peter until September 1527, since there are references that from April to September 1527 he still received late payments for his activity as a *coadiutore* [263]. From this year on he was absent from Rome until 1534, except for sporadic visits [264].

It is also important to remember that on April 19, 1525, at a time already economically uncertain, without knowing how to continue the construction, Pope Clement VII again granted *plenam auctoritatem* to Antonio da Sangallo: "*Habeat curam Antonius St. Gallus architectus y absque aliquo respectu provideat en premissim super quibus habeat plenam auctoritatem*" [265]. The same thing happened, and due to similar circumstances, in 1520, when Pope Leo X granted Antonio da Sangallo "*plenam et omnimodam potestatem inveniendi modum et conclusendi*" [266]. This could explain the reason why Peruzzi, in his proposal GDSU 14 A, tries to adapt to the final proposals of Antonio da Sangallo.

It is very surprising that two different popes on two different stages gave full authority to Antonio da Sangallo, being the *primo architetto*. It is possible that it was due to the discrepancies between Antonio da Sangallo and Baldassare Peruzzi, and that there were even discrepancies among the construction workers. Without a doubt, Clement VII seems to have had the need to mediate in this conflict, putting an end to it and granting *plenam auctoritatem* to Antonio da Sangallo. Therefore, it is to be assumed that the Antonio da Sangallo model prevailed over the Peruzzi model, despite having much lower architectural quality.

Peruzzi moved to Siena in the early summer of 1527, although he traveled to Rome for about the beginning of December of the same year. He is hired by the Republic of Siena to carry out different jobs, although on December 14, 1530, he is granted permission to go to Rome for twenty days and, again, on April 15, 1531, for a month. This last short stay in Rome is probably motivated by the commission to prepare the Bacchidi stage apparatus for the Cesarini-Colonna wedding [267].

However, on July 1, 1531, Pope Clement VII declares himself eager to be able to dispose of his work and his *scientia* in the future, and confirms it as *secondo architetto* of S. Peter with the usual monthly salary of 12.5 ducats of gold [268]. Therefore, Peruzzi's repeated trips to Rome will become longer and more continuous. In fact, it is known that he obtained another permission from the Republic of Siena to return to Rome in December of the same year and, and it is possible that he continued in Rome in May of the following year. It is possible that, during these short stays Peruzzi was working in S. Peter. But it is much more likely that this happened when, on April 30, 1533, Clement VII made him a request to stay in Rome for six months. Although he only obtained one concession, on May 15, 1533, to stay there for just one month, in fact, he was present from spring until at least August, and returned to Siena in early October [269]. In addition to S. Peter, Peruzzi secured at least two other commissions during his brief stays in Rome, such as the Palazzo Massimo alle Colonne, and the Palazzo Massimo (summer 1533). These three commissions together perhaps were the triggers for Peruzzi to return to Rome permanently [270].

Peruzzi's small projects after the Sacco di Roma

To this second stage of the period belongs a group of drawings and existing studies by Peruzzi, which do not seem to end in a completely defined project, and exploring various possibilities of downsizing the area of the floor plan [271]. These drawings are easily and obviously connected to each other. Therefore, they could also belong to a single and intense planning phase, perhaps concentrated in a short time. It is difficult, however, to be sure of it, just as it is difficult to establish their precise chronological dating, but it is most likely that they belong to the final time of Clement VII. As has been said, Clement VII appointed Peruzzi as an architect *coadiutore* on July 1, 1531, with a salary of 150 ducats per year, so these drawings could have been made from this moment on. However, it is most likely that he carried them out from the spring of 1533 until the death of Pope Clement VII, on September 25, 1534, when the psychological shock caused by the looting was still very present; or perhaps even at the beginning of the pontificate of Paul III, when Peruzzi definitively returns to Rome. it must be considered that Paul III, on December 1, 1534, names Peruzzi as *primo architetto* of the Fabbrica, with a salary of 25 gold ducats per month [272].

The difficulty of a reliable chronological dating is increased by the fact that these sketches are not definitive and, in any case, can refer to a relatively limited time, so it is possible that designs made in a slightly different time. On the other hand, it seems that ideal studies, *teotici* and yet related to meditations on S. Peter, which could not be useful for an unfinished *trattato*, could be together with design studies.

To give an example, the GDSU 19 Ar drawing is not a proposal for S. Peter, and it should be part of a large study material, prepared and selected in view of a hypothetical chapter or book on *temple*, similar to what Serlio had done in his corresponding Book V [273]. For this treatise, for example, drawings such as GDSU 24 Ar, GDSU 107 Ar, GDSU 107 Av, GDSU 109 Ar, GDSU 123 Ar, GDSU 126 A, GDSU 154 A, GDSU 497 A, GDSU 499 A, GDSU 529 Ar, GDSU 529 Av, GDSU 581 A, GDSU 4137 A and others, were made. Even the drawing GDSU 13 Av (which Wurm does not consider it his own) [274] can also be located in its close context [275].

In any case, Baldassarre Peruzzi seems to proceed largely autonomously from the proposals of Antonio da Sangallo, and following his own ideas. Some of these projects, such as GDSU 15 Ar and GDSU 16 Ar seem to have as their starting point the drawing GDSU 14 A, made almost certainly before the year 1527, and perhaps in 1525 (although the right part it must have been done after the Sacco di Roma, perhaps in

1528). As such, these drawings could be dated chronologically to the beginning of the sequence and, in turn, would be starting points for new reduced proposals, perhaps even in the time of Clement VII, more reduced and economic, such as the GDSU 17 Ar and GDSU 18 Ar. In any case, in all the drawings in this group the *quincunx typology* and the ambulatory is abandoned and they have very small dimensions, which means that they were made in a time of economic difficulties.

It is impossible to know with certainty the chronological sequence of the projects that Peruzzi carried out, taking into account that all of them would have a certain utopian character, such as the GDSU 15 Ar, or the GDSU 17 Ar drawings, in which even crossing central piers of the "central nucleus of Bramante" are modified, which implies a huge cost, a huge personal wear and tear to convince the pope, and what is worse, the solution achieved is no better than the others. Therefore, the drawings will be described in relation to their surface, starting with the largest and ending with the smallest. In any case, all of them seem to correspond to the end of the pontificate of Pope Clement VII, when it was necessary to adapt to a reduced budget, and this in any case shows that aspects of the project were a priority at this time, and that secondary aspects, and therefore they can be dispensed with.

Baldassarre Peruzzi. GDSU 15 Ar

The GDSU 15 Ar project (Fig. 7.72) [276] dated by Wurn between the years 1533 and 1534 [277], is a variant of the left alternative of the GDSU 14 A project. In this proposal, the *quincunx* and the ambulatory were abolished and only the Julius II choir remained, which is retouched only on the outside, transforming the large windows designed by Bramante, protected by columns, into large niches. On the sides of the choir, near the crossing piers, there are chapels, which take advantage of part of the 40 *palmi* wide niches that they began to be built in the southwest by Fra Giocondo, as Antonio da Sangallo indicates (GDSU 44 A) [278].

The central nave is covered by three large ribbed vaults of the same width that rest on very narrow piers of 24 *palmi* and, therefore, with a single paraste (instead of the two paraste piers already built and respected in all previous projects). These piers are divided in the transverse direction to form the minor naves and counteract the crossings according to the scheme of the Basilica of Massenzio, called *Tempio della Pace* (Fig. 7.73).

This proposal would therefore oblige to partially demolish the eastern counter-piers already built, but it allowed to obtain three equal sections, to insert in each one four pairs of free columns in succession, continuing to give rise to two lateral naves flanked by columns. The small niches that could be included in the perimeter walls could become small chapels as they are flanked by columns. The free columns also protect the open chapels in the transept on the sides of the large crossing piers of the dome, and also those perforated in the internal part of the north and south apses, similar to those of the Pantheon.

The space reduction of the nave is achieved with only three equal sections with ribbed vaults in equidistant sections marked by a single pilaster, and probably connected by minor transverse arches. This resets the unity of the longitudinal space of the nave following a temple typology (*etruscan*) of the ancients, prestigiously represented by the Tempio della Pace. It should be noted that the Basilica of Massenzio (Basilica of Constantine), as was believed since ancient times, the *Templun Pacis* had constituted, as is well known, since Alberti, an essential reference built of one of the supposed Templar typology of the ancients (the Etruscan temple described by Vitruvius) and, together with the Pantheon, had been a programmatic landmark by Bramante at the beginning of the design process for the new basilica of S. Peter.

In the same way Peruzzi, probably in order to include them in his *trattato* (as Serlio will do in his Terzo Book), draws different design variations of the drawing, such as drawing GDSU 156 A, with columns that protect the arches, or drawing GDSU 543 A, with measurements; and in some cases completed by a front row of columns between pillars, imagining the internal elevation as in GDSU 539 A, or by polishing some details, as in GDSU 396 A, or GDSU 487 Av [279].

The basilical typology is fulfilled with twelve pairs of ancient columns on each side, whose first row towards the nave literally repeats the placement of the Constantinian order, and it certainly wants to directly evoke the image of the old basilica of S. Peter, preserving, even materially, the memory.

The drawing is just a sketch and only by integrating it with other Peruzzi projects, and making an effort of imagination, provides an idea of the values that could have characterized the building. However, even from the study of this floor plan and some other known elements, it seems possible to conclude that a building constructed on the basis of this project could be one of the most mature results achieved by Peruzzi for S. Peter.

This idea, even with many columns, would have the need to manufacture new columns and demolish parts of the building already started, so, despite its small surface, the proposal did not appear to be economical enough, and the absence of the chapels (such as the ones added in the GDSU 14 Ar drawing at a later time, perhaps to avoid potential criticism), is not functional enough.

Baldassarre Peruzzi. GDSU 16 Ar

The GDSU 16 Ar project (Fig. 7.74) [280] is a much cheaper proposal, and in many respects comparable to the previous one (GDSU 15 A), with similar simplifications in the cruise. However, the central nave, as in the GDSU 14 A project, recalls the idea of a large central vault, preceded and followed by double barrel vaults with twin pilasters and niches. Contrary to what was foreseen in the projects previously examined and as a concession to Antonio da Sangallo, the central nave is extended under the vault to 117 *palmi*. In order to reduce costs, the smaller aisles are not protected by pairs of columns, but by individual columns (which in the correct alternative and in a side elevation sketch made on the left side of the drawing, Peruzzi proposes couplings with pairs of columns, just as he is doing at the same time in Palazzo Massimo). It should be remembered that in addition to the works of S. Peter, Peruzzi obtained some additional commissions shortly before, among which are the Palazzo Massimo alle Colonne, and the Palazzo Massimo (summer 1533). These three commissions together were perhaps the main reason for Peruzzi to return to Rome permanently [281].

Peruzzi respects in this drawing, also to avoid criticism of cost overruns, the large lenticular piers by Bramante, with opposite niches of 40 *palmi*, and hesitates to propose an apse at the entrance of the building.

Several beautiful sketches, autographed or copies, of the *taccuino Senese*, provide some ideas on how Peruzzi envisioned some parts of the interior of the basilica in elevation while drawing these various versions of the plan with extensive use of colonnades as in the various GDSU alternatives 14 A, GDSU 15 A and GDSU 16 Ar, as well as other possible drawings that you could make. These drawings cannot be attributed with certainty to the design of S. Peter, however they are linked to possible visualizations of its interior, such as, for example, the perspective sketches GDSU 21 A (Fig. 7.75) y *GDSU 22 A* (Fig. 7.76) with glimpses of architectural colonnades [282]. The stylistically late GDSU 21 A and GDSU 22 A autographed sketches appear to constitute a quick perspective view of the minor aisle, respectively, with the view of the 40 *palmi* niche at the bottom and with the barrel vault between the pillars of the wall of the halls, as in GDSU 15 A and GDSU 16 A.

There is a small sketch (Fig. 7.77) of the internal elevation of a lateral compartment of the cruise ship, drawn in GDSU 18 Av, referring to a solution connected with the variant, following the original draft, of the GDSU 14 Ar project. But much more interesting for the purposes of the reconstruction of the internal image of S. Peter conceived in these years by Peruzzi, is the autographed sketch GDSU 15 Av (on the verse of the GDSU 15 Ar floor plan, and therefore probably made later) and an incorrect copy of a similar sketch by Peruzzi (Fig. 7.78) on f. 37r del Taccuino S IV 7 detto di Baldassarre Peruzzi cit., Tav. 72 [283].

The three sketches represent the nave covered by a large vaulted ceiling with the central section wider than the two that flank them, in turn covered by barrel vaults with lunettes windows. Very significant, even in relation to the later executive decisions of Antonio da Sangallo, is the fact that all the great 12 *palmi* pilasters of the order established by Bramante do not have pedestals and rest directly on the ground. The reason for the removal of the pedestals in this drawing is because they would remain hidden after the decision to raise the floor of the new basilica (thus altering the proportions projected by Bramante) which was surely taken jointly by Peruzzi and Antonio da Sangallo in the time of Clement VII. Furthermore, as there are no floor plans that correspond exactly to what is depicted at this elevation, it is difficult to organize these sketches in a precise and safe chronological sequence, but they must have been made at that time.

In the autographed sketch (Fig. 7.79) GDSU 15 Av [284] the large order of 12 *palmi* in diameter continues to triple the large wall of the slightly retracted central span, as in GDSU 16 Ar, and as in Antonio's 1521 model da Sangallo, in comparison with the two vaulted side sections with large arches. But the lower part of the pilasters in the central section seems to be flanked by a lower order, perhaps by columns with architrave with a blind wall at the top.

A succession of columns with architrave that support large plates or blank walls between the giant pilasters, characterize in a very unitary and original way the solution copied in the lower part of sheet 37r of the "taccuino Senese", S IV 7, of the Biblioteca Comunale di Siena (fig. 7.78). Inspired by Bramante's solution of the last floor of the lower courtyard of Belvedere (GDSU 569 Ar and GDSU 569 Av, datables in the years 1534-1535), in which Peruzzi will intervene, around 1534-1535, after the collapse that occurred in January of 1531 [285].

Baldassarre Peruzzi. GDSU 26 Ar

The same design as above characterizes the facade of the beautiful drawing, with light watercolor brushstrokes, GDSU 26 A (Fig. 7.80) [286], which, however, is difficult to date with certainty. In any case, it corresponds to the sketch at the bottom of sheet 37r of the *taccuino Senese*, S IV 7, from the Biblioteca Comunale di Siena, despite its simplicity and blurriness, the drawing clearly shows Peruzzi's intentions to complete the arms of the cross, since they were already deductible from the observation of the floor plans GDSU 14 A, GDSU 15 A and GDSU 16 A.

The drawing shows a large frame of giant pilasters that support the vaults, which finish off the large openings generously illuminated from above, a simple group of columns that closes and structures the two gaps between the three projecting bodies, and acts as a diaphragm of the side spaces, presumably in low light. For this reason, in order to subtract materiality from the filling structures between the support structures, the walls had to take the appearance of gigantic plates and under the great dome of the central nave, a *polifora de serliana multipla* supported by small columns was opened. The large closed panels and the aged elegance of the marble colonnades (possibly polychrome), which evoked the central nave of the old Constantinian basilica, but with a modern style and raised by the small columns of the Serlian and perhaps the drum of the dome - they had to enhance, in contrast to their character and scale, the exceptional width of the vaults, probably upholstered with different geometric shapes, and the gigantic dome supported on the four enormous central crossing piers.

The sketch in the upper left (Fig. 7.78) of the same sheet BCS, TS IV 7, F. 37r of the *taccuino Senese*, doubtless a copy of an autographed sketch, shows a similar general design of the great nave. But it is worth noting the addition of a complex caisson with hexagonal and square lacunae on the spherical surface of the vaulted ceiling and the attempt, closer to the ideas of Antonio da Sangallo, even with the expansion of the central span, to adjust the structure in elevation of the latter to that of the smaller bays that flanked it. But, even here, the quick signals in the central arch seem to suggest a desire to insert a row of columns to support a closed curtain wall.

Baldassarre Peruzzi. GDSU 17 Ar

In the next two projects GDSU 17 A and GDSU 18 Ar the columns have almost completely disappeared. In fact, they show the smallest and most economical solutions in this series. In both, in the layout of the nave, the idea of the spatial-structural installation of the *Tempio della pace* dominates. This idea seems to have made Peruzzi abandon the intention of recalling at the same time the image of the ancient basilica of S. Peter.

This is particularly evident (Fig. 7.81) in GDSU drawing 17A [287]. In the effort to emulate and surpass the great Roman spaces, the central nave is extended to 127 *palmi* and extends for a length of 38 canne, covered by three large transverse transept, of which the central one (83 *palmi*) is wider than the sides (72 *palmi*). The three vaults rest, as in the GDSU 15 Ar project, on pillars with reduced frontal extension (24 *palmi*) with a large semi-column facing the nave. The side corridors, contained as in the projects previously examined in the space corresponding to the thickness of the large crossing piers of the dome, open into simple chapels or semicircular niches of which the one corresponding to the central section is wider. This last detail, as well as the replacement of the Bramante pillar by two pilasters with a single column pillar and the portal with three large ribbed vaults on huge arches, this solution particularly brings this solution to the Roman model of the *Tempio della Pace*.

But at the same time, and to a greater degree than was the case in the GDSU 15 A design, the central nave space assumes highly autonomous characters with respect to the "central nucleus of Bramante" and the crossed arm of the cross where it is juxtaposed, and somehow opposes it, without really integrating. The rupture of the unitary and formal integrity of the organism established by Bramante and constantly sought by Raffaello, by Antonio da Sangallo and, previously, by Peruzzi himself, here becomes explicit and dramatic. The tendency to reduce the structures and elements to the simple and pure expression of the constructive data of the building envelope and the presumed characteristics of the almost schematic forms of austerity that should distinguish the development in elevation of this project could be colored, according to the intentions of Peruzzi and the papacy, to listen to the new, generalized ethical and religious motivations, already before the Sacco di Roma, not only in environments more open to reform ideas.

Baldassarre Peruzzi. GDSU 18 Ar

Perhaps this decisive break in the integrity of the architectural structure of the new basilica of S. Peter in the GDSU 17 Ar project must have seemed too bold and *scorretta* in the eyes of Peruzzi, so he continued to make new proposals, such as the project GDSU 18 Ar (Fig. 7.82) [288].

In this solution, the entire floor plan is simplified in a similar way to the previous one according to a similar spatial structure and with a greater reduction in the perimeter chapels. However, the piers are retaken in the nave with the large and usual stacked walls and, probably, a ceiling with a large barrel vault with lunettes supported by three equal arches, of almost 60 *palmi* of light, to reduce the nave to 364 *palmi*. As in the GDSU 17 A project, economic concerns are very evident even in the synthetic indications for the facade, and although this is a freehand sketch, the synthetic metric estimate, graphed on the left, suggests that deals with a mature proposal [289]. Therefore, although it is a less audacious proposal than the previous one, it could have been acceptable to the Pope, and even to Antonio da Sangallo.

This group of drawings with longitudinal implants, probably hve been made parallel to some studies by Antonio da Sangallo, such as GDSU 40 A and GDSU 25 A [290].

Pope Clement VII died on September 25, 1534, at 56 years of age and was succeeded by Paul III named Pope on November 3, 1534, and at 66 years of age.

Paul III will provide an important momentum and turn in the history of the design and construction of the new basilica.

Stages in the construction of the *new basilica of S. Peter*

PERIOD 3. 1534–1605

Period 3: **(1534-1605)** From Pope Paul III to Pope Paul V

Period 3.a: **(1534-1546)** Antonio da Sangallo, Peruzzi

Paul III

Paul III (1534-1549) was appointed pope on November 3, 1534, when he was 66 years old. Undoubtedly, with Paul III, a new planning phase opens, supported by a progressively improving economic situation and by an optimistic will to resume and finish the works of the basilica.

As soon as his mandate began, on December 1, 1534, the pope confirmed Peruzzi as *architetto* of S. Peter with a salary of *primo architetto*, of 25 escudos a month, like the one that Antonio da Sangallo had been receiving for some time [1], and on December 31, 1534 Peruzzi definitively moved to Rome [2].

In this way Peruzzi caught up with Antonio da Sangallo, being able to treat him as equals with respect to the decisions that could be made in the development of the project for the new basilica of S. Peter. If the pope abandoned the usual structure between *primo architetto* and *coadiutore* it would be for some important reason, and perhaps it was firstly because he wanted the works to advance at the highest possible pace and secondly to achieve a new balance of powers with respect to Antonio da Sangallo. As a consequence of his new commission and his transfer to Rome, on January 25, 1535, in Siena, the cession of his service for the republic was decreed, for having gone to Rome without permission [3], and on February 16 he was they stopped their payments [4].

Peruzzi therefore began to receive the same income that Antonio da Sangallo had for a long time, together with a renewed interest and enthusiasm for the work in the basilica, which also gave him a new authority and the possibility of relaunching old proposals that remained attractive and convenient. However, the pope's confidence in Peruzzi's architectural inventiveness was not limited to his new commission and his new fees, but also resulted in the hiring of Jacopo Meleghino, who worked closely with Peruzzi, as the architect of the Fabbrica.

The pope hires Jacopo Meleghino in April 1535 as a *computista* architect (*terzo architetto*) with a salary of 6 escudos per month, and from June 1538 he was appointed *secondo architetto*. In addition, since December 1546, once Antonio da Sangallo died, (he died on August 3, 1546), he occupies the position of *architetto* with a salary of 25 escudos per month while he continues to collect his salary as a *computista* [5].

Paul III (1534-1539) showed from the first day a visionary capacity and a power of action similar to that of Julius II [6]. Convinced that he soon had the finances of the curia in hand, wanted to return to the simplicity of the plans of Julius II [7]. Even before 1513 it is probable that Antonio da Sangallo, for years as a private architect, had brought him up to date on the vicissitudes in the construction of the new basilica [8] and, therefore, knew the reasons that led Julius II to reject the first Bramante and Giuliano da Sangallo projects, and to decide on a longitudinal design with naves. On the other hand, not only Michelangelo, whom he recognized as the highest artistic authority, but also Peruzzi must have strengthened his predilection for the centralized plant.

Based on the available historical references, it can be deduced that Pope Paul II had a certain predilection for a building with a centralized plan typology to be built, and perhaps the most important reason is that he wanted to "*vedere S. Pietro finito*" [9]. And perhaps this was the main reason why the pope doubled Peruzzi's salary four weeks after starting his term.

Paolo II was therefore determined to finish the building, or at least give it a great decisive impulse. This firm will is demonstrated through two frescoes.

The first fresco, made by Francesco Salviati, is in the "*Sala dei fasti Farnesiani*", on the main floor of the Palazzo dei Farnese (Fig. 7.83). In this fresco the pope is shown with a tiara on his head, and showing a plan, which can be identified with a plan made by Antonio da Sangallo. In the fresco a dome can be seen as Bramante had left it, and on the right side there are remains of the transept of the old basilica, with obvious signs of deterioration. The pope points out the work firmly, which seems to indicate his determination to speed up the works.

The second fresco, made by Vasari, in the "*Sala dei cento giorni*", is in the Palazzo della Cancelleria (Fig. 7.84). In this fresco it is observed that the pope wears the clothes of a priest from the Old Testament, and is in front of the women who display a plan, which again seems to have been projected by Antonio da Sangallo. The pope extends his hand to take the map, while with his left hand he points to the works, in which scaffolding has been erected, and also ramps and columns.

Undoubtedly, these frescoes show the firm will of Paul III to advance the works as much as possible, and forget the crises of the previous years.

Pablo III kept Antonio da Sangallo as the first architect since he had great confidence in him since 1514, in which he began to build for the Farnese family, although in order to give an enormous boost to the works, he placed a trust similar in Peruzzi, giving him the same salary as Antonio da Sangallo.
In a complementary way to the new basilica, Pope Paul II promoted the expansion of the Vatican Palace, and in 1537 he commissioned Antonio da Sangallo to build the Pauline Chapel, which would constitute “his own Sistine Chapel”, and with this he would fulfill another of his great wishes, which was to hire Michelangelo, and that he could create new works of art during his tenure [10]. The Pauline Chapel is very simple and consists of a single room, high and wide, and stands out in a southern direction over the Sala Regia. This is a courageous decision on the part of Paul III and perhaps it is a new proof of his desire to create a building with a centralized plan from the beginning, since the Pauline Chapel invaded the space reserved for a possible longitudinal extension, in an easterly direction, of the new basilica. Sangallo made it known to the pope and it was not successful, so it can be deduced that the pope was doing everything possible to make it difficult to carry out projects of a longitudinal typology with naves. In fact, to make sure of this, the pope decorated the chapel with precious stones and hired Michelangelo to paint it.

Baldassarre Peruzzi projects

After his appointment as *architetto* by Pablo III, Peruzzi made several drawings that show traits of his renewed interest in the typology of centralized floor plant. This interest may have already arisen at the time Peruzzi was making the *Progetti di Riduzione* that have been discussed above.
On the other hand, at this stage Peruzzi began to develop a large number of *teorici* projects, perhaps due to the difficulty of searching and agreeing on a valid solution for the new basilica of S. Peter. These *teorici* studies would be freely made proposals, but without taking into account some of the repeated restrictions that had accumulated in the project, whether they came from the pope, the first architect, or the varied set of prejudices that had already accumulated until then. In the same way, some of these theoretical studies would be proposals made almost from scratch, that is, without taking into account the “central nucleus of Bramante”.

For this reason, distinguishing between real proposals for S. Peter, from theoretical studies related directly or indirectly to S. Peter, is extraordinarily difficult and will always be a focus of conjecture. For example, in drawing GDSU 19 A only the sketch in the upper right refers to S. Peter [11]. In this sketch, perhaps related to GDSU 17 Ar project, the uncertainties between the semi-columns and the pilasters in the piers of the nave are evident.

Baldassarre Peruzzi. GDSU 19 Ar

Drawing GDSU 19 Ar corresponds to the design of a temple in the shape of a cross inscribed in a square (Fig. 7.85). The drawing shows a dome on large piers with a different shape than those built by Bramante, and four large spaces, of different shapes, in the corners. This drawing certainly does not correspond to S. Peter, but rather to a *teorici* study perhaps for the unfinished treatise, but this plan is interesting for many reasons in relation to the above.

In the first place, the GDSU 19 Ar drawing confirms in general, a renewed interest at this time in the centralized plan and contains, in particular, the definition of some parts according to the solutions that return to other studies for S. Peter, such as arches protected by columns and, especially, the type of facade articulated in three different bodies based on porticoes with columns, similar to drawing GDSU 26 Ar (Fig. 7.80) (which probably shows a centralized structure). On the other hand, there is evidence of a connection between the sketch in the upper right part of this GDSU 19 Ar drawing with the GDSU 17 Ar drawing discussed above (Fig. 7.81), and which is characterized by the addition of large semi-columns in the large piers. Undoubtedly the upper sketch of the GDSU 19 Ar is part of the design process of the GDSU 17 Ar drawing.

Baldassarre Peruzzi. GDSU 19 Av

Drawing GDSU 19 Ar shows on the back the drawing GDSU 19 Av (Fig. 7.86), which shows a study, with alternatives, for the arms of the transept, with a plan still strongly reduced, but according to some historians already have a centralized structure [12] (although personally I only see a centralized structure in the upper right, in the event that the drawing shows different alternatives). In the alternative on the right, Peruzzi returns to use the ambulatory protected by columns. And in one of the alternatives on the left, the domes appear on the diagonal axes of the quincunx, although it must be taken into account, however, that, perhaps due to the speed of execution of the sketch, the domes of the quincunx appear larger than those already established by Bramante, and respected in all subsequent projects.

Baldassarre Peruzzi. GDSU 16 Av

Drawing GDSU 16 Ar, shown above, shows on the back the drawing GDSU 16 Av (Fig. 7.87) [13]. The drawing on the right side emphasizes the left part of the drawing made on the back (that is, the GDSU 16 Ar drawing) and based on this draw a new possibly centralized solution, in which, in an alternative, the system of quincunx, without ambulatory but with corresponding diagonal domes.

Baldassarre Peruzzi. GDSU 29 Av

Drawing GDSU 29 Ar shows on the back the drawing GDSU 29 Av (Fig. 7.88) [14].

It is only a floor plan sketch with a centralized structure, with ambulatory and with a facade that includes two lateral bell towers and a portico of rows of pairs of columns (perhaps 9 *palmi* in diameter). The side bell towers open in the lower part like a triumphal arch, which is drawn quickly but masterfully (Fig. 7.89) in the front part of the same sheet, that is, in drawing GDSU 29 Ar, and that with all security is related to studies for the S. Peter project [15].

The GDS U 29 Av drawing is a document of extraordinary historical importance, since for the first time in a decisive and complete way, the longitudinal structure (invariant in the previous drawings) is abandoned and a centralized structure with ambulatory protected by apparently similar columns is retaken to those of the Serlio 1544, f. 38 drawing but with important new ideas regarding the completion of the quincunx towards the facade.

Baldassarre Peruzzi. GDSU 2 A

The GDSU 2 A drawing has a text on the back, written by Salvestro Peruzzi, "*Pianta di Sto Pietro in perspectiva*", so at first it was assumed that it was made by Peruzzi for S. Peter. However, it is still open controversy, and its dating is still uncertain, and it remains doubted that it is directly related to the construction of S. Peter. Some historians think that the project was carried out between 1520 and 1535 [16], while others consider it a work of the initial phase of the studies for Saint Pietro [17].

The late date, between 1520 and 1535, is due to the fact that in the time of Paul III the idea of a centralized plan was accepted, first suggested by Peruzzi and shortly thereafter followed by Antonio da Sangallo. In fact, the GDSU 2 A design has a colonnaded facade, consisting of a U-shaped portico divided into five sectors, resembles the GDSU 29 Av drawing on the east face, and is almost identical to the design of the *White collection*. In addition, the drawing shows columns without pedestals, therefore when it was made it was already assumed that the floor of S. Peter would rise.

According to other historians, the drawing could have been made in two completely different stages, either at an early stage, around the year 1505, or conversely, at a late stage, around 1530.

It could have been carried out at a very early stage in the design process, at the end of 1505, since the “central nucleus of Bramante” and the ambulatory closely resemble what was built and the proposals of Bramante and Rafael. However, the design of the large central piers is very different from the design of the piers that were built, and they are associated with a purely quincunx typology, which does not allow a longitudinal extension in naves. Therefore, if the drawing belongs to an early period, it should be made a little after the GDSU 20 A drawing, and at about the same time as the drawing PML, codex Mellon, fol. 71r drawing. This forces us to think that it was carried out when Peruzzi was helping Bramante, creatively active, around 1505, and at the same time that the works of the Farnesina were being carried out (which is not confirmed by any document). However, it is a hypothesis, and there are other indications, since for example Geymüller classifies some drawings as made by "Peruzzi for Bramante", so he thought that Peruzzi was devising proposals (that at that time they would all be equally *teorici*) when he was very young, and in collaboration with Bramante, around the year 1505 [18].

However, as has been said, several historians are of the opinion that the "logical conclusion" is that the GDSU 2 A design, despite what is written in the verse, does not constitute a real project but a *teorici* design, like others from Peruzzi at the end of his life and at the end of a design process started with Bramante, *sarebe piciuto* made in S. Peter. Realizing solutions that he did not have to share with anyone, and without concessions to what has already been built. That is, the *teorici* projects are Peruzzi's freest, purest and most personal ideas for S. Peter.

Personally, I think that Peruzzi could have done this drawing at any time. The history of the design process in S. Peter is full of returns to ideas supposedly discarded throughout the design process, so that the same architect could have continued working, at a certain moment, on certain ideas on which he had worked 25 years before.

In this proposal, Peruzzi took a decisive step, recovering the first projects of Bramante with a centralized plan typology, also providing the piers of the dome towards the secondary centers with a wide beveled side and niches and thus restoring again a complete analogy between the area of the central dome and secondary dome areas [19]. He also designed there a huge *pronaos* implanted almost exclusively on columns of the order of 9 *palmi*, which would have covered the entire eastern arm. Its three reliefs, crowned by an attic and pediments, would have led to the three naves. Perhaps it was the difficulty of connecting these columns to the palace, perhaps the consent of the Pope to moderately increase the pavement, which led him to maintain the tripartite division of the *pronaos*, to return to an order of 12 *palmi* and inserted columns of 5 *palmi*, and with this on the basis of Rafael's project [20]. In this way, the facade reacquired its ancient monumentality. That is why this facade project, perhaps the most harmonious of all known, is animated by an ancient spirit similar to Peruzzi's *Progetti di Riduzione* [21].

Baldassarre Peruzzi. White collection. Accademia Americana di Roma in New York

The definitive project proposed by Peruzzi, perhaps in 1535, for Paul III was very close (or substantially coincident) with the plan (Fig. 7.90) of the *White Collection*, at the New York headquarters of *the Accademia Americana di Roma* [22].

This plan is a presumable copy of Peruzzi's final project presented to Pablo III. This floor plan, as recognized by Frommel [23], is strongly associated, especially with regard to the facade with columns, to drawing GDSU 2 A (Fig. 7.91). But this project is also the logical development of the GDSU 29 A sketch, with which it shares both the renunciation of octagonal rooms with niches in the corner sacristies (or perhaps bell towers), and the brilliant insertion of two hexagonal rooms to both sides of the gate house. This floor plan layout from the White Collection introduces a series of adjustments to the centralized typology already proposed by Peruzzi in the Serlio 1544 f. 38 drawing, of which, however, it retains some detailed solutions. For example, the partition of the outer wall of the ambulatory in nine instead of seven sections (as also proposed in GDSU 14 A and as Antonio da Sangallo will do in his final project in the Salamanca-Labacco impression). It also shares the accentuation of the volumetric articulation of the building, exalting the protuberance of the ambulatory and the bell towers. It also shares the articulation of the exterior of the lower part of the bell towers with angular pilasters with interposed niches (as also in the elevation drawing GDSU 29 Ar), and the use of columns inside only in the ambulatory. This project, which undoubtedly dates after 1520-1521, had to satisfy, at least partially, the wishes of Antonio da Sangallo.

The internal structure of this proposal is identical to the two previous proposals of Serlio 1544, f. 38, and the model of 1520-1521, PML, codex Mellon, f. 71r, although with some minor changes. Among the most important changes is the adoption for the internal face of the outer hemicycles of the ambulatory of the solution of the Antonio da Sangallo model of the 1521 model. That is, it includes aedicules in the axes of the pillars of the internal hemicycle; rectangular niches in the axis of the paired colonnade of the internal hemicycle; and the rest of niches are semicircular.

Another no less important change is that two of the four niches around the quincunx's perimeter domes (those adjacent to the corner towers) now have a depressed shape. The use of depressed niches now creates a greater thickness in the walls that are formed between the niches of the perimeter domes and the niches at the end ends of the ambulatory. However, although they create a greater thickness in the wall, it also creates an asymmetry in the 4 niches under the four perimeter cupolas of the quincunx, now there are two semicircular niches and two depressed niches, something that Peruzzi himself would not have accepted at the beginning of his job. The depressed niches, whether in the form of a circle segment, or a polycentric curve, had already been used, for example, by Brunelleschi in the Sacristy of San Lorenzo and by the Bramante in the choir of Santa Maria del Popolo), and They had also been used by Peruzzi previously, and their use derives from the writings of Francesco di Giorgio in whose work they are very frequent. Among Peruzzi's drawings with depressed niches, the most important are GDSU 456 A (palazzo di Orsini), GDSU 339 A, GDSU 345 A (San Domenico di Siena, respectively the right transept and the nave chapel), GDSU 380 Ar, GDSU 501 A (churches) [24].

These two small details suggest that Peruzzi, perhaps due to the passing of the years, made concessions to Antonio da Sangallo, and likewise, adopted solutions that he would not have allowed himself just ten years ago.

However, the drawing shows architectural details of extreme quality to achieve a perfect integration between each of the parts and between each part and the total set (*concinnitas*). Everything is in the right place. There is no tension and no problem to solve. It is therefore a mature project, the fruit of many years of work, and which is based on the mixed quincunx-naves typology, devised by Bramante, and the use of ambulatory, inherently generated by the design of the counter-piers, which in turn are a reflection of the great central piers. No doubt Bramante's dream, done 21 years after his death.

Inside, the four counter-piers seem to remain only to generate the four ambulatory, with which they integrate perfectly, just as he had done before, like Bramante and Rafael. These ambulatory use 48 columns of 5 *palmi* in diameter, reusing those of the old basilica (it reuses 48 of the 56 existing ones), and therefore there is no need to manufacture new ones. However, it uses 64 columns on the facade, perhaps 9 *palmi* in diameter, with 12 *palmi* bases.

As is known, the idea of a facade composed of free columns for S. Peter appeared for the first time, as far as we know, at the beginning of the pontificate of Leo X, in two projects by Giuliano da Sangallo (GDSU 7A and Cod. Barb. Lat 4424, fol. 65v) and also in Serlio 1544, f. 37 drawing, by Rafael (Fig. 7.22), although in this project the columns were colossal, 12 *palmi* in diameter [25]. It is also quite possible that Bramante already had this idea [26], since the origin of the S. Peter project was forged on the basis of a creative synthesis between the Pantheon and the Tempio della Pace, so the reference of the portico of the pantheon had always been a valid reference.

Peruzzi's proposal, as it appears in the White Collection drawing, has many things in common with the GDSU 2 A perspective drawing, but they also have some differences. The most important is that the GDSU 2 A proposal does not allow a typology of naves, and therefore it is less mature (and perhaps it was made in 1505), or it is simply a theoretical proposal (which could have been made between 1520 and 1534). And this is one reason why I am inclined to think that it is an early proposal by Peruzzi, or a late theoretical proposal, which was part of a research process making theoretical variations inspired by the architectural structure of S. Peter.

There are also other small differences such as the depressed niches and some minor details, such as the use of semi-columns of 9 *palmi* in diameter outside the ambulatory, instead of rectangular *paraste*. It should be remembered that the semi-columns of 9 *palmi* in diameter were determined by consensus by Antonio da Sangallo and Rafael, between 1519 and 1520, since there are references that, in February 1521, Giuliano Leno, director of works of the Fabbrica, he had spent up to 14,000 ducats for the outer walls of the southern chamber *et conci et pilastri e capitelli* [27]. This order of Doric semi-columns, which frame the *tabernacholi* with reduced niches, which will also characterize the external perimeter of the large wooden model of Antonio da Sangallo's project for Pablo III, also appears on the external part of the hemicycle of the western ambulatory, engraved in Peruzzi's drawing from the White Collection. In this drawing, the order of semi-columns of 9 *palmi*, in addition to going through the ambulatory (without being now framed by columns of smaller diameter), reach the facade, in the form of free and bearing columns. While around the perimeter the order of 9 *palmi* in diameter had to rest on bases, the columns of the facade had to rest directly on the interior floor, since it was almost certainly raised, and accessible from the street plane by a large U-shaped staircase, placed in correspondence with the only facade with columns, in the same way that Peruzzi previously proposed in the perspective sketch on the side of drawing GDSU 29 Ar (Fig. 7.89). Therefore, the facade must have Doric columns considerably smaller (9 *palmi* in diameter) than those that appear to have been foreseen (12 *palmi*) in the two mentioned proposals by Giuliano da Sangallo (GDSU 7A and Cod Barb. Lat. 4424, fol. 65v) and in Rafael's proposal (Serlio 1544, f. 37) [28].

In this drawing from the White Collection, and as in the GDSU 31 A design, the colonnades delimit five different spatial cores: two squares on each side and one rectangular in the center. But here the supports are formed by groups of four free columns, probably separated from each other according to the arrangement of the triglyphs and metopes in a Doric order (as mentioned in the perspective sketch in drawing GDSU 29 Ar (Fig. 7.89). Studies, probably theoretical, of Doric intercolumniations in relation to the modules of the columns and the arrangement of the triglyphs, as in drawing U 547 A, with which Peruzzi was especially engaged, perhaps in these years, also in relation to design of the portico, initially in triglyphs, of the Palazzo Massimo [29] and with it that this proposal for S. Peter was related, although in this case it is a larger and more complex set with triple-sized columns.

In the White Collection proposal, groups of four columns are arranged in each of the square lateral nuclei and in the frontal nucleus, forming larger central intercolumniations, in correspondence with the entrances, and an even wider opening at the main entrance. Undoubtedly, the columns would be load-bearing and probably made of travertine, connected by means of an architrave that supports the large vaulted ceilings of the five space cores of the portico.

The three-dimensional arrangement of the core of columns should have withstood the pressure of the vaulted structures, but the set of hypostyle environments could seem quite precarious and without a doubt its stability would be precarious. Aware of these constructive difficulties, Peruzzi replaces the columns in the corners of the interior spaces with pillars, probably similar to the *columnae quadrangulae* embedded in the vertices, and framed with architraves, rationally stiffening the structural framework, by means of a reiterative solution in the proposals of Peruzzi of these years [30], drawings GDSU 118 Av, GDSU 150 A (sketches), GDSU 338 A, GDSU 340 A (Siena, San Domenico), GDSU 368 A (Palazzo Massimo), GDSU 380 A, GDSU 449 Ar and GDSU Av, GDSU 501 A (studi di chiese), GDSU 598 A (studio di palazzo), etc.

This ingenious solution, with *columnae quadrangulae* columns set back from the outer vertex of the front, while giving up the prominence of the columns in the foreground, allowed the facade to be articulated in clearly different but homogeneous sectors that had to assume a three-dimensional accentuated spatial identity, underlined by the continuation of the colonnades in the gloomy depth of the portico.

For the first time in Renaissance architecture, the theme of the architrave colonnade, as well as in the interior previously imagined especially in drawings GDSU 14 A and GDSU 15 A (Figs. XXX 21, 26), would have assumed a decisive role in the architectural structure. It will be necessary to wait for the Bernini colonnade (with columns a little smaller than those of Peruzzi), to see again in S. Peter something similar to this innovative idea.

To give consistency to the facade, formed only by Doric columns, as studied in the perspective sketch GDSU 29 Ar, it had to support a massive attic, probably *allegerite*, as in the attics of the triumphal arches, of a *nano* order of pilasters with broad *specchiature*.

This was an architectural element already inserted by Bramante outside the apse of Julius II, and taken up in projects for S. Peter, by Rafael and Antonio da Sangallo since the time of Leo X [31]. But here, supported on the entablature of free columns, with an *artificiosa mezcolanza*, typical of Peruzzi, of two ancient elements of very different origins, the temple and the triumphal arch [32]. This would create an extraordinary new idea for the facade as well as a reflective relationship with the general idea of the new basilica of S. Peter. Perhaps the free columns arranged in front by Peruzzi could have a slightly thinner proportion than that of the semi-columns designed by Rafael and Antonio da Sangallo for the hemicycles (in the GDSU drawing 29 Ar a measurement of 8 1/3 *palmi* appears, which perhaps refers to the width of the pilasters).

In any case, even with the overlapping attic, the overall development of the facade had to reach a much more limited height than anticipated in all previous projects and in the contemporary projects of Antonio da Sangallo.

The large size of the front columns, and their presumed elegance, would have exalted the great dimension of the internal order and the spatial preeminence of the immense dome. The result would appear to be a new Christian Pantheon erected on the powerful structures of the Tempio della Pace, but with a centralized, organic, unitary structure.

Peruzzi could not adequately detail or defend this fabulous project before the pope, and against the final proposal of Antonio da Sangallo, since he died shortly after having carried it out, on January 6, 1536.

Antonio da Sangallo projects

In the days of Pope Paul III Antonio da Sangallo found himself at a crossroads since he could not build what he was projecting, and what he was building increasingly compromised what he was projecting for the future.
Apparently, in this period his model of 1520-1521 had already been forgotten, as well as the *Progetti di Riduzione* that both he, and especially Peruzzi, had made during the pontificate of Clement VII. With the passage of time, Antonio da Sangallo was more receptive to retaking a typology of a centralized plan. However, coinciding more or less with the death of Peruzzi in 1536, in his first known project of this period he continued to prefer a building with a longitudinal typology connected to the Vatican Palace [33]. As Peruzzi, it was also stuck at first in the quincunx system, and ambulatory, with columns that continue to include 40 *palmi* niches, which in any case would have been compatible with the modest increase in pavement that was being planned in that period. In a later proposal, he renounced the ambulatory system of the quincunx system and kept the choir of Julius II [34]. However, neither with this proposal, nor with any of his successive projects with a longitudinal plan, managed to dissuade Pablo III from building a building with a centralized plan typology [35].
Perhaps in the spring of 1538, coinciding with the beginning of the construction of the Pauline Chapel, Sangallo made a viable proposal, since through the atrium he prolonged the centralized construction, so that he could have connected the papal palace with the atrium by means of a staircase, and the Sala Regia with the Lodge of the Blessings through the Pauline Chapel.
In June 1539, the congregation of S. Peter invited him to build a wooden model of his latest proposal, with an astonishing size and at an exorbitant economic cost [36]. In this

model from 1539 the articulation with the Pauline Chapel is contemplated, which was about 100 *palmi* above the level of the old basilica, so it is possible that, to achieve a correspondence between the levels, Sangallo considerably lowered the exterior order Doric with respect to the project of 1520-1521. The area of the windows and the vaults of the Pauline Chapel would have been raised with the Ionic order of the tower, so that its four arched windows could be used to illuminate both tripartite windows.

After thirty-four years of indecision, reconsideration and a series of smaller models, perhaps mostly incomplete, it was desired to define all the details, and Sangallo appealed to all his knowledge, not only to satisfy the pontifical ceremonial needs and to satisfy all static problems, but also to unite existing fragments with harmonic ordering. Everything was so defined that, even after Sangallo's death, the deputies insisted on the realization of his model [37].

Antonio da Sangallo. GDSU 39 A

It is not known with certainty when Antonio da Sangallo carried out this GDSU 39 A project (Fig. 7.92), although it is most likely that it was carried out just after Peruzzi's death in 1536. The drawing has two versions. The left version shows a building with a centralized plan typology and does not have a lobby on either side. Sangallo is undoubtedly influenced by Peruzzi's two centralized plan proposals (Serlio 1544, f. 38, and PML, codex Mellon, f. 71r), but with new details. Without a doubt, Sangallo was looking for new alternatives at the level of Peruzzi's, but without succeeding. Once again the circular elements in the corners competed with the ambulatory ones and created a confusing mass.

The right version shows a building in the shape of a Latin cross, with a longitudinal body with three sections and a deep vestibule. In the lower right part, the main elements of the Escala Regia and the old basilica are drawn. The drawing contains two measurements, so Antonio da Sangallo undoubtedly intended to demonstrate with this drawing that he had taken the built environment into account, and also that the dimensions of the project were viable. In this drawing, the Pauline Chapel does not appear, since it was at a higher height than the basilica floor plan, although it is possible that it was not yet built. In this right part of the drawing appears the chorus of Julius II, so this drawing shows an attempt to integrate with existing reality, imitating the second project by Raffaello (PML, codex Mellon, f. 72v).

Analyzing both versions, it gives the impression that the variant on the left was a pure proposal, without environmental conditions, from which the right variant is derived, in which the two main environmental conditions have been taken into account, the existence of the *Capella Iulia*, and the need for a longitudinal body. It seems that finally Sangallo knew how to understand the ideas of Bramante, Raffaello and Peruzzi fairly.

Antonio da Sangallo. GDSU 40 Av

The GDSU 40 Av project (Fig. 7.93), is a simplified project that repeats the same scheme of the right side of the GDSU 39 A. On the front of the sheet, experiments are made with different variants of the longitudinal body and an attempt is made to compress even the atrium. The proposal preserves the apse of Julius II, and the cupolas of the quincunx and the ambulatory have been removed. It is possible that it was a proposal that did not even please Antonio da Sangallo himself, judging by the comment that he himself wrote *"questo saria bello e breve".*

Antonio da Sangallo. GDSU 256 A

During this period, Antonio da Sangallo would carry out a *picolo progetto longitudinale* that was later drawn on parchment, the GDSU 256 A project (Fig. 7.94), in which special attention is given to the composition of the facade and the connection with the Pauline Chapel and the Vatican Palace. This drawing contains measurements that are also found in the drawing, the GDSU 119 Ar (Fig. 7.95) and GDSU 119 Av (Fig. 7.96) [38]. This drawing provides exact measurements of the Pauline chapel (which Sangallo was building between 1537 and 1538), as well as the "dividing wall" (which was completed in the fall of 1538). Therefore, drawing GDSU 256 A must have been made in the autumn of 1538. An important aspect of this drawing is that for the first time it shows the decision to raise the floor inside the new basilica, approximately 11 *palmi*.

Antonio da Sangallo. Grande progetto longitudinale. GDSU 66 A, 67 A and 259 A

Sangallo later made the *grande progetto longitudinale* (Fig. 7.97) of which three large drawings have been preserved [39], for which they were predictably made to be presented to Pope Paul III. The drawings correspond to a section of the transept, a section of the longitudinal body and the north elevation. No plan from this project is preserved, although Letarouilly was able to rebuild it based on the documentation that he could have (Fig. 7.98). In these drawings the apse of Juluis II does not appear, and in fact it will no longer appear in any later known drawing, from which it can be deduced that around the year 1538 it may have already been decided to tear it down. The drawing bears an important conceptual resemblance to the two drawings by Raffaello, which is why, after 20 years, Antonio da Sangallo apparently endorsed the Bramante-Raffaello proposals, at least in certain basic aspects of the plan. The whole set is developed within a compact rectangle of rectangular shape, from which only three ambulatory stands out.

A very important aspect of this drawing is that inside it is planned to raise the floor of the new basilica about 11 *palmi* [40] (although later, once the *Tegurium* had been demolished, it was decided to raise the floor a little more, about 16.5 *palmi*).

The decision to raise the floor was twofold. On the one hand, to have additional space to store the enormous amount of Treasures that the old basilica housed, and on the other hand to reduce the internal height so that the central nave does not look like an alley, as Antonio da Sangallo would explain in his famous *memoriale*.

The decision to raise the floor would hardly mean reducing the bases of the paraste of the crossing piers, so it was not a problem. However, the 40 *palmi* niches of the crossing piers and counter-piers, as built by Bramante, were extremely shortened in height, and would not make sense. That is why Antonio da Sangallo decided to fill them in, and alternatively create an order based on aedicules framed with columns (see chapter 8). Of course the filling of the niches, in the way in which they were made, would hardly increase the bearing capacity of the piers, so the reasons for the filling were not structural in nature.

The drawing shows irregular walls in the apses of the ambulatory instead of the usual pairs of columns used in most of the preceding solutions.

On the south facade, there is an effort to integrate the different volumes of the building through horizontal divisions, integrating orders of the same dimension.

In addition, Sangallo's ideas for the design of the large central dome are appreciated for the first time. Its appearance is similar to that projected by Bramante, although the drum is lower and the Bramante colonnade becomes a solid circle, articulated by semi-columns and niches. On the other hand, the interior of the dome looks more like the dome of the Duomo in Florence than the Bramante design, which makes it much more resistant and suitable.

The small domes above the aisles have neither a drum nor a lantern, and are illuminated by beveled windows that are embedded in their vaults. Outside the windows are shown as if they were aedicules crowned by pediments, completely disfiguring the domes. The end result, despite the compositional robustness of the plan, is, once again, disjointed and disrupted. In fact, the same thing that Vasari said about the large wooden model that Sangallo would make in the next few years can be applied to this project, which was a *"componimiento troppo sminuzzato"* [41].

Antonio da Sangallo. GDSU 41 A

It is curious the surprising changes that Antonio da Sangallo makes in this period. It goes from a centralized plan typology to a longitudinal plan typology in a matter of weeks. Personally, I think that the general feeling is that the building should be long and reach the square. However, a building with a centralized plan was purer and cheaper. Therefore, what was actually intended is the same as what Bramante intended from the beginning: to make a building of great purity and symmetrical about 4 axes, and based on this typology create a longitudinal arm that seems to emerge from it, and therefore, perfectly integrated into it. In this way the desired purity and the necessary functionality would be achieved.

In this sense, Antonio da Sangallo draws schematically, in the lower part of drawing GDSU 41 A (Fig. 7.99), some lines of a centralized plan together with the sketch of an elevation. The drawing shows a quincunx typology, without the *Capella Iulia*, and with four corner towers with an octagonal interior. The result is very similar to drawing GDSU 110 A (Fig. 7.100), in which a free-standing hall and side towers are added to a pure typology with a centralized plan typology. It is as if one wanted to preserve the highest possible purity, but at the same time grant a differentiable access in the east direction. It is possible that Sangallo was maturing certain ideas, at the same time as convincing the pope, in order to prepare his famous wooden model of 1539.

Antonio da Sangallo. Grande modello of 1539

Almost all the longitudinal typology proposals made up to this moment had a longitudinal body and a concatenated access space to the central part of the building. However, in this wooden model by Sangallo [42] (Fig. 7.101), the access section is very separated from the rest, perhaps in order to integrate with the papal Palace. This separation had already been tested in the GDSU 110 A project and was sensed in the GDSU 39 A project, but now it appears in all its magnitude.

The existence of this enormous project is not well understood, taking into account the desire of Pope Paul III to see the new St. Peter's Basilica completed. The dimensions of the building it represents are enormous, and its construction would have been very expensive and would have taken a long time.

It is possible that, after so much time of uncertainty, in which no architect had carried out an overall project, fully defined in all its details, the members of the Curia wanted a model to be made fully defined in all its details. It is possible that there was already a general resignation that the construction would be greatly delayed and perhaps a completely defined model should be left for the new generations to finish the building according to this perfectly defined model. In fact, Antonio da Sangallo put aside the construction of the real building a bit, to focus on the construction of this wooden model. It seems that his model was more important than the construction of the real building. And that ended up being lethal.

The realization of the model began in 1539 by a great team of cabinetmakers led by Antonio Labacco, a close collaborator of Antonio da Sangallo [43]. The costs of the model amounted to almost 4,800 escudos, to which should be added the salaries of 1,500 escudos, so the critics of the model assured that with that money an entire church could have been built. In addition, the construction of the model took a long time, and on the day of Sangallo's death, August 3, 1546, it had not yet been completed [44].

Plan layouts of this model are not known, with the exception of the drawings that Antonio Labacco would later make, published by A. Salamanca in 1549 (Fig. 7.102).

The plan is very similar to Peruzzi's two centralized plan proposals, to which a free-standing hall has been added on the east side. The “central nucleus of Bramante” appears intact, extending in the four cardinal points through apses. These apses are surrounded by ambulatory in a north, west and south direction, and in an east direction, the apse is articulated with the branch of the facade, by means of a circular space, as a general vestibule. In this central space there is a corridor that opens laterally, creating two new entrances to the building. The access body appears flanked by two impressive towers. Therefore, with the vestibule inserted between the core of the building and the section of the facade, Sangallo reuses its lifelong claim to create a counter-dome, as it had indicated in its previous model of 1520-1521.

After having analyzed and reconstructed the design process of the 25 most binding projects in the history of the design process of the new St. Peter's Basilica, and as a personal comment, I personally think that the architectural floor plan structure of this model of wood is the best that Antonio da Sangallo designed. On the other hand, the design of the elevations is very deficient in many aspects, providing a mammoth, unstructured and Gothic aspect to the whole. Sangallo wooden model floor plan has an architectural quality level close to that of the two Raffaello-Bramante projects (Serlio 1544, f. 37, and PML, codex Mellon, f.72v), and to the two Peruzzi projects (Serlio 1544, f. 38, and PML, codex Mellon, f. 71r). Personally, it gives the impression that Sangallo never wanted to recognize the enormous quality of his rivals' projects, did everything possible to hinder them, and finally could not create a valid alternative, so he simply made a small variation, merging the projects of his competitors.

State of the Works

The building had been almost abandoned since the Sacco di Roma and was in a semi-dilapidated state for almost 10 years as can be seen in Heemskerck's drawing in Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n.79, D.2a, fol. 1r) (Fig. 7.103) and also in drawing in Staatliche Museen zu Berlin, Kupferstichkabinett, Heemskerck-Alben, n.79, D.2a, fol. 54r) (Fig. 7.104). Therefore, initially it had to be stripped of vegetation, it had to be cleaned, repairs had to be made, and temporary covers had to be placed.

The section of the old basilica that was still standing was also suffering damages of all kinds, and needed to be repaired. Even the upper part of the walls had sloped to the south [45]. For this reason, Antonio da Sangallo decided to build a transversal wall that would consolidate the existing section of the old basilica (later called “dividing wall”) (Fig. 7.105). The dividing wall completely filled in the cross section of the old basilica and therefore exactly reproduced its shape, and was completed in a few months, in the summer of 1538 [46]. Antonio da Sangallo carried out a meticulous project for this wall, from which it follows that it was not a simple provisional wall, but that it should be designed so that the surviving section of the old basilica remained standing as long as possible, to that liturgical activities could be carried out normally in its interior.

The interior of the dividing wall can be seen not only in Antonio da Sangallo's project, but also in Domenico Taselli da Lugo's watercolors. Initially, the wall had an arch 40 *palmi* wide (that is, the same width as the crossing piers niches) and three pointed windows without cornice, located in the upper part [47]. Later, in the year 1546, the arch was partially blocked and a portal was arranged, framed with two columns, which supported an architrave with a design similar to the architrave of the colonnades of the central nave of the old basilica. In this way the surviving section of the old basilica could be used normally and be properly protected.

Between the years 1544-1545, a connection was made between the closed section of the old basilica and the works of the new building (later called "intermediate section"). As can be seen in the plans made by Bufalini (1551) and Étienne Dupérac (1577), the intermediate section had a width similar to the width of the central nave of the old basilica, with a gabled roof that protruded over the roof of the ancient basilica. The resulting building was a strange entity, like an architectural Frankenstein, a forced union between the old and the new building. However, this strange symbiotic building survived until the year 1600, and even when it was decided to tear it down, many opposed it.

On the other hand, the Bramante niches were closed, and in their place Antonio da Sangallo arranged 24 Corinthian aedicules [48], which still remain in the current building. When the Bramante niches were closed and the floor was raised, the idea that Bramante had about the interior space of the basilica disappeared since the line of the niches created an intermediate order that articulated the great height of the building.

Influence of Peruzzi on Antonio da Sangallo and on Pope Paul III

After Peruzzi's death (on January 6, 1536), Vasari wrote: "*risolvendosi Pablo III far finire S. Peter, si desiderò molto lo aiuto di lui, atesso che assai giovato avrebbe Baldasarre in tal fabbrica con Antonio da Sangallo. E brenche Antonio facesse poi quello che si si vede, nondimeno assai meglio in compagnia avrebbono veduto le difficultà di tale opera*" [49]. Therefore, Peruzzi seems to have the confidence of Pablo III, like Jacopo Meleghino, certainly in relation to Peruzzi.

It is therefore probable that the definitive election of the pope in favor of a return to the centralized plan typology, would have been due to this latest proposal by Peruzzi, although it certainly had to *giovare* for its maturation, based on the particular suggestions of the final project by Antonio da Sangallo, or perhaps even by Michelangelo. Again, and now without contradictions, the humanistic idea of the centralized temple could coincide with that of the Christian temple.

It therefore seems that, for various reasons, it is possible that at this time there was a constructive and positive relationship between Peruzzi and Antonio da Sangallo, undoubtedly influenced by the respect that Antonio da Sangallo might have for Peruzzi, and by the mature age of both.

Peruzzi greatly influenced Antonio da Sangallo, especially in the adoption of a centralized plan typology, in fact, Antonio da Sangallo, in his final project, as shown in several drawings, such as the GDSU 39 Ar, the model of 1539 and Salamanca engravings (1549), takes up the centralized plan typology, despite juxtaposing, as is well known, the large body of the facade with the bell towers and the connecting hall.

In addition, Peruzzi's influence on Antonio da Sangallo was manifested in other multiple aspects, such as in the design of the lower body of the bell towers in the form of a triumphal arch flanked by a binary order (see GDSU 29 Ar), in the division of the exterior of the ambulatory in nine sections, in the introduction of orders in the dome and, especially, in the introduction of hexagonal-shaped rooms (as in GDSU 29 Av and in the White Collection floor plan) near the facade, on both sides from the entrance. The latter was a great idea that allowed a structure of the facade in the form of a portico on three sides.

In contrast, Baldassarre Peruzzi was also influenced by the proposals of Antonio da Sangallo, such as the fact of having semi-columns outside the hemicycle of the ambulatory, and also aedicules, as designed by Rafael and Antonio da Sangallo, and except the ambulatory ones, eliminating the small order of columns inside. In their respective projects there are also some solutions that probably attest common decisions, such as sacristies or angular bell towers of similar dimensions, internal square spaces, the abolition of 40 *palmi* niches on the sides of the secondary entrances on all four sides (which Peruzzi replaces by depressed niches), the four angular bodies with the sacristies to highlight the exterior hemicycles, an equal number of doors, etc.

It is probable that Michelangelo was also aware of Peruzzi's latest projects, and that he accepted some suggestions, such as the idea of the facade with columns placed only in correspondence of the entrance arm of the cross, as already appears in Cod. Vat. 3211, fol. 92r, and in many other drawings [50].

Peruzzi's legacy

Peruzzi had a receptive personality, like Raphael's, to the most diverse stimuli, from the ancients to all his contemporaries. And not only, of course, from Bramante (and previously by Francesco di Giorgio), Raphael and the young Giulio Romano, but also from Giuliano da Sangallo and Antonio da Sangallo, and even by Michelangelo. But classical or contemporary forms,"*in ogni momento attuali o superate, vive o morte*", as Bonelli wrote [51], they are "*solo un riferimento iniziale, una forma di partenza da transformare poi in funzione di un sentimento e di una poetica individuale*".

For all these reasons, the speech so often mentioned by Benvenuto Cellini is extremely revealing: Baldassarre " *... cercò della bella maniera dell'architettura ... si sottomesse a ritrarre tutte le belle maniere che egli vedeva delle cose antiche di Roma ... Et avendo ragunato una bella quantità di queste diverse maniere, molte volte disse che cognosceva che Vitrivio non aveva scelto di queste belle maniere la più bella*".

Finally, and in order to show the value of the figure of Peruzzi in the history of architecture, I would like to highlight the fact that Cellini, like many other historians have revealed close parallels between Peruzzi and Michelangelo, "*il maggiore architetto che fussi mai*" [52].

This ideal relationship between Peruzzi and Michelangelo has been widely referenced, and among many examples mentioned by Ackerman and Zander, it is worth remembering the one cited by Passeri, when he reports that Adriano Rainaldi, painter and decorator of Domenico Fontana's circle in Rome, addressed his son Girolamo, later an architect, arrived *"in età di rendersi capace di regole"*, at the *"buone imitazioni di Buonarroti y e di Baldassarre da Siena"* [53].

Indeed, the relationship with Michelangelo, and almost certainly the mutual exchange between the two, was profound and decisive. Perhaps they are united in the extreme diversity of their respective personalities and, even more so, of the characters, a rigorous, restless and suffering religiosity [54]. Peruzzi and Michelangelo share the freedom of Vitruvius and a subtly archaic *quattrocentesque* background, from which strangely new solutions arise [55]. Perhaps not by chance, in the selection of forms, there is a common early inclination towards certain forms, such as an oval plan, proposed for the first time in the history of Renaissance architecture by Michelangelo, and soon followed by Peruzzi [56]. In the same way, they both manifest a decided preference for architrave systems and orders, and for the free, but *logica reinventzione* of a classic vocabulary adapted to the needs of an innovative context [57]. The use of statues aligned to the columns, above the entablature must also be remembered (a detail also common in Palladio, who could see Peruzzi's projects for the new basilica of S. Peter in his first stay in Rome in 1541) which is something common in all the successors of Bramante, and among them, in Michelangelo.

Peruzzi not only influenced Michelangelo in a generalized way, but also collaborated directly, for example, in the construction of the fortifications of Florence during the war of 1529-1530 [58], or the rehabilitation of the central chamber of the Baths of Diocletian, studied by Peruzzi a little before Michelangelo.

In any case, Peruzzi's recovery of the centralized plan typology for S. Peter must have undoubtedly influenced Michelangelo's subsequent decision-making, especially for the adoption of a facade with a Templar typology, with a restricted, architrave order to the central part of the front. For this reason, it is more than likely that Vasari was not referring to Antonio da Sangallo, but to Michelangelo, when he wrote that Peruzzi "f*ece un modello molto ingegnoso e magnifico, d'alcune parti del quale si sono poi serviti questi altri architetti*" [59]. *Vasari, in the 1550 edition, had also written that after Peruzzi's death,* "*risolvendosi Paulo III far finire S. Peter, si desiderò molto lo aiuto di lui, atteso che assai giovato avrebbe Baldasarre in tal fabbrica con Antonio da Sangallo. E benche Antonio facesse poi quello che ci si vede, nondimeno assai meglio in compagnia avrebbono veduto le difficultà di tale opera*", so it is clear the trust that Pope Paul III had placed in Peruzzi.

As has been said, this confidence of the pope in Peruzzi's architectural ingenuity also materialized with the election of Jacopo Meleghino, who worked closely with Peruzzi, as the architect of the Fabbrica. The pope hires Jacopo Meleghino in April 1535 as a *computista* (*terzo architetto*) with a salary of 6 escudos per month, and from June 1538 he was appointed *secondo architetto*. Subsequently, since December 1546, once Antonio da Sangallo died, he occupies the position of architect with a salary of 25 escudos per month while he continues to receive his salary as a *computista* [60].

It is possible that Paul III thought that, given Peruzzi's state of health in 1535 (he died the following year, on January 6, 1536) he should hire an architect of his trust, to ensure the permanence of his ideas in the project end of Antonio da Sangallo. Without a doubt, Meleghino was the best option, so on Peruzzi's death all his powers and privileges were transferred to him [61].

Tegurium

During the papacy of Paul III (1534-1549), in the year 1538 (coinciding with the construction of the "dividing wall" by Antonio da Sangallo) windows were added on the sides of the *tetto rustico* of the *Tegurium* [62]. It is difficult to imagine the reasons that prompted the construction of a building like this. On the one hand, one can imagine the confusion that existed after Bramante's death (1514), with Rafael trying to defend his project against the unsuccessful ideas of Antonio da Sangallo. The premature death of Raphael (1520) increased the confusion, and during the papacy of Hadrian VI (1522-1523) it increased even more, since he was not at all interested in the construction of the basilica. Things improved somewhat during the papacy of Clement VII (1523-1534), although he had no special interest in the basilica.

This chain of circumstances could explain the precariousness of the design and construction of the *Tegurium*, especially in its last phase. On the other hand, it is possible that it was desired that the *Tegurium* remained as high as possible, so that the structure of an "Arc de Triomphe" would not be enough, and it would rise even higher, conforming a new architectural typology, but not very attractive. Undoubtedly, the considerable delay in the works would force to convert the Tegurum not only into a protective structure, but also into a symbolic and outstanding construction, with a certain size, in order to please the pilgrims, who for many years could only see stones, dust and construction materials between sections of a work whose construction did not seem to advance.

Period 3.b: (1546-1564) Michelangelo

After the death of Sangallo, on August 3, 1546, Paul III (1534-1549) appointed Jacopo Meleghino as *architetto*, in December 1546, with a salary of 25 escudos per month while he continued to collect his salary as a computer writer [63].
However, it is necessary to hire a new architect to lead the works. Pope Farnese thought of Giulio Romano, the last heir to Bramante's legacy in Rome, but that same year he died. So the way was clear for the pope to hire his favorite architect, Michelangelo.
The deputies of the Fabbrica were upset by this appointment, since they argued that Michelangelo had no experience working as architect in Rome, and that he also had a very difficult personal relationship (referring to his famous *"terribilità"*) [64]. However, Pope Paul III stood firm and argued that the election was made on the basis of divine inspiration, which made Michelangelo untouchable, since he was a guest of God [65].
However, the collaborators and disciples of Sangallo, called by Michelangelo, with sinister irony, with the nickname of the *"setta sangallesca"*, did not immediately give up. Between 1546 and 1549, the publisher Antonio Salamanca made a series of engravings by Labacco that reproduced the great model in plan, elevation and section, to *mostrare*, as Vasari writes, *"quanta fusse la virtù del Sangallo, e che si conosca da ogni uomo il parere di quell'architetto, essendo stati dati nuovi ordini in contrary to Michelagnolo Buonarroti"* [66]. In addition, the engravings also publicly showed the merit of Labacco as developer of the model. They were later included in Antoine Lafrery's *Speculum Romanae Magnificentiae*. In this way the project for the new basilica of S. Peter by Antonio da Sangallo was thus present in the consciousness of architectural experts.
Also Pope Paul III (1534-1549) contributed to honor the memory of Antonio da Sangallo, and immortalized his model on a medal. On the occasion of the jubilee of the year 1550, the same medal was issued again and also the successor of Paul III, Pope Julius III (1550-1555) took it up again in his medal of the Holy Year. These events should not be understood as taking a position in favor of the Antonio da Sangallo project and against Michelangelo. The reason, instead, was due to the fact that Michelangelo had not yet drawn up a project for the facade and refused to do so just to make a celebratory coin [67].
The present basilica has little in common with the building that Michelangelo desired, although he has contributed more to its appearance and architectural structure than any

other architect. Michelangelo made a fabulous design under which, throughout his life, the counter-piers and the apses of the arms of the transept were built, and in the north arm the main barrel vault was built. Likewise, the pinnacles of the dome were completed and the drum was raised. His successors, until the end of the century, carried out their project, modifying it only in some details. In year 1600 the western body had reached its current shape, and only the eastern side was pending [68].

Michelangelo caused a real stir from the beginning of his appointment, since he criticized the Sangallo model to the smallest detail, and replaced Sangallo's collaborators with people he trusted [69]. In addition, Michelangelo made it clear to the deputies that their obligation was to procure the necessary money to continue the works, and defend it against the *ladri* (dishonest employees and workers), since the design and planning of the works were up to him, and about which I would only argue with the pope. The deputies protested with indignation, but the pope stood firm. Furthermore, to ensure that Michelangelo's designs were respected after his death, a contract was drawn up in 1549 to be respected by all successor architects [70]. In fact, Pope Paul III died on November 10, 1549, at the age of 81, and Pope Julius III was appointed as his successor, on February 7, 1550, who continued to protect Michelangelo, as would all his successors.

Michelangelo projected a new building, according to his own purist ideals, and according to the new social and architectural paradigms that had mutated in the last two generations. For this reason, he returned to the origins and proposed a project with a centralized plan typology "*chiara e schietta, luminosa e isolata attorno*", as he would write in a letter [71].

However, while Michelangelo carried out his new project, he would have to deal with the works in progress, which also had acquired a good rhythm in recent years.

Michelangelo's Project

Michelangelo was undoubtedly able to see Bramante's initial projects, hear his ideas, and most importantly, he was a direct witness to the construction of the “central nucleus of Bramante”. Undoubtedly, he must have liked them a lot since his intention from the beginning was to take up Bramante's initial proposals. In fact, Vasari wrote that "*Egli mi disse parechie volte*", referring to Michelangelo, “*che era esecutore del disegno et ordine di Bramante, atteso che coloro che piantato la prima volta uno edificio rande, sono quegli gli autori*" [72]. Michelangelo was undoubtedly referring to the “central nucleus of Bramante", "*come ancora è manifesto*" (as indicated in a letter to Ammanati), and whose design, as will be seen in the next chapter, was incredibly well done.

For this reason, Michelangelo wanted to demolish the ambulatory (*giunta*) designed jointly by Raffaello and Antonio da Sangallo, to safeguard the purity of the "central nucleus of Bramante" [73]. The deputies reacted by saying that, by eliminating the ambulatory, the surface of the building would be greatly reduced, and it would end up becoming a "*San Pietrino*" [74].

However, Michelangelo asserted himself, and in order to make a pure building, he not only demolished the ambulatory of the tribunes, but also demolished the outer arms of the cross of the secondary centers, as well as the openings of the corners, with its towers. In this way, the building was transformed and the four perimeter domes of the quincunx (which occupied an intermediate position in Sangallo's project) began to occupy the corners of the new building, so that the spaces under these perimeter domes became corner chapels. The result project was simple, pure, beautiful and resounding. In fact, Vasari referred to Michelangelo's project as *"minor forma, mas sì bene maggior grandezza"* [75].

To ensure that the building was respected by its successors, Michelangelo took up the construction strategy of Bramante, which implied putting aside the idea of the total complex, to focus on the parts of immediate execution. He had learned from Bramante, and he had also learned from Antonio da Sangallo, who, trying to define the building in all its details, simply focused on the construction of a model, instead of spending time on the construction of the building. And what he achieved in this way is that after his death, everyone forgot his ideas, his projects and his model.

The important thing was that the construction progressed as far as possible following a perfectly designed project, although not completely defined.

However, the deputies asked Michelangelo to make a model to see what the new building would look like. Michelangelo did it in two weeks and cost 25 escudos. A year later, he made another larger model, but not of the building as a whole, but of the south tribune, which was the part in which he was working [76].

The tasks required to implement Michelangelo's project were complex. In addition to demolishing the ambulatory, a new structure had to be built for the perimeter walls and for the apse walls, respecting the "central nucleus of Bramante", and therefore the structure of the counter-piers of Bramante (although its niches were filled by Sangallo since they were very low, as a consequence of the elevation of the ground that was planned to be).

Michelangelo's original project is not preserved (since he was very fond of destroying his own projects, and thus hiding the design and execution process of his paintings, sculptures and buildings), so only conjectures can be made on the basis of the construction, and on the basis of the drawing made by Étienne Dupérac (Fig. 7.106), in 1569, which can provide an pretty accurate idea of the intentions of Michelangelo.

Spiral ramps (*lumache piene*) should be built to transport the material needed to build the dome. Bramante had arranged these ramps inside the crossing piers, although Antonio da Sangallo designed new double ramps in the corner spans in the project of his model [77]. As these Sangallo ramps had been eliminated, Michelangelo arranged them on the counter-piers of the north and south tribunes. To do this, he eliminated, with a diagonal cut, the outer edges of the counter-piers, and in this way the *smussi* were created, solid blocks located between the corner chapels and the apses, and which give the floor plan of the building its peculiar and attractive *poligonale* shape. In the next chapter, the design process that Michelangelo followed in the project of the entire building, and especially of these *smussi*, is reconstructed with all precision.

For the design of the perimeter wall, Michelangelo eliminated the stacked arcades built by Antonio da Sangallo and which he so disliked (Vasari comments that Michelandelo referred to them as *"archi sopra archi, e colonne sopra colonne")* [78]. Instead Michelangelo designed internally composed apses by means of double paraste, between which he arranged niches and large openings. In this way Michelangelo was able to return to Bramante's *verità*, as he stated: *"Chinque s'è discostato dal decto ordine di Bramante, come à fatto il Sangallo, s'è discostato dalla verità"* [79]. The sense of *verità* is similar to the classic concept of *concinnitas,* so paraphrased by Alberti, and should be understood as authenticity, frankness, transparency, in the sense of matching the internal with the external, and creating a fully harmonious set, in which each part is related to the others, and to the total set, under the same set of geometric proportions and compositional rules, applied on a recurring basis. The compositional rhythm of the paraste-niches-paraste reflects the articulation that Bramante had planned for the interior of Julius II's apse, and as a consequence the vertical character of the ends of the building's arms is accentuated, and that Antonio da Sangallo had hidden behind of arches similar to those used in the Colosseum. Michelangelo arranged barrel vaults in the arms, framed on the outside by means of attics, just as Bramante also did years ago.

In fact around 1560 the south tribune was executed according to these new proposals by Michelangelo [80].

The open structure used by Bramante inside the Jilius II apse was transformed in the hands of Michelangelo into a perimeter wall articulated in depth, which delimited the different spaces. As Bramante did, huge windows open at the top to adequately illuminate the interior of the building.

After designing the tribunes, Michelangelo focused on the dome. Again Michelangelo took over the Dome of Bramante (Serlio 1540), rejecting the proposals of Antonio da Sangallo. Without a doubt, Michelangelo's goal, once again, was to take up Bramante's *progetto originario*, the *tholos* surrounded by columns and crowned by the semi-sphere of the Pantheon dome. Therefore, it had to be freed from the envelope of secondary structures that Antonio da Sangallo had designed.

Evolution of the Works

When Michelangelo took office, the works on the new basilica had picked up a good pace, which is why the deputies refused to allow Michelangelo to stop the works immediately [81]. However, Michelangelo went further, and even modified the construction strategy that was being carried out, as well as the materials used. Michelangelo ordered that the new tribunes should be built from travertine marble, *"cosa non usata a Roma"*, as he himself would write to Vasari [82].

Until 1546 the south arm of the transept was almost finished, and the barrel vault was completed in December 1547. In addition, the construction of the ground floor of the ambulatory apse was in process [83]. The north arm was much more backward, and in 1549 the barrel vault was still being worked on.

Michelangelo adopted the same construction technique as Bramante, not dedicating much time to the complex, and focusing especially on specifying the architectural elements for immediate execution. For this reason, Michelangelo's constructive objective was the dome. The pinnacles that remained half-built since Bramante's time were cleaned, completed and reinforced by means of a reinforcement wall. Since 1547 the spiral ramps of the south arm of the transept were under construction, and work began on the inner cornice of the basement of the drum. Between 1548-1552, the base of the drum of the dome designed by Michelangelo was made.

From the year 1549, the construction of the new south apse designed by Michelangelo began, and a little later the new north apse was also started.

Pope Julius III died on March 23, 1555, and his successor Marcellus II was appointed pope on April 9, 1555. However, Pope Marcellus II died suddenly of a heart attack, on May 1, 1555, and Pope Paul IV is named as his successor on May 23, 1555. Tres dibujos muestran el estado de las obras alrededor del año 1556 (Figs. 111, 112, 113).
In 1557 the *cantino* of the south apse was completed, but it was done with a different technique and form from that specified by Michelangelo, who caused it to be demolished. Michelangelo had designed it with a shape of three candles that rested on the faces of the apse, and instead they had been built with a spherical shape [84].
From 1555 work was being done on the columns of the buttresses of the dome, and on the capitals for the interior walls. In 1556 excavation works were carried out in the northeast, probably to raise the corner chapel.
Pope Paul IV died on August 18, 1559, and his successor Pius IV was named pope on December 25, 1559.
A few years later, on February 18, 1564, Michelangelo Buonarroti (88 years old) died.

In that year 1564 the construction of the south tribune, with its corresponding chamfers (*smussi*) had been completed, the north tribune was finished up to the cap of the apse, and was not yet closed. The drum of the dome was finished (except for the capitals of the outer order), the entablature of the interior (which should support the scaffolding for the construction of the vault) was under construction. No changes were made to the east and west sides of the building.

Period 3.c: (1564-1602) Giacomo della Porta

After Michelangelo's death in 1564, the continuation of the construction of the basilica of S. Peter in Vaticano was entrusted to Pirro Ligorio (who was 51 years old on the day of Michelangelo's death), and to Jacopo Barozzi (Vignola) (that on the day of Michelangelo's death he was 56 years old). During this period several popes succeeded one another.

Pope Pius IV died on December 9, 1565, and his successor Pius V was appointed pope on January 7, 1566. Pope Pius V had a brief mandate since he died on May 1, 1572, and his successor Gregory XIII was appointed pope on May 13, 1572.

Pirro Ligorio

Pirro Ligorio, was born in Naples, probably in 1513, and died in Ferrara on October 30, 1583, at the age of 69 [85].

In 1534 Ligorio went to Rome, where he became interested in antiquities and was appointed superintendent of ancient monuments by Popes Pius IV and Paul IV.

In 1549 he began excavations at Villa Adriana in Tivoli and designed his masterpiece, the Villa d'Este water features, for Cardinal Hippolytus II of Este. He also designed the fountains for Villa Lante in Bagnaia, in collaboration with Vignola. In 1552, commissioned by Prince Pier Francesco Orsini, he finished the garden of the "*Villa delle meraviglie*" of Bomarzo (better known as the “Park of the monsters” of Bomarzo) which was intended to be something unique in the world. His Mannerist taste is also present in the Casina di Pio IV (known as Villa Pia) in Vatican City (1559-1562).

On the death of Michelangelo in 1564, he was appointed architect of the Basilica of S. Peter, in order to finish the dome in collaboration with Giacomo della Porta, but wanting to change various designs and criticize Michelangelo, he was fired in October 1565, together with Vignola, during the mandate of Pius IV (1559-1565). This prompts him to leave Rome and go to Ferrara.

Vignola

Jacopo Barozzi, or Giacomo Barozzi, (known as Jacopo Barozzi de Vignolao, or simply as Vignola) was born in Vignola on October 1, 1507, and died in Rome on July 7, 1573, at 65 years of age. He studied painting and architecture in Bologna.

He began his training as a painter and came to architecture through the study of Antiquity, being an assistant to Peruzzi. Influenced by Leon Battista Alberti and Antonio da Sangallo as well as by the Renaissance tradition, he was the greatest exponent of the transition period from Renaissance to Baroque, and is currently considered Mannerist [86].

After a first professional stage as an architect in the city of Bologna, he settled in Rome from 1530. He worked in S. Peter in Vaticano with Peruzzi, and Antonio di Sangallo, rebuilding some monuments and becoming secretary of the Vitruvian Academy. He was a disciple of Michelangelo, and succeeded him after his death in the works of the basilica of S. Peter in Vaticano, being in charge mainly of the construction of the small lateral domes. However, and for reasons unclear, Vignola was fired, along with Liguori, in October 1565 under Pope Pius IV (1559-1565). However, later Vignola assumed the role of architect, with managerial skills, but without a fixed salary, since Pope Pius V (1566-1572) wanted to use all the resources at his disposal to fight the Turks [87].

Vignola died in Rome on July 7, 1573, at the age of 65. The following year, Gregory XIII (1572-1585) appointed Giacomo Della Porta as the architect of the Fabbrica.

Giacomo della Porta

Giacomo della Porta, was born in Porlezza, Lombardy, in 1540, and died in Rome on September 3, 1602, at the age of 70. He was a collaborator of Michelangelo and a student of Vignola, for which he was influenced by both teachers. After 1563 he worked on Michelangelo's plans for the reconstruction of the open spaces of Rome. On Capitol Hill he took part in the design of the facade and the steps of the Senate Palace.

After Vignola's death in 1573, the construction of the Gesù church continued, and in 1584 he modified its facade with his own design. From 1573 he led the reconstruction of the basilica of S. Peter in Vaticano, and later, in collaboration with Domenico Fontana, completed the dome (1588-1590).

Unlike their precedents, Ligorio and Vignola were forced not to deviate from Michelangelo's project. But the big problem is that this project did not exist. Michelangelo had made a model of the dome, but not of the entire building. And if there was a project of the set, more or less detailed, perhaps Michlangelo destroyed it. However, in order to get an idea of Michelangelo's complete project, there are two main references. On the one hand Vasari's drawings from 1568 [88], and on the other hand the three large-format drawings by Étienne Dupérac from 1569 (Fig. 7.109, 7.110, 7.111)

[89], the latter constitute something similar to a pendant from the series of drawings by Labacco, from 1549-1549, whose main objective was to disseminate the great model of Antonio da Sangallo. However, there are some drawings that differ in certain details, such as a technical report on the construction of the dome by Guglielmo Della Porta, which must be dated before the year 1565 [90], and an anonymous drawing of the section (Fig. 7.112 and 7.113) and perspective of Michelangelo's project, kept in the Biblioteca Nazionale di Napoli [91].

In reality, only two main issues remained to be defined, the definition of the facade, and the design of the four secondary domes. We can get an idea of how Michelangelo imagined the access to his building by a sketch, and that goes back to the beginning of his design process [92]. This sketch shows a colonnaded portico, similar to the Pantheon *pronaos*. The front has 5 columns, although six columns were probably planned, to leave five intermediate spaces, and a central space to facilitate access. The drawing is just a simple sketch, hardly reflecting an initial intention, so no further guessing can be done. No other sources are available and it seems that Dupérac did not have them either, since in his series of engravings he did not include an image of the east facade. Based on the rest of Dupérac's engravings a facade can be reconstructed, but there are many contradictions (especially in the attic area) and the result is very unconvincing. In the engraving of the Dupérac floor plan, instead of an atrium a row of 10 columns is shown, in front of which there is a second row of 4 columns that support a pediment, constituting a central group with not very graceful proportions in elevation [93]. It could be an idea from Michelangelo's later years, but more likely it could be an alternative solution developed after death, suggested perhaps by Vasari or Vignola. In any case, it seems that Michelangelo did not care too much about the eastern finish of the building, whose realization required major interventions on the old building, and it would take many years for these works to be undertaken. Michelangelo embraced Bramante's strategy, and focused on building the heart of his project.

Analysis of Dupérac engravings

Dupérac's engravings show Michelangelo's dome surrounded by 4 small satellite domes that rise above the corner chapels [94]. Therefore, the mixed quincunx-naves typology is evident, which of course was contained in Bramante's project, but had never truly manifested on the outside, since the height of the secondary domes had always been lower than the height of the vaults of the arms of the cross. In contrast, in Dupérac's perspective sections, the secondary domes start from the same level as the main dome, thus affecting the silhouette of the building as a whole, but not as true domes, but as open structures similar to pavilions, that rest on the true domes of the corner chapels. As John Coolidge has shown [95], these four domes, as they appear in the engravings, can be attributed to Vignola, and furthermore it cannot be proved that Michelangelo was responsible for their design. Therefore, it can be assumed that Michelangelo had imagined the building of S. Peter without the small perimeter domes, and therefore with a roof dominated only by the large central dome.

State of the Works

In the twenty years after Michelangelo's death, works continued continuously, but slowly, and several drawings made in this period give an idea of the evolution of the works (Fig. 6.7), (Fig. 7.33), (Fig. 7.34), (Fig. 7.114), (Fig. 7.115).

Under Vignola's direction, the vault of the north apse was closed and the architrave of the dome drum was completed. The northeast corner chapel (later named *Cappella Gregoriana*) was started under the direction of Vignola, and its vault was built in the rough in 1578, under the direction of Giacomo Della Porta. The southeast corner chapel (*Cappella Clementina*) was started in 1578 and its vault was built in 1585 [96]. Over these two eastern chapels the new pavilions designed by Giacomo Della Porta were built.

The pavilion over the *Cappella Gregoriana* was built between the years 1578-1584 (modified and continued in the period 1596-1597), and the pavilion over the *Cappella Clementina* was built between the years 1593-1596. For a time, they were used as bell towers, since these elements were not foreseen in Michelangelo's project [97]. They were no foreseen pavilions on the western chapels, since they would be hardly visible from the square [98].

Under Gregory XIII, the western apse of Julius II probably began to be demolished, although the decision to do so was probably made much earlier.

Pope Gregory XIII died on April 10, 1585, and his successor Sixtus V was named pope on April 24, 1585.

Sixtus V (1585-1590) was another true *papa di S. Pietro* and wanted to give a new impetus to construction. A fresco located in the *Salone Sistino*, of the newly built library, shows what the pope wanted to do: the completion of the church of S. Peter according to Michelangelo's project, as represented in Dupérac engravings (Fig. 7.116). During his pontificate, which lasted only 5 years, three great steps were undertaken: the restructuring of the western arm, the raising of the obelisk in the square and the realization of the vault of the dome.

The Western Arm

The partial demolition of the choir of Julius II, and the construction of a new arm of the choir according to the design of the north and south tribunes, had been decided long time ago, and the works probably began during the Gregory XIII papacy. The works were carried out during the years 1585-1587, and as a result the vault of the new arm of the choir was completed in 1589. The demolition and reconstruction occurred at the same time, using a technically very complex procedure that caused *molte spese e gran fatica* [99].

The transfer of the obelisk

Sixtus V (1585-1590) hired, in 1585, the architect Domenico Fontana and specially commissioned him to move the obelisk from its current position to the center of S. Peter Square [100]. It was decided to move the obelisk in order to emphasize the axis of the new basilica, and to serve as a point of deference to restructure the square in the near future, in order to create an anteroom for the new basilica of S. Peter. Fontana's feat was discussed throughout Europe as it was unprecedented and somehow demonstrated that the technological level of ancient Rome had been reached again. Therefore it was a symbol of the beginning of a new era.

Without a doubt, the position that the obelisk should occupy within the Plaza del Borgo should have been chosen with great care. It was clear that it should be on the axis of the new basilica (which presumably should be the same axis of the old basilica, but a small mistake was made), but the exact point on the axis should be decided. Finally, the obelisk was located at a distance of 1,440 *palmi* from the center of the dome of the new basilica. This distance was not just any number, and it had great symbolic value since it expressed the expansion of the Church and the word of the apostles throughout the territory (1440 = 10 * 122).

Doménico Fontana

Domenico Fontana, was born in Melide (in Ticino, currently belonging to Switzerland) in 1543, and died in Naples on June 28, 1607, at the age of 70.

He traveled to Rome, before the death of Michelangelo (1564), where he made studies of ancient architecture, and became a confidant of Cardinal Montalto, who in 1585 would be elected Pope with the name of Sixtus V. Fontana built him the Palazzo Montalto, near the basilica. After his appointment as pope, Sixtus V appointed him architect of St. Peter's Basilica. In this position, he added the lantern of the dome and proposed the extension of the interior in a well-defined nave. Fontana also designed the transverse arms that separate the courtyards from Vatican City. In 1586 he erected the 327-ton obelisk in St. Peter's Square. This engineering test meant the effort of 900 men, 75 horses, innumerable pulleys and hundreds of meters of rope. The obelisk was located in the axis of the old basilica and at a distance of 1440 *palmi* from the tomb of the apostle. The works began in April 1586 and on September 26 the obelisk was erected in the right place, which would become the center of the square. The obelisk was located in the area of the old basilica, but it was displaced a distance of about 3.8 m. with respect to the axis of the new basilica (the new basilica began to be built from the west, behind the square, so no exact measurements could be taken so that its axis coincided with the axis of the old basilica).

After the death of Sixtus V, Fontana continued for some time in the service of his successor, Clement VIII (1592-1605). However, in 1592 due to dissatisfaction with his style, envy, and accusations of misuse of public funds, he was forced to move to Naples. In 1606 he participated in the competition for the facade of St. Peter's Basilica, later won by Carlo Maderno.

The construction of the dome vault

The construction of the dome by Della Porta, had nothing to envy the work of the builders of the Pantheon, moreover, it surpassed it in difficulty, due to the fact that it was erected on a structure of non-attached vertical supports and arches ("*il Pantheon sulle volte del Tempio della Pace*") [101]. Unfortunately, Giacomo Della Porta's drawings are not known, nor are there views of the time on the construction of the dome. However, the construction process is extensively detailed in the Fabbrica documents, although only recently Federico Bellini has analyzed them exhaustively, illustrating a process that was much more complex and difficult than could be imagined [102].

After lengthy preparations, construction began in December 1588. In the lower third of the vault the outer and inner cupola are strictly linked. This part was executed "by hand free", bone without false work, and in 1589 it was completed. For the continuation of the construction a wooden scaffold was erected that rests on the architrave of the drum. The work proceeded rapidly. By May 1590, the apex of the vault was reached, and the inner ring of the lantern's base was closed. From June to September 1590, work was done on the body of the lantern.

Sixtus V dies on August 27, 1590, and his successor Urban VII was named pope on September 15, 1590. The new pope dies on September 27, 1590, victim of malaria, and Gregory XIV was named pope, on December 5, 1590. Gregory XIV died on October 16, 1591, and Pope Innocent IX was named as his successor, on October 29, 1591. However, he died prematurely on December 30, 1591, and Pope Clement VIII was named as successor, on January 30, 1592.

In the month of March 1591 the scaffolding of the dome was dismantled, between the months of September and October the scaffolding of the lantern was dismantled, revealing the dome that was erected with majesty.

In the success of the construction of the Bellini dome, the key role played by both Pope Sixtus V and Giacomo Della Porta stands out. On the one hand, Sixtus V assured by all means the financing of the construction, removing it from the *Fabbrica*, and passing it on to the *Camera Apostolica* [103]. Only in this way would the continuous flow of money required by the exceptional procedure of the vault construction be guaranteed, since it had to be executed in a single stroke.

On the other hand, Giacomo Della Porta proved to be completely up to the task and undertook the task with astonishing courage (and without the help of Domenico Fontana, as is often cited in the related literature) [104].

To solve the many technical problems encountered during the construction of the dome, iron was used in abundance to withstand the enormous centrifugal forces resulting from the deformation of the dome, and therefore tensile-resistant materials were effectively combined (iron) and compression (stone) [105]. In this way, a giant step was taken in the evolutionary line undertaken by the fabulous Italian architects since the Middle Ages, giving rise to modern engineering.

Della Porta also intervened in the external appearance of Michelangelo's dome, as he changed the shape of the window cornices, and especially the lantern, to adapt them to the new preferences of a new society. The most striking difference referred to the profile of the cap (*calotta*), since Della Porta replaced Michelangelo's semicircle with a pointed arch, and therefore its vertex was higher than that projected by Michelangelo (more than seven meters) [106]. The reason for this change in the shape of the dome is not known with certainty. On the one hand, it is possible that Della Porta mistrusted the buttress system created by Michelangelo and wanted to preventively reduce the lateral thrust of the vault (which at that time was not yet known to be calculated). Brunelleschi had also given his drum dome an ogival profile, just as Antonio da Sangallo, in his projects for S. Peter, had also experimented with. On the other hand, Della Porta must have taken into account the visual conditions under which the dome would have been perceived. In a perspective view from the square - whose level was still 6 meters below the foundation ground - the vertex of Michelangelo's semicircular dome would not have been visible, and the base of the lantern would have been sunk in the cap (*calotta*).

Della Porta had undoubtedly improved the project of his predecessor, but at the same time, he had modified his character. The dome did not look like a heavy object now, but seemed to rise freely above the drum.

The construction of the dome ended with the construction of the lantern in the year 1591 under Pope Gregory XIV [107].

Sixtus V had done everything possible to build Michelangelo project, but its conception went back forty years, and in that period of time society had evolved. In this sense, the vision that the Pope anticipated in the fresco of the *Salone Sistino*, (Fig. 7.116) seems anachronistic.

Society had evolved, and had become used to the existence of the old surviving body of the old basilica. Without a doubt, the construction of the new basilica should continue in an easterly direction.

In 1602 Giacomo della Porta died (under the mandate of Clement VIII), and Carlo Maderno and Giovanni Fontanna were called to succeed him.

Period 3.d: (1602-1605) Carlo Maderno

Carlo Maderno

Carlo Maderno (Capolago, Switzerland in 1556 - Rome, January 30, 1629). From an early age he was a marble cutter in the quarries of his region, following the family tradition. He moved to Rome in 1588 with four of his brothers to help his uncle Domenico Fontana, an architect, who at that time was in charge of the works on the basilica of S. Peter in Vaticano. Carlo Maderno demonstrated great talent and brilliant ingenuity in the work on the basilica of S. Peter in Vaticano, which allowed him to immediately get his first personal commission: the construction of the facade of the church of Santa Susanna, in Rome (1597-1603). He took advantage of the opportunity and in this project he would use innovative techniques that would make him stand out from the Mannerist architects of the time, and in this way he would begin to lay the foundations of what would later be called the "baroque style" in architecture.

On the facade of the church of Santa Susana, following the strokes of the painting by Annibale Carracci and Caravaggio, it introduces sharp chiaroscuro that allow attention to be focused on the center of the portal, and at the same time enhance the general contours of the façade.

Santa Susanna gained the attention of Pope Paul V, who in 1603 gave him the position of chief of Architecture of S. Peter.

During these first years of his position, Maderno collaborated in the previously planned works in progress, although there was still widespread doubt about the continuation of the basilica in an easterly direction, as well as its connection with the Vatican Palace.

Clement VIII dies on March 3, 1605, and is succeeded by Pope Leo XI, on April 1, 1605. However, Leo XI died on the 26th day of his pontificate, on April 27, 1605, as a consequence from a cooling that he took on the day of his coronation. Pope Paul V succeeds him on May 16, 1605.

Stages in the construction of the *new basilica of S. Peter*

PERIOD 4. 1605–1667

Period 4: **(1605-1667)** From Pope Paul V to Pope Alexander VII

Period 4.a: **(1605-1529)** Carlo Maderno

Paul V

Paul V (1605-1621) was named pope just on the hundredth anniversary of the start of the construction of the new basilica. During his tenure, the longitudinal body was built in an easterly direction, as well as the secondary spaces (*cappella del coro* and *cappella del Santissimo Sacramento*), the atrium and the facade [1].

Over 100 long years the conception of the building had changed substantially. In the early years there was an optimism that a new, beautiful and modern building should replace the old one. However, in the times of Pope Leo X, people began to look to the past as they wanted to continue with a building begun to be built in the past. In the middle of the century a "*rivolta della memoria*" began [2], since it was intended to materialize the existing go in historical memory, which was seeking a relationship with the present.

In fact, for Tiberio Alfarano, the old and the new building were simply different *strutture* of the same temple, called the Vatican basilica [3]. And also, when the construction was completed, the canonicals stated that *Haec non est novi templi constructio sed veteris redificatio et renovatio* [4].

This conceptual evolution mutated in parallel with the typology of the building , and especially on the longitudinal body to the east. Like the old basilica, also the new building, from the foundation, had been conceived with longitudinal typology. After the Sacco di Roma, a renunciation of the longitudinal body was seriously considered, and Michelangelo erected a centralized plan as an artistic ideal, while the surviving part of the nave of the ancient basilica, which was still under the jurisdiction of the Capitolo [5], it became a citadel of the opposition. After its reform, it again offered a space for worship (thus also guaranteeing the material basis for the existence of ecclesiastics), and generated new topics for historical research.

The interest of Roman theologians turned to the history of the early basilica, perhaps sparked by Protestant criticism [6]. Between the year 1558 and the year 1568 the manuscript of the Augustinian scholar hermit was drawn up Onofrio Panvinio: *De rebus antiquis memorabilius Basilicae Sancti Petri Apostolorum Principis Vaticanae libri VII,* shortly after the aforementioned treatise of Alfarano. Panvinio declared that the choice of a basilical typology was a deliberate alternative to the "*templi circolare o quadrati dei pagani*", While Alfarano related its shape to the vision of the cross of Constantine before the battle of Ponte Milvio. Alfarano drew his plan of the old basilica on a copy of the floor plan of Dupérac [7], with which he was able to demonstrate that with the realization of Michelangelo's project, much of the old consecrated land occupied by the tombs of the martyrs was renounced. Having studied the history of the old basilica, but not that of the new construction, Michelangelo considered the author of the original project for the new building, since Michelangelo's association with Julius II was too obvious. The idea of the centralized plan was projected, therefore, in retrospect, as the basis of the initial project, while the work and the name of Bramante began to fade [8].

Criticism even ceased in front of the pope and, for example, the esteemed contemporary history scholar Pablo Emilio Santoro affirmed that Julius II was more interested in worldly fame than in the glory of God, and therefore was riddled with the grave sin of the demolition of the ancient basilica of S. Peter [9].

The ecclesiastics criticized the functional deficits of Michelangelo's building, Alfarano listed them scrupulously and Clemente VIII's master of ceremonies, Giovanni Pablo Mucante, came to the conclusion that "*La nuova Basilica di S. Pitro è poco adatta alle messe e non conforme alle esigenze della Chiesa*" [10].

The new basilica

The will of Pope Paul V to finish the basilica of S. Peter is well known. For example, the Mantovan legacy in Rome states that "*Il Santo Padre ha dei grandi progetti per la construzione, così come si addicono ad un principe que unisce il massimo potere spirituale a quello temporale*" [11].

Paul V wanted to leave a legacy for humanity, since the completion of a building that seemed to never end was really in his hands, and therefore its completion constituted a new impulse of the Renaissance spirit [12].

Since the pontificate of Clement VIII, the old Deputation entrusted to the Fabbrica had been replaced by a Cardinal Congregation (which initially consisted of three cardinals, but their number was subsequently increasing) [13]. With the passage of time, the number of people meddling in the development of the works increased, creating various pressure groups, which included even the group of architects. The basilica already seemed an immediate reality, and everyone wanted to be heard, and for this reason the pope had obstacles from all over.

On the one hand, Cardinal Cesare Baronio was against the demolition of the old building [14]. Paul V instead continued with the works, and instead commissioned the librarian and archivist of the capitol, Giacomo Grimaldi, to write an exact and exhaustive description of all the parts of the old building and all the objects it housed. Similarly, he commissioned the painter Domenico Tasselli to make the necessary drawings [15]. Acting like a true historian, Grimaldi carried out detailed studies including historical references, incorporating historical and artistic arguments (especially comparisons between different styles). In 1620 the work was completed under the name "*Instrumenta authentica*", whose title clearly indicates its legal function as the official record of all the sacred objects of the basilica. As a final result of these activities, many thought that the new building should preserve the surface of the old basilica, as a reliquary, as Alfarano had previously proposed [16].

On the other hand, what could be called the *Fazione toscana* arose, which had Maffeo Barberini (the future Pope VIII) as its spokesman, and which tried to save the "*gloria di Michelangelo Buonarroti* ". Therefore, this group did not pretend to defend the construction of the new basilica (and against the renovation of the old one), but rather they pretended to defend an aesthetic ideal that already belonged to the past. However, Maffeo Barberini was able to do nothing against the project of the longitudinal body, also taking into account that his protests began when the pope had already made the decision [17]. For this reason, years later, once appointed pope, he became the main enemy of the building, even going so far as to accuse Carlo Maderno, with all kinds of tricks, when the building was already finished.

State of the works

Contrary to the complicated situation, the work was carried out in a hurry. Pablo V was elected on May 1605, and on September 19 of the same year he announced his decision to demolish the old building. Five days later the Sacrament that was preserved in the old building was transferred, in a solemn procession, to the Gregorian Chapel of the new building. Thus began the demolition of the remains of the old basilica, even before there was an agreement that it should replace it.

In May 1606, an architectural competition took place before the Congregazione della Fabbrica, to finish the Michelangelo building heading east. In this competition Maderno, Cigoli and eight other invited architects were able to present sketches of their projects. As a result, Maderno and Cigoli were invited to make some models. As expected, the chosen project had been carried out by Carlo Maderno, who at that time held the position of chief architect of the Fabbrica.

Expansion projects of Michelangelo project at the beginning of the papacy of Paul V

The projects presented to the consultation of Pope Paul V in May 1606, can be divided into two groups.

- The first group of projects tries to combine the western body, as it was, with a new longitudinal body.

Drawing Tav. 27. Filipo Buonanni

The simplest project is shown in the engraving *Tabvla 27 "Ichonographia Templi a Bonarota delineati cum aditamento incoepto sub Paulo V"*, published by the Jesuit Father Filipo Buonanni, in 1696 [18]. The engraving shows a long central nave, with 3 rectangular chapels on each side, inserted between Michelangelo's centralized building (the project uses the Dupérac's floor plan layout) and the facade (Fig. 7.117). It is as if its author had cut out the facade of Dupérac's drawing and moved it away from the central body, and in the free space created in the middle he had inserted a longitudinal body [19]. Due to its precariousness, it is very possible that the project was carried out by someone other than an architect, as could it have been Alfarano. In fact, Buonanni comments that this engraving was kept in the archive of the basilica in the same place where the Alfarano manuscript was found. However, Paul Letarouilly, who also knew this engraving, attributed it to Domenico Fontana, although he did not state his reasons [20].

Drawing n. 2352. Accademia Nazionale di S. Luca. Ottavio Mascherino

Another project of this group is the one meticulously elaborated by Ottavio Mascherino (Fig. 7.118), dated between the years 1584-1585 [21], and preserved in the Accademia Nazionale di S. Luca, Mascherino Fund, n. 2352. In this project, the Michelangelo building is extended by adding two chapels (on one side the *Cappella del Coro*, and on the other side the *Cappella del Santísimo Sacramento*), and as a continuation of them a longitudinal body of three *campate* with chapels sides, a narthex and finally a small facade atrium composed of columns on all sides, which ignores the compositional guidelines of Michelangelo's facade. In addition, there is an imposing facade in the narthex and atrium area that allows access to the building from three of its sides. This building had an utopian character, since it was about 300 meters long, compared to the 200 meters approximately of the current building.

Drawing GDSU 101 A. Carlo Maderno

Carlo Maderno made a more real project, as shown in drawing GDSU 101 A (Fig. 7.119). In this project, each of the corner chapels of the Michelangelo building (Cappella Gregoriana and Cappella Clementina) was duplicated and, from the eastern arm of the cross, a longitudinal body of three sections emerged. This project also does not take into account the compositional guidelines of Michelangelo's facade [22].

- The second group of projects try to save Michelangelo's project, expanding it by means of annexed spaces so that it can be accepted by the clergy

Anonymous drawing American Academy. New York. Giacomo Della Porta?

Within this group there is an anonymous drawing, which can be dated to 1589 (Fig. 7.120), which could perhaps have been made by Giacomo Della Porta, or one of his collaborators. This project proposes to stretch the eastern arm of the centralized floor plan made by Michelangelo, in order to make room for two lateral lobbies at the entrance and some secondary rooms. This project fully respects the facade sketched by Dupérac [23].

Drawing GDSU 100 A. Carlo Maderno

A second project made by Maderno can be seen in GDSU 100 A (Fig. 7.121). This drawing shows the floor plan of Dupérac with the stretched eastern apse with the end of articulating two chapels at its sides (*Cappella del Coro* and *Cappella del Santísimo Sacramento*), including a narthex and topped by a reduced version of the facade of Dupérac, with only four columns.

Drawings GDSU 2635 A and GDSU 2633 A. Lodovico Cingoli

The florentine architect and painter Lodovico Cingoli (disciple of Buontalenti) [24], made at least 20 sketches and large projects, among which are, for example, the drawings GDSU 2635 A (Fig. 7.122) and GDSU 2633 A (Fig. 7.123). The general objective of these projects is to maintain the eastern apse of Michelangelo (sometimes it is lengthened), and to have a large portico on the south side, made of large columns and piers. The proposals are highly inventive and varied, although none of them is adequately integrated with the building already built, among other things due to the use of a different compositional language from that used by Michelangelo.

Drawing Biblioteca Apostolica Vaticana. Arch. Cap. S. Pietro. Fausto Rughesi

Another very original proposal was made by Fausto Rughesi (Fig. 7.124) [25]. This project shows an oval atrium, framed by porticoes based on columns, replacing the old longitudinal body. Fausto Rughesi's proposal stands out for the incorporation on the east side of a large atrium with a guaranteed shape framed by a portico based on columns. Clearly, this atrium was intended to be the substitute for the old longitudinal body. Again this project does not integrate successfully with the building already built, since the atrium, far from having been designed based on the compositional rules used by Michelangelo, uses a completely different compositional structure, and what is worse, due to its size and shape rivals the existing building, creating a tension, which translates into an evident lack of integration.

Drawing GDSU 264 A. Carlo Maderno

Maderno had the enormous advantage of being able to listen to the different positions on the extension of the basilica. And based on this he deduced that the best strategy would be moderation. Michelangelo's building was so impressive and meticulously designed (see chapter 8), that without a doubt the extension should be designed using the same compositional strategies as Michelangelo and trying not to rival his design. The extension should flow from the interior of Michelangelo's building, in the same way that he made the design of his building, flowing from the "central core of Bramante". And this is what he did in his drawing GDSU 264 A (Fig. 7.125)

In this project, Miguel's floor plan remains intact, lengthening only the eastern apse in order to locate on its sides the two chapels (*Cappella del Coro* and *Cappella del Santisimo Sacramento*), that had already been articulated in his previous proposal GDSU 100 A. Articulating with these chapels a small longitudinal body is generated, with three naves and three *campate*, which preserves the spirit of Michelangelo's project. Without a doubt, with this project, Maderno wanted to avoid all possible objections that could be made to him, and in fact, thanks to this project, he was commissioned to enlarge the building.

State of the works based on Carlo Maderno's project

In March 1607, excavations began in the area of the *Cappella del Santisimo Sacramento*, and on May 7 the laying of the first stone took place and construction began.

But strangely, at the beginning of the autumn of the same year 1607, Paul V ordered that the facade be built first, and then that the union with the Michelangelo building be made later [26] The reason for this decision is not known although everyone attributes it to the same reasons. On the one hand, and perhaps the most important reason, is that Paul V was impatient to take credit for the completion of the building, and thereby go down in history (and incidentally anger Maffeo Barberini even more). No doubt, the pope wanted to see his own name *Paulus Burghesius Romanus* written as soon as possible on the pediment of the facade. On the other hand, Maderno wanted to start with the facade, since it was the part with the greatest construction difficulty. Finally, I think there is another reason, which perhaps nobody put forward, but which everyone had in mind. Given the existence of a huge amount of internal tensions, one way to guarantee the future of construction is to see it as advanced as possible, and in the shortest possible time, in order for citizens to get used to its existence, and thus guaranteeing the construction of the building.

As a result, in October 1607 the atrium was dismantled, and the act of laying the first stone was carried out there again, on February 10, 1608. However, in April 1608, the *Congregazione della Fabbrica* met again and decided to modify Maderno's project. The interior apse should be replaced on the east side, and instead have a longitudinal body, in which the central nave was widened and extended to the facade. Therefore, Michelangelo's centralized building had to be extended through a longitudinal body, but without an interior apse. In this way, after a long process, the building would finally have the shape imagined by Bramante. A building with a centralized floor plan, based on a mixed quincunx-naves typology, that will be lengthened towards the east side by means of a longitudinal body with naves.

Maderno had to modify his project again, anguished by the deadlines, and with a very small margin of design freedom. Despite construction, from June 1608 it advanced at a dizzying pace. The number of workers on the construction site increased dramatically [27], and new technologies were developed and experimented with [28]. The pope continually appeared at the work, stimulating its rapid development.

An anonymous view from this year (Fig. 7.126) shows the facade under construction, and the entire front square was used as a construction office [29].

In the spring of 1612 the facade was complete, and in September of the same year 1612 Paul V ordered that it be enlarged with two annexes that would serve to support two bell towers [30]. The great barrel vault above the central nave of the longitudinal body was completed at the end of 1614.

In the spring of 1616 the dividing wall of Antonio da Sangallo was finally demolished, and on Palm Sunday it was possible to walk from one part of the building to the other [31].

Follow-up of the design and construction process through existing engravings

Engravings by Mattheus Greuter

In 1613, Mattheus Greuter published two large-format engravings (Fig. 7.127) (7.128). The first shows the floor plan of the building once it was finished, and the second shows the facade with Maderno's bell towers, which were not executed. On the ground floor there is a dedicatory document by Maderno to Pablo V, in which the motivations for the new building are set out in detail, and the construction measures adopted by Maderno are explained. This gives Greuter's engravings a more or less official character.

Engravings by Giovanni Maggi and Jacopo Mascardi

In 1615 was made teh panoramic engraving of S. Peter and the Vatican Palace, made by Giovanni Maggi and Jacopo Mascardi, and printed with two copper plates (Fig. 7.129). It is interesting especially as a source on the state of the square. The facade of the basilica largely corresponds to the Greuter engraving.

Engravings by Martino Ferrabosco

Martino Ferrabosco made the most important drawings of the basilica of S. Peter (Fig. 7.130) [32]. The set of engravings is divided into three groups. The first group shows the old basilica through drawings made by Alfarano, Grimaldi and Tasselli. The second group shows the building of Pablo V, but including some “supposed improvements” made by himself, relating to the square and surroundings, bell towers and the configuration of the choir and the *Grotte Vaticane*. The third group shows a set of 15 engravings of the most important parts of the building, made in detail.

There are horizontal and vertical sections of up to 6 different planes, in a 1: 100 scale, which, arranged side by side, provide a very complete definition of the new basilica of S. Peter. The still unnumbered tables were published for the first time in 1620 under the "*L'architettura di S. Piero in Vaticano"*, and later different volume editions came out.

The projet(s) of Carlo Maderno

Maderno has played the most important role in the current building even though his margin of freedom was very restricted, due to the advanced state of construction in 1500, and also due to the rigid directives of the client, who, as if that were not enough, changed his mind quickly. This makes it difficult to assess his personal contribution to the new basilica of S. Peter [33], although having analyzed his design process in depth, it appears that Maderno had great talent, an enormous project vision, and an enormous capacity for work.

From my point of view, art history has an outstanding debt with Maderno.

The facade of Carlo Maderno

The first and most important problem that Maderno had to solve was the shape that should be given to the facade. Until then, the facade had had a marginal role in the history of the design process, and none in the history of the construction process.

Antonio da Sangallo made several facade designs, but in his final project established the different parts of the facade in an unstructured and unattractive way. On the other hand, the atrium with Michelangelo's columns could have had any aspect (without a doubt with great monumetality), but would have been anything but a facade.

However, the construction of the longitudinal body had pushed into the square an important architectural element that had to be properly designed, since the fabulous dome of Michelangelo disappeared from the visual field. In addition, the new front part had to satisfy the demands of the papal ceremonial (ignored by Michelangelo), and it was necessary to create a connection with the Papal palace and incorporate a nartex and a loggia of blessings. For this reason, Maderno had a big responsibility.

To carry out the architectural composition of the facade and comply with all the indicated restrictions, Maderno experimented with three different ways.

In the first place, with the GDSU 101 A project, Maderno experiments by arranging a pillar-based portico in front of the entire front of the longitudinal body, articulated only by alternating pillars and openings, forming a 7-axis atrium, and replacing the colossal columns of Michelangelo by paraste. It is possible that the four central piers supported a pediment, although they are in the same line as the others. The result was a flat facade, with vertical linear perforations and of enormous width, not very different, therefore, from the current appearance of the basilica.

Second, with the GDSU 100 A Maderno project, he tries to imitate the outstanding central body of Michelangelo's project. However, the atrium is now narrower and has only 5 axes, and from its central part 4 colossal columns emerge, erected in front of the facade, taking up the central motif of the Michelangelo plan (as we know it from the Dupérac drawing).

Third, his project for the GDSU 264 A Maderno contest widens the atrium again, and takes special care in the structure of the facade. For this reason, he resorts to a system of raised facade, which he had developed with such success 4 years ago in front of Santa Susanna, and which the Pope liked so much. A portico similar to the one in Dupérac's drawing is projected onto the surface of the wall, so that the degree of relief decreases from three-quarter columns to semi-columns and paraste. It is evident that Maderno was trying to achieve a kind of resonance in the facade, providing it with greater depth. A new architectural style was undoubtedly being created based on visual scenography.

When later, at the Pope's request, Maderno had to design the lateral annexes for the bell towers, they were also perfectly integrated into the facade (see chapter 8). In this way a massive block arose, arranged across the width, in which Michelangelo's porticoed front, with its temple motif, appears only as an interior partition.

The dominant aspect of this new facade is undoubtedly the attic, which extends over the entire facade block, providing a balustrade of statues, a motif that (in tune with the glazed balcony windows on the first and second floors, and the opulence of the individual forms) generates a great similarity to the facade of a palace.

This compositional idea could have been extended to the papal palace as well, as shown in drawing GDSU 263 A, which is the first of all surviving projects that treats the basilica and the papal residence as a as a single integrated set. In this project the front of the church would be framed by two wings of the palace more or less of the same height, and projecting towards the square [34]. The image of S. Peter as a papal palace church would have been undeniable.

The longitudinal body of Maderno

In general, the project of the longitudinal body should face two major problems.

The first problem was the *Cappella Paolina* [35], which should be integrated into the longitudinal body, but without damaging its internal appearance. Maderno had thoroughly studied this problem already in his competing project, and proposed to keep the first north side chapel below the presbyterial area of the *Cappella Paolina*. In the great longitudinal body, with its wide chapels, this produced a discreet symmetry, echoing the cross shape of the western body. To build the north side chapel, during the years 1611-162, Maderno had to demolish the presbyteral area of the *Cappella Paolina*, rebuilding it in one position and with slightly modified dimensions. At the same time, he made an easy connection between the ceremonial rooms of the Palace and the coronation hall located above the narthex with the loggia of blessings. The latter was used for the first time on Ascension Day in 1611 [36].

The second problem was the connection of the longitudinal body with a centralized plan building. In the central nave there were no difficulties, so it was easy to capture a Renaissance ideal there. Without a doubt, Maderno was concerned about the proportion between the height and width of the central nave (like Antonio da Sangallo), so he decided to widen it, perfectly articulating the width of the central nave with the internal separation of the large counter-piers. The lateral naves correspond to the small inner lateral naves of the great Renaissance projects with 5 naves, their axes are those of the 40-foot niches of the piers of the dome, or rather the aedicules of the altars that Antonio da Sangallo had replaced long ago. Already in his first drawings, Maderno had followed this solution foreshadowed at the Dupérac plan. On the other hand, a longitudinal body with a greater number of naves was conceivable only with a degrading cross section, of the basilica typology, something that was incompatible with the great exterior order that covered the centralized plan building of Michelangelo. Maderno had no choice but to continue it on the flanks of his longitudinal body. Thus arose the *vuote* walls similar to theatrical frames that today can be seen from the ceiling of the longitudinal body. It was a patent violation of the principle of architectural *verità* that Michelangelo had praised so much in the S. Peter of Bramante, and claimed by himself [37].

Surprising is the interior appearance of the aisles. Relatively narrow and tall, all three *palmi* support longitudinal oval drum domes. But the passages between them are quite low. They are framed by aedicules with lowered arch pediments open at the bottom, the same type that Maderno had in mind in one of his early preliminary drawings. Its meaning is of a constructive nature, since it was necessary to prop up the piers of the central nave against the lateral thrust of the great barrel vault. In fact, behind the pediments of the aedicules, there are massive barrel vaults with a lowered arch, tense between the piers of the nave and the perimeter wall.

In the upper part of the passage aedicules of the lateral naves there are transverse walls with large windows fitted with glass, as a solution to the lighting problems that would inevitably be generated with the exterior architecture of Michelangelo, based on windows arranged in a completely different way. The oval domes have high drums, their lanterns, which are stretched out like giraffe necks, catch the daylight thanks to circular openings in the terrace roof. Also the empty spaces in the upper part of the barrel vaults with lowered arch of the passages would have had to be illuminated by openings in the roof, although they were later bricked up, probably because it was impossible to keep them to rain.

This architectural arrangement had another advantage, which perhaps was always present in Maderno's mind, and that is that the lateral naves appear lined by columns, which can be understood as reminiscent of the ancient basilica [38].

The old building was also physically present in the new one, in the form of recovered material from the demolition of the longitudinal body of the old basilica, which Maderno used in abundance [39]. As has been previously commented on repeatedly, both Bramante and Antonio da Sangallo had used some columns from the old basilica, arranging them with such mastery in the new building that it would appear that they had been manufactured specifically for the new building. With this ecological exercise of recovery-reuse, Maderno wanted to show that the old basilica of Constantine continued to exist in the new building, and for this reason he inserted the old columns in the facade and in the atrium of its longitudinal body in a very visible way. In fact, the two exceptional African marble shafts that flank the central entrance of the facade were the same ones that started the rows of columns in the central nave of the longitudinal body of the old building.

The “central nucleus” of the present building is from Bramante, but Maderno managed to modernize it, integrating it into his new building in a masterful way. In fact, Maderno made three important decisions that subtly modified the appearance of the “central core of Bramante” [40]. In the first place, and as previously it had been planned that the great central piers of the dome would house the most important relics of the basilica,

Maderno placed balconies on its internal face, and in front of the upper niches, from which the relics could be shown to the faithful.
Secondly, the *Confessio* in front of the Apostle's tomb was excluded from the pavement lifting carried out throughout the building, and Maderno decided to give it the horseshoe shape that it has today, and cover it with marble [41].
Third, Maderno reorganized the spaces under the new raised floor of the basilica. Between the pavement of the old basilica and that of the new building, an intermediate floor had been generated that seemed buried, initially under the longitudinal body (*Grotte vecchie*), and also under some parts of the western body (*Grotte nuove*). which were used to house objects from the old basilica [42]. Maderno arranged the spaces so that they could be used in the best possible way, and for this reason, among other things, he inserted stairs in front of the eastern piers of the dome that connected them to the span of the dome. As a consequence of this complexity of buried spaces under the new building, in 1618 the first guide to this artificially created passage of *Roma sotteranea* came out in Viterbo [43].
Looking back at the widely branched activity of Maderno, his link with the times is evident, and he was able to project a S. Peter as an architectural *manifesto* of a Church that was about to overcome its crisis. Consolidated from the economic point of view, with an internal structure and a more solid position towards the outside world, it found a new relationship also with its own tradition. The radically innovative conceptions of the last century were therefore replaced by a kind of pragmatism, and a balance was sought between memory and planning, between religious and worldly interests, between spirit and power, also at the price of a certain loss of the artistic level.
We have a painting from 1627 that shows the state of the basilica at that time, although the author added the towers, which had not yet been built (Fig. 7.131).

Pope Paul V died on January 28, 1621, and his successor Gregory XV was appointed pope on February 9, 1621.
Pope Gregory XV died on July 8, 1623, and his successor Urban VIII was appointed pope on August 6, 1623.

Period 4.b: (1629-1667) Gian Lorenzo Bernini

Carlo Maderno died in Rome on January 30, 1629, at the age of 73. On the day of his death, Gian Lorenzo Bernini was 29 years old. Gian Lorenzo Bernini was Maderno's successor in 1629, and he held the position of *primo architetto* of the Fabbrica until his death, on November 28, 1680.

Gian Lorenzo Bernini

Gian Lorenzo Bernini, was born in Naples on December 7, 1598, and died in Rome on November 28, 1680, at the age of 81). His father was the sculptor Pietro Bernini, born in Sesto Fiorentino, and moved to Naples to work on the Charterhouse of San Martín. Gian Lorenzo Bernini, when was six years old, moved to Rome, together with his parents, because his father worked under the protection of Cardinal Scipione Caffarelli-Borghese, the Pope's nephew.

Rome at the beginning of the 17th century was a city of exceptional, innovative and revolutionary artistic fervor, which welcomed artists from all over Europe in a continuous confrontation of artistic ideas.

Bernini's works revealed his enormous talent since his childhood. In his early stylistic phase, Bernini demonstrated an absolute interest and respect for Hellenistic sculpture, in works that perfectly imitated the ancient style.

Bernini in S. Peter

Bernini was working on S. Peter for 50 years, and for seven popes (including Paul V and Gregorio XV (for whom he only worked as a sculptor) [44]. Throughout this long period, the bronze ciborium on the altar of the tomb, the decoration of the piers of the dome, the southern bell tower of the facade (which was later demolished), S. Peter Square and the Royal Scale of the Vatican Palace were made [45].

Urban VIII (1623-1644) was the first pope to hire Bernini (in 1629), and previously, when he was only a cardinal, he had already referred to Bernini as the "*Michelangelo del suo secolo*" [46].

As previously said Urban VIII was always contrary to the longitudinal body of Maderno [47], although in 1626 he had no choice but to consecrate the new building.

Now the pope's goal, once the basilica was built, was to transform it into a stage for the self-representation of the *Ecclesia triumphans*. According to his vision, within this setting, the usual masses of faithful and pilgrims would transform into an audience, who would admire the *meraviglie* staged by his favorite architect Bernini. However, the bad experience of the Pantheon, and Bernini's exclusive dedication to S. Peter fostered all kinds of envy, and after the failure of his project for the bell towers, his stardom plummeted.

Pope Urban VIII died on July 29, 1644, and his successor Innocent X was appointed pope on September 15, 1644.

During the papacy of Pope Innocent X (1644-1655), the design of the unattractive bell towers built by Bernini in the Pantheon was still discussed, and perhaps for this reason the pope commissioned his eternal rival Borromini, with the best project of his time, the renovation of the Lateran Basilica, urging it to be completed by the jubilee of 1650.

Pope Innocent X died on January 7, 1655, and his successor Alexander VII was appointed pope on April 7, 1655.

Pope Alexander saw fit to give Bernini a second chance, his talent was indisputable and society had already punished him enough. The fact that Bernini, despite all these turbulences, remained as an artistic reference can easily be misleading, since it could be thought that he had been a great inspirer of new ideas, later elaborated and executed by his numerous collaborators. But a deep research discovers that what is perceived as a spontaneous genius, was the fruit of long-term effort and synthetic planning work. And in this way those *tutte d'un pezzo* structures had arisen, such as the ciborium and the colonnades, which finally silenced the critics.

The chimera. The origin of the ciborium-baldachin

As the new basilica was already built Bernini's work at S. Peter focused mainly on the interior decoration of the building, but there were also three tasks that required an architectural intervention.

The most urgent design activity concerned the liturgical center of the basilica [48] because, since the demolition of the *Tegurium* in 1592, under Clement VIII (1592-1605), the tomb of the Apostle and the altar of the pope were uncovered, in the middle of the huge space under the dome.

Paul V (1605-1621) decided to separate the altar from the tomb, moving it to the apse of the western arm, where it was crowned by a ciborium and framed by an enclosure inspired by the pergola with the *colonne tortili* of Constantine [49]. On top of the tomb, Maderno built provisionally a colossal canopy, with ephemeral material, which was later replaced under Pope Gregory XV (1621-1623) by a permanent structure. On the other hand, Urban VIII (1623-1644) thought that the logical thing was for the altar to return to its traditional place, above the tomb of the Apostle. Thus was born the idea of a *chimera* (synthesis) between the ciborium and the canopy.

Although Maderno remained *primo architetto* of the Fabbrica, Urban VIII entrusted the commission to erect the new structure to his favorite architect Bernini, and Maderno's assistant, Borromini, collaborated on the design simply as a draftsman. The ciborium of the altar should stand out among the travertine pomp and other marbles inside the basilica since it would be made of gilt bronze. And as is known Urban VIII (1623-1644), ignoring the protests by the citizens, had the bronze decoration of the *travature* of the Pantheon *pronaos* disassembled and cast for this purpose [50]. The casting of the monument in bronze, with a height of about 130 *palmi*, was an unusual and exceptional work (Fig. 7.132).

Starting in 1624, work was done on the foundations of the four marble plinths that should have supported the enormous weight. The excavations of the foundations were carried out in the immediate vicinity of the memory of the Apostle, without it being touched. In 1625 the bronze columns had been erected. Later its cover was redesigned from scratch, as can be seen in the drawings and in a set of incisions and medals.

In the definitive version of the ciborium cover (Fig. 7.133), the small crossed arches of Constantine's ciborium were replaced by a *fascio* of four ascending volutes, which hold a globe on which a statue of the *Risorto* must have stood, although it was later replaced by a cross. As a result, the entire central span became a symbolic place of the Resurrection, which also inspired Bernini in his redecoration of the crossing piers [51]. In 1635 the gigantic work was finished.

The bell towers

The lateral towers were the only exterior part that Maderno had not finished [52]. After the completion of the Maderno facade and the placement of the large inscription on the frieze (in 1612), Paul V (1605-1621) ordered that two bell towers be erected on each side of the facade. According to Maderno's project, they had to support subtle structures for the bells, with a height of one and a half floors. Construction began in 1618, and progressed slowly, as considerable problems with the foundations arose on the south side. In 1637 Urban VIII (1623-1644) commissioned Bernini to design the towers, and as expected his project was better to Maderno's (Figs. 7.134 and 7.135) [53].

Two complete floors and a structure for the bells would be built on the facade. Unlike Maderno's *capricci*, Bernini's bell towers were designed to establish a dialogue with Michelangelo's dome.

In 1638 the entire two floors of the south bell tower were erected (Fig. 7.136), and Bernini had a 1: 1 wooden model made for the third floor in order to study its design, since the proposals seemed too small to the pope, while to Bernini was concerned about its weight, so his proposals had small dimensions and were light. Nonetheless, the two lower floors had severe cracks and, as a consequence, in 1641 both had to be dismantled [54].

The causes of the disaster were carefully examined by a commission, which detected foundation problems (referring to the Maderno substructure). But Bernini had made a basic error, since he had not taken into account the fact that the Maderno substructures had been added in a second stage to the facade block and therefore had been cemented separately. Therefore, Maderno had limited the dimensions of the bell towers to the width of these additions [55].

Bernini, on the other hand, supported the inner edge of his bell tower on the outer pillar of the original Maderno facade. Thus, under the new loads, both the foundations gave differently. The entire project was lost.

The successor of Urban VIII (1623-1644), the inflexible Pope Innocent X (1644-1655) ordered to liquidate the remains of the construction and confiscate Bernini's private patrimony in favor of the Fabbrica of S. Peter.

The problem of the bell towers plagued Bernini for a long time afterwards, as there are some compositional sketches of the facade with a central block, with five axes, and two separate bell towers (similar to the large model by Antonio da Sangallo), and other sketches of colonnaded porticoes (similar to Michelangelo) in front of Maderno's facade line [56]. But these were more about contributions to the vast field of S. Peter's *virtuale* architecture than about serious projects to be built. In fact, Michelangelo's dome remained the sole protagonist of the building, limited in its visibility, splendidly isolated, without being part of a baroque ensemble that was emerging in front of him.

The restructuring of S. Peter Square

It was evident that once the new basilica was built, the new square should be restructured and articulated with the building based on the axis recently reinforced with the obelisk [57]. Alexander VII (1655-1667) wanted the square to become the central element of his vision of Rome as the capital of Western Christendom. On the other hand for Bernini the design of a magnificent square will allow the possibility of washing away the affront suffered in the construction of the bell towers and at the same time correcting the *difetti* of the Maderno's facade [58].

The urban structure of the square seemed to have no solution. On the one hand, the square had a very large surface, but it was delimited in an asymmetric way, since the Borgo road system was not oriented with the axis of the basilica. On the other hand, the basilica should constitute the axis of symmetry of the square, whose center was previously fixed with the obelisk, which had been located at a very symbolic distance from the tomb of the Apostle, 1440 *palmi* ($10 * 12^2$, symbol of the expansion of the Church and the 12 Apostles). In addition, the terrain was not flat, but rather had an upward slope from east to west, generating a gap between the Borgo and the basilica of about 27 *palmi*. These were the conditions for the project of a square that had to be designed to accommodate large crowds, and allow an optimal view of the loggia of blessings in front of the Church. It was also necessary to create a dignified and comfortable access, protected from rain and sun, both to the basilica and the Vatican Palace. It was therefore a complex task.

On the same day of his election, April 7, 1655, Alexander VII (1655-1667) summoned Bernini for the first time to make a complete analysis of the square, and in 1656 he communicated his decision to give the space in front of the basilica an architectural structure. In September of the same year 1655, surveys were carried out on the foundation ground, and in December 1655 certain houses destined for demolition were acquired. On August 28, 1657, the first stone was laid [59].

In a short space of time a huge work emerged. On the banks of the river Tevere, a port was established to unload the travertine blocks transported to Rome from Tivoli or Monterotondo. Alexander VII personally took care of numerous details, evidently driven by the feeling that his time available for construction was running out.

Bernini's design methodology, and the square project

It could be thought that Bernini's projects had been crafted quickly, purposefully, and resolutely put into practice, but in reality, throughout the entire construction period, the design process was arduous and ongoing, trying out new strategies and with a special obsession for details.

At the beginning of the design process of the square, the original idea of Pope Paul V (1605-16021) still persisted, that the square had a trapezoidal shape surrounded by porticoes and that was to be developed from the Borgo road network.

Faced with this idea, Alexander VII (1655-1667) proposed a closed symmetrical implant, in a similar way to that which had been planned by Carlo Rainaldi, perhaps already in the time of Innocent X (1644-1655). Bernini initially thought, in August 1656, about a rectangular square surrounded by arcades based on Doric pillars, of which a large model was built.

However, throughout the design process, the idea of creating a transversal oval-shaped square arose (it is always suggested that the idea came from the pope, although there are no historical references to confirm it), and based on these ideas Bernini carried out a new project, in March 1657.

An important voice in the Congregation of the Fabbrica was Virgilio Spada, who was interested above all in the functionality of the project, and argued that the porticos had to be dimensioned so that two chariots could be found. Based on this idea, he suggested that the porticoes should be open, and made with columns, which could also be better adapted to the oval shape of the porticos [60].

The result of the new planning phase was an oval square with a colonnade of binary columns (Figs. 7.137 and 7.138), and based on this project the act of laying the first stone was carried out in August 1657. In 1658, when 24 columns of the north wing had already been erected, Bernini worked on the project of the groups of pillars to be located in the access points and in the places of passage of the colonnades. This was a task of extreme difficulty, since the complex structures had to be adapted to the geometry of the oval plant (since there is not even a right angle on the whole plant).

Bernini's work then focused on the arms of the corridors, in connection with the Scala Regia of the Vatican Palace, whose construction was undertaken in 1663, and just then the idea of the whole became recognizable. Lastly, he focused on specifying the shape that the eastern portico should have, the *terzo braccio*, which should have a clock tower, and shifted a little towards the Borgo. However, this project was not carried out [61].

At the death of Alexander, on May 22, 1667, the construction had reached the current state (Fig. 7.139), and no one of the successors was intended to continue it, so the *terzo braccio* was never built, although the works only lasted with the placement of the statues, and ended in the year 1700 [62].

The resulting square was part of the arsenal of *classici* prototypes in the history of architecture [63], and soon was impregnated with a strong symbolic character. Bernini defined the corridors between colonnades and the basilica as the arms of the church stretched out towards the world, and which should be maternally welcomed by all visitors to the square: "*i cattolici per confermarli nella fede, gli eretici per ricondurli alla Chiesa, gli infedeli per illuminarli alla vera fede*" [64].

Of course, there was no lack of criticism of the pope's projects, even from the *Cueria* [65] and the discussions in the Congregation of the Fabbrica were very critical. There were numerous functional objections against Bernini's and Alexander VII's definitive project. Even architects and purists were shocked that Bernini did not strictly follow the canon of the *ordini*, as well as the exclusive use of oblique angles throughout the portico. On the other hand, purist theorists would have preferred an *architettura obliqua* [66]. From an economic point of view, the portico was also criticized, arguing that there was a strong imbalance between expenses and results, and commented that the times were not suitable for luxury architecture.

However, the discussions subsided soon enough, but instead made it clear that the end of an era had been reached.

This era began with the beginning of the construction of a monumental building that represented the authority of the Pope and the Church. This objective was maintained over time, from Pope Nicholas V (1447-1455) until Pope Alexander VII (1655-1667), and justified the completion of the new basilica of S. Peter over time, giving the necessary strength to overcome the enormous amount of problems that occurred.

However, times had changed and few now shared that goal.

However, something strange happened, since it is possible that the dissolution with the bond of power and authority had allowed the spirituality of Bernini's late work.

It is as if the pope Alexander VII and Bernini had added to the new basilica of St. Peter the spiritual essence that was missing in the 200 years of construction process.

And this spiritual essence remained in the basilica of S. Peter with the passage of time.

Notes 7 intro

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[2] Filippo Buonanni, "*Numismata Summorum Pontificum Templi Vaticani Fabricam Indicantia*", Chronologica ejusdem Fabricae narratione, ac multiplici eruditione explicata. Opus secundò impressum cum correctione, & aditamento (Roma: Ed. Imp. Domenico Antonio Herculi, 1696); Buonanni 1699-1706: Filippo Buonanni, Numismata Pontificum Romanorum, 2 vol. (Roma: Ercoli, 1699 and 1706)

[3] Filippo Buonanni, *Numismata Summorum Pontificum Templi Vaticani Fabricam Indicantia*, (Roma: Ed. Imp. Domenico Antonio Herculi, 1696); (Roma: Ercoli, 1699 and 1706)

[4] Johann Wolfgang Goethe, Sämtliche Werke nach Epochen seines Schaffens. Münchener Ausgabe, Herausgegeben von Karl Richter in Zusammenarbeit mit Herbert G. Göpfert, Norbert Müller und Gerhard Sauder, Edith Zehm // Band 2.2 Erstes Weimarer Jahrzehnt 1775 - 1786 2 / Band 9 Epoche der Wahlverwandtschaften 1807 - 1814 / Band 10 Zur Farbenlehre / Band 15 Italienische Reise / Band 16 Aus meinem Leben. Dichtung und Wahrheit / Band 18.2 Letzte Jahre 1827 - 1832 // 6 Bände (München: Carl Hanser Verlag, 1985)

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[7] Constantin A. Jovanotis, *Forschungen über den Bau der Peterskirche zu Rom* (Wien, 1877)

[8] Constantin A. Jovanotis, *Zu den streitfragen in der Baugeschichte der Peterskirche zu Rom* (Wien, 1878)

[9] Hans Hubert, 'Bramantes St. Peter-Entwürfe und die Stellung des Apostelgrabes', in *Zeitschrift für Kunstgeschichte*, 31 (Berlin, 1988), pp. 195-211

[10] Christoph Luitpold Frommel, ‘San Pietro, Storia della sua construzione’, in Frommel, C. L., Ray, S., Tafuri, M., *Raffaello architetto* (Milano, 1984), pp. 241-310

[11] Franz Graf Wolff Metternich, *Die Erbauung der Peterskirche zu Rom im 16. Jahrhundert I* (Wien-München, 1972), p. 13

[12] Without a doubt the best reference that illustrates the work of these historians is: Bruschi, A.; Frommel, C.L.; Wolfff Metternich, F.G.; Thoenes, C. (coords.). *San Pietro che non c'è: da Bramante a Sangallo il Giovane*, A cura di Tessari, Cristiano (Milano: Electa, 1996)

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[15] Arnaldo Bruschi, *Problemi del San Pietro bramantesco*, p. 120

[16] Christoph Luitpold Frommel, *San Pietro, Storia della sua construzione* (Milano, 1984), p. 264

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Notes 7. Period 1. (1447-1503)

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[3] Flavia Cantatore, 'In margine alla vita di Giannozzo Manetti: scrittura e architettura nella Roma di Niccolò V', in *Leon Battista Alberti. Architetture e Committenti*, a cura di Arturo Calzona, Joseph Connors, Francesco Paolo Fiore, Cesare Vasoli (Firenze-Rimini-Mantova: Leo S. Olschki Editore, 2009), p. 563

[4] Anna Modigliani (a cura di), Gianozzo Manetti, Vita di Niccolò V (Roma, 1999), p. 179

[5] Eugène Müntz, *Les Arts à la cour des papes pendant le XV^{e} et le XVI^{e} siecle* (Paris: Thorin, 1878-1882), I, pp. 4, 9, 28; Flavia Cantatore, *In margine alla vita di Giannozzo Manetti: scrittura e architettura nella Roma di Niccolò V* (Firenze-Rimini-Mantova: Leo S. Olschki Editore, 2009), p. 566

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FIGURES 7

Figure 7.1

Reconstruction of the main road structure of medieval Rome (in black) with the projects of Niccolò V and Sisto IV (dotted lines): 1) San Pietro; 2) Castel Sant'Angelo; 3) Fontana di Trevi; 4) Campidoglio; 5) Via Florida-Mercatoria; 6) Via papale; 7) Via dei Coronari; 8) Via Lata; 9) Vie Sistina e di Ripetta; 10) Via della Lungara; 11) Ponte Sisto; 12) Campo dei Fiori; 13) piazza di Ponte; 14) porto di Ripa grande; 15) porto di Ripa piccola (da Tafuri 1992)

Flavia Cantatore. *In margine alla vita di Giannozzo maneti: scrittura e architettura nella roma di Niccolò V* (art.). Florencia, Leo S. Olschki Editor E. (2009)

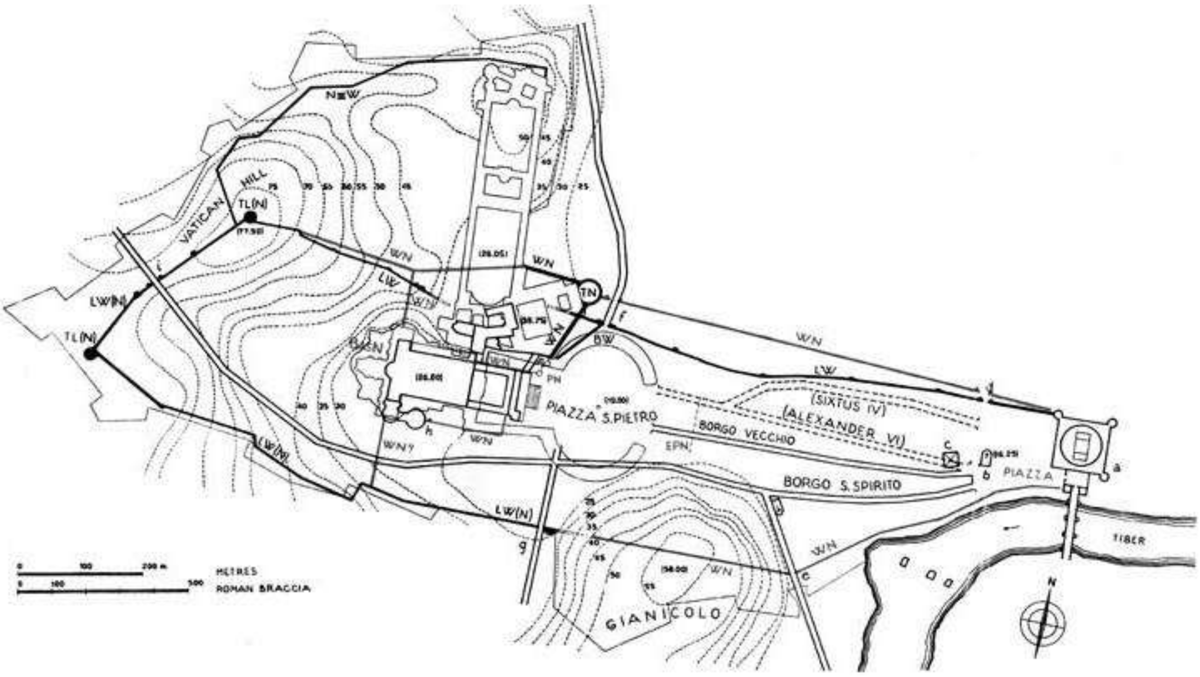


Figure 7.2

Borgo and the Vatican at the time of Niccolò V: a) Castel Sant'Angelo with towers of Niccolò V; b) site of the old church of St. Maria in Traspontina; c) Meta Romuli; d) porta Castello; e) porta Santo Spirito; f) porta San Pietro (or porta Sant'Egidio, or porta Viridaria); g) porta Cavalleggeri (or porta Torrione); h) original location of the obelisk; i) porta Pertusa; BW) Bonifacio IX wall; LW) Leonine wall; LW(N), Leonine wall towers rebuilt by Niccolò V; NIIIW) Niccolò III wall aroud Pomerium; TL(N), Leonine wall towers rebuilt by Niccolò V; TN) great Niccolò tower; WN) defensive wall of Niccolò V. in gray the structures designed by Niccolò V: BASN, Vatican Basilica; EPN, east limito f the square designed in front of San Pietro; PN, new main entrance of the Palazzo; WN, defensive walls

Magnuson, 1958

Figure 7.3

Portrait of a gentlewoman, detail of the palace of Niccolò V towards the courtyard of Belvedere

Davide Ghirlandaio

New York, Payson Collection

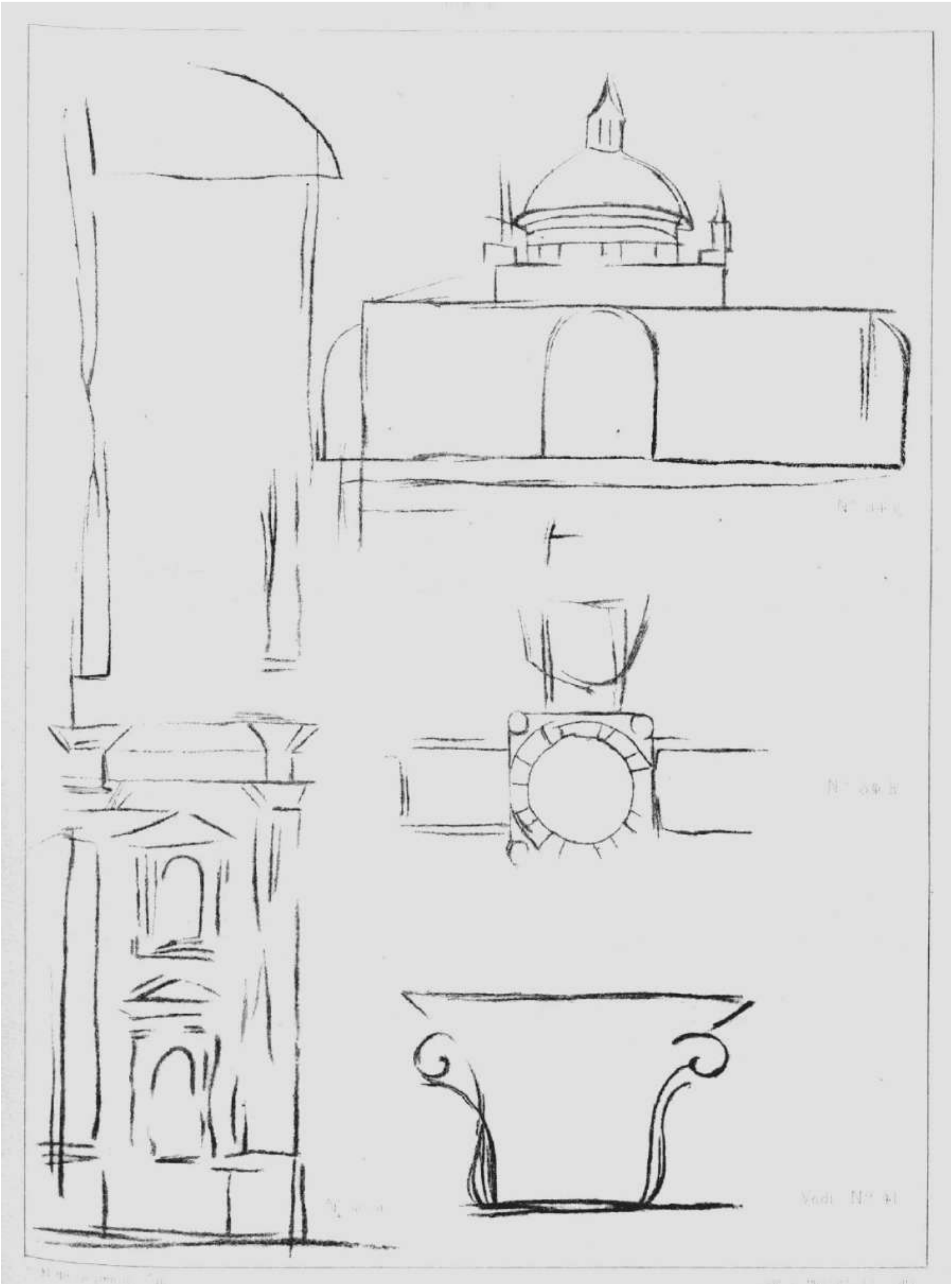


Figure 7.4

St. Peter's project

Bramante, highlighted by Geymüller

GDSU 20 Av

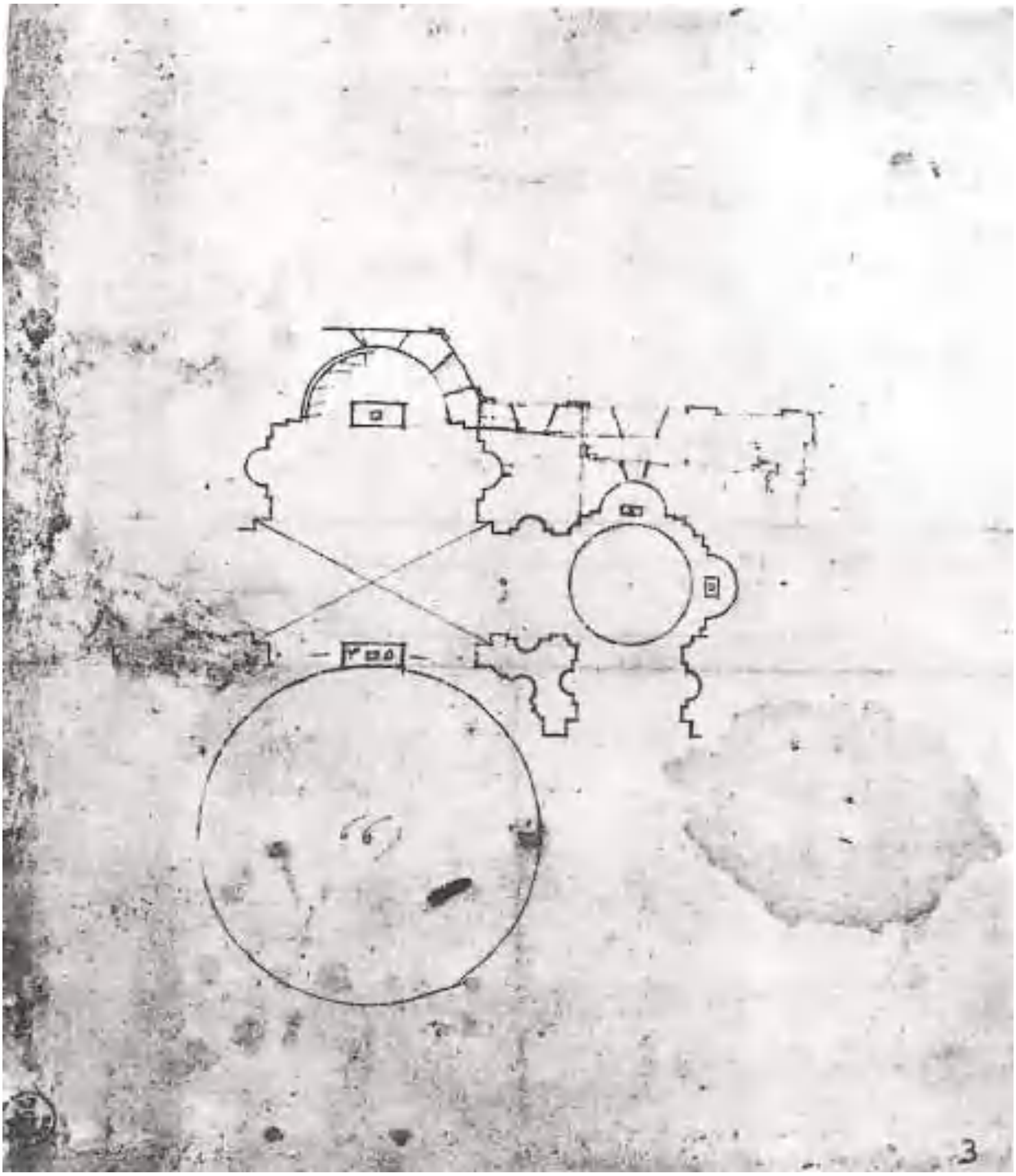


Figure 7.5

Project of the plan of St. Peter previous the drawing study by Bramante according to the Frommel of the hand of Antonio di Pellegrino, master's helper

Bramante Donato

GDSU 3 A

Figure 7.6

Bramante’s first project of the plant of St. Peter, rejected by Giulio II

Donato di Pascuccio di Antonio detto Bramante, 1506

GDSU 1 A

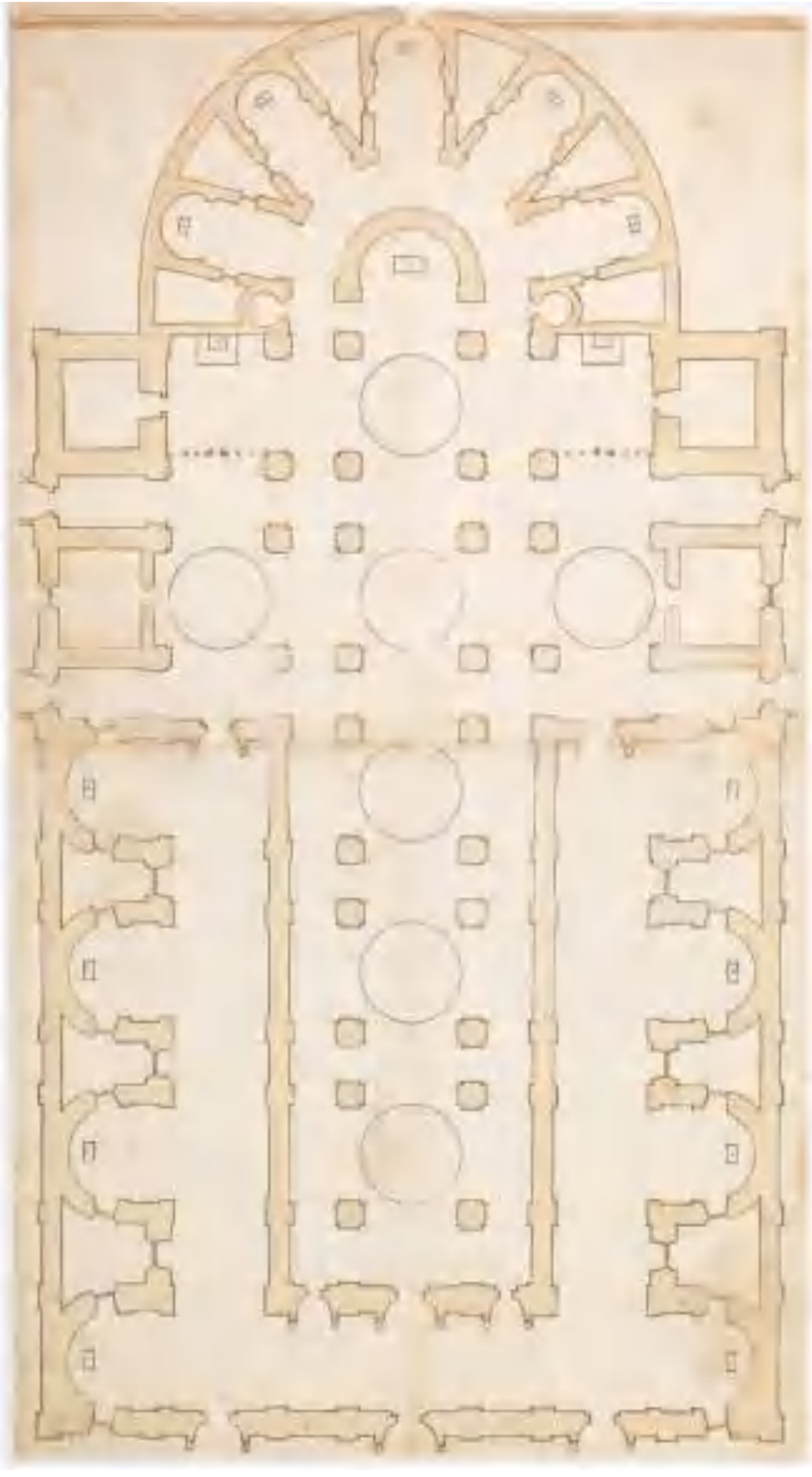


Figure 7.7

Floor plan for the new San Pietro

Fra Giocondo, 1506

GDSU 6 A

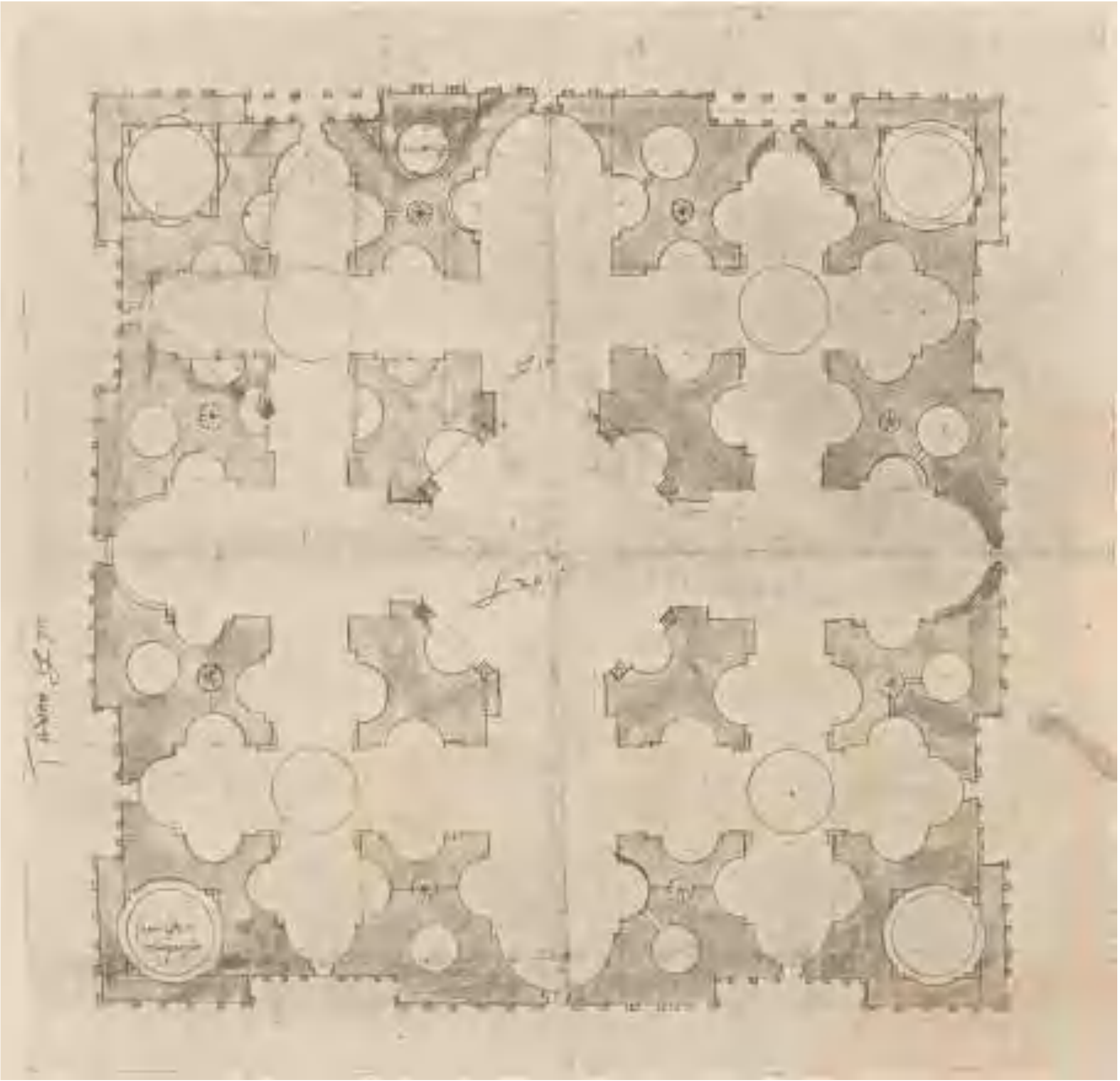


Figure 7.8

St. Peter's project

Giamberti Giuliano detto Gioliano da Sangallo, 1506

GDSU 8 Ar

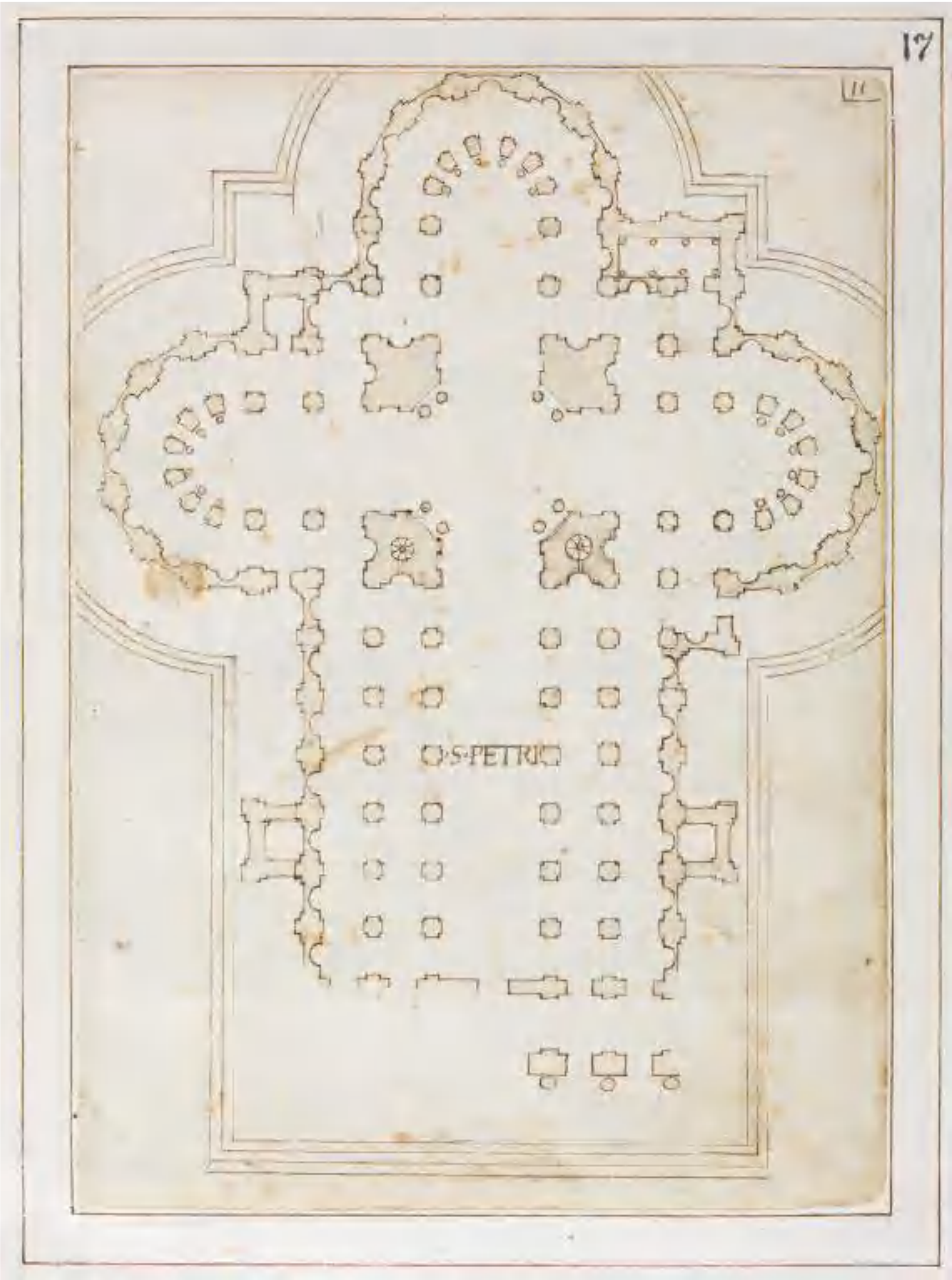


Figure 7.9

Five navates project for San Pietro before April 1506

Donato Bramante (?)

Sir John Soane's Museum London, cod. Vol 115/17

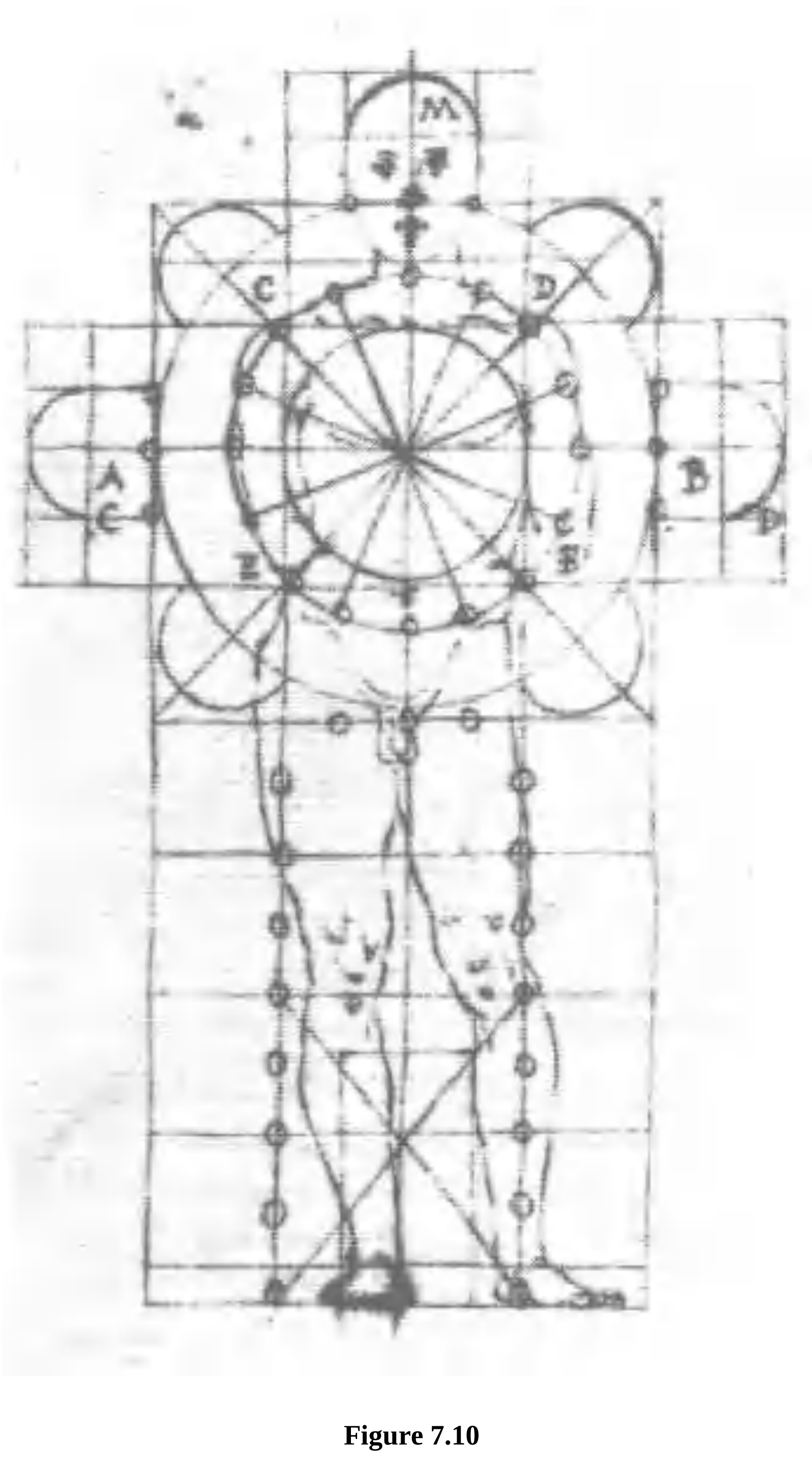


Figure 7.10

Composite figure

Francesco di Giorgio, 1475

BNCF, cod. Magl. II, 1, 141, f. 42v

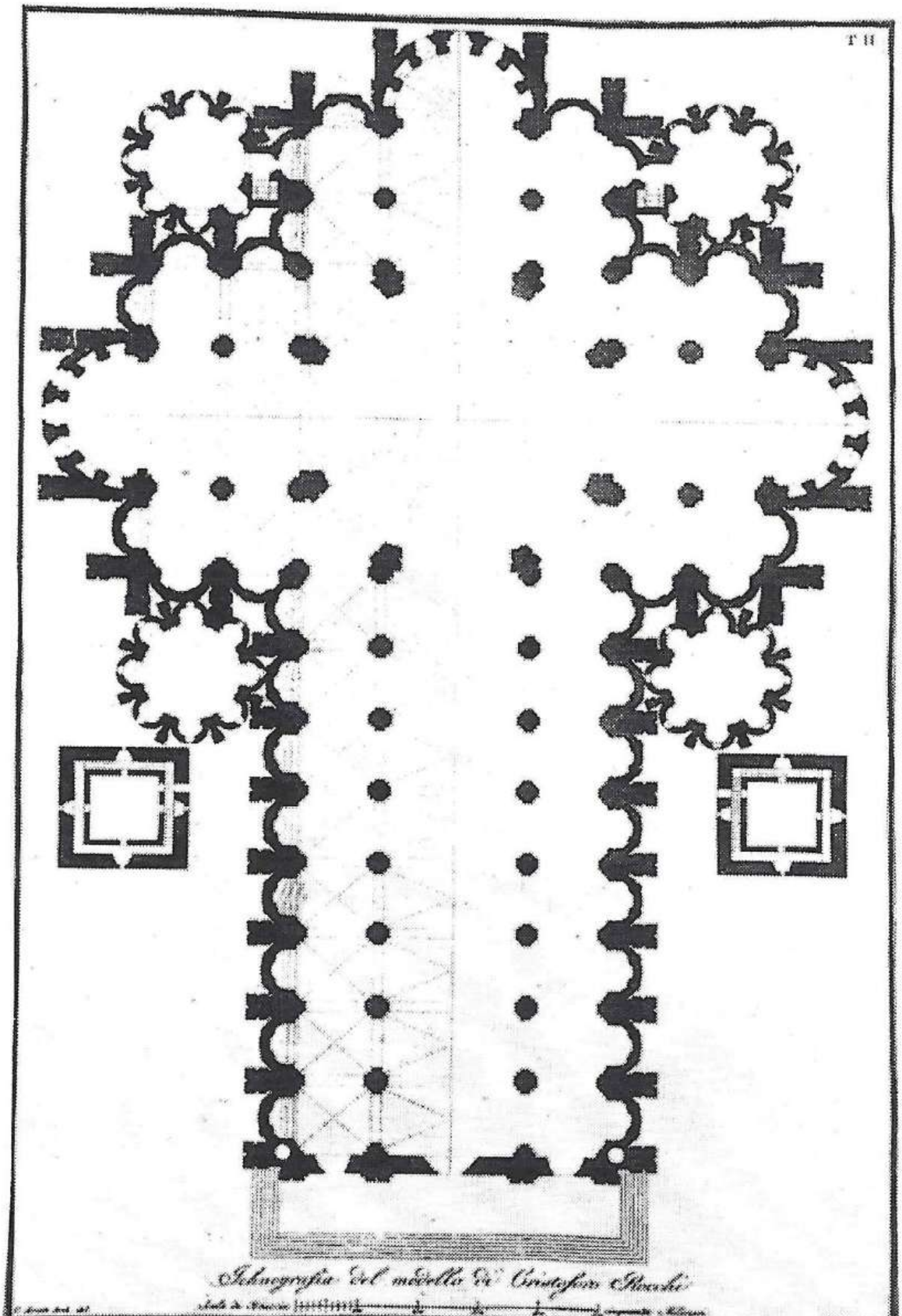


Figure 7.11

Pavia cathedral plan

Of the model by Cristoforo Rocchi, 1488-1892

Figure 7.12

Study for St. Peter

Bramante Donato, XV-XVI century

GDSU 7945 Ar

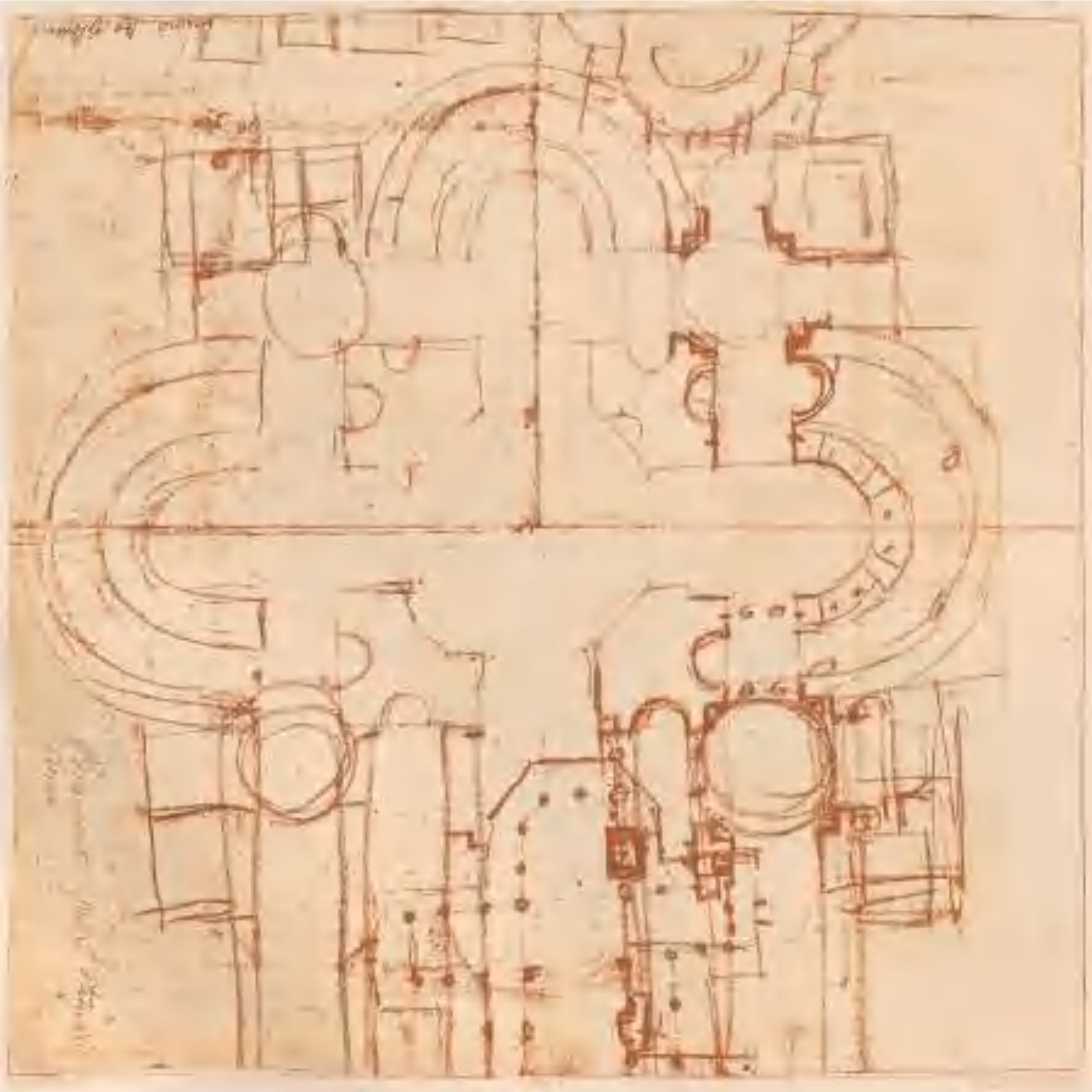


Figure 7.13

Study for five navates on the back of a centric project. At the bottom, the planimetric scheme of the Cathedral of Milan and, at the top right, San Lorenzo

Giamberti Giuliano detto Giuliano da Sangallo

GDSU 8 Av

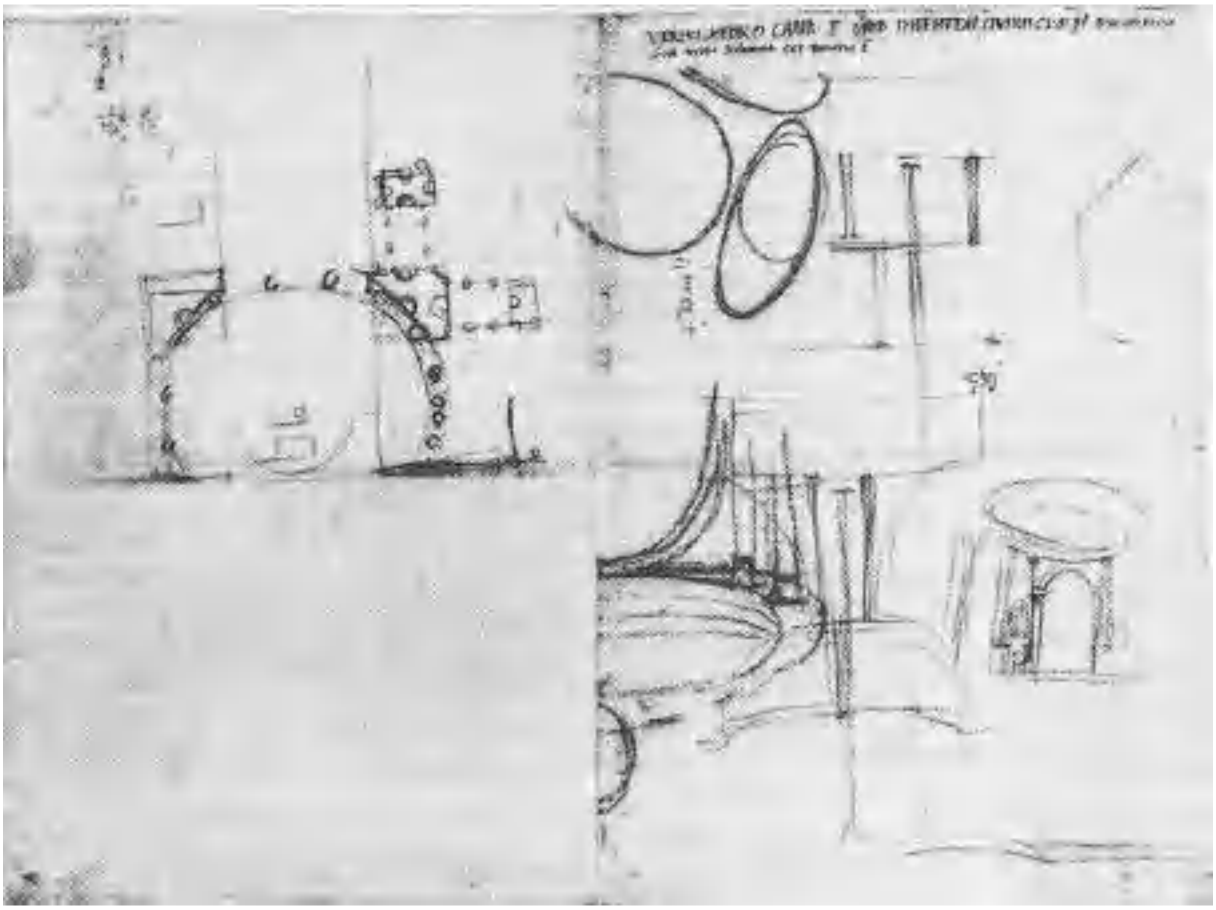


Figure 7.14

St. Peter’s project

Bramante Donato, XV-XVI century

GDSU 7945 Av

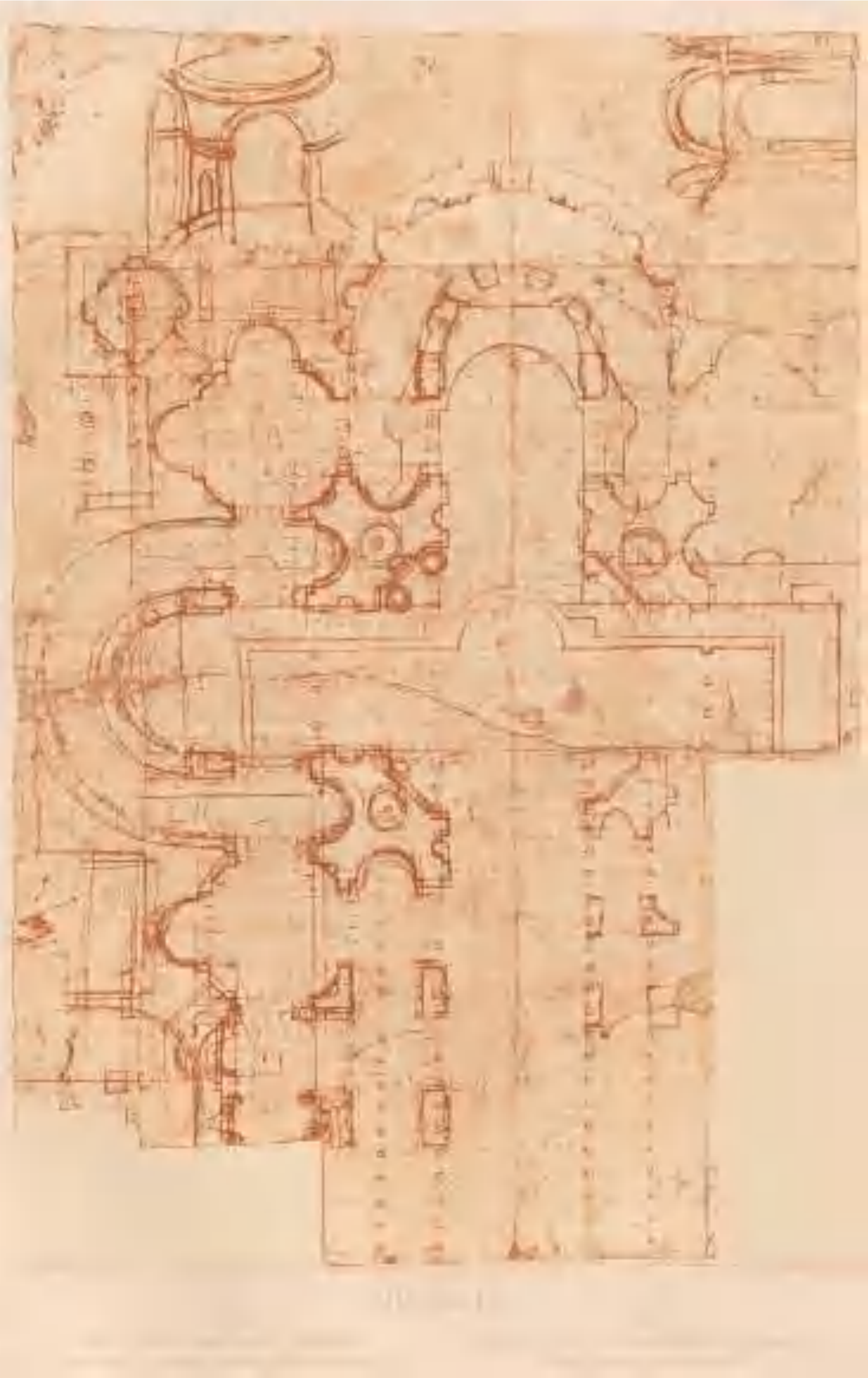


Figure 7.15

Study for St. Peter extended to five navates. The plan of the Constantinian basilica and, at the bottom left the “Giulio Cesare”

Donato Bramante

GDSU 20 Ar

Figure 7.16

Sketch of the choir of Giulio II, perhaps taken from the model (Frommel) by Bramante in a first design version not implemented

Tatti Jacopo detto Sannsovino,16th century

GDSU 4 Ar

Figure 7.17

Sketch of the choir of Giulio II, perhaps taken from the model (Frommel) by Bramante in an early version not implemented. The apsidal half cylinder with five windows between single pilasters and hints to the external order with pedestals

Tatti Jacopo detto Sannsovino,16th century

GDSU 5 Ar

Figure 7.18

Madonna delle rovine, dettaglio con San Pietro

Scuola di Raffaello

Kingston Lacy, Dorset

Figure 7.19

Dimensioned relief of the choir of Giulio II implemented in the final version with the division of the half-cylinder apse into three bays with windows divided by pairs of pilasters. On the left, on the diagonal of the dome pylon the oblique bevel arranged for the placement of an angular chapel according to the scheme of quincunx and, lighter ink, the initial structures of a sacristy with the middle of a niche of 40 palms in diameter and the inscription “Frajochondo”

Da Sangallo Antonio il giovane

GDSU 44 A

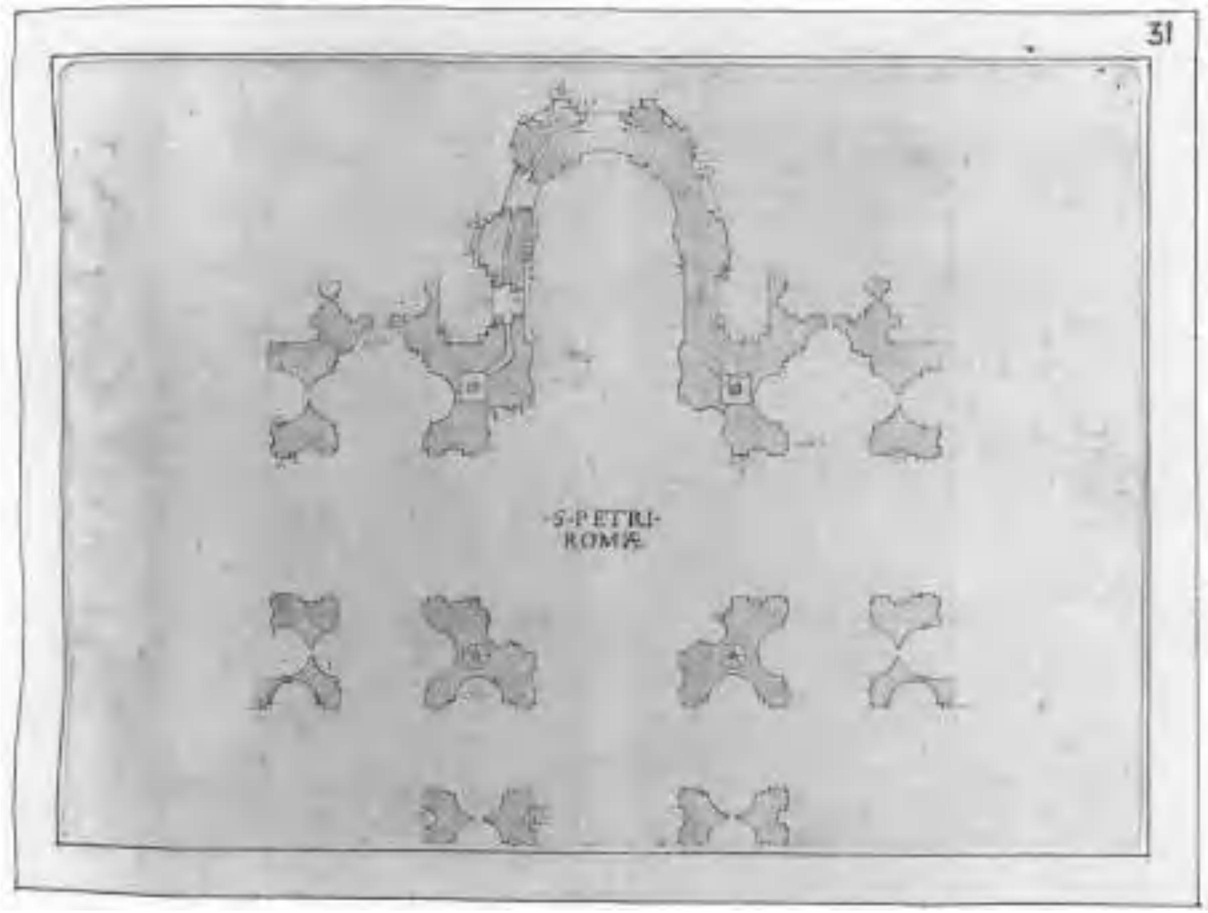


Figure 7.20

Planimetric survey of the structures of San Pietro begin to build and partially completed with those planned, before 1515

Donato Bramante (?)

Sir John Soane's Museum London, codex Coner Vol 115/31

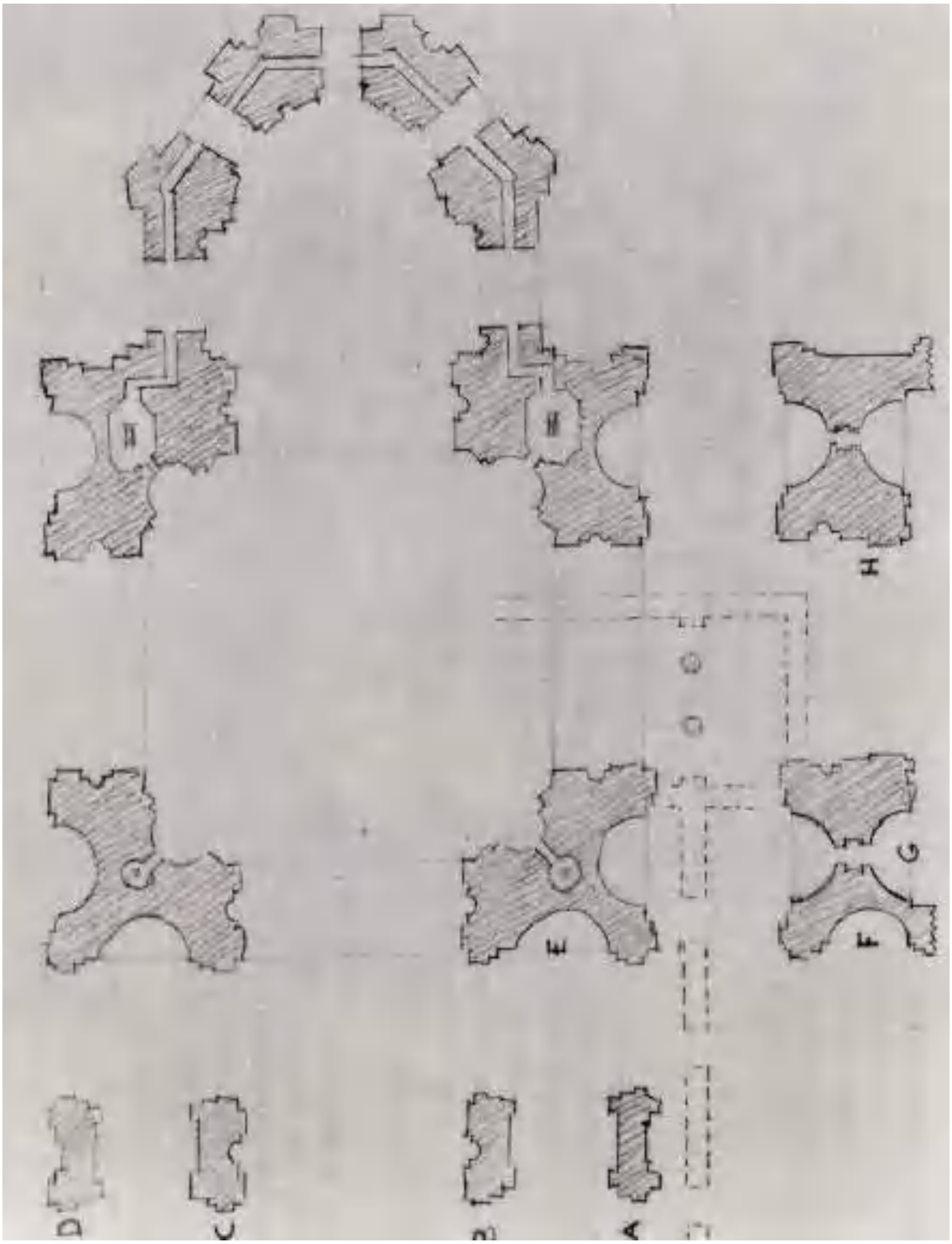


Figure 7.21

Parts of the drawing codex Coner Vol 115/31. That had been constructed after Bramante's death according to Metternich (1975)

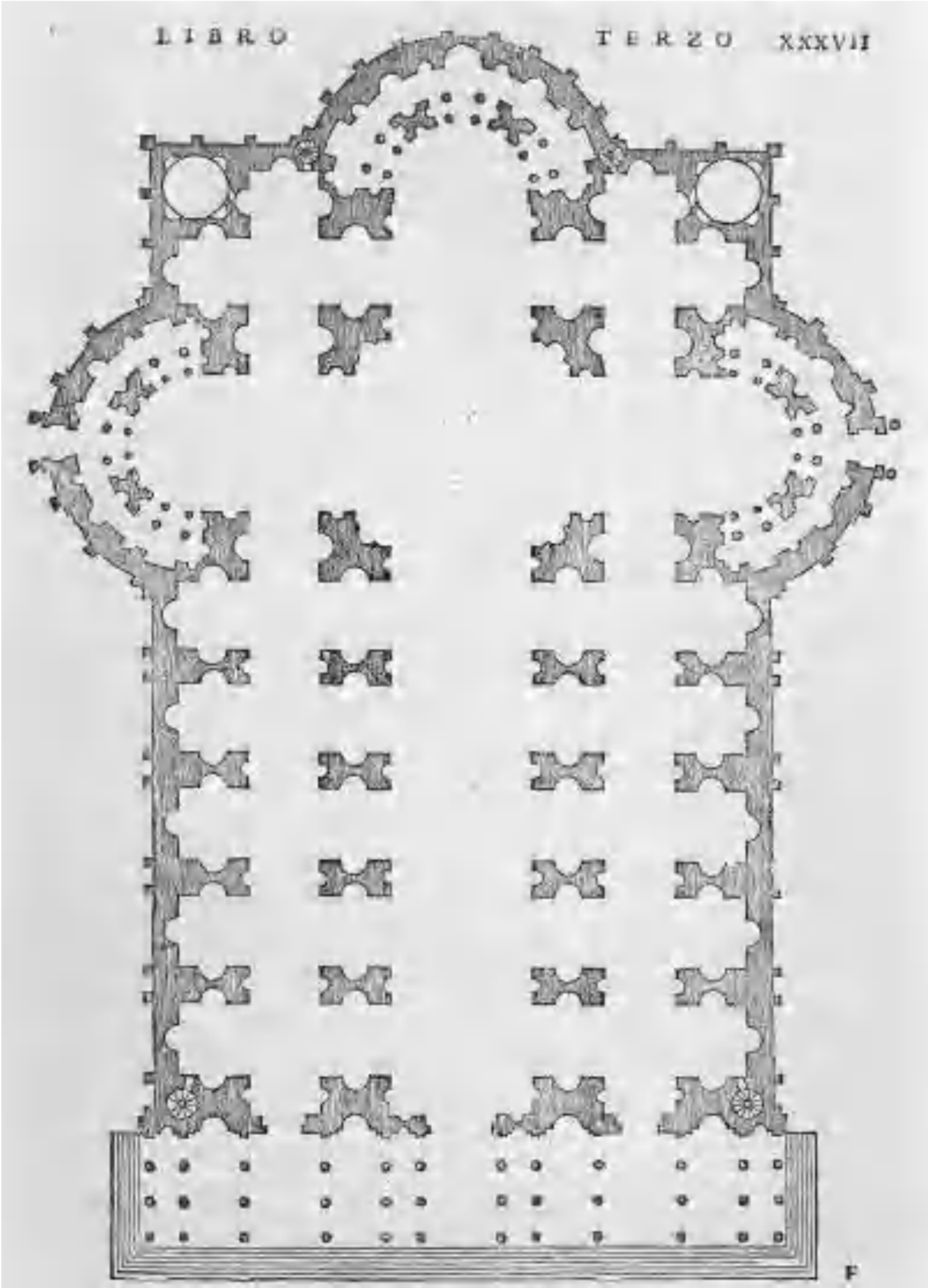


Figure 7.22

Plan of San Peter according to the design of Raphael

Sebastiano Serlio, 1514

Sebastiano Serlio. *Il terzo libro di Sabastiano Serlio Bolognese: nel qual si figurano, e descriuno le antichitá di Roma, e le altre che sono in Italia e fuori d'Italia.* Venice: Francesco Marcolini da Forli (1544), f. XXXVII

Figure 7.23

Foundation medal of the new San Pietro

Cristofono Caradosso

BNP, Cabinet des Medailles

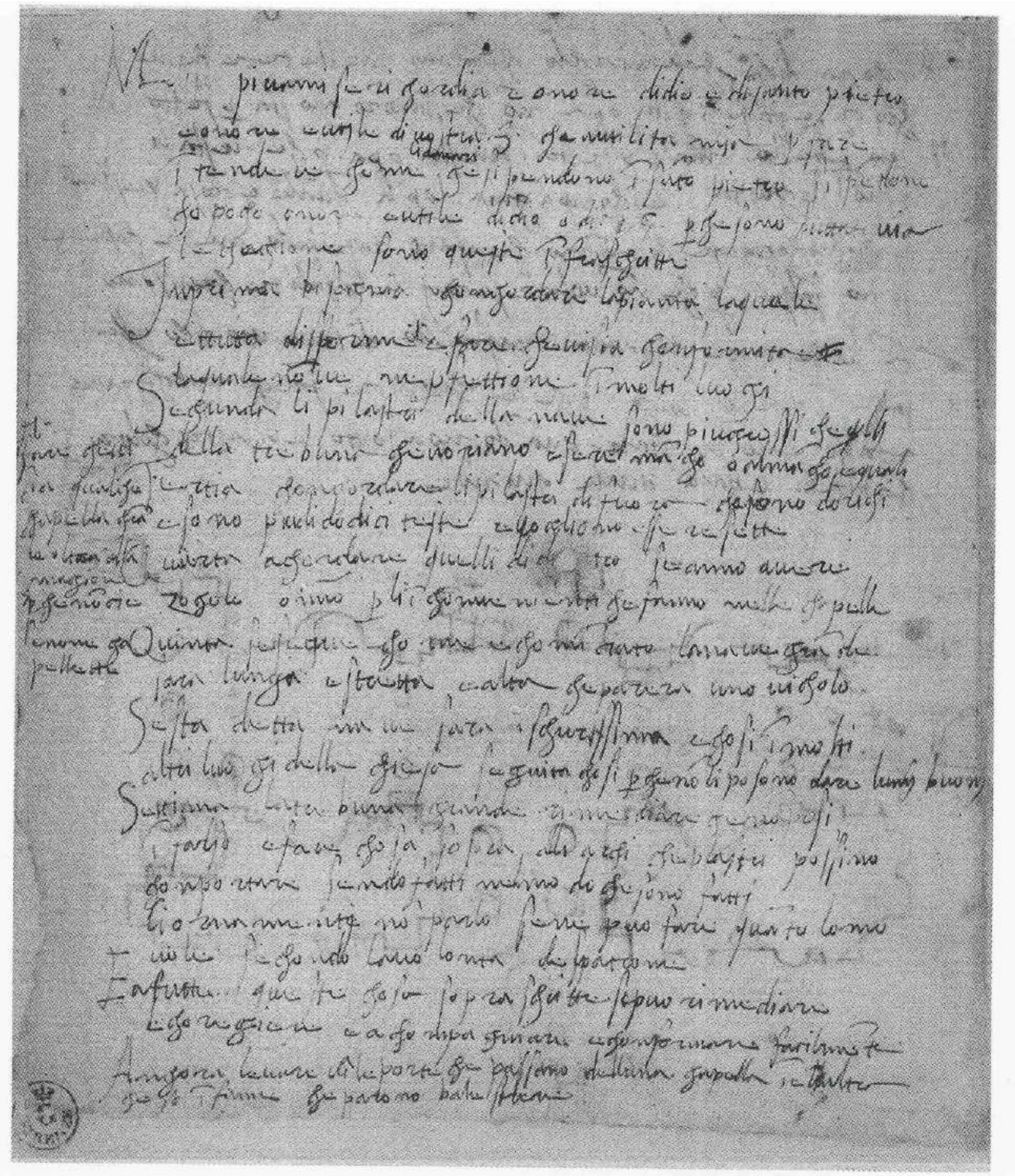


Figure 7.24

Memorial for the San Pietro's plan

Antonio da Sangallo

GDSU 33 Ar

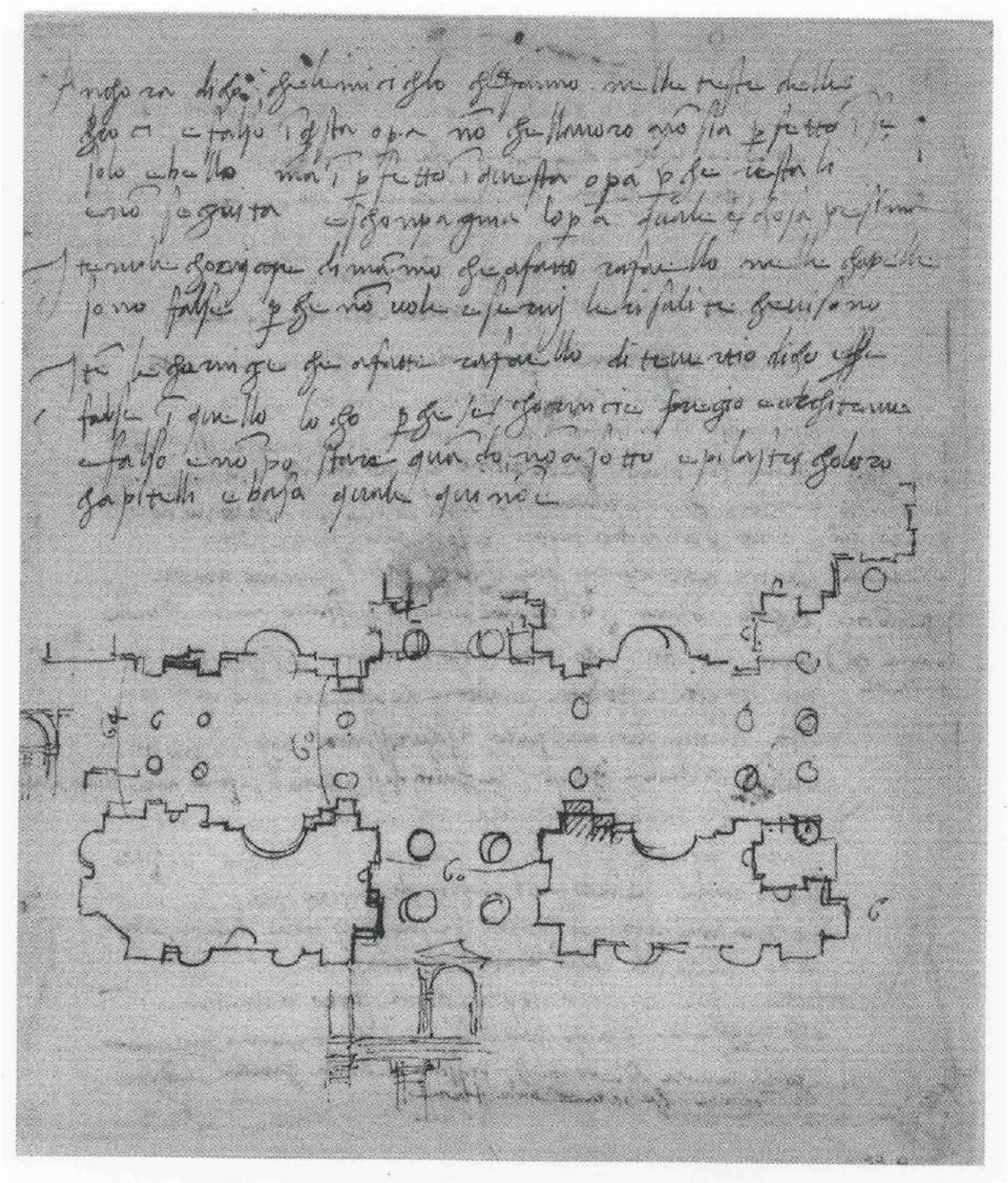


Figure 7.25

Memorial for the San Pietro's plan

Antonio da Sangallo

GDSU 33 Av

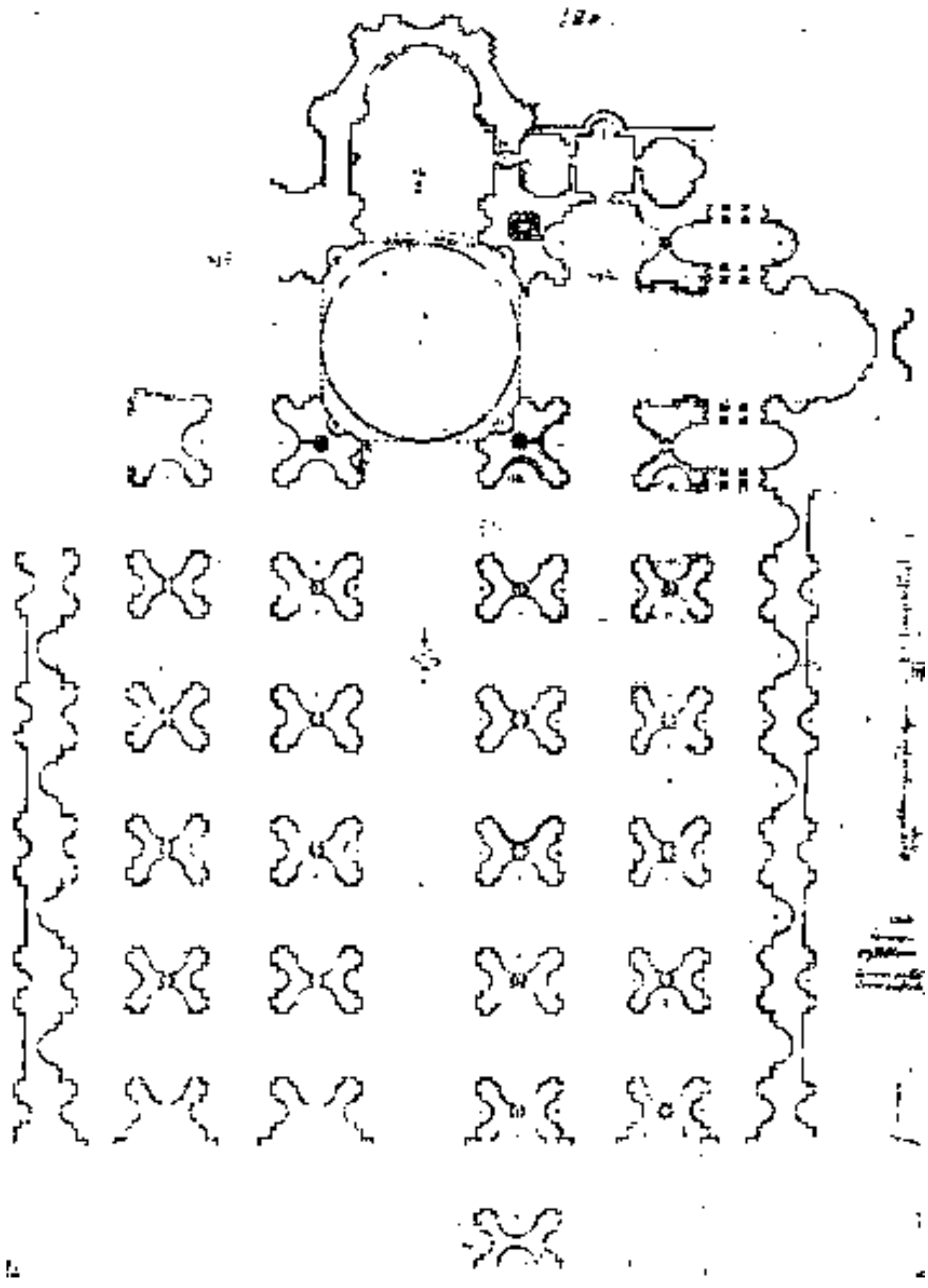


Figure 7.26

St. Peter's project of the Leone X temple

Da Sangallo Giuliano

GDSU 9 A

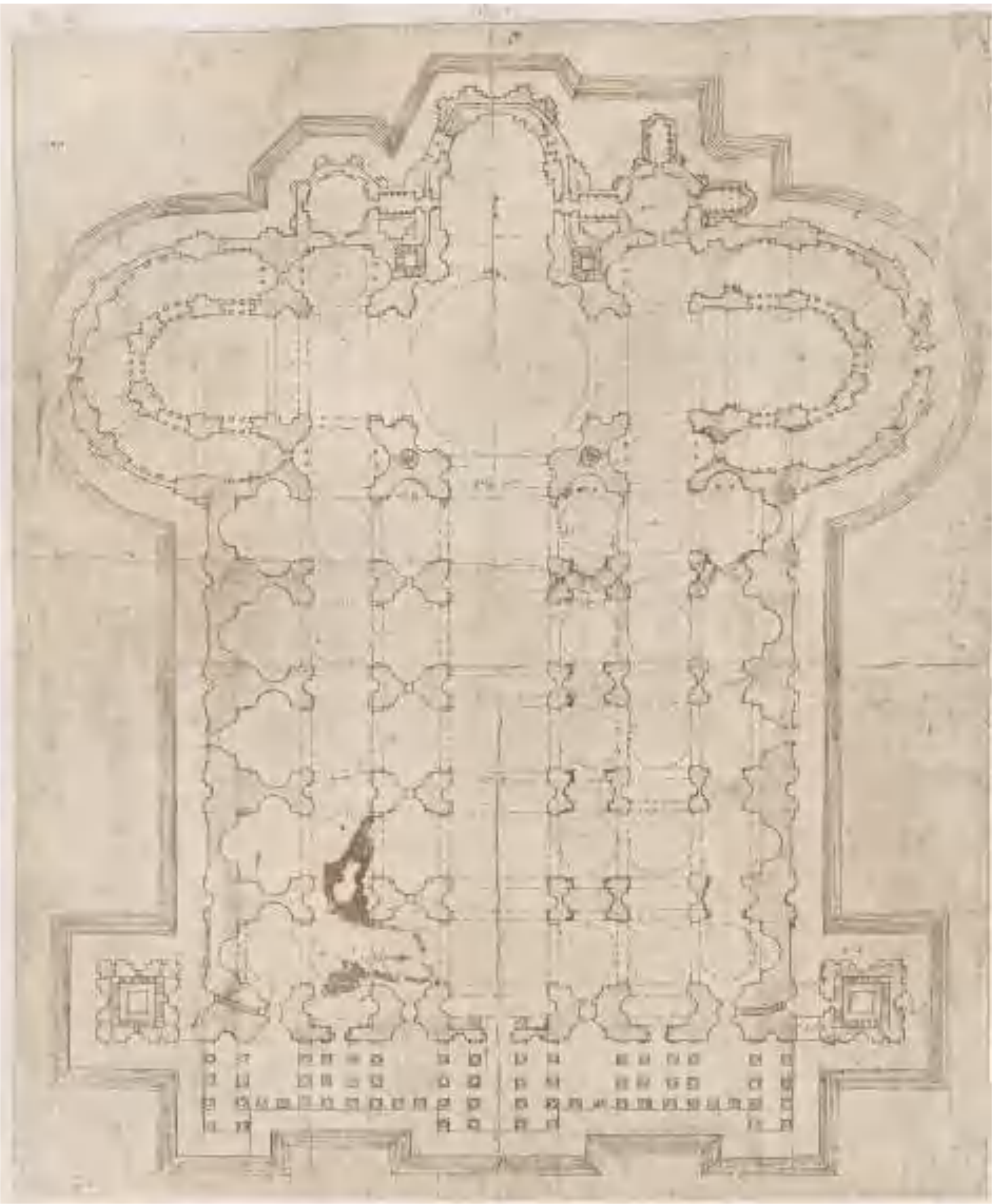


Figure 7.27

St. Peter's project of the Leone X temple

Da Sangallo Giuliano for Bramante. XV-XVI century

GDSU 7 Ar

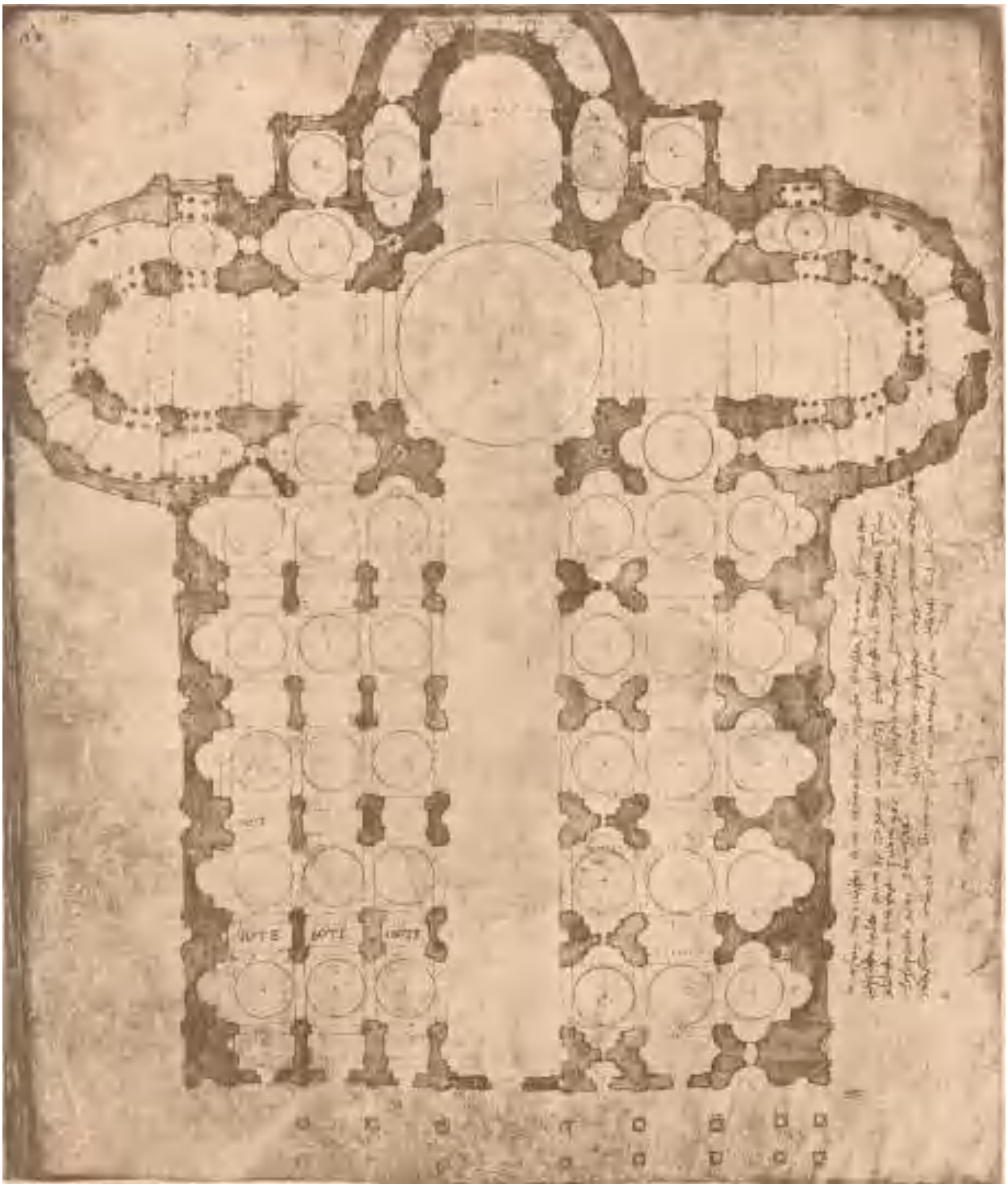


Figure 7.28

St. Peter's project of the Leone X temple

Giuliano da Sangallo

Biblioteca Apostólica Vaticana, Barb. Lat. 4424, f.56v

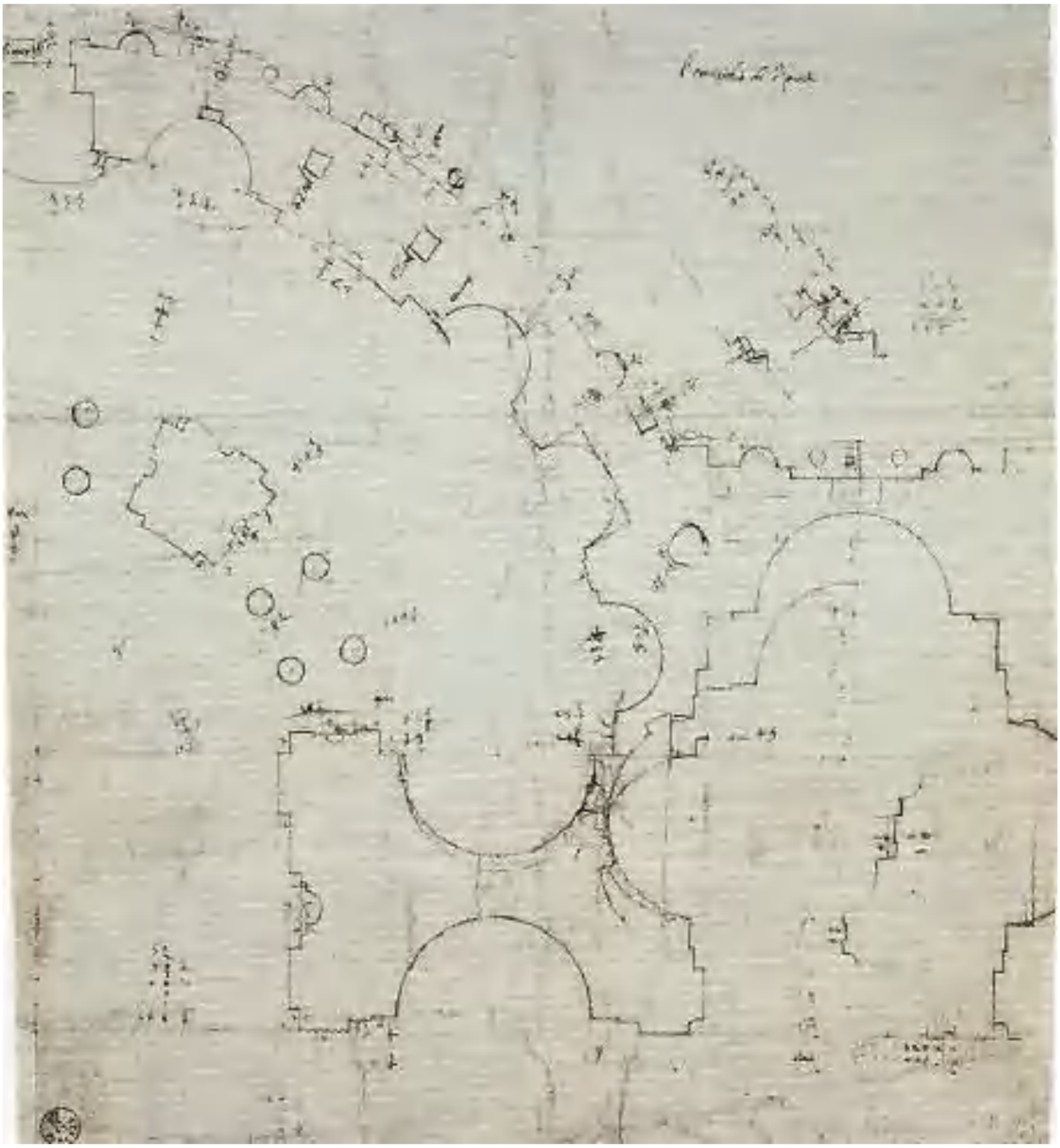


Figure 7.29

Study of half of plan of the hemicycle of St. Peter

Antonio da Sangallo, 1518-1519

GDSU 45 A

Figure 7.30

Half of the plan of the hemicycle of San Pietro, with mesure

Antonio da Sangallo, 1518-1519

GDSU 46 A

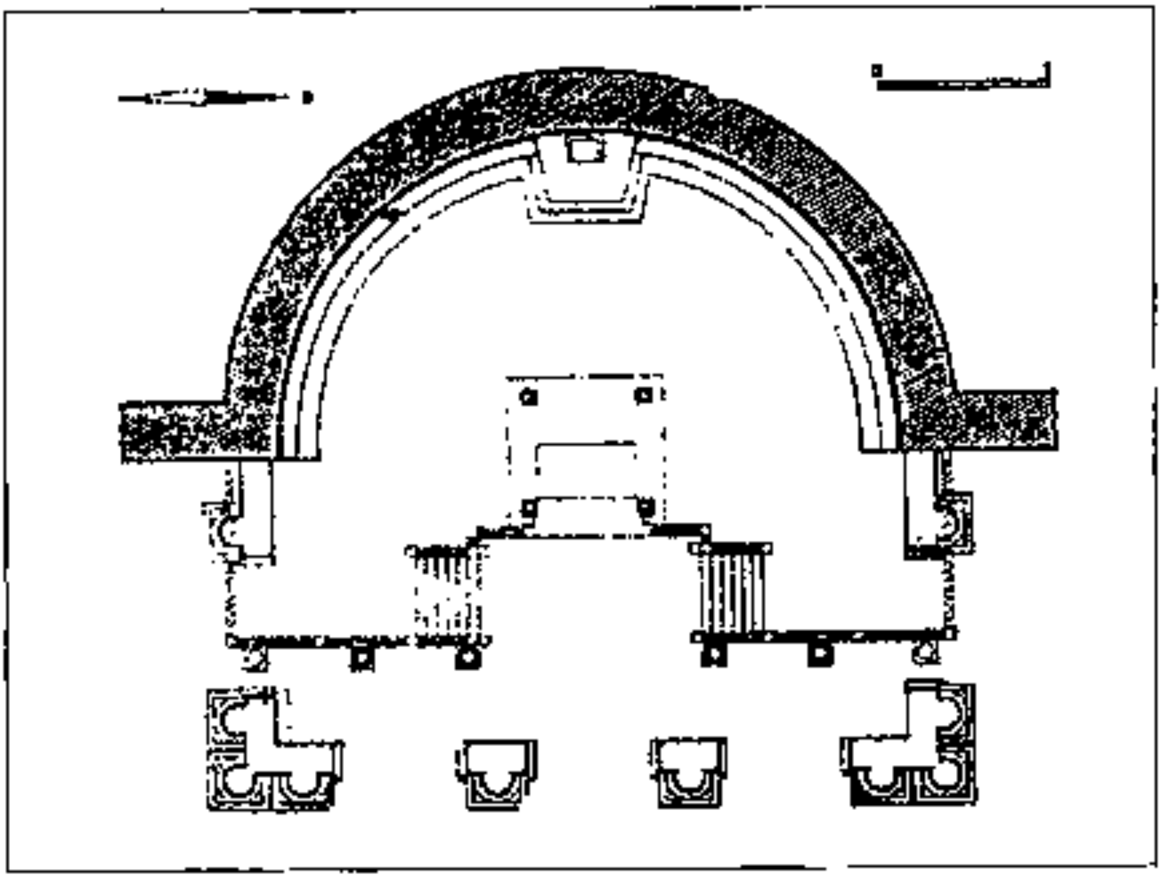


Figure 7.31

Plan of the Tegurio

Bruno M. Apollonj Ghetti; Antonio Ferrua; Camillo Serafini. *Esplorazioni sotto la confessione di San Pietro in Vaticano, eseguite negli anni 1940-1949.* Roma: Stampato Nella Tipografia Poliglotta Vaticana (1951), f. 158

Figure 7.32

The Thegurio

Domenico Antonio de Chiarellis, 1513

New York, Pierpoint Morgan Library, Codex Mellon, f. 7v

Figure 7.33

Interior view of the crossing of S. Peter in Rome under construction, after 1562

Giovanni Antonio Dosio, 1564-1565

Hamburger Kunsthalle, Kupferstichkabinett, nro. 21311

Figure 7.34

The tribune of S. Peter seen from the southern arm of the transept of the basilica

Giovanni Antonio Dosio, 1562

GDSU 91 Ar

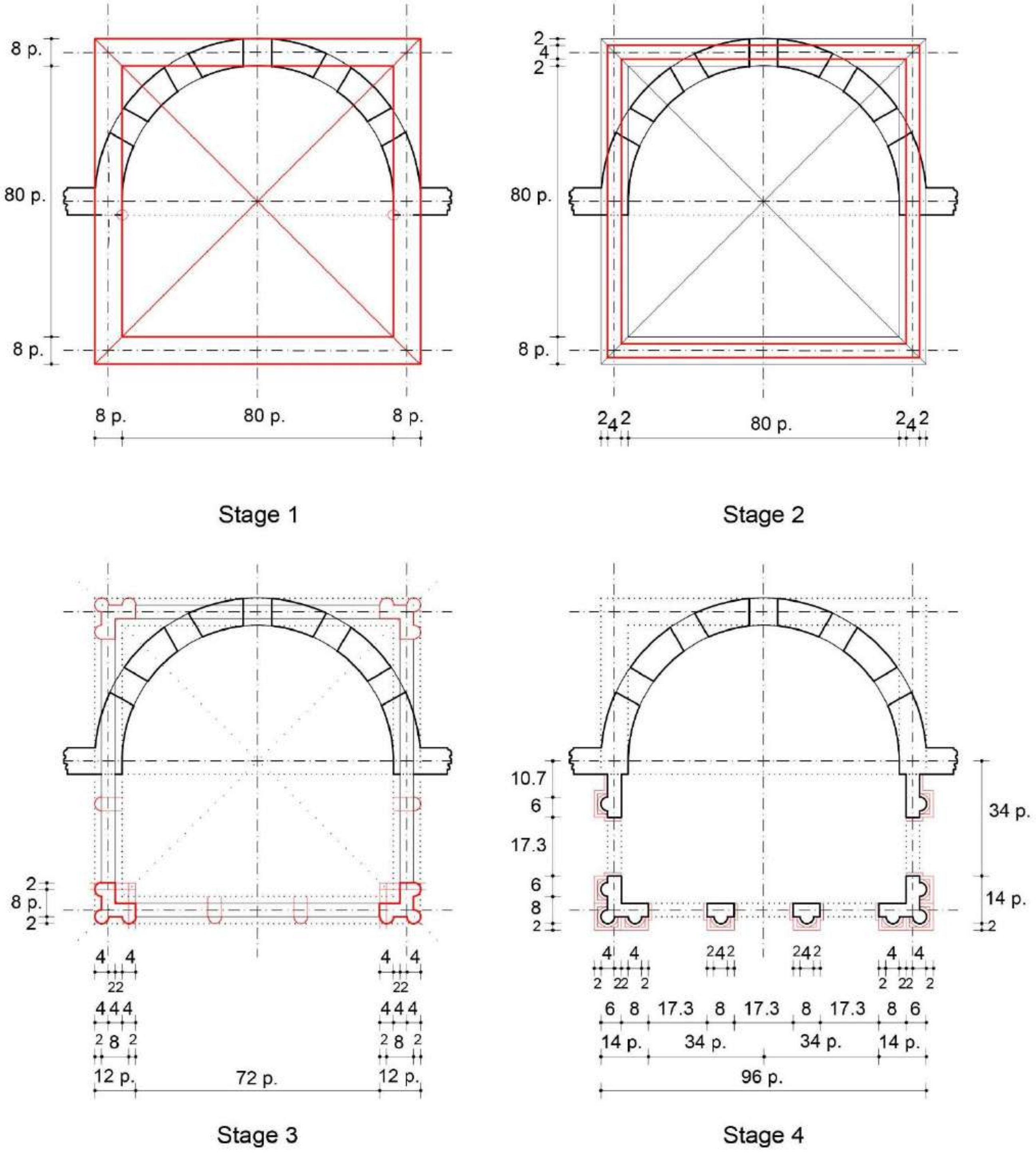


Figure 7.35

Reconstructed stages of the design process of the Tegurium, by Bramante (1505-1506)

Drawing by Luis de Garrido, 2020

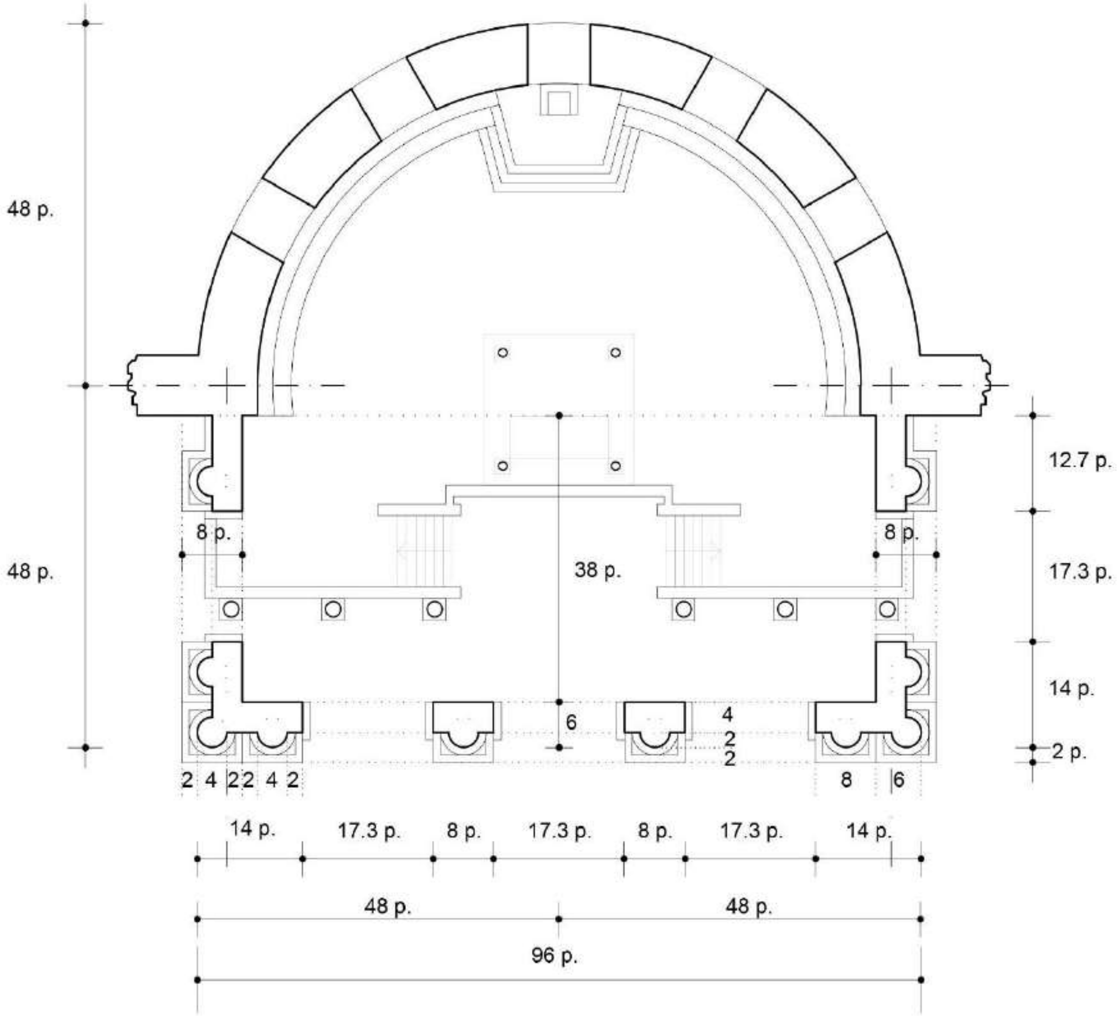


Figure 7.36

Tegurium as built by Bramante with open arches, 1513-1514

Reconstructed by Luis de Garrido, 2020

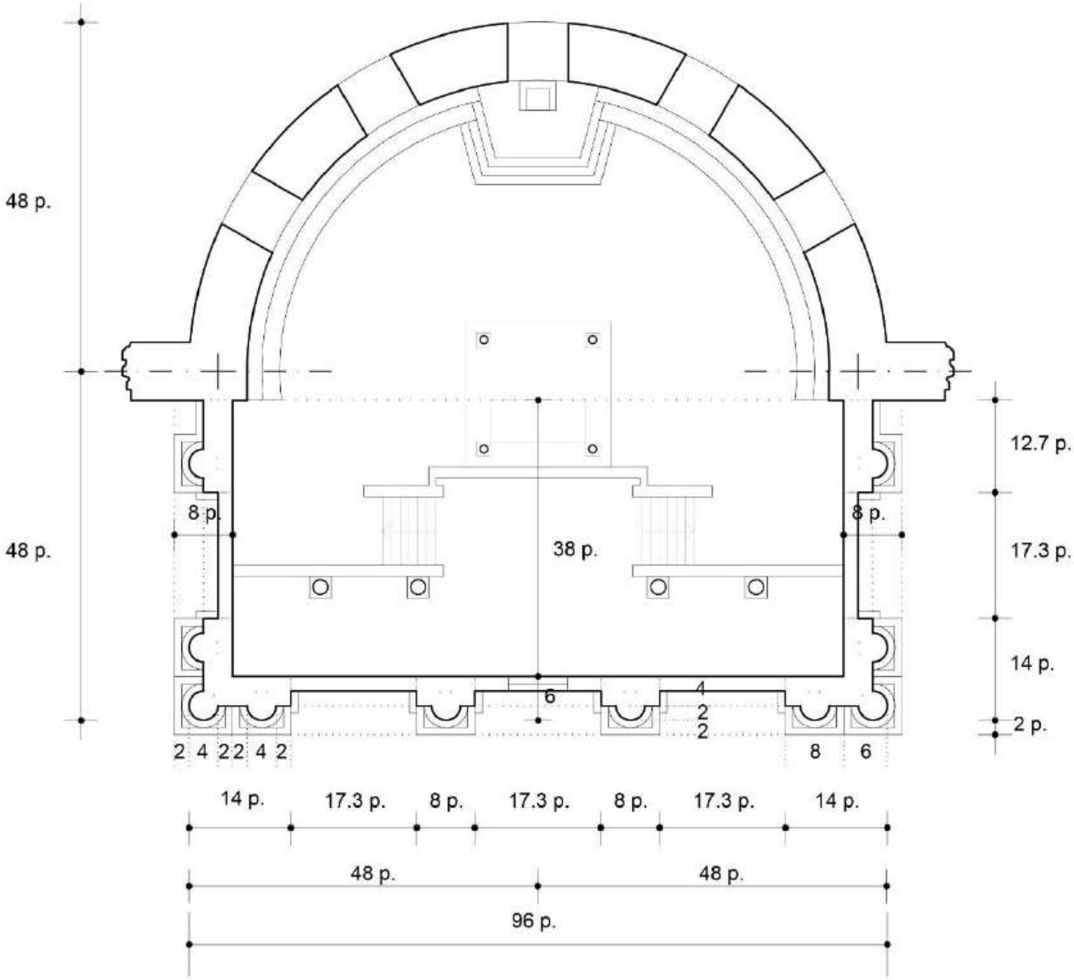


Figure 7.37

Tegurium (1518-1519). Peruzzi or maybe Giovanni Franceso da Sangallo closed the archs to protect the historical memory from the dust of works

Reconstructed by Luis de Garrido, 2020

Figure 7.38

Plant of San Peter, according to Baldassarre Peruzzi design

Domenico Antonio de Chiarellis (attr.), 1513

New York, Pierpoint Morgan Library, codex Mellon, f. 71r

Figure 7.39

Nave of the new construction, view of the south tribune from the inside

Maarten van Heemskerck,1532-1536

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2, f. 8 recto

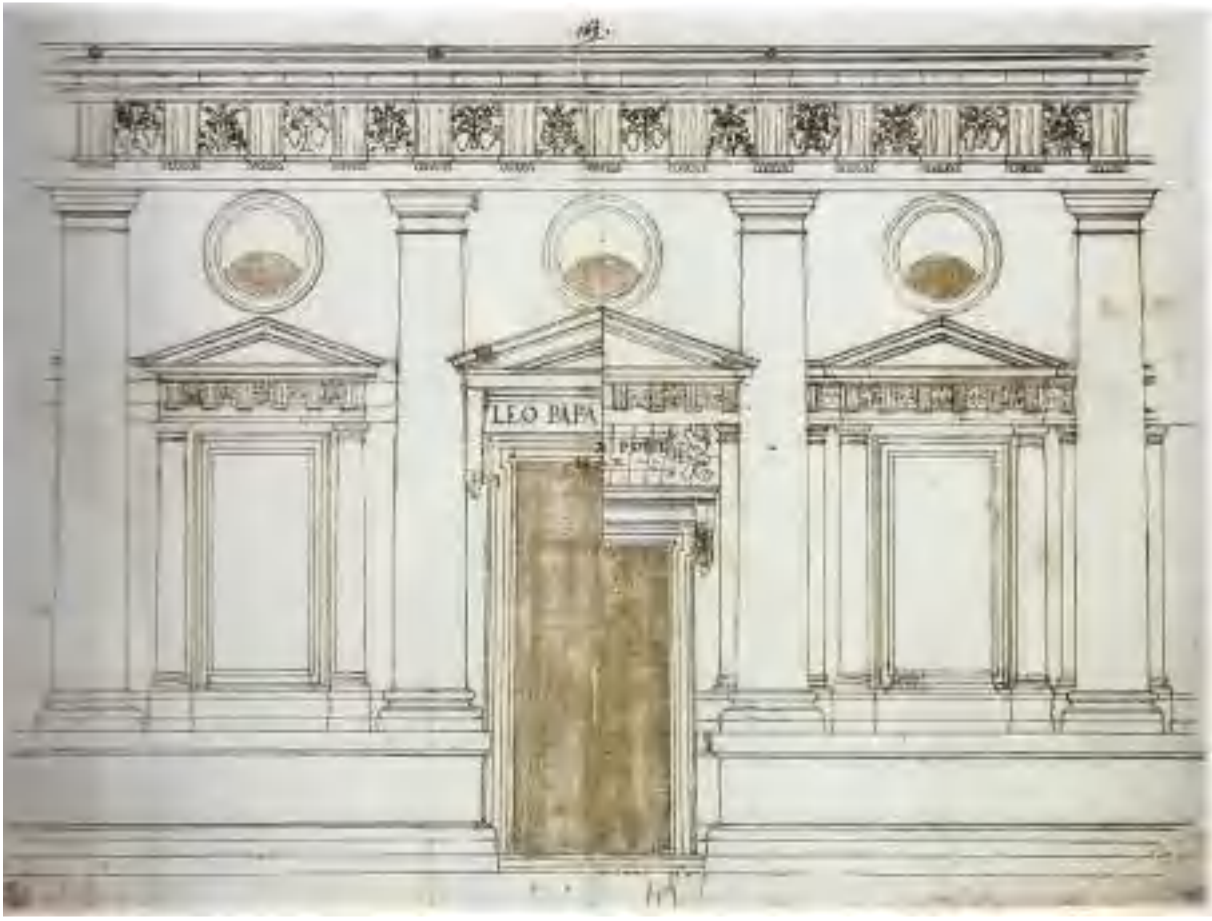


Figure 7.40

Project, close to the final solution, of the prospect of the deambulatory. The outside of the hemicycles with the semi-columns of 9 palmi of diameter and niche newsstands

Antonio da Sangallo, 1519

GDSU 122 Ar

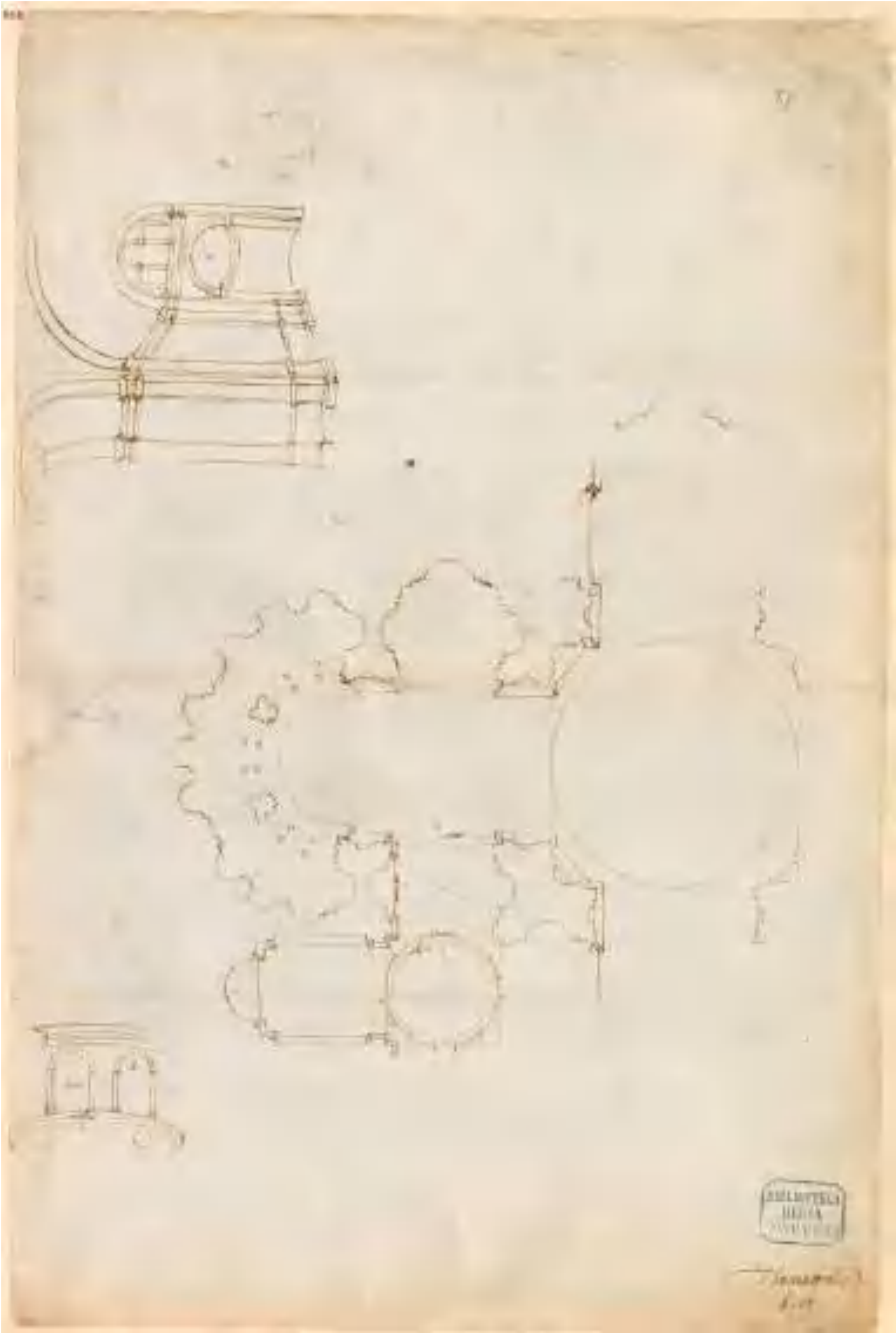


Figure 7.41

Plan with the relief of the parts built and those designed by Antonio da Sangallo, 1520-1521

Jean de Chenevières (?)

Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter

und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 1r

Figure 7.42

Partial plan of the minor nave and a perimeter chapel, seen in elevation of the same chapel according to the model

Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 1v

Figure 7.43

Partial relief plan with measurements in ounces (= 1/12 of roman palm) of the model by Antonio da Sangallo

Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 2r

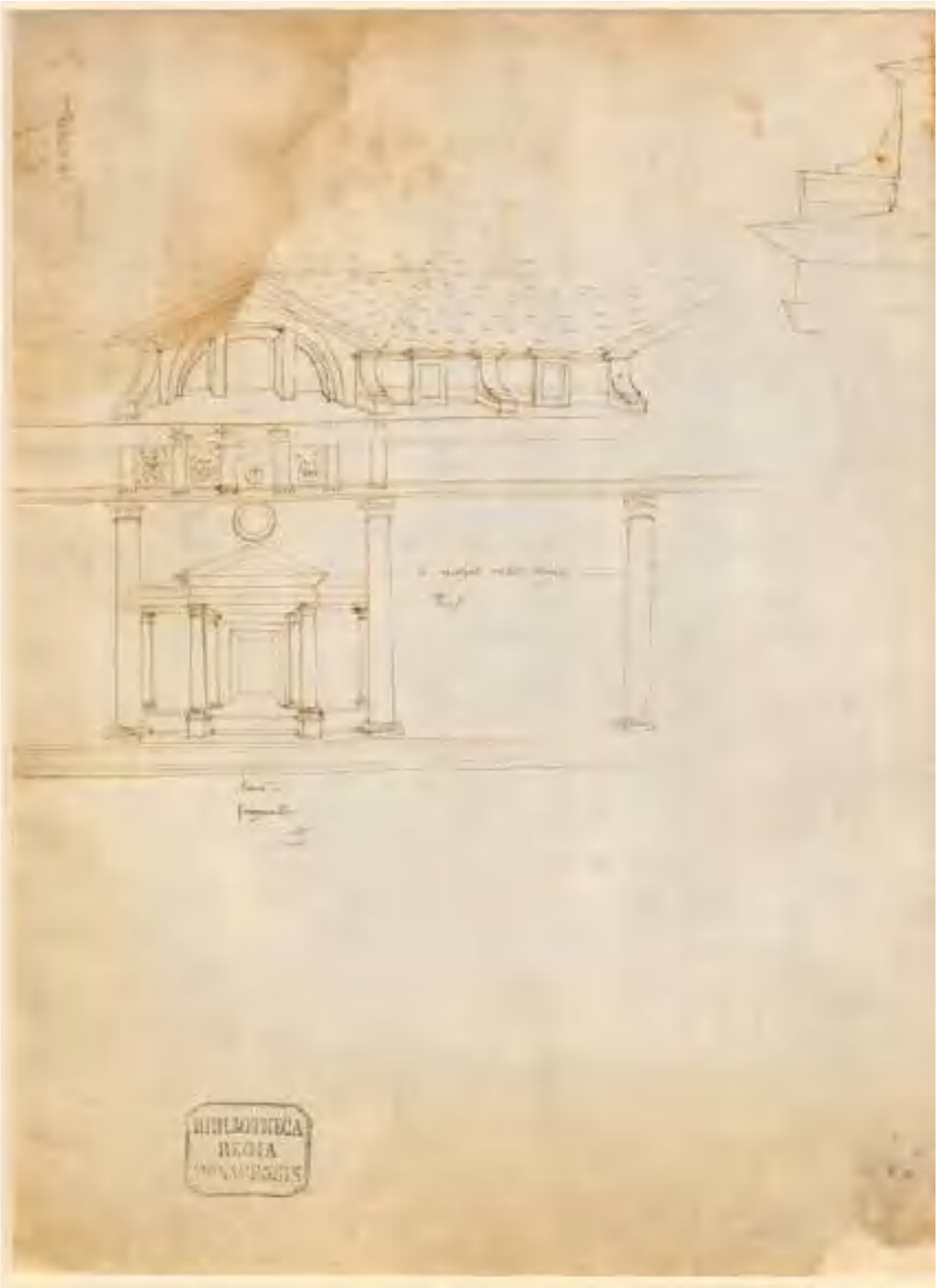


Figure 7.44

New Saint Peter, design according the wood model of Antonio da Sangallo

Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 3v

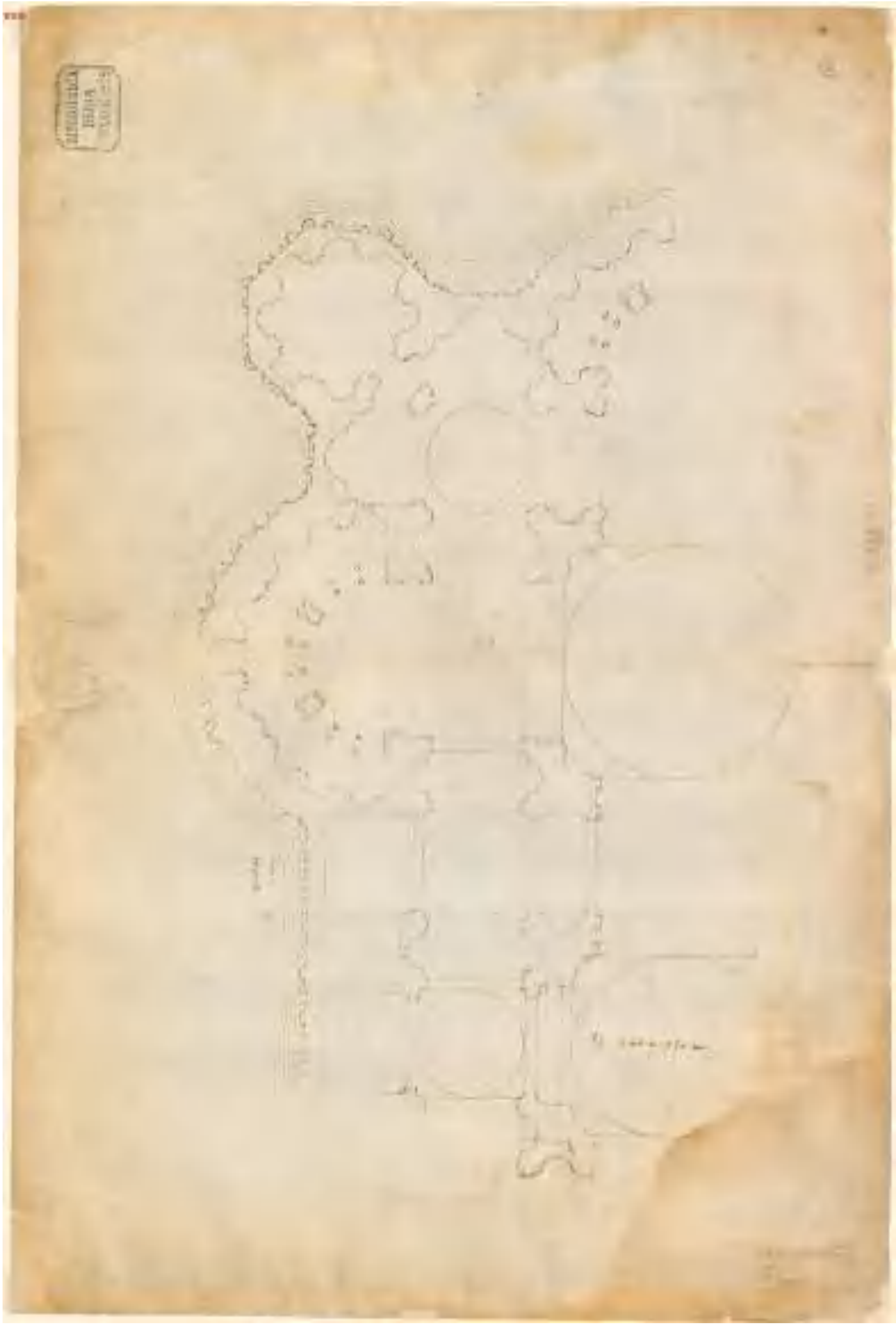


Figure 7.45

Plant with presumable representation of the model of 1521 by Antonio da Sangallo

Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter

und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 3r

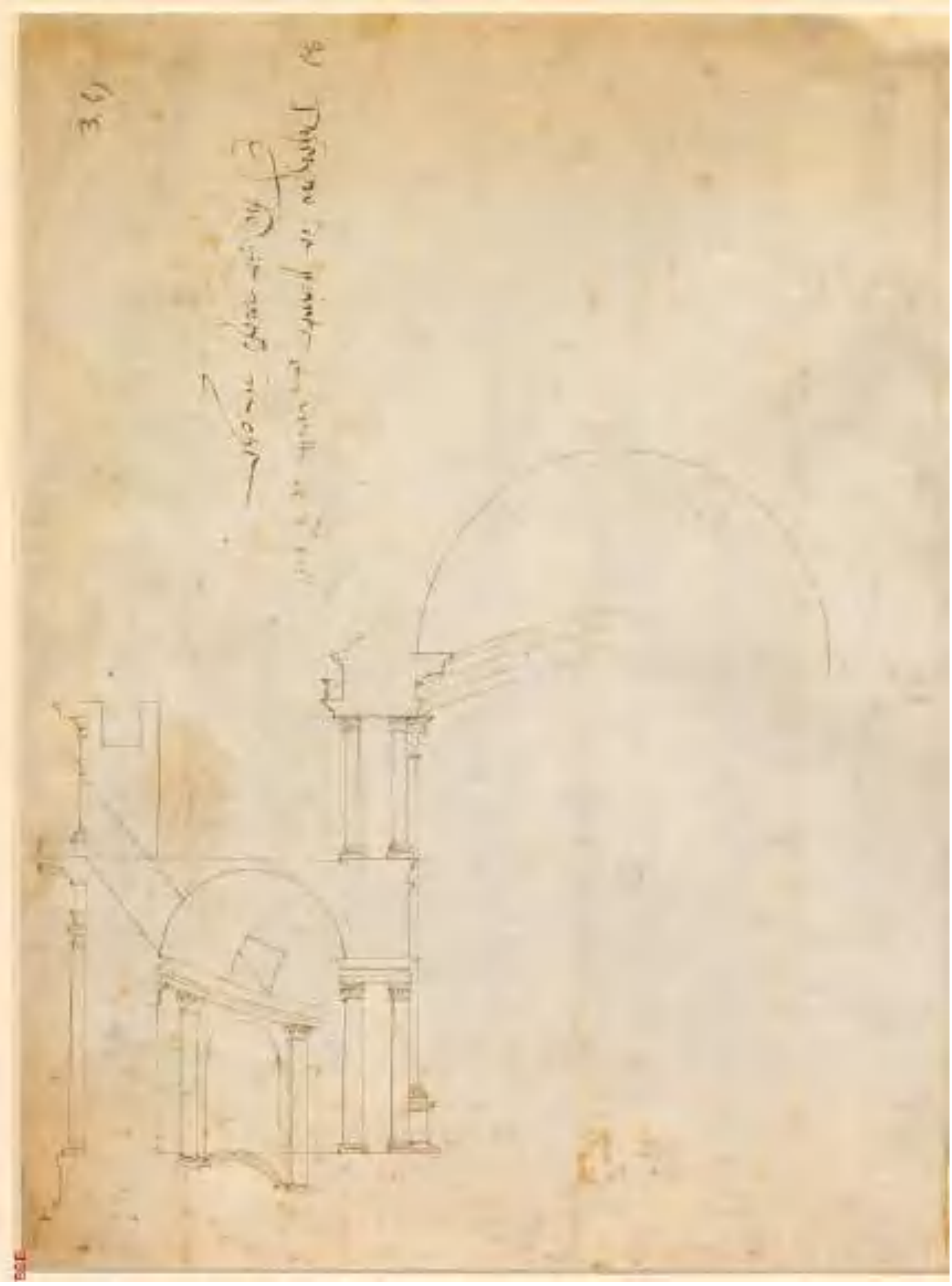


Figure 7.46

New Saint Peter, design according the wood model of Antonio da Sangallo

Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 3v

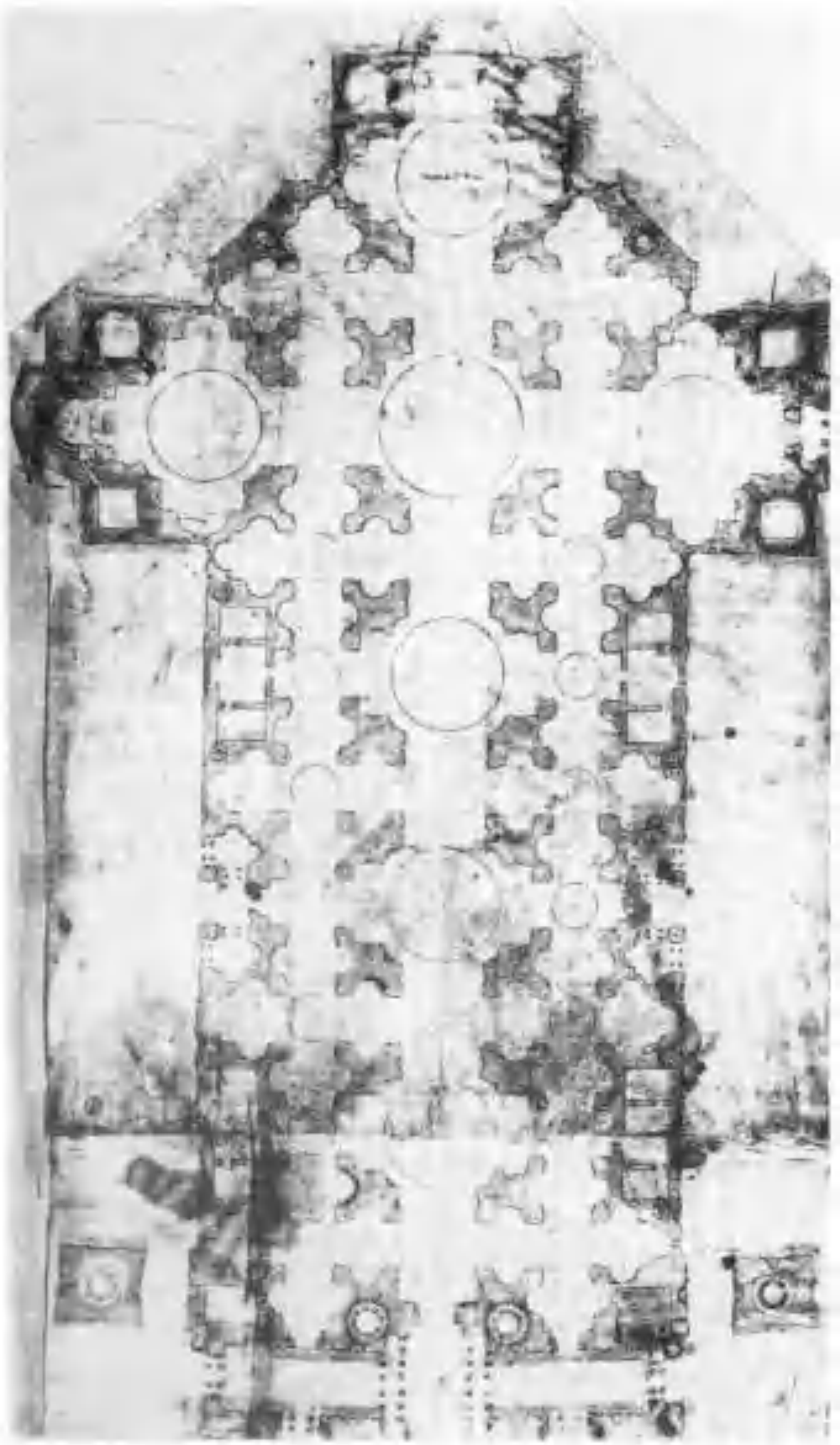


Figure 7.47

Project of St. Peter on parchment

Antonio da Sangallo

GDSU 254 Ar

Figure 7.48

Project of St. Peter on parchment, left half drawn first

Antonio da Sangallo

GDSU 252 A

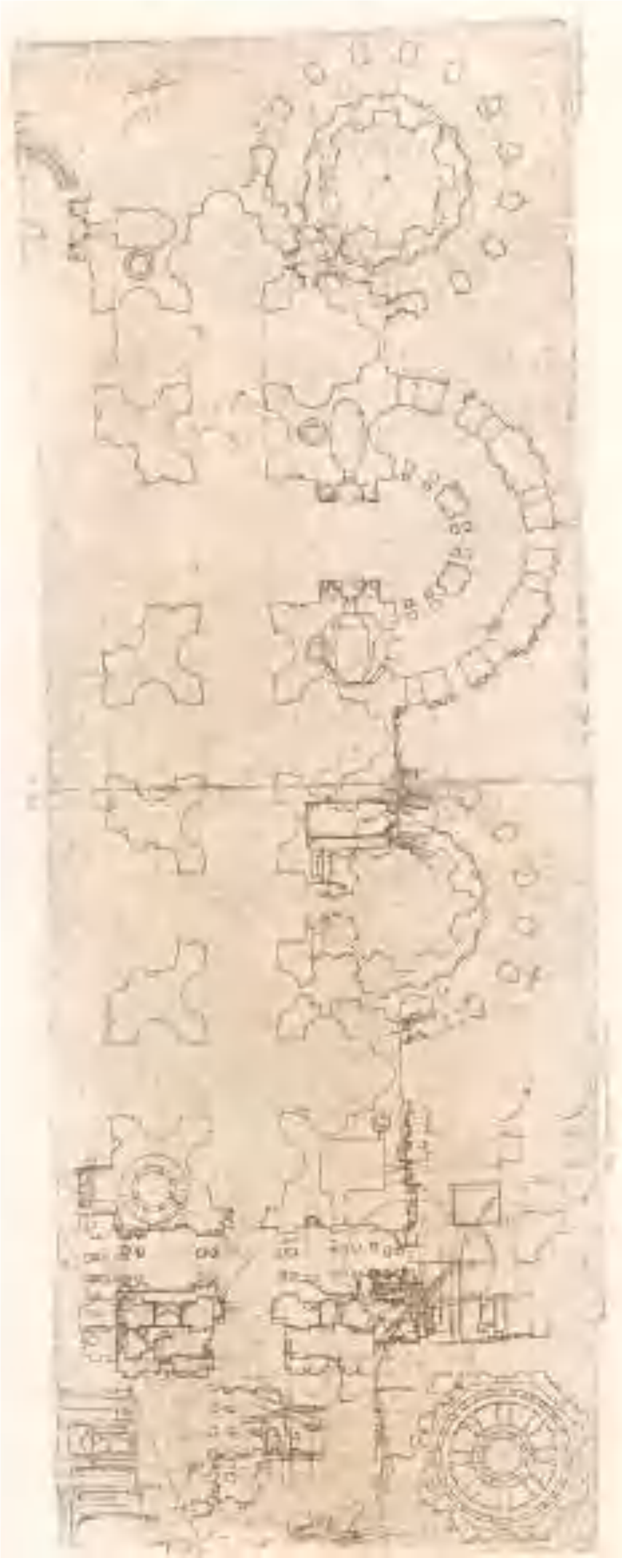


Figure 7.49

Study for the parish plant on parchment

Antonio da Sangallo

GDSU 37 Ar

Figure 7.50

Studies for St. Peter in elevation, façade and cross section and sketches for the Loggia of Blessings, the deambulatory, the domes of the minor naves, the lantern of the central dome

Antonio da Sangallo,1518

GDSU 70 Ar

Figure 7.51

Studies for the section and the elevation of the deambulatory to the south

Antonio da Sangallo, 1516

GDSU 54 Ar

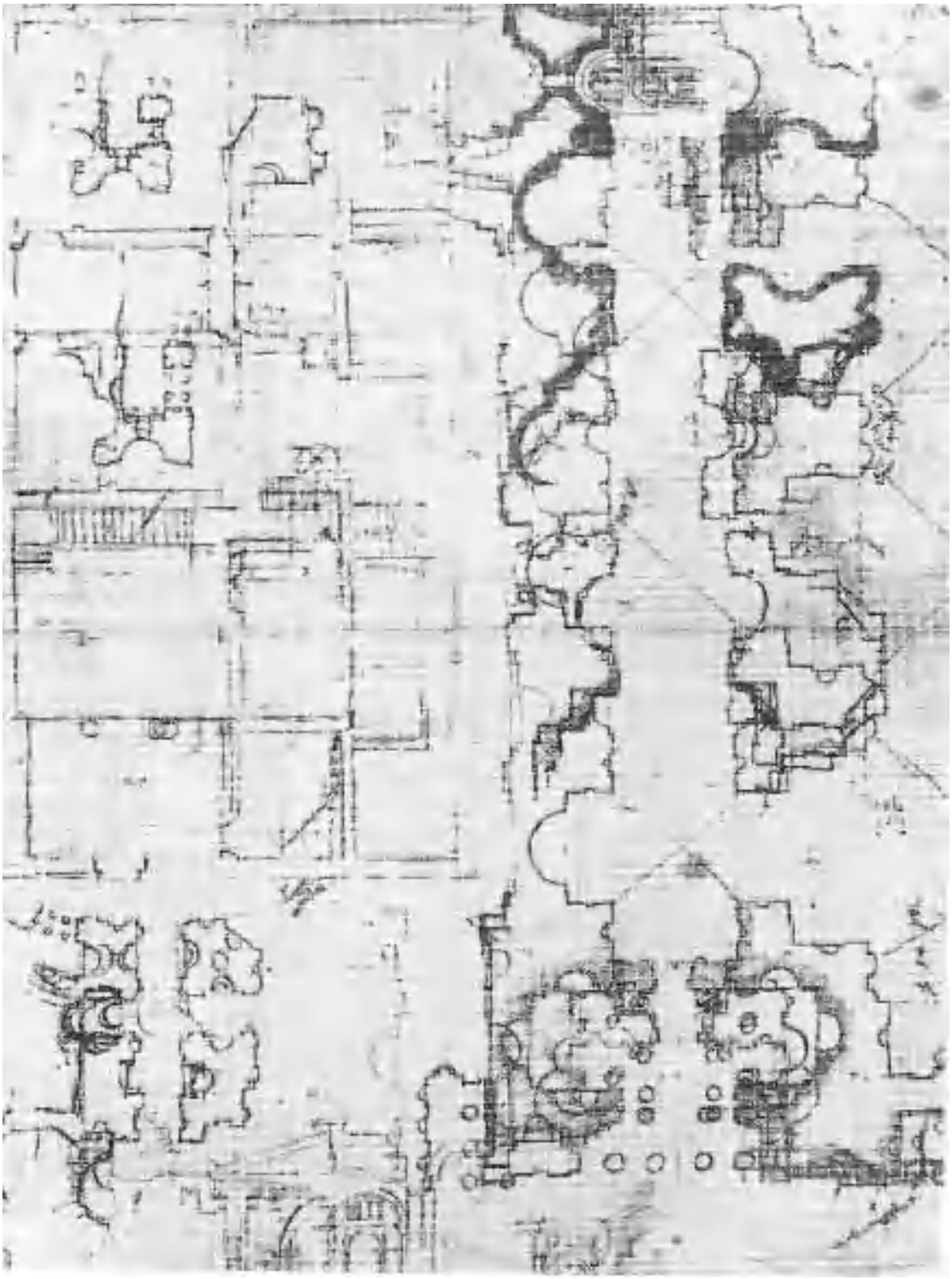


Figure 7.52

Cast study for an unknown building (on the left) and studies for the longitudinal body, the deambulatory and the facade of St. Peter

Antonio da Sangallo, 1518-1519

GDSU 35 Ar

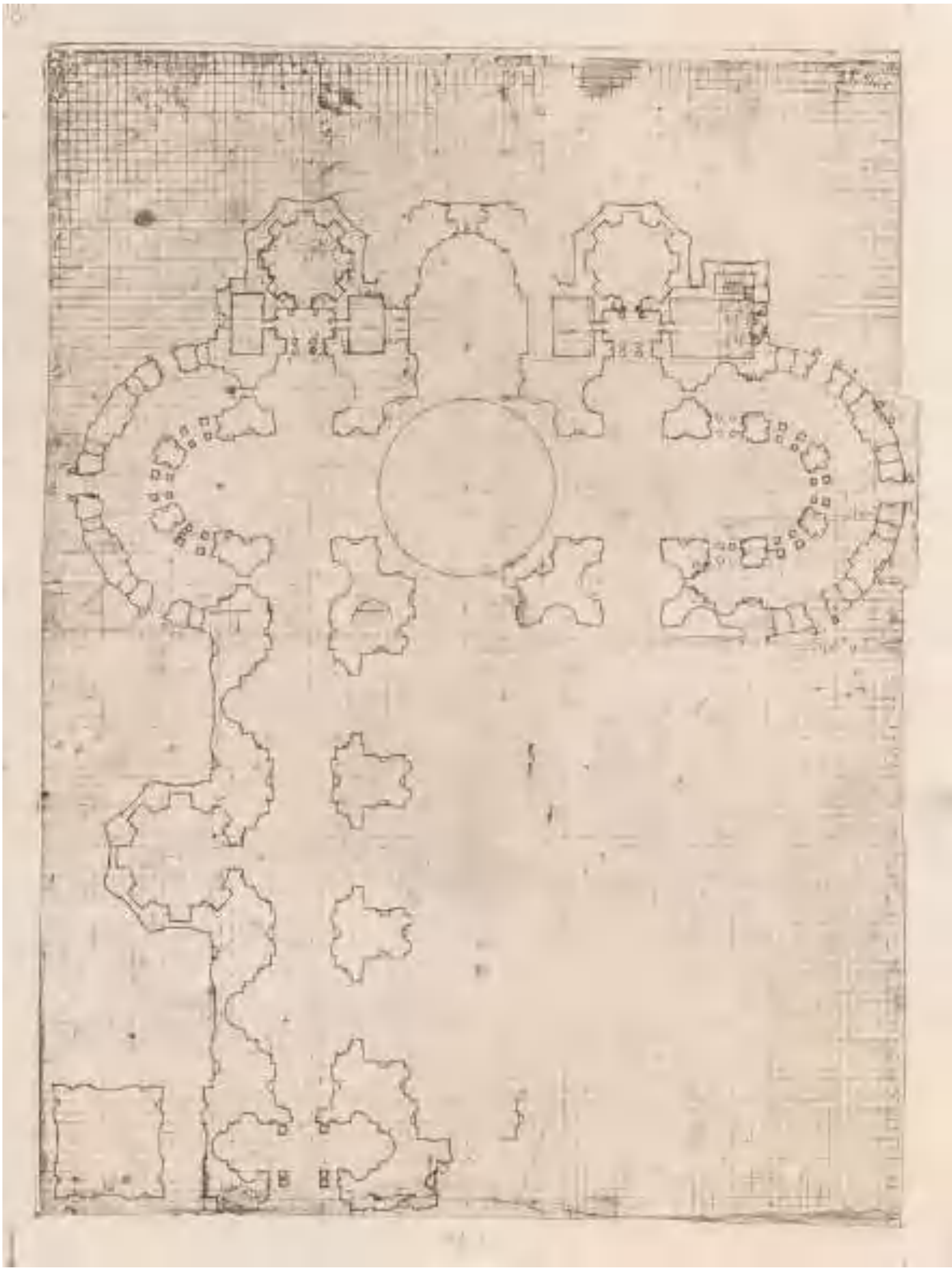


Figure 7.53

Incomplete plant for St. Peter

Antonio da Sangallo

GDSU 34 Ar

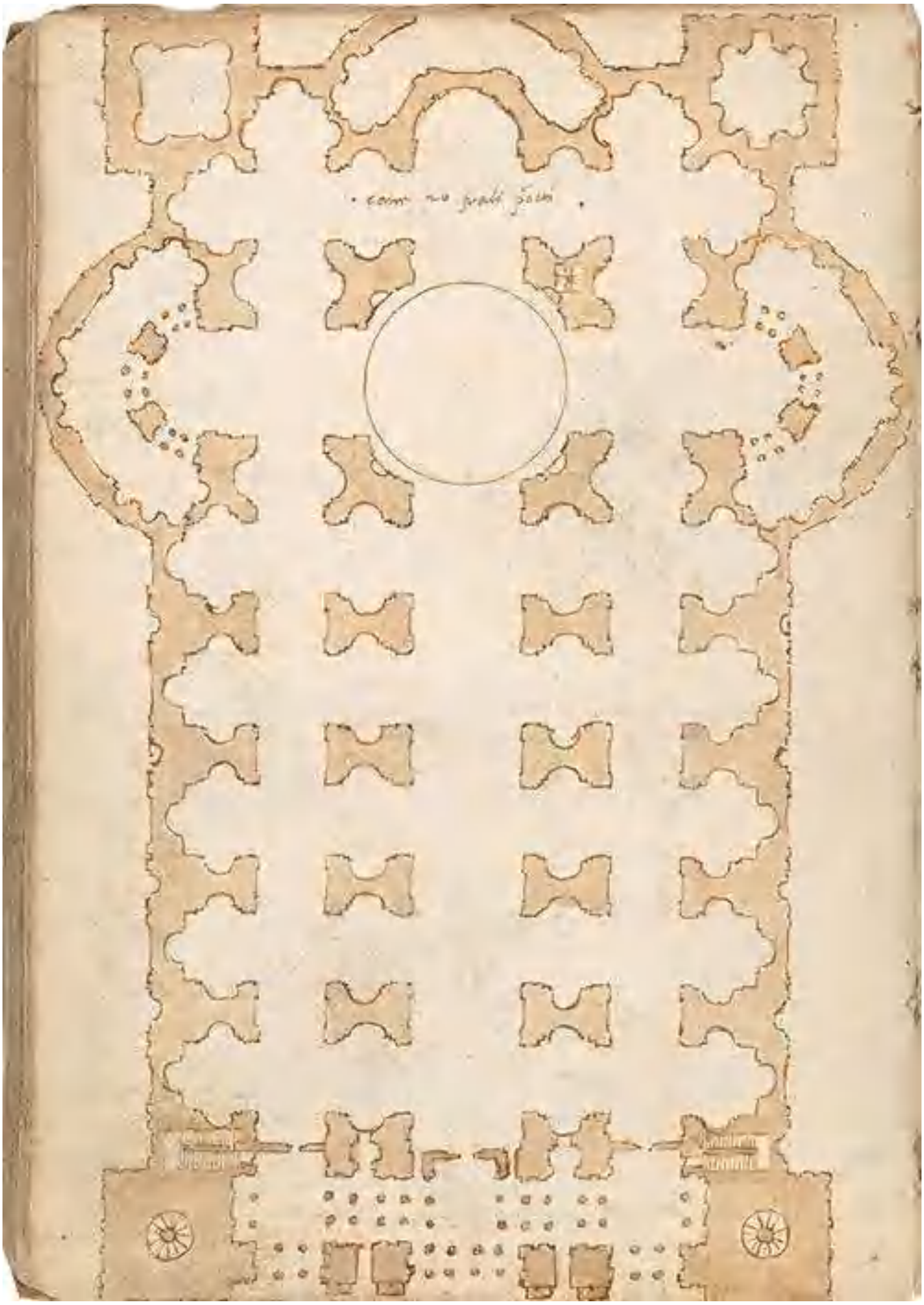


Figure 7.54

Plant of a presumable Raffaello’s Project

Domenico Antonio de Chiarellis (attr.), 1513

New York, Pierpoint Morgan Library, codex Mellon, f. 72v

Figure 7.55

Project of the St. Peter plan on parchment (only the right half, redesigned after having scraped the first draft left in the left half)

Antonio da Sangallo

GDSU 252 Ar

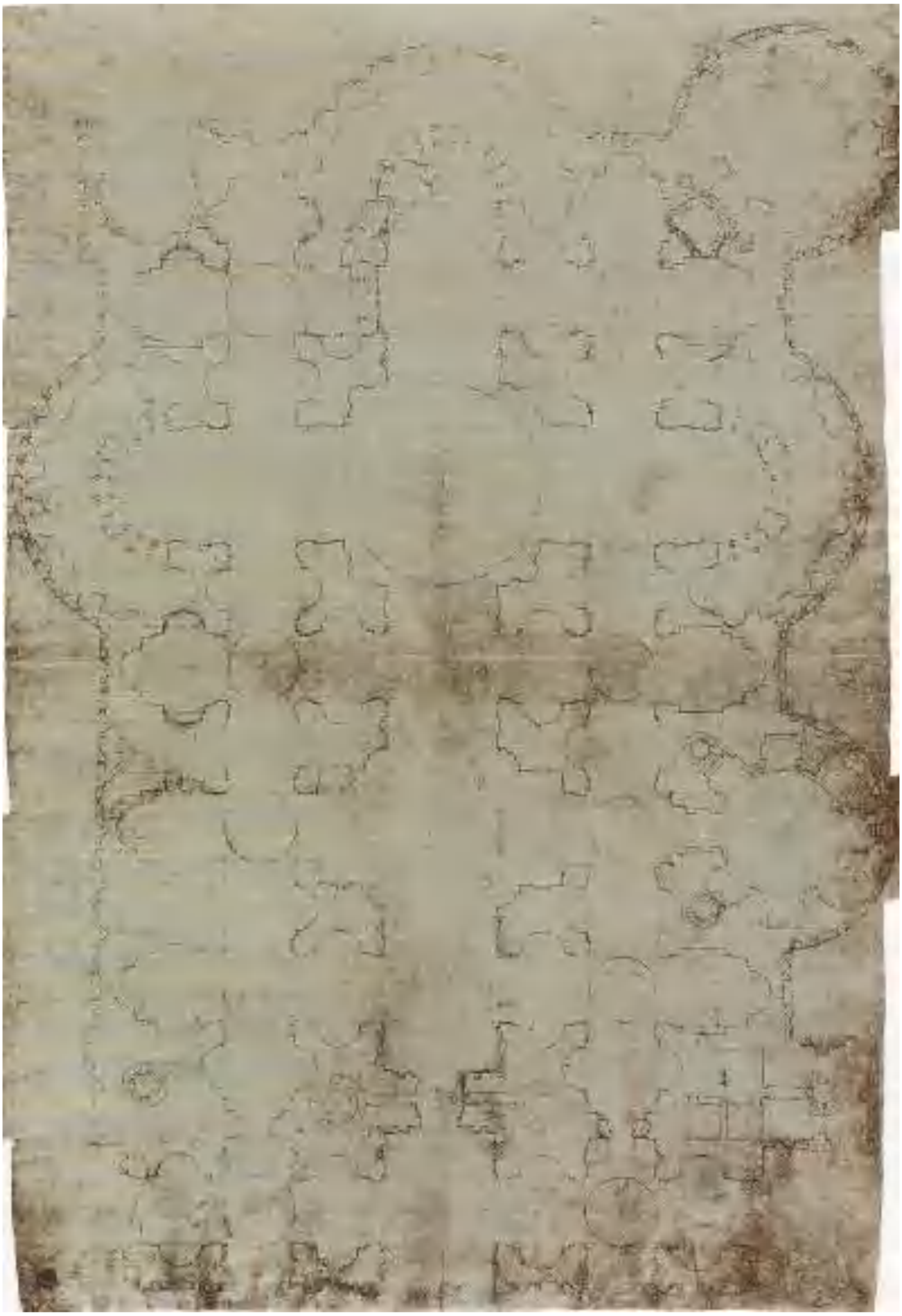


Figure 7.56

Project of the St. Peter’s plant on parchment, with two alternative solutions

Antonio da Sangallo, 1519

GDSU 255 Ar

Figure 7.57

Studies for the facade of St. Peter

Antonio da Sangallo, 1519

GDSU 72 A

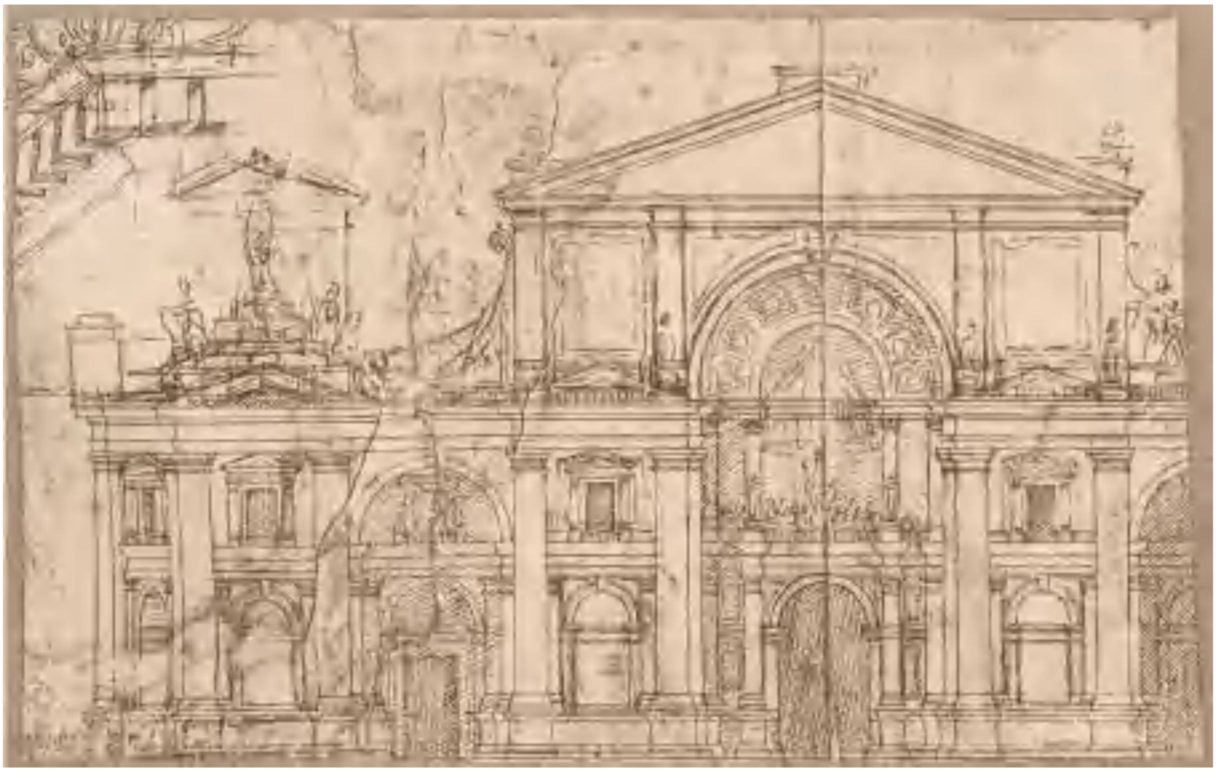


Figure 7.58

Studies for the facade of St. Peter

Antonio da Sangallo, 1519

GDSU 73 A

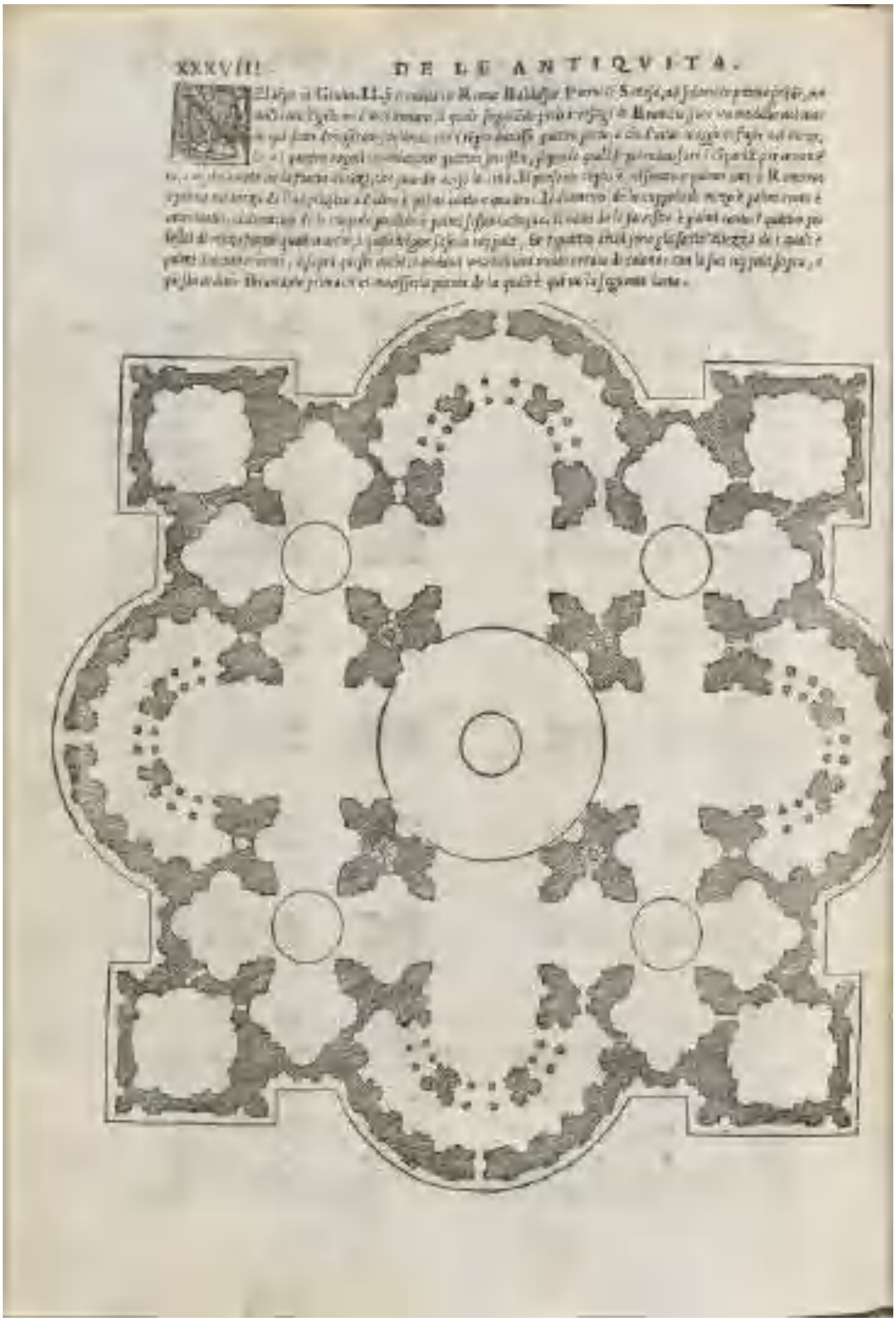

XXXVIII DE LE ANTIQVITA.

Figure 7.59

Plan of San Peter according to the “model” of Baldassarre Peruzzi, probably from 1520-1521

Sebastiano Serlio, 1544

Sebastiano Serlio. *Il terzo libro di Sabastiano Serlio Bolognese: nel qual si figurano, e descriuno le antichitá di Roma, e le altre che sono in Italia e fuori d’Italia.* Venice: Francesco Marcolini da Forli (1544). f. XXXVIII

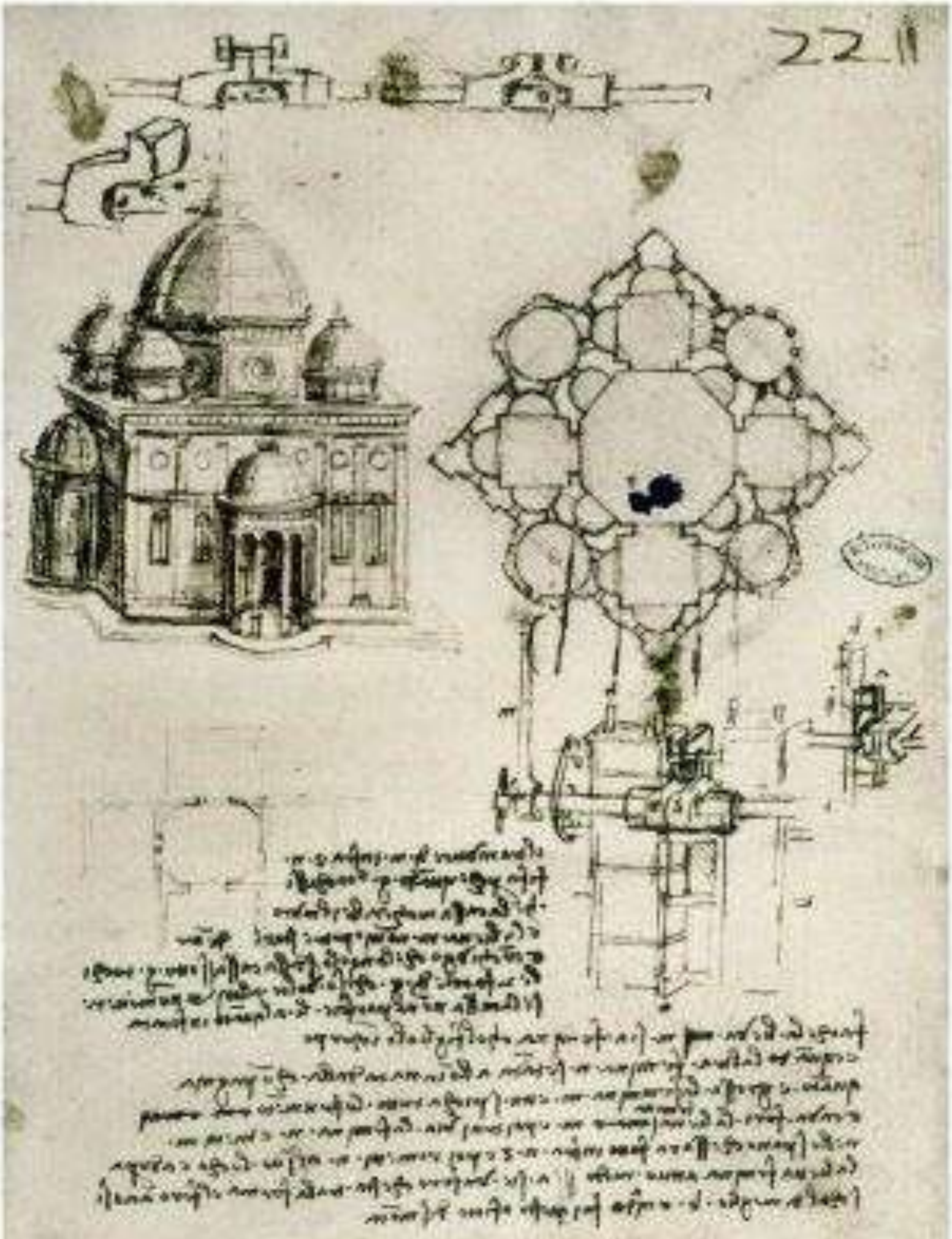


Figure 7.60

Studies for a building in a centralized plan IV

Leonardo da Vinci, 1487-1490

Figure 7.61

Studies for a building in a centralized plan VI

Leonardo da Vinci, 1488-89

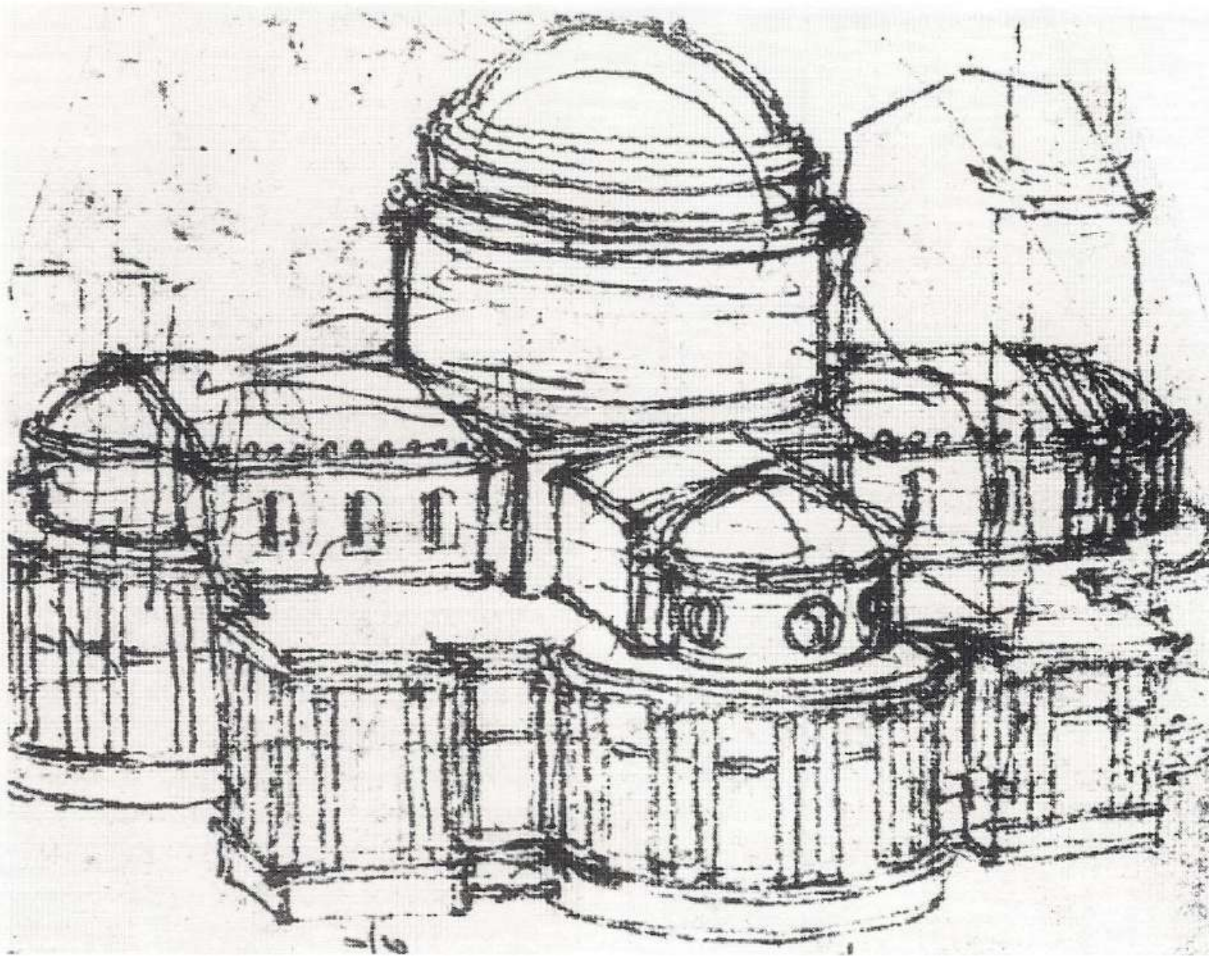


Figure 7.62

Perspective view likely for St. Peter, perhaps dating back to the time of Paolo III

Baldassarre Peruzzi

GDSU 27 Ar

Figure 7.63

Facade study for St. Peter, possibly before 1521

Baldassarre Peruzzi

GDSU 113 A

Figure 7.64

Room of Perspectives or Columns, detail

Baldassarre Peruzzi, 1518 -1519

Roma, Farnesina

Figure 7.65

Presentation of Maria at the temple

Baldassarre Peruzzi, about 1515 – 1525

Roma, Santa Maria della Pace

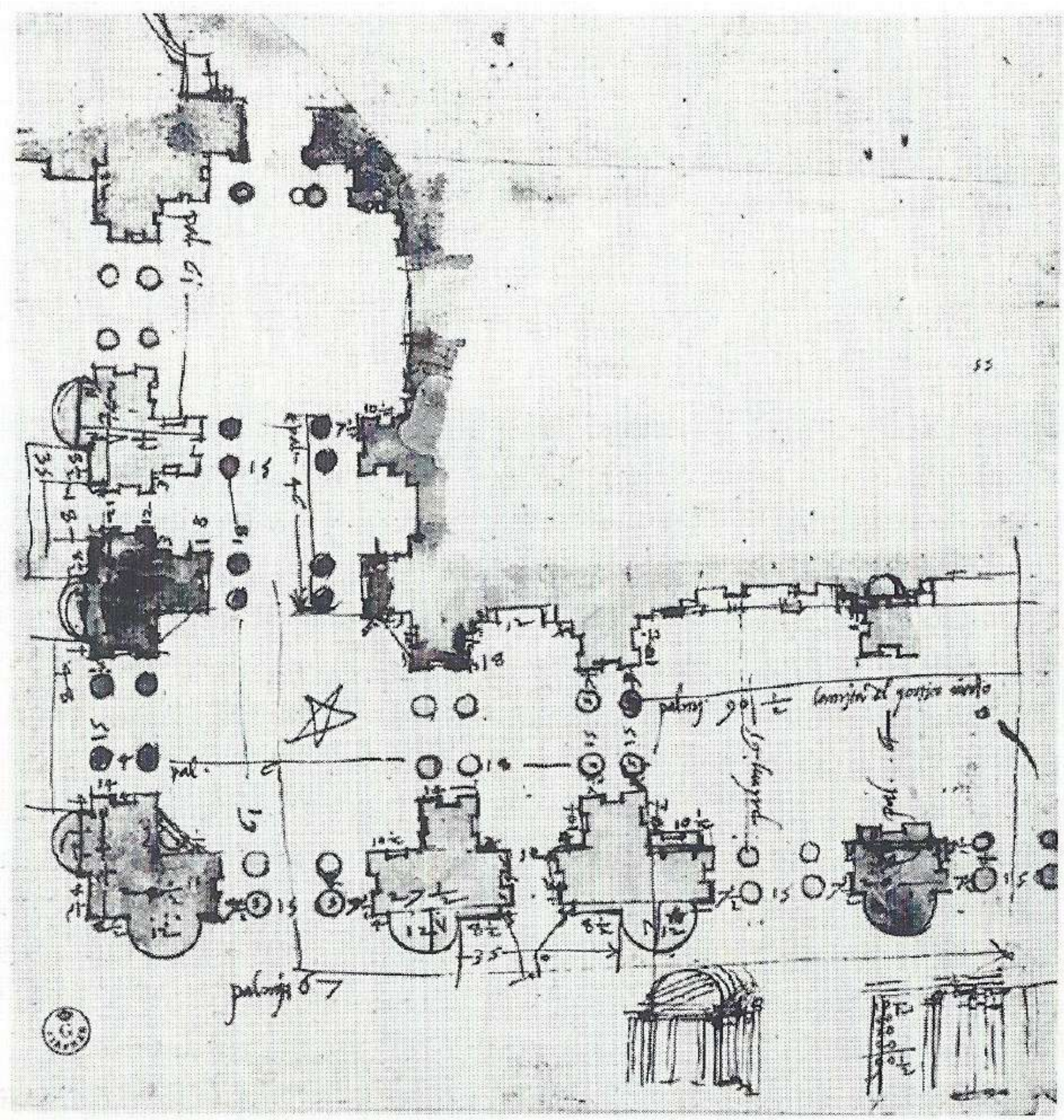


Figure 7.66

Project of the porch of the facade of St. Peter, with giant order of 12 palmi in diameter. Note the U-shaped plant, embracing the central part of the front and its articulation in sectors separated by rows of columns, according to a spatial-structural scheme similar to that of the final project of the time by Paolo III (1534-1535)

Baldassarre Peruzzi

GDSU 31 Ar

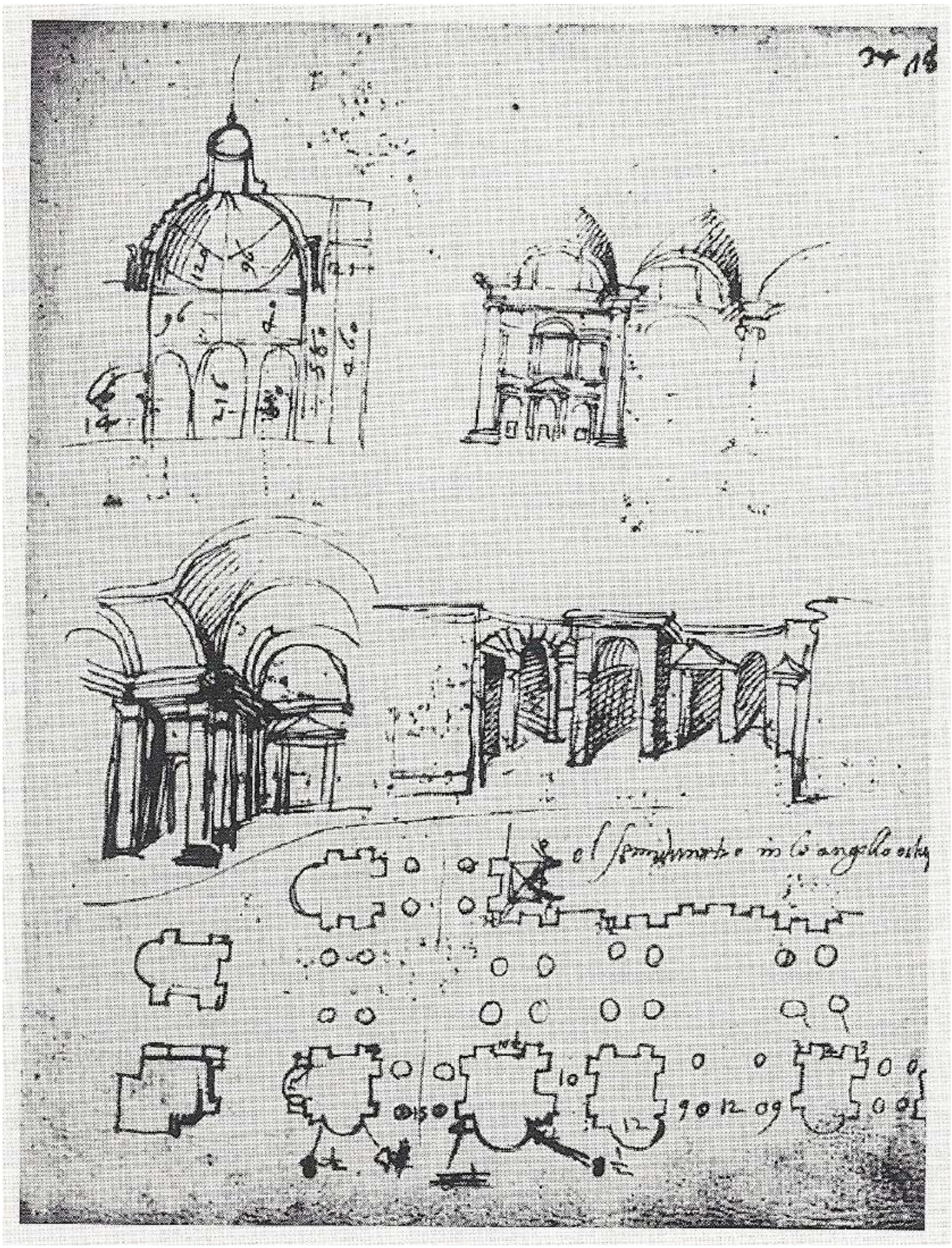


Figure 7.67

Copy of a project similar to the U 31Ar for the facade of San Pedro. The differences with this, the corrections and the note (“el semidiametro in lo angolo ottuso”) suggest that it is your wrong copy or the copy of a perhaps immediately previous drawing. The perspective sketch on the left shows the interior of the portico with the square section covered with sail flanked by four times a barrel

Baldassarre Peruzzi

BCS, TS IV 7, f. 28r

Figure 7.68

Study of facade with giant order, substantially corresponding to the plan in U 31Ar and to the copy of f.28 del TS IV 7

Baldassarre Peruzzi

BCS, TS 7, f. 36v

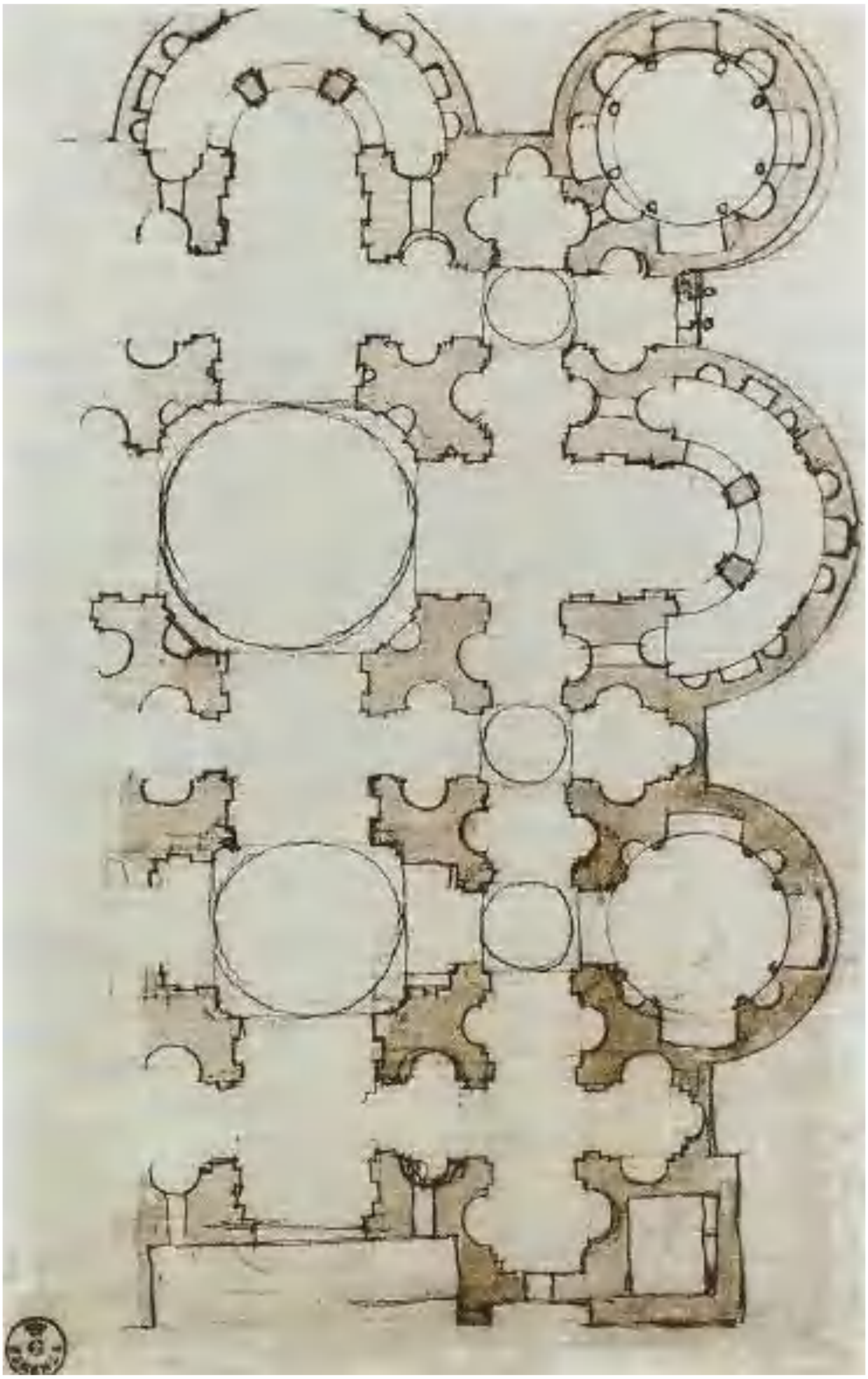


Figure 7.69

Interpretation with variant, especially in the facade, of project U 225A, right alternative

Antonio da Sangallo

GDSU 38 A

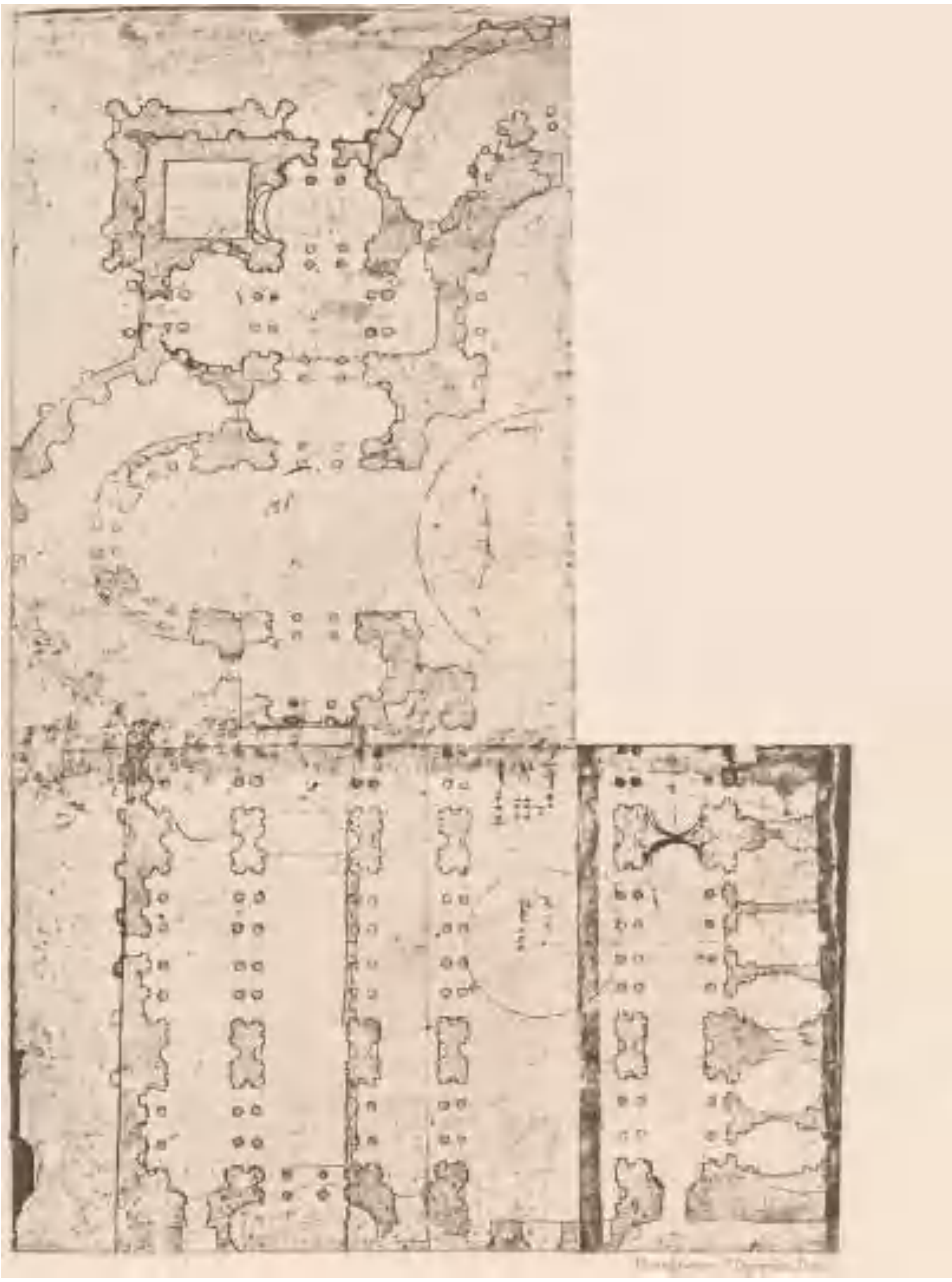


Figure 7.70

Latin cross plan for St. Peter's Basilica in Rome. On the left the first draft, probably before the sack of 1527, with modifications to reduce its extension, perhaps after the sack; on the right (on an added sheet) reduced solution with the abolition of the quincunx termination

Baldassarre Peruzzi

GDSU 14 Ar

Figure 7.71

L'incendio del Borgo

Raffaello Sanzio, 1514

Palazzo Apostolico, Città del Vaticano

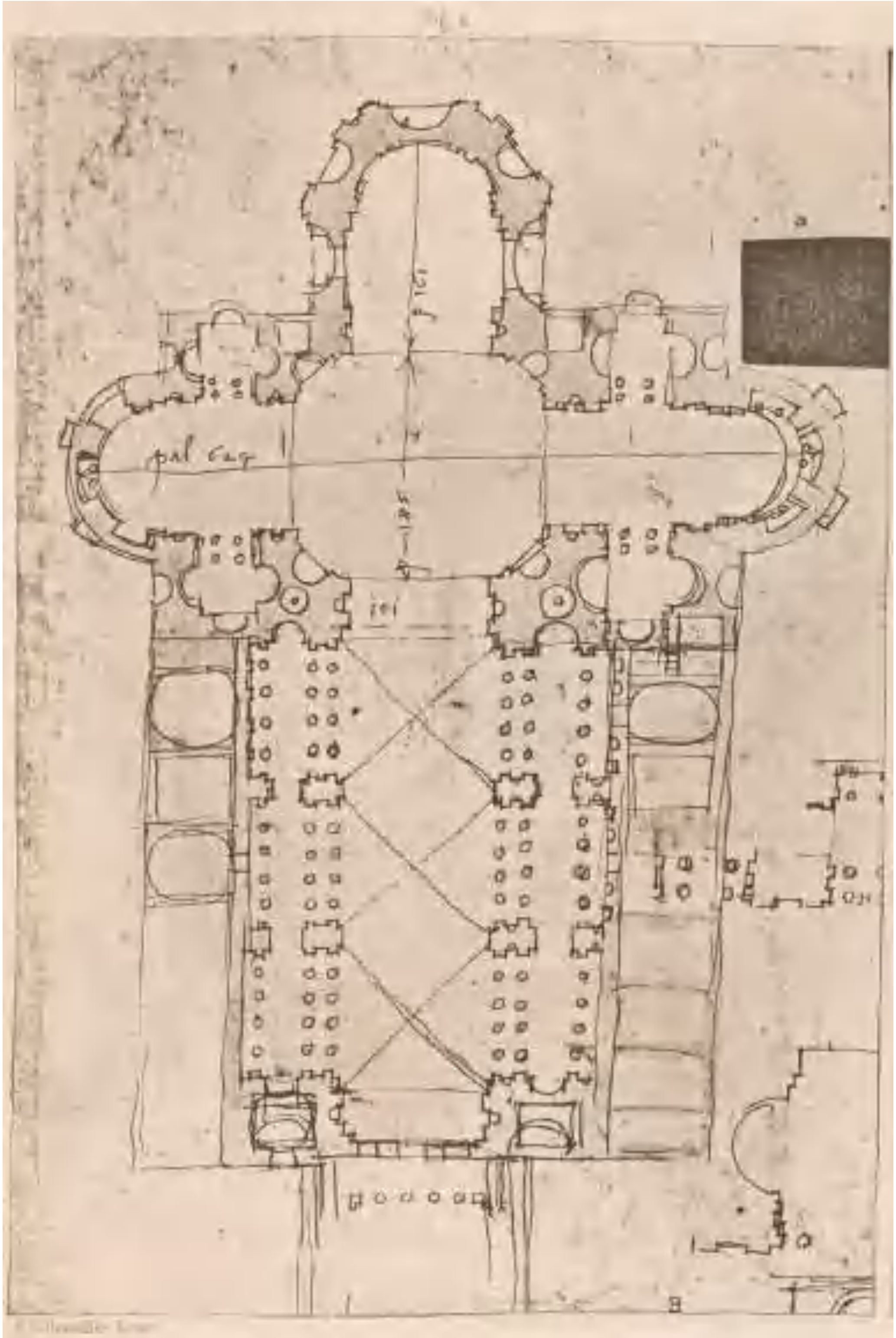


Figure 7.72

Latin cross plan for St. Peter's Basilica in Rome. Reduced solution, probably following the sack of 1527, perhaps from the time of Clement VII (spring-summer 1533)

Baldassarre Peruzzi

GDSU 15 Ar

Figure 7.73

View of the Basilica of Majencio in Rome (view of the ruins of the Temple of Peace)

Hieronymus Cock, 1561

Herzog Anton Ulrich Museum, Virtuelles Kupferstichkabinett, cod. HCock WB 3.96

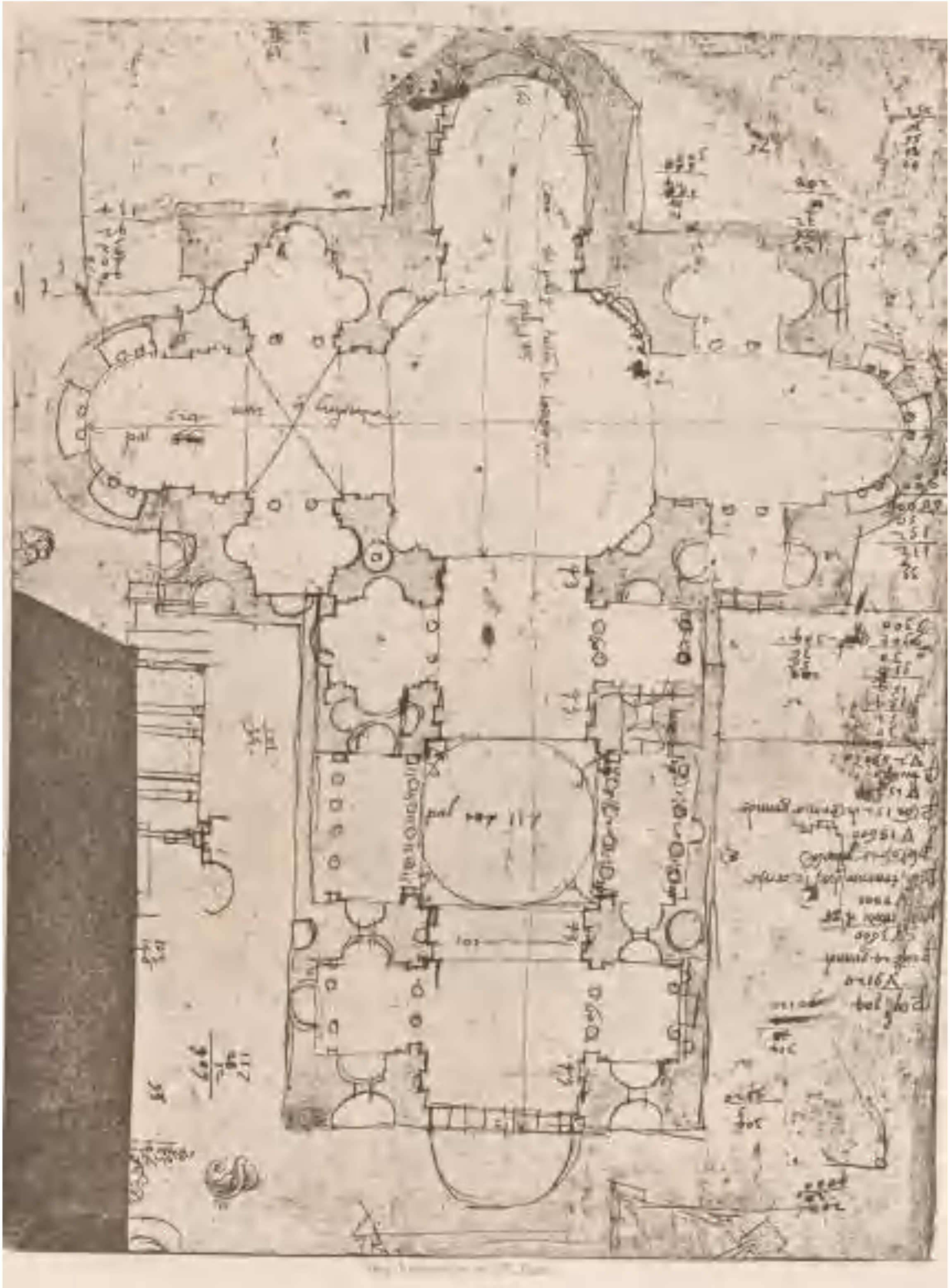


Figure 7.74

Plan of St. Peter's Basilica in Rome, probably of the time of Clemente VII

Baldassarre Peruzzi

GDSU 16 A.

Figure 7.75

Perspective sketches, perhaps related to the minor navate of St. Peter

Baldassarre Peruzzi

GDSU 21 A

Figure 7.76

Perspective sketches, perhaps related to the minor navate of St. Peter

Baldassarre Peruzzi

GDSU 22 A

Figure 7.77

Perspective sketches, perhaps of a side navate with vaulted cover to disgust

Baldassarre Peruzzi

GDSU 18Av; cfr. U 16 A

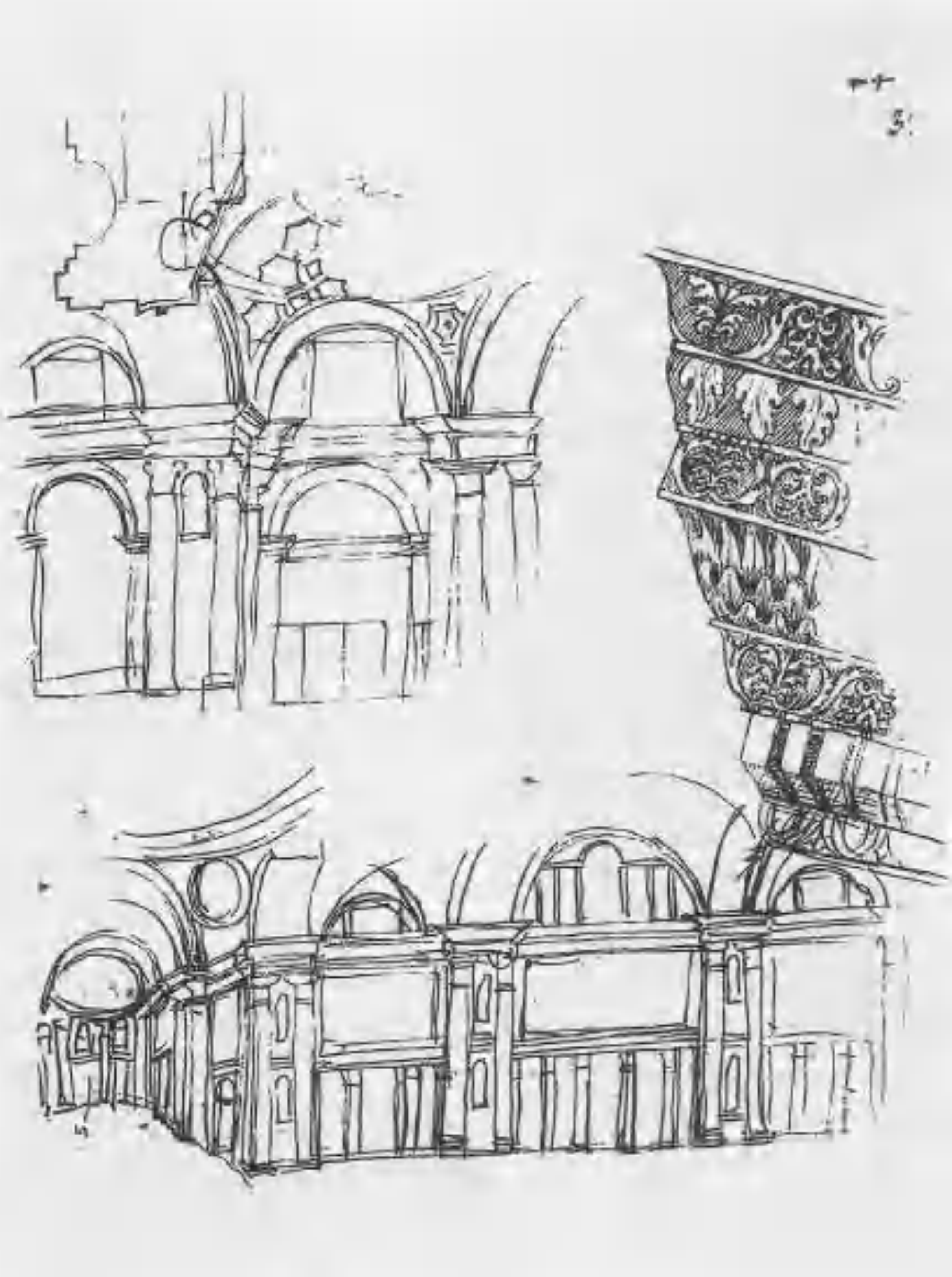


Figure 7.78

Studies for the development in elevation of the navate of St. Peter

Copy from Baldassarre Peruzzi

BCS, TS IV 7, f. 37r

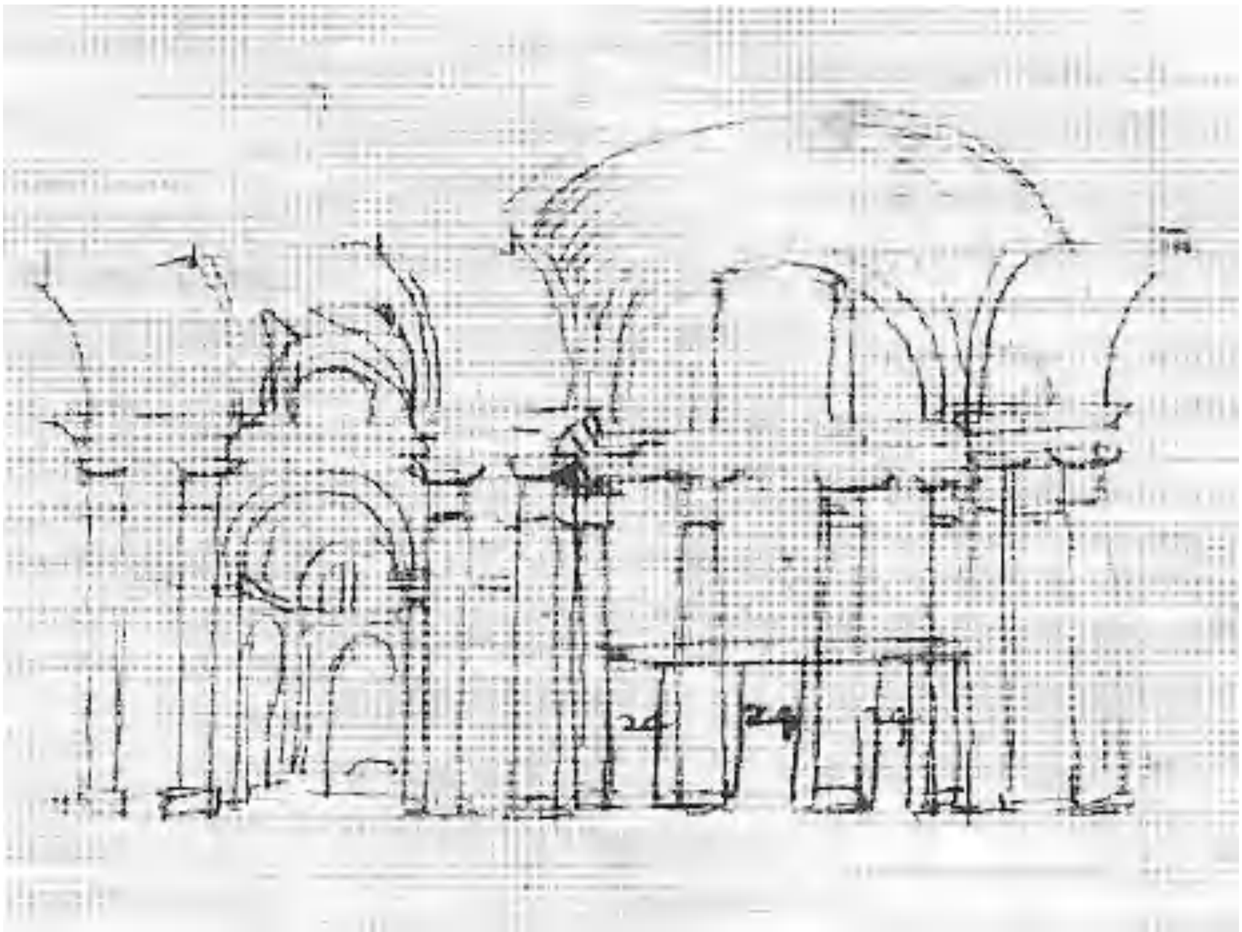


Figure 7.79

Perspective sketch for the elevation of the nave with a central bay with a ribbed vault

Baldassarre Peruzzi

GDSU 15 Av; cfr. TS IV T, f. 37r

Figure 7.80

Facade study for St. Peter. Probably corresponding to a centric plant, with an external division of the kind adopted for the interior of the drawing at f. 37r of TS IV 7, uncertain dating, perhaps thirties

Baldassarre Peruzzi

GDSU 26 Ar

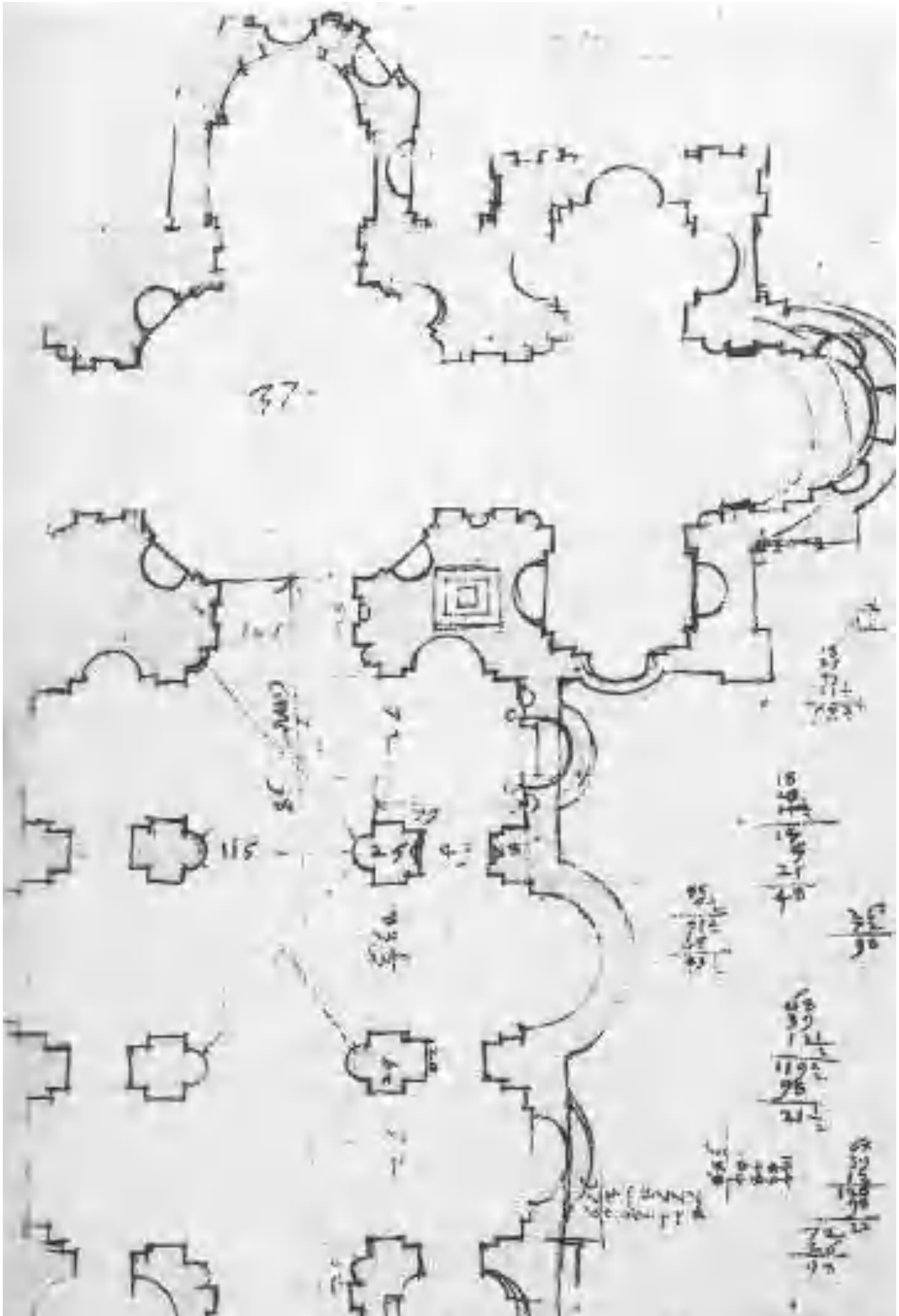


Figure 7.81

Reduced solution, following the sack of 1527, perhaps at the time of Clemente VII (spring-summer 1533), with the pillars of the navate with single semi-columns of 12 palmi of diameter and wider central span of the side

Baldassarre Peruzzi

GDSU 17 A

Figure 7.82

Reduced solution with a navate with equal span and pillars with double parastepal of 12 palmi; on the bottom left a synthetic estimate metric calculation

Baldassarre Peruzzi

GDSU 18 Ar

Figure 7.83

Paolo III ordina la ripresa dei lavori

Fresco by Francesco Salviati

Roma, Palazzo Farnese

Figure 7.84

La Fabbrica nell'estate del 1549

Fresco by Giorgio Vasari

Sala dei Cento Giorni, Palazzo della Cancelleria, Rome

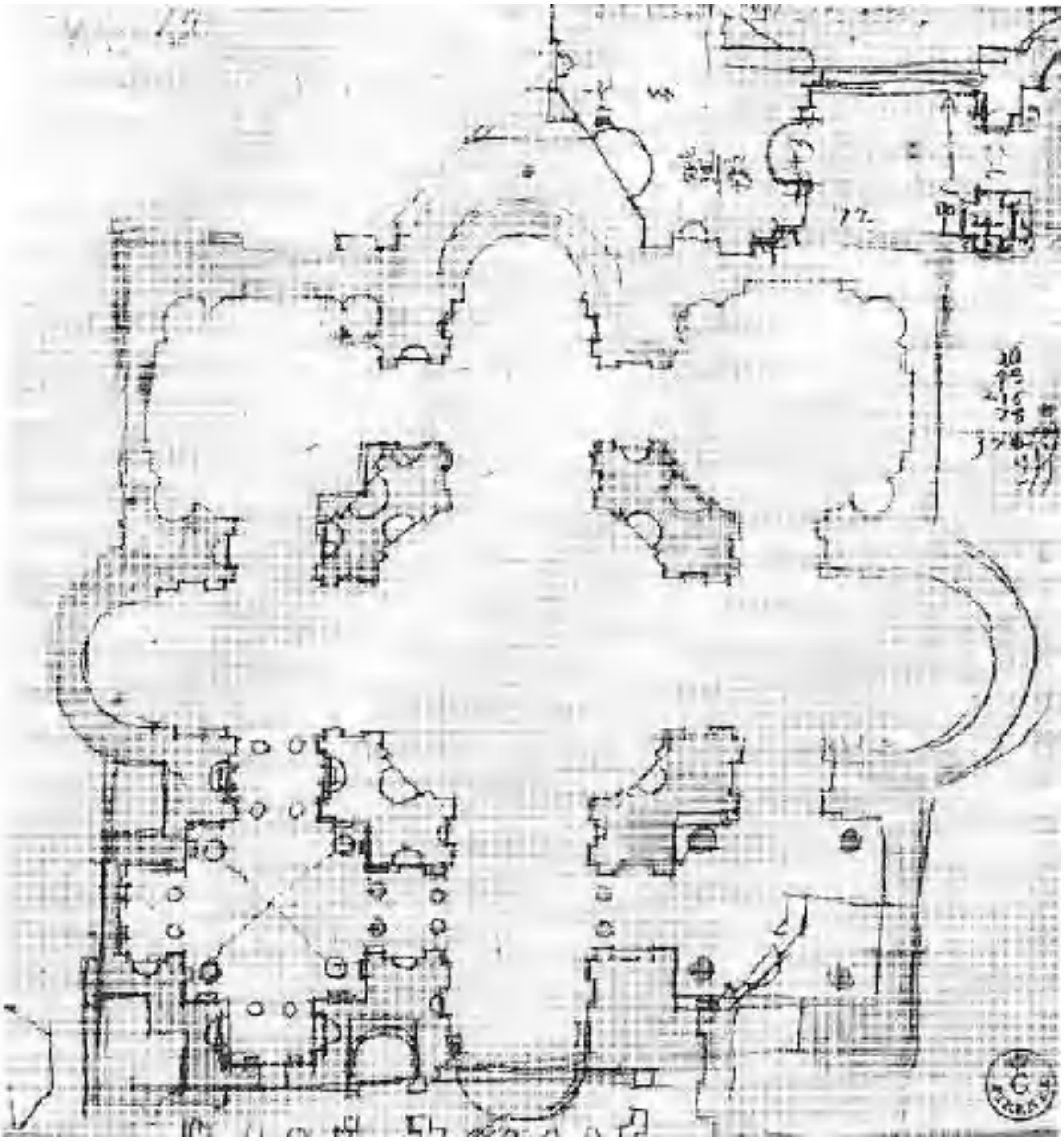


Figure 7.85

"Theoretical" plan of a centric "temple" and, at the top right, a study for the nave of St. Peter with an arch of 72 palms and pillars with a single pilaster later corrected in the form of a semi-column, in a similar arrangement to that of plant U 17A of which preparation is presumable

Peruzzi Baldassarre for Bramante

GDSU 19 Ar

Figure 7.86

Plan sketch of St. Peter's Basilica

Baldassarre Peruzzi

GDSU 19 Av

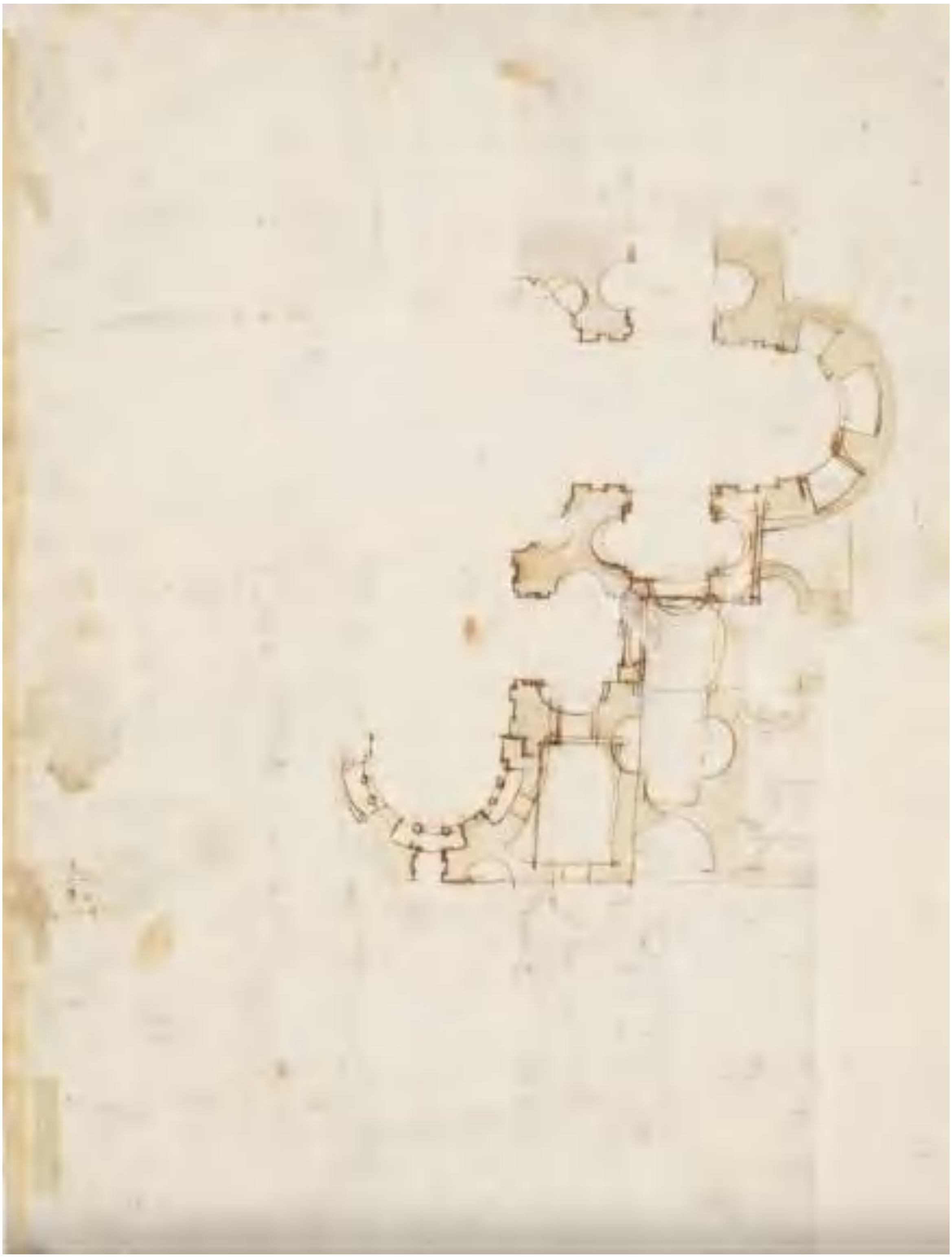


Figure 7.87

Drawing for the plan of S. Peter in Rome

Baldassarre Peruzzi

GDSU 16 Av

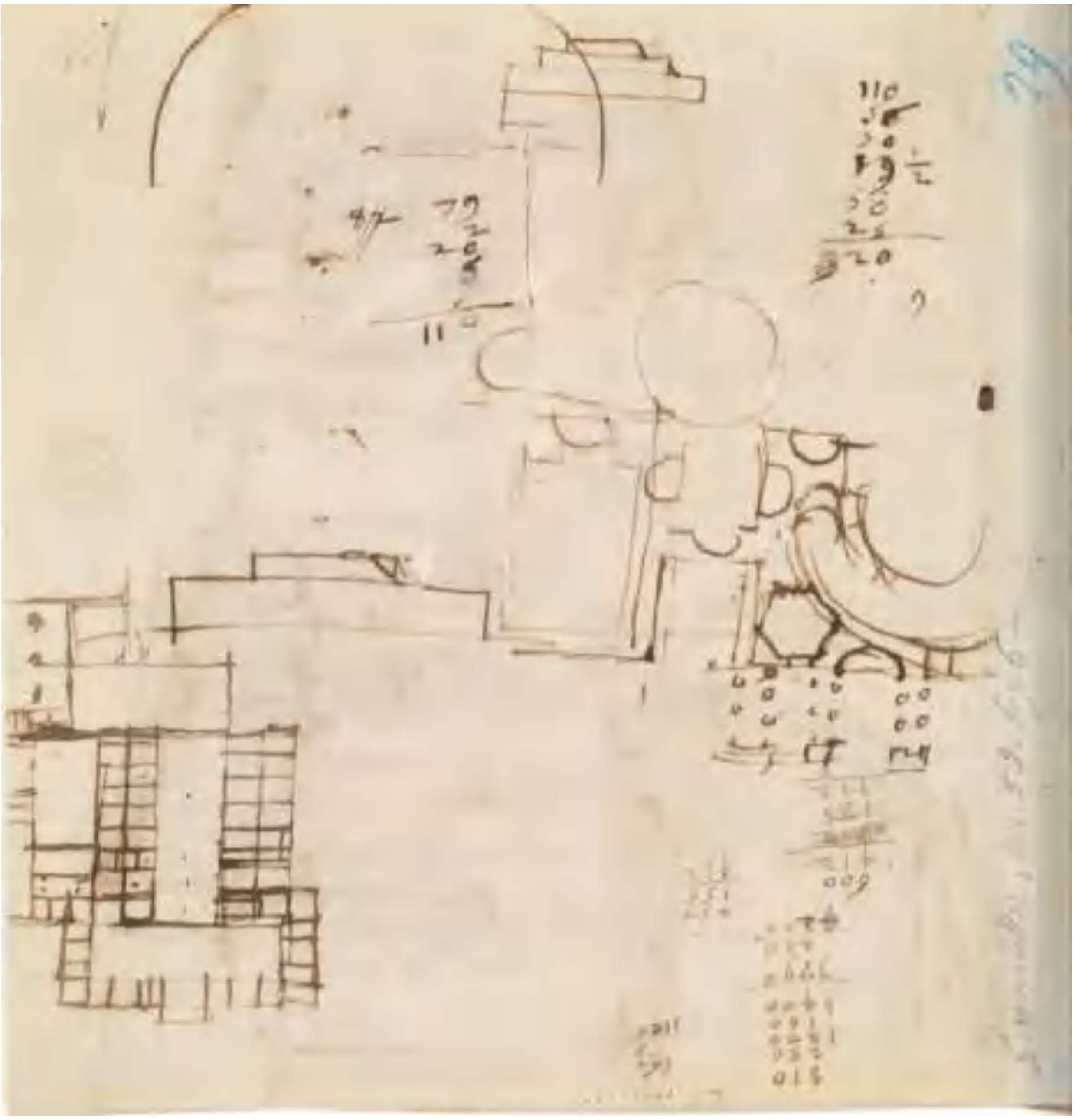


Figure 7.88

Study for the plan of S. Peter with central plant in quincunx with walkways, facade porch with columns and pillars and backward bells. note the hexagonal environment on the side of the eastern hemicycle towards the facade

Baldassarre Peruzzi

GDSU 29 Av

GDSU 29 Ar

Figure 7.89

Facade studies probably for S. Peter, with portico with tabeate columns, overhanging attic and rear bell towers, in the form of a four-faced arch with probable upper nucleus with an octagonal plan

Baldassarre Peruzzi

GDSU 29 Ar

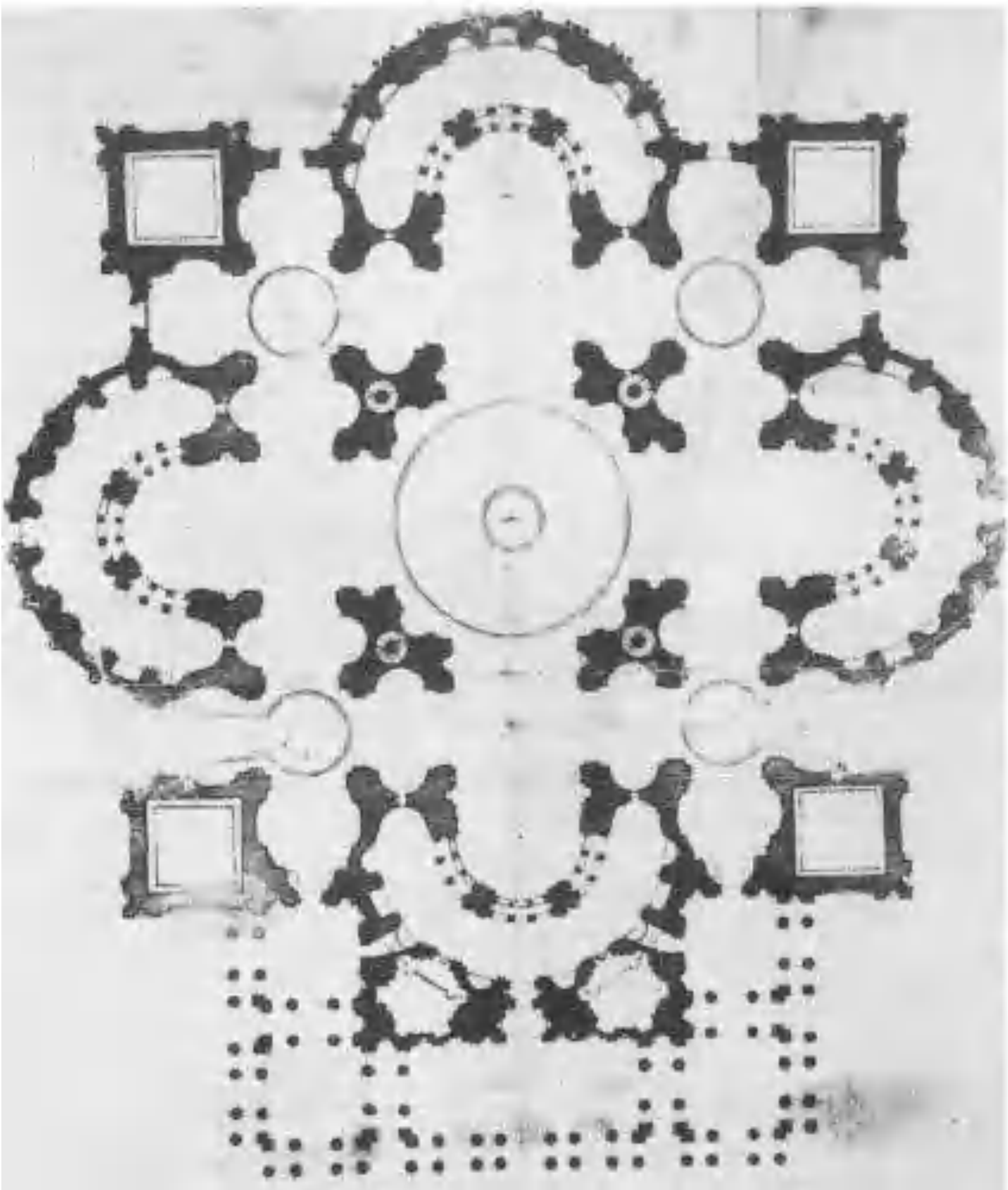


Figure 7.90

Copy (?) of the probable conclusive plan of Baldassarre Peruzzi for St. Peter at the time of Paolo III, probably of 1535

White collection, New York, sede della American Academy of Rome

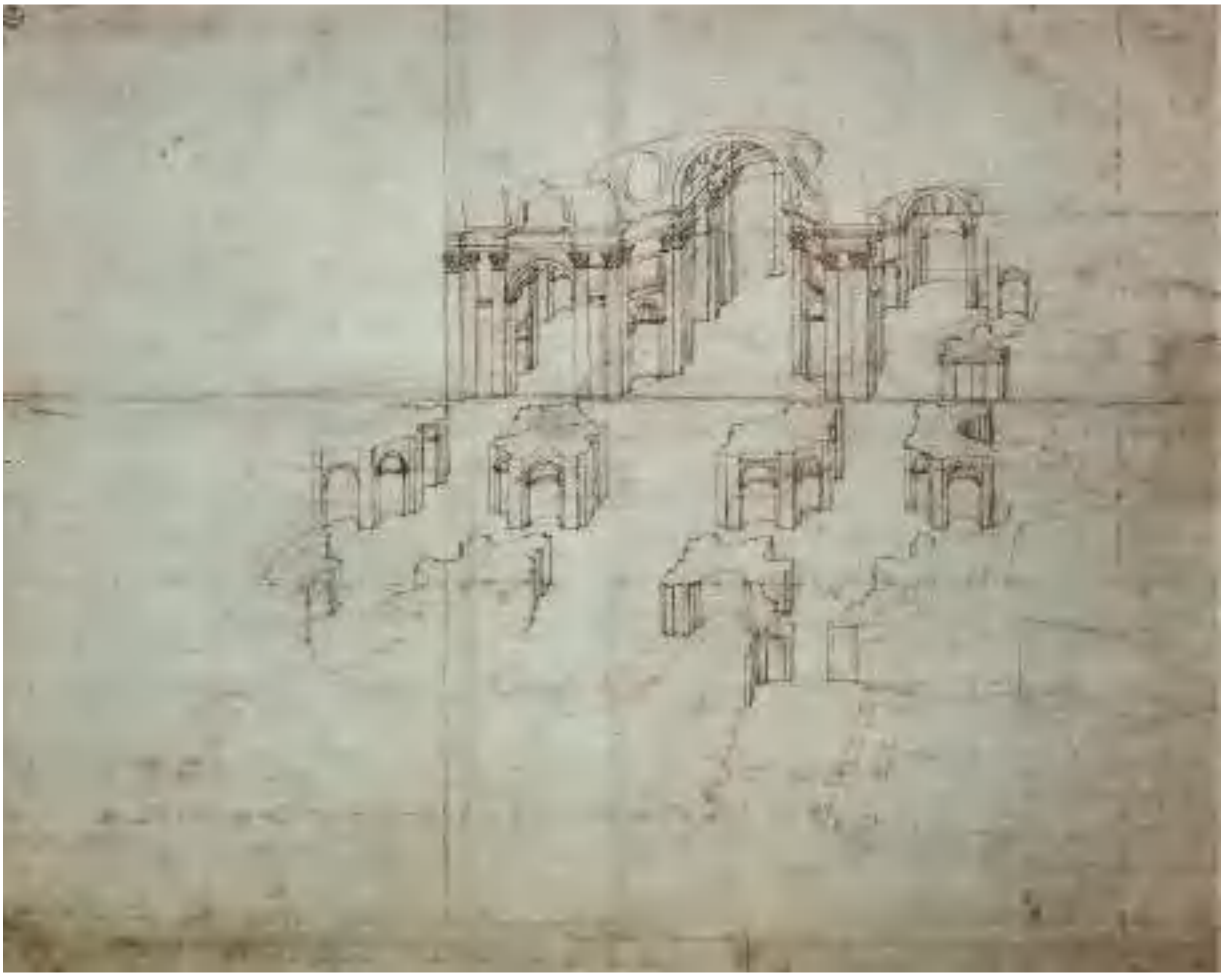


Figure 7.91

Drawing for the Church of San Pietro in Rome, partly in plan and partly in perspective elevation

Baldassarre Peruzzi

GDSU 2 A

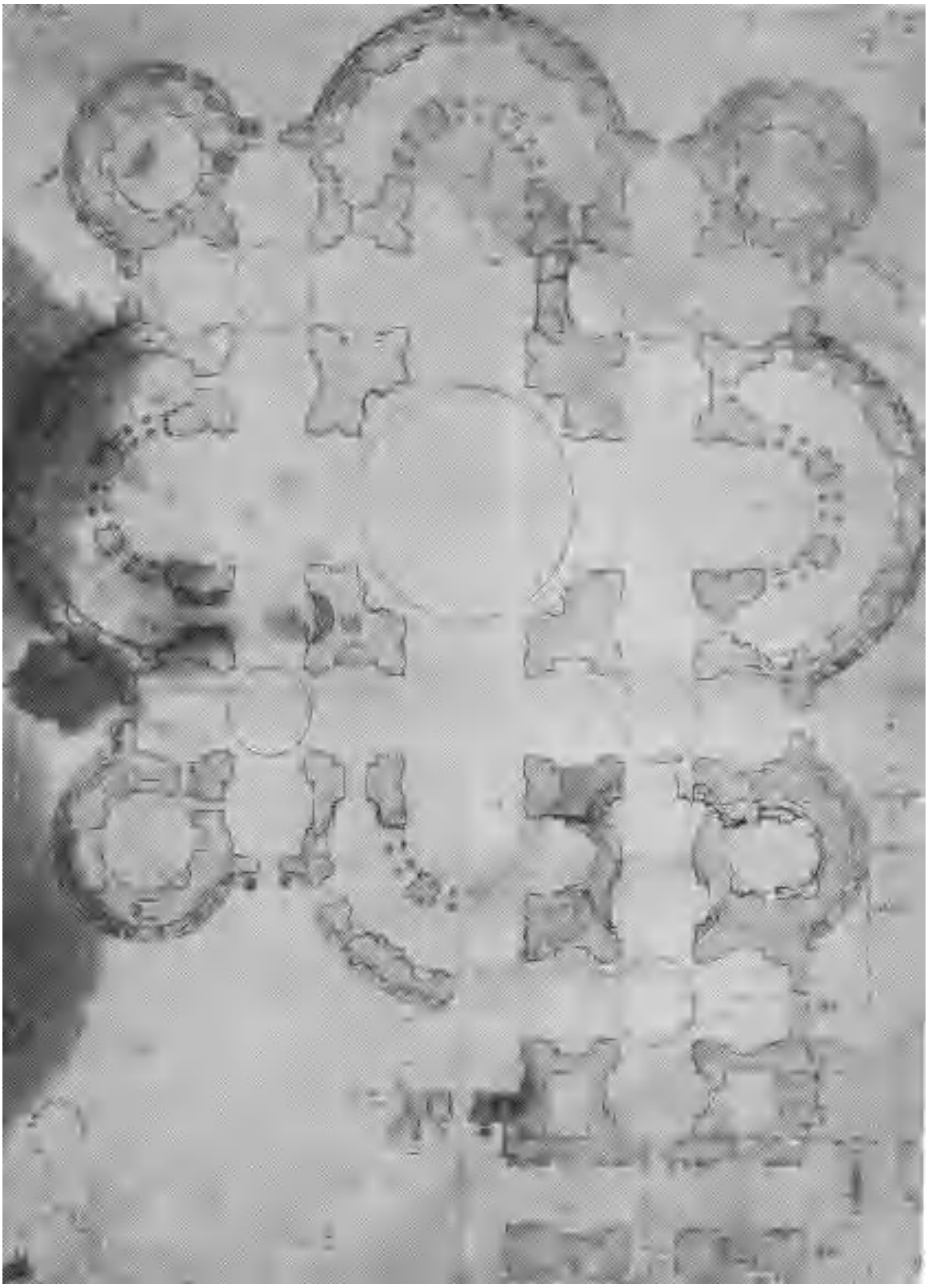


Figure 7.92

Project of a ploorplan for Saint Peter in Rome

Antonio da Sangallo

GDSU 39 A

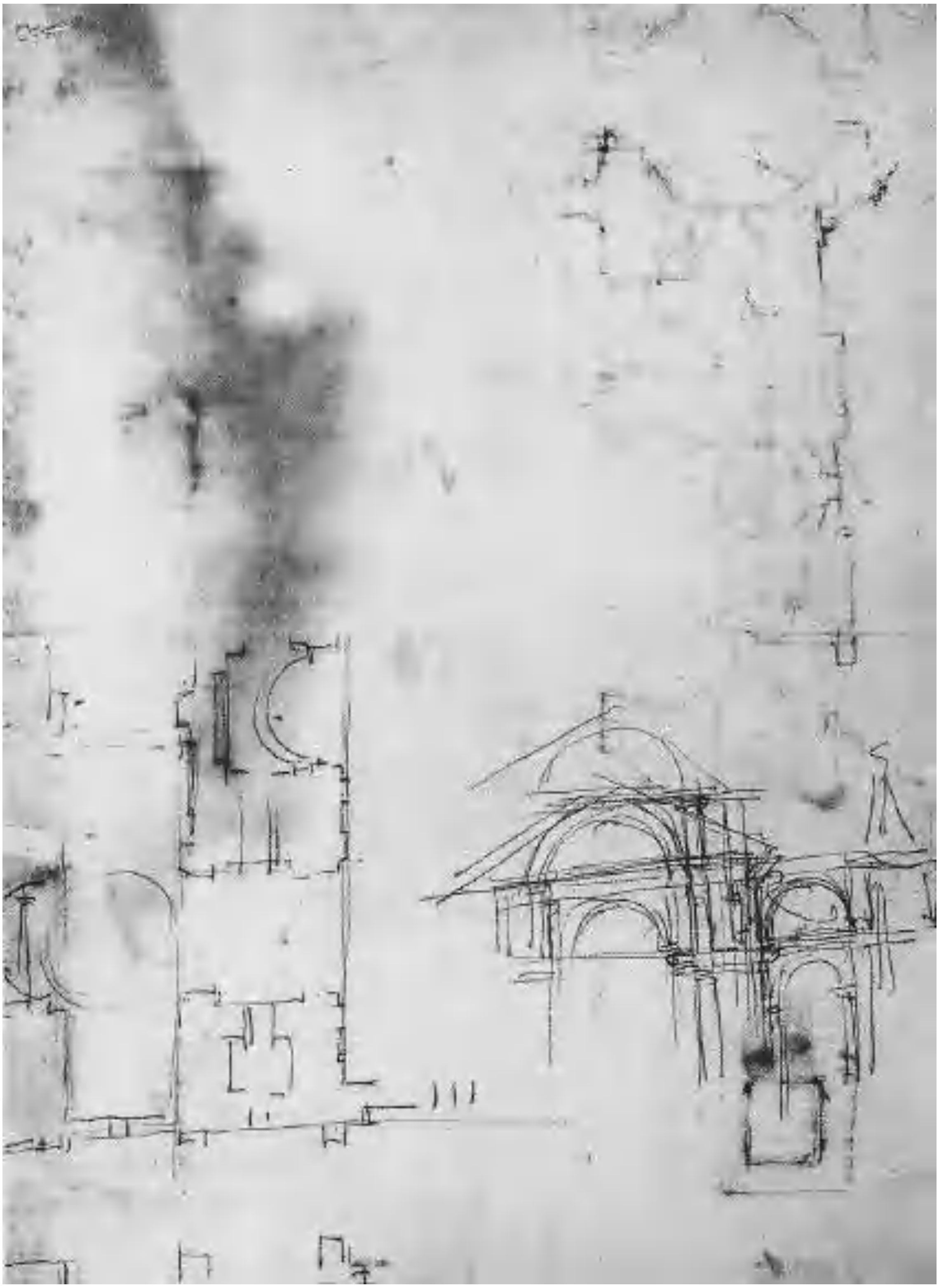


Figure 7.93

Antonio da Sangallo

GDSU 40 Av

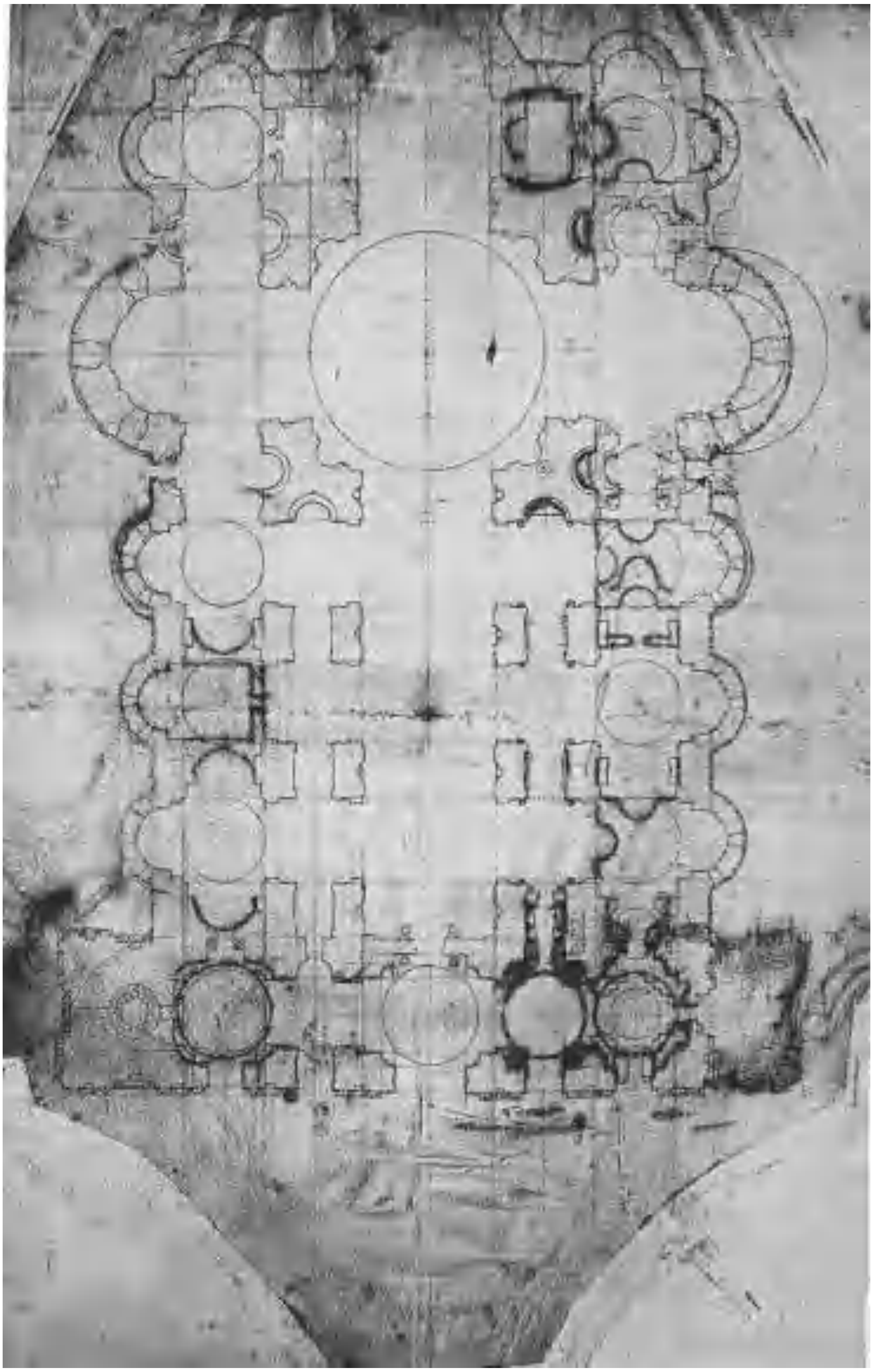


Figure 7.94

Latin cross plan but the two side arms very slightly extended

Antonio da Sangallo

GDSU 256 A

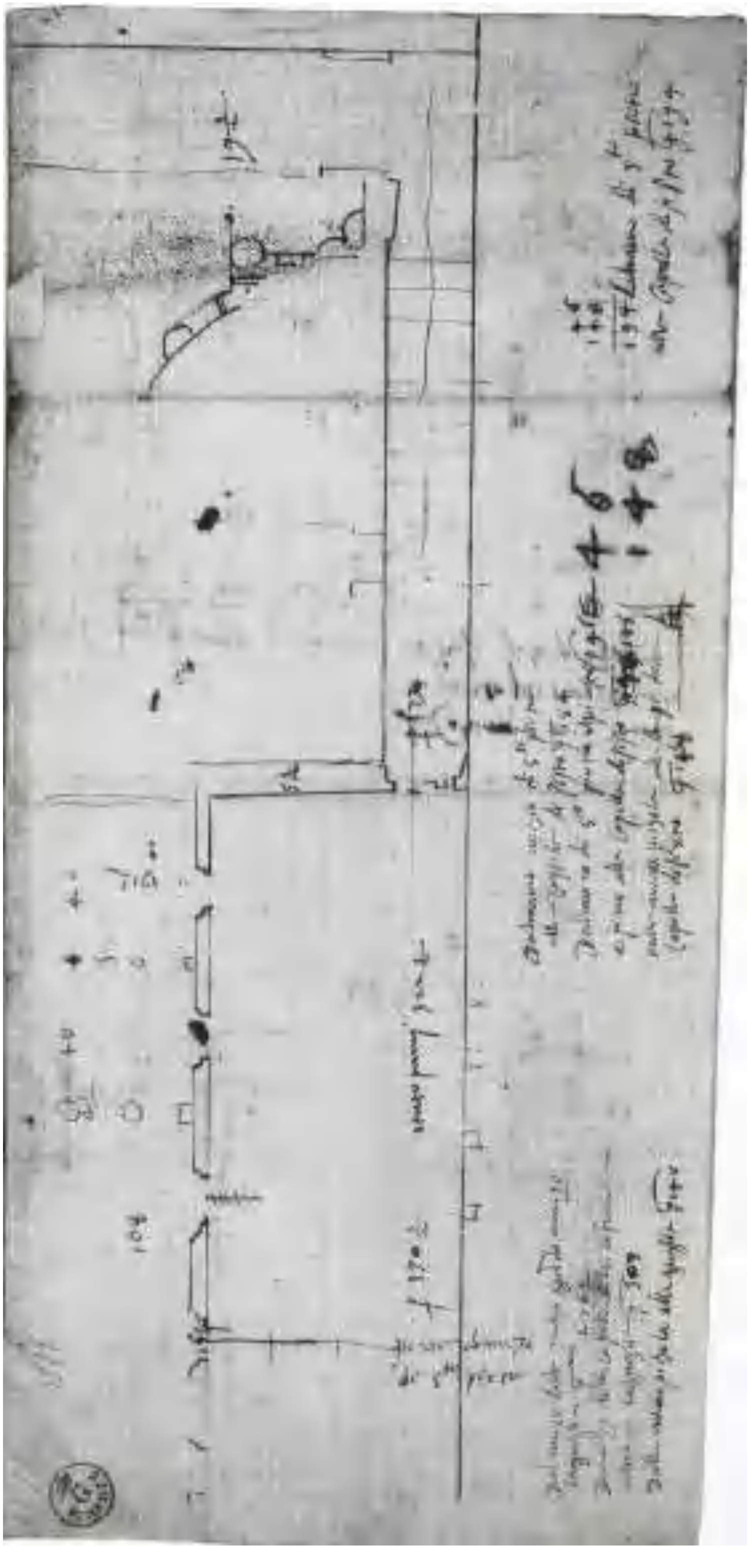


Figure 7.95

Reliefs of the ancient Basilica

Antonio da Sangallo

GDSU 119 Ar

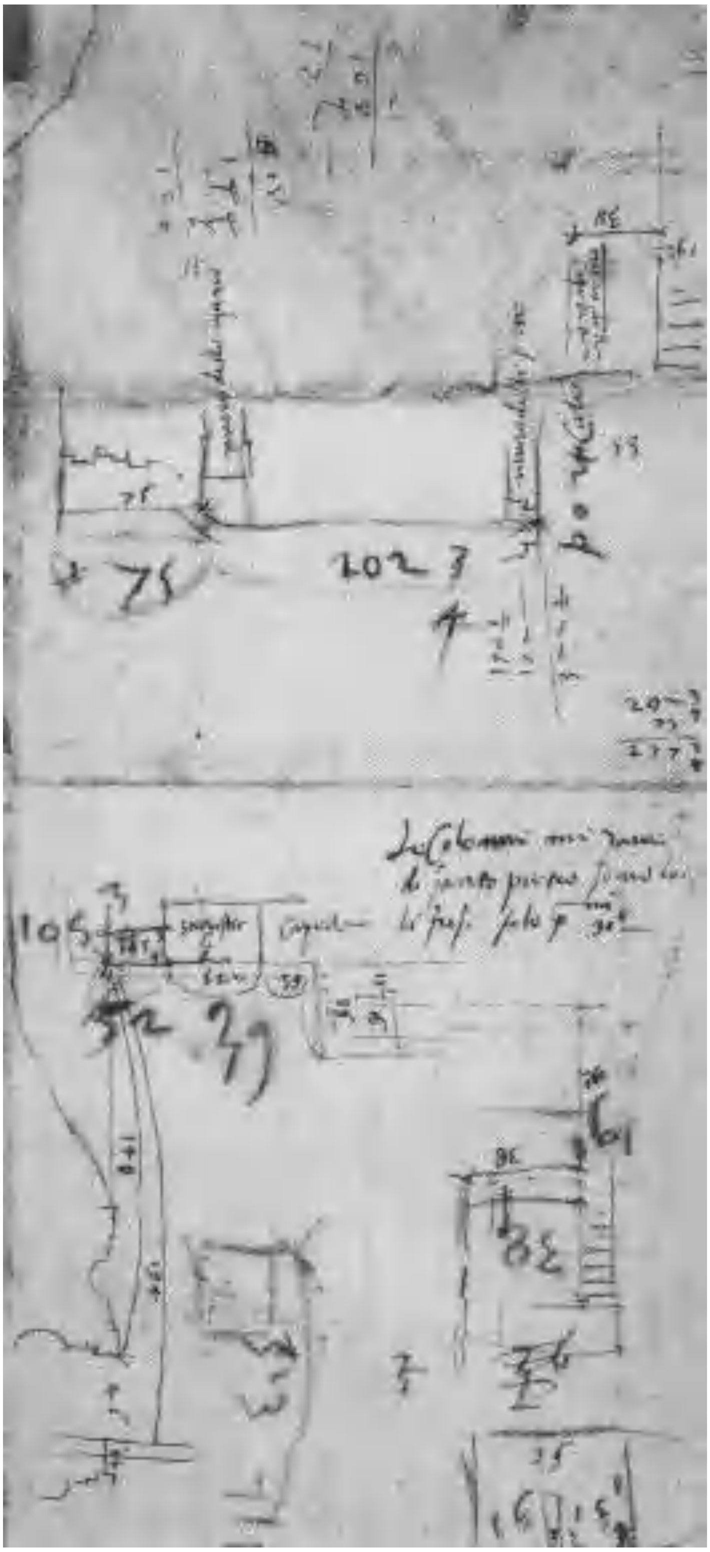


Figure 7.96

Sketch of relief

Antonio da Sangallo

GDSU 119 Av

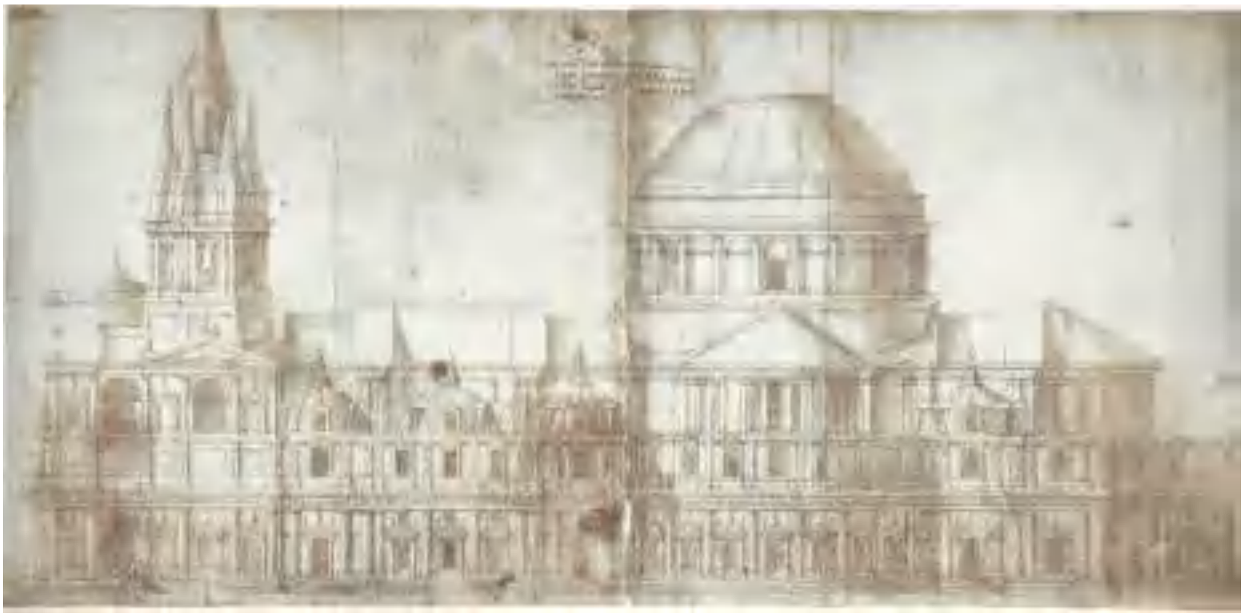


Figure 7.97

Project for San Peter, exterior toward south

Antonio da Sangallo

GDSU 259 A

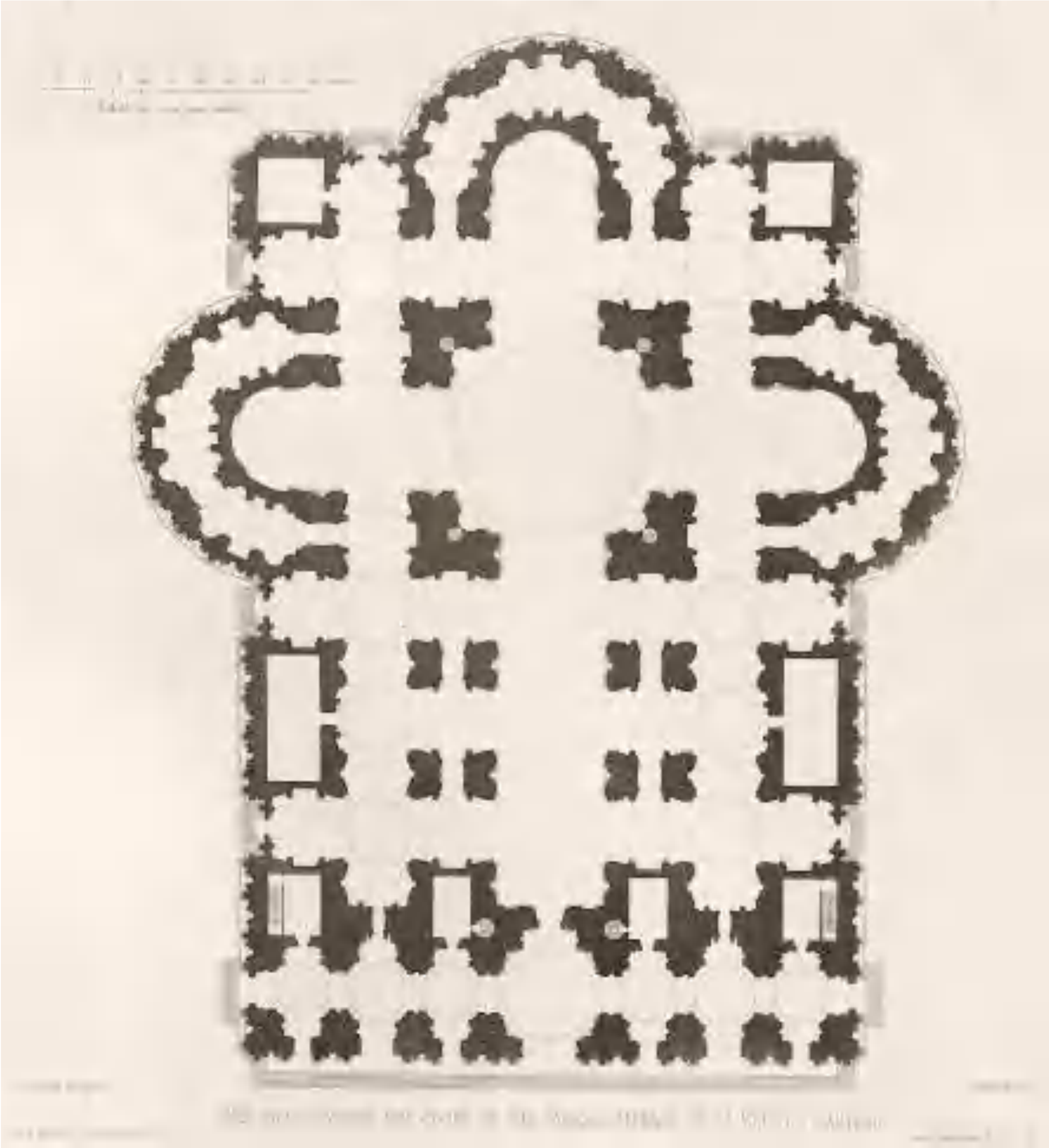


Figure 7.98

Antonio da Sangallo, project for S. Peter, reconstruction of the plant of 1518

Paul Marie Letarouilly, 1882

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1. Paris (1882). Cap. Projets divers pour la Basilique de St. Pierre, PL14, fig. 2

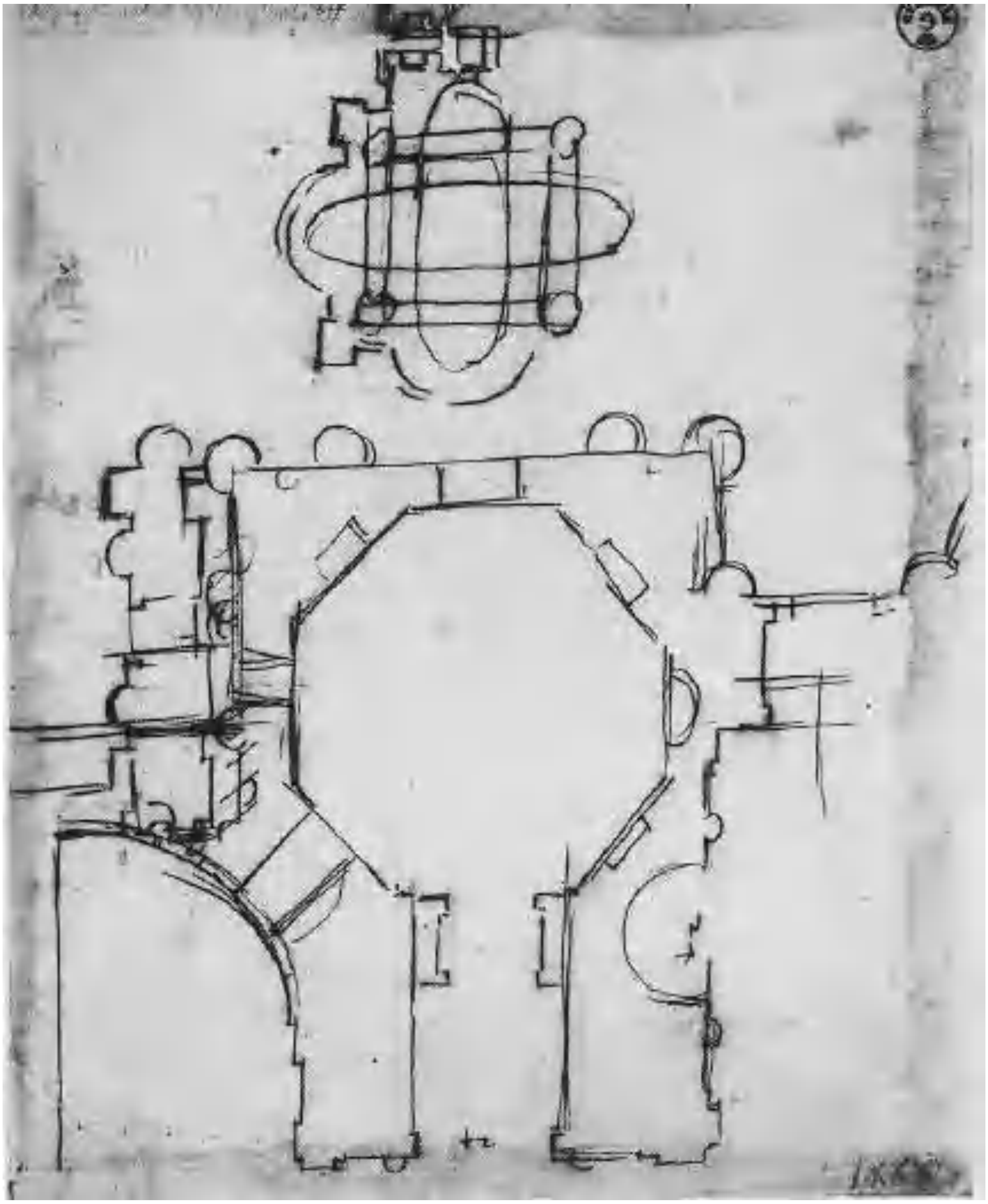


Figure 7.99

Study for S. Peter

Antonio da Sangallo

GDSU 41 A

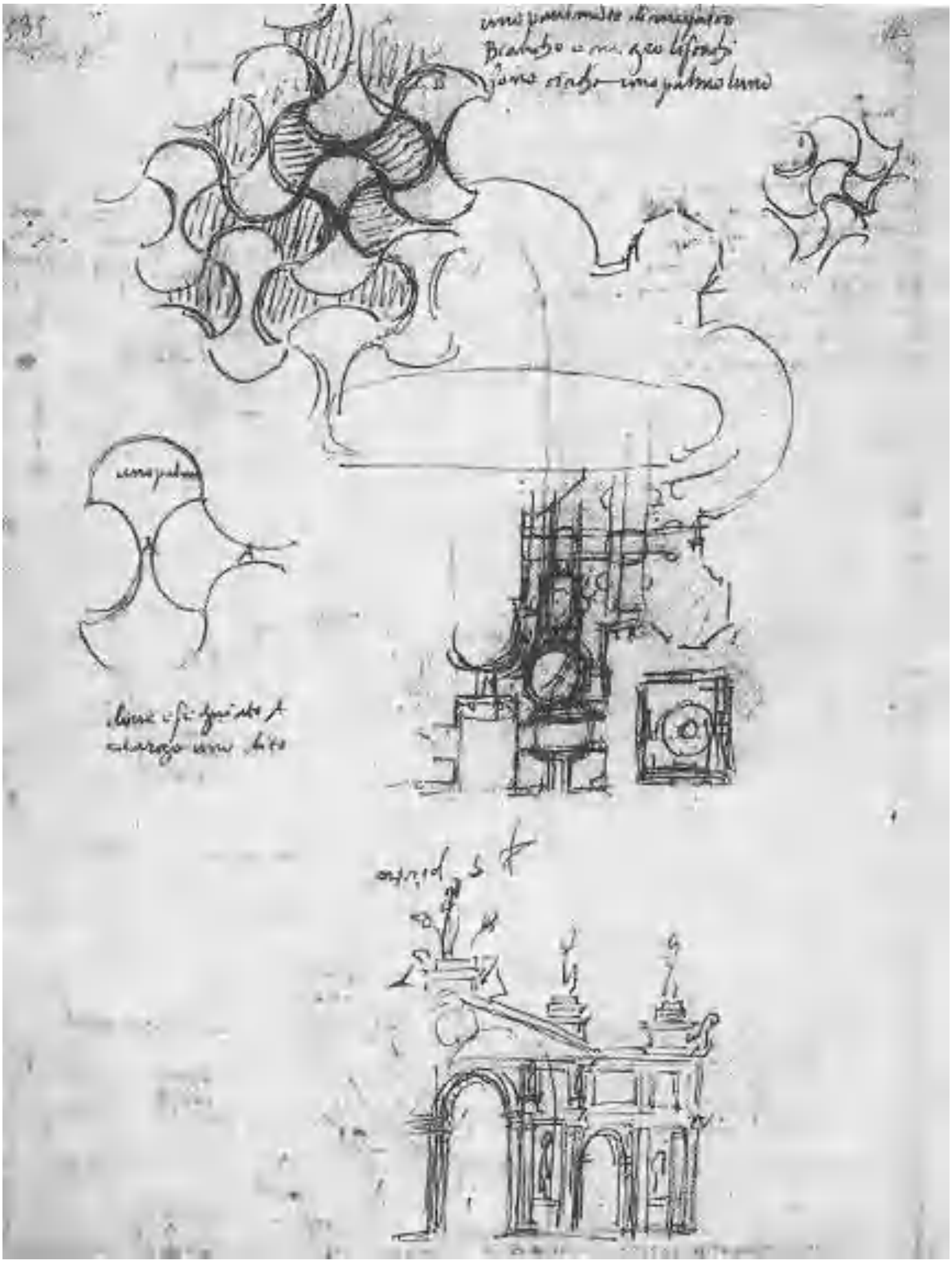


Figure 7.100

Study for San Pietro

Antonio da Sangallo

GDSU 110 A

Figure 7.101

Large wooden model for San Pietro

Antonio da Sangallo / Antonio Labacco

Basilica di S. Pietro, Ottagono di S. Girolamo

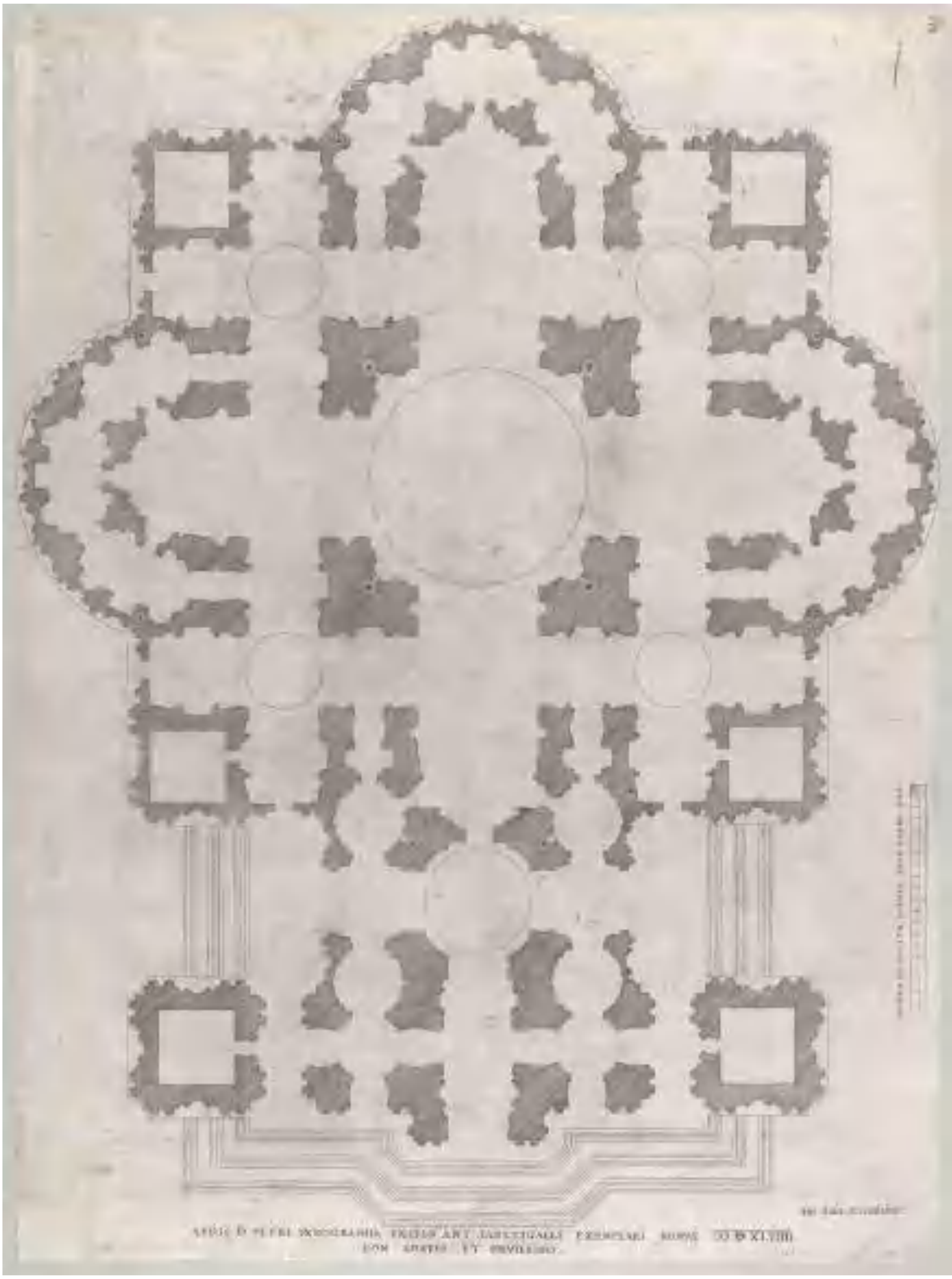


Figure 7.102

Aedis D. Petri Ixnographia ex ipso Ant. Sanctigalli exemplari. Plan of the model by Antonio da Sangallo.

Antonio da Sangallo and Antonio Salamanca, 1549

The Metropolitan Museum of Art, cod. 41.72(3.28)

Figure 7.103

New contruction of San Peter

Maarten van Heemskerck, 1532-1536

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 1 recto

Figure 7.104

South arm of the crouise of the new contruction, view of the south tribune from the outside

Maarten van Heemskerck, 1534-1535

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 54 recto

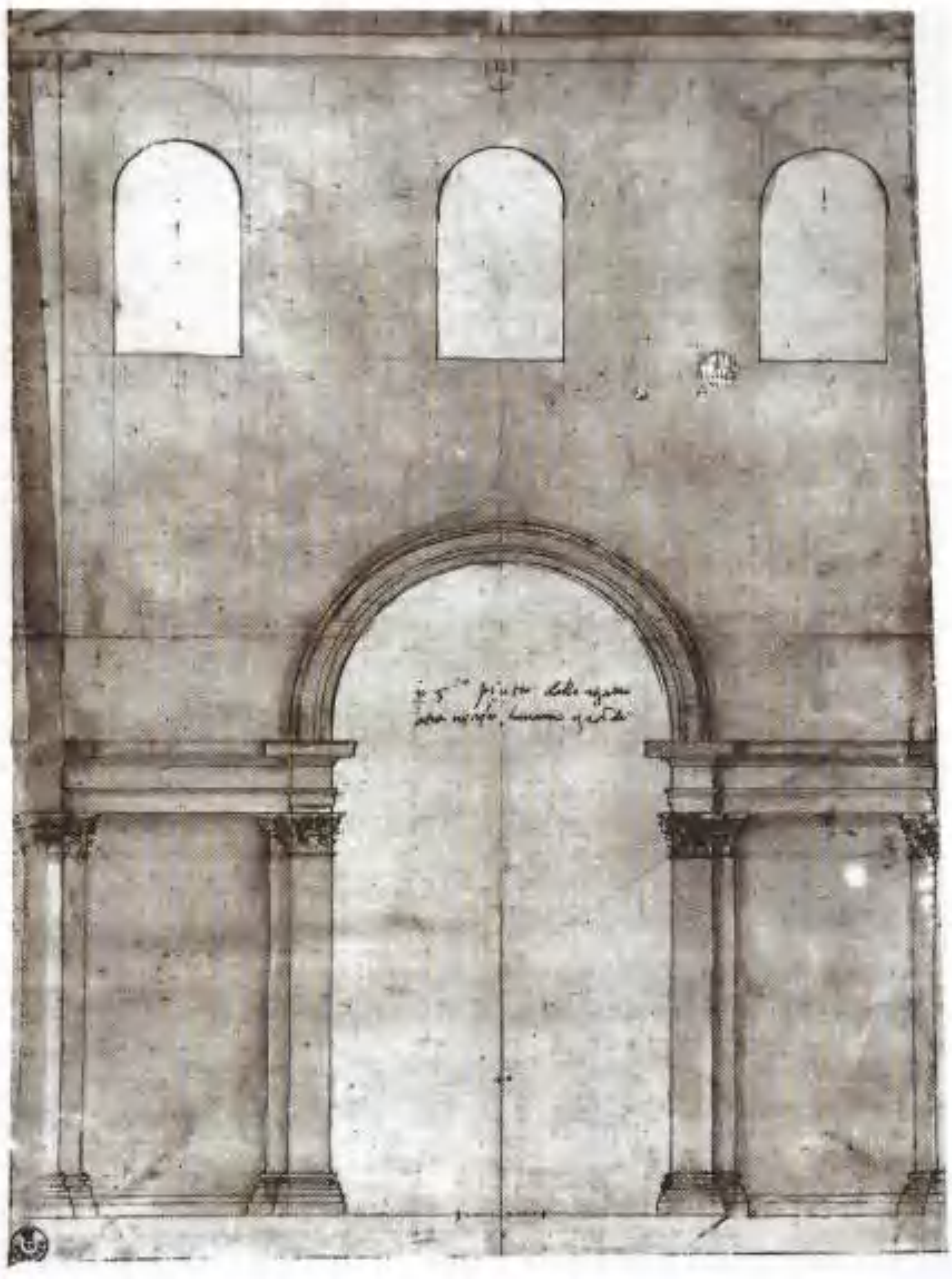


Figure 7.105

Project for the *muro divisorio*

Cordini Antonio detto Antonio da Sangallo il Giovane

GDSU 121 A

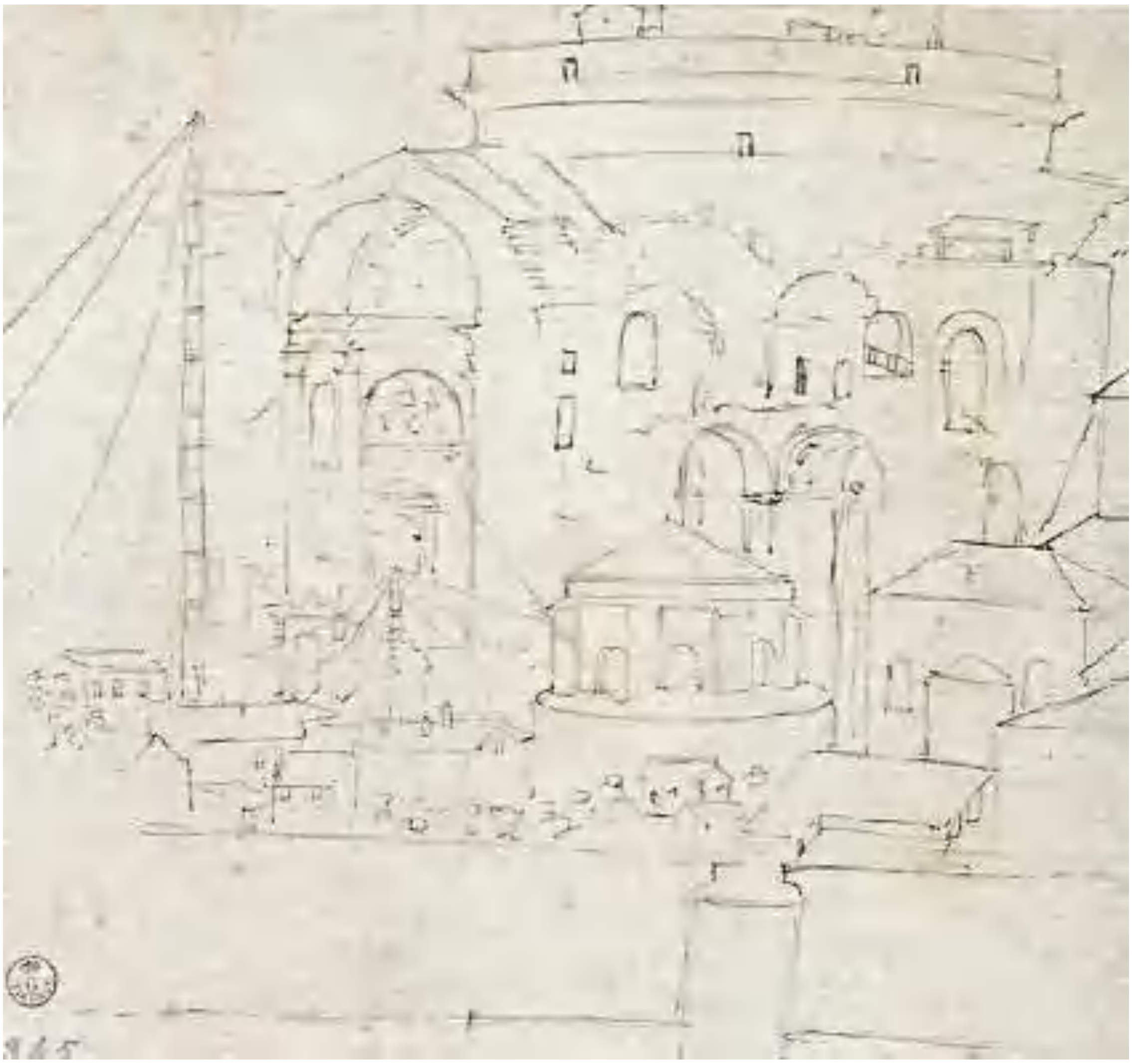


Figure 7.106

View of the works in the Cappella del Re, December 1552- March 1553, 185x205mm

Dosio Giovani Antonio

GDSU 4345 A

Figure 7.107

New contruction of San Peter: south tribune

Maarten van Heemskerck, 1556

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 60 verso

Figure 7.108

New building of San Peter, north stand

Maarten van Heemskerck, 1556

Staatliche Museen zu Berlin, Kupferstichkabinett, nro. 79 D 2 a, f. 60 recto

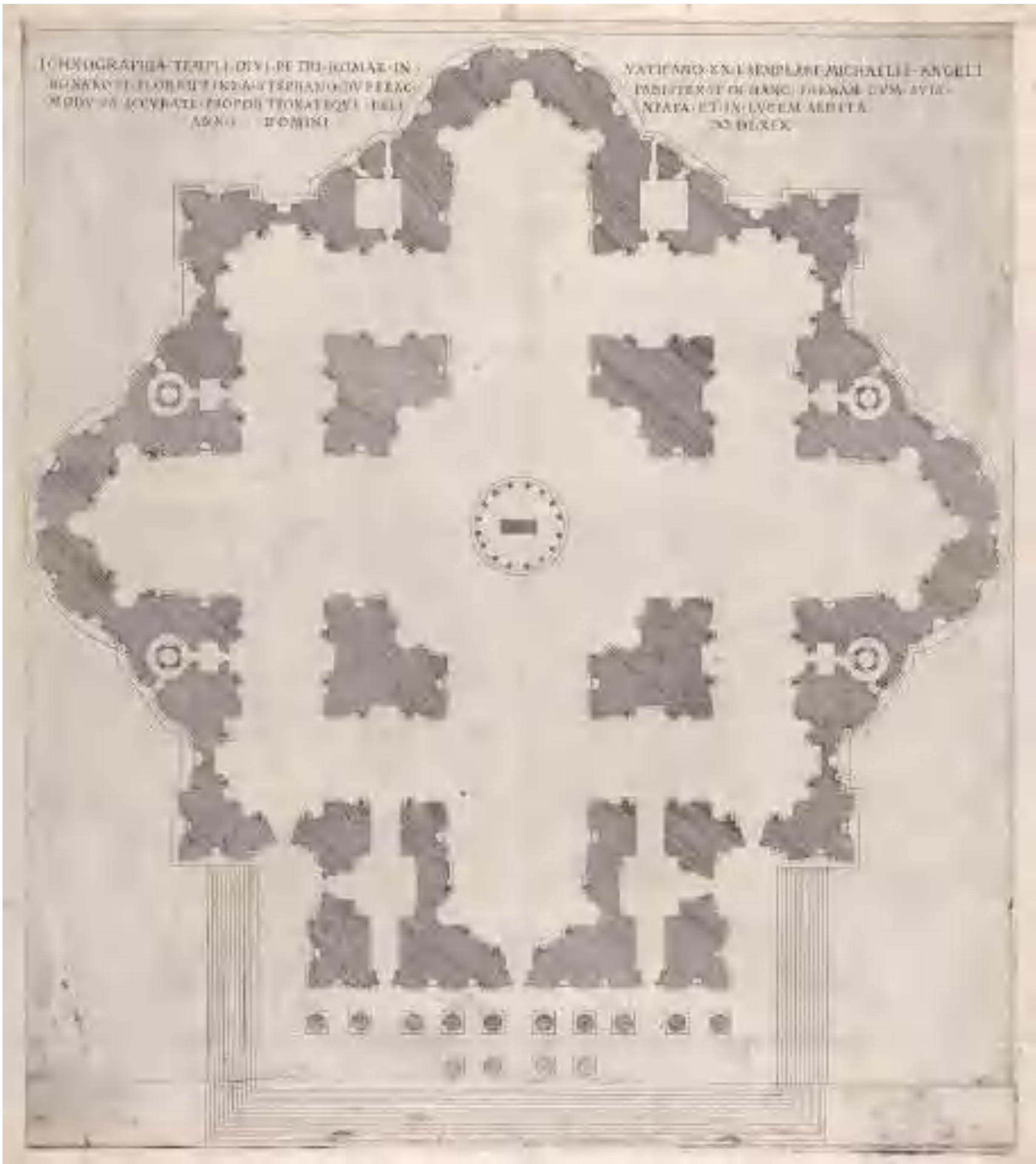


Figure 7.109

Ichonographia Templi Divi Petri Romae in Vaticano. Plan according to Michelangelo

Étienne Dupérac, 1569 (Speculum Romanae Magnificentiae)

The Metropolitan Museum of Art, cod. 41.72(3.29)

Figure 7.110

Orthographia partis exterioris Templi Divi Petri in Vaticano. Elevation showing the exterior of Saint Peter's basilica from the south as conceived by Michelagelo

Étienne Dupérac, engraving, 1569

The Metropolitan Museum of Art, cod. 41.72(3.24)

Figure 7.111

Orthographia partis exterioris Templi Divi Petri in Vaticano. Longitudinal section showing the interior of Saint Peter's basilica as conceived by Michelangelo

Étienne Dupérac, engraving, 1569

The Metropolitan Museum of Art, cod. 41.72(3.26)

Figure 7.112

Facade of San Pietro in the drawing of Naples: mirror completion of the left half

Anonymous

Napoli, Biblioteca Nazionale

Figure 7.113

Hypothesis of completion of St. Peter, 1564-1565 ca., 366x442mm

Anonymous

Napoli, Biblioteca Nazionale, Ms XII, D 74

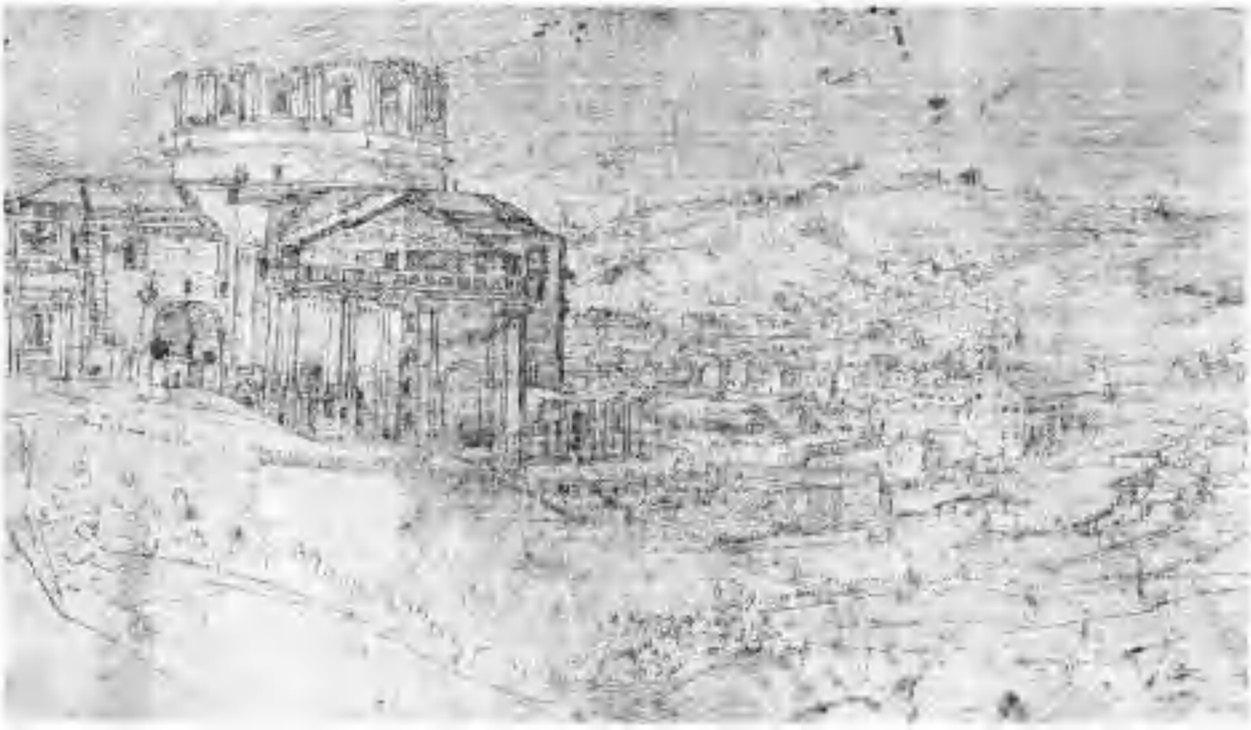


Figure 7.114

View of the exterior from the west

Anonymous Fabriczy, 1573

Staatsgalerie Stuttgart, cod. C 5811

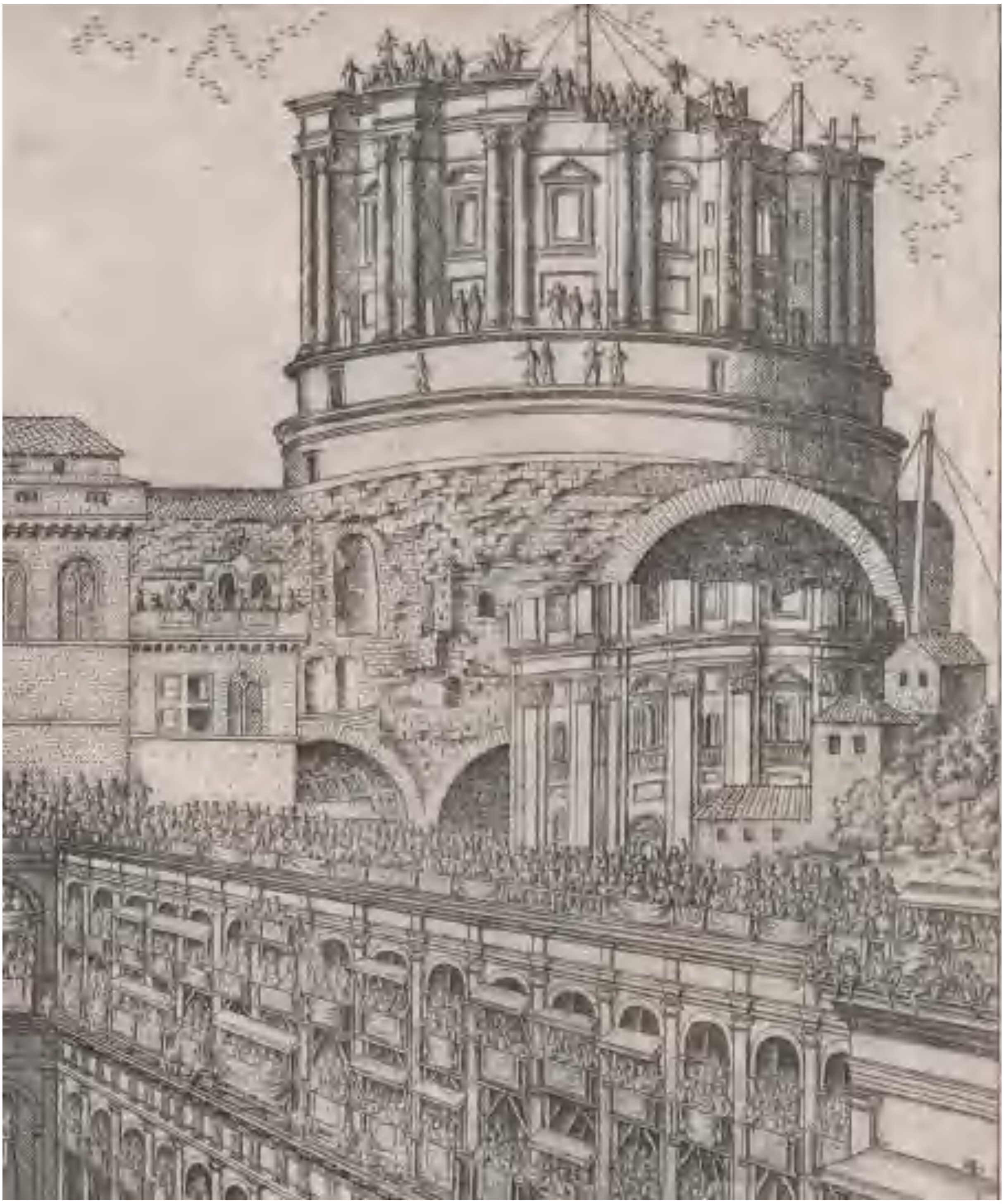


Figure 7.115

View of the weeding tournament between Annibale Altemps and Ortensia Borromeo, held in the courtyard of the Belvedere in Vatican on 5 March 1565, detail

Anonymous Fabriczy HCB and Antonio Lafrery, 1565. (Speculum Romanae Magnificentiae)

The Metropolitan Museum of Art, cod. 41.72 (3.72)

Figure 7.116

San Peter michelangioleso from the east

Paris Nogari (attr.)

Palazzo Apostolico Vaticano, Biblioteca di Sisto V, Sala II

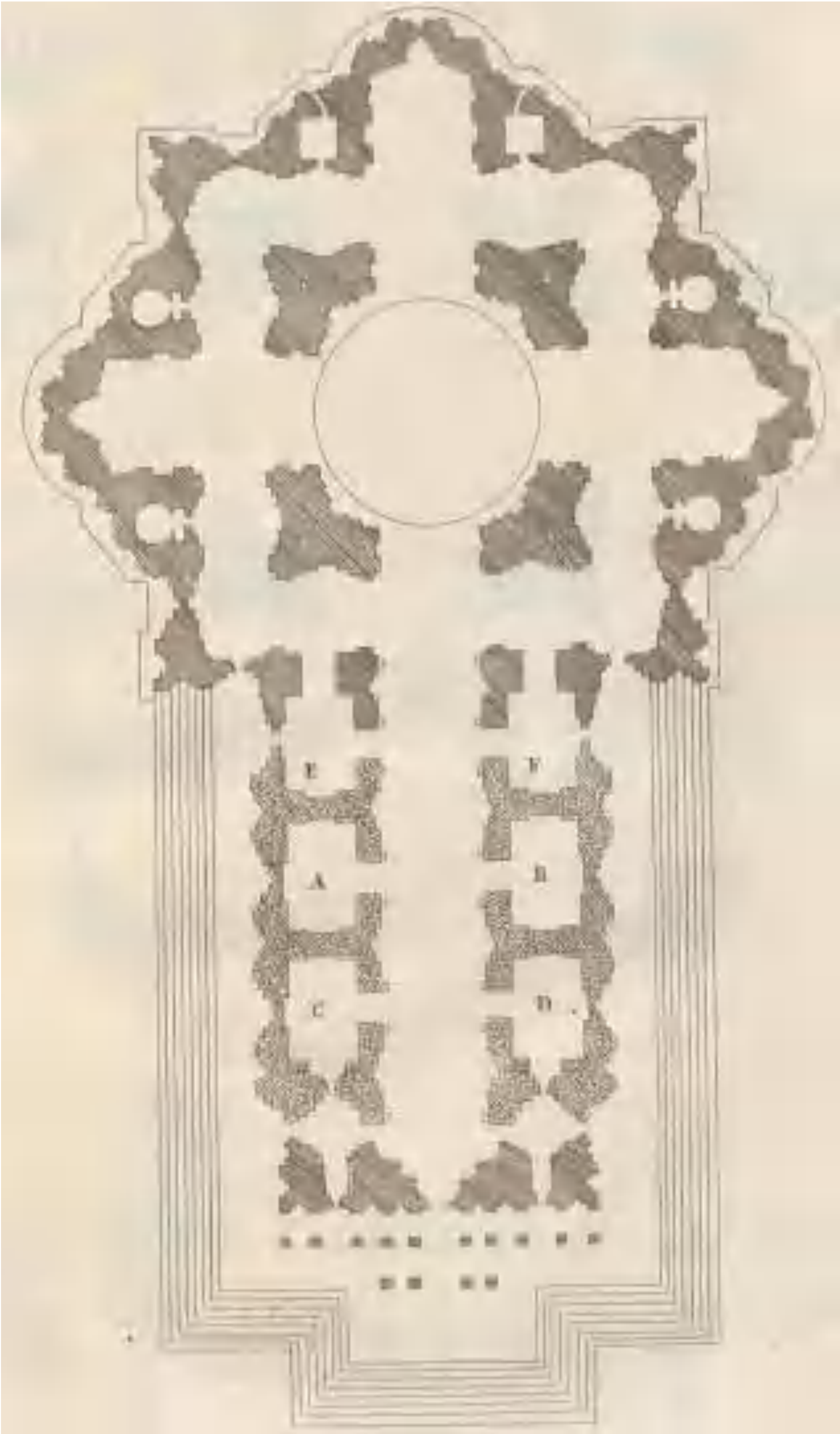


Figure 7.117

Ichonographia Templi a Bonarota delineati cum additamento incoepto sub Paulo V

Filippo Buonanni, 1696

Filippo Buonanni. Numismata Summorum Pontificum Templi Vaticani Fabbricam indicantia, chronologica ajusdem fabricae narratione ac multiplici eruditione explicata: atque uberiori numismatum omnium pontificiorum lucubrationi veluti prodromus praemissa. Rome: Ex. Typographia Dominici Antonii Herculis (1696), tav. 27

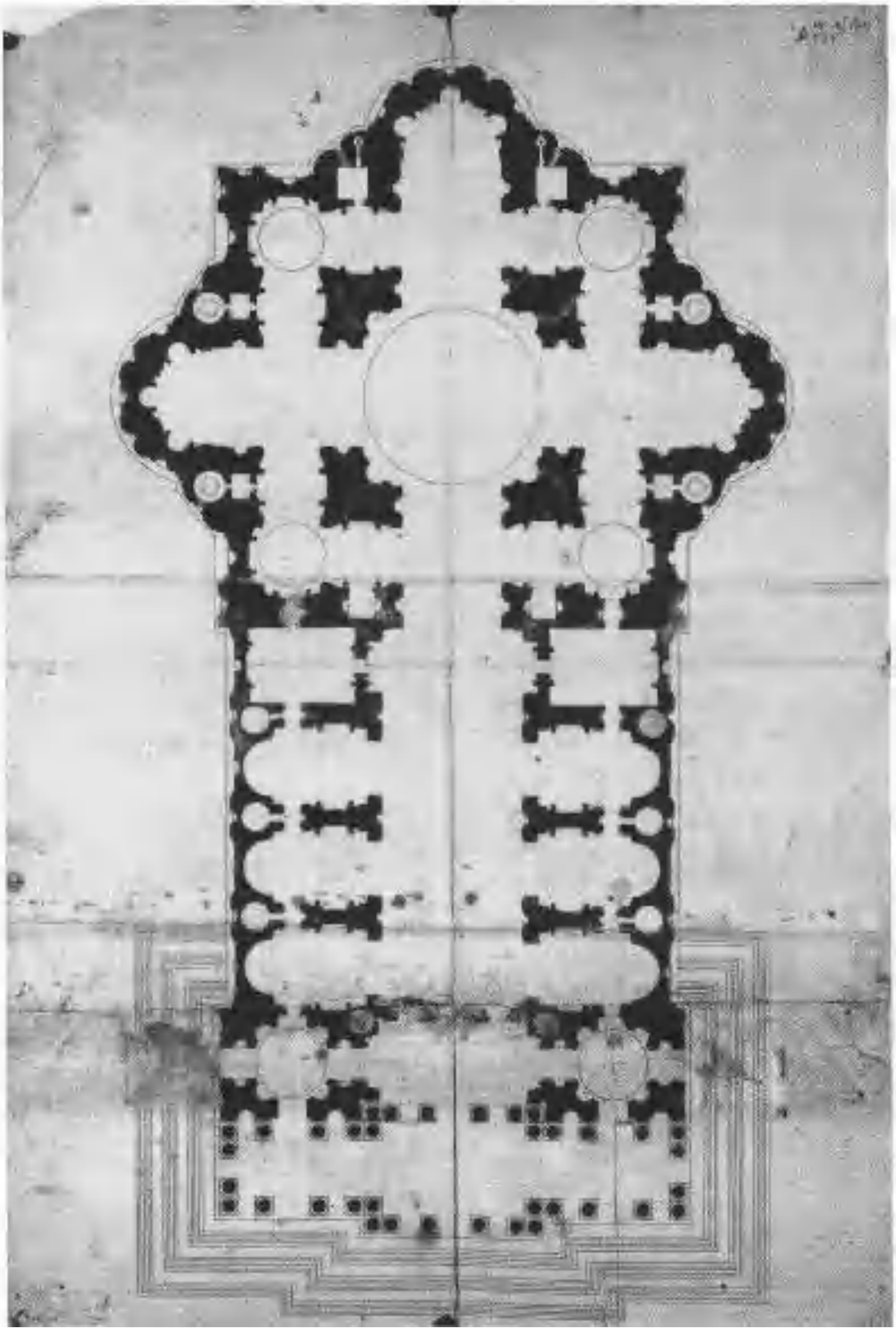


Figure 7.118

Project for St. Peter

Ottavio Mascherino

Accademia Nazionale di S, Luca, Fondo Mascherino, nro. 2352

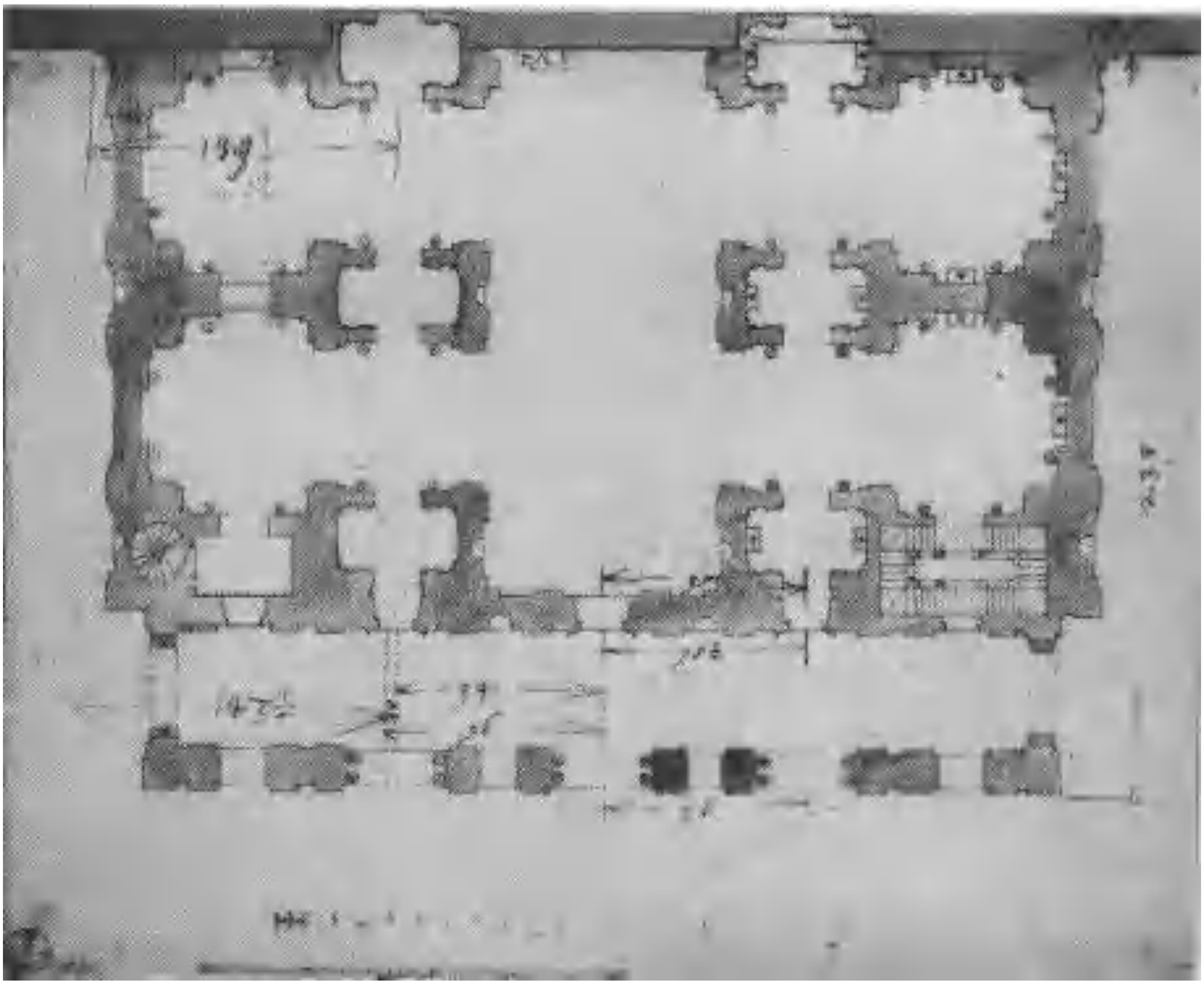


Figure 7.119

Plan with measurements depicting a project for the entrance area of San Pietro

Carlo Maderno

GDSU 101 A

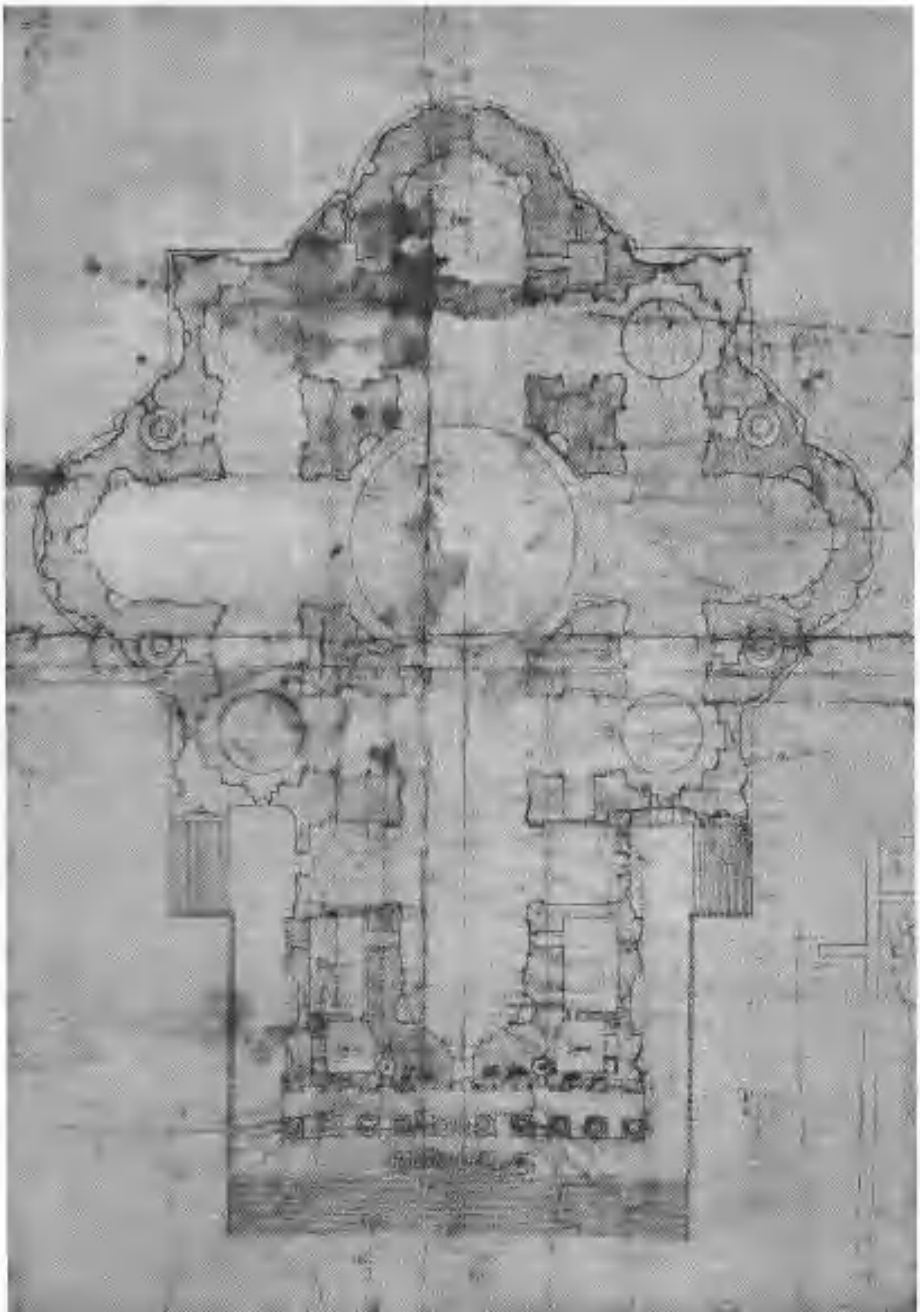


Figure 7.120

Project for San Peter

Anonymous (Giacomo della Porta?)

New York, American Academy (missing)

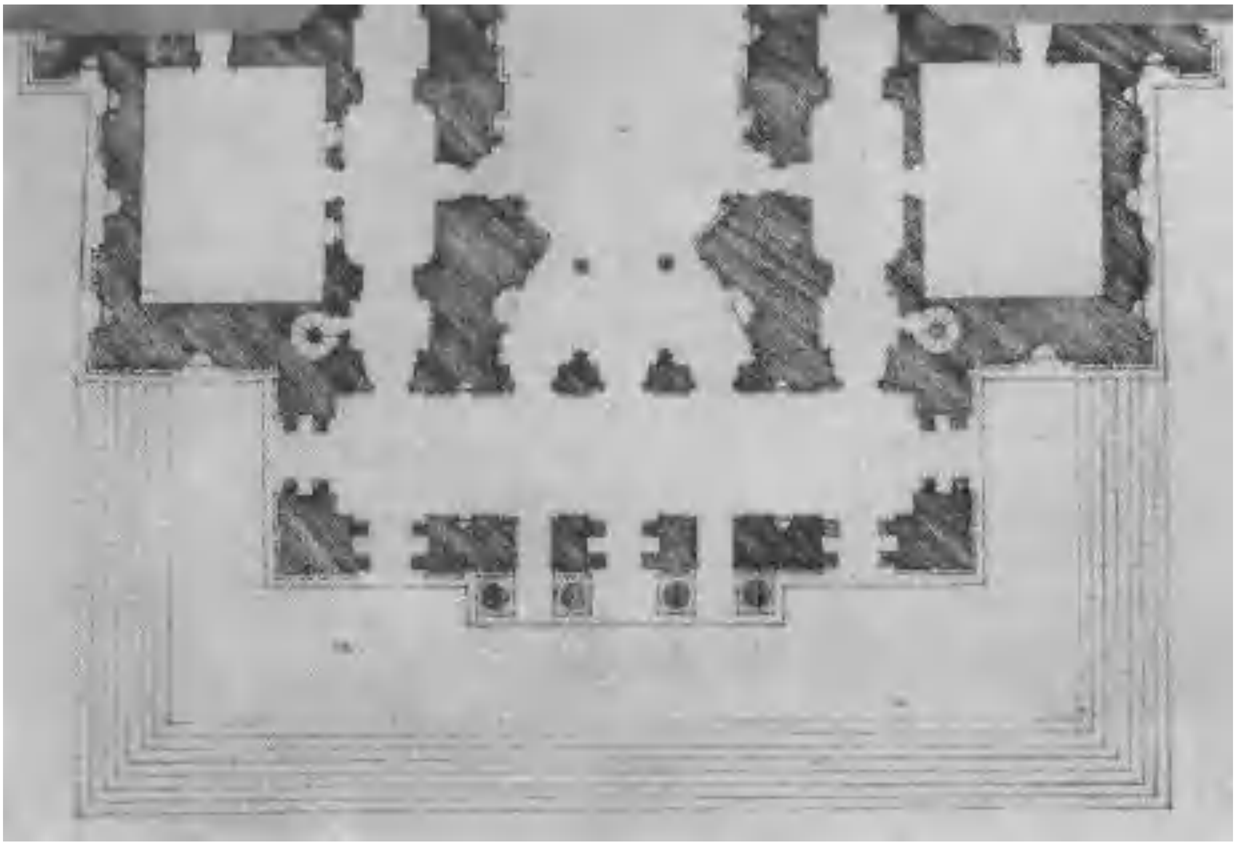


Figure 7.121

Plan depicting a project for the entrance area of S. Peter

Carlo Maderno

GDSU 100 A

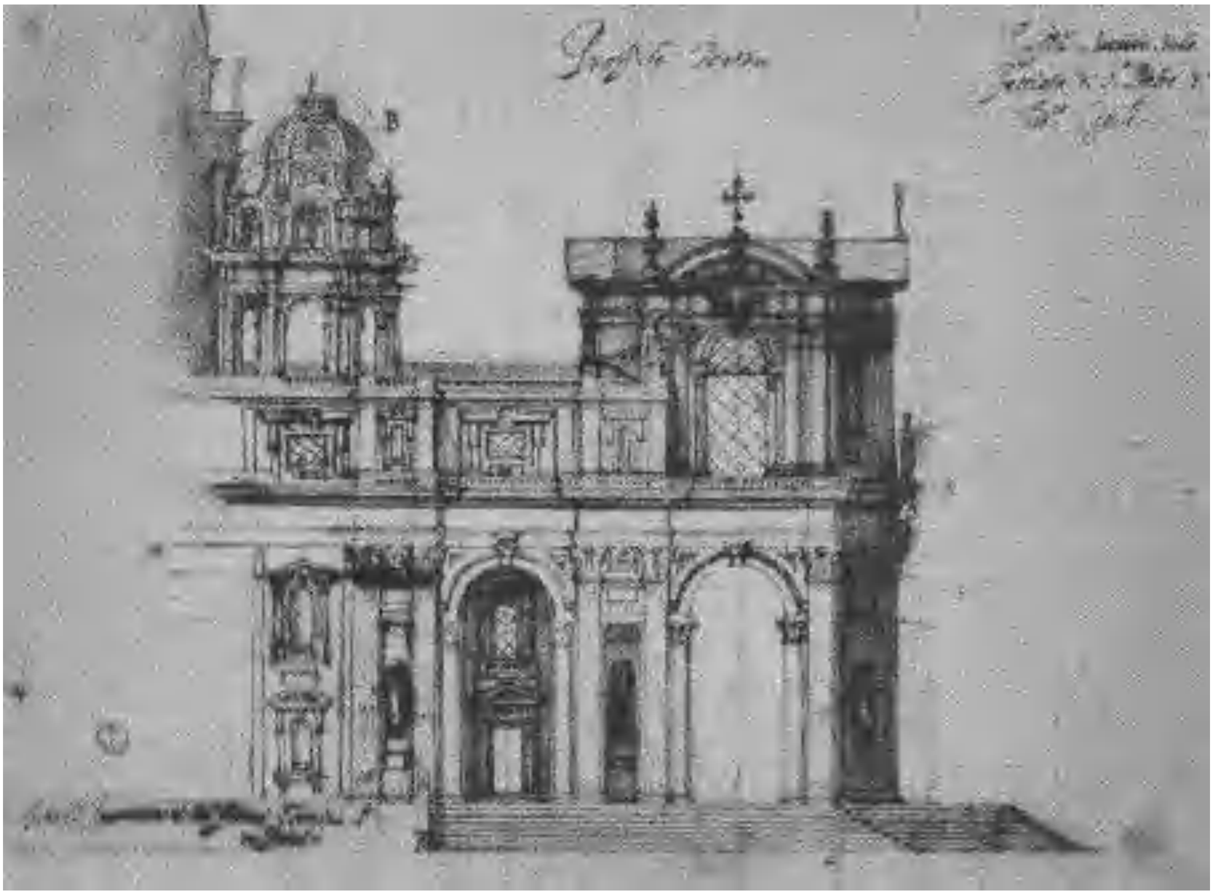


Figure 7.122

Project for S. Peter

Ludovico Cigoli

GDSU 2633 A

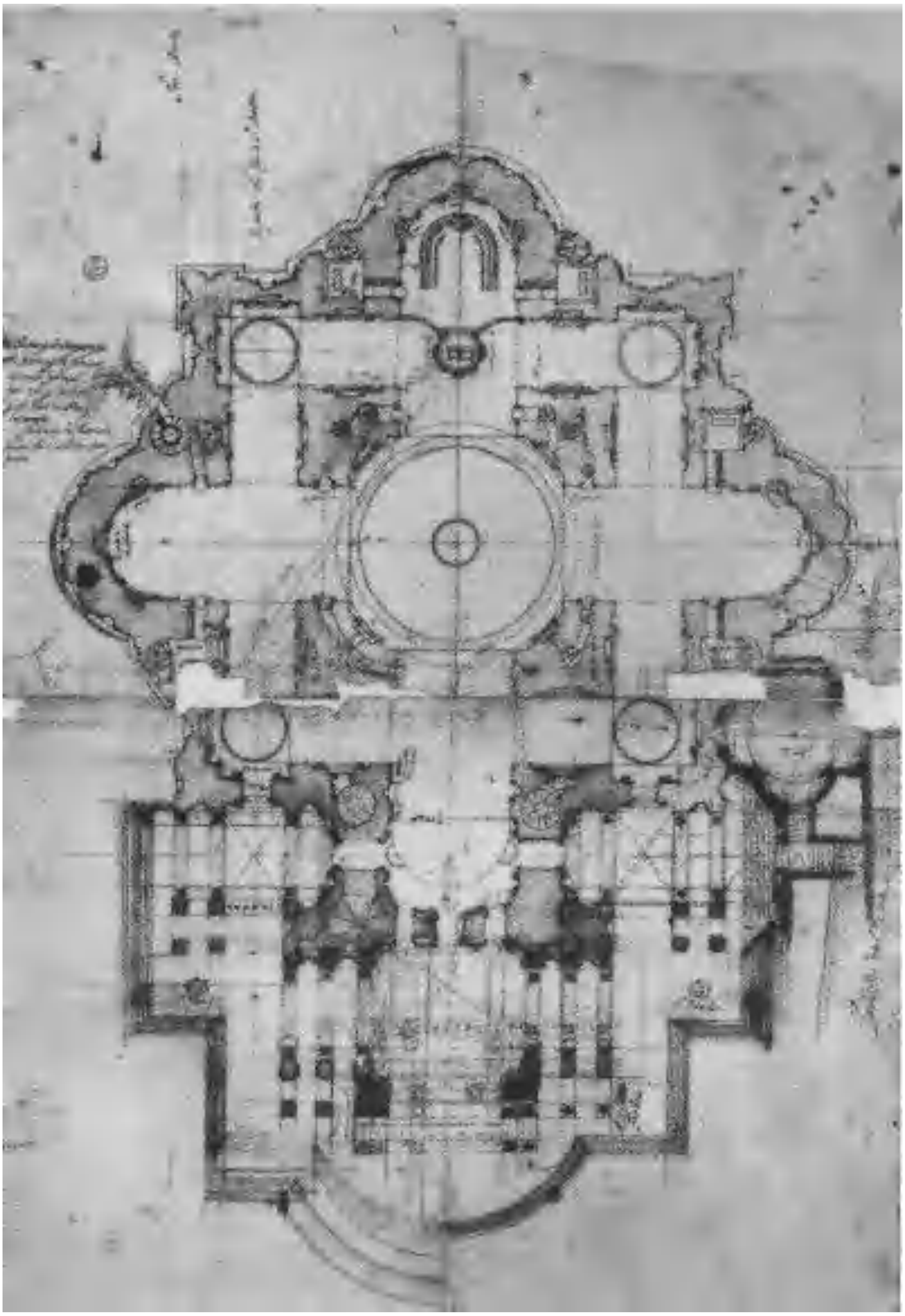


Figure 7.123

Project for S. Peter

Ludovico Cigoli

GDSU 2635 A

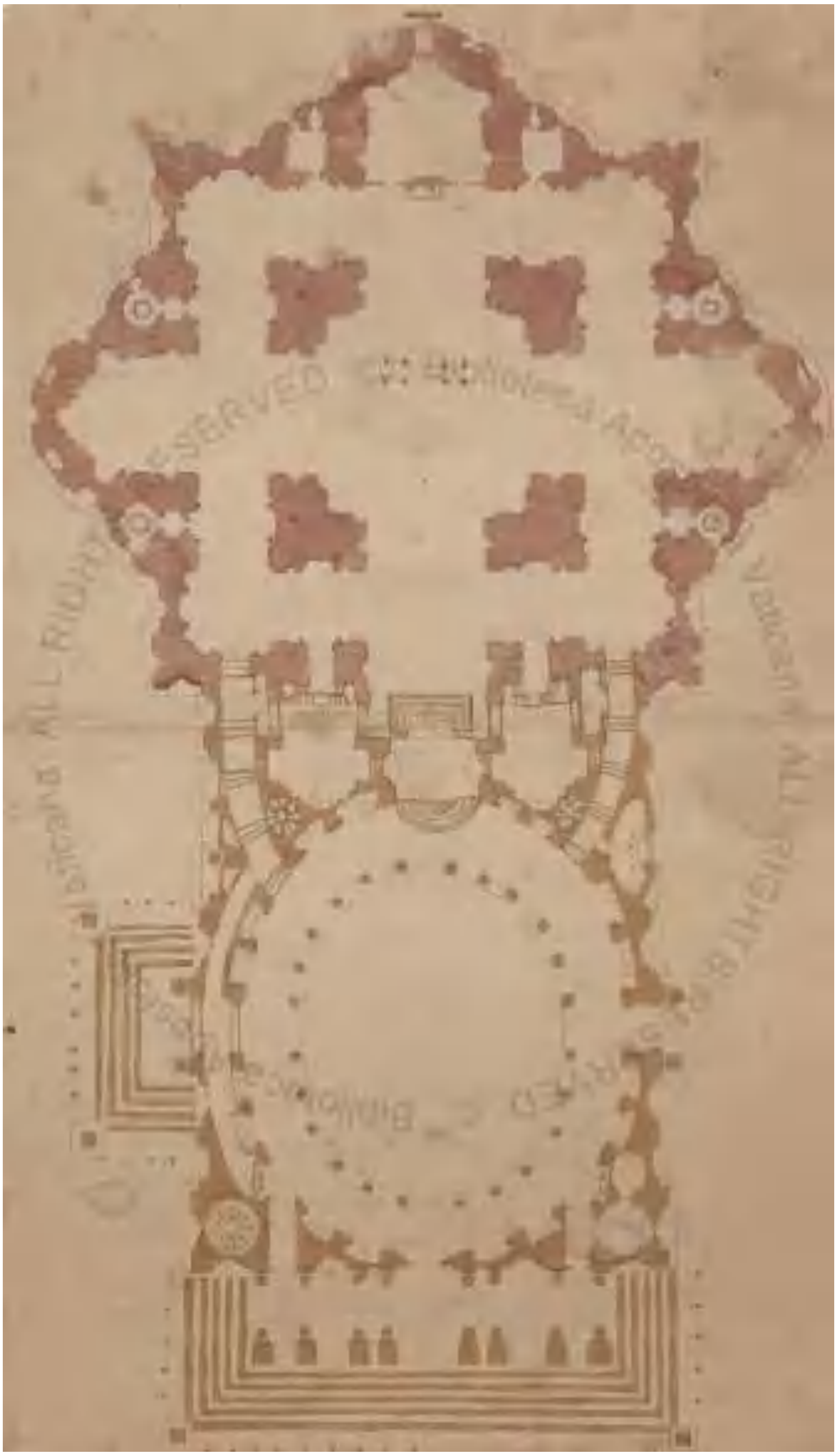


Figure 7.124

Project for S. Peter

Fausto Rughesi, 1606 (?)

Biblioteca Apostolica Vaticana, Arch. Cap. S. Pietro, A64 ter, 4r

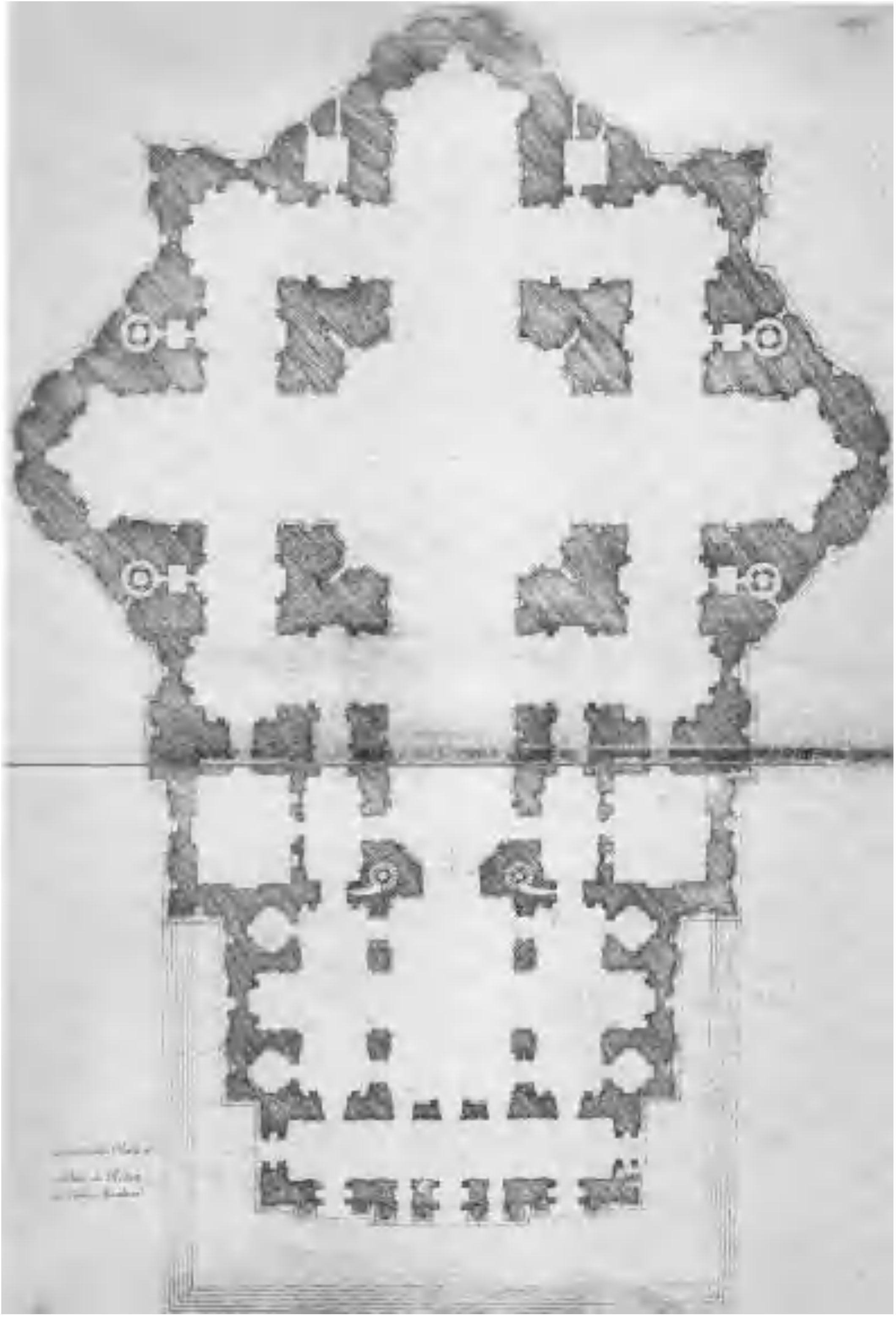


Figure 7.125

Plan of the basilica of St. Peter, a Latin cross with a forward portico

Carlo Maderno

GDSU 264 A

Figure 7.126

Madernian works at the Vatican Basilica, detail with the balustrades of the door on the edge of the Cappella Clementine. Note also the forebody of the partition wall and the new roofs of the ship sangallesca

Anonymous, 1611 ca

Wolfenbüttel, Herzog August Bibliothek, Guelf. 136, Extrav. 27

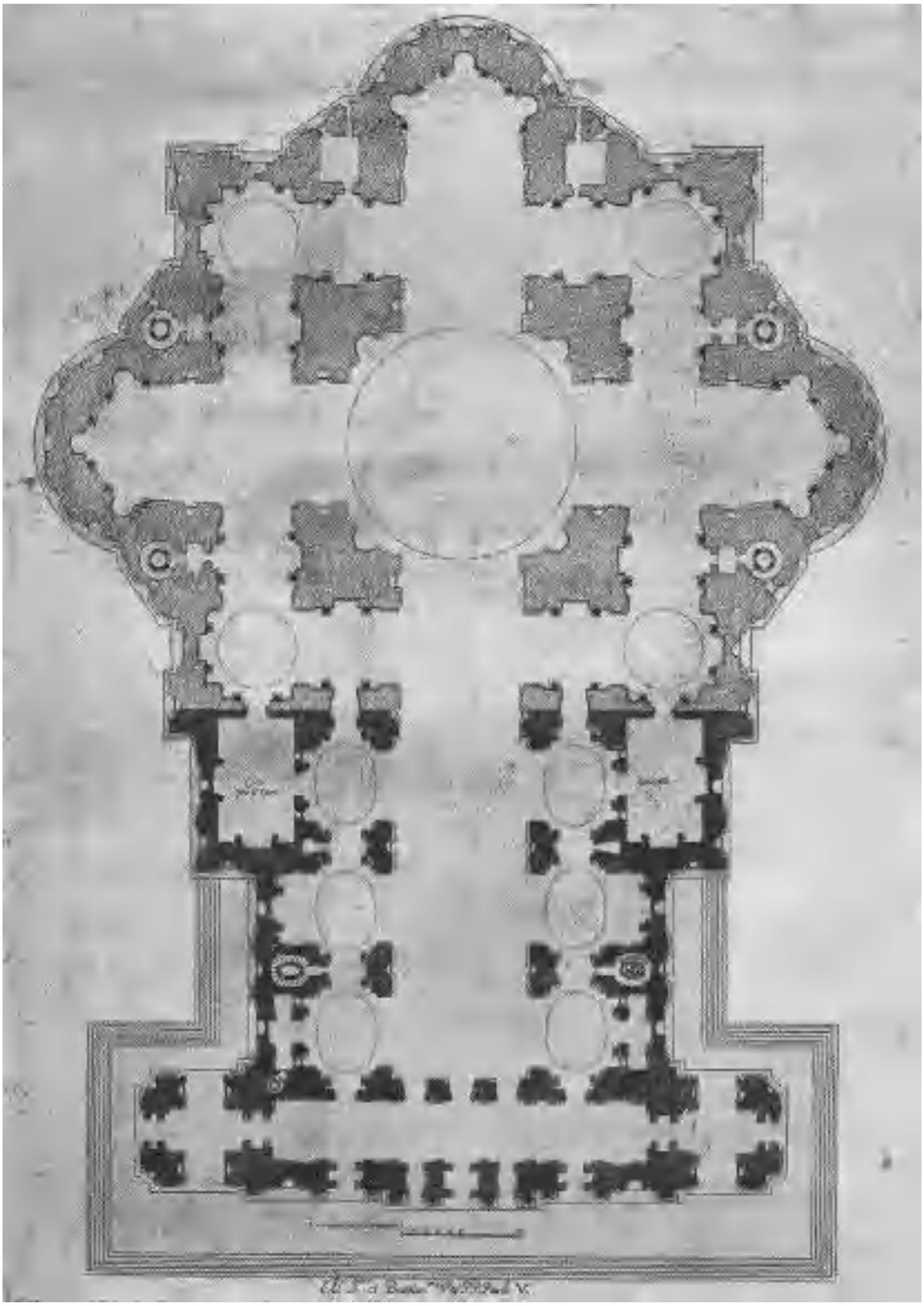


Figure 7.127

Plan of S. Peter according to Carlo Maderno

Matthaeus Greuter, 1613

Library of Worcester College, Oxford, Ms B 2. 3, f. 55v and 56r

Figure 7.128

View of the factory of the Church of S. Peter of Rome, in the Vatican

Matthaeus Greuter, 1613

This work belongs to Album met Romeinse tempels, paleizen, triomfbogen en andere monumenten (RP-P-2016-345). Rijksmuseum Amsterdam, cod. RP-P-2016-345-11

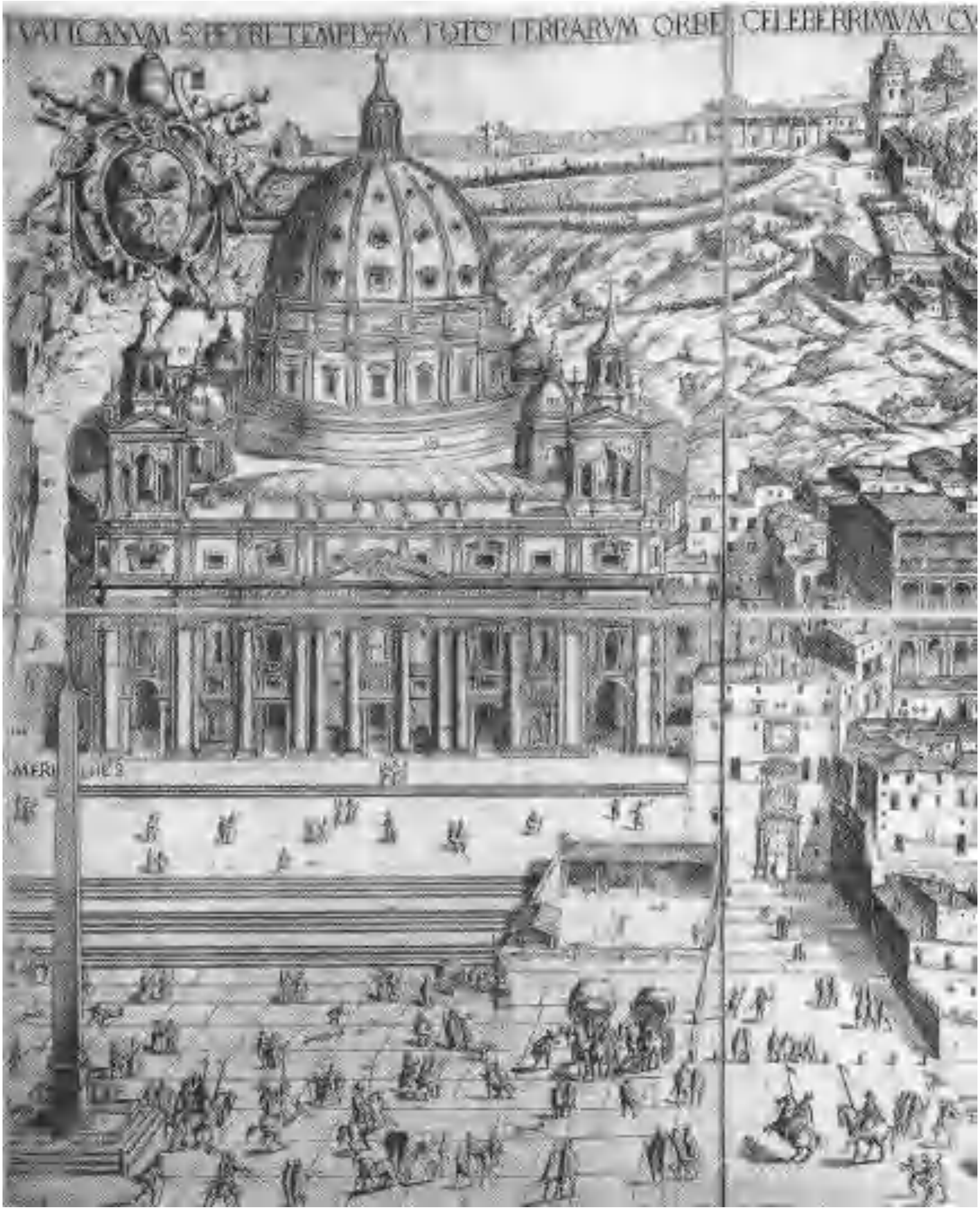


Figure 7.129

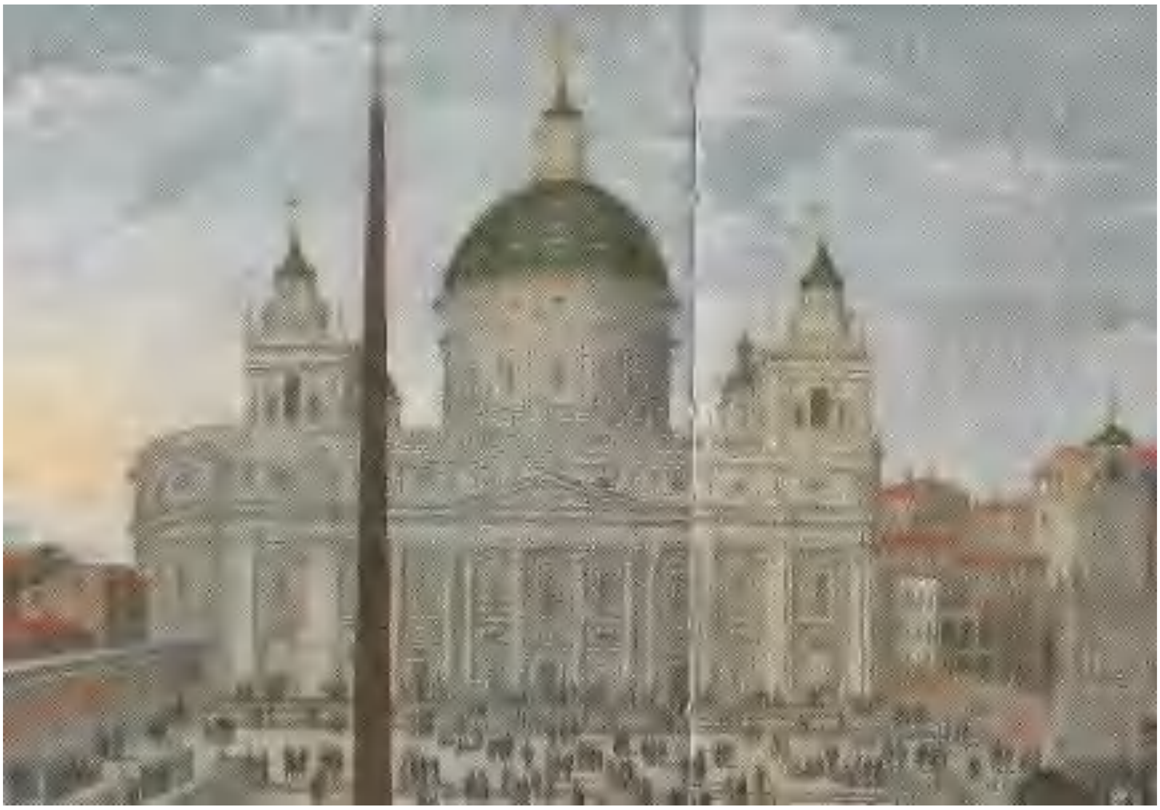
View of S. Peter

Giovanni Maggi and Jacopo Mascardi, 1615

Figure 7.130

Elevation of the Basilica and section of the portico, (photomontage)

Martino Ferrabosco, 1620



Detail

Figure 7.131

Papal procession in San Peter’s square. In front of the new basilica, with the facade completed, is visible also the obelisk brought to the center of the square. The bell towers were not built

Jacob Isaacsz Van Swanenburg, 1627-1628

Copenhagen, Staten Museum for Kunst, KMS SP 368

Figure 7.132

Ciborio on the papal altar, first project, engraving

Filippo Buonanni, 1696

Filippo Buonanni. *Numismata Summorum Pontificum Templi Vaticani Fabbricam indicantia, chronologica ejusdem fabricae narratione ac multiplici eruditione explicata: atque uberiori numismatum omnium pontificiorum lucubrationi veluti prodromus praemissa*. Rome: Ex. typographia Dominici Antonii Herculis (1696), tav. 50

Figure 7.133

Ciborio on the papal altar, second project, engraving

Filippo Buonanni, 1696

Filippo Buonanni. *Numismata Summorum Pontificum Templi Vaticani Fabbricam indicantia, chronologica ejusdem fabricae narratione ac multiplici eruditione explicata: atque uberiori numismatum omnium pontificiorum lucubrationi veluti prodromus praemissa*. Rome: Ex. typographia Dominici Antonii Herculis (1696), tav. 49

Figure 7.134

Project for the facade

Gian Lorenzo Bernini

Biblioteca Apostolica Vaticana, Vat.Lat. 13442, f. 4r

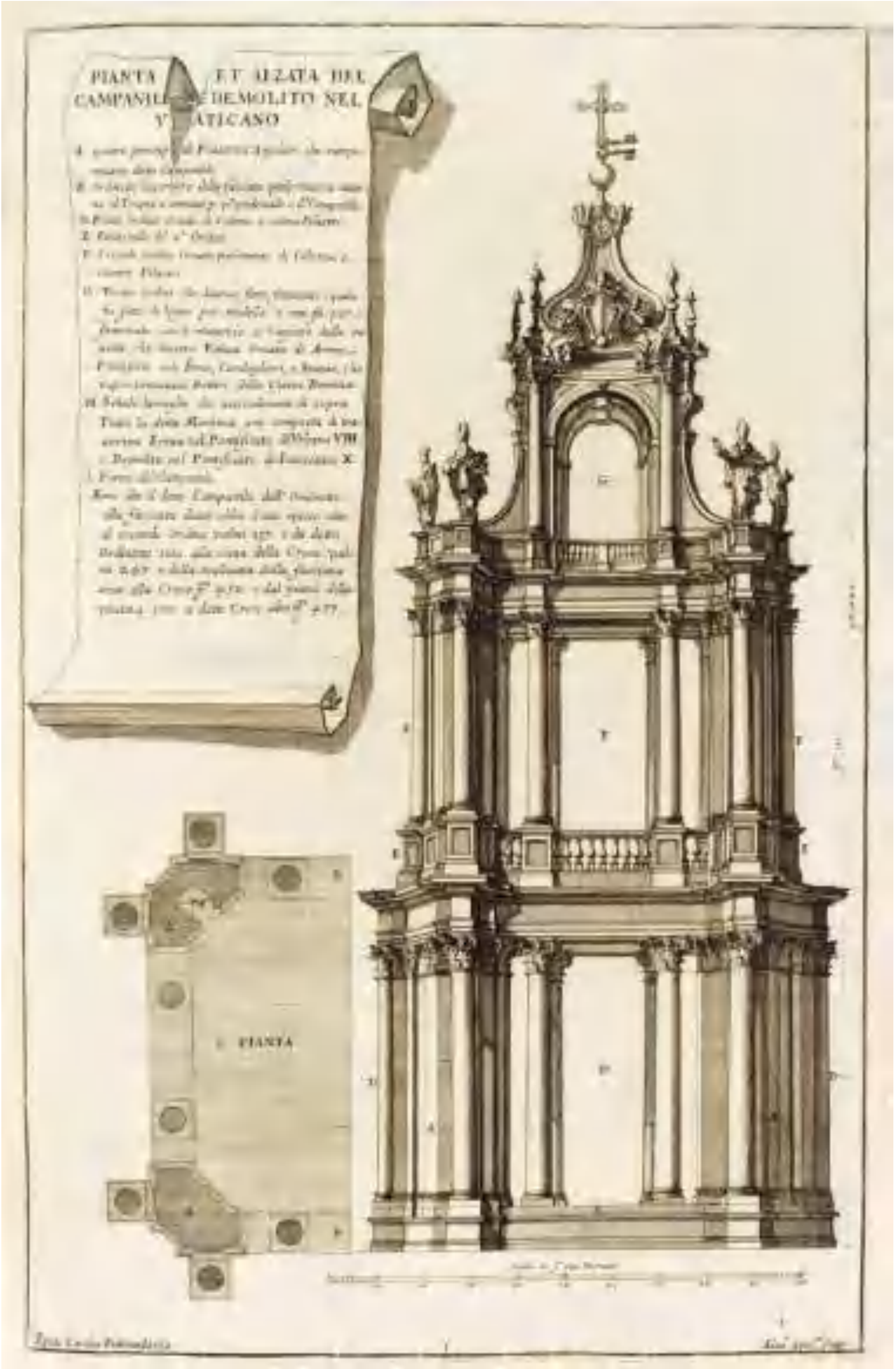


Figure 7.135

Pianta et Alzata del Campanile demolito nel Vaticano

Carlo Fontana e Alessandro Specchi

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), f. 263

Detail

Figure 7.136

View of San Pietro’s square

Israel Silvestre, 1643-1644

Figure 7.137

Le Vatican et legliese de S. Pierre a Rome

Giuseppe de Rossi, 1655

Figure 7.138

Bird's-eye view of the square and arcade in front of Saint Peter's Basilica in Rome. The arcade is depicted in a stage of the plans that was never realized with a third part of the arcade on the far side, leaving only two narrow entrances to the square. Numbers are added near several notable buildings and monuments which are identified below the image

Giovanni Battista Falda, 1665-1669

The Metropolitan Museum of Art, cod. 31.67.4(1)

Giovanni Giacomo Rossi; Giovanni Battista Falda. *Il Nuovo teatro delle fabriche, et edificii, in prospettiva di Roma moderna, sotto il felice pontificato di N. S. Papa Alessandro VII,* libro primo. Roma (1665), p. 3

Detail

Figure 7.139

Prospectus Basilice Vaticane D. Petri

Lieven Cruyl, 1666

CHAPTER 8

"*Quanto fu dolce il giogo e la catena delle tue candide braccia al collo mio volti, che sciogliendomi, io sento mortal pena*"

Raffaello

Chapter 8. Reconstruction in stages of the design process of the *new basilica of S. Peter*

8.1. Objectives

This chapter will analyze the sequential stages of the design process for the new basilica of S. Peter.

As mentioned in the previous chapter, the design process for the new basilica of S. Peter was long and complex, full of all kinds of vicissitudes, and the building that was built was not designed by a single architect. Instead the building was projected for a long time, based on a sequence of projects carried out by different architects in different historical periods. In addition, in each specific historical period not only did a single architect participate, but there could be several architects competing and at the same time collaborating with each other, in such a way that the works would only begin to be executed until there was a consensus between them.

In general, the works progressed very slowly, which is why, on a continuous basis, new architects had to replace the previous ones. In addition, with the passage of time new needs arose and new programs and new solutions were demanded from new architects, who should make new proposals, trying to respect most of the works already built. From among all the proposals made, the most suitable were chosen in each era.

Once a new project was approved, or certain parts of a new project, construction began based on its specifications that were completed throughout the course of the works. However, after the death of its authors, in general their proposals were questioned, even if they were previously partially or totally approved, and new architects carried out new projects, taking into account what has already been built.

In this way, a sequential concatenation of projects carried out by different architects was created, in different historical periods, although only a few of these projects were used for the construction of some parts of the building.

As a result of the above, it can be said that the design process of the new basilica has been created based on two types of sequential stages.

1. The sequence of projects used
2. The sequence of actions carried out for the elaboration of each project

In this chapter, the sequence of projects directly involved in the construction process of the new basilica will be analyzed, and the stages of the design process of the most important projects (those that had the greatest impact on the construction process) will be reconstructed. In a complementary way, the appendices show the reconstruction of the stages of the design process carried out in the rest of the projects.

8.2. Units of measurement

In order to properly analyze each of the projects carried out for the new basilica of S. Peter, it should be remembered that most of them were designed based on the usual measurement units in Rome in the Renaissance:

Palmo (*di architetti*) = 0.2234 m.
1 *once* = 1 / 12 *palmo* = 1.8616 cm.
1 *minuti* = 1 / 5 *once* = 0.3723 cm.
1 *canna* = 10 *palmi* (22.34 m.)

Some architects (as in the case of Giuliano da Sangallo) also carried out a project using the usual measurement units in Florence in the Renaissance:

Braccia fiorentine (b.f.) = 0.583 m.
1 b.f. = 2.6096 *palmi* (*di architetti*)

8.3. Sequence of projects used in the construction of the *new basilica of S. Peter*

From among all the drawings and projects made by all the architects involved in the design and construction of the new basilica of S. Peter, a sequence of projects that had a special relevance can be identified.

The analysis of all these projects, and the reconstruction of the stages of the design process carried out in each one of them, provides an exact idea of the process carried out in the design of the new basilica of S. Peter.

The sequence of projects is as follows:

1. Nicholas V Project
2. GDSU 3 A drawing

3. GDSU 1 A drawing
4. JSM Codex Coner, f. 17 drawing
5. GDSU 8 Ar drawing
6. GDSU 7945 Ar drawing
7. GDSU 8 Av drawing
8. GDSU 7945 Av drawing
9. GDSU 20 A drawing
10. “Central Nucleus” of Bramante
11. Apse of Julius II project (based on GDSU 44 A drawing)
12. GDSU 46 A drawing
13. Serlio 1544, f. 37 drawing
14. PML codex Mellon, f. 71r. drawing
15. PML, codex Mellon, f.72v. drawing
16. Serlio 1544, f. 38 drawing
17. Duperac drawing (1569)
18. Maderno executive project of April 1608
19. Matthaeus Greuter (1613) drawing

However, three projects by Antonio da Sangallo have been included which, although they had no impact on the current building, have been analyzed in order to show the possible variations based on the central nucleus of Bramante.

8.4. Historical graphics and measurements of plan layout of the *new basilica of S. Peter*

In order to reconstruct the design process of the new basilica of S. Peter, it is essential to first know the dimensions indicated in each of the projects carried out throughout history.

Not all historical available drawings contain specifications and measurements, and when they do they are very rare and sometimes inaccurate. However, and despite its scarcity, the available dimensions have been sufficient to be able to accurately reconstruct each and every one of the available drawings.

However, in order to define the evolution of the construction of the building in detail, very detailed measurements of the building are needed. Fortunately throughout history there have been many architects who have measured the new basilica of S. Peter, and have made precise plans of it.

Among all the measurements and plans made throughout history, two historical sources stand out, both for the precision in the specification of the dimensions, and in the detail of the drawing:

1. Drawings and measurements made by Carlo Fontana. The drawings contain measurements in *palmi* (Figs. 8.1, 8.2 and 8.3).
2. Drawings and measurements made by Paul Letarouilly. The drawings contain measurements in meters (Figs. 8.4 and 8.5). For the reconstruction of the Vatican Palace (next chapter), 4 other drawings by Letarouilly have been taken into account (Figs. 8.6, 8.7, 8.8. and 8.9).

Of course there are other measurements made by other researchers and architects throughout history, but these two sources are the best. On the one hand, the Fontana drawings correspond to the state of the basilica just after it was built, and on the other hand, the Letarouilly drawings were made with much greater precision than the other available drawings.

When comparing both drawings, the first thing that can be seen is that the drawings made by Letarouilly are made in greater detail than the drawings made by Fontana, and his measurements are also made with greater precision. There are also discrepancies between the measurements in both drawings, which do not correspond to changes made in the basilica, but to mistakes when making the measurements. In addition, both drawings have small errors, which surely do not correspond to measurement mistakes, but mistakes when writing the dimensions on the floor plans.

The same occurs in other drawings and measurements made throughout history and others made today using precise measuring instruments. They all have various kind of errors.

In general, measurement mistakes of historical monuments are very common, and for this reason it is necessary to act with exceptional rigor, but at the same time, certain analysis guidelines must be established, and certain working hypotheses, in order to be able to reconstruct the proper measurements.

Being aware of the almost certain existence of measurement mistakes, all kinds of precautions can be taken to avoid committing them when highlighting new measurements, and also to conveniently analyze the measurements included in the different historical drawings. In this way, scale plans can be made with precision, and based on them, you can even rebuild the executive project that was carried out at the time.

8.5. Common mistakes when making measurements of historical monuments

When making measurements on historical architectural monuments 7 different types of mistakes can be made. These errors do not allow us to know with certainty the dimensions of the different architectural elements built, and as a consequence, neither can the theoretical dimensions that the architect author established in the project of said monument be reconstructed. It is important to know these types of mistakes in order to take the appropriate measures to avoid them, and in this way to be able to accurately rebuild a certain monument, and later to be able to rebuild the architectural project (or projects) based on which it was built.

These mistakes, and how to avoid them, are shown below:

1. Erosion

The first mistake that is usually made when measuring a historical monument is the erosion. In general, with the passage of time, the materials erode and architectural elements change their shape (the domes deform, the pillars lean, the walls buckle ...). Depending on the material, its environment, and the construction solution used, there may be significant differences between the original dimensions and the current dimensions.

To try to detect and avoid possible errors, several measurements must be made of the same architectural element, and several measurements of elements that are known (or assumed) to have identical dimensions and materials. In this way, the most probable dimension can be extrapolated and deduced. In the same way, different conceptual hypotheses must be made in order to identify the dimensional variation of the different architectural elements over time.

2. Constructive errors

In the construction of any building, countless construction mistakes are usually made compared to the original project. There can be two types of mistakes:

2.1. Mistakes when executing the building

Masons continually make small mistakes, and the dimension of what they build has slight variations from the dimensions set in the original project.

To identify this type of error, all the elements that should theoretically have the same dimensions as the element to be measured must be measured. Subsequently, the measurement of the least deteriorated element must be chosen, comparatively, and extrapolated, in order to deduce the correct dimension that it should have had in the executive project.

2.2. Subsequent modifications

In many monuments modifications have been made with respect to the state they had just built. In some cases, these modifications were made by architects who did not know in detail the geometric proportions and the design process initially followed by the architect who created the original project. As a result, some architectural elements currently have a slightly different shape and dimensions than they originally had (this is the case, for example, of the dimensions of the counter-piers of the new basilica of S. Peter).

For this reason, historical documentation must be collected, exhaustively, looking for possible alterations of the element to be measured, and trying to reconstruct the design process carried out initially, quantifying them, and thus deducing the original dimensions and characteristics of said architectural element.

3. Establishment of the start and end point of the measurement

Many architectural elements have some measurement ambiguity for various reasons. For example, in the case of curved architectural elements, the initial design and sizing could be done in an arc, and now it is not possible to measure the arc. In other cases, when architectural elements are eroded, the start and end of the measurement cannot be properly established. In other cases, there are architectural elements with rounded, truncated or sloping edges at their ends, and as a consequence their edges cannot be precisely identified and errors can be made when setting the start and end of the measurement.

To avoid making this type of errors, a sketch should be made with the shape of the architectural element to be measured before the measurement process, and based on it, the measurement ends can be correctly identified.

4. Deformation of the measuring tool

On many occasions there are physical obstacles that make it impossible to measure with optical instruments (laser, ...) or acoustic instruments (microwaves, ..), so measurements should be taken with tape measures. However, measuring tapes (made from fabrics, plastics, metals ...) deform when stretched and also form a catenary due to their own weight. That means that a comparative mistake is made when measuring elements of reduced dimensions with them, with respect to large elements. That is why you must choose the most suitable material for the belt, put intermediate supports to avoid the catenary, and make different measurements of the same object.

5. Rounding when measuring

When measuring any object of medium or large size, there is a tendency to "round" the measurement. For example, if you take a measurement and look at the measuring device, a value of 1.98 m. it may be tempting to assume, trying to find an architectural rhythm, that the measurement is actually 2 m. But you would be committing a double error, since when doing an initial dimensional analysis, in order to identify the design process and the geometric and harmonic proportions between the different architectural elements, this erroneous interpretation would force to look for rhythms of 2 m., and would discourage looking for rhythms of 1.98 m. This may seem like a trivial mistake, however it is a common and the most dangerous mistake made even by architects who must reform an existing building.

In the case of the new basilica of S. Peter for example, Bramante successors (with the exception of Carlo Maderno) have stated that the dimension of the paired pilasters of the large central piers is 39 *palmi* (12 *palmi* + 15 *palmi* + 12 *palmi*). But actually the true dimension is 39.1643 *palmi* (see “central nucleus” of Bramante).

Many researchers have measured these paired pilasters throughout history and found that they measure a little over 39 *palmi*, but they immediately assumed that the correct dimension is actually just 39 *palmi*, which has prevented them from ascertaining the true design process followed by Bramante in its design. One could fall into the temptation to think that this error, of just four centimeters with respect to the "ideal measurement", could be due to small construction errors, and this could even force measurement errors (as has happened to Fontana, for example). However, this erroneous conviction could dissuade the architects who are analyzing the basilica from assuming alternative scenarios, paradigms and rhythms, and therefore never being able to identify the true design process followed in S. Peter. In fact, and as I show in this Thesis, Bramante did not want this set to have just 39 *palmi*, but something else, exactly 39.1647 *palmi*, since in this way the set of the four central crossing piers and all their components are integrated with each other through strong geometric relationships (see in this chapter “central nucleus” of Bramante). Bramante was an extreme perfectionist (as has been shown when analyzing another of his exemplary projects such as the *tempietto* of San Pietro in Montorio) and it would be strange to think that Bramante would have allowed four gigantic piers to be built, with the same error of 3.67 cm. in the separation of the pilasters (0.1647 *palmi* = 3.67 cm.).

6. Accumulated error when measuring sequentially

When measuring a set of architectural elements, the same error is usually found, which consists in measuring these objects sequentially, taking the end of the previous measurement as the start of the measurement. This way of measuring encourages the incremental accumulation of the error made in each measurement along with the error of establishing the beginning and the end of the measurement, so the more items that are measured, the greater the error will have accumulated.

To avoid this type of error, one must be very disciplined and carry out sequential individual measurements, complemented with joint measurements (from the same reference point) including groups of several architectural elements, and contrast the general measurement of the group of elements, with the sum of each of them separately.

7. Interpretation errors with laser tools

Our current society has an excess of “technological optimism”, and in general there is a tendency to think that things are always done better with current technology than with previous technology (unfortunately this is de case of many historians, since they are unaware of the limitations of "high technology" and trust more than they should. That is why I suggest them think that the buildings they are trying to measure with lasers were made using strings). In addition, each technology offers advantages, but also disadvantages.

In this sense, it is often thought that measurements made with “total stations” based on laser instruments and computer programs are completely reliable, but this is not the case. These instruments provide at the end of the process a 3D model of the monument, in its current state. But this virtual model is not very useful in order to know the dimensions of all the architectural elements, and with it, deduce the design process of the executive project. The 3D model includes also the damage to the monument, as well as wear due to erosion, as expected, but the worst part is that it generates total confusion regarding the beginning and end of each architectural element. The 3D models generated are usually continuous and it is not possible to differentiate the different architectural elements individually, and as a consequence the dimensions of each element cannot be precisely known.

Therefore, these instruments are not very useful when reconstructing the exact dimensions of the different architectural elements, and therefore reconstructing the initial executive project, and the different stages of the design process.

8.6. Measurements made directly on the current building of the *new basilica of S. Peter*

Once Fontana and Letarouilly drawings have been examined, a table has been made containing the list of architectural elements not bounded in them, and also with the elements whose dimensions differ in both drawings.

Taking this list into account, direct measurements have been made on the monument on two occasions. Firstly, between May 22 and 25, 2018; and secondly, between March 19 and 22, 2019. To carry out these measurements, laser meters and non-deformable tape measures have been used.

During these two sessions, all kinds of measurements have been carried out in order to complete and correct Fontana and Letarouilly measurements, as well as to confirm all their dimensions, and to resolve any existing discrepancies.

Especially those elements that are essential when rebuilding the design process have been repeatedly measured.

8.7. Reconstruction in stages of the projects involved in the construction of new S. Peter

In this chapter is carried out in sequential order (and more or less in chronological order) the analysis of the most important projects in the evolution of the design process of the new basilica of S. Peter.

Although all the stages of the design process of all known projects for the design of the new basilica of S. Peter have been reconstructed, due to lack of available space, only three stages of the non-executive projects are shown.

However, all the stages of the executive projects are shown. Tracking the stages of the executive projects provides an exact idea of the design process of the new basilica: from the tracing of the first sketches by Bramante, to the tracing of the last line by Maderno

8.7.1. Nicholas V. Analysis and reconstruction of Nicholas V project

Nicholas V's project for the reform of the Old basilica turned out to have an enormous influence on the design of the new basilica, despite the fact that, based on it, only the foundations and the lower part of the walls of the western arm were built.

Years later, Pope Julius II commissioned Bramante the construction of a new basilica, but forced him to use these foundations for the construction of the western choir. The pope was in a hurry to build his own funeral chapel, and the quickest thing to do was to build it on the already made foundations of the western arm of Nicholas V.

This request was the origin of one of the biggest problems in the design process of the new basilica, and it could only be solved after the death of Michelangelo.

Nicholas V's biographer Manetti provides a basic description of Nicholas V's reform project and some of its dimensions, making it possible to reconstruct it with some precision. In the same way, Bramante drew quite precisely the shape and dimensions of the western arm already built, following the project of Nicholas V in his drawing GDSU 20 A.

In chapter 4 it has been possible to rebuild the shape of the old basilica of S. Peter, and in chapter 5 it has been possible to rebuild the state it had in the time of Nicholas V. Based on this, and taking into account the GDSU drawing 20 A and Manetti's description it has been possible to reconstruct the reform project of Nicholas V.

In the same way, it has been possible to reconstruct the sequence of stages carried out to carry out this project. Each stage is the consequence of having made the most appropriate decision with respect to the previous stage in order to reach the best possible result. Therefore, the identification of the most appropriate sequence of actions is precisely what justifies and legitimizes the goodness of the final result.

Due to the limitation of the size of the Thesis, only three stages of the design process are shown: an initial stage, another intermediate stage, and the final stage.

As can be seen in the probable reconstruction of Nicholas V's reform project, the western arm had an internal width of 110 *palmi* and an internal length of 150 *palmi*, to which must be added 50 *palmi*, which is the radius of the semicircular apse located at the bottom of it.

The project has been exhaustively delimited, and it has been drawn with great precision, especially the western apse, since its shape was decisive in Bramante's project for Julius II (Layouts NVP 1, NVP 2, NVP 3, NVP 4 and NVP 5).

8.7.2. Bramante. Analysis and reconstruction of GDSU 3 A drawing

Of all Bramante's known drawings, the first to be made was GDSU 20 Av, since it only indicates an idea, a way forward. As has been commented, the plan and the elevation of this drawing do not correspond, and this suggests that with these Bramante drawings only an initial idea was being hinted at. Bramante's initial wish corresponded to the creation of a huge dome seated in a pure quadrangular body, with a quincunx typology, which would allow the integration of four smaller perimeter domes.

Later, and based on these initial ideas, Bramante developed the GDSU 3A drawing.

The drawing corresponds to a project of a centralized plan with a quincunx typology, with an architectural structure generated from 4 large central crossing piers. The generation of the compositional mesh of the central nucleus is carried out by means of circles, squares and golden rectangles. Bramante was undoubtedly looking for a compositional strategy to create a "central nucleus" that could geometrically relate the central dome, the four crossing piers, the perimeter chapels, and the four perimeter domes. Therefore, the design of the crossing piers could not be carried out separately, but instead being integrated into this "central nucleus" (Layouts GDSU3Ar 1, GDSU3Ar 2, GDSU3Ar3).

This project has a completely different compositional structure from the others, which suggests that it is one of Bramante's first ideas. However, the generation of a "central nucleus" from circles and golden rectangles did not provide adequate dimensions for the four central crossing piers. So Bramante decided to continue experimenting based on a central octagon as an integrator of the different architectural elements of the "central nucleus". In fact, Bramante used an octagon in all of his subsequent projects, including that of his last executive project with which the works began ("the central nucleus of Bramante").

8.7.3. Bramante. Analysis and reconstruction of GDSU 1 A drawing Design alternatives

This drawing is the most elaborate of all those attributable to Bramante, but it corresponds to an initial stage in which Bramante was looking for the geometric bases to make a "central nucleus" that generates a quincunx typology, to achieve the design of a basilica apparently with centralized plan.

All the stages of the design process have been rebuilt, although here only an initial stage and the final result completely defined and bounded are shown. (Layouts GDSU1A 1, GDSU1A 2, GDSU1A 3). The final result has been overlaid with the original drawing to verify that they basically match, and that the reconstruction of the design process is correct (Layout GDSU1A 4).

It might seem, as has always been erroneously stated, that this project corresponds to a centralized plan typology (Layouts GDSU1A Q1, GDU1A Q2, GDSU1A Q3), however, based on the "central nucleus" of the GDSU 1 A project, it has been possible to rebuild different alternatives with a typology of naves (Layouts GDSU1A N1, GDSU1A N2). That means that in the other missing half of the drawing GDSU 1 A could have drawn anything.

From the analysis and reconstruction of the GDSU 1 A project, it can be deduced that from the beginning Bramante was trying to design a "central nucleus" capable of generating both a centralized quincunx typology and a longitudinal typology with naves. However, as can be seen in the alternative reconstructed projects, although the result could be acceptable, it lacks maturity, since the possible design of the variants with naves is very forced.

Without a doubt Bramante should modify the central nucleus to generate a new typology capable of integrating a pure centralized quincunx typology, with a typology of naves.

8.7.4. Bramante (Giuliano da Sangallo?). Analysis and reconstruction of JSM Codex Coner, 115/17 drawing

This project shows a new version of the “central nucleus” capable of generating a typology with naves, but it cannot generate a centralized quincunx typology. This project, whether carried out by Bramante or by Giuliano da Sangallo, shows the desire to design the four central crossing piers so that they can generate ambulatory, perfectly integrated into the central nucleus (Layouts CONER115/17 1, CONER115/17 2, CONER115/17 3).

No doubt this project was carried out very quickly in order to please the Pope, but it is evident that it did not please either Bramante or Giuliano. However, this drawing shows a significant advance, since in addition to achieving a new mixed typology capable of generating a longitudinal body with naves, without losing the purity of a quincunx typology, there is another pending issue, which was the definition of the ambulatory. Undoubtedly, once the GDSU 1 A proposal was rejected, it had been decided that the best integrative solution should be achieved with ambulatory.

However, the desire of both Guliano da Sangallo and Bramante was to create a typology with a purer heart. In other words, a mixed typology that can generate projects with a centralized plan of great architectural purity, but which at the same time could be developed on one of its sides, creating a longitudinal body with naves.

8.7.5. Giuliano da Sangallo. Analysis and reconstruction of GDSU 8 Ar drawing. Quincunx typology

Around the same time that Bramante made the GDSU 1 A drawing, Giuliano da Sangallo made the GDSU 8 Ar drawing. (Layouts GDSU8Ar 1, GDSU8Ar 2, GDSU8Ar 3). The resemblance between the two proposals is amazing, and perhaps Giuliano's project is more elaborate, and has a higher level of internal coherence. Based on the analysis of both drawings, it can be deduced that at this time both architects worked together, exchanging experiences, and forging a new typology.

With this proposal Giuliano da Sangallo, like Bramante, was looking for the geometric bases to create a “central nucleus” that generates a quincunx typology, to achieve the design of a basilica apparently with a centralized plan.

The result is a beautiful mosaic of spaces that recalls a fractal typology, which is an indication of its enormous compositional quality.
The two proposals had to be shown to Pope Julius II almost at the same time, and despite their enormous quality and beauty, both were rejected.
The causes of rejection are not known, but if they were rejected it is because, despite their enormous quality, they did not correspond to the wishes of the pope.
No doubt the pope wanted two things that these typologies could hardly achieve. On the one hand the apse of Nicholas V should be integrated, and secondly the project should extend in an easterly direction, and have a longitudinal body with naves.

8.7.6. Bramante. Analysis and reconstruction of GDSU 7945 Ar drawing. Design alternatives

The GDSU 7945 Ar drawing is a more mature proposal than the previous ones in several ways. In the first place, the design is more detailed since a compositional mesh module has been used to establish the geometric relationships between the different parts of the four great crossing piers. Secondly, the design of the crossing piers is perfectly defined, based on a compositional module of reduced dimensions. Third, the drawing includes a ring of large columns in the transept to help support the enormous loads on the dome, as a result of an initial analysis of the loads that the four central piers could support.
Bramante must have doubts as to whether previous projects could support the enormous weight of a gigantic central dome. For this reason, he gave more prominence to the four central crossing piers, and also added a ring of columns in case the section of the crossing piers was not enough.
In a complementary way, Bramante was in the process of searching for a central nucleus that, in addition to generating a qincunx typology, could generate a typology of naves, and of course the key was in the design of the four large crossing piers, to which it should provide greater prominence.
To carry out this project, Bramante used a mesh based on a compositional module of 2.5 *palmi*. As usual he began by drawing the compositional lines of the naves with a width of 110 *palmi* (44 modules), rounding the width of the central nave of the old basilica of

109.33 *palmi* from column to column). The separation between pilasters is 105 *palmi* (42 modules).

The analysis of the drawing clearly shows that the GDSU 7945 Ar drawing corresponds to a quincunx typology, with a central dome 200 *palmi* in diameter, four perimetral domes 120 *palmi* in diameter and side chapels 65 *palmi* wide (60 palmi from *paraste* to *paraste*) (Layouts GDSU 7945Ar 1, GDSU 7945Ar 2, GDSU 7945Ar 3, and Layout GDSU 7945Ar Q1).

According to a tradition usually argued, although no source is known to affirm it, Bramante wanted to exceed the diameter of the dome of the Pantheon (196 *palmi*), so he initially established a rounded diameter of 200 *palmi*. Taking into account that he also wanted to dimension the main nave and the transept with the same rounded width as the old basilica (110 *palmi*), the crossing piers would necessarily have a flattened shape and their section would have a reduced surface. For this reason, he needed to incorporate a ring of columns under the dome, to help support its enormous weight.

The reconstructed central nucleus corresponding to drawing GDSU 7945 Ar has great similarities with the central nucleus of drawing GDSU 1 A. Therefore, following the same design process, the shape of the plan to which it corresponds can be reconstructed. The process has been simplified in only 6 stages due to lack of space (Layouts GDSU 7945Ar Q2, GDSU 7945Ar Q3, GDSU 7945Ar Q4, GDSU 7945Ar Q5, GDSU 7945Ar Q6, and GDSU 7945Ar Q7) and finally it can obtain a beautiful centralized plan based on a quincunx typology, which greatly recalls the GDSU 1 A drawing. However, now the four central crossing piers have much more prominence.

Bramante was clearly approaching a satisfactory solution, and was on the right track, but he had not yet arrived.

It might seem at first that Bramante was simply looking for a simpler and cheaper alternative to the GDSU 1 A drawing in order to present a new proposal to the pope, but this is not the case. After having drawn the GDSU 1 A proposal on an expensive parchment, the pope rejected the solution, so there was no point in carrying out a similar solution, even if it was simpler and cheaper.

Bramante did not really want to create a new quincunx typology, but was actually looking for new “central nucleus” designs in order to give even more prominence to the four crossing piers, and to be able to generate a new, more versatile typology.

However, neither Bramante nor Giuliano da Sangallo were going to put aside such innovative and beautiful projects as the GDSU 3 A and GDSU 8 A drawings, so they respectively took them as a starting point, to gradually modify their central nucleus, and thereby finding a new typology.

Undoubtedly both Bramante and Giuliano da Sangallo would tirelessly meditate on how to transform their respective proposals to satisfy the demands of Julius II.

However, after having analyzed all his known projects, I believe that Giuliano da Sangallo reacted first, and indicated to Bramante the way forward with his drawing GDSU 8 Av.

8.7.7. Giuliano da Sangallo. Analysis and reconstruction of GDSU 8 Av drawing. The genesis of the mixed quincunx-naves typology. Design alternatives

Giuliano da Sangallo on the back of the GDSU 8 drawing Ar, and with a quick sketch, transformed his own proposal, and at the same time created a new typology.

The GDSU 8 Av drawing shows how with the central crossing piers it is possible to achieve a typology of naves and in turn capable of generating ambulatory (Layouts GDSU8Av 1, GDSU8Av 2, GDSU8Av 3).

The drawing schematically shows a building with a centralized plan and a quincunx typology (Layout GDSU8Av Q1), but which extends longitudinally on the east side, forming a body with naves (Layouts GDSU8Av N1, GDSU8Av N2, GDSU8Av N3). Without a doubt Giuliano da Sangallo had created, almost without realizing it, a "central nucleus" capable of generating a mixed typology of quincunx-naves. The key is in the design of the central crossing piers whose internal lateral sides should be as large as possible, and the beveled side, opposite the dome, should be as small as possible.

The drawing also shows how the central crossing piers are capable of generating ambulatory with adequate dimensions, from which it can be inferred that the ambulatory was something desired by both the pope and the architects, both from a functional and project point of view. Without a doubt, a large longitudinal building from which only a few stunted apses emerged was not the most beautiful solution.

The drawing also shows a quadrangular plan that integrates 4 bell towers at its vertices, without exceeding the perimeter. The body of the naves has been composed of paired septa directly integrated in the lateral *paraste* of the central crossing piers. An important detail of the drawing is shown in its upper right part, where the interior vertices of the crossing piers are subtly beveled, no doubt to emphasize that the drawing allows a quincunx typology.

The structure is very reminiscent of Bramante's later GDSU 20 A drawing, which is why this drawing is attributed to Bramante. However, one question may be asked: Why did Bramante draw behind a drawing by Giualiano da Sangallo? If the drawing were made by Bramante, it means that he worked in direct contact with Giuliano da Sangallo, and with this drawing it was Bramante who showed Sangallo the way to go. However, no previous drawing by Bramante had ever come this far. Only in drawing GDSU 7945 Av is a mixed type quincunx-naves shown, but it is much more schematic than in drawing GDSU 8 Av.

It could have happened that Bramante had been the one who had found the key, making the drawing GDSU 7945 Av, and that he showed Giuliano da Sangallo the way forward, drawing behind his drawing a transformed project of the same according to his own findings. Could be.

But I am reluctant to believe that Bramante drew behind a drawing by Giuliano da Sangallo.

8.7.8. Bramante. Analysis and reconstruction of GDSU 7945 Av drawing. Design alternatives

It was quite easy to transform the GDSU 8 Ar drawing into a quincunx-naves typology, since the central crossing piers did not have a large beveled side opposite the dome, as did all the crossing piers that Bramante had designed. Bramante undoubtedly liked the qincunx typology more than Guliano da Sangallo, and that is why all of his previous proposals had truncated crossing piers, with one beveled side.

Therefore, Bramante should change the design of the central crossing piers in order to, in addition to being able to generate a quincunx typology, they could generate a typology of naves. And that is precisely what he did in drawing GDSU 7945 Av.

Bramante realized that the smaller the bevelled side (and therefore the larger the lateral sides) the easier it was to achieve a type of naves. Therefore, he provided the smallest possible size (Layouts GDSU 7945Av 1, GDSU 7945Av 2, GDSU 7945Av 3, GDSU 7945Av 4, GDSU 7945Av 5). In fact, in the current basilica, the beveled side has the smallest possible dimension.

With these new modified crossing piers, a central nucleus was generated capable of generating a mixed quincunx-naves typology. This new typology allowed the design of a basilica with the purity of a pure quincunx typology and, at the same time, allowed it to be extended in an easterly direction by means of a longitudinal body with naves. This longitudinal body could be structured by means of lenticular counter-piers (Layout GDSU 7945Av 6), or by means of paired septa counter-piers (Layout GDSU 7945Av 7). In addition, the design of the crossing piers, with large lateral sides, allowed the generation of appropriately sized ambulatory.

Based on this new central nucleus, a great diversity of projects can be generated, integrating three ambulatory and a longitudinal body in an eastern direction. For example, you can create a basilica with a longitudinal body of 3 *navate* and 3 *campate* (Layout GDSU 7945Av QN3-3), or a basilica with a longitudinal body of 3 *navate* and 5 *campate* (Layout GDSU 7945Av QN3-5), using lenticular counter-piers. It is also possible to create a basilica with a longitudinal body of 5 *navate* and 3 *campate* (Layout GDSU 7945Av QN5-3), or a basilica with a longitudinal body of 5 *navate* and 5 *campate* (Layout GDSU 7945Av QN5-5), using paired septa counter- piers.

At this point there was only one problem left to solve. The crossing piers continue to have a very small section, so the inner ring of columns under the dome was still necessary. The only way to increase the section of the crossing piers was to decrease the diameter of the dome. As a consequence, Bramante had to give up his wish to build a dome with a diameter greater than that of the Pantheon dome (196 *palmi*).

Bramante had to pre-dimension the diameter of the dome in relation to the internal sides of the crossing piers. Initially in the GDSU 7945 Ar drawing the order of the internal sides was 10-2.5-10 *palmi* (different from the order of the lateral face of the counter-piers of 10-20-10 *palmi*), and finally, in the GDSU drawing 7945 Av the order of the internal sides could pass to 10-15-10 (coinciding with the order of the lateral face of the counter-piers). Therefore, by reducing the diameter of the dome and increasing the cross-piers section, Bramante solved a fundamental issue, providing the same order to both the crossing piers and the counter-piers.

Based on this new design of crossing piers, a wide variety of projects can be generated, integrating three ambulatory and a longitudinal body facing east. For example, a basilica with a longitudinal body of 3 *navate* and 3 *campate* (Layout GDSU 7945Av QNB3-3), or a basilica with a longitudinal body of 3 *navate* and 5 *campate* (Layout GDSU 7945Av QNB3-5) can be created, using lenticular counter -piers. It is also possible to create a basilica with a longitudinal body of 5 *navate* and 3 *campate* (Layout GDSU 7945Av QNB5-3), or a basilica with a longitudinal body of 5 *navate* and 5 *campate* (Layout GDSU 7945Av QNB5-5), using paired septa counter- piers.

In fact, this last possible project bears a striking resemblance to Bramante's next known project, the GDSU 20A drawing.

8.7.9. Bramante. Analysis and reconstruction of GDSU 20 A drawing

8.7.9.1. Reconstruction of GDSU 20 A drawing as Longitudinal plan typology. Design alternatives

With the GDSU 7945 Av drawing, Bramante created a new quincunx-naves typology and also laid the conceptual foundations for the design of the 4 crossing piers, so that they had sufficient bearing capacity, and with them create a central nucleus, capable of generating ambulatory and a longitudinal body with nave, based on counter piers.

The next necessary step was to integrate this typology into the built environment and especially with the old basilica. And he did that immediately with the GDSU 20 A drawing.

Bramante made this drawing using a compositional mesh with a module of 5 *palmi*, so the dimensions of the different architectural elements to be designed would be integer multiples of 5 *palmi*, that is, it would hardly be a modular and scaled sketch. Therefore the GDSU 20 A drawing was not intended to be an executive project but was simply a scale sketch in order to fit dimensionally, and roughly, the new architectural typology that he had just created.

Bramante already had an approximate idea of the shape that the four crossing piers should have, and he began to draw the first one trying to fit it into the main compositional lines of the naves of the old basilica. Bramante had already decided that the east face of the transept should coincide with the east face of the transept of the old basilica, so with quick gestures he began to draw the crossing pier to the west integrating it with the east side of the transept, with the north side of the central nave and also with the two colonnades. Bramante quickly abandoned this idea as the resulting crossing pier was too small.

He then began to draw the southeast crossing pier, aligning its west face with the east side of the transept, and its north face with the south side of the central nave, but without trying to align it with the colonnades of the old basilica. In this way he created a crossing pier with a shape capable of generating ambulatory with adequate dimensions. He did the same with the other two crossing piers, testing different dimensional and proportional alternatives between the different sides of the four large crossing piers, as well as different proportions between the piers pilasters and their spacing. In the same way he began to sketch the design of the paired septa counter-piers, using the same compositional lines hinted at in the design of the crossing piers.

The GDSU 20 A drawing is an application test of the new quincunx-naves typology to achieve both a centralized plan building and a longitudinal plan building with naves (Layouts GDSU20Ar 1, GDSU20Ar 2, GDSU20Ar 3). Similarly, it is a first real attempt to delimit the perimeter of the building taking into account the built environment and especially the position of the obelisk. In fact, the drawing clearly shows three ambulatory and a longitudinal body to the east (Layouts GDSU20Ar N1, GDSU20Ar N2), but it is intuited that the central nucleus composed by the four crossing piers can generate a quincunx typology with a centralized plan, simply by substituting the east longitudinal body for an ambulatory similar to the others.

Therefore, and due to the mixed quincunx-naves typology recently created by Bramante, the GDSU 20 A drawing shows a high degree of ambiguity and flexibility, evidently desired by Bramante, in order to be able to create both a centralized plan and a longitudinal plan, as appropriate.

8.7.9.2. Reconstruction of GDSU 20 A drawing as Centralized plan typology. Design alternatives

The GDSU 20 A drawing has been also reconstructed in the form of a quincunx typology with a centralized plan structure (Layouts GDSU20Ar Q1, GDSU20Ar Q2). It can be seen how the counter piers are generated as a mirror image of the crossing piers. In the same way, the counter-piers generate an ambulatory with adequate dimensions. Two bell towers are located on the west side of the basilica, while on the east side there are open walls, which on the south side embrace the obelisk. These walls have the same compositional structure as the bell towers on the west side, which they replace on the east side.

8.7.10. Bramante. Reconstruction of “Central nucleus” project

The final Bramante project that was used at the beginning of the works, on April 18, 1506, is not known, but a completely detailed executive project must have existed since without it, the works would not have begun.

Some historians think that if there was an initial project and in fact Frommel suggests a certain project, drawn by P. Foellbach (Christoph Luitpold Frommel, 'San Pietro', Milano: Electa, 1996, pp. 249-280). In fact, I have rebuilt the project myself, since the proposal has several compositional and dimensional errors (Layout Frommel). However, and for all that was discussed in chapter 7, I do not believe in any way that this project existed at any time, nor that Bramante designed something like that.

On the basis of a scrupulous analysis of all known projects on S. Peter, I have deduced that the situation was quite different and that there was never actually an executive project. Bramante used a strategy similar to the one Michelangelo used years later. Bramante would define a complete project only in a basic way, and would only define in an executive way the parts of immediate execution. And as I have commented in the previous chapter, the joint basic project must have been very similar to the one presented a few years later by Raffaello, Serlio 1544, f. 37 drawing. Without a doubt, he also defined in detail the central nucleus of the building, and the west arm, taking advantage of what was already built by Nicholas V.

Nowadays it may be surprising that a building so important and of gigantic dimensions began to be built without the existence of a general and detailed project in all its aspects, but it is possible that Bramante would have had no choice but to do something similar due to its huge discrepancies with Pope Julius II. In fact, his decision had repercussions throughout the entire design process, at least until 1585, when Pope Sixtus V had the western apse demolished.

On the one hand, Pope Julius II was interested in taking advantage of the foundations of the western arm of Nicholas V to quickly build a chapel in which his own tomb, the *Capella Iulia,* would reside. This request forced the western arm to have a shape similar to that already built by Nicholas V.

On the other hand, Bramante wanted to carry out a magnificent project without being hampered by the mediocre architectural structure initiated by Nicholas V. Bramante wanted to take the opportunity to express his own Renaissance ideas and create a new innovative project in which a huge dome rests on four crossing piers capable of generating a new architectural structure, as has been shown in the analysis of their previous projects.

However, the architectural structure that he wanted to create could not integrate in any way a western arm with the form given by Nicholas V, or similar.

Taking into account the analysis of the projects attributed to Bramante, it is to be assumed that he would do everything possible to make Julius II change his mind, and not require him to reuse the foundations of Nicholas V and make an arm with a similar shape. However, Julius II never changed his mind and demanded that the works of the *Capella Iulia* begin in a hurry, since he was aware that he would not have many years to live.

The matter seemed to have no solution, since, of course, Bramante would not abandon his ideas, and would do everything in his power to get his way, one way or another. So he created an amazing strategy, which he followed until the end of his life.

The works began in April 1506, and it is evident that the pope gave the go-ahead there should have been some general project, even if not completely detailed, that would give the pope a general idea of his ideas. And it is possible that Bramante made one or more complete projects, which would undoubtedly be very similar to the Serlio 1544, f. 37, and PML, codex Mellon, f. 72v, which years later Raffaello presented to Pope Leo X.

However, based on the analysis of historical events and known drawings, the strategy used by Bramante consisted in the first place in ambiguity. If Bramante carried out a joint, complete and detailed project that included a western arm in the shape given by Nicholas V, he would make it impossible for him to develop his own new ideas. On the other hand, if he developed projects expressing his own ideas without including the chorus of Nicholas V, the pope would reject them (in fact he rejected several previous projects perhaps for this reason).

So Bramante did something surprising, and decided to start building two radically opposite projects at the same time. Rather, he began to build a part of two different projects and never fully defined.

On the one hand, he carried out the project of the *Capella Iulia*, which he designed with great care, and even made a model (since it had to satisfy the Pope's demands), following a form similar to that already built by Nicholas V.

On the other hand, he began to build the central part of a new project, which on the one hand would please the pope, and on the other hand it was the result of his innovative and creative architectural ideas. It is very likely that Bramante never carried out this project in detail in a complete and detailed way, since for this he would have to solve the integration with the apse of Julius II, and that was a very difficult task and would give some not very graceful results (as demonstrated all the architects who succeeded him).

Instead, it is possible that Bramante limited himself to carrying out indicative projects, as a declaration of intent, similar to the two that years later Raffaello defended with all his determination, drawn without much detail. However, for the works to begin, Bramante had to detail the central part of his project, carrying out a detailed partial project, which at least included the architectural elements shown in the JSM drawing, codex Coner, f 24r. This drawing shows what was built up to the year 1514-1515, including some projected parts, although not yet built in those years.

Bramante knew perfectly well that he would not see the building completed before the end of his days, so he established a series of priorities, and deduced that the most important thing was to quickly build the central part of his new project, since once built, it The central part would limit the freedom of the architects who succeeded to the maximum. In the architectural structure devised by Bramante, the central part acted as a generator of the surrounding spaces, so once built, it would force the succeeding architects to project typologies according to Bramante's ideas. In other words, the construction of the central nucleus of his project forced his ideas to survive in time, since his successors would have no choice but to adopt them, at least in their essence.

The responsibility was so great that Bramante had to use all his ingenuity, and he designed a “central nucleus” that perfectly integrated the four crossing piers, with the central dome, and the four perimeter domes. This central nucleus would allow at the same time a quincunx typology and a typology of naves (as he already achieved in his previous project GDSU 7945 Ar and Av). Furthermore, the shape of the four crossing piers compositionally controlled the design of the specular counter-piers, and by extension, it greatly restricted any design that its successors could make (as it did).

Bramante would undoubtedly devise different buildings generated from his "central nucleus" that would please both him and Pope Julius II, similar to those that Raffaello later presented to Pope Leo X. But these projects would not be defined in detail so as not to reinforce the problem posed by the *Capella Iulia*.

As a result, Bramante made a courageous decision: he would build the central nucleus of his project, at the same time as its greatest obstacle: The *Capella Iulia*. And he would build both in a hurry.

The coexistence of these two elements, with a completely different architectural conception, generated strange and disintegrated architectural forms, as can be seen in the JSM drawing, codex Coner, f 24r.

However, the important thing was that the works of the central nucleus advanced as much as possible, so that his successors had no choice but to respect what was built, and ensure that his ideas survived over time. The construction of the central nucleus was a complex task since, to build the foundations of the four crossing piers, the ancient Roman foundation platform would have to be drilled and reached firm ground. For this reason, and due to the speed of the works, Fra Giocondo had to reinforce the foundations of the first pylon built in the southwest years later. In the same way, cracks appeared in the *Capella Iulia* shortly after it was built, so it is possible that Bramante, even using quality materials, would force a hasty and careless construction, carrying out an exercise in "programmed obsolescence" in order to shorten its durability.

This “central nucleus” detailed by Bramante includes the detailed design of the four crossing piers, as well as the exact separation between them. In this way, the four crossing piers are perfectly integrated with each other, with the central dome, the four small perimeter domes, as well like the side chapels to the four crossing piers (Layouts CENTRAL NUCLEUS 1 to 19).

The "central nucleus" design is so special that it can be extended through a sequence of counter-piers whose design is derived directly from the design of the central crossing piers. In the same way, the "central nucleus" can be extended, by means of counter-piers, forming ambulatory with an architectural structure that is directly deduced from the design of the central crossing piers. As a consequence, the central nucleus designed by Bramante is valid for both a quincunx typology and a typology of naves at the same time (as demonstrated in the projects of Bramante's successors).

8.7.11. Bramante. Analysis and reconstruction of Apse of Julius II project (based on the drawing GDSU 44 A)

Immediately after designing the "central core", Bramante designed the western apse. This western apse should have a shape similar to the apse designed by Nicholas V, since the pope wanted the foundations to be used, so that the construction progressed as far as possible. It is possible that the pope was thinking of Bramante making his Capella Iulia as if it were an isolated building, although at the same time integrated with the two western crossing piers of the “central nucleus” of Bramante.

Based on the analysis of the design of the western apse by Nicholas V, and the western apse designed by Bramante, it is deduced the enormous skill that Bramante had as an architect. His visual and design capacity was enormous. Bramante was obliged to take into account the compositional guidelines set by the design of the central 4 crossing piers, and at the same time he had to create a shape as close to the western arm as Nicholas V.

The reconstruction of the design process followed by Bramante shows the enormous precision with which Bramante designed the western apse. His design is very similar to Nicholas V's design, even though it was designed with a different compositional strategy and different geometric proportions (Layouts GDSU44A 1 to 21). The design of the “Bramante choir”, on the foundations of the western apse of Nicholas V, constitutes without a doubt a masterful lesson of architecture. And this also taking into account the anger that Bramante should have when forced to design a nonsense of such caliber.

8.7.12. Antonio da Sangallo. Analysis and reconstruction of GDSU 46 A drawing (reconstruction of the ambulatory designed by Bramante)

The GDSU 46 A drawing by Antonio da Sangallo makes it possible to accurately reconstruct the design of the Bramante ambulatory. As mentioned in chapter 7, Sangallo initially, in his first proposals, created a completely different structure for the ambulatory. On the other hand, the architectural structure of the ambulatory depicted in the drawings that Raffaello and Peruzzi made between 1513 and 1520 (Serlio 1544, f. 37; PML, codex Mellon, f. 71r drawing; PML, codex Mellon, f. 72v drawing and Serlio 1544, f. 38) is similar to the one in drawing GDSU 46 A. Therefore, it follows that this drawing corresponded to what was previously projected by Bramante and conveniently safeguarded by Raffaello and Peruzzi. Antonio da Sangallo limited himself to introducing small ornamental changes both inside and outside. So, based on this drawing and the drawings by Raffello and Peruzzi, the ambulatory projected by Bramante can be reconstructed with enough certainty, as well as its design process (Layouts GDSU46A 1 to 7).

8.7.13. Raffaello. Analysis and reconstruction of Serlio 1544, f. 37 drawing

The drawing Serlio 1544, f. 37 may represent Bramante's final proposal, safeguarded by Raffaello, whom Bramante had chosen as his successor, and to whom he had instilled his own ideas.

The reconstruction of the Bramante-Raffaello project has been straightforward based on the reconstruction of the previous drawings. The resemblance to the reconstruction of the drawing GDSU 20 Ar (Layout GDSU20Ar N2) is more than patent (Layouts SERLIO37 1 to 3).

The drawings speak for themselves.

8.7.14. Peruzzi. Analysis and reconstruction of PML, codex Mellon, f. 71r drawing

The drawing PML, codex Mellon, f. 71r is the theoretical project made by Peruzzi during the last year of Bramante's life and which reflects Bramante's purest ideas, as can be deduced from the reconstruction of the GDSU 20 Ar drawing (Layouts GDSU20Ar Q1 and GDSU20Ar Q2).

Peruzzi works in a disciplined way together with Bramante and helps him solve all the small details necessary to properly finish the building according to his wishes. During this time, they both knew that the building would be irretrievably adulterated, and it was very attractive to carry out theoretical projects showing "what could have been".

As can be seen from the reconstruction of its design process, this project is the centralized version of the longitudinal plant project presented by Raffaello a year later, since both were probably carried out at the same time (Layouts MELLON71r 1 to 5).

8.7.15. Raffaello. Analysis and reconstruction of PML, codex Mellon, f. 72v drawing

The drawing PML, codex Mellon, f. 72v was carried out by Raffaello in 1518, introducing some changes to please the pope and making small concessions to Antonio da Sangallo, in order to reach certain executive agreements. The project is very similar to the one he had carried out 4 years earlier, although now the corner towers and the facade are given greater prominence. On the contrary, and in order to provide a greater section to the lenticular counter-piers, in this project the repetitive order of the double faces of the crossing piers and counter-piers is altered (Layouts MELLON72v 1 to 3).

In his previous proposal of 1514 (Serlio 1544, f. 37) the internal face of the counter-piers (adjoining the main nave) had the same order that Bramante used in the four large central crossing piers, (12 *palmi* -15 *palmi* - 12 *palmi*), that is 39 *palmi*.

To increase the robustness of the counter-piers, and increase the thickness in their central part, there was only one solution, which consisted in breaking the rhythm of the paired paraste, and separating them a little more.

In the new proposal of 1518 PML, codex Mellon, f. 72v, Raffaello designed wider counter-piers, separating the 12 *palmi* paraste a distance of 20 *palmi*, instead of 15 *palmi*. However, the compositional rhythm was altered. The central crossing piers had an order of 12-15-12 *palmi*, and the piers of the naves had an order of 12-20-12 *palmi*. And that was the object of a new criticism by Antonio da Sangallo, documented in his famous *memorial*.

8.7.16. Peruzzi. Analysis and reconstruction of Serlio 1544, f. 38 drawing

Serlio 1544, f. 37 drawing was made by Peruzzi, in 1520-1521, as a counterproposal to Antonio da Sangallo's model of 1520. The project closely resembles the project he made in 1513.

As seen in the reconstruction of the project, Peruzzi masterfully designs a new articulation at the ends of the ambulatory in order to increase the thickness of the wall between the niches at the ends of the ambulatory and the niches in the perimeter chapels (Layouts SERLIO38 1 to 3).

8.7.17. Antonio da Sangallo. Analysis and reconstruction of GDSU 255 A drawing

Although it had no influence on the built building, I have rebuilt this project as an example of the possible design variations that can be made based on the "central nucleus of Bramante" (Layouts GDSU255A 1 to 3).

8.7.18. Antonio da Sangallo. Analysis and reconstruction of BSB cod. Icon. 195, f. 2r

Although it had no influence on the built building, I have rebuilt this project as an example of the possible design variations that can be made based on the "central nucleus of Bramante" (Layouts ICON195F.2r 1 to 3).

8.7.19. Antonio da Sangallo. Analysis and reconstruction of Antonio da Labacco drawing

Although it had no influence on the built building, I have rebuilt this project as an example of the possible design variations that can be made based on the "central nucleus of Bramante" (Layouts LABACCO 1 to 3).

8.7.20. Michelangelo. Analysis and reconstruction of Duperac drawing (1569)

Michelangelo demolished the little that Antonio da Sangallo had built, leaving only the "central nucleus of Bramante" standing, including the north and south counter-piers (cut to the bevel), and the paired counter-piers from the west. Michelangelo also preserved the 14 aedicules that Sangallo had arranged in the crossing piers and in the counter-piers (once the 40-palmi niches built by Bramante had been covered).

Based on this "slightly enlarged central nucleus of Bramante", Michelangelo created a new project with a centralized plan structure. This new project was very simple, and it was structured on the basis of two transversal arms topped by apses without ambulatory. Between the apses Michelangelo created new polygonal elements, the *smussi*, which housed the 4 ramps (in the north and in the south) and two new chapels (in the west). On the east side, Michelangelo finished off the building by means of a multiple *pronaos,* with four columns in front and ten columns in the back.

The resulting building was tremendously attractive, pure and simple.
It has been possible to perfectly reconstruct the design process, step by step, that Michelangelo followed in the realization of his project, based on the engraving made by Dupérac, and taking into account the drawings made by Fontana and Letarouilly, as well as the measurements made directly on the current building (Layouts DUPERAC 1 to 31).

8.7.21. Maderno. Reconstruction of *Maderno final executive project of April 1608 (after GDSU 264 A drawing)*

After the death of Michelangelo, and with the works being very advanced, the ecclesiastics made a harsh criticism of the functionality of the building, and Paul V decided that it should be extended in an easterly direction, creating a longitudinal body with naves.
In May 1606, an architectural competition took place before the Congregazione della Fabbrica, to finish the Michelangelo building heading east. As expected, the chosen project had been carried out by Carlo Maderno, although he had to make several changes.
At the beginning of 1607, the Maderno first executive project was approved, as we know it from drawing GDSU 264 A. In March 1607, following this project, excavations began in the area of the *Cappella del Santísimo Sacramento*, and on May 7 the laying of the first stone took place and construction began.
But strangely, at the beginning of the autumn of the same year 1607, Paul V ordered that the facade be built first, and then that the union with the Michelangelo building be made later.
However, in April 1608, the *Congregazione della Fabbrica* decided to modify Maderno's project. The interior apse should be replaced on the east side, and instead have a longitudinal body, in which the central nave was widened and extended to the facade.
Maderno had to work very quickly and carry out a new executive project in two months, between May and June 1608, since in June m the works began and developed at a dizzying pace.
There are no references of what this executive project was like under which construction began, but it was built and today it can be measured. Details and specific measurements are also recorded in the Fontana and Letaroully plans.

Logically, the body of the facade should be the same as the one shown in the GDSU 264 A project, or very similar to the fact that the Congregazione della Fabbrica did not put any problem on it. In addition, this body of the facade was built, and what is built coincides with what is shown in this project.

It has been possible to reconstruct the entire design process carried out by Maderno, starting from the Michelangelo Project (which basically coincides with those built), and following the GDSU 264 A project, and especially the reconstructed plans of Fontana and Letaroully.

The design process was spectacular, and the result achieved was masterful, despite the short time Maderno had available. The analysis of these projects shows that Maderno had exceptional talent, and knew how to perfectly internalize the design strategy followed by Bramante and Michelangelo, and subtly transformed it by integrating his own updated vision of architecture. Maderno knew how to create a strong Renaissance purist structure, but impregnated with a new dynamism, typical of new times.

As I have said several times, I think that the history of architecture is indebted to Maderno.

The attached graphics show the reconstruction of the design process that Maderno followed in the realization of the executive project of the eastern arm of the new basilica of S. Peter (Layouts MADERNOA 1 to 29).

8.7.22. Maderno. Analysis and reconstruction of Mattheus Greuter (1613) drawing

In the spring of 1612 the longitudinal body with the three naves and the facade were completed. However, Pope Paul V estimated that the facade was missing some lateral bell towers, and in September of the same year 1612 ordered that it be enlarged with two annexes that would serve to support two bell towers.

Maderno got to work quickly and designed the steeples again in record time, and with exceptional mastery. The project that he carried out can be seen in the 2 large-format engravings that Mattheus Greuter published in 1613, which basically coincides with the built building. The first shows the floor plan of the building once it was finished, and the second shows the facade with Maderno's bell towers, which were not executed. On the ground floor there is a dedicatory document by Maderno to Pablo V, in which the motivations for the new building are set out in detail, and the construction measures

adopted by Maderno are explained. This gives Greuter's engravings a more or less official character.
The height development of the bell towers was carried out later by Bernini and Borromini, but the structure of the lower part was built by Maderno.
It has been possible to reconstruct the design process that Maderno followed in the realization of the bell tower project, based on the engravings of Mattheus Greuter, the plans of Fontana and Letarouilly, and the measurements made directly on the monument (Layouts MADERNOB 1 to 19).
This completes the reconstruction of the complex, long and tormented design process of the new basilica of S. Peter.

8.4. Conclusions

Based on the analysis of all available historical references, I have been able to reconstruct the design process of the new basilica of S. Peter. The process has been exciting, and I have personally learned a lot.
The reconstruction of the design process for the new St. Peter's Basilica is an architectural masterclass that all historians and architects should know about.
The best architects of his time were involved in the design of S. Peter, and they are among the best architects in the history of mankind.
These architectural geniuses carried out master projects individually. And among all of them they created a wonderful building, which has become the symbol of all humanity.

FIGURES 8

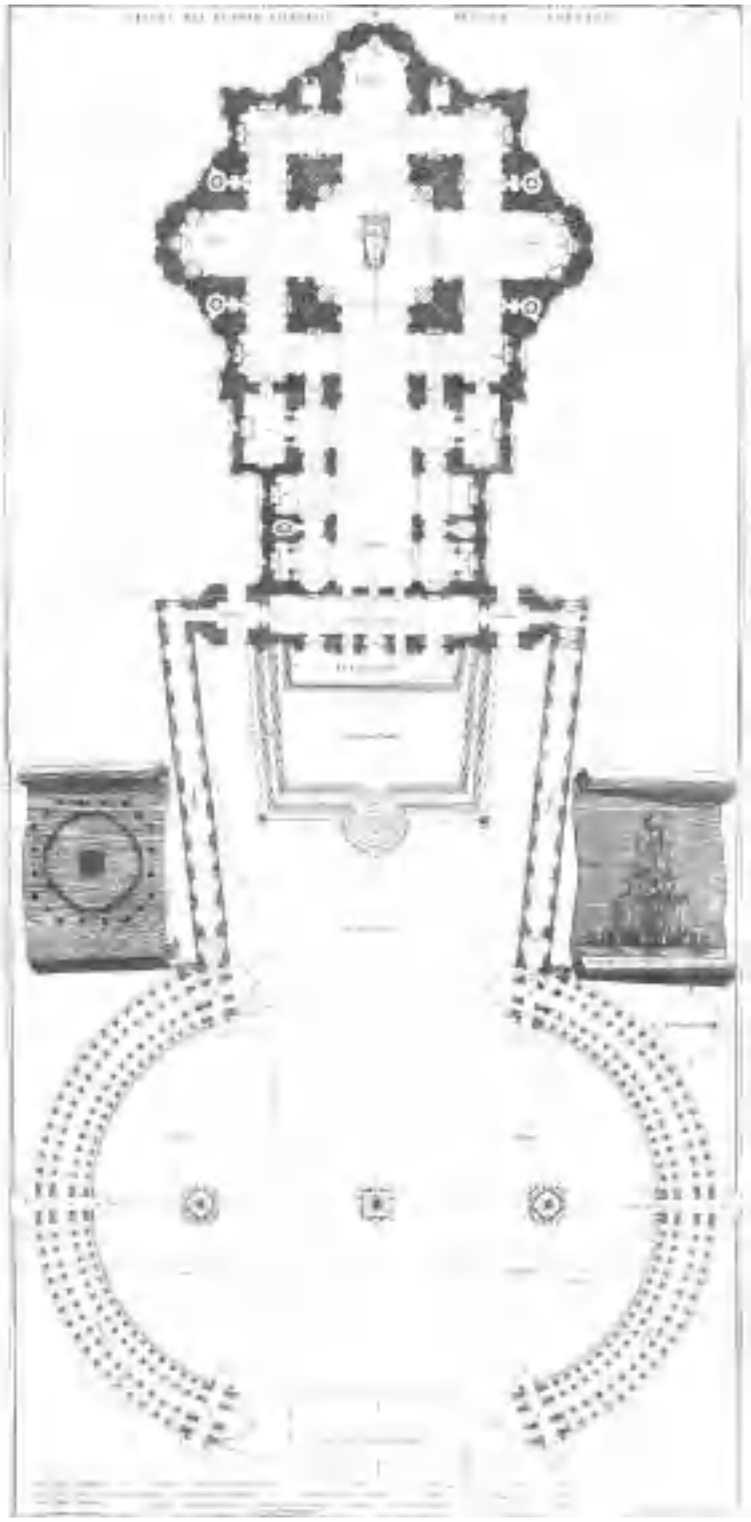


Figure 8.1

Pianta del tempio Vaticano, piazza e portici

Carlo Fontana e Alessandro Specchi

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), f. 205

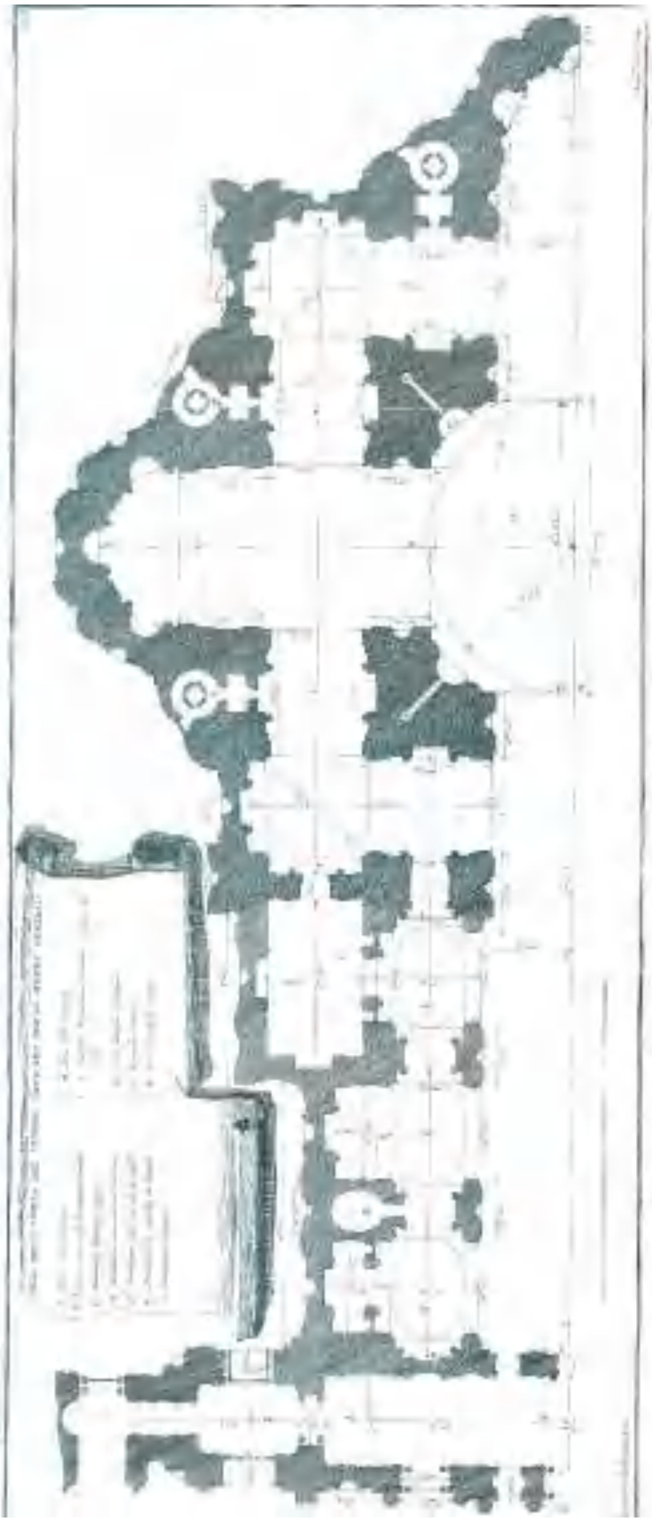


Figure 8.2

Metà della pianta del tempio Vaticano per le misure generali

Carlo Fontana e Alessandro Specchi

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), f. 383

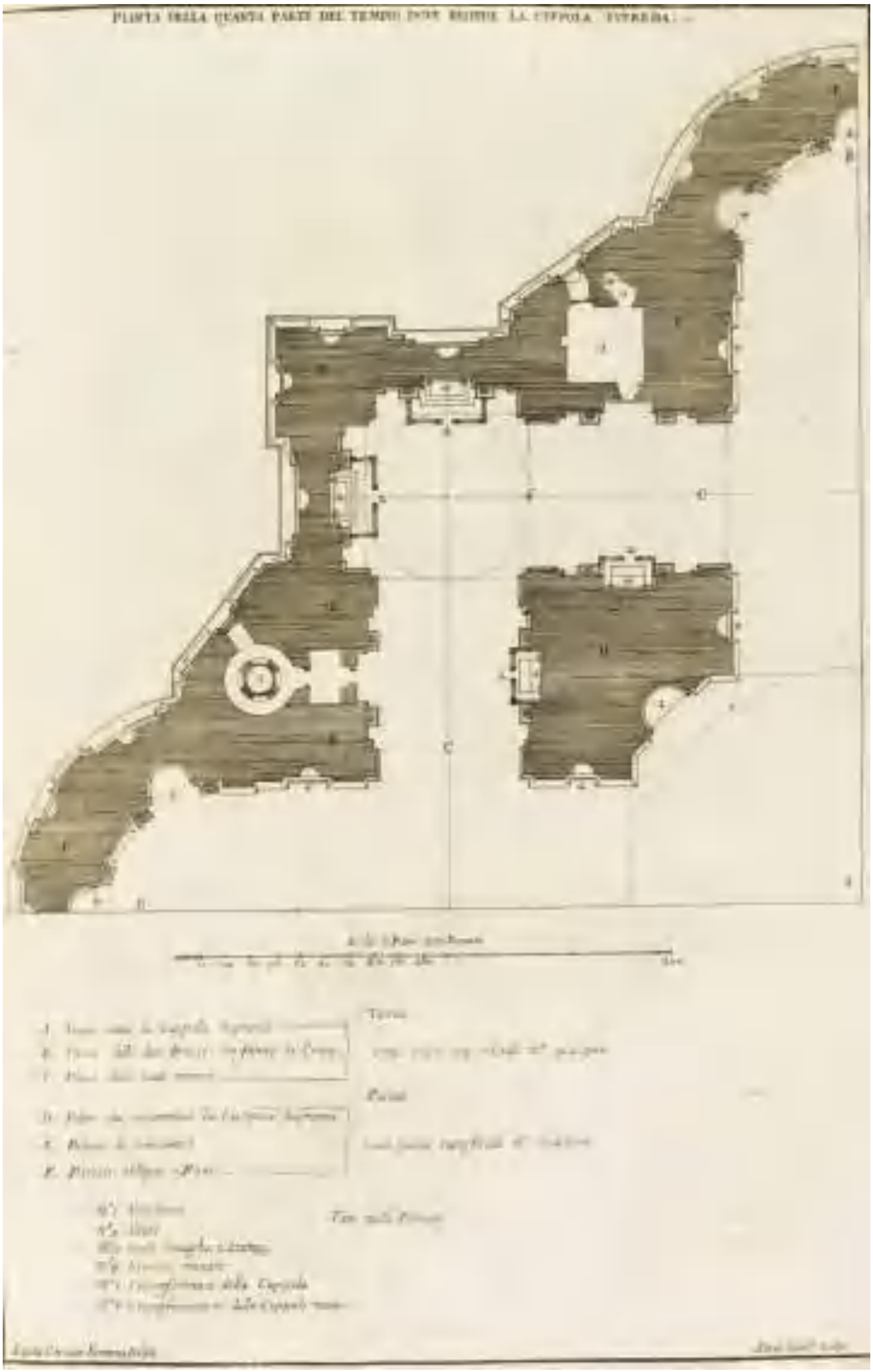


Figure 8.3

Pianta della quarta parte del tempio dove risiede a cupola suprema

Carlo Fontana e Alessandro Specchi

Carlo Fontana. *Il tempio Vaticano e sua origine. Con gli edifice piú cospicui antichi e moderni fatti dentro e fuori di esso.* Rome (1694), f. 243

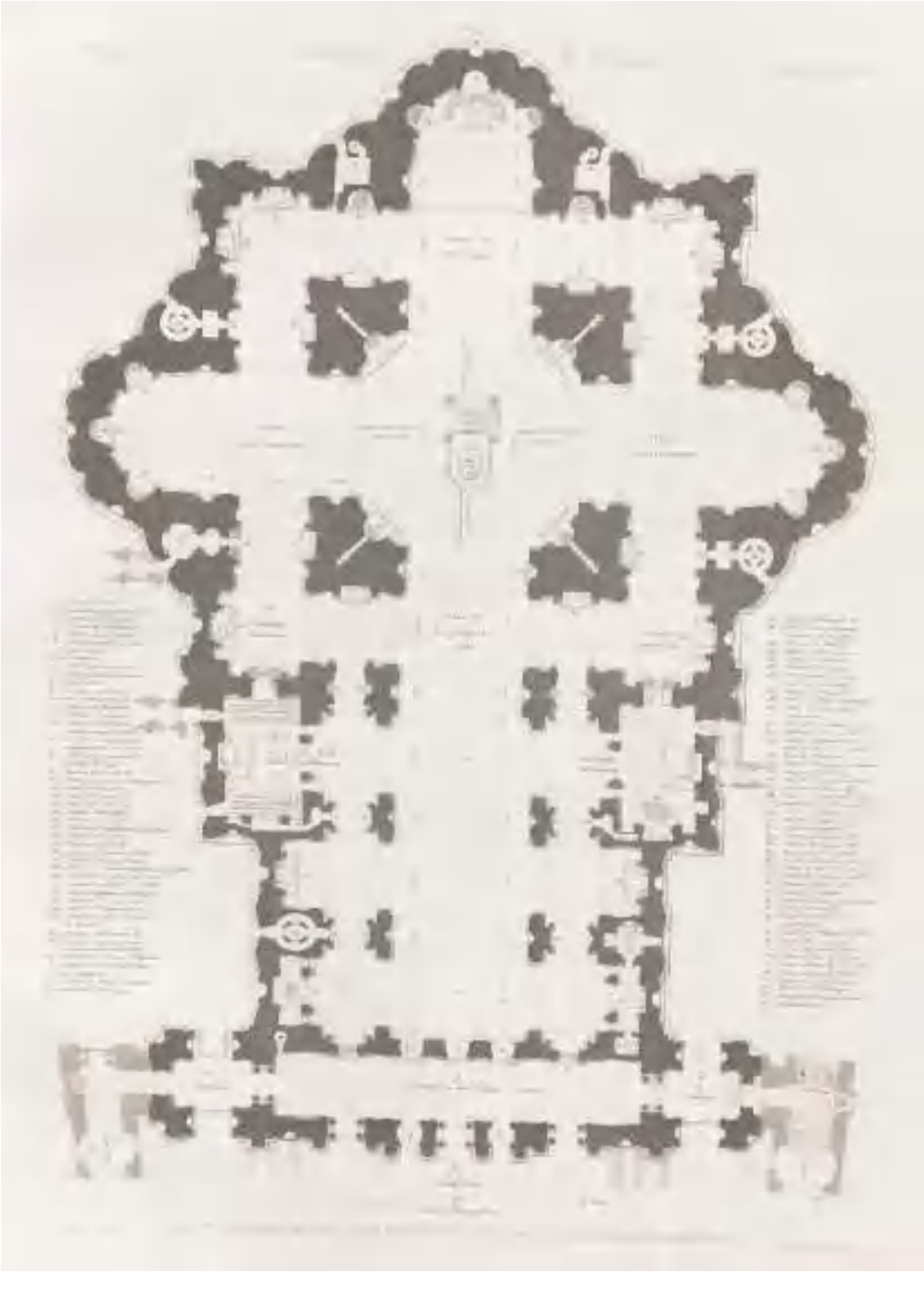


Figure 8.4

Plan de la Basilique de Saint Pierre fondée en MDVI par Jules II et achevée en MDCXII sous Paul V

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Basilique de St. Pierre, PL1

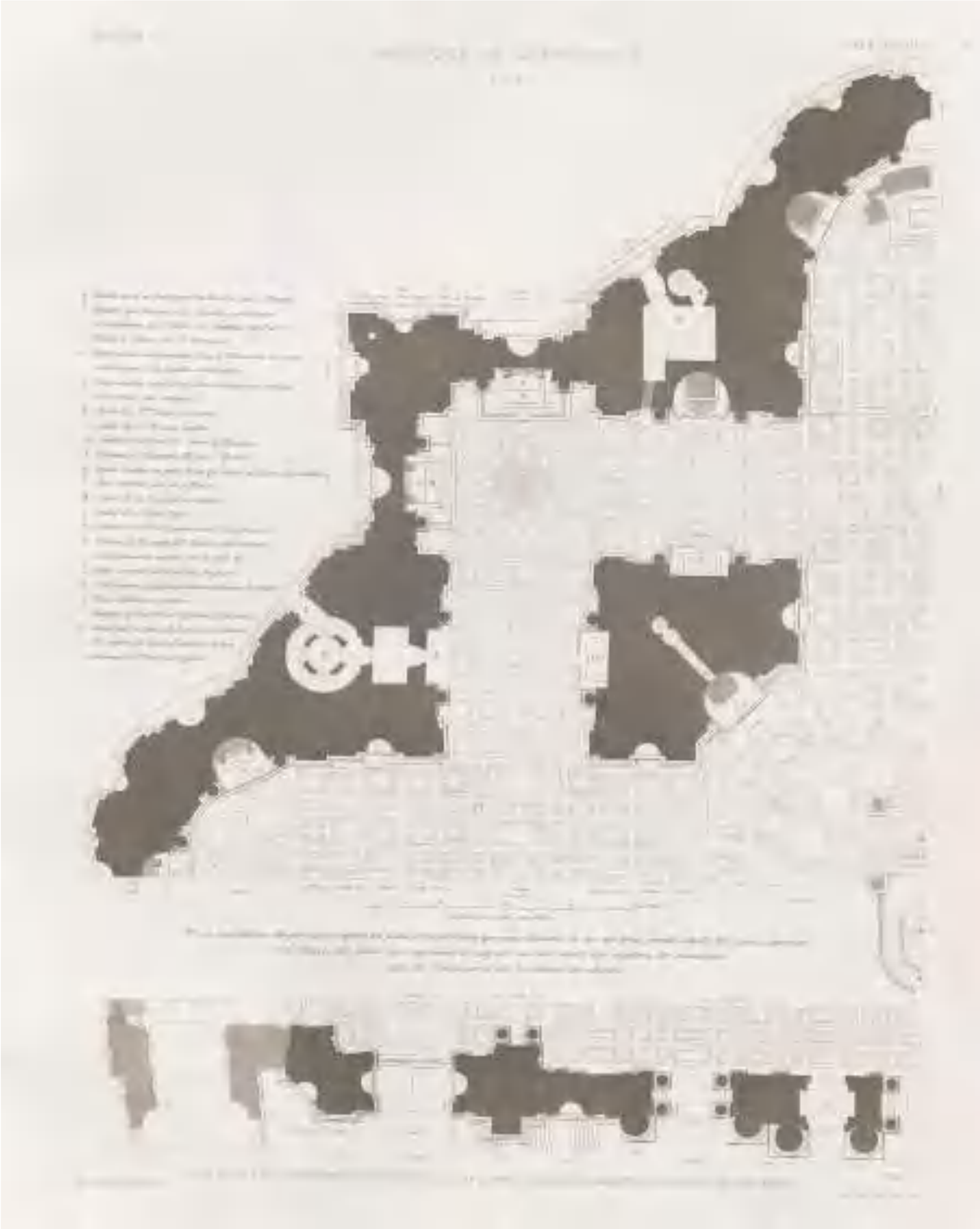


Figure 8.5

Plan détaillé de la façade principale du vestibule et de la partie centrale de l’abside de la Basilique de Saint Pierre

Paul Marie Letarouilly, 1882

Letarouilly, Paul Marie. *Le Vatican et la basilique de Saint-Pierre de Rome*, vol.1, Paris (1882). Cap. Basilique de St. Pierre, PL2

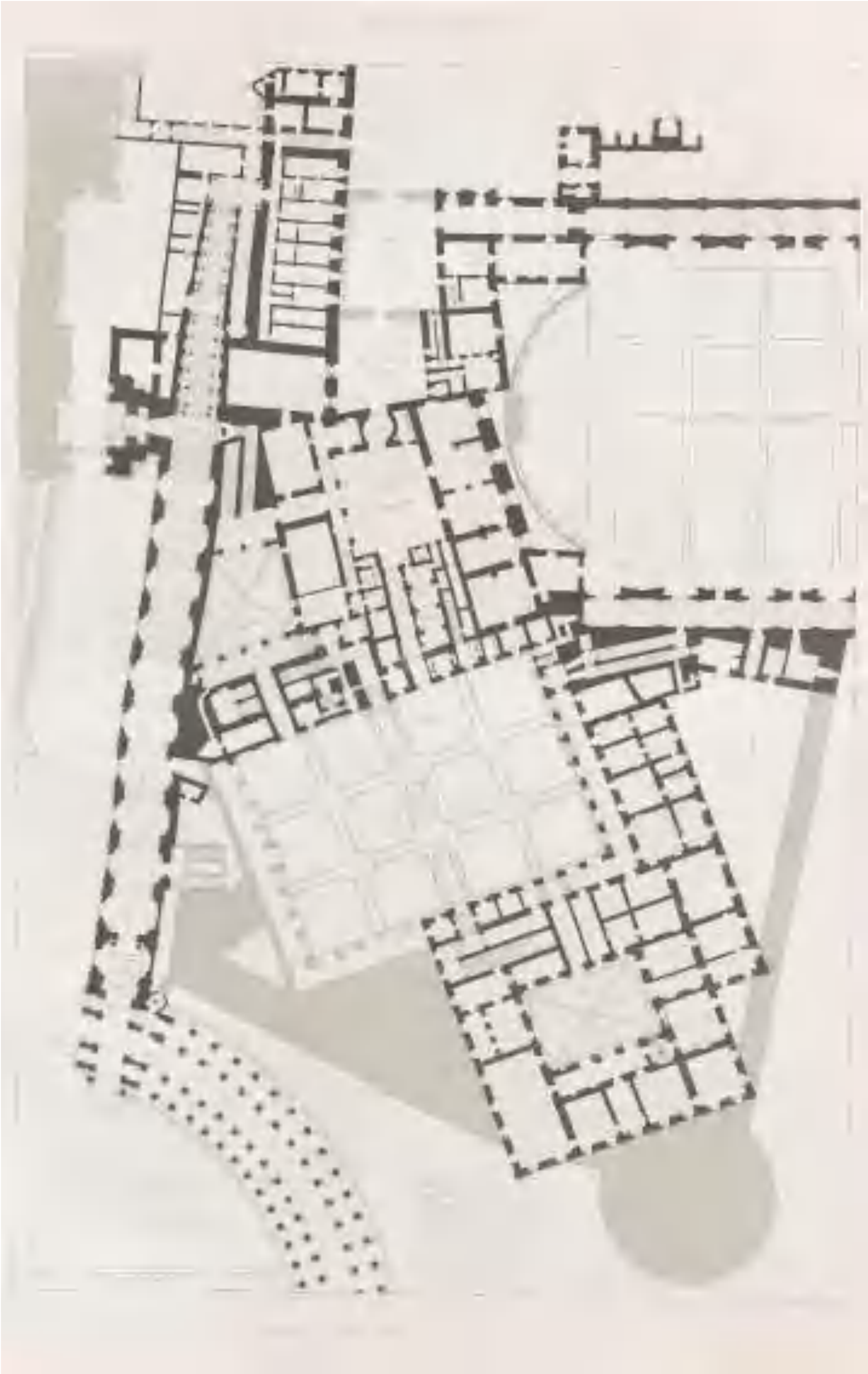


Figure 8.6

Detail du plan du rez-de-chaussée du palais pontifical

Paul Marie Letarouilly, 1882

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Cap. Ensemble des Batiments, PL4

Figure 8.7

Detail du plan du 1er étage du palais pontifical

Paul Marie Letarouilly, 1882

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Cap. Ensemble des Batiments, PL6

Figure 8.8

Detail du plan du 2e étage du palais pontifical

Paul Marie Letarouilly, 1882

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Cap. Ensemble des Batiments, PL8

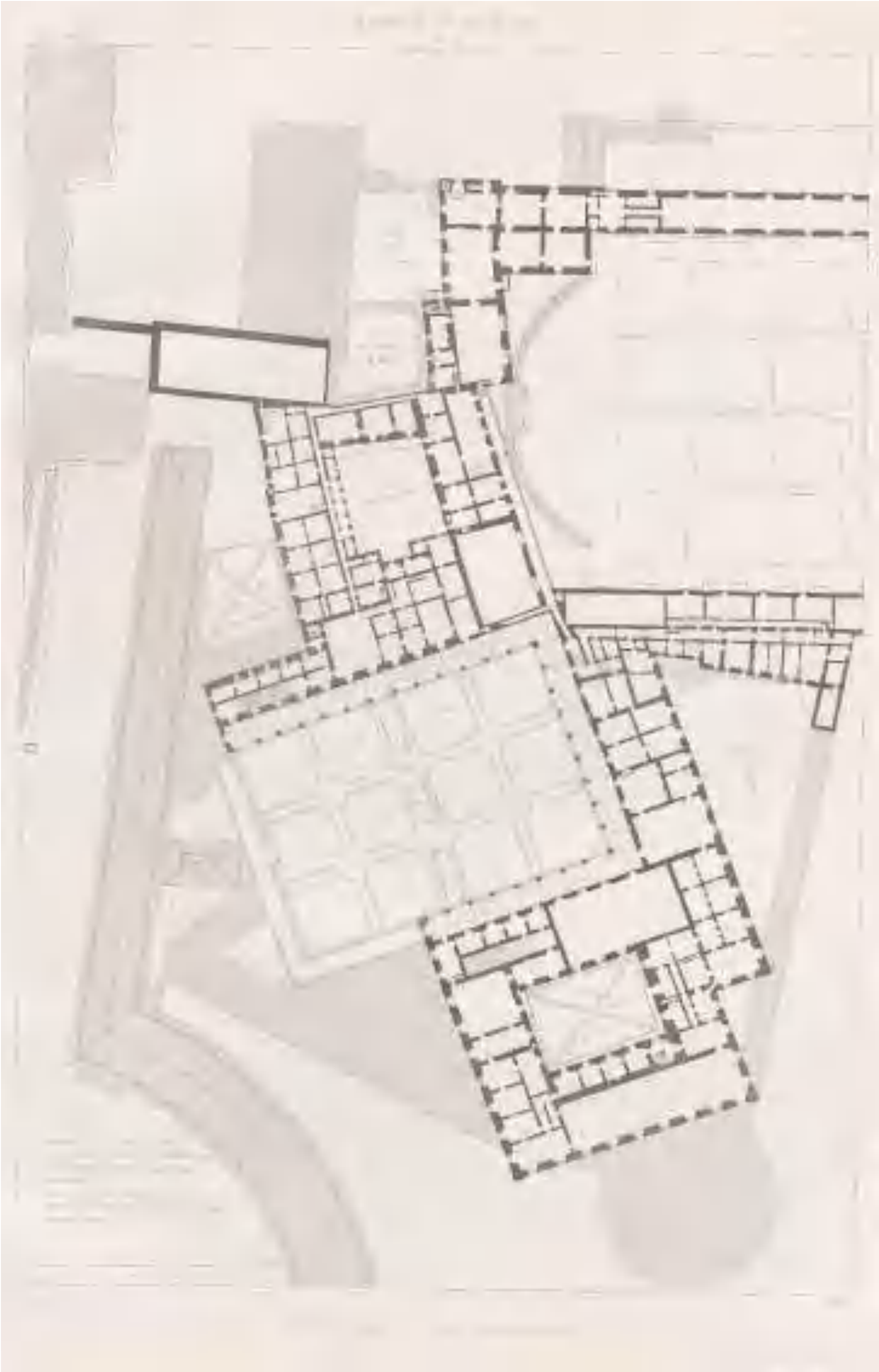


Figure 8.9

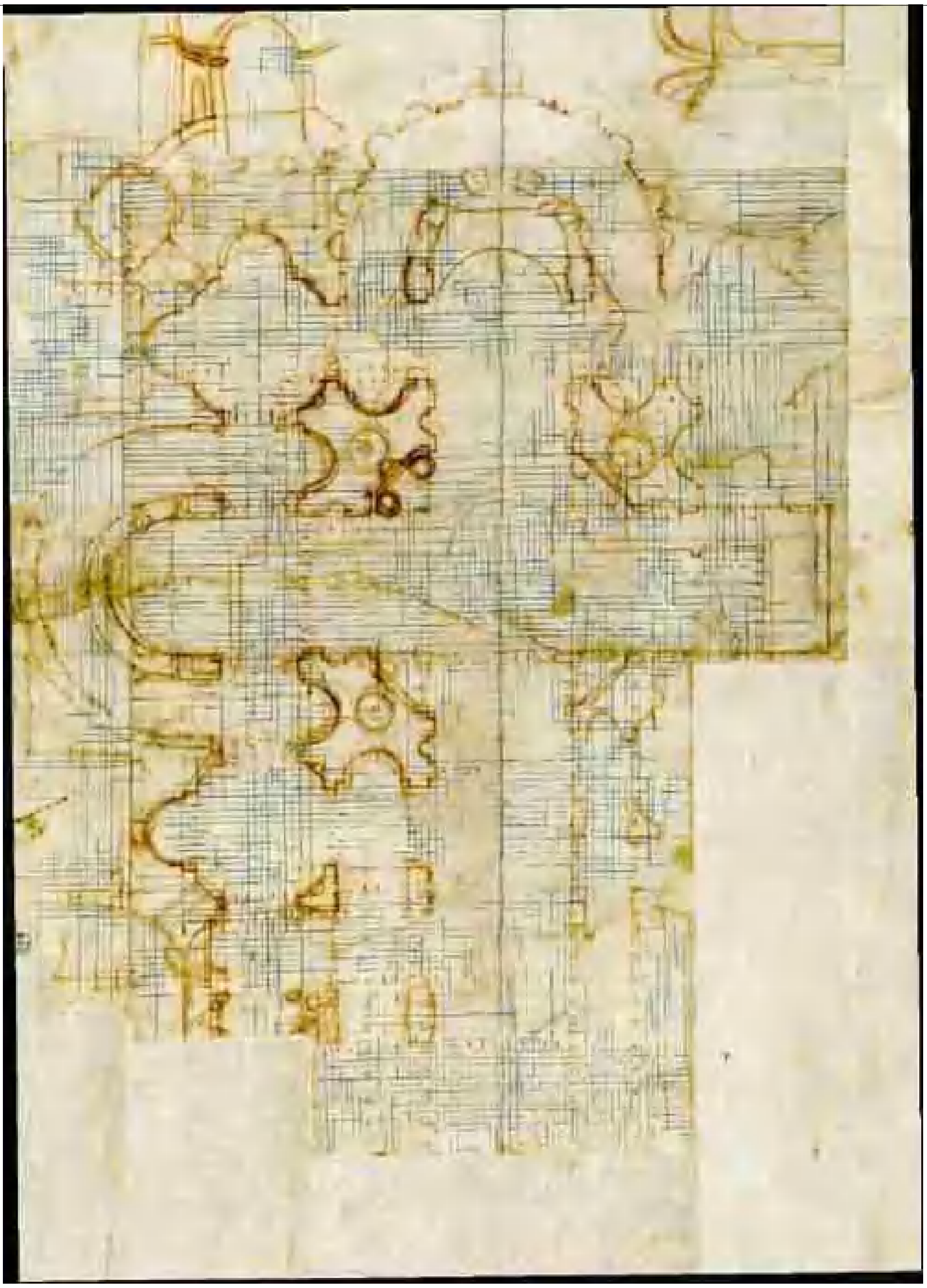
Detail du plan du 3e étage du palais pontifical

Paul Marie Letarouilly, 1882

Paul Marie Letarouilly. *Le Vatican et la basilique de Saint-Pierre de Rome,* vol.1. Paris (1882). Cap. Ensemble des Batiments, PL10

LAYOUTS 8

RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF NICHOLAS V PROJECT



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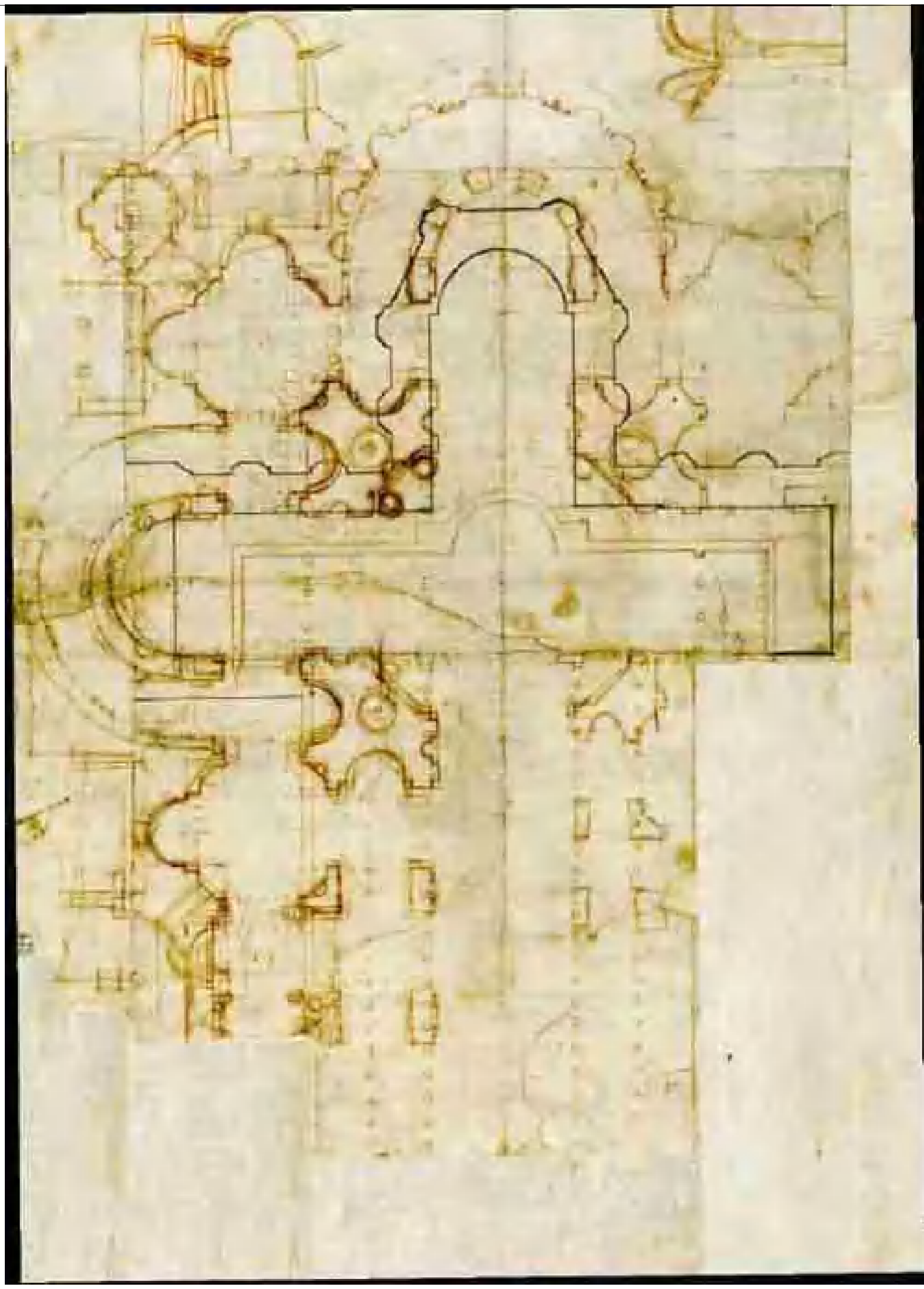
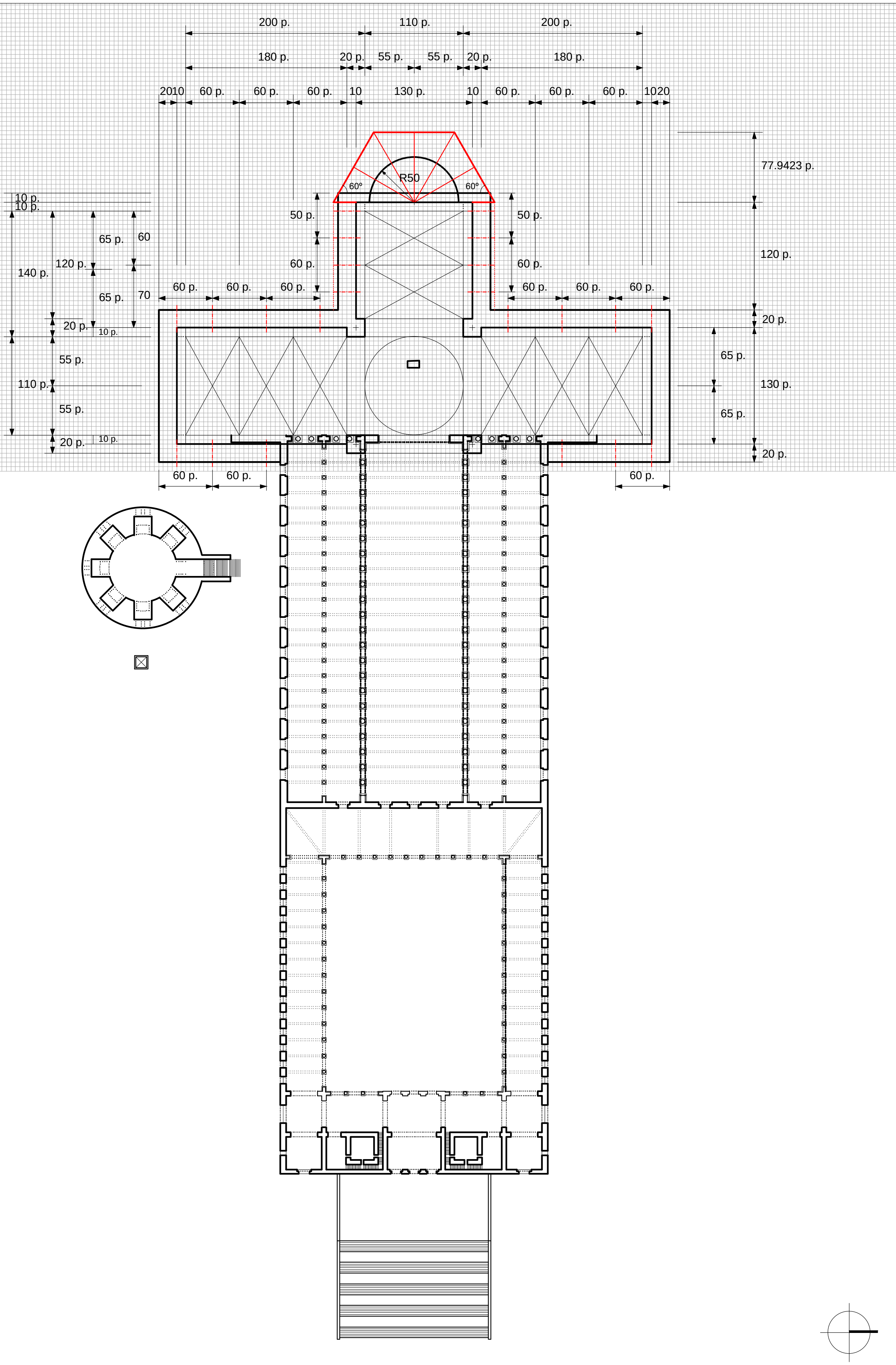
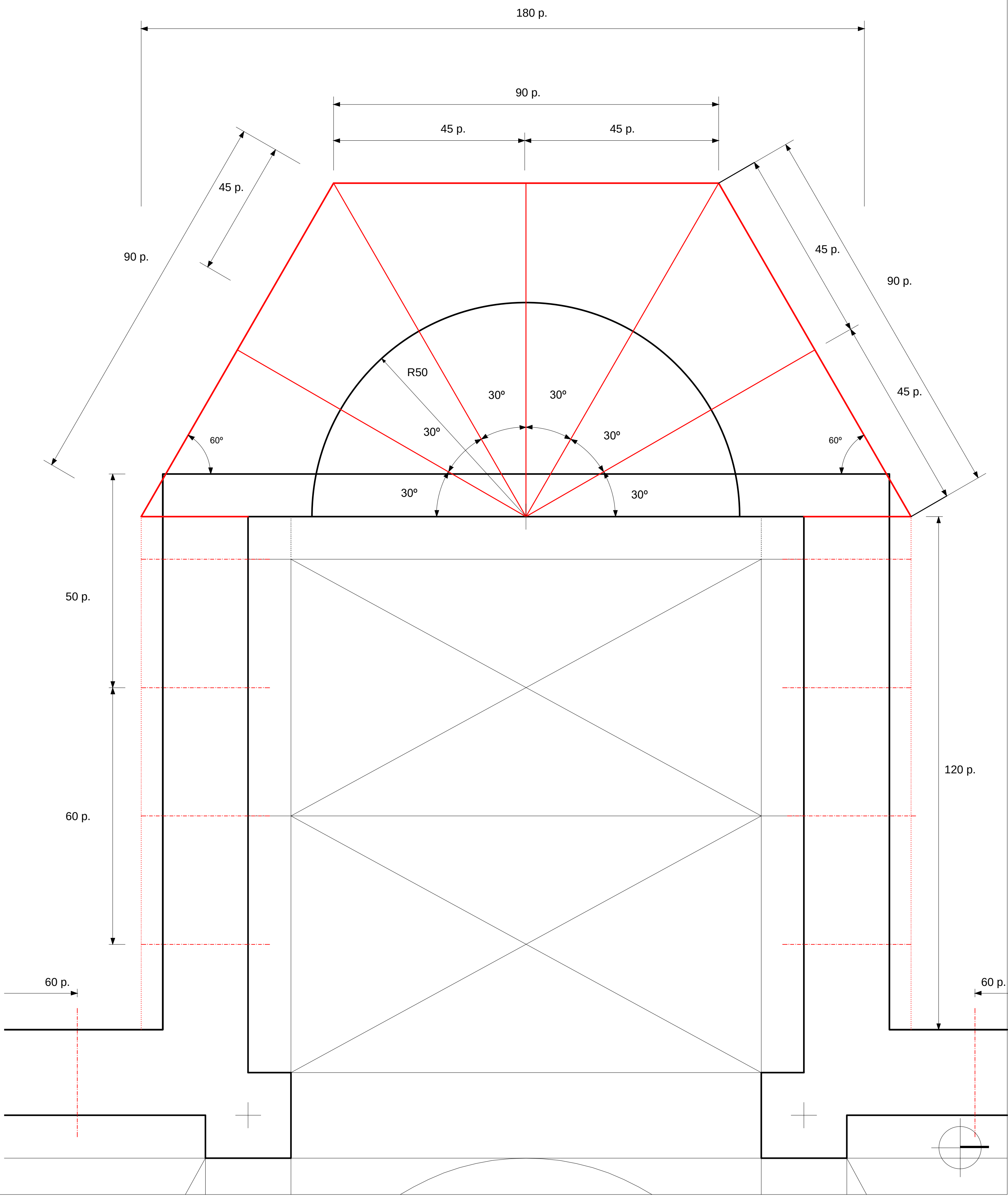


HIGHLIGHTING THE PERIMETER OF THE WALL AND OF THE FOUNDATION



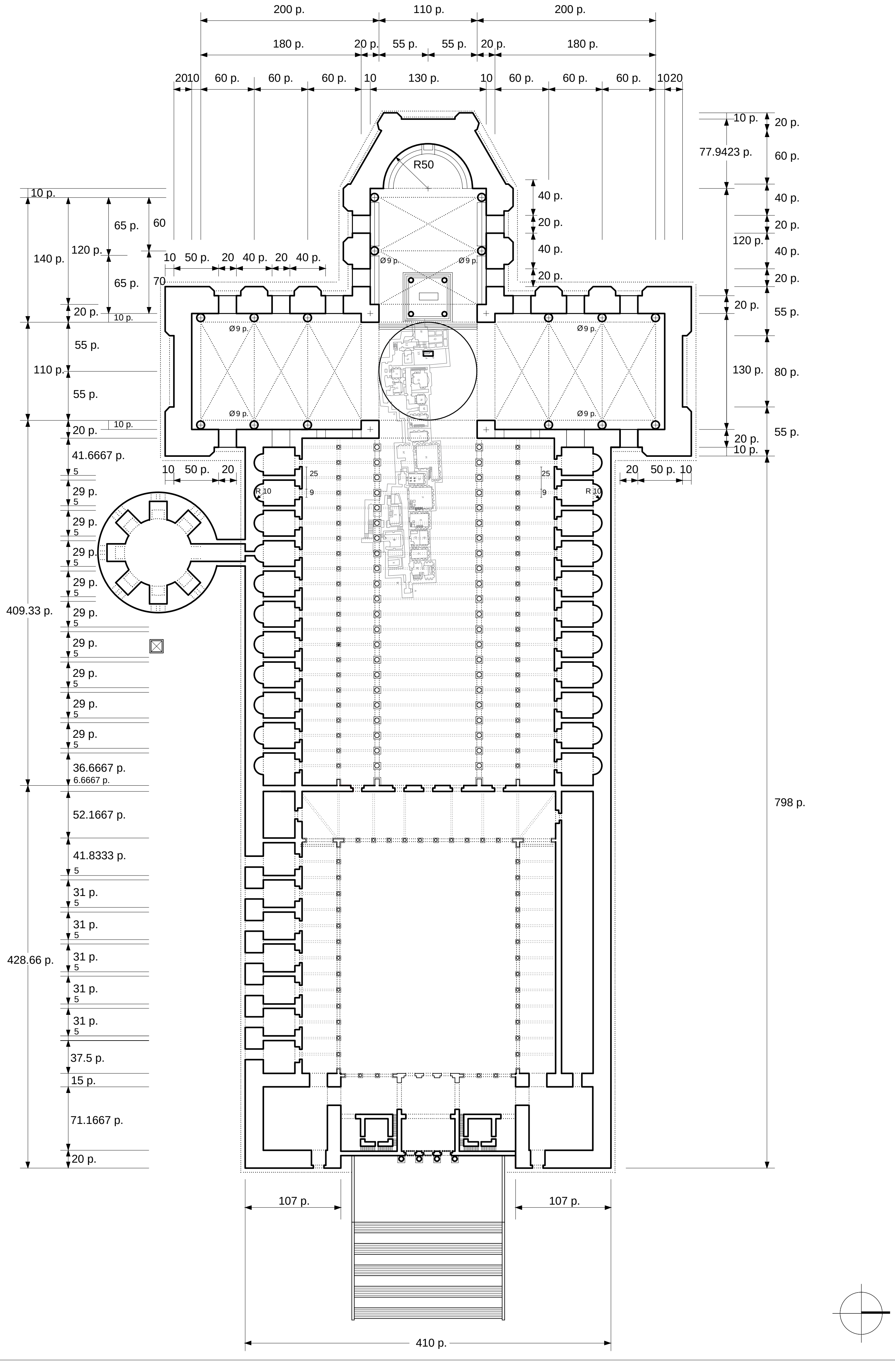
RESEARCH AND DRAWING LUIS DE GARRIDO

1450	RECONSTRUCTION OF NICHOLAS V PROJECT (I)	NVP	3



RESEARCH AND DRAWING LUIS DE GARRIDO

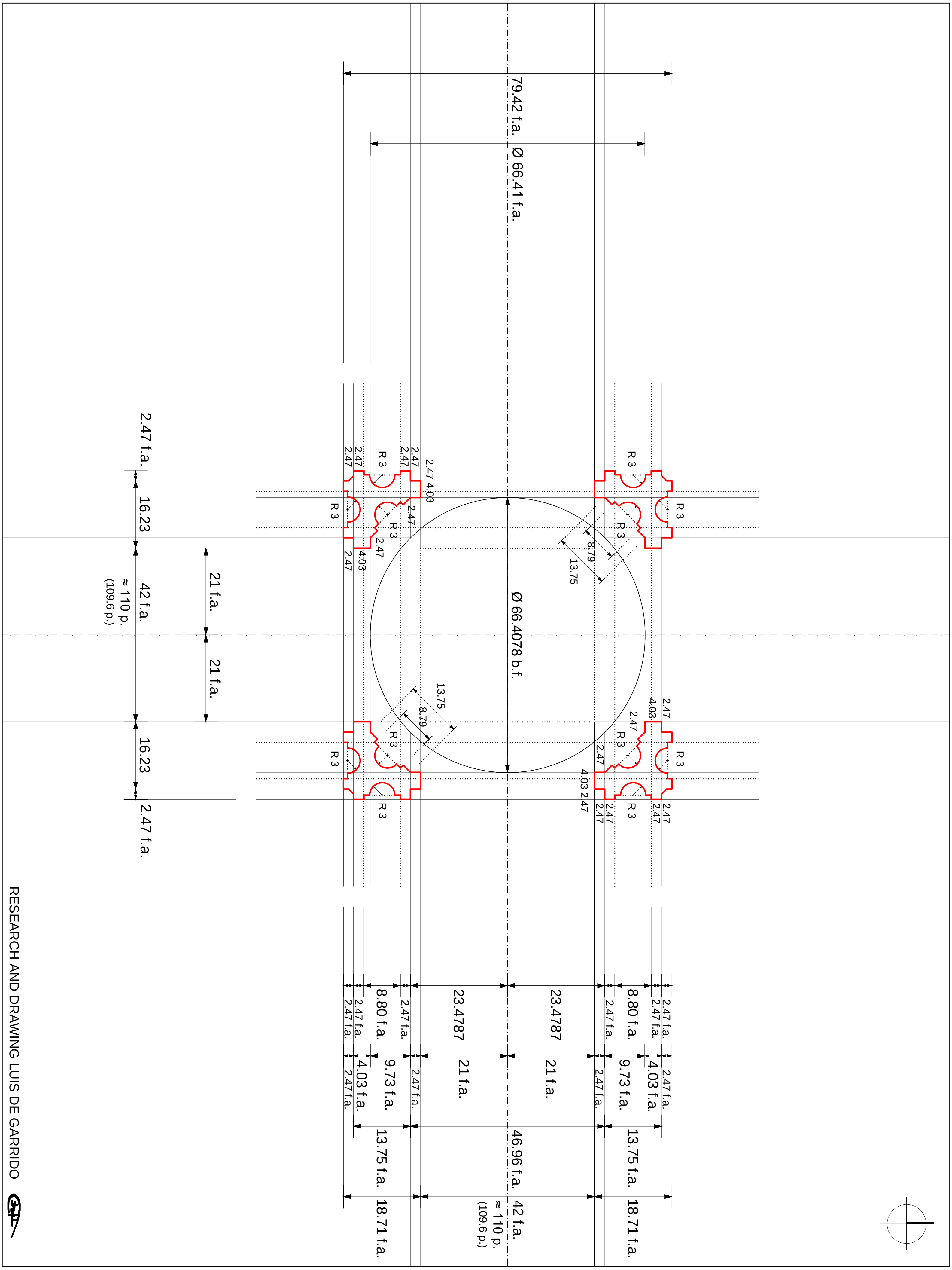
1450	ESTABLISHING THE APSE OF THE MAIN ARM (I) (DETAIL)	NVP	4



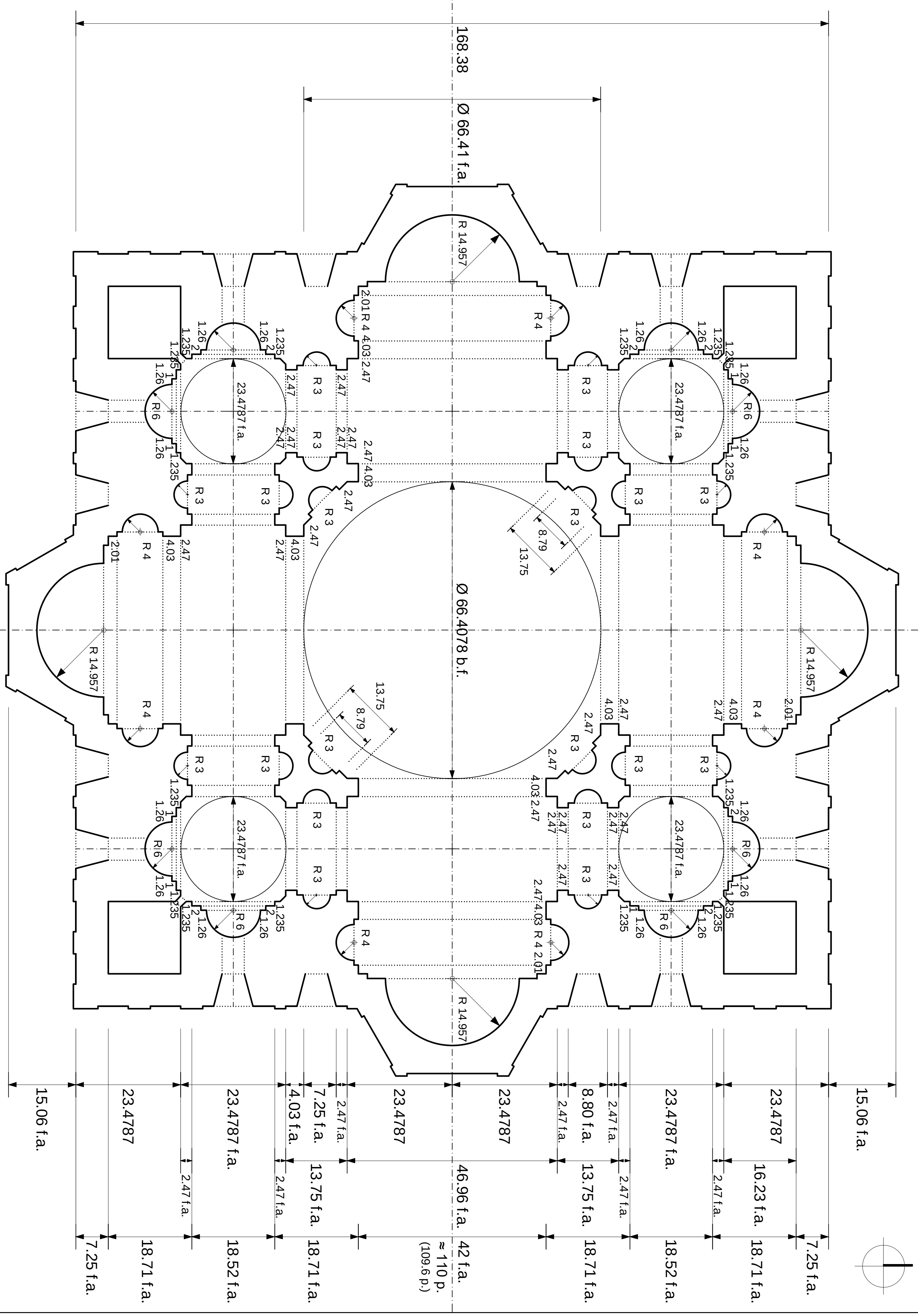
RESEARCH AND DRAWING LUIS DE GARRIDO

1450	RECONSTRUCTION OF NICHOLAS V PROJECT (II)	NVP	5

RECONSTRUCTION OF GDSU 3 Ar

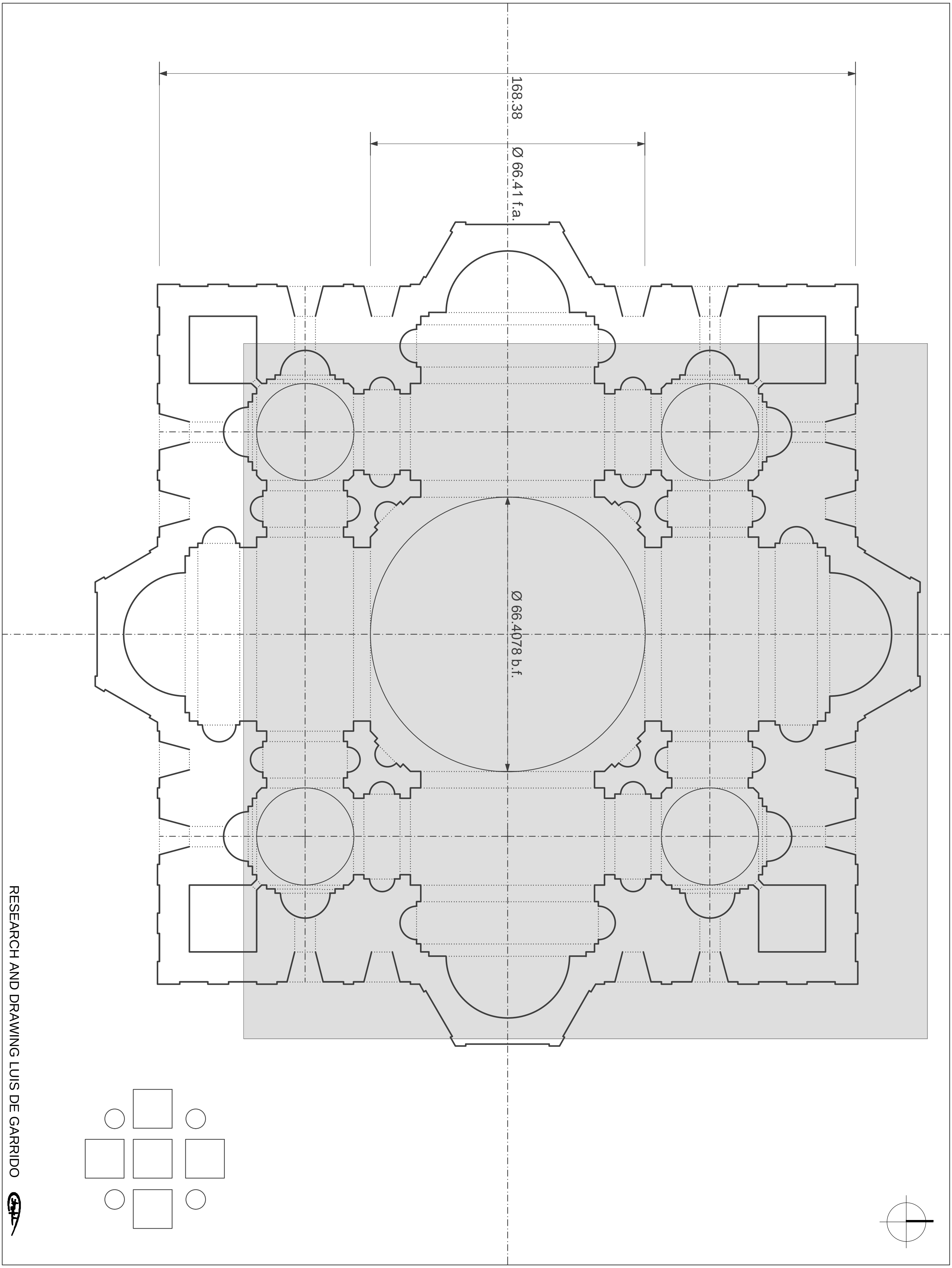


1505	COMPLETE DETERMINATION OF THE CROSSING PIERS	GDSU 3 Ar	1



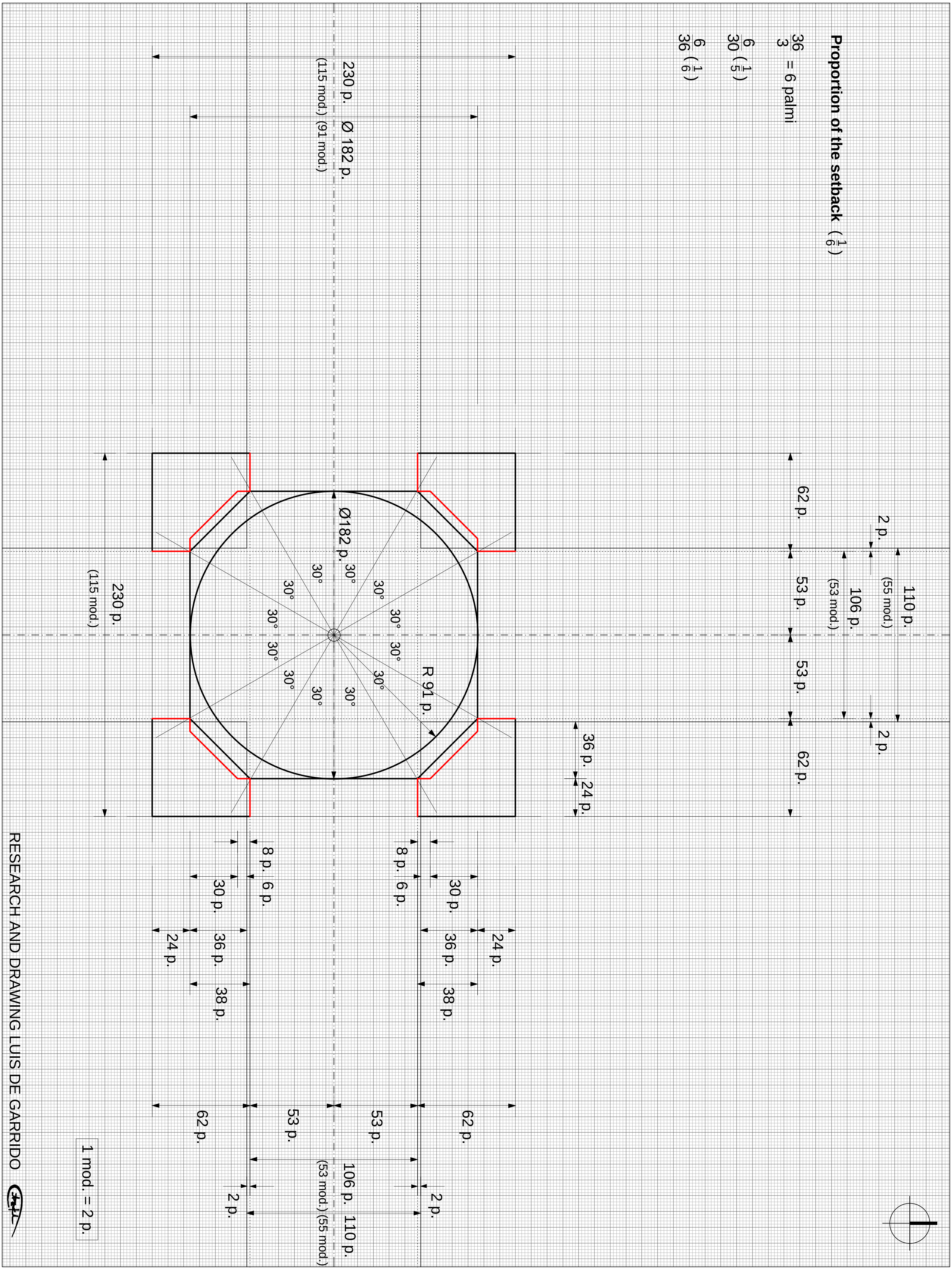
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	RECONSTRUCTED PROJECT GDSU 3 Ar	GDSU 3 Ar	2

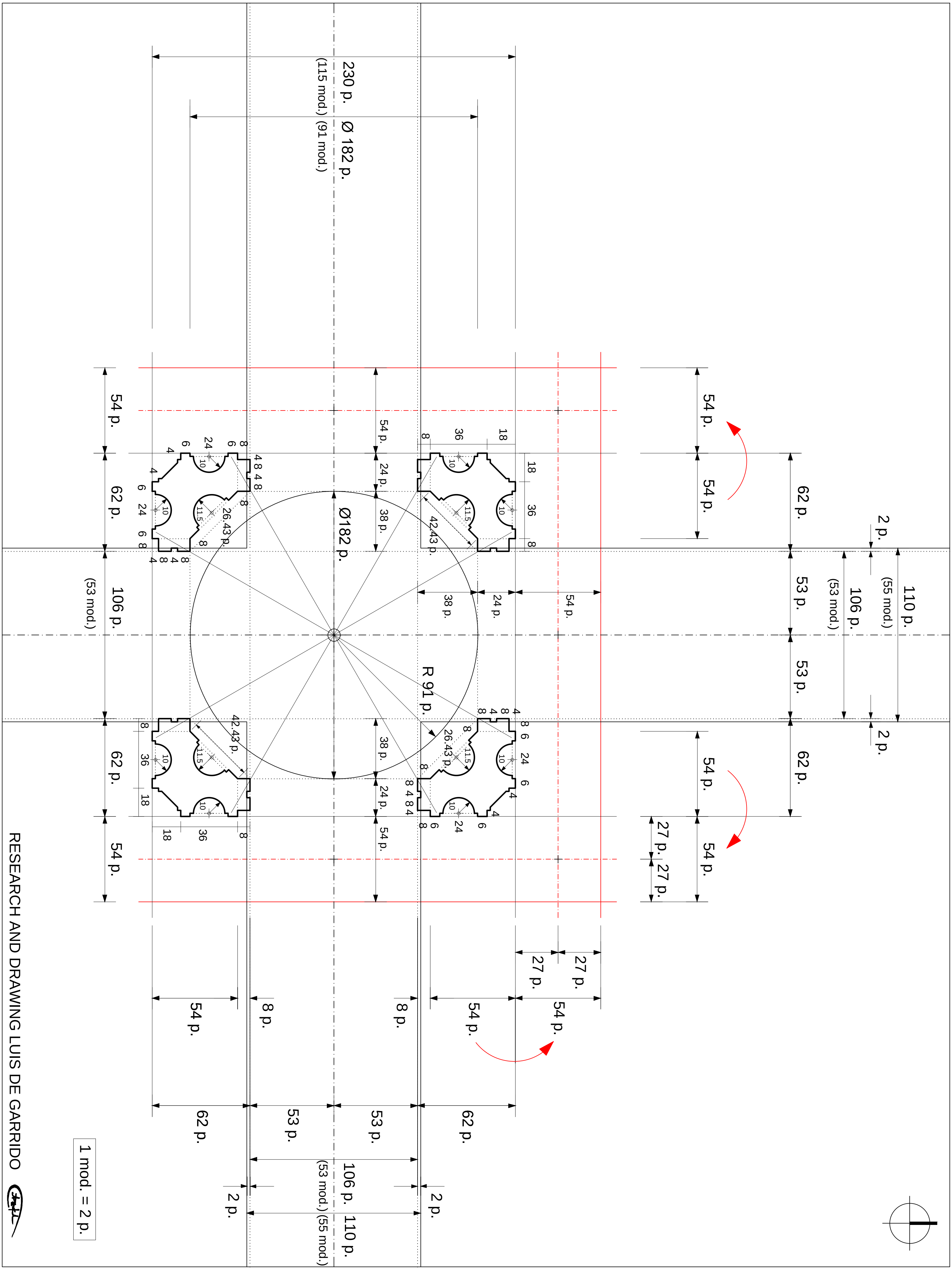


1505	RECONSTRUCTED PROJECT OVERLAY WITH GDSU 3 Ar	GDSU 3 Ar	3

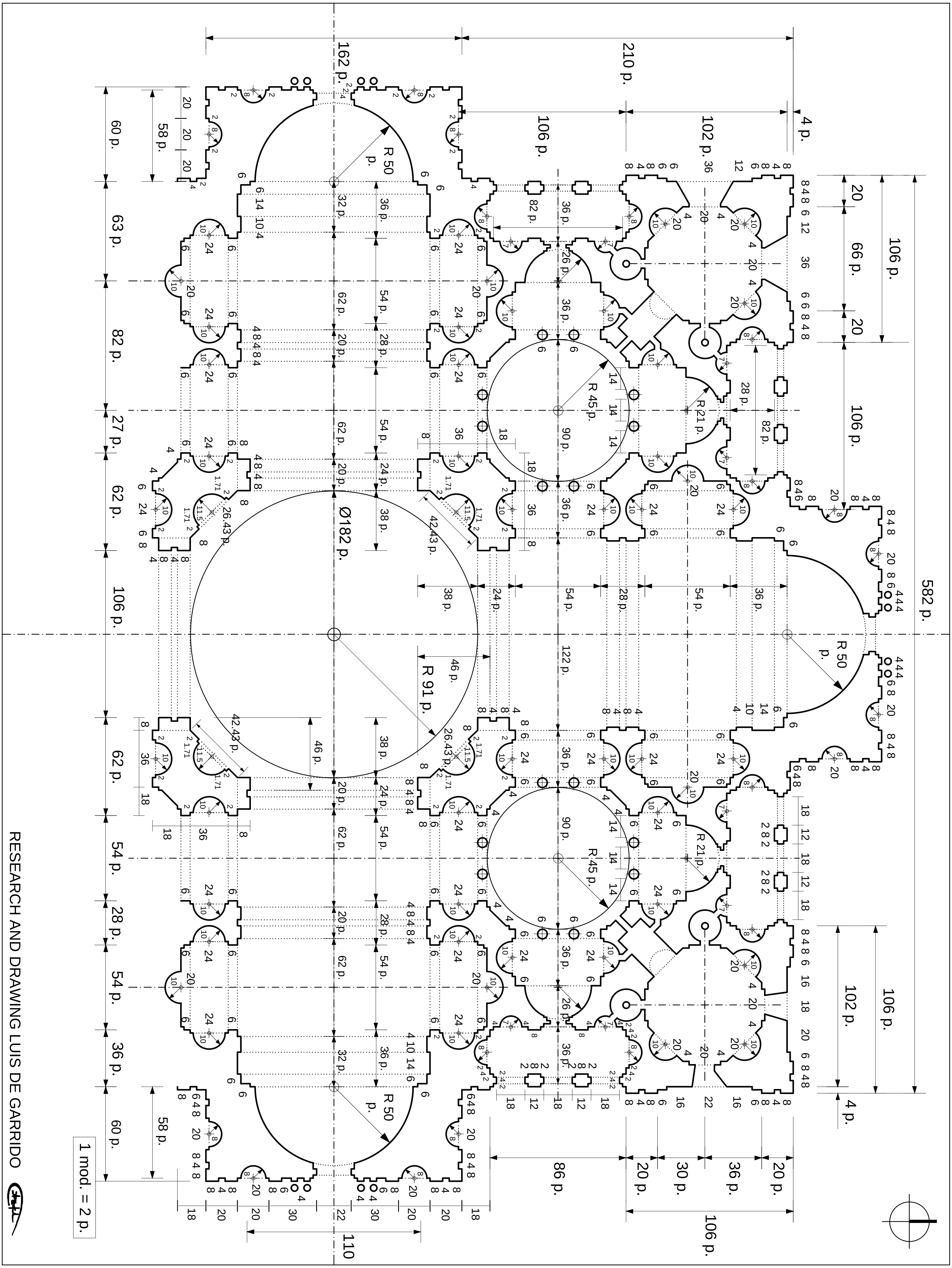
RECONSTRUCTION OF GDSU 1 A
DESIGN ALTERNATIVES

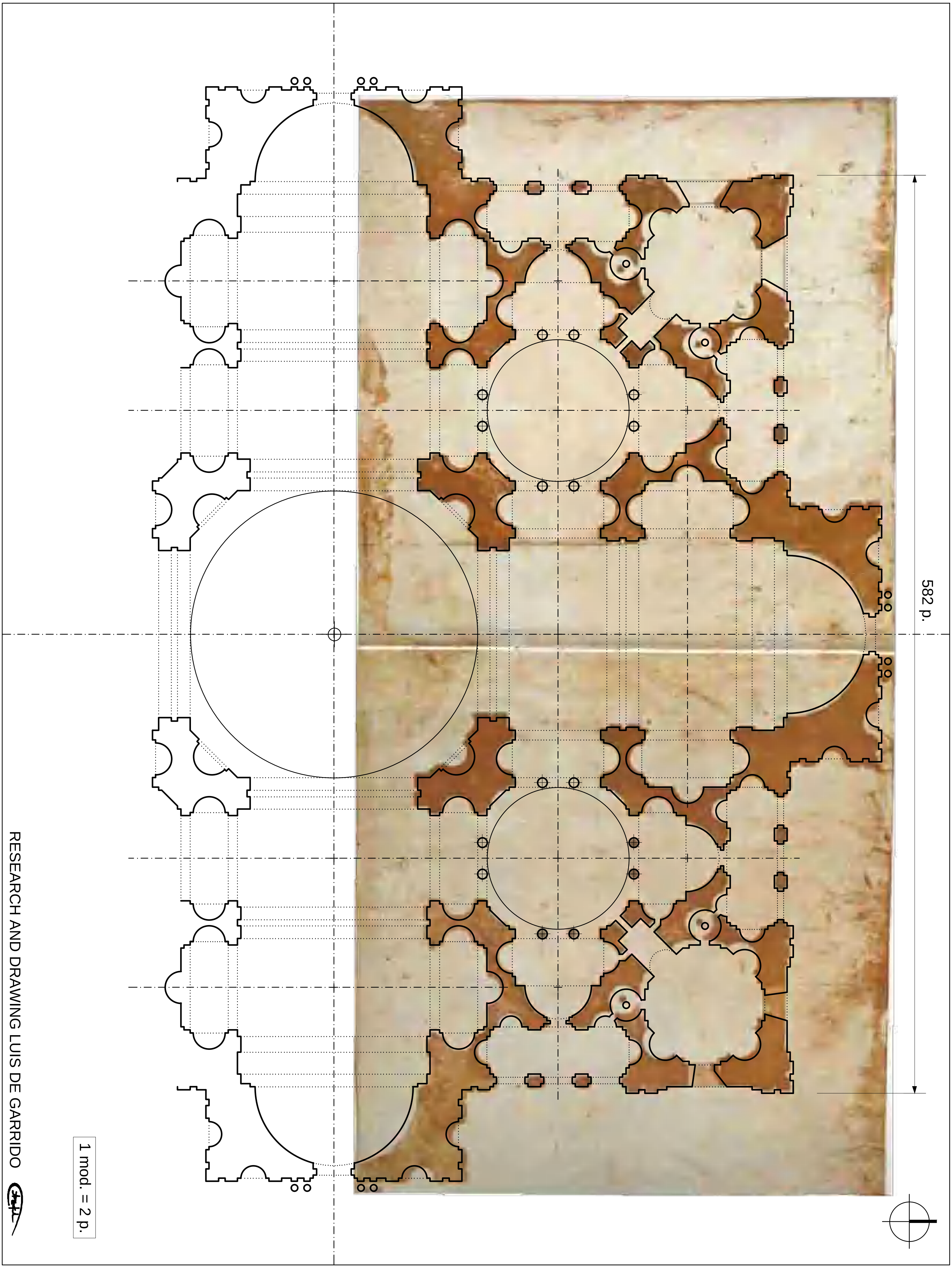


1505	ESTABLISHING THE CONTOUR OF THE CROSSING PIERS	GDSU 1 A	1

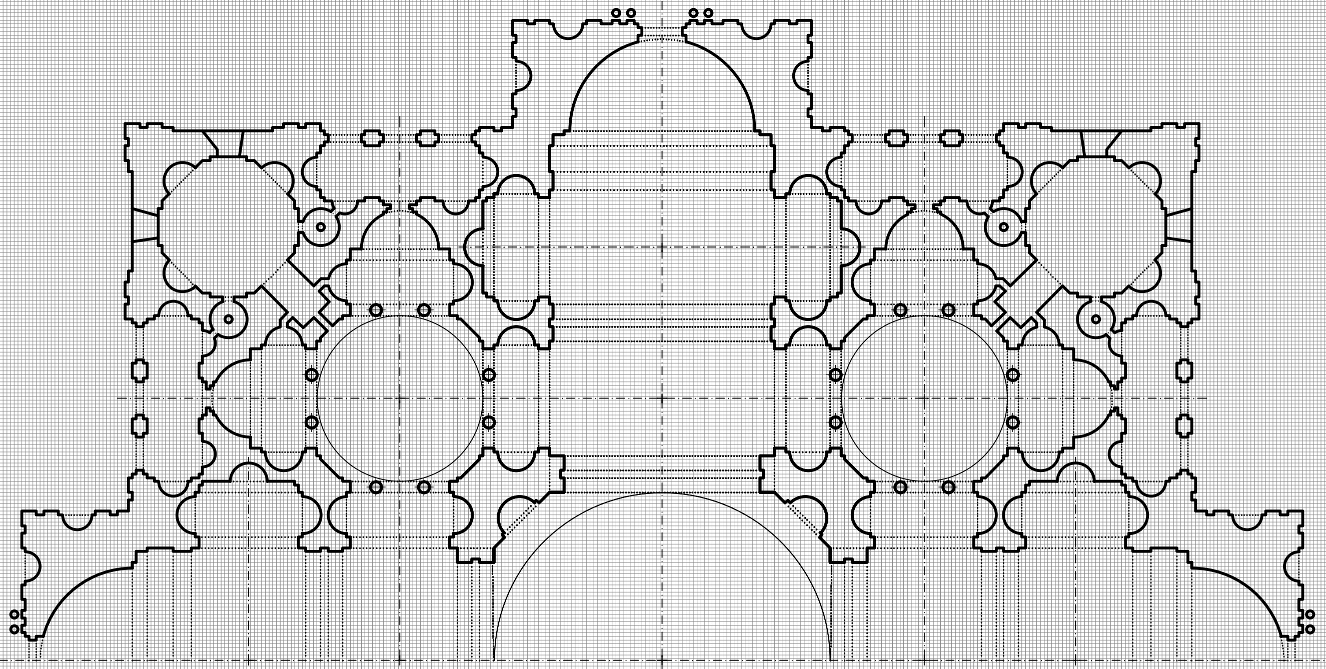


1505	ESTABLISHING THE SEPARATION OF COUNTER-PIERS - 54 p.	GDSU 1 A	2


RESEARCH AND DRAWING LUIS DE GARRIDO
1 mod. = 2 p.

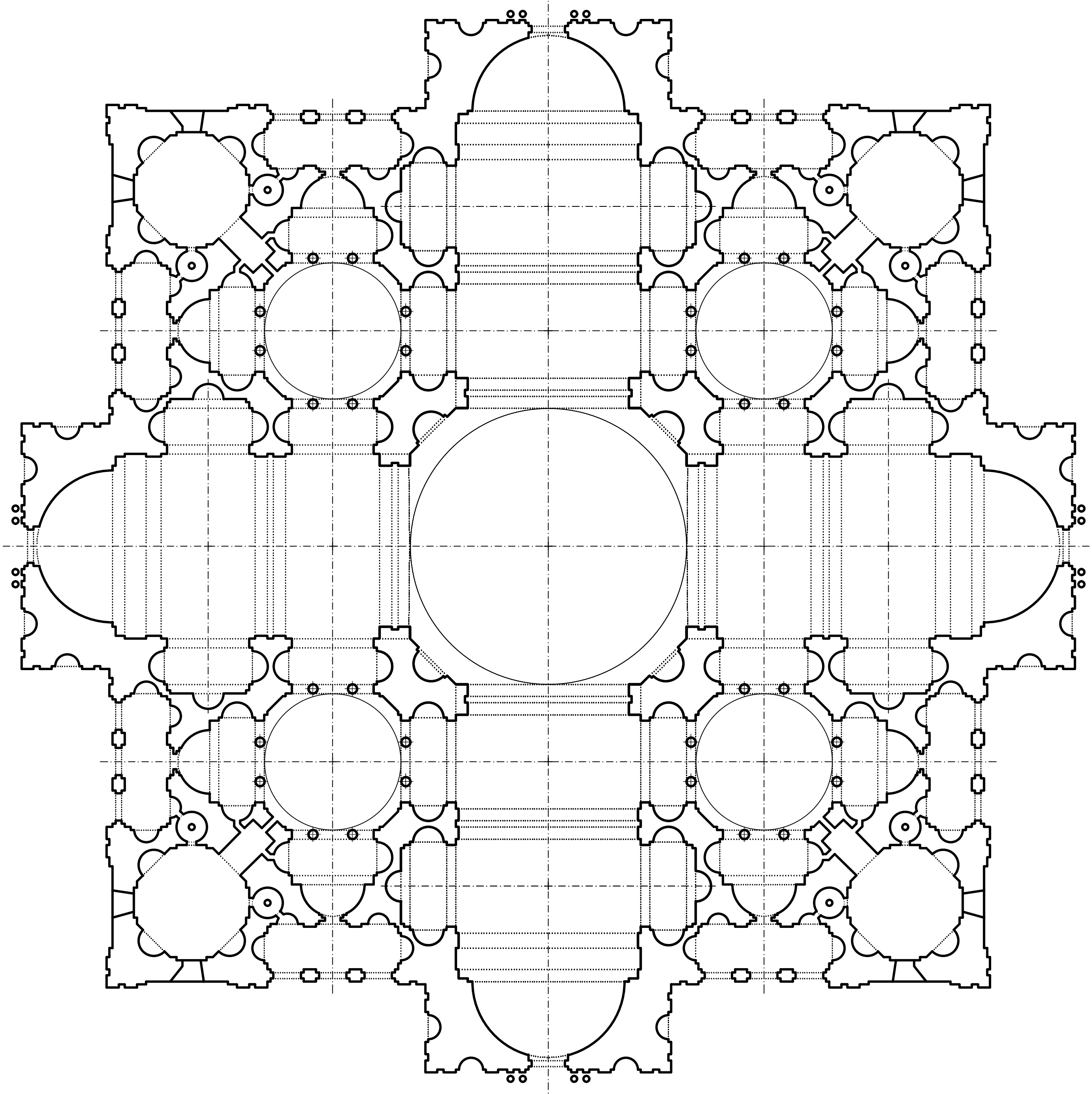


1505	RECONSTRUCTED PROJECT OVERLAY WITH GDSU 1 A	GDSU 1 A	4



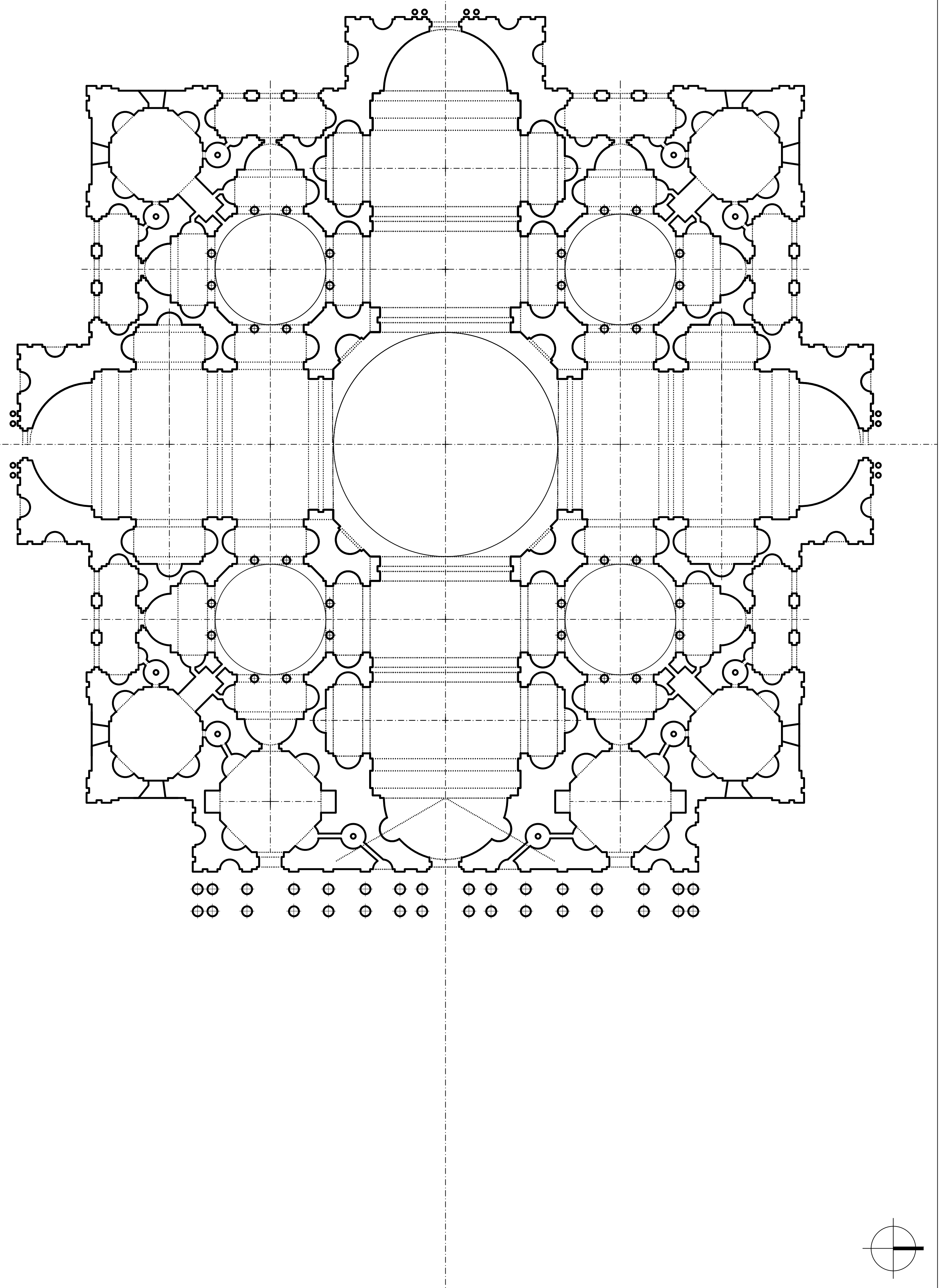
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	GDSU 1 A, QUINCUNX TYPOLOGY	GDSU 1 A	Q 1



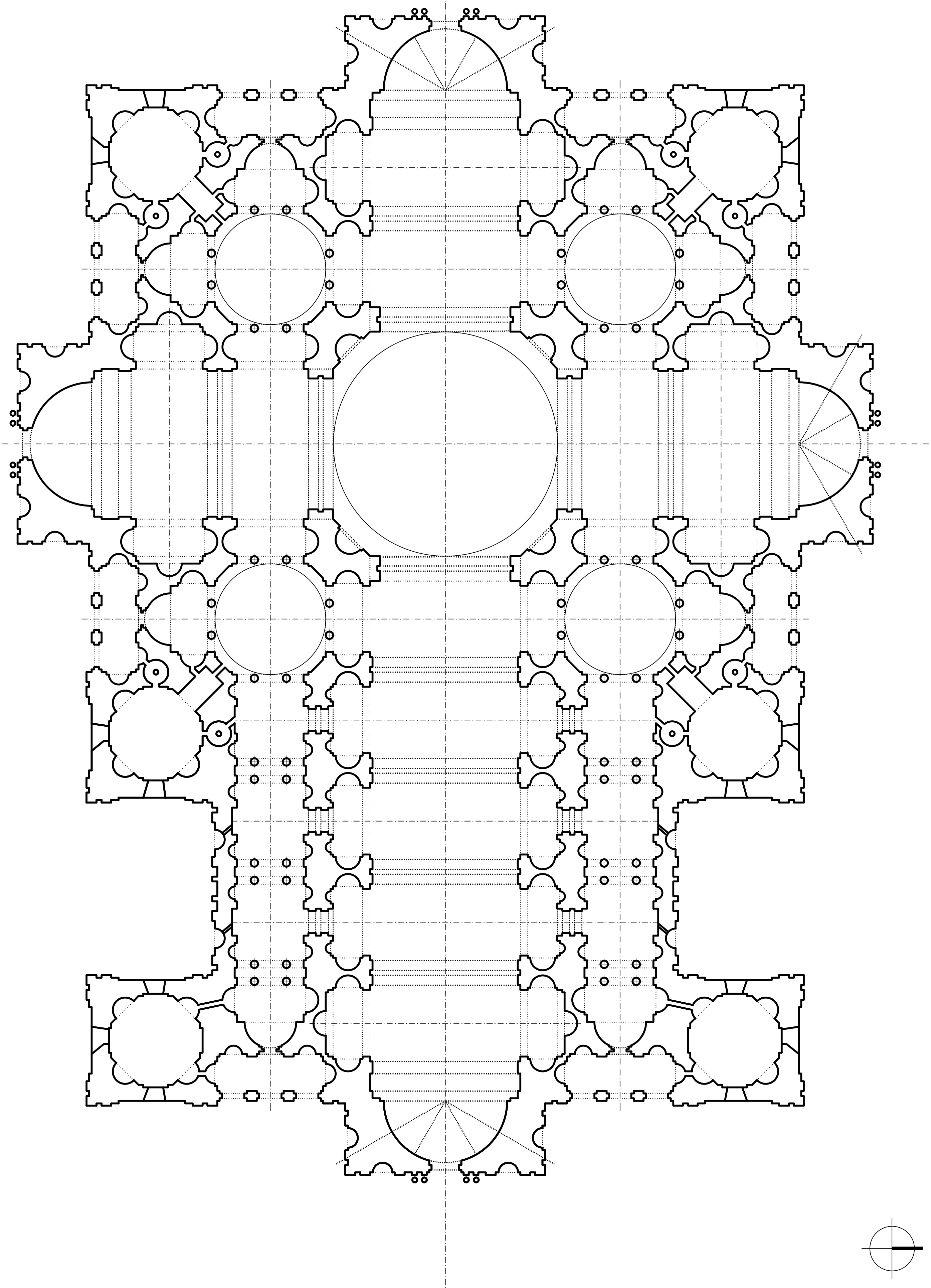
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	GDSU 1 A, CENTRALIZED PLAN	GDSU 1 A	Q 2



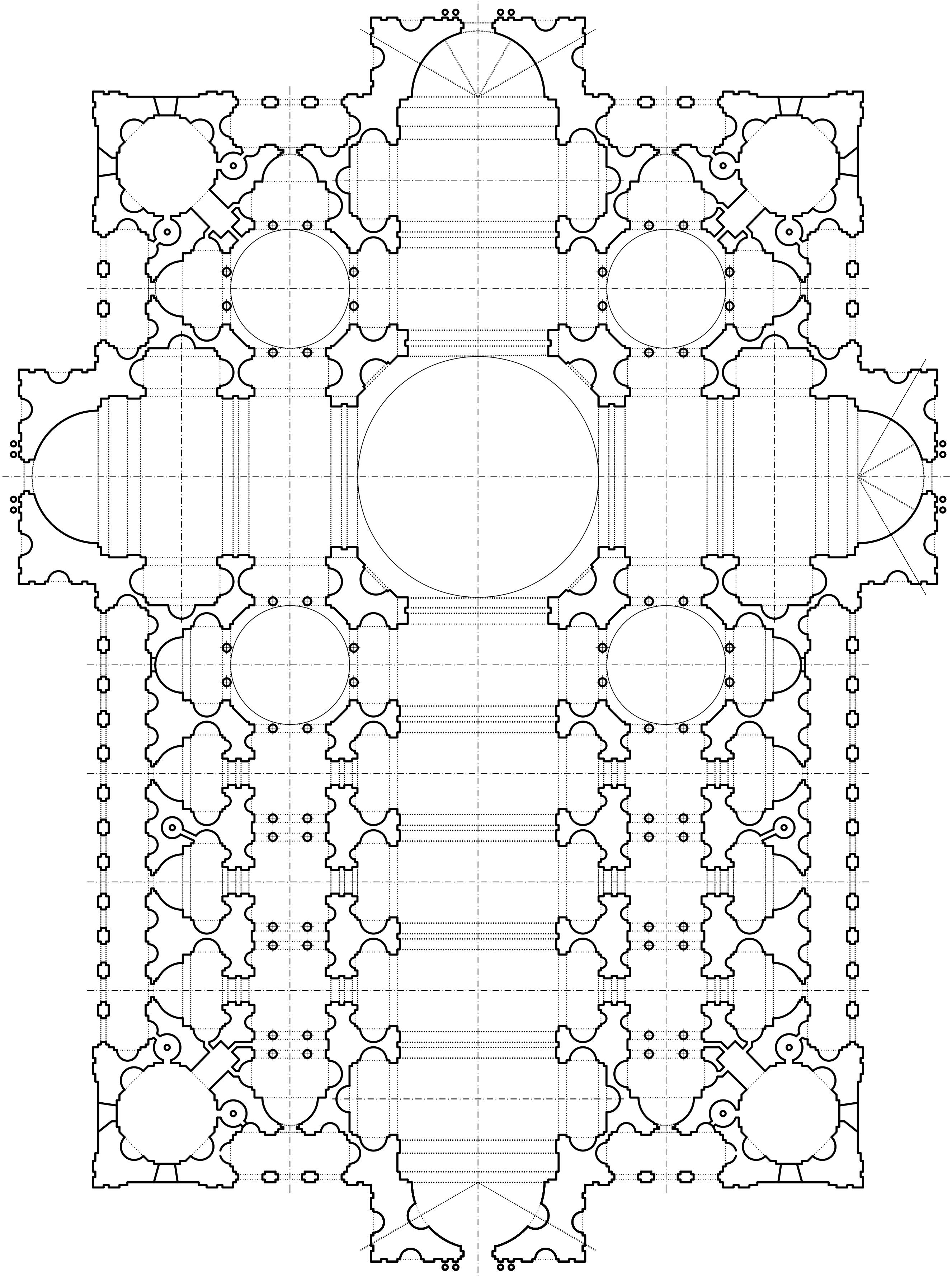
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	GDSU 1 A, CENTRALIZED PLAN WITH PORTICO	GDSU 1 A	Q 3



RESEARCH AND DRAWING LUIS DE GARRIDO

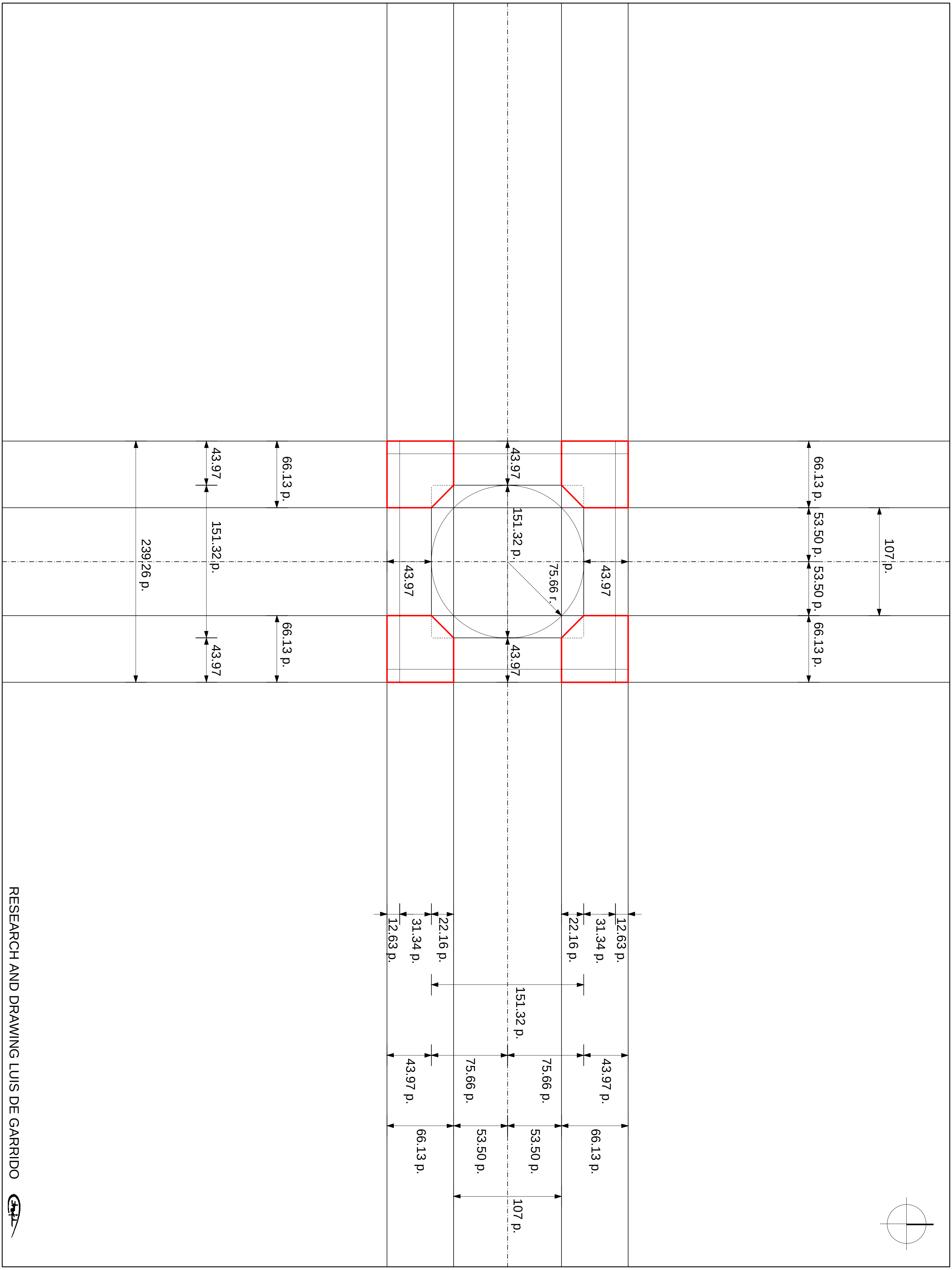
1505	GDSU 1 A, LONGITUDINAL PLAN	GDSU 1 A	N 1



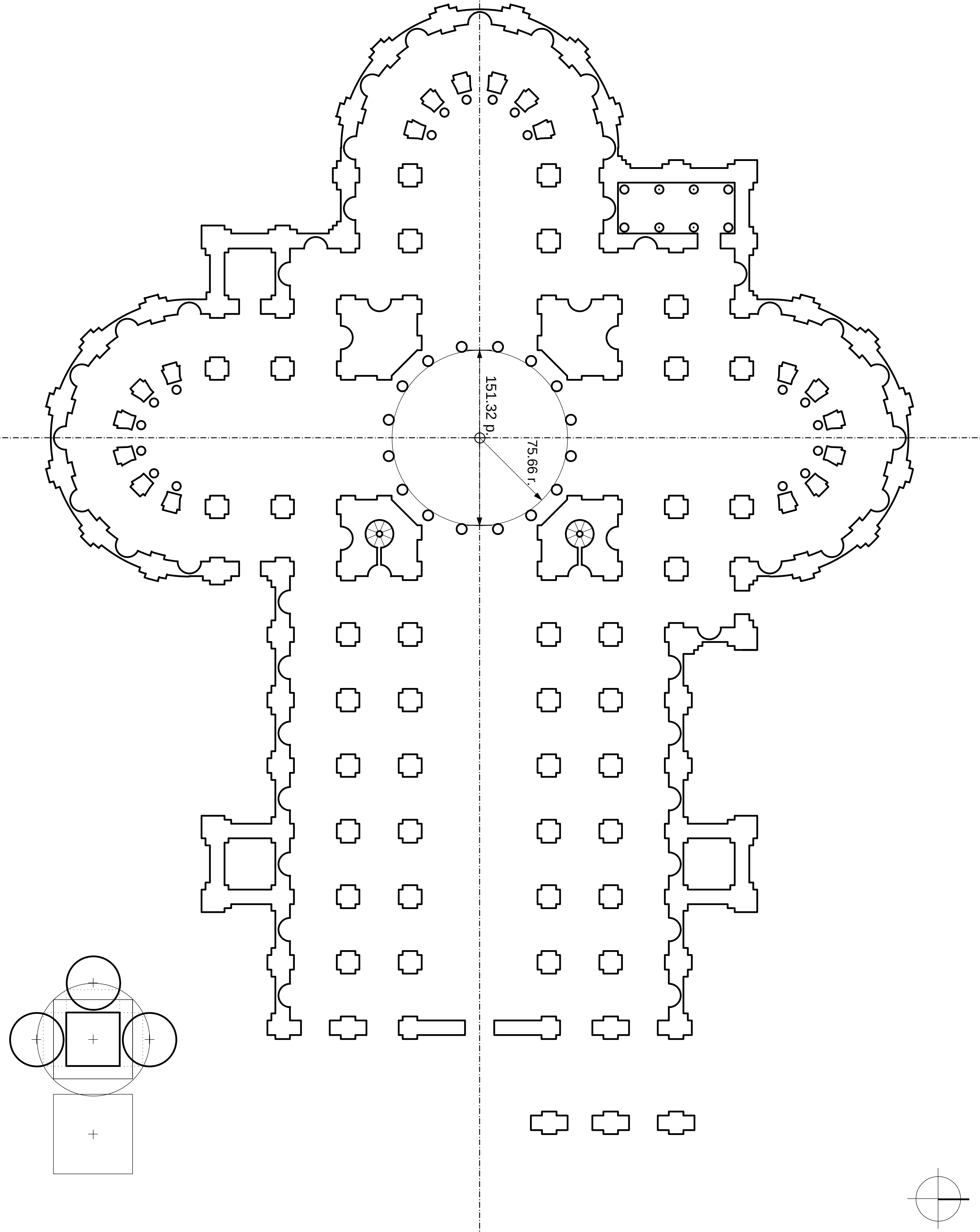
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	GDSU 1 A, LONGITUDINAL PLAN WITH LATERAL CHAPELS	GDSU 1 A	N 2

RECONSTRUCTION OF JSM, CODEX CONER 115/17

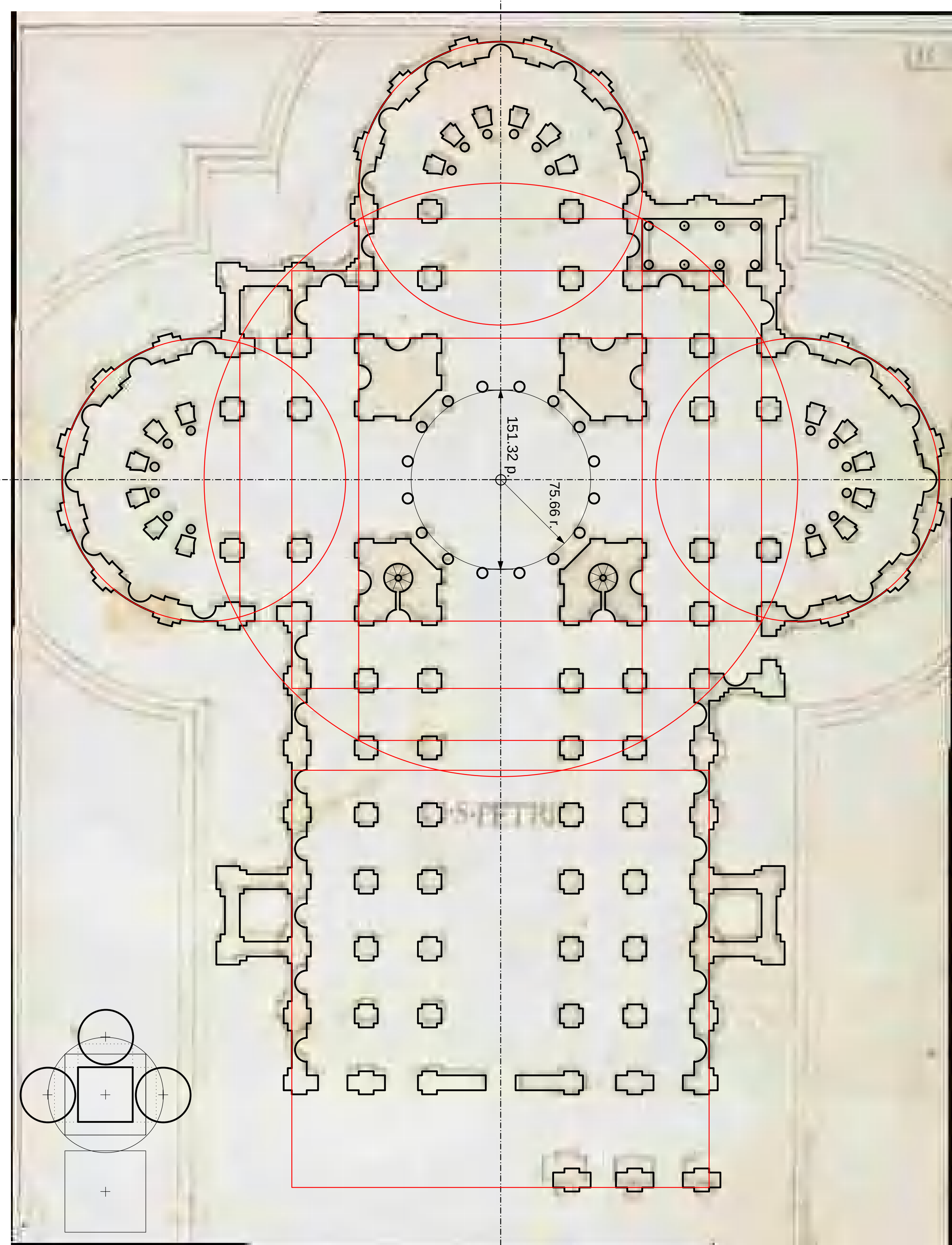


1503	ESTABLISHING THE GENARAL DIMENSIONS	CONER 115/17	1



RESEARCH AND DRAWING LUIS DE GARRIDO

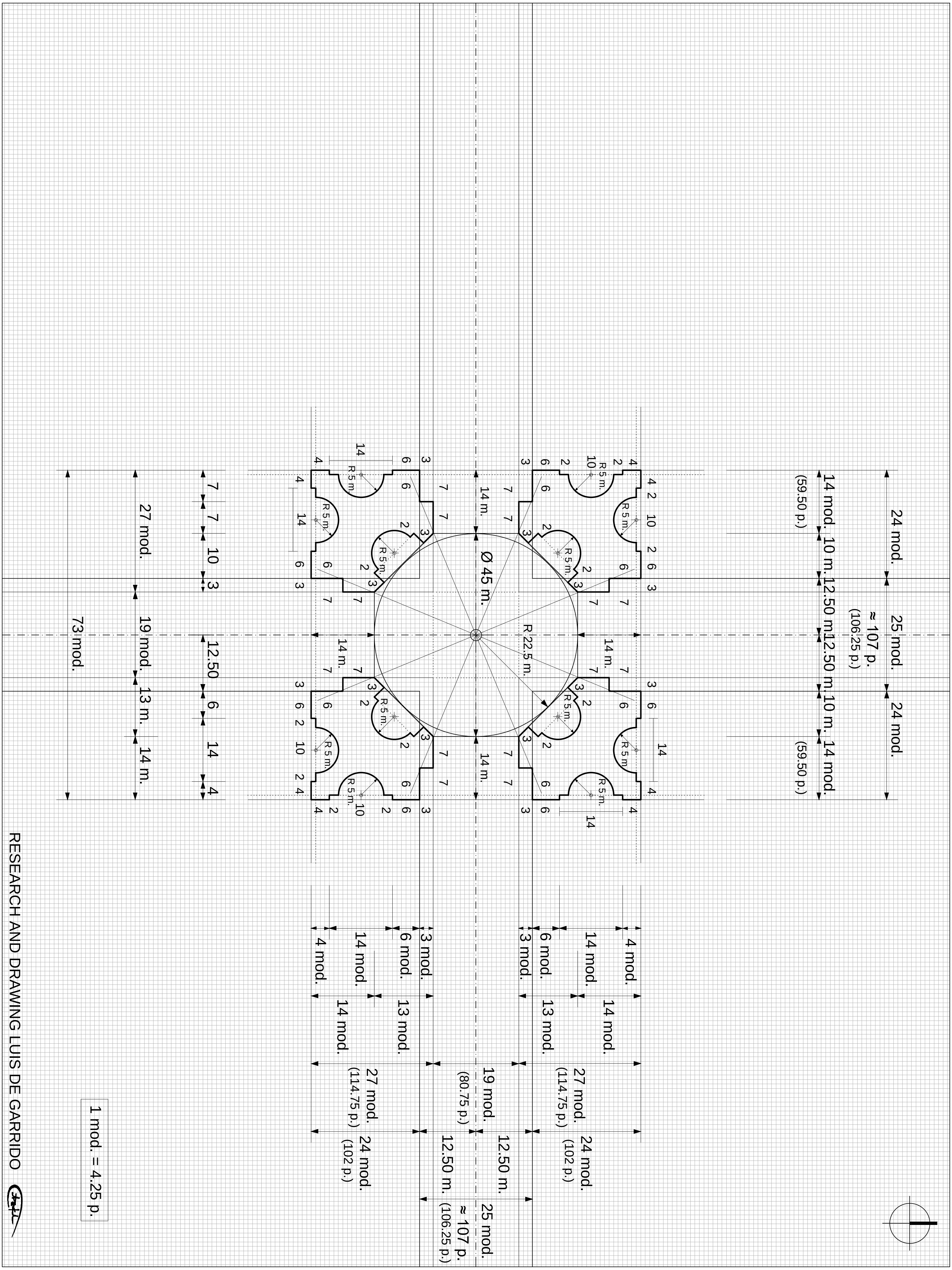
1503	RECONSTRUCTED PROJECT OF CODEX CONER VOL. 115/17	CONER 115/17	2



RESEARCH AND DRAWING LUIS DE GARRIDO

1503	RECONSTRUCTED PROJECT OVERLAY WITH CODEX CONER VOL. 115/17	CONER 115/17	3

RECONSTRUCTION OF GDSU 8 Ar

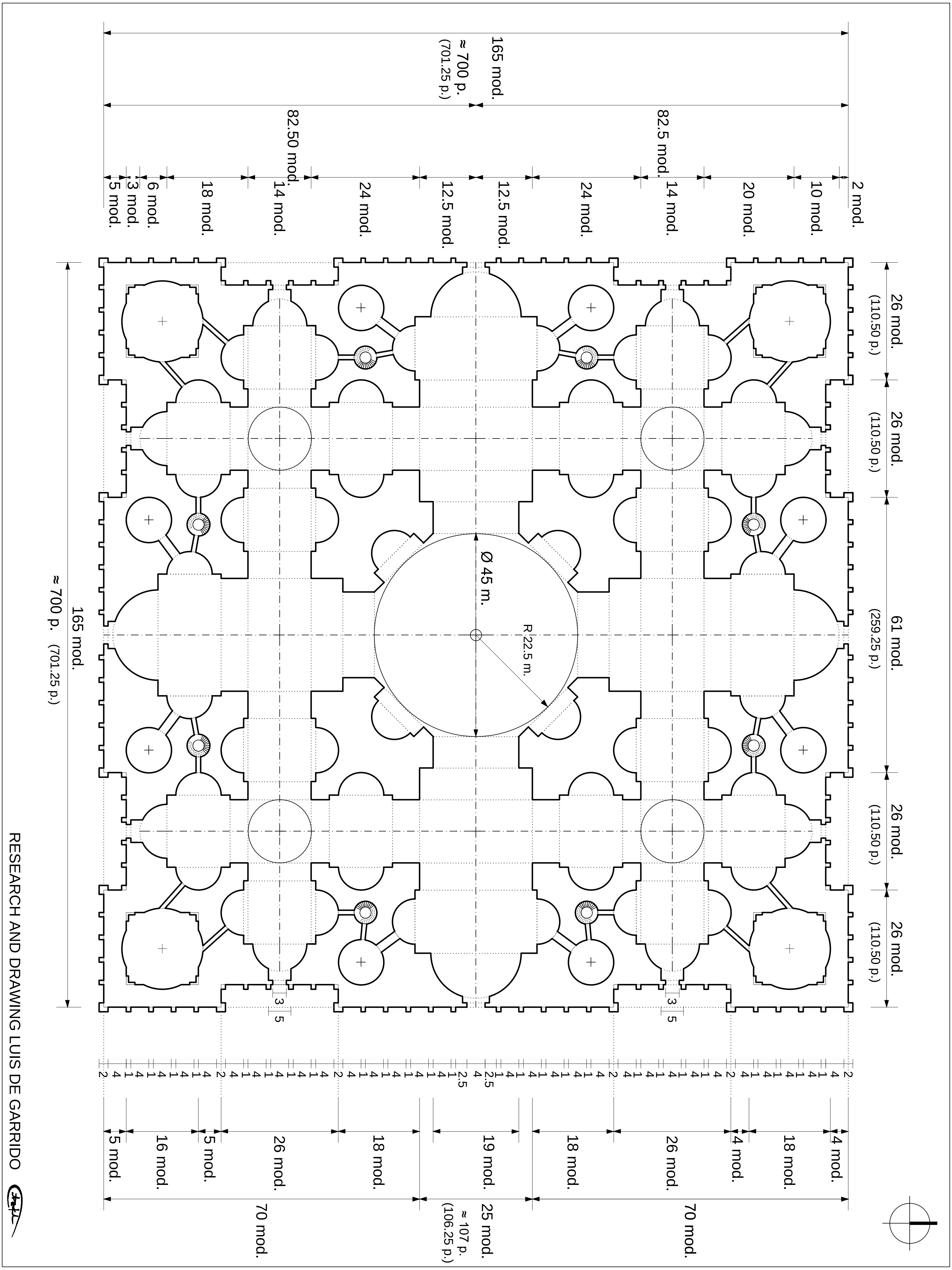


1505

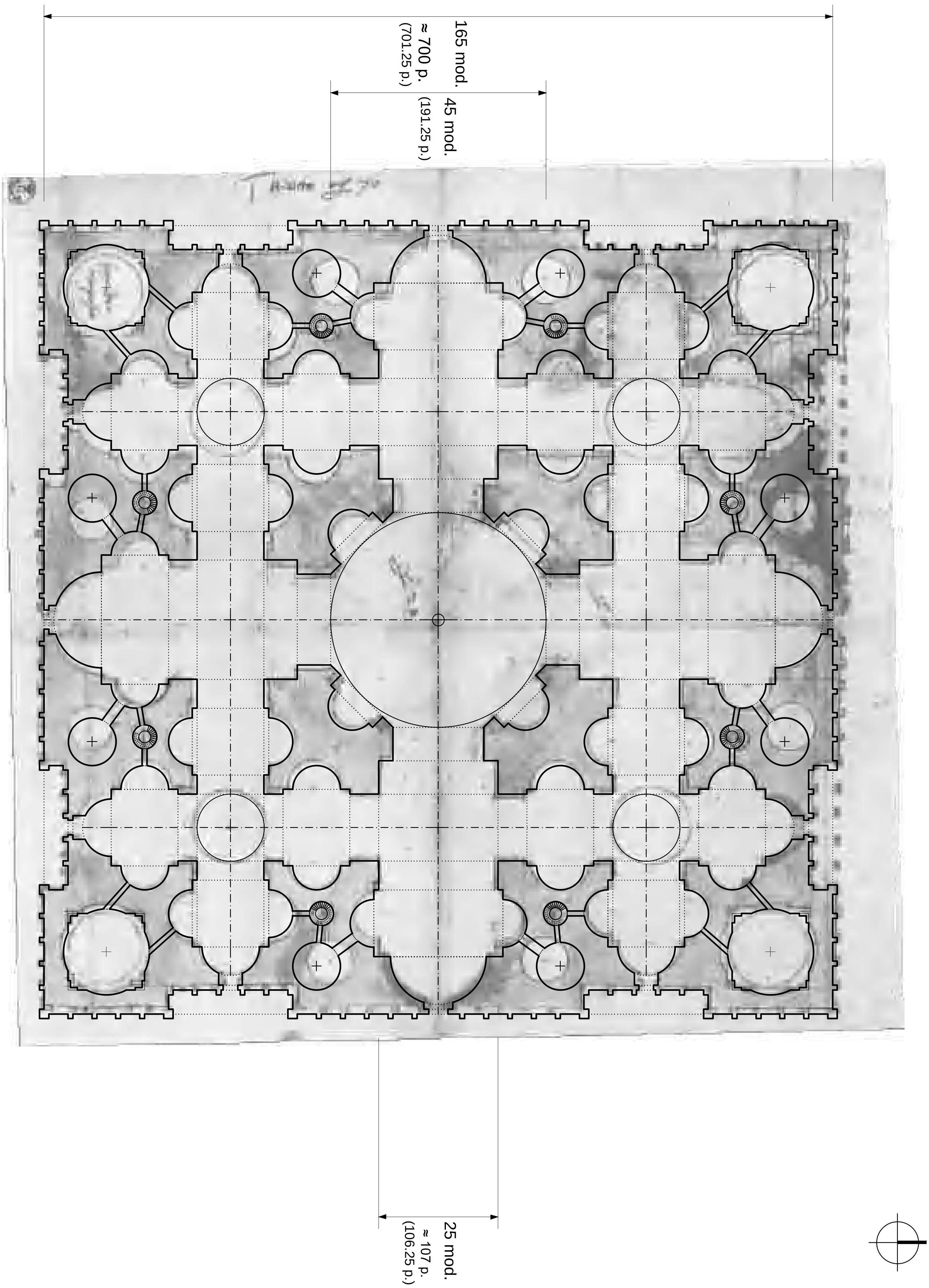
COMPLETE DESIGN OF THE CROSSING-PIERS

GDSU 8 Ar

1



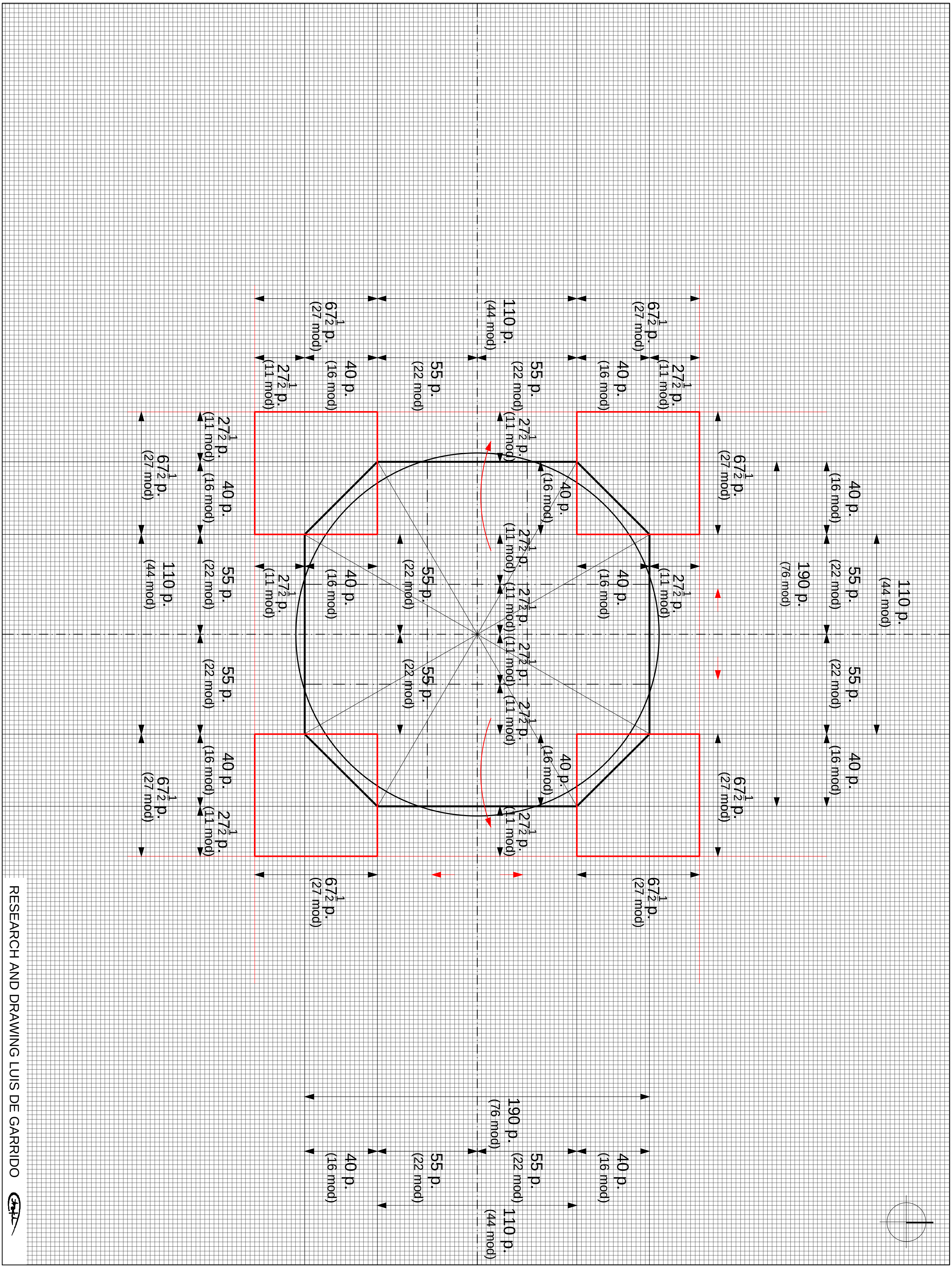
1505	RECONSTRUCTED PROJECT GDSU 8 Ar	GDSU 8 Ar	2



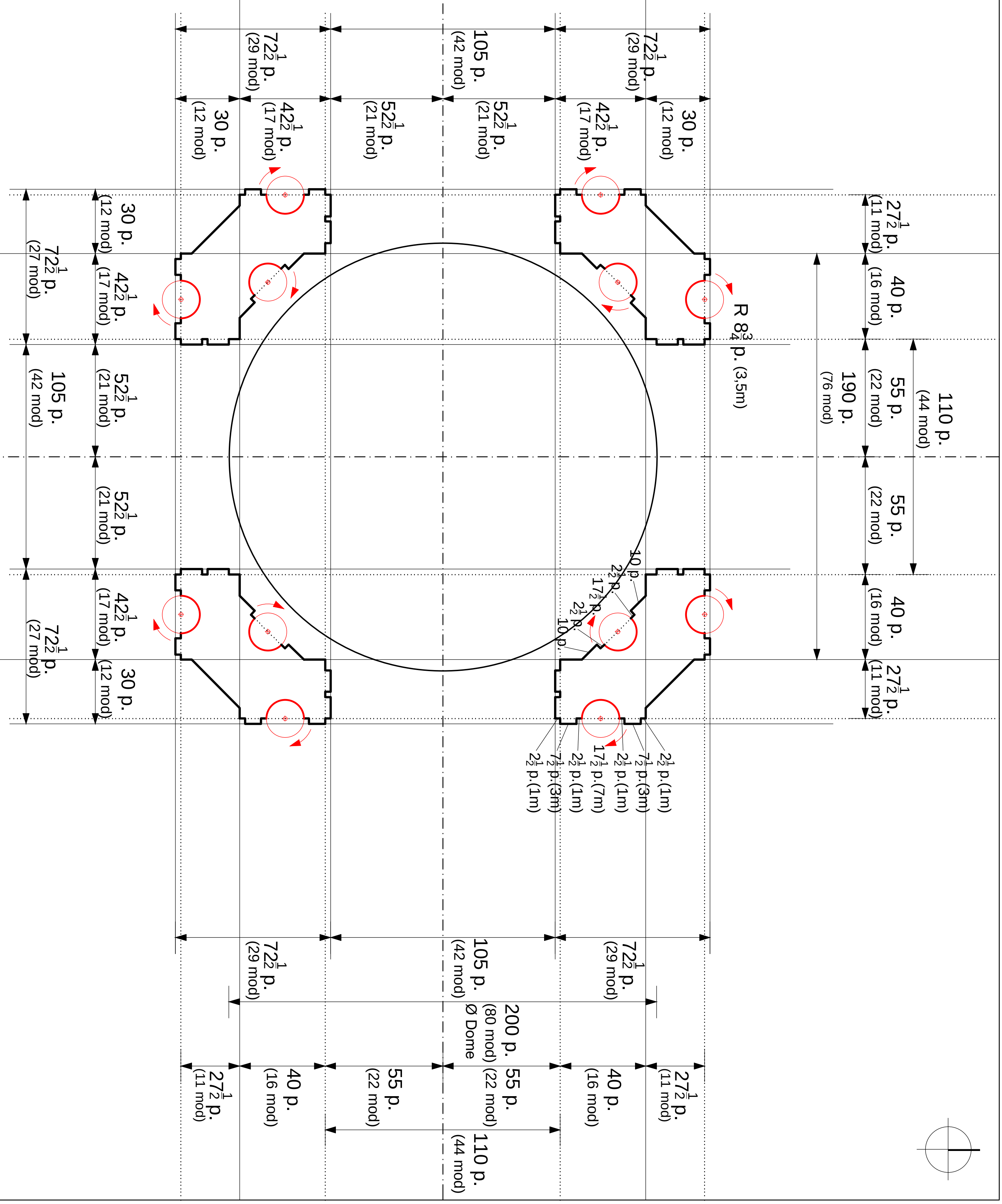
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	RECONSTRUCTED PROJECT OVERLAY WITH GDSU 8 Ar	GDSU 8 Ar	3

RECONSTRUCTION OF GDSU 7945 Ar
DESIGN ALTERNATIVES

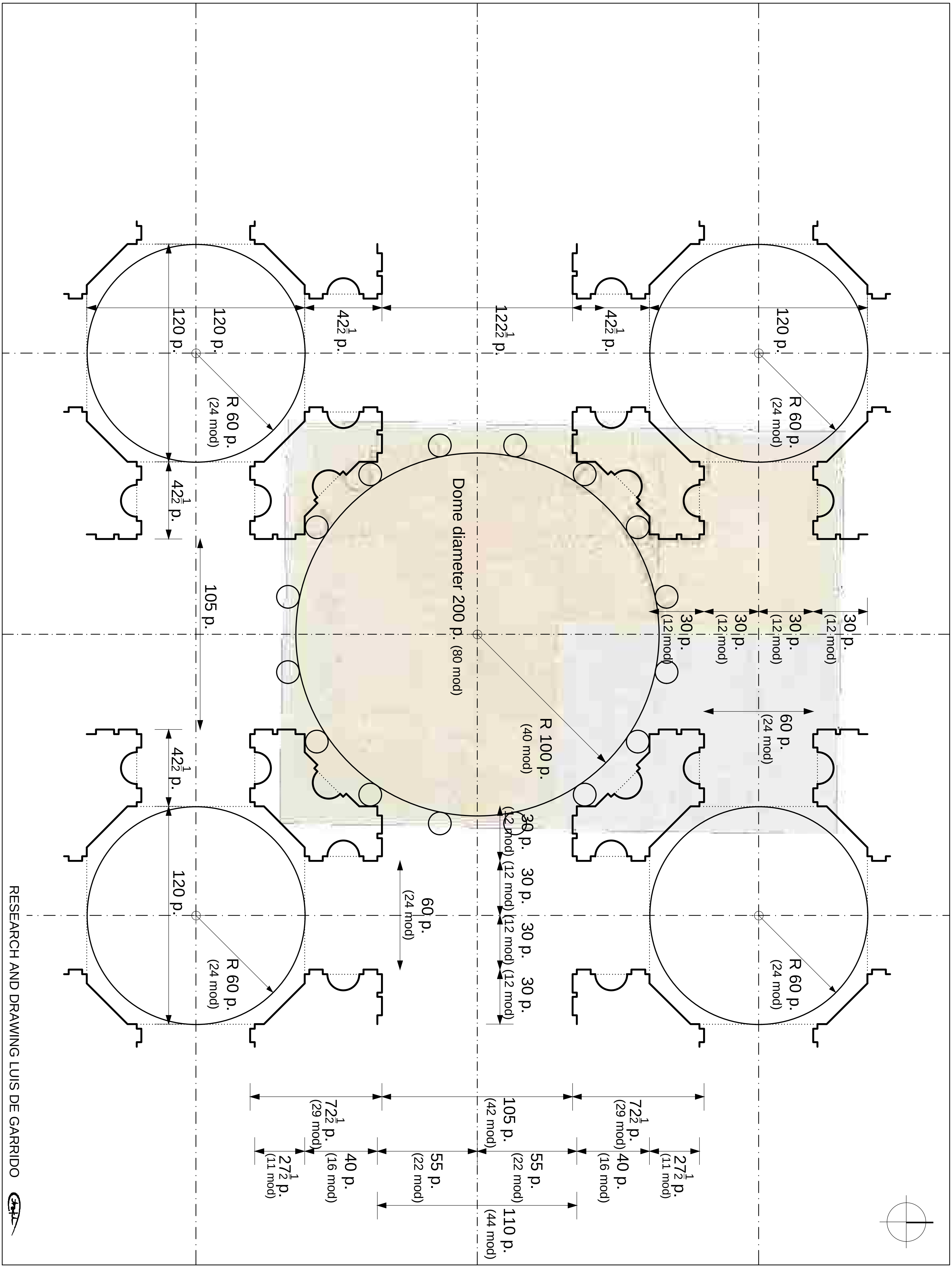


1505	ESTABLISHING THE AUXILIARY LINES OF THE COUNTER-PIERS (I)	7945 Ar	1



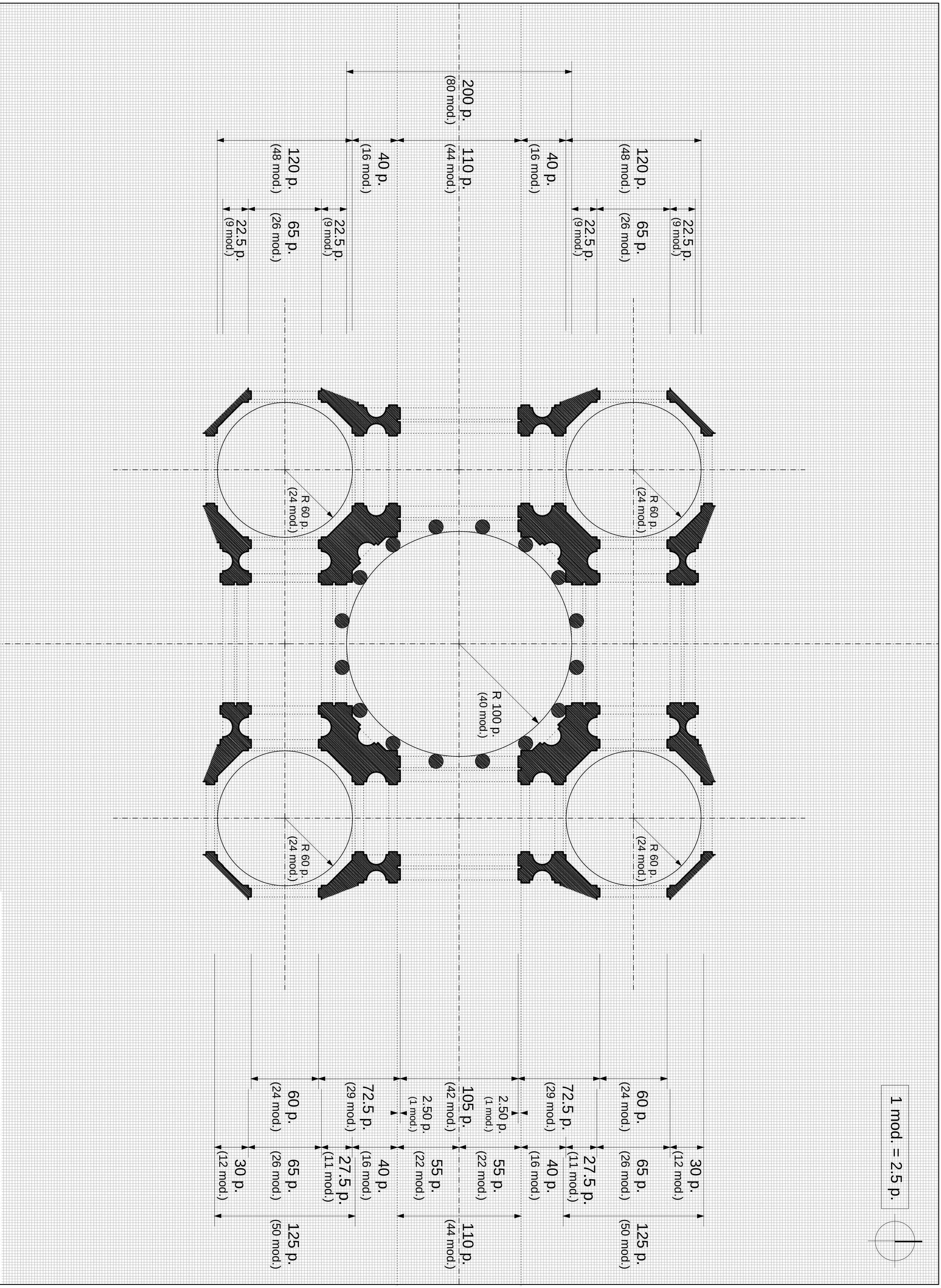
RESEARCH AND DRAWING LUIS DE GARRIDO

1505	ESTABLISHING DETAILS OF THE COUNTER-PIERS: SIDES NICHES	7945 Ar	2



1505	RECONSTRUCTION PROJECT OVERLAY WITH GDSU 7945 Ar	7945 Ar	3

RECONSTRUCTION OF GDSU 7945 Ar
DESIGN ALTERNATIVES

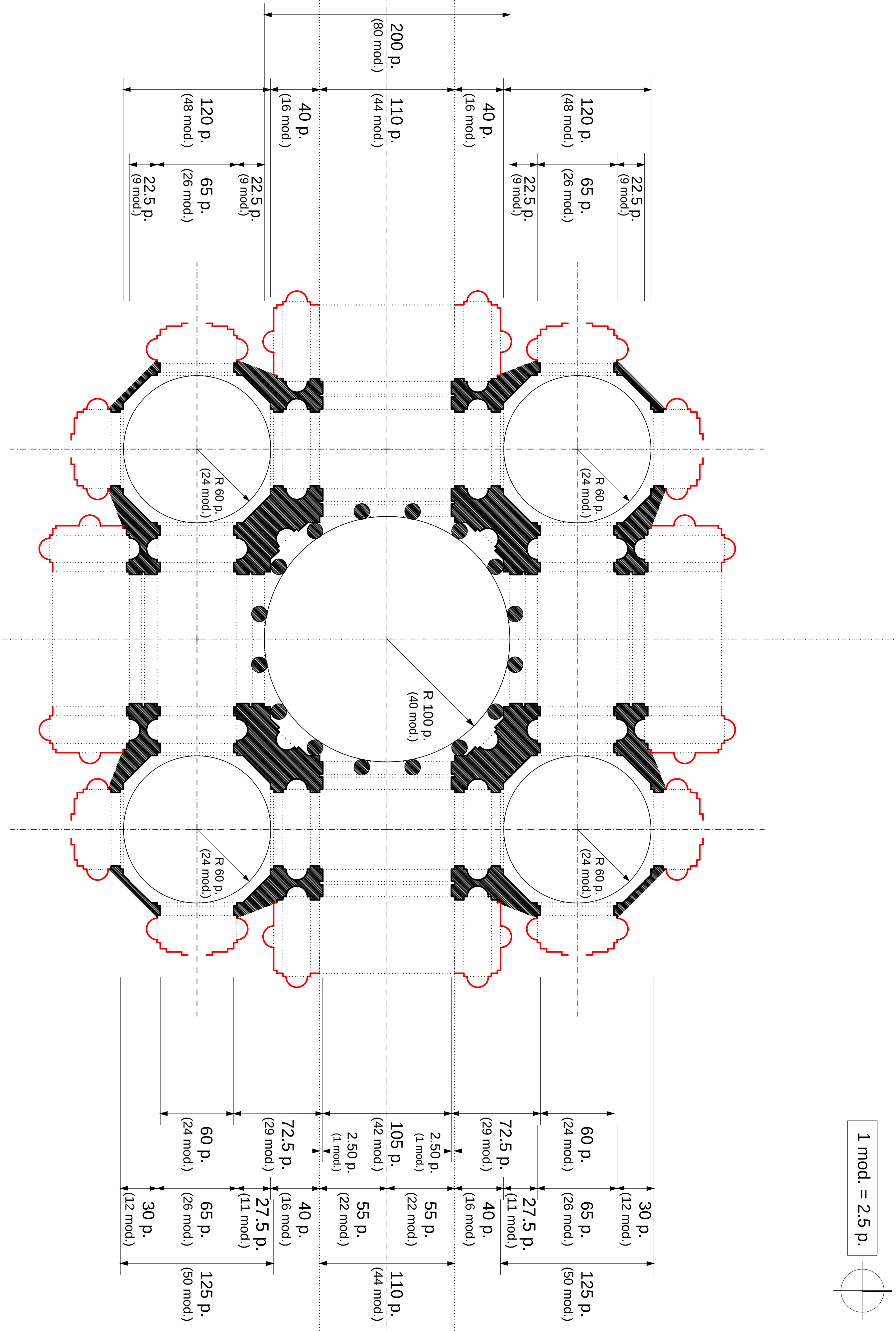


RESEARCH AND DRAWING LUIS DE GARRIDO

CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (I)

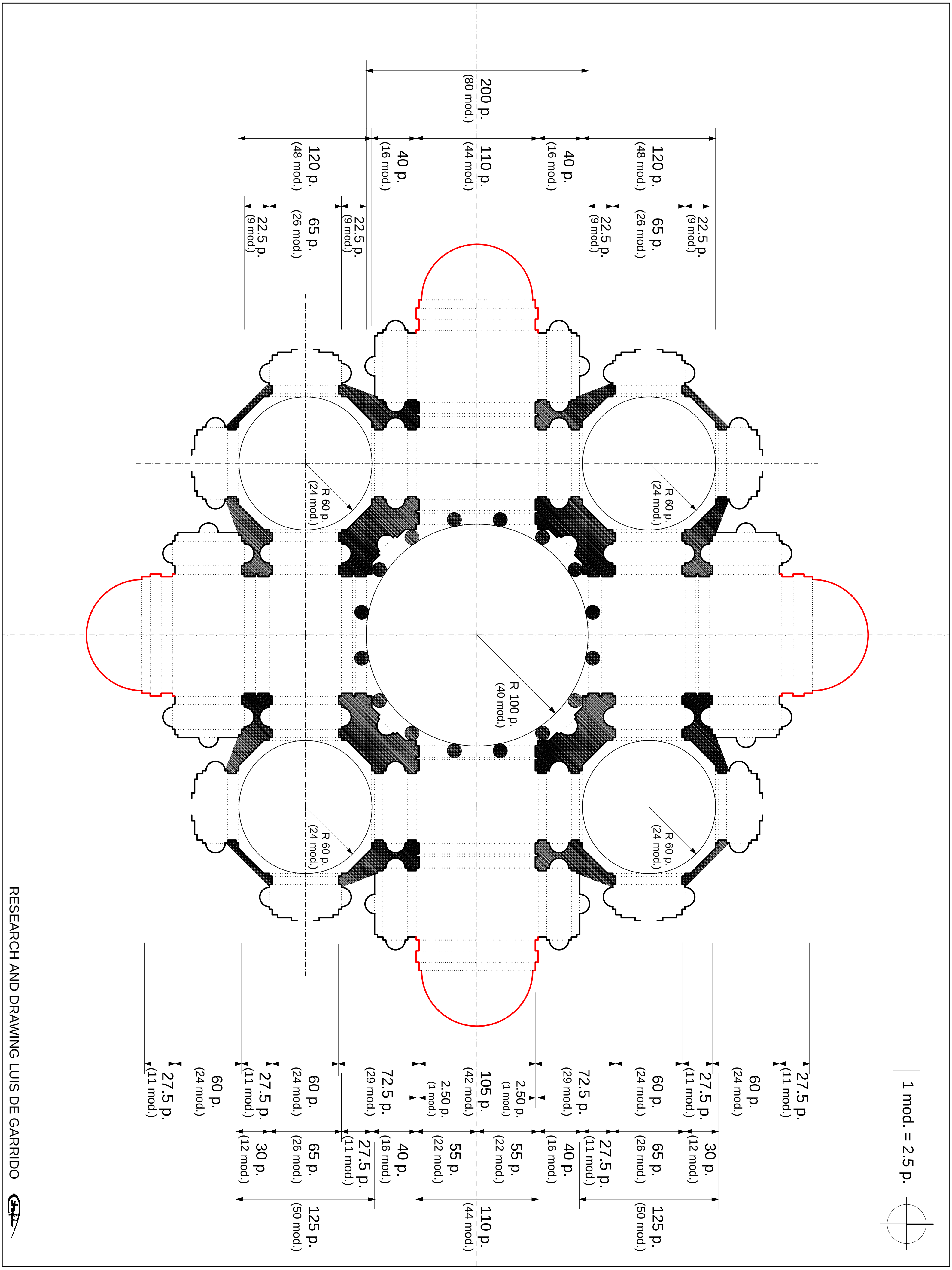
7945 Ar

Q 1

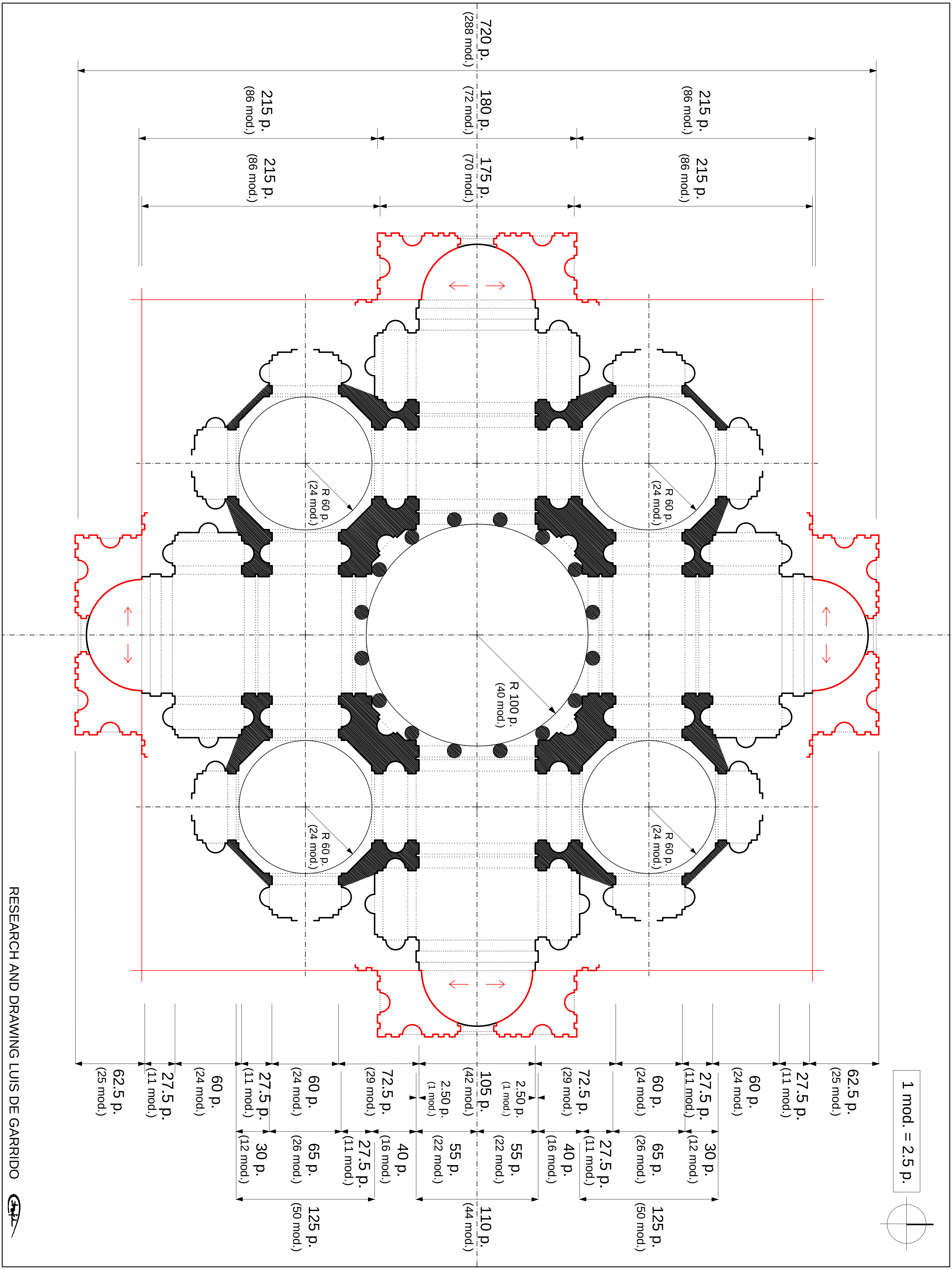


RESEARCH AND DRAWING LUIS DE GARRIDO

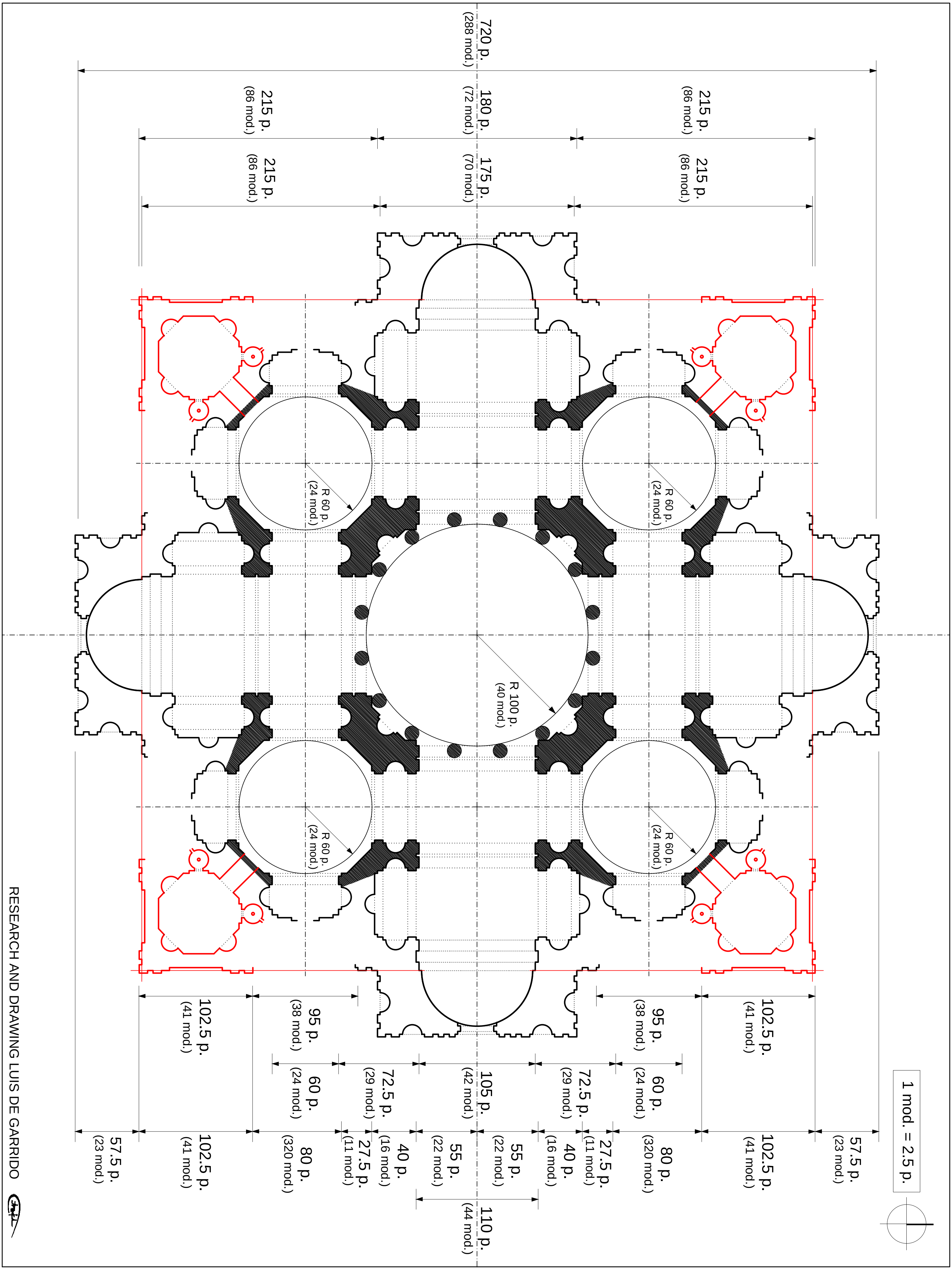
1505	CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (II)	7945 Ar	Q 2



1505	CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (III)	7945 Ar	Q 3



1505	CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (IV)	7945 Ar	Q 4

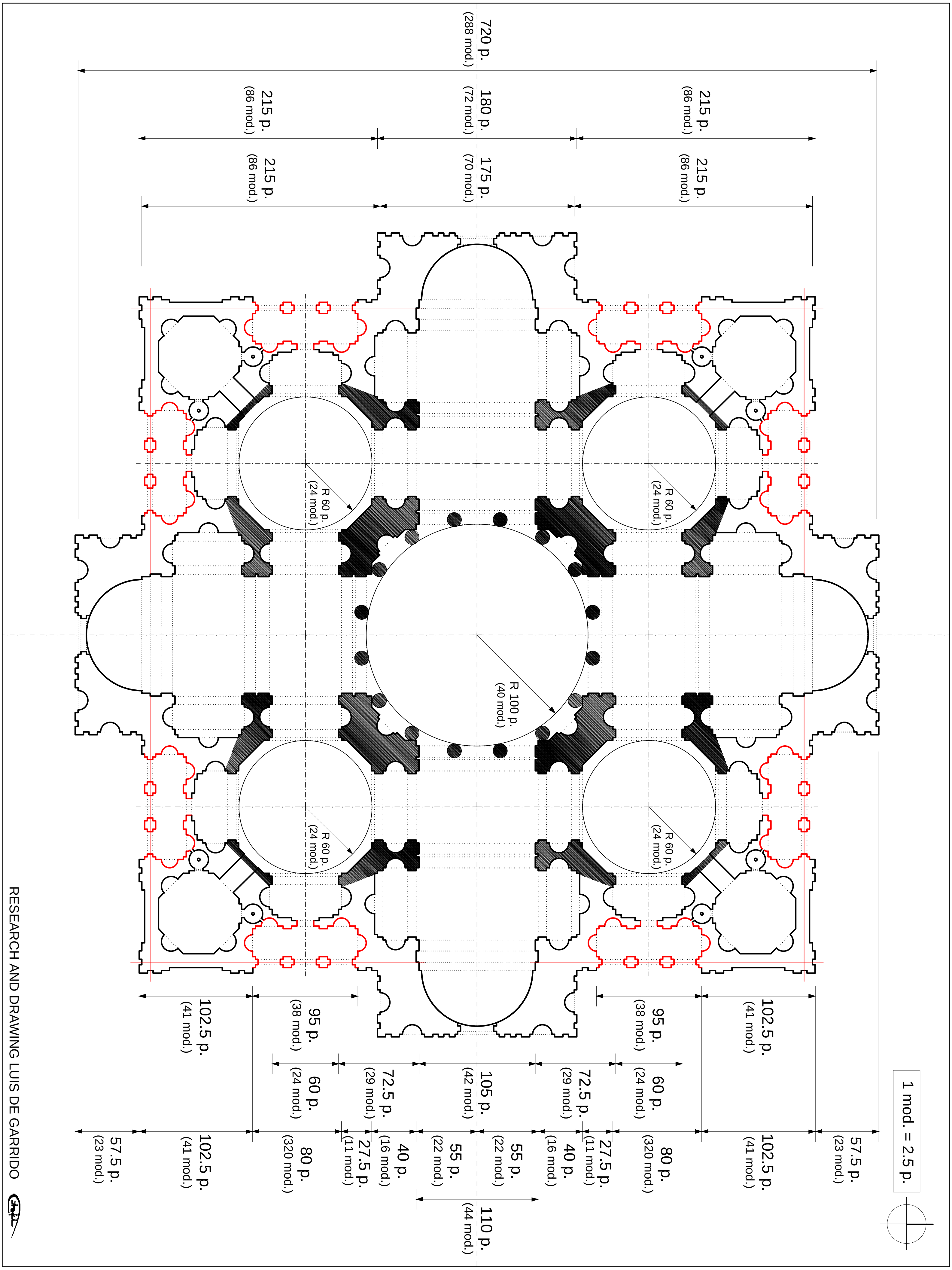


1505

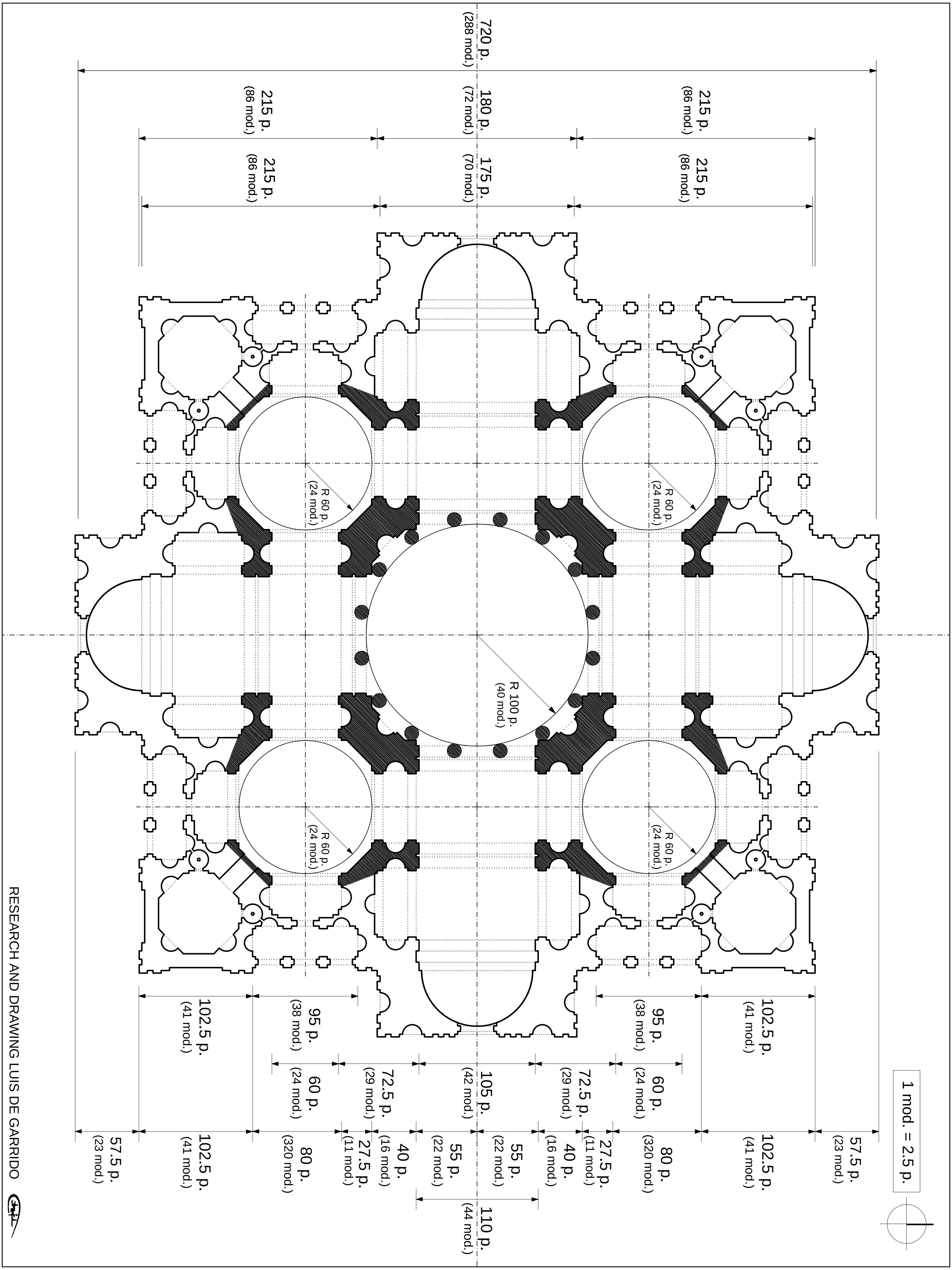
CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (V)

7945 Ar

Q 5

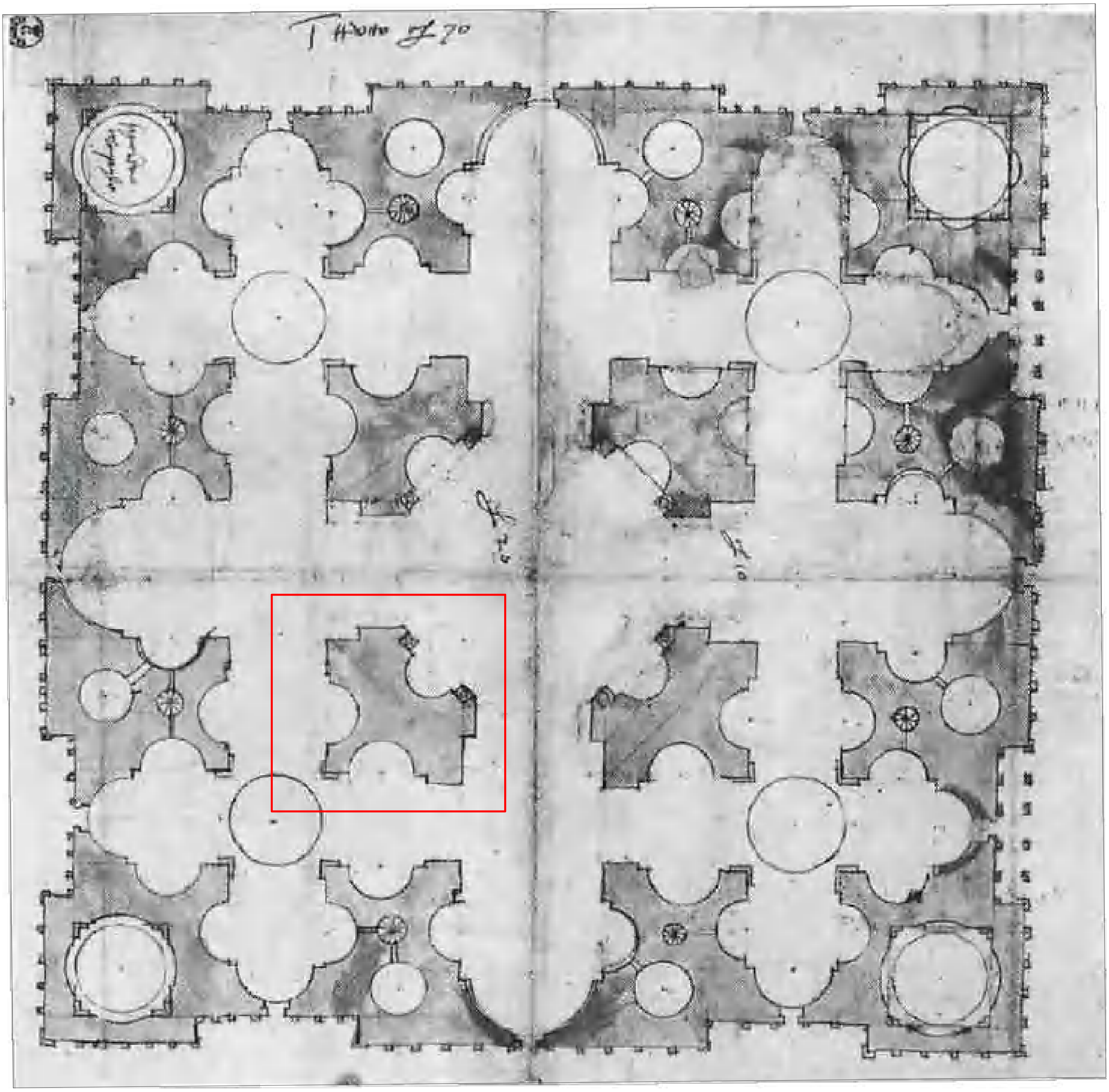


1505 | CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (VI) | 7945 Ar | Q 6

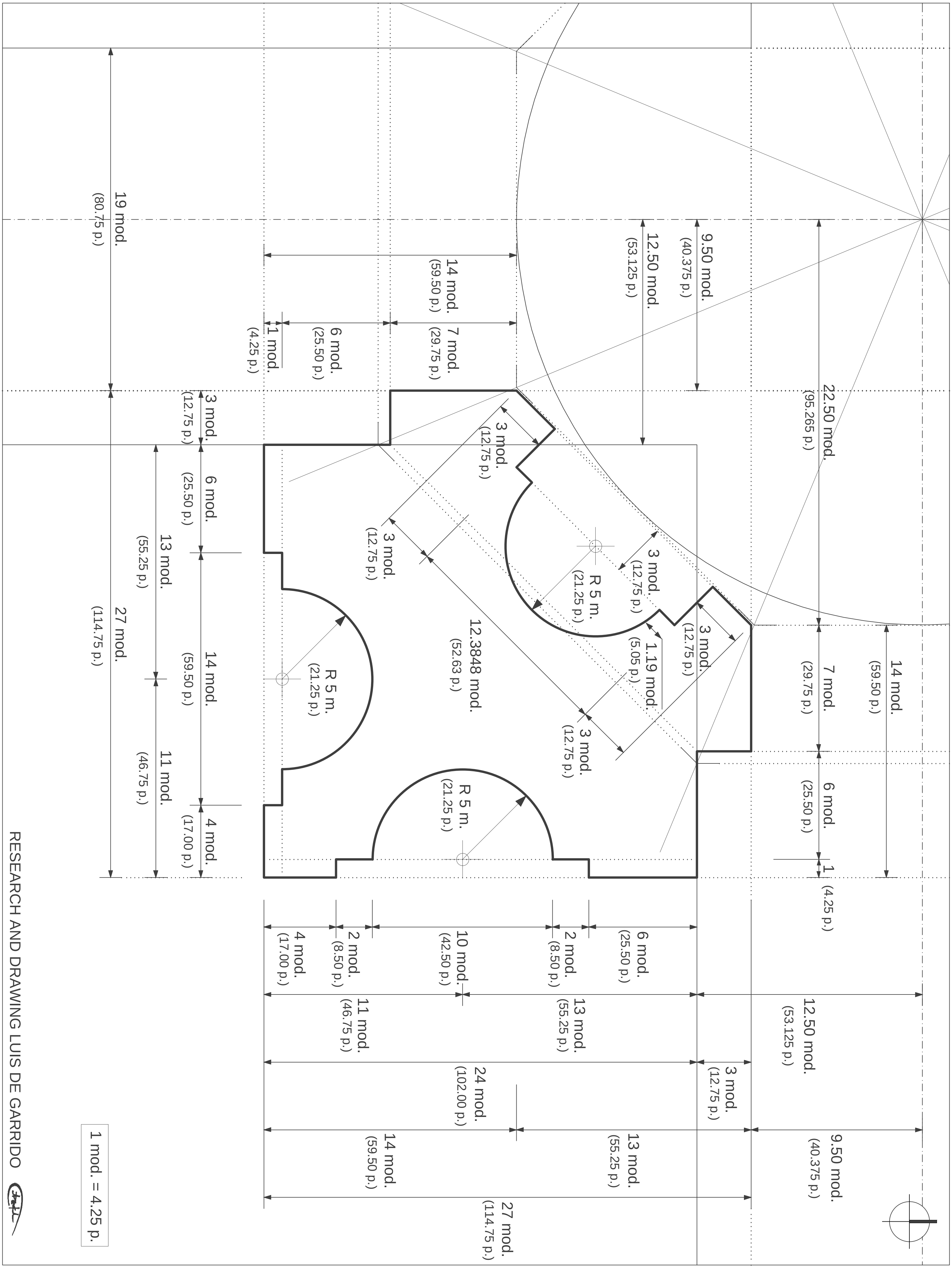


1505	CROSSING-PIERS OF PROJECT GDSU 7945 Ar ALLOW A QUINCUNX TYPOLOGY (VII)	7945 Ar	Q 7

RECONSTRUCTION OF GDSU 8 Av
DESIGN ALTERNATIVES



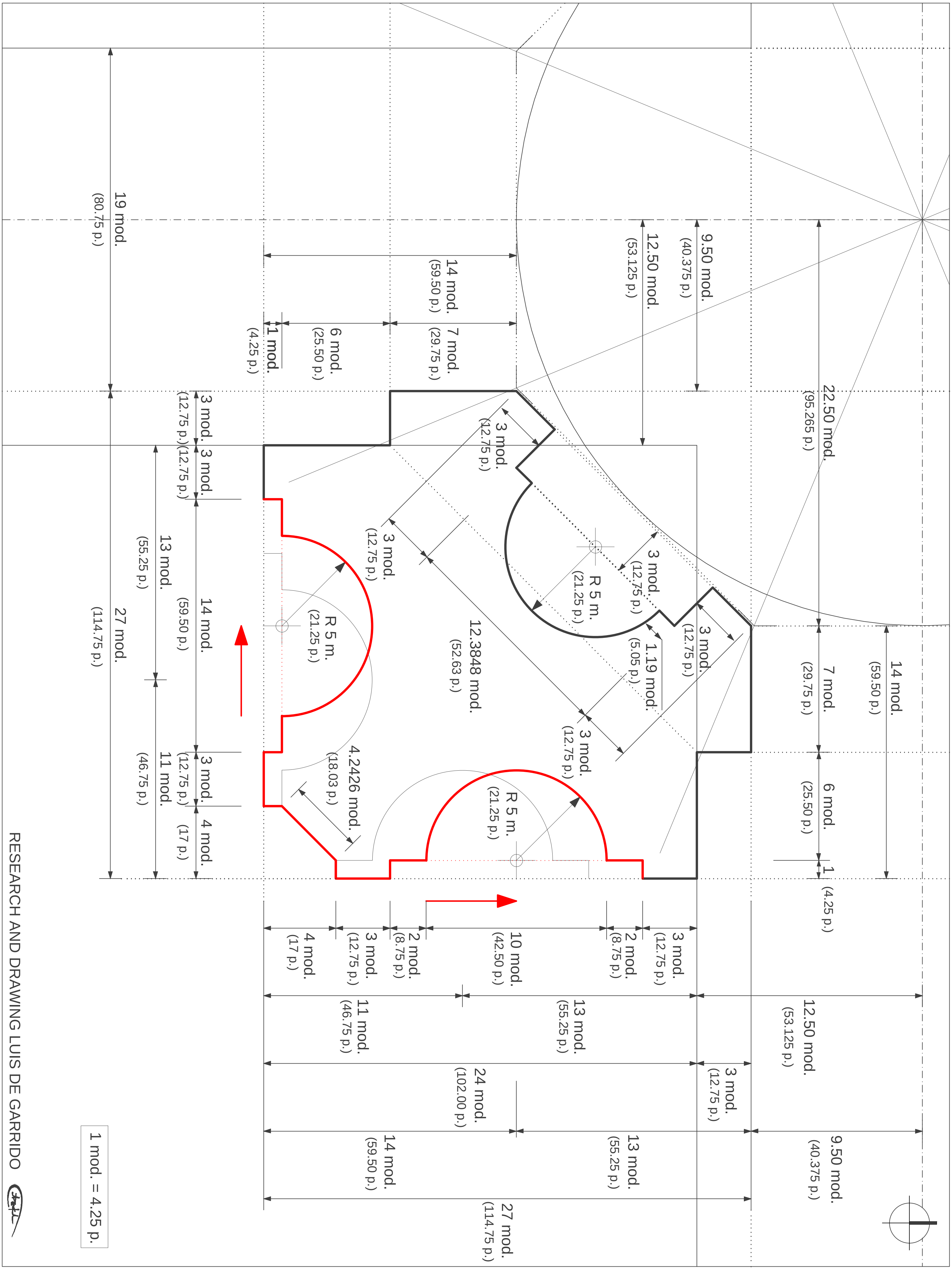
RESEARCH AND DRAWING LUIS DE GARRIDO



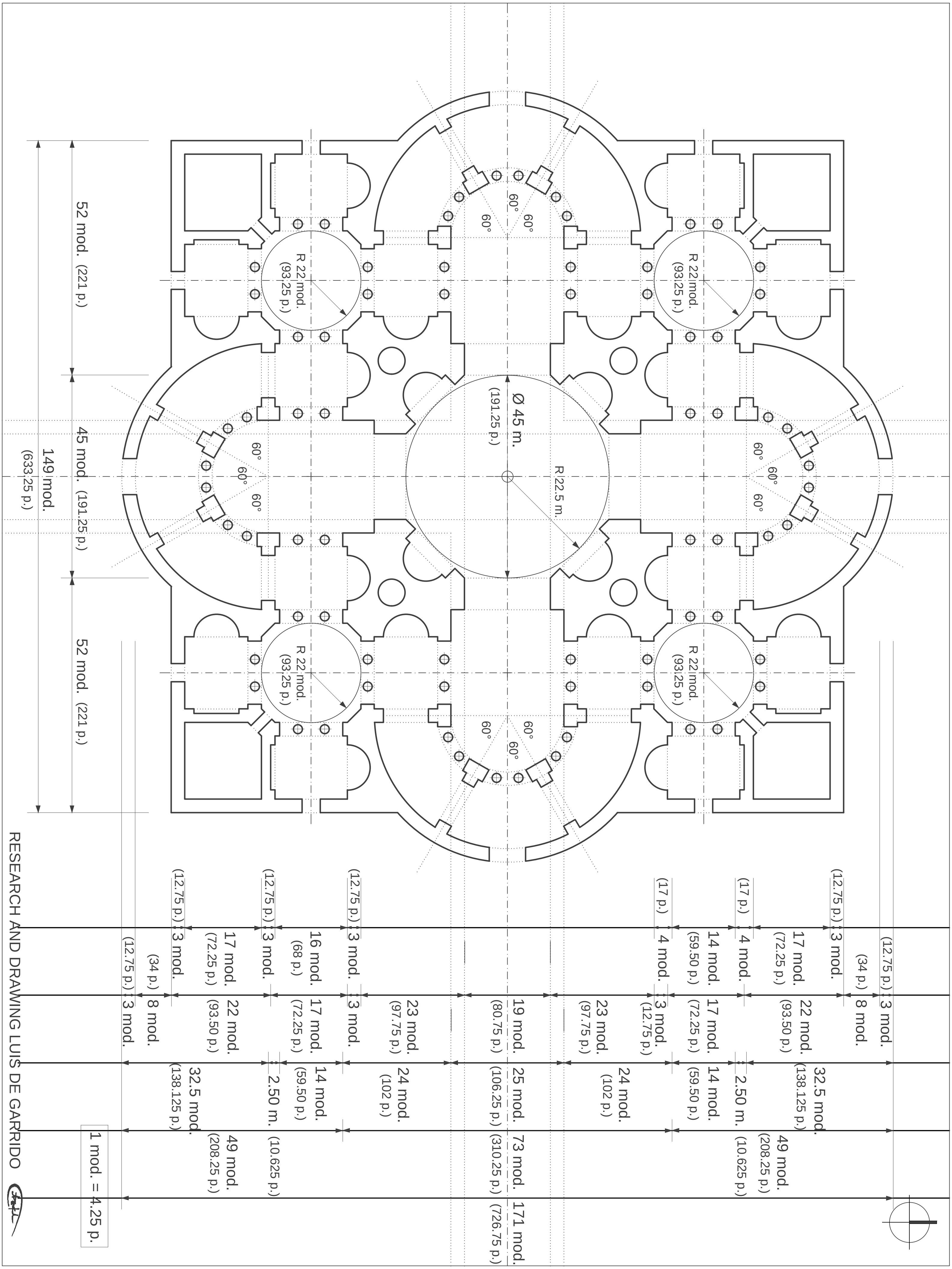
1505

CROSSING-PIERS BY GIULIANO DA SANGALLO IN GDSU 8 Ar

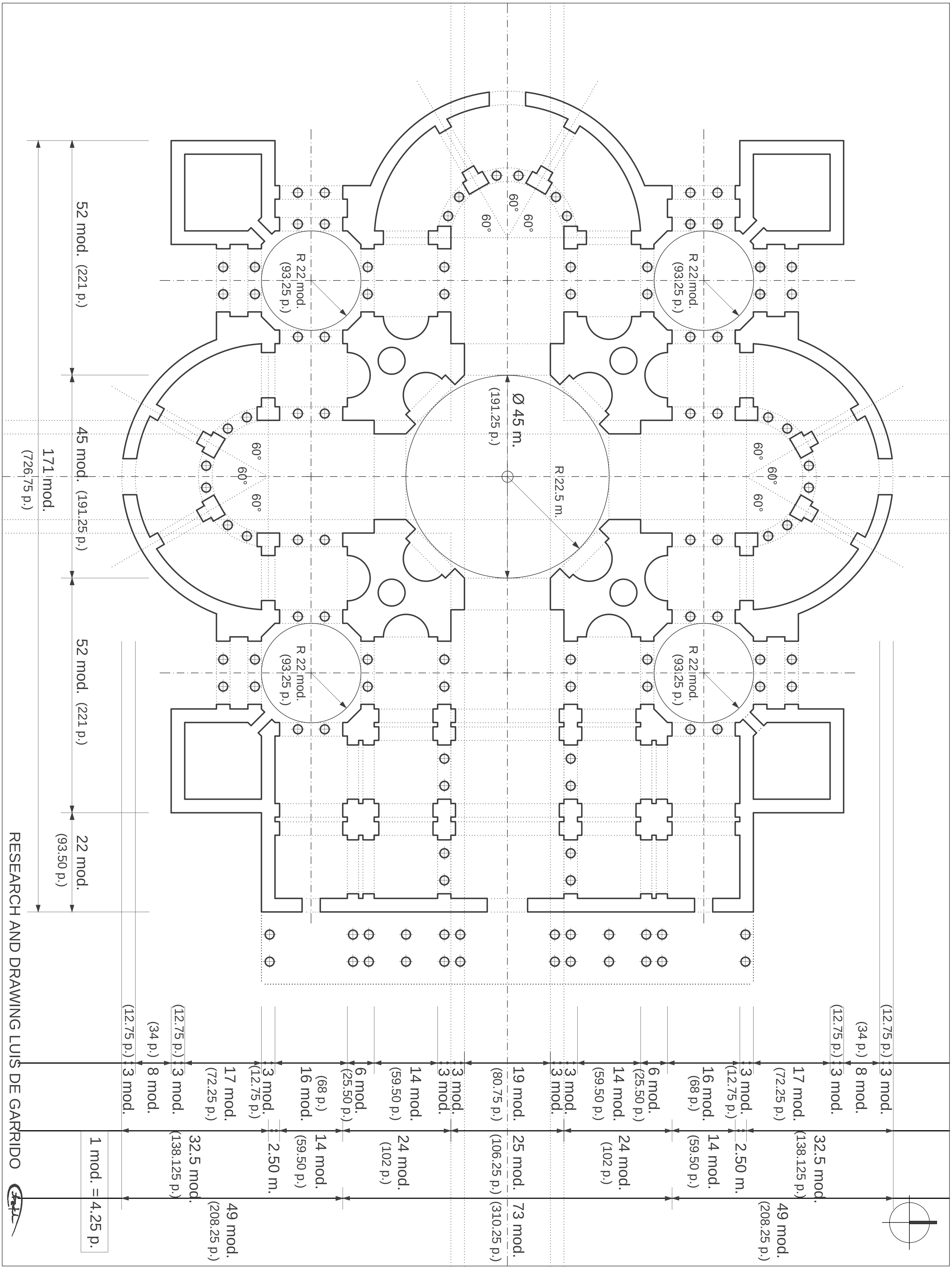
GDSU 8 Av



1505	G. DA SANGALLO MODIFIES THE CROSSING-PIERS OF GDSU 8 Ar TO OBTAIN 8 Av	8 Ar to 8 Av	3



1505	CENTRALIZED PLAN WITH MIXED QUINCUNX-NAVES TIPOLOGY OF GDSU 8 Av	GDSU 8 Av	Q 1

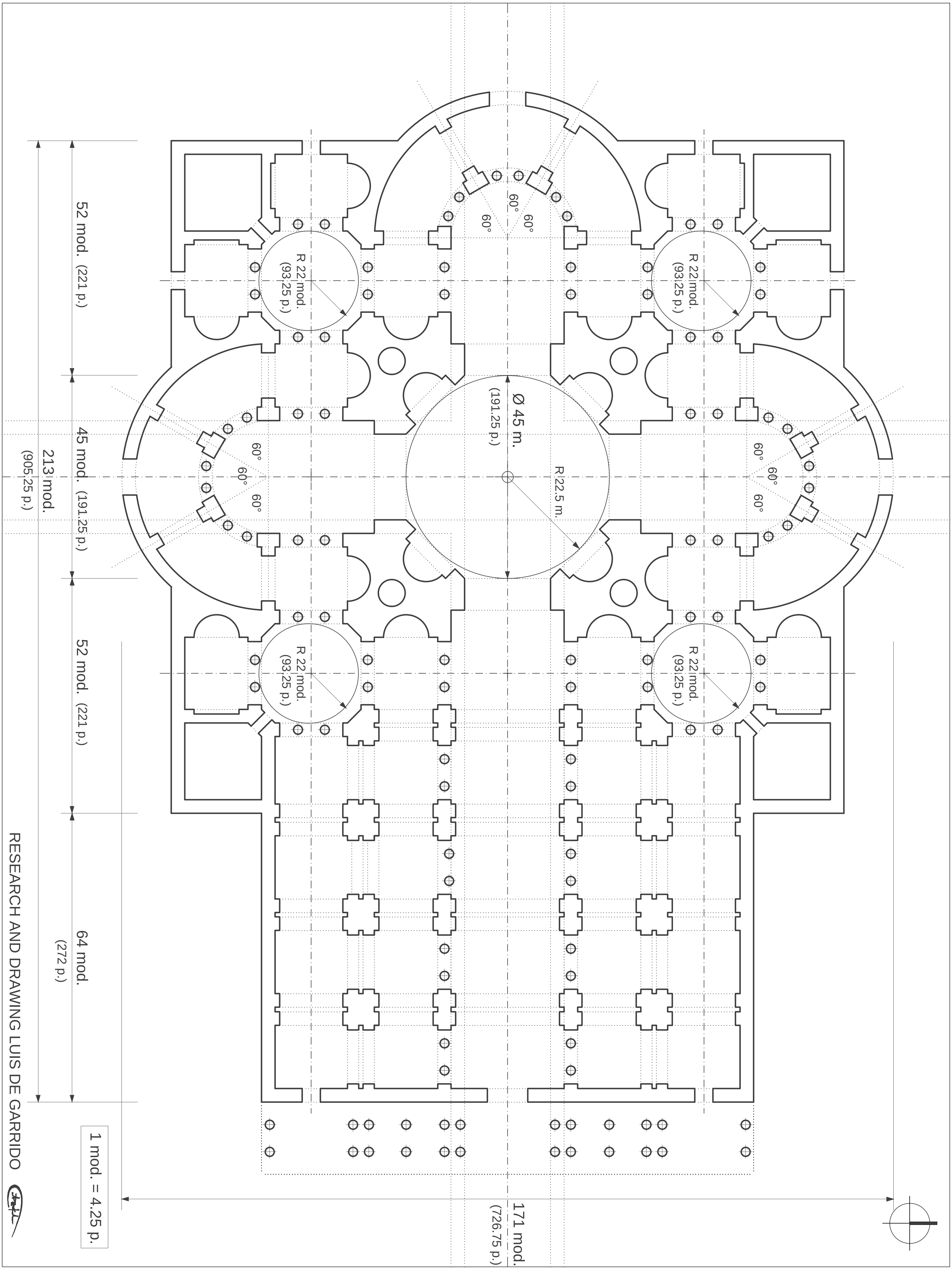


1505

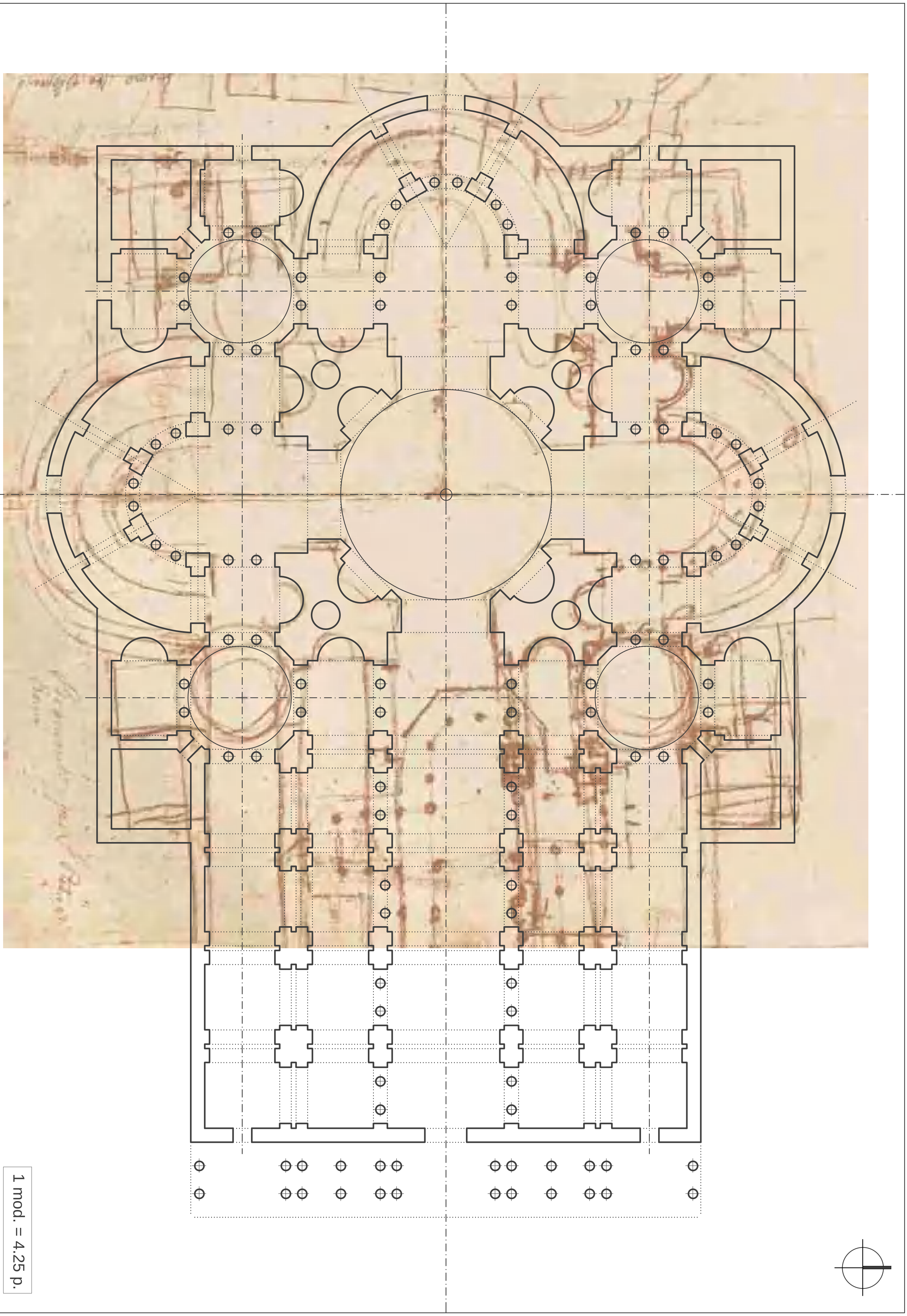
LONGITUDINAL PLAN WITH MIXED QUINCUNX-NAVES TIPOLOGY OF GDSU 8 Av (I)

GDSU 8 Av

N 1



1505	CENTRALIZED PLAN WITH MIXED QUINCUNX-NAVES TIPOLOGY OF GDSU 8 Av (II)	GDSU 8 Av	N 2

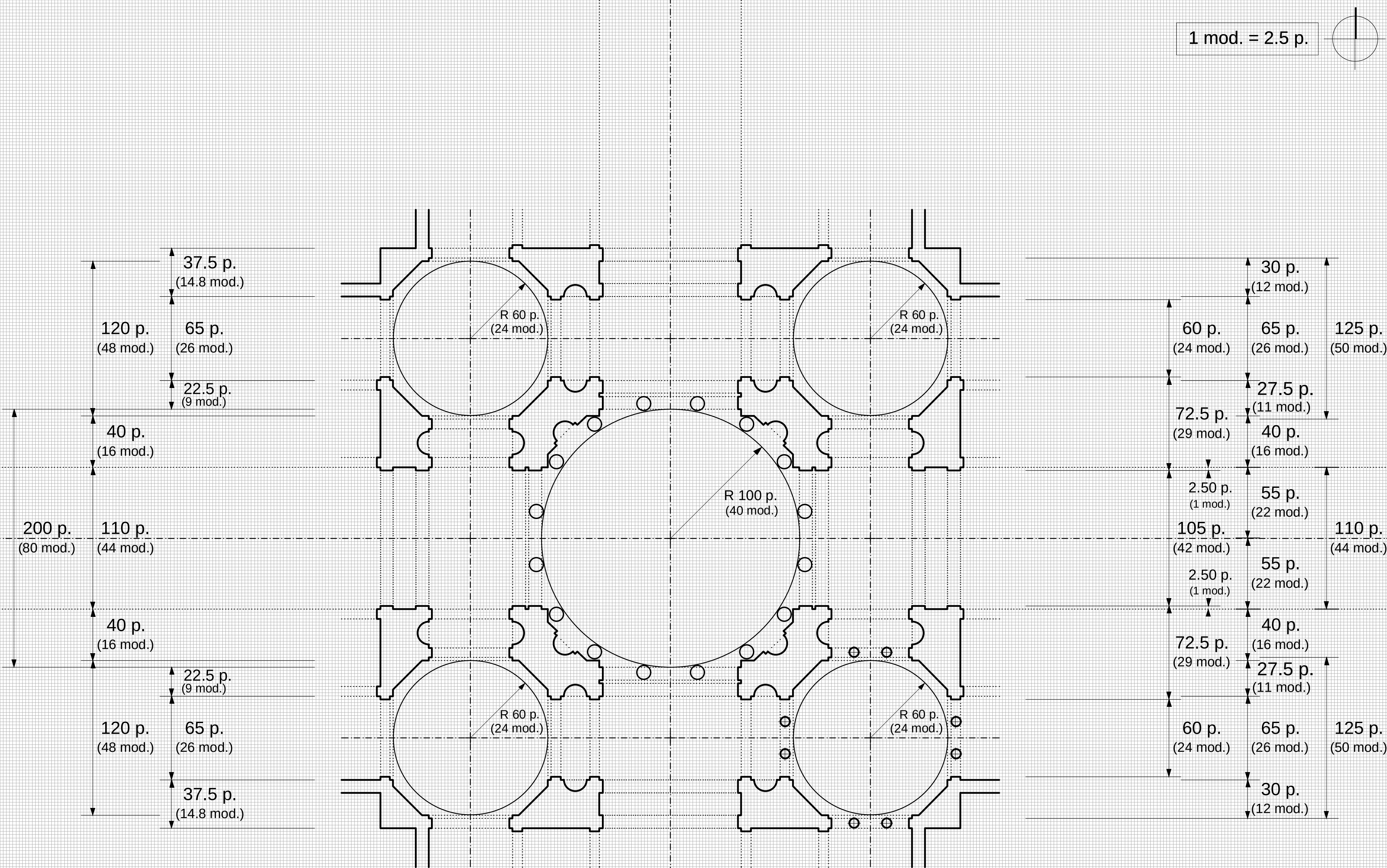


RESEARCH AND DRAWING LUIS DE GARRIDO

1 mod. = 4.25 p.

1505	RECONSTRUCTED PROJECT GDSU 8 Av, OVERLAY	GDSU 8 Av	N 3

RECONSTRUCTION OF GDSU 7945 Av
DESIGN ALTERNATIVES



Øm MAIN DOME: 200 P.

Øp PERIMETRAL DOMES: 120 P.

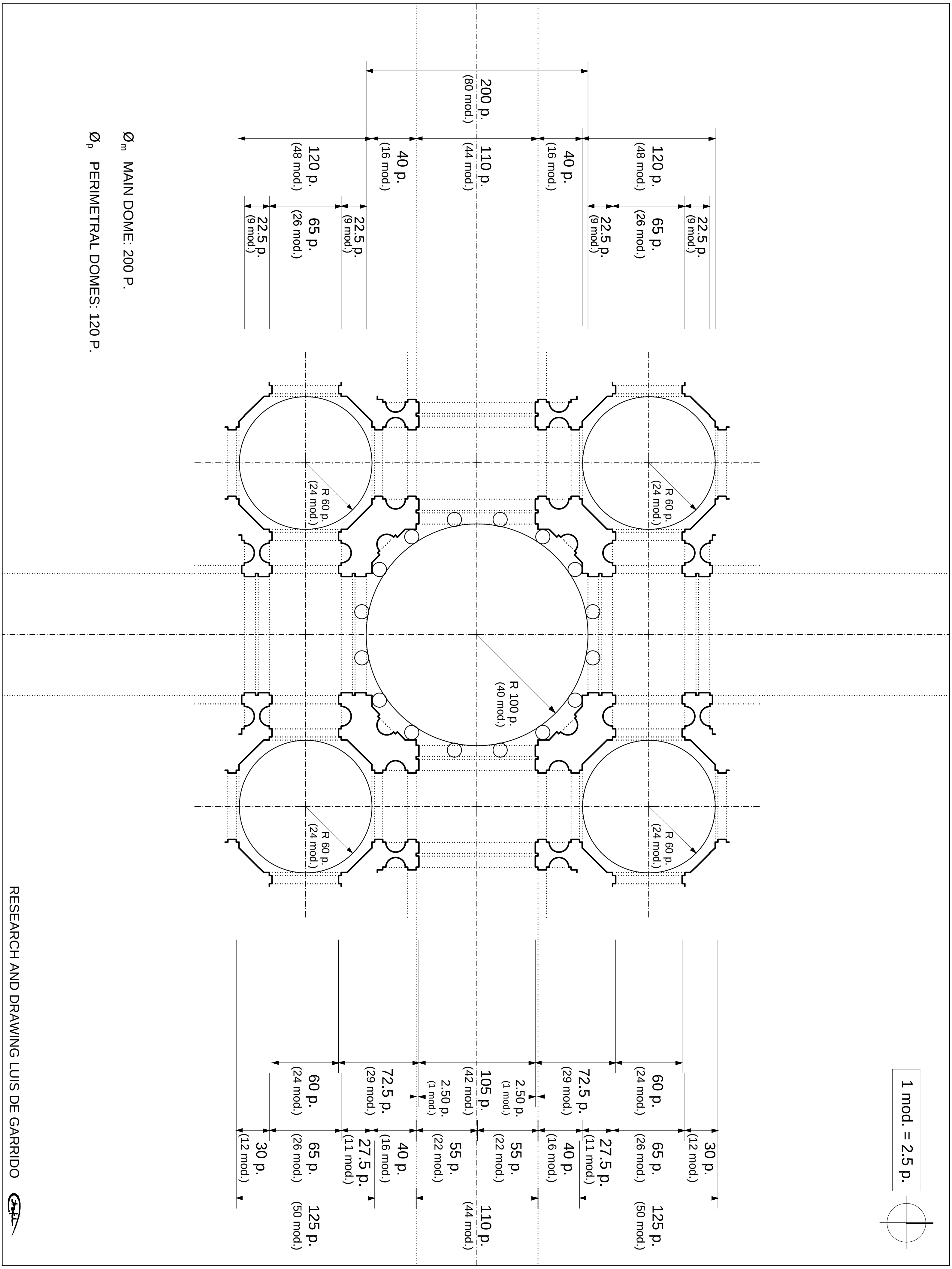
The problem is that the back side (beveled side) of the great crossing piers is too wide.

It is not possible to integrate a Quincunx tipology with a tipology of naves with this design of crossing piers.

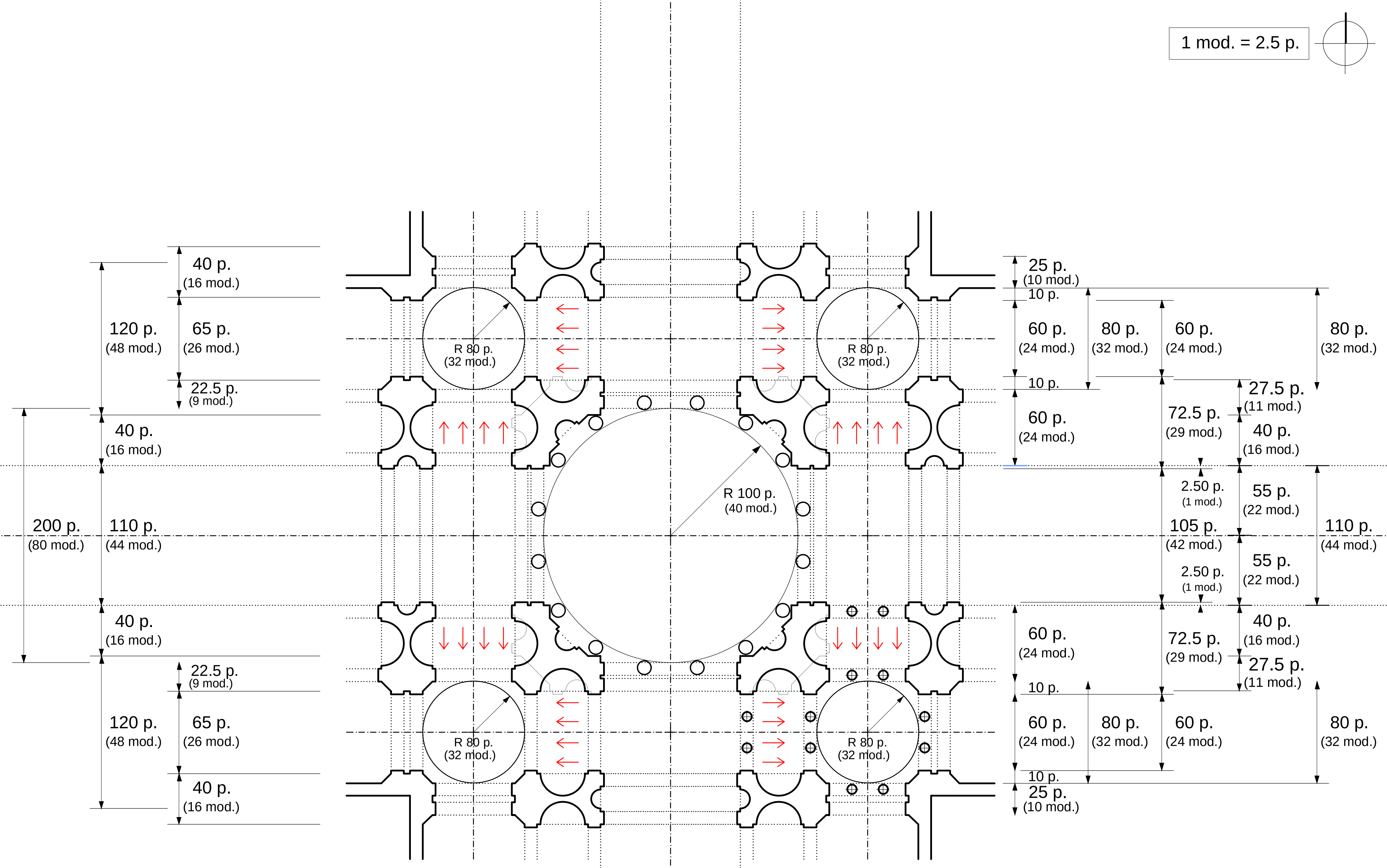
The back side of crossing piers must be more narrow.

RESEARCH AND DRAWING LUIS DE GARRIDO

1505 | CROSSING PIERS OF GDSU 7945 Ar DO NOT ALLOW A TYPOLOGY OF NAVES | 7945 Av | 1



1505	CROSSING PIERS OF THE PROJECT GDSU 7945 Ar (QUINCUNX)	7945 Av	2



Bramante decided (project by project) to make shorter the back side (beveled side) of the crossing piers.

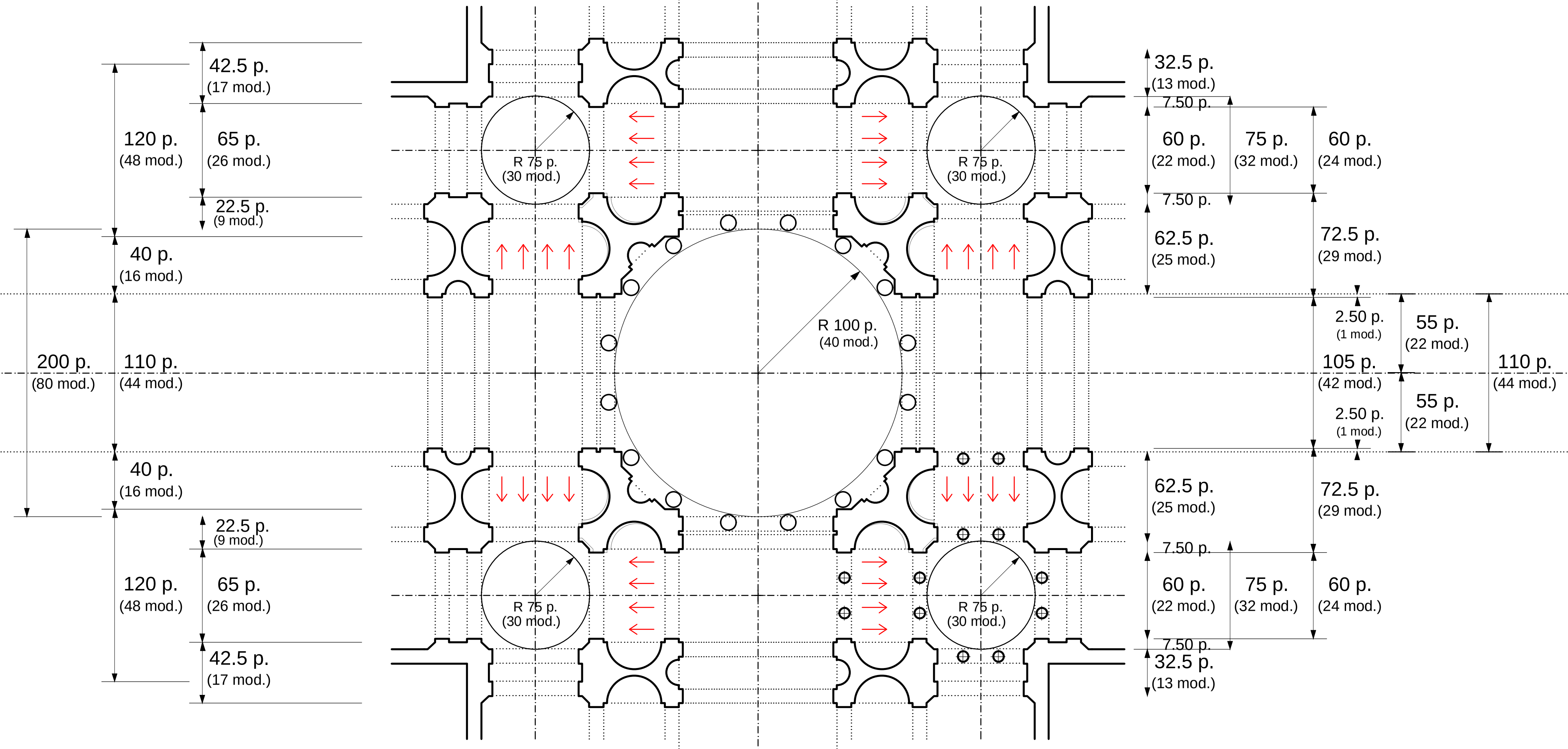
However, counterpiers are still not proportioned and the tipology of naves is not fully defined.

Back side of crossing piers must be even more narrow and, therefore, the side faces must be expanded.

$Ø_m$ MAIN DOME: 200 P.

$Ø_p$ PERIMETRAL DOMES: 80 P.

RESEARCH AND DRAWING LUIS DE GARRIDO



$Ø_m$ MAIN DOME: 200 P.

$Ø_p$ PERIMETRAL DOMES: 75 P.

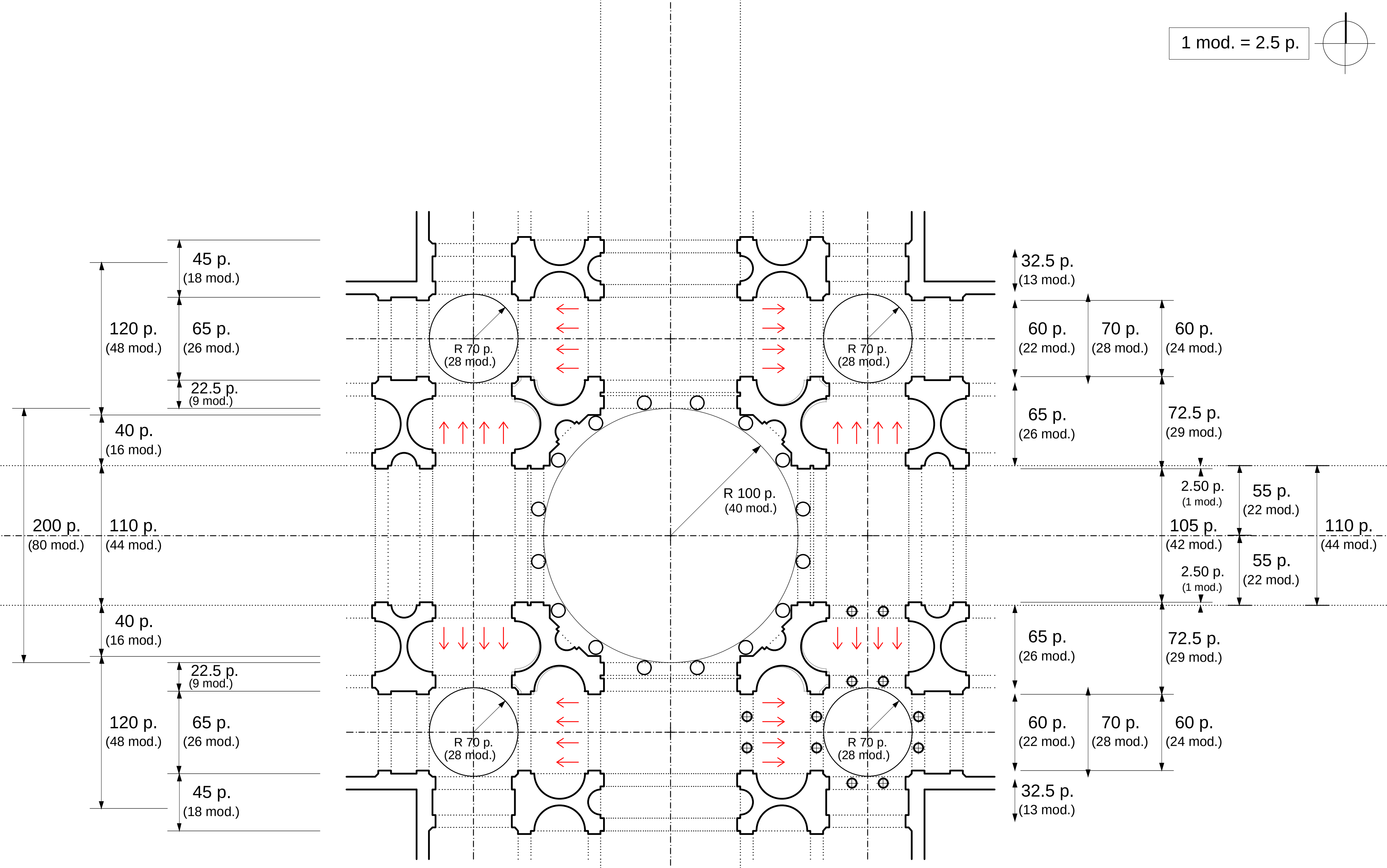
Bramante shortens even more the back side (bevered side) of the crossing piers.

Still, the lenticular counterpiers remain out of proportion and the tipology of naves is not completely achieved.

Back sides of crossing piers must be even narrower to the limit.

RESEARCH AND DRAWING LUIS DE GARRIDO

1505	TO OBTAIN A TYPOLOGY OF NAVES, PIERS OF GDSU 7945 Ar SHOULD BE MODIFIED (II)	7945 Av	4



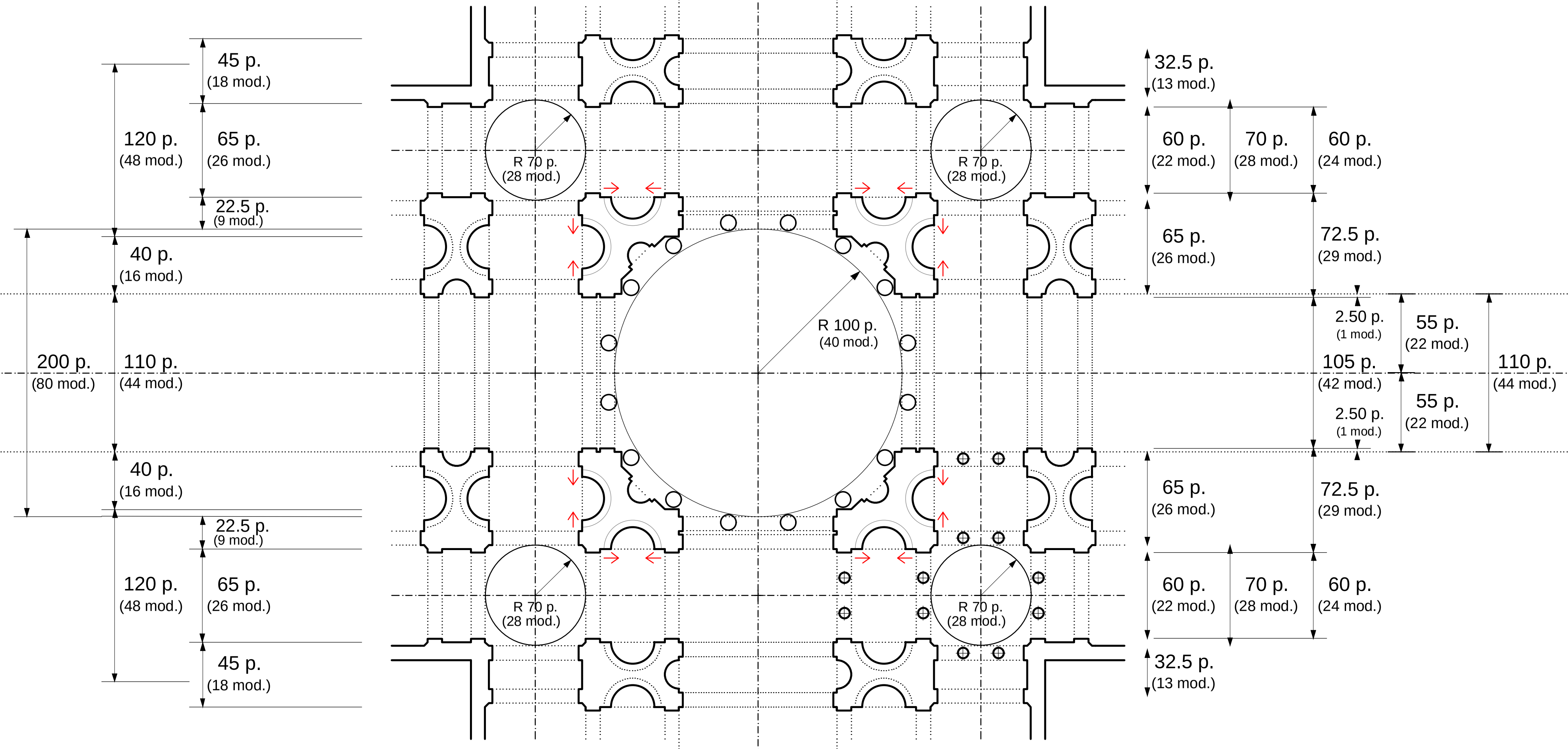
Ø_m MAIN DOME: 200 P.

Ø_p PERIMETRAL DOMES: 70 P.

Finally, Bramante gets to the very limit decreasing up to the maximum possible the back side beveled side) of the great crossing piers.

By doing this, he finally reaches to a solution integrating a quincunx tipology with a tipology of naves.

RESEARCH AND DRAWING LUIS DE GARRIDO



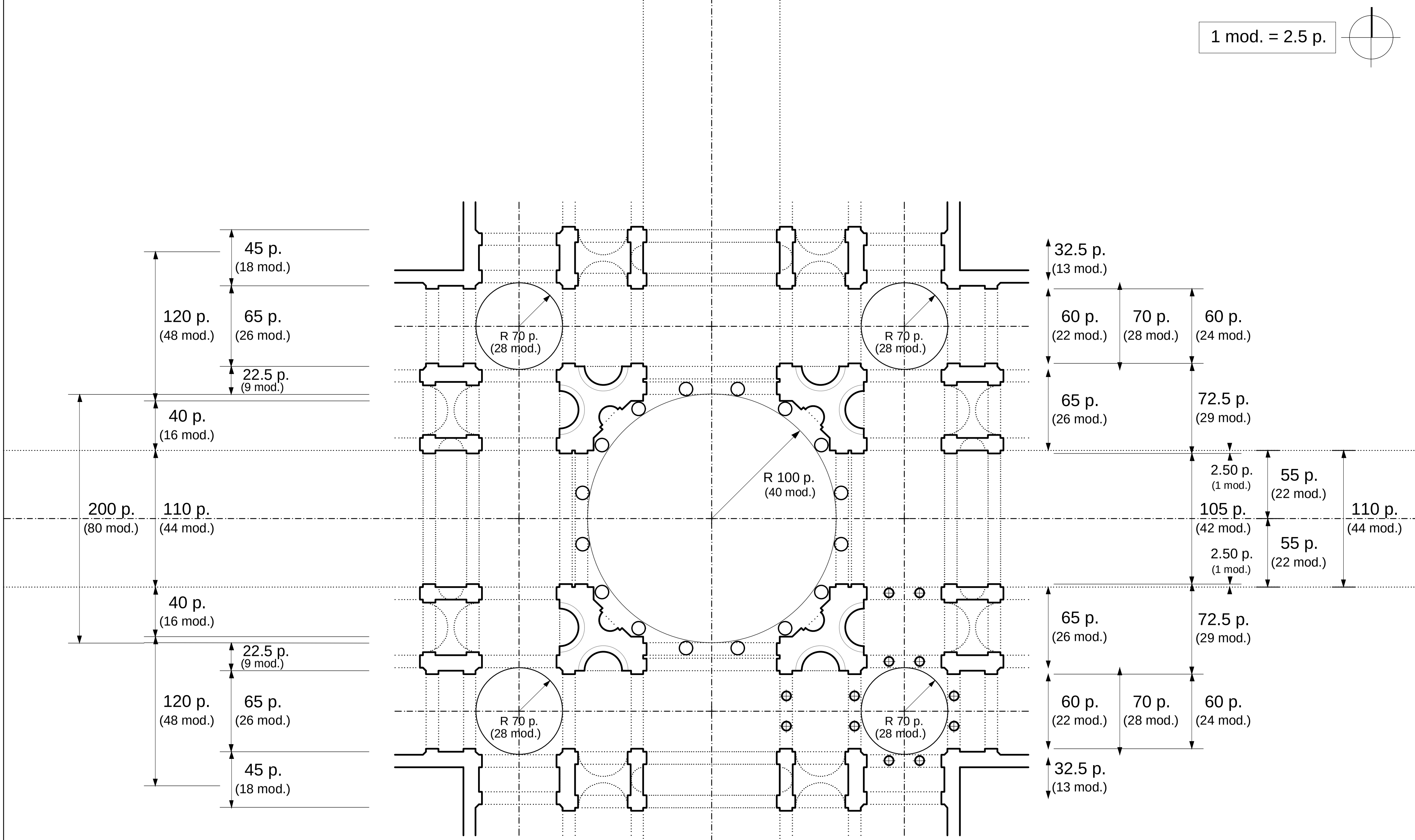
$Ø_m$ MAIN DOME: 200 P.

$Ø_p$ PERIMETRAL DOMES: 70 P.

Bramante decided to decrease the size of the niches to increase the sturdiness and resistance of the great crossing piers and lenticular counterpiers.

Project GDSU 7945 Ar is obtained

RESEARCH AND DRAWING LUIS DE GARRIDO



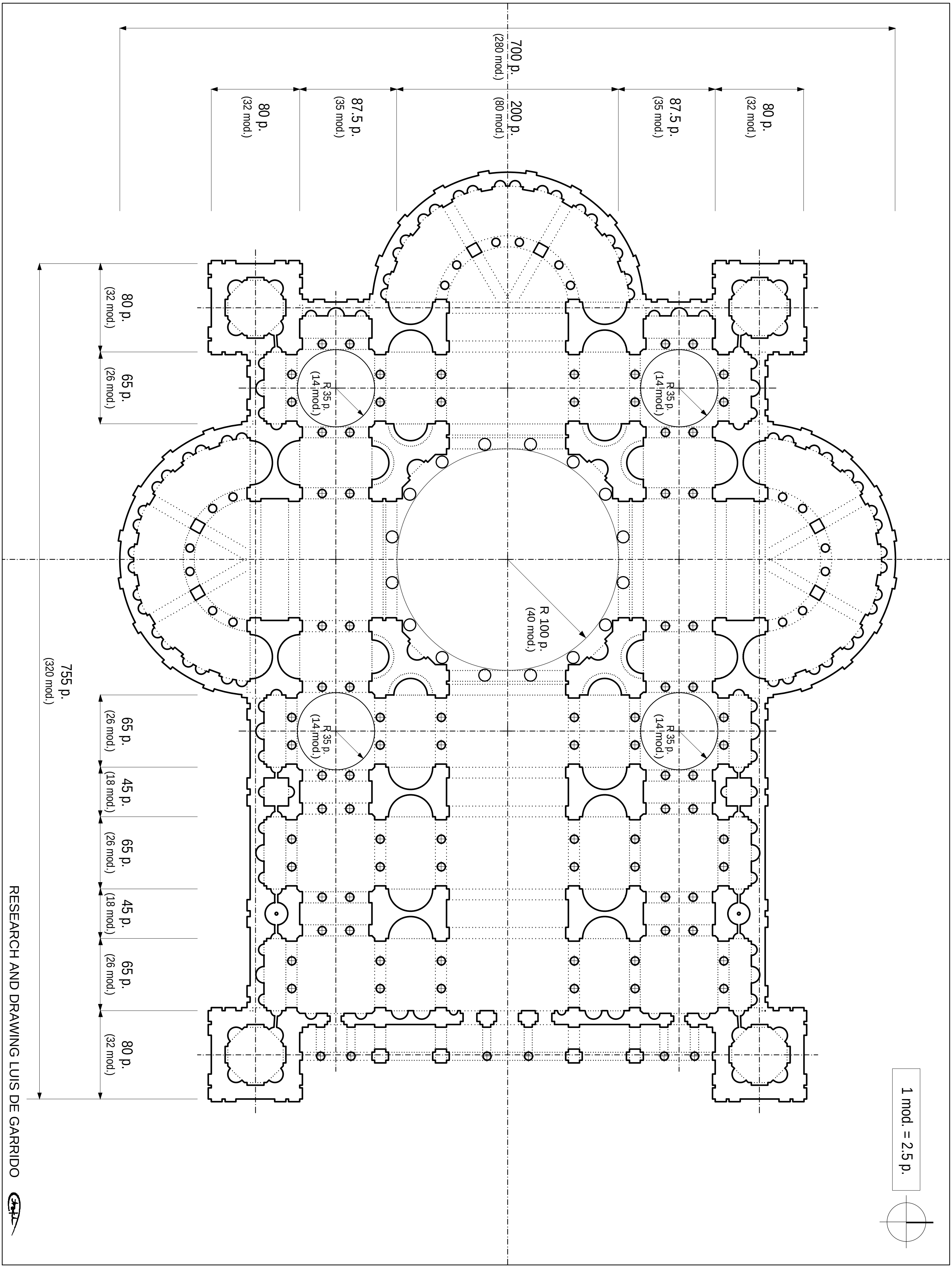
Øm MAIN DOME: 200 P.

Øp PERIMETRAL DOMES: 70 P.

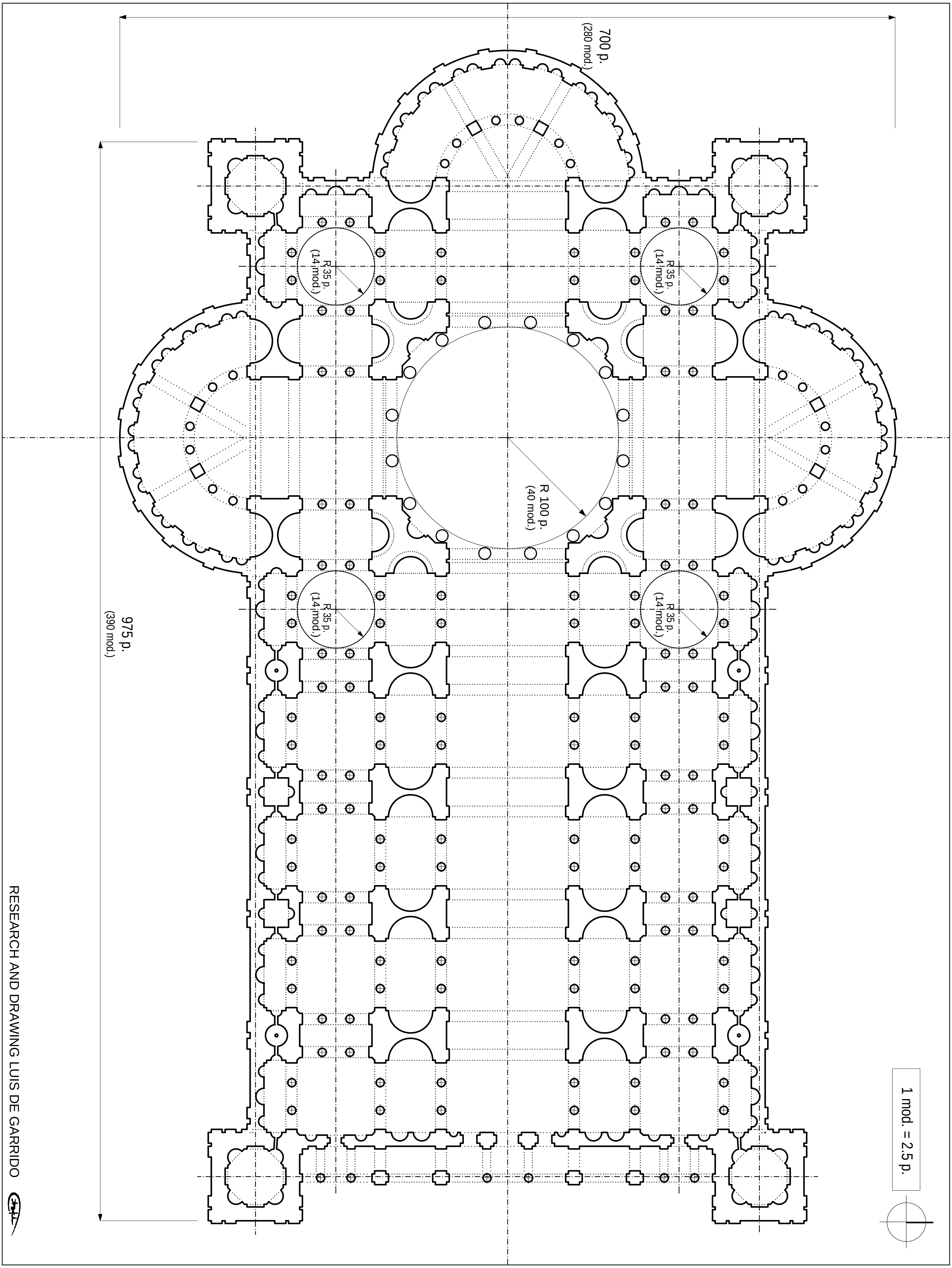
Bramante decided to replace the lateral counterpiers with independent piers.

Finally, he reaches the perfect integration of a quincunx, with smaller dimensions of perimetral domes, and the tipology of naves.

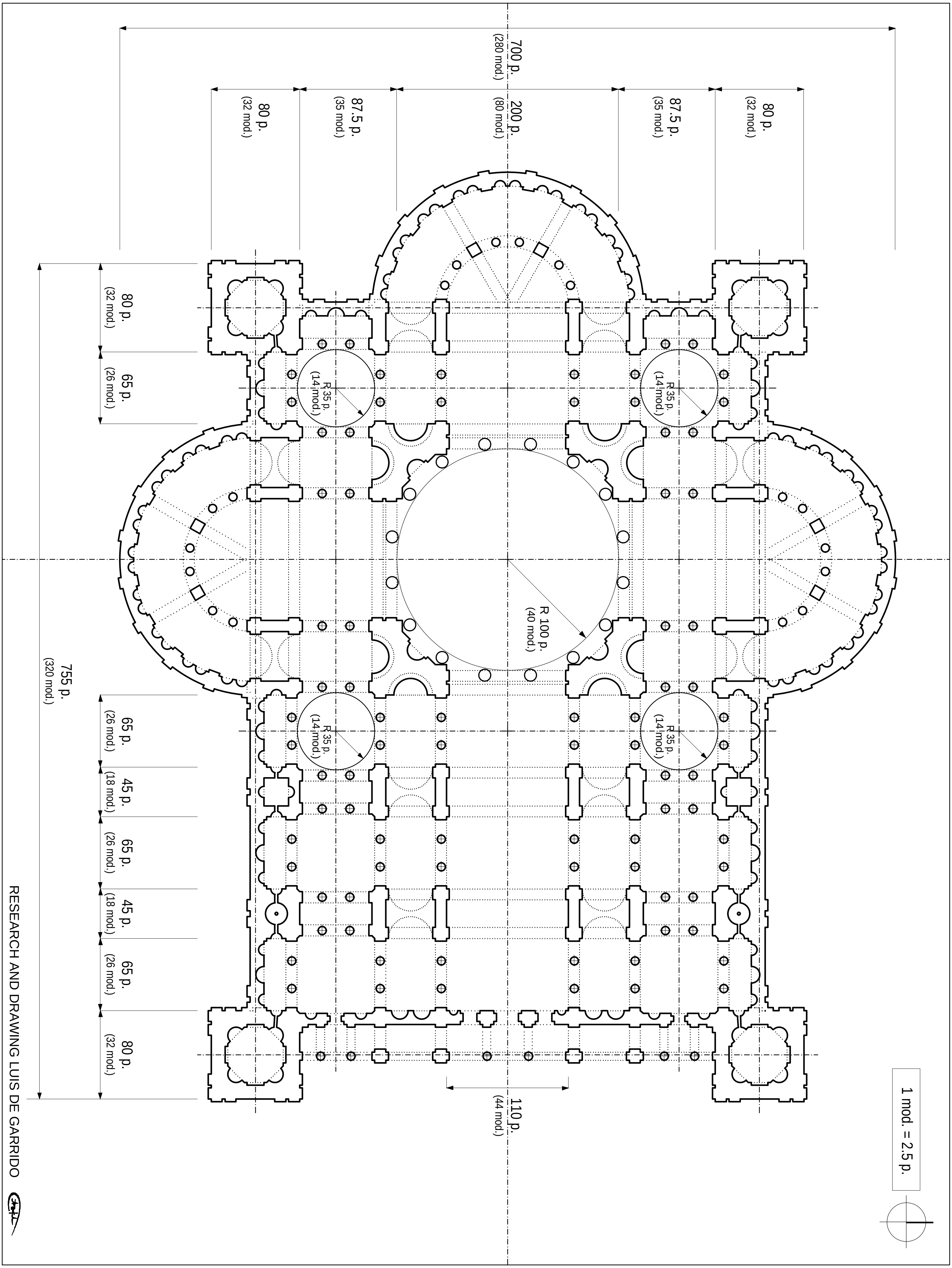
RESEARCH AND DRAWING LUIS DE GARRIDO



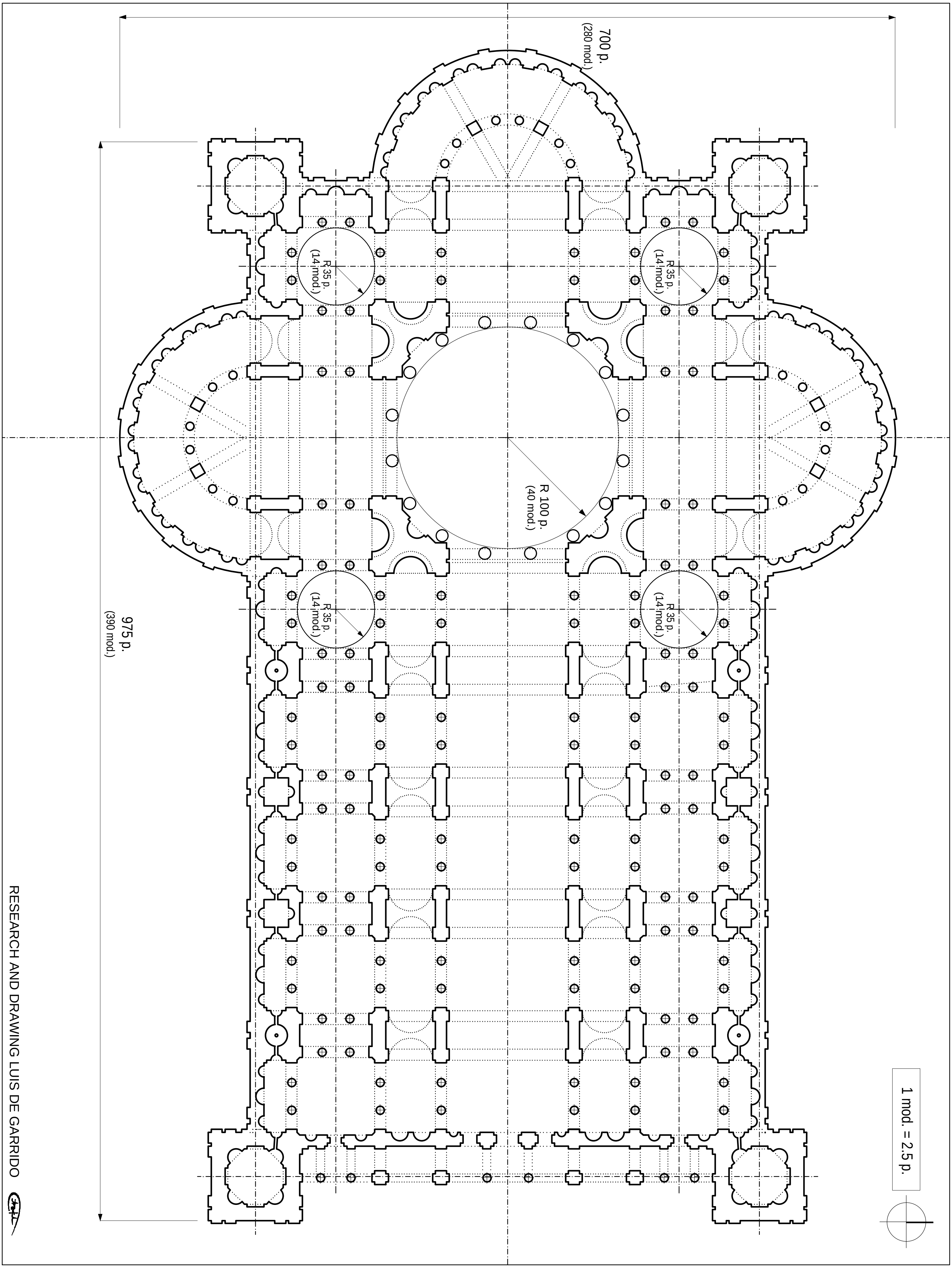
1505	QUINCUNX-NAVES TYPOLOGY. LENTICULAR COUNTER-PIERS. 3 NAVES, 3 CAMPATE	U 7945 Av	QN 3-3



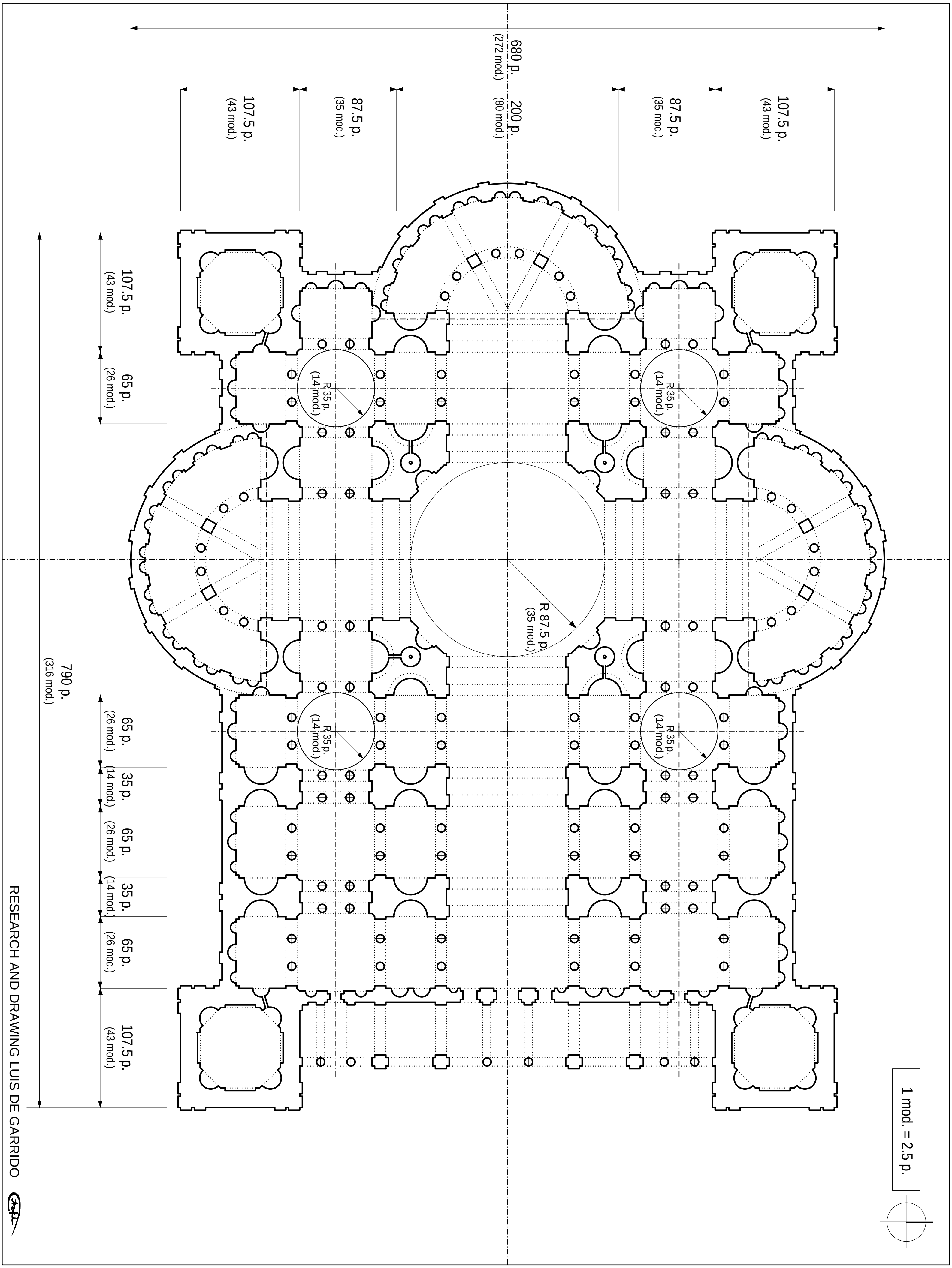
1505	QUINCUNX-NAVES TYPOLOGY. LENTICULAR COUNTER-PIERS. 3 NAVES, 5 CAMPATE	U 7945 Av	QN 3-5



1505	QUINCUNX-NAVES TYPOLOGY. PAIRED SEPTA COUNTER-PIERS. 5 NAVES, 3 CAMPATE	U 7945 Av	QN 5-3



1505	QUINCUNX-NAVES TYPOLOGY. PAIRED SEPTA COUNTER-PIERS. 5 NAVES, 5 CAMPATE	U 7945 Av	QN 5-5

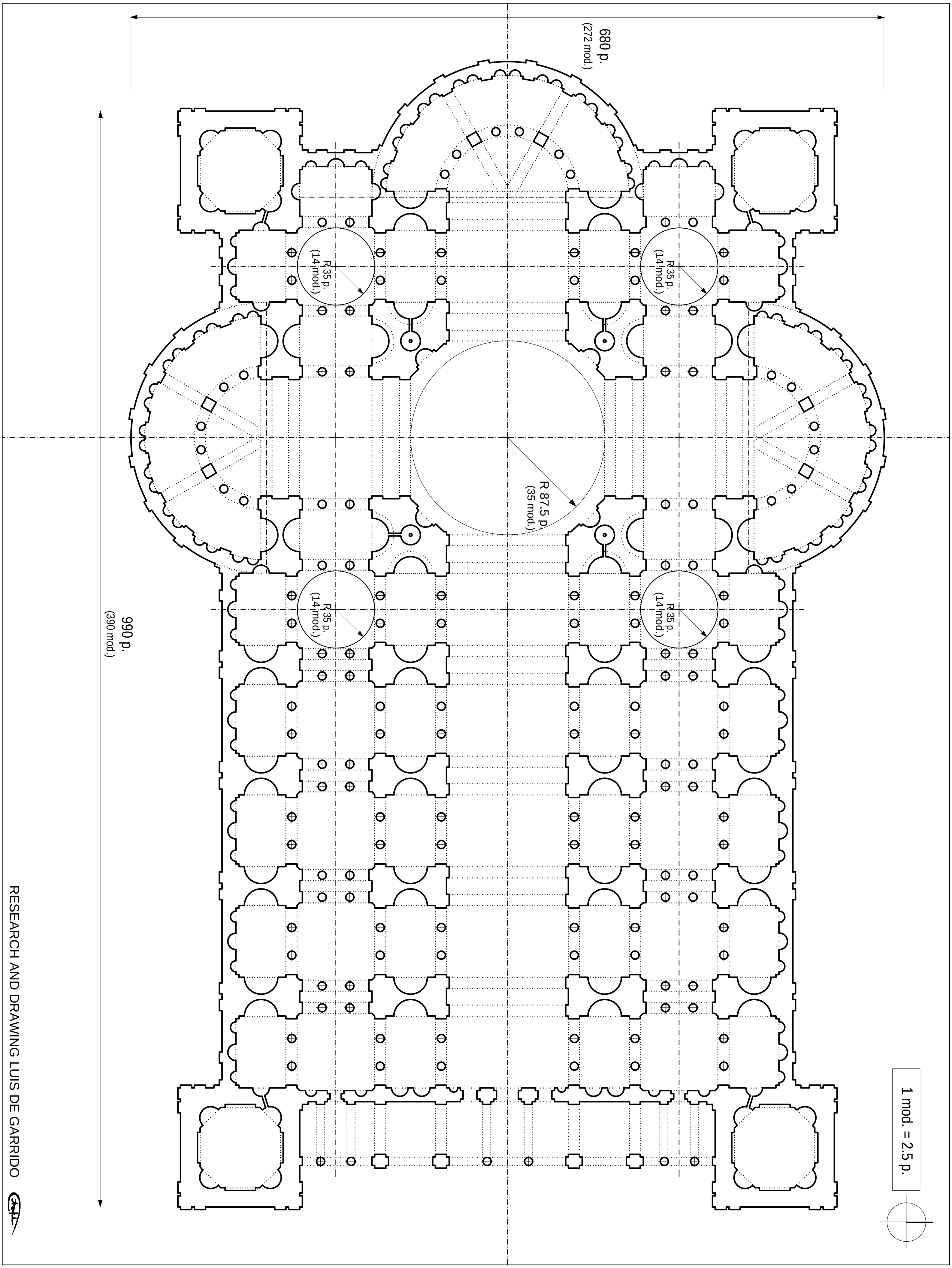


1505

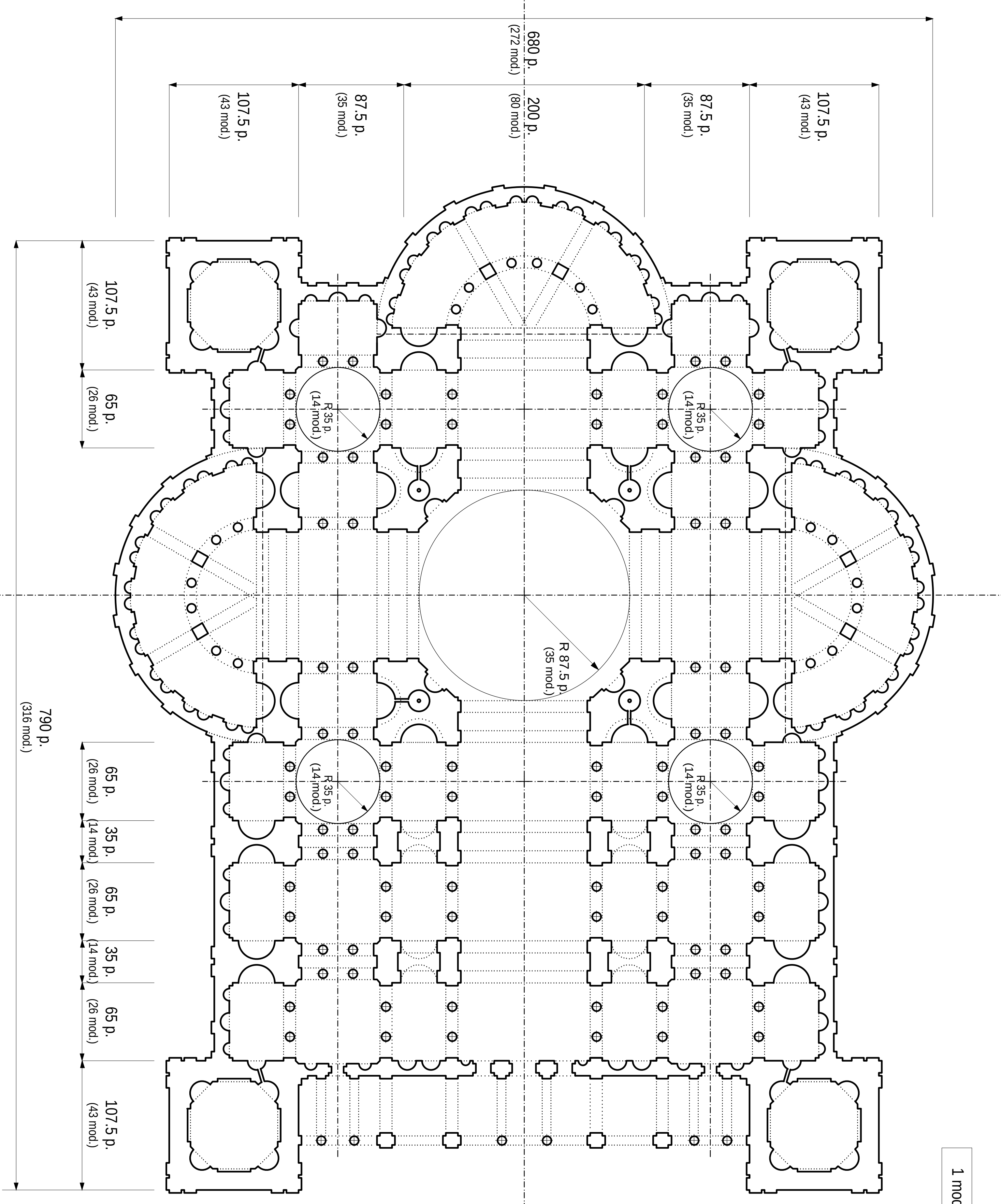
QUINCUNX-NAVES TYPOLOGY (B). LENTICULAR COUNTER-PIERS. 3 NAVES, 3 CAMPATE

U 7945 Av

QNB 3-3



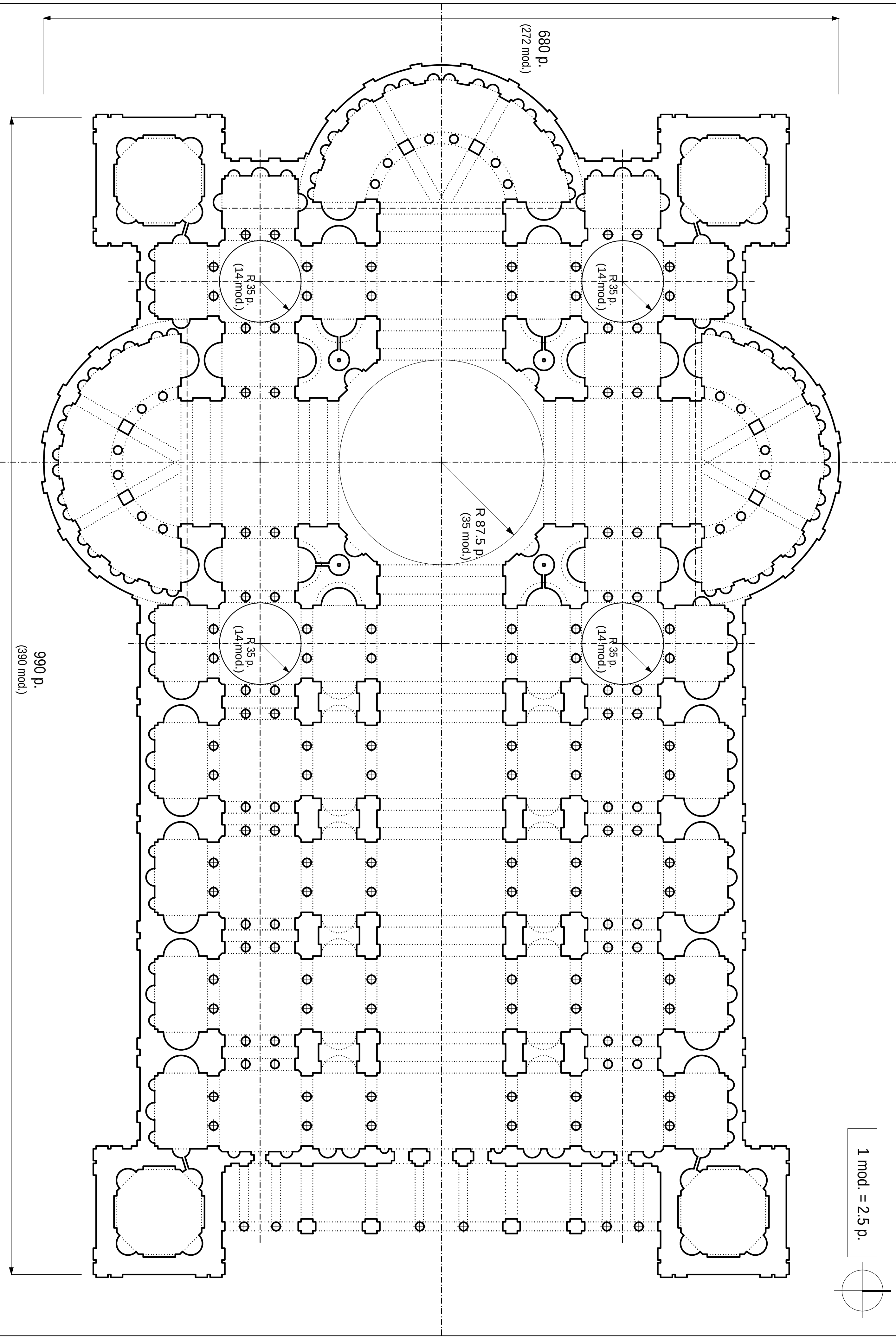
1505	QUINCUNX-NAVES TYPOLOGY (B). LENTICULAR COUNTER-PIERS. 3 NAVES, 5 CAMPATE	U 7945 Av	QNB 3-5



1 mod. = 2.5 p.

RESEARCH AND DRAWING LUIS DE GARRIDO

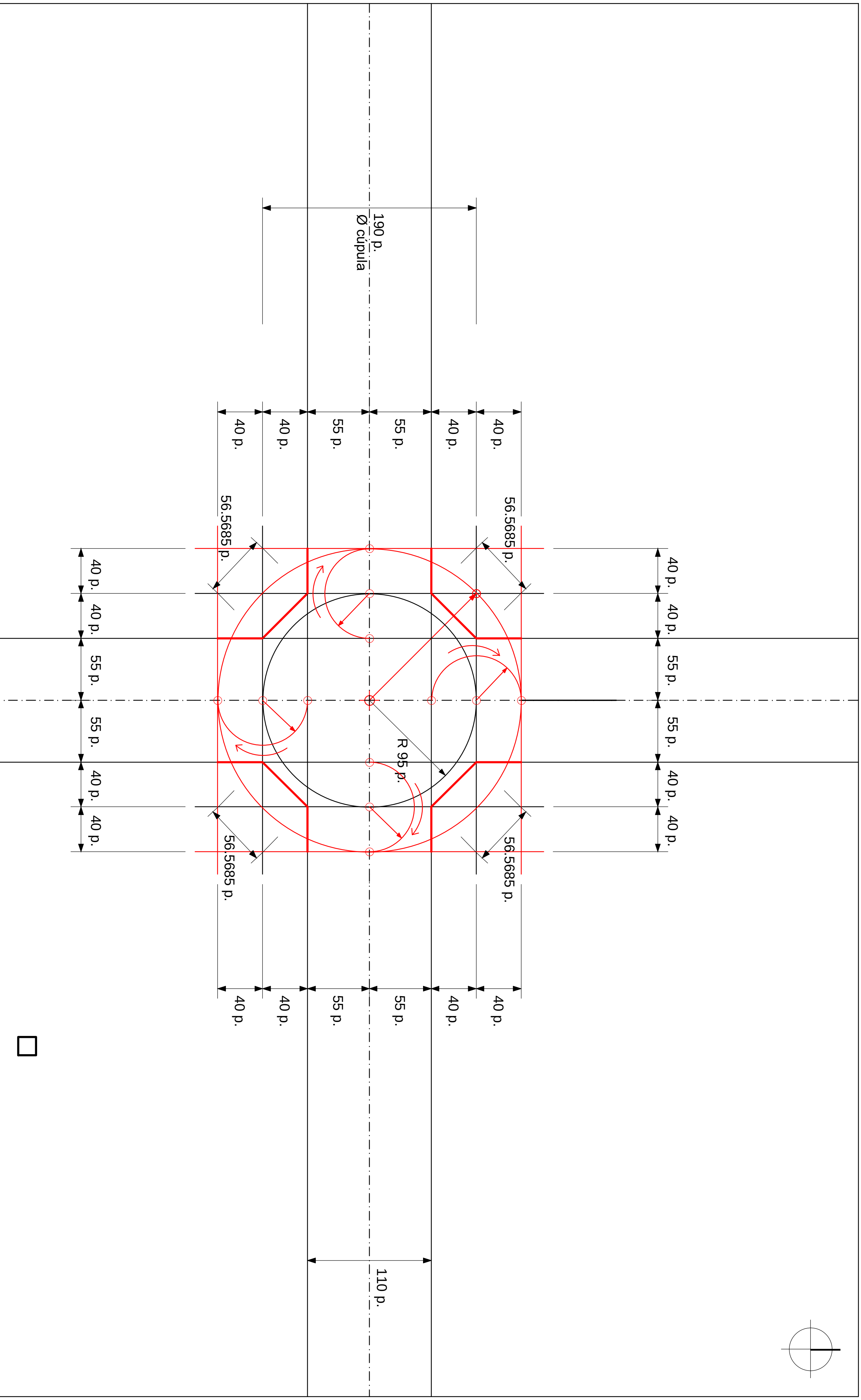
1505	QUINCUNX-NAVES TYPOLOGY (B). PAIRED SEPTA COUNTER-PIERS. 5 NAVES, 3 CAMPATE	U 7945 Av	QNB 5-3



RESEARCH AND DRAWING LUIS DE GARRIDO

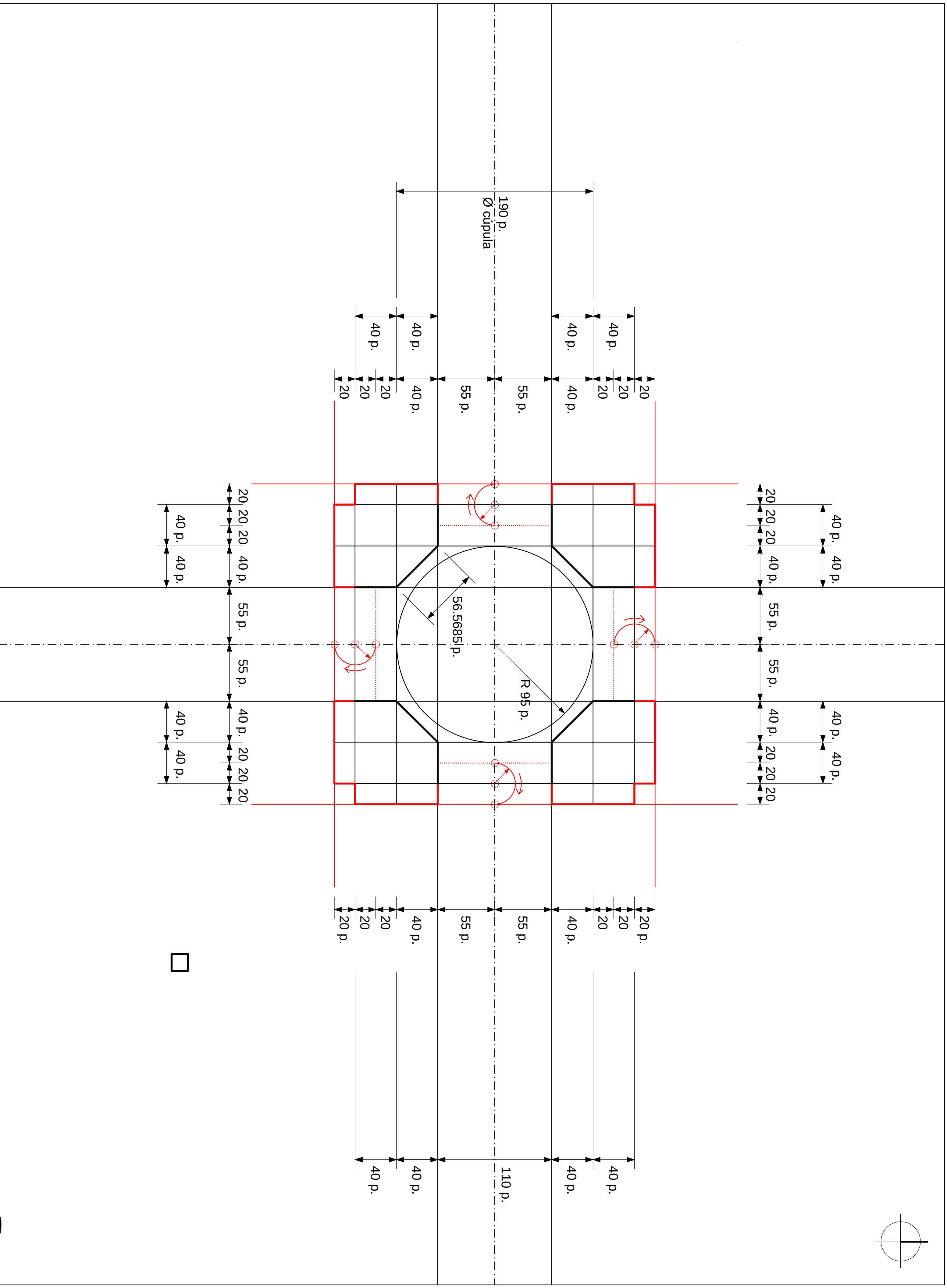
1505	QUINCUNX-NAVES TYPOLOGY (B). PAIRED SEPTA COUNTER-PIERS. 5 NAVES, 5 CAMPATE	U 7945 Av	QNB 5-5

RECONSTRUCTION OF GDSU 20 A DESIGN ALTERNATIVES



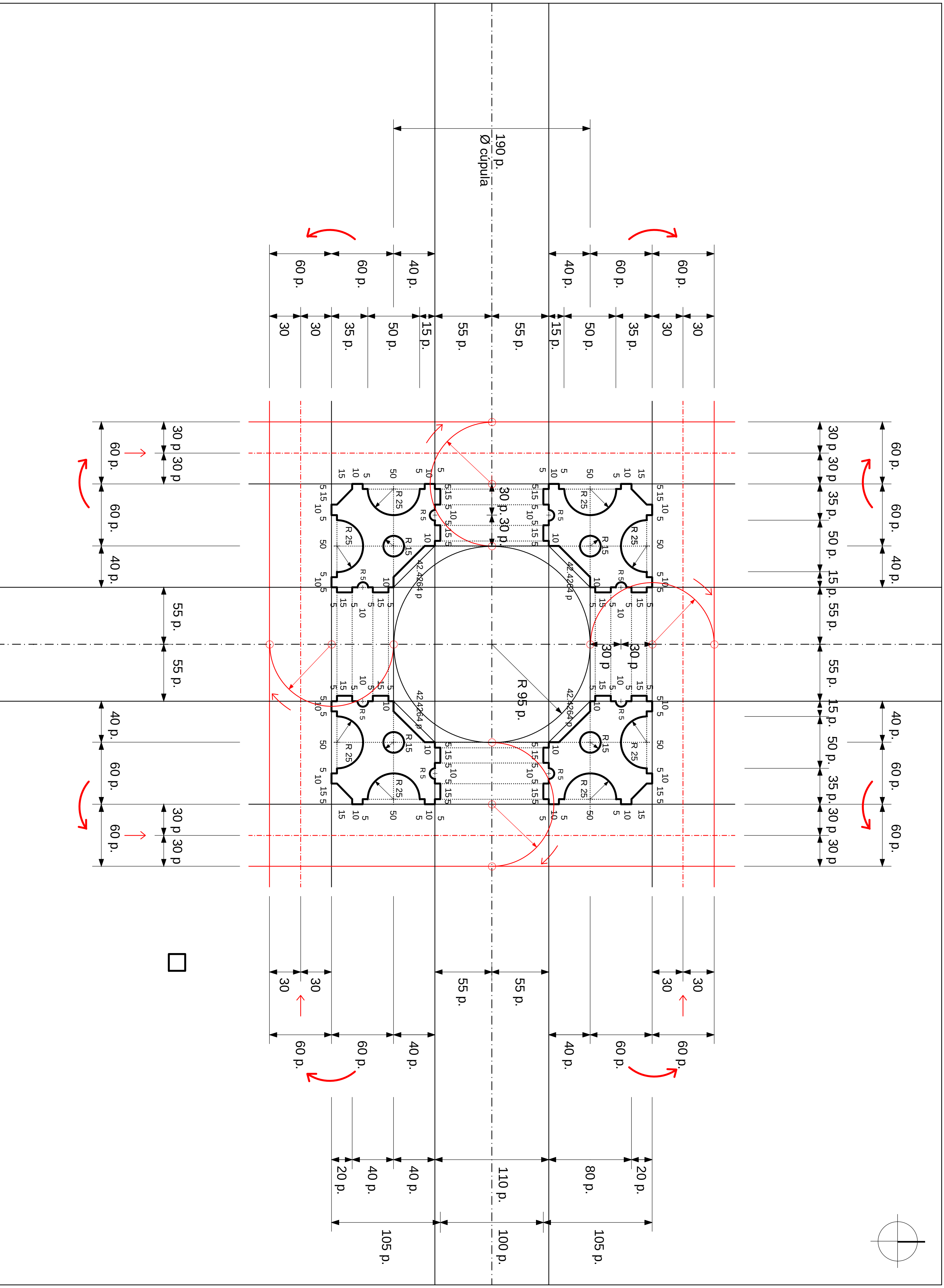
RESEARCH AND DRAWING LUIS DE GARRIDO

1505/06	ESTABLISHING THE INTERIOR SIDES OF THE CROSSING-PIERS	GDSU 20 Ar	1



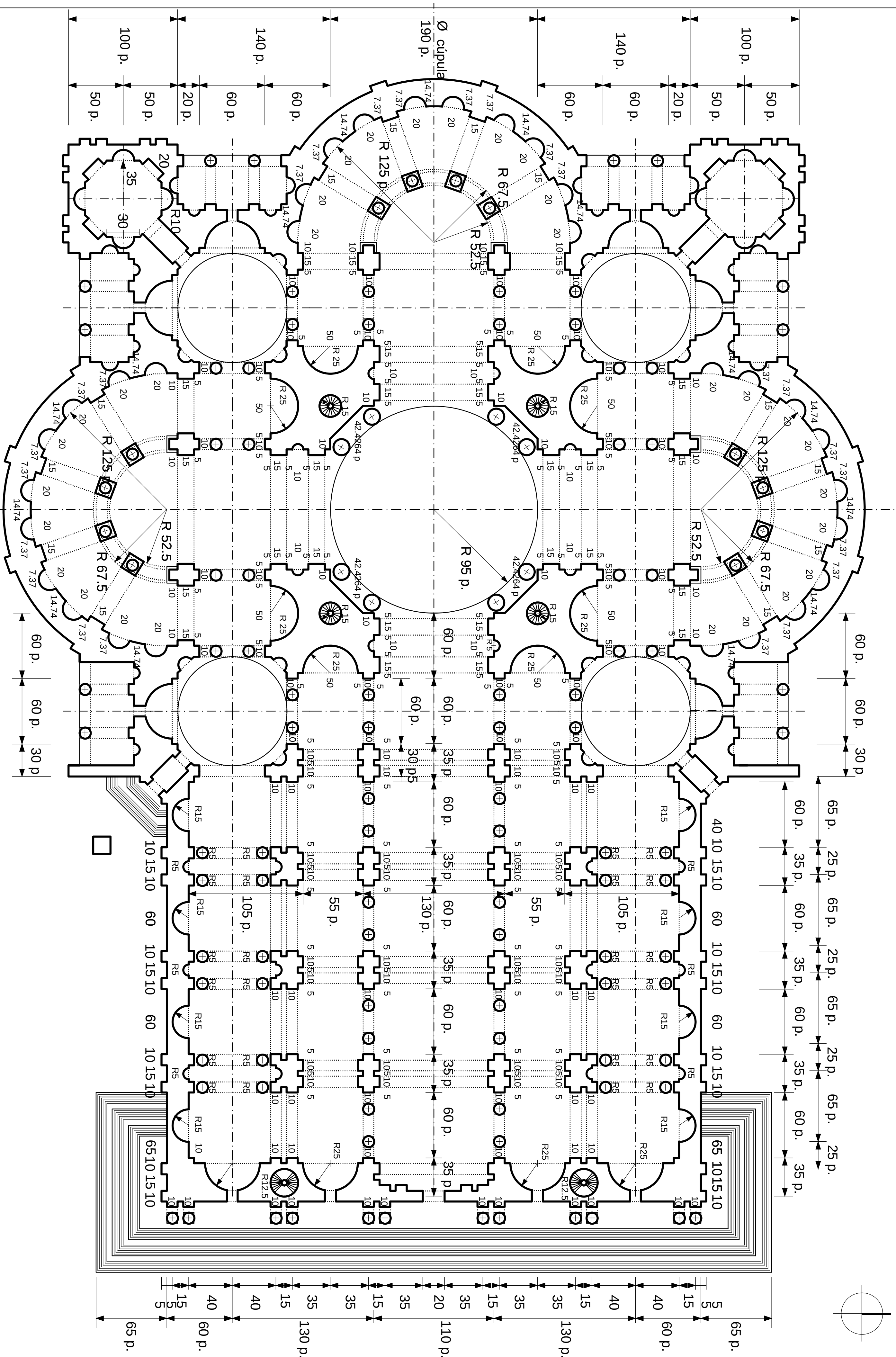
RESEARCH AND DRAWING LUIS DE GARRIDO

1505/06	ESTABLISHING THE EXTERIOR SIDES OF THE CROSSING-PIERS	GDSU 20 Ar	2



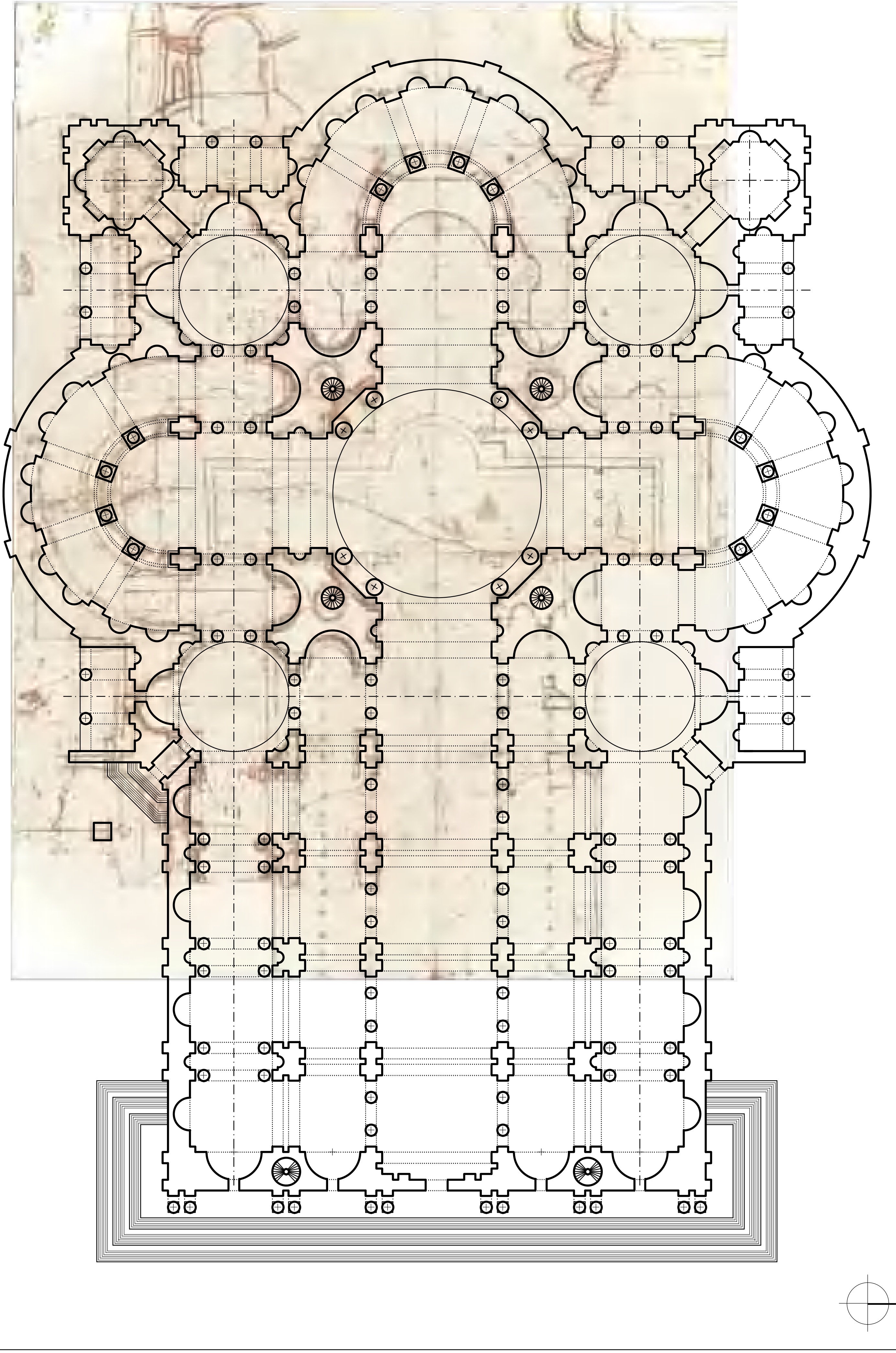
RESEARCH AND DRAWING LUIS DE GARRIDO

1505/06	ESTABLISHING THE QUINCUNX TYPOLOGY	GDSU 20 Ar	3



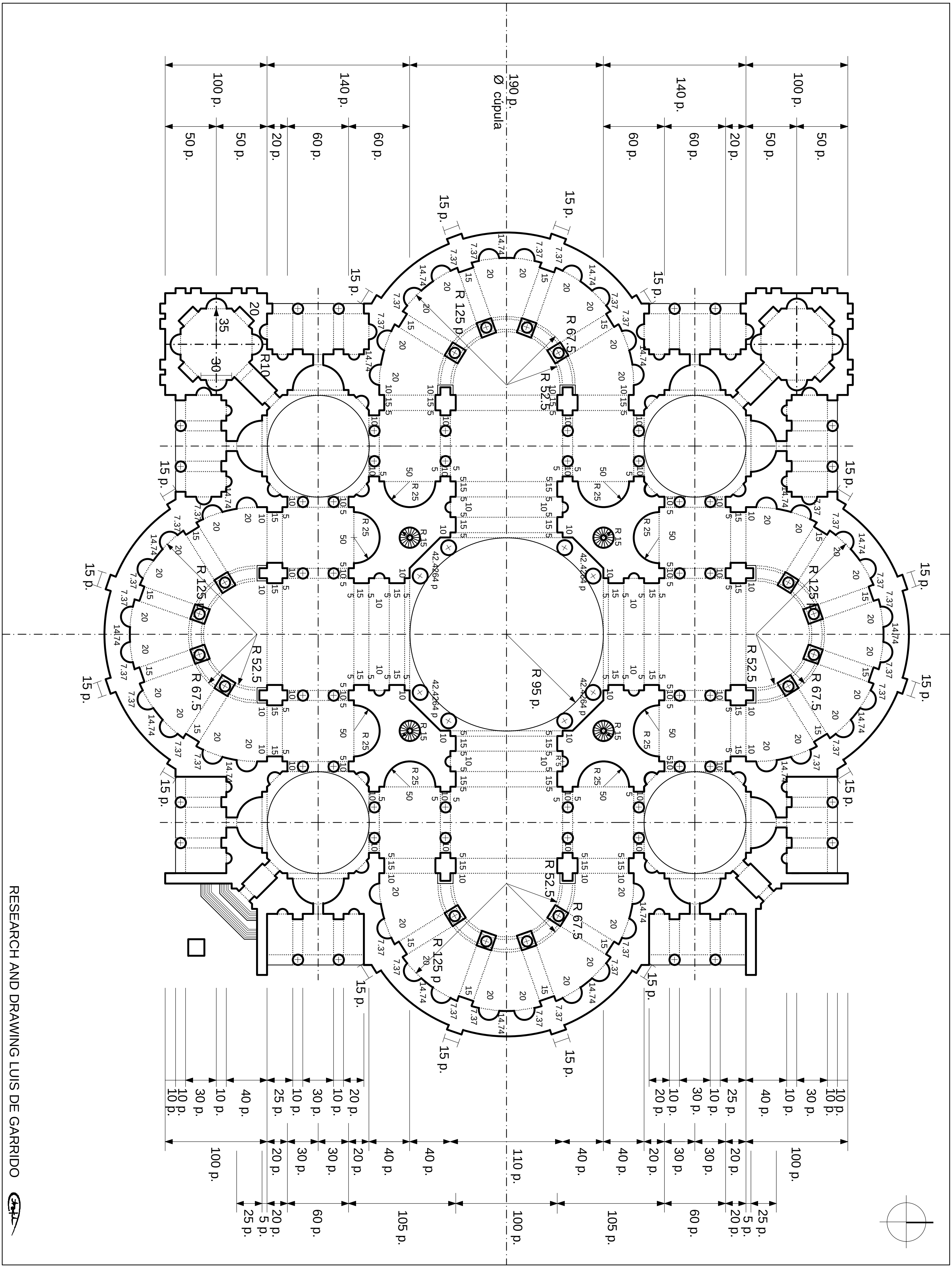
RESEARCH AND DRAWING LUIS DE GARRIDO

1505/06	RECONSTRUCTED PROJECT GDSU 20 Ar (LONGITUDINAL FLOOR PLAN)	GDSU 20 Ar	N 1

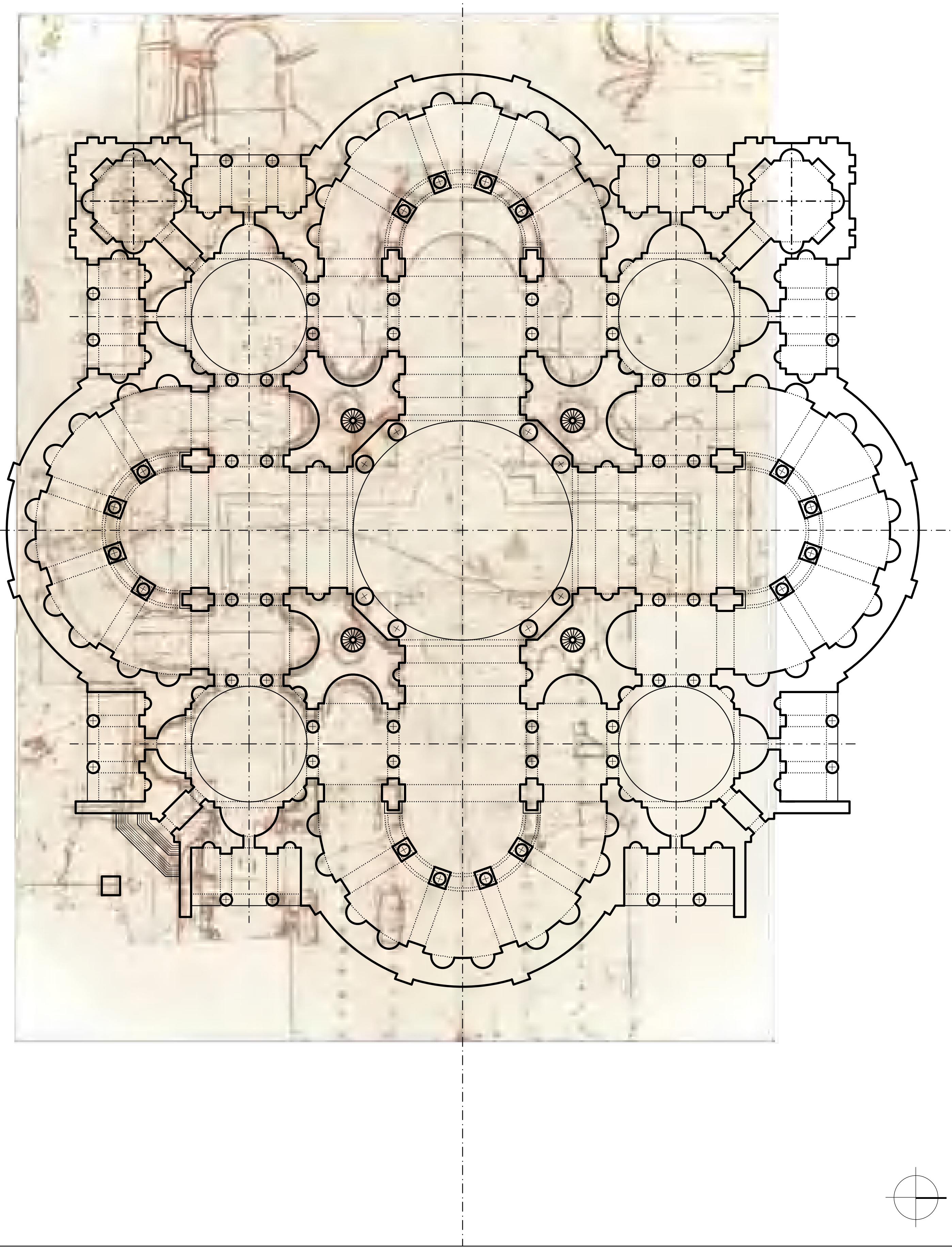


RESEARCH AND DRAWING LUIS DE GARRIDO

1505/06	RECONSTRUCTED PROJECT GDSU 20 Ar (LONGITUDINAL FLOOR PLAN), OVERLAY	GDSU 20 Ar	N 2



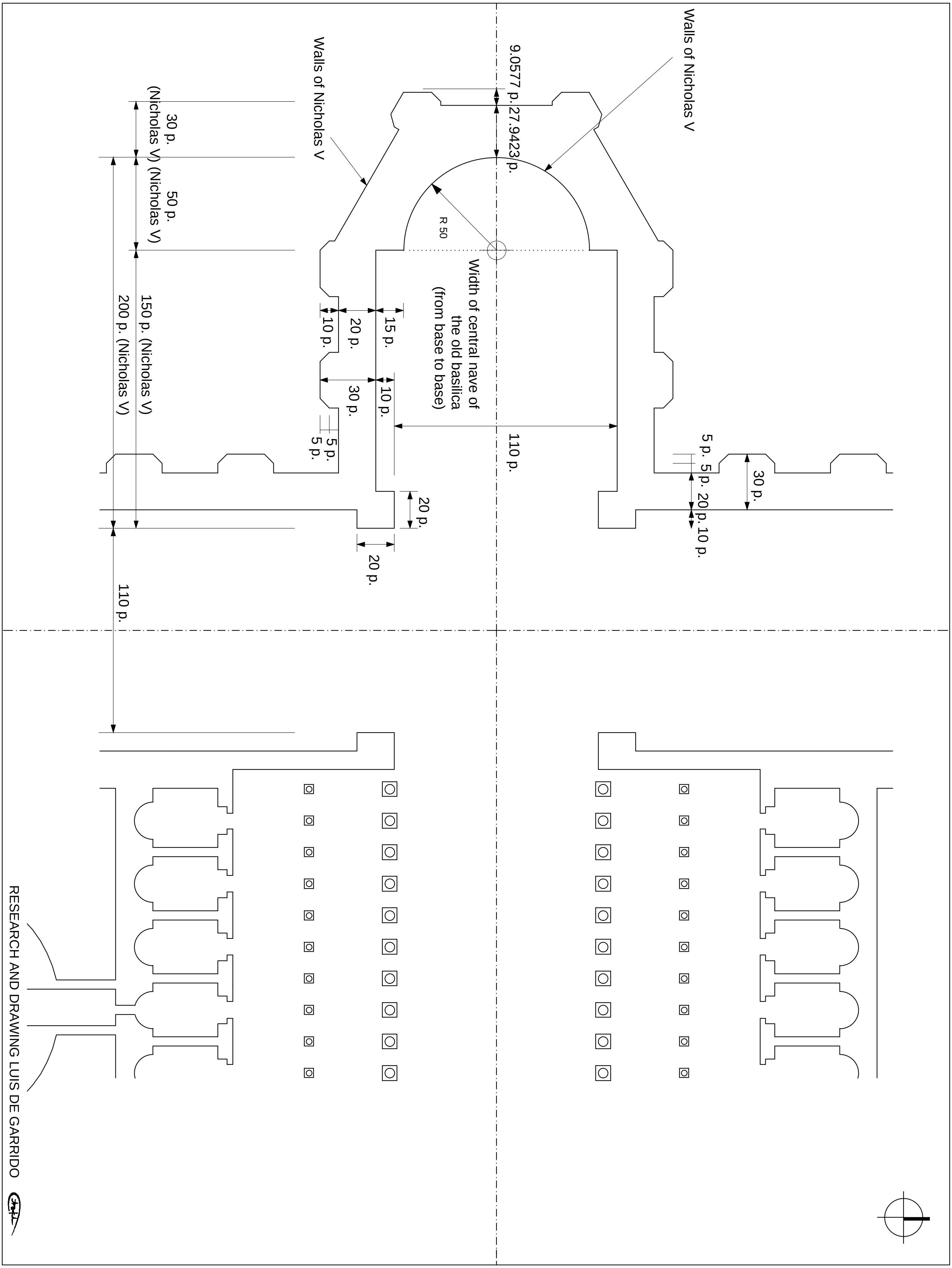
1505/06	RECONSTRUCTED PROJECT GDSU 20 Ar (CENTRALIZED FLOOR PLAN)	GDSU 20 Ar	Q 1



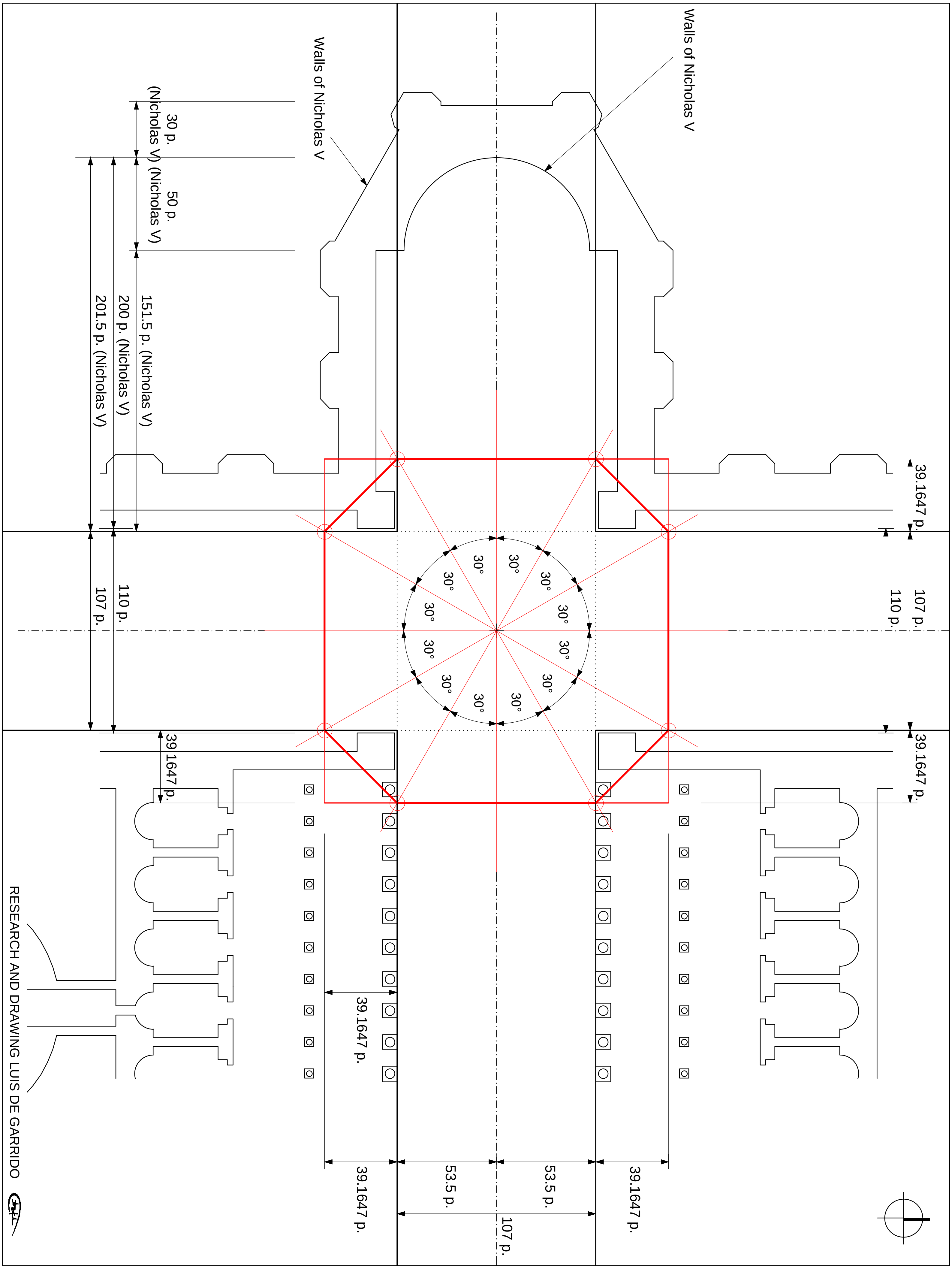
RESEARCH AND DRAWING LUIS DE GARRIDO

1505/06	RECONSTRUCTED PROJECT GDSU 20 Ar (CENTRALIZED FLOOR PLAN), OVERLAY	GDSU 20 Ar	Q 2

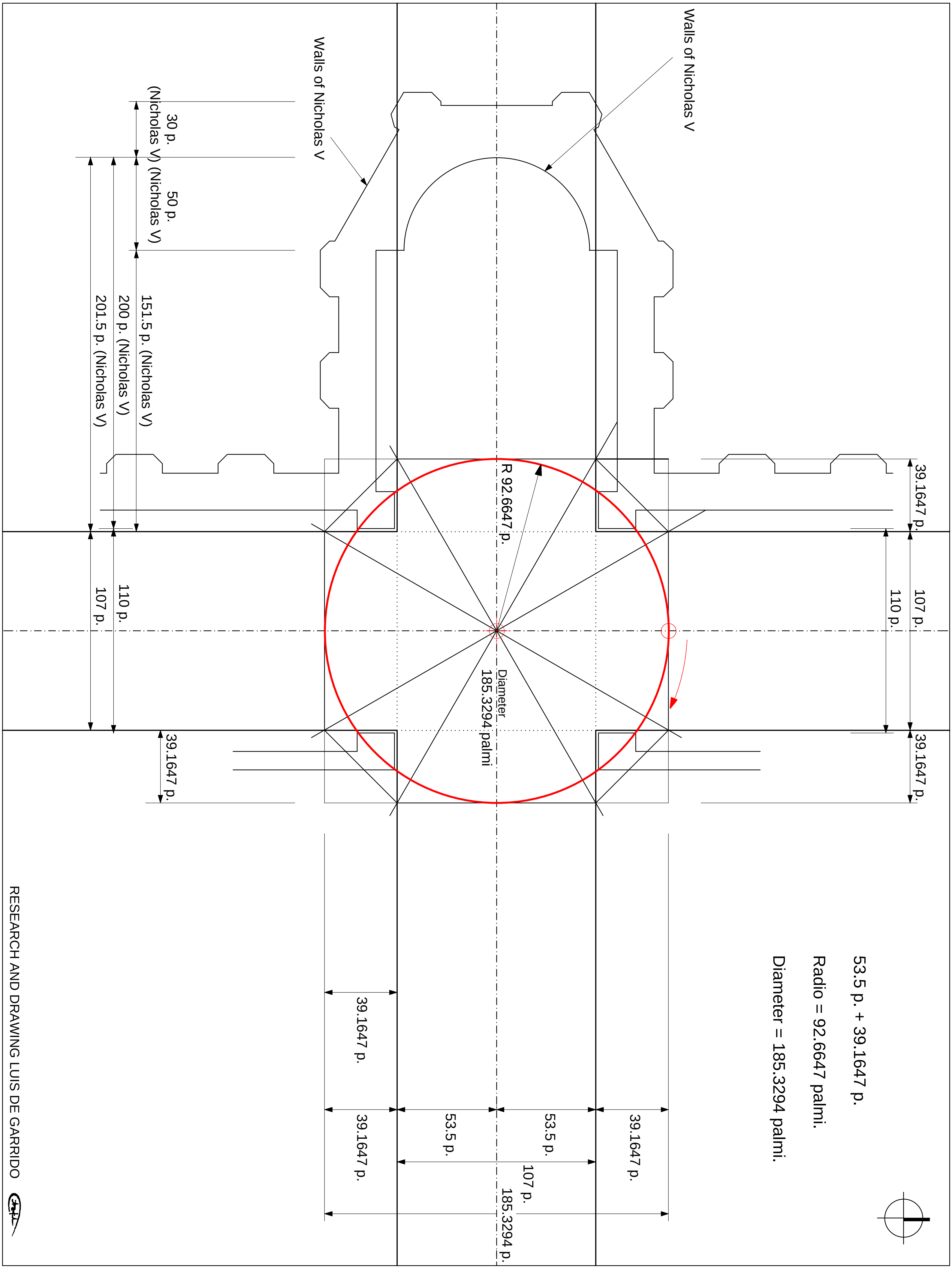
RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF CENTRAL NUCLEUS PROJECT



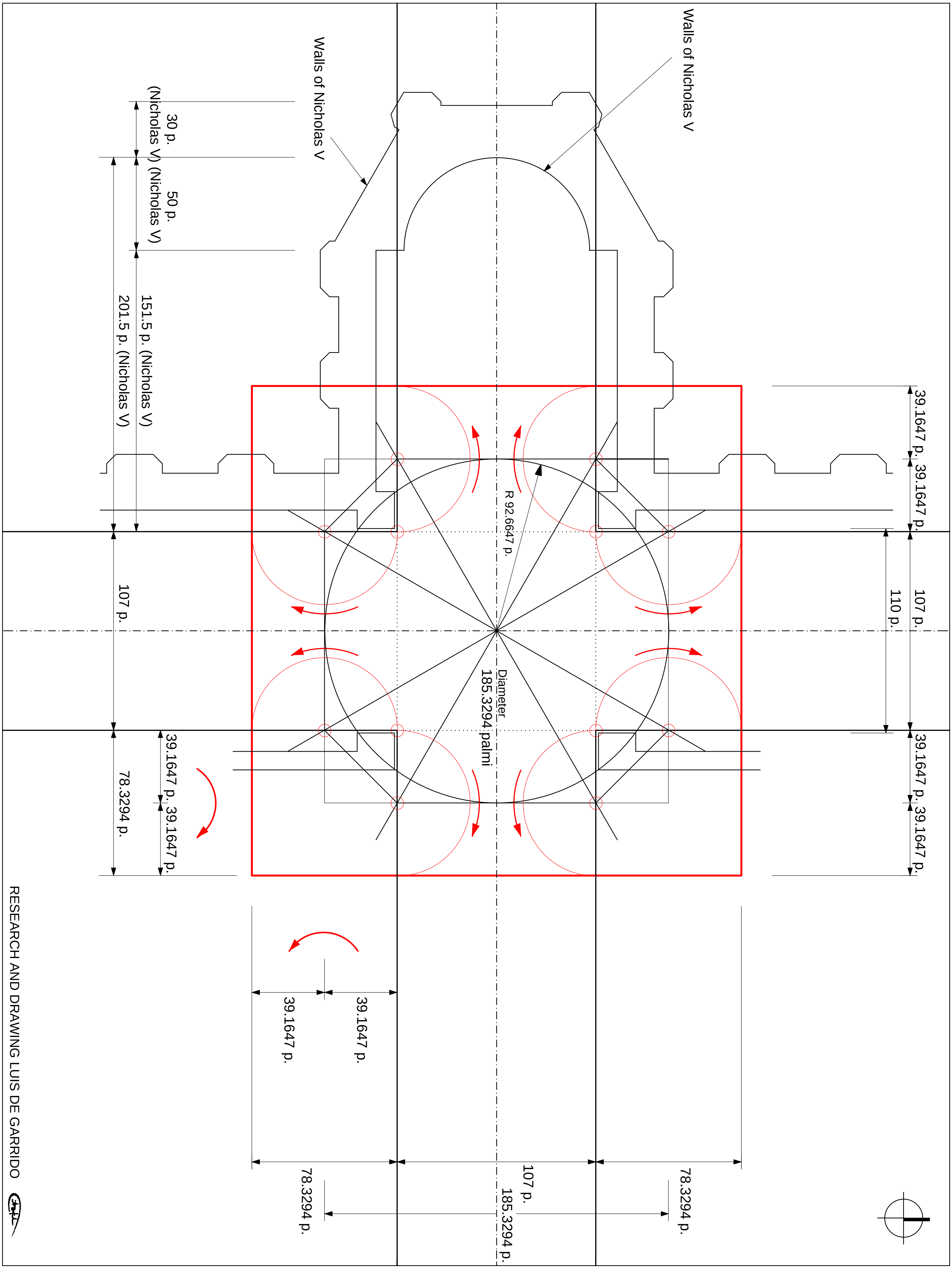
1514/15	NICHOLAS V PROJECT (ONLY THE WESTERN ARM WALLS WERE PARTIALLY BUILT)	CENTRAL NUCLEUS	1



1514/15	DEDUCING THE COMPOSITIONAL GEOMETRICAL OCTAGON: EXACT OCTAGON	CENTRAL NUCLEUS	2



1514/15	DEDUCING THE DIAMETER OF THE DOME (185.3294 palmi)	CENTRAL NUCLEUS	3

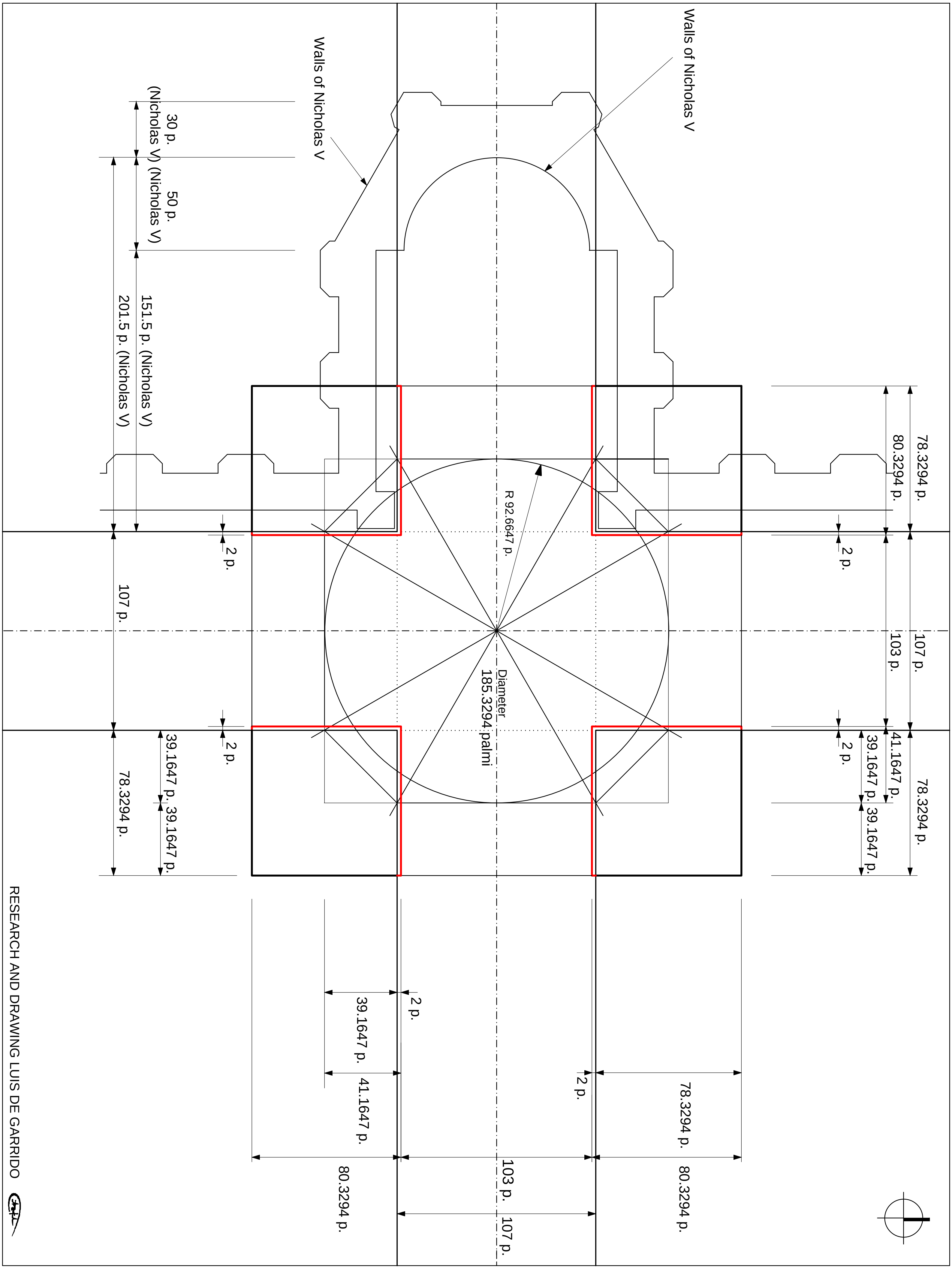


1514/15

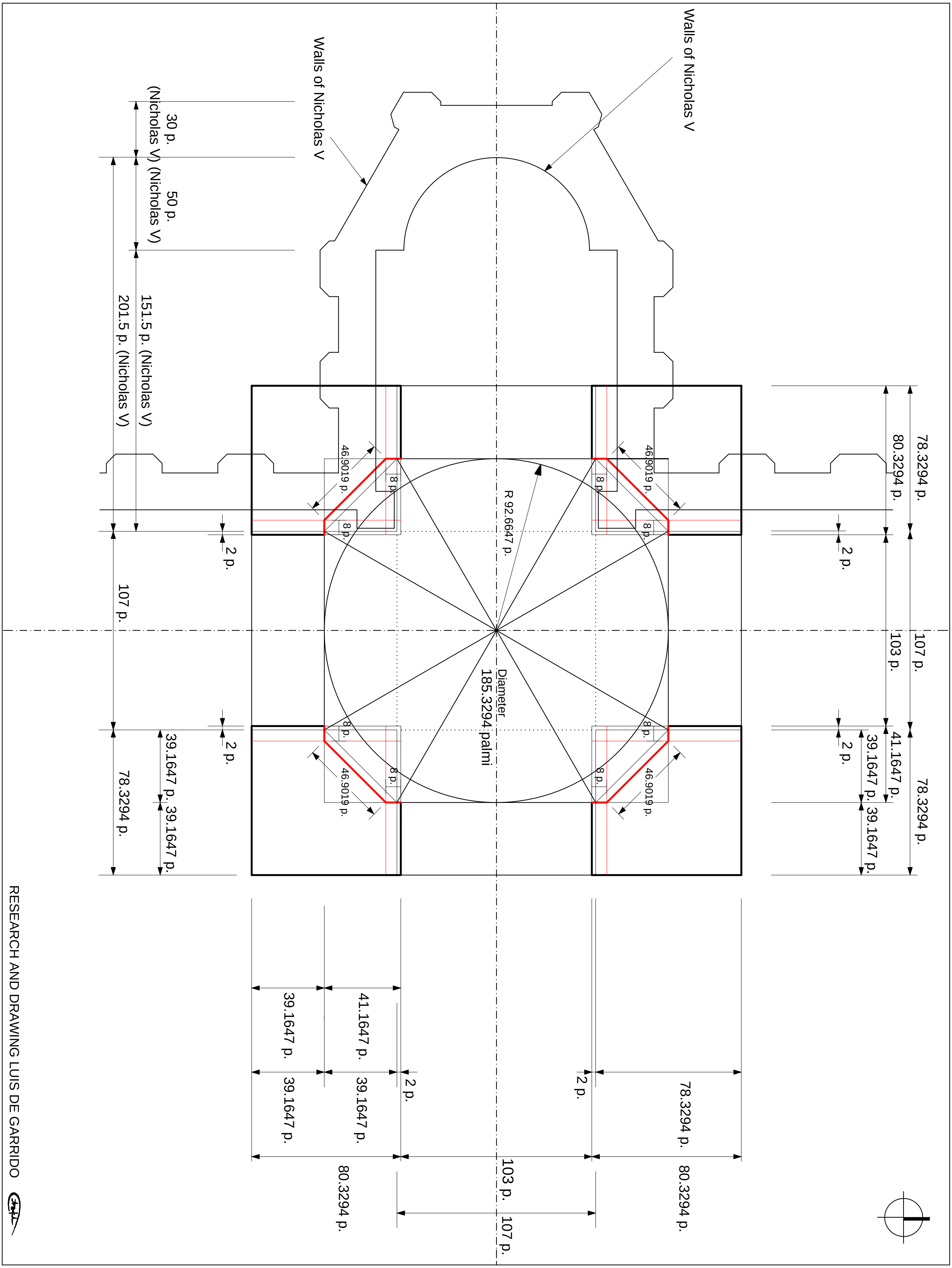
ESTABLISHING THE AUXILIARY LINES OF THE CROSSING-PIERS

CENTRAL NUCLEUS

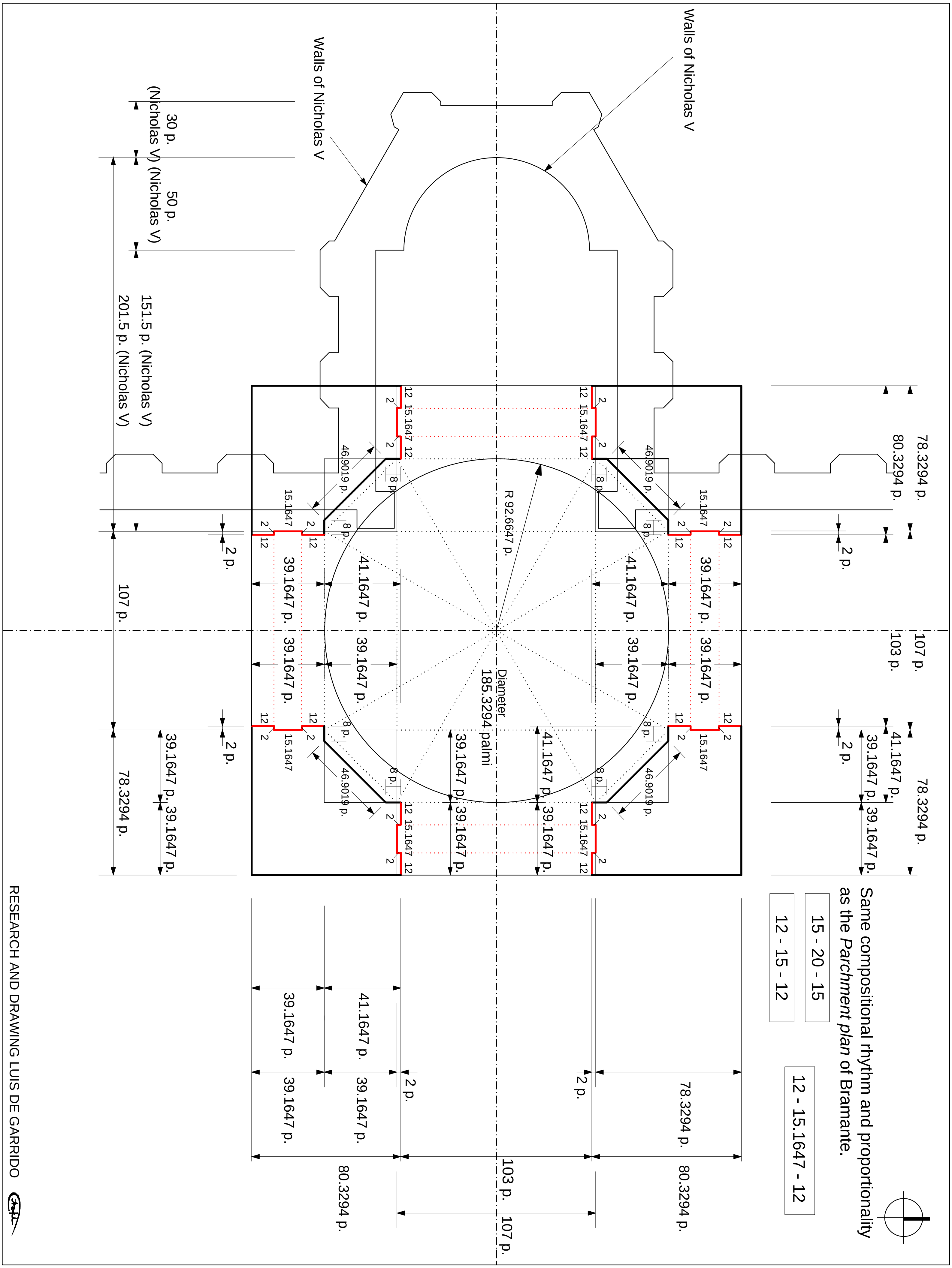
4



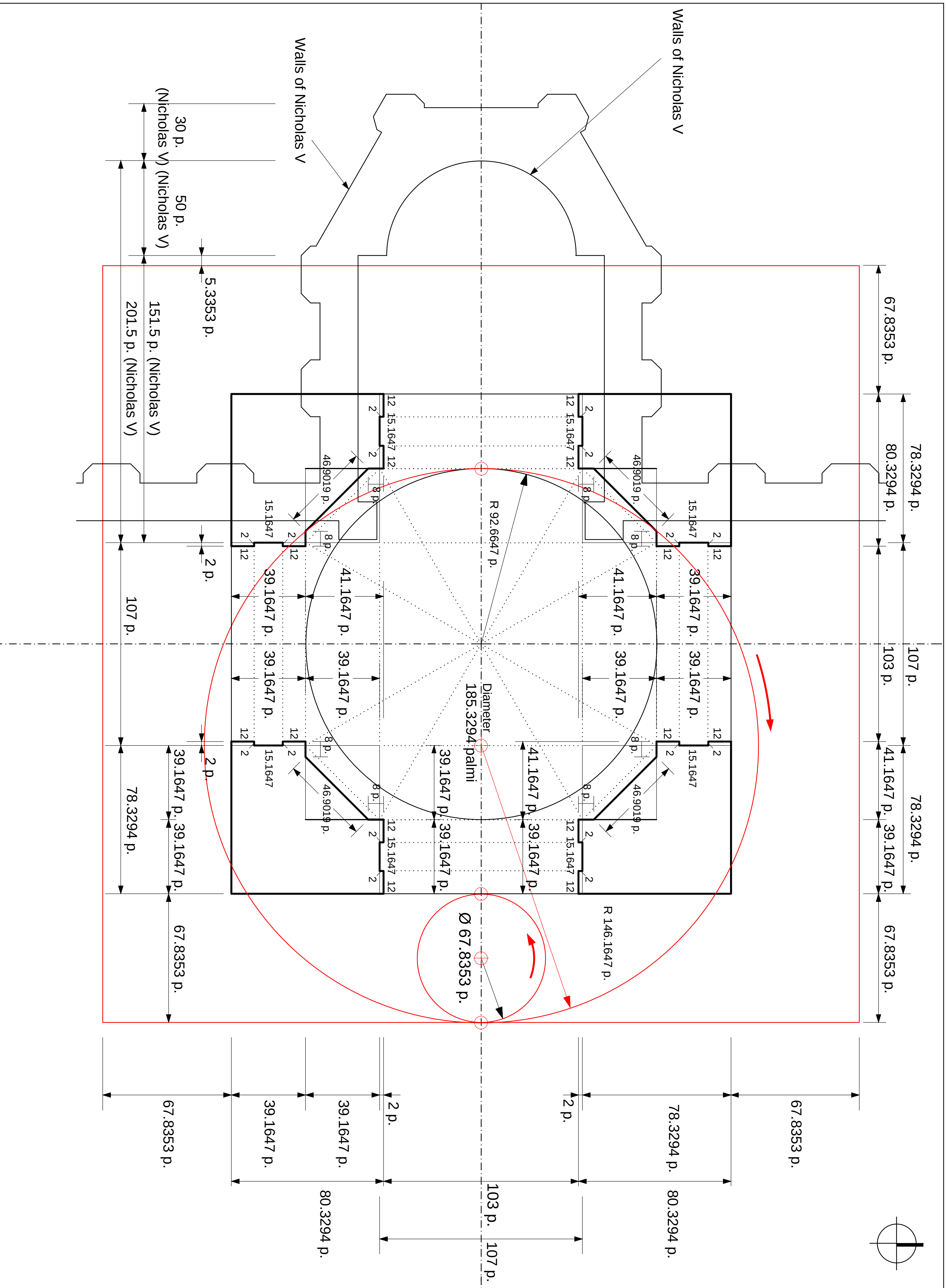
1514/15	ESTABLISHING THE INTERNAL PERIMETER OF THE CROSSING-PIERS	CENTRAL NUCLEUS	5



1514/15	ESTABLISHING THE DESIGN CONFIGURATION OF THE CROSSING-PIERS	CENTRAL NUCLEUS	6

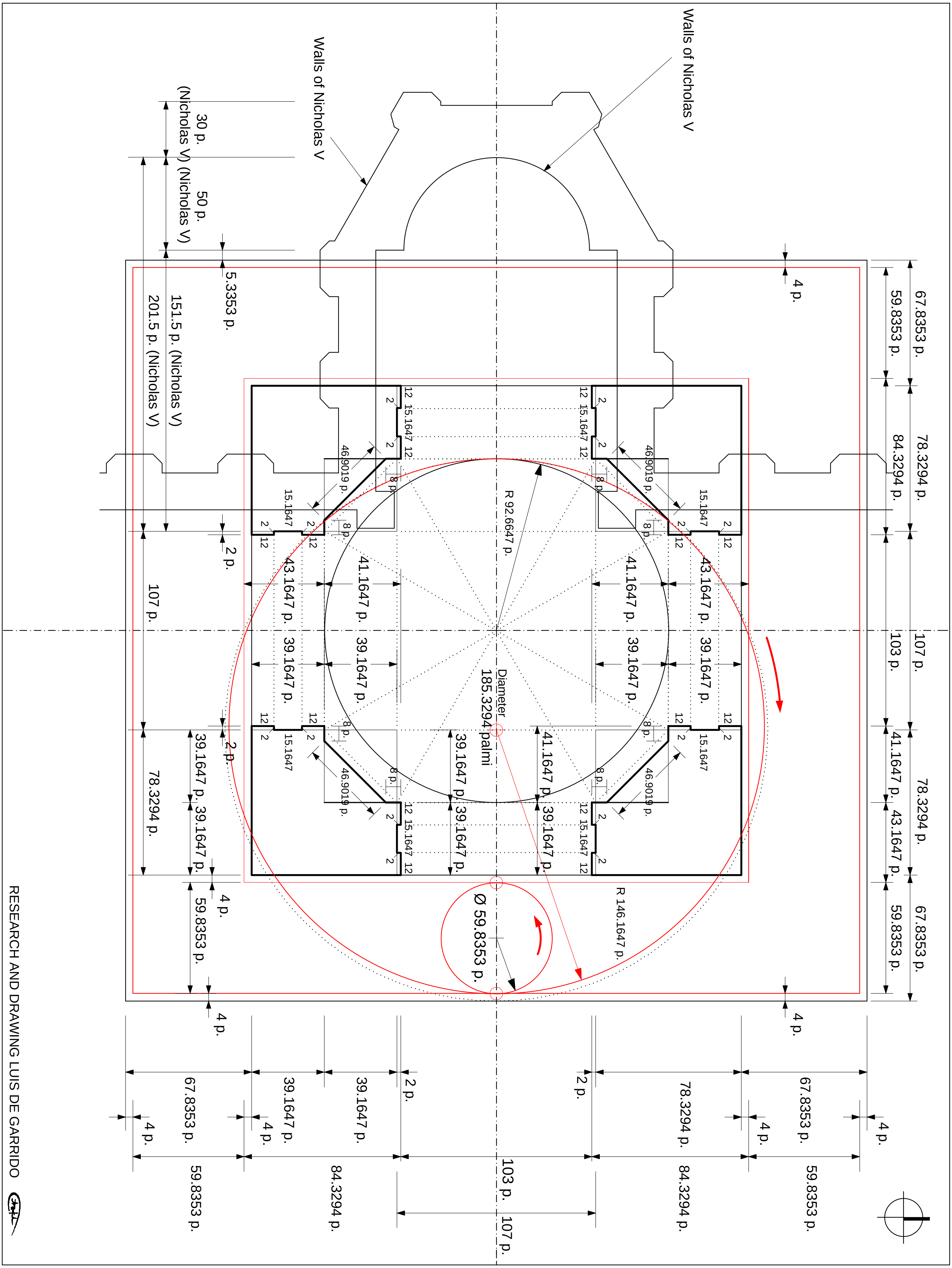


1514/15 | INTERNAL RHYTHM OF THE PARASTE OF THE CROSSING-PIERS (12 - 15 - 12) | CENTRAL NUCLEUS

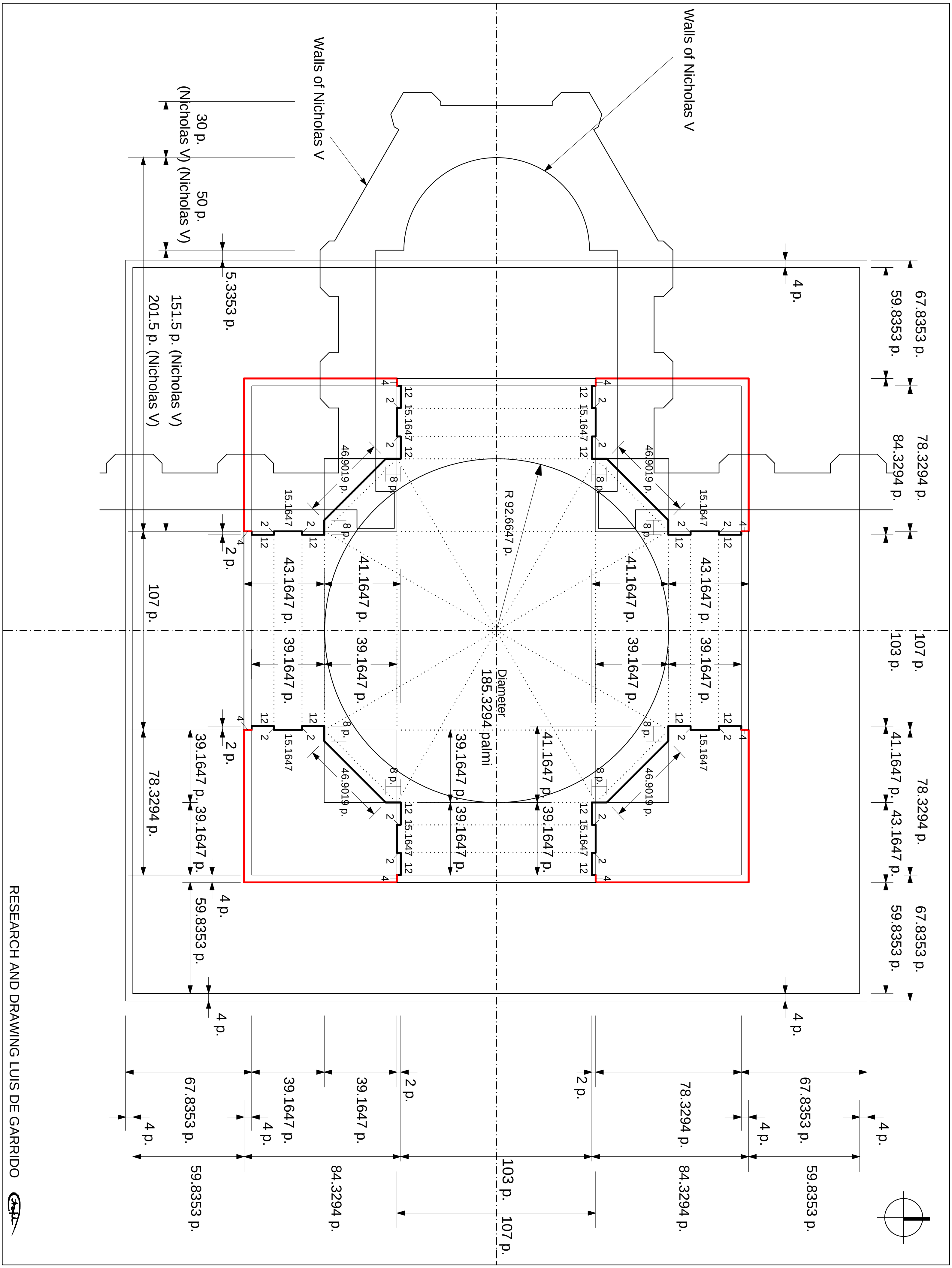


RESEARCH AND DRAWING LUIS DE GARRIDO

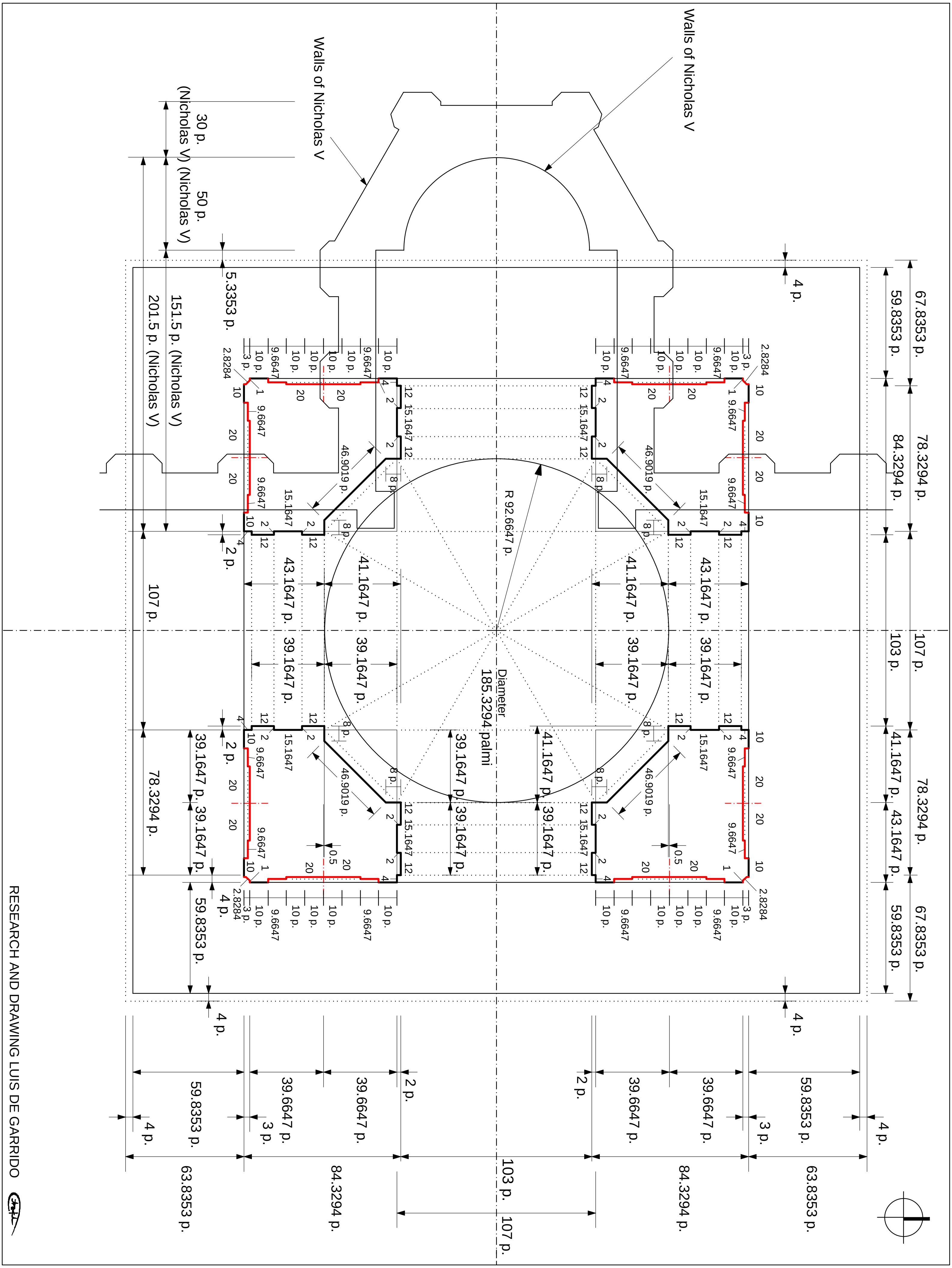
1514/15	ESTABLISHING THE SEPARATION OF COUNTER-PIERS (I)	CENTRAL NUCLEUS	8



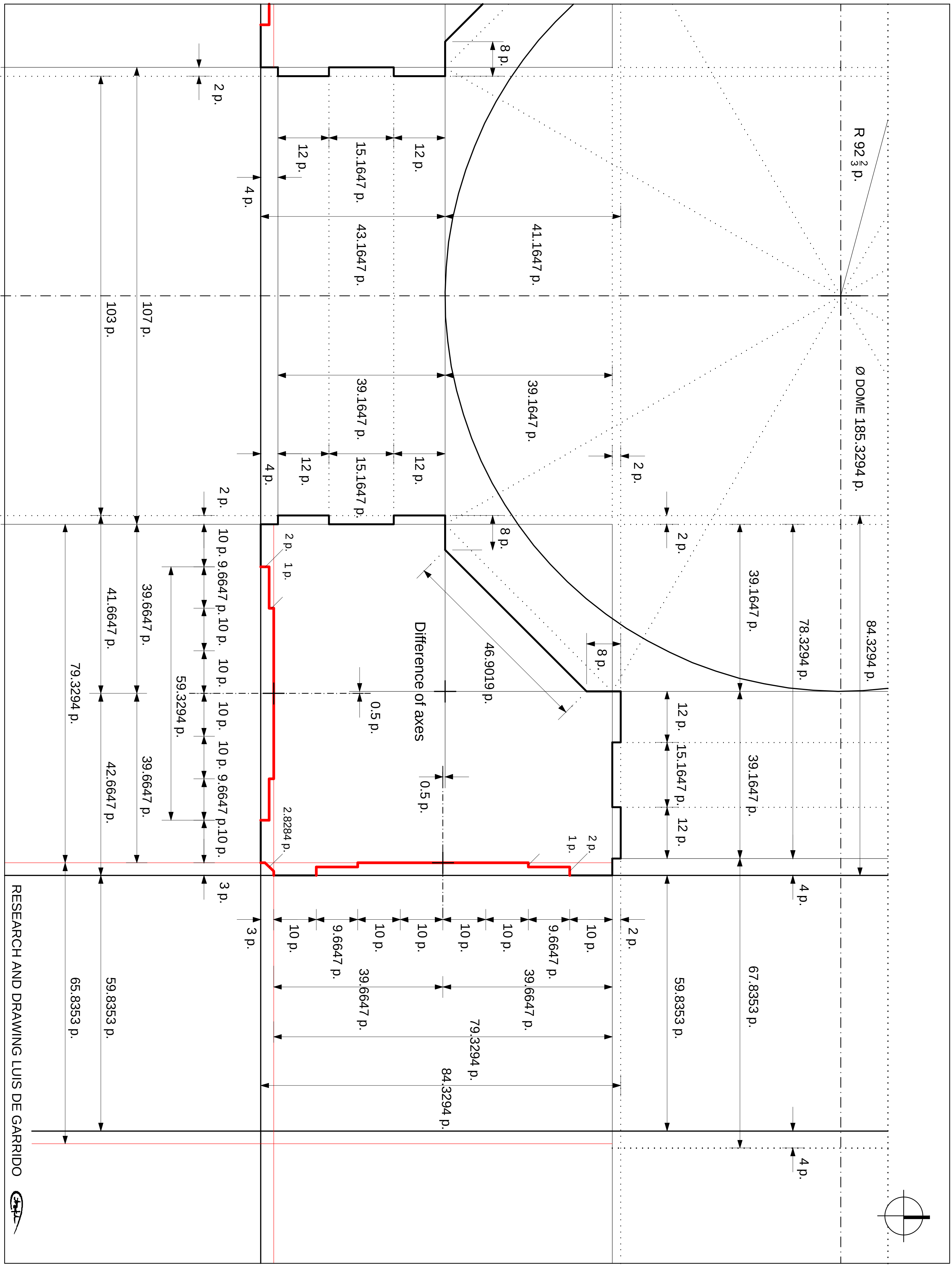
1514/15	ESTABLISHING THE SEPARATION OF COUNTER-PIERS (II)	CENTRAL NUCLEUS	9



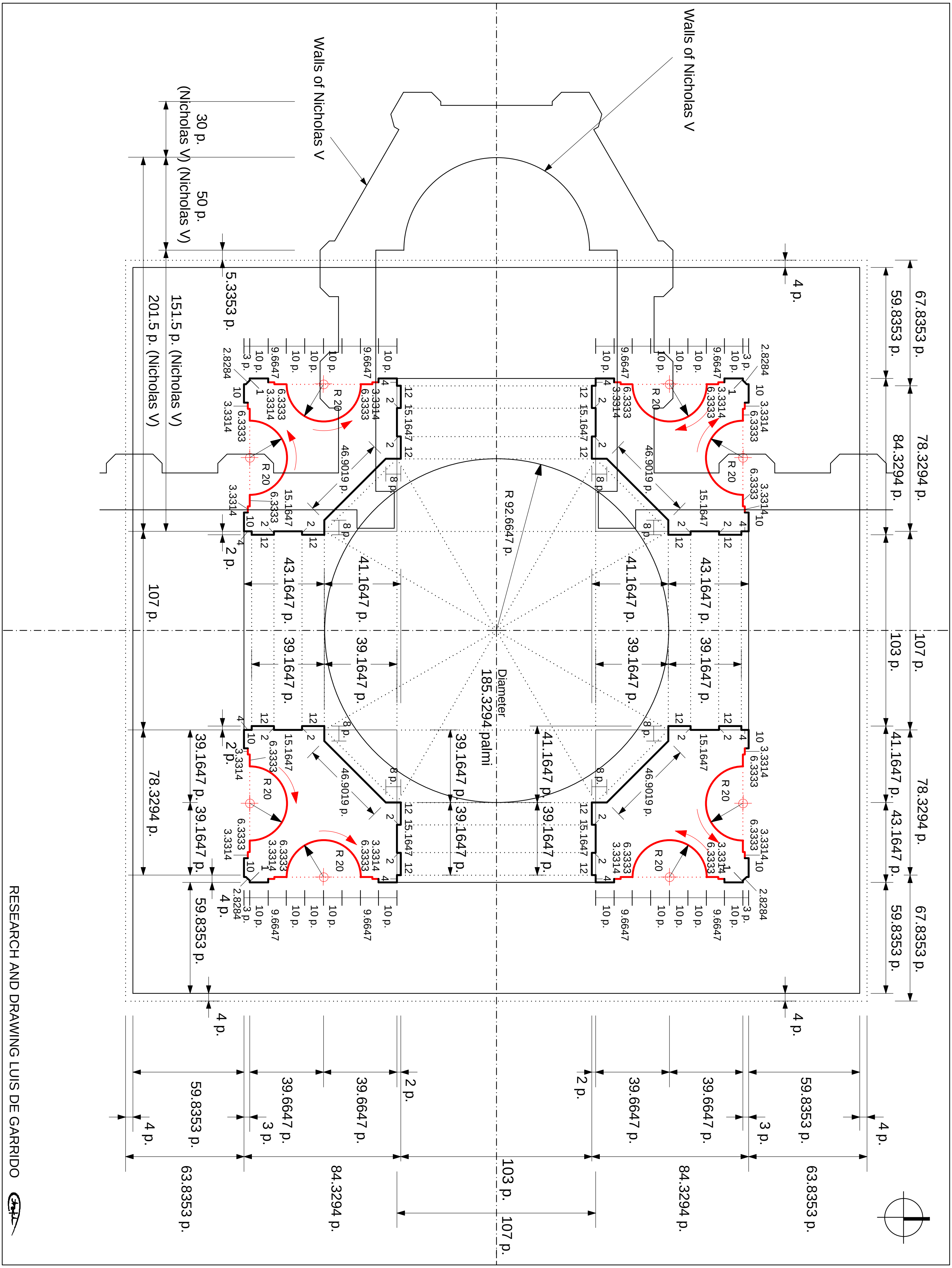
1514/15	ESTABLISHING THE EXTERNAL PERIMETER OF THE CROSSING-PIERS	CENTRAL NUCLEUS	10



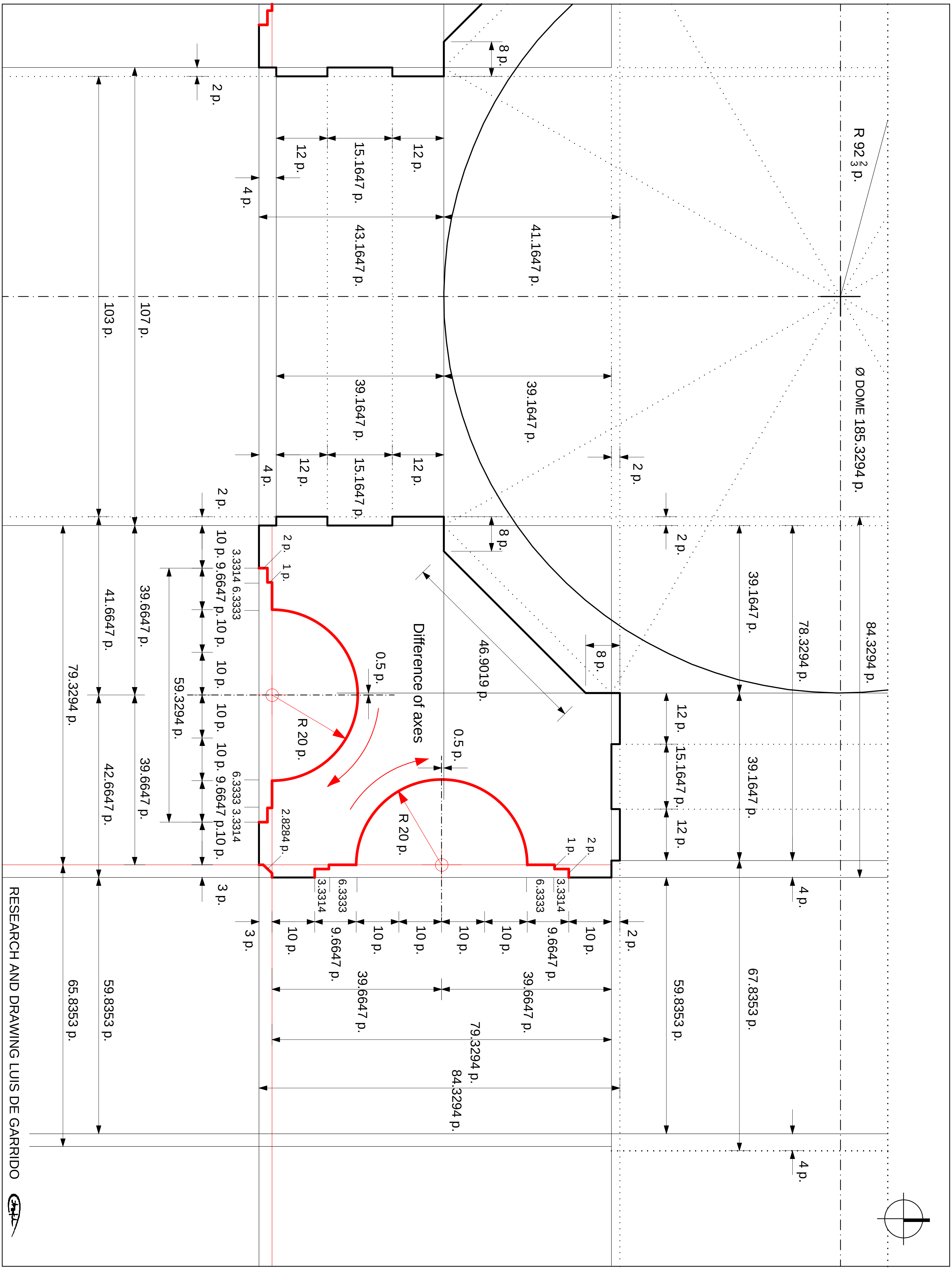
1514/15	RHYTHM OF THE EXTERIOR SIDES OF THE CROSSING-PIERS	CENTRAL NUCLEUS	11



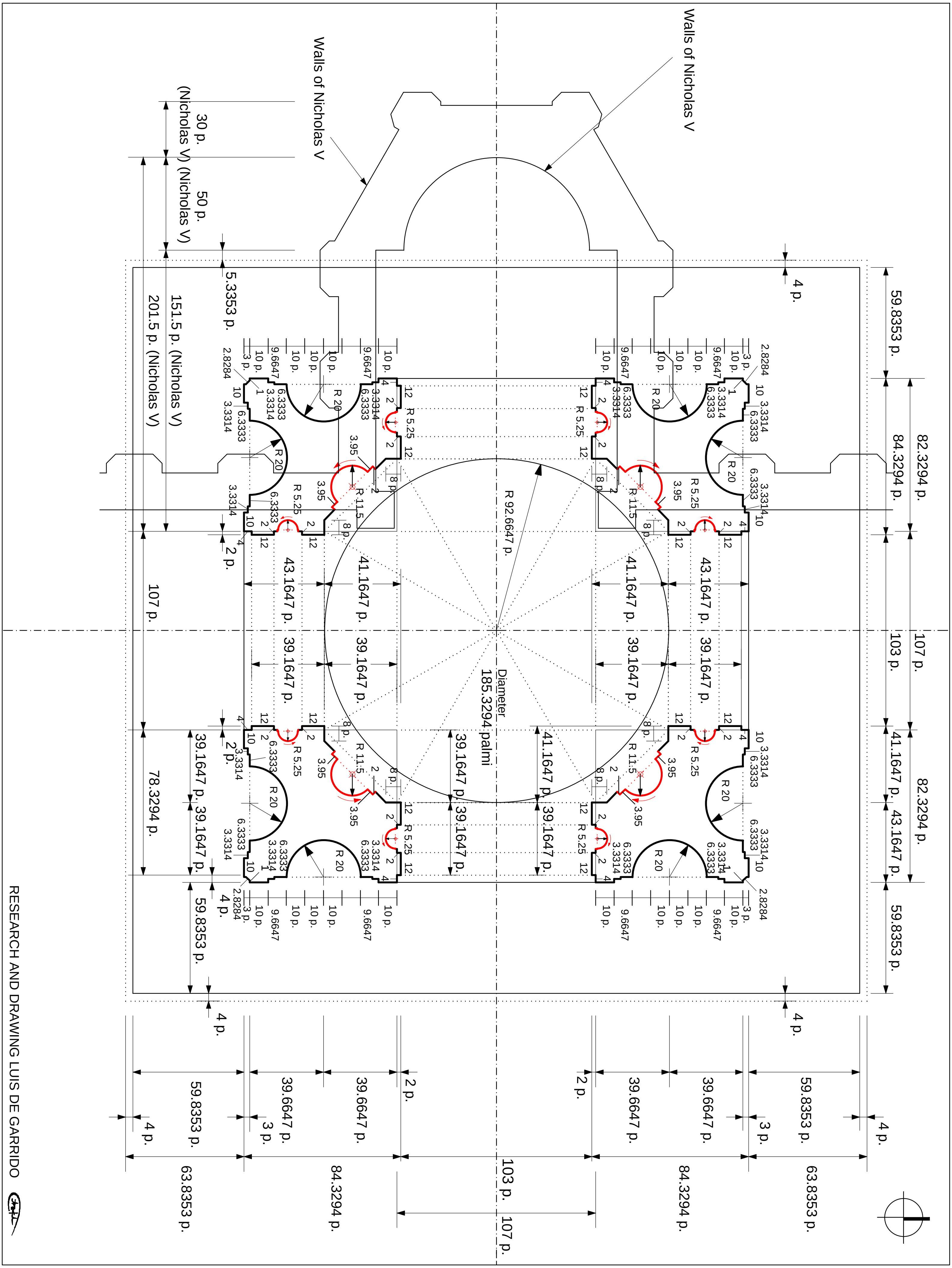
1514/15	RHYTHM OF THE EXTERIOR SIDES OF THE CROSSING-PIERS - DETAIL	CENTRAL NUCLEUS	12



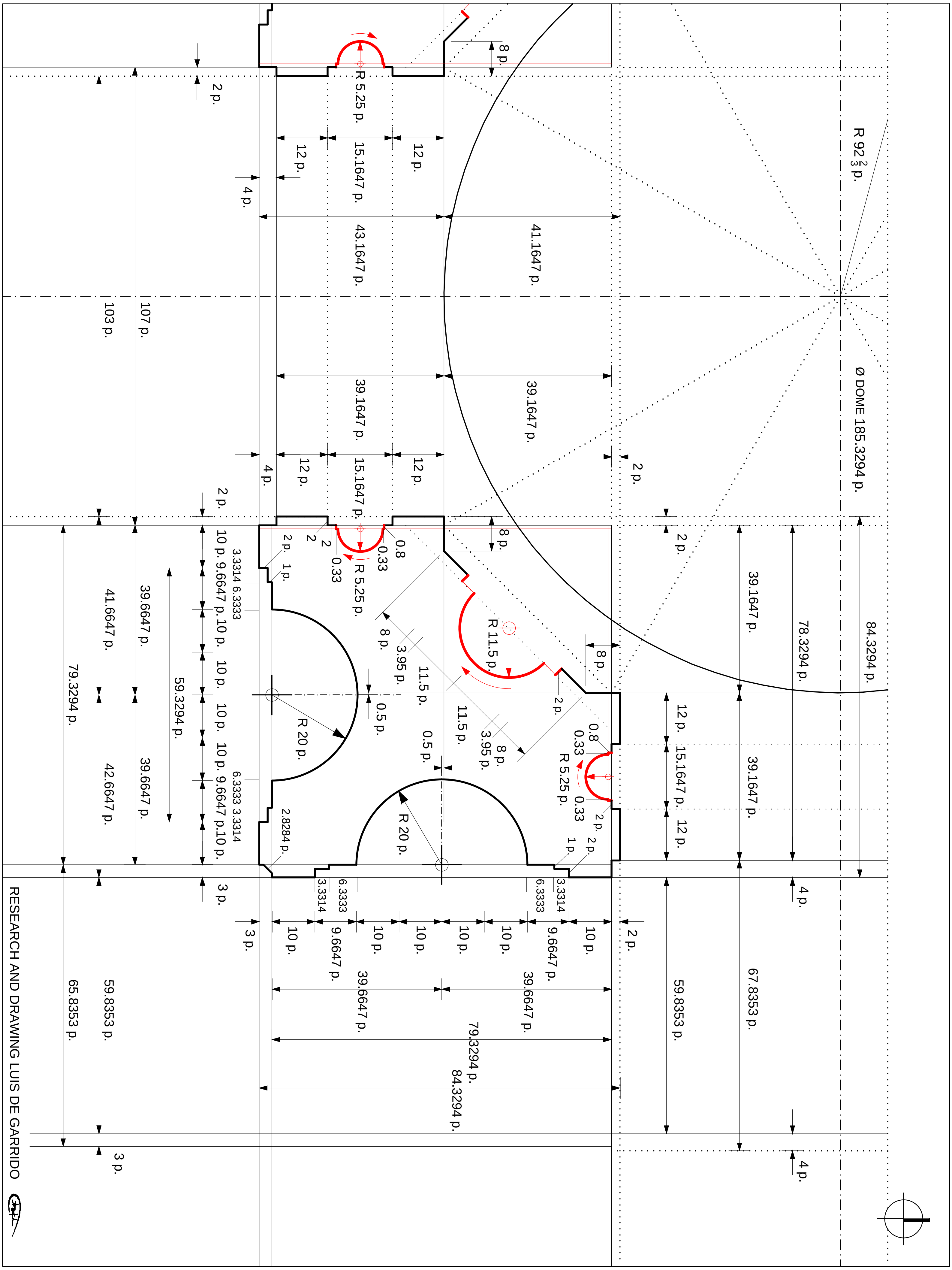
1514/15	NICHES OF THE EXTERNAL PERIMETER OF THE CROSSING-PIERS	CENTRAL NUCLEUS	13



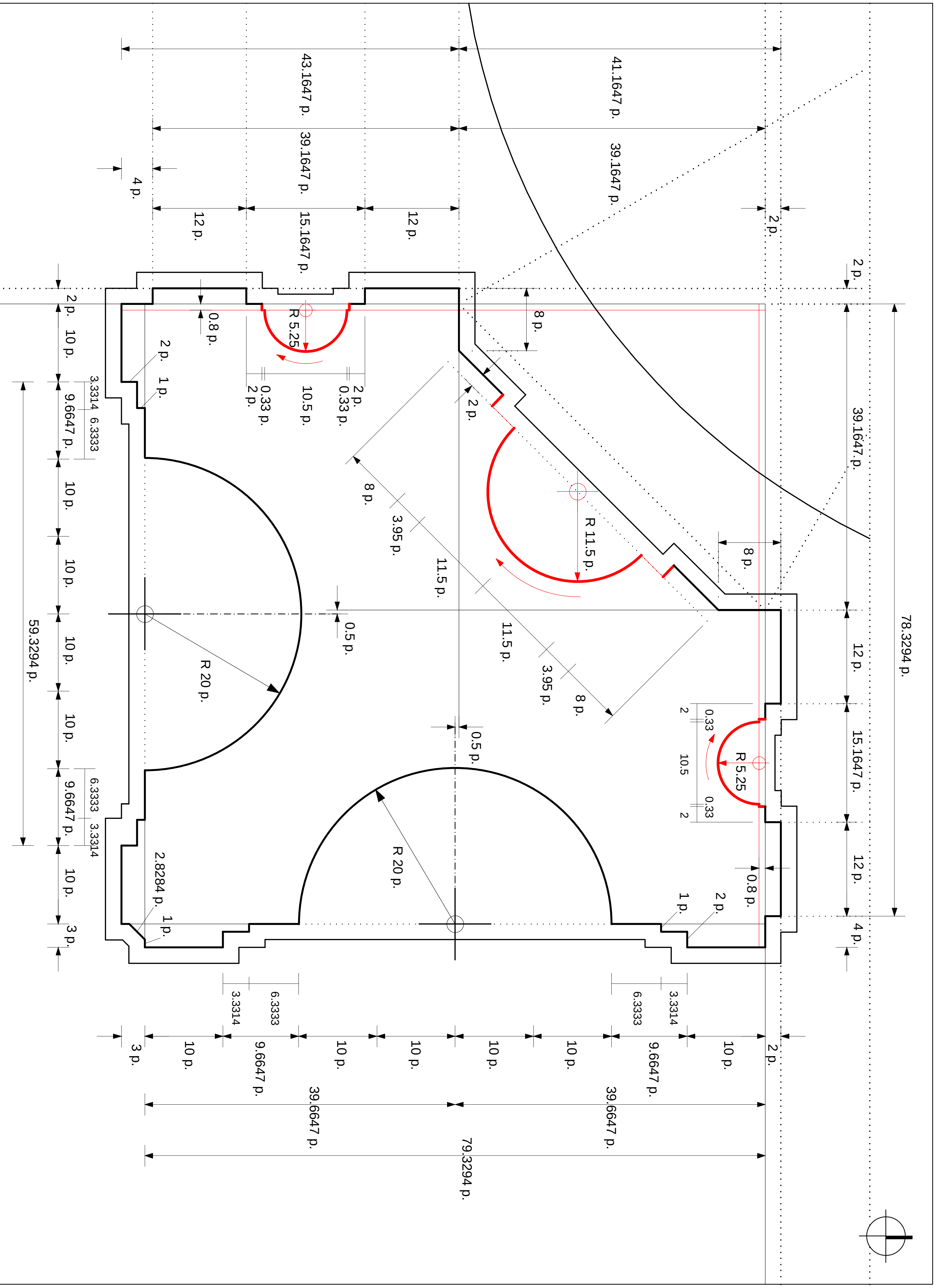
1514/15	NICHES OF THE EXTERNAL PERIMETER OF THE CROSSING-PIERS - DETAIL	CENTRAL NUCLEUS	14



NICHES OF THE INTERNAL PERIMETER OF THE CROSSING-PIERS

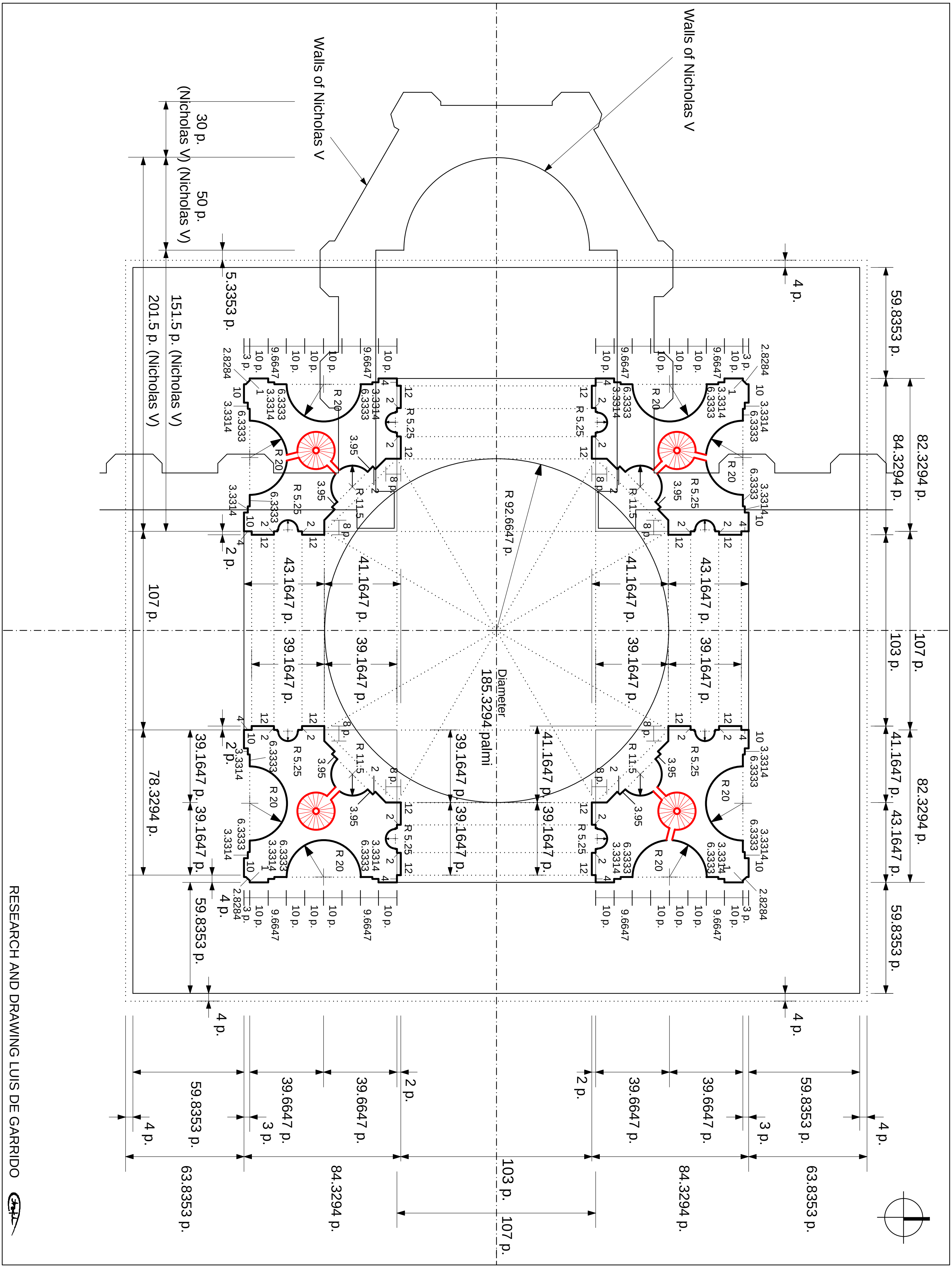


1514/15	NICHES OF THE INTERNAL PERIMETER OF THE CROSSING-PIERS - DETAIL	CENTRAL NUCLEUS	16

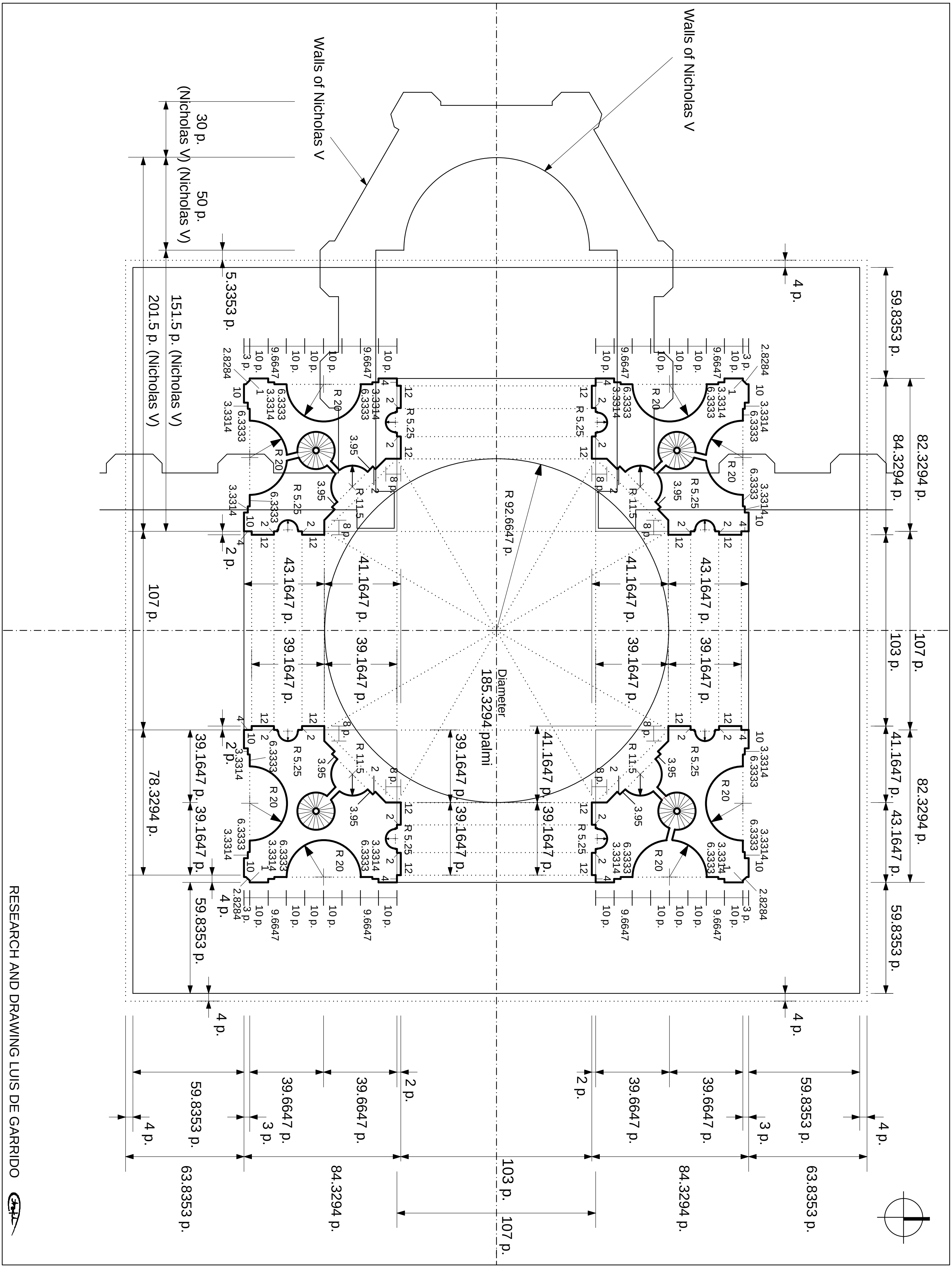


RESEARCH AND DRAWING LUIS DE GARRIDO

1514/15	NICHES OF THE INTERNAL PERIMETER OF THE CROSSING-PIERS - DETAIL	CENTRAL NUCLEUS	17

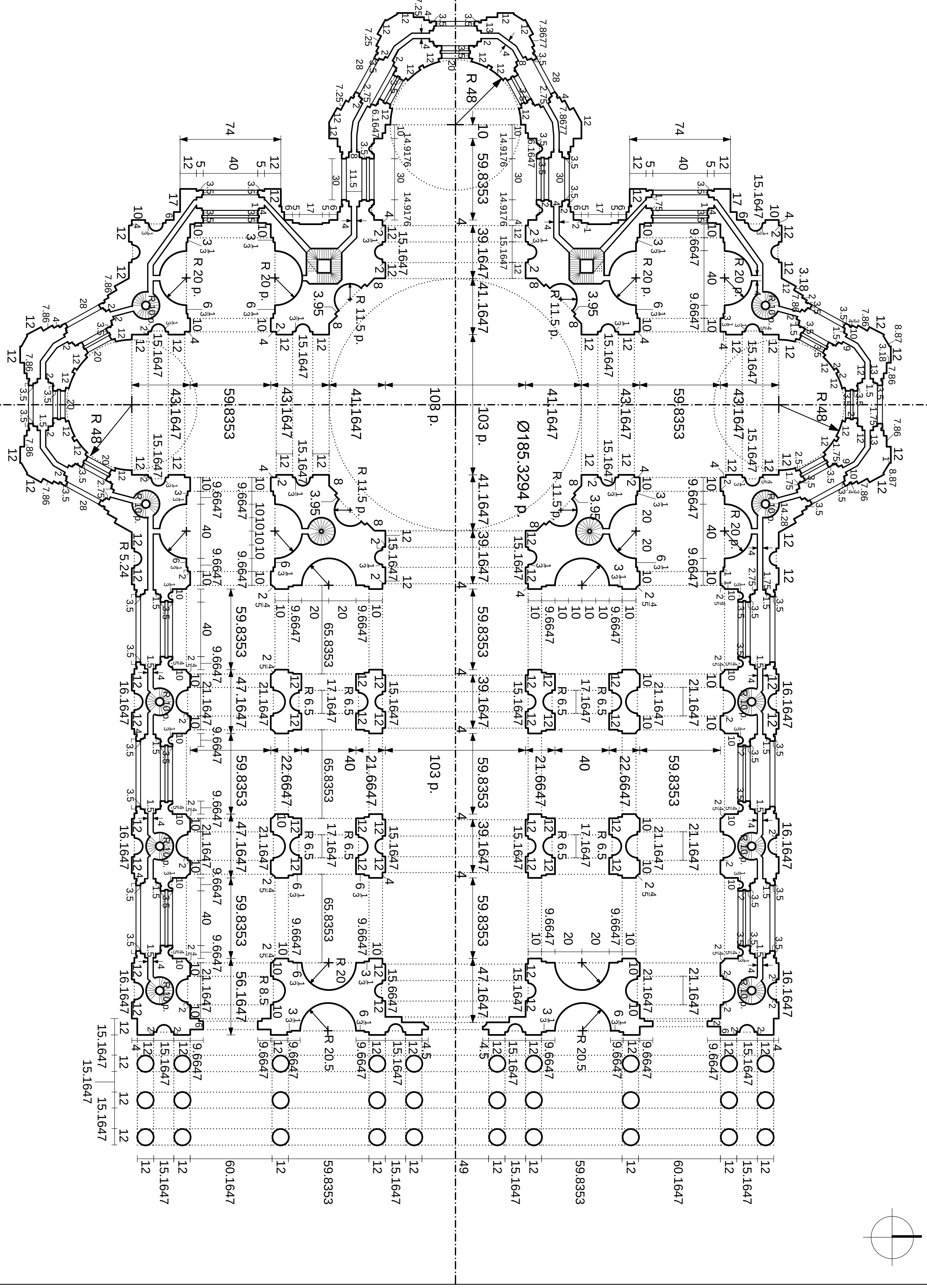


1514/15	DESIGN OF THE INTERNAL STAIRCASE OF THE CROSSING-PIERS	CENTRAL NUCLEUS	18



1514/15	EXECUTIVE PROJECT OF THE CENTRAL NUCLEUS OF BRAMANTE	CENTRAL NUCLEUS	19

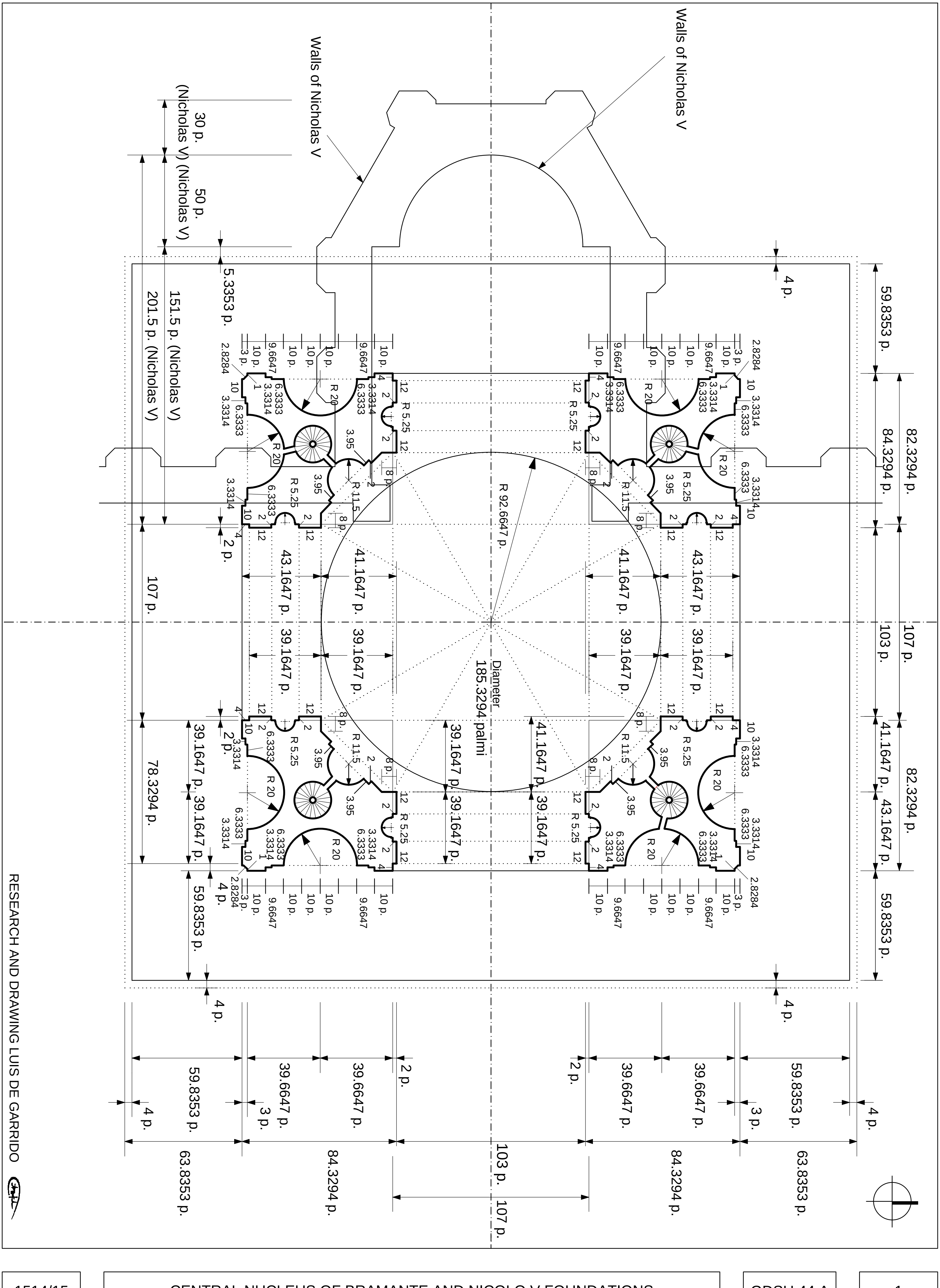
RECONSTRUCTION OF SUPPOSED EXECUTIVE PROJECT BY BRAMANTE ACCORDING TO CHRISTOPH FROMMEL



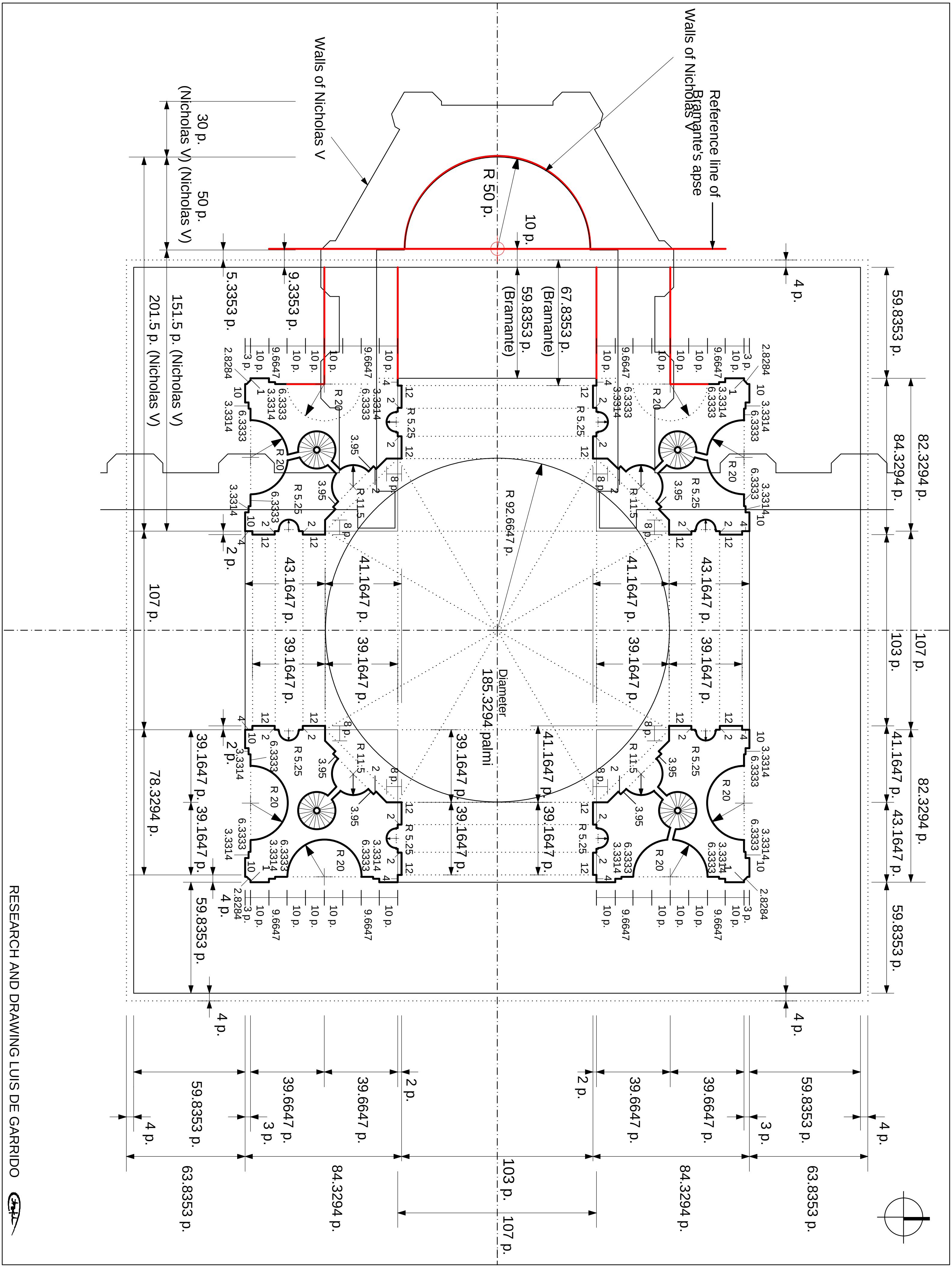
RESEARCH AND DRAWING LUIS DE GARRIDO

1506	SUPPOSED EXECUTIVE PROJECT OF BRAMANTE. ACCORDING TO FROMMEL	EPFROMMEL	1

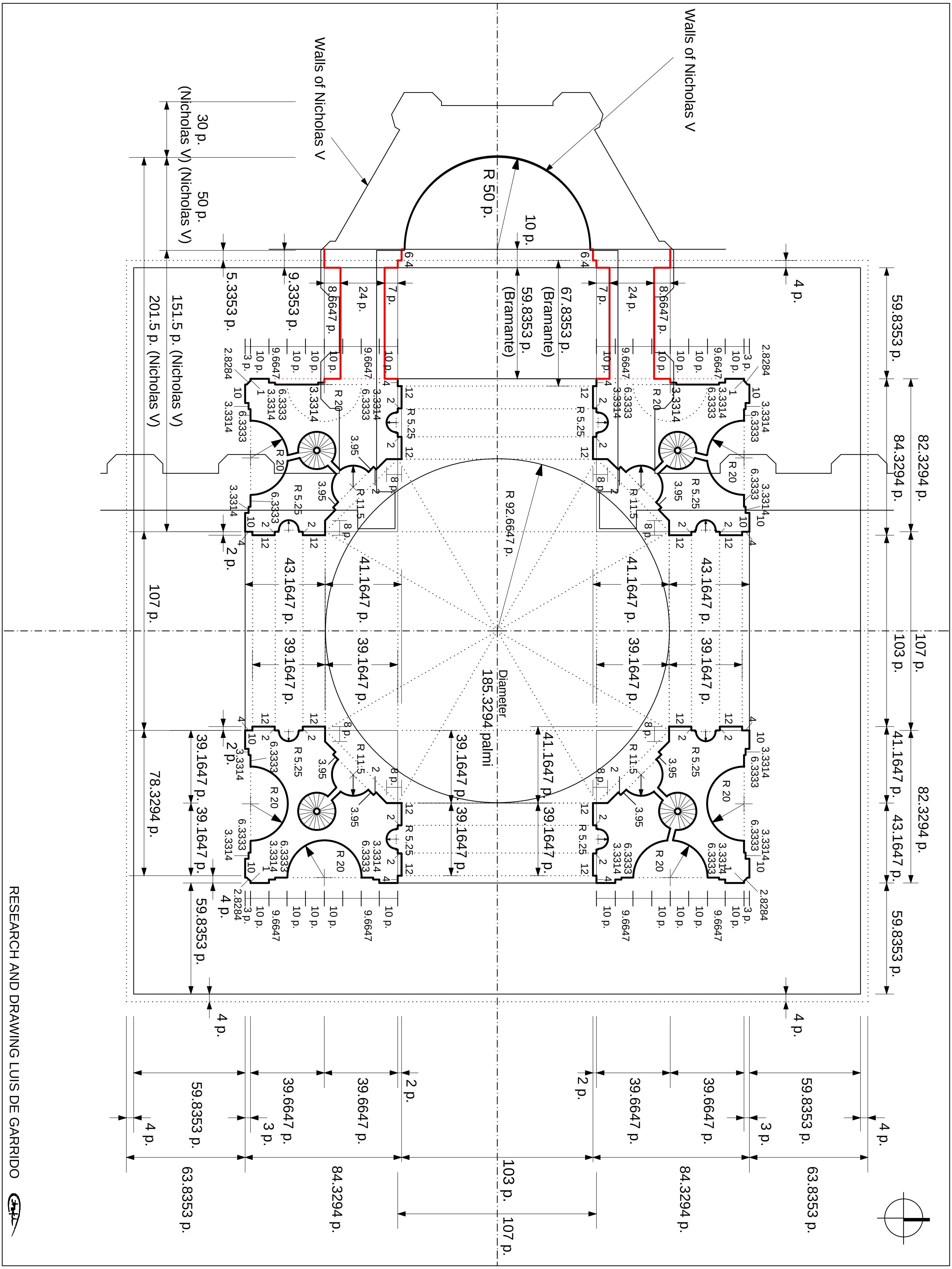
RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF THE APSE OF JULIUS II PROJECT (BASED ON THE DRAWING GDSU 44 A)



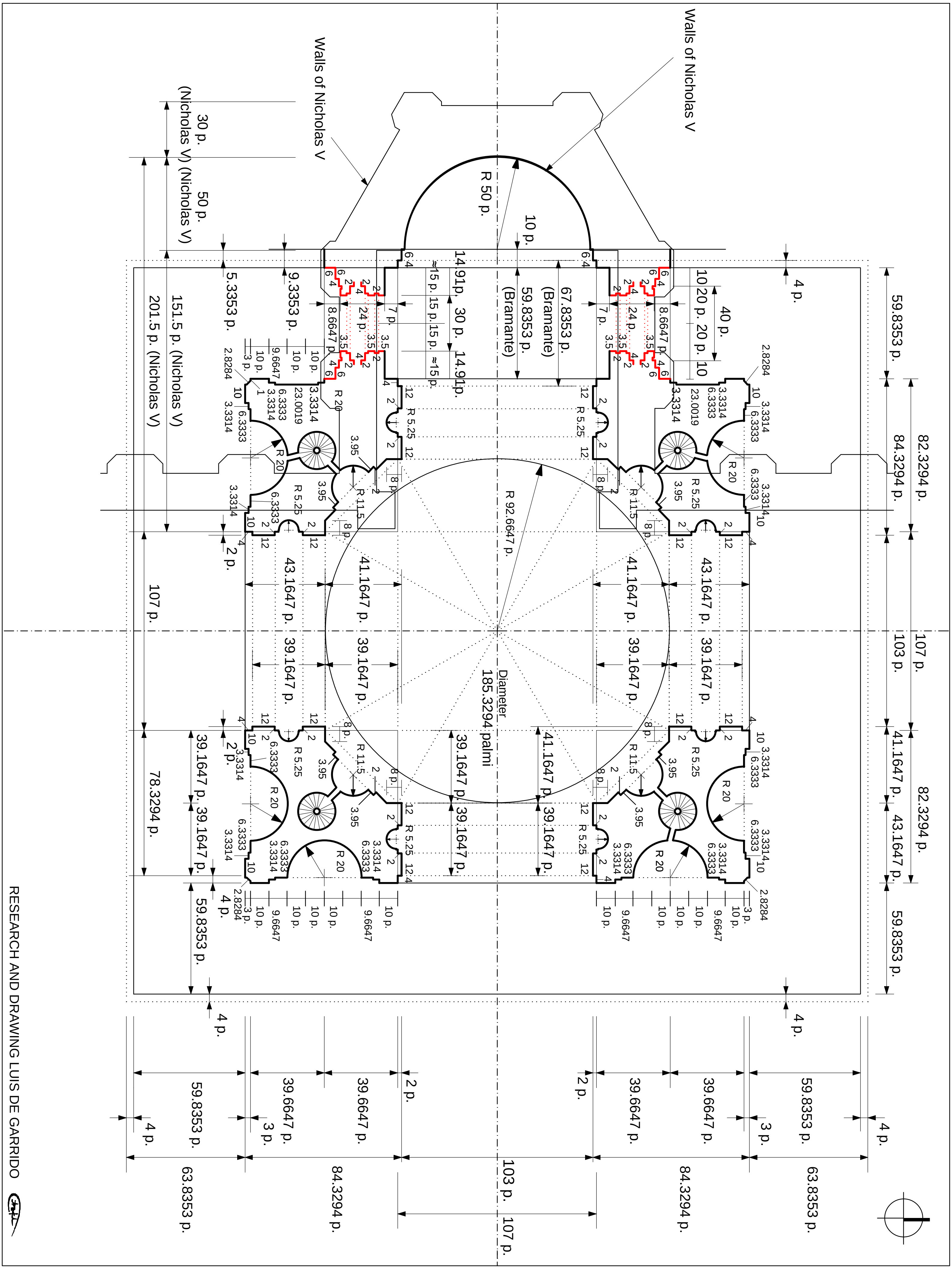
1514/15	CENTRAL NUCLEUS OF BRAMANTE AND NICOLO V FOUNDATIONS	GDSU 44 A	1



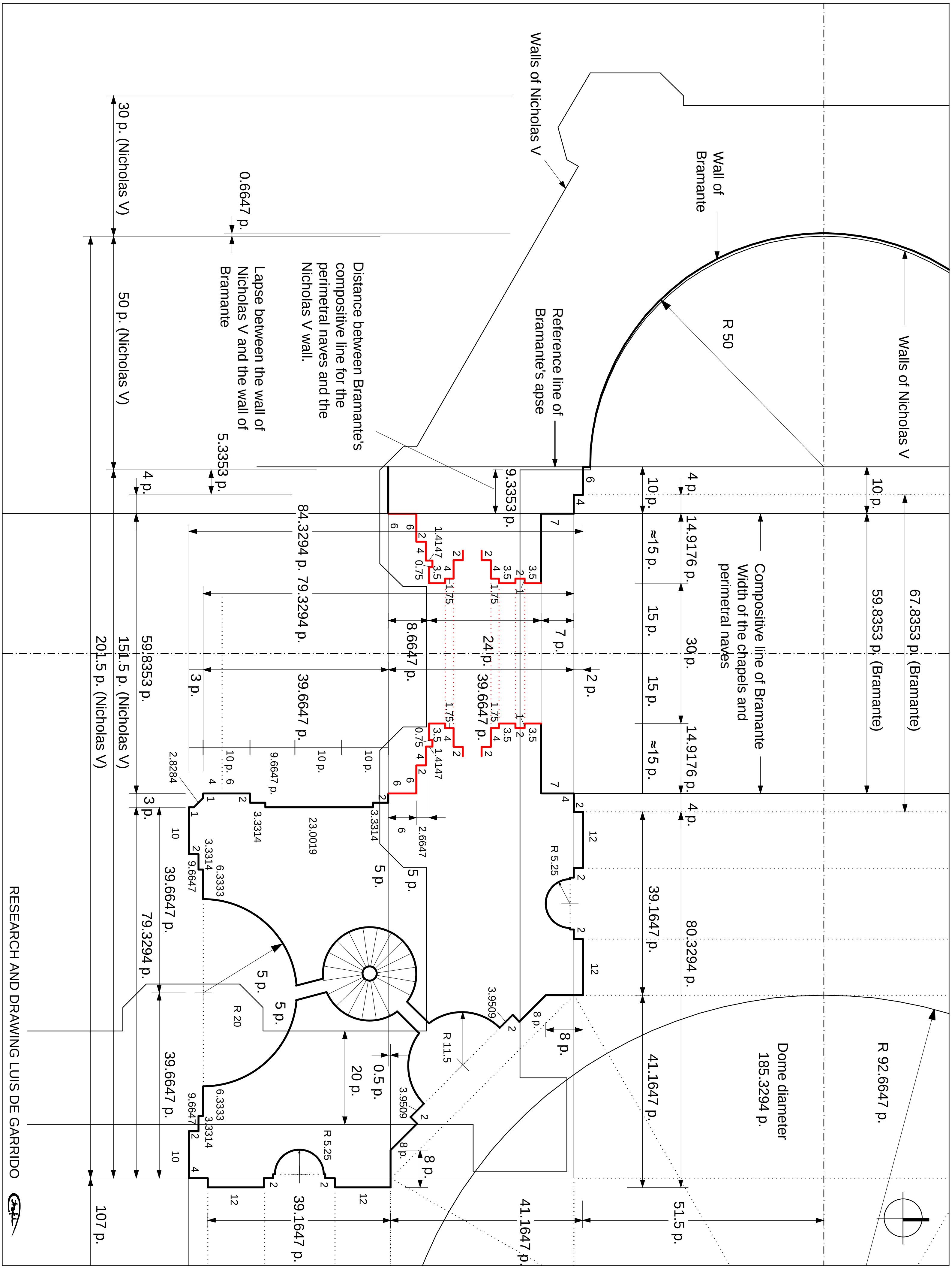
1514/15	ESTABLISHING THE REFERENCE LINE OF THE APSE AND THE APSE DIAMETER	GDSU 44 A	2



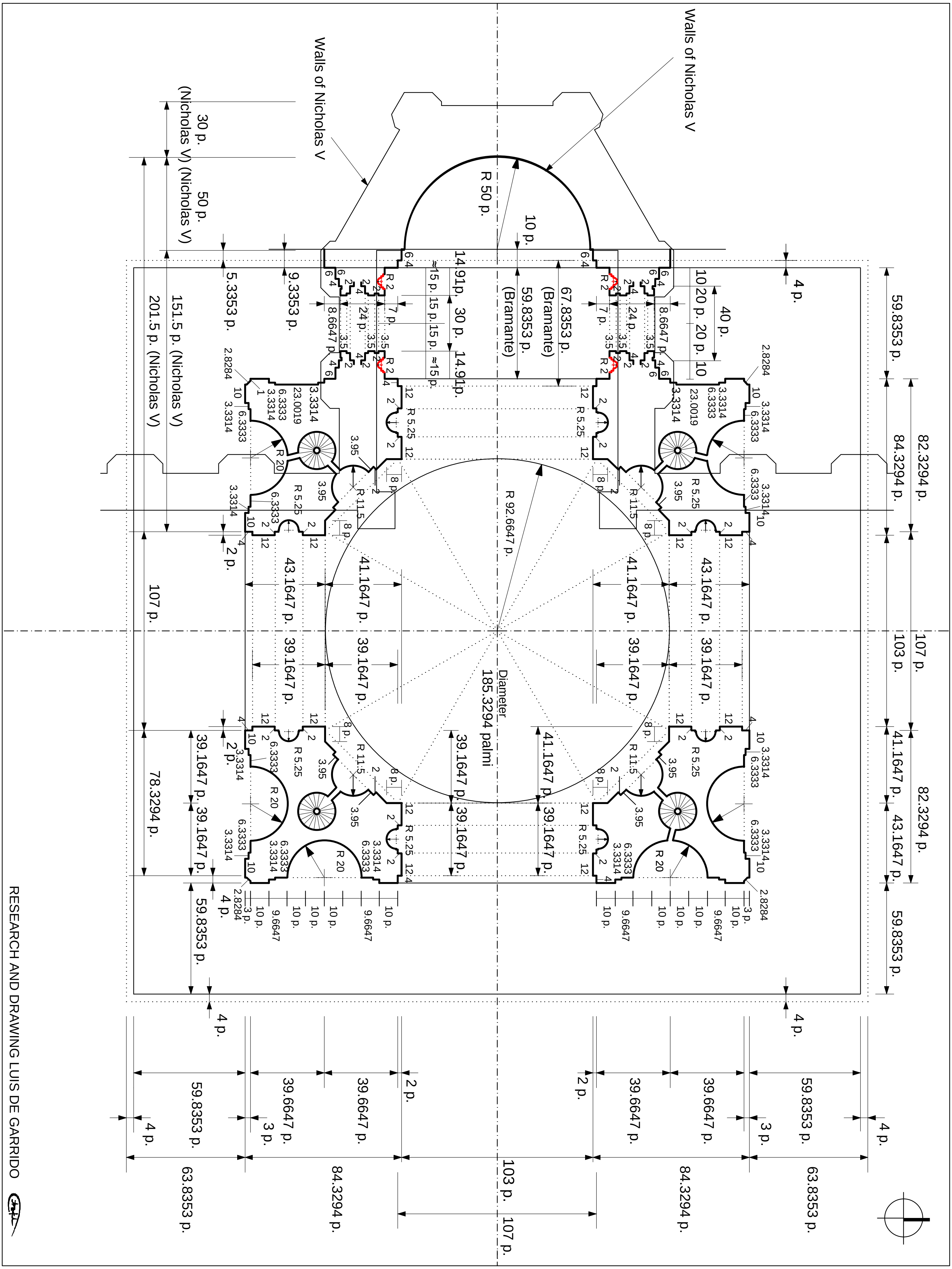
1514/15	POSITION AND THICKNESS OF THE WALLS AND ARTICULATION WITH THE PILASTERS	GDSU 44 A	3



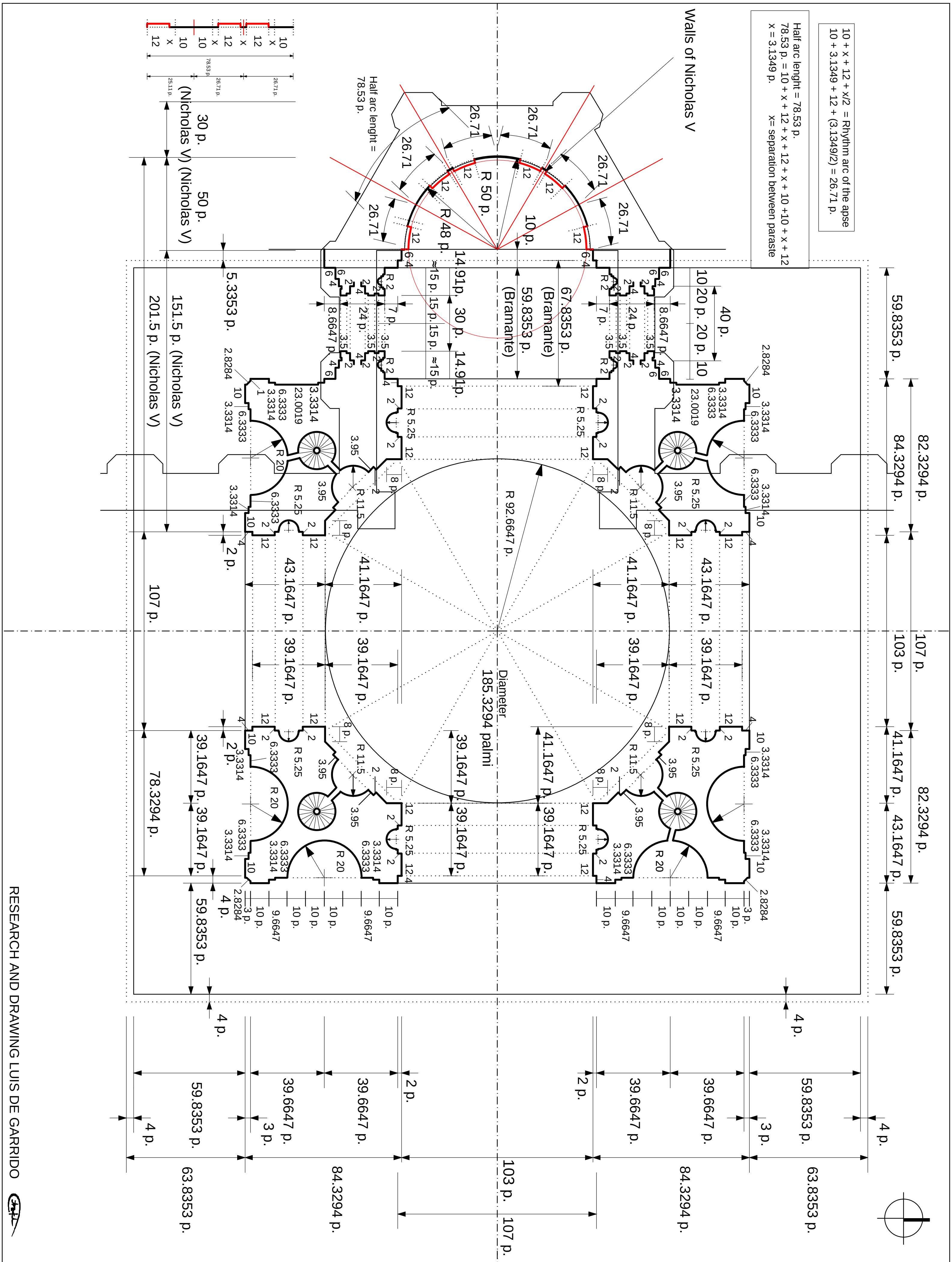
1514/15	WINDOWS OF THE TRIBUNE AND THE ARTICULATION WITH CROSSING-PIERS	GDSU 44 A	4



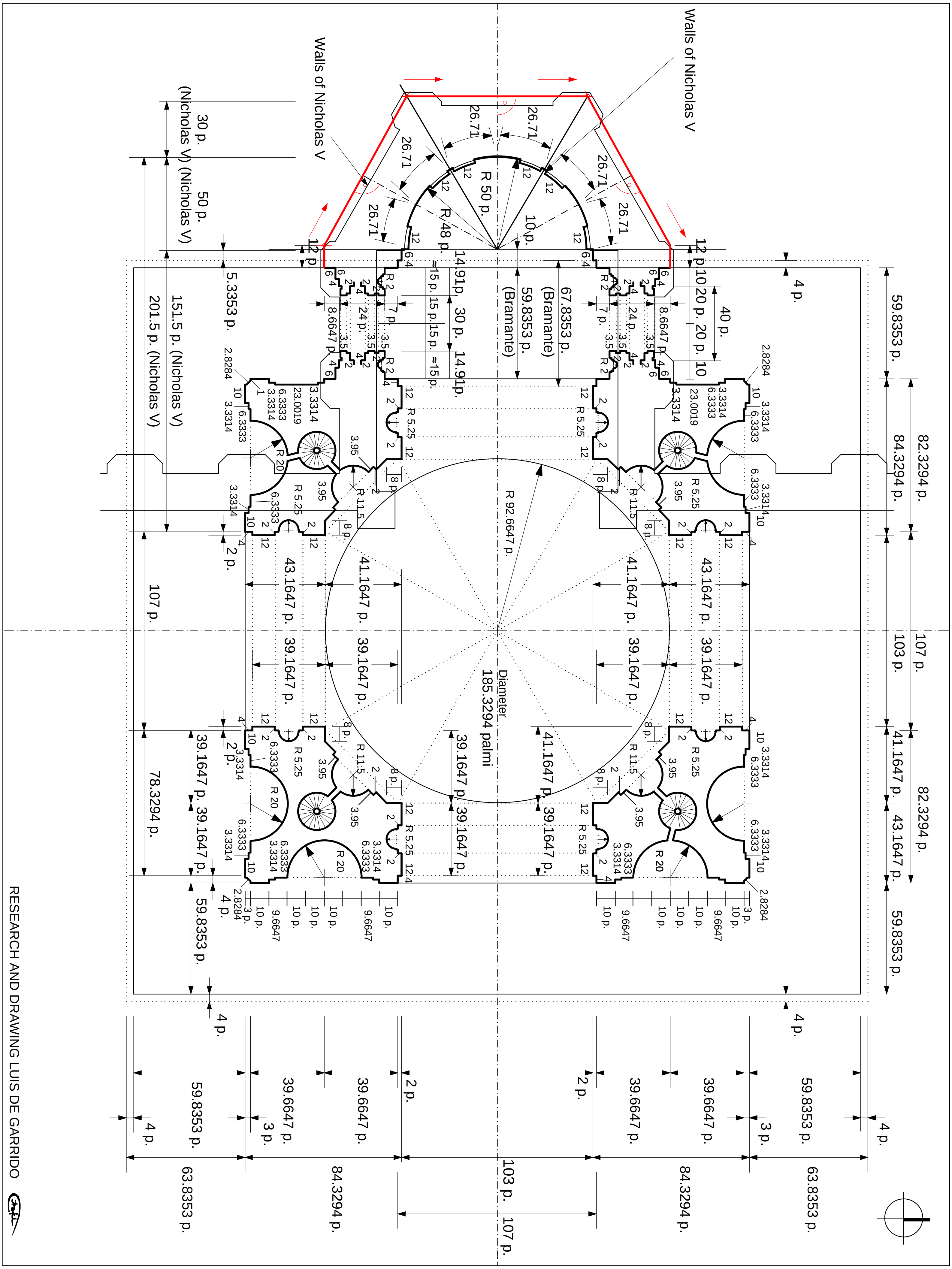
1514/15	WINDOWS OF THE TRIBUNE AND THE ARTICULATION WITH CROSSING-PIERS (DETAIL)	GDSU 44 A	5



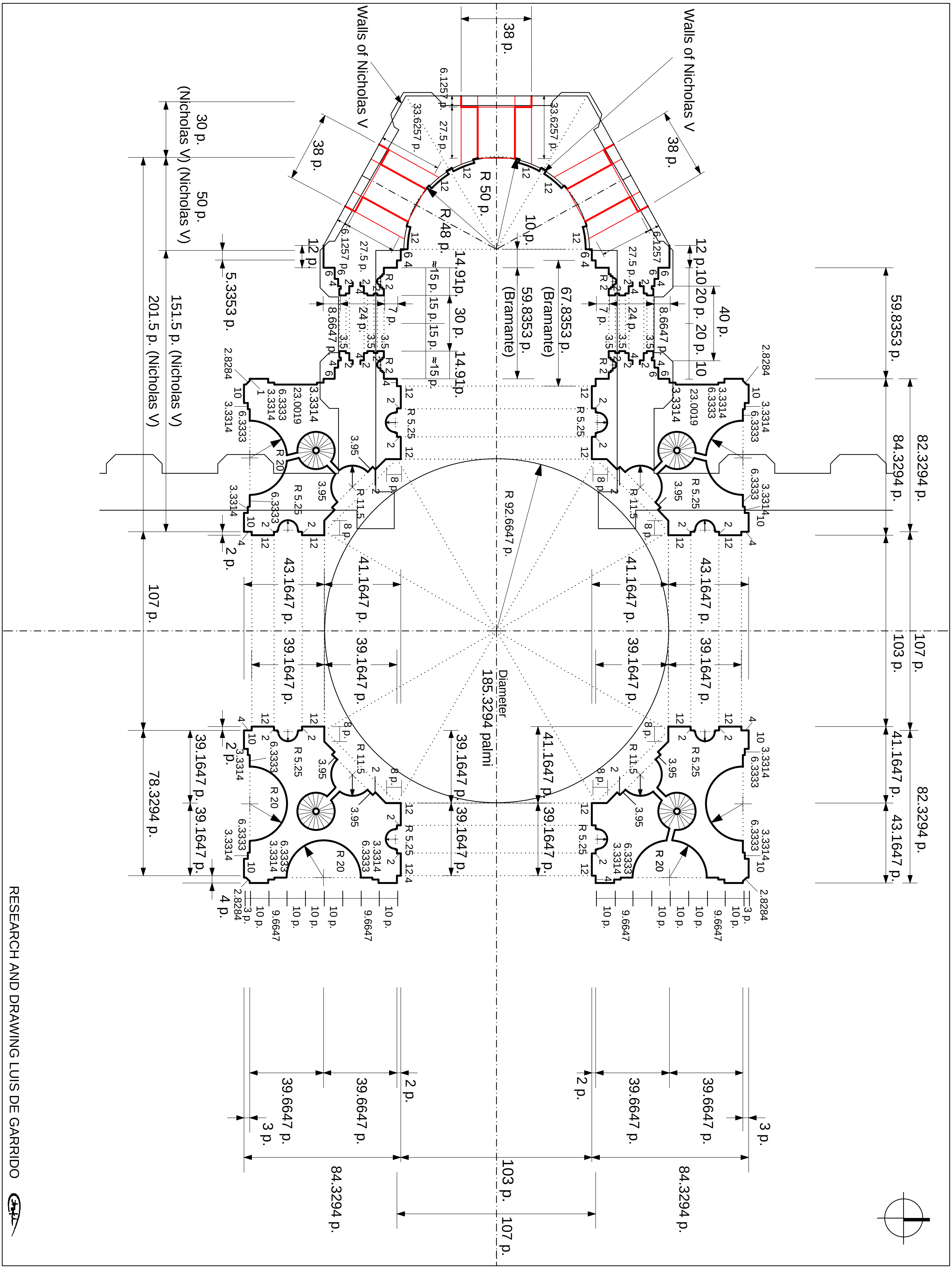
1514/15	ESTABLISHING THE INTERIOR NICHES OF THE WALLS OF THE TRIBUNE	GDSU 44 A	6



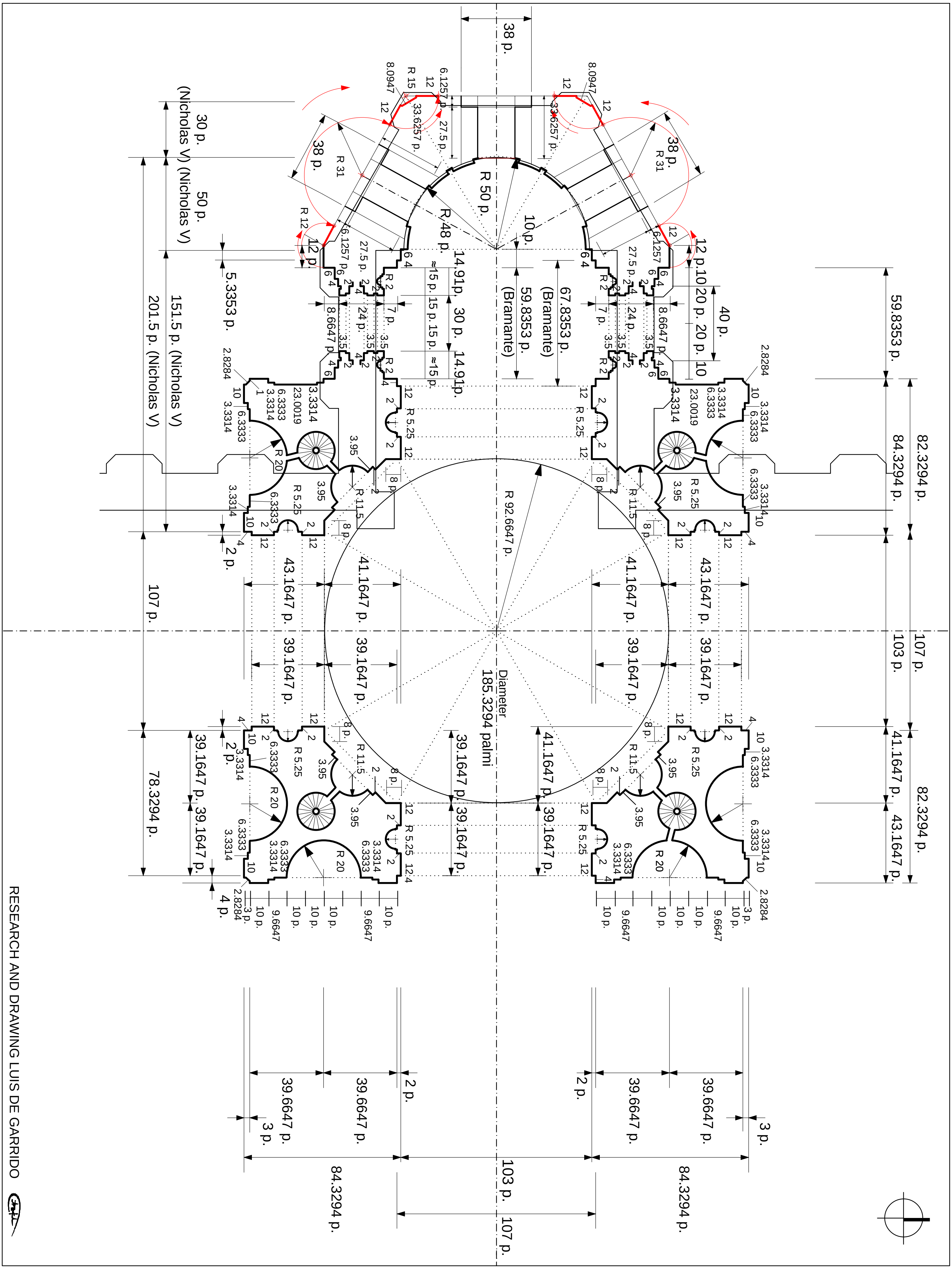
1514/15	ESTABLISHING THE RHYTHM OF THE PARASTE IN THE APSE	GDSU 44 A	7



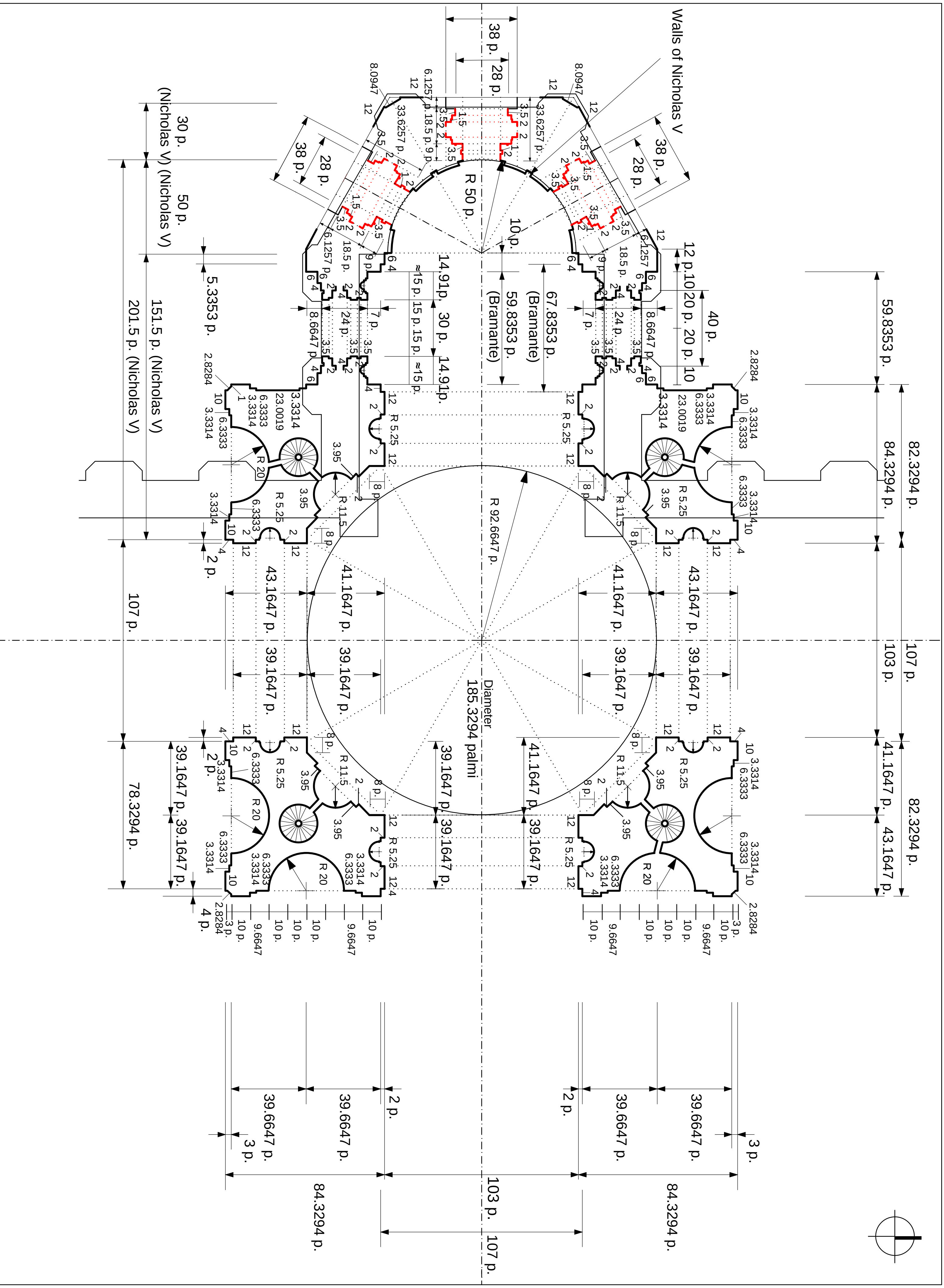
1514/15	ESTABLISHING THE WIDTH OF THE EXTERIOR WALLS OF THE APSE	GDSU 44 A	8



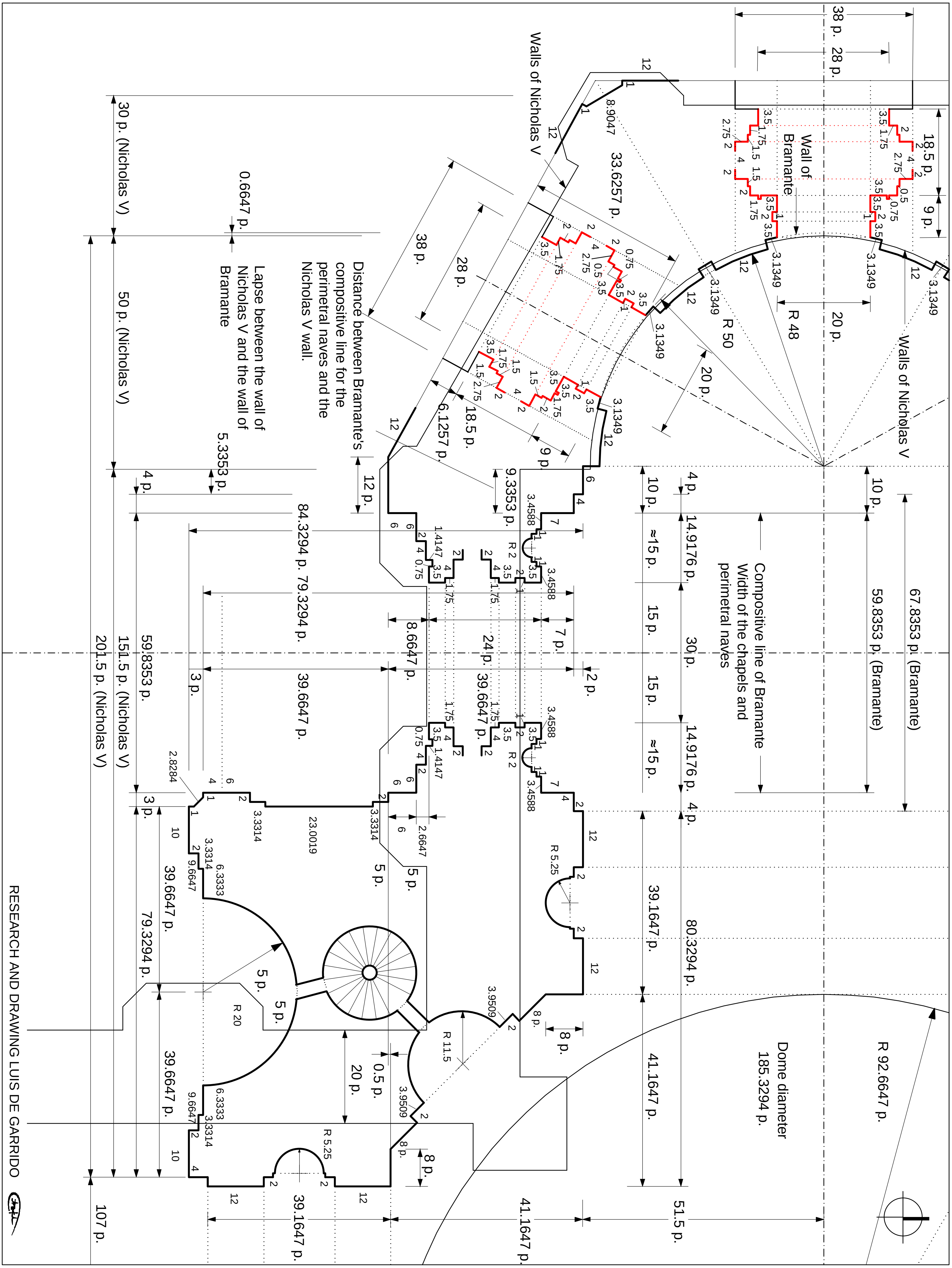
1514/15	ESTABLISHING THE COMPOSITIVE STRUCTURE OF THE WINDOWS OF THE APSE	GDSU 44 A	9



1514/15	ESTABLISHING THE EXTERNAL RHYTHM OF THE TRIBUNE	GDSU 44 A	10



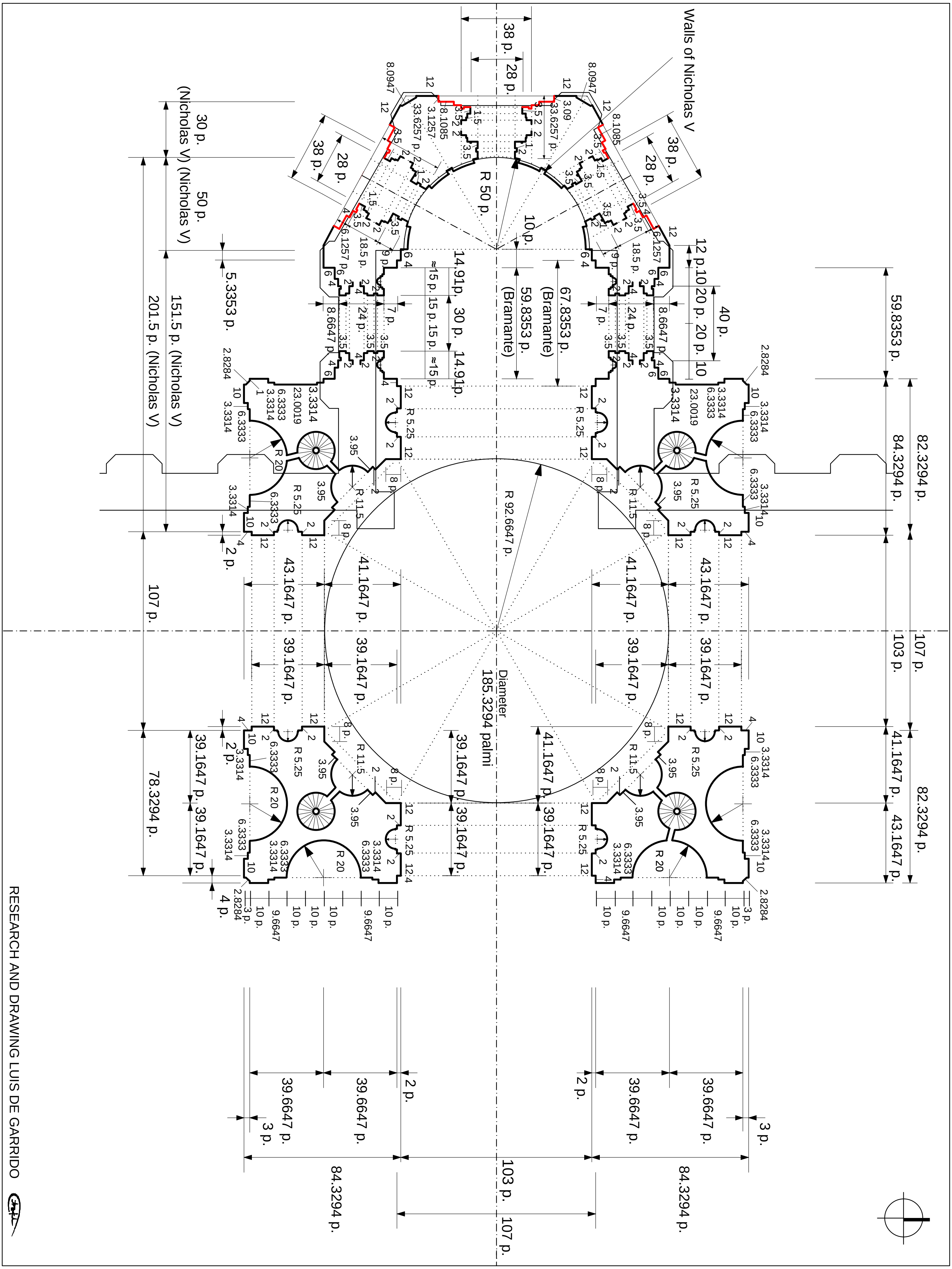
RESEARCH AND DRAWING LUIS DE GARRIDO



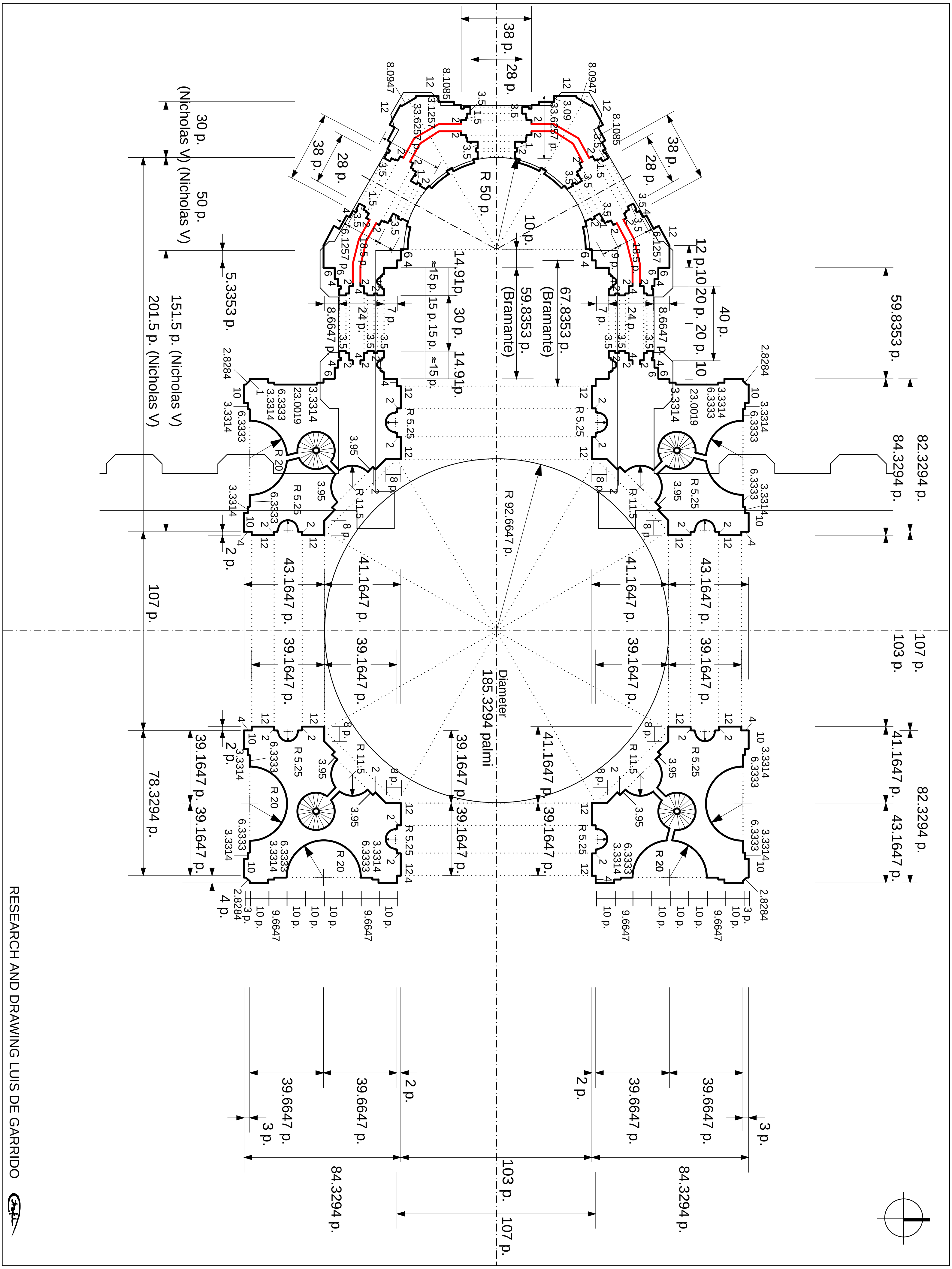
1514/15

THE MEDIUM COMPOSITION OF THE 38 PALMI WINDOW OF THE TRIBUNE (DETAIL)

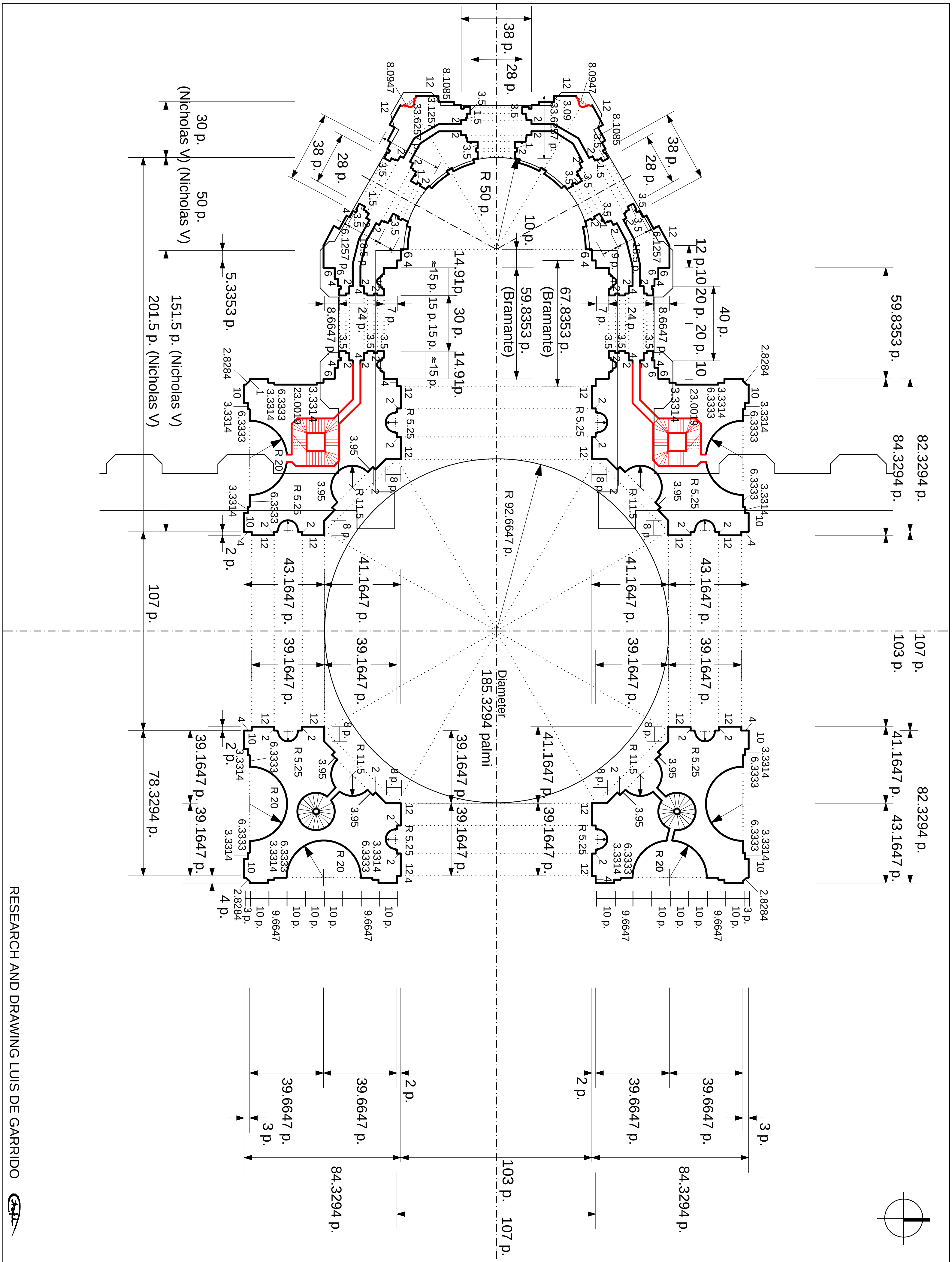
GDSU 44 A



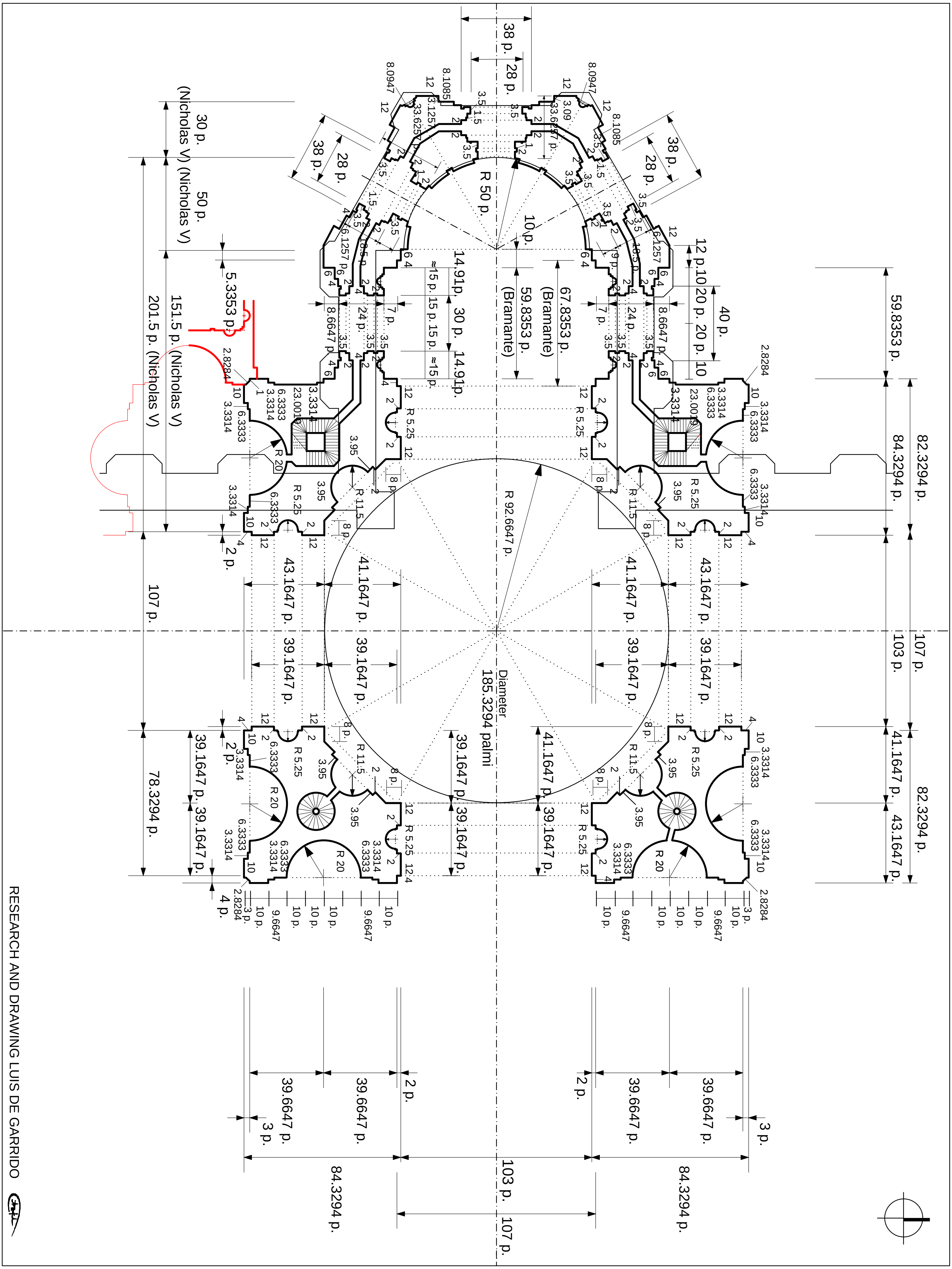
1514/15	INTEGRATION BETWEEN THE EXTERNAL RHYTHM OF THE TRIBUNE AND THE WINDOWS	GDSU 44 A	13



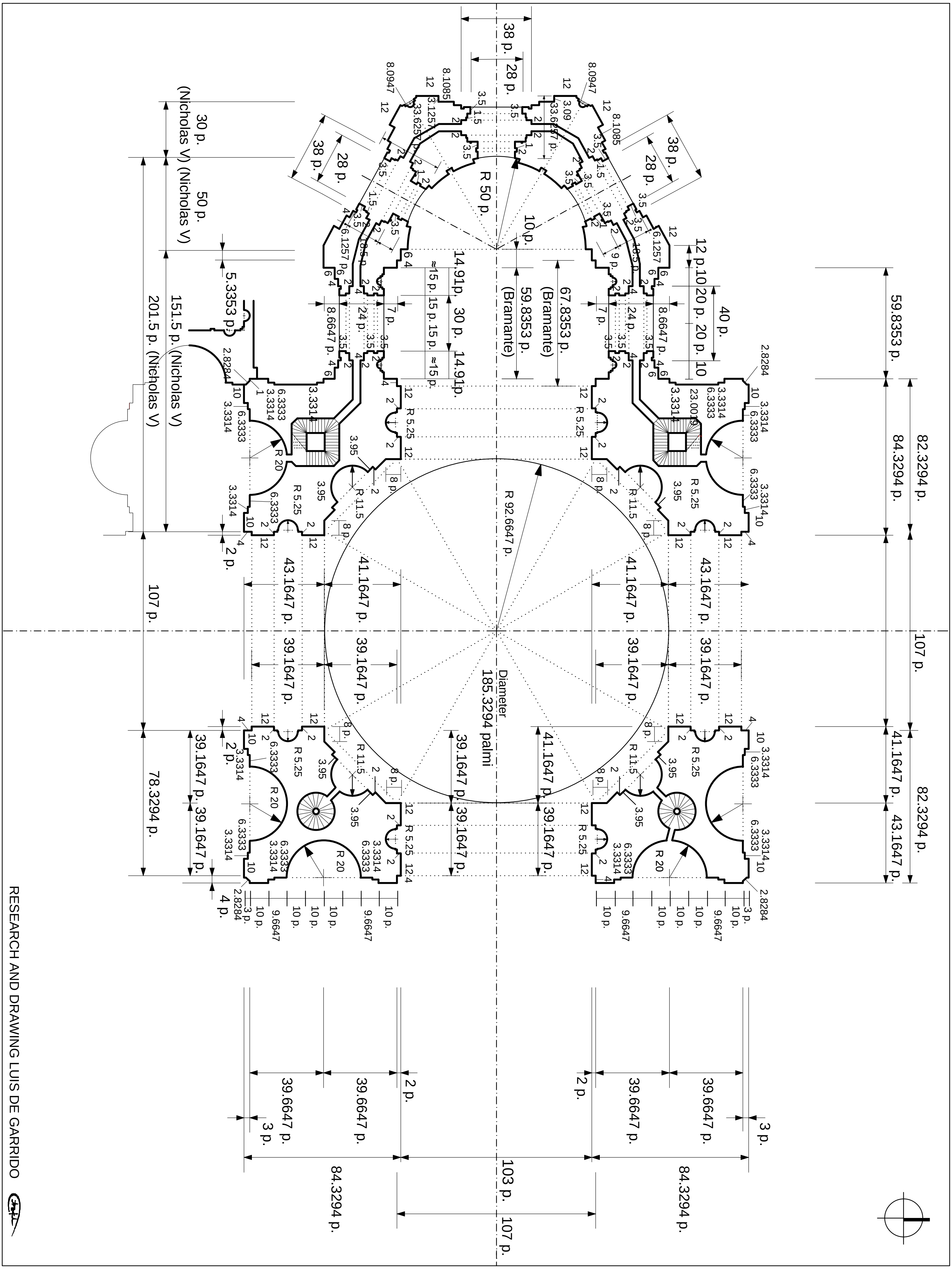
1514/15	ESTABLISHING THE INTERNAL CORRIDORS OF THE TRIBUNE	GDSU 44 A	14



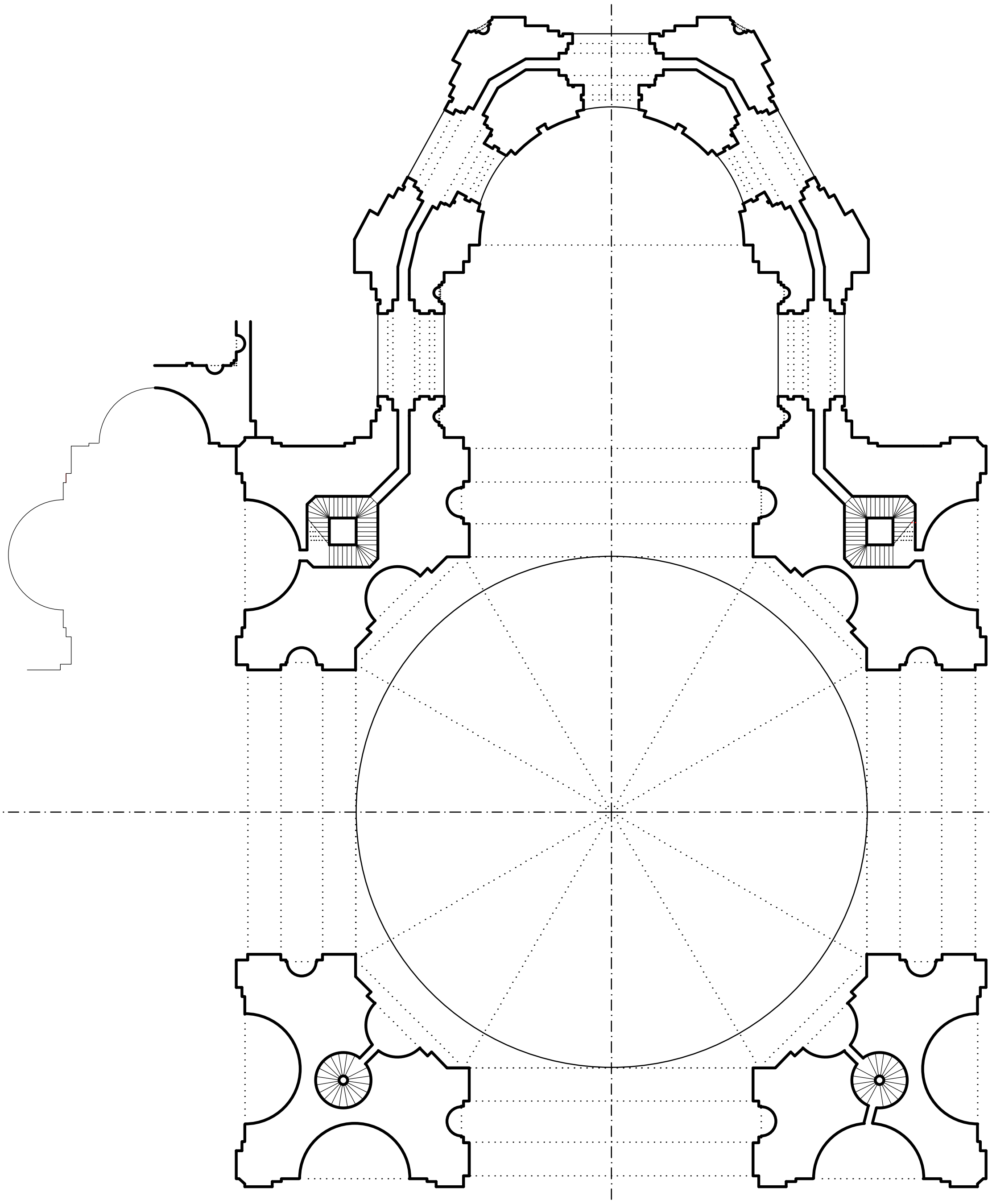
1514/15	NICHES OF THE OUTER PERIMETER OF THE TRIBUNE AND THE INTERNAL STAIRCAISE	GDSU 44 A	15



1514/15	PROJECTING THE ATTACHED DOME OF FRA GIOCONDO	GDSU 44 A	16

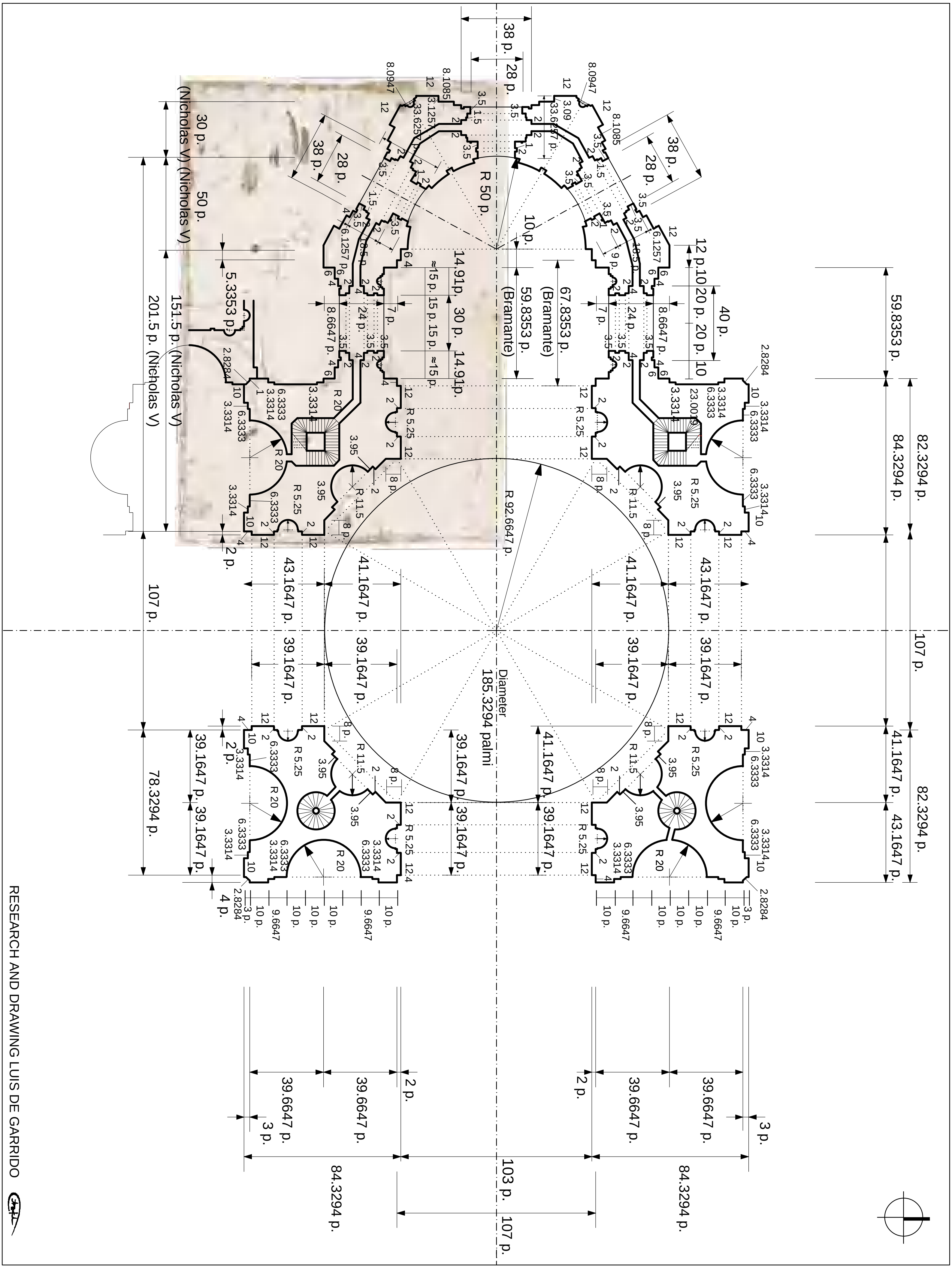


1514/15	RECONSTRUCTED PROJECT GDSU 44 A (WITH DIMENSIONS)	GDSU 44 A	17

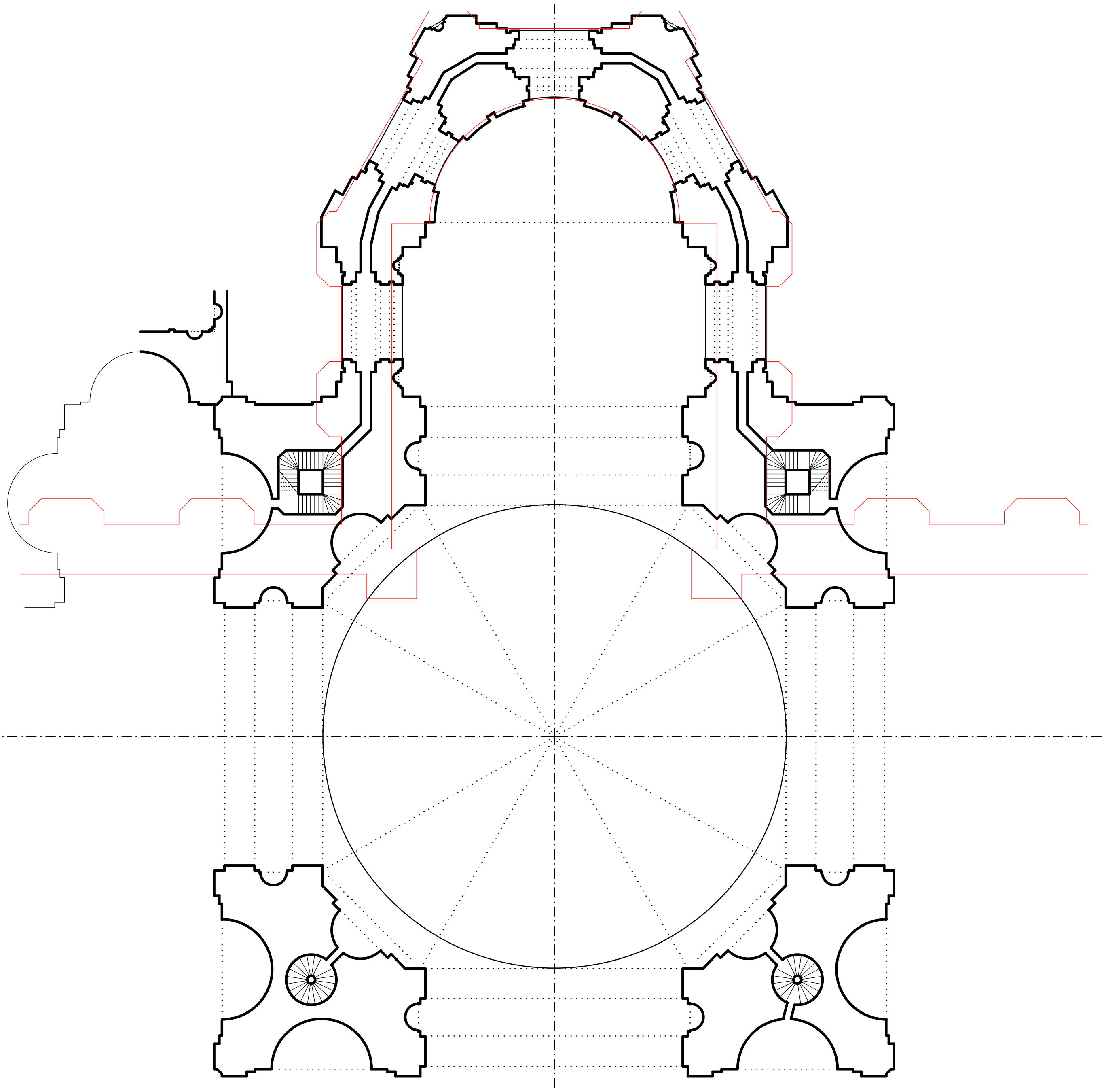


RESEARCH AND DRAWING LUIS DE GARRIDO

1514/15	RECONSTRUCTED PROJECT GDSU 44 A (WITHOUT DIMENSIONS)	GDSU 44 A	18

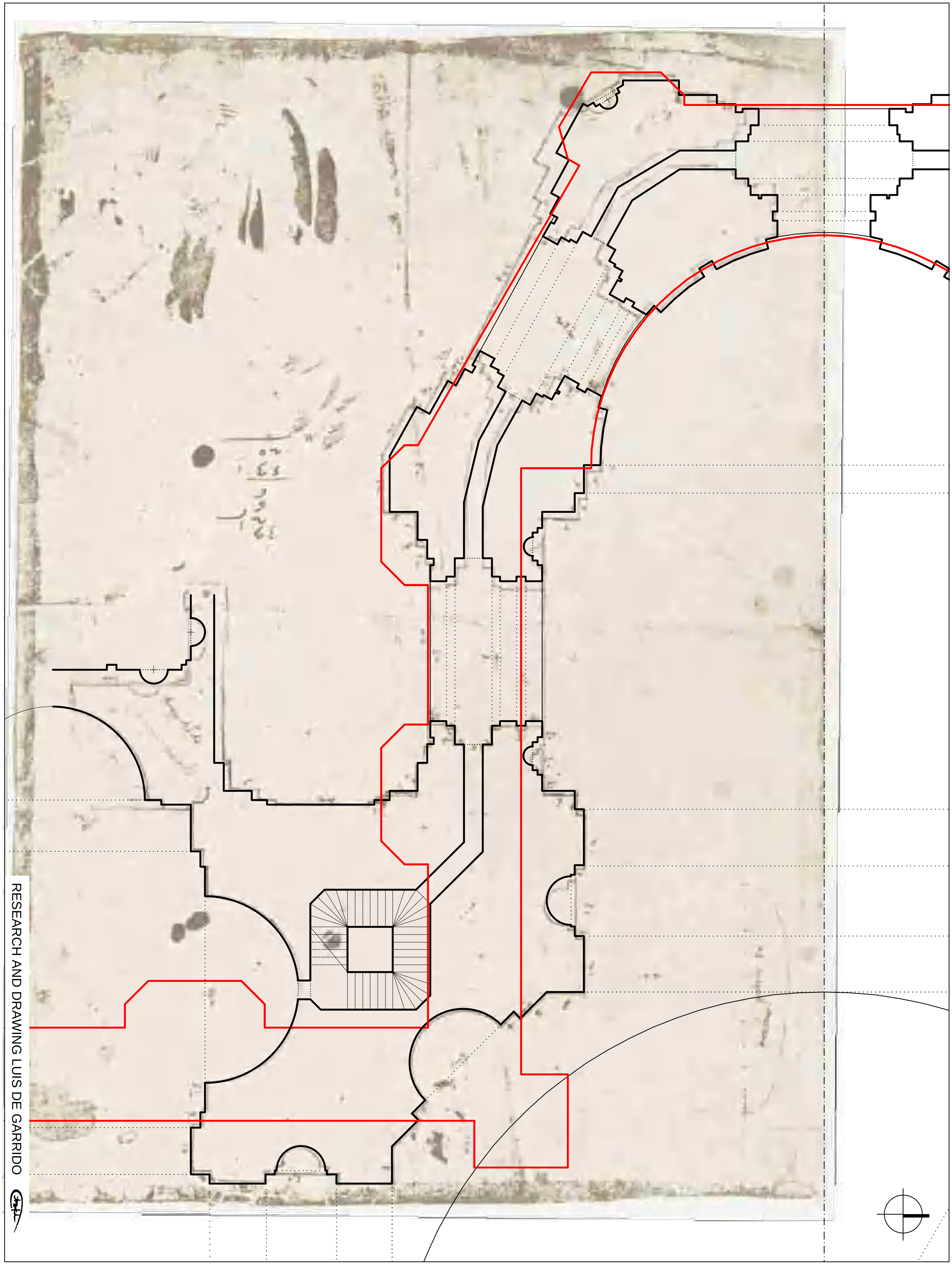


1514/15	OVERLAY RECONSTRUCTED PROJECT GDSU 44 A (WITH DIMENSIONS)	GDSU 44 A	19



RESEARCH AND DRAWING LUIS DE GARRIDO

1514/15	RECONSTRUCTED PROJECT GDSU 44 A AND NICOLO V FOUNDATIONS	GDSU 44 A	20

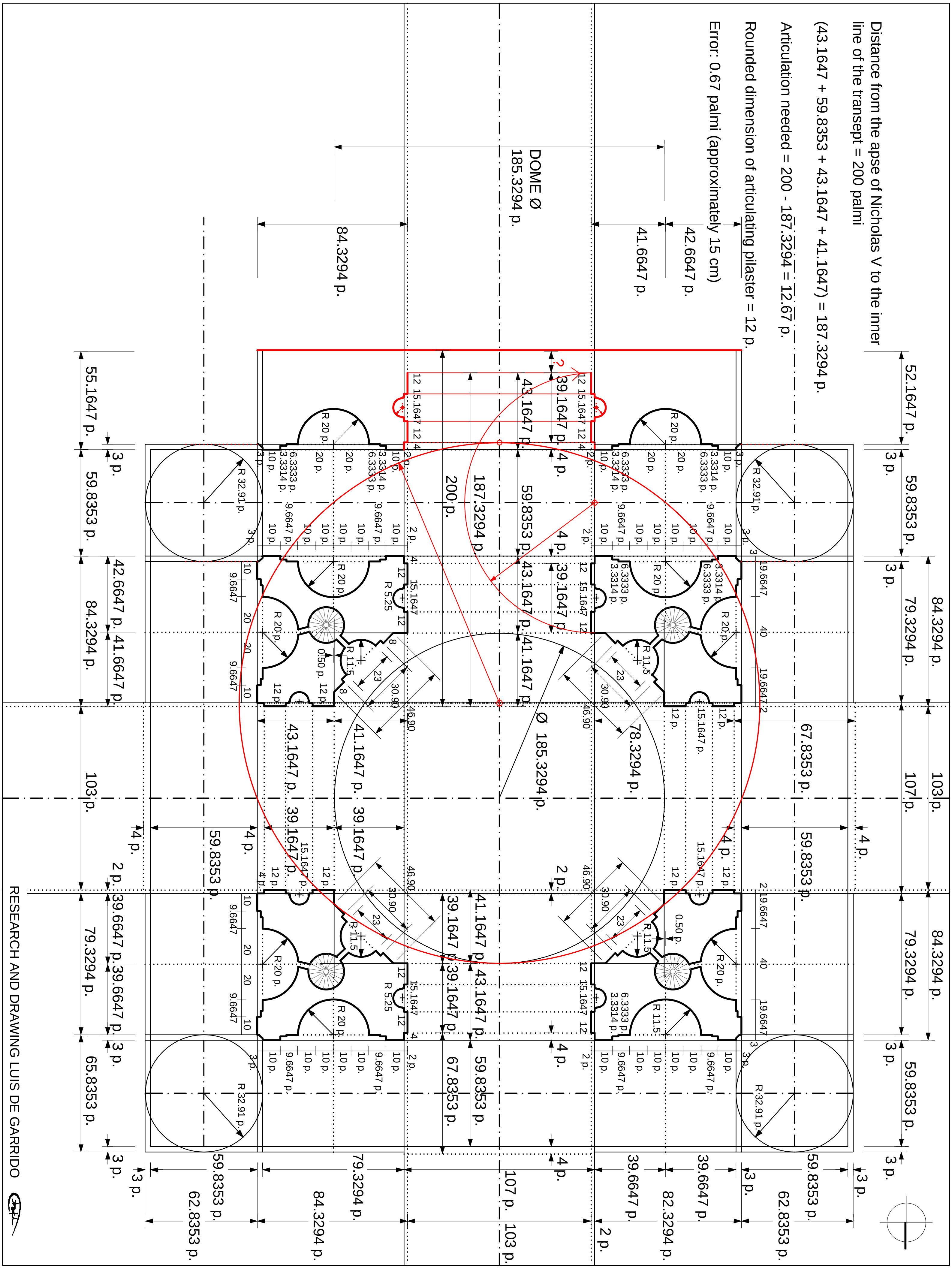


RESEARCH AND DRAWING LUIS DE GARRIDO

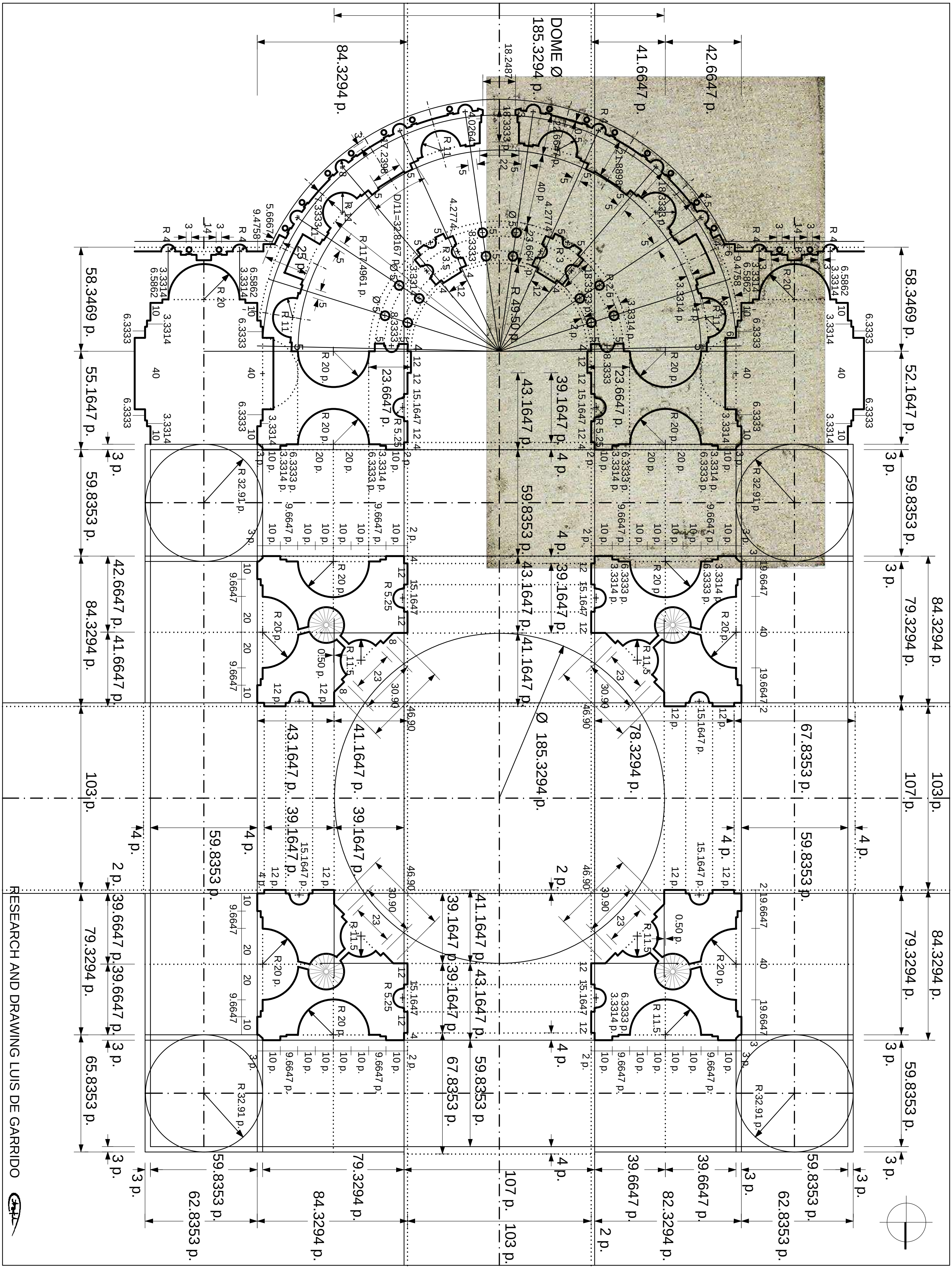
OVERLAY RECONSTRUCTED PROJECT GDSU 44 A AND NICOLO V FOUNDATIONS

GDSU 44 A

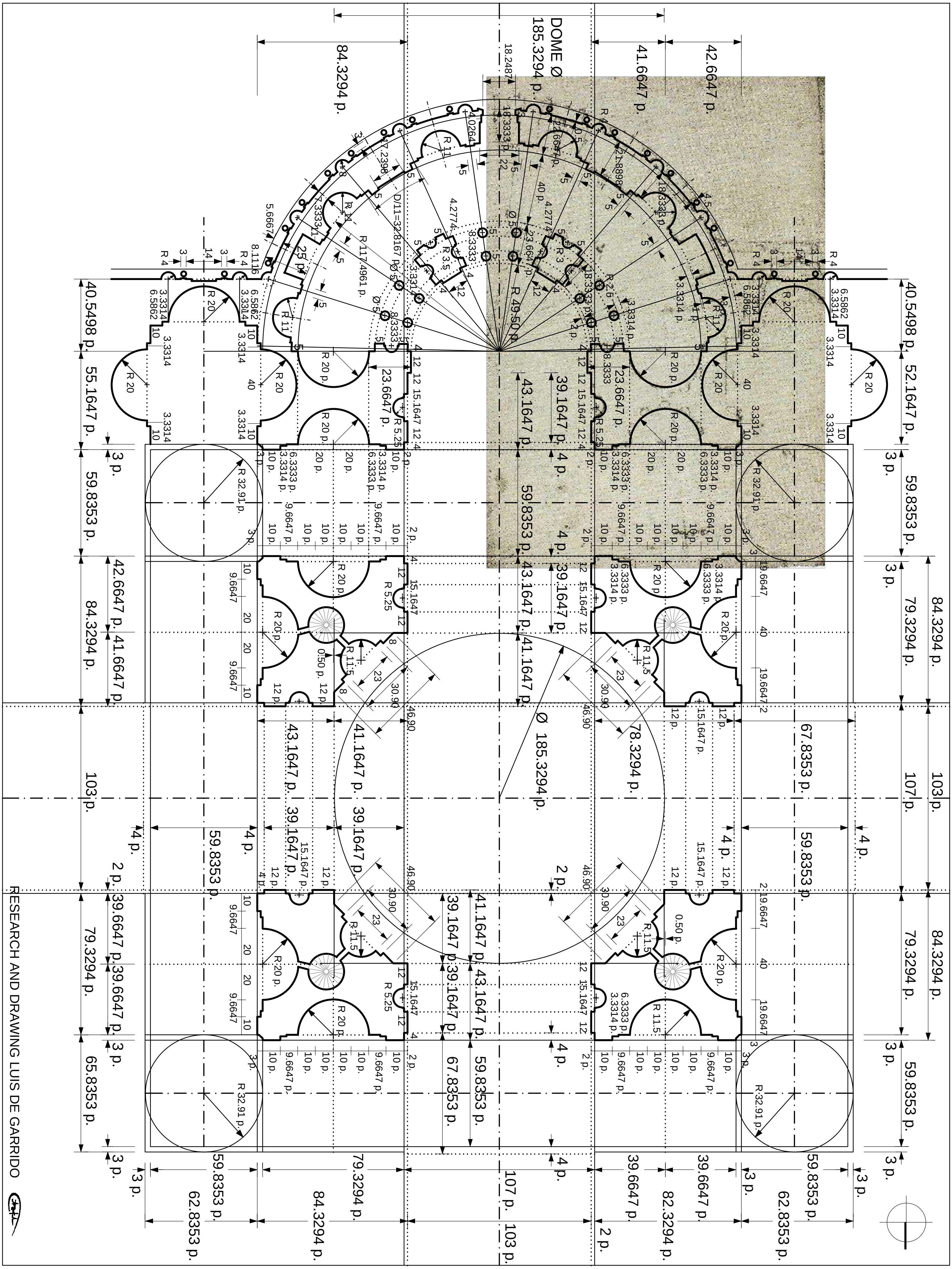
RECONSTRUCTION OF GDSU 46 A



1518/19	ESTABLISHING THE POSITION LINE OF HEMICYCLE PILASTERS	GDSU 46 A	1

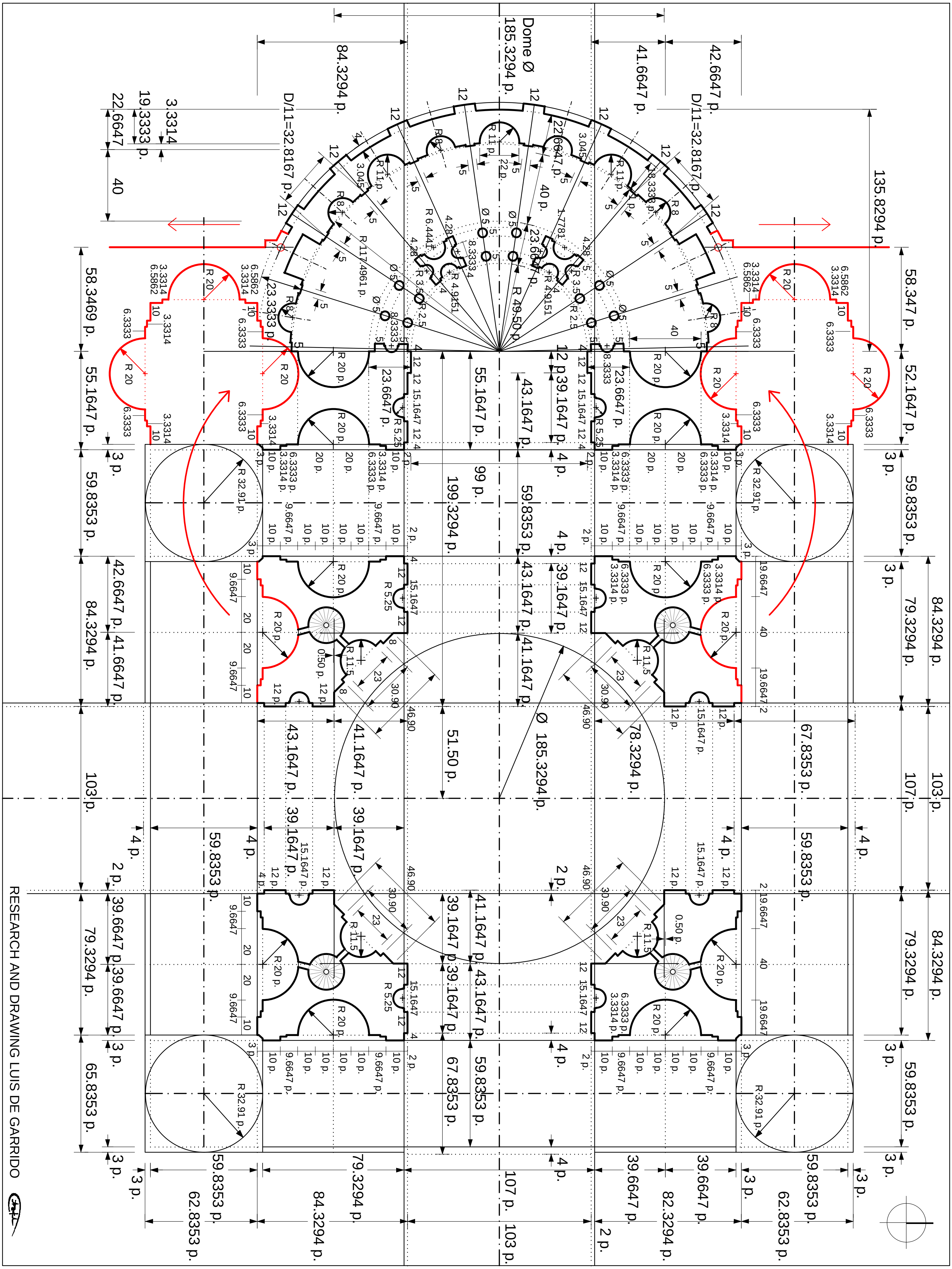


1518/19	OVERLAY GDSU 46 A (VERSION I, WITHOUT NICHES)	GDSU 46 A	2



1518/19	OVERLAY GDSU 46 A (VERSION II, WITH NICHES)	GDSU 46 A	3

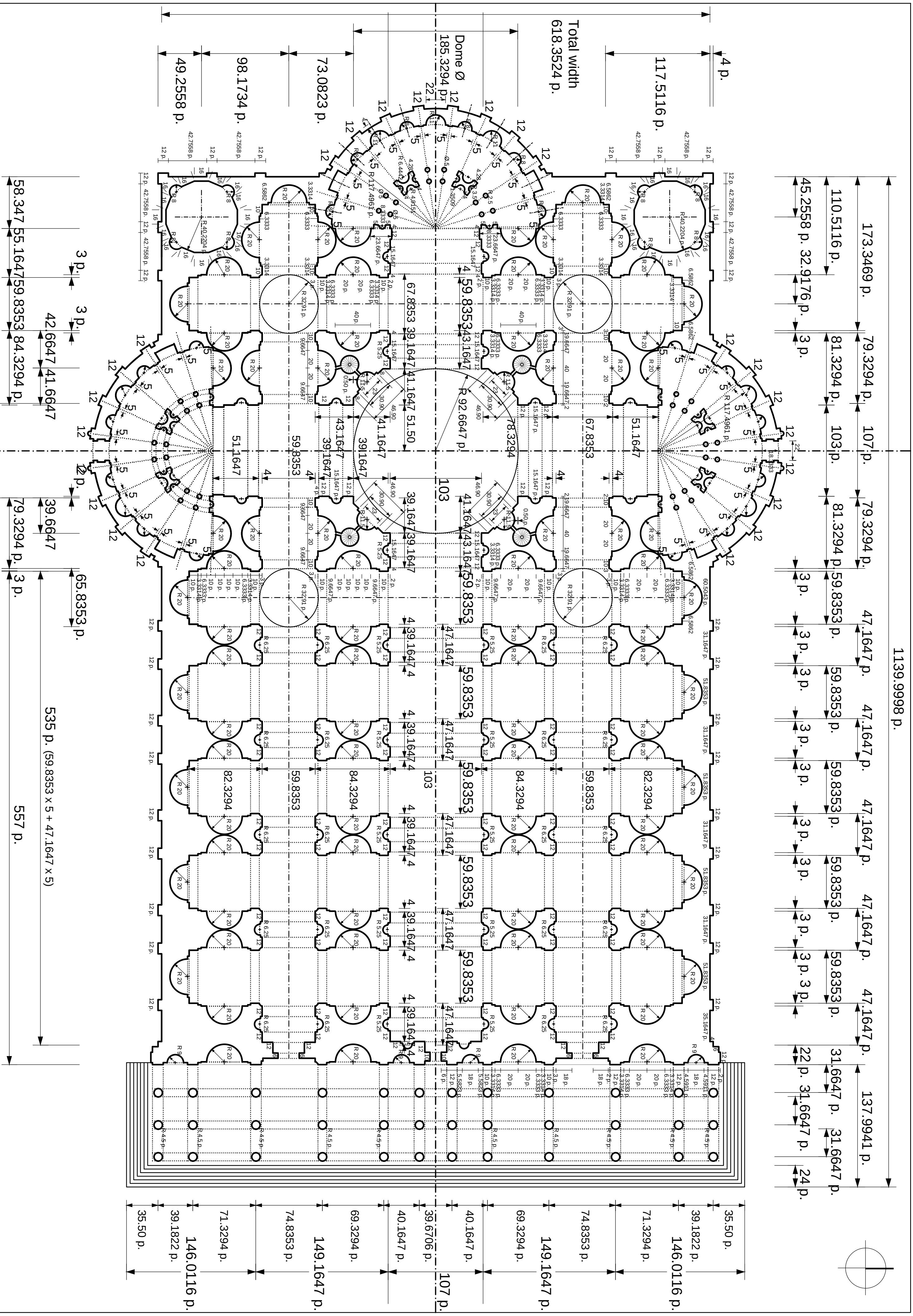
RECONSTRUCTION OF SERLIO 1544, f. 37



ESTABLISHING THE ADJACENT CHAPELS OF THE HEMICYCLE

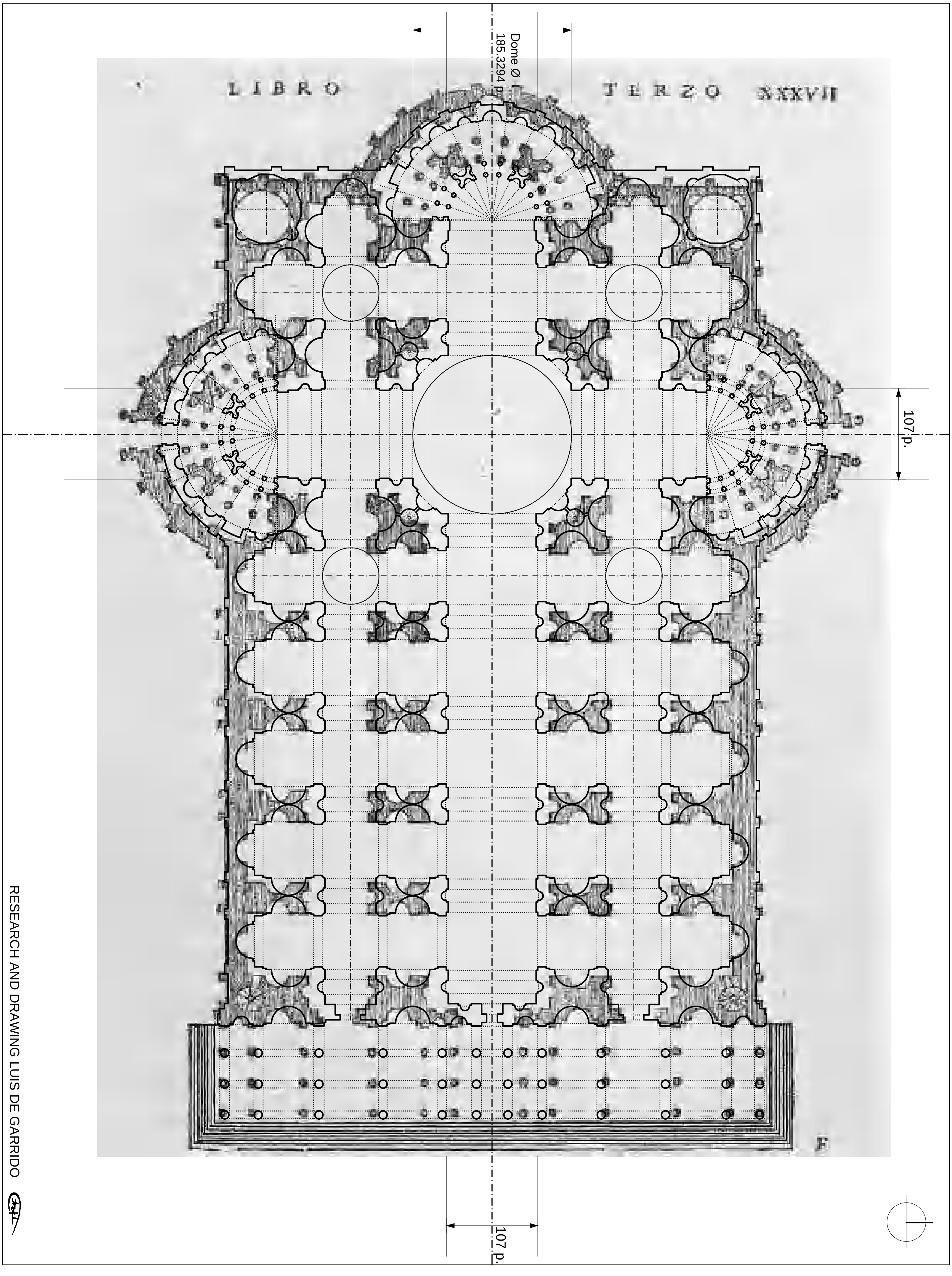
SERLIO 37

1



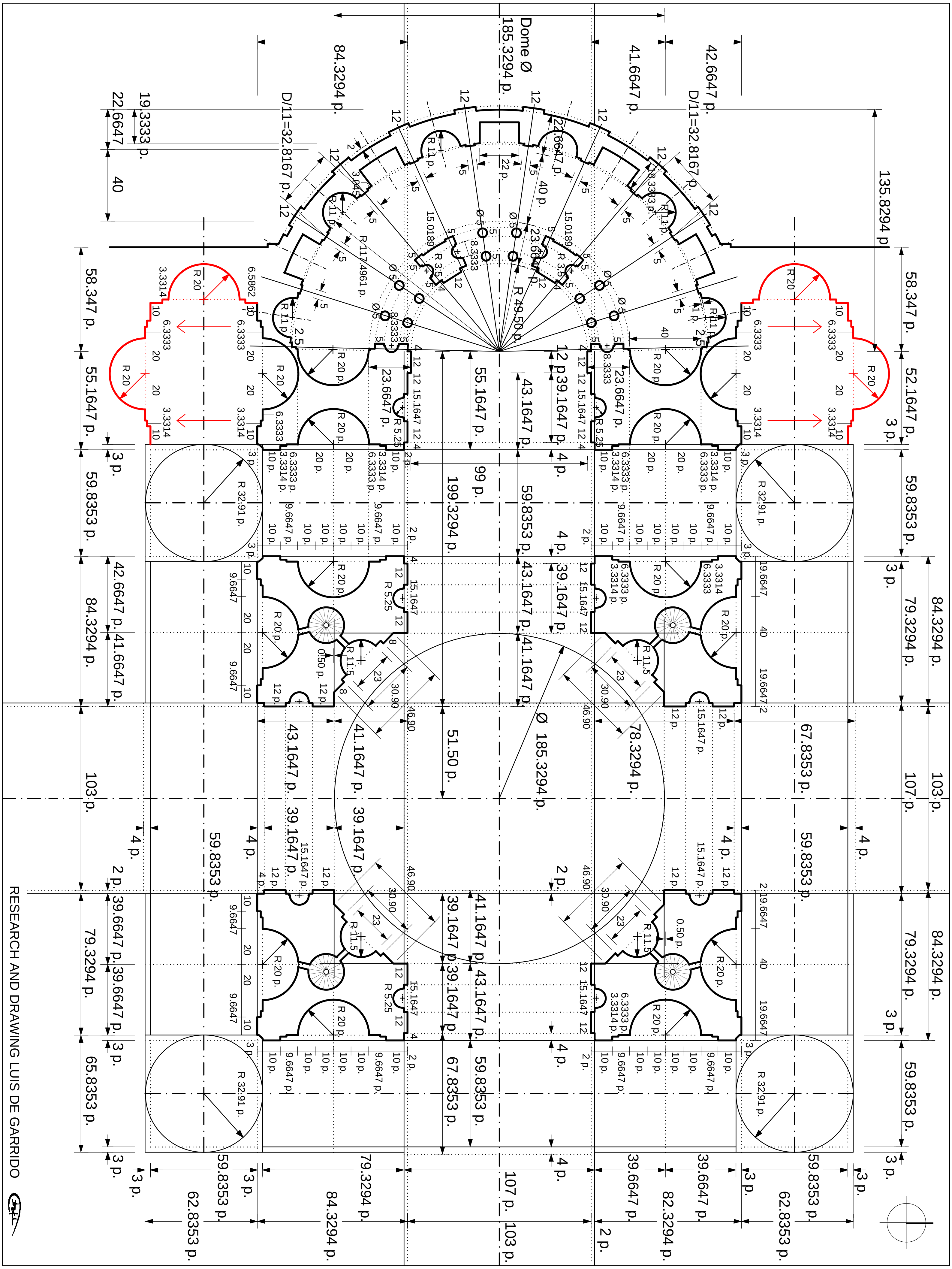
RESEARCH AND DRAWING LUIS DE GARRIDO

1514	RAFAEL COMPLETE PROJECT, SERLIO 37 (WITH MEASURES)	SERLIO 37	2

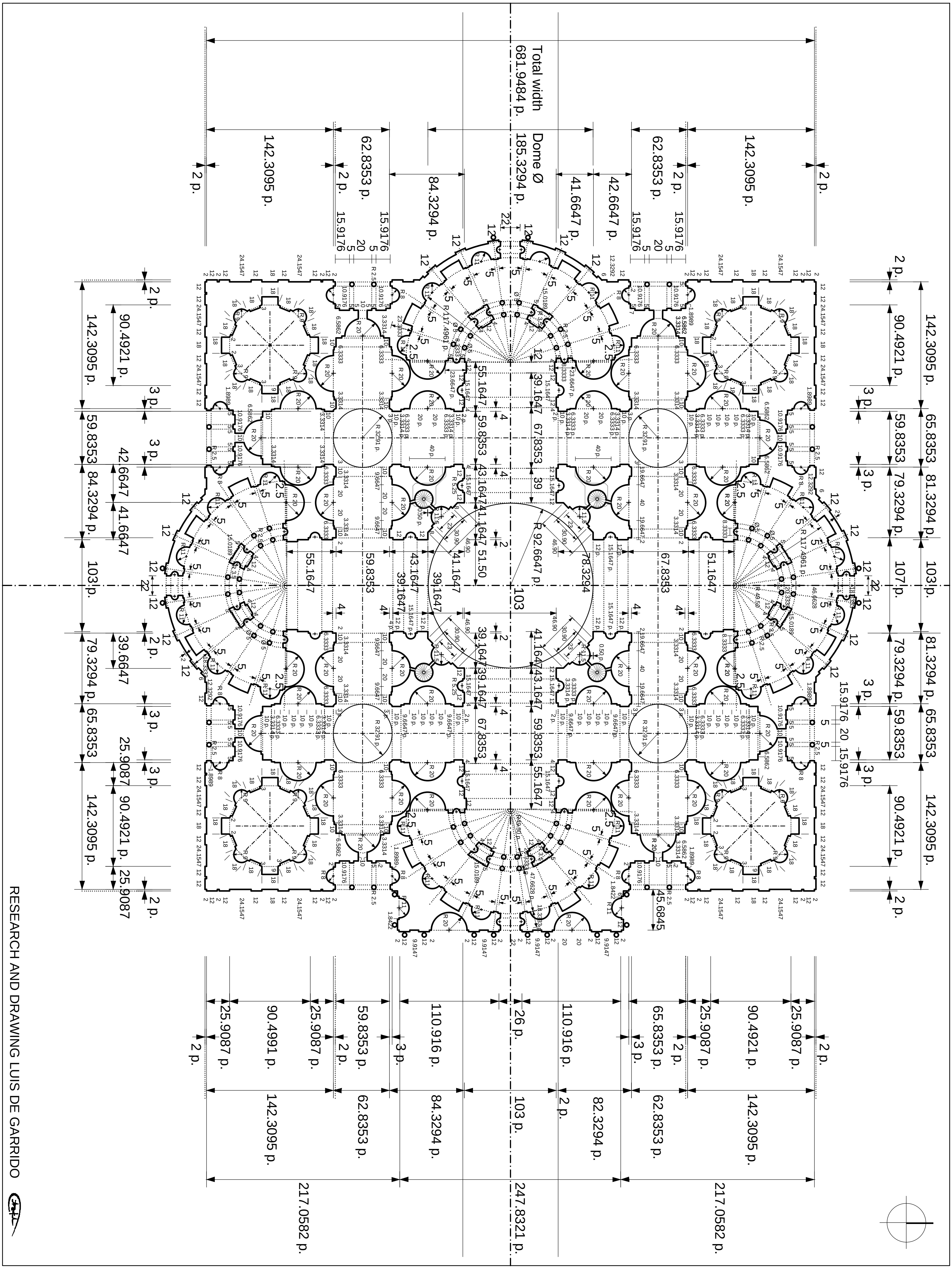


1514	OVERLAY RAFAEL COMPLETE PROJECT, SERLIO 37 (WITHOUT MEASURES)	SERLIO 37	3

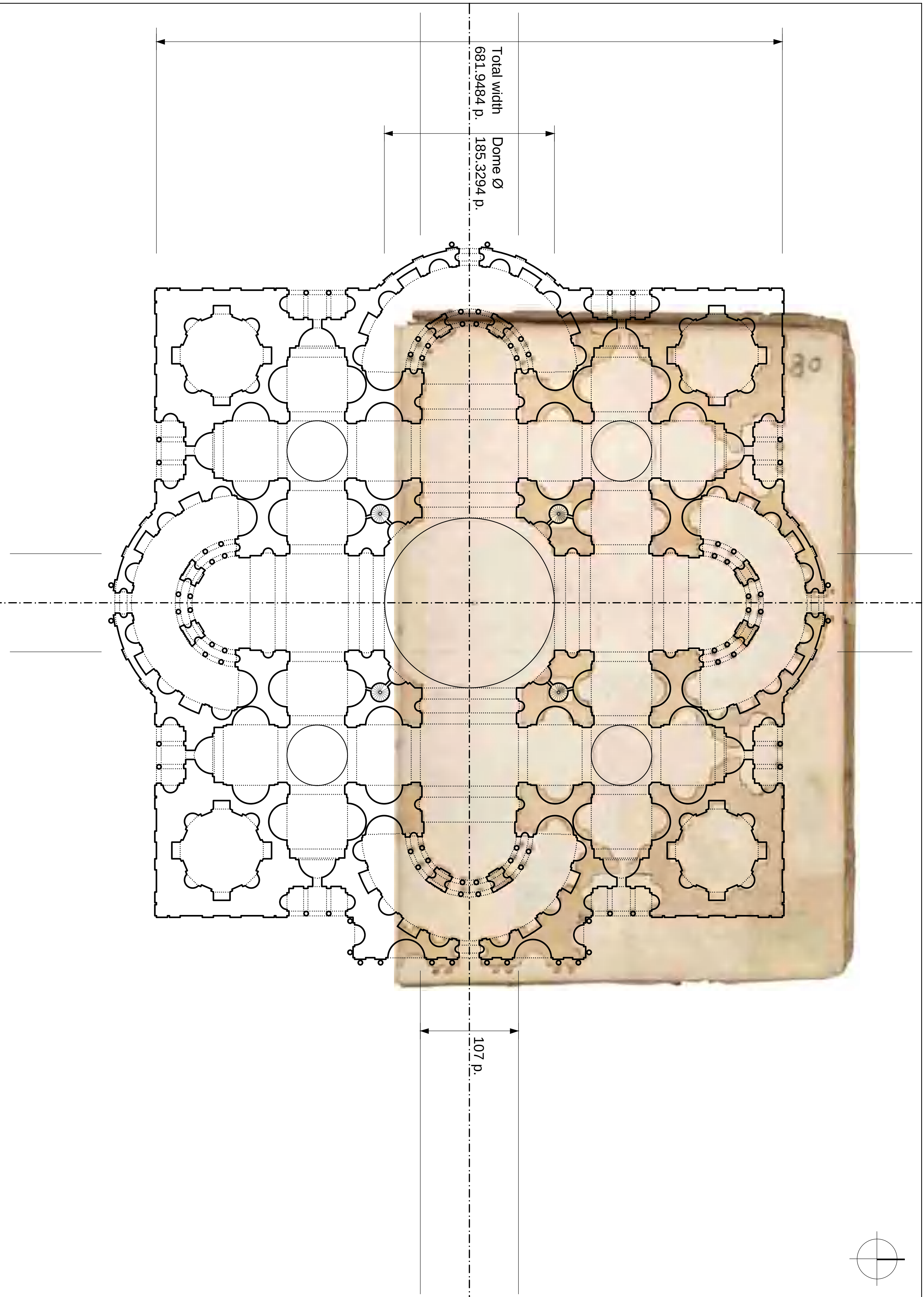
RECONSTRUCTION OF PML, CODEX MELLON, f. 71r



1513	ESTABLISHING THE ADJACENT CHAPELS OF THE HEMICYCLE (II)	MELLON 71r	1



1513	PERUZZI COMPLETE PROJECT (II), COD. MELLON 71r (WITH MEASURES)	MELLON 71r	2



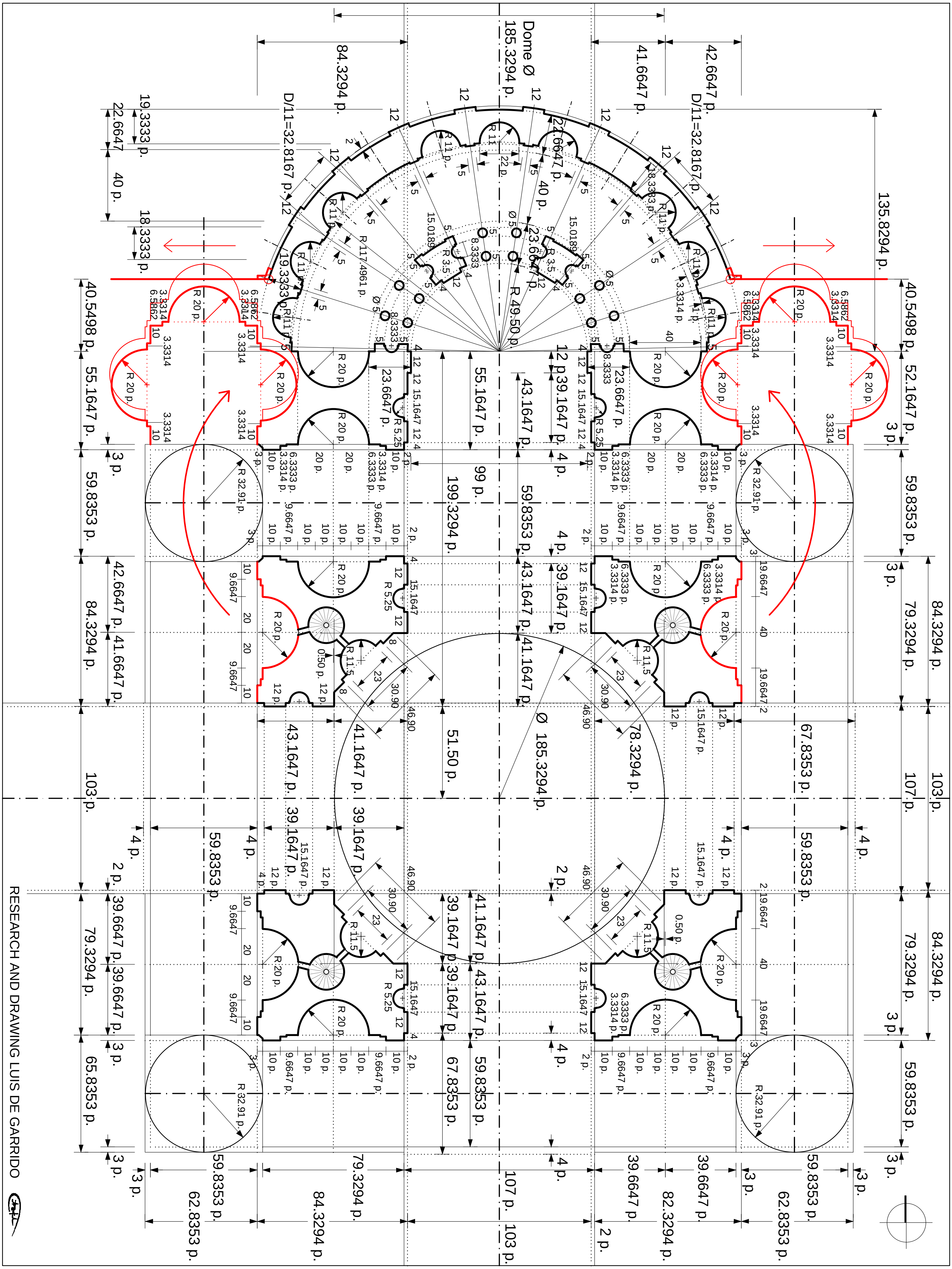
RESEARCH AND DRAWING LUIS DE GARRIDO

1513

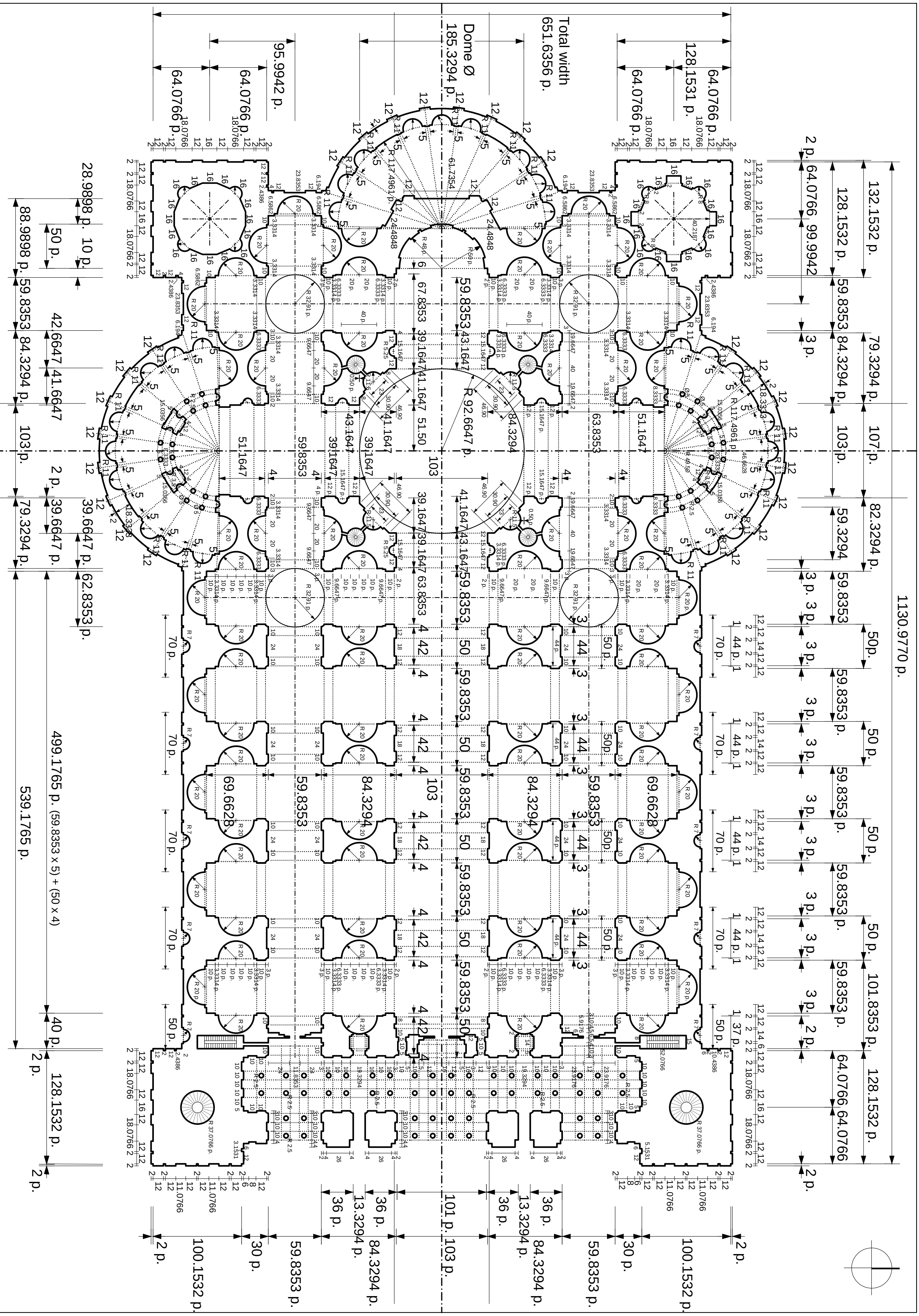
PERUZZI COMPLETE PROJECT (II), COD. MELLON 71r (WITHOUT MEASURES)

MELLON 71r

RECONSTRUCTION OF PML, CODEX MELLON, f. 72v

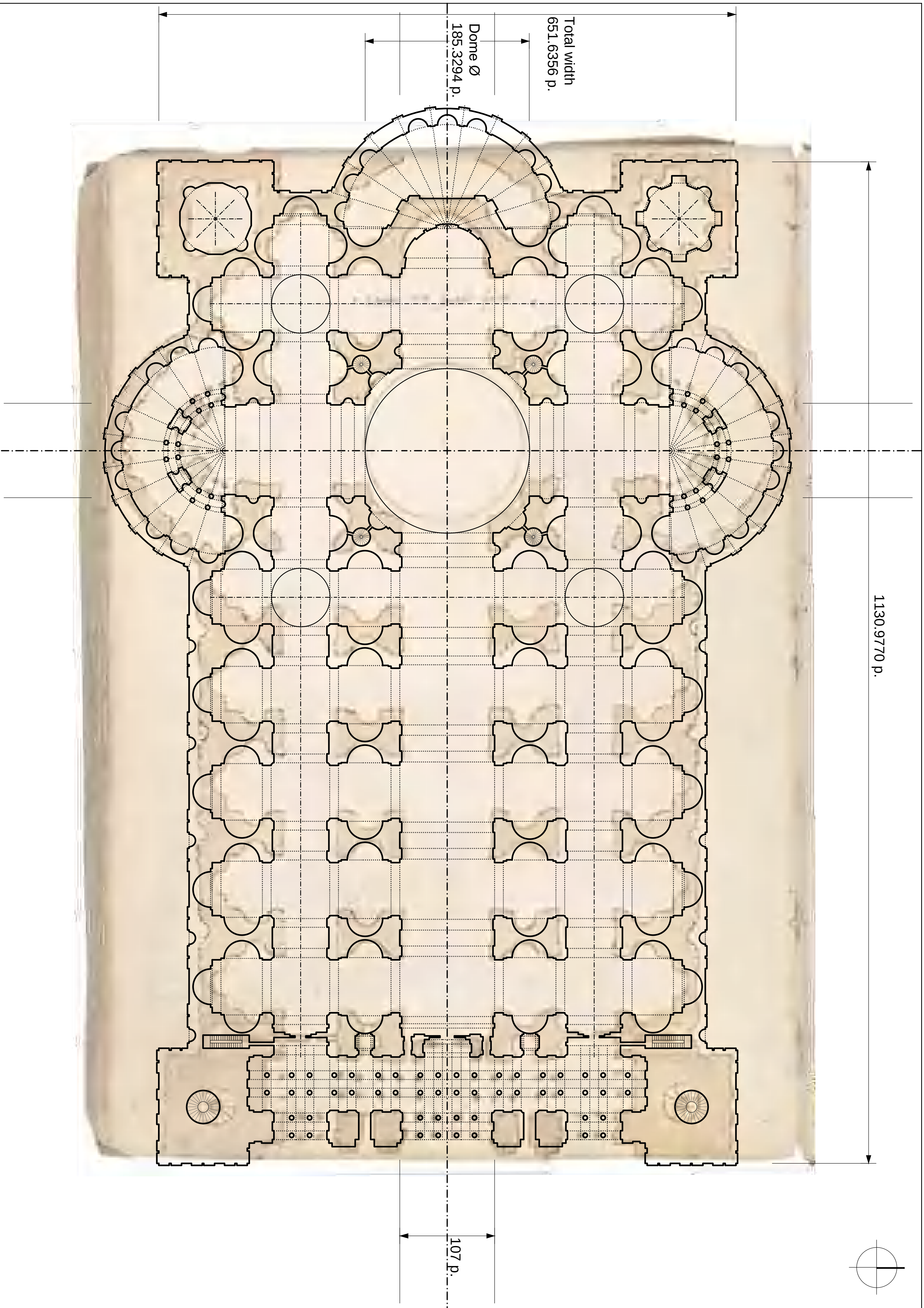


1513	ESTABLISHING THE ADJACENT CHAPELS OF THE HEMICYCLE	MELLON 72v	1



RESEARCH AND DRAWING LUIS DE GARRIDO

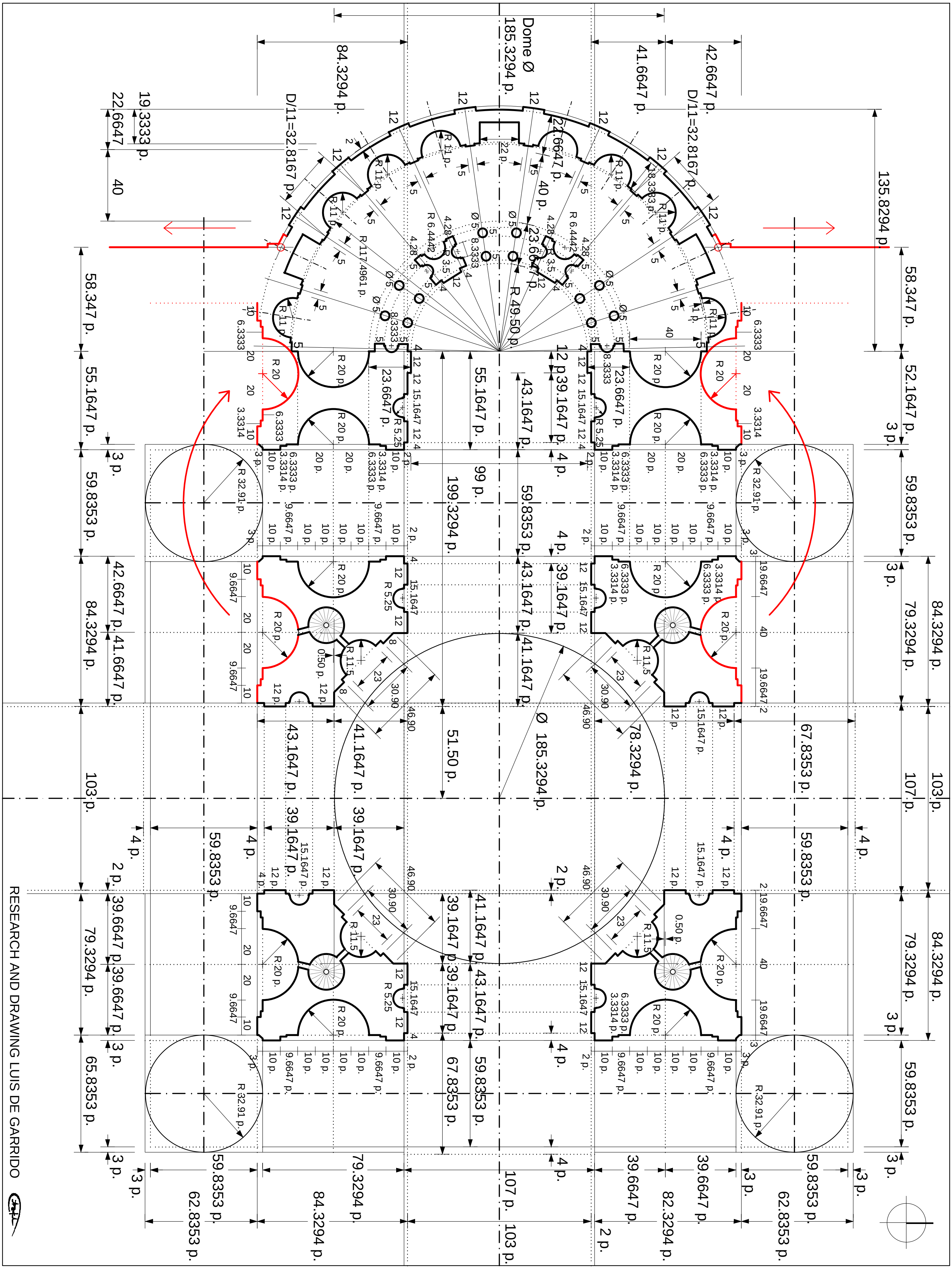
1513	RECONSTRUCTED PROJECT CODEX MELLON 72 (WITH MEASURES)	MELLON 72v	2



RESEARCH AND DRAWING LUIS DE GARRIDO

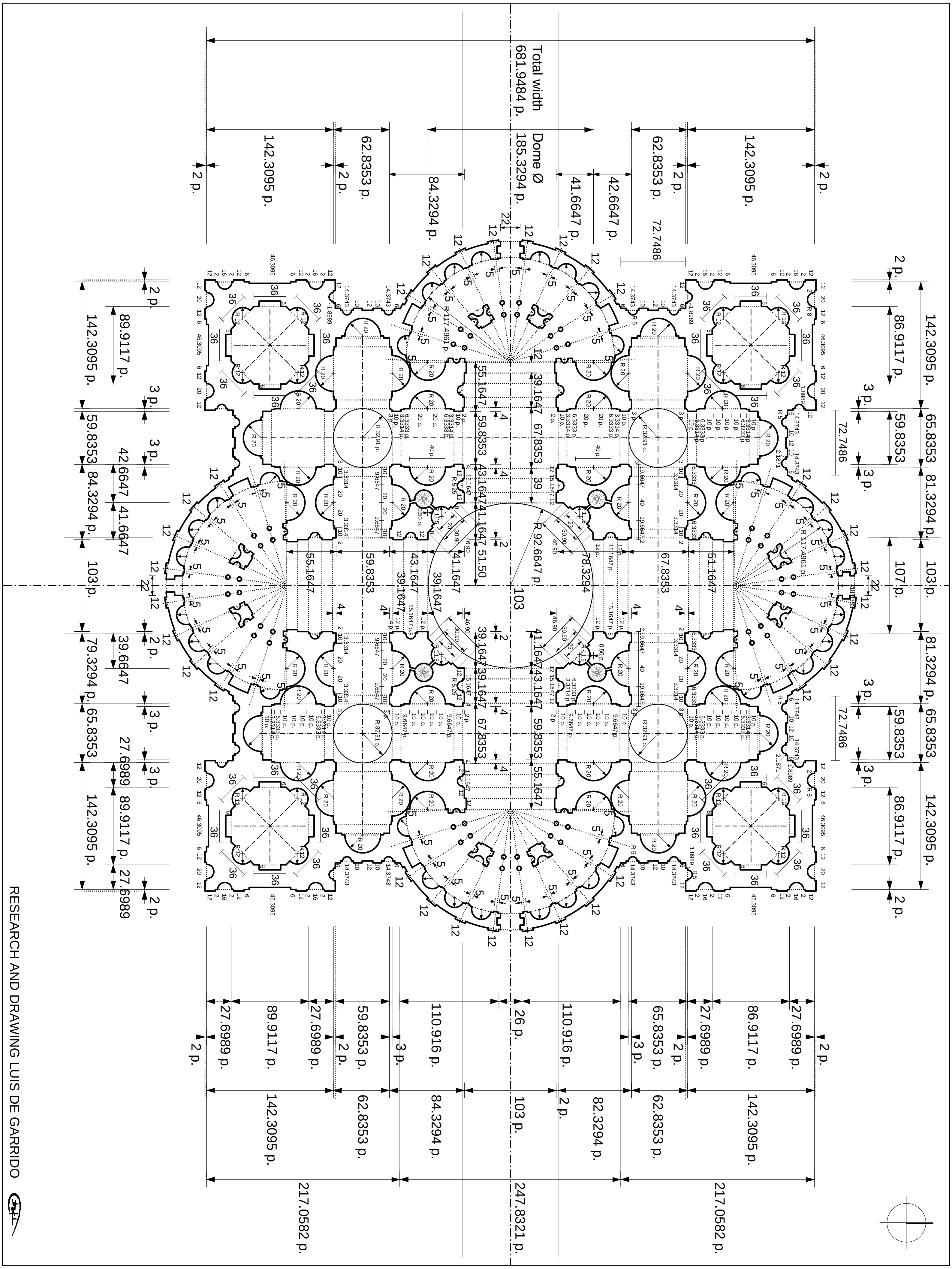
1513	RECONSTRUCTED PROJECT OVERLAY WITH CODEX MELLON 72	MELLON 72v	3

RECONSTRUCTION OF SERLIO 1544, f. 38

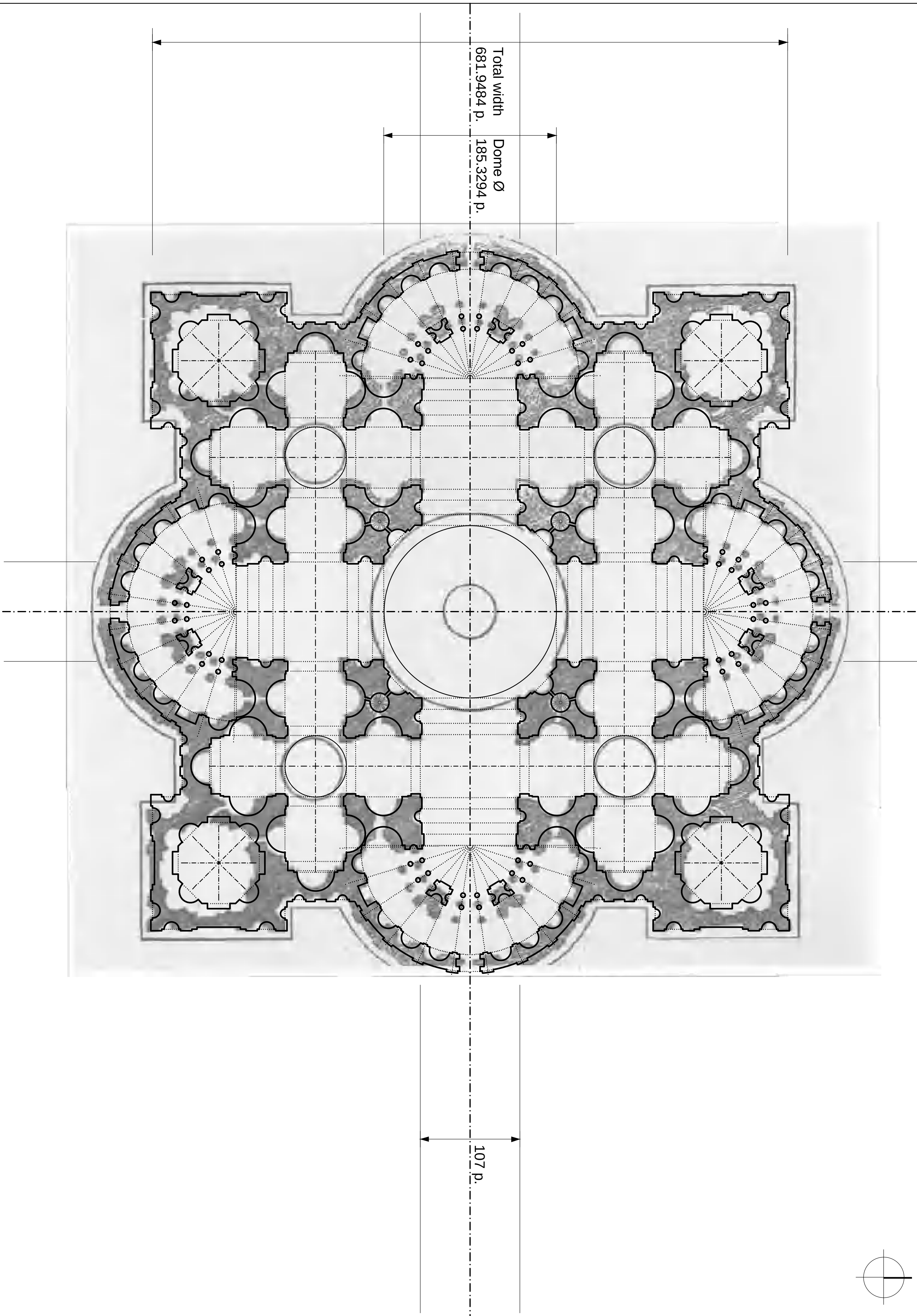


RESEARCH AND DRAWING LUIS DE GARRIDO

1520	ESTABLISHING THE ADJACENT CHAPELS OF THE HEMICYCLE (I)	SERLIO 38	1



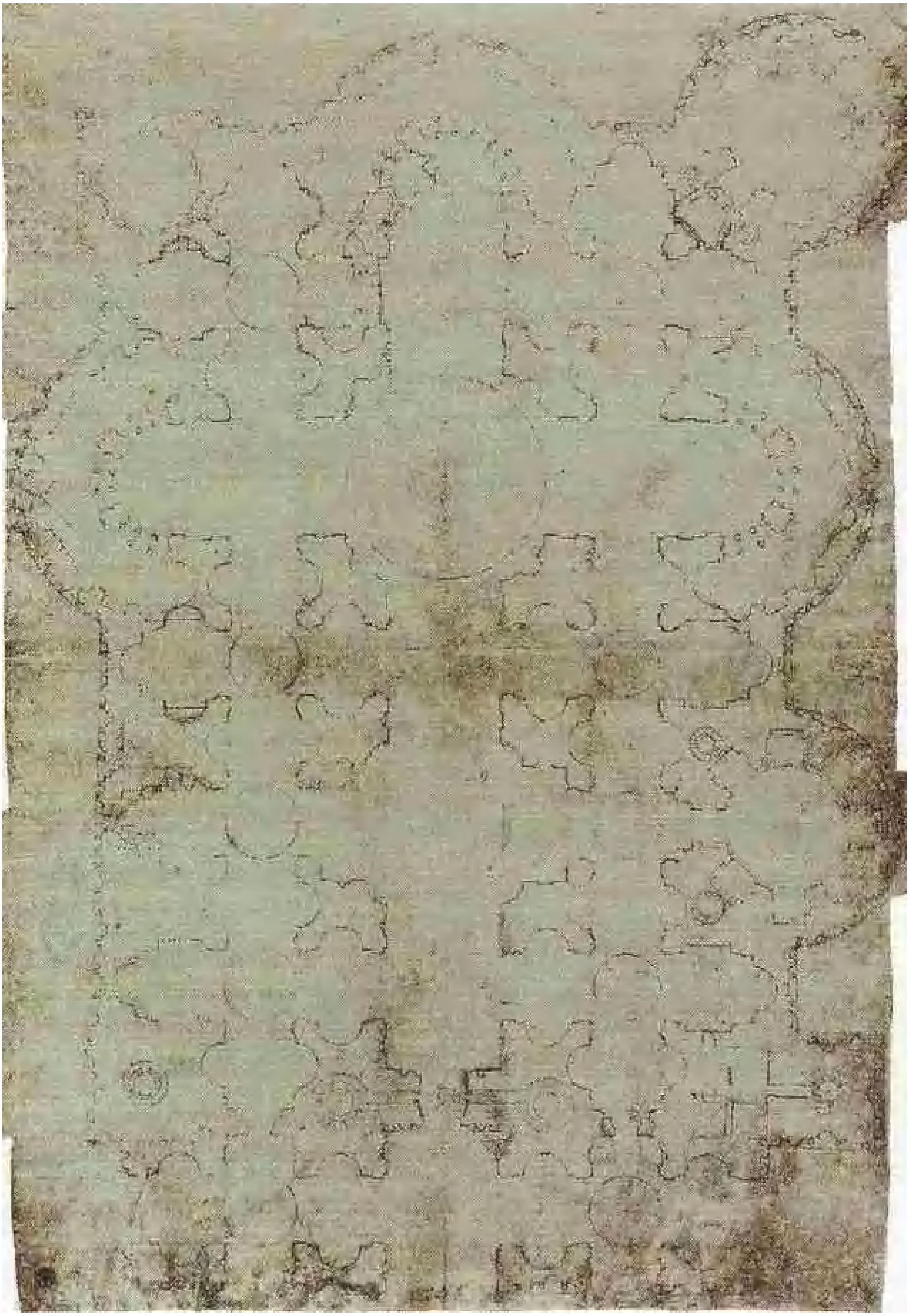
1520	PERUZZI COMPLETE PROJECT, SERLIO 38 (WITH MEASURES)	SERLIO 38	2



RESEARCH AND DRAWING LUIS DE GARRIDO

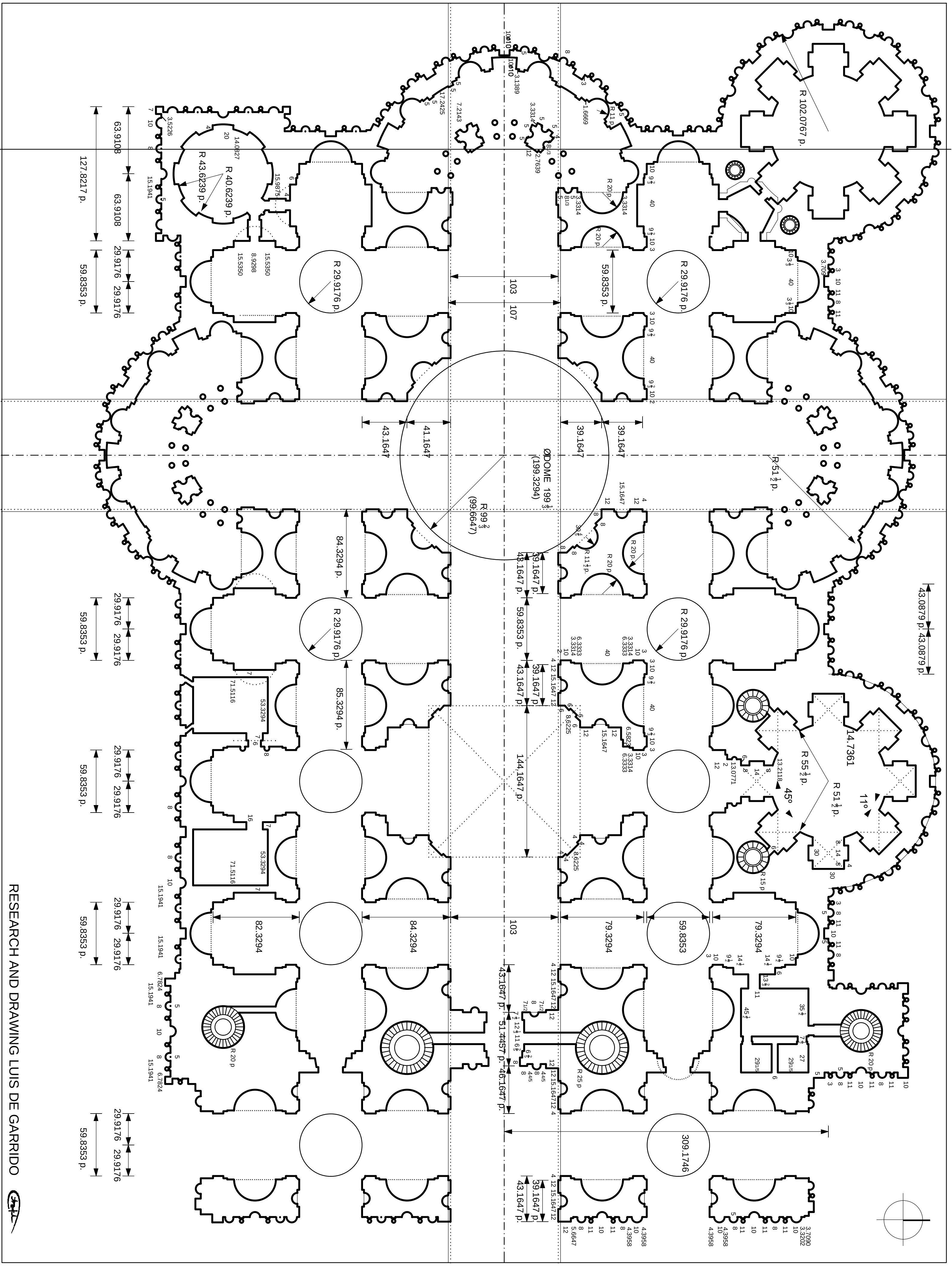
1520	OVERLAY PERUZZI COMPLETE PROJECT, SERLIO 38 (WITHOUT MEASURES)	SERLIO 38	3

RECONSTRUCTION OF GDSU 255 A

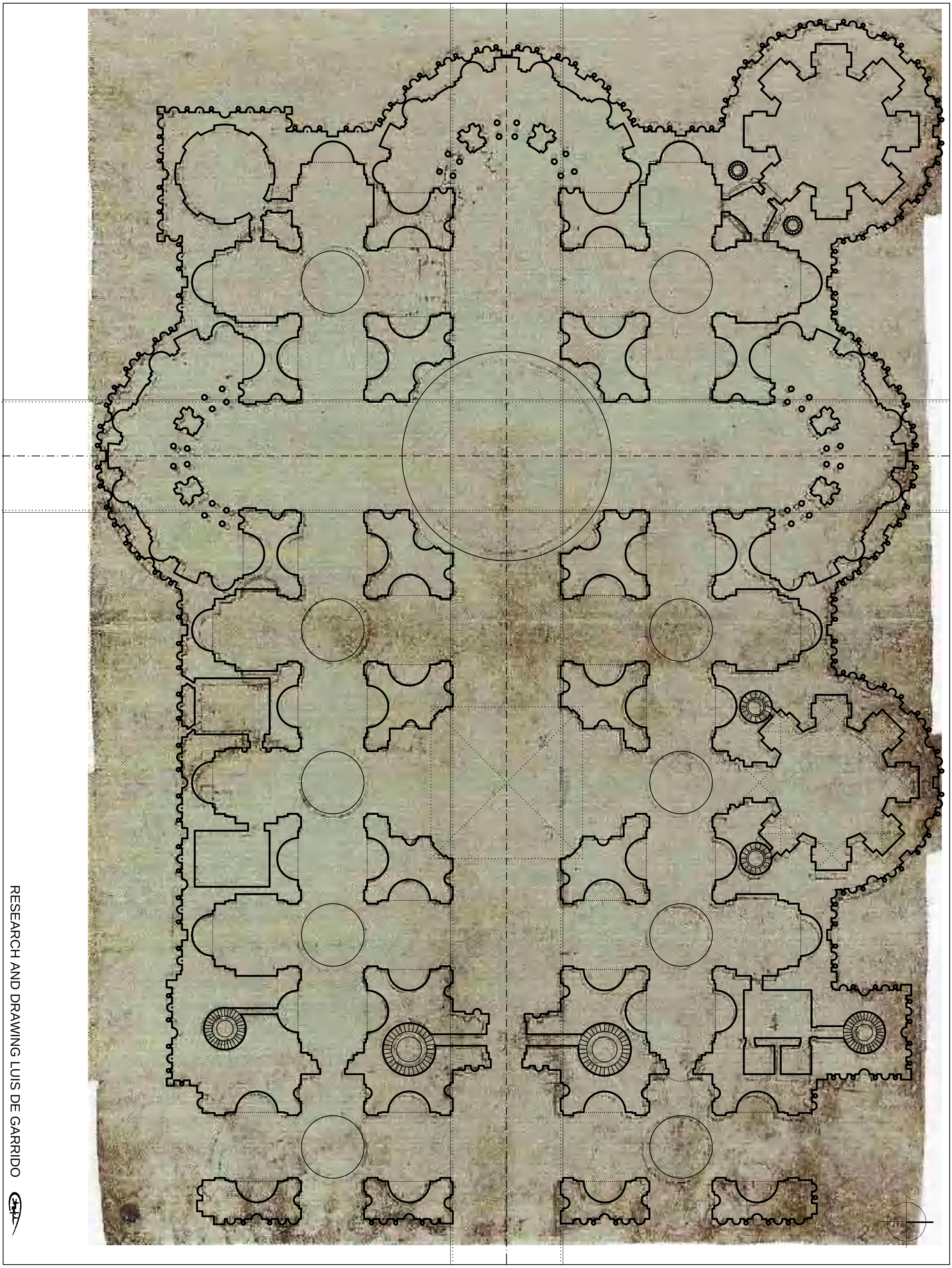


Project of the St. Peter's plant on parchment, with two alternative solutions. Drawing by Antonio da Sangallo, 1519
GDSU 255Ar

RESEARCH AND DRAWING LUIS DE GARRIDO



1519/20	COMPLETE PLAN OF GDSU 255 A, BY ANTONIO DA SANGALLO	GDSU 255 A	2



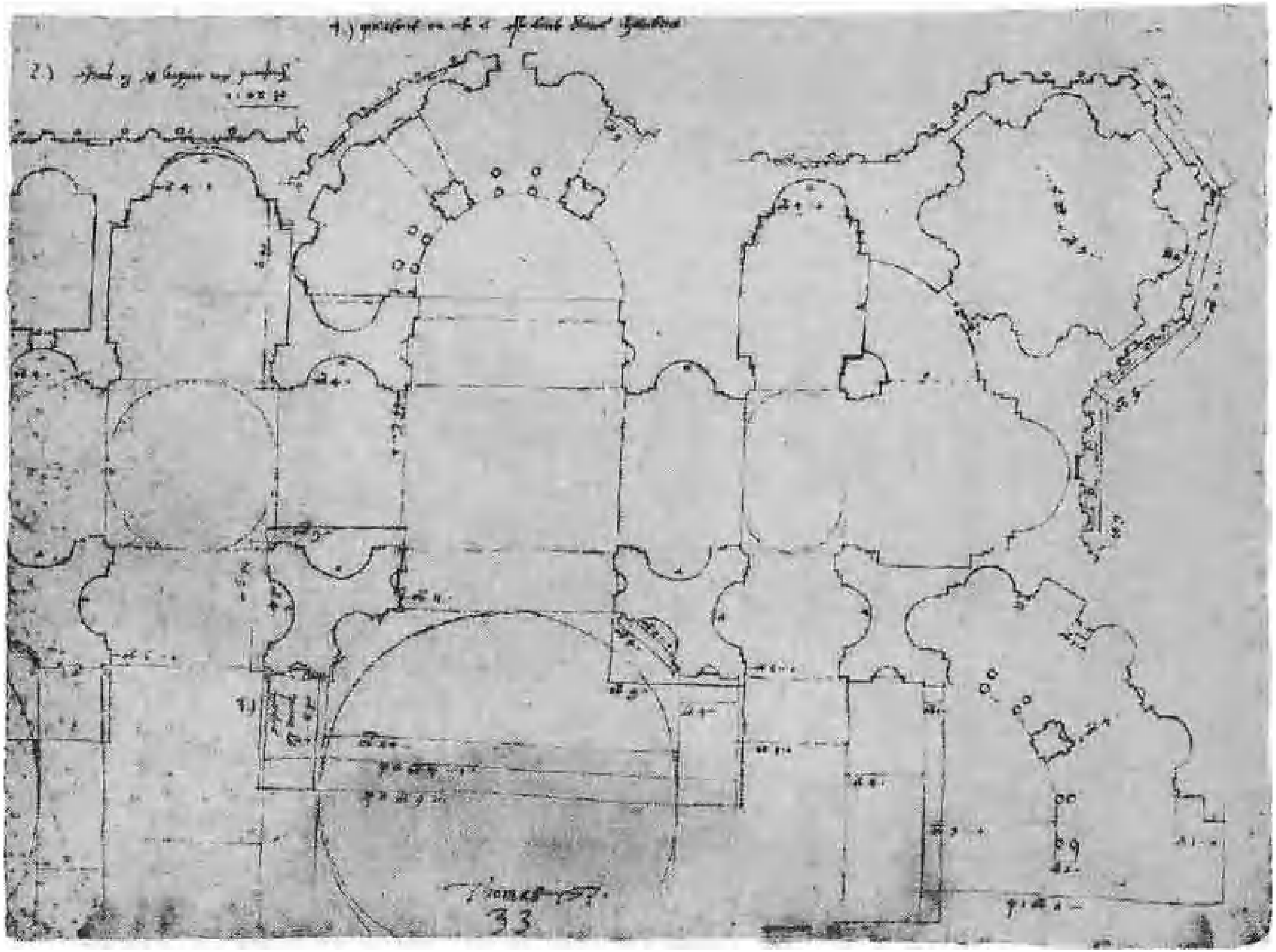
1519/20

COMPLETE PLAN OF GDSU 255 A BY ANTONIO DA SANGALLO, OVERLAY

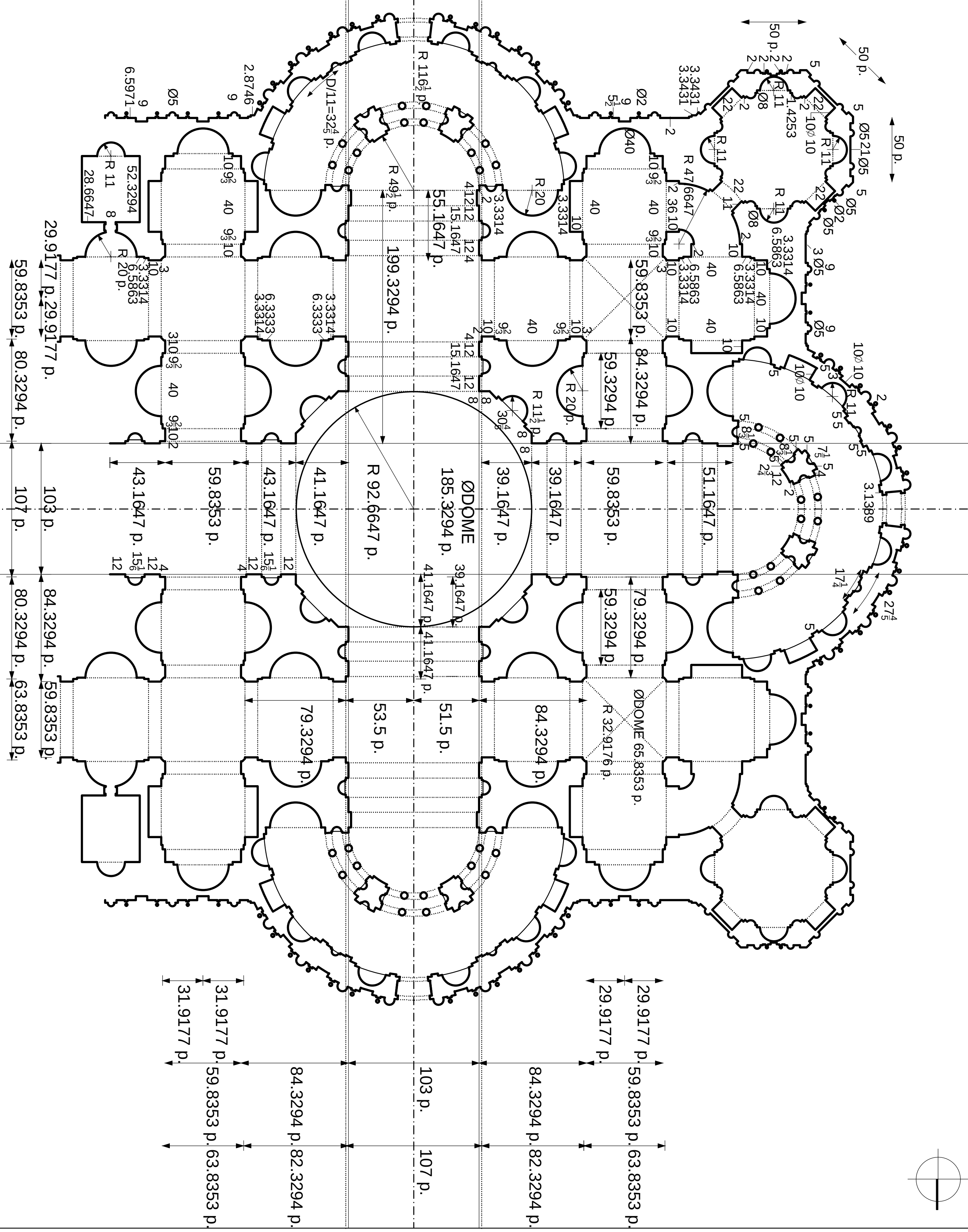
GDSU 255 A

RECONSTRUCTION OF BSB COD. ICON. 195, f. 2r

Partial relief plan with measurements in ounces (= 1/12 of roman palm) of the model by Antonio da Sangallo
Französische Architekturzeichnungen nach italienischen Entwürfen für Neu-St. Peter und für römische Palazzi des Cinquecento - BSB Cod.icon. 195, f. 2r

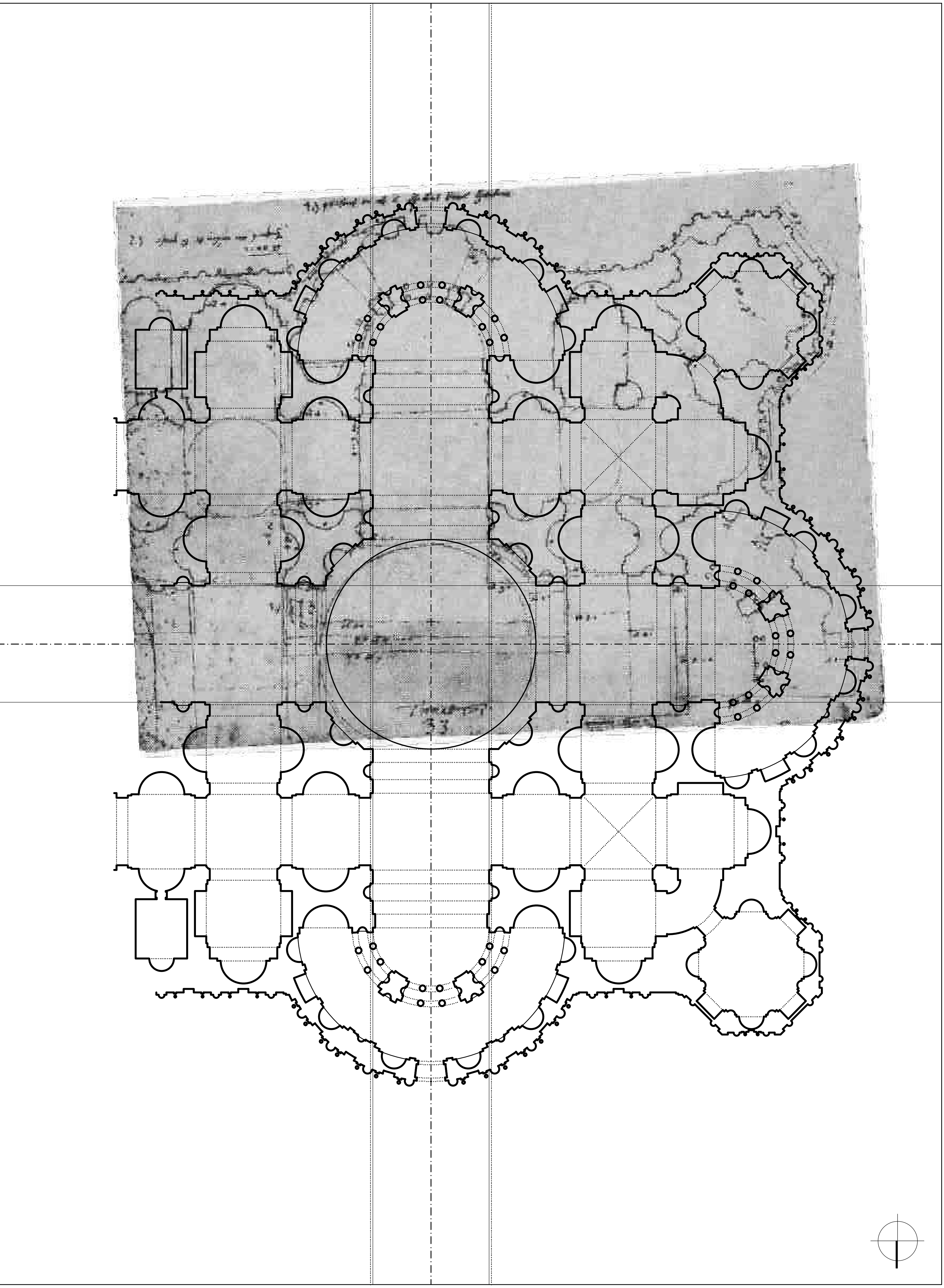


RESEARCH AND DRAWING LUIS DE GARRIDO



RESEARCH AND DRAWING LUIS DE GARRIDO

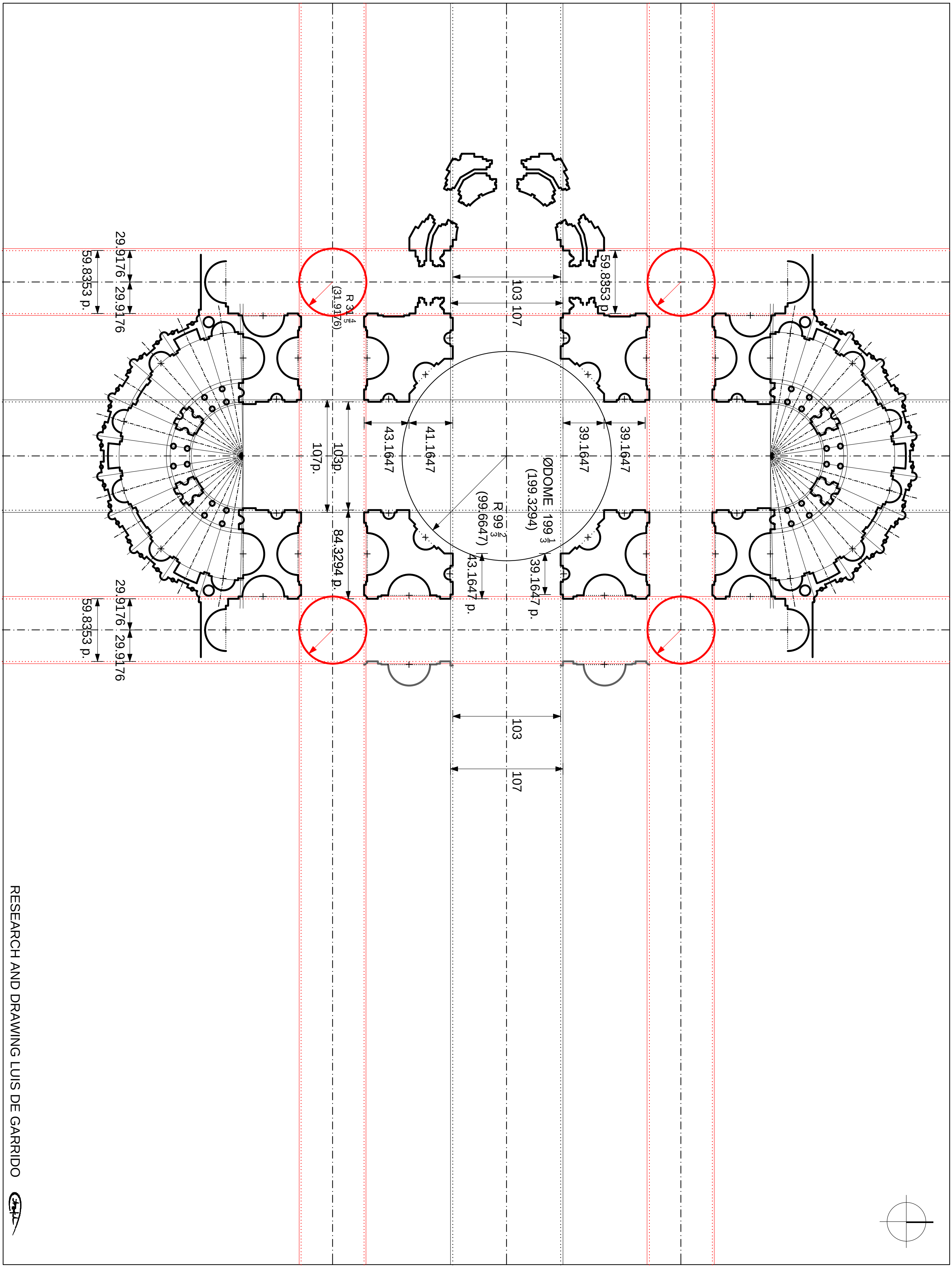
1521	RECONSTRUCTED CODEX ICON 195 f. 2r (WITH MEASUREMENTS)	Icon 195 f.2r	2



RESEARCH AND DRAWING LUIS DE GARRIDO

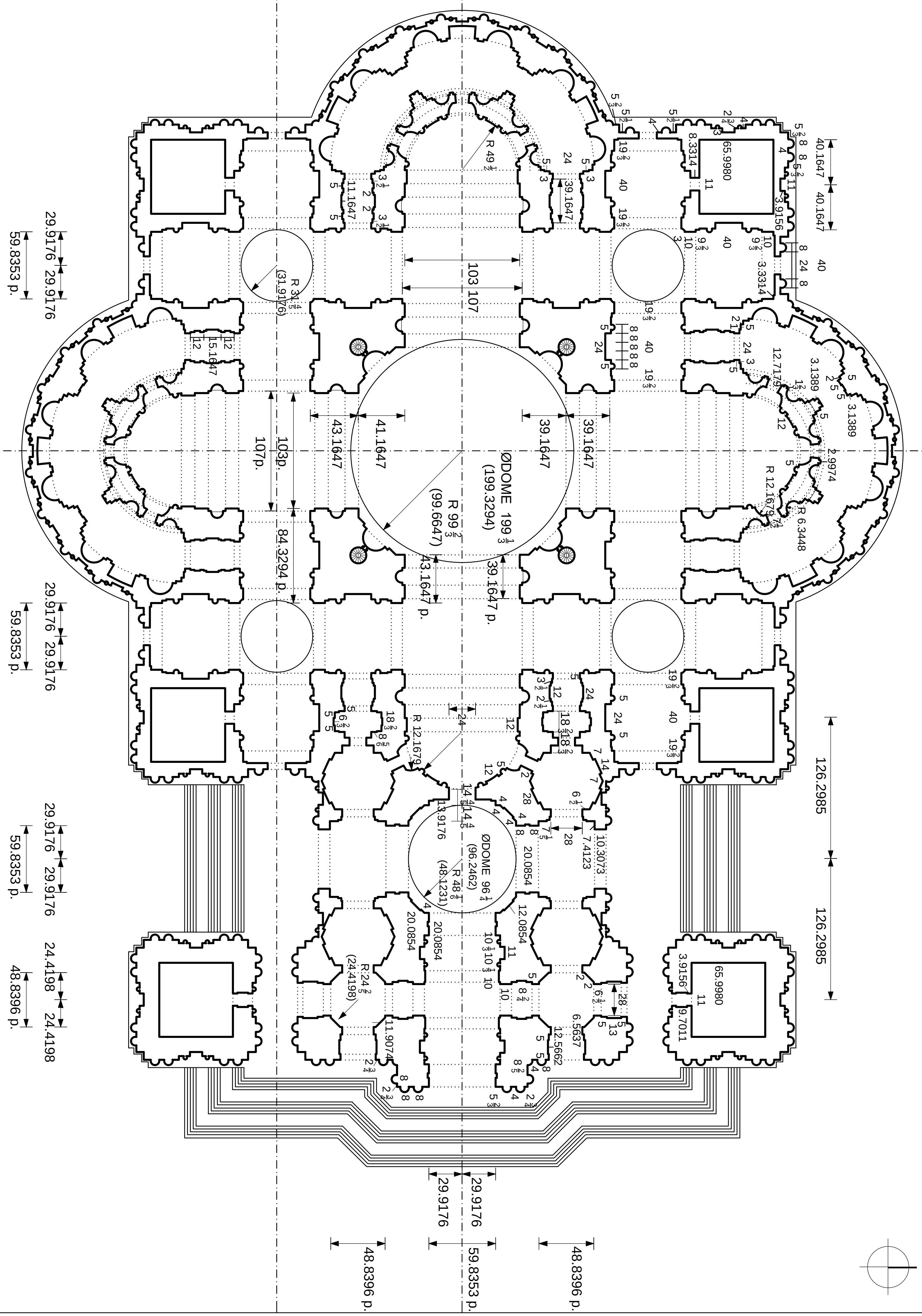
1521	OVERLAY RECONSTRUCTED CODEX ICON 195 f. 2r	Icon 195 f.2r	3

RECONSTRUCTION OF THE PROJECT BY ANTONIO DA SANGALLO ACCORDING TO ANTONIO DA LABACCO



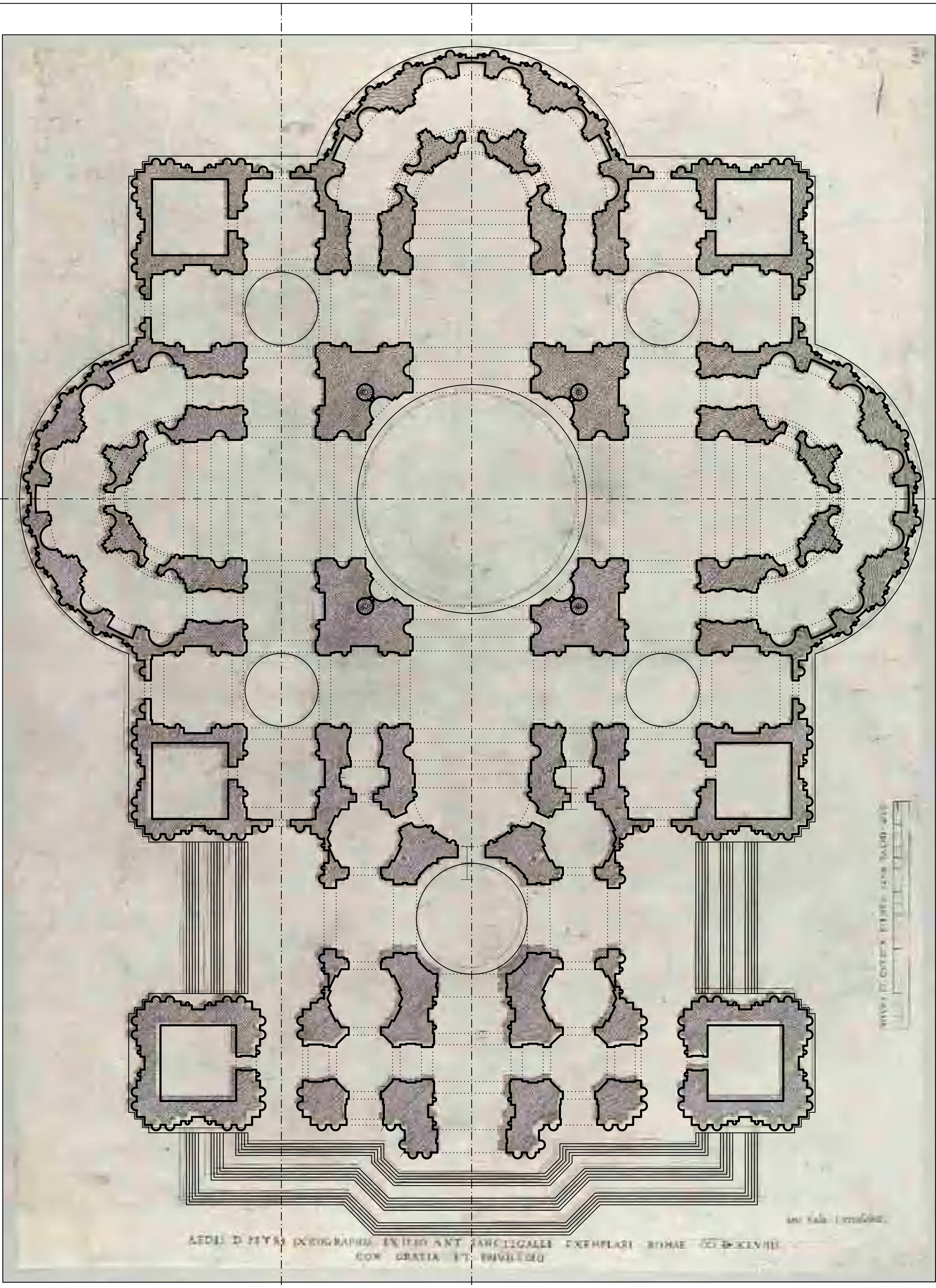
RESEARCH AND DRAWING LUIS DE GARRIDO

1549	CENTRAL NUCLEUS WITH WEST APSE AND LATERAL APSES WITH SACRISTY	LABACCO	1



RESEARCH AND DRAWING LUIS DE GARRIDO

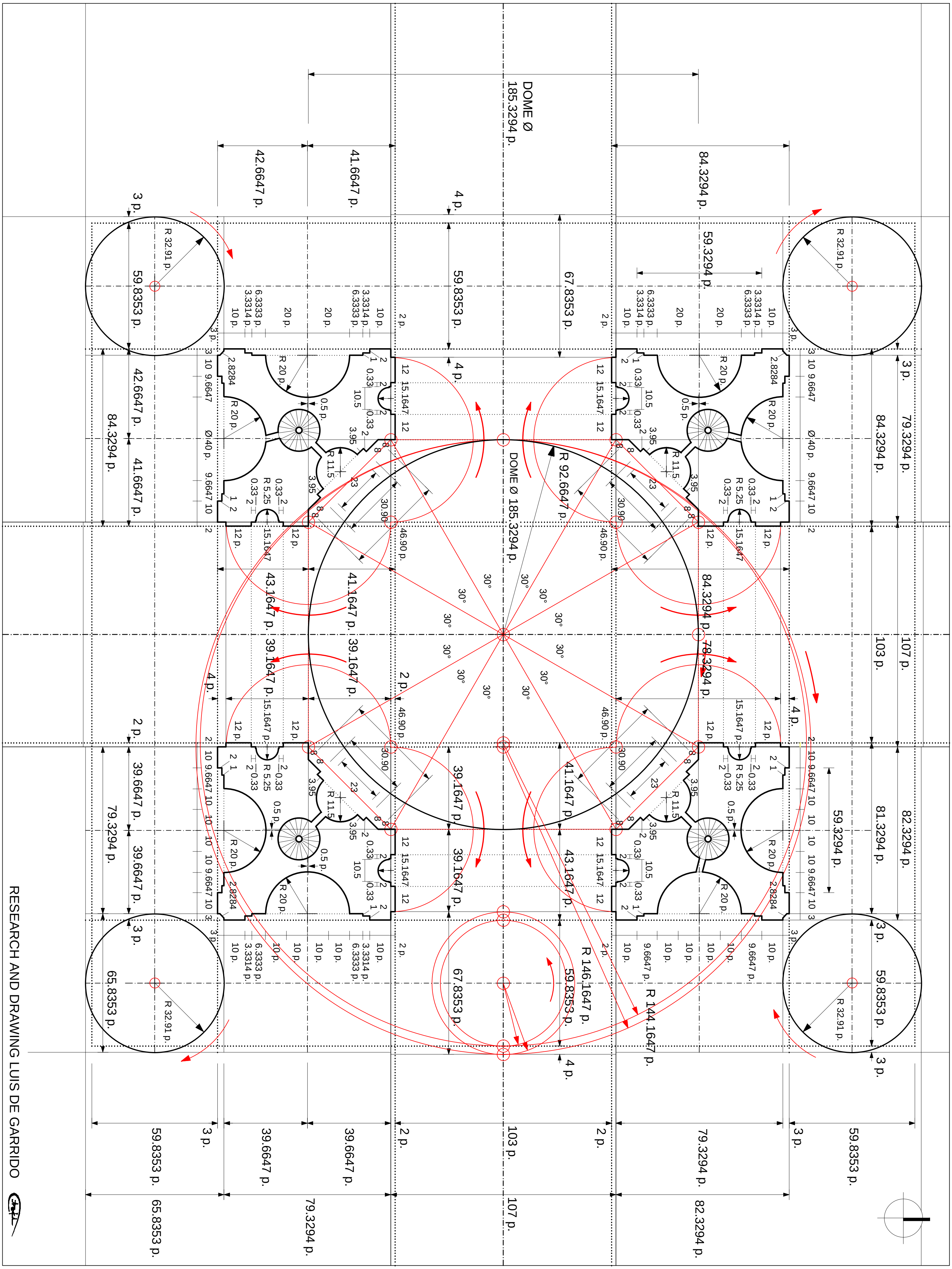
1549	PLAN BY ANTONIO LABACCO. MODEL BY ANTONIO DA SANGALLO	LABACCO	2



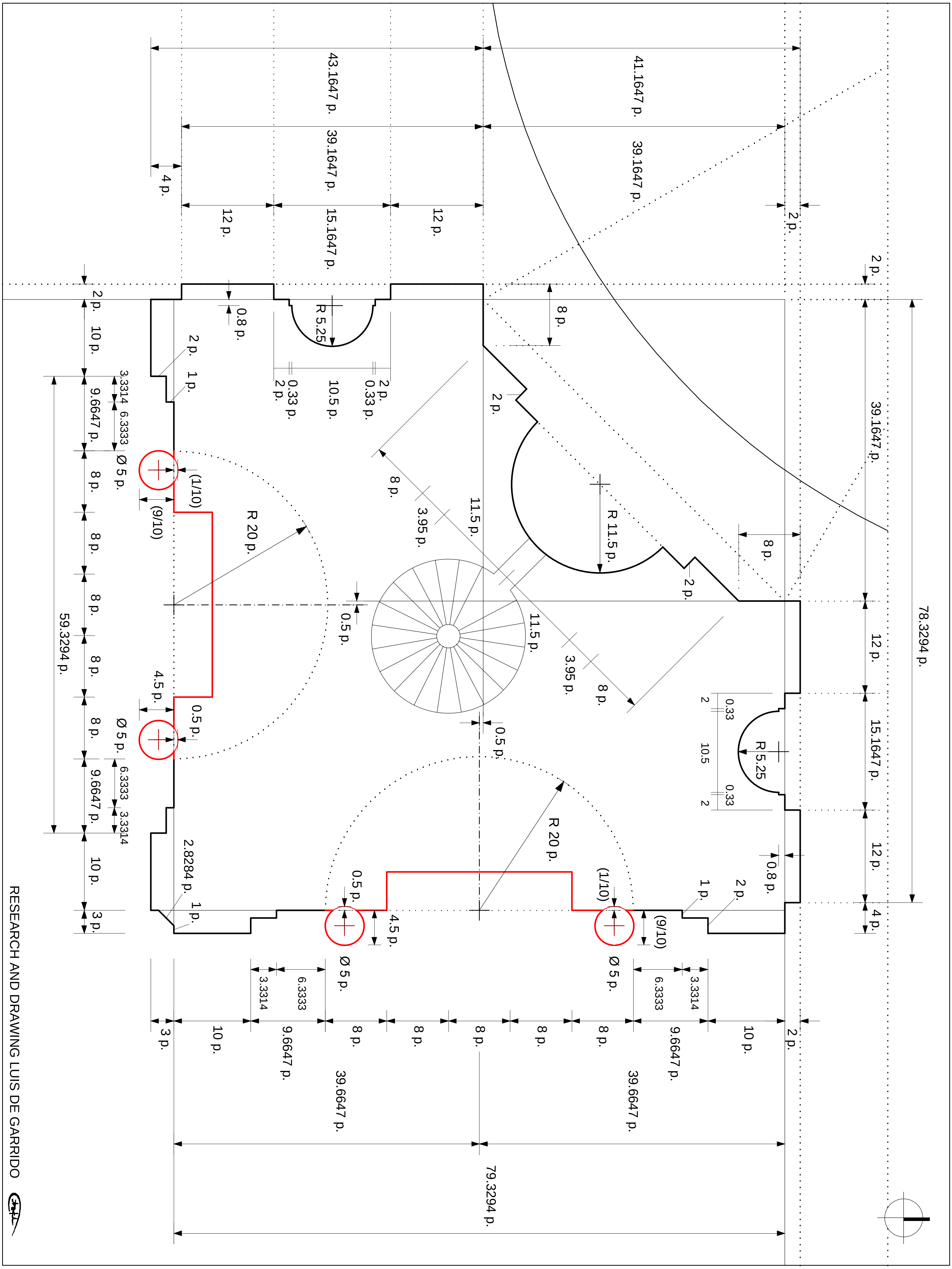
RESEARCH AND DRAWING LUIS DE GARRIDO

1549	PLAN BY ANTONIO LABACCO. MODEL BY ANTONIO DA SANGALLO, OVERLAY	LABACCO	3

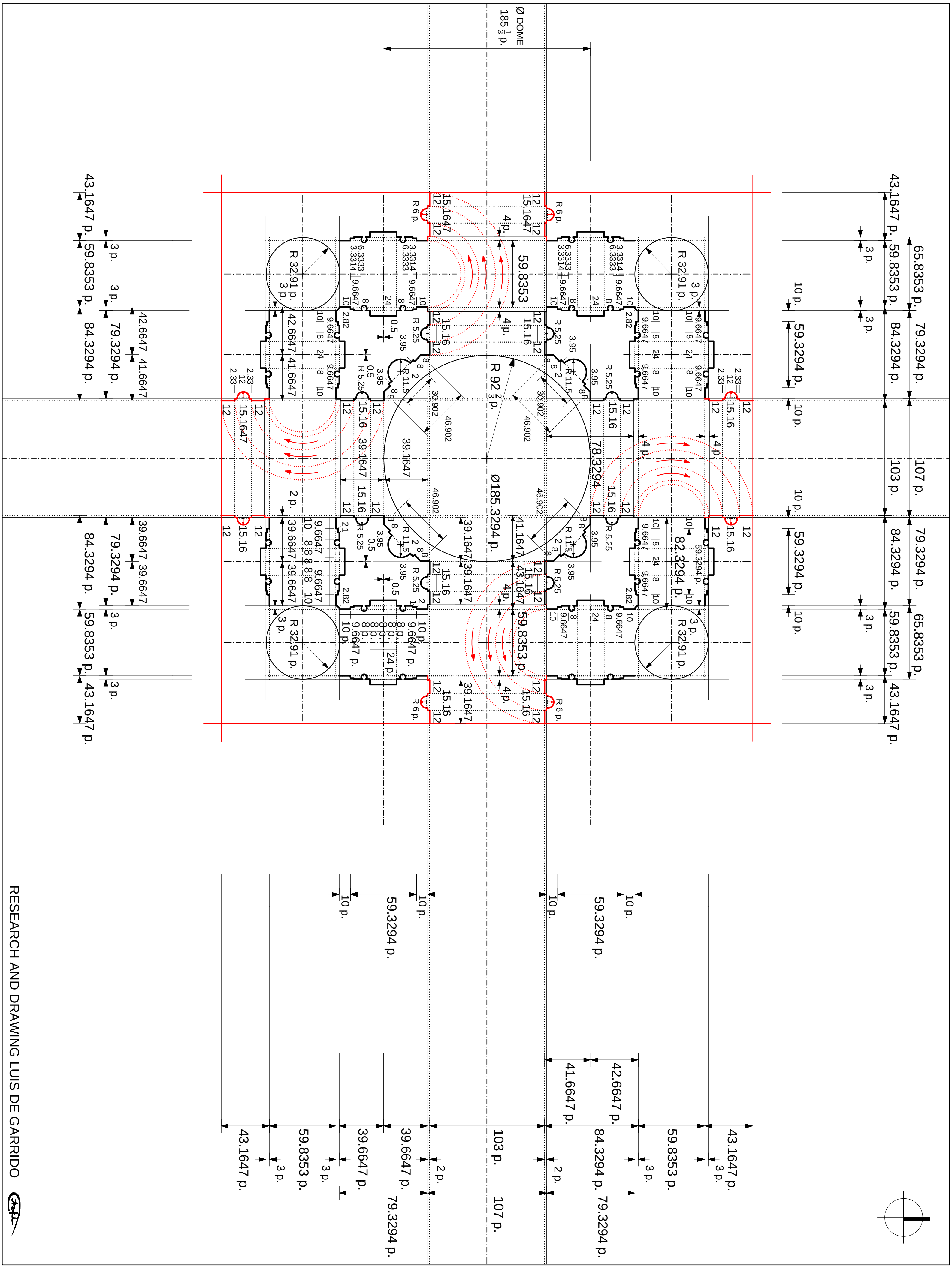
RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF THE EXECUTIVE PROJECT BY MICHELANGELO ACCORDING TO ETIENNE DUPERAC DRAWING



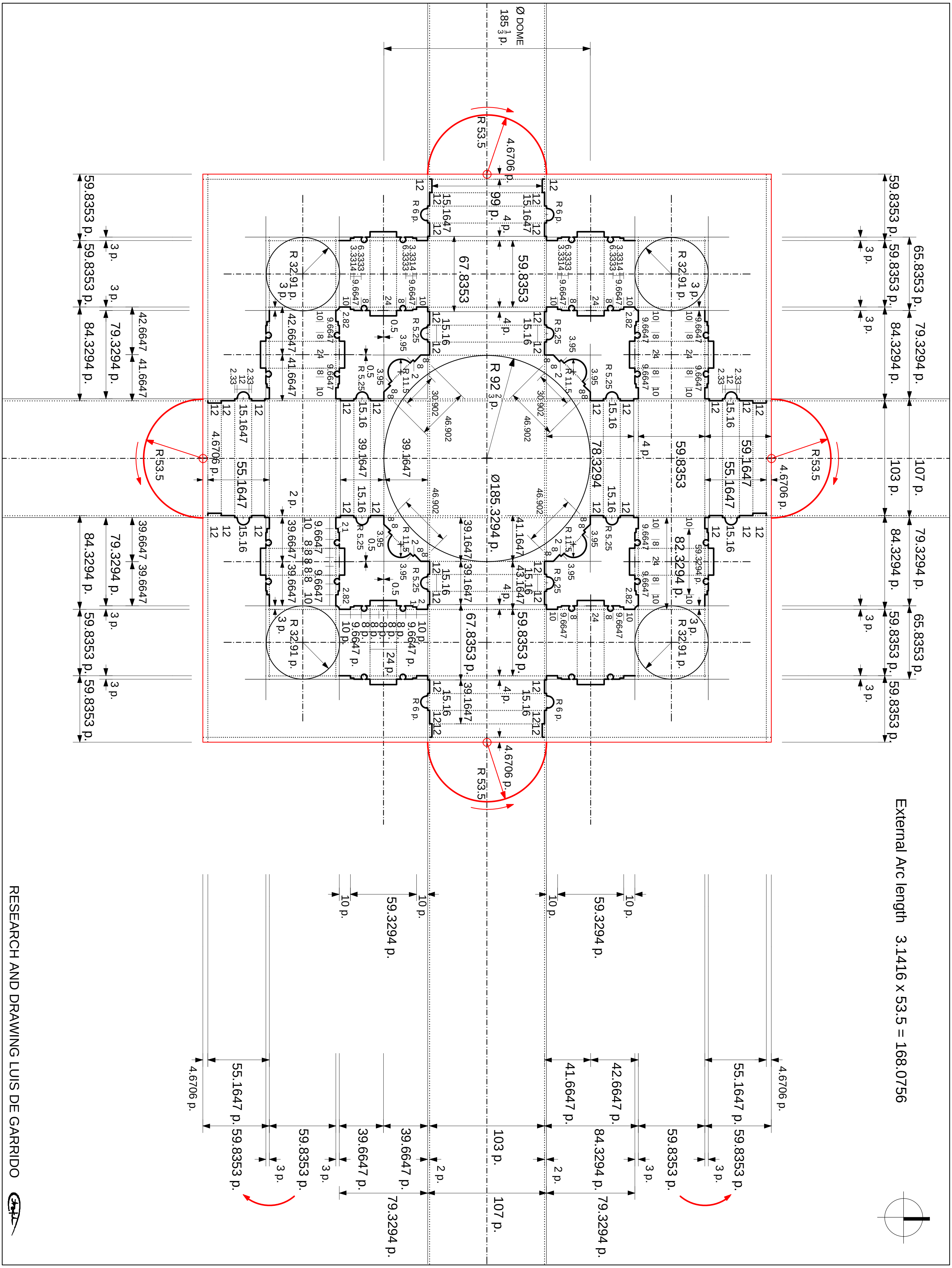
1569	COMPLETE DESIGN OF THE "CENTRAL CORE OF BRAMANTE"	DUPERAC	1



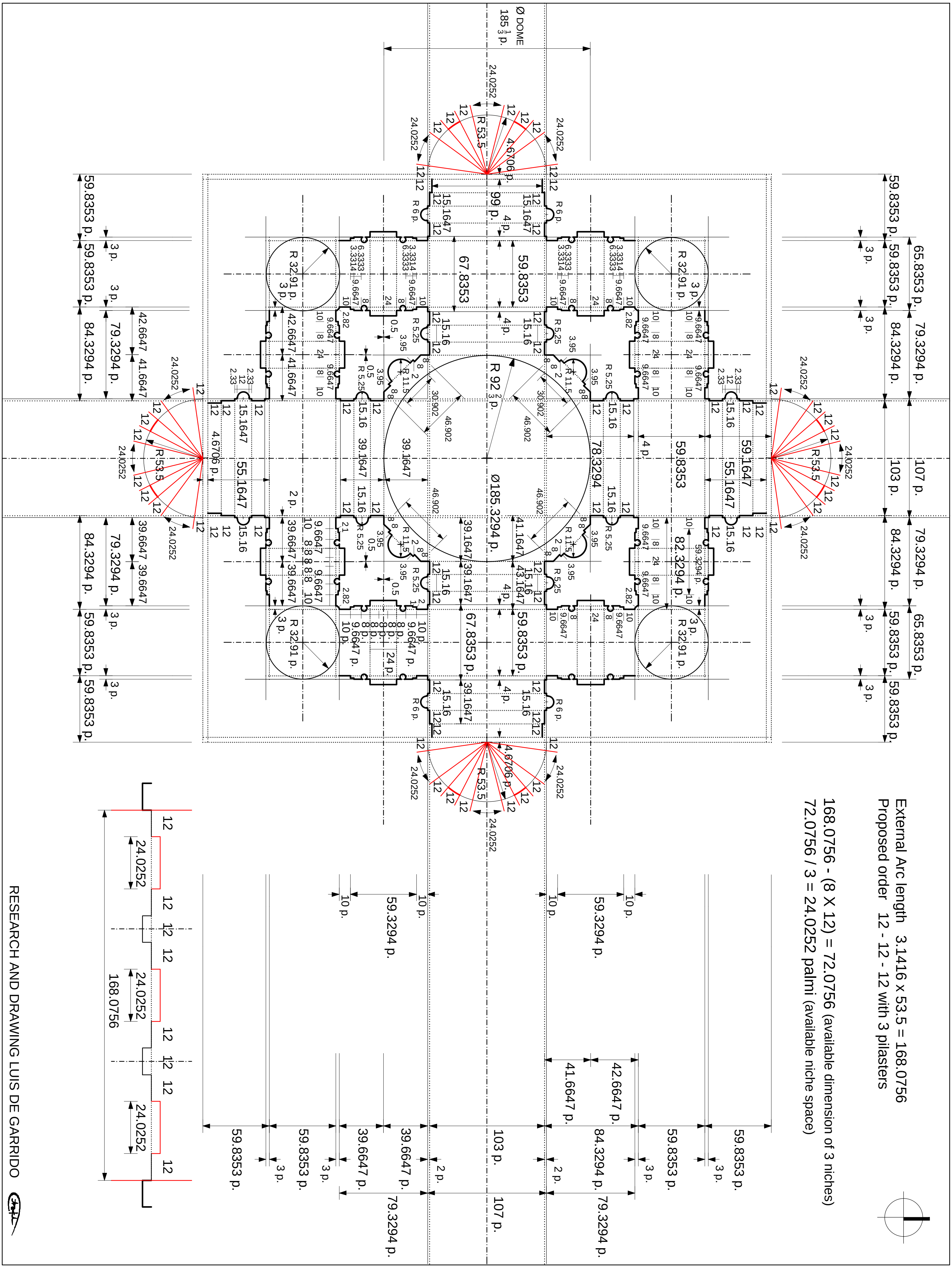
1569	INTERVENTION OF THE EXTERNAL PERIMETER OF THE GREAT DOME PILASTERS	DUPERAC	2



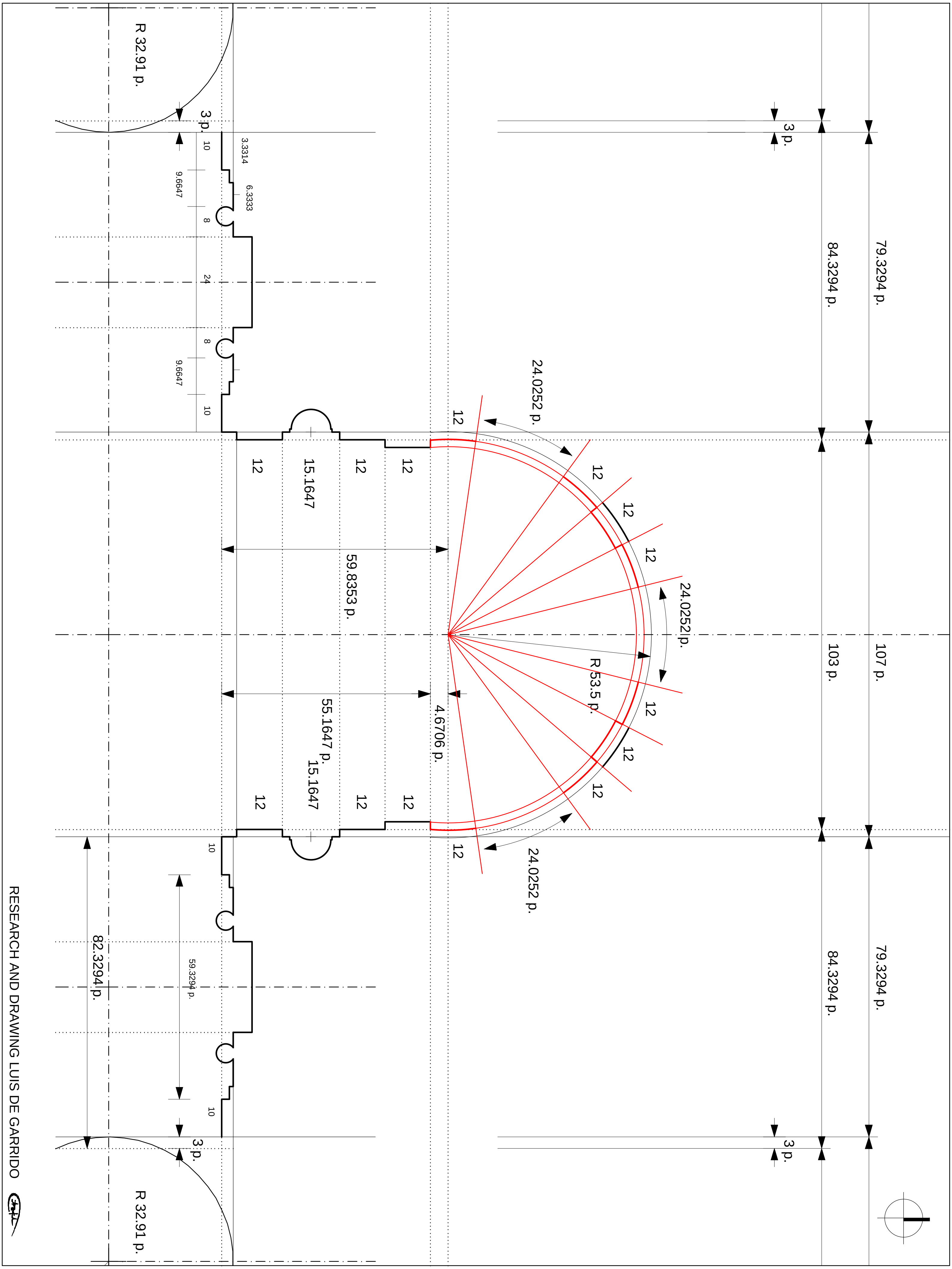
1569	ESTABLISHING THE LATERAL RHYTHM OF THE COUNTER PILASTERS	DUPERAC	3



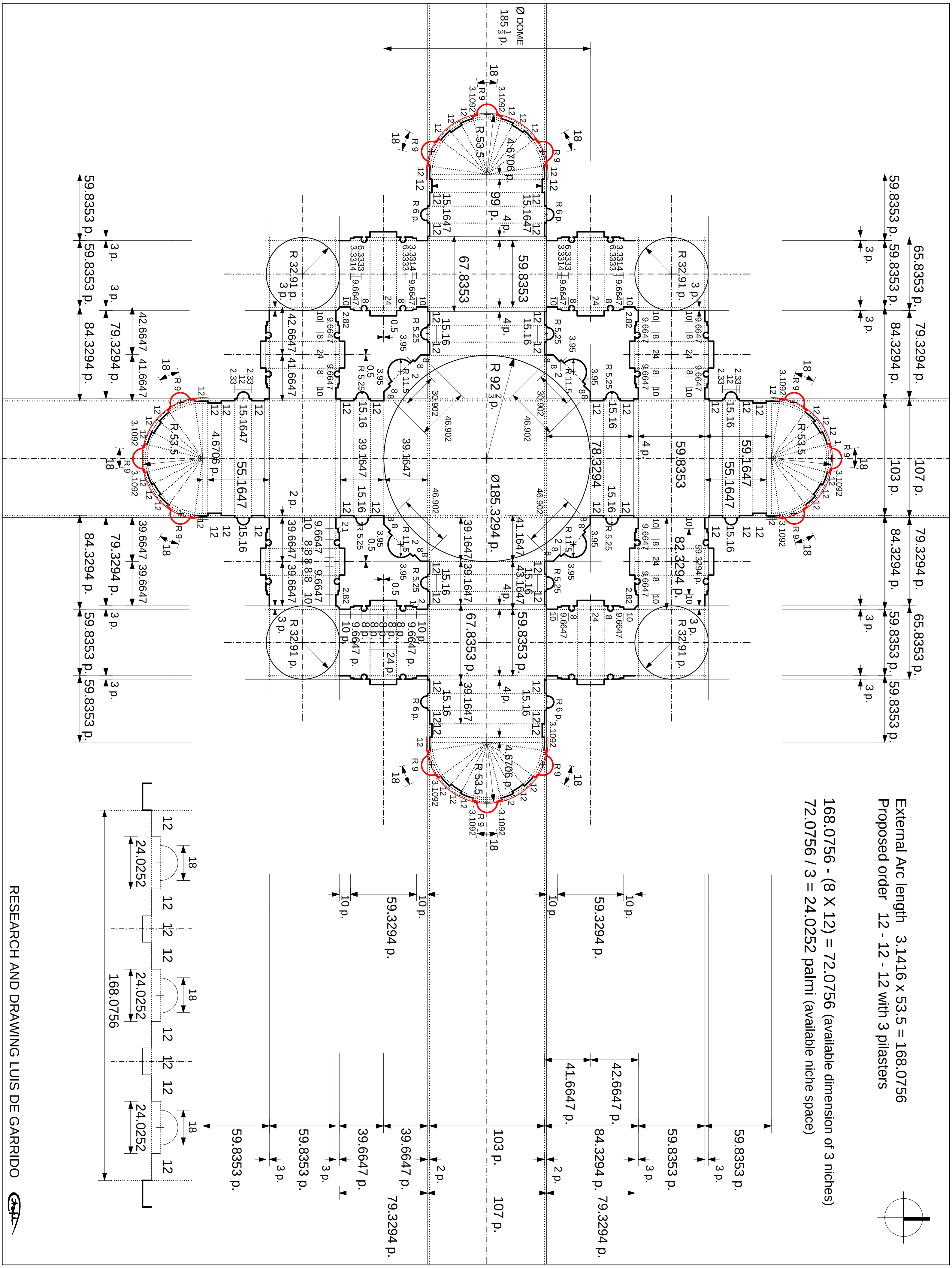
1569	ESTABLISHING THE COMPOSITIONAL LINES OF THE APSES	DUPERAC	4



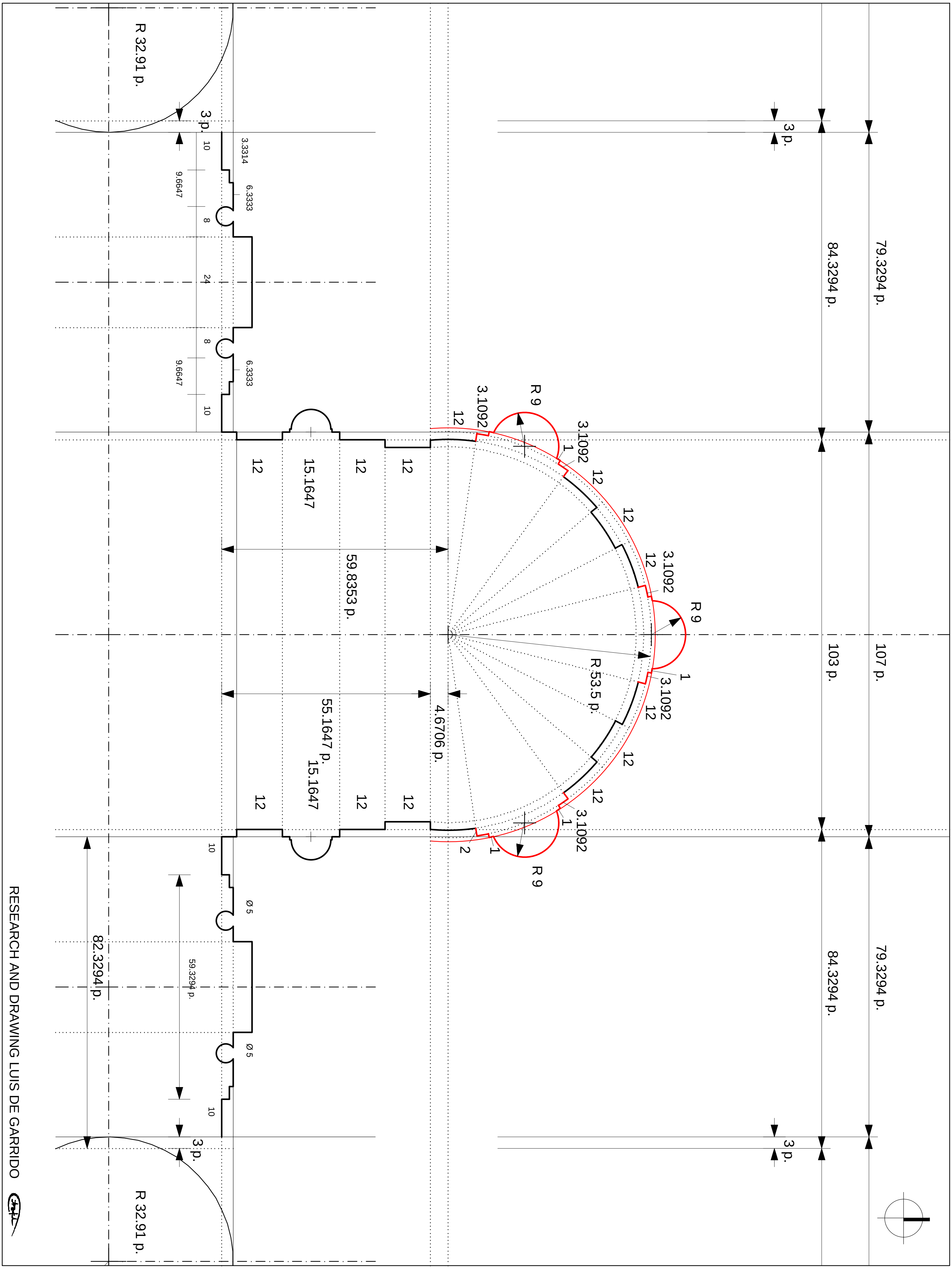
1569 | ESTABLISHING THE COMPOSITIONAL LINES OF THE APSES | DUPERAC



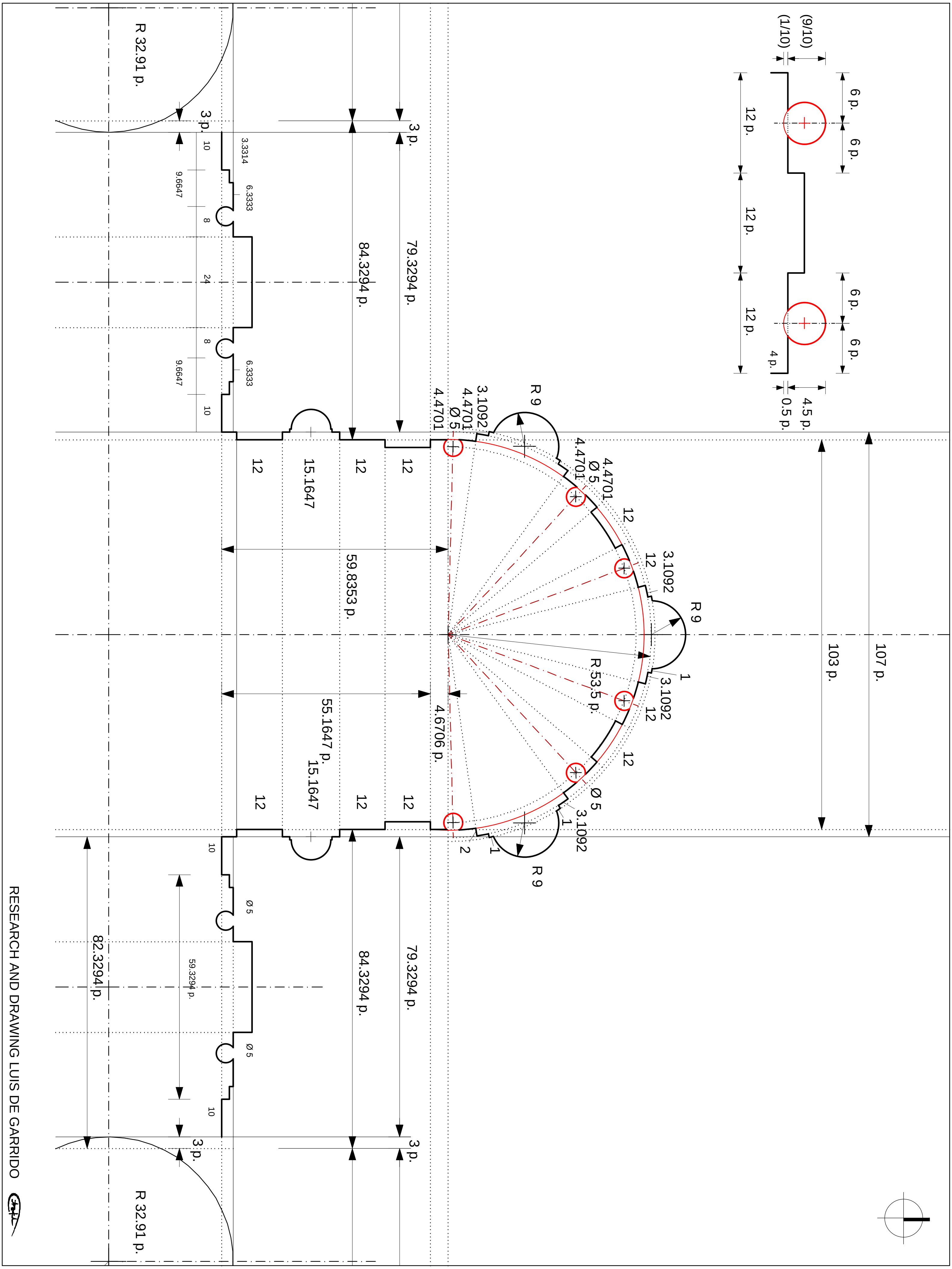
1569	ESTABLISHING OF THE MAIN PILASTERS OF THE APSES - DETAIL	DUPERAC	6



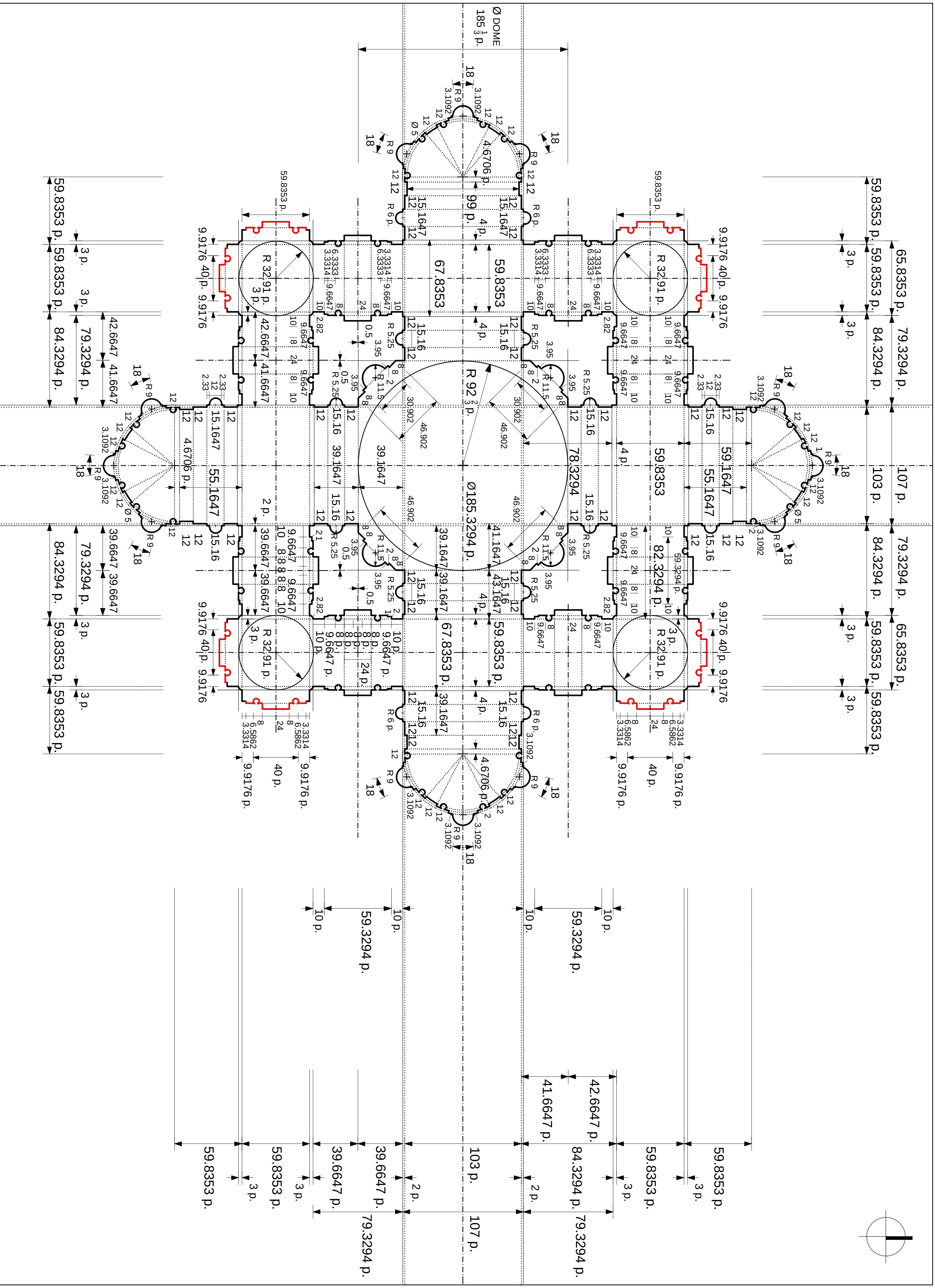
1569	ESTABLISHING THE INTERNAL NICHES OF THE APSES	DUPERAC	7



1569	ESTABLISHING THE INTERNAL NICHES OF THE APSES - DETAIL	DUPERAC	8

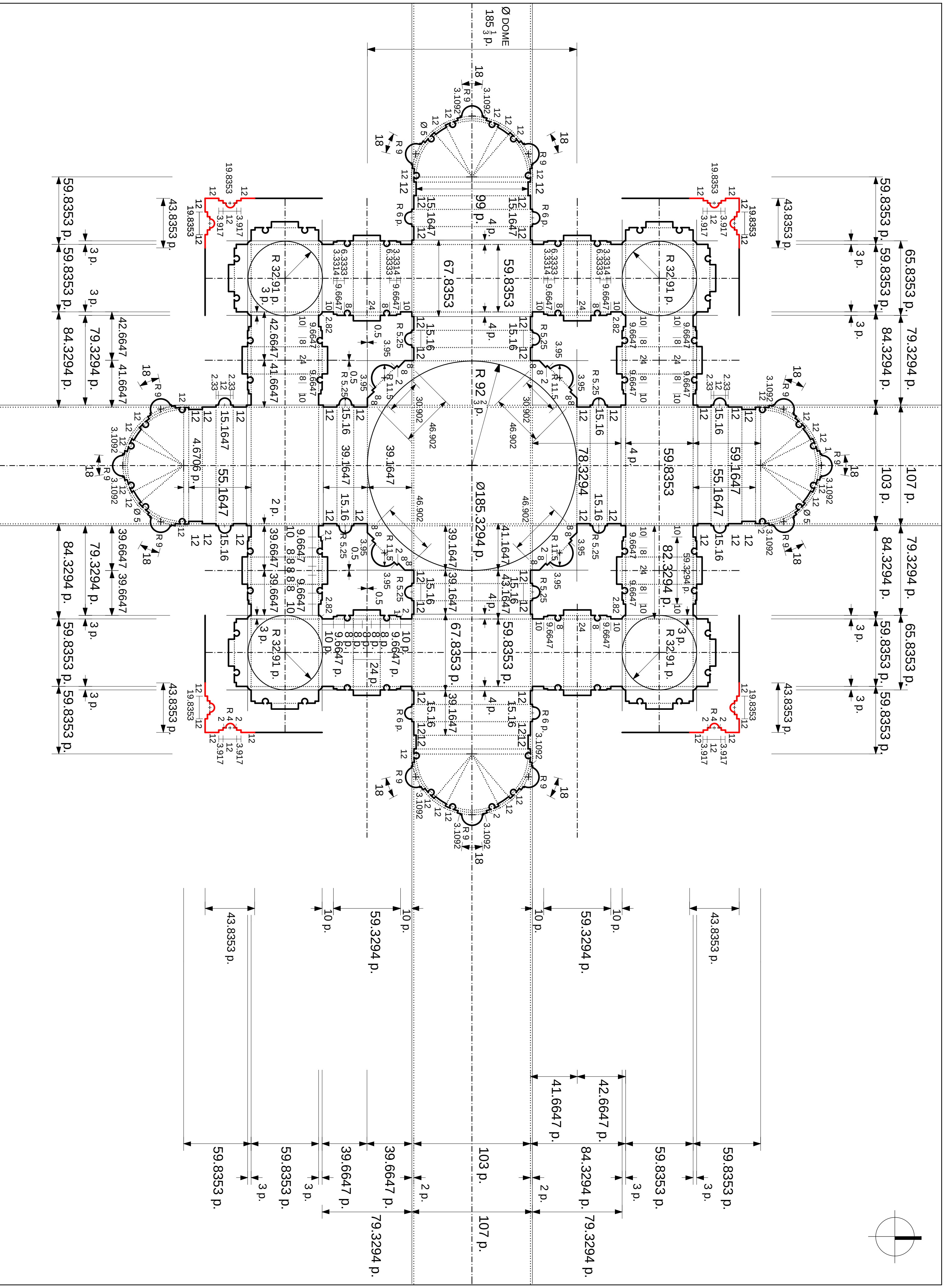


1569	ESTABLISHING THE INTERNAL COLUMNS OF THE APSES - DETAIL	DUPERAC	9



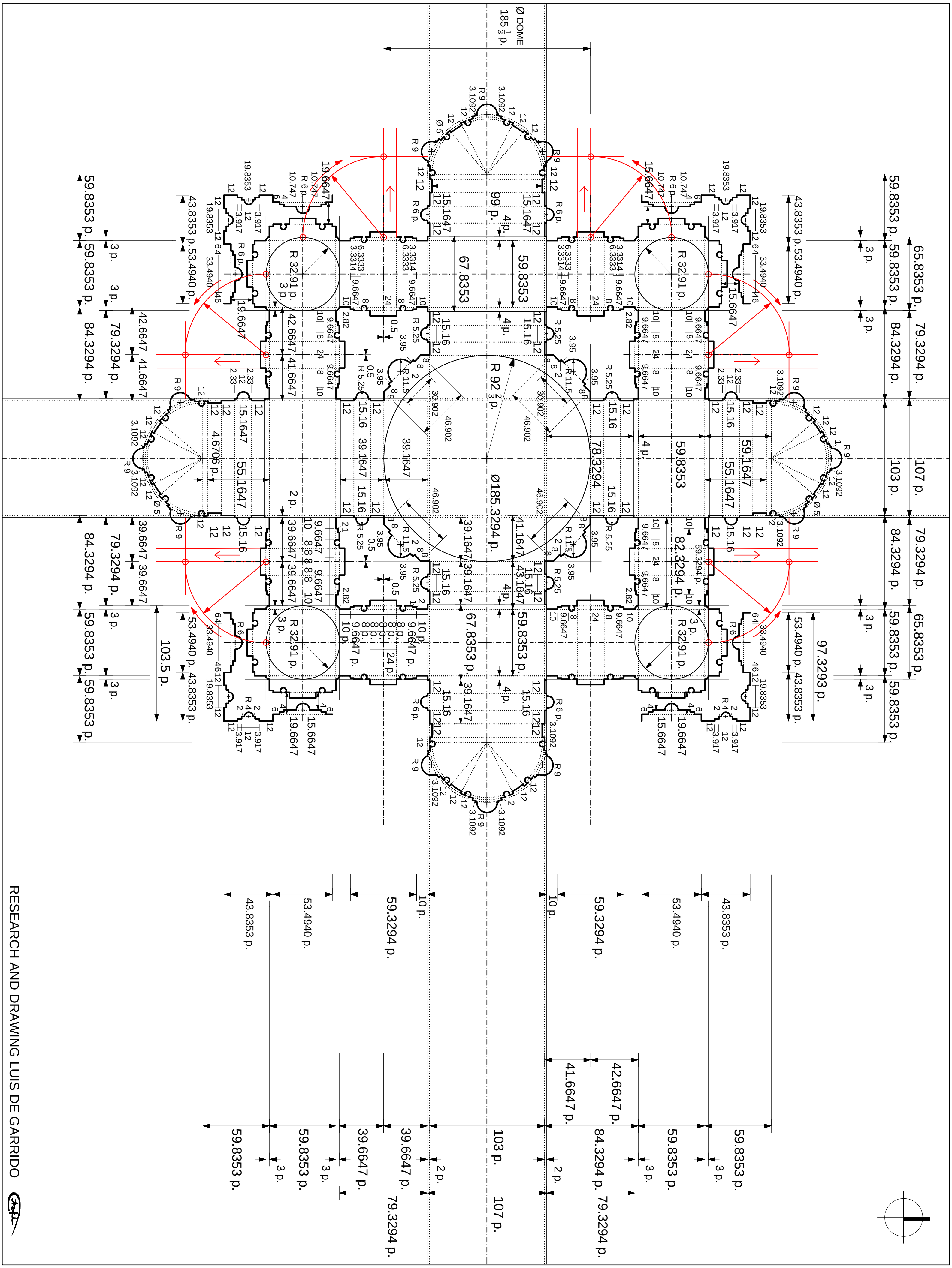
RESEARCH AND DRAWING LUIS DE GARRIDO

1569	ESTABLISHING THE INTERNAL RHYTHM OF THE EXTERIOR WALL	DUPERAC	10

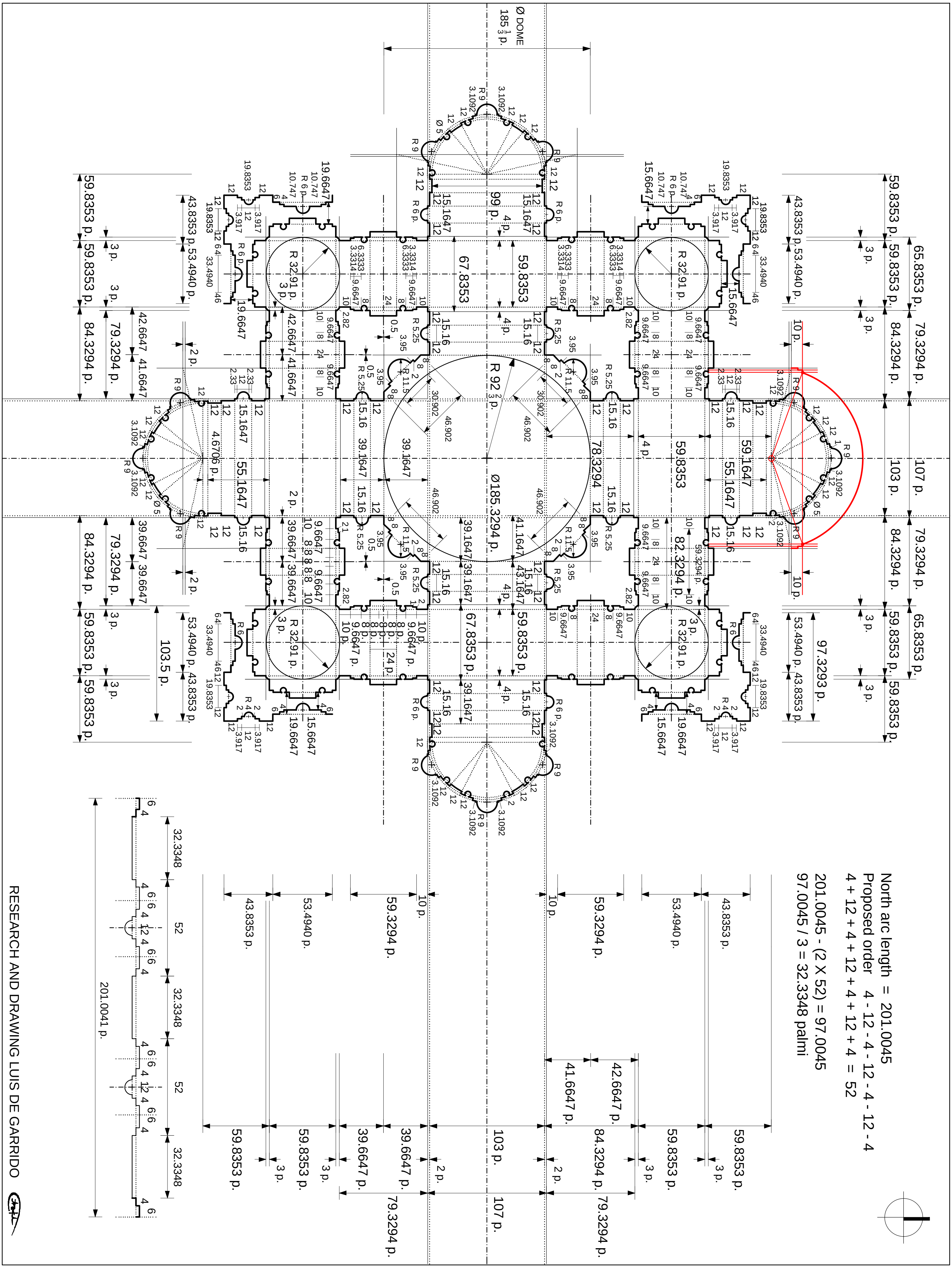


RESEARCH AND DRAWING LUIS DE GARRIDO

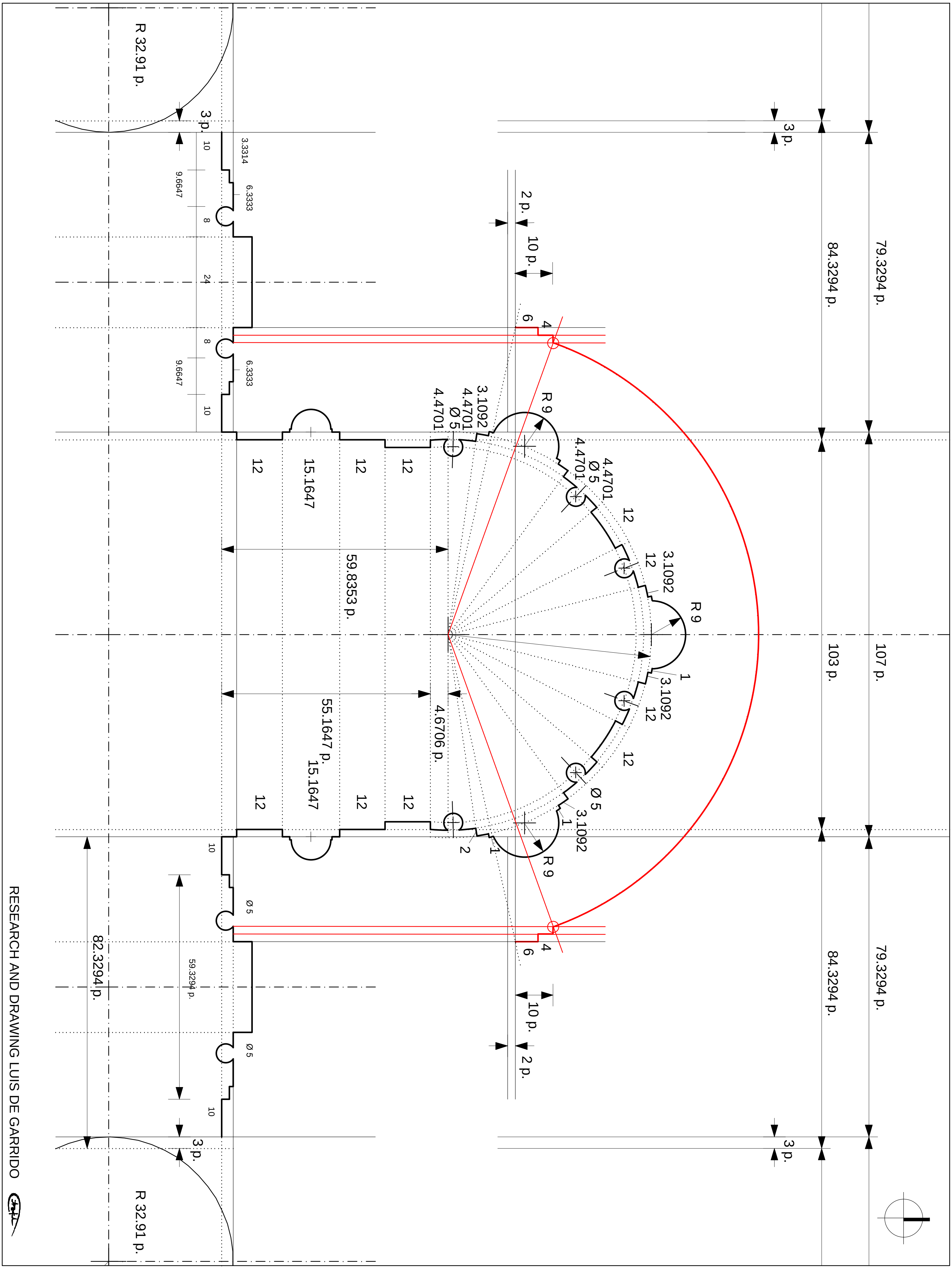
1569	ESTABLISHING THE EXTERNAL RHYTHM OF THE EXTERIOR WALL	DUPERAC	11



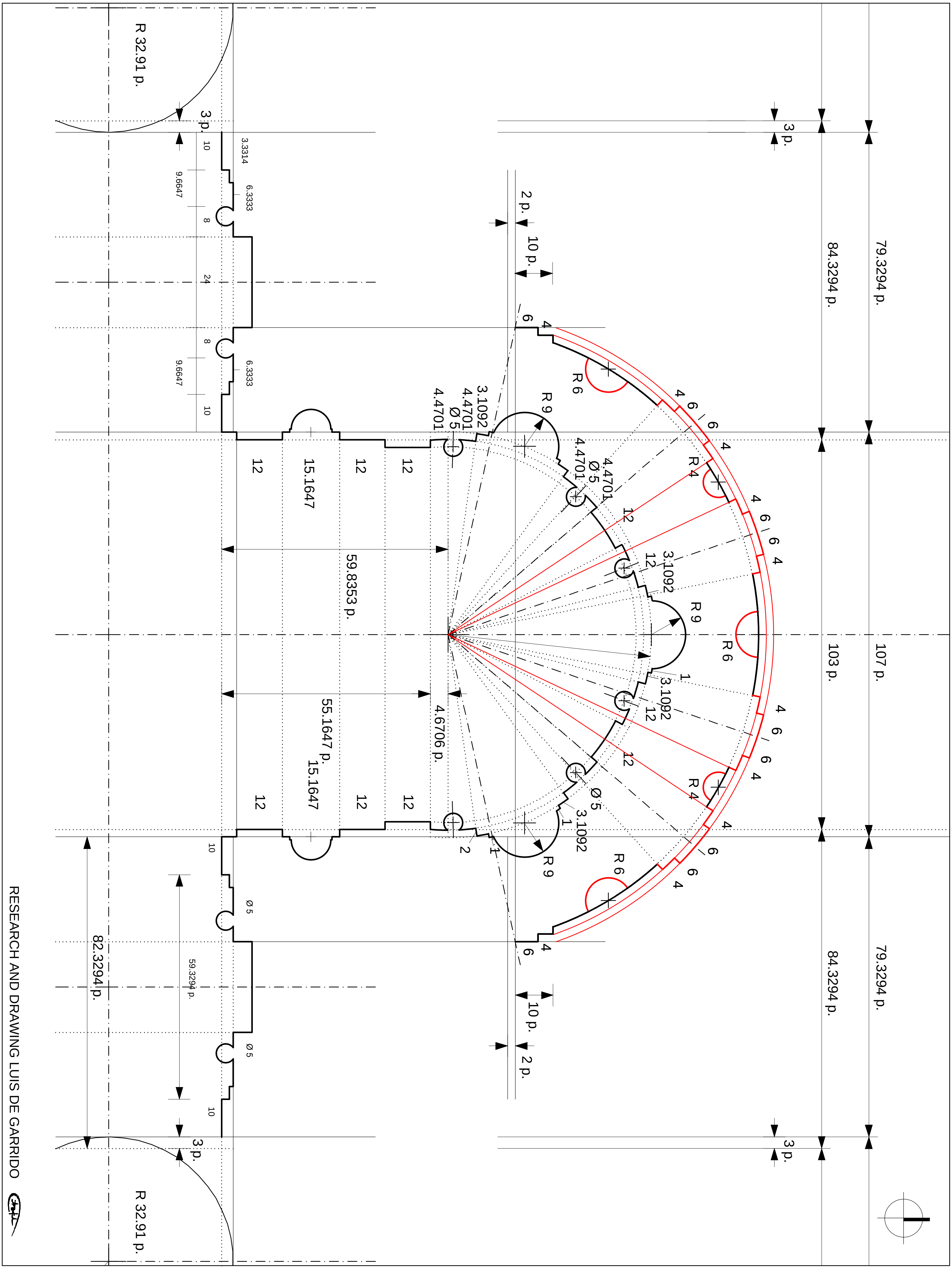
1569	ESTABLISHING THE WIDTH OF THE EXTERIOR WALL OF THE APSES	DUPERAC	12



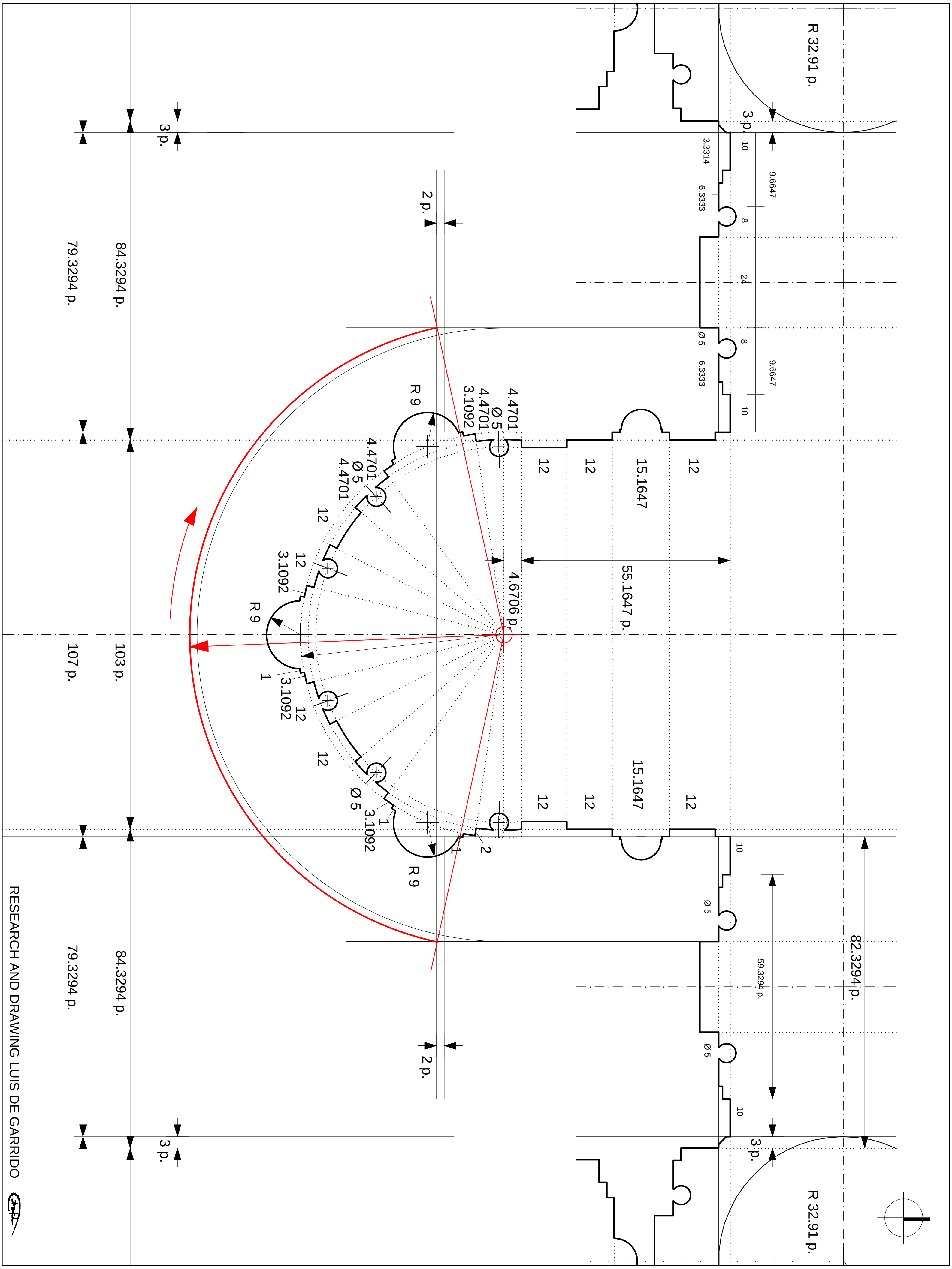
1569	ESTABLISHING THE EXTERNAL ARC OF THE NORTH APSE	DUPERAC	13



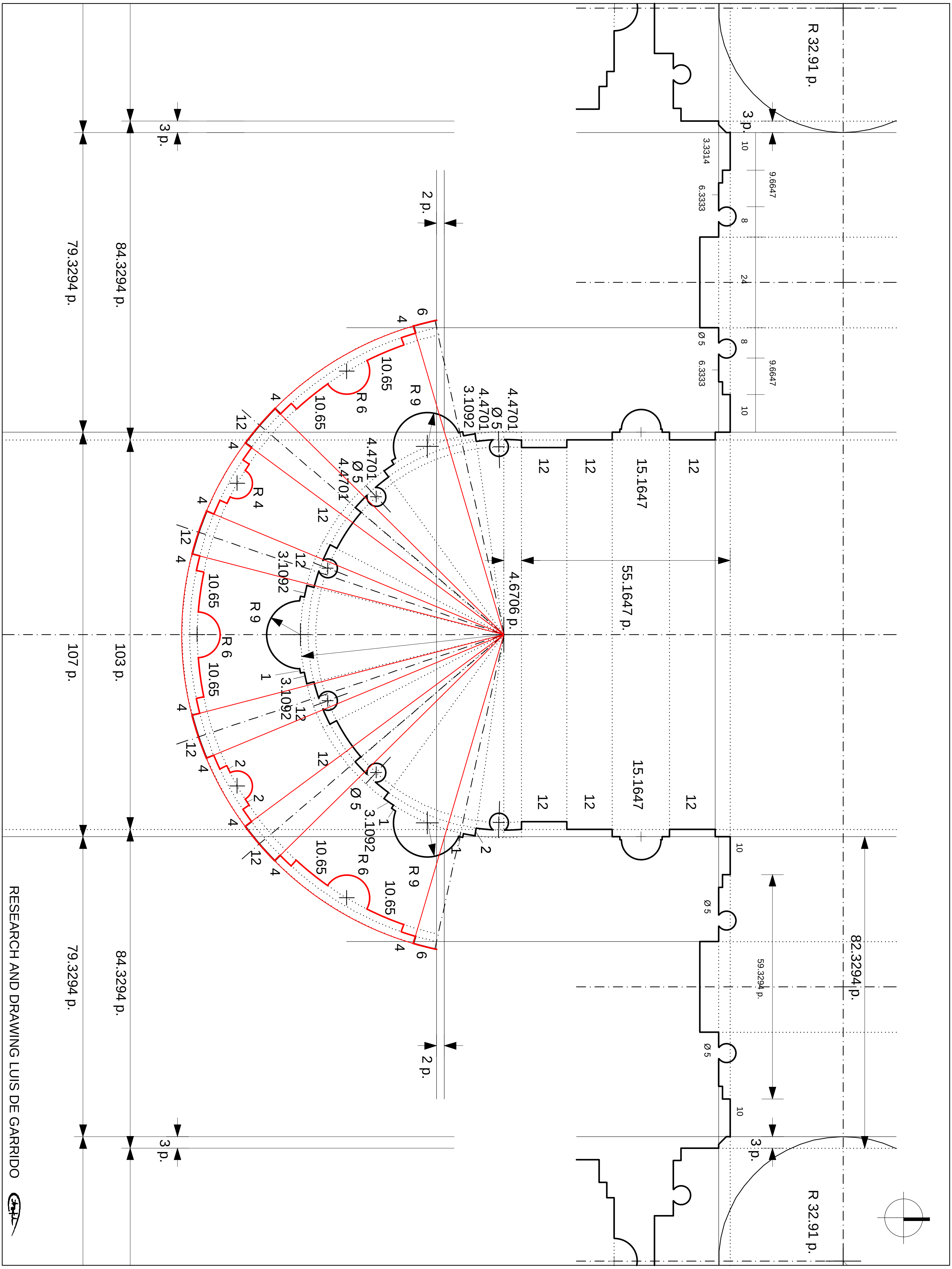
1569	ESTABLISHING THE EXTERNAL ARC OF THE NORTH APSE - DETAIL	DUPERAC	14



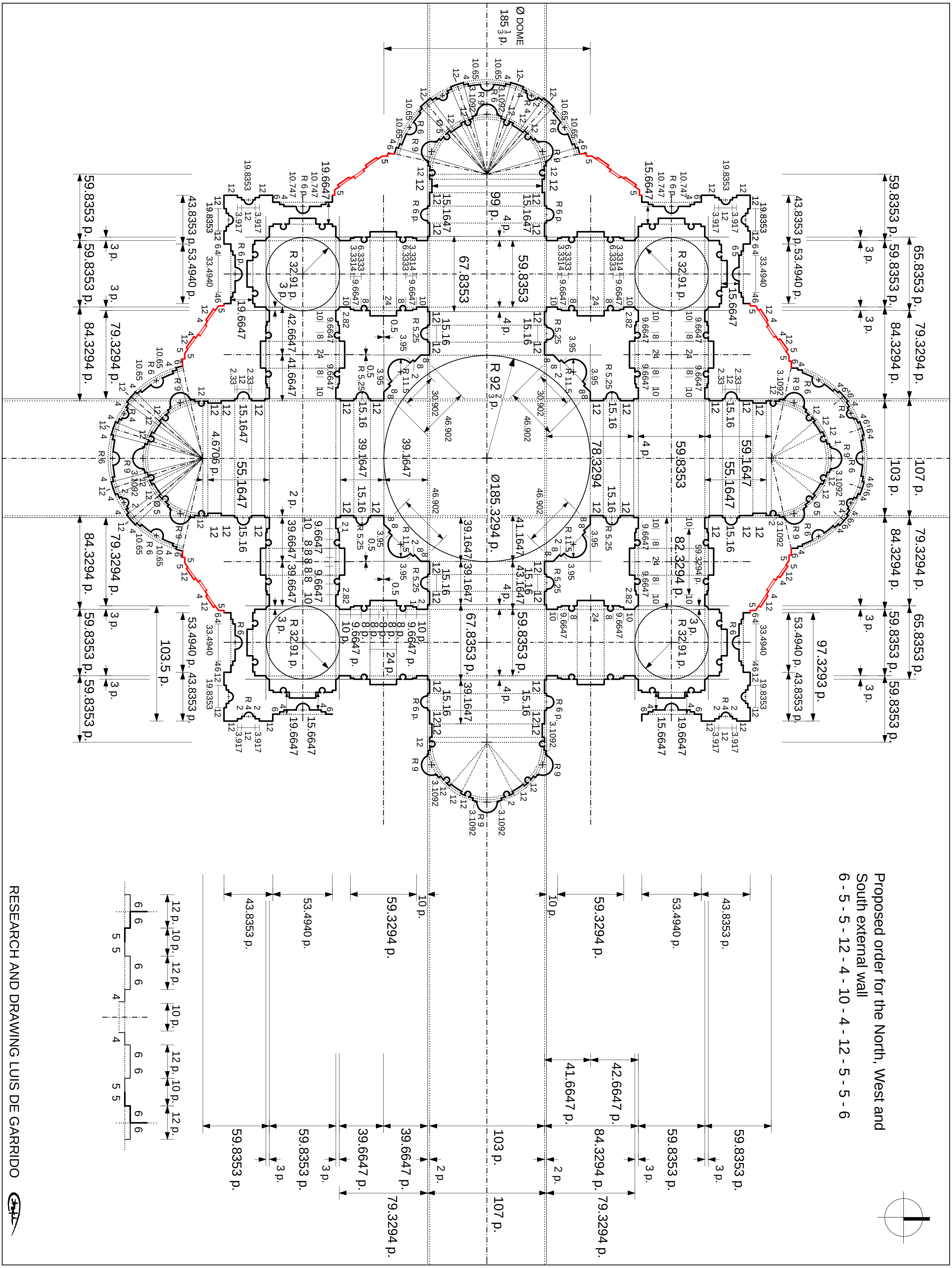
1569	ESTABLISHING THE NICHES OF THE EXTERIOR WALL OF THE NORTH APSE	DUPERAC	15



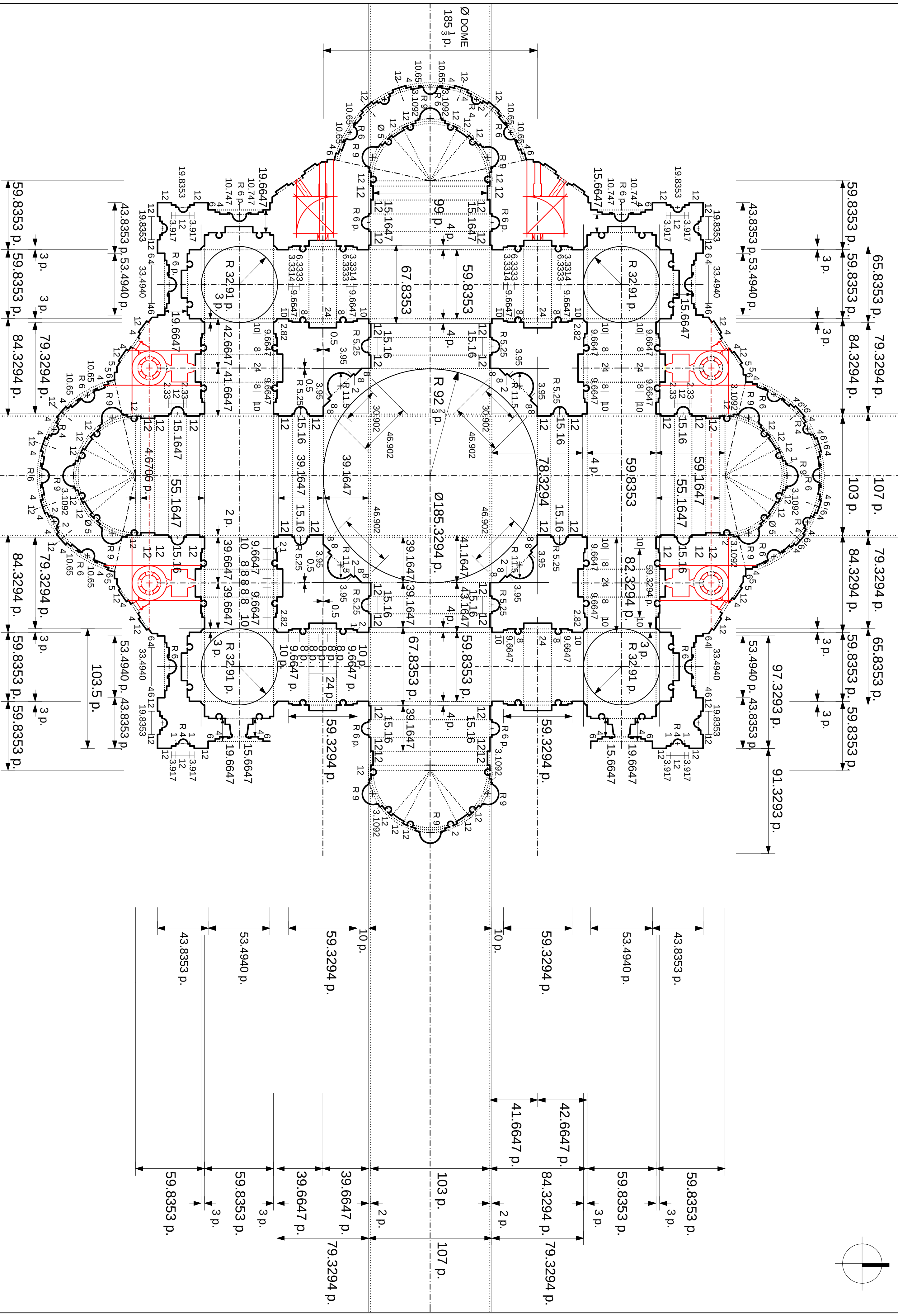
1569	ESTABLISHING THE EXTERIOR OF THE SOUTH AND WEST APSES - DETAIL	DUPERAC	16



1569	ESTABLISHING THE EXTERIOR OF THE SOUTH AND WEST APSES - DETAIL	DUPERAC	17



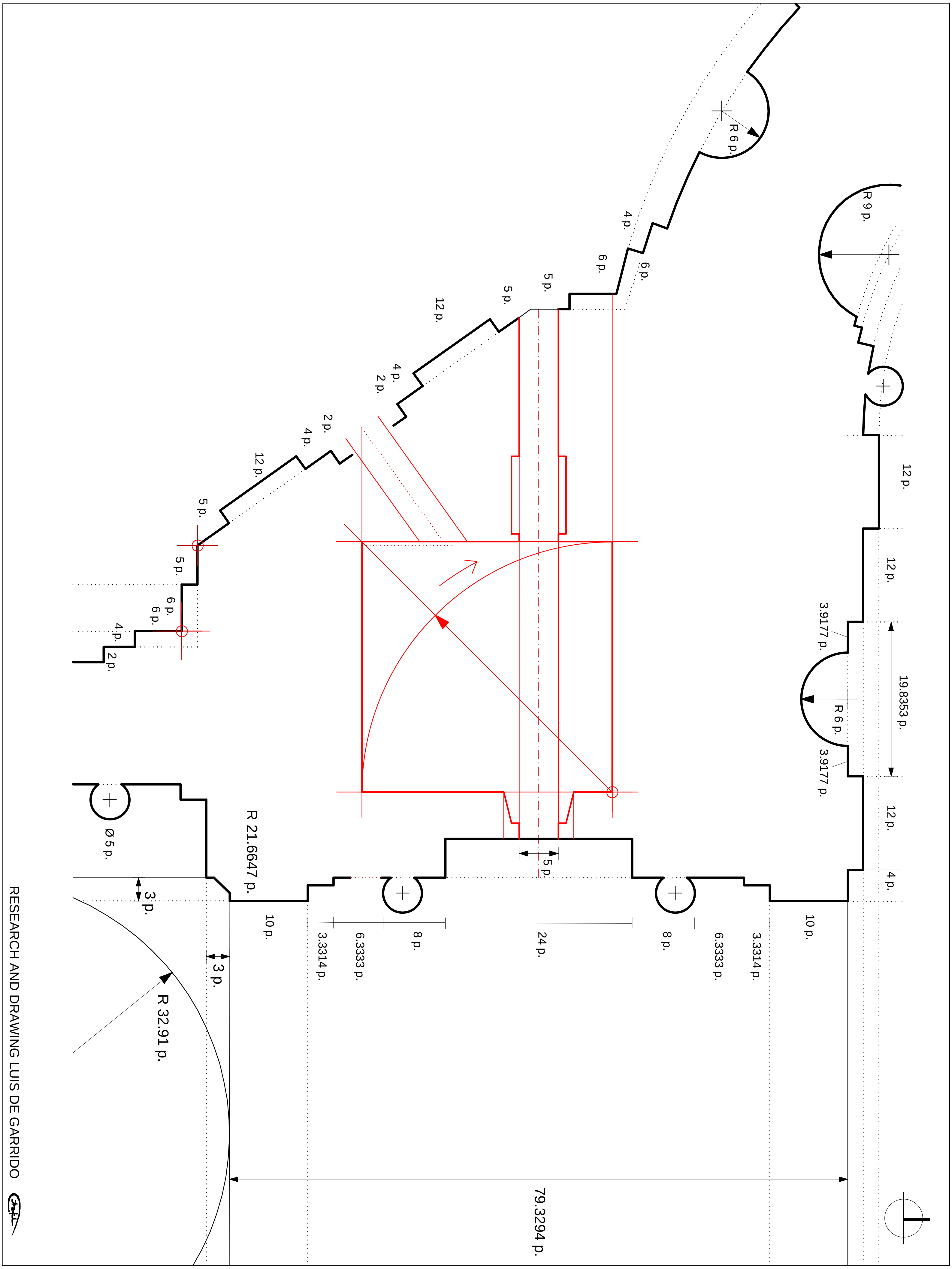
1569	ESTABLISHING THE RHYTHM OF THE EXTERIOR WALL	DUPERAC	18



RESEARCH AND DRAWING LUIS DE GARRIDO

ESTABLISHING THE INTERNAL STAIRCASES AND PASSAGES

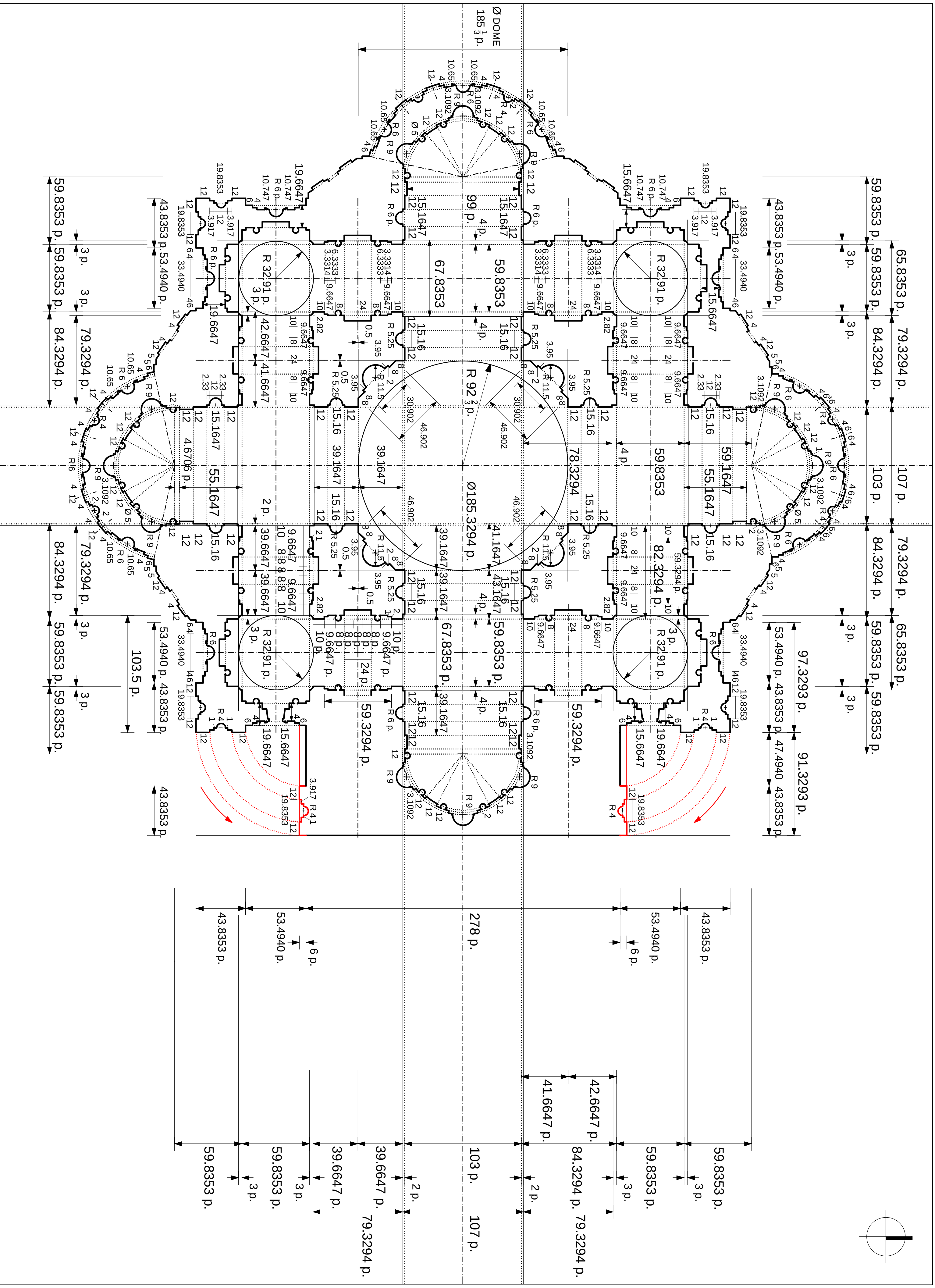
DUPERAC



1569

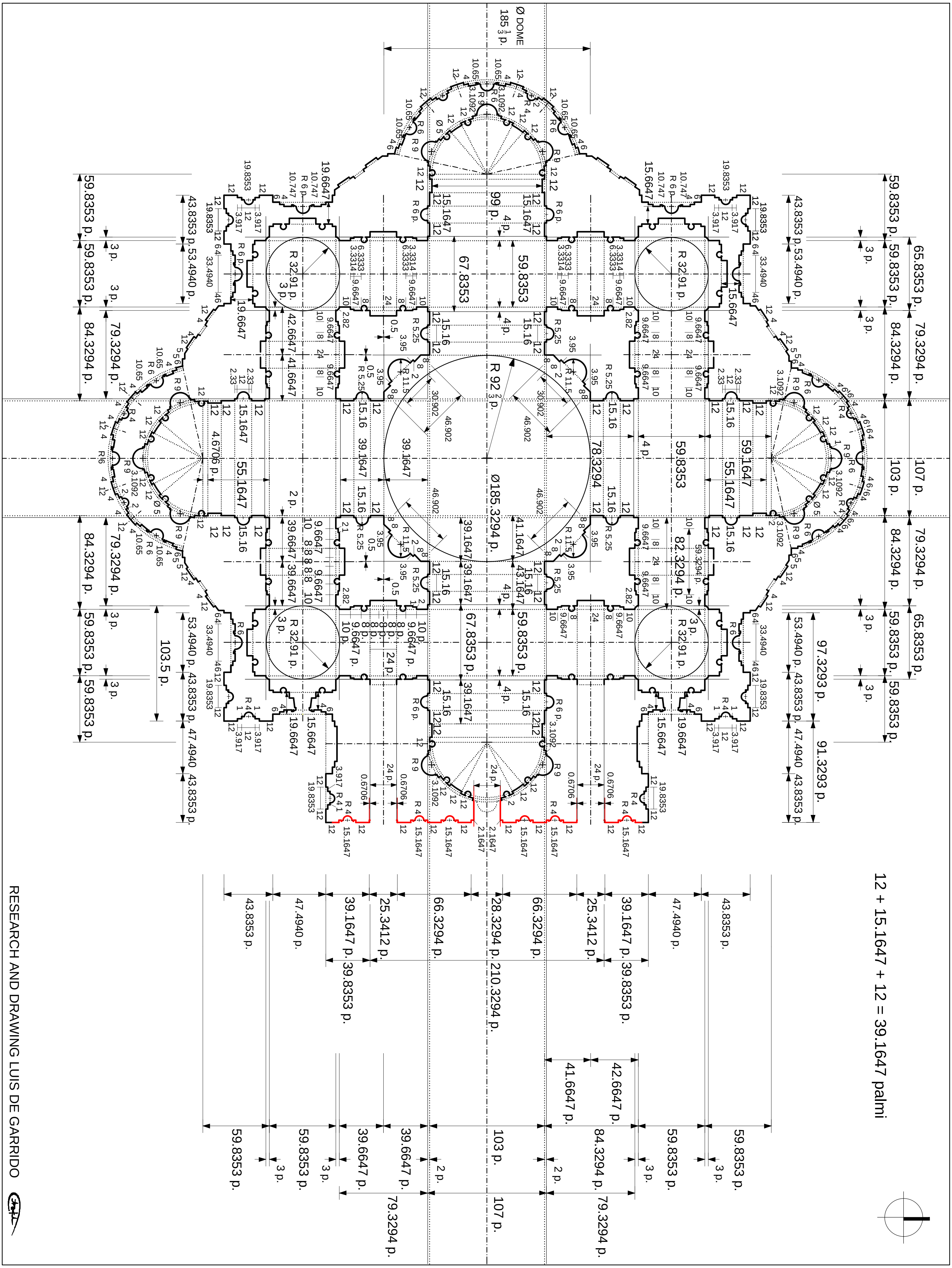
ESTABLISHING THE SOUTH-WEST INTERNAL STAIRCASES DESIGN - DETAIL

DUPERAC

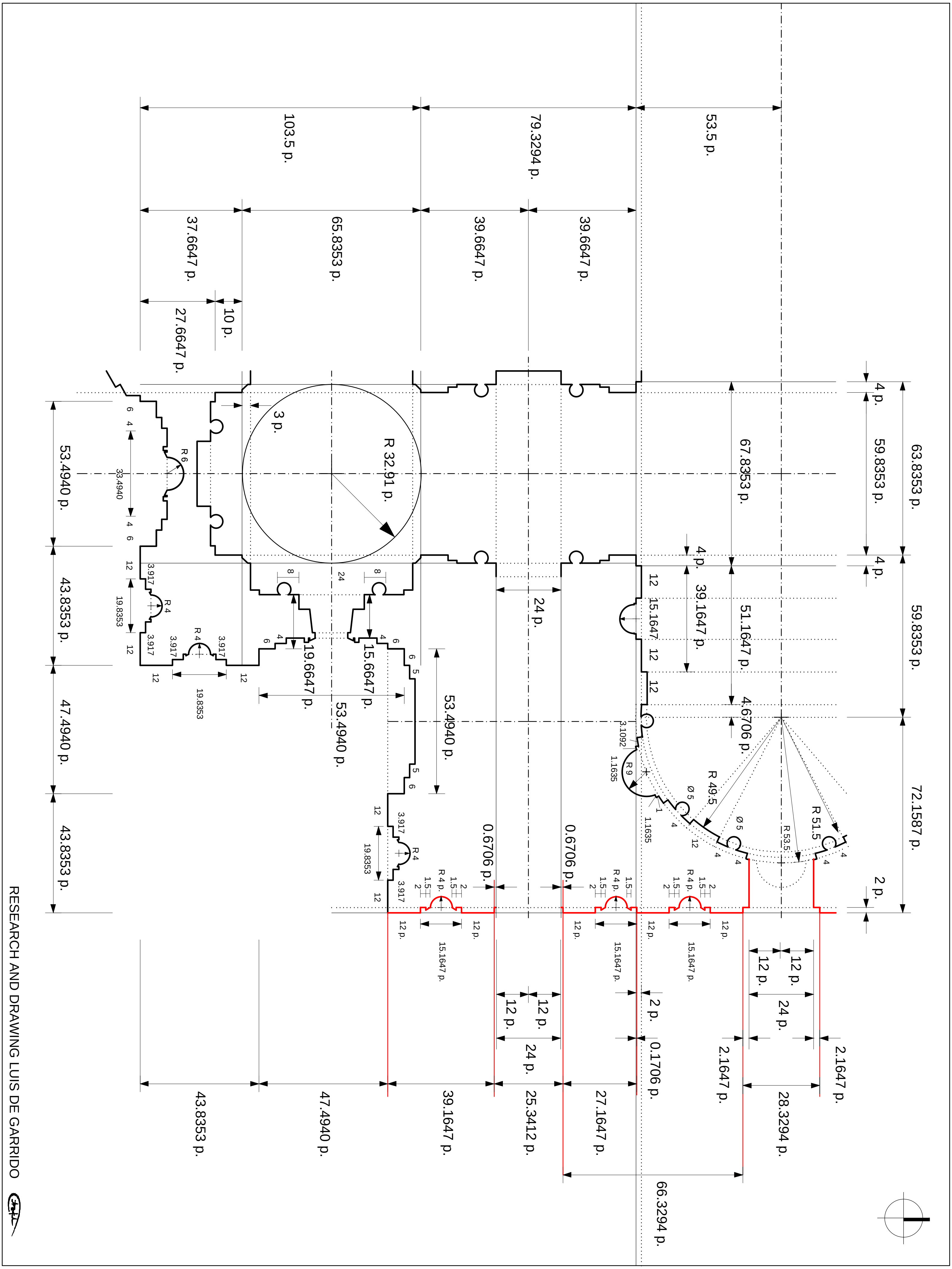


RESEARCH AND DRAWING LUIS DE GARRIDO

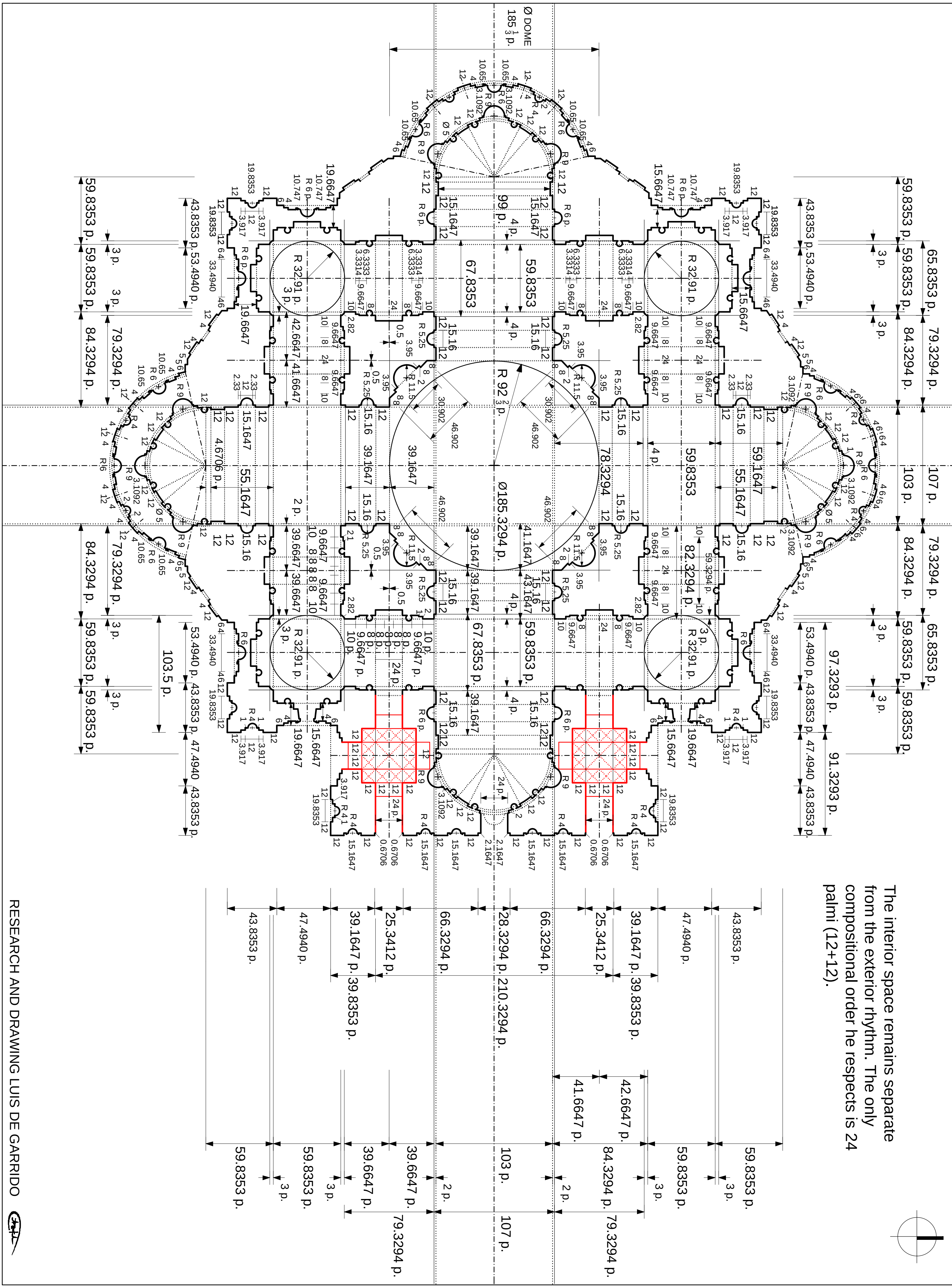
1569	ESTABLISHING THE LATERAL RHYTHM OF THE FACADE	DUPERAC	21



1569	ESTABLISHING THE RHYTHM OF THE PILASTERS OF THE THE FACADE	DUPERAC	22

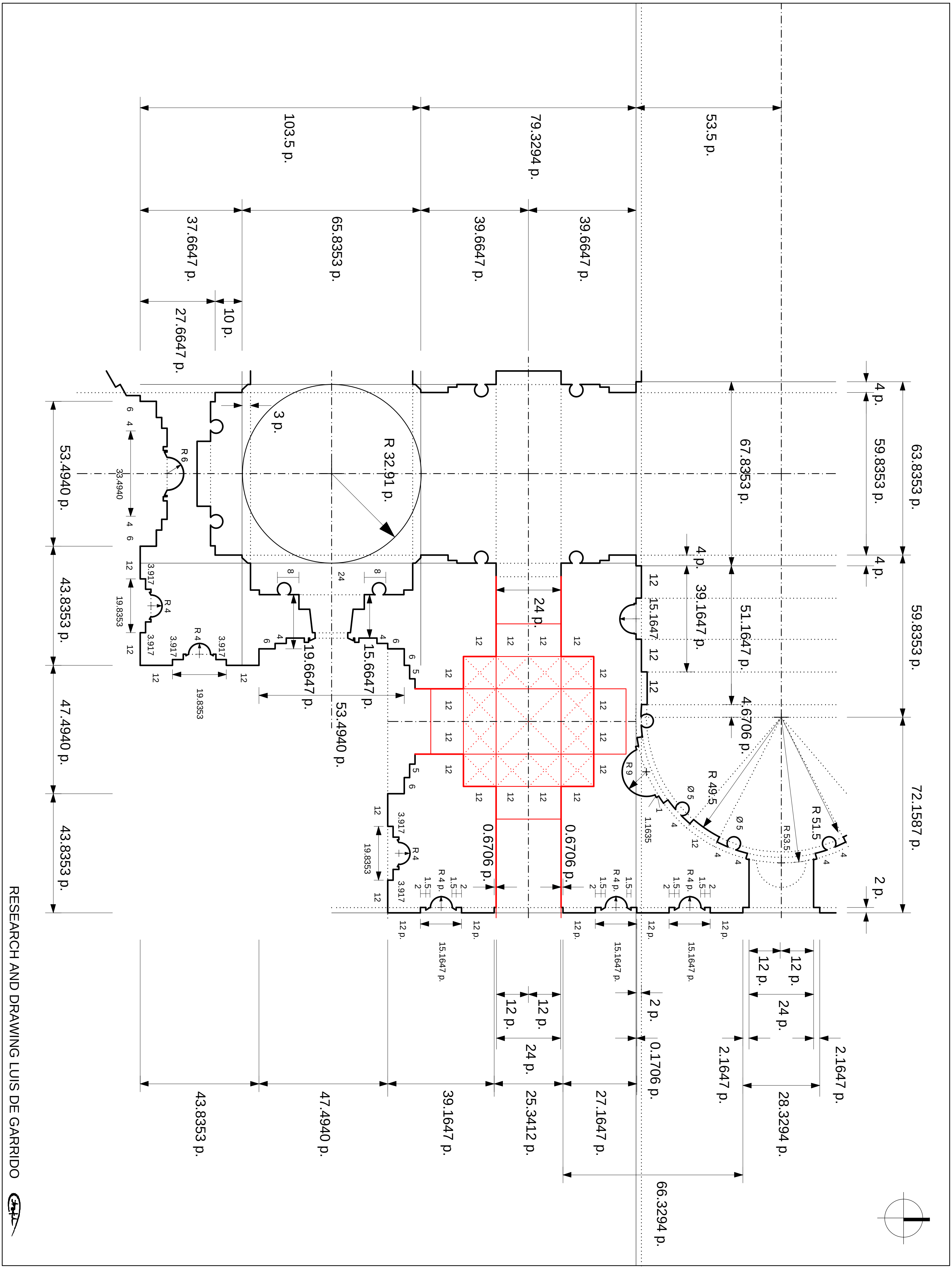


1569	ESTABLISHING THE FRONTAL RHYTHM OF THE THE FACADE - DETAIL	DUPERAC	23

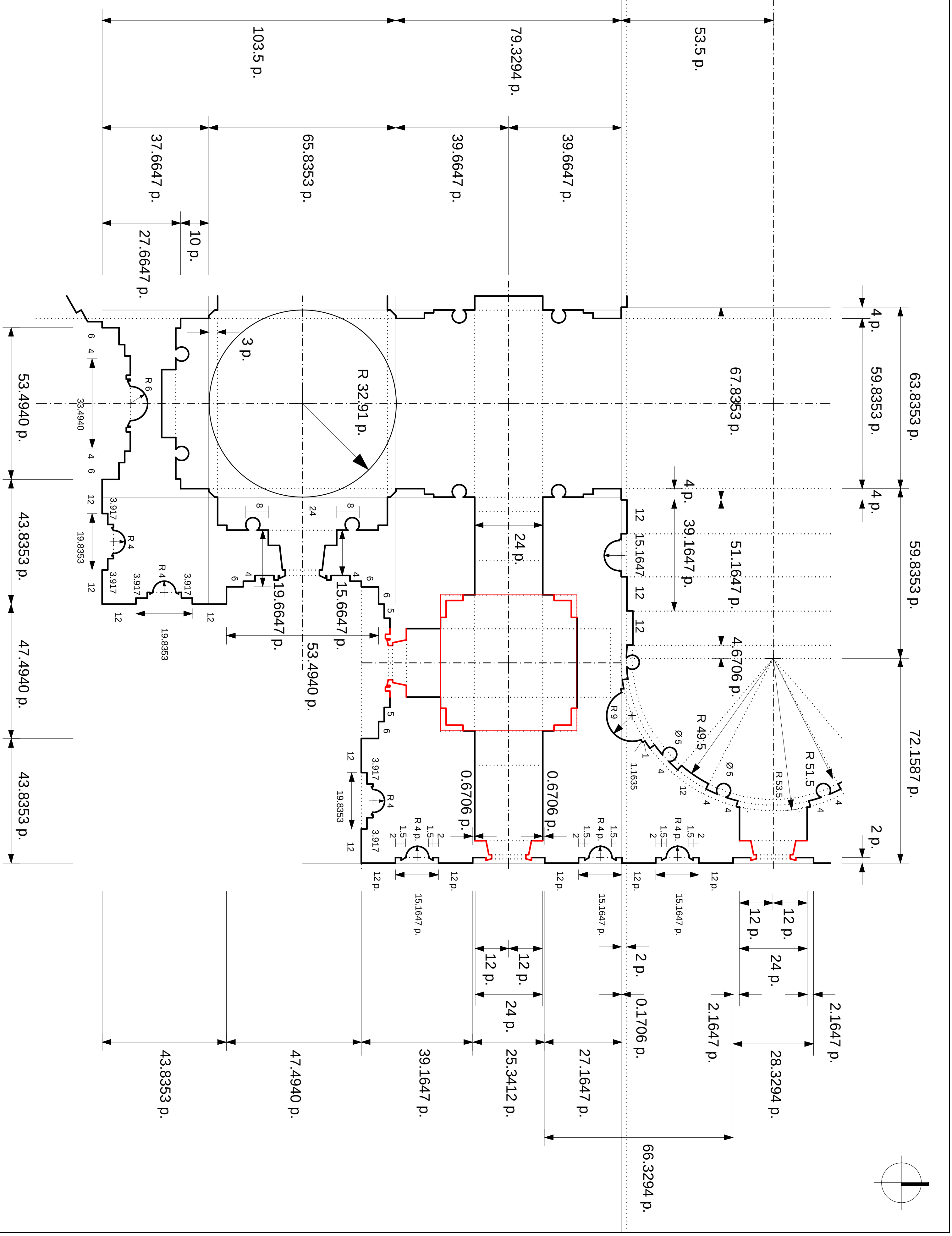


The interior space remains separate from the exterior rhythm. The only compositional order he respects is 24 palmi (12+12).

RESEARCH AND DRAWING LUIS DE GARRIDO

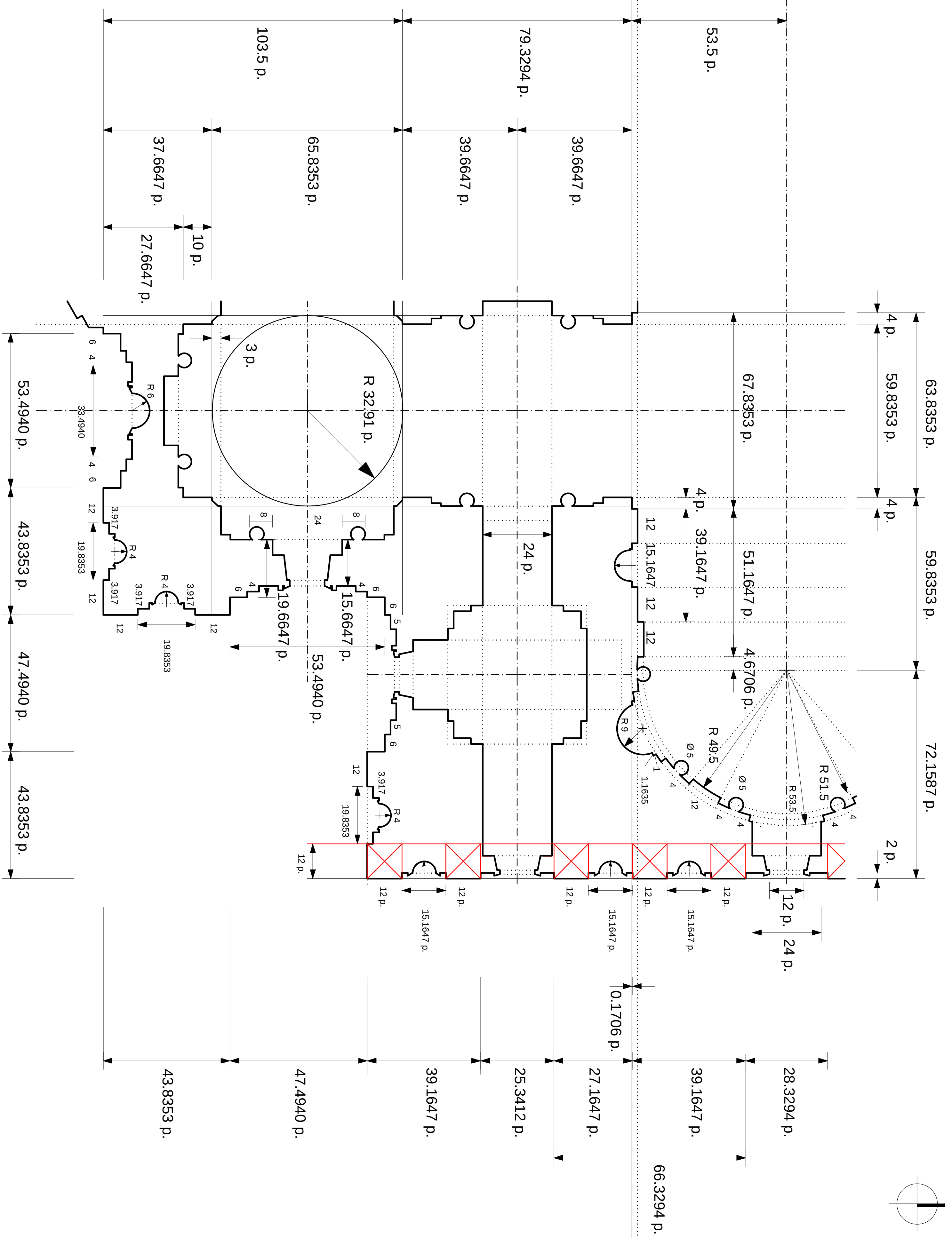


1569	ESTABLISHING THE ACCESS PASSAGES - DETAIL	DUPERAC	25



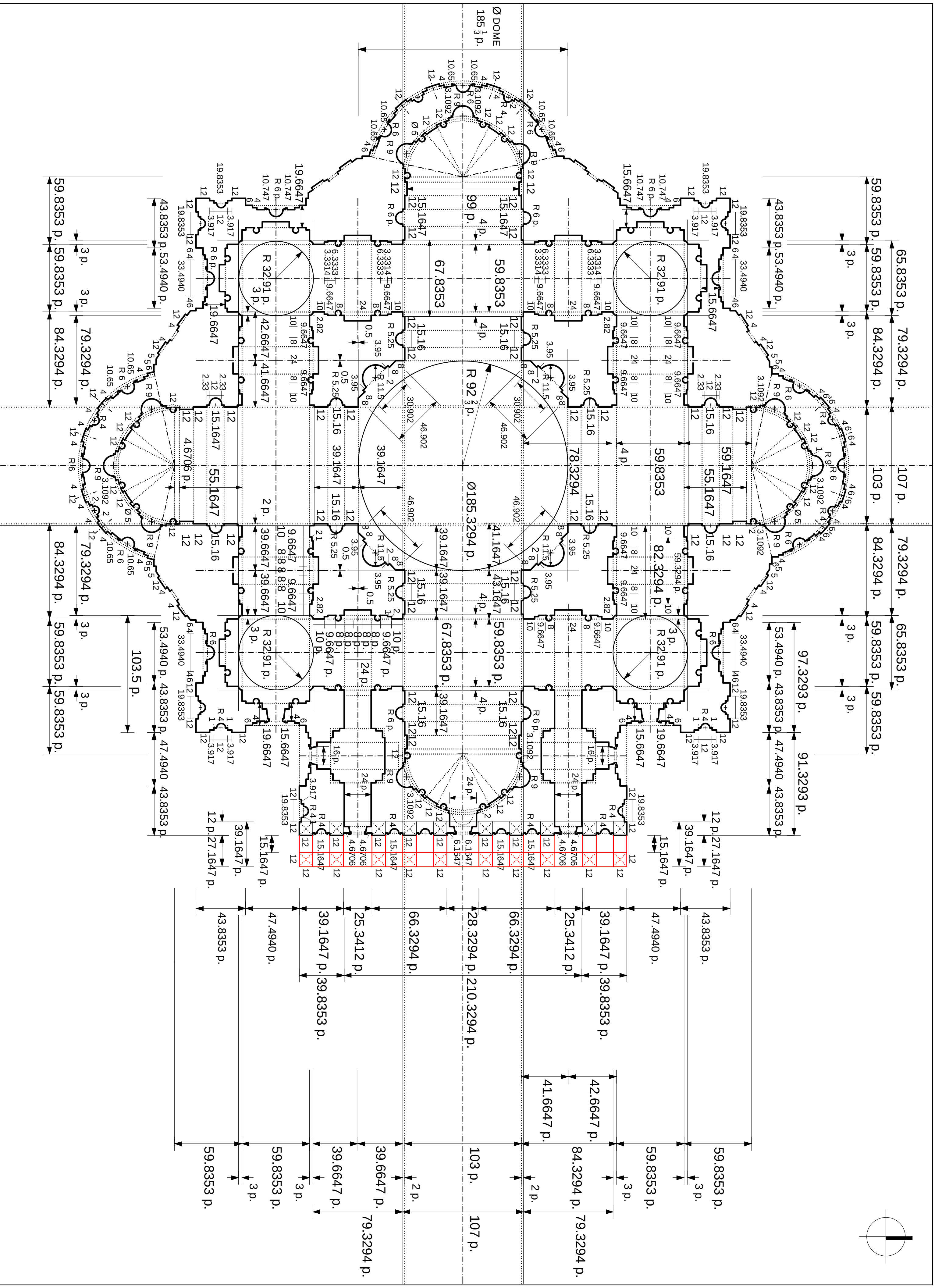
RESEARCH AND DRAWING LUIS DE GARRIDO

1569	ESTABLISHING THE COMPLETE DESIGN OF THE ENTRANCE - DETAIL	DUPERAC	26



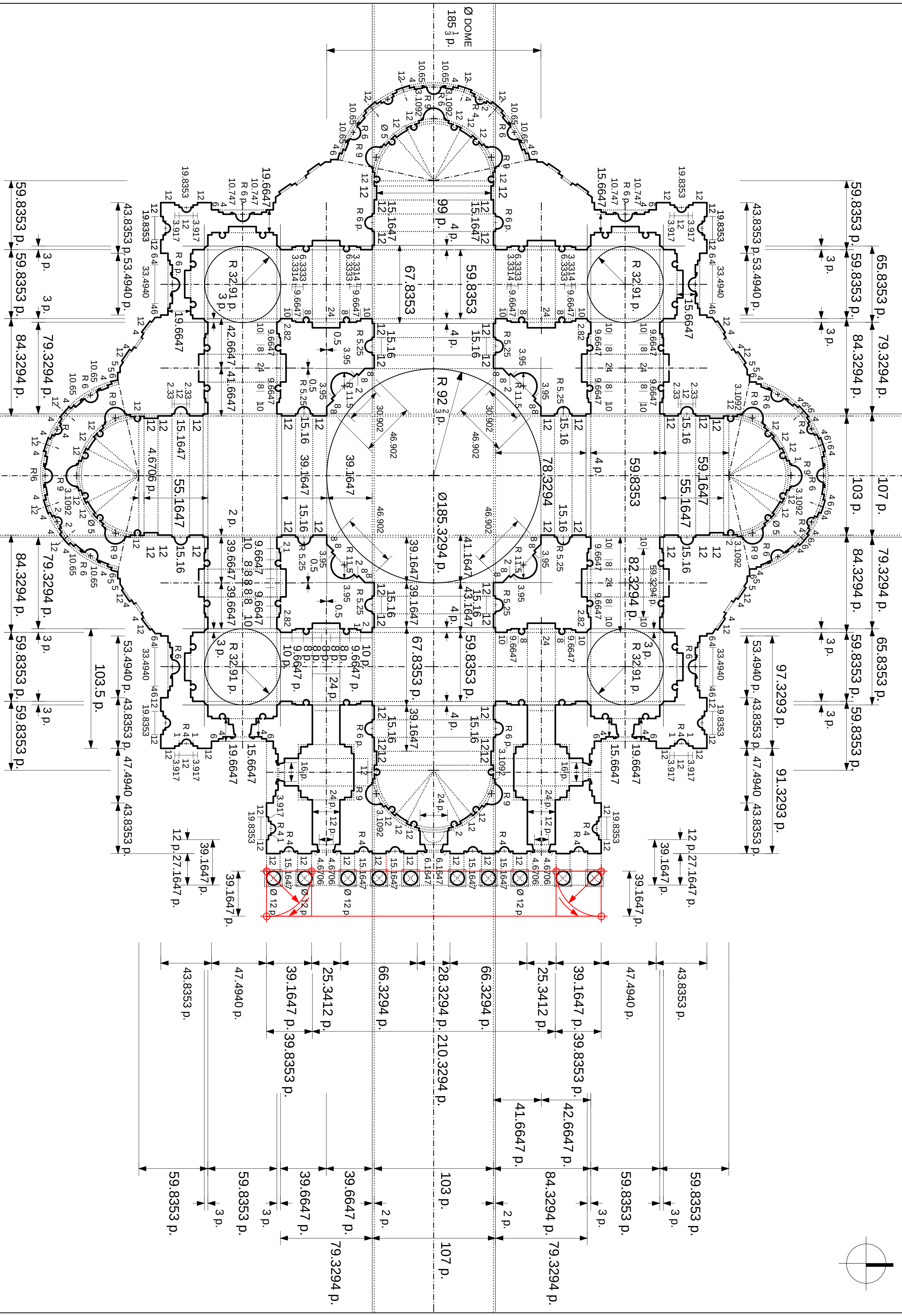
RESEARCH AND DRAWING LUIS DE GARRIDO

1569	ESTABLISHING THE RHYTHM FOR THE SEPARATION OF THE COLUMNS - DETAIL	DUPERAC	27



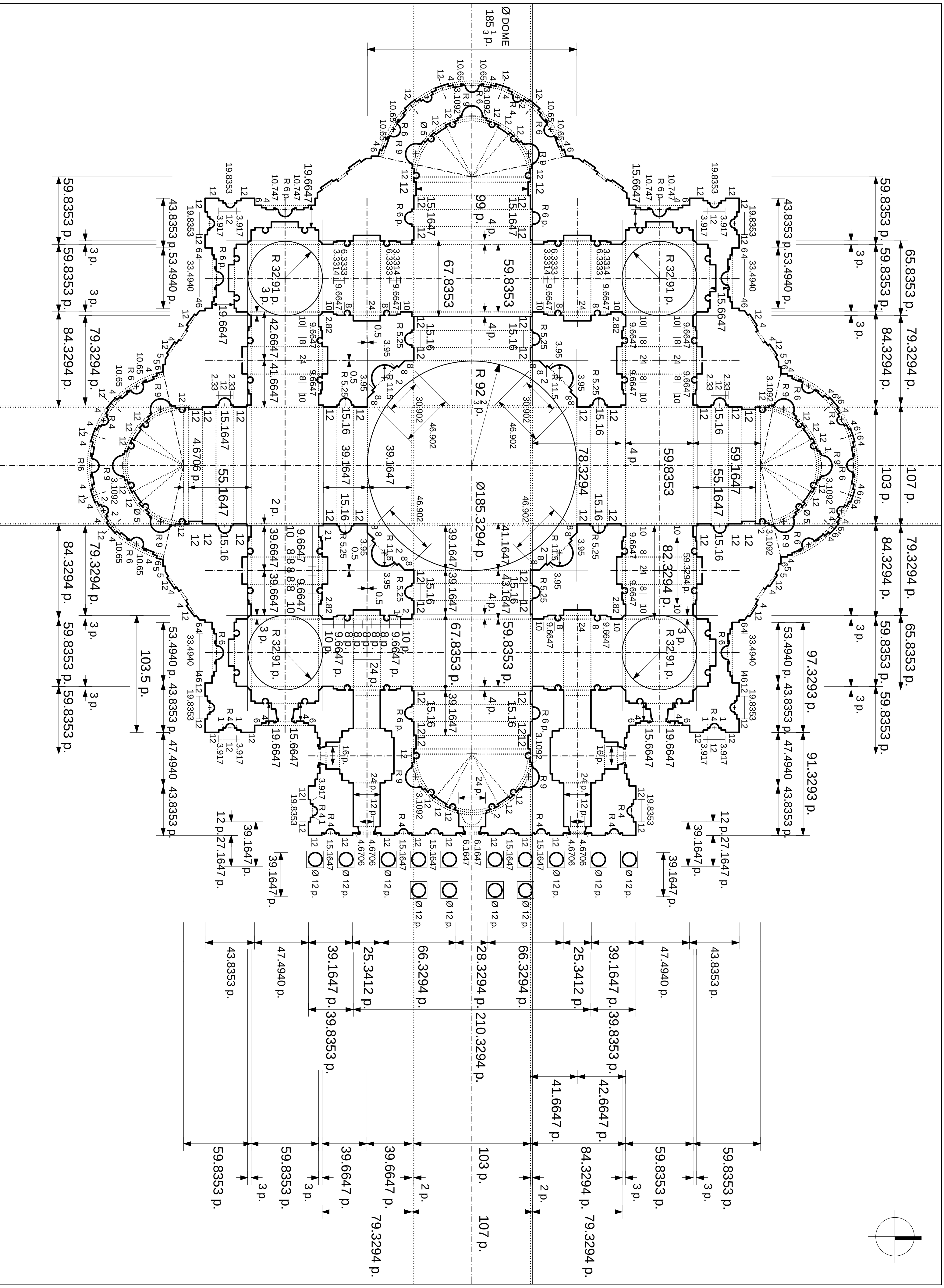
RESEARCH AND DRAWING LUIS DE GARRIDO

1569	ESTABLISHING THE POSITION OF THE COLUMNS OF THE FACADE	DUPERAC	28



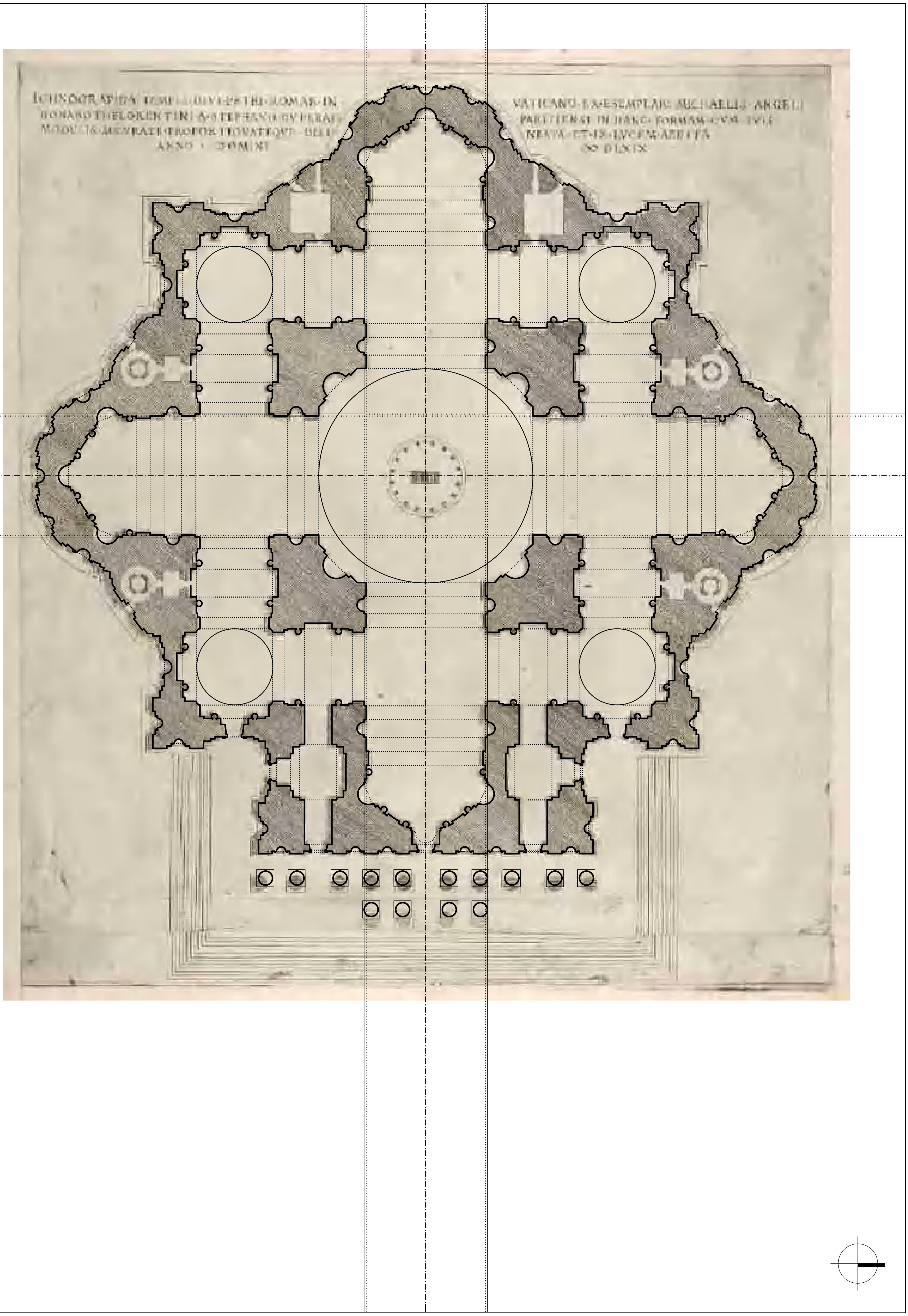
RESEARCH AND DRAWING LUIS DE GARRIDO

1569	ESTABLISHING THE SEPARATION OF THE FRONT COLUMNS OF THE FACADE	DUPERAC	29



RESEARCH AND DRAWING LUIS DE GARRIDO

1569	RECONSTRUCTED PLAN ATTRIBUTED TO MICHELANGELO BY E. DUPERAC	DUPERAC	30



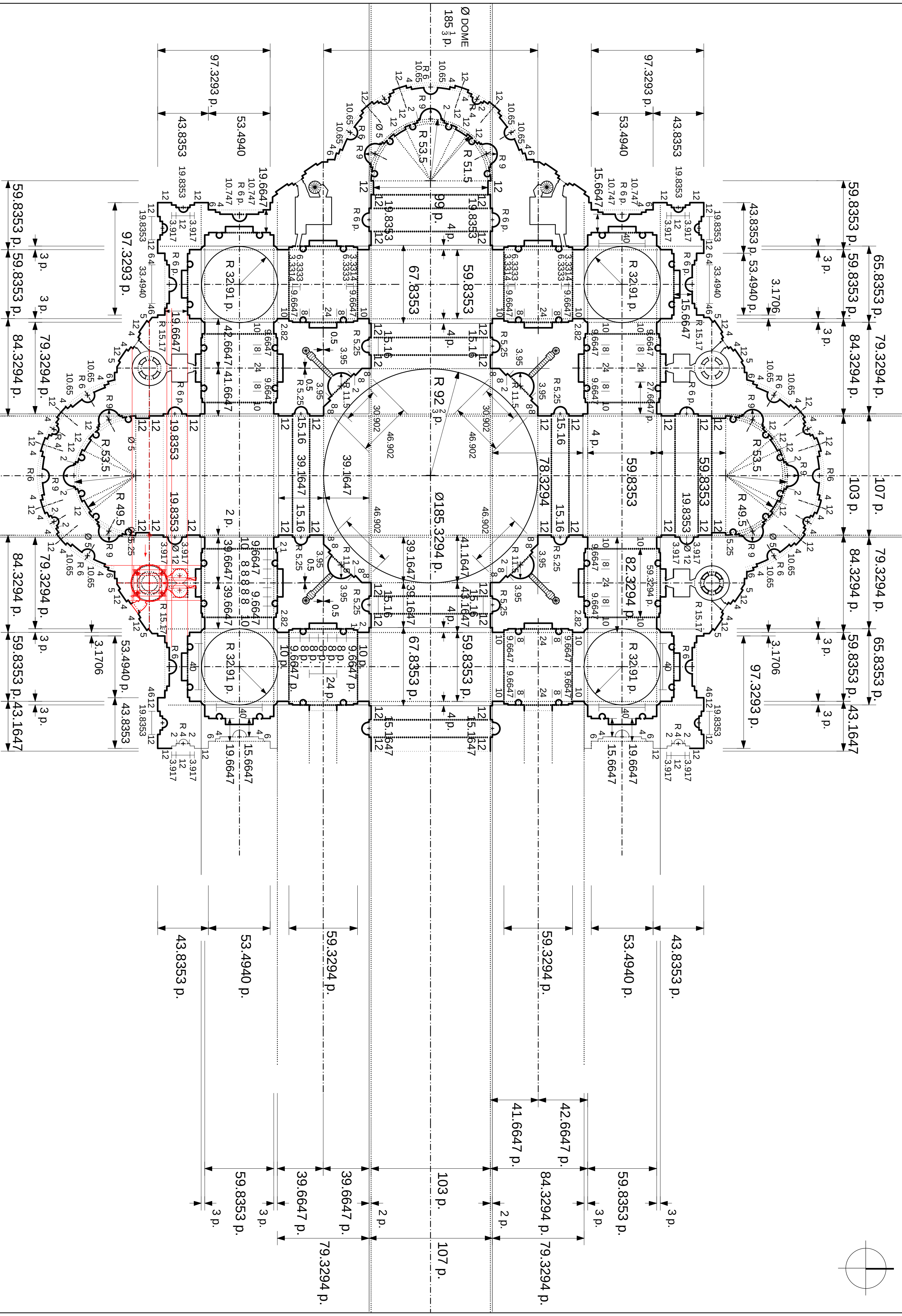
RESEARCH AND DRAWING LUIS DE GARRIDO

1569

OVERLAY WITH RECONSTRUCTED PLAN ATTRIBUTED TO MICHELANGELO

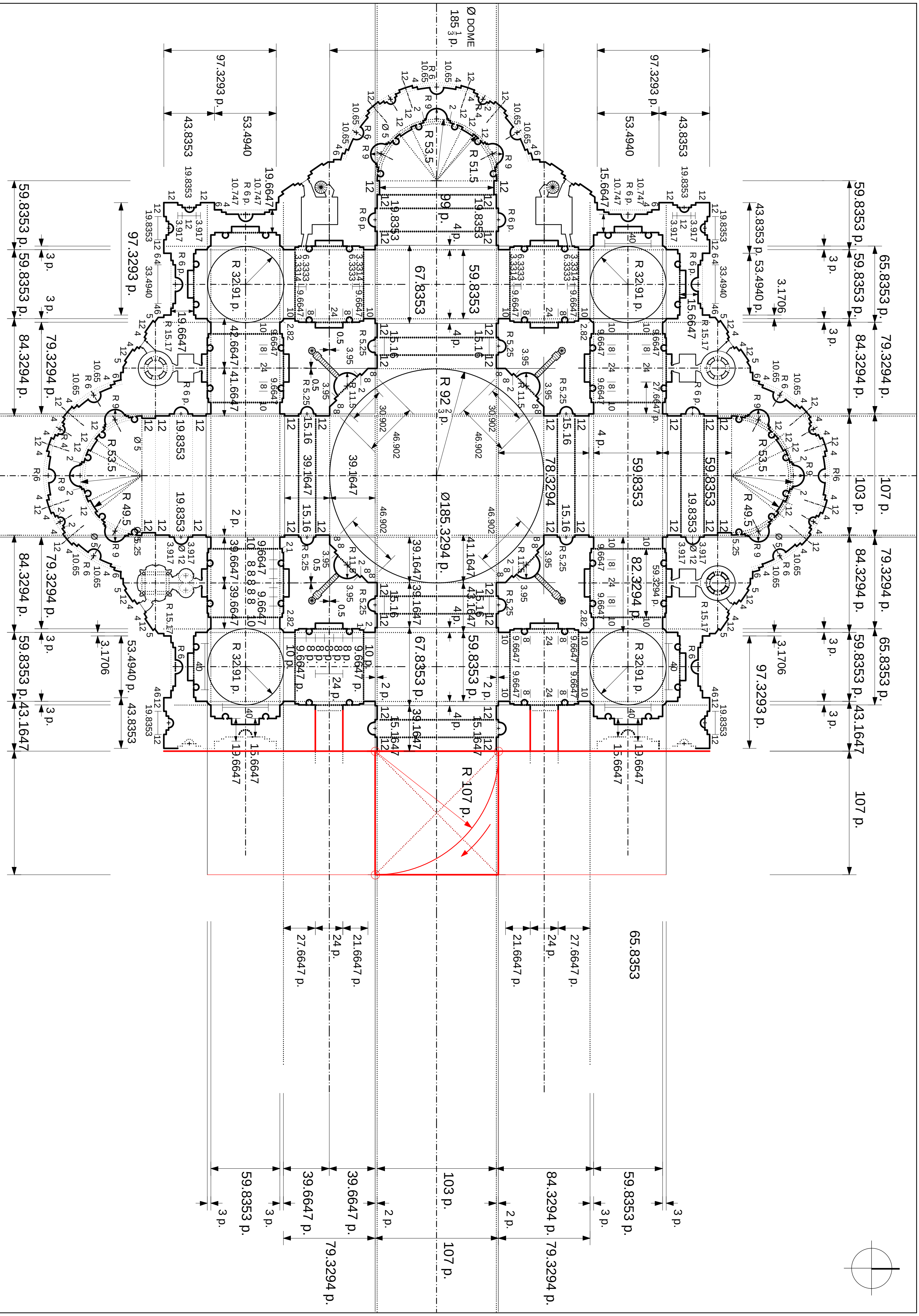
DUPERAC

RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF MADERNO EXECUTIVE PROJECT OF APRIL 1608



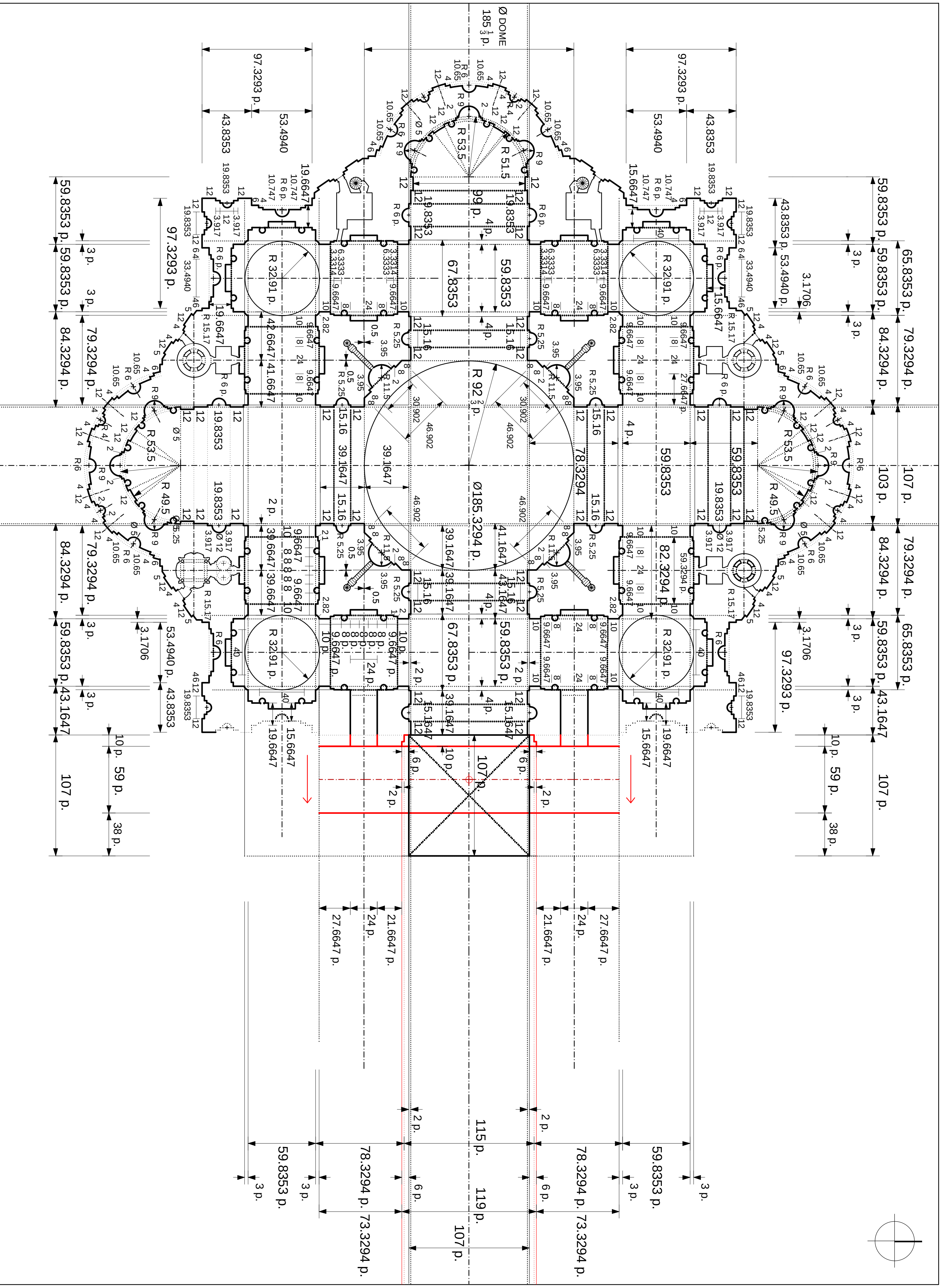
RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE REMODELING OF MICHELANGELO'S PROJECT BY MADERNO	MADERNO A	1



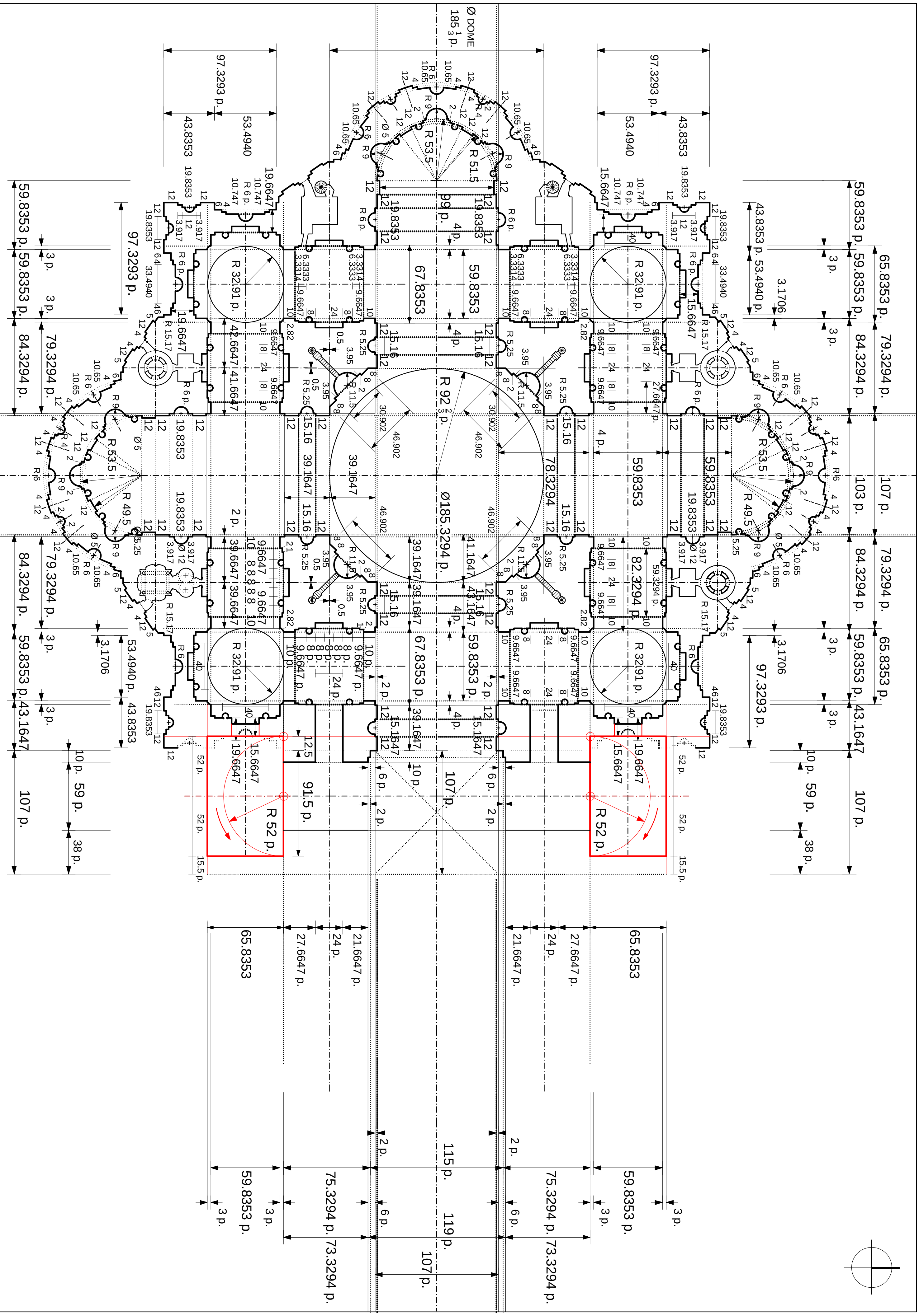
RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE INTEGRATION AXES WITH THE NAVES	MADERNO A	2



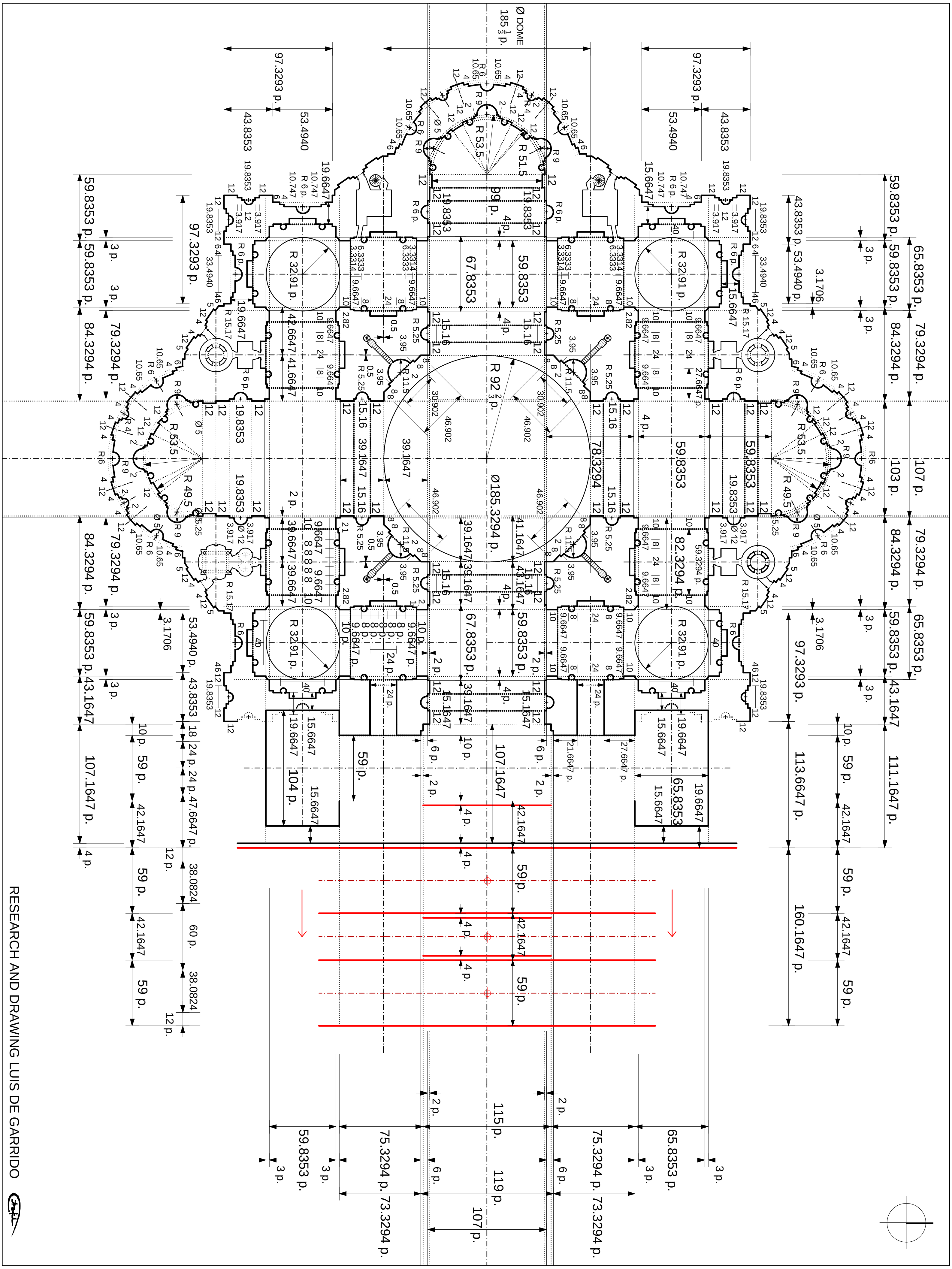
RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE COMPOSITIONAL RHYTHM OF THE NAVES	MADERNO A	3

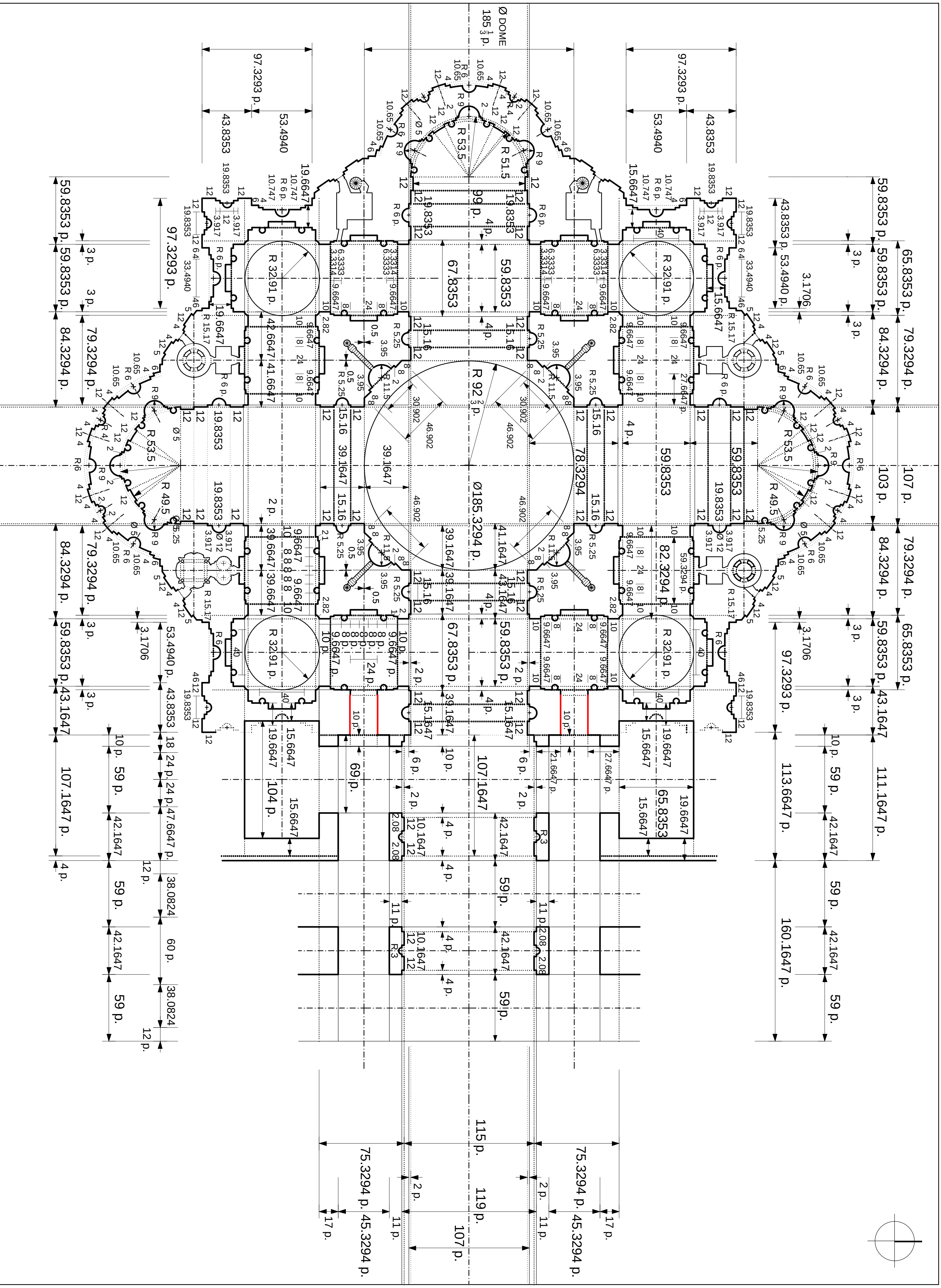


RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE	MADERNO A	4

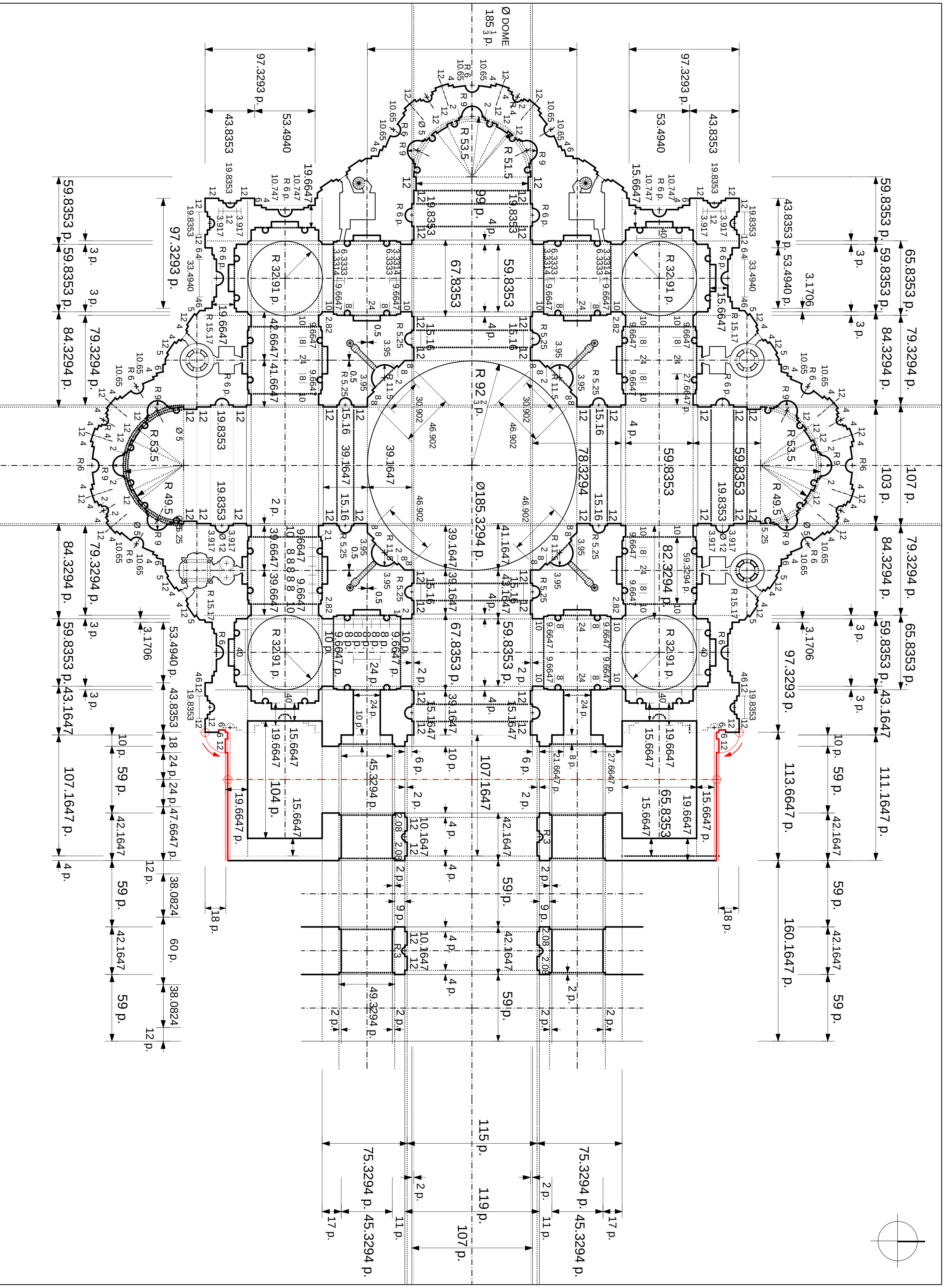


1607	PROJECTING THE COMPOSITIONAL RHYTHM OF THE NAVES	MADERNO A	5

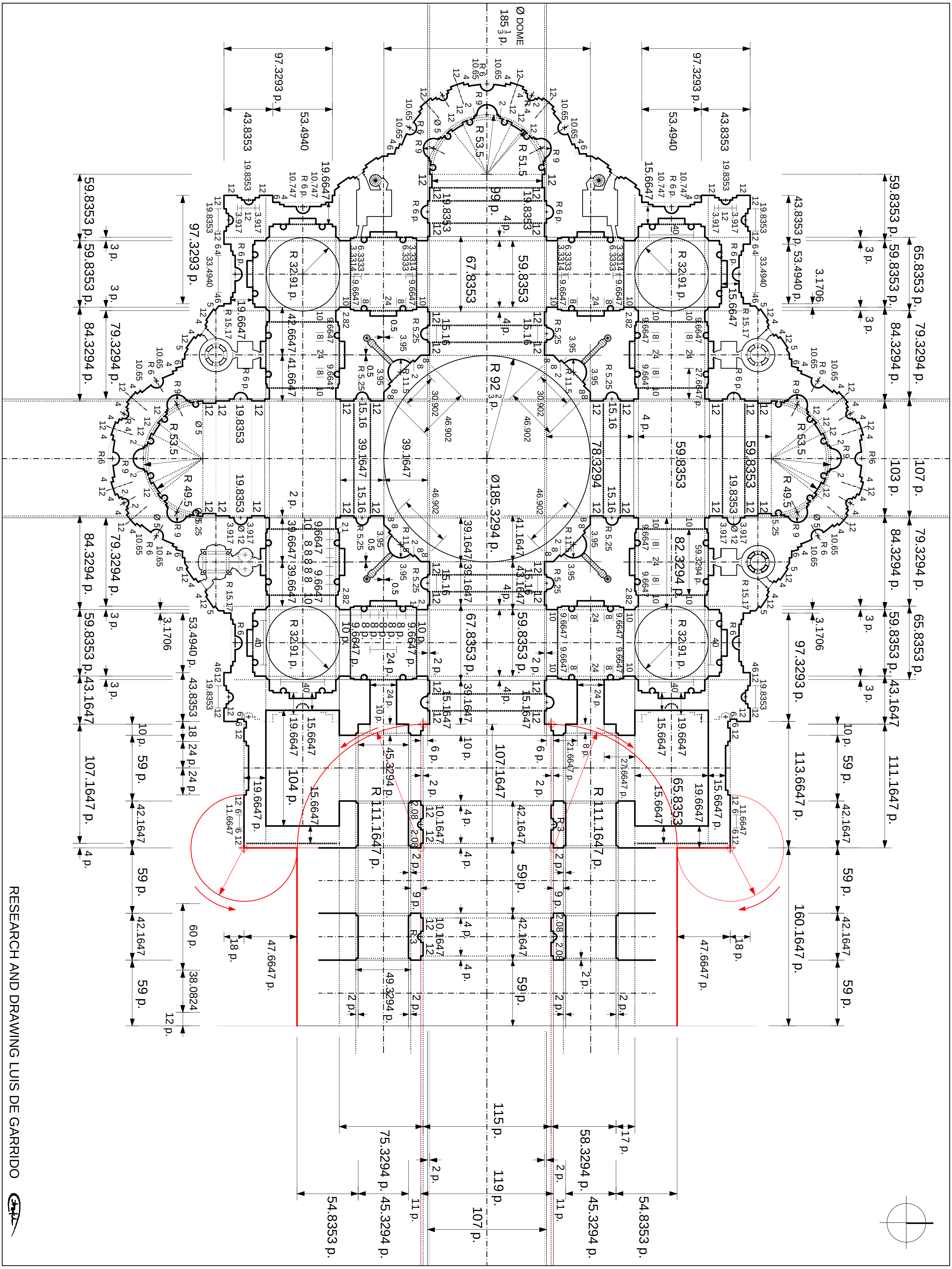


RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE LOCATION OF THE MAIN COLUMNS OF THE NAVES	MADERNO A	6



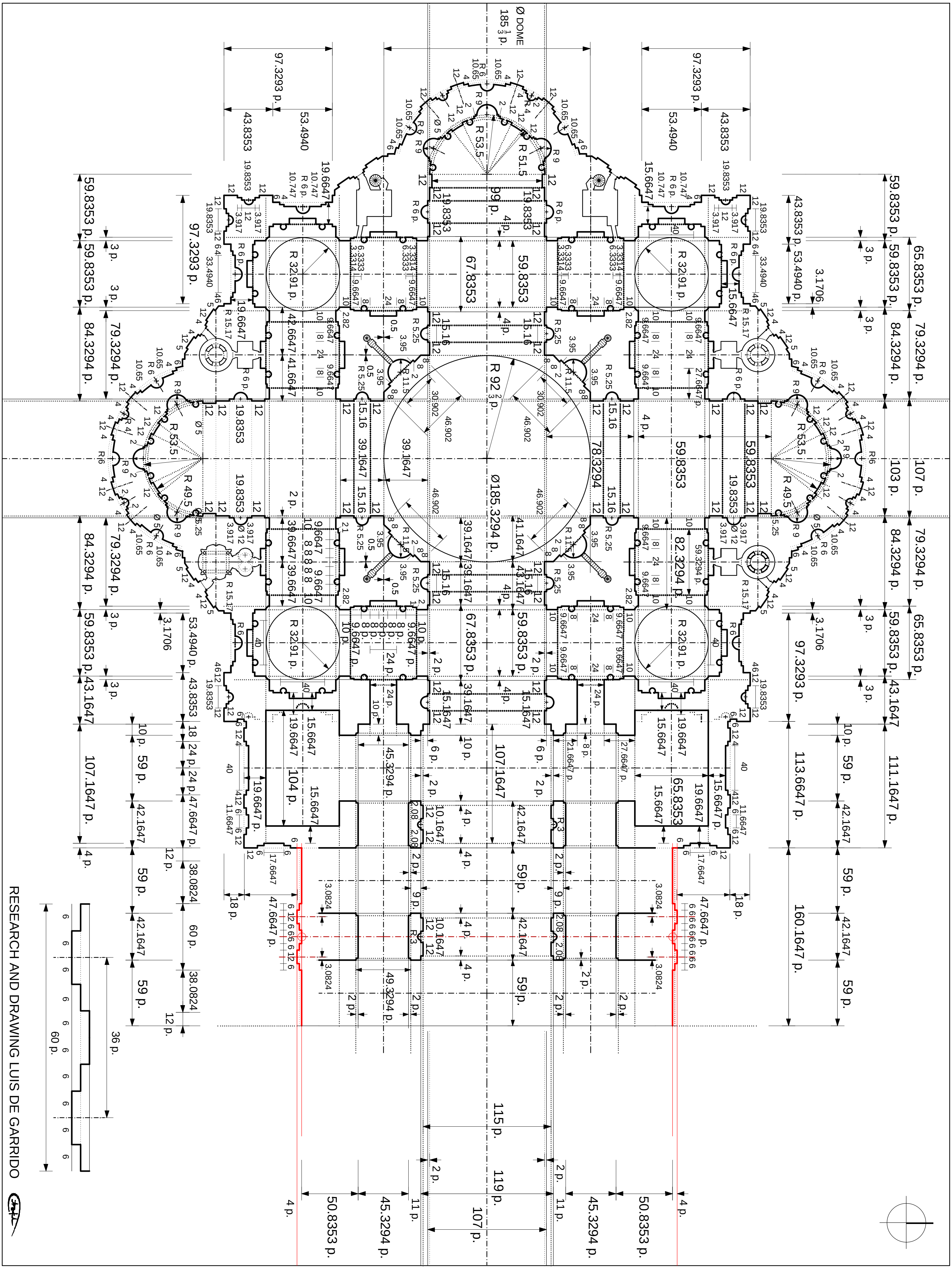
RESEARCH AND DRAWING LUIS DE GARRIDO



1607

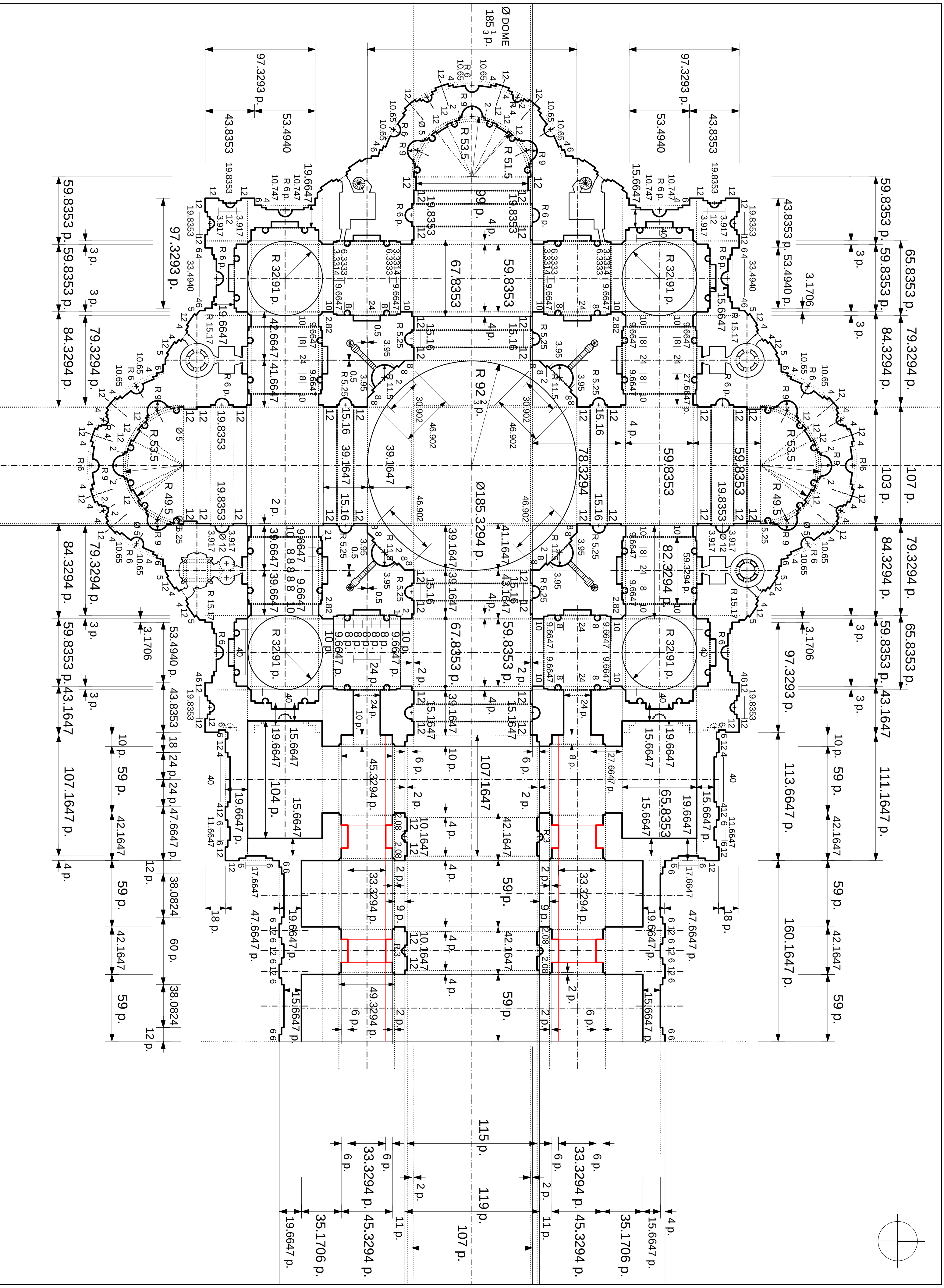
MADERNO A

8



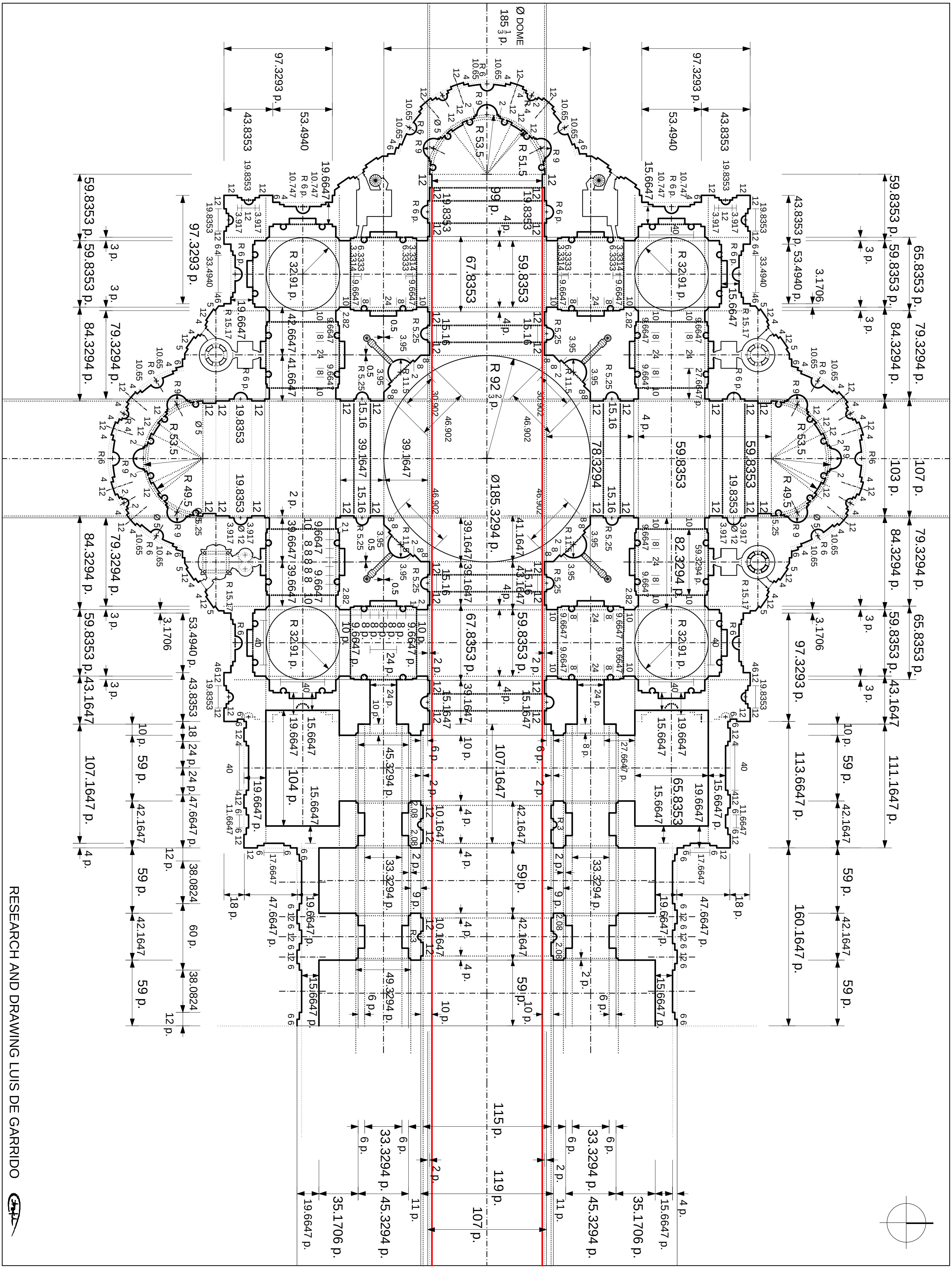
1607

MADERNO A

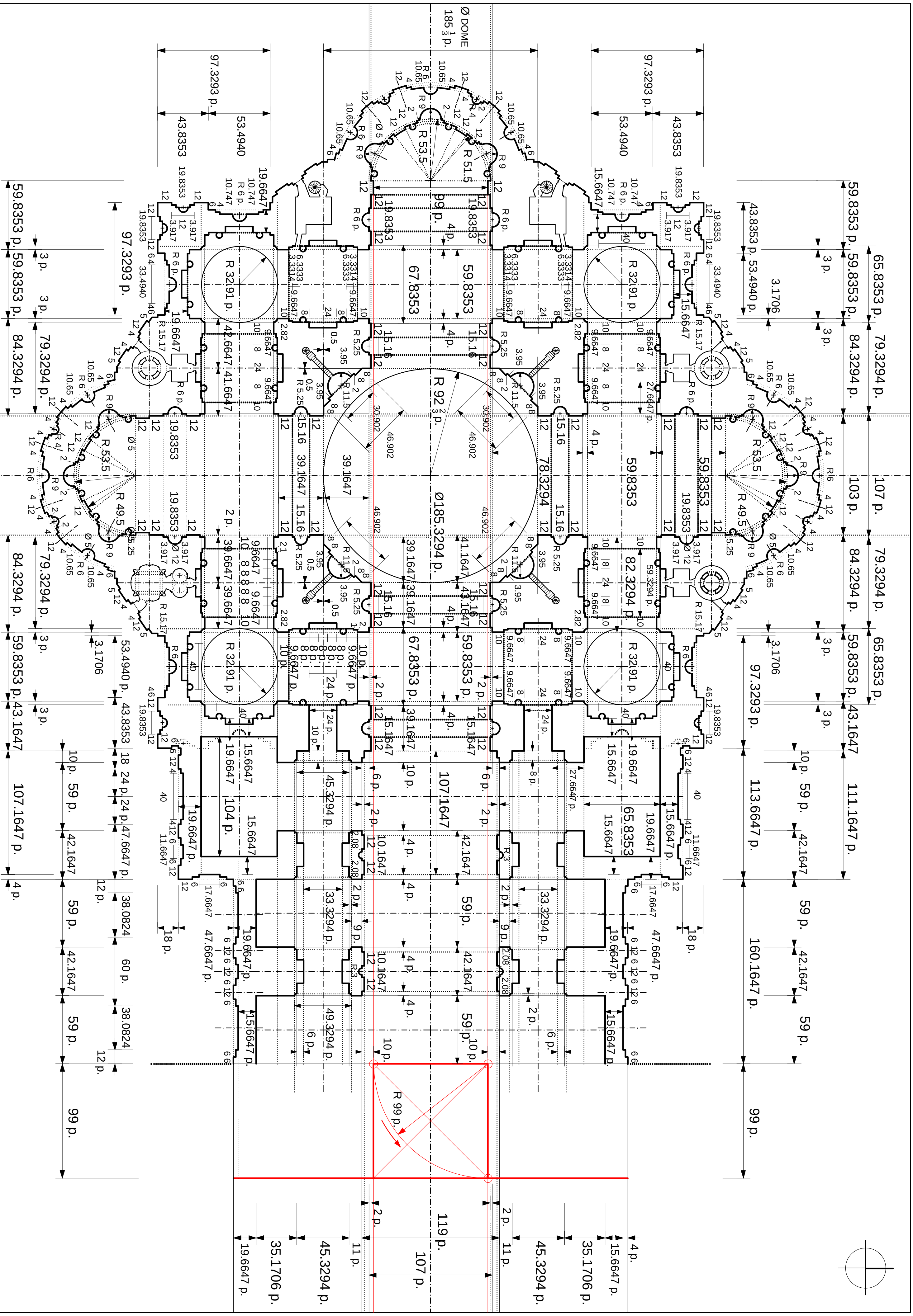


RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE INTERNAL PILASTERS OF THE MAIN COLUMNS OF THE NAVES	MADERNO A	10

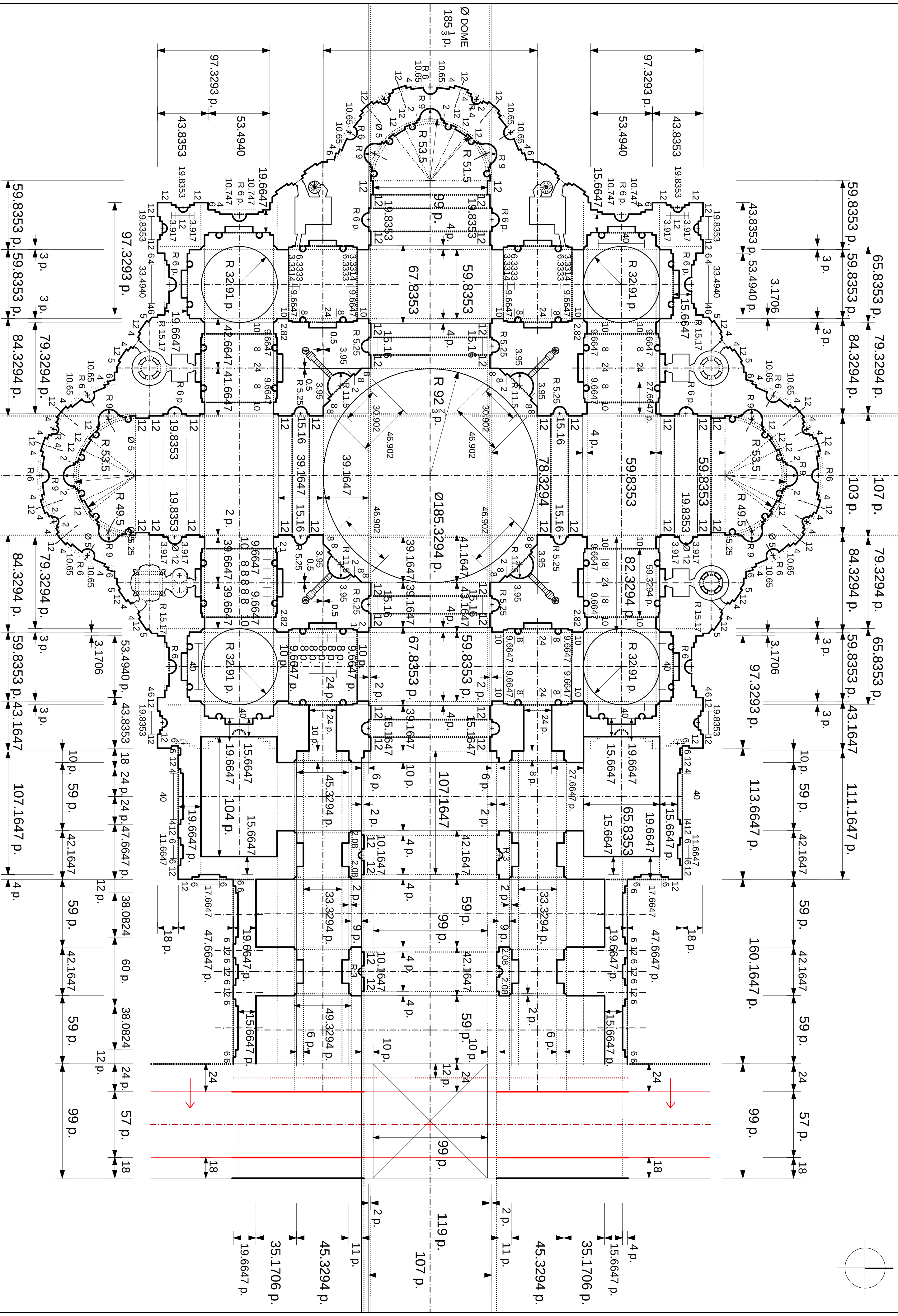


1607	ESTABLISHING THE MAIN AXES OF THE PORCH	MADERNO A	11

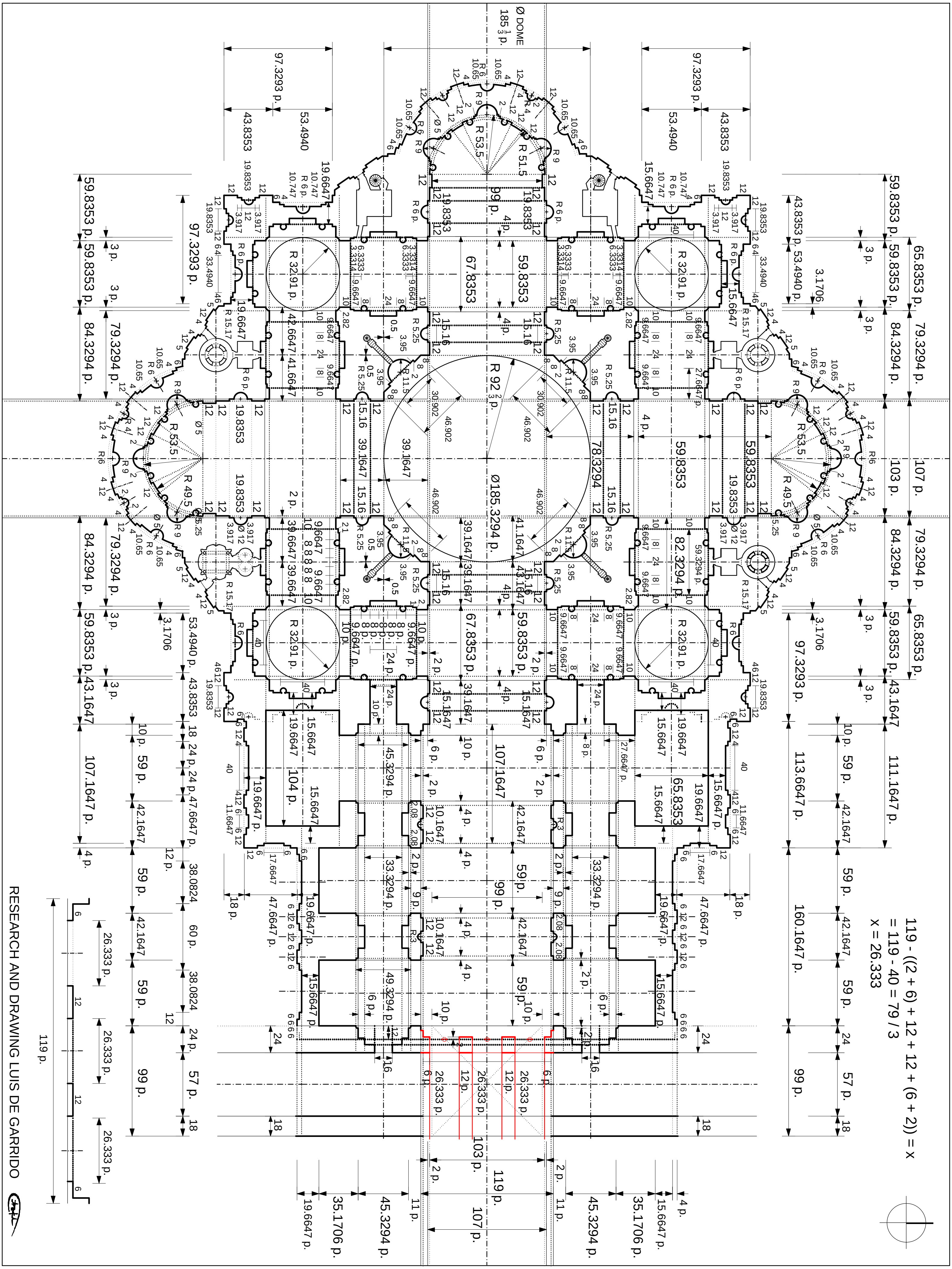


RESEARCH AND DRAWING LUIS DE GARRIDO

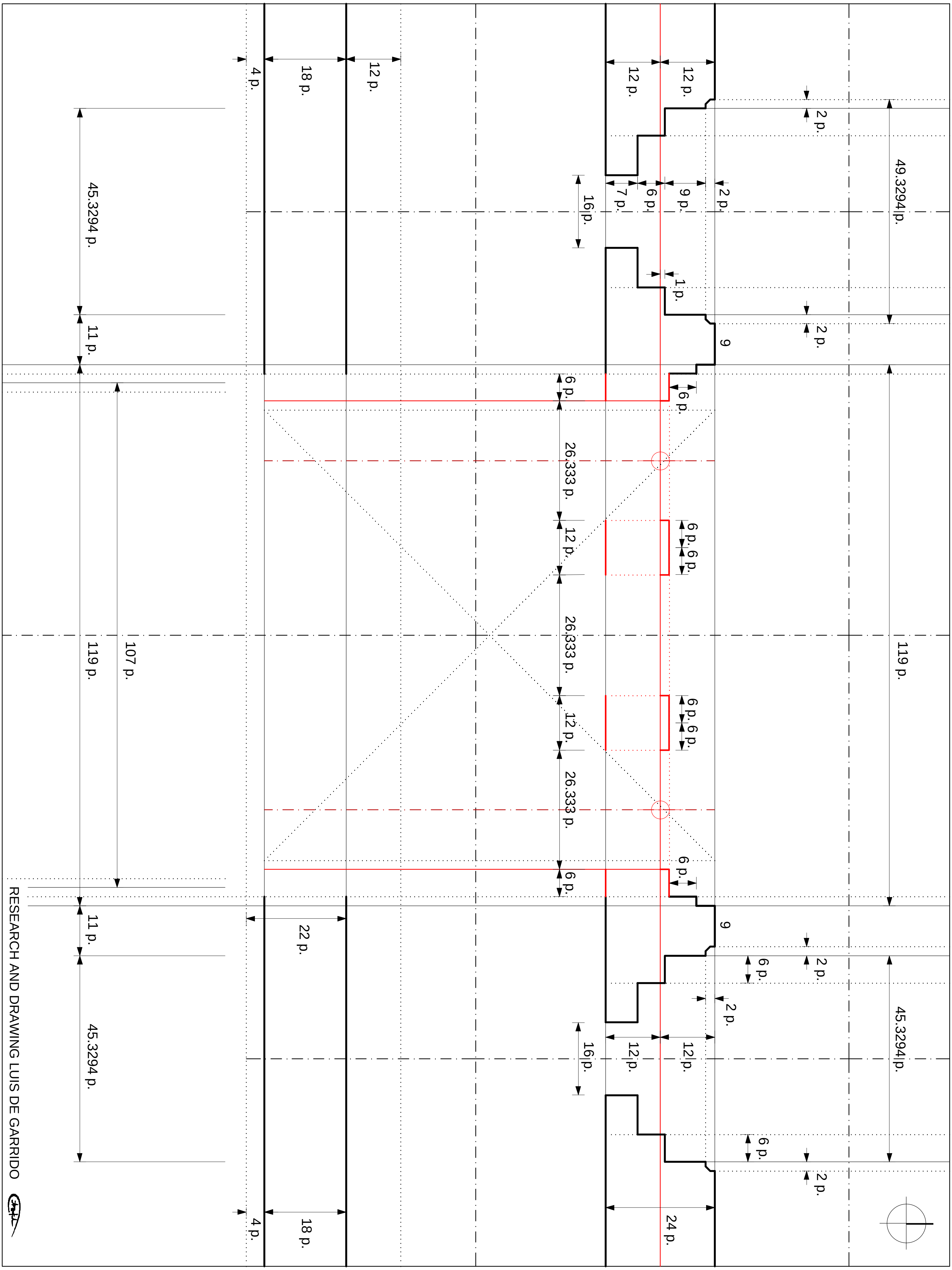
1607	ESTABLISHING THE INTEGRATION PROPORTION WITH THE PORCH	MADERNO A	12



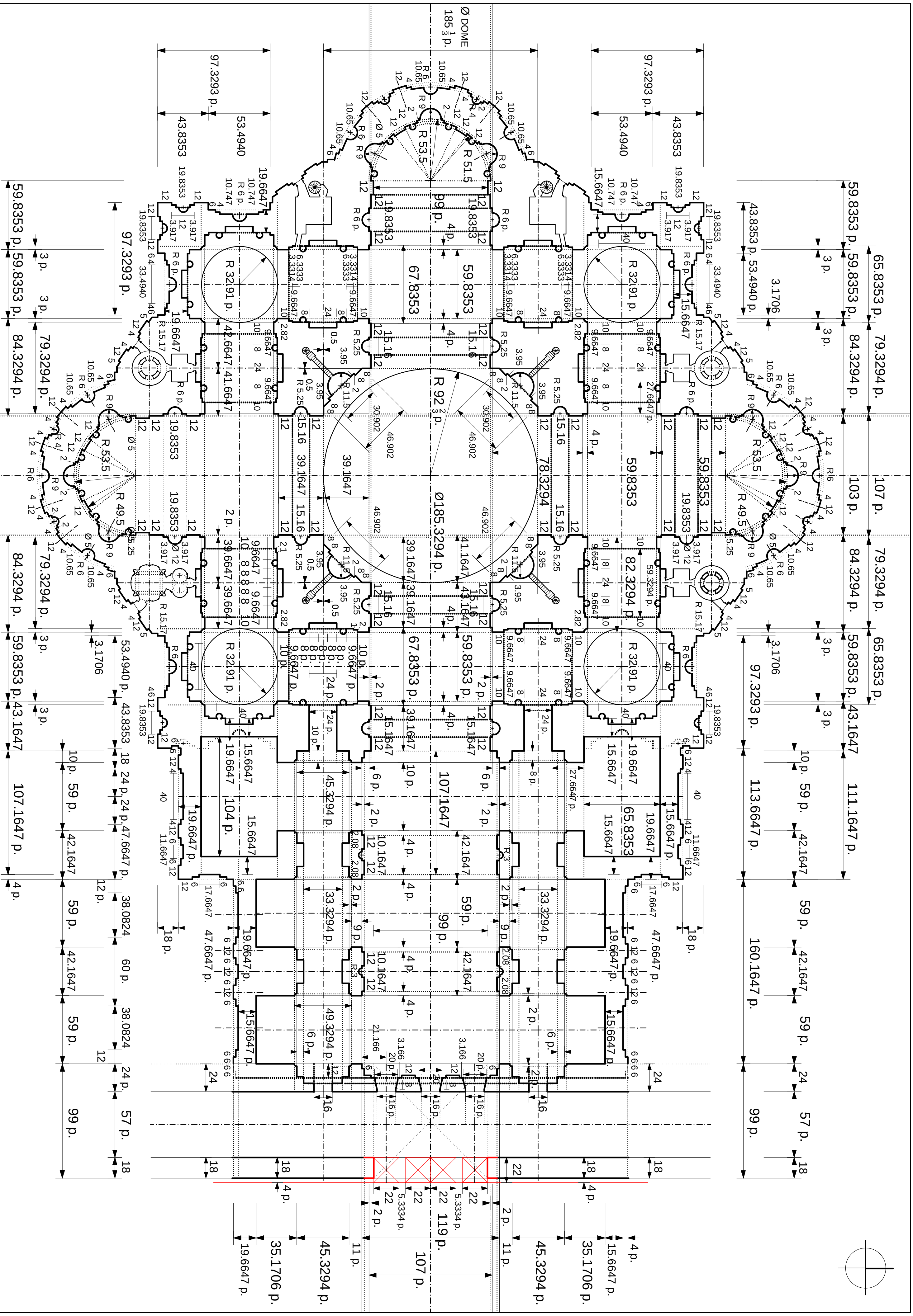
RESEARCH AND DRAWING LUIS DE GARRIDO



1607		MADERNO A	14

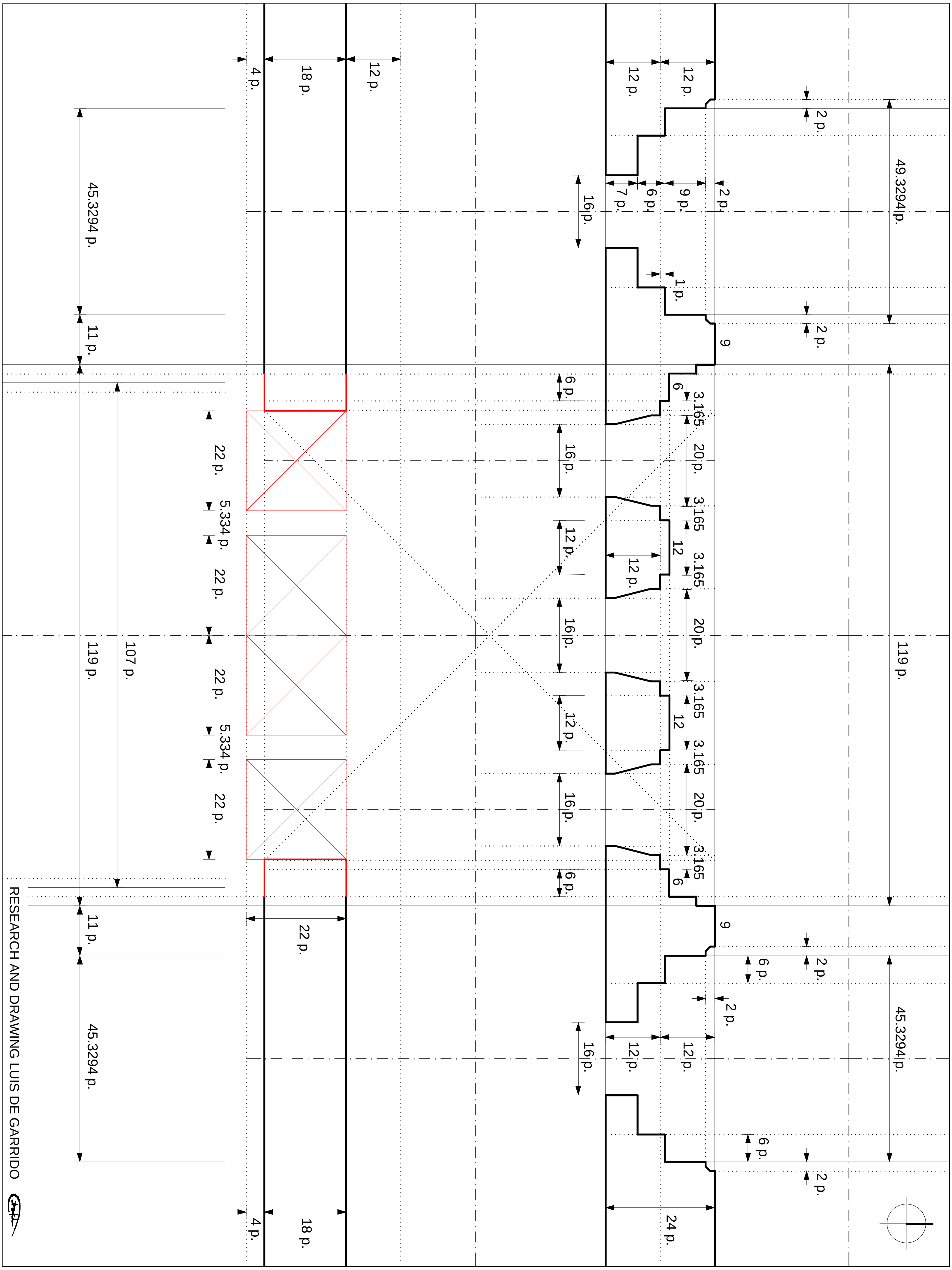


1607		MADERNO A	15

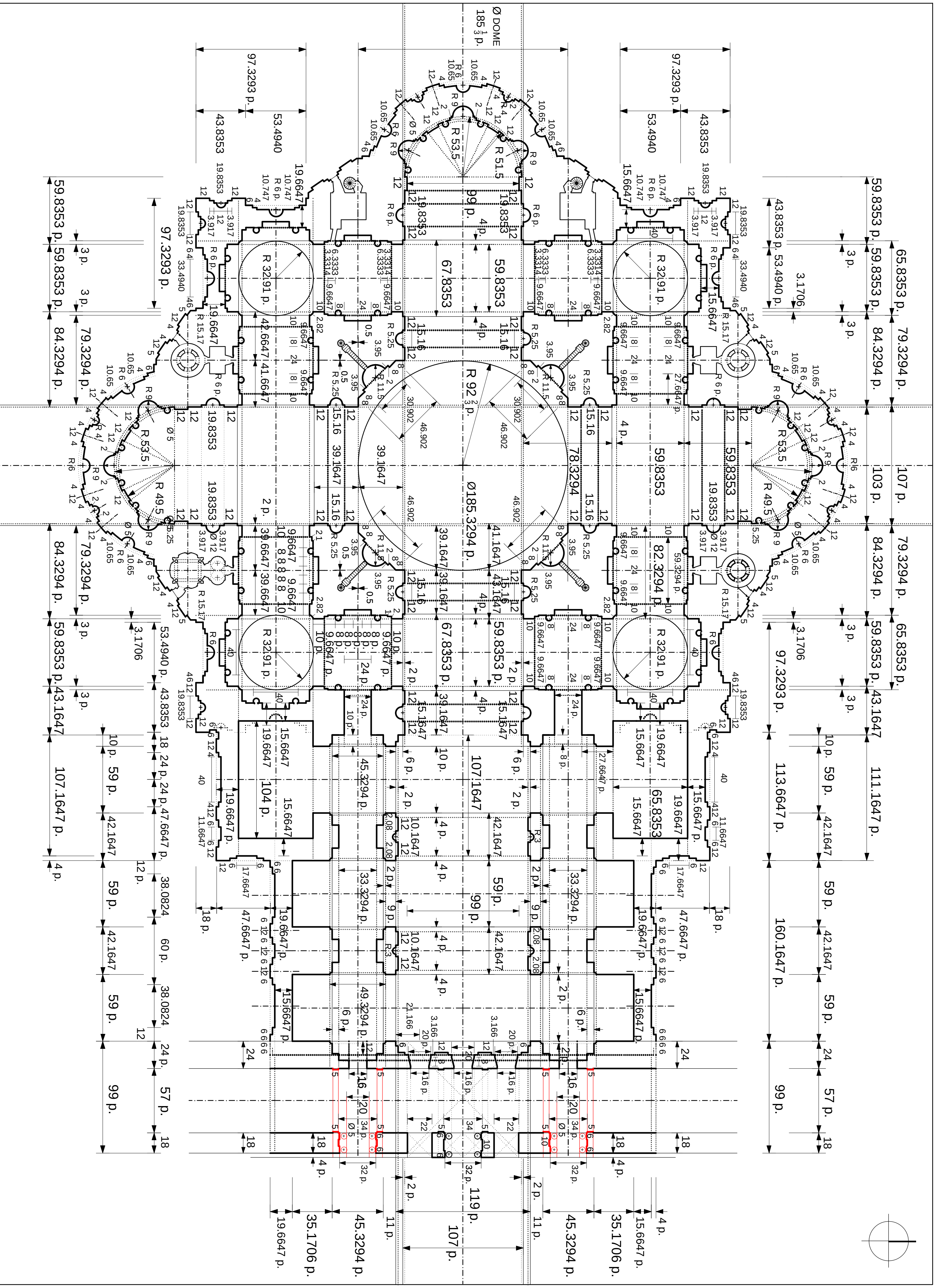


RESEARCH AND DRAWING LUIS DE GARRIDO

1607		MADERNO A	16

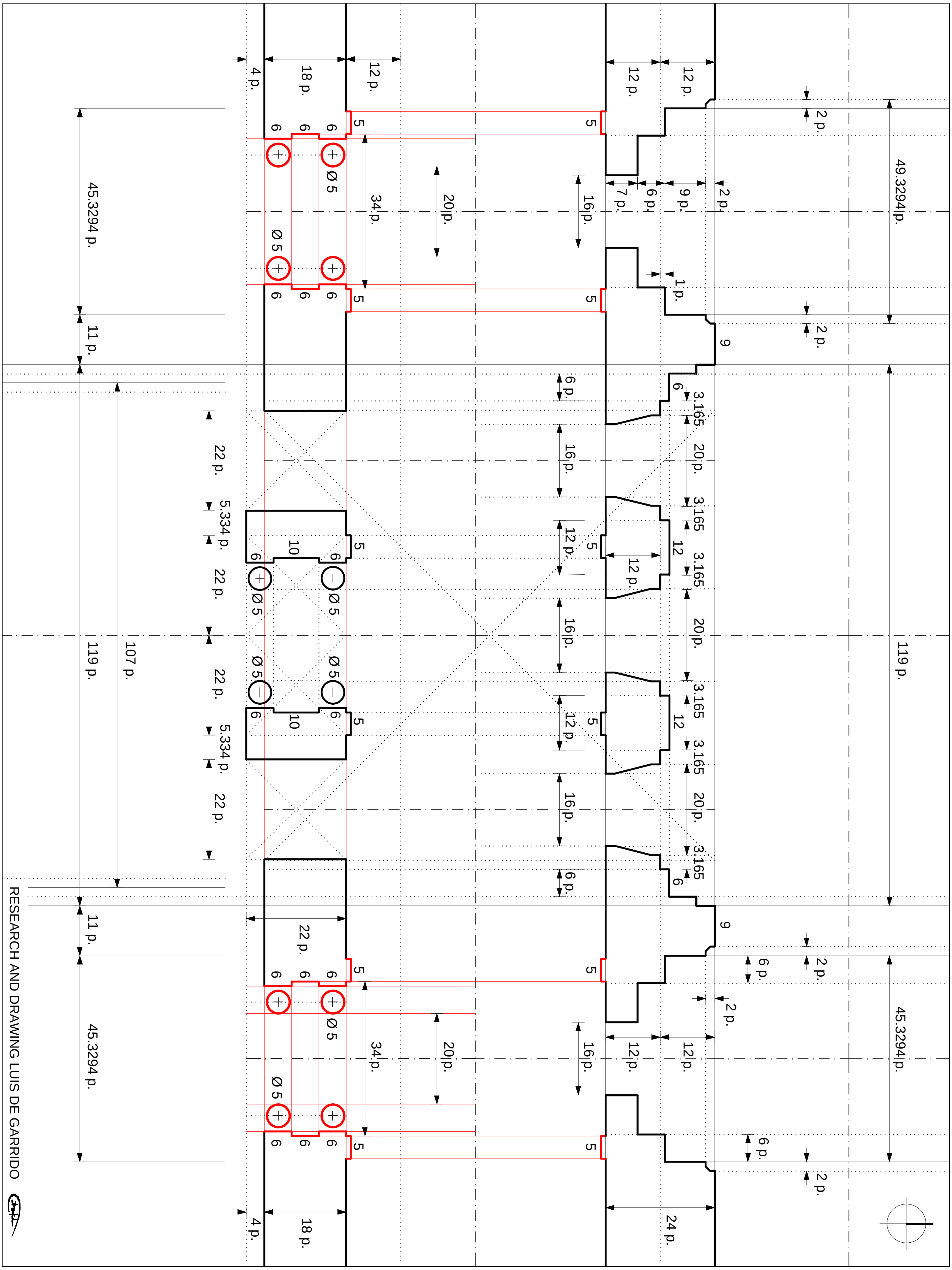


1607		MADERNO A	17



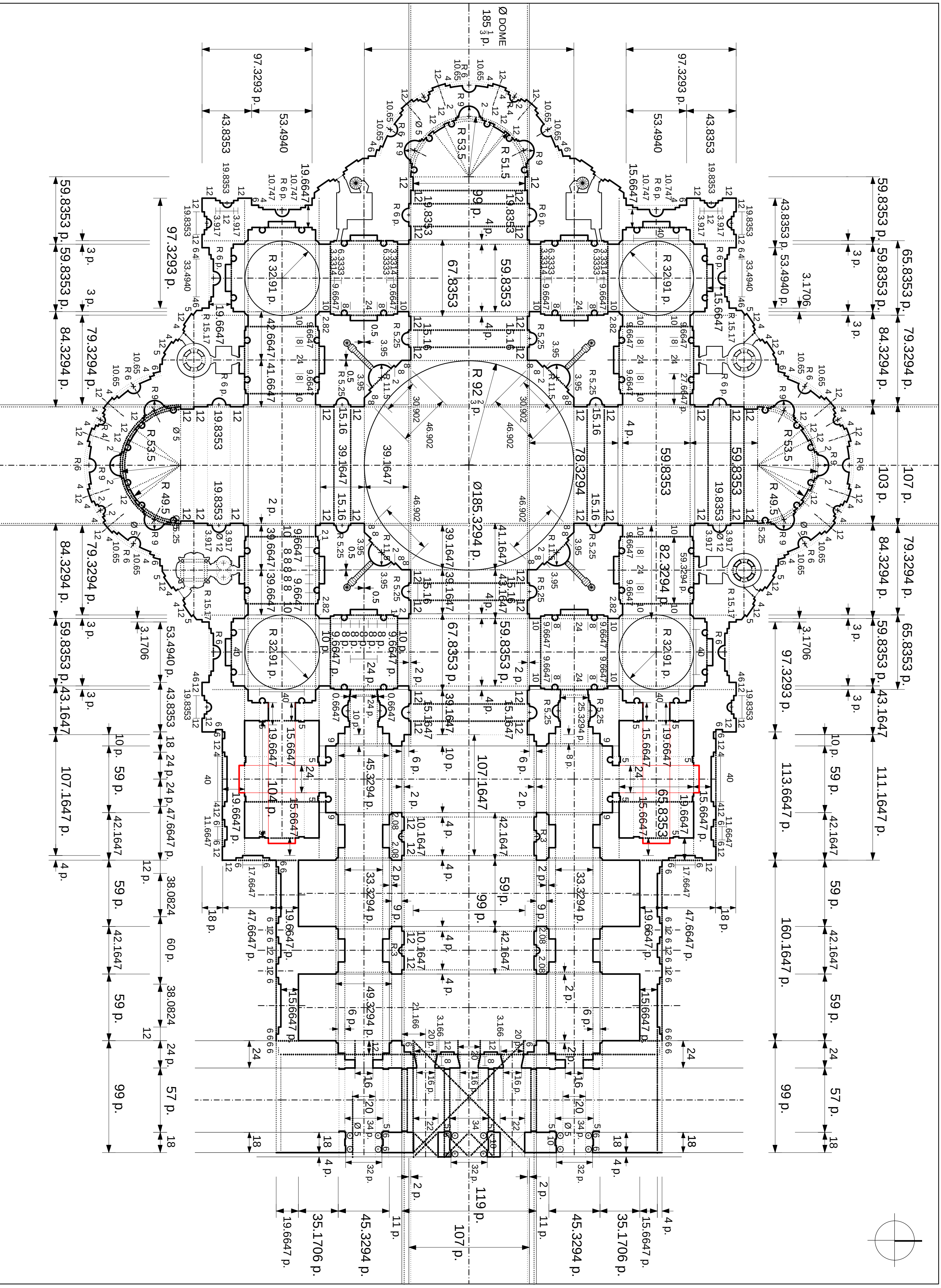
RESEARCH AND DRAWING LUIS DE GARRIDO

1607		MADERNO A	18



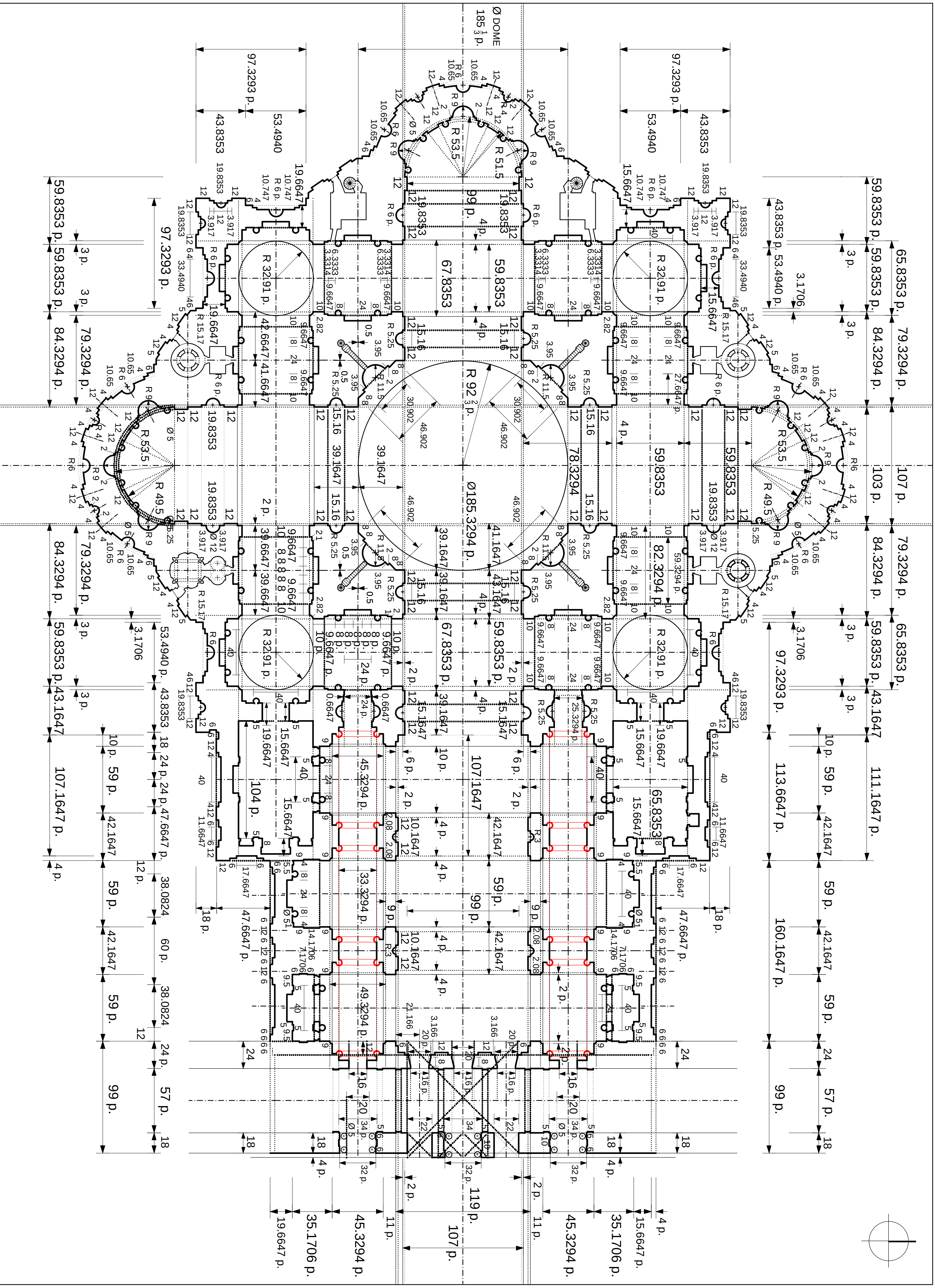
1607		MADERNO A	19

RESEARCH AND DRAWING LUIS DE GARRIDO



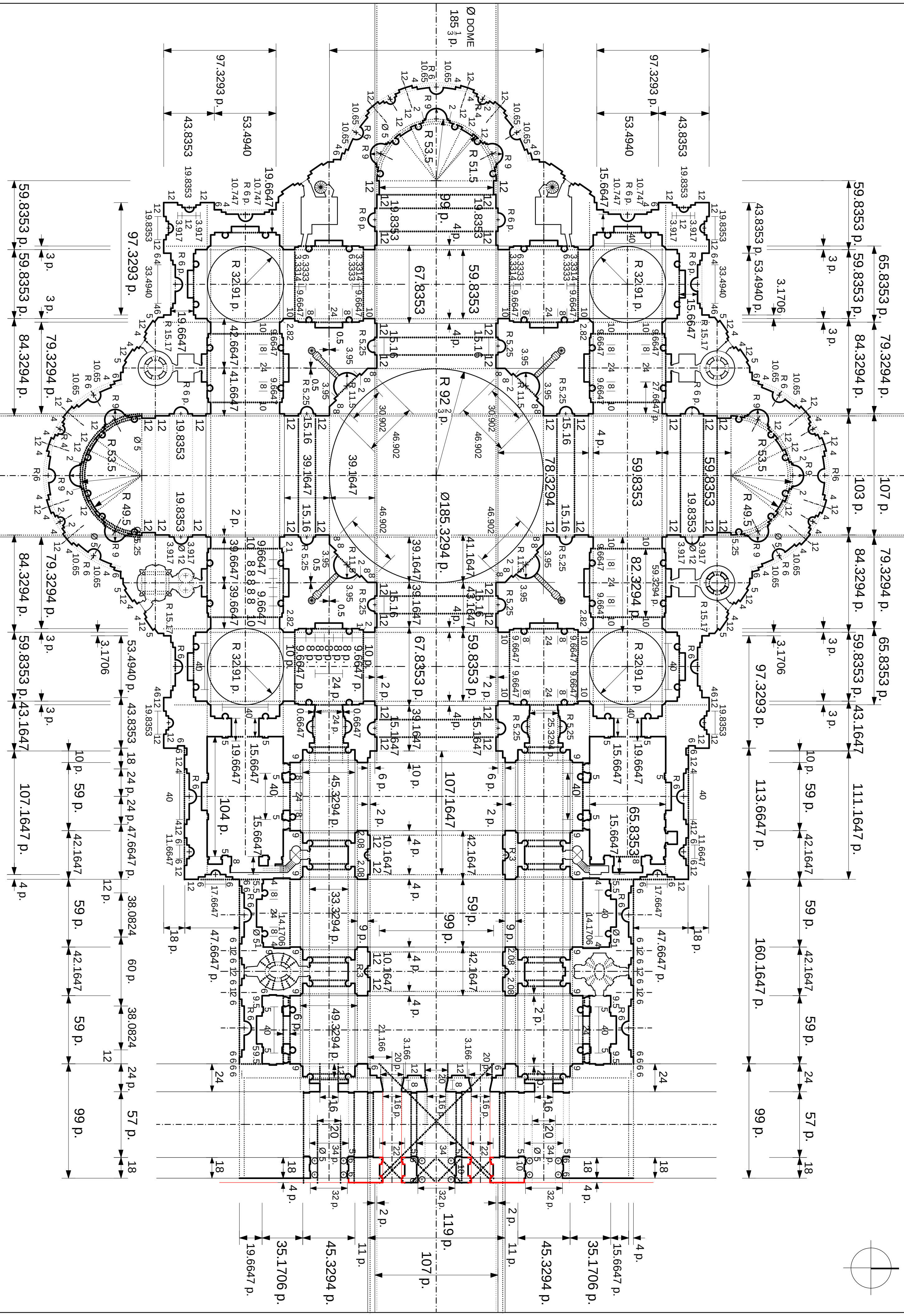
1607		MADERNO A	20

RESEARCH AND DRAWING LUIS DE GARRIDO

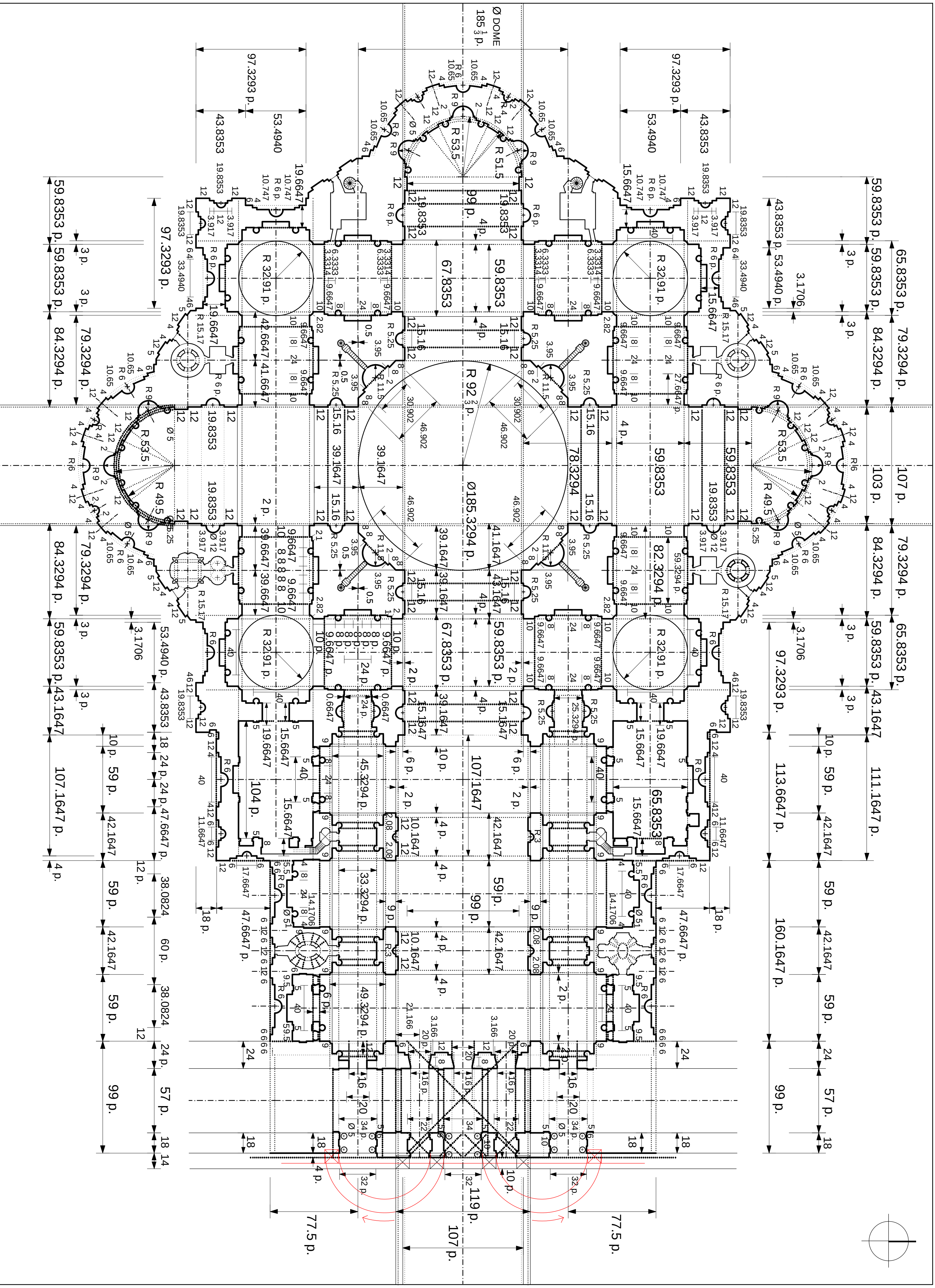


1607		MADERNO A	21

RESEARCH AND DRAWING LUIS DE GARRIDO

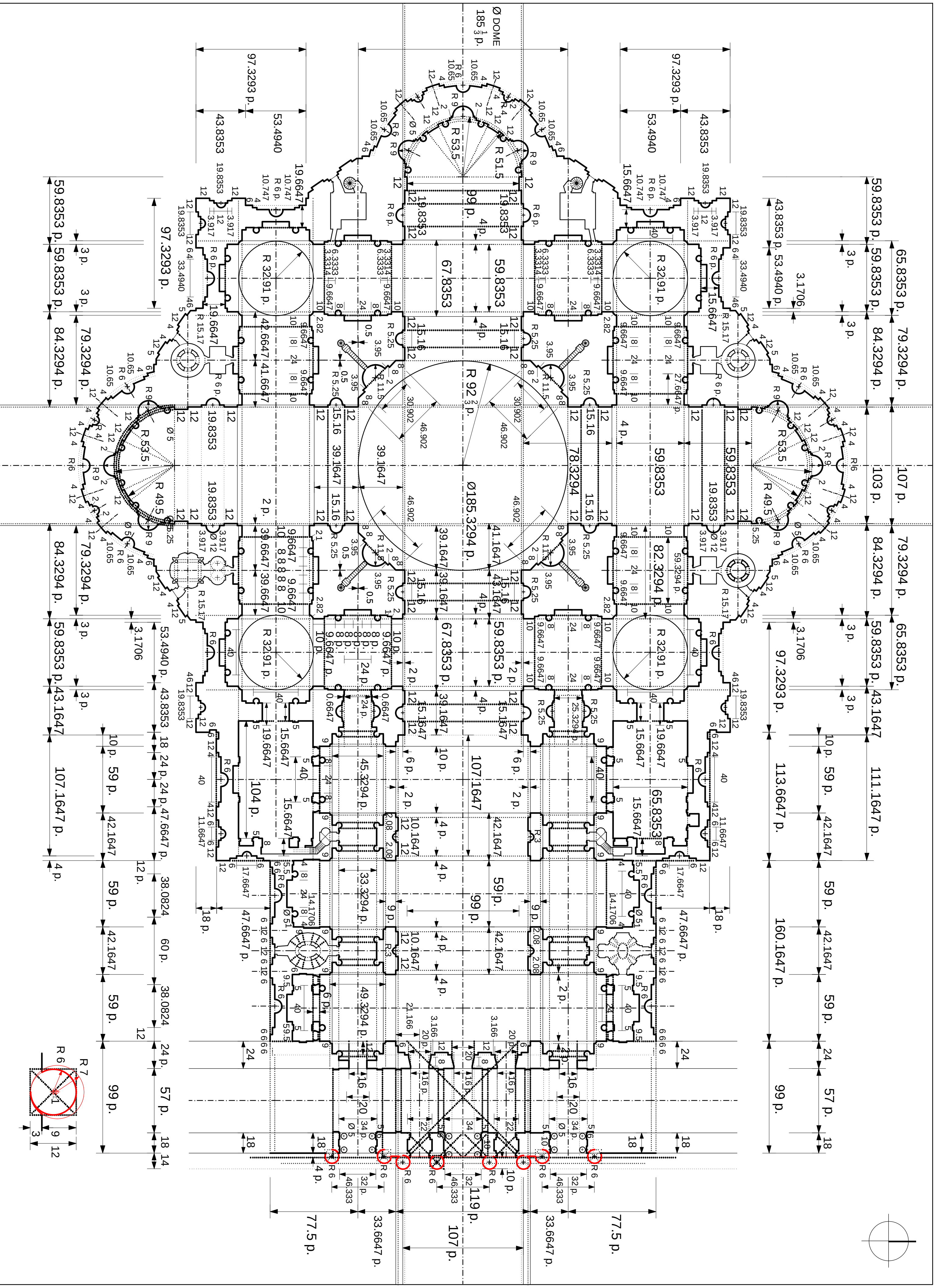


1607		MADERNO A	22



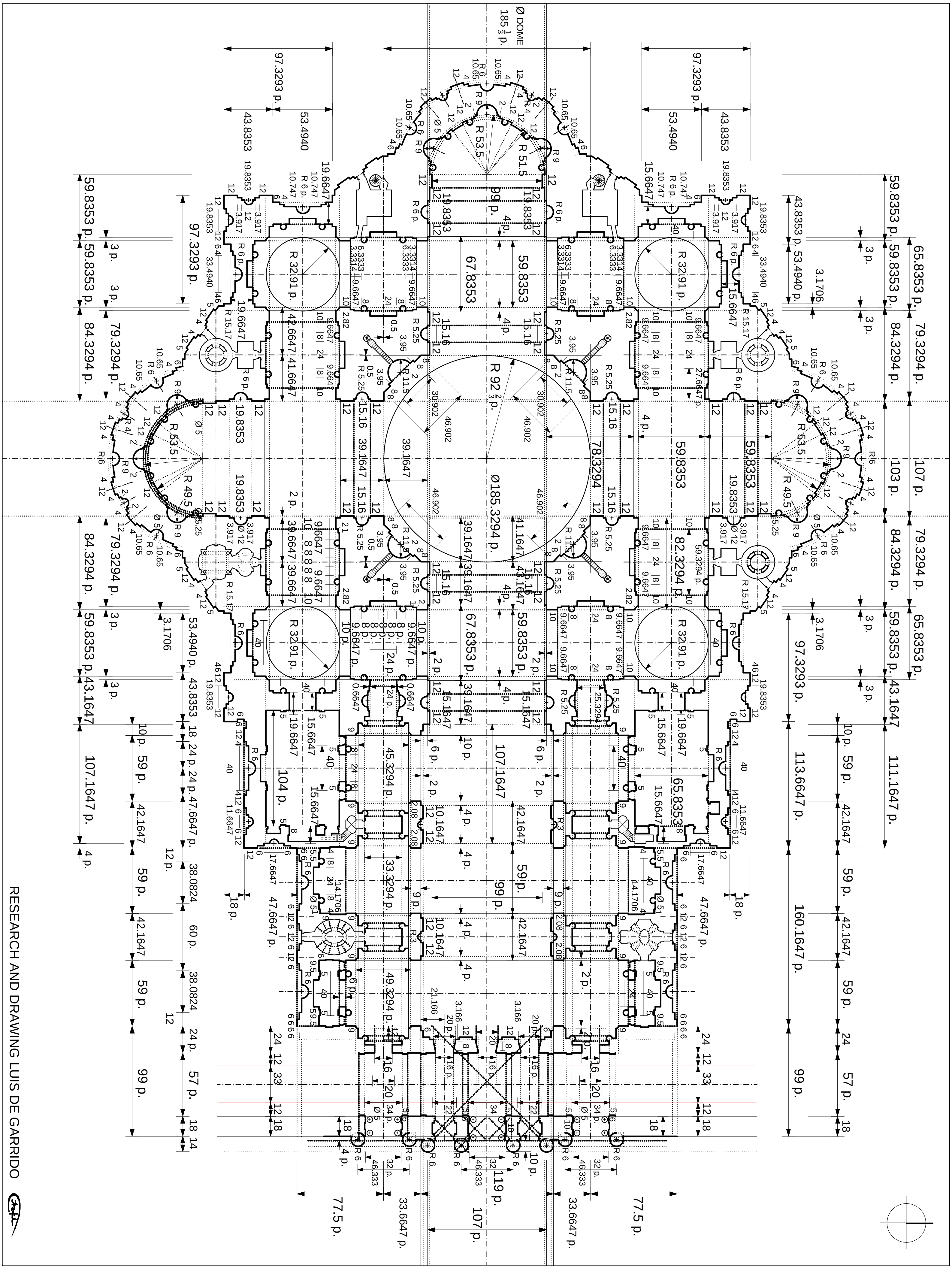
RESEARCH AND DRAWING LUIS DE GARRIDO

1607	ESTABLISHING THE LATERAL COLUMNS OF THE FACADE	MADERNO A	23

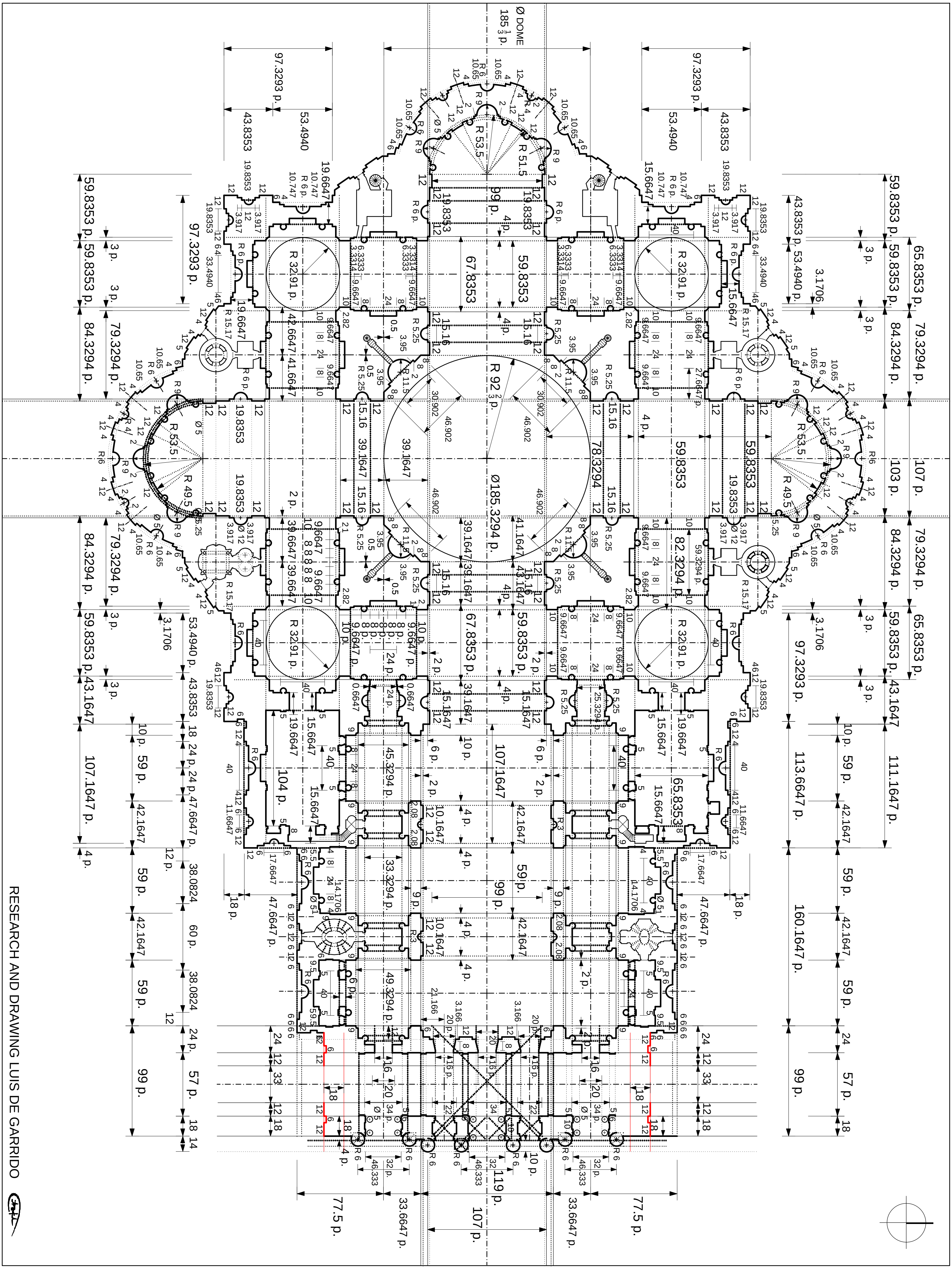


RESEARCH AND DRAWING LUIS DE GARRIDO

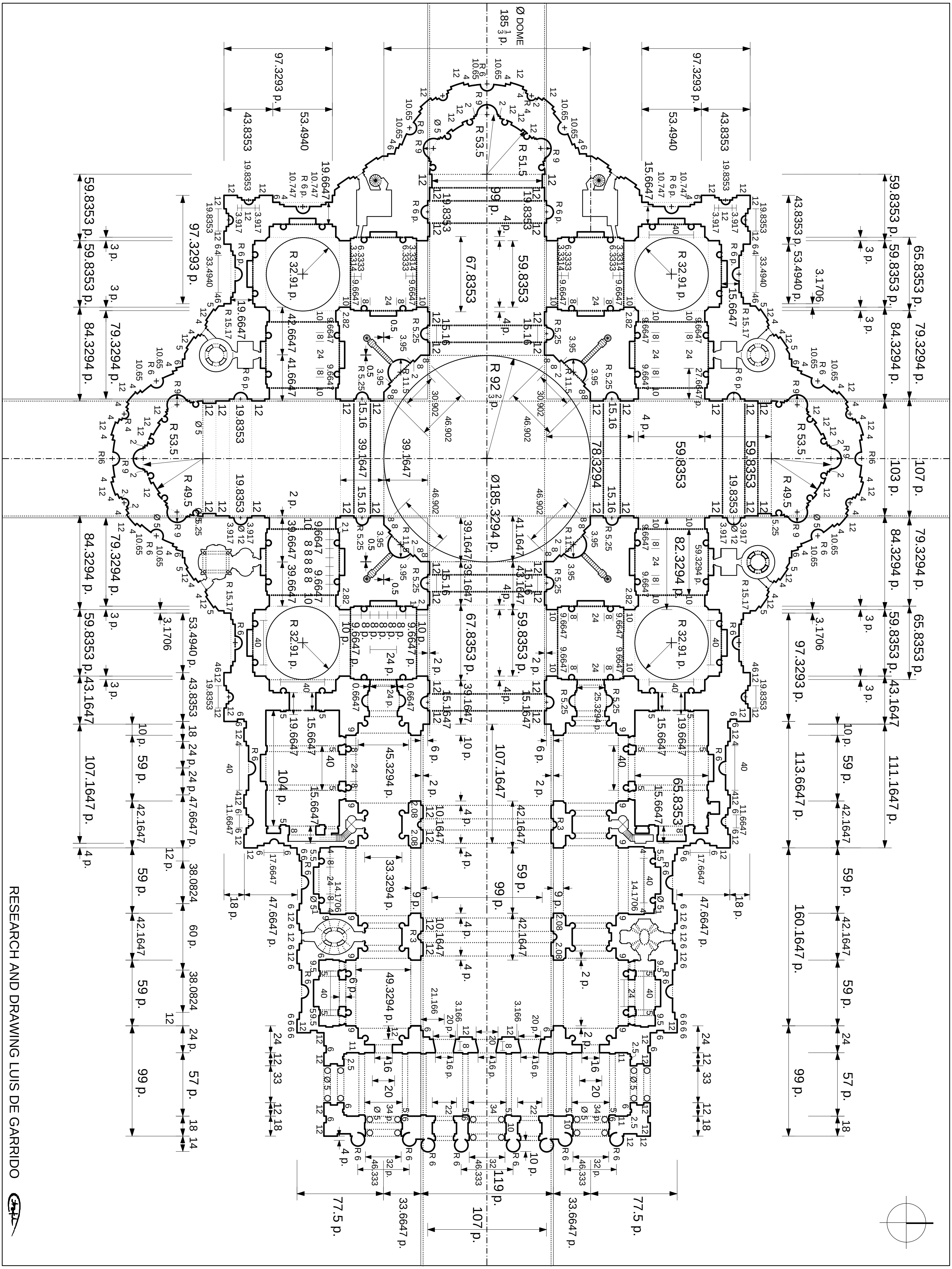
1607	ESTABLISHING THE LOCATION OF THE COLUMNS OF THE FACADE	MADERNO A	24



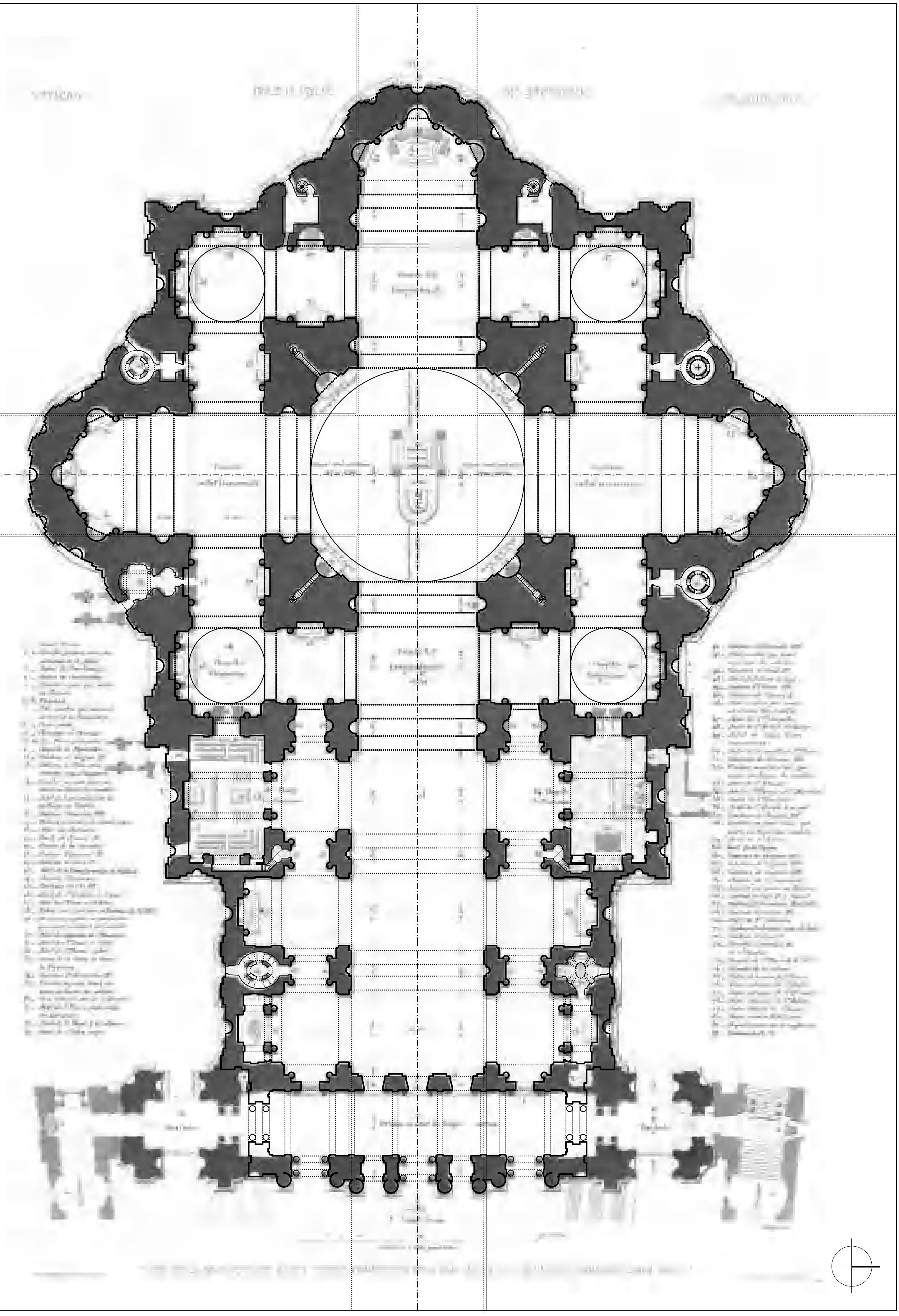
1607		MADERNO A	25



1607		MADERNO A	26

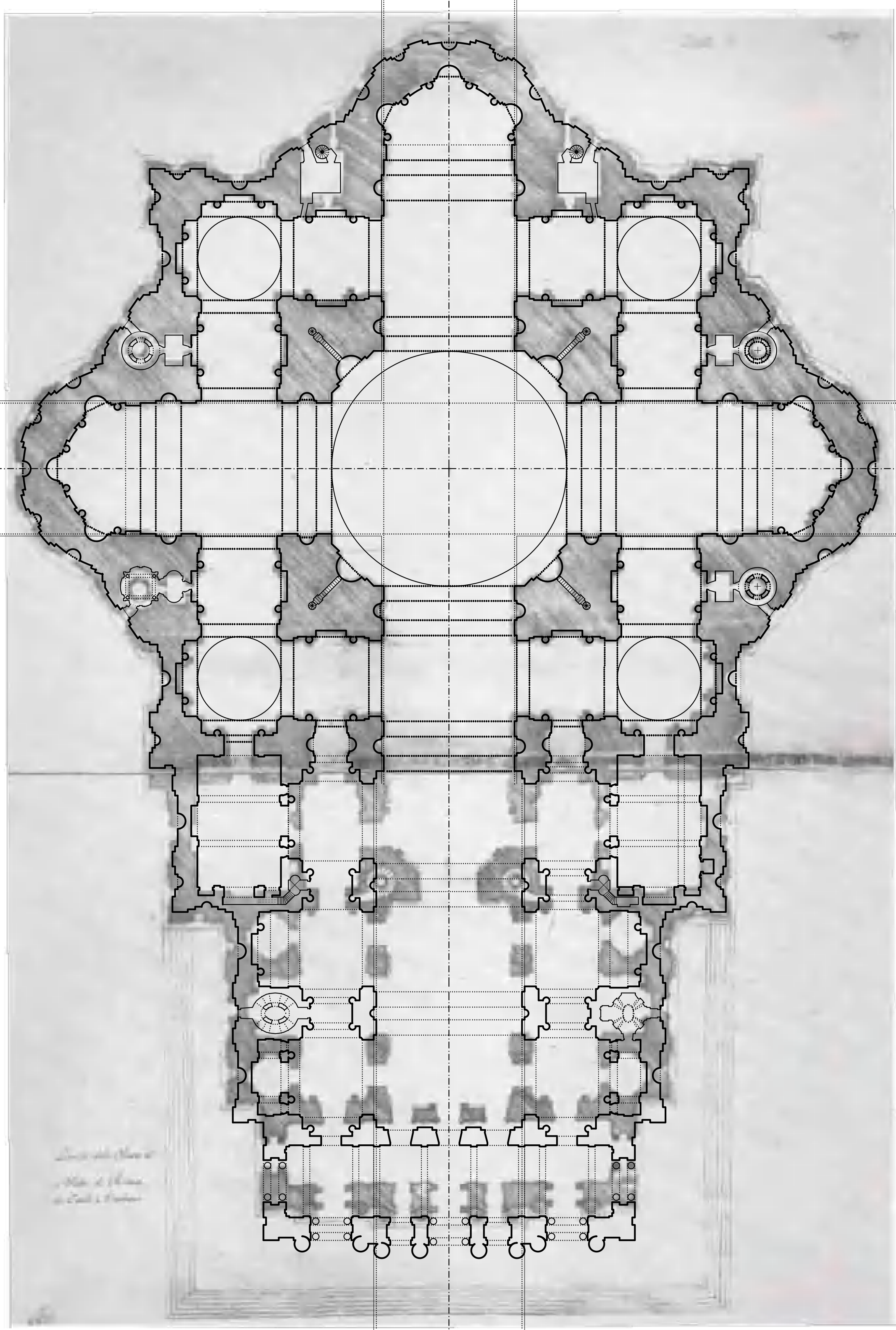


1607	EXECUTIVE PROJECT BY CARLO MADERNO RECONSTRUCTED	MADERNO A	27



RESEARCH AND DRAWING LUIS DE GARRIDO

1607	RECONSTRUCTED EXECUTIVE PROJECT OVERLAY WITH LETAROUILLY PLANE	MADERNO A	28

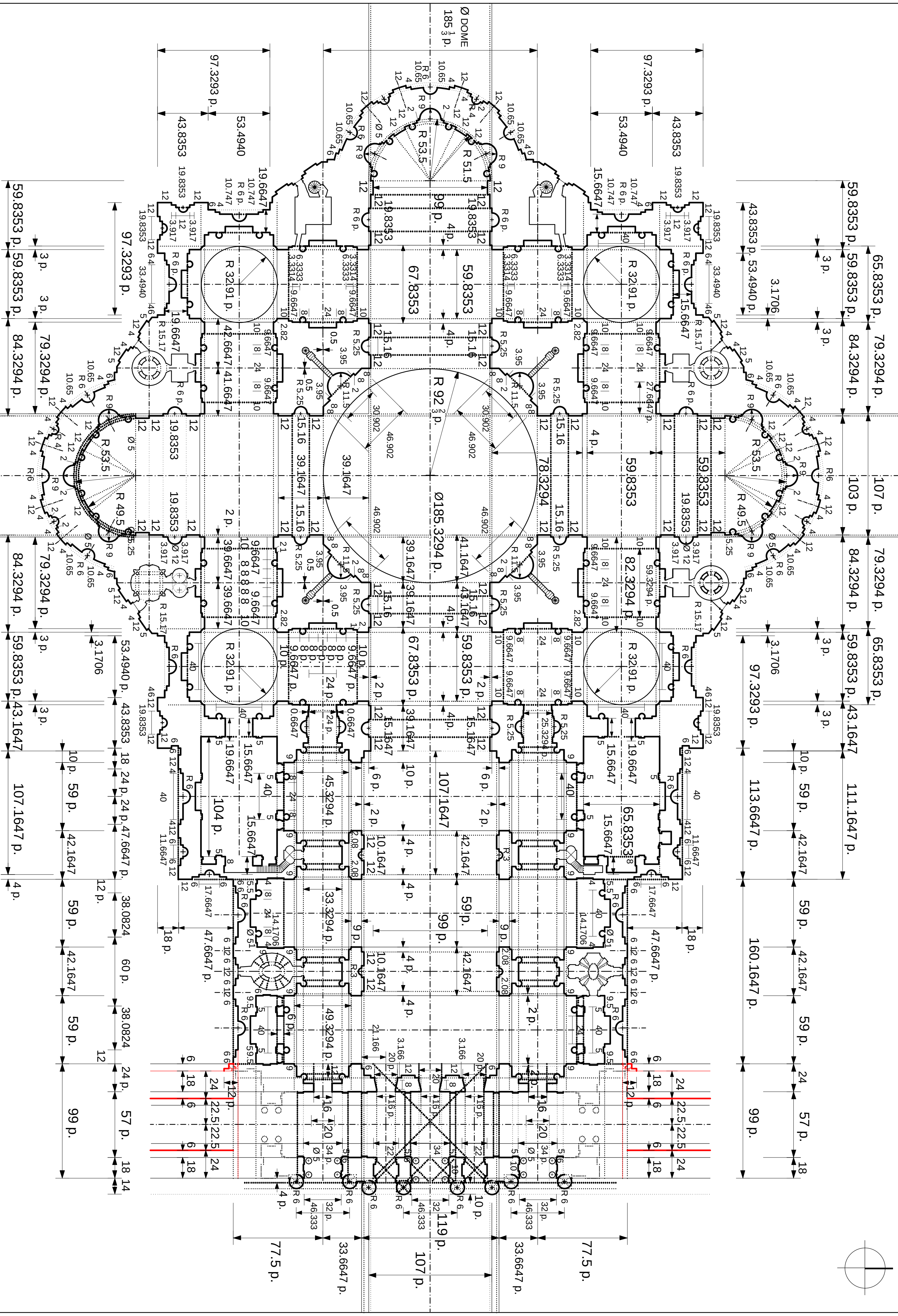


RESEARCH AND DRAWING LUIS DE GARRIDO

1607	RECONSTRUCTED EXECUTIVE PROJECT OVERLAY WITH GDSU 264 A BY MADERNO	MADERNO A	29

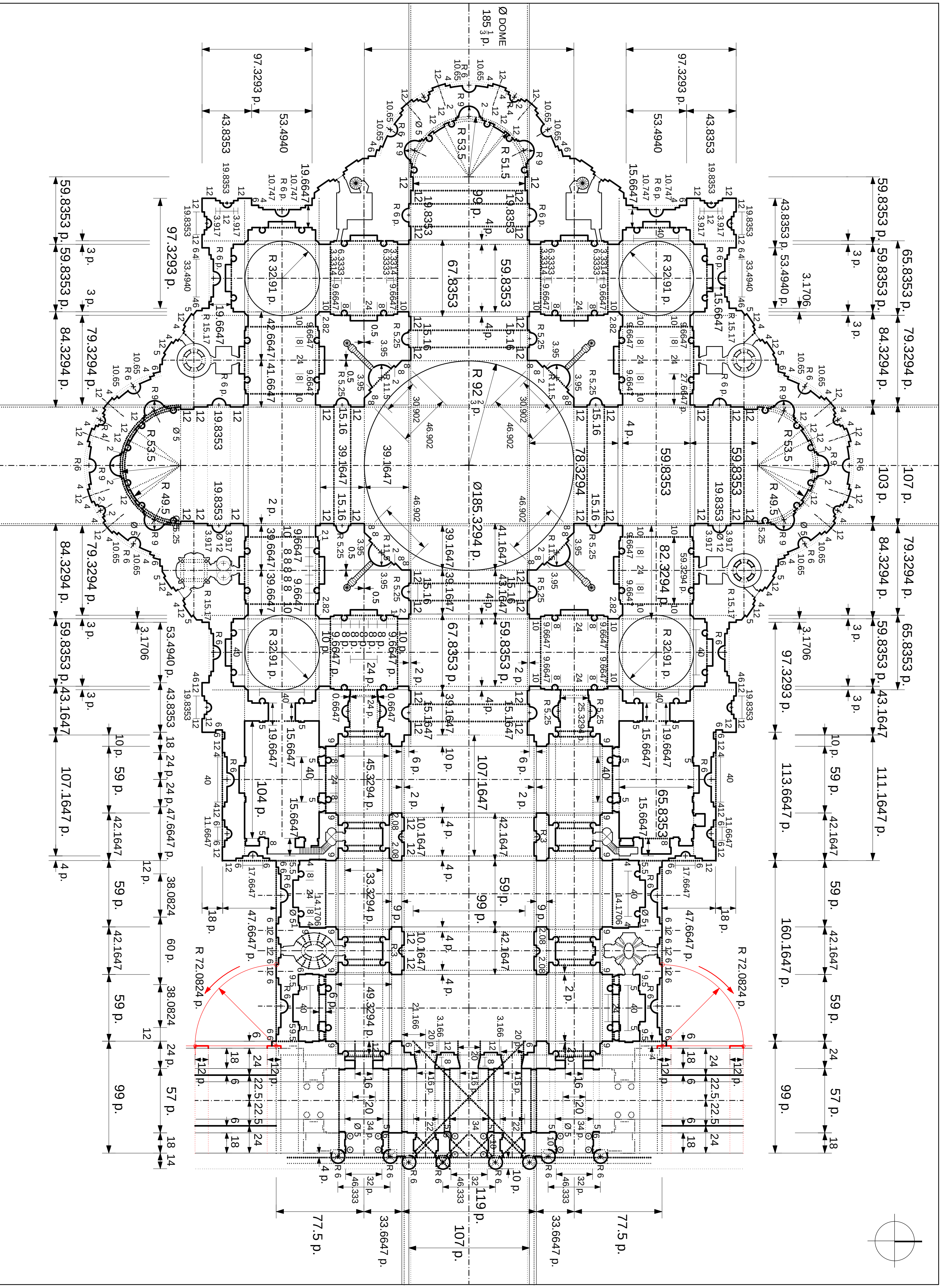
RECONSTRUCTION BY STAGES OF THE DESIGN PROCESS OF THE EXECUTIVE PROJECT OF 1612 BY MADERNO

ACCORDING TO MATTHEUS GREUTER DRAWING (1613)



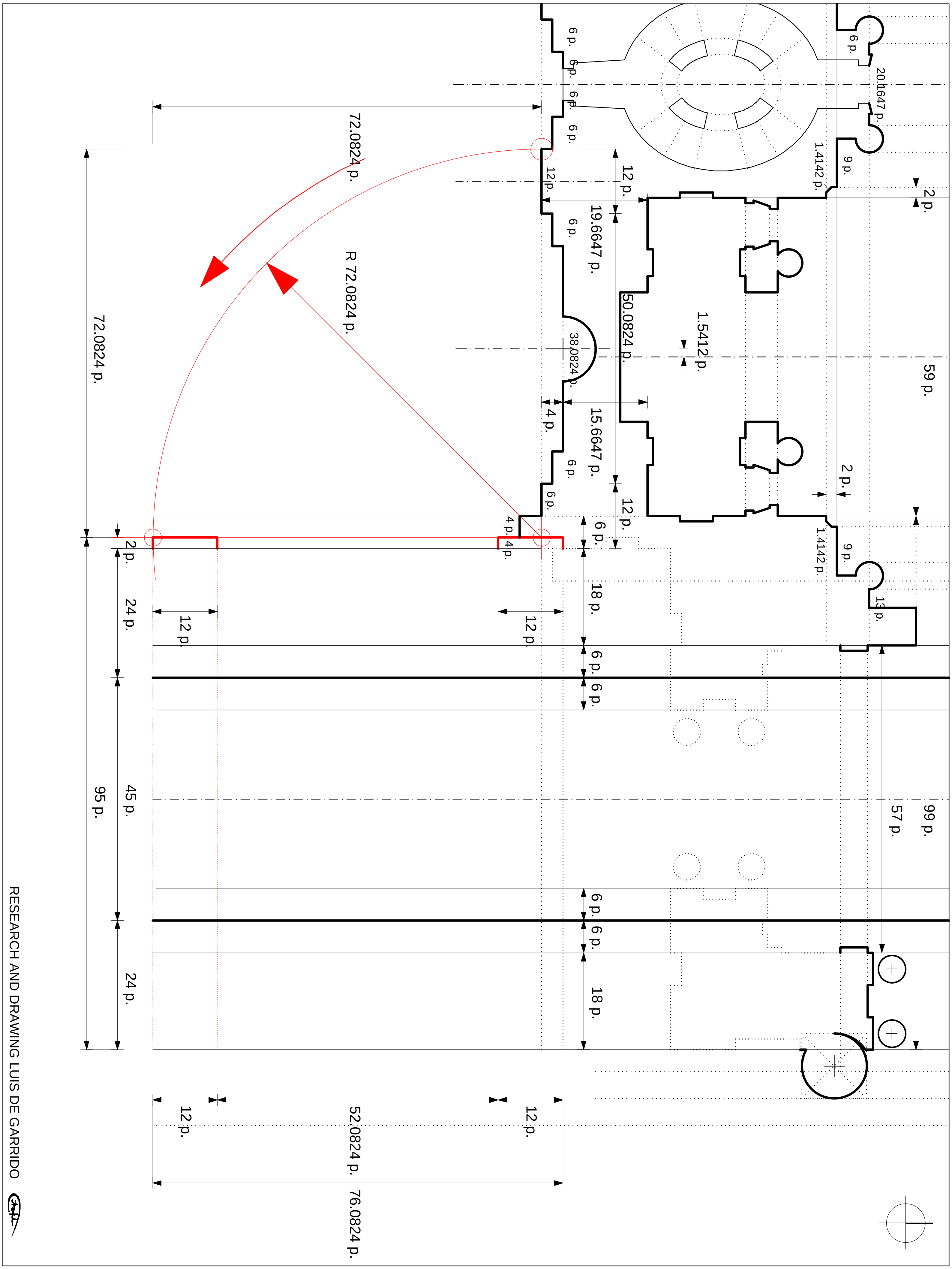
RESEARCH AND DRAWING LUIS DE GARRIDO

1607		MADERNO B	1

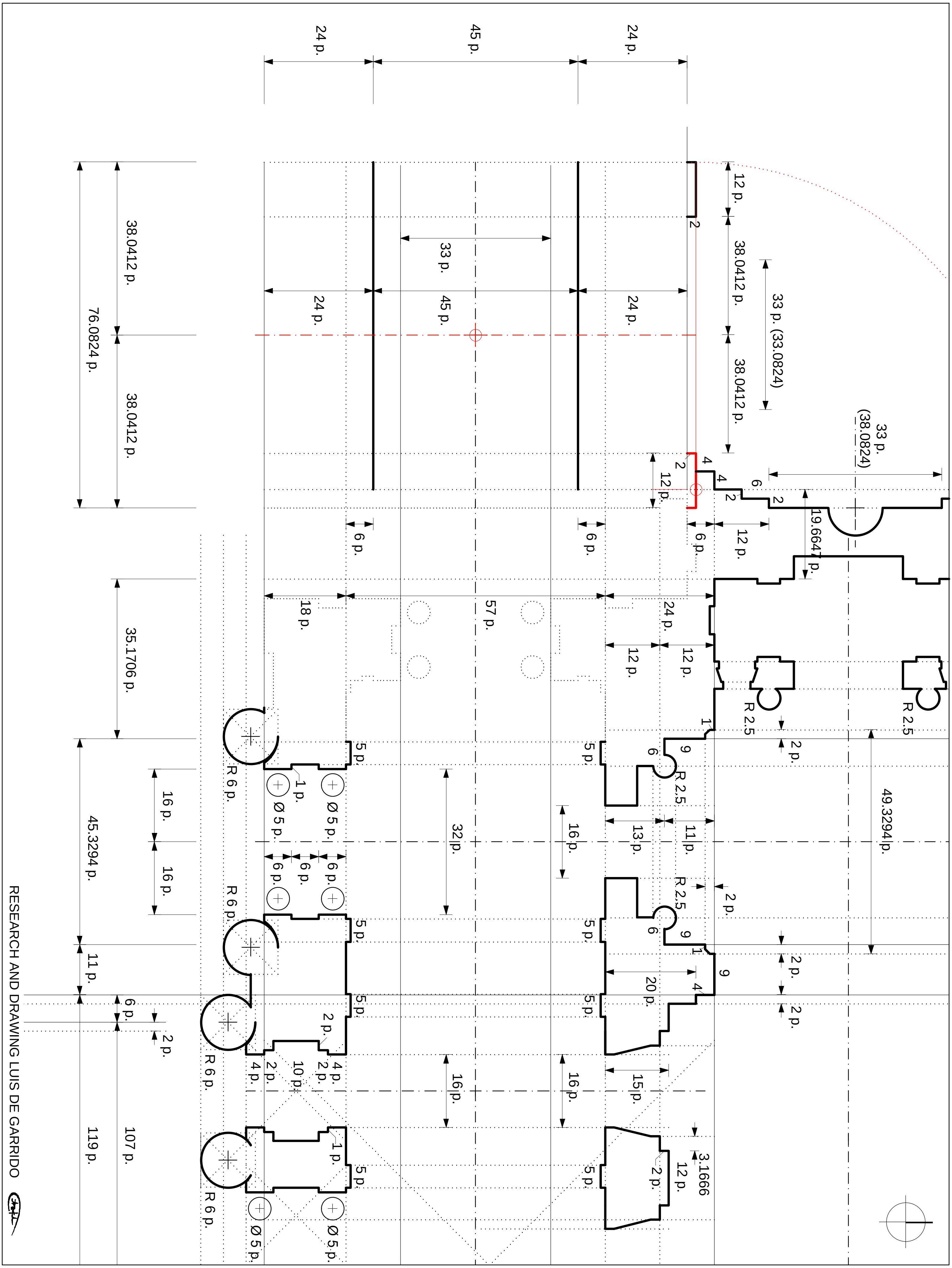


RESEARCH AND DRAWING LUIS DE GARRIDO

1607		MADERNO B	2



1607		MADERNO B	3



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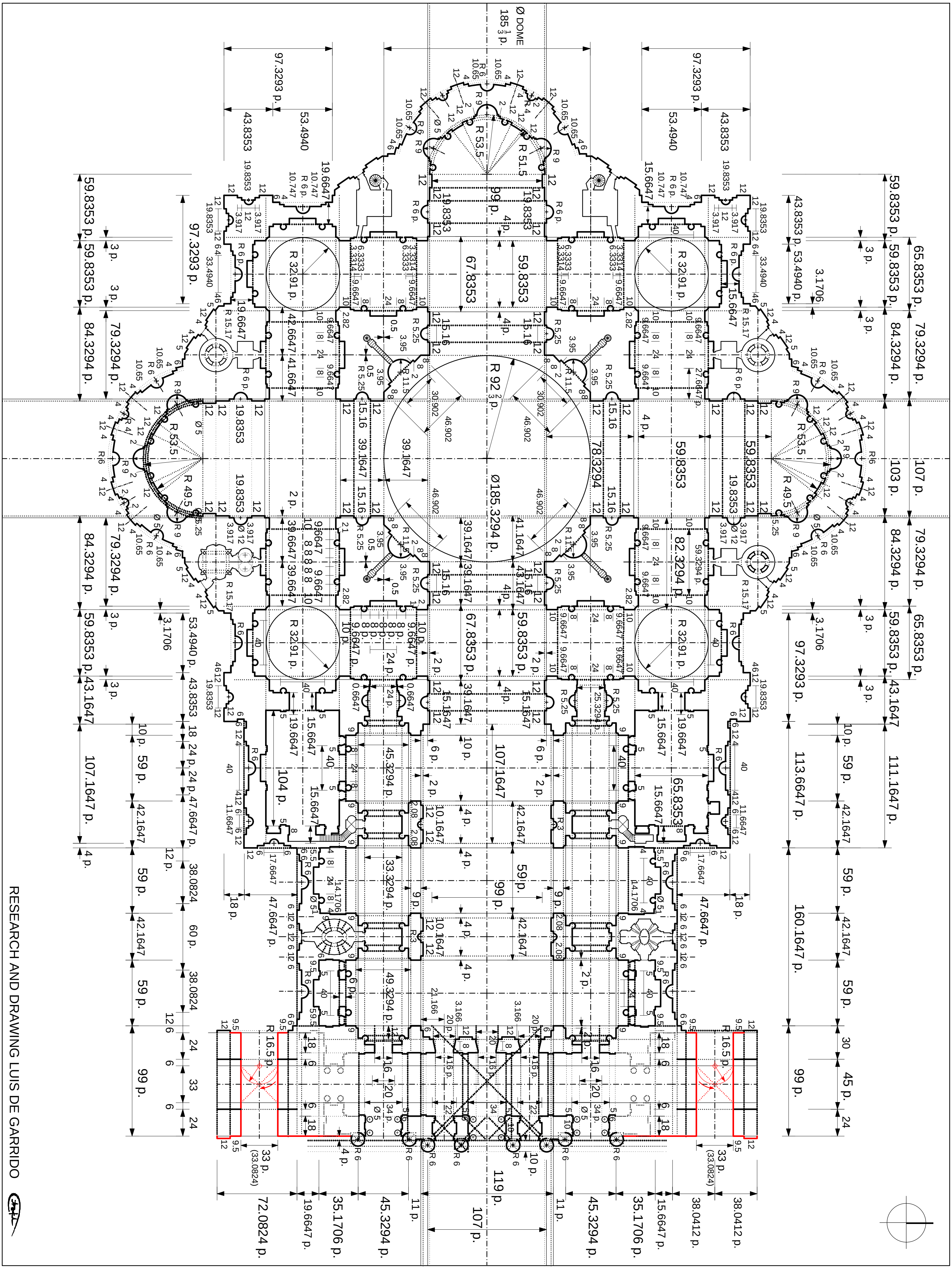

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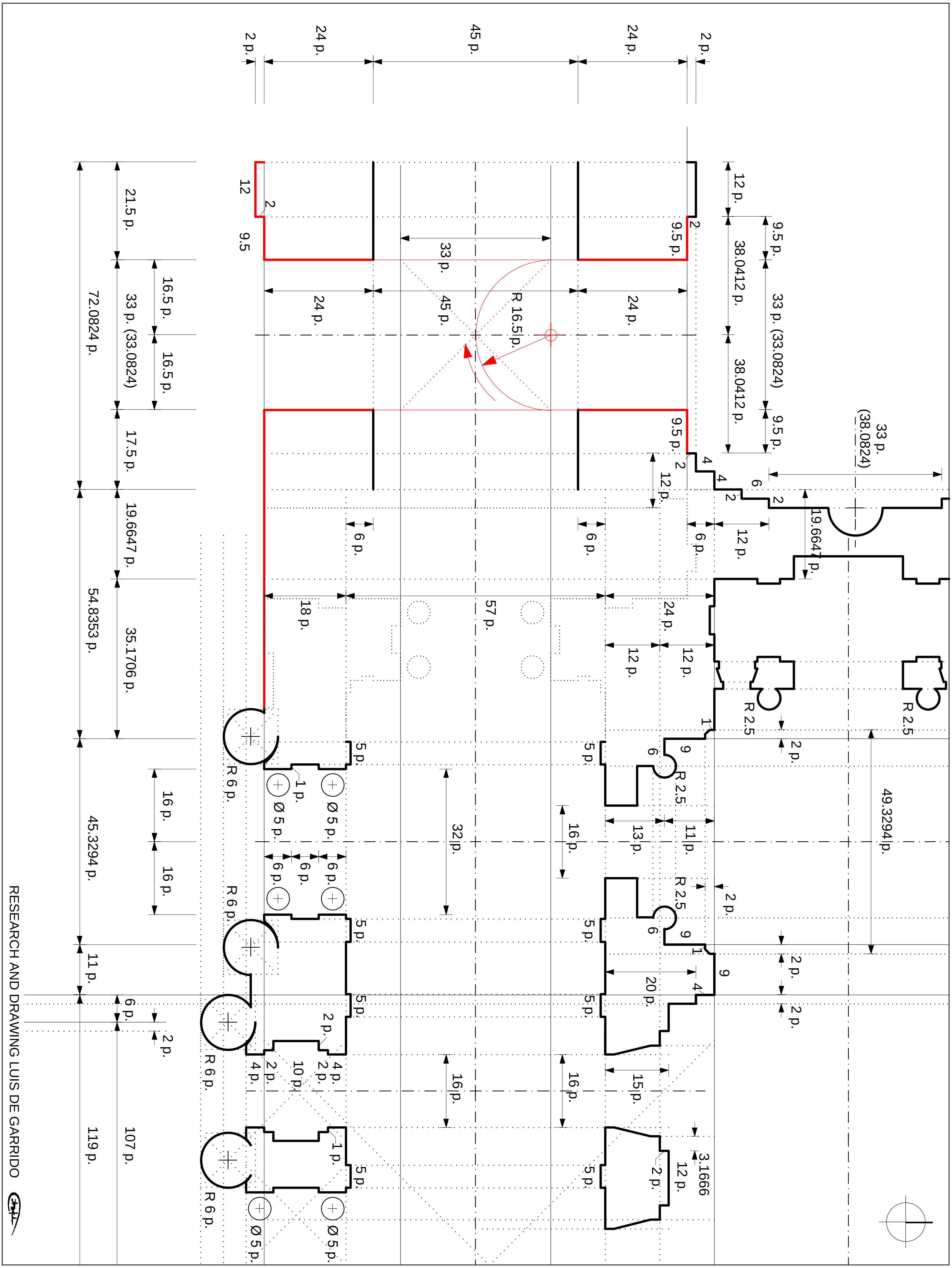

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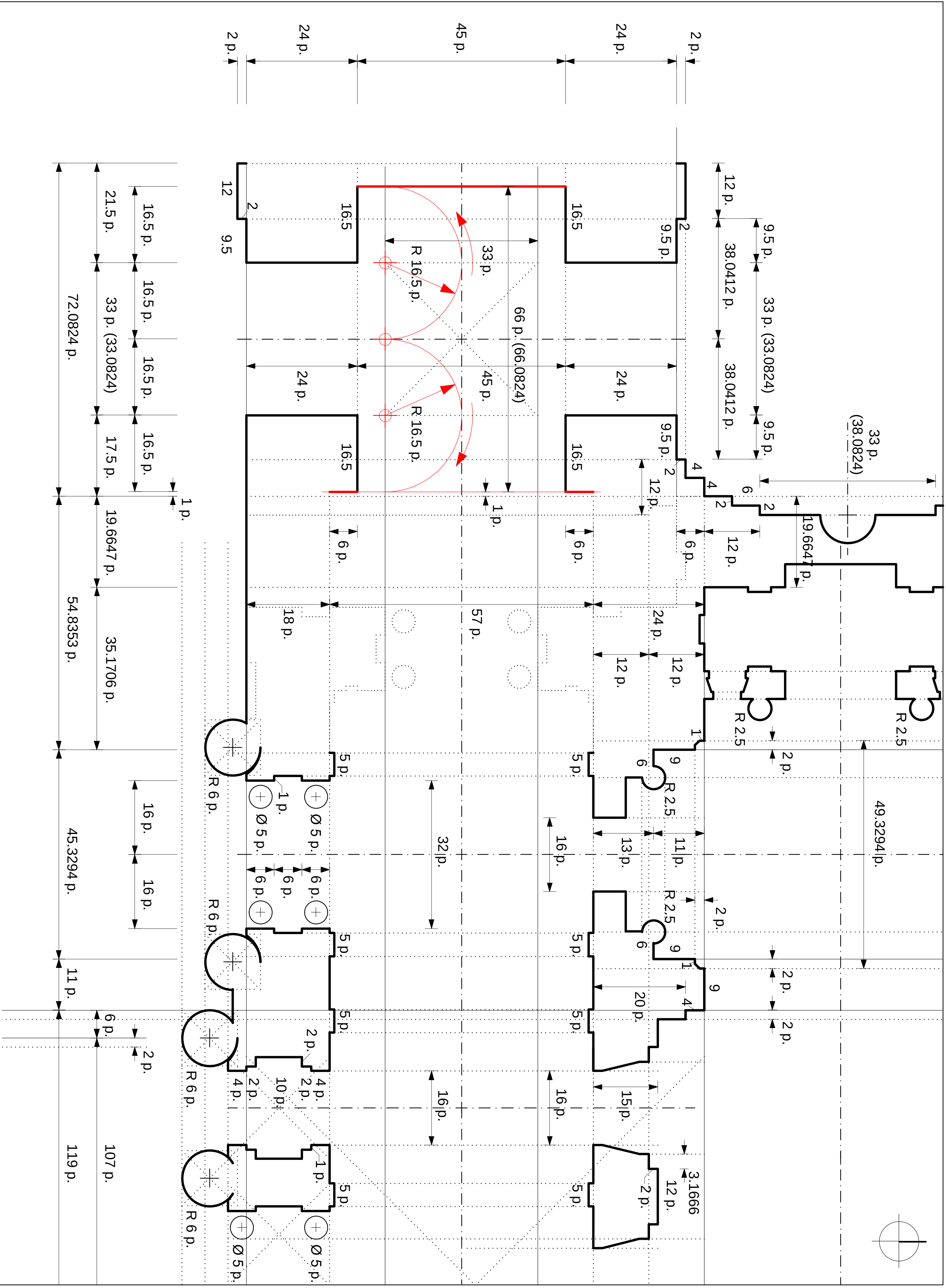
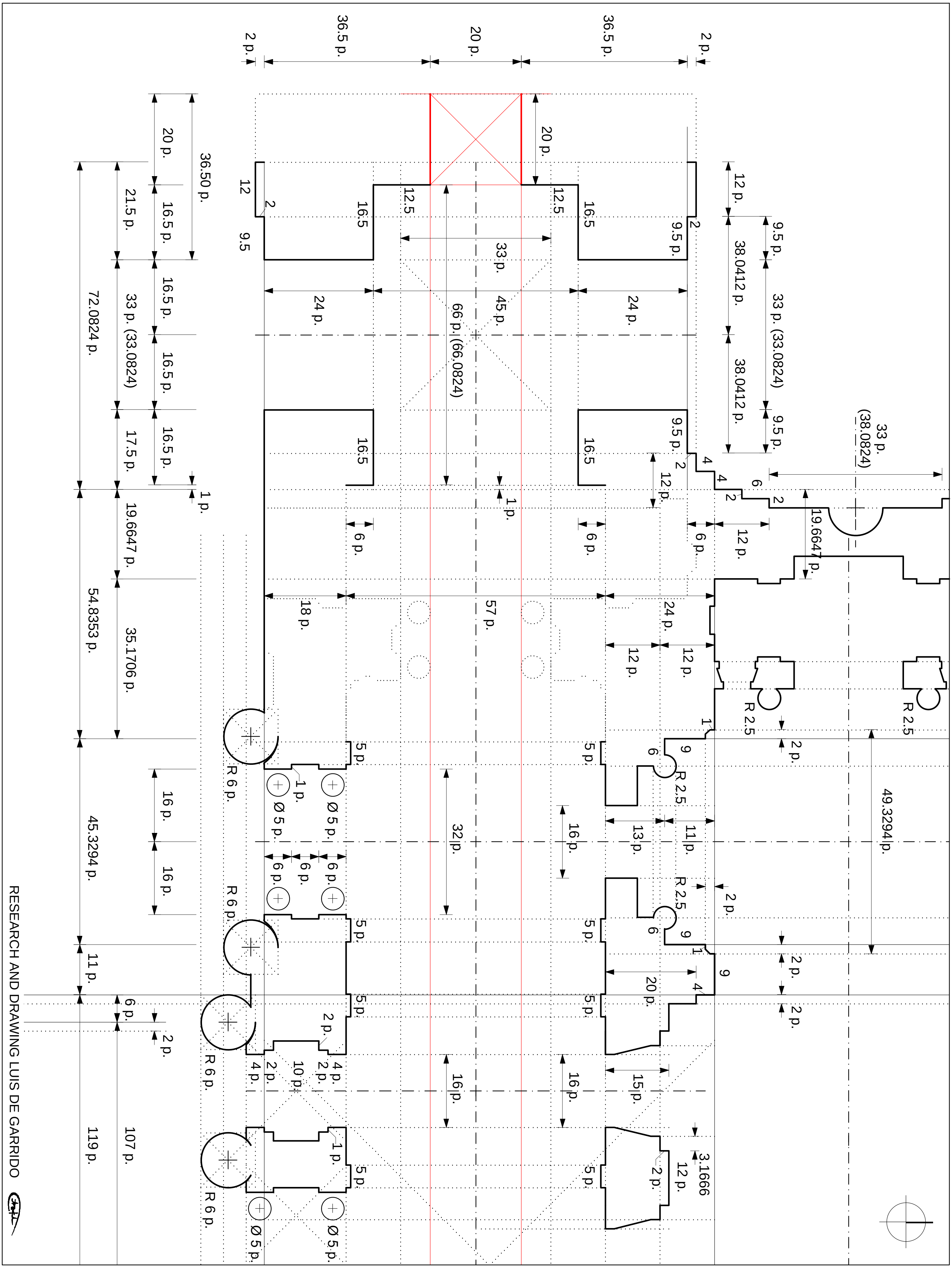


RESEARCH AND DRAWING LUIS DE GARRIDO



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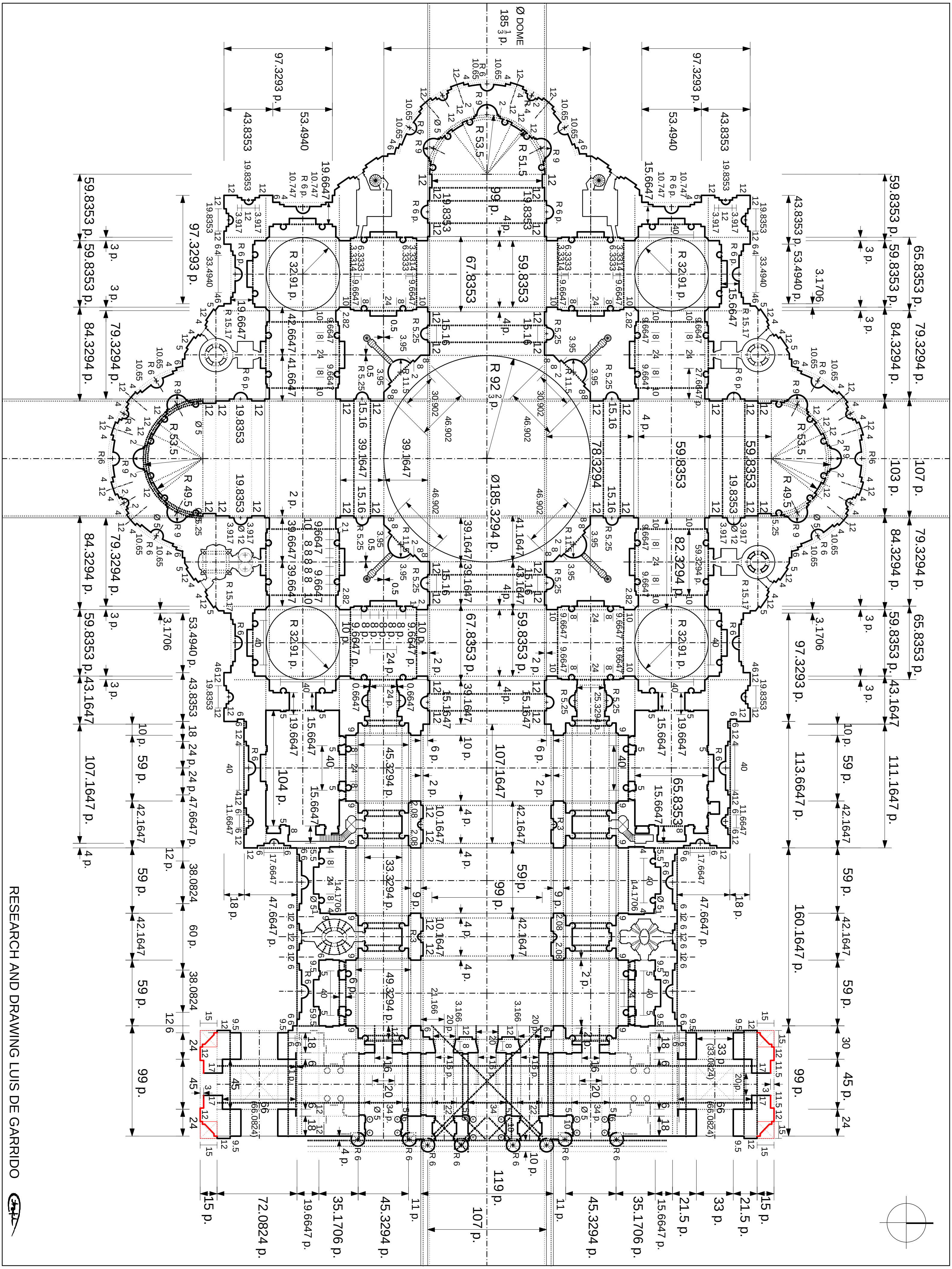

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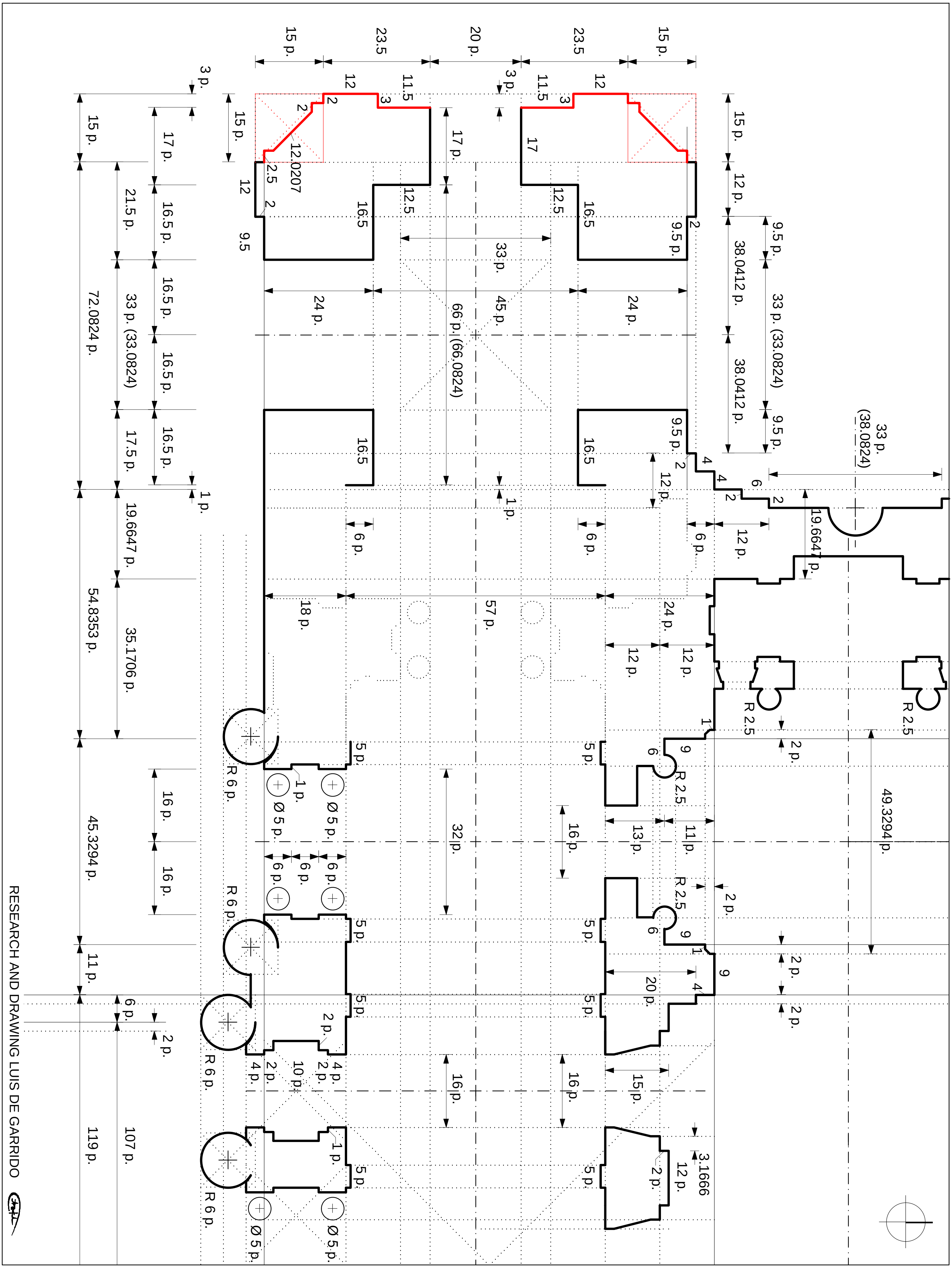
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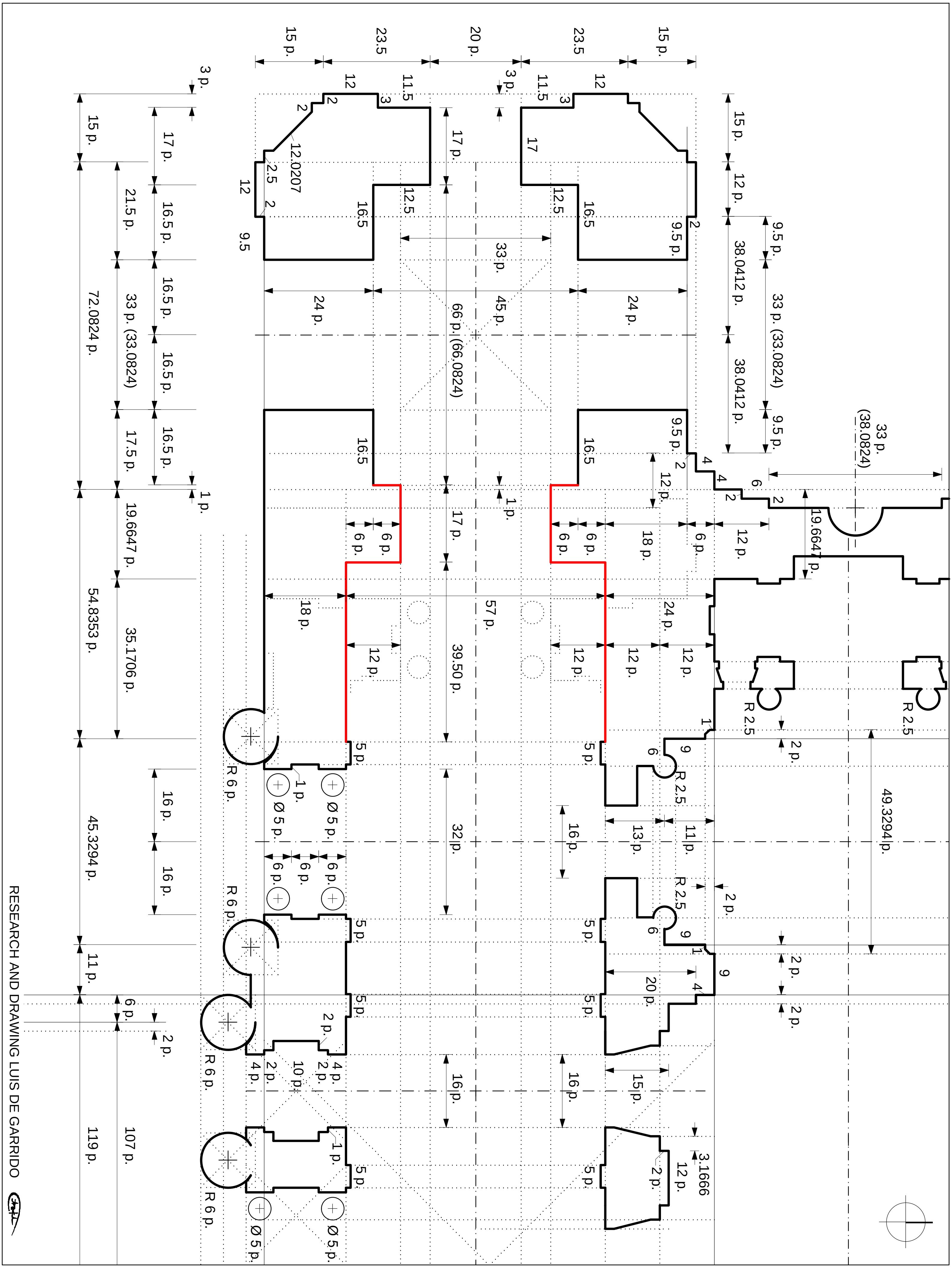

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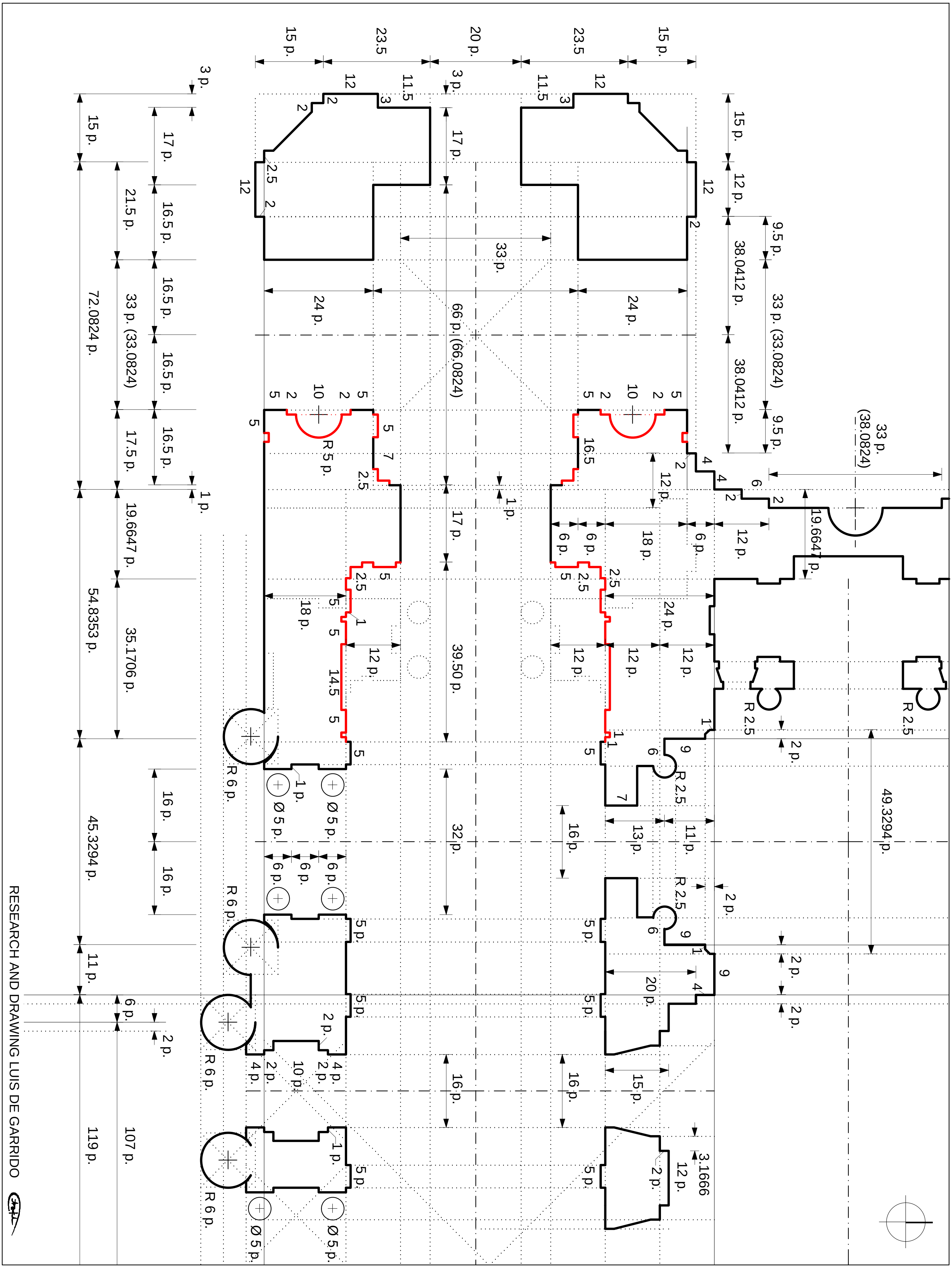
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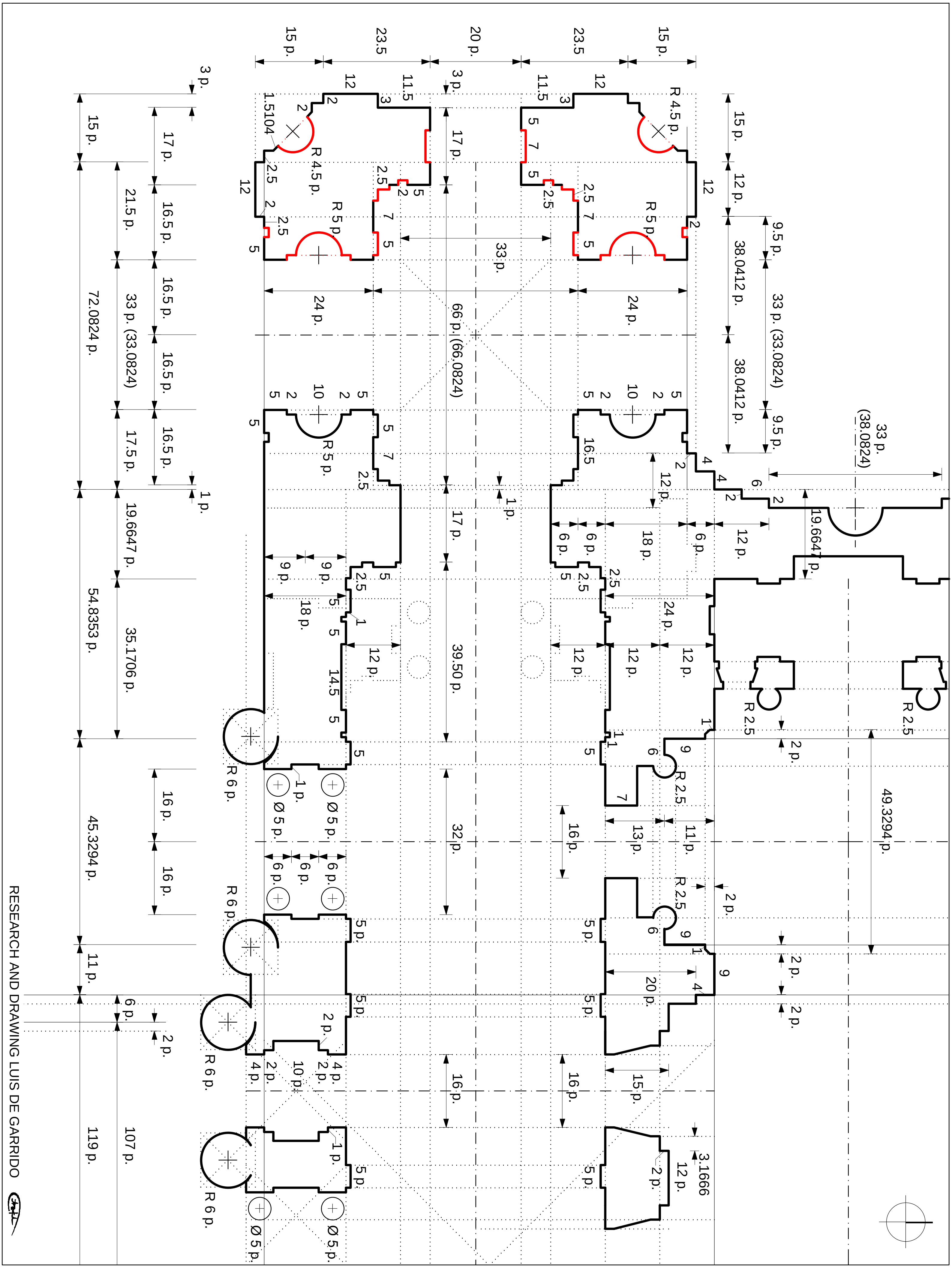
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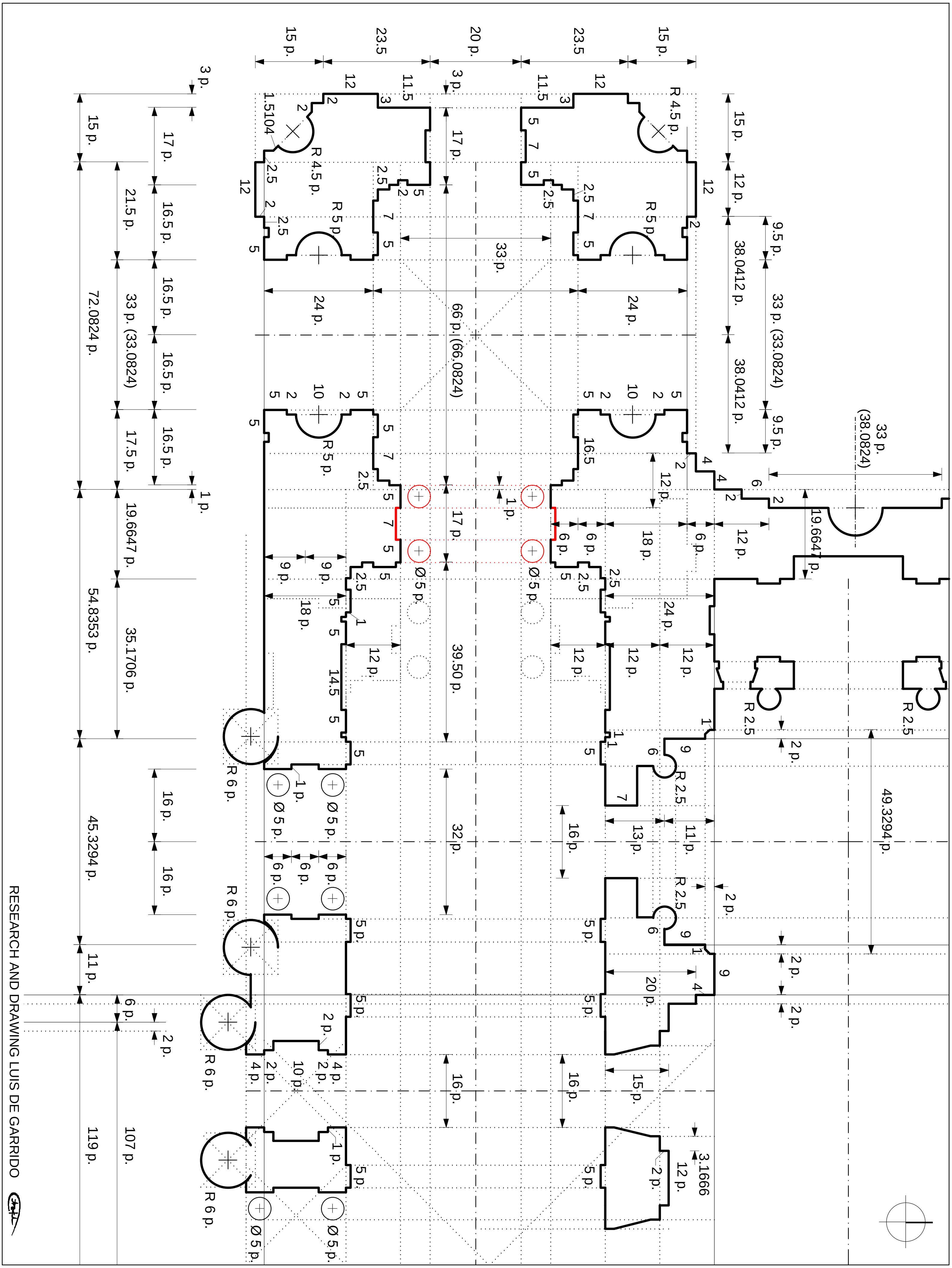
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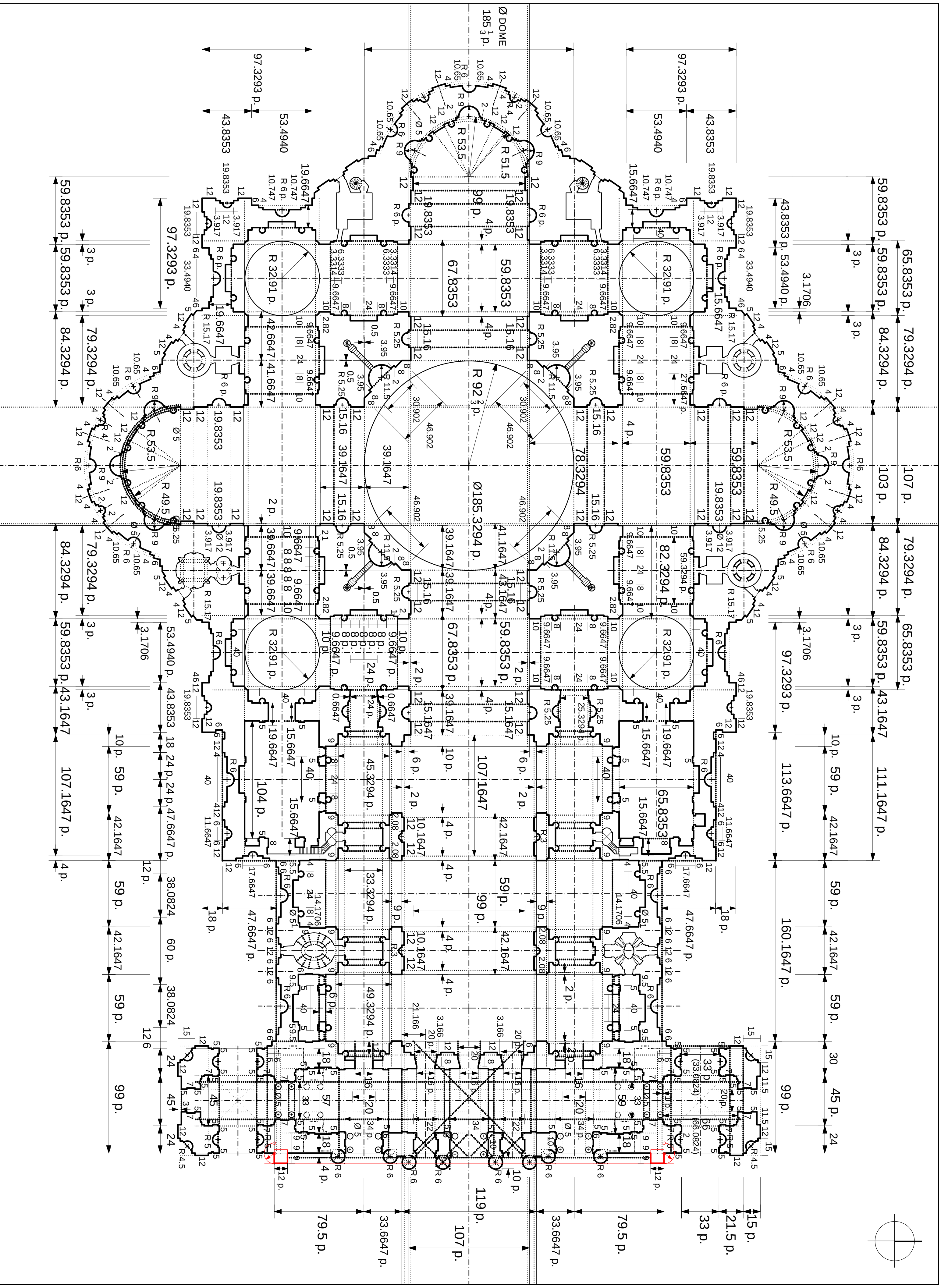

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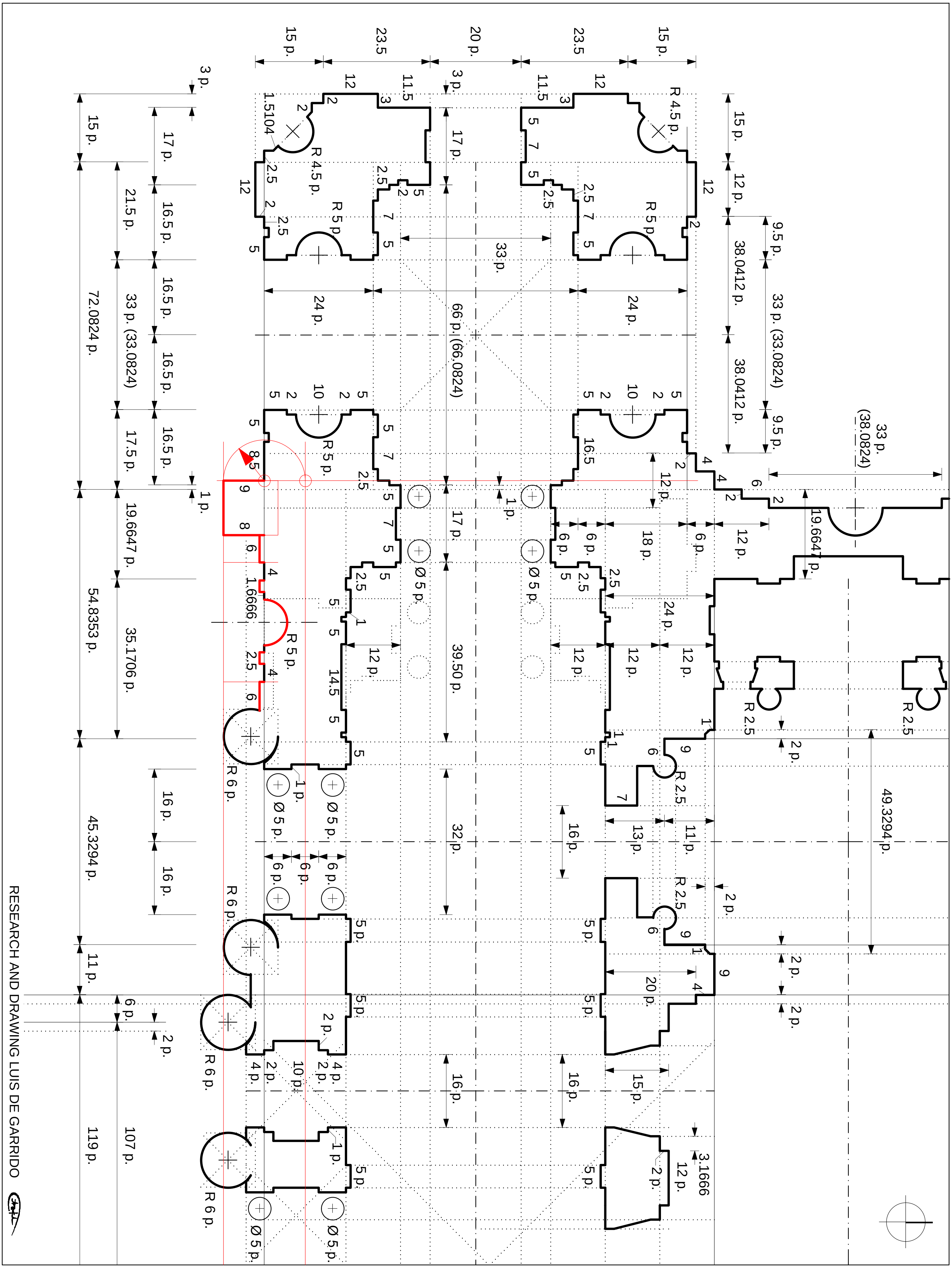
1607		MADERNO B	15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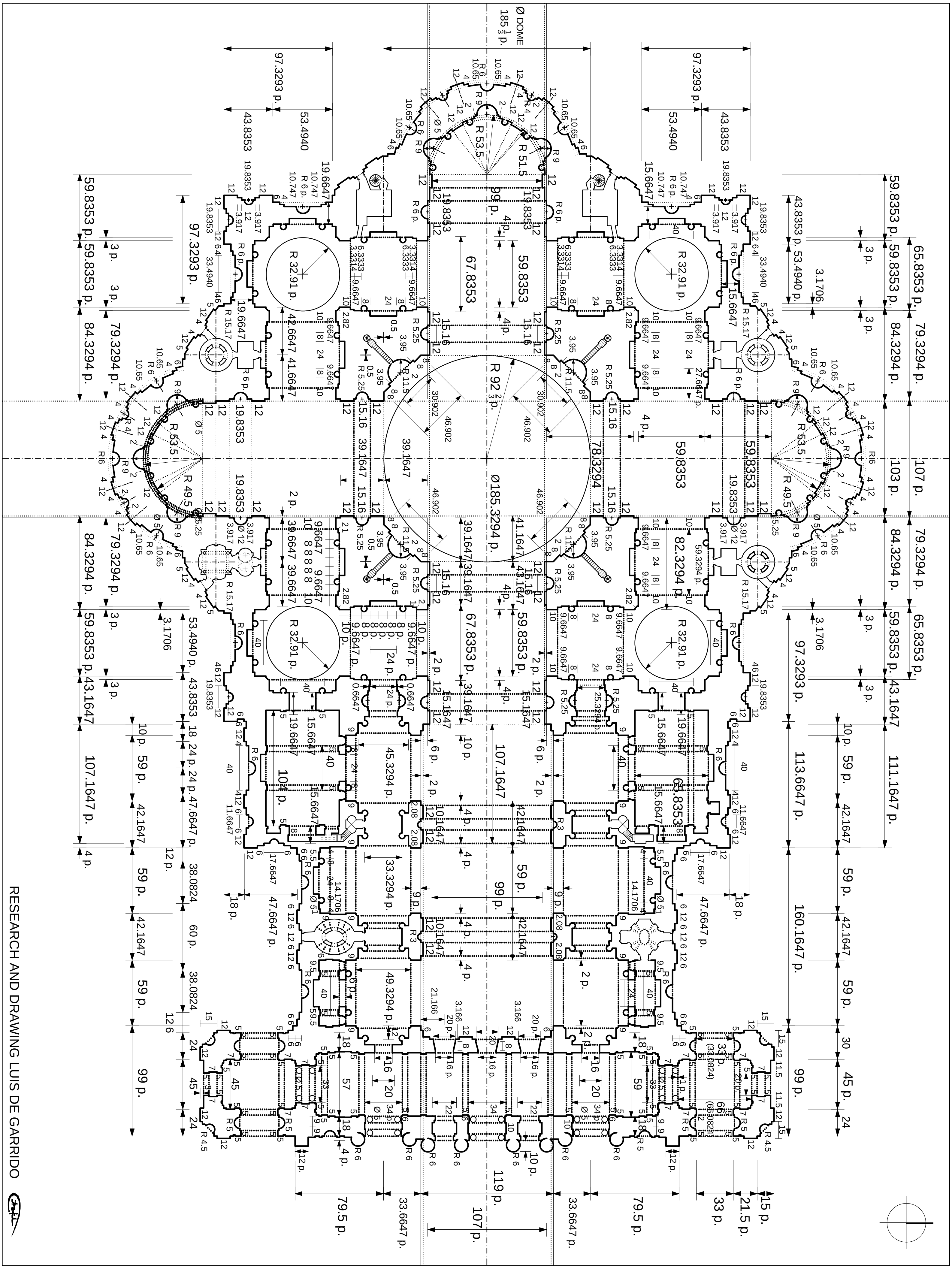
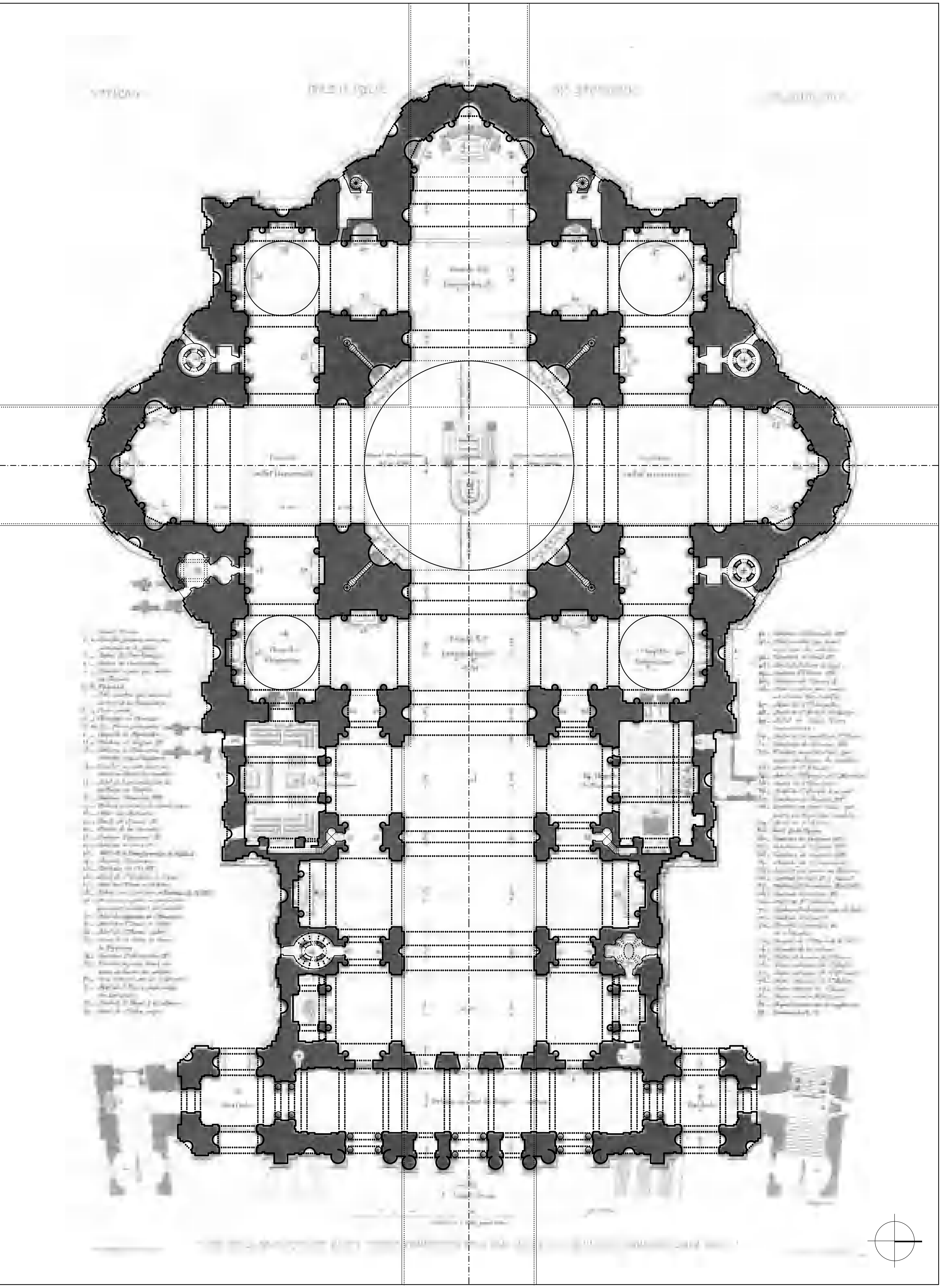
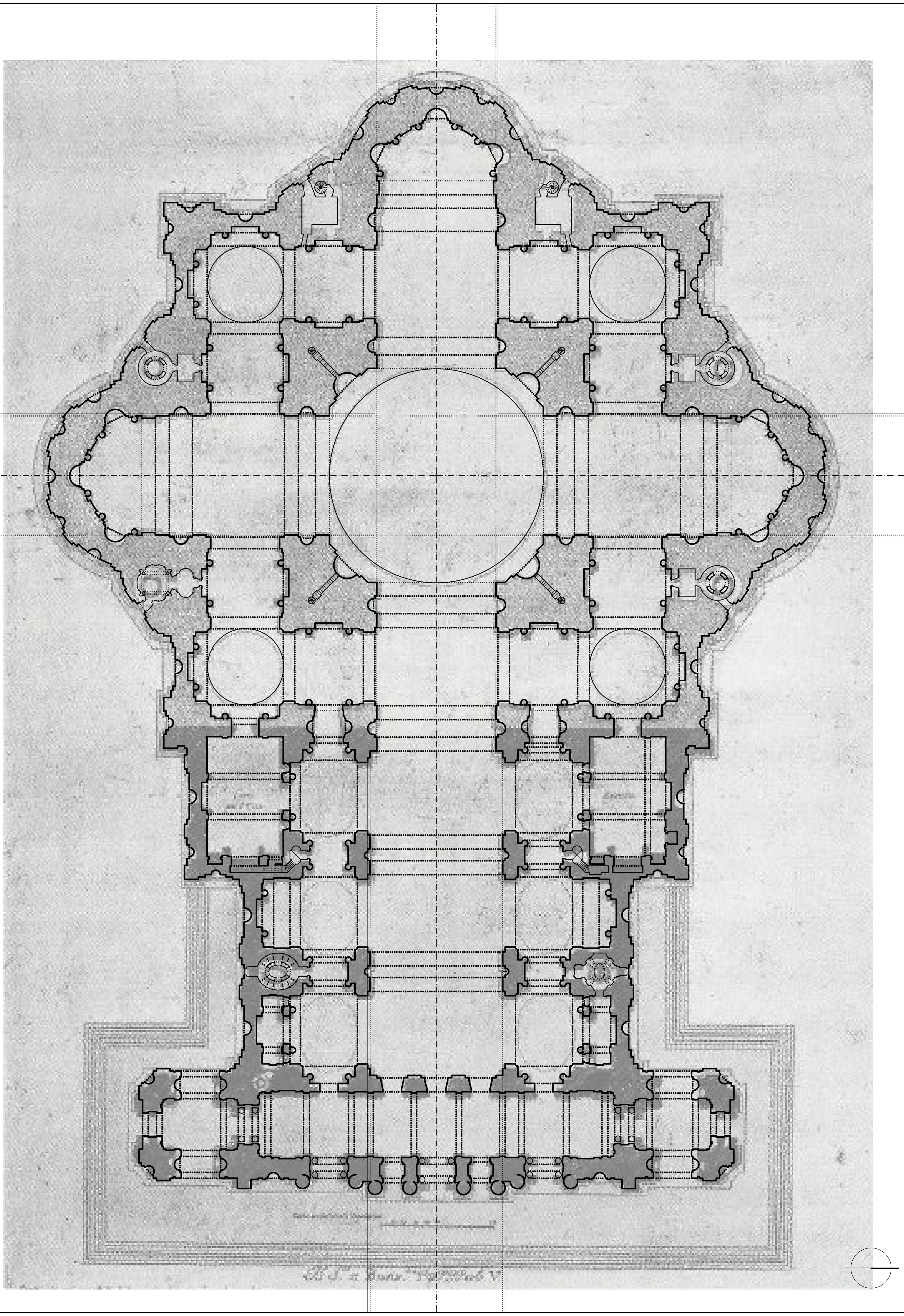


1607	EXECUTIVE PROJECT BY CARLO MADERNO RECONSTRUCTED	MADERNO B	17



RESEARCH AND DRAWING LUIS DE GARRIDO

1607	RECONSTRUCTED EXECUTIVE PROJECT OVERLAY WITH LETAROUILLY PLANE	MADERNO B	18



RESEARCH AND DRAWING LUIS DE GARRIDO

1607	RECONSTRUCTED EXECUTIVE PROJECT OVERLAY WITH GREUTER PLANE	MADERNO B	19

CHAPTER 9

"*Il più grande pericolo per molti di noi non sta nel fatto che i nostri obiettivi siano troppo elevati e quindi non riusciamo a raggiungerli, ma nel fatto che siano troppo bassi e che li si raggiunga*"

Michelangelo

Chapter 9. Graphic reconstruction, description and justification, of the most significant stages of the construction process of the new basilica of S. Peter

As discussed in the two previous chapters, the design and construction process of the new Basilica of St. Peter was very complex, and lasted about 200 years, from the mandate of Pope Nicholas V (1447-1455) until Pope Alexander VII (1655-1667).

The new basilica was taking shape by building partial elements of several different projects, carried out by several architects consecutively, who were forced to compete and collaborate with each other. In some periods of history, parts of the new building were even demolished because they didn´t fit in with the new projects at the time. Sometimes the construction was very fast, and sometimes it was extremely slow. As a result, it is very difficult to get a good idea of the complex design and construction process of the new St. Peter's Basilica.

In the previous chapter, the design process of the new Basilica of S. Peter was described, sorting out and analyzing the most relevant projects carried out by the architects involved in it.

In this chapter, and based on what was stated in the two previous chapters, the construction process of the new basilica is described in detail, taking into consideration the same stages defined in chapter 7. In many of these stages there was hardly any construction activity, on the other hand, in other stages the construction progressed very fast. For this reason, and considering this proposed structure of stages, the status of the works will be reconstructed, sequentially, taking into consideration, only the stages with significant activity development.

Each stage of the construction process of the new basilica will be shown graphically, with complete precision and by scale plans, representing not only the progress of the works, but also the evolution of the buildings in its immediate surroundings.

The name of each plane describes both, the order and the year it represents in the structure of stages. For example, the plan (Layout NSP-CP1 1455) corresponds to sequential stage No. 1, and shows the status of the works in the year 1455.

To describe the construction, process the clearest and most concise way possible, the explanation of the events has been reduced to the minimum, and it has been avoided to repeat the bibliographic references already included in the two previous chapters.

Period 1: **(1447-1503)** From Pope Nicholas V to Pope Pius III

Period 1.a: **(1447-1455)** Nicholas V, Bernardo Rosellino, Alberti

Nicholas V (1447-1455) (Layout NSP-CP1 1455)

The construction process of the new basilica begins with the desire of Nicholas V to make a major renovation of the old basilica of Constantine.

Over time, it had become clear that the width of the transept of the old basilica was not enough, and it was necessary to create a larger transept to have enough space to shelter the altar and the historical memory, and at the same time allowing the activities of an evolved liturgy. An elongated western arm was also necessary to fit the choir and papal cathedra.

As it has been analyzed and reconstructed in the two previous chapters, Nicholas V's reform project was based, on one hand on the consolidation of the main body of the five naves, building a straight line of chapels on both sides, and on the other hand in the substitution of the transept and the apse of the old basilica by a square transept of 110 *palmi* on each side, and three arms of the same width as the main nave. The three arms had a similar dimension, although the north and south arms were rectangular, and the west arm had a polygonal shape on the outside and a semicircular apse inside.

A large dome would be built over the transept, and the transverse arms would be covered by large ribbed vaults, and flanked by free-standing columns, next to each of the side walls.

The longitudinal body remained almost intact, even though in the upper part of the walls of the central nave there were new circular windows. On both sides of the entrance portico, two bell towers were planned and the atrium was transformed into a regular four-sided portico.

According to the accounting documents, in June 1452 the work began on the "*tribuna grande di S. Pietro*", behind the apse of the old basilica. But payments stopped at the end of 1455, so the works were suspended no later than March of that same year with the death of the Pope. Only the foundations of the western arm were built and the perimeter walls were barely started. However, and without anyone suspected it, this small construction would be a determining factor in the future of the design and construction process of the new basilica.

Period 1.b: (1455-1503) Francesco del Borgo, Giuliano da Sangallo, Meo del Caprina

Callixtus III (1455-1458)

He did not continue with the works of Nicholas V.

Pius II (1458-1464)

Pius II didn't continue with the works of Nicholas V, but he wanted to renew the front of the irregular facade of the atrium of the old basilica, creating a uniform facade facing the square. The Pope's architect, Francesco del Borgo projected a building in the manner of a three-story loggia, overlayed on the facade. The loggia had to cover the old Constantinian facade, 224 *feet* (298.66 *palmi*) wide, because time it had become a chaotic and irregular medieval organism. In order to create a uniform front facing the square, and to merge the chaotic buildings together, Francesco del Borgo created a false facade, like a loggia, by a repetitive order of 11 equal sections, and three heights. The loggia is projected by arches on pilasters to which it attaches an order of semi-columns, following the model of Roman theaters.

He also decided that the grand staircase in front of the square would be wider until it had the same width as the old basilica (and therefore the same width as the loggia), that is 298.66 *palmi*, which counting on the two lateral parapets of 3 *palmi* width, it would have a total width of 304.66 *palmi*.

As seen in Chapter 4, the original Constantinian staircase had a total width of 147 *feet* (196 *palmi*), with lateral parapets of 2.25 *feet* (3 *palmi*). Therefore, the ladder had a total width of 151.5 *feet* (147 + 2.25 + 2.25), that is, 202 *palmi*. Pius II wanted the staircase (like the loggia) to occupy the entire front of the ancient basilica, but he could only extend it to the north, thus reaching a width of 185.5 *roman feet* (147 + 38.5), that is, 247.33 *palmi*, which basically matches with Carlo Maderno's drawing GDSU 263 A, in which he tells that the width of the staircase was 248 *palmi*.

The new staircase (extended only to the north) was already completed in 1462, and at both sides the colossal statues of the apostles Peter and Paul were placed.

Regarding the Lodge of Blessings, at the death of Pope Pius II, only the lower part of three of the eleven projected sections were built (those located further north and adjacent to the Papal Palace), the fourth section was under construction, and only the foundations of three other adjacent sections were built.

Paul II (1464-1471)

Paul II wishes to continue with the construction of the choir of Nicholas V, probably because of Jubilee’s year of 1475, which he proclaimed in 1470.

There is news that on these dates, there were payments for the works in the “*tribuna Sancti Petri*”, and Giuliano da Sangallo and Meo del Caprina are mentioned as the architects. The Pope had a minted medal showing the interior of the new apse. However, the year of his death the works were suspended again. Probably, the works that were made only involved cleaning the land and what was already built, and raising the wall of the western apse a few *feet* above the ground.

During the mandate of Paul II, the construction work of the four sections of the Lodge of Blessings continued.

Although no works are being made, at this time there is still the idea of reforming the old basilica and continuing with the works begun by Nicholas V. However, they stopped the construction of the loggia across the east facade as it was planned, and the four sections already completed were consolidated waiting the construction of two new plants on top of them. The facade facing the square, including the unfinished loggia with only four sections built, will remain almost intact until Pablo V (1605-1621) demolished the old atrium and the access building, and the loggia of blessings is incorporated into Maderno´s facade.

Sixtus IV (1471-1484) (Layout NSP-CP2 1484)

At this time, it seems that the idea of a reform of the Basilica has been definitively forgotten. However, Pope Sixtus IV built a new spacious chapel for the choir next to the southern lateral naves of the old longitudinal body, also destined to house his tomb.

Innocent VIII (1484-1492)

No works are made in the basilica.

Alexander VI (1492-1503)

No works are made in the basilica, except on the facade. The four sections already built of the Lodge of Blessings are finished all up to the second floor. In 1505 Bramante builds the third.

Pius III (1503-1503)

No works are made in the basilica.

Period 2: **(1503-1534)** From Pope Julius II to Pope Clement VII

Period 2.a: **(1503-1513)** Bramante

Julius II (1503-1513) (Layouts NSP-CP3 1506, NSP-CP4 1507, NSP-CP5 1513)

Julius II gets to the position with the intention of continuing the reform works of Nicholas V, and at the same time building his funerary chapel. In the first years of his pontificate he dedicated, also following in the footsteps of Nicholas V, to the transformation of the Vatican Palace into an updated papal residence. Before getting to the papacy, he met Giuliano da Sangallo, who taught him different buildings in France, which undoubtedly led him to an effervescent construction activity years later. In the same way, when he arrived in Rome, he met Bramante, and was surprised by his innovative ideas. Therefore, to properly channel its construction activity, he had two of the best architectural geniuses of its time, who were complemented with Fra Giocondo.

The first year of his papacy, in 1503, he commissioned Michelangelo to erect his funerary monument, and according to later testimonies (Condivi, Vasari), the search for a suitable site for this monument leads the pope to look at the interrupted works of Nicholas V, and complete the western arm as the most suitable place. However, building the western arm also meant building the north and south arms, which meant that an important reform of the old basilica, similar to that desired by Nicholas V.

Since the reform work was huge, Bramante constantly suggested to the pope that a new basilica should be made at the level of its greatness. And he finally succeeded. However, the Pope's and Bramante's ideas for the new building were quite different. The pope wanted to make the most of what was built by Nicholas V, so he wanted the building to be made using what was already built and integrate it into its design. However, Bramante knew that any project that integrated what was built by Nicholas V would be mediocre, and certainly incompatible with his new architectural ideas. He also wanted to make the most of the new opportunity to make a magnificent building to finish his career. This dichotomy would last until the end of the Pope´s and Bramante´s life, and somehow, until the conclusion of the basilica until 1666.

According to Egidio da Viterbo, who is in close contact with the Pope, Bramante initially proposed to the Pope a project, located in the main body of the ancient basilica, but in a transversal way. In such way that the main entrance was located in the south side, right in front of the obelisk. The pope rejected the solution for several reasons (the naves were full of objects of great value, tombs, chapels, etc.,), but the most important problem is that Bramante's proposal involved moving the tomb of the apostle Peter, which it was out of the question. The tomb should remain where it was and should be in the center of the transept of any project, therefore proposals with a larger transept should be studied, so that the altar, and the rites of the Christian liturgy, have a place along with the historical memory of the apostle. If that wasn´t enough, Julius II was in a hurry to build his funeral chapel, and decided to build it in the choir of Nicholas V.

Since then, a tortuous process began, that implied the confrontation of two great personalities. Bramante made countless projects, expressing his own ideas and trying to seduce the pope. However, the pope remained intransigent since he was in a hurry and wanted to take advantage of what was already built by Nicholas V at all cost to have the apse finished as soon as possible. However, Bramante was aware that it was impossible to integrate the apse of Nicholas V in any project with a minimum architectural quality, and much less with his advanced ideas.

For this reason, Bramante planned a constructive strategy based on ambiguity and with that he begin to build, at the same time, two architectural elements that are incompatible in a way.

On the one hand, he would build the essence of his final proposal, the "central nucleus"; and on the other hand, he would build on the apse of Nicholas V. While he was building these two incompatible elements, he would gain time to see what destiny held. Perhaps at some point he could convince the pope not to continue with the choir works. For this reason, Bramante had to build the "central nucleus" as quickly as possible.

At the beginning of 1506 a medal was wedged, in which the Pope announced the planned *Templi Petri Instauracio*. The medal shows a previously rejected solution, which indicates the speed with which the process was carried out, and the enormous ambiguity of the process. Nobody knew the project with which Bramante began the works, except perhaps some of his close friends, and in any case it wouldn´t be defined in all its details. The general project, more than a project, was the expression of an idea, and Bramante began to make executive plans "inside out". The most important thing was to build the "central nucleus" as soon as possible.

On April 18, 1506, in a solemn ceremony, the first stone of the new work was set. Construction began on the two western piers of the dome (*pilastri della tribuna*) and the adjacent arm of the choir. That same year some parts of the transept and the western half of the longitudinal body of the old Basilica were demolished. In March 1507 work also involved the two eastern piers of the dome (*pilastri della Basilica*).

Construction advanced quickly.

At the death of Julius II, in February 1513, the four crossing piers, the arches that connect to them and the imposts of the pendentives of the dome were built. In the same way, the arm of the choir is built up to the imposts of the vault, while the first pair of counter-piers of the transverse arms and the longitudinal body are under construction.

As shown, in at least two Heemskerck drawings, the first two western counter-piers were constructed in the form of paired septa, following Bramante's early ideas, as shown in the JSM drawing, codex Coner f. 18, and which were finally embodied in the GDSU 20 A project. On the other hand, the counter-piers located to the north were built with a lenticular shape, clearly showing that on the north side (and therefore on the south side) they wanted to build two ambulatory. The separation of the paired septa was 40 *palmi*, that is, the same diameter as the niches of the crossing piers.

Once the “central nucleus” was built, Bramante began to feel relieved, although his ideas evolved and in his last years of life, he decided that the counter-piers would not be in the form of a pair of paired septa, but rather large lenticular piers. In the same way, he begins to elaborate the project of the great dome.

Period 2.b: (1513-1514) Bramante, Fra Giocondo, Giuliano da Sangallo

Leo X (1513-1521) (Layout NSP-CP6 1514)

Julius II died on February 21, 1513, and was succeeded by 37-year-old Leo X, who was appointed pope in March 1513. Due to Bramante's poor health since the death of Julius II, Leo X called Giuliano da Sangallo (named *coadiutore*) and Fra Giocondo (named *administer*, that is, “third architect”) to help Bramante. Fra Giocondo is dedicated to reinforce the foundations of the large central piers because cracks had appeared since the beginning of their construction. The construction advanced at a good pace, and the roof of the vault of the choir arm is completed. Taking advantage of Bramante's advanced age and his poor health, Giuliano da Sangallo and Fra Giocondo designed various alternative projects between 1513 and 1514, very far from Bramante's will and the strategy he had designed to build his project. These projects tried to integrate the apse of Julius II with the 4 large crossing piers already built, offering an unattractive result. As if that were not enough, the existence of these projects gave importance and legitimacy to the apse of Julius II, which would considerably worsen the future of Bramante's strategy. Popes and future architects would tend to think that if two architects of the stature of Giuliano da Sangallo and Fra Giocondo had included the apse of Julius II, in their projects it is that they considered its existence correct. However, Bramante, despite his poor health, was able to contain the ambition of these architects, and while he was alive, nothing on their projects was built.

The roof of the western part of the old basilica of S. Peter was demolished in 1506, leaving the altar exposed to the natural elements, and nothing was done to protect it, maybe because they thought the works would proceed faster. On the death of Julius II it was known that the work was going to take much longer than expected, and they decided to build a construction (*Tegurium*) to protect the altar and the historical memory from the weather and dust of the construction works. The *Tegurium* was started to build between Pentecost 1513 and Easter 1514, and its construction lasted until 1526-1527. Bramante's original project, with the open arches, was undoubtedly similar to *Mellon code* fol. 7v drawing.

On April 11, 1514, Bramante died, at age 70, and according to his wish, the young Raffaello was appointed his successor (ten days before Bramante's death, on April 1, 1514).

The JSM drawing, code Coner f. 24, cod. Vol. 115/31, was made between the years 1514-1515, so it was initially believed that it showed the state of the works of the new basilica in those years, that is, just after Bramante's death. However, in several Heemskerck drawings it is appreciated that the western counter-piers are not lenticular in shape, and instead have the shape of paired septa of a smaller size. For this reason, Wolf Metternich, had the opinion that the drawing shows not only what was already built, but also what was planned to be built at that time.

Without a doubt, the works should have proceeded at a good pace from 1506 to 1514. It is possible that initially the counter-piers had been designed by Bramante in the form of pairs of paired septa, and thus began to be built, but at the end of his days Bramante had to change his opinion, and decided to join the septa together, creating large lenticular counter-piers with opposing niches 40 *palmi* in diameter, as they appear in Raffaello's project, Serlio 1540, c. 65. It is certain that this project corresponds to the will of Bramante's last days, and the responsibility of building it would be Raffaello's.

Period 2.c: (1514-1515) Fra Giocondo, Giuliano da Sangallo, Raffaello

Leo X (1513-1521)

Taking advantage of the initial confusion of Raffaello, the veteran architects Giuliano da Sangallo and Fra Giocondo acted quickly, taking advantage of the opportunity that was offered to them, and began to build a chapel on the southeast side, following what was specified in their own projects, made between the years 1513 and 1514. Of course, these projects did not correspond to Bramante's wishes, and consequently neither to Raffaello's. For this reason, Raffaello asserted himself immediately, and was able to quickly interrupt the works that barely reached the middle of a niche. Later on, Antonio da Sangallo would call it “Fra Giocondo's niche”, which was never completed and ended up being demolished.

Meanwhile, although slowly, the works of S. Peter continued, finishing details of the “central nucleus” of Bramante, previously projected by Bramante and controlled by Raffaello.

Raffaello, fully taking control of his work and in 1514 presented his own project that, without a doubt, followed Bramante's wishes almost perfectly, maybe completing it with a portico based on giant columns. The project arises the admiration of all, but it does not solve the difficulties that happened during the work.

On July 1, 1515, Fra Giocondo dies, so his tandem with Giuliano da Sangallo is destroyed. Because of this, a few weeks later Giuliano returned definitively to Florence, where he died, on October 20, 1516.

Period 2.d: (1515-1520) Raffaello, Antonio da Sangallo, Peruzzi

Leo X (1513-1521) (Layout NSP-CP7 1520)

From July 1515 to December 1516 Raffaello worked alone at the *Fabbrica*, with the eventual help of Peruzzi, who was hired as an assistant architect from December 1514 until the end of 1520. Raffaello is slowly taking power, however not enough to demolish the “Fra Giocondo niche” (who would end up being shot down by Antonio da Sangallo, or at the latest by Michelangelo immediately after being hired). However, the consolidation works of the “central nucleus” of Bramante continued slowly, following Bramante´s project that has now taken it as his own.

On December 1, 1516, Antonio da Sangallo was named *coadiutore*, and he dedicated above all to making new personal proposals to continue the new basilica. Antonio da Sangallo had collaborated with Bramante from 1510 to 1512, although he never had his trust. Bramante doubted his talents and the social power of his family, which would put in danger his ideas. In fact, Sangallo's proposals were more influenced by Giuliano da Sangallo and Fra Giocondo than by Bramante's ideas, and based on them he made several consecutive proposals, finding his own style, but very far away from Bramante's and Raffaello's proposals. However, Pope Leo X (1513-1521), after the crisis of the papacy (February 1517-spring 1518) forced them to reach at least some partial agreement. For this reason, Raffaello made a new proposal in 1518, and at least the ambulatory were somehow agreed with Antonio da Sangallo since the construction began (with some modifications). It is not known which project, or part of the project, was being used in construction work in the year 1518-1519. However, Raffaello and Antonio used the same compositional structure made by Bramante for the ambulatory. Although, they made some small changes in the inside niches, the aedicules, and replaced the exterior 12 *palmi* paraste with an order of circular semi-columns of 9 *palmi* of diameter (in an elevation made bay Antonio da Sangallo (GDSU 122 Ar)) appear to be 9 *palmi* in diameter, worse in drawings GDSU 45 A, and GDSU 46 A, they are clearly 8 *palmi* in diameter).

This project had to represent a strange synthesis, act like a compromise solution, between the ideas of Bramante, Raffaello and Sangallo, but a synthesis that, nevertheless, deviated from the essence of Bramante's ideas, and this gave Sangallo the opportunity to work later on other projects, dismembered and unattractive.

The construction of the southern ambulatory began in a partially consensual way between Raffaello and Antonio da Sangallo between the end of 1518 (or beginning of 1519) and the year 1520.

The construction of the southern ambulatory, and its connection to the "central nucleus" of Bramante, advanced very slowly, and was made outside in. Initially, the foundations were built and the ambulatory began to be built, and then its connection with the central nucleus was made, as it was done later in the following decade, before the Sacco di Rome, in 1527.

On Holy Friday, April 6, 1520, Raffaello suddenly died. For this reason, in April 1520 Antonio da Sangallo was named *primo architetto*, and in August 1520 Peruzzi was named *coadiutore*.

Periodo 2.e: (1520-1534) Antonio da Sangallo, Baldassarre Peruzzi

Leo X (1513-1521)

Between 1520 and 1521 both Antonio da Sangallo and Baldassarre Peruzzi each prepared a model following their own ideas. Apparently, Antonio da Sangallo's model turns out to be the chosen one, but it has no relevance in the construction works, which continue very slowly, in the area between the southern ambulatory and the central nucleus of Bramante, following the partially agreed project in 1518, between Antonio da Sangallo and Raffaello.

However, after Raffaello's death, there was without a doubt a period of uncertainty, which the pope tried to remedy by granting "*plenam potestatem*" to Antonio da Sangallo, knowing that Peruzzi didn´t share the misguided ideas of Antonio da Sangallo. The Sangallo´s family had a lot to do with this decision of the pope, which could have been just a show of authority to try to create a compact group after the death of the leadership of Raffaello (something that would not be achieve, simply because Antonio da Sangallo's ideas seemed misguided to all the architects he worked with at S. Peter). On the other hand, Peruzzi was not a social rival for Antonio da Sangallo, since he didn´t have any social power, and simply had his huge talent.

In 1521, just after Raffaello's death, Antonio da Sangallo presents his famous *memoriale* with which he criticizes a project, which was clear that it was the project presented by Raffaello in 1518. The most important criticism focuses on the narrow dimension of the central nave (107 *palmi*) with regard to its high height. This criticism, although it may have never reached the pope, was made public in order to increase the value of his own model (which had been designed to provide answers to his criticisms, but generated multiple other problems). It is possible that the criticisms included in the *memoriale* were because in a way, to his failure to share Bramante's compositional ideas (it is even possible that he didn´t understand them) and try to justify and promote his own personal ideas. For Bramante it was essential to respect the width of the old basilica of S. Peter, because this way, the new basilica would seem to “rise again” from the old one. On the other hand, the design of the four large crossing piers, and as demonstrated in the previous chapter, was part of the integral design of the "central nucleus", and the creation of a 12-15-12 order in the paired columns. The sides of the crossing piers required a width of 107 *palmi*, both in the central nave and the transept. The width of the central nave of the ancient basilica was 106.33 *palmi* (from base to base), and Bramante rounded it to 107 *palmi*.

Regarding the *Tegurium*, it can be said that Peruzzi in 1518 (or perhaps Giovanni Franceso da Sangallo in 1519) closed the arches to protect the historical memory from the dust and debris of the works, since Bramante built it with all the arches open (in the disposition observed in the excavations and as seen in the drawing code Mellon fol. 7v). In the same way, Peruzzi, maybe also in the year 1518, built using stone ashlar masonry, a parapet as a *specchiature* perfectly integrated into the upper part of Bramante's architectural structure.

Leo X died on December 1 of 1521, and was replaced by Pope Hadrian VI, on January 9 of 1522.

Adrian VI (1522-1523)

Adrian VI is not interested in the new S. Peter, but he is in the reform of the church, and hardly any work is done on the new basilica during his short tenure.

Clement VII (1523-1534)

During the first years of his mandate, Clement VII 1523-1524, under the direction of Antonio da Sangallo and Peruzzi, built a good part of the southern transverse arm. After these years, the construction works proceed very slowly again.

Given the new status of confusion due to the interruptions of the works, and perhaps trying to provide a certain order in the direction of the same, on April 19 1525, Clemente VII once again granted Antonio da Sangallo "*plenam auctoritatem*". Without a doubt the family clan returned to the scene, since maybe the differences between Antonio da Sangallo and Peruzzi were obvious.

The works were suspended for a while in 1525 due to lack of funds and started again in 1526, the year in which Giuliano Leni added a *tetto rustico* in the Bramante´s *Tegurium*, above Peruzzi's *specchiature*. However, the Sacco di Roma of 1527 and the papacy´s crisis that came later on, interrupted again the works.

Feeling little valued in S. Peter, and as a consequence in addition to the looting, Peruzzi left Rome and moved to his native Siena at the beginning of 1527, leaving Antonio da Sangallo alone.

However, years later, Clement VII calls him back on July 1 of 1531, and named him *secondo architetto*. Clemente VII valued Peruzzi's talent, and considered him an ideal complement to counter Antonio da Sangallo's proposals. Peruzzi travels to Rome intermittently, while promoting himself and looking for new complementary commissions. During these complicated years, Antonio da Sangallo, and especially Peruzzi, given the bad finances situation, were making simplified proposals for S. Peter, in order to reduce the surface and volume of the new basilica, and thereby reduce the costs to the maximum.

The construction activity of the previously agreed and pending works was resumed around the years 1530-1531, but didn´t progress much until the death of Clement VII, on September 25 of 1534.

Clement VII is succeeded by Pope Paul III, on November 3 of 1534.

Period 3: **(1534-1605)** From Pope Paul III to Pope Paul V

Period 3.a: **(1534-1546)** Antonio da Sangallo, Baldassarre Peruzzi

Paul III (1534-1549) (Layouts NSP-CP8 1538, NSP-CP9 1546)

Paul III decided to push construction of the new S. Peter to the maximum, with the aim that it can be completed in the not too far future. On December 1 of 1534, the pope promoted Peruzzi as *architetto* of the *Fabbrica*, with the same skills and the same salary as Antonio da Sangallo. This shows the great trust that the Pope had in Peruzzi, considering him essential to guarantee the best possible design for the new basilica, and also to speed up the design and construction process as much as possible. A trust pope also demonstrated with the appointment of Jacopo Meleghino (who worked closely with Peruzzi) as “third architect” in April of 1535, maybe also because of Peruzzi's bad health.

During this period, Peruzzi created the best projects for S. Peter, ending with his final project for the White Collection, of the Accademia Americana di Roma in New York, which Peruzzi would present to the pope maybe in 1535. However, Peruzzi died two years later in 1536, and Antonio da Sangallo was the only architect, together with Meleghino, who became *secondo architetto* in June 1538.

After the Sacco di Roma and Peruzzi's death, even if some works were done at S. Peter, they mainly were in a condition of abandonment, as can be seen in the drawings made by Maerten van Heemskerck.

While things are being cleared in S. Peter, Paul III also dedicates many resources to the Vatican Palace, and among other things he ordered the decoration of the Sala Regia, and in 1537 he asked Antonio da Sangallo to build the Pauline Chapel, very close to the designated area for the construction of the new basilica, which would highly determine the future of its design.

At the same time, renovation and maintenance works are being done on the old body of the basilica. In 1538, Antonio da Sangallo built a transversal wall without openings, the “dividing wall”, at the height of column number 11 (starting from the east) dividing the main body of the old basilica in two. Once the wall was built, the area to the west of the dividing wall was demolished, clearing the way for the works to move forward. On the other hand, the eastern part of the main body of the old basilica remains standing. Closed in the west by the dividing wall in order to protect the new shortened building of the old basilica from dust and debris, and to be able to celebrate the liturgical activity normally, moving the altar in the western part of its interior.

Among the maintenance work made in 1538, windows were added to the sides of the *tetto rustico* of the *Tegurium* in order to create ventilation streams. It is believed that the tomb of the apostle was too closed and perhaps had little ventilation, since years before the arches that Bramante had initially built had been completely closed.

As a response to Peruzzi's fabulous project of 1535 (White collection), Antonio da Sangallo develops a new final project, maybe in the year 1539, with great similarities to Peruzzi´s one, and therefore a little more successful, but again scattered, confusing, and now mammoth. Without a doubt, Antonio de Sangallo had taken a new impulse by acting alone, since Meleghino had just taken the job, and didn´t have the necessary power to counter his new proposals and defend Peruzzi's.

Because of this, under the direction of Antonio Labacco, Antonio da Sangallo's assistant, a gigantic wooden model was made between 1539 and 1546, which defined every detail of the new project. The new project has a centralized plant structure, with apses at the end of each of the four arms of the transept, and the longitudinal body is replaced by a vestibule and a facade flanked by two bell towers.

In 1539 the construction work on the transverse arms (the foundations of the north arm and small actions in the south arm) started again. Until now, there haven´t been any work done on the east arm, and therefore the area between the central nucleus of Bramante and the dividing wall remained open and clear.

In 1539 Antonio da Sangallo built a short "middle section" in this area, which joins the new basilica with the existing part of the old longitudinal body. This intermediate section was intended to be provisional and was built to keep the perimeter of the new basilica closed, to stabilize and reinforce the dividing wall and the shortened building of the old basilica.

In the center of the "dividing wall" an arch-shaped passage was opened (which would later be provided with an interior architrave portal with two columns), and this way the two buildings get connected.

On the other hand, and although the apse of Julius II (Bramante's apse) is already destined to be demolished, for the moment it is still standing. In these years, therefore, the appearance of the building is chaotic and it seems a concatenation of dispersed elements, each with a different architectural structure.

On August 3 of 1546, Antonio da Sangallo died. The first conversations with Giulio Romano were held in Mantua to choose a successor, although for different reasons they stopped that same year. However, Meleghino is hired, promoting him as *architetto*, with a salary matching the one Peruzzi and Antonio da Sangallo had, although he isn´t trusted with the leadership of the works.

Finally, on 1546, Michelangelo, aged 72, is being called, who after some doubts decides to accept the order to continue with the work. Michelangelo gets Antonio da Sangallo's model to a devastating criticism and proposes a new project, with more compact dimensions, and with an astonishingly attractive architectural structure.

Michelangelo proposes a building with a centralized plant structure, based on a mixed quincunx-naves typology, without ambulatory, but with an additional colonnade on the west side.

Period 3.b: (1546-1564) Michelangelo

Paul III (1534-1549) (Layout NSP-CP10 1549)

Thanks to the extraordinary power that the Pope has granted him, Michelangelo achieves to demolish between 1548 and 1549 the ambulatory of the southern arm, which was already completed. The ambulatory of the northern arm had only been built to the ground, so it didn´t bother him for the execution of his project.

In the following years, the apses were raised according to Michelangelo's project, and the construction of the transverse arms began. During this time Michelangelo worked on the design of the dome.

Paul III died on November 10 of 1549, and Pope Julius III was appointed as his successor, on February 7 of 1550.

Julius III (1550-1559)

Julius III confirms the full power of Michelangelo and supports him against obstruction by the Sangallo´s family and the *"setta sangallesca"*. In 1551 there is a disagreement between Michelangelo and the members of the *Fabbrica*, of which Cardinal Marcello Cervini is the spokesman. The deputies ask to inspect Michelangelo's projects, but he defends that he is the only responsible for the design and that the deputies´ competence is to give the necessary means for the construction. The pope agrees with him and forbid any deviation from Michelangelo's project. The attempt by Cosimo I de Medeci to take advantage of the situation to drag Michelangelo to Florence fails because he claims to feel personally committed to working on the new S. Peter basilica.

The continuation of the construction of the transverse arms is slowed down because the difficult situation at the *Fabbrica*. Michelangelo dedicates especially to the construction of the dome. Between the years 1551-1552 the pendentives were completed and the cornice at the base of the drum was done, which was erected in 1554. The status of the works of the new basilica in 1551 is perfectly shown in the plan by Leonardo Bufalini, made that same year.

Paul III died on March 23 of 1555, and the belligerent Pope Marcellus II was named as his successor, on April 9 of 1551. However, a heart attack ended his life on May 1 of 1555, and Paul IV was made pope on May 23 of 1555.

Paul IV (1555-1559)

Paul IV struggles but successes to retain Michelangelo in Rome, despite the fact that economic funds for S. Peter are reduced due to the war against Spain. In 1557 Michelangelo, who occasionally goes to the construction site, gave the report that the *cantino* in the apse of the southern transverse arm was executed with a different technique that the one he had designed, and he gets the *cantino* demolished and rebuilt

according to his instructions. In 1558-1561, at the pushing of some friends, concerned about his old age, he prepared a large wooden model of the dome that he had designed.
Paul IV died on August 18 of 1559, and Pope Pius IV was made his successor on December 25 of 1559.

Pius IV (1559-1565)

Because of his election, Pope Pius IV commits to do everything on his hands to complete the new basilica of S. Peter, and to protect Michelangelo as much as possible from the new attacks of Sangallo´s family and friends.
Michelangelo has a bad getting old and the members of the *Fabbrica* designates Nanni di Baccio Bigio as *secondo architetto*, but because Michelangelo's didn´t agreed he is fired.
Construction is now advancing at a good pace. In 1561 new foundations were built on the north side, probably it was the chapel in the northeast corner (later called Gregorian chapel).
In 1564 some houses located in front of the entrance steps to the atrium were demolished to extend to the South the Plaza in front of the Basilica, which the Pope have plans to surround with loggias.
During this time, the first criticisms of Michelangelo's project started. Curiously, the most important ones came from the Augustinian Theologian, Onofrio Panvinio (1529-1568) who was a corrector and reviser of manuscripts in the Vatican Library since 1559, and for a short time. Panvinio was known in his time for being one of the greatest exponents of Catholic scholar, and he was also regularly in contact with architects, like Étienne Dupérac, who illustrated several of his works. Panvinio argued that Michelangelo's building was unsuitable, because the true form for a sacred Christian building is the basilica (leaving aside that the basilica was once a Roman civil building).
Michelangelo died on February 18 of 1564, at the age of 89.
At the time of his death, the new transverse arms had reached the attic level and the construction of the corner chapels had begun. The western apse of Julius II, and the longitudinal body of the old Basilica, still remained connected with the intermediate section built by Sangallo as a dividing wall.
The Pope asks for the opinion of experts for the construction of the dome. Nanni di Baccio Bigio, aspiring to become principal architect, promises to create a more solid

and less expensive dome, the same way the sculptor Guglielmo della Porta, who makes several proposals for improvement.

Period 3.c: (1564-1602) Giacomo della Porta

Pius IV (1559-1565) (Layout NSP-CP11 1565)

In August of 1564 Pirro Ligorio and Giacomo Vignola were named *primo architetto* and *secondo architetto* respectively. However, at the end of the following year, Ligorio is fired for disagreeing with Michelangelo's project. His complaint, however, may concerned the lining of the attic of the north stand, which was now being worked on and whose design can´t be said it was Michelangelo´s for sure.

Pius IV died on December 9 of 1565, and Pius V was designated as his successor, on January 7 of 1566.

Pius V (1566-1572) (Layout NSP-CP12 1570)

Pius V renews the order of strictly stick to Michelangelo's project. II Vignola is chief architect, but he is still paid as *second architetto* because the Pope, no less thrifty than devout, doesn´t pay regular salaries.

Most of the available monetary funds, are destined to the construction of the fleet that will defeat the Turks at Lepanto. However, the construction work is still active, and among other small details, the entablature is completed on the upper part of the dome's drum.

In the time of Pius V, in the year 1571, Tiberio Alfarano a cleric of the Basilica, knowing the imminent demolition of the Basilica, drew a synoptic plant of the old basilica over Dupérac's drawing of Michelangelo's design of the new basilica.

Pius V died on May 1, 1572, and Gregory XIII was appointed as his successor, on May 13, 1572.

Gregory XIII (1572-1585) (Layout NSP-CP13 1585)

Gregory XIII focused on building the chapel in the northwest corner, which would house his tomb. The rustic work is already finished by Vignola, but the decoration work continues until 1580. This chapel in the northwest corner, is the first part of the new basilica of S. Peter that is consecrated and used for the cult.

In July 1573 Vignola died, and the next year Giacomo della Porta replaced him. In 1584-1585 Giacomo della Porta replaced the external hemispherical dome of the Gregorian chapel with a dome supported by a sturdier drum and profiled according to a sharper arch.

In 1582 Tiberio Alfarano criticized in his treaty *De Basilicae Vaticanae antiquissima et nova structura*, Michelangelo's project and proposed to add a longitudinal body that involve the new and the old basilica with their sepulchral monuments.

Because of this, Ottavio Mascherino made some designs for the longitudinal body.

Gregory XIII died on April 10 of 1585, and was replaced by Sixtus V, made pope on April 24 of 1585.

Sixtus V (1585-1590) (Layout NSP-CP14 1590)

Sixtus V, with a spirit similar to the one Pope Paul III had, wishes to impress a great rhythm in the construction activity of the new basilica, and saw the possibility of completing it according to Michelangelo's design. His first intervention was finally, the demolition of the apse of Julius II. With this, it was possible to build the western arm according to Michelangelo's project, almost identical to the transverse arms, it was completed in 1587.

During the year 1587 the preview works for the construction of the dome began by Giacomo della Porta and Domenico Fontana. The first modifies Michelangelo's wooden model, and designs a pointer dome. The works began in July of 1588, and in May of 1590 the ring at the base of the lantern was completed.

Sixtus V also provided a new face to Piazza S. Peter, and in 1585 he commissioned Domenico Fontana to remove the Vatican Obelisk from its former location on the south side of the basilica. He raises it in the square on the axis of the old basilica and at 1440 *palmi* distance from the apostle's tomb (a very special number that symbolizes the spread of Christianity, $1440 = 10 * 12^2$). The works began in April of 1586 and on September 10th the obelisk was erected in the right place, which would become the center of the square. The obelisk was located in the area of the old basilica, but it was displaced around 3.8 m. with respect to the axis of the new basilica (the new basilica started to be built from the west, behind the square. So, no exact measurements could be taken in order to make its axis match with the axis of the old basilica).

On September 26 of 1586, the pagan monument is exorcised and consecrated as a monument to the triumph of Christ by adding a cross on top of it. To clear the view of

the obelisk from Castel Sant'Angelo, the pope planed to demolish all the existing houses between Borgo Vecchio and Borgo Nuovo (his idea wasn´t made during his mandate, and it had to wait until 1935, with the creation of Via de la Conciliazione).
Sixtus V died on August 27 of 1590, and was replaced by Pope Urban VII, on September 15 of 1590. However, the new pope died on September 27 of 1590, victim of malaria, and Gregory XIV was named Pope on December 5.

Gregory XIV (1590-1591)

During Gregory XIV´s mandate, Giacomo della Porta built the lantern on top of the vault, which construction was completed in 1593.
Gregory XIV died on October 16 of 1591, and Pope Innocent IX was named as his successor, on October 29 of 1591. However, he died on December 30 of 1591, and Pope Clement VIII was named Pope on January 30 of 1592.

Clement VIII (1592-1605) (Layout NSP-CP15 1602)

Clement VIII reorganized the administrative department of the *Fabbrica* and replaced the College of Deputies with a *Congregazione Cardenalizia*. The dome is covered with lead plates and a cross is placed over the lantern, consecrated with a solemn ceremony. In 1598 the Cavaliere d´Arpinio began to cover the interior of the dome with mosaics, until the year 1612, when the work was completed.
Once the dome was finished, in 1592 the *Tegurium* and the apse of the old Basilica of Constantine were demolished. Clement VIII renovates the Papal altar over the tomb of S. Peter and overlays a dome with a wooden dome.
The surviving front part of the old basilica is still preserved and used as *confessio*. On the other hand, once the *Tegurium* has been demolished, the ground level of the new basilica rose about 16.5 *palmi* above the ground level of the old basilica, that is about 5.5 *palmi* more than the 11 *palmi* planned by Antonio da Sangallo in 1538. This way, an intermediate floor was created above the level of the old basilica, the *Grotte Vaticane*, to shelter the innumerable treasures and relics that accumulated in the old basilica over time. To access the new basilica, a semicircular staircase was built in the inside of the dividing wall, the old arch was filled in and an architrave portal was created, using pieces of the dismantled architrave of the central nave and two of its columns.
In 1594 the main altar was consecrated, which gave the cleric of the Basilica the opportunity to point out the functional differences of Michelangelo building. As a

consequence, in a report on the status of the *Fabbrica* under Clement VIII, they mention some plans for extending the building to the east.

An enormous number of alternative projects appeared everywhere with the aim of expanding the Miguel Angel´s building to the east. The proposals can be divided into two groups.

The first group, tries to combine the western body, as it was, with a new longitudinal body.

The second group tries to save Michelangelo's project completely, trying to get the cleric to accept it, even if it needed small attachments and changes. The most striking proposal was from the architect Fausto Rughesi, who proposed the construction of an oval atrium instead of the old longitudinal body.

Pope Clement VIII designates the southeast corner for his own chapel, completes it and takes care of its decoration.

In 1602 Giacomo della Porta died, and Carlo Maderno and Giovanni Fontana were called to replaced him.

Period 3.d: (1602-1605) Carlo Maderno

Clement VIII (1592-1605)

As expected, in this period there were almost no construction works, and the status of the basilica remained still, waiting for a decision on its future. Carlo Maderno, from his position, dedicated himself to listening to all parties in order to make the find possible solution.

Initially, he had prepared a proposal that implied an important transformation of the basilica, as it can be seen in drawing GDSU 101 A. In this proposal, each of the corner chapels of the Michelangelo´s building (Gregorian and Clementine Chapels) were duplicated, and from the eastern arm of the cross emerged a longitudinal body of three sections. Later, he created a very limited solution, GDSU 100 A, in which he combined a slightly enlarged eastern arm with a reduced version of the Dupérac facade. If all of these were compromise proposals, Maderno finally got the best compromise, as shown in drawing GDSU 264 A. In this last proposal, the central floor of Michelangelo is perfectly preserved, the eastern arm also has an apse, flanked by two chapels, the choir chapel and the chapel of the Blessed Sacrament. It is connected something similar to it, a miniaturized longitudinal body, with three naves and with three sections. Obviously,

Maderno was trying to give an early answer to all possible future objections, and in fact with this proposal he got the job later on.
Clement VIII dies on March 3 of 1605, and is replaced by Pope Leo XI, on April 1 of 1605. However, Leo XI died on the 26th day of his pontificate, on April 27 of 1605, as a consequence from a flu that he took on the day of his coronation. Pope Paul V replaced him on May 16 of 1605.

Period 4: **(1605-1667)** From Pope Paul V to Pope Alexander VII

Period 4.a: **(1605-1629)** Carlo Maderno

Paul V (1605-1621) (Layouts NSP-CP16 1610, NSP-CP17 1615)**,** NSP-CP18 1620)
Paul V got to the papal throne with the firm intention of completing the new basilica of S. Peter. In September of 1605 he invited the *Congregazione della Fabbrica* to reflex on the demolition of the surviving part of the old basilica. To calm Cardinal Baronio's protests, he arranges that all surviving early Christian and medieval monuments would be treated with the best possible care and stored in the most suitable place for them. For each relic that was saved, an extensive report must be done, and the opening of the tombs will only be possible in the presence of the cleric from the Basilica. The Capitol Archivist Giacomo Grimaldi (1568-1623), is in charge of making a detailed inventory of the old building and the sacred ornaments inside it. The most important monuments are transferred to the *Grotte Vaticane* which are between the floor of the old basilica and the raised floor of the new basilica.
In February of 1606 the demolition of the old longitudinal body began. In November of 1609, the last building to be demolished is the chapel of the choir of Sixtus IV. The demolition of the atrium and the surrounding buildings continues until 1610.
For the construction of the new longitudinal body, an architecture competition is organized in 1606, in which architects from all Italy participated. As expected, the architect of the *Fabbrica*, Carlo Maderno, won. The east side of Michelangelo's building is articulated with two large side chapels (the choir chapel and the Sacramento chapel, adjacent to the Clementine and the Gregorian chapels) and it extends to the east by three naves, which replace the front part of the old longitudinal body.
In March of 1607 at the east of the Gregorian chapel, the excavations for the foundation are done, in which the first stone was solemnly laid on 7 May of 1607. In September of

this same year, the Pope gave the order to start the construction of the facade, and after completing the necessary demolition in the atrium area, the first stone is solemnly laid in February 10 of 1608. Two months later the *Congregazione della Fabbrica* meet again, making an exhaustive critique of Maderno's project, and as a result, in July they decided to demolish what had already been built, and make a new project, leaving behind the closure of the east apse and continuing the east arm of the cross, in a central nave of the same width.

The construction is made according with this final project. In 1612 the facade, the portico and the loggia of the blessings, are executed in rustic, in 1614 the barrel vault of the central nave is finished, and in February of 1615 the demolition of the intermediate section of Antonio da Sangallo begins, together with the "dividing wall".

On Palm Sunday of the same year 1615, the whole building could be used.

Two other sections were added to both sides of the facade, in which Maderno hoped to build two low bell towers. The northern section is completed in 1617 and the southern section in 1621, but the bell towers are not built. In the years 1616-1617 Maderno renewed the staircase at the base of the facade, and at the same time presented a project to restructure the Square, the surroundings of the Vatican Palace and the new basilica. But the project would never be executed.

The Pope's interest is now focused on the decoration of the inside of the building, especially in the area under the dome.

In the previous century, the relics had already been placed in the niches of the great central piers. The *Colonna Santa* was placed on the northeast pier and the bronze funerary monument of Pope Paul III on the southeast pier. Paul V now uses the two western piers to host the most important relics, in the northwest the head of the Apostle Saint Andrew, and in the southwest the *Volto santo* and the lance of Saint Longinus.

In the lower niches of the piers the altars are placed, and above them the balconies for the exhibition of the relics. The confession in front of the tomb of S. Peter is surrounded by a marble structure designed by Maderno. The papal altar is moved to the western apse and over it, wooden model of a dome is placed.

On the old altar over the tomb of the apostle there is overlayed, a canopy supported by Angels, meant to be cast in bronze, but which for the moment remains in as a model. As everything is ready now, it begins the time of the great ceremonies of sanctification and beatification, using temporary decorative elements and having great performances.

Paul V died on January 28 of 1621, and was replaced by Pope Gregory XV, on February 9 of 1621.

Gregory XV (1621-1623)

Gregory XV built the dome and canopy, planned by his predecessor Paul V, in durable materials, and was in charge of the decoration of the choir chapel, next to the south nave of the new longitudinal body.

Gregory XV died on July 8 of 1623, and was replaced by Pope Urban VIII, on August 6 of 1623.

Urban VIII (1623-1644) (Layout NSP-CP19 1629)

Urban VIII celebrated the Jubilee for the first time in the new S. Peter. On Christmas Eve of 1624 he opens the Holy Door, which Maderno moved from the narthex of the old ancient basilica to the corresponding point of the portico. On November 18 of 1626, 1300 years after the consecration of the construction of Constantine, the new church is solemnly dedicated.

From 1624 on, the Pope took care of the projects for the area under the dome. The Papal altar is moved to its old place in the tomb of S. Peter and therefore Bernini´s designs a huge bronze baldachin. Between the years 1626-1627 the four Solomonic columns were built, and between the years 1631-1633, after having made several design alternatives, the coronation is executed and installed.

In 1629 Urban VIII transferred the relic of the Cross, from the Church of Santa Croce in Jerusalem to the new basilica of S. Peter. Each of the four piers in the dome can host one relic. There is a long discussion about its placing, and finally the *Sudarium* of Veronica (*Volto santo*) is kept in the south-west pier, the relic of the Cross is placed in the north-west pier, the sacred spear of St. Longino in the north-east one, and in the south-east pier the head of S. Andrew. In the upper niches of the large central piers Bernini has aedicules decorated with low reliefs.

On the other hand, the lower niches of the four big central piers host the huge statues of Veronica (Mochi), St. Helen (Bali), S. Longino (Bernini) and S. Andrew (Duquesnoy). The corresponding altars were placed on the lower floor, in the *Grotte Vaticane*, at the base of the four big central piers. The funerary monument, made in bronze of Pope Paul III, is moved to the apse where it will work as a pendant to the monument, which is also

made out from bronze, of Urban VIII. Probably the Pope has already planned to place the *Cattedra di San Pietro* in the center of the apse.
In 1629 Maderno dies, and Bernini replaces him.

Period 4.b: (1629-1667) Gian Lorenzo Bernini

Urban VIII (1623-1644)

Urban VIII commissioned Bernini with the construction of the bell towers above the two outstanding lateral bodies of the facade. Bernini's project, which raises one more floor compared to Maderno's, was approved in 1637, and from 1639 the bell tower in the south was built. But in the lower part of the facade, large cracks and injuries appear so in 1641 the works were interrupted.
Urban VIII died on July 29 of 1644, and was replaced by Pope Innocent X, on September 15 of 1644.

Innocent X (1644-1655)

Innocent X is particularly interested in the Lateran´s Basilica, and commissioned Borromini to rebuild it, which must be completed before the Jubilee of 1650, as it happened like that. Between the years 1645-1646 the *Congregazione della Fabbrica* de S. Peter constantly worked on the problems of the bell towers. After Borromini made an expert report, mentioning the serious construction mistakes committed by Bernini, they decided to demolish the southern bell tower and it was decided not to built the pendant to the north.
In the inside, the walls and pavement of the central nave were covered with marble under Bernini´s supervision. Commissioned by the Pope, Carlo Rainaldi presented ten projects for the reorganization and structuring of the Piazza San Pietro, but none of them were done.
Innocent X died on January 7 of 1655, and was replaced by Pope Alexander VII, on April 7 of 1655.

Alexander VII (1655-1667) (Layout NSP-CP20 1667)

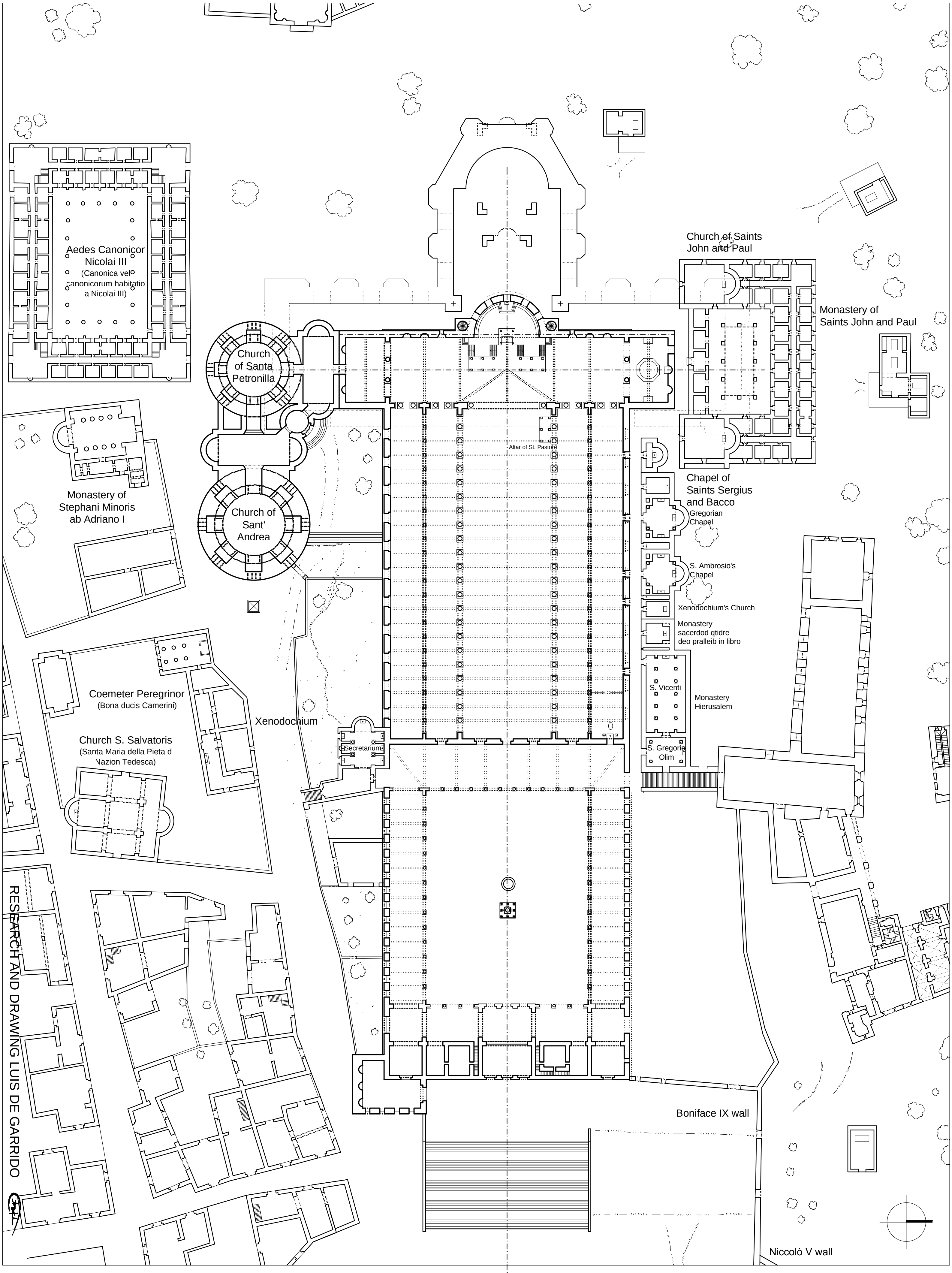
Alexander VII solves the last two problems still pending of the new Basilica of S. Peter: the arrangement of the outside square and its connection with the Vatican Palace. The design, made by Bernini and in which the pope himself takes an active participation, lasts for two years, and in 1658 the final solution was ready.

Two sts of columns, made up of four pairs of free-standing columns, form an oval with the major axis placed across the Basilica (*Piazza obliqua*). In the center an obelisk rises and two big fountains are placed on the transverse axis. The columns are connected to the Basilica by two arms, like corridors, forming a trapezoid that stretches towards the facade (*Piazza retta*). The north arm integrates the entrance to the Vatican Palace (*Portone di bronzo*), and at the western end, a vestibule gives access to the portico of the new Basilica and the *Scala Regia*. This one, enlarged by Bernini, leads to the Sala Regia on the top floor of the building. The rails at the top of the columns are decorated with statues of various saints. In the vestibule of the *Scala Regia*, aligned with the portico, Bernini raises the statue of Constantine the Great, Imperial founder and protector of the new basilica, and serving as Pendant at the southern end of the portico stands the statue of Charlemagne as King of France, added in the 18th century.

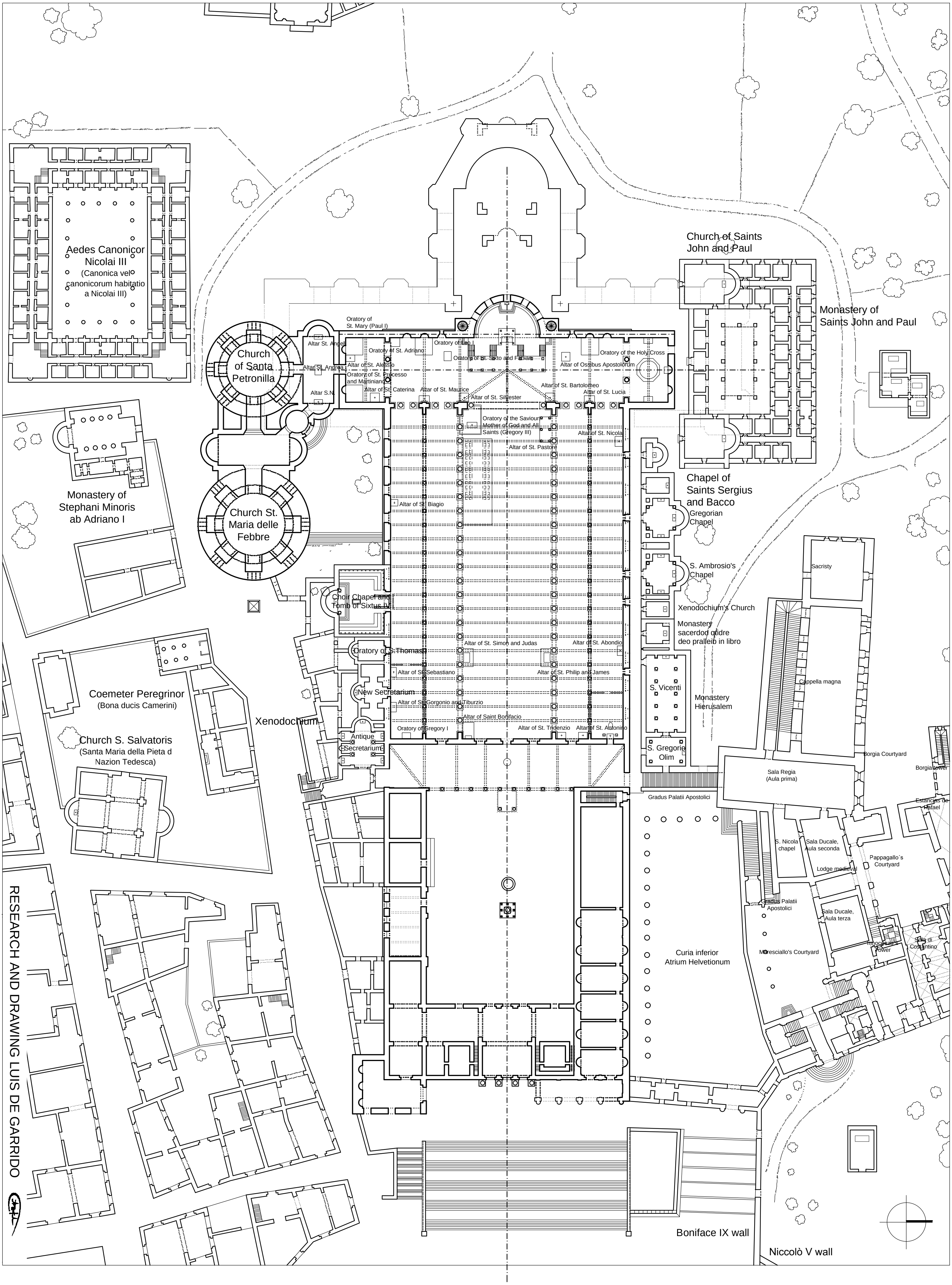
The construction of the columns was prepared in 1656 with the evacuation of the area destined for the Plaza. The north colonnade was built between 1659 and 1661, and the south colonnade between 1661 and 1666. The renovation of the Scala Regia was carried out in the years 1663-1666. In 1670 the statue of Constantine was inaugurated, between the years 1667-1677 the two fountains were built in the square, and the creation of the statues on the roof aligned on an axis on the colonnades lasted until 1673.

Alexander VII did the final touches inside the new basilica, with the installation of the *Cattedra di San Pietro* in the center of the apse. Bernini made the designs since 1659, and in 1666 the work was completed.

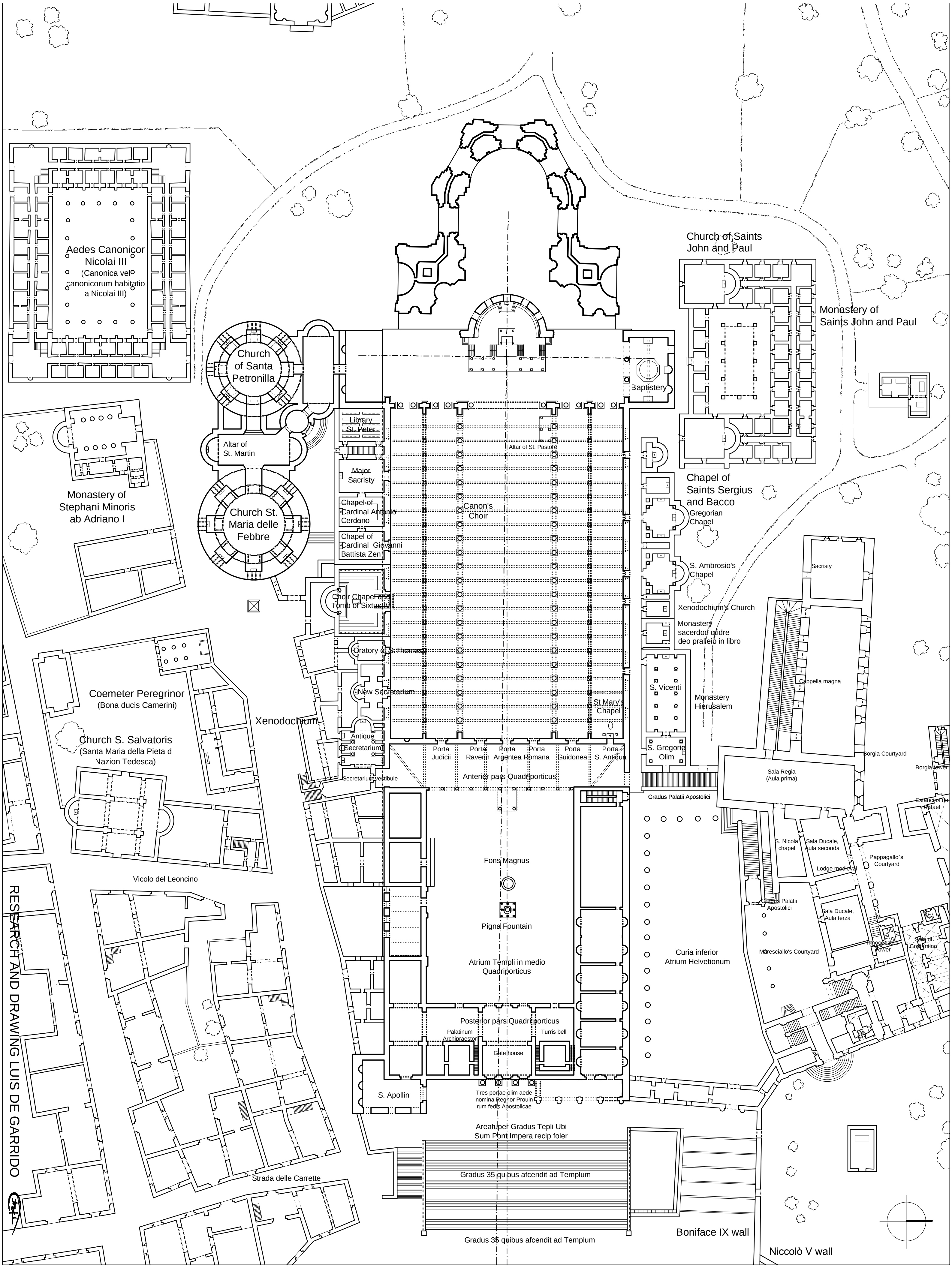
LAYOUTS 9



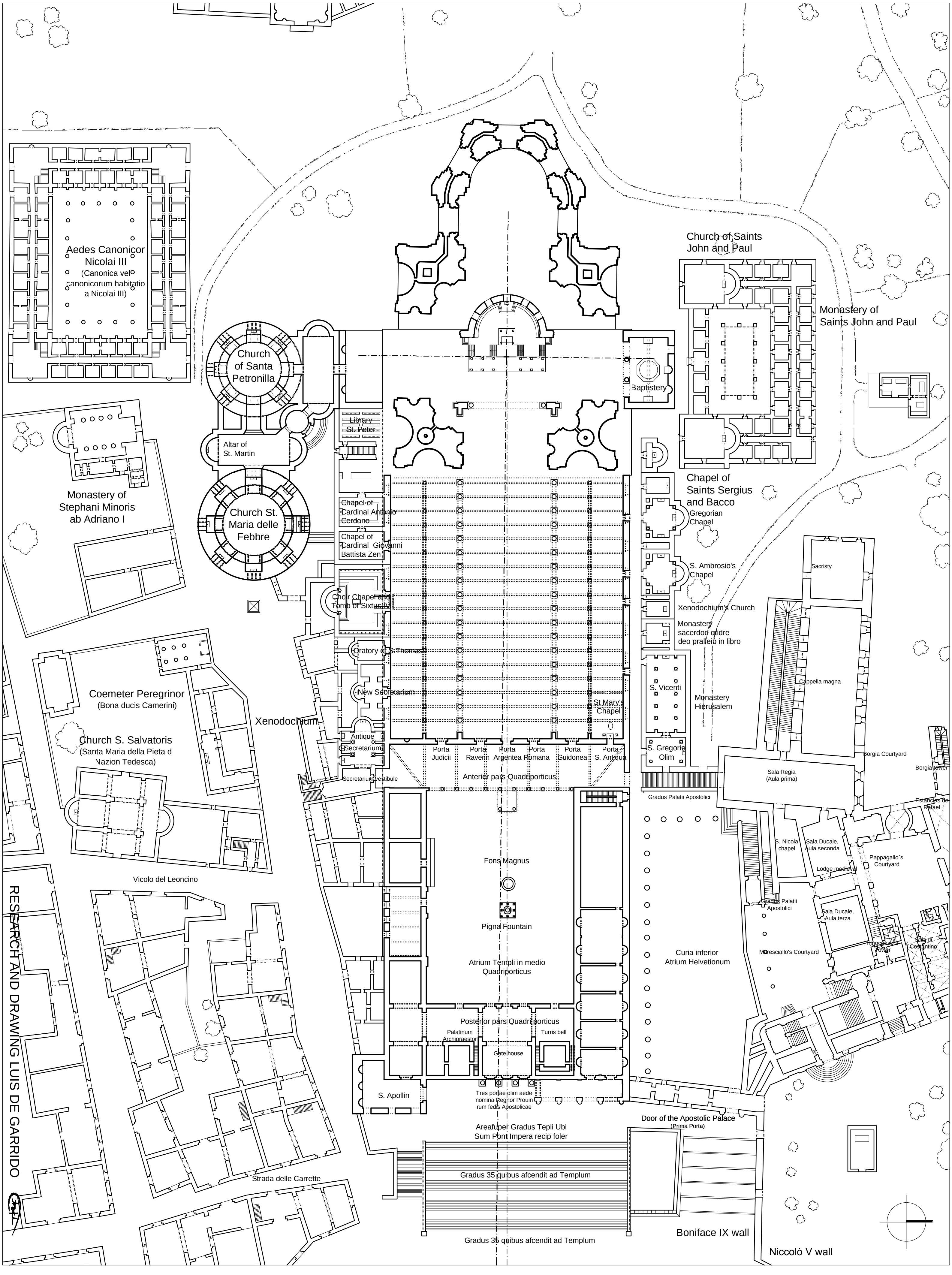
1455	Nicholas V (1447-1455).WESTERN NEW APSE FOUNDATION	NSP	CP-1



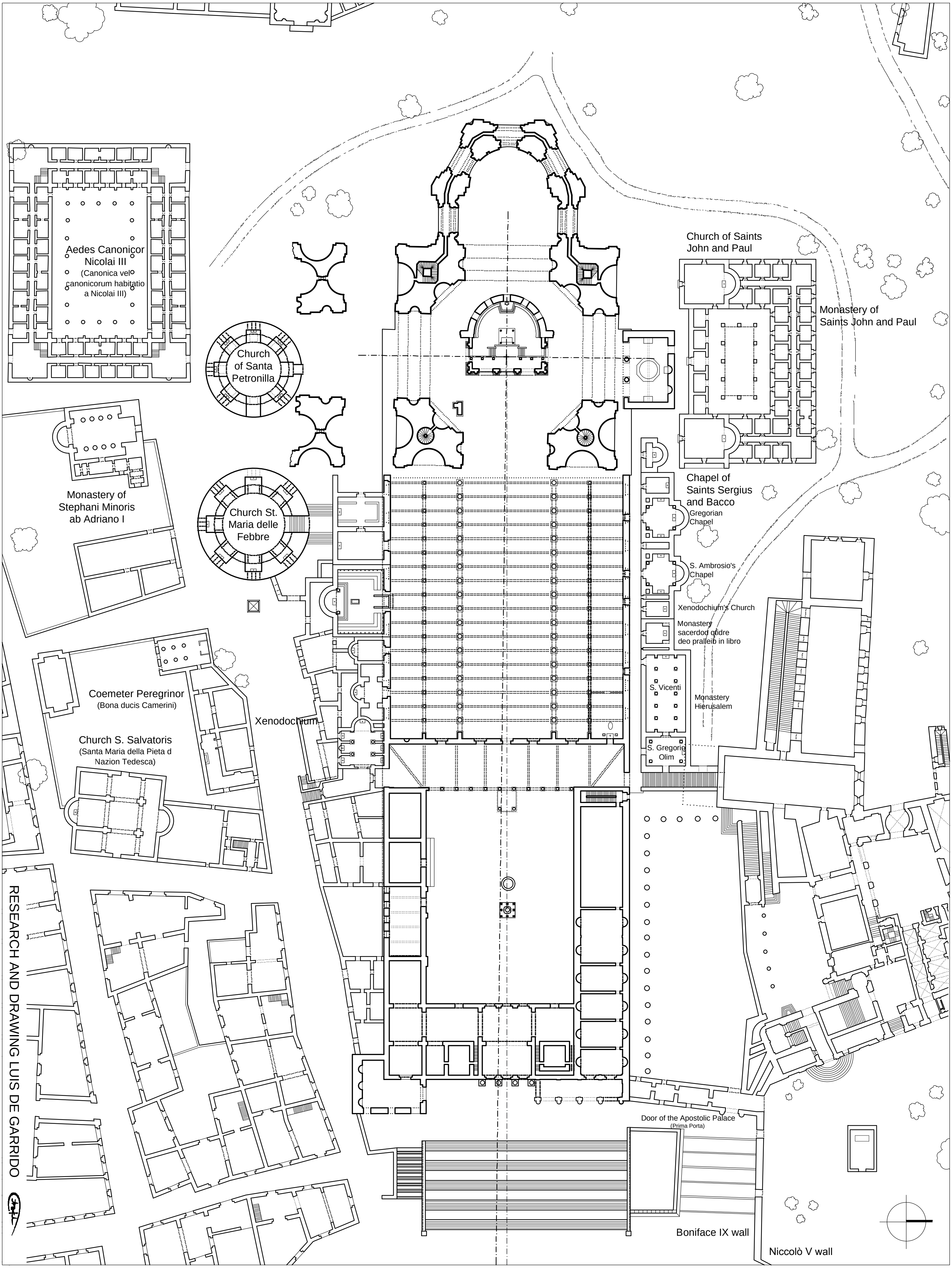
1484	Sixtus IV (1474-1484). CHAPEL OF SIXTUS IV. 4 SECTIONS LODGE OF BLESSINGS	NSP	CP-2



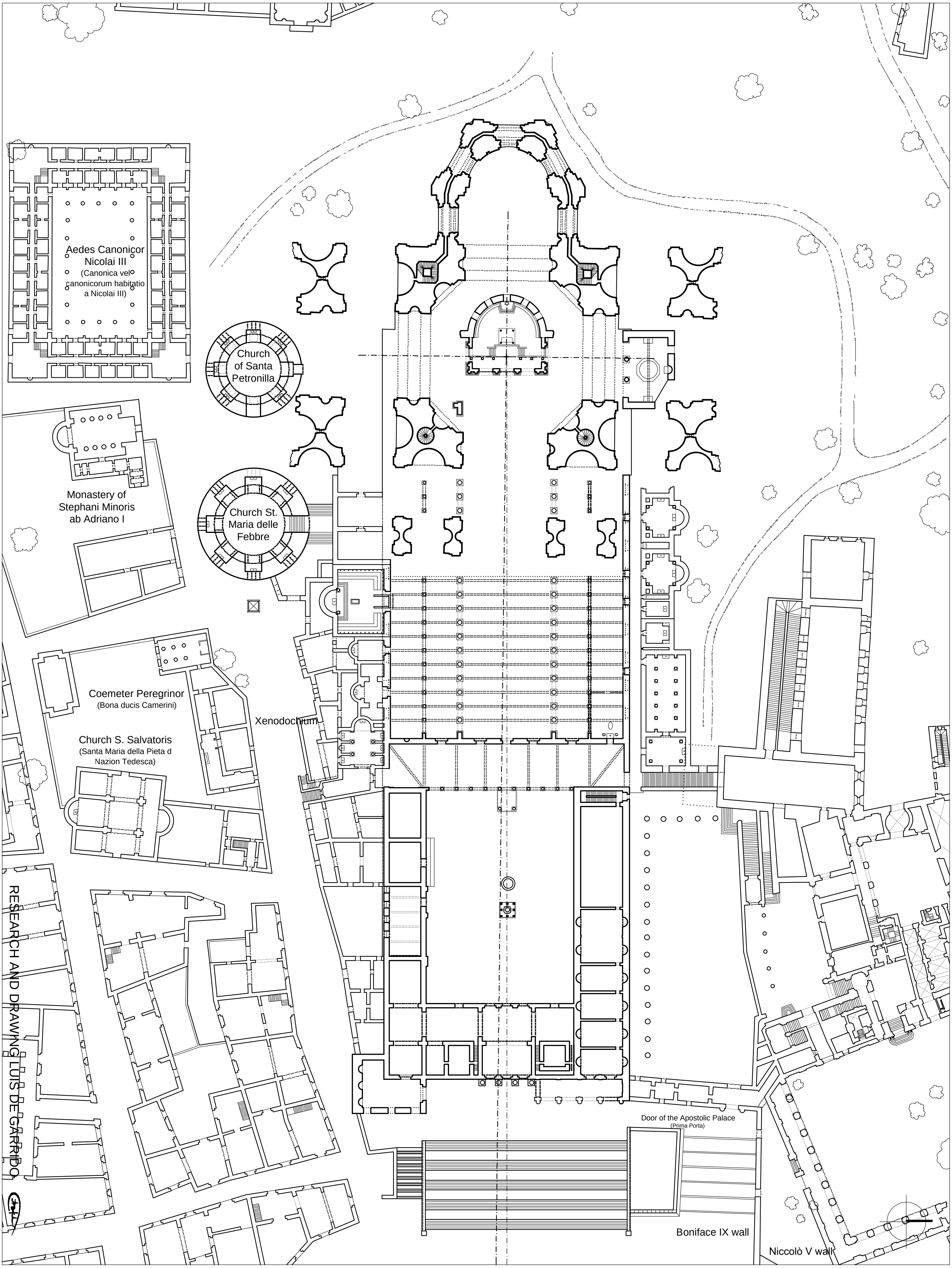
1506	Julius II (1503-1513). WESTERN CROSSING PIERS. BRAMANTE	NSP	CP-3



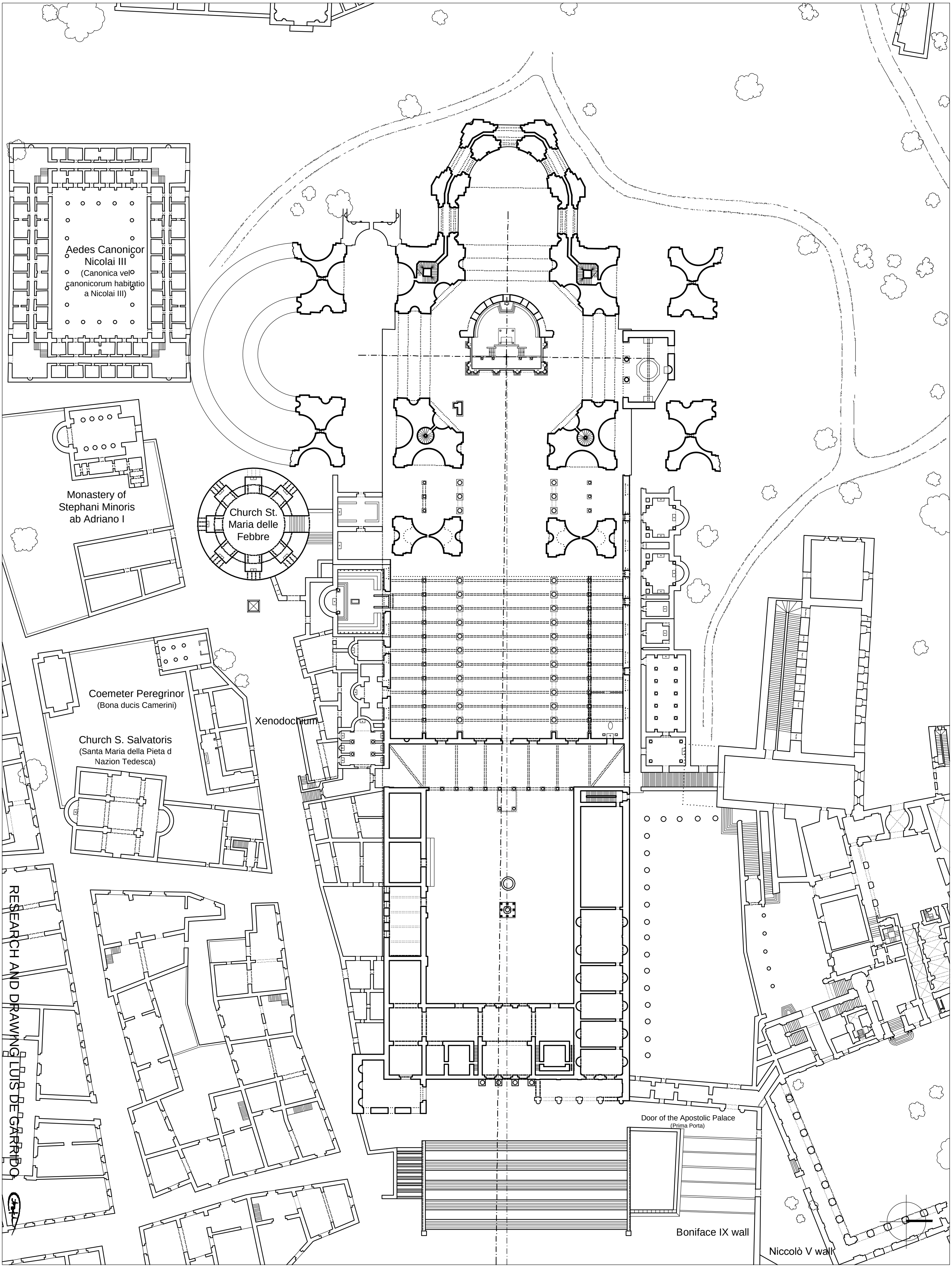
1507	Julius II (1503-1513). WESTERN APSE AND EASTERN CROSSING PIERS	NSP	CP-4



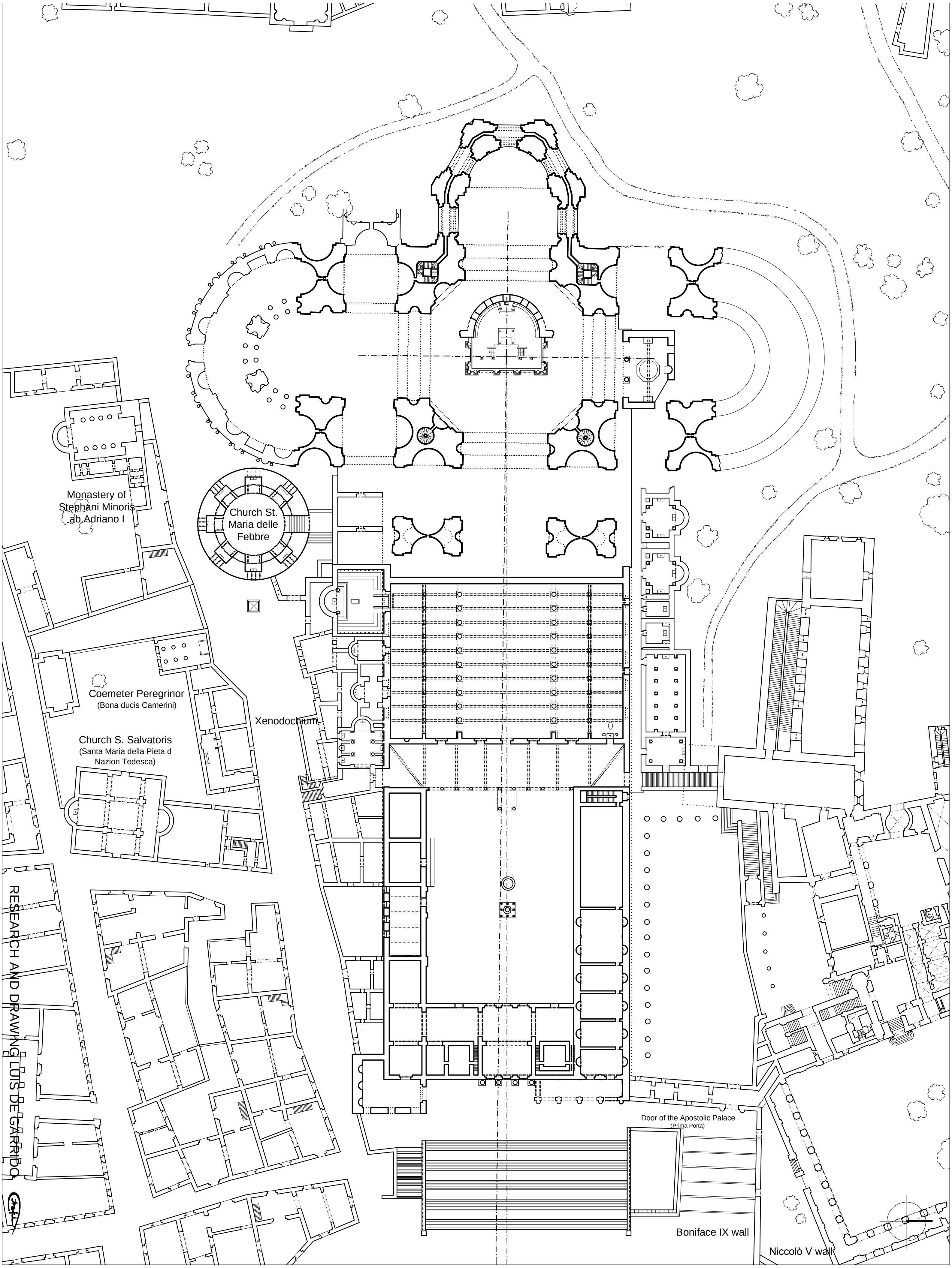
1513	Julius II (1503-1513). DOUBLE-SEPTA COUNTER PIERS. TEGURIUM	NSP	CP-5



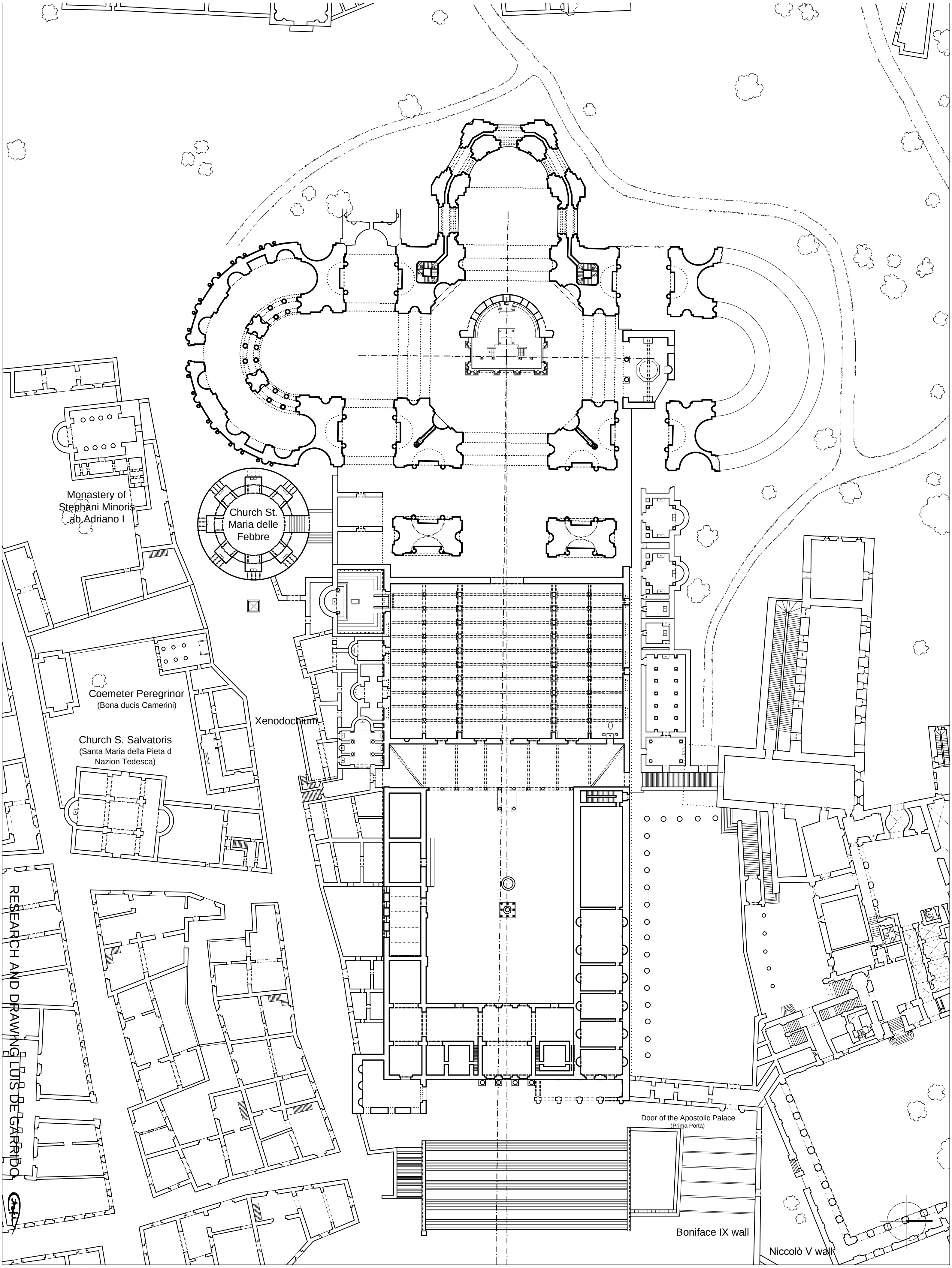
1514	Leo X (1513-1521). FRA GIOCONDO NICHE AND LENTICULAR COUNTER-PIERS	NSP	CP-6



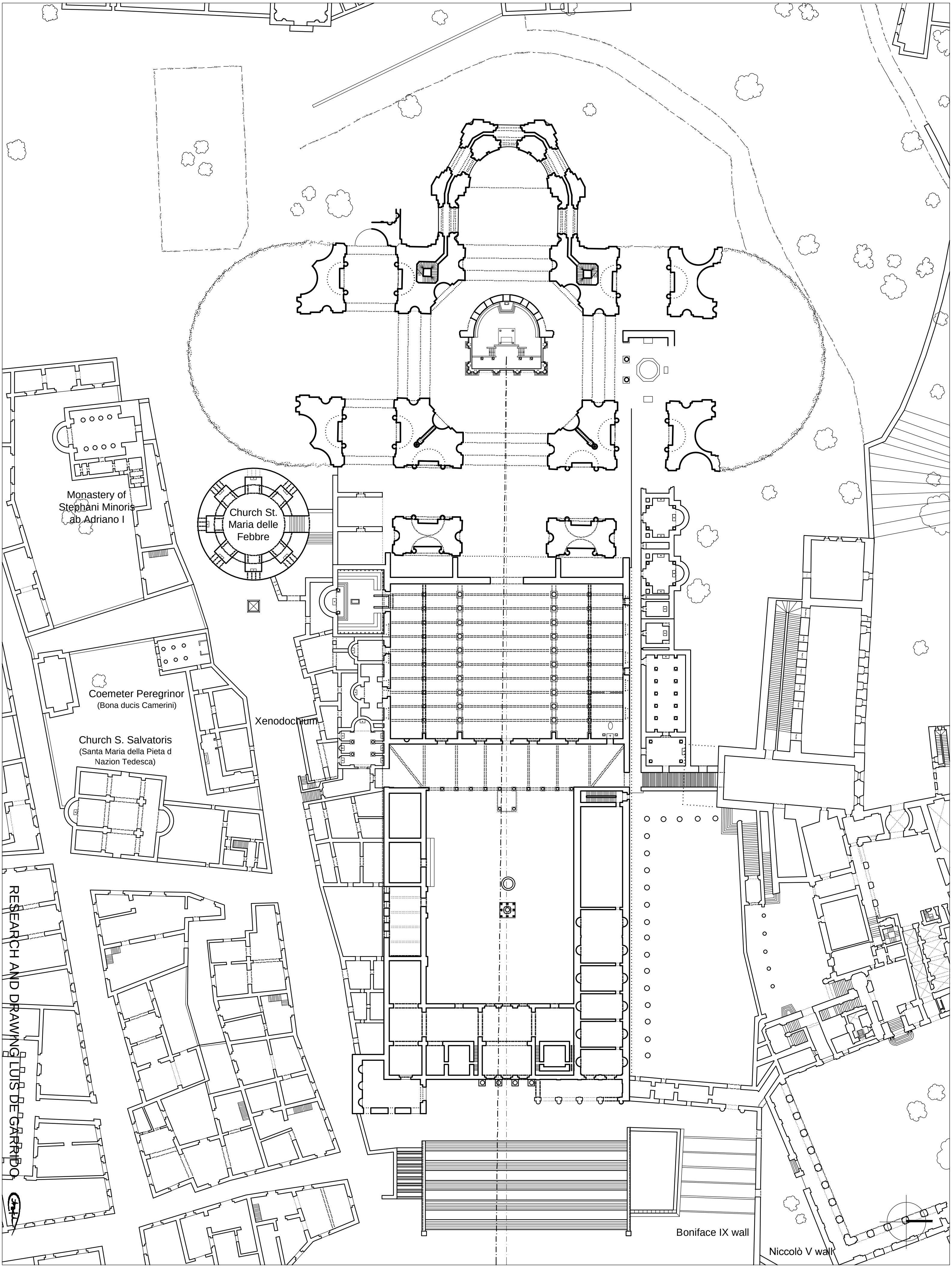
1520	Leo X (1513-1521). SOUTHERN AMBULATORY. RAFFAELLO-SANGALLO	NSP	CP-7



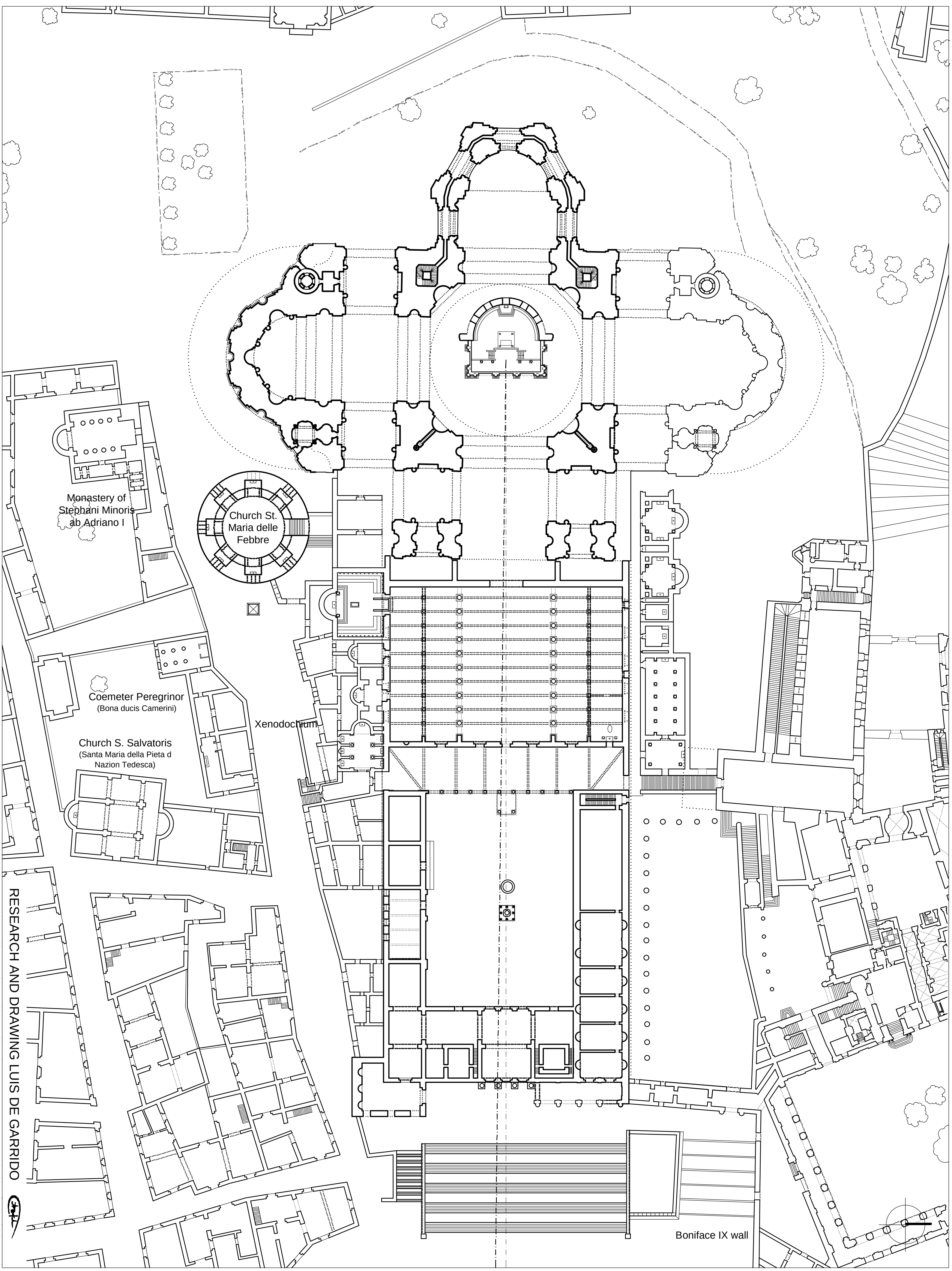
1538	Paul III (1534-1549). DIVIDING WALL. ANTONIO DA SANGALLO	NSP	CP-8



1546	Paul III (1534-1549). THE NICHES OF THE PIERS ARE FILLED	NSP	CP-9

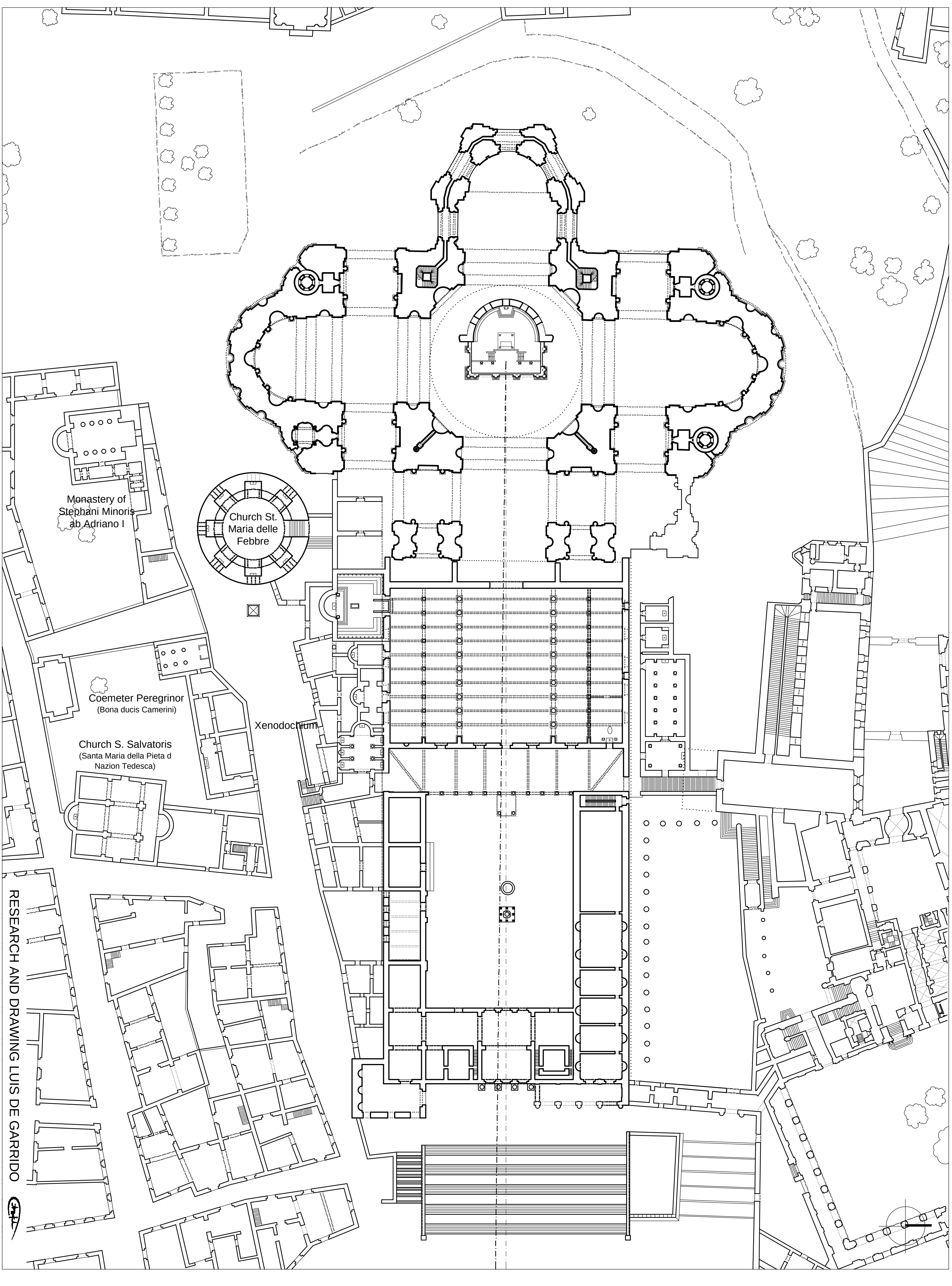


1549	Paul III (1534-1549).DEMOLITION OF THE SOUTHERN AMBULATORY. MICHELANGELO	NSP	CP-10

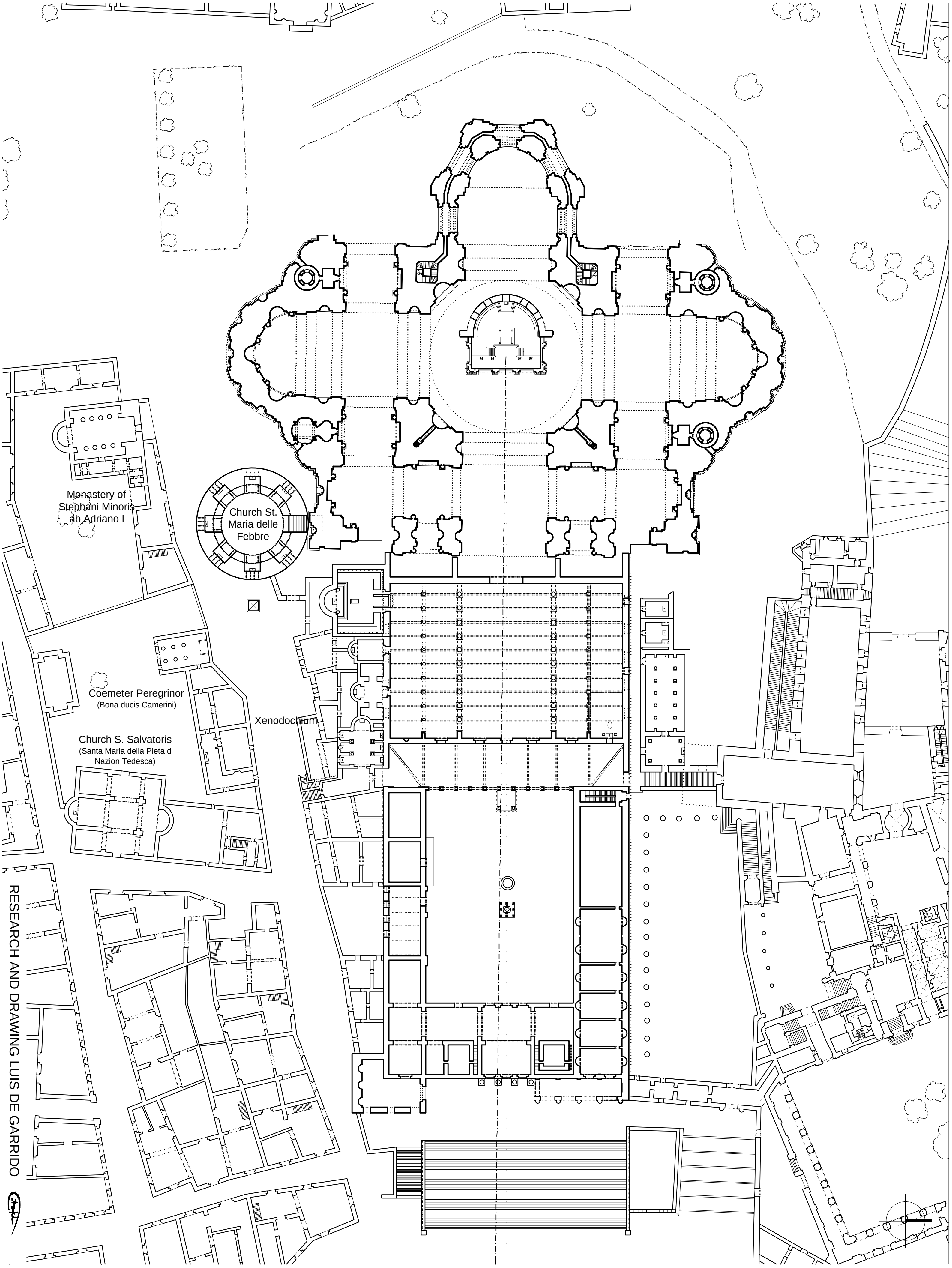


RESEARCH AND DRAWING LUIS DE GARRIDO

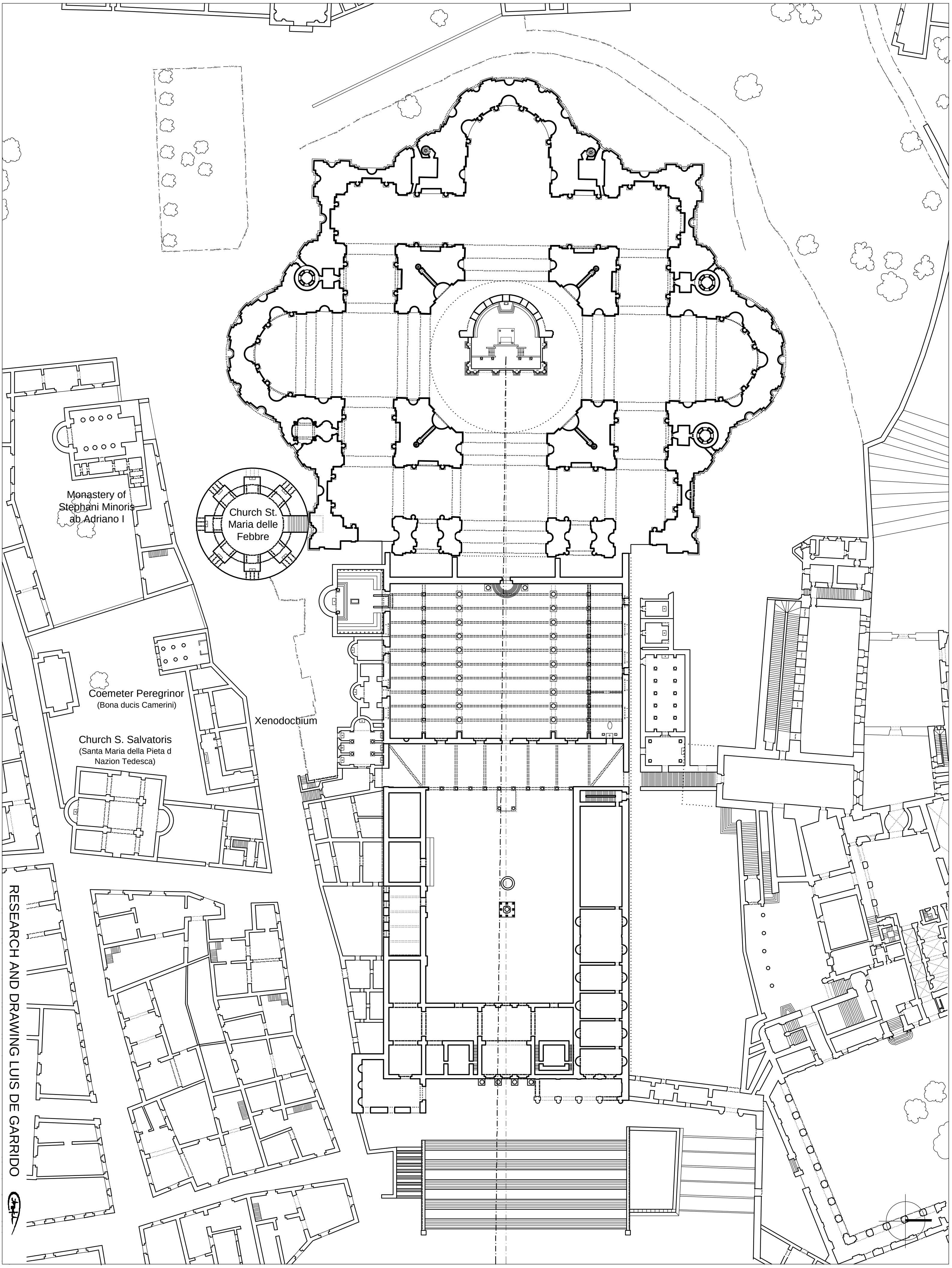
1565	Pius IV (1559-1565). CONSTRUCTION OF THE GREGORIAN CHAPEL	NSP	CP-11



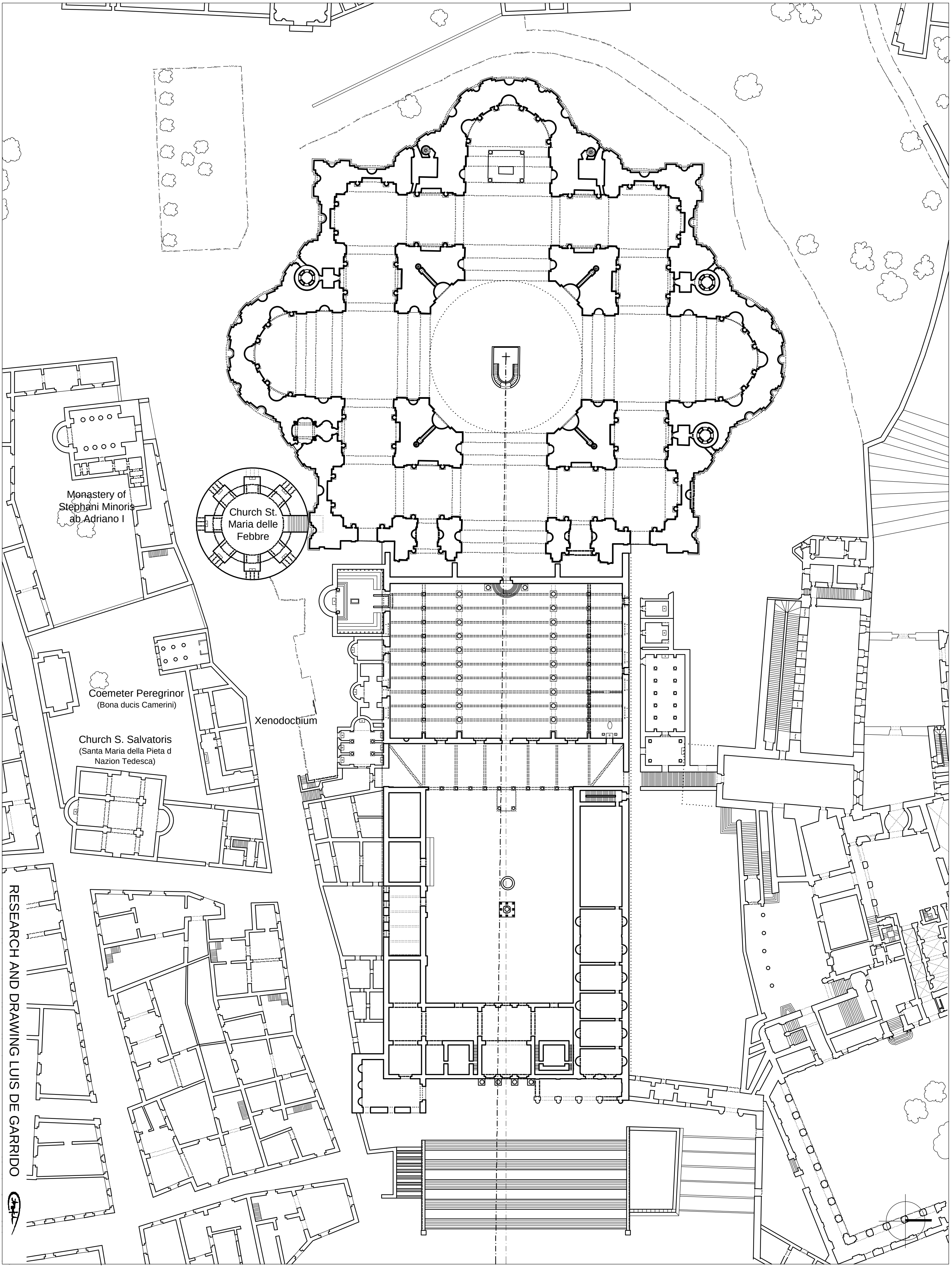
1570	Pius V(1566-1572).NORTH ARM CONSTRUCTION	NSP	CP-12



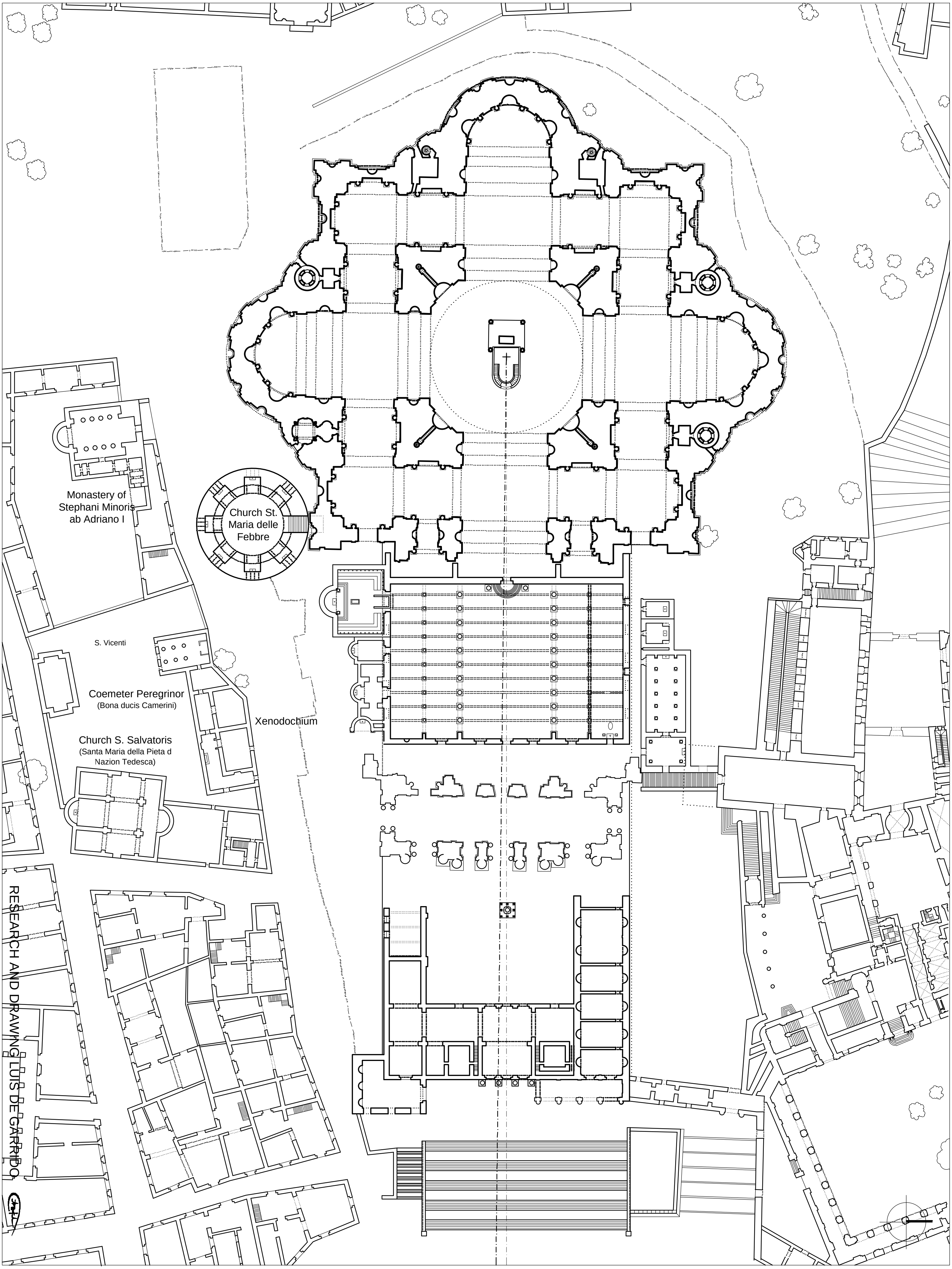
1585	Gregory XIII (1572-1585). NORTHWEST CHAPEL	NSP	CP-13



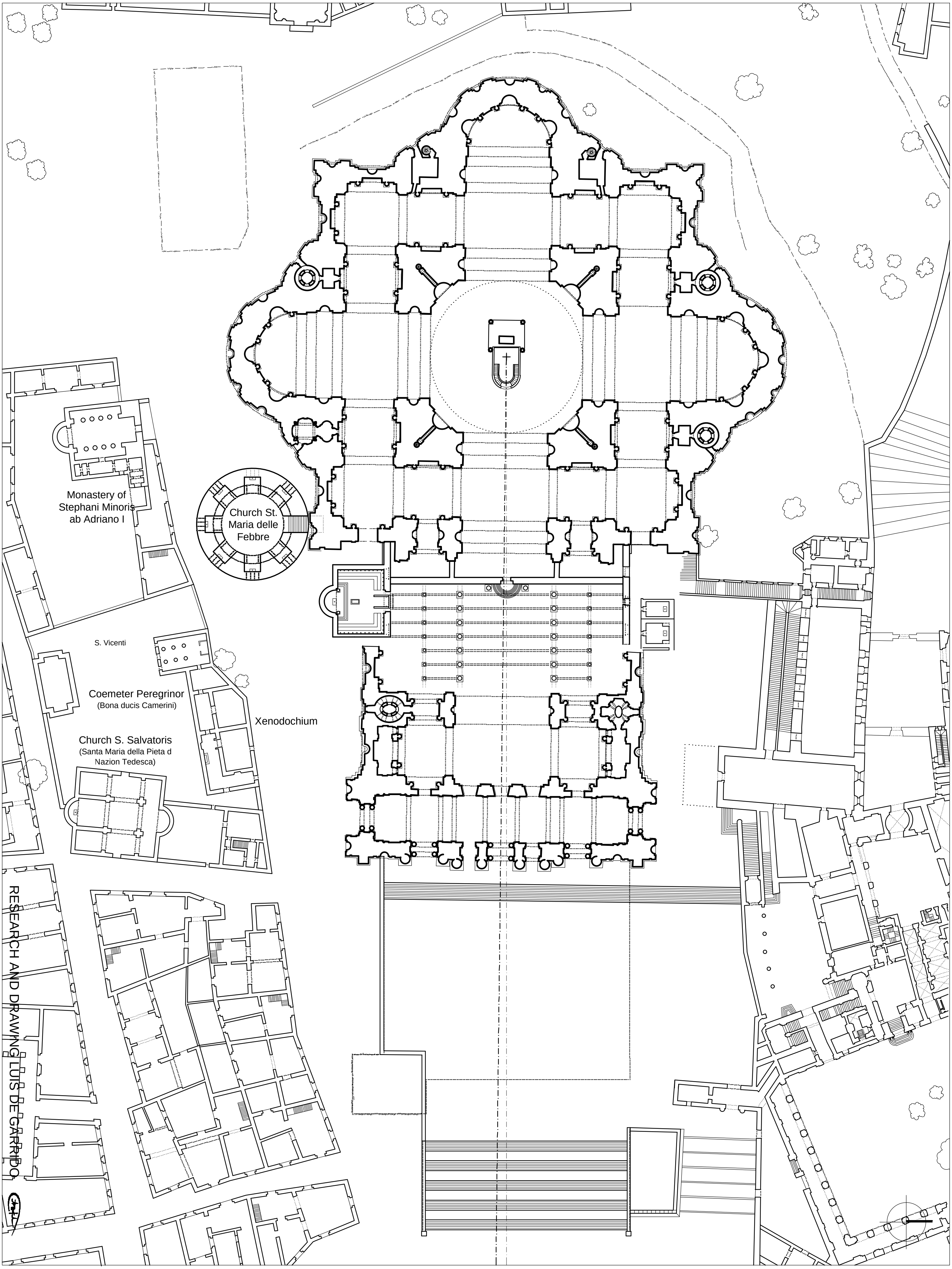
1590	Sixtus V (1585-1590). DEMOLITION CAPELLA IULIA. OBELISK MOVED	NSP	CP-14



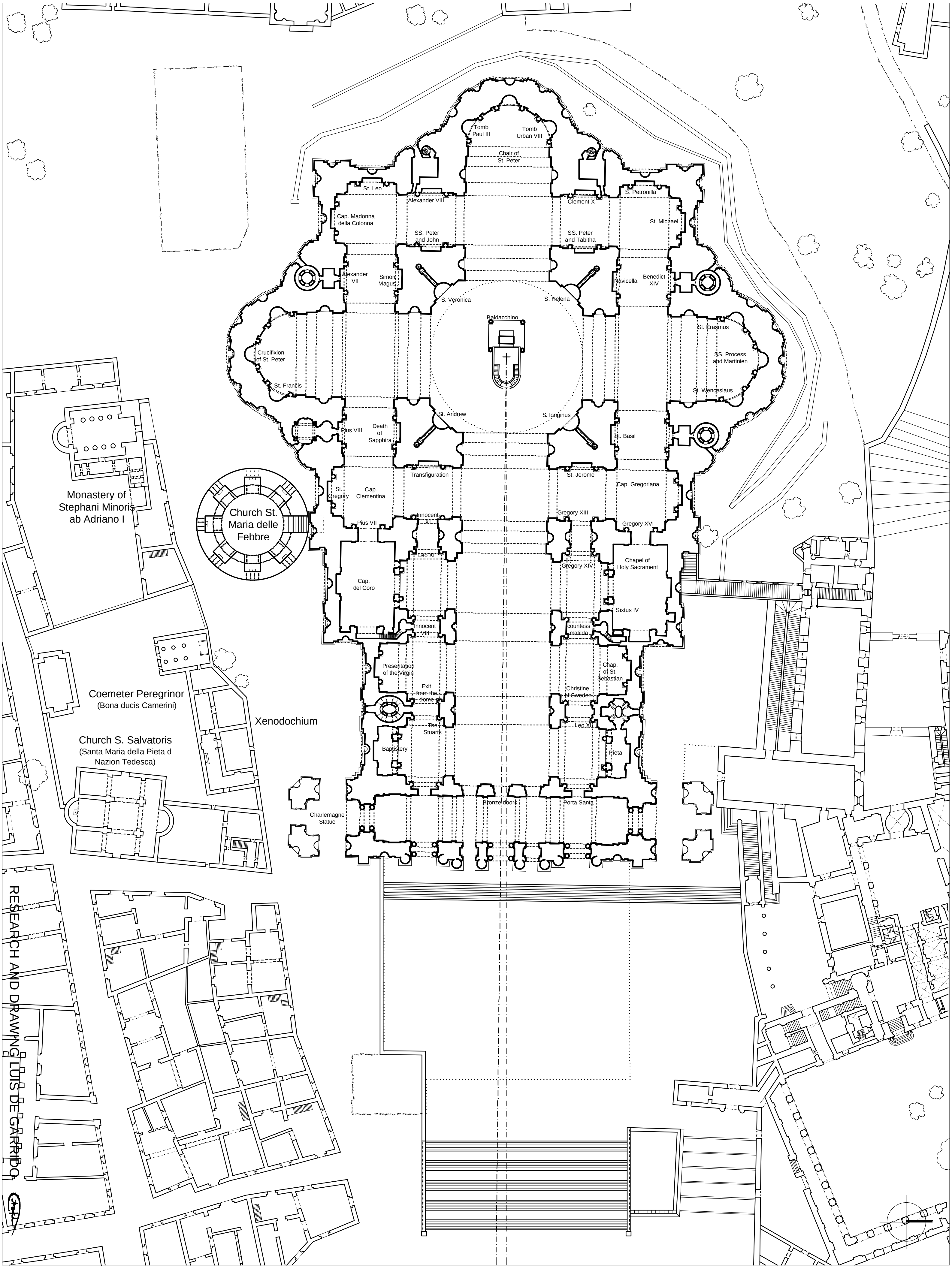
1602	Sixtus V (1585-1590). GIACOMO DELLA PORTA	NSP	CP-15



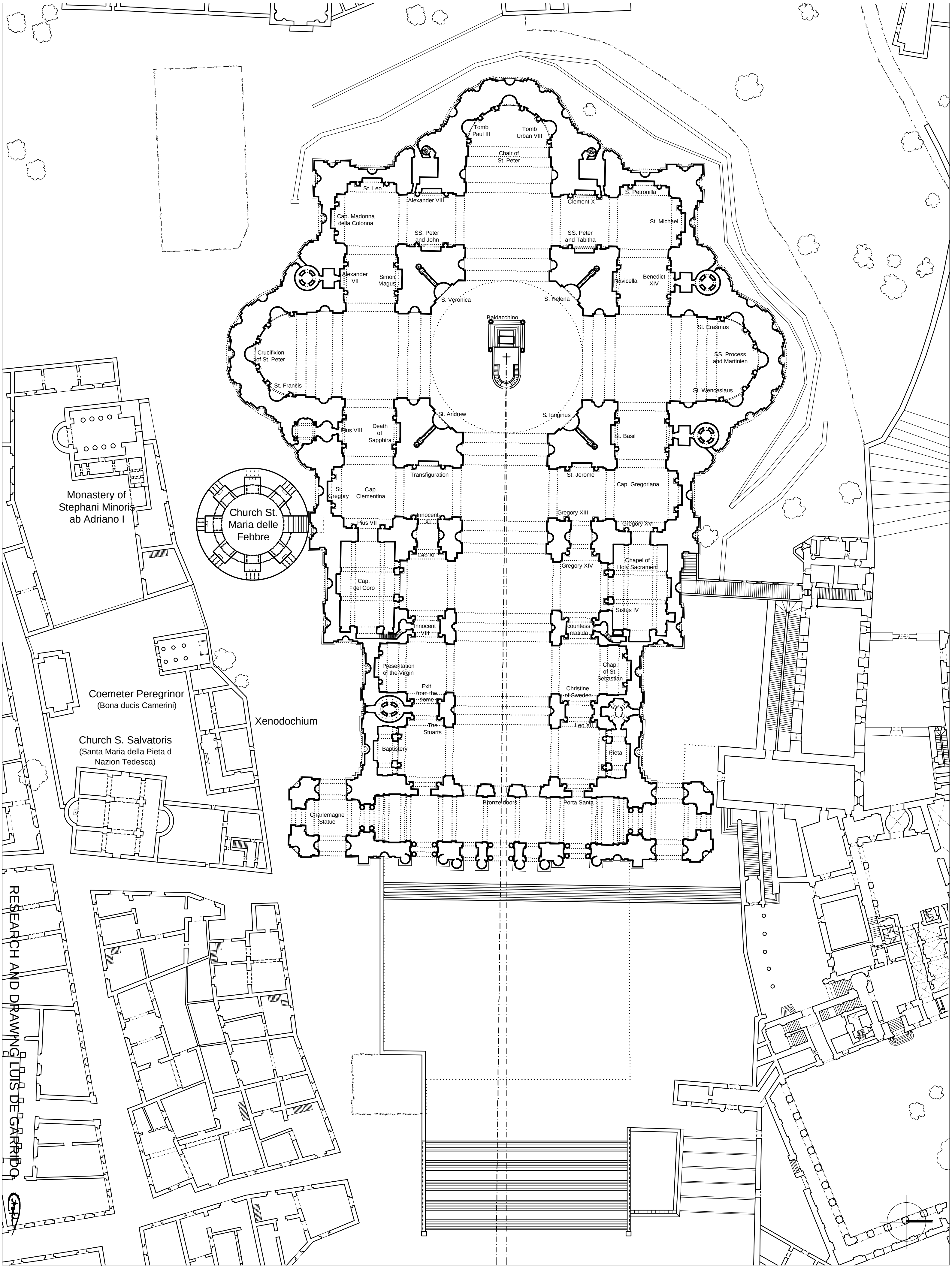
1610	Paul V(1605-1621). BEGINNING OF FACADE CONSTRUCTION. CARLO MADERNO	NSP	CP-16



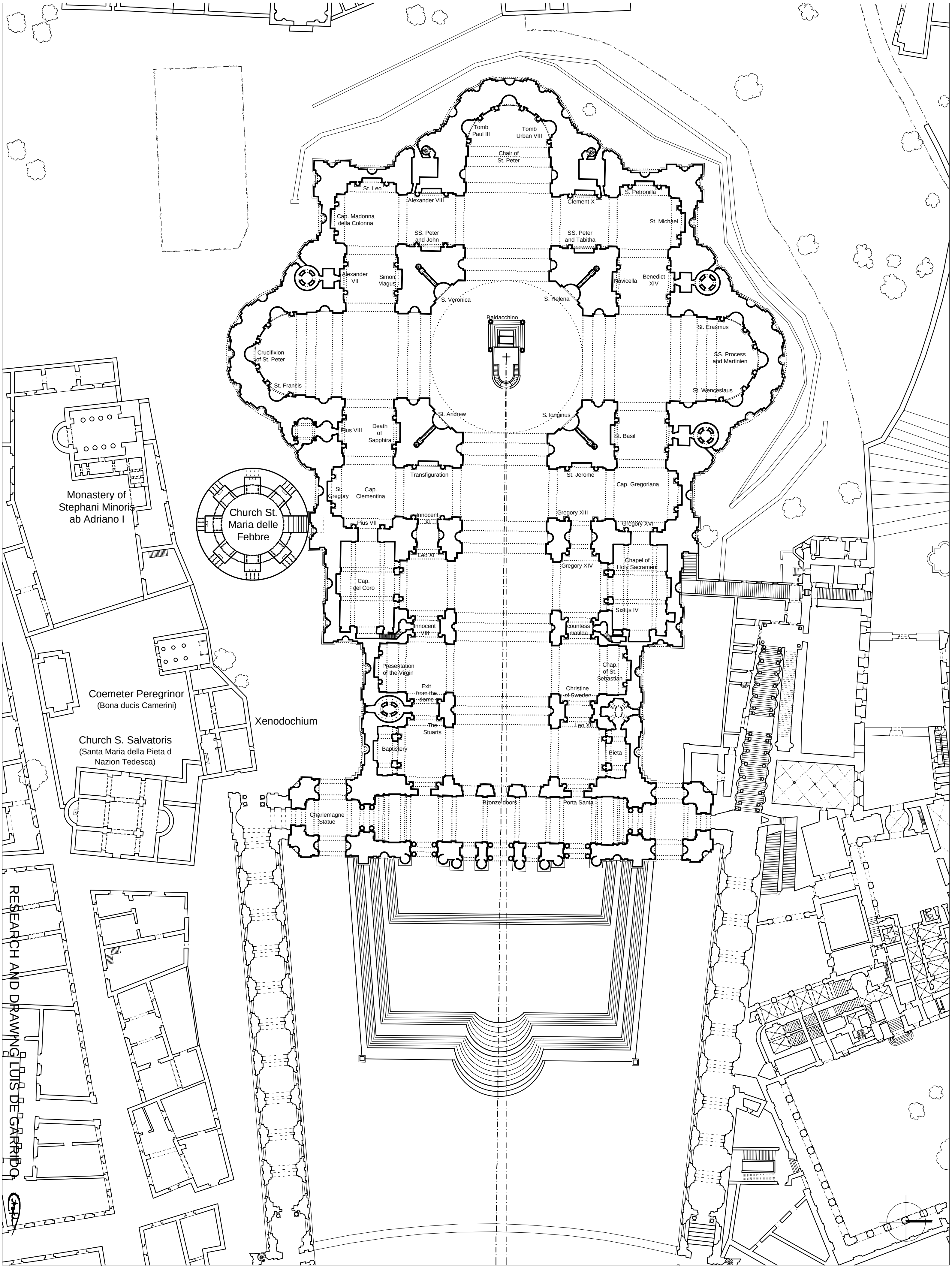
1615	Paul V(1605-1621). EAST ARM CONSTRUCTION	NSP	CP-17



1620	Paul V (1605-1621). COMPLETE DEMOLITION OLD BASILICA	NSP	CP-18



1629	Urban VIII (1623-1644). SIDE BELL TOWERS CONSTRUCTION	NSP	CP-19



1667	Alexander VII (1655-1667). FINAL OF THE NEW BASILICA PROJECT	NSP	CP-20

CONCLUSIONS

Conclusions

The general objective of this Doctoral Thesis is to determine the design process and construction process of the Basilica of S. Peter (old and new buildings) and the temporal evolution of Vatican area.
This general objective consists of three main objectives, which are closely related to each other, and which are the following:

a. Reconstruction by stages of the evolution of the urban structure of the Vatican area, from its origin to the present day

b. Reconstruction of the design process, the construction process and the temporal evolution by stages, of the old basilica of S. Peter

c. Reconstruction of the design process and construction process of the new basilica of S. Peter

Each of these main objectives has been achieved through the different chapters of this Thesis, along with other complementary objectives, as shown below.

Objective a
Reconstruction by stages of the evolution of the urban structure of the Vatican area, from its origin to the present day
This objective has been achieved in Chapter 2 of this Doctoral Thesis. In this chapter a basic historical account has been created, which sequentially describes the most important events that occurred in the Vatican area from its origin to the present. For the creation of this story, a compilation of the most relevant historical references in the history of the Vatican area has been made, they have been ordered sequentially, and have been grouped according to the 29 most representative historical stages. Finally, an improved story has been created, substantially enriched based on the analysis of the collected historical drawings.
In this chapter, a graphic reconstruction of the evolution of the urban structure of the Vatican area has also been made. For this, 29 scale plans have been made,

corresponding to the state of the urban structure on the 29 most representative dates in its history.

Objective b

Reconstruction by stages of the design process, the construction process and the temporal evolution of the old basilica of S. Peter

This objective has been achieved in chapters 3, 4, 5, 6 of this Doctoral Thesis.

The old basilica of S. Peter was built over a long period of time, and stood for an even longer period of time. For this reason, two historical accounts have been created, one about the construction process, and another about the temporal evolution of the old basilica, until it was finally demolished. Based on these basic accounts it has been possible to reconstruct the design process, stage by stage, of the old basilica, taking into account the available historical references. As a result of the identification of the design process, it has been possible to reconstruct the architectural structure of the old basilica once it was built, and based on this, all the stages of its construction process have been also reconstructed.

Chapter 3 has been made a historical account about the construction process of the old basilica of S. Peter, as well as its temporal evolution, from its construction to its demolition.

In order to carry out this historical account, in the first place, the beginning and end of the works have been identified, as well as the most characteristic stages of the construction process of the old basilica of S. Peter. In the same way, the most characteristic stages of its temporal evolution have been identified, from when it was built until it was demolished.

The different available historical references have been compiled, classified and integrated in stages. Based on these references, and based on the analysis of the different historical drawings available, a basic account has been made about the design process and construction process of the old basilica of S. Peter.

Without a doubt there had to be a complete project for the old basilica of S. Peter, since initially a huge platform was built on which the old basilica was built.

In chapter 4 it has been possible to reconstruct all the stages of the design process of the project of the old basilica of S. Peter, by testing with different compositional settings and contrasting the results obtained with the available historical evidence.

The old basilica of S. Peter had to be carefully designed for its social importance, and especially for its religious and political importance. Therefore the different components of the building could not be sized and designed at random. As in any good architectural project, the different architectural elements of the old basilica had to be perfectly geometrically related to each other, as a result of the redundant application of the same set of compositional strategies, and the same set of geometric relationships. The compositional rules and geometric relationships used in the design of the old basilica have been deduced based on a complex and slow, but effective strategy.

Initially, different combinations between certain compositional strategies and certain geometric relationships have been tentatively tested. Based on them, a tentative design process has been rebuilt, defining both the starting point and the way forward. During this design process, the different parts of the basilica are obtained, and whose dimensions must be compared with the dimensions known from the available historical evidence. If any dimension does not match, it is necessary to go back and continue trying a new set of geometric relationships with a new compositional strategy. With this new design process, the different parts of the basilica are once again being obtained, the dimensions of which must be compared, once again, with known historical evidence. Continuing with this process, there will come a time when it is possible to define a certain design process that results in a basilica, in which the dimensions of its different architectural elements coincide with the dimensions of the available historical evidence.

Based on this methodology, the design process of the old basilica of S. Peter has been reconstructed, both in plan and in section, and all its stages have been identified, from the first decision, to the completion of the project.

The identification of the design process allows reconstructing with precision the exact shape and dimensions of all the components of the old basilica of S. Peter, and based on this it has been possible to reconstruct its executive project (floor plan layout and section layout).

The floor plan layout reconstructed in the previous chapter must have basically coincided with the plan that the old basilica could have had around the year 514 when its construction was completed. Therefore, based on this plan, the most important stages of both its construction process and its temporal evolution can be identified, from when it was built until it was demolished.

In chapter 5 the construction process of the old basilica has been identified, graphically reconstructing the state of the building in each of its most characteristic stages, taking into account the available historical references. Based on the state of the building in 514, the main construction actions carried out in each stage have been retraced, and as a result, each of the stages has been graphically defined, quite precisely.

In a complementary way, this chapter has identified the most important stages in the evolution of the old basilica of S. Peter throughout history, since it was built in 514, until 1505, shortly before starting to be demolished, to make way for the construction of the new basilica.

Each stage of the construction process and of the temporal evolution of the old basilica of S. Peter has been carried out by means of floor plans to scale, with the greatest possible detail. The floor plans not only show the evolution of the old basilica, but also the evolution of the buildings in its environment.

Two secondary objectives have also been achieved in this chapter.

As a consequence of the reconstruction of the most important stages of the construction process and of the temporal evolution, it has been possible to complete a detailed historical account on the evolution of the old basilica from the beginning of its construction, until which was finally shot down.

Secondly, it has been possible to gather a very extensive and complete bibliography, related to the process of design and construction of the old basilica, and which can undoubtedly facilitate the work of historians who wish to carry out specific research on certain aspects related to the old basilica of S. Peter.

In chapter 6, based on the information generated in chapters 4 and 5, and taking into account the historical documentation and available historical drawings, it has been possible to reconstruct the appearance of the old basilica of S. Peter, in three fundamental stages of its existence:

- year 514. When the old basilica was completely built
- year 1003. Towards the middle of the existence of the old basilica
- year 1505. When the old basilica began to fall

The reconstruction of the appearance of the old basilica in these three stages has been carried out by means of floor plans to scale, with as much detail as possible, and with the most important dimensions. One of the most outstanding aspects of the drawings made is the reconstruction of the variation in the level of the surrounding terrain on each side of the old basilica. It is observed how with the passage of time, the level of the ground on the south side of the basilica gradually rose, as a consequence of the continuous paving of the ground.

The plans made for each stage have been the following:

- Floor plan layout
- Cross section
- Longitudinal section
- South facade
- East facade
- East facade to the Atrium
- West facade

The plans have been made with all rigor and accuracy, and represent in detail the different parts of the old basilica of S. Peter and the attached buildings. For this reason, these plans can be very useful for historians who wish to investigate a specific aspect of the old basilica and its immediate surroundings.

Objective c

Reconstruction by stages of the design and construction process of the new basilica of S. Peter

This objective has been achieved in chapters 7, 8, 9 of this Doctoral Thesis

In Chapter 7, a complete historical account of the design and construction process of the new basilica has been made, from its beginning in the time of Pope Nicholas V (1447-1455), until its completion in the time of Pope Alexander VII (1655-1667). To carry out the historical account, a large number of historical references and historical studies related to the design process and the construction process of the new basilica have been grouped, classified and integrated.

The story has been structured based on the consecutive historical periods identified in the design and construction process. These periods have been delimited, in turn, based on the presence of the most important actors in the design process (popes and architects), whose activity has directly influenced the evolution of the construction process of the new basilica of S. Peter.

Undoubtedly, this story has a great historical value since it allows knowing with the greatest possible rigor the design process and construction process of the new basilica, and contains an enormous amount of historical references, for those scholars who wish to investigate in detail any specific aspect of it.

The account carried out has complemented the previously existing accounts due to the exhaustive collection of historical data, and especially due to the conclusions obtained in the analysis made of the different projects of the new basilica of S. Peter. The rigorous analysis of these projects has made it possible to complement existing gaps in the previously existing partial historical accounts, and has provided a robust thread for the genesis of a complete account.

Of course, the account does not pretend to be exhaustive, and surely contains deductions that, based on new information that may appear in the future, may be partially modified. However, these small possible changes can undoubtedly enrich the present story, but they would not alter its validity, its essence and its basic structure.

In chapter 8, based on the complete historical account that has been made in the previous chapter, it can be deduced that the design process of the new basilica was extremely complex, and involved the activity of several architects in various historical stages.

The design process originated from the will of Nicholas V to carry out a major renovation of the old basilica of S. Peter. However, he hardly carried out a few small works in the western area. These small works were insignificant and hardly involved the construction of the foundation of a new western apse. However, these small foundations had enormous importance in the future of the building, due to the will of Julius II that these foundations be used to build a new apse that would contain his own funerary chapel.

Julius II created a complicated design strategy based on the creation of a team made up of three architects, who competed and cooperated with each other, and something would only be built without being agreed upon by the three architects. There should always be three architects, and upon the death of one architect another would take his place. In general, each architect made proposals independently, which should integrate the parts already built. Of all the proposals made, only those that enjoyed the consensus of the three architects were partially built. In this way the work progressed, building only some fragments included in some of the projects carried out by one of the architects belonging to the group.

Sometimes it was even decided to demolish some parts already built so that the projects that everyone liked the most could be carried out.

This general process had some exceptions. For example, at the beginning of the design process Bramante had an enormous role over its competitors, and of course Michelangelo completely destroyed its structure since, as usual, he worked alone and did not accept any collaborator. After Michelangelo, the structure devised by Julius II remained, but the main architect had a greater role over the others, who became simply his collaborators.

In short, a huge number of projects were carried out throughout the process, but only a few of them were used for construction.

In this chapter, the projects that were used in the construction of the building, or that at least were binding in certain aspects of its construction, have been analyzed and reconstructed.

Especially important has been the reconstruction of the "central nucleus of Bramante", whose project has not reached us, but which undoubtedly existed, since it necessarily had to be used for the beginning of the construction of the new basilica of S. Peter.

Due to the maximum limitation of 50 Megabytes that a Doctoral Thesis in Spain must have, only the projects directly used in the construction process have been reconstructed stage by stage, and they are the following:

- Nicholas V reform project
- Bramante Central Nucleus Project
- Project of the apse of Julio II
- Projects of the Bramante-Raffaello-Antonio Sangallo ambulatory
- Michelangelo Project
- Maderno projects

All the projects carried out for the new basilica of S. Peter have been analyzed, and they have been rebuilt stage by stage. However and due to the limitation of size, this chapter only shows the most important projects, and of all of them only an initial stage is shown, and the final stage, together with the superposition with the historical drawing that has been rebuilt.

Special attention has been devoted to the analysis and reconstruction of the first projects carried out by Bramante and Giuliano da Sangallo. In the same way, an exhaustive analysis has been carried out on the different architectural typologies that can be achieved with these initial projects, as well as the evolution from one project to another. All this with the purpose of demonstrating the genesis of a new architectural typology created by Giuliano da Sangallo and Bramante, and which throughout this Thesis has been called "mixed quincunx-naves typology".

With this mixed typology, a building can be made with the purity of a centralized typology, but at the same time it can be lengthened in an easterly direction, where the Vatican Square was located, and where a new Loggia of the Blessings should be located.

The sequence of the different executive projects allows for a detailed reconstruction of all the design decisions made by the different architects involved in the design process. In this way, it has been possible to reconstruct the design process, as if it had been carried out from start to finish, by a single architect.

As a final result of the design process, detailed floor plans of the final building, existing today, have been obtained. The deduced dimensions of the different architectural elements of the new basilica coincide almost exactly with the measurements made directly on the building.

This legitimizes that the deduced design process basically coincides with the sequential design process carried out by the different architects involved in the design of the new basilica.

In chapter 9, based on the reconstruction of the different projects directly linked to the construction process, it has been possible to rebuild the exact shape and dimensions of the current basilica of S. Peter. These dimensions coincide almost exactly with measurements made directly on the current building, with advanced laser measurement technologies.

In this chapter, and based on the plans obtained in the previous chapter, the construction process of the new basilica has been identified, graphically

reconstructing the state of the building in each of its most significant stages, taking into account the historical references available.
Starting from the current state of the building, the main construction actions carried out in each stage have been retraced, and with this it has been possible to graphically define the state of the works in each one of them.
Each stage of the construction process of the new basilica of S. Peter has been carried out by means of floor plans to scale, with the greatest possible detail. The floor plans not only show the evolution of the new basilica, but also the evolution of the buildings in its immediate environment.

Value and usefulness of the results obtained

The results of this Doctoral Thesis can be of great use to historians who wish to investigate certain specific aspects of the old and new basilica of S. Peter.

First, the scale plans of the Vatican area are of great importance for the History of Art, and can be very useful in several aspects, among which the following stand out:

1. They allow a better understanding of the history of the Vatican area, and especially its social, artistic, architectural and urban development
2. They allow contextualizing isolated events in the history of art in the Vatican area and its immediate surroundings
3. They allow the visualization of the urban structure of the Vatican area in each of its historical stages
4. They allow a better understanding of the most important architectural and urban actions carried out at each stage
5. They make it possible to identify the main urban plan layouts that, like historical scars, have characterized the evolution of the Vatican area
6. They provide a suitable context for the analysis of the historical evolution of the most important buildings in the Vatican area, such as the old Constantinian basilica, the new basilica of S. Peter, the Mausoleum of the Severan dynasty, the Mausoleum of Honorius, the Circus of Nero, and many others
7. They provide a detailed graphic context to frame future research on specific aspects, or specific buildings, included in the Vatican area

Second, the identification of all the stages of the design and construction process of the old basilica of S. Peter is of great importance for the History of Art, and can be very useful in several aspects, among which the following stand out:

1. It provides a better understanding of the history of the old basilica of S. Peter
2. It provides a greater understanding of the architectural design methodology in ancient Rome
3. It allows knowing in more detail, the shape and dimensions of old S. Peter
4. It offers a general framework for the detailed study of certain aspects of the old basilica of S. Peter
5. It allows the visualization of all the historical facts related to the old basilica of S. Peter, from its inception to its demolition
6. It allows knowing in detail the buildings attached to the old basilica of S. Peter
7. It allows knowing in detail the design process of the old basilica of S. Peter
8. It allows knowing the evolution of the construction process of old S. Peter
9. It allows knowing the evolution of the old basilica over time, especially the modifications, extensions and reforms of its architectural structure

In third place, the identification of all the stages of the design and construction process of the new basilica of S. Peter is of great importance for the History of Art, and can be very useful in several aspects, among which the following stand out:

1. It provides a better understanding of the history of the new basilica of S. Peter
2. It provides a better understanding of the architectural design methodology in the Renaissance
3. It offers a general framework for the detailed study of certain aspects of the new basilica of S. Peter
4. It allows the visualization of all the historical facts related to the new S. Peter
5. It allows knowing in detail the buildings annexed to the new basilica of S. Peter
6. It allows knowing in detail the design process of the new basilica of S. Peter
7. It allows knowing the evolution of the construction process of the new S. Peter

Without a doubt, the work carried out in this Doctoral Thesis can be useful for many people and in many aspects. However, perhaps its greatest contribution is that it allows the creation of a more complete account of the history of S. Peter's Basilica in the Vatican, which has undoubtedly become one of the greatest symbols of Western culture, and which has been the effect and cause of a way of thinking, which has evolved over time.

The Basilica of S. Peter, more than a symbol of a certain religion, has become the symbol of human power.

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APPENDIX

Appendix. List of Popes

order	*English name*	*papacy*	*spanish name*
1.	Simon Peter	(37-53)	Simón Pedro
2.	Linus	(64/67-76)	Lino
3.	Anacletus	(79-92)	Anacleto
4.	Clement I	(88-99)	Clemente
5.	Evaristus	(98-105)	Evaristo
6.	Alexander I	(106-115)	Alejandro I
7.	Sixtus I	(115-125)	Sixto I
8.	Telesphorus	(125-136)	Telesforo
9.	Hyginus	(136-140)	Higinio
10.	Pius I	(140-154)	Pio I
11.	Anicetus	(154-167)	Aniceto
12.	Soter	(167-175)	Sotero
13.	Eleutherius	(175-189)	Eleuterio
14.	Victor I	(189-199)	Víctor I
15.	Zephyrinus	(199-217)	Ceferino
16.	Callistus I	(217-222)	Calixto I
17.	Urban I	(222-230)	Urbano I
18.	Pontian	(230-235)	Pontiano
19.	Anterus	(235-236)	Antero
20.	Fabian	(236-250)	Fabian
21.	Cornelius	(251-253)	Cornelio
22.	Lucius I	(253-254)	Lucio I
23.	Stephen I	(254-257)	Esteban I
24.	Sixtus II	(257-258)	Sixto II
25.	Dionysus	(259-268)	Dionisio
26.	Félix I	(269-274)	Félix I
27.	Eutychian	(275-283)	Eutiquio
28.	Caius	(283-296)	Cayo
29.	Marcellinus	(296-304)	Marcelino
30.	Marcellus I	(308-309)	Marcelo I

31.	Eusebius	(309-310)	Eusebio
32.	Miltiades	(311-314)	Melquíades
33.	**Sylvester I**	**(314-335)**	**Silvestre I**
34.	Mark	(336-336)	Marcos
35.	Julius I	(337-352)	Julio I
36.	Liberius	(352-366)	Liberio
37.	Damasus I	(366-384)	Damaso I
38.	Siricius	(384-399)	Siricio
39.	Anastasius I	(399-401)	Anastasio I
40.	Innocent I	(401-417)	Inocencio I
41.	Zosimus	(417-418)	Zosimo
42.	Boniface I	(418-422)	Bonifacio I
43.	Celestine I	(422-432)	Celestino I
44.	Sixtus III	(432-440)	Sixto III
45.	Leo I	(440-461)	León I
46.	Hilarius	(461-468)	Hilario
47.	Simplicius	(468-483)	Simplicio
48.	Felix III	(483-492)	Felix III
49.	Gelasius I	(492-496)	Gelasio I
50.	Anastasius II	(496-498)	Anastasio II
51.	Symmachus	(498-514)	Simaco
52.	Hormisdas	(514-523)	Hormisdas
53.	John I	(523-526)	Juan I
54.	Felix IV	(526-530)	Félix IV
55.	Boniface II	(530-532)	Bonifacio II
56.	John II	(533-535)	Juan II
57.	Agapetus I	(535-536)	Agapito I
58.	Silverius	(536-537)	Silverio
59.	Vigilius	(537-555)	Vigilio
60.	Pelagius I	(556-561)	Pelagio
61.	John III	(561-574)	Juan III
62.	Benedict I	(575-579)	Benedicto I
63.	Pelagius II	(579-590)	Pelagio II
64.	Gregory I	(590-604)	Gregorio I

65.	Sabinian	(604-606)	Sabiniano
66.	Boniface III	(607-607)	Bonifacio III
67.	Boniface IV	(608-615)	Bonifacio IV
68.	Adeodatus I	(615-618)	Adeodato I
69.	Boniface V	(619-625)	Bonifacio V
70.	Honorius I	(625-638)	Honorio I
71.	Severinus	(640-640)	Severino
72.	John IV	(640-642)	Juan IV
73.	Theodore I	(642-649)	Teodoro I
74.	Martin I	(649-655)	Martin I
75.	San Eugene I	(654-657)	San Eugenio I
76.	Vitalian	(657-672)	Vitaliano
77.	Adeodatus II	(672-676)	Adeodato II
78.	Donus	(676-678)	Dono
79.	Agatho	(678-681)	Agaton
80.	Leo II	(682-683)	León II
81.	Benedict II	(684-685)	Benedicto II
82.	John V	(685-686)	Juan V
83.	Conon	(686-687)	Conon
84.	Sergius I	(687-701)	Sergio I
85.	John VI	(701-705)	Juan VI
86.	John VII	(705-707)	Juan VII
87.	Sisinnius	(708-708)	Sisinio
88.	Constantine	(708-715)	Constantino
89.	Gregory II	(715-731)	Gregorio II
90.	Gregory III	(731-741)	Gregorio III
91.	Zachary	(741-752)	Zacarías
92.	Stephen II	(752-757)	Esteban II
93.	Paul I	(757-767)	Pablo I
94.	Stephen III	(768-772)	Esteban III
95.	Adrian I	(772-795)	Adriano I
96.	Leo III	(795-816)	León III
97.	Stephen IV	(816-817)	Esteban IV
98.	Paschal I	(817-824)	Pascual I

99.	Eugene II	(824-827)	Eugenio II
100.	Valentine	(827-827)	Valentin
101.	Gregory IV	(827-844)	Gregorio IV
102.	Sergius II	(844-847)	Sergio II
103.	Leo IV	(847-855)	León IV
104.	Benedict III	(855-858)	Benedicto III
105.	Nicholas I	(858-867)	Nicolas I
106.	Adrian II	(867-872)	Adriano II
107.	John VIII	(872-882)	Juan VIII
108.	Marinus I	(882-884)	Marino I
109.	Adrian III	(884-885)	Adriano III
110.	Stephen V	(885-891)	Esteban V
111.	Formosus	(891-896)	Formoso
112.	Boniface VI	(896-896)	Bonifacio VI
113.	Stephen VI	(896-897)	Esteban VI
114.	Romanus	(897-897)	Romano
115.	Theodore II	(897-897)	Teodoro II
116.	John IX	(898-900)	Juan IX
117.	Benedict IV	(900-903)	Benedicto IV
118.	Leo V	(903-904)	León V
119.	Sergius III	(904-911)	Sergio III
120.	Anastasius III	(911-913)	Anastasio III
121.	Lando	(913-914)	Landó
122.	John X	(914-928)	Juan X
123.	Leo VI	(928-928)	León VI
124.	Stephen VII	(928-931)	Esteban VII
125.	John XI	(931-935)	Juan XI
126.	Leo VII	(936-939)	León VII
127.	Stephen VIII	(939-942)	Esteban VIII
128.	Marinus II	(942-946)	Marino II
129.	Agapetus II	(946-955)	Agapito II
130.	John XII	(965-972)	Juan XII
131.	Benedict V	(964-964)	Benedicto V
132.	Leo VIII	(964-965)	León VIII

133.	John XIII	(965-972)	Juan XIII
134.	Benedict VI	(973-974)	Benedicto VI
135.	Benedict VII	(974-983)	Benedicto VII
136.	John XIV	(983-984)	Juan XIV
137.	John XV	(985-996)	Juan XV
138.	Gregory V	(996-999)	Gregorio V
139.	Sylvester II	(999-1003)	Silvestre II
140.	John XVII	(1003-1003)	Juan XVII
141.	John XVIII	(1004-1009)	Juan XVIII
142.	Sergius IV	(1009-1012)	Sergio IV
143.	Benedict VIII	(1012-1024)	Benedicto VIII
144.	John XIX	(1024-1032)	Juan XIX
145.	Benedict IX	(1032-1044)	Benedicto IX
146.	Sylvester III	(1045-1045)	Silvestre III
147.	Benedict IX	(1045-1045)	Benedicto IX
148.	Gregory VI	(1045-1046)	Gregorio VI
149.	Clement II	(1046-1047)	Clemente II
150.	Benedict IX	(1047-1048)	Benedicto IX
151.	Damasus II	(1048-1048)	Damaso II
152.	Leo IX	(1049-1054)	León IX
153.	Victor II	(1055-1057)	Victor II
154.	Stephen IX	(1057-1058)	Esteban IX
155.	Nicholas II	(1059-1061)	Nicolás II
156.	Alexander II	(1061-1073)	Alejandro II
157.	Gregory VII	(1073-1085)	Gregorio VII
158.	Víctor III	(1086-1087)	Victor III
159.	Urban II	(1088-1099)	Urbano II
160.	Paschal II	(1099-1118)	Pascual II
161.	Gelasius II	(1118-1119)	Gelasio II
162.	Callixtus II	(1119-1124)	Calixto II
163.	Honorius II	(1124-1130)	Honorio II
164.	Innocent II	(1130-1143)	Inocencio II
165.	Celestine II	(1143-1144)	Celestino II
166.	Lucius II	(1144-1145)	Lucio II

167.	Eugene III	(1145-1153)	Eugenio III
168.	Anastasius IV	(1153-1154)	Anastasio IV
169.	Adrian IV	(1154-1159)	Adriano IV
170.	Alexander III	(1159-1181)	Alejandro III
171.	Lucius III	(1181-1185)	Lucio III
172.	Urban III	(1185-1187)	Urbano III
173.	Gregory VIII	(1187-1187)	Gregorio VIII
174.	Clement III	(1187-1191)	Clemente III
175.	Celestine III	(1191-1198)	Celestino III
176.	Innocent III	(1198-1216)	Inocencio III
177.	Honorius III	(1216-1227)	Honorio III
178.	Gregory IX	(1227-1241)	Gregorio IX
179.	Celestine IV	(1241-1241)	Celestino IV
180.	Innocent IV	(1243-1254)	Inocencio IV
181.	Alexander IV	(1254-1261)	Alejandro IV
182.	Urban IV	(1261-1264)	Urbano IV
183.	Clement IV	(1265-1268)	Clemente IV
184.	Gregory X	(1271-1276)	Gregorio X
185.	Innocent V	(1276-1276)	Inocencio V
186.	Adrian V	(1276-1276)	Adriano V
187.	John XXI	(1276-1277)	Juan XXI
188.	Nicholas III	(1277-1280)	Nicolás III
189.	Martín IV	(1281-1285)	Martin IV
190.	Honorius IV	(1285-1287)	Honorio IV
191.	Nicholas IV	(1288-1292)	Nicolás IV
192.	Celestine V	(1294-1294)	Celestino V
193.	Boniface VIII	(1294-1303)	Bonifacio VIII
194.	Benedict XI	(1303-1304)	Benedicto XI
195.	Clement V	(1305-1314)	Clemente V
196.	John XXII	(1316-1334)	Juan XXII
197.	Benedict XII	(1334-1342)	Benedicto XII
198.	Clement VI	(1342-1352)	Clemente VI
199.	Innocent VI	(1352-1362)	Inocencio VI
200.	Urban V	(1362-1370)	Urbano V

201.	Gregory XI	(1370-1378)	Gregorio XI
202.	Urban VI	(1378-1389)	Urbano VI
203.	Boniface IX	(1389-1404)	Bonifacio IX
204.	Innocent VII	(1404-1406)	Inocencio VII
205.	Gregory XII	(1406-1415)	Gregory XII
206.	Martin V	(1417-1431)	Martín V
207.	Eugene IV	(1431-1447)	Eugenio IV
208.	**Nicholas V**	**(1447-1455)**	**Nicolas V**
209.	Callixtus III	(1455-1458)	Calixto III
210.	Pius II	(1458-1464)	Pio II
211.	Paul II	(1464-1471)	Pablo II
212.	Sixtus IV	(1471-1484)	Sixto IV
213.	Innocent VIII	(1484-1492)	Inocencio VIII
214.	Alexander VI	(1492-1503)	Alejandro VI
215.	Pius III	(1503-1503)	Pio III
216.	**Julius II**	**(1503-1513)**	**Julio II**
217.	Leo X	(1513-1521)	León X
218.	Adrian VI	(1522-1523)	Adriano VI
219.	Clement VII	(1523-1534)	Clemente VII
220.	**Paul III**	**(1534-1549)**	**Pablo III**
221.	Julius III	(1550-1555)	Julio III
222.	Marcellus II	(1555-1555)	Marcelo II
223.	Paul IV	(1555-1559)	Pablo IV
224.	Pius IV	(1559-1565)	Pio IV
225.	Pius V	(1566-1572)	Pio V
226.	Gregory XIII	(1572-1585)	Gregorio XIII
227.	**Sixtus V**	**(1585-1590)**	**Sixto V**
228.	Urban VII	(1590-1590)	Urbano VII
229.	Gregory XIV	(1590-1591)	Gregorio XIV
230.	Innocent IX	(1591-1591)	Inocencio IX
231.	Clement VIII	(1592-1605)	Clemente VIII
232.	Leo XI	(1605-1605)	León XI
233.	**Paul V**	**(1605-1621)**	**Pablo V**
234.	Gregory XV	(1621-1623)	Gregorio XV

235.	Urban VIII	(1623-1644)	Urbano VIII
236.	Innocent X	(1644-1655)	Inocencio X
237.	**Alexander VII**	**(1655-1667)**	**Alejandro VII**
238.	Clement IX	(1667-1669)	Clemente IX
239.	Clement X	(1670-1676)	Clemente X
240.	Innocent XI	(1676-1689)	Inocencio XI
241.	Alexander VIII	(1689-1691)	Alejandro VIII
242.	Innocent XII	(1691-1700)	Inocencio XII
243.	Clement XI	(1700-1721)	Clemente XI
244.	Innocent XIII	(1721-1724)	Inocencio XIII
245.	Benedict XIII	(1724-1730)	Benedicto XIII
246.	Clement XII	(1730-1740)	Clemente XII
247.	Benedict XIV	(1740-1758)	Benedicto XIV
248.	Clemente XIII	(1758-1769)	Clemente XIII
249.	Clement XIV	(1769-1774)	Clemente XIV
250.	Pius VI	(1775-1799)	Pio VI
251.	Pius VII	(1800-1823)	Pio VII
252.	Leo XII	(1823-1829)	León XII
253.	Pius VIII	(1829-1830)	Pio VIII
254.	Gregory XVI	(1831-1846)	Gregorio XVI
255.	Pius IX	(1846-1878)	Pio IX
256.	Leo XIII	(1878-1903)	León XIII
257.	Pius X	(1903-1914)	Pio X
258.	Benedict XV	(1914-1922)	Benedicto XV
259.	Pius XI	(1922-1939)	Pio XI
260.	Pius XII	(1939-1958)	Pio XII
261.	John XXIII	(1958-1963)	Juan XXIII
262.	Paul VI	(1963-1978)	Pablo VI
263.	John Paul I	(1978-1978)	Juan Pablo I
264.	John Paul II	(1978-2005)	Juan Pablo II
265.	Benedict XVI	(2005-2013)	Benedicto XVI
266.	**Francis**	**(2013-)**	**Francisco**

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