



Preliminary Hydrology and Hydraulics Report

## PRELIMINARY HYDROLOGY & HYDRAULICS REPORT

Cheval Blanc Beverly Hills 449 N. Rodeo Drive Beverly Hills, CA 90210

**September 10, 2020** 

#### PREPARED FOR:

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#### **References**

Hydraulic Design Manual. Los Angeles County Flood Control District, March 1982.

#### **Section 100: Introduction**

#### 100.1 Introduction

The Project site is comprised of 1.28 acres located at 449 (Inclusive of 451 and 453), 456, and 468 N. Rodeo Drive, and 461 (Inclusive of 463 and 465) N. Beverly Drive in Beverly Hills, CA. The proposed site development includes a multi-story mixed-use development with a 115-key hotel and 91,592 square feet (sf) of commercial retail, private club restaurant, and amenity space. The Project will also include private internal driveways, landscaping, stormwater conveyance and treatment structures/utilities, and subterranean parking. This technical memorandum provides a preliminary storm water design for the Project. It considers existing and proposed conditions and provides calculations for the sizing of storm drain pipes and associated structures.

#### 100.2 Methodology

The Los Angeles County Department of Public Works Hydrology Map was used to determine the approximate rainfall during a 50-year storm on the site. This hydrology map contains historical rainfall data from the previous 40-80 years at 99 rainfall gauges across the County. HydroCalc was used to determine the pre- and post-development on-site flows. The calculations are included in Appendix A.

#### 100.3 Existing Drainage Conditions

The elevation of the site ranges from approximately 265 to 262 feet above mean sea level (MSL). In the existing condition, stormwater runoff from the surface parking areas and alley sheet flows south towards Brighton Way at a slope of approximately 1%.

The runoff from the roof areas of the existing buildings discharges at the curb face of the frontage streets of N. Rodeo Drive, S. Santa Monica Boulevard, and N. Beverly Drive via curb and parkway drains respectively. The runoff is then conveyed via a concrete curb and gutter south towards Brighton Way where it discharges into the public storm drain system.

See Exhibit 1 – Existing Drainage Area Map for details.

## 100.4 Proposed Drainage Conditions

The Project site improvements will include constructing storm drainage infrastructure, including storm drain inlets internal to the site and within the private driveways, to convey onsite runoff to a stormwater treatment system. The proposed stormwater treatment system will consist of an underground rainwater harvesting cistern which will capture the stormwater runoff and then dispose of it via metered discharge to the City's system. See Table 1 on page 2 for a summary of the Pre- and Post-Development Conditions.

**Table 1: Pre- and Post-Development Conditions** 

Construction site area	<u>1.28</u>	acres
Percent impervious before construction	<u>100</u>	%
Percent pervious before construction	<u>0</u>	%
Percent impervious after construction	<u>87</u>	%
Percent pervious after construction	<u>13</u>	%

Per the ALTA/Topographic Survey provided by Calvada Surveying Inc., dated 4/28/2020, there is an existing City-maintained catch basin north of the site near the intersection of N. Rodeo Drive and S. Santa Monica Boulevard. Onsite runoff that exceeds the required stormwater treatment volume will overflow to the catch basin via a direct connection from an underground storm drain pipe.

A summary of proposed drainage areas and their associated flows are as follows:

**Area-1:** Area-1 is comprised of building and driveway area (87% impervious) with landscape areas located on the ground, balcony, and roof levels (13% pervious). The landscape areas are comprised of landscape planters and tree wells with substantial soil depth for incidental stormwater treatment and thus can be considered pervious. See Appendix B – Landscape Plans for additional information.

This drainage tributary area has a  $Q_{50}$  flow of 3.63 cfs. The onsite runoff will be captured by the roof drains/area drains and conveyed via the stormwater pipe network to the stormwater treatment system and associated overflow structure. The overflow from the underground cistern will be discharged to the catch basin at N. Rodeo Drive and S. Santa Monica Blvd. and conveyed to the public storm drain system to the north of the proposed development.

The Project will decrease the total runoff for the  $Q_{50}$  from pre-development to post-development conditions by 0.08 cfs (3.63 cfs existing vs 3.71 cfs proposed). See Table 2 below for a summary of the existing and proposed drainage areas and flows. Refer to Exhibit 1 for the Existing Drainage Area Map, and Exhibit 2 for the Proposed Drainage Area Map.

Table 2: Existing and Proposed Drainage Areas and Flows

Drainage Area Number	Drainage Area (Acres)	50-year Flow (CFS)
EX-1	0.41	1.17
EX-2	0.23	0.66
EX-3	0.48	1.37
EX-4	0.18	0.51
Total Pre-Dev.	1.28	3.71
AREA-1	1.28	3.63
Total Post-Dev.	1.28	3.63

#### 100.5 LID Design Criteria & Feasibility Analysis

Proposed peak mitigated flows and volumes have been calculated using the Los Angeles County HydroCalc Calculator. Per the Los Angeles County Department of Public Works' requirements, the peak mitigated flows and mitigated volumes are based on the 85<sup>th</sup>

Percentile of rainfall or 3/4" rainfall, whichever is greater. Our analysis shows the 85<sup>th</sup> Percentile to be greater, which shows to be 1.12 inches.

The tributary area of the site of 1.28 acres includes building area, proposed paved traffic circulation area, and landscaping. The peak mitigated discharge volume was calculated to be 4,099 cubic feet per the LA County HydroCalc Calculator.

Per the Preliminary Geotechnical Engineering Investigation performed by Feffer Geological Consulting, dated March, 5, 2020, a stormwater infiltration system is not recommended at the site due to the observed groundwater level of 50 feet below the surface, and proposed subgrade parking extending to a total maximum depth of 44 feet. Since a minimum of 10 feet is required from the groundwater level to the bottom of a proposed infiltration device, it is reasonable to assume that infiltration is not feasible for the Project. Thus, a rainwater harvesting system is proposed for the Project. Stormwater will be pre-treated with an approved pretreatment structure prior to entering the cistern. Stormwater will then be metered out to the City storm drain system in coordination with the City, as irrigation for the site will be provided via greywater reuse.

#### Sample Rainwater Harvesting System OVERFLOW OUTLET ACCESS COVER ACCESS COVER HDPE RISER PIPE OPTIONAL PUMP MANHOLE WATER LINE TO REUSE OR FINAL TREATMENT FOR REUSE 22 FLOATING INTAKE CALMING FLOATING INTAKE OPTIONAL SUITABLE ITY OF OUTLET TO PUMP OR FINAL TREATMENT SUBMERSIBLE OPTIONAL INTERNAL W/ FLOAT CONTROL Typical underground cistern components

#### 100.6 Conclusions

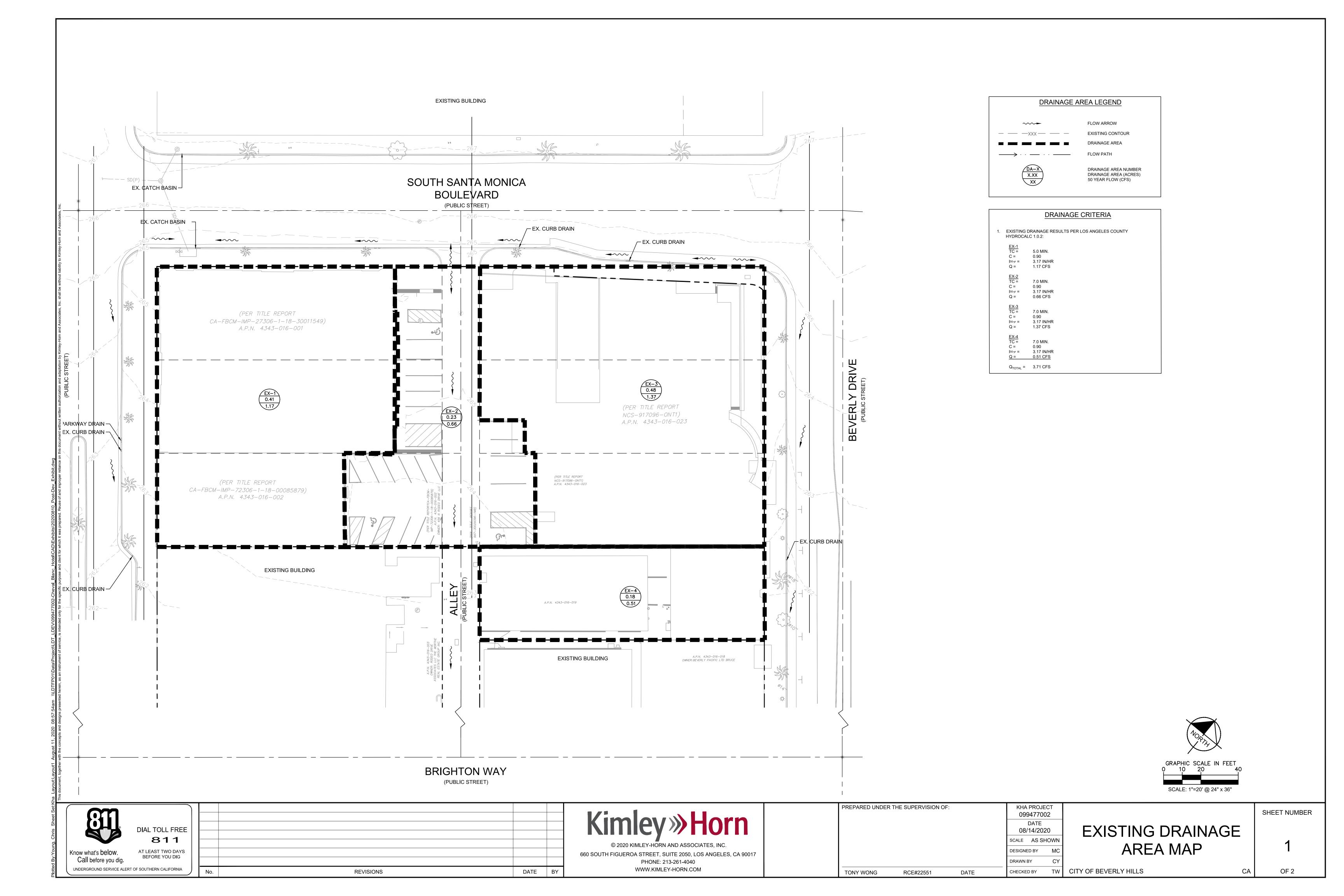
The Project's proposed drainage system is designed to provide storm water control and quality measures based on the current City of Beverly Hills requirements. The Project has been analyzed for adherence to Low Impact Development (LID) design requirements for stormwater treatment, along with stormwater runoff control for the 50-year (Q50) storm event per the Los Angeles County requirements.

The analysis shows that the proposed development will decrease the overall runoff flow. Runoff will ultimately discharge to the existing catch basin to the north of the site near the intersection of S. Santa Monica Boulevard and N. Rodeo Drive. Since the total runoff from the site will decrease in the post-development condition, it has been determined that the existing storm drain system has adequate capacity for the proposed development.

#### 100.7 Limitations

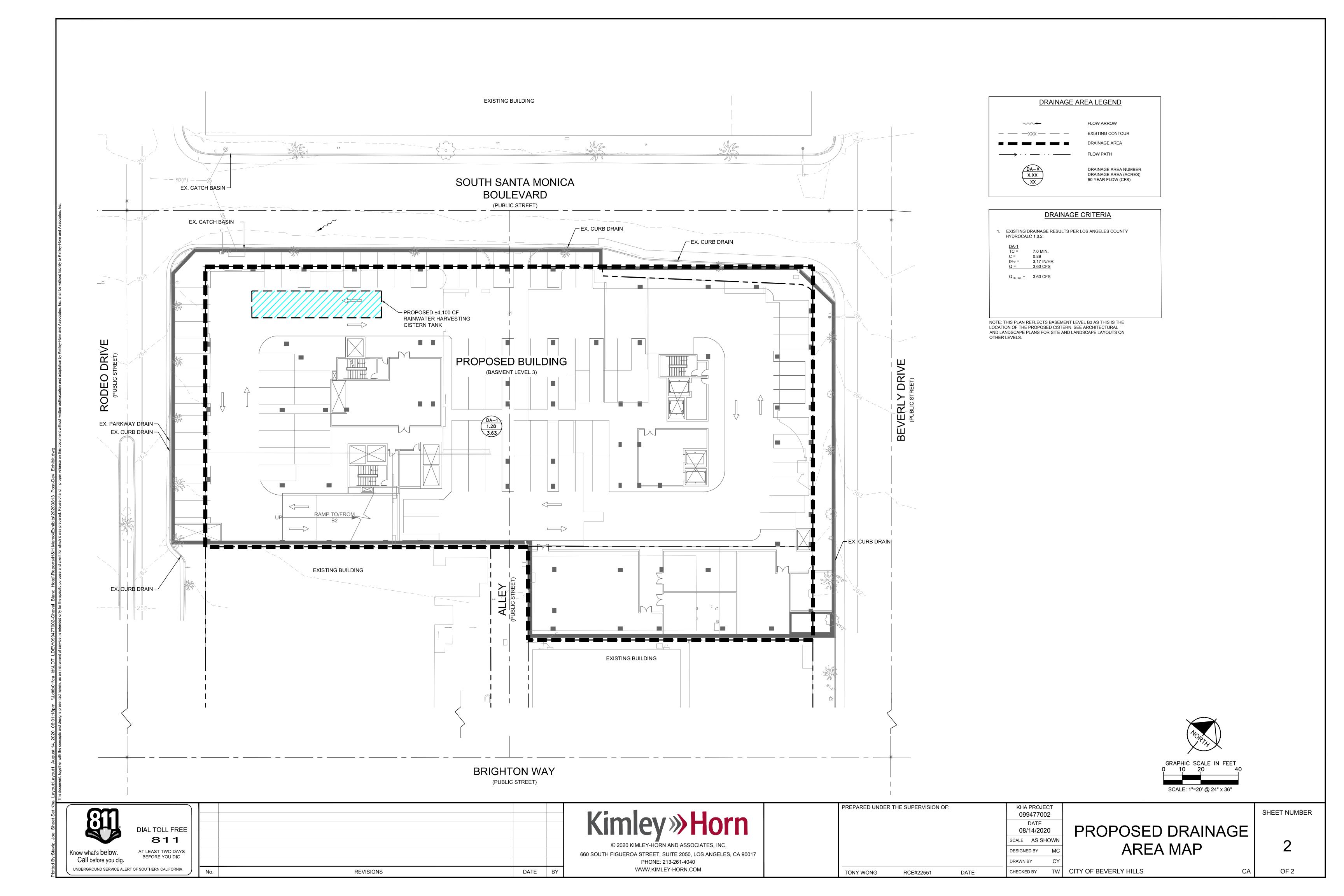
Kimley-Horn was retained to perform a limited preliminary hydrology analysis and report to support the California Environmental Quality Act analysis that is being prepared by the City of Beverly Hills. Our assessment is based on information provided to Kimley-Horn by others (municipality staff, design team, utility company representatives, etc.) up to the date of this report.

# EXHIBIT 1 Existing Drainage Area Map



## **EXHIBIT 2**

**Proposed Drainage Area Map** 



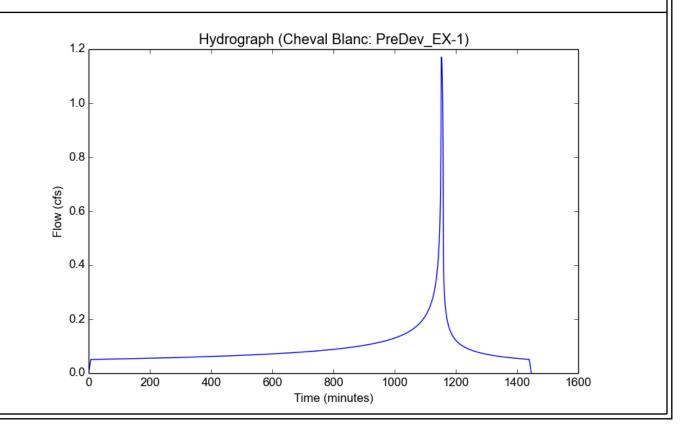
## **APPENDIX A**

HydroCalc Calculations − 50-yr Storm & 85<sup>TH</sup> Percentile

 $File\ location: // LDTFP01/Data/Project/LDT\_LDEV/099477002-Cheval\_Blanc\_Hotel/Reports/H\&H\ Memo/Calculations/Cheval\ Blanc\ -\ PreDev\_EX-1.pdf$ Version: HydroCalc 1.0.2

Input Parameters	
Project Name	Cheval Blanc
Subarea ID	PreDev_EX-1
Area (ac)	0.41
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.23
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

#### **Output Results** Modeled (50-yr) Rainfall Depth (in) 6.23 Peak Intensity (in/hr) 3.1733 Undeveloped Runoff Coefficient (Cu) Developed Runoff Coefficient (Cd) 0.8583 0.9 Time of Concentration (min) Clear Peak Flow Rate (cfs) 7.0 1.1709 Burned Peak Flow Rate (cfs) 24-Hr Clear Runoff Volume (ac-ft) 1.1709 0.19 24-Hr Clear Runoff Volume (cu-ft) 8275.9371



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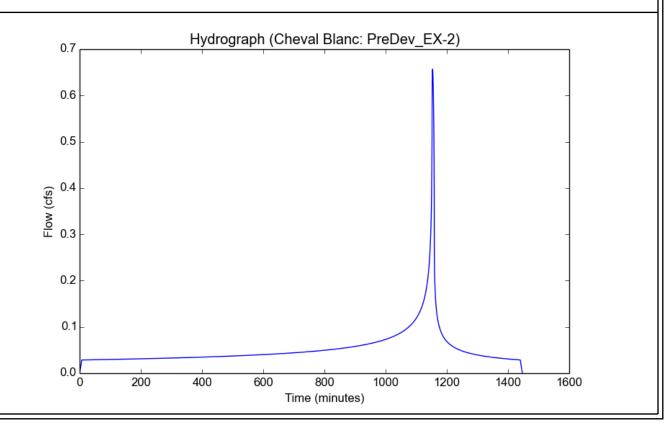
False

Input Parameters	
Project Name	Cheval Blanc
Subarea ID	PreDev_EX-2
Area (ac)	0.23
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.23
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0

**Output Results** 

LID

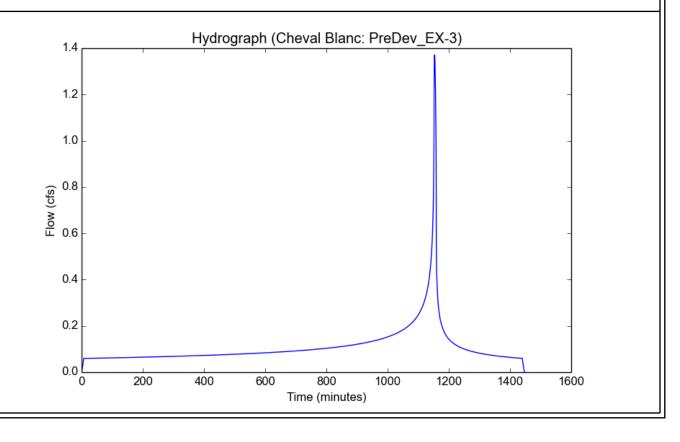
Output Nesults		
Modeled (50-yr) Rainfall Depth (in)	6.23	
Peak Intensity (in/hr)	3.1733	
Undeveloped Runoff Coefficient (Cu)	0.8583	
Developed Runoff Coefficient (Cd)	0.9	
Time of Concentration (min)	7.0	
Clear Peak Flow Rate (cfs)	0.6569	
Burned Peak Flow Rate (cfs)	0.6569	
24-Hr Clear Runoff Volume (ac-ft)	0.1066	
24-Hr Clear Runoff Volume (cu-ft)	4642.5989	



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Input Parameters	
Project Name	Cheval Blanc
Subarea ID	PreDev_EX-3
Area (ac)	0.48
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.23
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

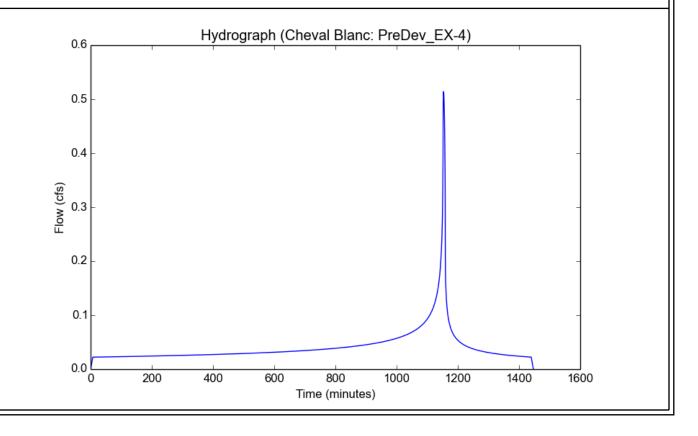
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0.8583	
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	3.1733 0.8583 0.9



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Input Parameters	
Project Name	Cheval Blanc
Subarea ID	PreDev_EX-4
Area (ac)	0.18
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.23
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

6.23
3.1733
0.8583
0.9
7.0
0.5141
0.5141
0.0834
3633.3382



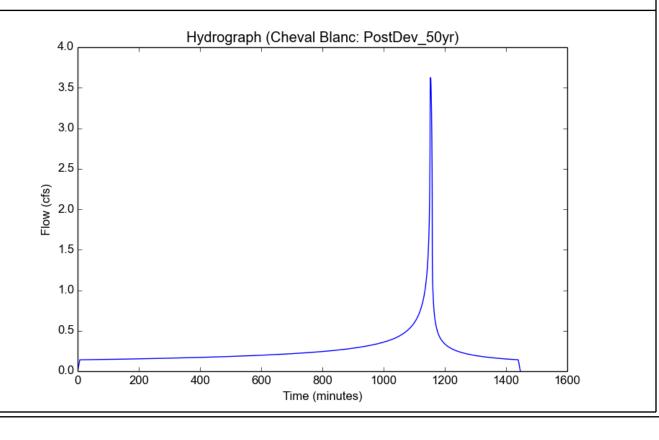
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Input F	Parameters
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Project Name	Cheval Blanc
Subarea ID	PostDev_50yr
Area (ac)	1.277
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	6.23
Percent Impervious	0.87
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

#### **Output Results**

Modeled (50-yr) Rainfall Depth (in)	6.23
Peak Intensity (in/hr)	3.1733
Undeveloped Runoff Coefficient (Cu)	0.8583
Developed Runoff Coefficient (Cd)	0.8946
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	3.6251
Burned Peak Flow Rate (cfs)	3.6251
24-Hr Clear Runoff Volume (ac-ft)	0.5322
24-Hr Clear Runoff Volume (cu-ft)	23182.2746



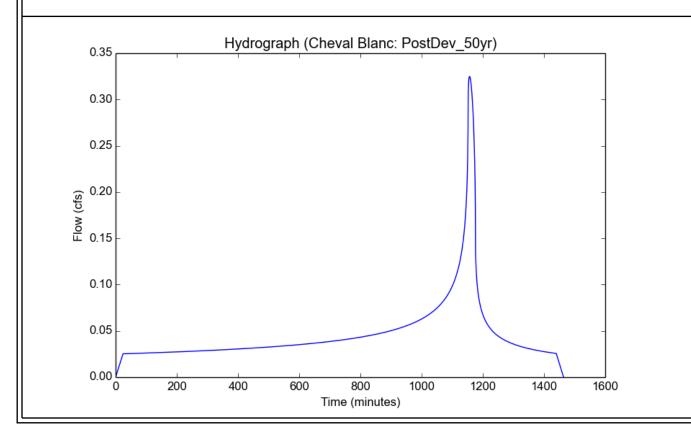
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Input	<b>Parameters</b>
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Project Name	Cheval Blanc
Subarea ID	LID
Area (ac)	1.277
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.12
Percent Impervious	0.87
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

#### **Output Results**

Modeled (85th percentile storm) Rainfall Depth (in)	1.12
Peak Intensity (in/hr)	0.3197
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.796
Time of Concentration (min)	24.0
Clear Peak Flow Rate (cfs)	0.325
Burned Peak Flow Rate (cfs)	0.325
24-Hr Clear Runoff Volume (ac-ft)	0.0941
24-Hr Clear Runoff Volume (cu-ft)	4098.5257



## PLANT SCHEDULE

TREES & PALMS

INLLS & FALIVIS							
Qty.	Genus	Species	Common Name	Min. Size	Min. Spacing	Notes	Water Usage
4	CHAMAEDOREA	CATARACTARUM	CAT PALM	48" BOX	AS SHOWN	-	MOD
9	HOWEA	forsteriana	KENTIA PALM	60" BOX	AS SHOWN	2 TO 3-TRUNKS	MOD
4	HOWEA	FORSTERIANA	KENTIA PALM	72" BOX	AS SHOWN	2 TO 3-TRUNKS	MOD
8	WASHINGTONIA	ROBUSTA	MEXICAN FAN PALM	18' BTH	AS SHOWN	-	LOW

SHRUBS & PERENNIALS & ORNAMENTAL GRASSES							
Qty.	Genus	Species	Common Name	Min. Size	Min. Spacing	Notes	Water Usage
341 SQ FT	ASPIDISTRA	ELATIOR	CAST IRON PLANT	1 GAL	24" O.C.	-	MOD
39	ASPIDISTRA	ELATIOR	CAST IRON PLANT	5 GAL	24" O.C.	-	MOD
581 SQ FT	BERGENIA	CRASSIFOLIA	WINTER BLOOMING BERGENIA	1 GAL	12" O.C.	-	MOD
895 SQ FT	LIRIOPE	MUSCARI	LILYTURF	1 GAL	12" O.C.	-	MOD
2	PHILODENDRON	x EVANSII	EVAN'S PHILODENDRON	48" BOX	As Shown	-	MOD
777	PHILODEDENDRON	'XANADU'	XANADU PHILODENDRON	1 GAL	18" O.C.	-	MOD
49	PHILODEDENDRON	'XANADU'	XANADU PHILODENDRON	5 GAL	24" O.C.	-	MOD
77	PITTOSPORUM	TENUIFOLIUM 'GOLF BALL'	GOLF BALL KOHUHU	15 GAL	36" O.C.		MOD
169	PITTOSPORUM	TOBIRA 'WHEELER'S DWARF'	MOCK ORANGE	15 GAL	36" O.C.		MOD
578 SQ FT	POLYSTICHUM	MUNITUM	WESTERN SWORD FERN	1 GAL	18" O.C.	-	MOD
451 SQ FT	SARCOCOCCA	HOOKERIANA	SWEETBOX	5 GAL	48" O.C.	-	MOD
39	STELITZIA	REGINAE	BIRD OF PARADISE	15 GAL	36" O.C.	-	MOD
116 SQ FT	TIARELLA	CORDIFOLIA	HEARTLEAF FOAMFLOWER	1 GAL	12" O.C.	-	MOD
710 SQ FT	VERBENA	HYBRIDA 'BABYLON PURPLE'	BABYLON PURPLE VERBENA	1 GAL	24" O.C.	-	MOD
1,127	VERBENA	HYBRIDA 'BALENDAKLE'	BALENDAKLE VERBENA	1 GAL	18" O.C.	-	MOD

GROUNDCOV	'ERS & VINES						
Qty.	Genus	Species	Common Name	Min. Size	Min. Spacing	Notes	Water Usage
483 SQ FT	GRAVEL	-	GRAVEL	-	N/A	-	VERY LOW
80 SQ FT	AJUGA	ATROPURPUREA 'COTTON TAILS'	CARPET BUGLE	FLATS		-	MODERATE
7	PARTHENOCISSUS	TRICUSPIDATA	BOSTON IVY	5 GAL.	6' O.C.	-	MODERATE
305 SQ FT	SOLEIROLIA	SOLEIROLII	BABY'S TEARS	FLATS	N/A	-	HIGH
722 SQ FT	THYMUS	PRAECOX 'COCCINEUM'	PINK CREEPING THYME	6" POTS	12" O.C.	-	LOW

1. PLANT QUANTITIES ARE PROVIDED FOR CONVENIENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR CONDUCTING THEIR OWN PLANT QUANTITY TAKE-OFFS AND INSURE FINAL INSTALLATION IS PER DESIGN INTENT SHOWN ON PLANS. CONTRACTOR IS TO MAKE LANDSCAPE ARCHITECT AWARE OF ANY DISCREPANCIES. 2. PLANT SUBSTITUTIONS MAY BE ALLOWED DUE TO AVAILABILITY ISSUES, HOWEVER, ALL PROPOSED SUBSTITUTIONS SHALL BE REVIEWED, AND APPROVED, BY

LANDSCAPE ARCHITECT PRIOR TO PURCHASING.
3. ALL PLANTING BEDS TO CONTAIN 2-3" BARK MULCH, CONTRACTOR TO PROVIDE SAMPLES FOR LANDSCAPE ARCHITECT'S APPROVAL.









Peter Marino Architect

GRUENASSOCIATES
ARCHITECTURE PLANNING INTERIORS LANDSCAPE

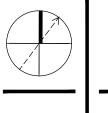
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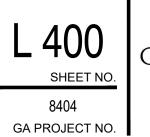
PLANT SCHEDULE AND NOTES

SHEET TITLE

07/17/2020 DATE

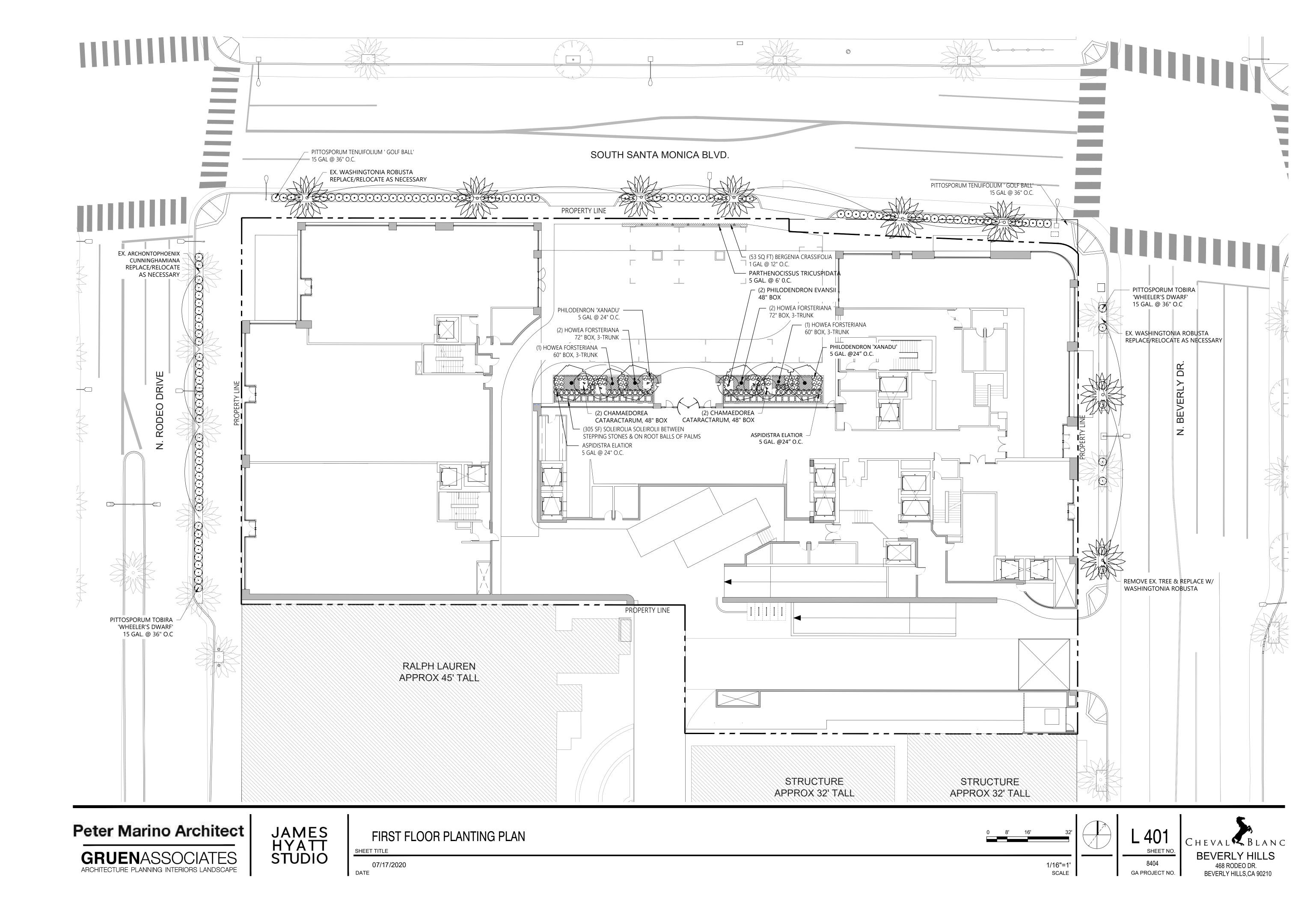


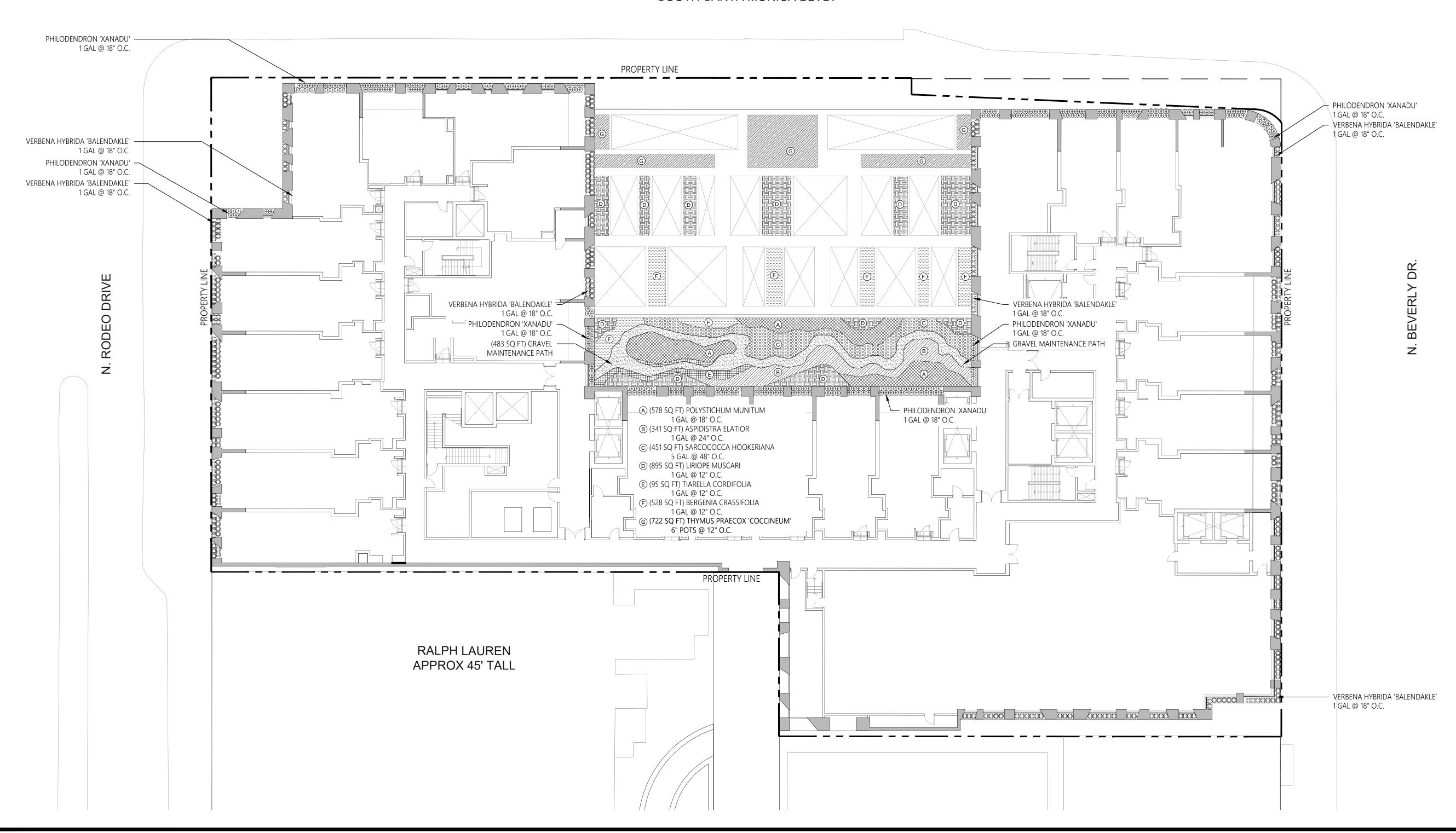






STRELITZIA REGINAE





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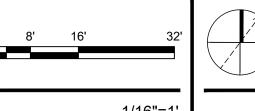
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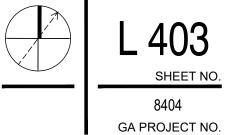
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THIRD FLOOR PLANTING PLAN

07/17/2020 DATE

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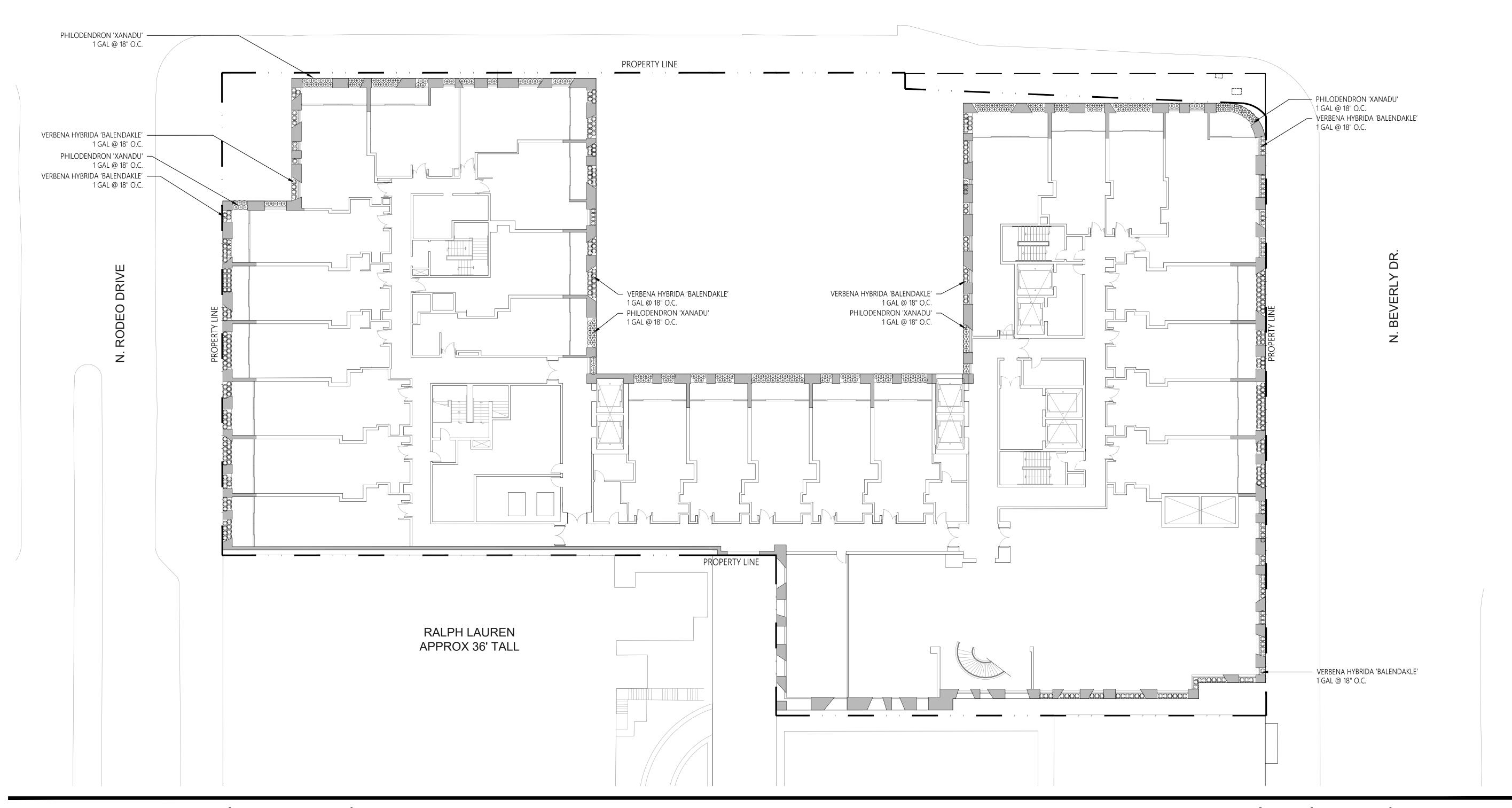




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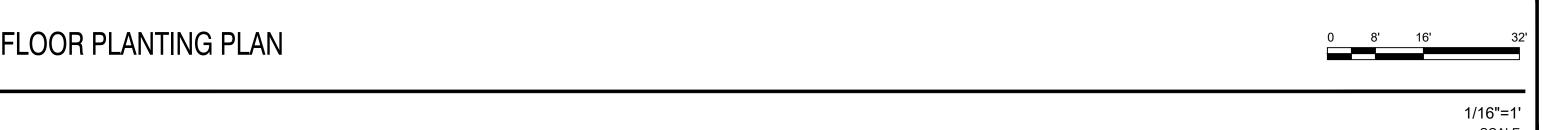
Peter Marino Architect

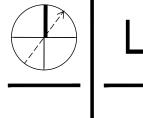
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JAMES HYATT STUDIO

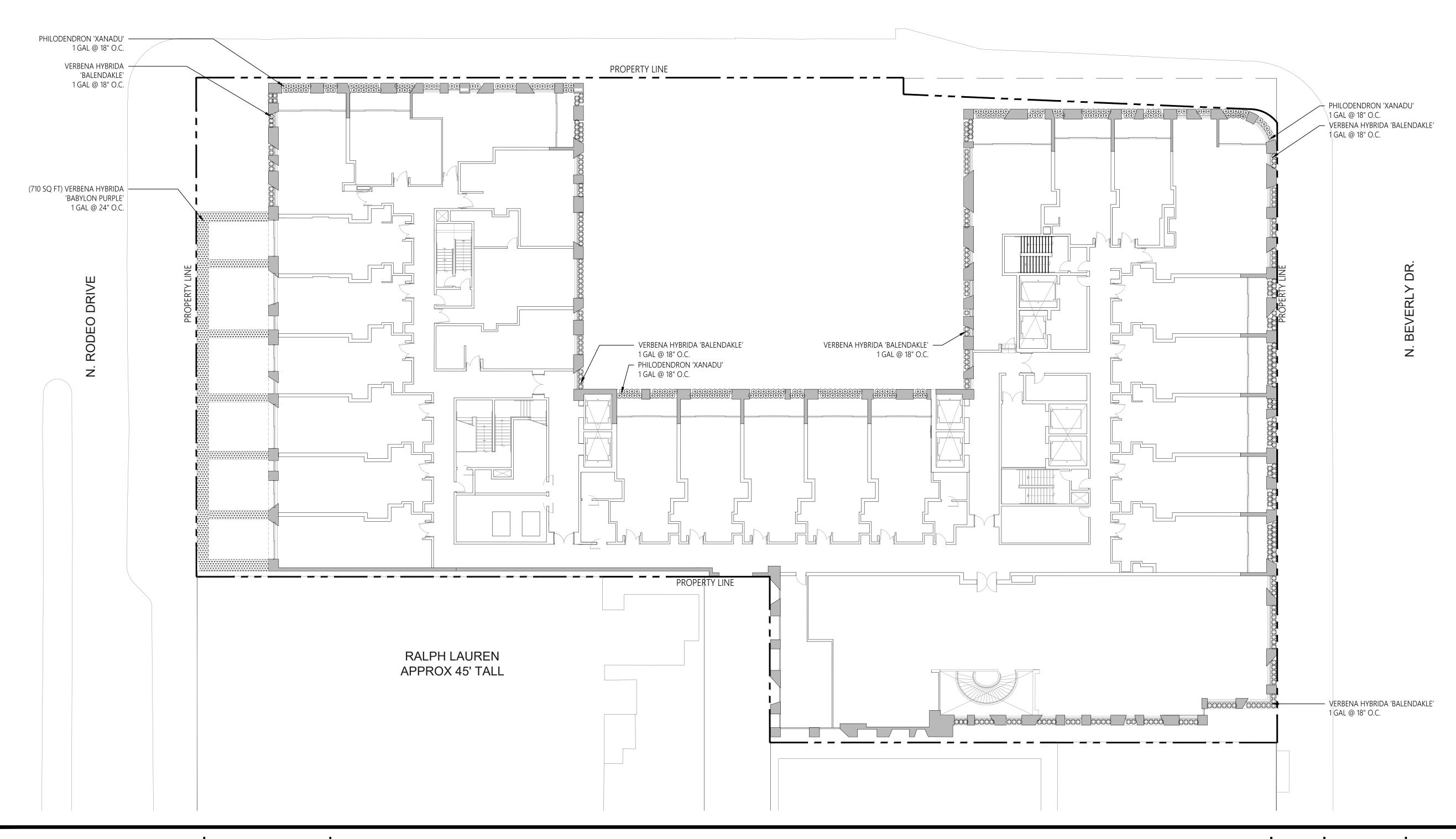
FOURTH FLOOR PLANTING PLAN

07/17/2020 DATE









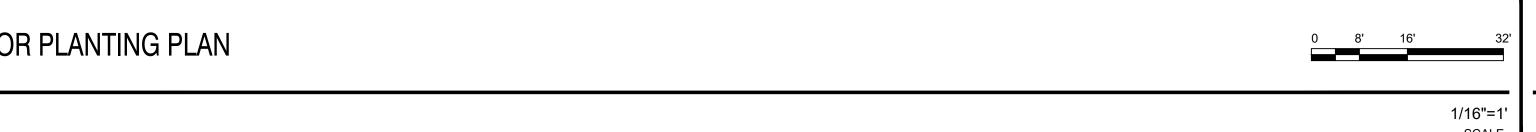
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ARCHITECTURE PLANNING INTERIORS LANDSCAPE

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FIFTH FLOOR PLANTING PLAN

07/17/2020 DATE



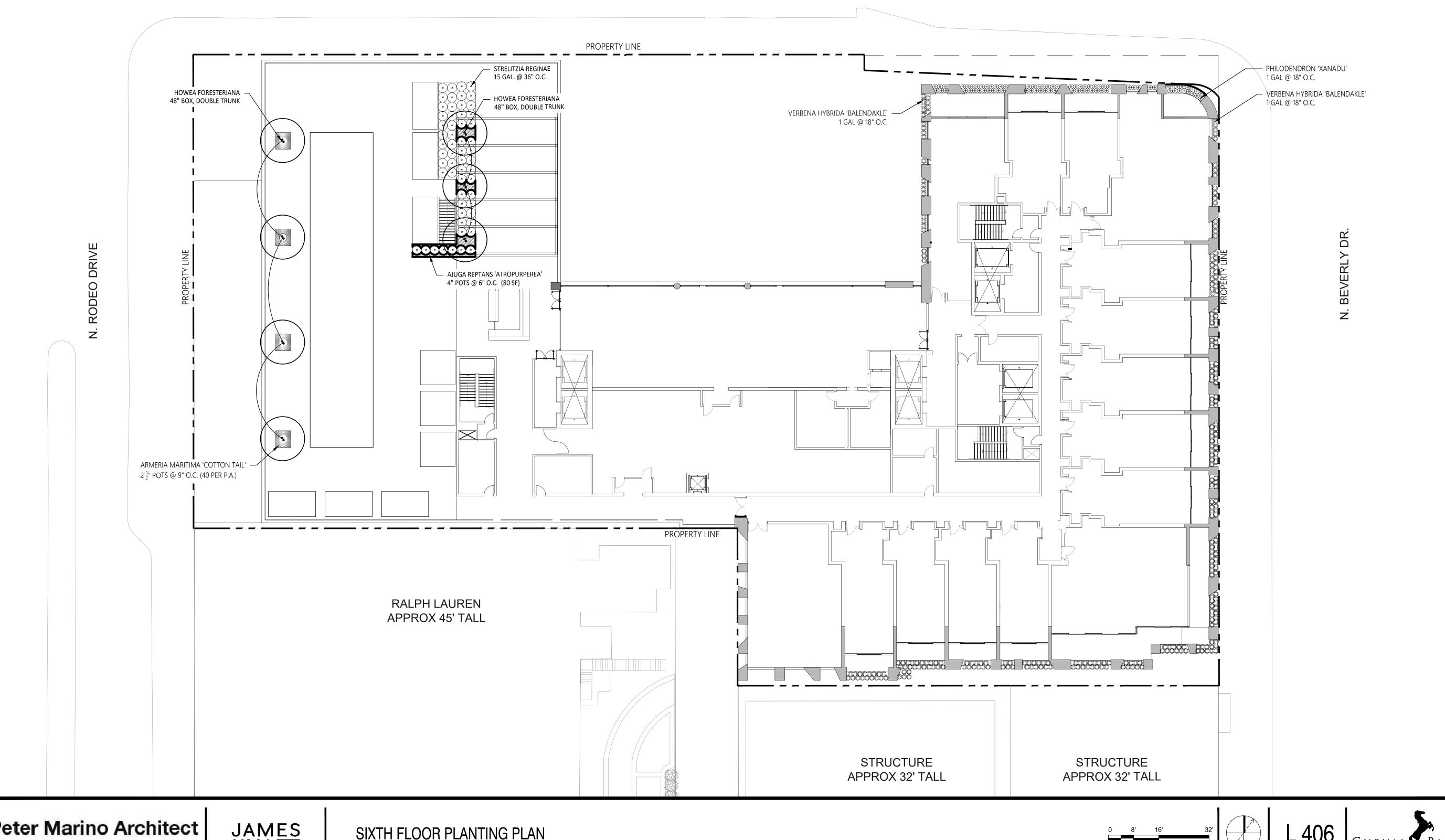
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GA PROJECT NO.

SHEET NO.

BEVERLY HILLS 468 RODEO DR. BEVERLY HILLS,CA 90210



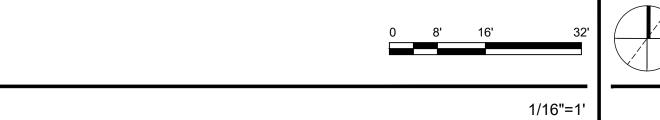
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SIXTH FLOOR PLANTING PLAN

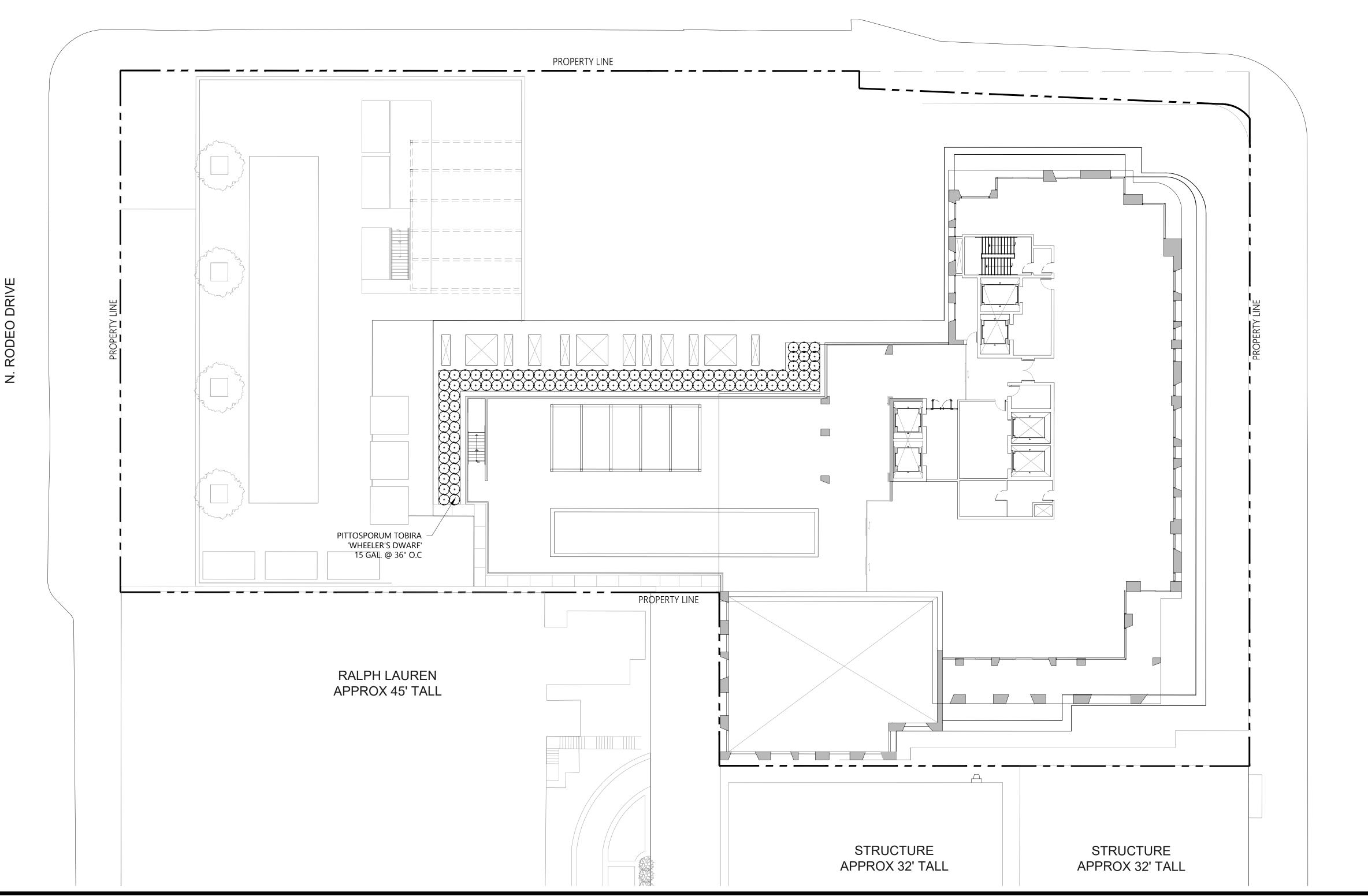
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GA PROJECT NO.





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JAMES HYATT STUDIO

07/17/2020 DATE

