

UCHealth – University of Colorado Hospital Aurora Garage 2 Project

University of Colorado Design Review Board
Schematic Design (Revised)
May 14, 2020

Contents

I. Introductions

II. Alternate Studies

- A. Overview of Existing Conditions
- B. Previous Concept Circulation Studies
- C. Alternate Concept Circulation Studies
- D. Proposed Solution – Protecting Pedestrians

III. Schematic Design

- A. Site & Landscape
- B. Building
- C. Sustainable Strategies

I. Introductions

A/E Team



Pact Studios, LLC – Architectural Design



Martin & Martin – Civil and Structural Engineering



Specialized Engineering Solutions – MEP Design; Low Voltage; Lighting Design



Kimley>Horn – Landscape Architecture



Felsburg Holt & Ullevig – Traffic, Transportation, and Parking Study



Lerch Bates – Vertical Transportation



Fd2s – Graphic and Signage Design

uhealth

Campus Plan

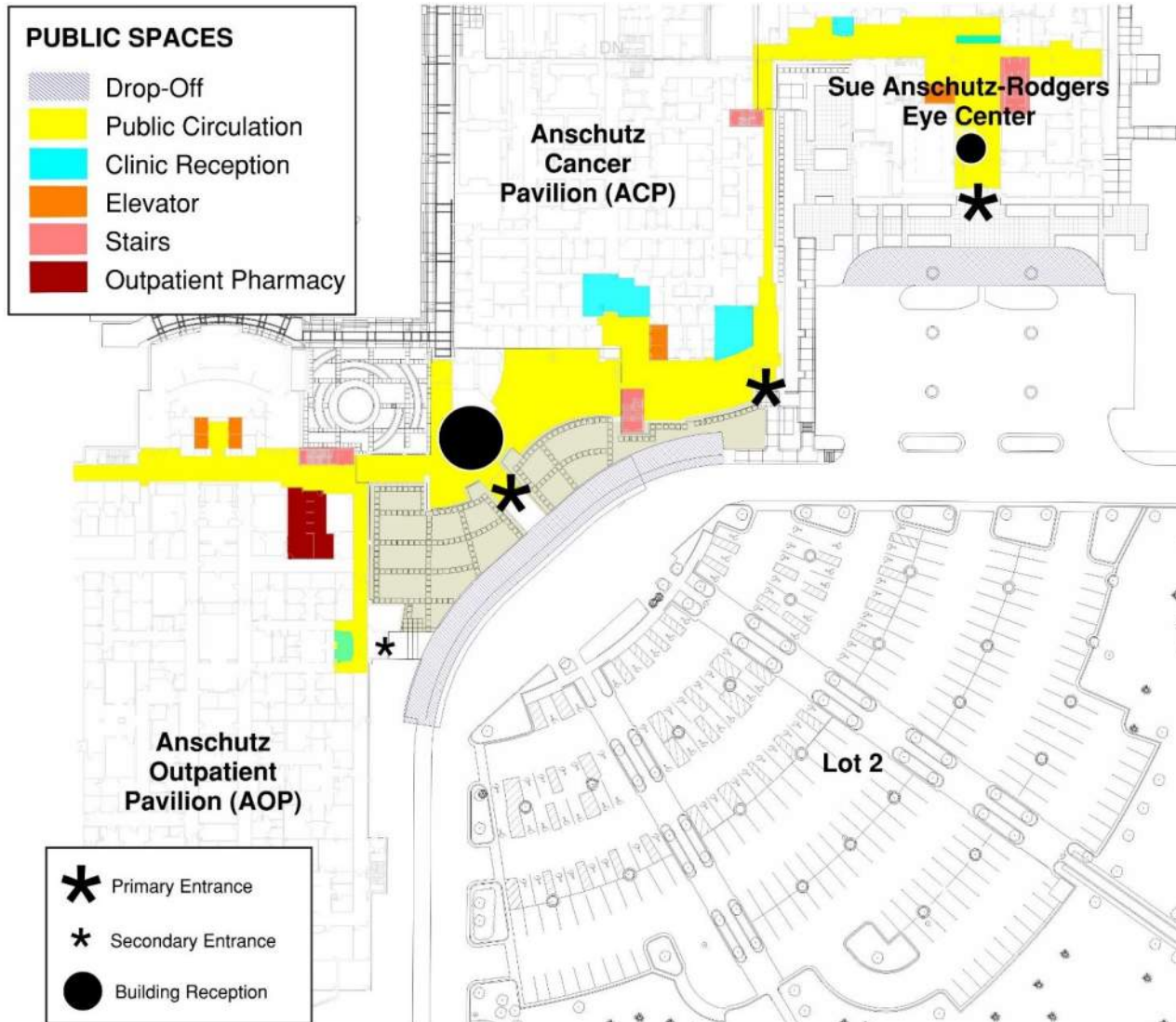


Context of Project – Campus



I. Alternate Studies

Existing Outpatient Access & Flow to Remain



Patient Experience – Sense of Arrival

In healthcare settings, visitors and patients require the following fundamentals to optimize their experience during a clinical visit:

Clear Visibility of Destination

- Helps reduce anxiety over reason for visit
- Reaching appointment on time reduces stress

Drop-off Near Entry Door/Pick-up Near Exit

- Many visitors have limited mobility
- Extra time is needed to disembark/embark vehicle
- For some, extra time is needed to utilize a wheelchair

Personal Interface with UCHealth

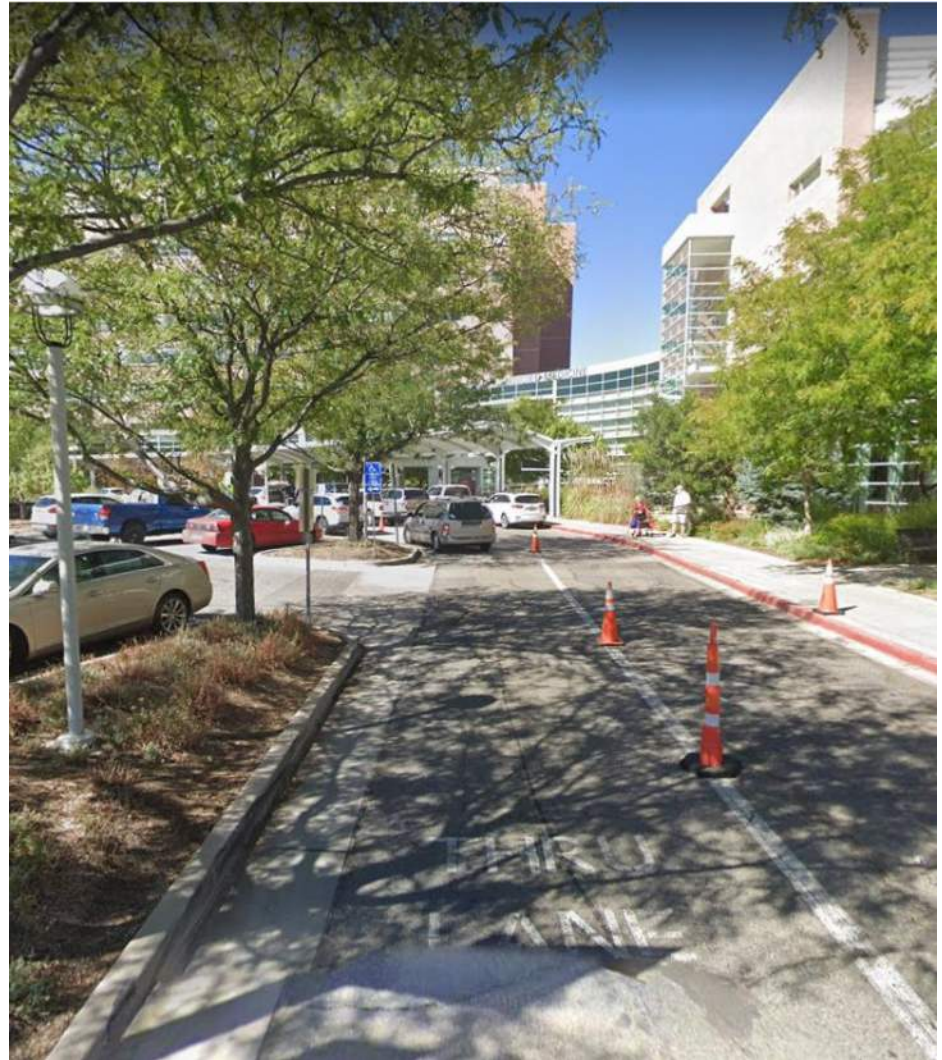
- Efficient valet exchange expected
- Reception near point of entry to provide further assistance

Short Walk between Garage and Entrance

- Older and unwell visitors have difficulty managing long walks
- Visitors with mobility challenges need proximity
- Less time needed to get to an appointment

Patient Satisfaction

- Drop-off, Pick-up, and parking are the first and last impressions of a visit



N/S - Early Circulation Studies (presented at Concept Design Feb. 13)

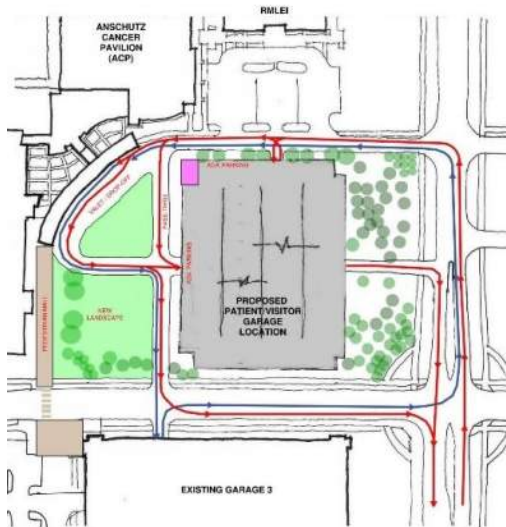


Figure 4

Pros

- Alleviate traffic at 16th and "Troy"
- Pass through lane for people going straight to garage

Cons

- Queuing on 16th Ave
- Entry point is in middle of garage on west/east sides



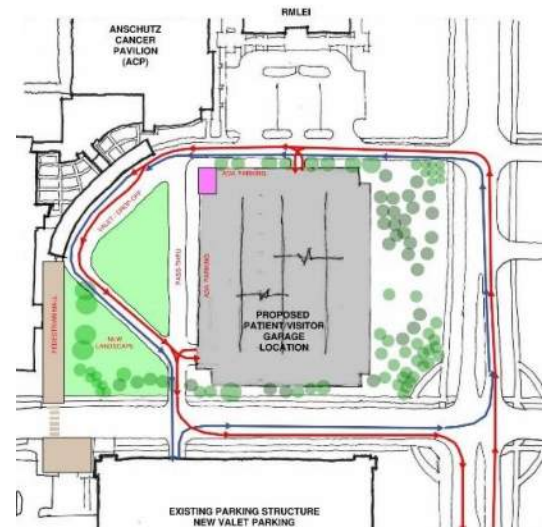
Figure 4 w/ Boulevard

Pros

- Alleviate traffic at 16th and "Troy"
- Pedestrians able to cross at north side without vehicle conflict

Cons

- Tight turn-around for valet drop-off
- Limited visibility when approaching the site
- Queuing on 16th Ave



Diagonal

Pros

- Pass through lane for people going straight to garage

Cons

- Not enough straight run before 16th Ave
- Queuing on 16th Ave
- Large island space that is not easily accessible

E/W - Early Circulation Studies (Presented at Concept Design Feb. 13)



Full-Boulevard

Pros

- Alleviate traffic at 16th and "Troy"
- Welcoming Boulevard entrance
- Force all garage traffic directly to Aurora Ct

Cons

- Valet needs to directly access Garage 3
- Tight turn-around at valet drop-off
- All entrances to garage on north
- Good routes for pedestrians to avoid vehicles

Diagonal

Pros

- Alleviate traffic at 16th and "Troy"
- Pedestrians able to cross at north side without vehicle conflict
- Good alignment with garage entry/exit points

Cons

- Impacts to Garage 3 entry/exit
- Not enough straight drive lane connecting to 16th Ave
- Queuing on 16th Ave

Mini-Boulevard

Pros

- Alleviate some congestion at 16th and Troy
- Welcoming Boulevard entrance
- Good alignment with garage entry/exit points

Cons

- Queuing on 16th Ave
- Valet forced to loop around site

Early Circulation Studies (Not Presented at Concept Design Feb. 13)



3-Bay Option

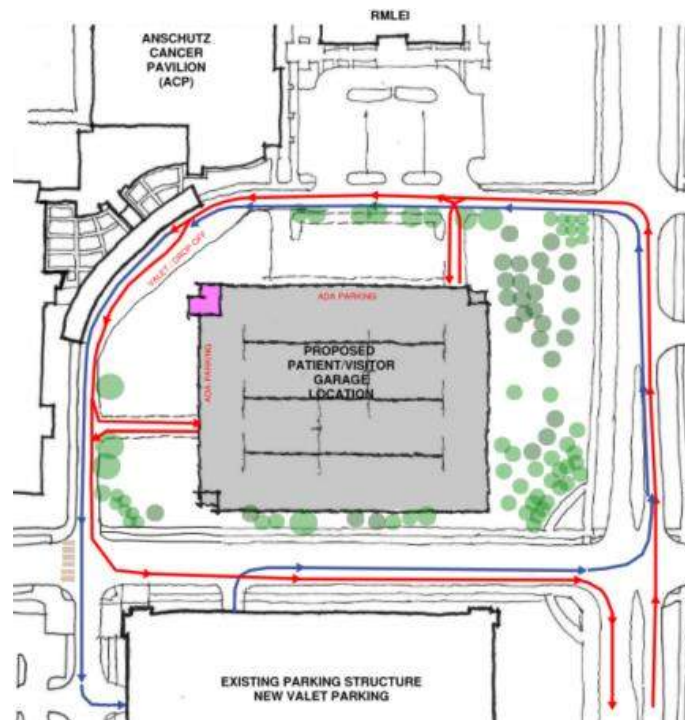
3-bay options were eliminated due to the reduction in vehicular circulation efficiency imposed by a single ramp.

Pros

- Alleviate some congestion at 16th and Troy
- Additional surface lot for potential valet staging

Cons

- Queuing on 16th Ave
- 3-bay create inefficient garage circulation
- Entry/exit on west side could create turning conflicts



4-Bay Option

This option was modified in subsequent studies to improve garage access, preserve more trees, and reduce grading

Pros

- 4-bay creates efficient garage circulation
- Additional surface lot for potential valet staging

Cons

- Does not alleviate congestion at 16th and Troy
- Entry/exit on west side could create turning conflicts

Alternate Studies - Criteria for Evaluation

Minimize Pedestrian & Vehicular Conflicts

Provide Drop-off/Pick-up Near Building Entrances

Limit Distance Visitors Must Walk from Garage to Destination

Provide Ample Stacking for Drop-off Lane

Create Intuitive Wayfinding on Site & in Garage

- Visibility of Entrances/Destination

- Visibility of Primary Elevator Core

- Visual Connectivity between Core and Entrances

Develop Drives Navigable for Cars, Fire Trucks, Ambulances, RVs, Box Trucks

Produce Efficient Throughput for Vehicles Circulating in Garage

Promote Efficient Valet Service

Retain Fire Lane Adjacent to AOP

Allow for Future Pedestrian Bridge to ACP

Minimize Loss of Existing Trees

Design within Budget

Turn-Around Criteria



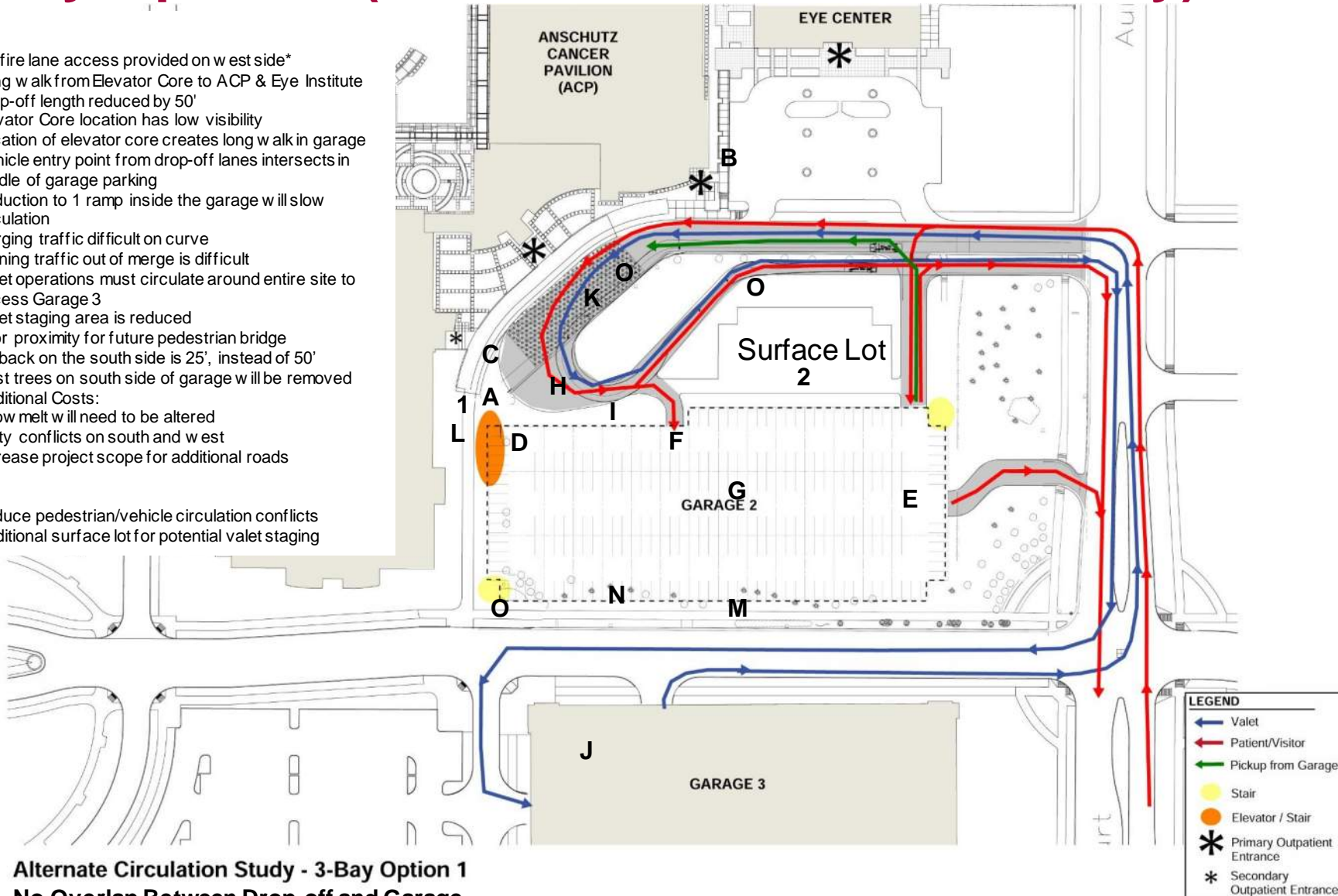
3-Bay Option 1 (eliminated from further study)*

Cons

- A. No fire lane access provided on west side*
- B. Long walk from Elevator Core to ACP & Eye Institute
- C. Drop-off length reduced by 50'
- D. Elevator Core location has low visibility
- E. Location of elevator core creates long walk in garage
- F. Vehicle entry point from drop-off lanes intersects in middle of garage parking
- G. Reduction to 1 ramp inside the garage will slow circulation
- H. Merging traffic difficult on curve
- I. Turning traffic out of merge is difficult
- J. Valet operations must circulate around entire site to access Garage 3
- K. Valet staging area is reduced
- L. Poor proximity for future pedestrian bridge
- M. Setback on the south side is 25', instead of 50'
- N. Most trees on south side of garage will be removed
- O. Additional Costs:
Snow melt will need to be altered
Utility conflicts on south and west
Increase project scope for additional roads

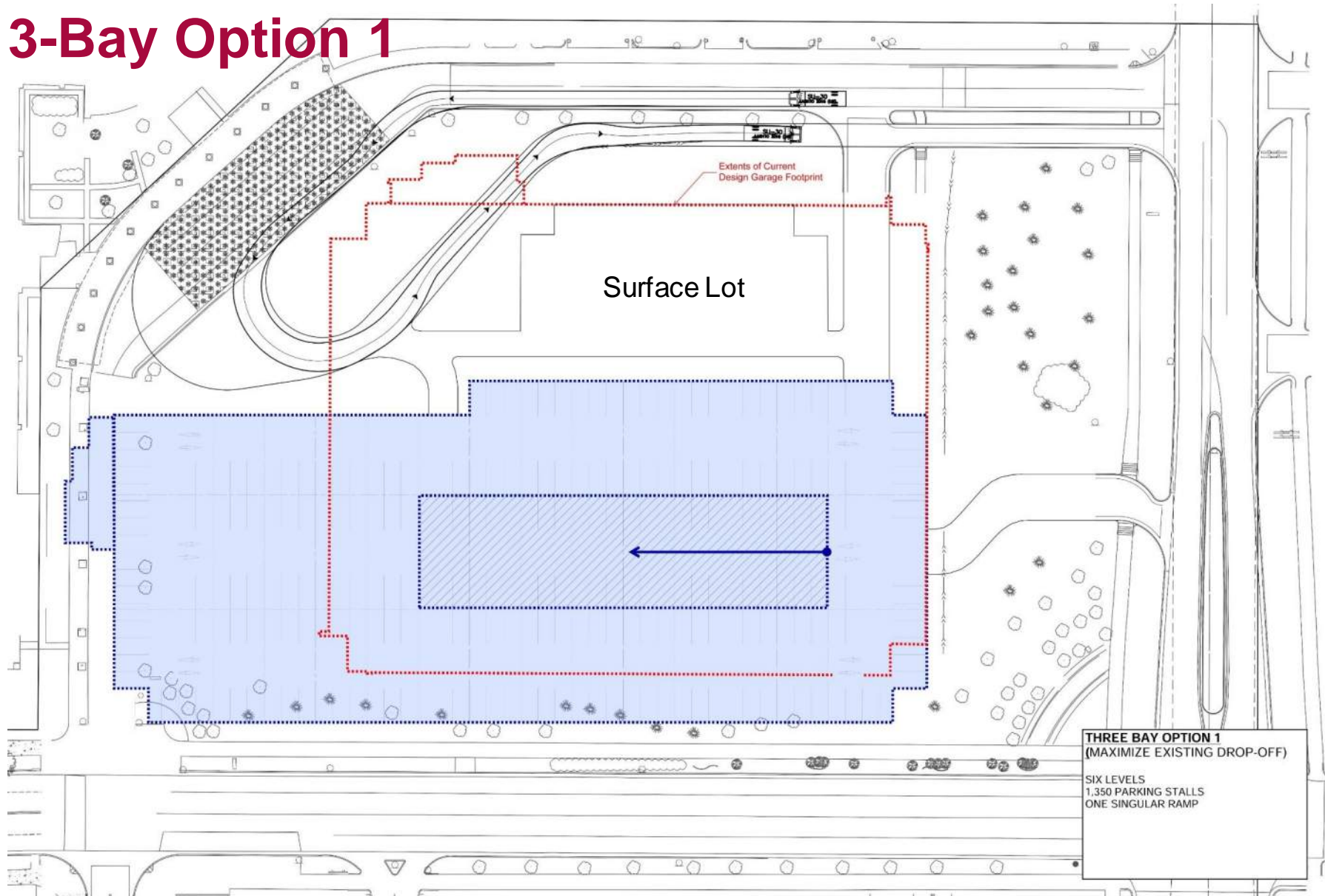
Pros

- 1. Reduce pedestrian/vehicle circulation conflicts
- 2. Additional surface lot for potential valet staging



Alternate Circulation Study - 3-Bay Option 1
No Overlap Between Drop-off and Garage

3-Bay Option 1



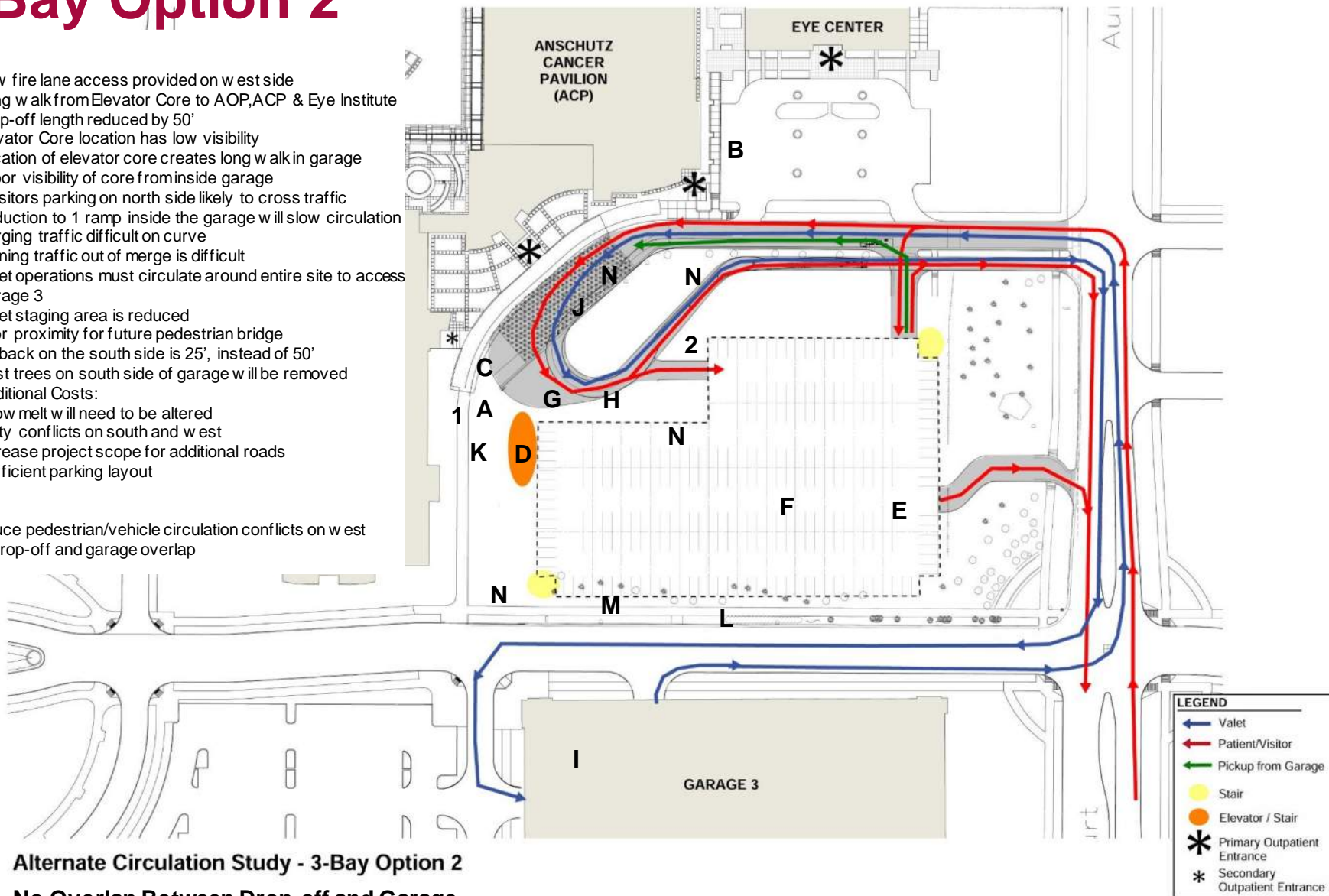
3-Bay Option 2

Cons

- A. New fire lane access provided on west side
- B. Long walk from Elevator Core to AOP, ACP & Eye Institute
- C. Drop-off length reduced by 50'
- D. Elevator Core location has low visibility
- E. Location of elevator core creates long walk in garage
 - Poor visibility of core from inside garage
 - Visitors parking on north side likely to cross traffic
- F. Reduction to 1 ramp inside the garage will slow circulation
- G. Merging traffic difficult on curve
- H. Turning traffic out of merge is difficult
- I. Valet operations must circulate around entire site to access Garage 3
- J. Valet staging area is reduced
- K. Poor proximity for future pedestrian bridge
- L. Setback on the south side is 25', instead of 50'
- M. Most trees on south side of garage will be removed
- N. Additional Costs:
 - Snow melt will need to be altered
 - Utility conflicts on south and west
 - Increase project scope for additional roads
 - Inefficient parking layout

Pros

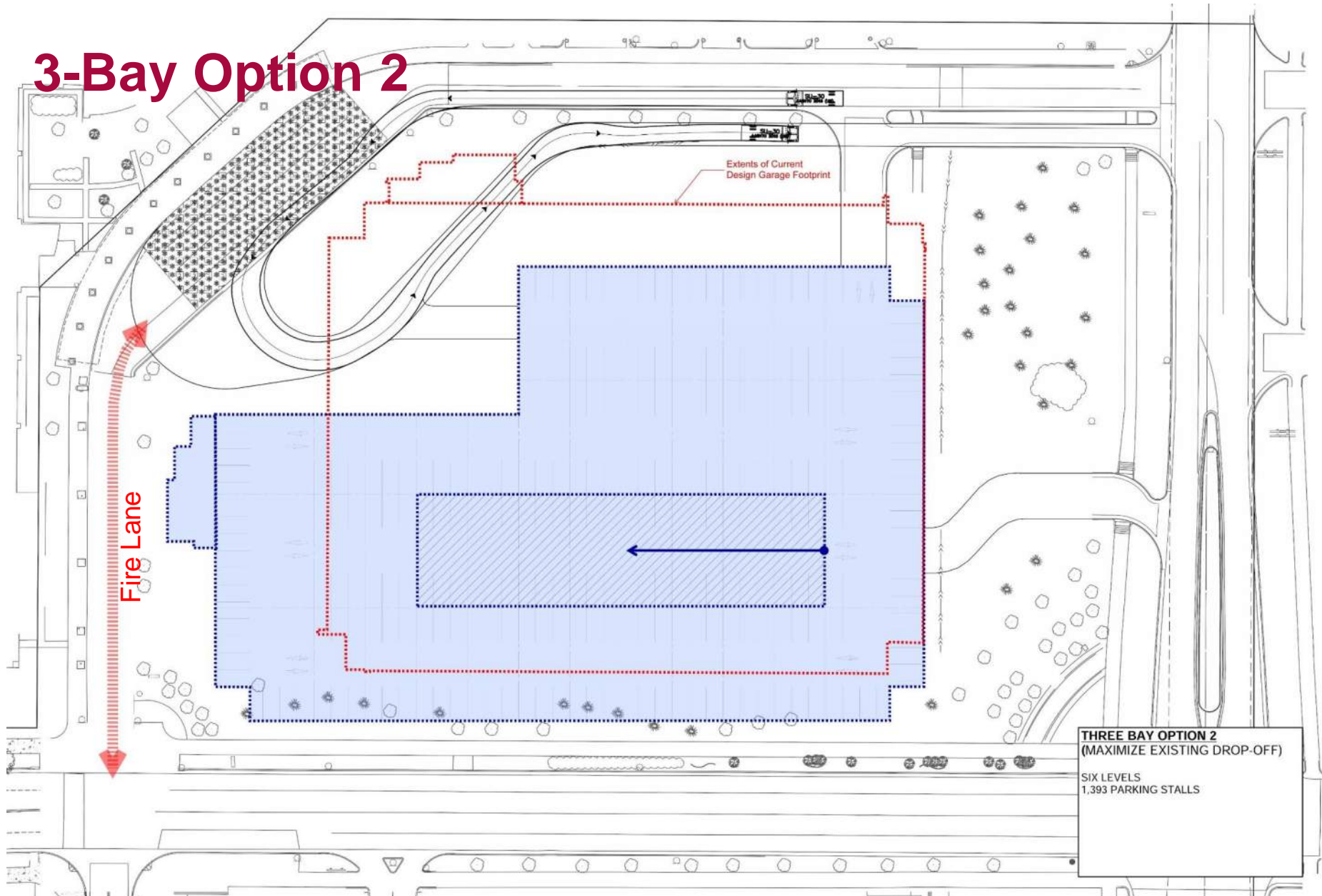
- Reduce pedestrian/vehicle circulation conflicts on west
- No drop-off and garage overlap



Alternate Circulation Study - 3-Bay Option 2

No Overlap Between Drop-off and Garage

3-Bay Option 2



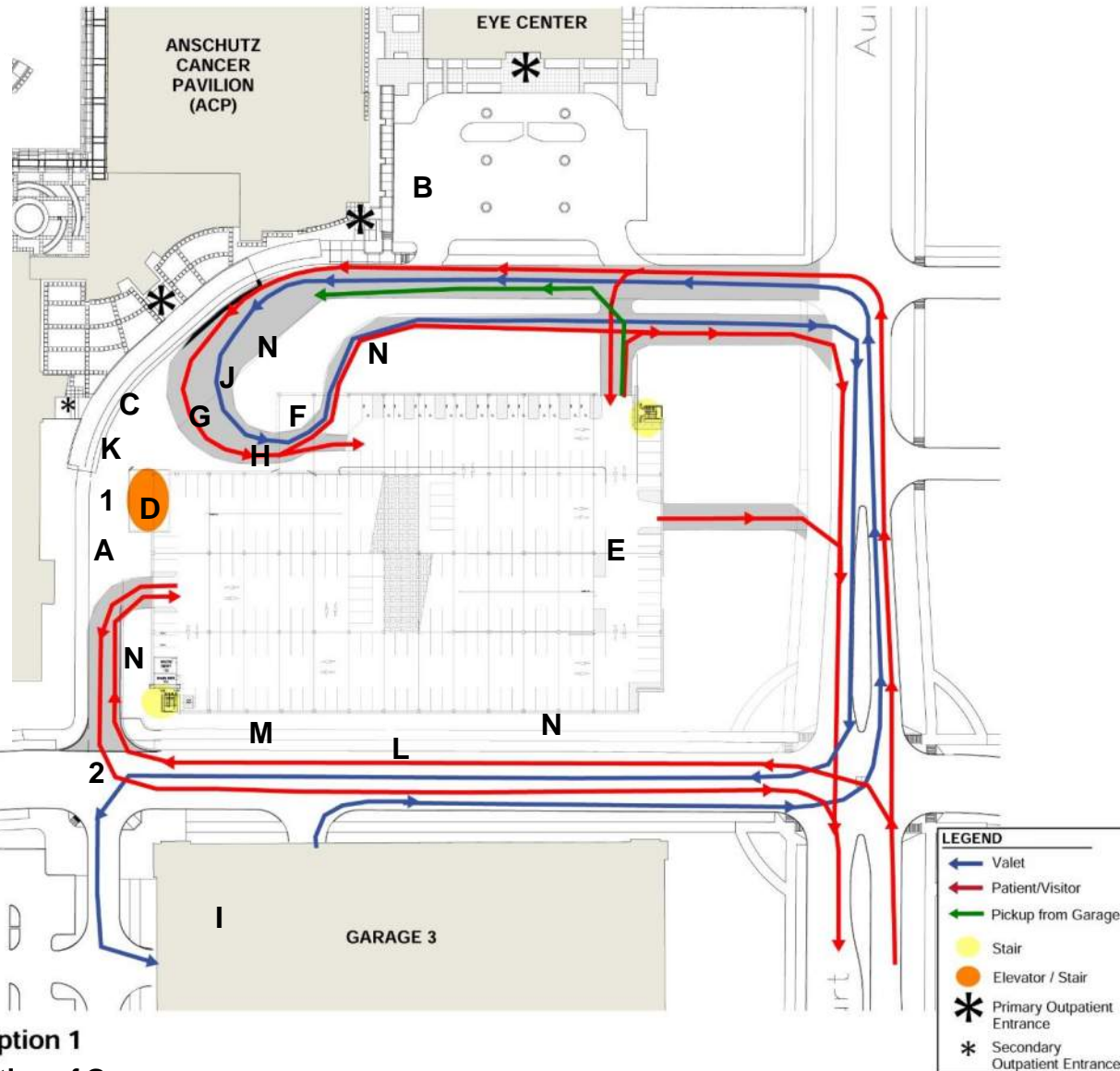
4-Bay Option 1

Cons

- A. New fire lane access provided on west side
Limits length of new drop-off canopy
- B. Long walk from Elevator Core to AOP, ACP & Eye Institute
- C. Drop-off length reduced by 100'
- D. Elevator Core location has low visibility
- E. Location of elevator core creates long walk in garage
Poor visibility of core from inside garage
Visitors parking on north side likely to cross traffic
- F. 17'-0" floor to floor required for vehicles to pass under NW corner of garage
- G. Merging traffic difficult on curve
- H. Turning traffic out of merge is difficult
- I. Valet operations must circulate around entire site to access Garage 3
- J. Valet staging area is reduced
- K. Poor proximity for future pedestrian bridge
- L. Setback on the south side is 25', instead of 50'
- M. Most trees on south side of garage will be removed
- N. Additional Costs:
Snow melt w/ill need to be replaced
Utility conflicts on south
Increase project scope for additional roads
More sitework needed for regrading at garage access

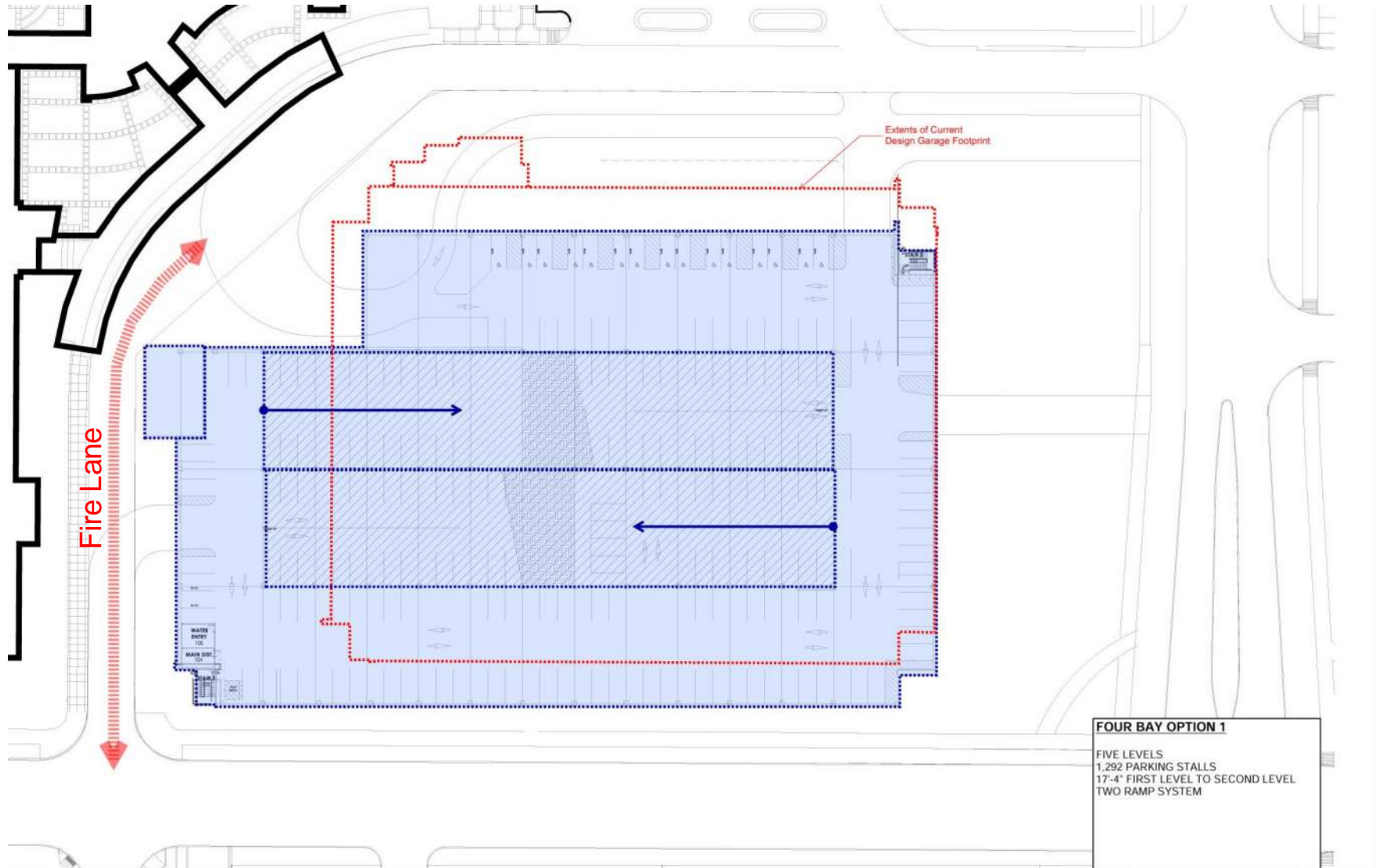
Pros

- 1. Reduce pedestrian/vehicle circulation conflicts on west
- 2. Familiar visitors can enter the garage from 16th Ave



Alternate Circulation Study - 4-Bay Option 1
Drop-off Circulates Underneath Portion of Garage

4-Bay Option 1



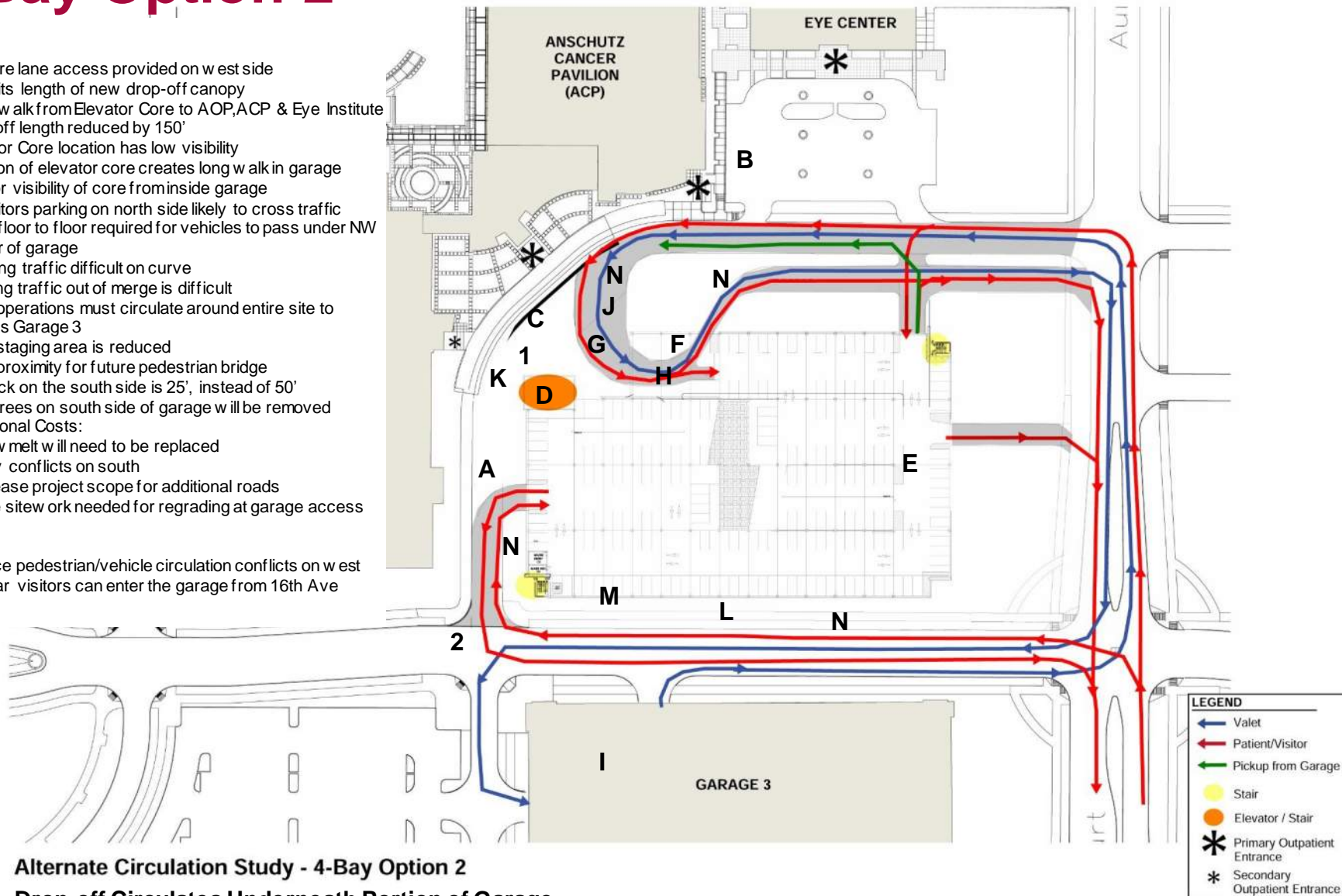
4-Bay Option 2

Cons

- A. New fire lane access provided on west side
Limits length of new drop-off canopy
- B. Long walk from Elevator Core to AOP, ACP & Eye Institute
- C. Drop-off length reduced by 150'
- D. Elevator Core location has low visibility
- E. Location of elevator core creates long walk in garage
Poor visibility of core from inside garage
Visitors parking on north side likely to cross traffic
- F. 17'-0" floor to floor required for vehicles to pass under NW corner of garage
- G. Merging traffic difficult on curve
- H. Turning traffic out of merge is difficult
- I. Valet operations must circulate around entire site to access Garage 3
- J. Valet staging area is reduced
- K. Poor proximity for future pedestrian bridge
- L. Setback on the south side is 25', instead of 50'
- M. Most trees on south side of garage will be removed
- N. Additional Costs:
Snow melt will need to be replaced
Utility conflicts on south
Increase project scope for additional roads
More sitework needed for regrading at garage access

Pros

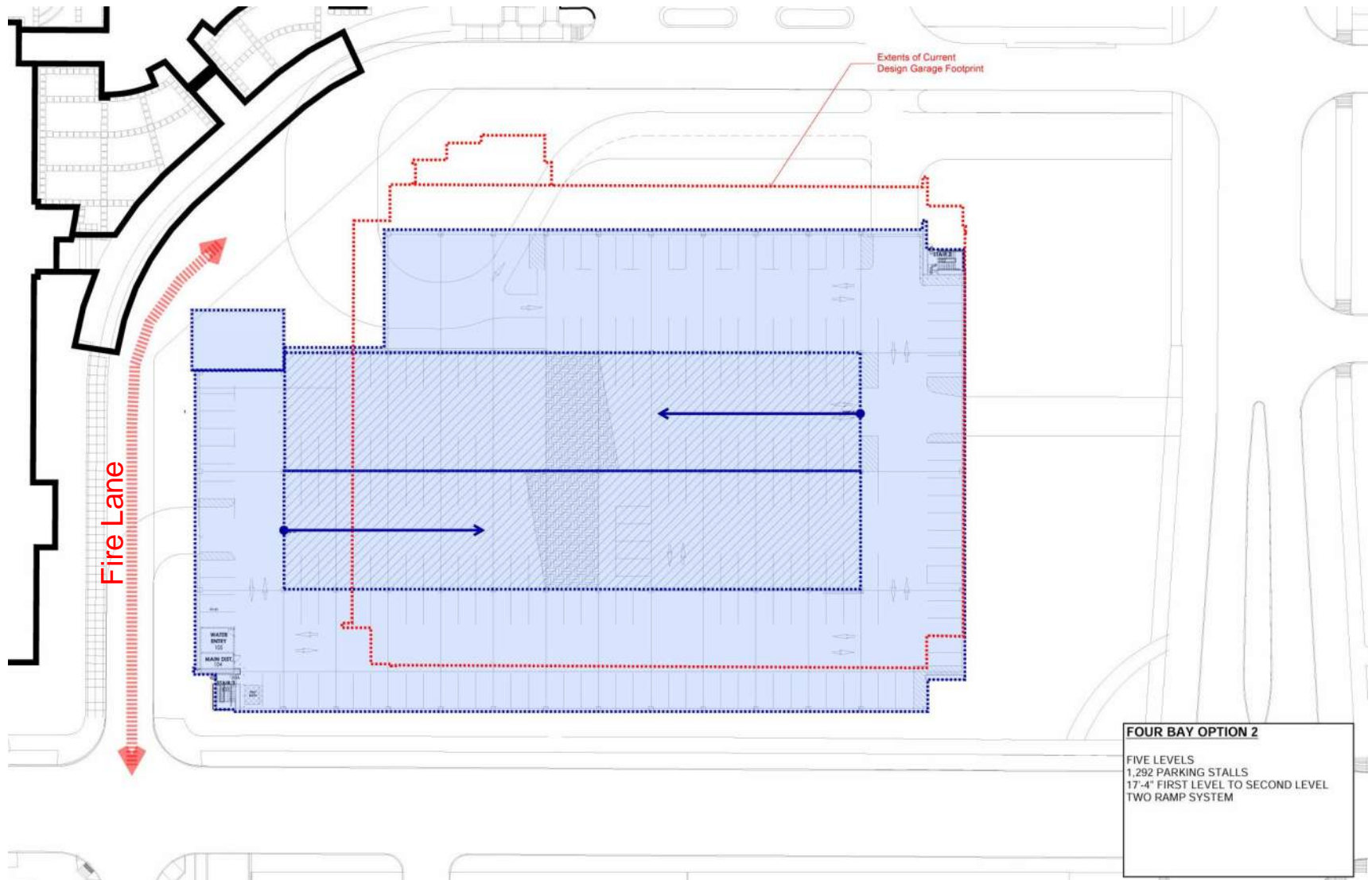
- 1. Reduce pedestrian/vehicle circulation conflicts on west
- 2. Familiar visitors can enter the garage from 16th Ave



Alternate Circulation Study - 4-Bay Option 2

Drop-off Circulates Underneath Portion of Garage

4-Bay Option 2



Summary of Alternate Studies

After revisiting conceptual site layouts for the UCHA Garage 2 project, the Design Team does not recommend proceeding with an option that creates a 'U-turn' style drive configuration on the north side of the garage.

While this layout does serve to help minimize pedestrian & vehicular conflicts, it does not eliminate those conflicts entirely and creates significant challenges for the solution in other areas including:

- Distancing Drop-off/Pick-up from Building Entrances
- Increasing Distance Visitors Must Walk from Garage Core to Destination
- Decreasing Stacking for Drop-off Lane
- Confusing Wayfinding on Site & Inside of Garage
 - Reduction of Visibility of Primary Elevator Core from Arrival
 - Reduction of Visual Connectivity between Core and Entrances
 - Complication of Vehicular Navigation due to Garage Entrances and Building Geometry
- Aggravating Valet Service Circulation/Increasing Total Trip Times
- Eliminating Potential for Future Pedestrian Bridge to ACP (Level 2 AOP is not appropriate access)
- Increases Loss of Existing Trees
- Exceeding Project Scope and Construction Budget
- Complicating Operations During Construction

For these reasons, the Design Team recommends continuing to develop the site layout previously approved at the Concept Review on February 13, 2020, which retains existing driveway drop-off and circulation that currently serves all access points for outpatient services.

Proposed Solution – Overall Project Site Plan



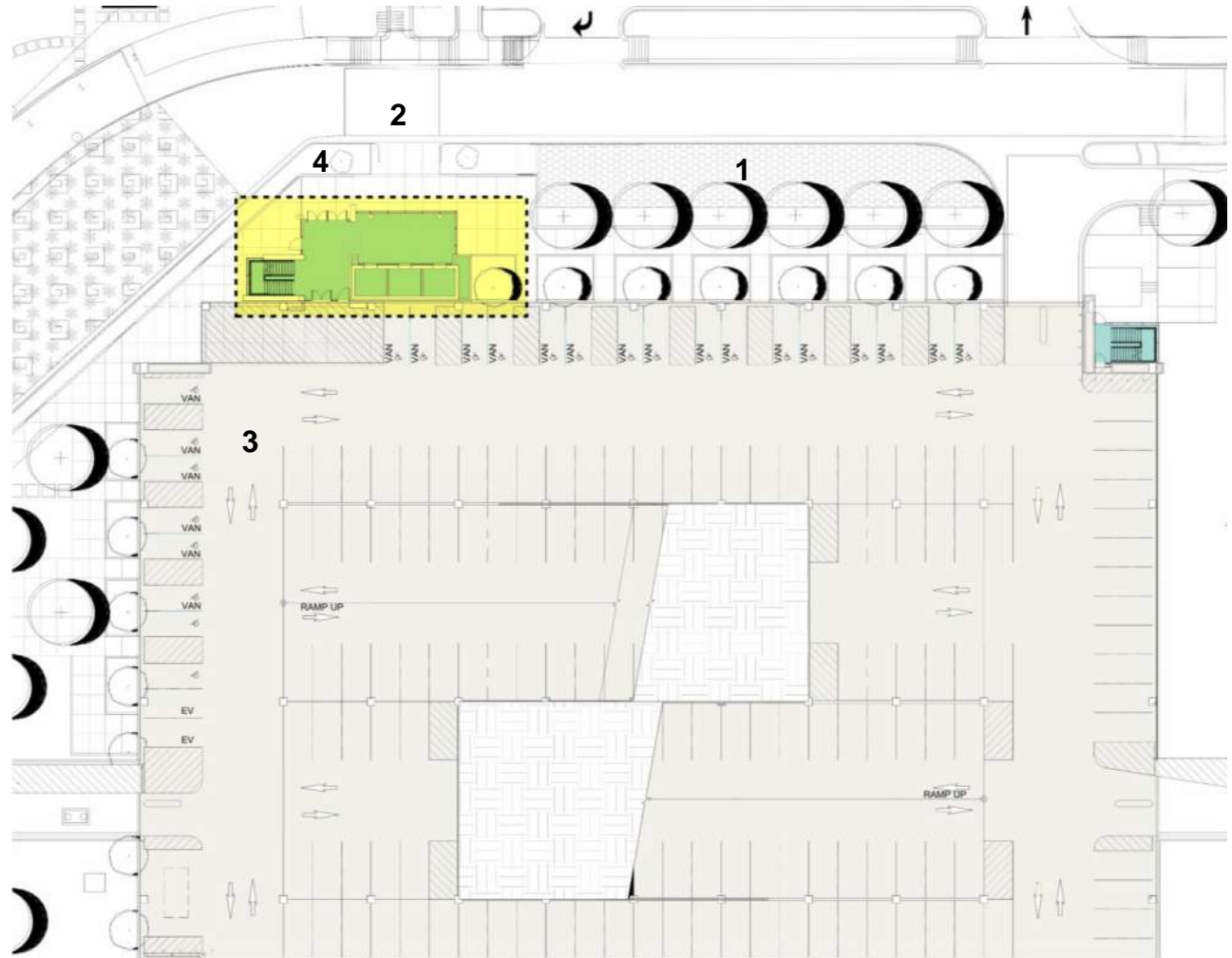
Protecting Pedestrians from Vehicles



Core Location

Key drivers for core:

1. Keeping core further west allows for longer fire lane access to be provided
2. By not aligning doors with crosswalk, there is more space for queuing around doors at areas away from vehicles
3. Due to the east/west orientation of garage, preference is to locate the core furthest west to help with way finding
4. Location of core is closest accommodation for future pedestrian link



Feedback from March 13 DRB Review

1. Review access and Circulation

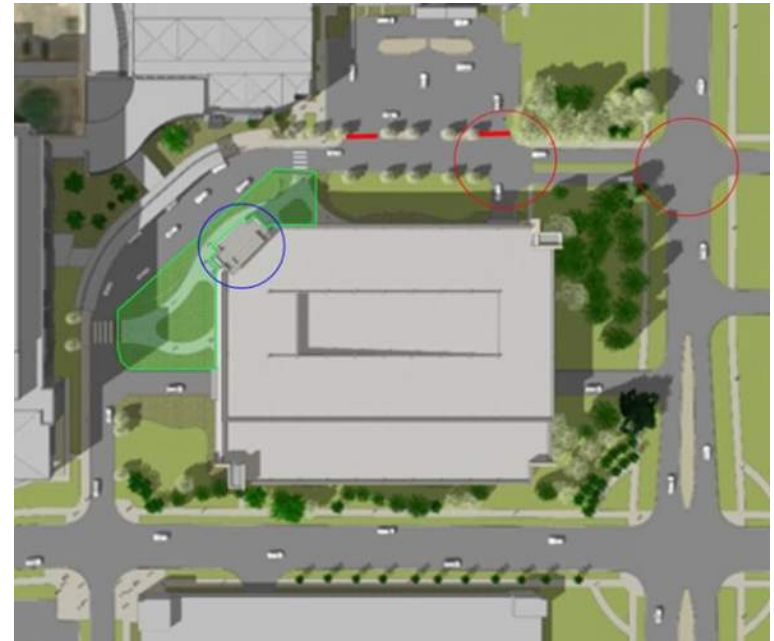
- A. Study traffic impact at intersection of Aurora Court and Drop-off Drive
- B. Study traffic impact at intersection of Drop-off Drive and north entrance/exit of garage

2. Refine urban design solution

- A. Reconsider garage materials
- B. Reconsider landscape design

3. Refine architectural mass

- A. Study moving primarily vertical circulation core away from corner
- B. Locate on north side with more direct access to northeast crosswalk



Site Plan with key areas to address indicated

Feedback from March 23 DRB Work Session

1. Review access and circulation

- A. Lot 1 Concept
- B. Traffic Study

2. Refine urban design solution

- A. Overall Design
- B. North Side
- C. West Side
- D. Northwest Corner
- E. Landscape Walls

3. Refine architectural mass

- A. New Elevator Core Location and Configuration
- B. Façade Design
- C. Sustainable Concrete Mix



New Landscape Concept shared during Work Session



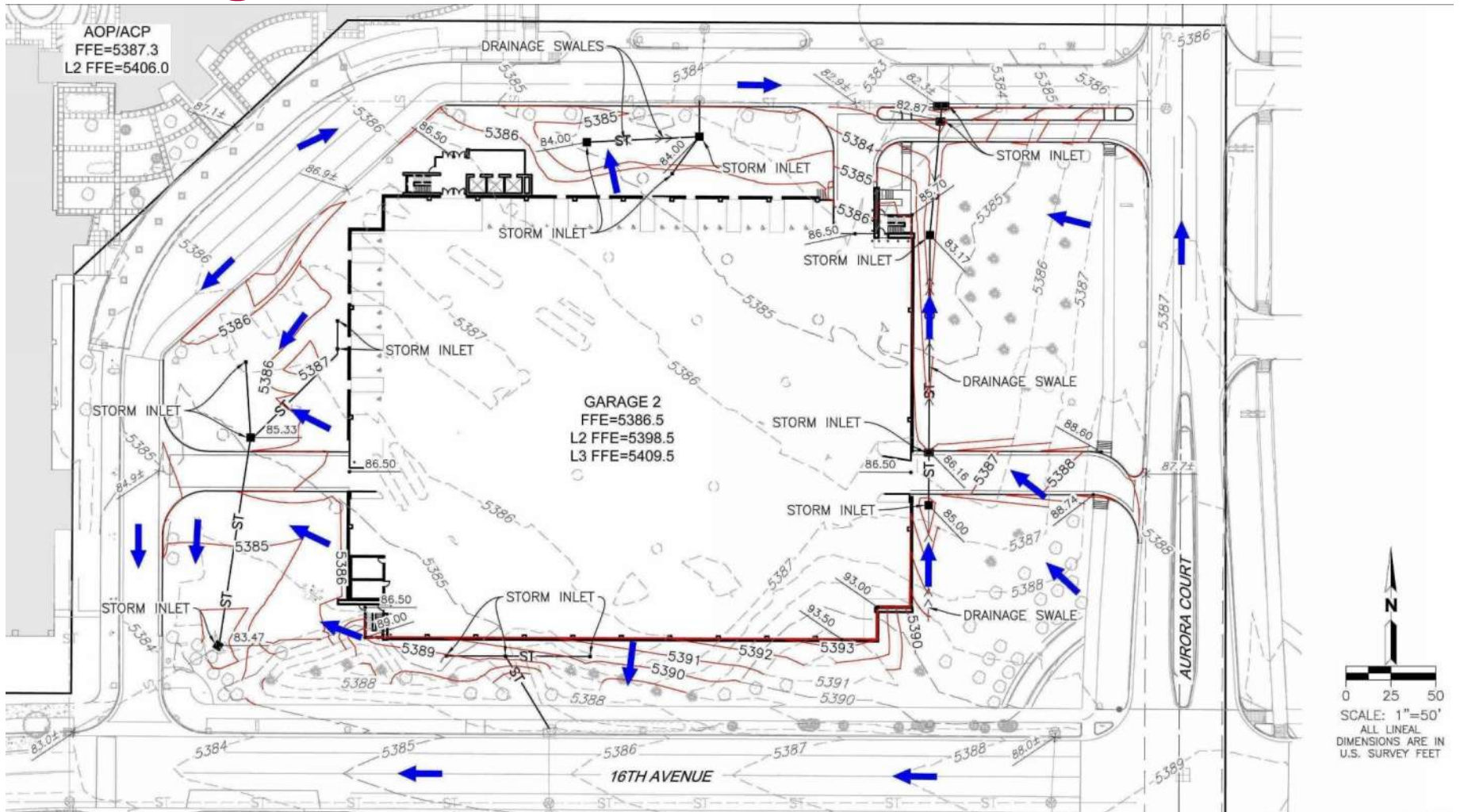
New Architecture Concept shared during Work Session



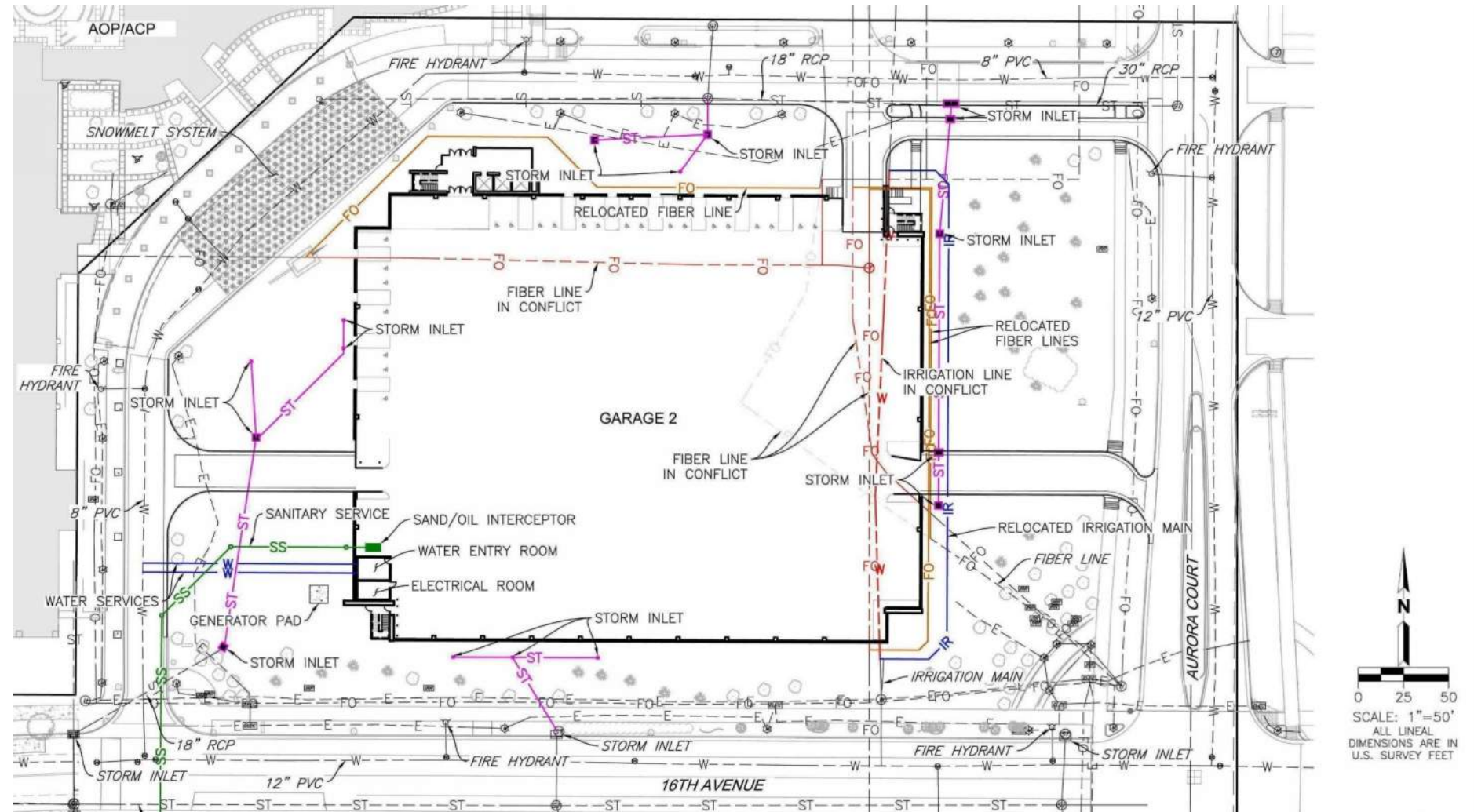
New Architecture Concept shared during Work Session

III. Schematic Design

Grading Plan



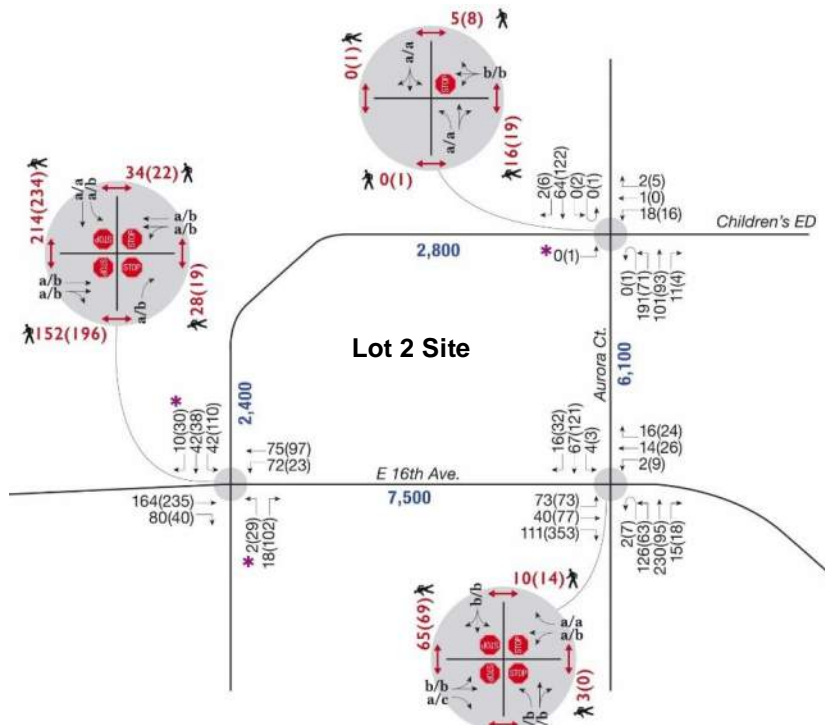
Utility Plan



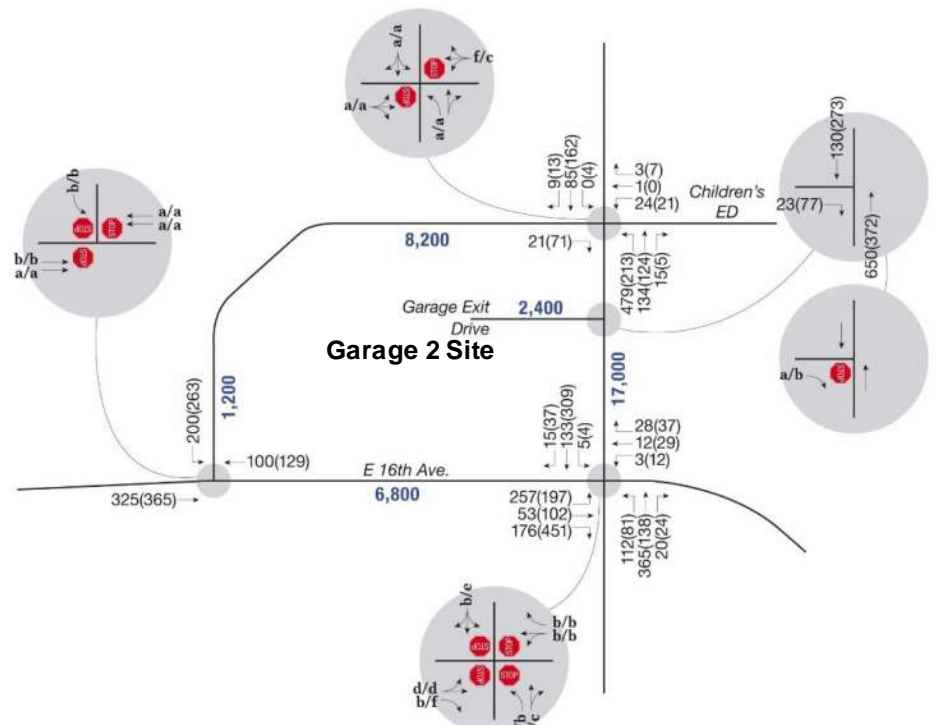
Traffic Study

LEGEND

- XXX(XXX) = AM(PM) Peak Hour Traffic Volumes
- XXXX = Daily Traffic Volumes
- x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service
-  = Stop Sign
-  = AM/PM Pedestrians
-  = Illegal/Prohibited Turn Movements

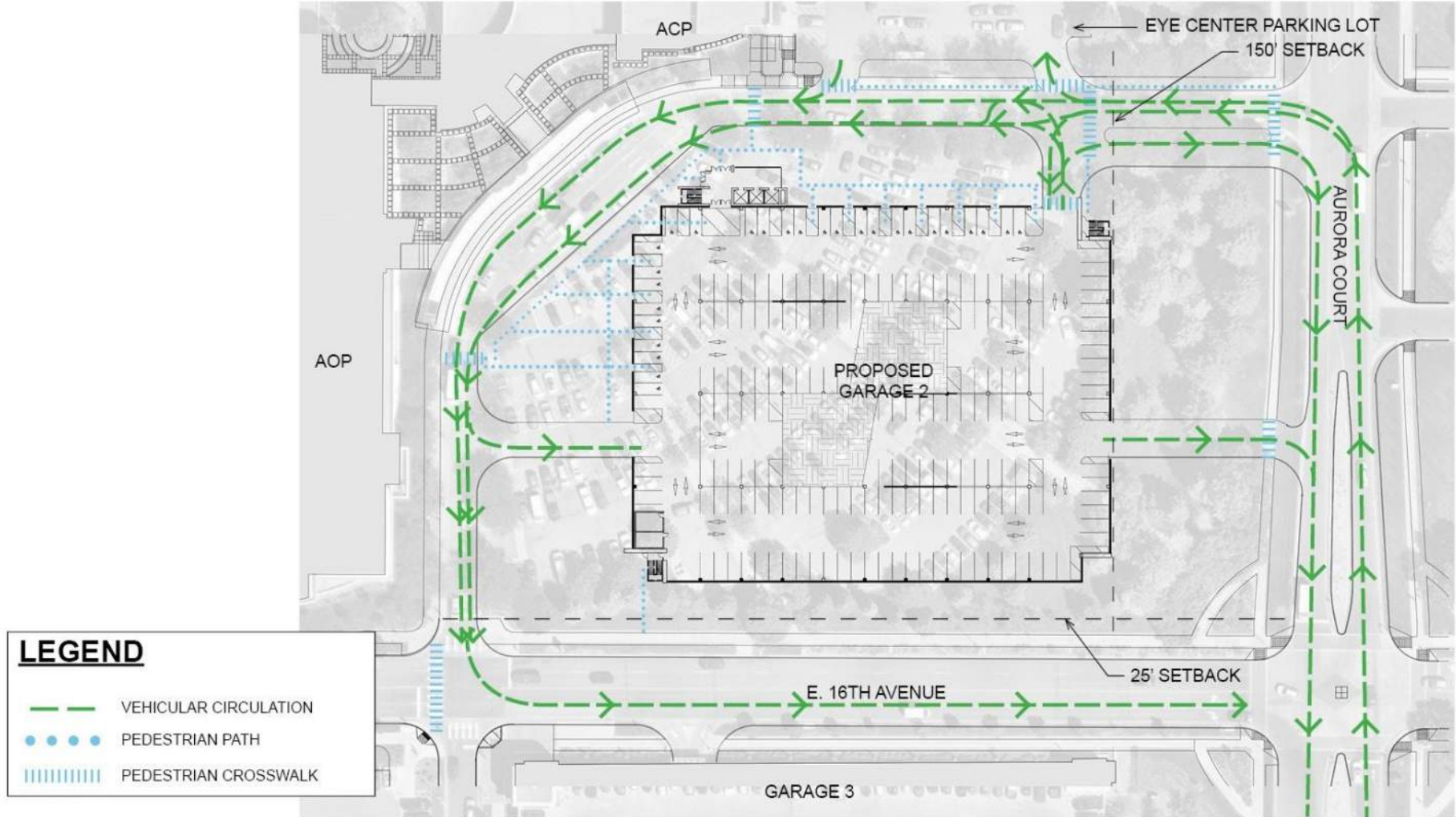


Existing Traffic Volumes



Anticipated 2025 Traffic Volumes

Pedestrian and Vehicular Circulation



PEDESTRIAN AND VEHICULAR CIRCULATION

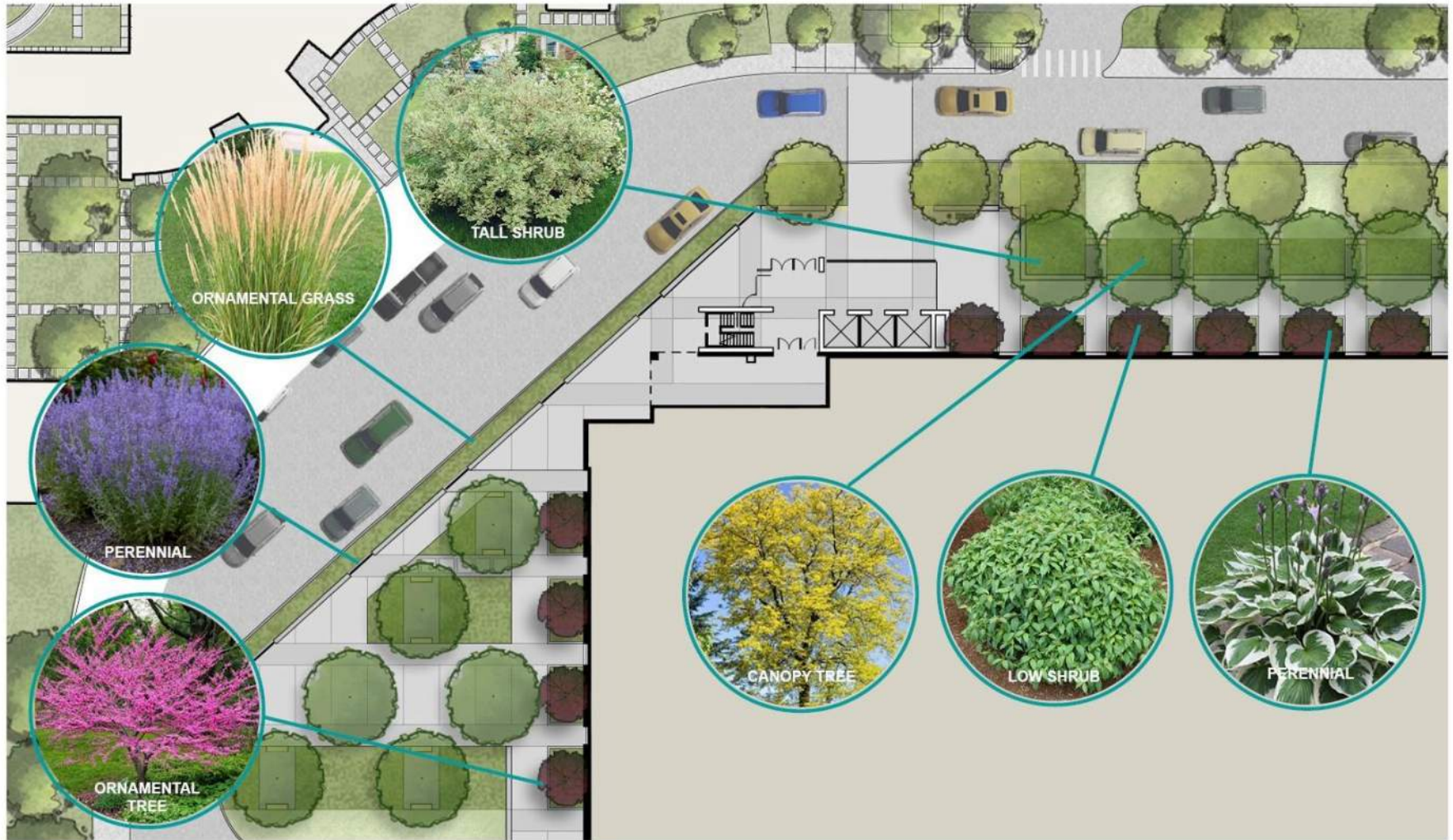


Overall Project Site Plan



OVERALL SITE PLAN

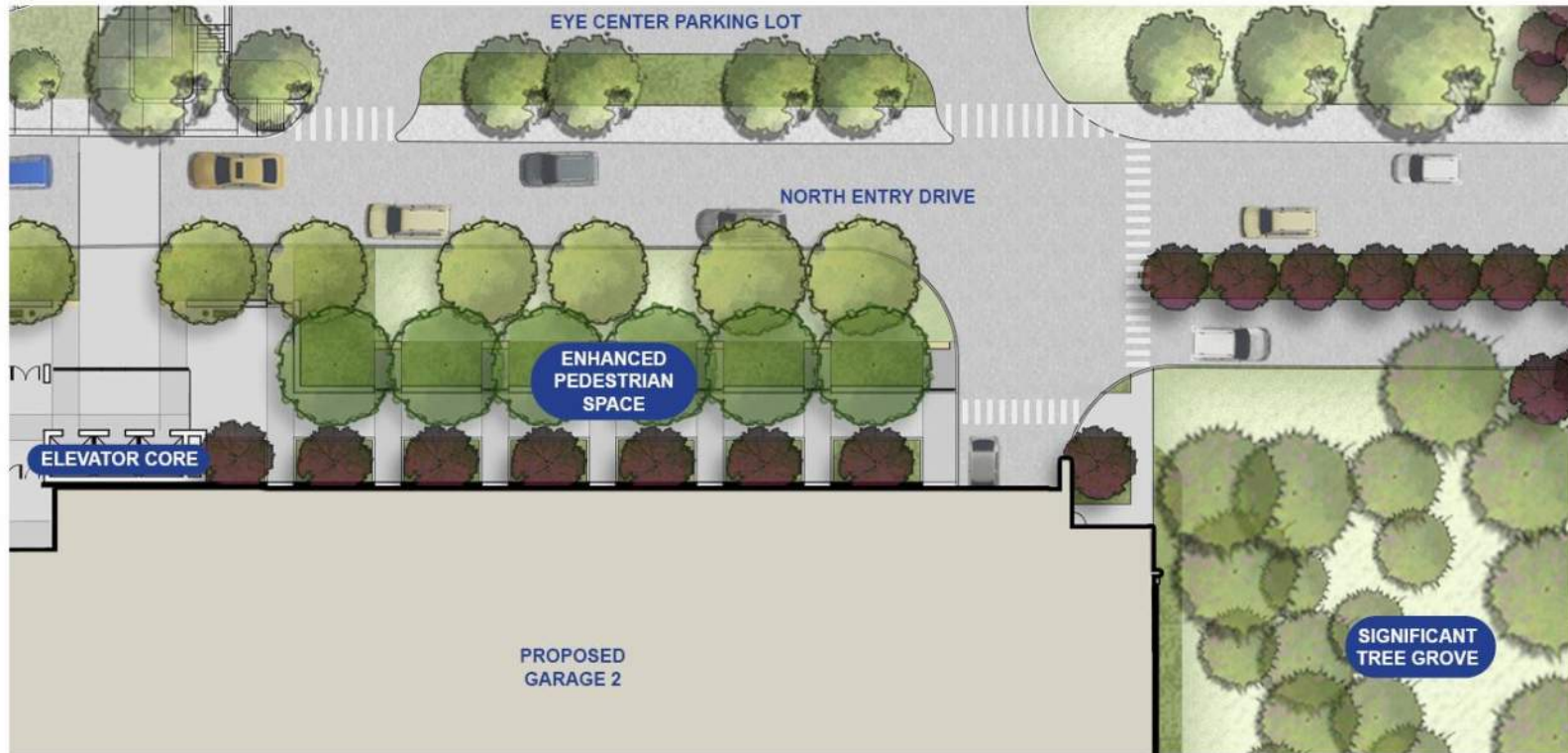
Planting Plan



PLANTING PLAN



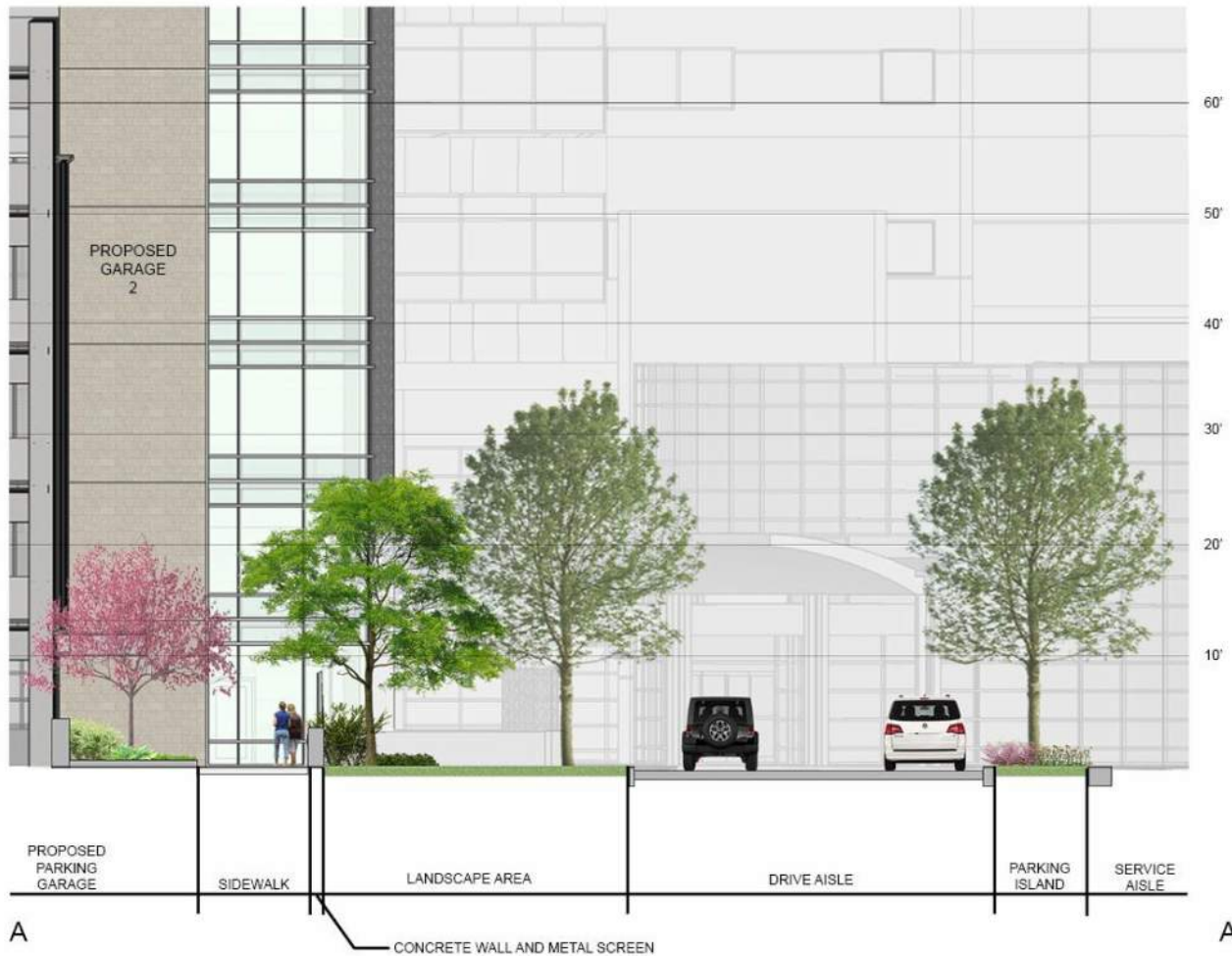
Enlargement Plan



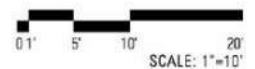
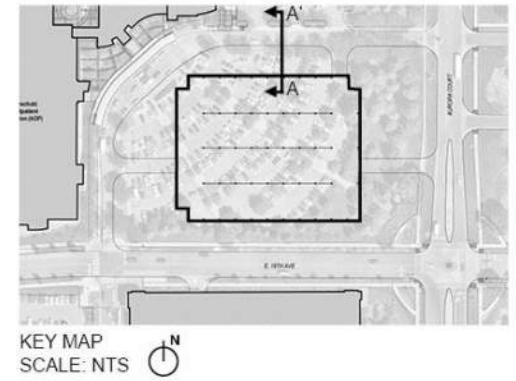
NORTH PLAZA ENLARGEMENT PLAN



Landscape Section



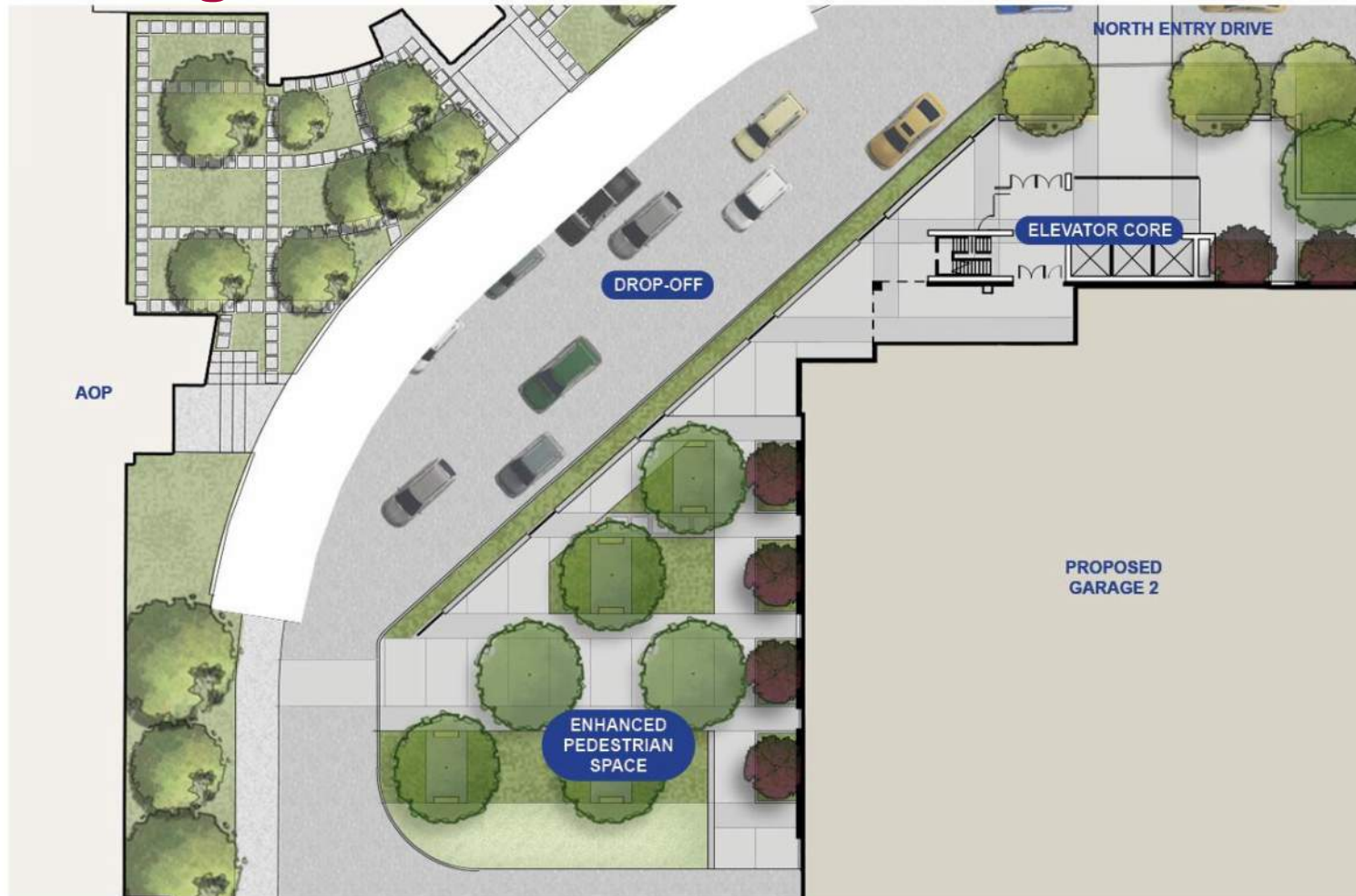
ENTRY DRIVE SECTION FACING WEST



North Plaza Perspective Views

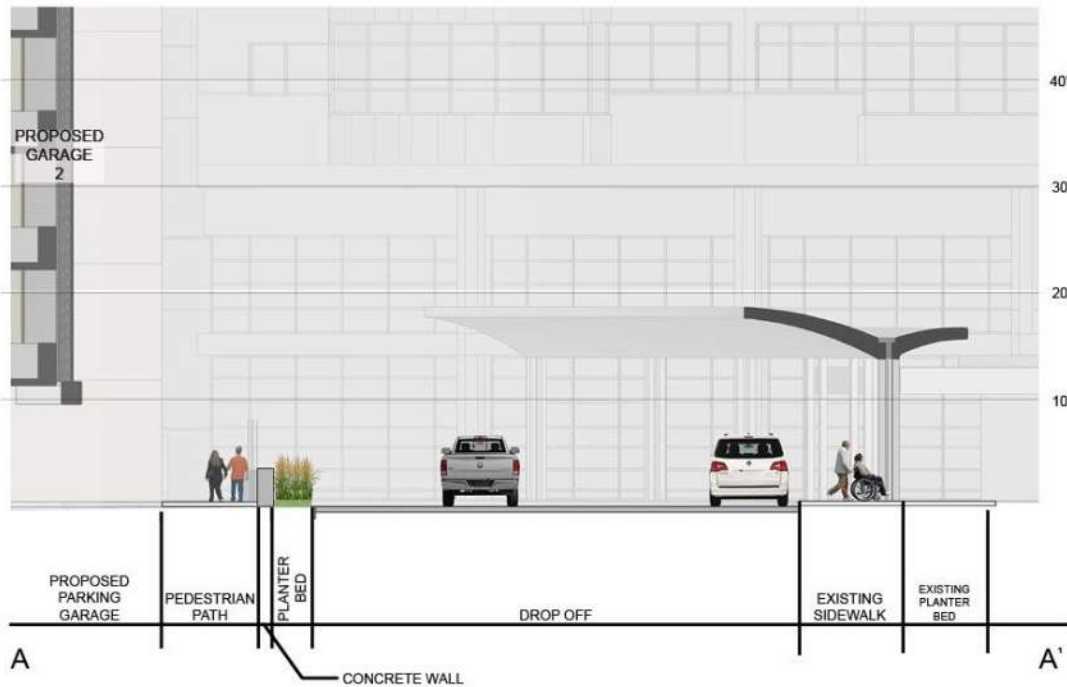


Enlargement Plan

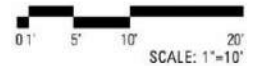
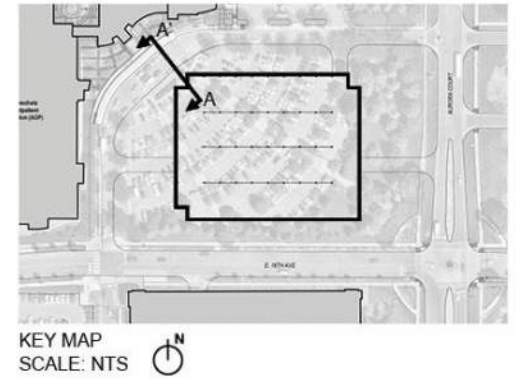


WEST PLAZA AND ELEVATOR CORE ENLARGEMENT PLAN

Landscape Section



DROP OFF AREA FACING SOUTHWEST



uhealth

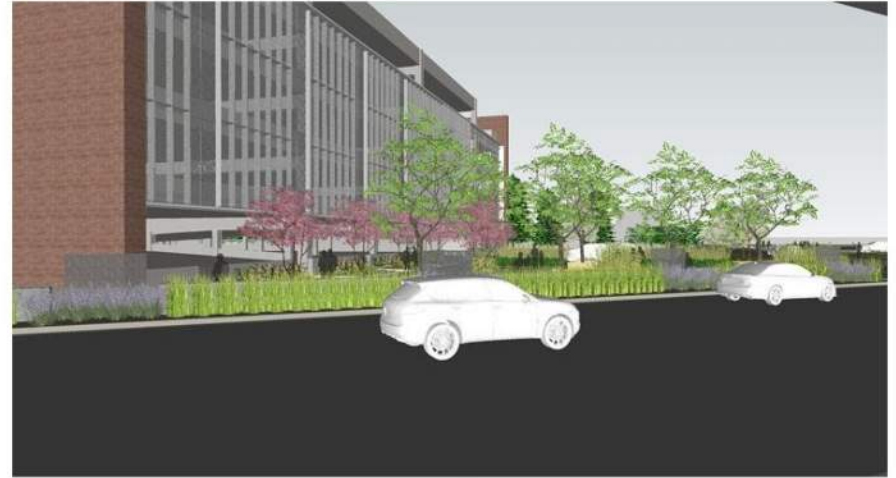
Landscape Section



WEST PLAZA FACING NORTH

uhealth

West Plaza Perspective Views



Inspiration



Palo Alto, CA

Hoover Parking Garage - Stanford



Raleigh, NC

Green Square Parking Garage

Rockhurst University Garage



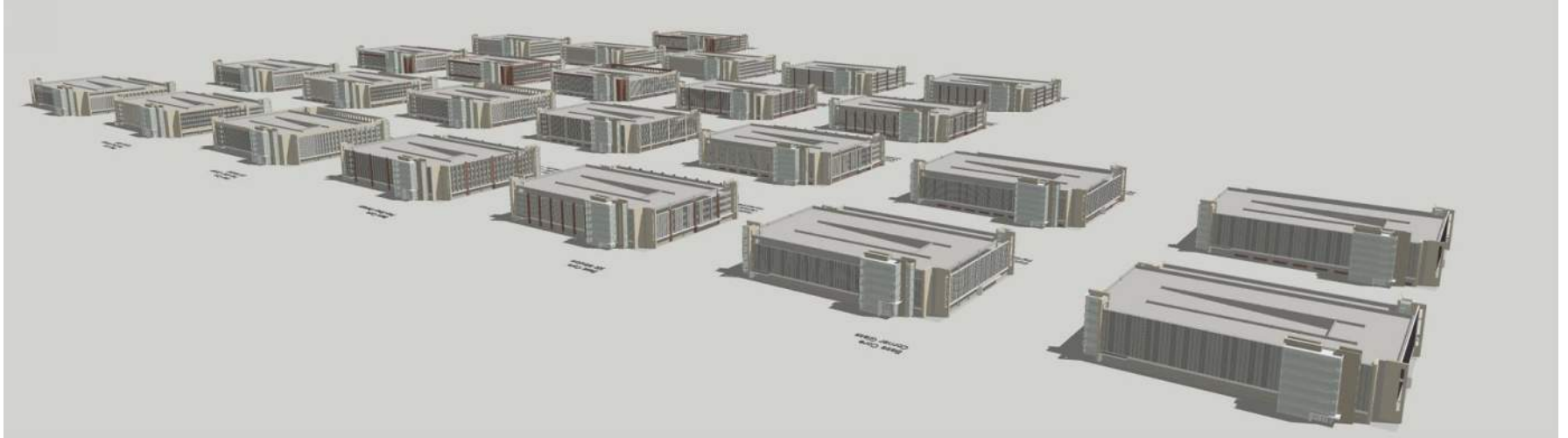
Kansas City , MO

Standard Parking Garage



Kansas City, MO

Façade Studies



Option 2A Selected for Further Study during March 23 DRB Work Session

Façade Vignettes – Screen Articulation



Steel Return at Opening



Recess at Opening



Proud at Opening



Flat Screen Fade

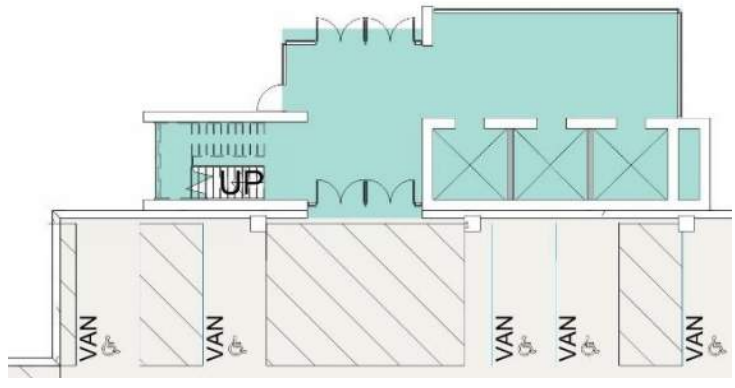


Perpendicular Screen Fade

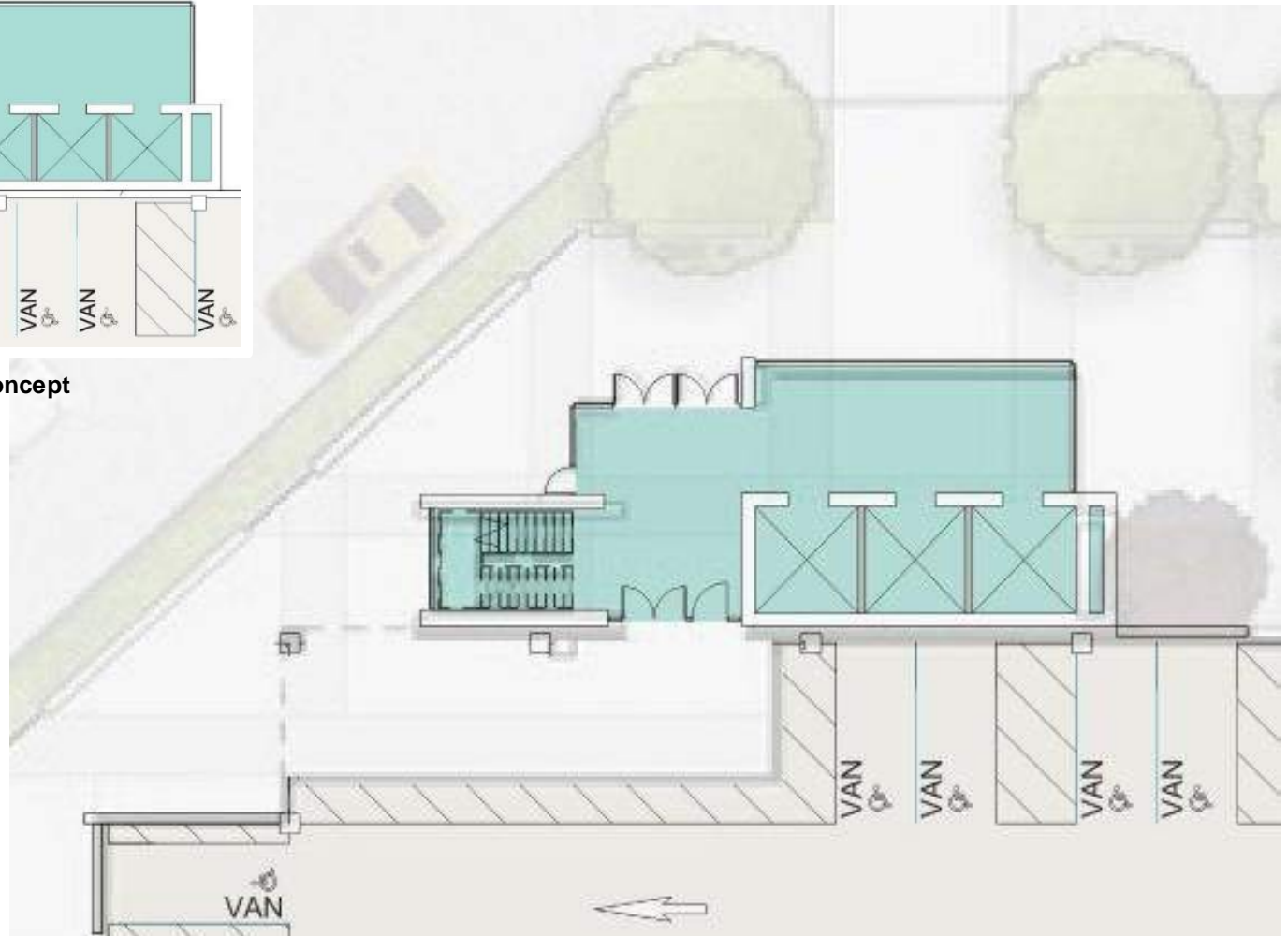


Combo Fade

Core Floor Plan



Initial Elevator Core and Stair Concept



Preferred Elevator Core and Stair Concept

Aerial Plan



Aerial Plan

uhealth

South & East Elevations



Aerial View Looking Northwest

North Elevation



Aerial View Looking Southwest

North & West Elevations



Aerial View Looking Southeast

South & West Elevations



Aerial View Looking Northeast

Schematic Design - Elevations



North Elevation



West Elevation



South Elevation



East Elevation

Schematic Design - Elevations



North Elevation

Schematic Design - Elevations



West Elevation

Schematic Design - Elevations



South Elevation

Schematic Design - Elevations



East Elevation

Schematic Design - Perspectives



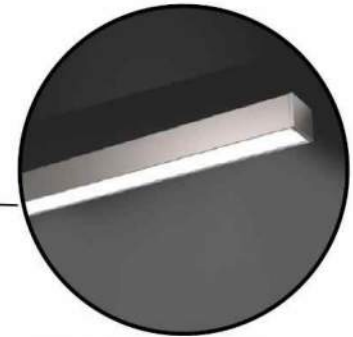
Street View at 16th Ave & Aurora Court Looking Northwest

Schematic Design - Perspectives

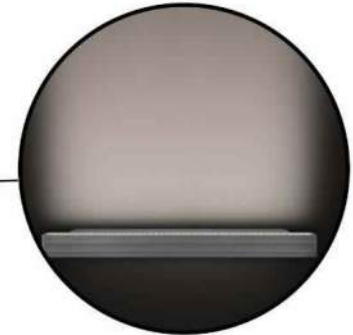


Street View at Entry Drive & Aurora Court Looking Southwest

Lighting Concept



**A-light Accolade D3
Mullion Mounted**



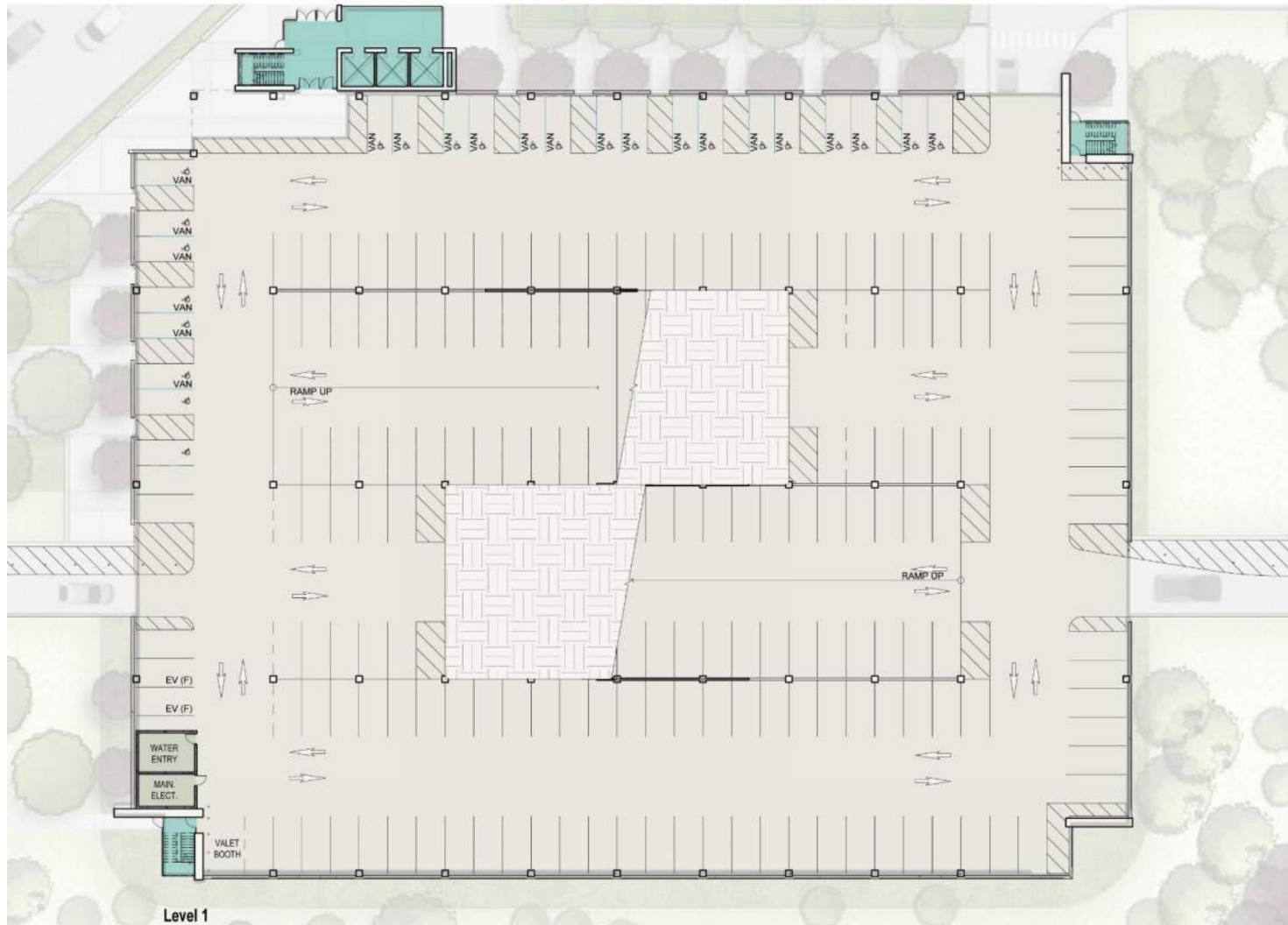
**Lumenpulse Slim Linear
LED Grazing**



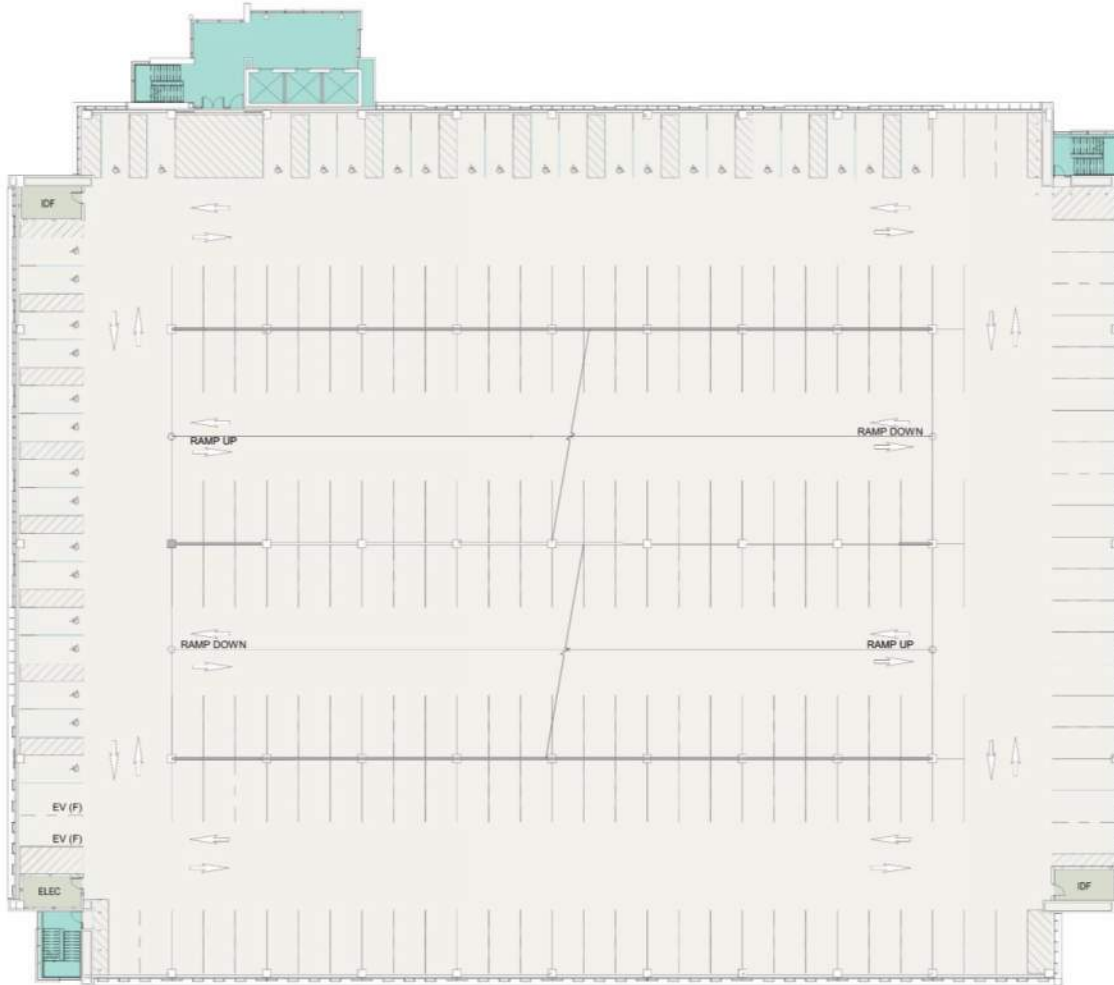
**Lumenpulse Inground
Uplight**

uhealth

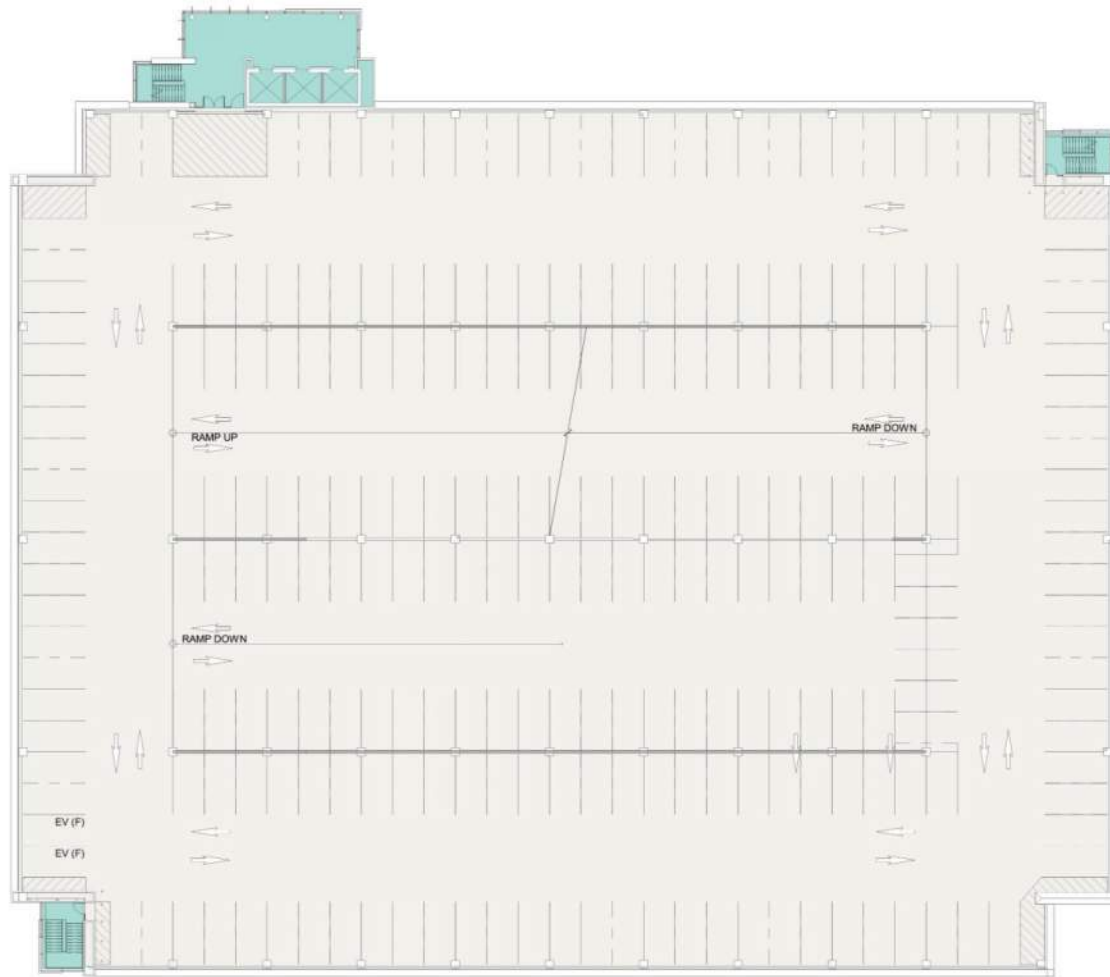
Ground Level Floor Plan



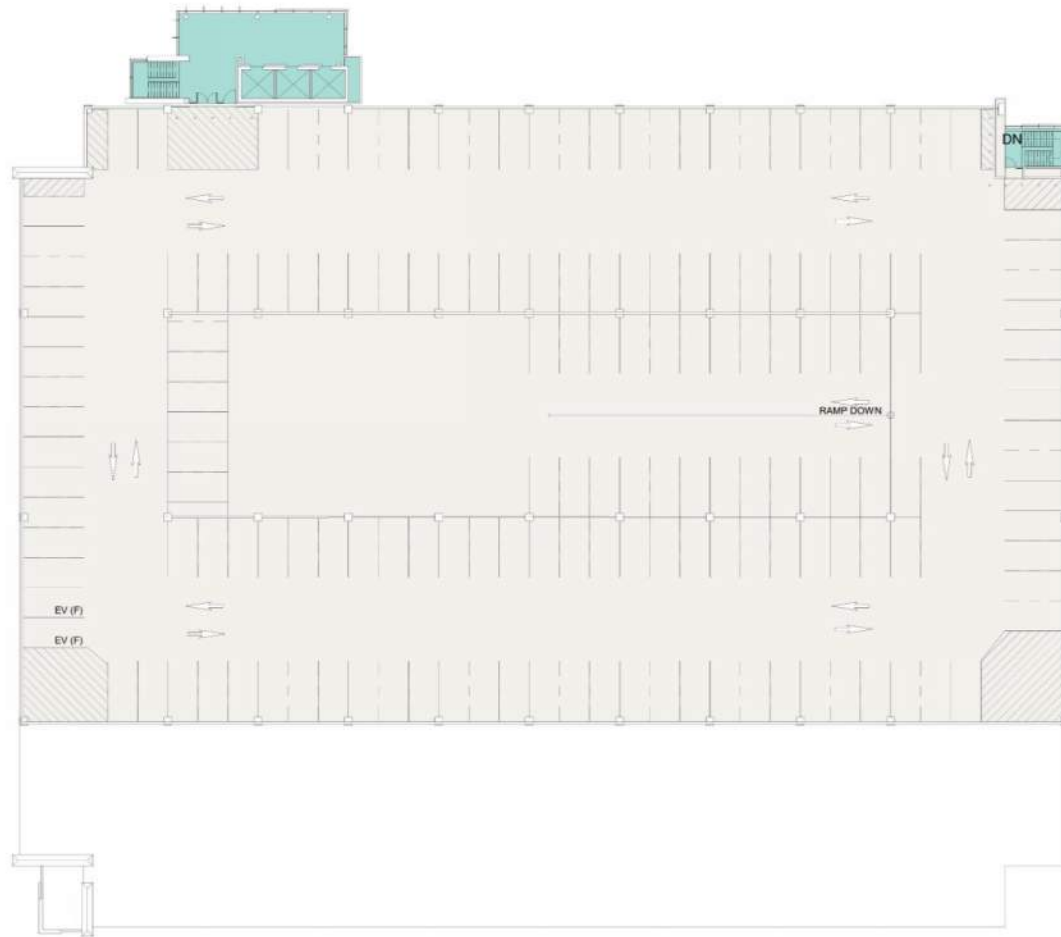
Levels 2-4, Typical Floor Plan



Level 5 Floor Plan



Level 6 Floor Plan



Energy Design Consideration Summary

	Typical Parking Structure	Best Practices	Project Implementation
Performance Specification	None.	Energy goal-driven specification	Design team has set annual energy goal of 51kWH /parking stall/year.
Ventilation	Mechanical ventilation if underground or enclosed	Natural ventilation only	Garage will be entirely naturally ventilated. Daylighting sensors provided to reduce power to luminaires by 30%.
Daylighting	None	Daylight provides 75%-100% energy use reduction for electric lighting during daytime hours	
Electric Lighting	0.18-0.30 W/ft2 installed load	0.05-0.18 W/ft2 installed load depending on illuminance requirements Concern for safety and way finding, driving time, and lighting use. Flow considerations reduce energy use by 75% during nighttime hours (can vary based on garage use patterns).	0.17 W/ft2 installed load.
Pedestrian Flow	Concern for safety and way finding		High priority on pedestrian experience and way finding.
Equipment	Active heating methods to prevent freezing in drainpipes and elevator gear.	Passive heating and heat recovery methods to prevent freezing in drain-pipes and elevator gear.	TBD
Incentives	Preferred parking.	Preferred parking and onsite charging stations powered by renewable energy	Infrastructure for (2) EV charging stations per floor.
Renewable Energy	None	Solar electricity and wind used in appropriate climate zones	Alternate for solar electricity on top level is included.
Commissioning	Commissioning but no measurement and verification (M&V)	Commissioning and ongoing M&V	TBD

Notes:

1. US Energy Star does not provide Energy Use Intensity (EUI) data for parking garage projects.
2. This list is adapted from NREL guidelines for Low-Energy Parking Structure Design.

Concrete Mix

SEARCH BY PROPERTIES: 03 30 00 CAST-IN-PLACE CONCRETE

▼ DESIGN INTENT

Compressive Strength: 5000 psi @ Curing Time: 28d

Slump (min): Options: W/C Ratio: SCM: EC3 / 1 yd3

Standardweight ☒ Lightweight ☐

▼ GEOGRAPHIC

Filter by Country/Region: USA Filter by State/Province: Colorado

▼ ADVANCED

Filter by Manufacturer: Filter by Plant: Filter by Product Name:

kgCO2e embodied per 1 yd3

Tour: BOXPLOT DIAGRAM

Notes:

Design team is using the EC3 website as a tool for selecting a concrete mix. Other variables will need to be considered and evaluated to ensure the proper concrete mix is selected.

EC3 Online Tool for Material Comparisons

Organization Name: Martin Marietta

Plant Name: Quivas

Product Name: A5512

Description: Exterior 5000 PSI

GWP: 400 kgCO2e

Declared Unit: 1 yd3

Concrete Compressive Strength 28D: 5000 psi

Original EPD File: [DOWNLOAD EPD](#)

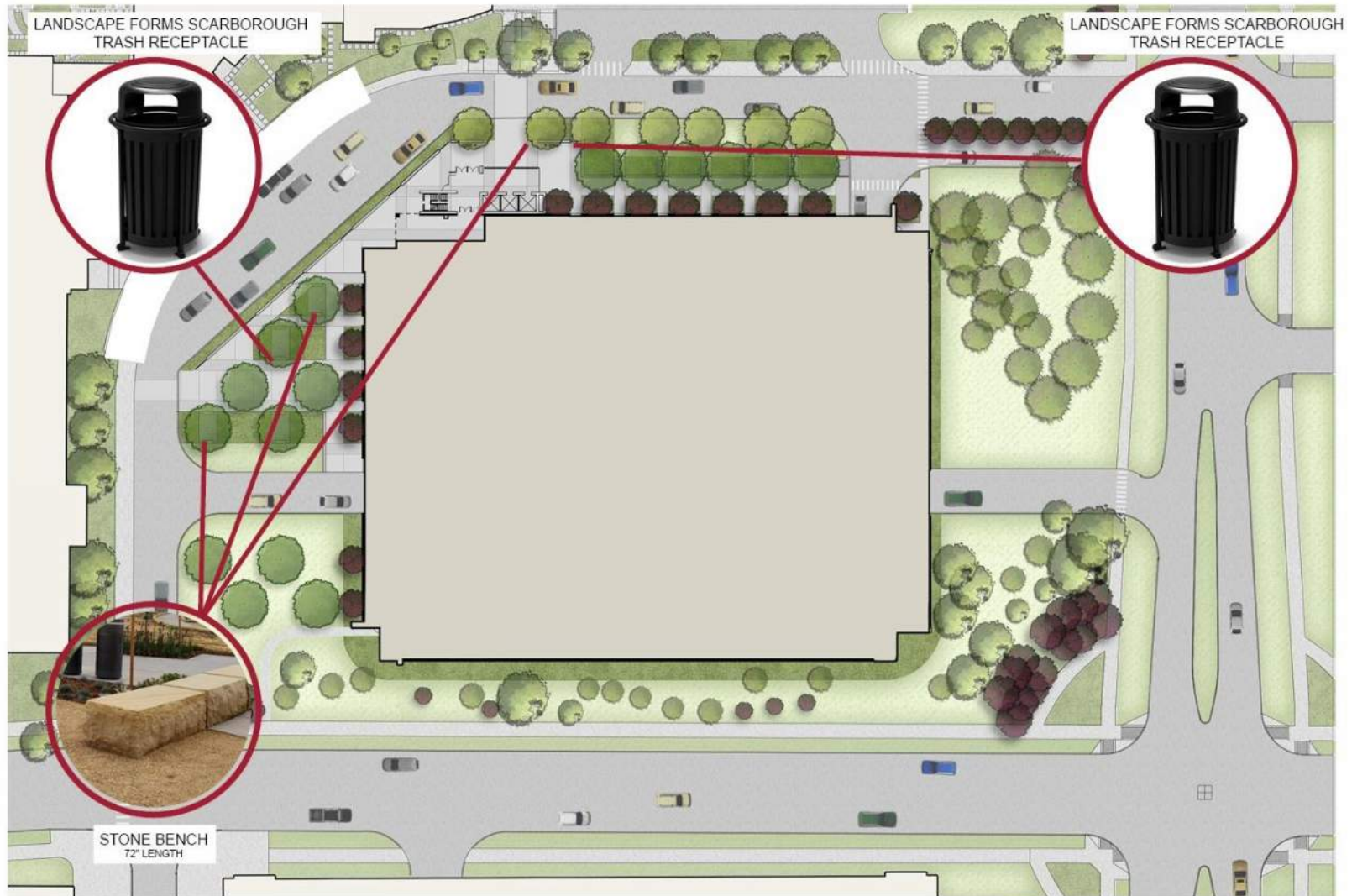
[View](#)

Example of Concrete Mix that would fall below the Carbon Leadership Forum (CLF) baseline for Ready Mix concrete, which is 458.73

Thank you

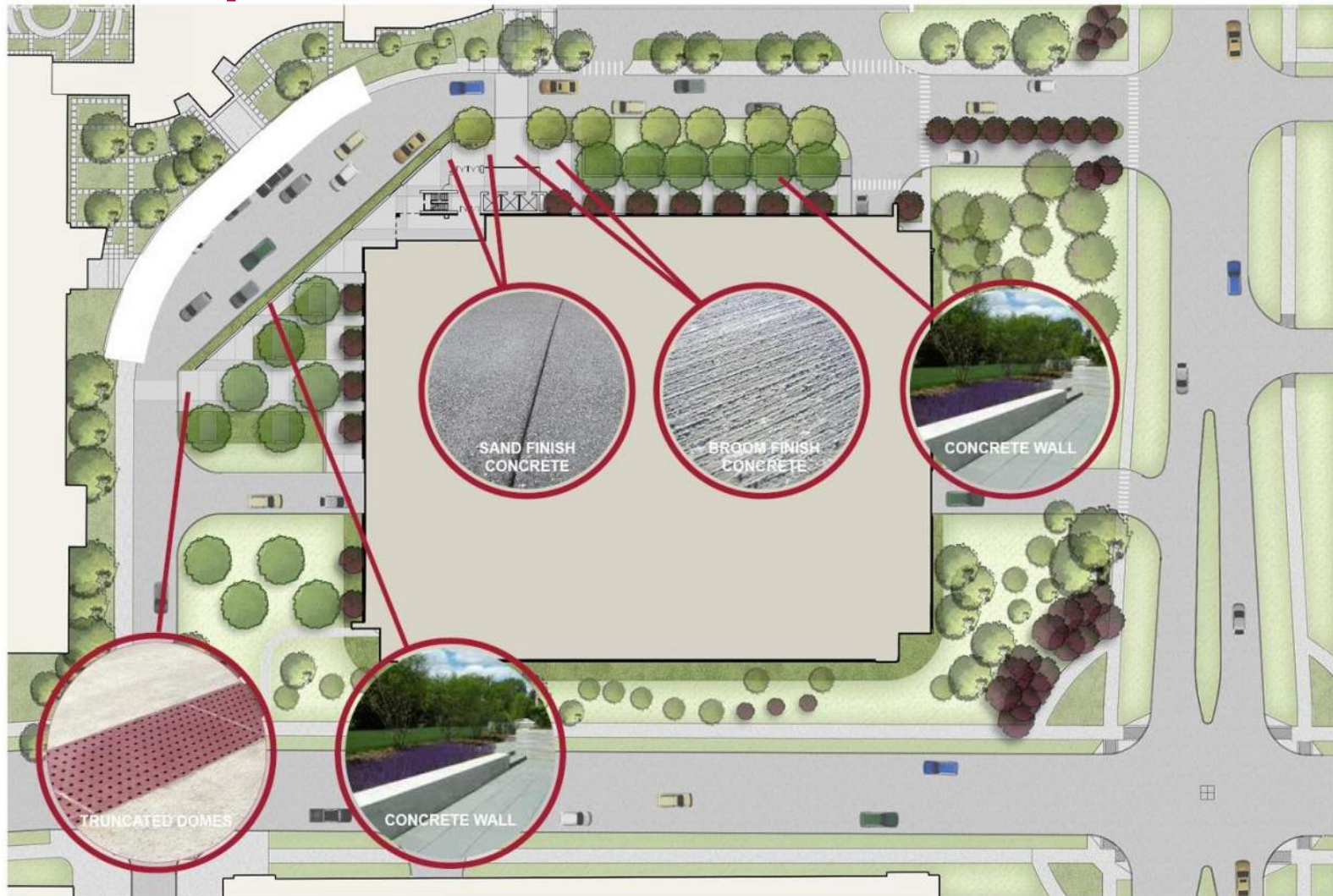
Appendix

Site Furnishings



SITE FURNISHINGS

Hardscape and Material Finishes



HARDSCAPE AND MATERIAL FINISHES



Plant Palette



AUTUMN BLAZE MAPLE ☀️



PYRAMIDAL ENGLISH OAK ☀️



PONDEROSA PINE ☀️



COLORADO SPRUCE ☀️



SKYLINE HONEY LOCUST ☀️



SPRING SNOW CRAB APPLE ☀️



EASTERN REDBUD 🌙



BLUE SPRUCE ☀️

PROPOSED PLANT PALETTE

SHADE 🌙 PARTIAL ☀️ SUN ☀️

Plant Palette



KNOCKOUT ROSE ☀️



SEA GREEN JUNIPER ☀️



DWARF KOREAN LILAC ☀️ ☀️



OREGON GRAPE HOLLY 🌿



GRO-LOW FRAGRANT SUMAC ☀️ ☀️



INKBERRY HOLLY ☀️ 🌿



VINCA 🌿

PROPOSED PLANT PALETTE

SHADE PARTIAL SUN



Plant Palette



CLIMBING HYDRANGEA 🌿



BLACK-EYED SUSAN ☀️



PAMPAS GRASS ☀️ ☀️



FEATHER REED GRASS ☀️ ☀️



PLANTAIN LILY 🌿



MINIATURE BEARDED IRIS ☀️ ☀️



LITTLE BLUESTEM GRASS ☀️



SEDGE 🌿

PROPOSED PLANT PALETTE

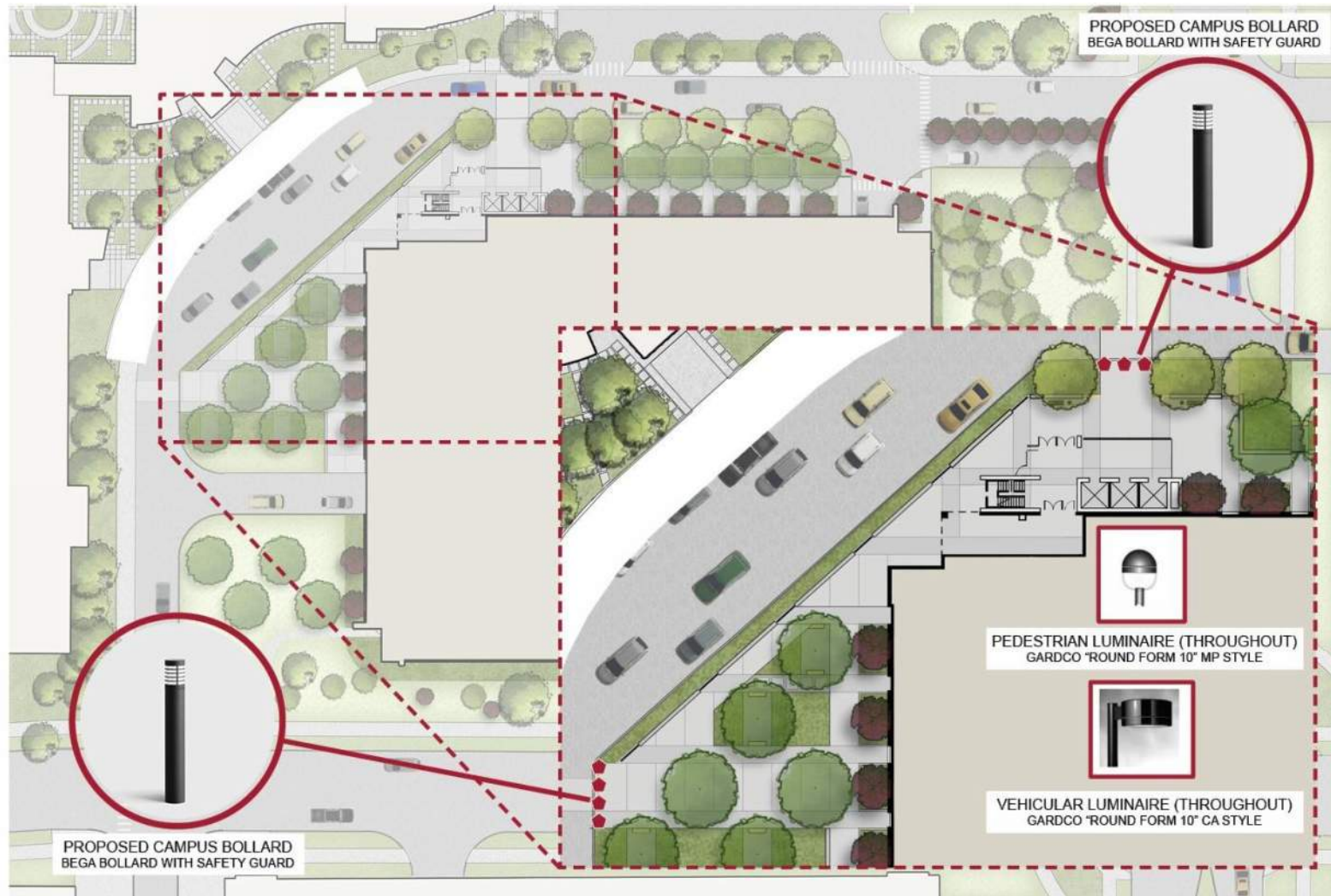


Precedent Images



uchealth

Site Lighting



SITE LIGHTING



uhealth

Lighting Fixtures

Fixture Vocabulary A

Vehicular Luminaire

Gardco "Round Form 10" CA Style

Material: Aluminum, RAL7038

Height: 30' (RA5)

*See University of Colorado Denver

Design & Construction Standards, Section 26 56 00

for additional Information



Bollard Lighting

Gardco "Round Form 10" MP Style

Material: Aluminum, RAL7038

Size: 16" Diameter

*See University of Colorado Denver

Design & Construction Standards, Section 26 56 00

for additional Information



Discontinued

Pedestrian Luminaire

Gardco "Round Form 10" MP Style

Material: Aluminum, RAL7038

Height: 10' (RA4)

*See University of Colorado Denver

Design & Construction Standards, Section 26 56 00

for additional Information



Exterior Building Wall Lighting

Gardco "Bollard 10" BR160

Material: Aluminum

Color: RAL 7038

*See University of Colorado Denver

Design & Construction Standards, Section 26 56 00

for additional Information



Campus Standard Fixtures

Total Parking Counts and GSF

Statistic Per Level

Level 6	164 spaces	45,808 GSF
Level 5	252 spaces	64,592 GSF
Level 4	241 spaces (35 ADA)	77,565 GSF
Level 3	242 spaces (36 ADA)	77,565 GSF
Level 2	242 spaces (36 ADA)	78,354 GSF
Level 1	169 spaces (2 ADA/22 van)	78,250 GSF

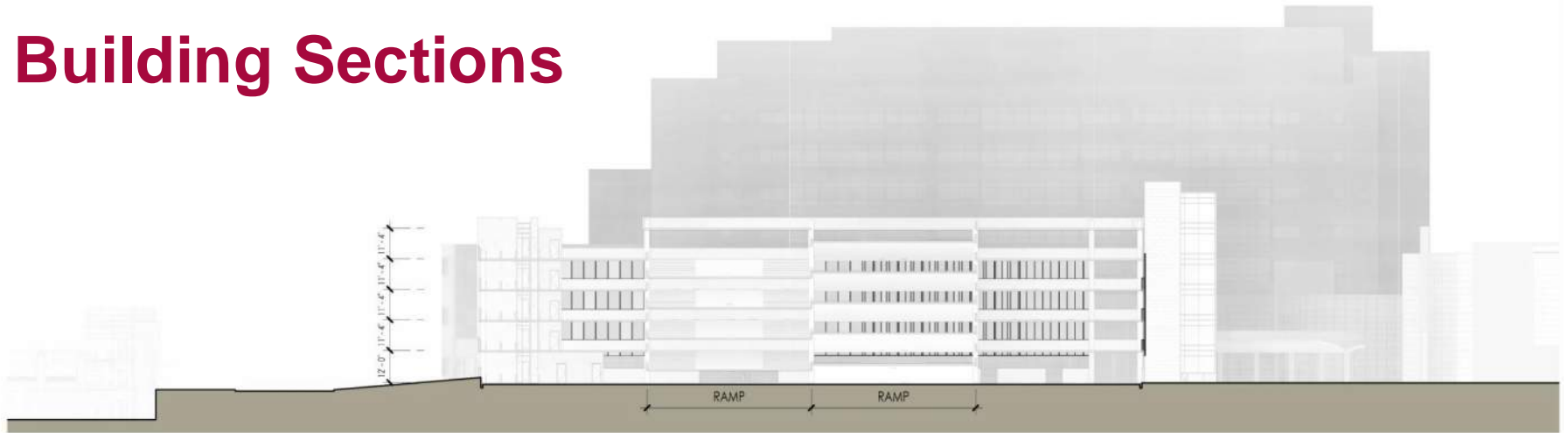
Totals

1,179 typical spaces
22 Van spaces
109 ADA spaces

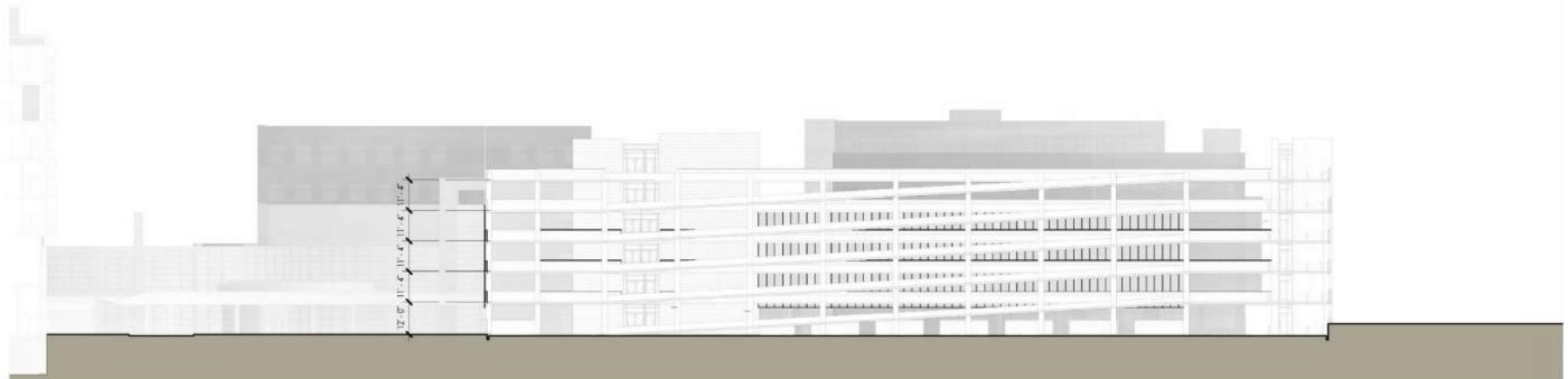
Grand Total

1,310 spaces 422,134 GFA (322 SF/stall)

Building Sections



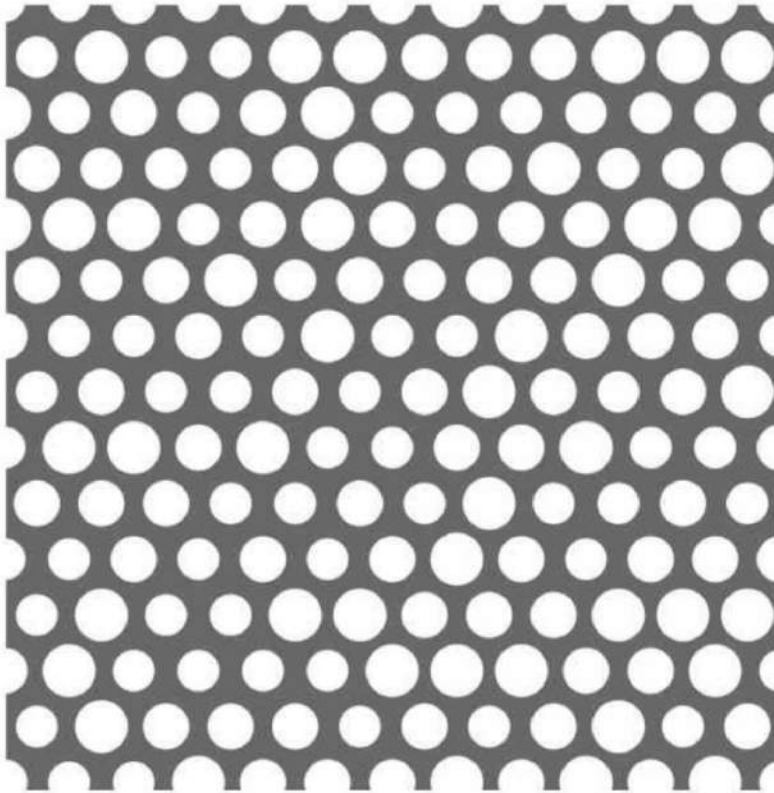
North/South Section



East/West Section

Perforated Screen

Perforation Pattern 1 - Base Pattern



Aero

- Material: Aluminum
- Finish: Powder Coated or Anodized
- Open Area: 56%
- Stock Status: Custom Made
- Max. Width: 60'
- Max. Length: 16' 4"
- Weight: 0.7373 lb/ft²
- Thickness: 0.125"
- Applications: Parking Garage Screens, Cladding, and Facades
- Attachment Methods: The Atmosphere System from the Valmont® Structures Architectural Facades product line or Screw Fastened (Use isolators LF11.0 from the Architectural Facades product line).

Notes

Other materials and thickness can be manufactured upon request. Open area and weight calculations are based on .12in (3.0mm) aluminum. Other versions of Aero are available to meet your exact specifications. While the ratio of hole sizes may need to be constant, the hole sizes and resulting open area can be adjusted.

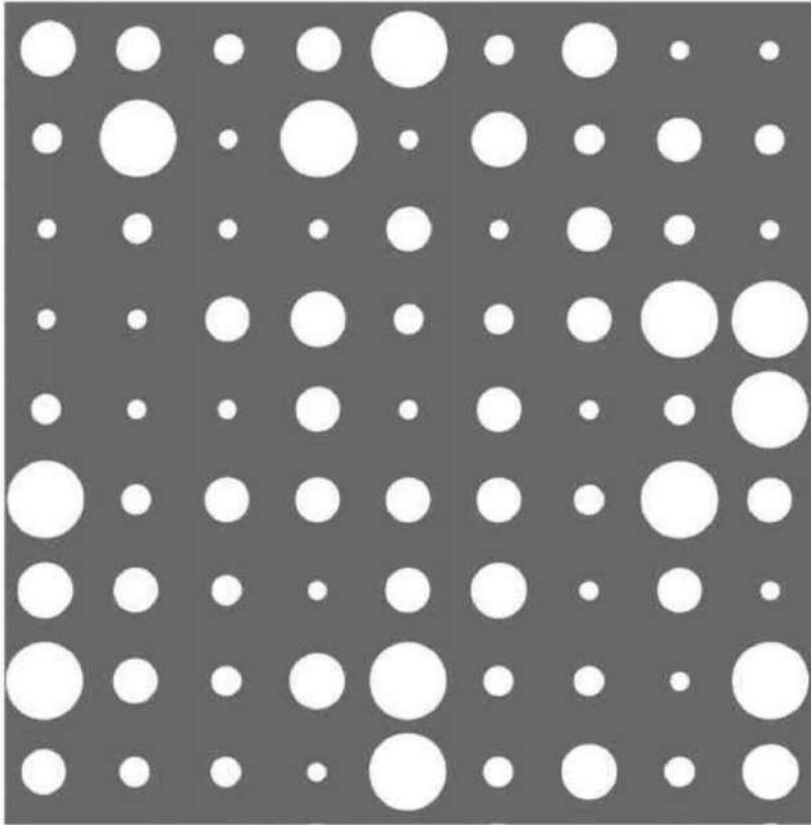
[View Reference Numbers](#)

[DOWNLOAD SPECIFICATION SHEET](#)



Perforated Screen

Perforation Pattern 2 - Used as accent and within landscape



Champagne

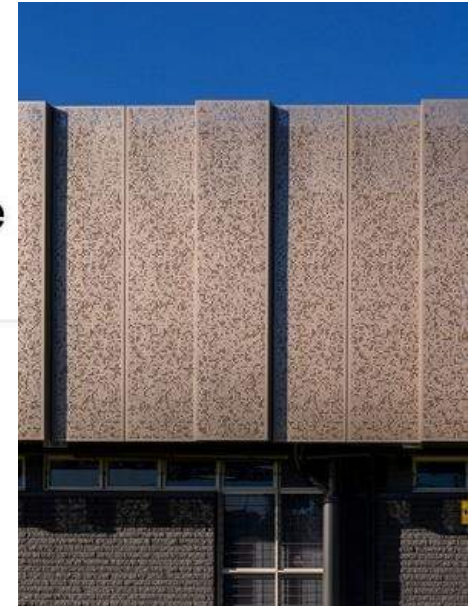
- Material: Aluminum
- Finish: Powder Coated or Anodized
- Open Area: 22%
- Stock Status: Custom Made
- Max. Width: 60"
- Max. Length: 16' 4"
- Weight: 1.2903 lb/ft²
- Thickness: 0.125"
- Applications: Decorative, Cladding, Facades, Ceiling Tiles, Privacy Screens, Partitions
- Attachment Methods: The Atmosphere System from the Valmont® Structures Architectural Facades product line or Screw Fastened (Use Isolators LF11.0 from the Architectural Facades product line).

Notes

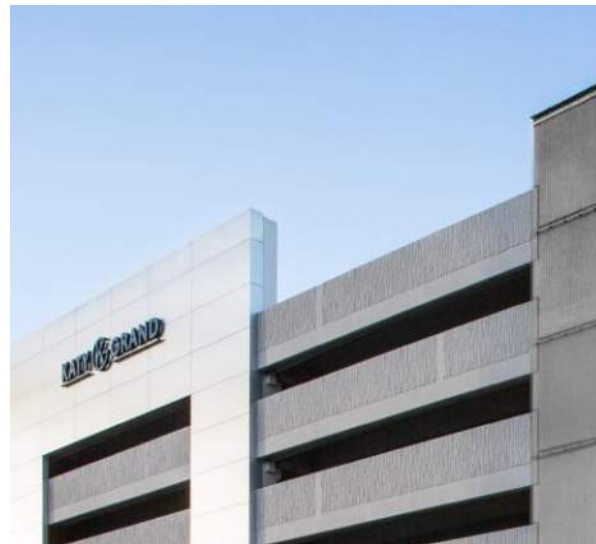
Other materials and thickness can be manufactured upon request. Open area and weight calculations are based on .12in (3.0mm) aluminum.

[View Reference Numbers](#)

[DOWNLOAD SPECIFICATION SHEET](#)



Concrete Texture



uhealth

Updated Core

