

# Construction Methods + Materials

Fall 2020  
Rachael Dwork  
Instructor: Patrick Reynolds



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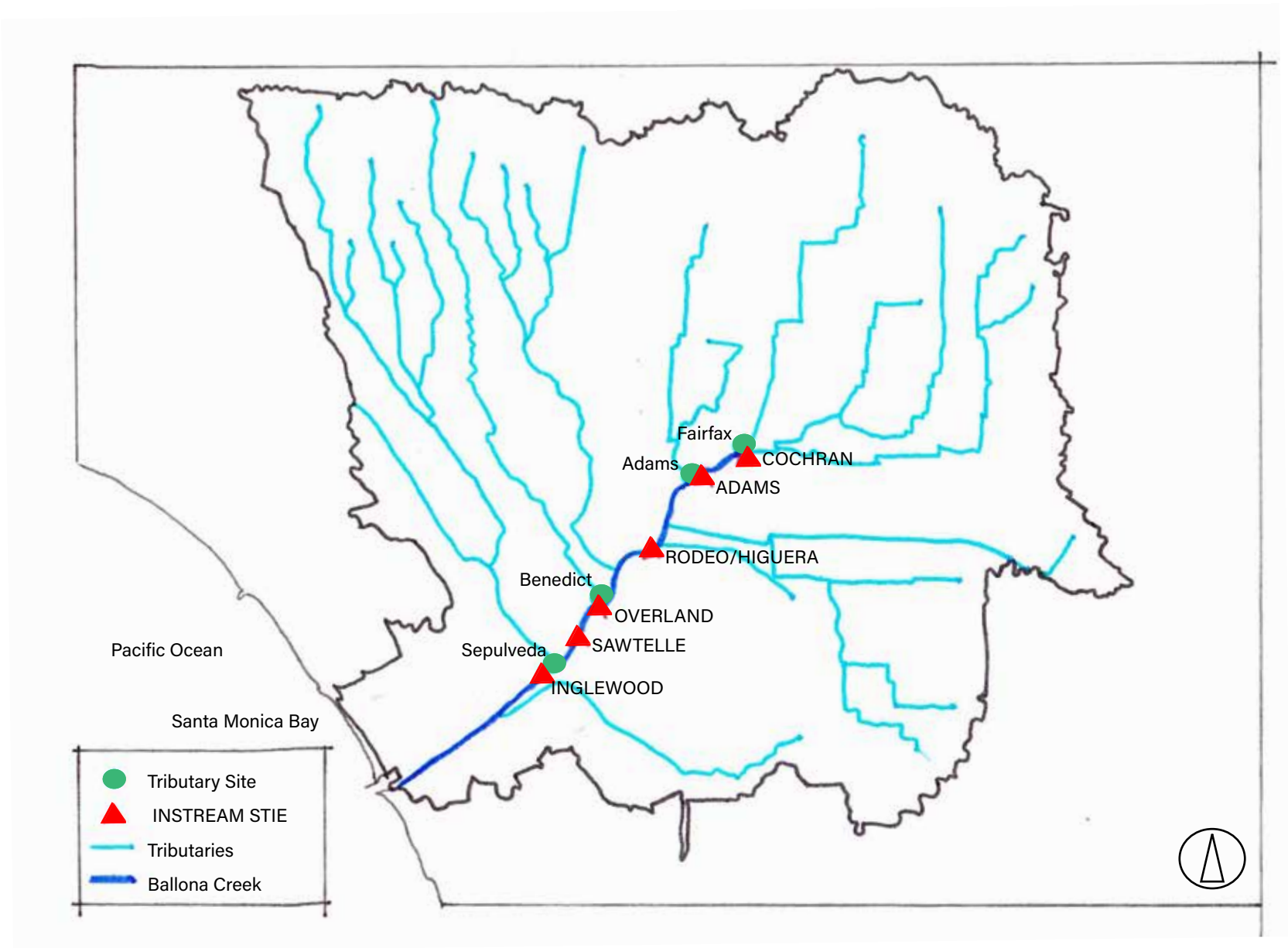
References

**MAR VISTA PARK + SAWTELLE CHANNEL**

STORMWATER STUDY

11430 Woodbine St, Los Angeles, CA 90066





**The Ballona Watershed**

The Sawtelle Channel Stormwater Conveyance System is a subterranean stormwater detention and treatment structure that was part of a 2006 improvement project located underneath the Western end of Mar Vista Park, in Los Angeles, CA. Mar Vista Park is a 15-acre site, located at the intersection of MacLaughlin Ave and Palms Blvd in a high density residential are and transportation corridor of Los Angeles. This system was designed to drain approximately 220 acres of urban runoff within Santa Monica’s Centinela sub-watershed and 2,280 acres from West LA from within the greater Ballona Watershed. It captures and

treats both dry weather runoff up to 3 ft<sup>3</sup>/sec and stormwater runoff up to 33 ft<sup>3</sup>/sec. After treatment, water re-enters the Sawtelle Channel drainage basin which then travels into the Ballona Creek and eventually into the Santa Monica Bay. The system was designed by Black & Veatch Design and constructed in 2006 by the Army Corps of Engineers with Blois Construction as the contractor. It was constructed as part of the Westside Water Quality Improvement Project. Today the facility os owned and operated by the Los Angeles County Dept. of Public Works.



**Southern California Location Map**



**Mar Vista Location Map**

# MAR VISTA PARK + SAWTELLE CHANNEL



Most water will enter the Sawtelle Channel via storm drain on McLaughlin Ave. The topography of the Mar Vista Park does not vary more than 1 foot in elevation. Upstream and downstream isolation gate valves are typically open so runoff is continuously treated. Gates can be closed in case of a high storm event. The synthetic turf and grass turf areas are intended to serve as an infiltration basin or "speed bump" slowing localized flooding so the open air conveyance channels are not overwhelmed. Any storm that yields a 3 foot depth of water (or more) would be classified as a high storm event and too intense for this system.

- Catch Basin Location
- Water Flow Direction
- Infiltration Zone

## EVIDENCE OF STORMWATER MANAGEMENT



A. Entrance to Channel



B. Typical Storm Drain



C. Infiltration Strip



C. Infiltration Strip



D. Catch Basin



E. Open Water Channel

## PARK AMENITIES



Synthetic Turf Field



Baseball Fields



Tennis Courts



Mar Vista Rec. Center



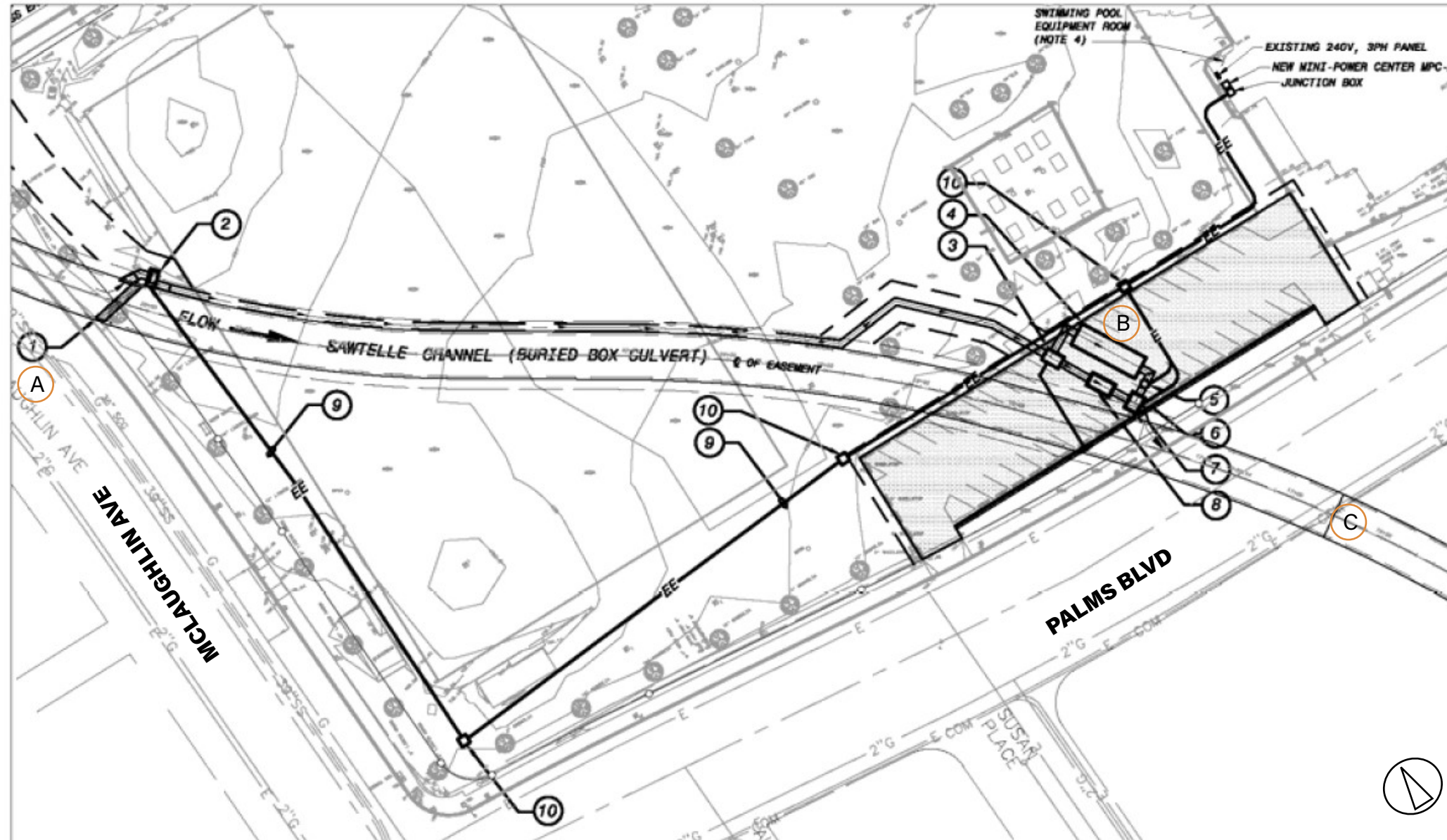
Mar Vista Public Pool



Roller Rink

# ENLARGEMENT OF SUBMURGED SYSTEM

- |  |   |
|--|---|
| ① Concrete Diversion Weir<br>Point of Flow Diversion from Sawtelle Channel | ⑥ Downstream Flow Isolation Vault and Valve |
| ② Upstream Diversion Vault Isolation Valve<br>and Flowmeter #1             | ⑦ Point of Return to Sawtelle Channel       |
| ③ Transverse Weir Flow Split Vault   | ⑧ Bio Clean Baffle Box                      |
| ④ Storm Filter Vault   | ⑨ Electrical Conduit                        |
| ⑤ Flow Meter #2  | ⑩ Electric Conduit Pullbox Location         |



Ⓐ Road Cut for Diversion Weir



Ⓑ Manholes to Access Storm Vault, Flow Meters, Baffle Box, and Isolation Vault + Valve



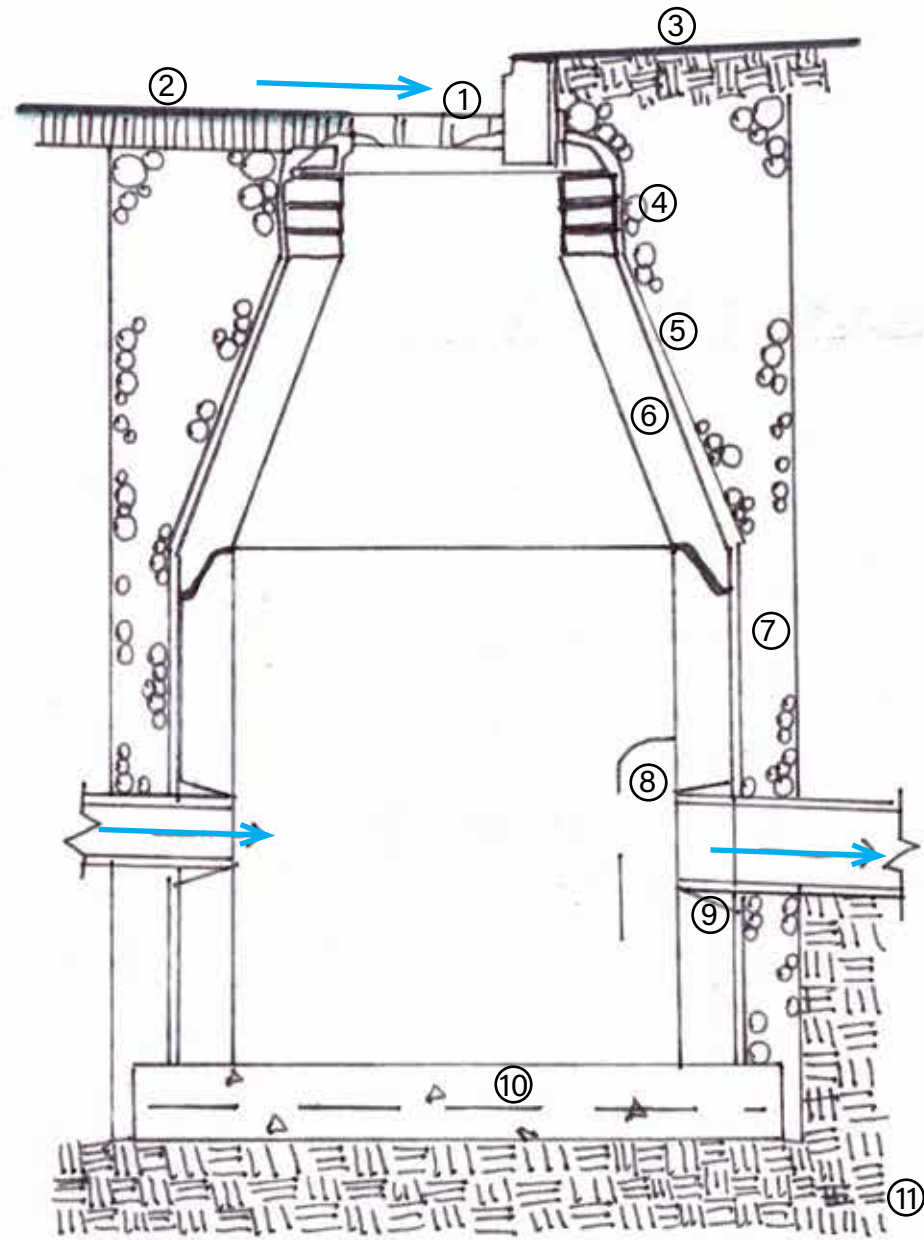
Ⓒ Return to Open Air Channel

The Sawtelle Channel Stormwater Conveyance System is hydraulically efficient and operates completely on a gravity flow basis. Isolation gate valves and the access hatches shown in photo B are the only moving parts. Upstream urban runoff flows through a diversion weir (Photo A) at the floor of the buried box culvert into a 36" diversion pipe that runs a

few hundred feet to a transverse weir before entering the treatment train. Water that enters the treatment train is returned to the Sawtelle Channel through a downstream isolation vault. Two FLO-DAR solid state flow meters measure the total flow of water transverse through this system.

# CONSTRUCTION METHOD DETAILS

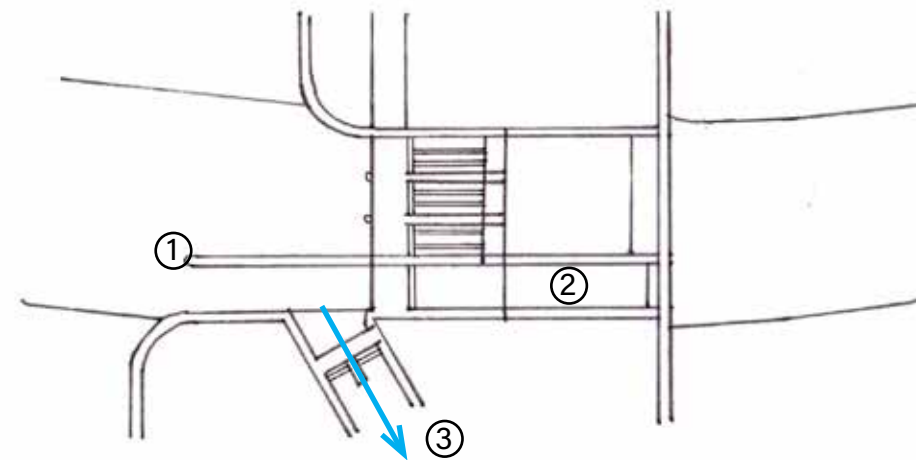
## TYPICAL PRECAST CONCRETE CATCH BASIN AT CURB



### SECTION

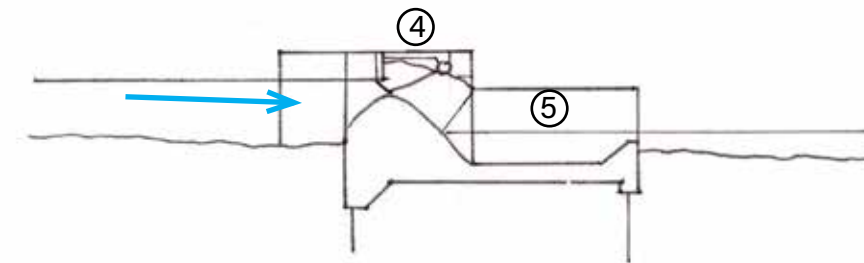
- |                                     |                                    |
|-------------------------------------|------------------------------------|
| ① Frame and grate                   | ⑦ Aggregate backfill               |
| ② Paving as specified               | ⑧ Hood to catch debris             |
| ③ Finish grade                      | ⑨ Mortar all joints                |
| ④ Block courses for adjustment      | ⑩ Concrete base reinforced as req. |
| ⑤ Slope varies to fit frame + grate | ⑪ Prepared subgrade                |
| ⑥ 5" Precast concrete units         |                                    |

## SUBTERRANEAN TRANSVERSE WEIR



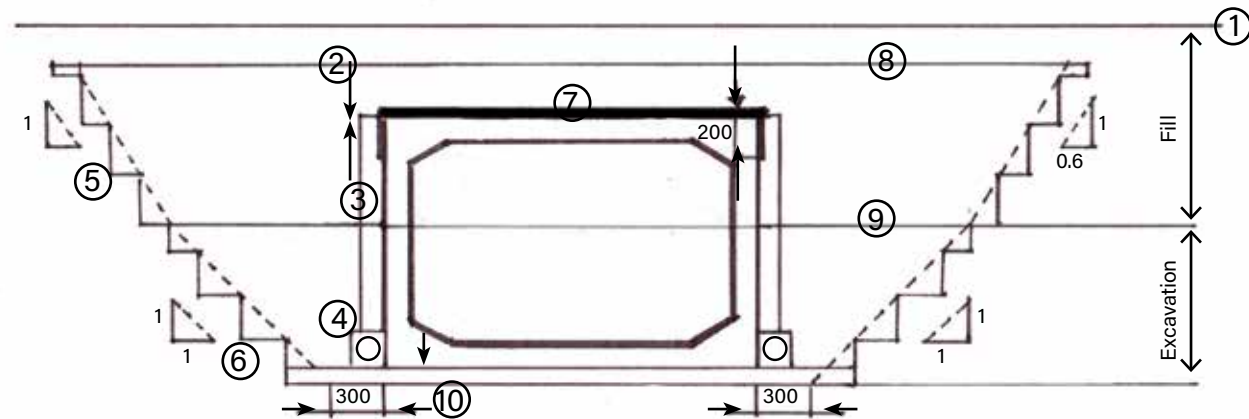
### PLAN

- ① Submerged guide wall
- ② Low flow discharge channel
- ③ To treatment via pumping station
- ④ Radial gates
- ⑤ Silting basin



### SECTION

## BURIED BOX CULVERT



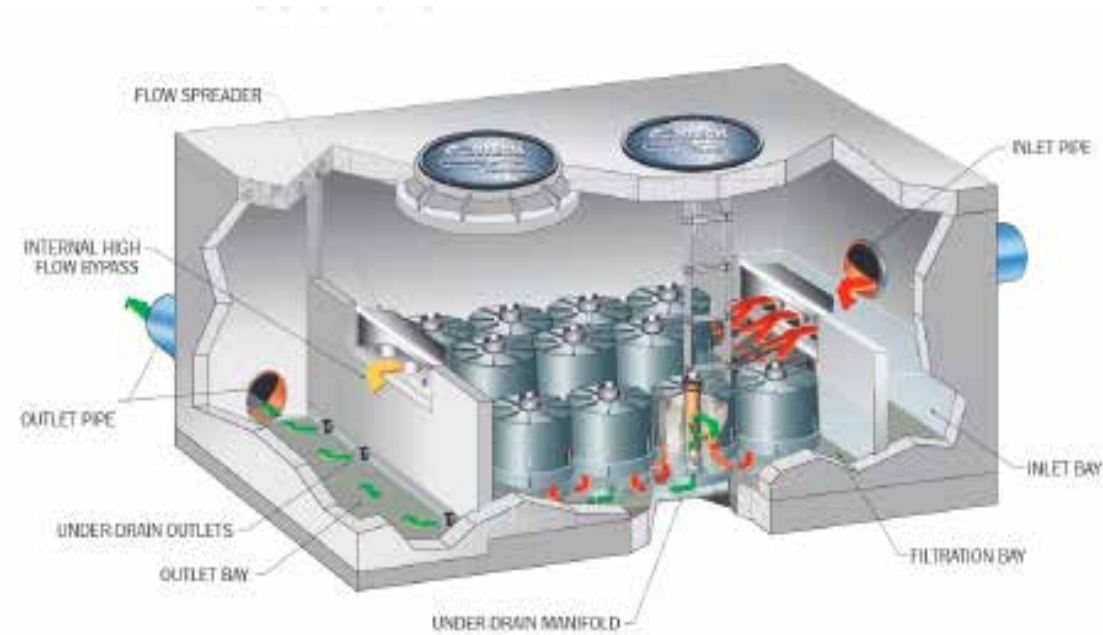
### SECTION

- |   |   |
|---|---|
| ① Proposed roadway level                  | ⑦ Waterproofing   |
| ② 500 or to roadway formation level       | ⑧ Top of Backfill Level                                 |
| ③ Drainage layer                          | ⑨ Original ground level                                 |
| ④ 150 perforated pipe to positive outfall | ⑩ In-situ structure : 75 binding class 20/20 concrete   |
| ⑤ Benching in fill                        | Precast structure:                                      |
| ⑥ Benching in excavation                  | i) on hard excavation: 50 class 6L on binding           |
|   | ii) not on hard excavation: 50 class 6L on 150 class 6N |



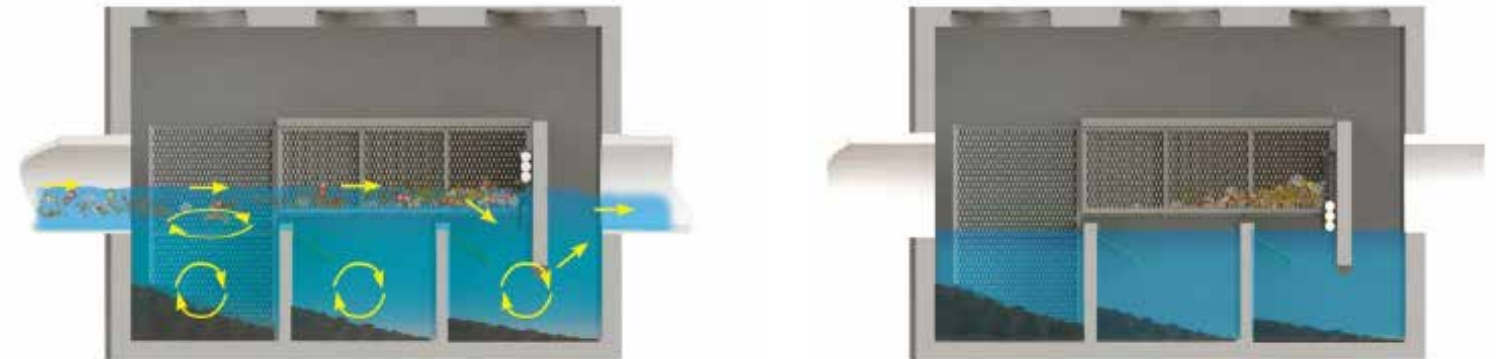
# STORMWATER FILTRATION

## CONTECH STORMFILTER VAULT



The upstream and downstream isolation gate valves are normally open so that dry weather (0 - 3 cfs) are always treated by the StormFilter unit. These gates do not regulate or throttle the flow moving through the system. It is either on or off for heavy storm events or for maintenance. This unit is fitted with 90 individual filter cartridges that have the initial capacity to treat 15 gallons of water per minute. During a storm, runoff enters the vault then drawn evenly through the filter media providing effective and efficient treatment. They are designed to trap particulates and absorb common stormwater pollutants such as total suspended solids, hydrocarbons, pesticides, metals, and others. As the cartridges become bogged with filtered material they must be replaced. It would be common practice to replace all at one time. Depending on frequency and intensity of storm events, the StormFilter cartridges range from 1 - 5 years.

## BIO CLEAN NUTRIENT SEPARATING BAFFLE BOX



During Storm Events: Trash, debris, and organics are captured in the filtration screen as sediments settle to the bottom chambers. Hydrocarbons are removed and absorbed by the screens.

Between Storm Events: Trash, debris, and organics are stored in a suspended screen system allowing pollutants to dry out between storm events eliminating septic conditions and leaching.

The transverse weir is equipped with oblong bolt holes so based on operational experience, the weir height can be adjusted to increase or decrease the amount of water flowing into the unit. Higher flows up to the capacity of 33 cfs will flow over the transverse weir and through the Bio Clean Nutrient Separating Baffle Box. This box utilizes non-clogging screening and hydrodynamic separation to capture pollutants and debris. The triple chamber is designed to distribute stormwater entering the device evenly which optimizes its ability to capture suspended solids with minimal surface area. Urban runoff is directed via inflow pipe above the chamber as shown in the image above. The flow is diverted into two directions: down the middle through a filter screen or towards the filter screens on either side. Debris is filtered by the screens while clean water passes through to the outlet pipe before reentering the Sawtelle Channel on the South side of Palms Blvd. These structures are preassembled in a concrete structure to meet site specific soil conditions, corrosiveness, lateral loading, and groundwater. Regular maintenance is recommended for these devices as the mass quantity of debris varies throughout the storm season.



Submerged StormFilter Vault during construction of the channel



StormFilter cartridges inside the vault

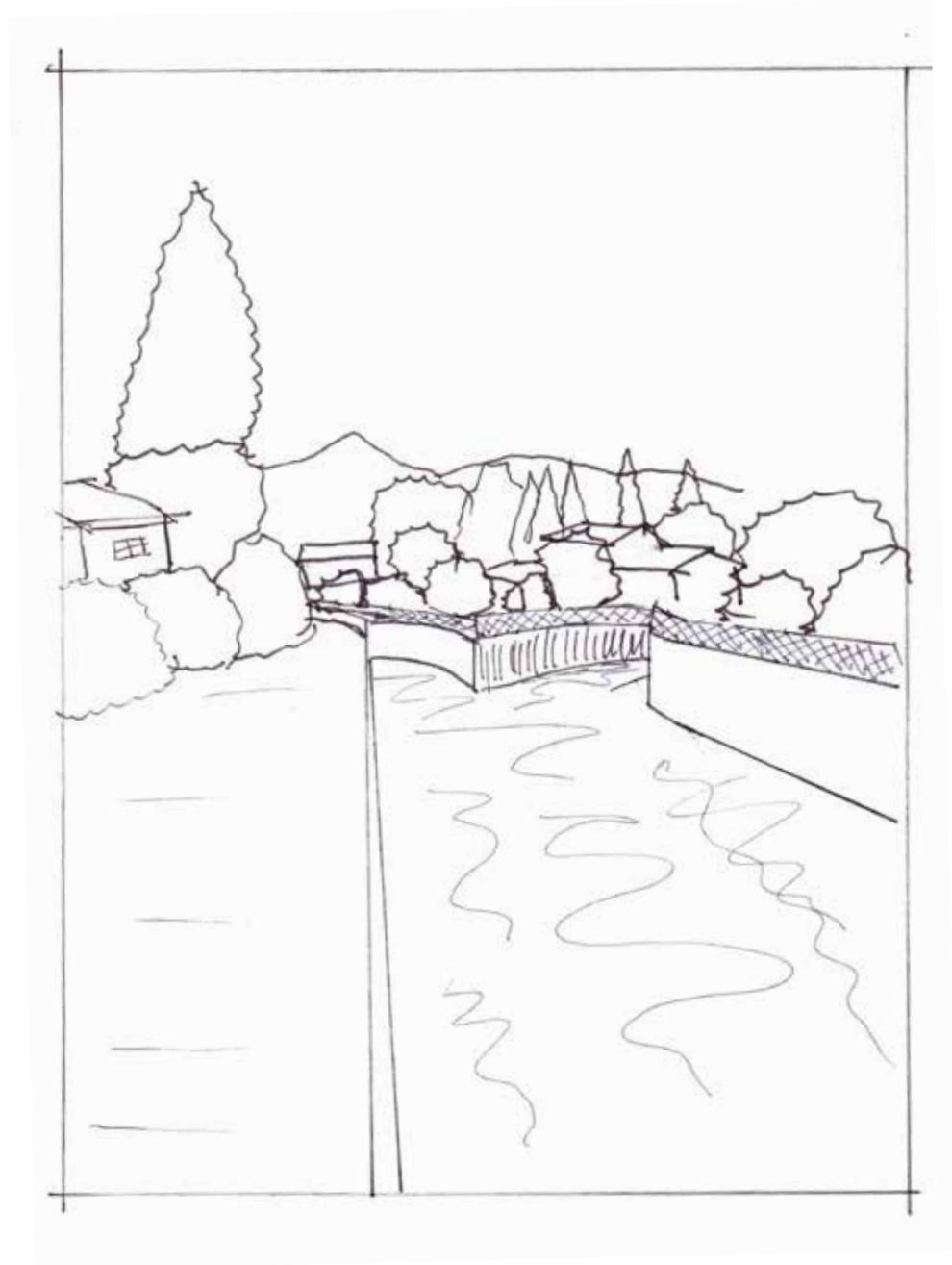


Baffle Box opened for debris removal



Manhole access for maintenance under the West parking lot of Mar Vista Park

## RE-ENTRY TO THE SAWTELLE CHANNEL



**The elements of this project are Phase I of the Mar Vista Recreation Center Stormwater BMP completed in 2010.**

Together, they manage 270 "green" acres; capture 55 acre-feet of water per year; remove 16 tons of pollutants and reduce 94% of bacteria. This assists the City of Los Angeles meeting Total Maximum Daily Load (TMDL) requirements and reduced the level of bacteria entering the surf zone of the Santa Monica Bay. \$4,163,094 were expended from the Proposition O budget to complete this project (LA Sanitation Clean Water Update, 2018). Unfortunately, some people still discard trash and even appliances over the fences then into the open air channel.

Phase II installs a system to beneficially capture and use the treated runoff to irrigate Mar Vista Park.

In September 2020 The Winward School donated 20 trees to contribute to the LA Park Forest Initiative. The 5 species of trees were grown and installed by Bright-view in the RED area.

My analysis of Area A revealed that the current plant palette chosen for the park is incompatible with the site. Pines and the *Metrosideros excelsa* in the irrigated areas thrive while the *Lagerstroemia indica*, *Ceratonia siliqua* and *aloe* on Mclaughlin Ave and Woodbine St struggle. The DG path however, is very successful.



Area B seems to be previously planted, but poor grading and drainage has decimated the grass and most shrubs. A line of desire footpath has evolved from the die back of plants. The local homeless population has also made camp along the privacy wall separating the adjacent neighborhood from the park.



# UPDATED INFILTRATION STRIP



ENLARGEMENT



*Quercus agrifolia*



*Platanus racemosa*



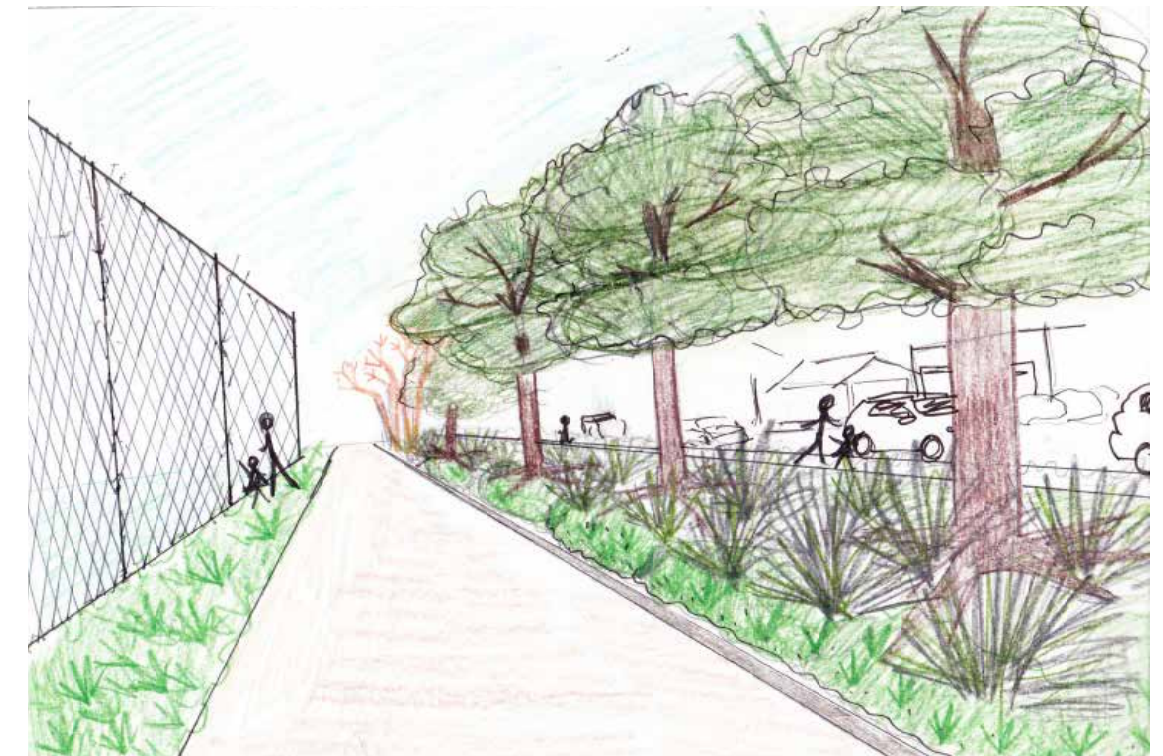
*Simmondsia chinensis*



*Elymus condensatus*



*Dymondia*



PERSPECTIVE



For Area A, I propose a change in plant palette in the existing infiltration strips but maintain the DG pathway for optimal stormwater absorption. The West end of the park receives quite a bit of direct sun. Some of the trees currently installed could be salvaged and relocated to the irrigated areas that are more compatible to their water needs. In their place, I would recommend mostly California native and drought tolerant planting that can not only endure the wet Winter and arid Summers on the Westside, but also withstand future heavy storm events by slowing the flow of water flooding to the open air channels on the South side of Palms Blvd. To contribute to the LA Urban Forest Initiative, large trees, specifically *Platanus racemosa* and *Quercus agrifolia* would canopy the pedestrian pathways. Both species are hardy to the California riparian ecosystem and elevate the habitat value of the site. For companion planting, I would recommend shrubs and groundcover with very low water requirements and suited for the Summer water restrictions required for the *Quercus agrifolia* such as: *Simmondsia chinensis*, *Elymus condensatus*, and *Dymondia*.

# STONE RIP-RAP SWALE

## ENLARGEMENT

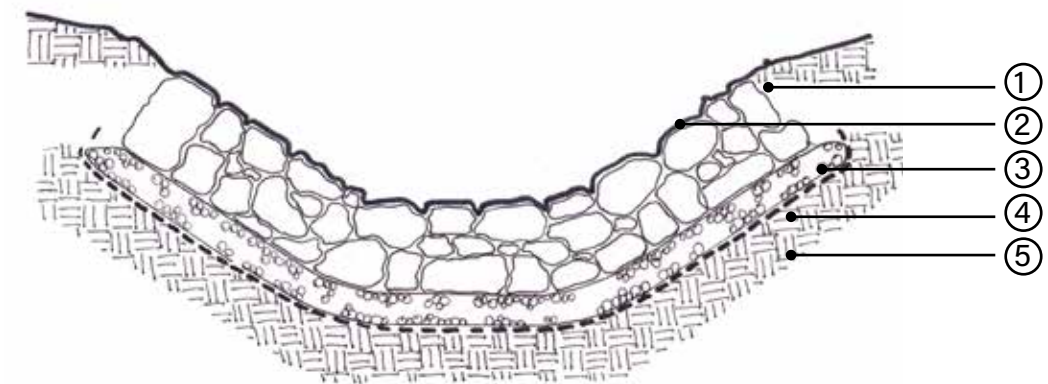


Rain Garden DG Walking Path Privacy Wall Low Water Planting Stone Rip Rap Swale *Platanus racemosa* *Quercus agrifolia*

There is evidence of previous planting along the North privacy wall that buffers the adjacent neighborhood from park noise. A natural swale and line of desire has emerged from the erosion and over saturation to previous planting from improperly directed runoff. I believe the site solution has already designed itself. Constructing a rain garden and a small stone rip rap swale to capture and redirect runoff from the neighborhood behind the park to the larger storm drains on it's edges at Woodbine St and Sawtelle Blvd. Lining the the swale with shrubs and grasses would help abosorb water and provide buffer to a new DG pedestrian path that meanders along the outer edge of the baseball fields. *Quercus agrifolia* and *Platanus racemosa* would also c anopy this walkway to provide shade, slow water during heavy storm events, and reduce space for potential encampents.



PERSPECTIVE



SECTION

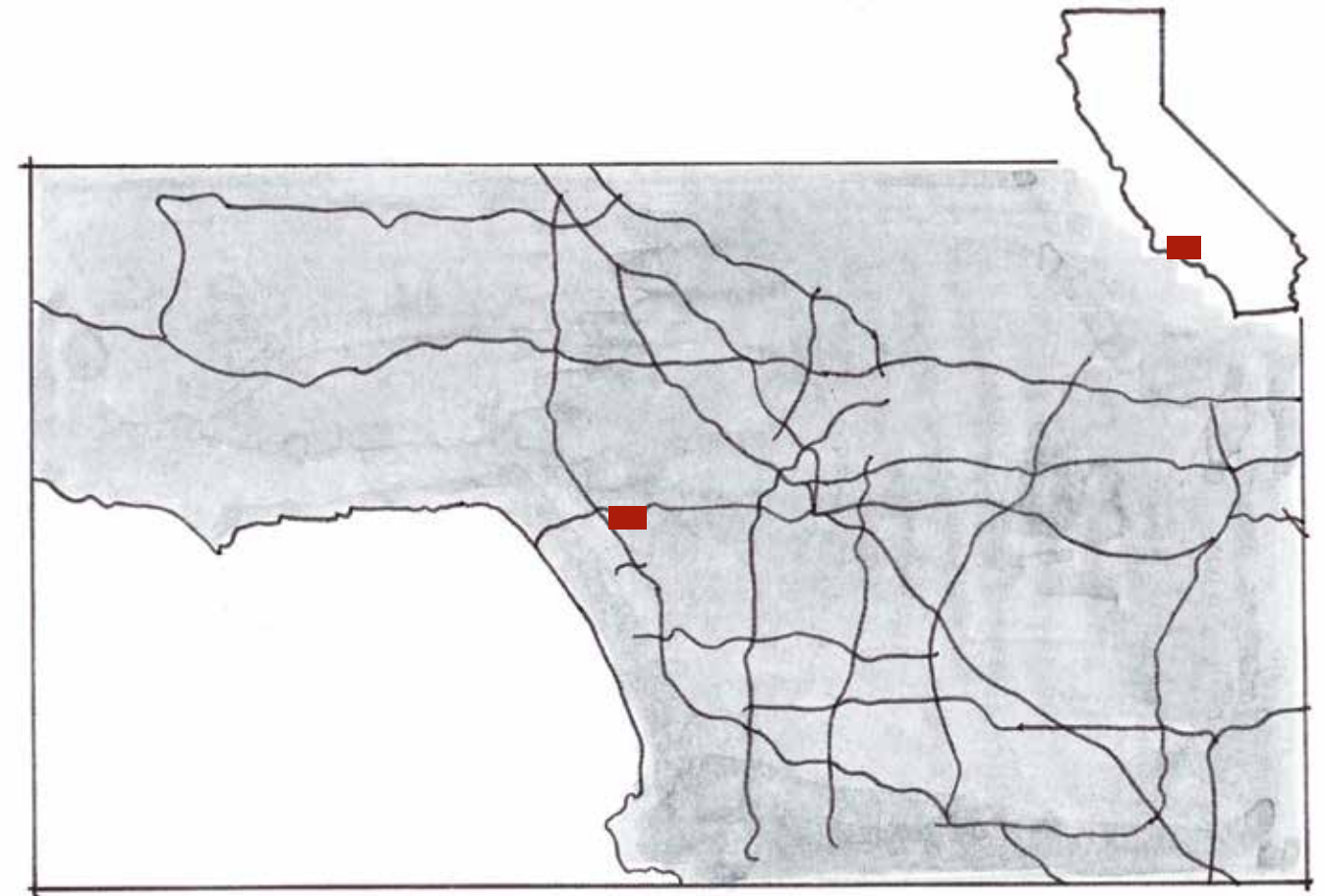
- ① 450mm (18") Deep Machine Spread Dumped Rip Rap
- ② Finished Grade
- ③ 150mm (6") min. Aggregate Base
- ④ Separator Fabric
- ⑤ Prepared Subgrade

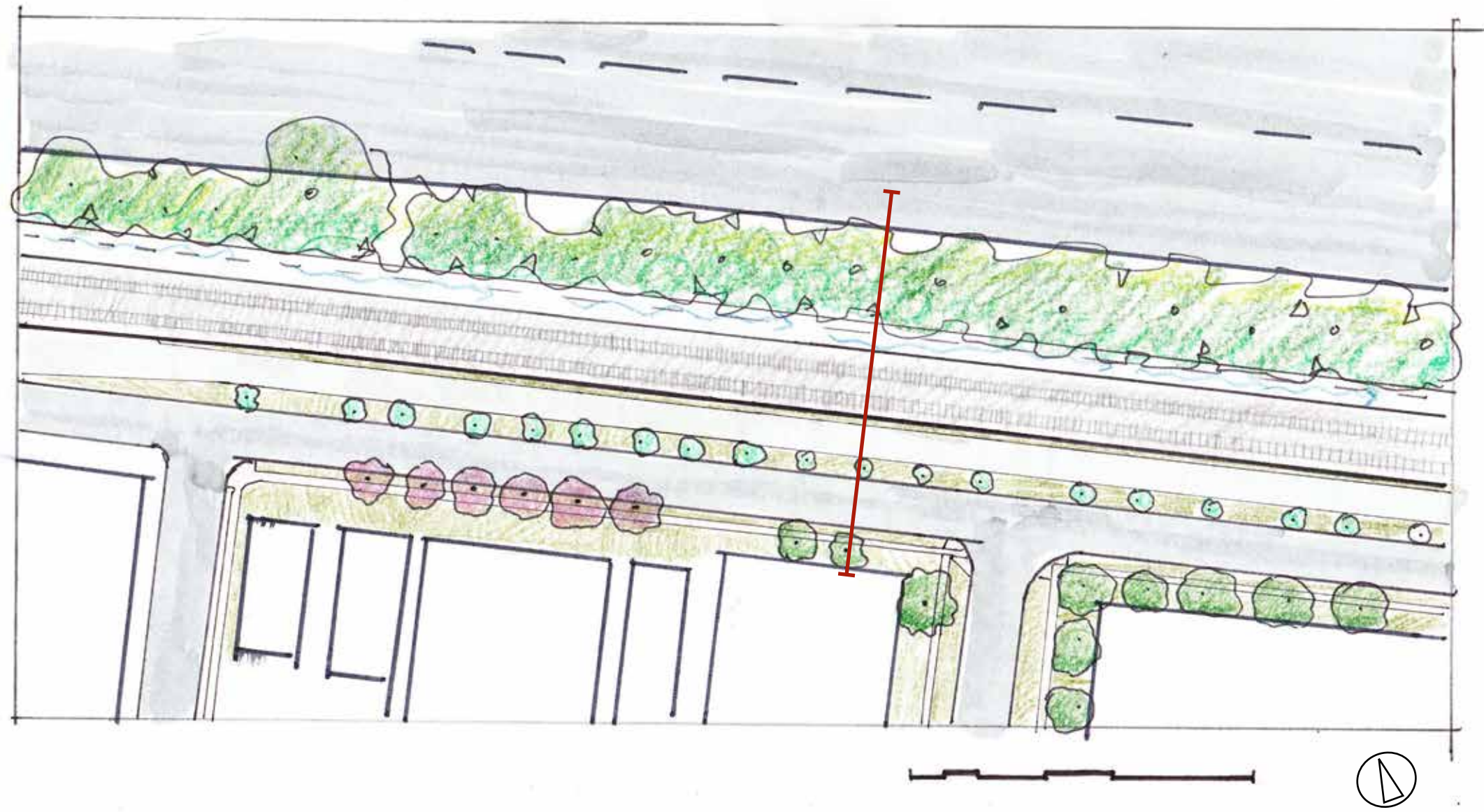


## LOCATION + BACKGROUND

This retaining wall is located inside the Exposition corridor of the dense Palms neighborhood in Western Los Angeles. It was constructed as part of the improvements to the electric light rail system of the LA County Metro Rail System in 2016. The retaining wall supports the embankment holding the railroad tracks. The location utilizes existing, historical railroad tracks and a depot location from The Los Angeles and Independence Railroad that was originally constructed in 1886.

The site of this retaining wall belongs to a portion of the Exposition Corridor Bike Path also completed in 2016. This path supports both cyclists and pedestrians with a planted buffer guarding the pathway from unsafe drivers on Exposition Blvd.

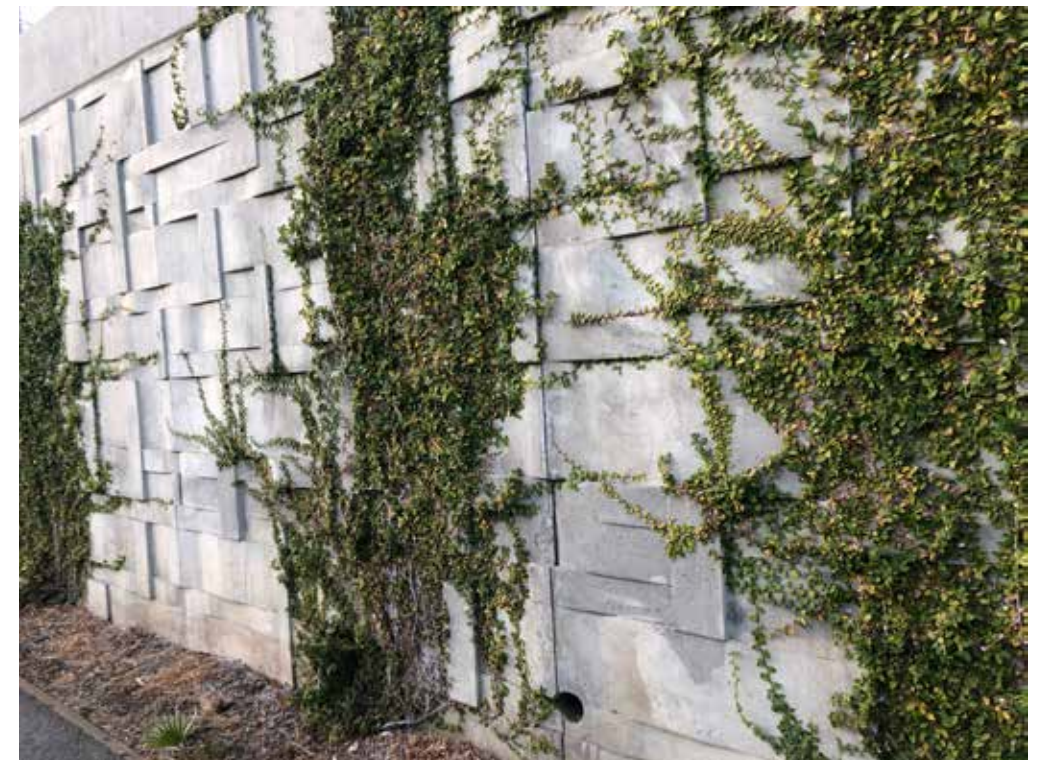
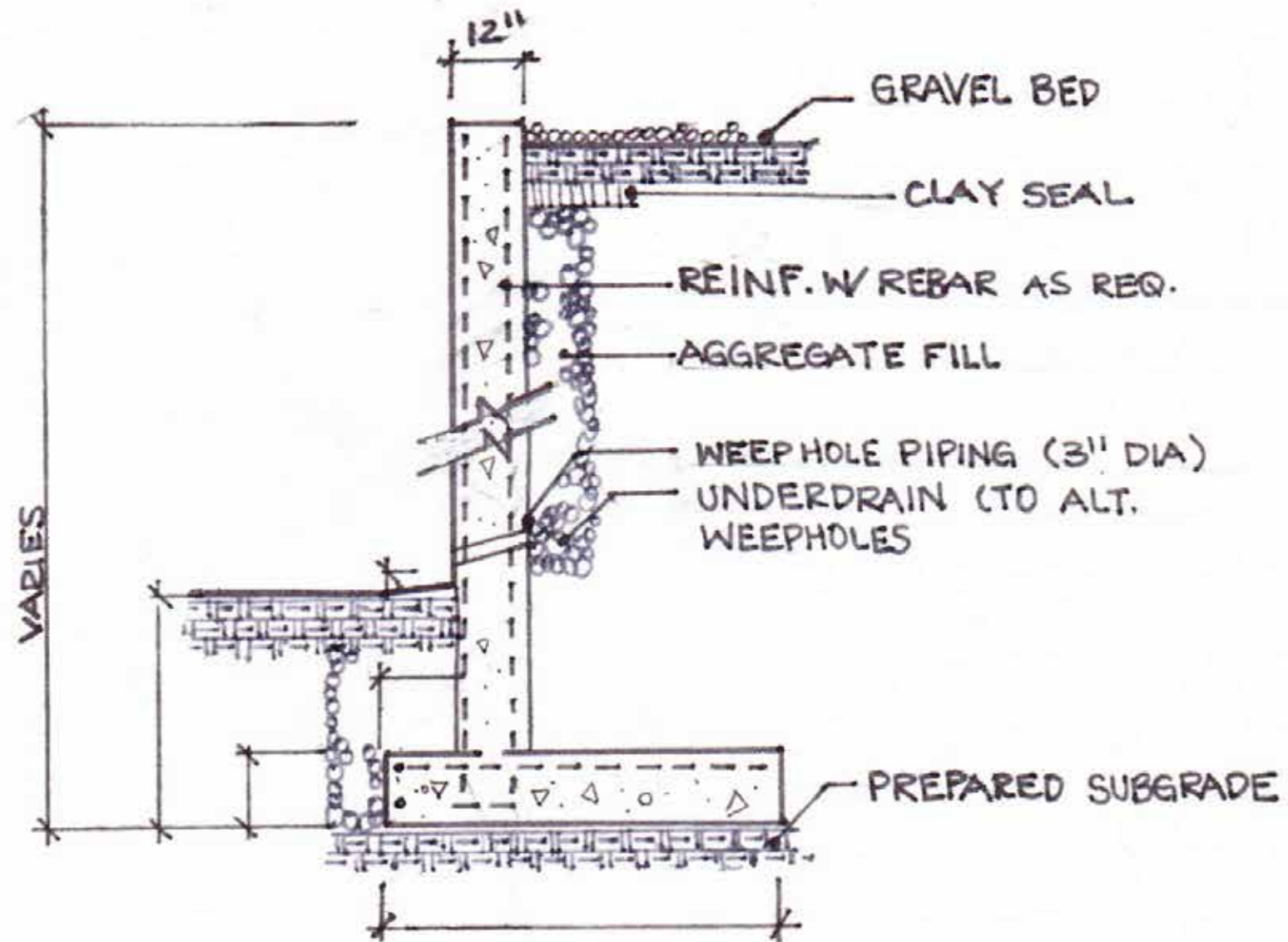




1" = 20'-0"







**Concrete Cantilevered Retaining Wall + Decorative Face**



4" PVC Weep Hole



4" Weep Hole in Panel



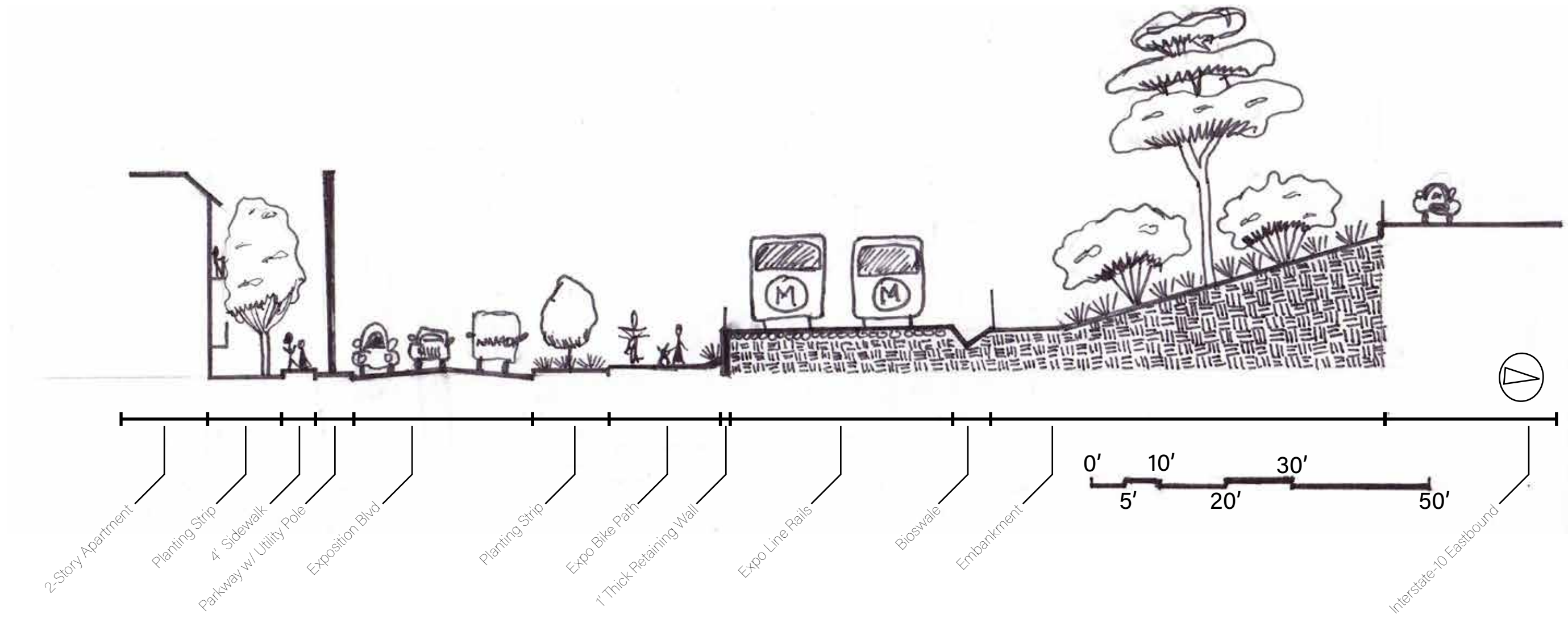
Fibre Expansion Joint



Concrete Expansion Joint

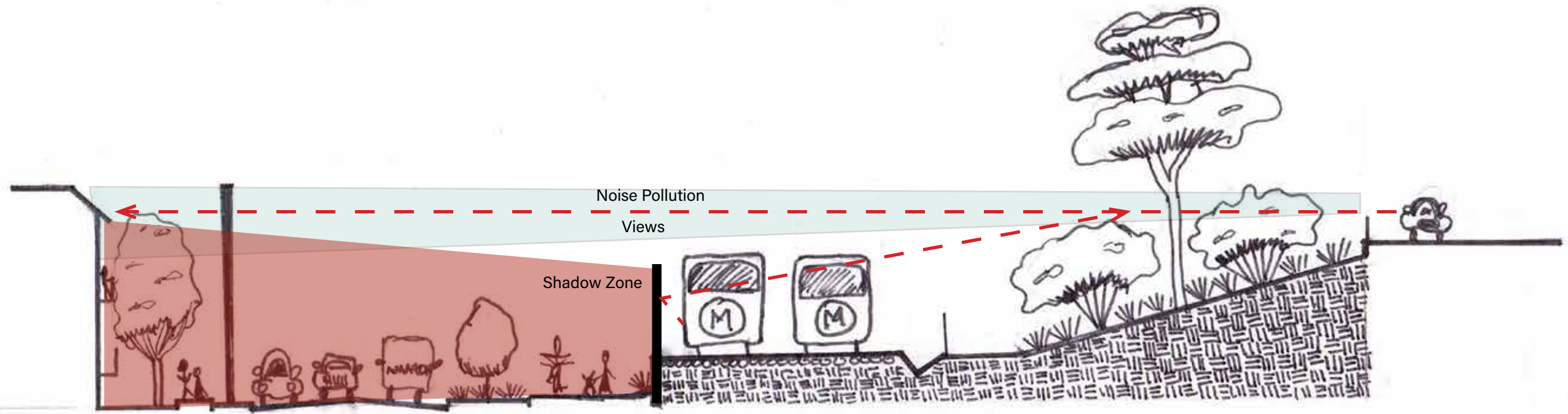
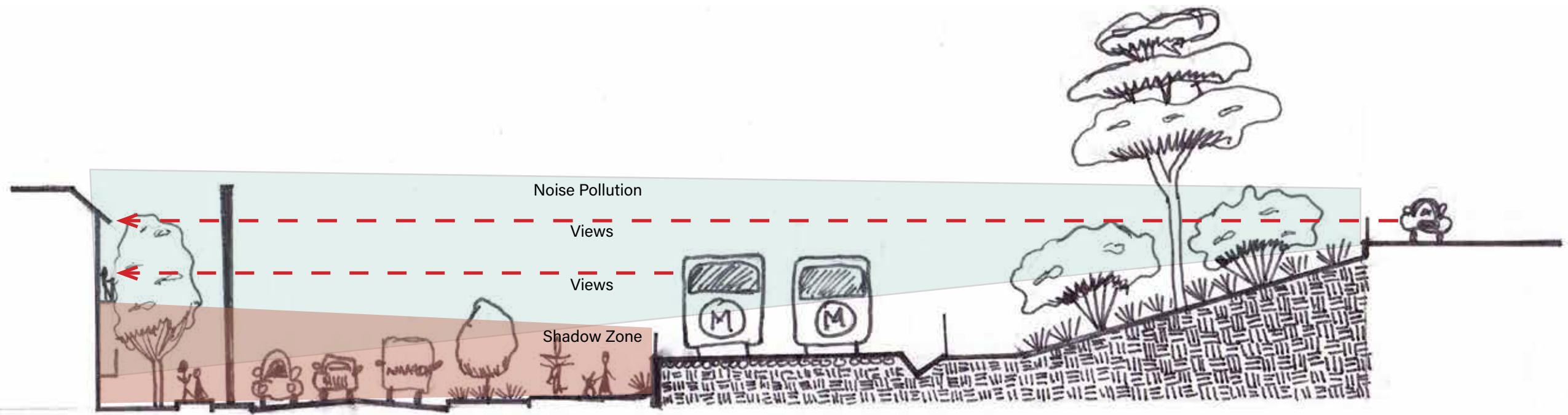
The retaining wall seems to be constructed with prefabricated concrete panels spanning 23.5 feet wide and rises an inch to 25 feet above grade. Each panel is 1 foot thick with a 45-degree beveled edge. The face utilizes a hatch pattern as a decorative accent with *Ficus repens* growing up it's sides and a variety of California native plants to add character and urban habitat to the bike path.

Most panels seems to join at a 4 inch PVC weep hole located at the bottom. Drainage during the rainy season supports the planting at the retaining wall edge. The expansion joints seem to be a combination of fibre and asphalt filled concrete joints. About 70 panels make up the East-West stretch between Bagley Ave and the intersection of Palms Blvd and National Blvd.

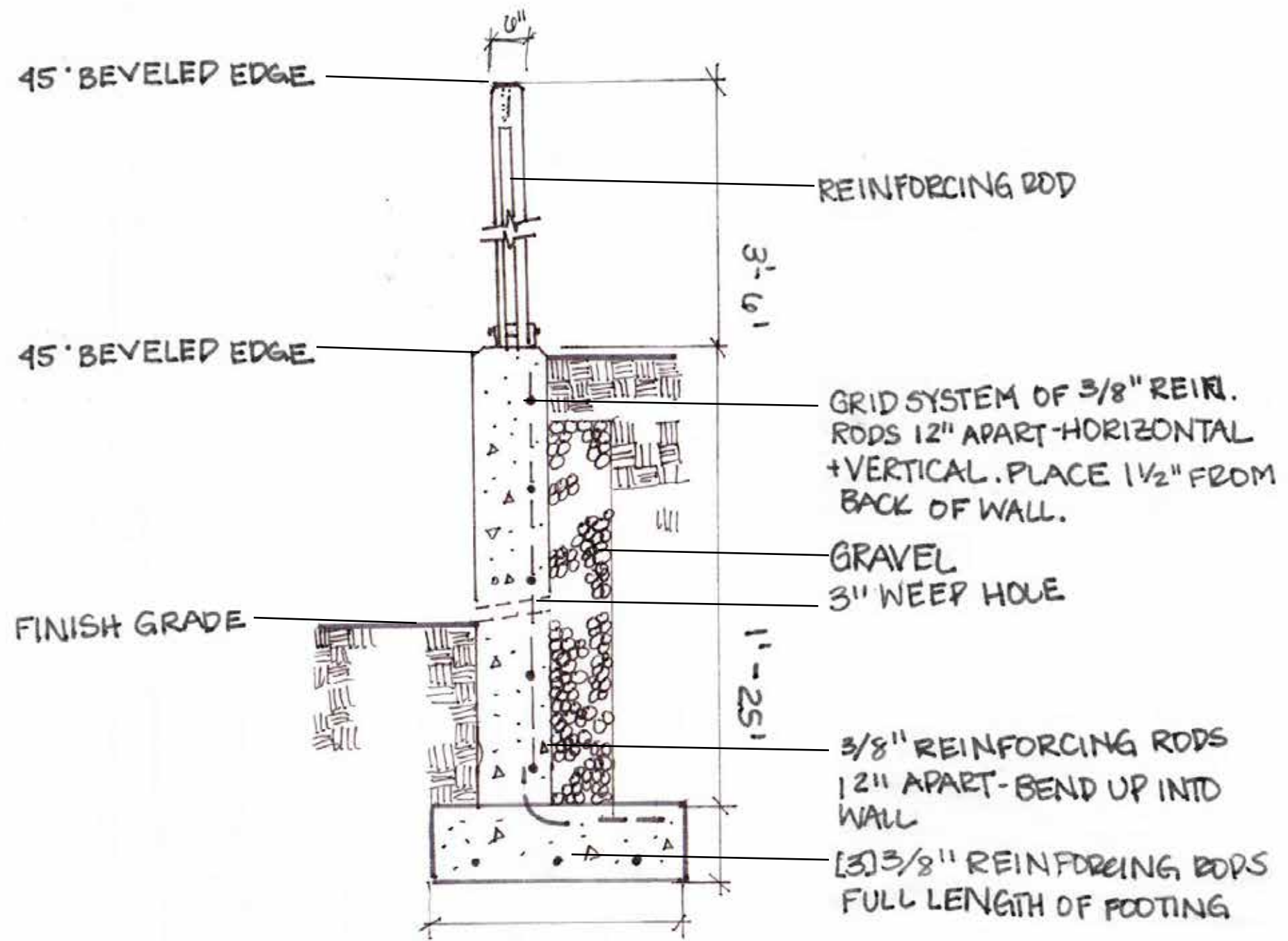


The enhanced bike path is nice and the retaining wall is structurally successful. While it is well disguised with a designed face and planting, it does nothing to reduce sound pollution from the Metro Line and Interstate-10 further up the embankment.

During high-volume windows of traffic it is possible for drivers on I-10 and inside the Metro cars to glimpse inside the multi-level residences that line Exposition Blvd.



For my redesign I would propose raising the wall 3' - 6' as the wall gradually rises in height to meet the Palms station. This wall could be an addition to the existing cast-in-place concrete wall, but ideally the embankment would have been higher it's original construction.



**Precast Concrete Retaining Wall**



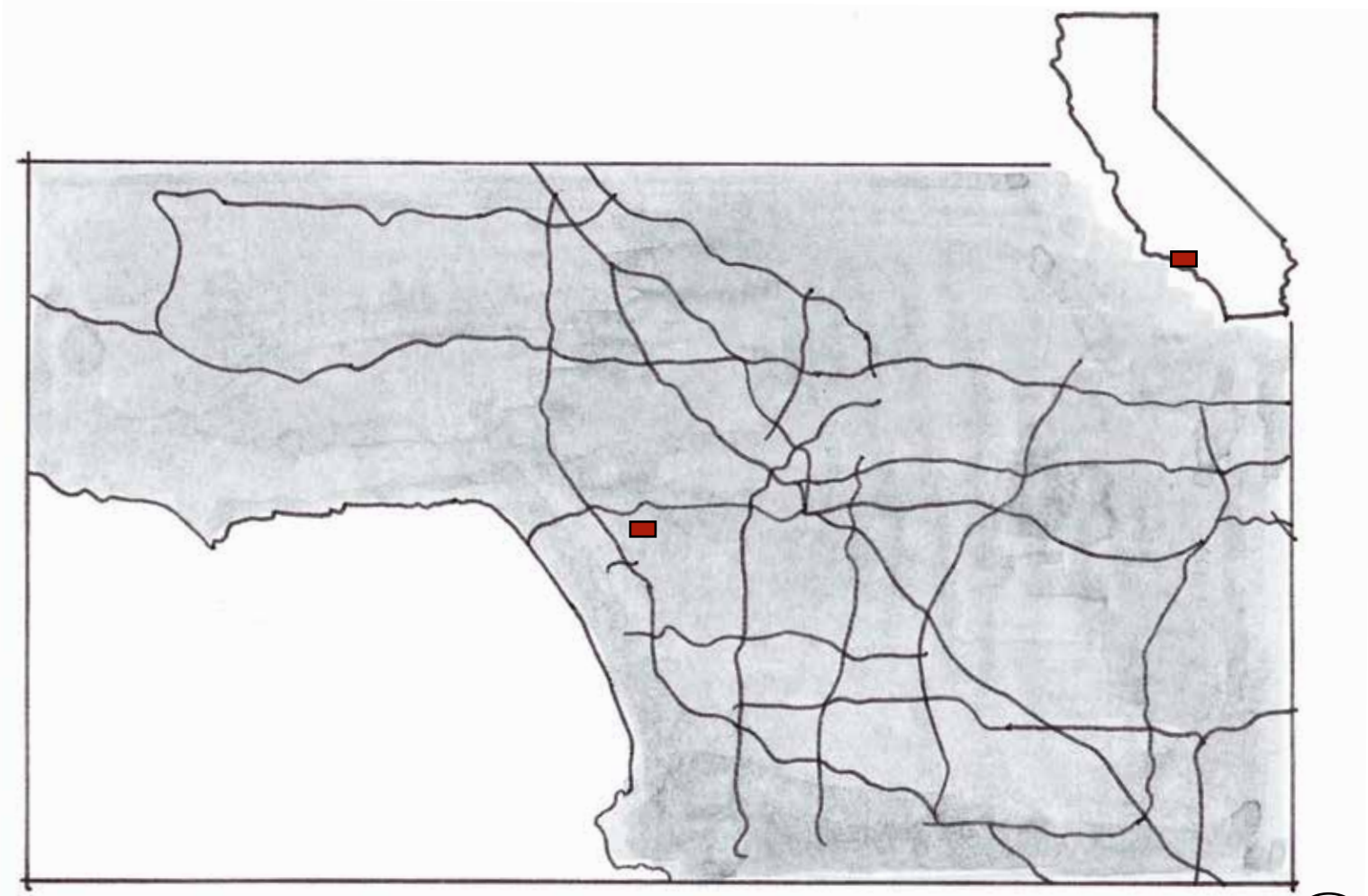


## CURRENT CONDITIONS

The present design for Culver City Hall is the result of a design competition and completed in 1995. It's structure is not the original home to Culver's City Hall. The original building was constructed in 1928 to house government offices, however deemed not sound enough to withstand future earthquakes therefore demolished in the early 1990s. It's current facade is a recreation of the original arch that opens to Heritage Park, a green space that occupies the building's previous footprint.

The design competition for the 1990's redesign required an indoor/outdoor styled public space in the Mediterranean Revival architectural expression. Goodale Architecture won the bid. Many local artists were invited to take part in the architectural process which yielded the beautiful sculpture garden within Heritage Park. 25 years later, the design is holding up well, but because of the recent increased investments in the infrastructure of Culver City, it hardscape and plating design certainly deserves some attention.





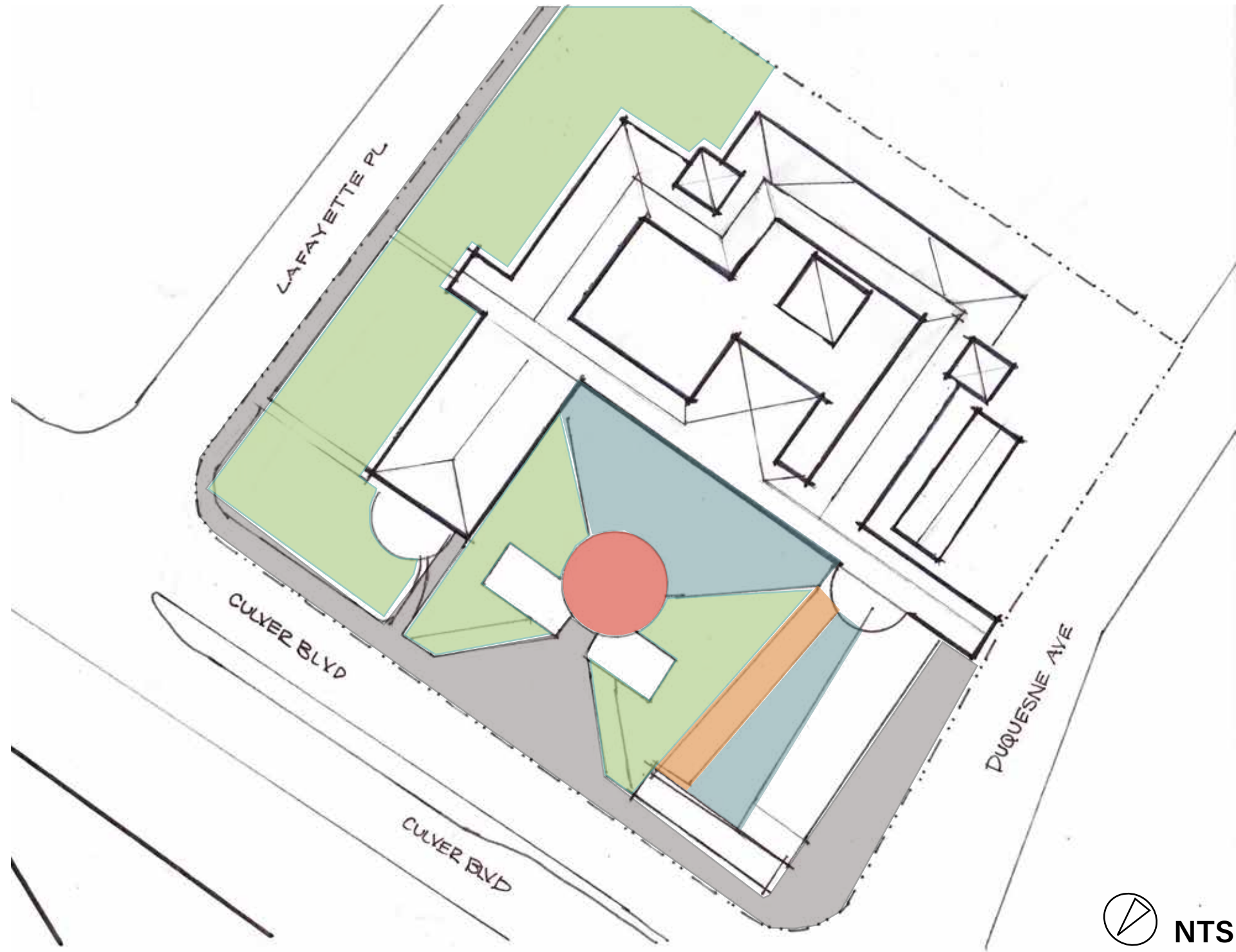
Southern California Context



Culver City, CA Context







 Grass/Permeable Surface



DG on Conc. Structure



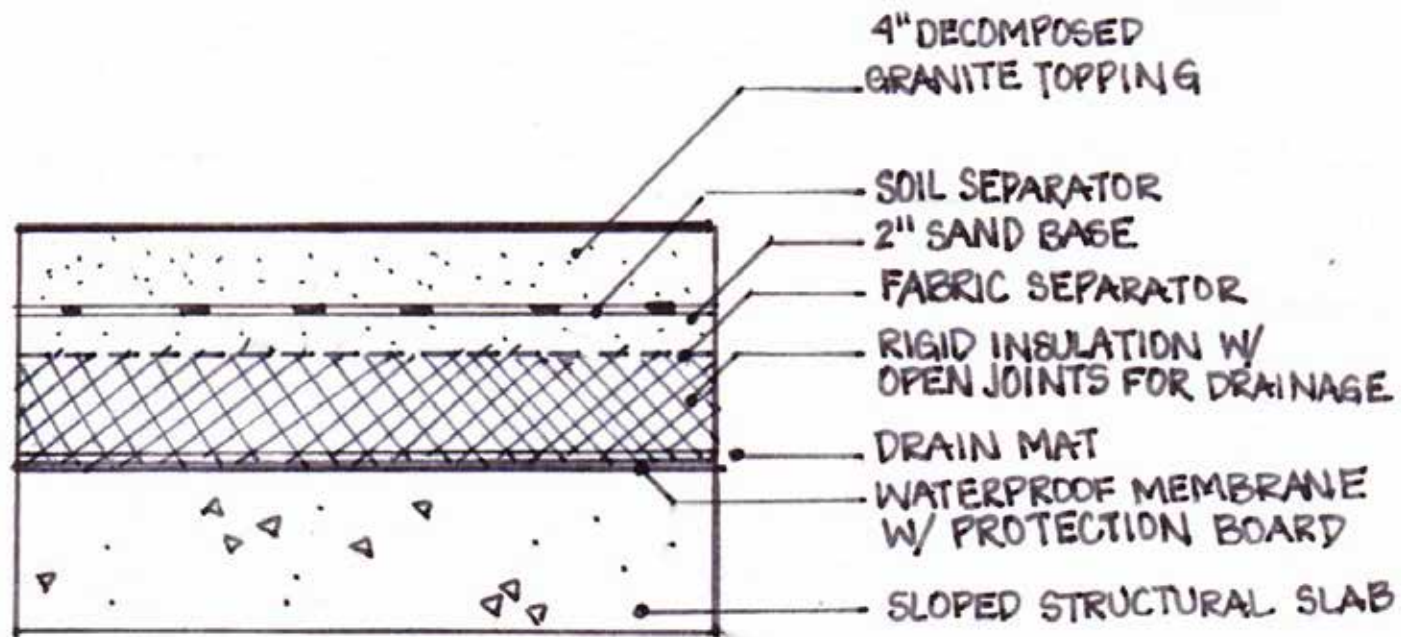
Poured Conc. on Conc. Structure



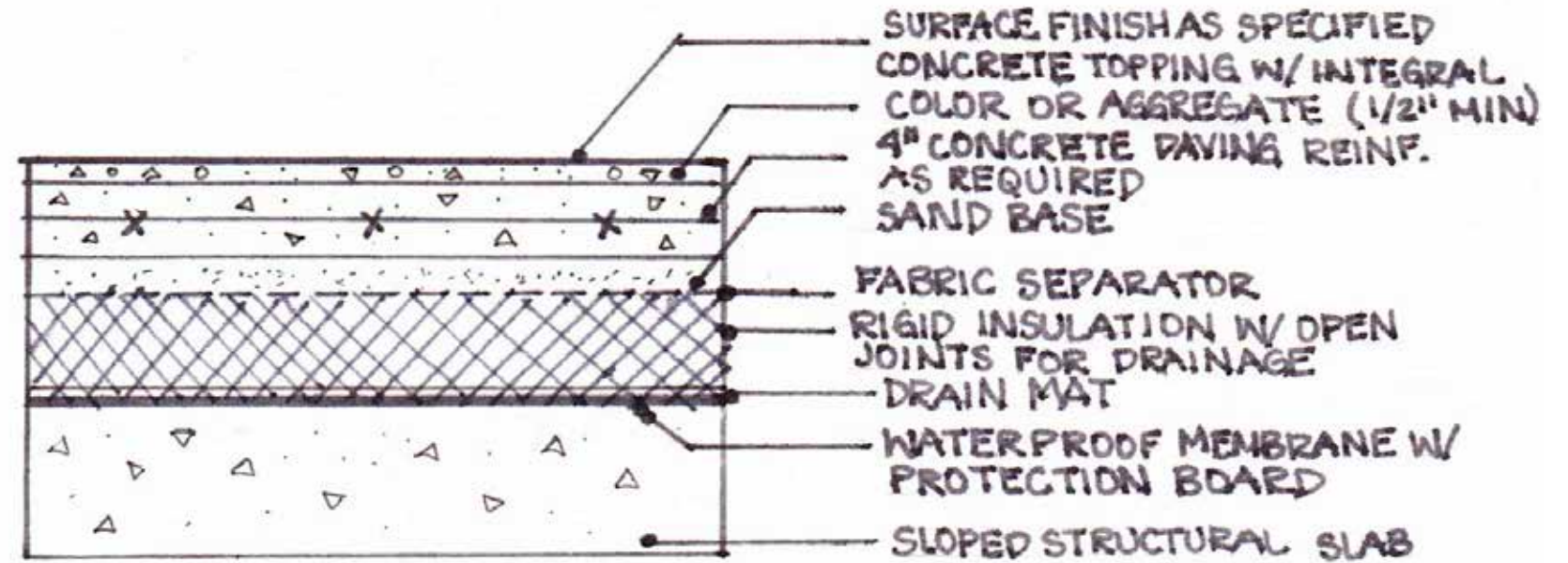
Colored Conc. on Concrete Structure



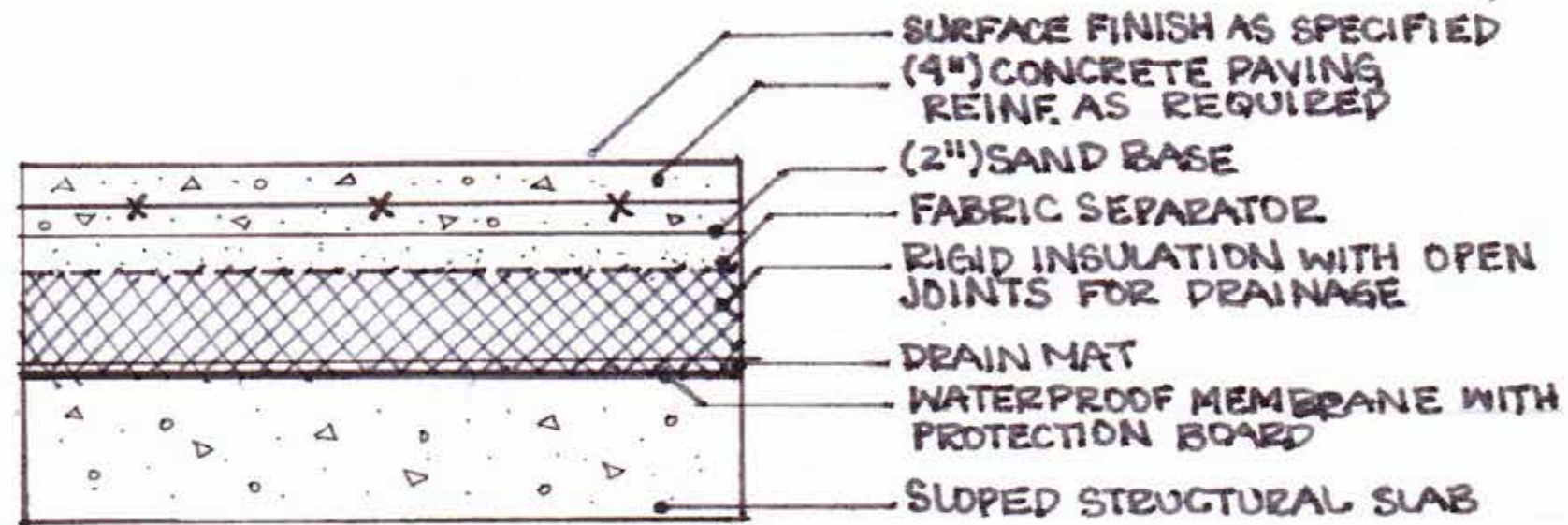
Exposed Aggregate on Conc. Structure



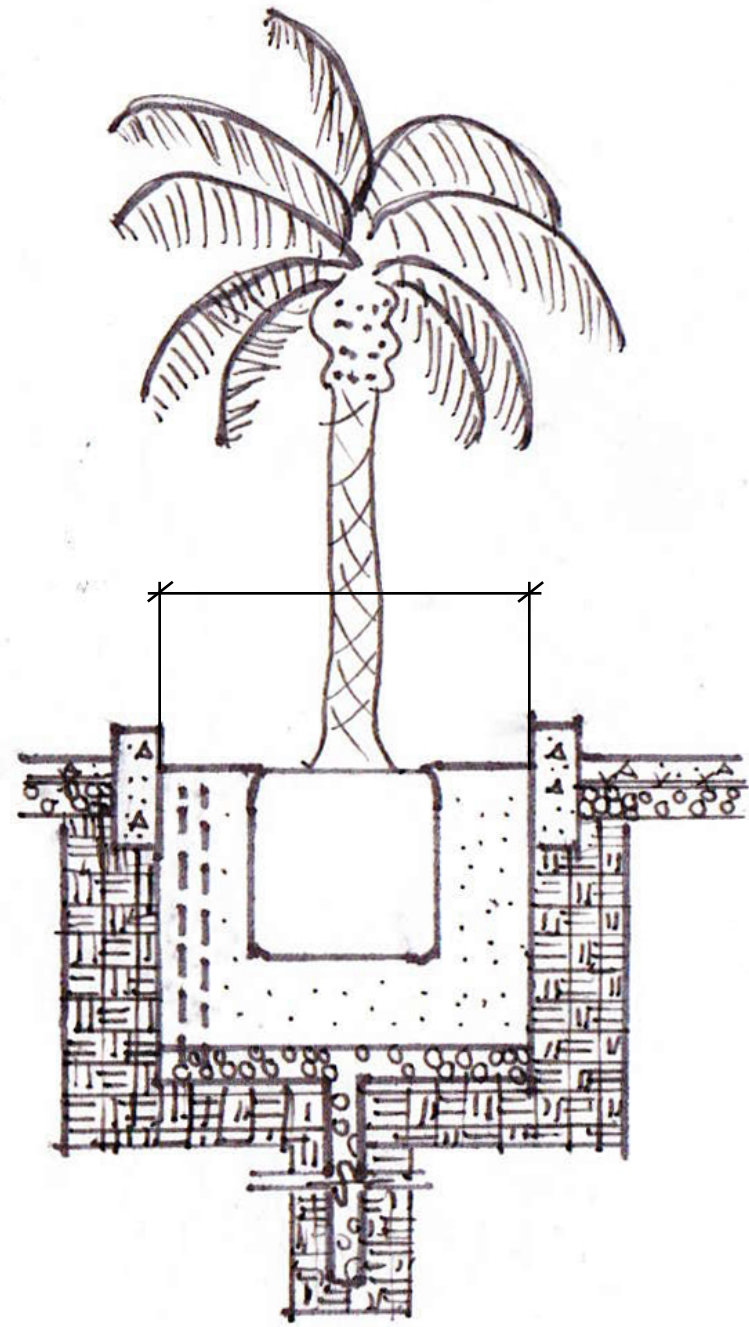
Decomposed Granite on Sloped Concrete Structure



Colored Concrete or Exposed Aggregate on Sloped Concrete Structure



Poured Concrete on Sloped Concrete Structure



Palm Tree in Raised Concrete Planter



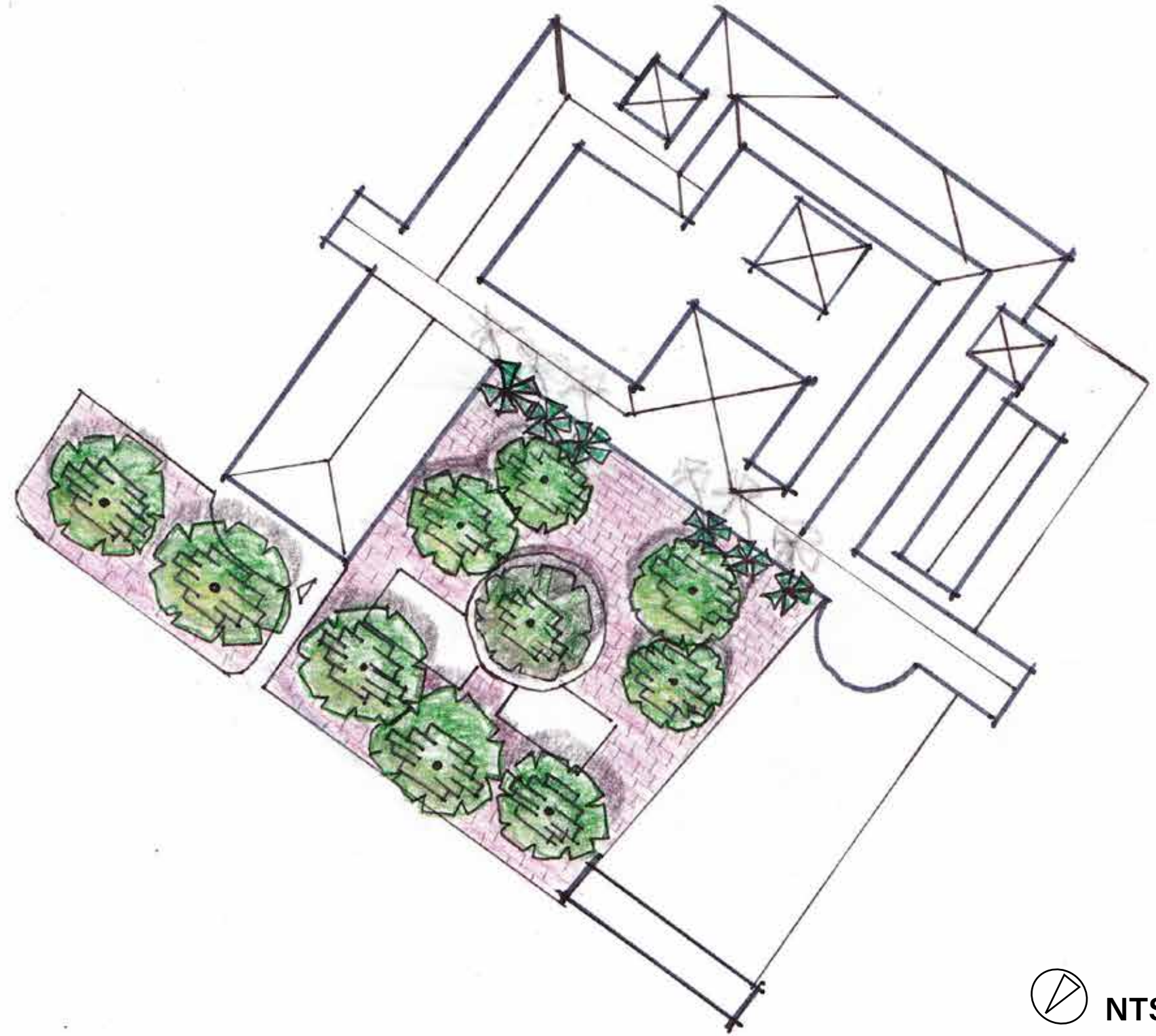
## WEAR AND TEAR

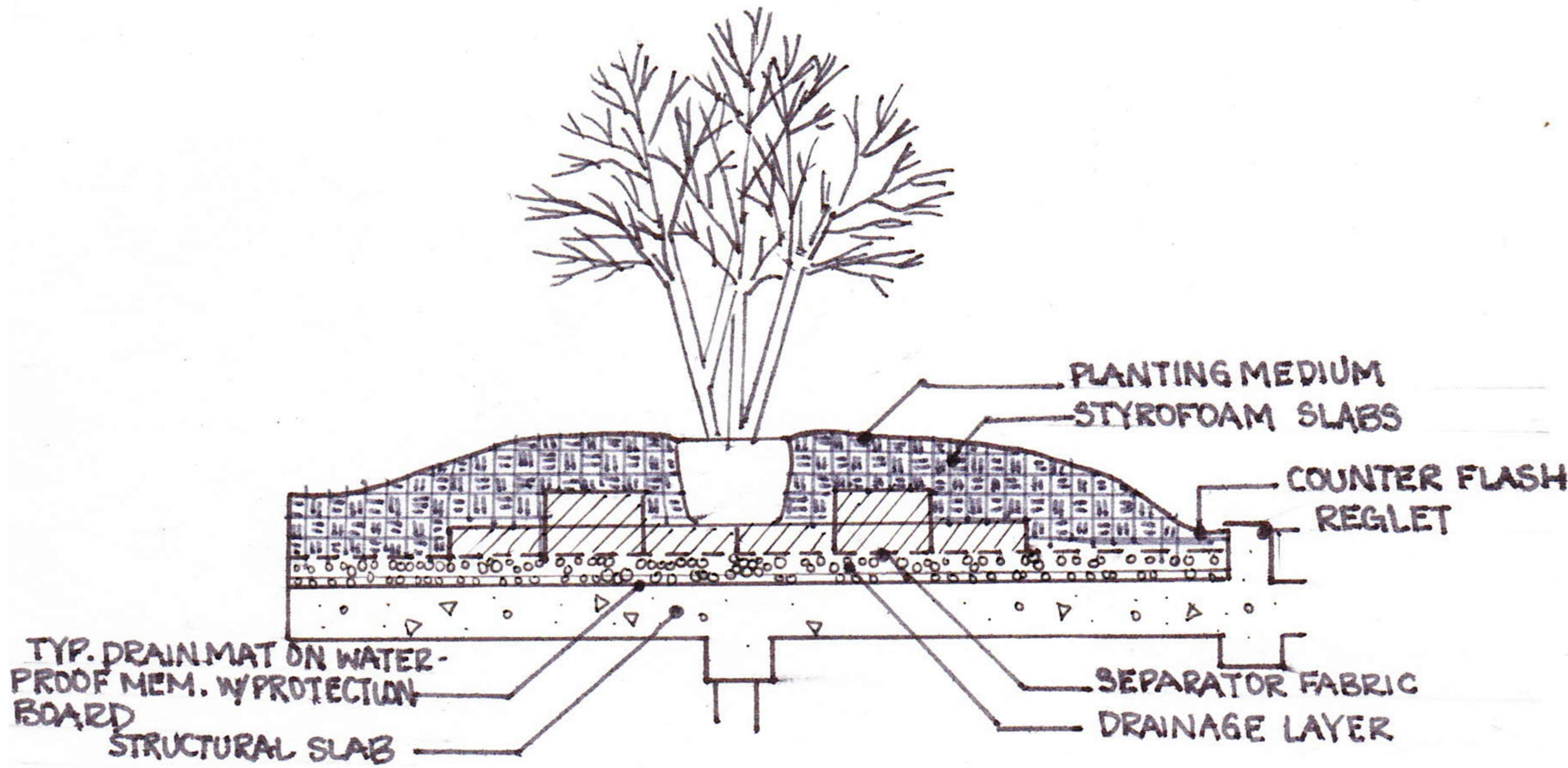
With little tree coverage and poor drainage, over 25 years, the existing hardscape is evidently damaged. Colored concrete appears faded and washed from intense sun exposure. The exposed aggregate is chipped and weathered. Joints show signs of chipping and water damage from an intense storm event. Planters that house the Palm trees circling the central water feature also show signs of weather related damage with mildew growing on the outside. The Palms have also outgrown the planter basins, therefore appear stressed and unhealthy.



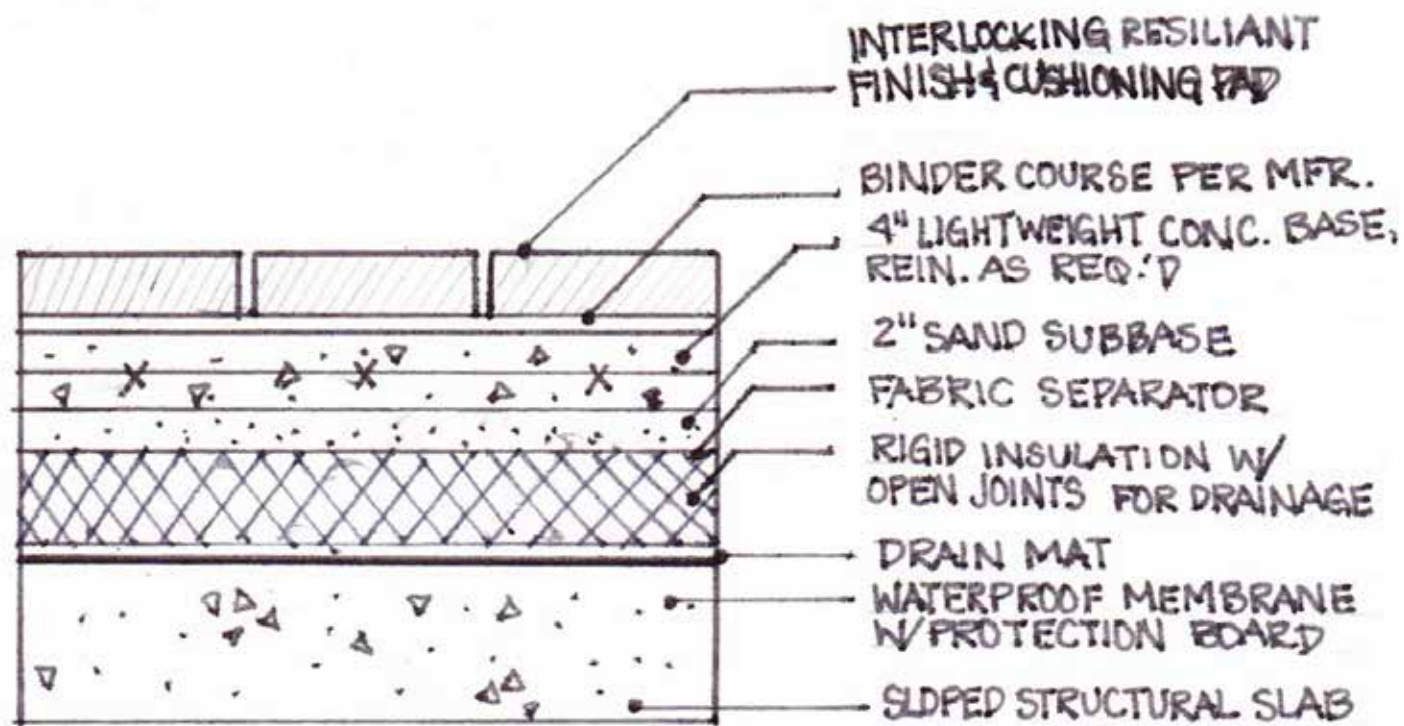
## REDESIGN

The Spanish Revival architecture and Art Deco fixtures of the Culver City Hall Structure deserve a modernized treatment to its hardscape. Red, black, and tan hues of sandstone previously used at the site and commonly observed against the Spanish Architecture styles attractively contrast the colors of the building structure. I believe these colors should be maintained but in the form of synthetic permeable pavers. As it is, City Hall seems separate and closed off from the rest of downtown Culver City. By removing some of the existing raised berms and concrete benching along Culver Blvd, and installing some tree trenches between concrete pavers such as the photo example from James Corner Designs I believe the space could be more open available to the community for interaction and events. With proper grading, water could also be collected and stored on site for irrigation.

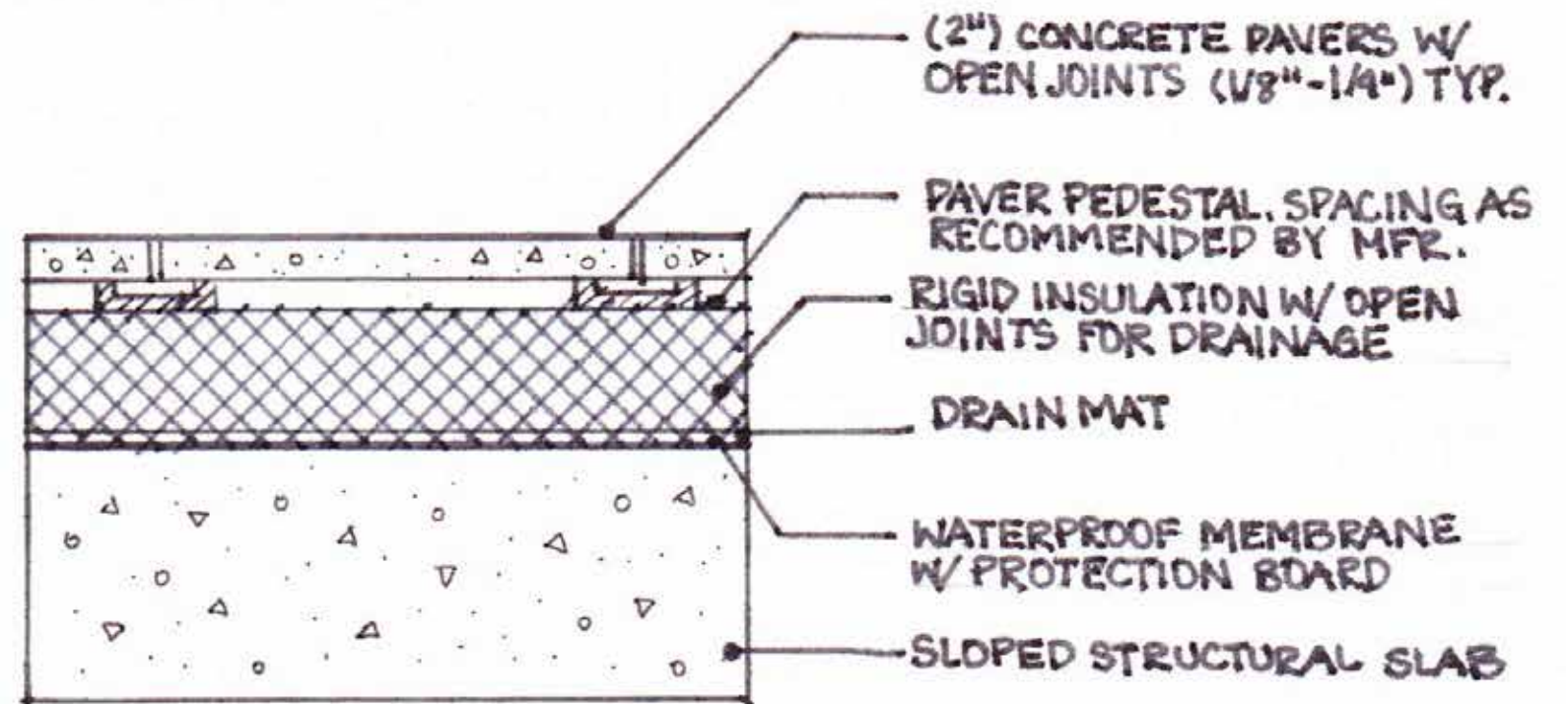




Tree Planted on Structure



Synthetic Pavers on Sloped Concrete Structure

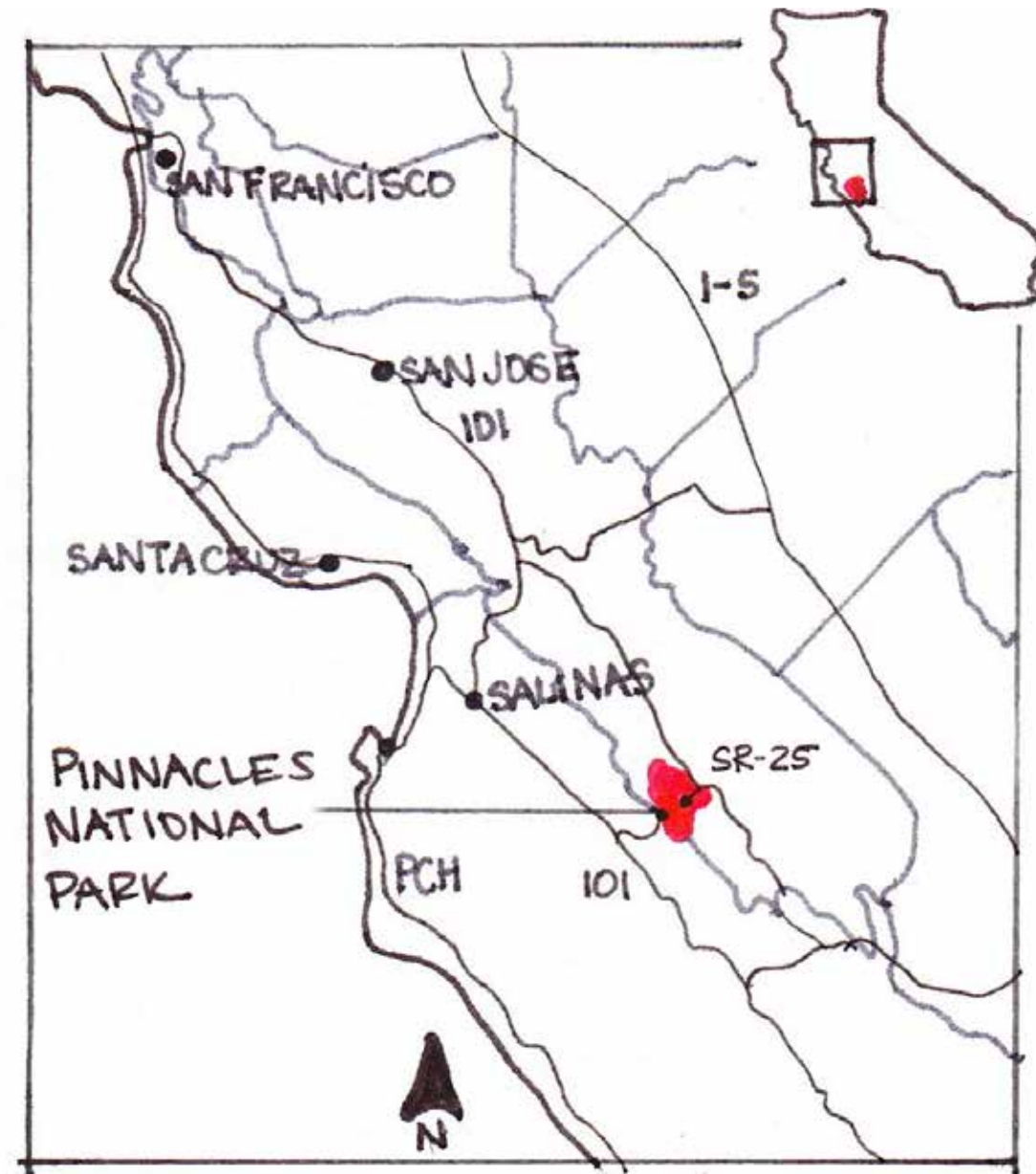


Concrete Pavers on Sloped Concrete Structure





## LOCATION



Pinnacles National Park is a former national monument that was designated a national park in 2013. The landscape is mostly mountainous inside a high desert climate, East of the Salinas Valley in Central California. The park is named for the geologic formations left from the eroded Western half of the extinct Neenach volcano of the Micoene era. Because the volcano was embedded on the San Andreas Fault, over 35 million years, the Western half of the volcano has gradually shifted 200 miles North, while the Eastern half mostly remains in present day Lancaster, CA.





The majority of construction inside the park was completed by the Civilian Conservation Corps between the 1920s and 1940s. Vegetation is about 80% chaparral with woodlands, riparian, and grasslands merged into the chaparral. Materials for surfaces, shoulders, bridges, culverts, and signage were acquired locally and were compatible with the surrounding colors and textures. The rustic style was widely used in park service design between 1916 and 1942 primarily through the efforts of National Park Service Landscape Architect Thomas C. Vint and his staff. The rustic style emphasized a philosophy of non-intrusive, naturalistic architectural design in natural settings, the sensitive use of native vegetation, and the incorporation of natural color were used to position roads, buildings, and other developments in harmony within the surrounding setting.



# SITE PLAN

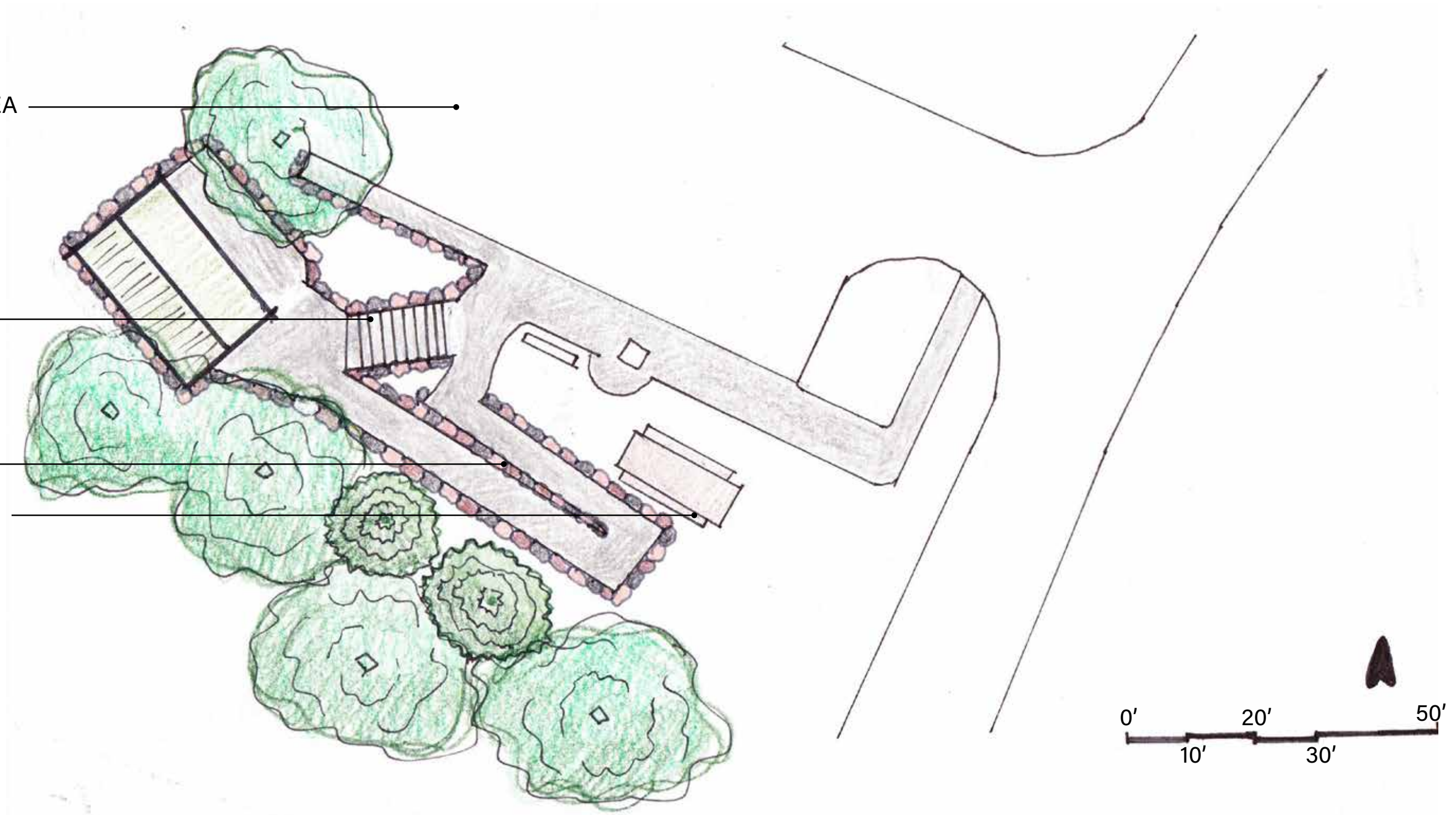
PARKING AREA

RESTROOM

STAIRS

TRAIL SIGN

ADA RAMP



## CURRENT CONDITIONS



Looking West from Stair Base



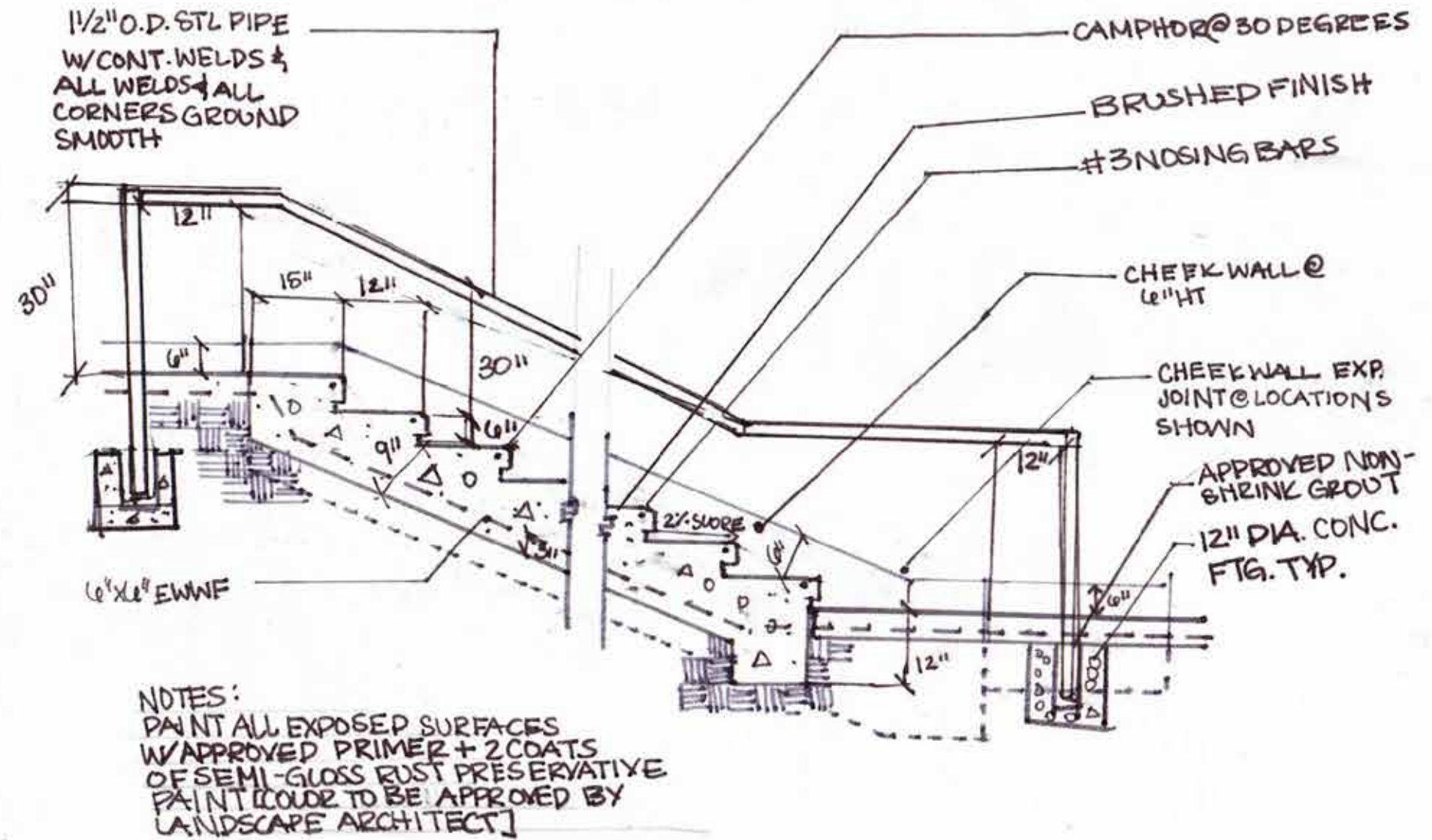
Looking East from Restroom

At the Bear Gulch Trailhead, stands a structure that was constructed in 1931. It previously housed park rangers however, now it has been converted to a restroom. The structure is a frame with a rock veneer. In 1957 it was wired for commercial power and in 1977 both the stairs and ramp shown above were added for accessibility. Both additions serve their purpose, but without handrails they do not comply with current ADA standards.

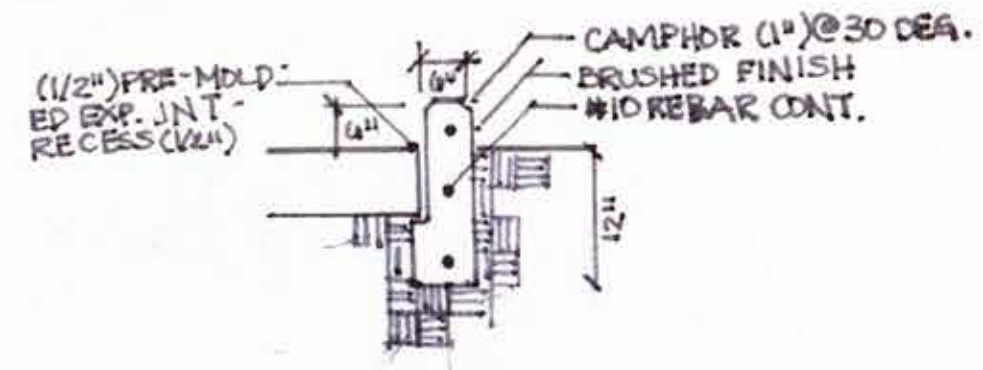
## STAIR HANDRAIL REDESIGN

For my redesign, I propose pouring a new staircase with 30" high galvanized steel or iron pipe hand rails. The base of the hand rails would be grounded inside concrete poured for the steps. Dry stones previously stacked should be replaced to maintain aesthetic and preserve valuable materials.

The previous riser of the steps was 8" with a tread of 10". This design can be burdensome to hikers weary from the descending the trails. I proposed reducing the rise to 6" and extending step treads to 12" for a more comfortable stride.



## CONCRETE STEPS WITH CHEEK WALL



## STAIRS REDESIGN PERSPECTIVE



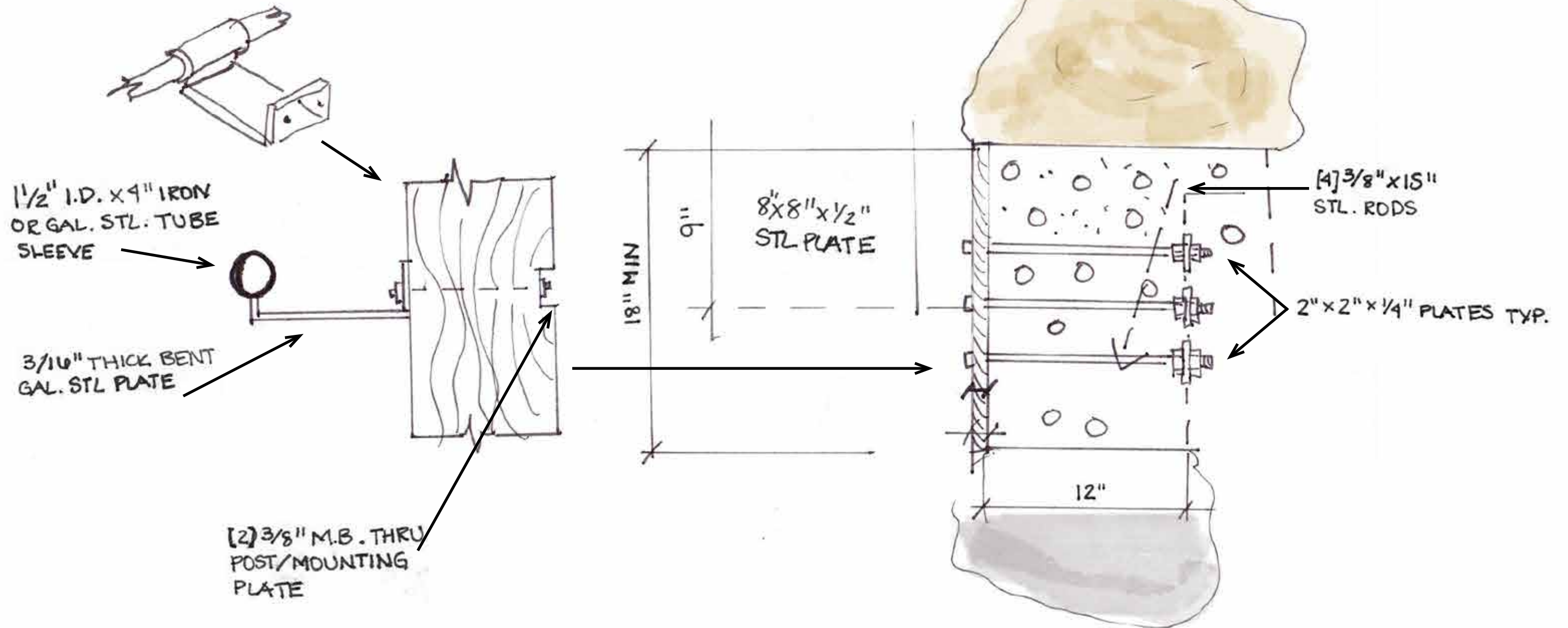
## RAMP REDESIGN PERSPECTIVE

The ramp also requires a hand-rail. Galvanized steel or iron piping should be anchored in a concrete with stones dry stacked around the base similar to the stair construction. Handrails can also be cradled or in a mounting bracket securely attached to the wall.



# RAILING BRACKET + MOUNTING BRACKET DETAILS

ISOMETRIC





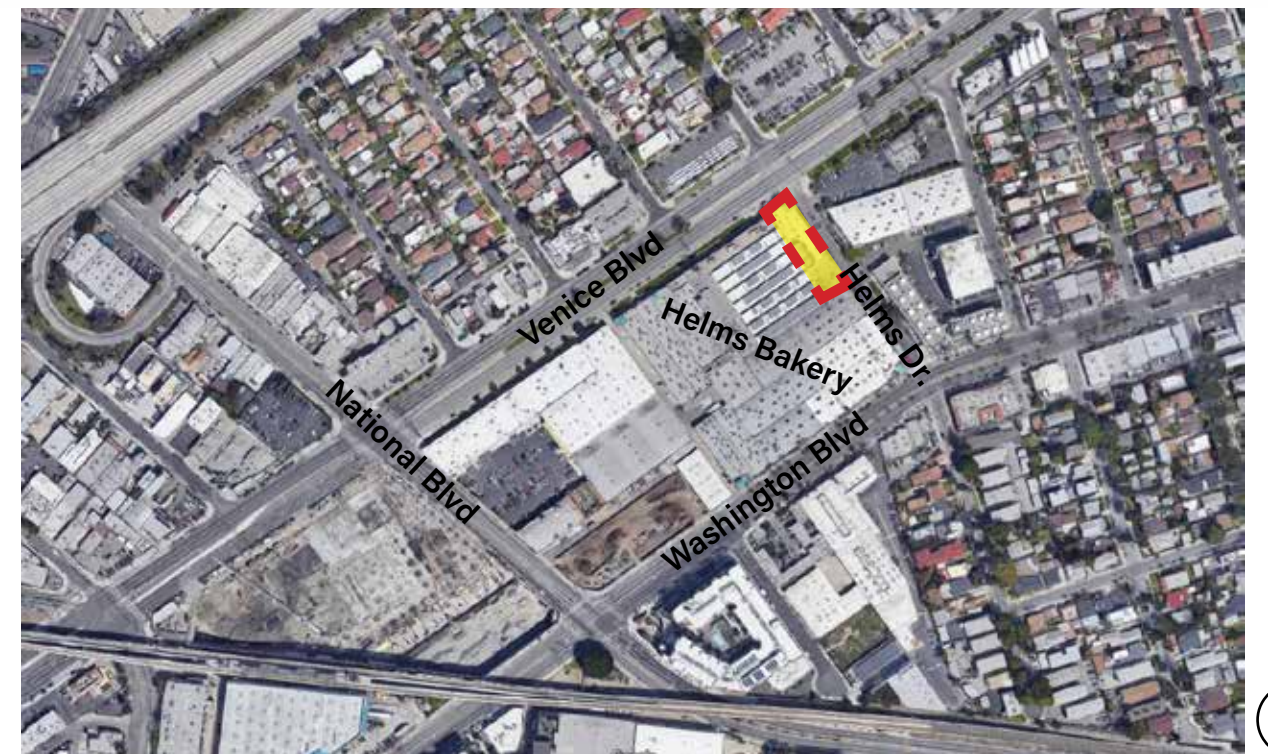
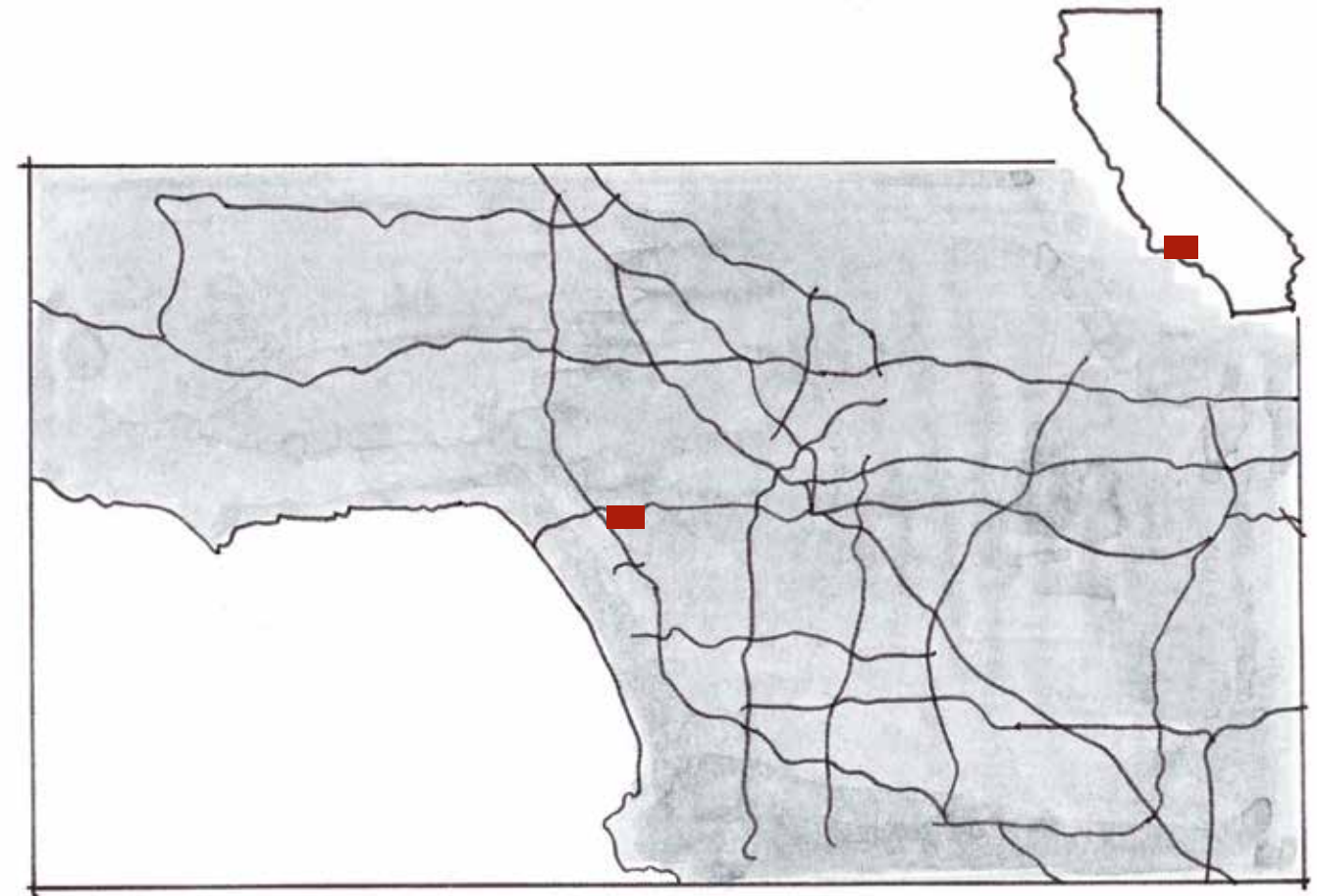
DECK + OVERHANG STUDY

3229 Helms Ave, Los Angeles, CA 90034

FATHER'S OFFICE BAR + RESTAURANT



This Father's Office location is the second location in this West LA chain inside the Helms Bakery building. It opened in April 2008. This location is very popular on the evenings and weekends for their great beer list and the outdoor seating. Wood is not the primary material used in the construction of its patio and overhang, but my design will be a wooden alternative.



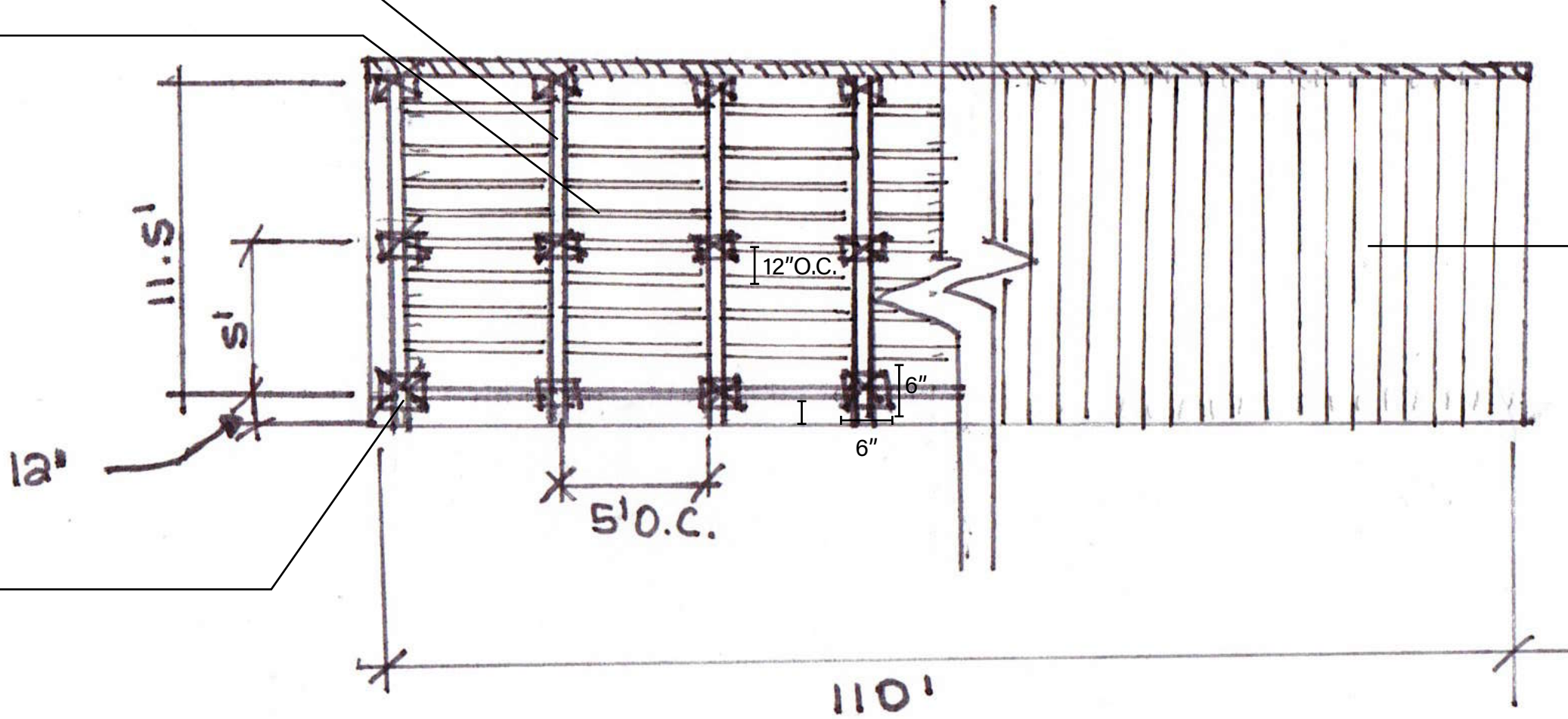
# DECK PLAN

4" x 8" DF beam @ 5' spacing  
O.C. typ.

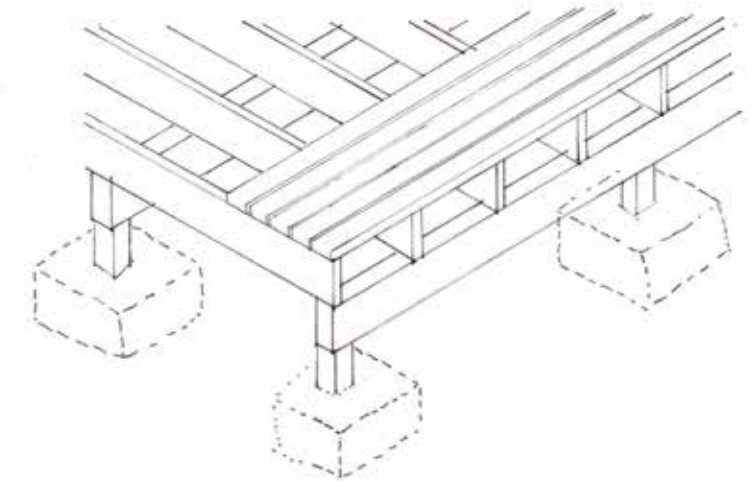
4" x 10" DF continuous joist  
spacing at 12" O.C. typ.

6"x6" DF post at 5'  
spacing O.C. typ.

2"x12" RDW Decking w/  
1/4" spacing typ.

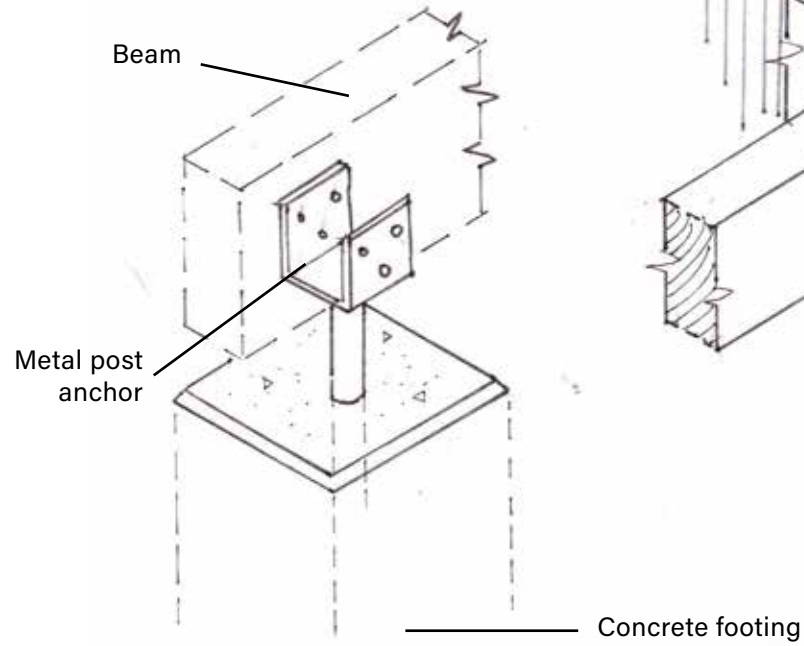
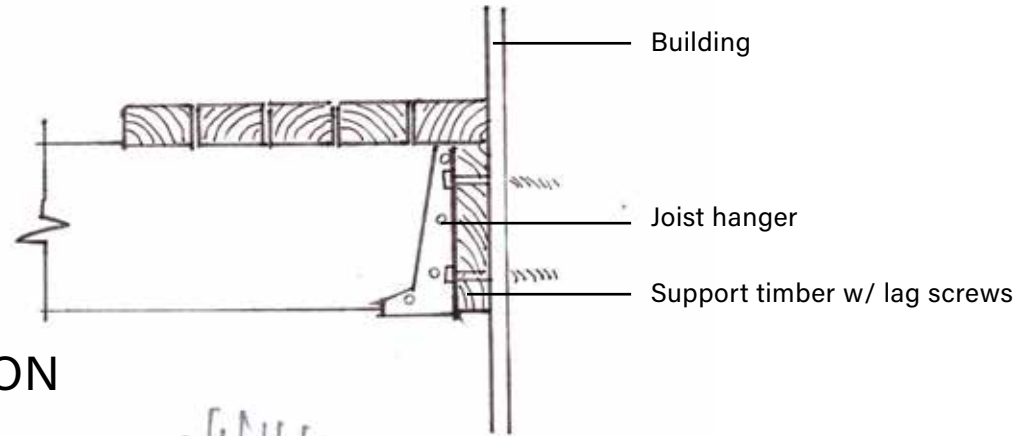


NTS



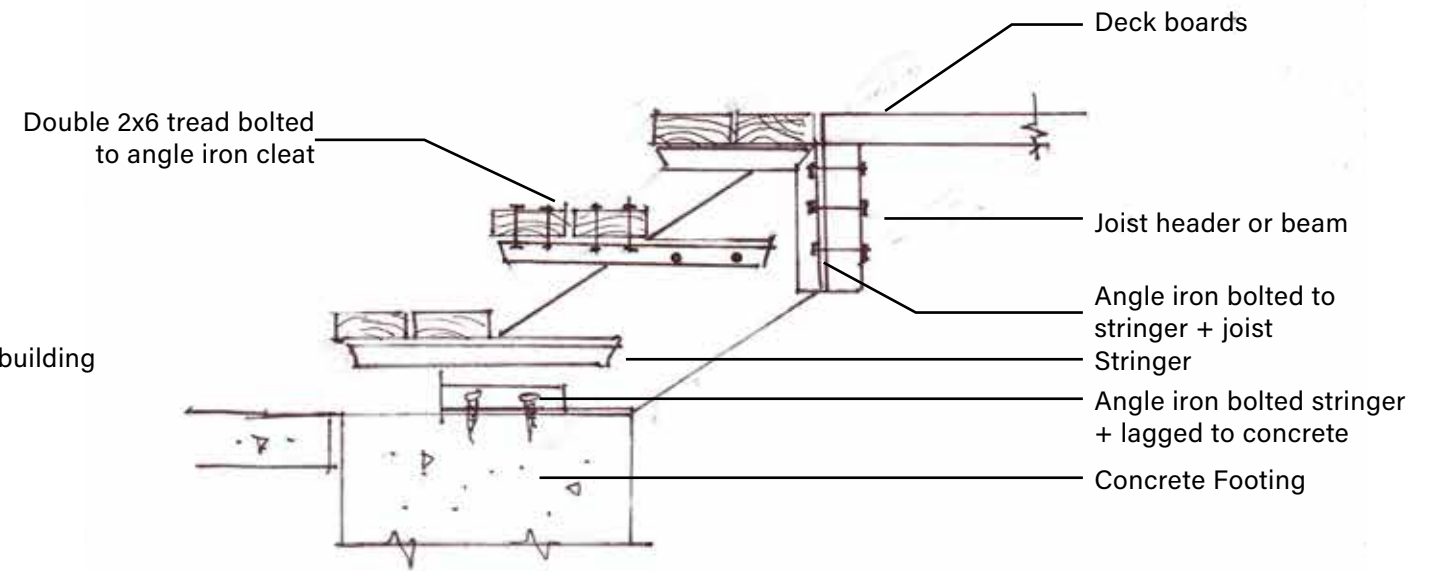
FRONT

### JOIST + BEAM CONNECTION TO BUILDING

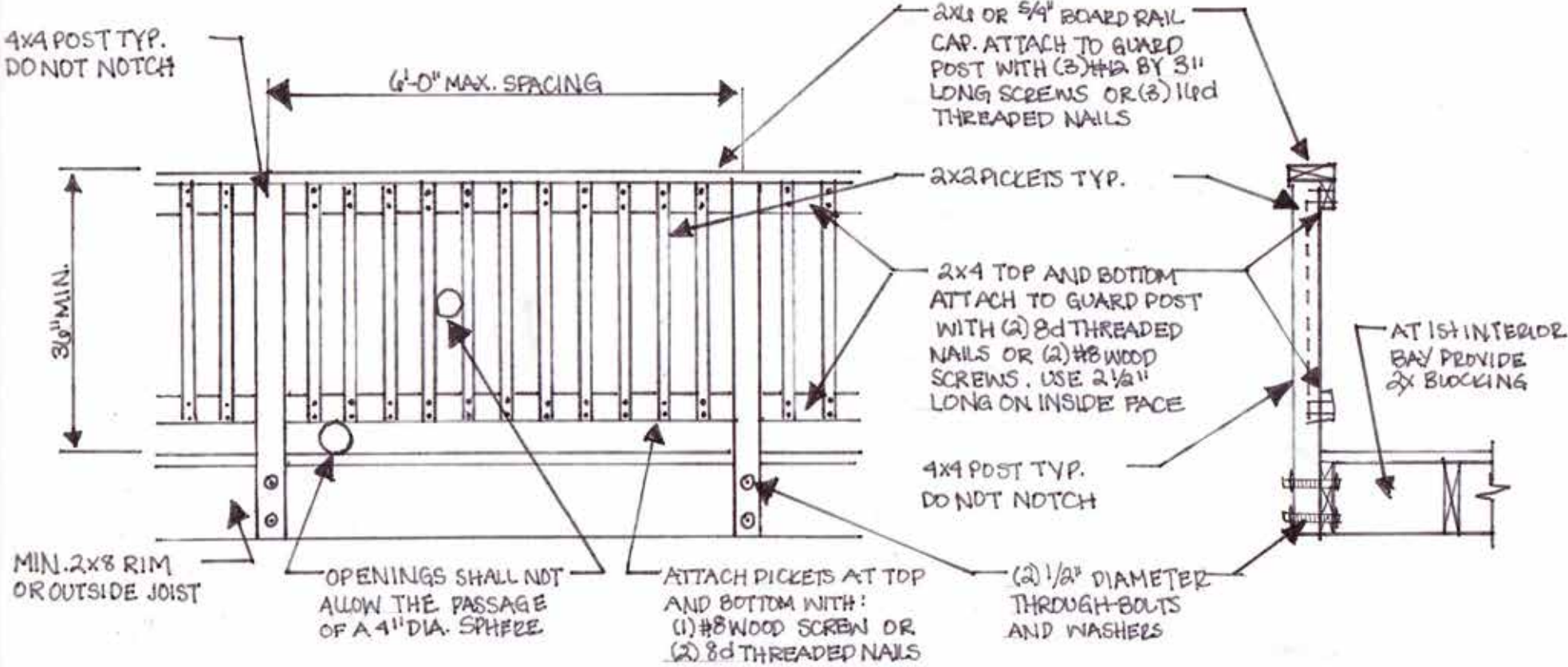


### BEAM TO FOOTING CONNECTION

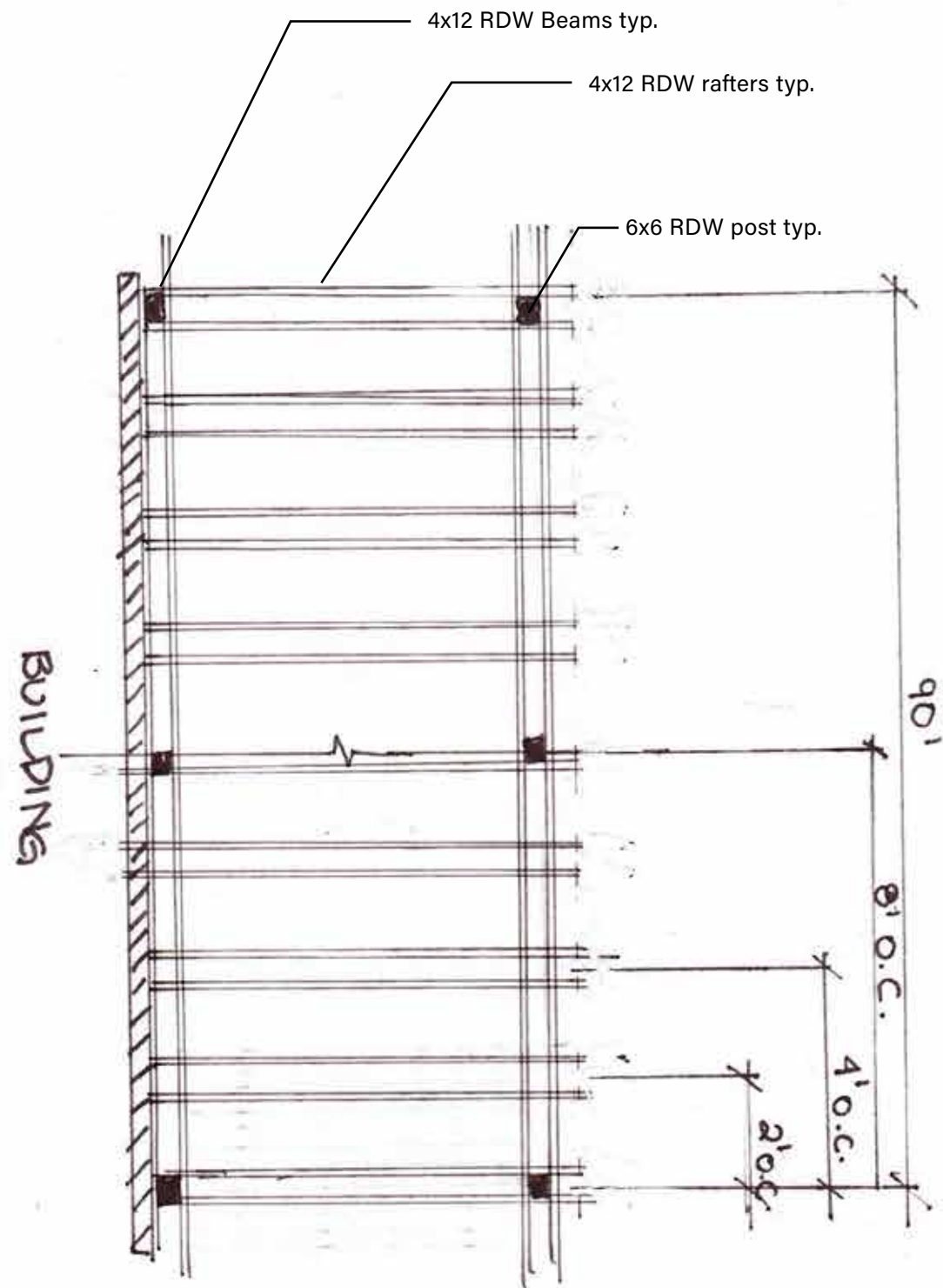
### STAIR CONNECTION



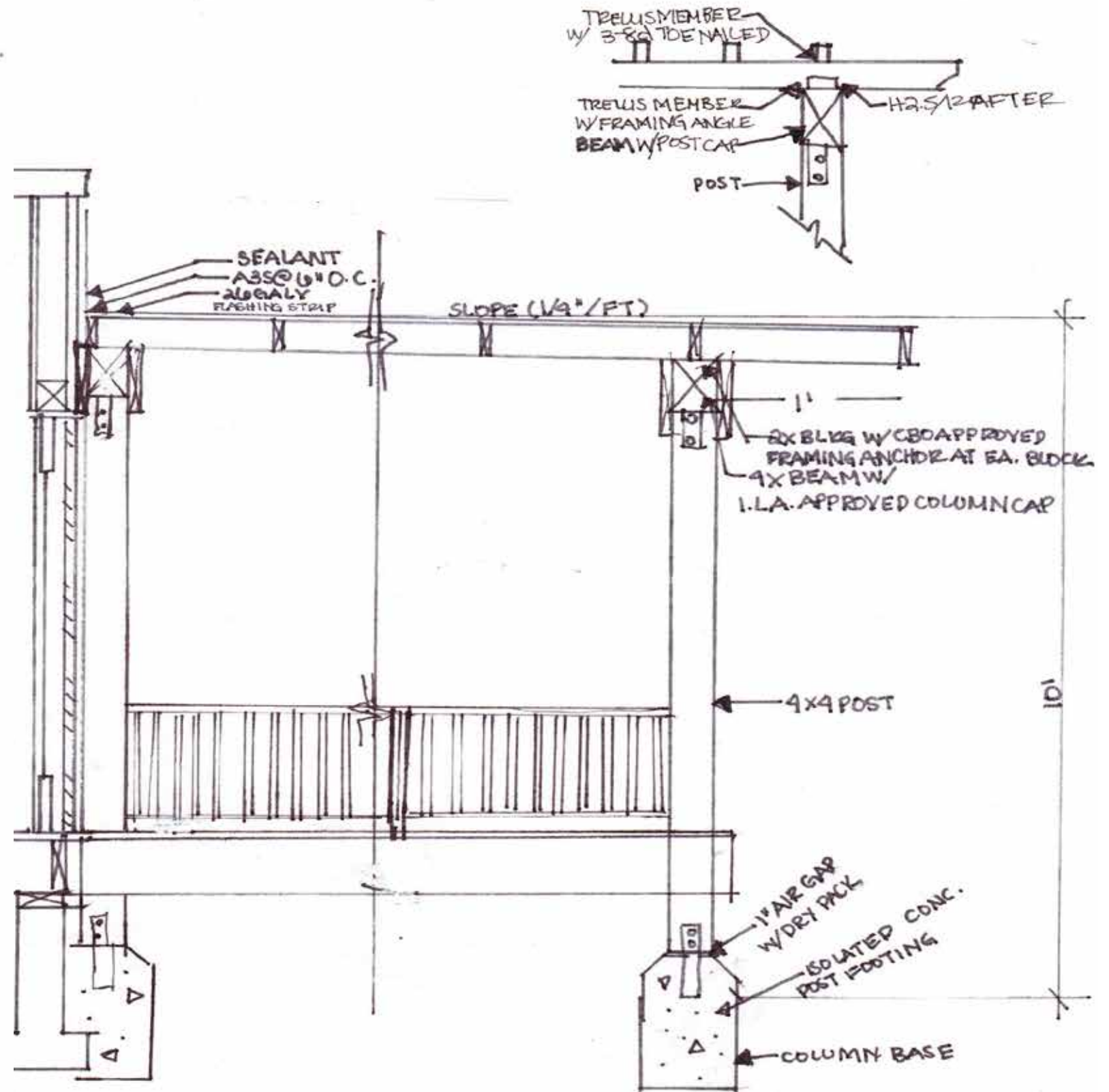
# HANDRAIL DETAIL



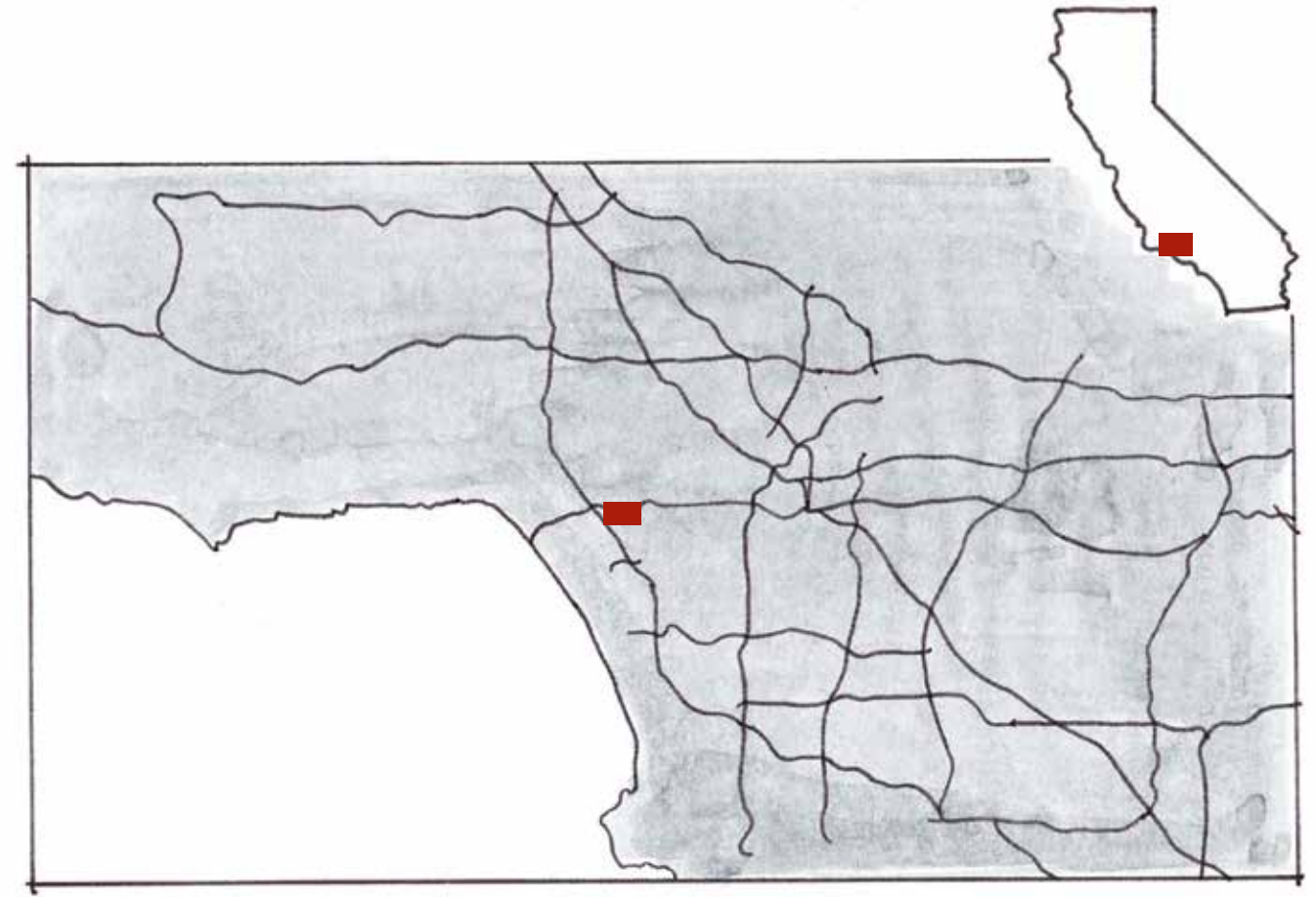
### OVERHANG PLAN VIEW



### OVERHANG TO BEAM SECTION

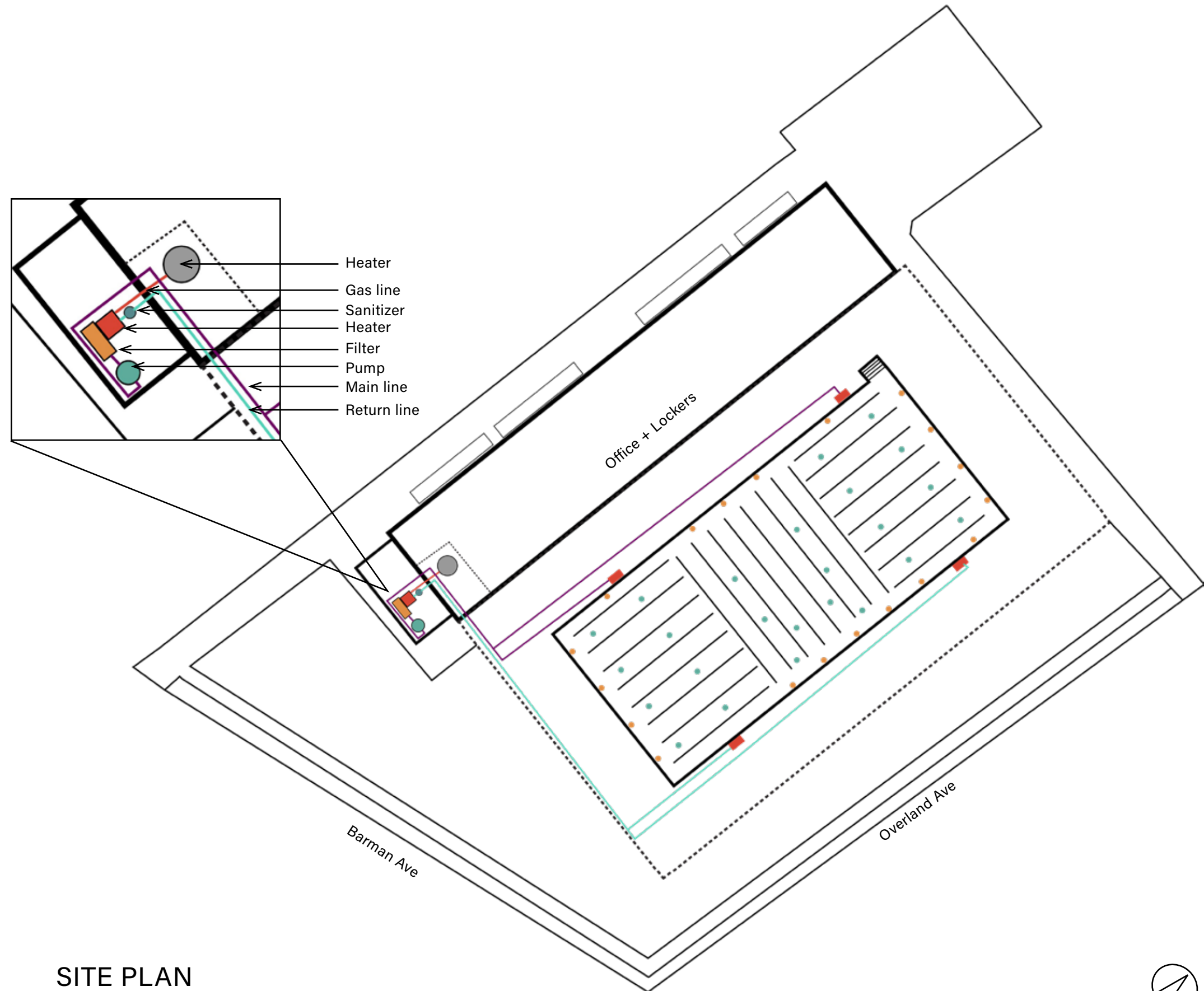






The Culver City Municipal Pool a.k.a. "The Plunge" is operated by the City of Culver's Parks and Recreation and Community Services Departments. It was originally opened in August of 1949 . In 2015 it was briefly closed for maintenance. Two failing filter tanks were replaced and the old plaster was replaced. It utilizes a perimeter recirculating gutter system. This facility is an outdoor lap pool that operates year-round (sans Covid) . It is a 50-meter x 25 -yard Olympic size competition pool and ADA accessible.





\*\*DUE TO COVID, ACCESS WAS NOT PERMITTED TO POOL PREMISES. DRAIN, LIGHTS, AND PIPING LOCATIONS ARE APPROXIMATE.

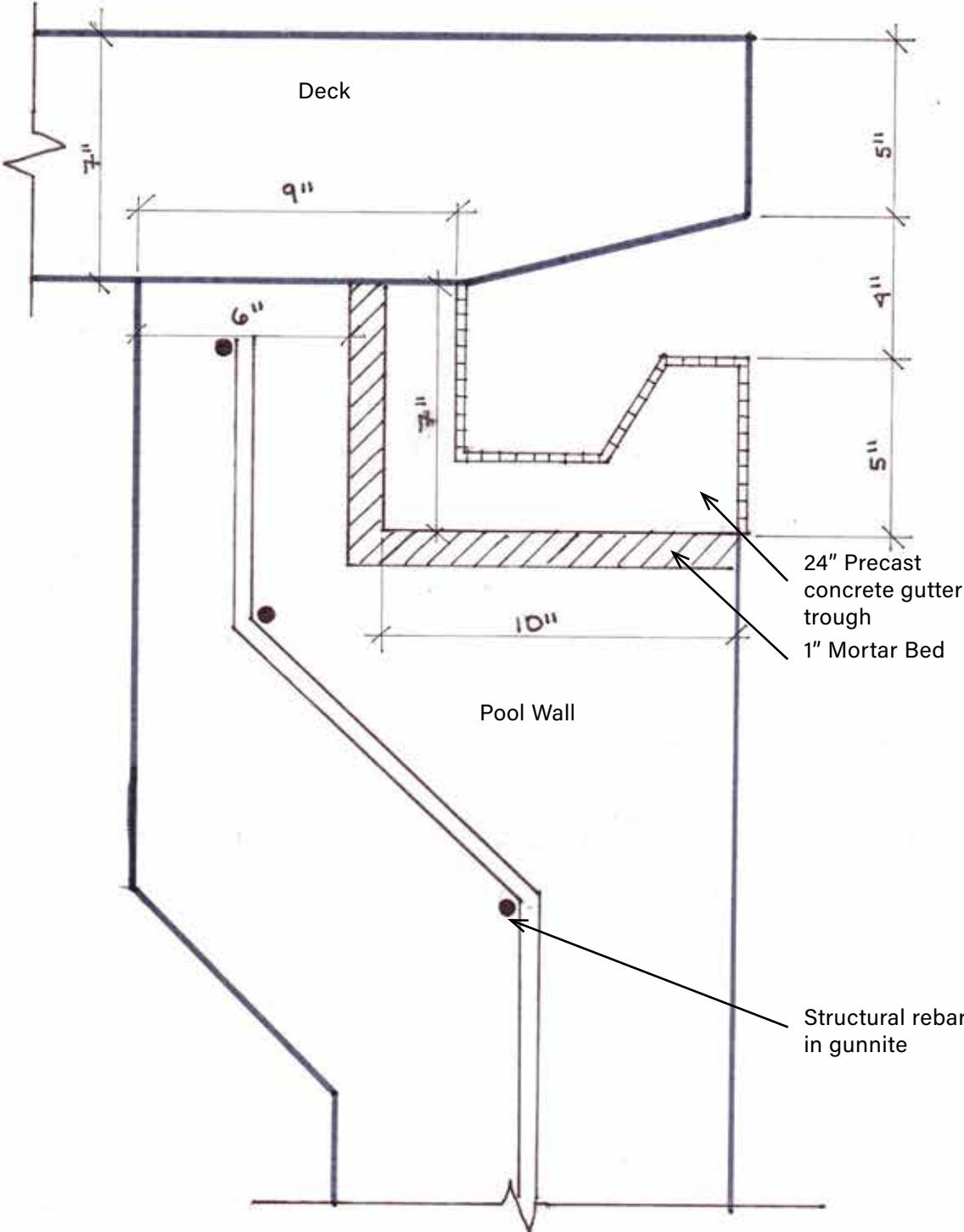
SITE PLAN

NTS

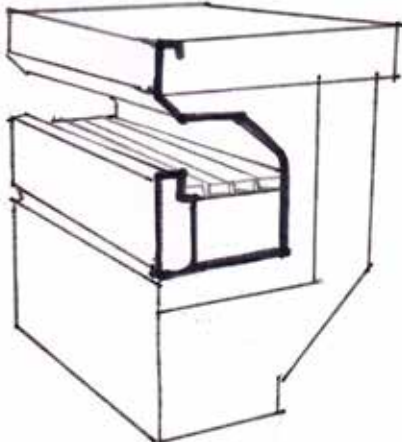


DRAINAGE DIRECTIONS

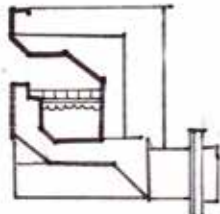
FULLY RECESSED CANTILEVER GUTTERS



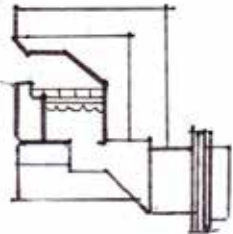
BOND BEAM SECTION DETAIL



Fully recessed cantilever perimeter gutters are ideal for competition facilities.



Clean filtered water is uniformly distributed around the pool perimeter.



Dirty surface water is continuously skimmed from the entire pool perimeter.



TYPICAL WALL PORTION

LIGHTING STUDY

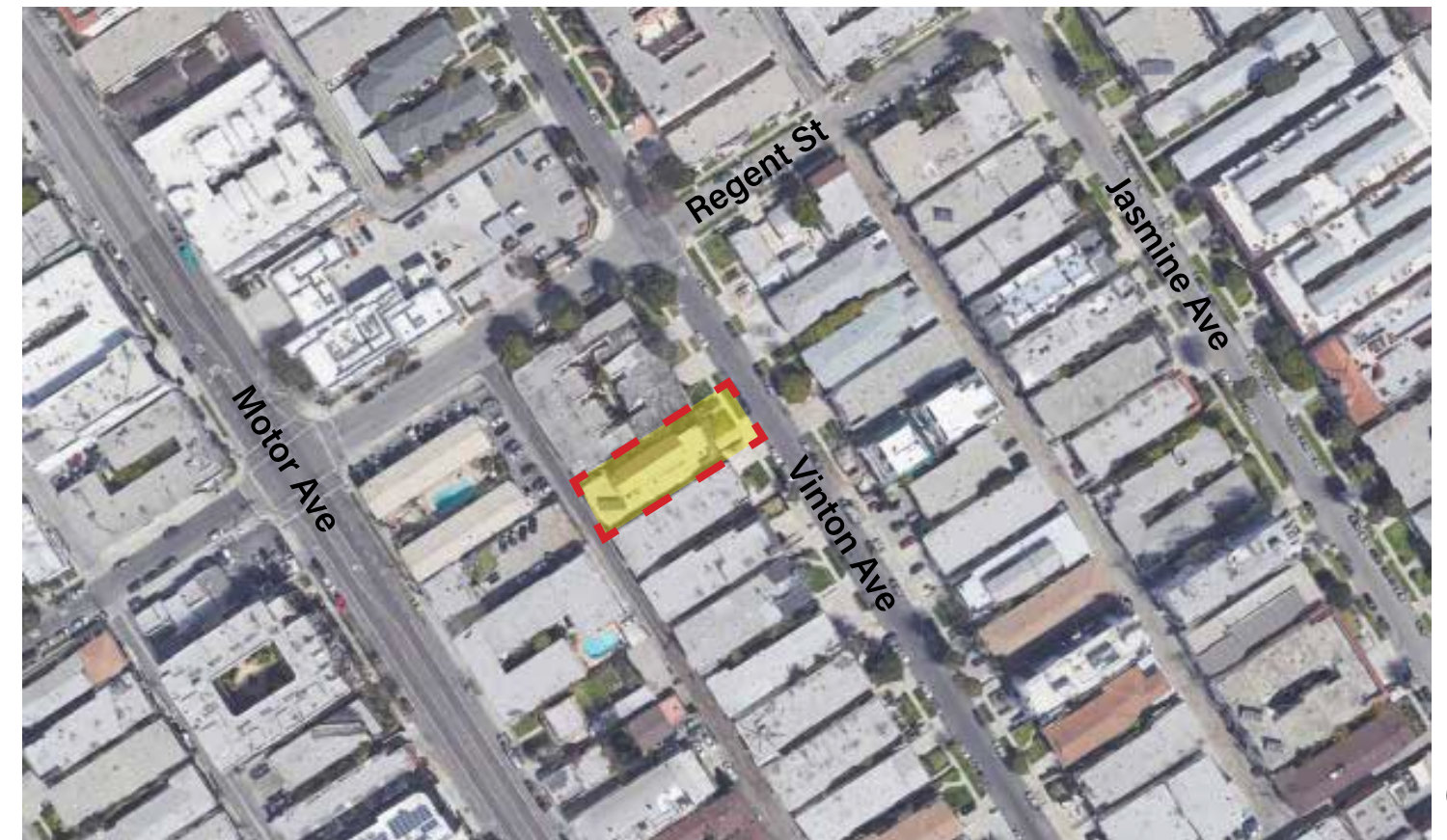
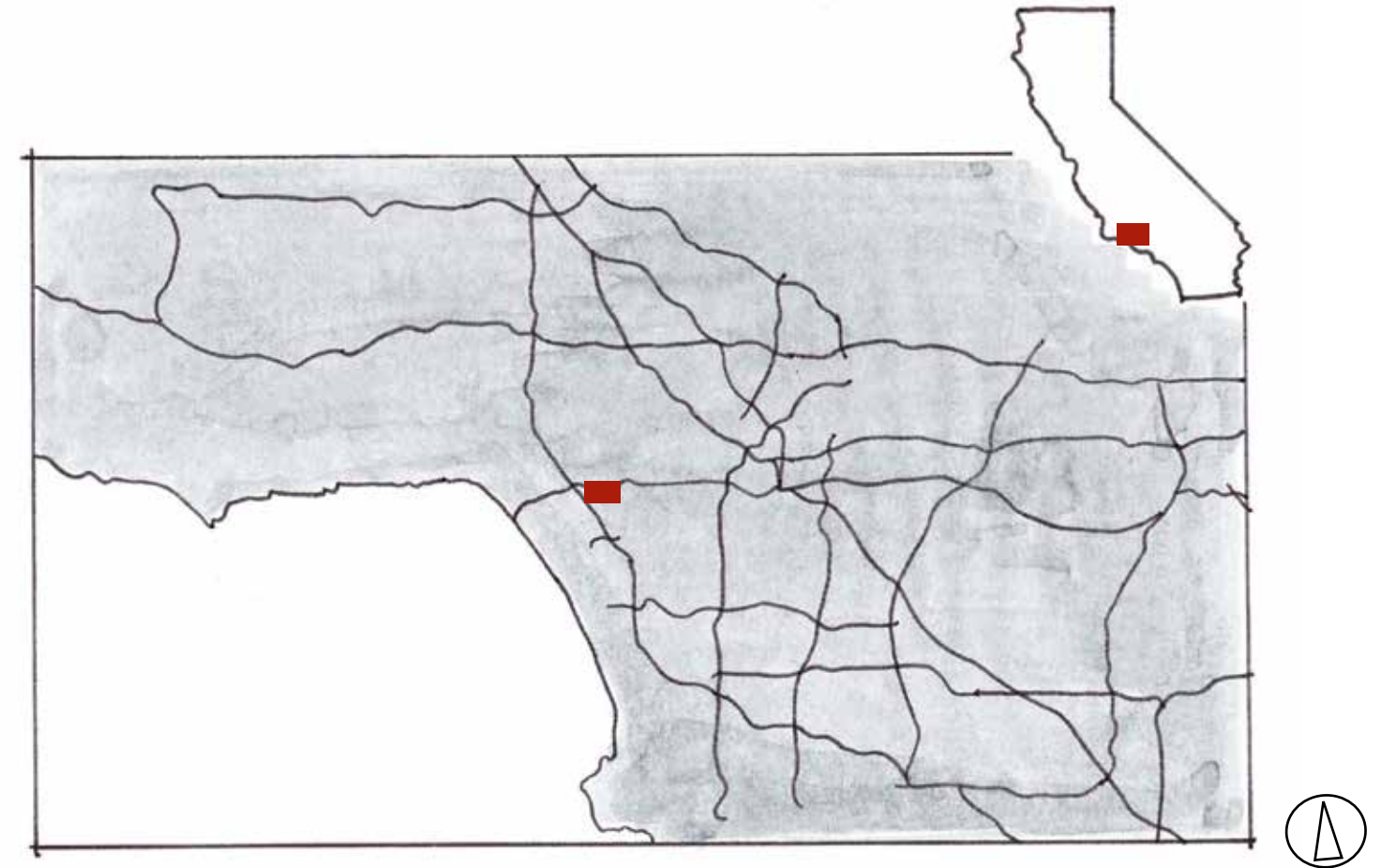
3717 Vinton Ave, Los Angeles, CA 90034

VINTON SUITES APARTMENT COMPLEX



## LOCATION + BACKGROUND

The Vinton Suites Apartment Complex is located in the Palms neighborhood on the West side of Los Angeles, CA. It contains 8 apartment units. A parking garage occupies the first level. Four one-bedrooms on the second level and four two-bedroom loft-style apartments on the third and fourth levels. The building was constructed in 1986. A modest landscape lighting plan currently exists, but it could use some updates.



### Circuit A

LED Path light (PL), 10 watts  
#12 cable, 7500 constant

$(10 \text{ watts}) \times (7 \text{ fixtures}) = 70 \text{ watts}$   
 $I = W/V = (70 \text{ watts}) / (12 \text{ volts}) = 5.8 \text{ amps}$   
 $VD = (70 \text{ watts}) \times (57.5 \text{ ft}) / 7500 = 0.54 \text{ voltage drop}$

### Circuit B

LED Up light (LC), 10 watts  
#12 cable, 7500 constant

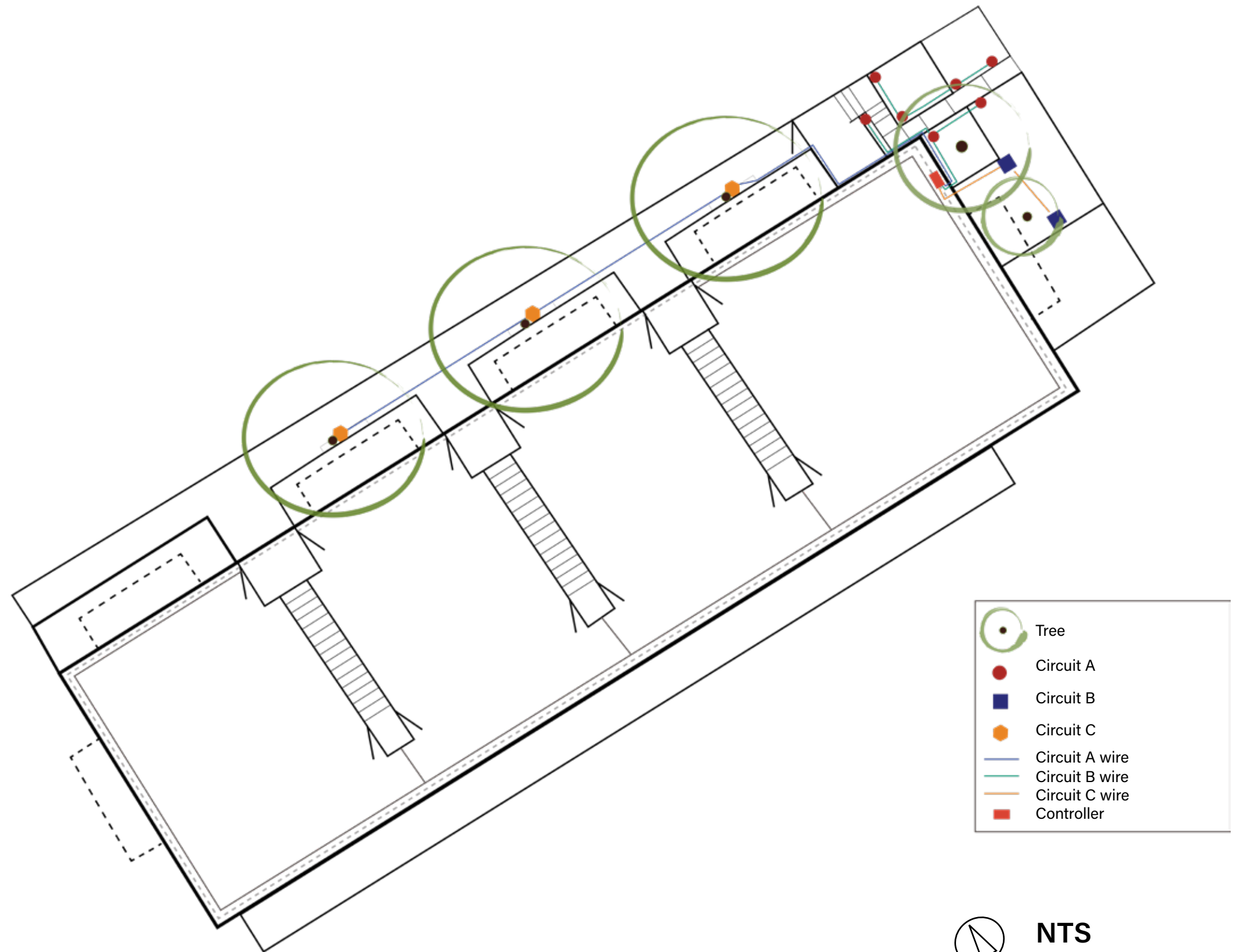
$(10 \text{ watts}) \times (2 \text{ fixtures}) = 20 \text{ watts}$   
 $I = W/V = (20 \text{ watts}) / (12 \text{ volts}) = 1.6 \text{ amps}$   
 $VD = (20 \text{ watts}) \times (36 \text{ ft}) / 7500 = 0.1 \text{ voltage drop}$

### Circuit C

LED Down light (VE), 46 watts  
#12 cable, 7500 constant

$(46 \text{ watts}) \times (3 \text{ fixtures}) = 138 \text{ watts}$   
 $I = W/V = (138 \text{ watts}) / (12 \text{ volts}) = 11.5 \text{ amps}$   
 $VD = (138 \text{ watts}) \times (76 \text{ ft}) / 7500 = 1.4 \text{ voltage drop}$

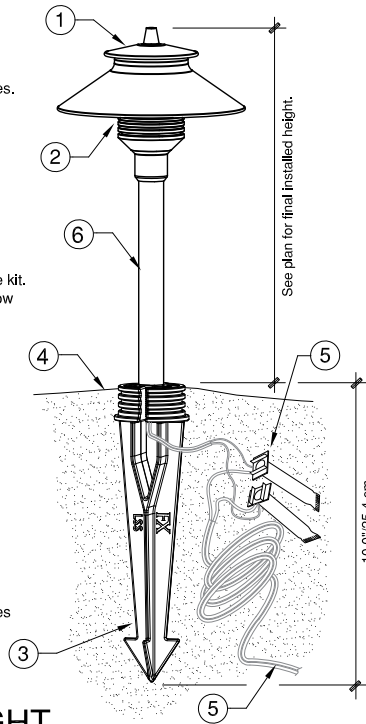
Controller to be set at 12 amp capacity.



NTS

DETAIL LEGEND

- ① FX Luminaire PL fixture. See plan legend for wattage, beam spread and accessories.
- ② Twist top assembly clockwise onto riser, until the gap between the lens and brass reducer is completely sealed.
- ③ FX Luminaire Long Slot Spike mount.
- ④ Finished grade.
- ⑤ Direct bury, UF/UL, copper, low voltage cable with 3M DBR/Y-6 direct bury splice kit. Leave 18" minimum wire loop coiled below fixture for service.
- ⑥ Aluminum Riser Assembly (ARA); see plan for height.

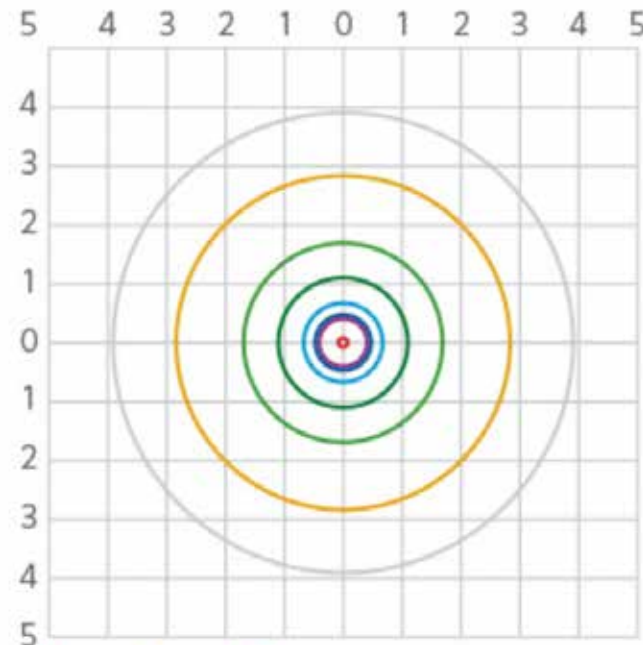


NOTES

- A. Installation to be completed in accordance with manufacturer's specifications.
- B. Accepts 10-15 volts - AC or DC
- C. See plan legend for LED board and accessories.
- D. Always refer to FX product installation notes prior to installation.

XX PL PATH LIGHT  
LONG SLOT SPIKE NOT TO SCALE

PL ILED ISOFOOTCANDLE PLOT



Distance in units of mount height

Circuit A

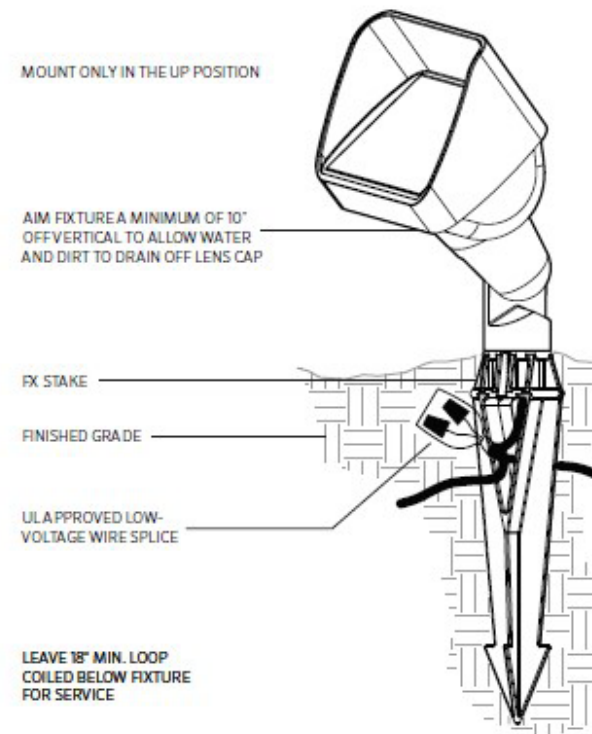
On circuit A, I chose to install the PL path light manufactured by FXLuminaire. There are 7 fixtures on the circuit. Each path lamp will be placed on a 12" riser then driven into the top soil or raised planters along the path way leading up to the front gate.



PL Spec Chart

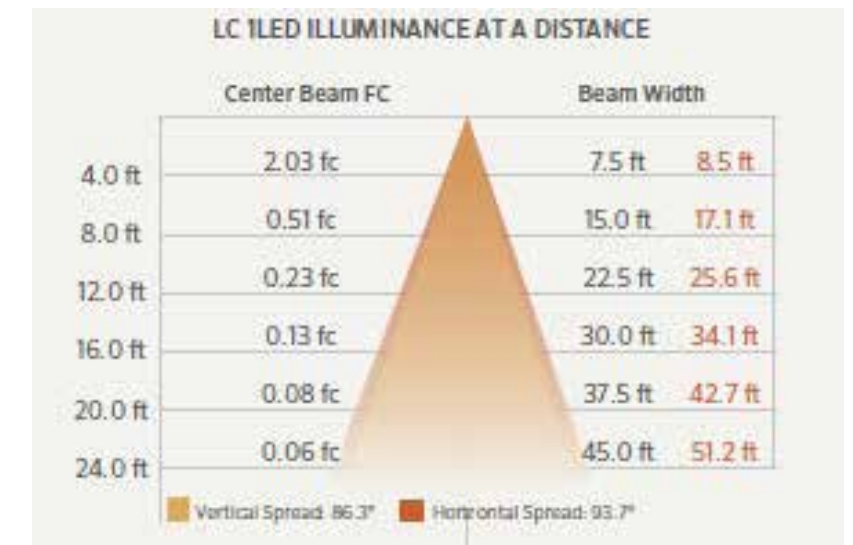
Number of LEDs	1
Halogen Lumen Output Equivalent	10 Watt
Useful LED Life (L70)	50,000 hrs avg
Input Voltage	10 to 15V
VA Total (Use this number to size the transformer)	2.4
Watts Used	2
Lumens per Watt (Efficacy)	15
Max Lumens	27
CRI (Ra)	85
CCT	
Amber Filter	2700K
Green Filter	4500K
Blue Filter	5200K





### Circuit B

On circuit B, I chose to install the LC up lights manufactured by FXLuminaire. There will only be 2 lights on this circuit. Each fixture will be attached to a 12" riser and placed 6' - 8' from the base of each tree to cast their silhouettes against the building. Beam width should remain under 18' to minimize light pollution pointed into the front apartment units.



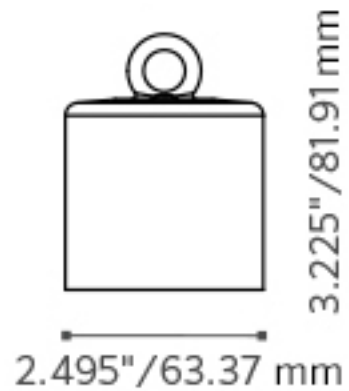
NUMBER OF LEDS:	1
HALOGEN LUMEN OUTPUT EQUIVALENT:	10 Watt
USEFUL LED LIFE (L70):	50,000 hrs avg
INPUT VOLTAGE:	10 to 15V
VA TOTAL: (Use to size the lighting controller)	2.4
WATTS USED:	2.0
LUMENS PER WATT (EFFICACY)	30.9
MAX LUMENS:	63
CRI (Ra)	82.8





**VE Spec Chart**

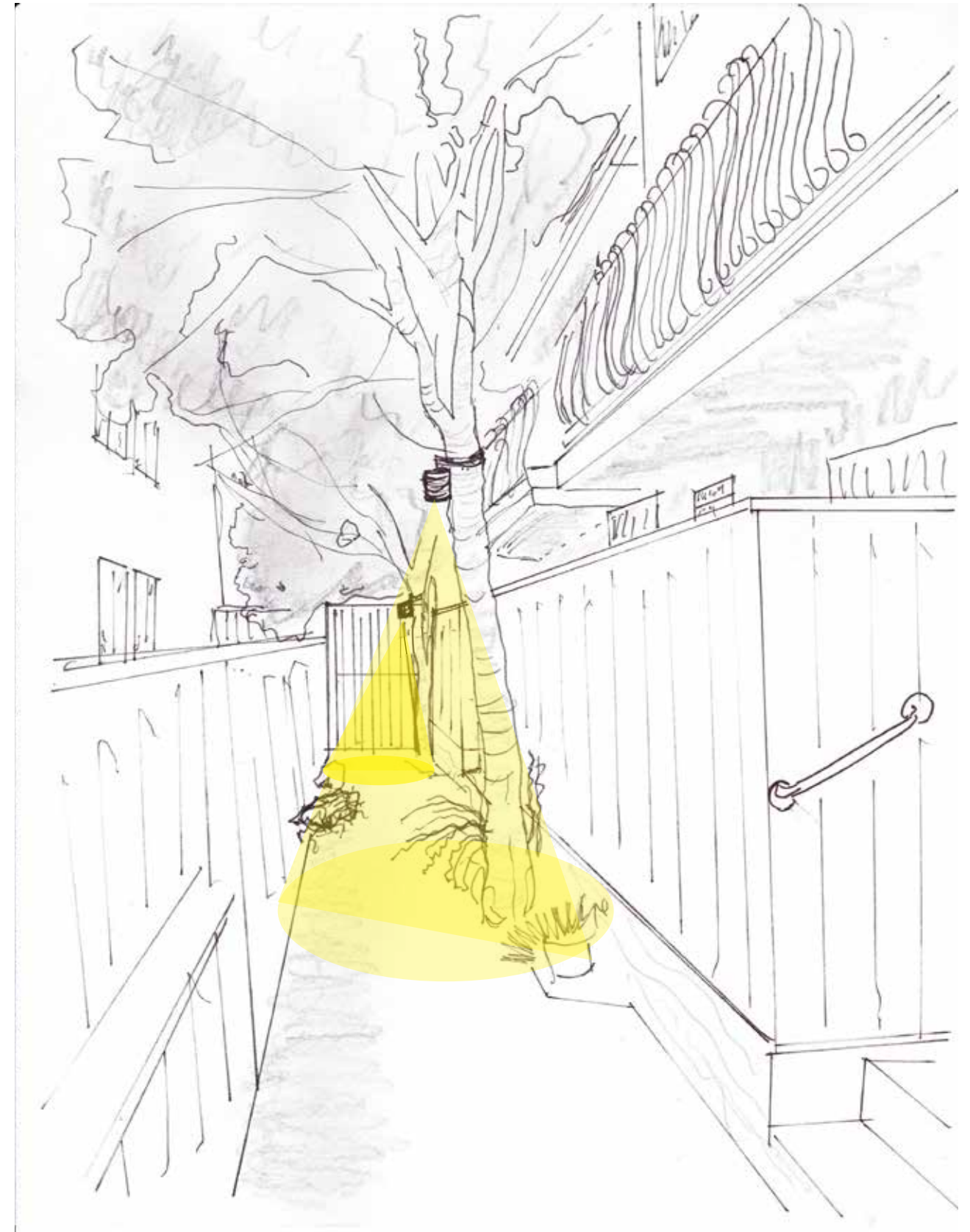
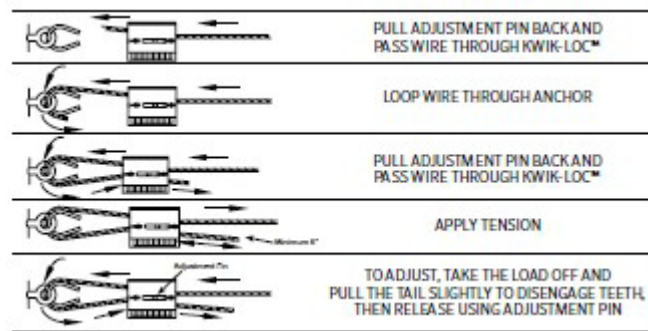
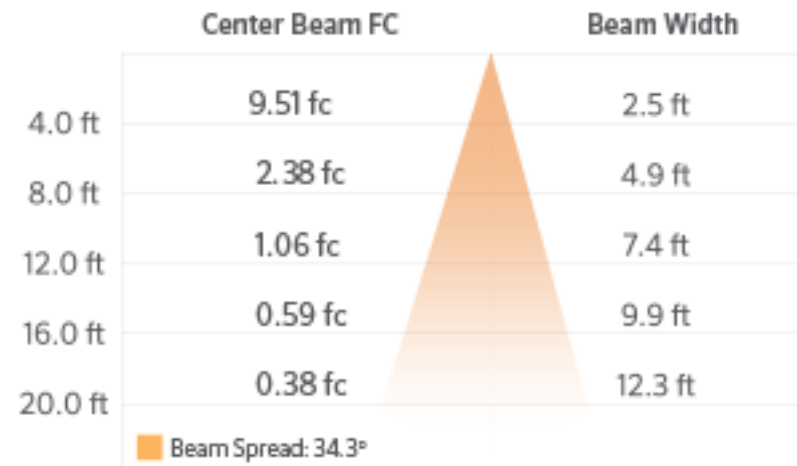
Output	1LED
Total Lumens†	90
Input Voltage	10 to 15V
Input Power (W)	2.0
VA	2.4
Efficacy (Lumens/Watt)	46
Color Rendering Index (CRI)	80+
Maximum Candela	152
Dimming	PWM, Phase**
RGBW Available	No
Luxor Compatibility	
Default	Zoning
ZD Option	Zoning/dimming
ZDC Option	--
Minimum Rated Life (L90 B10)	55,000 Hrs



**Circuit C**

On circuit C, I chose to install the VE down light manufactured by FXLuminaire. There are 3 fixtures on the circuit. Each lamp should be strung by a cable with lock (spec below) then screwed into the trunk of the *Cupaniopsis anacardioides*. Cables and screws should secure the fixtures from high wind events and the family of squirrels living among the canopy. Light fixtures should be positioned at minimum 8' high to create a moonlighting effect that illuminates the main walkway through the building.

**VE 1LED ILLUMINANCE AT A DISTANCE**

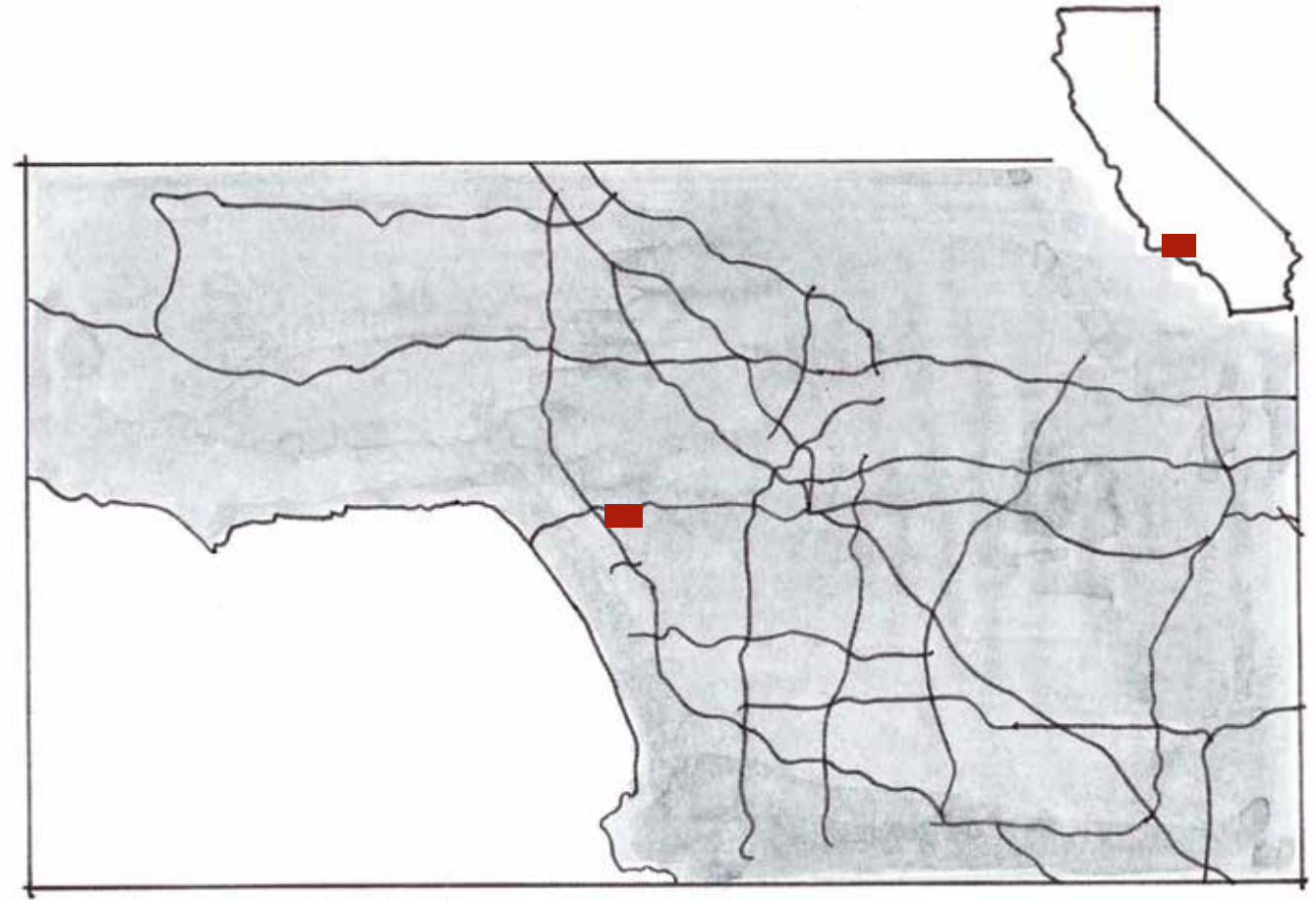
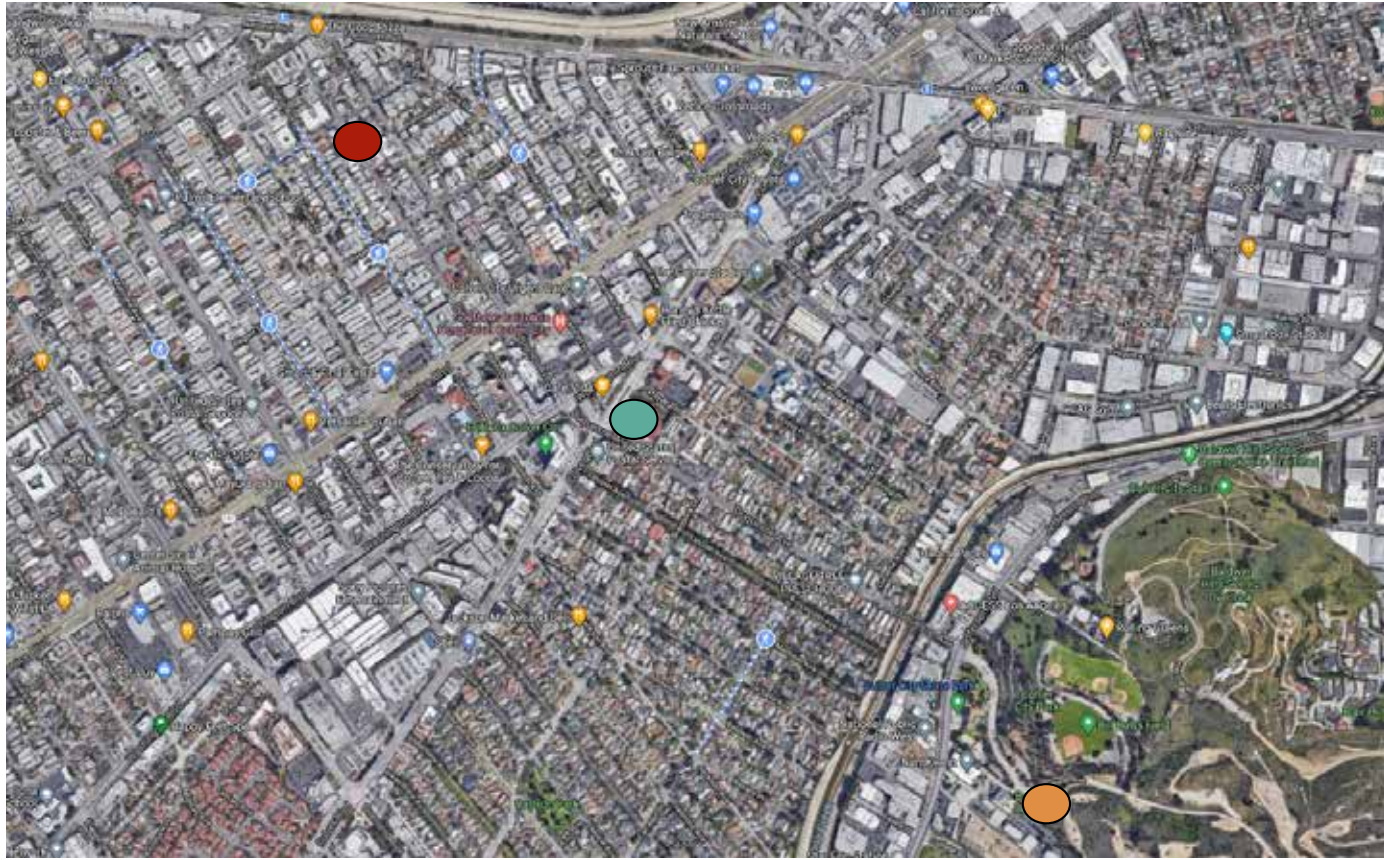


PLANTING STUDY

WEST LOS ANGELES, CA

**WEST LOS ANGELES TREE PLANTINGS**





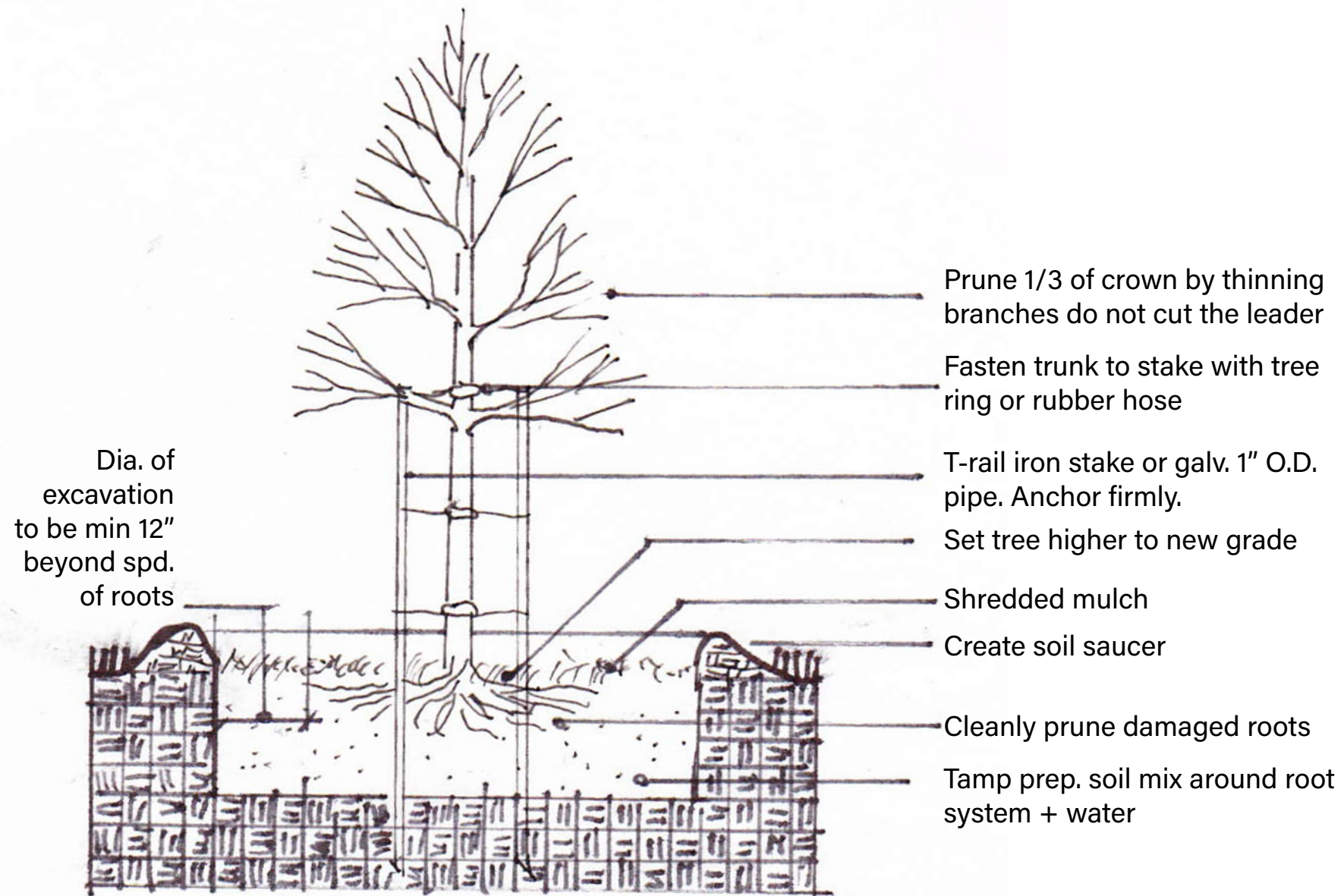
Site A - Parkway Tree Planting ●



Site B - Tree Planting on Structure ●



Site C - Tree Planting on Slope ●



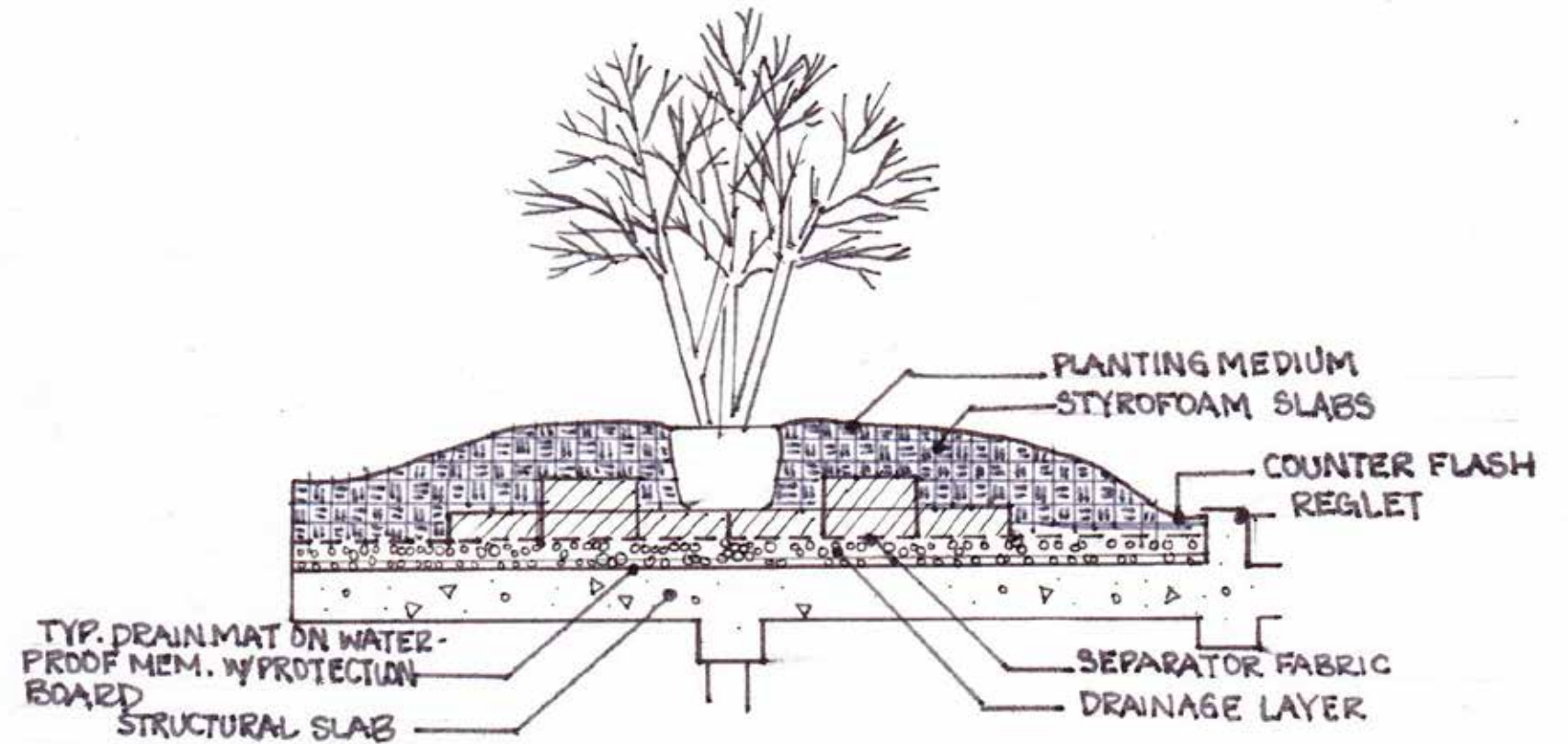
## STREET TREE PLANTING DETAIL

Site A examines a newly planted row of Madrone trees planted in front of a new apartment complex at the intersection of Dunn Dr and Tabor Dr in the Palms neighborhood of Los Angeles. The staking may be the only correct action taken when these trees were planted. A soil saucer was not created and shredded mulch was not distributed over the top.



LOCATION: 3612 Dunn Dr  
Los Angeles, CA





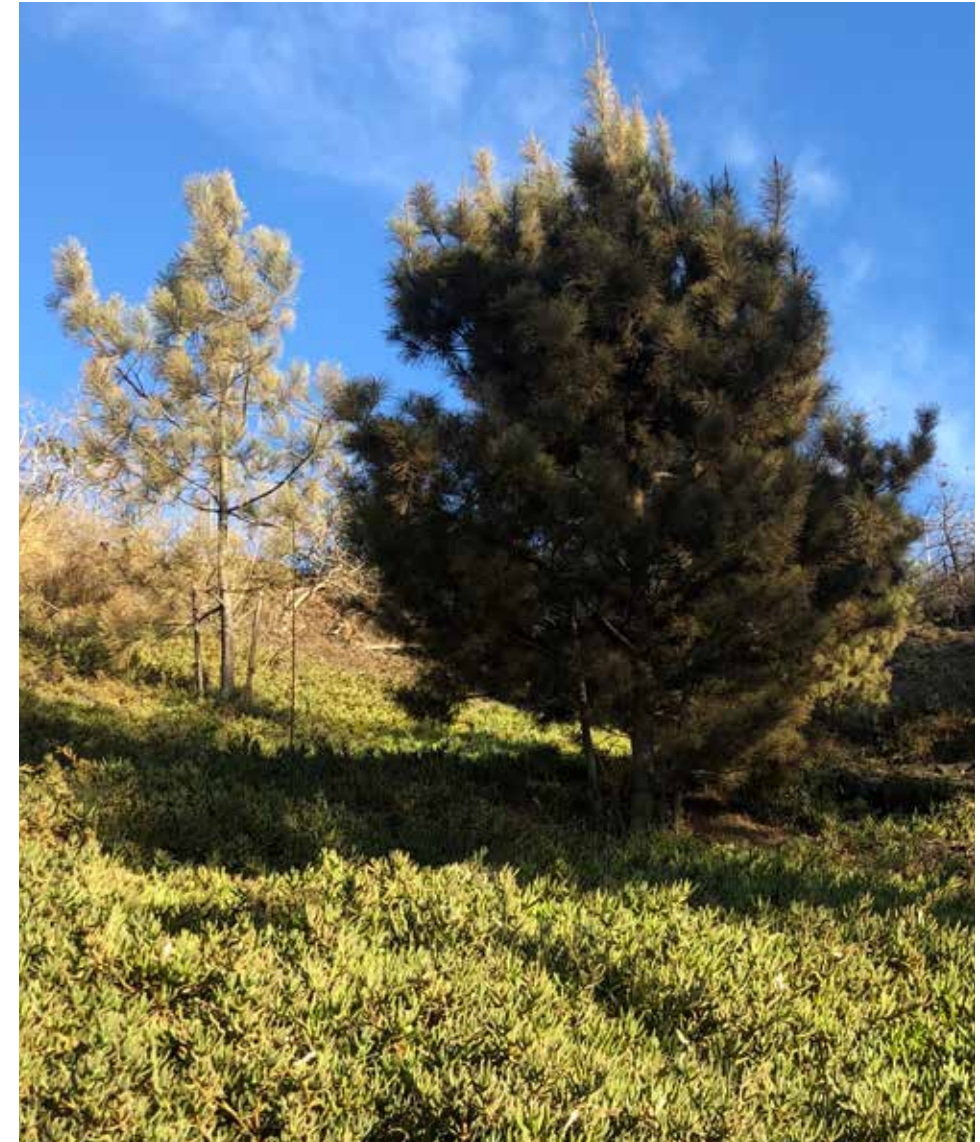
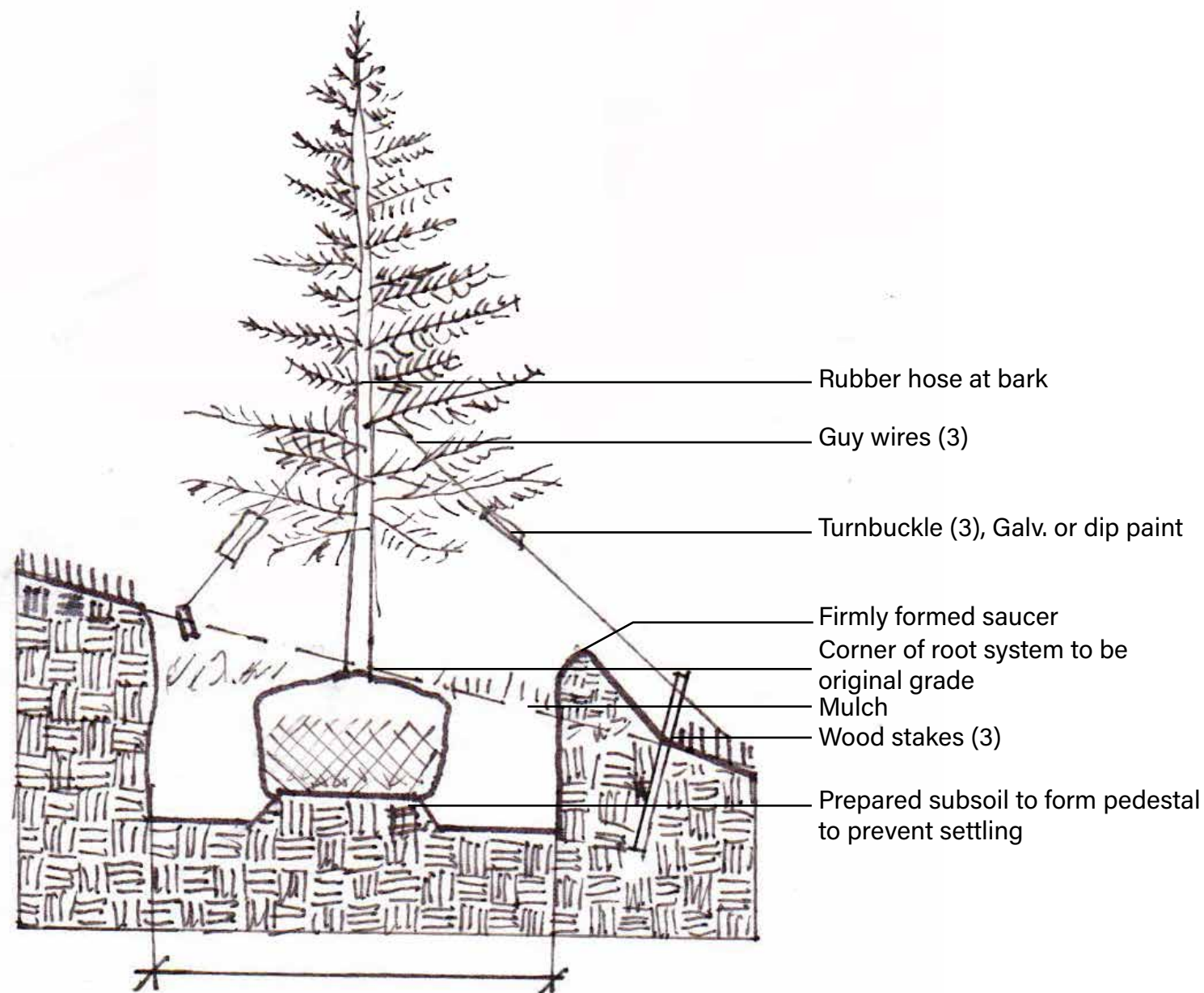
## TREE PLANTING ON STRUCTURE DETAIL

Site B examines some Jacaranda trees planted on top of the parking structure for Culver City Hall. The trees are healthy and however the berm the trees are planted on top of directs runoff to the concrete plaza rather than draining through the intended medium.



LOCATION: Culver City Hall  
9770 Culver Blvd, Culver City, CA  
90232





LOCATION: Boneyard Dog Park,  
Duquesne Avenue, Culver City, CA

## TREE PLANTING ON SLOPE DETAIL

Site C examines some conifers planted on a steep slope that separates the Boneyard Dog Park in Culver City from oil rigs owned by the Inglewood Oil Field. These trees were installed to mitigate erosion along the slope. Most are doing well despite their improper staking and lack raised saucer downhill. Some trees along the Eastern edge have failed.

# References

Stormwater

Retaining Walls

## **Hardscape**

<https://www.goodalearch.com/culvercityciviccenterandsquare?lightbox=datapitem-j8oxnqdo>

Stairs + Ramp

## **Deck + Overhead Structure**

## **Pool**

<https://www.culvercity.org/Explore/Parks-Recreation/Culver-City-Pool>

<http://culvercitytimes.com/profiles/blogs/culver-city-plunge-gets-plastered-will-reopen-this-friday>

<https://www.natare.com/>

## **Landscape Lighting**

<https://www.fxl.com/>

**Planting**