

Appendix 2

**Stormwater Management Compliance Memorandum**

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# **WILLOW VILLAGE PROJECT**

## **STORMWATER MANAGEMENT**

## **COMPLIANCE MEMORANDUM**

**March 9, 2021**

**Prepared by:**



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San Francisco, CA 94110  
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## **SECTION 1: Overview**

Willow Village is a mixed development site located in Menlo Park, California. The project is being developed by Peninsula Innovation Properties with site plans currently in the Schematic Design phase of development.

The project is a 59.36-acre site located within the City of Menlo Park. The project is bounded by Willow Road to the west, the SFPUC's Hetch Hetchy parcel to the south, Life Sciences District to the east, and the inactive Dumbarton Rail Corridor along the north. The existing site is made up of 18 parcels that include approximately 1 million square feet of existing industrial, office, and warehouse land uses with surface parking.

The existing project site is a developed "office park" with 87% of the area covered with buildings and paved surfaces, the remaining 13% consists of scattered pockets of landscape. There are currently no stormwater management facilities in place. In general, the site slopes from the southeast towards the north at approximately a 0.5% slope. The existing storm infrastructure drains west and discharges to an existing 66-inch storm drain at the Hamilton Avenue and Willow Road intersection. The 66-inch storm drain travels north, increases in size to 78-inch, and ultimately outfalls to Ravenswood Slough via a Caltrans owned and operated pump station. Refer to Exhibit A for Willow Village existing conditions.

The drainage basin for this site is the San Francisco Bay which was identified from the storm drain system maps provided by the City of Menlo Park. Refer to Exhibit B for a compiled version of the provided maps.

Based on historic groundwater data from the California Geologic Survey, the geotechnical report (prepared by Cornerstone Earth Group, 2017) recommends the project use the historic high groundwater elevation 4' (NAVD88). Past industrial activities on the site have led to underlying shallow groundwater contamination that may require certain BMPs to be lined with impermeable materials. Based on preliminary results from additional infiltration testing, the site is underlaid with predominantly clayey deposits with infiltration rates ranging from 0.08 to 0.17 inches per hour. Due to this low infiltration rate, all stormwater treatment facilities are likely to be underdrained.

## **SECTION 2: Proposed Site**

The Proposed Project has been designed as a master plan to implement the guiding principles and policies adopted as part of ConnectMenlo, such as including new affordable and market-rate housing units, providing opportunities for future transit connections, and constructing a grocery store. The Proposed Project would develop the site with new infrastructure, housing, sustainability features, circulation elements, open spaces, office uses,

commercial (retail, dining, entertainment, and hotel) uses, and bicycle and pedestrian infrastructure. The new housing and community-serving retail would include public spaces of various scales, restaurants, public gathering spaces. In addition, the Proposed Project would include a community-serving space adjacent to the approximately 4-acre publicly accessible park. The Proposed Project would also include a Town Square including ground floor retail, public gathering space, a visitors center, and 193 room hotel.

Specifically, the Project Sponsor would demolish the existing onsite buildings at the Project Site and construct a Residential/Shopping District, a Town Square District, and a Campus District. The Proposed Project would increase the area for commercial uses (excluding the hotel) by approximately 1 million sf, for a total of approximately 2 million sf of nonresidential uses at the Project Site. In addition, the Proposed Project would include up to 1,735 housing units, a limited-service hotel with up to 193 rooms, an approximate 5,000 sf community-serving space which may use used initially to accommodate a small general store, and approximately 24.8 acres of open space, of which approximately 11.6 acres would be publicly accessible. The proposed site plan would aggregate approximately 4.0 acres of the publicly accessible open space in a public park located at the southwestern corner of the Project Site. In total, the Proposed Project would construct approximately 3.5 million sf of uses at the Project Site. Refer to Exhibit C for the Proposed Parcel Map.

All proposed buildings will have a finished floor elevation (FFE) of at least 13' which will ensure that the site is above the base flood elevation of 11' per the current effective FEMA map dated 4/5/2019. The City of Menlo Park also requires that all new construction within the flood zone that is located in zones R-MU, LS, and O shall have an FFE 24" above base flood elevation to mitigate for sea level rise. The proposed project is located within both O and R-MU zones. The proposed minimum FFE of elevation 13' meets both requirements.

### **Methodology**

The stormwater treatment volume was sized per the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) C.3 volume-based method. This method resulted in approximately 93,000 sf of green infrastructure (GI) required for stormwater treatment for the entire site (parcels and rights of way). See Appendix 1 for sizing sheet using the C.3 volume-base method.

All drainage management areas (DMAs) for the proposed site parcels are estimated to be between 80% and 95% impervious. The only exceptions are the community parks (Parcel A & B) which have an estimated impervious area of 15% each and the parcel E-A with an estimated impervious area of 60%. The DMAs on private and public right of ways are estimated to be between 75% and 100% impervious. The proposed project is a C.3 Regulated Project because it will replace more than 10,000 sq ft of impervious surface and is therefore required to comply with the Municipal Regional Stormwater Permit C.3 Provisions. See Exhibit D for the proposed DMAs in public roads, private roads and site parcels.

For this analysis, all landscape areas on site are considered to be self-treating. Stormwater GIs are required to treat runoff from all buildings and site hardscape.

Green infrastructure areas within parcels and streets were determined using the 4% rule of the contributing impervious area. The DMAs within street ROWs were provided with slightly larger areas to take into account into the potential variability of these spaces due to street trees, lighting, fire hydrants and utility crossings. See Table 1 for the summarized pre- versus post-construction imperviousness and Table 2 for the approximate required treatment areas for each DMA.

### **Treatment Strategies**

Because the design project is still in progress, detailed stormwater BMP design has not yet been developed. Instead, the purpose of this report is to show intent and feasibility to meet the C.3 Provisions utilizing green stormwater infrastructure standard details as provided in the June 2019 City of Menlo Park Green Infrastructure Plan. The treatment measures are anticipated to vary depending on parcel designation and ultimate design approach.

Treatment strategies for office and mixed use parcels may include bioretention areas, flow-through planters, pervious paving, proprietary treatment systems such as Silva Cells and green roofs. Rainwater harvesting will not be considered on site as the Non-Potable Water Ordinance will require significant recycled water supplies which can only be met via municipally provided recycled water or on-site treatment of wastewater.

Publicly owned streets have been conceptually designed to treat road runoff using evenly spaced bioretention basins, bioretention planters, proprietary treatment systems such as Silva Cells or connected tree wells located at the back of curb. See Exhibit E for the street design concept, and Exhibits F & G for standard details. Planter widths vary per street, depending on the in-progress street section. These planters shall not limit pedestrian walkways or step-out zones for proposed parallel parking. Stormwater treatment will be located at low points within the proposed grading scheme to facilitate surface drainage and minimize required storm drain piping.

When managing stormwater runoff on private roads, the roads must be graded to maintain all private stormwater flows within the private DMAs. Private streets will utilize the same strategies as public streets for stormwater treatment.

**Tables/Supporting Data:**

**Table 1: Summary of existing and proposed total pervious and impervious area on site**

EXISTING (SQFT)		PROPOSED (SQFT)	
PERVIOUS AREA	IMPERVIOUS AREA	PERVIOUS AREA	IMPERVIOUS AREA
332,597	2,253,195	430,818	2,154,974

**Table 2A: Approximate biotreatment sizing summary table for proposed drainage management areas in parcels**

DMA ID	Area (SQFT)	% Of Imperviousness	Impervious Area (SQFT)	% Of Impervious Area Required For BTA Area	Treatment Area Required (SQFT)
P1-A	71,588	95%	68,009	4%	2,720
P1-B	54,622	95%	51,891	4%	2,076
P1-C	59,688	80%	47,750	4%	1,910
P1-D	56,927	80%	45,542	4%	1,822
P1-E	45,024	80%	36,019	4%	1,441
P1-F	67,027	80%	53,622	4%	2,145
P1-G	70,195	80%	56,156	4%	2,246
P1-H	57,542	80%	46,034	4%	1,841
P1-I	67,806	80%	54,245	4%	2,170
P1-J	47,844	95%	45,452	4%	1,818
P1-K	38,379	95%	36,460	4%	1,458
P1-L	108,119	80%	86,495	4%	3,460
P1-M	61,081	80%	48,865	4%	1,955
P1-N	55,343	80%	44,274	4%	1,771
P1-O	110,139	80%	88,111	4%	3,524
P1-P	52,768	95%	50,130	4%	2,005
P1-Q	85,614	80%	68,491	4%	2,740
P1-R	22,880	80%	18,304	4%	732
P1-S	59,103	95%	56,148	4%	2,246
P1-T	38,394	95%	36,474	4%	1,459
P1-U	61,857	80%	49,486	4%	1,979
P2-A	72,712	95%	69,076	4%	2,763
P2-B	68,857	95%	65,414	4%	2,617
P3-A	52,663	95%	50,030	4%	2,001
P3-B	72,661	95%	69,028	4%	2,761
P4-A	57,805	95%	54,915	4%	2,197
P4-B	57,865	95%	54,972	4%	2,199
P5-A	37,761	95%	35,873	4%	1,435

P5-B	33,109	95%	31,454	4%	1,258
P6	64,434	95%	61,212	4%	2,448
P7	31,857	95%	30,264	4%	1,211
A	154,491	15%	23,174	4%	927
B	11,404	15%	1,711	4%	68
E-A	47,980	60%	28,788	4%	1,152
Total					66,555

**Table 2B: Approximate biotreatment sizing summary table for proposed drainage management areas in streets**

Street	DMA ID	Area (SQFT)	% Of Imperviousness	Impervious Area (SQFT)	% Of Impervious Area Required For BTA Area	Treatment Area Required (SQFT)	Treatment Area Given (SQFT)
Center Street	CS-1	16,117	95%	15311	4%	612	806
	CS-2	14,520	95%	13794	4%	552	720
	CS-3	13,344	95%	12677	4%	507	682
East Loop Road	ELR-1	20,731	95%	19694	4%	788	996
	ELR-2	21,728	95%	20642	4%	826	1056
	ELR-3	17,011	95%	16160	4%	646	827
	ELR-4	23,627	95%	22446	4%	898	1150
	ELR-5	34,129	75%	25597	4%	1024	1666
East Street	ES-1	14,156	95%	13448	4%	538	710
Hamilton Avenue	HA-1	31,101	95%	29546	4%	1182	1567
Main Street	MS-1	14,966	95%	14218	4%	569	746
	MS-2	15,807	100%	15807	4%	632	831
	MS-3	19,070	100%	19070	4%	763	937
	MS-4	13,869	95%	13176	4%	527	703
	MS-5	11,255	95%	10692	4%	428	575
	MS-6	23,132	95%	21975	4%	879	1288
North Loop Road	NLR-1	32,712	95%	31076	4%	1243	1575
	NLR-2	37,760	75%	28320	4%	1133	1896
Park Street	PS-1	21,492	95%	20417	4%	817	1025
	PS-2	26,501	95%	25176	4%	1007	1270
	PS-3	17,496	95%	16621	4%	665	897
	PS-4	21,689	95%	20605	4%	824	1095
	PS-5	14,596	95%	13866	4%	555	742
West Street	WS-1	21,201	95%	20141	4%	806	1040
	WS-2	17,902	95%	17007	4%	680	917
	WS-3	14,347	95%	13630	4%	545	703
Total						19644	26420

## **EXHIBITS**





**LEGEND**

PROPERTY LINE

AREA USED FOR CALCULATING TIME OF CONCENTRATION FOR PIPE FLOW

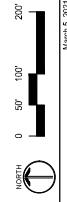
LAWN (C=0.30)

DENSE BUSH OR VEGETATION (C=0.35)

ASPHALT PAVEMENT (C=0.80)

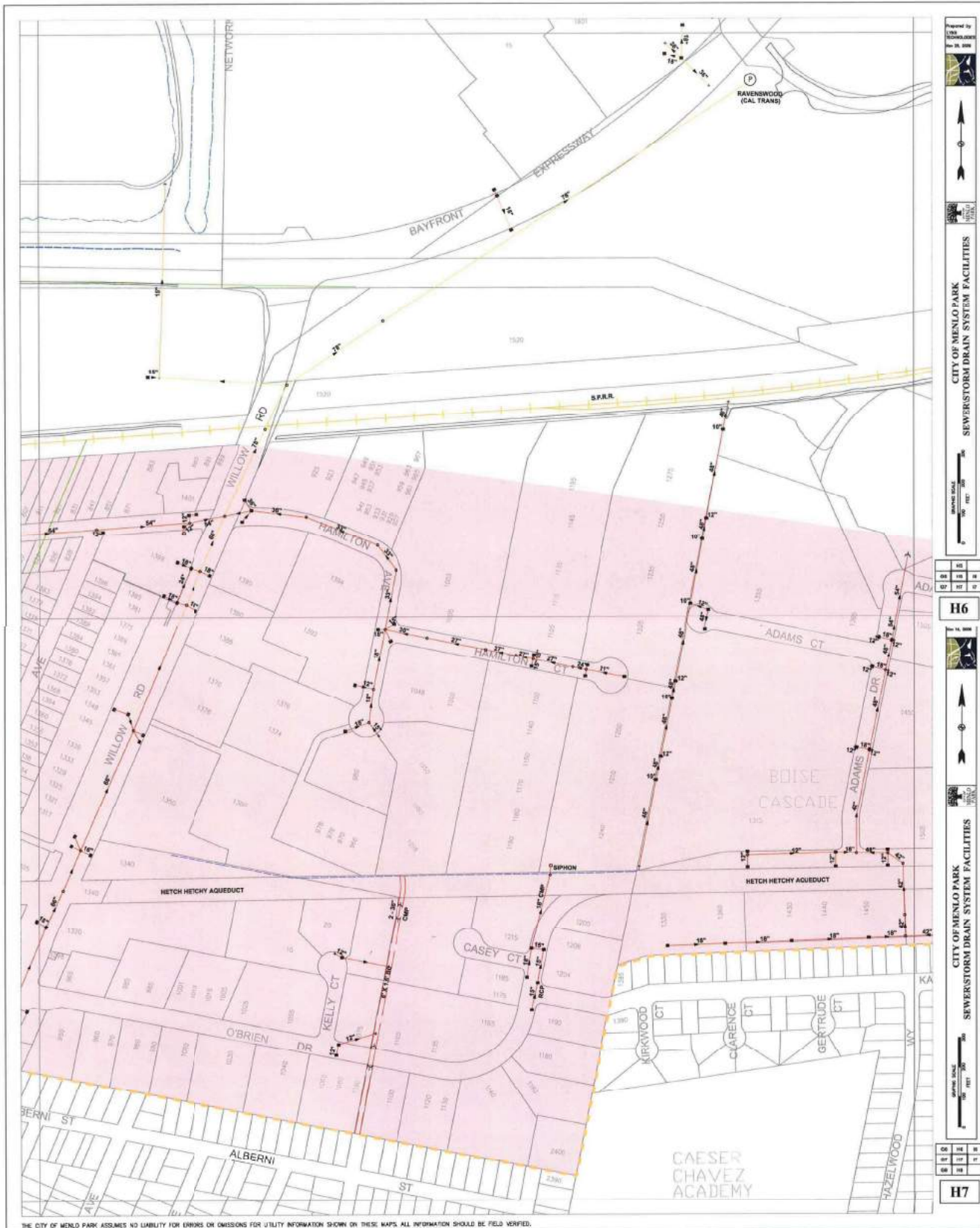
ROOFTOP (C=0.90)

Type of Surface	C	Runoff coefficient			C/A
		Area (SQ)	Area (Acre)	% Area	
Lawn	0.30	214,143	4.92	8.30%	8,5316
Dense Bush or Vegetation	0.35	118,454	2.72	4.60%	41,459
Asphalt pavements	0.88	1,354,217	31.09	52.40%	1,091,711
Rooftops	0.90	898,978	20.64	34.80%	809,080
<b>TOTAL</b>		<b>2,585,792</b>	<b>59.36</b>	<b>100%</b>	<b>2,125,766</b>




## EXHIBIT A - EXISTING CONDITIONS

WILLOW VILLAGE  
MENLO PARK, CA



THE CITY OF MENLO PARK ASSUMES NO LIABILITY FOR ERRORS OR OMISSIONS FOR UTILITY INFORMATION SHOWN ON THESE MAPS. ALL INFORMATION SHOULD BE FIELD VERIFIED.



## CITY OF MENLO PARK













### STORM DRAIN SYSTEM

#### LEGEND

<ul style="list-style-type: none"> <li>CITY PIPE</li> <li>PIPE MAINTAINED BY OTHERS</li> <li>CLAYDIP</li> <li>DRY DITCH</li> <li>PVC DRY DITCH</li> <li>OPEN CHANNEL</li> <li>ABANDONED PIPE</li> <li>ROAD LINE</li> <li>CITY LIMIT</li> <li>RAILROAD</li> </ul>	<ul style="list-style-type: none"> <li>MANHOLE (ACCESS)</li> <li>INLET / CATCH BASIN</li> <li>BUNKER BOX</li> <li>BUNKER BOX MAINTAINED BY OTHERS</li> <li>HEADWALL</li> <li>OUTFALL TO CHANNEL</li> <li>PIPE JUNCTION</li> </ul>	<ul style="list-style-type: none"> <li>PUMP STATION</li> <li>MANHOLE (ACCESS)</li> <li>INLET / CATCH BASIN</li> <li>BUNKER BOX</li> <li>BUNKER BOX MAINTAINED BY OTHERS</li> <li>HEADWALL</li> <li>OUTFALL TO CHANNEL</li> <li>PIPE JUNCTION</li> </ul>	<ul style="list-style-type: none"> <li>DIRECTION OF SURFACE FLOW</li> <li>DIRECTION OF STREET FLOW</li> <li>DIRECTION OF PIPE FLOW</li> <li>OPEN ENDED PIPE (OUTFALL TO NEIGHBORING JURISDICTION)</li> </ul>	<ul style="list-style-type: none"> <li>SWEEP ROUTES</li> <li>1</li> <li>2</li> <li>3</li> <li>4</li> <li>5</li> <li>6</li> <li>7</li> <li>8</li> <li>9</li> <li>10</li> <li>11</li> <li>12</li> <li>13</li> <li>14</li> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> </ul>
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**EXHIBIT B**  
**STORM DRAIN SYSTEM MAP**  
**CITY OF MENLO PARK**

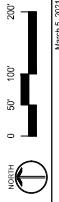
**LEGEND**

-  PUBLIC RIGHT OF WAY
-  PRIVATE STREET WITH PUBLIC ACCESS EASEMENT
-  PARCEL LINE
-  SETBACK LINE
-  BUILD-OUT LINE
-  EXISTING PROPERTY LINE
-  CALTRANS DEDICATION
-  PUBLIC UTILITY EASEMENT (PUE)
-  PUBLIC ACCESS EASEMENT (PAE)
-  WEST BAY SANITARY DISTRICT EASEMENT
-  PG&E TRANSMISSION LINE AND TOWER LINE EASEMENT
-  STORM DRAINAGE EASEMENT



**EXHIBIT C - PROPOSED PARCEL MAP**

WILLOW VILLAGE  
MENLO PARK, CA

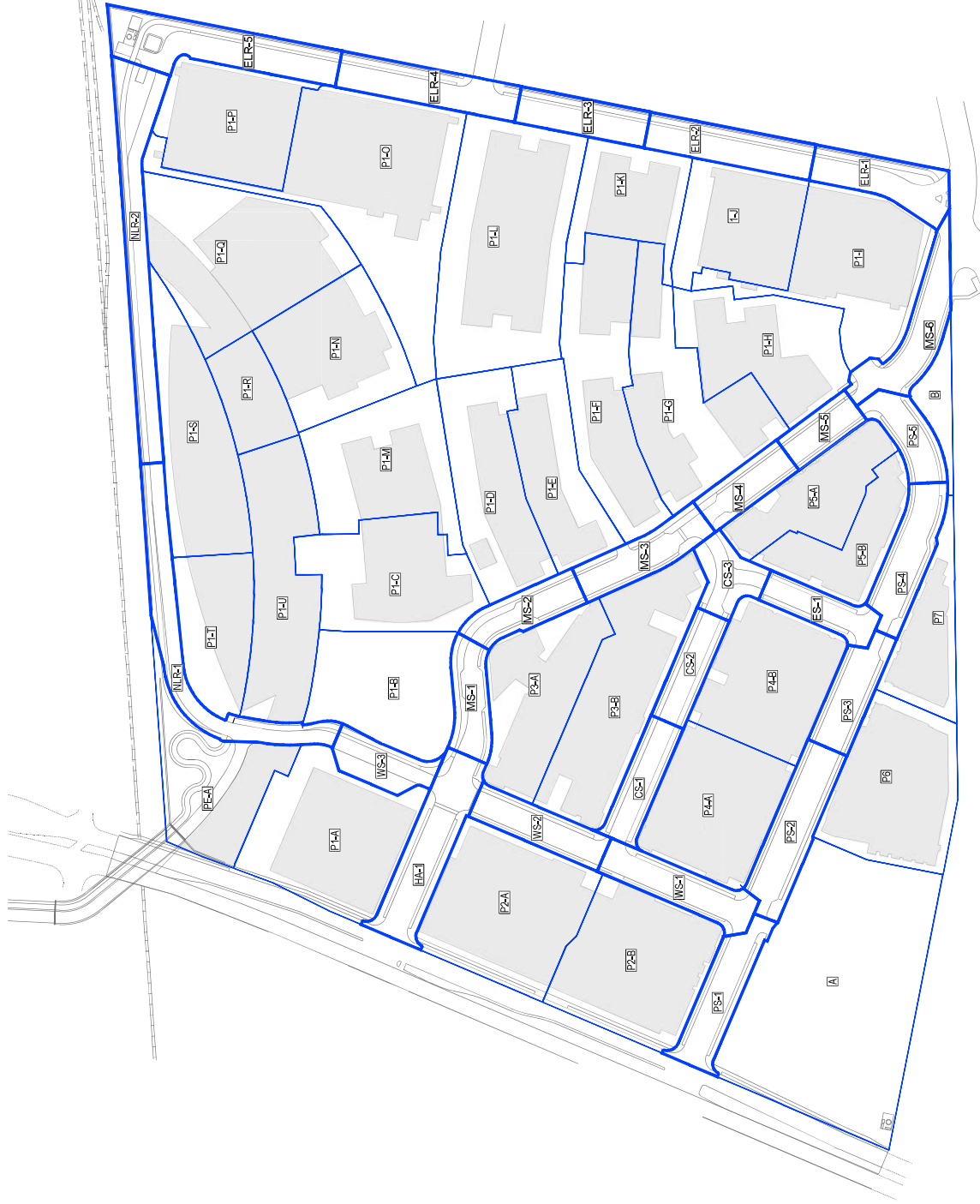


March 5, 2021

**SHERWOOD**  
DESIGN ENGINEERS  
2545 Mission Street  
San Francisco, CA 94110  
www.sherwoodengineers.com

LEGEND

- PARCEL DMA
- STREET DMA

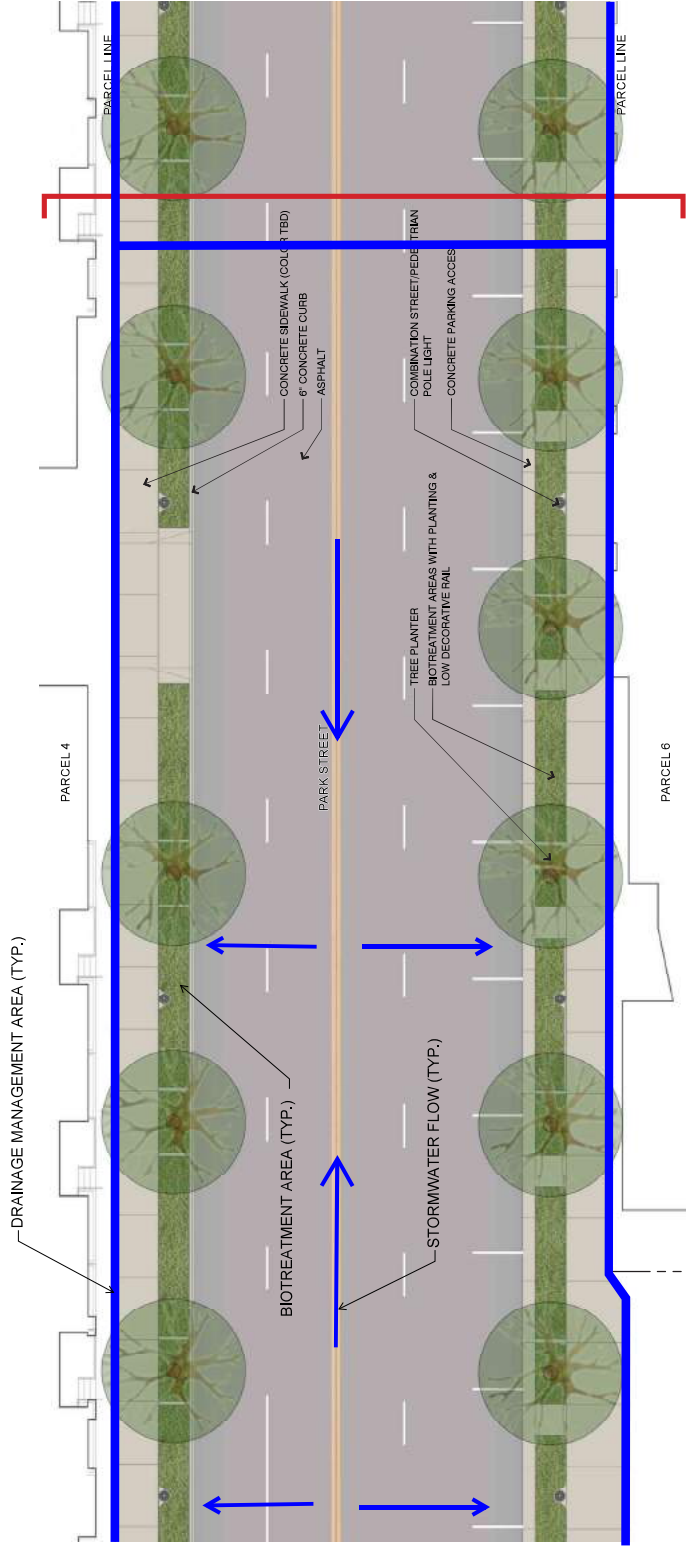
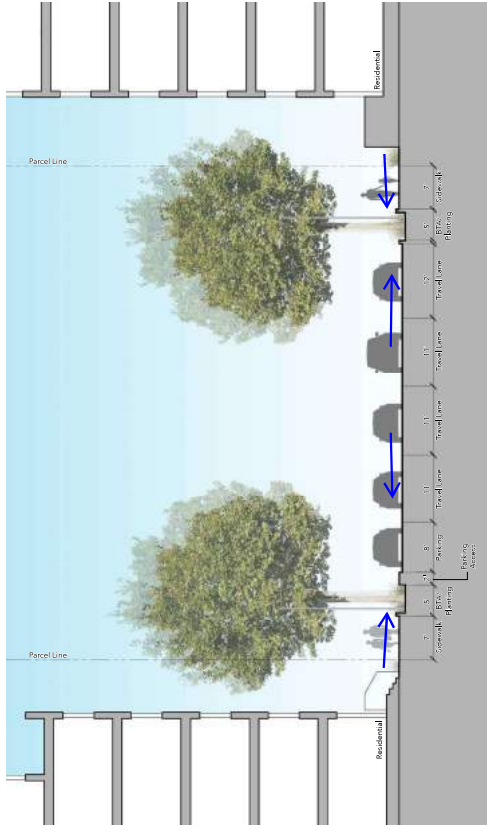


# EXHIBIT D - PROPOSED DRAINAGE MANAGEMENT AREAS

WILLOW VILLAGE  
MENLO PARK, CA



March 5, 2021

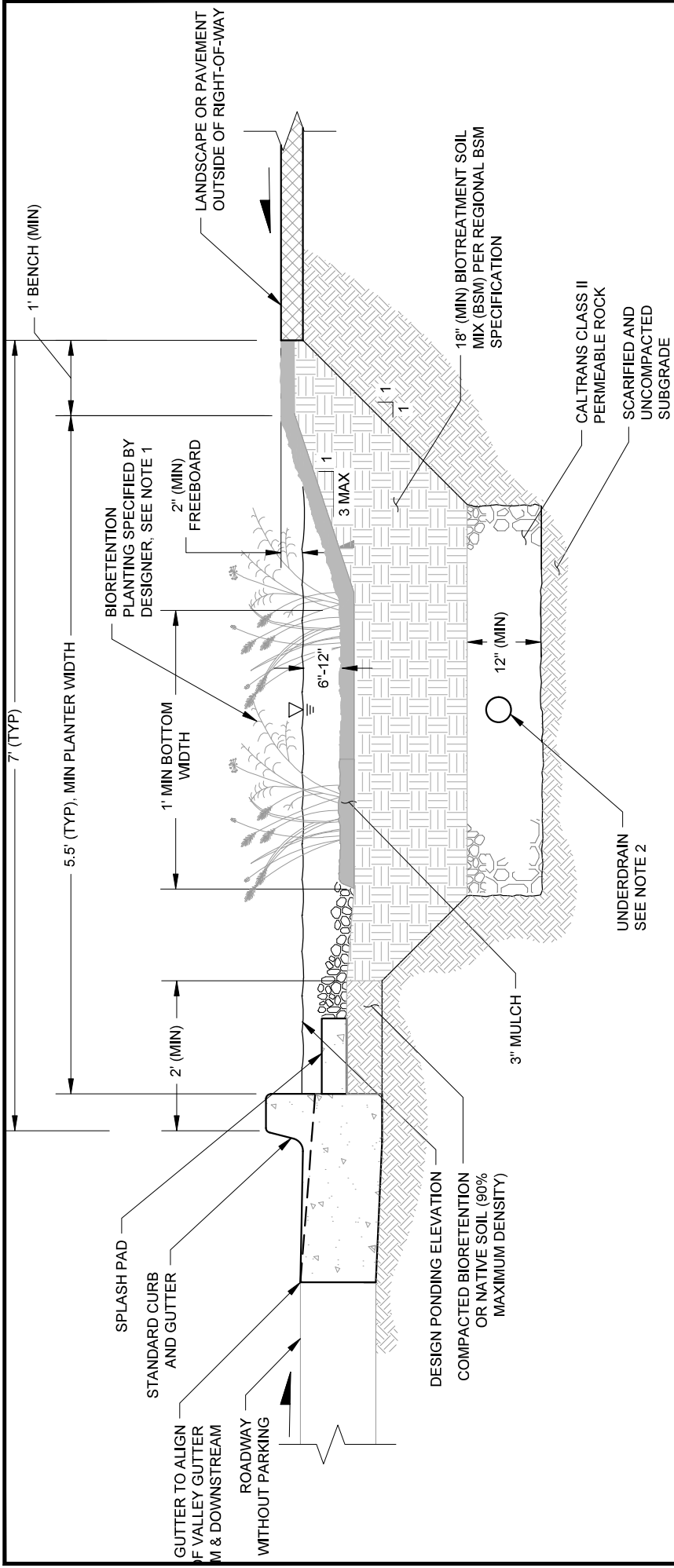


## EXHIBIT E - TYPICAL TREATMENT FOR RIGHT OF WAY

WILLOW VILLAGE  
MENLO PARK, CA

## **Exhibit F**

*"City of Menlo Park Green Infrastructure Standard  
Details"*



SECTION A

**CONSTRUCTION NOTES:**

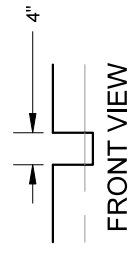
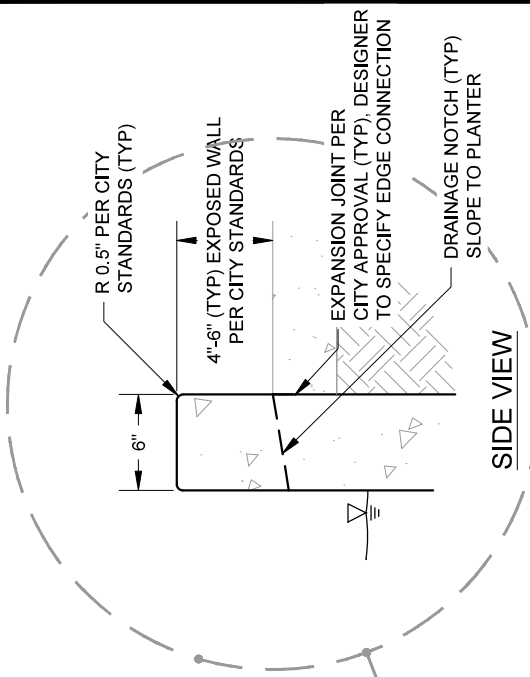
1. AVOID COMPACTION OF EXISTING SUBGRADE BELOW BASIN.
2. SCARIFY SUBGRADE TO A DEPTH OF 3 INCHES (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIORETENTION SOIL MATERIALS.
3. COMPACT BIORETENTION SOIL IMMEDIATELY BEHIND CURB TO 90% OF MAXIMUM DENSITY PER STANDARD PROCTOR TEST (ASTM D698).
4. UNDERDRAIN REQUIRED FOR ALL FACILITIES WITH IMPERMEABLE LINER.
5. PROVIDE ONE CLEANOUT PER PLANTER (MIN) FOR FACILITIES WITH UNDERDRAINS.
6. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES MUST CONFORM TO CURRENT SFPUC ASSET PROTECTION STANDARDS. COORDINATE WITH ENGINEER IN THE EVENT OF UTILITY CROSSING AND UTILITY CONFLICTS.
7. GEOTECHNICAL OR HYDRAULOGIST ENGINEER TO DETERMINE IF LINER SHALL BE USED.
8. ANGLE OF REPOSE MAY VARY BASED ON GEOTECHNICAL ENGINEER RECOMMENDATIONS.



**GREEN INFRASTRUCTURE  
TYPICAL DETAILS**  
CITY OF MENLO PARK

DATE	APRIL 2019
VERSION	1.0
REVISED	

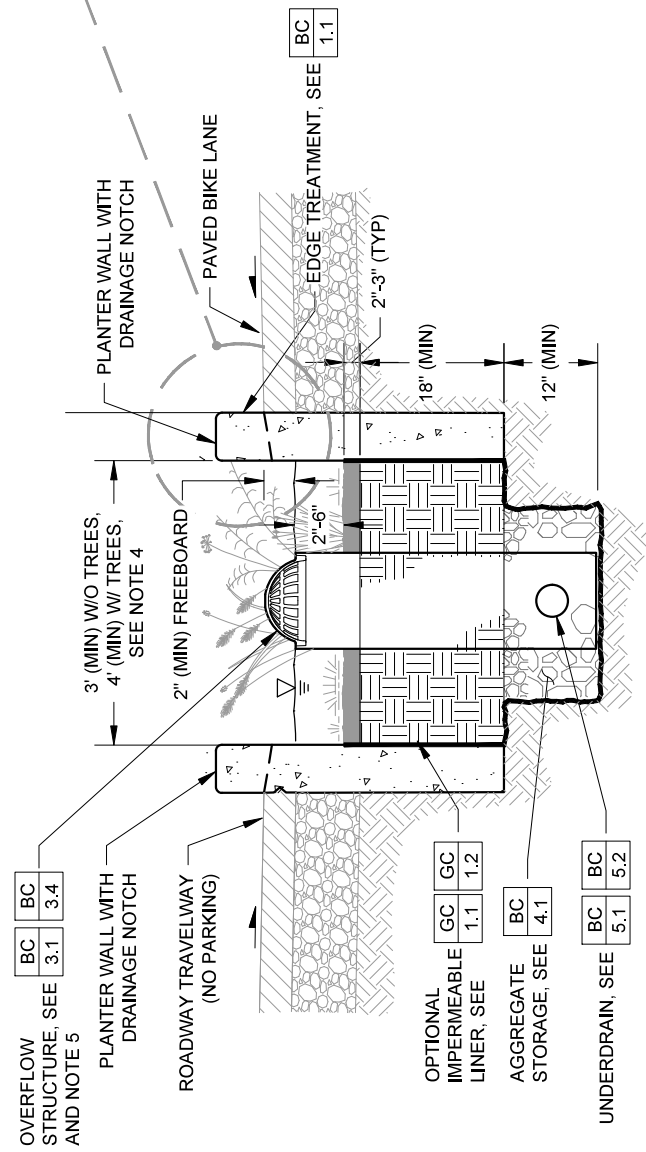
**BIORETENTION BASIN  
ROADSIDE SECTION TYPE 3**



**TYPICAL DRAINAGE NOTCH DETAIL**

**NOTES:**

1. AVOID COMPACTION OF EXISTING SUBGRADE BELOW PLANTER DURING CONSTRUCTION.
2. SCARIFY SUBGRADE TO A DEPTH OF 3 INCHES (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIOTRETION SOIL MATERIAL.
3. MAXIMUM DROP FROM TOP OF CURB TO TOP OF BIOTRETION SOIL SHALL INCLUDE CONSIDERATIONS FOR BIOTRETION SOIL SETTLEMENT.
4. DESIGNER TO SPECIFY PLANTER WIDTH AND IF TREES ARE DESIRED, PROVIDE ADDITIONAL TREE ROOT VOLUME USING STRUCTURAL SOIL OR SILVA CELLS UNDER ADJACENT BIKEWAY PAVEMENT.
5. OVERFLOW STRUCTURE TO HAVE SQUARE OR ATRIUM GRATE PER PROJECT DESIGN AND THE DISCRETION OF THE PUBLIC WORKS DEPARTMENT.



**STORMWATER BARRIER PLANTER FOR CLASS 4 BIKEWAY**

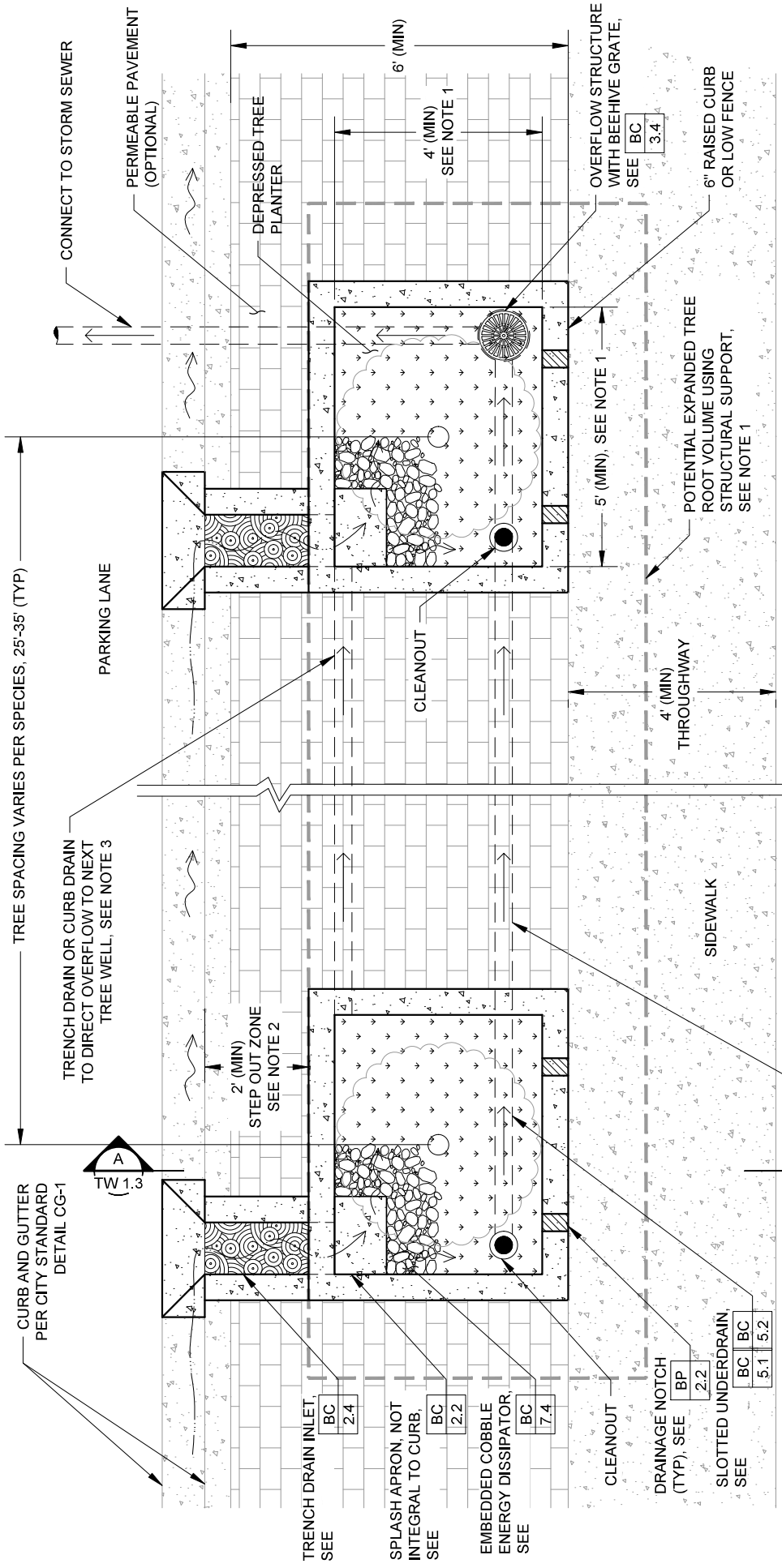


**GREEN INFRASTRUCTURE  
TYPICAL DETAILS**  
CITY OF MENLO PARK

DATE	APRIL 2019
VERSION	1.0
REVISED	

**BIOTRETION PLANTER  
STORMWATER BARRIER PLANTER  
CLASS 4 BIKEWAY - SECTION**





**NOTES:**

1. PREFERRED TREE WELL SIZE IS 6 FEET BY 6 FEET, BUT CONSTRAINED SITES CAN REDUCE WIDTH TO 4 FEET PROVIDED THEY CAN ACCOMMODATE MINIMUM REQUIRED TREE ROOT VOLUME BY INCREASING LENGTH AND/OR USING STRUCTURAL SOIL, PERMEABLE PAVEMENT, AND/OR SILVA CELLS UNDER ADJACENT SIDEWALK.
2. DESIGNER TO SPECIFY MINIMUM SIDEWALK WIDTH BEHIND AND STEP-OUT ZONE IN FRONT OF TREE WELL THAT COMPLIES WITH ALL APPLICABLE AGENCY AND ADA REQUIREMENTS. STEP-OUT ZONE CAN BE ELIMINATED IF PARKING IS PROHIBITED ALONG CURB. SEE DESIGNER NOTES.
3. IF CURB DRAIN, I.E. SHALLOW PIPES, ARE USED TO CONVEY SURFACE WATER BETWEEN TREE WELLS, 3 INCH CAST IRON PIPES SHALL BE INSTALLED AND A MINIMUM COVER OF 1-1/2 INCHES OF CONCRETE OVER PIPES SHALL BE PROVIDED. IF TRENCH DRAIN IS USED, THE GRATE SHALL BE ADA COMPLIANT AND HAVE A NON-SLIP SURFACE.

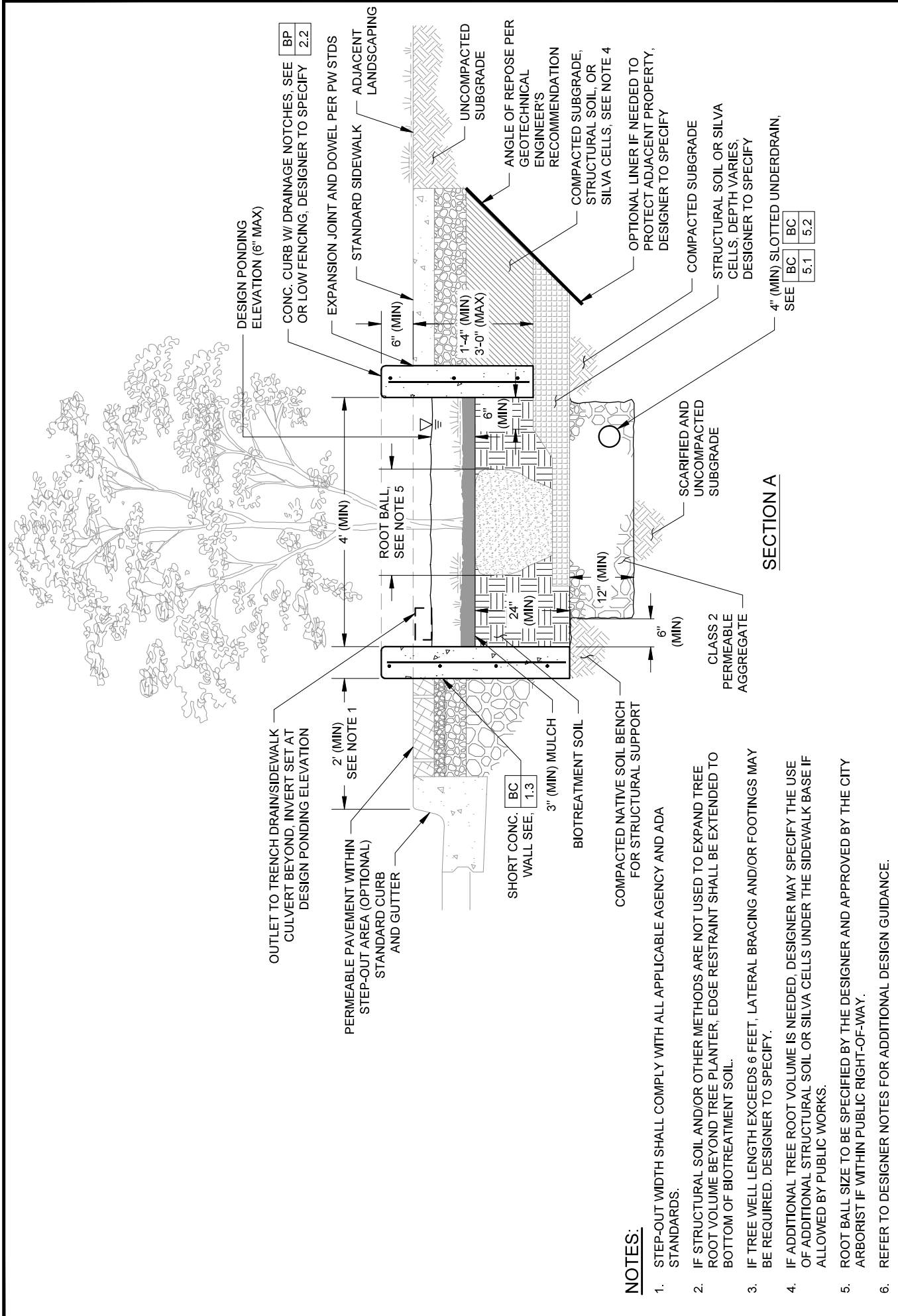
EXTEND UNDERDRAIN THROUGH AGGREGATE STORAGE LAYER OF PERMEABLE PAVEMENT, STRUCTURAL SOIL, AND/OR SILVA CELLS (OPTIONAL)



**GREEN INFRASTRUCTURE  
TYPICAL DETAILS**  
CITY OF MENLO PARK

DATE	APRIL 2019
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**TREE WELL  
CONNECTED TREE WELLS  
WITH PARKING - PLAN**



**NOTES:**

1. STEP-OUT WIDTH SHALL COMPLY WITH ALL APPLICABLE AGENCY AND ADA STANDARDS.
2. IF STRUCTURAL SOIL AND/OR OTHER METHODS ARE NOT USED TO EXPAND TREE ROOT VOLUME BEYOND TREE PLANTER, EDGE RESTRAINT SHALL BE EXTENDED TO BOTTOM OF BIOTREATMENT SOIL.
3. IF TREE WELL LENGTH EXCEEDS 6 FEET, LATERAL BRACING AND/OR FOOTINGS MAY BE REQUIRED. DESIGNER TO SPECIFY.
4. IF ADDITIONAL TREE ROOT VOLUME IS NEEDED, DESIGNER MAY SPECIFY THE USE OF ADDITIONAL STRUCTURAL SOIL OR SILVA CELLS UNDER THE SIDEWALK BASE IF ALLOWED BY PUBLIC WORKS.
5. ROOT BALL SIZE TO BE SPECIFIED BY THE DESIGNER AND APPROVED BY THE CITY ARBORIST IF WITHIN PUBLIC RIGHT-OF-WAY.
6. REFER TO DESIGNER NOTES FOR ADDITIONAL DESIGN GUIDANCE.



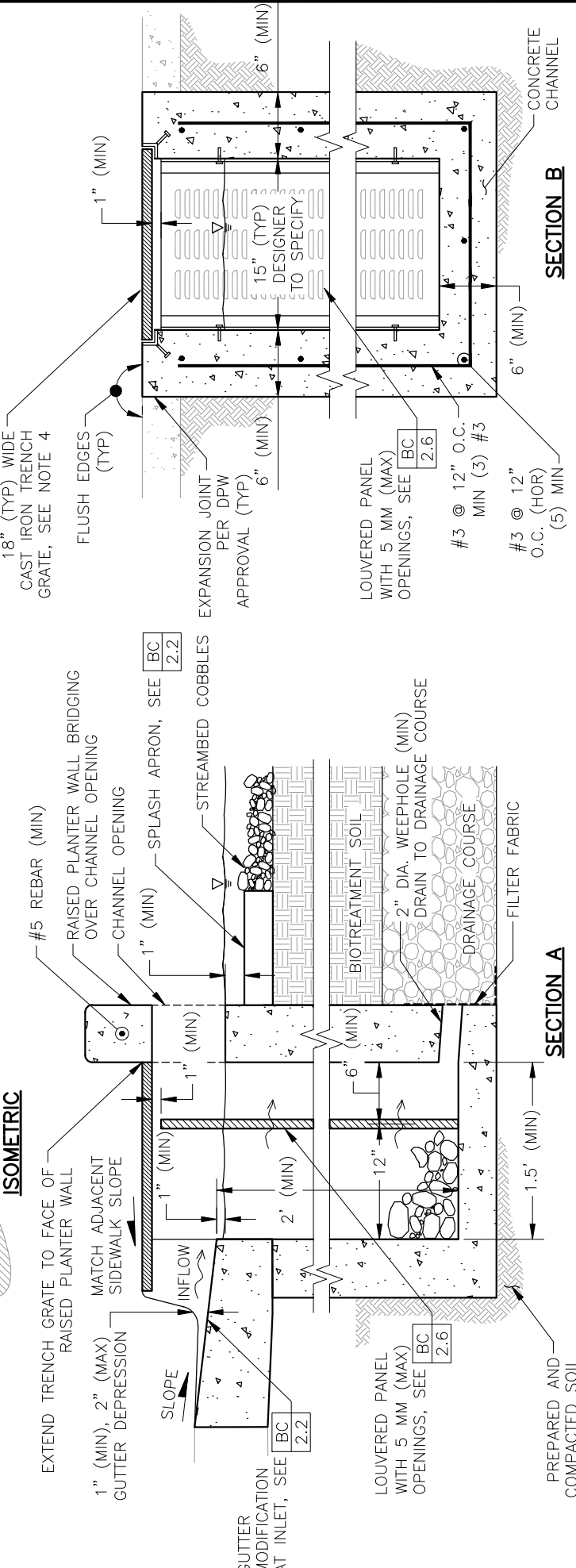
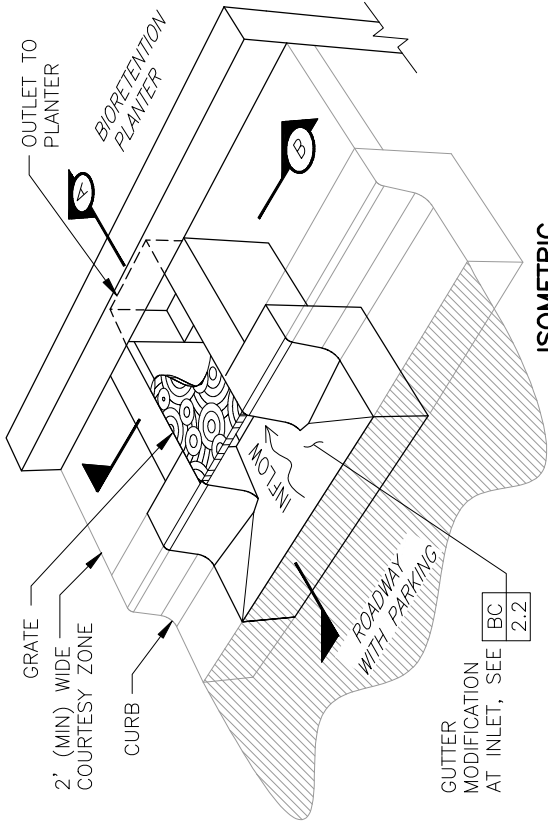
**GREEN INFRASTRUCTURE  
TYPICAL DETAILS**  
CITY OF MENLO PARK

DATE	APRIL 2019
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**TREE WELL  
CONNECTED TREE WELLS WITH  
PARKING - SECTION**

## **Exhibit G**

*"City of San Mateo Green Infrastructure Standard  
Details"*



**NOTES:**

- THIS DETAIL SHOWS ONE EXAMPLE OF A NON-PROPRIETARY TRASH CAPTURE DEVICE THAT CAN BE PROVIDED ON THE INLET SIDE OF ROADSIDE BIORETENTION PLANTERS TO MEET THE FULL TRASH CAPTURE SYSTEM REQUIREMENTS MANDATED BY THE STATE WATER BOARD. TRASH CAPTURE CAN ALSO BE PROVIDED AT THE OVERFLOW OR BYPASS OUTLET STRUCTURE BY TRAPPING PARTICLES 5 MM OR GREATER DURING THE DESIGN STORM EVENT. SEE THE STATE WATER BOARD SITE FOR MORE INFORMATION.
- ALL MATERIAL AND WORKMANSHIP FOR TRENCH DRAIN AND TRASH CAPTURE ASSEMBLY SHALL CONFORM TO CITY OF SAN MATEO STANDARD SPECIFICATIONS AND APPLICABLE PUBLIC WORKS CODES.
- PROVIDE AT LEAST 1 INCH DROP BETWEEN INLET ELEVATION AT GUTTER AND PONDING ELEVATION.
- ALL TRENCH GRATES/TRASH CAPTURE STRUCTURE LIDS SHALL BE REMOVABLE, RATED PER THE ANTICIPATED LOADING (H-20 LOADING WITHIN PUBLIC STREETS), AND BOLTED IN PLACE OR OUTFITTED WITH APPROVED TAMPER-RESISTANT LOCKING MECHANISM, FLUSH OR RECESSED IN GRATE.
- BOND NEW CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH EPOXY AND DOWEL CONNECTION.
- HORIZONTAL CONTROL JOINTS SHALL BE PROVIDED EVERY 10 LINEAR FEET, OR PER MANUFACTURER'S RECOMMENDATIONS.
- APPLY EPOXY BONDING AGENT AT ALL TRENCH DRAIN CONSTRUCTION COLD JOINTS.

**INLET - TRENCH DRAIN WITH TRASH CAPTURE** 1

**GREEN INFRASTRUCTURE  
TYPICAL DETAILS**  
CITY OF SAN MATEO

DATE	JUNE 2019
VERSION	1.0
REVISED	

**BIORETENTION COMPONENTS  
INLET WITH TRASH CAPTURE  
CURB CUT WITH TRENCH DRAINS (1 OF 2)**

## **Appendix 1**

*"SMCWPPP C3. Worksheet for Calculating the Water Quality Design Volume (80 percent capture method)"*

## Worksheet for Calculating the Water Quality Design Volume (80 percent capture method)

Instructions: After completing Section 1, make as many copies of this Excel file as needed to fill out the worksheet for each Drainage Management Area of the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

### 1.0 Project Information

1-1 Project Name:	Willow Village
1-2 City application ID:	
1-3 Site Address or APN:	900-910 Hamilton Ave
1-4 Tract or Parcel Map No:	
1-5 Rainfall Region	4
1-6 Region Mean Annual Precipitation (MAP)	14.60
1-7 Site Mean Annual Precipitation (MAP)	17

The calculations presented here are based on the 80% capture method of sizing volume-based treatment measures provided in the Countywide Program's C.3 Technical Guidance, v. 5.0 (2016). The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

[Click here for map](#)

1-8 **MAP adjustment factor is automatically calculated as:** **1.13**  
 (The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, shown in Table 5-3, below.)  
 Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

### 2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **Site**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

Type of Surface	Area of surface type within DMA (Sq. Ft)	Adjust Pervious Surface	Effective Impervious Area
2-2 Impervious surface	2,154,974	1.0	2,154,974
2-3 Pervious service	430,818	0.1	43,082
<b>Total DMA Area (square feet) =</b>	<b>2,585,792</b>		

2-4 **Total Effective Impervious Area (EIA)** **2,198,056** Square feet

### 3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 **Unit basin storage volume from Table 5.2:** **0.64** Inches  
 (The coefficient for this method is 1.00, due to the conversion of any landscaping to effective impervious area)

3-2 **Adjusted unit basin storage volume:** **0.72** Inches  
 (The unit basin storage volume is adjusted by applying the MAP adjustment factor.)

3-3 **Required Capture Volume (in cubic feet):** **132,486** Cubic feet  
 (The adjusted unit basin sizing volume [inches] is multiplied by the size of the DMA and converted to feet)

3-4 **To size an infiltration trench, enter the surface area available:** **92,973** Square feet

3-5 **Required depth of infiltration trench, given the surface area available (in 3-4):** **4.07** Feet  
 (Assumes 35% void space in rectangular trench with vertical sides.)  
 (Note: Infiltration trench depths are typically between 3 and 8 feet.)