



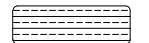
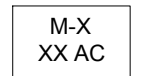
BASIN M FLOOD ATTENUATION ALTERNATIVES
ENGINEER'S PRELIMINARY ESTIMATE
RICK ENGINEERING COMPANY

Item	Description	Unit	Quantity	Unit Price	Extension
BASE BID - ALTERNATIVE 1: DETENTION VAULT					
1	Mobilization	LS	1	\$100,000.00	\$100,000.00
2	Earthwork and Export	CY	59,400	\$30.00	\$1,782,000.00
3	Utility Relocation	LS	1	\$50,000.00	\$50,000.00
4	AC Pavement Removal	SF	9,000	\$4.00	\$36,000.00
5	Class Two Base (4")	SF	9,000	\$0.75	\$6,750.00
6	Debris Separating Baffle Box	EA	1	\$50,000.00	\$50,000.00
7	Pump Assembly	EA	1	\$50,000.00	\$50,000.00
8	StormCapture Vault	CY	54,000	\$12.00	\$648,000.00

SUB TOTAL:	\$2,730,000.00
CONTINGENCY	20%
TOTAL ENGINEER'S ESTIMATE:	\$3,300,000.00



LEGEND

-  MINOR BASIN BOUNDARY
SOURCE: CITY OF IMPERIAL BEACH GIS
-  SURFACE FLOW PATH
-  RETENTION VAULT
-  BASIN ID
BASIN AREA

NOTES:

1. BASIN AREA DELINEATION AND COMPOSITE RUNOFF FACTORS ARE BASED ON CITY OF IMPERIAL BEACH 2010 STORM DRAIN STUDY PREPARED BY MICHAL PIASECKI CONSULTING AND CHRIS HELMER CITY OF IMPERIAL BEACH.
2. DIMENSIONS OF EXISTING IMPROVEMENTS ARE APPROXIMATE AND HAVE BEEN OBTAINED FROM AERIAL.
3. INITIAL STORMWATER CONCEPTS REFLECT INFILTRATION BMPs WITHOUT AN UNDERDRAIN. INFILTRATION TESTING WILL BE REQUIRED DURING THE DESIGN PHASE TO CONFIRM IN-SITU INFILTRATION RATES.
4. PERVIOUS PAVEMENT/PAVERS AT ALONG PARKING LANE MAY BE SUITABLE FOR ADDITIONAL WATER QUALITY BENEFIT.

Basin ID	Area(ac)
M1	9.92
M2	2.69
M3	5.96
M4	7.01
M5	3.34
M6	13.97
M7	5.18

Area Tributary to Proposed Vault

Basin: M1, M2, M3, M4
 Total Area: 25.5 acres
 Runoff Coeff: 0.57
 6-Hr Rainfall: 1.6 inches
 Time of concentration: 27 mins
Q10: 21.8 cfs

COUNTOUR SOURCE: SANGIS/SANDAG
 VERTICAL DATUM: NAVD88
 DATE: NOVEMBER 2014

JN-19003

RICK
ENGINEERING COMPANY

5620 FRIARS ROAD
 SAN DIEGO, CA 92110
 619.291.0707
 (FAX) 619.291.4165

BASIN M FLOOD ATTENUATION
IMPERIAL BEACH
 ALTERNATIVE 1: DETENTION VAULT

DATE:	12/31/19
DRAWN BY:	LC
CHECKED BY:	SFR
SCALE:	1" = 150'
SHEET	1 OF 3

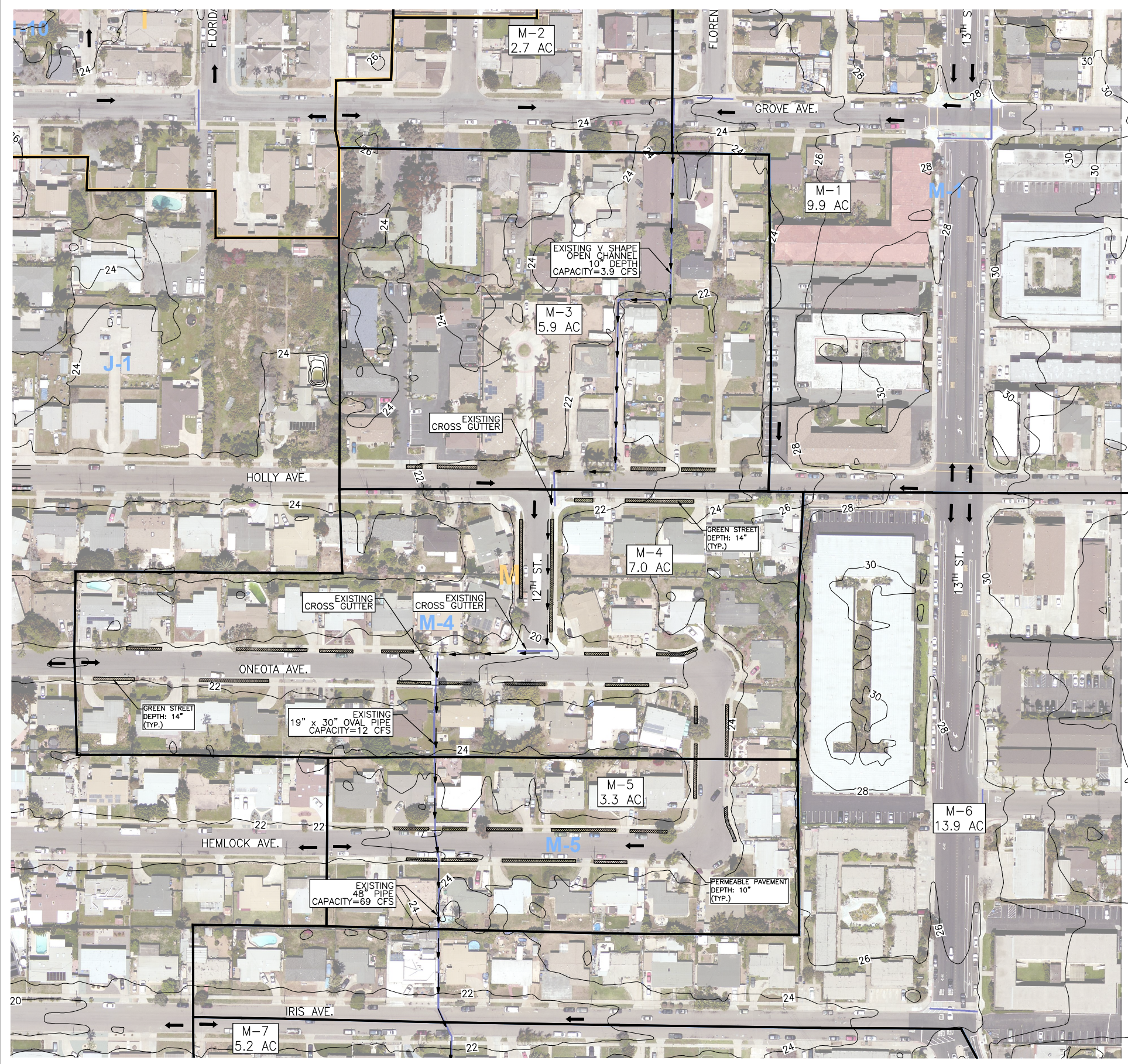
C:\Rick\Projects\190003\19003_LaurelbeachPark\WaterResources\ImperialBeach\19003_IB_DWA_03.dwg 2020-01-06 - 1:13PM - locatillo

© 2020 Rick Engineering Company

BASIN M FLOOD ATTENUATION ALTERNATIVES
ENGINEER'S PRELIMINARY ESTIMATE
RICK ENGINEERING COMPANY

Item	Description	Unit	Quantity	Unit Price	Extension
BASE BID - ALTERNATIVE 2: GREEN STREETS					
1	Mobilization	LS	1	\$100,000.00	\$100,000.00
2	AC Pavement Removal	SF	7,415	\$4.00	\$29,659.20
3	6" Curb and Gutter	LF	1,545	\$20.00	\$30,895.00
4	Earthwork and Export	CY	23,789	\$30.00	\$713,674.50
5	Biofiltration Aggregate Layer(3" No. 33, 3" No. 8, 6" No. 57)	CY	229	\$40.00	\$9,154.07
6	Mulch	SF	6,179	\$0.50	\$3,089.50
7	Biofiltration Soil Mix	CY	343	\$50.00	\$17,163.89

SUB TOTAL:	\$910,000.00
CONTINGENCY	20%
TOTAL ENGINEER'S ESTIMATE:	\$1,100,000.00



LEGEND

- MINOR BASIN BOUNDARY
SOURCE: CITY OF IMPERIAL BEACH GIS
- SURFACE FLOW PATH
- FILTRATION BMP
- PERMEABLE PAVEMENT
- BASIN ID
BASIN AREA

NOTES:

1. BASIN AREA DELINEATION AND COMPOSITE RUNOFF FACTORS ARE BASED ON CITY OF IMPERIAL BEACH 2010 STORM DRAIN STUDY PREPARED BY MICHAL PIASECKI CONSULTING AND CHRIS HELMER CITY OF IMPERIAL BEACH.
2. DIMENSIONS OF EXISTING IMPROVEMENTS ARE APPROXIMATE AND HAVE BEEN OBTAINED FROM AERIAL.
3. INITIAL STORMWATER CONCEPTS REFLECT INFILTRATION BMPs WITHOUT AN UNDERDRAIN. INFILTRATION TESTING WILL BE REQUIRED DURING THE DESIGN PHASE TO CONFIRM IN-SITU INFILTRATION RATES.
4. PERVIOUS PAVEMENT/PAVERS AT ALONG PARKING LANE MAY BE SUITABLE FOR ADDITIONAL WATER QUALITY BENEFIT.

Basin ID	Area ac	C ¹	85th Percentile 24-hr Storm Depth	DCV
			in	cu ft
M1-M5	25.50	0.57	0.55	29,019

BMP Parameters							Provided Bioretention Volume
Total BMP Footprint	Surface Ponding Depth	Media Thicknes s	Aggregate Depth	Media Available Pore Space	Aggregate Pore Space	Depth of Retention Storage	
sf	in.	in.	in.	in/in	in/in	in.	cu ft
6,179	6	18	12	0.2	0.4	14	7,415

COUNTOUR SOURCE: SANGIS/SANDAG
VERTICAL DATUM: NAVD88
DATE: NOVEMBER 2014

JN-19003

RICK
ENGINEERING COMPANY

5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165

BASIN M FLOOD ATTENUATION IMPERIAL BEACH

ALTERNATIVE 2: GREEN STREETS

DATE:	12/31/19
DRAWN BY:	LC
CHECKED BY:	SFR
SCALE:	1" = 150'
SHEET	2 OF 3

PRELIMINARY - NOT FOR CONSTRUCTION

C:\Rick\Projects\C19000\19003_LaurelbeachPark\WaterResources\ImperialBeach\19003_IB_DWA_04.dwg 2020-01-06 1:12PM - locatillo

© 2020 Rick Engineering Company

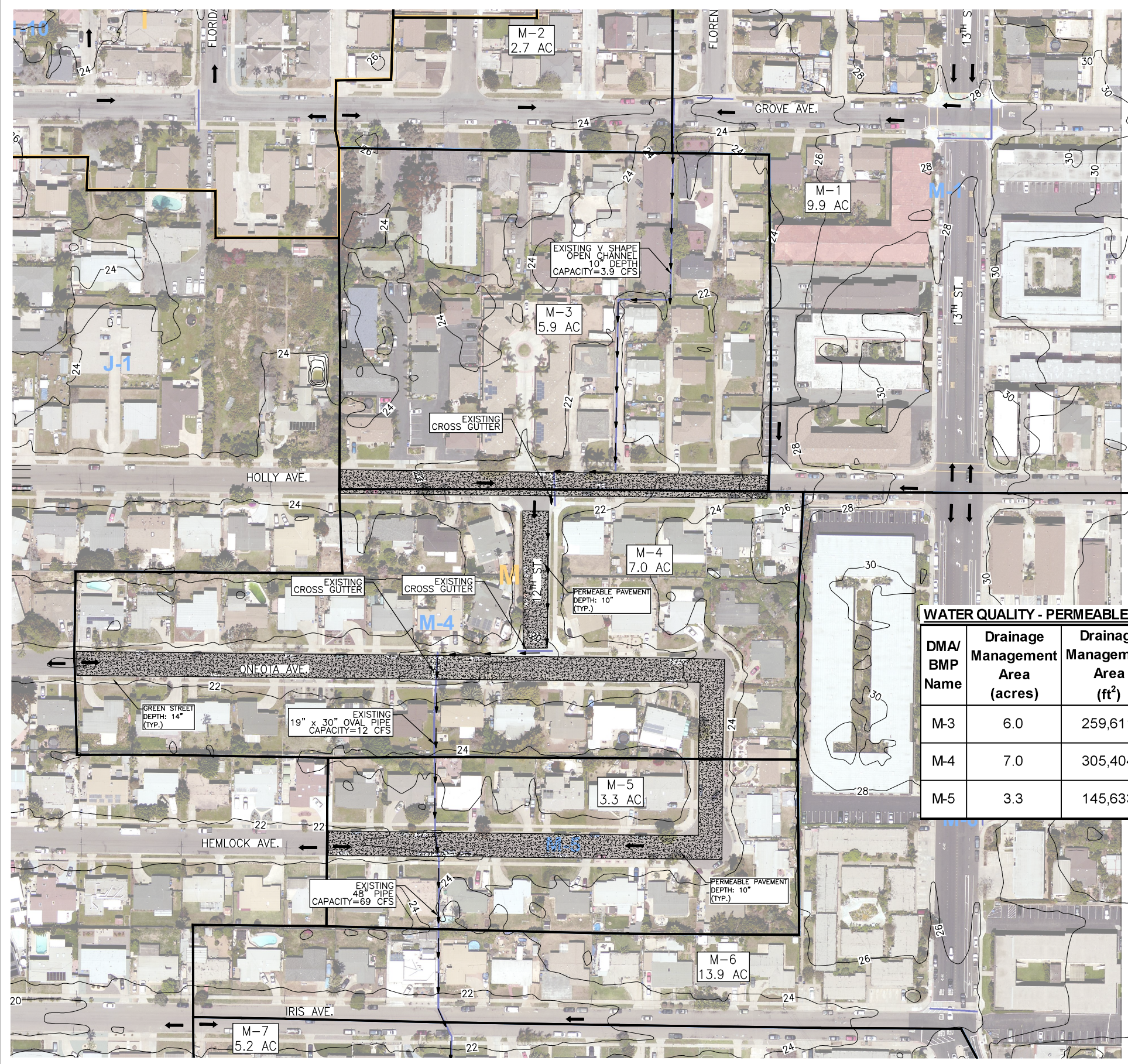
BASIN M FLOOD ATTENUATION ALTERNATIVES
ENGINEER'S PRELIMINARY ESTIMATE
RICK ENGINEERING COMPANY

Item	Description	Unit	Quantity	Unit Price	Extension
BASE BID - ALTERNATIVE 3: PERMEABLE PAVEMENT					
1	Mobilization	LS	1	\$100,000.00	\$100,000.00
2	AC Pavement Removal	SF	81,979	\$4.00	\$327,915.54
3	6" Curb and Gutter	LF	2,192	\$20.00	\$43,838.98
4	Earthwork and Export	CY	68,316	\$30.00	\$2,049,472.15
5	Porous Pavement (10")	SF	74,526	\$15.00	\$1,117,893.90
6	Class Two Base (4")	SF	74,526	\$0.75	\$55,894.70

SUB TOTAL: \$3,700,000.00

CONTINGENCY 20%

TOTAL ENGINEER'S ESTIMATE: \$4,500,000.00



LEGEND

- MINOR BASIN BOUNDARY SOURCE: CITY OF IMPERIAL BEACH GIS
- SURFACE FLOW PATH
- FILTRATION BMP
- PERMEABLE PAVEMENT
- M-X
XX AC
BASIN ID
BASIN AREA

NOTES:

- BASIN AREA DELINEATION AND COMPOSITE RUNOFF FACTORS ARE BASED ON CITY OF IMPERIAL BEACH 2010 STORM DRAIN STUDY PREPARED BY MICHAL PIASECKI CONSULTING AND CHRIS HELMER CITY OF IMPERIAL BEACH.
- DIMENSIONS OF EXISTING IMPROVEMENTS ARE APPROXIMATE AND HAVE BEEN OBTAINED FROM AERIAL.
- INITIAL STORMWATER CONCEPTS REFLECT INFILTRATION BMPS WITHOUT AN UNDERDRAIN. INFILTRATION TESTING WILL BE REQUIRED DURING THE DESIGN PHASE TO CONFIRM IN-SITU INFILTRATION RATES.

Basin ID	Area ac	C ¹	85th Percentile 24-hr Storm Depth	DCV
			in	cu ft
M1-M5	25.50	0.57	0.55	29,019

WATER QUALITY - PERMEABLE PAVEMENT-BMP SIZING CALCULATIONS

DMA/BMP Name	Drainage Management Area (acres)	Drainage Management Area (ft ²)	% Imp.	Impervious Area (ft ²)	Pervious Area (ft ²)	Runoff Factor for Impervious Area	Runoff Factor for Pervious Area	Effective Impervious Area (ft ²)	24-hour 85th Percentile Precipitation (inches)	Required WQ Volume (ft ³)
M-3	6.0	259,611	40%	103,844	155,767	1.0	0.1	119,421	0.55	5,473
M-4	7.0	305,404	40%	122,161	183,242	1.0	0.1	140,486	0.55	6,439
M-5	3.3	145,633	40%	58,253	87,380	1.0	0.1	66,991	0.55	3,070

DMA/BMP Name	Bottom Surface Area (ft ²)	Gravel Layer (ft)	Porosity for Gravel	Subsurface Volume (ft ³)	Total Depth (ft)	Provided WQ Volume (ft ³)	Adequacy of Provided WQ Volume ⁶ (ft ³)
M-3	17,825	0.83	0.40	5942	0.83	5,942	OK
M-4	36,741	0.83	0.40	12247	0.83	12,247	OK
M-5	19,960	0.83	0.40	6653	0.83	6,653	OK

COUNTOUR SOURCE: SANGIS/SANDAG
 VERTICAL DATUM: NAVD88
 DATE: NOVEMBER 2014

JN-19003

RICK ENGINEERING COMPANY
 5620 FRIARS ROAD
 SAN DIEGO, CA 92110
 619.291.0707
 (FAX) 619.291.4165

**BASIN M FLOOD ATTENUATION
 IMPERIAL BEACH**
 ALTERNATIVE 3: PERMEABLE PAVEMENT

DATE:	12/31/19
DRAWN BY:	LC
CHECKED BY:	SFR
SCALE:	1" = 150'
SHEET	3 OF 3

C:\Rick\Projects\C19000\19003_LaurelParkWaterResources\ImperialBeach\19003_IB_DMA.05.dwg 2020-01-06 - 1:12PM - locatillo

© 2020 Rick Engineering Company