

Waterways Access and Development

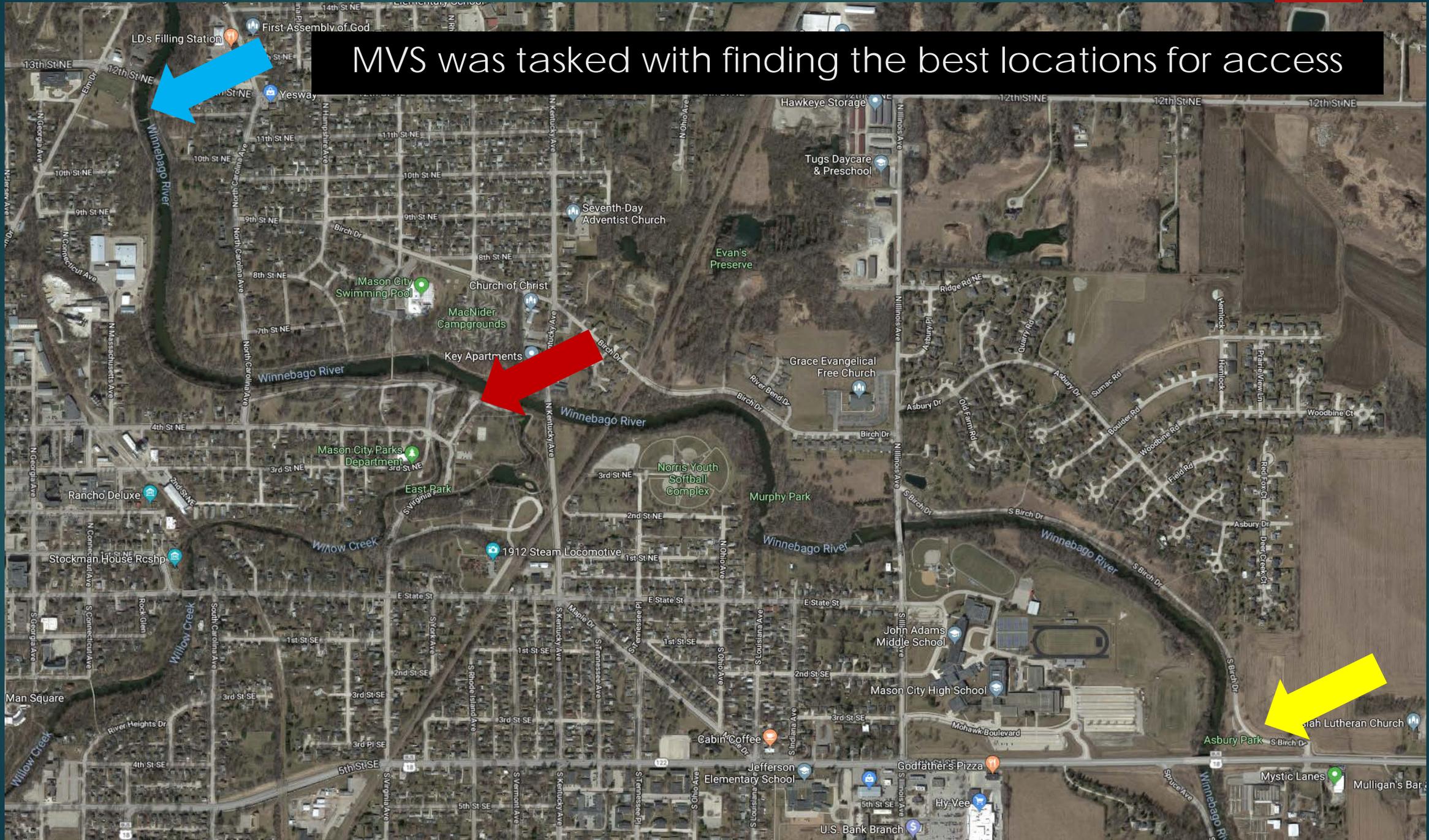
Mason City, Iowa

MVS CONSULTANTS

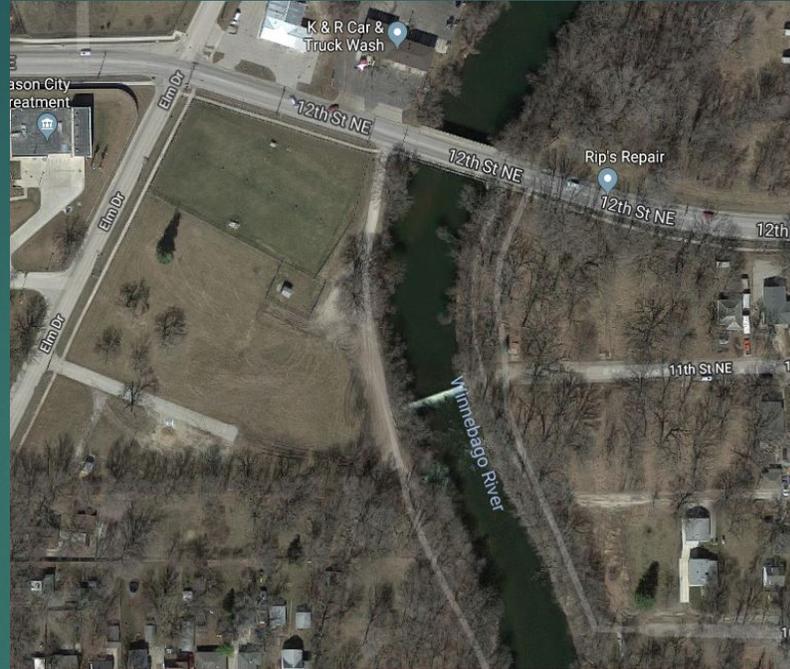
HUNTER MILLER, MARRI VANDYKE, PAIGE SALZ



MVS was tasked with finding the best locations for access



12th Street Access



Impassable low head dam,
Steep rock bank



Steep land slopes

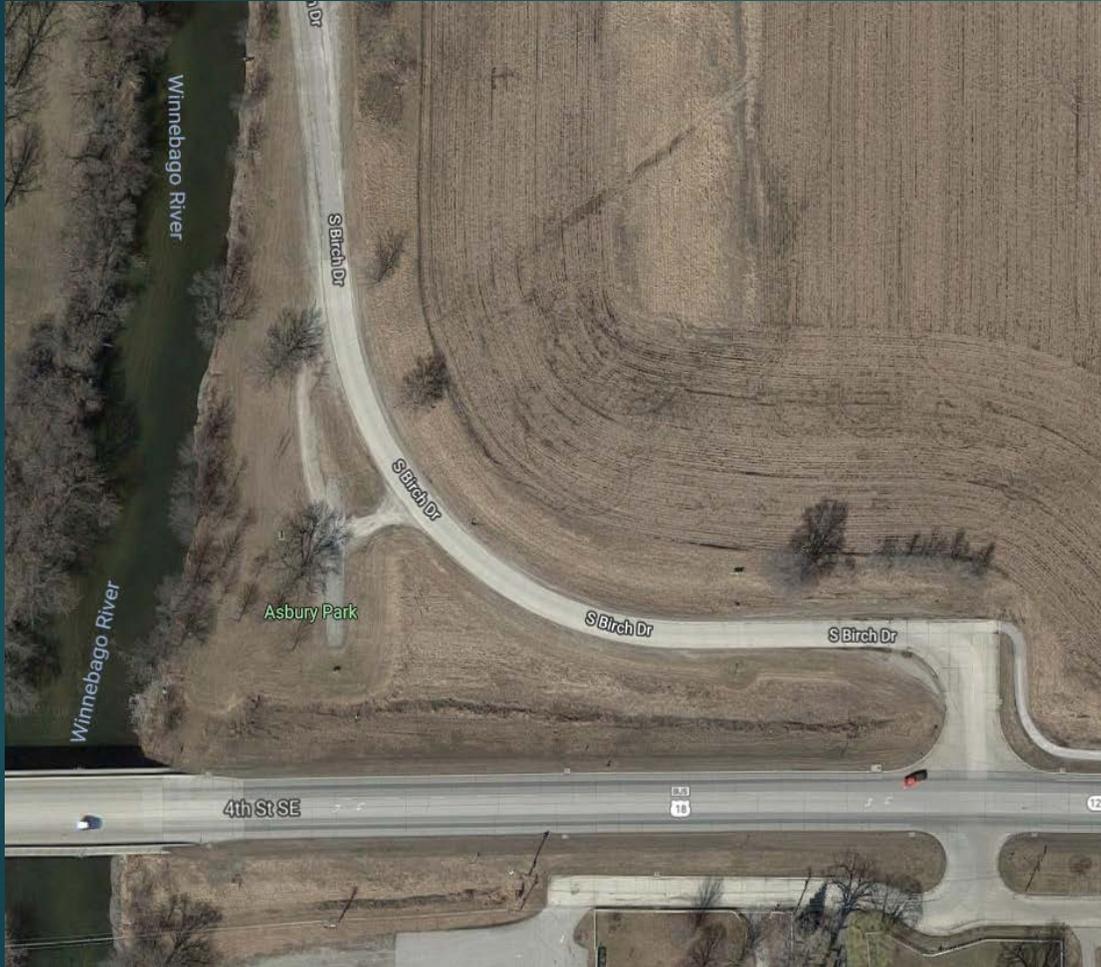


East Park Access



Upstream low head dam,
creek inlet, existing gravel lot

Asbury Park

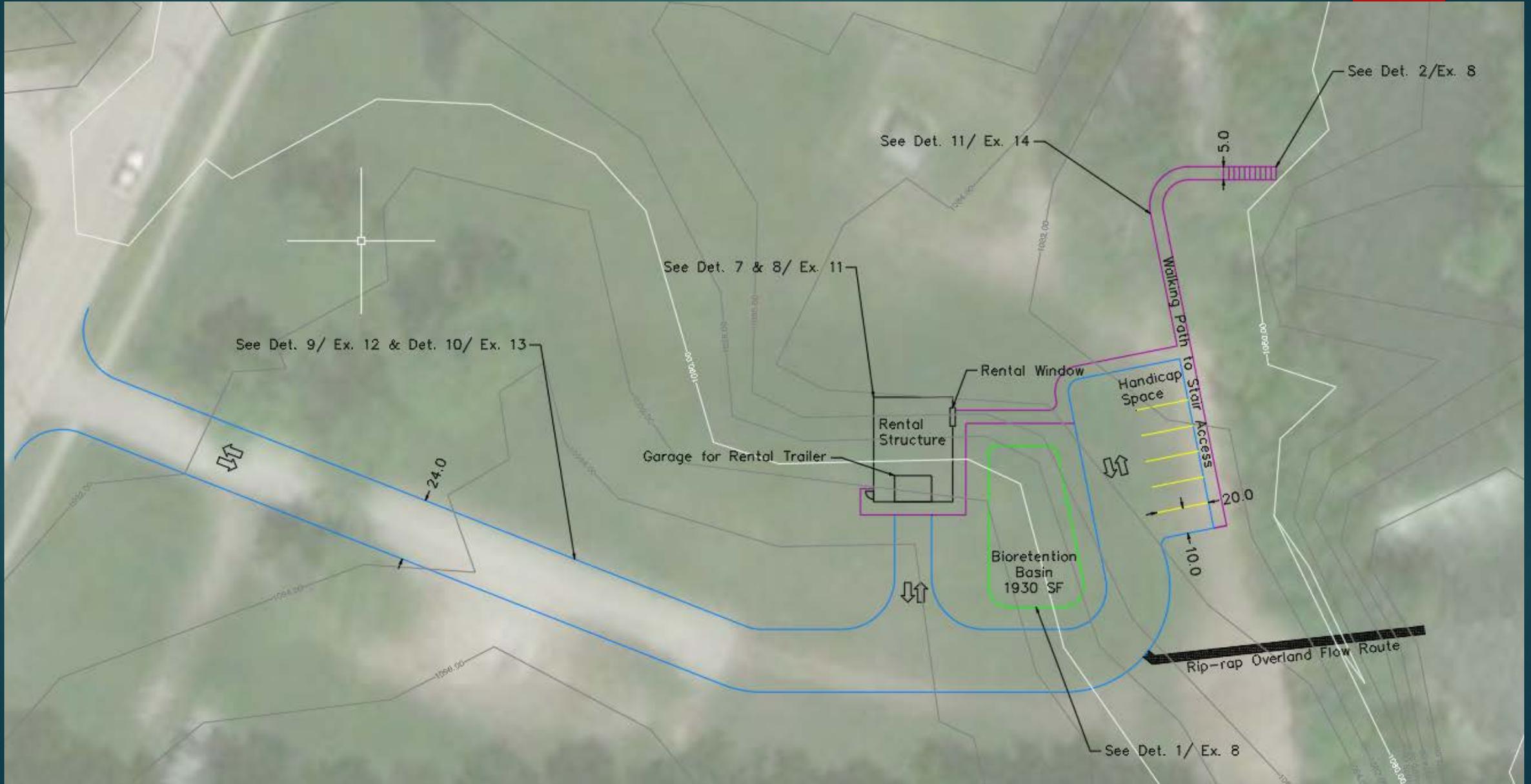


Small location, flat

Iowa DNR Water Trails Manual

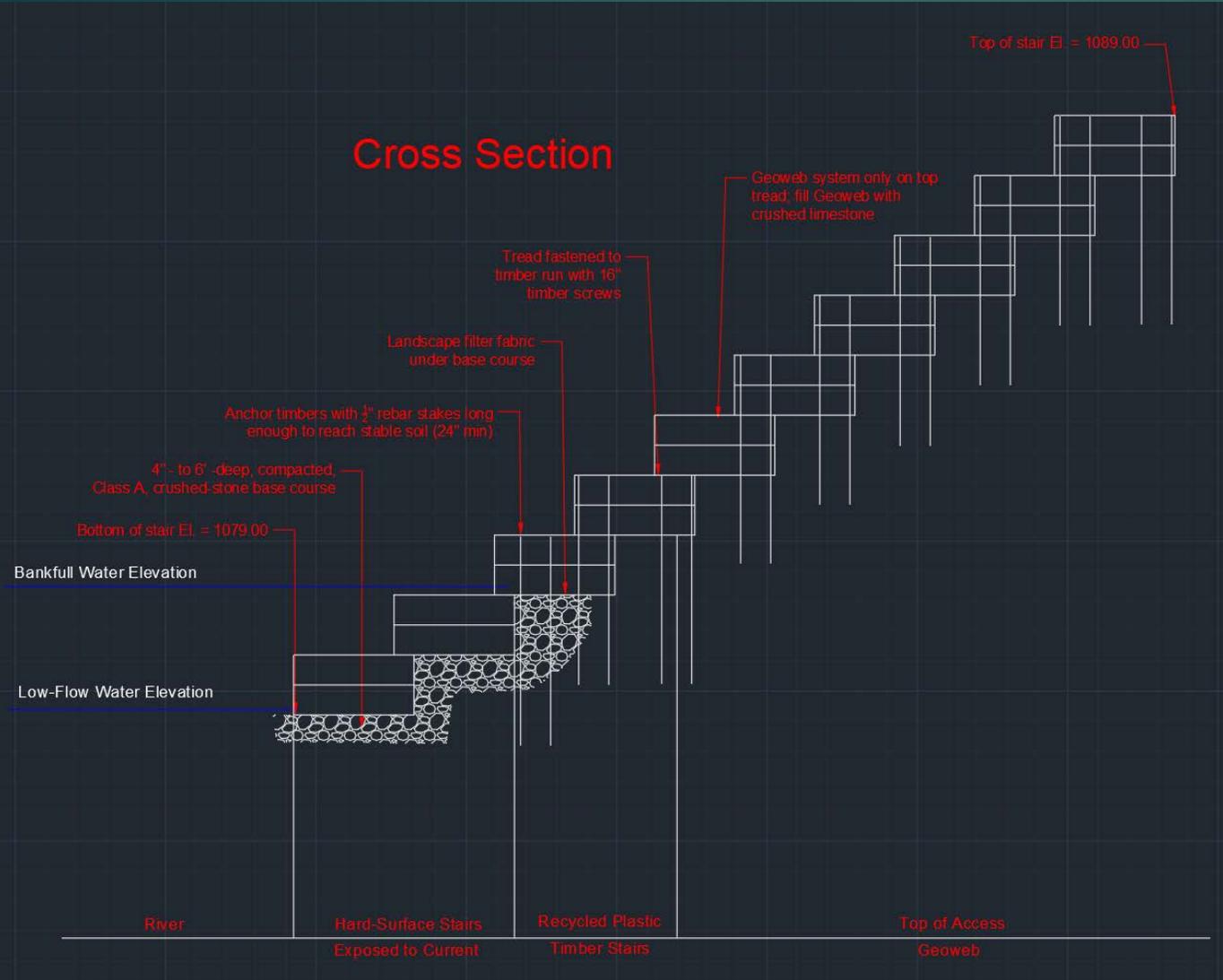


12th Street Site Design

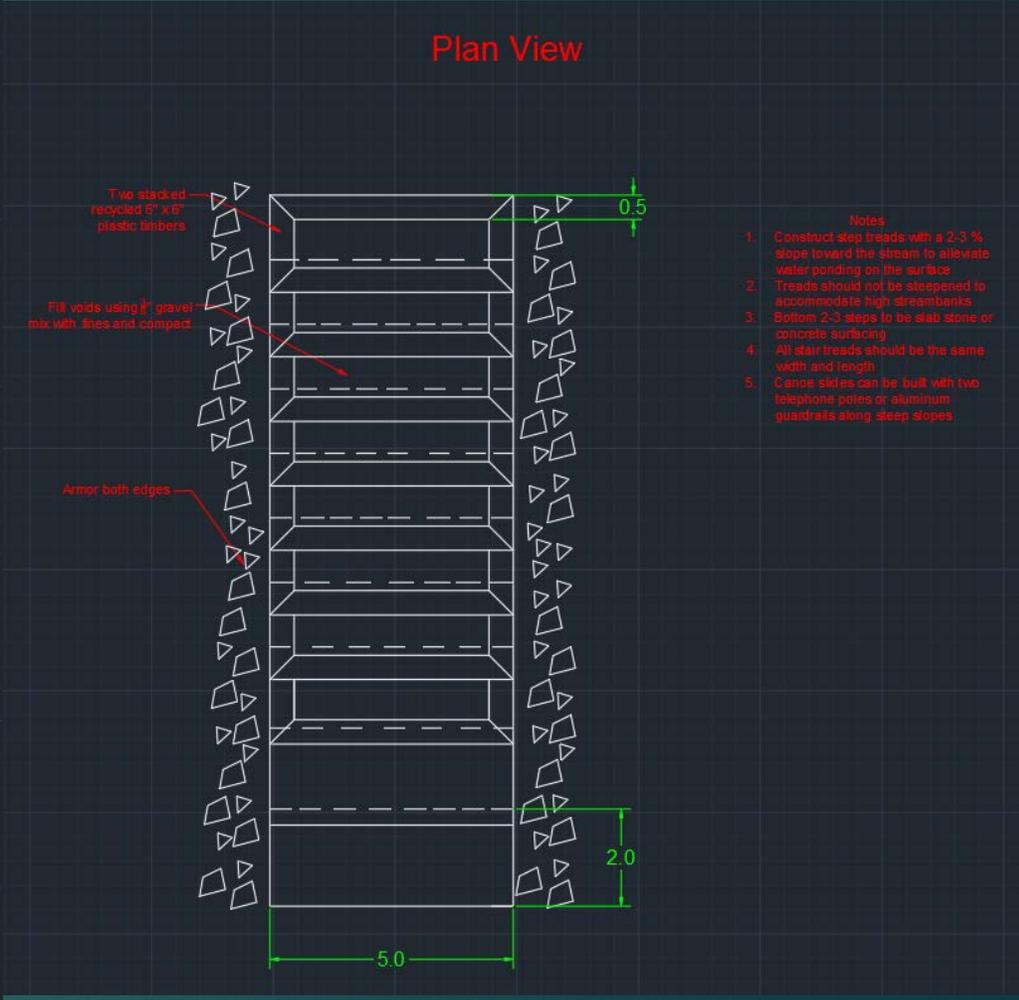


12th Street Stair Design

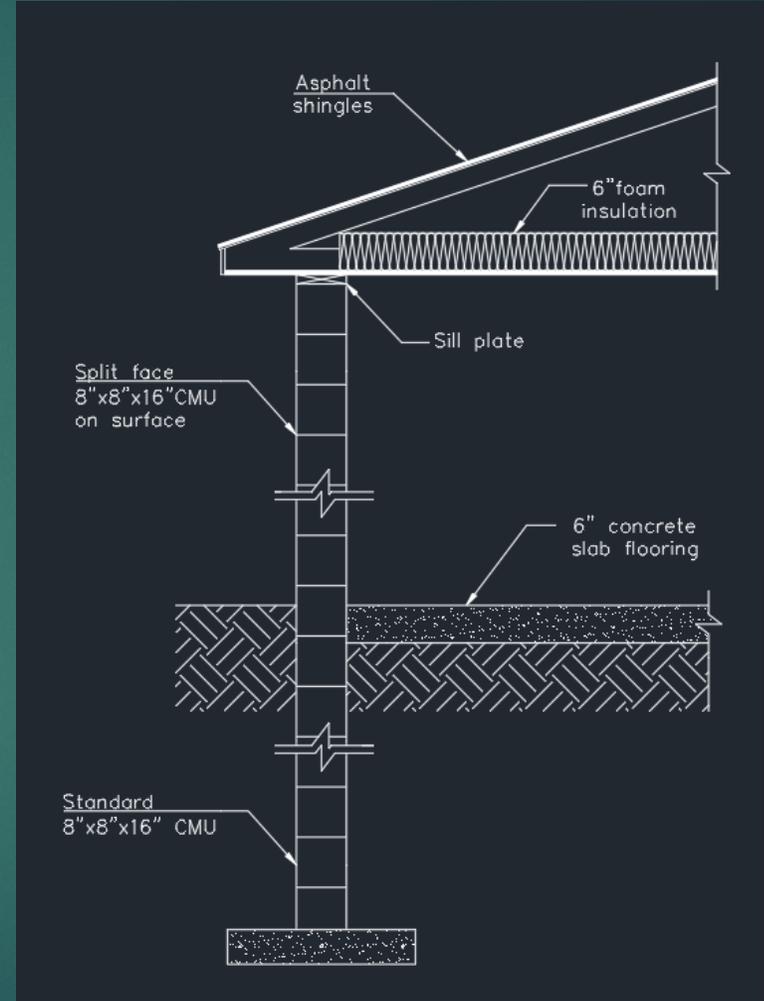
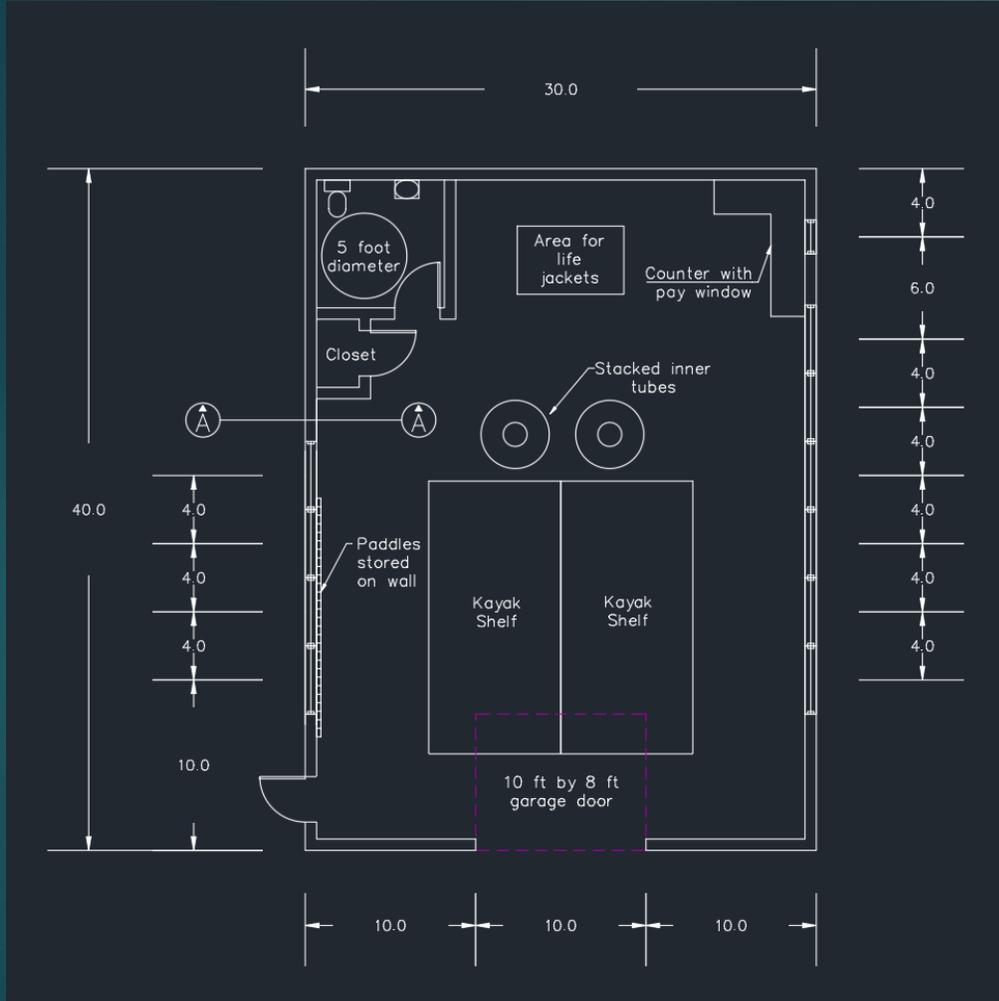
Cross Section



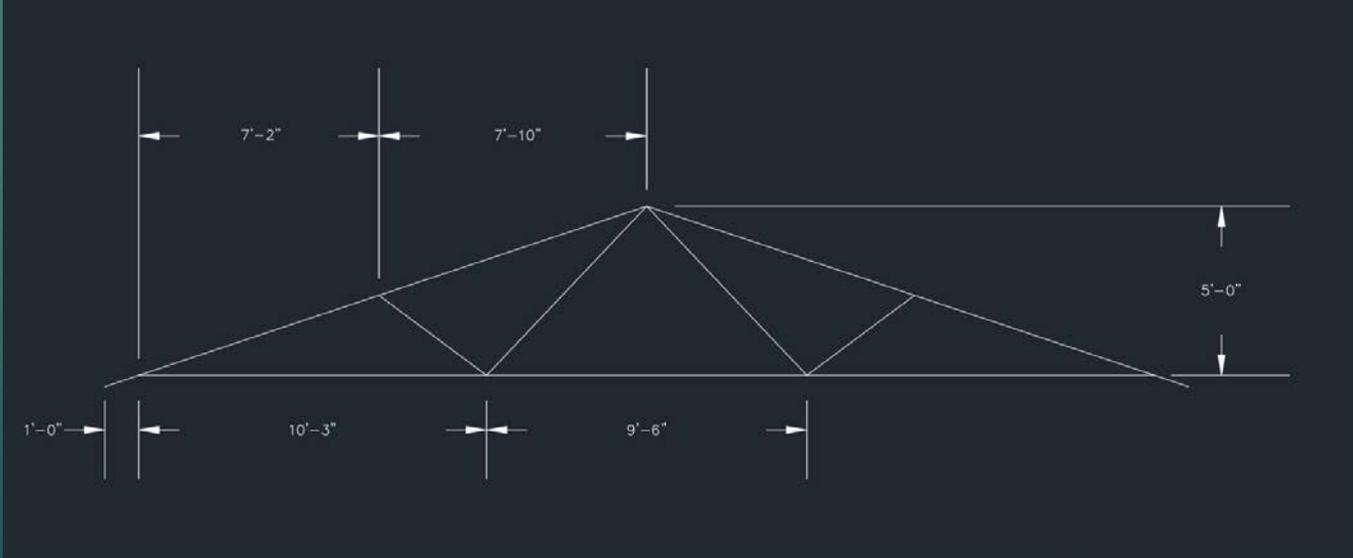
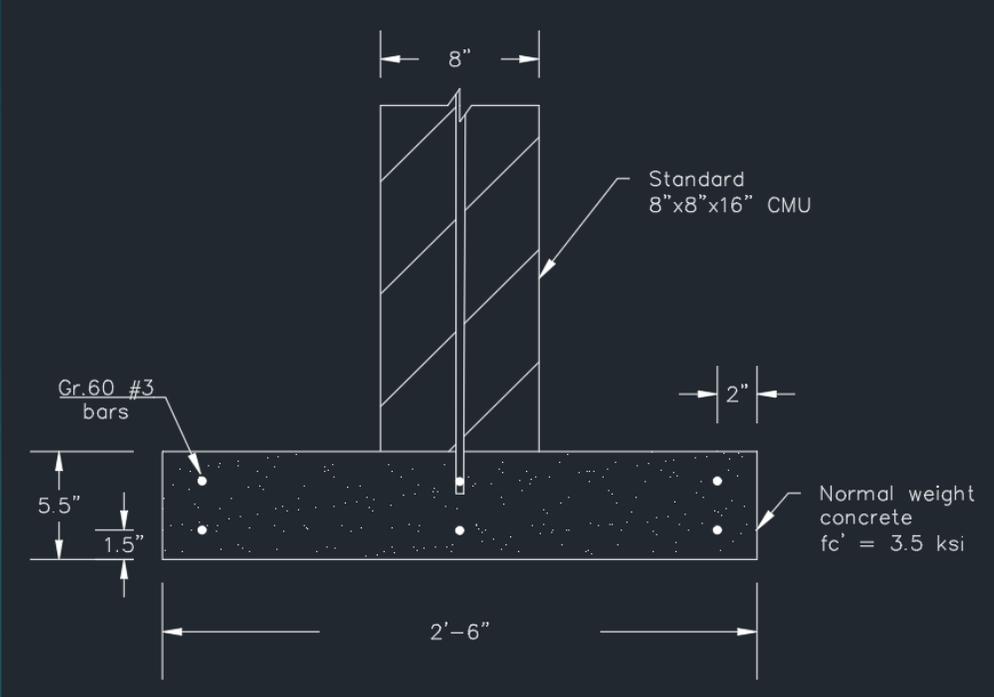
Plan View



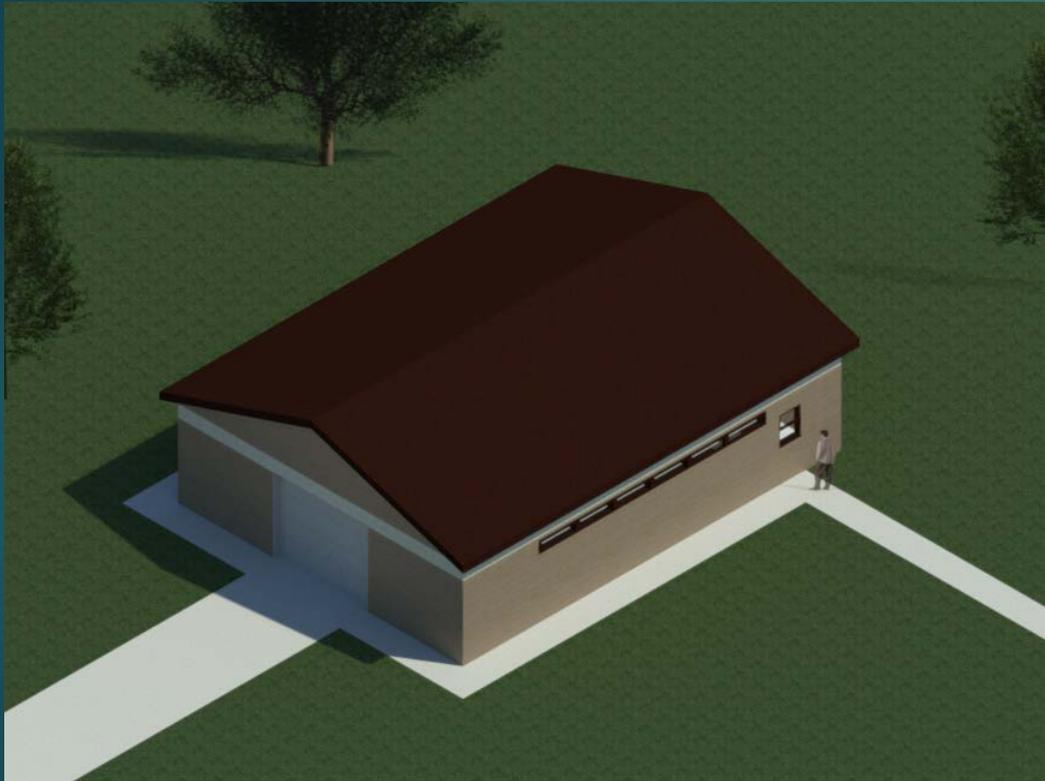
12th Street Structure

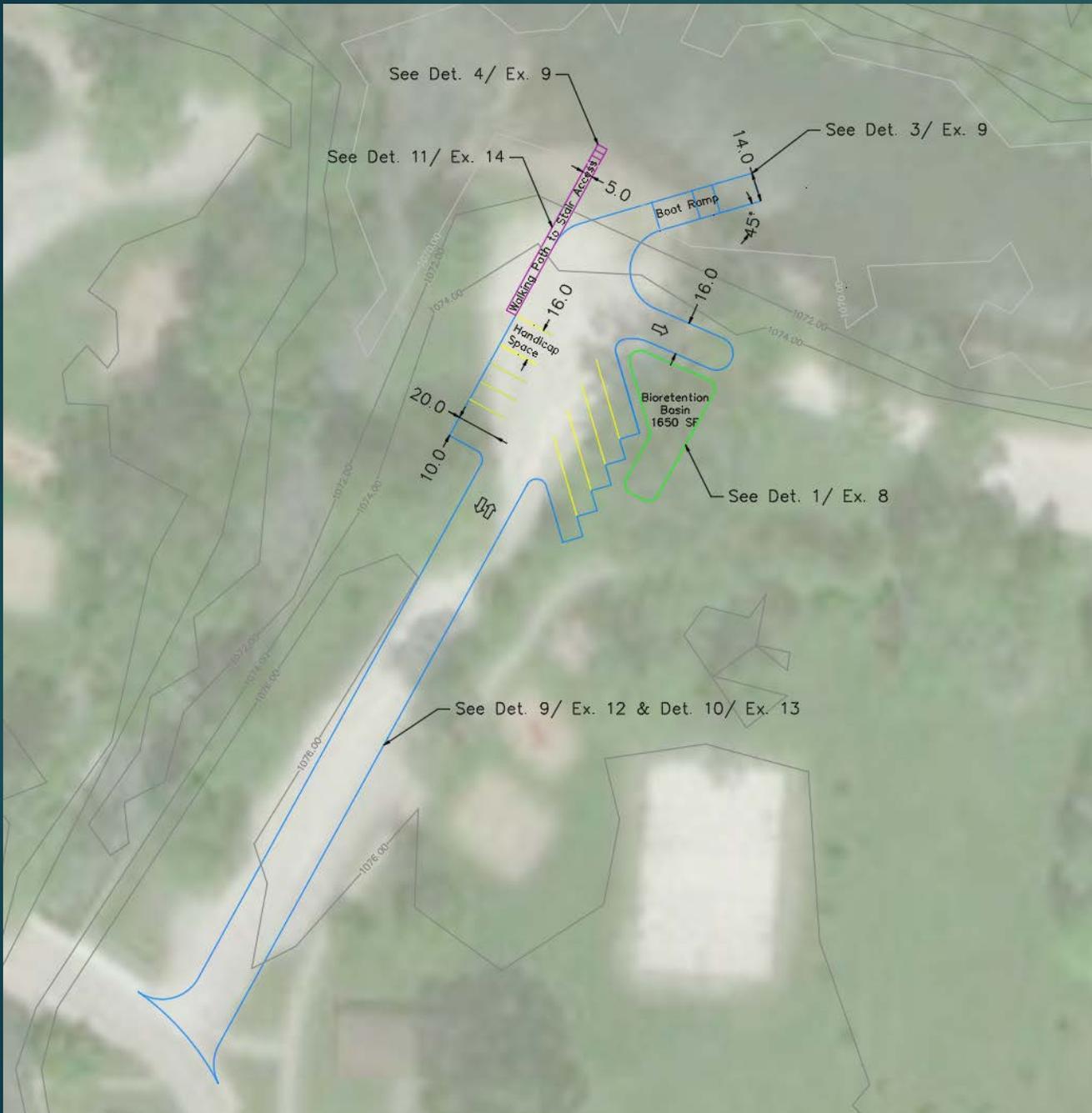


12th Street Structure



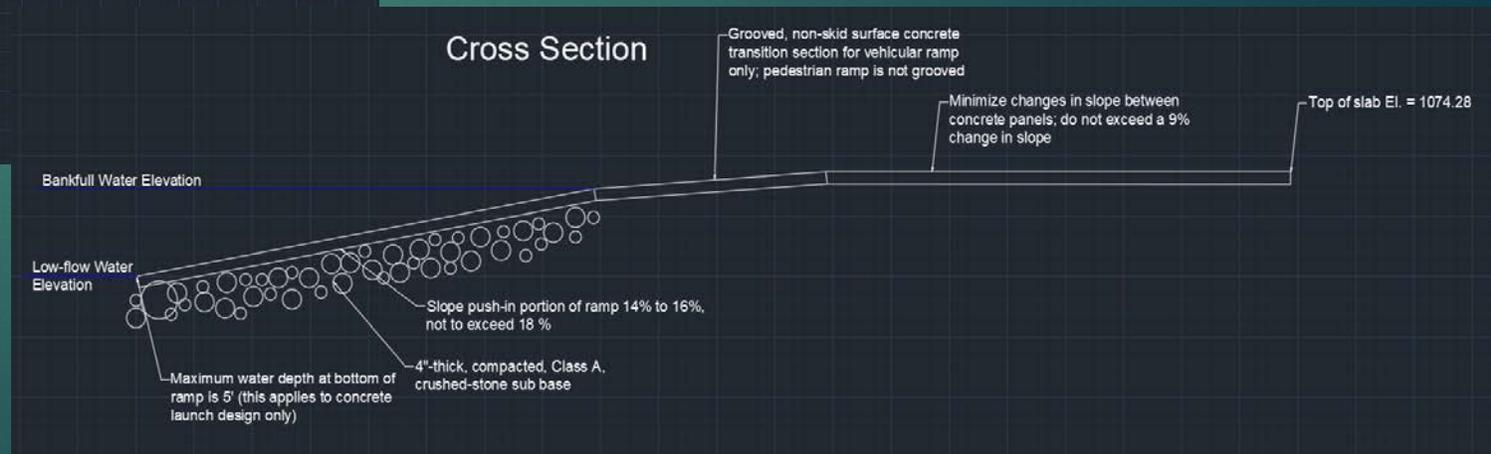
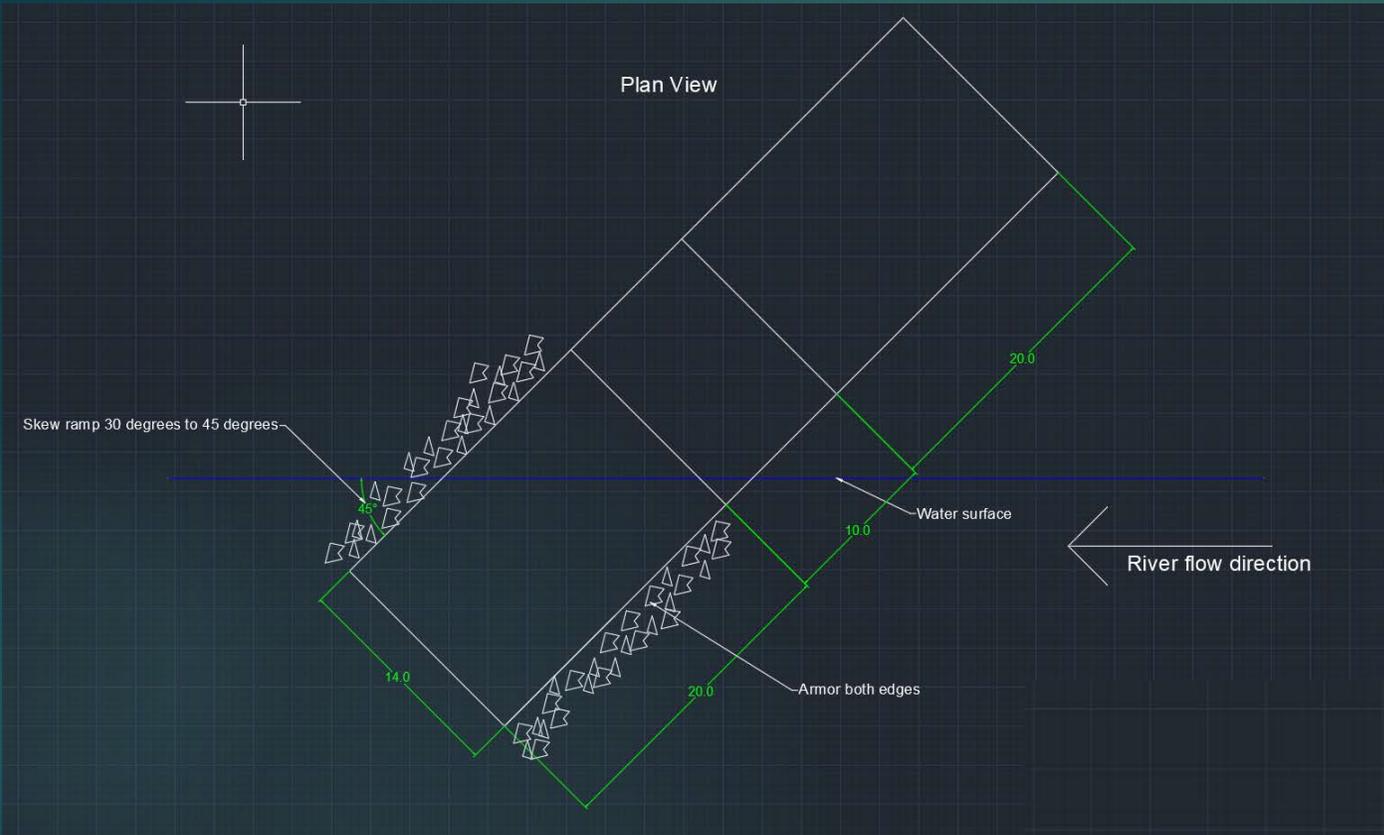
12th Street Structure





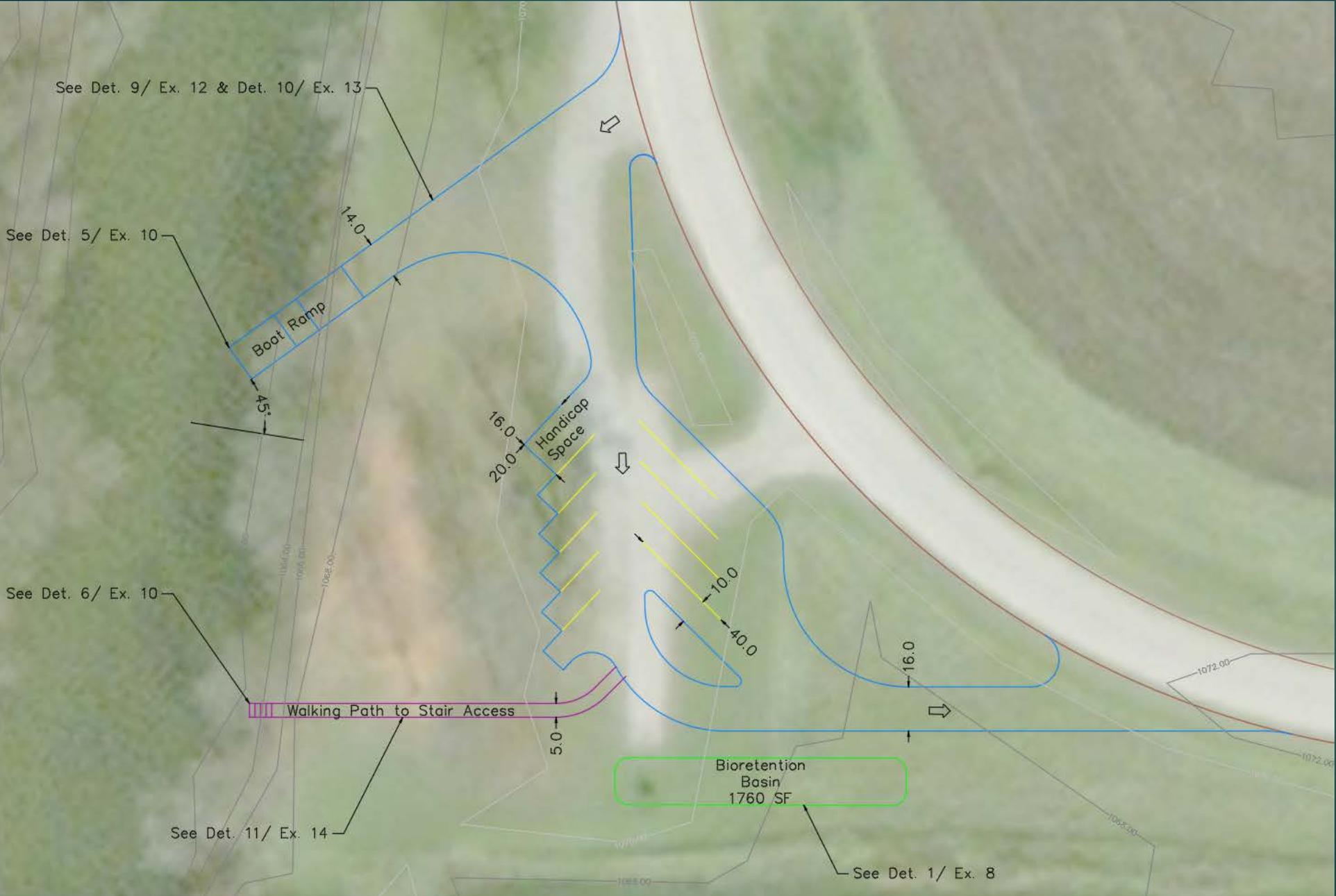
East Park Site Design

East Park Boat Ramp

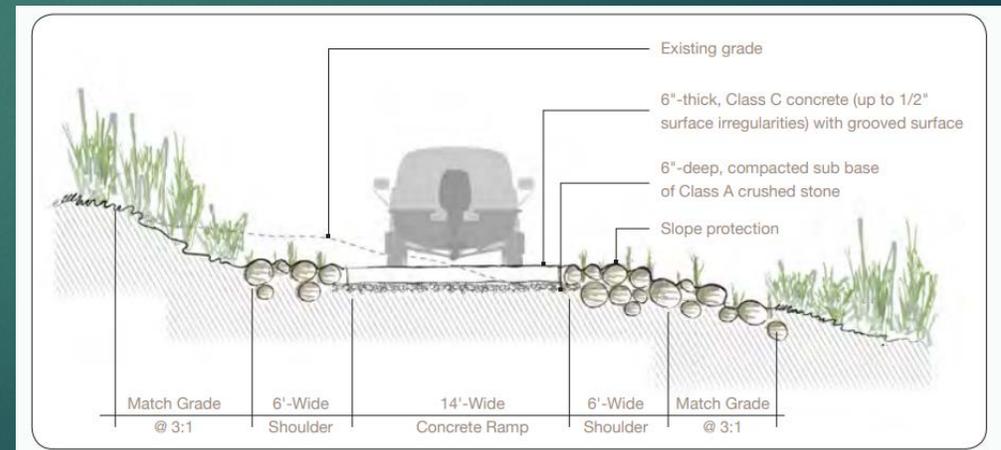
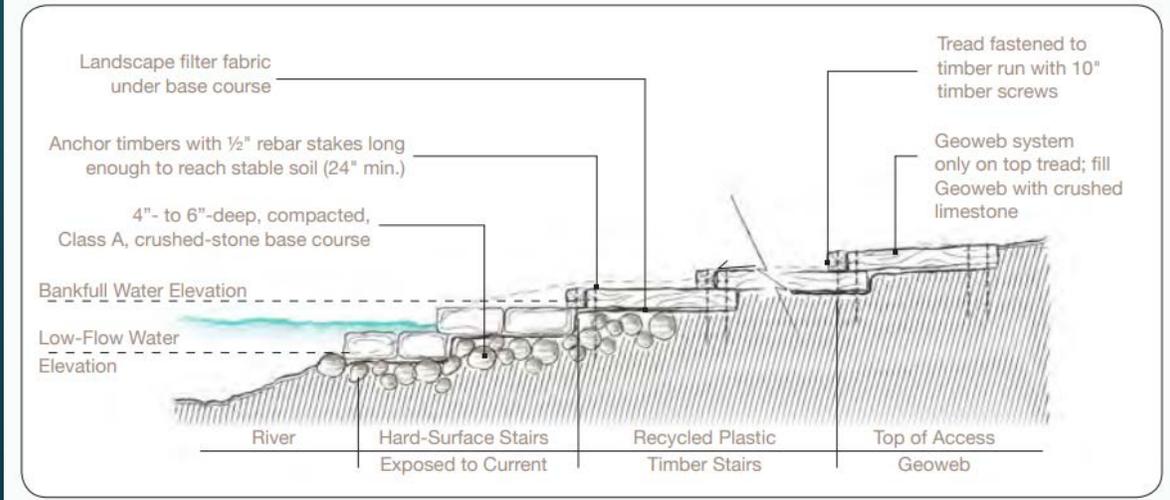
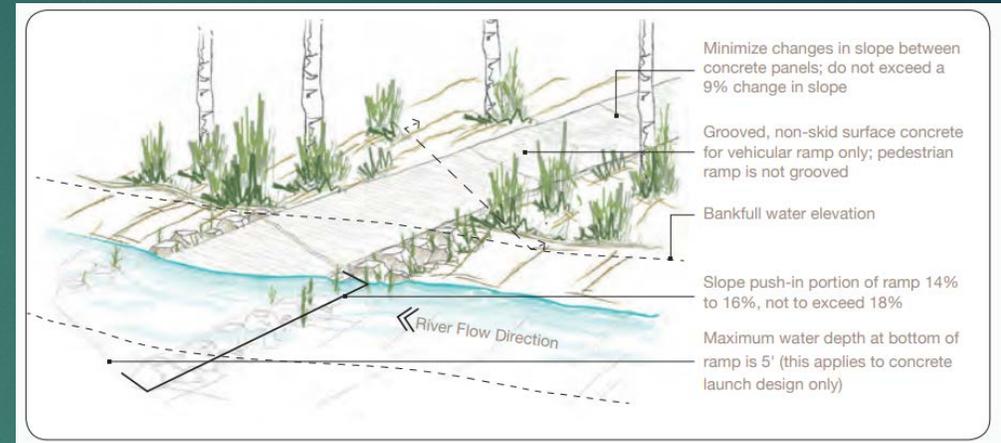
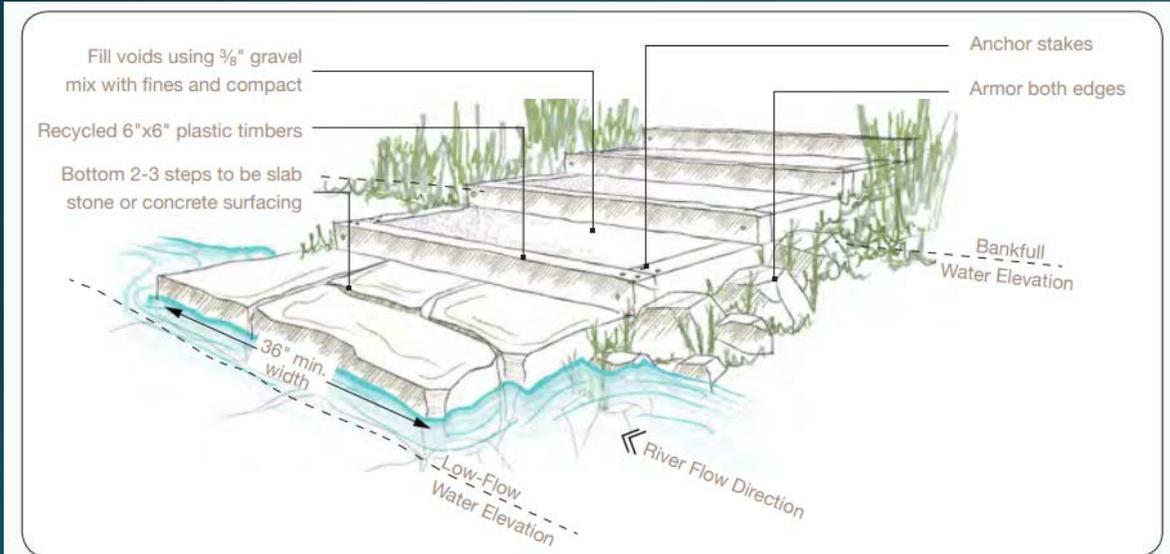




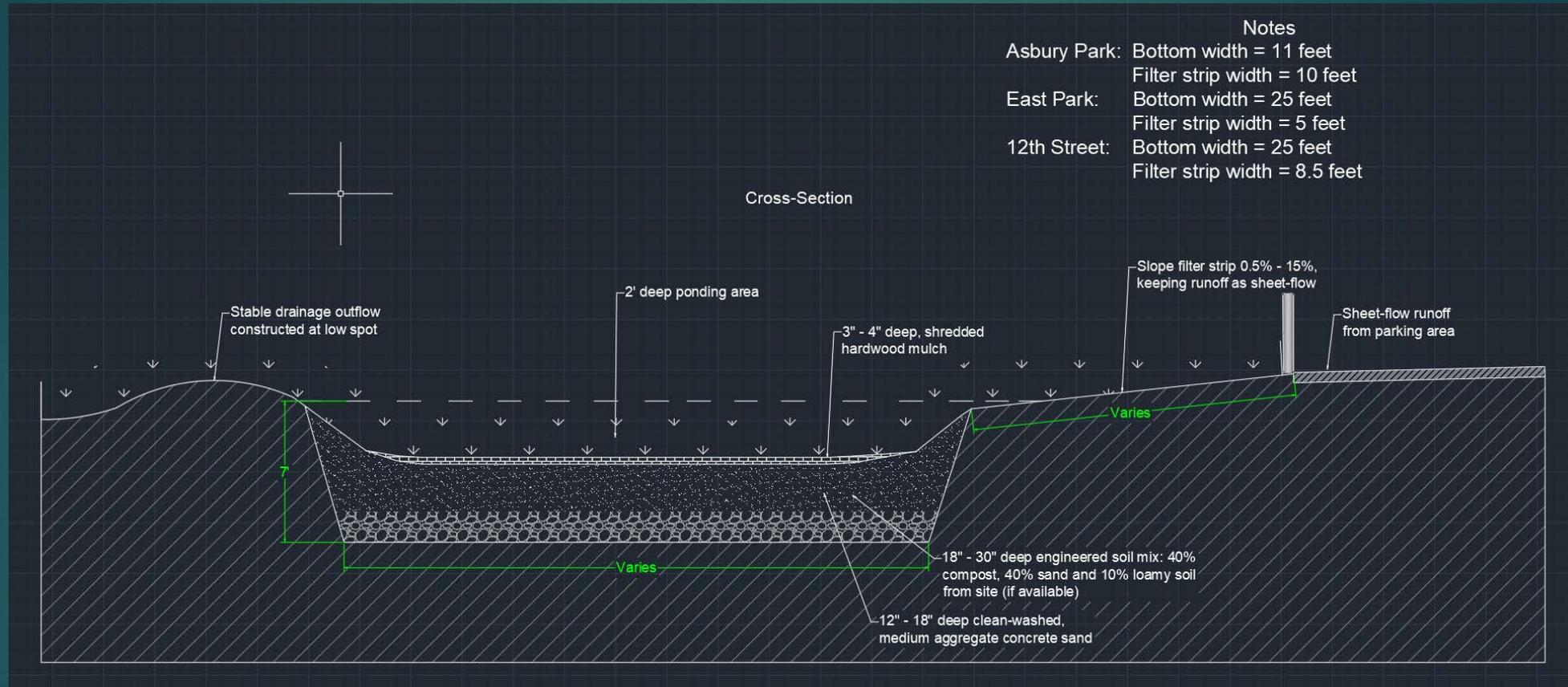
Asbury Park Site Design



Typical Iowa DNR Drawings



Bioretention Cells



Cover flowers for the bioretention basins are native and appealing

Little Bluestem



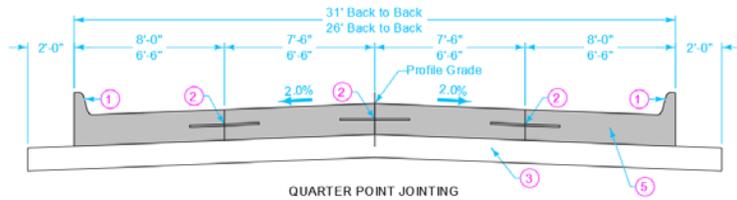
Butterfly Milkweed



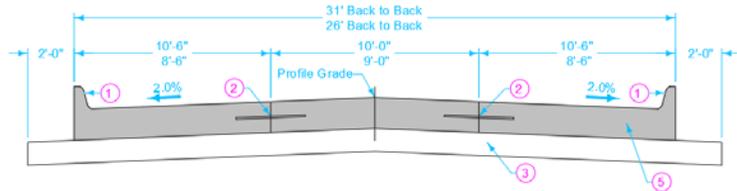
Turtlehead



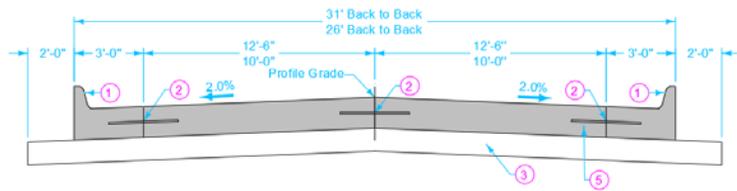
Pavement Details



QUARTER POINT JOINTING



THIRD POINT JOINTING



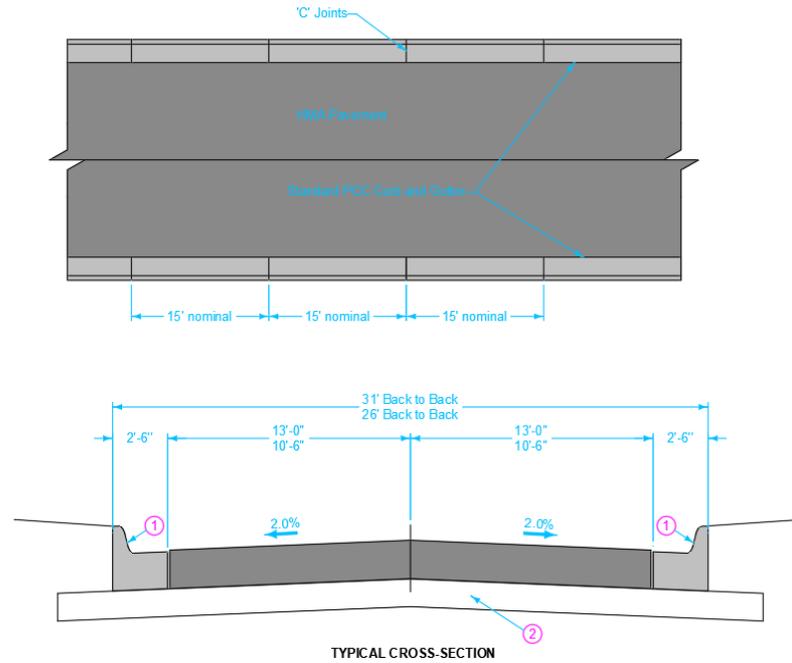
GUTTERLINE JOINTING

- ① 6 inch standard curb.
- ② BT, KT, or L joint depending on pavement thickness and construction staging.
- ③ Subbase or subgrade as specified.
- ④ Unless otherwise specified in the contract documents.
- ⑤ No dowels within 24" of the back of curb. With gutterline joint, place first dowel 6 inches from the joint. See Figure 7010.101, Sheet 8.

TRANSVERSE JOINT REQUIREMENTS ④		
Pavement Thickness	Transverse Joint Type	Transverse Joint Spacing
6"	C	12'
7"	C	15'
8"	CD ⑤	15'
9"	CD ⑤	15'
≥10"	CD ⑤	20'

REVISION	
No.	Date
1	10-16-12
7010.901	
SHEET 1 of 1	
PCC PAVEMENT JOINTING	

9 PCC Detail
Not to Scale



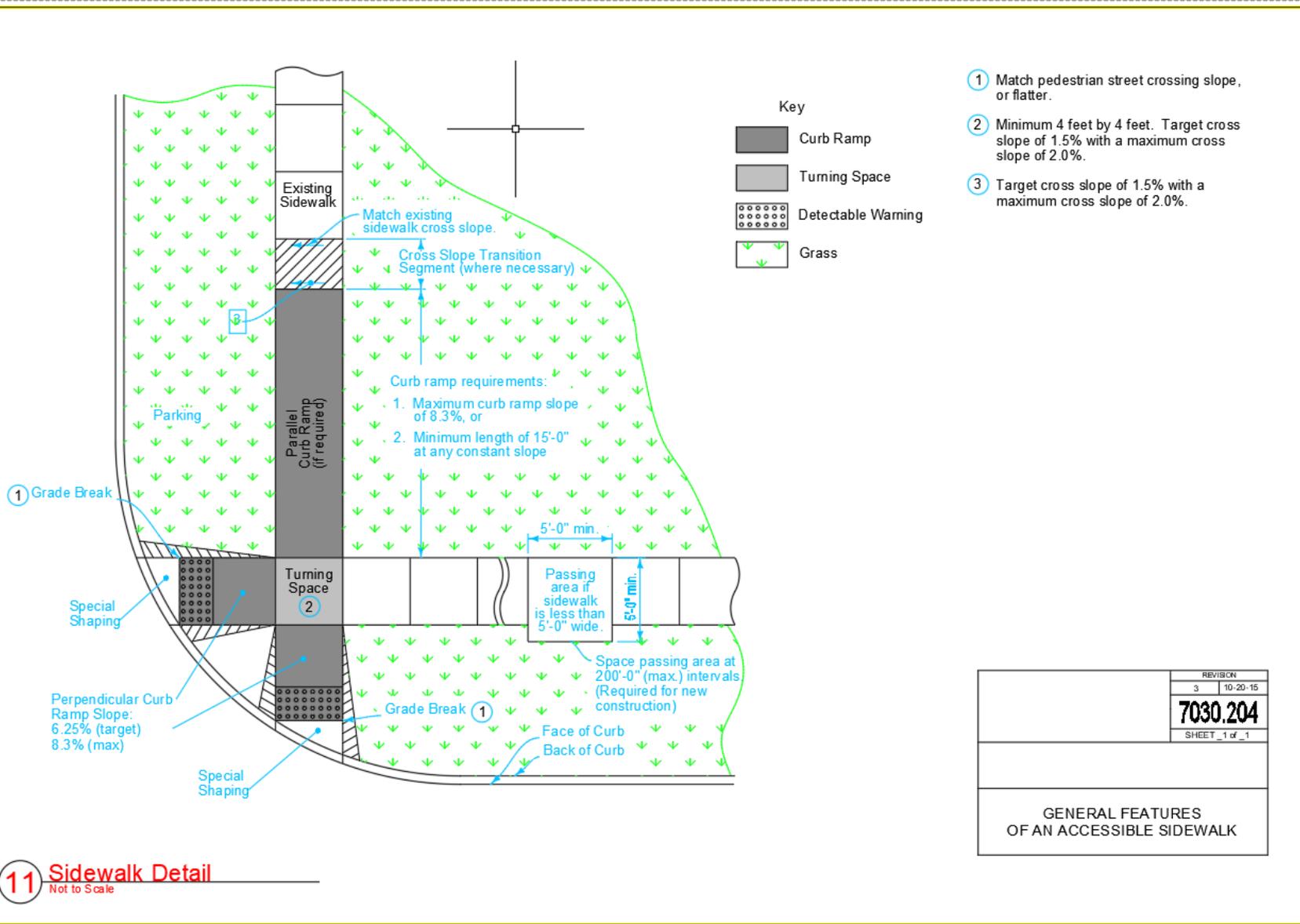
TYPICAL CROSS-SECTION

- ① 6 inch standard curb and gutter.
- ② Subbase or subgrade as specified.

10 HMA Detail
Not to Scale

REVISION	
No.	Date
1	10-19-10
7020.901	
SHEET 2 of 2	
HMA PAVEMENT	

Sidewalk Detail



11 Sidewalk Detail
Not to Scale

Stormwater Management

Asbury Park	
Site Area (acres)	1.65
Pre-Development Time of Concentration (minutes)	14.01 (15)
Post-development Time of Concentration (minutes)	2.47 (5)
5-year Pre-Development Runoff (cfs)	4.28
5-year Post Development Runoff (cfs)	7.34
Water Quality Volume (ft ³)	1927
100-year Required Bioretention Storage (ft ³)	3468

- ▶ Rational Method
- ▶ Short Cut Method (WQV)
- ▶ 5-year return period for pre and post-development
- ▶ Iowa Stormwater Management Manual, SUDAS, Iowa DNR Water Trails Manual

East Park	
Site Area (acres)	1.56
Pre-Development Time of Concentration (minutes)	16.42 (15)
Post-development Time of Concentration (minutes)	3.86 (5)
5-year Pre-Development Runoff (cfs)	3.98
5-year Post Development Runoff (cfs)	6.86
Water Quality Volume (ft ³)	1702
100-year Required Bioretention Storage (ft ³)	3261

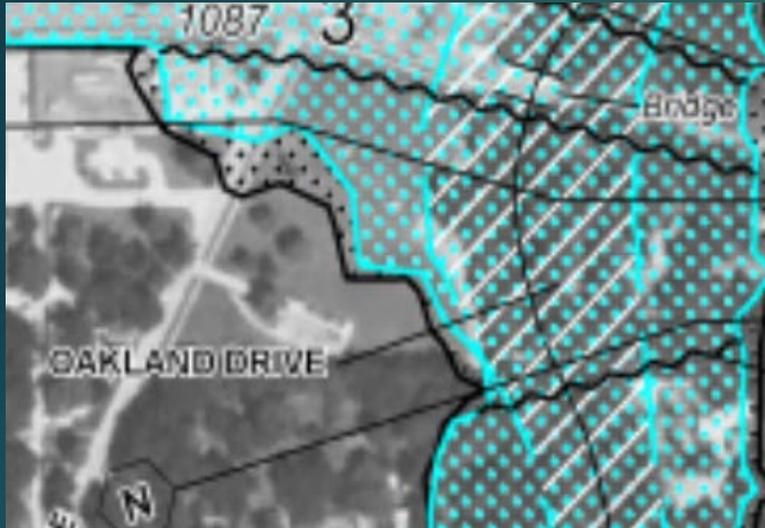
12th Street	
Site Area (acres)	2.05
Pre-Development Time of Concentration (minutes)	11.73 (10)
Post-development Time of Concentration (minutes)	4.22 (5)
5-year Pre-Development Runoff (cfs)	5.92
5-year Post Development Runoff (cfs)	8.95
Water Quality Volume (ft ³)	2140
100-year Required Bioretention Storage (ft ³)	3769

Table 2B-2.03: Section 2 - North Central Iowa
Rainfall Depth and Intensity for Various Return Periods

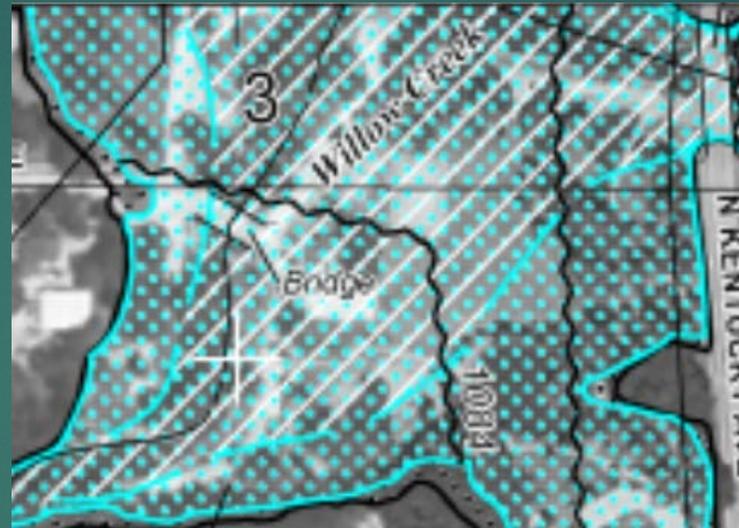
Duration	Return Period															
	1 year		2 year		5 year		10 year		25 year		50 year		100 year		500 year	
	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I
5 min	0.39	4.69	0.46	5.53	0.57	6.93	0.68	8.18	0.83	9.96	0.95	11.4	1.07	12.9	1.39	16.6
10 min	0.57	3.44	0.67	4.04	0.84	5.07	0.99	5.98	1.21	7.29	1.39	8.35	1.57	9.45	2.03	12.2
15 min	0.69	2.79	0.82	3.28	1.03	4.12	1.21	4.87	1.48	5.92	1.69	6.79	1.92	7.68	2.48	9.93
30 min	0.99	1.98	1.16	2.33	1.47	2.94	1.73	3.47	2.11	4.23	2.42	4.85	2.75	5.50	3.56	7.13
1 hr	1.28	1.28	1.52	1.52	1.92	1.92	2.27	2.27	2.80	2.80	3.23	3.23	3.69	3.69	4.85	4.85
2 hr	1.58	0.79	1.87	0.93	2.37	1.18	2.82	1.41	3.49	1.74	4.04	2.02	4.63	2.31	6.14	3.07
3 hr	1.76	0.58	2.08	0.69	2.64	0.88	3.15	1.05	3.91	1.30	4.56	1.52	5.24	1.74	7.04	2.34
6 hr	2.06	0.34	2.42	0.40	3.07	0.51	3.67	0.61	4.6	0.76	5.38	0.89	6.22	1.03	8.45	1.40
12 hr	2.34	0.19	2.74	0.22	3.46	0.28	4.14	0.34	5.18	0.43	6.07	0.50	7.03	0.58	9.59	0.79
24 hr	2.65	0.11	3.06	0.12	3.83	0.15	4.55	0.18	5.67	0.23	6.63	0.27	7.68	0.32	10.4	0.43
48 hr	3.04	0.06	3.46	0.07	4.26	0.08	5.01	0.10	6.18	0.12	7.19	0.14	8.29	0.17	11.2	0.23
3 day	3.31	0.04	3.78	0.05	4.63	0.06	5.42	0.07	6.64	0.09	7.68	0.10	8.80	0.12	11.8	0.16
4 day	3.55	0.03	4.06	0.04	4.97	0.05	5.80	0.06	7.06	0.07	8.12	0.08	9.26	0.09	12.2	0.12
7 day	4.19	0.02	4.79	0.02	5.83	0.03	6.76	0.04	8.12	0.04	9.24	0.05	10.4	0.06	13.4	0.07
10 day	4.78	0.01	5.45	0.02	6.58	0.02	7.56	0.03	8.99	0.03	10.1	0.04	11.3	0.04	14.3	0.05

D = Total depth of rainfall for given storm duration (inches)
I = Rainfall intensity for given storm duration (inches/hour)

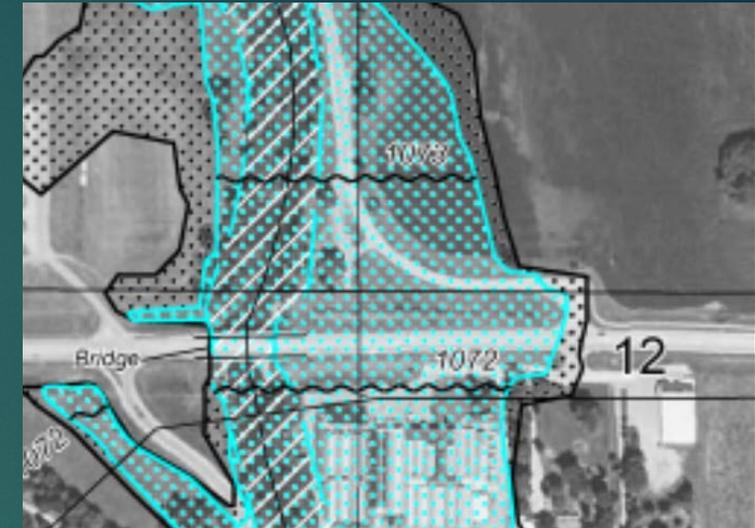
100-year Floodplain



12th Street



East Park



Asbury Park

LEGEND

 SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard may include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

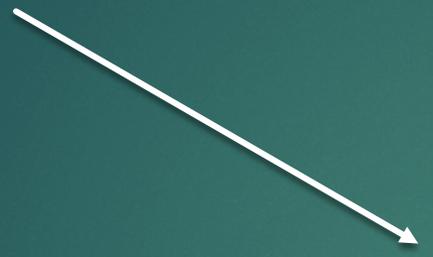
Cost Estimate

12th Street				
Item	Unit	Quantity	Unit Price	Total
6" PCC Class C	cy	279.00	\$200.00	\$55,800
4" PCC Class C	cy	21.00	\$242.00	\$5,082
Class A Granular Subbase	ton	781.00	\$21.00	\$16,401
Fill	cy	4145.00	\$2.80	\$11,606
Borrow	cy	4145.00	\$10.00	\$41,450
HMA Pavement, 6"	ton	565.00	\$23.00	\$12,995
Structure	ls	1.00	\$64,000.00	\$64,000
Total				\$221,616
10% Contingencies				\$22,162
20% Engineering and Administration				\$44,323
Total Project Cost (PCC & Shelter)				\$288,000
Total Project Cost (PCC & No Shelter)				\$206,000
Total Project Cost (HMA & Shelter)				\$232,500
Total Project Cost (HMA & No Shelter)				\$150,000

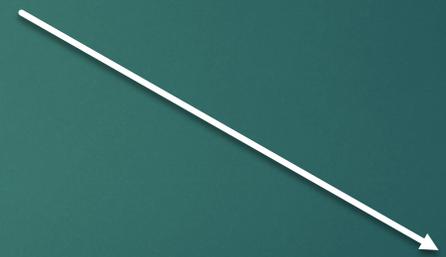
East Park				
Item	Unit	Quantity	Unit Price	Total
6" PCC Class C	cy	320.00	\$200.00	\$64,000
4" PCC Class C	cy	4.70	\$242.00	\$1,137
Class A Granular Subbase	ton	872.00	\$21.00	\$18,312
Engineered Soil Mix	cy	139.00	\$35.00	\$4,865
Fill	cy	2623.00	\$2.80	\$7,344
Borrow	cy	2623.00	\$10.00	\$26,230
Total				\$139,900
10% Contingencies				\$13,900
20% Engineering and Administration				\$28,000
Total Project Cost (PCC)				\$182,000
Total Project Cost (HMA)				\$117,500

Asbury Park				
Item	Unit	Quantity	Unit Price	Total
6" PCC Class C	cy	317.00	\$200.00	\$63,400
4" PCC Class C	cy	8.50	\$242.00	\$2,057
Class A Granular Subbase	ton	867.00	\$21.00	\$18,207
Engineered Soil Mix	cy	101.00	\$35.00	\$3,535
Excavation	cy	677.00	\$3.10	\$2,099
Cut from site	cy	677.00	\$10.00	\$6,770
HMA Pavement, 6"	ton	640.00	\$23.00	\$14,720
Total				\$108,500
10% Contingencies				\$10,900
20% Engineering and Administration				\$21,700
Total Project Cost (PCC)				\$141,000
Total Project Cost (HMA)				\$78,000

12th Street



East Park



Asbury Park

Recommended Phasing



Recap and Recommendations

