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MICHIGAN AIR NATIONAL GUARD CONSTRUCT MAIN BASE ENTRANCE

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

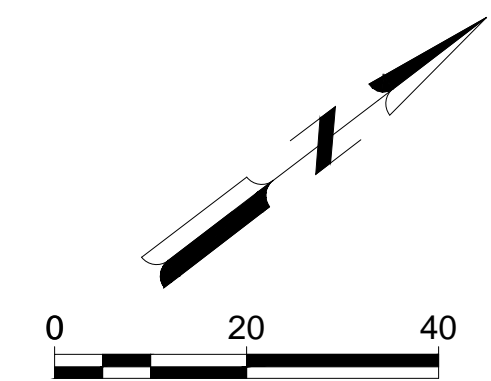
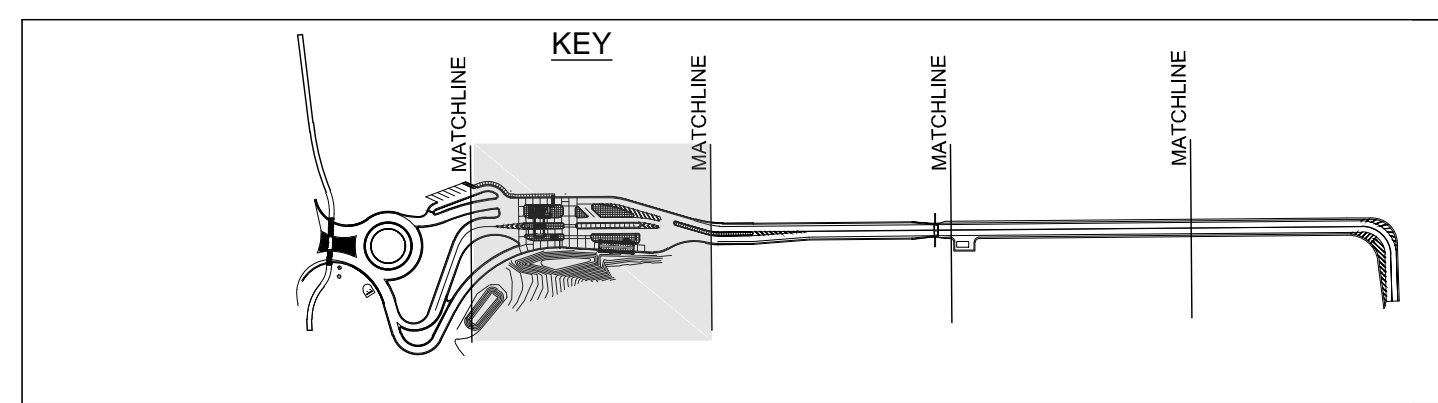
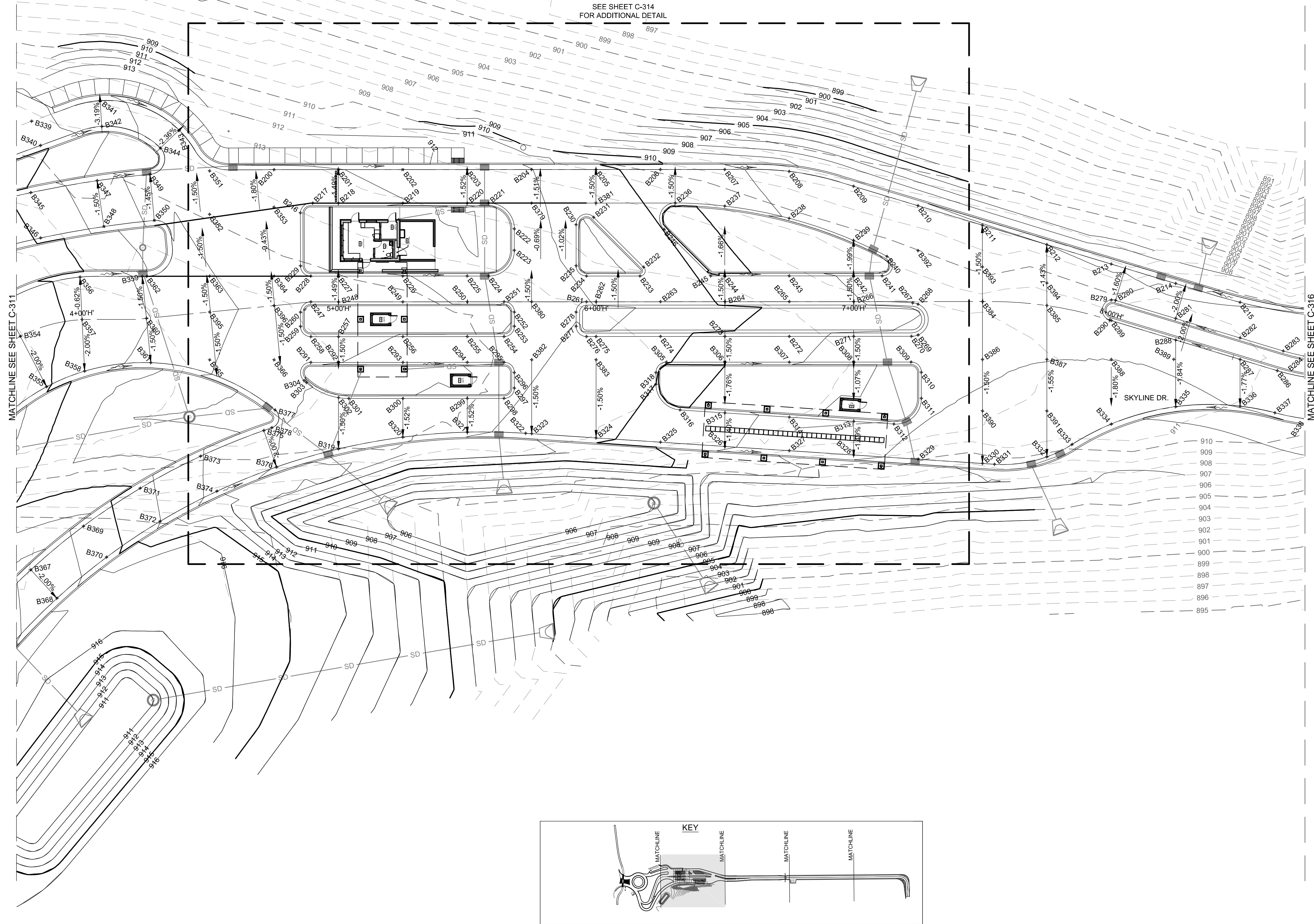
ANG Project No: MBMV099170
MH No: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
DRAWN BY: DAY
CHECKED BY: SAH
DO NOT SCALE DRAWINGS

SHEET CONTENTS
PAVING DETAILS

SHEET NO.

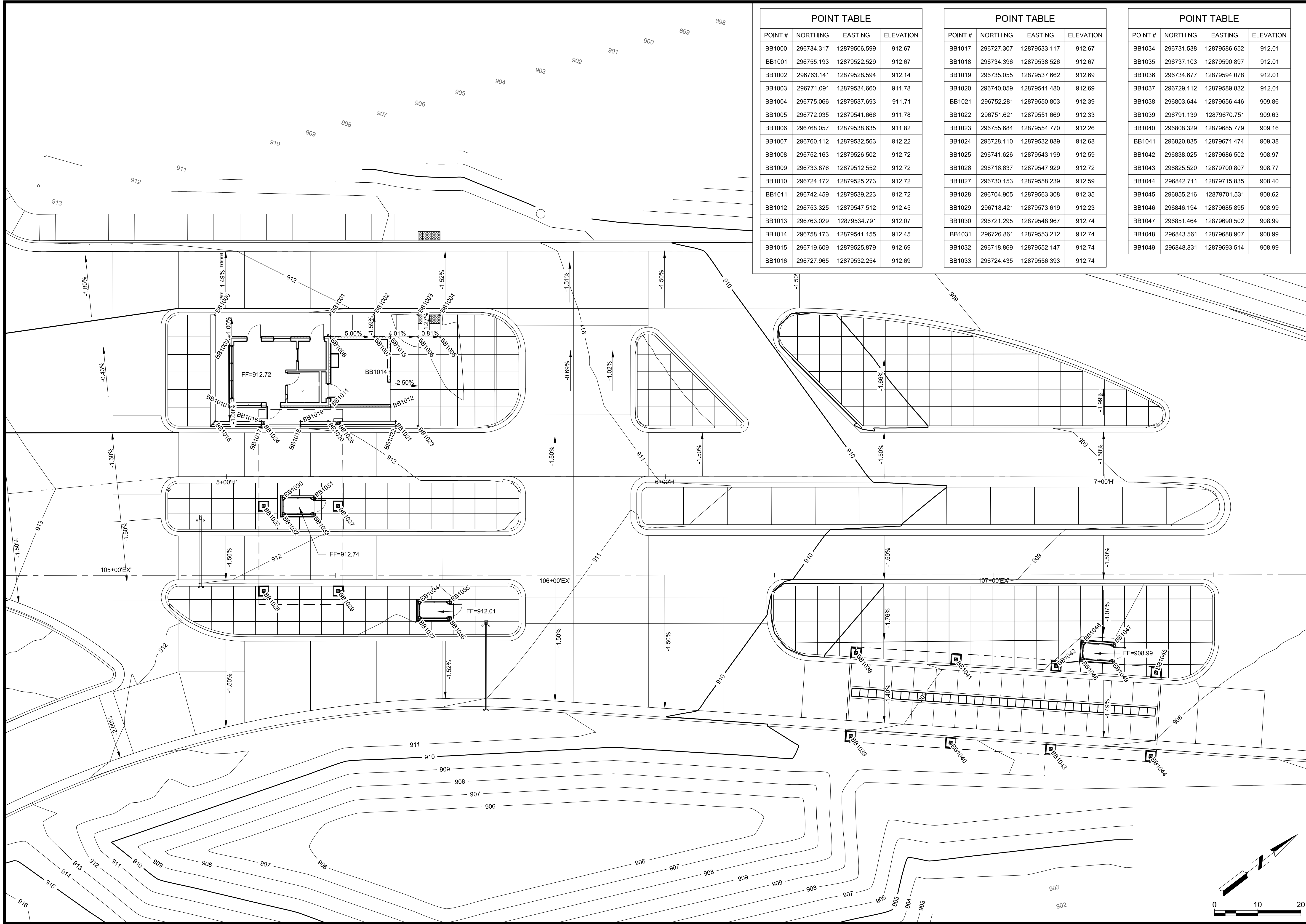
C-313

LEGEND
 + A867 SPOT ELEVATION
 -1.50% SURFACE GRADE
 FLOW ARROW
 SEE SHEETS C-314 FOR POINT INFORMATION



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POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
BB1000	296734.317	12879506.599	912.67
BB1001	296755.193	12879522.529	912.67
BB1002	296763.141	12879528.594	912.14
BB1003	296771.091	12879534.660	911.78
BB1004	296775.066	12879537.693	911.71
BB1005	296772.035	12879541.666	911.78
BB1006	296768.057	12879538.635	911.82
BB1007	296760.112	12879532.563	912.22
BB1008	296752.163	12879526.502	912.72
BB1009	296733.876	12879512.552	912.72
BB1010	296724.172	12879525.273	912.72
BB1011	296742.459	12879539.223	912.72
BB1012	296753.325	12879547.512	912.45
BB1013	296763.029	12879534.791	912.07
BB1014	296758.173	12879541.155	912.45
BB1015	296719.609	12879525.879	912.69
BB1016	296727.965	12879532.254	912.69

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
BB1017	296727.307	12879533.117	912.67
BB1018	296734.396	12879538.526	912.67
BB1019	296735.055	12879537.662	912.69
BB1020	296740.059	12879541.480	912.69
BB1021	296752.281	12879550.803	912.39
BB1022	296751.621	12879551.669	912.33
BB1023	296755.684	12879554.770	912.26
BB1024	296728.110	12879532.889	912.68
BB1025	296741.626	12879543.199	912.59
BB1026	296716.637	12879547.929	912.72
BB1027	296730.153	12879558.239	912.59
BB1028	296704.905	12879563.308	912.35
BB1029	296718.421	12879573.619	912.23
BB1030	296721.295	12879548.967	912.74
BB1031	296726.861	12879553.212	912.74
BB1032	296718.869	12879552.147	912.74
BB1033	296724.435	12879556.393	912.74

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
BB1034	296731.538	12879586.652	912.01
BB1035	296737.103	12879590.897	912.01
BB1036	296734.677	12879594.078	912.01
BB1037	296729.112	12879589.832	912.01
BB1038	296803.644	12879656.446	909.86
BB1039	296791.139	12879670.751	909.63
BB1040	296808.329	12879685.779	909.16
BB1041	296820.835	12879671.474	909.38
BB1042	296838.025	12879686.502	908.97
BB1043	296825.520	12879700.807	908.77
BB1044	296842.711	12879715.835	908.40
BB1045	296855.216	12879701.531	908.62
BB1046	296846.194	12879685.895	908.99
BB1047	296851.464	12879690.502	908.99
BB1048	296843.561	12879688.907	908.99
BB1049	296848.831	12879693.514	908.99



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ISSUED 02/17/21 B3 FINAL

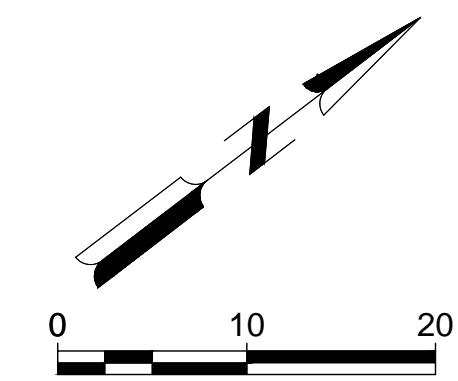
NOT FOR CONSTRUCTION

ANG Project No: MBMV099170
M&H No: 3141900-113782.01
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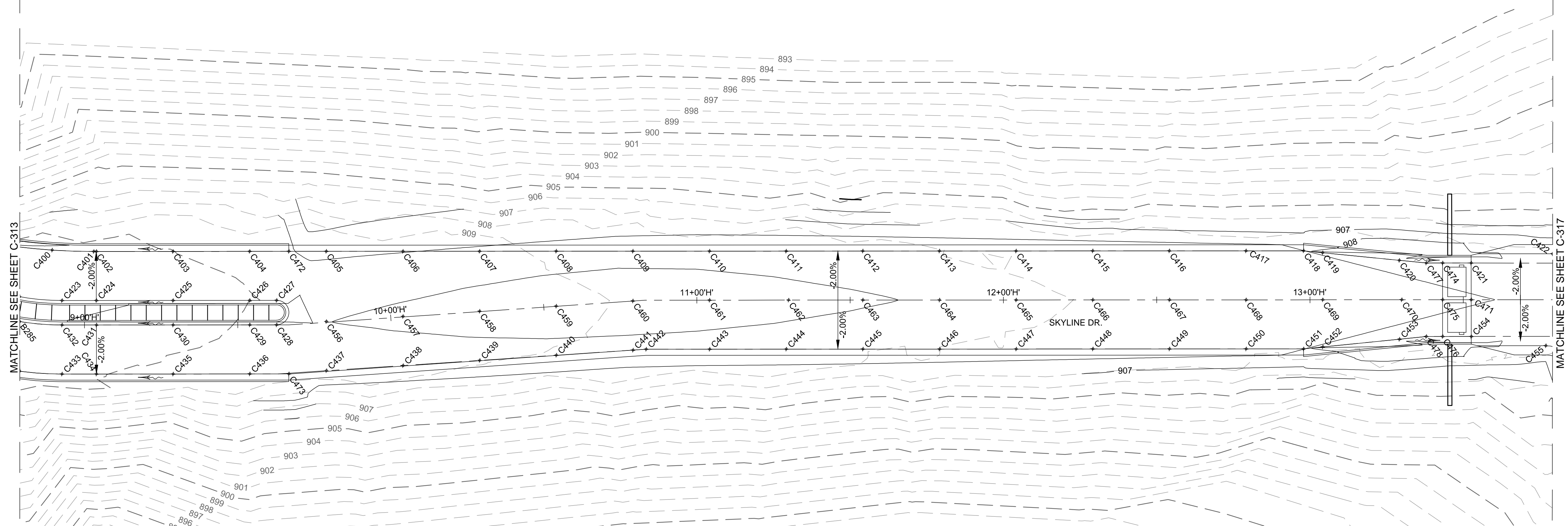
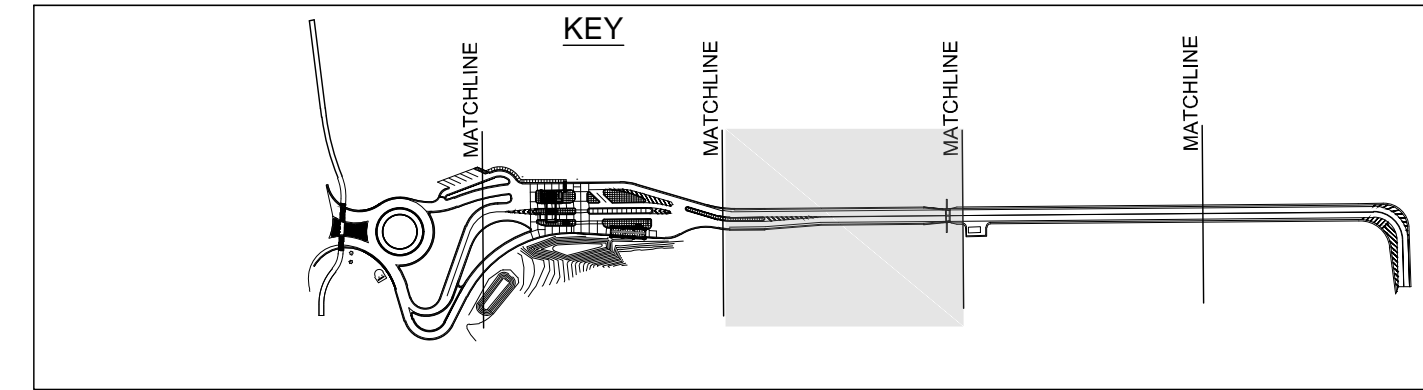
SHEET CONTENTS
PAVING DETAILS

SHEET NO.

C-314



- LEGEND**
- ▲ A867 SPOT ELEVATION
 - 1.50% SURFACE GRADE
 - FLOW ARROW



POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
C400	297016.753	12879776.044	908.11
C401	297027.259	12879784.641	908.19
C402	297027.946	12879785.165	908.20
C403	297047.812	12879800.342	908.32
C404	297067.696	12879815.496	908.45
C405	297087.570	12879830.662	907.37
C406	297107.445	12879845.828	907.89
C407	297127.320	12879860.993	908.39
C408	297147.194	12879876.159	908.85
C409	297167.069	12879891.325	908.89
C410	297186.944	12879906.490	908.87
C411	297206.810	12879921.667	908.82
C412	297226.693	12879936.822	908.73
C413	297246.568	12879951.987	908.62
C414	297266.442	12879967.153	908.49
C415	297286.317	12879982.318	908.36
C416	297306.192	12879997.484	908.23
C417	297326.066	12880012.650	908.10
C418	297345.940	12880027.816	908.00
C419	297365.814	12880042.982	907.98

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
C420	297363.922	12880045.463	907.90
C421	297382.011	12880060.400	907.80
C422	297404.959	12880074.107	907.60
C423	297009.322	12879791.080	908.46
C424	297018.240	12879797.885	908.52
C425	297038.115	12879813.050	908.64
C426	297057.990	12879828.216	908.77
C427	297064.971	12879833.544	908.81
C428	297060.118	12879839.904	908.91
C429	297053.137	12879834.576	908.87
C430	297033.262	12879819.410	908.74
C431	297013.387	12879804.245	908.62
C432	297004.469	12879797.440	908.56
C433	296994.763	12879810.160	908.24
C434	297003.681	12879816.965	908.30
C435	297023.547	12879832.141	908.42
C436	297043.431	12879847.296	908.55
C437	297063.935	12879861.636	908.67
C438	297084.822	12879875.476	908.78
C439	297105.709	12879889.315	908.85

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
C440	297126.595	12879903.154	908.89
C441	297147.482	12879916.993	908.90
C442	297151.088	12879919.382	908.90
C443	297167.532	12879931.930	908.87
C444	297187.406	12879947.095	908.82
C445	297207.281	12879962.261	908.73
C446	297227.156	12879977.427	908.62
C447	297247.030	12879992.592	908.49
C448	297266.905	12880007.758	908.36
C449	297286.780	12880022.924	908.23
C450	297306.654	12880038.089	908.10
C451	297321.554	12880049.463	908.00
C452	297326.906	12880052.761	907.98
C453	297348.298	12880065.939	907.90
C454	297367.467	12880079.461	907.80
C455	297384.997	12880096.612	907.61
C456	297073.666	12879848.883	908.99
C457	297094.551	12879862.725	909.09
C458	297115.435	12879876.568	909.17
C459	297136.320	12879890.410	909.21

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
C460	297157.204	12879904.252	909.21
C461	297177.238	12879919.210	909.19
C462	297197.719	12879934.839	909.14
C463	297216.987	12879949.541	909.05
C464	297236.862	12879964.707	908.94
C465	297256.736	12879979.873	908.81
C466	297276.611	12879995.038	908.68
C467	297296.486	12880010.204	908.55
C468	297316.360	12880025.370	908.42
C469	297336.235	12880040.535	908.29
C470	297356.110	12880055.700	908.16
C471	297374.746	12880069.922	908.04
C472	297077.857	12879823.250	908.31
C473	297053.592	12879855.050	908.60
C474	297374.601	12880054.726	907.85
C475	297367.326	12880064.260	908.09
C476	297360.062	12880073.803	907.85
C477	297370.371	12880051.489	907.88
C478	297355.812	12880070.568	907.88



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CONSTRUCT MAIN BASE ENTRANCE**

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

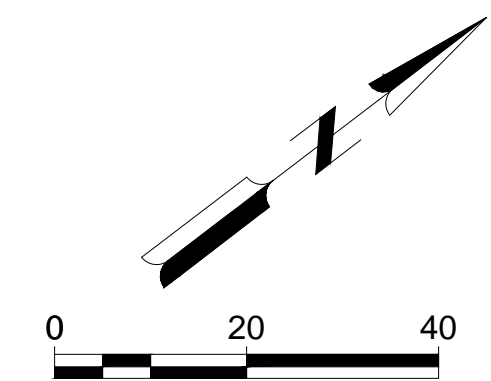
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ANG Project No: MBMV099170
M&H NO.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
DRAWN BY: DAY
CHECKED BY: SAH
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SHEET CONTENTS
PAVING DETAILS

SHEET NO.

C-316



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02/17/21 B3 FINAL

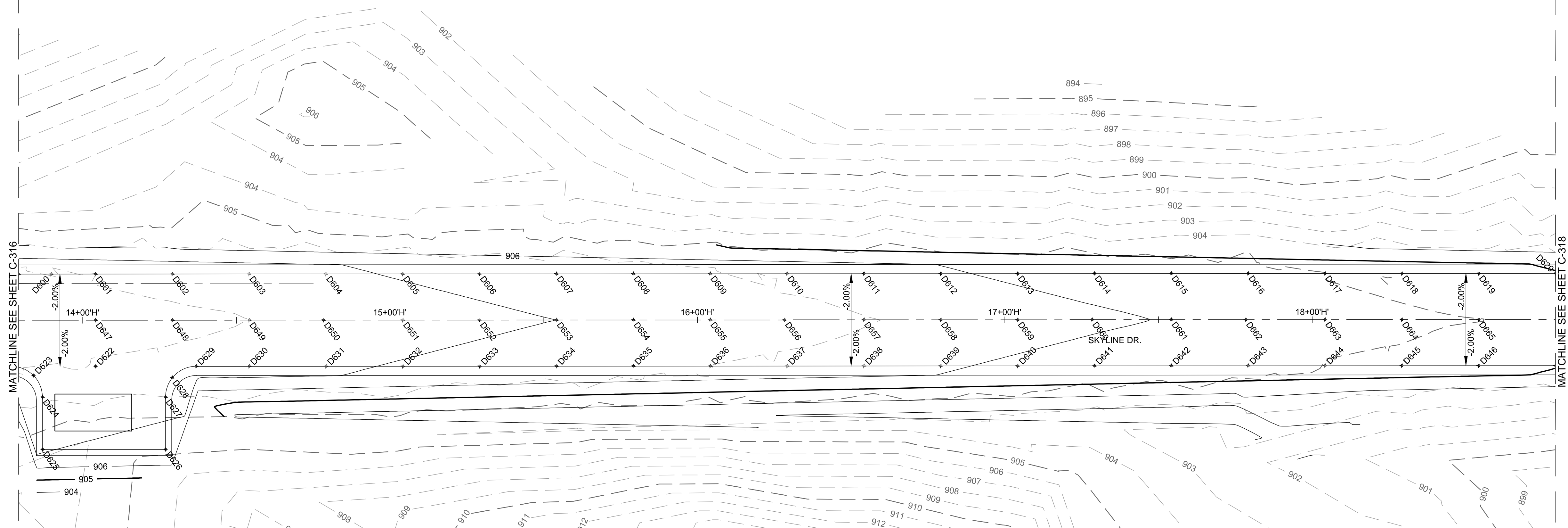
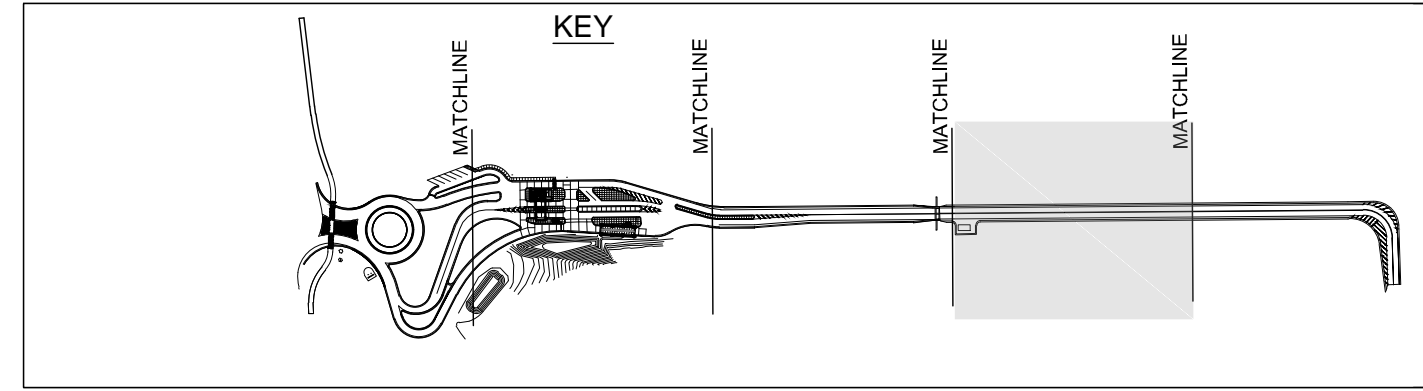
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SHEET CONTENTS
PAVING DETAILS

SHEET NO.

C-317

- LEGEND**
- + A867 SPOT ELEVATION
 - 1.50% SURFACE GRADE
 - FLOW ARROW

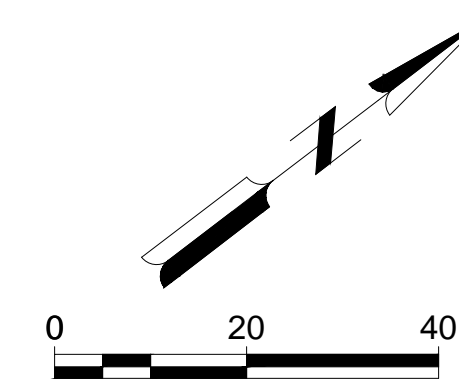


POINT #	NORTHING	EASTING	ELEVATION
D600	297413.360	12880080.518	907.55
D601	297424.833	12880089.273	907.47
D602	297444.708	12880104.439	907.34
D603	297464.583	12880119.604	907.21
D604	297484.457	12880134.770	907.09
D605	297504.332	12880149.936	906.96
D606	297524.207	12880165.101	906.83
D607	297544.081	12880180.267	906.70
D608	297563.956	12880195.433	906.57
D609	297583.831	12880210.598	906.44
D610	297603.705	12880225.764	906.31
D611	297623.580	12880240.929	906.18
D612	297643.455	12880256.095	906.05
D613	297663.330	12880271.261	905.92
D614	297683.204	12880286.426	905.79
D615	297703.079	12880301.592	905.66
D616	297722.954	12880316.758	905.53
D617	297742.828	12880331.923	905.41
D618	297762.703	12880347.089	905.28
D619	297782.578	12880362.255	905.15

POINT #	NORTHING	EASTING	ELEVATION
D620	297802.452	12880377.420	905.02
D622	297406.635	12880113.123	907.47
D623	297388.841	12880103.230	907.52
D624	297386.880	12880110.628	907.36
D625	297376.568	12880124.142	907.02
D626	297408.367	12880148.408	906.82
D627	297418.680	12880134.893	907.16
D628	297424.253	12880131.246	907.27
D629	297432.696	12880133.009	907.30
D630	297446.384	12880143.454	907.21
D631	297466.259	12880158.620	907.09
D632	297486.133	12880173.785	906.96
D633	297506.008	12880188.951	906.83
D634	297525.883	12880204.116	906.70
D635	297545.757	12880219.282	906.57
D636	297565.632	12880234.448	906.44
D637	297585.507	12880249.613	906.31
D638	297605.381	12880264.779	906.18
D639	297625.256	12880279.945	906.05
D640	297645.131	12880295.110	905.92

POINT #	NORTHING	EASTING	ELEVATION
D641	297665.005	12880310.276	905.79
D642	297684.880	12880325.442	905.66
D643	297704.755	12880340.607	905.53
D644	297724.629	12880355.773	905.41
D645	297744.504	12880370.939	905.28
D646	297764.379	12880386.104	905.15
D647	297784.254	12880401.269	905.02
D648	297804.129	12880416.434	904.89
D649	297824.004	12880431.600	904.76
D650	297843.879	12880446.765	904.63
D651	297863.754	12880461.930	904.50
D652	297883.629	12880477.095	904.37
D653	297903.504	12880492.260	904.24
D654	297923.379	12880507.425	904.11
D655	297943.254	12880522.590	903.98
D656	297963.129	12880537.755	903.85
D657	297983.004	12880552.920	903.72
D658	298002.879	12880568.085	903.59
D659	298022.754	12880583.250	903.46
D660	298042.629	12880598.415	903.33

POINT #	NORTHING	EASTING	ELEVATION
D661	297693.979	12880313.517	905.96
D662	297713.248	12880328.220	905.84
D663	297733.729	12880343.848	905.71
D664	297753.604	12880359.014	905.58
D665	297773.478	12880374.179	905.45





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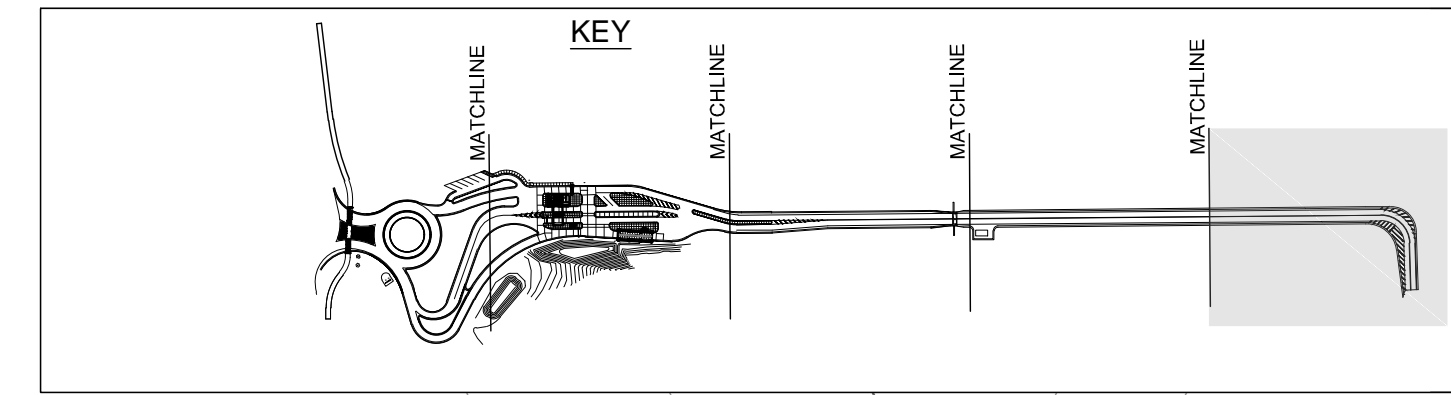
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SHEET CONTENTS
PAVING DETAILS

SHEET NO.

C-318

- LEGEND**
- + A867 SPOT ELEVATION
 - 1.50% SURFACE GRADE
 - FLOW ARROW



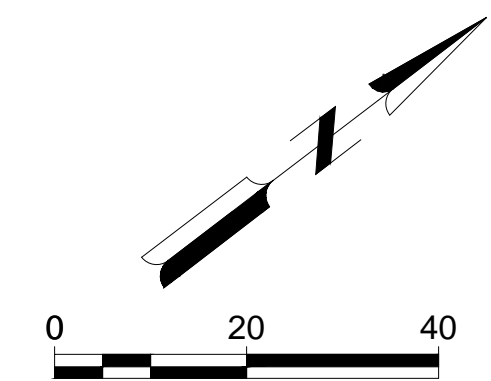
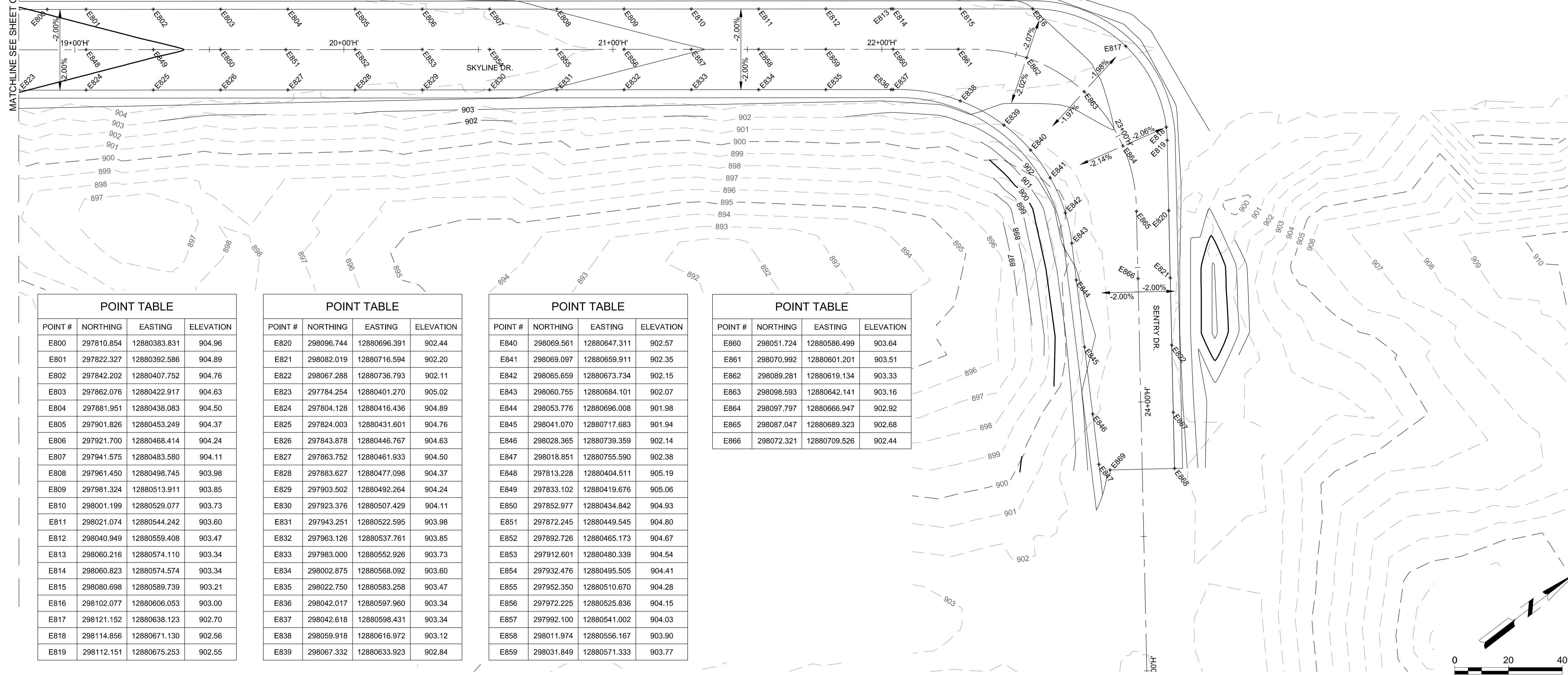
MATCHLINE SEE SHEET C-317

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
E800	297810.854	12880383.831	904.96
E801	297822.327	12880392.586	904.89
E802	297842.202	12880407.752	904.76
E803	297862.076	12880422.917	904.63
E804	297881.951	12880438.083	904.50
E805	297901.826	12880453.249	904.37
E806	297921.700	12880468.414	904.24
E807	297941.575	12880483.580	904.11
E808	297961.450	12880498.745	903.98
E809	297981.324	12880513.911	903.85
E810	298001.199	12880529.077	903.73
E811	298021.074	12880544.242	903.60
E812	298040.949	12880559.408	903.47
E813	298060.823	12880574.574	903.34
E814	298080.698	12880589.739	903.21
E815	298102.077	12880606.053	903.00
E816	298121.152	12880638.123	902.70
E817	298114.856	12880671.130	902.56
E818	298112.151	12880675.253	902.55

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
E820	298096.744	12880696.391	902.44
E821	298082.019	12880716.594	902.20
E822	298067.288	12880736.793	902.11
E823	297784.254	12880401.270	905.02
E824	297804.128	12880416.436	904.89
E825	297824.003	12880431.601	904.76
E826	297843.878	12880446.767	904.63
E827	297863.752	12880461.933	904.50
E828	297883.627	12880477.098	904.37
E829	297903.502	12880492.264	904.24
E830	297923.376	12880507.429	904.11
E831	297943.251	12880522.595	903.98
E832	297963.126	12880537.761	903.85
E833	297983.000	12880552.926	903.73
E834	298002.875	12880568.092	903.60
E835	298022.750	12880583.258	903.47
E836	298042.624	12880598.424	903.34
E837	298062.500	12880613.590	903.21
E838	298082.375	12880628.756	903.08
E839	298102.250	12880643.922	902.95

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
E840	298069.561	12880647.311	902.57
E841	298069.097	12880659.911	902.35
E842	298065.659	12880673.734	902.15
E843	298060.755	12880684.101	902.07
E844	298053.776	12880696.008	901.98
E845	298041.070	12880717.683	901.94
E846	298028.365	12880739.359	902.14
E847	298018.851	12880755.590	902.38
E848	297813.228	12880404.511	905.19
E849	297833.102	12880419.676	905.06
E850	297852.977	12880434.842	904.93
E851	297872.245	12880449.545	904.80
E852	297892.726	12880465.173	904.67
E853	297912.601	12880480.339	904.54
E854	297932.476	12880495.505	904.41
E855	297952.350	12880510.670	904.28
E856	297972.225	12880525.836	904.15
E857	297992.100	12880541.002	904.03
E858	298011.974	12880556.167	903.90
E859	298031.849	12880571.333	903.77

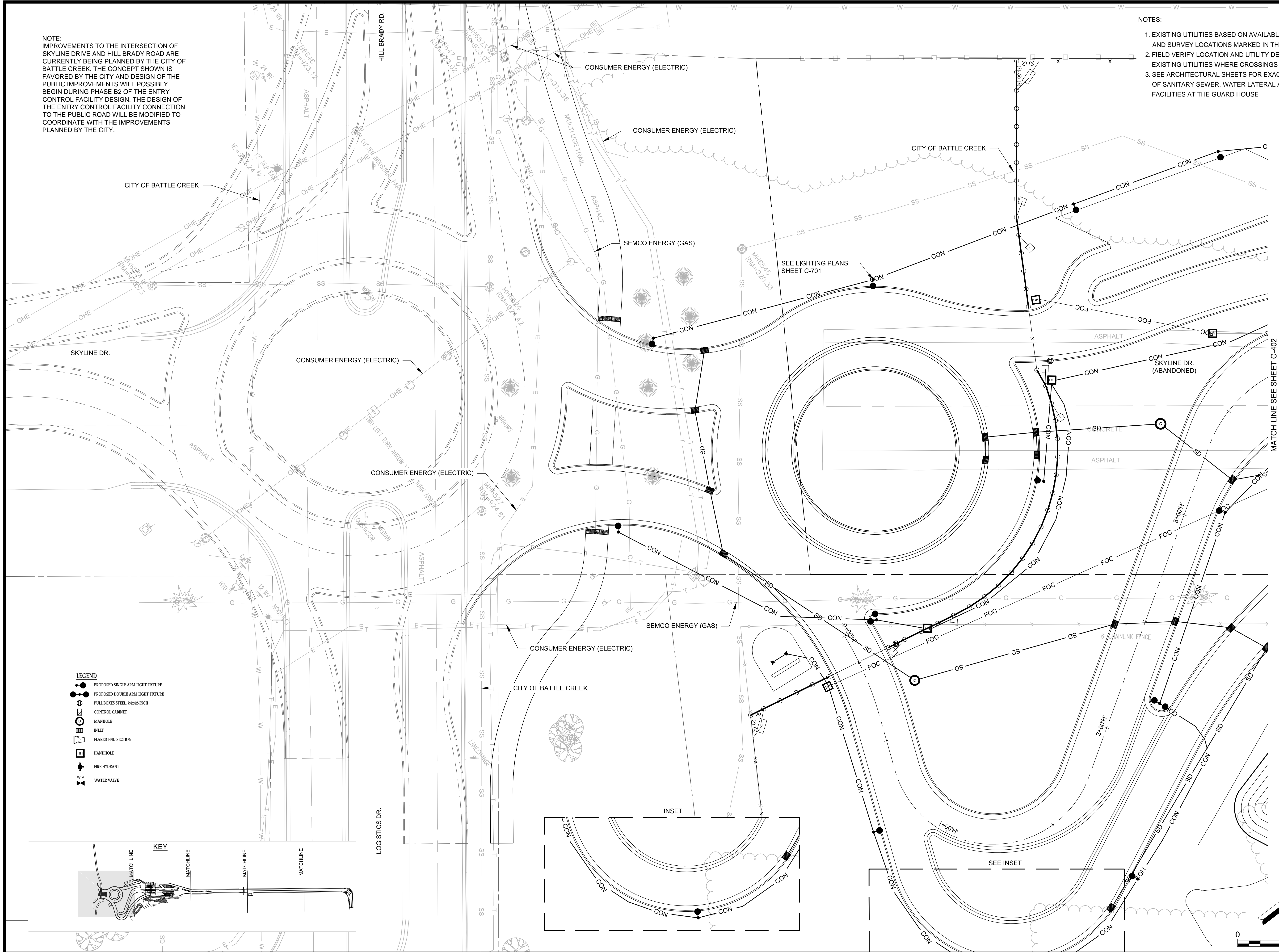
POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
E860	298051.724	12880586.499	903.64
E861	298070.992	12880601.201	903.51
E862	298089.281	12880619.134	903.33
E863	298098.593	12880642.141	903.16
E864	298097.797	12880666.947	902.92
E865	298087.047	12880689.323	902.68
E866	298072.321	12880709.526	902.44



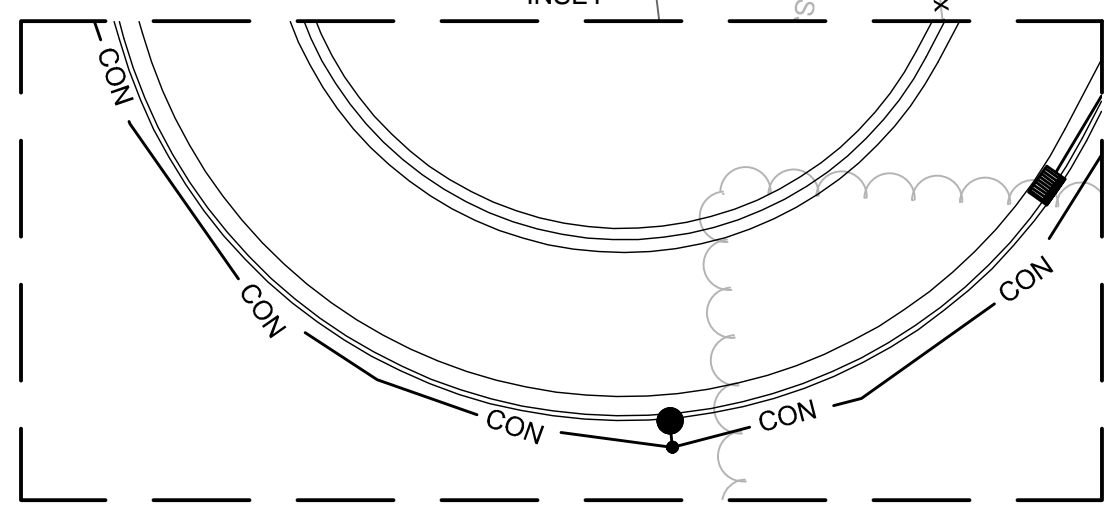
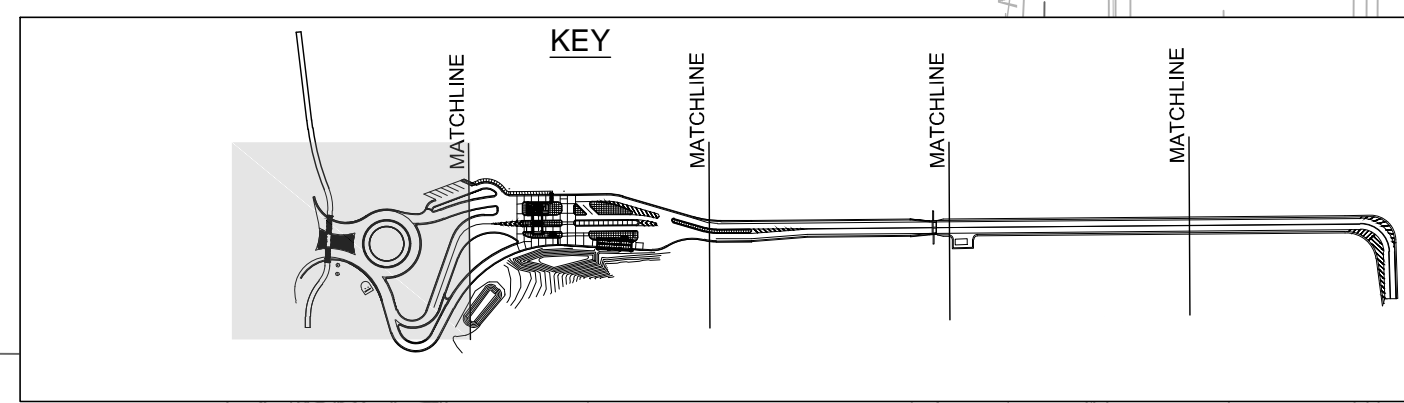
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NOTE:
IMPROVEMENTS TO THE INTERSECTION OF SKYLINE DRIVE AND HILL BRADY ROAD ARE CURRENTLY BEING PLANNED BY THE CITY OF BATTLE CREEK. THE CONCEPT SHOWN IS FAVORED BY THE CITY AND DESIGN OF THE PUBLIC IMPROVEMENTS WILL POSSIBLY BEGIN DURING PHASE B2 OF THE ENTRY CONTROL FACILITY DESIGN. THE DESIGN OF THE ENTRY CONTROL FACILITY CONNECTION TO THE PUBLIC ROAD WILL BE MODIFIED TO COORDINATE WITH THE IMPROVEMENTS PLANNED BY THE CITY.

- NOTES:
1. EXISTING UTILITIES BASED ON AVAILABLE AS-BUILTS AND SURVEY LOCATIONS MARKED IN THE FIELD
 2. FIELD VERIFY LOCATION AND UTILITY DEPTH OF ALL EXISTING UTILITIES WHERE CROSSINGS ARE PROPOSED
 3. SEE ARCHITECTURAL SHEETS FOR EXACT LOCATIONS OF SANITARY SEWER, WATER LATERAL AND OTHER FACILITIES AT THE GUARD HOUSE



- LEGEND
- PROPOSED SINGLE ARM LIGHT FIXTURE
 - PROPOSED DOUBLE ARM LIGHT FIXTURE
 - ⊕ PULL BOXES STEEL, 24x42 INCH
 - ⊕ CONTROL CABINET
 - ⊕ MANHOLE
 - ⊕ INLET
 - ⊕ FLARED END SECTION
 - ⊕ HANDHOLE
 - ⊕ FIRE HYDRANT
 - ⊕ WATER VALVE



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CONSTRUCT MAIN BASE ENTRANCE**
BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

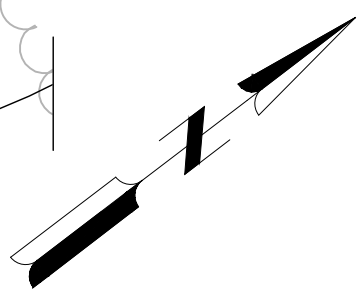
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SHEET CONTENTS
UTILITY PLAN

SHEET NO.

C-401



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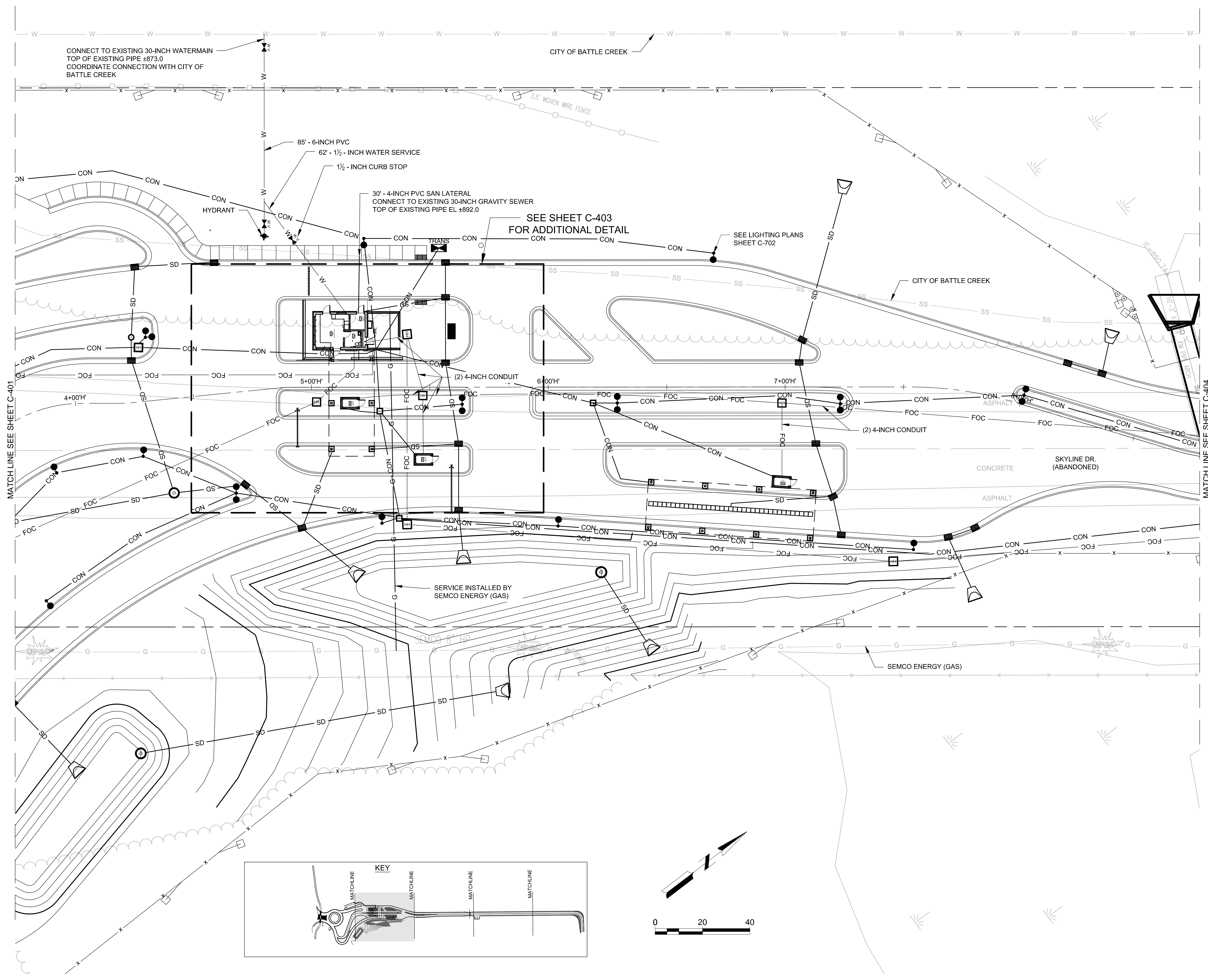
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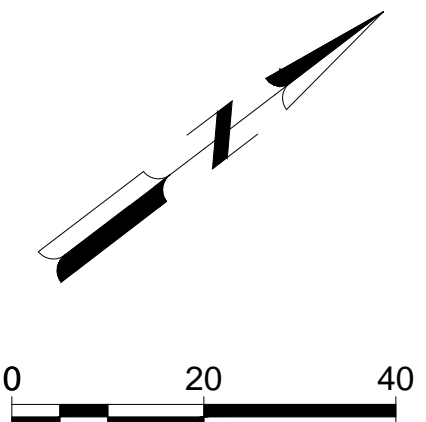
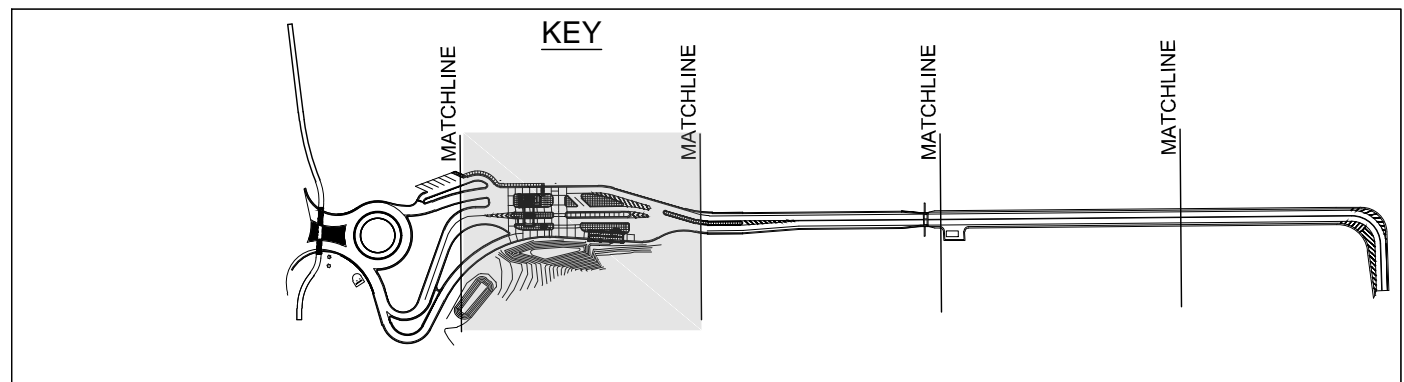
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UTILITY PLAN

SHEET NO.

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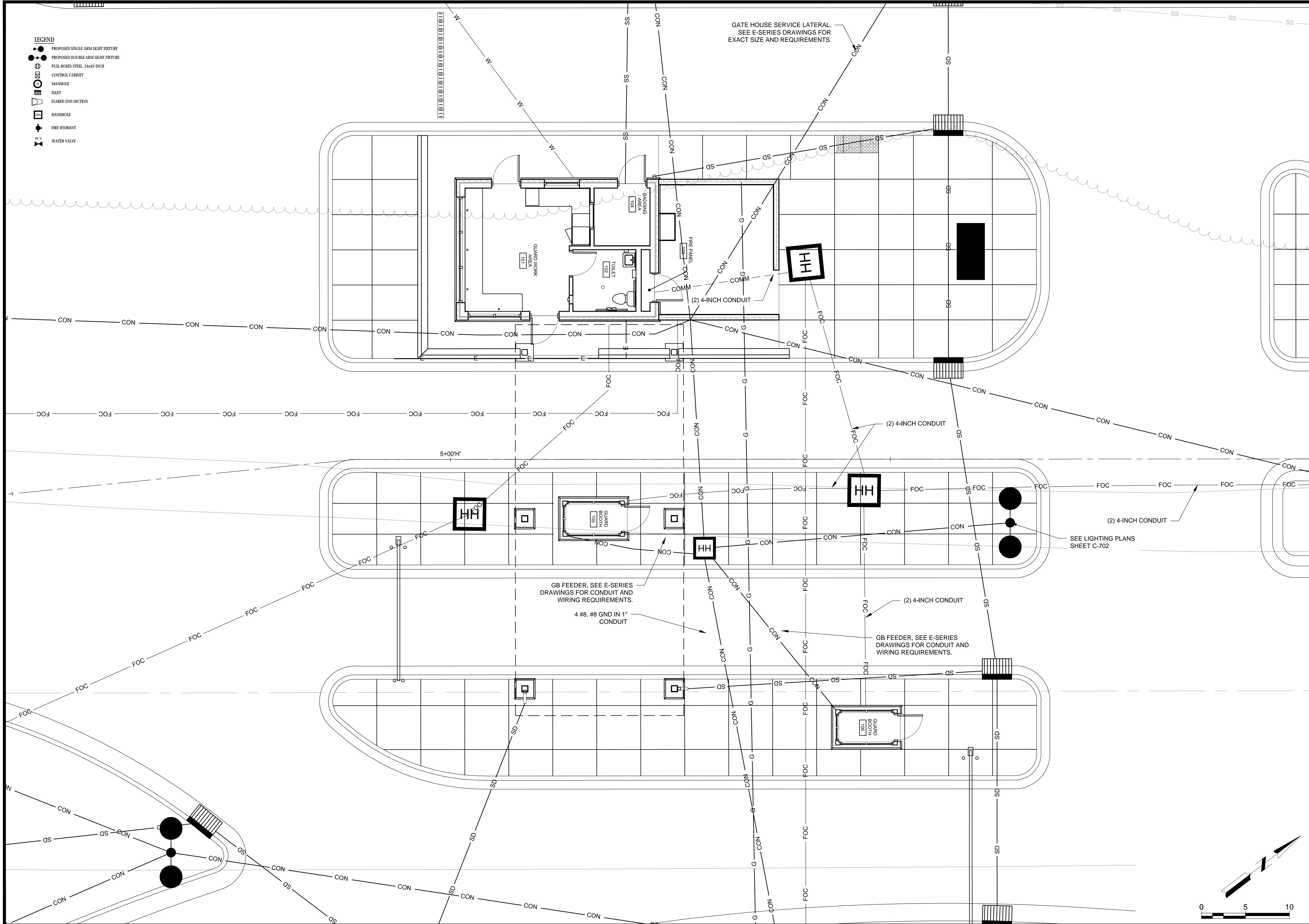


- LEGEND**
- PROPOSED SINGLE ARM LIGHT FIXTURE
 - PROPOSED DOUBLE ARM LIGHT FIXTURE
 - PULL BOXES STEEL, 24x42-INCH
 - CONTROL CABINET
 - MANTICLE
 - INLET
 - FLARED END SECTION
 - HANDHOLE
 - FIRE HYDRANT
 - WATER VALVE



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- LEGEND**
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 - PROPOSED DOUBLE ARM LIGHT FIXTURE
 - ⊕ FULL BOXES STEEL, 24x42-INCH
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 - ⊞ FIRE HYDRANT
 - WV WATER VALVE



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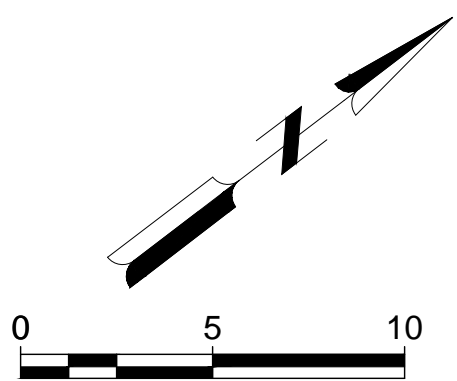
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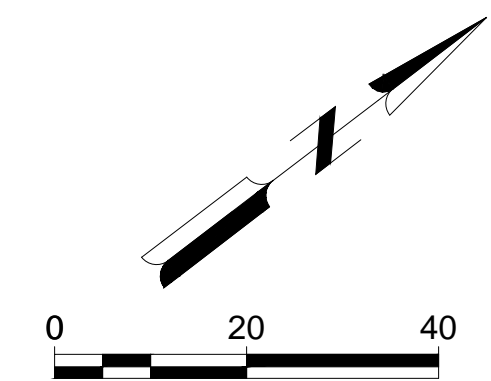
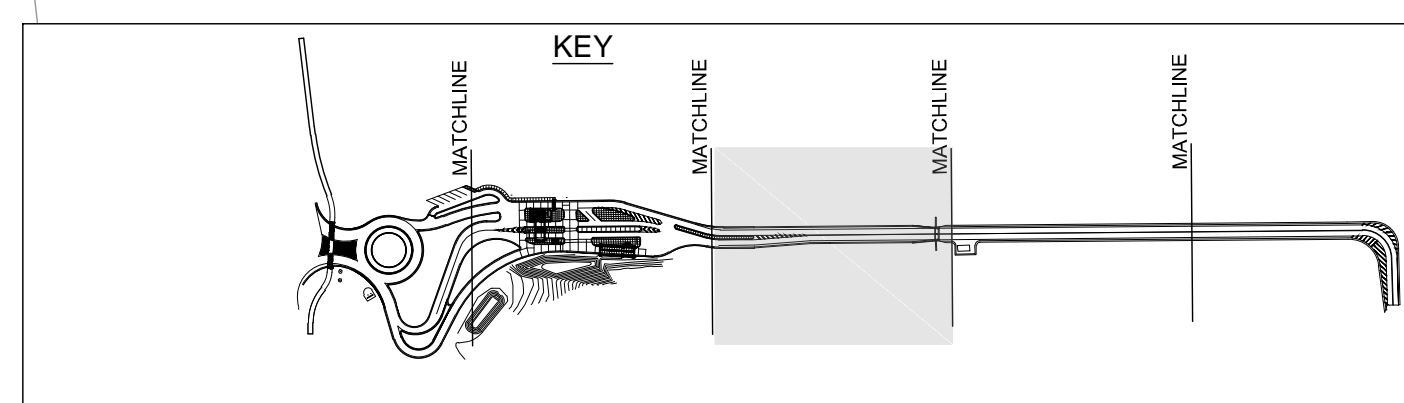
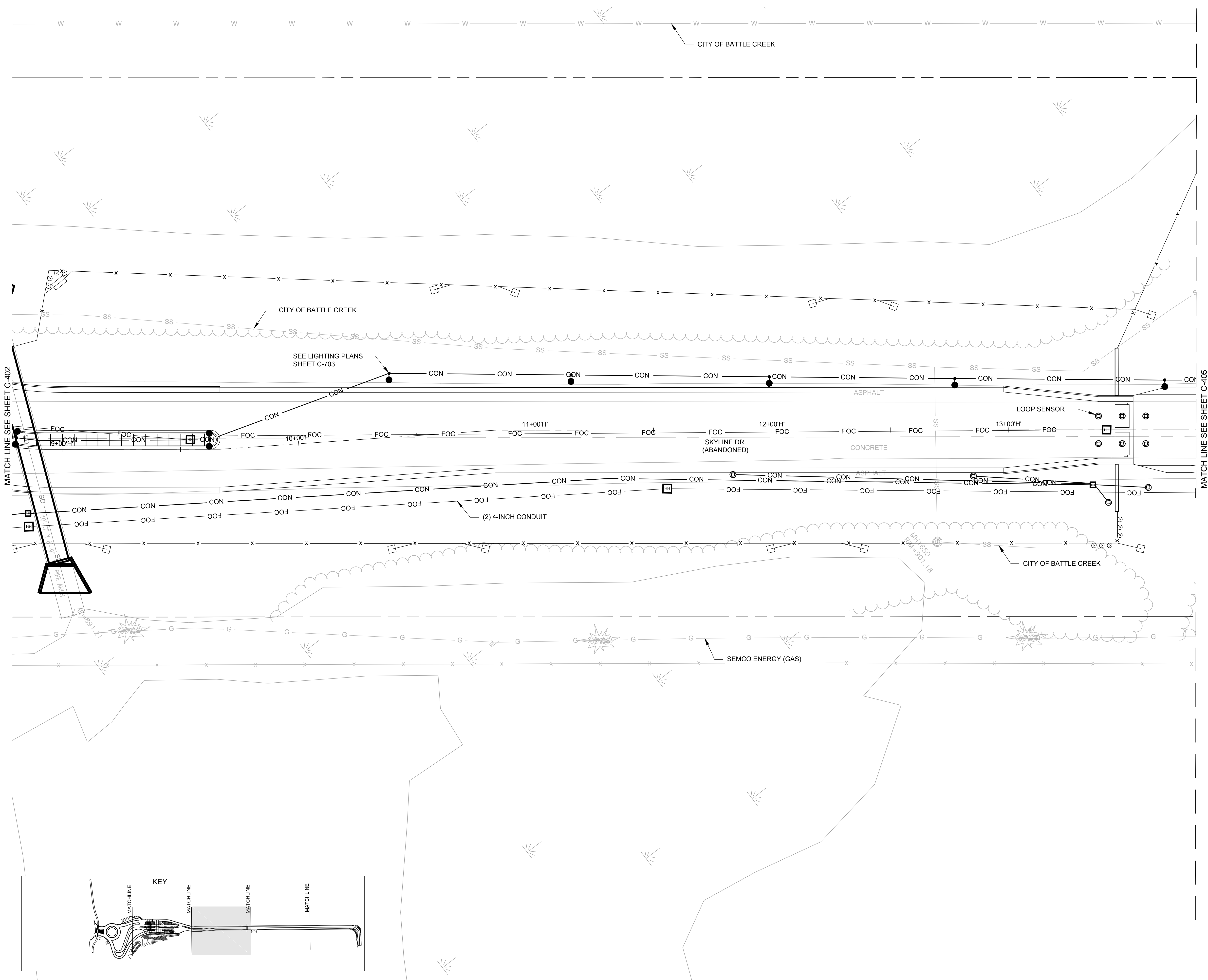
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SHEET CONTENTS
UTILITY PLAN

SHEET NO.

C-404

- LEGEND**
- PROPOSED SINGLE ARM LIGHT FIXTURE
 - PROPOSED DOUBLE ARM LIGHT FIXTURE
 - ⊗ FULL BOXES STEEL 24x42-INCH
 - ⊕ CONTROL CABINET
 - ⊖ MANHOLE
 - ⊙ INLET
 - ⊚ FLARED END SECTION
 - ⊛ HANDHOLE
 - ⊜ FIRE HYDRANT
 - W V WATER VALVE



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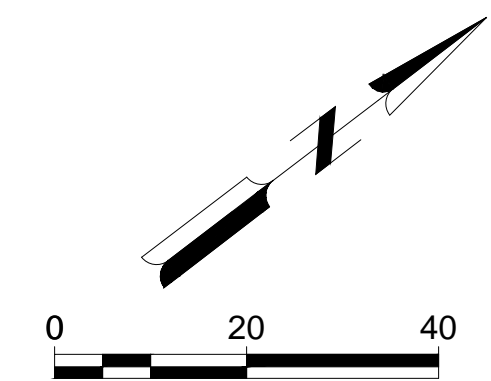
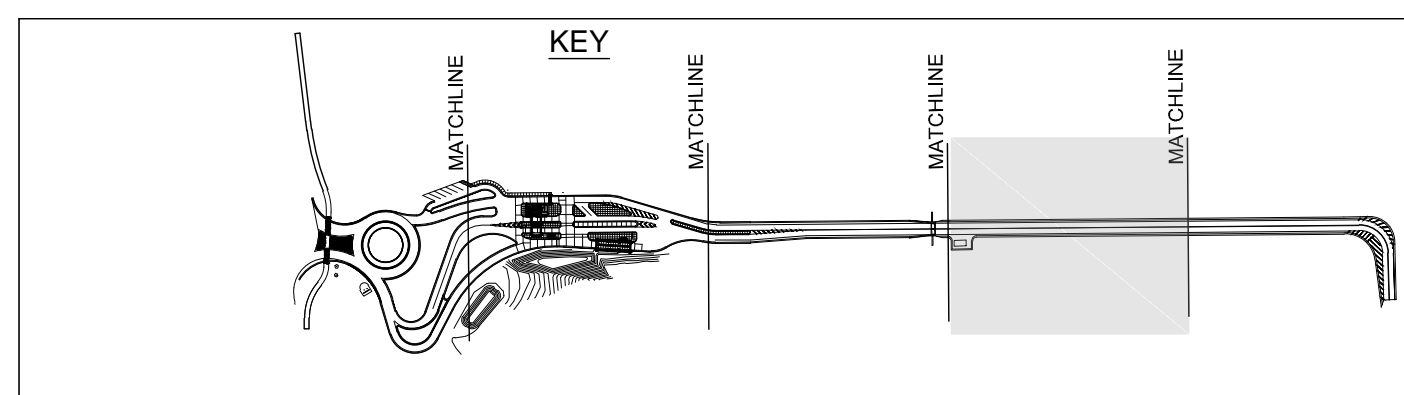
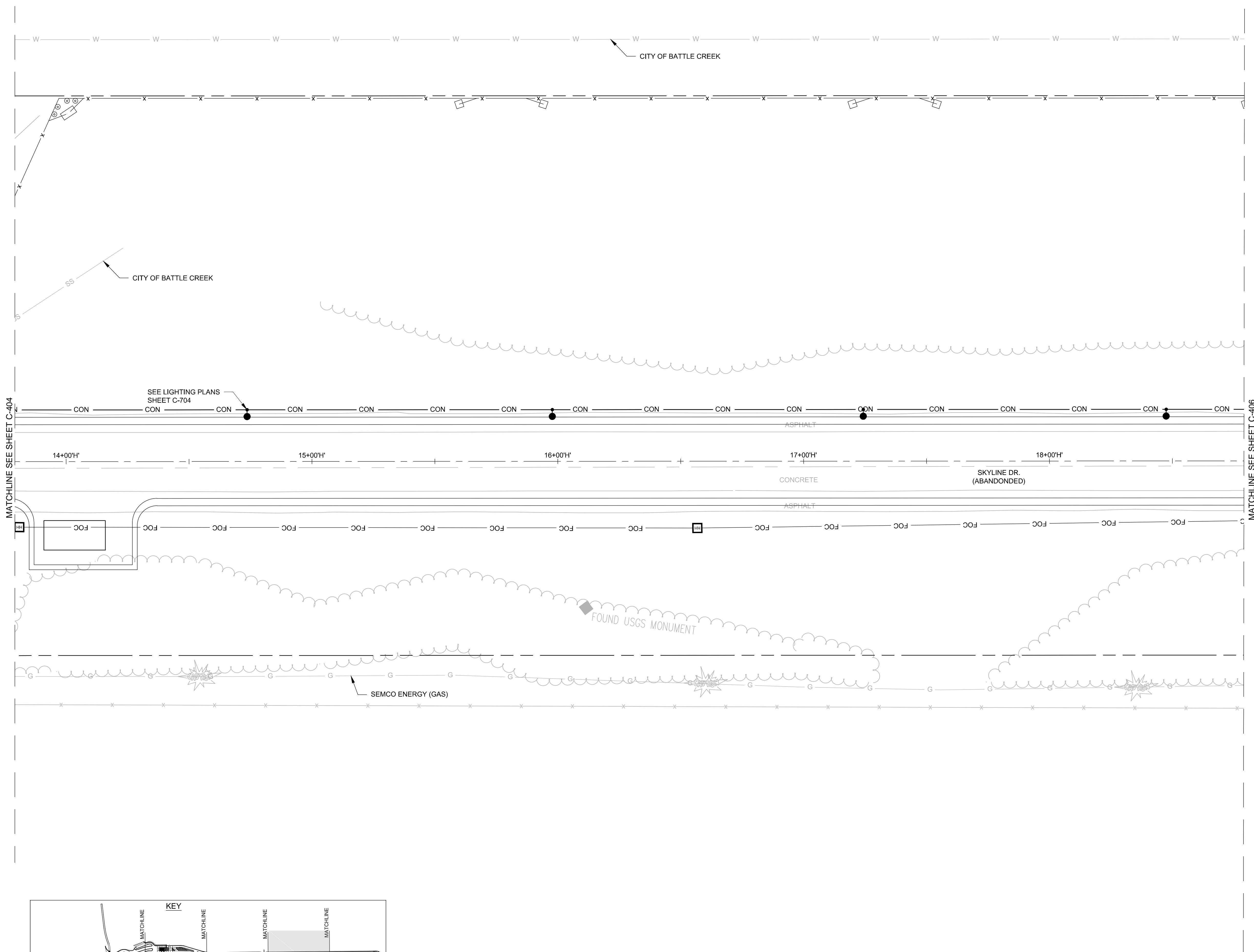
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SHEET CONTENTS
UTILITY PLAN

SHEET NO.

C-405

- LEGEND**
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 - PROPOSED DOUBLE ARM LIGHT FIXTURE
 - ⊕ FULL BOXES STEEL, 24x42-INCH
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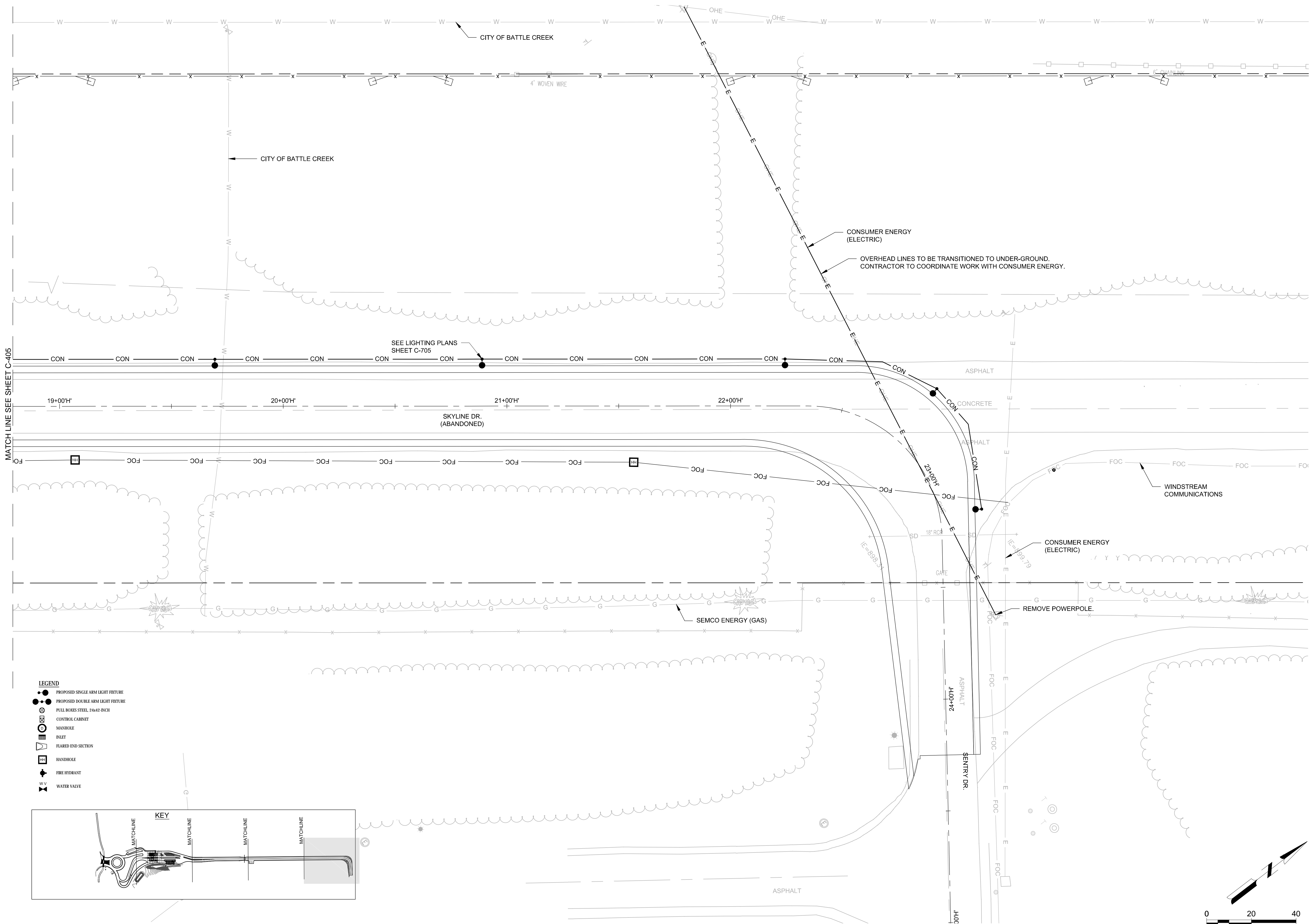
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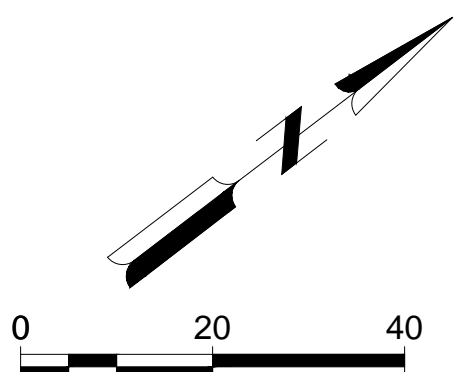
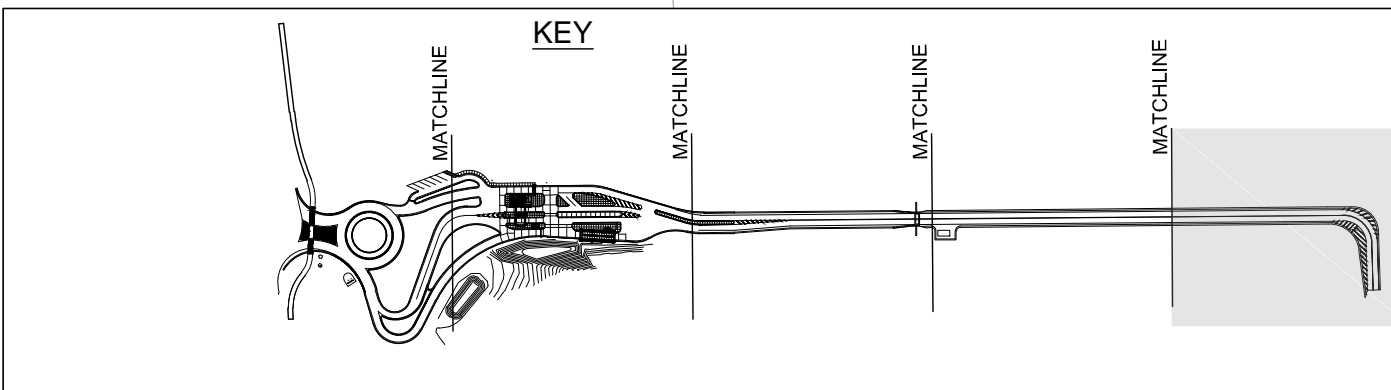
SHEET CONTENTS
UTILITY PLAN

SHEET NO.

C-406



- LEGEND**
- PROPOSED SINGLE ARM LIGHT FIXTURE
 - PROPOSED DOUBLE ARM LIGHT FIXTURE
 - ⊗ FULL BOXES STEEL 24x42 INCH
 - ⊗ CONTROL CABINET
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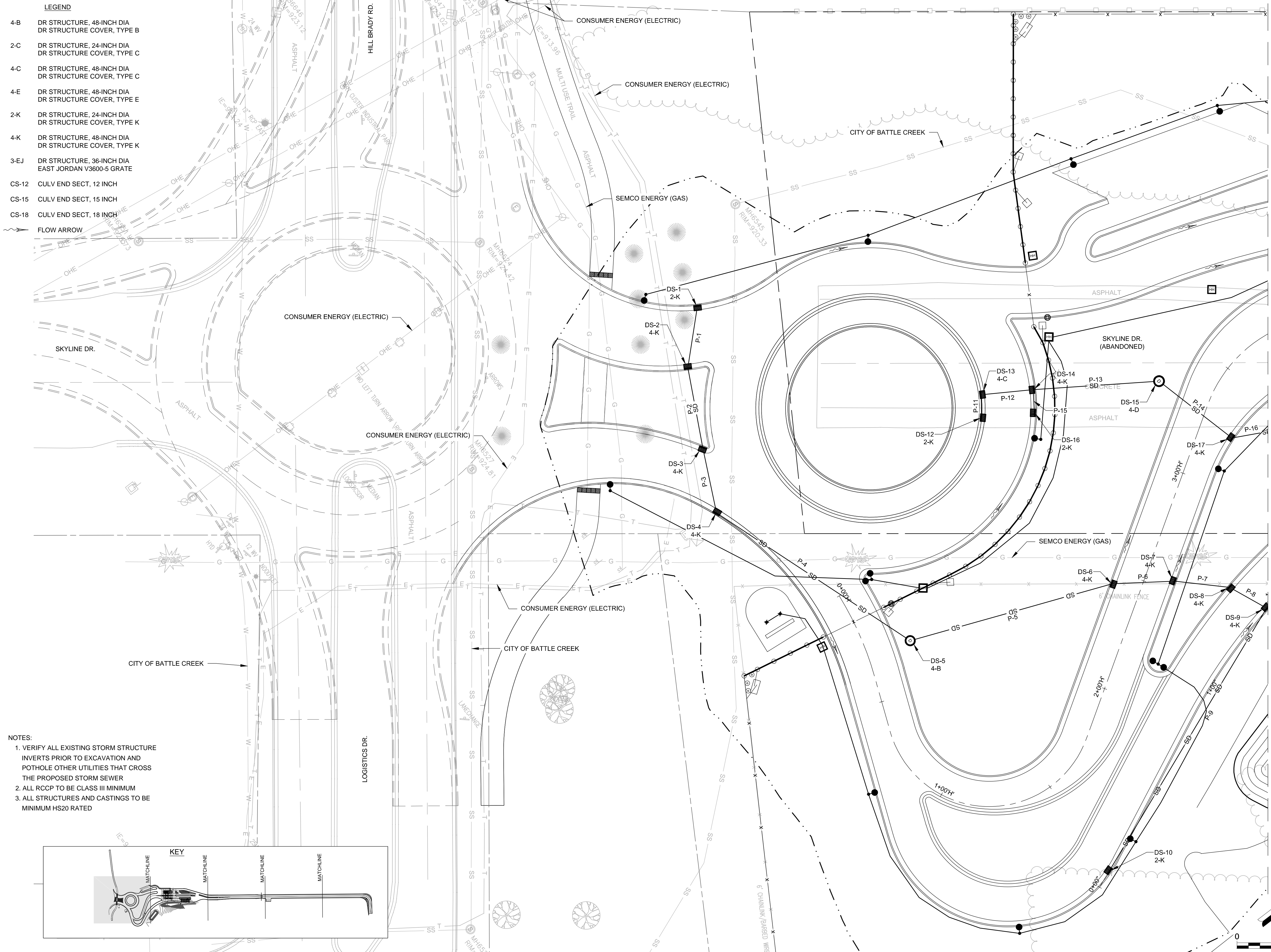
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SHEET CONTENTS
STORM SEWER PLAN
AND PROFILES

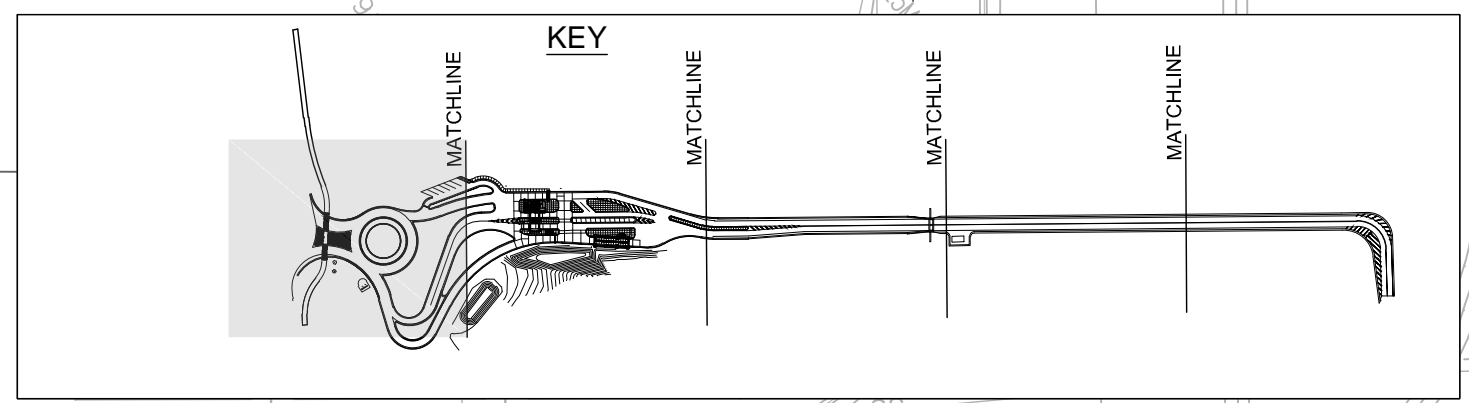
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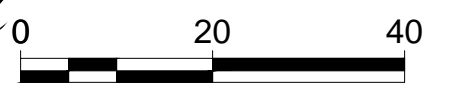


- LEGEND**
- 4-B DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE B
 - 2-C DR STRUCTURE, 24-INCH DIA
DR STRUCTURE COVER, TYPE C
 - 4-C DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE C
 - 4-E DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE E
 - 2-K DR STRUCTURE, 24-INCH DIA
DR STRUCTURE COVER, TYPE K
 - 4-K DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE K
 - 3-EJ DR STRUCTURE, 36-INCH DIA
EAST JORDAN V3600-5 GRATE
 - CS-12 CULV END SECT, 12 INCH
 - CS-15 CULV END SECT, 15 INCH
 - CS-18 CULV END SECT, 18 INCH
 - FLOW ARROW

- NOTES:**
1. VERIFY ALL EXISTING STORM STRUCTURE INVERTS PRIOR TO EXCAVATION AND POT HOLE OTHER UTILITIES THAT CROSS THE PROPOSED STORM SEWER
 2. ALL RCCP TO BE CLASS III MINIMUM
 3. ALL STRUCTURES AND CASTINGS TO BE MINIMUM HS20 RATED



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MATCH LINE SEE SHEET C-142



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BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

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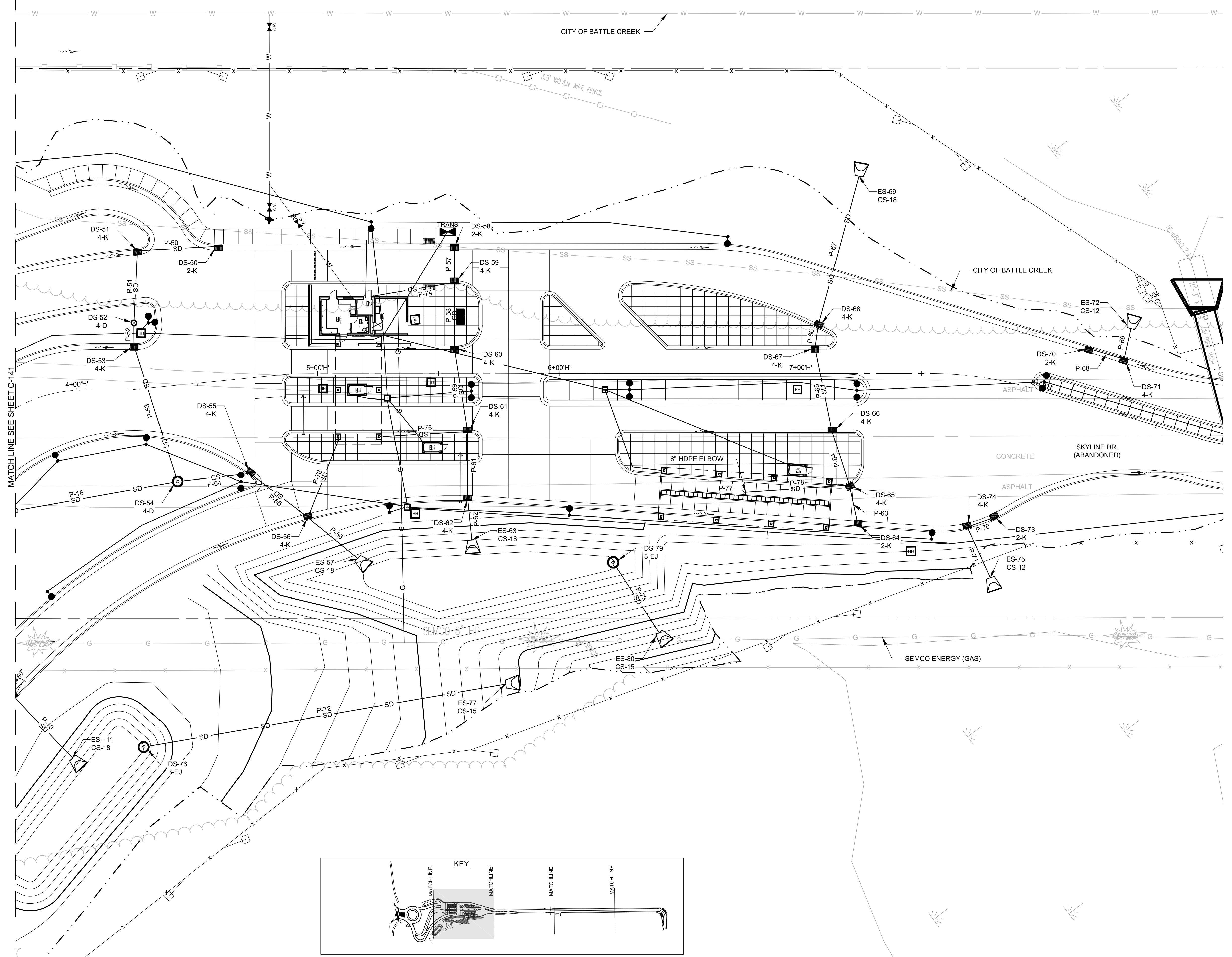
SHEET CONTENTS
STORM SEWER PLAN
AND PROFILES

SHEET NO.

C-442

LEGEND

- 4-B DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE B
- 2-C DR STRUCTURE, 24-INCH DIA
DR STRUCTURE COVER, TYPE C
- 4-C DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE C
- 4-E DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE E
- 2-K DR STRUCTURE, 24-INCH DIA
DR STRUCTURE COVER, TYPE K
- 4-K DR STRUCTURE, 48-INCH DIA
DR STRUCTURE COVER, TYPE K
- 3-EJ DR STRUCTURE, 36-INCH DIA
EAST JORDAN V3600-5 GRATE
- CS-12 CULV END SECT, 12 INCH
- CS-15 CULV END SECT, 15 INCH
- CS-18 CULV END SECT, 18 INCH
- FLOW ARROW



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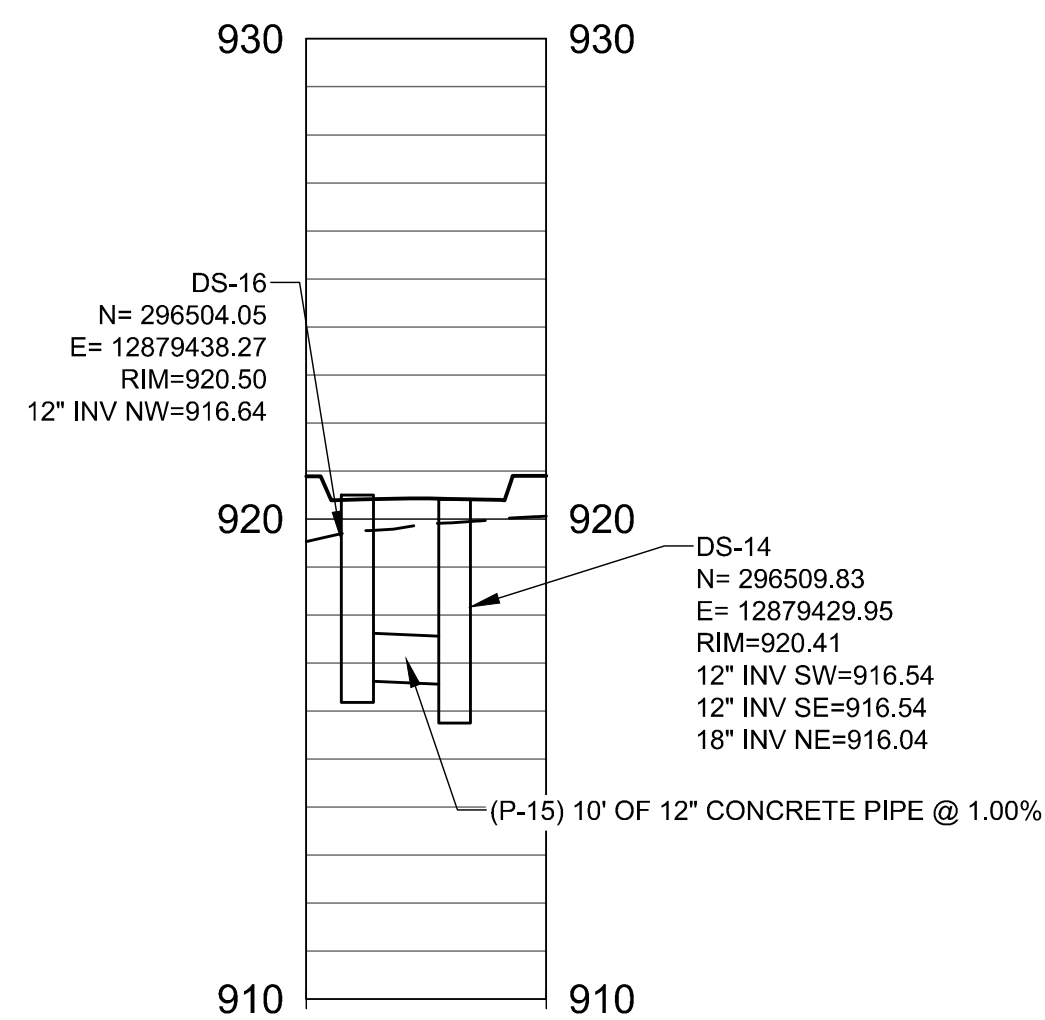
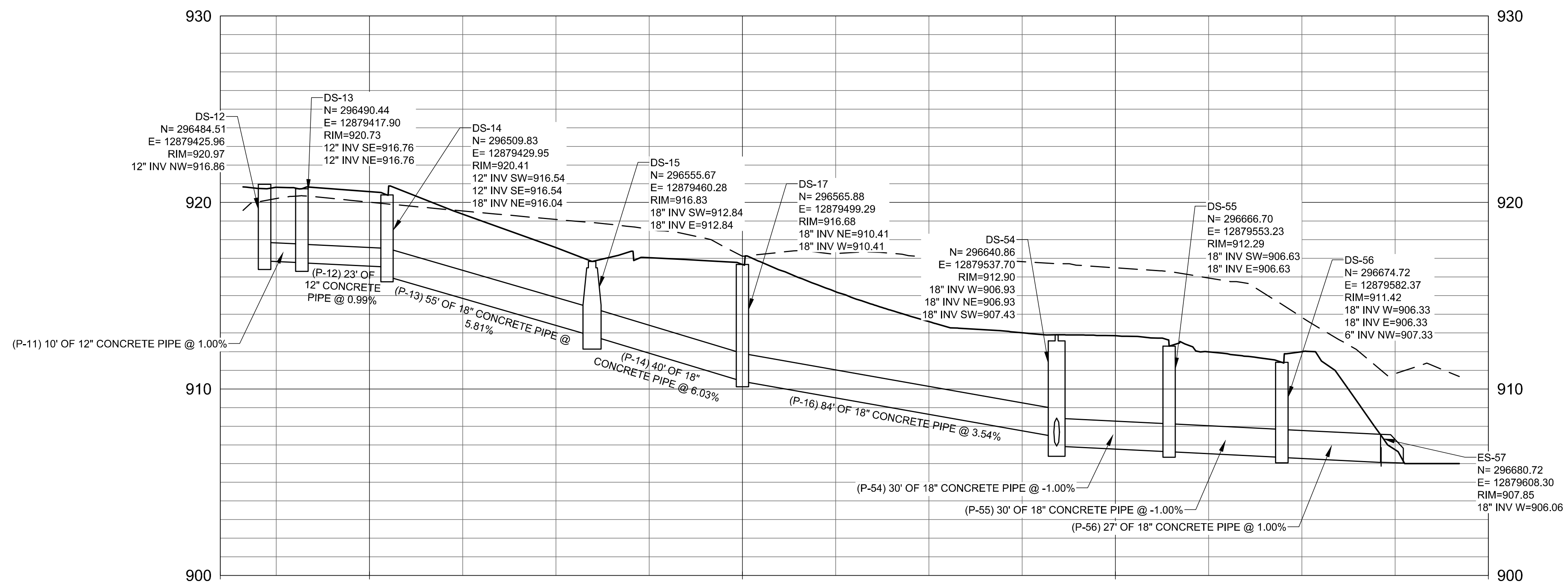
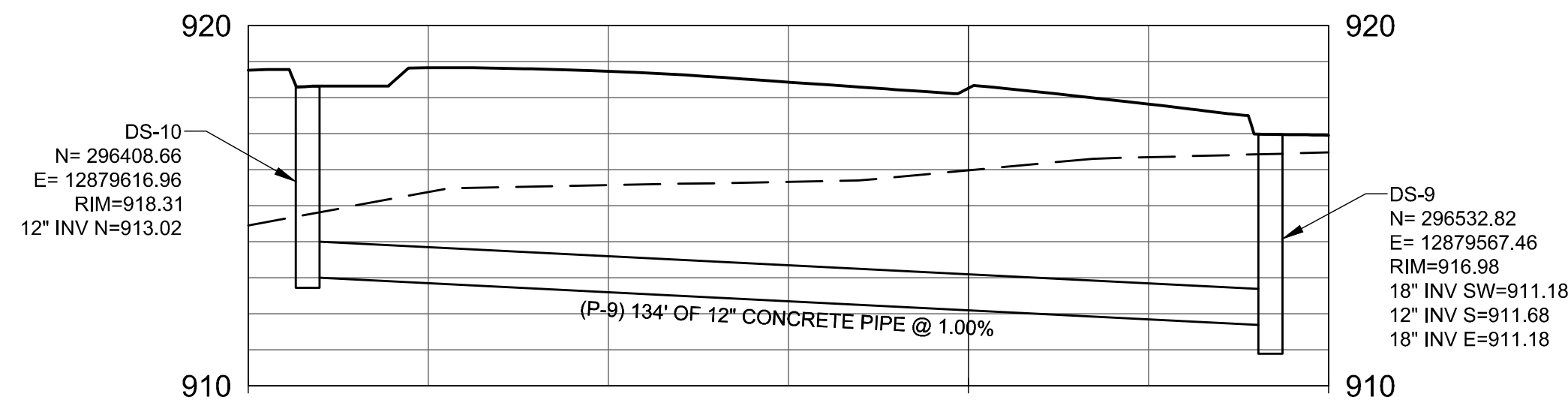
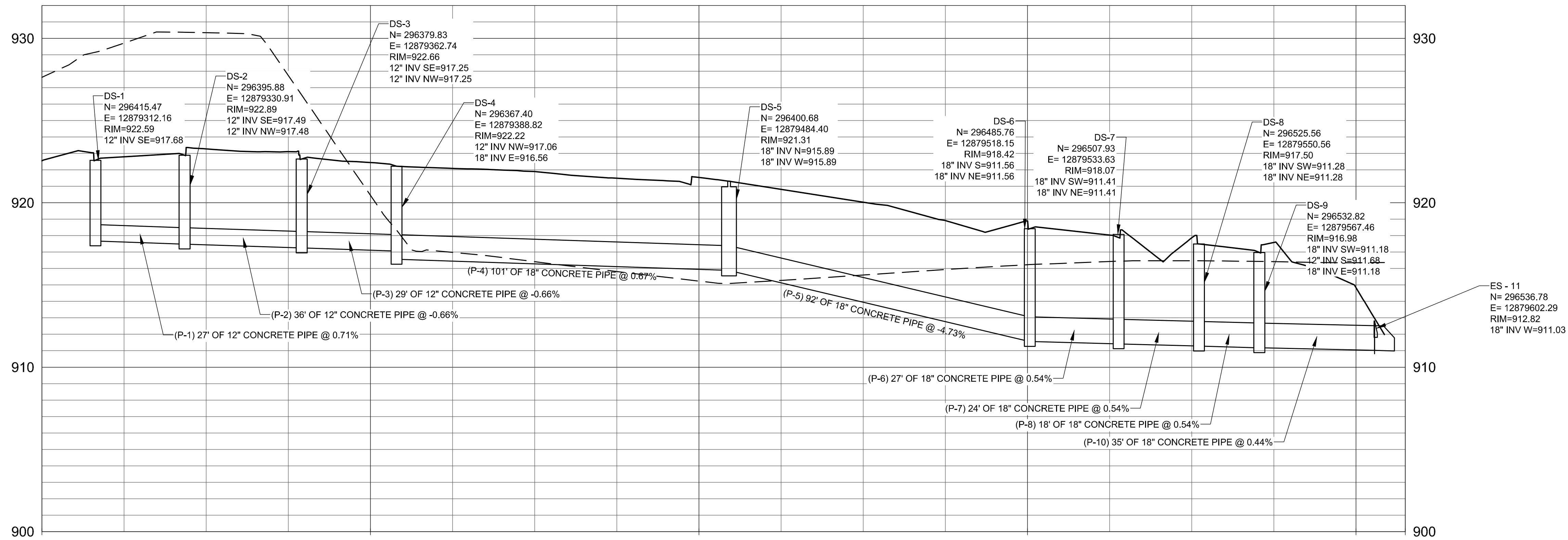
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STORM SEWER PLAN
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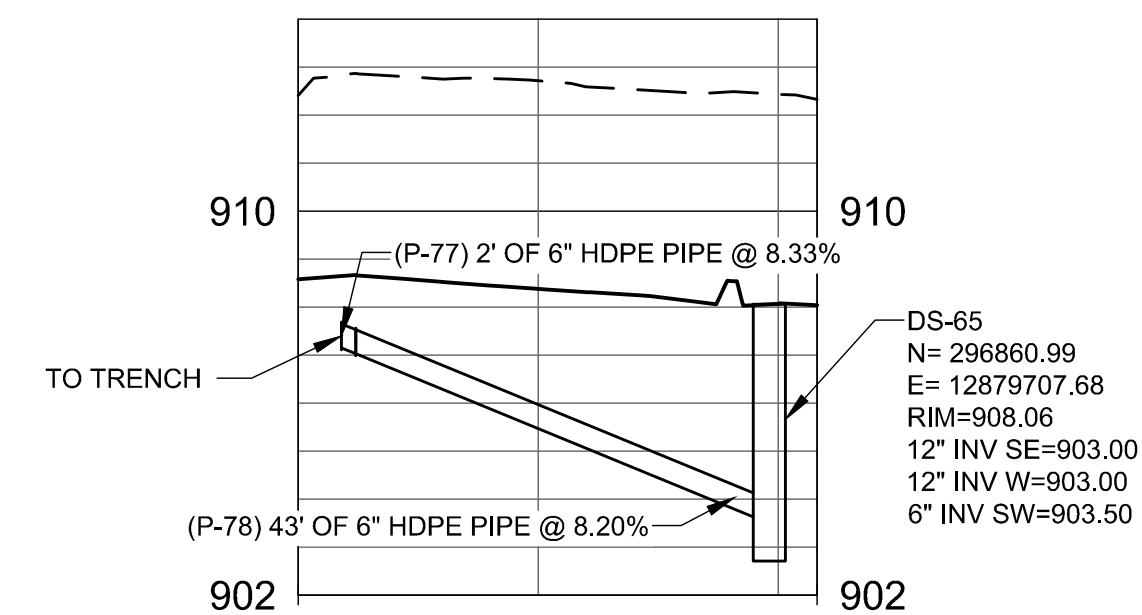
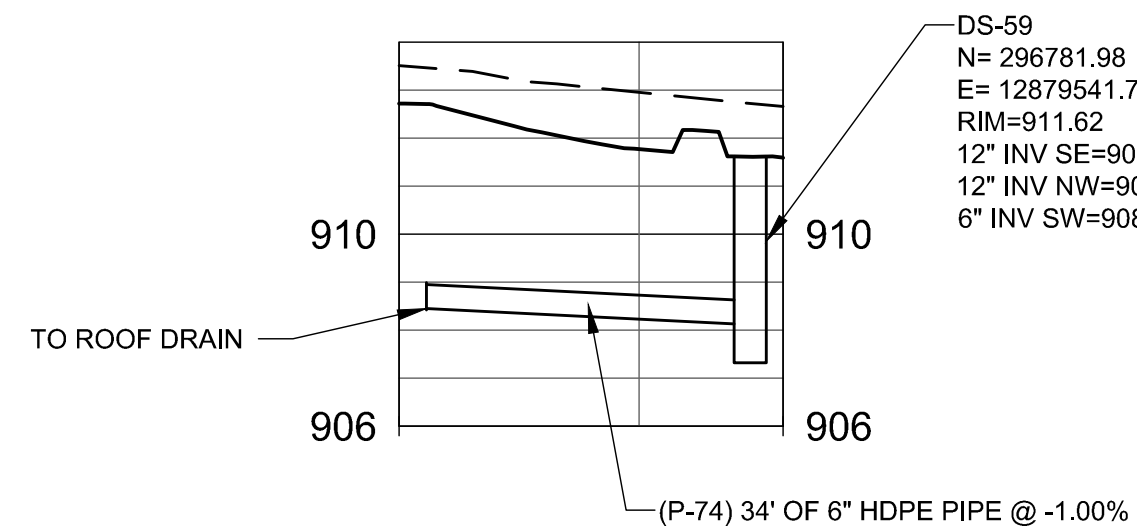
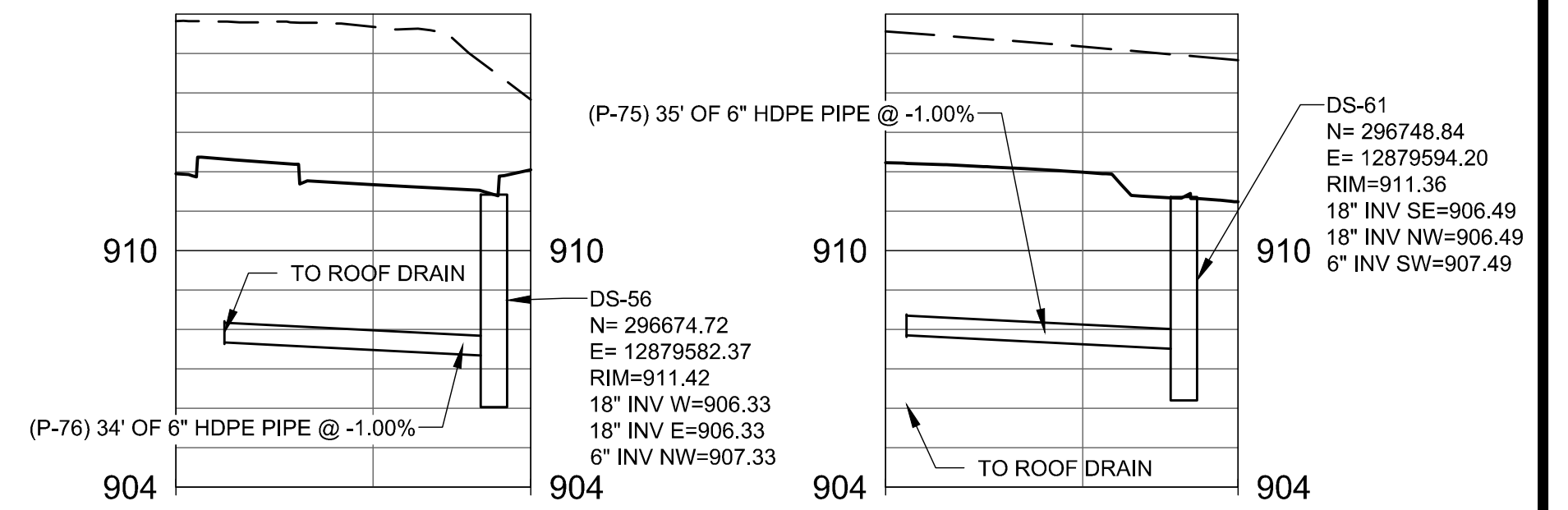
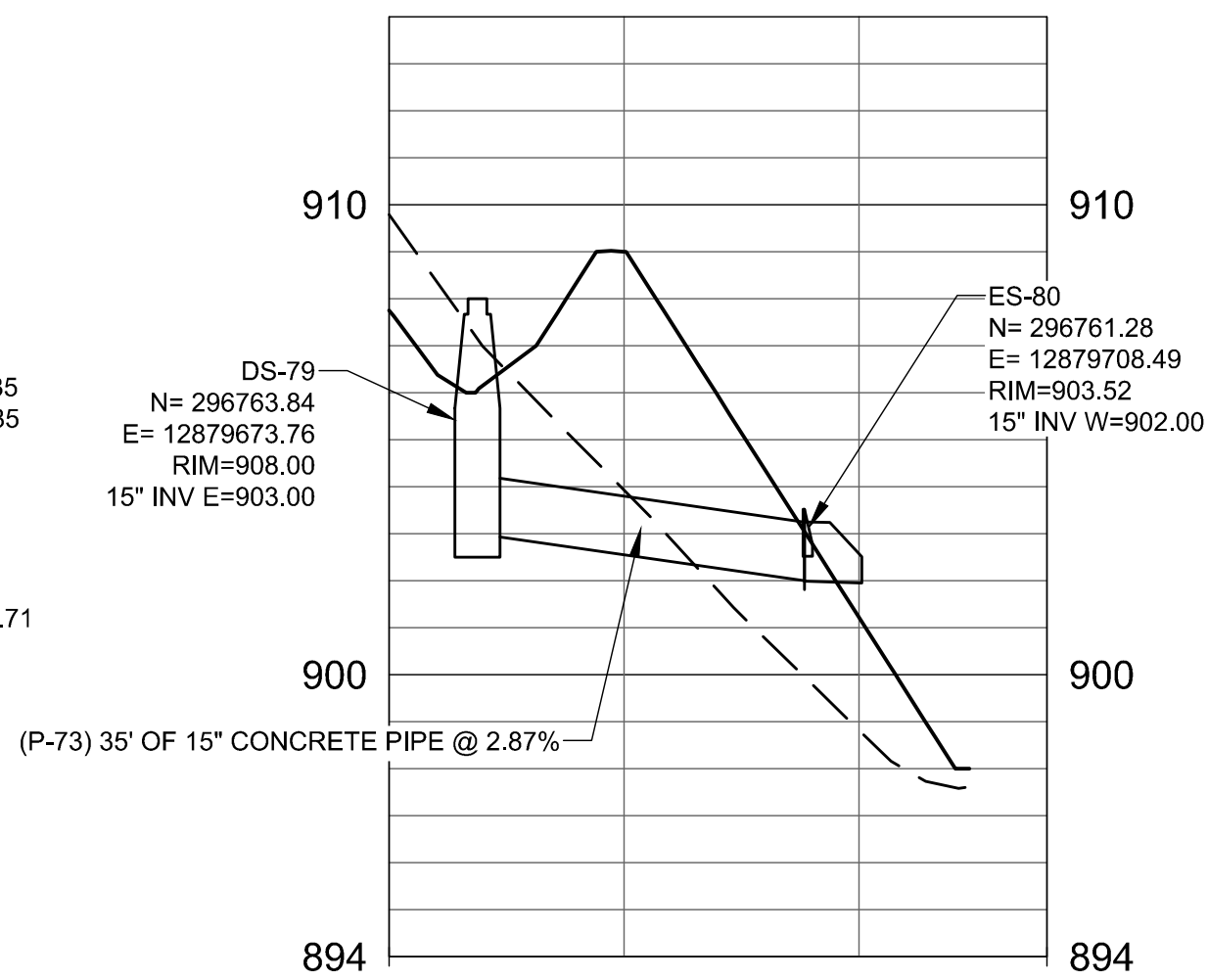
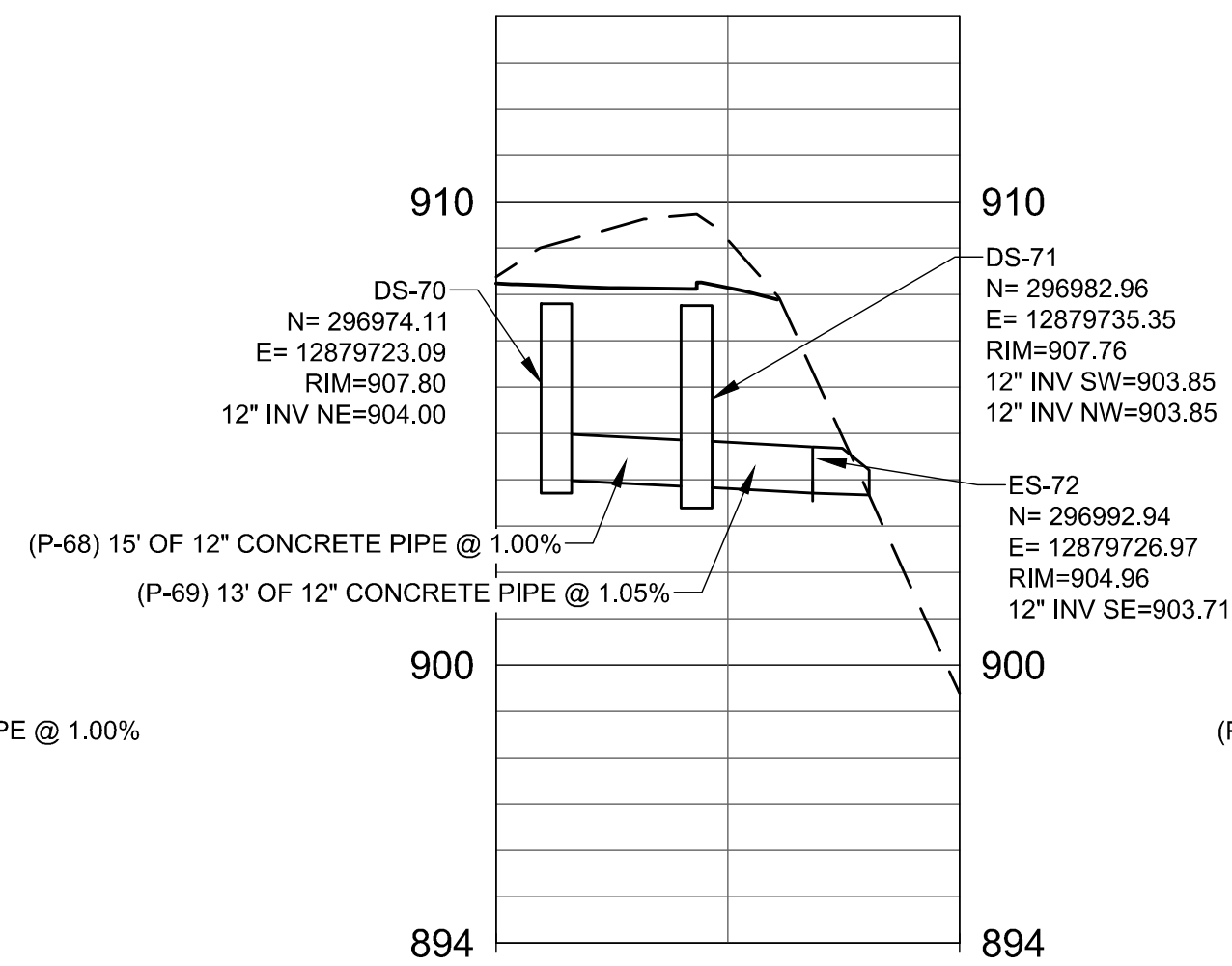
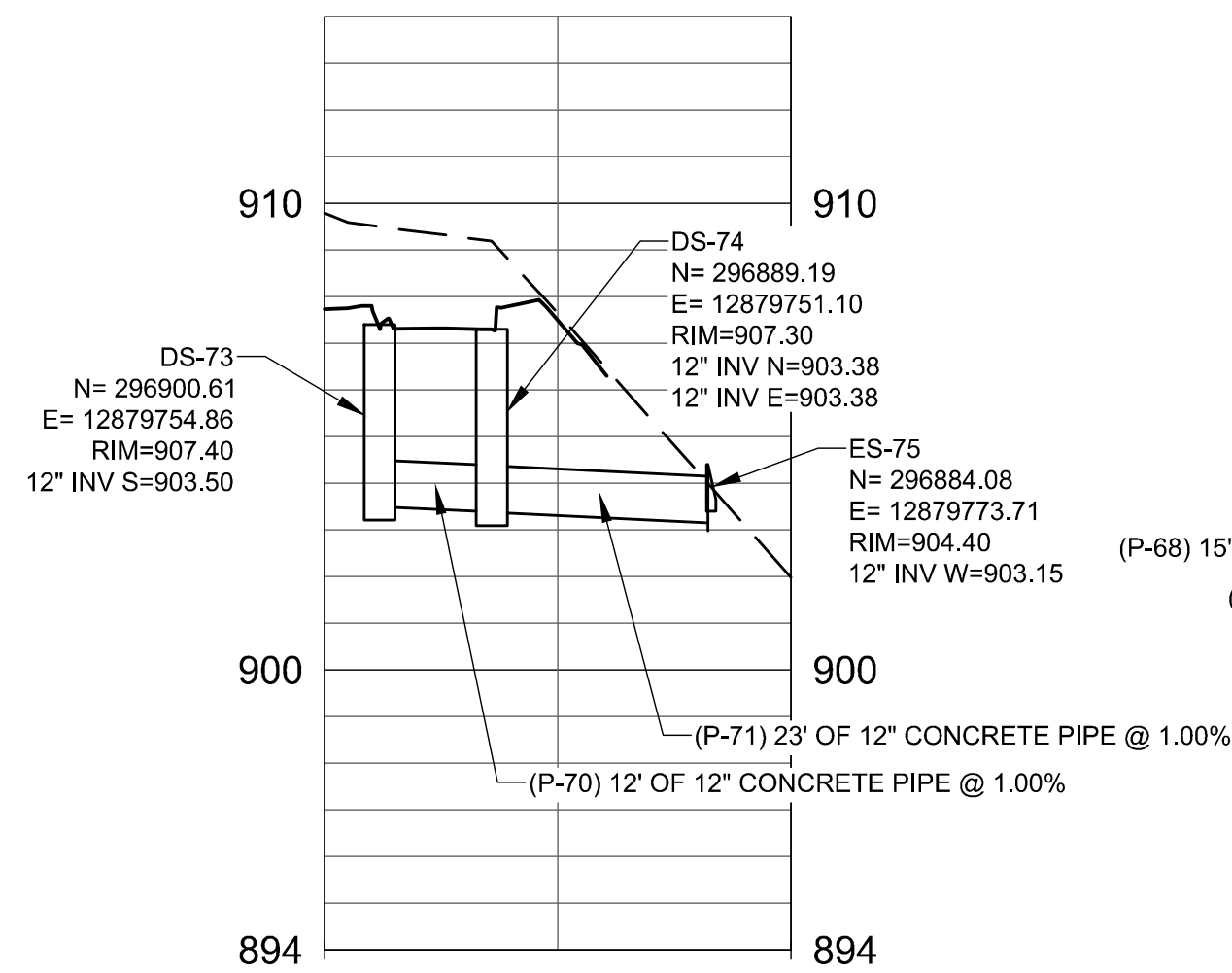
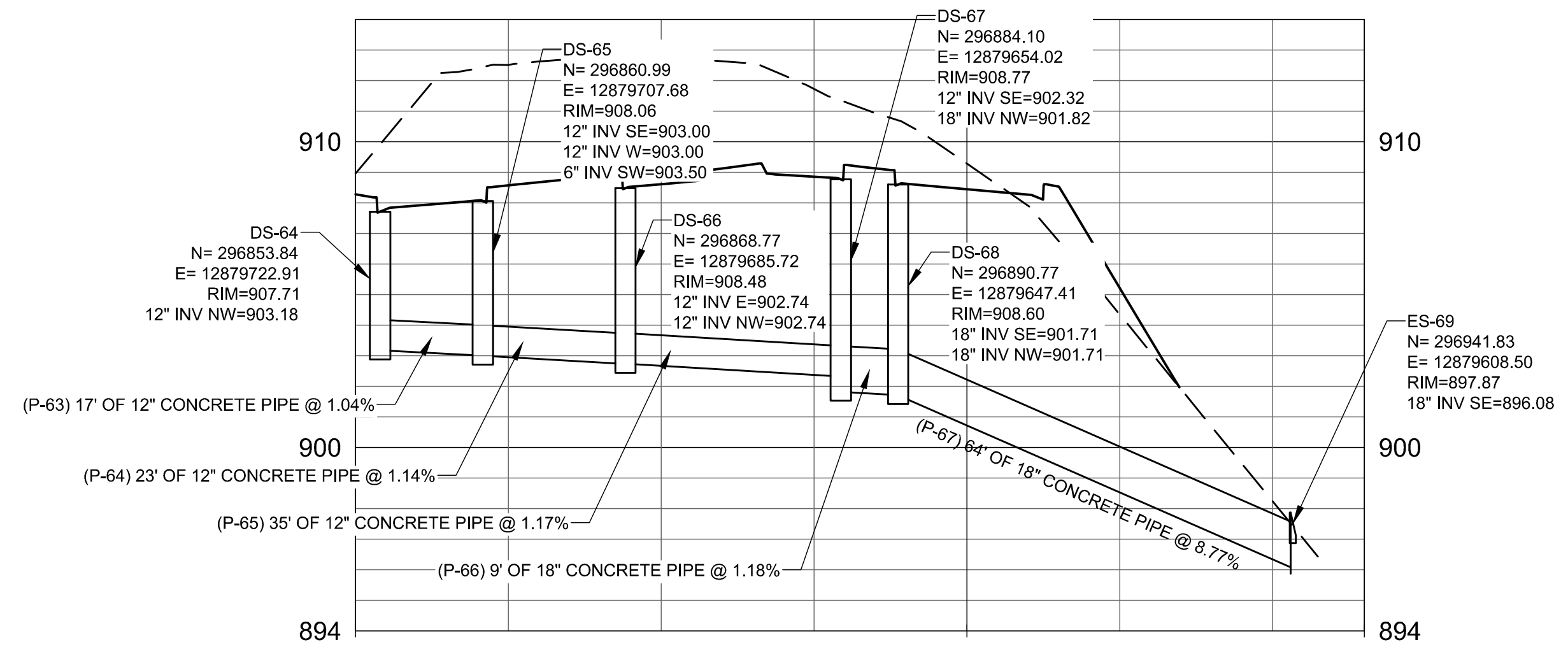
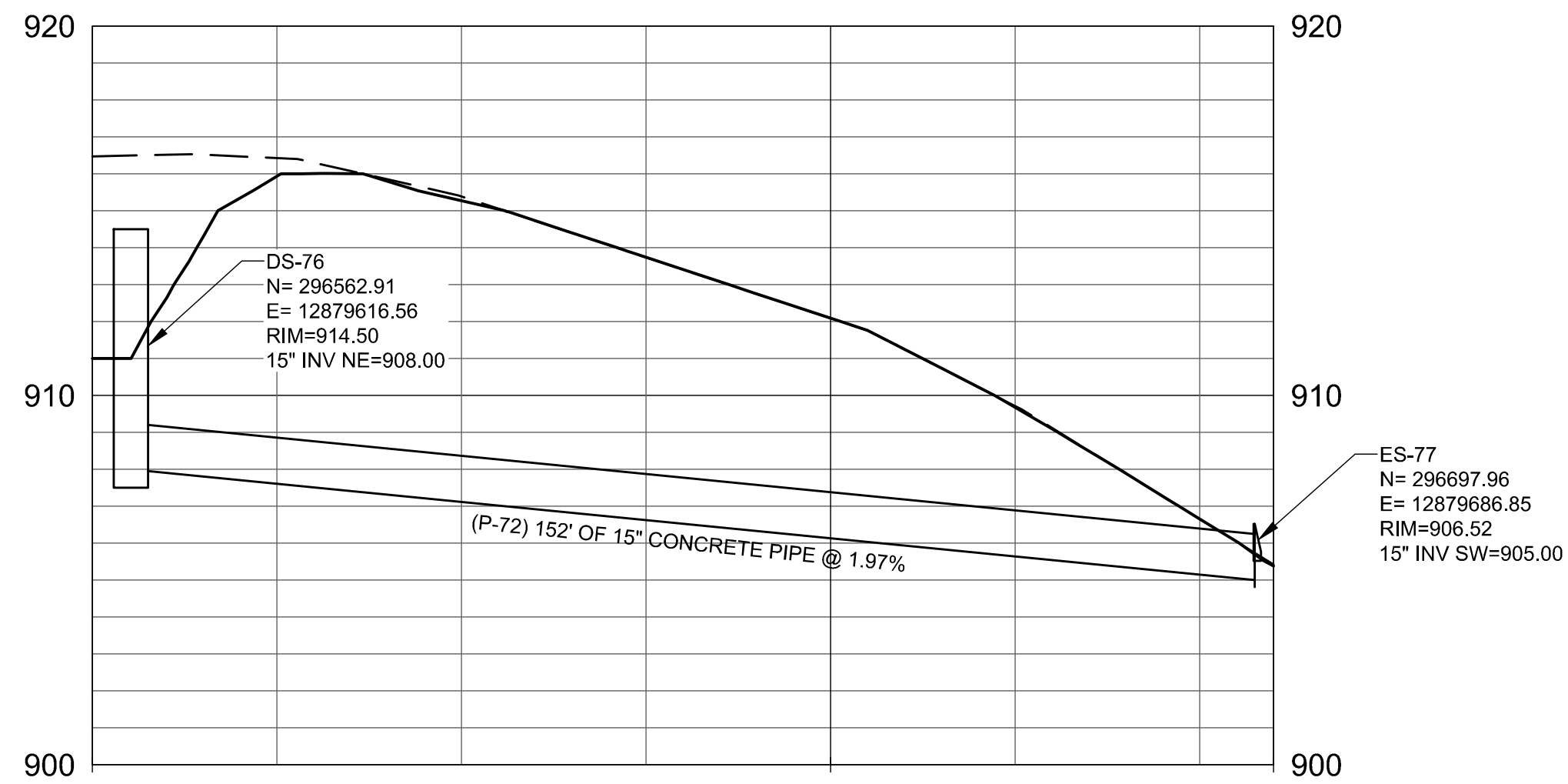
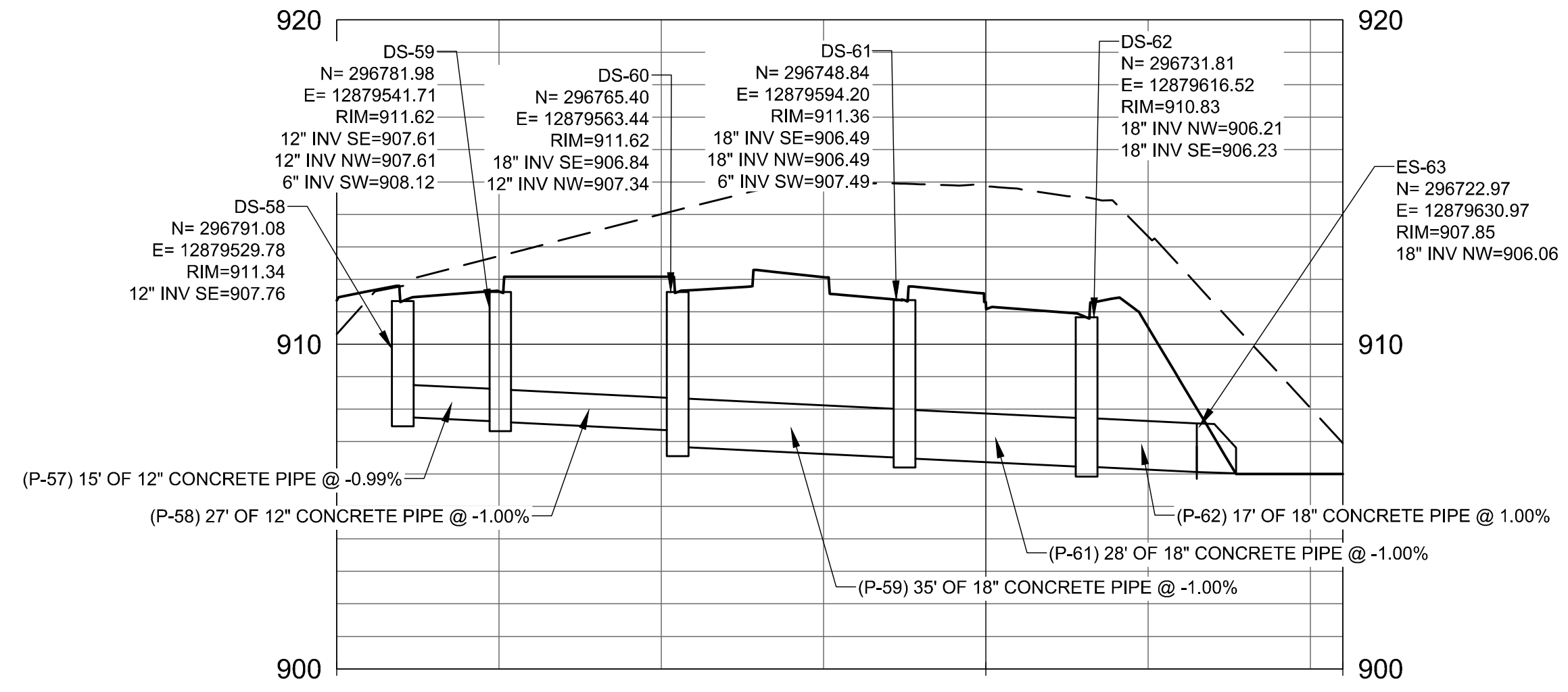
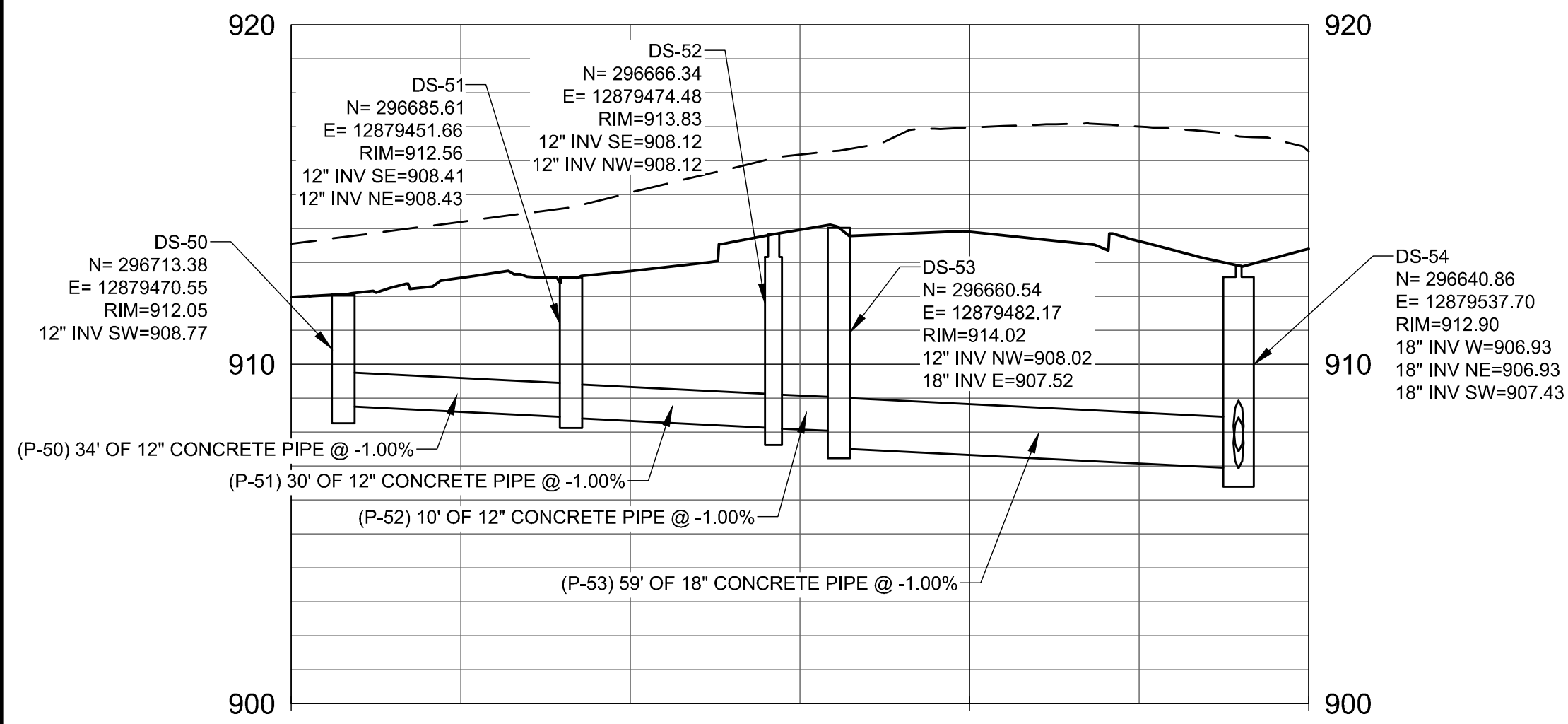
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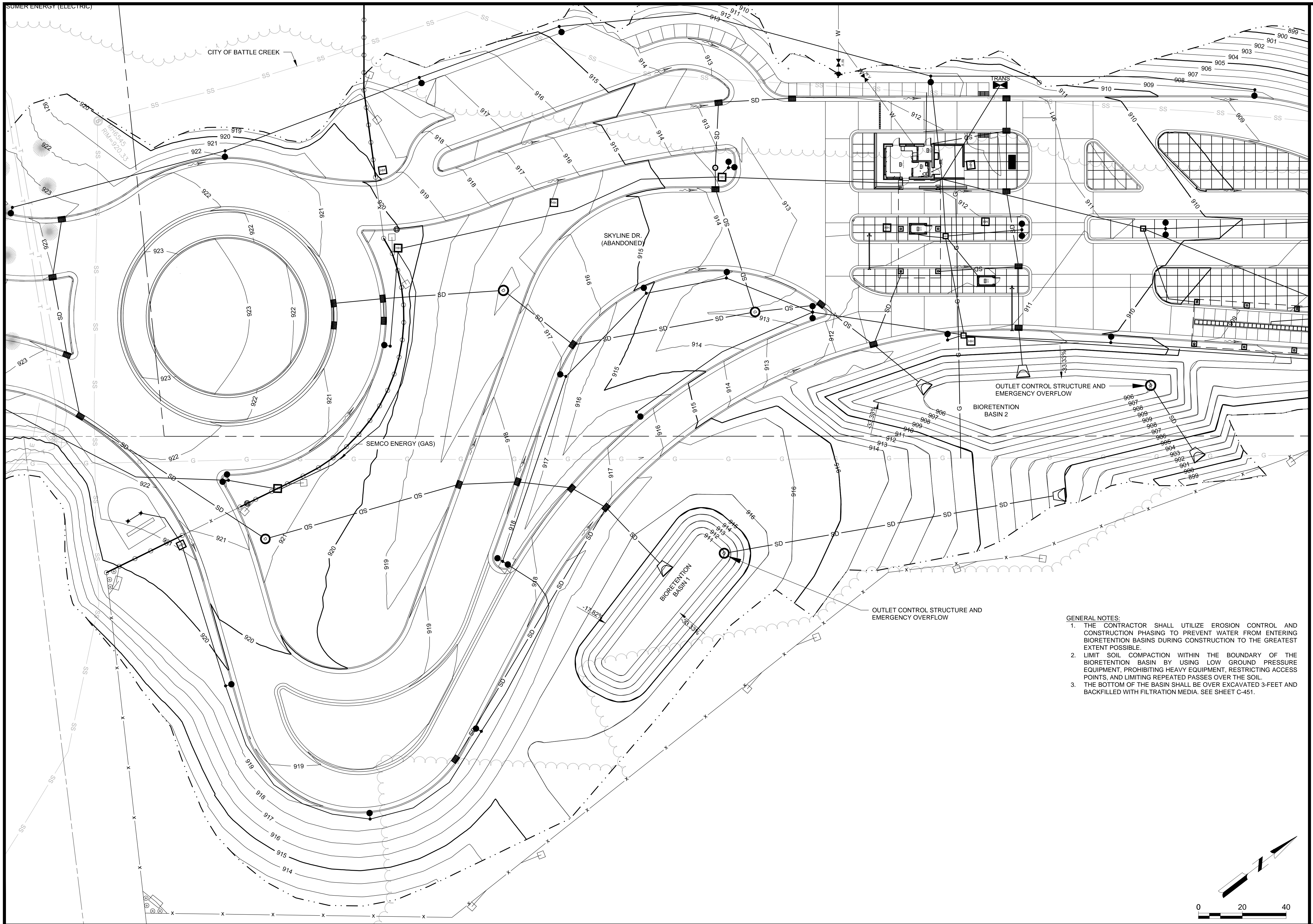
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STORM SEWER PLAN
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**MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE**
BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

- GENERAL NOTES:**
1. THE CONTRACTOR SHALL UTILIZE EROSION CONTROL AND CONSTRUCTION PHASING TO PREVENT WATER FROM ENTERING BIORETENTION BASINS DURING CONSTRUCTION TO THE GREATEST EXTENT POSSIBLE.
 2. LIMIT SOIL COMPACTION WITHIN THE BOUNDARY OF THE BIORETENTION BASIN BY USING LOW GROUND PRESSURE EQUIPMENT, PROHIBITING HEAVY EQUIPMENT, RESTRICTING ACCESS POINTS, AND LIMITING REPEATED PASSES OVER THE SOIL.
 3. THE BOTTOM OF THE BASIN SHALL BE OVER EXCAVATED 3-FEET AND BACKFILLED WITH FILTRATION MEDIA. SEE SHEET C-451.

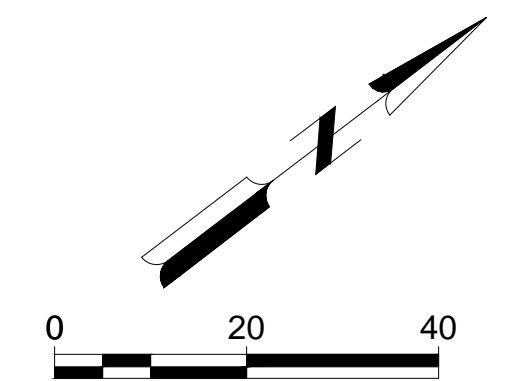
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SHEET CONTENTS
STORMWATER BASIN

SHEET NO.

C-450



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**MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE**

**BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN**

ISSUED
02/17/21 B3 FINAL

ANG Project No: MBMV099170
MH No.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
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SHEET CONTENTS
STORMWATER BASIN
DETAIL

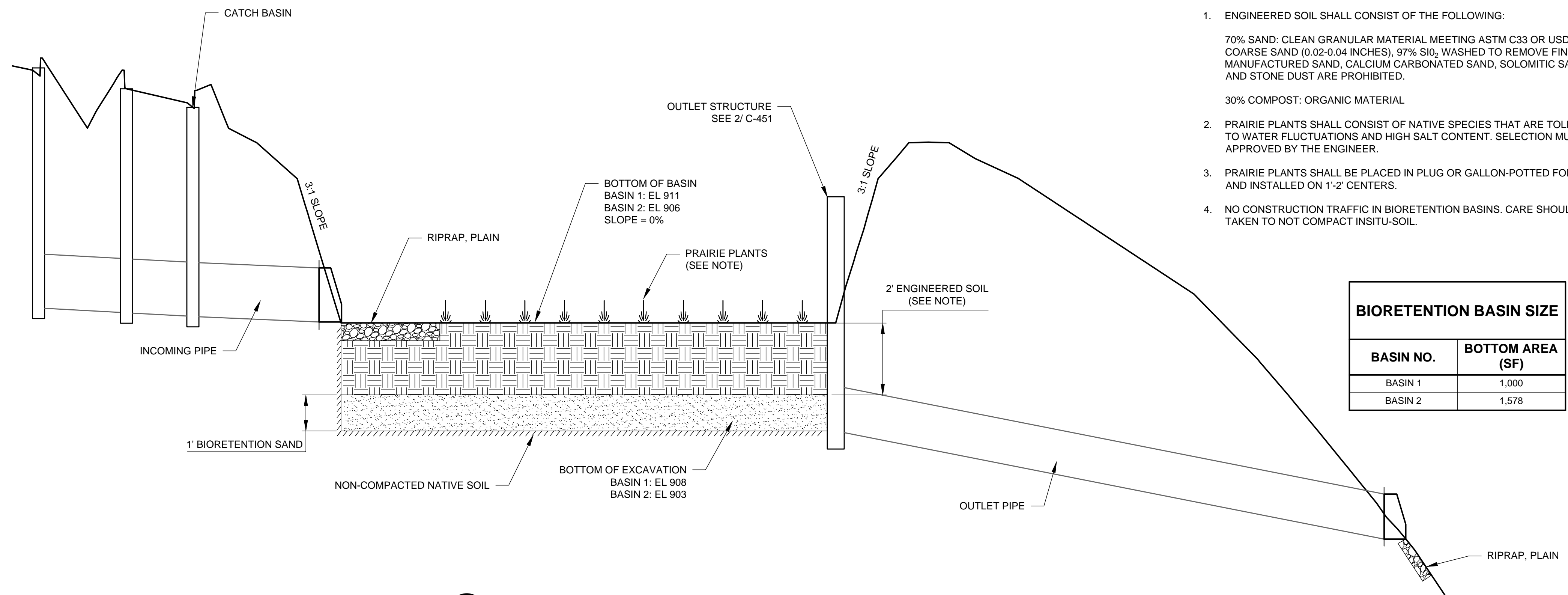
SHEET NO.

C-451

GENERAL NOTES:

- ENGINEERED SOIL SHALL CONSIST OF THE FOLLOWING:
70% SAND: CLEAN GRANULAR MATERIAL MEETING ASTM C33 OR USDA COARSE SAND (0.02-0.04 INCHES), 97% SiO₂ WASHED TO REMOVE FINES. MANUFACTURED SAND, CALCIUM CARBONATED SAND, SOLOMITIC SAND AND STONE DUST ARE PROHIBITED.
30% COMPOST: ORGANIC MATERIAL
- PRAIRIE PLANTS SHALL CONSIST OF NATIVE SPECIES THAT ARE TOLERANT TO WATER FLUCTUATIONS AND HIGH SALT CONTENT. SELECTION MUST BE APPROVED BY THE ENGINEER.
- PRAIRIE PLANTS SHALL BE PLACED IN PLUG OR GALLON-POTTED FORM AND INSTALLED ON 1'-2' CENTERS.
- NO CONSTRUCTION TRAFFIC IN BIORETENTION BASINS. CARE SHOULD BE TAKEN TO NOT COMPACT INSITU-SOIL.

BIORETENTION BASIN SIZE	
BASIN NO.	BOTTOM AREA (SF)
BASIN 1	1,000
BASIN 2	1,578

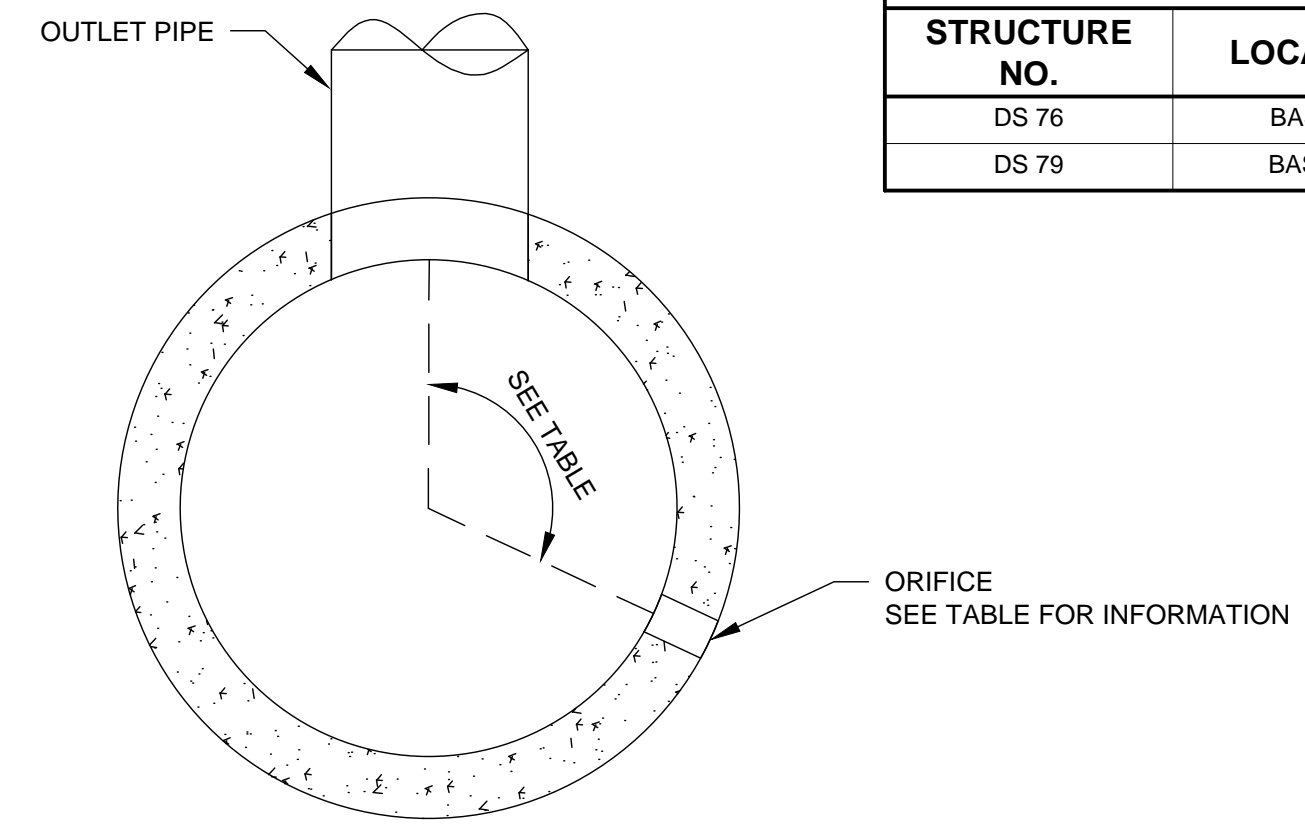
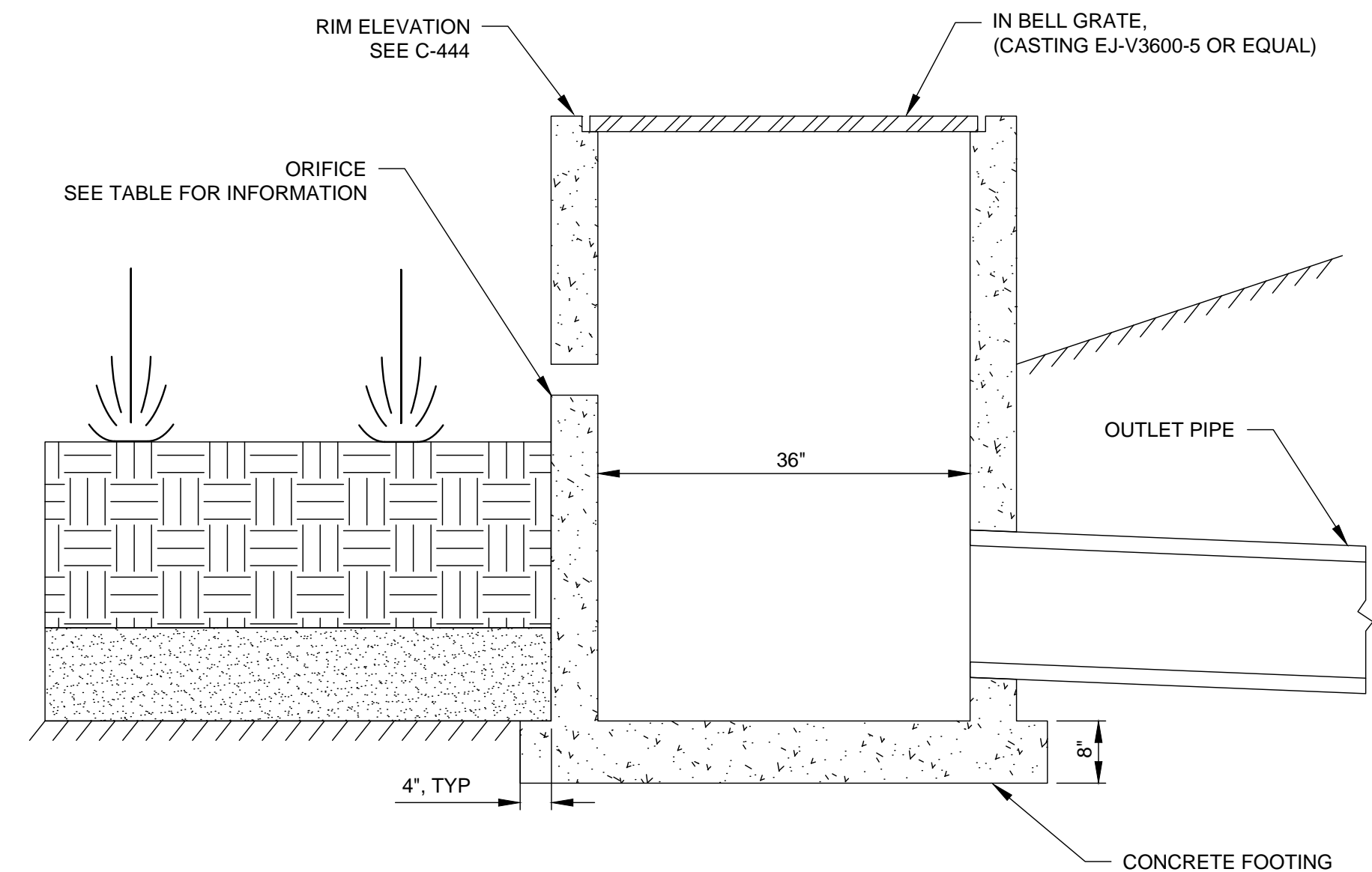


1 TYPICAL SECTION - BIORETENTION BASIN
NOT TO SCALE

GENERAL NOTES:

- PRECAST STRUCTURE IN ACCORDANCE WITH ASTM C478.
- REFER TO C-444 FOR STRUCTURE AND CONNECTED PIPES INFORMATION.
- REFER TO C-XXX FOR DRAINAGE DETAILS.

OUTLET STRUCTURE TABLE				
STRUCTURE NO.	LOCATION	ORIFICE DIA.	ORIFICE INV.	Angle
DS 76	BASIN 1	4-INCH	911.5	180°
DS 79	BASIN 2	4-INCH	906.2	115°



PROFILE VIEW

PLAN VIEW

2 TYPICAL OUTFALL STRUCTURE DETAIL
NOT TO SCALE



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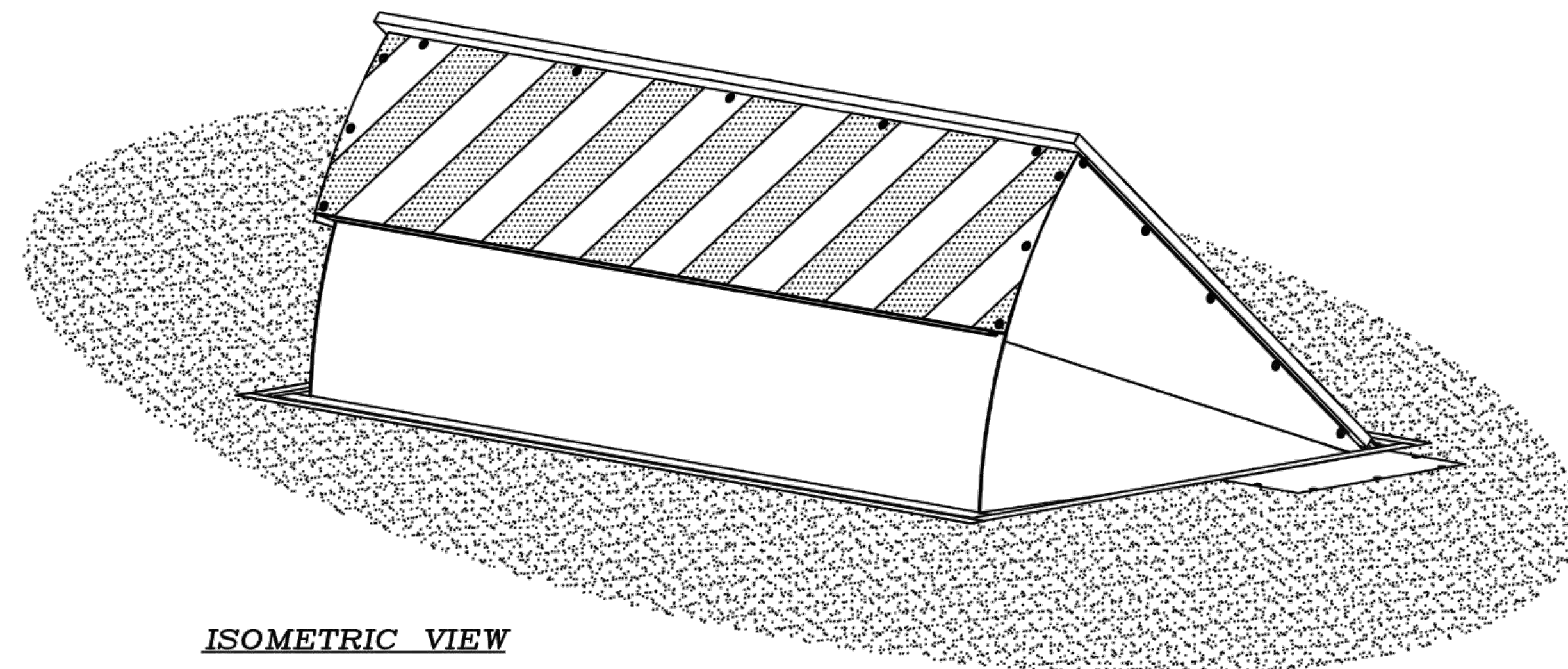
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SHEET CONTENTS
 CONSTRUCTION
 DETAILS

SHEET NO.

C-501



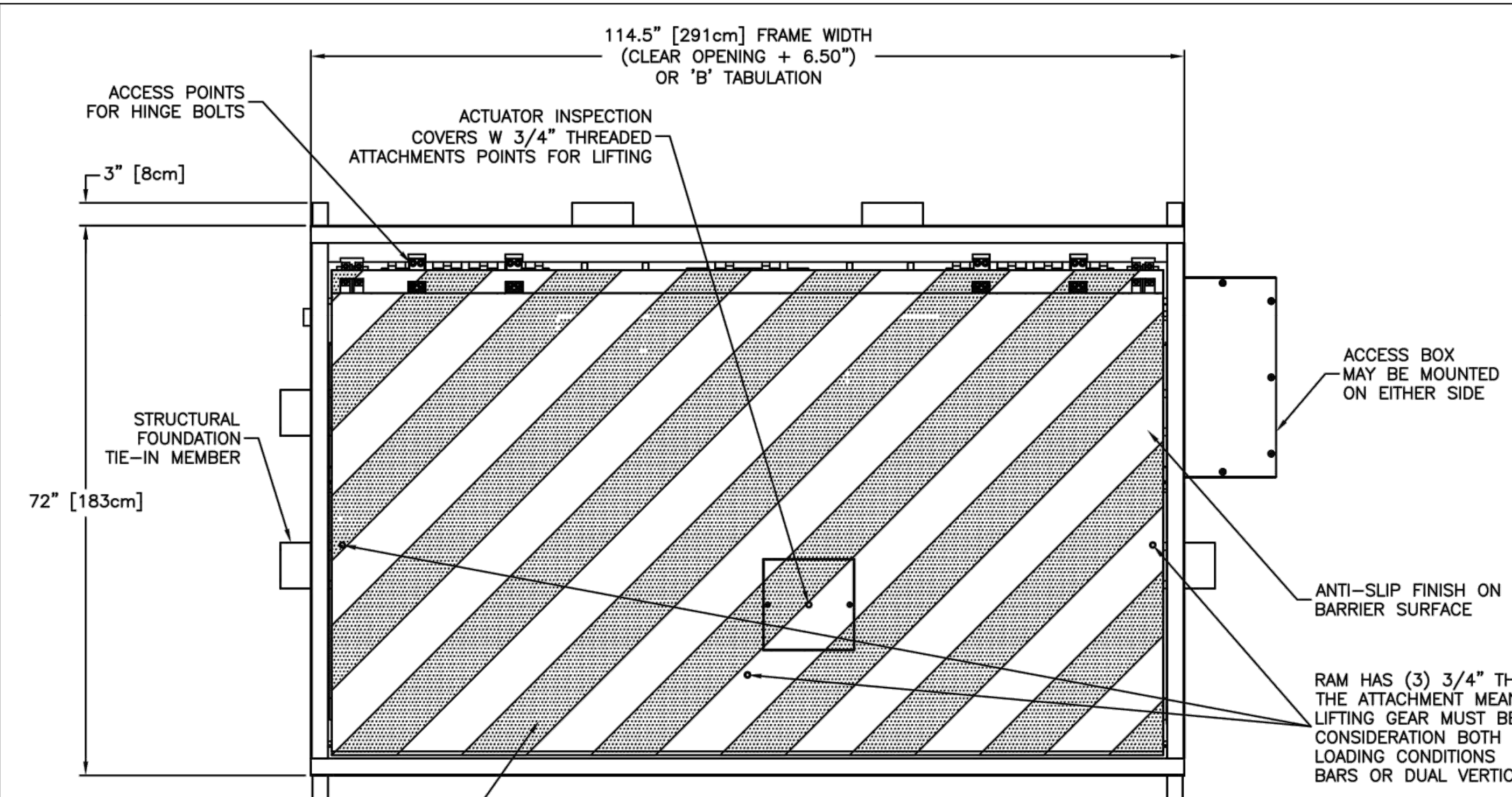
ISOMETRIC VIEW

NOTES:

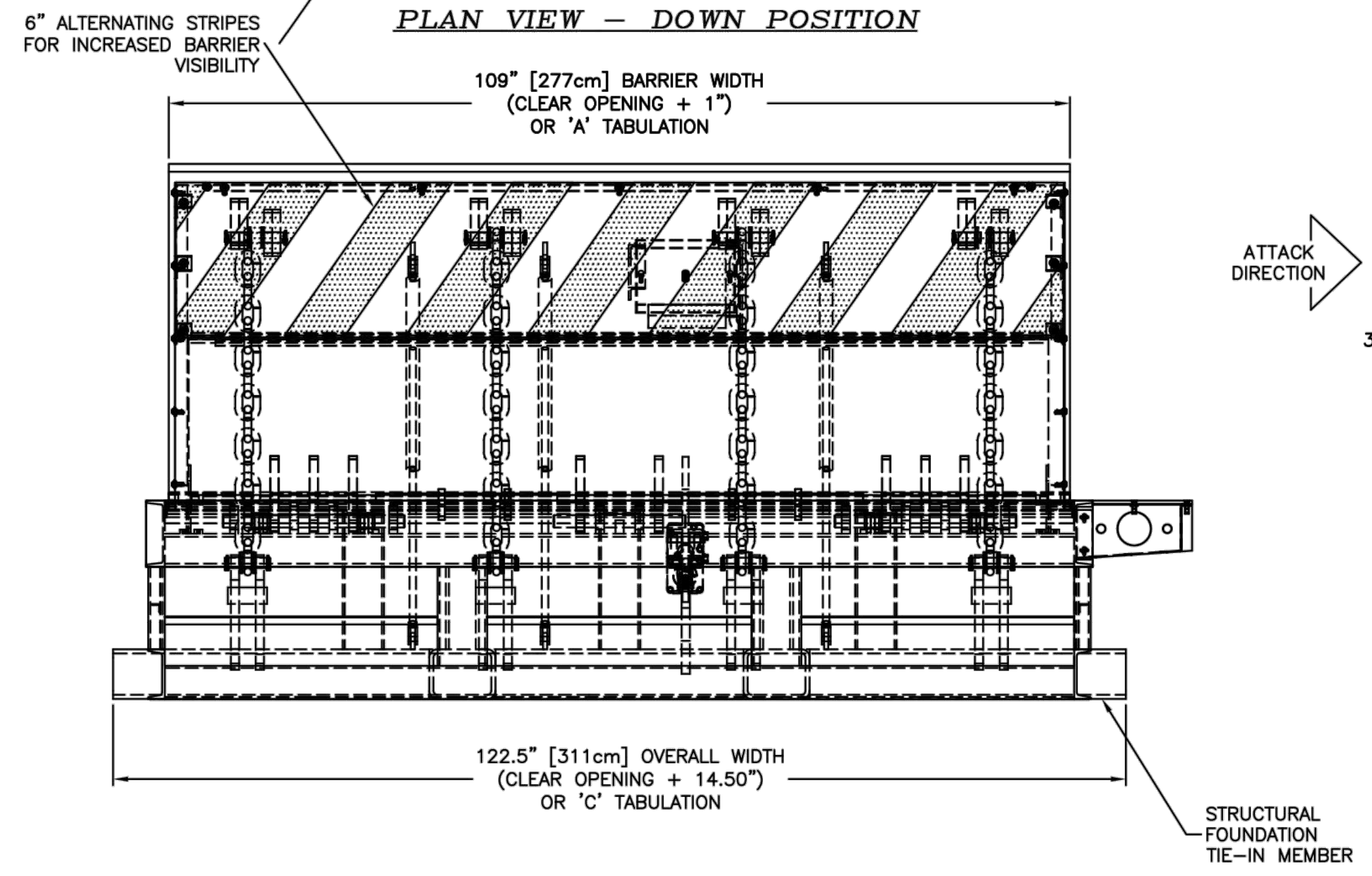
- OPTIONAL AVAILABLE FEATURES (PARTIAL)

	PART NO.
(A) HEATER, 1400 WATTS @ 120 VOLTS	B1285
(A) HEATER, 1400 WATTS @ 240 VOLTS	B1286
(B) LIMIT SWITCH, FULLY DOWN	B2005
(C) LIMIT SWITCH, FULLY UP	B2006
(D) HOT-DIP GALVANIZING PRIOR TO PAINTING GALV	
- COLOR OPTIONS:
 WHITE W/6" WIDE YELLOW STRIPES
 BLACK W/6" WIDE YELLOW STRIPES
 WHITE W/6" WIDE RED STRIPES

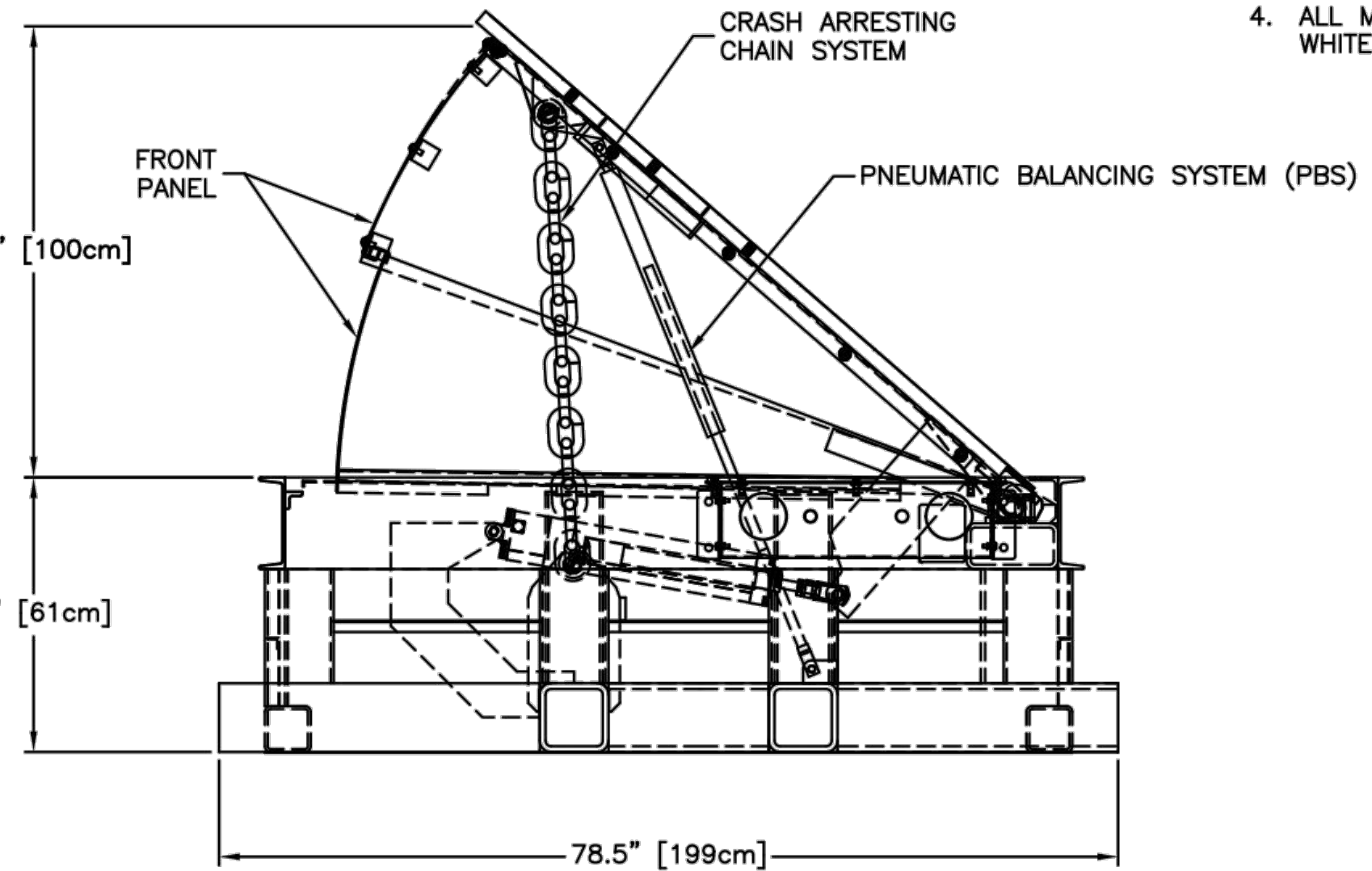
 FOUNDATION - ASBESTOS FREE ASPHALT EMULSION UNDERCOAT.
- ALL STEEL MEMBERS PER AISC STANDARDS
 WELDING DESIGN CRITERIA AWS D1.1, LATEST REVISION.
- ALL MILD STEEL COMPONENTS SANDBLASTED TO NEAR
 WHITE METAL AFTER FABRICATION AND PRIOR TO COATING.



PLAN VIEW - DOWN POSITION



FRONT ELEVATION - UP POSITION



SIDE ELEVATION - UP POSITION

REV.	DESCRIPTION	DRWN BY	DATE	APPVD BY	DATE
D	ECO 2016-062		R.C.	6/16/16	
C	ECO 2016-016		R.C.	2/11/16	
B	ECO 2015-061		JNF	06/29/15	
A	ECO 2014-075		M.C.	07/25/14	

UNLESS OTHERWISE NOTED, DIMENSIONS ARE IN INCHES.

TOLERANCES
 .X = ±.250/FT
 .XX = ±.125/FT
 .XXX = ±.063/FT

DELTA SCIENTIFIC CORPORATION
 40355 DELTA LANE
 PALMDALE, CA 93351 U.S.A.
 (661) 575-1100 FAX (661) 575-1109

HD300EM PHALANX BARRIER
 GENERAL ARRANGEMENT

DRWN BY J. MANOR	DATE 1/17/2014	DRAWING NO. 90155	REV. D
CHKD BY	DATE	SCALE 1:12 (D SIZE)	SHEET 1 OF 1

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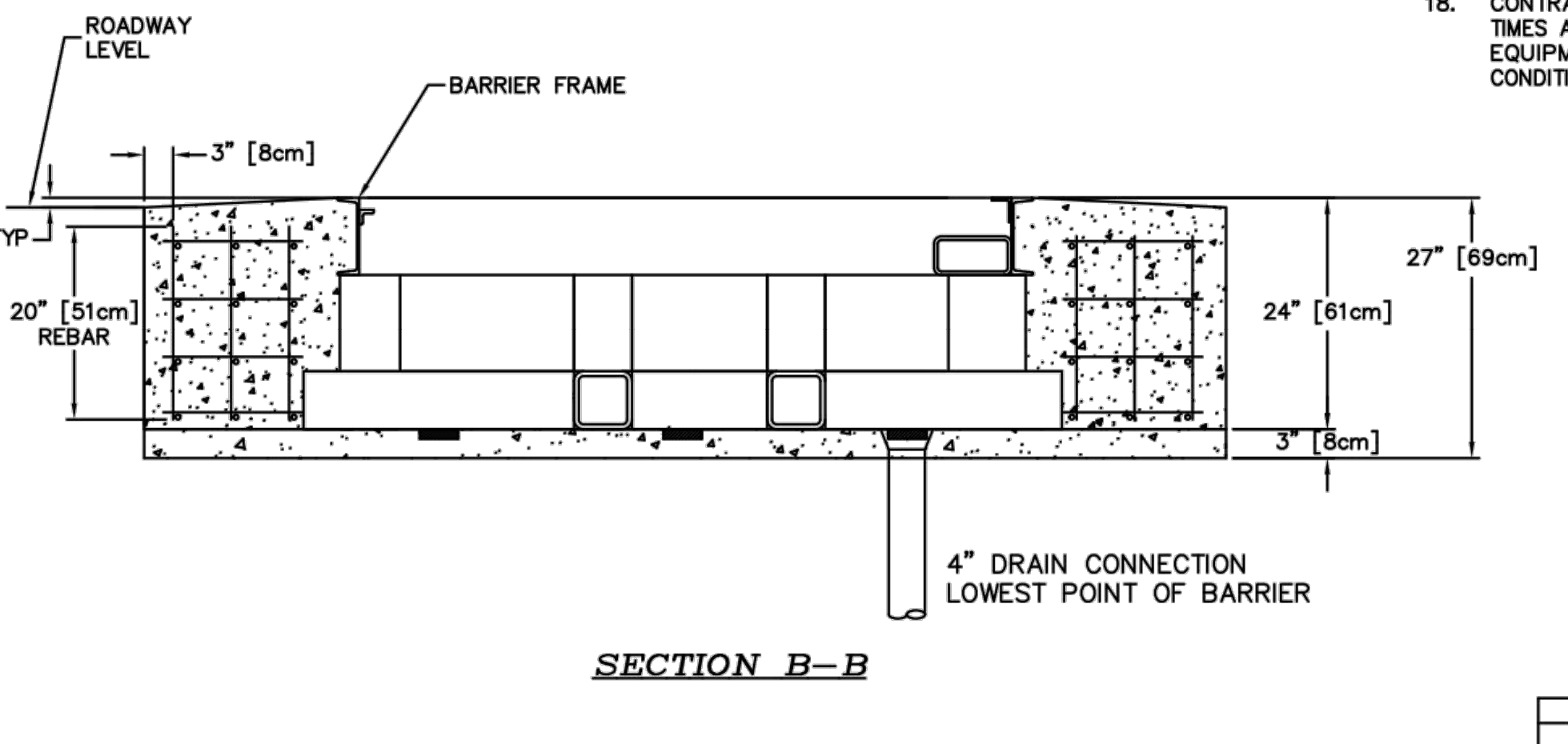
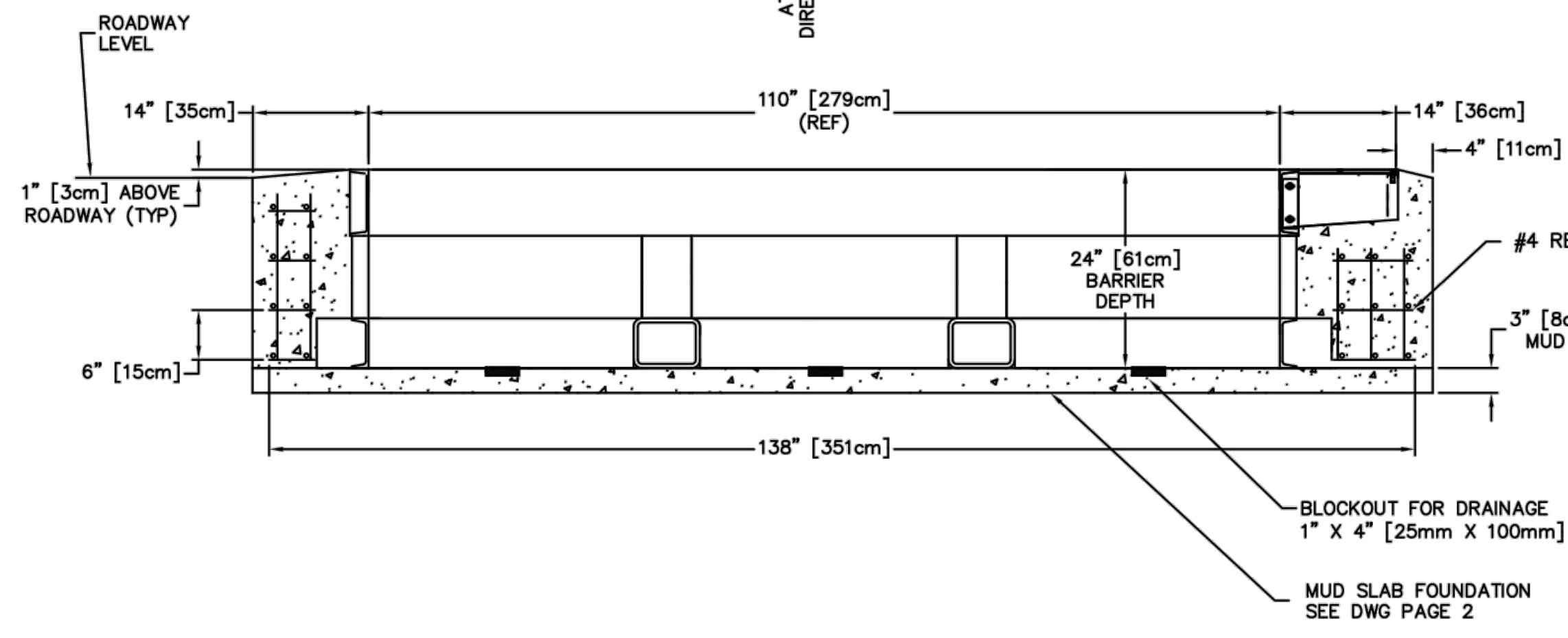
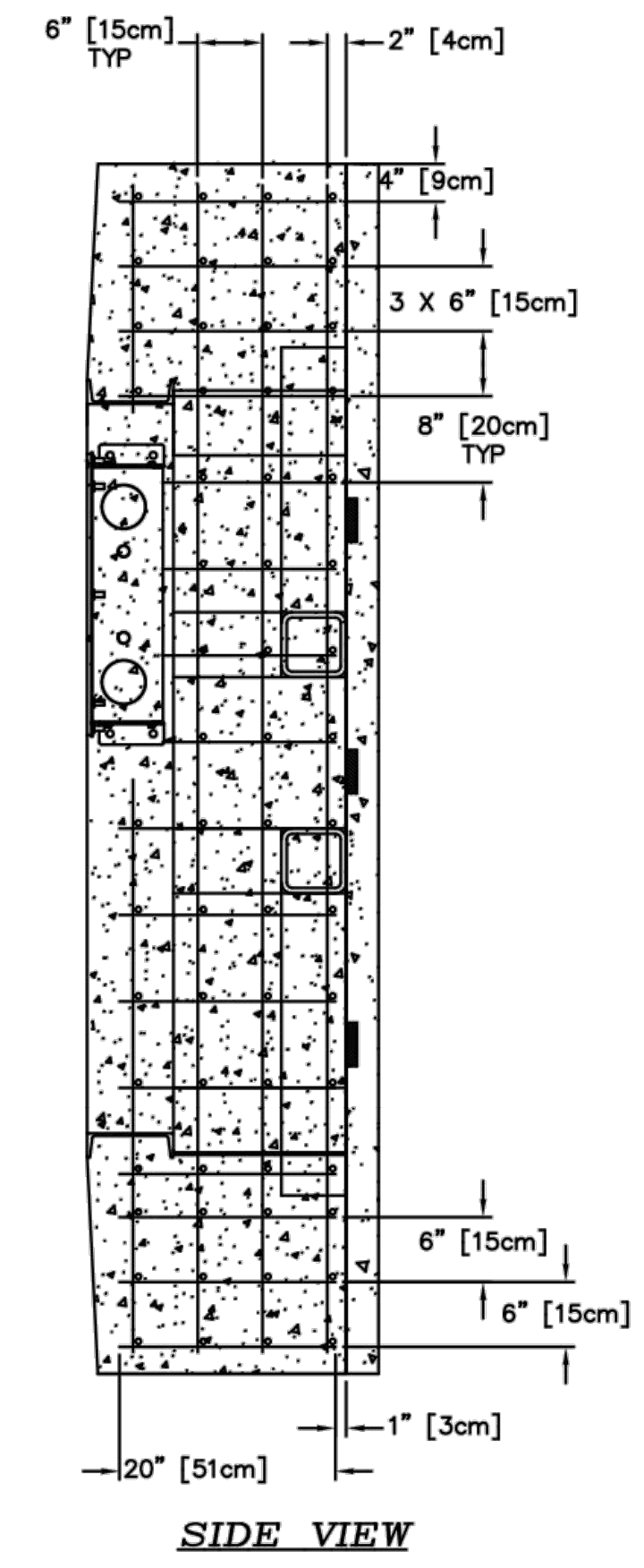
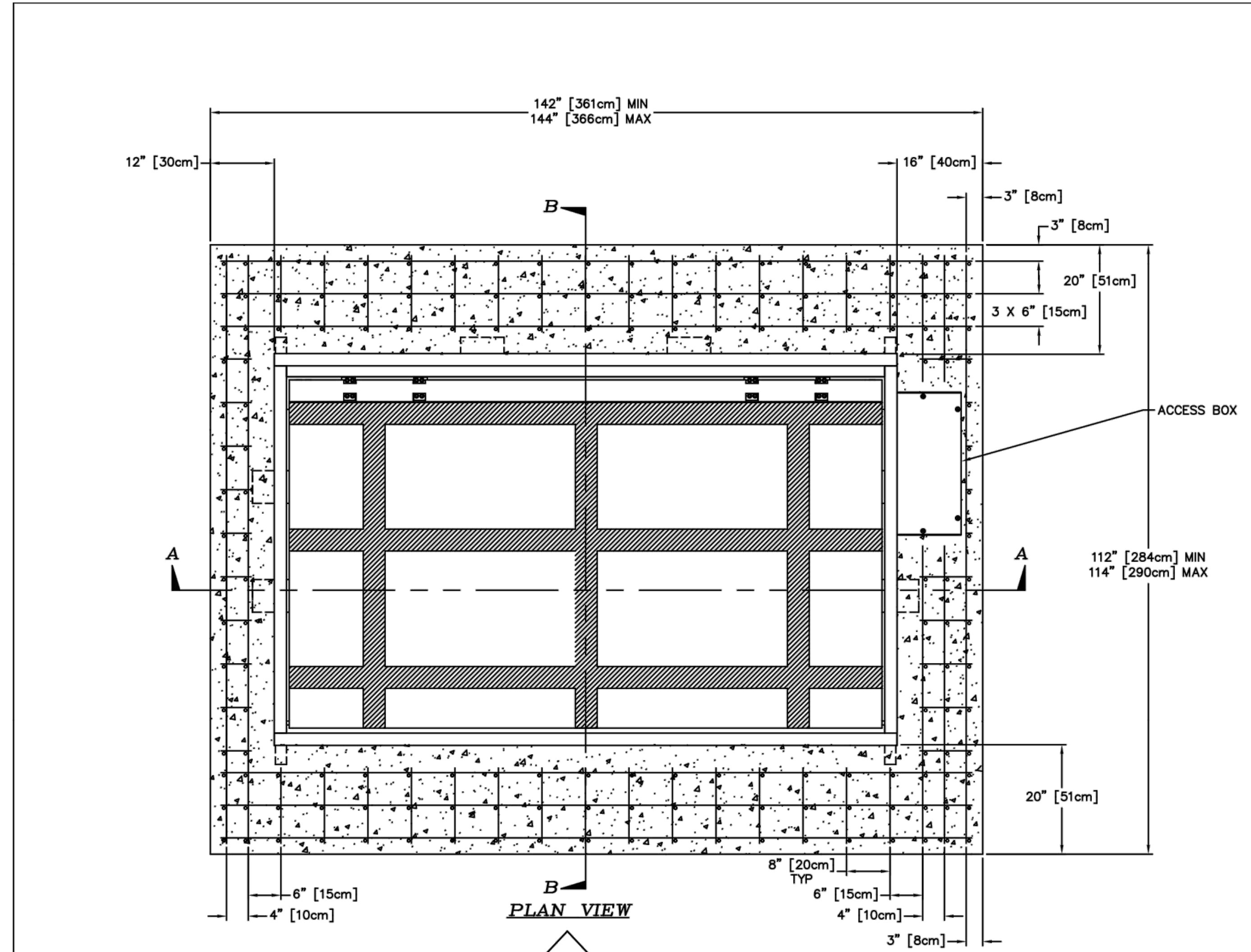
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C-502

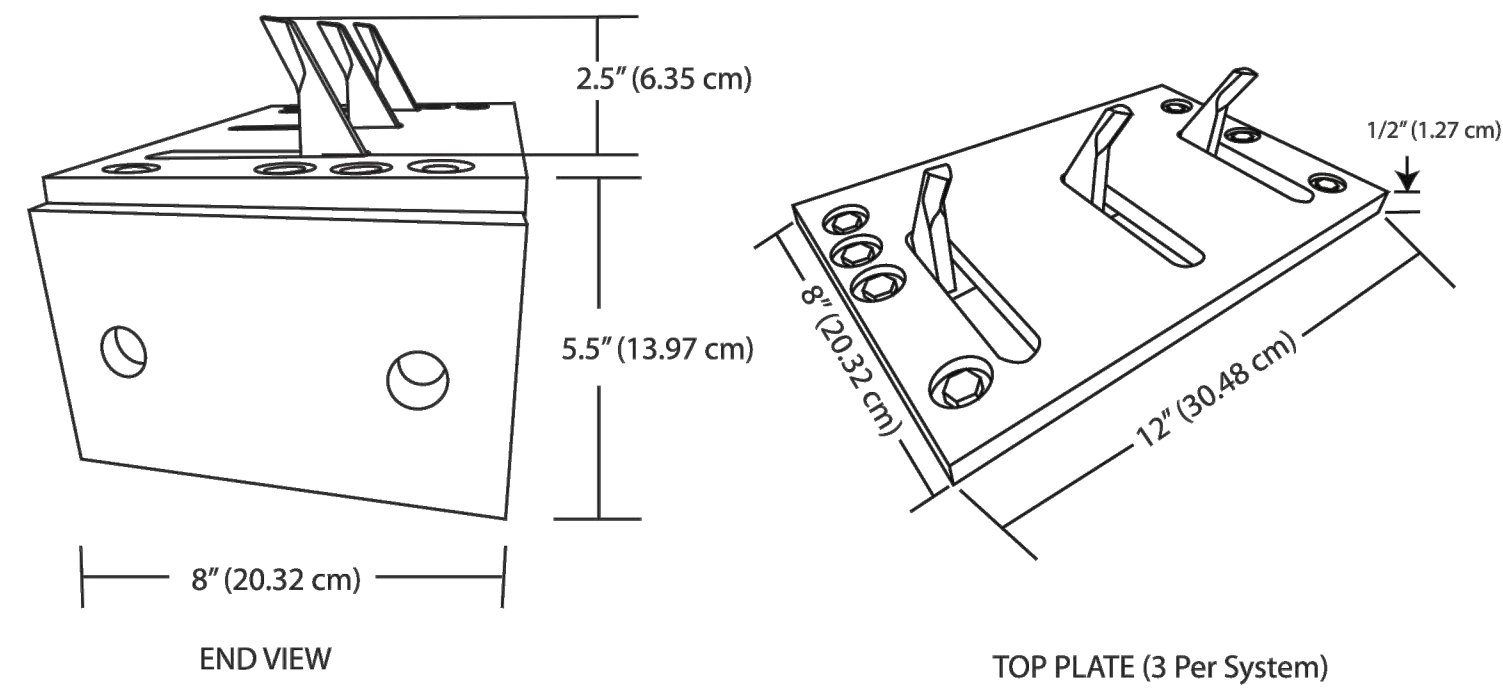
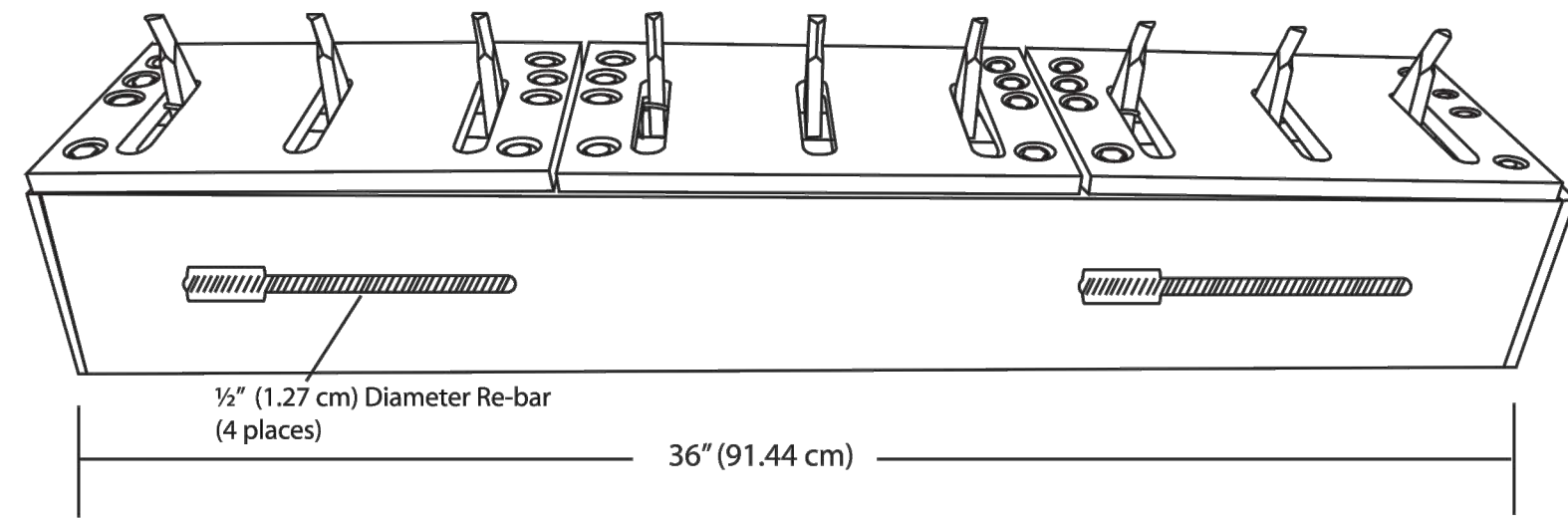
CONCRETE NOTES & RECOMMENDED SPECIFICATIONS:

- CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE.
- FOUNDATION CONCRETE MAY BE PLACED DIRECTLY INTO NEAT EXCAVATIONS, PROVIDED THE SIDES OF THE EXCAVATION ARE STABLE. WHERE CAVING OCCURS, PROVIDE SHORING. TYPE AND METHOD OF SHORING SHALL BE AT CONTRACTORS OPTION.
- THE EXCAVATION SHALL BE KEPT DRY AT ALL TIMES. GROUND WATER, IF ENCOUNTERED, SHALL BE PUMPED FROM THE EXCAVATION.
- CONCRETE SHALL BE LABORATORY DESIGNED, MACHINE MIXED, PRODUCING 3,000 PSI (20.68 MPA) AT 28 DAYS.
- CEMENT SHALL BE TESTED PORTLAND CEMENT CONFORMING TO ASTM C150, TYPE II ONLY.
- AGGREGATES SHALL CONFORM TO ASTM C33 & B GRADE PER STANDARD SPECIFICATIONS. MAXIMUM SIZE OF AGGREGATE SHALL BE 1-1/2 INCHES (38mm).
- REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60 (60,000 PSI OR 413.7MPa).
- HOOKS AND BENDS SHALL CONFORM TO ACI STANDARD 318. LATEST REVISION. INSIDE DIAMETER OFF HOOKS AND BENDS SHALL BE AT LEAST SIX (6) BAR DIAMETERS.
- PROVIDE SPACER BARS, CHAIRS, SPREADERS, BLOCKS, ETC. AS REQUIRED TO POSITIVELY HOLD THE STEEL IN PLACE BEFORE CONCRETE IS POURED.
- CONCRETE SHALL BE CONVEYED FROM THE MIXER TO FINAL DEPOSIT BY METHODS THAT WILL PREVENT SEPARATION OR LOSS OF MATERIALS.
- CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY SUITABLE MEANS DURING PLACEMENT AND SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT AND EMBEDDED FIXTURES AND CORNERS OF FORMS.
- CONCRETE SHALL BE MAINTAINED ABOVE 50°F (10°C) AND IN A MOIST CONDITION FOR AT LEAST SEVEN (7) DAYS AFTER PLACEMENT. ADEQUATE EQUIPMENT SHALL BE PROVIDED FOR HEATING CONCRETE MATERIALS AND PROTECTING CONCRETE DURING FREEZING OR NEAR FREEZING WEATHER.
- WHERE EXTERIOR WALL FACE REQUIRES SHORING AND/OR FORMING, THE FORMS SHALL BE SUBSTANTIAL AND SUFFICIENTLY TIGHT TO PREVENT LEAKAGE. FORMS SHALL NOT BE REMOVED UNTIL THE CONCRETE IS SEVEN (7) DAYS OLD.
- BACKFILLING SHALL BE DONE BY DEPOSITING AND TAMPING INTO PLACE CLEAN SAND OR POURING LEAN CONCRETE, TO 95% COMPACTION. WATER JETTING SHALL NOT BE ALLOWED.
- CONDUITS AND PIPES OF ALUMINUM SHALL NOT BE ALLOWED.
- CONSTRUCTION JOINTS NOT INDICATED ON THE DRAWINGS SHALL NOT BE ALLOWED. WHERE A CONSTRUCTION JOINT IS TO BE MADE, THE SURFACE OF THE CONCRETE SHALL BE THOROUGHLY CLEANED AND ALL LAITANCE AND STANDING WATER REMOVED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT AREAS AGAINST DAMAGE AND SHALL REPAIR OR PATCH ALL DAMAGED AREAS TO MATCH EXISTING IMPROVEMENTS.
- CONTRACTOR SHALL KEEP THE CONSTRUCTION AREA CLEAN AT ALL TIMES AND AT COMPLETION OF WORK, REMOVE ALL SURPLUS MATERIALS, EQUIPMENT AND DEBRIS AND LEAVE THE PREMISES IN A CLEAN CONDITION ACCEPTABLE TO THE OWNER OR OWNER'S REPRESENTATIVE.



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B	ECO 2017-102	JNF	12/14/17		
A	ECO 2016-014	R.C.	2/15/16		
REV.	DESCRIPTION	DRWN BY	DATE	APPVD BY	DATE
		J. MANOR	1/16/2014		
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NOTES

1. DIRECTIONAL TRAFFIC CONTROLLER (DTC) SHALL BE LOADED RATED FOR HEAVY AXLE LOADS NOT LESS THAN 20 TONS PER AXLE.
2. DTC INSTALLATION SHALL INCLUDE ACCOMMODATION FOR DRAINAGE.
3. DTC SHALL BE FLUSH MOUNTED INCLUDING HARDWARE.
4. PROVIDE DRAINAGE OF DTC IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

1 DIRECTIONAL TRAFFIC CONTROLLER
NO SCALE



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CONSTRUCT MAIN BASE ENTRANCE**

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
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DETAILS

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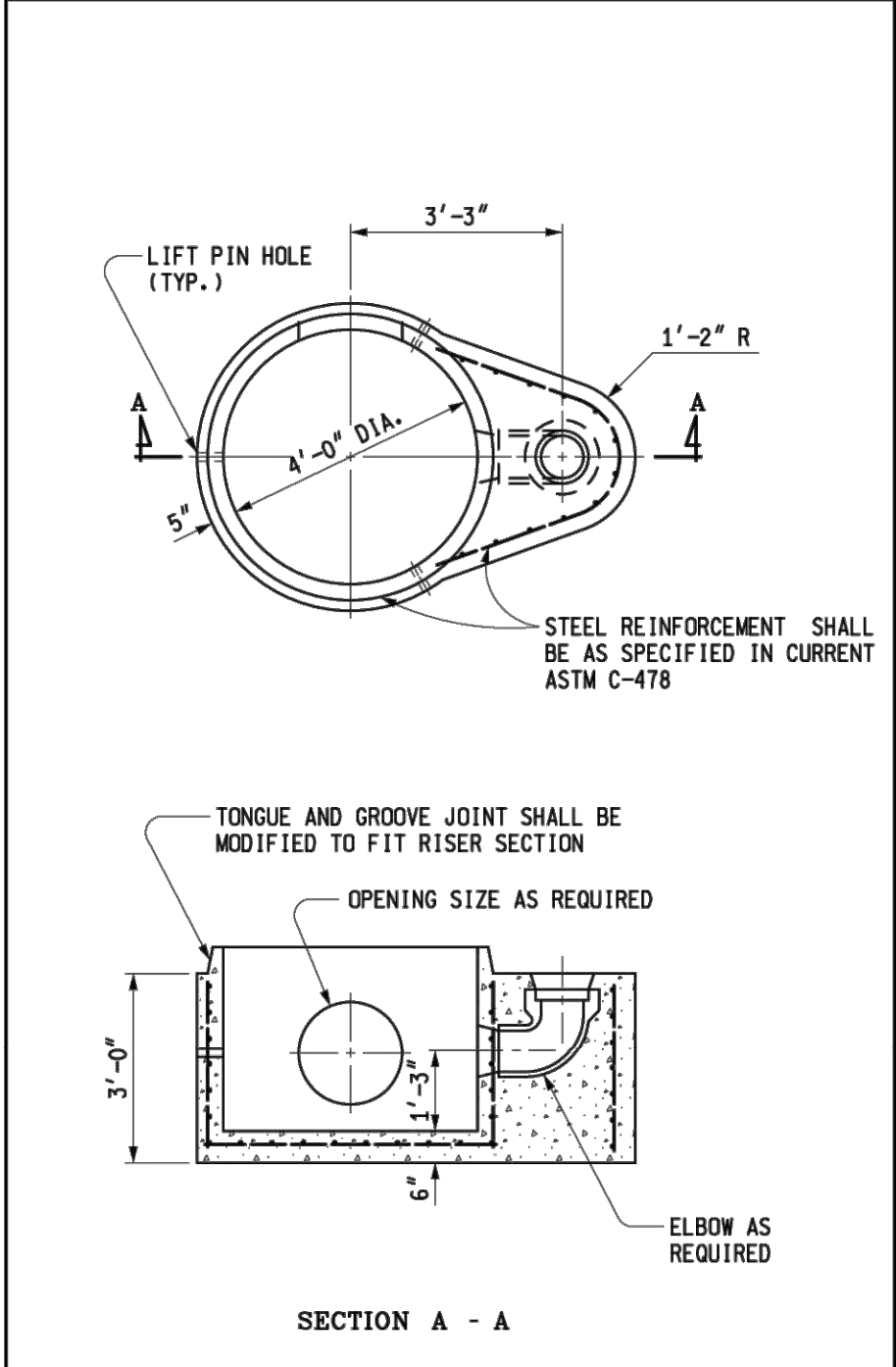
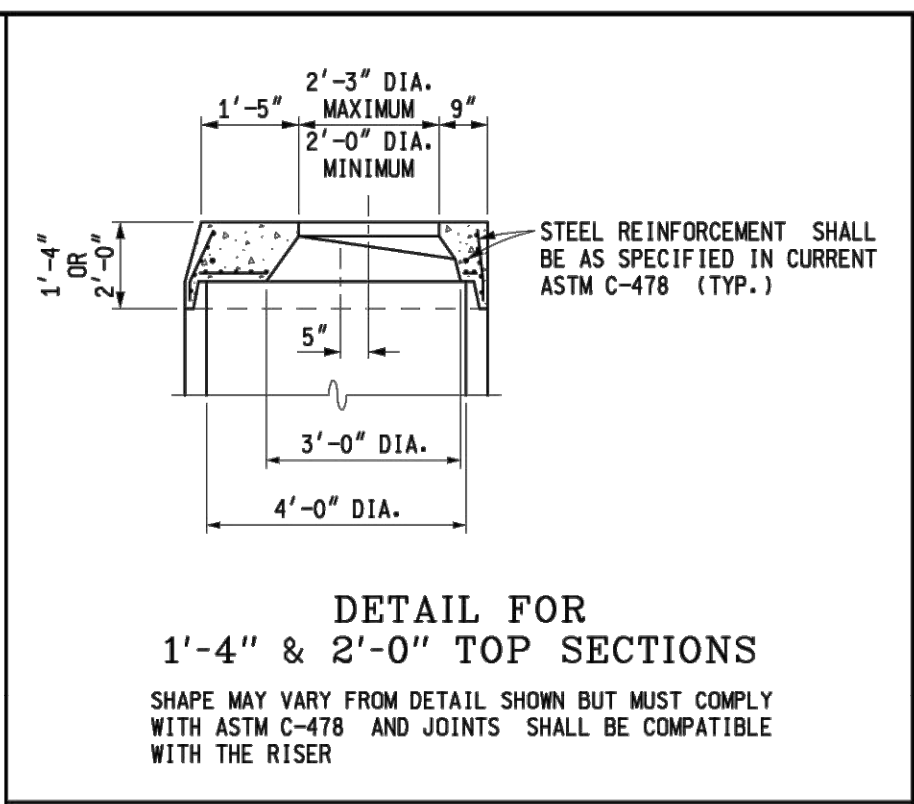
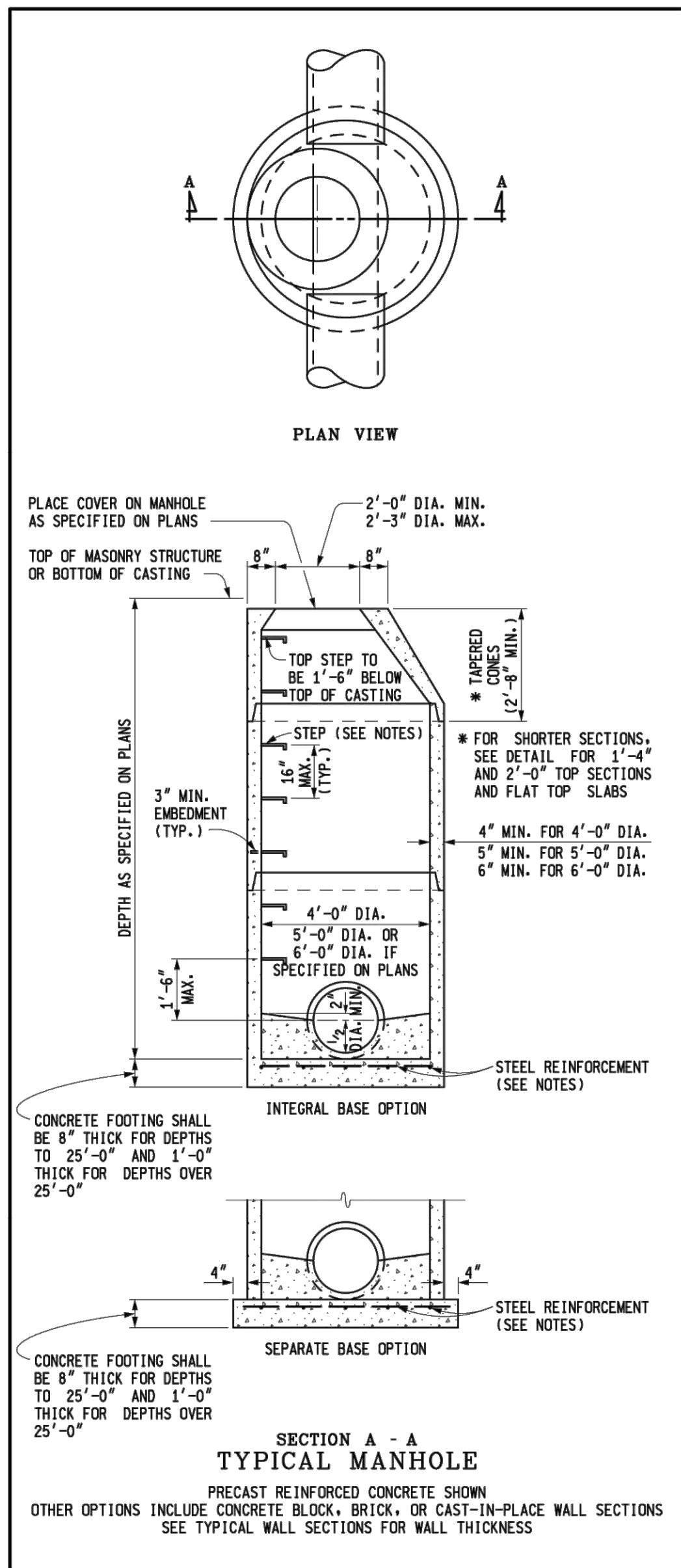
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 BATTLE CREEK, MICHIGAN

ISSUED 02/17/21 B3 FINAL



MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES

PREPARED BY: DESIGN DIVISION

DRAWN BY: B.L.T.

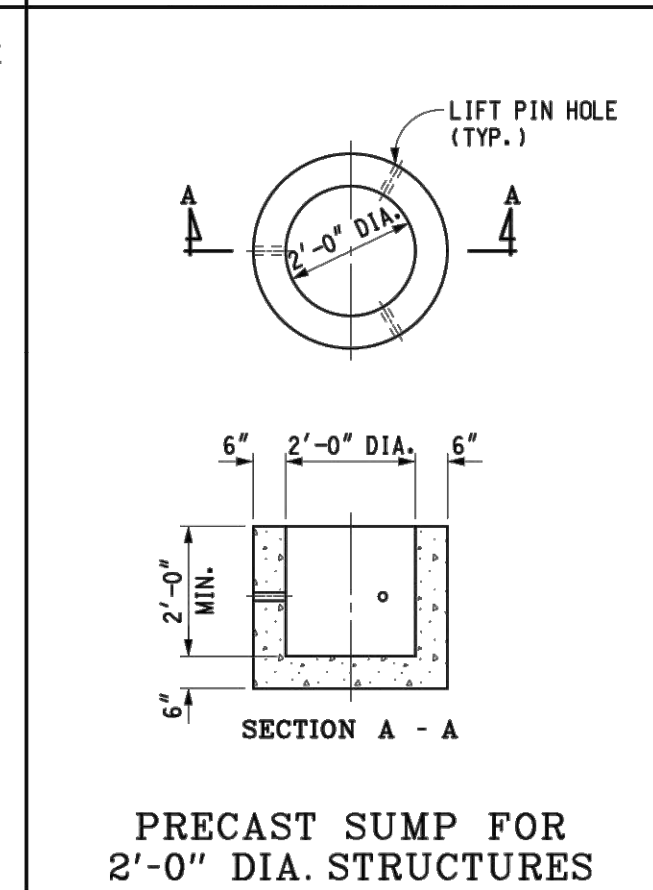
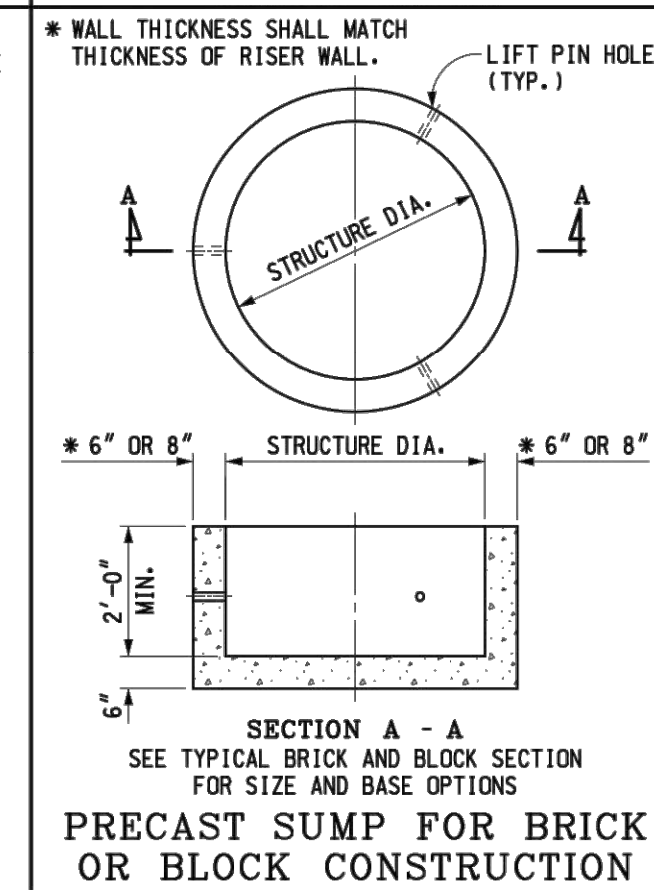
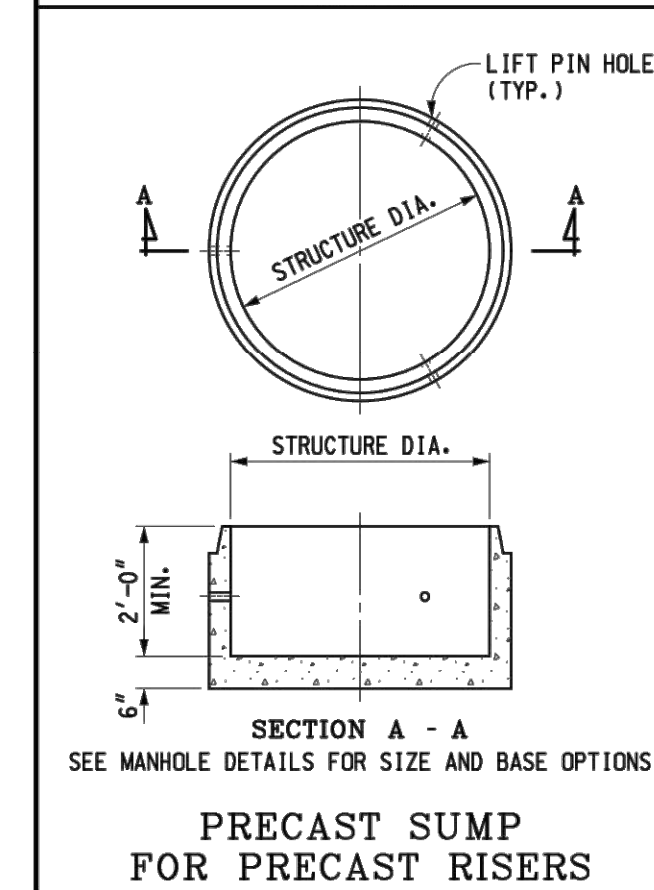
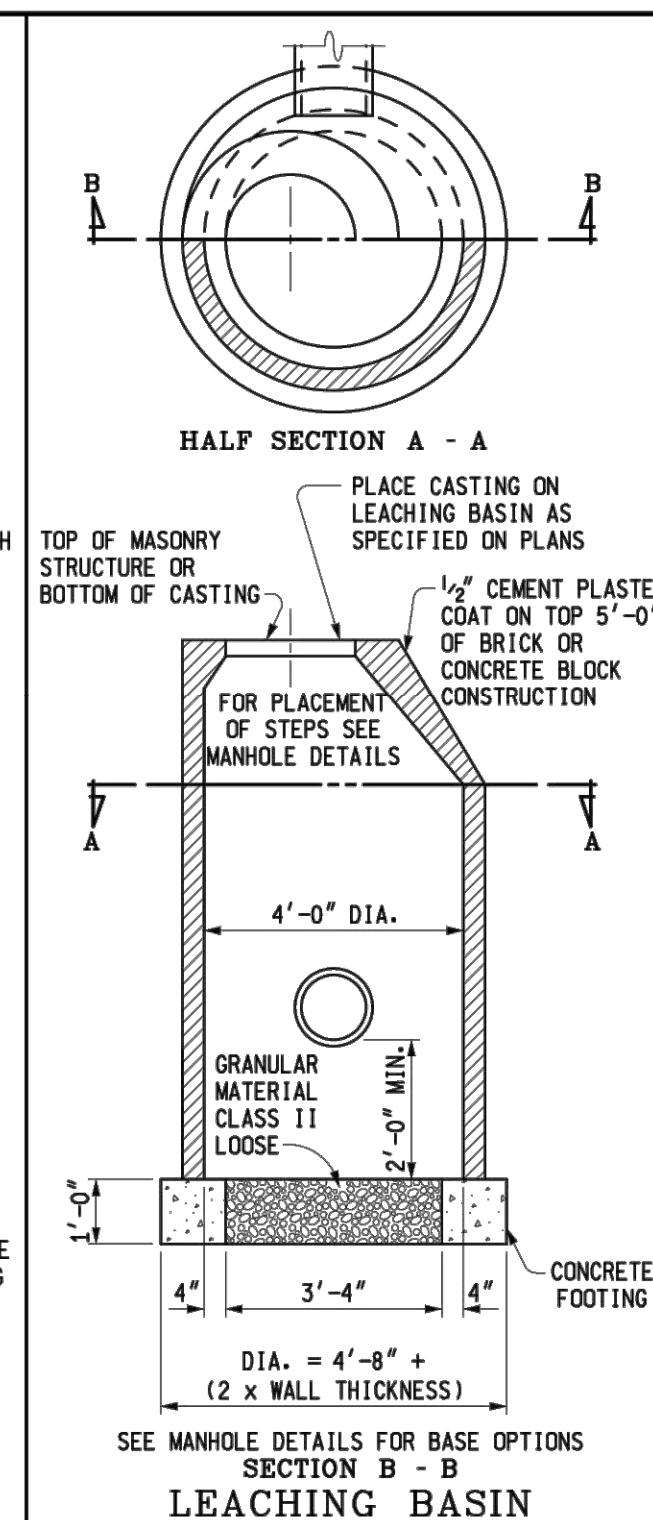
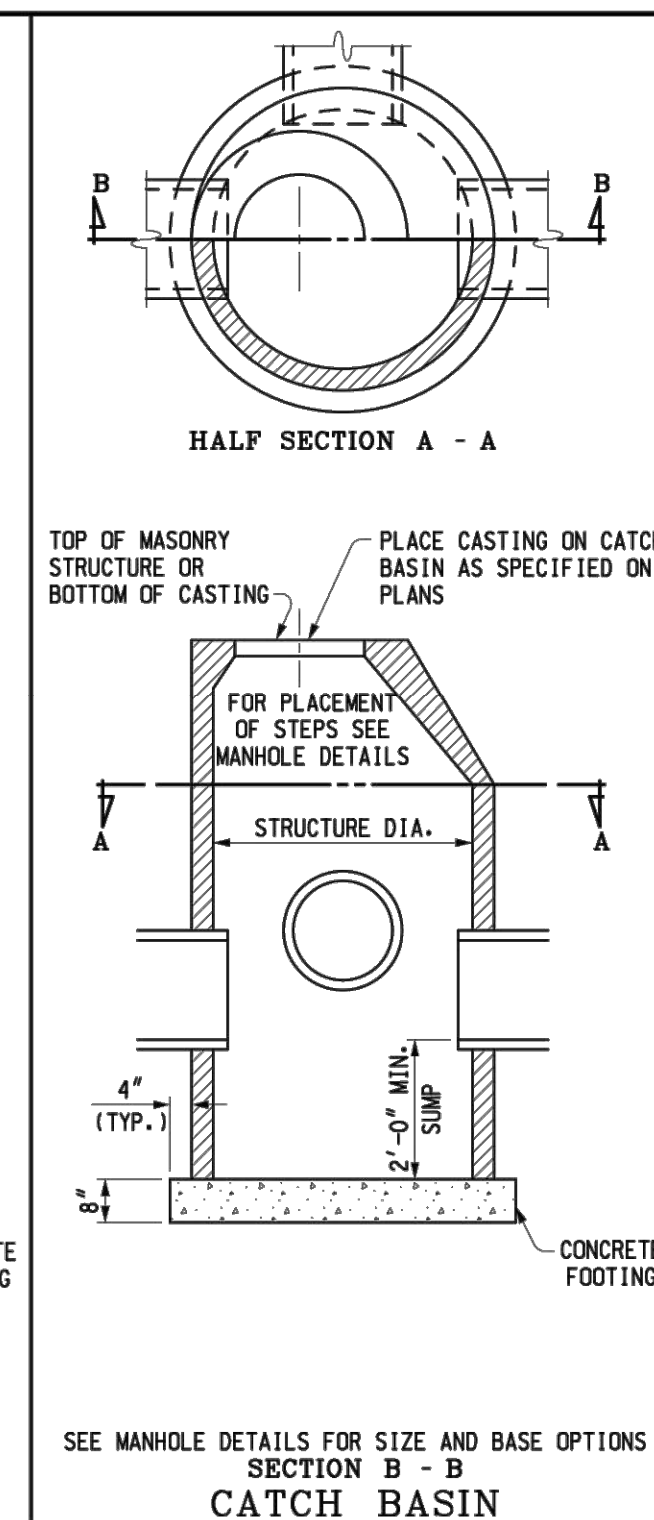
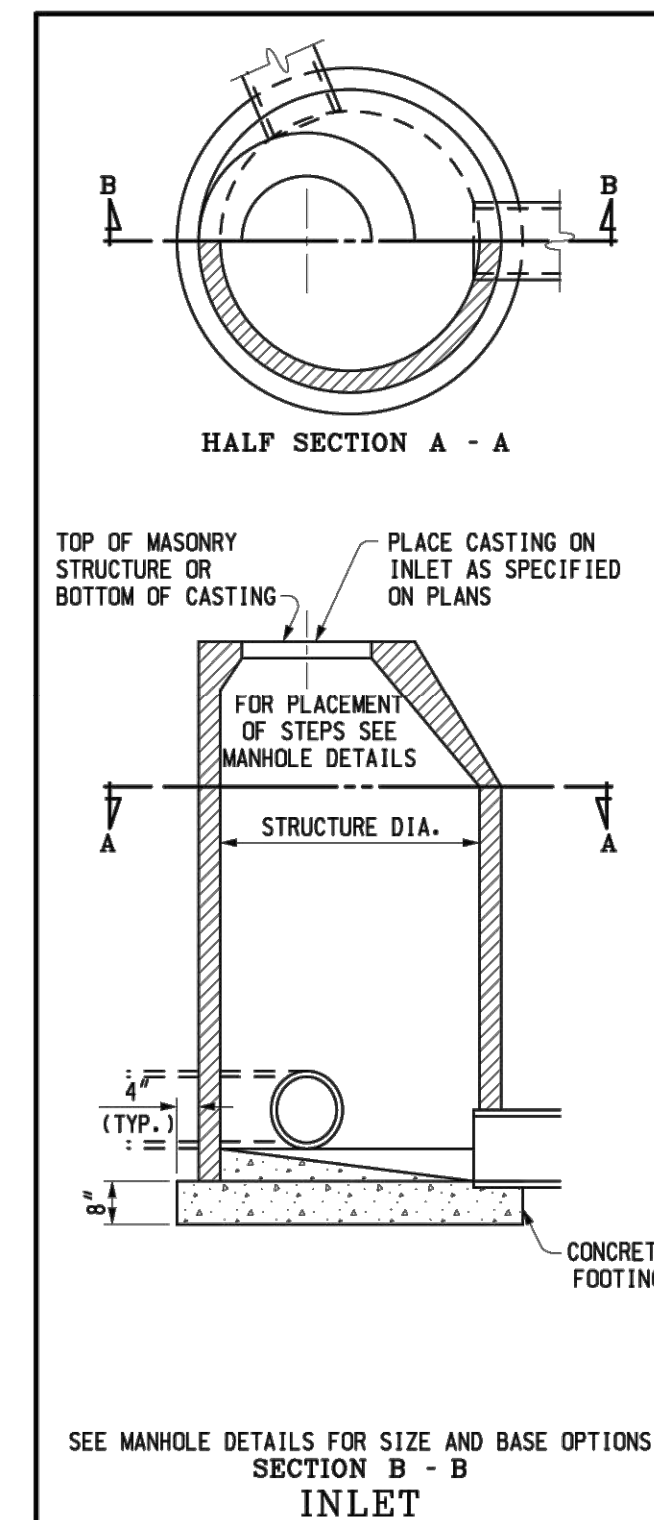
CHECKED BY: W.K.P.

APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL 6-15-2016 PLAN DATE R-1-G SHEET 1 OF 9



MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL 6-15-2016 PLAN DATE R-1-G SHEET 2 OF 9

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL 6-15-2016 PLAN DATE R-1-G SHEET 2 OF 9

AS-LET PLAN REVISIONS					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE



DATE: _____

DESIGN UNIT: _____

TSC: _____

CS: _____

JN: _____

FILE: _____

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MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED 02/17/21 B3 FINAL

TYPICAL CONCRETE BLOCK WALL SECTION

* 4 BLOCK MIN. FOR 4'-0" DIA. STRUCTURE
6 BLOCK MIN. FOR 5'-0" DIA. STRUCTURE
6 BLOCK MIN. FOR 6'-0" DIA. STRUCTURE

TYPICAL CAST-IN-PLACE CONCRETE WALL SECTION

TOP OF MASONRY OR BOTTOM OF CASTING

0 TO 8'-0"

3'-0" MIN.

45° BEVEL

CONCRETE FOOTING OR BASE FOR WALL SECTION

TYPICAL BRICK WALL SECTION

TOP OF MASONRY OR BOTTOM OF CASTING

0 TO 15'-0"

1/2" CEMENT PLASTER COAT

45° MORTAR BEVEL

CONCRETE FOOTING OR BASE FOR WALL SECTION

DROP INLET (TYPE 1)

3'-0" DIA.

CONCRETE

PIPE PAID FOR AS LINEAL FEET OF 12" DIA.

* PAID FOR AS DROP INLET (TYPE 1)

TYPICAL CAST-IN-PLACE CONCRETE WALL SECTION

TOP OF MASONRY OR BOTTOM OF CASTING

0 TO 15'-0"

45° BEVEL

CONCRETE FOOTING OR BASE FOR WALL SECTION

TYPICAL BRICK WALL SECTION

TOP OF MASONRY OR BOTTOM OF CASTING

0 TO 15'-0"

1/2" CEMENT PLASTER COAT

45° MORTAR BEVEL

CONCRETE FOOTING OR BASE FOR WALL SECTION

DROP INLET (TYPE 1)

3'-0" DIA.

CONCRETE

PIPE PAID FOR AS LINEAL FEET OF 12" DIA.

* PAID FOR AS DROP INLET (TYPE 1)

DROP INLET (TYPE 2)

3'-0" DIA.

3'-6"

3'-0"

6"

4"

6" MIN.

45°

REINFORCED CONCRETE CULVERT OR SEWER

CUT TO INSIDE SURFACE OF SEWER

BACKFILL SHALL BE PLACED TO BOTTOM OF INLET AND COMPACTED BEFORE CONSTRUCTING THE INLET

INLET

TOP OF MASONRY STRUCTURE OR BOTTOM OF CASTING

PLACE COVER ON CATCH BASIN AS SPECIFIED ON PLANS

2'-0" DIA.

CONCRETE FOOTING

DIA. = 2'-8" + (2 x WALL THICKNESS)

CATCH BASIN

TOP OF MASONRY STRUCTURE OR BOTTOM OF CASTING

PLACE COVER ON CATCH BASIN AS SPECIFIED ON PLANS

2'-0" DIA.

CONCRETE FOOTING

DIA. = 2'-8" + (2 x WALL THICKNESS)

2'-0" MIN. SUMP

PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478

* D BAR 0.20 in² AT 90°

SECTION B - B

SECTION A - A

PRECAST FLAT SLAB TOP FOR MASONRY STRUCTURE, 2' x 4' CASTING

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478

* D BAR 0.20 in² AT 90°

SECTION B - B

SECTION A - A

PRECAST REINFORCED CONCRETE FLAT SLAB TOP

PLAN (SHOWING BOTTOM LAYER OF REINFORCEMENT)

COVER DIAMETER

#4 BARS AT 10" MAXIMUM SPACING EACH WAY (TOP) EXCEPT 4'-0" DIAMETER

27" DIA. HOLE

2" DIA. PLUG (MIN.)

THREE HANDLING HOLES AT 120° SPACING

#5 BARS PLACE ON TOP OF BOTTOM BARS

#5 BARS PLACE ON TOP OF BOTTOM BARS

TWO ADDITIONAL BARS IN THE BOTTOM CENTERED BETWEEN THE BOTTOM BARS (SEE TABLE FOR BAR SIZE)

ONE ADDITIONAL BAR IN THE BOTTOM CENTER BETWEEN THE FIRST AND SECOND BAR NEXT TO HOLE (SEE TABLE FOR BAR SIZE)

ONE ADDITIONAL BAR IN THE BOTTOM CENTER BETWEEN THE FIRST AND SECOND BAR NEXT TO HOLE (SEE TABLE FOR BAR SIZE)

#5 BAR 2'-10" LONG IN BOTTOM

L (TYP.)

STRUCTURE DIAMETER	COVER DIAMETER	T	K	L	BAR MAXIMUM SPACING (BOTTOM EACH WAY)
* 4'-0"	58"	6"	6"	8"	#5 AT 6"
5'-0"	72"	8"	7"	9"	#5 AT 7"
6'-0"	86"	8"	8"	10"	#5 AT 6"
7'-0"	101 1/2"	12"	8 3/4"	11"	#5 AT 5"
8'-0"	114"	12"	9"	11"	#6 AT 6"
9'-0"	128"	12"	10"	12"	#5 AT 6"
10'-0"	140"	12"	10"	13"	#5 AT 6"

* ONLY BOTTOM LAYERS OF STEEL NECESSARY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL: _____ PLAN DATE: 6-15-2016 R-1-G SHEET 3 OF 9

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL: _____ PLAN DATE: 6-15-2016 R-1-G SHEET 4 OF 9

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

0 VERT. (FT)
0 HORZ. (FT)

DATE:	CS:	DRAWING SHEET
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C-505

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CONSTRUCT MAIN BASE ENTRANCE**

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

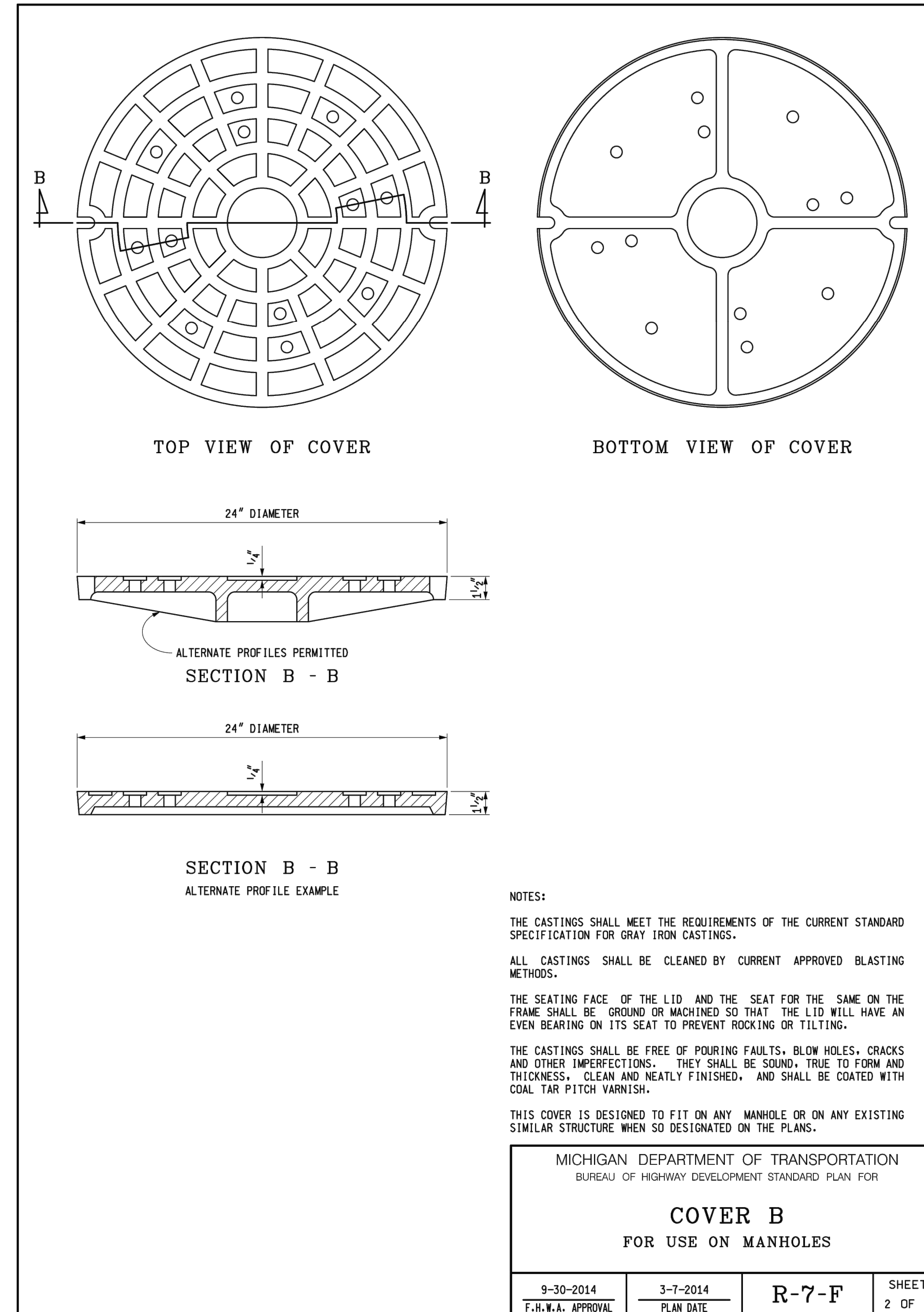
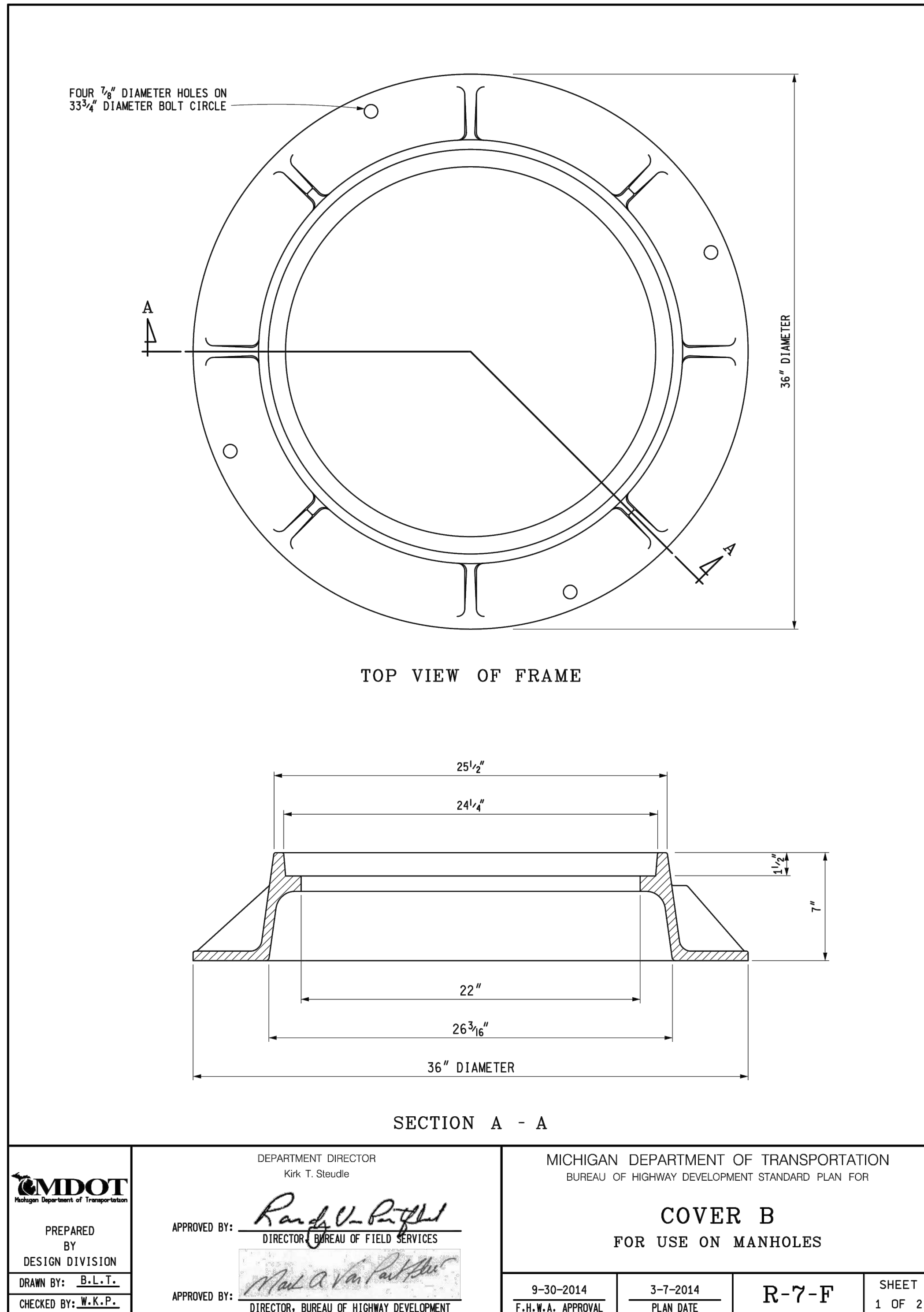
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ANG Project No: MBMV099170
MMH NO.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
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SHEET NO.

C-506

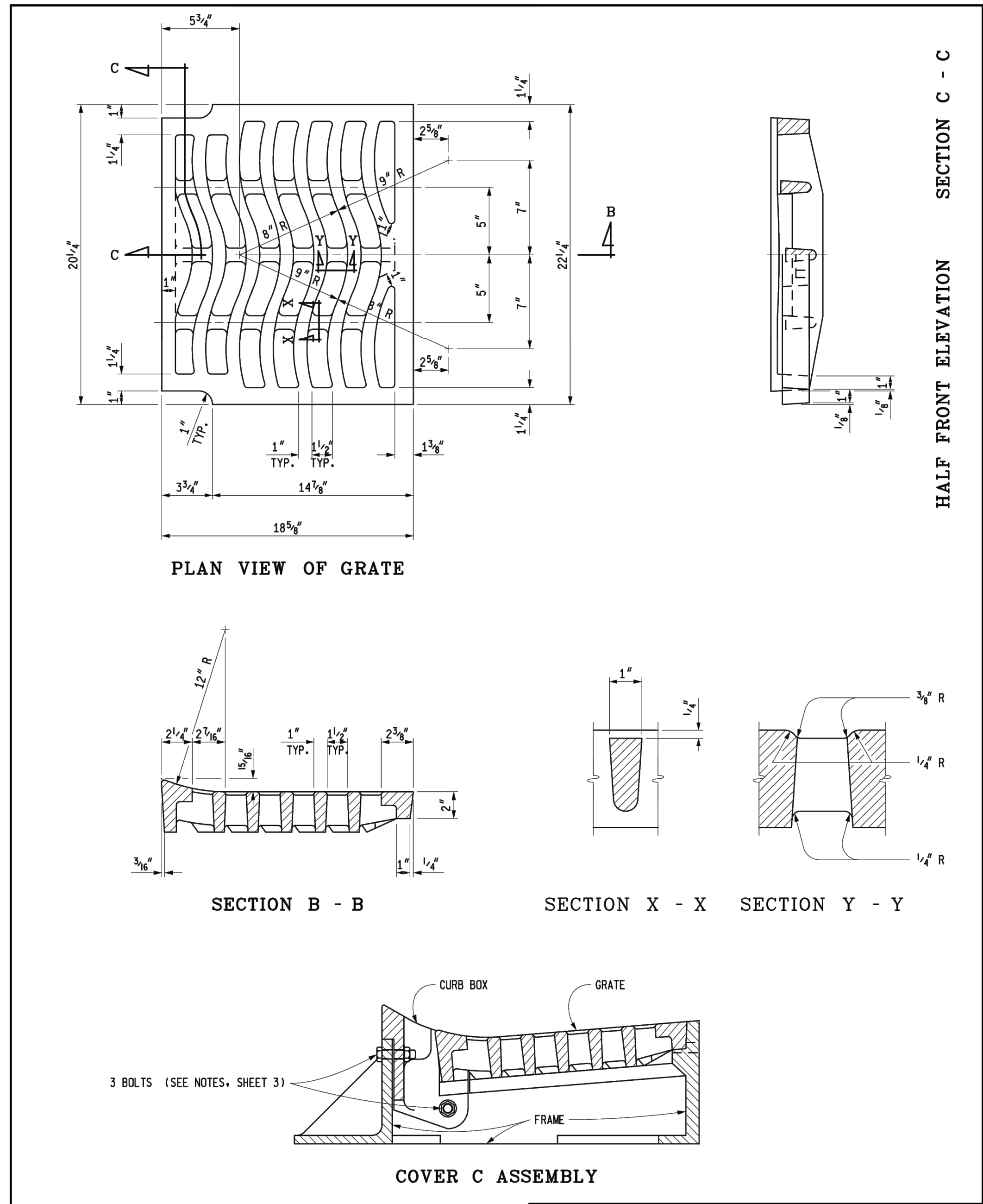
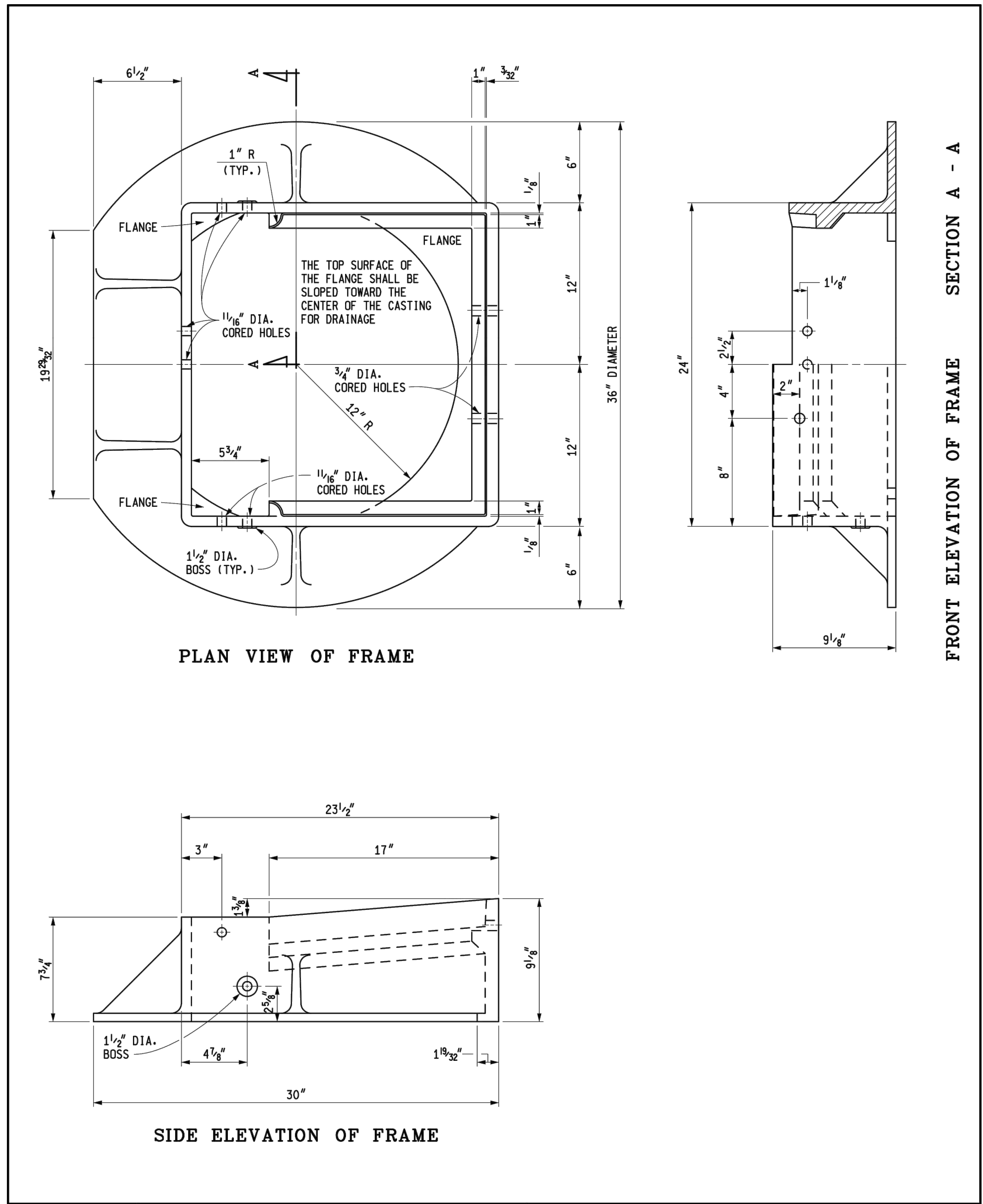




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SHEET NO.

C-507

	DEPARTMENT DIRECTOR Kirk T. Stuedde APPROVED BY: <i>Randy U. Pitzel</i> DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
	PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.T. CHECKED BY: W.K.P.	APPROVED BY: <i>Mead A. Van Pelt</i> DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT	COVER C FOR USE WITH CONCRETE CURB & GUTTER, DETAIL D		
		9-30-2014	5-15-2014	R-8-D	SHEET 1 OF 3
		F.H.W.A. APPROVAL	PLAN DATE		

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
COVER C FOR USE WITH CONCRETE CURB & GUTTER, DETAIL D			
9-30-2014	5-15-2014	R-8-D	SHEET 2 OF 3
F.H.W.A. APPROVAL	PLAN DATE		



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SHEET NO.

C-508

NOTE:
BOLT CURB BOX FIRMLY TO FRAME AT FOUNDRY WITH THREE 5/8" DIAMETER X 2 1/2" GALVANIZED MACHINE BOLTS WITH WASHERS AND NUT ENDS. (SEE NOTES)

PLAN VIEW OF CURB BOX

SECTION D - D

FRONT ELEVATION OF CURB BOX

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME AND THE CURB BOX SHALL BE GROUND SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE BEARING SURFACES BETWEEN CURB BOX AND FRAME SHALL BE GROUND AND SEATED SO AS TO PROVIDE AN EVEN BEARING THROUGHOUT. THE CURB BOX SHALL BE FIRMLY BOLTED IN PLACE ON THE FRAME BEFORE FINISHING OF THE GRATE SEATS IS DONE. GALVANIZED IRON WASHERS AND SHIMS SHALL BE PLACED BETWEEN FRAME AND ENDS OF CURB BOX SO AS BREAKING OF CURB BOX WHEN THESE BOLTS ARE TIGHTENED.

THE CURB BOX AND BOTH SECTIONS SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
COVER C			
FOR USE WITH CONCRETE CURB & GUTTER, DETAIL D			
9-30-2014 F.H.W.A. APPROVAL	5-15-2014 PLAN DATE	R-8-D	SHEET 3 OF 3

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CASTING SHALL BE SET IN SOFT MORTAR BED TO THE ELEVATION SPECIFIED ON THE PLANS AND IN SUCH A MANNER AS TO PROVIDE A FIRM AND UNIFORM BEARING ON THE MASONRY WALL.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

PLAN VIEW

SECTION A-A

PLAN VIEW

HALF ELEVATION

HALF SECTION

NORMAL VIEW OF INCLINED RIB

DEPARTMENT DIRECTOR Kirk T. Stuedle		MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR	
PREPARED BY DESIGN DIVISION		COVER E	
DRAWN BY: B.L.T.		FOR USE ON STRUCTURES IN DITCHES WHERE NOT SUBJECT TO TRAFFIC	
CHECKED BY: W.K.P.		9-30-2014 F.H.W.A. APPROVAL	4-16-2014 PLAN DATE
APPROVED BY: <i>Randy V. Puffel</i> DIRECTOR, BUREAU OF FIELD SERVICES		R-10-D	SHEET 1 OF 1
APPROVED BY: <i>Muel A. Van der Pijl</i> DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT			



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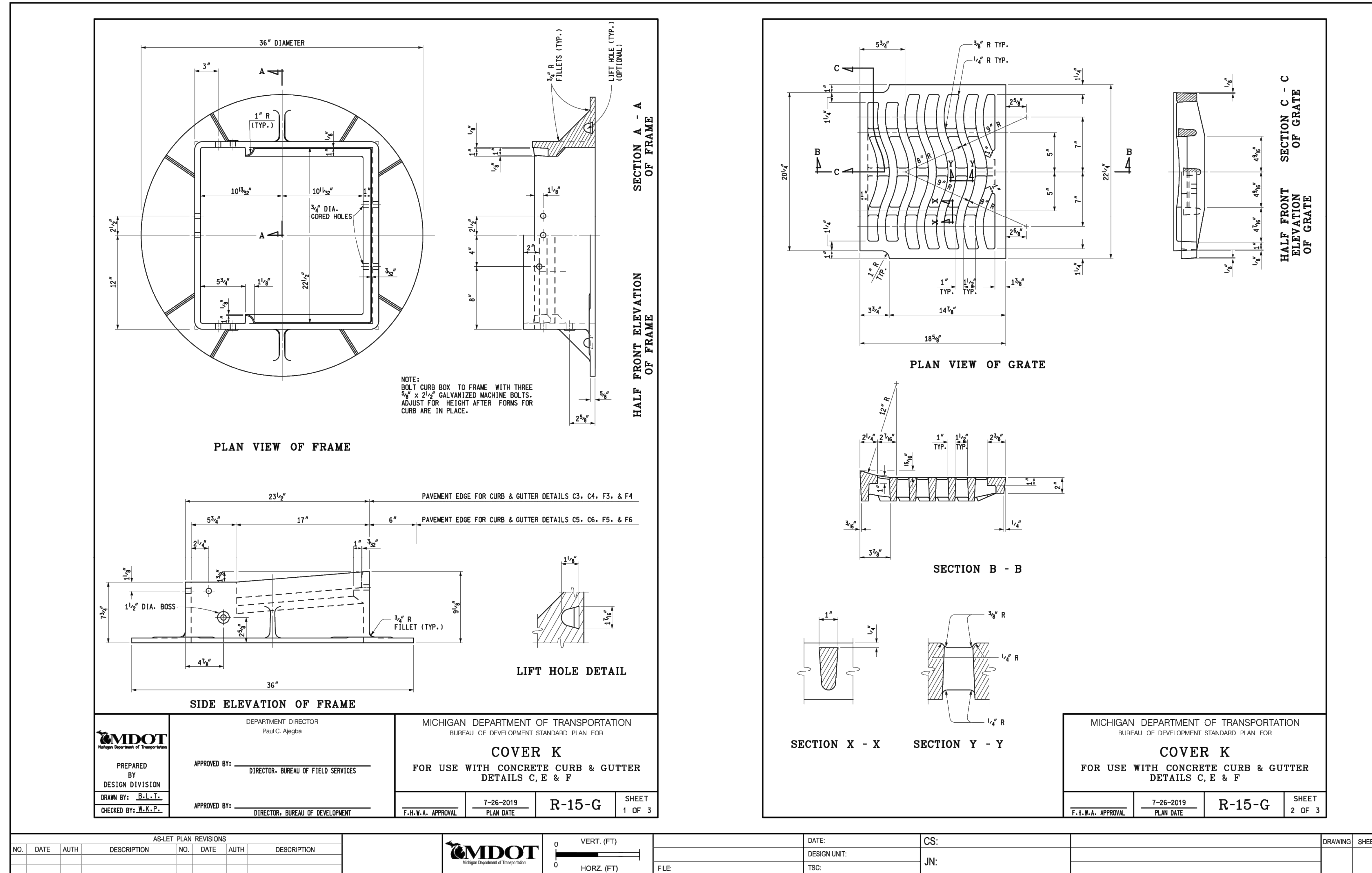
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BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

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BATTLE CREEK, MICHIGAN**

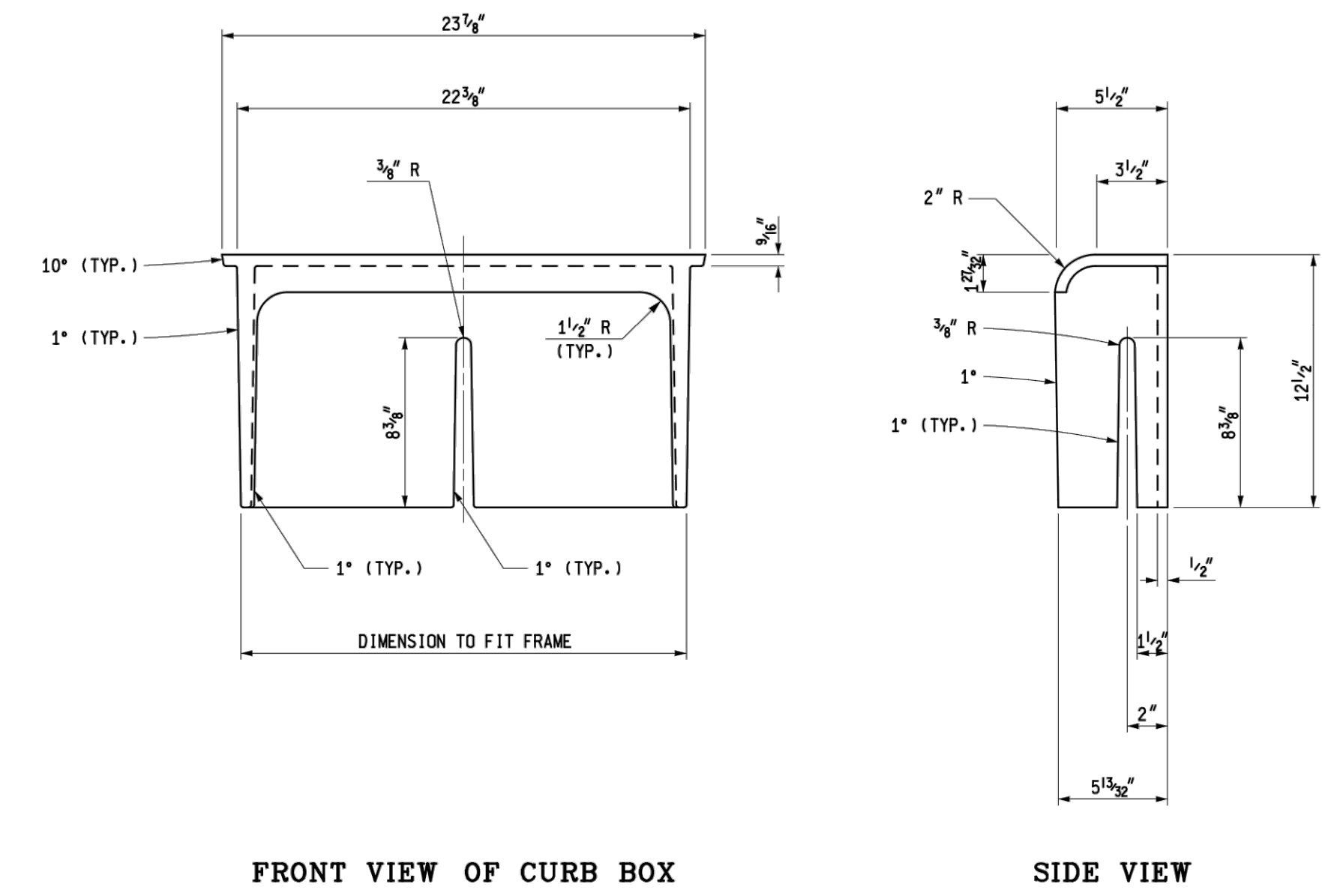
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SHEET CONTENTS
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DETAILS

SHEET NO.

C-510



NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON OR DUCTILE IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GRIND OR MACHINED SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CURB BOX AND FRAME SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

F.H.W.A. APPROVAL	PLAN DATE	SHEET OF
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MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

COVER K
FOR USE WITH CONCRETE CURB & GUTTER
DETAILS C, E & F

F.H.W.A. APPROVAL	7-26-2019 PLAN DATE	R-15-G	SHEET 3 OF 3
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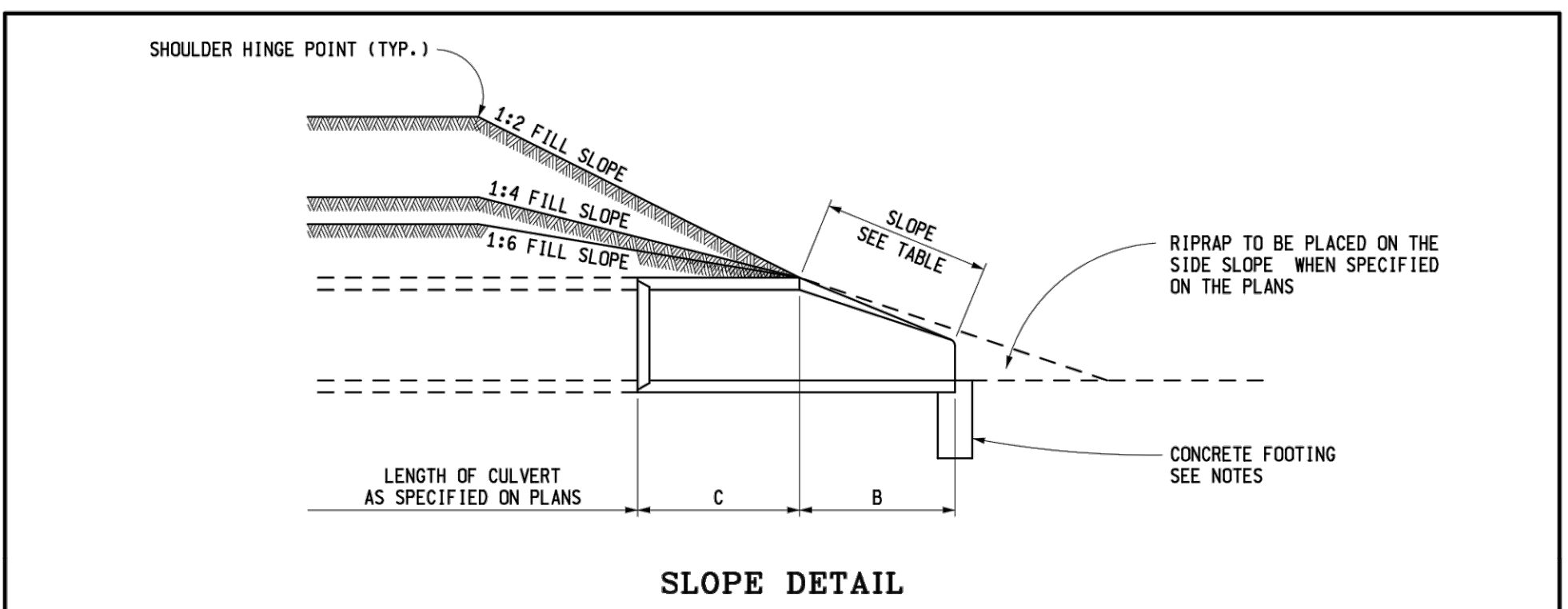


TABLE OF DIMENSIONS

PIPE DIAMETER (INCHES)	APPROX. SLOPE	T (INCHES)	A (INCHES)	B (INCHES)	C (INCHES)	D (INCHES)	E (INCHES)	G (INCHES)	R (INCHES)	X (INCHES)	Y (INCHES)
12	2.4 to 1	2	4	24	49	73	24	2	9	8	18
15	2.4 to 1	2 1/4	6	27	46	73	30	2 1/4	11	8	18
18	2.3 to 1	2 1/2	9	27	46	73	36	2 1/2	12	8	18
21	2.4 to 1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	13	8	18
24	2.5 to 1	3	9 1/2	43 1/4	30 1/2	73 3/4	48	3	14	8	18
27	2.5 to 1	3 1/4	10 1/2	49 1/4	24 1/2	73 3/4	54	3 1/4	14 1/2	8	18
30	2.5 to 1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	15	8	18
36	2.5 to 1	4	15	63	34 3/4	97 3/4	72	4	20	8	18
42	2.5 to 1	4 1/2	21	63	35	98	78	4 1/2	22	10	24
48	2.5 to 1	5	24	72	26	98	84	5	22	10	24
54	2.0 to 1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	24	10	24
60	1.9 to 1	6	35	60	39	99	96	5	*	12	24
66	1.7 to 1	6 1/2	30	72	27	99	102	5 1/2	*	12	24
72	1.8 to 1	7	36	78	21	99	108	6	*	12	24
78	1.8 to 1	7 1/2	36	90	21	111	114	6 1/2	*	12	24
84	1.6 to 1	8	36	90 1/2	21	111 1/2	120	6 1/2	*	12	24

* AS FURNISHED BY THE MANUFACTURER

NOTES:

CONCRETE IN THESE END SECTIONS SHALL BE THE SAME GRADE AND STRENGTH AS SPECIFIED FOR REINFORCED CONCRETE PIPE, A.S.T.M. DESIGNATION C 76 CLASS 11, EXCEPT AS MODIFIED BY THE STANDARD SPECIFICATION.

REINFORCEMENT IN THE "C" PORTION SHALL BE THE SAME AS SPECIFIED FOR REINFORCED CONCRETE, A.S.T.M. DESIGNATION C 76 CLASS 11 FOR THE SIZE OF CONNECTING PIPE.

REINFORCEMENT IN THE "B" PORTION SHALL HAVE A CROSS-SECTIONAL AREA EQUAL TO THAT OF ONE LAYER OF STEEL IN THE "C" PORTION.

THE END OF THE PIPE CULVERT SHALL BE PLACED IN THE CONCRETE END SECTION SO THAT THE FLOW LINES ARE FLUSH. THE JOINT MUST BE COMPLETELY FILLED WITH MORTAR ON THE INSIDE AND OUTSIDE AND STRUCK FLUSH. THE JOINT MUST BE WRAPPED WITH GEOTEXTILE BLANKET 36" WIDE WITH A 12" OVERLAP.

TO CHANGE THE FILL SLOPE TO THE SLOPE OF THE END SECTION USE A TRANSITION SLOPE OF APPROXIMATELY 10' IN LENGTH TO PROVIDE A PLEASING APPEARANCE.

VARIATIONS IN DIMENSIONS - THE THICKNESS OF CONCRETE, THE POSITION OF STEEL, AND THE INTERNAL DIAMETER OF THE PIPE SHALL CONFORM WITH THE VARIATIONS IN DIMENSIONS AS PROVIDED IN THE SPECIFICATIONS FOR REINFORCED CONCRETE CULVERT, STORM DRAINS, AND SEWER PIPE, A.S.T.M. DESIGNATION C 76.

PLACE CONCRETE FOOTING AS SHOWN.

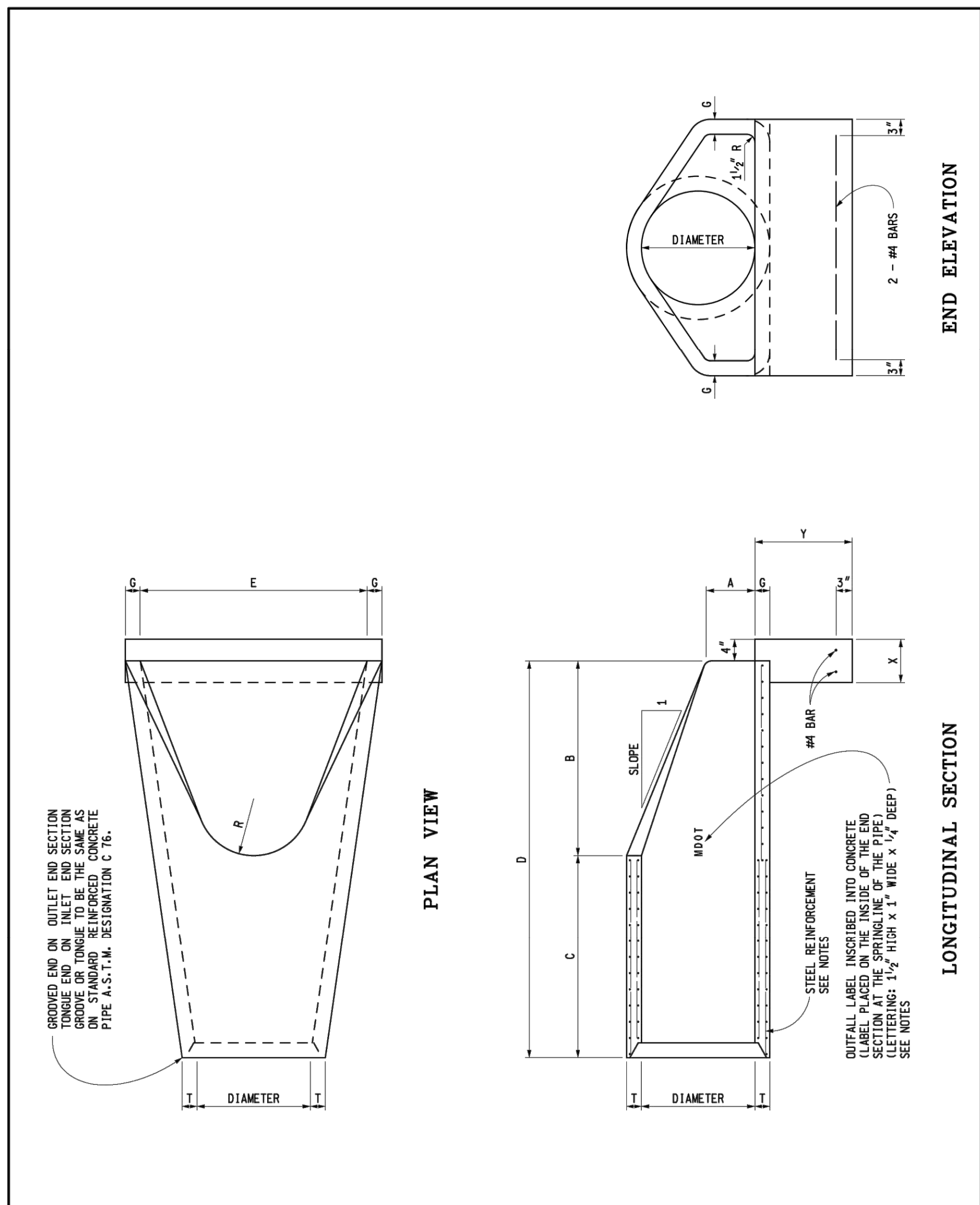
OUTFALL LABEL TO BE USED ONLY WHERE STORMWATER WILL DISCHARGE DIRECTLY TO THE WATERS OF THE STATE.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**PRECAST CONCRETE END SECTION
FOR PIPE CULVERT**

9-13-2018
PLAN DATE

R-86-F

SHEET
2 OF 2



DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

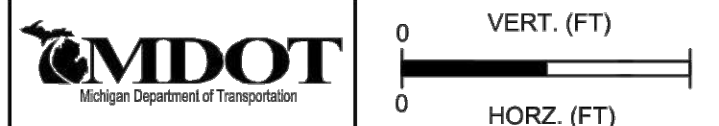
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**PRECAST CONCRETE END SECTION
FOR PIPE CULVERT**

9-13-2018
PLAN DATE

R-86-F

SHEET
1 OF 2

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METAL CULVERT SLOPED END SECTION FOR CORRUGATED METAL PIPE
(TRANSVERSE DRAINAGE INSTALLATION SHOWN)

METAL CULVERT SLOPED END SECTION FOR ARCH PIPE
(LONGITUDINAL DRAINAGE INSTALLATION SHOWN)

METAL CULVERT SLOPED END SECTION FOR ELLIPTICAL CONCRETE PIPE
(TRANSVERSE DRAINAGE INSTALLATION SHOWN)

METAL CULVERT SLOPED END SECTION AND CONNECTION TO CIRCULAR CONCRETE PIPE
(LONGITUDINAL DRAINAGE INSTALLATION SHOWN)

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

PREPARED BY: DESIGN DIVISION
DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**CULVERT
SLOPED END SECTIONS
(CONCRETE AND METAL)**

F.H.W.A. APPROVAL 9-19-2018 R-95-G SHEET 1 OF 7
PLAN DATE

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

PREPARED BY: DESIGN DIVISION
DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**CULVERT
SLOPED END SECTIONS
(CONCRETE AND METAL)**

F.H.W.A. APPROVAL 9-19-2018 R-95-G SHEET 2 OF 7
PLAN DATE

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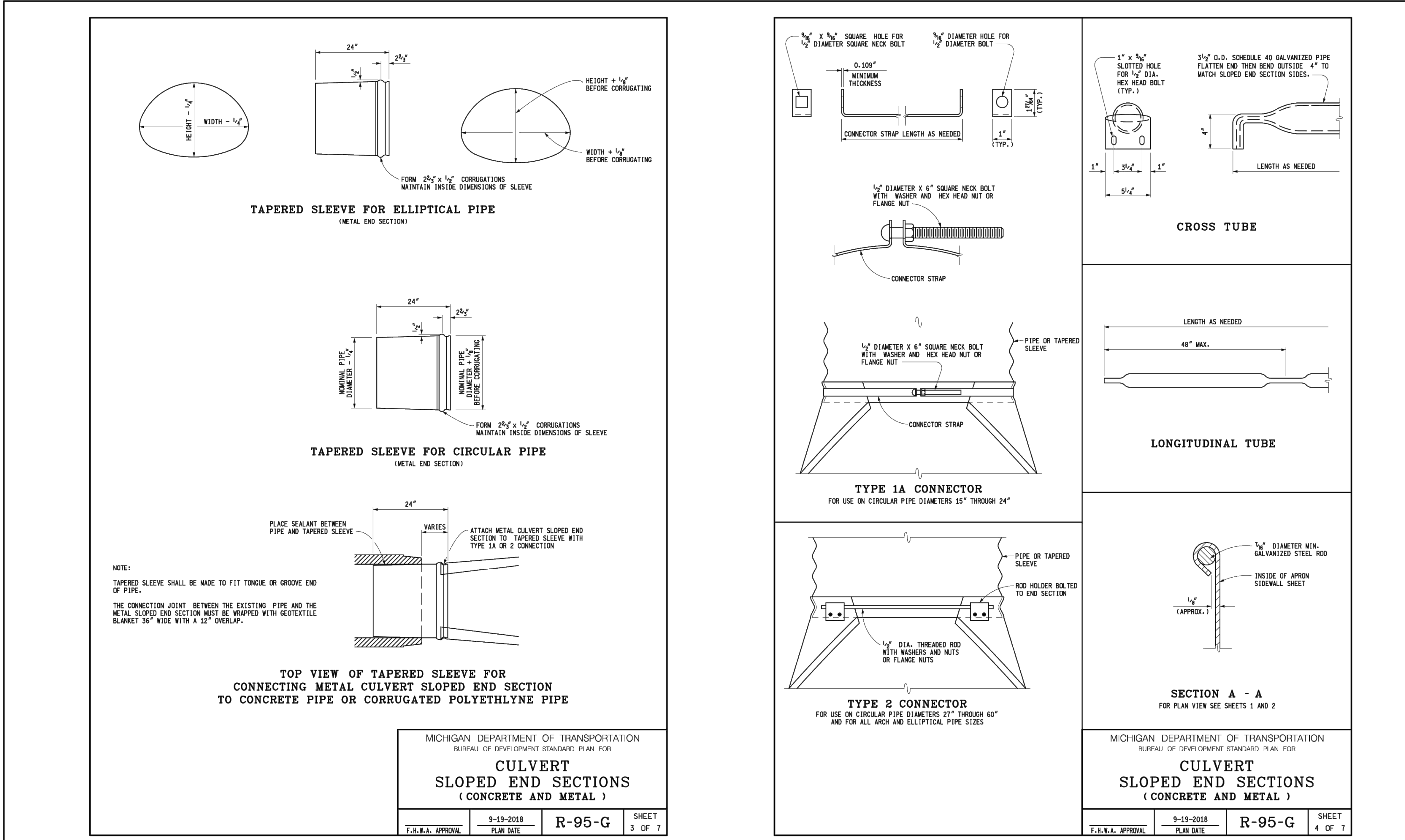


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SHEET NO.

C-514

CONCRETE CULVERT SLOPED END FOR CIRCULAR PIPE

CONCRETE CULVERT SLOPED END SECTIONS FOR 30" AND 36" DIAMETER PIPES WILL HAVE A 3" LONGITUDINAL BAR IN THE MIDDLE WHEN LOCATED TRANSVERSE TO THE ROADWAY.

CROSS BAR ATTACHMENT SEE DETAIL

3" CROSS BAR
5/8" x 2" RETAINING BOLT
FERRULE LOOP INSERT

PLAN VIEW

CROSS BAR ATTACHMENT DETAIL

3" CROSS BAR (TYP.)
12"
6"
PIPE DIA.
D

GROOVED END ON OUTLET END SECTION
TONGUE END ON INLET END SECTION
GROOVE OR TONGUE TO BE THE SAME AS
ON STANDARD REINFORCED CONCRETE
PIPE A.S.T.M. DESIGNATION C 76M.

INVERT ELEVATION
LOCATION REFERENCE

OUTFALL LABEL INSCRIBED INTO CONCRETE
(LABEL PLACED ON THE INSIDE OF THE END
SECTION AT THE SPRINGLINE OF THE PIPE)
(LETTERING: 1 1/2" HIGH x 1" WIDE x 1/4" DEEP)
SEE NOTES

SIDE VIEW

END VIEW

PIPE DIA. (INCHES)	SLOPE	DIMENSIONS (INCHES)					
		D	L	W	T	H	
15	6:1	25	57	25	5	8	
	4:1	28	55	28	5	8	
18	6:1	28	75	28	5	8	
	4:1	34	79	36	5	8	
24	6:1	34	111	36	5	8	
	4:1	40	104	43	5	8	
30	6:1	40	147	43	5	8	
	4:1	47	127	51	5 1/2	8	
36	6:1	47	183	51	5 1/2	8	

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**CULVERT
SLOPED END SECTIONS
(CONCRETE AND METAL)**

9-19-2018 PLAN DATE R-95-G SHEET 6 OF 7
F.H.W.A. APPROVAL

METAL SLOPED END SECTIONS FOR ARCH PIPES

SPAN/ RISE (INCHES)	MINIMUM THICKNESS (INCHES)	DIMENSIONS (INCHES)				L DIMENSIONS (INCHES)	
		A	H	W	OVERALL WIDTH	LENGTH (SLOPE 4:1)	LENGTH (SLOPE 6:1)
21 X 15	.064	8	6	27	43	20	30
24 X 18	.064	8	6	30	46	32	48
28 X 20	.064	8	6	34	50	40	60
35 X 24	.079	12	9	41	65	56	84
42 X 29	.109	12	9	48	72	76	114
49 X 33	.109	16	12	55	87	92	138
57 X 38	.109	16	12	63	95	112	168
64 X 43	.109	16	12	70	102	132	198
71 X 47	.109	16	12	77	109	148	222
77 X 52	.109	16	12	83	115	168	252
83 X 57	.109	16	12	89	121	188	282

**METAL SLOPED END SECTIONS FOR CIRCULAR PIPES
(STEEL OPTION)**

PIPE DIA. (INCHES)	MINIMUM THICKNESS (INCHES)	DIMENSIONS (INCHES)				L DIMENSIONS (INCHES)	
		A	H	W	OVERALL WIDTH	LENGTH (SLOPE 4:1)	LENGTH (SLOPE 6:1)
15	.064	8	6	21	37	20	30
18	.064	8	6	24	40	32	48
21	.064	8	6	27	43	44	66
24	.064	8	6	30	46	56	84
27	.109	12	9	33	57	68	102
30	.109	12	9	36	60	80	120
36	.109	12	9	42	66	104	156
42	.109	16	12	48	80	128	192
48	.109	16	12	54	86	152	228
54	.109	16	12	60	92	176	264
60	.109	16	12	66	98	200	300

METAL SLOPED END SECTIONS FOR ELLIPTICAL PIPES

HEIGHT/ WIDTH (INCHES)	MINIMUM THICKNESS (INCHES)	DIMENSIONS (INCHES)				L DIMENSIONS (INCHES)	
		A	H	W	OVERALL WIDTH	LENGTH (SLOPE 4:1)	LENGTH (SLOPE 6:1)
14 X 23	.064	8	6	29	45	16	24
19 X 30	.064	8	6	36	52	36	54
22 X 34	.079	12	9	40	64	48	72
24 X 38	.079	12	9	44	68	56	84
27 X 42	.109	12	9	48	72	68	102
29 X 45	.109	16	12	51	83	76	114
34 X 53	.109	16	12	59	91	96	144
38 X 60	.109	16	12	66	98	112	168
43 X 68	.109	16	12	74	106	132	198
48 X 76	.109	16	12	80	112	152	228

**MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
CONCRETE AND METAL**

9-19-2018 PLAN DATE R-95-G SHEET 5 OF 7
F.H.W.A. APPROVAL

**METAL CULVERT SLOPED END SECTION
SHOWING CROSS TUBES USED FOR
LONGITUDINAL DRAINAGE INSTALLATIONS**

NOTE: IN LONGITUDINAL DRAINAGE SITUATIONS, CROSS TUBES ARE REQUIRED AT A 24" MAXIMUM SPACING. THE NUMBER OF CROSS TUBES REQUIRED WILL VARY DEPENDING ON THE LENGTH OF THE CULVERT SLOPED END SECTION.

OUTFALL LABEL STAMPED INTO STEEL
(LABEL PLACED ON THE INSIDE OF THE END
SECTION AT THE SPRINGLINE OF THE PIPE)
(LETTERING: 1 1/2" HIGH x 1" WIDE x 1/4" DEEP)
SEE NOTES

CROSS TUBE (TYP.)

WOOD

**METAL CULVERT SLOPED END SECTION
SHOWING CROSS TUBES AND LONGITUDINAL TUBE
USED FOR TRANSVERSE DRAINAGE INSTALLATIONS
(CONNECTED TO CONCRETE PIPE SHOWN)**

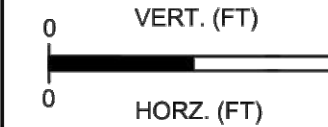
NOTE: IN TRANSVERSE DRAINAGE SITUATIONS, NO TUBES ARE REQUIRED WHEN THE "W" DIMENSION IS 30" OR LESS. CROSS TUBES ARE REQUIRED WHEN THE CLEAR SPAN DIMENSION IS LARGER THAN 30". THE NUMBER OF CROSS TUBES WILL VARY DEPENDING ON THE LENGTH OF THE LONGITUDINAL TUBE REQUIRED. WHEN THE "W" DIMENSION IS 36" TO 60", ONE LONGITUDINAL TUBE IS REQUIRED. WHEN THE "W" DIMENSION IS LARGER THAN 60", TWO LONGITUDINAL TUBES EQUALLY SPACED ARE REQUIRED. LONGITUDINAL TUBES SHALL BE WELDED TO CROSS TUBES TO ATTAIN A SINGLE PIECE STRUCTURE.

OUTFALL LABEL STAMPED INTO STEEL
(LABEL PLACED ON THE INSIDE OF THE END
SECTION AT THE SPRINGLINE OF THE PIPE)
(LETTERING: 1 1/2" HIGH x 1" WIDE x 1/4" DEEP)
SEE NOTES

CROSS TUBE (TYP.)

LONGITUDINAL TUBE

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



FILE:	DATE:	CS:	DRAWING	SHEET
	DESIGN UNIT:	JN:		
	TSC:			



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**MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE**

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

ANG Project No: MBMV099170
MAH No: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
DRAWN BY: DAY
CHECKED BY: SAH
DO NOT SCALE DRAWINGS

SHEET CONTENTS
CONSTRUCTION
DETAILS

SHEET NO.

C-515

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

F.H.W.A. APPROVAL	PLAN DATE	SHEET OF
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NOTE: ALL STEEL REINFORCEMENT SHALL BE #4 BARS

STEEL REINFORCEMENT FOR CONCRETE CULVERT SLOPED END

NOTES:

GALVANIZED STEEL SHALL MEET THE REQUIREMENTS IN THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

GALVANIZED TOE PLATE EXTENSIONS ARE REQUIRED ON METAL CULVERT SLOPED END SECTIONS WHEN INDICATED ON THE PLANS OR BY AUTHORIZATION WHEN EITHER HEIGHT OF FILL IS 10'-0" OR MORE OR WHEN THE CULVERT GRADE IS 10% OR MORE. THEY SHALL BE MATCHED-PUNCHED TO FIT HOLES IN TOE PLATE AND SUPPLIED LOOSE, COMPLETE WITH 3/8" DIAMETER GALVANIZED BOLTS. TOE PLATE EXTENSIONS SHALL BE THE SAME THICKNESS AS THE METAL CULVERT SLOPED END SECTION. LENGTH OF TOE PLATE EXTENSION IS "OVERALL WIDTH" LESS 6".

CORRUGATED METAL PIPES, ARCHED PIPES, AND SMOOTH TAPERED SLEEVES THAT ARE SHOWN ON THIS PLAN HAVE 2 1/2" x 1/2" CORRUGATIONS. EQUIVALENT PIPE AND SLEEVE SIZES WITH 3" x 1" OR 5" x 1" CORRUGATIONS WILL BE ALLOWED.

FOR BOTH METAL AND CONCRETE CULVERT SLOPED END SECTIONS, CROSS AND LONGITUDINAL BARS/TUBES SHALL BE SCHEDULE 40 GALVANIZED PIPE, A.S.T.M. A53. WHEN PARALLEL BARS/TUBES ARE WELDED TO CROSS TUBES, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED ACCORDING TO SECTION 716 OF THE STANDARD SPECIFICATIONS.

SLOTTED HOLES FOR PARALLEL TUBE ATTACHMENT SHALL BE PROVIDED FOR ALL METAL CULVERT SLOPED END SECTIONS.

SMOOTH TAPERED SLEEVES (FOR METAL END SECTIONS) SHALL BE GALVANIZED AND HAVE A MINIMUM THICKNESS AS FOLLOWS:

0.079" FOR NOMINAL PIPE DIAMETERS LESS THAN 27"
0.109" FOR NOMINAL PIPE DIAMETERS 27" AND LARGER
0.079" FOR ELLIPTICAL PIPES LESS THAN 24" x 38"
0.109" FOR ELLIPTICAL PIPES 24" x 38" AND LARGER

ANY SEAMS IN SMOOTH TAPERED SLEEVES SHALL BE BUTT WELDED.

A TYPE 2 CONNECTOR (FOR METAL END SECTIONS) DESIGNATED FOR ROUND PIPES 27" AND LARGER MAY BE USED ON SMALLER PIPE SIZES.

OUTFALL LABEL TO BE USED ONLY WHERE STORMWATER WILL DISCHARGE DIRECTLY TO THE WATERS OF THE STATE.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**CULVERT
SLOPED END SECTIONS
(CONCRETE AND METAL)**

9-19-2018	R-95-G	SHEET 7 OF 7
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AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

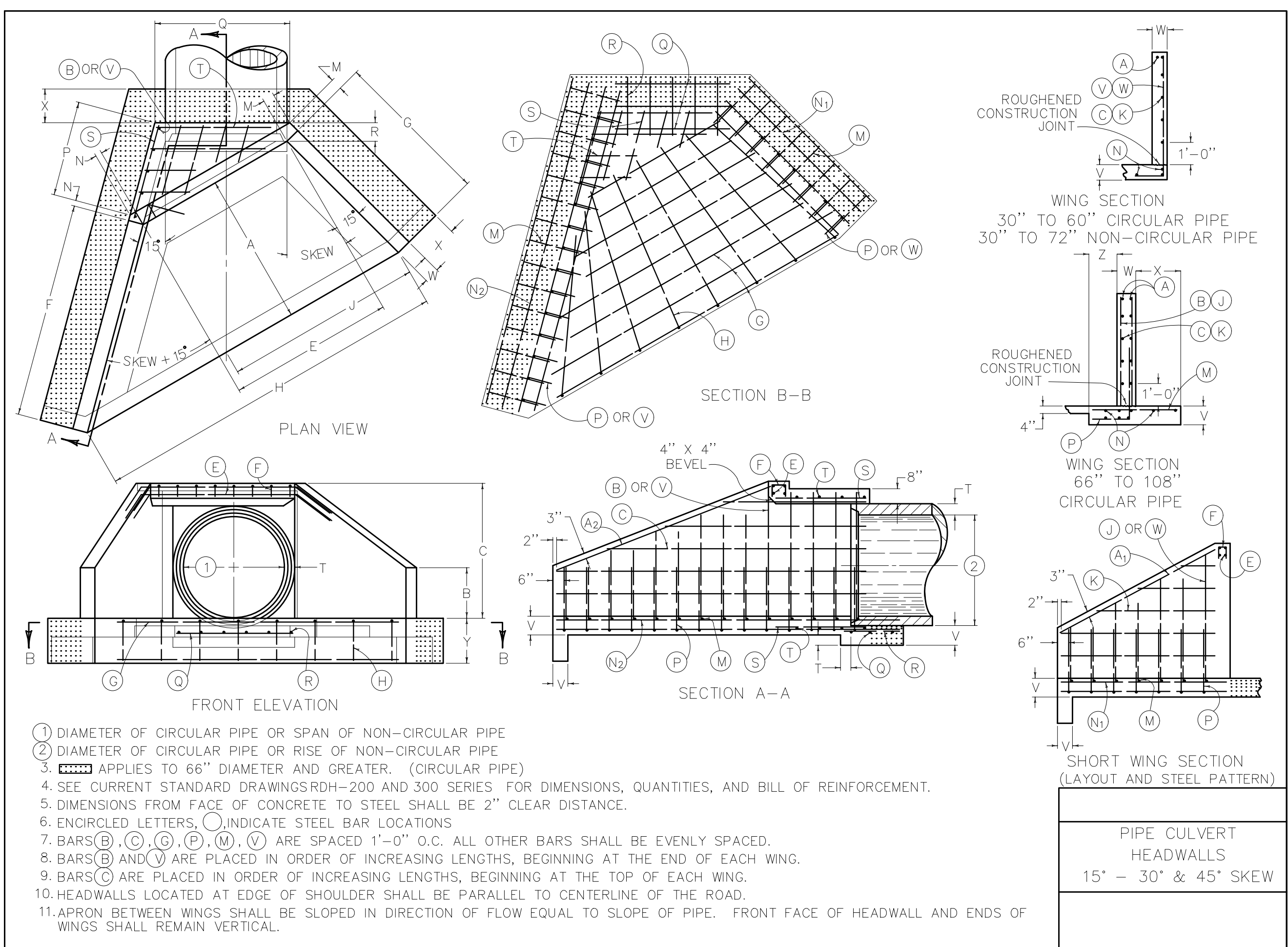
0 VERT. (FT)
0 HORZ. (FT)

DATE: _____ CS: _____
DESIGN UNIT: _____ JN: _____
TSC: _____

FILE: _____

DRAWING SHEET

X:\3141900\113782\01\TECH\CAD\B\CONSTRUCTION DETAILS.DWG
2/10/2021 8:04:53 AM



DIMENSION	DIAMETER OF PIPE													DIMENSION	
	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"		108"
A	4'-5"	5'-0"	5'-7"	6'-2"	6'-9"	7'-4"	7'-9"	8'-4"	8'-11"	9'-6"	10'-1"	10'-8"	11'-3"	11'-10"	A
B	1'-3"	1'-6"	1'-9"	2'-0"	2'-3"	2'-6"	2'-9"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"	4'-6"	B
C	3'-10"	4'-4"	4'-11"	5'-5"	6'-0"	6'-6"	7'-1"	7'-7"	8'-2"	8'-8"	9'-3"	9'-9"	10'-4"	10'-10"	C
E	3'-5"	4'-1"	4'-9"	5'-5"	6'-0"	6'-8"	7'-4"	8'-0"	8'-8"	9'-4"	9'-11"	10'-7"	11'-3"	11'-11"	E
F	5'-1"	5'-9"	6'-5"	7'-1"	7'-10"	8'-6"	8'-11"	9'-7"	10'-4"	11'-0"	11'-8"	12'-4"	13'-0"	13'-8"	F
G	4'-7"	5'-2"	5'-9"	6'-5"	7'-0"	7'-7"	8'-0"	8'-8"	9'-3"	9'-10"	10'-5"	11'-1"	11'-8"	12'-3"	G
H	7'-2"	8'-4"	9'-6"	10'-7"	11'-9"	12'-11"	13'-11"	15'-0"	16'-2"	17'-4"	18'-6"	19'-7"	20'-9"	21'-11"	H
J	4'-0"	4'-7"	5'-2"	5'-10"	6'-5"	7'-0"	7'-7"	8'-2"	8'-9"	9'-5"	10'-0"	10'-8"	11'-3"	11'-10"	J
M	0'-6"						0'-8"						M		
N	0'-5"						0'-6"						N		
P	1'-2"	1'-4"	1'-6"	1'-8"	1'-10"	2'-0"	2'-3"	2'-5"	2'-7"	2'-9"	3'-0"	3'-2"	3'-4"	3'-6"	P
Q	3'-11"	4'-6"	5'-1"	5'-8"	6'-3"	6'-10"	7'-7"	8'-2"	8'-9"	9'-4"	9'-11"	10'-6"	11'-1"	11'-8"	Q
R	0'-9"						1'-0"						R		
T	0'-3.5"	0'-4.0"	0'-4.5"	0'-5.0"	0'-5.5"	0'-6.0"	0'-6.5"	0'-7.0"	0'-7.5"	0'-8.0"	0'-8.5"	0'-9.0"	0'-9.5"	0'-10.0"	T
V	0'-8"						1'-0"						V		
W	0'-8"						0'-10"						W		
X	----						2'-0"			2'-6"				X	
Y	2'-0"						2'-6"				3'-0"			Y	
Z	----						1'-3"			1'-9"				Z	
CU. YDS. CONC. HEADWALLS	3.76	4.89	6.15	7.55	9.07	10.73	21.24	23.75	26.39	29.16	35.43	38.66	42.03	45.54	CU. YDS. CONC. HEADWALLS
LBS. STEEL HEADWALLS	399	470	555	644	753	862	1689	1912	2148	2390	2937	3238	3582	3852	LBS. STEEL HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

DIMENSIONS & QUANTITIES	
30" - 108" HEADWALLS	
CIRCULAR PIPE	
15° SKEW	

MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K	MARK	SIZE	NO	LGTH	K
A1	5	2	10	3	A1	5	2	10	11	A1	5	2	11	7	A1	5	2	12	4	A1	5	2	12	10	A1	5	2	13	7										
A2	5	2	11	3	A2	5	2	12	0	A2	5	2	13	5	A2	5	2	14	0	A2	5	2	14	0	A2	5	2	14	11										
B1	5	4	3	4	B1	5	4	3	7	B1	5	4	3	10	B1	5	4	4	1	B1	5	4	4	3	B1	5	4	4	7										
B2	5	4	4	3	B2	5	4	4	6	B2	5	4	4	9	B2	5	4	5	0	B2	5	4	5	3	B2	5	4	5	6										
B3	5	4	5	3	B3	5	4	5	6	B3	5	4	5	8	B3	5	4	6	2	B3	5	4	6	2	B3	5	4	6	5										
B4	5	4	6	2	B4	5	4	6	5	B4	5	4	6	10	B4	5	4	7	1	B4	5	4	7	1	B4	5	4	7	4										
B5	5	4	7	1	B5	5	4	7	4	B5	5	4	7	7	B5	5	4	8	0	B5	5	4	8	0	B5	5	4	8	4										
B6	5	6	7	7	B6	5	8	8	2	B6	5	10	8	6	B6	5	4	8	9	B6	5	4	8	11	B6	5	4	9	3										
C1	4	2	4	11	C1	4	2	5	6	C1	4	2	5	6	C1	4	2	6	1	C1	4	2	6	1	C1	4	2	5	4										
C2	4	2	7	0	C2	4	2	6	3	C2	4	2	7	7	C2	4	2	8	3	C2	4	2	8	3	C2	4	2	7	6										
C3	4	2	9	1	C3	4	2	8	4	C3	4	2	9	9	C3	4	2	9	9	C3	4	2	9	9	C3	4	2	9	9										
C4	4	2	11	3	C4	4	2	10	6	C4	4	2	11	11	C4	4	2	11	11	C4	4	2	10	4	C4	4	2	11	9										
C5	4	6	13	1	C5	4	6	12	6	C5	4	6	12	6	C5	4	6	12	6	C5	4	6	12	6	C5	4	6	12	6										
E1	5	2	14	0	E1	5	2	14	0	E1	5	2	15	3	E1	5	2	15	3	E1	5	2	15	3	E1	5	2	15	3										
E2	5	2	14	6	E2	5	2	14	8	E2	5	2	15	3	E2	5	2	15	3	E2	5	2	15	3	E2	5	2	15	3										
F	4	9	1	9	F	4	10	1	10	F	4	11	1	9	F	4	11	1	9	F	4	11	1	9	F	4	11	1	9	F	4	11	1	9	F	4	11	1	9
G1	4	3	10	11	G1	4	3	10	8	G1	4	3	10	9	G1	4	3	10	9	G1	4	3	11	4	G1	4	3	11	4										
G2	4	3	13	5	G2	4	3	12	1	G2	4	3	13	3	G2	4	3	13	3	G2	4	3	13	3	G2	4	3	13	3										
G3	4	3	15	2	G3	4	3	14	9	G3	4	3	15	9	G3	4	3	15	7	G3	4	3	15	7	G3	4	3	14	2										
H	4	8	11	9	H	4	8	12	4	H	4	9	13	6	H	4	9	13	6	H	4	9	13	6	H	4	9	13	6	H	4	9	13	6	H	4	9	13	6
J1	5	4	4	4	J1	5	4	4	7	J1	5	4	4	11	J1	5	4	4	11	J1	5	4	4	4	J1	5	4	4	7										
J2	5	4	5	5	J2	5	4	4	7	J2	5	4	5	11	J2	5	4	5	2	J2	5	4	5	4	J2	5	4	4	7										
J3	5	4	6	5	J3	5	4	5	8	J3	5	4	6	2	J3	5	4	6	4	J3	5	4	6	4	J3	5	4	5	7										
J4	5	4	7	7	J4	5	4	6	9	J4	5	4	7	0	J4	5	4	7	3	J4	5	4	7	5	J4	5	4	6	8										
K1	4	2	1	9	K1	4	2	2	2	K1	4	2	2	3	K1	4	2	2	3	K1	4	2	2	3	K1	4	2	1	9										
K2	4	2	3	8	K2	4	2	4	8	K2	4	2	5	10	K2	4	2	5	10	K2	4	2	5	10	K2	4	2	3	8										
K3	4	2	5	7	K3	4	2	6	7	K3	4	2	7	9	K3	4	2	7	9	K3	4	2	7	9	K3	4	2	5	7										
K4	4	2	7	5	K4	4	2	8	6	K4	4	2	9	8	K4	4	2	9	8	K4	4	2	9	8	K4	4	2	7	5										
K5	4	6	9	1	K5	4	6	9	8	K5	4	6	10	3	K5	4	6	10	3	K5	4	6	10	3	K5	4	6	9	1										
M	4	22	3	9	M	4	24	3	9	M	4	26	4	9	M	4	26	4	9	M	4	26	4	9	M	4	26	4	9	M	4	26	4	9	M	4	26	4	9
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N2	4	7	13	0	N2	4	7	14	0	N2	4	8	10	3	N2	4	8	10	3	N2	4	8	10	3	N2	4	8	10	3										
P	5	22	5	6	P	5	24	5	9	P	5	26	6	4	P	5	26	6	4	P	5	26	6	4	P	5	26	6	4	P	5	26	6	4	P	5	26	6	4
Q	5	3	7	5	Q	5	3	8	0	Q	5	3	8	0	Q	5	3	8	0	Q	5	3	8	0	Q	5	3	7	5										
R	5	8	2	8	R	5	8	2	10	R	5	8	2	10	R	5	8	2	10	R	5	8	2	10	R	5	8	2	8										
S1	5	8	1	3	S1	5	10	1	3	S1	5	9	5	3	S1	5	9	5	3	S1	5	10	1	6	S1	5	10	1	3										
S2	5	6	2	3	S2	5	6	2	3	S2	5	8	2	9	S2	5	8	2	9	S2	5	8	2	9	S2	5	8	2	3										
T1	5	2	2	3	T1	5	2	2	3	T1	5	2	2	3	T1	5	2	2	3	T1	5	2	2	3	T1	5	2	2	3										
T2	5	4	7	0	T2	5	4	7	6	T2	5	4	8	3	T2	5	4	8	3	T2	5	4	8	3	T2	5	4	7	0										

NOTES
 1. NUMBER OF BARS IN ONE HEADWALL.
 2. DIMENSIONS ARE 0. TO 0. OF BARS.
 3. ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

BENT BAR SHAPES

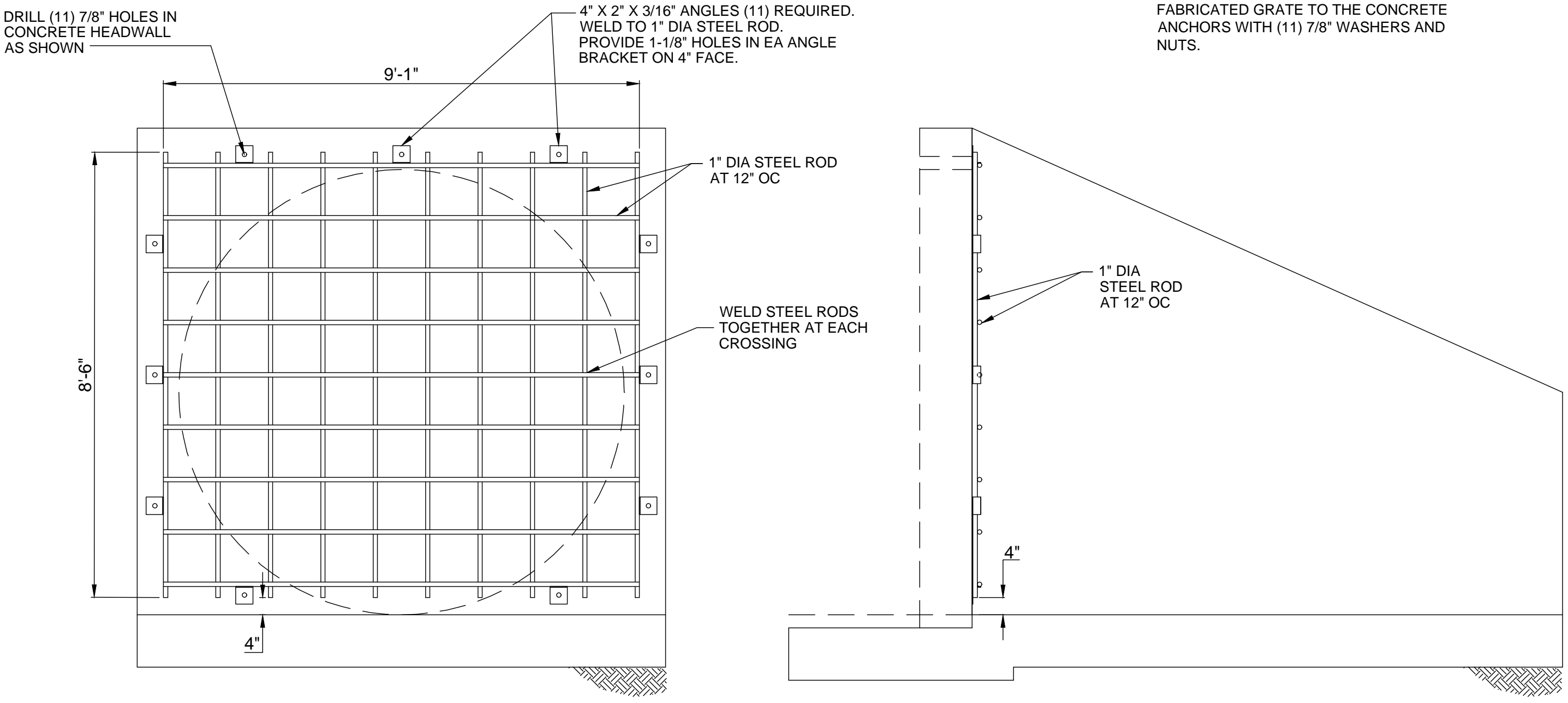
BARS (E)
 TO BE FIELD BENT
 1'-6" (30"-60")
 2'-6" (66"-108")

BARS (F)
 0'-6" (30"-60")
 0'-8" (66"-108")

BARS (H)
 1'-8" (30"-60")
 2'-2" (66"-84")
 2'-8" (90"-108")

BARS (P) AND (V)
 1'-3" (30"-60")
 1'-9" (66"-84")
 2'-3" (90"-108")

BILL OF REINFORCEMENT
 78" TO 108" DIAMETER
 CIRCULAR PIPE HEADWALLS
 15° SKEW



APRON ENDWALL SCREEN DETAIL (102" PIPE)

NOTES:
 1. CONTRACTOR TO DRILL 7/8" HOLES 6" DEEP INTO CONCRETE HEADWALL AND PLACE 8" X 7/8" GALVANIZED CONCRETE WEDGE ANCHORS.
 2. CONTRACTOR SHALL BOLT THE FABRICATED GRATE TO THE CONCRETE ANCHORS WITH (11) 7/8" WASHERS AND NUTS.



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**MICHIGAN AIR NATIONAL GUARD
 CONSTRUCT MAIN BASE ENTRANCE
 BATTLE CREEK ANGB
 BATTLE CREEK, MICHIGAN**

ISSUED 02/17/21 B3 FINAL

ANG Project No: MBMV099170
 M&H No: 3141900-113782.01
 DATE: FEBRUARY 17, 2021
 DESIGNED BY: JAK
 DRAWN BY: DAY
 CHECKED BY: SAH
 DO NOT SCALE DRAWINGS

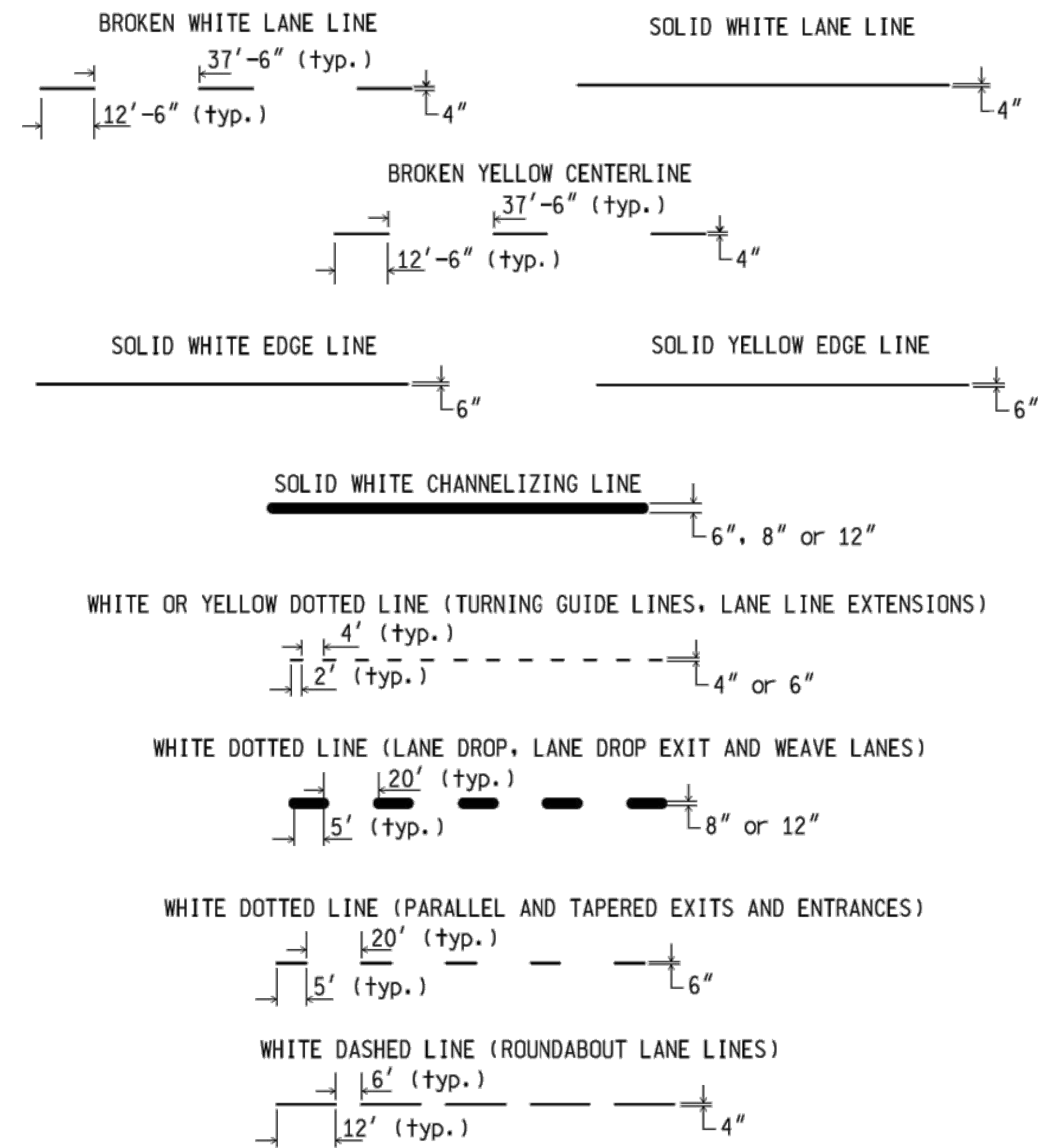
SHEET CONTENTS
 CONSTRUCTION
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SHEET NO.

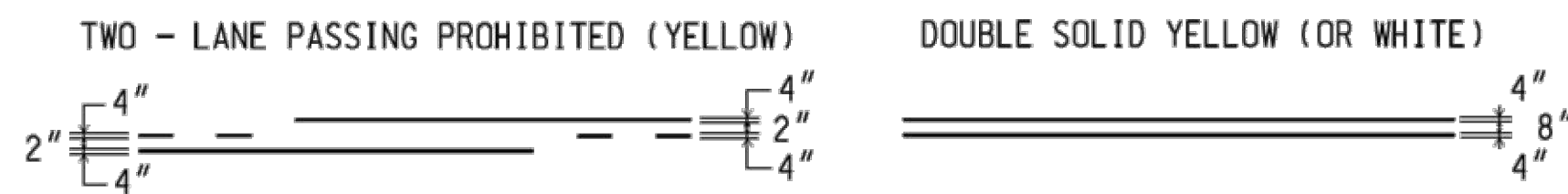
C-516

X:3141900113782.01\TECH\CAD\B\CONSTRUCTION DETAILS.DWG 2/10/2021 6:04:59 AM

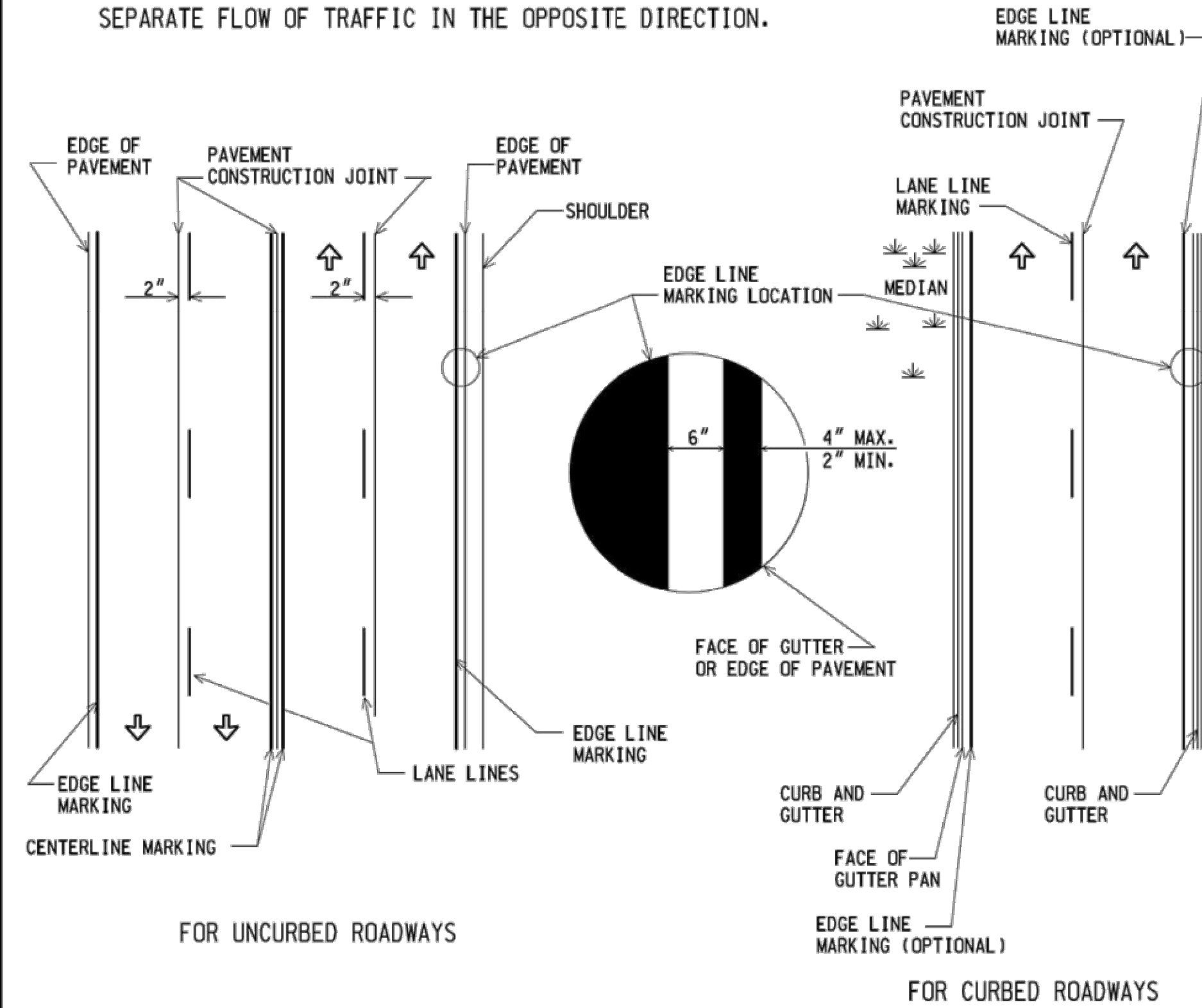
TYPES OF PERMANENT LONGITUDINAL LINES



LINE PATTERNS



BASIC COLOR RULE: WHITE LINES SEPARATE FLOW OF TRAFFIC IN THE SAME DIRECTION. YELLOW LINES SEPARATE FLOW OF TRAFFIC IN THE OPPOSITE DIRECTION.



PLACEMENT OF LINES

Notes:

- On all divided highways, lane lines shall be offset 2 inches from pavement construction joints toward the median side.
- On 2-lane, 2-way north-south roadways a broken yellow centerline shall be offset 2 inches to the left of pavement construction joints when facing northward. Double solid yellow or solid and broken yellow centerline may straddle the construction joint.
- On 2-lane, 2-way east-west roadways, a broken yellow centerline shall be offset 2 inches to the left of pavement construction joints when facing eastward. Double solid yellow or solid and broken yellow centerlines may straddle the construction joint.
- When a centerline construction joint does not correspond to the geometric centerline of the roadway for roadway segments over 1/2 mile, place the centerline in the location that will provide lanes of equal width unless directed otherwise by the Engineer.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

08/23/17
F.H.W.A. APPROVAL

01/22/17
PLAN DATE

PAVE-905-D

SHEET
2 OF 2

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<p>PREPARED BY DESIGN DIVISION DRAWN BY: LMF CHECKED BY: JGM</p>	<p>DEPARTMENT DIRECTOR Kirk T. Stoude</p> <p>APPROVED BY: Kimberly Avery DIRECTOR, BUREAU OF FIELD SERVICES</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR LONGITUDINAL LINE TYPES & PLACEMENT</p>		
	<p>APPROVED BY: Bradley C. Wiefelich 2017.09.20 10:25:35 -0400 DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT</p>	<p>08/23/17 F.H.W.A. APPROVAL</p>	<p>01/22/17 PLAN DATE</p>	<p>PAVE-905-D</p>
				<p>SHEET 1 OF 2</p>

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Middleton, WI 53562
phone: 608-273-6380
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MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

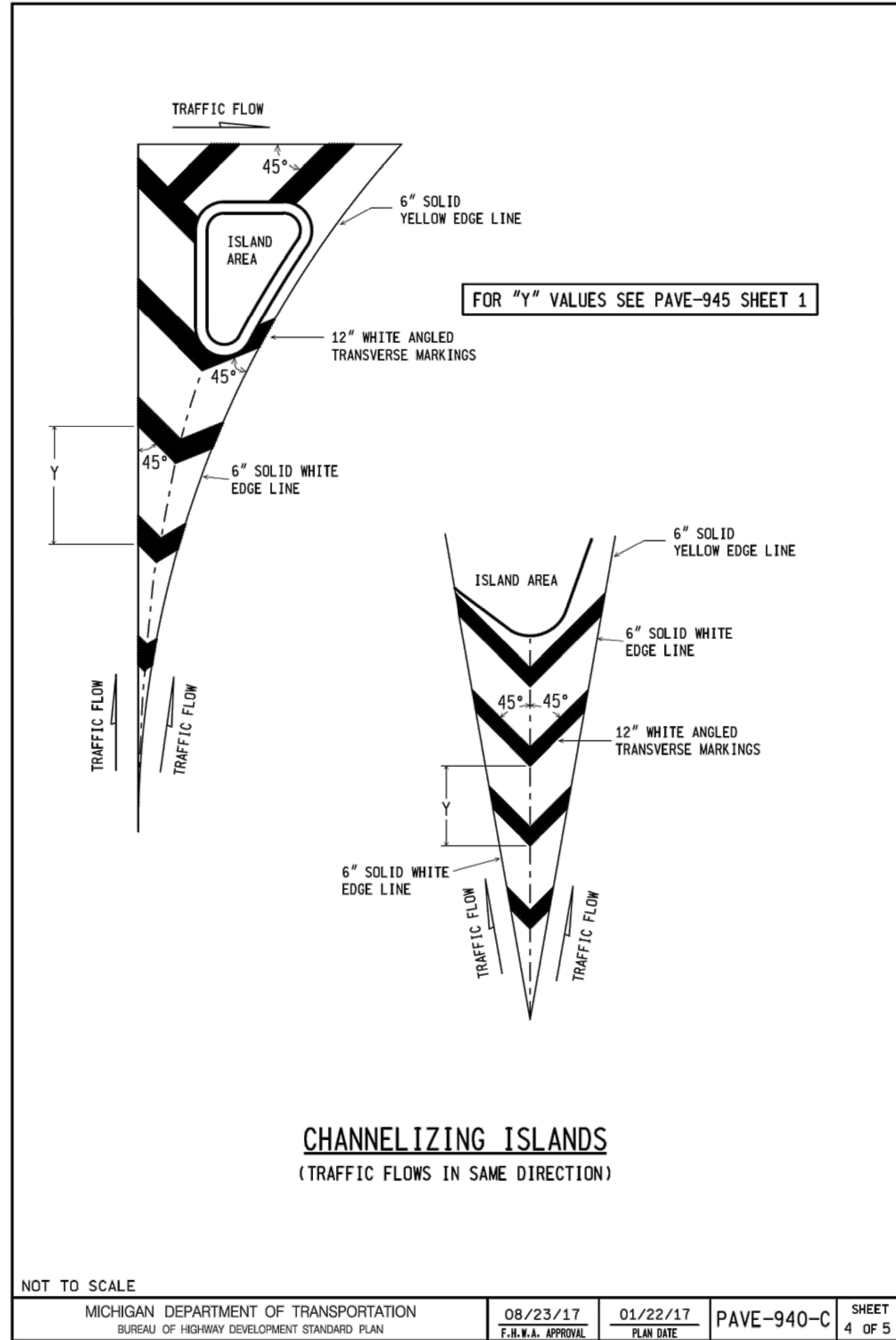
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ANG Project No: MBMV099170
MAH No.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
DRAWN BY: DAY
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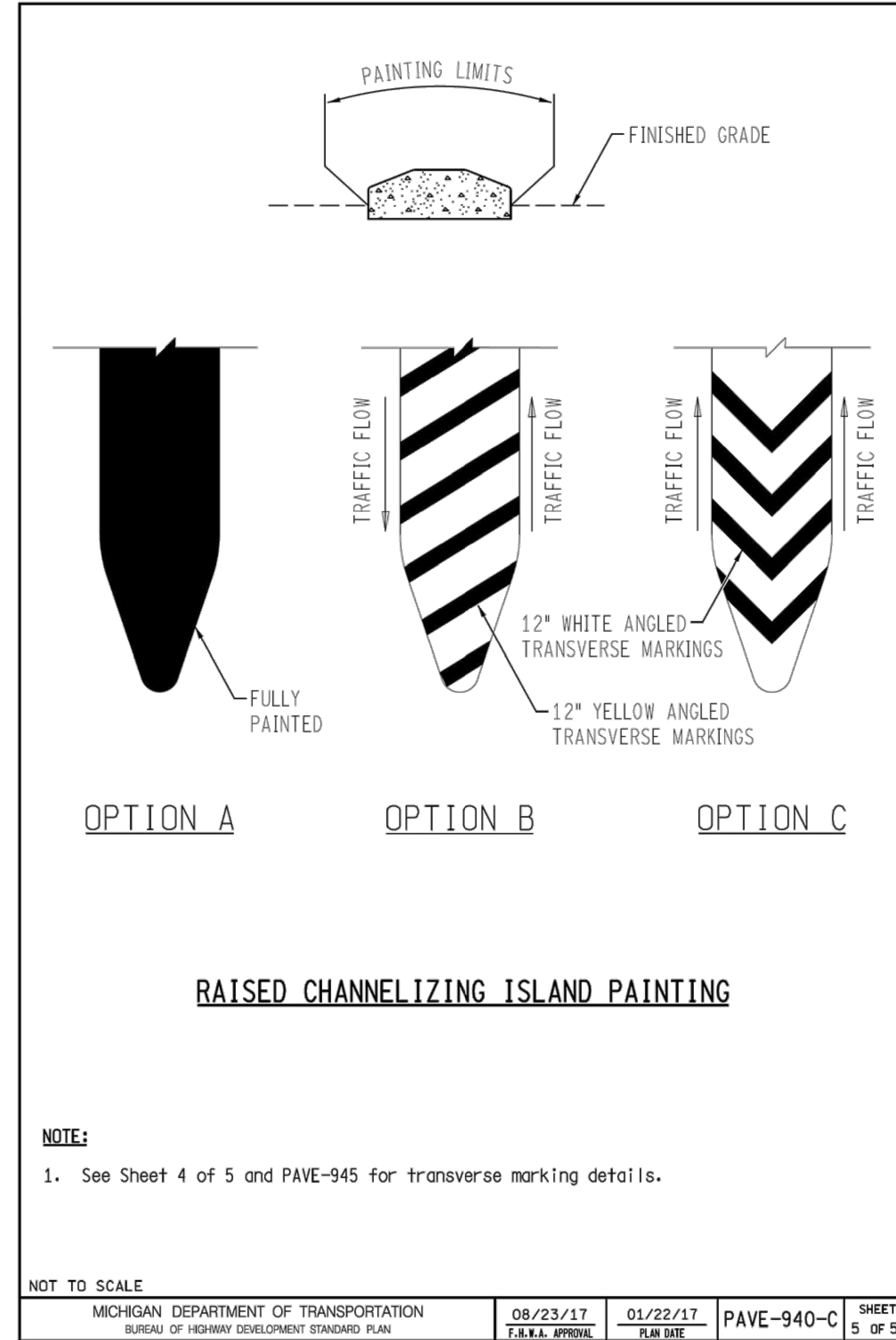
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SHEET NO.

C-517



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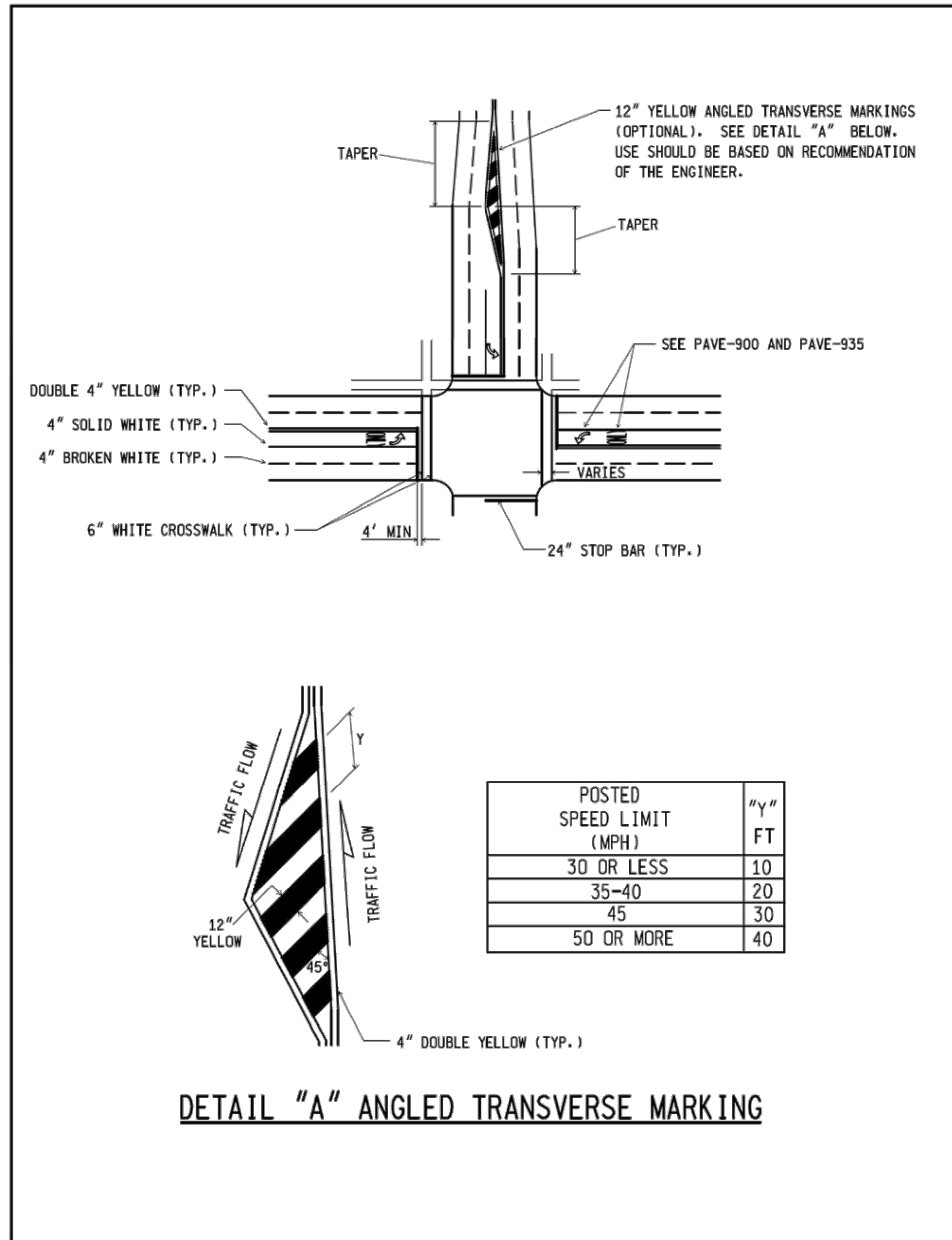
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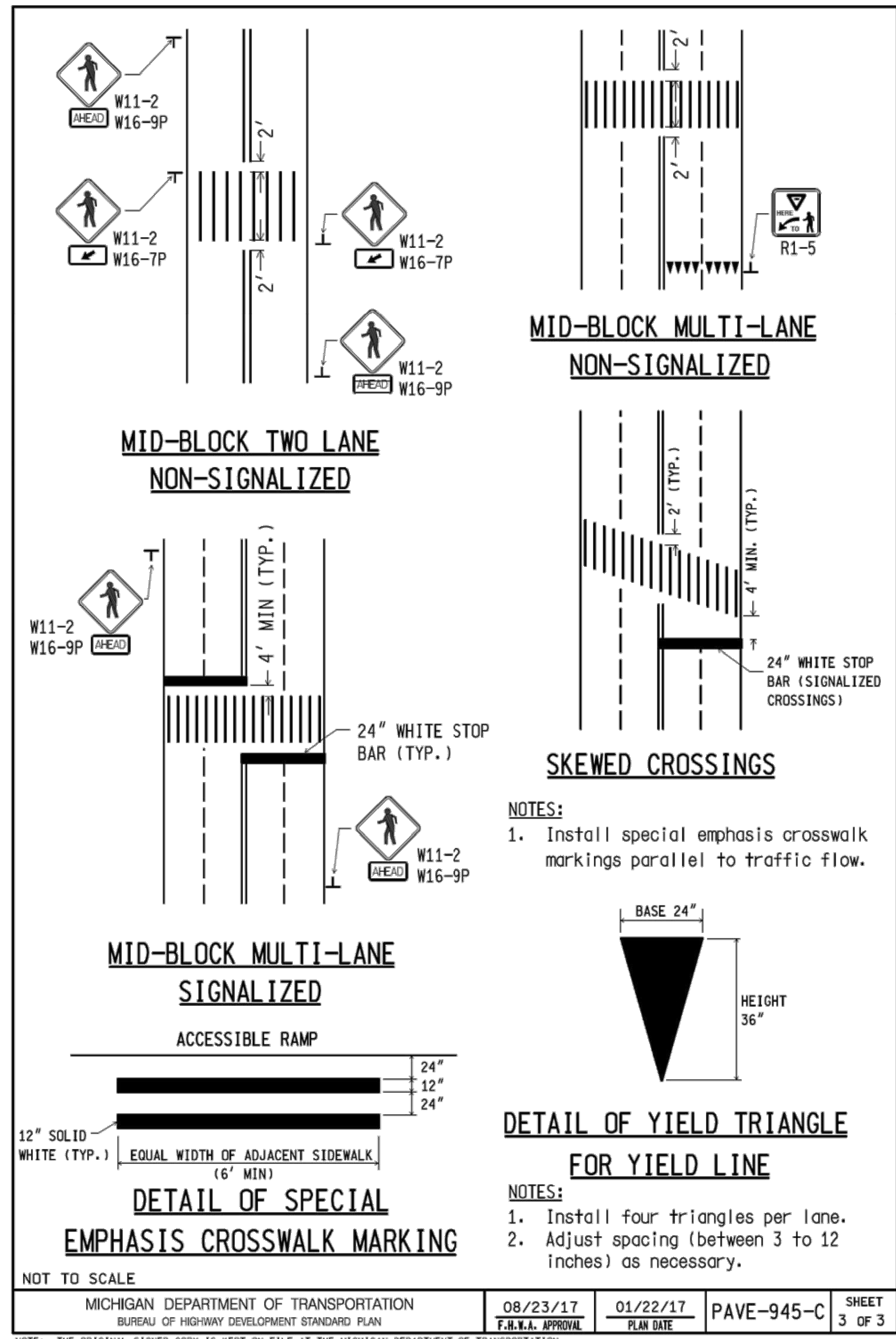
SHEET CONTENTS
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SHEET NO.



DETAIL "A" ANGLED TRANSVERSE MARKING

	DEPARTMENT DIRECTOR Kirk T. Stouckle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR		
	PREPARED BY DESIGN DIVISION DRAWN BY: LME CHECKED BY: JGM	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES Kimberly Avery Digitally signed by Kimberly Avery DN: o=Dave of Michigan, ou=Michigan Department of Transportation, email=kimberly.avery@mta.state.mi.us, c=US, 2017.09.24 18:21:47 -0400	INTERSECTION, STOP BAR & CROSSWALK MARKINGS	
	APPROVED BY: DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT Bradley C. Wiefelrich Bradley C. Wiefelrich 2017.09.24 18:21:47 -0400	08/23/17 F.H.W.A. APPROVAL	01/22/17 PLAN DATE	PAVE-945-C SHEET 1 OF 3



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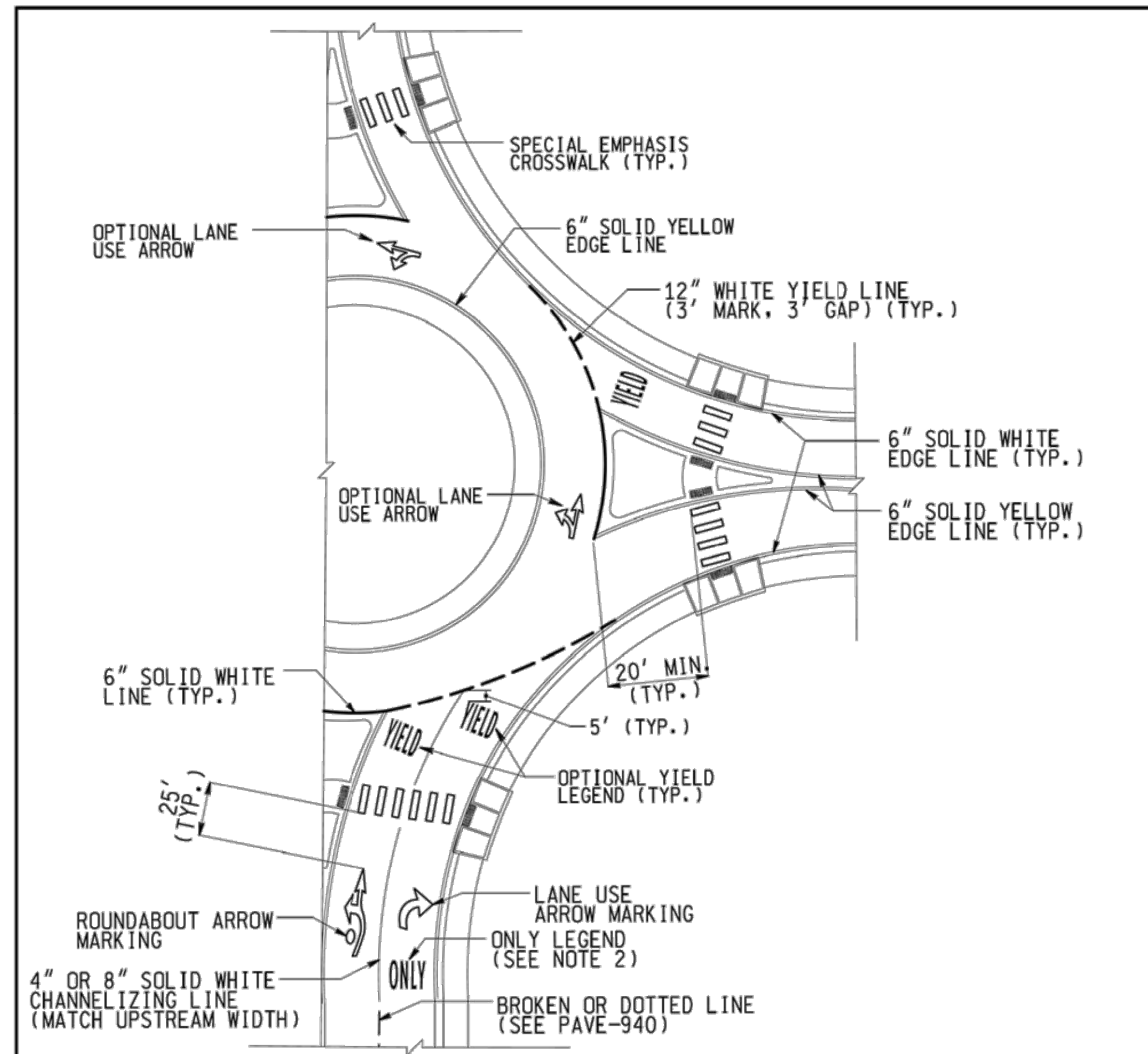
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CONSTRUCTION
DETAILS

SHEET NO.

C-520



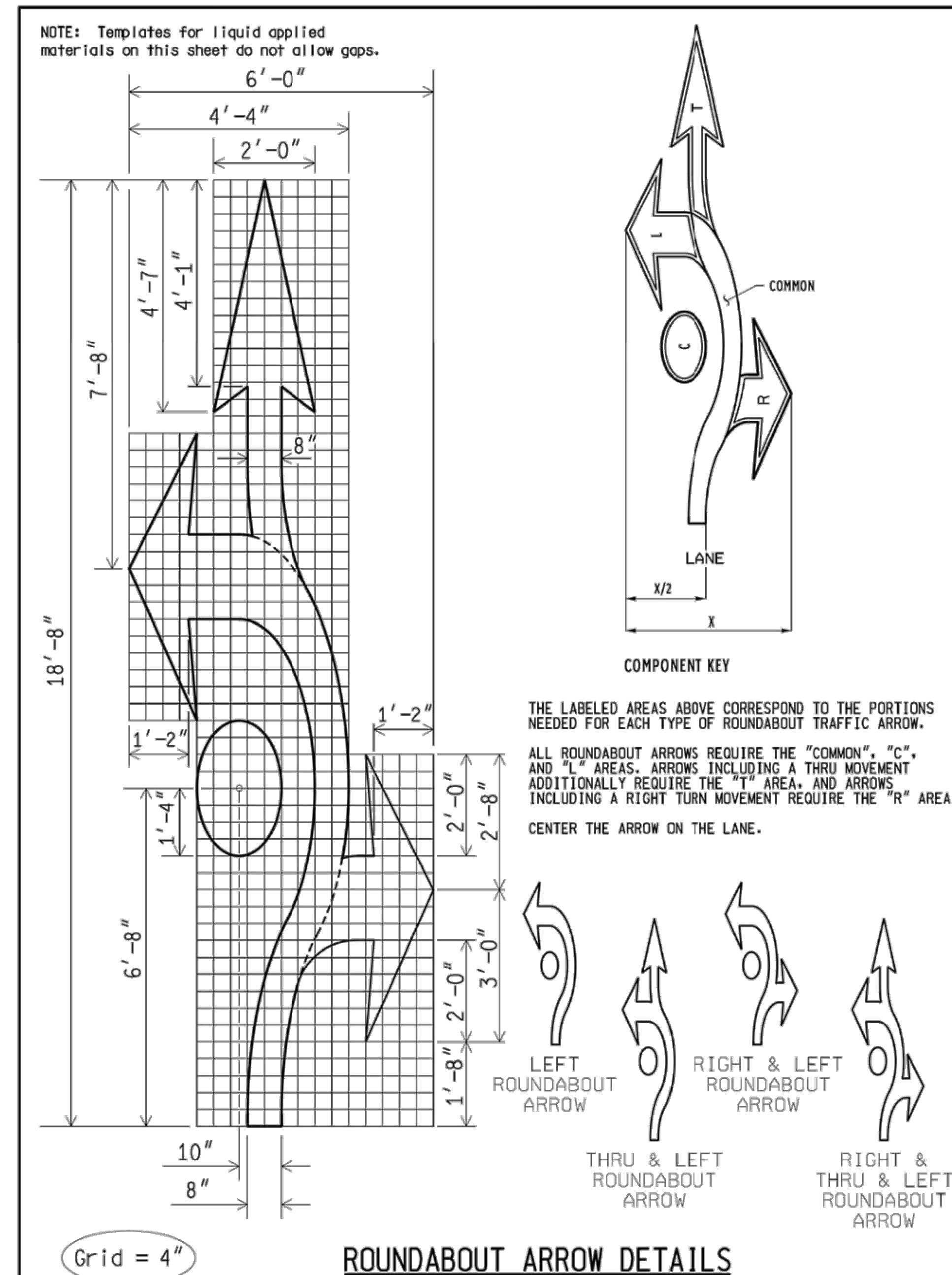
ONE-LANE ROUNDABOUT

NOTES:

1. Lane use arrows shall be placed on approaches with more than one lane. Use roundabout (fishhook style) arrows for approach arrows that include a left turn movement, and standard arrows for all other applications. See Sheet 3 for roundabout arrow details.
2. Use ONLY legend when the right turn lane becomes a mandatory turn lane; omit for developed lanes. See PAVE-900 for layout.
3. If there is no crosswalk on a multilane approach, place the lane use arrows 25' in advance of the yield line (or, if present, the yield legend).
4. If the channelizing (solid) lane line extends beyond the first lane use arrows, install additional sets of arrows/legends in accordance with PAVE-935.

NOT TO SCALE

 PREPARED BY: MKG DESIGN DIVISION DRAWN BY: MKG CHECKED BY: JGM	DEPARTMENT DIRECTOR Kirk J. Steudler APPROVED BY: Kimberly Avery DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR ROUNDABOUT MARKINGS	
	APPROVED BY: Bradley C. Wiefelrich 2017.09.24 18:23:06 04000	08/23/17 F.H.W.A. APPROVAL	01/22/17 PLAN DATE



ROUNDABOUT ARROW DETAILS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	08/23/17 F.H.W.A. APPROVAL	01/22/17 PLAN DATE	PAVE-951-B SHEET 3 OF 3
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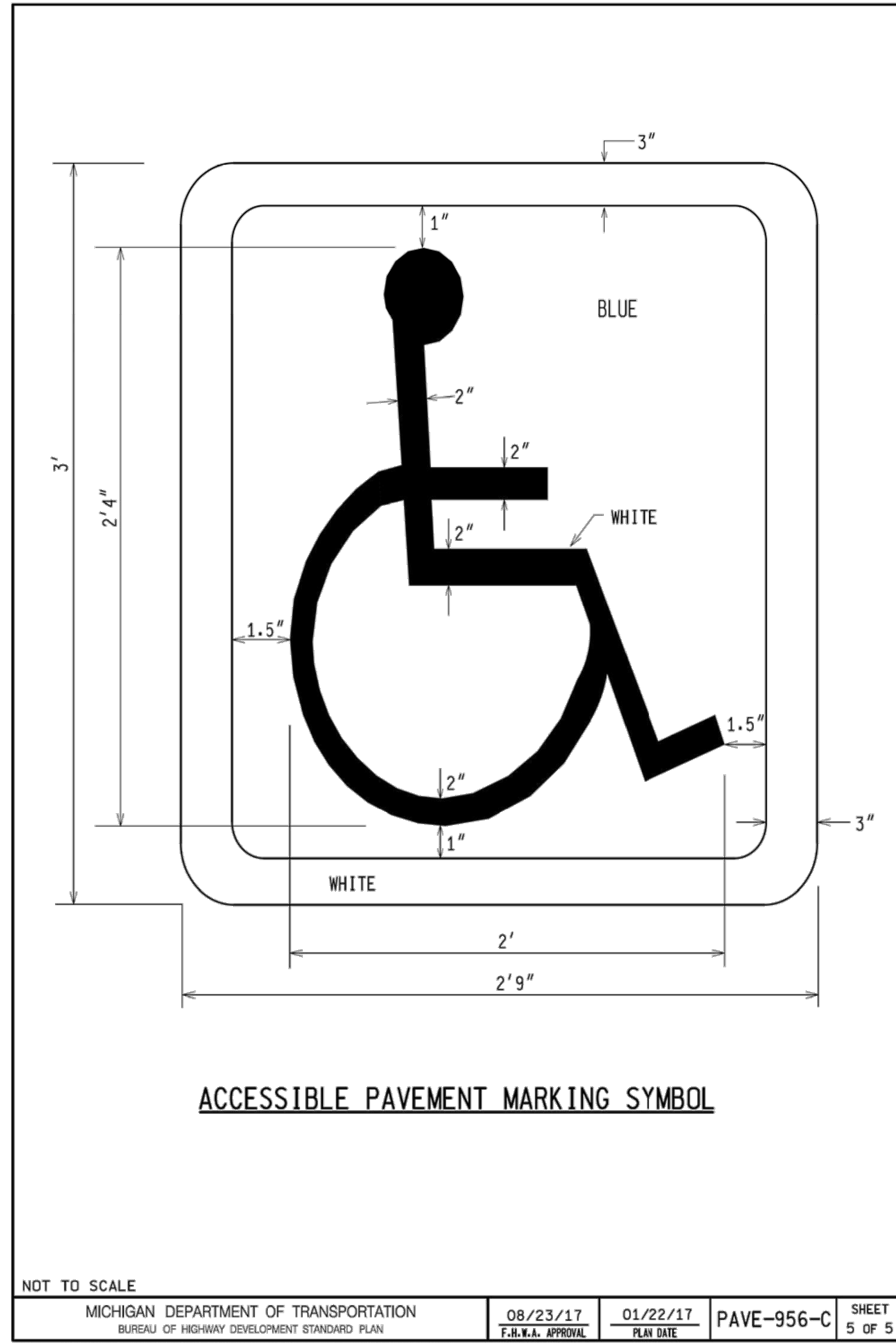
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CONSTRUCTION
DETAILS

SHEET NO.

C-521



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2/10/2021 8:05:29 AM

SIGN	SIGN CODE	SIZE	SIGN AREA ft ²	SIGN TYPE	NO.	SUPPORT			
						SIZE	TOTAL LENGTH ft	BOTTOM HEIGHT (H)	
	R1-1(30)	2.5' x 2.5'	6.25	111A	1	3 lbs	14	7 ft	
	R1-1(36)	3' x 3'	9	111A	2	3 lbs	30	7 ft	
	R1-2(36)	3' x 3' x 3'	4	111A	1	3 lbs	14	7 ft	
	R1-2(48)	4' x 4' x 4'	7	VA	2		32	7 ft	
	R2-1(24)	2' x 2.5'	5	111B	1	3 lbs	14	7 ft	
	R2-1(30)	2.5' x 3'	7.5				14	7 ft	
	R2-1(36)	3' x 4'	12				32	7 ft	
	R2-4a	4' x 8'	32	11B	2	4" x 6" WOOD POSTS OR SIGN-207	46	7 ft	
	R2-4b	12' x 5'	60	1B	2	6" x 8" (NOMINAL) WOOD POSTS	36	7 ft	
	R3-1(24)	2' x 2'	4	111B	1	3 lbs	14	7 ft	
	R3-1(30)	2.5' x 2.5'	6.25	111B	1	3 lbs	14	7 ft	
	R3-1(36)	3' x 3'	9	111B	2	3 lbs	30	7 ft	
	R3-2(24)	2' x 2'	4	111B	1	3 lbs	14	7 ft	
	R3-2(30)	2.5' x 2.5'	6.25	111B	1	3 lbs	14	7 ft	
	R3-2(36)	3' x 3'	9	111B	2	3 lbs	30	7 ft	
	R4-7(24)	2' x 2.5'	5	111B	1	3 lbs	14	7 ft	
	R4-7(36)	3' x 4'	12	VB	2	3 lbs	30	7 ft	
	R5-1(30)	2.5' x 2.5'	10	111A	1	3 lbs	14	7 ft	
	R5-1a(30)	2.5' x 1.5'					14	7 ft	
	R5-1(36)	3' x 3'					15	28	7 ft
	R5-1a(36)	3' x 2'					6	26	7 ft
	R5-1a(42)	3.5' x 2.5'	8.75	VA	2	3 lbs	28	7 ft	
	R5-11a(24)	2' x 2.5'	5	111B	1	4" x 6" (NOMINAL) WOOD POSTS	16	7 ft	
	R5-11(30)	2.5' x 2'	5	111B	1	3 lbs	14	7 ft	
	R6-1(54)L OR R	3' x 1'	3	111B	1	3 lbs	14	7 ft	
	R6-1(54)L OR R	4.5' x 1.5'	6.75	VB	2	3 lbs	28	7 ft	
	W1-1(36)	3' x 3'	13	111B	2	3 lbs	32	* 7 ft	
W13-1(24)	2' x 2'	32					* 7 ft		
	W1-1(48)	4' x 4'	16	VB	2	4" x 6" (NOMINAL) WOOD POSTS	32	* 7 ft	
	W13-1(30)	2.5' x 2.5'	6.25	111B	1	3 lbs	32	* 7 ft	
	W1-2(36)	3' x 3'	9	111B	2	3 lbs	32	* 7 ft	
	W13-1(24)	2' x 2'	4	111B	1	3 lbs	32	* 7 ft	
	W1-2(48)	4' x 4'	16	VB	2	4" x 6" (NOMINAL) WOOD POSTS	32	* 7 ft	
	W13-1(30)	2.5' x 2.5'	6.25	111B	1	3 lbs	32	* 7 ft	

* 7 ft BOTTOM HEIGHT APPLIES TO PARENT SIGN FOR INFORMATION ONLY

 PREPARED BY DESIGN DIVISION DRAWN BY: <u>AKJ</u> CHECKED BY: <u>AJJ</u>	DEPARTMENT DIRECTOR Kirk T. Staudte APPROVED BY: <u>Kimberly Avery</u> DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR STANDARD SIGN INSTALLATIONS	
	APPROVED BY: <u>Bradley C. Wierfisch</u> DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT	05/24/18 F.H.W.A. APPROVAL	02/16/17 PLAN DATE
	SIGN-100-G	SHEET 1 OF 3	

SIGN	SIGN CODE	SIZE	SIGN AREA ft ²	SIGN TYPE	NO.	SUPPORT		
						SIZE	TOTAL LENGTH ft	BOTTOM HEIGHT (H)
	W1-6(48)	4' x 2'	8	VB	2	3 lbs	26	7 ft
	W1-6(60)	5' x 2.5'	12.5	VB	2	4" x 6" WOOD POSTS	32	7 ft
	W1-6(96)	8' x 4'	32	11B	2	6" x 8" WOOD POSTS	38	7 ft
	W1-7(48)	4' x 2'	8	VB	2	3 lbs	26	7 ft
	W1-7(60)	5' x 2.5'	12.5	VB	2	4" x 6" WOOD POSTS	32	7 ft
	W1-7(96)	8' x 4'	32	11B	2	6" x 8" WOOD POSTS	38	7 ft
	(30)	2.5' x 2.5'	6.25	111B	1	3 lbs	15	7 ft
	(36)	3' x 3'	9	111B	2	3 lbs	30	7 ft
	(48)	4' x 4'	16	VB	2	3 lbs	32	7 ft
	W10-1(30)	(R) 1' 3"	6.25	111B	1	3 lbs	14	7 ft
	W10-1(36)	(R) 1' 6"	9	111B	1	3 lbs	14	7 ft
	W10-1(48)	(R) 2'	16	VB	2	3 lbs	26	7 ft
	W13-2(48) OR W13-3(48) (RAMP)	4' x 5'	20	VB	2	3 lbs	32	7 ft
	W14-3 (30)	40" x 30"	4.25	VB	2	3 lbs	29	7 ft
	W14-3 (36)	48" x 36"	6	VB	2	3 lbs	29	7 ft
	W14-3 (48)	64" x 48"	10.75	VB	2	3 lbs	29	7 ft
	E5-1	6' x 5'	30	11A	2	4" x 6" WOOD POSTS OR	32	7 ft
	E5-1a	6' x 5'	30	11A	2	REFER TO SIGN-207 SERIES		
		7.5' x 5'	37.5	11A	2	REFER TO SIGN-207 SERIES		
	** D10-4	1.5' x 4.5'	6.75	111A	1	4" x 6" WOOD POSTS OR	14	4 ft
	** D10-5	1.5' x 5'	7.5	111A	1	REFER TO SIGN-207 SERIES	16	4 ft
	W8-13 (36)	3' x 3'	9	111B	2	3 lbs	30	7 ft
	W8-13 (48)	4' x 4'	16	VB	2	3 lbs	32	7 ft
	W1-8(24) 10-40 RAMP	2' x 2.5'	5	111B	1	3 lbs	15	7 ft
	W1-8(36) 45-55 RAMP	3' x 4'	12	VB	2	3 lbs	30	7 ft
	W1-8(24) NON-FWY	2' x 2.5'	5	111B	1	3 lbs	15	7 ft
	W1-8(36) FWY	3' x 4'	12	VB	2	3 lbs	30	7 ft
	S1-1(30)	2.5' x 2.5'	6.25	111B	1	3 lbs	14	7 ft
	S1-1(36)	3' x 3'	9	111B	2	3 lbs	26	7 ft
	S1-1(48)	4' x 4'	16	VB	2	3 lbs	28	7 ft

* 7 ft BOTTOM HEIGHT APPLIES TO PARENT SIGN
** BEHIND GUARDRAIL, USE 1 - 4" x 6" WOOD POST

NOT TO SCALE MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	05/24/18 F.H.W.A. APPROVAL	02/16/17 PLAN DATE	SIGN-100-G	SHEET 2 OF 3
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CONSTRUCT MAIN BASE ENTRANCE
BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

ANG Project No: MBMV099170
MAH NO.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
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SHEET CONTENTS
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SHEET NO.

C-522

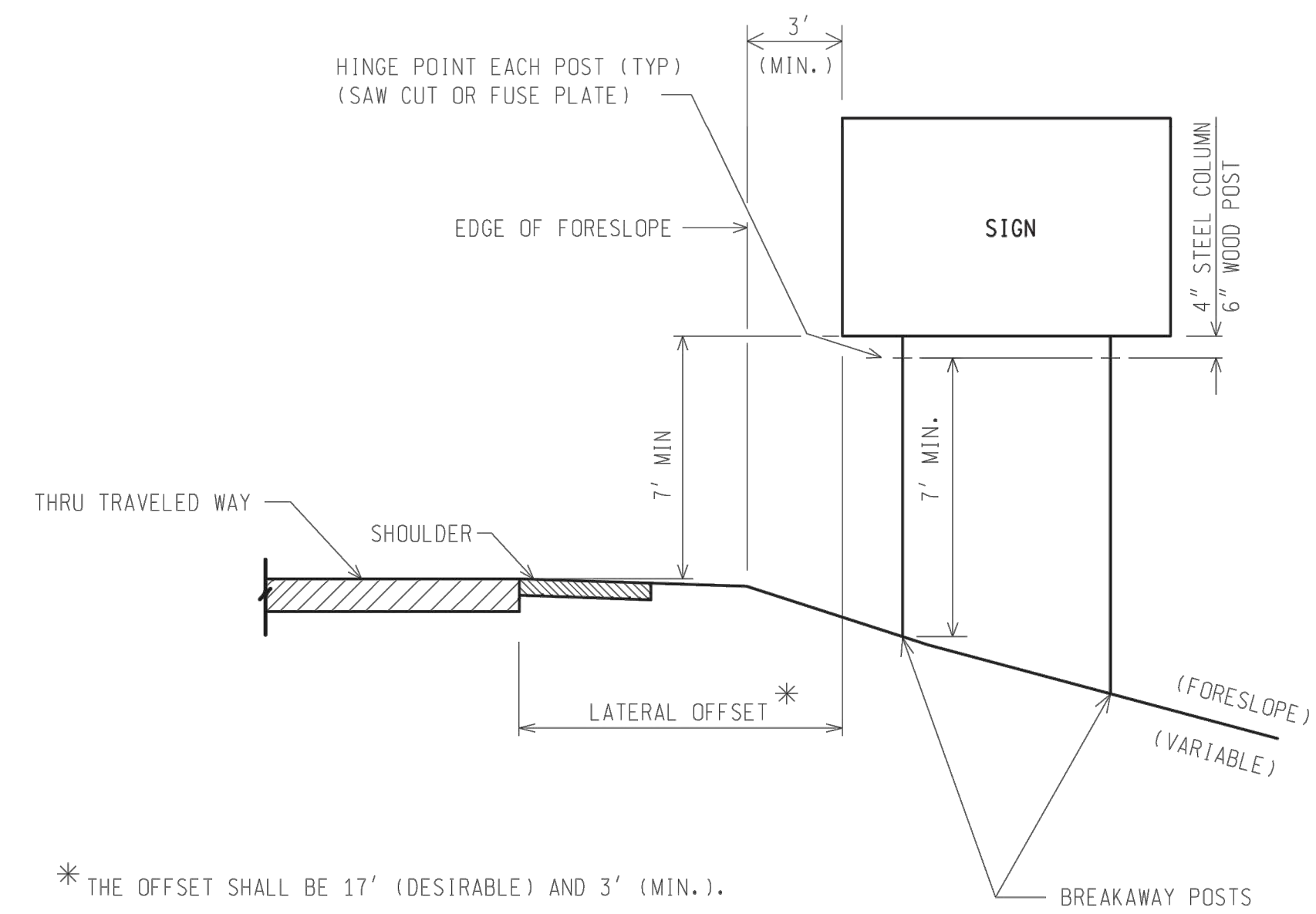
NOTES:

1. TOTAL SUPPORT LENGTHS ARE FOR ESTIMATING PURPOSES ONLY.
2. THE SUPPORT(S) LISTED FOR STANDARD SIGNS SHALL BE USED, UNLESS SHOWN OTHERWISE ON CONTRACT SIGN PLAN SHEETS. FOR SIGNS NOT LISTED HERE, SEE SIGN-150-SERIES FOR PROPER SUPPORT.
3. FOR TWO PANEL SIGN INSTALLATIONS, ALLOW A 2 INCH (S) SPACE BETWEEN PANELS AS SHOWN ON PAGE ONE. THIS 2 in. REQUIREMENT DOES NOT APPLY TO RAMP SERVICES SIGNS (E11-15 SERIES) WHICH SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO EACH OTHER.
4. BOTTOM HEIGHT IS DEFINED AS HEIGHT FROM THE NEAR EDGE OF TRAVEL LANE PAVEMENT (EDGE-OF-METAL) TO THE BOTTOM OF THE PARENT SIGN. SEE SIGN-120-SERIES FOR REQUIRED MINIMUM SIGN BOTTOM HEIGHTS.
5. M8 SIGN SERIES \leq 44 SFT PLACED IN THE GORE SECTION SHOULD BE TYPE I1A ON 2-PERFORATED STEEL SQUARE TUBE SIGN BREAKAWAY SYSTEM.
6. FOR ECONOMIC AND MAINTENANCE PURPOSES, DO NOT USE PERFORATED STEEL SQUARE TUBE SIGN BREAKAWAY SYSTEM BEHIND GUARDRAILS OR PROTECTION BARRIERS. REFER TO THE SIGN SUPPORT SELECTION CHART FOR APPROPRIATE SUPPORTS.
7. REFLECTIVE PANELS, WHERE CALLED FOR ON TWO PANEL SIGN INSTALLATIONS SHALL BE IN LENGTHS OF 3 FOOT PER POST.

* 7 ft BOTTOM HEIGHT APPLIES TO PARENT SIGN FOR INFORMATION ONLY

NOT TO SCALE	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	05/24/18 F.H.W.A. APPROVAL	02/16/17 PLAN DATE	SIGN-100-G	SHEET 3 OF 3
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* THE OFFSET SHALL BE 17' (DESIRABLE) AND 3' (MIN.).

**SIGN PLACEMENT-ELEVATION VIEW: NON-FREEWAY
(FORESLOPE)**

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**MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE**

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

ANG Project No: MBMV099170
MMH No: 3141900-113782.01
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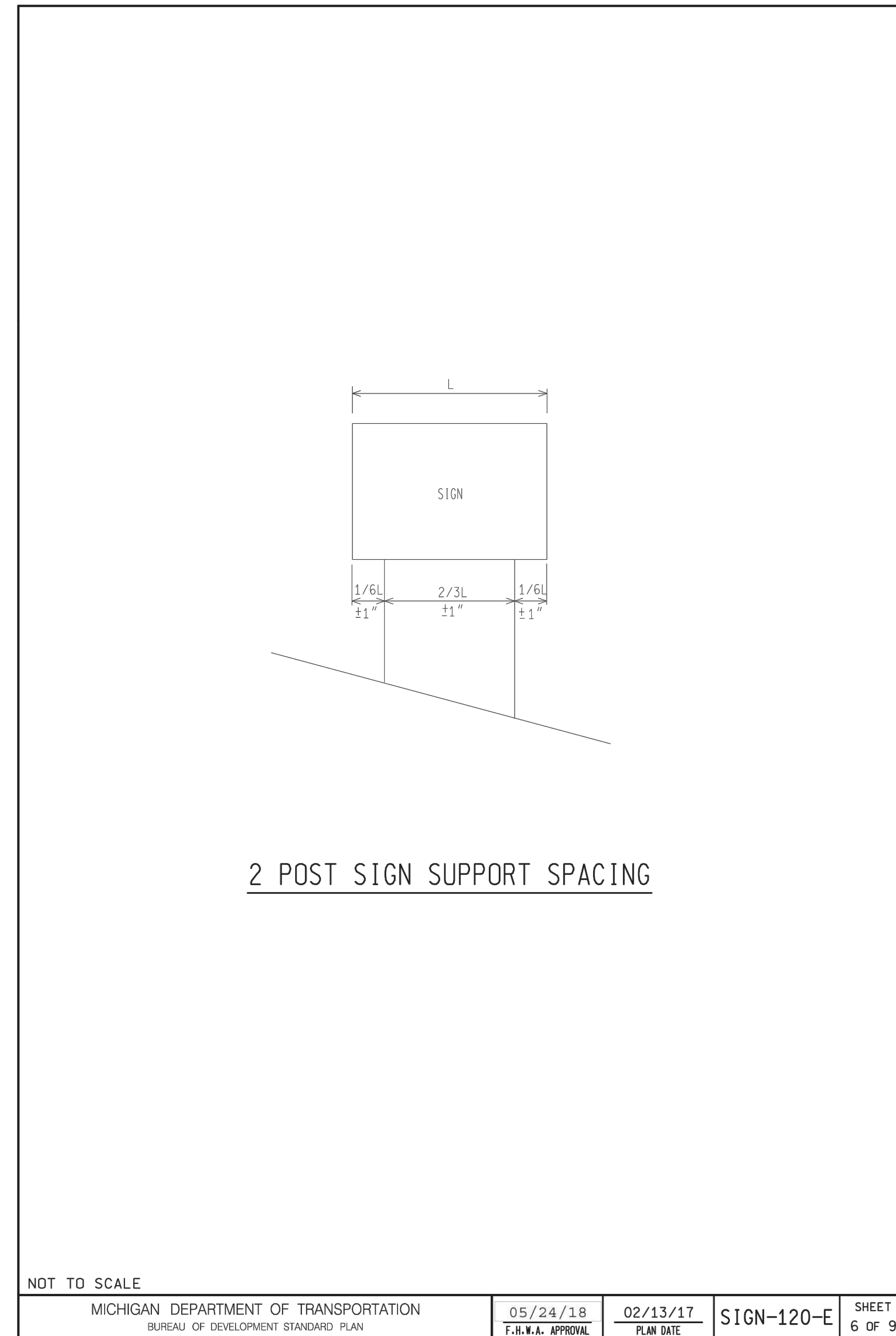
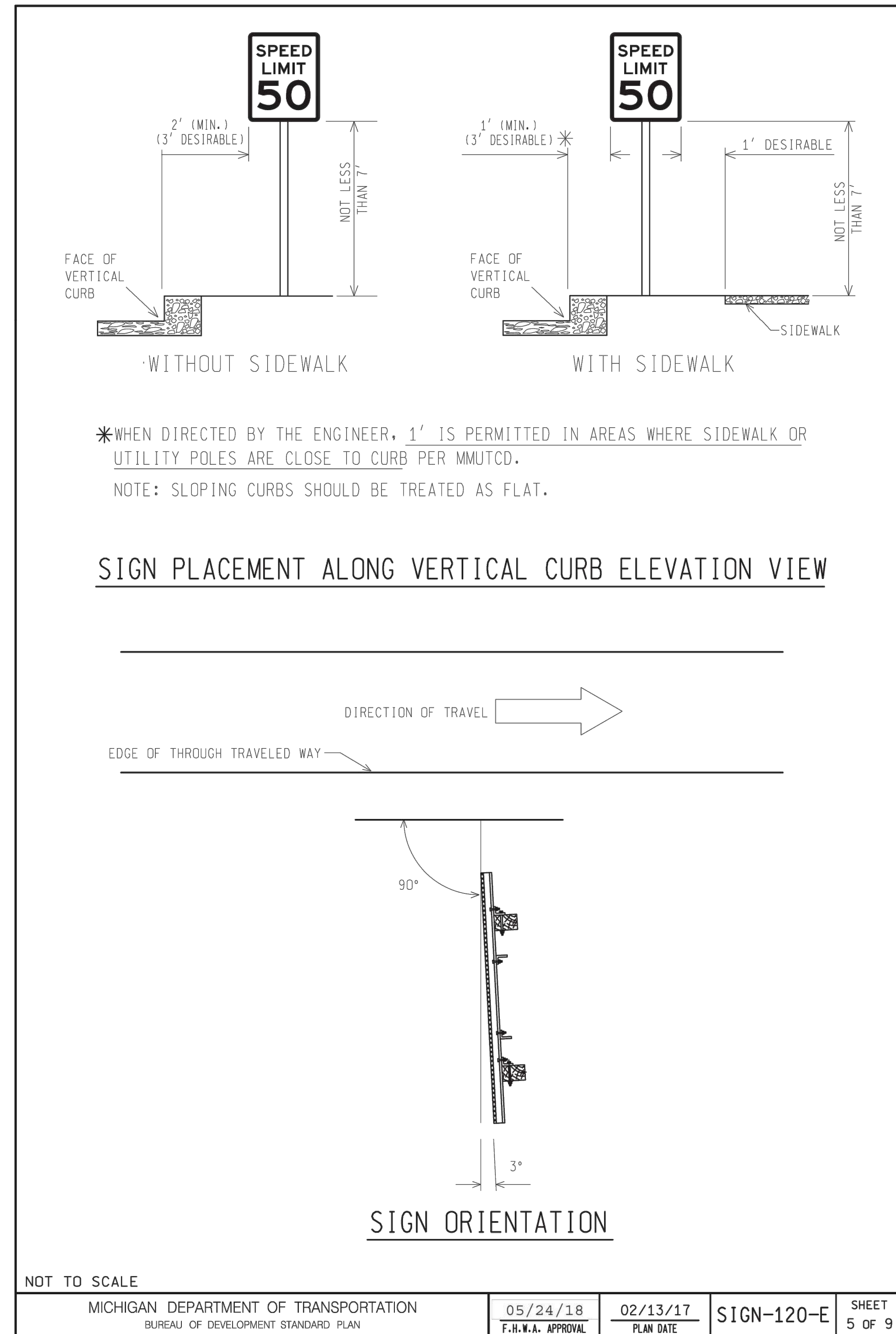
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SHEET NO.

C-525

SIGN BOTTOM HEIGHTS

CONVENTIONAL ROADS

- 7' - RURAL AREAS
- 7' - URBAN AREAS
- 7' - ALL CONDITIONS WHERE SIDEWALKS EXISTS

RAMPS/CROSSROADS

- 7' - RAMP AND CROSSROAD SIGNING (WITHOUT VERTICAL CURB)
- 7' - RAMP AND CROSSROAD SIGNING (WITH VERTICAL CURB)
- 7' - ALL CONDITIONS WHERE SIDEWALK EXISTS

- 4' - DO NOT ENTER AND WRONG WAY SIGNS (FOR FREEWAY RAMPS)

FREEWAYS/EXPRESSWAYS

- 7' - ROUTE MARKERS, WARNING AND REGULATORY SIGNS
- 7' - ALL OTHER FREEWAY/EXPRESSWAY SIGNS

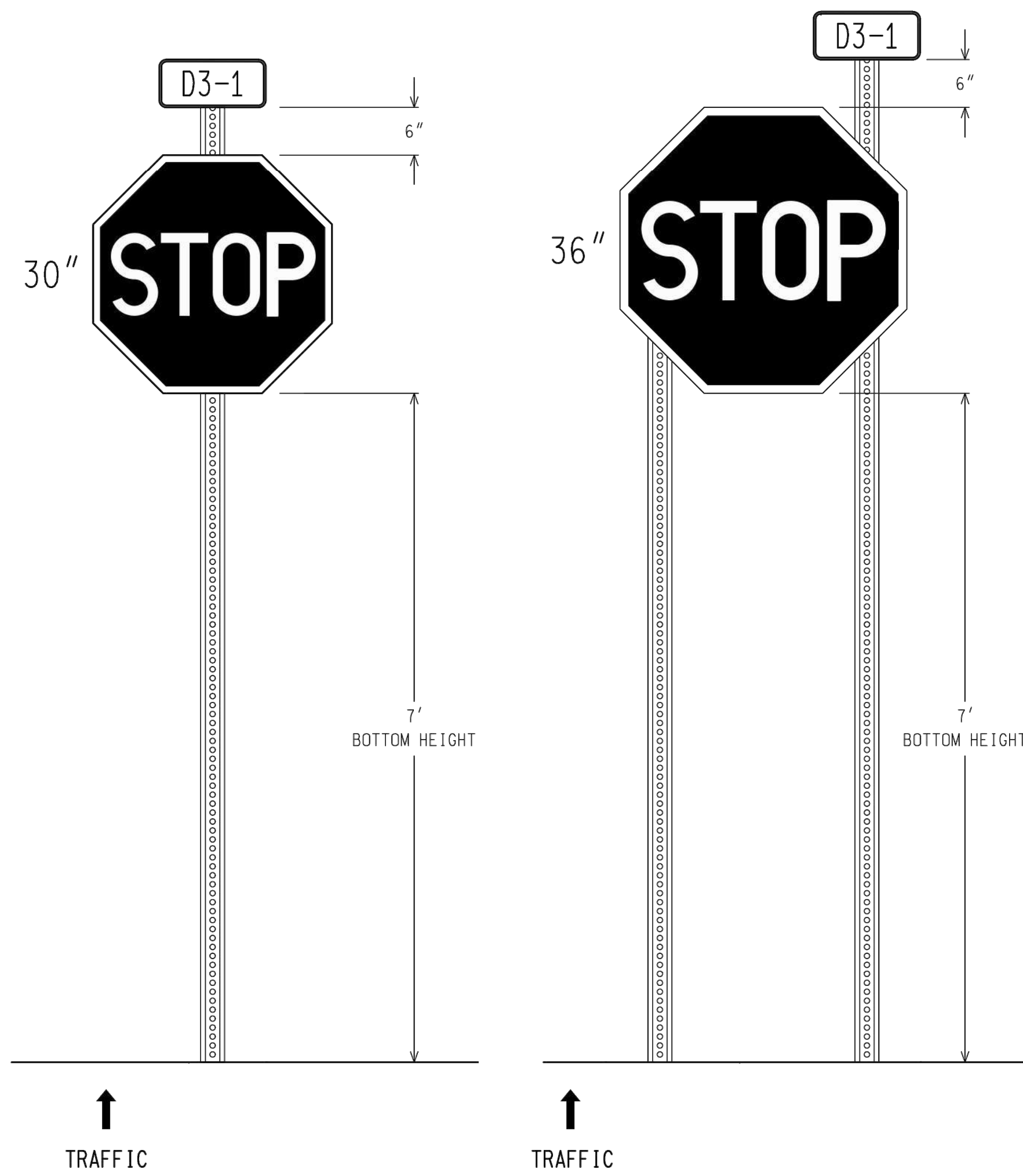
NOTES:

1. PARKING SIGNS MOUNTED BELOW A PARENT SIGN MAY HAVE A BOTTOM HEIGHT 1' OR 1.5' (DEPENDING ON SIGN SIZE) LESS THAN BOTTOM HEIGHTS LISTED FOR PARENT SIGNS.
2. BOTTOM HEIGHT OF ALL SIGNS ARE 7' EXCEPT THE FOLLOWING:
OBJECT MARKERS- 4'
MILE POST MARKERS- 4'
WRONG WAY/DO NOT ENTER (FRWY RAMPS)- 4'
3. CONVENTIONAL ROAD-A STREET OR HIGHWAY OTHER THAN A FREEWAY OR EXPRESSWAY.
4. EXPRESSWAY-A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.
5. FREEWAY-A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

NOT TO SCALE				MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	05/24/18 F.H.W.A. APPROVAL	02/13/17 PLAN DATE	SIGN-120-E	SHEET 7 OF 9
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**PLACEMENT OF D3-1 SIGNS
ABOVE R1-1**



PREPARED BY DESIGN DIVISION DRAWN BY: DHD CHECKED BY: AJL	DEPARTMENT DIRECTOR Kirk T. Stuedle APPROVED BY: <i>Randy V. Puff</i> DIRECTOR, BUREAU OF FIELD SERVICES	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR PLACEMENT OF D3-1 SIGNS ABOVE R1-1		
	APPROVED BY: <i>Mark A. Van Pelt</i> DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT	08/17/05 F.H.W.A. APPROVAL	03/01/05 PLAN DATE	SIGN-140-A

Sign Support Selection Chart: Foreslope Section, 1:4 slope, non-freeway

Sign Height (ft)	Sign Width (ft)																	
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.5	13.5	15	16.5	18	20	22												
2	15	17.5	20	22.5	25	27.5												
2.5	17.5	20	22.5	25	27.5	30												
3	20	22.5	25	27.5	30	33												
3.5	22.5	25	27.5	30	33	35												
4	25	27.5	30	33	35	38.5												
4.5	27.5	30	33	35	38.5	42												
5	30	33	35	38.5	42	45												
5.5	32.5	35	38.5	42	45	49.5												
6	35	38.5	42	45	49.5	54												
6.5	37.5	40.5	44	48	52	56.5												
7	40	43	46.5	50	54	58.5												
7.5	42	45	49.5	54	58.5	63												
8	44	48	52	56	60	64												
8.5	46	50	54	58.5	63	67.5												
9	48	52	56	60	64	68												
9.5	50	54	58.5	63	67.5	71.5												
10	52	56	60	64	68	72												
10.5	54	58.5	63	67.5	71.5	75												
11	56	60	64	68	72	76												
11.5	58	62	66	70	74	78												
12	60	64	68	72	76	80												

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

04/13/15
F.H.W.A. APPROVAL

01/14/15
PLAN DATE

SIGN-150-D

SHEET 3 OF 7

Notes:
-Based on AASHTO 6th Ed. (2013).
-Numbers in individual cells represent sign areas.
-Based on a lateral offset of 17ft., and a 7ft height from bottom of sign to pavement.

Review SIGN-100-SERIES and SIGN-110-SERIES for support selection prior to using SIGN-150-SERIES
Use this standard for signs other than those shown in SIGN-100-SERIES and SIGN-110-SERIES

2-3# Steel

2-4X6 Wood

2-6X8 Wood

2-WBX13 Steel

2-WBX18 Steel

Sign Support Selection Chart: Foreslope Section, 1:6 slope, non-freeway

Sign Height (ft)	Sign Width (ft)																	
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.5	13.5	15	16.5	18	20	22												
2	15	17.5	20	22.5	25	27.5												
2.5	17.5	20	22.5	25	27.5	30												
3	20	22.5	25	27.5	30	33												
3.5	22.5	25	27.5	30	33	35												
4	25	27.5	30	33	35	38.5												
4.5	27.5	30	33	35	38.5	42												
5	30	33	35	38.5	42	45												
5.5	32.5	35	38.5	42	45	49.5												
6	35	38.5	42	45	49.5	54												
6.5	37.5	40.5	44	48	52	56.5												
7	40	43	46.5	50	54	58.5												
7.5	42	45	49.5	54	58.5	63												
8	44	48	52	56	60	64												
8.5	46	50	54	58.5	63	67.5												
9	48	52	56	60	64	68												
9.5	50	54	58.5	63	67.5	71.5												
10	52	56	60	64	68	72												
10.5	54	58.5	63	67.5	71.5	75												
11	56	60	64	68	72	76												
11.5	58	62	66	70	74	78												
12	60	64	68	72	76	80												

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

04/13/15
F.H.W.A. APPROVAL

01/14/15
PLAN DATE

SIGN-150-D

SHEET 5 OF 7

Notes:
-Based on AASHTO 6th Ed. (2013).
-Numbers in individual cells represent sign areas.
-Based on a lateral offset of 17ft., and a 7ft height from bottom of sign to pavement.

Review SIGN-100-SERIES and SIGN-110-SERIES for support selection prior to using SIGN-150-SERIES
Use this standard for signs other than those shown in SIGN-100-SERIES and SIGN-110-SERIES

2-3# Steel

2-4X6 Wood

2-6X8 Wood

2-WBX13 Steel

2-WBX18 Steel

**MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE**

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

ANG Project No: MBMV099170
MAH NO.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
DRAWN BY: DAY
CHECKED BY: SAH
DO NOT SCALE DRAWINGS

SHEET CONTENTS
CONSTRUCTION
DETAILS

SHEET NO.

Sign Support Selection Chart: Backslope Section, Freeway and Non-Freeway

Sign Height (ft)	Sign Width (ft)																	
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.5	4.5	6	7.5	9	10.5	12	13.5	15	16.5									
2	6	8	10	12	14	16	18	20	22									
2.5	7.5	10	12.5	15	17.5	20	22.5	25	27.5									
3	9	12	15	18	21	24	27	30	33									
3.5	10.5	14	17.5	21	24.5	28	31.5	35	38.5									
4	12	16	20	24	28	32	36	40	44									
4.5	13.5	18	22.5	27	31.5	36	40.5	45	49.5									
5	15	20	25	30	35	40	45	50	55									
5.5	16.5	22	27.5	33	38.5	44	49.5	55	60.5									
6	18	24	30	36	42	48	54	60	66									
6.5	19.5	26	32.5	39	45.5	52	58.5	65	71.5									
7	21	28	35	42	49	56	63	70	77									
7.5	22.5	30	37.5	45	52.5	60	67.5	75	82.5									
8	24	32	40	48	56	64	72	80	88									
8.5	25.5	34	42	50	58	66	74	82	90									
9	27	36	45	54	63	72	81	90	99									
9.5	28.5	38	47	56	65	74	83	92	101									
10	30	40	50	60	70	80	90	100	110									
10.5	31.5	42	52	62	72	82	92	102	112									
11	33	44	55	65	75	85	95	105	115									
11.5	34.5	46	57	68	78	88	98	108	118									
12	36	48	60	72	84	96	108	120	132									

NOT TO SCALE

Notes:
 -Based on AASHTO 6th Ed. (2013).
 -Numbers in individual cells represent sign areas.
 -Based on a 7ft height from bottom of sign to pavement.

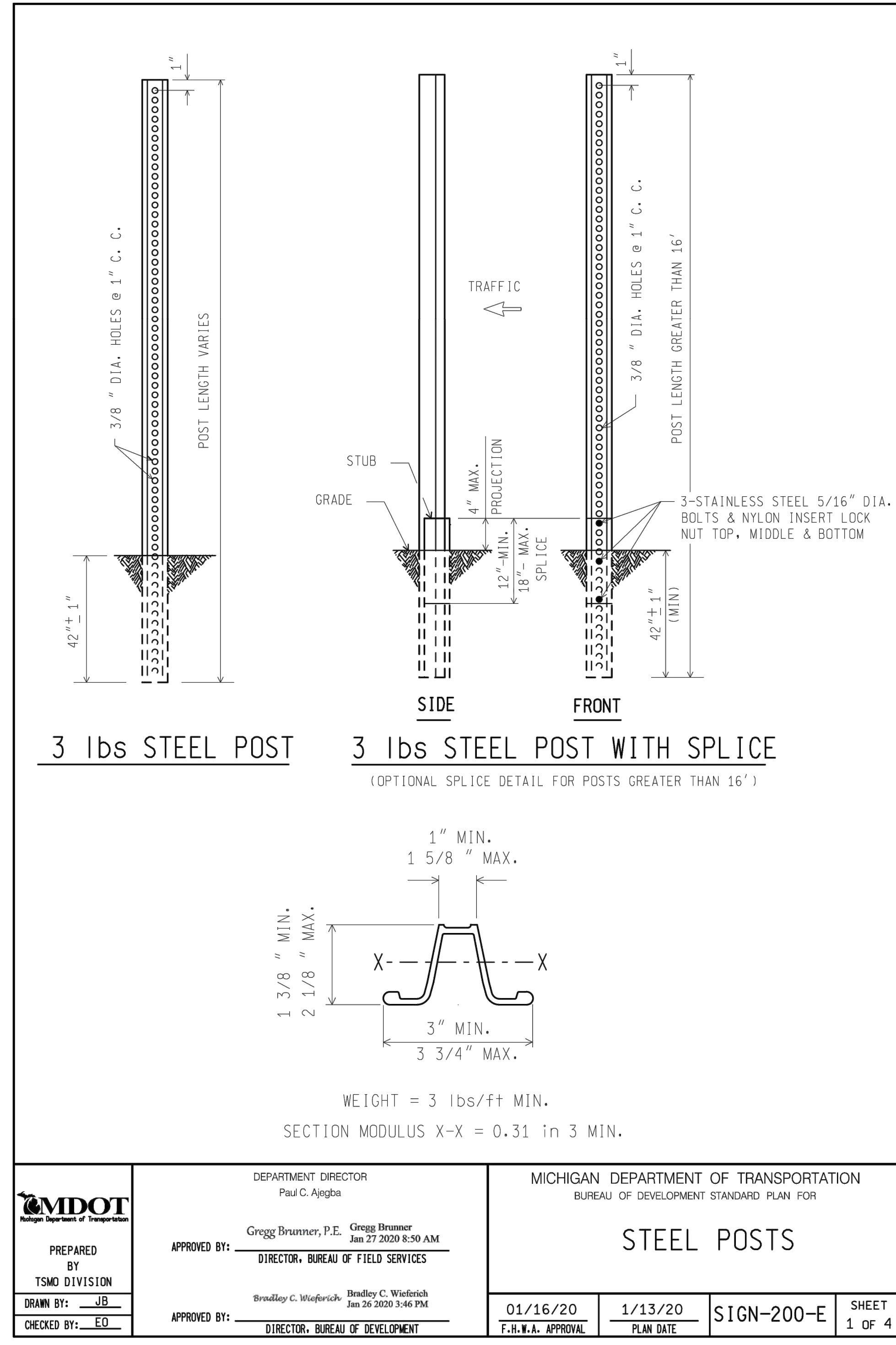
2-3# Steel
2-4X6 Wood
2-6X8 Wood

2-W8X13 Steel
2-W8X18 Steel

Review SIGN-100-SERIES and SIGN-110-SERIES for support selection prior to using SIGN-150-SERIES
Use this standard for signs other than those shown in SIGN-100-SERIES and SIGN-110-SERIES

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	04/13/15 F.H.W.A. APPROVAL	01/14/15 PLAN DATE	SIGN-150-D	SHEET 7 OF 7
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 CONSTRUCT MAIN BASE ENTRANCE**

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 BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

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CONSTRUCT MAIN BASE ENTRANCE**

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BATTLE CREEK, MICHIGAN

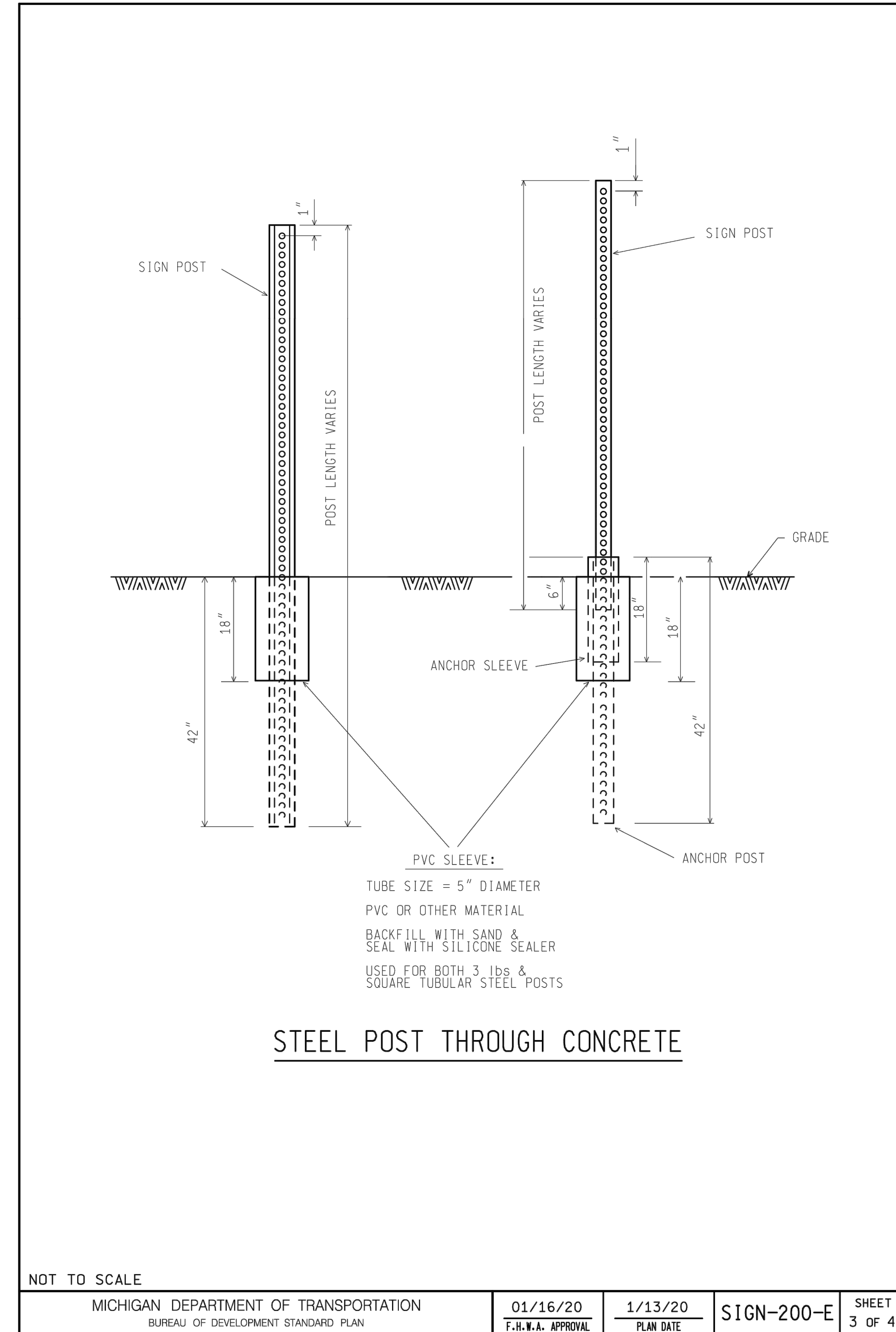
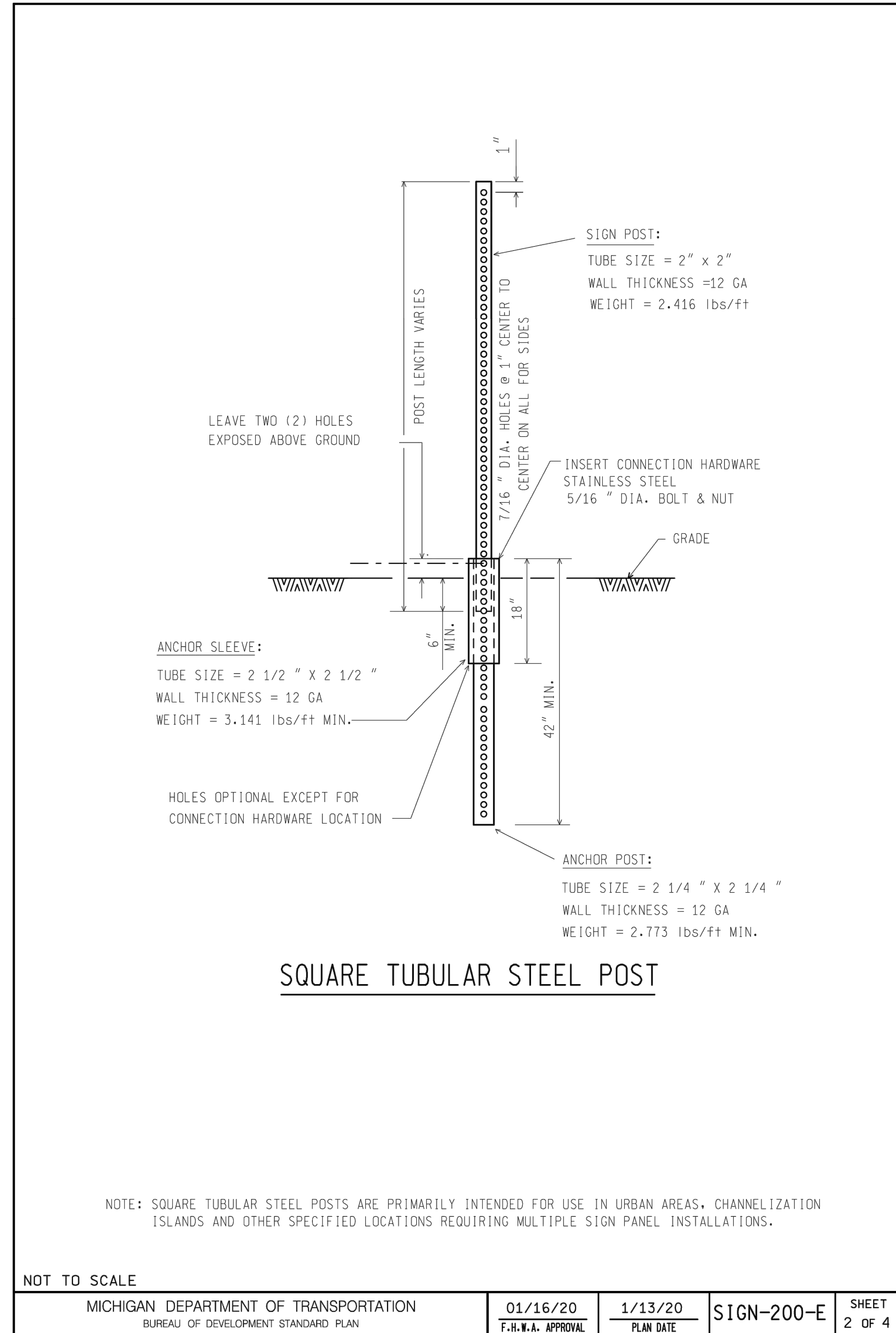
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MMH NO.: 3141900-113782.01
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CONSTRUCTION
DETAILS

SHEET NO.

C-528





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BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

ISSUED
02/17/21 B3 FINAL

ANG Project No: MBMV099170
MAH NO.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
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SHEET CONTENTS
CONSTRUCTION
DETAILS

SHEET NO.

TABLE 1 ELEMENTS OF SECTION			
2" x 2"	2 1/4" x 2 1/4"	2 1/2" x 2 1/2"	
<u>SECTION PROPERTIES</u>	<u>SECTION PROPERTIES</u>	<u>SECTION PROPERTIES</u>	
A = 0.5090 in ²	A = 0.695 in ²	A = 0.803 in ²	
I = 0.372 in ⁴	I = 0.561 in ⁴	I = 0.804 in ⁴	
S = 0.372 in ³	S = 0.499 in ³	S = 0.643 in ³	
r = 0.794 in	r = 0.898 in	r = 1.001 in	
TOLERANCES			
1. OUTSIDE TOLERANCE FOR ALL SIDES AT CORNERS			± 0.01 in
2. WALL THICKNESS			-0.008 in TO + 0.011 in
3. CONVEXITY AND CONCAVITY			± 0.01 in
4. SQUARENESS OF SIDES			± 0.14 in
5. TWIST PERMISSIBLE IN 3 in LENGTH			0.062 in
6. STRAIGHTNESS			1/16 in IN 3 ft
7. CORNER RADIUS			5/32 in ± 1/32 in
8. LENGTH			± 1/4 in

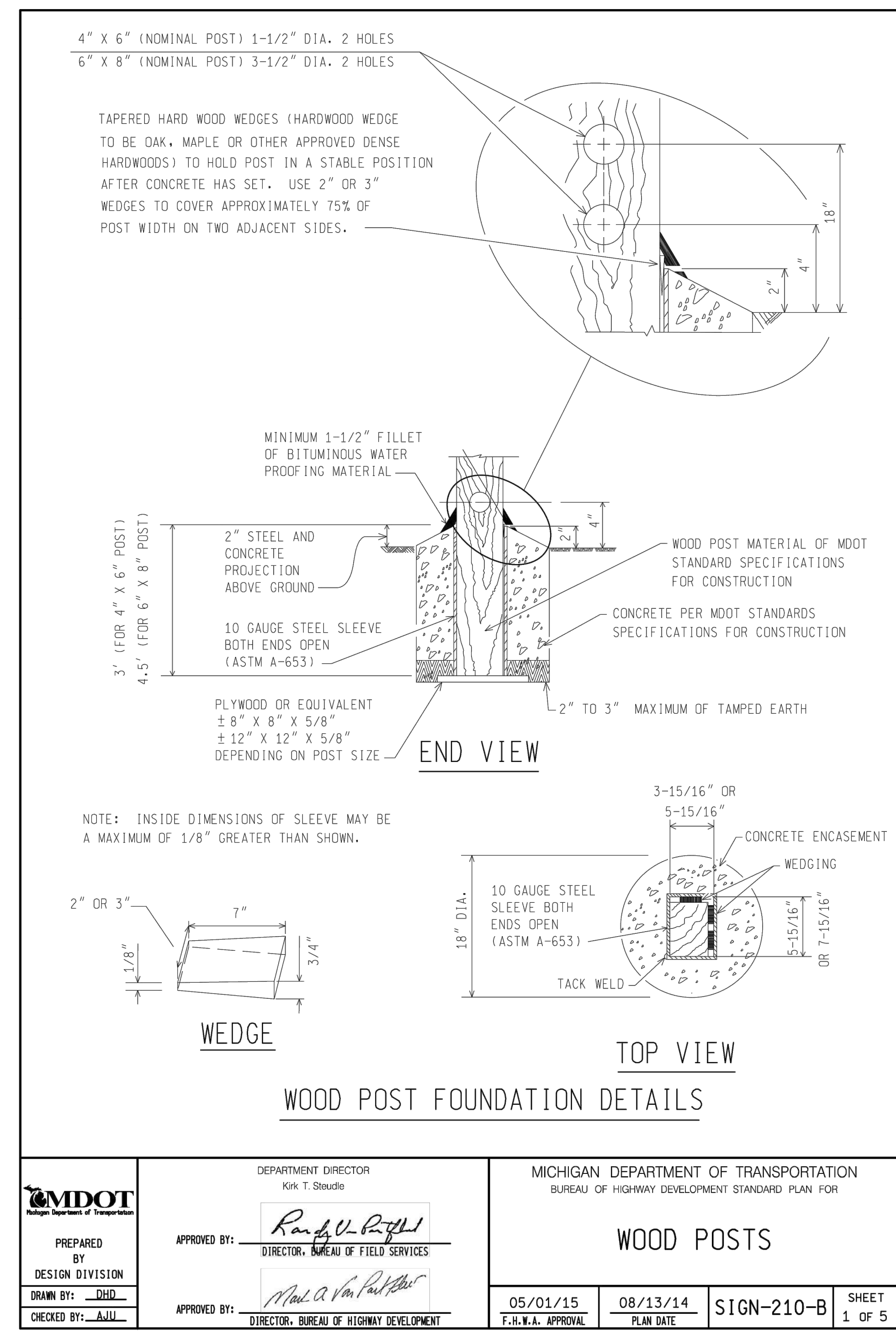
NOTES:

- POST SHALL BE GALVANIZED EXCEPT ON TEMPORARY CONSTRUCTION SIGNS.
- BOLTS & NYLON INSERT LOCK NUTS SHALL BE STAINLESS STEEL, PER CURRENT MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- SEE SIGN-740-SERIES-ENG FOR SIGN CONNECTION.
- POSTS SHALL BE MARKED AT THE 42" POINT WITH SPRAY PAINT PRIOR TO DRIVING TO INDICATE MINIMUM EMBEDMENT.
- POSTS WILL BE MEASURED FOR PAYMENT TO THE NEAREST COMMERCIAL LENGTH.
- SELF-ALIGNING STEEL SIGN REINFORCING PLATE (SEE SIGN-740-SERIES-ENG) REQUIRED FOR USE WITH ALL TYPE III (SHEET STEEL OR ALUMINUM) SIGNS INSTALLED ON 3 lbs. SELF-ALIGNING STEEL SIGN REINFORCING PLATE IS NOT TO BE USED WITH SQUARE TUBULAR STEEL POSTS.
- MAXIMUM SIGN SQUARE FOOT FOR 1-3 LB. POST SHALL BE 8 SQUARE FEET.
- MAXIMUM SIGN SQUARE FOOT FOR 2-3 LB. POST SHALL BE EQUAL TO THE 2-3 LB. STEEL POST PER SIGN-150-SERIES.
- STEEL POSTS PLACED IN CONCRETE SHALL UTILIZE A 5" DIAMETER SLEEVE AT MINIMUM.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN	01/16/20 F.H.W.A. APPROVAL	1/13/20 PLAN DATE	SIGN-200-E	SHEET 4 OF 4
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MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE

BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN

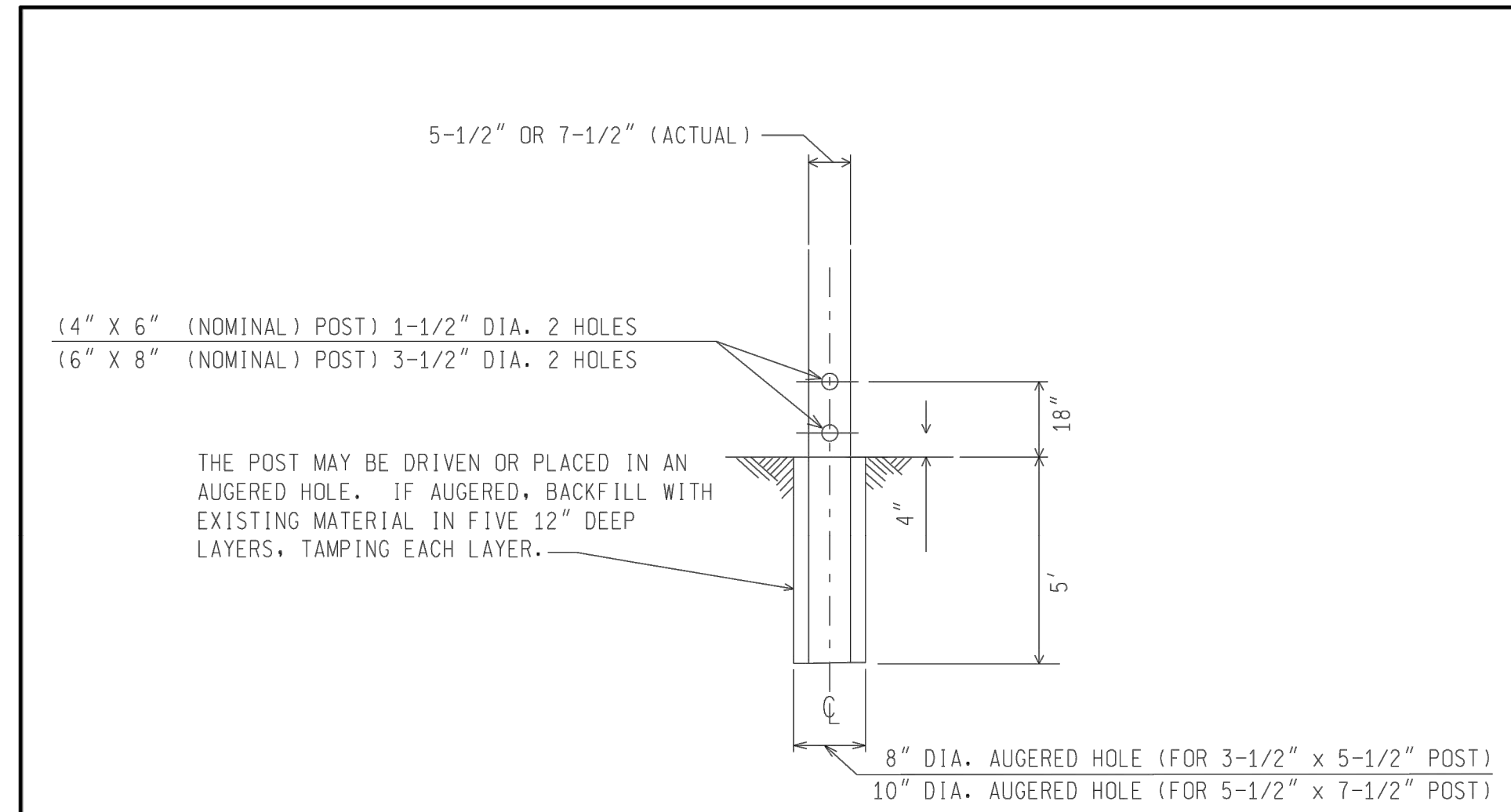
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SHEET CONTENTS
CONSTRUCTION
DETAILS

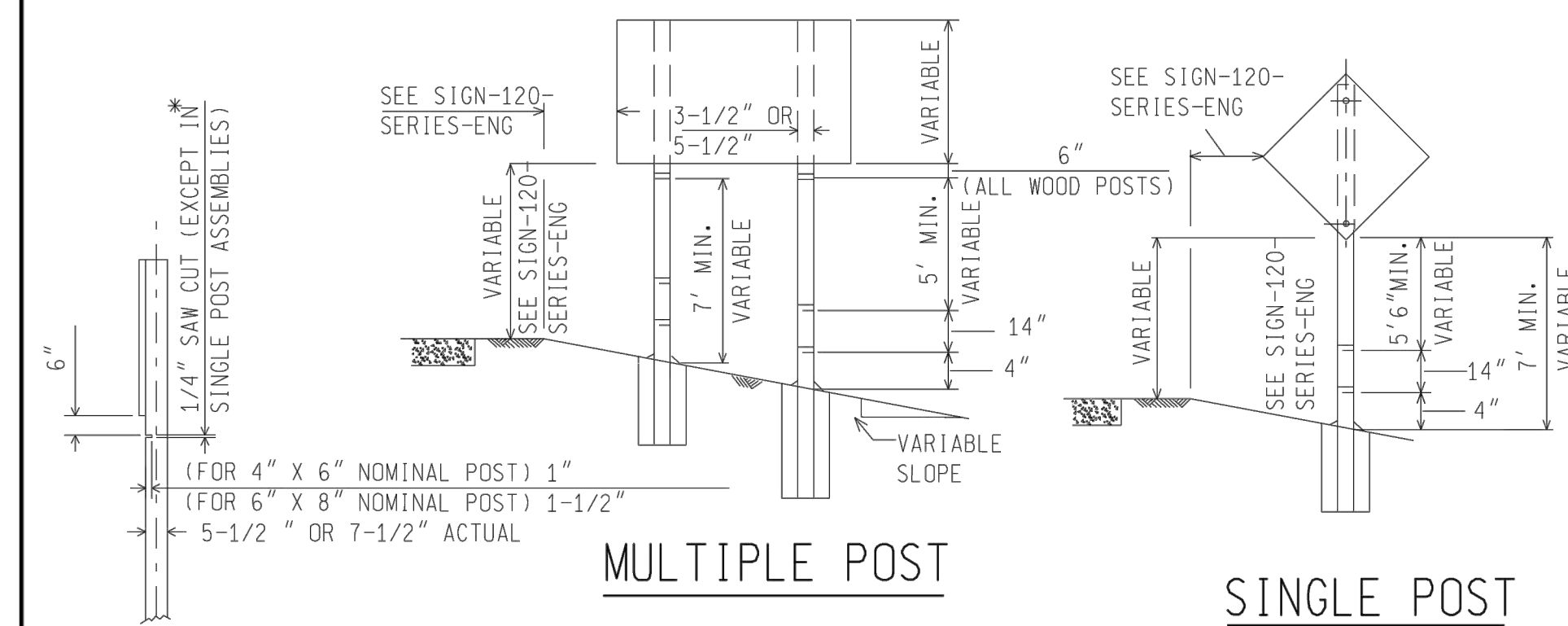
SHEET NO.

C-530



END VIEW
WOOD POST DIRECT EMBEDMENT DETAIL
SINGLE POST INSTALLATIONS ONLY

NOTE: DIRECT EMBEDMENT ONLY AT LOCATIONS IDENTIFIED IN PLANS OR PROPOSAL.

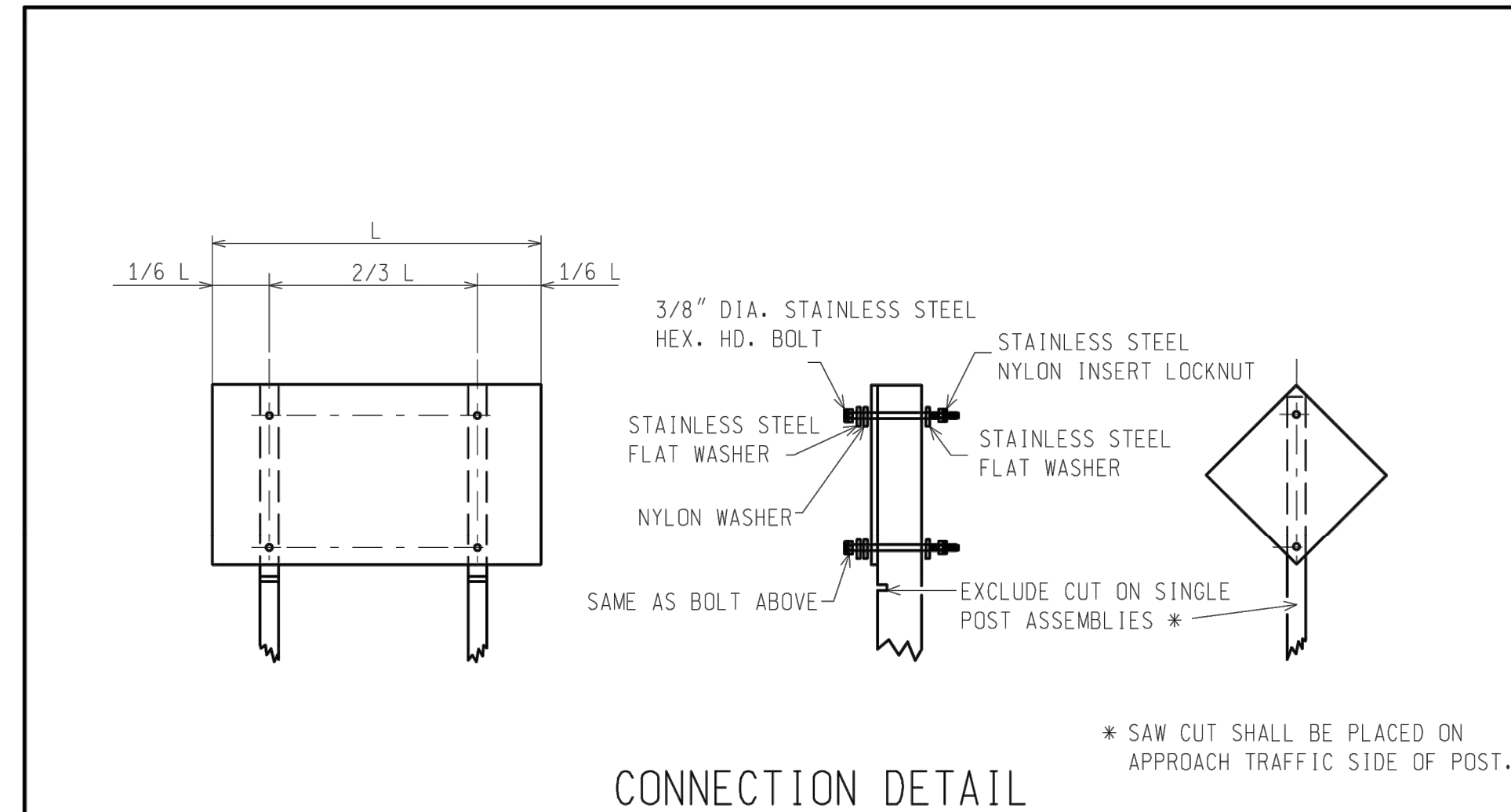


SAW CUT DETAIL **BREAKAWAY HOLES/SAWCUT RELATIONSHIP**

*SAW CUT SHALL BE PLACED ON
APPROACH TRAFFIC SIDE OF POST.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	05/01/15 F.H.W.A. APPROVAL	08/13/14 PLAN DATE	SIGN-210-B	SHEET 2 OF 5
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CONNECTION DETAIL
TYPES II & III SIGNS - ERECTION DETAILS

* SAW CUT SHALL BE PLACED ON
APPROACH TRAFFIC SIDE OF POST.

NOTES:

1. THE DRILLED BREAKAWAY HOLES ARE TO BE CAREFULLY CENTERED ON THE POSTS.
2. ALL CONCRETE FOUNDATIONS SHALL BE FINISHED AS SHOWN AND ANY SURPLUS MATERIAL SHALL BE COMPLETELY REMOVED FROM RIGHT-OF-WAY. SIGNS SHALL NOT BE ERECTED ON WOOD POSTS FOR A MINIMUM OF 24 HOURS AFTER PLACEMENT OF THE CONCRETE.
3. THE PAY ITEM "SIGN, TYPE ___" INCLUDES ALL ATTACHING DEVICES AND HARDWARE.
4. WOOD POSTS MAY BE DIRECTLY EMBEDDED ONLY AT THOSE LOCATIONS IDENTIFIED IN THE PLANS OR PROPOSAL.
5. A 0.500" WIDE X 0.015" DEEP GROOVE SHALL RUN THE ENTIRE LENGTH AT TOP AND BOTTOM OF ALL EXTRUDED ALUMINUM PANELS TO ACCOMMODATE OVERLAP SHEETING.
6. ALL STAINLESS STEEL BOLTS, NUTS, AND WASHERS SHALL BE MDOT STANDARDS SPECIFICATIONS FOR CONSTRUCTION.
7. FIELD DRILL ALUMINUM ANGLES AND WOOD POSTS.
8. ALL SIGNS SHALL BE ATTACHED SO THAT THE BOLTS ARE CENTERED HORIZONTALLY ON THE POSTS.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	05/01/15 F.H.W.A. APPROVAL	08/13/14 PLAN DATE	SIGN-210-B	SHEET 5 OF 5
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**MICHIGAN AIR NATIONAL GUARD
CONSTRUCT MAIN BASE ENTRANCE**

**BATTLE CREEK ANGB
BATTLE CREEK, MICHIGAN**

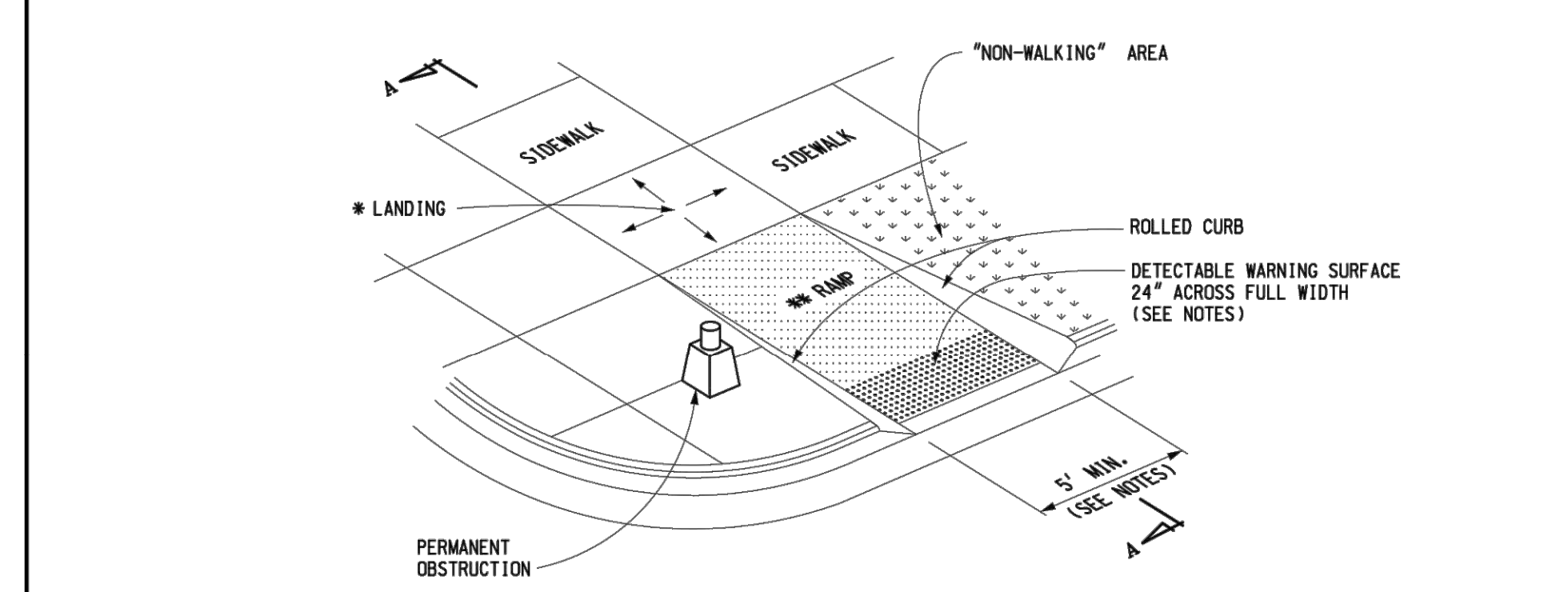
ISSUED 02/17/21 B3 FINAL

ANG Project No: MBMV099170
MAH NO.: 3141900-113782.01
DATE: FEBRUARY 17, 2021
DESIGNED BY: JAK
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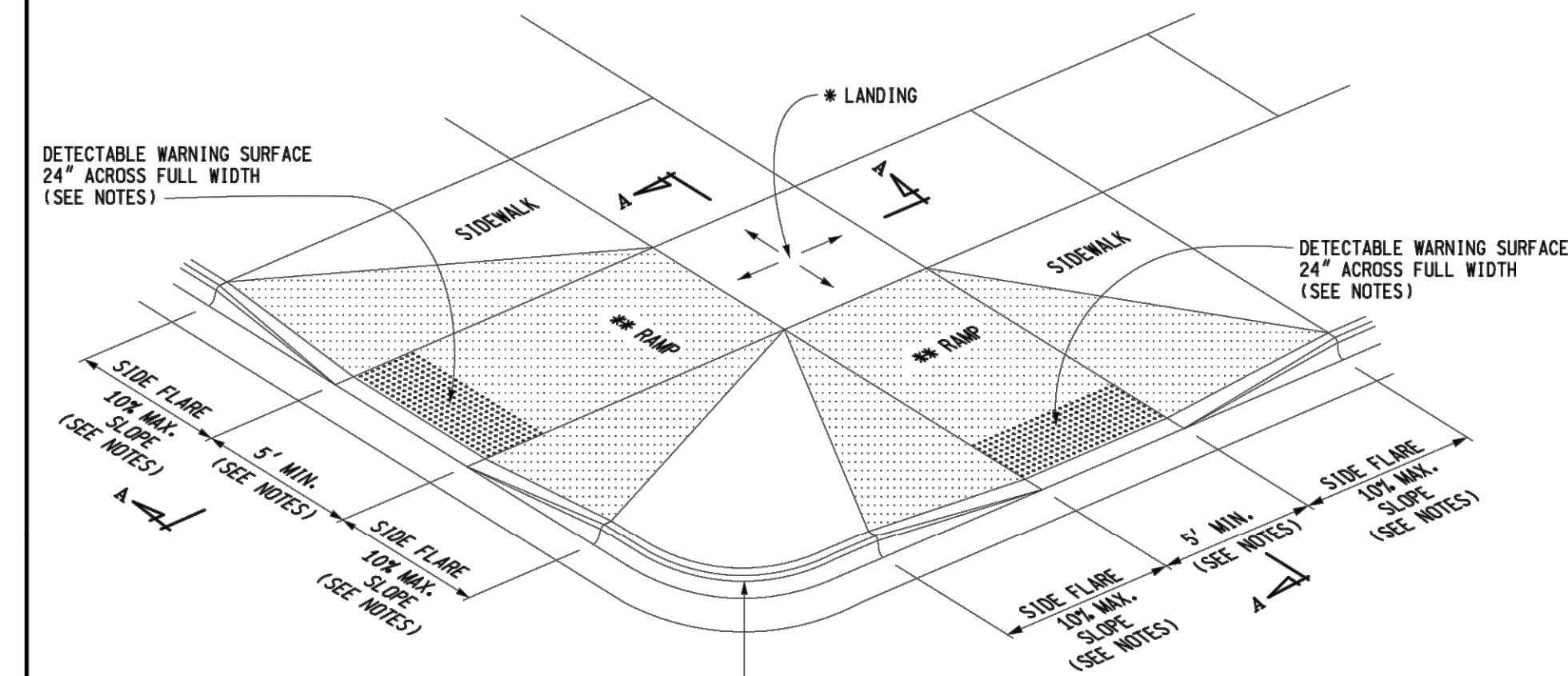
SHEET CONTENTS
CONSTRUCTION DETAILS

SHEET NO.
C-531

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.
** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



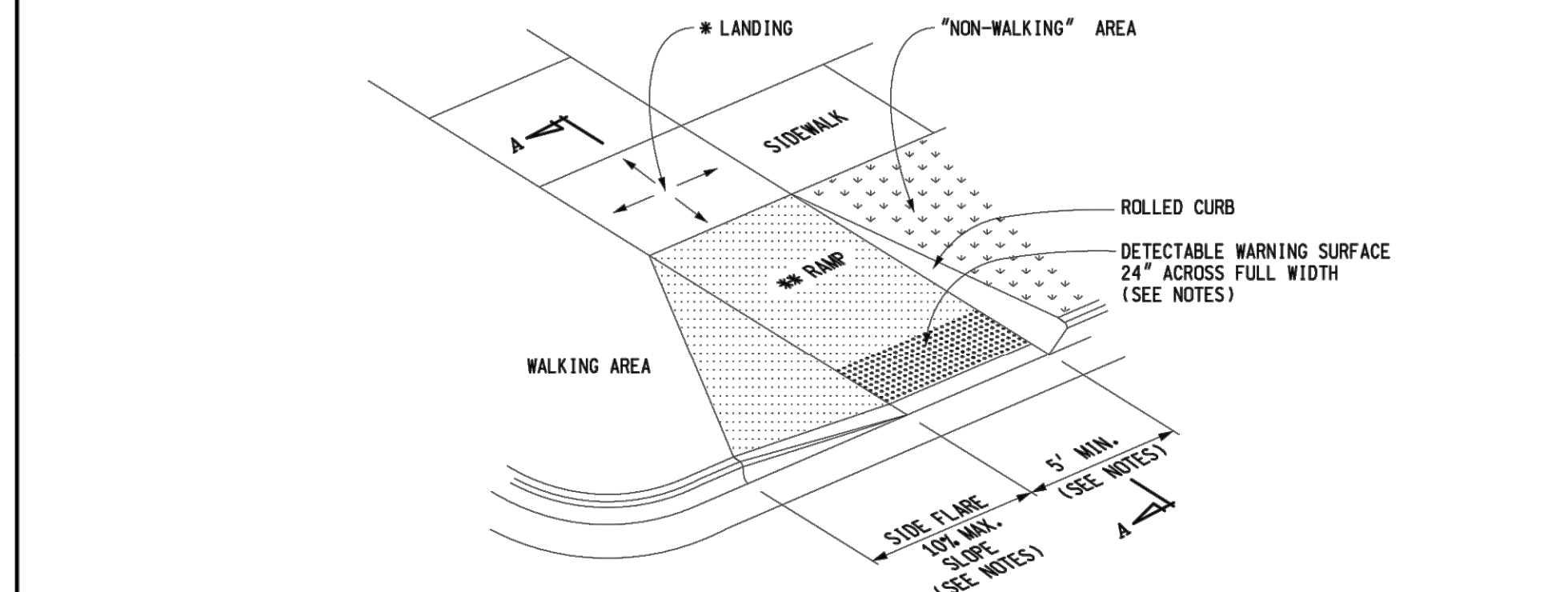
SIDEWALK RAMP TYPE R
(ROLLED SIDES)



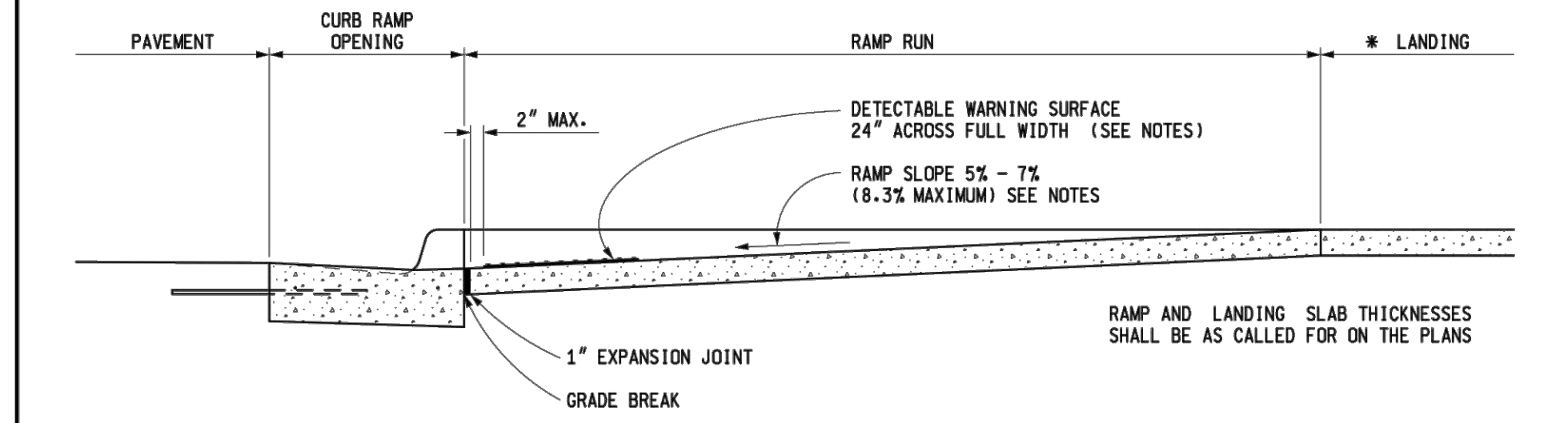
SIDEWALK RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)

	DEPARTMENT DIRECTOR Kirk T. Stuedle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR
	PREPARED BY: DESIGN DIVISION	APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES
DRAWN BY: B.L.T. CHECKED BY: W.K.P.	APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	F.H.W.A. APPROVAL
	7-26-2019 PLAN DATE	R-28-J SHEET 1 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.
** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



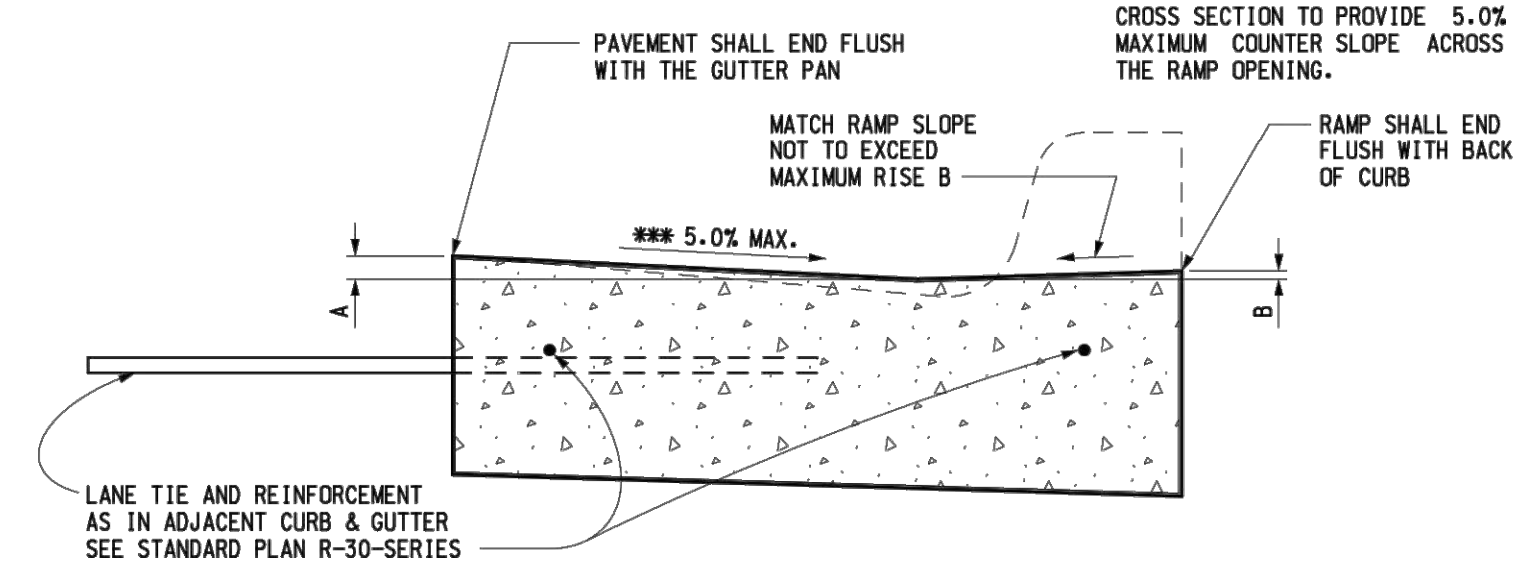
SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A

CURB TYPE	MAXIMUM RISE (INCHES)	
	A	B
B1	3/4	1
B2	3/4	1
B3	3/4	1
D1	3/4	1
D2	3/4	1
D3	3/4	1
C1	1/2	1/2
C2	1/2	1/2
C3	3/4	1/2
C4	3/4	1/2
C5	1	1/2
C6	1	1/2
F1	1/2	1/2
F2	1/2	1/2
F3	3/4	1/2
F4	3/4	1/2
F5	1	1/2
F6	1	1/2

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES



SECTION THROUGH CURB RAMP OPENING
(TYPICAL ALL RAMP TYPES)

	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR
	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS
F.H.W.A. APPROVAL	7-26-2019 PLAN DATE
	R-28-J SHEET 2 OF 7

AS-LET PLAN REVISIONS					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE



DATE:	CS:	DRAWING	SHEET
DESIGN UNIT:	JN:		
TSC:			
FILE:			