REINFORCED CONCRETE APRON ENDWALLS

DIA	APPROX. WEIGHT/ SECTION	T	A	B	C	D	E	G	APPROX. SLOPE
12"	530	2"	4"	24"	48⅝"	72⅝"	24"	2"	3 TO 1
15"	740	2½"	6"	27"	46"	73"	30"	2½"	3 TO 1
18"	990	2½"	5"	27"	46"	73"	36"	2½"	3 TO 1
21"	1280	2½"	9"	36"	37½"	73½"	42"	2½"	3 TO 1
24"	1520	3"	9½"	43½"	30"	73½"	48"	3"	3 TO 1
27"	1930	3½"	10½"	49½"	24"	73½"	54"	3½"	3 TO 1
30"	2190	3½"	12"	54"	18½"	73½"	60"	3½"	3 TO 1
36"	4100	4"	15"	63"	34⅝"	97½"	72"	4"	3 TO 1
42"	5350	4½"	21"	63"	35"	98"	78"	4½"	3 TO 1
48"	6550	5"	24"	72"	26"	98"	84"	5"	3 TO 1
54"	8040	5½"	27"	85"	33½"/35"	98½"/100"	90"	5"	2½ TO 1
60"	8130	6"	30"/35"	90"	39"	99"	96"	5"	2 TO 1
66"	10630	6½"	24"/30"	92"/78"	21"/27"	99"	102"	5½"	2 TO 1
72"	12520	7"	24"/36"	78"	21"	99"	108"	6"	2 TO 1
78"	14430	7½"	24"/36"	78"	21"	99"	114"	6½"	2 TO 1
84"	18160	8"	36"	90½"	21"	111½"	120"	6½"	1½ TO 1

NOTE: MINIMUM/MAXIMUM

GENERAL NOTES:

DETAILS OF CONSTRUCTION, MATERIALS, AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE CONSTRUCTION REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

VARIATIONS OF THE DIMENSIONS AND DESIGNS SHOWN BEFORE WILL BE PERMITTED PROVIDING EQUIVALENT CAPACITY AND STRUCTURAL INTEGRITY ARE ATTAINED, AND PRIOR APPROVAL OF THE ENGINEER IS OBTAINED.

CONCRETE CULVERT ENDWALLS MAY NOT BE USED WITH GALVANIZED STEEL OR ALUMINUM CULVERT PIPE OR VICE VERSA.

GALVANIZED STEEL OR ALUMINUM ENDWALLS SHALL NORMALLY BE INSTALLED ON CULVERT PIPE OF THE SAME METAL. THE USE OF GALVANIZED STEEL ENDWALLS ON ALUMINUM PIPES IS PERMITTED, PROVIDED THE TWO METALS AT THE JOINT INTERFACE ARE KEPT SEPARATED BY A SUITABLE INSULATING MATERIAL APPROXIMATELY 1/8" THICK OR GREATER. SUCH MATERIAL WOULD BE AN ASPHALT IMPREGNATED FELT, PLASTIC, OR EQUIVALENT SYNTHETIC. A RUBBER GASKET OR OTHER NONDEGRADABLE MATERIAL OF SUBSTANTIAL STRENGTH.

WHEN TWO OR MORE PIPE ARCHES WITH APRON ENDWALLS ARE TO BE LAID ADJACENT TO EACH OTHER, THEY SHALL BE SEPARATED BY THE FOLLOWING AMOUNT:
PIPE-ARCHES: TOTAL WIDTH OF APRON ENDWALL LESS THE DIAMETER OF PIPE PLUS 6 INCHES.
PIPE-ARCHES: TOTAL WIDTH OF APRON ENDWALL LESS THE SPAN DIMENSION OF THE PIPE ARCH PLUS 6 INCHES.

METAL APRON ENDWALLS FOR PIPE ARCHES

PIPE-ARCH DIMENSIONS SPAN	RISE	MIN. METAL THICK	DIMENSIONS G +/-1"	H MAX	J +/-1"	K +/-1½"	W +/-2"	APPROX. SLOPE
11"	13"	0.064	7"	9"	6"	19"	31"	2½ TO 1
21"	15"	0.064	7"	10"	6"	23"	26"	2½ TO 1
24"	18"	0.064	8"	12"	6"	28"	42"	2½ TO 1
28"	20"	0.064	9"	14"	6"	32"	48"	2½ TO 1
35"	24"	0.079	10"	16"	6"	39"	60"	2½ TO 1
42"	29"	0.079	12"	18"	8"	46"	75"	2½ TO 1
49"	33"	0.109	13"	21"	9"	53"	85"	2½ TO 1
57"	38"	0.109	15"	26"	12"	63"	90"	2½ TO 1
64"	43"	0.109	15"	30"	12"	70"	102"	2½ TO 1
71"	47"	0.109	18"	33"	12"	77"	114"	2½ TO 1
77"	52"	0.109	18"	36"	12"	77"	126"	2 TO 1
83"	57"	0.109	18"	39"	12"	77"	138"	2 TO 1

NOTE: ALL SPLICES TO BE LAP RIVETED OR BOLTED

METAL OR ALUMINUM APRON ENDWALLS FOR CIRCULAR PIPES

DIA	MIN. METAL THICKNESS	MIN. ALUM THICKNESS	DIMENSIONS A +/-1"	B MAX	H +/-1"	K +/-1½"	W +/-2"	APPROX. SLOPE
12"	0.064	0.080	6"	6"	6"	21"	24"	2½ TO 1
15"	0.064	0.080	7"	8"	6"	26"	30"	2½ TO 1
18"	0.064	0.080	8"	10"	6"	31"	36"	2½ TO 1
21"	0.064	0.080	9"	12"	6"	36"	42"	2½ TO 1
24"	0.064	0.079	10"	13"	6"	41"	48"	2½ TO 1
30"	0.079	0.079	12"	16"	8"	51"	60"	2½ TO 1
36"	0.079	0.105	14"	19"	9"	60"	72"	2½ TO 1
42"	0.109	0.105	16"	22"	11"	69"	84"	2½ TO 1
48"	0.109	0.105	18"	27"	12"	78"	90"	2½ TO 1
54"	0.109	0.105	18"	30"	12"	84"	102"	2 TO 1
60"	0.105	N/A	18"	33"	12"	87"	114"	1¾ TO 1
66"	0.105	N/A	18"	36"	12"	87"	120"	1½ TO 1
72"	0.109	N/A	18"	39"	12"	87"	126"	1½ TO 1
78"	0.109	N/A	18"	42"	12"	87"	132"	1½ TO 1
84"	0.109	N/A	18"	45"	12"	87"	138"	1½ TO 1

NOTE: ALL SPLICES TO BE LAP RIVETED OR BOLTED

CITY OF MADISON
ENGINEERING DIVISION

APRON ENDWALLS FOR PIPES AND PIPE ARCHES

STANDARD DETAIL DRAWING 5.4.1

STORM SEWER CAPACITY CALCULATIONS

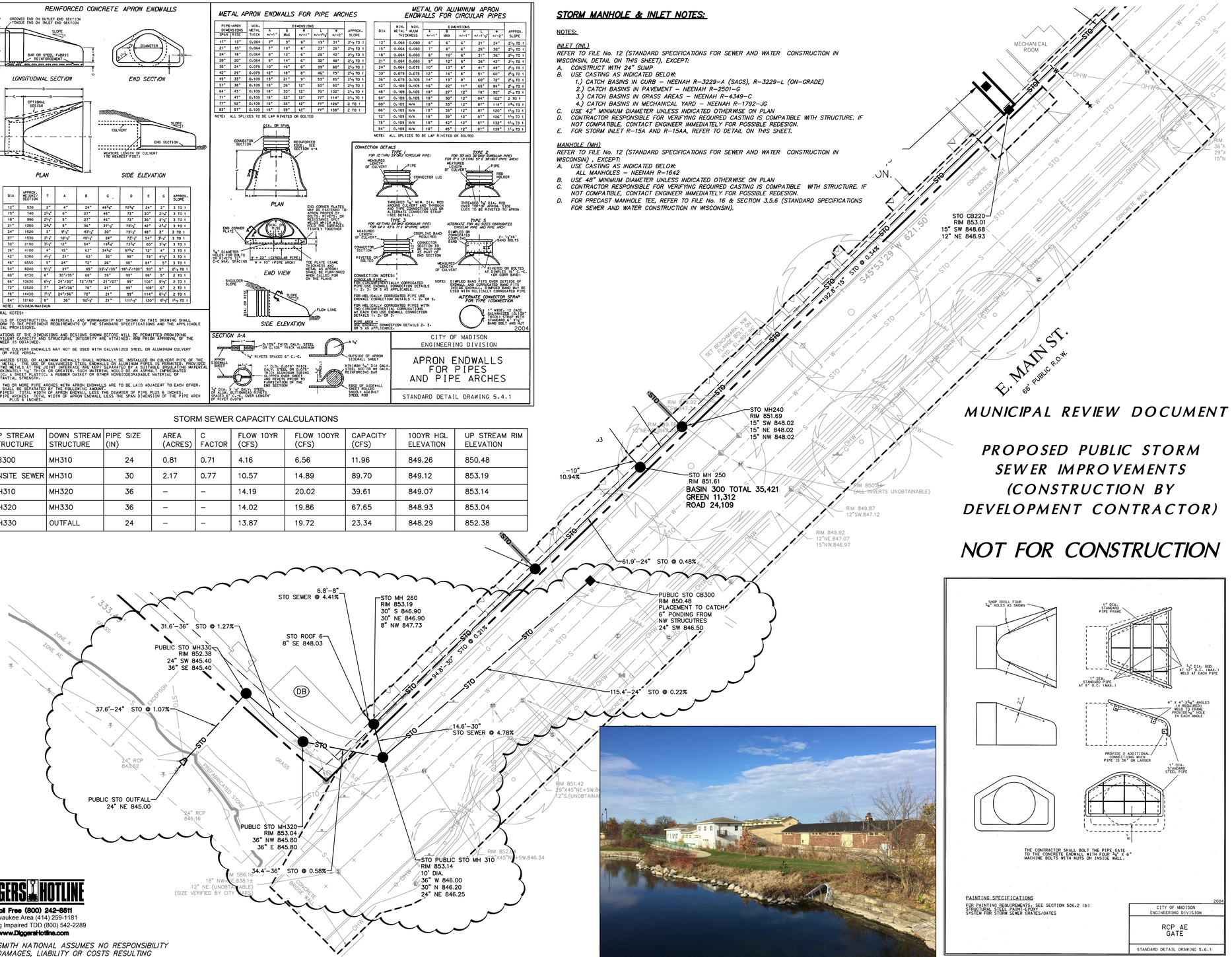
UP STREAM STRUCTURE	DOWN STREAM STRUCTURE	PIPE SIZE (IN)	AREA (ACRES)	C FACTOR	FLOW 10YR (CFS)	FLOW 100YR (CFS)	CAPACITY (CFS)	100YR HGL ELEVATION	UP STREAM RIM ELEVATION
CB300	MH310	24	0.81	0.71	4.16	6.56	11.96	849.26	850.48
ONSITE SEWER	MH310	30	2.17	0.77	10.57	14.89	89.70	849.12	853.19
MH310	MH320	36	–	–	14.19	20.02	39.61	849.07	853.14
MH320	MH330	36	–	–	14.02	19.86	67.65	848.93	853.04
MH330	OUTFALL	24	–	–	13.87	19.72	23.34	848.29	852.38

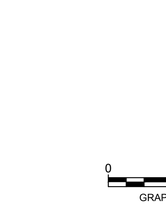
STORM MANHOLE & INLET NOTES:

NOTES:

INLET (INL)
REFER TO FILE No. 12 (STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN, DETAIL ON THIS SHEET), EXCEPT:
A. CONSTRUCT WITH 24" SUMP
B. USE CASTING AS INDICATED BELOW:
1.) CATCH BASINS IN CURB – NEENAH R-3229-A (SAGS), R-3229-L (ON-GRADE)
2.) CATCH BASINS IN PAVEMENT – NEENAH R-2501-G
3.) CATCH BASINS IN GRASS AREAS – NEENAH R-4349-C
4.) CATCH BASINS IN MECHANICAL YARD – NEENAH R-1792-JG
C. USE 42" MINIMUM DIAMETER UNLESS INDICATED OTHERWISE ON PLAN
D. CONTRACTOR RESPONSIBLE FOR VERIFYING REQUIRED CASTING IS COMPATIBLE WITH STRUCTURE. IF NOT COMPATIBLE, CONTACT ENGINEER IMMEDIATELY FOR POSSIBLE REDESIGN.
E. FOR STORM INLET R-15A AND R-15AA, REFER TO DETAIL ON THIS SHEET.

MANHOLE (MH)
REFER TO FILE No. 12 (STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN), EXCEPT:
A. USE CASTING AS INDICATED BELOW:
ALL MANHOLES – NEENAH R-1642
B. USE 48" MINIMUM DIAMETER UNLESS INDICATED OTHERWISE ON PLAN
C. CONTRACTOR RESPONSIBLE FOR VERIFYING REQUIRED CASTING IS COMPATIBLE WITH STRUCTURE. IF NOT COMPATIBLE, CONTACT ENGINEER IMMEDIATELY FOR POSSIBLE REDESIGN.
D. FOR PRECAST MANHOLE TEE, REFER TO FILE No. 16 & SECTION 3.5.6 (STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN).





LEGEND

- EXISTING SANITARY MANHOLE
- EXISTING POWER POLES
- EXISTING WATER VALVE
- EXISTING FIRE HYDRANT
- EXISTING SANITARY SEWER
- EXISTING WATER MAIN
- EXISTING GAS LINE
- EXISTING TELEPHONE LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING OVERHEAD ELECTRIC
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED 10" DESIGN BUILD STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATER MAIN
- PROPOSED STORM SEWER MANHOLE WITH GRATE
- PROPOSED STORM SEWER MANHOLE
- PROPOSED STORM SEWER AREA DRAIN
- PROPOSED FLARED END SECTION
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER CLEANOUT
- PROPOSED HYDRANT
- PROPOSED GATE VALVE WITH VALVE BOX
- PROPOSED GATE VALVE WITH VAULT
- PROPOSED ELECTRIC TRANSFORMER

MUNICIPAL REVIEW DOCUMENT

PROPOSED PUBLIC STORM SEWER IMPROVEMENTS (CONSTRUCTION BY DEVELOPMENT CONTRACTOR)

NOT FOR CONSTRUCTION

UTILITY NOTES

BEFORE PROCEEDING WITH ANY UTILITY CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE EACH EXISTING LATERAL OR POINT OF CONNECTION AND VERIFY THE SIZE, LOCATION AND ELEVATION OF ALL UTILITIES.

ALL EXISTING UNUSED SANITARY AND WATER SERVICE LATERALS SERVING THE SITE SHALL BE ABANDONED.

PRIVATE SANITARY SEWER PROPOSED SHALL BE INSTALLED TO APPLICABLE CITY OF MADISON CONSTRUCTION STANDARDS.

STORM SEWER NOTES:
1. CONTRACTOR TO MAINTAIN MINIMUM 18" CLEARANCE WHEN WATER MAIN CROSSES ABOVE OR BELOW STORM SEWER.
2. CONTRACTOR TO MAINTAIN MINIMUM 18" CLEARANCE WHEN WATER SERVICE CROSSES ABOVE OR BELOW STORM SEWER.
3. BEFORE PROCEEDING WITH ANY UTILITY CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE EACH EXISTING LATERAL OR POINT OF CONNECTION AND VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES. IF ANY EXISTING UTILITIES ARE NOT AS SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY FOR POSSIBLE REDESIGN.
4. CONTRACTOR IS RESPONSIBLE FOR VERIFYING REQUIRED CASTING IS COMPATIBLE WITH SPECIFIED STRUCTURE. IF NOT COMPATIBLE, CONTACT ENGINEER IMMEDIATELY.
5. RIM ELEVATIONS FOR CURB INLETS IS TO THE TOP OF THE CAST IRON INLET COVER.
6. ALL STORM SEWER AREA DRAINS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL DESIGN–BUILD STORM BUILDING LATERALS AND ASSOCIATED AREA DRAINS. CONTRACTOR SHALL MATCH DESIGN–BUILD STORM SEWER PIPE TYPE, SIZE AND SLOPE AS SHOWN ON THIS PLAN.
7. ADDITIONAL DETAILS CAN BE FOUND ON C503.

CITY OF MADISON FORESTRY DEPARTMENT MUST BE CONTACTED PRIOR TO THE CONSTRUCTION OF THE SIDEWALK ALONG MAIN STREET TO REVIEW ANY POTENTIAL CONFLICTS WITH THE SIDEWALK CONSTRUCTION AND EXISTING TREE ROOTS. FORESTRY CONTACT: BRIAN MEILLER (608) 266–4890.

RIM ELEVATIONS ARE GIVEN TO THE FACE OF CURB FOR INLET GRATES OR THE CENTER OF THE MANHOLE STRUCTURE FOR MANHOLES. PIPE LENGTHS ARE MEASURED TO THE CENTER OF STRUCTURE OR THE END OF PIPE WHERE THERE IS AN ENDWALL.

TRACER WIRE SHALL BE INSTALLED ON ALL NON–METALLIC SANITARY, STORM AND WATER MAINS, AND LATERALS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION, LATEST EDITION, AND ANY ADDITIONAL LOCAL REQUIREMENTS AS APPLICABLE.

RENDERING: PROPOSED 24" STORM OUTFALL TO YAHARA RIVER

DIGGERS HOTLINE
Toll Free (800) 242-8511
Milwaukee Area (414) 259-1181
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com

R.A. SMITH NATIONAL ASSUMES NO RESPONSIBILITY FOR DAMAGES, LIABILITY OR COSTS RESULTING FROM CHANGES OR ALTERATIONS MADE TO THIS PLAN WITHOUT THE EXPRESSED WRITTEN CONSENT OF R.A. SMITH NATIONAL.

THE LOCATIONS OF EXISTING UTILITY INSTALLATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE. THERE MAY BE OTHER UNDERGROUND UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.

DATE	DESCRIPTION

R.A. Smith National
Beyond Surveying and Engineering
www.rasmithnational.com

1801 WASHINGTON
CITY OF MADISON, WI

PUBLIC STORM SEWER PLAN

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DATE: 12/05/2016
SCALE: 1" = 20'
JOB NO. 3150290
PROJECT MANAGER: MICHAEL A. BACH, P.E.
DESIGNED BY: CBW
CHECKED BY: MAB

SHEET NUMBER
C402