1140 BROADWAY STREET

CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

CONSTRUCTION PLANS

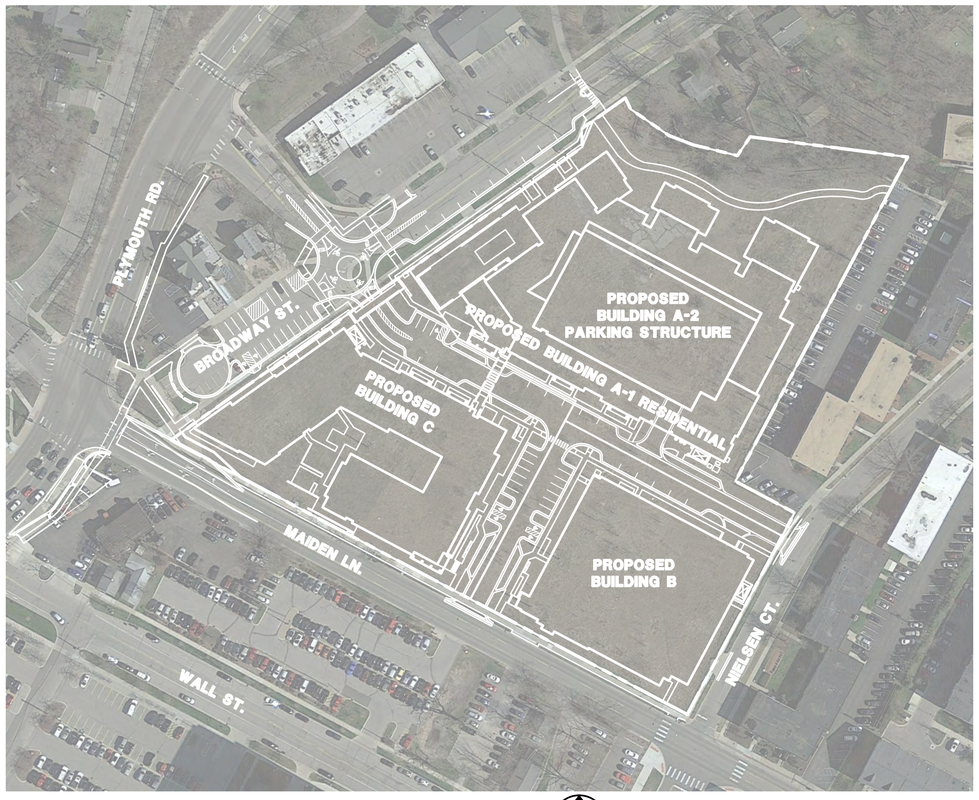
OWNER
MORNINGSIDE LOWER TOWN, LLC
223 W. ERIE THIRD FLOOR
CHICAGO, IL 60654
PH. (312) 280-7770
ATTN: RONALD MUCHA

SURVEYOR/CIVIL ENGINEER
MIDWESTERN CONSULTING, LLC
3815 PLAZA DR.
ANN ARBOR, MI 48108
PH. (734) 995-0200
ATTN: TOM COVERT, RLA, AICP, LEED AP
HEATH HARTT, PE

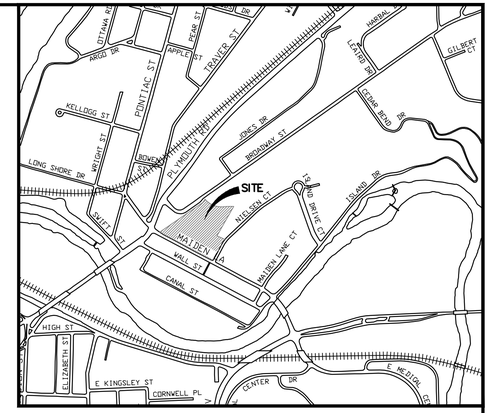
ARCHITECT
HKM ARCHITECTS + PLANNERS, INC.
43 SOUTH VAIL AVENUE
ARLINGTON HEIGHTS, IL 60005
PH (847) 392-9200
ATTN: MARK KURENSKY, PRINCIPAL
MARK HOPKINS, PRINCIPAL
HKM ARCHITECTS + PLANNERS, INC.

TRAFFIC ENGINEER
FLEIS & VANDENBRINK
27725 STANSBURY BLVD, SUITE 150
FARMINGTON HILLS, MI 48334
PH (248) 536-0080
ATTN: JULIE KROLL, PE, PTOE
MICHAEL LABADIE, PE

ENVIRONMENTAL SERVICES
SOILS AND MATERIALS ENGINEERS, INC.
43980 PLYMOUTH OAKS BLVD
PLYMOUTH, MI 48170-2584
PH (734) 454-9900
ATTN: JAMES HARLESS, PHD, CHMM



OVERALL SITE
1" = 80'



VICINITY MAP
NOT TO SCALE

SHEET INDEX

#	SHEET TITLE
01	COVER SHEET
02	BOUNDARY SURVEY
03	EASEMENT PLAN
04	TOPOGRAPHIC SURVEY
05	TREE LIST AND EXISTING UTILITIES SCHEDULE
06	SITE DEMOLITION PLAN
07	SITE LAYOUT PLAN
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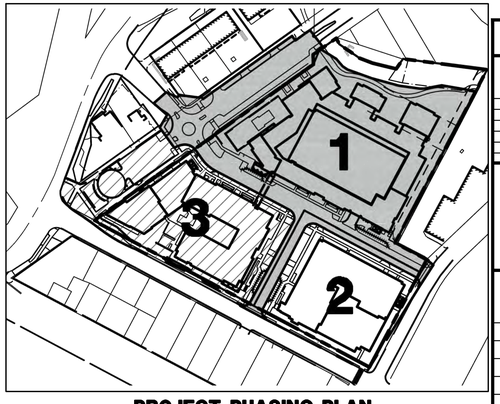
28	PHOTOMETRIC PLAN
LA-01	LANDSCAPE PLAN

PROJECT SUMMARY

THE PROPOSED DEVELOPMENT CONSISTS OF 4 SEPARATE BUILDINGS INCLUDING PARKING. OCCUPANCY OF THE BUILDINGS WILL BE APARTMENT AND CONDOMINIUM UNITS WITH RETAIL LOCATED ON THE GROUND FLOOR OF BUILDING "A". VEHICULAR PARKING IS PROPOSED WITHIN THE BUILDING "A" PARKING STRUCTURE, BUILDING "B" PODIUM, AND SURFACE PARKING ALONG THE VEHICULAR ACCESS ROUTES. EXTERIOR BIKE PARKING IS PROVIDED IN BIKE HOOPS. ALL BUILDINGS INCLUDE INTERIOR BIKE PARKING. STORM WATER FROM THE PROJECT WILL BE CAPTURED AND DIRECTED TO A DETENTION CHAMBER, AFTER MECHANICAL QUALITY TREATMENT, UNDER THE PARKING STRUCTURE. THE CHAMBER WILL DISCHARGE TO THE EXISTING STORM SEWER IN NIELSEN COURT.

GENERAL NOTES:

1. PER CHAPTER 49, SECTION 4:58 OF THE CITY CODE, "ALL SIDEWALKS ARE TO BE KEPT AND MAINTAINED IN GOOD REPAIR BY THE OWNER OF THE LAND ADJACENT TO AND ABUTTING THE SAME." PRIOR TO ISSUANCE OF THE FINAL CERTIFICATE OF OCCUPANCY FOR THIS SITE, ALL EXISTING SIDEWALKS MUST BE REPAIRED IN ACCORDANCE WITH CITY STANDARDS.
2. "THE CONSTRUCTION COVERED BY THESE PLANS SHALL CONFORM TO THE CITY OF ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS WHICH ARE INCLUDED BY REFERENCE."
3. "THE OMISSION OF ANY STANDARD DETAILS DOES NOT RELIEVE THE CONTRACTORS OF THEIR OBLIGATION TO CONSTRUCT ITEMS IN COMPLETE ACCORDANCE WITH PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS."
4. WORK IN THE MAIDEN LANE, BROADWAY AND NIELSEN COURT RIGHT-OF-WAY REQUIRED A CITY RIGHT-OF-WAY PERMIT(S). PROJECT MANAGEMENT SHALL INSPECT ALL WORK IN THE RIGHT-OF-WAY INCLUDING BUT NOT LIMITED TO DRIVE APPROACHES, SIDEWALKS, CURB & GUTTER, UTILITIES, RELOCATION OF STREET LIGHTS, ETC.
5. PUBLIC STREET LIGHT RELOCATION REQUIRED REVIEW AND APPROVAL OF THE CITY TRAFFIC ENGINEER. THE PROJECT OWNER WILL BE RESPONSIBLE FOR ALL ASSOCIATED COSTS OF THE RELOCATION.
6. CONTRACTORS PERFORMING SUBSURFACE ACTIVITIES SHALL REVIEW SUBSURFACE DATA AND THE DUE CARE PLAN FOR CONSTRUCTION. THE DUE CARE PLAN PROVIDES GUIDANCE FOR HANDLING IMPACTED SOIL AND GROUNDWATER, WORKER HEALTH AND SAFETY, AND OTHER SITE ENVIRONMENTAL PROTOCOLS.



PROJECT PHASING PLAN
ALL UTILITIES AND STORMWATER SHALL BE BUILT DURING BUILDING STAGE A

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

M:\Civil3d_Proj\16196\Detailed Engineering\16196CV1.dwg, 6/5/2018 10:42 AM, Heath Hartt, None
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1140 BROADWAY STREET

JOB No. 16196A

DATE: 1/22/18
SHEET 1 OF 26

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	3/16/18
PER MUNICIPAL REVIEW	4/6/18
PER MUNICIPAL REVIEW	5/30/18

CADD:
ENG: HTH
PM: TJC
TECH:
16196CV1.DWG
FB#

01

MIDWESTERN CONSULTING
3815 Plaza Drive Ann Arbor, Michigan 48108
(734) 995-0200 • www.midwesternconsulting.com
Land Development • Land Survey • Institutional • Municipal
Wireless Communications • Transportation • Landfill Services

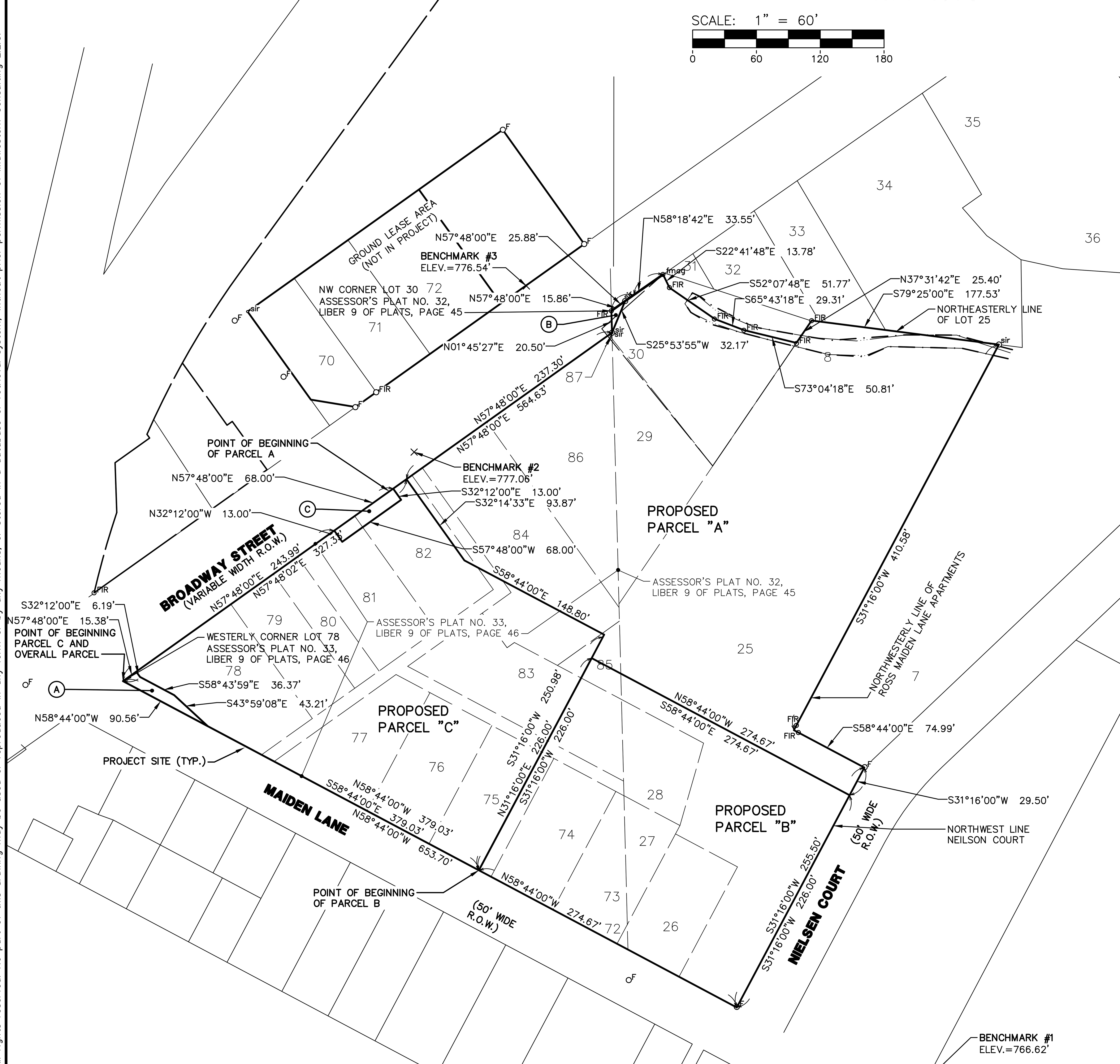
RELEASED FOR:	DATE

STATE OF MICHIGAN
HEATH HARTT
ENGINEER
No. 56247
LICENSED PROFESSIONAL ENGINEER

HEATH HARTT, P.E.
P.E. #56247

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

Know what's **below.** **Call** before you dig.



BENCHMARKS

BENCHMARK #1 – SPIKE IN EAST SIDE UTILITY POLE; NORTH SIDE OF MAIDEN LANE; +/– 150' SOUTHEASTERLY FROM NEILSON COURT.

ELEV. = 766.62' (NAVD88)

BENCHMARK #2 – BOAT SPIKE IN EAST FACE OF UTILITY POLE; SOUTHEAST SIDE OF BROADWAY STREET; +/–360' NORTH OF MAIDEN LANE.

ELEV. = 777.06' (NAVD88)

BENCHMARK #3 – SOUTHEAST EDGE OF CONCRETE LIGHT POLE BASE; SOUTH EAST OF MANNA ORIENTAL MARKET; NORTHWEST SIDE OF BROADWAY STREET; +/–400' NORTH OF MAIDEN LANE.

ELEV. = 776.54' (NAVD88)

OVERALL LEGAL DESCRIPTION

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE SOUTHWEST ¼ OF SECTION 21, TOWN 2 SOUTH, RANGE 6 EAST, CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

BEGINNING at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records;

thence Northeasterly along the Southerly right-of-way line of Broadway Street (variable width) in the following four (4) courses:
(1) N 57°48'00" E 564.63 feet,
(2) N 01°45'27" E 20.50 feet,
(3) N 57°48'00" E 25.88 feet
and (4) N 58°18'42" E 33.55 feet (recorded as N 58°18'00" E);
thence along the centerline of Traver's Creek in the following four (4) courses:
(1) S 22°41'48" E 13.78 feet (recorded a S 22°42'30" E),
(2) S 52°07'48" E 51.77 feet (recorded as S 52°08'30" E,
(3) S 65°43'18" E 29.31 feet (recorded as S 65°44'00" E)
and (4) S 73°04'18" E 50.81 feet (recorded as S 73°06'00" E);
thence N 37°31'42" E 25.40 feet (recorded as N 37°31'00" E);
thence S 79°25'00" E 177.53 feet along the Northeasterly line of Lot 25 of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9, Page 45 of Plats, Washtenaw County Records;
thence S 31°16'00" W 410.58 feet along the Northwesterly line of Ross Maiden Lane Apartments;
thence S 58°44'00" E 74.99 feet;
thence S 31°16'00" W 255.50 feet along the West right-of-way line of Nielsen Court;
thence N 58°44'00" W 653.70 feet along the Northerly right-of-way line of Maiden Lane to the POINT OF BEGINNING. Being Lots 25 through 30 ASSESSOR'S PLAT NO. 32, as recorded in Liber 9, Page 45 of Plats, Washtenaw County Records and Lots 72 through 87, inclusive and a vacated alley of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records and containing 6.42 acres of land, more or less. Subject to easements and restrictions of record, if any.

PROPOSED PARCEL 'A' LEGAL DESCRIPTION

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE SOUTHWEST ¼ OF SECTION 21, TOWN 2 SOUTH, RANGE 6 EAST, CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

COMMENCING at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records; thence Northeasterly along the Southerly right-of-way line of Broadway Street (variable width) N 57°48'00"E 307.51 feet to the POINT OF BEGINNING;

thence continuing Northeasterly along the Southerly right-of-way line of Broadway Street (variable width) in the following four (4) courses:
(1) N 57°48'00" E 257.12 feet,
(2) N 01°45'27" E 20.50 feet,
(3) N 57°48'00" E 25.88 feet
and (4) N 58°18'42" E 33.55 feet (recorded as N 58°18'00" E);
thence along the centerline of Traver's Creek in the following four (4) courses:
(1) S 22°41'48" E 13.78 feet (recorded a S 22°42'30" E),
(2) S 52°07'48" E 51.77 feet (recorded as S 52°08'30" E,
(3) S 65°43'18" E 29.31 feet (recorded as S 65°44'00" E)
and (4) S 73°04'18" E 50.81 feet (recorded as S 73°06'00" E);
thence N 37°31'42" E 25.40 feet (recorded as N 37°31'00" E);
thence S 79°25'00" E 177.53 feet along the Northeasterly line of Lot 25 of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9, Page 45 of Plats, Washtenaw County Records;
thence S 31°16'00" W 410.58 feet along the Northwesterly line of Ross Maiden Lane Apartments;
thence S 58°44'00" E 74.99 feet;
thence S 31°16'00" W 29.50 along the West right-of-way line of Nielsen Court;
thence N 58°44'00" W 274.67 feet;
thence N 31°16'00" E 22.50 feet;
thence N 58°44'00" W 149.13 feet;
thence N 42°41'03" W 96.29 feet to the POINT OF BEGINNING. Being part of Lot 25 and Lots 29 and 30, of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9, Page 45 of Plats, Washtenaw County Records and part of Lots 82, 84 and 85 and Lots 86 and 87, and a vacated alley of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records and containing 3.14 acres of land, more or less. Subject to easements and restrictions of record, if any.

PROPOSED PARCEL 'B' LEGAL DESCRIPTION

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE SOUTHWEST ¼ OF SECTION 21, TOWN 2 SOUTH, RANGE 6 EAST, CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Beginning at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records; thence southeasterly along the northerly right-of-way line of Maiden Lane (50 feet wide) S 58°44'00" E 379.03 feet to the POINT OF BEGINNING;

thence N 31°16'00" E 226.00 feet;
thence S 58°44'00" E 274.67 feet;
thence along the westerly right-of-way line of Nielson Court (50 feet wide) S 31°16'00" W 226.00 feet;
thence along said northerly line of Maiden Lane N 58°44'00" W 274.67 feet to the POINT OF BEGINNING. Being Lots 72 thru 74, inclusive, and part of Lots 75, 83, and 85, and a vacated alley of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records, also being Lots 26 thru 28, inclusive, and part of Lot 25 of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9, Page 45 of Plats, Washtenaw County Records and containing 1.43 acres of land, more or less. Subject to easements and restrictions of record, if any.

PROPOSED PARCEL 'C' LEGAL DESCRIPTION

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE SOUTHWEST ¼ OF SECTION 21, TOWN 2 SOUTH, RANGE 6 EAST, CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

BEGINNING at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records;

thence Northeasterly along the Southerly right-of-way line of Broadway Street (variable width) N 57°48'00" E 327.33 feet;
thence S 32°14'33" E 93.87 feet;
thence S 58°44'00" E 148.80 feet;
thence S 31°16'00" W 250.98 feet;
thence N 58°44'00" W 379.03 feet along the Northerly right-of-way line of Maiden Lane to the POINT OF BEGINNING. Being part of Lots 75, 83, 82 and 85, and Lots 76 through 81, inclusive, and a vacated alley of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records and containing 1.87 acres of land, more or less. Subject to easements and restrictions of record, if any.

PROPOSED ROW DEDICATIONS

(A) AREA TO BE DEDICATED TO CITY

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Beginning at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records;

thence N 57°48'00" E 15.38 feet along the Southerly right-of-way line of Broadway Street (variable width);
thence S 32°12'00" E 6.19 feet;
thence S 58°43'59" E 36.37 feet;
thence S 43°59'08" E 43.21 feet;
thence N 58°44'00" W 90.56 feet along the Northerly right-of-way line of Maiden Lane (50 feet wide) to the POINT OF BEGINNING. Being a part of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records and containing 745.68 square feet, more or less. Being subject to easements and restrictions of record, if any.

(B) AREA TO BE DEDICATED TO CITY

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Commencing at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9, Page 46 of Plats, Washtenaw County Records; thence Northeasterly along the Southerly right-of-way line of Broadway Street (variable width) N 57°48'00" E 564.63 feet to the POINT OF BEGINNING;

thence continuing along said right-of-way in the following two (2) courses: (1) N 01°45'27" E 20.50 feet and (2) N 57°48'00" E 15.86 feet;
thence S 25°53'55" W 32.17 feet to the POINT OF BEGINNING. Being a part of Lot 30 of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9, Page 45 of Plats, Washtenaw County Records and containing 134.86 square feet, more or less.

(C) AREA TO BE DEDICATED TO CITY

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Commencing at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records; thence N 57°48'00" E 243.99 feet along the Southerly right-of-way line of Broadway Street (variable width) to the POINT OF BEGINNING;

thence continuing N 57°48'00" E 68.00 feet along said right-of-way line;
thence S 32°12'00" E 13.00 feet;
thence S 57°48'00" W 68.00 feet;
thence N 32°12'00" W 13.00 feet to the POINT OF BEGINNING. Being a part of Lots 81 & 82, of said ASSESSOR'S PLAT NO. 33. Being subject to easements and restrictions of record, if any.

BEING SUBJECT TO:

Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: storm and sanitary sewers
Recording No: Liber 628, Page 226 (PLOTTED)

Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in documents:

Entitled: Declaration of Taking
Recording Nos: Liber 1712, Page 253, and Liber 1730, Page 456 (PLOTTED)

Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in document:

Entitled: Right of Way Agreement
Purpose: Public Utilities
Recording Nos: Liber 1756, Page 994 (PLOTTED)

Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: water mains, storm sewers, sanitary sewers and appurtenances
Recording No: Liber 1791, Page 160 (PLOTTED)

Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: water mains, storm sewers, sanitary sewers and appurtenances
Recording No: Liber 1857, Page 620 (PLOTTED)

Right(s) of Way and/or Easement(s) and rights incidental thereto as granted in a document:

Granted to: Michigan Bell Telephone Company
Recording Nos: Liber 1925, Pages 652, 653 and 654 (as to Parcel C) (PLOTTED)

Right(s) of Way and/or Easement(s) and rights incidental thereto as granted in a document:

Granted to: Detroit Edison Company
Recording Nos: Liber 1968, Page 152; Liber 1973, Page 649; and Liber 1978, Page 121 (as to Parcel C) (PLOTTED)

Terms, Covenants, and Conditions of Broadway Village at Lower Town Development Agreement as set forth below:

Recording No: Liber 4664, Page 171 (DOCUMENT BLANKET IN NATURE)
An agreement to modify the terms and provisions of said agreement as therein provided
Entitled: First Amendment
Recording No: Liber 4664, Page 172 (DOCUMENT BLANKET IN NATURE)

PARCEL ID:
09-09-21-302-024
09-09-21-302-046
09-09-21-302-049
09-09-21-302-026
09-09-21-302-029
09-09-21-302-045
09-09-21-302-047
09-09-21-302-022

STATE OF MICHIGAN · PAUL KOVACS · PROFESSIONAL SURVEYOR No. 62151 · LICENSED PROFESSIONAL SURVEYOR

PAUL KOVACS, PROFESSIONAL SURVEYOR #62151

MIDWESTERN CONSULTING
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Land Development • Land Survey • Institutional • Municipal
Wireless Communications • Transportation • Landfill Services

CLIENT
MORNINGSIDE LOWER TOWN, LLC
223 W. ERIE ST., THIRD FLOOR
CHICAGO, IL 60654
RON MUCHA
312.280.7770

1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
BOUNDARY SURVEY

02

DATE: 1/22/18	SHEET 2 OF 26
CADD:	
ENG: HTH	
PM: TJC	
TECH:	
16196SV1.dwg	FB#

JOB No. **16196A**

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	3/16/18
PER MUNICIPAL REVIEW	4/6/18
PER MUNICIPAL REVIEW	5/30/18

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M:\Civil3d_Proj\16196\Detailed Engineering\16196SV1.dwg, 6/5/2018 10:21 AM, Heath Hartt, MCLLC PDF.pc3

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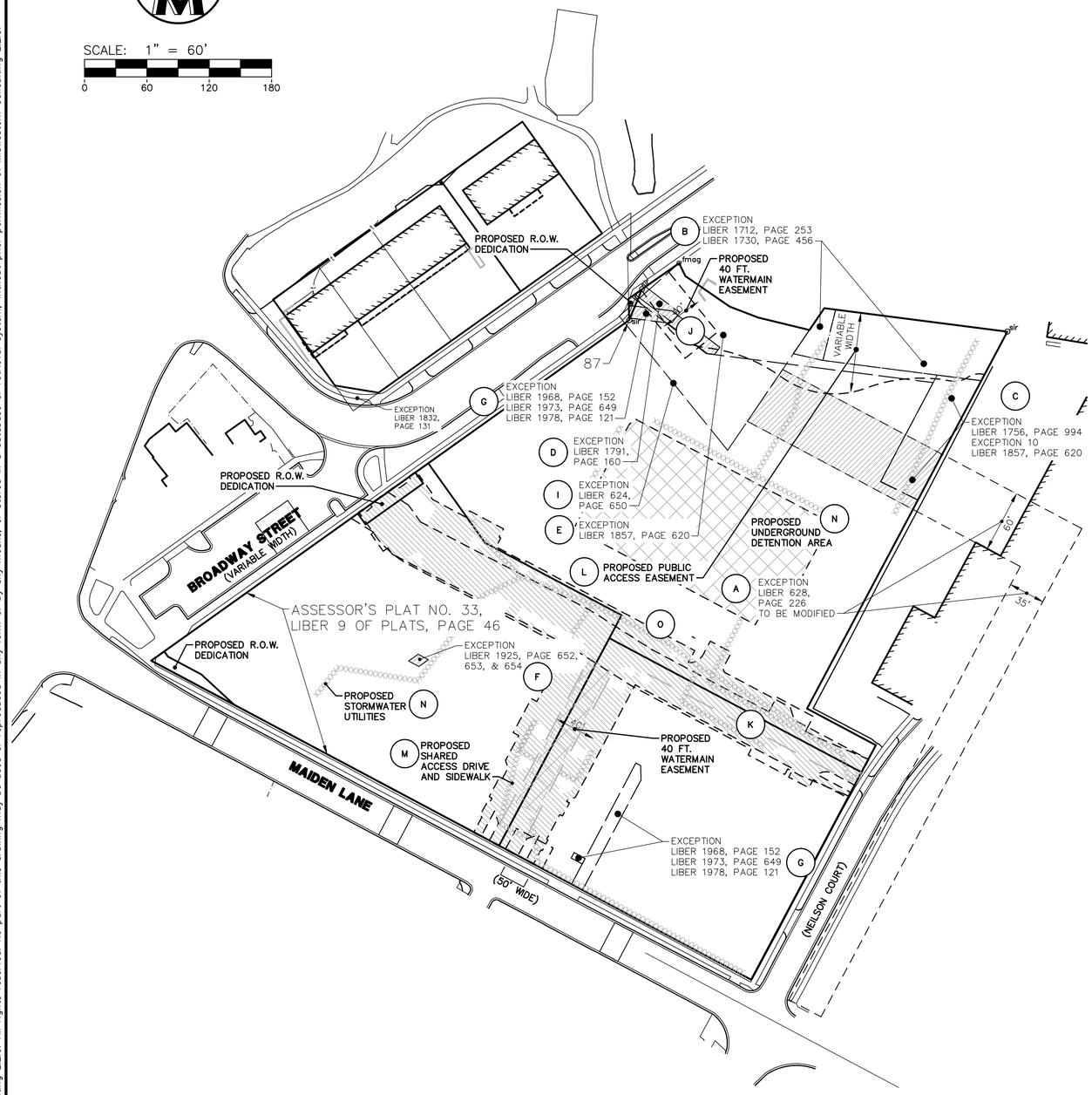
LEGEND

EASEMENT AREA TO BE VACATED

SCALE: 1" = 60'

0 60 120 180



The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

EXISTING EASEMENTS

(A) Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: storm and sanitary sewers
Recording No: Liber 628, Page 226 (PLOTTED)

–To be modified

LEGAL DESCRIPTION OF A PORTION OF AN EASEMENT, RECORDED IN LIBER 628, PAGE 226, WASHTENAW COUNTY RECORDS, TO BE ABANDONED, LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Commencing at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records; thence S 58°44'00" E 653.70 feet along the Northerly right-of-way line of Maiden Lane (50.00 feet wide); thence N 31°16'00" E 255.50 feet along the Westerly line of Neilson Court (50.00 feet wide); thence N 58°44'00" W 75.00 feet; thence N 31°16'00" E 217.00 feet along the Northwesterly line of Ross Maiden Lane Apartments to the POINT OF BEGINNING;

thence N 58°44'00" W 180.35 feet;
thence N 37°27'39" E 60.35 feet;
thence S 58°44'00" E 173.84 feet;
thence S 31°16'00" W 60.00 feet along the Northwesterly line of Ross Maiden Lane Apartments to the POINT OF BEGINNING. Being a part of Lot 25 of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9 of Plats, Page 45, Washtenaw County Records. Being subject to easements and restrictions of record, if any.

(B) Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in documents:

Entitled: Declaration of Taking
Recording Nos: Liber 1712, Page 253, and Liber 1730, Page 456 (PLOTTED)

(C) Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in document:

Entitled: Right of Way Agreement
Purpose: Public Utilities
Recording Nos: Liber 1756, Page 994 (PLOTTED)

(D) Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: water mains, storm sewers, sanitary sewers and appurtenances
Recording No: Liber 1791, Page 160 (PLOTTED)

–TO BE ABANDONED

(E) Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: water mains, storm sewers, sanitary sewers and appurtenances
Recording No: Liber 1857, Page 620 (PLOTTED)

(F) Right(s) of Way and/or Easement(s) and rights incidental thereto as granted in a document:

Granted to: Michigan Bell Telephone Company
Recording Nos: Liber 1925, Pages 652, 653 and 654 (as to Parcel C)(PLOTTED)

–TO BE ABANDONED

(G) Right(s) of Way and/or Easement(s) and rights incidental thereto as granted in a document:

Granted to: Detroit Edison Company
Recording Nos: Liber 1968, Page 152; Liber 1973, Page 649; and Liber 1978, Page 121 (as to Parcel C) (PLOTTED)

–TO BE ABANDONED

(H) Terms, Covenants, and Conditions of Broadway Village at Lower Town Development Agreement as set forth below:

Recording No: Liber 4664, Page 171 (DOCUMENT BLANKET IN NATURE)
An agreement to modify the terms and provisions of said agreement as therein provided
Entitled: First Amendment
Recording No: Liber 4664, Page 172 (DOCUMENT BLANKET IN NATURE)

(I) Right(s) of Way and/or Easement(s) and rights incidental thereto as set forth in a document:

In favor of: City of Ann Arbor
Purposes: storm sewers, sanitary sewers and appurtenances
Recording No: Liber 624, Page 650 (PLOTTED)

PROPOSED EASEMENTS

(J) **PROPOSED 40' WATERMAIN EASEMENT**

LEGAL DESCRIPTION OF A PROPOSED EASEMENT FOR WATER MAIN LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Commencing at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records; thence along the Southerly right-of-way line of Broadway Street (variable width) in the following three (3) courses: N 57°48'00" E 564.63 feet; N 01°45'27" E 20.50 feet; N 57°48'00" E 6.16 feet to the POINT OF BEGINNING;

thence continuing N 57°48'00" E 19.72 feet along said right-of-way line;
thence N 58°18'42" E 20.37 feet along said right-of-way line;
thence S 35°48'19" E 75.67 feet;
thence S 54°11'41" W 40.00 feet;
thence N 35°48'19" W 78.37 feet to the POINT OF BEGINNING. Being a part of Lot 30, of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9 of Plats, Page 45, Washtenaw County Records. Being subject to easements and restrictions of record, if any.

(K) **PROPOSED 40' WATERMAIN EASEMENT**

LEGAL DESCRIPTION OF A PROPOSED EASEMENT FOR WATER MAIN LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Commencing at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records; thence N 57°48'00" E 236.15 feet along the Southerly right-of-way line of Broadway Street (variable width) to the POINT OF BEGINNING;

thence continuing N 57°48'00" E 43.30 feet along said right-of-way line;
thence S 54°41'52" E 23.43 feet;
thence S 32°11'52" E 19.95 feet;
thence S 59°13'59" E 272.03 feet;
thence N 31°40'17" E 22.89 feet;
thence S 58°19'43" E 40.00 feet;
thence S 31°40'17" W 22.26 feet;
thence S 59°13'59" E 69.68 feet;
thence N 31°12'54" E 8.77 feet;
thence S 58°47'06" E 40.00 feet;
thence S 31°12'54" W 8.46 feet;
thence S 59°13'59" E 65.95 feet;
thence S 31°16'00" W 40.00 feet along the Westerly right-of-way line Nielson Court (50.00 feet wide);
thence N 59°13'59" W 243.38 feet;
thence S 31°12'54" W 178.15 feet;
thence S 58°19'21" E 15.66 feet;
thence S 31°40'39" W 23.32 feet;
thence N 58°44'00" W 55.47 feet along the Northerly right-of-way line of Maiden Lane (50.00 feet wide);
thence N 31°12'54" E 201.23 feet;
thence N 59°13'59" W 213.56 feet;
thence N 32°11'52" W 7.49 feet;
thence S 57°48'00" W 5.52 feet;
thence N 32°12'00" W 20.00 feet;
thence N 57°48'00" E 3.08 feet;
thence N 54°41'52" W 25.68 feet to the POINT OF BEGINNING. Being a part of Lots 74, 75, 81 through 85 and a vacated alley of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records and being a part of Lots 25 and 28 of ASSESSOR'S PLAT NO. 32, as recorded in Liber 9 of Plats, Page 45, Washtenaw County Records. Being subject to easements and restrictions of record, if any.

(L) **PROPOSED PUBLIC ACCESS EASEMENT**

LEGAL DESCRIPTION OF A PUBLIC ACCESS EASEMENT LOCATED IN THE CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

Commencing at the Westerly corner of Lot 78 of ASSESSOR'S PLAT NO. 33, as recorded in Liber 9 of Plats, Page 46, Washtenaw County Records; thence along the Southerly right-of-way line of Broadway Street (variable width) in the following three (3) courses: N 57°48'00" E 564.63 feet; N 01°45'27" E 20.50 feet; N 57°48'00" E 14.99 feet to the POINT OF BEGINNING;

thence continuing N 57°48'00" E 10.89 feet along said right-of-way line;
thence N 58°18'42" E 33.55' feet along said right-of-way line;
thence S 22°41'48" E 13.78 feet;
thence S 52°07'48" E 51.77 feet;
thence S 65°43'18" E 29.31 feet;
thence S 73°04'18" E 50.81 feet;
thence N 37°31'42" E 25.40 feet;
thence S 79°25'00" E 177.53 feet along the Northeasterly line of Lot 25 of "Assessor's Plat No. 32", as recorded in Liber 9 of Plats, Page 45, Washtenaw County Records;
thence S 31°16'00" W 46.85 feet;
thence Southwesterly 15.57 feet along the arc of a non-tangential circular curve to the left, radius 18.41 feet, central angle 48°28'25", long chord S 86°27'06" W 15.11 feet;
thence Southwesterly 17.96 feet along the arc of a non-tangential circular curve to the right, radius 22.09 feet, central angle 46°33'42", long chord S 78°51'53" W 17.47 feet;
thence Southwesterly 85.48 feet along the arc of a non-tangential circular curve to left, radius 151.23 feet, central angle 32°23'05", long chord S 88°11'11" W 84.35 feet;
thence Northwesterly 84.00 feet along the arc of a non-tangential circular curve to the right, radius 87.50 feet, central angle 55°00'03", long chord N 78°24'42" W 80.81 feet;
thence Northwesterly 77.51 feet along the arc of a circular curve to the left, radius 152.80 feet, central angle 29°03'53", long chord N 65°26'37" W 76.68 feet;
thence Northwesterly 39.36 feet along the arc of a non-tangential circular curve to the right, radius 55.38 feet, central angle 40°43'18", long chord N 61°20'00" W 38.54 feet;
thence N 32°11'56" W 48.24 feet to the POINT OF BEGINNING. Being a part of Lots 25 & 30, of said ASSESSOR'S PLAT NO. 32. Being subject to easements and restrictions of record, if any.

(M) Shared access drive and sidewalk per proposed reciprocal easement agreement.

(N) Shared stormwater drainage system and piping per proposed reciprocal easement agreement.

UNDERGROUND DETENTION AREA

xxxxxxxxxxxxxx · STORMWATER UTILITIES

(O) SEE RECIPROCAL EASEMENT AGREEMENT DOCUMENTS SUBMITTED SEPARATELY

MIDWESTERN CONSULTING
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(734) 995-0200 • www.midwesternconsulting.com
Land Development • Land Survey • Institutional • Municipal
Wireless Communications • Transportation • Landfill Services

CLIENT
MORNINGSIDE LOWER TOWN, LLC
223 W. ERIE ST., THIRD FLOOR
CHICAGO, IL 60654
RON MUCHA
312.280.7770

1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
EASEMENT PLAN

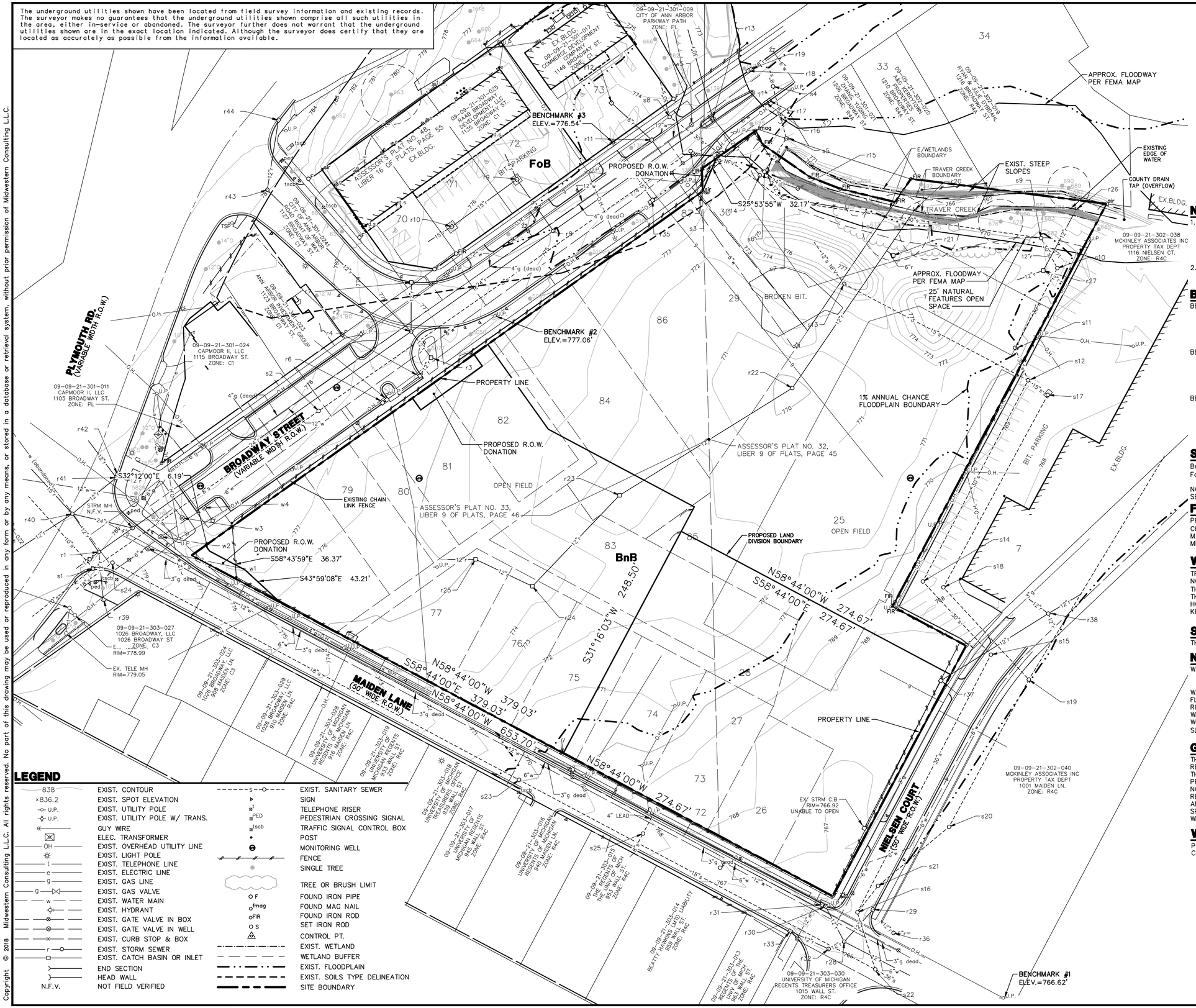
03

JOB No. 16196A

DATE: 1/22/18
SHEET 3 OF 26
CADD:
ENG: HTH
PM: TJC
TECH:
16196EC1.dwg

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	4/16/18
PER MUNICIPAL REVIEW	4/26/18
PER MUNICIPAL REVIEW	5/30/18

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.



LEGEND

838	EXIST. CONTOUR	s	EXIST. SANITARY SEWER
×836.2	EXIST. SPOT ELEVATION		SIGN
U.P.	EXIST. UTILITY POLE		TELEPHONE RISER
U.P.	EXIST. UTILITY POLE W/ TRANS.	PED	PEDESTRIAN CROSSING SIGNAL
	GUY WIRE	tscb	TRAFFIC SIGNAL CONTROL BOX
	ELEC. TRANSFORMER		POST
OH	EXIST. OVERHEAD UTILITY LINE		MONITORING WELL
	EXIST. LIGHT POLE		FENCE
t	EXIST. TELEPHONE LINE		SINGLE TREE
e	EXIST. ELECTRIC LINE		TREE OR BRUSH LIMIT
g	EXIST. GAS LINE	F	FOUND IRON PIPE
g	EXIST. GAS VALVE	fmag	FOUND MAG NAIL
w	EXIST. WATER MAIN	FIR	FOUND IRON ROD
	EXIST. HYDRANT	S	SET IRON ROD
w	EXIST. GATE VALVE IN BOX		CONTROL PT.
w	EXIST. GATE VALVE IN WELL		EXIST. WETLAND
	EXIST. CURB STOP & BOX		WETLAND BUFFER
r	EXIST. STORM SEWER		EXIST. FLOODPLAIN
	EXIST. CATCH BASIN OR INLET		EXIST. SOILS TYPE DELINEATION
	END SECTION		SITE BOUNDARY
	HEAD WALL		
N.F.V.	NOT FIELD VERIFIED		

SCALE: 1" = 40'
0 40 80 120

Know what's below. Call before you dig.

NOTES

1. THE BASE SURVEY WAS PREPARED BY MIDWESTERN CONSULTING IN DECEMBER 2016. ALL UNDERGROUND UTILITIES AND STRUCTURES HAVE BEEN SHOWN TO A REASONABLE DEGREE OF ACCURACY AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THEIR EXACT LOCATION AND TO AVOID DAMAGE THERETO.
2. CONTRACTOR SHALL VERIFY LOCATION OF PROPOSED WORK AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

BENCHMARKS

BENCHMARK #1 – SPIKE IN EAST SIDE UTILITY POLE; NORTH SIDE OF MAIDEN LANE; +/– 150' SOUTHEASTERLY FROM NEILSON COURT.

ELEV. = 766.62' (NAVD88)

BENCHMARK #2 – BOAT SPIKE IN EAST FACE OF UTILITY POLE; SOUTHEAST SIDE OF BROADWAY STREET; +/–360' NORTH OF MAIDEN LANE.

ELEV. = 777.06' (NAVD88)

BENCHMARK #3 – SOUTHEAST EDGE OF CONCRETE LIGHT POLE BASE; SOUTH EAST OF MANNA ORIENTAL MARKET; NORTHWEST SIDE OF BROADWAY STREET; +/–400' NORTH OF MAIDEN LANE.

ELEV. = 776.54' (NAVD88)

SOILS DESCRIPTION

BnB – BOYER LOAMY SAND, 1–6% SLOPES (TYPE B SOILS)
FoB – FOX SANDY LOAM, 2–6% SLOPES (TYPE B SOILS)

NOTE: SEE PHASE 1 AND PHASE 2 ESA SUBMITTED UNDER SEPARATE COVER.

FLOODPLAIN

PROPERTY IS LOCATED WITHIN FLOODPLAIN ZONE AE, A 1% ANNUAL CHANCE FLOOD (100–YEAR FLOOD), PER FLOOD INSURANCE RATE MAP NO. 2602130261E, IN WASHTENAW COUNTY, STATE OF MICHIGAN, WITH AN EFFECTIVE DATE OF APRIL 3, 2012.

WETLANDS/WATER COURSES

TRAVER CREEK IS A WATER COURSE THAT RUNS EAST/WEST ALONG THE NORTHERN PROPERTY LINE. THERE IS A WETLAND ON EACH SIDE OF THE CREEK LIMITED TO THE BANKS. DEPTH OF TRAVERS CREEK IS 18". THE BANK IS PROTECTED BY NATURAL VEGETATION OF JAPANESE HONEYSUCKLE, COTTONWOOD, GRAY DOGWOOD, JAPANESE KNOTWEED AND KENTUCKY BLUE GRASS.

STEEP SLOPES

THERE ARE STEEP SLOPES GREATER THAN 33% ALONG TRAVER CREEK.

NATURAL FEATURES SUMMARY

WASHTENAW COUNTY WATER RESOURCES COMMISSIONERS OFFICE

	MAPPED	TOTAL AREA	PROTECTED/ UNDISTURBED
WATER BODIES	YES	0.07 AC.	0.09 AC.
FLOODPLAINS	YES	1.54 AC.	0.25 AC.
RIPARIAN AREAS	YES	300 L.F.	300 L.F.
WETLANDS	YES	0.09 AC.	0.09 AC.
WOODLANDS	YES	0 AC.	0 AC.
SLOPES (>33%)	YES	0.04 AC.	0.04 AC.

GENERAL DESC. OF NATURAL FEATURES

THE MAJORITY OF THE SITE WAS PREVIOUSLY OCCUPIED BY COMMERCIAL RETAIL BUSINESSES THAT HAVE BEEN RAZED IN AND RAZED IN 2008. THE SITE HAS BEEN UNDEVELOPED SINCE THAT TIME AND IS PREDOMINANTLY OPEN FIELD. TRAVER CREEK RUNS ALONG THE NORTHERN PROPERTY BOUNDARY WITH ASSOCIATED WETLAND AND CITY REEGULATED NATURAL FEATURES OPEN SPACE. FOUR LANDMARK TREES ARE LOCATED WITHIN THE WETLAND AND NATURAL FEATURES OPEN SPACE. FLOODWAY AND 1% ANNUAL CHANCE FLOODPLAIN ASSOCIATED WITH TRAVER CREEK ARE LOCATED ON THE PROPERTY.

WETLAND DELINEATION

PER ASTI WETLAND DELINEATION REPORT SUBMITTED UNDER SEPARATE COVER.

PAUL KOVACS
PROFESSIONAL SURVEYOR
No. 62151
STATE OF MICHIGAN
LICENSED PROFESSIONAL SURVEYOR

PAUL KOVACS, PROFESSIONAL SURVEYOR #62151

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DETAILED ENGINEERING PLANS
TOPOGRAPHIC SURVEY

04

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	4/7/18
PER MUNICIPAL REVIEW	5/30/18

DATE: 1/22/18
SHEET 4 OF 26
CADD:
ENG: HTH
PM: TJC
TECH:
16196SV1.dwg

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TREE LIST

TAG#	DBH	COMMON NAME	GENUS/SPECIES	STEMS	SCORE	LM	INV	NOTES
659	7"	Bradford Pear	Pyrus calleryana					Off-site
660	8"	Bradford Pear	Pyrus calleryana					Off-site
661	9"	Bradford Pear	Pyrus calleryana					Off-site
662	17"	Silver Maple	Acer saccharinum					Off-site
663	27"	Silver Maple	Acer saccharinum		21	X		Off-site
664	12"	Douglas-fir	Pseudotsuga menziesii					Off-site
665	23"	White Oak	Quercus alba		21	X		Off-site
666	10"	Norway Maple	Acer platanoides				X	
667	13"	Cottonwood	Populus deltoides					
668	14"	Black Willow	Salix nigra					
669	10"	Box Elder	Acer negundo	quad	10	X		
670	11"	Black Willow	Salix nigra					
671	8"	Black Willow	Salix nigra					
672	10"	Box Elder	Acer negundo					
673	8"	Norway Spruce	Picea abies					
674	30"	Silver Maple	Acer saccharinum		22	X		
675	27"	Silver Maple	Acer saccharinum		18	X		
676	20"	Black Walnut	Juglans nigra		21	X		
677	15"	Black Walnut	Juglans nigra					
678	12"	American Elm	Ulmus americana					
679	7"	American Elm	Ulmus americana	twin				
680	9"	Black Walnut	Juglans nigra					
681	14"	American Elm	Ulmus americana					
682	10"	Box Elder	Acer negundo					
683	15"	Box Elder	Acer negundo					
684	16"	Black Walnut	Juglans nigra					
685	7"	American Elm	Ulmus americana	twin				
686	13"	American Elm	Ulmus americana					
687	9"	American Elm	Ulmus americana					
688		Lost	Tag					
689	19"	Black Walnut	Juglans nigra		22	X		
690	14"	Black Walnut	Juglans nigra					
691	29"	Siberian Elm	Ulmus pumila				X	
692	31"	Catalpa	Catalpa speciosa				X	
693	12"	Sugar Maple	Acer saccharum					
694	8"	Sugar Maple	Acer saccharum					
695	7"	White Mulberry	Morus alba	twin			X	
696	11"	Linden	Tilia americana					
697	11"	Linden	Tilia americana					
698	14"	Linden	Tilia americana					
699	2"	Redbud	Cercis canadensis					Off-site
1300	2"	Maple	Acer sp.					Off-site
1365	3"	Maple	Acer sp.					Off-site
1392	3"	Maple	Acer sp.					Off-site
1404	4"	Maple	Acer sp.					Off-site
1462	6"	Pine	Pinus sp.					Off-site
1463	6"	Not identified	Not identified					Off-site
1464	4"	Not identified	Not identified					Off-site
1618	14"	Pine	Pinus sp.					Off-site
1680	35"	Black Walnut	Juglans nigra			X		Off-site
1690	12"	Maple	Acer sp.					Off-site
1691	31"	Black Walnut	Juglans nigra			X		Off-site
5050	2"	Redbud	Cercis canadensis					Off-site
5057	2"	Amur maackia	Maackia amurensis					Off-site
5077	2"	Maple	Acer sp.					Off-site
5100	2"	Maple	Acer sp.					Off-site
5104	2"	Serviceberry	Amelanchier sp.					Off-site
5217	2"	Maple	Acer sp.					Off-site
5627	6"	Maple	Acer sp.					Off-site
5799	11"	Red Oak	Quercus rubra					Off-site
5824	9"	Red Oak	Quercus rubra					Off-site

SANITARY STRUCTURE TABLE

STR. #	DESCRIPTION	RIM	INVERT
s1	MANHOLE	779.89	8" NW. 766.19 10" N. 765.39 8" E. 765.49
s2	MANHOLE	N.F.V.	N.F.V.
s3	MANHOLE	773.92	8" W. 768.17 8" E. 768.12 (ABD?)
s4	MANHOLE	774.13	8" NE. 769.38 8" S. 769.08
s5	MANHOLE	772.90	12" N. 764.60 12" SW. 764.50
s6	MANHOLE	772.51	12" N. 764.01 12" E. 763.71
s7	MANHOLE	772.23	12" N. N.F.V. 18" W. 762.23 30" E. 761.63
s8	MANHOLE	773.55	30" N. 763.80 30" SE. 763.75
s9	MANHOLE	770.88	30" W. 760.83 30" SE. 760.68
s10	MANHOLE	772.02	30" N. 761.47 30" SW. 761.37
s11	MANHOLE	770.58	30" SE. 758.33 30" NE. 758.23
s12	MANHOLE	768.91	30" NW. 757.21 30" S. 757.21 15" E. 758.51
s13	MANHOLE	N.F.V.	N.F.V.
s14	MANHOLE	768.46	30" NE. 756.41 30" SE. 756.31
s15	MANHOLE	766.66	30" NW. 755.71 30" SW. 755.56
s16	MANHOLE	766.16	18" NE. 756.81 30" N. 754.56 30" S. 754.26
s17	MANHOLE	768.43	N.F.V.
s18	MANHOLE	768.08	15" NE. 758.63 15" SE. 758.68
s19	MANHOLE	767.31	N.F.V.
s20	MANHOLE	767.58	N.F.V.
s21	MANHOLE	766.29	15" NE. 757.99 18" SW. 757.89
s22	MANHOLE	765.76	18" NW. 754.86 30" N. 755.31 36" SE. 753.26
s23	MANHOLE	770.05	18" NW. 758.10 18" SE. 758.00
s24	MANHOLE	779.31	18" W. 762.11 18" SE. 762.06
s25	MANHOLE	768.44	8" N. 762.24 8" S. 761.99

N.F.V.– NOT FIELD VERIFIED

WATER STRUCTURE TABLE

STR. #	DESCRIPTION	RIM	ELEVATION
w1	GVIW	778.87	6" NW. & SE. 775.07 T/ICE
w2	GVIW	779.22	6" SW. & NE 773.47 (FULL OF WATER)
w3	GVIW	778.98	12" NW. & SE. 773.38
w4	GVIW	778.41	12" NE./SW./SE 773.46
w5	GVIW	773.79	

STORM STRUCTURE TABLE

STR. #	DESCRIPTION	RIM	INVERT
r1	MANHOLE	780.05	12" W. 775.85 12" S. 775.05 12" NW. 774.90 24" E. 774.25
r2	MANHOLE	777.85	12" NE. 773.00 12" N. 772.85 12" S. 771.50 24" W. 770.45 24" E. 770.35
r3	CATCH BASIN	776.59	12" W. 772.44 12" N. 772.34
r4	CATCH BASIN	775.95	12" W. 773.00 12" E. 772.95
r5	CATCH BASIN	775.87	12" W. 773.72 12" E. 773.67
r6	CATCH BASIN	775.97	12" E. 773.82
r7	CATCH BASIN	776.45	12" S. 773.85
r8	MANHOLE	774.95	15" N. 768.95 24" W. 768.75 24" E. 768.65
r9	CATCH BASIN	774.74	4" N. 769.16 15" SW. 768.81 15" NE. 768.51 (SEALED) 15" S. 768.56
r10	CATCH BASIN	775.86	15" SW. 769.46 15" NE. 769.21
r11	CATCH BASIN	772.81	6" NW. 769.46 12" SE. 769.11
r12	CATCH BASIN	773.31	6" SE. 770.46
r13	MANHOLE	774.71	24" SW. 767.21 30" N. 767.61 (SEALED) 24" SE. 767.51
r14	MANHOLE	772.85	24" NW. 766.95 24" SE. 766.85
r15	MANHOLE	771.57	N.F.V.
r16	CATCH BASIN	773.62	N.F.V.
r17	CATCH BASIN	773.65	12" W. 769.40
r18	CATCH BASIN	773.68	18" NE. 768.87 18" SW. 768.87
r19	CATCH BASIN	773.77	18" NE. 768.87 18" SW. 768.87
r20	END SECTION	N/A	12" SW. 766.24
r21	CATCH BASIN	772.18	6" NW. 768.58
r22	MANHOLE	769.70	12" SW. 766.60 12" NE. 766.50
r23	CATCH BASIN	771.32	12" SW. 767.52 12" NE. 767.97
r24	CATCH BASIN	774.83	12" SW. 770.73 12" NE. 770.73
r25	CATCH BASIN	774.98	12" W. 771.88 12" SE. 771.68
r26	END SECTION	N/A	765.09
r27	CATCH BASIN	770.77	12" NE. 766.77 12" SW. 766.57 12" E. 766.27
r28	MANHOLE	766.39	12" W. 761.99 12" N. 761.94 12" E. 761.89 12" SE. 761.84
r29	CATCH BASIN	765.97	12" W. 762.39
r30	CATCH BASIN	765.57	12" W. 762.37 12" SE. 762.32
r31	CATCH BASIN	765.64	12" SE. 762.39
r32	MANHOLE	766.05	12" NW. 762.45 12" E. 762.05
r33	CATCH BASIN	766.12	12" SE. 762.85
r34	MANHOLE	772.82	30" S. 768.22 30" N. 768.17
r35	CATCH BASIN	772.92	15" NW. 769.82 (VAULT)
r36	MANHOLE	766.30	6" E. 757.70 12" NW. 757.65
r37	CATCH BASIN		12" NE. 762.84 12" S. 762.84
r38	MANHOLE	766.39	12" SW. 762.34 12" W. 762.09 12" NE. 762.04 12" E. 762.09
r39	CATCH BASIN	778.38	12" NE. 775.54
r40	MANHOLE	781.11	15" NW. 777.01 12" NE. 774.51 12" SW. 774.56 24" E. 774.46
r41	CATCH BASIN	781.11	12" N. 775.22 12" SW. 775.27 12" NW. 776.97
r42	CATCH BASIN	781.31	12" S. 775.31
r43	MANHOLE	783.24	12" N. 779.29 12" SE. 779.19
r44	CATCH BASIN	784.29	12"S. 780.74

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DETAILED ENGINEERING PLANS
TREE LIST AND EXISTING UTILITIES SCHEDULE

05

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/7/18
PER MUNICIPAL REVIEW	5/30/18

DATE: 1/22/18
SHEET 5 OF 26
CADD:
ENG: HTH
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SCALE: 1" = 40'
0 40 80 120

LEGEND

- EXIST. UTILITY POLE
- EXIST. UTILITY POLE W/ TRANS.
- GUY WIRE
- ELEC. TRANSFORMER
- EXIST. OVERHEAD UTILITY LINE
- EXIST. LIGHT POLE
- EXIST. TELEPHONE LINE
- EXIST. ELECTRIC LINE
- EXIST. GAS LINE
- EXIST. GAS VALVE
- EXIST. WATER MAIN
- EXIST. HYDRANT
- EXIST. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- EXIST. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- END SECTION
- HEAD WALL
- EXIST. DOWNSPOUT
- EXIST. SANITARY SEWER
- SIGN
- TELEPHONE RISER
- ELECTRIC METER
- WATER METER
- GAS METER
- PEDESTRIAN CROSSING SIGNAL
- TRAFFIC SIGNAL CONTROL BOX
- POST
- MONITORING WELL
- FENCE
- SINGLE TREE
- TREE OR BRUSH LIMIT
- FOUND IRON PIPE
- FOUND MAG NAIL
- FOUND IRON ROD
- CONTROL PT.
- CONCRETE TO BE REMOVED
- BITUMINOUS TO BE REMOVED
- BITUMINOUS TO BE MILLED 1.5"
- UTILITY TO BE REMOVED
- CURB TO BE REMOVED
- TREE TO BE REMOVED
- ITEM TO BE RELOCATED
- ITEM TO BE REMOVED
- ITEM TO BE ADJUSTED
- LIMITS OF DISTURBANCE
- EXIST. FLOODPLAIN

NOTE

1. CONTRACTOR SHALL CONTACT SME (SEE SHEET 1 FOR CONTACT INFORMATION) TO COORDINATE REMOVAL OF WELLS ON SITE.
2. PAVEMENT MARKING DISTURBED DUE TO PAVEMENT CUTS OR CONSTRUCTION RELATED ACTIVITIES SHALL BE REPLACED AS DIRECTED BY THE ENGINEERING. REPLACEMENT DURING CONSTRUCTION OF THE PROJECT MAY BE CONSIDERED TEMPORARY, WITH FINAL PAVEMENT MARKING RESTORATION TO OCCUR AT THE END OF THE PROJECT.
3. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING PUBLIC ROAD PAVEMENT. DAMAGE TO THE PUBLIC ROAD PAVEMENT DURING THE COURSE OF CONSTRUCTION MAY NECESSITATE MILLING AND RESURFACING OF THE DAMAGED AREAS PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY.

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DETAILED ENGINEERING PLANS
SITE DEMOLITION PLAN

06

JOB No. 16196A
DATE: 1/22/18
SHEET 6 OF 26
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PM: TJC
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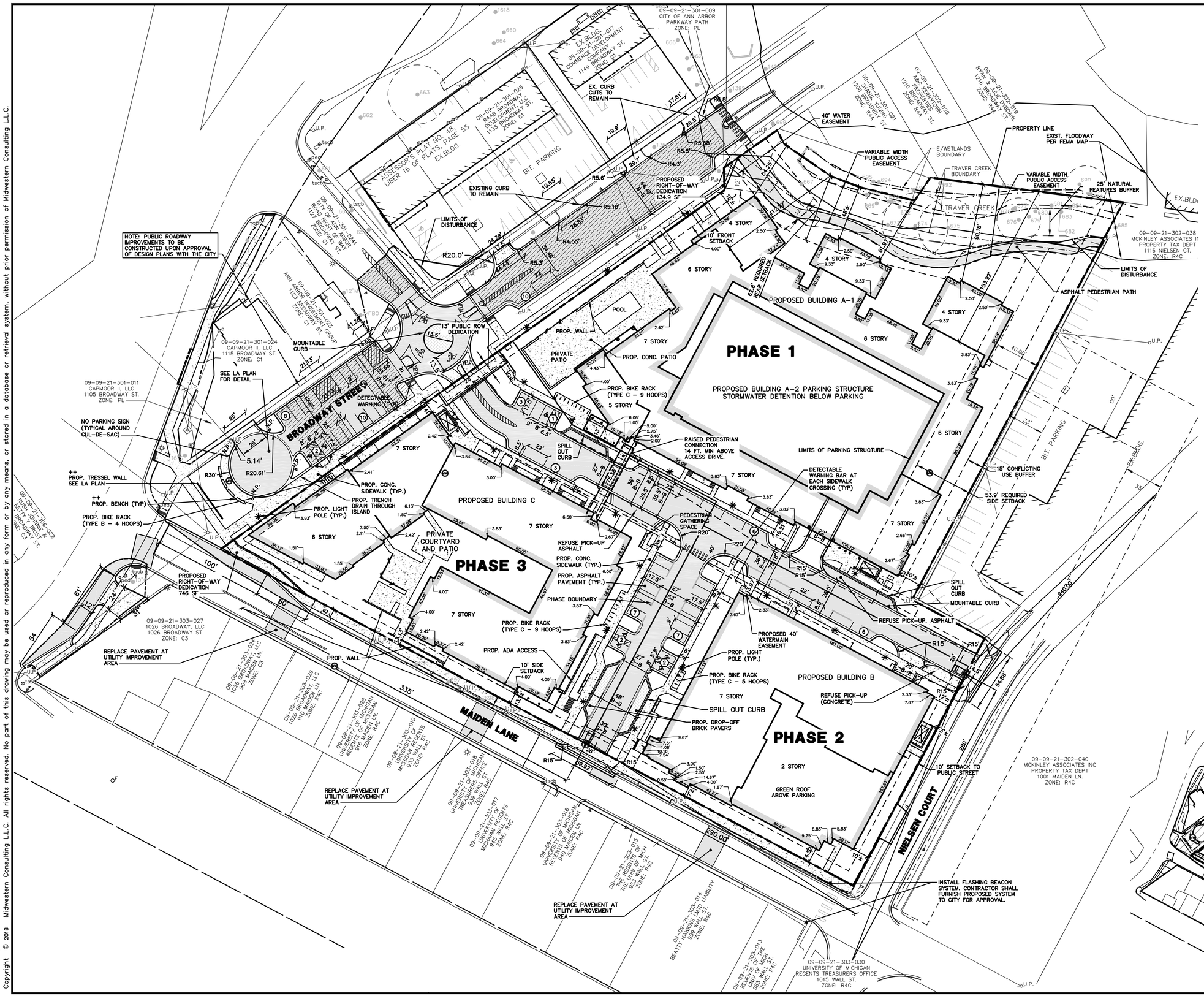
REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	3/16/18
PER MUNICIPAL REVIEW	5/30/18



SCALE: 1" = 40'

0 40 80 120

811 Know what's below. Call before you dig.

LEGEND

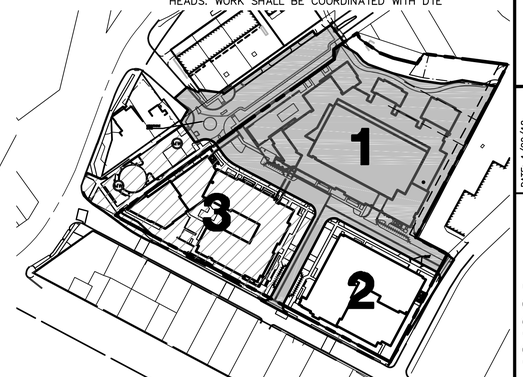
- PROP. ASPHALT PAVEMENT
- PROP. CONCRETE SIDEWALK
- PROP. ASPHALT OVERLAY
- PROP. BRICK/CONCRETE PAVERS
- NUMBER OF STANDARD PARKING SPACES IN ROW
- NUMBER OF BARRIER FREE PARKING SPACES IN ROW
- LIMITS OF DISTURBANCE
- SPILL OUT CURB
- ++ PRIVATELY OWNED ELEMENT IN PUBLIC ROW

NOTES

1. CURB RADIAL DIMENSIONS ARE TO BACK OF CURB, UNLESS OTHERWISE NOTED. "E-E" DENOTES EDGE-TO-EDGE OF ASPHALT PAVEMENT (AKA EDGE-OF-METAL), AND "B-B" DENOTES BACK-TO-BACK OF CURB.
2. NO TEMPORARY EARTH RETENTION SYSTEM TO BE LOCATED IN CITY RIGHT-OF-WAYS
3. PAVEMENT MARKING DISTURBED DUE TO PAVEMENT CUTS OR CONSTRUCTION RELATED ACTIVITIES SHALL BE REPLACED S DIRECTED BY THE ENGINEERING. REPLACEMENT DURING CONSTRUCTION OF THE PROJECT MAY BE CONSIDERED TEMPORARY, WITH FINAL PAVEMENT MARKING RESTORATION TO OCCUR AT THE END OF THE PROJECT.
4. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING PUBLIC ROAD PAVEMENT. DAMAGE TO THE PUBLIC ROAD PAVEMENT DURING THE COURSE OF CONSTRUCTION MAY NECESSITATE MILLING AND RESURFACING OF THE DAMAGED AREAS PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY.
5. DO NOT USE BUILDING FOOTPRINT FOR STAKING. CONFIRM WITH CURRENT ARCHITECTURAL PLANS PRIOR TO STAKING.
6. OWNER RESERVES THE OPTION TO INSTALL TEMPORARY CURB AT PHASE BOUNDARIES.

BROADWAY CONSTRUCTION NOTES

1. AREAS SHOWN FOR FULL DEPTH ASPHALT REPLACEMENT WILL UTILIZE THE EXISTING BASE MATERIAL WITH REQUIRED GRADING.
2. ALL PROPOSED LIGHT POLES WITHIN THE BROADWAY STREET RIGHT-OF-WAY SHALL BE LUMICON "RING OF FIRE"
3. RELOCATED LIGHT POLES ALONG THE MAIDEN LANE CORRIDOR SHALL REUSE THE EXISTING LIGHT HEADS. WORK SHALL BE COORDINATED WITH DTE



PROJECT PHASING PLAN

ALL UTILITIES AND STORMWATER SHALL BE BUILT DURING BUILDING PHASE 1

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DETAILED ENGINEERING PLANS
SITE LAYOUT PLAN

07

DATE: 1/22/18
SHEET 7 OF 26
CADD:
ENG: HTH
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JOB No. 16196A

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PER MUNICIPAL REVIEW	5/30/18

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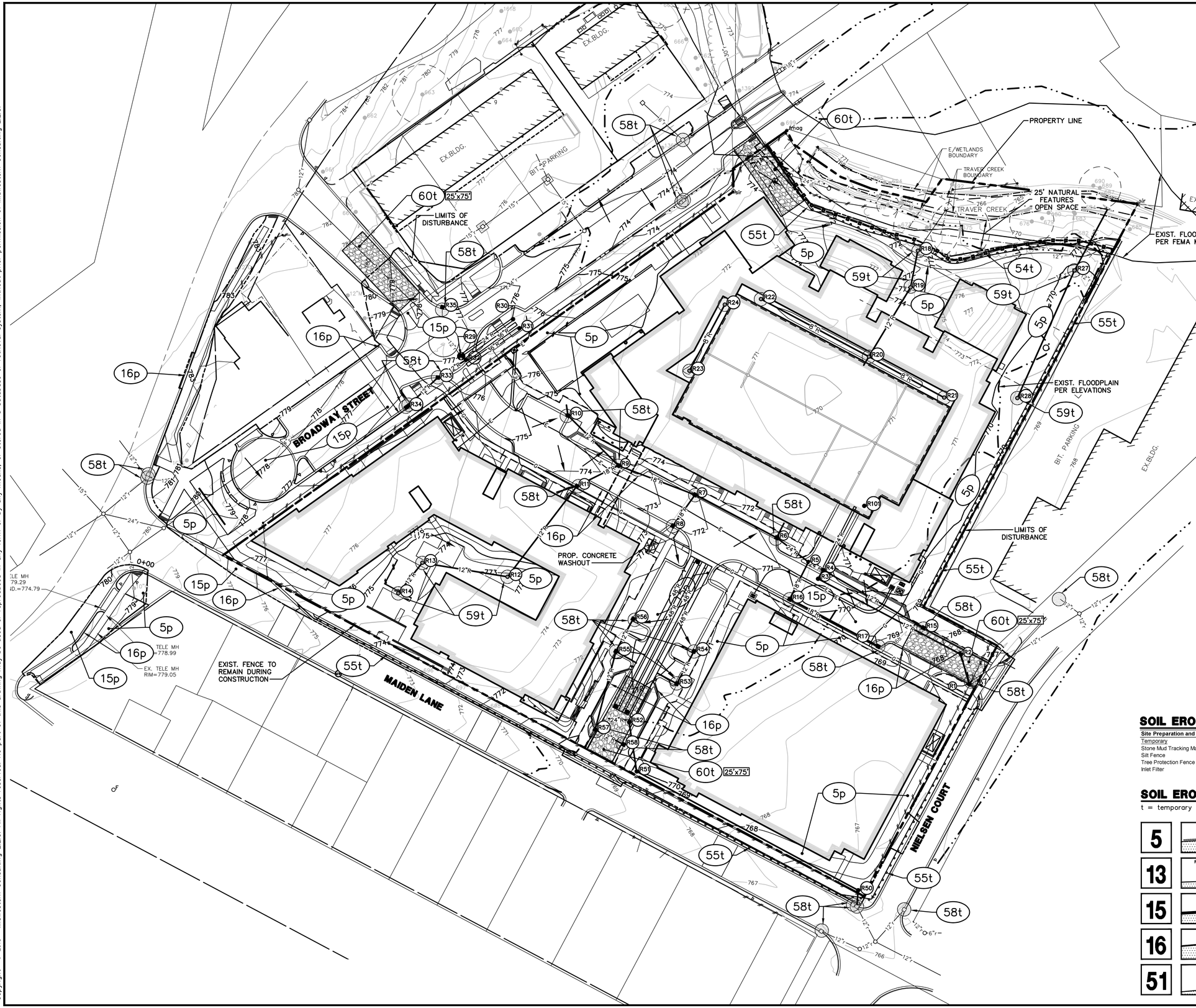

SCALE: 1" = 40'

0 40 80 120

811 Know what's below. Call before you dig.

LEGEND

- EXIST. CONTOUR
- PROP. CONTOUR
- PROP. CATCH BASIN OR INLET
- LIMITS OF DISTURBANCE
- SILT FENCE
- TREE PROTECTION FENCE
- LIMITS OF DISTURBANCE
- EXIST. FLOODPLAIN

SESC NOTES:

1. ALL SILT FENCE SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. IF AT ANY TIME THE DEPTH OF SILT AND SEDIMENT COMES TO WITHIN 12" OF THE TOP OF ANY SILT FENCE, ALL SILT AND SEDIMENT SHALL BE REMOVED TO ORIGINAL GRADE.
2. ALL TEMPORARY GRAVEL FILTERS SHOULD BE ADJUSTED AS TO LOCATION PER ACTUAL FIELD CONDITIONS. THE REMOVAL OF TRAPPED SEDIMENT AND THE CLEANOUT OR REPLACEMENT OF CLOGGED STONE MAY BE NECESSARY AFTER EACH STORM EVENT DURING THE PROJECT.
3. ONLY UPON STABILIZATION OF ALL DISTURBED AREAS MAY THE SILT FENCE, AND TEMPORARY GRAVEL FILTERS BE REMOVED. ALSO, ALL STORM SEWERS MUST BE CLEANED OF ALL SEDIMENT.
4. SEE SITE DETAILS SHEET FOR CONSTRUCTION SEQUENCE
5. INTERNAL & EXTERNAL STREETS TO BE CLEANED OF ANY TRACKED MUD IMMEDIATELY FOLLOWING EACH MUD-TRACKING OCCURRENCE.
6. ESTIMATED COST TO STABILIZE SITE SHOULD CONSTRUCTION CEASE:

   6.5ac X $10,500/ac = $68,250
7. ESTIMATED SOIL MOVEMENTS ON SITE:

   10,200 C.Y CUT; 2680 C.Y. FILL
8. NPDES/NOC PERMIT REQUIRED FOR PROJECT. INSPECTIONS TO BE PERFORMED BY CERTIFIED MDEQ STORM WATER OPERATOR. REPORTS TO REMAIN ON SITE AND TO BE CONDUCTED ONCE A WEEK AND IMMEDIATELY FOLLOWING EACH PRECIPITATION EVENT.
9. PERMANENT SOIL EROSION CONTROLS ARE REQUIRED TO BE INSTALLED WITHIN FIVE (5) DAYS AFTER FINAL GRADING.
10. AFTER SITE GRADING ALL DISTURBED AREAS NOT IMMEDIATELY UNDER CONSTRUCTION ARE TO BE STABILIZED.
11. THE DETENTION FACILITIES SHALL BE CONSTRUCTED IN CONJUNCTION WITH BUILDING FOUNDATION SYSTEMS AS THESE SYSTEMS ARE INTEGRAL WITH EACH OTHERS. SEE CONSTRUCTION SEQUENCE FOR DETAILED CONSTRUCTION SCHEDULE.

SOIL EROSION COST ESTIMATE

Site Preparation and SESC				**$22,467.50**
Temporary				
Stone Mud Tracking Mat	4	ea	$2,650.00	$10,600.00
Silt Fence	1600	Ft	$3.10	$4,960.00
Tree Protection Fence	350	Ft	$2.25	$787.50
Inlet Filter	34	Ea	$180.00	$6,120.00

SOIL EROSION CONTROL MEASURES

t = temporary p = permanent

5	SEEDING	54	CONSTRUCTION FENCE OR SNOW FENCE
13	RIPRAP, RUBBLE, GABIONS	55	GEOTEXTILE SILT FENCE
15	PAVING	58	CURB INLET FILTER
16	CURB & GUTTER	59	C.B./INLET FILTER
51	RETAINING WALL	60	MUD TRACKING MAT

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DETAILED ENGINEERING PLANS
SOIL EROSION CONTROL PLAN

08

JOB No. 16196A

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PER MUNICIPAL REVIEW	5/30/18

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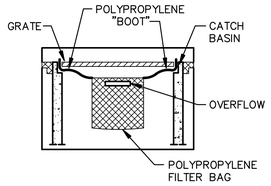
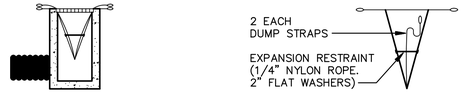
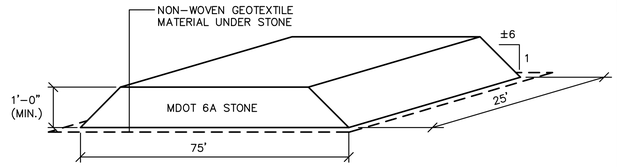


NOTE:
TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. INLET FILTER TO BE SIMILAR TO "STREAMGUARD" AS MANUFACTURED BY STORMWATER SERVICES CORPORATION (206-767-0441) OR "SILTSACK" AS MANUFACTURED BY ATLANTIC CONSTRUCTION FABRICS, INC.; (800-448-3636). CLEAN FILTER AS NEEDED.



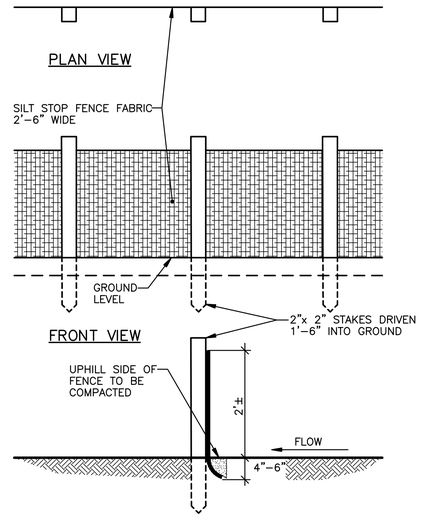
SILT SACK DETAIL

NO SCALE



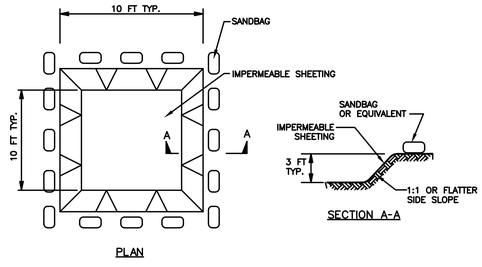
GRAVEL MUD TRACKING MAT

NOT TO SCALE



SILT FENCE DETAIL

NO SCALE



EXCAVATED WASHOUT STRUCTURE

NO SCALE

CONSTRUCTION SEQUENCE

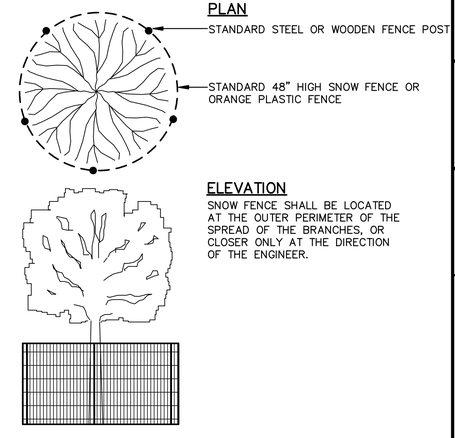
CONSTRUCTION SEQUENCE	2018												2019												2020					
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
INSTALL AND MAINTAIN SOIL EROSION CONTROL MEASURES AS REQUIRED																											
SITE REMOVALS																											
STRIP AND STOCKPILE/HAUL TOPSOIL																											
FOUNDATION INSTALLATION, BLDG A																											
DETENTION BASIN CONSTRUCTION																											
INSTALL STORM SEWER SYSTEMS																											
CONSTRUCT GRAVEL HAUL ROADS																											
VERTICAL CONSRUCTION, BLDG A																											
INSTALL SANITARY AND WATER LEADS																											
FOUNDATIONS AND VERTICAL CONSTRUCTION, BLDG B																											
INSTALL FRANCHISE UTILITIES (ELEC., GAS, TELECOM)																											
BROADWAY INTERSECTION ROAD RESURFACING & STREETSCAPE																											
BROADWAY ROUNDABOUT, PARKING AREA RESURFACING & STREETSCAPE																											
CONSTRUCT SIDEWALK AND CURB																											
CONSTRUCT/PAVE MAIN ROAD																											
PLACE LANDSCAPING, TOPSOIL AND LAWNS BUILDING A																											
PLACE LANDSCAPING, TOPSOIL AND LAWNS BUILDING B																											
FINAL CLEAN-UP & REMOVAL OF SESC CONTROL, STAGE A&B																											
CONSTRUCTION BLDG C AND SESC IN FUTURE																											

SOIL EROSION & SEDIMENTATION CONTROL NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE SOIL EROSION CONTROL MEASURES AS SHOWN ON THE SESC PLANS AT ALL TIMES DURING CONSTRUCTION ON THIS PROJECT. FOLLOWING CONSTRUCTION, IT WILL BE THE RESPONSIBILITY OF THE CONDOMINIUM ASSOCIATION TO PERFORM THE MAINTENANCE. ANY MODIFICATIONS OR ADDITIONS TO THE SOIL EROSION CONTROL MEASURES DUE TO CONSTRUCTION OR CHANGED CONDITIONS, SHALL BE COMPLIED WITH AS REQUIRED OR DIRECTED BY THE OWNER, PROJECT ENGINEER, OR WASHTENAW COUNTY.
2. DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR. PERIODIC INSPECTIONS MAY BE MADE BY THE OWNER/PROJECT ENGINEER/COUNTY TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES. ANY NECESSARY CORRECTIONS SHALL BE MADE WITHOUT DELAY BY THE ONSITE RESPONSIBLE INDIVIDUAL.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND REMOVAL OF SOME UPON AUTHORIZED COMPLETION OF PROJECT. COMPLETION OF PROJECT WILL NOT BE AUTHORIZED UNTIL ALL SITE WORK, HOME BUILDING, ROAD WORK, AND UTILITY CONSTRUCTION IS COMPLETE AND ALL SOILS ARE STABILIZED.

PERMANENT MAINTENANCE TASKS AND SCHEDULE - BY OWNER

TASKS	Storm Sewer System	Catch Basin Sumps	Catch Basin Castings	Ditches & Swales	Detention Basin	Emergency Overflow	Green Roof	Schedule
Inspect for sediment accumulation	X	X		X	X		X	annually
Removal of sediment accumulation	X	X		X	X		X	every 2 yrs as needed
Inspect for floatables and debris			X	X	X		X	annually
Cleaning of floatables and debris			X	X	X		X	as needed
Inspect stormwater system components during wet weather and compare to as-built plans (by professional engineer reporting to Washtenaw County.)	X	X	X	X	X	X	X	annually
Make adjustment or replacements as determined by annual wet weather inspection	X	X	X	X	X	X	X	as needed
Keep records of all inspections and maintenance activities and report to Washtenaw County.							X	annually



TREE PROTECTION DETAIL

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DETAILED ENGINEERING PLANS
SESC DETAILS

09

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	2/15/18
PER MUNICIPAL REVIEW	5/30/18

DATE: 1/22/18
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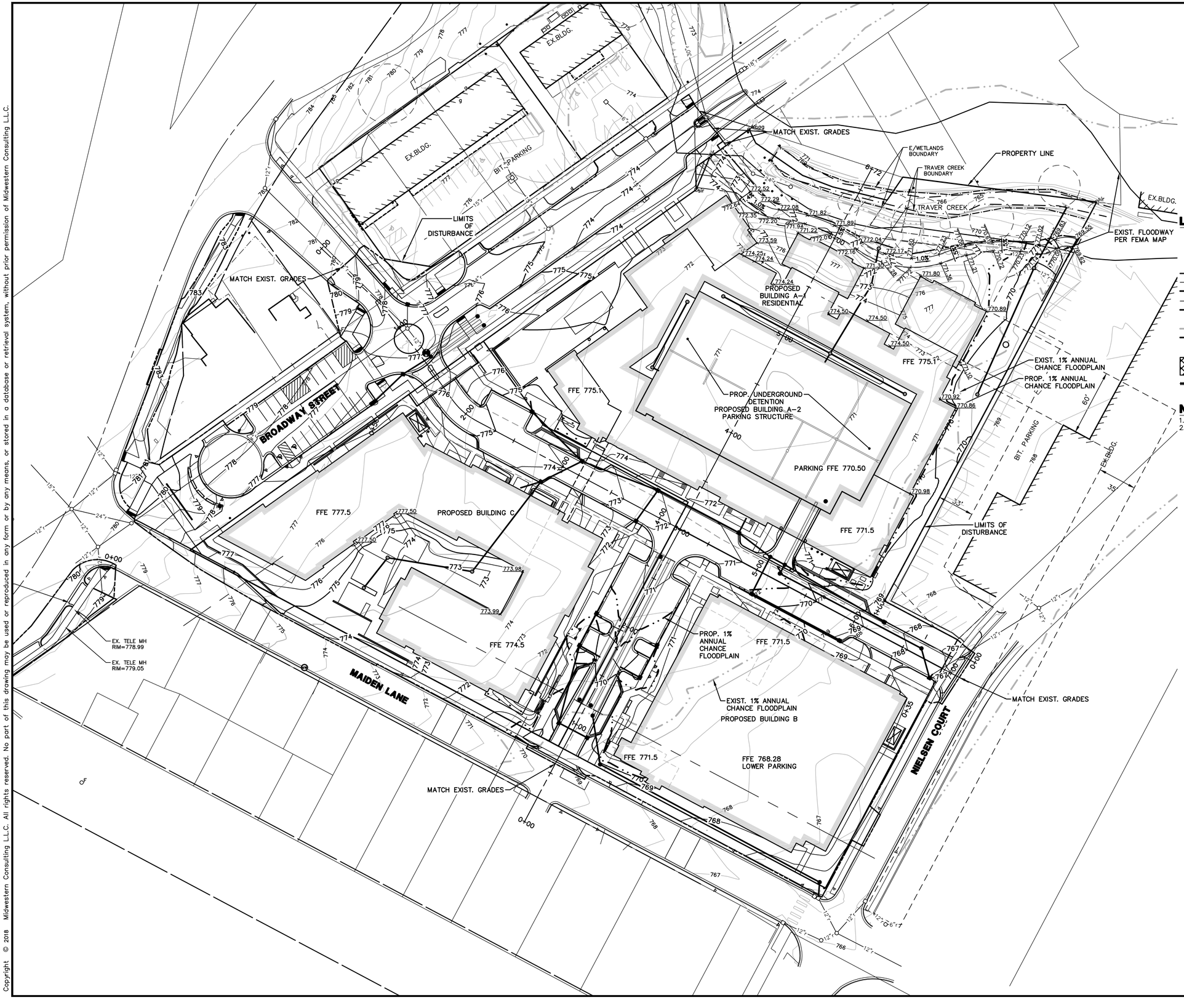

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DETAILED ENGINEERING PLANS
SITE GRADING PLAN

10

JOB No. 16196A

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PER MUNICIPAL REVIEW	5/30/18

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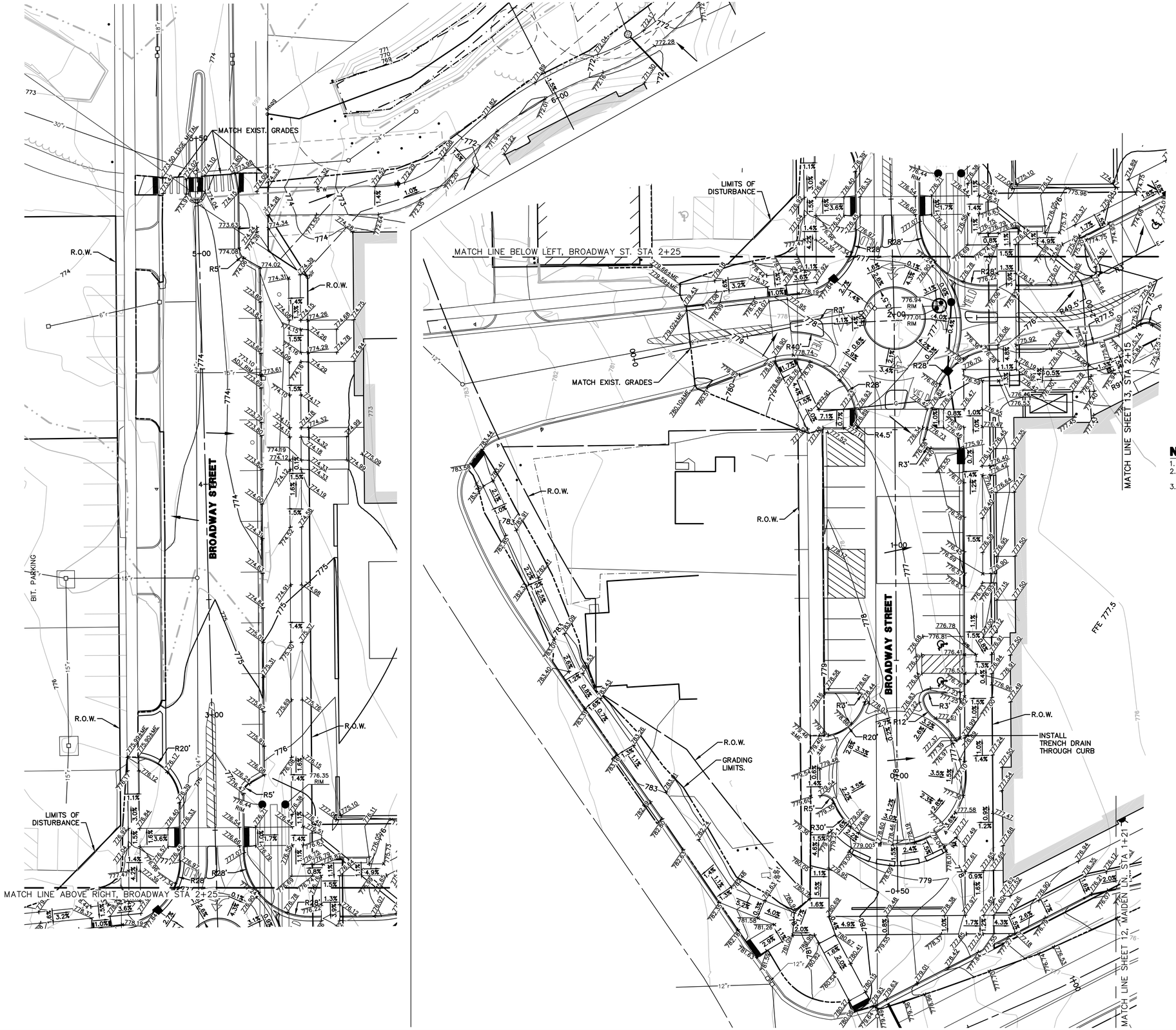

SCALE: 1" = 20'

0 20 40 60

Know what's below. Call before you dig.

LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60x	PROP. SPOT ELEVATION
	GRADING LIMITS
r	EXIST. STORM SEWER
R	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
	END SECTION
	EXIS. 1% FLOODPLAIN ZONE AE PER ELEV
	PROP. 1% FLOODPLAIN ZONE AE PER ELEV
	PROP. DRAINAGE ARROWS
	PROP. STORMWATER DETENTION
	DETECTABLE WARNING
±ME	MATCH EXISTING

NOTES

1. CURB RADIAL DIMENSIONS ARE TO BACK OF CURB.
2. CURB SPOT ELEVATIONS REPRESENT TOP OF CURB UNLESS OTHERWISE NOTED.
3. ELEVATIONS AT BOTTOM OF RAMP LOCATIONS ARE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.

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DETAILED ENGINEERING PLANS
ENLARGED GRADING PLAN – BROADWAY CORRIDOR

11

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	4/16/18
PER MUNICIPAL REVIEW	5/30/18

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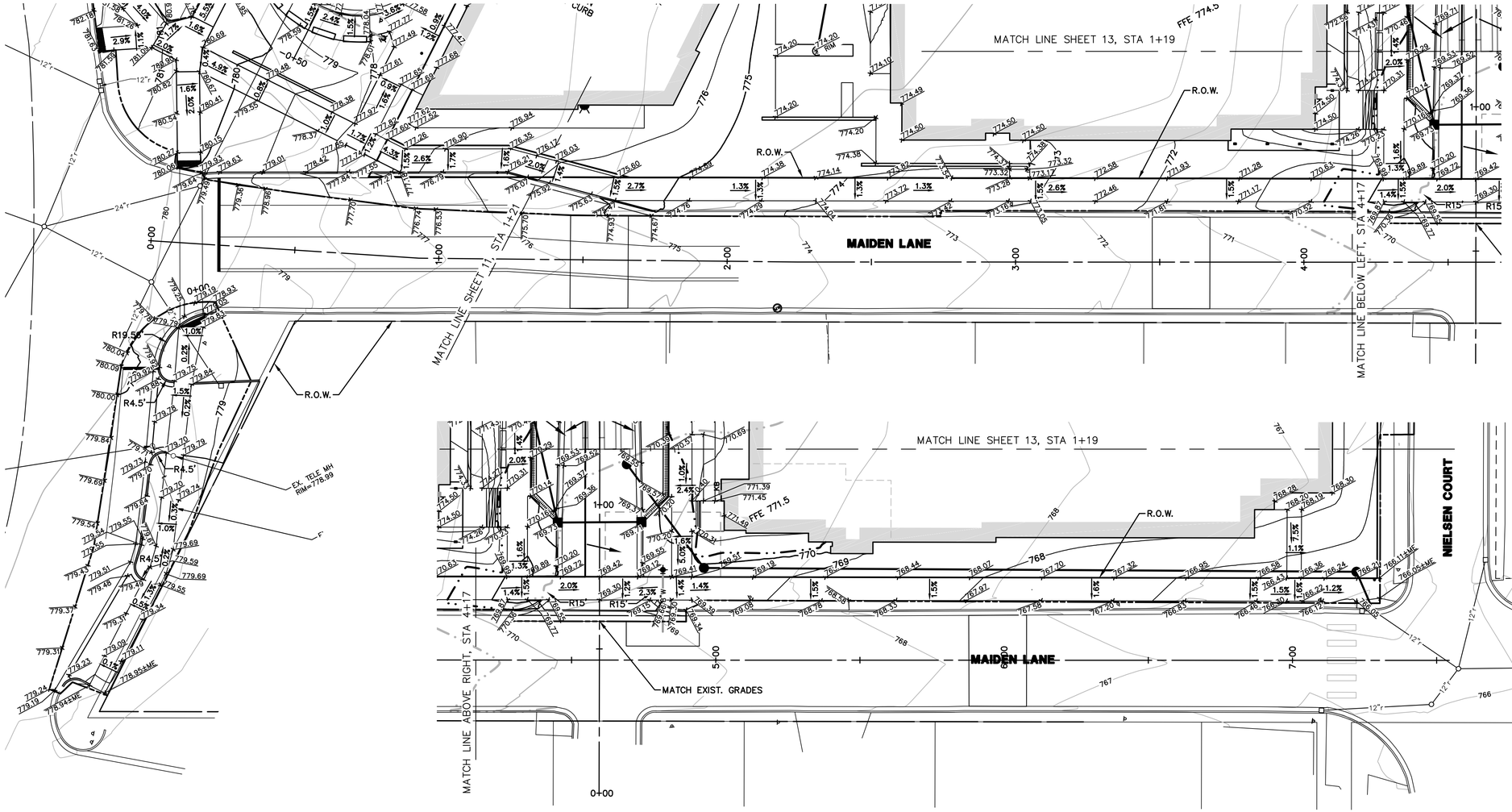

SCALE: 1" = 20'

0 20 40 60

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LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
	GRADING LIMITS
r	EXIST. STORM SEWER
R	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
	END SECTION
	EXIS. 1% FLOODPLAIN ZONE AE PER ELEV
	PROP. 1% FLOODPLAIN ZONE AE PER ELEV
	PROP. DRAINAGE ARROWS
	DETECTABLE WARNING

NOTES

1. CURB RADIAL DIMENSIONS ARE TO BACK OF CURB.
2. CURB SPOT ELEVATIONS REPRESENT TOP OF CURB UNLESS OTHERWISE NOTED.
3. ELEVATIONS AT BOTTOM OF RAMP LOCATIONS ARE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.

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1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
ENLARGED GRADING PLAN – MAIDEN LANE CORRIDOR

12

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/30/18
PER MUNICIPAL REVIEW	

DATE: 1/22/18
SHEET 12 OF 26
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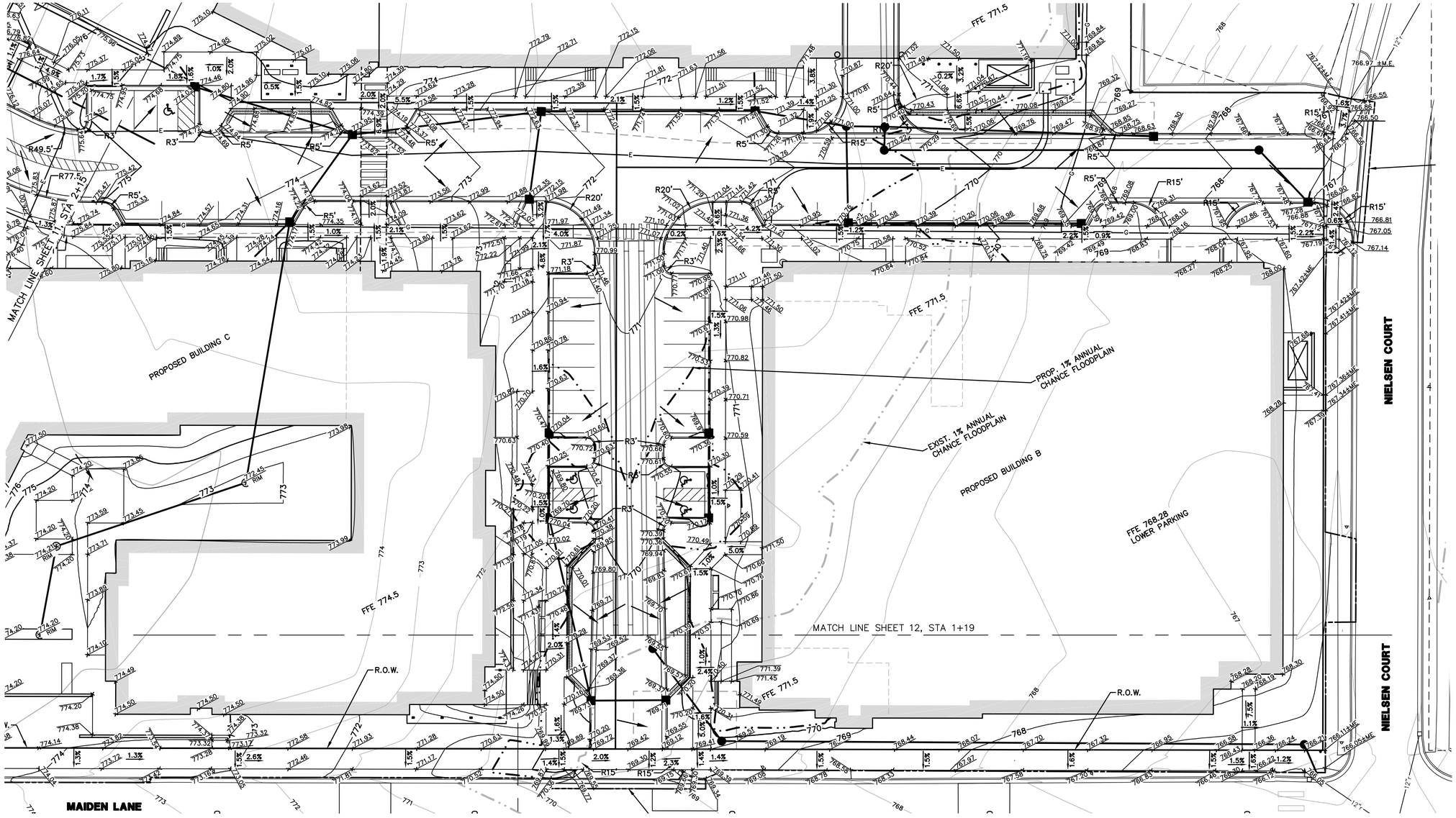

LEGEND

838	EXIST. CONTOUR
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×836.2	EXIST. SPOT ELEVATION
36.60×	PROP. SPOT ELEVATION
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	PROP. CATCH BASIN OR INLET
	END SECTION
	EXIS. 1% FLOODPLAIN ZONE AE PER ELEV
	PROP. 1% FLOODPLAIN ZONE AE PER ELEV
	PROP. DRAINAGE ARROWS

NOTES

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DETAILED ENGINEERING PLANS
ENLARGED GRADING PLAN – INTERNAL SITE

13

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/10/18
PER MUNICIPAL REVIEW	5/30/18

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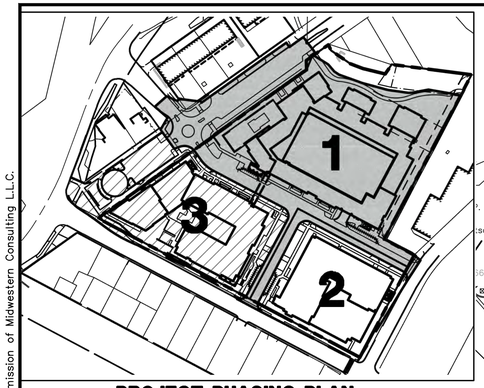

PROJECT PHASING PLAN

ALL WATERMAIN AND STORMWATER DETENTION SHALL BE BUILT DURING BUILDING STAGE A

NOTES:

1. BOOSTER PUMPS ARE ANTICIPATED AND LOCATIONS ARE SHOWN.
2. FIRE COMMAND CENTER LOCATIONS ARE SHOWN.
3. FOOTING DRAINS TO CONNECT TO STORM SEWER.
4. POOL TO DISCHARGE TO STORM SEWER.
5. ALL SANITARY CONNECTIONS SHALL BE CONNECTED WITH A WYE UNLESS NOTED ON PLANS.
6. ALL PROPOSED SANITARY CONNECTIONS TO BE MADE TO EXISTING MANHOLES SHALL HAVE APPROVAL FROM PUBLIC WORKS THAT MANHOLES ARE IN ACCEPTABLE CONDITION OR SHALL BE REBUILT

SCALE: 1" = 40'

0 40 80 120

LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
U.P.	EXIST. UTILITY POLE
U.P.	EXIST. UTILITY POLE W/ TRANS.
	GUY WIRE
	ELEC. TRANSFORMER
	ELEC. GENERATOR
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
t	EXIST. TELEPHONE LINE
T	PROP. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
E	PROP. ELECTRIC LINE
g	EXIST. GAS LINE
G	PROP. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
F.O.	PROP. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	PROP. HYDRANT
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	PROP. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	PROP. CURB STOP & BOX
r	EXIST. STORM SEWER
R	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
	PROP. BEEHIVE INLET
RD	PROP. ROOF DRAIN
	END SECTION
	HEAD WALL
	CULVERT
	UNDERGROUND DETENTION
s	EXIST. SANITARY SEWER
S	PROP. SANITARY SEWER
	EXIST. CLEANOUT
	PROP. CLEANOUT
t	TELEPHONE RISER
tcatv	CABLE TELEVISION RISER
e	ELECTRIC METER
w	WATER METER
g	GAS METER
glm	GAS LINE MARKER
fiber	FIBER OPTIC MARKER
FDC	FIRE DEPARTMENT CONNECTION
FCC	FIRE COMMAND CENTER
KB	KNOX BOX

UTILITY NOTES

1. ALL PUBLIC UTILITY INSTALLATION SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF ANN ARBOR STANDARD SPECIFICATIONS, CURRENT EDITION. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT.
2. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITY LOCATIONS, DEPTHS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL PROTECT EXISTING UTILITIES DURING CONSTRUCTION.
4. NO FIRE WALLS ARE PROPOSED WITHIN NEW CONSTRUCTION.
5. ANY EXISTING UTILITY LEADS NOT TO BE RE-USED ARE TO BE ABANDONED IN ACCORDANCE WITH THE CURRENT CITY OF ANN ARBOR STANDARDS.
6. SUPPORTING FIRE HYDRANT(S) SHALL BE IN PLACE AND ACCEPTED BY THE FIRE MARSHALL PRIOR TO BRINGING COMBUSTIBLE MATERIALS ONTO THE SITE.
7. SANITARY CONNECTION TO EXISTING MANHOLES SHALL BE MADE WITH THE APPROVAL OF PUBLIC WORKS AND CONDITION OF MANHOLES SHALL BE VERIFIED TO BE ACCEPTABLE.
8. STORM SEWER GOING INTO DETENTION SYSTEM SHALL BE THERMALLY FUSED OR INSTALLED WITH NITRILE GASKETS OR EXTERNAL PIPE WRAP AT ALL PIPE JOINTS.
9. STORM SEWER EXITING DETENTION SYSTEM AND GOING TO EXISTING STRUCTURES ON NIELSON COURT SHALL BE THERMALLY FUSED OR INSTALLED WITH NITRILE GASKETS AND EXTERNAL PIPE WRAP (MAR MAC OR EQUIVALENT) AT ALL PIPE JOINTS.
10. SEAL ALL UTILITY PENETRATIONS INTO DETENTION SYSTEM WITH NITRILE GASKET/BOOT OR EQUIVALENT.
11. NITRILE GASKETS OR EQUIVALENT SHALL BE USED AT ALL WATERMAIN FITTINGS.
12. NITRILE GASKETS WILL BE USED BASED ON DURABILITY AND COMPATIBILITY TO TETRACHLOROETHENE AND OTHER CHLORINATED VOLATILE ORGANIC COMPOUNDS (CI-VOCs) THAT ARE PRESENT IN GROUNDWATER ON THE SITE.
13. USE OF LINE STOPS IS REQUIRED WHERE EXISTING WATER MAINS CANNOT BE SUFFICIENTLY ISOLATED TO COMPLETE THE WORK. THE COST OF THE ANY LINE STOP INSTALLATION IS THE RESPONSIBILITY OF THE DEVELOPER AND/OR CONTRACTOR.

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DETAILED ENGINEERING PLANS
SITE UTILITY PLAN

14

JOB No. 16196A

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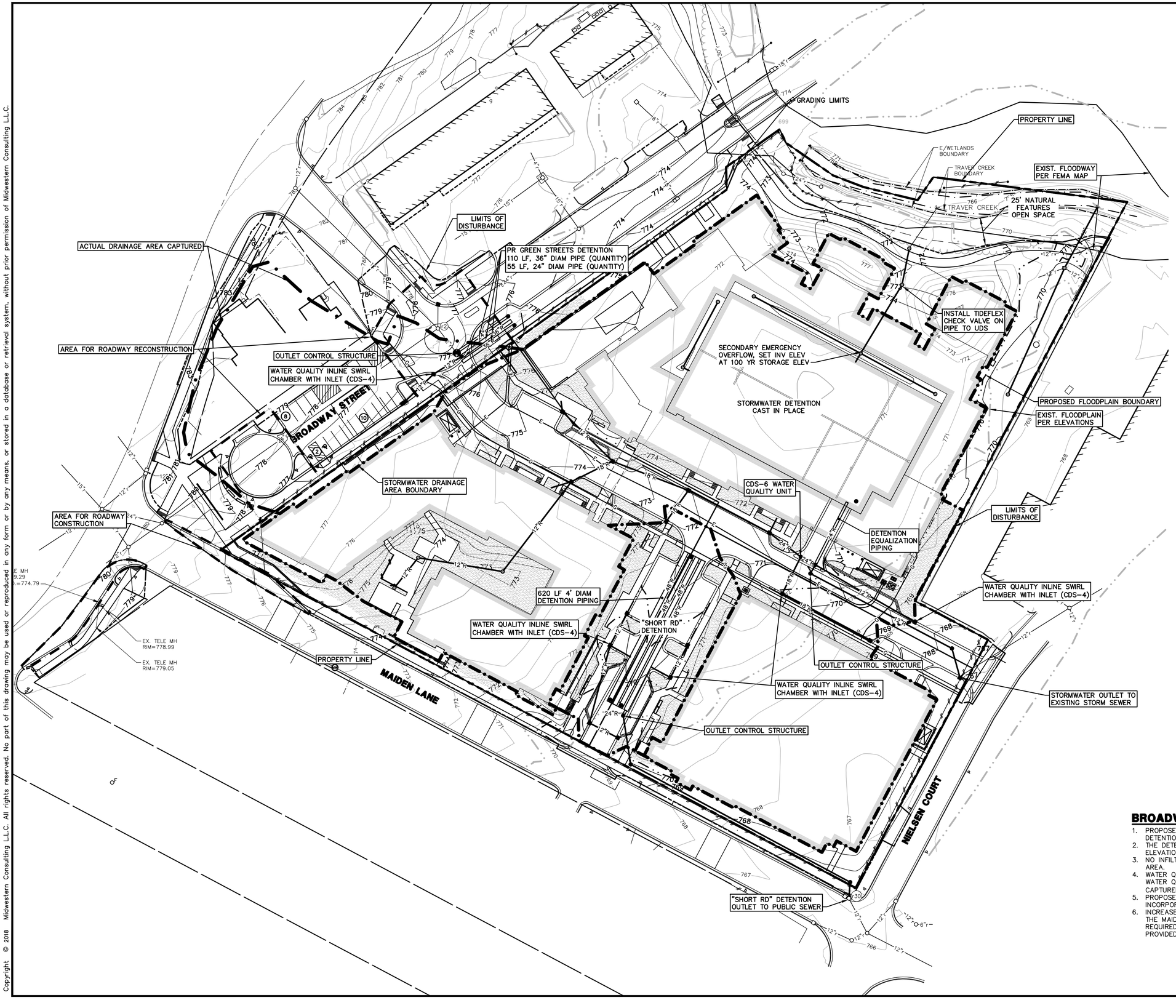

SCALE: 1" = 40'

0 40 80 120

LEGEND

- 838 — EXIST. CONTOUR
- 838 — PROP. CONTOUR
- 12" R — PROPOSED STORM DRAIN
- ● ■ — PROP. STORM INLETS
- TREE OR BRUSH LIMIT
- PERVIOUS AREAS
- WATER SURFACE
- DRAINAGE AREA BOUNDARY
- GRADING LIMITS

STORMWATER NARRATIVE

Existing Drainage Patterns

The existing site drainage pattern drains mainly from northwest to southeast to the Traver Creek and the Huron River. The current site consists of several raized building foundations and open brownfield site. The north and east portions of the site, adjacent to Traver Creek and Neilson Court, contains land within the 100 year floodplain. There currently is no detention provided for stormwater management.

Proposed Drainage Patterns

The proposed site will drain through a proposed storm sewer system in drives and yard areas. The storm sewer system will be routed into an underground detention system. The underground detention chambers are proposed under the proposed parking structure. The detention will consists of precast chambers under the east end of the parking structure and cast in place concrete under the west end of he structure. The separate detention areas will l be connected to allow for equalization between the chambers. Water quality will be provided through the use of structural swirl concentrator unit prior to entry into the underground detention system. The drainage will be intercepted and the discharge delayed and release at a controlled rate over the course of 24 to 72 hours. The detention basin is sized for the 100 year storm and will discharge to the existing stormwater piping on the site which is then discharges to Traver Creek through the public sewer system.

MAINTENANCE PLAN BUDGET

Annual inspection for sediment accumulation	$100.00
Removal of sediment accumulation every 2 years as needed	$500.00
Inspect for floatables and debris annually and after major storms	$100.00
Removal of floatables and debris annually and after major storms	$150.00
Inspect system for erosion annually and after major storms	$100.00
Inspect structural elements during wet weather and compare to as-built plans every 2 years	$150.00
Make structural adjustments or replacements as determined by inspection as needed	$400.00
Have a professional engineer carry out emergency inspections upon identification of severe problems	$200.00
Total Annual Budget	**$1,700.00**

BROADWAY DETENTION (GREEN STREETS) NOTES

1. PROPOSED DESIGN ASSUMES TREATMENT FOR FIRST FLUSH (1" RAINFALL) DETENTION VOLUME FOR AREA WITH RECONSTRUCTION OF ROADWAY.
2. THE DETENTION SYSTEM ELEVATION IS LOCATED WITHIN THE FLOODPLAIN ELEVATION LIMITS.
3. NO INFILTRATION IS PROPOSED DUE TO EXISTING SOIL CONTAMINATION IN THE AREA.
4. WATER QUALITY TREATMENT SHALL BE PROVIDED AT STORMWATER INLET. WATER QUALITY TREATMENT UNIT SHALL BE SIZED FOR ACTUAL DRAINAGE CAPTURED (.75 ACRES, RUNOFF COEFFICIENT .80)
5. PROPOSED BROADWAY STREET IMPROVEMENT INCLUDES AREA TO BE INCORPORATED INTO LICENSING AGREEMENT WITH CITY.
6. INCREASES IN PAVEMENT AREA DUE TO THE ADDITION OF TURN LANES ALONG THE MAIDEN LANE CORRIDOR AND BROADWAY STREET ARE INCLUDED IN REQUIRED GREEN STREET DETENTION VOLUME AND ADEQUATE STORAGE IS PROVIDED IN THE UNERGROUND DETENTION BENEATH BROADWAY STREET.

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DETAILED ENGINEERING PLANS
STORMWATER MANAGEMENT PLANS

15

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Parking Structure A Basin Stormwater Calculations

W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Rational Method Variables

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) x (Area)
Building/Pavement		180,613	4.15	0.95	3.94
Grass	B	23,179	0.53	0.25	0.13
Total		203,792	4.68		4.07

Weighted C = (Sum(C)x(Area))/(Area Total)= 0.87

NRCS Variables (Pervious)

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) x (Area)
Grass	B	23,179	0.53	61	0.32
Total		23,179	0.53		0.32

Weighted CN = (Sum(CNlx(Area))/(Area Total)= 61

NCRS Variables (Impervious)

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) x (Area)
Building/Pavement		180,613	4.15	98	4.06
Total		180,613	4.15		4.06

Weighted CN = (Sum(CNlx(Area))/(Area Total)= 98

W2 - First Flush Runoff Calculations (Vff)

A. Vff = 1" x 1/12" x 43560 sf/ac x A x C — where A= 4.68, where C= 0.87 — 14,775 cf

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A.	2 year / 24 hour storm event:	P=	2.35 in
B.	Pre-Development CN (Good Cover Woods, Type D Soils)	CN=	61
C.	S = (1000 / CN) - 10	S=	6.393 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	Q=	0.154 in
E.	Total Site Area excluding "Self-Crediting" BMPs		203,792 sft
F.	Vbf-pre = Q x (1/12) x Area		2,611 cft

W4 - Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post)

A.	2 year / 24 hour storm event:	P=	2.35 in
B.	Pervious Cover CN From Worksheet 1	CN=	61
C.	S = (1000 / CN) - 10	S=	6.393 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	Q=	0.154 in
E.	Pervious Cover Area from Worksheet 1		23,179 sft
F.	Vbf-per-post = Q x (1/12) x Area		297 cft

W5 - Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post)

A.	2 year / 24 hour storm event:	P=	2.35 in
B.	Impervious Cover CN From Worksheet 1	CN=	98
C.	S = (1000 / CN) - 10	S=	0.204 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	Q=	2.122 in
E.	Impervious Cover Area from Worksheet 1		180,613 sft
F.	Vbf-imp-post = Q x (1/12) x Area		31,933 cft

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A.	100 year / 24 hour storm event:	P=	5.11 in
B.	Pervious Cover CN From Worksheet 1	CN=	61
C.	S = (1000 / CN) - 10	S=	6.393 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	Q=	1.436 in
E.	Pervious Cover Area from Worksheet 1		23,179 sft
F.	V100-per-post = Q x (1/12) x Area		2,773 cft

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A.	2 year / 24 hour storm event:	P=	5.11 in
B.	Impervious Cover CN From Worksheet 1	CN=	98
C.	S = (1000 / CN) - 10	S=	0.204 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	Q=	4.873 in
E.	Impervious Cover Area from Worksheet 1		180,613 sft
F.	Vbf-imp-post = Q x (1/12) x Area		73,344 cft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concen — 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A.	Summary from Previous Worksheets	
	First Flush Volume (Vff)	**14,775 cft**
	Pre-Development Bankfull Runoff Volume (Vbf-pre)	**2,611 cft**
	Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	*297 cft*
	Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	*31,933 cft*
	Total BF Volume (Vbf-post)	**32,230 cft**
	Pervious Cover Post-Development 100-Year Volume (V100-per-post)	*2,773 cft*
	Impervious Cover Post-Development 100-Year Volume (V100-imp-post)	*73,344 cft*
	Total 100-Year Volume (V100)	**76,117 cft**
B.	Determine Onsite Infiltration Requirement	
	Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume	
	Total Post-Development Bankfull Volume (Vbf-post)	32,230 cft
	Pre-Development Bankfull Runoff Volume (Vbf-pre)	2,611 cft
	Bankfull Volume Difference	**29,619 cft**
	Infiltration Requirement (Vinf)	**29,619 cft**

W10 - Detention/Retention Requirement

A.	Qp = 238.6 Tc^0.82	743.63 cfs/(in x sq. mi)
B.	Total Site Area excluding "Self-Crediting" BMPs	4.68 ac
C.	Q100 = Q100-per + Q100-imp (from W6 and W7, respectively)	6.309 in
D.	Peak Flow (PF) = Qp x Q100 x Area / 640	34.29 cfs
E.	Delta = PF - 0.15 x Area (ac)	33.59 cfs
	[0.15 x Area (ac)]	*0.70 cfs*
F.	Vdet = Delta / PF x V100	74,559 cft
	Required Detention not including infiltration credit or penalty.	
	Sediment Forebay Volume Required (5% of V100)	3,806 cft

Retention

A. Vret = 2 x V100 — 152,234 cft

W11 - Determine Applicable BMPs and Associated Volume Credits

Due to soil contamination infiltration will not be provided for this project.

W12 - Natural Features Inventory

Refer to Natural Features Plan **Sheet** for location and size of natural features.

W13 - Site Summary of Infiltration & Detention

A.	**Stormwater Management Summary**	
	Min Infiltration Requirement (Vinf)	29,619 cft
	Designed/Provided Infiltration Volume	0 cft
	% Minimum Required Infiltration Provided	0 %
	Total Calculated Detention Volume, Vdet	74,559 cft
	Net Required Detention Volume (Vdet - Designed/Provided Infiltration Volume)	74,559 cft
B.	**Detention Volume Increase for sites where the required infiltration volume cannot be achieved.**	
	% Required Infiltration NOT Provided	100.0 %
	(100% - % Minimum Required Infiltration Provided)	
	Net % Penalty (20% x % Required Infiltration NOT Provided)	20.0 %
	Total Required Detention Volume, including penalty	**89,471 cft**
	[(100% + Net % Penalty) x Net Required Detention Volume)]	

W14 - Storage-Elevation Data

Pond Storage Information

Elevation (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)
765.00	18,820	-	
766.00	18,820	18,820	18,820
766.00	25,458	-	18,820
767.00	25,458	25,458	44,278
768.00	25,458	25,458	69,736
769.00	25,458	25,458	95,194

Total Storage Volumes (excluding 6-hour infiltration volumes)

1" Event	14,775	cft	0.34 ac-ft
2-year Event	32,230	cft	0.74 ac-ft
100-year Event	76,117	cft	1.75 ac-ft
100-year + 20% Penalty	*89,471*	*cft*	*2.05 ac-ft*

Storage Elevations

Elevation for 1" event	765.79	Elevation	0.79 ft. depth
Elevation for 2-year event	766.53	Elevation	1.53 ft. depth
Elevation for 100-year event	768.25	Elevation	3.25 ft. depth
100-year + 20% Penalty	*768.78*	*Elevation*	*3.78 ft. depth*

Note: Due to the presence of groundwater contamination, the 20% penalty is not proposed to be implemented on this project in an effort to minimize excavation and disturbance of existing ground water.

W15 - Two-Stage Outlet Design

Xbot (bottom detention elevation)	765.00	
Xbf (bankfull detention elevation)	766.53	
X100 (100-year detention elevation)	768.25	
Vbf (bankfull detention volume)	32,230	cft
V100 (100-year detention volume)	76,117	cft
Qallow (allowable 100-year release rate)	0.70	cfs

0.15 cfs/acre x area draining to basin

Bankfull Discharge (24-36 hours for the detention volume to drain past the lowest orifice)

Average Head	1.02	ft	h(ave) = 2/3 (Xbf - Xbot)
Bankfull Max. Flowrate	0.37	cfs	Qbf = Vbf / Tbf Tbf = 24 hour min.
Required Area	0.074	sft	Abf = Qbf / 0.62 / sqrt (2*g*h-ave)
Orifice Diameter	2.000	in	
Orifice Area	0.022	sft	
Number Required for 24 hour drainage	3.41		
Number of Holes Used	3		
Area of (3) - 2 inch Orifice	0.065	sft	
Actual Flow	0.33	cfs	Qact-bf = 0.62 * A * sqrt(2*g*h-ave)
Actual Time	27.25	hr	Tact-bf = Vbf / Qact-bf

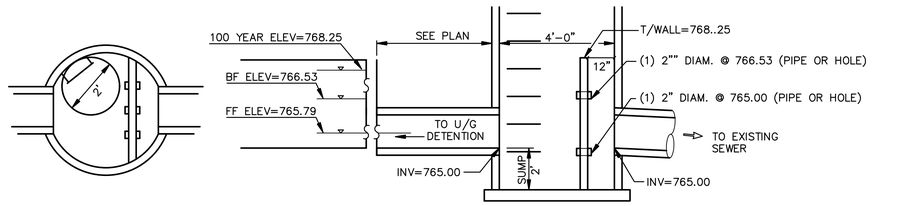
100-year Discharge (0.15 cfs/acre max. allowed)

Average head - 100-year to bankfull orifice	2.17	ft	h(100-ave) = 2/3 (X100 - Xbot)
Average head - 100-year to 100-year orifice	1.15	ft	h(100-ave~) = 2/3 (X100 - Xbf)
Flow through bankfull orifices	0.48	cfs	Q100-bf = 0.62 * Abf * sqrt (2*g*h-100-ave)
Qallow (allowable 100-year release rate)	0.70	cfs	0.15 cfs/acre x area draining to basin
Max flow through 100-year orifices	0.22	cfs	Qmax-100 = Qallow - Qbf
Max. Area for Orifices	0.04	sft	A_{ORI} = Qmax-100 / 0.62 / sqrt (2*g*h-100-ave~)
Proposed Orifice Diameter	2.000	in	
Orifice Area	0.022	sft	
Number Required for 0.15 cfs/acre drainage	1.9		
Number of holes Proposed	1		
Area of (1) - 2 inch Orifice	0.022	sft	
100-year orifices - Actual Flow	0.12	cfs	Q100~ = 0.62 * A100 * sqrt (2*g*h-100-ave~)
Actual Combined 100-year Flow	0.60	cfs	Q100 = Q100-bf + Q100~

100-year Drawdown Time (72-hour max. to the lowest orifice)

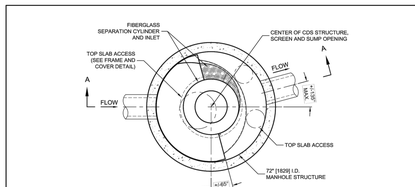
Average head for this drawdown (dd)	2.68	ft	h-dd = 2/3 (X100 - Xbf) + (Xbf - Xbot)
Flow in bankfull for this drawdown (bf-dd)	0.53	cfs	Qbf-dd = 0.62 * Abf * sqrt (2*g*h-dd)
Flow in 100-yr orifices (100-dd)	0.12	cfs	Q100-dd = .62 * A100 * sqrt (2*g*h-100-ave~)
Combined drawdown flow	0.65	cfs	Qdd = Qbf-dd + Q100-dd
Volume of 100-year storm above 2-year vol	43,886	cft	Vrem = V100 - Bfb
Actual time to drain this volume	18.78	hr	T100 = Vrem / (Qdd)
Total 100-year drawdown time	46.03	hr	T100-total = T100 + Tact-bf

This is less than 72 hours max, so the basin complies with the drawdown requirement.

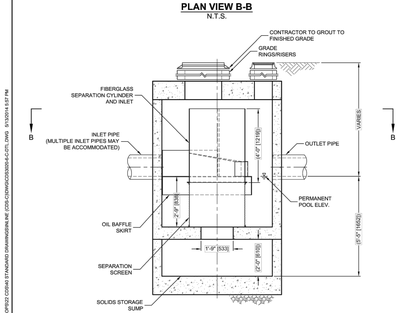


DETENTION AREA OUTLET (R3)

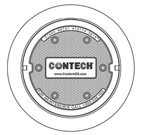
MANHOLE DETAIL W/RESTRICTED OUTLET



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS3020-6-C DESIGN NOTES
CDS3020-6-C RATED TREATMENT CAPACITY IS 2.0 CFS (56.6 L/s) OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 20.0 CFS (566 L/s). IF THE SITE CONDITIONS EXCEED 20.0 CFS (566 L/s), AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
THE STANDARD CDS3020-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.
CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			*
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES
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2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO H520 AND CASTINGS SHALL MEET H520 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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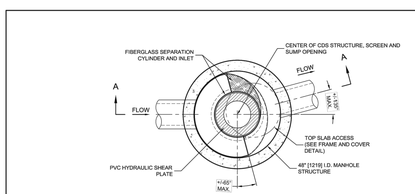
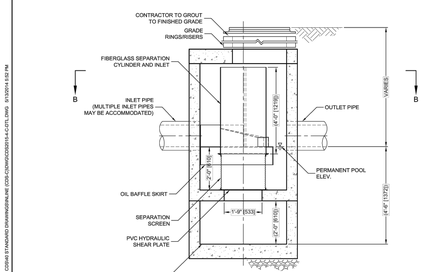
CDS3020-6-C
INLINE CDS
STANDARD DETAIL

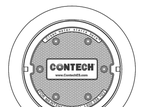
WATER QUALITY UNIT (TYP) (R5)



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS2015-4-C DESIGN NOTES
CDS2015-4-C RATED TREATMENT CAPACITY IS 0.7 CFS (19.8 L/s), OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 10.0 CFS (283 L/s). IF THE SITE CONDITIONS EXCEED 10.0 (283 L/s) CFS, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.
CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			*
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

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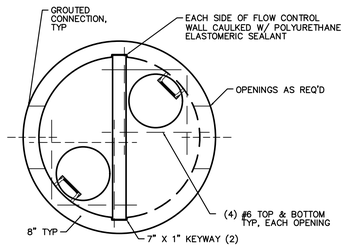
CDS2015-4-C
INLINE CDS
STANDARD DETAIL

WATER QUALITY UNIT (TYP) (R16, R33, R53, R55)

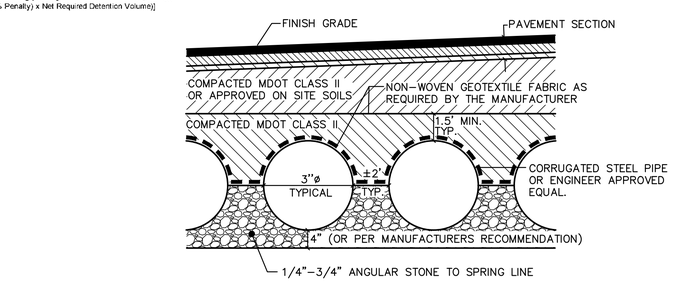


NOTES:

1. MANHOLE SECTIONS TO BE MANUFACTURED TO ASTM C-478 SPECIFICATIONS.
2. REINFORCING SHOWN FOR SCHEMATIC ONLY.
3. CONTRACTOR TO SEAL BETWEEN PRECAST WALL & BASE W/BUTYL ROPE.
4. INLET & OUTLET PIPES SIZE VARIES.

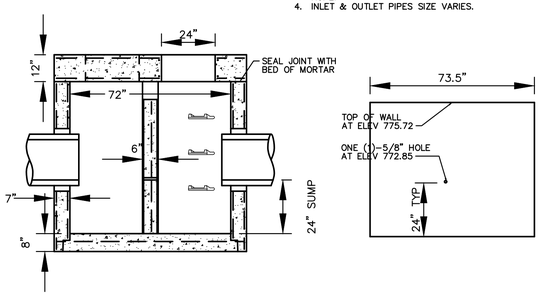
BROADWAY OUTLET CONTROL STRUCTURE (R29)

NO SCALE



BROADWAY PIPE STORMWATER DETENTION

NOT TO SCALE



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1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
STORMWATER MANAGEMENT CALCULATIONS AND DETAILS

16

DATE: 1/22/18
SHEET 16 OF 26
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ENG: HTH
PM: TJC
TECH:
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REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/30/18
PER MUNICIPAL REVIEW	8/10/18

JOB No. 16196A

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1140 Broadway "Short Street" Basin Stormwater Calculations

W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Rational Method Variables

Cover Type	Soil Type	Area (sf)	Area (ac)	Runoff Coeff. (C)	(C) x (Area)
Building/Pavement		15,432	0.35	0.95	0.34
Grass	B	6,126	0.14	0.25	0.04
Total		21,558	0.49		0.37

Weighted C = (Sum(C)x(Area))/(Area Total)= 0.75

NRCS Variables (Pervious)

Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN) x (Area)
Grass	B	6,126	0.14	61	0.09
Total		6,126	0.14		0.09

Weighted CN = (Sum(CN)x(Area))/(Area Total)= 61

NCRS Variables (Impervious)

Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN) x (Area)
Building/Pavement		15,432	0.35	98	0.35
Total		15,432	0.35		0.35

Weighted CN = (Sum(CN)x(Area))/(Area Total)= 98

W2 - First Flush Runoff Calculations (Vff)

A. Vff = 1" x 1/12" x 43560 sf/ac x A x C — where A= 0.49, where C= 0.75 — 1,347 cf

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pre-Development CN:
Meadow, type B Soils CN= 61
C. S = (1000 / CN) - 10 S= 6.393 in
D. Q = [(P-0.2S)^2] / [P+0.8S] Q= 0.154 in
E. Total Site Area excluding "Self-Crediting" BMPs 21,558 sft
F. Vbf-pre = Q x (1/12) x Area 276 cft

W4 - Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pervious Cover CN From Worksheet 1 CN= 61
C. S = (1000 / CN) - 10 S= 6.393 in
D. Q = [(P-0.2S)^2] / [P+0.8S] Q= 0.154 in
E. Pervious Cover Area from Worksheet 1 6,126 sft
F. Vbf-per-post = Q x (1/12) x Area 78 cft

W5 - Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Impervious Cover CN From Worksheet 1 CN= 98
C. S = (1000 / CN) - 10 S= 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] Q= 2.122 in
E. Impervious Cover Area from Worksheet 1 15,432 sft
F. Vbf-imp-post = Q x (1/12) x Area 2,728 cft

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A. 100 year / 24 hour storm event: P= 5.11 in
B. Pervious Cover CN From Worksheet 1 CN= 61
C. S = (1000 / CN) - 10 S= 6.393 in
D. Q = [(P-0.2S)^2] / [P+0.8S] Q= 1.436 in
E. Pervious Cover Area from Worksheet 1 6,126 sft
F. V100-per-post = Q x (1/12) x Area 733 cft

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A. 2 year / 24 hour storm event: P= 5.11 in
B. Impervious Cover CN From Worksheet 1 CN= 98
C. S = (1000 / CN) - 10 S= 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] Q= 4.873 in
E. Impervious Cover Area from Worksheet 1 15,432 sft
F. Vbf-imp-post = Q x (1/12) x Area 6,267 cft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concent 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A. Summary from Previous Worksheets
First Flush Volume (Vff) 1,347 cft
Pre-Development Bankfull Runoff Volume (Vbf-pre) 276 cft
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post) 78 cft
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post) 2,728 cft
Total BF Volume (Vbf-post) 2,807 cft
Pervious Cover Post-Development 100-Year Volume (V100-per-post) 733 cft
Impervious Cover Post-Development 100-Year Volume (V100-imp-post) 6,267 cft
Total 100-Year Volume (V100) 7,000 cft
B. Determine Onsite Infiltration Requirement
Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume
Total Post-Development Bankfull Volume (Vbf-post) 2,807 cft
Pre-Development Bankfull Runoff Volume (Vbf-pre) 276 cft
Bankfull Volume Difference 2,531 cft
Infiltration Requirement (Vinf) 2,531 cft

W10 - Detention/Retention Requirement

A. Qp = 238.6 Tc^0.82 743.63 cfs/(in x sq. mi)
B. Total Site Area excluding "Self-Crediting" BMPs 0.49 ac
C. Q100 = Q100-per + Q100-imp 6.309 in
(from W6 and W7, respectively)
D. Peak Flow (PF) = Qp x Q100 x Area / 640 3.63 cfs
E. Delta = PF - 0.15 x Area (ac) 3.55 cfs
[0.15 x Area (ac)] *0.07 cfs*
F. Vdet = Delta / PF x V100 6,856 cft
Required Detention not including infiltration credit or penalty.
Sediment Forebay Volume Required (5% of V100) 350 cft

W13 - Site Summary of Infiltration & Detention

A. Stormwater Management Summary

Min Infiltration Requirement (Vinf)	2,531 cft
Designed/Provided Infiltration Volume	0 cft
% Minimum Required Infiltration Provided	0 %
Total Calculated Detention Volume, Vdet	6,856 cft
Net Required Detention Volume (Vdet - Designed/Provided Infiltration Volume)	6,856 cft

B. Detention Volume Increase for sites where the required infiltration volume cannot be achieved.

% Required Infiltration NOT Provided (100% - % Minimum Required Infiltration Provided)	100.0 %
Net % Penalty (20% x % Required Infiltration NOT Provided)	20.0 %
Total Required Detention Volume, including penalty [(100% + Net % Penalty) x Net Required Detention Volume)]	**8,228 cft**

W14 - Storage-Elevation Data

Pond Storage Information

Elevation (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)
764.00			-
764.50			582
765.00			1,523
765.50			2,669
766.00			3,896
766.50			5,123
767.00			6,268
767.50			7,229
768.00			7,791

Total Storage Volumes (excluding 6-hour infiltration volumes)

1" Event	1,347	cft	0.03 ac-ft
2-year Event	2,807	cft	0.06 ac-ft
100-year Event	7,000	cft	0.16 ac-ft
100-year + 20% Penalty	*8,228*	*cft*	*0.19 ac-ft*

Storage Elevations

Elevation for 1" event	764.91	Elevation	0.91 ft. depth
Elevation for 2-year event	765.55	Elevation	1.55 ft. depth
Elevation for 100-year event	767.36	Elevation	3.36 ft. depth

W15 - Two-Stage Outlet Design

Xbot (bottom detention elevation)	764.00	
Xbf (bankfull detention elevation)	765.55	
X100 (100-year detention elevation)	767.36	
Vbf (bankfull detention volume)	2,807	cft
V100 (100-year detention volume)	7,000	cft
Qallow (allowable 100-year release rate)	0.07	cfs — 0.15 cfs/acre x area draining to basin

Bankfull Discharge (24-36 hours for the detention volume to drain past the lowest orifice)

Average Head	1.03	ft — h(ave) = 2/3 (Xbf - Xbot)
Bankfull Max. Flowrate	0.03	cfs — Qbf = Vbf / Tbf Tbf = 24 hour min.
Required Area	0.006	sft — Abf = Qbf / 0.62 / sqrt (2*g*h-ave)
Orifice Diameter	1	in
Orifice Area	0.005	sft
Number Required for 24 hour drainage	1.18	
Number of Holes Used	1	
Area of (1) - 1 inch Orifice	0.005	sft
Actual Flow	0.03	cfs — Qact-bf = 0.62 * A * sqrt(2*g*h-ave)
Actual Time	28.27	hr — Tact-bf = Vbf / Qact-bf

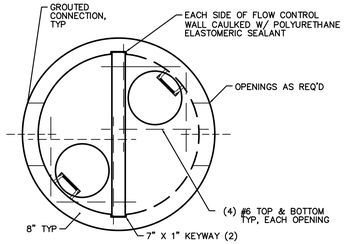
100-year Discharge (0.15 cfs/acre max. allowed)

Average head - 100-year to bankfull orifice	2.24	ft — h(100-ave) = 2/3 (X100 - Xbot)
Average head - 100-year to 100-year orifice	1.21	ft — h(100-ave~) = 2/3 (X100 - Xbf)
Flow through bankfull orifices	0.04	cfs — Q100-bf = 0.62 * Abf * sqrt (2*g*h-100-ave)
Qallow (allowable 100-year release rate)	0.07	cfs — 0.15 cfs/acre x area draining to basin
Max flow through 100-year orifices	0.03	cfs — Qmax-100 = Qallow - Qbf
Max. Area for Orifices	0.01	sft — A_{100} = Qmax-100 / 0.62 / sqrt (2*g*h-100-ave~)
Proposed Orifice Diameter	1.000	in
Orifice Area	0.005	sft
Number Required for 0.15 cfs/acre drainage	1.1	
Number of holes Proposed	1	
Area of (1) - 1 inch Orifice	0.005	sft
100-year orifices - Actual Flow	0.03	cfs — Q100~ = 0.62 * A100 * sqrt (2*g*h-100-ave~)
Actual Combined 100-year Flow	0.07	cfs — Q100 = Q100-bf + Q100~

100-year Drawdown Time (72-hour max. to the lowest orifice)

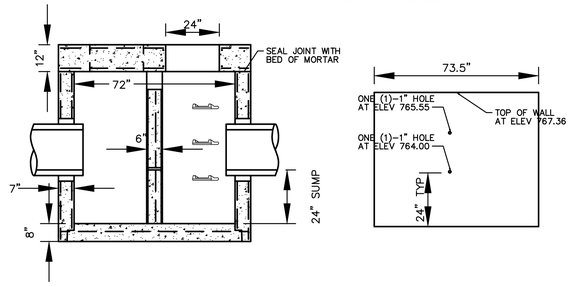
Average head for this drawdown (dd) calculat	2.76	ft — h-dd = 2/3 (X100 - Xbf) + (Xbf - Xbot)
Flow in bankfull for this drawdown (bf-dd) calc	0.05	cfs — Qbf-dd = 0.62 * Abf * sqrt (2*g*h-dd)
Flow in 100-year orifices for this drawdown (~	0.03	cfs — Q100-dd = .62 * A100 * sqrt (2*g*h-100-ave~)
Combined drawdown flow	0.07	cfs — Qdd = Qbf-dd + Q100-dd
Volume of 100-year storm above 2-year storr	4,193	cft — Vrem = V100 - Bfb
Actual time to drain this volume	15.56	hr — T100 = Vrem / (Qdd)
Total 100-year drawdown time	43.82	hr — T100-total = T100 + Tact-bf

This is less than 72 hours max, so the basin complies with the drawdown requirement.



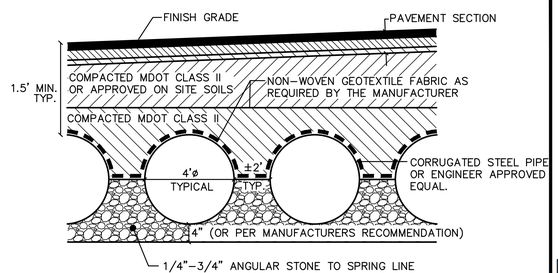
NOTES:

1. MANHOLE SECTIONS TO BE MANUFACTURED TO ASTM C-478 SPECIFICATIONS.
2. REINFORCING SHOWN FOR SCHEMATIC ONLY.
3. CONTRACTOR TO SEAL BETWEEN PRECAST WALL & BASE W/BUTYL ROPE.
4. INLET & OUTLET PIPES SIZE VARIES.



SHORT DRIVE OUTLET CONTROL STRUCTURE

NO SCALE



SHORT DRIVE PIPE STORMWATER DETENTION

NOT TO SCALE

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1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
STORMWATER MANAGEMENT CALCULATIONS AND DETAILS

17

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/30/18

DATE: 01/22/18
SHEET OF 26
CADD:
ENG: HTH
PM: TJC
TECH:
16196SW1.dwg

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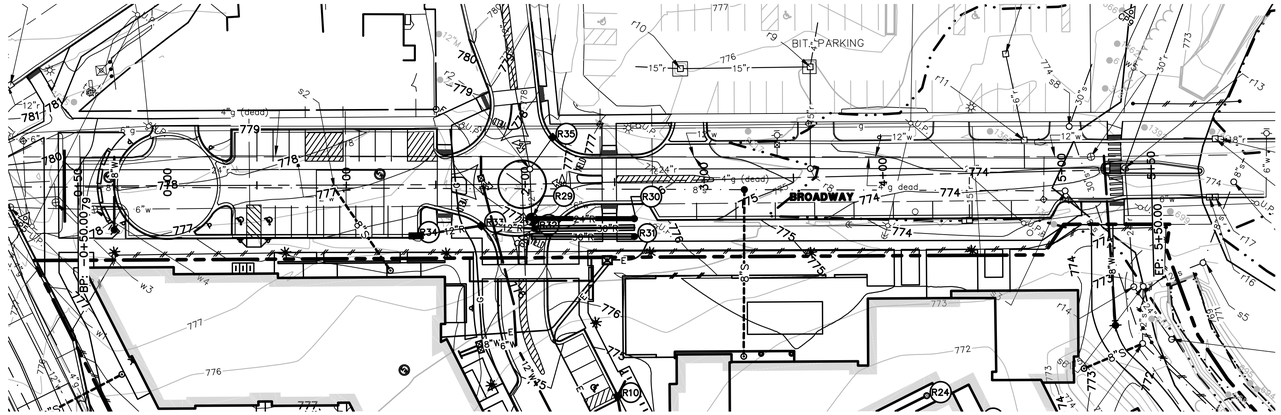
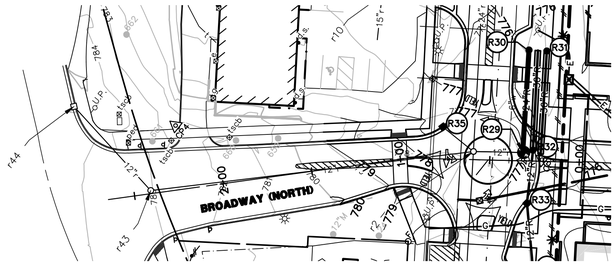
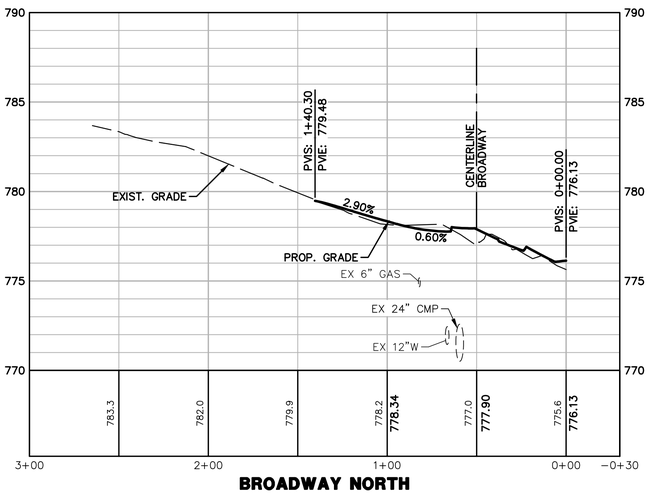


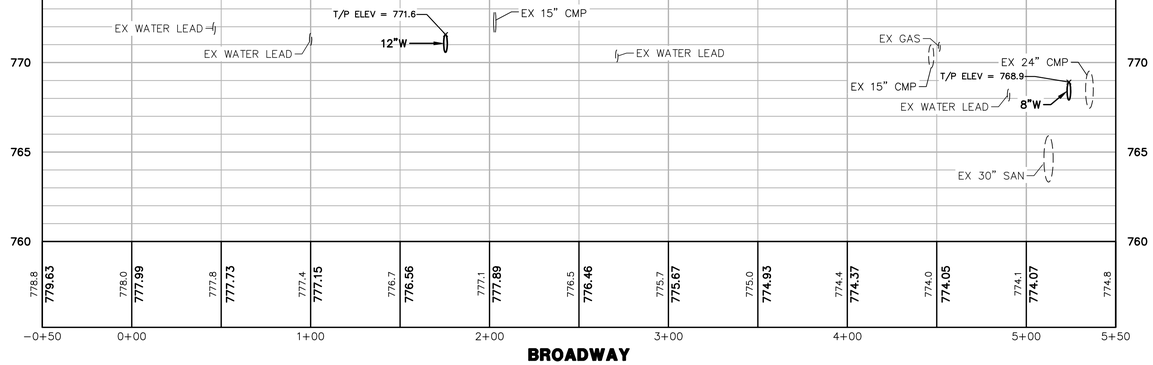


SCALE: 1" = 40'HOR, 1"=4' VERT

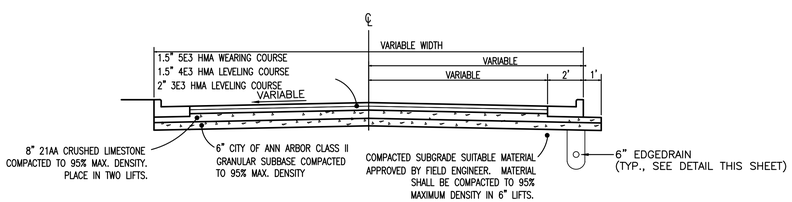
0 40 80 120



BROADWAY NORTH

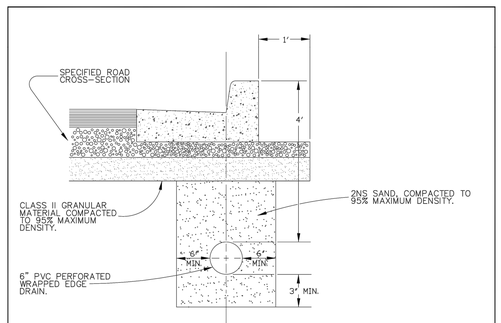


BROADWAY



TYPICAL BROADWAY STREET CROSS-SECTION

NOT TO SCALE



NOTE: FOR PAVEMENT BASE AND SUBBASE THICKNESS, SEE TYPICAL PAVEMENT CROSS-SECTION.

NOTE: DENSITY TESTING PER CITY OF ANN ARBOR SPECIFICATIONS.

NOTE: TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION ONLY.

NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE

PUBLIC SERVICES DEPARTMENT
CITY OF ANN ARBOR

TYPICAL EDGEDRAIN TRENCH

DR. BY	DF	CH. BY	CSS	DRAWING NO.
SCALE	NONE	DATE	11-6-92	SD-TD-10
INCH	0 1"			SHEET NO. ____ OF ____

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

M:\Civil3d_Pro\16196\Detailed Engineering\16196PR2.dwg, 6/5/2018 9:52 AM, Heath Hartt, None
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1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
BROADWAY PLAN AND PROFILE

18

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/30/18
PER MUNICIPAL REVIEW	

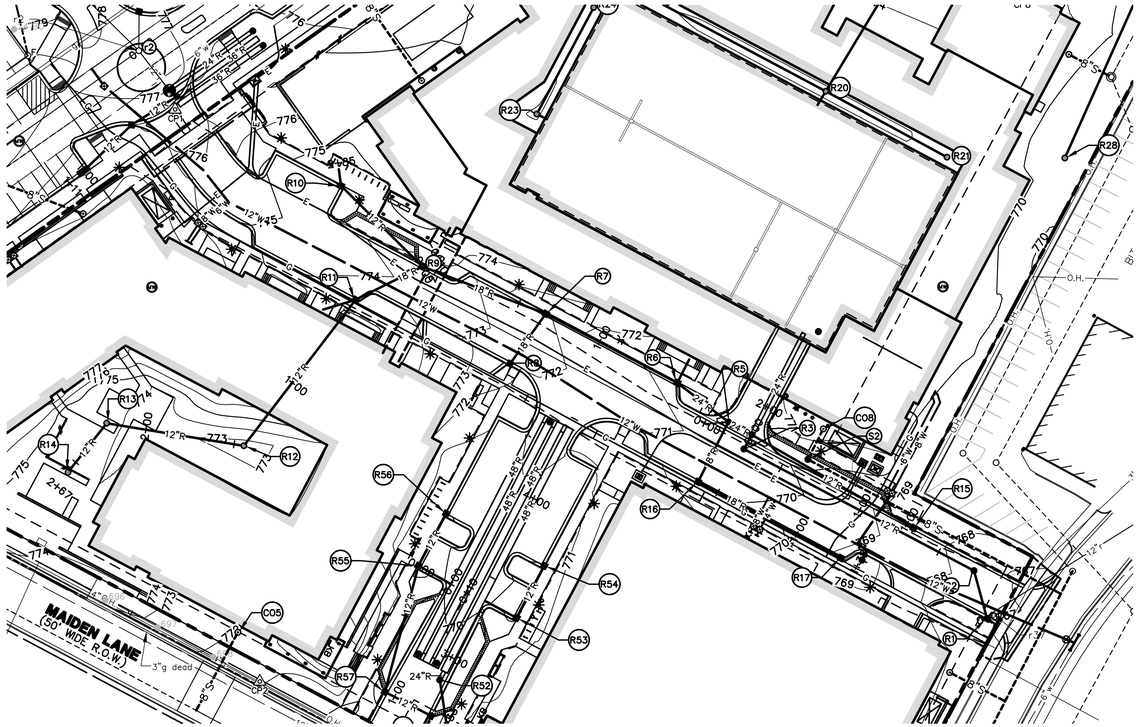
DATE: 01/22/18
SHEET 17 OF 26
CADD:
ENG: HTH
PM: TJC
TECH:
16196PR2.dwg
1:50

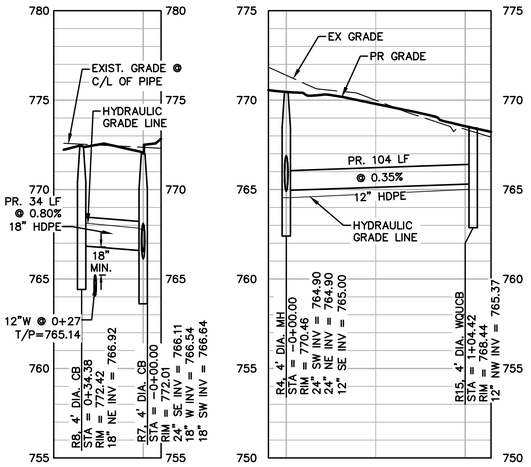
SCALE: 1" = 4' VERT
SCALE: 1" = 40' HOR

0 40 80 120

LEGEND

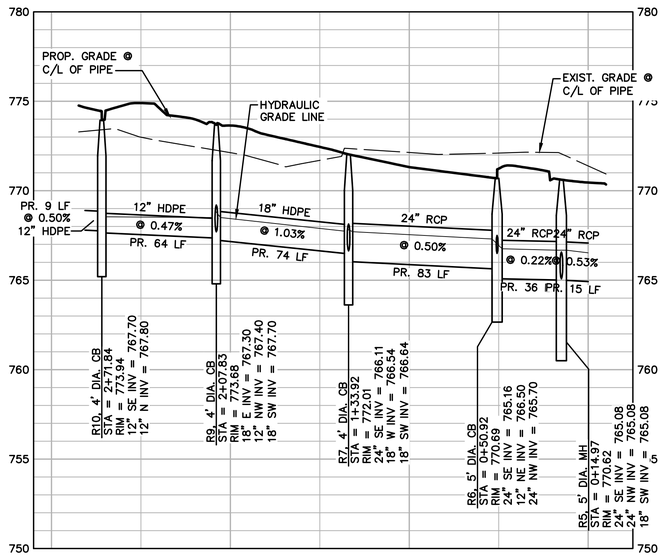
- EXIST. WATER MAIN
- PROP. WATER MAIN
- EXIST. HYDRANT
- PROP. HYDRANT
- EXIST. GATE VALVE IN BOX
- PROP. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- PROP. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- PROP. CURB STOP & BOX
- REDUCER
- EXIST. BLOW-OFF
- PROP. BLOW-OFF
- P.I.V. POST INDICATOR VALVE
- THRUST BLOCK
- EXIST. STORM SEWER
- PROP. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- PROP. CATCH BASIN OR INLET
- END SECTION
- HEAD WALL
- CULVERT
- EXIST. SANITARY SEWER
- PROP. SANITARY SEWER
- EXIST. CLEANOUT
- PROP. CLEANOUT



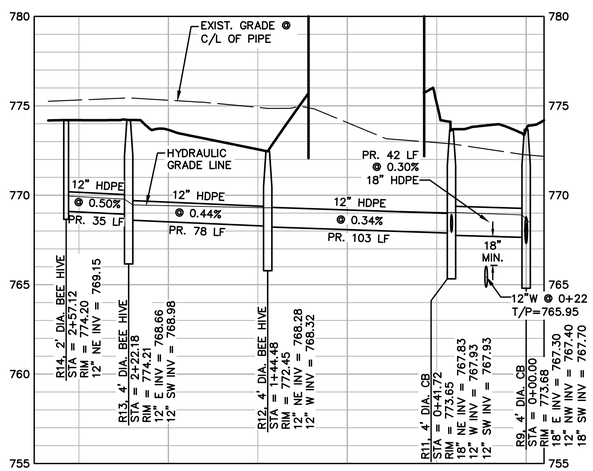


R8 TO R7

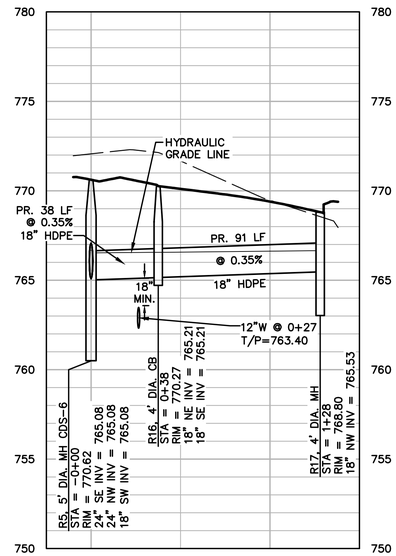
R15 TO R4



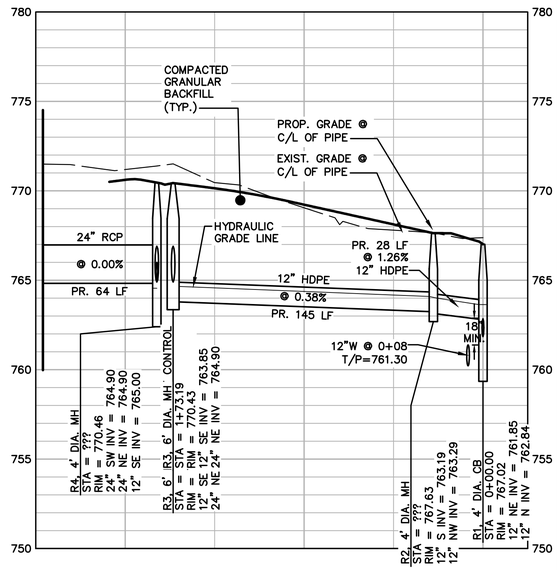
R10-R3



R14 TO R9



R17 TO R5 (WQU)



DETENTION TO R1

M:\Civil3d_Proj\16196\Detailed Engineering\16196PR1.dwg, 6/5/2018 9:53 AM, Heath Hart, 19 STORM SEWER PROFILES, MCLLC PDF.pc3
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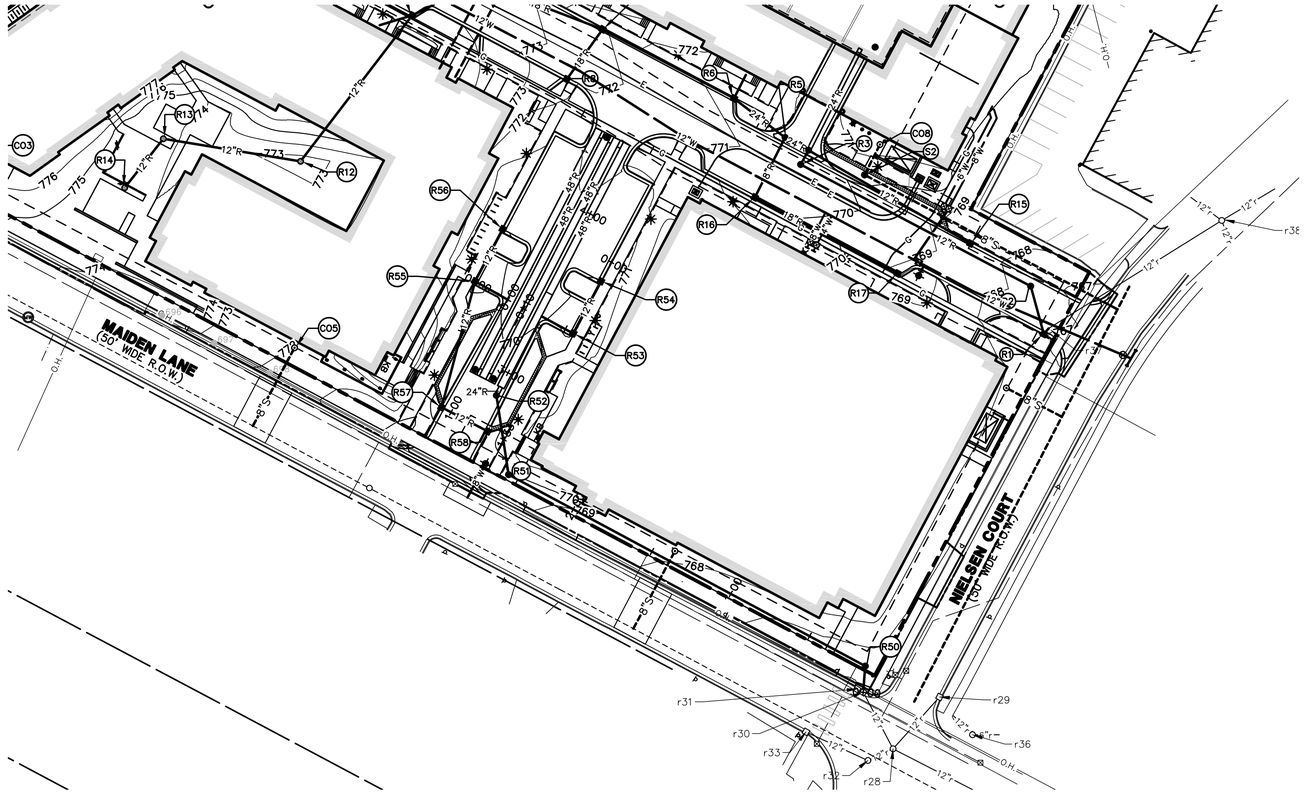
DETAILED ENGINEERING PLANS
STORM SEWER PROFILES

19

JOB No. 16196A

DATE: 01/22/18
SHEET 18 OF 26
CADD:
ENG.: MTH
PM: DJC
TECH:
16196PR1.dwg

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	4/30/18
PER MUNICIPAL REVIEW	5/30/18



SCALE: 1" = 4' VERT
SCALE: 1" = 40' HOR

0 40 80 120

LEGEND

- EXIST. WATER MAIN
- PROP. WATER MAIN
- EXIST. HYDRANT
- PROP. HYDRANT
- EXIST. GATE VALVE IN BOX
- PROP. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- PROP. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- PROP. CURB STOP & BOX
- REDUCER
- EXIST. BLOW-OFF
- PROP. BLOW-OFF
- P.I.V. POST INDICATOR VALVE
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- PROP. STORM SEWER
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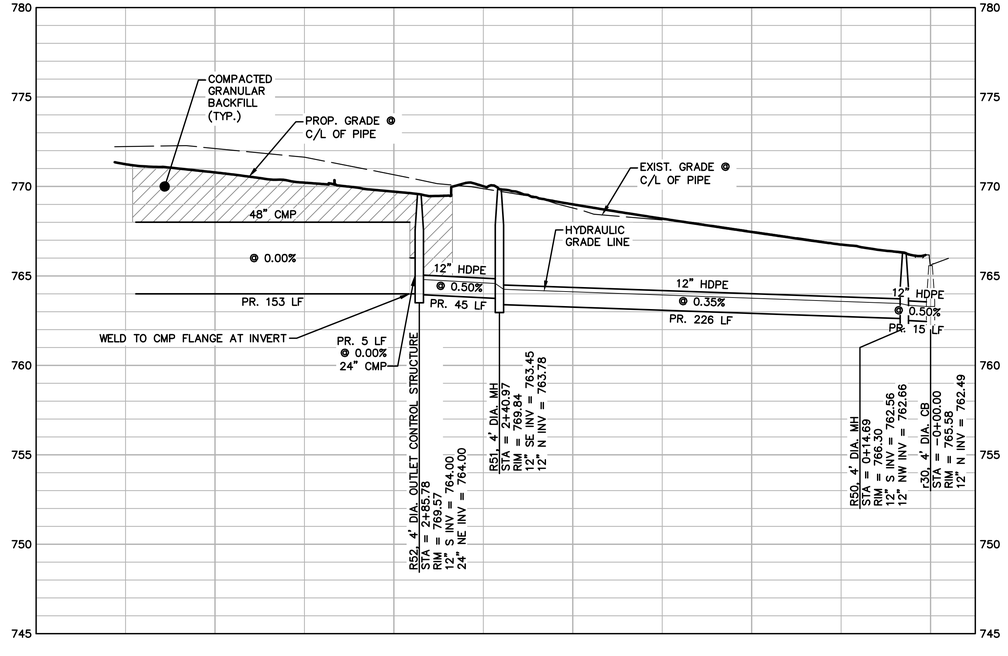
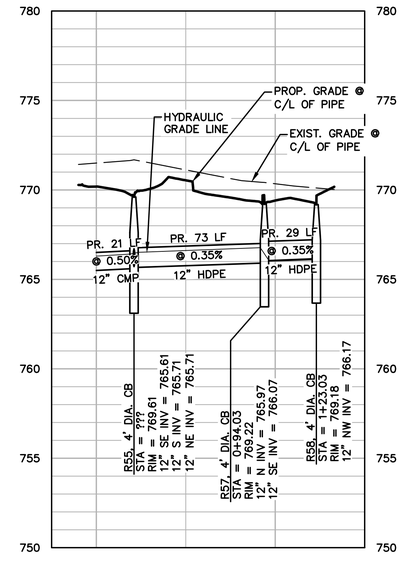
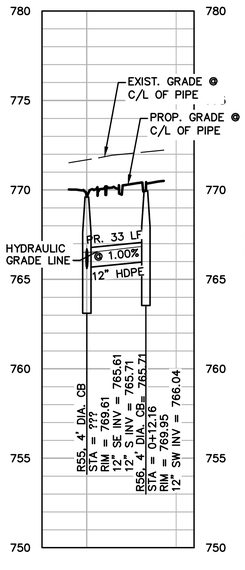
- PROP. CATCH BASIN OR INLET
- END SECTION
- HEAD WALL
- CULVERT
- EXIST. SANITARY SEWER
- PROP. SANITARY SEWER
- EXIST. CLEANOUT
- PROP. CLEANOUT



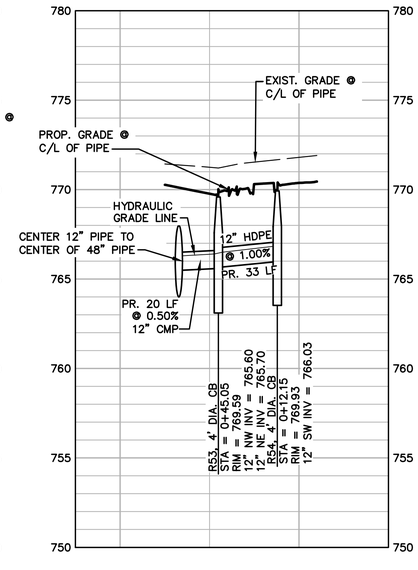
R51-R50



R58 TO SHORT RD DETENTION



R56 TO R55



R54 TO SHORT RD DETENTION

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DETAILED ENGINEERING PLANS
STORM SEWER PROFILES

20

JOB No. **16196A**

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/30/18
PER MUNICIPAL REVIEW	

DATE: 01/22/18
SHEET 19 OF 26
CADD:
ENG: HTH
PM: TJC
TECH:
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STORM DRAINAGE CALCULATION SHEET

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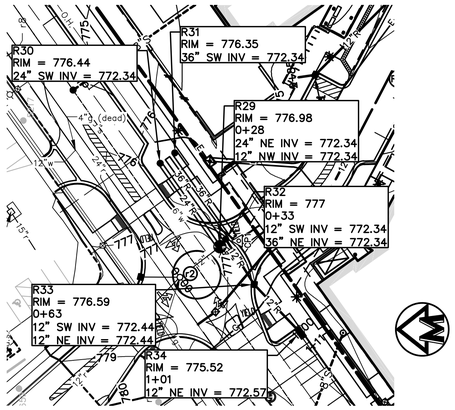
Ann Arbor, MI 48108
(734) 995-0200, Fax (734) 995-0599

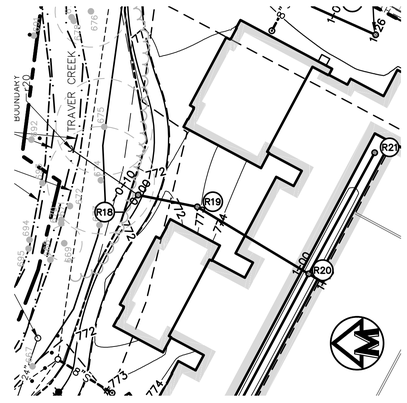
Runoff Formula: Q = CIA
I = x/T+y x = 175 y= 25 (10 Year Storm Event)
Type of Pipe = rcp
n = 0.012 0.013 (RCP)

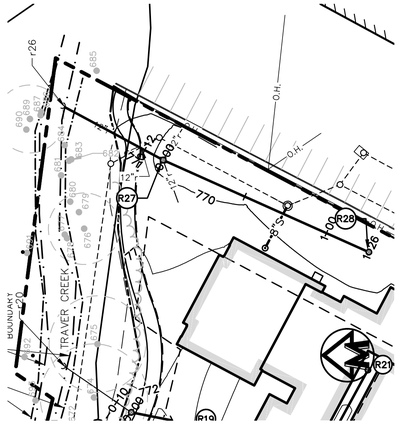
PROJECT/CLIENT:
Job No.: 16196
Date: 05/08/18
By: HTH
Revised:

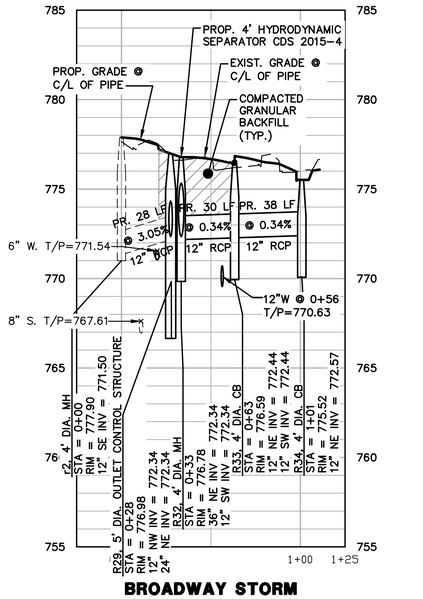
Structure No. From	Structure No. To	Drainage Area A (Acres)	Runoff Coeff. C	CxA	ADD. CxA	Σ CxA	Time T (min.)	Rainfall I (in./hr.)	Q (cfs)	Pipe Dia. (in.)	Pipe Length (ft.)	Pipe Slope %	H.G. Slope %	Velocity Flowing Full (ft./sec.)	Travel Time (min.)	Pipe Capacity (cfs)	Surface Elev. Upstr.	H.G. Upstr.	H.G. Dwnstr.	Invert Elev. Upstr.	Invert Elev. Dwnstr.
R58	R57	0.04	0.74	0.03		0.03	15.00	4.38	0.14	12	29	0.35	0.00	2.92	0.17	2.29	769.18	766.17	766.07	766.17	766.07
R57	R55	0.04	0.74	0.03		0.07	15.17	4.36	0.29	12	73	0.35	0.01	2.92	0.42	2.29	769.22	766.77	766.51	765.97	765.71
R56	R55	0.04	0.74	0.03		0.03	15.58	4.31	0.14	12	33	1.00	0.00	4.93	0.11	3.87	769.95	766.84	766.51	766.04	765.71
R55	DET	0.04	0.74	0.03	0.07	0.13	15.69	4.30	0.57	12	21	0.50	0.02	3.48	0.10	2.74	769.61	766.41	766.30	765.61	765.50
R54	R53	0.10	0.78	0.07		0.07	15.00	4.38	0.33	12	33	1.00	0.01	4.93	0.11	3.87	769.93	766.83	766.50	766.03	765.70
R53	DET	0.04	0.73	0.03		0.11	15.11	4.36	0.46	12	20	0.50	0.01	3.48	0.10	2.74	769.59	766.40	766.30	765.60	765.50
R52	R51	0.00	0.00	0.00	0.24	0.24	15.00	4.38	1.04	12	45	0.50	0.09	3.48	0.21	2.74	769.57	764.80	764.58	764.00	763.78
R51	R50	0.00	0.00	0.00		0.24	15.21	4.35	1.03	12	226	0.35	0.08	2.92	1.29	2.29	769.93	764.25	763.46	763.45	762.66
R50	r30	0.00	0.00	0.00		0.24	16.51	4.22	1.00	12	15	0.50	0.08	3.48	0.07	2.74	766.35	763.36	763.29	762.56	762.49
R34	R33	0.19	0.35	0.07		0.07	15.00	4.38	0.29	12	38	0.34	0.01	2.65	0.24	2.08	775.52	773.37	773.24	772.57	772.44
R33	R32	0.19	0.35	0.07		0.13	15.24	4.35	0.58	12	30	0.34	0.03	2.65	0.19	2.08	776.59	773.24	773.14	772.44	772.34
R28	R27	0.19	0.35	0.07		0.07	15.00	4.38	0.29	12	126	0.34	0.01	2.87	0.73	2.26	769.46	768.10	767.67	767.30	766.87
R19	R18	0.94	0.93	0.87		0.87	15.00	4.38	3.83	12	34	3.00	0.98	8.53	0.07	6.70	772.24	768.11	767.10	767.31	766.30
R17	R16	0.94	0.93	0.87		0.87	15.00	4.38	3.83	18	78	0.32	0.11	3.65	0.35	6.45	768.66	766.65	766.56	765.35	765.10
R16	DET	0.00	0.00	0.00		0.87	15.35	4.34	3.79	18	26	0.52	0.11	4.66	0.09	8.23	770.05	766.56	766.53	764.98	764.85
																		766.53			
R15	R4	0.13	0.83	0.11		0.11	15.00	4.38	0.46	12	93	0.50	0.01	3.48	0.44	2.74	768.44	765.01	764.55	764.21	763.75
R14	R13	0.07	0.57	0.04		0.04	15.00	4.38	0.17	12	35	0.50	0.00	3.48	0.17	2.74	774.20	769.95	769.78	769.15	768.98
R13	R12	0.28	0.90	0.25		0.29	15.17	4.36	1.25	12	78	0.44	0.11	3.27	0.40	2.57	774.21	769.46	769.30	768.66	768.32
R12	R11	0.25	0.70	0.17		0.46	15.56	4.31	1.99	12	102	0.34	0.27	2.87	0.59	2.26	772.45	769.30	769.03	768.28	767.93
R11	R9	0.39	0.92	0.35		0.82	16.16	4.25	3.47	18	42	0.30	0.09	3.54	0.20	6.25	774.15	769.03	768.90	767.83	767.70
R10	R09	0.26	0.84	0.22		0.22	15.00	4.38	0.95	12	64	0.47	0.06	3.38	0.32	2.65	773.94	768.54	768.50	767.70	767.40
R09	R07	0.06	0.84	0.05	0.82	1.08	16.36	4.23	4.57	18	74	1.04	0.16	6.58	0.19	11.64	773.80	768.50	767.74	767.30	766.54
R08	R07	0.29	0.90	0.26	1.08	1.34	15.00	4.38	5.86	18	34	0.80	0.27	5.78	0.10	10.21	772.42	768.12	767.84	766.92	766.64
R07	R06	0.65	0.93	0.61		1.95	16.54	4.21	8.21	24	83	0.50	0.11	5.53	0.25	17.38	772.01	767.71	767.30	766.11	765.70
R06	R05	0.07	0.83	0.06		2.01	16.79	4.19	8.42	24	29	0.27	0.12	4.06	0.12	12.77	770.69	766.76	766.68	765.16	765.08
R05	DET	0.00	0.00	0.00		2.01	16.91	4.18	8.40	24	41	0.43	0.12	5.13	0.13	16.11	771.06	766.68	766.53	765.08	764.91

SCALE: 1" = 4' VERT
SCALE: 1" = 40' HOR
0 40 80 120

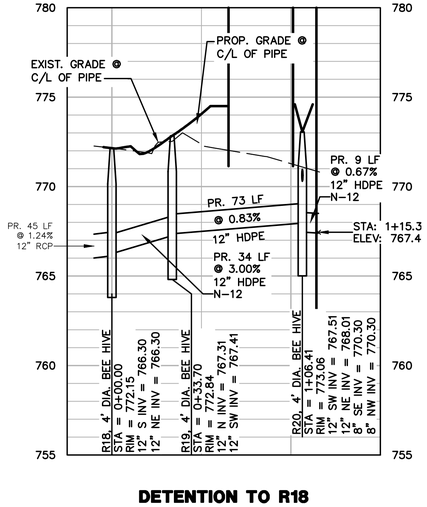




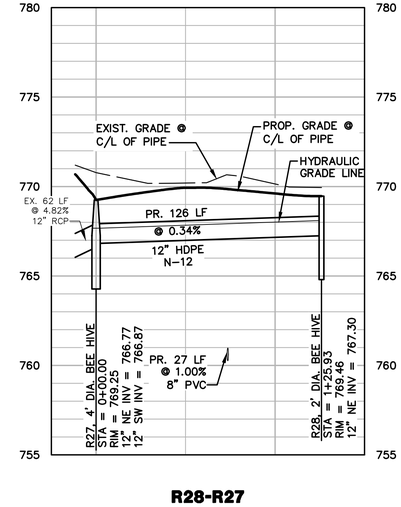




BROADWAY STORM



DETENTION TO R18



R28-R27

STRUCTURE TABLE

STRUCTURE NO.	TYPE	RIM ELEV.	INV.	DEPTH	SUMP	COVER TYPE
R1	4' DIAM. CB	767.02	12" N 762.84 12" NE 761.85	7.17	2'	EJIW 7045 Type M1
R2	4' DIAM. MH	767.63	12" NW 763.29 12" S 763.19	4.44	0'	EJIW 1040 Type B
R3	6' DIAM. MH	770.43	24" NE 764.90 12" SE 763.85	6.58	0'	EJIW 1040 Type B
R4	4' DIAM. MH	770.46	24" NE 764.90 12" SE 765.00 24" SW 764.90	7.56	2'	EJIW 1040 Type B
R5	6' DIAM. MH	770.62	24" NW 765.08 18" SW 765.08 24" SE 765.08	9.62	4'	EJIW 1040 Type B
R6	5' DIAM. CB	770.69	24" NW 765.70 24" SE 765.16 12" NE 766.50	7.53	2'	EJIW 7045 Type M1
R7	4' DIAM. CB	772.01	18" W 766.54 18" SW 766.64 24" SE 766.11	7.90	2'	EJIW 7045 Type M1
R8	4' DIAM. CB	772.42	18" NE 766.92	7.50	2'	EJIW 7045 Type M1
R9	4' DIAM. CB	773.68	12" NW 767.40 18" SW 767.70 18" E 767.30	8.38	2'	EJIW 7045 Type M1
R10	4' DIAM. CB	773.94	12" N 767.80 12" SE 767.70	8.24	2'	EJIW 7045 Type M1
R11	4' DIAM. CB	773.65	12" W 767.93 12" SW 767.93 18" NE 767.83	7.83	2'	EJIW 7045 Type M1
R12	4' DIAM. BEE HIVE	772.45	12" W 768.32 12" NE 768.28	6.17	2'	EJIW 1040 Type N
R13	4' DIAM. BEE HIVE	774.21	12" SW 768.98 12" E 768.66	7.55	2'	EJIW 1040 Type N
R14	2' DIAM. BEE HIVE	774.20	12" NE 769.15	5.05	0'	EJIW 1040 Type N
R15	4' DIAM. CB	768.44	12" NW 765.37	5.08	2'	EJIW 7045 Type M1
R16	4' DIAM. CB	770.27	18" SE 765.21 18" NE 765.21	5.06	0'	EJIW 7045 Type M1
R17	4' DIAM. MH	768.80	18" NW 765.53	5.28	2'	EJIW 7045 Type M1
R18	4' DIAM. BEE HIVE	772.15	12" S 766.30 12" NE 766.30	7.85	2'	EJIW 1040 Type N
R19	4' DIAM. BEE HIVE	772.84	12" SW 767.41 12" N 767.31	7.53	2'	EJIW 1040 Type N
R20	4' DIAM. BEE HIVE	773.06	8" SE 770.30 8" NW 770.30 12" SW 767.51 12" NE 768.01	7.55	2'	EJIW 1040 Type M1
R21	2' DIAM. BEE HIVE	774.38	8" NW 772.00	2.38	0'	EJIW 1040 Type M1
R22	2' DIAM. BEE HIVE	774.17	8" SE 772.50	1.67	0'	EJIW 1040 Type M1
R23	2' DIAM. BEE HIVE	773.77	8" NE 769.32 8" SE 769.22	4.55	0'	EJIW 1040 Type M1
R24	2' DIAM. BEE HIVE	774.44	8" SW 770.00	4.44	0'	EJIW 1040 Type M1
R27	4' DIAM. BEE HIVE	769.25	12" SW 766.87 12" NE 766.77	4.48	2'	EJIW 1040 Type N
R28	2' DIAM. BEE HIVE	769.46	12" NE 767.30	4.17	2'	EJIW 1040 Type N
R29	5' DIAM. OUTLET CONTROL STRUCTURE	776.98	24" NE 772.34 12" NW 772.34	9.83	2'	EJIW 1040 Type B
R32	4' DIAM. MH	776.78	12" SW 772.34 36" NE 772.34	6.44	2'	EJIW 1040 Type B
R33	4' DIAM. CB	776.59	12" SW 772.44 12" NE 772.44	6.15	2'	EJIW 7045 Type M1
R34	4' DIAM. CB	775.52	12" NE 772.57	4.95	2'	EJIW 7045 Type M1
R35	4' DIAM. CB	777.31	12" S 773.32	3.99	0'	EJIW 7045 Type M1
R50	4' DIAM. MH	766.30	12" NW 762.66 12" S 762.56	3.74	0'	EJIW 1040 Type B
R51	4' DIAM. MH	769.84	12" N 763.78 12" SE 763.45	6.39	0'	EJIW 1040 Type B
R52	4' DIAM. OUTLET CONTROL STRUCTURE	769.57	24" NE 764.00 12" S 764.00	5.57	0'	EJIW 1040 Type B
R53	4' DIAM. CB	769.59	12" NE 765.70 12" NW 765.60	5.99	2'	EJIW 7045 Type M1
R54	4' DIAM. CB	769.93	12" SW 766.03	5.90	2'	EJIW 7045 Type M1
R55	4' DIAM. CB	769.61	12" S 765.71 12" NE 765.71 12" SE 765.61	6.00	2'	EJIW 7045 Type M1
R56	4' DIAM. CB	769.95	12" SW 766.04	5.91	2'	EJIW 7045 Type M1
R57	4' DIAM. CB	769.22	12" SE 766.07 12" N 765.97	5.25	2'	EJIW 7045 Type M1
R58	4' DIAM. CB	769.18	12" NW 766.17	5.01	2'	EJIW 7045 Type M1

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DETAILED ENGINEERING PLANS
STORM SEWER PROFILES

21

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	4/27/18
PER MUNICIPAL REVIEW	5/30/18

DATE: 1/22/18
SHEET 20 OF 26
CADD:
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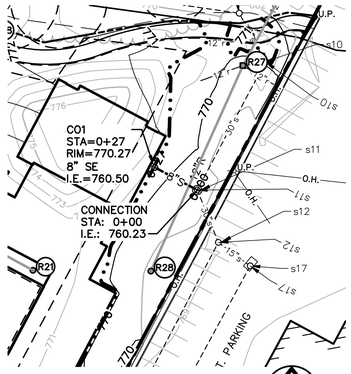

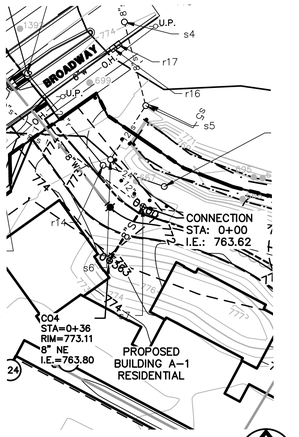

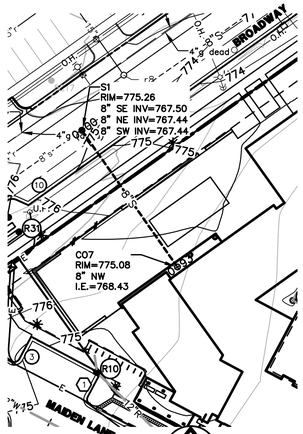

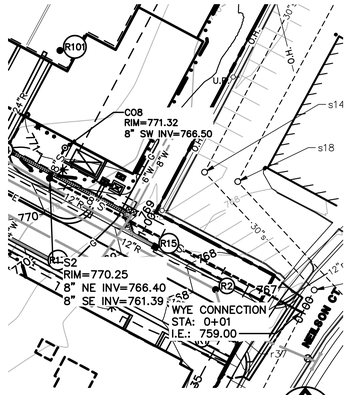

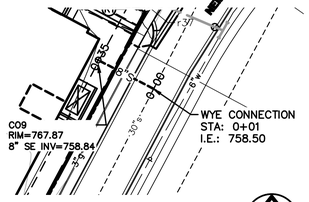

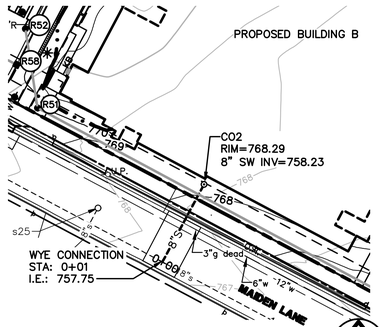

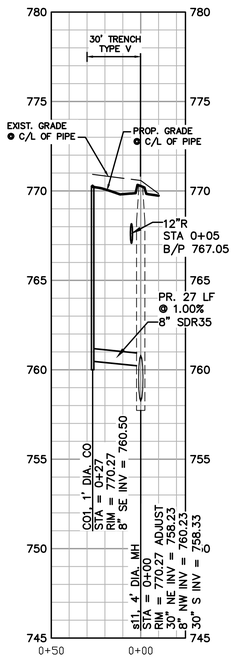

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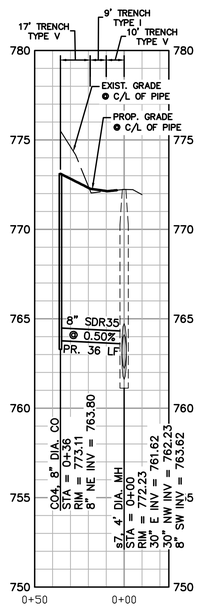

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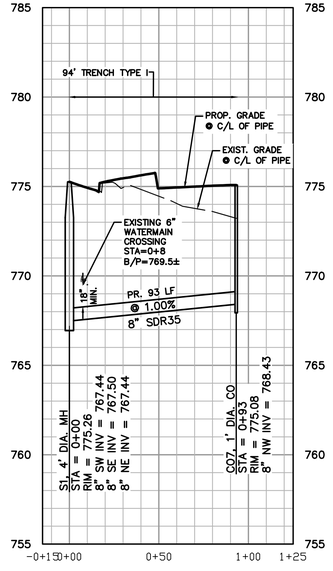

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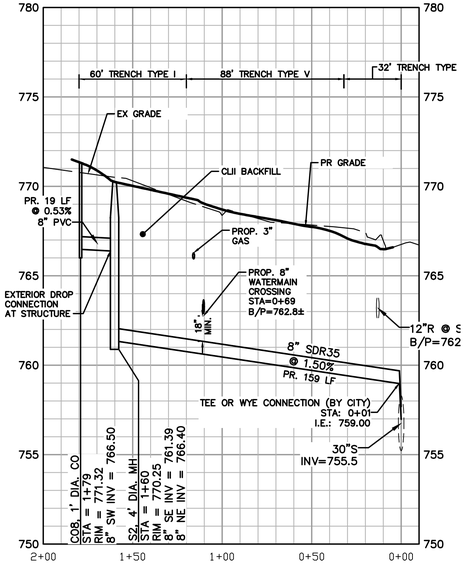

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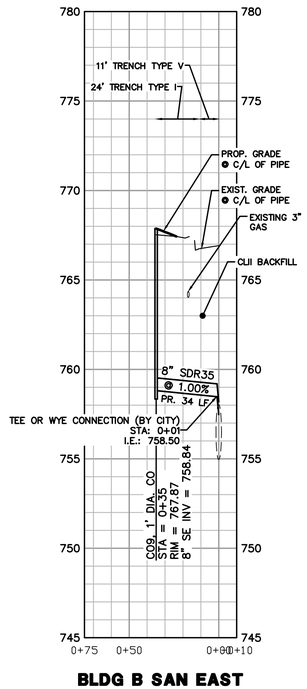

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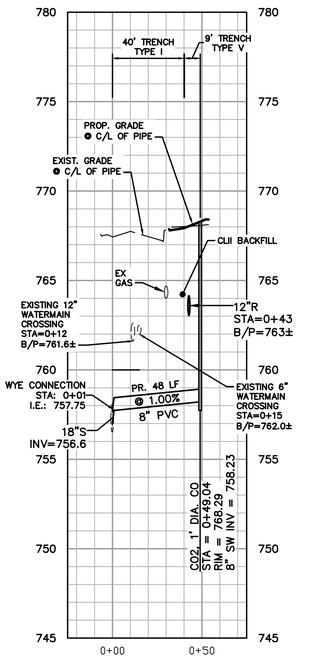

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SCALE: 1" = 4' VERT
SCALE: 1" = 40' HOR
0 40 80 120

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

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SANITARY LEAD PROFILES

22

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	7/18/18
PER MUNICIPAL REVIEW	5/30/18

DATE: 1/22/18
SHEET 21 OF 26
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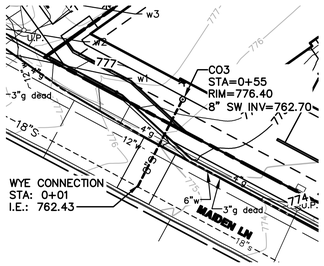

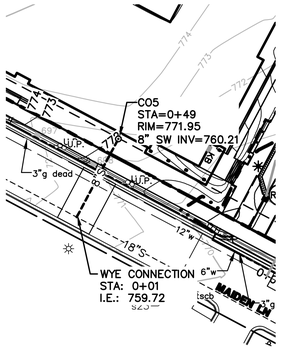

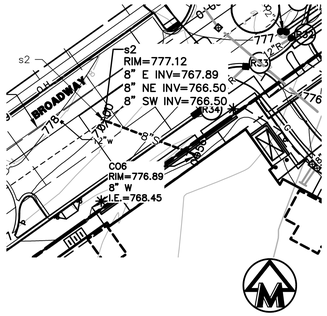

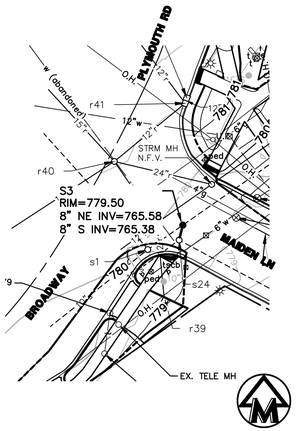

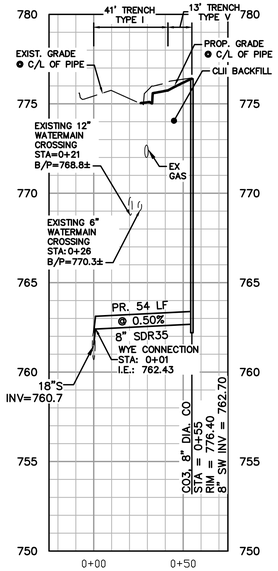

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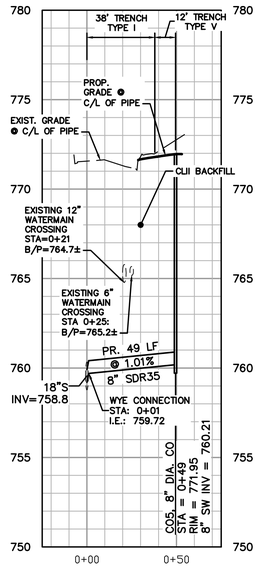

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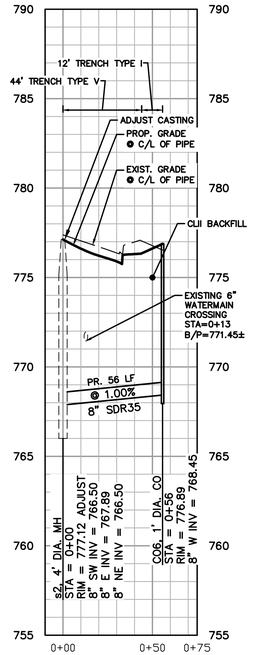

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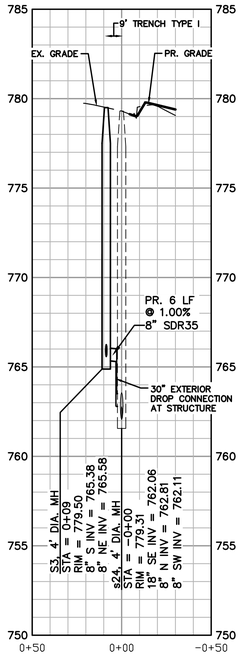

PLYMOUTH RD CONNECTION

SCALE: 1" = 4' VERT
SCALE: 1" = 40' HOR

0 40 80 120

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JOB No. 16196A
REVISIONS: PER MUNICIPAL REVIEW — REV. DATE 5/30/18
DATE: 01/22/18
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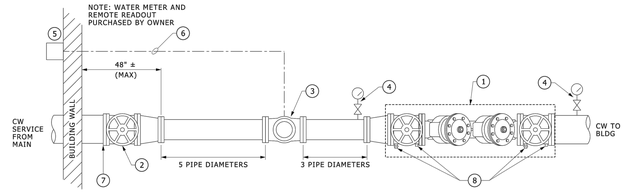

1. U.L. APPROVED DOUBLE CHECK DETECTOR ASSEMBLY OR REDUCED PRESSURE ZONE DETECTOR ASSEMBLY, AS REQUIRED BY CITY OF ANN ARBOR. PROVIDE WITH OS&Y GATE VALVES.
2. HIGH PERFORMANCE BUTTERFLY VALVE
3. WATER METER (OBTAINED FROM CITY OF ANN ARBOR, INSTALLED BY CONTRACTOR)
4. PRESSURE GAUGE AND BALL VALVE
5. REMOTE READOUT (OBTAINED FROM CITY OF ANN ARBOR, INSTALLED BY CONTRACTOR)
6. ½" EMT CONDUIT WITH 3 WIRE PHONE CABLE. CABLE FURNISHED BY CITY OF ANN ARBOR. CONTRACTOR SHALL FURNISH AND INSTALL CONDUIT AND INSTALL CABLE. CONTACT CITY FOR MAX. CABLE LENGTH.
7. TERMINATION OF DUCTILE IRON PIPE SHALL BE THREADED AND EQUIPPED WITH SCREW-ON MACHINE TIGHTENED, DUCTILE IRON FLANGE COMPLYING WITH ANSI/AWWA C110 AND C115.
8. PROVIDE ALL CONNECTIONS, VALVES AND FITTINGS REQUIRED TO PROPERLY TEST THE BACKFLOW PREVENTION DEVICE.

DOMESTIC WATER SERVICE SYSTEM DETAIL

NO SCALE

DESIGNER'S NOTE: REVISE NOTE (1) TO SPECIFY A RPZ OR A DOUBLE CHECK ASSEMBLY, AS REQUIRED BY THE CITY OF ANN ARBOR BASED ON THE BUILDING HAZARD LEVEL.

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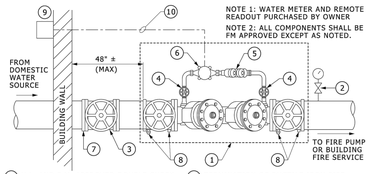


1. U.L. AND F.M. APPROVED DOUBLE CHECK DETECTOR ASSEMBLY, PROVIDE WITH OS&Y GATE VALVES.
2. PRESSURE GAUGE AND BALL VALVE
3. OS&Y VALVE
4. BALL VALVE
5. DOUBLE CHECK VALVES
6. U.L. LISTED AND/OR F.M. APPROVED ¾" WATER METER (OBTAINED FROM CITY OF ANN ARBOR, INSTALLED BY CONTRACTOR)
7. TERMINATION OF DUCTILE IRON PIPE SHALL BE THREADED AND EQUIPPED WITH SCREW-ON MACHINE TIGHTENED, DUCTILE IRON FLANGE COMPLYING WITH ANSI/AWWA C110 AND C115.
8. PROVIDE ALL CONNECTIONS, VALVES AND FITTINGS REQUIRED TO PROPERLY TEST THE BACKFLOW PREVENTION DEVICE.
9. REMOTE READOUT (OBTAINED FROM CITY OF ANN ARBOR, INSTALLED BY CONTRACTOR).
10. ½" EMT CONDUIT WITH 3 WIRE PHONE CABLE. CABLE FURNISHED BY CITY OF ANN ARBOR. CONTRACTOR SHALL FURNISH AND INSTALL ONDUIT AND INSTALL CABLE. CONTACT CITY FOR MAX. CABLE LENGTH.

FIRE SERVICE SYSTEM DETAIL

NO SCALE

DESIGNER'S NOTE: REVISE NOTE (1) AND (5) SPECIFY A RPZ OR A DOUBLE CHECK ASSEMBLY, AS REQUIRED BY THE CITY OF ANN ARBOR BASED ON THE BUILDING HAZARD LEVEL.

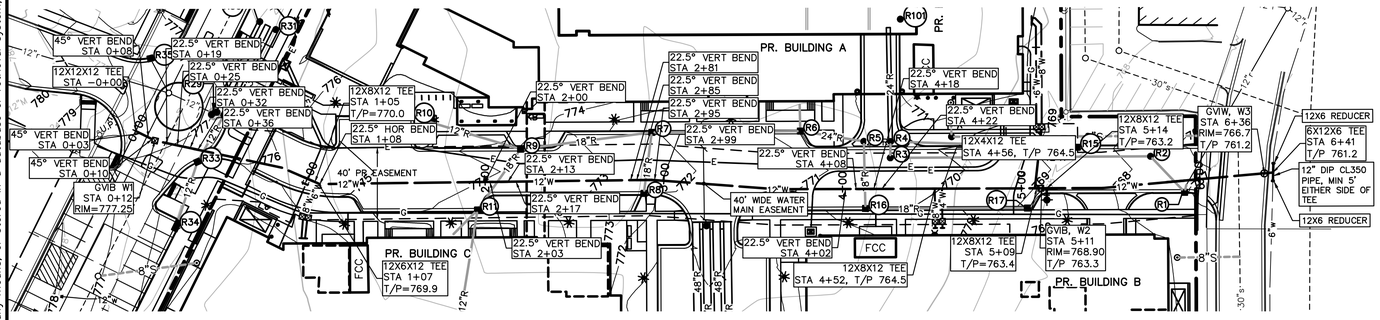
D 15300 001 01 14.dgn

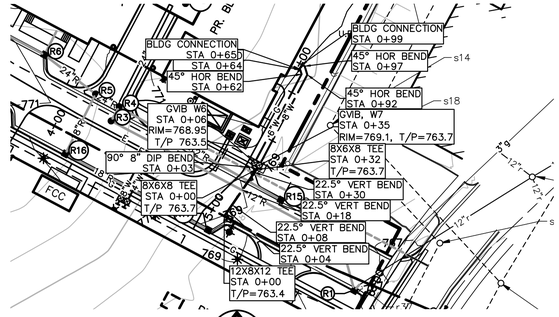
NOTE:
ALL WATERMAIN SHALL HAVE NITRILE GASKETS AND DOUBLE WRAP POLY

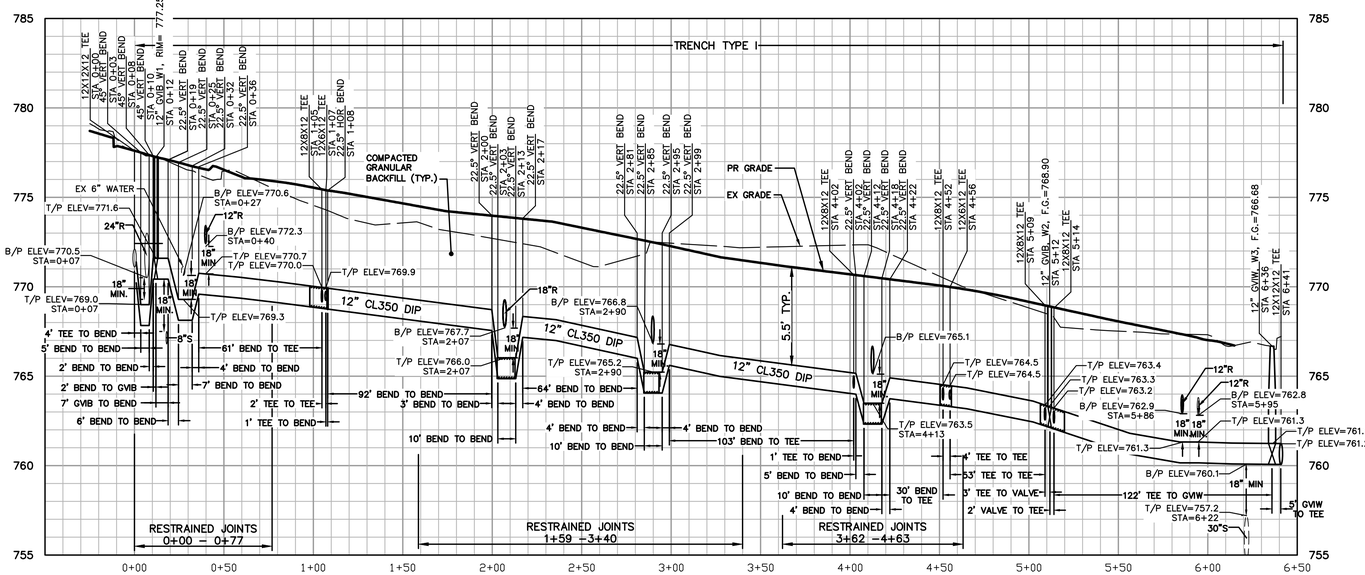
LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	PROP. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	PROP. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	PROP. CURB STOP & BOX
	REDUCER
r	EXIST. STORM SEWER
	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
s	EXIST. SANITARY SEWER
	PROP. SANITARY SEWER
	EXIST. CLEANOUT
	PROP. CLEANOUT

1' = 4' VERT
SCALE: 1" = 40' HOR
0 40 80 120







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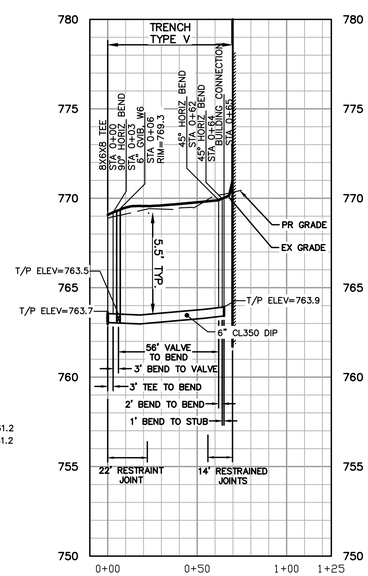
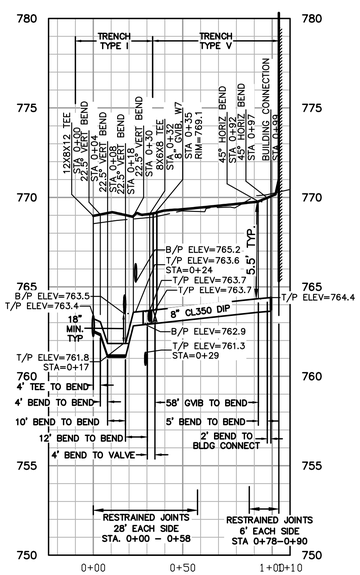


BUILDING A 6 In DOMESTIC



BLDG A 8 In FIRE

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1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
WATER MAIN PROFILES

24

JOB No. 16196A

DATE: 1/22/18
SHEET 22 OF 26
CADD:
ENG.: MTH
PM: DJC
TECH:
16196PW1.dwg

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	3/16/18
PER MUNICIPAL REVIEW	5/30/18

M:\Civil3d_Proj\16196\Detailed Engineering\16196PW1.dwg, 6/5/2018 9:57 AM, Heath Hart1, 24 WATER MAIN PROFILES, MCLLC PDF pc3
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WATER MAIN QUANTITIES

Description	Quantity	Unit
12" Gate Valve in Box	2	Ea
12" Gate Valve in Well	1	Ea
8" Gate Valve in Box	3	Ea
6" Gate Valve in Box	2	Ea
4" Gate Valve in Box	1	Ea
12" Ductile Iron Pipe, CL350	641	L.F.
8" Ductile Iron Pipe, CL350	286	L.F.
6" Ductile Iron Pipe, CL350	122	L.F.
4" Ductile Iron Pipe, CL350	22	L.F.
Hydrant Assembly	4	Ea
12"x12"x12" TEE	2	Ea
12"x8"x12" TEE	7	Ea
12"x4"x12" TEE	1	Ea
8"x6"x8" TEE	1	Ea
45 Degree Bend, 12"	3	Ea
22.5 Degree Bend,12"	17	Ea
45 Degree Bend, 8"	2	Ea
22.5 Degree Bend, 8"	8	Ea
11.25 Degree Bend, 8"	1	Ea
22.5 Degree Bend, 4"	2	Ea
12"x6" Reducer	2	Ea
8"x6" Reducer	4	Ea

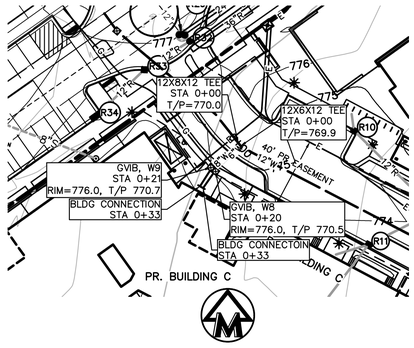
NOTE:
ALL WATERMAIN SHALL HAVE NITRILE GASKETS AND DOUBLE WRAP POLY

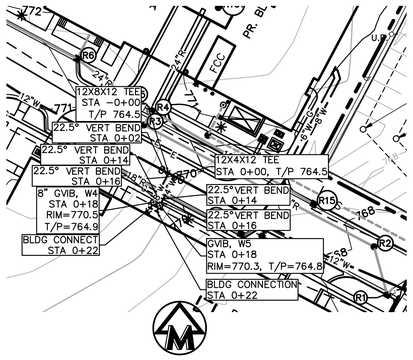
SCALE: 1" = 40'

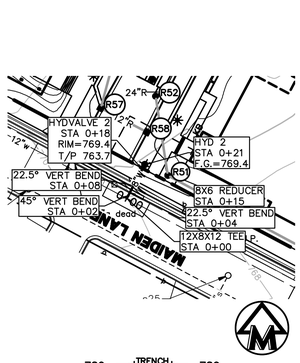
0 40 80 120

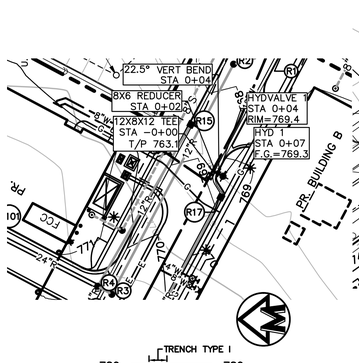
LEGEND

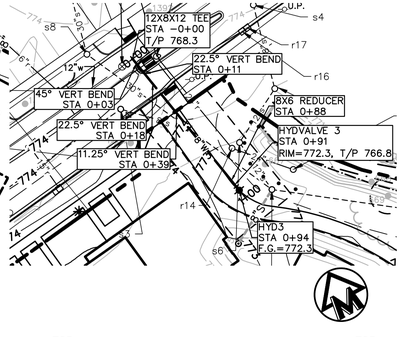
838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	PROP. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	PROP. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	PROP. CURB STOP & BOX
	REDUCER
r	EXIST. STORM SEWER
	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
s	EXIST. SANITARY SEWER
	PROP. SANITARY SEWER
	EXIST. CLEANOUT
	PROP. CLEANOUT

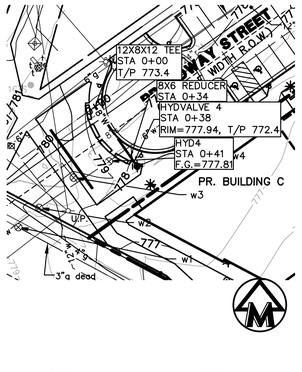


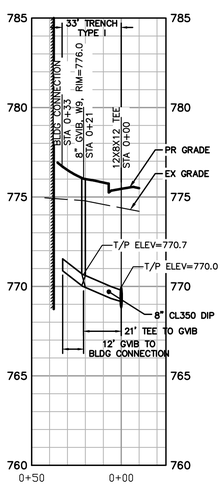




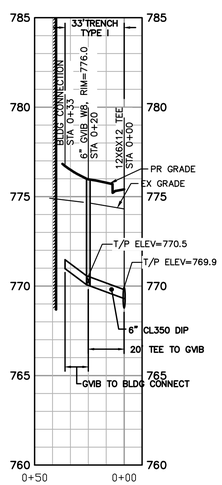




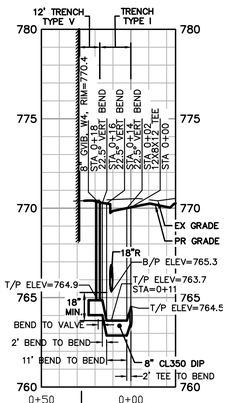




BLDG C 8 in FIRE



BLDG C 6 in DOMESTIC



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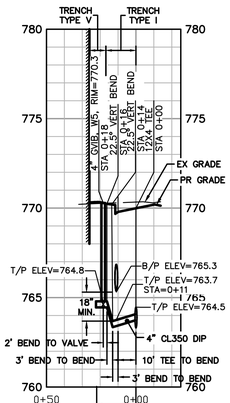

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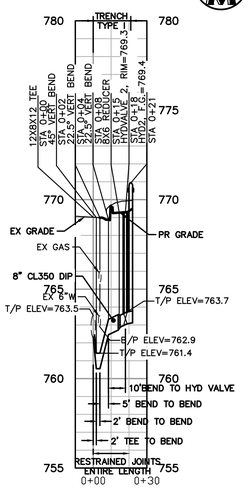

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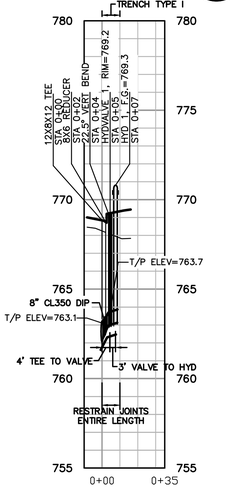

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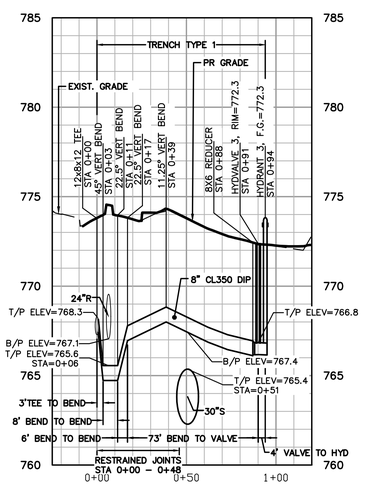

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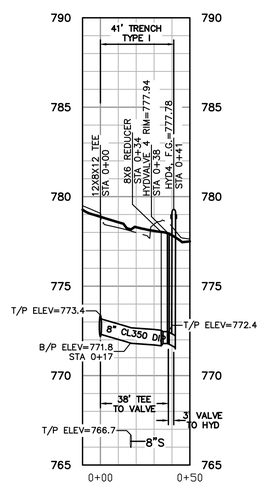

HYDRANT 4

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DETAILED ENGINEERING PLANS
WATER MAIN PROFILES

25

JOB No. 16196A

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	5/30/18
PER MUNICIPAL REVIEW	7/10/18

DATE: 1/22/18
SHEET 23 OF 26
CADD:
ENG: HTH
PM: TJC
TECH:
16196PW1.dwg

M:\Civil3d_Proj\16196\Detailed Engineering\16196PW1.dwg, 6/6/2018 9:59 AM, Heath Hortt, 25 WATER MAIN PROFILES, MCLLC PDF.pc3
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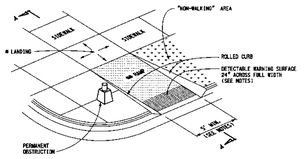
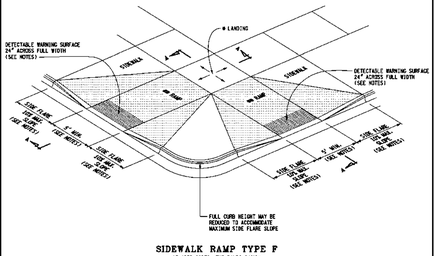
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (5.3% MAXIMUM). SEE NOTES.

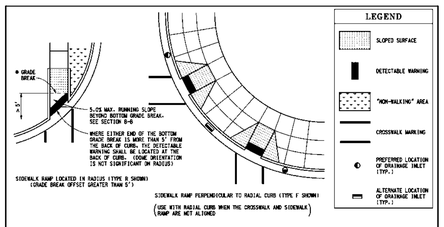


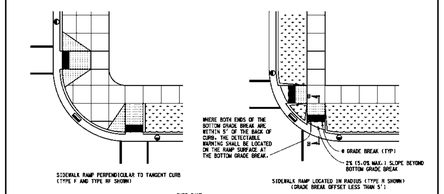
SIDEWALK RAMP TYPE R
(ROLLED SIDES)



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

MDOT PREPARED BY DESIGN DIVISION	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 SIDEWALK RAMP AND DETECTABLE WARNING DETAILS F.H.W.A. APPROVAL — PLAN DATE 12-11-2017 — R-28-J — SHEET 1 OF 7



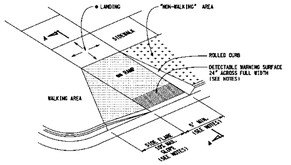


SECTION B-B
SIDEWALK RAMP ORIENTATION

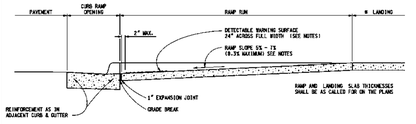
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
F.H.W.A. APPROVAL — PLAN DATE 12-11-2017 — R-28-J — SHEET 6 OF 7	

* 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% (5.3% MAXIMUM). SEE NOTES.



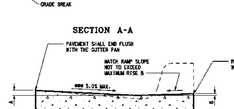
SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A

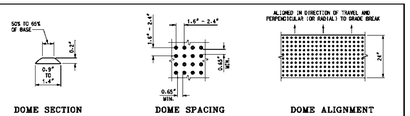
CURB TYPE	MATHEW RISE (INCHES) A	B
B1	5/8	1
B2	5/8	1
B3	5/8	1
D1	5/8	1
D2	5/8	1
D3	5/8	1
C1	5/8	1 5/8
C2	5/8	1 5/8
C3	5/8	1 5/8
C4	5/8	1 5/8
C5	1	1 5/8
C6	1	1 5/8
F1	1/2	1 1/2
F2	1/2	1 1/2
F3	1/2	1 1/2
F4	1/2	1 1/2
F5	1	1 1/2
F6	1	1 1/2

FOR CURB TYPES SEE STANDARD PLAN M-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 — PLAN DATE 12-11-2017 — R-28-J — SHEET 2 OF 7	



DOME SECTION — DOME SPACING — DOME ALIGNMENT

DETECTABLE WARNING DETAILS

NOTES!

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE ENCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5' MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' x 4'.

CURB RAMPS WITH A RUNNING SLOPE ≤5% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 5% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION: THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS. WHERE POSSIBLE, THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN ½". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

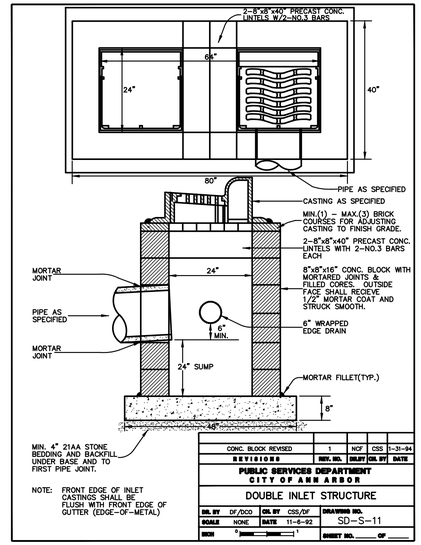
THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS- IF USED, SHALL BE 53 LOCATED AT TO STOP TRAFFIC SIGNS OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE SHOWN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THERE IS A CONTINUOUS LANDSCAPING, IMPROVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

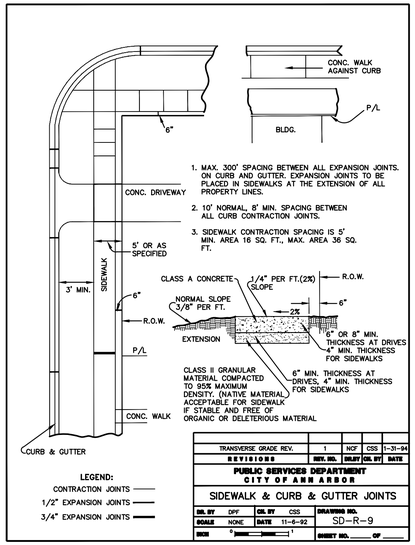
DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
F.H.W.A. APPROVAL — PLAN DATE 12-11-2017 — R-28-J — SHEET 7 OF 7	

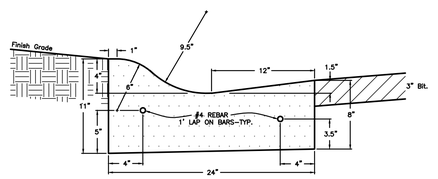


NOTE: FRONT EDGE OF INLET CASTINGS SHALL BE FLUSH WITH FRONT EDGE OF GUTTER (EDGE-OF-METAL)

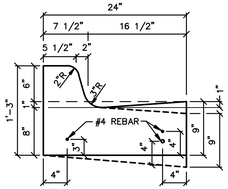
CONC. BLOCK REVISED	1	NCF	CSS	1-31-94
REVISIONS	REV. NO.	DRAFT	CHK. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
DOUBLE INLET STRUCTURE				
DES. BY DF/DCO — CHK. BY CSS/DF — DRAWING NO. SD-S-11				
SCALE NONE — DATE 11-6-92 — SHEET NO. ____ OF ____				



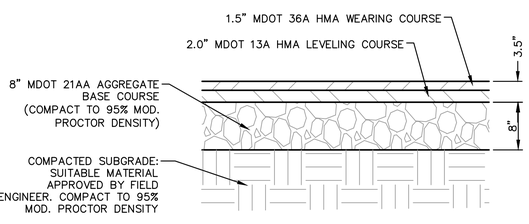
TRANSVERSE GRADE REV.	1	NCF	CSS	1-31-94
REVISIONS	REV. NO.	DRAFT	CHK. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
SIDEWALK & CURB & GUTTER JOINTS				
DES. BY DPF — CHK. BY CSS — DRAWING NO. SD-R-9				
SCALE NONE — DATE 11-6-92 — SHEET NO. ____ OF ____				



MOUNTABLE CONCRETE CURB & GUTTER
NOT TO SCALE

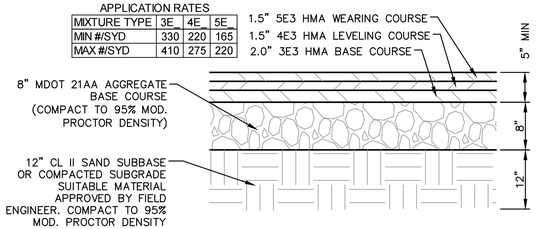


24" STANDARD CURB & GUTTER
24" STANDARD CURB W/SPILLOUT GUTTER

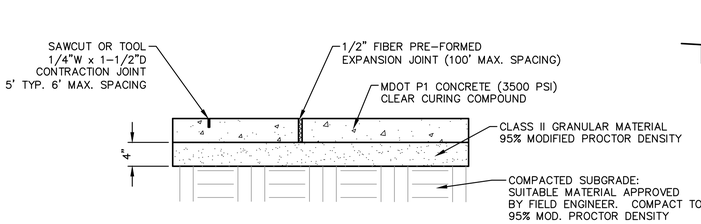


3.5" ASPHALT PAVEMENT - PRIVATE
(NOT FOR PUBLIC RIGHT-OF-WAY)

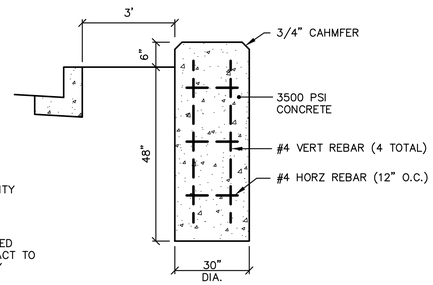
APPLICATION RATES			
MIXTURE TYPE	3E	4E	5E
MIN #/SYD	330	220	165
MAX #/SYD	410	275	220



5" ASPHALT PAVEMENT - PUBLIC R.O.W.



4' CONCRETE SIDEWALK DETAIL
SCALE: 1"=1'



STREETLIGHT FOUNDATION
NOT TO SCALE

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CHICAGO, IL 60654
RON MUCHA
312.280.7770

1140 BROADWAY STREET
DETAILED ENGINEERING PLANS
SITE DETAILS

26

JOB No. 16196A
REVISIONS:
PER MUNICIPAL REVIEW
PER MUNICIPAL REVIEW

REV.	DATE
1	5/30/18
2	6/5/18

DATE: 1/22/18
SHEET 24 OF 26
CADD:
ENG: HFH
PM: MJC
TECH:
16196DT1.dwg

M:\Civil3d_Pro\16196\Detailed Engineering\16196DT1.dwg, 6/6/2018 9:59 AM, Heath Hoit, MCLLC PDF.pc3
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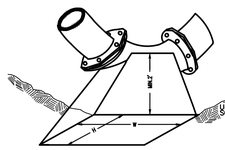
MINIMUM STANDARDS

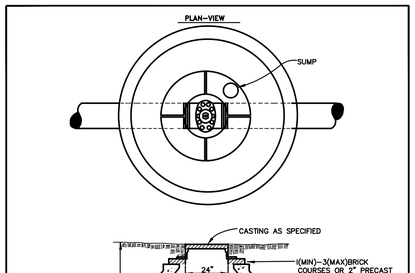
REACTION BACKING: The Class "A" concrete at the Fitting face shall extend to within (2) inches of the bell and shall extend from the fitting face a minimum of (2) feet to the UNDISTURBED SOLID GROUND. The dimensions of the reaction backing (thrust block) at the face of the undisturbed solid ground shall be as shown in the Table below. If there isn't sufficient space for the installation of the "thrust block" without interference with other services, another arrangement satisfactory to the engineer shall be used, i.e. encasement.

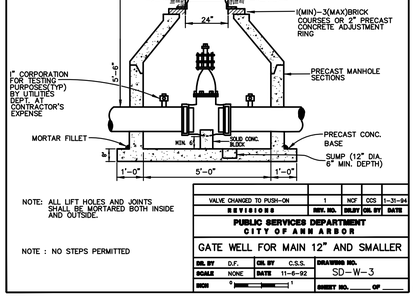
Fittings I.D. Inches	Plug Tee Cross		Bends								Hydrant	
			90°		45°		22 1/2°		11 1/4°			
	W	H	W	H	W	H	W	H	W	H	W	H
2.5	1	1	1	1	1	1						
4	1	1	1	1	1	1						
6	2	1.5	2	2	2	1	1	1	1	1	2	1.5
8	2.5	2	3.5	2	2	2	2	1	1	1	2.5	2
12	3.5	3	5.5	3	3.5	2.5	2	2	2	1		
16	6	3.5	6	4	5	3	3.5	2.5	2	2		
20	8	4	12	4	8	4	4	3	3	2		
24	11	4	17	4	9	4	6	4	3.5	2		



NOTE: THESE ARE MINIMUM STANDARDS. WHERE SITE CONDITIONS DICTATE, ADJUSTMENTS IN SIZE SHALL BE MADE BY THE PUBLIC SERVICES DIRECTOR.

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
THRUST BLOCK				
DR. BY D.F. CH. BY C.S.S. DRAWING NO. SD-W-2				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				

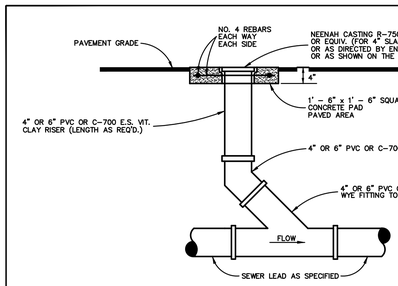




NOTE: ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.

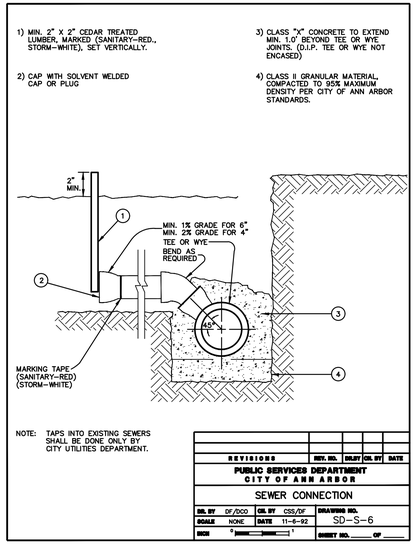
NOTE : NO STEPS PERMITTED

VALVE CHANGED TO PUSH-ON	1	NCF	CSS	1-31-94
REVISIONS REV. NO. DR.BY CH. BY DATE				
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
GATE WELL FOR MAIN 12" AND SMALLER				
DR. BY D.F. CH. BY C.S.S. DRAWING NO. SD-W-3				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



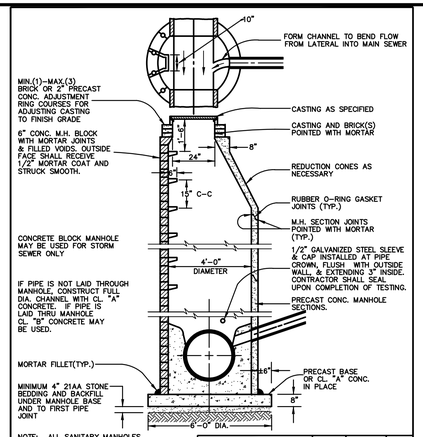
NOTE: CONCRETE SLAB IS NOT REQUIRED IF CLEANOUT IN GREENBELT AREA.

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
SANITARY SEWER LEAD CLEANOUT				
DR. BY D.F. CH. BY C.S.S. DRAWING NO. SD-S-8				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



NOTE: TAPS INTO EXISTING SEWERS SHALL BE DONE ONLY BY CITY UTILITIES DEPARTMENT.

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
SEWER CONNECTION				
DR. BY DF/DCO CH. BY CSS/DF DRAWING NO. SD-S-6				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



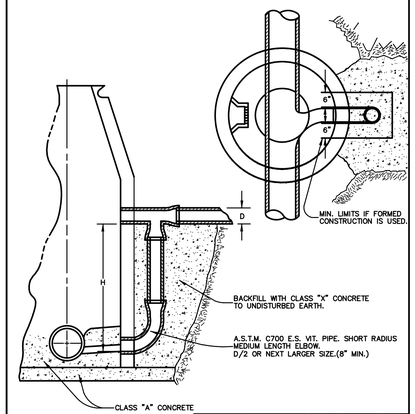
NOTE: ALL SANITARY MANHOLES SHALL BE PRECAST CONC.

NOTE: ALL MANHOLES MUST HAVE ECCENTRIC CONES-- BOTH STORM AND SANITARY

NOTE: ALL SANITARY SEWER OPENINGS SHALL BE PRECAST WITH RUBBER BOOT CONNECTIONS.

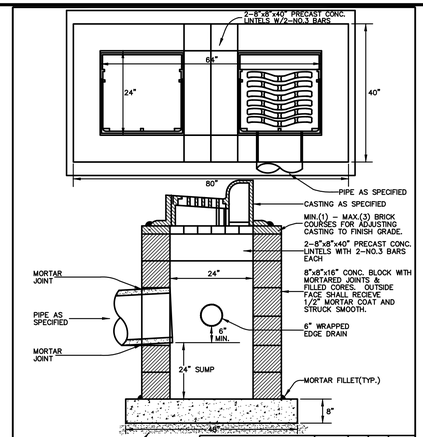
NOTE: CONCRETE BLOCK MANHOLE MAY BE USED FOR STORM SEWER ONLY, AND SHALL BE ECCENTRIC

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
STANDARD MANHOLE (TYPE I) FOR 8" TO 30" SEWERS				
DR. BY DF/DCO CH. BY CSS/DF DRAWING NO. SD-S-1				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



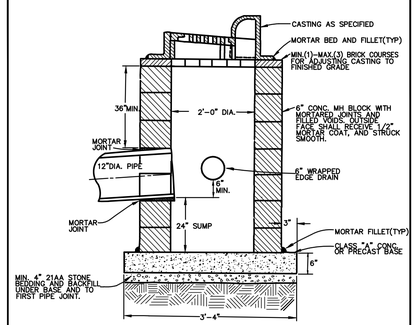
H = HEIGHT OF DROP CONNECTION

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
DROP M.H. CONNECTION				
DR. BY DF/DCO CH. BY CSS/DF DRAWING NO. SD-S-5				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



NOTE: FRONT EDGE OF INLET CASTINGS SHALL BE FLUSH WITH FRONT EDGE OF GUTTER (EDGE-OF-METAL)

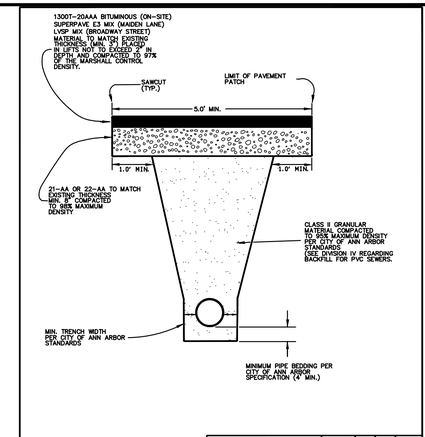
CONC. BLOCK REVISED	1	NCF	CSS	1-31-94
REVISIONS REV. NO. DR.BY CH. BY DATE				
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
DOUBLE INLET STRUCTURE				
DR. BY DF/DCO CH. BY CSS/DF DRAWING NO. SD-S-11				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



NOTE: MAY BE USED WITH ONLY SINGLE OUTLET PIPE AND NO INLET PIPE.

NOTE: FRONT EDGE OF INLET CASTING SHALL BE FLUSH WITH FRONT EDGE OF GUTTER (EDGE-OF-METAL)

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
SINGLE INLET STRUCTURE				
DR. BY DF/SMJ CH. BY CSS/DF DRAWING NO. SD-S-10				
SCALE NONE DATE 6-11-92 SHEET NO. ___ OF ___				
INCH 0 1"				

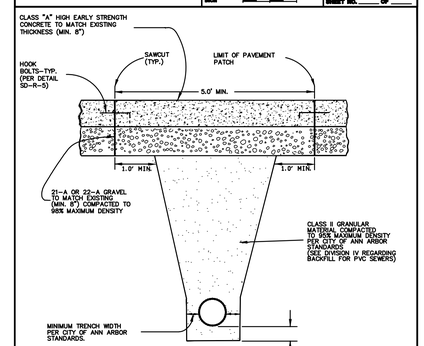


NOTE: DENSITY TESTING PER CITY ANN ARBOR SPECIFICATION

NOTE: TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION ONLY.

NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
UTILITY TRENCH-TYPE I (UNDER BITUMINOUS SURFACE)				
DR. BY DF CH. BY CSS DRAWING NO. SD-TD-1				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



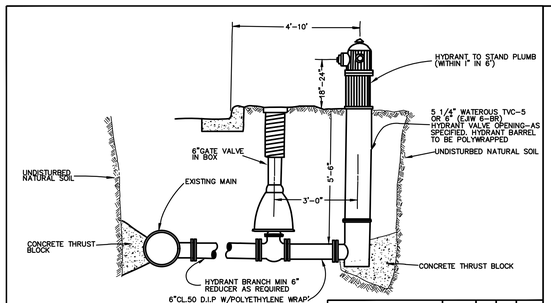
NOTE: REMOVE AND REPLACE HALF OF FULL PAVEMENT PANEL(S)

NOTE: TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION ONLY.

NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS.

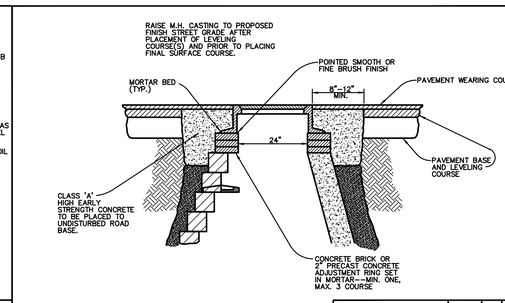
NOTE: DENSITY AND CONCRETE TESTING PER CITY OF ANN ARBOR SPECIFICATIONS.

HOOK BOLT REFERENCE CORRECTED	1	NCF	CSS	1-31-94
REVISIONS REV. NO. DR.BY CH. BY DATE				
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
UTILITY TRENCH-TYPE III (UNDER CONCRETE PAVEMENT)				
DR. BY DF CH. BY CSS DRAWING NO. SD-TD-3				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



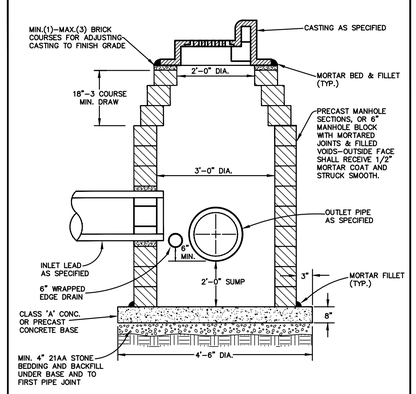
NOTE: ALL PIPE, FITTINGS AND HYDRANT BARREL TO BE POLYWRAPPED PER AWWA C105

PLUMBNESS NOTE ADDED; RETITLED	1	NCF	CSS	1-31-94
REVISIONS REV. NO. DR.BY CH. BY DATE				
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
FIRE HYDRANT ASSEMBLY				
DR. BY DF CH. BY CSS DRAWING NO. SD-W-1				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



NOTE: IF MANHOLE TO BE PLACED IN GRAVEL ROAD, CASTING TO BE SET 6" TO 8" BELOW BROADWAY GRADE. ALL CONSTRUCTION METHODS SHALL REMAIN AS SHOWN ABOVE.

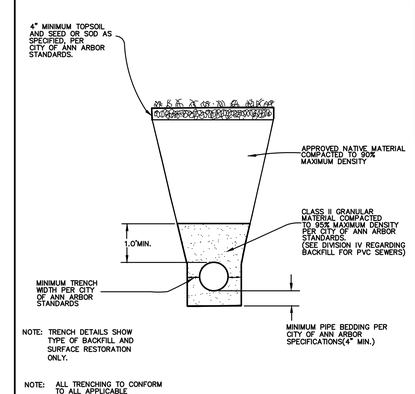
REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
MANHOLE CASTING ADJUSTMENT				
DR. BY DF CH. BY CSS DRAWING NO. SD-GU-6				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				



NOTE: SHALL BE USED IF SINGLE OUTLET PIPE AND SINGLE INLET PIPE.

NOTE: FRONT EDGE OF INLET CASTING SHALL BE FLUSH WITH FRONT EDGE OF GUTTER (EDGE-OF-METAL)

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
INLET-JUNCTION CHAMBER				
DR. BY DF CH. BY CSS/DF DRAWING NO. SD-S-9				
SCALE NONE DATE 11/6/92 SHEET NO. ___ OF ___				
INCH 0 1"				



NOTE: TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION ONLY.

NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS.

NOTE: DENSITY TESTING PER CITY OF ANN ARBOR SPECIFICATIONS.

REVISIONS	REV. NO.	DR.BY	CH. BY	DATE
PUBLIC SERVICES DEPARTMENT CITY OF ANN ARBOR				
UTILITY TRENCH-TYPE V (IN GREENBELT AREA OUTSIDE PAVEMENT INFLUENCE)				
DR. BY DF CH. BY CSS DRAWING NO. SD-TD-5				
SCALE NONE DATE 11-6-92 SHEET NO. ___ OF ___				
INCH 0 1"				

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1140 BROADWAY STREET

DETAILED ENGINEERING PLANS
SITE DETAILS

27

JOB No. 16196A

DATE: 1/22/18
SHEET 25 OF 26
CADD:
ENG.: MTH
PM.: MJC
TECH:
16196DT1.dwg

REVISIONS:	REV. DATE
PER MUNICIPAL REVIEW	4/6/18
PER MUNICIPAL REVIEW	5/30/18

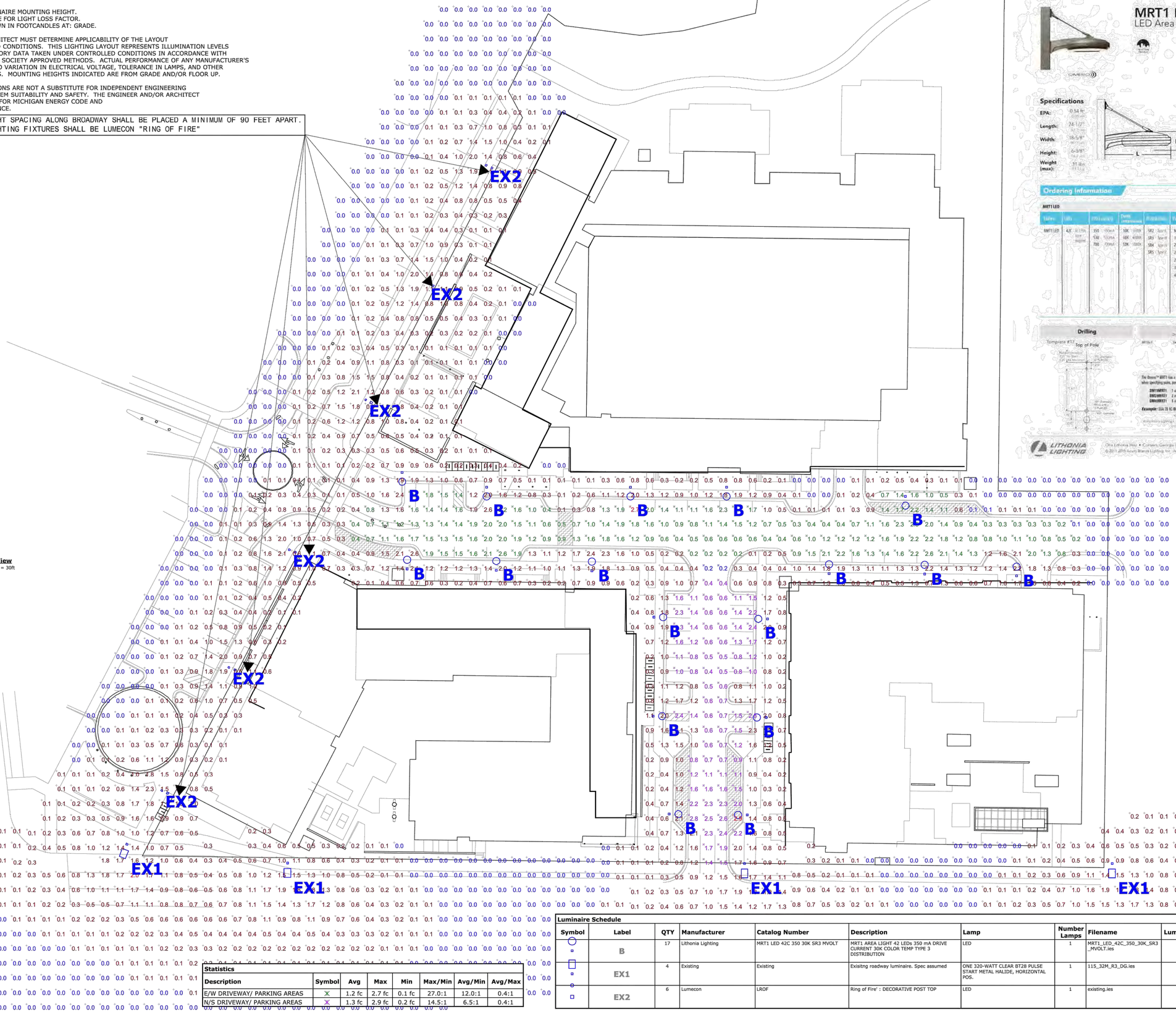
GENERAL NOTE

1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: GRADE.

THE ENGINEER AND/OR ARCHITECT MUST DETERMINE APPLICABILITY OF THE LAYOUT TO EXISTING / FUTURE FIELD CONDITIONS. THIS LIGHTING LAYOUT REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS. MOUNTING HEIGHTS INDICATED ARE FROM GRADE AND/OR FLOOR UP.

THESE LIGHTING CALCULATIONS ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM SUITABILITY AND SAFETY. THE ENGINEER AND/OR ARCHITECT IS RESPONSIBLE TO REVIEW FOR MICHIGAN ENERGY CODE AND LIGHTING QUALITY COMPLIANCE.

PROPOSED STREET LIGHT SPACING ALONG BROADWAY SHALL BE PLACED A MINIMUM OF 90 FEET APART.
PROPOSED STREET LIGHTING FIXTURES SHALL BE LUMECON "RING OF FIRE"


EX2
EX2
EX2
EX2
EX2
EX1
EX1
EX1
B
B
B

Trees

sym	Botanic Name	Common Name	Size
4	AM Acer Miyabe	Miyabe Maple	3" BB
8	AO Aesculus octandra	Yellow Buckeye	3" BB
5	AA Amelanchier x 'Autumn Brilliance'	Serviceberry	Multi-stem 8' Ht. BB
3	CO Celtis occidentalus 'Chicagoland'	Chicagoland Hackberry	3" BB
12	GB Ginkgo biloba 'Magyar'	Columnar Ginkgo	2.5" BB
8	GT Gleditsia triacanthos 'Shademaster'	Thornless Honeylocust	3" BB
5	NS Nyssa sylvatica	Blackgum	2" BB
8	PA Picea abies	Norway Spruce	8' Ht. BB
10	PG Picea glauca 'Densata'	Black Hills Spruce	8' Ht. BB
12	PS Prunus serrulata "Kwanzan'	Kwanzan Cherry	8' Ht. BB
2	QB Quercus bicolor	Swamp White Oak	2" BB
4	QR Quercus robur	English Oak	2" BB
5	SR Syringa reticulata 'Ivory Silk'	J. Tree Lilac	2" BB
16	UF Ulmus 'Frontier'	Frontier Elm - (medium scale)	2.5" BB
13	UM Ulmus davidiana 'Morton'	Morton Elm	3" BB

Shrubs

sym	Botanic Name	Common Name	Size
12	BG Buxus x "Glencoe'	Glencoe Boxwood	24" BB
22	IV Itea virginica 'Morton'	Morton Sweetspire	24" BB
127	RA Rhus aromatica 'Gro Low'	Grow Low Sumac	18" BB
35	SG Spiraea japonica 'Gold Flame'	Gold Flame Spirea	18" BB
33	VD Viburnum dentatum "Ralph Senior"	Autumn Jazz Viburnum	3' BB

Perennials

sym	Botanic Name	Common Name	Size
48	cac Caryopteris x clandonensis	Bluebeard	#2 Cont.
135	cvz Coreopsis verticillata 'Zagreb'	Zagreb Tickseed	#1 Cont.
249	pac Penisetum alopecuiroides 'Cassian'	Fountain Grass	#1 Cont.
99	ssc Schizachyrium scoparium 'Carousel'	Carousel Little Bluestem	#1 Cont.
42	ssn Sedum spectabile 'Neon'	Neon Sedum	#1 Cont.

Natural Open Space

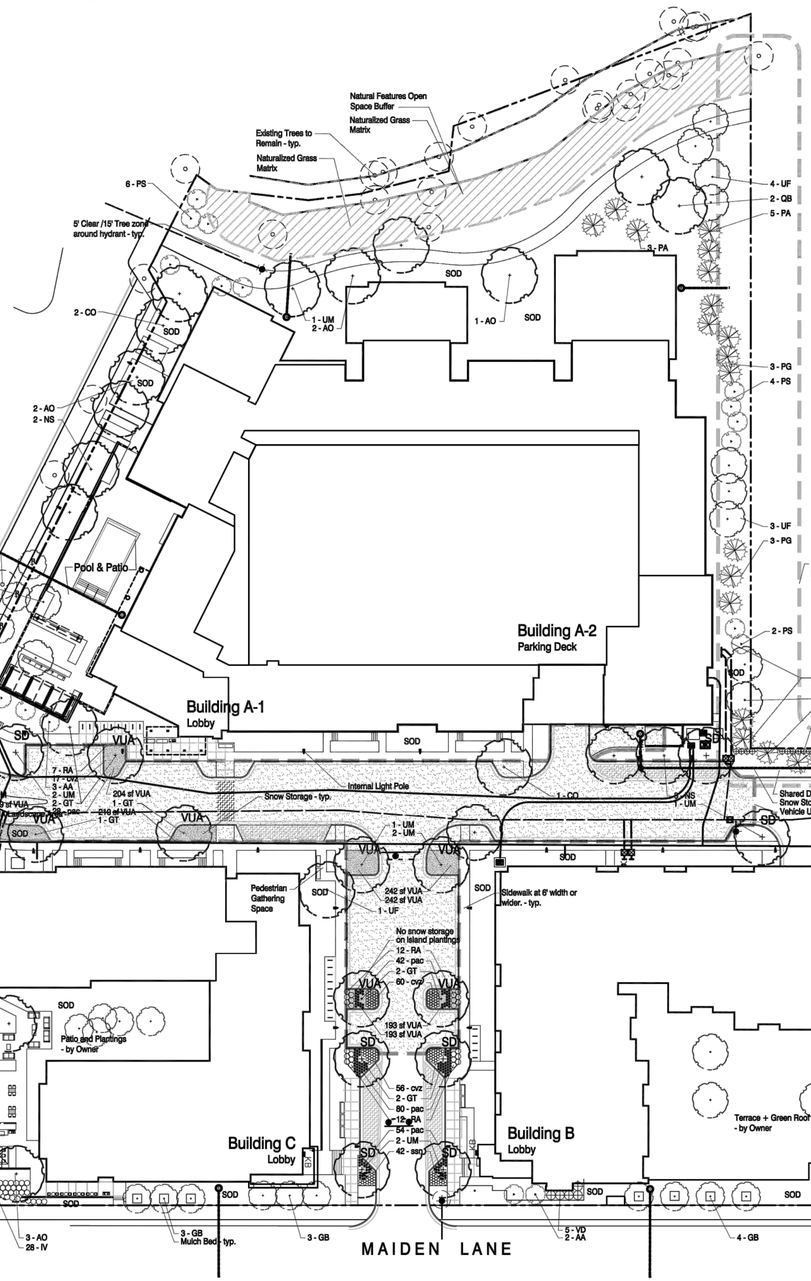
Botanic Name	Common Name	Seed Matrix
Elymus riparius	Riverbank Wild Rye	
Elymus villosus	Silky Wild Rye	
Elymus virginicus	Virginia Wild Rye	
Bromus Kalmii	Prairie Brome	
Dichanthelium oligosanthes	Panic Grass	
Elymus canadensis	Canada Wild Rye	
Eragrostis spectabilis	Purple Love Grass	
Koeleria cristata	June Grass	
Schizachyrium scoparium	Little Bluestem	
Sporobolus cryptandrus	Sand Dropseed	

A1 PLANT LIST
SCALE: -

Artistic partial view

Art Concept
- Steel 'Bridge' to allude to historic working neighborhood.
- to be coordinated with local community
- 'Lower Town' lettering to be incorporated into design.
- Approx. 40' length.

B1 GATEWAY ART
SCALE: N/A



E1 Landscape Layout
SCALE: 1" = 40'-0"

North 0 20' 40' 80'

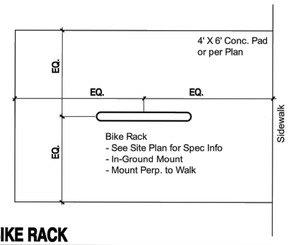
1. No wheeled power equipment or vehicles are permitted in the Natural Features Open Space. All landscape to be done by hand.
2. Landscape shall be maintained to industry standards. All diseased, damamged or dead material will be replaced by the end of the following planting season.
3. Snow storage will not be on any landscape parking island that has shrubs and/or perennials.
4. All planting beds shall be tilled a min of 24" depth prior to planting. All lawn areas to be tilled a min. of 12" depth.
5. Planting media shall be on-site soil, amended only if recommended by soil testing, and approved by architect.
6. All plant beds to me mulched with 3" premium hardwood mulch.
7. After initial planting, all fertilizers shall be free of phosphorus.
8. Due to the environmental soil conditions relief is requested from the required bioretention islands.
9. Maintenance: the HOA is responsible for the maintenance of all site landscape and shall hire a professional contractor to provide maintenance and replacement. All diseased, damaged and dead material shall replaced by the end of the following planting season.

A5 NOTES
SCALE: -

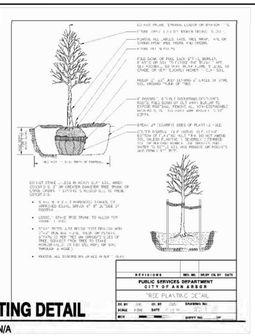
120

1. Bike Rack
   - 1.1. BRWS-101 by Victor Stanley or equal
   - 1.2. Color - Grey
   - 1.3. In-ground mount
2. Bench - 8' Length
   - 2.1. FS-58 by Victor Stanley or equal
   - 2.2. Color - Bench A:Black - Bench B:Grey
   - 2.3. Skateboard guards
   - 2.4. In-ground mount
3. Site Bollard
   - 3.1. HRE-6 by Keystone Ridge or equal
   - 3.2. Color - Black
   - 3.3. In-ground mount

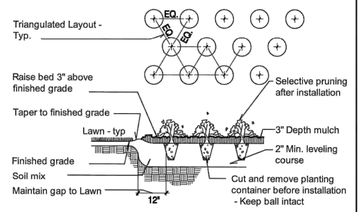
B5 SITE FURNITURE
SCALE: - Install per Manuf. Recommendations



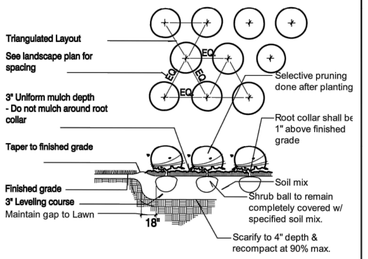
C5 BIKE RACK
SCALE: N/A



A6 TREE PLANTING DETAIL
SCALE: N/A



B6 PERENNIAL PLANTING DETAIL
SCALE: N/A



C6 SHRUB PLANTING DETAIL
SCALE: N/A

VUA Tree
ROW Tree
Shared Driveway Tree

Site Area		279,458 sf	6.41 ac
Vehicular Use Area - 28,620 sf		Required	Proposed
- Interior Island sf	@ 1/20 ratio	1,431	1,793
- Interior Trees	@ 1/250 sf	6	8
- Islands at min. 165 sf and 8' width			
- 50% req'd bio-retention not provided due to soil conditions			
Conflicting Land Use Buffer - 485 lf		Required	Proposed
Trees	@ 1 / 15 linear feet	33	33
Min. 50% of required trees shall be evergreen		17	18
Shared Driveway		Required	Proposed
Trees EW Drive - not incl VUA	86 lf / 30 x 2	6	5
NS Drive - not incl VUA	85 lf / 30 x 2	6	4
Street Tree Escrow		Required	Proposed
Maiden Ln.	653 lf @ 45' spacing	15	-
Broadway St.	635 lf @ 45' spacing	15	*13
Nielsen Ct.	245 lf @ 45' spacing	6	*6
* Plan shows Developer installing 13 trees in Broadway ROW			
* Plan shows Developer installing 6 trees in Nielsen ROW			
Park Contribution		Required	Proposed
0.0124 ac/du @ 617		7.65 ac	TBD
		Required	
Right of way Screening		NA	
Refuse Container Screening		NA	
* All refuse areas are inside the buildings			

E6 LANDSCAPE CALCULATIONS
SCALE: -

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HKM DESIGN FIRM NO.: 184-001735 ©2017

Morningside

1140 Broadway
Ann Arbor, Michigan

no.	revision	init.	date
1	revised per city comments		03.22.2017
2	revised per city comments		04.18.2017
3	revised per city comments		05.23.2017
4	per municipal review		08.11.2017
5	revised per city comments		09.10.2017
6	revised per city comments		10.17.2017
7	Detailed Engineering		01.22.2018
8	per municipal review		3.16.2018
9	per client		05.29.2018

Landscape Plan

date 03.23.2017 drawn by checked by

Job No. 16020

Sheet No. LA-01 sht 28