UNIVERSITY OF MICHIGAN CREDIT UNION

CARPENTER ROAD BRANCH

TPascoe@atwell-group.com

2621 CARPENTER ROAD
ANN ARBOR, MI

FINAL SITE PLAN

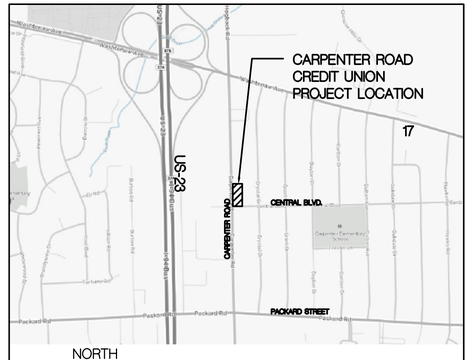
FEBRUARY 5, 2018

OWNER	UNIVERSITY OF MICHIGAN CREDIT UNION 340 EAST HURON STREET ANN ARBOR MI 48104	**MECHANICAL ENGINEER**	VF AND ASSOCIATES 4444 WYMAN ROAD TIPTON MI 49287 (517) 431-3732
CONSTRUCTION MANAGER	JS VIG CONSTRUCTION 16650 RACHO ROAD TAYLOR MI 48180 (734) 283-3002	**ELECTRICAL ENGINEER**	MONTERO ENTERPRISES, INC. 3475 JEANETTE DRIVE CHELSEA MI 48118 (734) 475-3592
ARCHITECT & INTERIOR DESIGNER	HOBBS + BLACK ASSOCIATES, INC. 100 N. STATE STREET ANN ARBOR MI 48104 (734) 663-4189 (734) 663-1770 FAX	**CIVIL ENGINEER**	ATWELL, INC. 311 NORTH MAIN STREET ANN ARBOR MI 48104 (734) 994-1590
STRUCTURAL ENGINEER	DESAI/NASR CONSULTING ENGINEERS 6765 DALY ROAD WEST BLOOMFIELD MI 48322 (248) 932-2010	**HARDWARE CONSULTANT**	ALLEGION, PLC 44704 HELM STREET PLYMOUTH MI 48170 (734) 456-5324

INDEX OF DRAWINGS

	2/5/18	1/23/18	12/13/17	12/1/17
FINAL SITE PLAN				
PRELIMINARY SITE PLAN #2				
PRELIMINARY SITE PLAN				
SITE PLAN REVIEW				
ISSUED:				

CSPA 17-30
Final Site Plean
Received: 2018-02-08



NORTH

SITE LOCATION MAP
SCALE - N.T.S.

U OF M CREDIT UNION: CSPA 17-30

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN #2	1/23/18
PRELIMINARY SITE PLAN	12/13/17
CONDITIONAL USE	10/26/17

DATE ISSUED

DRAWN BY

CHECKED BY

HOBBS + BLACK ARCHITECTS
100 N. State St.
Ann Arbor, MI 48104
P.734.663.4189
www.hobbs-black.com

CARPENTER ROAD BRANCH
2621 Carpenter Road
Ann Arbor, MI 48108

PROJECT

CONSULTANT

TITLE SHEET & INDEX

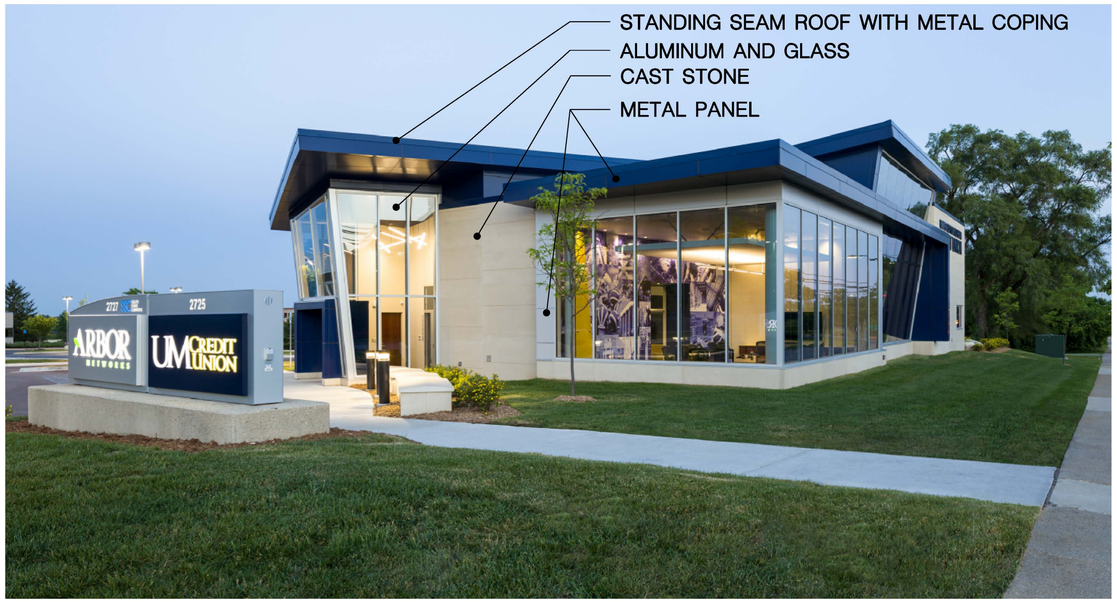
SHEET TITLE

17-201

PROJECT NUMBER

A-000

SHEET NUMBER



NORTHWEST VIEW (EVENING) - EXISTING STATE STREET U OF M CREDIT UNION

NORTH FACADE - EXISTING STATE STREET U OF M CREDIT UNION

WEST VIEW (EVENING) - EXISTING STATE STREET U OF M CREDIT UNION

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN	12/13/17

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Ann Arbor, MI 48108

PROJECT

CONSULTANT

EXISTING STATE STREET UMCU PHOTOS FOR REFERENCE

SHEET TITLE

17-201

PROJECT NUMBER

A-005

SHEET NUMBER

Drawing: P:\2017\1720\Dwgs\CDArchie5HA005.dwg
Date: Feb 07, 2018, 9:24am Layout: A-000 Plotted by: ccorbett

NORTHWEST AERIAL VIEW - PROPOSED CARPENTER ROAD UMCU

SOUTHWEST AERIAL VIEW - PROPOSED CARPENTER ROAD UMCU

NORTHWEST VIEW - PROPOSED CARPENTER ROAD UMCU

SOUTHWEST VIEW (SCREENING AT ROOF TOP UNITS) - PROPOSED CARPENTER ROAD UMCU

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN	12/13/17

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CARPENTER ROAD BRANCH
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Ann Arbor, MI 48108

PROJECT

CONSULTANT

PROPOSED CARPENTER RD UMCU RENDERINGS

SHEET TITLE

17-201

PROJECT NUMBER

A-006

SHEET NUMBER

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Date: Feb 07, 2018, 9:23am Layout: A-006 Plotted by: ccorbett

FINAL SITE PLAN/CONSTRUCTION PLANS

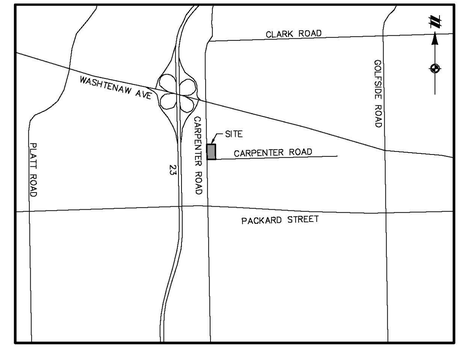
U OF M CREDIT UNION

A COMMERCIAL DEVELOPMENT
2621 CARPENTER ROAD
PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

APPLICANT
U OF M CREDIT UNION
340 E. HURON STREET, SUITE 100
ANN ARBOR MI 48104
PHONE: 734.662.8200
ATTN: MICHAEL NICHOLAS

ARCHITECT
HOBBS AND BLACK ARCHITECTS
100 N. STATE STREET
ANN ARBOR, MICHIGAN 48104
PHONE: 734.663.4189
ATTN: DAVID NIMS

ENGINEER
ATWELL, LLC
311 NORTH MAIN STREET
ANN ARBOR, MICHIGAN 48104
PHONE: 734.994.4000
ATTN: MATTHEW BUSH, PE, LEED AP



VICINITY MAP
NOT TO SCALE

SITE DATA

SITE DATA			
PARCEL ID		L -12-01-329-022	L-12-01-329-003 & 4
ZONING		FB Form Based Mixed Use	Building Form A
GROSS SITE AREA	±	1.18 ACRES	51,200 SQFT
EXISTING R.O.W.	±	0.00 ACRES	0 SQFT
WETLANDS	±	0.00 ACRES	0 SQFT
EASEMENTS	±	0.08 ACRES	3,540 SQFT
NET SITE AREA	±	1.09 ACRES	47,660 SQFT
LOT COVERAGE		8.6 % (GROSS)	
FLOOR AREA RATIO		8.6 % (GROSS)	

SETBACKS	
FRONT SETBACK	10' REQUIRED
SIDE SETBACK	5' MINIMUM
REAR SETBACK	10' MINIMUM/20' TO EXISTING RESIDENTAL USE

BUILDING DATA			
FOOTPRINT	±	0.10 ACRES	4,400 SQFT*
HEIGHT		38 FT	
STORIES		1	

*SEE ARCHITECTURAL PLANS FOR ADDITIONAL FOOTPRINT AND FLOOR AREA BREAKDOWNS

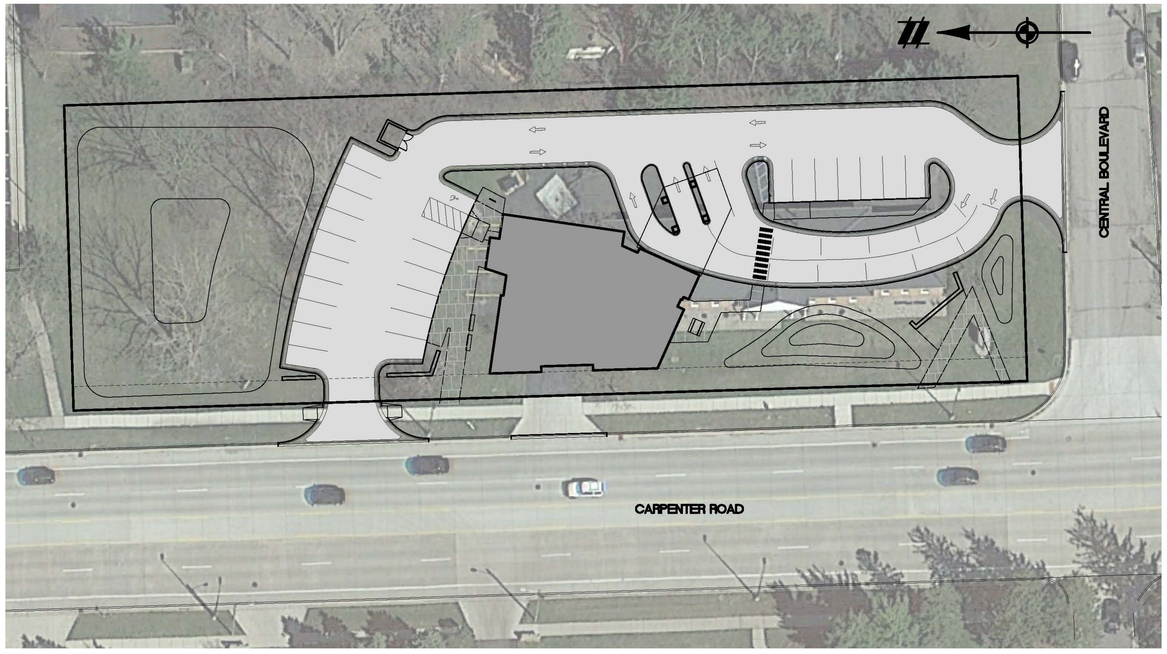
PARKING	REQUIRED	PROVIDED
COMMERCIAL	22	22 *
NON-DRIVE UP ATM	2	2 **
ADA PARKING (INCLUDED IN TOTAL)	1	1 (VAN ACCESSIBLE)
SITE TOTAL	24	24

* 1 SPACE FOR EVERY 200 SQUARE FEET OF GROSS FLOOR AREA
** 2 SPACES FOR EACH NON-DRIVE UP ATM

IMPERVIOUS CALCULATIONS			
TOTAL IMPERVIOUS AREA	±	0.53 ACRES	23,057 SQFT
IMPERVIOUS PERCENT	±	48.4 % (NET)*	

*MAXIMUM ALLOWED 80%

LANDSCAPE AREA			
TOTAL LANDSCAPE AREA	±	0.57 ACRES	24,829 SQFT
LANDSCAPE PERCENT	±	52.1 % (NET)	



OVERALL DEVELOPMENT MAP
1" = 30 FEET

SHEET INDEX

LEGAL DESCRIPTION

SCHEDULE C DESCRIPTION PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE, FILE NO. 17-87009, COMMITMENT DATE MAY 25, 2017

SITUATED IN THE TOWNSHIP OF PITTSFIELD, COUNTY OF WASHTENAW, STATE OF MI:

LOTS 1, 2, 3, 4 AND 5, BLOCK 2, SUBDIVISION OF LOTS 1 TO 73, INCLUSIVE, EXCEPTING LOTS 34 AND 36, AND LOTS 109 TO 111, INCLUSIVE, OF OAK PARK, AS RECORDED IN LIBER 8 OF PLATS, PAGE 6, WASHTENAW COUNTY RECORDS, EXCEPT THE WESTERLY 17 FEET THEREOF, CONVEYED TO THE STATE HIGHWAY COMMISSION.

DEVELOPMENT NARRATIVE

THE EXISTING SITE IS A DEVELOPED PARCEL LOCATED WITHIN THE FORM-BASED ZONING AREA ON CARPENTER ROAD AND CENTRAL BOULEVARD IN PITTSFIELD TOWNSHIP. THE EXISTING BUILDING, EXISTING PAVING, AND EXISTING ENTRANCE OFF OF CARPENTER ROAD WILL BE REMOVED AND THE SITE GRADED TO FIT THE NEEDS OF THE NEW DEVELOPMENT. THE DESIGN OF THE SITE WILL MEET THE TECHNICAL REQUIREMENTS OF THE WASHTENAW COUNTY WATER COMMISSIONER.

THE OWNER PROPOSES A 4,400 SQUARE FOOT CREDIT UNION WITH TWO DRIVE THROUGH LANES AND AN DRIVE UP ATM. THE PROPOSED CARPENTER ROAD ACCESS WILL BE NORTH OF THE CURRENT ENTRANCE LOCATION WHILE THE CENTRAL BOULEVARD ENTRANCE WILL REMAIN. THE PROPOSED BUILDING WILL HOUSE SEVEN STAFF MEMBERS AND A CONFERENCE ROOM. THE NORTH SIDE OF THE DEVELOPMENT WILL FEATURE A DETENTION POND BUILT TO WITHSTAND THE 100 YEAR STORM EVENT. THE SOUTH SIDE FEATURES A SMALL WALK UP PLAZA WITH BUILT IN SEATING TO REFLECT THE MATERIALS ON THE BUILDING FACADE. THE PROPOSED MATERIALS INCLUDE CAST STONE, METAL PANELING, AND GLASS. THE DEVELOPMENT WILL FEATURE A MIXTURE OF NATIVE PLANTS VARYING IN SIZE AND COLOR TO GIVE SEASONAL INTEREST TO THE SITE.

ATWELL
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311 NORTH MAIN STREET
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SECTION 14
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION
COVER SHEET

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 15 30
1" = 30 FEET

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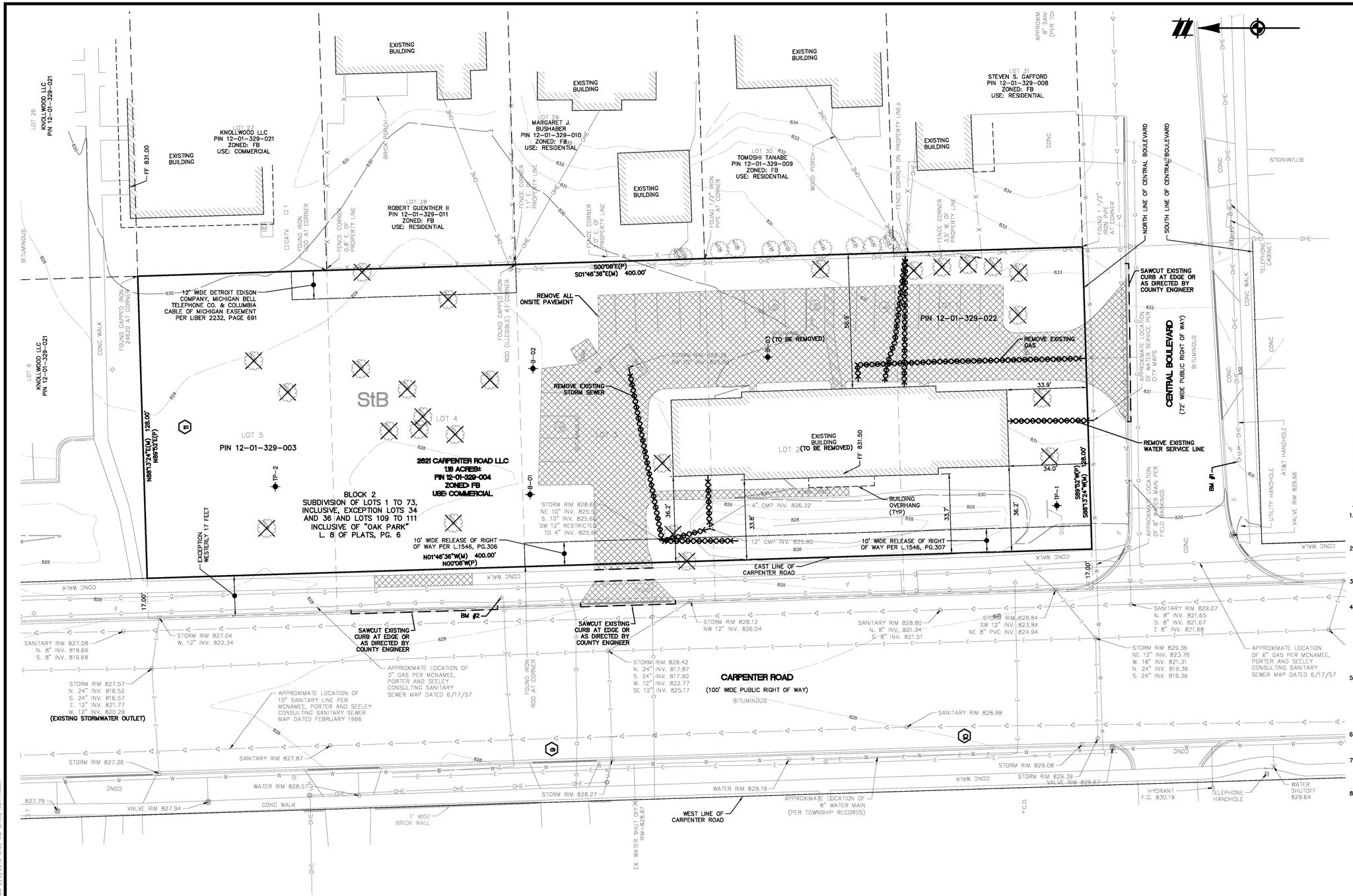
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 01



NATURAL FEATURES

THE SUBJECT PROPERTY IS CURRENTLY A COMMERCIAL DEVELOPMENT. THE UNDEVELOPED AREA OF THE SITE IS SCATTERED WITH TREES, PRIMARILY SPRUCE, COTTONWOOD, AND CRABAPPLE. THE MAJORITY OF TREES ARE IN GOOD CONDITION. THERE ARE NO FOREST HABITATS ON SITE. THE PROPERTY IS EXPECTED TO SUPPORT COMMON PLANTS AND WILDLIFE. THERE ARE NO WETLANDS ON SITE.

DEMOLITION NOTES

1. ALL ON-SITE WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT SPECIFICATIONS AND STANDARD DETAILS OF PITTSFIELD TOWNSHIP, UNLESS OTHERWISE SPECIFIED.
2. THE CONTRACTOR SHALL DEMOLISH OR RELOCATE ANY SITE FEATURES AS APPROPRIATE TO FACILITATE THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.
3. ALL DEMOLITION MATERIALS SHALL BE PROPERLY REMOVED FROM THE SITE AND DISPOSED OF IN A LEGALLY DESIGNATED DISPOSAL AREA.
4. THE CONTRACTOR SHALL OBTAIN THE NECESSARY PERMITS AND NOTIFY ALL AFFECTED UTILITY COMPANIES PRIOR TO THE DEMOLITION OF ANY EXISTING STRUCTURES. ALL EXISTING UTILITIES SHALL BE CAPPED OFF OR REMOVED SO AS NOT TO INTERFERE WITH THE CONSTRUCTION PROJECT. ALL DEBRIS SHALL BE HAULED AWAY FROM THE SITE AND DISPOSED OF AT AN APPROVED LOCATION.
5. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE. PRIOR TO THE START OF ANY DEMOLITION OR CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES AND FIELD LOCATE EXISTING UTILITIES.
6. ANY REMOVAL/ABANDONMENT OF EXISTING WELLS AND SEPTIC FIELDS, SHALL BE IN ACCORDANCE WITH WCEHD STANDARDS.
7. ALL TELEPHONE AND ELECTRIC UTILITIES FOR THE EXISTING BUILDING WILL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH TOWNSHIP STANDARDS.
8. THE LOCATION OF THE EXISTING BUILDING SANITARY LEAD IS UNKNOWN PER AVAILABLE RECORDS AND FIELD SURVEY. REFER TO SHEET 04.

SOIL NOTES

1. NO GROUNDWATER WAS ENCOUNTERED DURING OR UPON COMPLETION OF DRILLING OPERATIONS.
2. SOILS ON SITE ARE ALMOST EXCLUSIVELY HARD BROWN SILTY CLAY.
3. REFER TO THE GEOTECHNICAL REPORT FOR SOIL BORING LOGS.

SOILS LEGEND

Map Unit Symbol	Map Unit Name
StB	St. Clair clay loam, 2 to 6 percent slopes

SOURCE BENCHMARK:

AAGRS NO. 0009B
ELEVATION: 845.67 (NAVD88)

AAGRS NO. 0009A
ELEVATION: 813.27 (NAVD88)

SITE BENCHMARKS:

BM #1: SET YELLOW BENCH TIE IN NORTH FACE OF UTILITY POLE ON THE SOUTH SIDE OF CENTRAL BOULEVARD
ELEVATION: 832.45 (NAVD88)

BM #2: RED PAINTED "X" IN SQUARE ON EAST TOP CONCRETE LIGHT POLE BASE
ELEVATION: 828.52 (NAVD88)

SCHEDULE BII EXCEPTIONS PER FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE, FILE NO. 17-87009, COMMITMENT DATE MAY 25, 2017

8. EASEMENT GRANTED TO WASHTENAW COUNTY DRAIN COMMISSIONER, DISCLOSED BY INSTRUMENT RECORDED IN LIBER 588 PAGE 364, AS TO ALL LOTS.
RESPONSE: APPEARS TO COVER PACKARD ROAD WHICH IS SOUTH OF SUBJECT PROPERTY.

(9) 9. TERMS, COVENANTS AND CONDITIONS AS SET FORTH IN RELEASE OF RIGHT OF WAY RECORDED IN LIBER 1546, PAGE 306, AS TO LOT 3, BLOCK 2.
RESPONSE: AS SHOWN HEREON.

(10) 10. TERMS, COVENANTS AND CONDITIONS AS SET FORTH IN RELEASE OF RIGHT OF WAY RECORDED IN LIBER 1546, PAGE 307, AS TO LOTS 1 AND 2, BLOCK 2.
RESPONSE: AS SHOWN HEREON.

(11) 11. EASEMENT GRANTED TO DETROIT EDISON COMPANY, MICHIGAN BELL TELEPHONE COMPANY AND COLUMBIA CABLE OF MICHIGAN, DISCLOSED BY INSTRUMENT RECORDED IN LIBER 2232, PAGE 691, AS TO LOTS 4 AND 5, BLOCK 2.
RESPONSE: AS SHOWN HEREON.

LEGEND

BOUNDARY LINE	EXIST. WALL
EXIST. EASEMENT	EXIST. WATER MAIN
SECTION LINE	EXIST. SANITARY
BOUNDARY/PROPERTY LINE	EXIST. GAS
EXIST. SETBACK	EXIST. STORM
890 EXIST. CONTOUR	EXIST. OVERHEAD ELEC. LINE
EXIST. TREE LINE	EXIST. OVERHEAD TELE. LINE
EXIST. CURB AND GUTTER	EXIST. CABLE LINE
EXIST. FENCE	EXIST. UNSPECIFIED UTILITIES
EXIST. GRAVEL	EXIST. CULVERT
EXIST. BUILDING	EXIST. CATCH BASIN/INLET
EXIST. STRUCTURE	

EXIST. HYDRANT	PROPOSED DEMO
EXIST. VALVE	PROPOSED DEMO
EXIST. SANITARY SEWER	SB SOIL BORING LOCATION
EXIST. UNSPECIFIED UTILITY	
EXIST. SIGN	
EXIST. LIGHT POLE	
EXIST. SOIL BOUNDARY	
MoC EXIST. SOILS TYPE	
3533 EXIST. TREE	
3529 EXIST. DEMO TREE	

Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
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WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

EXISTING CONDITIONS, NATURAL FEATURES, AND DEMOLITION PLAN

DATE
OCTOBER 4, 2017

REVISIONS
12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

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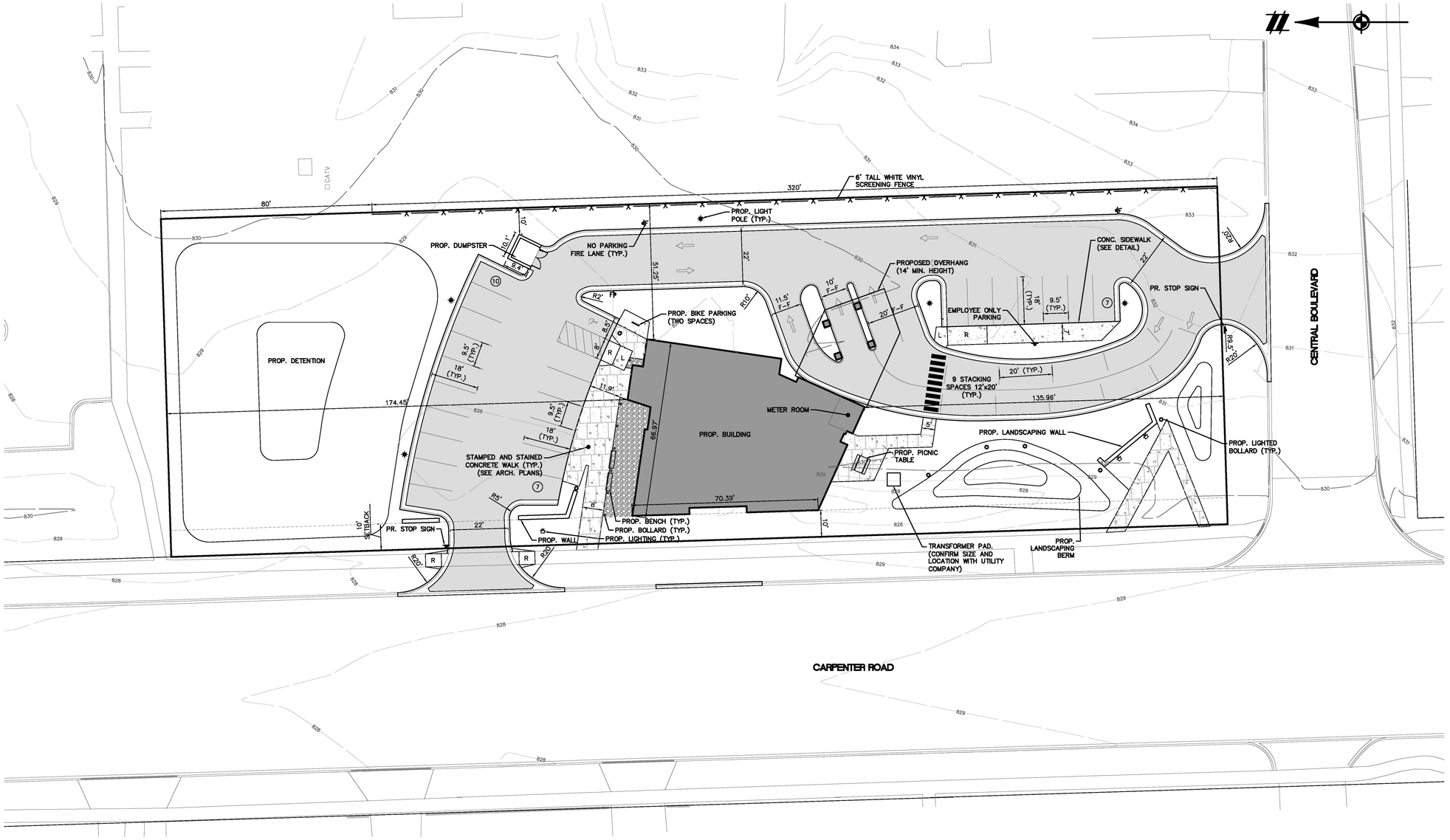

NOTES

1. ALL PROPOSED WALKS AND CURB RAMPS SHALL BE ADA COMPLIANT.
2. PROPOSED SITE BENCHES SHALL BE STANDARD BACKLESS STRATA BEAM BENCH BY LANDSCAPE FORMS OR APPROVED EQUAL. REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS.
3. REFER TO PHOTOMETRIC PLAN FOR LIGHTING LOCATIONS AND DETAILS.

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND BUFFER
- EXIST. WETLAND
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ROAD CENTERLINE
- PROP. FENCE
- PROP. WALK
- PROP. ASPH.
- PROP. ADA PARKING SPACE

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WASHTENAW COUNTY, MICHIGAN

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LAYOUT PLAN

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

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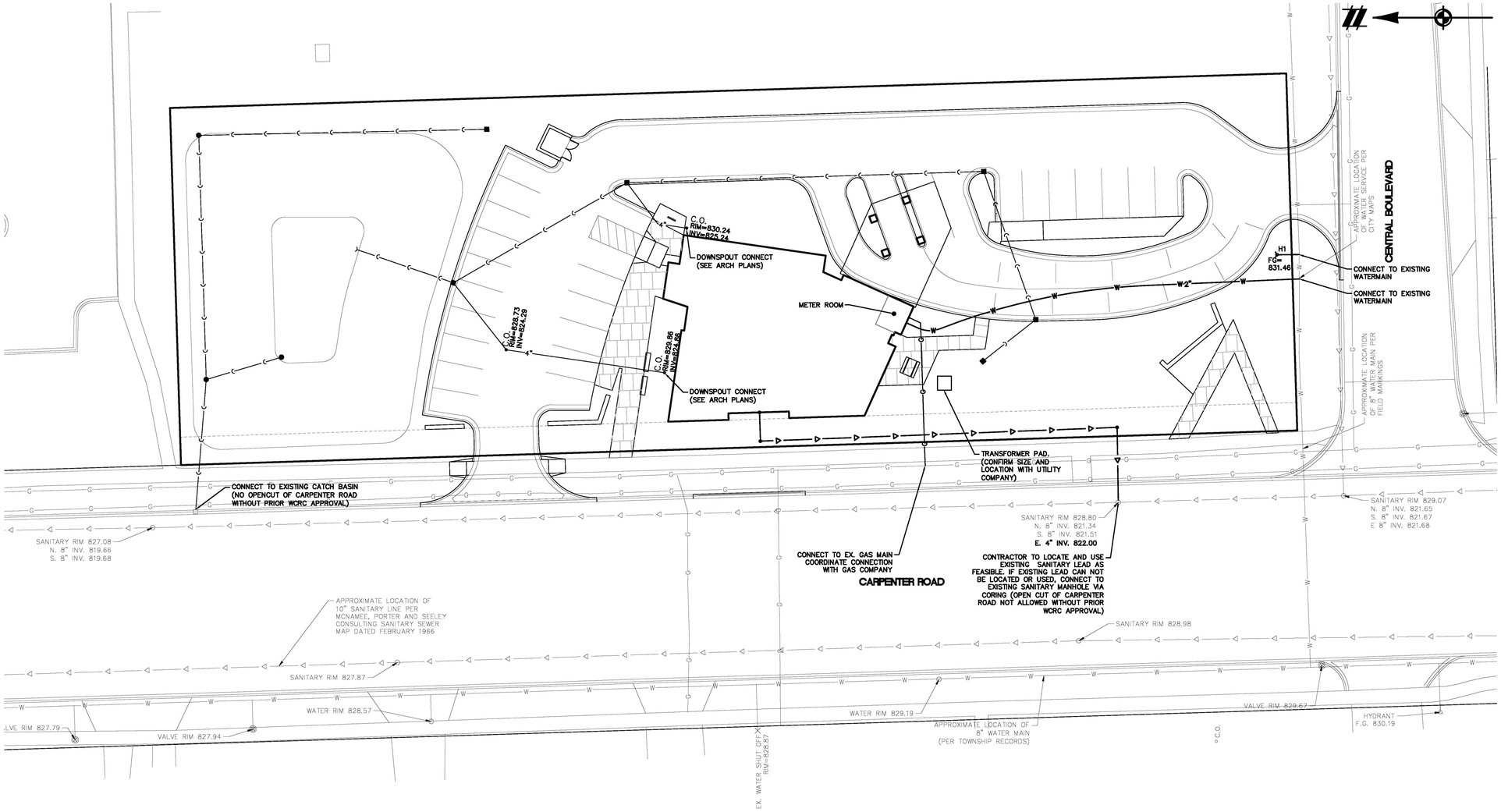

SANITARY BASIS OF DESIGN:

Non-Residential

Office Building:	4,400 S.F.				
	0.75 units/1000 sf	4,400	units =	3.3	E.R.U.
TOTAL =				**3.3**	**E.R.U.**
Number of Persons per unit =				3.4	persons/ERU
Design Population =	3.3 units	x	3.4 units =	11.2	people

Average Discharge Rate

Average Discharge = 100 GPD/person

(People x 100 GPCPD)/(1440 min/day)(448.8 gpm/cfs)= **0.002 cfs**

Peak Discharge Rate

Peaking Factor = $(18 + (\text{Population}/1000)^{0.5})/(4 + (\text{Population}/1000)^{0.5})$ = 4.41

Peak Flow = Average Discharge x Peaking Factor = **0.008 cfs**

Capacity of 4 " pipe @ 1.00 %= 0.19 cfs > 0.008 cfs

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR (923)
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE (X — X)
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. TREE (3533)
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE (OHE)
- EXIST. OVERHEAD TELE. LINE (OHT)
- EXIST. CABLE LINE (TV)
- EXIST. UNSPECIFIED UTILITIES (U)
- EXIST. GAS (G)
- EXIST. STORM (C)
- EXIST. WATER MAIN (W)
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR (923)
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER (C)
- PROP. SANITARY
- PROP. WATER MAIN (W)
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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UTILITY PLAN

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 10 20
1" = 20 FEET

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SHEET NO. 04

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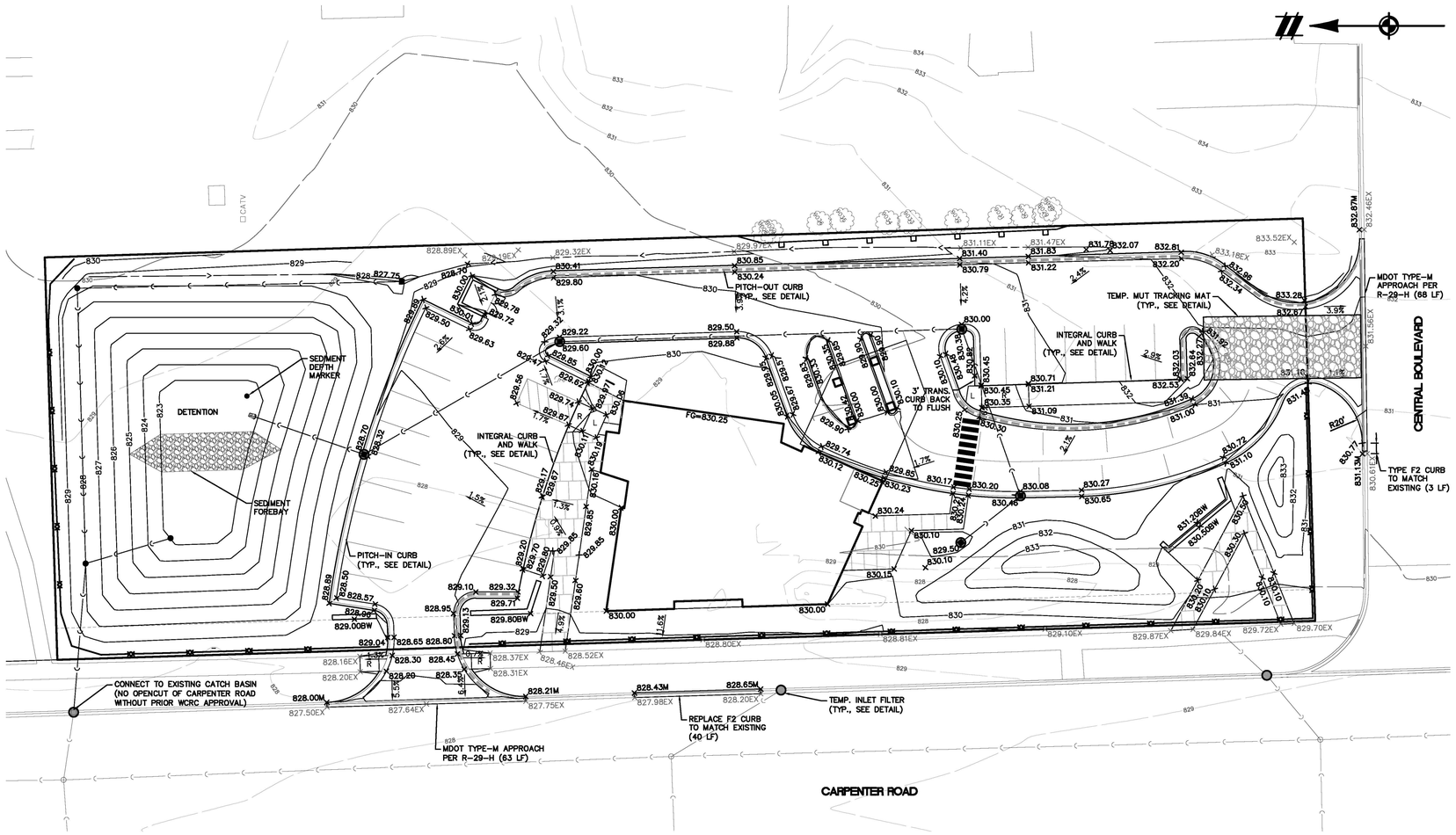

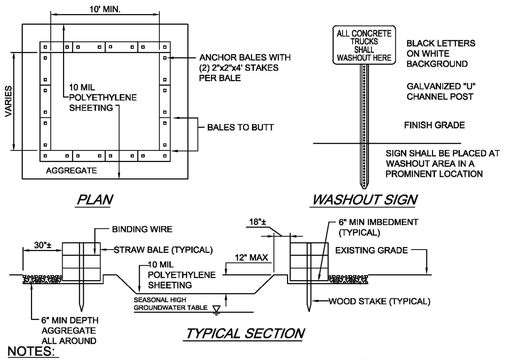

NOTES:

1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
2. CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE ASHOUT IS 75% FULL.
4. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

CONCRETE WASHOUT AREA
NO SCALE

SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME DURING DEVELOPMENT.
2. WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHALL BE KEPT TO THE SHORTEST PERIOD OF TIME.
3. TEMPORARY VEGETATION AND/OR MULCHING SHALL BE BE USED TO PROTECT CRITICAL AREAS EXPOSED DURING DEVELOPMENT.
4. THE PERMANENT FINAL VEGETATION AND STRUCTURES SHALL BE INSTALLED AS SOON AS PRACTICAL IN DEVELOPMENT.
5. THE DEVELOPMENT PLAN SHOULD BE FITTED TO THE TOPOGRAPHY AND SOIL SO AS TO CREATE THE LEAST SOIL EROSION POTENTIAL.
6. REFER TO WASHTENAW COUNTY STANDARD DETAILS OF THE SESC BMP MEASURES AS THEY CORRESPOND WITH THIS PLAN.
7. ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE TOWNSHIP AND THE WASHTENAW COUNTY DRAIN COMMISSIONER.
8. THE CONTRACTOR SHALL MAKE DAILY INSPECTIONS TO DETERMINE EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES, AND ANY NECESSARY REPAIRS SHALL BE PERFORMED WITHOUT DELAY.
9. EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT ON ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
10. EROSION AND ANY SEDIMENTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CONSTRUCTION. SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTING OF SILT OFF THE SITE.
11. PERMANENT SOIL EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 5 CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH CHANGE HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHERE SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED. ALL PERMANENT SOIL EROSION CONTROL MEASURES WILL BE IMPLEMENTED AND ESTABLISHED BEFORE A CERTIFICATE OF COMPLIANCE IS ISSUED.
12. A WATER TRUCK SHALL BE AVAILABLE TO WATER DOWN THE SITE ON A DAILY BASIS FOR DUST CONTROL.
13. ALL MUD/DIRT TRACKED ONTO EXISTING CITY/COUNTY ROADS FROM THIS SITE, DUE TO CONSTRUCTION, SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR/BUILDER, AS DIRECTED BY THE TOWNSHIP. MUD MAT DAILY MAINTENANCE WILL INCLUDE THE ADDITION OF EXTRA LAYERS OF STONE AS NECESSARY.
14. DURING CONSTRUCTION OF THE STORM SEWER SYSTEM, STRAW BALES, STONE FILTERS OR OTHER APPROVED MEANS, WILL PROTECT THE ENDS OF ALL OPEN PIPES.
15. PROMPTLY UPON THE BACKFILLING OF STORM STRUCTURES, INLET FILTERS WILL BE PLACED AROUND THE STRUCTURE PER DETAILS.
16. WITHIN FIVE (5) DAYS AFTER COMPLETION OF PAVING, A 16-FOOT STRIP AROUND PAVED AREAS SHALL BE PROTECTED FROM SOIL EROSION BY AN APPROVED METHOD CONSISTENT WITH THE GROWING SEASON.
17. ANY REMAINING DENUDED AREA SHALL BE SEEDED AND MULCHED WITHIN 5 DAYS AFTER COMPLETION OF FINAL GRADING. SEED MIX AND APPLICATION RATES SHALL BE PER MDOT CLASS A SEED.
18. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE MAINTAINED ON A DAILY BASIS TO ENSURE PROPER FUNCTIONING. SEDIMENT DEPOSIT MUST BE REMOVED WHEN ACCUMULATION REACHES 1/3 TO 1/2 OF THE HEIGHT OF THE SILT FENCE AND SHOULD BE REMOVED AFTER EACH STORM EVENT. FABRIC SHALL BE REPLACED PROMPTLY IF IT DECOMPOSES OR BECOMES INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USEABLE LIFE.
19. THAT ALL EROSION CONTROL MEASURES ARE INSTALLED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE OF CONSTRUCTION
    - 19.1. INSTALL SILT FENCE/STRAW BERMS AS SHOWN ON PLANS.
    - 19.2. STRIP AND STOCKPILE TOPSOIL AND GRADE SITE.
    - 19.3. INSTALL ON-SITE AND OFF-SITE STORM SEWER SYSTEMS COMPLETE. IMMEDIATELY INSTALL STONE FILTERS ON ALL PIPE INLETS AND CATCH BASINS AND ESTABLISH VEGETATION ON ALL DITCHES, SWALES, AND DISTURBED AREAS.
    - 19.4. INSTALL ALL PUBLIC UTILITIES (GAS, ELECTRICITY, AND TELEPHONE)
    - 19.5. INSTALL PAVEMENT COMPLETE REPAIR AND/OR REPLACE STONE FILTERS AS REQUIRED.
    - 19.6. FINISH GRADE, REDISTRIBUTE TOPSOIL, ESTABLISH VEGETATION AND/OR LANDSCAPE ALL DISTURBED AREAS.
    - 19.7. CLEAN PAVEMENT, WALKS, CULVERTS, WATERCOURSES, AND STORM SEWER SYSTEMS OF ALL SEDIMENT IN CONJUNCTION WITH THE REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURES. REESTABLISHED VEGETATION AS NECESSARY.
20. SHOULD DEWATERING BE NECESSARY, DISCHARGE SHALL BE ROUTED THROUGH A SEDIMENT FOREBAY, FILTER BAG OVER A WELL VEGETATED AREA OR OTHER APPROVED FILTERING MECHANISM PRIOR TO BEING DISCHARGED FROM THE SITE. DISCHARGE MUST BE LIMITED TO A NON-EROSIVE VELOCITY.
21. SOIL EROSION WILL BE CONTROLLED DURING AND AFTER CONSTRUCTION TO PROTECT ADJACENT PROPERTIES OR FACILITIES.
22. EROSION CONTROL BLANKET/MATTING SHALL BE INSTALLED ON SLOPES AT OR NEAR MAXIMUM ALLOWABLE GRADE AND AS NEEDED TO EFFECTIVELY ESTABLISH BOTH TEMPORARY AND PERMANENT VEGETATIVE COVER.

SOIL EROSION CONSTRUCTION SEQUENCE

1. NOTIFY SOIL EROSION OFFICE 48 HOURS BEFORE WORK IS TO BEGIN.
2. PRIOR TO CONSTRUCTION, INSTALL TEMPORARY STONE ACCESS DRIVES AT ENTRANCE, PERIMETER SILT FENCE, SNOW FENCE, AND EROSION CONTROL MEASURES ON EXISTING STORM INLETS AS DESIGNATED ON THE SESC PLAN.
3. INSTALL UNDERGROUND UTILITIES (I.E. SANITARY, STORM, AND WATER MAIN.). INSTALL INLET FILTER PROTECTION ON PROPOSED STORM SEWER STRUCTURES. (120 DAYS)
4. PAVING ACTIVITIES. REMOVE STONE ACCESS DRIVE WHEN COMPLETE. (30 DAYS)
5. INSTALL PUBLIC UTILITIES (ELECTRIC, TELEPHONE, AND CABLE T.V.). (30 DAYS)
6. FINAL GRADING AND INSTALLATION OF LANDSCAPING. ESTABLISH PERMANENT VEGETATION FOR REMAINING DISTURBED AREAS. (45 DAYS)
7. CLEAN OUT STORM SEWER SYSTEM INCLUDING WATER QUALITY STRUCTURES AND STORAGE FACILITIES. (15 DAYS)
8. CALL SOIL EROSION OFFICE FOR FINAL INSPECTION. REMOVE TEMPORARY SOIL EROSION MEASURES UPON APPROVAL.

SITE INFORMATION

SITE LOCATION: SECTION 14, PITTSFIELD TOWNSHIP, MICHIGAN.

1. ULTIMATE RECEIVING WATER: HURON RIVER
2. SITE SOILS INFORMATION: PER THE NRCS WEB SURVEY FOR WASHTENAW COUNTY; SIB – ST. CLAIR CLAY LOAM, 2 TO 6% SLOPES
3. APPROXIMATE AREA OF DISTURBANCE: ±1.18 ACRES

LEGEND

BOUNDARY LINE	PROP. SETBACK
EXIST. EASEMENT	PROP. BUILDING
SECTION LINE	PROP. PARKING STRIPE
BOUNDARY/PROPERTY LINE	PROP. CURB AND GUTTER
EXIST. SETBACK	PROP. PITCH-OUT CURB AND GUTTER
EXIST. CONTOUR	PROP. ASHPALT
EXIST. TREE LINE	PROP. PARKING STRIPE
EXIST. CURB AND GUTTER	PROP. CONTOUR
EXIST. FENCE	PROP. INLET FILTER
EXIST. GRAVEL	PROP. SILT FENCE
EXIST. BUILDING	PROP. STORM SEWER
EXIST. TREE	PROP. SANITARY
EXIST. WETLAND BUFFER	PROP. WATER MAIN
EXIST. OVERHEAD ELEC. LINE	PROP. END SECTION
EXIST. OVERHEAD TELE. LINE	PROP. CATCH BASIN/INLET
EXIST. CABLE LINE	PROP. WATER VALVE
EXIST. UNSPECIFIED UTILITIES	PROP. FIRE HYDRANT
EXIST. GAS	PROP. MANHOLE
EXIST. STORM	
EXIST. WATER MAIN	
EXIST. SANITARY	
EXIST. UNSPECIFIED UTILITY	
EXIST. CULVERT	
EXIST. CATCH BASIN/INLET	
EXIST. HYDRANT	
EXIST. VALVE	
EXIST. SANITARY SEWER	

Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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ANN ARBOR, MI 48104
734.994.4000

SECTION 14 TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

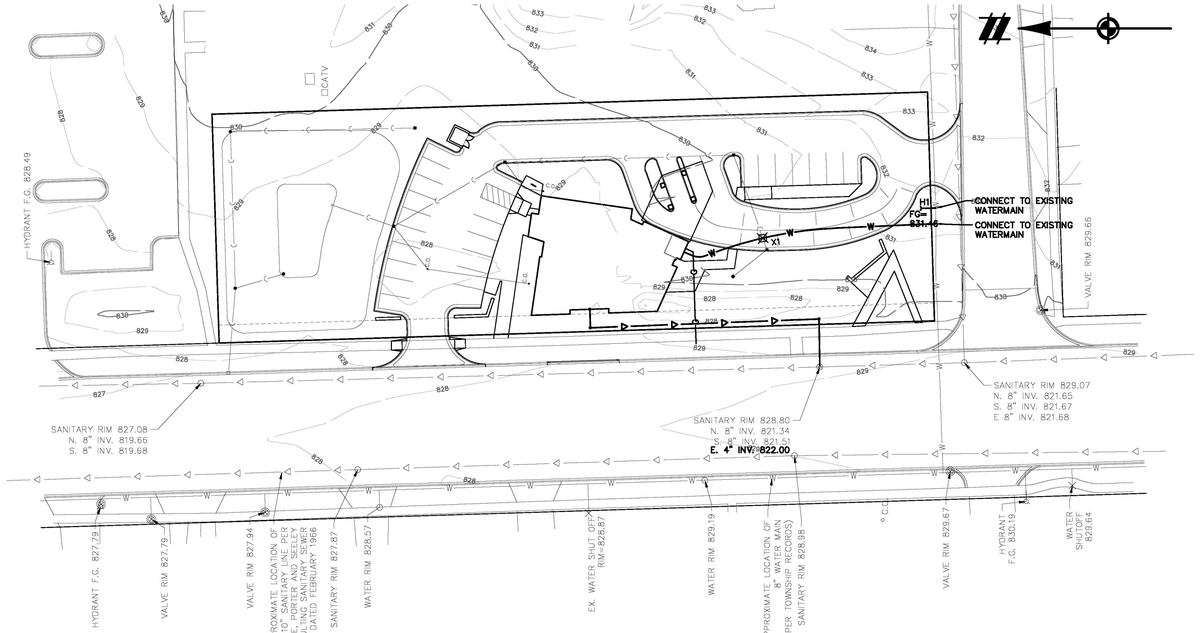
GRADING AND SESC PLAN

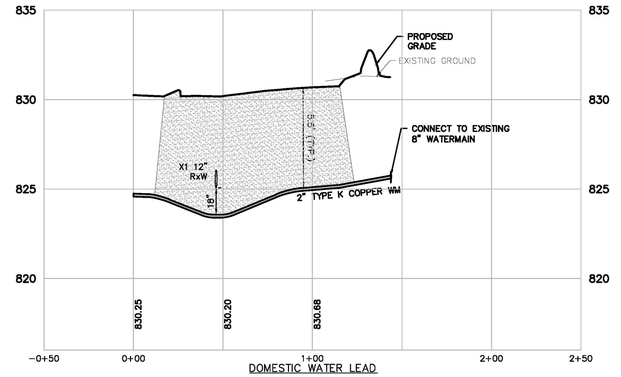
DATE
OCTOBER 4, 2017

REVISIONS
12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

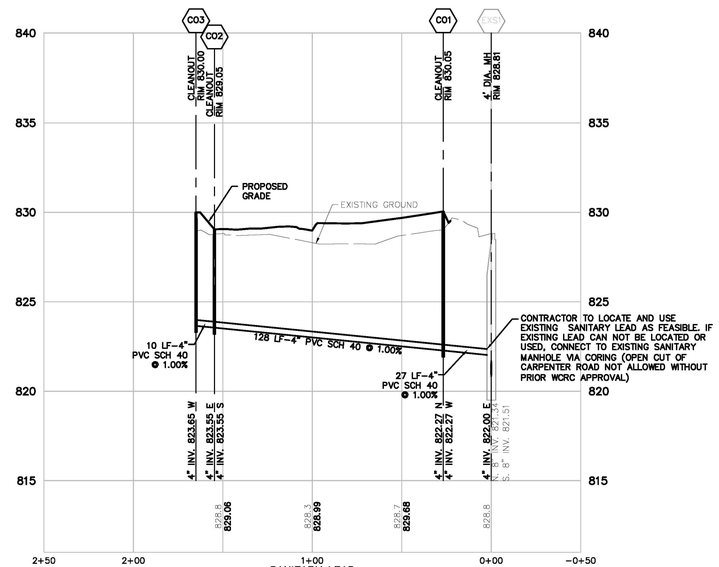
SCALE 0 10 20
1" = 20 FEET
DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 05

K:\17002264-UMCU\DWG\P-LAN SET\SITE-FINAL\17002264-GS-DWG 2/6/2018 8:10 AM CHRIS ROTHHAAR





DOMESTIC WATER LEAD
VERT: 1"=4'
HORZ: 1"=40'



SANITARY LEAD
VERT: 1"=4'
HORZ: 1"=40'

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
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- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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SECTION 14
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

UTILITY LEAD PROFILES

DATE
OCTOBER 4, 2017

REVISIONS
12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

SCALE 0 20 40
1" = 40 FEET

DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 06

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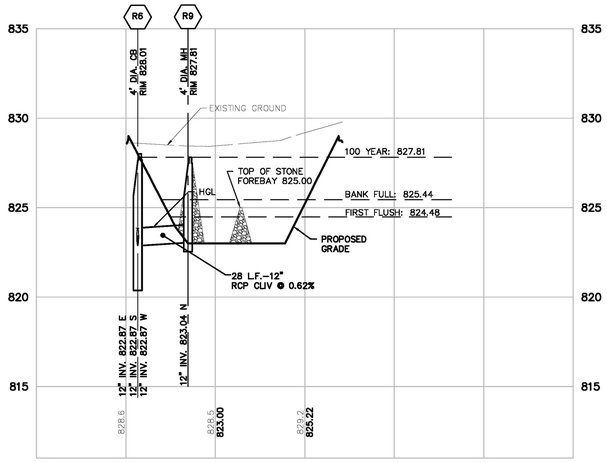
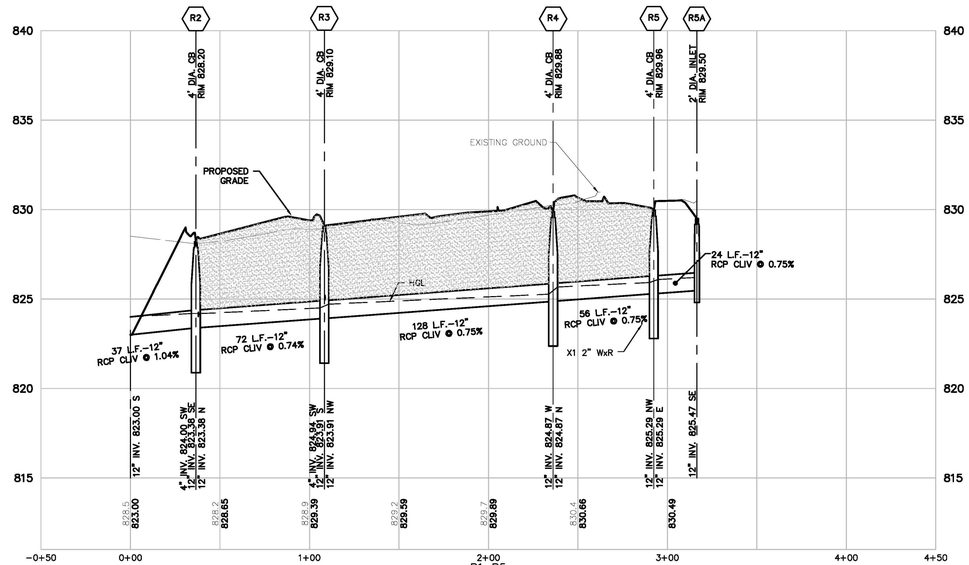


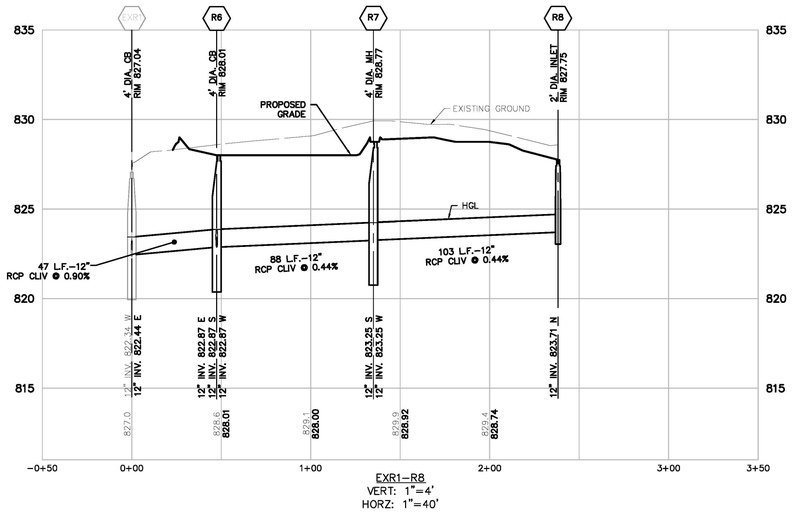
R6–R9 & DETENTION BASIN
VERT: 1"=4'
HORZ: 1"=40'



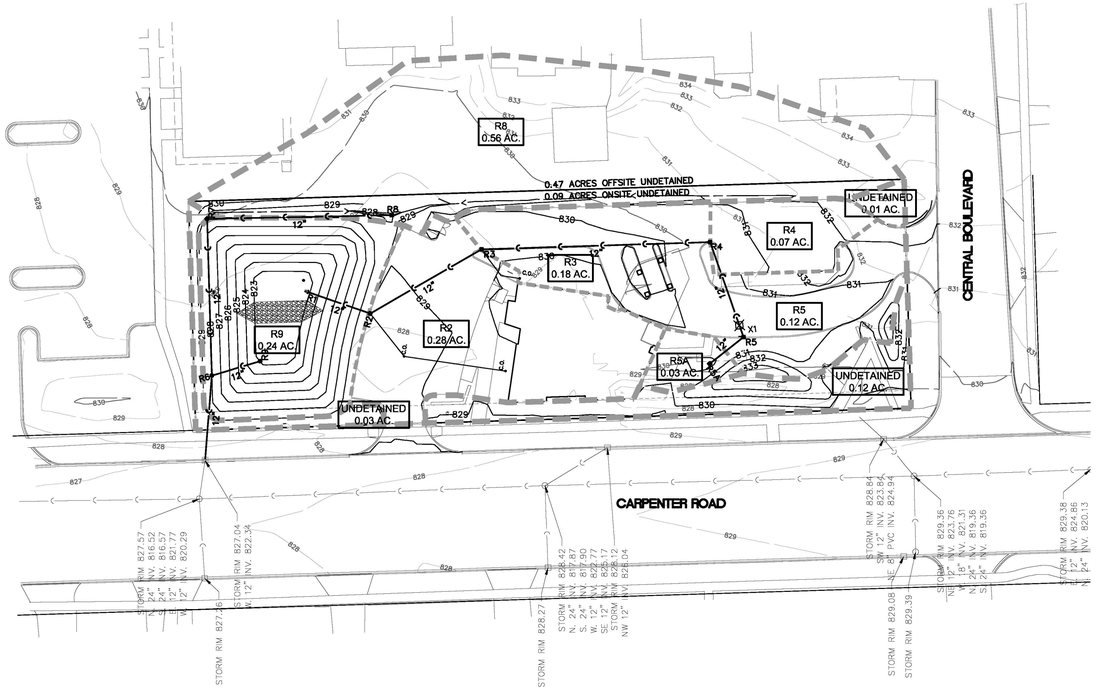
R1–R5
VERT: 1"=4'
HORZ: 1"=40'

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE
- PROP. OVERALL DRAINAGE AREA
- COMPACTED SAND BACKFILL



EXR1–R8
VERT: 1"=4'
HORZ: 1"=40'



CONVEYANCE CALCULATIONS

I = B/(T+D)^E B = 175.0 D = 25.0 E = 1
C = varies
T = 15 (min.)

FROM MH INPUT	TO MH	INCRE-MENT ACRES (A)	C	EQUIV. AREA 100% ACRES CA	TOTAL AREA 100% ACRES SUM CA	T TIME (MIN.)	I (IN PER HOUR)	Q=CIA C.F.S. FLOW	CAPAC-ITY OF SEWER (C.F.S.)	DIAM. OF PIPE (IN.)	LENGTH OF LINE (FT.)	SLOPE OF PIPE (%)	MIN HG BASED ON "Q" (%)	HG FOR 3.0 FPS GIVEN "D" (%)	ACTUAL HG (%)	VEL. FLOW FULL (FT./ SEC.)	TIME OF FLOW (MIN.)	H.G.L. ELEV.		GROUND ELEV.		INVERT ELEV.	
																		UPPER END	LOWER END	UPPER END	LOWER END	UPPER END	LOWER END
South Basin																							
R5A	R5	0.03	0.64	0.02	0.02	15.00	4.38	0.08	3.09	12	24	0.75	0.00	0.44	0.44	3.9	0.1	826.19	826.08	829.50	829.96	825.47	825.28
R5	R4	0.12	0.71	0.08	0.10	15.10	4.36	0.45	3.09	12	56	0.75	0.02	0.44	0.44	3.9	0.2	825.91	825.66	829.96	829.88	825.28	824.86
R4	R3	0.07	0.95	0.07	0.17	15.30	4.34	0.75	3.09	12	128	0.75	0.04	0.44	0.44	3.9	0.5	825.26	824.70	829.88	829.10	824.86	823.90
R3	R2	0.18	0.77	0.14	0.31	15.80	4.29	1.34	3.09	12	72	0.75	0.14	0.44	0.44	3.9	0.3	824.49	824.17	829.10	828.20	823.90	823.37
R2	R1	0.28	0.95	0.26	0.58	16.10	4.26	2.45	3.56	12	37	1.00	0.47	0.44	0.47	4.5	0.1	824.17	824.00	828.20	824.25	823.37	823.00
R8	R7	0.56	0.25	0.14	0.14	15.00	4.38	0.61	2.36	12	103	0.44	0.03	0.44	0.44	3.0	0.6	824.68	824.23	827.75	828.77	823.71	823.25
R7	R6	0.00	0.00	0.00	0.14	15.60	4.31	0.61	2.36	12	88	0.44	0.03	0.44	0.44	3.0	0.5	824.23	823.85	828.77	828.01	823.25	822.87
R6	EXR1	0.00	0.00	0.00	0.78	16.10	4.26	3.31	3.38	12	47	0.90	0.86	0.44	0.86	4.3	0.2	823.85	823.44	828.01	827.04	822.87	822.44
R9	R6	0.24	0.25	0.06	0.64	15.00	4.38	2.79	2.81	12	28	0.62	0.61	0.44	0.61	3.6	0.1	824.02	823.85	827.81	828.01	823.04	822.87

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PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
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STORM PROFILES & DRAINAGE AREA PLAN

DATE
OCTOBER 4, 2017

REVISIONS
12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

SCALE 0 20 40
1" = 40 FEET
DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 07

DETENTION CALCULATIONS

W1 Determining Post-Development Cover Types, Areas, Curve Numbers and runoff coefficients

Total Contributing Drainage Area = 1.18 Acres
Total Disturbed Area = 1.18 Acres

Rational Method Variables

Cover Type	Soil Type	Area (sf)	Area (ac)	Runoff Coef	(c)(Area)
Pavement, rooftops	D	23,060	0.53	0.95	21,907
Water Surfaces (bankfull in basin)	D	5,000	0.11	1.00	5,000
Developed Open Space, Good Condition	D	23,341	0.54	0.50	11,670
				Total - Sum (c)(Area) =	38,577
				Area Total (sf)=	51,401
				Weighted C-Sum(c)(Area)/Sum(ac) or Sum(sf)=	**0.75**

NRCS Variables

Pervious Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN)(Area)
Developed Open Space, Good Condition	D	23,341	0.54	80	1,867,264
			0.00		0
			0.00		0
	Total - Sum (CN)(Area) =				1,867,264
	Area Total - Sum(ac) of Sum(sf)=				23,341
	Weighted CN-Sum(CN)(Area)/Sum(ac) or Sum(sf)=				**80**

NRCS Variables

Impervious Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN)(Area)
Pavement, rooftops	D	23,060	0.53	98	2,259,880
Water Surfaces (bankfull in ponds)	D	5,000	0.11	98	490,000
			0.00		0
	Total - Sum (CN)(Area) =				2,749,880
	Area Total - Sum(ac) of Sum(sf)=				28,060
	Weighted CN-Sum(CN)(Area)/Sum(ac) or Sum(sf)=				**98**

W2 First Flush Runoff Calculations (Vff)

A. Vff = (1") (1/12) (43560/1) (C) AC = **3,213** cf

W3 Predevelopment Bankfull Runoff Calculations (Vbf-pre)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Pervious Cover CN *(meadow, Type D soils)*	CN =	78	
C.	S = (1000/CN)-10	S =	2.82	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	0.69	in
E.	Pervious Cover Area	Area =	51,401	sf
F.	$V_{bf\text{-}pre}$ = Q(1/12)Area	$V_{bf\text{-}pre}$ =	**2,966**	cf

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	CN =	80	
C.	S = (1000/CN)-10	S =	2.50	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	0.79	in
E.	Pervious Cover Area	Area =	23,341	sf
F.	$V_{bf\text{-}per\text{-}post}$ = Q(1/12)Area	$V_{bf\text{-}per\text{-}post}$ =	**1,530**	cf

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	CN =	98	
C.	S = (1000/CN)-10	S =	0.20	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	2.12	in
E.	Pervious Cover Area	Area =	28,060	sf
F.	$V_{bf\text{-}imp\text{-}post}$ = Q(1/12)Area	$V_{bf\text{-}imp\text{-}post}$ =	**4,961**	cf

W6 Pervious Cover Post-development 100-year Storm Runoff Calculations (V100-per-post)

A.	100 year storm event	P =	5.11	in
B.	Pervious Cover CN	CN =	80	
C.	S = (1000/CN)-10	S =	2.50	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	2.99	in
E.	Pervious Cover Area	Area =	23,341	sf
F.	$V_{100\text{-}per\text{-}post}$ = Q(1/12)Area	$V_{100\text{-}per\text{-}post}$ =	**5,814**	cf

W7 Impervious Cover Post-development 100-year Storm Runoff Calculations (V100-imp-post)

A.	100 year storm event	P =	5.11	in
B.	Pervious Cover CN	CN =	98	
C.	S = (1000/CN)-10	S =	0.20	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	4.87	in
E.	Pervious Cover Area	Area =	28,060	sf
F.	$V_{100\text{-}imp\text{-}post}$ = Q(1/12)Area	$V_{100\text{-}imp\text{-}post}$ =	**11,395**	cf

W8 Determine Time of Concentration (Tc-hrs)

User specified; assume 30 minutes — Total Time of Concentration (hrs) = 0.50

W9 Runoff Summary & Onsite Infiltration Requirement

A. Runoff Summary from Previous Worksheets

V_{ff} =	**3,213**	cf*	
$V_{bf\text{-}pre}$ =	2,966	cf	
$V_{bf\text{-}per\text{-}post}$ =	1,530	cf	**Total BF Volume ($V_{bf\text{-}post}$)**
$V_{bf\text{-}imp\text{-}post}$ =	4,961	cf	6,492 cf
$V_{100\text{-}per\text{-}post}$ =	5,814	cf	**Total 100-year Volume (V_{100})**
$V_{100\text{-}imp\text{-}post}$ =	11,395	cf	17,209 cf

B. Determine Onsite Infiltration Requirement

$V_{bf\text{-}post}$ =	6,492	cf
$V_{bf\text{-}pre}$ =	2,966	cf
Bankfull Volume Difference =	**3,526**	**cf***

Onsite Infiltration Requirement (V_{infr}) = **3,526** cf

W10 Detention / Retention Requirement

A.	Q_a = 238.6 (T_c) ^ -0.82	421.23	cfs/in-mi^2
B.	Total Site Area	1.18	ac
C.	Q_{100} = $Q_{100\text{-}per}$ + $Q_{100\text{-}imp}$	7.86	in
D.	Peak Flow (PF) = (Q_a-Q_{100}-A)/640	6.106	cfs
E.	Delta = PF - 0.15A	5.929	cfs
F.	V_{det} = (Delta/PF) x V_{100}	**16,710**	**cf**

W12 Infiltration / Detention Summary

Total Infiltration Required per WCWRC Rules:	3,526	cf
Total Infiltration Provided:	0	cf
Difference:	(3,526)	cf
% Deficiency:	100.0%	
Pro-Rated 20% Detention Penalty:	**20.0%**	
Total Detention Required	16,710	cf
Total Detention Required w/ Pro-Rated Penalty	**20,052**	**cf**

Basin Stage-Storage Summary:

Elev.	Area	Avg. Area	Depth	Volume
829.0	9,770	8,855	1.0	30,228
828.0	7,940	7,095	1.0	21,373
827.0	6,250	5,495	1.0	14,278
826.0	4,740	4,080	1.0	8,783
825.0	3,420	2,860	1.0	4,703
824.0	2,300	1,843	1.0	1,843
823.0	1,385			

Total Detention Provided: **30,228** **cf**

Vff Elev.= 824.48
Vbf Elev.= 825.44
V100 Elev.= 827.81 — 1.19 Freeboard

Forebay Sizing

Required Volume (Vfb)=0.05*V100 — **860 cf**

Forebay Stage-Storage Summary:

Elev.	Area	Avg. Area	Depth	Volume
825.0	1,730	1,385	1.0	2,165
824.0	1,040	780	1.0	780
823.0	520			

Outlet Control Structure Sizing

1. Standpipe outlet holes sizing - "first flush" runoff
First Flush discharge should be released from in 24 hours

Qff = Vff / 24 hrs / 3600 sec	Qff=	0.037	cfs
hff(ave) = 2/3 x (Xff - Xo)	hff(ave) =	0.986	ft
Aff(required) = Qff / 0.62 x sqrt(2*32.2*h)	A(required) =	0.008	sf
Selected Orifice Diameter =		0.75	in
Area of each orifice =		0.003	sf
Number of orifice holes required =	=	2	holes at elev. 823.00

Check First Flush discharge release time

Aff(actual) =	0.0061	ft²
Qff = A x 0.62 x sqrt(2*32.2*h) =	0.0303	cfs
Tff = Vff / (Qff x 3600)	29.4 hrs	O.K.

2. Standpipe outlet holes sizing - "Bankfull flood" discharge
Bankfull should discharge within 36 to 48 hours

Check release from first flush holes only

hbf(ave) = 2/3 x (Xbf - Xo)	hbf(ave) =	1.626	ft
Qbf = A x 0.62 x sqrt(2*32.2*h) =	Qbf =	0.039	cfs
Tbf = Vbf / (Qbf x 3600) =	Tbf =	46.3	hrs

Add holes at to decrease storage time

The first flush volume will discharge in Tff	=	29.4	hrs
Additional volume between Xbf and Xff = Vbf - Vf	=	3,279	cf
Target Bankfull Discharge Time =	=	40.0	hrs
Vbf = Target Discharge Time - Tff	=	10.6	hrs
Qbf - Qff = (Vbf - Vff) / ((42-Tff) x 3600)	=	0.09	cfs
Hff=(2/3)(Xbf-Xff)+(Xff-Xo)	=	2.12	ft
Q_1=A_{bf}(.62)(SQRT(2gh)	=	0.04	cfs
V_1=$T_{rem}$$Q_1$	=	1,690	cf
V_2=V_{rem}-V_1	=	1,589	
Q_2=V_2/T_{rem}	=	0.04	cfs
H_{bf}=(2/3)(X_{bf}-X_{ff})	=	0.64	
A_{bf}(required)	=	0.011	sf
Selected Orifice Diameter =		0.75	in
Area of each orifice =		0.0031	sf
Number of orifice holes required =	=	3	holes at elev. 824.48

3. Standpipe outlet holes sizing - "100-yr flood" discharge

Q100 = Qa	Q100 =	0.177	cfs
Release from above holes			
hff = (Xprovided-Xo)	hff =	4.814	ft
hbf = (Xprovided-Xff)	hbf =	3.335	ft
Q = A x 0.62 x sqrt(64.4*hff) + A x 0.62 x sqrt(64.4*hbf) =		0.151	cfs
Remaining flow =	Q100-Q=	0.026	cfs
A = Q100 /(.62 x sqrt(2*32.2*h))	A(required) =	0.003	sf
Selected Orifice Diameter =		0.75	in
Area of each orifice =		0.0031	sf
Number of orifice holes required =	=	1	holes at elev. 825.44

4. Riser Outlet Pipe Design
Outlet pipe designed to handle the 100-year restricted flow

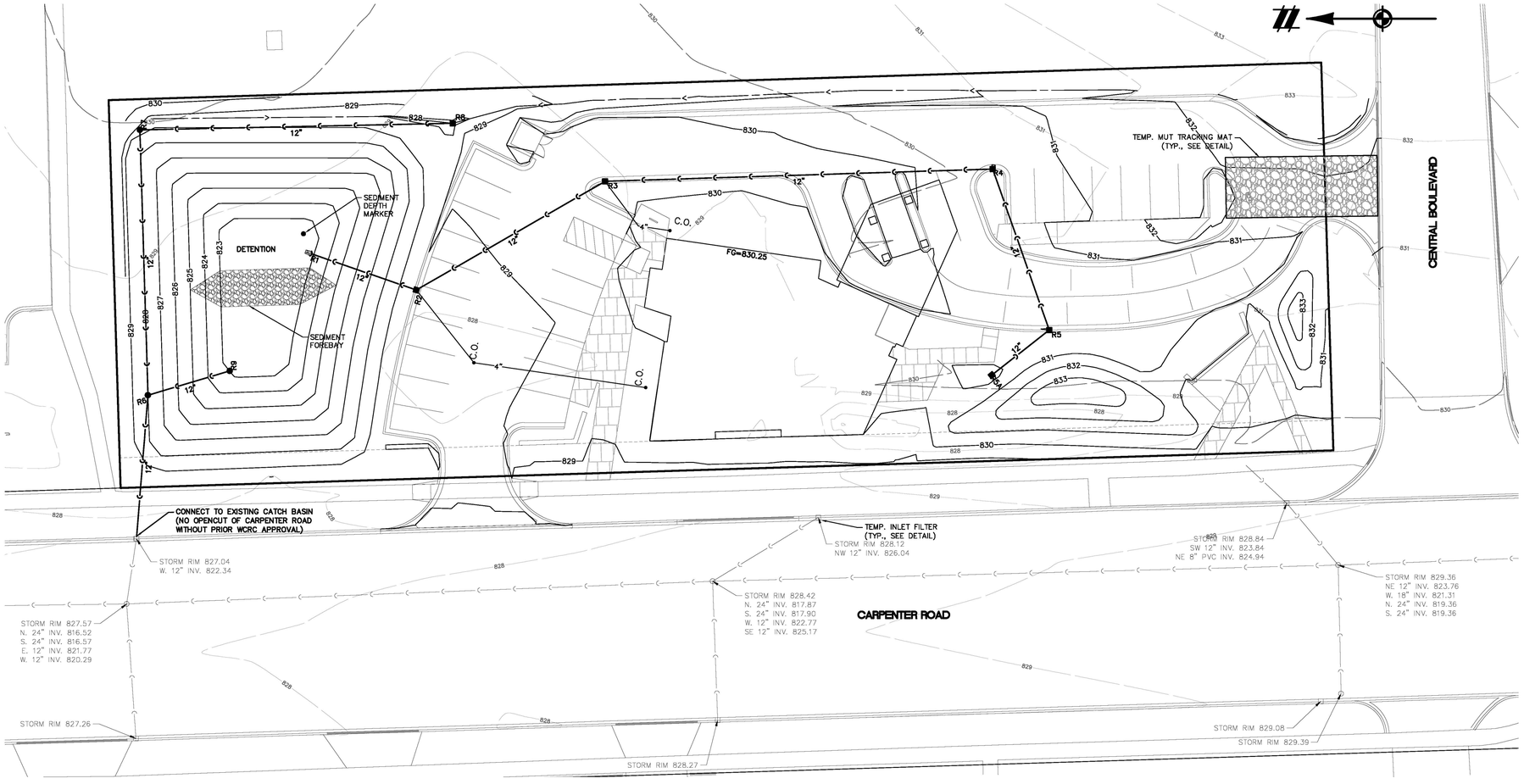
100-year restricted flow =	Q =	0.15	cfs
Choose outflow pipe diameter =	d =	12	in
Choose outflow pipe slope =	S =	0.44	%
Assume roughness factor	n =	0.013	
Flow velocity at 100-yr restricted flow (Mannings	V =	3.01	fps
Design Pipe Capacity =	=	2.36	cfs

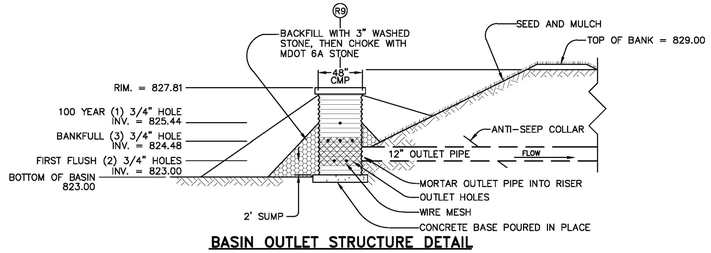
Basin Overflow Weir

Drainage Area, A =	1.2	ac
C-Factor (C) =	0.75	
Time of Conc. (T) =	30	min
Intensity (I)	5.00	in/hr — I = 275/(T+25)
Design Flow (Q) =	4.43	cfs — C x I x A
Weir Coef (C)=	3.367	
Invert of Weir =	828.5	ft
Height of Weir (H) =	0.5	ft
Min. Width of Weir (B) =	3.7	ft
L = Q/(C x H^(3/2))		

GRADING/DRAINAGE/STORMWATER NOTES

1. THE TOTAL REQUIRED DETENTION HAS BEEN DETERMINED IN ACCORDANCE WITH THE WASHTENAW COUNTY WATER RESOURCES COMMISSIONER RULES AND GUIDELINES, REVISED OCTOBER 2016.
2. BASED ON THE SOIL INVESTIGATION THE SITE IS NOT SUITABLE FOR INFILTRATION.
3. THE REQUIRED DETENTION SHALL BE PROVIDED WITH A DETENTION BASIN ON THE NORTH END OF THE SITE.
4. THE PROPOSED DETENTION BASIN SHALL OUTLET TO THE EXISTING STORM SEWER ALONG CARPENTER ROAD.
5. ROOF DRAINAGE SHALL BE DIRECTED TO THE STORM SEWER WATER MANAGEMENT SYSTEM.





BASIN OUTLET STRUCTURE DETAIL
NO SCALE

LEGEND

BOUNDARY LINE	PROP. SETBACK
EXIST. EASEMENT	PROP. BUILDING
SECTION LINE	PROP. BUILDING INTERIOR
BOUNDARY/PROPERTY LINE	PROP. WALL
EXIST. SETBACK	PROP. PARKING STRIPE
EXIST. CONTOUR	PROP. BACK OF CURB
EXIST. TREE LINE	PROP. ASHPALT
EXIST. CURB AND GUTTER	PROP. LOT LINE
EXIST. FENCE	PROP. PARKING STRIPE
EXIST. GRAVEL	PROP. CONTOUR
EXIST. BUILDING	PROP. INLET FILTER
EXIST. TREE	PROP. SILT FENCE
EXIST. WETLAND BUFFER	PROP. STORM SEWER
EXIST. OVERHEAD ELEC. LINE	PROP. SANITARY
EXIST. OVERHEAD TELE. LINE	PROP. WATER MAIN
EXIST. CABLE LINE	PROP. END SECTION
EXIST. UNSPECIFIED UTILITIES	PROP. CATCH BASIN/INLET
EXIST. GAS	PROP. WATER VALVE
EXIST. STORM	PROP. FIRE HYDRANT
EXIST. WATER MAIN	PROP. MANHOLE
EXIST. SANITARY	PROP. OVERALL DRAINAGE AREA
EXIST. UNSPECIFIED UTILITY	
EXIST. CULVERT	
EXIST. CATCH BASIN/INLET	
EXIST. HYDRANT	
EXIST. VALVE	
EXIST. SANITARY SEWER	

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ANN ARBOR, MI 48104
734.994.4000

SECTION 14 — TOWN 3 SOUTH, RANGE 6 EAST — PITTSFIELD TOWNSHIP — WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK — UNIVERSITY OF MICHIGAN CREDIT UNION

STORMWATER MANAGEMENT PLAN

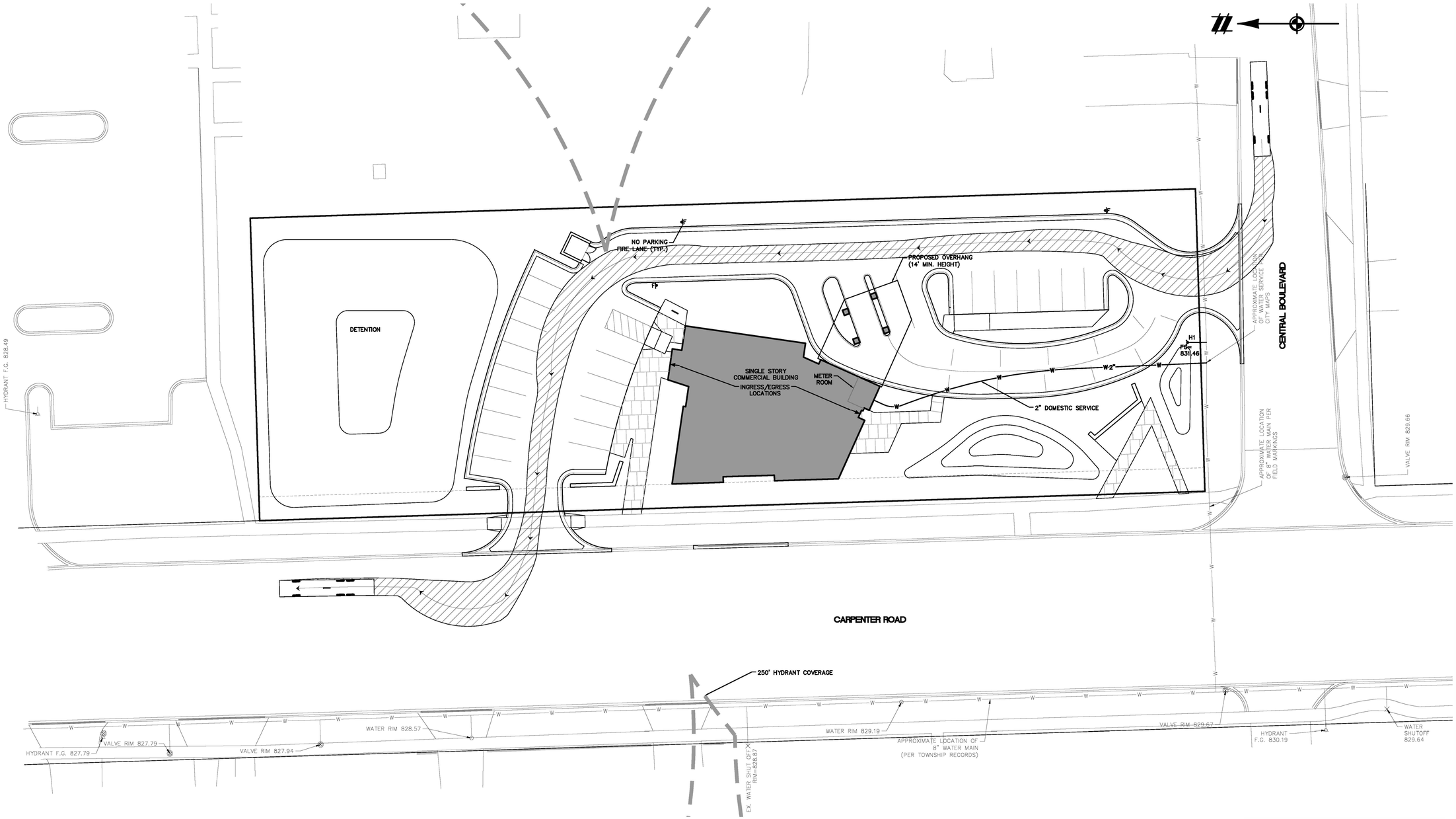
DATE
OCTOBER 4, 2017

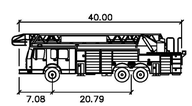
12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 10 20
1" = 20 FEET

DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 08





T-2 Fire Truck feet

Width	: 6.90
Track	: 6.90
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

T-2 FIRETRUCK DETAIL
NOT TO SCALE

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND BUFFER
- EXIST. WETLAND
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ROAD CENTERLINE
- PROP. WALK
- PROP. ASPH.
- PROP. ADA PARKING SPACE

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PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN
CREDIT UNION

FIRE PROTECTION PLAN

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 10 20
1" = 20 FEET

DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 09

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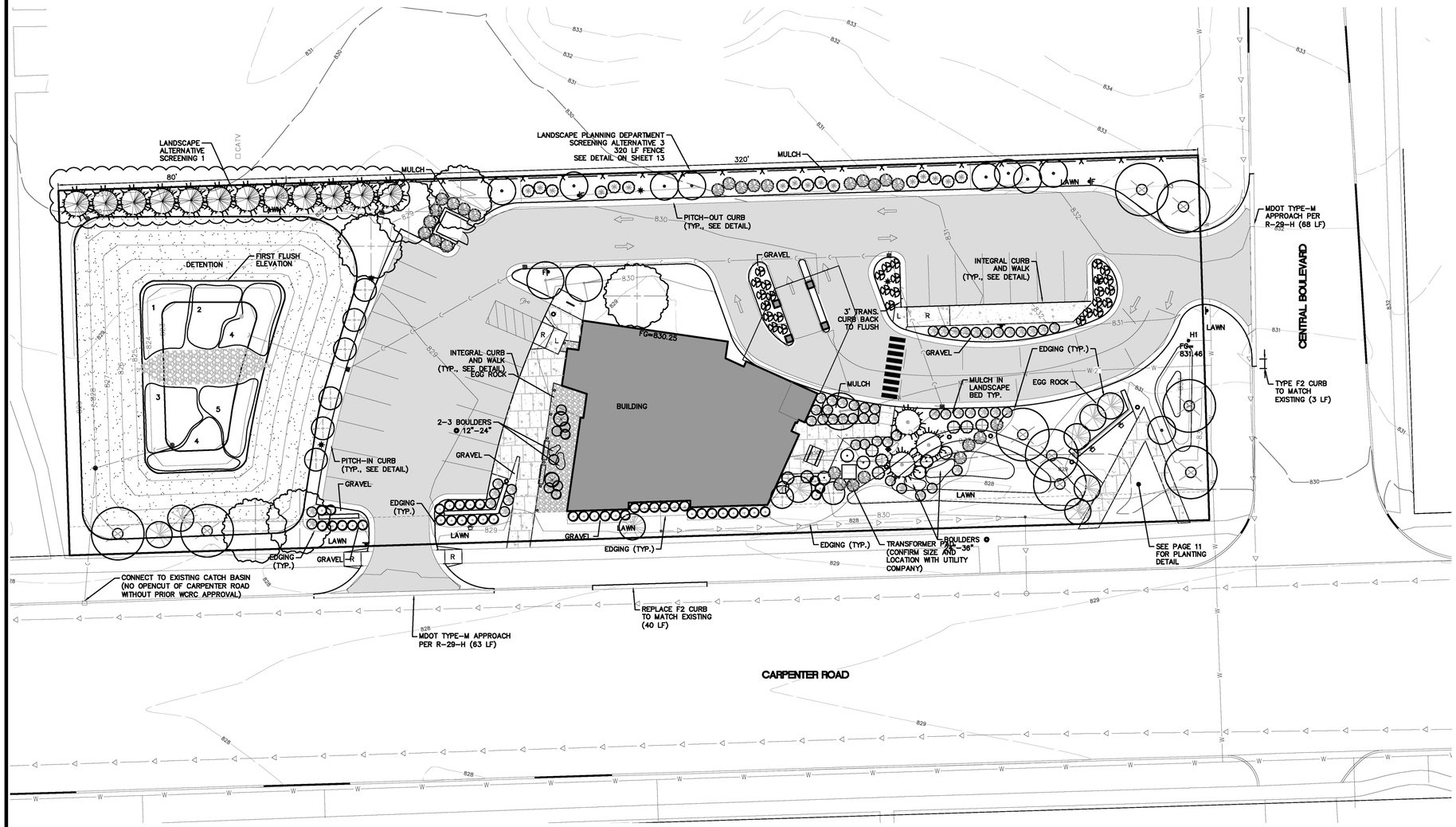
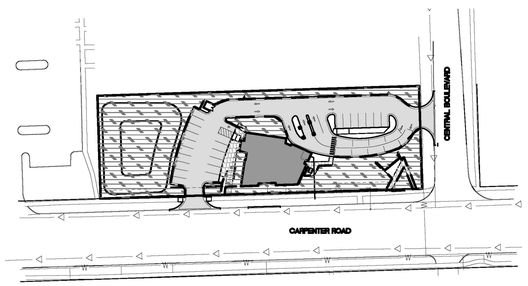


LANDSCAPE LEGEND

QUANT.	SYMBOL	PROPOSED DECIDUOUS TREES	SIZE
6		ARMSTRONG RED MAPLE (ACER X FREEMANII 'ARMSTRONG')	3" CAL B&B
8		GOLDSPIRE SUGAR MAPLE (ACER SACCHARUM "GOLDSPIRE")	3" CAL B&B
9		BLACK GUM (NYSSA SYLVATICA)	3" CAL B&B
9		REGAL PRINCE OAK (QUERCUS X WAREI 'REGAL PRINCE')	3" CAL B&B
9		PRINCETON SENTRY GINKGO (GINKGO BILOBA)	3" CAL B&B
		PROPOSED ORNAMENTAL TREES	
3		SERVICE BERRY (AMELANCHIER CANADENSIS)	6' HGT. B&B
		PROPOSED EVERGREEN TREE	
12		FASTIGIATA GIANT ARBORVITAE (THUJA PLICATA FASTGIATA)	8' HGT. B&B
3		COLUMNAR EASTERN WHITE PINE (PINUS STROBUS 'FASTIGIATA')	8' HGT. B&B
		PROPOSED SHRUBS	
2		ARNOLD GIANT FORSYTHIA (FORSYTHIA 'ARNOLD GIANT')	#3 CONT.
16		TINY WINE NINEBARK (PYSOCARPUS OPULIFOLIUS 'TINY WINE')	#3 B&B
27		GLOBE ARBORVITAE (THUJA OCCIDENTALIS 'GOLDEN GLOBE')	#3 B&B
		PROPOSED ORNAMENTAL GRASSES	
43		BLUE OAT GRASS (HELICTOTRICHON SEMPERVIRENS)	#3 CONT.
6		MAIDEN GRASS (MISCANTHUS SINENSIS)	#3 CONT.
58		BLUE FESCUE (FESTUCA GLAUCA)	#3 CONT.
28		HOSTA	#3 CONT.
9		BIG BLUESTEM (ANDROPOGON GERARDII)	#3 CONT.



LANDSCAPING AREA
NOT TO SCALE

= LANDSCAPE AREA
.57 AC

LIVE PLANTING LIST LEGEND

			QUANTITY	SIZE
1	NODDING WILD ONION ALLIUM CERNUUM PLANTED 24" O.C.	358 SF	179	LIVE PLUG
2	BLACK EYED SUSAN RUDBECKIA HIRTA PLANTED 24" O.C.	304 SF	152	LIVE PLUG
3	JOE PYE WEED EUTROCHIUM PURPUREUM PLANTED 24" O.C.	326 SF	163	LIVE PLUG
4	PURPLE CONEFLOWER ECHINACEA PURPUREA PLANTED 24" O.C.	372 SF	186	LIVE PLUG
5	BLUE FLAG IRIS IRIS VERSICOLOR PLANTED 24" O.C.	314 SF	157	LIVE PLUG
6	NEW ENGLAND ASTER ASTER NOVAE-ANGLIAE PLANTED 24" O.C.	320 SF	160	LIVE PLUG

SEED MIX

DETENTION SEED MIX:
DETENTION BASIN MIX BY PRAIRIE NURSERY (OR APPROVED EQUAL)
WILDFLOWERS: NODDING PINK ONION, RED MILKWEED, NEW ENGLAND ASTER, WHITE FALSE INDIGO, PALE INDIAN PLANTAIN, WLD SENNA, CANADA TICK TREFOIL, JOE PYE WEED, BONESET, DOGTOOTH DAISY, OX EYE SUNFLOWER, WLD IRIS, BLUE FLAG IRIS, PRAIRIE BLAZINGSTAR, DENSE BLAZINGSTAR, GREAT BLUE LOBELIA, BERGAMOT,YELLOW CONEFLOWER, BLACK EYED SUSAN, SWEET BLACK EYED SUSAN, BROWN EYED SUSAN, ROSINWEED, CUPPLANT, PRAIRIE DOCK, OHIO GOLDENROD, STIFF GOLDENROD, TALL MEADOWRUE, BLUE VERVAIN, IRONWEED, GOLDEN ALEXANDERS
GRASSES: BIG BLUESTEM, BEBB'S SEDGE, BOTTLEBRUSH SEDG, PORCUPINE SEDGE, AWL FRUITED SEDGE, FOX SEDGE, CANADA WILD RYE, VIRGINIA WILD RYE, SWITCHGRASS, DARK GREEN BULRUSH, INDIANGRASS, PRAIRIE CORDGRAS, ANNUAL RYE

PLANTING RATE PER ACRE: 10 LBS

SOILS:
SOILS MUST BE AMENDED WITH A COMPOSTED ORGANIC MATERIAL. SOILS MUST BE FREE OF CONSTRUCTION DEBRIS AND SUBSOILS. A RECOMMENDED SOIL BLEND INCLUDES 20 TO 30 PERCENT COMPOST

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND BUFFER
- EXIST. WETLAND
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ROAD CENTERLINE
- PROP. WALK
- PROP. ASPH.
- PROP. ADA PARKING SPACE
- PROP. TREE UP LIGHT

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TOWN 3 SOUTH, RANGE 6 EAST
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WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

LANDSCAPE PLAN

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 10 20
1" = 20 FEET
DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 10

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LANDSCAPE REQUIREMENTS

Landscape Requirements

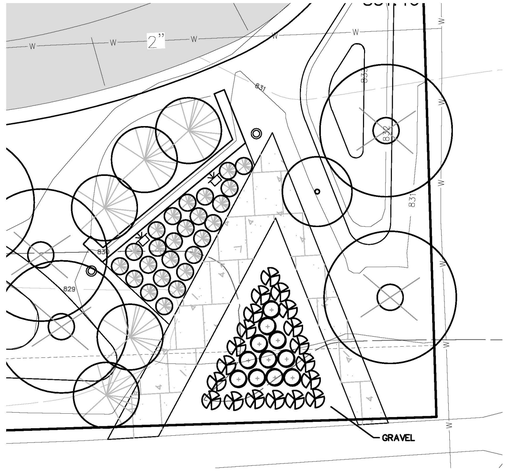
Heritage Tree	**Total Removed**	**Required Replacement**
	39"	39" / 3" = 9 Trees
Parking	**Required**	**Proposed**
Parking Spaces	1 Tree Per 8 Parking Spaces 24 Spaces	3 Trees
Perimeter Parking	1 Tree per 40 LF	6 Trees
Screening	**Required**	**Proposed**
East Property Line	Alternative 1,2, or 3	Alternative 1 and 3
Greenbelt	**Required**	**Proposed**
Central Boulevard	127 LF/30 = 4.2	5 Trees
Carpenter Road	394 LF /30 = 13.3	14 Trees
Site Landscaping	**Required**	**Proposed**
Total Site	1.17 Ac x 20%= .23 Acres	.57 ac
Total Trees	37	44

TREE LIST

Tree Tag #	*Botanical Name*	Common Name	Data Code	Diameter (inches)	Condition	Heritage Tree	Weeds & Invasive List*	Comments	To Be Removed
9001	*Ulmus americana*	American Elm	ULAM	39.5	Good	No	Yes		Yes
9002	*Piceas pungens*	Blue Spruce	PIPU	12.5	Fair	No	No	Nearby distribution line	Yes
9003	*Piceas pungens*	Blue Spruce	PIPU	12.0	Fair	No	No	Nearby distribution line	Yes
9004	*Piceas pungens*	Blue Spruce	PIPU	8.5	Good	No	No	Nearby distribution line	Yes
9005	*Piceas pungens*	Blue Spruce	PIPU	13.0	Good	No	No	Nearby distribution line	Yes
9006	*Piceas pungens*	Blue Spruce	PIPU	8.0	Fair	No	No	Nearby distribution line	Yes
9007	*Robinia pseudoacaccia*	Black Locust	ROPS	6.0	Good	No	Yes		Yes
9008	*Ulmus americana*	American Elm	ULAM	10.0	Poor	No	Yes	Dying, directly under distribution line	No
9009	*Ulmus americana*	American Elm	ULAM	20.0	Poor	No	Yes	Fused trunks, dying, directly under distribution line	No
9010	*Rhamnus cathartica*	Common Buckthorn	RHCA	7.5	Good	No	Yes	3T, 5", 4.5"	Yes
9011	*Rhamnus cathartica*	Common Buckthorn	RHCA	8.0	Good	No	Yes	2T, 7.5	Yes
9012	*Ulmus americana*	American Elm	ULAM	21.5	Good	No	Yes		Yes
9013	*Ulmus americana*	American Elm	ULAM	7.5	Good	No	Yes	2T, 6"	Yes
9014	*Populus deltoides*	Eastern Cottonwood	PODE	38.0	Excellent	No	Yes		Yes
9015	*Populus deltoides*	Eastern Cottonwood	PODE	22.5	Good	No	Yes		Yes
9016	*Populus deltoides*	Eastern Cottonwood	PODE	9.5	Good	No	Yes		Yes
9017	*Populus deltoides*	Eastern Cottonwood	PODE	22.0	Good	No	Yes		Yes
9018	*Populus deltoides*	Eastern Cottonwood	PODE	18.5	Good	No	Yes		Yes
9019	*Malus spp.*	Apple/Crabapple	MASP	7.0	Fair	No	No	Dead branches	Yes
9020	*Malus spp.*	Apple/Crabapple	MASP	7.0	Good	No	No	4T, 6", 4" 3.5"	Yes
9021	*Populus deltoides*	Eastern Cottonwood	PODE	16.5	Good	No	Yes		Yes
9022	*Populus deltoides*	Eastern Cottonwood	PODE	26.0	Good	No	Yes		Yes
9023	*Malus spp.*	Apple/Crabapple	MASP	8.0	Good	No	No		Yes
9024	*Malus spp.*	Apple/Crabapple	MASP	12.0	Good	Yes	No		Yes
9025	*Crataegus spp.*	Hawthorn	CRSP	6.5	Good	No	No		Yes
9026	*Malus spp.*	Apple/Crabapple	MASP	9.0	Poor	No	No	Mostly dead branches	Yes
9027	*Malus spp.*	Apple/Crabapple	MASP	14.0	Fair	Yes	No	Dead branches	Yes
9028	*Ulmus americana*	American Elm	ULAM	8.0	Fair	No	Yes	3T, 8", 6", Nearby distribution line	No
9029	*Piceas abies*	Norway Spruce	PIAB	14.0	Good	No	No	Nearby distribution line, may be outside property line	No
9030	*Piceas abies*	Norway Spruce	PIAB	11.0	Good	No	No	Nearby distribution line, may be outside property line	No
9031	*Piceas abies*	Norway Spruce	PIAB	17.0	Good	No	Yes	Nearby distribution line, may be outside property line	No
9032	*Piceas abies*	Norway Spruce	PIAB	14.0	Fair	No	Yes	Nearby distribution line, may be outside property line	No
9033	*Piceas abies*	Norway Spruce	PIAB	16.5	Good	No	Yes	Nearby distribution line, may be outside property line	No
9034	*Piceas abies*	Norway Spruce	PIAB	16.0	Good	No	Yes	Nearby distribution line, may be outside property line	No
9035	*Piceas abies*	Norway Spruce	PIAB	21.0	Good	Yes	Yes	Nearby distribution line, may be outside property line	No
9036	*Piceas abies*	Norway Spruce	PIAB	13.5	Fair	No	Yes	Nearby distribution line, may be outside property line	No

LANDSCAPE NOTES

1. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING LOCATION OF ALL UNDERGROUND AND OVERHEAD UTILITIES.
2. LANDSCAPING OPERATIONS, INCLUDING PLANTING OF TREES AND SHRUBS, SHALL NOT DAMAGE ANY UTILITY OR INTERRUPT ANY UTILITY SERVICE, AND SHALL NOT DAMAGE OR CREATE A NUISANCE AFFECTING ADJACENT PROPERTY, PUBLIC STREETS, OR SIDEWALKS.
3. PLANT AND GRASS MATERIALS SHALL BE INSTALLED ACCORDING TO GENERALLY ACCEPTED PLANTING PROCEDURES AND PITTSFIELD TOWNSHIP REQUIREMENTS.
4. ALL PARKING LOT ISLANDS, BOULEVARDS, OPEN OR OTHERWISE DISTURBED AREAS THAT ARE NOT SPECIFIED WITH OTHER PLANTING, PAVING, LAWN OR SEED MIXTURES SHALL BE FINISHED WITH A 3" LAYER OF LANDSCAPE ROCK.
5. LANDSCAPING MATERIALS THAT ARE UNSIGHTLY, DEAD, DYING, OR THAT BECOME UNHEALTHY BECAUSE OF DAMAGE, NEGLECT, DRAINAGE PROBLEMS, DISEASE, INSECT INFESTATION, OR OTHER CAUSES SHALL BE REPLACED WITHIN ONE YEAR, OR THE NEXT PLANTING PERIOD, WHICHEVER OCCURS FIRST. REPLACEMENT MATERIALS SHALL MEET ALL STANDARDS OF THE ORIGINAL INSTALLATION.
6. ALL LANDSCAPED AREAS SHALL BE PROVIDED WITH AN ADEQUATE WATER SUPPLY.
7. THE PROPERTY OWNER (OR ANY APPLICABLE OWNER'S MAINTENANCE COMPANY) SHALL BE RESPONSIBLE TO ENSURE THE PROPER CARE AND MAINTENANCE OF LANDSCAPE AREAS, INCLUDING KEEPING ALL LANDSCAPE MATERIALS IN A HEALTHY AND GROWING STATE. ALL LANDSCAPE ELEMENTS SUCH AS, BUT NOT LIMITED TO, FENCES, SCREENS, WALLS, OR LIGHTING SHALL BE KEPT IN GOOD REPAIR.
8. TOPSOIL REMOVED DURING CONSTRUCTION SHALL BE STOCKPILED IN AN APPROPRIATE MANNER TO PREVENT EROSION, AND SHALL BE REDISTRIBUTED ON RE-GRADED SURFACES TO BE LANDSCAPED, TO PROVIDE A MINIMUM OF FOUR INCHES OF EVEN COVER. THE TOPSOIL SHALL THEN BE PERMANENTLY STABILIZED BY GRASS, GROUND COVER, OR OTHER PLANTINGS.
9. NO PLANT MATERIAL SHALL BE PLANTED CLOSER THAN 4 FEET FROM ANY PROPERTY LINE.
10. REMOVE ALL TWINE, WIRE, NURSERY GUARDS, TAGS AND INORGANIC MATERIAL FROM ROOT BALL. PEEL BACK THE BURLAP FROM EARTH BALLS AND REMOVE ANY BURLAP, TWINE OR WIRE AROUND THE TRUNK FLARE AND ABOVE.
11. ALL PLANTING AREAS ARE TO BE EXCAVATED OF ALL BUILDING / CONSTRUCTION AND FILL MATERIALS AND BACKFILLED WITH GOOD MEDIUM TEXTURED PLANTING SOIL. SEEDING AREAS ARE TO BE TREATED WITH 4" OF NEW TOPSOIL AND ROTOTILLED OR OTHERWISE SCARIFIED TO BREAK UP COMPACTION AT LEAST 8" BELOW THE TOPSOIL. THE BED SHALL BE FINISHED WITH A 4" LAYER OF MULCH OR 3" LAYER OF LANDSCAPE ROCK, WHICHEVER IS SPECIFIED.
12. TOPSOIL SHALL BE SCREENED AND SUITABLE FOR GROWING VEGETATION AND MEET AT A MINIMUM ASTM D-5268 AND MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
13. RECOMMENDED PLANTING DATES ARE MARCH 15 TO JUNE 15 AND SEPTEMBER 15 TO NOVEMBER 15.
14. IRRIGATION SYSTEM TO BE DESIGNED/BUILT BY CONTRACTOR.

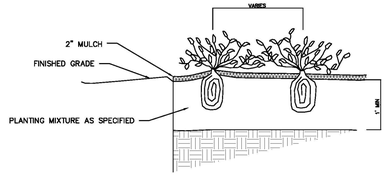


PLAZA PLANTING DETAIL

SCALE: 1" = 10'

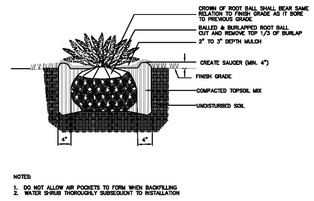
PLAZA PLANTING LIST

QUANT.	SYMBOL	PROPOSED ORNAMENTAL GRASSES	SIZE
25		BLUE FESCUE (FESTUCA GLAUCA)	#3 CONT.
11		BLUE OAT GRASS (HELICTOTRICHON SEMPERVIRENS)	#3 CONT.
19		HOSTA	#3 CONT.



PERRENIAL PLANTING DETAIL

NO SCALE

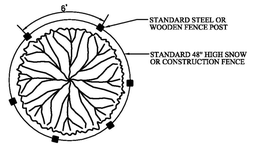


NOTES:
1. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING
2. WATER SHRUB THOROUGHLY SUBSEQUENT TO INSTALLATION

SHRUB PLANTING DETAIL

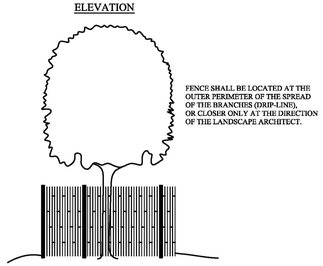
NO SCALE

PLAN



TREE PROTECTION NOTES:
1. ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING.
2. TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT,OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIP LINE OF ANY TREES TO BE SAVED.

ELEVATION



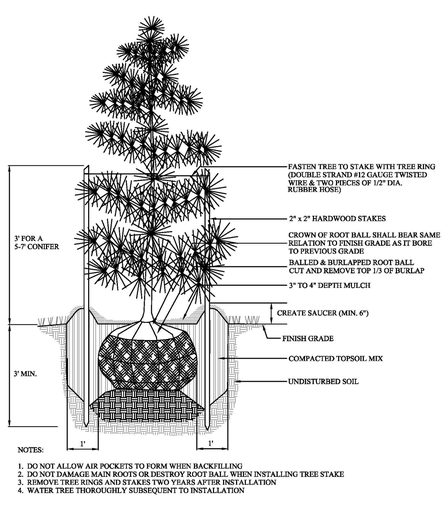
TREE PROTECTION FENCE DETAIL

NO SCALE

NOTES:
1. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING
2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE STAKE
3. REMOVE TREE RINGS, TREE WRAP AND STAKES TWO YEARS AFTER INSTALLATION
4. WATER TREE THOROUGHLY SUBSEQUENT TO INSTALLATION

DECIDUOUS TREE PLANTING DETAIL

NO SCALE



NOTES:
1. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING
2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE STAKE
3. REMOVE TREE RINGS AND STAKES TWO YEARS AFTER INSTALLATION
4. WATER TREE THOROUGHLY SUBSEQUENT TO INSTALLATION

CONIFEROUS TREE PLANTING DETAIL

NO SCALE

ATWELL
866.850.4200 www.atwell-group.com
311 NORTH MAIN STREET
ANN ARBOR, MI 48104
734.994.4000

SECTION 14
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

LANDSCAPE DETAILS AND TREE LIST

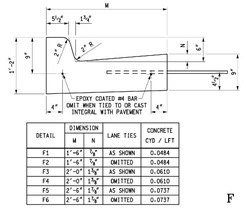
DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 5 10
1" = 10 FEET

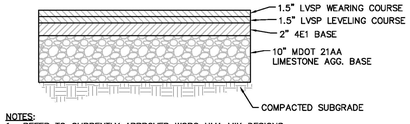
DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 11



DETAIL	DIMENSION M	DIMENSION N	LANE TIES	CONCRETE CYD / LFT
F1	1'-6"	5/8"	AS SHOWN	0.0484
F2	1'-6"	1 3/4"	OMITTED	0.0484
F3	2'-0"	1 3/4"	AS SHOWN	0.0610
F4	2'-0"	1 3/4"	OMITTED	0.0610
F5	2'-6"	1 3/4"	AS SHOWN	0.0737
F6	2'-6"	1 3/4"	OMITTED	0.0737

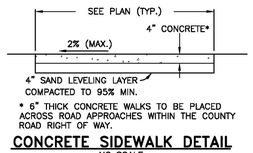
F

F TYPE CURB DETAIL
(FOR CURB REPLACEMENT ALONG CARPENTER ROAD)
NOT TO SCALE



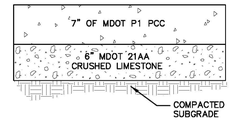
NOTES:
1. REFER TO CURRENTLY APPROVED WCRC HMA MIX DESIGNS AND BINDER REQUIREMENTS
2. THE HMA THICKNESS SHALL MATCH THE EXISTING HMA THICKNESS IF GREATER THAN 5"

R.O.W. ASPHALT PAVING SECTION
(FOR PAVEMENT WITHIN COUNTY ROW)
NOT TO SCALE



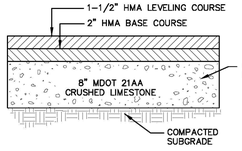
* 6" THICK CONCRETE WALKS TO BE PLACED ACROSS ROAD APPROACHES WITHIN THE COUNTY ROAD RIGHT OF WAY.

CONCRETE SIDEWALK DETAIL
NO SCALE



CONCRETE PAVING SECTION
NO SCALE

FOR USE IN DUMPSTER PAD AND ON-SITE DRIVEWAY AREAS.
CONFIRM SECTION WITH GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.



NOT APPLICABLE FOR USE WITHIN PUBLIC RIGHT-OF-WAY. FOR ONSITE USE ONLY. PAVEMENT WITHIN THE RIGHT OF WAY SHALL CONFORM TO WCRC STANDARDS.

ASPHALT PAVING SECTION
CONFIRM SECTION WITH GEOTECHNICAL REPORT
NO SCALE

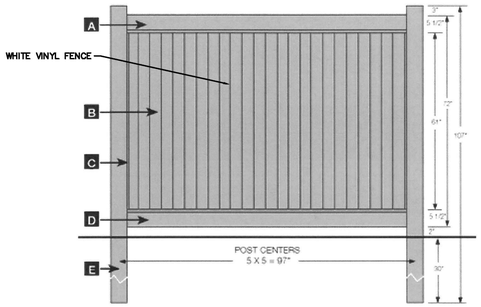
A **TOP RAIL** PALLET QUANTITY = 96
1-1/2" X 5-1/2" X 95" Deco rail ribbed.

B **PICKETS** PALLET QUANTITY = 16 Fill Kits
5/8" X 11-3/8" X 63-3/4" Section includes 8 pickets.

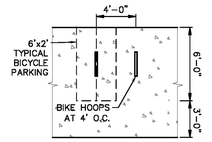
C **END CHANNEL**

D **BOTTOM RAIL** PALLET QUANTITY = 96
1-1/2" X 5-1/2" X 95" Deco rail ribbed
Includes steel channel.

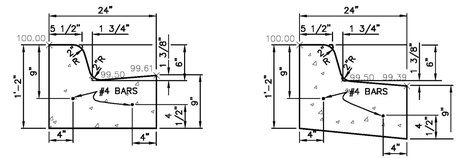
E **POST** PALLET QUANTITY = 48
5" X 5" X 107"
5" X 5" X 96"



TYPICAL SCREENING FENCE DETAIL
(FOR REPRESENTATIVE PURPOSES ONLY)
NO SCALE



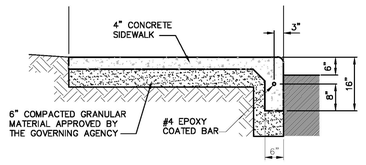
BIKE RACK DETAIL
NO SCALE



PITCH IN CURB PITCH OUT CURB

BASE AND SUBBASE AGGREGATES TO EXTEND MINIMUM 1'-0" BEHIND BACK OF CURB.

F4 CURB DETAIL
NO SCALE



NOT APPLICABLE FOR USE WITHIN PUBLIC RIGHT-OF-WAY. FOR ONSITE USE ONLY.

WHERE THE CURB HEIGHT IS BEING REDUCED FOR ADA RAMPS THE RE-BAR SHALL HAVE A MINIMUM OF 3 INCHES OF COVER BELOW THE TOP OF CURB

INTEGRAL CURB AND SIDEWALK
NO SCALE

TASKS	COMPONENTS							SCHEDULE
	Storm Sewer System	Catch Basin Inlet Filters	Silt Fence	Ditches and Swales	Outflow Control Structure	Rip-Rap	Detention Basins	
Inspect for sediment, floatables, and debris	X	X	X	X	X	X	X	Weekly / Within 24 hrs after a Rain Event
Removal of sediment, floatables, and debris	X	X	X	X	X	X	X	As Needed & At turnover
Inspection for erosion				X	X	X	X	Weekly / Within 24 hrs after a Rain Event
Re-establish permanent vegetation on eroded slopes				X	X	X	X	As needed
Replacement of stone					X			At turnover

NOTE: "As Needed" refers to when sediment has accumulated to a maximum of one foot depth and/or visually apparent debris exists

STORMWATER MAINTENANCE SCHEDULE (DURING CONSTRUCTION)

TASKS	COMPONENTS					SCHEDULE	Annual Cost
	Storm Sewer System	Ditches and Swales	Outflow Control Structure	Pond Outlet & Rip-Rap	Detention Basin		
Inspect for sediment, floatables, and debris	X	X	X	X	X	Annually	$ 600.00
Removal of sediment, floatables, and debris	X	X	X	X	X	As Needed	$ 1,400.00
Inspection for erosion		X	X	X	X	Quarterly	$ 300.00
Re-establish permanent vegetation on eroded slopes		X	X	X	X	As needed	$ 500.00
Replacement of stone		X	X	X		As Needed	$ 700.00
Mowing		X				1-2 times per year	$ 400.00
Inspect Stormwater system components during wet weather and compare to as-built plans	X	X	X	X	X	Annually	$ 400.00
Make adjustments as determined by annual inspection	X	X	X	X	X	As needed	$ 500.00
						Total Cost=	$ 4,800.00

Note: Stormwater maintenance is the responsibility of the building owner.
NOTE: "As Needed" refers to when sediment has accumulated to a maximum of one foot depth, visually apparent debris exists, or if either of the stormwater management basins do not drain within 48-72 hours after a rain event
NOTE: No chemicals are allowed in stormwater features or buffer zones with the following exception: Invasive species may be treated with chemicals by a certified applicator.

STORMWATER MAINTENANCE SCHEDULE (POST-CONSTRUCTION)

ATWELL
866.850.4200 www.atwell-group.com
311 NORTH MAIN STREET
ANN ARBOR, MI 48104
734.994.4000

SECTION 14
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

DETAIL SHEET

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

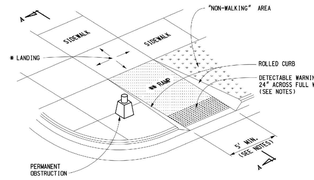
REVISIONS

SCALE 0 — — —
NO SCALE

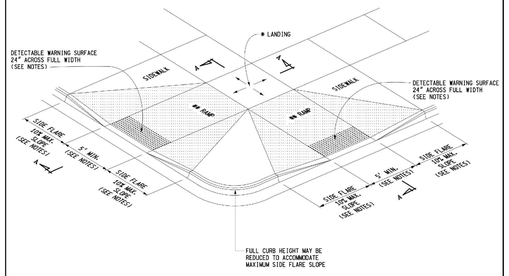
DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 12

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R
(ROLLED SIDES)



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

DEPARTMENT DIRECTOR
Kirk T. Steudle

PREPARED BY DESIGN DIVISION
DRAWN BY: R.L.T.
CHECKED BY: M.K.P.

APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT

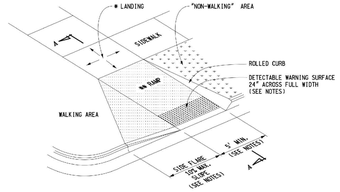
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

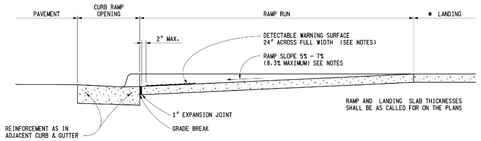
T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 1 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



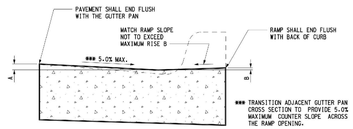
SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A

CURB TYPE	MAXIMUM RISE (INCHES) A	B
B1	1/4	1
B2	3/8	1
B3	3/8	1
D1	3/4	1
D2	3/4	1
D3	3/8	1
C1	1/2	1/2
C2	1/2	1/2
C3	3/8	1/2
C4	3/8	1/2
C5	1	1/2
C6	1	1/2
F1	1/2	1/2
F2	1/2	1/2
F3	3/8	1/2
F4	3/8	1/2
F5	1	1/2
F6	1	1/2

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES



SECTION THROUGH CURB RAMP OPENING
(TYPICAL ALL RAMP TYPES)

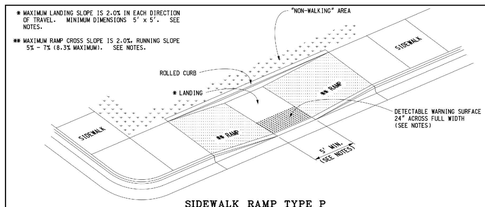
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

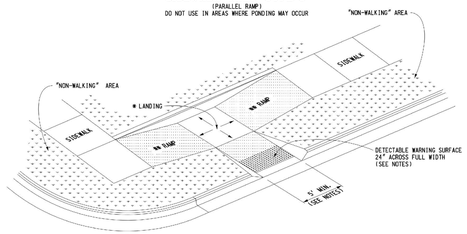
T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 2 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

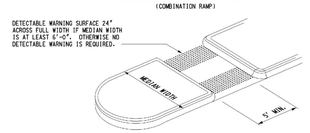
** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE P
(PARALLEL RAMP)
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C
(COMBINATION RAMP)



SIDEWALK RAMP TYPE M
(MEDIAN ISLAND)

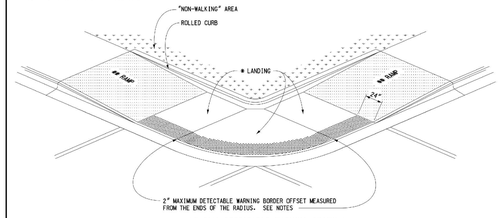
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

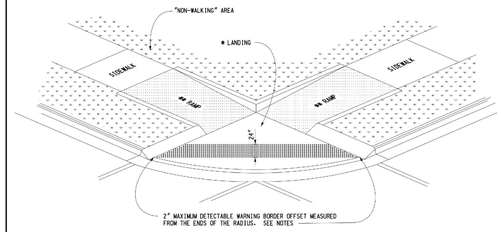
T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 3 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



(RADIAL DETECTABLE WARNING SHOWN)



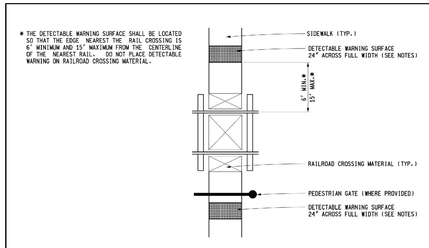
(TANGENT DETECTABLE WARNING SHOWN)

SIDEWALK RAMP TYPE D
(DEPRESSED CORNER)
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

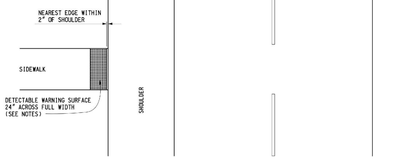
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 4 OF 7



DETECTABLE WARNING AT RAILROAD CROSSING

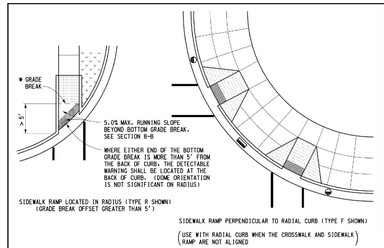


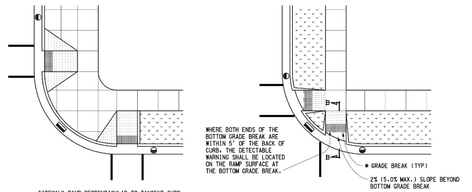
DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

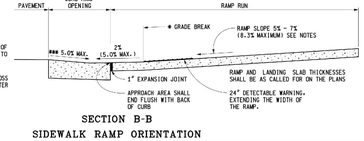
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 5 OF 7







* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

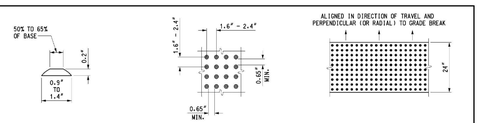
SEE SHEET 2 FOR CURB RAMP OPENING DETAILS.

SECTION B-B
SIDEWALK RAMP ORIENTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 6 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 INCREASED, 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'.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH 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.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF 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 SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

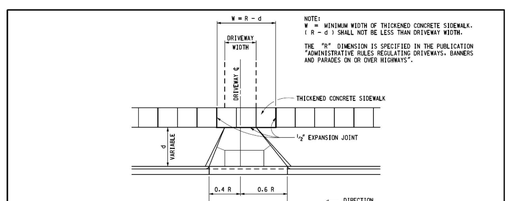
FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY 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

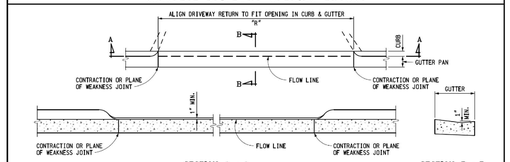
T.R.N.S. APPROVAL	3-31-2017 PLAN DATE	R-28-J	SHEET 7 OF 7



NOTE:
W = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK. (R - d) SHALL NOT BE LESS THAN DRIVEWAY WIDTH.

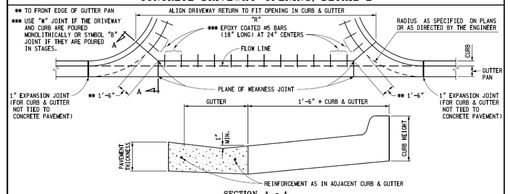
THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS AND PARADES ON OR OVER HIGHWAYS".

CONCRETE DRIVEWAY OPENING LAYOUT



SECTION A - A | SECTION B - B

CONCRETE DRIVEWAY OPENING, DETAIL L



SECTION A - A

CONCRETE DRIVEWAY OPENING, DETAIL M

NOTE:
FOR ROADWAYS WITH CONCRETE PAVEMENTS, LONGITUDINAL LANE TIES WILL BE CONTINUOUS THROUGH THE DRIVEWAY OPENING AND THE SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

P.N.S. APPROVAL	9-30-2014 PLAN DATE	7-1-2014 PLAN DATE	R-29-I	SHEET 2 OF 4

ATWELL
866.850.4200 www.atwell-group.com
311 NORTH MAIN STREET
ANN ARBOR, MI 48104
734.994.4000

SECTION 14
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

HOBBS AND BLACK
UNIVERSITY OF MICHIGAN CREDIT UNION

MDOT DETAILS

DATE
OCTOBER 4, 2017

12/01/17 PSP REVIEW
12/13/17 PSP REVIEW
01/23/18 PSP REVIEW
02/05/18 FSP/ENG REVIEW

REVISIONS

SCALE 0 --- ---
NO SCALE

DRAWN BY: CR
CHECKED BY:
P.M.:
JOB #: 17002264
FILE CODE: –
SHEET NO. 13

Earthwork

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall perform all excavation and backfilling necessary to complete the work. This shall include the excavation of earth and rock, the removal and disposal of unsuitable material, dewatering, placement of suitable fill and backfill material, pipe boring and jacking, all quality assurance testing, and the restoration and final grading for all earth surfaces.

1.02 WORK WITHIN RIGHTS-OF-WAY

A. Where the governmental bodies having jurisdiction of the streets or rights-of-way have specific specifications relating to the requirements for work within their jurisdiction, such requirements must be met as a minimum requirement, and if these Specifications impose further limitation on the work, they shall also be met as the required work standard.

B. During all operations of the CONTRACTOR in the streets and roadways, the CONTRACTOR shall maintain barricades, lights, and warning signs as required by the agency having jurisdiction.

1.03 WORK WITHIN EASEMENTS

A. During construction within any easements, the CONTRACTOR shall confine himself to the limits shown on the Plans. He shall notify property owners in advance of moving equipment on easements and use of the access routes which will be designated by the OWNER. The OWNER will cooperate in working out the details of access. The topsoil over the trench shall be removed and carefully replaced upon completion of the work. The backfill of the trench in the easement may be left slightly high to provide for any slight residual settlement. Any trees, shrubs, or bushes removed shall be replaced to the satisfaction of the property owner.

1.04 SOIL BORINGS

A. Soil boring results, if taken on a site, are appended to these Specifications with locations noted. Boring logs are shown to be generally representative of the site and to assist in the design and construction of the work.

2.00 PRODUCTS

2.01 BACKFILL MATERIAL

A. For areas not requiring "granular backfill" material, backfill shall be of the excavated material, with the exception that materials such as soft clay, topsoil, muck, cinders, vegetable matter, refuse, boulders and other objectionable and non-packing earth shall be excluded from the backfill and removed from the site. Stone larger than 3 inches in any dimension shall be excluded from the backfill and removed from the site by the CONTRACTOR.

B. Where "granular material" backfill is required as specified herein, backfill material shall be defined as a material meeting granular material Class II as defined in 2003 MDOT 902.08.

C. All utilities within road right-of-way corridor (existing or proposed) shall be backfilled with MDOT CL II granular material compacted to 95% maximum unit weight.

D. All utilities shall be installed with 2 NS sand bedding or better.

2.02 ENCASING PIPE

A. Steel encasing pipe for boring and jacking shall conform to the requirements of either, ASTM A53, Type E or S, Grade B or ASTM A139, Grade B.

B. Steel encasing pipe used under channels and highways shall meet the requirements of the governmental agency having jurisdiction and the following minimum requirements:

Nominal Diameter (Inches)	Maximum Wall Thickness
Under 13	0.188 inches
13-24	0.250 inches
25-36	0.312 inches
42	0.438 inches
48	0.500 inches
54	0.563 inches

C. Steel encasing pipe used under railroads shall meet the requirements of the railroad and the following minimum requirements:

	Minimum Wall Thickness (inches)	
Nominal Diameter (Inches)	Coated or Cathodically Protected.	Uncoated & Unprotected.
Under 14	0.180	0.251
14-16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
22	0.312	0.375
24	0.344	0.407
26	0.375	0.438
28-30	0.406	0.469
32	0.438	0.501
34-36	0.469	0.532
38-42	0.500	0.563
48	0.563	0.626

D. Casing pipe joints shall be welded to form a leak-proof continuous casing.

E. The inside diameter of casing pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe joints or couplings for carrier pipe less than 6 inches in diameter, and at least 4 inches greater than the largest outside diameter of the carrier pipe joints for carrier pipe 6 inches and over in diameter, unless otherwise shown on the Plans.

F. The steel casing pipe shall be of smooth interior and shall be placed accurately to line and grade, allowing for the encased pipe thickness and supports under each length of encased pipe.

3.00 EXECUTION

3.01 GENERAL EXCAVATION

A. Excavation shall be performed by any practicable method consistent with the integrity and protection of the work and neighboring structures, workmen, and the public. Topsoil shall be separately removed and stockpiled for reuse.

B. All excavation, except where necessary to tunnel, bore or jack under roads, railroads, tree roots and other obstructions within the limits indicated on the Plans, may be open cut from the surface. Tunneling or boring under trees shall be considered as incidental to construction and will not be considered as cause for request for additional payment.

C. Foreign material or unsuitable foundation material encountered such as wood, boulders, etc., which obstruct the excavation, shall be removed. Such materials found at the bottom of the excavation shall be removed and the foundation restored with approved materials.

D. If excess excavation is made or the material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be filled with selected material solidly tamped into place, in not more than 6-inch layers to the satisfaction of the ENGINEER, before the construction work proceeds. At the direction of the ENGINEER, the excess excavation may be filled with 2000 psi concrete at the CONTRACTOR's expense.

E. The excavation shall be kept dry during the work. Where water is encountered in the excavation, it shall be removed by pumping or well points. All necessary precautions shall be taken to prevent damage to existing wells and to completed or partially completed structures. The CONTRACTOR shall be responsible for all damages caused by him due to inadequate or improper protection.

F. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction areas, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in the judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental to the Contract work.

G. Any excavation not backfilled at the end of each day must be clearly marked and surrounded by appropriate safety fencing as directed by the ENGINEER. If directed by the ENGINEER, the CONTRACTOR shall cover the open excavation with a steel plate and light the excavated area.

3.02 EXCAVATION FOR SEWERS AND WATER MAINS

A. Trenches shall be excavated to the depth required with allowance for bedding the pipe. The trench shall be cut wider and deeper at each pipe joint location to provide for properly completing the pipe joint and to relieve the joint of all loadings.

B. The width of the trench at the top of a rigid pipe shall be sufficient to allow the pipe to be laid and jointed properly and shall provide for a minimum net clearance of 6 inches and a maximum net clearance of 12 inches on each side of the barrel of the pipe and to allow the backfill to be placed and properly compacted.

C. The width of trench at the top of a flexible pipe backfill when using concrete bedding shall be sufficient to allow the pipe to be laid and jointed properly with the minimum net clearance of 12 inches and a maximum net clearance of 18 inches on each side of the barrel of the pipe.

D. Where the conditions of the ground require or where the work is in close proximity of existing structures, the sides of excavation shall be securely held by bracing and/or sheeting which may be removed in units when the level of the backfill has reached a point where it is safe to pull the sheeting without disturbing the protected feature. No sheeting, bracing, or other timber shall be left in the excavation upon the completion of the main or other structures, except with the specific review and direction of the ENGINEER.

E. Other underground mains, sewers or structures encountered in the excavation shall be adequately supported during the CONTRACTOR's operations, and before backfilling, shall be given permanent support as directed by the ENGINEER to meet the standards or requirements of the owning utility or agency.

F. Water, sewer, gas and other utility services disturbed by the CONTRACTOR in his operations shall be repaired or replaced in a manner equal to the original condition by the CONTRACTOR at his own expense. Where these services are encountered and are undamaged, they shall be supported and/or protected by the CONTRACTOR at his expense against later settlement and/or damage after backfill. The CONTRACTOR shall consult the agency or the utility firm having jurisdiction over any duct line, gas main, etc., which may cross the excavation to determine method of supporting such duct or pipe.

G. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve manhole covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clean, or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed except as otherwise provided for herein on a temporary basis.

3.03 EXCAVATION FOR STRUCTURES

A. Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and for practicable construction methods to be followed.

B. Requirements for excavation of sewers and water mains shall also apply to this Section.

3.04 EXCAVATION FOR PAVED SURFACES

A. In excavating around manholes and catch basins or inlets, care shall be exercised to avoid removing the casings and pushing dirt into the structures. Dirt pushed into manholes, catch basins or inlets by the CONTRACTOR's operations shall be immediately removed so that the dirt will not be carried into the sewer by the flow of sewage or storm water.

B. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction area, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in the judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental to the Contract work.

3.05 ROCK EXCAVATION

A. Rock excavation shall consist of excavating igneous, metamorphic and sedimentary rock which cannot be excavated without continuous drilling and blasting or drilling and splitting to fracture the rock. Blasting shall be permitted only after it has been shown that other methods of excavation are impractical. All rock excavation shall be carried to a minimum depth of 8 inches below the pipe or manhole bottom and to the bottom of all footings. The width of the rock excavation shall not exceed the diameter of the pipe plus 12 inches on either side or the edge of the foundation footing.

B. When the use of explosives is necessary for the progression of the work, the CONTRACTOR shall comply with all laws, ordinances and applicable safety code requirements and regulations relative to the handling, storage and use of explosives and protection of life and property. A person competent and experienced in the use of explosives shall be employed to supervise the work. The CONTRACTOR shall schedule all blasting for a definite hour of the day and shall so notify all residents and businesses in the area as to the scheduled day and hour for such blasting operations. Explosive materials shall not be stockpiled and stored in residential areas. Explosives and initiating devices shall not be carried in the same vehicle.

C. Suitable weighted plank coverings or timber mats shall be provided to confine all materials lifted by blasting within the limits of the excavation of trench. Excessive blasting or overshooting shall not be permitted. Any material outside of the authorized excavation cross section which may be shattered or loosened shall be removed at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

3.06 PIPE BORING AND JACKING

A. The CONTRACTOR shall obtain all necessary permits for jacking the encasing pipe under channels, highways and/or railroads and shall notify the governmental agency and/or company having jurisdiction 48 hrs before work at any crossing is started. The CONTRACTOR shall pay all costs for an inspector and/or flagmen required by a railroad or governmental agency.

B. A suitable approach trench shall be opened, adjacent to the toe of the slope of the embankment. The approach trench shall be long enough to accommodate the length of pipe units to be placed, and wide enough to provide sufficient working room. Guide timbers or rails for keeping the pipe on-line and grade shall be installed in the bottom of the trench and heavy timber backstop supports installed at the rear of the trench to take the thrust of the jacks. A timber bearing a "pushing frame" shall be built and furnished to fit or match the end of the pipe to be jacked, so that the pressure of the jacks will be evenly distributed over the end of the pipe. Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure. For firm ground, excavation shall be carried on from inside the pipe, not to exceed twelve (12) inches ahead of the lead pipe. For unstable ground, the lead pipe shall precede the auger. Excavation at the top and sides shall be accurately cut to line and grade. Adjoining sections of steel pipe shall be welded. Pipe shall be jacked on successive shifts until completed to guard against the "freezing of the line" due to settlement and compaction of surrounding soil.

C. The sheeting of pits along any road will be required if the leading edge of all work pits will be closer to the pavement edge than the shoulder point or ten (10) ft, which ever distance is greater, or on curb and gutter sections, at least five (5) ft from back of curb.

D. Upon completion of the installation of the steel pipe encasement, the contractor shall furnish and install a bolted style casing spacer as described below on the carrier pipe. Casing spacers shall be placed a maximum of seven (7) feet apart along the length of the carrier pipe with one casing spacer within 2-1/2 feet of each side of a pipe joint and the rest evenly spaced. Wood skids are not an acceptable method of supporting the carrier pipe.

1. Casing spacers for carrier pipes from 4" - 24" shall be made of a molded, segmented high density polyethylene plastic with 304 stainless steel connecting nuts and bolts. Minimum spacer width shall be 5.2" for carrier pipes from 4" - 12" and 7.0" for carrier pipes 14" - 24". Each casing spacer shall have at least six (6) integrally molded skids extending 1" beyond the bell or mechanical joint of the carrier pipe. The casing spacers shall be equal to the PSI Ranger as manufactured by Pipeline Seal and Insulator, Inc., Houston, TX.

2. Casing spacers for carrier pipes larger than 24" shall be a PVC fusion bonded coated (10-16 mils) steel shell (minimum 14 gauge steel) with a 90 mil PVC inner liner and 2" wide 30% glass reinforced polyester runners (minimum compressive strength = 18,000 psi) (polyethylene is not an acceptable runner material) attached by 3/8" coated steel studs welded to the steel shell. All bolts and nuts used to fasten the shell to the carrier pipe shall be cadmium plated steel. Where riser are required under the runners they shall be a minimum 10 gauge steel welded to the shell and coated as specified for the shell (epoxy is not an acceptable coating for the shell riser). The casing spacers shall be equal to the PSI Model C as manufactured by Pipeline Seal and Insulator, Inc., Houston, Texas.

E. Boring shall be performed by accepted and recognized methods which will provide adequate safety and protection at all times to workmen employed in the work and to inspectors and others involved in the construction.

F. If voids should develop around the outside of the encasing pipe, grouting or other methods approved by the ENGINEER shall be employed to fill such voids.

G. After the pipes are tested satisfactorily, the remaining space between the carrier pipe and the encasing pipe shall be pressure grouted or otherwise filled with concrete. The carrier pipe shall be adequately braced to prevent floating or movement of the pipe.

3.07 SHORING, SHEETING AND BRACING

A. Where sheet piling, shoring, sheeting, bracing, or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the CONTRACTOR.

B. All sheet piling, shoring, sheeting and bracing shall be designed by a professional engineer engaged by the CONTRACTOR with demonstrated competence and experience in such work. The sheeting system shall be designed to prevent bottom failure and hydrostatic uplift within the excavation. Provision shall also be made in the design for lateral pressures due to side slope and construction equipment or other surcharge loads, as applicable.

C. The CONTRACTOR shall provide to the ENGINEER for his review, design calculation and arrangement drawings of the sheeting system prior to ordering any materials for bracing, sheeting, etc., and prior to the commencement of the excavation.

D. All materials, except as otherwise specified, used for sheeting and sheet piling, lagging, braces, shores, and stringers, or waling strips shall be of approved quality and dimensions throughout.

E. Materials for sheeting systems shall be furnished and driven or set in place by the CONTRACTOR, where necessary or wherever ordered by the ENGINEER, whether the same is or is not considered necessary by the CONTRACTOR. If, in the opinion of the ENGINEER, the materials furnished by the CONTRACTOR are not of proper quality or sufficient size or not properly placed to ensure the safety of the work or of adjacent structures and property, the CONTRACTOR shall, upon notice from the ENGINEER to that effect, forthwith procure, furnish and set in place or drive other and satisfactory materials, or place the material in a satisfactory manner; and if he shall fail or neglect to do so, the ENGINEER may order all or any part of the work to be stopped until such materials so used are furnished and placed; and the CONTRACTOR shall not be entitled to claim, demand, or receive any compensation for larger size or better quality or different disposal of materials ordered by the ENGINEER, nor any compensation for allowance of any kind whatsoever for or on account of any damage or delay resulting from such stoppage of work.

F. Steel sheet piling may be either new or used. It shall be of adequate strength, straight and properly braced. Steel sheet piling shall be of the interlocking type. Friction in the interlocks shall not be assumed to contribute to the strength of the sheet piling.

G. The design, planning, installation and removal, if required, of all sheet piling, shoring, sheeting, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.

H. Steel sheet piling for the excavation shall be driven straight and in-line. The piling shall be supported above ground, before driving, by a guide frame at least 20 ft high which will keep the piling accurately in the required position and vertical. Each piece of piling shall be driven only a few feet at a time and driving shall proceed continuously around the perimeter so that the piles shall reach their full penetration together.

I. Walers and bracing shall be supplied and installed as required to complete the sheeting system. Walers and braces shall be of adequate strength for the load imposed. Splices in walers shall develop the full strength of the member in bending, shear, and axial compression.

J. If bracing members are to be removed during construction, the timing and procedure for removal shall not induce excessive stresses in the permanent structures or in steel sheet piling and bracing members.

K. If the construction sequence of structures requires the transfer of bracing to the completed portions of any structure, the CONTRACTOR shall secure written acceptance of the ENGINEER prior to the installation of such bracing.

L. In trenching operations the use of horizontal strutting below the barrel of pipe or the use of the pipe as support for trench racing will not be permitted. The use of a traveling shield for sewer construction shall require that the device be approved for use by a professional engineer. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

M. The neglect, failure, or refusal of the ENGINEER to order the use of sheeting, or sheet piling or steel, or to order the same to be left in place, or the giving or failure to give of any order or directions as to the manner or methods of driving or placing sheeting, sheet piling, bracing, shores, etc., shall not in any way relieve the CONTRACTOR of any or all obligations under this Contract. Sheeting left in place shall be cut off one (1) ft below existing grade.

N. The rules of the OSHA and the State Department of Labor with respect to excavation and construction shall at all times be strictly observed.

3.08 GENERAL BACKFILLING

A. For all areas, unless otherwise noted, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum density.

B. Under pavements, curb, paved driveways, and sidewalks, and where pipe is within a one on one influence of pavement, compaction testing shall be performed by an independent testing laboratory. Testing shall be performed at intervals of one test per lift per 50 feet of trench or as determined necessary by the ENGINEER.

C. In residential developments, all backfill within the road corridor shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be as such to obtain 95% of the maximum unit density as determined at the optimum moisture content. For purposes of this section, the road corridor is defined as front of house to front of house, including right-of-way and adjacent easements and setbacks.

3.09 BACKFILLING FOR SEWERS AND WATER MAINS

A. Backfilling shall consist of placement of the prescribed materials from a level 12 inches above the crown of the pipe. Placement shall be as follows:

1. Under gravel driveways, gravel roads and shoulders, the backfill shall be granular material which shall be solidly compacted by mechanical tamps in layers of not more than 12 inches loose thickness with backfilling carried up to within 12 inches of finished grade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

2. Under pavements, curb, paved driveways, and sidewalks, the backfill shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content. After a period of about 60 days or less, if the backfill compaction is satisfactory to the ENGINEER, to provide for any slight settlement, the CONTRACTOR shall retrim neatly any broken edges of pavement and replace the top surface of the backfill within the pavement area with pavement surface equal to that surface which was removed. The pavement shall be replaced in accordance with the standard specifications of the agency having jurisdiction.

3. Backfill around lift stations, or buried underground structures shall be granular material compacted in 12-inch lifts. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

4. For all other areas, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum unit density as determined at the optimum moisture content.

3.10 FILLING AND BACKFILLING FOR STRUCTURES

A. Embankments underlying structural footings, streets and drives, sidewalks and around structures shall be granular material meeting the requirements of the Michigan Department of Transportation for granular material compacted to 95% density.

B. In all other areas, material required for embankments and backfilling shall be soil or soil-rock mixture free of organic and other deleterious matter and shall contain no more than 15% rocks or lumps larger than 2-1/2 inches in the greatest dimension, compacted to 90% density.

C. Under all interior and exterior floor slabs, an 8-inch thick granular cushion shall be placed. This material shall be clean mineral aggregate meeting the following gradation requirements:

Passing the No. 4 Sieve	100%
Passing the No. 200 Sieve	0-3%

D. Where embankment material is placed to achieve a new surface elevation, the top 4 inches shall be approved topsoil either salvaged from the site or hauled in by the CONTRACTOR.

3.11 FILLING AND BACKFILLING FOR PAVED SURFACES

A. Embankments, including sand cushions and granular fills, shall be placed in successive layers not more than 6 inches in depth the full width of the cross section, each layer to be thoroughly compacted by means of vibratory compactors or by an approved pneumatic-tired roller or combination thereof, as required by the ENGINEER. Each layer shall be compacted to not less than 95% of the maximum unit density as determined at the optimum moisture content. All parts of the embankment shall be uniformly compacted and the CONTRACTOR shall so direct all earthmoving equipment used in the work so that the same shall be attained. Embankment or fill outside the limits of the subgrade where sand or gravel is not required shall be made with suitable material which is free from perishable organic matter, rubbish, stones, broken concrete, roots, or other foreign materials, at no additional compensation. Before any embankments are begin, the base shall be made firm and cleared of topsoil, sod or other perishable material. The sides of the embankment shall be neatly and evenly dressed to the slope shown on the Plans, or such other slope as the ENGINEER may direct.

B. Upon completion of the placing of the curbs, and after the concrete has cured sufficiently, forms shall be removed and the excavated space behind the curb shall be backfilled with a good quality of surface soil, free of rubbish, stone, broken concrete, roots or other foreign material. Where adequate acceptable material for backfill behind the curb is not available, granular fill conforming to 2003 MDOT 8.02.06, Class II, shall be used. Where the area behind the curb is in cut, it shall be trimmed from the top of the curb on the slope shown on the Plans. If the area is in embankment or fill, an earth berm shall be placed immediately adjacent to the top of the curb and then the embankment of fill shall be finished to the slope shown on the Plans. All trimming and finishing shall be done in a neat, workmanlike manner. All excess concrete and debris shall be removed from the excavation behind the curb line before backfilling begins.

C. In construction of non-rigid pavements, backfilling back of curb and gutter shall be completed before placement and compaction of the base course of the roadway.

3.12 PREPARATION OF SUBGRADE FOR ROADWAY SURFACES

A. The bottom of the excavation for the pavement or top of the fill shall be known as the pavement subgrade and shall be smoothed, trimmed and compacted to the required line, grade and cross section to receive the road metal. It shall be thoroughly compacted by rolling with a roller of approved type weighing not less than 8 tons. The subgrade shall be compacted to at least 95% of the maximum density as designated by the test method AASHTO T-180. Inaccessible areas, where rolling is not practical, shall be thoroughly compacted by mechanical tampers capable of striking a blow equivalent to at least 250 foot-pounds per square foot. The subgrade thus formed shall be maintained in a smooth and compacted condition until the pavement has been placed. No base course, surfacing, curb, or curb and gutter, shall be placed until the subgrade has been reviewed by the ENGINEER. The subgrade shall be finished in an acceptable condition at least one day in advance of the pavement construction at all times. Six inches of compacted depth of granular material shall be used where uncompactable soil is encountered. The granular fill shall conform to the 2003 MDOT 9.02.08., Class II, compacted to 95% of its density.

B. Immediately prior to placing the pavement, the subgrade shall be tested for conformity with the cross section shown on the Plans by means of an approved template riding on the curb and gutter sections or on side forms. If necessary, materials shall be removed or added, as required, to bring all portions of the subgrade to the correct elevation. Corrected portions shall then be thoroughly compacted and again tested with the template. Pavement material shall not be placed at any portion of the subgrade which has not been tested for correct elevation.

C. The finished subgrade shall be maintained in a smooth and compacted condition until the pavement is placed. No storage piles of fine or coarse aggregate shall be placed directly upon the finished subgrade. Should the subgrade become rutted or disturbed in any manner, it shall be reshaped and recompacted.

3.13 GRADING

A. The CONTRACTOR shall grade the site to achieve the elevations as shown on the Plans. All disturbed areas beyond the grading limits shall be restored to prior condition.

B. Surplus excavated material not needed for embankment shall be disposed of by the CONTRACTOR. Headwalls, culverts, drains, sewers and appurtenances filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, repaired, or replaced at his expense.

C. All temporary earth changes shall be in conformance with the Soil and Erosion Control Act.

3.14 RESTORATION

A. Headwalls, culverts, and drainage systems filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, relaid or rebuilt with new materials to a condition equal to the original state, and of thickness equal to the original structure and to the original line and grade at the CONTRACTOR's expense.

B. Where the excavation is located beside a ditch and/or where an existing ditch is filled or disturbed in the CONTRACTOR's operations, the CONTRACTOR shall clean, repair, or replace the ditch with properly pitched bottom and side slopes and of section and capacity not less than the original section.

C. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

D. The CONTRACTOR shall remove excess dirt and other construction material from the site of the work and leave the site in a condition equal to its original state.

E. The final condition of the streets and roadways shall be subject to the approval of the governmental body having jurisdiction thereof, as well as review by the ENGINEER.

PITTSFIELD CHARTER TOWNSHIP

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TWP REV		BWA	DRW	11.04.27
UPDATES		TTN	DRW	10.01.20
Revision		By	Appd.	YY.MM.DD
Issued		By	Appd.	YY.MM.DD
File Name: SE-02	TTN	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
EARTHWORK SPECIFICATIONS

Project No.
2075001300

Scale
NOT TO SCALE

Revision

STORM SEWER AND DRAINAGE STRUCTURES

1.00 GENERAL

1.01 DESCRIPTION

A. Furnish all labor, tools, equipment and materials to construct all storm sewers, and drainage structures as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed or just prior to placing the line in service providing the sewer pipe has been installed for not less than 30 days.

B. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

C. Material Tests

1. The CONTRACTOR shall have tests of pipe strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

D. Submittals

1. The CONTRACTOR shall submit shop drawings, or data sheets for all castings, steps and manholes.

2. The CONTRACTOR shall submit certification letters for all pipes. All letters must contain the following: Contractors name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 PIPE

A. Reinforced concrete pipe and manhole tees shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Proposal.

B. Concrete pipe shall have tongue and groove gasketed premium joints.

C. Corrugated steel pipe shall meet the requirements of AASHO M-190 for coated pipe latest revision. Minimum gage thickness shall be as shown on the Plans.

2.02 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM Specifications for precast reinforced concrete Manhole Sections, serial designation C478. Manhole section joints shall conform to ASTM Designation C990. All cones shall be eccentric with an offset step configuration. Concrete adjustment rings or riser rings shall not be used for adjusting the height of the structure.

B. All manhole component parts shall have the name of the manufacturer stenciled on the inside. The lettering or logo shall be a minimum of 4 inches high.

2.03 MORTAR FOR MANHOLES

A. Mortar for plastering manholes and drainage structures shall be made of one part Portland cement and two parts fine aggregate.

2.04 BRICK AND BLOCK

A. Brick for brick and mortar structures shall conform to the current ASTM Specification C32. Block for block and mortar structures shall conform to the current ASTM Specification C135.

B. The concrete block masonry used to construct manhole and catch basin walls shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have tongue and groove or other approved type of joint at the ends so that the units interlock to form a strong, rigid structure. Curved blocks shall have the inside and outside surfaces parallel.

C. The block shall not exceed 18 inches in length or 8 inches in depth (height). No block shall be less than 6 inches in width (thickness). All blocks in one structure shall be of the same height dimension. The blocks shall be designed for length so that only full-length or half-length blocks are required to lay the circular wall of any one course.

D. Blocks intended for use in the cones or tops of manholes and catch basins shall have such shape as may be required to form the structure as shown on the Plans with inside and outside joint not to exceed 1/4-inch in thickness.

2.05 STRUCTURE FRAMES AND COVERS

A. Structures frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each solid manhole cover shall be marked Storm Sewer with letters integrally cast into the cover.

B. Frames and Covers shall be as follows:
1. For use on manholes: East Jordan 1040Z, with Type B cover lettered "STORM SEWER", or equal. Structures 24-inches in diameter shall have the 1045 Z frame.
2. For use on drainage structures in paved areas: East Jordan 1040Z, with Type M1 cover, with "DUMP NO WASTE" lettering and trout logo.
3. For use on drainage structures in curbed areas: East Jordan 7045 or 7065, with "DUMP NO WASTE" lettering and trout logo.
4. For use on drainage structures in landscaped areas: East Jordan 1040Z, with 1040 N 7", with "DUMP NO WASTE" lettering and trout logo.

C. All frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

D. All covers for drainage structures shall have storm drain markers affixed to the nearest available flat surface. The storm drain markers shall be manufactured by Das Manufacturing and shall be #SDR "No Dumping. Drains to River." The storm drain markers shall be installed per the manufacturer's recommendations.

2.06 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF for precast manholes, PS1-B for block manholes, or equal.

2.07 DRAINAGE STRUCTURES

A. All manholes and catch basins shall be precast unless otherwise specified.

B. Manhole and catch basin bottoms shall be concrete and top of slab shall have a troweled finish.

C. Upon approval by the ENGINEER, the manhole and catch basin walls may be constructed of concrete block masonry or concrete manhole pipe conforming to the requirements of the specifications previously listed. Construction shall be in accordance with the details for Catch Basin and Storm Sewer Manhole shown on the Plans.

D. A plaster coat of mortar 1/2-inch in thickness shall be applied to the inside and outside surface of all manholes and catch basins constructed with concrete block masonry or sewer brick. The inside coat of mortar shall be applied in a smooth, neat workmanlike manner.

E. Final adjustment of the top of manholes and catch basins, so that the manhole or catch basin cover is at finished elevations as shown on the Plans or meets the finished surface, may be accomplished with sewer brick conforming to the previously listed Specifications. The total height of brick for this purpose shall not exceed 9 inches. The total chimney height shall not exceed 18 inches.

F. All block and brick masonry units shall be laid in a full bed of mortar. The inside joints of the block masonry construction shall be tooled in a neat and workmanlike manner.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill 12 inches above the crown of pipe shall conform to Section 2.04, Earthwork of these specifications.

B. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within four pipe lengths behind pipe laying.

3.02 BEDDING

A. Concrete pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches. Where indicated on the Plans or required by the ENGINEER, concrete encasement or cradle shall be used.

B. For all pipes, compacted aggregate material shall be placed at the sides of the pipe in 12-inch lifts and cover not less than 12 inches above the crown of the pipe.

C. "Granular Material" shall be MDOT class II, placed in not more than 6-inch layers and compacted to not less than 90% standard density.

3.03 PIPE INSTALLATION

A. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress, shall be kept dry, and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

B. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

C. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities or structures. Any change in location or alignment of piping, which may be found more feasible or practicable as the work progresses, shall be made by the CONTRACTOR, as the ENGINEER may direct.

D. All pipe shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the concrete pipe will be considered cause for rejection.

E. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine toothsaw, tubing cutter or similar tool may be used to cut concrete pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

F. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cored into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

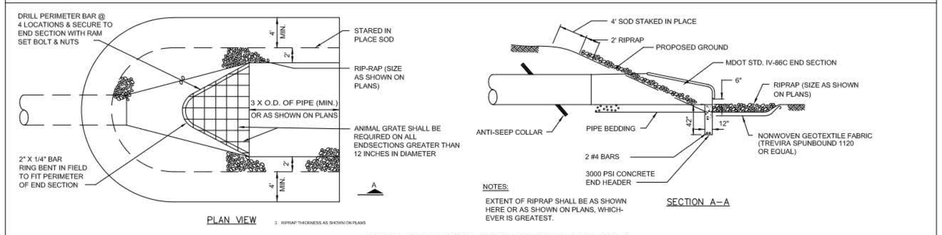
C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. Reinforcing steel shall not be cut out shall be bent and replaced in the area that is to be patched. A form shall be constructed over the area of pipe penetration. The formed area shall then be filled with concrete.

D. Closure of the manhole wall shall be made watertight using concrete.

3.05 ANIMAL GRATES

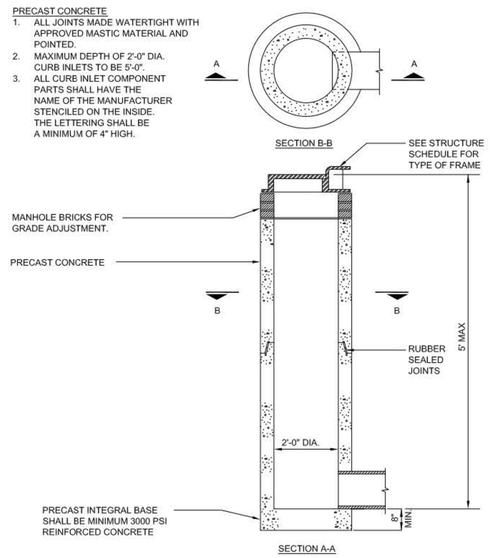
A. Animal grates shall be required on all endsections greater than 12-inch diameter.

PCT February 2008



END SECTION AND RIPRAP DETAIL

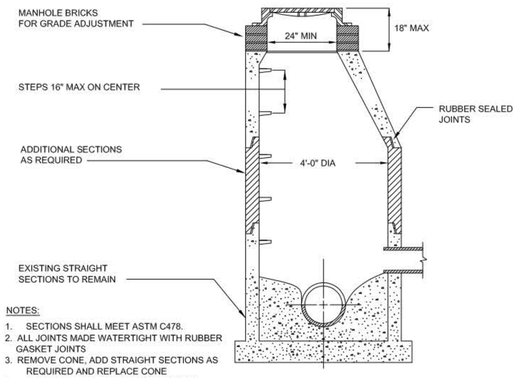
PRECAST CONCRETE
1. ALL JOINTS MADE WATERTIGHT WITH APPROVED MASTIC MATERIAL AND POINTED.
2. MAXIMUM DEPTH OF 2'-0" DIA. CURB INLETS TO BE 5'-0".
3. ALL CURB INLET COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



2' DIAMETER INLET

AFFIX TO SURFACE ON OR NEAR ALL DRAINAGE COVERS.

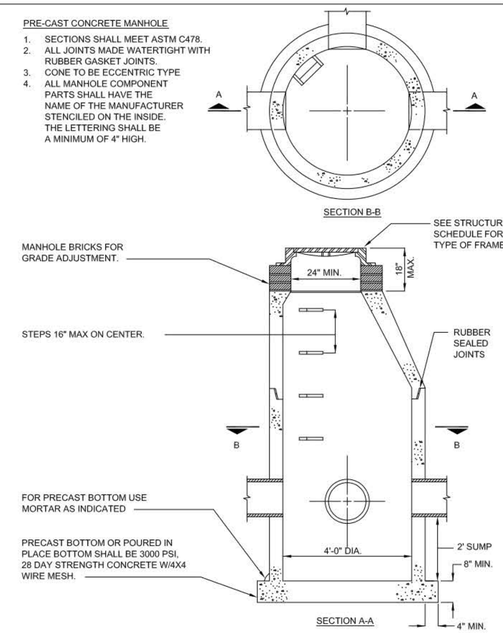
STORM DRAIN MARKER



NOTES:
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. REMOVE CONE, ADD STRAIGHT SECTIONS AS REQUIRED AND REPLACE CONE
4. ADD MANHOLE STEPS AS NECESSARY
5. ADD ADJUSTMENT RINGS FOR RIM GRADE ADJUSTMENT

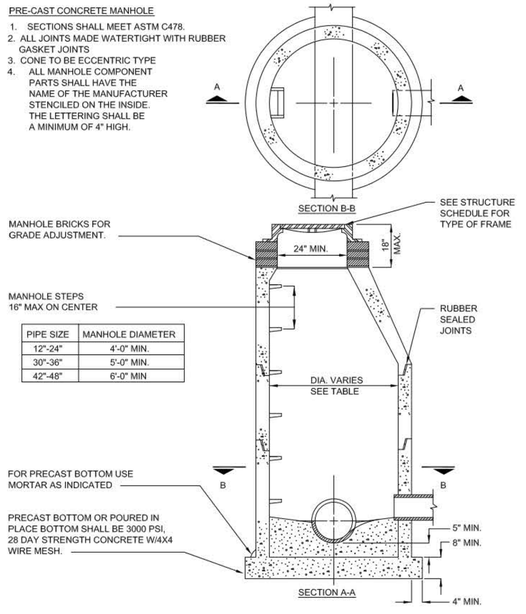
MANHOLE & CATCH BASIN RECONSTRUCTION DETAIL

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS.
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



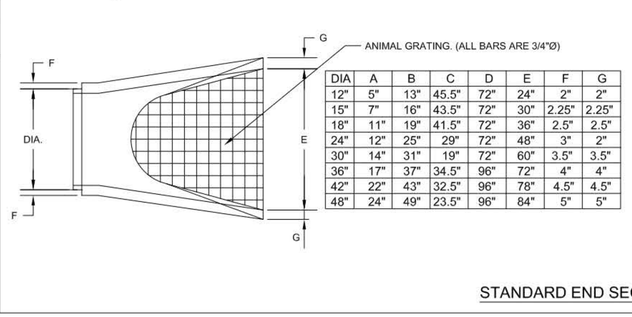
4' DIAMETER CATCH BASIN

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



PIPE SIZE	MANHOLE DIAMETER
12"-24"	4'-0" MIN.
30"-36"	5'-0" MIN.
42"-48"	6'-0" MIN

STORM SEWER MANHOLE



DIA	A	B	C	D	E	F	G
12"	5"	13"	45.5"	72"	24"	2"	2"
15"	7"	16"	43.5"	72"	30"	2.25"	2.25"
18"	11"	19"	41.5"	72"	36"	2.5"	2.5"
24"	12"	25"	29"	72"	48"	3"	2"
30"	14"	31"	19"	72"	60"	3.5"	3.5"
36"	17"	37"	34.5"	96"	72"	4"	4"
42"	22"	43"	32.5"	96"	78"	4.5"	4.5"
48"	24"	49"	23.5"	96"	84"	5"	5"

NOTE:
FLARED END SECTIONS SHALL BE MANUFACTURED TO THE CLASS SPECIFICATIONS AS THE PIPE ITSELF.

STANDARD END SECTIONS FOR PRECAST CONCRETE

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield–mi.gov

UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	12.08.09
TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20
Revision	By	Appd.	YY.MM.DD
Issued	By	Appd.	YY.MM.DD
File Name: ST–01	TTN	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

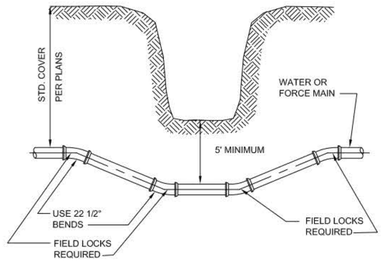
Pittsfield Township, Michigan

Title
STORM SEWER DETAILS AND SPECIFICATIONS

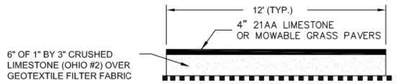
Project No.
2075001300

Scale
NOT TO SCALE

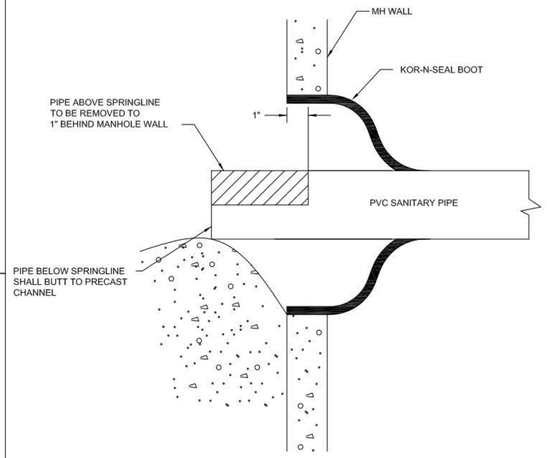
Revision



DITCH & STREAM CROSSING



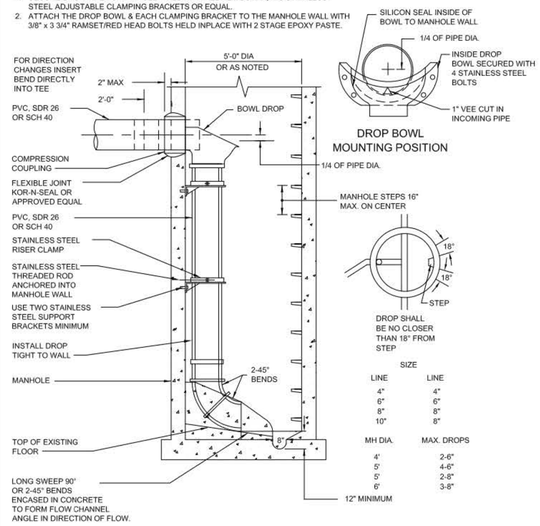
SANITARY SEWER ACCESS PATH



SANITARY PIPE PENETRATION

NOTES:

1. SECURE DROP PIPE TO MANHOLE WALL WITH RELINER-DURAN, INC STAINLESS STEEL ADJUSTABLE CLAMPING BRACKETS OR EQUAL.
2. ATTACH THE DROP BOWL & EACH CLAMPING BRACKET TO THE MANHOLE WALL WITH 3/8" x 3 3/4" RAMSET/RED HEAD BOLTS HELD INPLACE WITH 2 STAGE EPOXY PASTE.



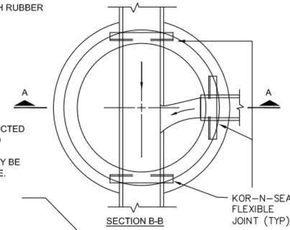
NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

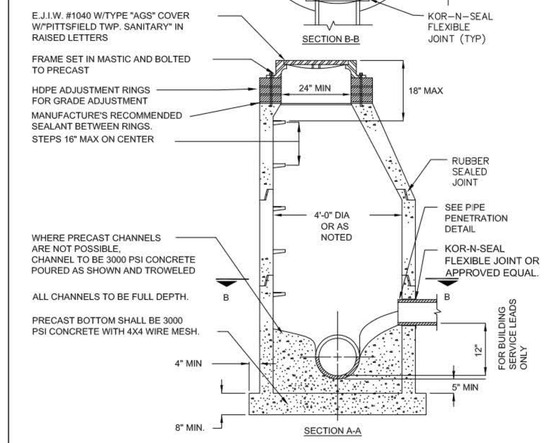
DROP BOWL
MOUNTING POSITION

INTERIOR DROP
SANITARY MANHOLE

PRE-CAST CONCRETE MANHOLE

1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE WITH PRECAST CONCRETE CHANNELS.
6. WHERE MANHOLES ARE CONSTRUCTED OVER EXISTING SEWERS, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MAY BE USED IN PLACE OF INTEGRAL BASE.

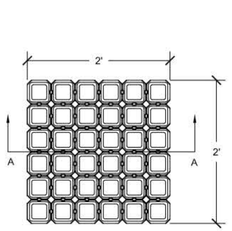




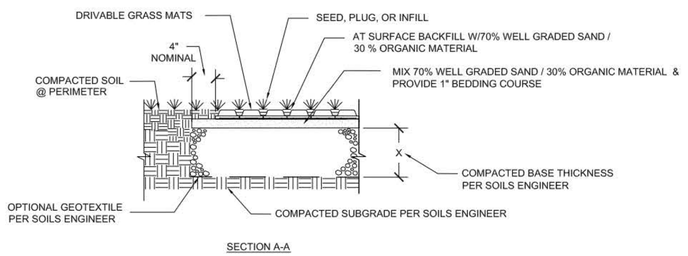
NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

SANITARY MANHOLE

NOTE:
FOR STORMWATER MANAGEMENT APPLICATIONS INCLUDING STORAGE AND INFILTRATION, ALTERNATE INFILLS, BASE MATERIAL, AND DRAINAGE MAY BE REQUIRED

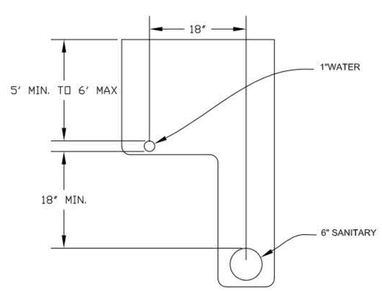


PLAN VIEW

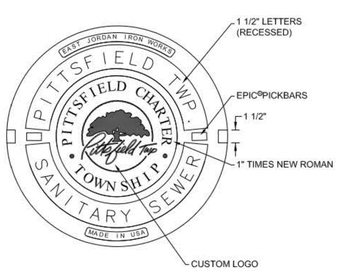


SECTION A-A

TYPICAL HEAVY TRAFFIC DRIVABLE GRASS DETAIL

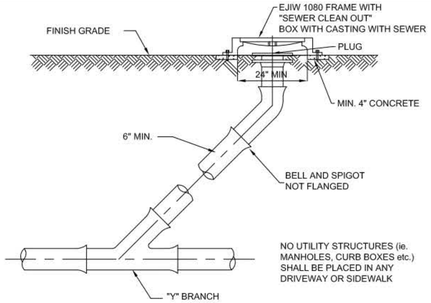


TYPICAL L TRENCH DETAIL
HOUSE LEADS

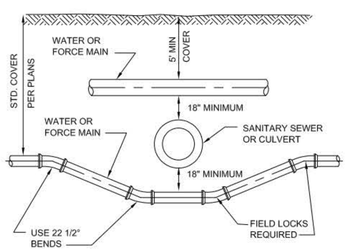


EAST JORDAN IRON WORKS 1040 Z BOLT DOWN FRAME
EAST JORDAN IRON WORKS 1040 AGS COVER

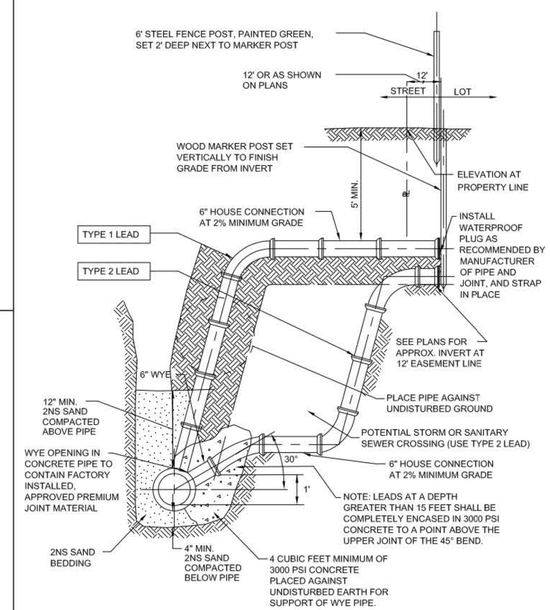
COVER DETAIL



SANITARY SEWER CLEANOUT



SEWER OR CULVERT CROSSING



SANITARY SEWER SERVICE
& RISER CONNECTION DETAIL

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
COVER DETAIL UPDATE	MRH	DRW	14.01.24
TWP REV	BWA	DRW	11.04.27
MANHOLE UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SS-01	BWA	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SANITARY SEWER DETAILS

Project No.
2075001300

Scale
NOT TO SCALE

Revision

SANITARY SEWER AND MANHOLES

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, tools, equipment and materials to construct all sanitary sewers, manholes and necessary appurtenant work as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equip\-ment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed and has been installed for not less than 30 days.

2. The CONTRACTOR may desire to make an air test prior to backfill for his own purposes but the line acceptance tests shall be conducted after backfilling or extensions.

3. All sewer lines shall be televised while running enough water through the line to be visible at the next downstream manhole.

4. All sewer lines shall be checked for alignment.

5. All manholes shall be tested for leakage. All PVC lines shall be tested for deflection.

6. Sewer pipe 30 inches and smaller shall be air tested. Sewer pipe larger than 30 inches shall be tested by either infiltration or exfiltration and shall be tested in lengths of 1600 feet or less.

7. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair rejected section and retest until it is within specified allowance.

B. Test for Leakage - Air Test

1. Section 33-95 (pg 30-6) 2004-Ten State Standards.

2. After a manhole-to-manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs inflated to 35 psig internal pressure. The design of the pneumatic plugs shall be such that they will hold against the line test pressure without requiring external blocking or bracing.

3. There shall be three (3) hose connections to the pneumatic plug. One hose shall be used only for inflation of the pneumatic plug. The second hose shall be used for continuously reading the air pressure rise in the sealed line. The third hose shall be used only for introducing low pressure air into the sealed line.

4. There shall be a 0-30 psig gauge for reading the internal pressure of the line being tested. Calibrations from the 1-10 psig range shall be in tenths of lbs (not ounces) and this 0-10 portion shall cover 90% of the complete dial range.

5. Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any ground water pressure that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the third hose shall be disconnected.

6. The portion of line being tested shall be accepted if the portion under test meets the following conditions.

a. DI, and RCP Pipes

(1) The time requirement for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time given in the following table:

Pipe	Min. Holding Time Seconds/100 ft. Pipe
4-inch	18
6-inch	42
8-inch	72
10-inch	90
12-inch	108
15-inch	126
18-inch	144
21-inch	180
24-inch	216
27-inch	252
30-inch	288

(2) In areas where ground water is known to exist, the CONTRACTOR shall install a 1/2-inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, the ground water level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the lbs of pressure that will be added to all readings. For example, if the height of water is 11-1/2 ft, then the added pressure will be 5 psig. This makes the 3.5 psig to be 8.5 psig, and the 2.5 psig to be 7.5 psig. The 1 lb allowable drop and the timing remains the same.

a. PVC Pipe

(1) The time requirement for the pressure to decrease from 3.5 to 3.O psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than that shown in the following table:

Pipe Size (inches)	Holding Time (seconds)	Minimum Holding Time (seconds)
4-inch	0.190xL	113
6-inch	0.427xL	170
8-inch	0.760xL	227
10-inch	1.187xL	283
12-inch	1.709xL	340
15-inch	2.671xL	425
18-inch	3.846xL	512

(2) If any section of the sewer fails to meet this requirement, the CONTRACTOR shall perform a television inspection of the faulty section and repair or replace at his own expense all defective materials and/or workmanship to the satisfaction of the ENGINEER. The test procedure shall be repeated until the results are acceptable.

C. Test for Infiltration

1. Sewer pipe over 18 inches shall be tested to measure the infiltration of ground water. If the measured leakage exceeds 100 gallons per inch diameter per mile of pipe per 24 hr period, the CONTRACTOR shall locate the points of excessive leakage and make the necessary repairs at his own expense.

2. In the event the line does not pass the infiltration test as stated above, the test shall be repeated after suitable repairs have been completed.

D. Test for Exfiltration

1. Where the ground water provides less than a 2 ft head on the sewer, an exfiltration test shall be conducted by filling the sewer with water to a 4 ft head or 4 ft above the ground water level, whichever is greater. The allowable water loss shall be 100 gal/in./mi/day as calculated above for infiltration.

2. After the sewer has been filled with water, 4 hrs time shall be allowed for water absorption by the pipe before exfiltration tests are initiated.

3. For the purpose of establishing the 4 ft test head, the head shall be measured from the center of the sewer pipe at the midpoint of the test section length. This procedure shall be used for both infiltration and exfiltration tests.

E. Test for Manhole Leakage

1. All manholes shall be tested for leakage by using plugs on inleting-outleting sewers, and filling the manholes with water to the top of the man\-hole. Four hours shall be allowed for water absorption by the manhole before testing is initiated. Allowable exfiltration for 48-inch diameter manholes shall be 2 gallons per foot of depth per day.

F. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

G. Test for Deflection of PVC Pipe

1. PVC pipe sewers shall be installed in such a manner that the initial deflection of the conduit shall conform to the latest revision of ASTM D-3034.

2. Deflection of PVC pipe shall be tested by pulling a rigid pig or equivalent through the pipe. The pig shall be constructed in accordance with the following table of maximum outside diameters and shall be submitted to the ENGINEER for review before testing is initiated.

Pipe I.D.	Pig O.D.
6 inches	5.33 inches
8 inches	7.11 inches
10 inches	8.87 inches
12 inches	10.55 inches
15 inches	12.90 inches
18 inches	15.74 inches

3. The pig shall be drawn by hand through the pipe from manhole to manhole. Any portion of pipe through which the pig passes freely shall be deemed to have passed the deflection test. Sections of pipe through which the pig does not pass shall be located, un\-covered and the pipe zone bedding improved and backfilled by the CONTRACTOR at his own expense. The pipe shall then be retested before acceptance is granted.

H. Material Tests

1. The CONTRACTOR shall have tests of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, and valves. The Contractor shall submit certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 SEWER PIPE

A. Pipe for sewer 24-inch diameter and smaller shall be polyvinyl chloride (PVC). Pipe for 30-inch diameter and larger shall be PVC truss pipe. Ductile iron pipe and reinforced concrete pipe shall be used as specified by the ENGINEER.

B. Pipe for service leads 4 though 8 inches in diameter shall be polyvinyl chloride (PVC).

C. Reinforced concrete pipe shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Pro\-posal.

D. PVC pipe 4 inches through 15 inches in diameter shall meet or exceed all of the requirements of the current ASTM D-3034 SDR-26 polyvinyl chloride sewer pipe and fittings. 18-inch diameter PVC pipe shall meet or exceed all the requirements of the current ASTM F-794 SDR 26 polyvinyl chloride sewer pipe and fittings. Samples of pipe and physical and chemical data sheets shall be submitted to the ENGINEER for review. Approval shall be obtained before pipe is purchased.

E. If the sewer pipe is greater than 15 feet deep PVC pipe shall be SDR 21.

F. Truss pipe shall meet or exceed all of the requirements of the current ASTM D2680.

G. Ductile iron pipe shall meet or exceed all the requirements of ANSI A21.50 with a cement lining.

2.02 SEWER PIPE FITTINGS

A. Fittings shall be of the same material as the pipe, and in no case shall the walls be thinner than that of the pipe furnished.

B. Wye and tee fittings for PVC pipe shall be reviewed by the ENGINEER before purchasing.

C. The dry fit of all fittings must be snug. If the fit is such that it is loose, the pipe or fitting will be rejected as faulty and of improper size.

2.03 SEWER PIPE JOINTS

A. Concrete pipe joints shall be made of a resilient material conforming to the latest revision of ASTM Designation C443. Proper lubricant shall be furnished by the joint manufacturer.

B. Concrete pipe for use with rubber joints shall be smooth and precisely formed to provide a uniform annular space for joint materials.

C. PVC pipe shall be jointed with ring gusseted bell ends. (ASTM-D3212) Jointing materials shall be applied to the bell end of the pipe at the point of manufacture in such a manner that a tight uniform joint will be achieved and such that when the joint is made up in the field, the joint material will not roll or tear from the pipe. A proper joint lubricant shall be furnished by the pipe manufacturer.

2.04 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM specifications for precast reinforced concrete manhole sections, serial designation C478. Manhole section joints shall conform to ASTM C990-96. Cone sections shall be straight side type, with an offset step configuration.

B. All manhole component parts shall have the name of the manufacturer stenciled on the inside. The lettering or logo shall be a minimum of 4-inches high.

C. Manholes constructed over an existing sewer line shall have a doghouse mudded to an 8-inch thick cookie. The bottom of the existing pipe shall be the channel. All other manholes shall have precast integral base sections with pre-formed concrete channels.

D. All channels shall be constructed to the full flow depth of the pipe.

2.05 MORTAR FOR MANHOLES

A. Mortar for plastering manholes shall be made of one part Portland cement and two parts fine aggregate.

2.06 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each cover shall be marked with the Pittsfield Township logo and the letters, PITTSFIELD TWP SANITARY SEWER integrally cast into the cover.

B. Covers shall be of the "self-sealing" design having a continuous gasket glued in a machined groove and a concealed pickhole. Frames and covers shall be East Jordan 1040Z, with Type AGS cover.

C. All manhole frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

2.07 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF or PS1-B, or approved equal.

2.08 MANHOLE CONNECTIONS

A. Sewer pipe (6-inch to 24-inch) to manhole connections shall be through: 1) a flexible rubber boot which shall be securely clamped into a core-drilled pipe port. Pipe ports shall be core-drilled at the point of manhole manufacturer and shall be accurately located within 1/2-inch of proposed sewer centerline (Kor-N-Seal); or, 2) a self-adjusting mechanical pipe to manhole seal which provides a resilient flexible and infiltration-proof joint (Res-seal); or, 3) a flexible rubber wedge firmly rammed into a rubber gasket which is cast into the manhole (Press Wedge II), or equal. All flexible pipe to manhole connections shall be installed per the manufacturers specifications.

B. Neoprene rubber for the manhole boot shall meet ASTM Specification C443 and shall have a minimum thickness of 3/8-inch. Pipe clamp bands shall be of corrosion-resistant steel.

C. Sewer pipe over 24 inches to manhole connections shall be in accordance with details shown on the Plan.

2.09 SANITARY MANHOLE ADJUSTMENTS

A. All final grade adjustment of manhole covers and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by LADTECH, INC. or approved equal. The adjustment rings shall be manufactured from polyethylene plastic as identified in ASTM Designation D 1248.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to ¼ inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet ASTM specification C-990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead concrete anchors or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

2.10 MANHOLE DROPS

A. Manhole drop connections shall be interior drops using the drop bowl as produced by Reliner-Duran Inc. or approved equal.

B. Drop bowl model A-4" shall be used for all lines up through full 6-inch inlets. Drop bowl model A-6" shall be used for all 8-inch inlets. Drop bowl model B-8" shall be used for all 10-inch inlets. Lines larger than 10 inches shall be as directed by the ENGINEER.

C. The force line hood shall be attached on models A-4" and A-6" when the incoming line is from a force main or the slope is 3 percent or greater.

D. The drop pipe shall be secured to the manhole wall with Reliner-Duran, Inc. stainless steel adjustable clamping brackets or approved equal.

E. The drop bowl and each clamping bracket shall be attached to the manhole wall with 3/8-inch x 3 3/4-inch bolts.

F. The incoming pipe shall be trimmed such that it protrudes 2 inches into the manhole .

G. A 1-inch V shaped notch shall be cut into the bottom edge of the incoming pipe.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill above a line 12 inches above the crown of the pipe shall conform to Section 2.04, Earthwork, of these Specifications.

3.02 BEDDING

A. Reference Section 33.83a of 10 State Standards.

B. Reference Section 33.83b of 10 State Standards.

C. Ductile iron, and concrete pipes shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 3 inches for 24-inch and smaller pipe and not less than 4 inches for pipe larger than 24-inch conforming to Class B bedding as shown on the Plans. Where shown on the Plans or required by the ENGINEER, concrete encasement or concrete cradle shall be used.

D. PVC pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches conforming to Class B bedding as shown on the Plans. Where shown on the Plans, or where the pipe passes under a road with less than 4 ft of cover, the pipes shall be encased.

E. For all pipes, compacted granular material shall be placed at the sides of the pipe and cover not less than 12 inches above the crown of the pipe.

F. "Granular Material" shall be class 2NS sand, pea gravel or crushed stone conforming to ASTM C33 Size No. 67 placed in not more than 6-inch layers and com\-pacted to not less than 95% standard density for PVC and 90% standard density for reinforced concrete.

G. Pea gravel or crushed stone used for bedding shall be separated from the sand backfill with a non-woven geotextile fabric. The fabric shall be Amoco 4551, or approved equal.

3.03 PIPE INSTALLATION

A. Installation of PVC pipe shall be in confor\-mance with ASTM D2321-89.

B. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress shall be kept dry; and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

C. All joints shall be made up in accordance with the manufacturer's instructions using materials and equipment especially prepared for the type of joint to be used.

D. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by levels, laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

E. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities, or structures. Any change in location or alignment of piping which may be found more feasible or practicable as the work progresses shall be made by the CONTRACTOR, as the ENGINEER may direct.

F. All pipe and fittings shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the PVC pipe will be considered cause for rejection.

G. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within two pipe lengths behind pipe laying.

H. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine tooth saw, tubing cutter or similar tool may be used to cut PVC pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

I. After cutting bell and spigot or socket pipe, a stop mark shall be made with a pencil or crayon using dimensions as shown by the manufacturer's instructions or by using another pipe in the field as a guide.

J. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES AND OTHER RIGID STRUCTURES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cut into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be clamped into the cored hole and used to make the connection.

D. For connections to existing fiberglass manholes, a hole shall be cored into the manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be installed using fiberglass reinforced pipe stubout for Kor-N-Seal boot sealing surface.

3.05 STREAM AND RIVER CROSSING

A. Whenever a pipe is required to cross a stream or river, all work shall be in accordance with the provisions of Act 346, the Inland Lakes and Streams Act of 1962, and the rules and regulations promulgated thereunder. Stream crossings and all restoration required shall be completed within five days of the construction.

B. The CONTRACTOR shall utilize such con\-struction methods as are feasible and practicable to divert or stop stream flow to lay the pipe in the dry. Pipe shall be ductile iron, mechanical joint, or compression gasket joint pipe with joints at transition to other types of sewer pipe encased with no less than 1 cu yd of concrete, placed at a minimum of 6 inches thickness around the pipe. After the sewer is properly laid, jointed and encased, the stream-channel shall be cleaned of dirt and debris resulting from the CONTRACTOR's operations.

C. After the crossing is made, heavy riprap and sodding shall be placed to protect the banks from corrosion as shown on the Plans.

PCT July 2008

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SS-02	BWA	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

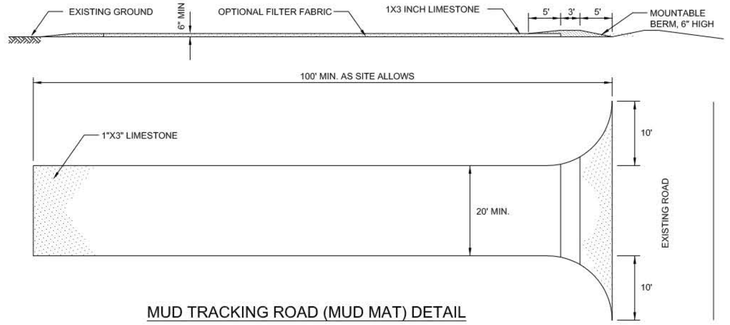
Pittsfield Township, Michigan

Title
SANITARY SEWER SPECIFICATIONS

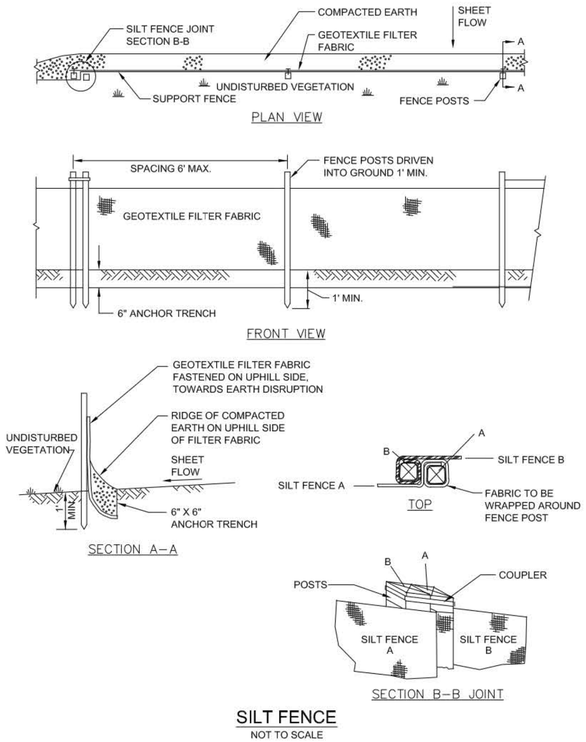
Project No.
2075001300

Scale
NOT TO SCALE

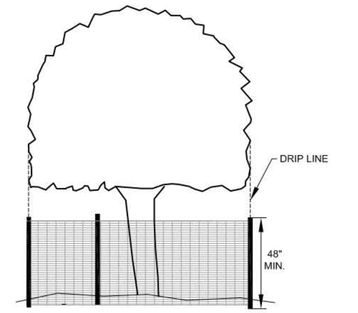
Revision

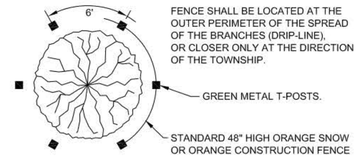


MUD TRACKING ROAD (MUD MAT) DETAIL



SILT FENCE
NOT TO SCALE





NOTES:
1. ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING.
2. TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION AND GRADING IS COMPLETE.
3. ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIP LINE OF ANY TREES TO BE SAVED.

TREE PROTECTION FENCE DETAIL
NOT TO SCALE

PITTSFIELD CHARTER TOWNSHIP
SOIL EROSION AND SEDIMENTATION CONTROL NOTES

GENERAL

1. The contractor shall implement and maintain the soil erosion control measures as shown on the plans at all times during construction on this project. 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 Pittsfield Township.
2. All soil erosion and sedimentation control work shall conform to the permit requirements of Pittsfield Township and the laws of the State of Michigan.
3. A NPDES construction activity permit is required for all sites greater than 5 acres.
4. Daily inspections shall be made by the contractor. Periodic inspections may be made by the owner/project engineer/Township to determine the effectiveness of erosion and sedimentation control measures. Any necessary corrections shall be made without delay.
5. Erosion and sedimentation from work on the site shall be contained on the site and not be allowed to collect on any off-site areas or in waterways.
6. All mud/dirt tracked onto roads from the site due to construction, shall be promptly removed by the contractor.
7. Restoration of all disturbed areas, including placement of topsoil, seed, fertilizer and mulch and/or sod shall be done within 5 days of the completion of final grade.
8. Construction operations shall be scheduled and performed so that preventative soil erosion control measures are in place prior to excavation in critical areas and temporary stabilization measures are in place immediately following backfilling operations.
9. Special precautions will be taken in the use of construction equipment to prevent situations that promote erosion.
10. Proper dust control shall be maintained during construction by use of water trucks and/or chloride as required.
11. 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.
12. The contractor shall not grade in existing wetland or conservation areas to be protected. Silt fence shall be installed and maintained adjacent to existing wetland and conservation areas to prevent grading, erosion and sedimentation into them.
13. Tree protection fencing must remain intact until restoration of the site is complete.

SEQUENCE OF CONSTRUCTION

1. Install sediment fence and tree protection fencing prior to any grading operation.
2. Install mud-tracking pad.
3. Construct temporary sediment/detention basin.
4. Place topsoil, fertilizer, seed and mulch over the entire detention basin area.
5. Rough grade site, stockpile topsoil and begin building construction.
6. Install storm drainage system including riprap and parking lot inlet filters and detention basin standpipe.
7. Maintain erosion and sedimentation control measures, as required.
8. Install sanitary sewer and water systems.
9. Bring pavement areas to sub-base grade, place sub-base and bituminous pavement.
10. Install franchised utilities.
11. Finish grade, redistribute topsoil, seed and mulch all disturbed areas.
12. Remove any accumulated sediment within the detention basin and replace clean washed stone around standpipe.
13. Complete construction of site.
14. Insure all soil is stabilized. Remove all temporary soil erosion control measures.

SEEDING/SOD

1. Seed or sod in accordance with project specifications.
2. All areas of disturbed earth that are not to be paved or sodded shall have 4 inches of topsoil, seed, fertilizer and mulch.
3. Immediately after seeding, mulch all seeded areas with unweathered small grain straw (preferably wheat) or hay spread. Spread uniformly at the rate of 1 ½ to 2 tons or 100 pounds (2 to 3 bales) per 1,000 square foot. This mulch should be anchored with a disc-type mulch-anchoring tool.
4. Any disturbed area not paved, seeded or mulched, sodded or built upon by November 15, is to be mulched in the manner as specified above, in order to provide soil erosion protection during the winter and early spring.
5. All erosion and sedimentation control prevention procedures and structures are to comply with the Standards and Specifications for soil erosion and sediment control of the Washtenaw County Soil Conservation District.
6. Drainage ditches and slopes steeper than 1:4 (25%) shall be stabilized with erosion control blankets.
7. Steep slopes that do not take upon initial seeding must be re-seeded and stabilized with erosion control blankets.
8. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

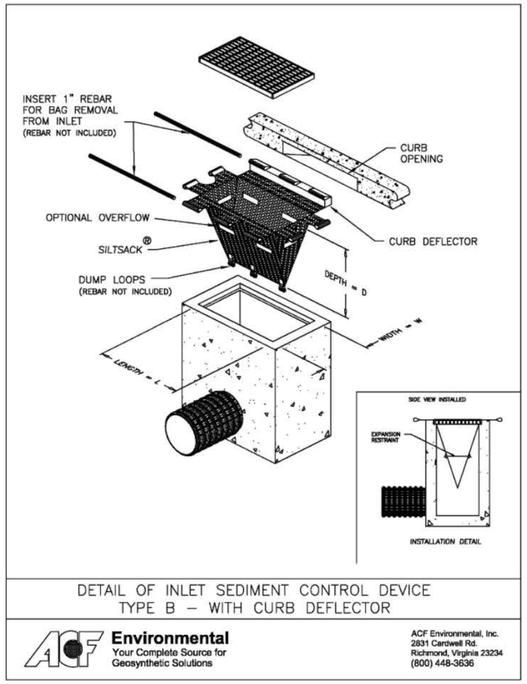
CATCH BASIN/MANHOLE PROTECTION

1. Protect storm sewer catch basins with Siltsack. or approved equivalent as follows:

ROADS

1. During construction, all roads shall be protected from unvegetated areas washing onto road surfaces by placement of silt fence behind curb or a 10 foot wide straw mulch bank behind the curb or other approved method and/or as shown on the plans.
2. During construction of any portion of the project, roads shall be maintained free of dirt, silt and construction debris.

Pittsfield SEC 9/22/2009



DETAIL OF INLET SEDIMENT CONTROL DEVICE
TYPE B – WITH CURB DEFLECTOR

Environmental
Your Complete Source for Geosynthetic Solutions

ACF Environmental, Inc.
2831 Cardwell Rd.
Richmond, Virginia 23234
(800) 448-3636

SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK ● WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK ●
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH	ASTM D-4632		300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632		20 %
PUNCTURE	ASTM D-4833		120 LBS
MULLEN BURST	ASTM D-3786		800 PSI
TRAPEZOID TEAR	ASTM D-4533		120 LBS
UV RESISTANCE	ASTM D-4355		90 %
APPARENT OPENING SIZE	ASTM D-4751		40 US SIEVE
FLOW RATE	ASTM D-4491		40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491		0.55 SEC -1

* HI-FLOW SILTSACK ●
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH	ASTM D-4632		265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632		20 %
PUNCTURE	ASTM D-4833		135 LBS
MULLEN BURST	ASTM D-3786		420 PSI
TRAPEZOID TEAR	ASTM D-4533		45 LBS
UV RESISTANCE	ASTM D-4355		90 %
APPARENT OPENING SIZE	ASTM D-4751		20 US SIEVE
FLOW RATE	ASTM D-4491		200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491		1.5 SEC -1

OIL-ABSORBANT SILTSACK ●
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK ●WITH A WOVEN PILLOW INSERT.

(* HI-FLOW SILT SACK SHALL BE USED FOR ALL APPLICATIONS WITHIN PITTSFIELD TOWNSHIP)

SILTSACK DISTRIBUTORS:
PRICE & COMPANY
(www.priceandcompany.com)

METRO GRAND RAPIDS, MI
425 36TH STREET SW
WYOMING, MI 49548-2108
1-800-248-8230

METRO DETROIT, MI
29165 WALL STREET
WIXOM, MI 48393-3525
1-866-960-4300

SILTSACK
NOT TO SCALE

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
SILTSACK	BWA	DRW	12.01.03
TWP REV	BWA	DRW	11.04.27
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SE-01	TTN	DRW	DRW 07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

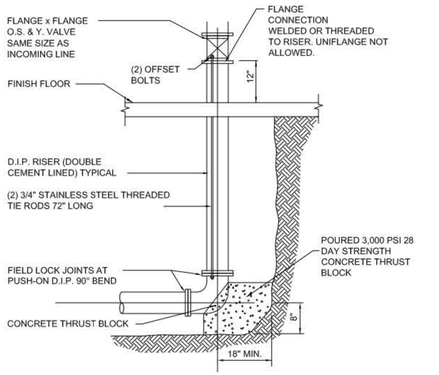
Pittsfield Township, Michigan

Title
SOIL EROSION DETAILS AND NOTES

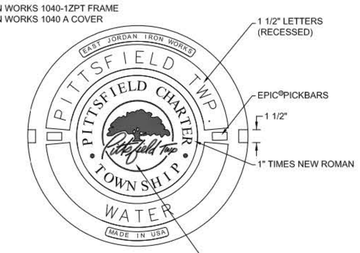
Project No.
2075001300

Scale
NOT TO SCALE

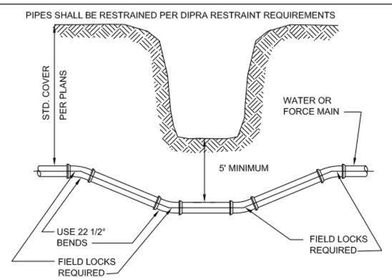
Revision



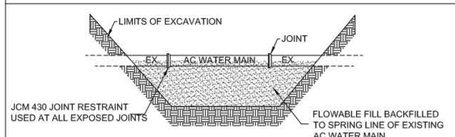
FIRE PROTECTION RISER DETAIL



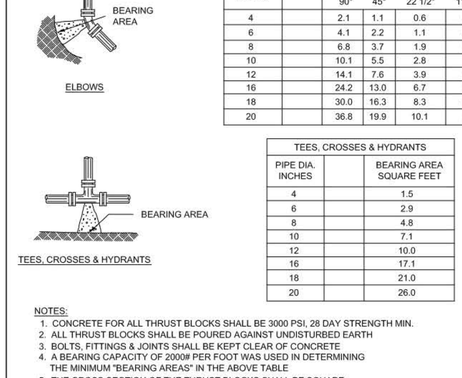
COVER DETAIL



DITCH & STREAM CROSSING



ASBESTOS CEMENT (AC) WATER MAIN



ELBOWS					
PIPE DIA. INCHES		BEARING AREA SQUARE FEET 90°	45°	22 1/2°	11 1/4°
4		2.1	1.1	0.6	0.3
6		4.1	2.2	1.1	0.6
8		6.8	3.7	1.9	0.9
10		10.1	5.5	2.8	1.4
12		14.1	7.6	3.9	2.0
16		24.2	13.0	6.7	3.3
18		30.0	16.3	8.3	4.2
20		36.8	19.9	10.1	5.1

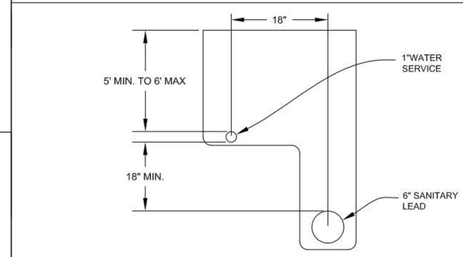
TEES, CROSSES & HYDRANTS		
PIPE DIA. INCHES		BEARING AREA SQUARE FEET
4		1.5
6		2.9
8		4.8
10		7.1
12		10.0
16		17.1
18		21.0
20		26.0

NOTES:
1. CONCRETE FOR ALL THRUST BLOCKS SHALL BE 3000 PSI, 28 DAY STRENGTH MIN.
2. ALL THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH
3. BOLTS, FITTINGS & JOINTS SHALL BE KEPT CLEAR OF CONCRETE
4. A BEARING CAPACITY OF 2000# PER FOOT WAS USED IN DETERMINING THE MINIMUM "BEARING AREAS" IN THE ABOVE TABLE
5. THE CROSS SECTION OF THE THRUST BLOCKS SHALL BE SQUARE
6. IN ADDITION TO THRUST BLOCKS, ALL PIPE JOINTS SHALL BE RESTRAINED WITH LOCKING GASKETS PER DIPRA'S STANDARDS.

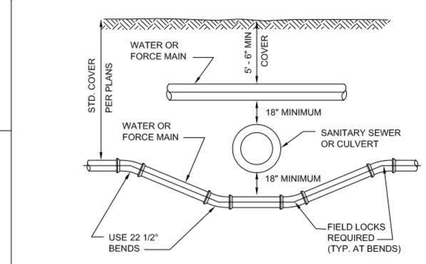
SOIL CHARACTERISTICS	FACTOR
(A) LOOSE COARSE OR MEDIUM SAND; COMPACT FINE SAND; COMPACT SAND-CLAY SOILS; STIFF CLAY	0.33
(B) FIRM FINE SAND; COMPACT INORGANIC SILT; FIRM SAND-CLAY SOILS; MEDIUM CLAY	0.50
(C) LOOSE FINE SAND; FIRM INORGANIC SILT	0.67
(D) LOOSE SAND-CLAY SOILS; LOOSE INORGANIC SILT SOFT CLAY	1.00

"BEARING AREA" x FACTOR = ACTUAL BEARING AREA
2.1 x .5 = 1.05 SQ. FT.
BASED UPON 150# TEST PRESSURE

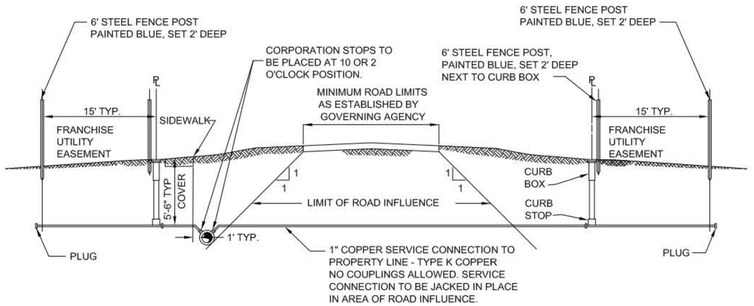
THRUST BLOCK



TYPICAL L TRENCH DETAIL HOUSE LEADS

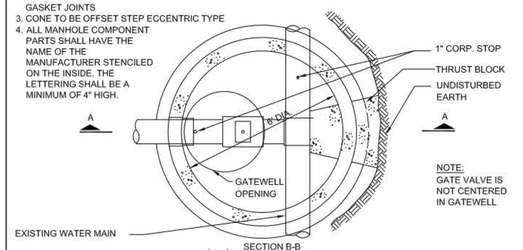


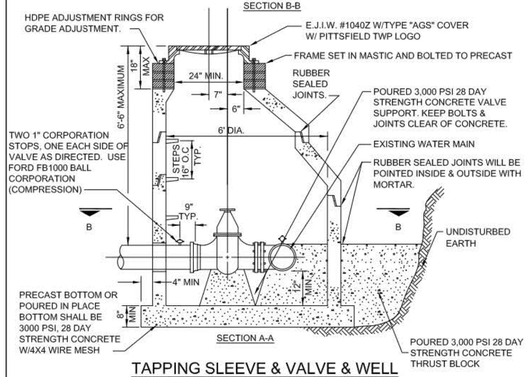
SEWER OR CULVERT CROSSING



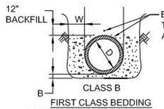
WATER MAIN CONNECTION

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.





TAPPING SLEEVE & VALVE & WELL

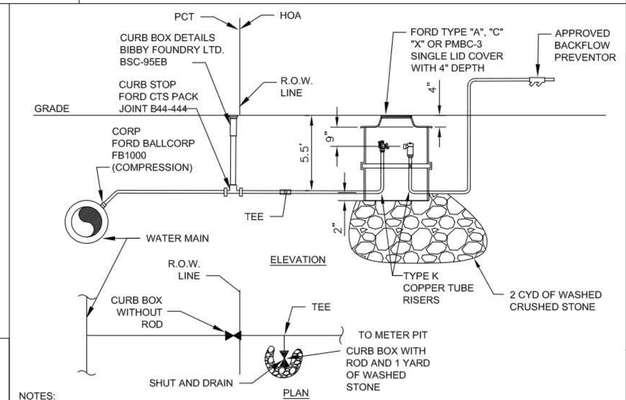


BLUE, 12 GAUGE SINGLE STRAND TRACER WIRE ATTACHED TO WATER MAIN PIPE MUST BE WRAPPED WITH POLLY WRAP AND SECURELY TAPED AT ENDS.

NOTES:
1. MINIMUM TRENCH WIDTH (SEE TABLE).
2. RECESS TRENCH TO RELIEVE THE BELL OF ALL LOAD. PIPE HAUNCHES SHALL BE COMPACTED.
3. 2NS BACKFILL TO DEPTH OF ONE FOOT ABOVE PIPE. TAMPED LAYERS NOT TO EXCEED 6" IN DEPTH. PLATE COMPACT ABOVE PIPE (ON 1st LIFT)
4. ALL PIPE TO BE PLACED AND JOINTED IN A DRY TRENCH AND LAID ACCURATELY TO LINE AND GRADE WITH BELLS UPHILL.
5. ALL CONCRETE ENCASEMENT AND CRADLING TO BE CLASS "A" CONCRETE.

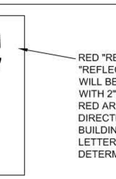
PIPE	D	W	B
PVC	0"-12"	12" MIN. 18" MAX.	4"
A-C,V.C.P.	0"-12"	6" MIN. 12" MAX.	4"
DIP	0"-24"	6" MIN. 12" MAX.	4"
A-C,CONC.	0"-24"	6" MIN. 12" MAX.	4"
CONC. DIP	24" +	6" MIN. 12" MAX.	4"

BEDDING



NOTES:
1. SADDLE MAY BE REQUIRED ON MAIN BASED ON LEAD SIZE, MAIN SIZE, AND MAIN PRESSURE
2. ALL WATER MAIN TAPS AND COMPONENT PARTS SHALL BE APPROVED BY THE PITTSFIELD TOWNSHIP UTILITIES DEPARTMENT PRIOR TO INSTALLATION.
3. INSTALLATION SHALL BE INSPECTED AND APPROVED BY THE PITTSFIELD TOWNSHIP UTILITIES DEPARTMENT.

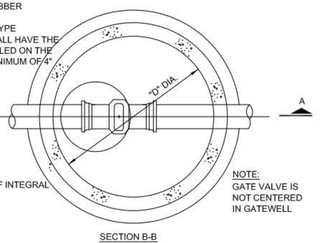
IRRIGATION METER PIT DETAIL



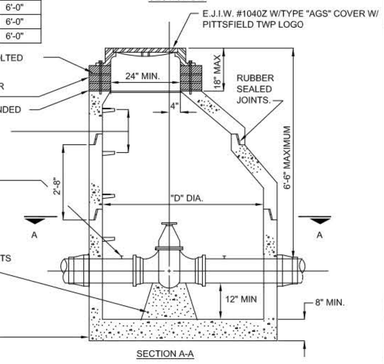
RED "REFLECTIVE" LETTERS WITH WHITE "REFLECTIVE" BACKGROUND. LETTERS WILL BE A MINIMUM OF 8" TALL BY 4" WIDE WITH 2" GIRTH, WITH AN 8" TALL 4" WIDE RED ARROW UNDER LETTERS POINTING DIRECTLY AT THE CONNECTION. TALLER BUILDINGS MAY REQUIRE LARGER LETTERING. SIGN SIZE AND LOCATION DETERMINED BY FIRE MARSHALL

FIRE DEPARTMENT CONNECTION LABEL DETAIL

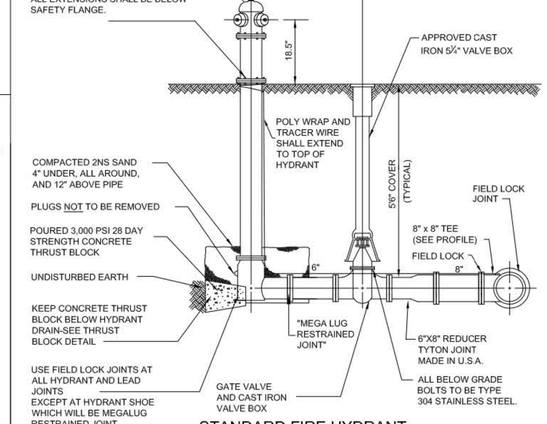
PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE.
6. KOR-N-SEAL BOOTS OR APPROVED EQUAL TO BE INSTALLED AT PIPE PENETRATIONS.
7. WHERE GATE WELLS ARE CONSTRUCTED OVER EXISTING WATERMAIN, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MY BE USED IN PLACE OF INTEGRAL BASE.



STRAIGHT THRU VALVE SIZE	"D"	TEE "D"
8"	5'-0"	6'-0"
12"	5'-0"	6'-0"
16"	6'-0"	6'-0"

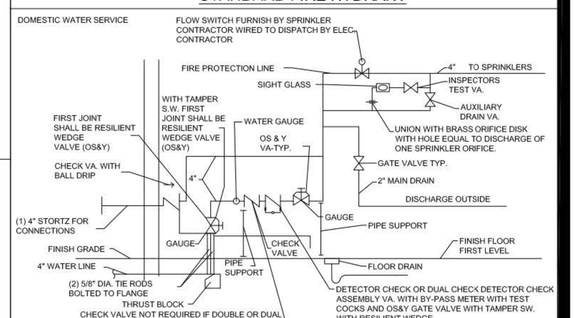


STANDARD GATE VALVE & WELL



NOTES:
-PROVIDE ONE 4-INCH STORZ CONNECTION ON EACH HYDRANT ON THE LEFT NOZZLE WHEN FACING THE HYDRANT
-HYDRANTS SHALL FACE THE PARKING LOT OR DRIVEWAY OR AS DIRECTED BY THE FIRE MARSHALL

STANDARD FIRE HYDRANT



METER ROOM DETAIL

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
UPDATES	MRH	DRW	14.01.24
FDC UPDATE	BWA	DRW	11.09.13
TWP REV	BWA	DRW	11.04.27
HYDRANT, MANHOLE UPDATE	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: W-01	BWA	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
WATER MAIN DETAILS

Project No. 2075001300

Scale NOT TO SCALE

Revision

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, materials, and equipment required to construct a water main and necessary appurtenant work as herein specified. The water main shall be installed in the locations as shown on the Plans and shall meet all acceptance tests.

1.02 NOTIFICATION

A. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department at (734) 882-2110, 24 hours prior to flushing or chlorination of the water main.

B. CONTRACTOR shall schedule bacteriological testing with the ENGINEER 48 hours prior.

C. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department 48 hours prior to connecting to an existing water main.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, valves, hydrants and the B-1 Poly Pig. The Contractor shall submit a certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, Township name, current date, certification of pipe provided and letterhead of the certifying company.

1.04 TESTING

A. General

1. CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein. All tests shall be conducted under the supervision of the ENGINEER. All water mains, branches and valves shall be subject to cleaning with a poly-pig, hydrostatic pressure testing, disinfection and bacteriological testing. No acceptance tests shall be conducted until the water main has been installed and backfilled for not less than 30 days. A copy of all test results shall be furnished to the ENGINEER.

2. Hydrostatic pressure testing must be performed in accordance with ANSI/AWWA C600. Disinfection and bacteriological testing must be performed in accordance with ANSI/AWWA C651.

3. CONTRACTOR shall furnish all material and labor to provide for an acceptable full size blow-off to flush the poly-pigs out of the main at the far end of the project not connected to the existing system.

4. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair the rejected section and retest until it is within the specified allowance.

5. Only Pittsfield Township personnel or the CONTRACTOR under direct supervision of Pittsfield Township personnel may fill or flush lines.

B. Preparation

1. After the pipe has been laid and backfilled as specified, the CONTRACTOR shall fill the line, or a valve section thereof, to be tested with water in such a manner as to expel all air from the pipe. This may be done through fire hydrants at the high points; or, if no hydrant is available at such point, the CONTRACTOR shall make the taps necessary to accomplish the expulsion of all air. At the close of the test, all taps shall be satisfactorily plugged with brass plugs.

C. Sequence

1. All water mains connected to an existing water system shall be flushed, swabbed, chlorinated and bacteriological tested prior to pressure testing. The sequence for acceptance testing shall be:

   a. Flushing with approved B-1 Poly-Pig
   b. Chlorination
   c. Flushing
   d. Bacteriological Testing
   e. Pressure Testing

2. Where mains can be totally isolated from the existing water system with airgaps, pressure testing shall precede chlorination and bacteriological testing. The sequence for acceptance testing shall be:

   a. Pressure Testing
   b. Connect to System
   c. Flushing with approved B-1 Poly Pig
   d. Chlorination
   e. Flushing
   f. Bacteriological Testing

3. If a hydrostatic pressure test fails, the chlorination and flushing process must be repeated after repairs to the system are completed.

D. Flushing

1. All flushing will be conducted by the TOWNSHIP with clean potable water until the water runs clear.

E. Chlorination

1. All new mains and pipe or any existing mains contaminated by the CONTRACTOR shall be chlorinated to a minimum residual chlorine concentration of fifty (50) parts per million with commercial liquid chlorine solution or approved equal. The chlorinated water shall be allowed to stand in the mains for 24 hours. The end of the 24-hour period the chlorinated water at all parts of the mains shall show a free available chlorine residual of not less than twenty-five (25) parts per million. If less than twenty-five (25) parts per million residual is shown at the end of the first 24 hours period, additional chlorine shall be added until a residual of not less than twenty-five (25) parts per million at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and the mains flushed with potable water for bacteriological testing. No flushing shall take place between the two required bacteriological testing.

F. Bacteriological Testing

1. The Pittsfield Township Utilities Department will take bacteriological samples of the water in the mains for analysis at two different times. The first samples will be taken 24 hours after the mains have been satisfactorily chlorinated, flushed and filled with potable water. The second sample will be taken 24 hours later. Each sample will be incubated for 48 hours. No flushing shall be done during or between tests, unless supervised and approved by ENGINEER. Two sets of safe consecutive bacteriological samples, collected at least 24 hours apart, must be obtained before placing the water main in service.

2. The CONTRACTOR shall provide a sufficient number of corporation cocks and copper tubing for taking samples. Samples shall not be collected from hoses or fire hydrants.

3. Bacteriological testing must begin on Mondays to allow Pittsfield Township personnel and the testing laboratory a full work week to conduct the testing.

G. Hydrostatic Pressure Testing

1. The CONTRACTOR shall pressure test sections of water main as sections of 2,000 feet or less unless otherwise authorized by the ENGINEER. When permitted to test lengths in excess of 2,000 feet, only the allowable leakage for 2,000 feet will be permitted.

2. All water mains shall be subjected to a hydrostatic pressure of 150 psi based on the elevation of the lowest point in the system. The main shall be maintained under the test pressure for a minimum continuous period of two (2) hours by pumping potable water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the main. No pipeline installed will be accepted until the leakage measured is less than 0.092 gallons per inch diameter of the pipe per 1 hour per 1,000 feet.

3. In the event that the leakage exceeds the specified amount, the main shall be carefully inspected for leaks and repaired as necessary. Any cracked or defective pipe, fittings, valves or hydrants discovered shall be removed and replaced with sound material and the test repeated to the satisfaction of the ENGINEER.

4. If the CONTRACTOR chooses to pressure test against an existing valve he assumes the responsibility of meeting the leakage requirements. The CONTRACTOR may at his discretion provide a physical break and cutting in sleeve for pressure testing.

5. Temporary connections (jumpers) between existing water mains and the newly constructed system for testing purposes, shall include a reduced zone backflow preventer to prevent backflow and possible contamination of the public water.

H. Material Tests

1. The CONTRACTOR shall have test of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of water main per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturers certificate of compliance to the specifications.

2.00 PRODUCTS

A. All products shall be consistent with the current component part submittal sheet posted on the Township website.

2.01 PIPE AND FITTINGS

A. Ductile-iron pipe water main shall meet all the requirements of the latest revision of ANSI/AWWA C151/A21.51. Pipe shall be furnished in eighteen-foor or twenty-foot lengths, unless otherwise required. All joints, to include joints for fittings, valves and hydrants, must be of the push on joint type and compatible tyton joint gaskets. Ductile iron pipe must be designed in accordance with the latest revision of ANSI/AWWA C150/A21.50 to meet requirements for Pressure Class 350.

B. Ductile iron pipe and fittings shall be double-cement lined with an approved bituminous seal coat in accordance with ANSI/AWWA C104/A21.4.

C. Ductile iron fittings shall meet all the requirements of the latest revision of ANSI/AWWA C110/A21.10 for full body fittings and ANSI/AWWA C153/A21.53 for compact fittings for a minimum working pressure of 250 psi and be of the push-on joint type. Plugs, where shown on the plans, shall be solid mechanical joint plug type.

D. Restrained mechanical joints of the wedge action type shall use a follower gland and shall include a restraining mechanism which, when activated, impart multiple wedging action against the pipe, increasing its resistance as the pressure increases. Twist off nuts shall be used to insure proper actuating of the restraining device. Restrained mechanical joints for ductile iron pipe shall be Megalug, Series 1100, or approved equal. Mechanical joints shall be in conformity with the requirements of the latest revision of the ANSI AWWA C111/A21.11. Bolts and nuts must be type 304 stainless steel.

E. Push-on joints shall meet all requirements of ANSI/AWWA C111/A21,11. Push-on joints shall consist of a ductile-iron bell provided with a recess to receive a circular molder rubber gasket to effect the joint seal. A rubber gasket and sufficient lubricant to assemble the joint shall be furnished with each joint. The lubricant shall have no deleterious effect upon the color, taste or odor of potable water and shall not be corrosive to either the pipe or gasket. Pipe furnished with push-on type joints shall be equal in strength and leak tightness to pipe furnished with mechanical joints as specified when installed under identical conditions, and shall meet all other requirements of these specifications. In addition to the above requirements, the gasket and lubricant shall conform to the latest revision of ANSI/AWWA C111/A21.11. When it is necessary to utilize a locking mechanism for a push-on joint upstream or downstream of a restrained mechanical joint, field-lok gaskets or equal shall be utilized and shall be used in conformance with DIPRA Standards for restraint distance from a restrained mechanical joint fitting.

F. All pipe and fittings shall be manufactured in the United States of America.

G. The ENGINEER shall witness the delivery and unloading of all pipe and collect the appropriate manufacturer's certificate of compliance per Section 1.04 of this Specification.

2.02 VALVES

A. All valves installed under this Specification shall conform to the applicable requirements of ANSI/AWWA C500, C504 and C509 standards governing construction materials and workmanship. Each valve shall carry the name or trademark of the manufacturer. All valves shall have operating nuts that turn to the right (clockwise) to open.

B. Resilient-Seated Gate Valves

1. Resilient seated gate valves shall conform to the applicable requirements of ANSI/AWWA C515. Valves shall have a minimum working pressure of 250 psi. The gate shall be ductile iron encased in a bonded synthetic rubber to form resilient seating surfaces. Stem shall be bronze with a non-rising design and double o-ring packing. Joints shall be push-on type.

2. Resilient Seated Gate Valves shall be manufactured by American Flow Control or Clow.

C. Tapping Sleeves and Valves

1. Tapping sleeves shall be full length of heavy-duty stainless steel construction designed for use with the type of pipe to be tapped. Tapping sleeve flange and body shall be type 304 stainless steel. Bolts and nuts shall be 304 stainless steel. Gasket shall be full circumferential SBR compounded for water service. Tapping sleeve shall contain a test plug to assure seal prior to tapping. Tapping sleeve shall be JCM Industries 432; Romac Industries SST, Ford FAST, Powerseal 3490AS; Dresser 630 or equal.

2. Tapping valves shall meet the specifications for gate valves except that the valve shall have a flange compatible with the tapping sleeve.

3. The tapping sleeves and valves shall be subjected to a hydrostatic pressure of 200 psi. The sleeves and valves shall be maintained under pressure for a minimum continuous period of 5 minutes by pumping potable water into the sleeve. Upon any visual leakage observed by the ENGINEER, the tapping sleeve and valve shall be removed and replaced, and the test repeated at the CONTRACTOR's expense to the satisfaction of the ENGINEER.

D. Corporation Stops

1. Corporation stops used for insertion into mains shall be ball valve type. All stops shall have no lead brass bodies, keys, stem washers and nuts. Inlet threads shall conform to the latest revision of AWWA C800. The outlet connection shall be of the compression type to receive copper service pipe.

E. Valve Boxes

1. Valves boxes shall be 5-1/4-inch and be of cast-iron construction. They shall be of three-piece, screw-type adjustment design. All valve boxes shall be installed flush with the top of the proposed site grade. Cover shall be designed to be removed easily to provide access to the valve. The base shall not rest upon the valve assembly. Valve boxes shall be Tyler 6860 Item DD with number 6 base, or equal.

F. Valve Extensions

1. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem. The length of the extension stem shall reach within 6.5 feet of the ground surface. Details of the extension system and method of installation shall be approved by the ENGINEER prior to installation.

G. Post Indicators and Valves

1. Post indicators, when specified, shall be American Flow Control series A240 or Clow series 2945A with aluminum plates indicating OPEN and SHUT. Post indicators shall open left.

2. Post indicator valves shall be American Flow Control Model 2500 or Clow model F-6120. All valves shall open left.

3. Post indicators and their corresponding valves must be made by the same manufacturer.

4. Bollards must be placed to protect post indicators, except as specified by the ENGINEER.

5. Bollards shall be 4-inch diameter galvanized schedule 40 steel posts 36 to 48 inches high with minimum depth of 24 inches. The posts shall be set in and filled with 3000 psi concrete. Bollards protecting hydrants and PIVs shall be painted red.

2.03 GATEWELLS

A. Gatewells shall conform to the latest revision of ASTM C478 for Precast Reinforced Concrete Manhole Sections. Section joints shall be rubber gasketed and shall conform to ASTM C990. Cone sections shall be eccentric, with an offset step configuration.

B. All gatewell components shall have the name of the manufacturer stenciled on the inside. The lettering shall be a minimum of 4-inches high.

C. Gatewells constructed over an existing water main shall have a doghouse mudded to an 8-inch thick cookie. All other gatewells shall have precast integral base sections.

D. Mortar for masonry or plastering outside of gatewells shall be made of one part of Portland Cement to two parts fine aggregate. Mortar materials and mixing shall correspond, in general, to those for concrete. All openings in gate wells shall be closed with brick and mortar in a manner that will make them watertight.

E. Gatewell steps shall be reinforced polypropylene coated steel. They shall be M.A. Industries models PS1-PF or PS1-B, or approved equal.

2.04 GATEWELL FRAMES AND COVERS

A. Gatewell frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitable notched for convenient removal of the cover.

B. Frames and covers shall be East Jordan Iron Works Model 1040Z frame with 1040 A cover. Each cover shall have the Pittsfield Township logo and the letters "PITTSFIELD TWP WATER" cast integrally into the cover.

C. All frames and covers shall be coated at the place of manufacturer with coal tar pitch varnish or other asphaltum coating approved by the ENGINEER.

2.05 GATEWELL CONNECTIONS

A. Water pipe to gate well connections shall be through a watertight flexible pipe-to-manhole connector, which shall be securely clamped into a core-drilled port. Pipe ports shall be core-drilled at the point of manufacturer and shall be accurately located within 1/2-inch of the proposed water main centerline. Flexible pipe-to-manhole connectors shall meet the requirements of ASTM C923 and shall be NPC, Kor-N-Seal, or equal.

B. All non-rubber components including wedges, bands and pipe clamps shall be stainless steel.

2.06 GATEWELL ADJUSTMENTS

A. All final grade adjustment of gatewell cover and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by Ladtech, Inc., or approved equal. The adjustment rings shall be manufactured from polyethylene plastic meeting the requirements of ASTM D4976. Brick adjustments are not acceptable.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to 1/4-inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet the requirements of ASTM C990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead Trubolt concrete anchors, or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

E. When the depth of the gate well requires an adjustment greater than the maximum allowed, the CONTRACTOR shall provide additional pre-cast gate well barrel sections required to maintain acceptable chimney heights.

2.07 HYDRANTS

A. Fire hydrants shall comply with the latest revision of ANSI/AWWA C502. Hydrants shall be compression type to open with the pressure. They shall have a 5-1/4" valve opening and 6" mechanical joint inlet. Hydrants shall have two 3-1/2" (4.05" O.D.) pumper connections with National Standard 7-1/2 threads per inch. All hydrants shall have City of Ann Arbor standard thread pattern.

B. Fire hydrants shall have an inside barrel dimension of not less than 7.375" I.D. from top to bottom. The 1-1/8" pentagon operating nut shall open left (counter clockwise).

C. All nozzles shall be on a removable head with a flange so that they may be rotated by changing the position of the flange.

D. Hydrant shall be fully bronze mounted, including top of the operating stem where it passes through the double o-ring seal in the bronze packing gland. The forged operating stem in the base and the valve seat shall also be of bronze. The molded valve shall be of composition rubber and the cast iron valve clamps shall be packed with o-ring seals and held tight to the stem by a threaded bronze hex retainer ring and threaded bronze locknut, anchored with set screws.

E. Hydrant shall be designed for 150 psi working pressure and tested to 300 psi. Those portions of the hydrant above grade shall have two coats of red enamel. All unpainted surfaces shall have two coats of coal tar pitch varnish.

F. The hydrants shall be EJIW WaterMaster 5BR-250 with mechanical joint connections and break flange barrel with standard head.

G. Hydrant bolts located below grade shall be type 304 stainless steel

H. All hydrants shall have a 4" Harrington Integral Hydra-Storz (HIHS) adaptor. The HIHS shall meet the requirements of AWWA C502 regarding material and pressure testing. Stortz nozzle shall have a brass metal face and hard anodized ramps and lugs. The aluminum finish shall be hardcoat anodized to Mil-A-8625f, type 3 dark gray. The adapter shall be made from forged or extruded 6061-T6 aluminum.

I. The blind cap shall have hard anodized aluminum Storz ramps and lugs, made of forged or extruded 6061-T6 aluminum. the cap shall be equipped with suction seal. The cap shall be connected to the adapter or the hydrant with 0.125 vinyl coated aircraft cable.

J. Fire hydrant extensions shall be manufactured by the hydrant manufacturer for use with the model hydrant being installed.

K. Hydrants adjacent to truck routes on commercial developments shall be protected by bollards.

2.08 SERVICE LEADS

A. Pipe for service leads 1-inch to 2-inch shall be soft annealed Type K copper. Service leads 4-inch to 8-inch shall be Pressure Class 350 Ductile Iron, Double cement lined.

B. Curb Stops

1. Curb stops used for service connections shall be ball valve type. All parts shall be no lead brass. Both the inlet and outlet connections shall be of the compression type to receive copper service pipe. Curb stops shall be consistent with the most current shop drawing checklist posted on the Township website.

C. Curb Boxes

1. Curb boxes shall be the Bibby Screw Style V010 with S169 top, V201 bottom, V223 extention, and V240 water cover . All curb boxes shall be coated inside and out with a tar base enamel. The minimum bury shall be 5'-0" (60") and the maximum 6' (72"). Curb boxes shall be consistent with the most current shop drawing checklist posted on the Township website.

D. Couplings

1. Couplings used for service connections shall be located outside the pavement and more than 10 feet from any building wherever possible. They shall have a three part union, and both connections shall be of the compression type to receive copper service pipe. All parts shall be no lead brass..

2. All service connections between two copper service pipes (two-inch or less in diameter) located under the pavement or within 10 feet of a building shall be connected using wrought copper, solder-sweat type couplings conforming to ASME B16.18 or ASME B16.22. Fittings shall bear made in USA labels. Joining of copper piping shall be a solder-sweat connection using lead free Silfos. The use of 95-5, Tin-Antimony or equivalent solders will not be allowed.

2.09 TRACER WIRE

A. Tracer wire to be used on open cut pipe shall be AWG #12 single strand copper with blue 30 mil HDPE insulation. Connections shall be made using 3M DBR-6 wire connectors, or equal.

2.10 POLYETHYLENE ENCASEMENT

A. All ductile iron pipe and fittings must be polyethylene encased. In addition, the initial 24-inches of copper service lead must be encased from the corporation stop. Polyethylene encasement must be manufactured in accordance with the requirements of the latest revison of ANSI/AWWA C105/A21.5.

B. Polyethylene Encasement shall be black linear low-density polyethylene with a minimum thickness of 8 mils.

C. The wrap shall overlap the joint by 12 inches to either side and be secured to the pipe with polyethylene adhesive tape.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill shall conform to the Earthwork specification.

3.02 PIPE INSTALLATION

A. The installation of ductile iron water main must conform to the requirements of ANSI/AWWA C600.

B. Any pipe damaged in transport or handling shall be rejected and removed from the site of the work.

C. Before lowering in the trench, and while suspended, each pipe and fitting shall be inspected for defects. Defective, damaged or unsound pipe shall immediately be removed from the construction site. The interior of each pipe shall be inspected for cleanness and cleared of all dirt and foreign matter before being lowered into the trench.

D. In handling and placing ductile iron pipe and fittings, no metal shall be used in contact with the inside of the pipe to fit or support the pipe. The pipe shall be moved only through the use of belt slings or automatic release type pipe tongs. Care shall be taken not to injure the pipe or pipe coating, and no damaged or imperfect pipe shall be used in the work except that minor damage to pipe coating may be repaired subject to the review of the ENGINEER.

E. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe; the pipe shoved into position and brought to a true alignment. It will then be secured with sand backfill tamped under and on each side of the pipe, except at bell holes. No earth or other foreign matter shall be allowed to enter the joint space.

F. All excavation and backfill above the pipe shall conform to specifications under Earthwork and as shown on the Drawings.

G. A minimum of 18-inches vertical clearance shall be provided between the water main and any existing underground facility, unless otherwise approved by the ENGINEER. Whenever a main is installed under any existing utility line such as gas, buried electric power, telephone line, sewer or water, provisions shall be made to properly support or distribute any concentrated load to avoid settlement and possible failure of either main. Such provisions shall consist of concrete bedding of the main, complete concrete encasement, or some other method as shown on the plans. Water mains passing under sewers, in addition, shall be protected by providing:

1. A vertical separation of at least 18-inches between the bottom of the sewer and the top of the water main.

2. Adequate structural support for the sewer to prevent excessive deflection of joints and settlement of the sewer about the water main; i.e., a concrete saddle under the pipe with a span length extending to undistributed earth bearing.

H. Water mains shall be installed at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge.

I. In assembly of push-on or shove type joints, the bell socket recess and the gasket shall be wiped clean and the gasket placed properly in position. A thin film of lubricant shall then be applied to the surface of the gasket to come into contact with the entering pipe. The plain end of the entering pipe shall be cleaned and then entered and forced home to the base of the socket.

J. Where necessary to cut pipe, cutting shall be done with approved tools and cut ends of pipe shall be square and regular. Cutting shall be done in a manner to avoid damage to lining and coating. Minor damage may be repaired subject to review of the ENGINEER.

K. To prevent trench water from entering the pipe, joints, which for any reason may not be completed as the pipe is laid, shall be thoroughly packed with approved material, in a manner to make them watertight. Open ends of fittings shall be tightly closed with approved plugs and well packed, as shall the end of the last pipe laid whenever work is not in progress.

L. Each pipe shall be laid accurately to the line and grade shown on the Plans. Wherever deflections at joints are required by changes in grade or alignment or to plumb valve stems, the deflection at any bell and spigot joint shall not exceed that which will cause the spigot end of pipe to be away from home in the bell of the adjacent pipe a distance of 1/4 inch at the point of greatest opening.

M. The deflection at any mechanical joint shall not exceed three-quarters of the maximum deflection recommended by the manufacturer or 3 degrees, whichever is more conservative of the joint used.

N. The CONTRACTOR shall not be entitled to any additional compensation because depth is more than specified at certain locations or due to clearances at manholes, or due to unforeseen obstacles, or occasioned in order to avoid undue changes in grade.

O. Pipe shall be laid at depths to provide minimum cover of 5' - 6" over the top of the pipe unless otherwise noted on the Drawings or elsewhere in these specifications.

3.03 GATE VALVES AND WELLS

A. All pre-cast section joints and lift holes shall be pointed and plugged, inside and outside, with mortar.

B. Gate valves shall be of the size and installed at the location as shown on the plans. They shall be set square with the line of the main, and unless otherwise directed by the Township ENGINEER, all gate valves shall be set with stems plumb. At each side of gate valve, the CONTRACTOR shall furnish and install a 1-inch corporation stop on the main as shown on the Standard Details.

C. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem.

3.04 HYDRANTS

A. Fire hydrants shall be constructed in accordance with the details shown on the plans, Finish grade level to center of nozzle caps shall measure between 24 and 30 inches. A maximum of one hydrant barrel extension and one operating stem extension may be used to accommodate changes in grade. Under no conditions shall extended hydrant have more than one coupling in the operating stem. Pumper connections shall point toward the street.

B. Fire hydrants shall be installed with barrel vertical and properly based. Concrete thrust blocks shall be placed behind the hydrant, tee, and every bend. Care should be taken to insure the drain holes on the hydrant are not plugged by the thrust blocks. Hydrant shall be set in 1 yard of coarse gravel for drainage purposes. If ground water is encountered, the drain hole shall be plugged as directed by the manufacturer. The backfill shall be sand thoroughly tamped around the hydrant and valve box in 1 ft layers.

C. Fire hydrant and gate valve shall be set apart 24 inches. Gate valves and valve box shall be as specified under the valve paragraphs of this section.

D. Hydrant leads shall have a minimum of 5.5 feet of cover in all areas, including crossings through ditch sections.

E. Hydrants shall be carefully plumbed, braced and backfilled so they remain plumb.

F. All grade, facing, and vertical alignment adjustment of hydrants shall be completed prior to pressure testing and charging of the hydrants.

G. All hydrants shall be cleaned and painted with a rust inhibitive, oil base paint such as "rustoleum" or approved equal to the Township's color code prior to acceptance.

H. The lubricant reservoirs in all hydrants having such construction shall be filled with a lubricant acceptable to the Michigan Department of Environmental Quality and recommended by the hydrant manufacturer.

I. Backfilling around fire hydrants shall be carefully tamped sand in 12-inch layers from the centerline of the lead main to a height of 1-foot below finished grade.

J. CONTRACTOR shall place burlap sack or equivalent material over the hydrant nozzles after installation.

K. Fire hydrant nozzles shall be aligned as required by the Township Fire Marshal.

L. Fire hydrant extensions shall be provided as necessary so that the safety flange is located at or above surface grade.

3.05 TRACER WIRE

A. Tracer wire shall be installed along the top of all water mains. For directional drilling, the tracer wire shall be installed at the same time as the pipe. For open cut construction, the tracer wire shall be installed at a height of not more than 6 inches above the main line pipe or service leads. Wire shall be extended to all hydrants, blow-offs, dead ends, service leads and post indicator valves. Tracer wire shall be brought to grade, leaving enough excess material to avoid loss or damage to the wire during construction and subsequent activities. Wire shall be trimmed to finish grade following completion of the landscaping.

B. When tracer wire is to be run along short offsets (less than 20 feet), a loop of wire shall be utilized to loop to the end of the offset, bring the loop to grade and terminate it in an approved manner. For service leads and offsets of more than 20 feet in length, or installed by directional drilling method, a splice may be utilized to make the connection at the main. The tracer wire shall then be installed and terminated in an approved manner.

C. Tracer wire terminations shall be made by one of the following methods:

1. Tracer wire shall be terminated at hydrants by tying off the wire at the head flange, leaving excess material for future trimming following landscape activities.

2. Terminations at valve/curb boxes, post indicators, valves and blow-offs shall be made with 2 wraps of wire at grade around the box or pipe, leaving excess material for future trimming following landscaping.

3. Gatewell terminations shall be made by running the tracer wire through the pipe opening in the wall, down to and across the floor to the steps, up the wall and secure to the top step leaving the stub accessible at the casting. Wire shall be run through the gatewell such that it does not create a hazard.

4. Terminations at existing water mains without tracer wire shall be made at the nearest hydrant or gate well as outlined above. If no hydrant or gatewell is available, an upper section of valve box shall be installed with the tracer wire stubbed up inside

D. When connections are made to existing water mains which do not have tracer wire, the following method most applicable to field conditions shall be used.

1. When connection is made at/near a valve or hydrant, the connection shall be made in the same manner as the termination at said structures in Item C(2) above.

2. When connection takes place in a gatewell, the same procedure shall be used as in termination at a gatewell (see Item C(3) above).

3. If no valve or hydrant is available, the upper section only of a valve box shall be set with the tracer wire stubbed up inside.

3.06 POLYETHYLENE ENCASEMENT

A. The polyethylene encasement must be installed in accordance with the specifications and requirements of ANSI/AWWA C105/A21.5. For open cut applications a single wrap is required, and for directional drill applications a double wrap is required.

B. The polyethylene encasement must be taped and overlapped at pipe joints and must be taped in a spiral configuration along the length of the pipe.

3.07 CONNECTION TO EXISTING MAINS

A. All connections to existing water mains shall be made at the locations as shown on the plans.

B. All valves shall be operated by the Pittsfield Township Utilities Department.

C. Prior to beginning construction of the final connections, the CONTRACTOR shall provide sequence of all final connections to the existing system and coordinate a meeting between the ENGINEER, OWNER and CONTRACTOR in the field to review the procedure.

D. When making a dry connection to an existing main, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be pumped out or removed by other means so the connection may be made in the dry. After the connection has been acceptably made, the portion of the new line to the nearest valve shall be satisfactorily tested and disinfected, along with the drained portion of the existing water main, before the isolated existing main is placed back in service, except as the ENGINEER may otherwise direct. In as much as residents served by this isolated main will be temporarily out of water during this period, the work shall be executed as rapidly as possible, and the time of, and the procedure in, making such connections shall be subject to the review of the ENGINEER. Such work may be required to be done at night in order to minimize inconvenience of water users. The CONTRACTOR shall not be entitled to any additional compensation because of night work or other special requirements in work under this section.

E. The CONTRACTOR shall make particular effort, prior to bidding, to ascertain whether or not valves in the existing mains to be connected to the new mains are so located as to provide isolation. If valves are not found to be adequate, then the CONTRACTOR shall utilize other means to make the connections with a minimum of interruption to service.

F. When making a wet tap connection to an existing main, a tapping sleeve designed for the type of pipe being tapped shall be utilized and the tap shall be made in accordance with the manufacturer of the tapping equipment.

G. Wherever adapters are required to properly connect the pipe with existing pipe or other material or manufacturer, the nominal I.D. of adapters shall be the same size as the nominal diameter of pipe connected thereto. Adapters shall also be furnished and used as required by the manufacturer for connection to fittings.

3.08 BEDDING

A. Ductile iron pipes shall be fully enclosed in polywrap and laid on a compacted sand cushion, 4 inches thick. Sand shall conform to fine aggregate 2NS as defined in 2003 MDOT, Section 902.

B. 2NS sand bedding material shall be placed around and above the main to a height of 12 inches above the main.

C. Sand shall be compacted on top of the 12-inches of sand above the pipe to not less than 95 percent of the maximum unit density as determined at optimum moisture content.

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SPEC. UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	11.04.27
SPEC. UPDATES	BWA	DRW	10.10.25
SPEC. UPDATES	TTN	DRW	10.01.19
Revision	By	Appd.	YY.MM.DD
Issued	By	Appd.	YY.MM.DD
File Name: W-02	BWA	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
WATER MAIN SPECIFICATIONS

Project No.
2075001300

Scale

Revision
20

FINAL SITE PLAN	2/5/18
PERMITS/ENGINEERING	1/31/18
BIDS	1/12/18
FINAL REVIEW	1/5/18
PRELIMINARY SITE PLAN	12/13/17
50% CD SET	12/8/17
DESIGN DEVELOPMENT	11/03/17

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PROJECT

CONSULTANT

DEMOLITION SITE PLAN

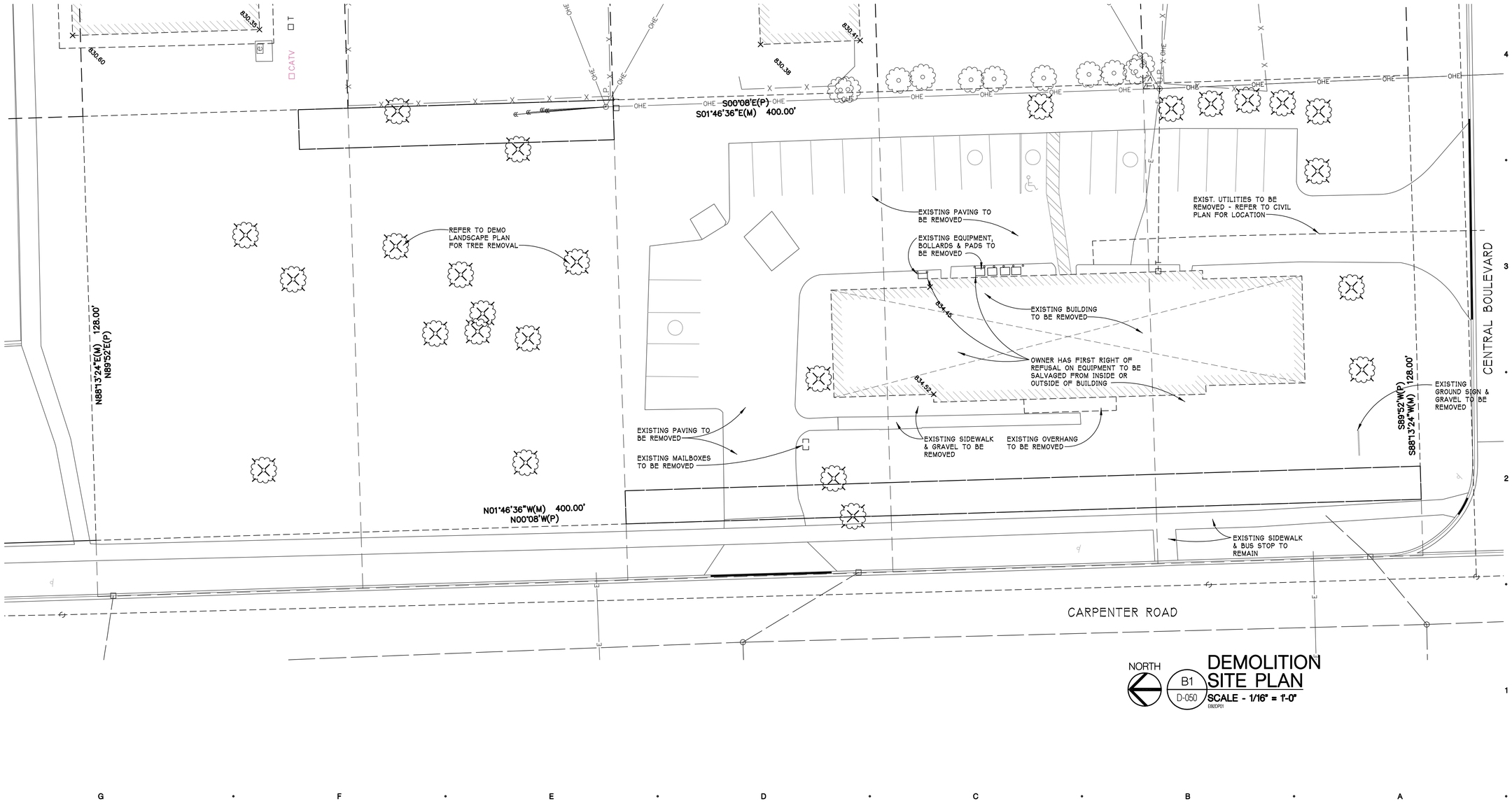
SHEET TITLE

17-201

PROJECT NUMBER

D-050

SHEET NUMBER



NORTH

B1 / D-050 E802P01

DEMOLITION SITE PLAN

SCALE - 1/16" = 1'-0"

Drawing: P:\2017\1720\IDwgs\CDArch\e5HD050.dwg
Date: Feb 07, 2018, 9:54am Layout: D-050 Plotted by: ccorbett

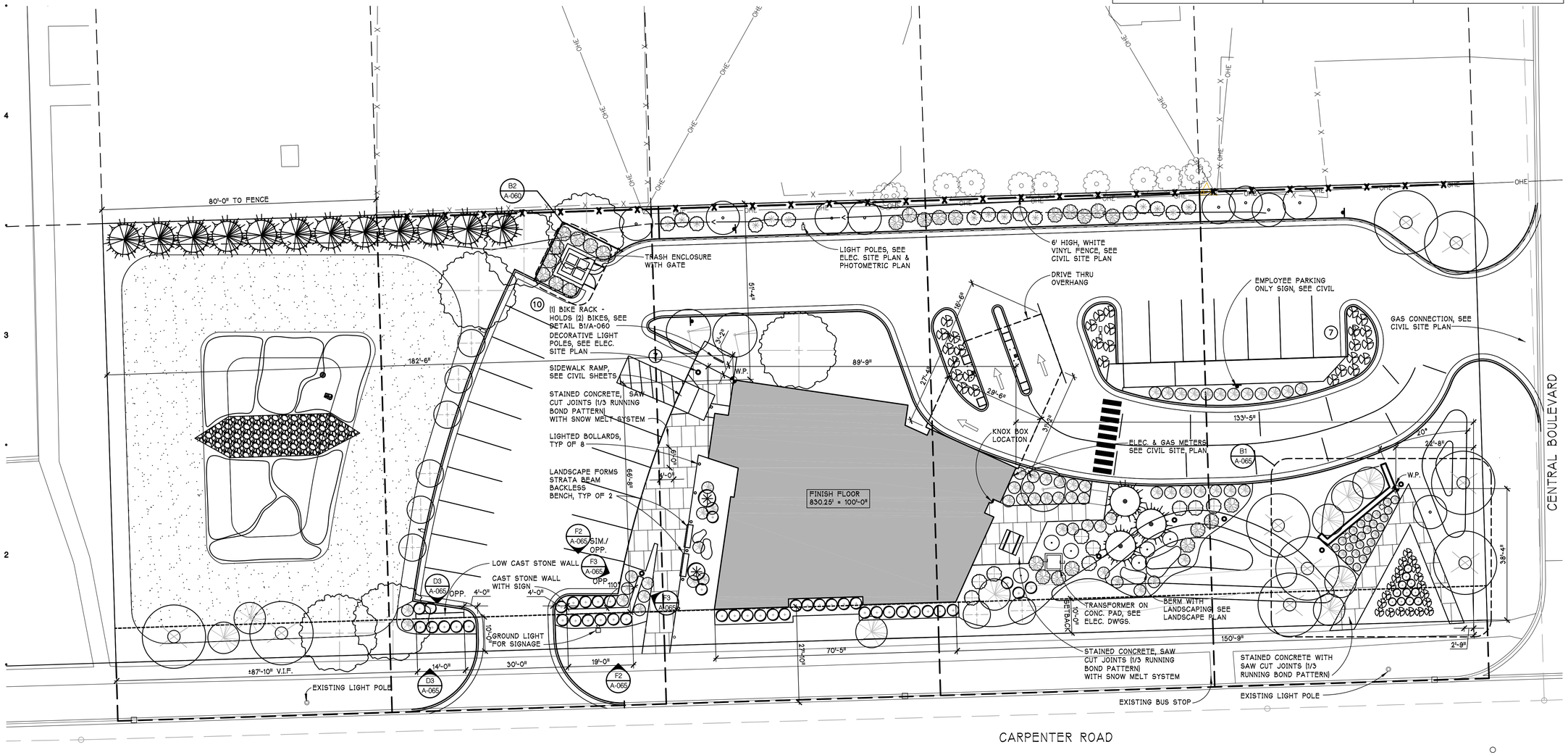
Branch Hours:
Monday - Thursday 9:00am-5:30pm
Friday 9:00am-6:00pm
Saturday 9:00am-2:00pm

Drive Thru Hours:
Monday - Friday 8:30am-6:00pm
Saturday 9:00am-2:00pm

ATM Hours:
24 Hour/7 days per week

ZONING CHART

ZONING CLASSIFICATIONS	FB FORM BASED MIXED USE - BUILDING FORM A	
LOT AREA (GROSS & NET)	1.18 ACRES / 51,200 SF GROSS AREA 1.09 ACRES / 47,660 SF NET AREA	
LOT COVERAGE	BUILDING FOOTPRINT / LOT AREA (INCLUDES CANOPY OVERHANG)	5,474 SF / 51,200 SF = 10.7% GROSS 5,474 SF / 47,660 SF = 11.5% NET
FLOOR AREA (FAR) AND/OR # OF DWELLING UNITS	GROSS BUILDING FLOOR AREA / NET PROPERTY AREA = FAR	4,400 SF / 51,200 SF = 8.6% GROSS 4,400 SF / 47,660 SF = 9.2% NET
SETBACKS - FRONT, SIDE AND REAR	10'-0" REQUIRED FRONT, 10' MIN. REAR YARD & 5' MIN. SIDE YARDS IF PROVIDED	
HEIGHT/STORIES	26'-0" / (1) STORY PROPOSED	14-0" MINIMUM / (1) STORY MIN. 38'-0" MAXIMUM / (3) STORIES MAX.
OFF-STREET PARKING, INCLUDING ACCESSIBLE AND BARRIER FREE	22 PARKING SPACES + (2) NON DRIVE UP ATM SPACES + (1) BARRIER FREE VAN SPACE = 25 SPACES PROPOSED	22 PARKING SPACES + (2) NON DRIVE UP ATM SPACES + (1) BARRIER FREE VAN SPACE = 25 SPACES REQUIRED
BICYCLE PARKING	2 PROPOSED (2 REQUIRED)	
LIGHTING HOURS	SEE PHOTOMETRIC PLAN FOR LIGHTING CONTROLS	



NORTH

B1 A-050 **ARCHITECTURAL SITE PLAN**
SCALE - 1/16" = 1'-0"

Drawing: P:\20\17\1720\1\Dwgs\CD\Arch\e5HA050.dwg
Date: Feb 07, 2018, 9:22am Layout: A-050-SITE PLAN Plotted by: ccorbett

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN #2	1/23/18
PRELIMINARY SITE PLAN	12/15/17
SITE PLAN REVIEW	12/1/17
DESIGN DEVELOPMENT	11/03/17
CONDITIONAL USE	10/26/17

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PROJECT

CONSULTANT

ARCHITECTURAL SITE PLAN

SHEET TITLE

17-201

PROJECT NUMBER

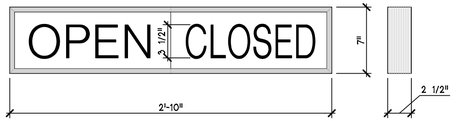
A-050

SHEET NUMBER

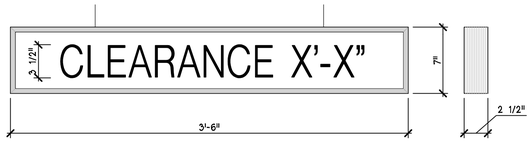
GENERAL SIGNAGE NOTES

1. DIRECT-VIEW LED
2. SINGLE FACE SIGN
3. SLIM LINE CONTINUOUS, CORROSION RESISTANT, ALUMINUM HOUSING
4. SIGNAGE SHALL BE BY OWNER UNDER SEPARATE CONTRACT. SIGNAGE IS SHOWN FOR REFERENCE ONLY.

G4 A-060 A-200 **DRIVE-THRU SIGN**
SCALE - 1 1/2" = 1/=0"
E08AD05



E4 A-060 A-200 **DRIVE-THRU SIGN**
SCALE - 1 1/2" = 1/=0"
E08AD05



D4 A-060 A-200 **DRIVE-THRU SIGN**
SCALE - 1 1/2" = 1/=0"
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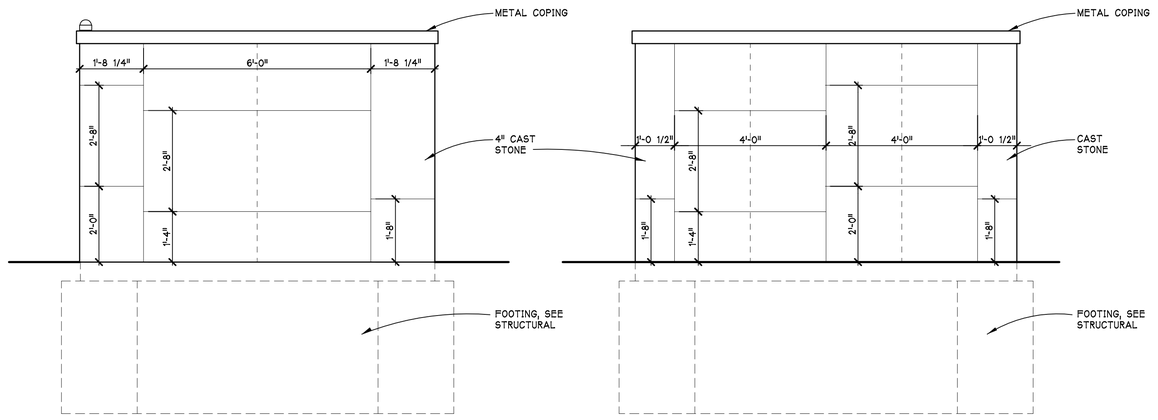
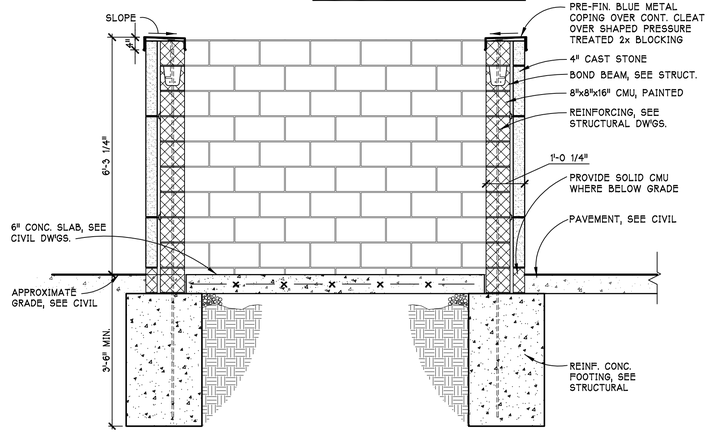
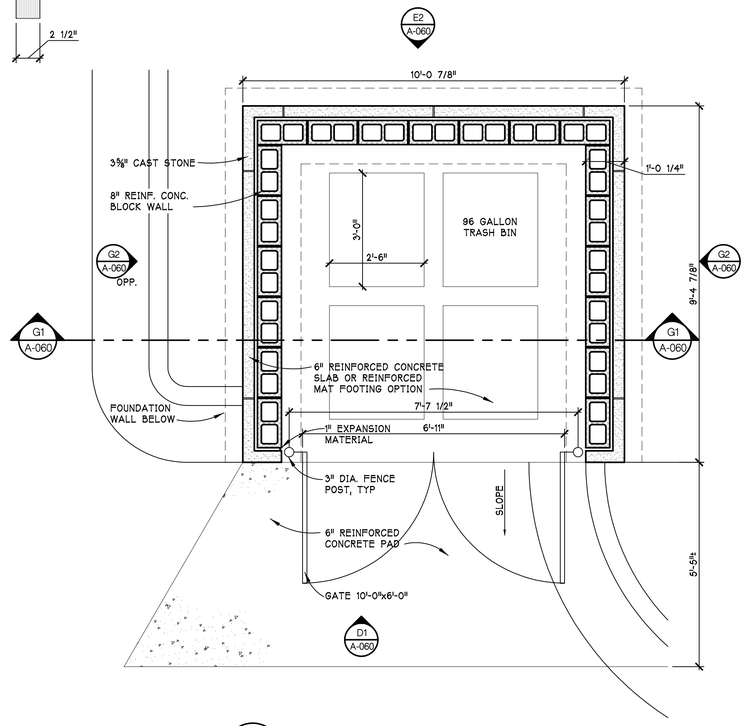


G2 A-060 A-060 **ELEVATION**
SCALE - 1/2" = 1'-0"
E24AD01

NOTE:
1. STEP CAST STONE LEDGE USING SOLID CMU SO THAT THE CAST STONE IN NEVER MORE THAN +/-2" BELOW GRADE.
2. NO EXPOSED FOUNDATION AFTER LANDSCAPE IS COMPLETE

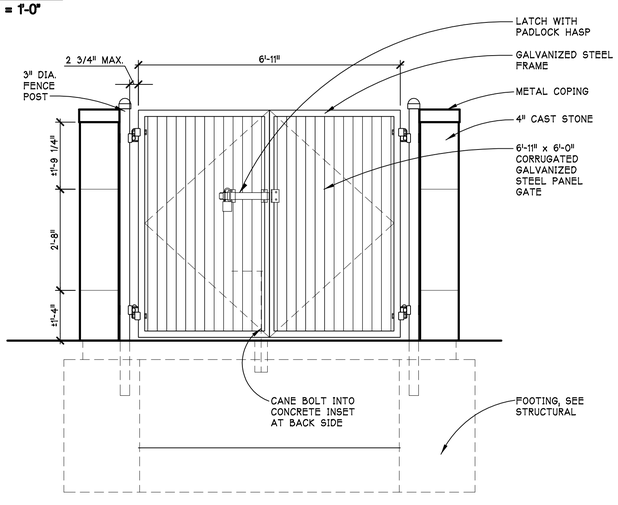


G1 A-060 A-060 **SECTION**
SCALE - 1/2" = 1'-0"
E24AD01

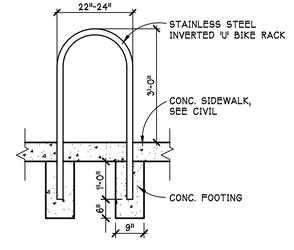


B2 A-060 A-050 **TRASH ENCLOSURE PLAN**
SCALE - 1/2" = 1'-0"
E24AD01

E2 A-060 A-060 **ELEVATION**
SCALE - 1/2" = 1'-0"
E24AD01



D1 A-060 A-060 **ELEVATION**
SCALE - 1/2" = 1'-0"
E24AD01



B1 A-060 A-050 **BIKE RACK**
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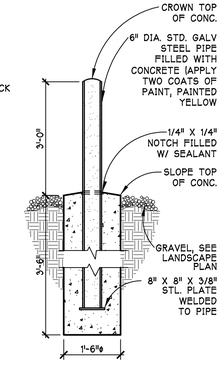
E24AD01



A1 A-060 A-106 **PIPE BOLLARD**
SCALE - 1/2" = 1'-0"
E24AD01

FINAL SITE PLAN	2/5/18
PERMITS/ENGINEERING	1/31/18
BIDS	1/12/18
FINAL REVIEW	1/5/18
PRELIMINARY SITE PLAN	12/13/17
50% CD SET	12/8/17
SITE PLAN REVIEW	12/1/17

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PROJECT

CONSULTANT

SITE ELEVATIONS, ENLARGED PLAN & DETAILS

SHEET TITLE

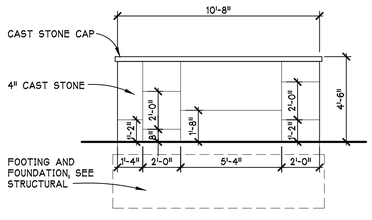
17-201

PROJECT NUMBER

A-060

SHEET NUMBER

Drawing: P:\2017\17201\Dwgs\CDArch\e5HA060.dwg
Date: Feb 07, 2018, 9:22am Layout: A-060 Plotted by: ccorbett



F3 ELEVATION
A-065 A-065 E48AE03
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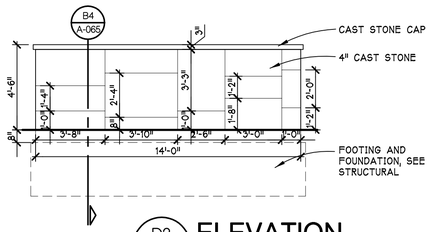

D3 ELEVATION
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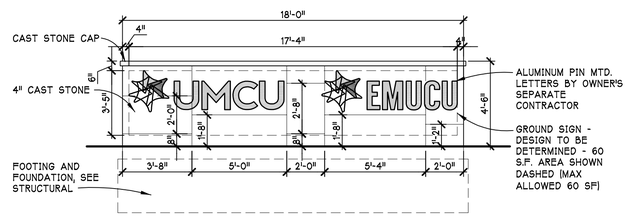

F2 ELEVATION
A-065 A-065 E48AE03
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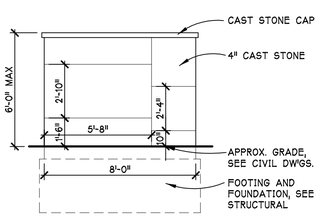

D2 ELEVATION
A-065 A-065 E48AE03
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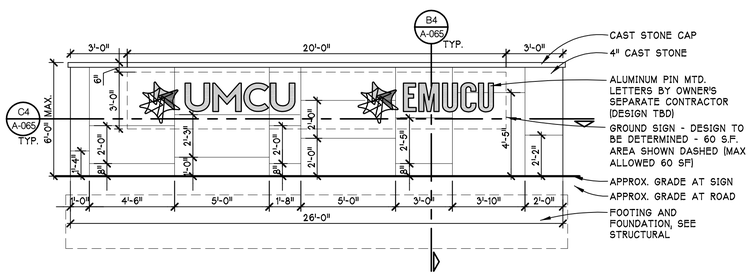
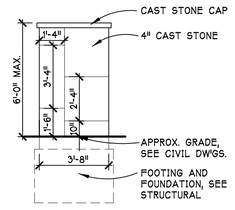
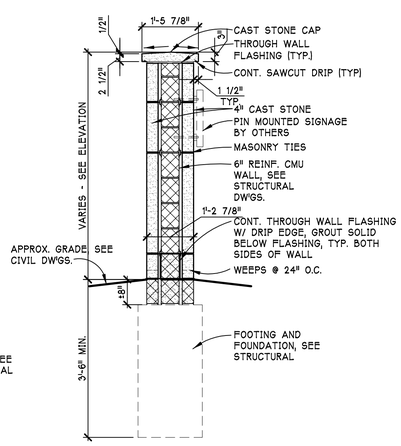


F1 ELEVATION
A-065 A-065 E48AE03
SCALE - 1/2" = 1'-0"

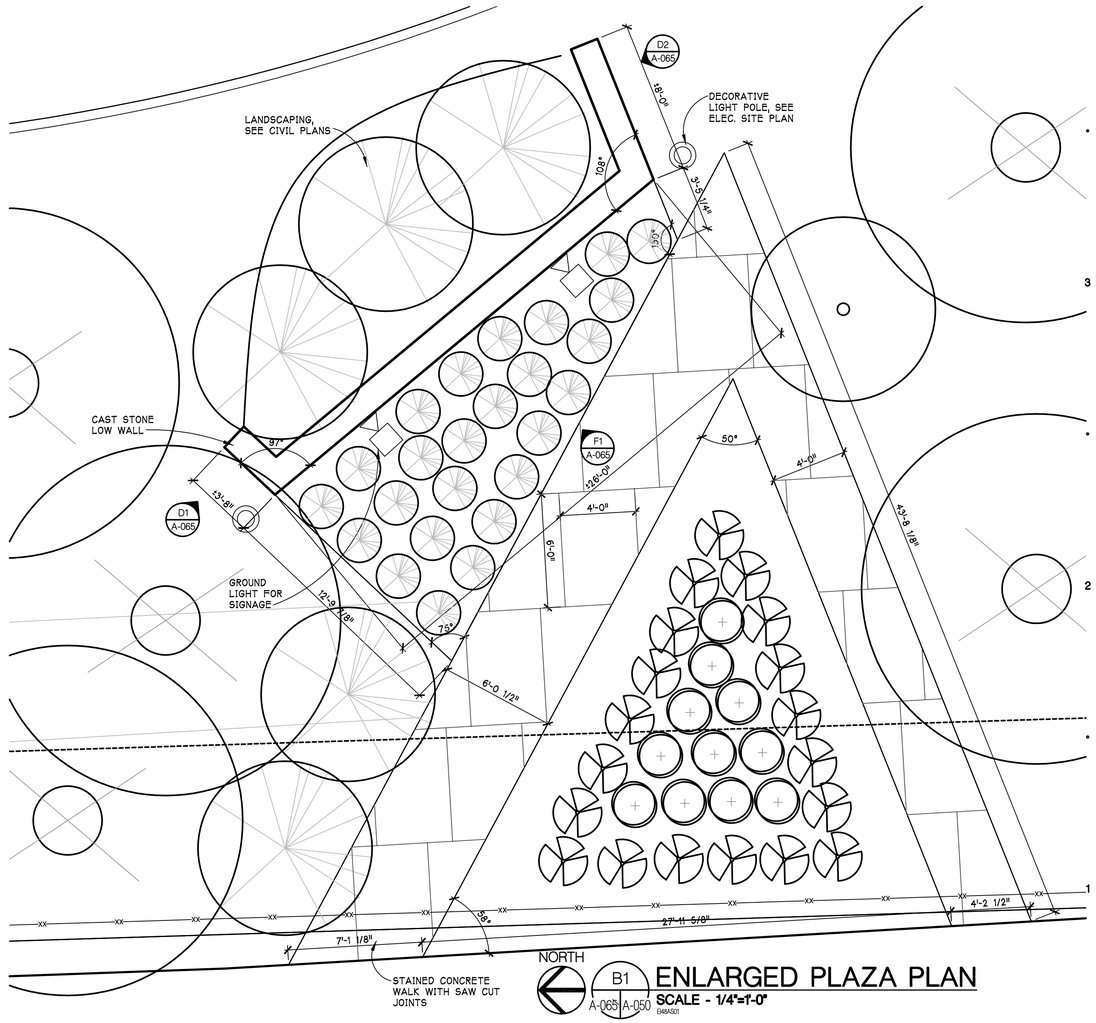


D1 ELEVATION
A-065 A-065 E48AE03
SCALE - 1/2" = 1'-0"



C4 MONUMENT SIGN PLAN VIEW
A-065 A-065 E48AD02
SCALE - 1/2" = 1'-0"

B4 SECTION
A-065 A-065 E48AD02
SCALE - 1/2" = 1'-0"



B1 ENLARGED PLAZA PLAN
A-065 A-050 E48AS01
SCALE - 1/4"=1'-0"

Sheet Size - 34x22

FINAL SITE PLAN	2/5/18
PERMITS/ENGINEERING	1/31/18
BIDS	1/12/18
FINAL REVIEW	1/5/18
PRELIMINARY SITE PLAN	12/13/17
50% CD SET	12/8/17
SITE PLAN REVIEW	12/1/17

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PROJECT

CONSULTANT

SITE ELEVATIONS, ENLARGED PLAN & DETAILS

SHEET TITLE

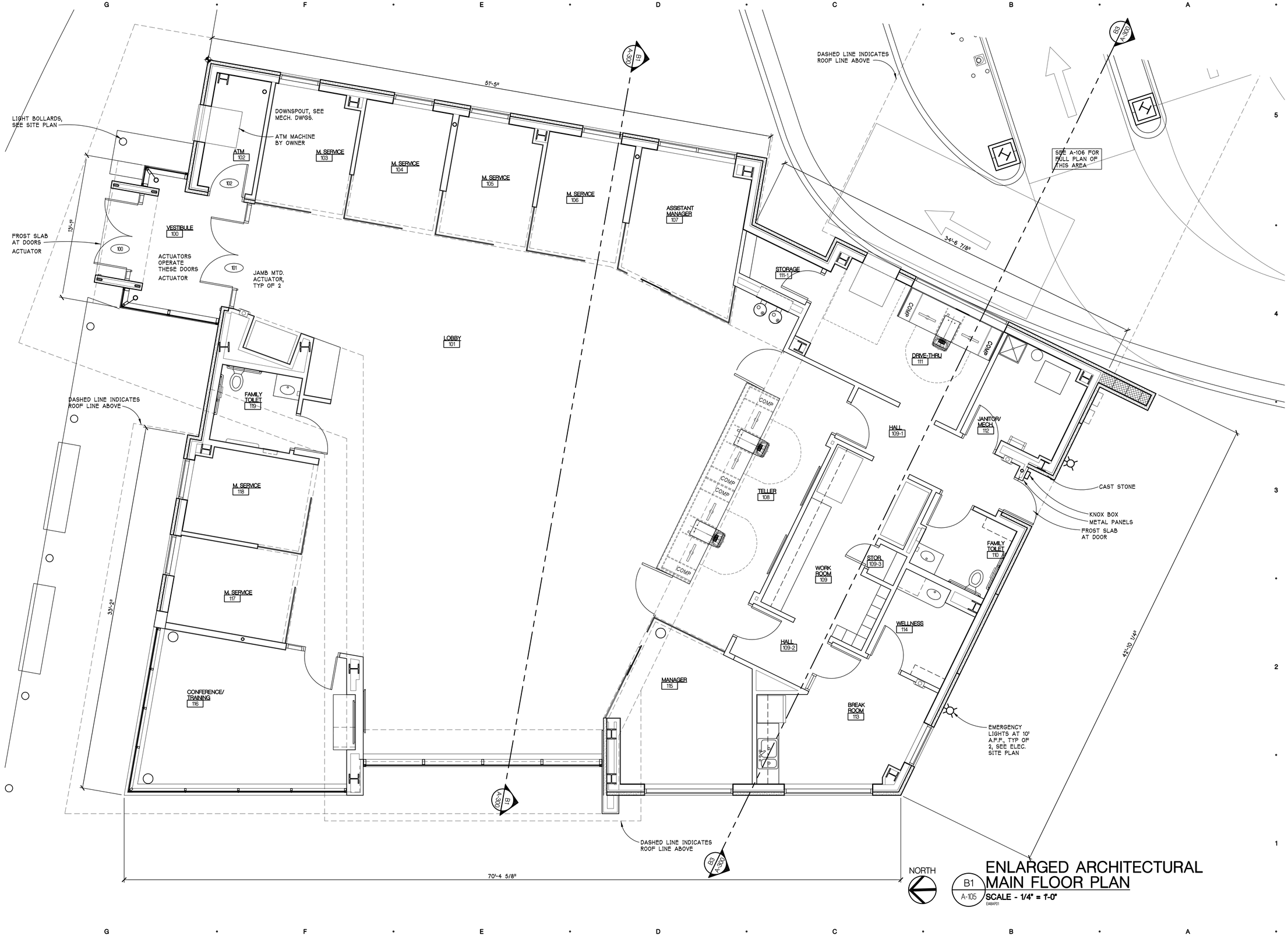
17-201

PROJECT NUMBER

A-065

SHEET NUMBER

Drawing: P:\2017\17201\Dwgs\CDA\cthe5HA065.dwg
Date: Feb 07, 2018, 9:21 am Layout: A-065 Plotted by: ccorbett



ENLARGED ARCHITECTURAL MAIN FLOOR PLAN

B1 / A-105 — SCALE - 1/4" = 1'-0"

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN	12/13/17
SITE PLAN REVIEW	12/1/17

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ENLARGED FLOOR PLAN

SHEET TITLE

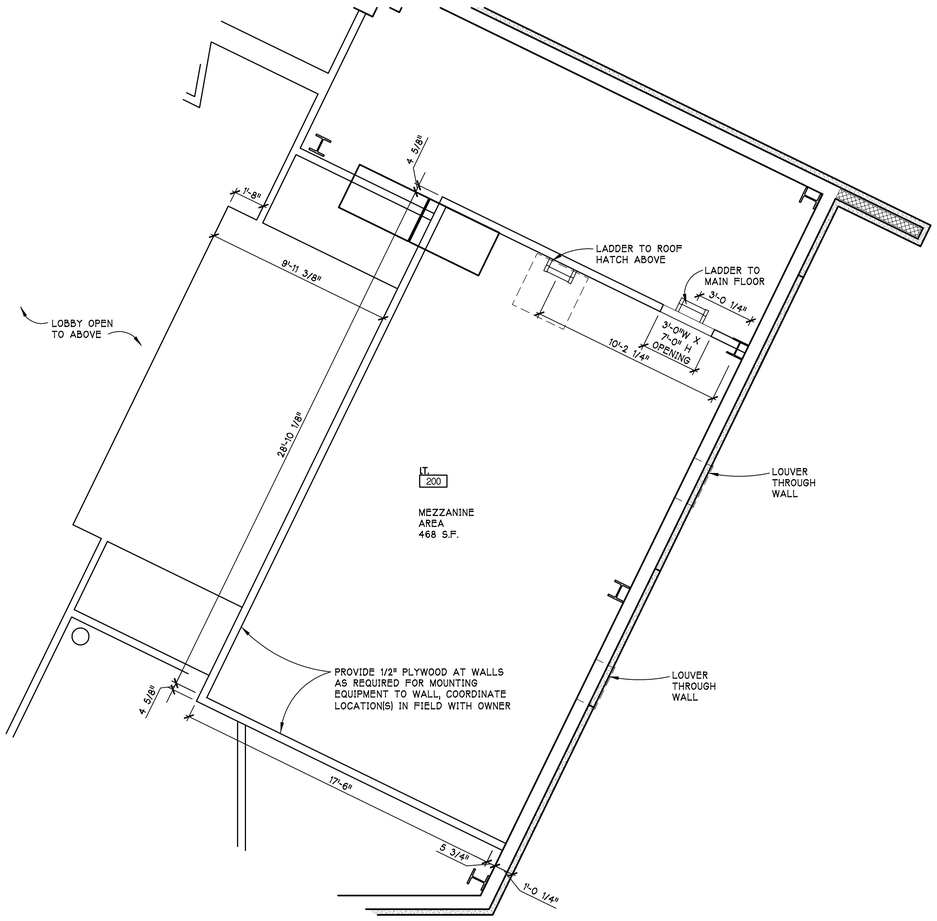
17-201

PROJECT NUMBER

A-105

SHEET NUMBER

Drawing: P:\20 | 7\ | 7201 \Dwgs\CD\Archi\ch5HA105.dwg
Date: Feb 07, 2018, 9:20am Layout: A-105-SITE PLAN Plotted by: ccorbett



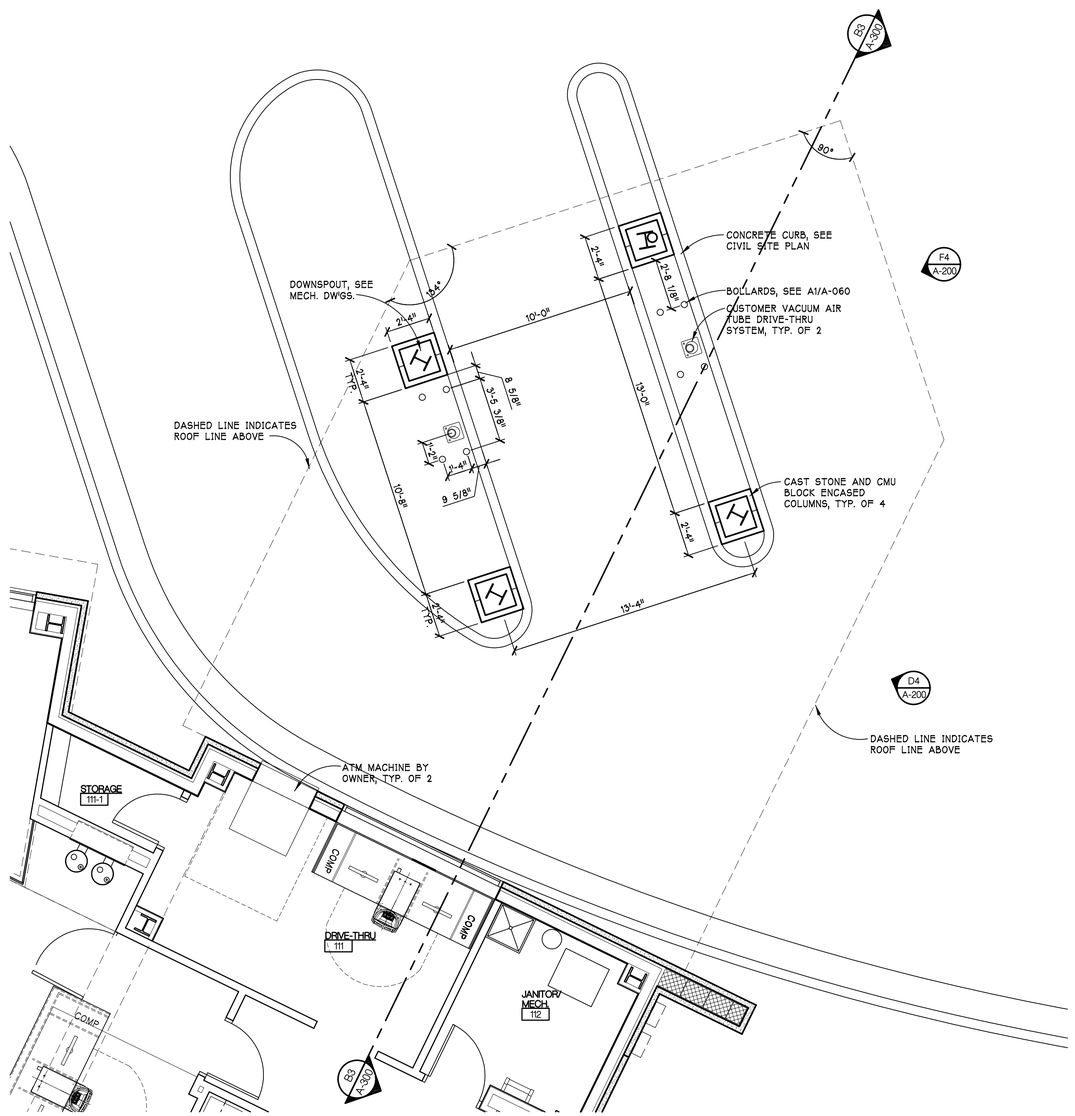
NORTH

F1 / A-106

ENLARGED ARCHITECTURAL MEZZANINE FLOOR PLAN

SCALE - 1/4" = 1'-0"

E48AP02



NORTH

B1 / A-106

ENLARGED ARCHITECTURAL MAIN FLOOR PLAN @ CANOPY

SCALE - 1/4" = 1'-0"

E48AP01

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN	12/13/17
SITE PLAN REVIEW	12/1/17

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ENLARGED FLOOR PLANS

SHEET TITLE

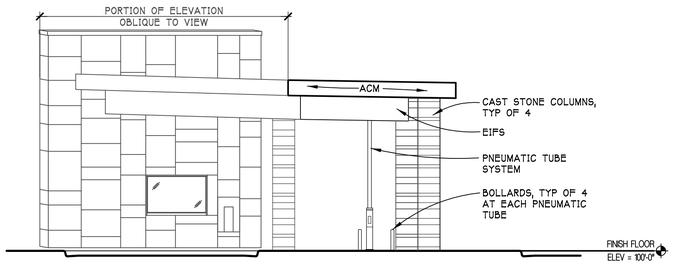
17-201

PROJECT NUMBER

A-106

SHEET NUMBER

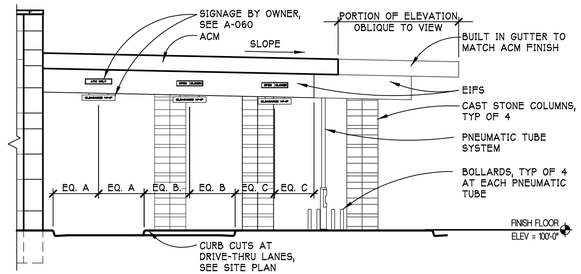
Drawing: P:\2017\17201\Dwgs\CDArch\e01A106.dwg
Date: Feb 07, 2018, 9:25am Layout: A-106-SITE PLAN Plotted by: cconbett



F4 / A-200 PARTIAL SOUTHEAST EXTERIOR ELEVATION @ DRIVE THRU

SCALE - 1/8" = 1'-0"

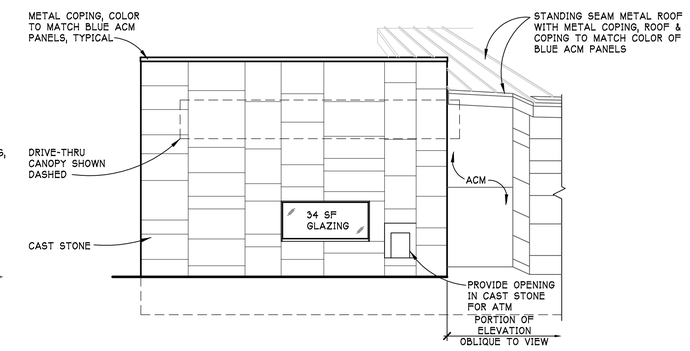
E96AE01



D4 / A-200 PARTIAL SOUTH EXTERIOR ELEVATION @ DRIVE THRU

SCALE - 1/8" = 1'-0"

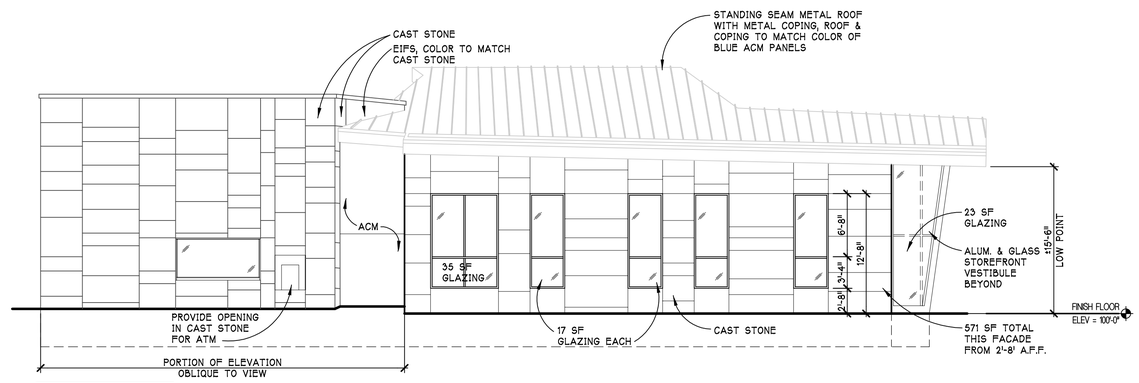
E96AE01



B4 / A-200 PARTIAL EAST EXTERIOR ELEVATION

SCALE - 1/8" = 1'-0"

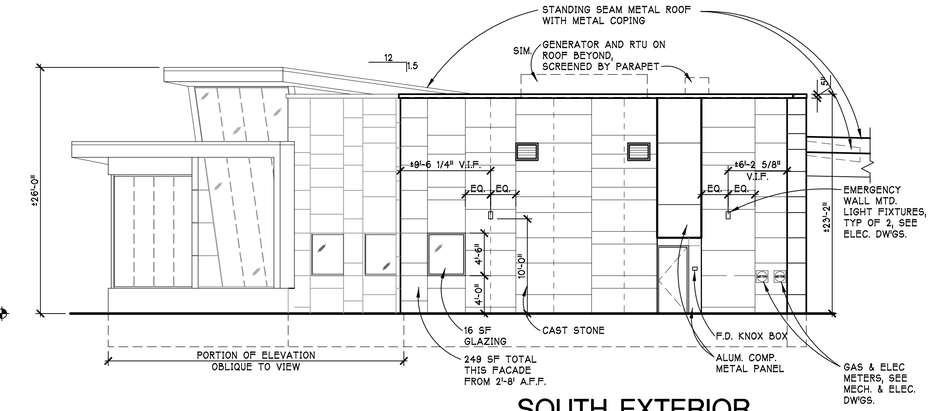
E96AE01



F3 / A-200 EAST EXTERIOR ELEVATION

SCALE - 1/8" = 1'-0"

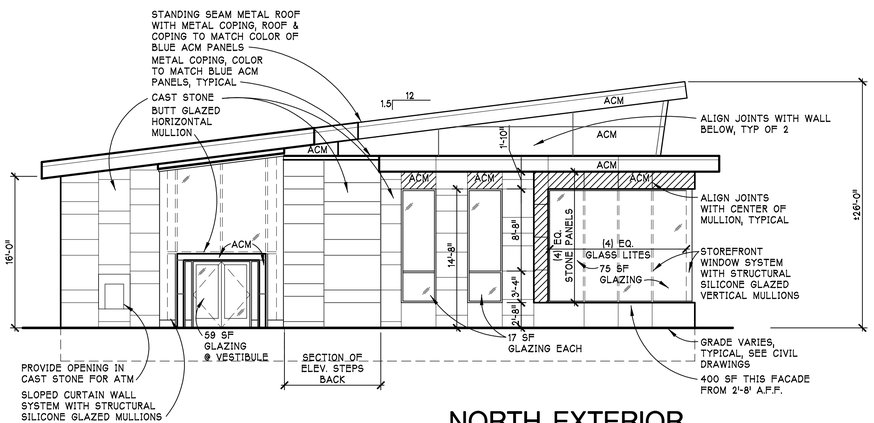
E96AE01



B3 / A-200 SOUTH EXTERIOR ELEVATION

SCALE - 1/8" = 1'-0"

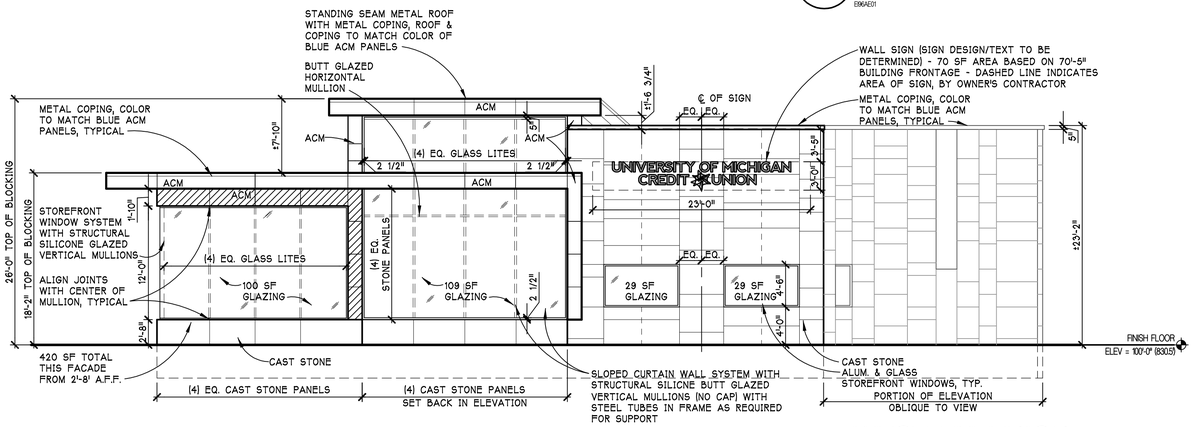
E96AE01



F1 / A-200 NORTH EXTERIOR ELEVATION

SCALE - 1/8" = 1'-0"

E96AE01



B1 / A-200 WEST EXTERIOR ELEVATION

SCALE - 1/8" = 1'-0"

E96AE01

TRANSPARANCY REQUIREMENTS PER SECTION 5.03.G.5.iii.A		
FACADE	REQUIRED	PROVIDED
NORTH (SIDE YARD)	30%	42%
WEST (RIGHT OF WAY)	50%	63.6%
SOUTH (RIGHT OF WAY)	50%	6.5%
EAST (REAR YARD)	0%	28%

GENERAL NOTES:

1. CAST STONE TO BE MAXIMUM +/-2" BELOW GRADE.
2. NO EXPOSED FOUNDATION AFTER LANDSCAPE IS COMPLETE.
3. ALL STOREFRONT AND CURTAINWALL TO BE CLEAR ANODIZED FINISH.

LEGEND:

DENOTES CLEAR ANODIZED ALUMINUM COMPOSITE METAL PANELS (ACM). ALL OTHER ACM TO BE BLUE

FINAL SITE PLAN	2/5/18
FINAL REVIEW	1/5/18
PRELIMINARY SITE PLAN	12/13/17
SITE PLAN REVIEW	12/01/17
CONDITIONAL USE	10/26/17

DATE ISSUED

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PROJECT

CONSULTANT

EXTERIOR ELEVATIONS

SHEET TITLE

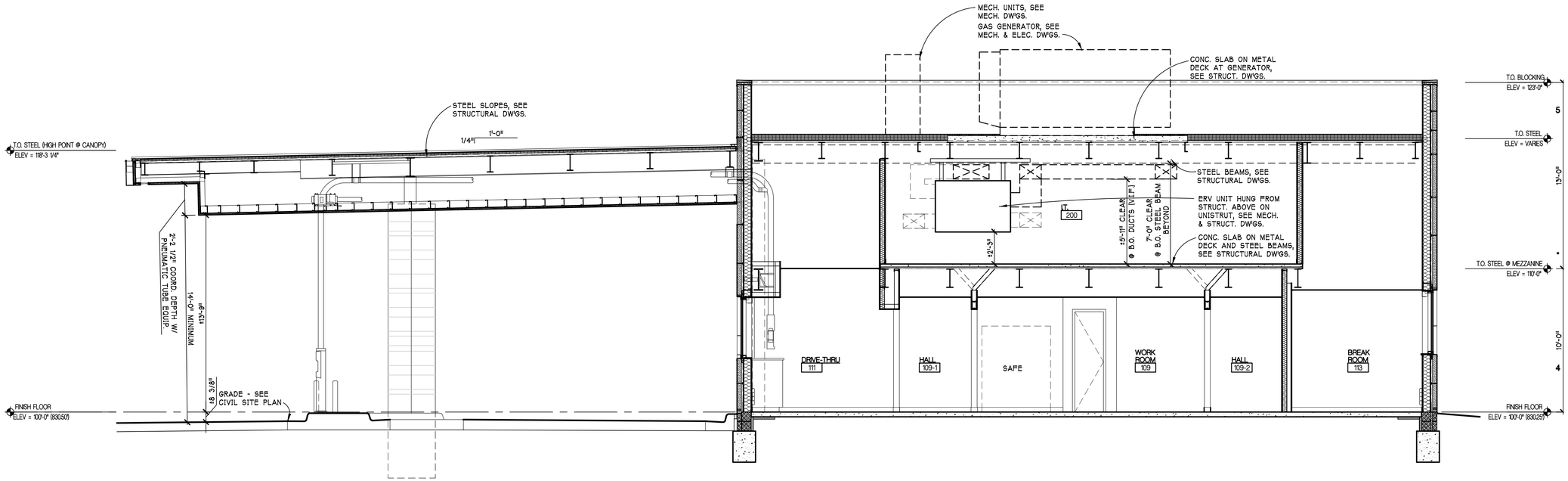
17-201

PROJECT NUMBER

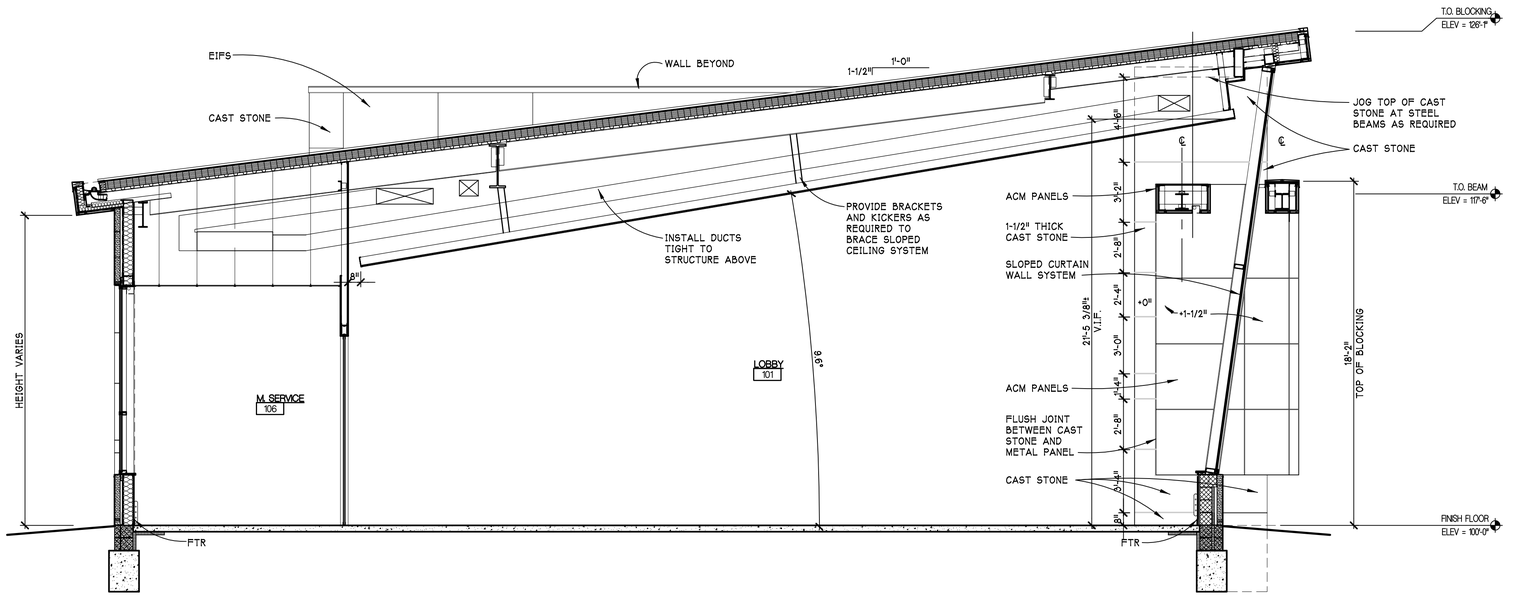
A-200

SHEET NUMBER

Drawing: P:\201 (7)\720 \Dwgs\CDArchic6HA200.dwg
Date: Feb 07, 2018, 9:13am Layout: A-200 SITE PLAN Plotted by: ccorbett



B3 A-300 A-105 — **BUILDING SECTION**
SCALE - 1/4" = 1'-0"
E08AD06



B1 A-300 A-105 — **BUILDING SECTION**
SCALE - 1/4" = 1'-0"
E08AD06

FINAL SITE PLAN	2/5/18
PRELIMINARY SITE PLAN	12/13/17
SITE PLAN REVIEW	12/1/17
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PROJECT

CONSULTANT

BUILDING SECTIONS

SHEET TITLE

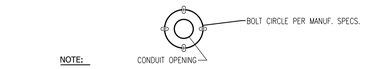
17-201

PROJECT NUMBER

A-300

SHEET NUMBER

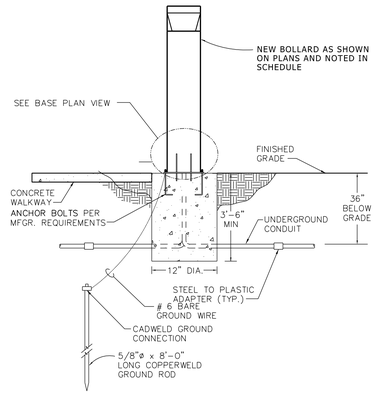
Drawing: P:\2017\1720\IDwgs\CDArchi\e6HA300.dwg
Date: Feb 07, 2018, 9:38am Layout: A-300-SITE PLAN Plotted by: cconbett



NOTE:

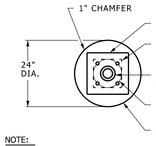
ALL LOCATIONS AND DIMENSIONS FOR ANCHOR BOLTS ETC. SHALL BE VERIFIED IN FIELD BY INSTALLING CONTRACTOR WITH BOLTS AS FURNISHED BY BOLLARD MANUFACTURER.

PLAN VIEW BASE



TYPICAL BOLLARD BASE DETAIL

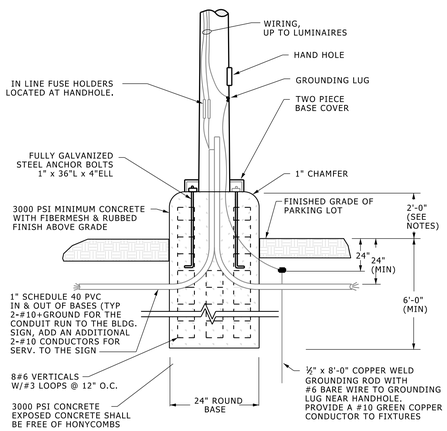
NO SCALE NOTE: FIXTURE TYPE 'LO' BASE IS SIMILAR.



NOTE:

ALL LOCATIONS AND DIMENSIONS FOR ANCHOR BOLTS ETC. SHALL BE VERIFIED IN FIELD BY INSTALLING CONTRACTOR WITH BOLTS AS FURNISHED BY POLE MANUFACTURER.

PLAN VIEW BASE

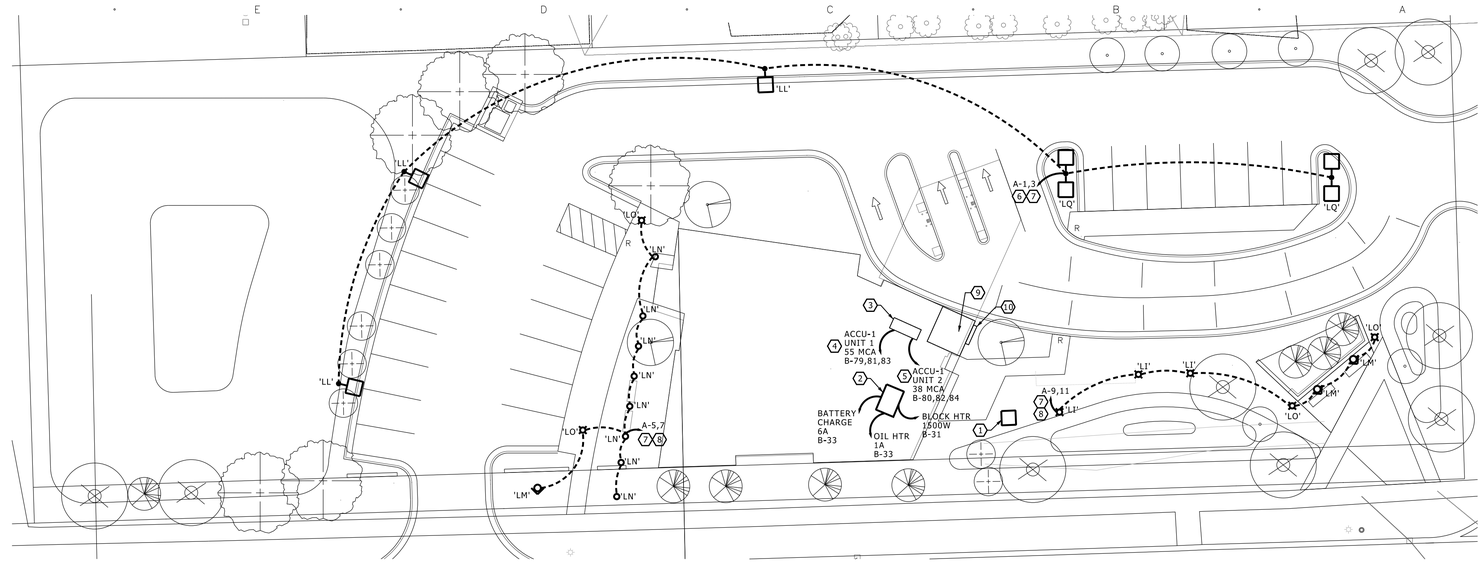


NOTES:

1. WHEN INSTALLING PARKING LOT LIGHTING IN LAWN AREAS AROUND THE PARKING LOT OR IN ISLANDS OR BERMS INSIDE THE PARKING LOT, ADJUST THE EXPOSED HEIGHT OF THE BASE SO THAT THE TOP OF THE BASE IS 2'-0" ABOVE THE FINISHED GRADE OF THE PARKING LOT SURFACE.
2. LOCATE BASES ON CENTERLINES WHERE CENTERLINES ARE SHOWN ON THE PLANS, OR CENTER BASES 3'-0" BACK FROM THE CURB WHERE CENTERLINES ARE NOT SHOWN.
3. REFER TO FIXTURE SCHEDULE FOR OVERALL HEIGHT OF PARKING LOT FIXTURES.

TYP. PARKING LOT FIXTURE BASE DETAIL

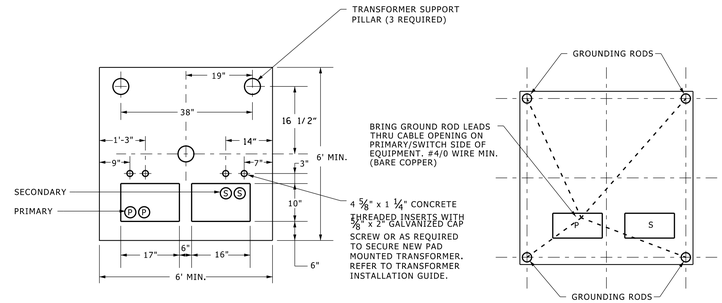
NO SCALE

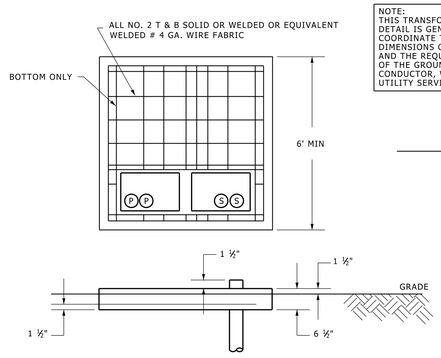


N

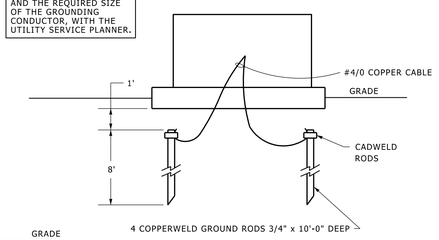
ELECTRICAL SITE PLAN

SCALE: 1" = 20'-0"





NOTE:
THIS TRANSFORMER PAD DETAIL IS GENERIC. COORDINATE THE EXACT DIMENSIONS OF THE PAD, AND THE REQUIRED SIZE OF THE GROUNDING CONDUCTOR, WITH THE UTILITY SERVICE PLANNER.



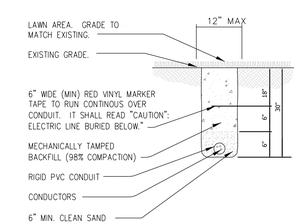
4 COPPERWELD GROUND RODS 3/4" x 10'-0" DEEP

TRANSFORMER PAD GROUNDING DETAILS

NO SCALE

PLAN REFERENCE NOTES:

1. APPROXIMATE LOCATION OF NEW PAD MOUNTED TRANSFORMER. TRANSFORMER IS BY UTILITY CO., CONCRETE PAD IS BY E.C. SEE PAD DETAILS THIS SHEET.
2. APPROXIMATE LOCATION OF NEW 150KW GENERATOR ON ROOF OF NEW BUILDING. CUMMINS GENSET MODEL C150N6.
3. APPROXIMATE LOCATION OF ROOF MOUNTED COMPRESSOR/CONDENSING UNIT. COORDINATE EXACT LOCATION WITH MECH TRADES.
4. CIRCUIT TO POSITION INDICATED WITH 3-#4 & 1-#8(G) - 1"C.
5. CIRCUIT TO POSITION INDICATED WITH 3-#6 & 1-#10(G) - 3/4"C.
6. CIRCUIT TO POSITION INDICATED WITH 2-#10 & 1-#10(G) - 1"C.
7. CIRCUIT TO POSITION INDICATED WITH 2-#12 & 1-#12(G) - 1"C.
8. TO TIME CLOCK & PHOTOCELL. REFER TO DETAIL ON SHEET E3.1.
9. APPROXIMATE LOCATION OF ELECTRICAL EQUIPMENT INSIDE BUILDING. REFER TO PLAN VIEWS FOR LAYOUT.
10. APPROXIMATE LOCATION OF ELECTRICAL SERVICE EQUIPMENT ON THE OUTSIDE OF THE BUILDING. REFER TO PLANS AND RISER DIAGRAM.



TYPICAL TRENCH DETAIL

NO SCALE

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

STATE OF MICHIGAN
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ENGINEER
No. 27202
LICENSED PROFESSIONAL ENGINEER
Allen F. Montero

FINAL SITE PLAN	2/5/18
ADDENDUM 1	1/31/18
PERMITS/ENGIN.	1/31/18
BIDS	1/12/18
FINAL REVIEW	1/5/18
50% CD Set	12/8/17

DATE ISSUED

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CARPENTER ROAD BRANCH
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PROJECT

MONTERO ENTERPRISES INCORPORATED
3475 Jeanette Drive
Chelsea, MI 48118
(734) 475-3592
www.monteroenterprises.net

CONSULTANT

Electrical Site Plan

SHEET TITLE

17-201

PROJECT NUMBER

E2.1

SHEET NUMBER

Pole top luminaires with asymmetric wide spread light distribution

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:

Housing/fitter: Die-cast and extruded aluminum construction. The fixture slip fits a 3" O.D. pole top or tenon and is secured by six (6) socket head stainless steel set screws threaded into stainless steel inserts. Die castings are marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy.

Enclosure: Clear acrylic diffuser and reflector made of pure anodized aluminum held in place by die-cast aluminum frame and stainless steel rods. Fully gasketed for weather tight operation using a molded silicone rubber gasket.

Electrical: 44.2W LED luminaire, 46 total system watts, -30°C start temperature. Integral 120V through 277V electronic LED driver, 0-10V dimming. LED module(s) are available from factory for easy replacement. Standard LED color temperature is 4000K with a >80 CRI. Available in 3000K (>80 CRI); add suffix K3 to order.

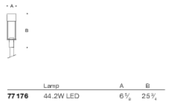
Note: LEDs supplied with luminaire. Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

Finish: All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. Available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

CSA certified to U.S. and Canadian standards, suitable for wet locations. Protection class IP65

Weight: 11 lbs.

Luminaire Lumens: 3230



	Lamp	A	B
77176	44.2W LED	6¼	25½

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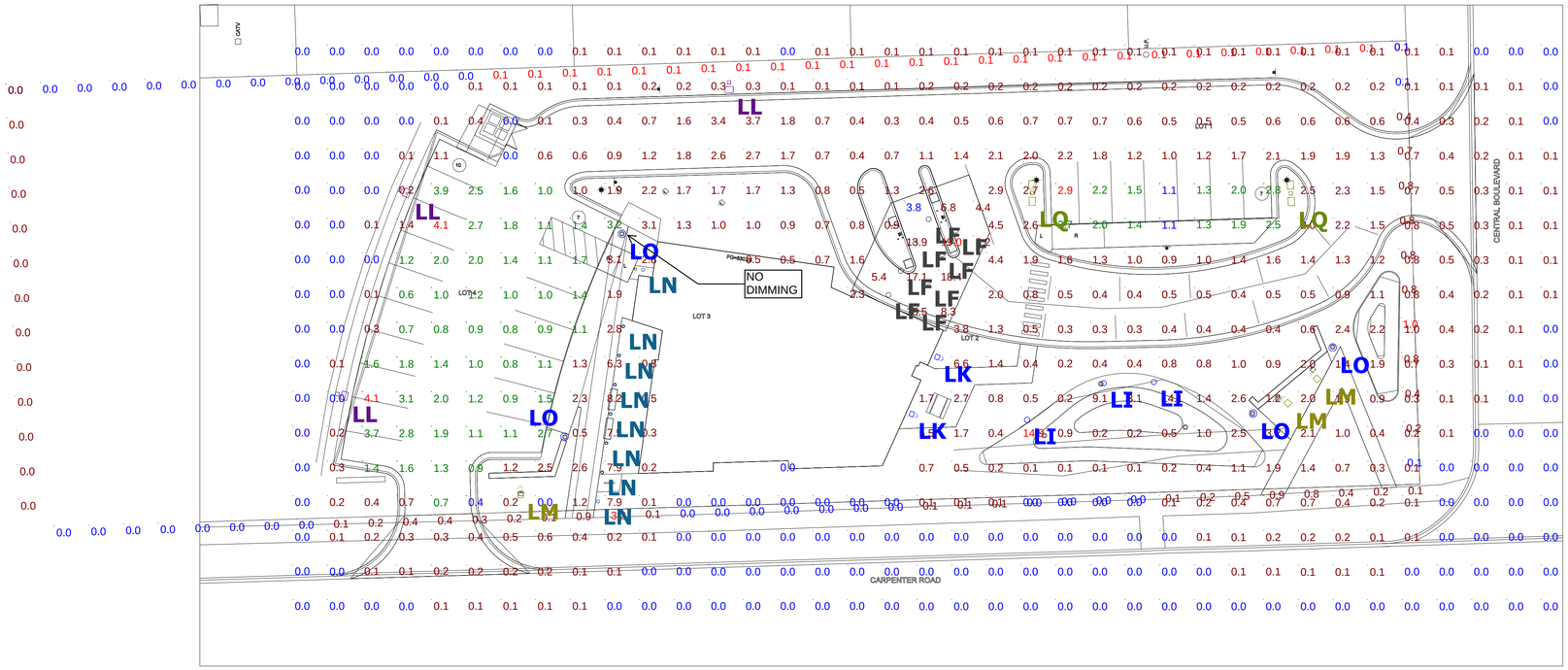


Plan View
Scale - 1" = 20ft

LED pole top luminaires with asymmetrical light distribution

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:

Housing: Die-cast aluminum housing and slip fitter. Slip fits 3" O.D. pole top, secures th pole with integrated slip fitter mechanism and single set screw. Die castings are marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy.

Enclosure: Faceplate is hinged; constructed of die-cast aluminum with toolless access latch for easy maintenance. Tempered clear safety glass with an anti-reflective coating. Optical reflector of pure anodized aluminum. Fully shielded light distribution for no trespass above horizontal. Type II distribution. Fully gasketed for weather tight operation using molded silicone gasket.

Electrical: 46.2W LED luminaire, 53.0 total system watts, -30°C start temperature. Integral 120V through 277V electronic LED driver, 0-10V dimming. Integral surge protection to protect the luminaire against surges sized up to 10kV. LED module(s) are available from factory for easy replacement. Standard LED color temperature is 4000K with a >80 CRI. Available in 3000K (>80 CRI); add suffix K3 to order.
Note: LEDs supplied with luminaire. Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

Options: Optionally available with multi-channel photocell receptacle, that provides electrical and mechanical interconnection between photocell and luminaire, specify photo receptacle. The photo receptacle supports ANSI standard dimming photocells and compatible with 0-10V dimming. Ambient temperature must not go below -40°C and must not exceed 85°C.

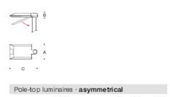
Finish: All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. Available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

CSA certified to U.S. and Canadian standards, suitable for wet locations. Protection class IP66

Weight: 10.1 lbs

Effective Projection Area (EPA): 0.32 ft²

Luminaire Lumens: 4870



Pole-top luminaires - **asymmetrical**				
	Lamp	A	B	C
99519	46.2 W LED	10	2⅛	17¼

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Bollards - STAINLESS STEEL

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:

Post construction: Seamless stainless steel tubing, ¼" wall thickness with a machined top housing and base, internally welded into an assembly.

Lamp enclosure: Machined stainless steel top housing assembly removable in one piece for relamping. Secured by three (3) socket head stainless steel screws threaded into stainless steel inserts. Clear ⅜" thick borosilicate glass with blasted stainless steel cone reflector and top downlight reflector. Fully gasketed using high temperature silicone rubber O-ring gaskets.

Electrical: 11.4W LED luminaire, 13.4 total system watts, -30°C start temperature. Integral 120V through 277V electronic LED driver, 0-10V dimming. LED module(s) are available from factory for easy replacement. Standard LED color temperature is 3000K with an 85 CRI. Available in 4000K (85 CRI); add suffix K4 to order.

Note: LEDs supplied with luminaire. Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

Anchor base: Heavy gauge stainless steel with four (4) threaded stainless steel studs which accept BEGA 79818 anchorage kit (supplied).

Finish: #4 brushed stainless steel. Stainless steel requires regular cleaning and maintenance, much like household appliances, to maintain its luster and to prevent tarnishing or the appearance of rust like stains.

Temperature caution: The column "I" in this chart indicates the temperature in degrees Celsius which is reached during operation.

CSA certified to U.S. and Canadian standards, suitable for wet locations. Protection class IP65

Weight: 26.5 lbs.

Luminaire Lumens: 654

Stainless steel bollards						
	Lamp	A	B	C	Anchorage	
88060	11.4W	6¼	36⅛	9½	**79818**	

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Lighting Control
- ALL SITE LIGHTING TO BE ON TIMERS; TO DIM AT 11PM PER ORDINANCE.

- LIGHTS AT CANOPY ON MOTION SENSOR TO BE INCREASED WITH MOTION ACTIVATION AND THEN DIMMED AFTER MOTION NO LONGER DETECTED

-LN LIGHTS ON MOTION SENSOR TO BE INCREASED WITH MOTION ACTIVIATION AND THEN DIMMED AFTER MOTION NO LONGER DETECTED

- ONE LO LIGHT FIXTURE TO REMAIN FULL INTENSITY AT ALL TIMES FOR SECURITY AT WALK UP ATM, SEE PLAN

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.

Statistics

Description	Symbol	Avg	Max	Min	Max / Min	Avg / Min	Avg / Max
EAST PROPERTY LINE	+	0.1 fc	0.1 fc	0.0 fc	N/A	N/A	1.0:1
NORTH PARKING AREA	X	1.6 fc	4.1 fc	0.4 fc	10.3:1	4.0:1	0.4:1
NORTH PROPERTY LINE	+	0.0 fc	0.0 fc	0.0 fc	N/A	N/A	N/A
NORTH SIGN	+	13.1 fc	35.8 fc	1.0 fc	35.8:1	13.1:1	0.4:1
SOUTH PARKING AREA	X	1.9 fc	2.9 fc	1.1 fc	2.6:1	1.7:1	0.7:1
SOUTH PROPERTY LINE	+	0.5 fc	1.0 fc	0.1 fc	10.0:1	5.0:1	0.5:1
SOUTH SIGN	+	20.2 fc	52.4 fc	1.7 fc	30.8:1	11.9:1	0.4:1
UNDER CANOPY	+	11.3 fc	19.0 fc	3.8 fc	5.0:1	3.0:1	0.6:1
WEST PROPERTY LINE	+	0.2 fc	3.2 fc	0.0 fc	N/A	N/A	0.1:1

Luminaire Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens per Lamp	LLF	Wattage	Mounting Height
	LF	8	BEGA LIGHTING	66058	LED Ceiling-mounted downlights - with crystal glass	LED	1	66058.ies	2590	0.9	42	12'-0"
	LI	3	BEGA LIGHTING	99862	System bollard - luminaire head with shielded light - 360°. No uplight	LED	1	99862.ies	1160	0.9	29	3'-0"
	LK	2	BEGA LIGHTING	33817	LED wall luminaires with shielded asymmetrical light distribution. no uplight. Dark Sky compliant	LED	1	33817.ies	1355	0.9	17	10'-0"
	LL	3	BEGA LIGHTING	99519	LED pole top luminaires with asymmetrical light distribution. Shielded- no uplight. Dark Sky compliant	LED	1	99519 (2).ies	4740	0.9	37	20'-0"
	LM	3	BEGA LIGHTING	77630	LED floodlight with 1/2" I.P.S. - flat beam	LED	1	77630.ies	2287	0.9	21	Grade
	LN	8	BEGA LIGHTING	88060	9-1/2"DIA. X 36"H. LED LUMINAIRE. LED BOLLARD. STAINLESS STEEL.	LED	1	88060.IES	654	0.9	13.35	3'-0"
	LO	4	BEGA LIGHTING	77176	Pole top luminaires with asymmetric wide spread light distribution. Shielded- no uplight. Dark Sky compliant	LED	1	77176 (1).ies	3149	0.9	36	12'-0"
	LQ	2	BEGA LIGHTING	99473	Twin LED pole-top luminaires with asymmetrical distribution. Shielded- no uplight. Dark Sky compliant	LED	1	99473 (1).ies	3431	0.9	90	20'-0"

U OF M CREDIT UNION
PHOTOMETRIC SITE PLAN
PREPARED FOR: HOBBS & BLACK
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer
LLB/AAM
Date
12/4/2017
rev 1/26/2018
Scale
Not to Scale
Drawing No.
#17-83682-V4