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RECEIVED

GENOA CHARTER TOWNSHIP
Application for Site Plan Review

TO THE GENOA TOWNSHIP PLANNING COMMISSION AND TOWNSHIP BOARD:

APPLICANT NAME & ADDRESS: COMMUNITY BIBLE CHURCH - JAMES WICKMAN
If applicant is not the owner, a letter of Authorization from Property Owner is needed.

OWNER'S NAME & ADDRESS: COMMUNITY BIBLE CHURCH

SITE ADDRESS: 7372 GRAND RIVER AVE PARCEL #(s): 11-13-200-008 & 11-13-200-055 11-13-300-007

APPLICANT PHONE: (810) 227-2255 OWNER PHONE: ( )

OWNER EMAIL: WICKMAN3093@YAHOO.COM

LOCATION AND BRIEF DESCRIPTION OF SITE: LOCATED AT 7372 GRAND RIVER ON THE SOUTH SIDE OF GRAND RIVER BETWEEN EULER RD AND GENOA BUSINESS PARK

BRIEF STATEMENT OF PROPOSED USE: SITE WILL CONTINUE TO FUNCTION AS A CHURCH BUT WILL RECEIVE A BUILDING AND PARKING LOT EXPANSION.

THE FOLLOWING BUILDINGS ARE PROPOSED: A BUILDING EXPANSION CONSTRUCTED OFF OF THE EXISTING CHURCH BUILDING OF APPROXIMATELY 18,000 SQFT.

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: James Wickman, Deacon

ADDRESS: 7372 Grand River Avenue, Brighton, MI 48116

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

Name	Business Affiliation	E-mail Address
1.) BRENT LAVANWAY	of BOSS ENGINEERING	at BRENTL@BOSSENG.COM

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: _____ DATE: 10/2/2018

PRINT NAME: James Wickman, Deacon PHONE: (810) 333-3841

ADDRESS: 7372 Grand River Avenue, Brighton, MI 48116

IMPACT ASSESSMENT
FOR
SITE PLAN PETITION
"COMMUNITY BIBLE CHURCH"
GENOA TOWNSHIP, LIVINGSTON COUNTY
MICHIGAN

Prepared for:

COMMUNITY BIBLE CHURCH
7372 GRAND RIVER
BRIGHTON, MICHIGAN 48114
(810) 227-2255

Prepared by:

BOSS ENGINEERING COMPANY
3121 E. GRAND RIVER
HOWELL, MI 48843
(517) 546-4836

October 3rd , 2018

14-047 EIA

INTRODUCTION

The purpose of this Impact Assessment (IA) report is to show the effect that this proposed development may have on various factors in the general vicinity of the project. The format used for presentation of this report conforms to the *Submittal Requirements For Impact Assessment* guidelines in accordance with Section 18.07 of the published Zoning Ordinance for Genoa Township, Livingston County, Michigan.

DISCUSSION ITEMS

A. Name(s) and address(es) of person(s) responsible for preparation of the impact assessment and a brief statement of their qualifications.

Prepared By :
Brent W. LaVanway, P.E.
BOSS ENGINEERING COMPANY
Civil Engineers, Land Surveyors, Landscape Architects and Planners
3121 E. Grand River
Howell, MI 48843
(517) 546-4836

Prepared For :
Community Bible Church
Client
7372 Grand River
Brighton, MI 48114
(810) 227-2255

B. Map(s) and written description / analysis of the project site including all existing structures, manmade facilities, and natural features. The analysis shall also include information for areas within 10 feet of the property. An aerial photograph or drawing may be used to delineate these areas.

The 9.24 acre site is located on the south side of Grand River immediately west of Harte Dr and across from Euler Rd. The subject property is currently the Community Bible Church Facility. There is the existing Church building, gravel parking lot, detention basin and house which Is currently used for storage and the occasional class or meeting. The south end of the property contains a natural area with shrub/scrub vegetation and a wetland. There is an established tree row along Harte Dr just off of the subject property.

C. Impact on natural features: A written description of the environmental characteristics of the site prior to development and following development, i.e., topography, soils, wildlife, woodlands, mature trees (eight inch caliper or greater), wetlands, drainage, lakes, streams, creeks or ponds. Documentation by a qualified wetland specialist shall be required wherever the Township

determines that there is a potential regulated wetland. Reduced copies of the Existing Conditions Map(s) or aerial photographs may accompany written material.

Resources utilized to study the natural features of the site included a on-site visit, aerial photos from Google Earth, a web soil survey prepared by the USDA, Wetlands Inventory Maps prepared by the MDEQ as well as resources prepared by the Huron River Watershed Council and other Livingston County Natural resources agencies.

The front (north) portion of the site is the existing Church facility, while the south contains the parking lot and natural area. The developed site slopes generally to the south toward the wetland. The soils on site consist of loam, loamy sand and muck. The soils shown on the USDA map are consistent with the field assessment of the upland and low land areas found on site. The land cover identified in the field is also consistent with the soils which consist of impervious surface, compacted lawn area, wetland and wooded shrub scrub areas. Existing vegetation specifically tree species found on-site that would be removed include Red Oak, Cottonwood, Basswood, Maple, Cherry, Cedar, and Pine. Given that the site has already been developed tree removal and natural features disturbance will be minimal.

D. Impact on storm water management: Description of measures to control soil erosion and sedimentation during grading and construction operations and until a permanent ground cover is established. Recommendations for such measures may be obtained from County Soil Conservation Service.

Topography on the site ranges from a low of 961.81 at the wetland edge to a high of 992.54 at the north central portion of the property near Grand River Road. The property is undulating, but largely drains from the north to the south toward a wetland system that extends off the property.

The land cover found in the field consisted of three different types; impervious surface (parking lot, building), wetland, wooded area including shrub scrub as well as compacted lawn areas.

The proposed stormwater design will utilize catch basins at low areas onsite and pipe stormwater to a detention basin located in the southeast corner of the site then be discharged into the existing wetland. In general existing drainage patterns on-site are being followed as closely as possibly with the proposed stormwater system.

Soil erosion measures will be utilized throughout the construction process to reduce the risk of erosion and sedimentation. This will be accomplished through the use of silt sacks placed in catch basins, silt fence installed along the perimeter of the property, and weekly inspections from a certified stormwater operator.

E. Impact on surrounding land use: Description of the types of proposed uses and other man made facilities, including any project phasing, and an indication of how the proposed use conforms or conflicts with existing and potential development patterns. A description shall be provided of any increases of light, noise or air pollution which could negatively impact adjacent properties.

As previously stated the site is the current home of Community Bible Church. The use of the site conforms with development patterns of the surrounding area and will feature an expansion of the existing facility.

In general the site will see an increase in use due to the expansion of the facility but, that is anticipated to occur over the next few years. Increased use would be during Sunday's service hours and perhaps occasional nights during the week after 5pm for various church related functions or activities. The increase in use will be minimal in that the site is already a functioning Church and this expansion is more of an overdue necessity to properly provide an adequate parking lot and worship area with associated classrooms, storage, and clerical space. Currently, Sunday school services are unable to be held at the church due to lack of space so a shuttle transfers children and young adults across the road to on offsite building not associated with the church to provide their education. With an expansion of their own facility shuttling elsewhere would no longer be required by keeping all Church related education and activities on-site instead of relying on local nearby facilities. Because the site is located in a commercial area increases in light or noise should not cause any issues with adjacent property owners.

F. Impact on public facilities and services: Description of number of expected residents, employees, visitors, or patrons, and the anticipated impact on public schools, police protection and fire protection. Letters from the appropriate agencies may be provided, as appropriate.

With the expansion of the existing facility impacts on public facilities and services are anticipated to be minimal. An increase in attendance and membership with the church is expected but again, the increase amount is anticipated to increase gradually over next few years.

Local school districts won't be affected by the addition, and the only impact to emergency services such as police protection and fire is the larger building footprint and perhaps some more patrons. Both of those impacts will be minimal and of little concern to each department.

G. Impact on public utilities: Description of the method to be used to service the development with water and sanitary sewer facilities, the method to be used to control drainage on the site and from the site, including runoff control during periods of construction. For sites service with sanitary sewer, calculations for pre- and post development flows shall be provided in equivalents to a single family home. Where septic systems are proposed, documentation or permits from the Livingston County Health Department shall be provided.

The existing Church is currently served by M.H.O.G public water and Genoa Township public sanitary sewer. With the building expansion comes the requirement to purchase additional REU's for the potential increased use of municipal utilities. Due to some special assessments on the property and coupled with REU's they had already purchased previously the church will need to purchase an additional 2 water REU's and 4 sanitary sewer REU's. The fees associated with the purchase cover the potential increase of usage or impact the expansion will have on public utilities.

Given the use of the building and peak usage times being Sunday mornings the impact on sanitary and water is anticipated to be minimal.

H. Storage or handling of any hazardous materials: Description of any hazardous substances expected to be used, stored or disposed of on the site. The information shall describe the type of materials, location within the site and method of containment. Documentation of compliance with federal and state requirements, and a Pollution Incident Prevention Plan (PIPP) shall be submitted, as appropriate.

There will be no hazardous materials used or disposed of on this site.

I. Impact on traffic and pedestrians: A description of the traffic volumes to be generated based on national reference documents, such as the most recent edition of the Institute of Transportation Engineers Trip Generation Manual, other published studies or actual counts of similar uses in Michigan.

Initial discussions with the Livingston County Road Commission and the Genoa Township Consulting Engineer produced a primary concern of traffic potentially backing up onto Grand River when patrons are entering the site. We have provided an on-site traffic circulation plan (Sheet 3A in plan set) specifically to help prevent this issue. Parking spaces located near the entrance off of Grand River will be designated for Church staff and volunteers only on Sunday's occupying spaces that otherwise could cause traffic backups. Signage on-site will be utilized as well as volunteer parking lot aides if needed to help direct traffic and prevent backups.

A breakdown of anticipated traffic based upon capacity of the new expansion is provided below:

Existing Seat Count- 375 Proposed Seat Count- 601

According to a parking study performed by Jeffery Parker Associates it was determined that for every 2.4 seats there is 1 associated car. Therefore, we apply that factor to both the existing and proposed seat counts:

Existing Seats: 375 / 2.4 = 156 vehicles Proposed Seats: 601 / 2.4= 250 vehicles

From information provided from the Church on member addresses we also know that forty two percent (42%) of members travel from the east and fifty eight percent (58%) travel from the west. Turning movements entering and exiting the site can then be broken down as follows:

<u>Existing Turning Movements:</u>
-Entering the site:
-156 vehicles x 42% = 65 vehicles turning left into the site
-156 vehicles x 58%=91 vehicles turning right into the site
-Exiting the site:
-156 vehicles x 42% = 65 vehicles turning right out of the site
-156 vehicles x 58%= 91 vehicles turning left out of the site

<u>Proposed Turning Movements:</u>
-Entering the site:
-250 vehicles x 42% = 105 vehicles turning left into the site
-250 vehicles x 58% = 145 vehicles turning right into the site
-Exiting the site:
-250 vehicles x 42%= 105 vehicles turning right out of the site
-250 vehicles x 58% = 145 vehicles turning left out of the site

As one can see the turning movements entering and exiting the site do increase but only by approximately 50 vehicles at peak capacity. During the typical Sunday it will be considerably less.

Community Bible Church currently has two (2) services on Sunday's, one at 9:30am and one at 11am. 2|42 Church located east of the proposed site has three (3) services on Sundays starting at 9am, 10:30am, and 12pm. The staggering of service times between the two churches also helps to alleviate some of the traffic on Grand River during those time periods.

J. A detailed traffic impact study shall be submitted for any site over ten (10) acres in size which would be expected to generate 100 directional vehicle trips (i.e. 100 inbound or 100 outbound trips) during the peak hour of traffic of the generator or on the adjacent streets.

A traffic study is not required for this site.

K. Special Provisions: General description of any deed restrictions, protective covenants, master deed or association bylaws.

An easement for access to Harte Dr will need to be obtained from owner of property to the east and a permit will be required to discharge into a MDEQ regulated wetland.

L. A list of all sources shall be provided.

Genoa Township's *Submittal Requirements For Impact Assessment*

Genoa Township Zoning Ordinances

Soil Survey of Livingston County, Michigan, U.S.D.A. Soil Conservation Service

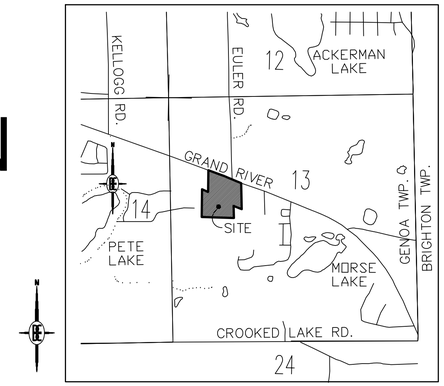
National Wetland Inventory Plan, United States Department of the Interior, Fish and Wildlife Service

SITE PLAN
FOR
COMMUNITY BIBLE CHURCH EXPANSION
PART OF NORTH 1/4 CORNER, SECTION 13, T2N-R5E
GENOA TOWNSHIP, LIVINGSTON COUNTY, MI

PROPERTY DESCRIPTION:

PARCEL DESCRIPTION (AS SURVEYED) (4711-13-300-055):
Part of the Northwest 1/4 of Section 13, T2N-R5E, Genoa Township, Livingston County, Michigan, more particularly described as follows: Commencing at the West 1/4 Corner of Section 13; thence along the East-West 1/4 line of Section 13, as previously surveyed and monumented, S 88°51'46" E, 1341.91 feet, to the POINT OF BEGINNING of the Parcel to be described, said point also being the Southwest Corner of the Southeast 1/4 of the Northwest 1/4 of Section 13, as monumented; thence N 00°39'48" E, 460.60 feet (recorded as N 00°41'35" E, 461.41 feet); thence S 65°23'01" E, 110.15 feet (recorded as 110.00 feet); thence N 00°50'02" E, 363.14 feet (recorded as N 00°34'55" W, 362.88 feet); thence along the Southerly Right of Way line of Grand River Avenue (50 foot wide 1/2 Right of Way), on the following two (2) courses: 1) S 69°38'24" E, 275.61 feet (recorded as S 71°02'45" E, 272.00 feet and S 71°08'30" E, 3.42 feet); 2) S 67°16'23" E, 312.61 feet (recorded as S 68°46'30" E, 312.69 feet), (said point bearing the following two (2) courses, from the Center of Section 13: 1) along the North-South 1/4 line of Section 13, as previously surveyed and monumented, N 00°04'53" E, 315.11 feet (recorded as N 01°03'38" W, 314.82 feet); 2) along the Southerly Right of Way line of Grand River Avenue (50 foot wide 1/2 Right of Way), N 67°16'23" W, 748.03 feet (recorded as N 68°46'30" W, 749.36 feet)); thence S 00°04'47" W, 430.35 feet (recorded as S 01°23'01 E, 430.25 feet); thence N 66°58'10" W (recorded as N 68°25'58" W), 145.05 feet; thence S 00°07'44" W (recorded as S 01°20'04" E), 206.68 feet; thence N 87°55'46" W (recorded as N 89°46'13" W), 523.39 feet, to the POINT OF BEGINNING, containing 9.17 acres, more or less, and subject to the rights of the public over the existing Grand River Avenue. Also subject to any other easements or restrictions of record.

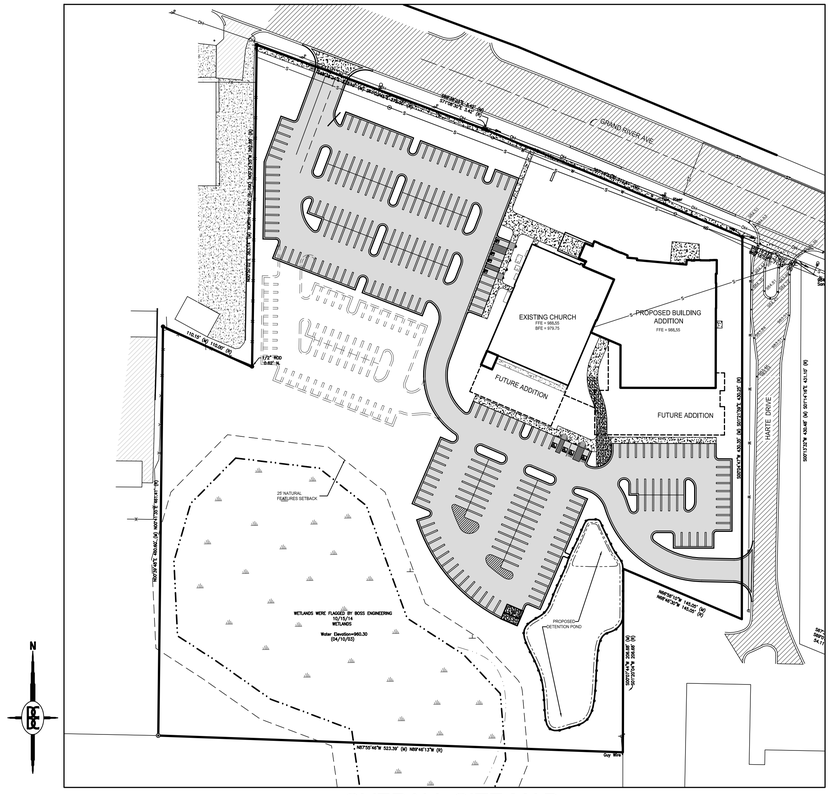
Description containing parcels: 4711-13-300-007, 4711-13-300-008, & 4711-13-300-035



LOCATION MAP
NO SCALE

CONSTRUCTION NOTES

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING NOTES AND ANY WORK INVOLVED SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
1. THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF ITS SUB CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LANDOWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUBCONTRACTORS.
2. DO NOT SCALE THESE DRAWINGS AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
3. A GRADING PERMIT FOR SOIL EROSION-SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO THE START OF CONSTRUCTION.
4. IF DUST PROBLEM OCCURS DURING CONSTRUCTION, CONTROL WILL BE PROVIDED BY AN APPLICATION OF WATER, EITHER BY SPRINKLER OR TANK TRUCK.
5. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS AND SPECIFICATIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED TOWNSHIP, COUNTY, AND STATE OF MICHIGAN PERMITS.
7. PAVED SURFACES, WALKWAYS, SIGNS, LIGHTING AND OTHER STRUCTURES SHALL BE MAINTAINED IN A SAFE, ATTRACTIVE CONDITION AS ORIGINALLY DESIGNED AND CONSTRUCTED.
8. ALL BARRIER-FREE FEATURES SHALL BE CONSTRUCTED TO MEET ALL LOCAL, STATE AND A.D.A. REQUIREMENTS.
9. ANY DISCREPANCY IN THIS PLAN AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL SETBACKS, EASEMENTS AND DIMENSIONS SHOWN HEREON BEFORE BEGINNING CONSTRUCTION.
10. THE CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHTS-OF-WAY, PUBLIC OR PRIVATE, PRIOR TO THE START OF CONSTRUCTION.
11. THE CONTRACTOR SHALL COORDINATE WITH ALL OWNERS TO DETERMINE THE LOCATION OF EXISTING LANDSCAPING, IRRIGATION LINES & PRIVATE UTILITY LINES. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING LANDSCAPING, IRRIGATION LINES, AND PRIVATE UTILITY LINES.
12. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT.
13. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A MANNER SO THAT WORKMEN AND PUBLIC SHALL BE PROTECTED FROM INJURY, AND ADJOINING PROPERTY PROTECTED FROM DAMAGE.
14. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
15. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
16. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED SHALL BE BACKFILLED AND COMPACTED WITH SAND (MDOT CLASS II).
17. ALL PAVEMENT REPLACEMENT AND OTHER WORKS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWNSHIP, INCLUDING THE LATEST MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
19. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR ANY DELAY OR INCONVENIENCE DUE TO THE MATERIAL SHORTAGES OR RESPONSIBLE DELAYS DUE TO THE OPERATIONS OF SUCH OTHER PARTIES DOING WORK INDICATED OR SHOWN ON THE PLANS OR IN THE SPECIFICATION OR FOR ANY REASONABLE DELAYS IN CONSTRUCTION DUE TO THE ENCOUNTERING OR EXISTING UTILITIES THAT MAY OR MAY NOT BE SHOWN ON THE PLANS.
20. DURING THE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL NOT PERFORM WORK BY PRIVATE AGREEMENT WITH PROPERTY OWNERS ADJACENT TO THE PROJECT.
21. IF WORK EXTENDS BEYOND NOVEMBER 15, NO COMPENSATION WILL BE DUE TO THE CONTRACTOR FOR ANY WINTER PROTECTION MEASURES THAT MAY BE REQUIRED BY THE ENGINEER.
22. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY BEYOND THE CONSTRUCTION LIMITS INCLUDING BUT NOT LIMITED TO EXISTING FENCE, LAWN, TREES AND SHRUBBERY.
24. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE NORMAL CONSTRUCTION LIMITS OF THE PROJECT SHALL BE SODDED OR SEEDED AS SPECIFIED OR DIRECTED BY THE ENGINEER.
25. ALL ROOTS, STUMPS AND OTHER OBJECTIONABLE MATERIALS SHALL BE REMOVED AND THE HOLE BACKFILLED WITH SUITABLE MATERIAL. WHERE GRADE CORRECTION IS REQUIRED, THE SUBGRADE SHALL BE CUT TO CONFORM TO THE CROSS-SECTION AS SHOWN IN THE PLANS.
26. TRAFFIC SHALL BE MAINTAINED DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL SIGNS AND TRAFFIC CONTROL DEVICES. FLAG PERSONS SHALL BE PROVIDED BY THE CONTRACTOR IF DETERMINED NECESSARY BY THE ENGINEER. ALL SIGNS SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AT NO COST TO THE TOWNSHIP. NO WORK SHALL BE DONE UNLESS THE APPROPRIATE TRAFFIC CONTROL DEVICES ARE IN PLACE.
27. ALL DEMOLISHED MATERIALS AND SOIL SPOILS SHALL BE REMOVED FROM THE SITE AT NO ADDITIONAL COST, AND DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
28. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
29. ALL GRADING IN THE PLANS SHALL BE DONE AS PART OF THIS CONTRACT. ALL DELETERIOUS MATERIAL SHALL BE REMOVED FROM THE SUBGRADE PRIOR TO COMPACTING.
30. NO SEEDING SHALL BE DONE AFTER OCTOBER 15 WITHOUT APPROVAL OF THE ENGINEER.
31. ANY EXISTING APPURTENANCES SUCH AS MANHOLES, GATE VALVES, ETC. SHALL BE ADJUSTED TO THE PROPOSED GRADE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
32. SOIL EROSION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
33. ALL PERMANENT SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION OF THE MICHIGAN MUTCD MANUAL AND SHALL BE INCIDENTAL TO THE CONTRACT.



OVERALL SITE MAP
NO SCALE

SHEET INDEX

INDEMNIFICATION STATEMENT

THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF ITS SUB CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LANDOWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUBCONTRACTORS.

COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR:

COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
CONTACT: JAMES WICKMAN
PHONE: 810-227-2255

CONTRACTOR:

CONTRACTING RESOURCES
8273 GRAND RIVER, #150
BRIGHTON, MI 48114
CONTACT: JOHN JICKLING
PHONE: 810-229-4320

ARCHITECT:

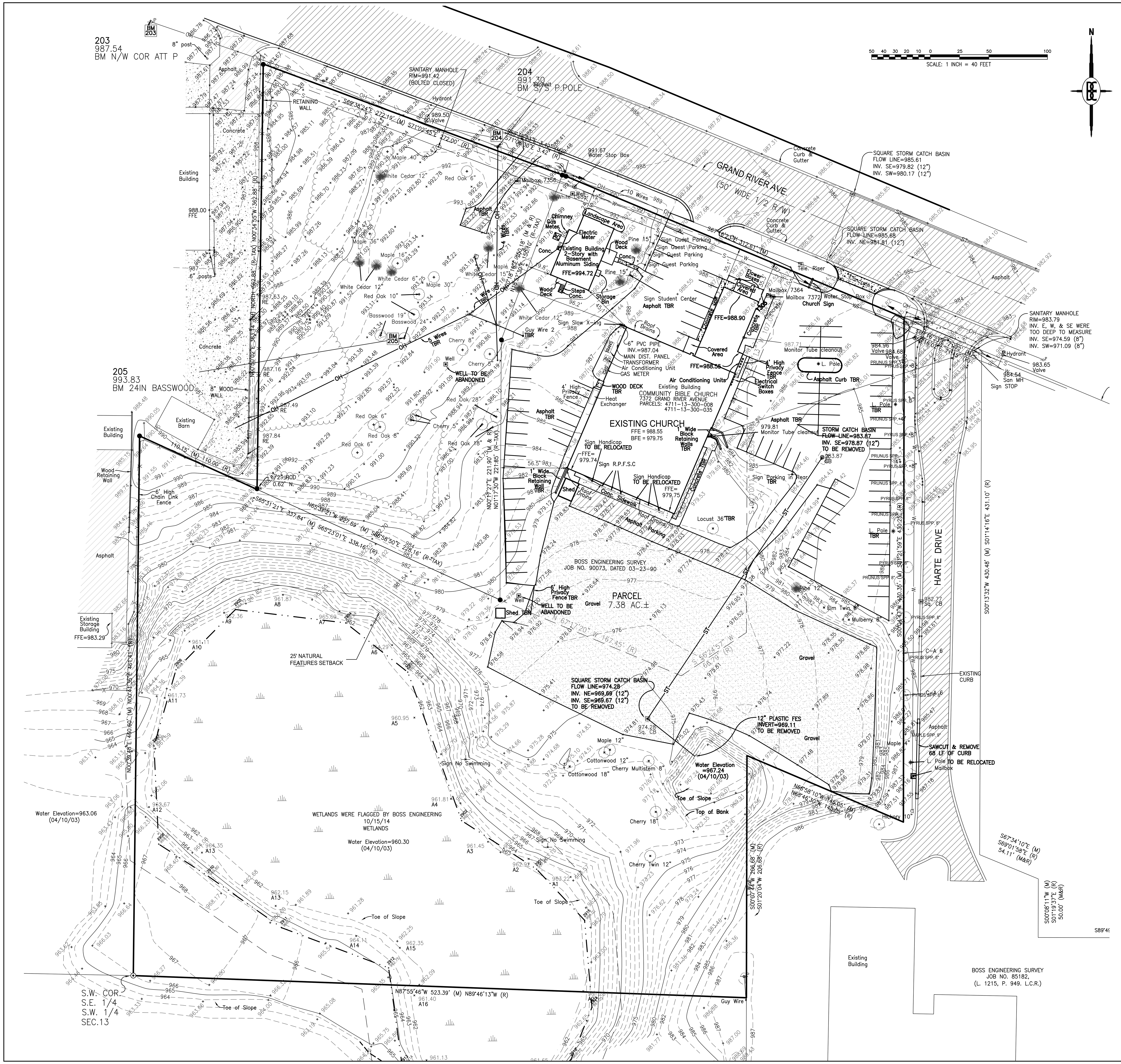
JEFFREY PARKER ARCHITECTS
855 28TH STREET SE
GRADN RAPIDS, MI 49508
CONTACT: JEFFREY PARKER
PHONE: 616-241-0090

PREPARED BY:

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

C1

NO	BY	CK	REVISION	DATE	JOB NO. 14-047-1
1	ST		PER TOWNSHIP REVIEW	10-24-18	ISSUE DATE: 10/2/18



SITE AERIAL

SOILS INFORMATION:
MIAMI LOAM (MoB), 2% TO 6% SLOPES
-EASTERN EDGE OF SITE ALONG HARTE DRIVE
MIAMI LOAM (MoC), 6% TO 12% SLOPES
-NORTHERN AND WESTERN EDGES OF SITE
MIAMI LOAM (MoD), 12% TO 18% SLOPES
-ACCOUNTS FOR ENTIRE CENTRAL PORTION OF SITE
CARLISLE MUCK (Cc),
-WETLAND AREA IN SOUTHWEST CORNER OF SITE

BENCHMARKS:

BENCHMARKS ARE BASED OFF GENOA TOWNSHIP BENCH MARKS BY MCNAMEE, PORTER & SEELEY (#197 & #198) (NGVD29 DATUM)

BENCHMARK #203
NW COR. TELEPHONE PAD, S/S GRAND RIVER AVE. BETWEEN HANDI-RENTAL AND SMEDE & SON.
ELEVATION = 987.54

BENCHMARK #204
BOSS TAG/NAIL SET S/S P. POLE IN FRONT OF HOUSE #7356.
ELEVATION = 991.30

BENCHMARK #205
BOSS TAG/NAIL SET NW/S 24" BASSWOOD IN BETWEEN HOUSE #7356 & EXISTING GARAGE.
ELEVATION = 993.83

BENCHMARK #207
BOSS TAG/NAIL SET NW/S P. POLE IN GRAVEL PARKING LOT, 170'± SOUTH OF CHURCH BUILDING.
ELEVATION = 977.33

LEGEND

Symbol	Description
900	CONTOUR
+ 922.08	SPOT ELEVATION
	WETLAND SYMBOL
P	POWER POLE
	HYDRANT
⊗	GATE VALVE
S	SANITARY SEWER
W	WATERMAIN
ST	STORM SEWER
G	GAS MAIN
E	ELECTRIC
T	TELEPHONE
OH	OVERHEAD WIRES
	FENCE
⊥	SIGN
	SQUARE STORM CATCH BASIN
	BEEHIVE STORM CATCH BASIN
○	SANITARY MANHOLE
○	POST
BM	BENCHMARK
FFE	FINISHED FLOOR ELEVATION
	DECIDUOUS TREE
	CONIFEROUS TREE
MB	MAILBOX
G	GAS METER
T	TELEPHONE RISER
E	ELECTRIC METER
AC	AIR CONDITIONING UNIT

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE APPARENT OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
(TOLL FREE)
FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255

TITLE
EXISTING CONDITIONS & DEMO PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO.
C2

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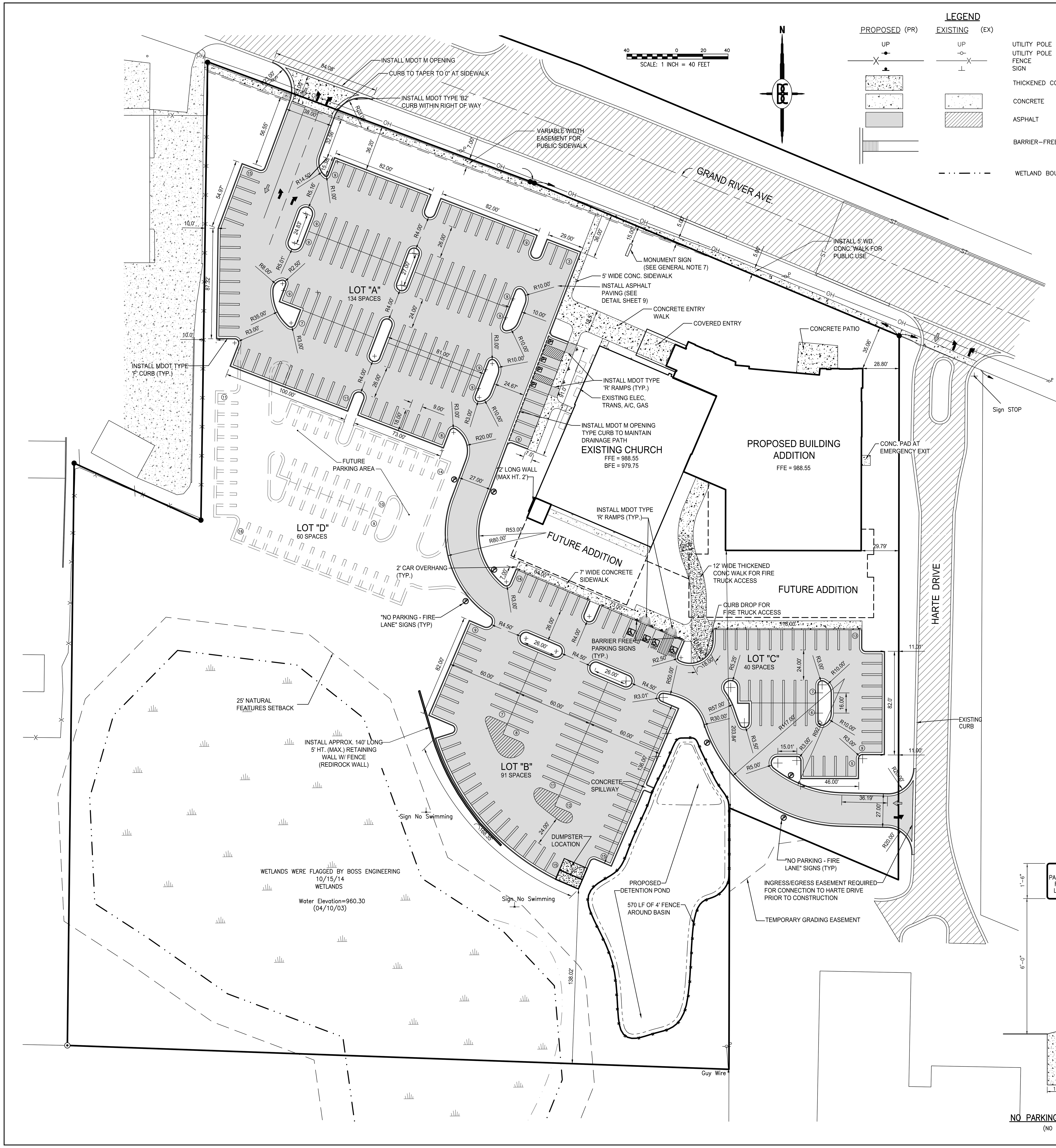


LEGEND

PROPOSED (PR)	EXISTING (EX)	
UP	UP	UTILITY POLE / UTILITY POLE
		FENCE
		SIGN
		THICKENED CONC.
		CONCRETE
		ASPHALT
		BARRIER–FREE RAMPS
		WETLAND BOUNDARY

SITE/BUILDING DATA

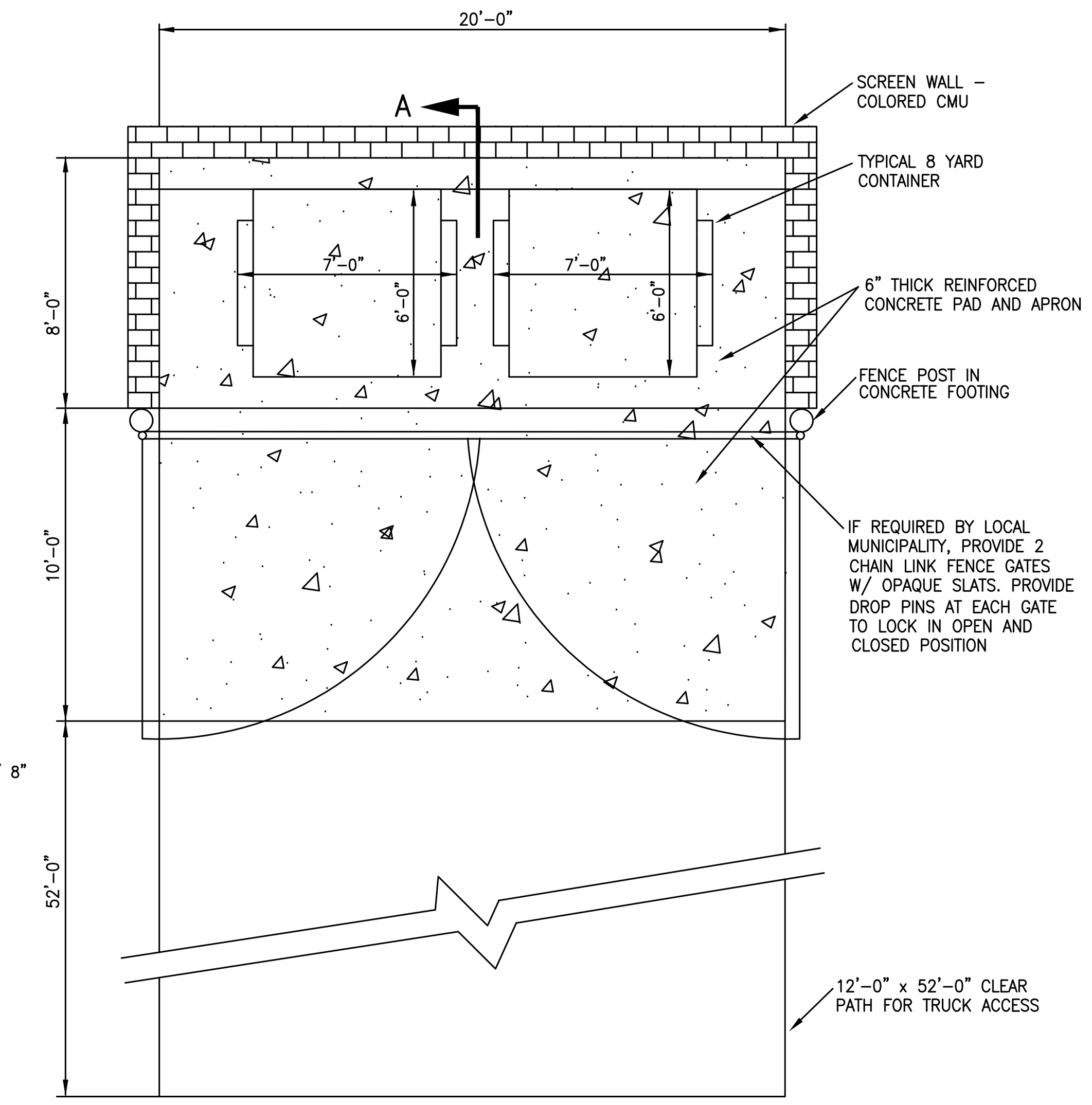
PARCEL SIZE:	9.24 AC.
EXISTING ZONING:	GENERAL COMMERCIAL DISTRICT
EXISTING USE:	CHURCH
PROPOSED USE:	CHURCH
REQUIRED FRONT SETBACK:	70 FT. (35 FT IF NO PARKING IN FRONT YARD)
PROPOSED FRONT SETBACK:	35.06 FT.
REQUIRED SIDE SETBACK:	15 FT.
PROPOSED SIDE SETBACK:	28.80 FT.
REQUIRED REAR SETBACK:	50 FT.
PROPOSED REAR SETBACK:	203.84 FT.
PARKING LOT SETBACK:	20.00 FT. , 10.00 FT(SIDE/REAR)
PROPOSED PARKING SETBACK:	11.00 FT. (SIDE)
MAX. BUILDING HEIGHT:	2 STORIES/35 FT **
	**60 FT MAX, PROVIDED THE FRONT, SIDE, AND REAR YARDS SHALL NOT BE LESS THAN THE HEIGHT OF THE BUILDING WALL ABUTTING ON SUCH YARD (ORDINANCE 11.01.05 (a))
PROPOSED BUILDING HEIGHT	
CHURCH	1 STORY
MAX. LOT COVERAGE	35% BUILDING 75% IMPERVIOUS
BUILDING FOOTPRINT	
EXISTING CHURCH:	13,036 S.F.
PROPOSED CHURCH:	18,176 S.F.
TOTAL:	31,212 S.F. (7.75%)
IMPERVIOUS COVERAGE	
PROPOSED BUILDING:	31,212 S.F.
PROPOSED PAVING:	100,301 S.F.
FUTURE PAVING/BLDG:	37,014 S.F.
TOTAL	131,513 S.F. (32.67%)
TOTAL (W/ FUTURE PAVING)	168,527 S.F. (41.87%) (TOTAL SITE BUILD-OUT)

PARKING DATA

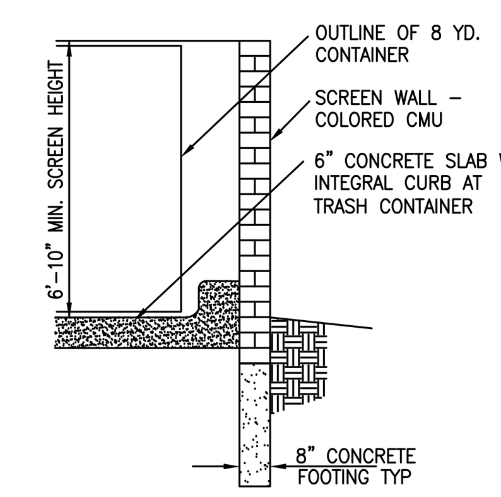
PARKING REQUIRED:	
CHURCHES:	1 SPACE FOR EACH 3 SEATS IN MAIN WORSHIP AREA 601 SEATS / 3 SEATS PER SPACE = 201 SPACES 201-300 SPACES REQUIRES 7 BARRIER-FREE SPACES 301-400 SPACES REQUIRES 8 BARRIER-FREE SPACES
PARKING PROPOSED:	265 SPACES (INCLUDING 8 BARRIER-FREE SPACES)
FUTURE PARKING:	60 SPACES (NOT PART OF THIS PROJECT)

GENERAL NOTES

1. ALL OUTDOOR LIGHTS SHALL BE SHIELDED TO REDUCE GLARE AND SHALL BE ARRANGED TO NOT INTERFERE WITH THE VISION OF PERSONS ON ADJACENT ROADWAYS OR ADJACENT PROPERTY.
2. ALL SIGNS SHALL MEET LOCAL MUNICIPALITY ORDINANCE REQUIREMENTS.
3. ACCESS ROADS TO SITE SHALL BE PROVIDED AND MAINTAINED DURING CONSTRUCTION. ACCESS ROADS SHALL BE CONSTRUCTED TO BE CAPABLE OF SUPPORTING THE IMPOSED LOAD OF FIRE APPARATUS OF 75,000 POUNDS.
4. THE PROPOSED BUILDING ADDITION IS TO HAVE AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH NFPA 13.
5. THE BUILDING ADDRESS SHALL BE A MINIMUM OF 6" HIGH LETTERS OF CONTRASTING COLORS AND BE CLEARLY VISIBLE FROM THE STREET. THE LOCATION AND SIZE ARE TO BE VERIFIED PRIOR TO INSTALLATION.
6. A KNOX BOX FOR FIRE DEPARTMENT USE SHALL BE LOCATED ADJACENT TO THE MAIN ENTRY.
7. PROPOSED MONUMENT SIGN TO MEET TOWNSHIP ORDINANCE REQUIREMENTS AND PROVIDED DURING THE SIGN PERMIT PROCESS.
8. DELIVERIES SHALL NOT OCCUR ON SUNDAYS DURING SERVICE TIMES TO AVOID TRAFFIC CONFLICTS.

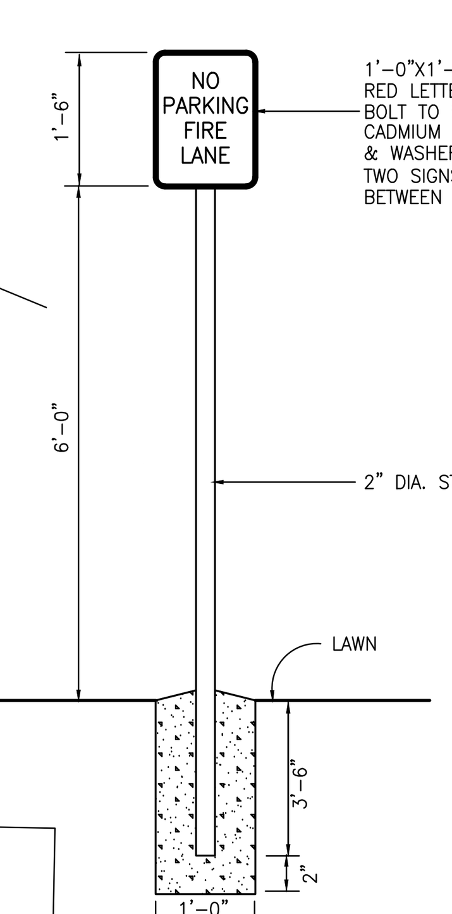


PLAN

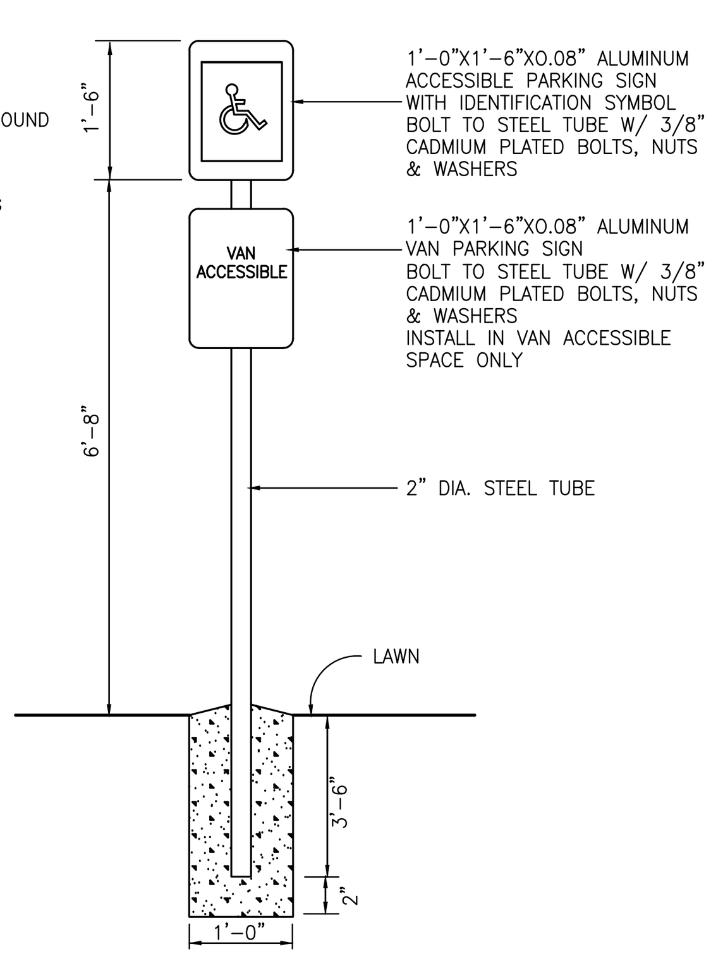


SECTION A

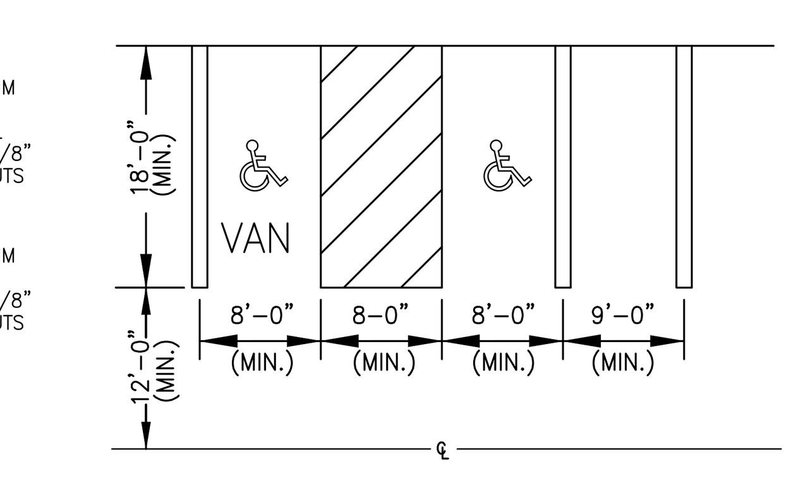
DOUBLE CONTAINER CORRAL
(NO SCALE)



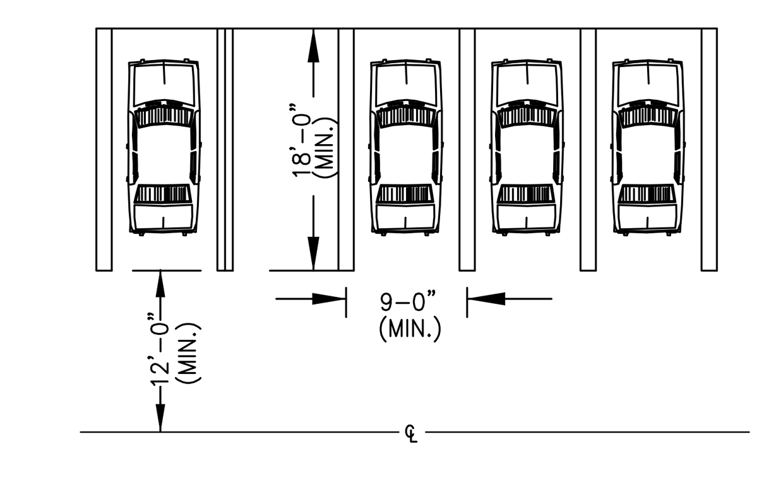
NO PARKING SIGN DETAIL
(NO SCALE)



HANDICAP PARKING SIGN DETAIL
(NO SCALE)



TYPICAL BARRIER FREE PARKING SPACE
(NO SCALE)



TYPICAL PARKING SPACE
(NO SCALE)

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3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 (TOLL FREE) FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

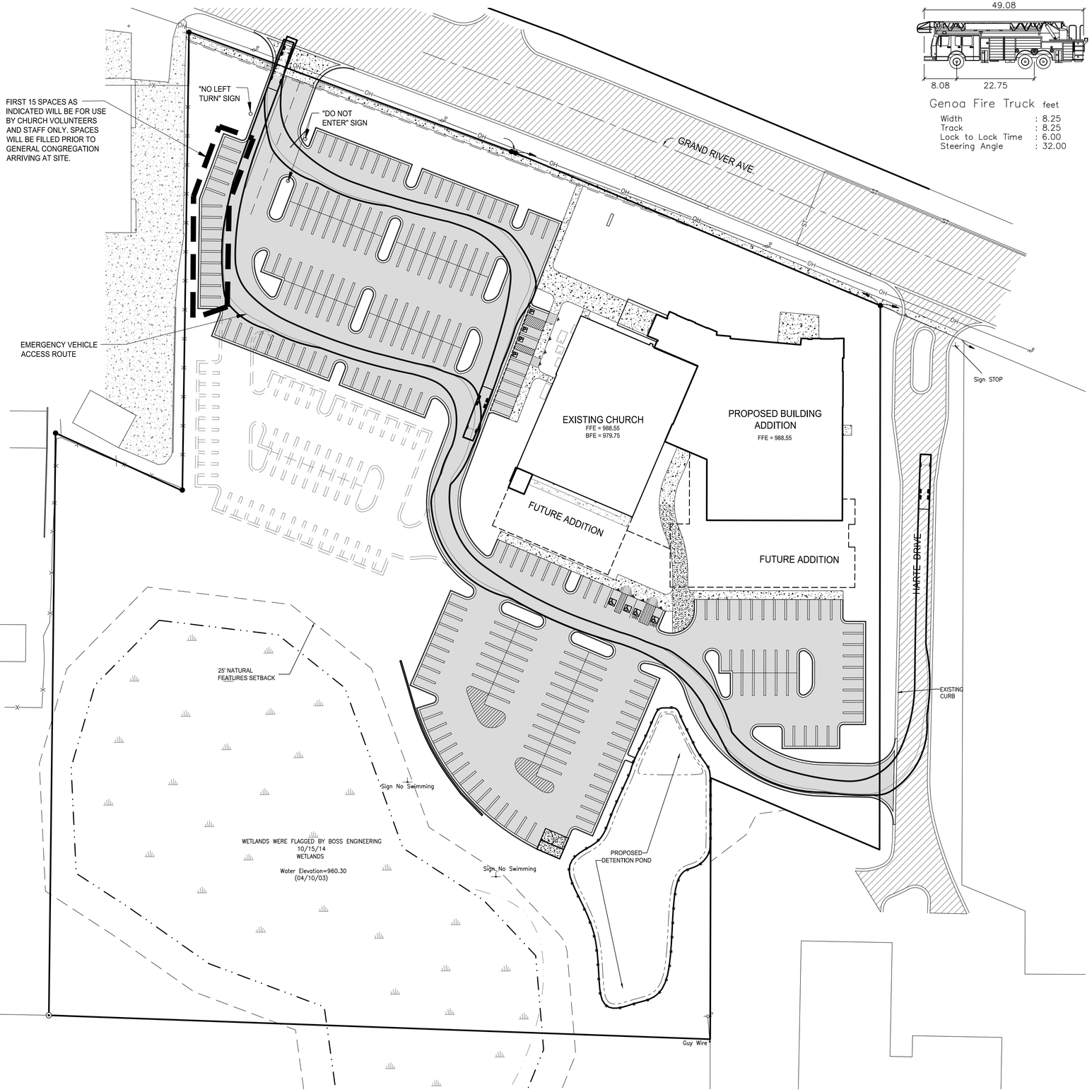
PROJECT: COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR: COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255

TITLE: SITE PLAN

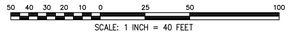
NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

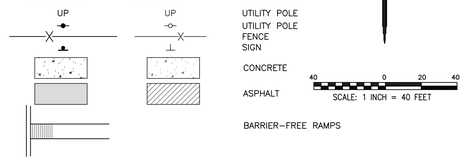
DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C3



Genoa Fire Truck feet

Width	: 8.25
Track	: 8.25
Lock to Lock Time	: 6.00
Steering Angle	: 32.00





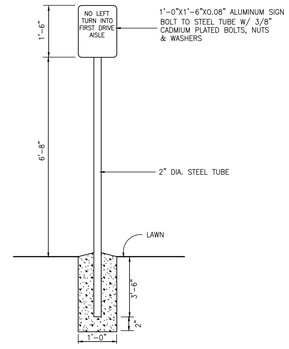
NOTES:

1. SIGNAGE WILL BE INSTALLED AT SPECIFIC LOCATIONS ON THE SITE TO HELP THE FLOW OF TRAFFIC.
2. COMMUNITY BIBLE CHURCH SERVICE TIMES ARE AT 9:30AM AND 11AM ON SUNDAYS.
3. 2|42 CHURCH LOCATED TO THE EAST OF COMMUNITY BIBLE CHURCH HAS SERVICE TIMES OF 9AM, 10:30AM, AND 12PM ON SUNDAYS AND 4PM AND 5:30PM ON SATURDAYS.
4. VOLUNTEER PARKING LOT ATTENDANTS WILL BE AVAILABLE TO HELP COORDINATE TRAFFIC PROCEDURES.
5. INSTRUCTIONAL PAMPHLETS SHALL BE DISTRIBUTED TO CONGREGATION MEMBERS EXPLAINING SITE CIRCULATION AND PROCEDURES BEFORE CONSTRUCTION IS COMPLETED. SERVICES LEADING UP TO COMPLETION DATE OF CONSTRUCTION AND SERVICES IMMEDIATELY FOLLOWING FIRST USE OF PROPOSED PARKING LOTS WILL ADDRESS PARKING RELATED ITEMS. THE FOLLOWING ITEMS WILL BE DISCUSSED:

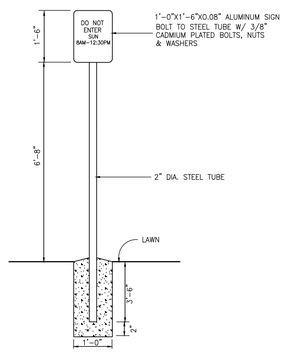
   -AVOIDANCE OF CAR STACKING ONTO GRAND RIVER.
   -NO LEFT TURNS INTO FIRST DRIVE AISLE AFTER ENTERING THE SITE FROM GRAND RIVER.
   -ETIQUETTE FOR ALLOWING FRONT PARKING LOT DRIVE LANES EXIT AFTER SERVICE.
   -BEST EXIT / ENTRANCE TO USE BASED UPON DIRECTION OF TRAVEL.
   -DESIGNATION OF SPACES TO BE DEDICATED TO CHURCH VOLUNTEER AND STAFF.

CHURCH MEMBER TRAVELING DIRECTION NOTE:

BASED UPON CURRENT CHURCH CONGREGATION ADDRESSES FORTY TWO PERCENT (42%)OF MEMBERS WILL TRAVEL FROM THE EAST TO ARRIVE AT THE SITE AND TURN LEFT INTO THE SITE. FIFTY EIGHT PERCENT (58%) WILL BE TRAVELING FROM THE WEST AND TURN RIGHT INTO THE SITE.



"NO LEFT TURN" SIGN DETAIL
(NO SCALE)



"DO NOT ENTER" SIGN DETAIL

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BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
IT'S NOT ONLY THE LAW, IT'S COMMON SENSE
WORKING DAYS

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PROJECT
COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255

TITLE
ON-SITE TRAFFIC CIRCULATION PLAN

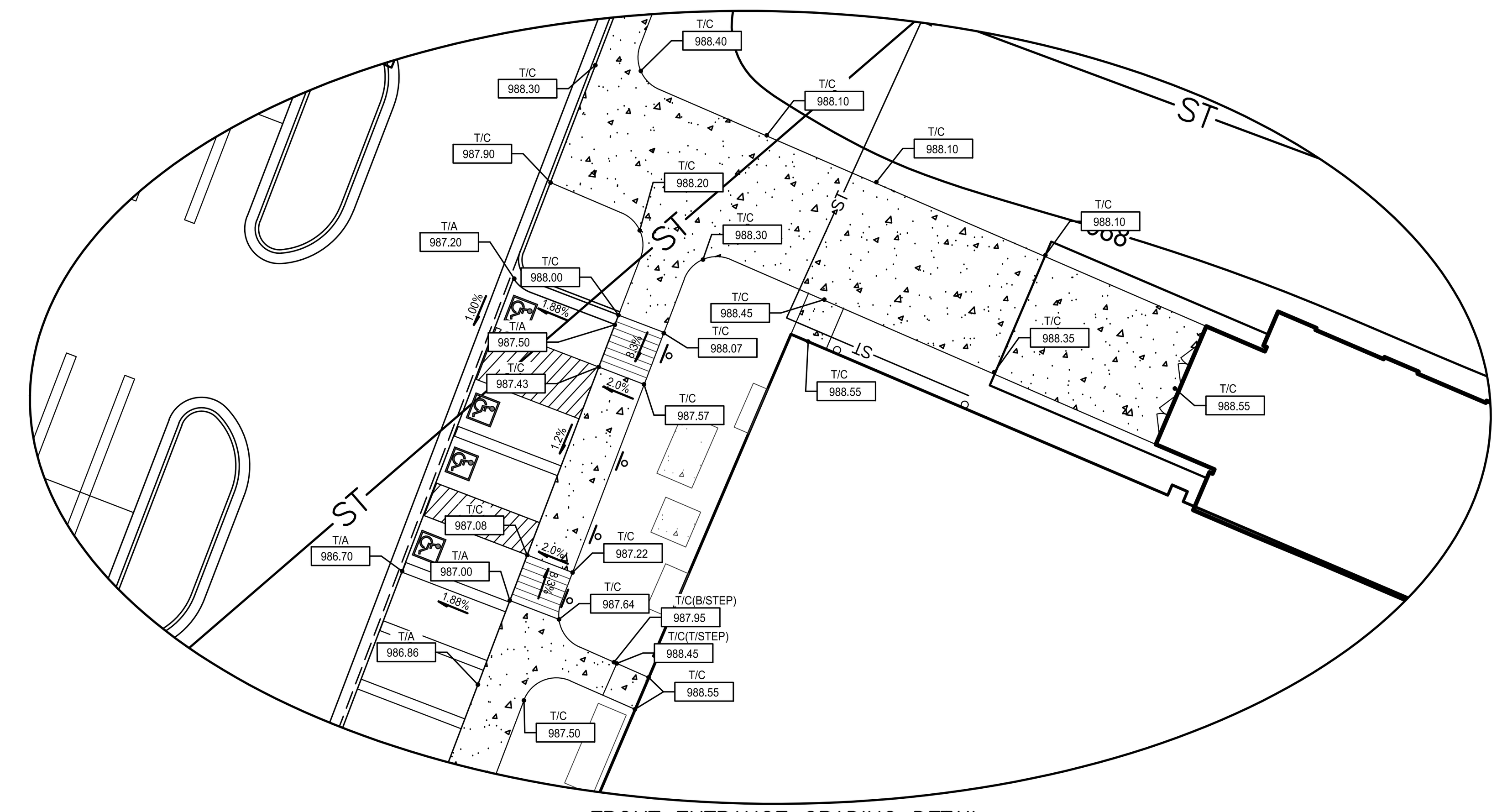
NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C3A

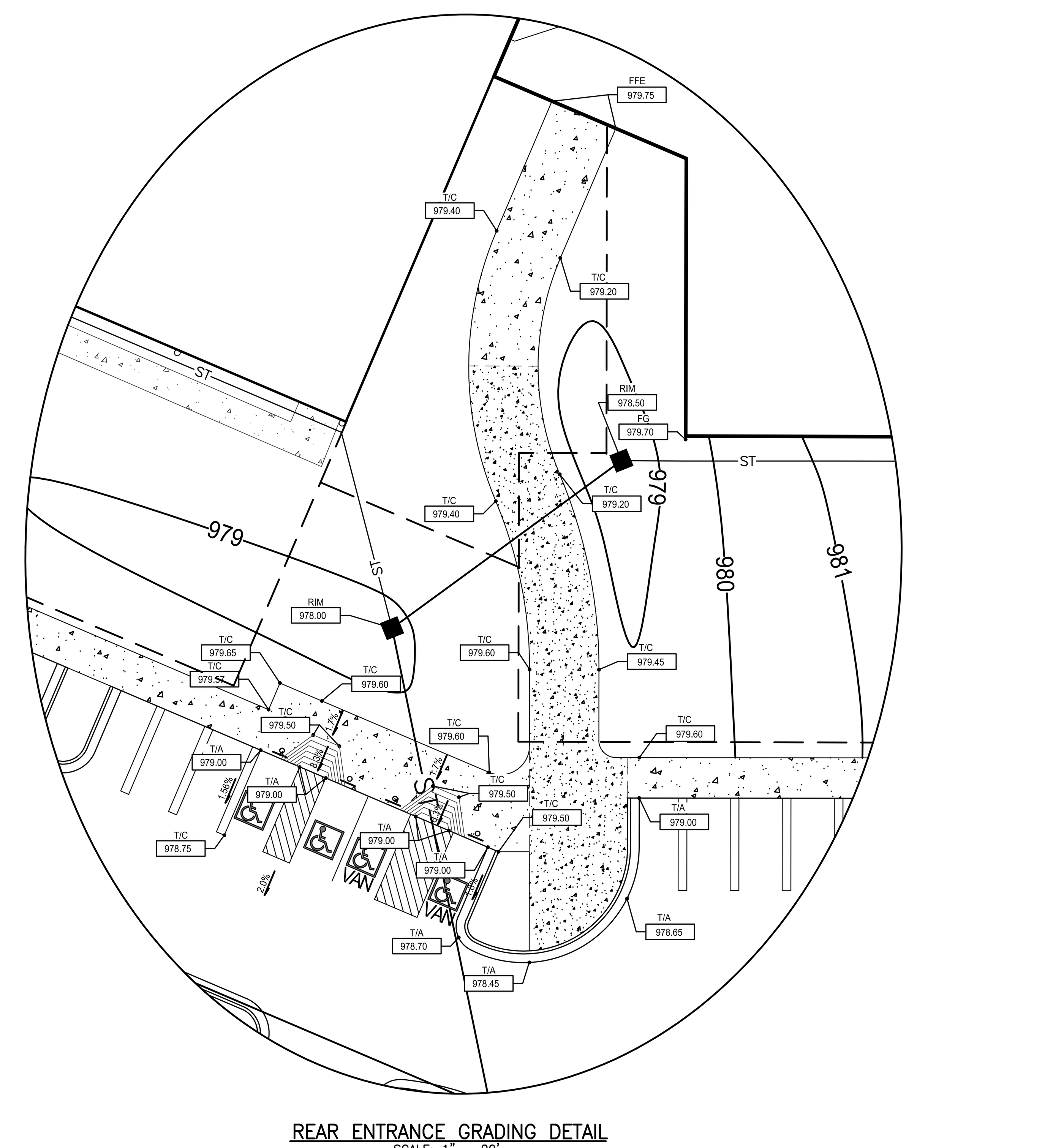
BOSS Engineering

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
		STORM DRAINAGE FLOW
T/C XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
OH	OH	OVERHEAD WIRE
		MANHOLE
		INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
		FENCE
		SIGN
CB 01		STORM SEWER LABEL
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY



FRONT ENTRANCE GRADING DETAIL
SCALE: 1" = 20'



REAR ENTRANCE GRADING DETAIL
SCALE: 1" = 20'

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PROJECT
COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255

TITLE
GRADING PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C4

LIVINGSTON COUNTY SOIL EROSION PERMIT TEMPLATE
TEMPORARY CONTROLS AND SEQUENCE

1. NOTIFY LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE 24 HOURS PRIOR TO START OF GRADE WORK.
2. IN ACCORDANCE WITH PUBLIC ACT NO. 53, OF 1974 THE PERMIT HOLDER SHALL CALL MISS DIG FOR STAKING AND LOCATING OF UTILITIES, AT LEAST 72 HOURS IN ADVANCE OF THE START OF ANY WORK.

PERMITTING STANDARDS

3. (IMPORTANT NOTICE) RETENTION/DETENTION PONDS SHALL BE EXCAVATED, TOPSOILED, SEEDED, MULCHED AND TACKED PRIOR TO THE START OF MASSIVE EARTH DISRUPTION. INGRESS/EGRESS MUST HAVE LARGE CRUSHED ROCK TO REDUCE THE TRACKING OF SOIL ONTO THE PUBLIC TRAFFIC AREAS. SEE DETAIL ITEMS BELOW.
4. 36" M.D.O.T SPECIFICATION TYPE SILT FABRIC FENCE AS SHOWN ON PLANS SHALL BE PLACED AND MAINTAINED ALONG PERIMETER ON ALL LOW LYING AREAS OF THE CONSTRUCTION SITE TO FILTER RUNOFF BEFORE LEAVING PROJECT SITE.

5. ALL TEMPORARY EROSION CONTROL DEVICES AS NOTED ON PLANS SHALL BE INSTALLED PRIOR TO THE START OF MASSIVE EARTH DISTRIBUTION.
6. PLAN DOES DENOTE A DETAILED EROSION CONTROL DEVICE TO RESTRICT TRACKING OF MATERIAL ONTO THE HIGHWAY. STONE DIAPERS SHALL BE INSTALLED AT ALL INGRESS/EGRESS AREAS OF THE SITE PRIOR TO THE START OF MASSIVE EARTH DISRUPTION. DIAPERS SHALL BE OF CRUSHED STONE AND SHALL HAVE A MINIMUM LENGTH OF 100' LINEAL FEET.

RETENTION PONDS

7. RETENTION/DETENTION/SEDIMENTATION PONDS SHALL BE EXCAVATED, TOPSOILED, SEEDED, MULCHED AND TACKED PRIOR TO THE START OF MASSIVE EARTH DISRUPTION.
8. DETENTION POND OUTLETS SHALL BE OF THE STANDPIPE AND STONE FILTER SYSTEM, WITH TRASH SCREEN. OUTLET FLOW SHALL NOT EXCEED 0.20 CUBIC FEET OF WATER PER SECOND/PER ACRE. POND DIKES SHALL HAVE A MINIMUM OF ONE (1) FOOT OF FREEBOARD. AN EMERGENCY SPILLWAY SHALL BE CONSTRUCTED WITHIN THE FREEBOARD LEVEL.
9. THE EMERGENCY SPILLWAY FROM THE DETENTION POND SHALL BE SODDED AND PEGGED, OR RIP RAPPED, 15 FEET PAST THE TOE OF THE SLOPE OF THE BERM.
10. DIKES AND BERMS SHALL BE FREE OF ALL ORGANIC MATTER.
11. RETENTION/DETENTION PONDS SHALL BE FENCED WITH A 4' CHAIN LINK FENCE, INCLUDING A 12' ACCESS GATE FOR MAINTENANCE UNLESS MINIMUM 5 FT. HORIZONTAL TO 1 FT. VERTICAL SIDE SLOPES ARE PROVIDED. THE FENCE SHALL BE INSTALLED AT THE OUTER PORTION OF THE BERM, TO ALLOW FOR MAINTENANCE WORK TO BE DONE INSIDE THE FENCE.
12. ALL UNIMPROVED DISTURBED AREAS SHALL BE STRIPPED OF TOPSOIL WHICH WILL BE STORED ONSITE DURING THE EXCAVATING STAGE. TOPSOIL PILES SHALL BE SEEDED AND MULCHED, OR MATTED WITH STRAW IN THE NON-GROWING SEASON, IMMEDIATELY AFTER THE STRIPPING PROCESS IS COMPLETED, TO PREVENT WIND AND WATER EROSION.
13. SOIL EROSION CONTROLS SHALL BE MONITORED DAILY BY THE ON-SITE ENGINEER, OR CONTRACTOR, WHICHEVER CASE APPLIES.

SLOPES AND DITCHES

14. ON SITE DITCHES SHALL BE OF THE FLAT BOTTOM TYPE MINIMUM WIDTH OF 2' WITH A MINIMUM OF 3 HORIZONTAL TO 1 VERTICAL SIDE SLOPES, 3:1.
15. DITCHES WITH STEEP SLOPES WILL NEED FLOW CHECKS TO PREVENT SCOURING OF THE DITCH BOTTOM. THESE SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER OR INSPECTOR.
16. SLOPES IN EXCESS OF 3 HORIZONTAL TO 1 VERTICAL SHALL NOT BE USED EXCEPT WITH A MECHANICAL DEVICE SUCH AS A RETAINING WALL, TERRACING, OR OTHER PRIOR APPROVED DEVICE.

STORM DRAINS

17. ALL STORM WATER STRUCTURES, CATCH BASINS AND/OR MANHOLES, IF BLOCK, SHALL BE PLASTERED ON BOTH THE INSIDE AND OUTSIDE OF THE STRUCTURES. GROUTING AND POINTING WILL BE NECESSARY AT THE CASTING AND STRUCTURE JOINT TO PREVENT LEAKAGE AND THE RESULTING SOIL MOVEMENT, AROUND THE STRUCTURE.
18. STORM WATER INLETS SHALL HAVE AS A TEMPORARY CONTROL A STRAW BALE BARRIER AND STONE FILTER INSTALLED AROUND THE INLET DURING CONSTRUCTION. AS AN ALTERNATIVE TO THE STRAW BALE BARRIER, A BURLAP AND PEA STONE FILTER MAY BE USED. THREE LAYERS OF BURLAP FIBER AND A FILTER OF PEA STONE MINIMUM 1 FT. IN DEPTH CAN BE USED. DUE TO THE POROSITY OF THE BURLAP FILTER THE MINIMUM OF 1 FT. OF STONE IS VERY IMPORTANT. THE CONTROL SHALL BE INSTALLED AS SOON AS THE STRUCTURE IS BUILT AND INSPECTED DAILY.
19. BURLAP AND PEA STONE FILTERS WILL NEED TO BE CHANGED AFTER EACH RAINFALL.
20. COUNTY CODE REQUIRES A MINIMUM PIPE SIZE OF 12" IN DIAMETER. IF SMALLER PIPE IS NEEDED FOR OUTLET PURPOSES THE 12" CAN BE BAFFLED TO THE CORRECT SIZE. ALL PIPE SHALL MEET THE 12" DIAMETER CODE SIZE.
21. ALL STORM DRAIN OUTLETS 15" IN DIAMETER OR LARGER SHALL HAVE ANIMAL GUARDS INSTALLED TO PREVENT ENTRANCE TO THE SYSTEM.
22. ALL STORM DRAINAGE PIPE 30" IN DIAMETER OR LARGER SHALL BE POINTED, AT THE JOINTS ON THE INSIDE WITH MORTAR, AFTER BACKFILLING.
23. ALL STORM DRAIN OUTLETS THAT DO NOT EMPTY INTO THE RETENTION/DETENTION POND SHALL HAVE A TEMPORARY 5'X10'X3' SUMP INSTALLED AT THE TERMINATION OF THE STORM SEWER. UPON COMPLETION OF THE STABILIZATION WORK THE SUMP AREA SHALL BE FILLED AND RIP RAPPED WITH COBBLE STONE. SILT TRAPS SHALL BE INSPECTED AFTER EACH STORM.
24. STORM WATER OUTLETS DO DENOTE RIP RAP. ALL OUTLETS SHALL BE RIP RAPPED OVER KEYED FILTER FABRIC WITH A MINIMUM OF 15 SQ. YARDS OF 6" OR LARGER COBBLE STONE.
25. RIP RAP AS NOTED ON THE PLAN SHALL BE OF A FUNNEL SHAPE CONSTRUCTION, WIDTH SHALL INCREASE AS DISTANCE FROM THE OUTLET POINT INCREASES AT A 3:1 RATIO.
26. RIP RAP SHALL BE OF COBBLE STONE, 6" IN DIAMETER OR LARGER. GROUTING MAY BE NECESSARY, AND SHALL BE A MINIMUM OF 6" IN DEPTH WITH THE COBBLE SET IN THE CEMENT SLURRY.
27. STORM WATER OUTLET IS IN NEED OF A SPLASH BLOCK WHICH IS NOT NOTED ON THE PLAN. INSTALL SPLASH BLOCK IF SLOPE OF THE PIPE IS 4% OR GREATER.
28. IT WILL BE NECESSARY FOR THE DEVELOPER TO HAVE THE STORM DRAINAGE LINES CLEANED PRIOR TO FINAL INSPECTION BY THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE. IF REQUIRED, THIS WORK SHALL BE DONE BY A PROFESSIONAL SEWER CLEANING FIRM AND CERTIFIED IN WRITING BY THE PROJECT ENGINEER. ALL SUMPS AND TEMPORARY SILT TRAPS SHALL ALSO BE CLEANED AT THIS TIME.

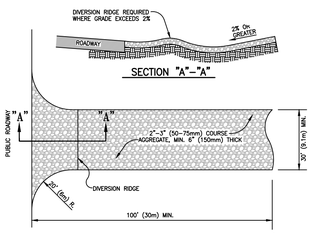
STABILIZATION

29. ALL UNIMPROVED DISTURBED AREAS SHALL BE RE-TOP SOILED, WITH A MINIMUM OF 3" OF MATERIAL, SEEDED, MULCHED AND TACKED WITHIN 15 DAYS OF THE COMPLETION OF THE MASSIVE EARTH DISRUPTION. IN THE NON-GROWING SEASON STRAW MATTING WILL SUFFICE. HYDROSEEDING WILL BE AN ACCEPTABLE ALTERNATE FOR MULCHING. EXTREME CARE SHOULD BE EXERCISED IN SPRING AND FALL PERIODS AS A FROST WILL BREAK THE BIND OF THE HYDROSEEDING, WHICH WILL AFFECT THE EFFECTIVENESS OF THIS PROCEDURE.
30. IN THE NON-GROWING SEASON, TEMPORARY STABILIZATION OF MASSIVELY EXPOSED AREAS FOR WINTER STABILIZATION SHALL BE DONE WITH STRAW MATTING.
31. PERMIT FEES DURING THE WINTER PERIOD OF NON-CONSTRUCTION, (DECEMBER 1 THROUGH MARCH 31), SHALL NOT BE IMPOSED IF THE PERMIT HOLDER TEMPORARILY STABILIZES THE EXPOSED AREAS WITH STRAW MATTING, AND OTHER APPROVED CONTROLS, AND OBTAINS A WINTER STABILIZATION CERTIFICATE FROM THIS OFFICE.
32. PERIODIC INSPECTIONS WILL BE MADE THROUGHOUT THE COURSE OF THE PROJECT. IT WILL BE THE RESPONSIBILITY OF THE MANAGERS OF THE PROJECT TO CONTACT THIS OFFICE FOR THE FINAL INSPECTION AT THE END OF THE PROJECT.
33. THIS COMMERCIAL PERMIT IS VALID FOR THE MASS EARTH MOVEMENT, THE INSTALLATION OF ROADS, DRAINS, AND UTILITIES AND IS NOT FOR ANY SINGLE FAMILY RESIDENCE. ALL RESIDENTIAL BUILDERS WILL NEED TO SECURE WAIVERS AND OR PERMITS AS NECESSARY FOR EACH LOT IN THIS DEVELOPMENT AT THE TIME APPLICATION FOR SINGLE FAMILY RESIDENCE IS MADE.
34. THE ISSUING BUILDING DEPARTMENT SHALL NOT ISSUE THE CERTIFICATE OF OCCUPANCY UNTIL THE FINAL INSPECTION LETTER FROM THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE HAS BEEN OBTAINED.
35. PER THE LIVINGSTON COUNTY DRAIN COMMISSIONER THE SEEDING, FERTILIZER AND MULCH MINIMUM QUANTITIES SHALL BE AS FOLLOWS:

TOP-SOIL	3" IN DEPTH
GRASS SEED	218 LBS. PER ACRE
FERTILIZER	150 LBS. PER ACRE
STRAW MULCH	3" IN DEPTH 1.5 TO 2 TONS PER ACRE (ALL MULCHING MUST HAVE A TIE DOWN, SUCH AS TACKIFIER, NET BINDING, ETC.)
HYDRO-SEEDING	HYDRO-SEEDING IS NOT ACCEPTABLE FOR SLOPES EXCEEDING 1%, IN SUCH CASES STABILIZATION SHALL BE DONE WITH SEED AND STRAW MULCH WITH A TACKIFIER.

MAINTENANCE SCHEDULE FOR SOIL EROSION CONTROLS

1. SILT FENCE SHALL BE INSPECTED WEEKLY AND AFTER EACH MAJOR STORM EVENT. MAINTENANCE SHALL INCLUDE REMOVAL OF ACCUMULATED SILT AND REPLACEMENT OF TORN SECTIONS. SILT FENCE SHALL BE REMOVED WHEN ALL CONTRIBUTING AREAS HAVE BEEN STABILIZED.
2. TRACKING PAD SHALL BE INSPECTED MONTHLY FOR ACCUMULATED DIRT. TRACKING PAD SHALL BE REPLACED WHEN THE STONES ARE CHOKED WITH DIRT. TRACKING PAD SHALL BE REMOVED IMMEDIATELY PRIOR TO THE FIRST COURSE OF ASPHALT BEING LAID.
3. DETENTION/RETENTION POND SHALL BE INSPECTED QUARTERLY ON A PERMANENT BASIS. MAINTENANCE SHALL INCLUDE SEDIMENT REMOVAL, EMBANKMENT STABILIZATION AND MAINTAINING THE OUTLET STRUCTURE IN GOOD CONDITION. NO TREES SHALL BE ALLOWED TO GROW ON THE EMBANKMENT.
4. CATCH BASINS SHALL BE INSPECTED ANNUALLY FOR ACCUMULATION OF SEDIMENT. ALL SEDIMENT MUST BE REMOVED AND DISPOSED OF PROPERLY WHEN THE SUMP IS FULL.
5. COMMON AREAS SHALL BE STABILIZED NO LATER THAN 15 DAYS AFTER GRADE WORK, PURSUANT TO RULE 1709 (5).



TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT
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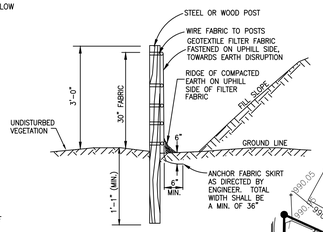

SILT FENCE DETAIL
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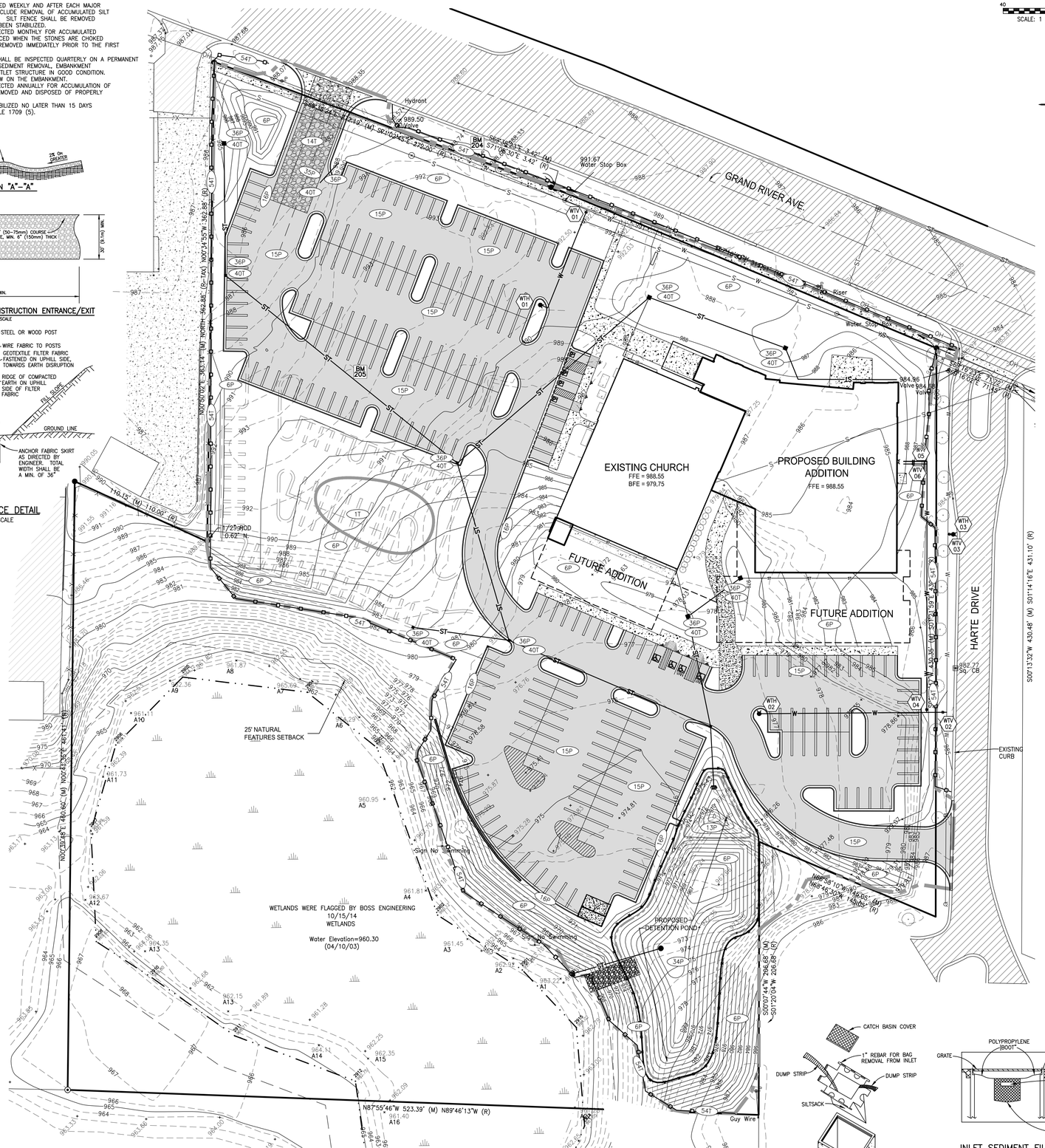

INLET SEDIMENT FILTER TEMPORARY
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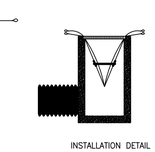

INSTALLATION DETAIL

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

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SS	SS	SANITARY SEWER
SL	SL	SANITARY LEAD
SM	SM	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
OH	OH	OVERHEAD WIRE
		MANHOLE
		INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
		FENCE
		SIGN
		STORM SEWER LABEL
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE COMPLETENESS OR ACCURACY OF THE INFORMATION SHOWN THEREON. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING ANY EXCAVATION. THE CONTRACTOR SHALL CONTACT ALL UTILITIES FOR FIELD LOCATIONS AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. IF ANY CONFLICTS EXIST BETWEEN EXISTING AND PROPOSED UTILITIES, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE DISCOVERED. IF THE CONTRACTOR DOES NOT REPORT CONFLICTS, SUBSEQUENT ADJUSTMENTS WILL BE AT THE EXPENSE OF THE CONTRACTOR AS DIRECTED BY THE ENGINEER.

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 OR 48 HOURS (EXCLUDING HOLIDAYS)

SOIL EROSION CONTROL MEASURES

1	STRIPPING & STOCKPILING TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A DIVERSION STOCKPILE SHOULD BE TEMPORARILY SEEDED
6	SEEDING WITH MULCH AND/OR MATTING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL SHOULD INCLUDE PREPARED TOPSOIL BED
13	RIP-RAP, RUBBLE, GABIONS	USED WHERE VEGETATION IS NOT EASILY ESTABLISHED EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS PERMITS RUNOFF TO INFILTRATE SOIL DISSIPATES ENERGY FLOW AT SYSTEM OUTLETS
14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THUS MINIMIZING EROSION PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS
15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VELOCITY IRREGULAR SURFACE WILL HELP SLOW VELOCITY
16	CURB & GUTTER	KEEPS HIGH VELOCITY RUNOFF ON PAVED AREAS FROM LEAVING PAVED SURFACE COLLECTS AND CONDUCTS RUNOFF TO ENCLOSED DRAINAGE SYSTEM OR PREPARED DRAINAGEWAY
34	SEDIMENT BASIN	TRAPS SEDIMENT RELEASES RUNOFF AT NON-EROSIVE RATES CONTROLS RUNOFF AT SYSTEM OUTLETS CAN BE VISUAL AMENITIES
35	STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION USE CATCH BASINS TO COLLECT RUNOFF
36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF MAY USE FILTER CLOTH OVER INLET
40	INLET SEDIMENT FILTER	EASY TO SHAPE COLLECTS SEDIMENT MAY BE CLEANED AND EXPANDED AS NEEDED
54	SILT FENCE	USES GEOTEXTILE FABRIC AND POST OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY. (SEE DETAIL THIS SHEET)

P=PERMANENT T=TEMPORARY

TOTAL DISTURBED AREA = 6.35 AC

NOTE: LCDC SESC & NPDES PERMITS REQUIRED PRIOR TO CONSTRUCTION

CONSTRUCTION SEQUENCE

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT EROSION IS MINIMIZED AND THAT COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES IS MAINTAINED THROUGHOUT EXECUTION OF THIS PROJECT.

1 DAYS	1.	INSTALL SILT FENCE AS SHOWN ON PLANS.
14 DAYS	2.	SITE DEMO
14 DAYS	3.	ROUGH GRADE AND INSTALL STORM DRAINAGE.
1 DAY	4.	INSTALL INLET PROTECTION ON STORM INLETS.
180 DAY	5.	START BLDG. CONSTRUCTION
21 DAYS	6.	INSTALL PAVEMENT, CURB, SIDEWALKS
10 DAYS	7.	FINE GRADE AROUND BUILDING, TOPSOIL, SEED/SOD AS APPLICABLE.
1 DAY	8.	REMOVE ALL EROSION CONTROL STRUCTURES.
1 DAY	9.	REMOVE ACCUMULATED SILT FROM ALL EXISTING DRAINAGE.

CONTROLS & MEASURES NARRATIVE

ACTIVITY	DESCRIPTION
MAINTAIN LANDSCAPING, REPLACE MULCH	COLLECT GRASS, TREE, AND SHRUB CLIPPINGS. DISPOSE IN APPROVED CONTAINER. REPLACE DEAD SOD, TREES AND SHRUBS.
CLEAN INLETS	REMOVE LITTER, SEDIMENT, AND DEBRIS. DISPOSE OF IN APPROVED LANDFILL.
COLLECT LITTER	DISPOSE OF WITH INLET DEBRIS.
SWEEP PARKING LOT	REMOVE MUD, DIRT, GREASE AND OIL WITH PERIODIC SWEEPING
DUST CONTROL	SPRINKLE WATER AS NEEDED

CONTROLS & MEASURES POST CONSTRUCTION SEQUENCE

ACTIVITY	WEEKLY	MONTHLY	AS REQUIRED
MAINTAIN LANDSCAPING, REPLACE MULCH	X	X	X
CLEAN INLETS		X	X
COLLECT LITTER	X		X
SWEEP PARKING LOT		X	X

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
COMMUNITY BIBLE CHURCH EXPANSION
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI. 48114
810-227-2255

PREPARED FOR

TITLE
SOIL EROSION CONTROL PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C4A

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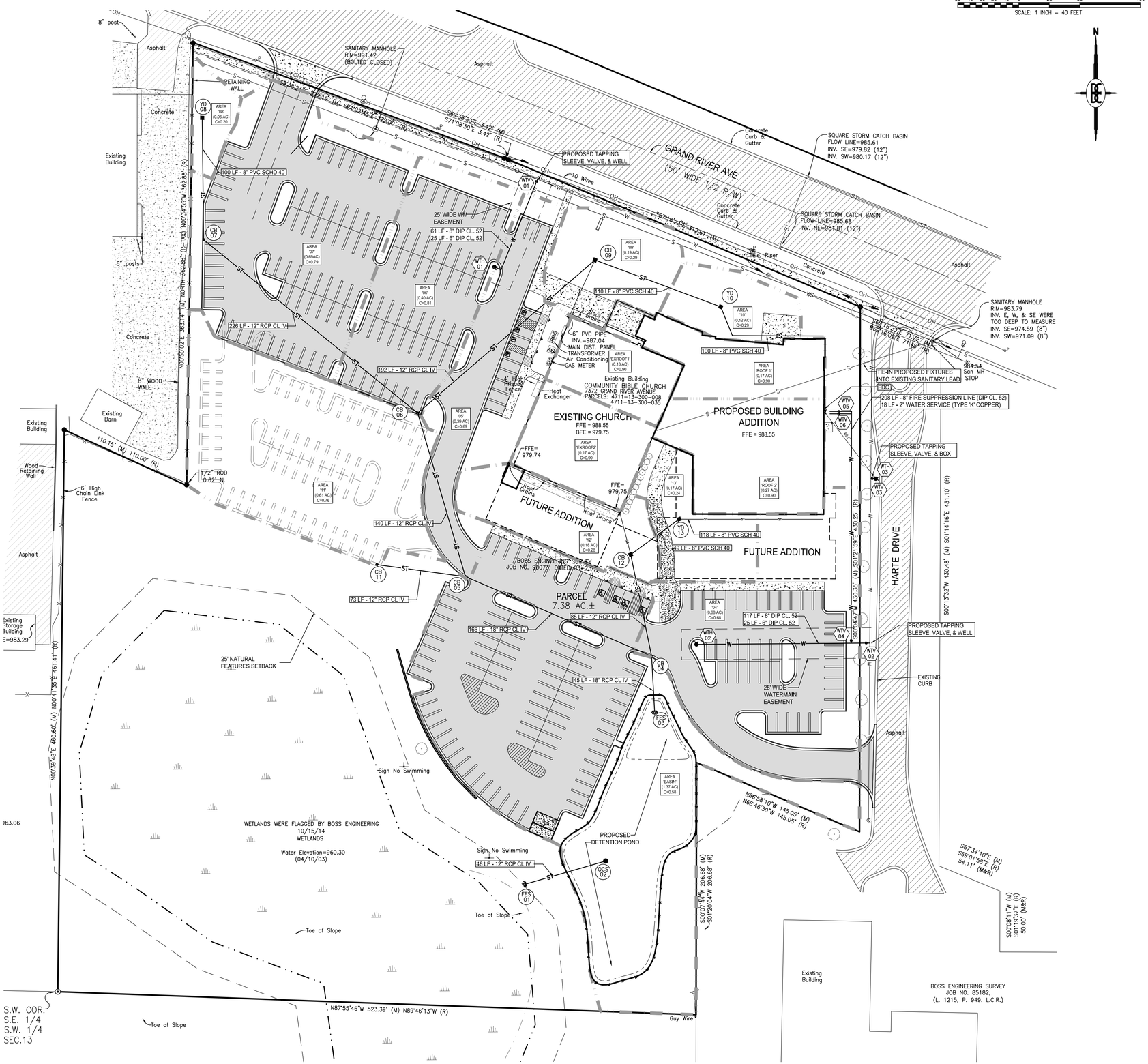

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
X X X	X X X	FENCE
		SIGN
SAN #1		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
GV 12		WATER MAIN LABEL
547		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR CONTACTING THE UTILITIES LISTED BELOW AND ANY OTHERS WHICH MAY HAVE LAID PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND. THE CONTRACTOR SHALL VERIFY THE DEPTH OF ALL UTILITIES SHOWN ON THE PLANS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
IT'S THE LAW!!! (P.A. 53 OF 1974, as amended)
IT'S A GOOD IDEA!!!

STORM SEWER STRUCTURE SCHEDULE

FES 01		
FLARED END SECTION		
INV. NE.	12 "	965.66
OCS 02		
COVER GRATE		
RIM	974.75	
INV. SW.	12 "	966.00
FES 03		
FLARED END SECTION		
INV. S.	18 "	972.00
CB 04		
4' DIA. CATCH BASIN, COVER "K"		
RIM	977.80	
INV. S.	18 "	972.79
INV. NW.	18 "	972.79
INV. N.	12 "	973.19
2' SUMP		
CB 05		
4' DIA. CATCH BASIN, COVER "K"		
RIM	979.35	
INV. SE.	18 "	974.45
INV. NW.	12 "	974.85
INV. W.	12 "	974.85
2' SUMP		
CB 06		
4' DIA. CATCH BASIN, COVER "K"		
RIM	985.50	
INV. SE.	12 "	979.75
INV. NW.	12 "	979.75
INV. NE.	12 "	979.75
2' SUMP		
CB 07		
4' DIA. CATCH BASIN, COVER "K"		
RIM	985.50	
INV. SE.	12 "	980.88
INV. N.	8 "	981.14
2' SUMP		

YD 08		
8" DIA. NYOPLAST YARD DRAIN, DOME GRATE		
RIM	985.00	
INV. S.	8 "	982.14
2' SUMP		
CB 09		
4' DIA. CATCH BASIN, COVER "E"		
RIM	987.00	
INV. SW.	12 "	982.15
INV. SW.	8 "	982.41
INV. SE.	8 "	982.41
2' SUMP		
YD 10		
12" DIA. NYOPLAST YARD DRAIN, DOME GRATE		
RIM	986.50	
INV. NW.	8 "	983.51
INV. SE.	8 "	983.51
2' SUMP		
CB 11		
2' DIA. CATCH BASIN, COVER "K"		
RIM	981.50	
INV. E.	12 "	976.31
2' SUMP		
CB 12		
4' DIA. CATCH BASIN, COVER "E"		
RIM	978.00	
INV. S.	12 "	974.25
INV. NE.	8 "	974.52
INV. NW.	8 "	974.52
2' SUMP		
YD 13		
12" DIA. NYOPLAST YARD DRAIN, DOME GRATE		
RIM	978.50	
INV. SW.	8 "	975.50
INV. E.	8 "	975.50
2' SUMP		

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COMMUNITY BIBLE CHURCH EXPANSION
PREPARED FOR
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI. 48114
810-227-2255
TITLE
UTILITY PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C5

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GENERAL LANDSCAPE NOTES:

1. ALL PLANT MATERIAL SHALL CONFORM TO THE REQUIREMENTS AND SPECIFICATIONS OF THE GOVERNING MUNICIPALITY AND SHALL BE NURSERY GROWN. ALL SIZES AND MEASUREMENTS SHALL CONFORM TO THE AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS. ALL PLANT MATERIAL SHALL BE OF SELECTED SPECIMEN QUALITY AND HAVE A NORMAL HABIT OF GROWTH. ALL PLANT MATERIAL IS SUBJECT TO APPROVAL OF THE LANDSCAPE ARCHITECT.
2. ALL PLANT MATERIALS SHALL BE BALLED AND BURLAPPED STOCK OR CONTAINER STOCK. NO BARE ROOT STOCK IS PERMITTED. ALL PLAN BALLS SHALL BE FIRM, INTACT AND SECURELY WRAPPED AND BOUND.
3. ALL PLANT BEDS SHALL BE EXCAVATED OF ALL BUILDING MATERIALS AND OTHER EXTRANEOUS OBJECTS AND POOR SOILS TO A MINIMUM DEPTH OF 12 INCHES AND BACKFILLED TO GRADE WITH PLANTING MIX (SEE BELOW).
4. PLANTING MIXTURE SHALL CONSIST OF 4 PARTS TOPSOIL FROM ON SITE, 1 PART PEAT, AND 5 POUNDS OF SUPERPHOSPHATE PER CUBIC YARD OF MIX. INGREDIENTS SHALL BE THOROUGHLY BLENDED TO A UNIFORM CONSISTENCY.
5. ALL PLANT BEDS AND INDIVIDUAL PLANTS SHALL BE MULCHED WITH A 4 INCH LAYER OF SHREDDED BARK MULCH.
6. ALL PLANTS AND PLANT BEDS SHALL BE THOROUGHLY WATERED UPON COMPLETION OF PLANTING AND STAKING OPERATIONS.
7. THE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIALS FOR A PERIOD OF 1 YEAR FROM THE DATE THE WORK IS ACCEPTED, IN WRITING,BY THE LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE, WITHOUT COST TO THE OWNER, WITHIN A SPECIFIED PERIOD OF TIME ALL DEAD PLANTS AND ALL PLANTS NOT IN A VIGOROUS, THRIVING CONDITION AS DETERMINED BY THE LANDSCAPE ARCHITECT DURING AND AT THE END OF THE GUARANTEE PERIOD. REPLACEMENT STOCK SHALL CONFORM TO THE ORIGINAL REQUIREMENTS.
8. EDGING, WHERE NOTED ON THE PLANS, SHALL BE BLACK ALUMINUM EDGING, 3/16 INCHES BY 4 INCHES. INSTALL PER MANUFACTURER'S INSTRUCTIONS. ALL EDGING SHALL BE INSTALLED IN STRAIGHT LINES OR SMOOTH CURVES WITHOUT IRREGULARITIES.
9. SOD SHALL BE DENSE, WELL ROOTED TURF, FREE OF WEEDS. IT SHALL BE COMPRISED OF A BLEND OF AT LEAST TWO KENTUCKY BLUEGRASSES AND ONE FESCUE. IT SHALL HAVE A UNIFORM THICKNESS OF 3/4 INCH, AND CUT IN UNIFORM STRIPS NOT LESS THAN 10 INCHES BY 18 INCHES. SOD SHALL BE KEPT MOIST AND LAID WITHIN 36 HOURS AFTER CUTTING.
10. ALL AREAS OF THE SITE THAT BECOME DISTURBED DURING CONSTRUCTION AND ARE NOT TO BE PAVE, STONED, LANDSCAPED, OR SODDED SHALL BE SEEDED AND MULCHED.

    SEED MIXTURE SHALL BE AS FOLLOWS:

KENTUCKY BLUEGRASS (CHOOSE 3 VARIETIES: ADELPHI, RUGBY, GLADE OR PARADE)	30%
RUBY RED OR DAWSON RED FINE FESCUE	30%
ATLANTA RED FESCUE	20%
PENNFINE PERENNIAL RYE	20%

    THE ABOVE SEED MIXTURE SHALL BE SOWN AT A RATE OF 250 POUNDS PER ACRE. PRIOR TO SEEDING, THE TOPSOIL LAYER SHALL BE FERTILIZED WITH A COMMERCIAL FERTILIZER WITH A 10–20–10 ANALYSIS:

    10% NITROGEN: A MINIMUM OF 25% FROM A UREAFORMALDEHYDE SOURCE
    20% PHOSPHATE
    10% POTASH: SOURCE TO BE POTASSIUM SULFATE OR POTASSIUM NITRATE.

    THE FIRST FERTILIZER APPLICATION SHALL BE AT A RATE OF 10 POUNDS OF BULK FERTILIZER PER 1000 SQUARE FEET.

    IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH A DENSE LAWN OF PERMANENT GRASSES, FREE OF LUMPS AND DEPRESSIONS. ANY PART OF THE AREA THAT FAILS TO SHOW A UNIFORM GERMINATION SHALL BE RESEEDED AND SUCH RESEEDING SHALL CONTINUE UNTIL A DENSE LAWN IS ESTABLISHED. DAMAGE TO SEEDED AREAS RESULTING FROM EROSION SHALL BE REPAIRED BY THE CONTRACTOR.
11. ALL AREAS OF THE SITE SCHEDULED FOR SEEDING OR SODDING SHALL FIRST RECEIVE A 4 INCH LAYER OF CLEAN, FRIABLE TOPSOIL. THIS SOIL SHALL BE DISCED AND SHALL BE GRADED IN CONFORMANCE WITH THE GRADING PLAN.
12. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION OF ALL UTILITIES AND TO INFORM THE LANDSCAPE ARCHITECT OF ANY CONFLICTS PRIOR TO COMMENCING LANDSCAPING.
13. ALL PLANT MATERIALS SHALL BE FREE OF WEEDS, INSECTS AND DISEASE.
14. ALL LANDSCAPE BEDS TO BE IRRIGATED BY UNDERWATER IRRIGATION SYSTEM.
15. A ONE FOOT WIDE MAINTENANCE DRIP EDGE IS SPECIFIED TO SURROUND THE BUILDING WITH 6–8" HANDSTONE OVER FILTER FABRIC INSTALLED WITH EDGING WHERE BORDERED BY LAWN.
16. UPRIGHT ARNOLD TULIPTREE SPECIFIED ALONG FIRE APPARATUS ACCESS ROAD. THESE TREES ARE TYPICALLY 8–10 FEET WIDE. ALL TREES WITHIN PARKING LOTS TO BE MAINTAINED AT PROPER HEIGHT TO NOT IMPEDE VIEWS OR ACCESS.

LANDSCAPE REQUIREMENTS

FRONTYARD GREENBELT

REQUIRED:
20' WIDE AND 1 TREE PER 40 LF OF FRONTAGE (583 LF FRONTAGE = 15 TREES)

PROVIDED:
16 TREES

LANDSCAPE BUFFERS

REQUIRED:
10' WIDE BUFFER TYPE 'C' FOR COMMERCIAL PROPERTIES ADJACENT TO OFFICE/COMMERCIAL REQUIRES 1 TREE OR 4 SHRUBS FOR EACH 20 LF ALONG PROPERTY LINE

PROVIDED:
WEST PROPERTY LINE TYPE 'C' (363 LF/20 LF = 18) : 16 TREES AND 8 SHRUBS
EAST PROPERTY LINE: DUE TO EXISTING TREES IN THIS LOCATION – (7) 3–4" PRUNUS CERASIFERA, (11) 8" PYRUS SPP. AND (1) 9" ACER SPP. – A BUFFER WAS NOT INCLUDED.
SOUTH PROPERTY LINE: DUE TO EXISTING WETLAND AND SCREENING VEGETATION IN THIS LOCATION (INCLUDING TREE SPECIES SUCH AS ACER, QUERCUS, POPULUS AND PICEA IN VARIED SIZES STARTING AT 6" DBH), A BUFFER WAS NOT INCLUDED.

PARKING LOT

REQUIRED:
1 CANOPY TREE AND 100 SF LANDSCAPE AREA PER 15 PARKING SPACES
250 SPACES PROPOSED/15 = 16.67 TREES REQUIRED
250 / 15 = 16.667 (* 100 SF) = 1,667 SF OF LANDSCAPE AREA REQUIRED

PROVIDED:
19 TREES AND 3,040 SF OF LANDSCAPE AREA WITHIN PARKING LOT

PARKING IN A FRONT YARD

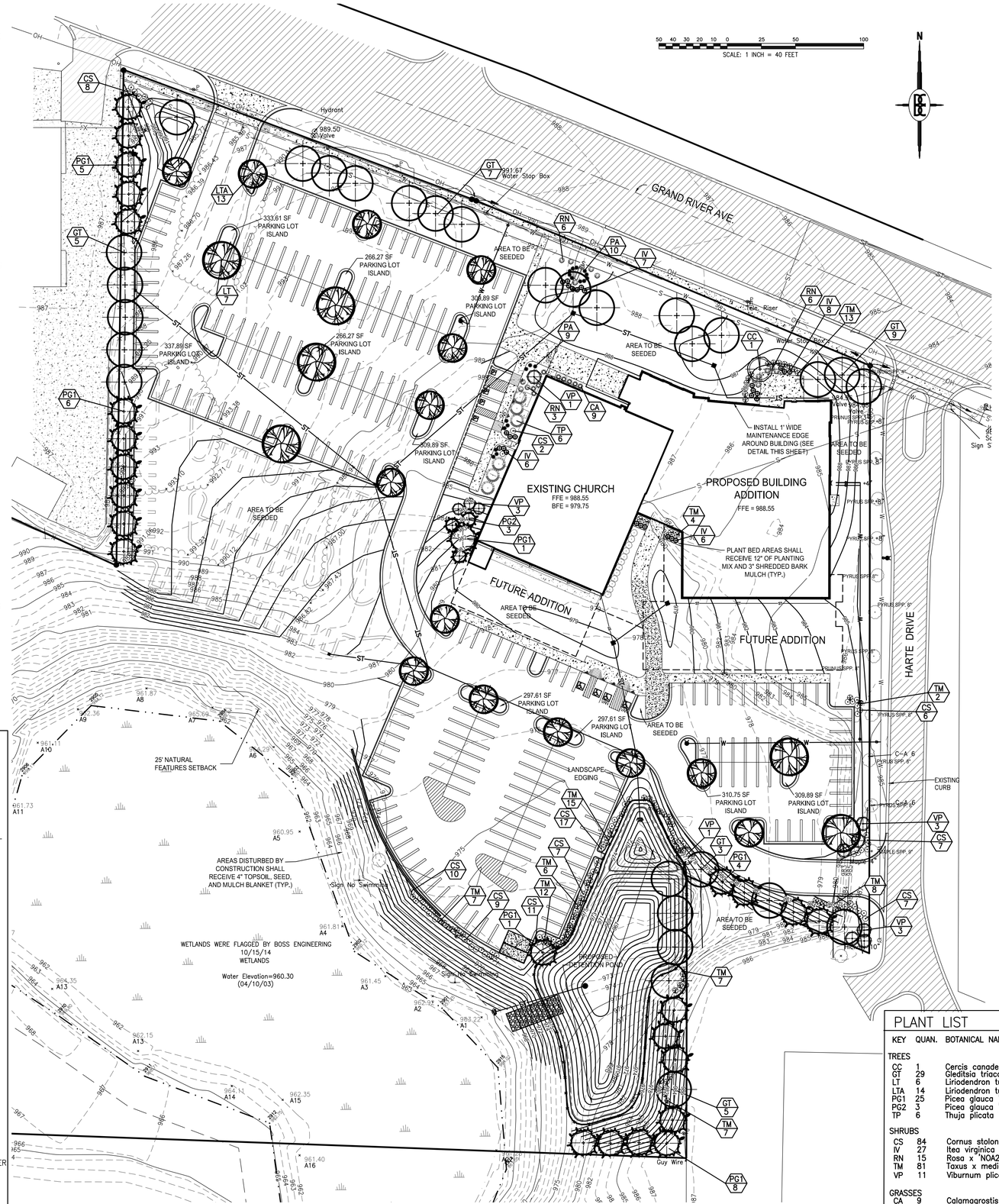
REQUIRED:
ACCORDING TO FOOTNOTE (g) TO TABLE 7.03.01 OF GENOA TWP ORDINANCE, REDUCED FRONT YARD SETBACK IS ALLOWED FOR SITES THAT DO NOT HAVE PARKING IN THE FRONT YARD AND PARKING LOT MUST BE LOCATED IN SIDE YARD NO CLOSER TO THE FRONT LOT THAN THE FRONT WALL OF THE BUILDING

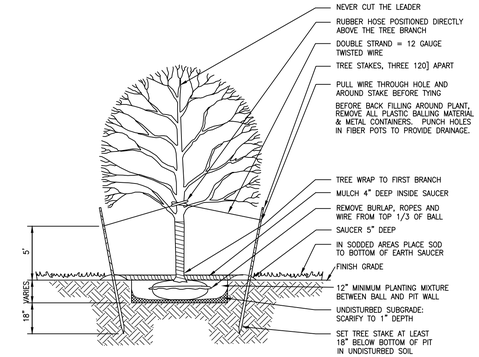
PROVIDED:
REDUCED FRONT YARD SETBACK

DETENTION POND

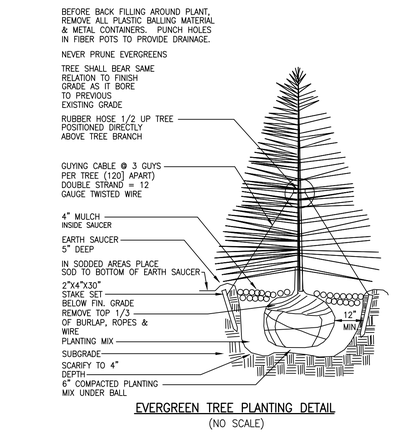
REQUIRED:
1 DECIDUOUS TREE OR EVERGREEN AND 10 SHRUBS FOR EVERY 50 LF OF POND PERIMETER
550 LF/50 LF = 11 (* 1 TREE) = 11 TREES REQUIRED
550 LF/50 LF = 11 (* 10 SHRUBS) = 110 SHRUBS REQUIRED

PROVIDED:
11 TREES AND 110 SHRUBS BASED ON 550 LF POND PERIMETER

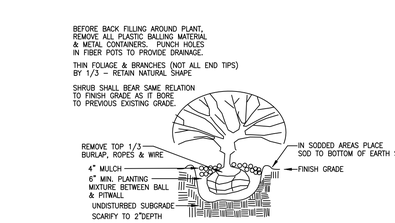




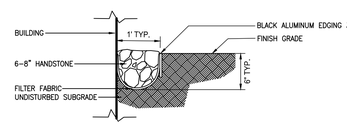
DECIDUOUS TREE PLANTING DETAIL
(NO SCALE)



EVERGREEN TREE PLANTING DETAIL
(NO SCALE)



SHRUB PLANTING DETAIL
(NO SCALE)



MAINTENANCE DRIP EDGE DETAIL
(NO SCALE)

PLANT LIST

KEY	QUAN.	BOTANICAL NAME	COMMON NAME	SIZE	REMARK
TREES					
CC	1	Cercis canadensis 'Forest Pansy'	Forest Pansy Redbud	2" Cal.	B&B
GT	29	Gleditsia triacanthos 'Inermis Suncole'	Sunburst Honeylocust	2 1/2" Cal	B&B
LT	6	Liriodendron tulipifera 'Aureomarginatum'	Majestic Beauty Tulip Tree	2 1/2" Cal	B&B
LTA	14	Liriodendron tulipifera fastigiata 'Arnold'	Arnold Tulip Tree	2 1/2" Cal	B&B
PG1	25	Picea glauca 'Densata'	Black Hills Spruce	7'–8' Hgt	B&B
PG2	3	Picea glauca 'Densata'	Black Hills Spruce	4' Hgt	B&B
TP	6	Thuja plicata 'Green Giant'	Green Giant Arborvitae	7'–8' Hgt	B&B
SHRUBS					
CS	84	Cornus stolonifera 'Farrow'	'Arctic Fire' Dogwood	36–48" Hgt	B&B
IV	27	Itea virginica 'Sprich'	'Little Henry' Sweetspire	No. 3	Cont
RN	15	Rosa x 'NOA250092'	Flower Carpet Rose – Pink Supreme	No. 3	Cont
TM	81	Taxus x media 'Densiformis'	Dense Spreading Yew	24" Hgt	B&B
VP	11	Viburnum plicatum tomentosum	Summer Snowflake Viburnum	36–48" Hgt	B&B
GRASSES					
CA	9	Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass	No. 3	Cont
PA	19	Pennisetum alopecuroides 'Hameln'	Hameln fountain grass	No. 3	Cont

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT: COMMUNITY BIBLE CHURCH EXPANSION
PREPARED FOR: COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255
TITLE: LANDSCAPE PLAN

NO	BY	REVISION PER	DATE
1	JA	PER TWP REVIEW	10-24-18

DESIGNED BY: JA
DRAWN BY: JA
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C6

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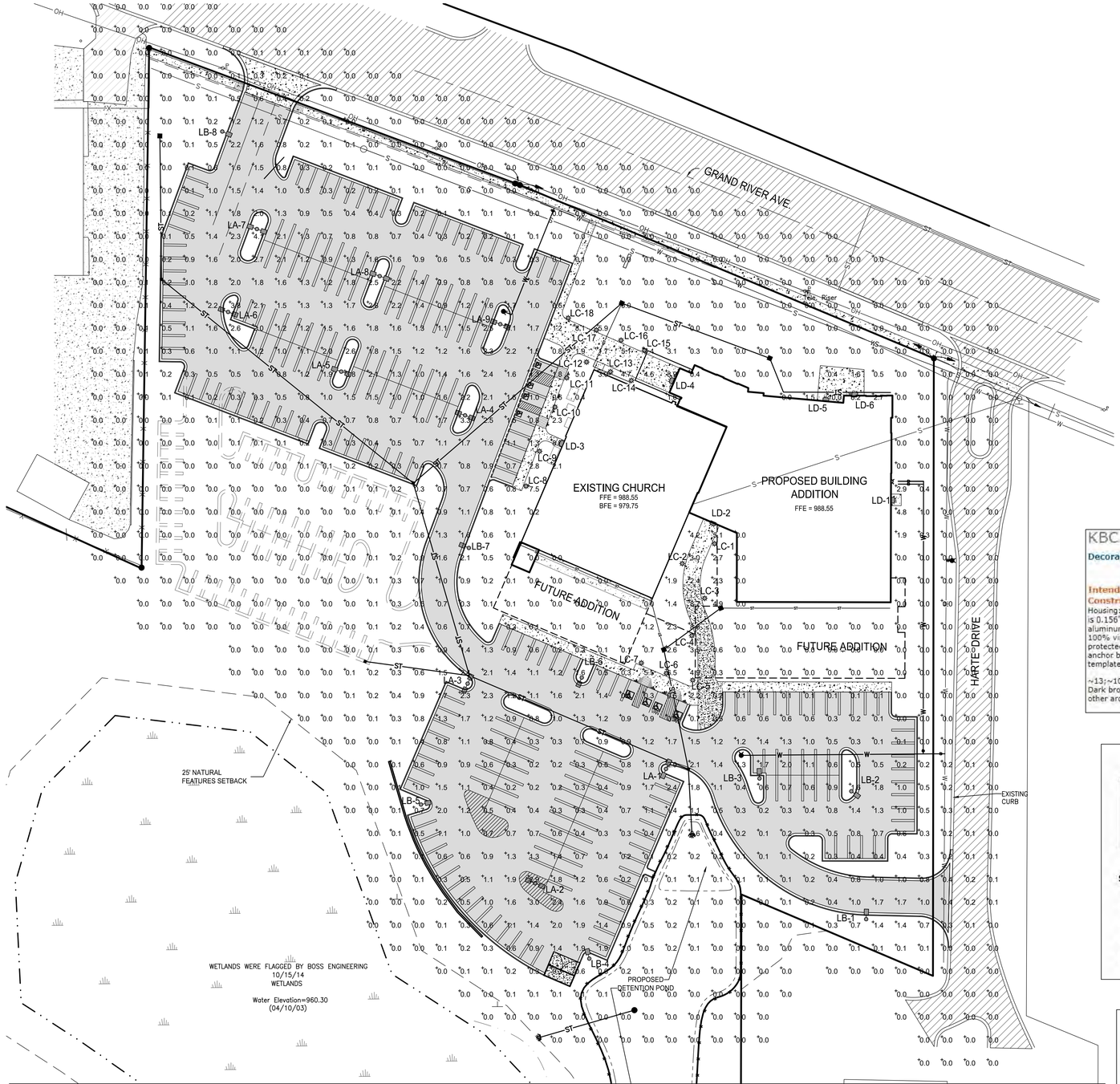
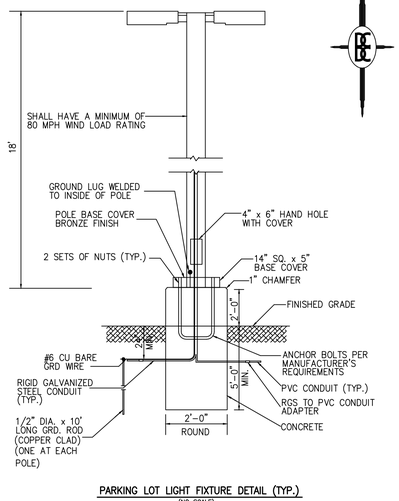


SCALE: 1 INCH = 40 FEET



PARKING LOT LIGHT FIXTURE DETAIL (TYP.)
(NO SCALE)

LEGEND

PROPOSED (PR)	EXISTING (EX)	
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
		DOUBLE FIXTURE LIGHT POLE
		SINGLE FIXTURE LIGHT FIXTURE
		WALL MOUNTED LIGHT FIXTURE
		BOLLARD LIGHT FIXTURE
+0.1		FOOT CANDLES ON SITE

SITE LIGHTING SUMMARY

LIGHTING LEVELS ARE SHOWN IN FOOTCANDLES AT GRADE
MAXIMUM PAVED LIGHT LEVEL: 10.0 FC.
MINIMUM PAVED LIGHT LEVEL: 0.4 FC.
MAX. LIGHT LEVEL AT THE PROPERTY LINE: 0.1 FC.
MIN. LIGHT LEVEL AT THE PROPERTY LINE: 0.0 FC.

GENERAL LIGHTING NOTES

1. THE LIGHTING PATTERN 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.
2. ALL POLES ARE TO BE MOUNTED ON CONCRETE PEDESTALS 2' ABOVE GRADE IN PARKING LOTS AS SHOWN IN DETAIL.
3. ALL POLES LOCATED OUTSIDE OF THE PARKING AREA SHALL BE LOCATED 3' FROM BACK OF CURB OR EDGE OF SIDEWALKS.
4. SHOP DRAWINGS FOR THE ELECTRICAL WIRING OF THE POLES NEED TO BE SUBMITTED TO THE ENGINEER FOR COORDINATION OF UNDERGROUND CONDUIT AND APPROVAL OF LAYOUT.

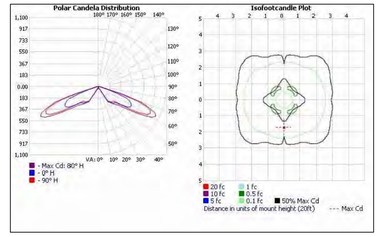
BOLLARD FIXTURE

KBC

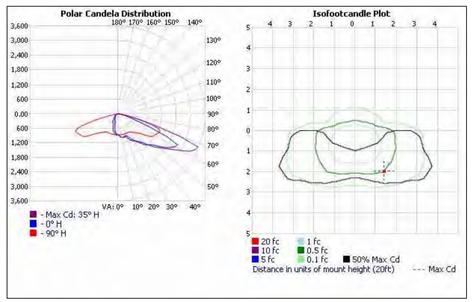
Decorative Round Bollard

Intended Use For walkways, plazas or pedestrian areas.
Construction
Housing: KB_6: Bottom housing is 0.125" extruded aluminum. Top cover is 0.156" cast aluminum. KB_8: Bottom housing is 0.156" extruded aluminum 42" overall height standard. Flush-fitting lens is 1/2", clear, 100% virgin acrylic. All exposed hardware is tamper-resistant steel protected by a 1,000 hour corrosion-resistant coating. Four 1/2" x 11" anchor bolts with double nuts/washers and 4-1/2" diameter bolt circle template provided for mounting (shipped separately).

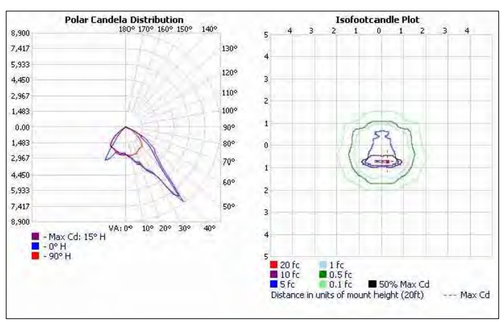
~13¡~10;
Dark bronze (DDB) corrosion-resistant polyester powder finish standard; other architectural colors available.



PARKING LOT LIGHT FIXTURE



WALL MOUNTED FIXTURES



LUMINAIRE SCHEDULE

SYMBOL	LABEL	QTY.	DESCRIPTION	CATALOG NUMBER	LAMP	LUMENS	LLF	POLE DESCRIPTION	POLE HEIGHT	BASE HEIGHT	TOTAL HEIGHT
	LA	9	(2) DSX1 LED P1 40K T4M MVOLT W/ HOUSE SHIELD	LITHONIA #DSX1 LED P1 40K T4M MVOLT HS	LED	ABSOLUTE	.93	SSA 25 6G T25 DM28 FBC BA	18'	2'	20'
	LB	8	DSX1 LED P1 40K T4M MVOLT W/ HOUSE SHIELD	LITHONIA #DSX1 LED P1 40K T4M MVOLT HS	LED	ABSOLUTE	.93	SSA 25 6G T25 DM28 FBC BA	18'	2'	20'
	LC	18	KBC8 WITH 4 LIGHT BOLLARDS (16 LED'S), 530mA DRIVER, 4000K COLOR TEMP, AND SYMMETRIC OPTIC	LITHONIA #KBC8 LED 16C 530 40K SYM MVOLT	LED	ABSOLUTE	.93		42"	0"	42"
	LD	6	ARCHITECTURAL SCONCE WITH MEDIUM THROW DISTRIBUTION WITH CLEAR FLAT GLASS LENS. COATED LAMP MEETS 'NIGHT TIME FRIENDLY' CRITERIA	LITHONIA WST 100M MD	LED	ABSOLUTE	.93		12' WALL MOUNTED	0"	12'

ALL IES FILES PROVIDED BY MANUFACTURER FOR CALCULATION OF LIGHTING LEVEL.

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255

TITLE
SITE PHOTOMETRIC PLAN

NO	BY	REVISION PER	DATE
1	CH	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 40'
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C7

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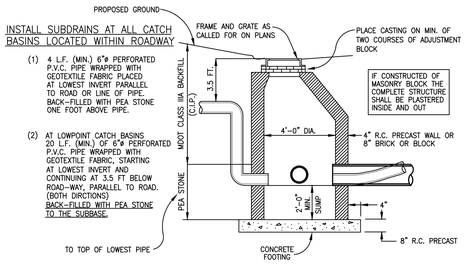
STRUCTURE FRAMES & COVERS					
COVER	TYPE	USE	MANUFACTURER OR EQUAL		TYPE OF COVER OR GRATE
			EAST JORDAN	NEENAH	
A	MH	ALL	1040	R-1916 F1	SANITARY-SELF SEALING STORM-VENTED
~~B~~	~~CB & INLET~~	~~TYPE B2 CURB~~	~~7085~~	~~R-3038-A~~	
K	CB & INLET	TYPE C & F CURB	7000-T1-M1	R-3070	FLAT GRATE WITH VERT. 4" OPEN THROAT
~~C~~	~~CB & INLET~~	~~VALLEY CURB~~	~~7065~~	~~R-3034-D~~	
~~D~~	~~CB & INLET~~	~~PARKING LOTS~~	~~1020-M1~~	~~R-2560-D~~	~~FLAT GRATE~~
E	CB & INLET	LAWN AREA OR DITCH	1020-01		BEEHIVE GRATE 4" HIGH



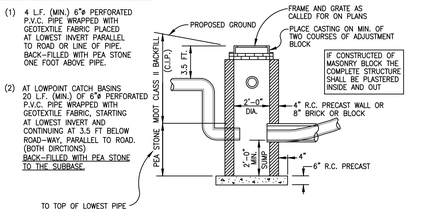
INSTALL SUBDRAINS AT ALL CATCH BASINS LOCATED WITHIN ROADWAY

(1) 4 L.F. (MIN.) 6"ø PERFORATED P.V.C. PIPE WRAPPED WITH GEOTEXTILE FABRIC PLACED AT LOWEST INVERT PARALLEL TO ROAD OR LINE OF PIPE, BACK-FILLED WITH PEA STONE ONE FOOT ABOVE PIPE.

(2) AT LOWPOINT CATCH BASINS 20 L.F. (MIN.) OF 6"ø PERFORATED P.V.C. PIPE WRAPPED WITH GEOTEXTILE FABRIC, STARTING AT LOWEST INVERT AND CONTINUING AT 3.5 FT BELOW ROAD-WAY, PARALLEL TO ROAD. (BOTH DIRECTIONS) BACK-FILLED WITH PEA STONE TO THE SUBBASE.

4 FT. DIA. CATCH BASIN W/SUMP

NO SCALE



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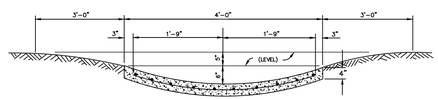
2 FT. DIA. CATCH BASIN W/SUMP

NO SCALE



W3 (NOM. DIA. 0.195") WIRE MESH 3'-6" WIDE, 4: C.-C. LONGITUDINAL & TRAVERSE WIRE SPACING

CONCRETE SPILLWAY

SCALE: NONE

NOTES

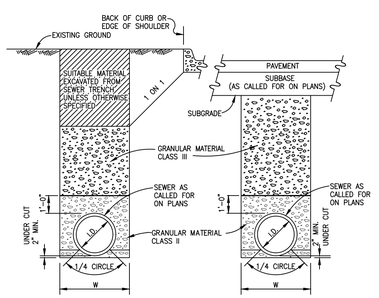
MAKE GRADUAL TRANSITION FROM STANDARD CONCRETE CURB AND GUTTER TO CONCRETE SPILLWAY

PLANE OF WEAKNESS JOINTS, NOT LESS THAN 1/8" NOR MORE THAN 1/4" IN WIDTH SHALL BE CUT IN THE PLASTIC CONCRETE. AFTER FLOATING TO A DEPTH OF NOT LESS THAN 1-1/2", SPACING SHALL BE AT UNIFORM INTERVALS OF APPROXIMATELY 4 FEET.

THE SPILLWAY ON SHOULDERS AND FORESLOPES WILL BE UNDERLAID WITH GEOTEXTILE BLANKET FROM THE BACK SIDE OF CURB AND GUTTER TO THE FAR END OF THE PLAIN RIPRAP. WHEN USING SPILLWAYS IN OTHER AREAS SUCH AS BACKSLOPES, THE GEOTEXTILE BLANKET SHALL UNDERLAY THE FULL LENGTH OF THE SPILLWAY. THE GEOTEXTILE BLANKET SHALL HAVE A MINIMUM WIDTH EQUAL TO THE WIDTH OF THE SPILLWAY.

THE SPILLWAY SHALL RECEIVE A TRANSVERSE COURSE BROOM FINISH.

WHILE CONCRETE SPILLWAY IS SHOWN ON THE FORESLOPE, IT MAY BE USED ON THE BACKSLOPE AS CALLED FOR ON THE PLANS. CONCRETE SHOULDER GUTTER WOULD BE CORRESPONDINGLY OMITTED.

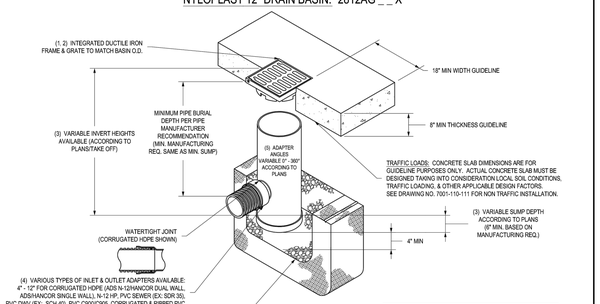


SEWER UNDER ROADBED OR WITHIN INFLUENCE OF ROADBED

(REF. MDOT DETAIL IV-83D)

NO SCALE

NYLOPLAST 12" DRAIN BASIN: 2812AG _ _ X



GRATE OPTIONS	LOAD RATING	PART #	DRAWING #
PEDESTRIAN	MEETS H-10	1299CGP	7001-110-202
STANDARD	MEETS H-20	1299CGS	7001-110-203
SOLID COVER	MEETS H-20	1299CGC	7001-110-204
PEDESTRIAN BRONZE DOME	N/A	1299CGPB	7001-110-205
DROP IN GRATE	LIGHT DUTY	1201CX	7001-110-201

1 - GRATE/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05, WITH THE EXCEPTION OF THE BRONZE GRATE.
2 - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D312 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

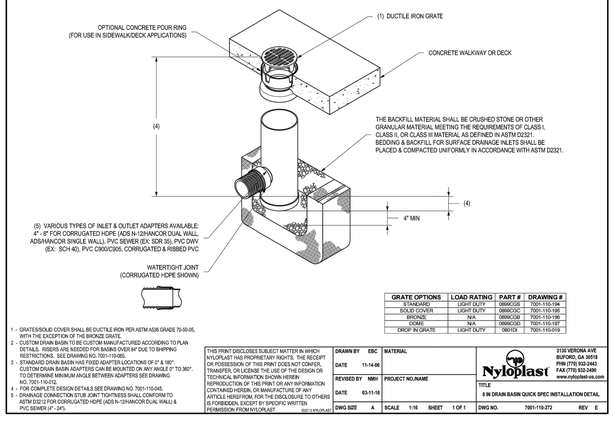
DRAWN BY	EBC	MATERIAL
DATE	03-29-06	
REVISED BY	MIH	PROJECT NO./NAME
DATE	03-11-16	
DWG SIZE	A	SCALE 1:20 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE. BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

TITLE: 12 IN DRAIN BASIN QUICK SPEC INSTALLATION DETAIL

DWG NO. 7001-110-185 REV E

NYLOPLAST 8" DRAIN BASIN: 2808AG _ _ X



GRATE OPTIONS	LOAD RATING	PART #	DRAWING #
STANDARD	LIGHT DUTY	0899CGS	7001-110-194
SOLID COVER	LIGHT DUTY	0899CGC	7001-110-195
BRONZE	N/A	0899CGB	7001-110-196
DOME	N/A	0899CGP	7001-110-197
DROP IN GRATE	LIGHT DUTY	0801CX	7001-110-019

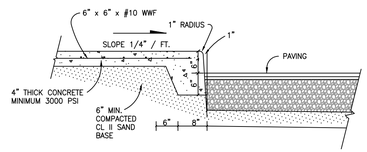
1 - GRATE/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05, WITH THE EXCEPTION OF THE BRONZE GRATE.
2 - CUSTOM DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
3 - STANDARD DRAIN BASIN HAS FIXED ADAPTER LOCATIONS OF 0° & 180°. CUSTOM DRAIN BASIN ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
4 - FOR COMPLETE DESIGN DETAILS SEE DRAWING NO. 7001-110-045.
5 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D312 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL) & PVC SEWER (4" - 24").

DRAWN BY	EBC	MATERIAL
DATE	11-14-06	
REVISED BY	MIH	PROJECT NO./NAME
DATE	03-11-16	
DWG SIZE	A	SCALE 1:16 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE. BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

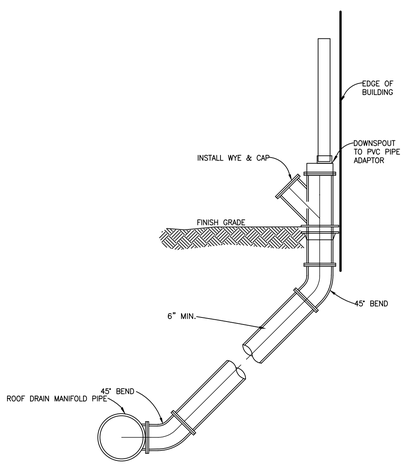
TITLE: 8 IN DRAIN BASIN QUICK SPEC INSTALLATION DETAIL

DWG NO. 7001-110-272 REV E



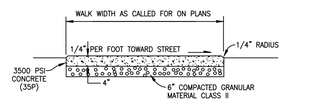
INTEGRAL CONCRETE WALK / CURB DETAIL

(NO SCALE)



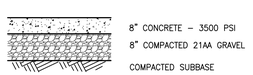
ROOF DRAIN CLEANOUT DETAIL

NO SCALE



4" CONCRETE SIDEWALK

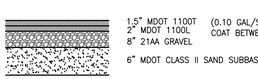
(NO SCALE)



CONCRETE PAVEMENT CROSS SECTION

NOTE: FOR DUMPSTER PAD AND FIRE ACCESS SIDEWALK

(NO SCALE)

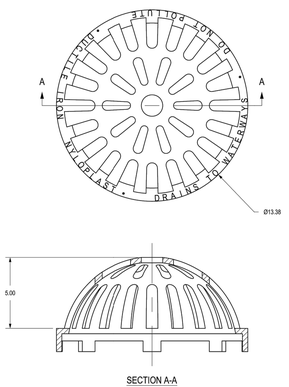


ASPHALT SECTION

(NO SCALE)

1299CGD

APPROX. DRAIN AREA = 82.87 SQ.IN
APPROX. WEIGHT = 18.50 LBS



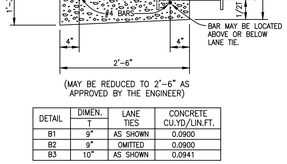
DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOOKING DEVICE AVAILABLE UPON REQUEST

DRAWN BY	EBC	MATERIAL
DATE	3-6-06	DUCTILE IRON
REVISED BY	EBC	PROJECT NO./NAME
DATE	3-10-11	
DWG SIZE	A	SCALE 1:4 SHEET 1 OF 1

Nyloplast — 3130 VERONA AVE. BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com

TITLE: 12 IN DOME GRATE

DWG NO. 7001-110-206 REV D

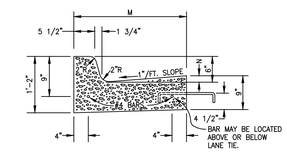


(MAY BE REDUCED TO 2'-6" AS APPROVED BY THE ENGINEER)

DETAIL	DIMEN. T	LANE TIES	CONCRETE CU.YD/LIN.FT.
B1	9"	AS SHOWN	0.0900
B2	9"	OMITTED	0.0900
B3	10"	AS SHOWN	0.0941

GRAND RIVER R.O.W. ONLY MDOT B-2 CURB DETAIL

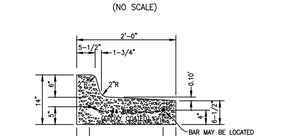
(NO SCALE)



DETAIL	DIMENSIONS M	N	LANE TIES	CONCRETE CU.YD/LIN.FT.
F1	1'-6"	7/8"	AS SHOWN	0.0484
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737

CONCRETE CURB & GUTTER TYPE F

(NO SCALE)



MODIFIED BARRIER (M.D.O.T. TYPE F4)

(NO SCALE)

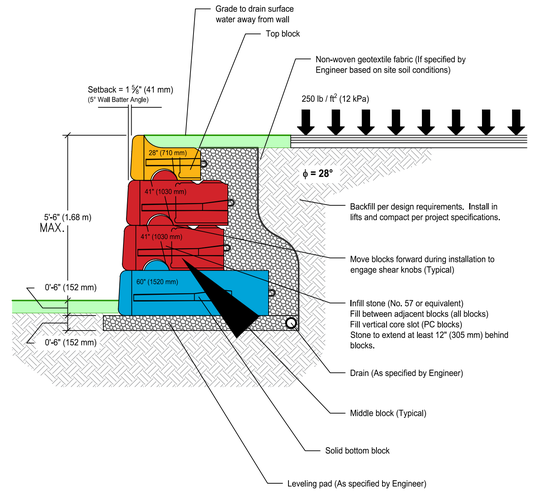
ϕ = 28° | SILTY SAND or CLAYEY SAND

LOAD CONDITION B | 250 lb/ft² (12 kPa) LIVE LOAD SURCHARGE, NO BACK SLOPE, NO TOE SLOPE

4 BLOCK HIGH SECTION
(1) 28" (710 mm) Block
(2) 41" (1030 mm) Blocks
(1) 60" (1520 mm) Block

COLOR: BEIGE

PRELIMINARY
Professional Engineering Design Required for Construction



This drawing is for reference only. Determination of the suitability and/or manner of use of any details contained in this document is the sole responsibility of the design engineer of record. Final project designs, including all construction details, shall be prepared by a licensed professional engineer using the actual conditions of the proposed site. Final wall design must address both internal and external drainage and all modes of wall stability.

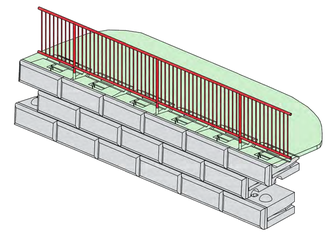
DRAWN BY:	C. Kruger
APPROVED BY:	J. Johnson
DATE:	June 10, 2015
SHEET:	1 of 1

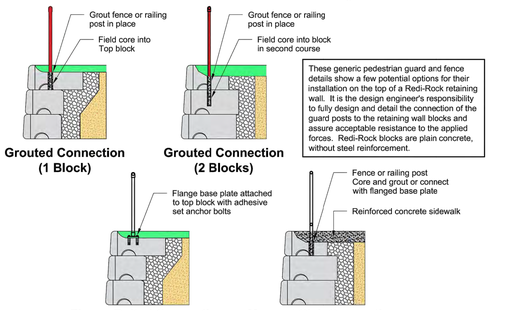
TITLE: **Preliminary Wall Section**
Silty Sand or Clayey Sand, ϕ = 28°
250 lb/ft² (12 kPa) Live Load Surcharge

FILE: B_28_B_60_72_cad.dwg

REDI-ROCK® 05481 US 31 SOUTH, CHARLEVOIX, MI 49720 (866) 222-8400 ext 3010 • engineering@redi-rock.com www.redi-rock.com

Fence or Pedestrian Guard Connection Options





These generic pedestrian guard and fence details show a few potential options for their installation on the top of a Redi-Rock retaining wall. It is the design engineer's responsibility to fully design and detail the connection of the guard posts to the retaining wall blocks and assure acceptable resistance to the applied forces. Redi-Rock blocks are plain concrete, without steel reinforcement.

This drawing is for reference only. Determination of the suitability and/or manner of use of any details contained in this document is the sole responsibility of the design engineer of record. Final project designs, including all construction details, shall be prepared by a licensed professional engineer using the actual conditions of the proposed site.

DRAWN BY:	JRJ
APPROVED BY:	JRJ
DATE:	06-22-2015
SHEET:	1 of 1

TITLE: Fence or Pedestrian Guard Connection Options

FILE: 5 Fence or Pedestrian Guard Connection Options 062215.dwg

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BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR LOCATING ALL UTILITIES AND STRUCTURES AND SHALL PROTECT THEM FROM DAMAGE AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. IF ANY CONFLICTS ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER. ANY CONFLICTS ARE NOT THE RESPONSIBILITY OF THE ENGINEER UNLESS SHOWN ON THE PLANS.

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PROJECT: COMMUNITY BIBLE CHURCH EXPANSION
PREPARED FOR: COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810-227-2255

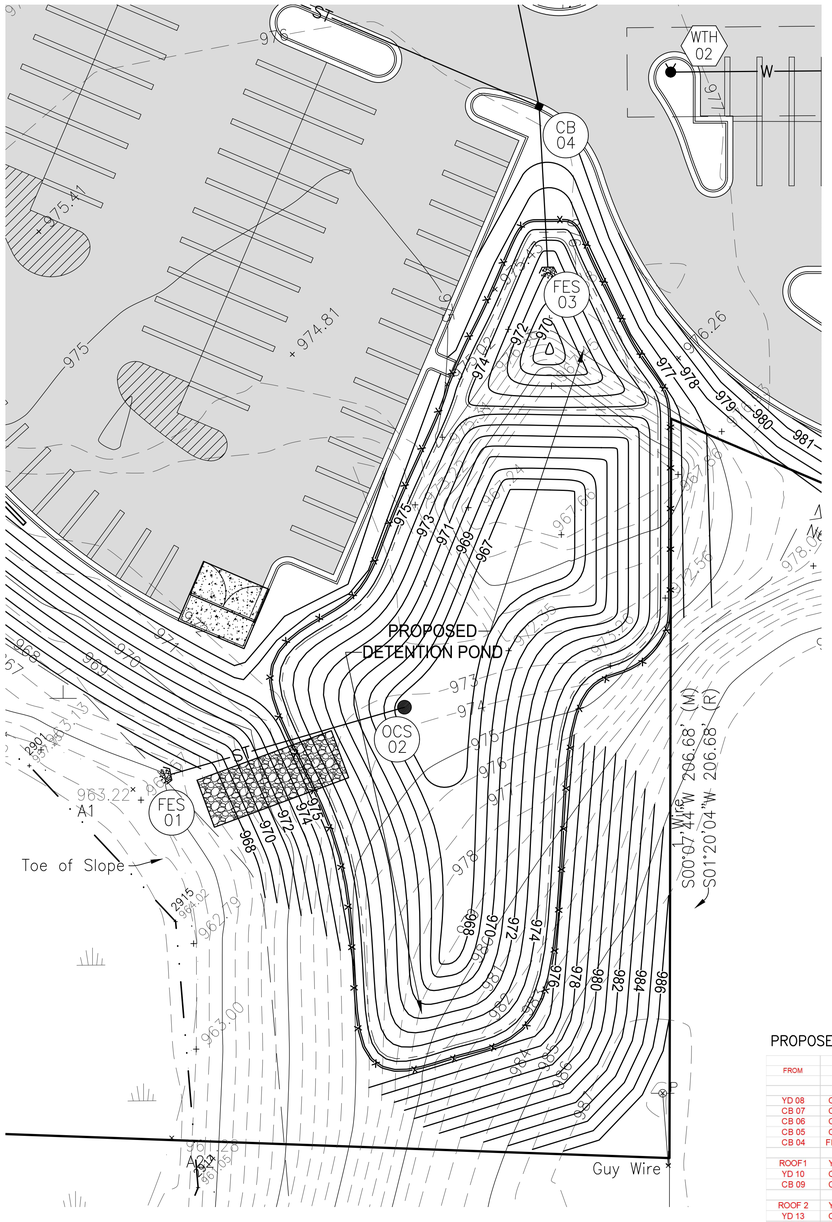
TITLE: CONSTRUCTION NOTES & DETAILS

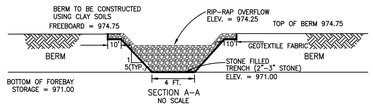
NO	BY	DATE
1	ST	10-24-18
		PER TWP REVIEW
		REVISION PER

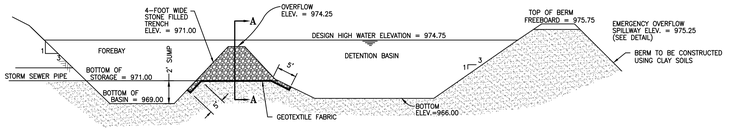
DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE NTS
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C8

BOSS Engineering

G:\14-047\dwg\14-047 BaseSP.dwg, 10/23/2018 7:02:53 PM

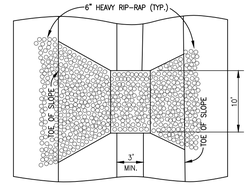




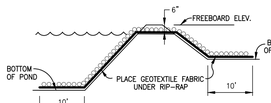


DETENTION BASIN CROSS SECTION

NOT TO SCALE



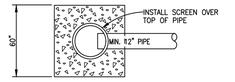
PLAN VIEW



PROFILE VIEW

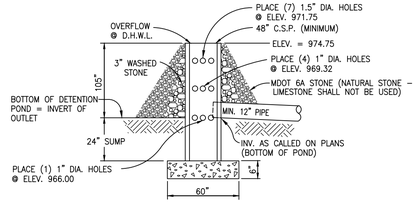
EMERGENCY SPILLWAY DETAIL

NO SCALE



PLAN

NOTE: SET PIPE IN CONCRETE

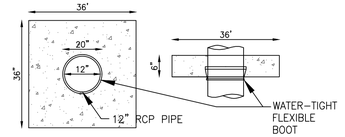


PROFILE

NOTE: UPON COMPLETION OF CONSTRUCTION STONE AROUND THE STRUCTURE SHALL BE REFRESHED WITH CLEAN STONE.

LCDC DETENTION/SEDIMENTATION POND OUTLET CONTROL STRUCTURE

(NO SCALE)



CONCRETE ANTI-SEEP COLLAR DETAIL

NO SCALE

1. COLLAR TO BE PLACED 2' MIN. FROM PIPE JOINT
2. STEEL REINFORECEMENT TO CONFORM TO LATEST ASTM SPECIFICATION
3. WATER-TIGHT FLEXIBLE BOOT PROVIDED FOR PIPE OPENING

SEE SHEET C10 FOR OFF-SITE DRAINAGE ANALYSIS

OVERFLOW SPILLWAY CAPACITY CALCULATIONS:

TOTAL FLOW INTO BASIN(100-YR) = 15.35 CFS
WIDTH OF SPILLWAY = 14 FT
DEPTH OF SPILLWAY = 0.5 FT
$Q = 3.33(B-0.2H)H^{3/2}$
$Q = 3.33(14-0.2*0.5)0.5^{3/2}$ = 16.36 CFS
16.36 > 15.35 THEREFORE SUFFICIENT CAPACITY

PROPOSED STORM SEWER CALCULATIONS

FROM	TO	DRAIN AREA	ACRES A	AREA IMPERV 0.9	AREA PERV 0.2	RUNOFF COEFF C	EQUIV. AREA A * C	INTENSITY I	TIME OF CONC. T_C	ADD'L RUNOFF Q	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING FLOW CAPACITY	MANNING'S VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	INVERT UPPER END	INVERT LOWER END
YD 08	CB 07	8	0.05893	0	0.0589	0.20	0.0118	4.38	15.00		0.05	100	8	1.62	0.22%	1.00%	1.21	3.47	0.48	982.68	982.46	985.00	982.14	981.14
CB 07	CB 06	7	0.68972	0.5804	0.1093	0.79	0.5443	4.32	15.48		2.40	226	12	4.18	0.84%	0.50%	2.53	3.22	1.17	982.46	980.55	985.50	980.88	979.75
CB 06	CB 05	6	0.40266	0.3538	0.0489	0.81	0.3282	4.20	16.65	1.58	5.36	140	12	8.42	3.43%	3.50%	6.68	8.51	0.27	980.55	975.65	985.50	979.75	974.85
CB 05	CB 04	5	0.39052	0.2744	0.1161	0.69	0.2702	4.17	16.93	2.02	8.51	166	18	5.90	0.98%	1.00%	10.53	5.96	0.46	975.65	973.99	979.35	974.45	972.79
CB 04	FES 03	4	0.67725	0.4658	0.2114	0.68	0.4615	4.13	17.39	2.19	12.61	45	18	9.46	2.52%	1.75%	13.93	7.88	0.10	986.68	985.55	977.80	972.79	972.00
ROOF 1	YD 10	ROOF 1	0.17348	0.1735	0	0.90	0.1561	4.38	15.00		0.68	100	8	3.54	1.04%	1.50%	1.48	4.25	0.39	985.55	984.05	988.50	985.01	983.51
YD 10	CB 09	10	0.12452	0.0154	0.1091	0.29	0.0357	4.33	15.39		0.84	110	8	3.30	0.90%	1.00%	1.21	3.47	0.53	984.05	982.95	986.50	983.51	982.41
CB 09	CB 06	9	0.19263	0.0256	0.1671	0.29	0.0564	4.28	15.92	0.50	1.58	192	12	4.07	0.80%	1.25%	3.99	5.09	0.63	982.95	980.55	987.00	982.15	979.75
ROOF 2	YD 13	ROOF 2	0.26511	0.2651	0	0.90	0.2386	4.38	15.00		1.04	118	8	6.21	3.20%	5.00%	2.71	7.76	0.25	981.93	976.03	985.00	981.40	975.50
YD 13	CB 12	13	0.16159	0.0309	0.1307	0.33	0.0539	4.35	15.25		1.28	49	8	4.79	1.90%	2.00%	1.71	4.91	0.17	976.03	975.05	978.50	975.50	974.52
CB 12	CB 04	12	0.20057	0.0217	0.1789	0.28	0.0553	4.33	15.42	0.67	2.19	85	12	4.53	0.99%	1.25%	3.99	5.09	0.28	975.05	973.99	978.00	974.25	973.19
CB 11	CB 05	11	0.60888	0.4849	0.1239	0.76	0.4612	4.38	15.00		2.02	73	12	5.15	1.28%	2.00%	5.05	6.43	0.19	977.11	975.65	981.50	976.31	974.85
OCS 02	FES 01	-	-	-	-	-	0	4.38	15.00		1.05	68	12	2.57	0.32%	0.50%	2.53	3.22	0.35	980.77	980.55	974.75	966.00	965.66
EX ROOF 1	CB 09	EX ROOF 1	0.12753	0.1275	0	0.90	0.1148	4.38	15.00		0.50	77	8	2.78	0.64%	1.00%	1.21	3.47	0.37	983.72	982.95	988.50	983.18	982.41
EX ROOF 2	CB 12	EX ROOF 2	0.17135	0.1713	0	0.90	0.1542	4.38	15.00		0.67	136	8	3.09	0.79%	1.00%	1.21	3.47	0.65	976.41	975.05	979.75	975.88	974.52

FUTURE STORM SEWER CALCULATIONS (INCLUDES ADDITIONAL FLOW DUE TO FUTURE ADDITIONS)

FROM	TO	DRAIN AREA	ACRES A	AREA IMPERV 0.9	AREA PERV 0.2	RUNOFF COEFF C	EQUIV. AREA A * C	INTENSITY I	TIME OF CONC. T_C	ADD'L RUNOFF Q	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING FLOW CAPACITY	MANNING'S VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	INVERT UPPER END	INVERT LOWER END
YD 08	CB 07	8	0.05893	0	0.0589	0.20	0.0118	4.38	15.00		0.05	100	8	1.62	0.22%	1.00%	1.21	3.47	0.48	982.68	982.46	985.00	982.14	981.14
CB 07	CB 06	7	0.68972	0.5804	0.1093	0.79	0.5443	4.32	15.48		2.40	226	12	4.18	0.84%	0.50%	2.53	3.22	1.17	982.46	980.55	985.50	980.88	979.75
CB 06	CB 05	6	0.40266	0.3538	0.0489	0.81	0.3282	4.20	16.65	1.58	5.36	140	12	8.42	3.43%	3.50%	6.68	8.51	0.27	980.55	975.65	985.50	979.75	974.85
CB 05	CB 04	5	0.42126	0.2744	0.1469	0.66	0.2763	4.17	16.93	2.02	8.54	166	18	5.90	0.98%	1.00%	10.53	5.96	0.46	975.65	973.99	979.35	974.45	972.79
CB 04	FES 03	4	0.59784	0.4658	0.132	0.75	0.4456	4.13	17.39	3.19	13.56	45	18	10.25	2.96%	1.75%	13.93	7.88	0.10	986.88	985.55	977.80	972.79	972.00
ROOF1	YD 10	ROOF 1	0.17348	0.1735	0	0.90	0.1561	4.38	15.00		0.68	100	8	3.54	1.04%	1.50%	1.48	4.25	0.39	985.55	984.05	988.50	985.01	983.51
YD 10	CB 09	10	0.12452	0.0154	0.1091	0.29	0.0357	4.33	15.39		0.84	110	8	3.30	0.90%	1.00%	1.21	3.47	0.53	984.05	982.95	986.50	983.51	982.41
CB 09	CB 06	9	0.19263	0.0256	0.1671	0.29	0.0564	4.28	15.92	0.50	1.58	192	12	4.07	0.80%	1.25%	3.99	5.09	0.63	982.95	980.55	987.00	982.15	979.75
ROOF 2	CB 12	ROOF 2	0.26511	0.2651	0	0.90	0.2386	4.38	15.00		1.04	118	8	6.21	3.20%	5.00%	2.71	7.76	0.25	991.70	987.92	985.00	980.42	974.52
CB 12	CB 04	12	0.40301	0.3674	0.0356	0.84	0.3378	4.35	15.25	0.67	3.19	85	12	5.03	1.23%	1.25%	3.99	5.09	0.28	987.92	986.88	978.00	974.25	973.19
CB 11	CB 05	11	0.60888	0.4849	0.1239	0.76	0.4612	4.38	15.00		2.02	73	12	5.15	1.28%	2.00%	5.05	6.43	0.19	977.11	975.65	981.50	976.31	974.85
OCS 02	FES 01	-	-	-	-	-	0	4.38	15.00		1.05	68	12	2.57	0.32%	0.50%	2.53	3.22	0.35	966.80	966.46	974.75	966.00	965.66
EX ROOF 1	CB 09	EX ROOF 1	0.12753	0.1275	0	0.90	0.1148	4.38	15.00		0.50	77	8	2.78	0.64%	1.00%	1.21	3.47	0.37	983.72	982.95	988.50	983.18	982.41
EX ROOF 2	CB 12	EX ROOF 2	0.17135	0.1713	0	0.90	0.1542	4.38	15.00		0.67	136	8	3.09	0.79%	1.00%	1.21	3.47	0.65	989.00	987.92	979.75	975.88	974.52

LIVINGSTON COUNTY DETENTION BASIN CALCULATIONS

AREA (ACRES)	IMPERVIOUS FACTOR	ACRE IMPERVIOUS	
3.22	0.9	2.90	Building/Parking
0.83	0.9	0.75	Future Building/Parking
1.56	0.2	0.31	

NOTE: CALCS INCLUDE FUTURE PARKING AND BUILDING

COMPOUND C: 0.71
TOTAL DRAINAGE AREA: 5.61 ACRES

K1 = AxC (Design Constant) 3.9831
Qa = MAX ALLOW OUTFLOW (0.20 CFS / ACRE) = 1.122 CFS

DURATION MINUTES	DURATION SECONDS	INTENSITY (IN/HR)	INCHES	INFLOW VOLUME IN. RUNOFF x A x C	OUTFLOW DURATION x Qa	STORAGE VOLUME INFLOW - OUTFLOW
5	300	9.17	2750	10954	337	10617
10	600	7.86	4714	18777	673	18104
15	900	6.88	6188	24645	1010	23636
20	1200	6.11	7333	29209	1346	27863
30	1800	5.00	9000	35848	2020	33828
60	3600	3.24	11647	46391	4039	42352
90	5400	2.39	12913	51434	6059	45375
120	7200	1.90	13655	54390	8078	46312
180	10800	1.34	14488	57706	12118	45589

REQUIRED 100 YEAR DETENTION VOLUME = 46312 CF

FOREBAY VOLUME
V(F) = 5% OF THE 100-YEAR STORM VOLUME BASED ON THE AREA TRIBUTARY TO THE INLET

V(F) = (.05)(V100)
V(F) = 2316 CF
FOREBAY STORAGE VOLUME REQUIRED: 2316 CF

FOREBAY STORAGE VOLUME PROVIDED:

ELEV	AREA	VOLUME	CUMMULATIVE VOLUME	
974.25	1460	350	2521	SPILLWAY ELEVATION
974	1340	1110	2171	
973	880	690	1061	
972	500	371	371	
971	241	158		**BOTTOM OF FOREBAY STORAGE**
970	75	40		
969	5			

BANKFULL FLOOD VOLUME
V_{BF} = 5160 x A x C= **20553 CF**

FIRST FLUSH VOLUME
V_{FF} = 1815 x A x C= **7229 CF**

BASIN STORAGE PROVIDED

ELEV.	AREA (FT^2)	DEPTH (FT)	VOLUME (FT^3)	TOTAL VOLUME (FT^3)	
975.75	14917	0.75	10,717	62,464	FREEBOARD ELEVATION
975	13661	0.25	3,364	51,748	
974.75	13250	0.75	8,875	**48,384**	**DESIGN HIGHWATER ELEVATION**
974	10417	1	9,354	39,509	
973	8290	1	7,896	30,155	
972	7502	1	6,833	22,259	
971	6163	1	5,382	15,427	
970	4601	1	4,158	10,045	
969	3715	1	3,145	5,887	
968	2574	1	2,015	2,742	
967	1455	1	728	728	
966	0				

BOTTOM OF BASIN = 966.00
FIRST FLUSH X_{FF} = 969.32
BANKFULL X_{BF} = 971.75
100 YEAR X_{100} = 974.57

OUTLET CONTROL STRUCTURE

FIRST FLUSH OF RUNOFF
THE AVERAGE ALLOWABLE RELEASE RATE FOR RUNOFF IS 0.5" OVER AREA OF SITE IN 24 HRS.

$Q_{FF} = V_{FF}$ x (1/24HRS) x (1HR/3600SEC)= 0.084 CFS

PLACE OPENINGS IN STANDPIPE AT BOTTOM OF BASIN = **966.00**

HEAD = $h_{FF} = X_{FF}$ - BOTTOM BASIN ELEV = 3.32 FT

$A = Q_{FF} / (0.62 \times (2 \times 32.2 \times h_{FF})^{0.5})$ = 0.009 FT^2

A 1 INCH DIAMETER ORIFICE HAS AN AREA OF 0.0055 SF
A/ 0.0055 = 1.69

THEREFORE, USE THE FOLLOWING NUMBER OF 1 INCH DIAMETER HOLES
1.00 HOLES, AT ELEV. 966.00
Q_{FF}MAX = 0.079 CFS

BANKFULL FLOOD
FOR THE ALLOWABLE RELEASE RATE OF 24-40 HOURS, CHECK THE DISCHARGE THROUGH THE FIRST FLUSH ORIFICE TO SEE IF ADDITIONAL HOLES ARE NECESSARY.

HEAD = h = X_{BF} - BOTTOM OF BASIN = 5.75 FT

$Q_{90.0} = 0.62x$ #HOLES x (AREA EACH HOLE$_{FF}$) x $(2 \times 32.2 \times h)^{0.5}$ = 0.065 CFS
$T_{90.0}$ = (1SEC / $Q_{90.0}$) x V_{BF} x (1HR / 3600SEC) = 87.73 HRS

BECAUSE THE HOLDING TIME EXCEEDS 40 HRS, ADDITIONAL ORIFICES IN THE STANDPIPE ARE REQUIRED.

VOLUME THROUGH 1 INCH DIAMETER HOLES IN 24 HOURS: 1
V=Q90.0x24HRSx3600SEC/HR = 5622 CF
REMAINING VOL. = 14930 CF
QBF = REMAINING VOLUME x (1 / 24HRS) x (1 / 3600SEC) = 0.173 CFS

PLACE OPENINGS AT FIRST FLUSH ELEVATION = 969.32
HEAD = hBF = XBF -XFF = 2.43 FT
A = QBF / (0.62 * (2*32.2*hBF)^0.5) = 0.022 SF

A 1 INCH DIAMETER ORIFICE HAS AN AREA OF 0.0055 SF
A/ 0.0055 = 4.09

THEREFORE, USE 4 1 INCH DIAMETER HOLES AT ELEV. = 969.32
Q_{BF}MAX = 0.249 CFS

100 YEAR FLOOD

Q_a = ALLOWABLE RELEASE RATE x AREA SITE IN ACRES= 1.122 CFS

Q_O IS A PEAK OR MAXIMUM FLOW. CALCULATE THE MAXIMUM FLOW PASSING THROUGH FIRST FLUSH AND BANKFULL ORIFICES, USING THE TOTAL HEAD, AND SUBTRACT FROM Q_a TO DETERMINE THE ORIFICE SIZE TO RELEASE THE 100 YEAR STORM VOLUME:

Q_{FF}MAX+Q_{BF}MAX = 0.33 CFS

Q_a - (Q_{FF}MAX + Q_{BF}MAX) = 0.79 CFS

$A = Q_a / (0.62 * (2 * 32.2 * (X_{(100)} - X_{BF}))^{0.5})$ = 0.095 SF

A 1.5 INCH DIAMETER ORIFICE HAS AN AREA OF 0.012 SF
A/ 0.012 = 7.74

THEREFORE, USE THE FOLLOWING NUMBER OF 1.5 INCH DIAMETER HOLES:
7 HOLES AT ELEV. = 971.75

Q_{100} = 0.718 CFS
$Q_O = Q_{100} + Q_{BF}$MAX + Q_{FF}MAX 1.047 CFS

SUMMARY OF REQUIRED STANDPIPE HOLES:

ELEVATION	# OF HOLES	DIAMETER OF HOLES
971.75	7	1.5 INCHES
969.32	4	1 INCHES
966.00	1	1 INCHES

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE COMPLETENESS OR ACCURACY OF THE INFORMATION CONTAINED THEREON. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES AND STRUCTURES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS ARE DISCOVERED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEPTH DIFFERENCES SHOWN FROM THE PLANS.

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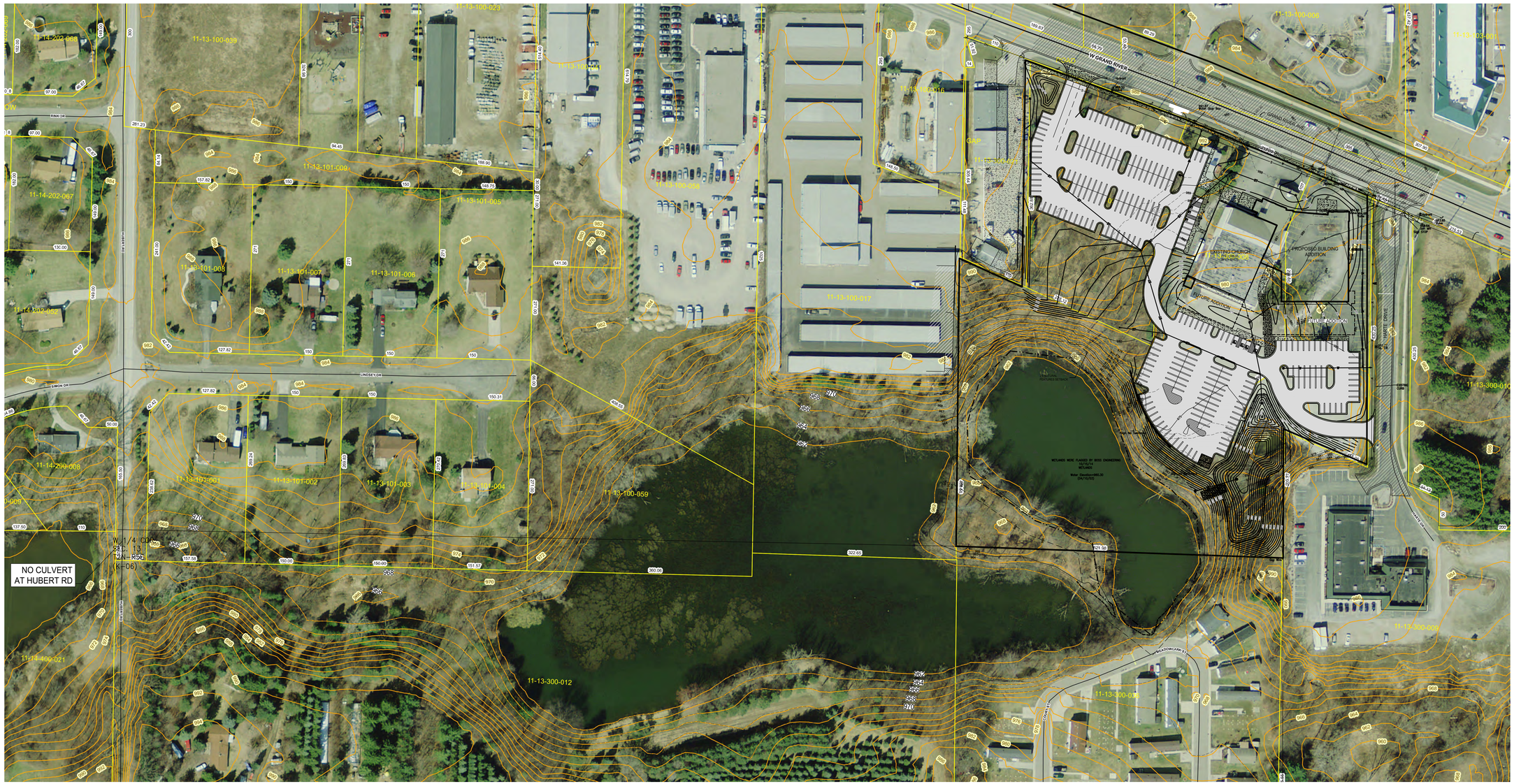
PROJECT: COMMUNITY BIBLE CHURCH EXPANSION
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MICHIGAN
810-227-2255
PREPARED FOR

TITLE: DETENTION BASIN DETAILS

NO	BY	REVISION PER	DATE
1	ST	PER TWP. REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE NTS
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C9



STORM WATER NARRATIVE

PRE–DEVELOPMENT CONDITIONS:
THERE ARE MINIMAL STORM STRUCTURES ON SITE. WATER ON THE EAST SIDE OF THE CHURCH DRAINS INTO A CATCH BASIN THAT FLOWS SOUTH TO A SMALL DETENTION POND AT THE SOUTHEAST PORTION OF THE SITE. WATER ON THE WEST SIDE OF THE EXISTING CHURCH BUILDING PRIMARILY SHEET FLOWS TO THE WETLANDS AT THE SOUTH PORTION OF THE SITE. THERE IS AN EXISTING CATCH BASIN STRUCTURE AT THE SOUTHEAST CORNER OF THE EXISTING GRAVEL PARKING LOT AT THE REAR OF THE BUILDING. THIS BASIN COLLECTS A SMALL PORTION OF STORM WATER FROM THE GRAVEL LOT. A MAJORITY OF THE SITE SHEET FLOWS FOR DIRECT RUNOFF TO THE WETLAND. THE WEST HALF OF THE SITE IS PARTIALLY WOODED AND WAS ORIGINALLY A RESIDENTIAL LOT. THE EAST HALF OF THE SITE IS CURRENTLY THE COMMUNITY BIBLE CHURCH FACILITY WITH PAVED PARKING AND GRAVEL PARKING.

PROPOSED CONDITIONS:
A DETENTION BASIN AND FOREBAY ARE PROPOSED AT THE SOUTHEAST PORTION OF THE SITE AND ARE SIZED FOR THE ENTIRE SITE TO BE DEVELOPED, INCLUDING THE TWO FUTURE BUILDING EXPANSION AREAS AS WELL AS THE FUTURE PARKING LOT. THE PROPOSED PARKING LOT SOUTH OF THE BUILDING WILL SHEET FLOW TO THE EAST AND ENTER THE FOREBAY VIA A SPILLWAY. THERE ARE ADDITIONAL STORM STRUCTURES THAT GO TO THE WEST PORTION OF THE SITE AND TO THE GREENSPACE NORTH OF THE BUILDING. THE PROPOSED DETENTION BASIN IS PROPOSED TO OUTLET INTO THE WETLAND AT A RATE OF 0.20 CFS PER ACRE. WITH THE CURBED PARKING AREAS CONTAINING THE SITE RUNOFF, THE ONLY AREA THAT WILL DIRECT DISCHARGE TO THE WETLAND IS THE GRASSED/WOODED AREAS SOUTH OF THE PROPOSED PARKING LOTS. THIS COLLECTION OF STORMWATER COMPARED TO THE PRE–DEVELOPMENT CONDITIONS WILL REDUCE THE DISCHARGE RATE TO THE WETLAND SIGNIFICANTLY.

INCREMENTAL RISE ANALYSIS NARRATIVE

THE ADDITIONAL DEVELOPMENT OF THE COMMUNITY BIBLE CHURCH SITE, CURRENT AND FUTURE ADDITIONS, WILL CAUSE INCREASE IN STORM WATER VOLUME GENERATED DUE TO THE INCREASE IN IMPERVIOUS SURFACES. THIS SITE DISCHARGES INTO A LARGE WETLAND SYSTEM AT THE SOUTH END OF THE SITE THAT EXTENDS WESTERLY ALL THE WAY TO HUBERT ROAD. THERE IS NO CULVERT CROSSING UNDER HUBERT ROAD TO CONNECT TO THE WETLAND SYSTEM ON THE WEST SIDE OF HUBERT ROAD. IT IS IMPORTANT TO ANALYZE BOTH THE FLOW AND VOLUME OF STORMWATER BEING DISCHARGED INTO THE WETLAND SYSTEM TO DETERMINE THE IMPACTS OF DEVELOPMENT. TR–55 WAS USED TO CALCULATE BOTH A PRE–DEVELOPMENT STORMWATER VOLUME AND FLOW AS WELL AS POST–DEVELOPMENT VOLUME.

DISCHARGE VOLUME

THE PRE–DEVELOPMENT PEAK DISCHARGE TO THE WETLAND FROM A 100–YEAR STORM IS 23.27 CFS. THIS DOES NOT CONSIDER THE DETENTION BASIN THAT DOES COLLECT STORM WATER FROM 2 STORM STRUCTURES ON SITE. THIS WAS DISREGARDED AS THE EXISTING DETENTION BASIN IS SEVERELY UNDERSIZED AND HAS VIRTUALLY NO VOLUME.
THE POST DEVELOPMENT VOLUME AS CALCULATED BY TR–55 IS 30.78 CFS. THIS FLOW RATE HOWEVER DOES NOT CONSIDER THE IMPLEMENTATION OF A PROPERLY SIZED 100–YR STORM DETENTION BASIN. THE POST–DEVELOPMENT FLOW DISCHARGE TO THE WETLAND PER THE LIVINGSTON COUNTY DRAIN COMMISSIONER STANDARDS IS 0.20 CFS/ACRE. THE ACTUAL DISCHARGE RATE FROM THE OVERFLOW CONTROL STRUCTURE IN THE PROPOSED BASIN IS 1.12 CFS. THIS CONTROLLED DISCHARGE RATE IS SIGNIFICANTLY LESS THAN THE PRE–DEVELOPMENT DISCHARGE RATE DUE TO THE FACT THAT THE PRE–DEVELOPMENT CONDITION IS PRIMARILY DIRECT DISCHARGE.

IT SHALL BE NOTED THAT THE AREA SOUTH OF THE PROPOSED CONSTRUCTION LIMITS WAS NOT INCLUDED IN THIS ANALYSIS FOR BOTH VOLUME AND FLOW RATE AS THE CONDITIONS FOR SAID AREA WILL NOT CHANGE BETWEEN PRE–DEVELOPMENT AND POST–DEVELOPMENT CONDITIONS.

VOLUME

TR–55 WAS UTILIZED TO CALCULATE PRE–DEVELOPMENT STORM WATER VOLUMES GENERATED BY A 100–YEAR STORM. THE PRE–DEVELOPMENT CONDITION HAS AN AREA OF 4.79 ACRES AND A CURVE NUMBER (CN) OF 85. THE LAND COVER FOR THE PRE–DEVELOPMENT CONDITION IS NEARLY HALF IMPERVIOUS SURFACE(ROOFS AND EXISTING PARKING LOTS AND HOUSE) AND THE OTHER HALF WOODED/GRASSED COVER. WITH A PRECIPITATION AMOUNT OF 5.36 INCHES FOR A 100–YEAR STORM, A PRE–DEVELOPMENT STORM WATER VOLUME OF 64,373 CFT IS GENERATED. FOR THE POST–DEVELOPMENT CONDITION, AN AREA OF 5.61 ACRES AND CURVE NUMBER OF 91 WAS USED. THE INCREASED AREA IN THE POST–DEVELOPMENT CONDITION IS DUE TO ADDITION AREA ALONG GRAND RIVER THAT IS NOW BEING COLLECTED INTO THE PROPOSED STORM WATER SYSTEM. THE HIGHER CURVE NUMBER IN THE POST–DEVELOPMENT CONDITION INDICATES ADDITIONAL IMPERVIOUS SURFACES DUE TO THE DEVELOPMENT. THIS POST–DEVELOPMENT CALCULATION CONSIDERS THE ULTIMATE DEVELOPMENT OF THIS SITE WHICH IS THE CURRENT PROPOSED PAVING AND EXPANSION AS WELL AS THE TWO FUTURE BUILDING EXPANSIONS AND THE FUTURE PARKING LOT. WITH THE SAME PRECIPITATION OF 5.36 INCHES IN A 100–YEAR STORM EVENT, A POST–DEVELOPMENT STORM WATER VOLUME GENERATED IS 88,222 CFT.

INCREMENTAL RISE

THE INCREMENTAL RISE IN THE WETLAND SYSTEM IS DUE TO THE ADDITIONAL STORM WATER VOLUME GENERATED IN THE POST–DEVELOPMENT CONDITION VERSUS THE PRE–DEVELOPMENT CONDITION. THE ADDITIONAL STORM WATER GENERATED IS:

88,222 CFT – 64,373 CFT = 23,849 CFT

EXISTING DATA POINTS AT THE PERIMETER OF THE WETLAND RANGE FROM 961.07 TO 964.35. BASED ON THE CONTOUR DATA, THE WETLAND ELEVATION IS MOST ACCURATELY JUST UNDER 962. ADDITIONAL CONTOUR DATA FURTHER WEST OF THE SITE WAS OBTAINED FROM THE LIVINGSTON COUNTY GIS OFFICE AND CAN BE SEEN IN THE IMAGE ABOVE. CONTOUR AREAS AND CONSEQUENTLY WETLAND STORAGE VOLUMES UP TO AN ELEVATION OF 968 WERE GENERATED. CERTAINLY THE WETLAND WATER ELEVATION FLUCTUATES PENDING THE SEASON, BUT FOR THE PURPOSE OF THIS ANALYSIS THE LARGEST INCREMENTAL RISE GENERATED BY THE DEVELOPMENT OF THIS SITE IS WHEN THE WETLAND ELEVATION IS LOW AND THE WETLAND AREAS ARE SMALLER. FOR THE INCREMENTAL RISE ANALYSIS A STARTING ELEVATION OF 962 WAS USED AS A BASELINE. WITH THE VOLUME DATA PROVIDED IN THE CHART ON THIS SHEET, THE ADDITIONAL 23,489 CFT WILL INCREASE THE WETLAND ELEVATION TO 962.06 WHICH IS AN INCREASE IN 0.06 FEET (0.76 INCHES). [EVEN AT SMALLER WETLAND AREAS, THE IMPACT OF ADDITIONAL STORM WATER ON THE WETLAND SYSTEM IS NEGLIGIBLE AS IT IS LESS THAN 1–INCH. IF THE WETLAND ELEVATION WERE ASSUMED TO BE EVEN HIGHER AS A BASELINE, THE INCREMENTAL RISE WOULD BE EVEN LESS YET AS THE WETLAND AREAS INCREASE AS ELEVATION INCREASES.]

SUMMARY

IN SUMMARY, THE PROPOSED DEVELOPMENT OF THIS EXISTING SITE IMPROVES THE DISCHARGE OF STORM WATER TO THE WETLAND AS STORM WATER IS ROUTED THROUGH A 100–YEAR VOLUME DETENTION BASIN WITH A CONTROLLED OUTLET RATE. THE INCREASED VOLUME GENERATED BY THE DEVELOPMENT OF THIS SITE IS MINIMAL AND HAS A NEGLIGIBLE INCREMENTAL RISE IN WATER ELEVATION IN THE WETLAND. FINALLY, THE PROPOSED DEVELOPMENT INCLUDES THE CONSTRUCTION OF A SEDIMENT FOREBAY FOR IMPROVED WATER QUALITY.

WETLAND STORAGE VOLUME & INCREMENTAL RISE CALC

EXISTING WETLAND STORAGE

ELEV.	AREA (FT²)	DEPTH (FT)	VOLUME (FT³)	TOTAL VOLUME (FT³)
968	537057	2	995,943	2,613,468
966	458886	2	865,743	1,617,525
964	406857	2	751,782	751,782
962	344925		0	0
VOLUME DIFFERENTIAL FROM DEVELOPMENT =			23849	CFT
ELEVATION OF WETLAND W/ ADDITIONAL VOLUME =			962.06	
INCREMENTAL RISE (FROM BASE OF 962) =			0.06 FT 0.76 INCHES	

TR–55 AREA SUMMARY

Livingston MSE3 County, Michigan

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
pre-dev.	4.79	0.250	85	Outlet	
post-dev.	5.61	0.250	91	Outlet	

TR–55 RAINFALL DATA

Livingston MSE3 County, Michigan

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
2.37	2.86	3.33	4.05	4.68	5.36	2.11

Storm Data Source: Livingston MSE3 County, MI (NRCS)
Rainfall Distribution Type: Type MSE3
Dimensionless Unit Hydrograph: <standard>

TR–55 PEAK FLOW (100–YR STORM)

Livingston MSE3 County, Michigan

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 100-Yr (cfs)
SUBAREAS	
pre-dev.	23.27
post-dev.	30.78 (DOES NOT CONSIDER CONTROLLED DISCHARGE FROM O.C.S. STRUCTURE)

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HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR
COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI 48114
810–227–2255

TITLE
DRAINAGE STUDY

NO	BY	DESCRIPTION	DATE
1	ST	PER TWP REVIEW	10–24–18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE 1" = 80'
JOB NO. 14–047
DATE 10/2/18
SHEET NO. C10

BOSS Engineering

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PIPE RESTRAINT SCHEDULE

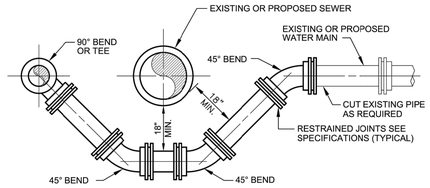
GROUND BURIED PRESSURE PIPE - POLYETHYLENE ENCASED DUCTILE IRON PIPE

PIPE DIAMETER	TEES, 90° BENDS	45° BENDS	22-1/2° BENDS	11-1/4° BENDS	DEAD ENDS	REDUCERS (ONE SIZE REDUCTION)*	REDUCERS (TWO SIZE REDUCTIION)*
4	13	5	3	1	40	--	--
6	19	8	4	2	58	31	--
8	24	10	5	2	75	30	70
12	34	14	7	3	107	57	116
16	43	18	9	4	139	59	137
20	52	22	10	5	169	59	134
24	61	25	12	6	199	60	132
30	73	30	15	7	242	85	168
36	84	35	17	8	281	84	168

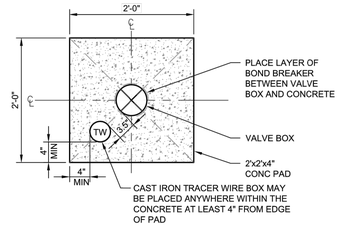
1. LENGTHS OF PIPE RESTRAINT ARE GIVEN IN FEET.
2. IF REQUIRED PIPE DIAMETER IS NOT LISTED IN THIS TABLE, THE NEXT LARGEST PIPE DIAMETER SHALL BE USED.
3. THIS TABLE IS BASED ON A TEST PRESSURE OF 180 PSI (OPERATING PRESSURE PLUS WATER HAMMER. FOR OTHER TEST PRESSURES, ALL VALUES TO BE INCREASED OR DECREASED PROPORTIONALLY.
4. THE VALUES PROVIDED OF RESTRAINT LENGTH ARE IN EACH DIRECTION FROM THE POINT OF DEFLECTION OR TERMINATION EXCEPT FOR TEES, AT WHICH ONLY THE BRANCH IN THE DIRECTION OF THE STEM.
5. IF TIE RODS ARE USED, USE FOUR RODS MINIMUM AND ADD 1/8-INCH TO BAR DIAMETER AS CORROSION ALLOWANCE.

* SIZE REDUCTION IS BASED UPON THE PIPE DIAMETER SHOWN IN THIS TABLE.

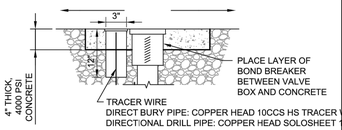
BASED UPON: INTERNAL PRESSURE: 180
PIPE DEPTH: 5
BEDDING CLASS: TYPE 4
SOIL TYPE: GOOD SAND
SAFETY FACTOR: 2



WATER MAIN UTILITY OFFSET



NOTE: ALL BOXES & ADJOINING TW BOXES SHALL BE ENCASED IN A CONC. PAD UNLESS OTHERWISE DETERMINED BY MHOG.

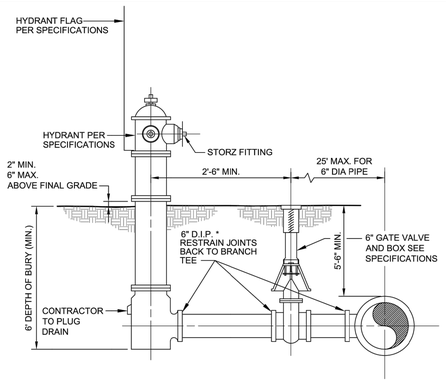


NOTE:
1. TRACER WIRE BOXES LOCATED WITHOUT A VALVE BOX ONLY REQUIRE AN 18" X 18" CONCRETE PAD.
2. TRACER WIRE BOX SHALL HAVE A LOCKING LID W/STANDARD AWWA PENTAGON KEY.
3. TRACER WIRE BOX SHALL BE COPPERHEAD RB14"TP IN ASPHALT INSTALLATIONS AND CD14"TP FOR ALL OTHER INSTALLATIONS.

PLAN SECTION

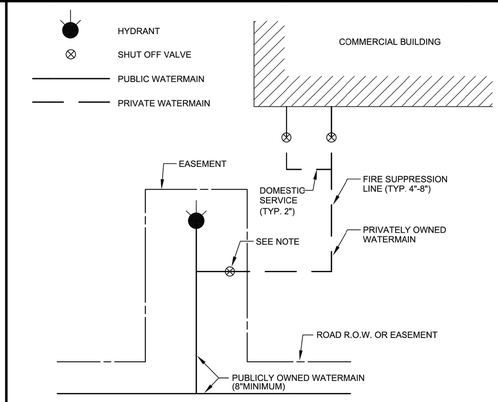
VALVE/TRACER WIRE BOX IN CONCRETE DETAIL

NO SCALE



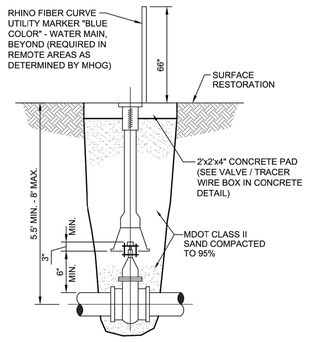
* THE LENGTH OF 6" PIPE FROM THE MAIN TO THE HYDRANT ASSEMBLY CANNOT EXCEED 25'. ANY PIPE OVER 25 FEET SHALL BE 8" DIAMETER MINIMUM AND DESIGNED PER MHOG SPECIFICATIONS.

FIRE HYDRANT ASSEMBLY



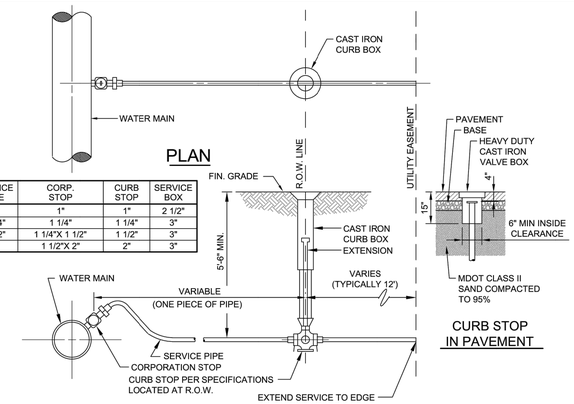
NOTE: PUBLICLY OWNED SHUT OFF VALVE TO BE LOCATED IN EASEMENT.

COMMERCIAL BUILDING WATER SERVICE LAYOUT



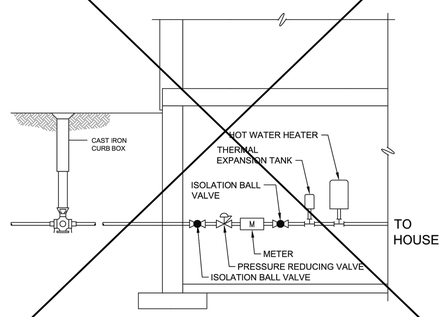
NOTES:
1. VALVE BOX SHALL NOT REST ON VALVE OR MAIN LINE PIPE.
2. A VALVE STEM EXTENSION WITH CENTERING RING IS REQUIRED FOR VALVES BURIED DEEPER THAN 6'.

GATE VALVE AND BOX

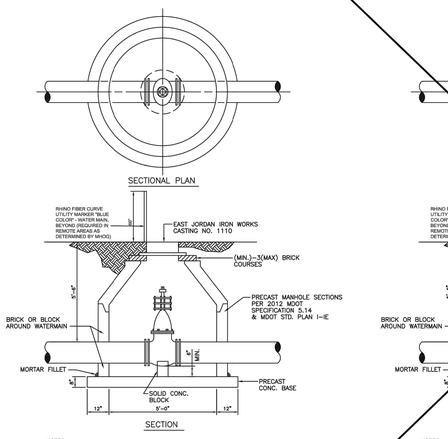


CURB STOP IN PAVEMENT

SECTION WATER SERVICE LATERAL

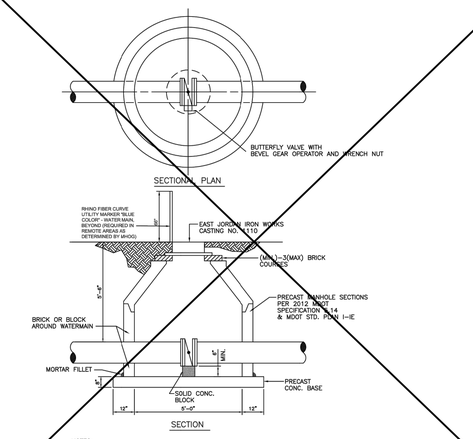


PRIVATE RESIDENCE PRESSURE REDUCING VALVE (PRV)



NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. NO STEPS PERMITTED.

GATE VALVE AND WELL



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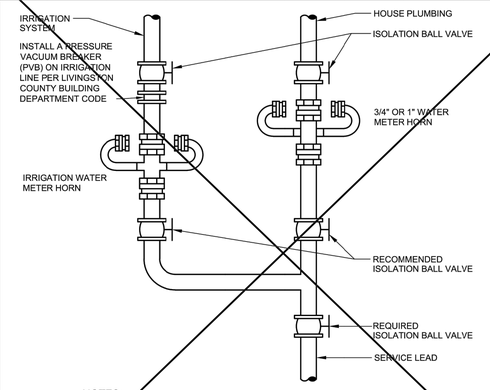
3. NO STEPS PERMITTED.

BUTTERFLY VALVE AND WELL



NOTES:
1. ALL METERS ARE TO BE INSTALLED HORIZONTALLY IN A DRY, CLEAN, SANITARY LOCATION THAT IS READILY ACCESSIBLE. THIS DRAWING IS NOT TO SCALE & IS ONLY A REPRESENTATION OF HOW THE METERS SHOULD BE INSTALLED. THE SECOND METER IS OPTIONAL FOR IRRIGATION USAGE. METERS SHOULD NOT BE INSTALLED IN LINE (ONE RIGHT AFTER THE OTHER).
2. PROPERTIES DESIGNATED "HIGH HAZARD" PER THE MHOG CROSS CONNECTION RULES MANUAL WILL REQUIRE THE INSTALLATION OF A REDUCED PRESSURE ZONE (RPZ) BACK FLOW PREVENTION DEVICE.

TYPICAL METER HORN INSTALLATION

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HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

MARION HOWELL OCEOLA GENOA Sewer and Water Authority

STANDARD DETAILS

Scale: NONE
Issued Date JANUARY - 2014
UPDATED: MAY 2015
UPDATED: FEBRUARY 2016
UPDATED: APRIL 2016

PROJECT: COMMUNITY BIBLE CHURCH EXPANSION

PREPARED FOR: COMMUNITY BIBLE CHURCH
7372 GRAND RIVER AVENUE
BRIGHTON, MI. 48114
810-227-2255

TITLE: WATER MAIN STANDARD DETAILS

NO	BY	REVISION PER	DATE
1	ST	PER TWP REVIEW	10-24-18

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE NTS
JOB NO. 14-047
DATE 10/2/18
SHEET NO. C11

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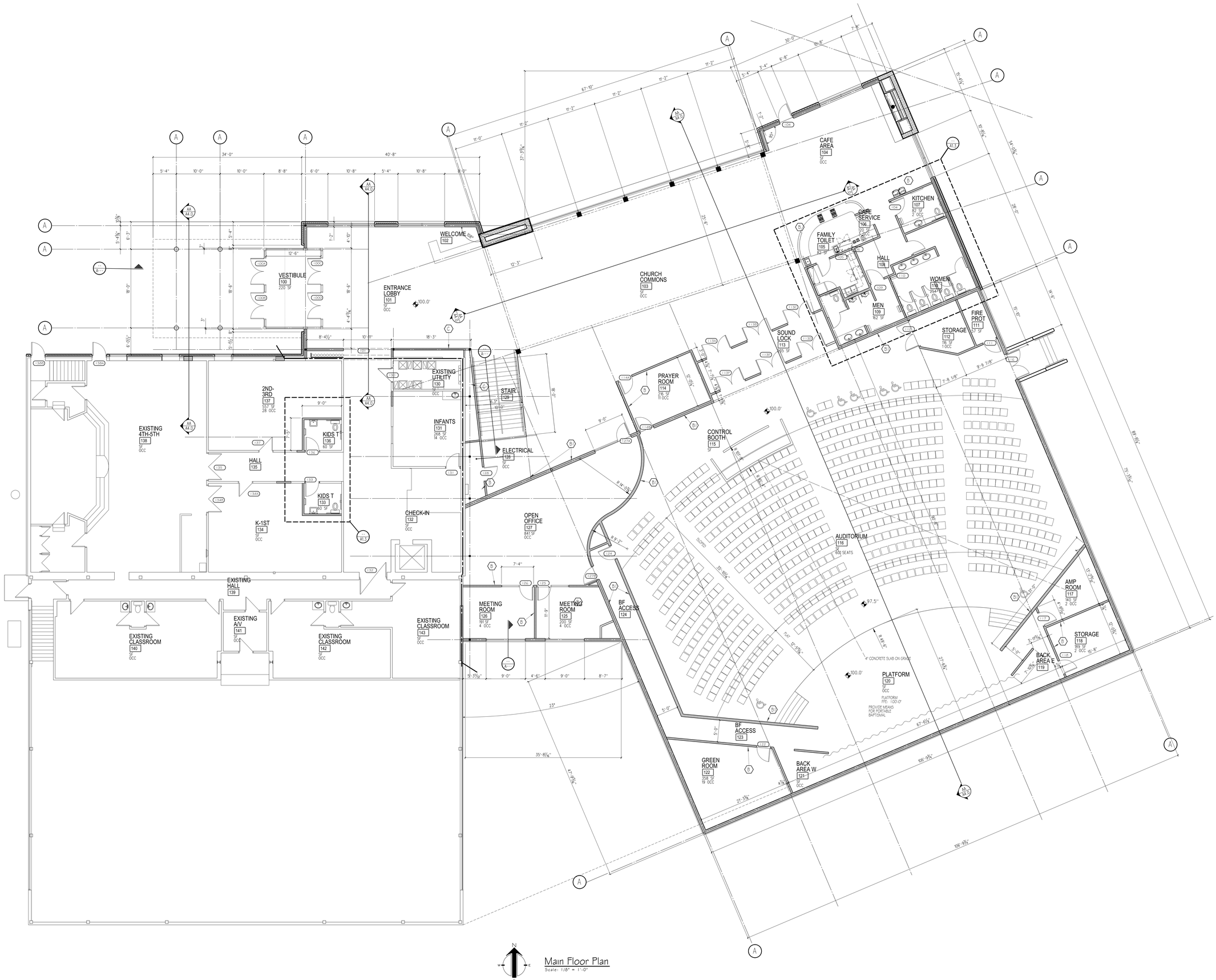


Main Floor Plan
Scale: 1/8" = 1'-0"

GENERAL NOTES

1. ALL DIMENSIONS ARE TO FACE OF FINISHED SURFACE OR COLUMN CENTER LINE UNLESS NOTED OTHERWISE
2. COORDINATE w/ MECH. & ELEC DRAWINGS FOR ALL FLOOR/WALL/ROOF PENETRATIONS NOT SHOWN ON ARCHITECTURAL PLANS. COORDINATE WITH C.M.
3. FIELD PAINT ALL MECHANICAL GRILLES & CABINETS TO MATCH ADJACENT SURFACES
4. SITE DATUM: MAIN LEVEL FINISH FLOOR
   ASSUMED= 100'-0"
   ACTUAL = XXX'-X"

KEY NOTES

1	36" GRAB BAR
2	42" GRAB BAR
3	18" VERTICAL GRAB BAR
4	TOILET PAPER DISPENSER
5	PAPER TOWEL DISPENSER
6	RECESSED PAPER TOWEL DISPENSER & DISPOSAL UNIT
7	FEMININE NAPKIN DISPOSAL
8	2x3 FRAMED MIRROR
9	FRAMELESS MIRROR- SEE ELEVATION FOR SIZE
10	URINAL SCREEN W/ CONT BRACKET
11	BABY CHANGER
12	COAT ROD & SHELF- MOUNT ROD @ 54" AFF
13	BULKHEAD ABOVE- SEE REFLECTED CEILING PLAN
14	CANOPY ABOVE
15	FIRE EXTINGUISHER w/ CABINET

INTERIOR WALL TYPES

B / B1 — 5/8" GYPSUM WALLBOARD
3 5/8" METAL STUDS @ 16" O.C.
3" ACOUSTICAL BLANKETS
5/8" GYPSUM WALLBOARD
6" STUDS @ B1

A — 5/8" GYPSUM WALLBOARD
3 5/8" METAL STUDS @ 16" O.C.
(ALL SHAFT WALLS & BULKHEADS)

NOTES:
1. REFER TO STRUCTURAL DRAWINGS FOR CROSS BRACING LOCATIONS
2. GYPSUM WALLBOARD TO EXTEND DECK ABOVE CEILING UNLESS NOTED OTHERWISE
3. ALL EXPOSED CMU CORNERS TO BE BULLNOSE CORNERS
4. ALL WALLS TO BE EXTENDED TIGHT TO STRUCTURE ABOVE U.N.O.
5. ALL WOOD FRAMING & SHEATHING IN A IIB CONSTRUCTION IS REQUIRED TO BE NON-COMBUSTIBLE
6. PROVIDE DAMPERS AS REQUIRED IN ALL RATED ASSEMBLIES. COORDINATE WITH MECHANICAL CONTRACTOR.

Mark	Description	Date
	FOR BUDGET UPDATE	09/07/18
	FOR SITE PLAN APPROVAL	10/01/18

Jeffrey Parker architects
ARCHITECTURE PLANNING ENGINEERING
855 28th Street SE
Grand Rapids MI 49508
Phone: 616-243-0090
Fax: 616-241-0098

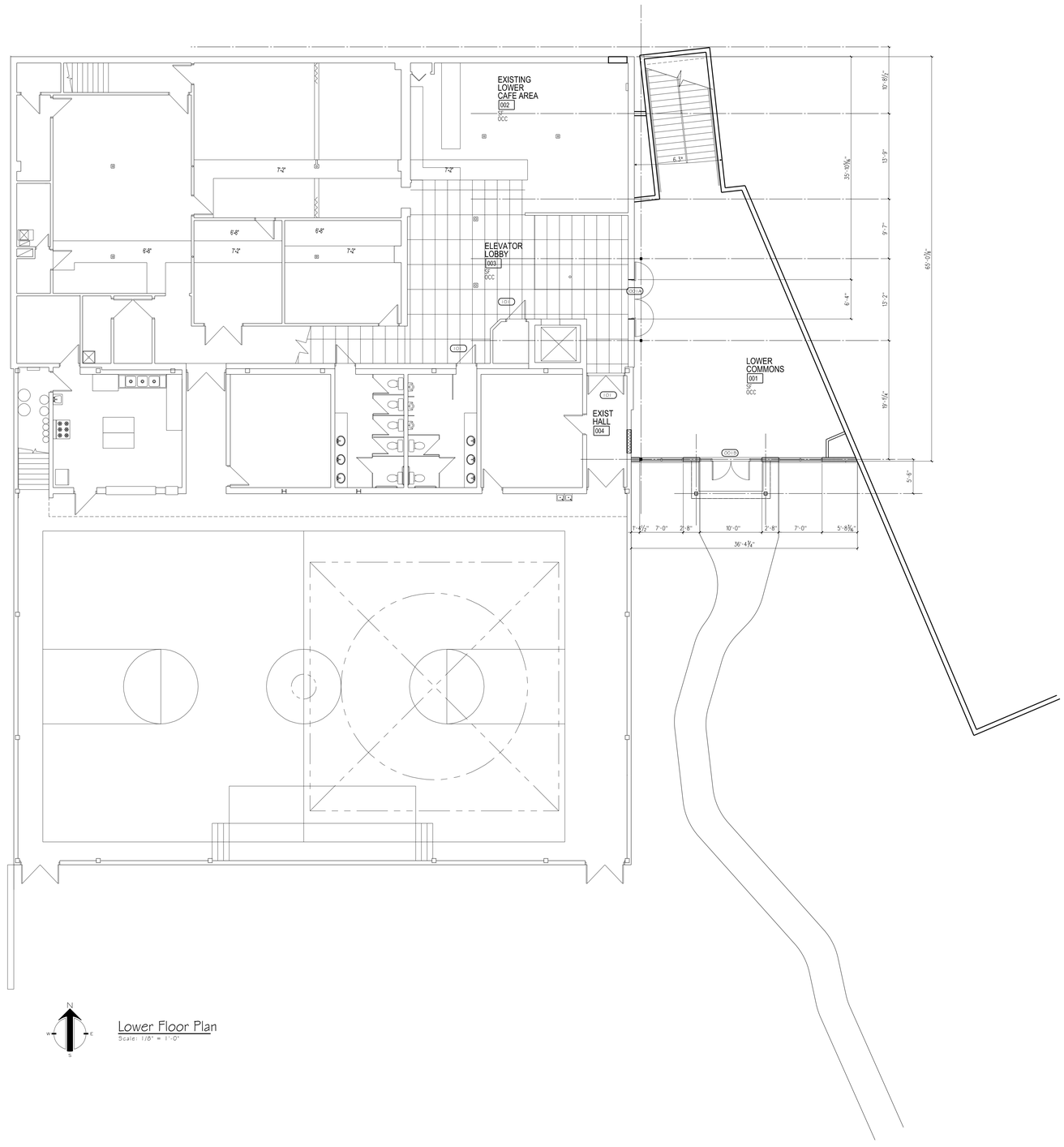
Addition & Renovations For:
Community Bible Church
Brighton , Michigan

Floor Plan

Issued -

Project No. 17078

Drawing No. A1.0



N

Lower Floor Plan

Scale: 1/8" = 1'-0"

GENERAL NOTES

1. ALL DIMENSIONS ARE TO FACE OF FINISHED SURFACE OR COLUMN CENTER LINE UNLESS NOTED OTHERWISE
2. COORDINATE w/ MECH. & ELEC DRAWINGS FOR ALL FLOOR/WALL/ROOF PENETRATIONS NOT SHOWN ON ARCHITECTURAL PLANS. COORDINATE WITH C.M.
3. FIELD PAINT ALL MECHANICAL GRILLES & CABINETS TO MATCH ADJACENT SURFACES
4. SITE DATUM: MAIN LEVEL FINISH FLOOR
   ASSUMED= 100'-0"
   ACTUAL = XXX'-X"

KEY NOTES

1	36" GRAB BAR
2	42" GRAB BAR
3	18" VERTICAL GRAB BAR
4	TOILET PAPER DISPENSER
5	PAPER TOWEL DISPENSER
6	RECESSED PAPER TOWEL DISPENSER & DISPOSAL UNIT
7	FEMININE NAPKIN DISPOSAL
8	2x3 FRAMED MIRROR
9	FRAMELESS MIRROR- SEE ELEVATION FOR SIZE
10	URINAL SCREEN W/ CONT BRACKET
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Mark	Description	Date
	FOR BUDGET UPDATE	09/07/16
	FOR SITE PLAN APPROVAL	10/01/16

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Addition & Renovations For:

Community Bible Church

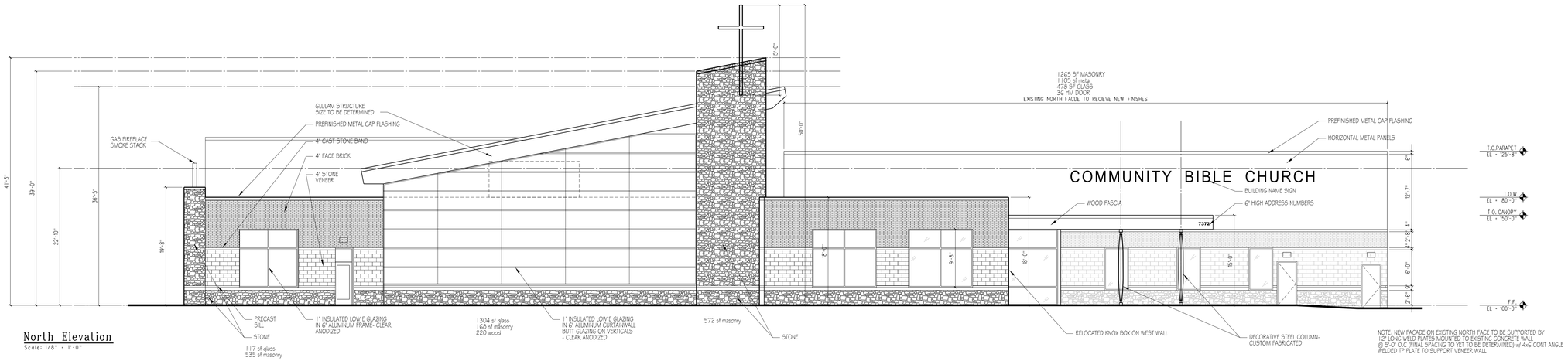
Brighton , Michigan

Lower Floor Plan

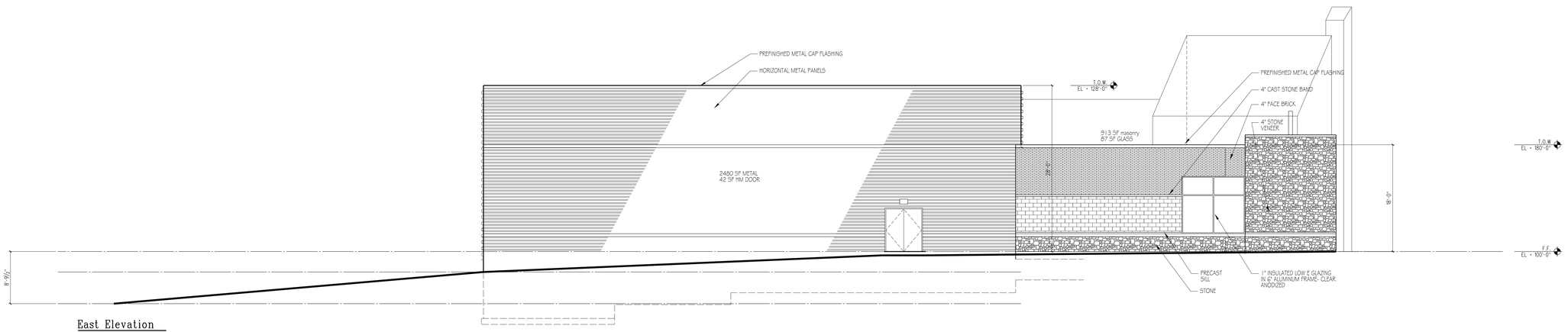
Issued: -

Project No. 17078

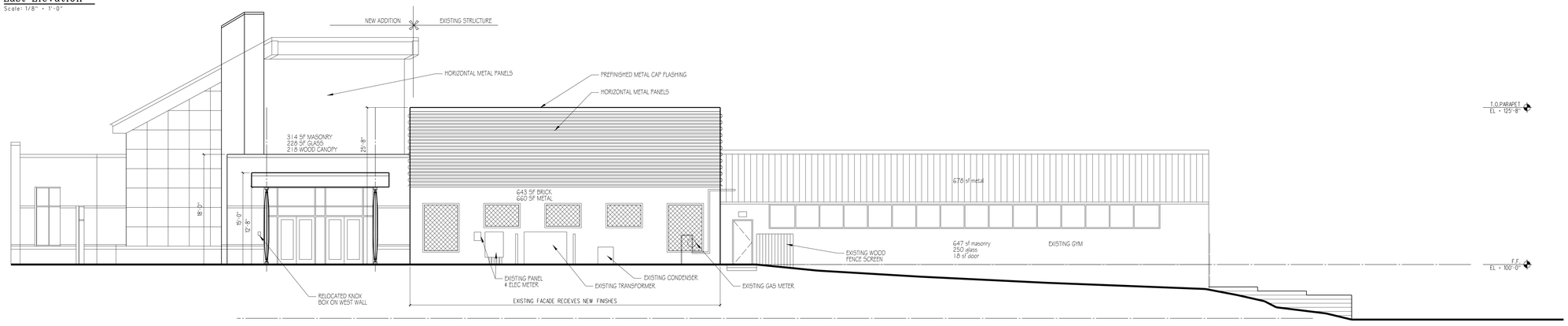
Drawing No. A1.1



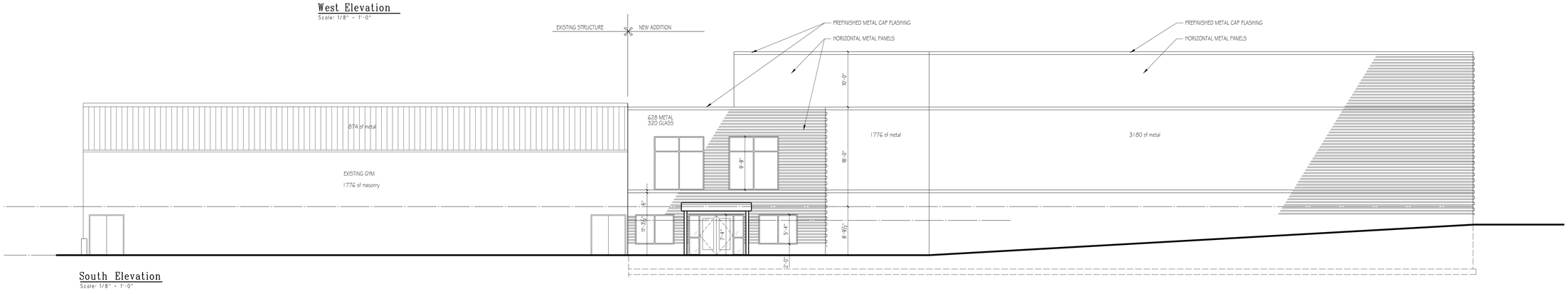
North Elevation
Scale: 1/8" = 1'-0"



East Elevation
Scale: 1/8" = 1'-0"



West Elevation
Scale: 1/8" = 1'-0"



South Elevation
Scale: 1/8" = 1'-0"

MATERIAL BREAKDOWN:

MASONRY (BRICK, STONE, BLOCK)= 7,849 SF
WOOD= 848 SF
POURED IN PLACE CONCRETE= 445 SF
METAL SIDING= 9,891 SF
(5, 584 SF IS FUTURE EXPANSION WALL)

GLASS=2,984 SF
HM DOORS=96 SF

19,668 SF TOTAL W/O DOORS & WINDOWS

METAL=50.2%
W/O SOUTH WALL 13,544 (31.8%)

Mark	Description	Date
	FOR BUDGET UPDATE	09/07/18
	FOR SITE PLAN APPROVAL revised	10/22/18

Jeffrey Parker architects
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Grand Rapids MI 49508
Phone: 616-241-0090
Fax: 616-241-0098

Addition & Renovations For:
Community Bible Church
Brighton , Michigan

Exterior Elevations

Issued
-

Project No.
17078

Drawing No.
A3.0

Overview

VIEW FROM GRAND RIVER AVENUE

View 1

NOT TO SCALE

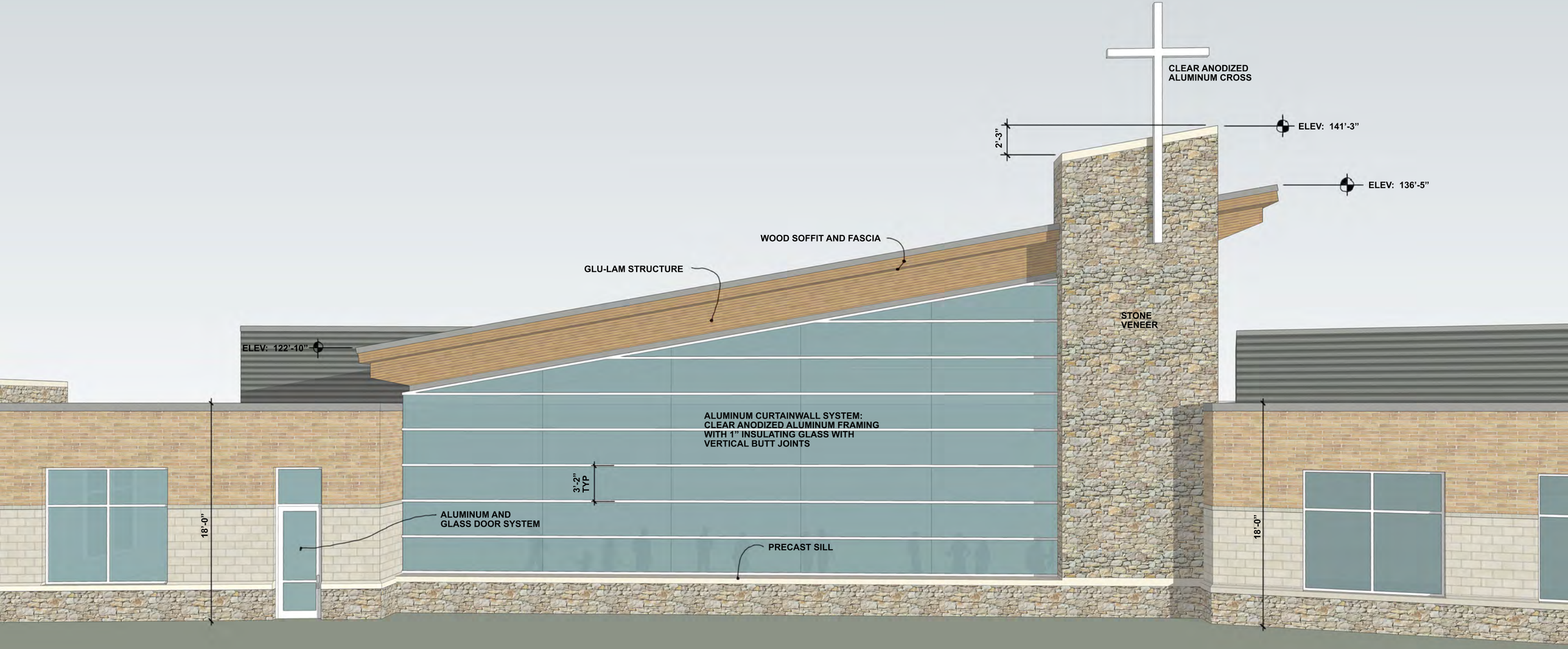
NOTE: VERTICAL DIMENSIONS ARE FROM FINISHED FLOOR LEVEL (100'-0") NOT FROM GRADE - GRADE VARIES

NOTE: REFER TO VIEW 1 FOR TYPICAL DIMENSIONS AND NOTES

NOTE: VERTICAL DIMENSIONS ARE FROM FINISHED FLOOR LEVEL (100’-0”) NOT FROM GRADE - GRADE VARIES

View 2

NOT TO SCALE



View 3

NOT TO SCALE

NOTE: REFER TO VIEW 1 FOR
TYPICAL DIMENSIONS AND NOTES

NOTE: VERTICAL DIMENSIONS ARE
FROM FINISHED FLOOR LEVEL (100'-0")
NOT FROM GRADE - GRADE VARIES

NOTE: REFER TO VIEW 1 FOR TYPICAL DIMENSIONS AND NOTES

NOTE: VERTICAL DIMENSIONS ARE FROM FINISHED FLOOR LEVEL (100'-0") NOT FROM GRADE - GRADE VARIES

View 4

NOT TO SCALE

IMPACT ASSESSMENT
FOR
SITE PLAN PETITION
"COMMUNITY BIBLE CHURCH"
GENOA TOWNSHIP, LIVINGSTON COUNTY
MICHIGAN

Prepared for:

COMMUNITY BIBLE CHURCH
7372 GRAND RIVER
BRIGHTON, MICHIGAN 48114
(810) 227-2255

Prepared by:

BOSS ENGINEERING COMPANY
3121 E. GRAND RIVER
HOWELL, MI 48843
(517) 546-4836

October 3rd , 2018

14-047 EIA

INTRODUCTION

The purpose of this Impact Assessment (IA) report is to show the effect that this proposed development may have on various factors in the general vicinity of the project. The format used for presentation of this report conforms to the *Submittal Requirements For Impact Assessment* guidelines in accordance with Section 18.07 of the published Zoning Ordinance for Genoa Township, Livingston County, Michigan.

DISCUSSION ITEMS

A. Name(s) and address(es) of person(s) responsible for preparation of the impact assessment and a brief statement of their qualifications.

Prepared By :
Brent W. LaVanway, P.E.
BOSS ENGINEERING COMPANY
Civil Engineers, Land Surveyors, Landscape Architects and Planners
3121 E. Grand River
Howell, MI 48843
(517) 546-4836

Prepared For :
Community Bible Church
Client
7372 Grand River
Brighton, MI 48114
(810) 227-2255

B. Map(s) and written description / analysis of the project site including all existing structures, manmade facilities, and natural features. The analysis shall also include information for areas within 10 feet of the property. An aerial photograph or drawing may be used to delineate these areas.

The 9.24 acre site is located on the south side of Grand River immediately west of Harte Dr and across from Euler Rd. The subject property is currently the Community Bible Church Facility. There is the existing Church building, gravel parking lot, detention basin and house which Is currently used for storage and the occasional class or meeting. The south end of the property contains a natural area with shrub/scrub vegetation and a wetland. There is an established tree row along Harte Dr just off of the subject property.

C. Impact on natural features: A written description of the environmental characteristics of the site prior to development and following development, i.e., topography, soils, wildlife, woodlands, mature trees (eight inch caliper or greater), wetlands, drainage, lakes, streams, creeks or ponds. Documentation by a qualified wetland specialist shall be required wherever the Township

determines that there is a potential regulated wetland. Reduced copies of the Existing Conditions Map(s) or aerial photographs may accompany written material.

Resources utilized to study the natural features of the site included a on-site visit, aerial photos from Google Earth, a web soil survey prepared by the USDA, Wetlands Inventory Maps prepared by the MDEQ as well as resources prepared by the Huron River Watershed Council and other Livingston County Natural resources agencies.

The front (north) portion of the site is the existing Church facility, while the south contains the parking lot and natural area. The developed site slopes generally to the south toward the wetland. The soils on site consist of loam, loamy sand and muck. The soils shown on the USDA map are consistent with the field assessment of the upland and low land areas found on site. The land cover identified in the field is also consistent with the soils which consist of impervious surface, compacted lawn area, wetland and wooded shrub scrub areas. Existing vegetation specifically tree species found on-site that would be removed include Red Oak, Cottonwood, Basswood, Maple, Cherry, Cedar, and Pine. Given that the site has already been developed tree removal and natural features disturbance will be minimal.

D. Impact on storm water management: Description of measures to control soil erosion and sedimentation during grading and construction operations and until a permanent ground cover is established. Recommendations for such measures may be obtained from County Soil Conservation Service.

Topography on the site ranges from a low of 961.81 at the wetland edge to a high of 992.54 at the north central portion of the property near Grand River Road. The property is undulating, but largely drains from the north to the south toward a wetland system that extends off the property.

The land cover found in the field consisted of three different types; impervious surface (parking lot, building), wetland, wooded area including shrub scrub as well as compacted lawn areas.

The proposed stormwater design will utilize catch basins at low areas onsite and pipe stormwater to a detention basin located in the southeast corner of the site then be discharged into the existing wetland. In general existing drainage patterns on-site are being followed as closely as possibly with the proposed stormwater system.

Soil erosion measures will be utilized throughout the construction process to reduce the risk of erosion and sedimentation. This will be accomplished through the use of silt sacks placed in catch basins, silt fence installed along the perimeter of the property, and weekly inspections from a certified stormwater operator.

E. Impact on surrounding land use: Description of the types of proposed uses and other man made facilities, including any project phasing, and an indication of how the proposed use conforms or conflicts with existing and potential development patterns. A description shall be provided of any increases of light, noise or air pollution which could negatively impact adjacent properties.

As previously stated the site is the current home of Community Bible Church. The use of the site conforms with development patterns of the surrounding area and will feature an expansion of the existing facility.

In general the site will see an increase in use due to the expansion of the facility but, that is anticipated to occur over the next few years. Increased use would be during Sunday's service hours and perhaps occasional nights during the week after 5pm for various church related functions or activities. The increase in use will be minimal in that the site is already a functioning Church and this expansion is more of an overdue necessity to properly provide an adequate parking lot and worship area with associated classrooms, storage, and clerical space. Currently, Sunday school services are unable to be held at the church due to lack of space so a shuttle transfers children and young adults across the road to on offsite building not associated with the church to provide their education. With an expansion of their own facility shuttling elsewhere would no longer be required by keeping all Church related education and activities on-site instead of relying on local nearby facilities. Because the site is located in a commercial area increases in light or noise should not cause any issues with adjacent property owners.

F. Impact on public facilities and services: Description of number of expected residents, employees, visitors, or patrons, and the anticipated impact on public schools, police protection and fire protection. Letters from the appropriate agencies may be provided, as appropriate.

With the expansion of the existing facility impacts on public facilities and services are anticipated to be minimal. An increase in attendance and membership with the church is expected but again, the increase amount is anticipated to increase gradually over next few years.

Local school districts won't be affected by the addition, and the only impact to emergency services such as police protection and fire is the larger building footprint and perhaps some more patrons. Both of those impacts will be minimal and of little concern to each department.

G. Impact on public utilities: Description of the method to be used to service the development with water and sanitary sewer facilities, the method to be used to control drainage on the site and from the site, including runoff control during periods of construction. For sites service with sanitary sewer, calculations for pre- and post development flows shall be provided in equivalents to a single family home. Where septic systems are proposed, documentation or permits from the Livingston County Health Department shall be provided.

The existing Church is currently served by M.H.O.G public water and Genoa Township public sanitary sewer. With the building expansion comes the requirement to purchase additional REU's for the potential increased use of municipal utilities. Due to some special assessments on the property and coupled with REU's they had already purchased previously the church will need to purchase an additional 2 water REU's and 4 sanitary sewer REU's. The fees associated with the purchase cover the potential increase of usage or impact the expansion will have on public utilities.

Given the use of the building and peak usage times being Sunday mornings the impact on sanitary and water is anticipated to be minimal.

H. Storage or handling of any hazardous materials: Description of any hazardous substances expected to be used, stored or disposed of on the site. The information shall describe the type of materials, location within the site and method of containment. Documentation of compliance with federal and state requirements, and a Pollution Incident Prevention Plan (PIPP) shall be submitted, as appropriate.

There will be no hazardous materials used or disposed of on this site.

I. Impact on traffic and pedestrians: A description of the traffic volumes to be generated based on national reference documents, such as the most recent edition of the Institute of Transportation Engineers Trip Generation Manual, other published studies or actual counts of similar uses in Michigan.

Initial discussions with the Livingston County Road Commission and the Genoa Township Consulting Engineer produced a primary concern of traffic potentially backing up onto Grand River when patrons are entering the site. We have provided an on-site traffic circulation plan (Sheet 3A in plan set) specifically to help prevent this issue. Parking spaces located near the entrance off of Grand River will be designated for Church staff and volunteers only on Sunday's occupying spaces that otherwise could cause traffic backups. Signage on-site will be utilized as well as volunteer parking lot aides if needed to help direct traffic and prevent backups.

A breakdown of anticipated traffic based upon capacity of the new expansion is provided below:

Existing Seat Count- 375 Proposed Seat Count- 601

According to a parking study performed by Jeffery Parker Associates it was determined that for every 2.4 seats there is 1 associated car. Therefore, we apply that factor to both the existing and proposed seat counts:

Existing Seats: 375 / 2.4 = 156 vehicles Proposed Seats: 601 / 2.4= 250 vehicles

From information provided from the Church on member addresses we also know that forty two percent (42%) of members travel from the east and fifty eight percent (58%) travel from the west. Turning movements entering and exiting the site can then be broken down as follows:

<u>Existing Turning Movements:</u>
-Entering the site:
-156 vehicles x 42% = 65 vehicles turning left into the site
-156 vehicles x 58%=91 vehicles turning right into the site
-Exiting the site:
-156 vehicles x 42% = 65 vehicles turning right out of the site
-156 vehicles x 58%= 91 vehicles turning left out of the site

<u>Proposed Turning Movements:</u>
-Entering the site:
-250 vehicles x 42% = 105 vehicles turning left into the site
-250 vehicles x 58% = 145 vehicles turning right into the site
-Exiting the site:
-250 vehicles x 42%= 105 vehicles turning right out of the site
-250 vehicles x 58% = 145 vehicles turning left out of the site

As one can see the turning movements entering and exiting the site do increase but only by approximately 50 vehicles at peak capacity. During the typical Sunday it will be considerably less.

Community Bible Church currently has two (2) services on Sunday's, one at 9:30am and one at 11am. 2|42 Church located east of the proposed site has three (3) services on Sundays starting at 9am, 10:30am, and 12pm. The staggering of service times between the two churches also helps to alleviate some of the traffic on Grand River during those time periods.

J. A detailed traffic impact study shall be submitted for any site over ten (10) acres in size which would be expected to generate 100 directional vehicle trips (i.e. 100 inbound or 100 outbound trips) during the peak hour of traffic of the generator or on the adjacent streets.

A traffic study is not required for this site.

K. Special Provisions: General description of any deed restrictions, protective covenants, master deed or association bylaws.

An easement for access to Harte Dr will need to be obtained from owner of property to the east and a permit will be required to discharge into a MDEQ regulated wetland.

L. A list of all sources shall be provided.

Genoa Township's *Submittal Requirements For Impact Assessment*

Genoa Township Zoning Ordinances

Soil Survey of Livingston County, Michigan, U.S.D.A. Soil Conservation Service

National Wetland Inventory Plan, United States Department of the Interior, Fish and Wildlife Service

BOSS
BE
Engineering
3121 E. Grand River Howell, MI 48843
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www.bosseng.com

October 24th, 2018

Ms. Kelly Van Marter, AICP
Planning Commission
Genoa Township
2911 Dorr Road
Brighton, MI 48116

Re: Genoa Plaza

Dear Kelly Van Marter,

We have received the review letters from SAFEbuilt Studio dated 10-17-18, Tetra Tech dated 10-17-18, and Brighton Area Fire Authority dated 10-9-18, for the Community Bible Church expansion site plan review, and offer the following comments.

SAFEbuilt Studio

1. Acknowledged.
2. Building material calculations have been added to the architectural elevations as requested. Material and color samples will be provided at the township meetings.
3. Please refer to the Tetra Tech (Township Engineering Consultant) dated 10-17-18 for acceptance of traffic analysis information.
4. Due to the anticipated increase of members, current member parking demand, and peak site uses we feel the excess parking is needed and are prepared to speak on this during the Planning Commission meeting.
5. Deliveries will be coordinated to not conflict with traffic circulation. A note has been added to sheet C3 clarifying this.
6. The amount of parking lot landscaping area has been confirmed on sheet C6. Notes have been added on the plan depicting areas of parking lot landscaping and the calculations have also been updated.
7. We are seeking relief from the south buffer requirement due to the natural area and wetland that currently exists and provides ample screening from adjacent uses.
8. The inconsistencies on the plant table have been corrected.
9. The proposed material for the dumpster enclosure is a colored CMU. This has been added to the dumpster enclosure detail on sheet C3.
10. The extra light pole previously shown on sheet C7 has been removed.
11. A detail for the proposed monument sign is not available at this time. Detail will be provided during the separate sign permit process as mentioned in review comment 12.
12. Acknowledged. All necessary documents and details will be provided for the signage prior to installation.

Tetra Tech

General Notes

1. The square footage of the existing building and proposed expansion are now shown on sheet C3.
2. Acknowledged. Preliminary discussion on REU's has been had between the Church and Genoa Township already.

Site Plan

1. The second FES in the forebay has been eliminated by connecting the storm sewer in to a new proposed storm structure at the location of the northern spillway.
2. The spillway has been eliminated as requested.

Sanitary Service

1. The existing sanitary service has been added to the utility plan. It currently runs from the lower level entry door on the east side of the Church to the manhole at Harte Drive. This will run underneath the proposed addition. Conversation has been had with the architect and plumber and has been determined that it will be utilized for the new fixtures in the proposed addition. A note has been added as such on the utility plan.
2. No proposed connection to the sanitary sewer main is occurring as the existing sanitary lead has been deemed usable for the expansion. (Multiple bathrooms are also being eliminated from the existing church within the front portion of the church that is being removed.)

Water Service

1. We recognize benefits of looping watermain but believe looping is unnecessary in this instance as additional hydrants are only needed for the purpose of hydrant coverage. The revised hydrant/watermain locations have been discussed with the Brighton Area Fire Authority prior to this revised submittal.
2. The fire suppression has been increased to an 8" line as requested by the Fire Authority and has been shifted to connect to the proposed watermain at the south end of the proposed building as requested to reduce the number of live taps needed.
3. There is no existing water lead for the church. The church is currently serviced by a well at the southern portion of the site. An additional existing well is used to service the existing house to the west of the church. This house is being demolished. Both wells are noted to be properly abandoned. The existing church building will be connected into the proposed water service.
4. Acknowledged. Easement documents will be provided to MHOG/Tetra Tech prior to MDEQ permitting.

Traffic

1. Acknowledged.

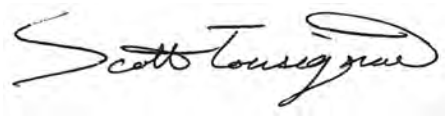
Brighton Area Fire Authority

1. Per phone discussion with Fire Marshal Rick Boisvert, the FDC remains at its originally proposed location. An additional hydrant is proposed along Harte Drive that places the FDC within 100' of a hydrant as required. The FDC will be along the east face of the building along Harte Drive.
2. The fire suppression line has been increased to 8" as requested.
3. Per phone discussion with Fire Marshal Rick Boisvert, the hydrant locations have been revised as discussed. The hydrant 2 has been shifted westerly to be more central in the rear of the building. Additionally, a hydrant has been added along Harte Drive.
4. The existing building will not be fire sprinkled. A fire wall is proposed between existing and proposed structures.
5. A note is included on sheet C3 acknowledging the address requirements. Additionally, the architectural elevation views note the address requirements and location.
6. Per phone discussion with Fire Marshal Rick Boisvert, the proposed building rear entryway sidewalk has been increased in width and a curb drop provided off of the 26' wide drive aisle for Fire Truck access at the southwest corner of the proposed addition. The site plan sheet C3 notes the width and location of the Fire truck access route. A detail on the detail sheet has been provided showing the thickened concrete section for loading requirements. The denser concrete pattern represents the limits of the thickened section of concrete.
7. A note is included on sheet C3 acknowledging the height requirements. The trees that were previously specified and shown overhanging the emergency access route have been changed to a variety that is more columnar in form and won't interfere with vertical clearance of emergency vehicles.
8. A note is included on sheet C3. Additionally, the location of a knox box has been noted on the architectural elevation view.

Feel free to contact us should you have any questions, or if you are in need of any additional information.

Regards,

BOSS ENGINEERING COMPANY



Brent LaVanway, P.E.
Vice President
Director of Engineering

Scott Tousignant, P.E.
Project Engineer