#### HOWELL TOWNSHIP ZONING BOARD OF APPEALS REGULAR MEETING

3525 Byron Road Howell, MI 48855 April 16, 2024 6:30 pm

1.	Call to Order	
2.	Roll Call:	<ul> <li>( ) Ken Frenger - Chair</li> <li>( ) Carol Weaver – Vice Chair</li> <li>( ) Jim McEvoy – Secretary</li> <li>( ) Harold Melton – Board Rep. Alternate</li> <li>( ) Wayne Williams – P.C. Rep.</li> </ul>
3.	Pledge of Alle	egiance
4.	Approval of the Agenda:	
5.	Approval of th Regular Meet	ne Minutes: ing March 19, 2024
6.	Township Board Report:	
7.	Planning Commission Report:	
9.	Old Business A. None	:
<ul> <li>New Business:         <ul> <li>A. Christopher Schmidt, PZBA-2024-01, Parcel #: 4706-02-100-042, 57</li> <li>Preston Rd. Howell, MI 48855.</li> <li>Section 14.07-B Accessory Building Provisions.</li> <li>Request: 125 foot variance to allow accessory building to be located in tof the rear line of the house</li> </ul> </li> </ul>		er Schmidt, PZBA-2024-01, Parcel #: 4706-02-100-042, 5731 Howell, MI 48855.  7-B Accessory Building Provisions. 5 foot variance to allow accessory building to be located in front
	Grand River A Section 14.3 Driveways, a	LLC, PZBA-2024-02, Parcel #: 4706-20-201-015, 4120 W. Ave. Howell, MI 48855.  5-A Supplemental Regulations. Section 26.05 Roads, and Related Land Use Developments.  foot variance to allow the detention basin to be located in the back
11.	Other Busine	ss:
12.	Call to the Pul	blic:
13.	Adjournment	

## HOWELL TOWNSHIP ZONING BOARD OF APPEALS UNAPPROVED MINUTES: FEBRUARY 20, 2024 3525 BYRON RD. HOWELL TOWNSHIP HALL, HOWELL MI 48855 (517-546-2817)

#### **MEMBERS PRESENT:**

#### **MEMBERS ABSENT:**

Ken Frenger Chairperson
Carol Weaver Vice-Chair
Jim McEvoy Secretary

Wayne Williams P.C. Representative
Jeff Smith Board Representative

The meeting was called to order at 6:30 p.m. The roll was called.

<u>APPROVAL OF AGENDA:</u> MOTION by Williams seconded by Smith, "To approve the February 20, 2024 Zoning Board of Appeals Agenda" Motion carried.

<u>APPROVAL OF MINUTES</u>: MOTION by Williams, seconded by McEvoy, "To Approve the January 16, 2024 Zoning Board of Appeals Minutes as Presented" Motion carried.

**TOWNSHIP BOARD REPORT:** Synopsis was attached, Wayne had a question on the rezoning that the board acted on.

PLANNING COMMISSION REPORT: No meeting.

#### **NEW BUSINESS:**

#### **OLD BUSINESS:**

<u>PETITIONER</u>: Josh Brinkman, File# PZBA-2023-07, PARCEL #4706-12-300-005, 626 Marr Rd., Howell MI, 48855 (full legal description available upon request).

ARTICLE XIV - SUPPLEMENTAL REGULATIONS,

SECTIION 14.07 Accessory Building Provisions, Item B.

**<u>REQUEST:</u>** Applying for a Sixty (24) foot dimensional variance to allow for an accessory building to be located in front of the rear line of the house.

Tracy Brinkman explained the changes to the site plan, the size of the barn was reduced and turned so they would only need a 17 foot variance. And that it would be too expensive to move the power lines. Laura Wilkerson at 728 E. Marr, stated that she talk with several appraiser that could not get the information to prove that the proposed building would reduce her property value. A discussion followed. Mrs. Wilkerson said that see would prefer that the variance not be granted but would preferred that the building be pushed forward the 24 foot that was originally requested.

MOTION by Frenger, seconded by Weaver, "To approve the requested 24 foot variance for File# PZBA2023-007, Parcel I.D. 4706-12-300-005. For 626 Marr Road."

Roll was called, Williams – Yes, Frenger – Yes, Weaver – Yes, McEvoy – Yes, Smith – Yes. Motion carried.

OTHER BUSINESS:	
CALL TO THE PUBLIC: No Response.	
ADJOURNMENT: Meeting adjourned at 7:03 P.M.	
Approved:	
As Presented:	Jim McEvoy, Secretary
As Amended:	
As Corrected:	

Howell Township Zoning Board of Appeals

Unapproved Minutes: 2.20.2024

Dated:

## HOWELL TOWNSHIP BOARD March 4, 2024 Regular Meeting Synopsis

The March 4, 2024 Howell Township regular meeting, held at the Township Hall, 3525 Byron Road, was called to order by Supervisor Coddington at 6:30 PM. Members present: Coddington, Daus, Hohenstein, **Smith**, Melton, Wilson. The following actions were taken: 1) Approved the agenda 2) Approved the February 12, 2024 Regular Board meeting minutes as amended 3) Approved the bid from Sprungtown Outdoor Services for cemetery maintenance 4) Approved the 2024 road projects for Layton Road and Bowen Road 5) Approved the bid to treat the Township Hall walking path 6) Approved the water utility consent and franchise agreement with Oceola Township 7) Approved the sewer utility consent and franchise agreement with Oceola Township 8) Approved the extraterritorial sewer and water agreement with Operating Engineers Local 324 9) Accepted the HR Committee's recommendations 10) Approved sending the ADU Ordinance to the Planning Commission 11) Approved the contract for flag services for the Township 12) Accepted the disbursements and customary payments for the month 13) Adjourned at 8:00 pm

Tanya Davidson Recording Secretary

Corrected from 3.13.24

#### **HOWELL TOWNSHIP**

#### **Application for Zoning Board of Appeals**

3525 Byron Road Howell, MI 48855 Phone: 517-546-2817 ext. 108 Email: inspector@howelltownshipmi.org

File Number: PZBA-2024-01 Parcel ID: 4706-02-100 - 042 Date 3-6-2024			
Residential Request, Fee \$400.00 Commercial Request, Fee \$900.00			
Owner Name Christopher Schmidt Owner Address 5731 Preston Rd			
Applicant Name Christopher Schmidt Applicant Address 5731 Preston Rd			
Contact Person for all Correspondence Christopher Schmidt			
Address 5731 Preston Rd			
Phone S17 404 8017 Fax Email CSchmidtsta 20@gmail.com			
Applicant is:			
Other, Explain			
Nature of Request			
Application for Variance Appealing Planning Commission Decision			
Appealing Zoning Administrator Decision Application for Interpretation of Ordinance			
General Location of Property West side of preston Rd			
Between Roads W Allen Rd & Nancy Ann Dr			
Please attach a copy of the legal description of property to the application.			
Current Zoning Classification AIR			

Details of your request and reasons why the request should be granted: I am wanting to build a 40 x 40 pole barn for storage on my property on what I thought was my side yard, but was informed it was in fact my front yard. This location is the best suited for the pole barn as it will not interfere with the homes septic field and underground utilities. I have attached pictures of the pole barn and of the lot for reference with messurements from property lines and the home.			
Have previous appeal(s) been made on this property?	No Yes		
If yes: Date of appeal Nature of appeal	Decision		
Appealing the Zoning Administrator's decision?	Yes No		
Appealing the Planning Commission's decision?	Yes No		
If yes, grounds for appeal:			
Specify ordinance sections which substantiate your reasons for appeal:			
Requesting an interpretation of the ordinance?	Yes No		
If yes, Zoning Ordinance section			
Applicants interpretation of the Ordinance section (attach any supporting material)			
Please provide the following:			
Zoning Ordinance Section			
Is this a request for a dimensional variance?	Yes No		
Is this a request for a use variance?	Yes No		
State the minimal acceptable variance being requested			
Date and Decision of Zoning Administrator and/or			
Planning Commission			

•

Applicant hereby acknowledges the following (initial each section)

0 1 0

	Applicant hereby acknowledges the following (initial ea	ich section)	
	That granting of the variance request will not confer u	ipon the Applicant any	110
	special privileges that are denied by the provisions of		
	lands, under the provisions of the ordinance.	(M)	
	The practical difficulties or unnecessary hardship in th	////	
	ordinance was not created or caused by the Applicant	<b>.</b>	1/1/10
	The Zoning Board of Appeals cannot grant a variance	for a use that is not	
	permissible in the designated zoning district.		00
	The Zoning Board of Appeals has the right to prescribe	e conditions and	///
	safeguards for any variance granted.		
	The Applicant acknowledges that the use for construc	tion authorized by such	
	variance or permit must be commenced within one ye	ear of granting the	
	variance, otherwise the variance is null and void.		
	No application for a variance which has been denied s	shall be resubmitted for a	
	period of one year except on grounds of new evidence	e of change of conditions.	
	Applicant acknowledges he has read and understands	Article XXII entitled	
	"Zoning Board of Appeals."		15
	Applicant grants permission to all ZBA members access	ss to the property to view	11/1
	all relevant areas pertaining to the request.		
	I hereby depose and say that all the above statements	and information contained	in this Application and
	any attachments submitted herein are true and accura	te.	
/	I for you		£ /
(	Owner's Signature	Applicant's Signature	
	Owner's signature	Applicant's Signature	1
	Christopher Schmid	Christopher	Schm, A
	- Chiristophia Chira		0100
	Print Name	Print Name 3-13-24	
	3-13-24	3-13-69	
-	-3-6-24	36-61	
	Date	Date	
	Subscribed and sworn to before me this	Subscribed and sworn to	before me this
	13th day of March, 2024	13th day of Mar	A CONTRACTOR OF THE CONTRACTOR
	1	1	,
	Laura Wallen	Krupa Wali	len
	Notary Public	Notary Public	
	LAURA WALKER	LAURA WALKE	R
	Printed Name	Printed Name	
	द्र हिन्दित हो है		
	<u>Livingston</u> County, Michigan	Livingston C	County, Michigan
		J	( )
	My Commission expires: 09/18/2024	My Commission expires:	19/18/2024
	, Chillian		/ /

#### LIVINGSTON COUNTY TREASURER'S CERTIFICATE

I hereby certify that there are no TAX LIENS OR TITLES held by the State or any individual against the within description, and all TAXES on same are paid for five years previous to the date of this instrument or appear on the records in this office, except as stated.

Dec 17, 2018 Jennifer M. Nash, Treasurer

2018 TAX NOT AVAILABLE FOR EXAMINATION

2018R-033249 RECORDED ON 12/18/2018 09:00:44 AM **BRANDON DENBY REGISTER OF DEEDS LIVINGSTON COUNTY, MI 48843 RECORDING: 26.00** 

> **REMON: 4.00** PAGES: 3

#### WARRANTY DEED



Received eRecord 12/17/2018 at 01:55 PM LivCo, MI ROD by

File No. LIB108480

The Grantors: Dawn McGahey f/k/a Dawn M. Bryan

whose address is: 5731 Preston Rd., Howell, MI 48855-9521

Convey and Warrant to: Christopher T. Schmidt and Cassandra A. Schmidt , Hushand and Wife

whose address is: 830 Tanager Trail, Howell, MI 48843

the following described premises situated in the Township of Howell, County of Livingston, State of Michigan, to wit:

#### SEE ATTACHED EXHIBIT A/LEGAL DESCRIPTION RIDER

for full consideration of: \$285,000.00 (Two Hundred Eighty Five Thousand Dollars and No Cents)

Subject to: Existing building and use restrictions, zoning ordinances, and easements if any. Liens for any tax and/or assessment which become due and payable on or after the effective date hereof.

This property may be located within the vicinity of farmland or a farm operation, Generally accepted agricultural and management practices which may generate noise, dust, odors, and other associated conditions may be used and are protected by the Michigan right to farm act.

The grantor grants to the grantee the right to make Mdivisions under Section 108 of the Land Division Act, Act No. 288 of the Public Acts of 1967.

Access to the property is over a private road/easement which is not required to be maintained by any governmental entity. Notice of private road given by separate document on even date herewith.

Oil and Gas Lease as recorded in Liber 1275, page 106, Livingston County Records; and mesne assignments thereof.

Dated 12 / 7 / /8



(File Number: LIB108480)

#### **WARRANTY DEED**

(Continued)

(Attached to and becoming part of the Warranty Deed between Dawn McGahey f/k/a Dawn M. Bryan, as Grantor(s) and Christopher M. Schmidt and Cassandra A. Schmidt, as Grantee(s))

Signed By:

Dawn McGahey f/k/a Dawn M. Bryan

STATE OF

**COUNTY OF** 

McGahey, f/k/a Dawn M. Bryan

Notary Public

**BRANDON BAREFIELD** NOTARY PUBLIC, STATE OF MICHIGAN COUNTY OF LIVINGSTON My Commission Expires 12-23-2022 ACTING IN THE COUNTY OF

My Compossion Expires: Acting in the County of:

Drafted by:

Thomas D. Richardson, Esq.

111 N. Main St. Ann Arbor, MI 48104 When recorded return to:

Christopher T. Schmidt and Cassandra A. Schmidt 5731 Preston Rd. Howell, MI 48855-9521

Tax Code: 4706-02-100-035 pt of, 4706-02-100-034 pt of

New tax code: 4706-02-100-042

#### **WARRANTY DEED**

(Continued)

(Attached to and becoming part of the Warranty Deed between Dawn McGahey f/k/a Dawn M. Bryan, as Grantor(s) and Christopher M. Schmidt and Cassandra A. Schmidt, as Grantee(s))

#### **EXHIBIT A/LEGAL DESCRIPTION RIDER**

Land is located in the Township of Howell, County of Livingston, State of Michigan, and described as follows: PARCEL B-2A:

Part of the Northwest fractional one-quarter of Section 2, Town 3 North, Range 4 East, Howell Township, Livingston County, Michigan, being described as follows: Commencing at the North 1/4 corner of said Section 2; thence along the North and South one -quarter line of said Section 2 and centerline of Preston Road (66 feet wide), South 00 degrees 12 minutes 22 seconds East (recorded as South 00 degrees 18 minutes 40 seconds East), a distance of 1156.75 feet; thence along said North and South one-quarter line and centerline of Preston Road (66 feet wide) South 00 degrees 18 minutes 40 seconds East, a distance of 200.12 feet; thence along the South line of the North one-half of the South one-half of the Northwest one-quarter of Section 2, as previously surveyed and monumented, North 89 degrees 58 minutes 29 West (recorded as North 88 degrees 20 minutes 04 seconds West) a distance of 909.74 feet to the Point of Beginning of the parcel to be described; thence South 00 degrees 01 minutes 26 seconds West 243.52 feet; thence along the centerline of Easement "A", a 66 foot wide private easement for ingress and egress, as described below, South 89 degrees 51 minutes 44 seconds West (recorded as North 88 degrees 14 minutes 34 seconds West) 364.36 feet; thence North 00 degrees 13 minutes 46 seconds West 244.56 feet; thence along the North lien of the North 1/2 of the South 1/2 of the Northwest 1/4 of Section 2, as previously surveyed and monumented, South 89 degrees 58 minutes 29 seconds East (recorded as South 88 degrees 04 minutes 47 seconds East), 365.44 feet to the Point of Beginning. Subject to and including the use of Easement A, described below.

#### EASEMENT "A", A 66 FOOT WIDE EASEMENT FOR INGRESS AND EGRESS:

Part of the Northwest fractional one-quarter of Section 2, Town 3 North, Range 4 East, Howell Township, Livingston County, Michigan, being more particularly described as follows: Commencing at the North one-quarter of said Section 2, thence along the North and South one-quarter line of said Section 2 and centerline of Preston Road (66 foot wide) South 00 degrees 18 minutes 40 seconds East a distance of 1397.84 feet to the Point of Beginning of the centerline of a 66 foot wide private easement for ingress and egress to be described; thence along the centerline of a 66 foot wide private easement for ingress and egress, North 88 degrees 14 minutes 34 seconds West a distance of 2053.12 feet to the point of Terminus of said easement.

The above described property is commonly known as 5731 Preston Rd., Howell, MI 48855-9521

(File Number: LIB108480)

Design #: 332051527964

Store: WIXOM



**Post Frame Building Estimate** 

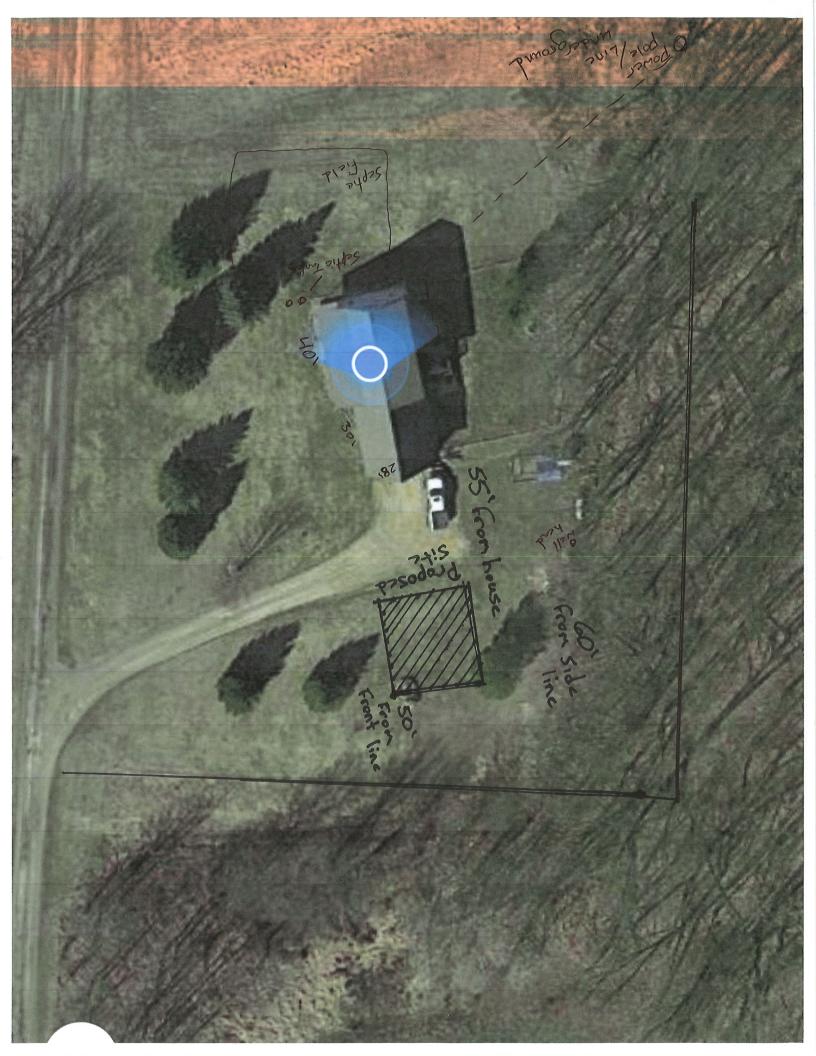
Date: Feb 1, 2024 1:37:29 PM

#### **Elevation Views**



For other design systems search "Design & Buy" on Menards.com

Page 2 of 8





#### **HOWELL TOWNSHIP**

#### **Application for Zoning Board of Appeals**

3525 Byron Road Howell, MI 48855 Phone: 517-546-2817 ext. 108 Email: inspector@howelltownshipmi.org

File Number: PZBA-2024-02 Parcel ID: 4706 Date Date				
Residential Request, Fee \$400.00 Commercial Request, Fee \$900.00				
Owner Name Old Glory, LLC Owner Address PO Box 328, Fowlerville, MI 48836				
Applicant Name Old Glory, LLC Applicant Address PO Box 328, Fowlerville, MI 48836				
Contact Person for all Correspondence Matt Martin				
Address PO Box 328, Fowlerville, MI 48836				
Phone 517-375-0555 Fax N/A Email carwashguy.mm@gmail.com				
Applicant is: Owner Tenant Land Contract Purchaser				
Other, Explain N/A				
Nature of Request				
Application for Variance  Appealing Planning Commission Decision				
Appealing Zoning Administrator Decision Application for Interpretation of Ordinance				
General Location of Property north side of Grand River west of Burkhart				
Between Roads Burkhart & Emmons				
Please attach a copy of the legal description of property to the application.				
Current Zoning Classification RSC				

Applicant hereby acknowledges the following (initial each section)

That granting of the variance request will not confer upon the Applicant any special privileges that are denied by the provisions of the ordinance to other lands, under the provisions of the ordinance.	m m
The practical difficulties or unnecessary hardship in the strict application of the ordinance was not created or caused by the Applicant.	mn
The Zoning Board of Appeals cannot grant a variance for a use that is not permissible in the designated zoning district.	mm
The Zoning Board of Appeals has the right to prescribe conditions and safeguards for any variance granted.	mm
The Applicant acknowledges that the use for construction authorized by such variance or permit must be commenced within one year of granting the variance, otherwise the variance is null and void.	mm
No application for a variance which has been denied shall be resubmitted for a period of one year except on grounds of new evidence of change of conditions.	MM
Applicant acknowledges he has read and understands Article XXII entitled "Zoning Board of Appeals."	mm
Applicant grants permission to all ZBA members access to the property to view all relevant areas pertaining to the request.	mm
I haraby danasa and say that all the above statements and information contained	in thic Annlication and

I hereby depose and say that all the above statements and information contained in this Application and any attachments submitted herein are true and accurate.

any attachments submitted herein are true and accur	ate.
Matthe Tlad	Colathe Zerlato
Owner's Signature	Applicant's Signature
Matthew Martin L Martin	Matthew Martin L. Mas LN
Print Name	Print Name
03/06/2024	03/06/2024
Date	Date
Subscribed and sworn to before me this  Oth day of Mar(N, 2024  Notary Public  Vor! Snow- Woolington  Printed Name	Subscribed and sworn to before me this  (of h day of March, 2024  Notary Public  Koy Snow Wode Horr  Printed Name
Living Sten County, Michigan	Livingston County, Michigan
My Commission expires: Color Snow-W  Notary Public - St  County of I  My Commission E  Acting in the County	Vadenstorer tate of Michigan Livingston Expires 6/6/2025

Details of your request and reasons why the request should be granted: Request is to allow the detention basin to be located in the front setback. This is an expansion of an existing detention basin in order to meet the current storm water management requirements. See attached plans and written explanation.			
Have previous appeal(s) been made on this property?	<b>√</b> No Yes		
If yes: Date of appeal Nature of appeal	/A Decision N/A		
Appealing the Zoning Administrator's decision?	Yes ✓ No		
Appealing the Planning Commission's decision?	Yes No		
If yes, grounds for appeal:			
N/A			
Specify ordinance sections which substantiate your reasons for appeal:  N/A			
Requesting an interpretation of the ordinance?	Yes 🗸 No		
If yes, Zoning Ordinance section N/A			
Applicants interpretation of the Ordinance section (attach any supporting material) N/A			
Please provide the following:	T		
Zoning Ordinance Section			
Is this a request for a dimensional variance?	✓ Yes No		
Is this a request for a use variance?	Yes V No		
State the minimal acceptable variance being requested	as shown on the plans		
Date and Decision of Zoning Administrator and/or Planning Commission  N/A			

### RECORDED

2002 AUG -9 P 12: 54

QUIT CLAIM DEED

FILE NO. 39-2109

NANCY HAVILAND
REGISTER OF DEEDS
LIVINGSTON COUNTY, MI.
48843

Great Lakes Title of Michigan

	The Grantor(s) MATTHEW LAIRD MARTIN ALSO KNOWN AS OLD GLORY, LLC AND WENDIE MARIE MARTIN ALSO KNOWN AS OLD GLORY, LLC, HUSBAND AND WIFE
	whose address is 14889 S. State St, Perny, Mi 48872-9541
	Quit-Claim(s) to OLD GLORY AUTO WASH, L.L.C., A MICHIGAN LIMITED LIABILITY COMPANY whose address is 14889 5. State St. Perry, ru 48872-9541
	The following described premises situated in the TOWNSHIP of HOWELL, County of LIVINGSTON, STATE of MICHIGAN:
	LOT 3 NEWMAN'S GRAND VIEW ESTATES SUBDIVISION AS RECORDED IN LIBER 8, PAGE 24 OF PLATS, LIVINGSTON COUNTY RECORDS
	Commonly known as: LOT 3 GRAND RIVER
	For the sum of ONE AND 00/100 (\$1.00) DOLLARS
	THIS INSTRUMENT IS EXEMPT FROM STATE AND COUNTY TRANSFER TAX PURSUANT TO MSA 7.456(26)(A) AND MSA 7.456(5)(A)
	Subject to easements and building and use restrictions of record, if any.  Dated: June 7, 2002
	Signed in the presence of:  Signed by:  With Land Matter  MATTHEW LAIRD MARTIN ALSO KNOWN AS OLD GLORY  LLC  WENDIE MARIE MARTIN ALSO KNOWN AS OLD GLORY,  LLC
	STATE OF MICHIGAN COUNTY OF LIVINGSTON
	The foregoing instrument was acknowledged before me on June 7, 2002, by MATTHEW LAIRD MARTIN ALSO KNOWN AS OLD GLORY, LLC, HUSBAND AND WIFE  DEBORAH WEBB Notary Public,
,	My commission expires: 8/24/02 LIVINGSTON County, Michigan
/	When Recorded Return To and Drafted By: OLD GLORY AUTO WASH, L.L.C. by MATTHEW MARTIN 14889 5. 5 tate 5t.  Penny Millsyzz-9541
	Tax Parcel # 06-20-201-015 Recording Fee 9.00 Transfer Tax EXEMPT  B-DW

#### **Monument Engineering Group Associates, Inc.**



Developing Lifelong Relationships monumentengineering.com

298 Veterans Drive, Fowlerville, MI 48836 (HQ) (517) 223-3512



#### **Summary:**

The subject site is the existing Old Glory Carwash located at 4120 Grand River Ave., Howell, MI. The existing carwash is comprised of 4 self-serve bays, a mechanical room, and 2 touchless bays. The original site was developed in 2002 under different ordinance and stormwater management requirements. The site is serviced by a small detention basin on the east side of the drive. This basin was designed under the rules in place and does not meet current stormwater management requirements.

The plans include the addition of 2 additional touchless bays on the west end of the existing building. This will require additional pavement in this area, increasing the overall impervious area. With the increase in impervious areas, the Livingston County Drain Commission (LCDC) requires stormwater management to address the *additional* runoff only, while grandfathering in the existing site.

#### **Request:**

The applicant is requesting a dimensional waiver of 25' from Section 14.35 Retention or Detention Ponds Located on adjacent Parcels of Land. Sub section A.

- A. A written application for a variance is submitted, demonstrating:
- 1. That special conditions and circumstances exist which are peculiar to the land use, land, structure or building in the same zoning district.

The site was originally developed in 2002. The current design for the proposed building addition is working around existing conditions. The existing detention basin is on the east side of the drive to the building. From a land development and engineering perspective it made the most sense to expand the existing basin. This would preserve the future developable space on the west side of the drive while utilizing existing infrastructure.

2. That literal interpretation of the provisions of this Ordinance would deprive the applicant of rights commonly enjoyed by other properties in the same zoning district under the provisions of this Ordinance.

Not allowing the applicant to expand the detention basin into the front setback would deprive the applicant of the ability to fully develop the property under the current ordinance in the future. The area on the west side of the drive could be an area for the construction of an accessory building for the carwash operation, ie. a future tunnel-wash.

3. That granting of the variance requested will not confer on the applicant any special privilege that is denied by the provisions of this Ordinance to other lands, structures, or buildings in the same zoning district.

Granting the variance as requested under the unique circumstances of this site will not confer on the applicant any special privilege. With the existing detention basin on the east side of the drive, it makes sense from an engineering perspective, and best use of land, to expand the existing basin rather than create a new one elsewhere on the site.

4. That no nonconforming uses of other lands, structures, or buildings in the same zoning district, and not permitted use of lands, structures, or buildings in other zoning districts, shall be considered grounds for the issuance of a variance.

This request is being made solely based on the existing conditions of the site and what makes the best use of the land and best engineering practice.

### LEGAL DESCRIPTION (AS PROVIDED)

(PER SURVEY BY: CORNERSTONE ENGINEERING, JOB NO.: 02013.GIN, DATED: 02/18/2002)

TAX ID: 4706-20-201-015

LOT 3 OF "NEWMAN'S GRAND VIEW ESTATES" A PART OF S. 1/2 N.E. 1/4 AND A PART OF N. 1/2 S.E. 1/4 SECTION 20, T. 3 N., R. 4 E., HOWELL TOWNSHIP, LIVINGSTON COUNTY, MICHIGAN, AS RECORDED IN LIBER 8 OF PLATS, PAGE 24, LIVINGSTON COUNTY RECORDS. 2.04 ACRES

#### BEARING REFERENCE

BEARINGS ARE BASED ON PROJECT COORDINATE SYSTEM: MICHIGAN STATE PLANE COORDINATE SYSTEM, NAD83 (CONUS) (MOL) (GRS80), SOUTH ZONE 2113, INTERNATIONAL FEET, GROUND (LAT: , LON: , ELEV: , SCALE FACTOR: ).

LAND USE SUMMARY			
LAND USE DATA	CHARACTERISTIC	EXISTING CONDITIONS	PROPOSED CONDITIONS
	TOTAL DEVELOPMENT AREA (AC)	X.XX AC	X.XX AC
	IMPERVIOUS AREA (AC)	X.XX AC	X.XX AC
	TOTAL PERVIOUS AREA (AC)	X.XX AC	X.XX AC
PERVIOUS AREA	PERVIOUS AREA BREAKDOWN BY COVER TYPE		
	MEADOW/FALLOW/NATURAL AREAS (NON-CULTIVATED)	X.XX AC	X.XX AC
	PREDOMINANT NRCS SOIL TYPE (A, B, C, OR D)	TYPE X = X.XX AC	TYPE X = X.XX AC
	IMPROVED AREAS (TURF GRASS, LANDSCAPE, ROW CROP)	X.XX AC	X.XX AC
	PREDOMINANT NRCS SOIL TYPE (A, B, C, OR D)	TYPE X = X.XX AC	TYPE X = X.XX AC
	WOODED AREAS	X.XX AC	X.XX AC
	PREDOMINANT NRCS SOIL TYPE (A, B, C, OR D)	TYPE X = X.XX AC	TYPE X = X.XX AC
_		CPVC VOLUME CALCULATED (CF)	X,XXX CF
		CPVC VOLUME PROVIDED (CF)	X,XXX CF
		CPRC VOLUME PROVIDED (CF)	X,XXX CF

THE PROFESSIONAL ENGINEER WHO SIGNS AND SEALS THIS SITE PLAN CERTIFIES THAT THE VALUES IN THIS TABLE REFLECT THE WRC

STORMWATER CALCULATIONS REQUIRED FOR THIS DEVELOPMENT AND THAT GEOTECHNICAL INVESTIGATIONS WERE PERFORMED THAT PROVIDE CONCLUSIVE DOCUMENTATION THAT DEMONSTRATES WHETHER INFILTRATION (I.E. CPVC VOLUME CONTROL) IS PRACTICABLE.

### DESIGN ENGINEER/SURVEYOR

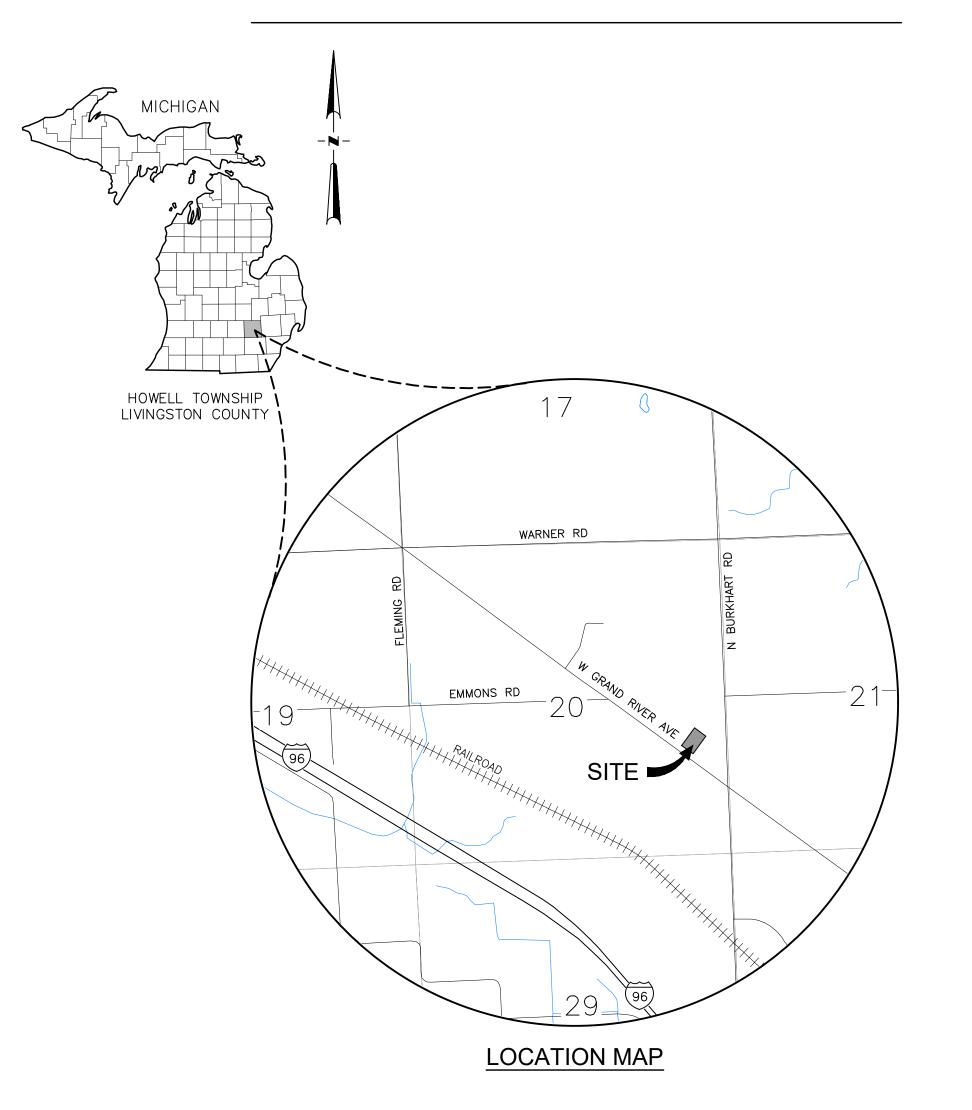


MONUMENT ENGINEERING GROUP ASSOCIATES, INC

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

298 VETERANS DRIVE, FOWLERVILLE, MI 48836 PHONE: 517-223-3512 PRELIMINARY SITE PLAN FOR

# NEW TOUCHLESS WASH BAYS



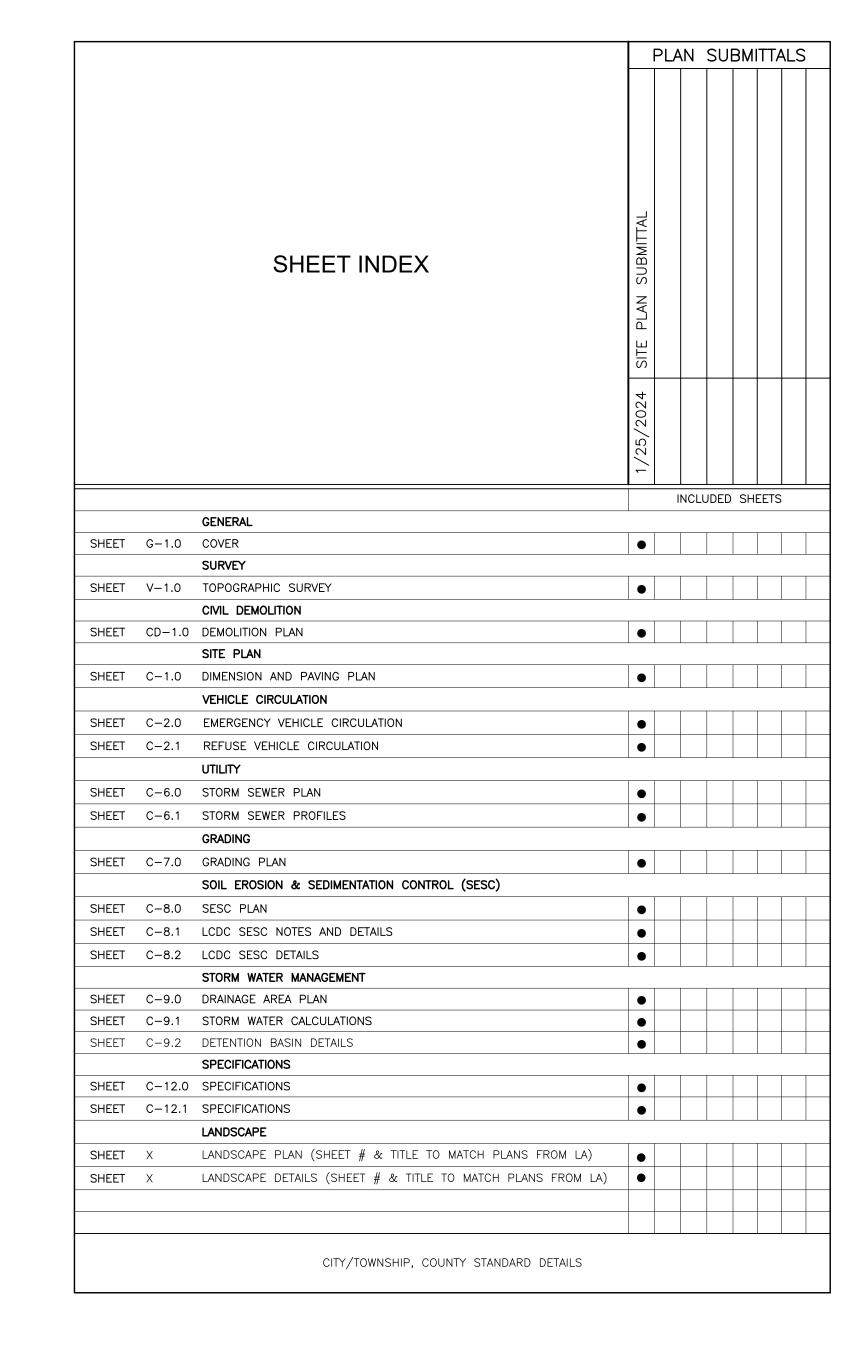
### CLIENT



OLD GLORY CAR WASH PO BOX 328 FOWLERVILLE, MI 48836 POC: MATT MARTIN PHONE: 517-375-0555

#### **ARCHITECT**

GILLETT ASSOCIATES ARCHITECTURE 32969 HAMILTON COURT, SUITE 211 FARMINGTON HILLS, MI 48334 POC: TIM MELVIN PHONE: 248-489-2344



INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS 298 VETERANS DRIVE FOWLERVILLE, MICHIGAN 48836 (OFFICE) 517-223-3512 MONUMENTENGINEERING.COM ERVICE DISABLED VETERAN OWNI

SMALL BUSINESS (SDVOSB)

**ALLAN W.** 

Call MISS DIG 3 full working days before you dig 1-800-482-7171

www.missdig.org ACCURACY THEREOF. THE CONTRAC SHALL BE EXCLUSIVELY RESPONSIBLE DETERMINING THE EXACT UTILITY LOCATI AND ELEVATIONS PRIOR TO THE START C O N S T R U C T I O

CLIENT:



FOWLERVILLE, MI 4883 POC: MATT MARTIN 517-375-0555

ORIGINAL ISSUE DATE:

PROJECT NO: 22-177 SCALE: N/A

0 1/2" 1 FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

G-1.0

DATUM: NAVD88

CHISELED "X" ON NW SIDE CONCRETE PAD FOR LIGHT POLE, 208'± EAST OF CENTERLINE W GRAND RIVER ROAD & 20'± SOUTH OF CENTERLINE FOR ACCESS DRIVE TO SUBJECT'S PROPERTY. ELEV = 955.54

BENCH TIE IN NE SIDE UTILITY POLE, 32'± EAST OF CENTERLINE W GRAND RIVER ROAD & 57'± NORTH OF CENTERLINE FOR ACCESS DRIVE TO SUBJECT'S PROPERTY. ELEV = 953.25

#### SOILS INFO

SOIL TYPES ARE ACCORDING TO THE USDA SOIL SURVEY WEB SITE (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) — — SOIL TYPE LIMIT AND LABEL

CONOVER LOAM, 0-4% SLOPES

LOT 22

NOW OR FORMERLY TAX ID: 4706-20-201-014 FREDENBURG, EVELYN

4200 GRAND RIVER

(ZONE: SFR)

EX. SHED

APPROX. 8" SANITARY SEWER -

(PER HOWELL TWP. PLAN)

EX. HOUSE

WAWASEE LOAM, 2-6% SLOPES

#### STRUCTURE SCHEDULE

	M SEWER	
STRUCTUF	RE RIM EL	EV. PIPES
(50071) CB	B 953.22	12" S IE= 949.35
(50097) CB	R 952.71	12" NE IE= 949.16 12" SE IE= 948.68
(50225) CB	R 953.08	12" NE IE= 949.13 12" N IE= 949.07
(50293) STI	MH 954.28	4" SW IE= 950.31
(50294) STI	MH 954.26	4" NE IE= 950.34
(50295) STI	MH 954.24	4" NE IE= 950.42
(50296) STI	MH 954.42	4" NE IE= 950.57
(50297) STI	MH 954.50	4" SW IE= 950.78
(50367) CB	R 953.29	12" SW IE= 949.14 12" NE IE= 949.09
(50421) OC	S 952.67	18" SW IE= 949.33
(50506) CB	B 952.35	12" S IE= 949.81
(50507) CB	R 953.51	12" SW IE= 949.64 12" N IE= 949.49
(50543) CB	R 953.15	12" SW IE= 949.62

EX	. SANITARY	SEWER
STRUCTURE	RIM ELEV.	PIPES
(50056) SMH	950.14	12" SE IE= 940.16
(50448) SMH	948.61	12" NW IE= 939.33 12" SE IE= 939.17

#### EXISTING PARKING

NOW OR FORMERLY

TAX ID: 4706-21-300-026 LIVINGSTON COUNTY AIRPORT

3399 COUNTY AIRPORT DRIVE

(ZONE: RT)

S52°50'08"E(M)

RIM=954.24

N: 0.11'

(50543)

(50097)

SUBJECT PROPERTY

NOW OR FORMERLY

OLD GLORY LLC 4120 GRAND RIVER

88,818 SF

2.039 ACRES

(ZONE: RSC)

N52°50'08"W(M)

N51°30'00"W(R) 🕉 240.00'(R&M)

TAX ID:4706-20-201-015 (PER SURVEY PROVIDED)

LANDSCAPE -

(LS) AREA

RIM = 952.71

N: 0.10'

E: 0.08'

RIM = 950.14

FIR (BENT) ~ N: -0.21'

RIM=953.15

S51°23'48"E(R) 240.00'(R&M)

THERE ARE NO STRIPED PARKING SPACES ON THE SUBJECT

( E: 0.23'

NOW OR FORMERLY TAX ID: 4706-20-201-016

GRAND-BURKE DEVELOPMENT LLC

2367 BURKHART

(ZONE: RSC)

APPROX. UG-TELEPHONE LINE

(PER SURVEY PROVIDED)

- RIM=948.61

- APPROX. 12" WATER MAIN

(PER HOWELL TWP. PLAN)

(50367)\_

RIM=953.29

─ VACCUM UNIT

(50421)

EX. DETENTION

**GRAND RIVER AVENUE** 

(100 FT. WD. - PUBLIC - R/W)

\_RIM=954.42

RIM = 954.26

\_(50293)

UG TELE, MH, TELE PED, CABLE PED UG FIBER, PED, LINE MARKER, VAULT —— X —— X —— X ——  $\bigcirc$ 

STEAM LINE, MH CONTOUR FENCE GUARD RAIL

EX. CONCRETE

WETLAND NOTE

ACCORDING TO THE NATIONAL WETLAND INVENTORY WEBSITE (HTTP:WWW.FWS.GOVWETLANDSDATAMAPPER.HTML), THERE ARE NO NOTED WETLANDS ON THE

WETLAND FLAGGING WAS NOT OBSERVED DURING THE FIELD SURVEY. AN OFFICIAL STUDY FOR THE PRESENCE OF WETLANDS WAS NOT CONDUCTED BY MONUMENT ENGINEERING GROUP ASSOCIATES.

BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THE SUBJECT PROPERTY APPEARS TO LIE ENTIRELY IN ZONE (X) AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN ACCORDING TO THE FLOOD INSURANCE RATE MAP FOR THE COUNTY OF LIVINGSTON,

1. ALL UNDERGROUND UTILITIES SHOWN ARE BASED ON DESIGN PLANS PROVIDED AT TIME OF

#### UTILITY REFERENCES

RECEIVED: 8/5/22 ~ N/A SAN:

GAS: CONSUMERS ENERGY 8/11/22

8/5/22

ELEC: DTE ENERGY ~ TANGER PROPERTIES LIMITED PARTNERSHIP ELECTRIC

PHONE/CABLE: AT&T

RECEIVED:

RECEIVED:

**EXISTING LEGEND** 

DECIDUOUS TREE, CONIFEROUS TREE, SHRUB TREE LINE/ CANOPY DITCH/ DRAINING COURSE UG-ELEC E T-AC-EM-EB UG ELEC, MH, TRANSFORMER, AC UNIT, METER, BOX OH ELEC, UTIL POLE, GUY WIRE GROUND LIGHT, POLE, POLE W/ ARM LT P L 1 H LIGHT MH, LT CTRL BOX, PARK. METER, CAR CHARGER ELEC HAND HOLE, OUTLET, SIGNAL MH, SIGNAL BOX UG GAS, MH, VALVE, LINE MARKER GAS WELL, METER, VENT

SERVICE DISABLED VETERAN OWNE SMALL BUSINESS (SDVOSB) WATER MAIN, MH, VALVE IN BOX, HYDRANT, FDC WATER WELL, METER, STOP BOX, POST INDICATOR VALVE IRRIGATION CONTROL VALVE, SPRINKLER HEAD STORM SEWER, MH, CB, INLET, YARD DRAIN, DOWN SPOUT CULVERT/ END SECTION SANITARY SEWER, MH, CLEAN OUT

MISC. MANHOLE, HAND HOLE, HAND BOX PARKING BLOCK, SIGN, FLAG POLE, POST, ROCK, MAIL BOX SECTION LINE, SECTION CORNER FOUND IRON ROD (FIR), FD MON, FD PK SET IRON ROD (SIR), SET PK, MAG NAIL FINISH FLOOR ELEVATION, SPOT ELEVATION

RAILROAD SIGNAL, SIGNAL BOX SOIL BORING

EX. ASPHALT

EX. GRAVEL

#### **FLOOD ZONE**

FEMA MAP SCALES DO NOT SUPPLY SUFFICIENT LEVEL OF DETAIL TO PLOT ACCURATELY. ZONES IF PLOTTED HEREIN ARE APPROXIMATE.

COMMUNITY PANEL NO. (26093C0188D), EFFECTIVE DATE 9/17/2008.

## **UTILITY NOTES**

- SURVEY UNLESS NOTED OTHERWISE.
- 2. THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING 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 UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

HOWELL TOWNSHIP ~ MHOG **HOWELL TOWNSHIP** 

STORM: LIVINGSTON COUNTY ROAD COMMISSION RECEIVED:

RECEIVED:

RECEIVED: 8/8/22 ~ N/A

7/18/22

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MICHIGAN 48836

(OFFICE) 517-223-3512

MONUMENTENGINEERING.COM

ALLAN W.

OLD GLORY CAR WASH PO BOX 328 FOWLERVILLE, MI 48836 POC: MATT MARTIN 517-375-0555

TOUCHI 4120 GRAN OF SE 1/4 NICHIP LIV **TOP** 

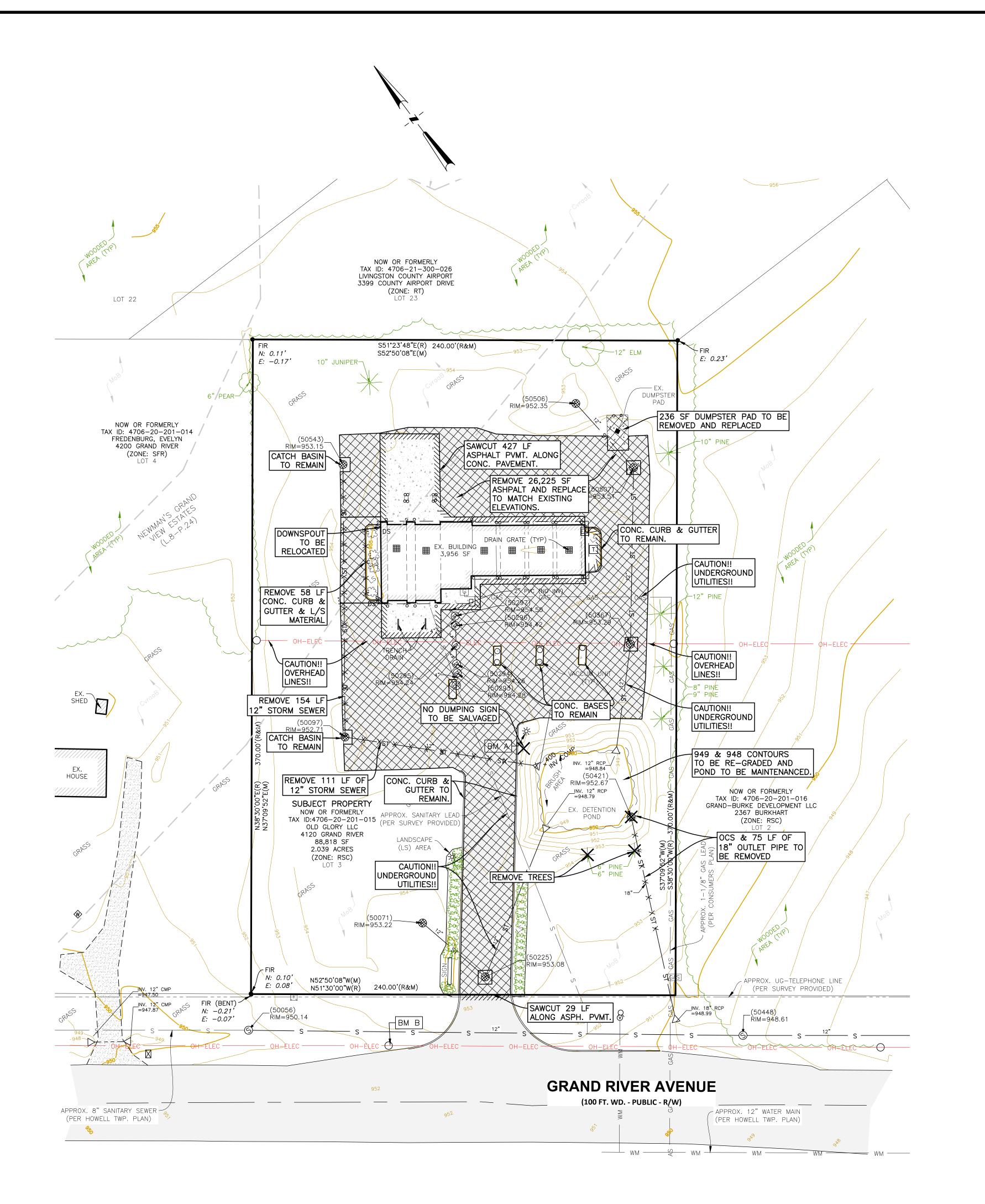
ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

SCALE: 1" = 30'1/2" FIELD:

DRAWN BY: DC DESIGN BY: CHECK BY: AP

**V-1.0** 



#### DEMOLITION LEGEND

. . . . . . . . . . ABANDON IN PLACE ./ / / / / / / / / . ABANDON LINEAR FEATURE REMOVE LINEAR FEATURE  $\cdot$  X X X X X X X  $\cdot$ LIMITS OF DISTURBANCE REMOVE OBJECT

REMOVE PAVEMENT

#### **DEMOLITION NOTES**

- 1. UTILITY OBJECTS SUCH AS GAS METER, TRANSFORMER, TELEPHONE PEDESTAL, UTILITY POLE & WIRES ARE TO BE REMOVED BY OTHERS IF APPLICABLE.
- 2. ANY TREES NOT MARKED PER PLAN ARE TO BE PROTECTED & PRESERVED DURING CONSTRUCTION.

& ENGINEERING SOLUTIONS

ing Group

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C O N S T R U C T I O N

CLIENT:



OLD GLORY CAR WASH PO BOX 328 FOWLERVILLE, MI 48836 POC: MATT MARTIN 517-375-0555

EW TOUCHLESS WASH 4120 GRAND RIVER RC OF SE 1/4, SEC. 20, NSHIP. LIVINGSTON CO

ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

SCALE: 1" = 30'1/2"

FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

**CD-1.0** 

#### **ZONING INFORMATION**

THIS ZONING INFORMATION IS TAKEN FROM HOWELL TOWNSHIP ZONING ORDINANCE DATED: APRIL 2015

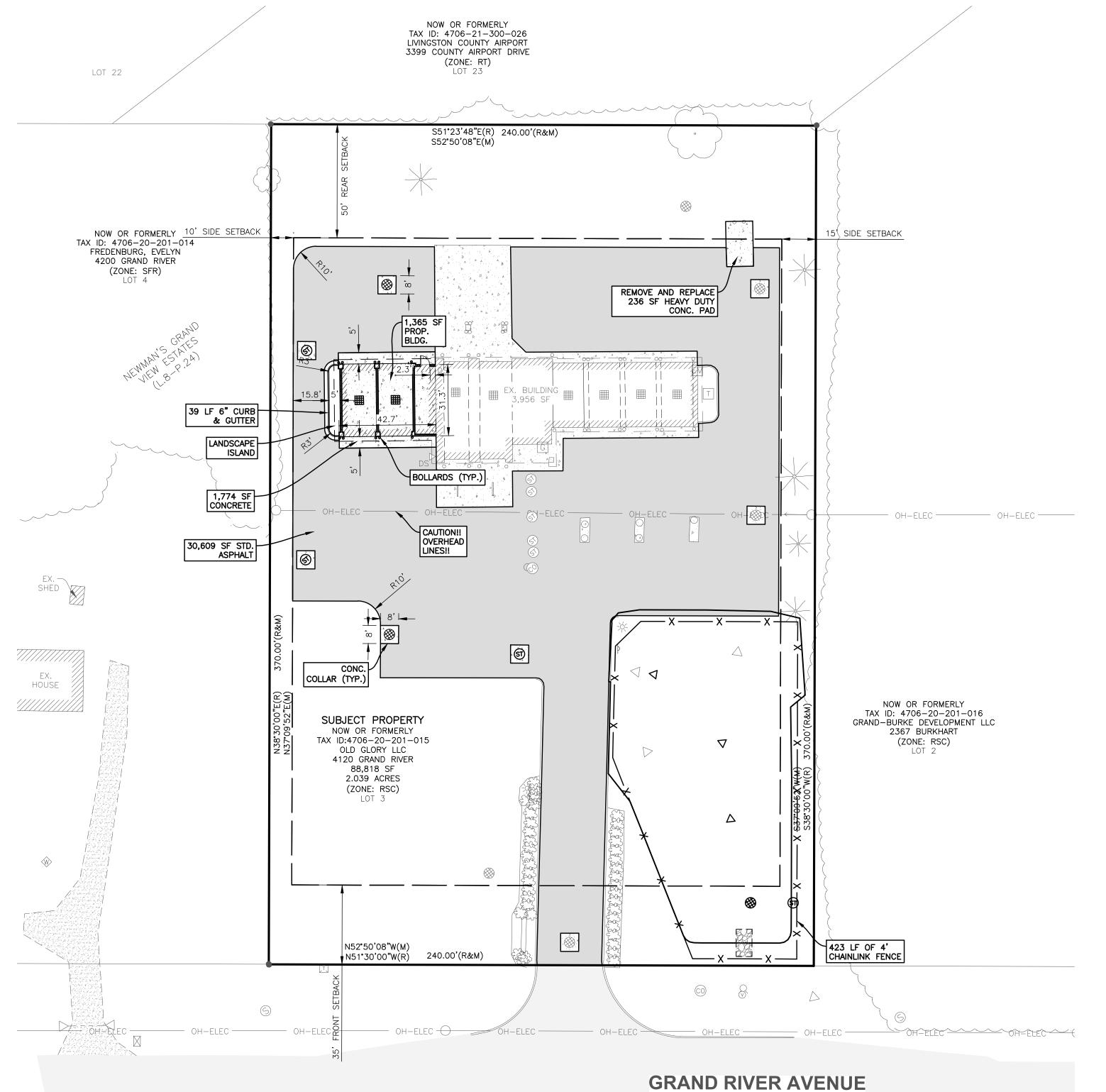
	SUBJECT PARCEL ZONING: (RSC) REGIONAL SERVICE	SUBJECT PARCEL		SUBJECT PARCEL		SUBJECT PARCEL		SUBJECT PARCEL		SUBJECT PARCEL		PROPOSED BUILDING	MAXIMUM HE BUILDI		BUILDIN	IG SETBAC	KS (FT)	PARKIN	G SETBACI	KS (FT)	MAXIMUM %
(RSC) REGIONAL SERVICE COMMERCIAL	AREA (AC)	WIDTH AT BUILDING SITE (FT)	BUILDING 'A' AREA (SF)	IN STORIES	IN FEET	FRONT (S)	SIDE (E,W)	REAR (N)	FRONT (S)	SIDE (E,W)	REAR (N)	IMPERVIOUS SURFACE									
	REQUIRED	2	200	_	NA	70	35	10 MIN. OR 25 FEET TOTAL	50	35	10 MIN. OR 25 FEET TOTAL	10	75								
	PROVIDED	2.039	240	1,365	NA	_	232.4	51.7, 29.9	105.1	181.8	40.1, 112.2	55.2	46								

#### ADJACENT ZONING

NORTH: (RT) RESEARCH AND TECH
SOUTH: GRAND RIVER AVE. R/W
EAST: (SFR) SINGLE FAMILY RESIDENTIAL
WEST: (RSC) REGIONAL SERVICE COMMERCIAL

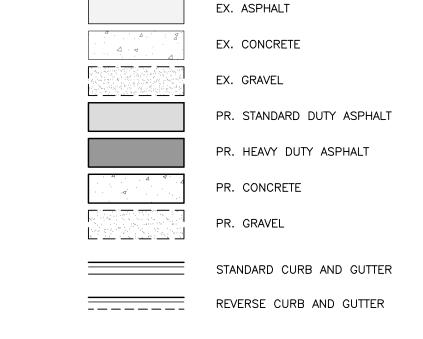
### % OF IMPERVIOUS SURFACES

BUILDINGS AND IMPERVIOUS SURFACES: 40,860.12 SF/88,818.8 SF = 46.00%



(100 FT. WD. - PUBLIC - R/W)

#### PAVEMENT LEGEND



#### NOTES

- SCREENING SHALL BE PROVIDED FOR ALL MECHANICAL EQUIPMENT.
- 2. PARKING LOT ISLANDS SHALL BE FINISHED IN GRASS, GROUND COVER OR MULCH.

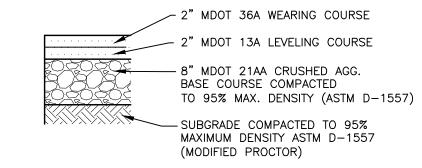
#### DIMENSIONING NOTE

1. DIMENSIONS ARE TO THE BACK OF CURB UNLESS OTHERWISE SPECIFIED.

FC = FACE OF CURB

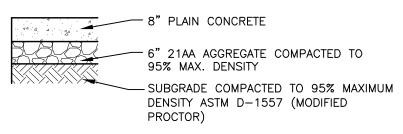
## STANDARD DUTY HMA PAVEMENT SECTION

Applies to: SITE



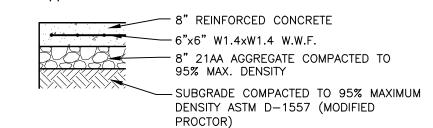
## STANDARD DUTY CONCRETE PAVEMENT SECTION

Applies to: SITE



## HEAVY DUTY CONCRETE PAVEMENT SECTION

Applies to: SITE



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MICHIGAN 48836
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SERVICE DISABLED VETERAN OWNE SMALL BUSINESS (SDVOSB)

ALLAN W.
PRUSS
ENGINEER
NO.
6201043168

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C O N S T R U C T I O N

CLIENT :



PO BOX 328
OWLERVILLE, MI 48836
POC: MATT MARTIN
517-375-0555

ESS WASH BAYS
D RIVER ROAD
, SEC. 20, T3N—R4E
NGSTON COUNTY, MICHIG

NEW TOUCHLESS 4120 GRAND R PART OF SE 1/4, SE HOWELL TOWNSHIP, LIVINGS

**ENSION** 

PLAN SUBMITTALS/REVISIONS DATE
1/25/2024
1/25/2024

ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

SCALE: 1" = 30'

0 1/2" 1"

FIELD:
DRAWN BY: DC
DESIGN BY:
CHECK BY: AP

C-1.0



32.67

8.17 16.25 TOYNE PUMPER

WIDTH : 8.35
TRACK : 7.93
LOCK TO LOCK TIME: 6.0
STEERING ANGLE : 50.0

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English Company of the second of the second

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SMALL BUSINESS (SDVOSB)

ALLAN W.

PRUSS

ENGINEER

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CLIENT :

**ILATION** 



OLD GLORY CAR WASH
PO BOX 328
FOWLERVILLE, MI 48836
POC: MATT MARTIN
517-375-0555

MASH BAYS VER ROAD S. 20, T3N-R4E ON COUNTY, MICHIGAN

NEW TOUCHLESS WA 4120 GRAND RIVEF OF SE 1/4, SEC.

PART HOWELL TO

PLAN SUBMITTALS/REVISIONS DATE

1/25/20

ORIGINAL ISSUE DATE:

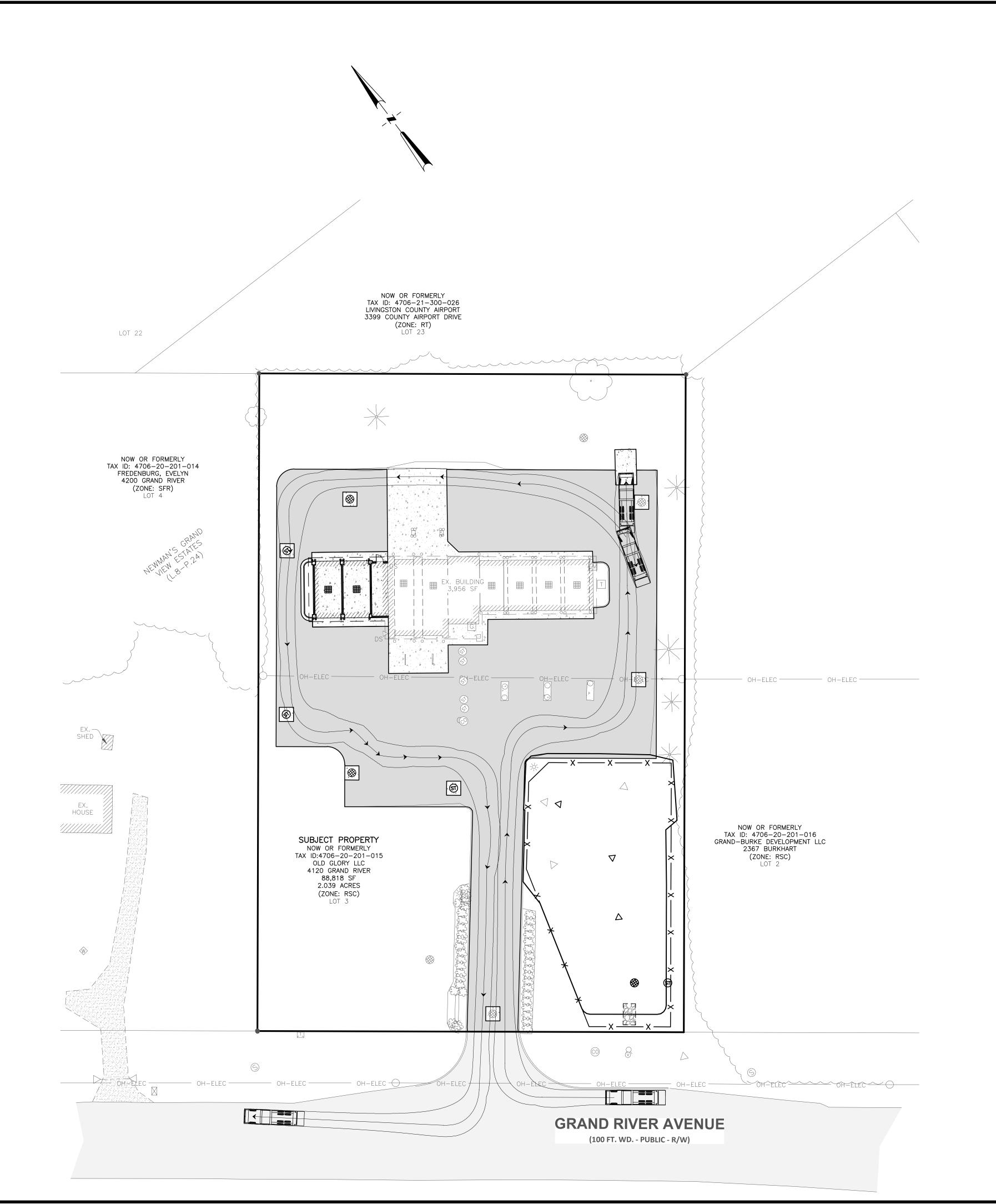
PROJECT NO: 22-177

SCALE: 1" = 30'

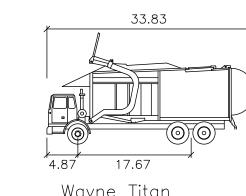
0 1/2" 1"

FIELD:
DRAWN BY: DC
DESIGN BY:
CHECK BY: AP

C-2.0







Wayne Titan

FEET : 8.46 TRACK : 8.00 LOCK TO LOCK TIME: 6.0 STEERING ANGLE : 45.0

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**ALLAN W. PRUSS ENGINEER** NO. 6201043168

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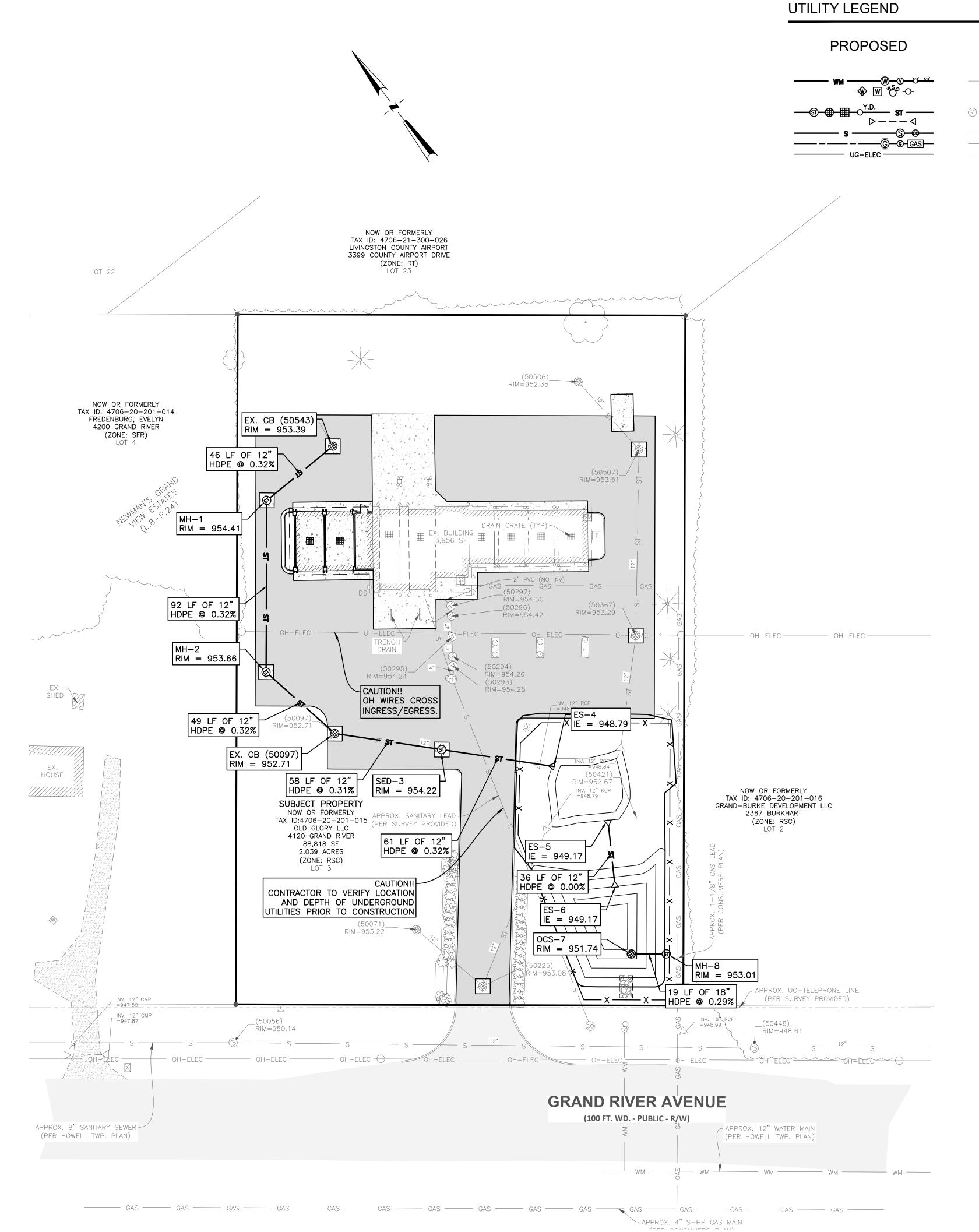
PO BOX 328 FOWLERVILLE, MI 48836 POC: MATT MARTIN 517-375-0555

ORIGINAL ISSUE DATE:

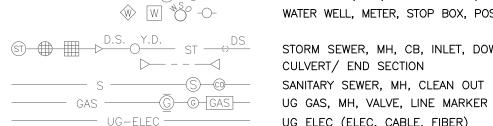
PROJECT NO: 22-177 SCALE: 1" = 30'

0 1/2" 1" FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

**C-2.1** 



### **EXISTING**



WATER MAIN, MH, VALVE IN BOX, HYDRANT WATER WELL, METER, STOP BOX, POST INDICATOR VALVE

STORM SEWER, MH, CB, INLET, DOWN SPOUT, YARD DRAIN CULVERT/ END SECTION SANITARY SEWER, MH, CLEAN OUT UG ELEC (ELEC, CABLE, FIBER)

MICHIGAN 48836 (OFFICE) 517-223-3512 MONUMENTENGINEERING.COM SERVICE DISABLED VETERAN OWNEL SMALL BUSINESS (SDVOSB)

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- ing Group

#### STORM SEWER NOTES

- 1. "IN" & "CB" STRUCTURES SHALL HAVE EJIW 1020 FRAME WITH TYPE M1 GRATE.
- 2. CURB "IN" & "CB" STRUCTURES SHALL HAVE EJIW 7010 FRAME WITH TYPE M1 GRATE.

### STORM SEWER QUANTITIES

QTY	UNIT	ITEM
2	EA	CATCH BASIN TAP
354	LF	12" HDPE
51	LF	18" HDPE
2	EA	4' MANHOLE
1	EA	4' MECHANICAL SEDIMENT SEPARATOR

### STRUCTURE SCHEDULE

PROP	OSED STORI	M SEWER
STRUCTURE	RIM ELEV.	PIPES
ES-4	949.92	12" NW IE= 948.79
ES-5	950.30	12" SW IE= 949.17
ES-6	950.30	12" NE IE= 949.17
EX. CB (50097)	952.71	12" N IE= 949.16 12" SE IE= 949.16
EX. CB (50543)	953.39	12" W IE= 949.76
MH-1	954.41	12" E IE= 949.62 12" SW IE= 949.62
MH-2	953.66	12" NE IE= 949.32 12" S IE= 949.32
MH-8	953.01	18" NW IE= 949.12 18" SW IE= 949.12
OCS-7	951.74	18" SE IE= 949.17
SED-3	954.22	12" NW IE= 948.98 12" SE IE= 948.98



- 3. STORM "MH" STRUCTURES SHALL HAVE EJIW 1040 FRAME WITH A TYPE A PERFORATED COVER.

	QTY	UNIT	ITEM
,	2	EA	CATCH BASIN TAP
	354	LF	12" HDPE
	51	LF	18" HDPE
	2	EA	4' MANHOLE
	1	EA	4' MECHANICAL SEDIMENT SEPARATO

**ALLAN W. PRUSS ENGINEER** 6201043168

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CLIENT:



PO BOX 328 FOWLERVILLE, MI 48836 POC: MATT MARTIN 517-375-0555

NEW TOUCHLESS 4120 GRAND F PART OF SE 1/4, SE WELL TOWNSHIP, LIVINGS STORM

ORIGINAL ISSUE DATE:

PROJECT NO: 22-177 SCALE: 1" = 30'

0 1/2" 1" FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

C-6.0

### NOTES

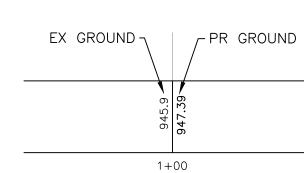
- 1. SAND BACKFILL AND BEDDING TO BE MDOT CL II.
- 2. MAINTAIN MINIMUM 18" VERTICAL CLEARANCE BETWEEN ALL UTILITIES.

PROFILE LEGEND

UTILITY CROSSING SAND BACKFILL

(REFER TO TRENCH DETAILS) \_\_\_\_ EXISTING GROUND

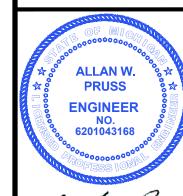
PROPOSED GROUND



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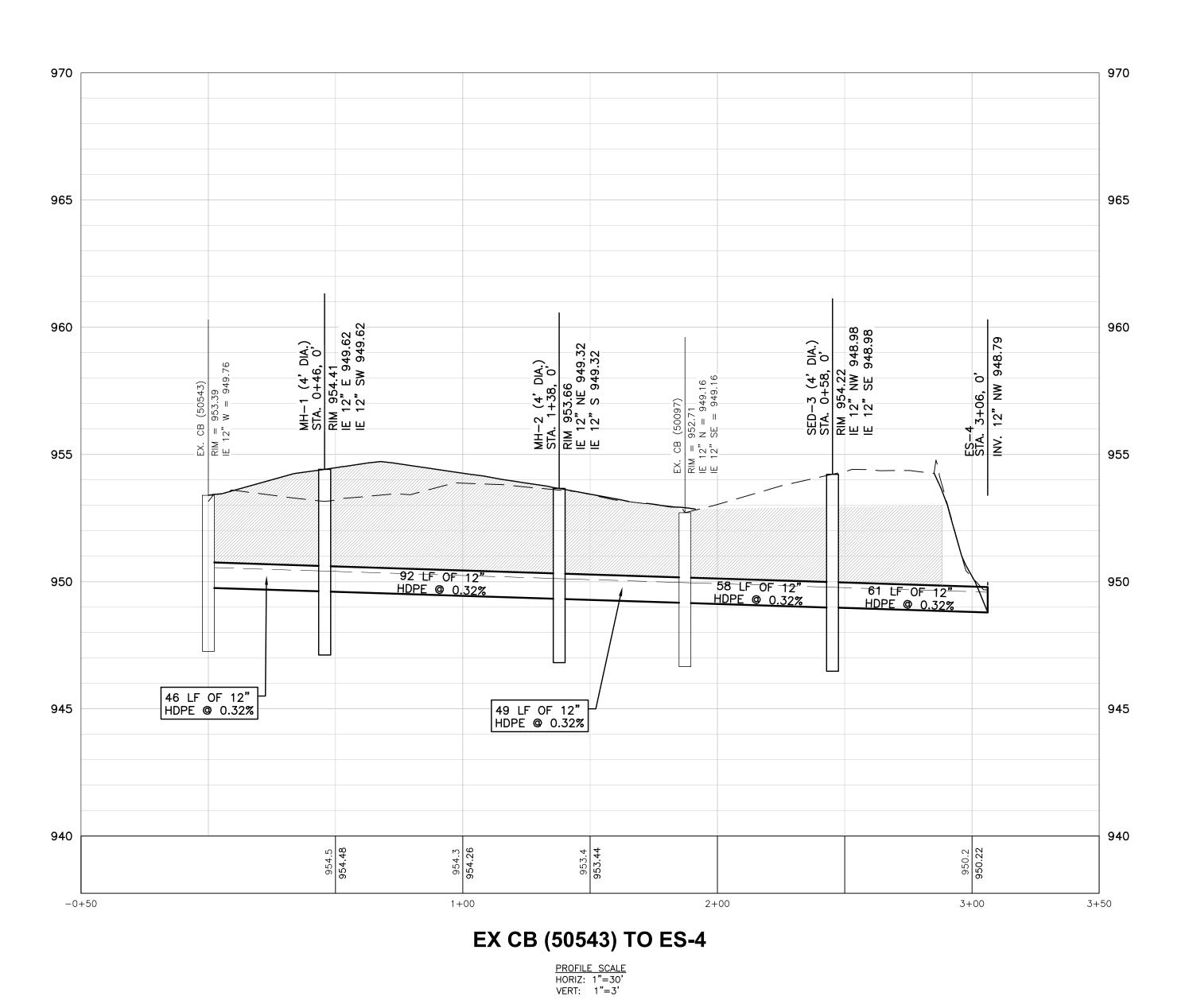
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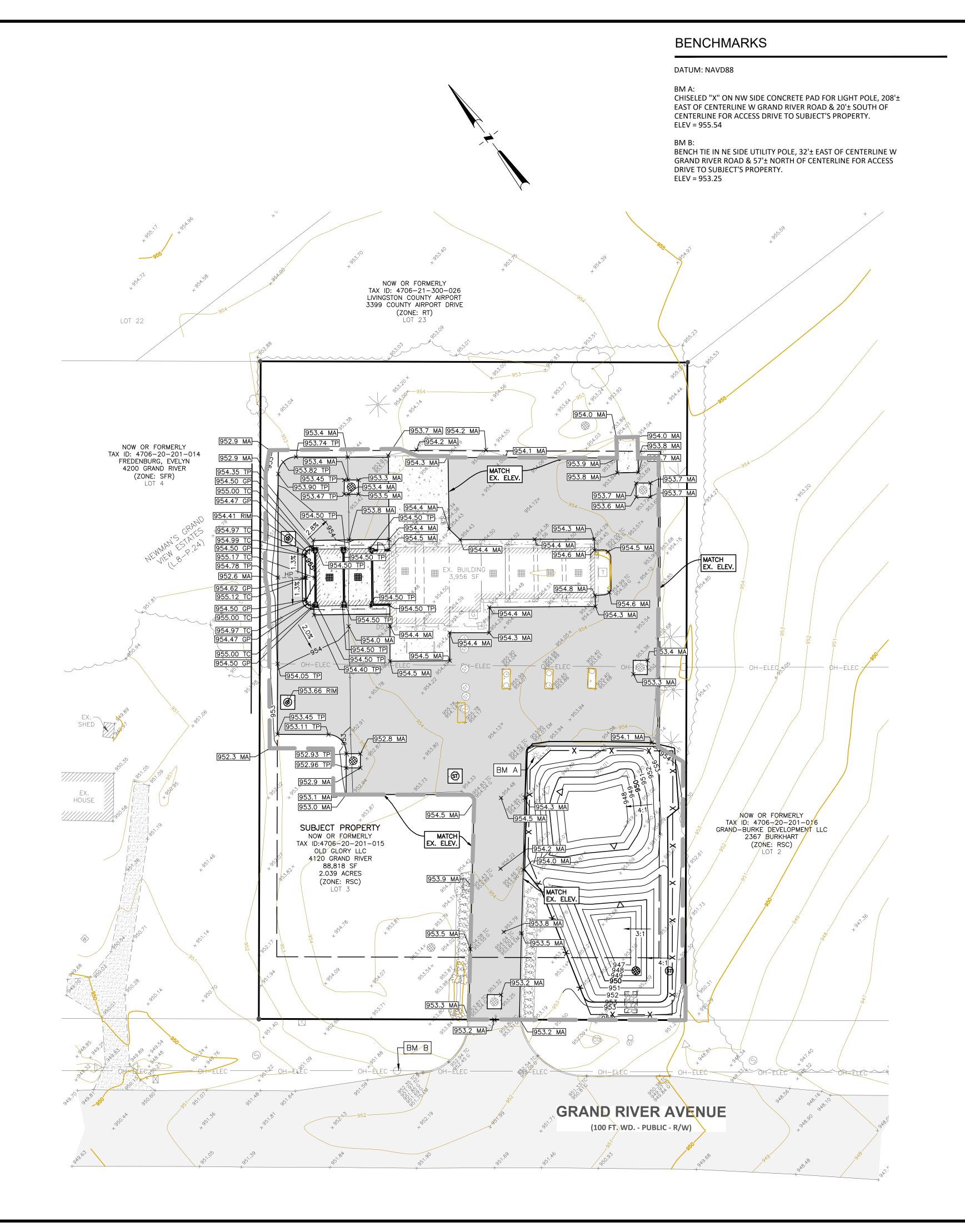
ORIGINAL ISSUE DATE:

PROJECT NO: 22-177 SCALE: 0 1/2" 1"

FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

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#### **GRADING LEGEND**

940.00 TP PROPOSED TOP OF PAVEMENT GRADE 940.00 SW PROPOSED SIDEWALK GRADE ×\_\_\_940.00 FG PROPOSED FINISH GRADE ×\_\_\_\_940.00 TC PROPOSED TOP OF CURB GRADE 940.00 GP PROPOSED GUTTER PAN GRADE 940.00 TW PROPOSED TOP OF WALL GRADE ×\_\_\_940.00 BW PROPOSED BOTTOM OF WALL GRADE 940.0 MA MATCH EXISTING GRADE 940.0 FFE PROPOSED FINISH FLOOR GRADE 940.00 RIM PROPOSED RIM GRADE 940.00 ADJ-RIM ADJUSTED RIM GRADE × 940.00 INV PROPOSED INVERT GRADE ADA COMPLIANT SIDEWALK RAMP ADA COMPLIANT SIDEWALK LANDING EXISTING ELEVATION EXISTING CONTOUR PROPOSED CONTOUR \_\_\_\_900\_\_\_\_ SOIL TYPE LIMIT AND LABEL (FROM USGS SOIL SURVEY) LIMITS OF DISTURBANCE

OVERFLOW ROUTE

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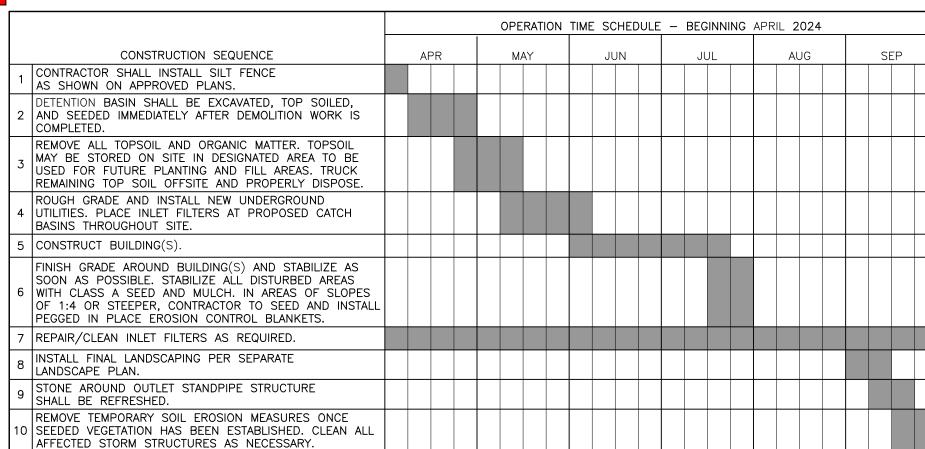
ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

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#### **SOILS INFO**

SOIL TYPES ARE ACCORDING TO THE USDA SOIL SURVEY WEB SITE (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) — — SOIL TYPE LIMIT AND LABEL

CONOVER LOAM, 0-4% SLOPES WAWASEE LOAM, 2-6% SLOPES

### **EROSION CONTROL QUANTITIES**

Disturbed Area: 35,376.1 SF = 0.81 Acres

QTY	UNIT	ITEM
1,105	LF	SILT FENCE
6	EA	INLET FILTER
1	EA	STABILIZED CONSTRUCTION ACCESS

TOPSOIL

STOCK PILE

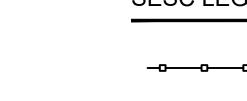
AREA

NOTE: QUANTITIES ARE FOR ENTIRE SITE

LOT 22

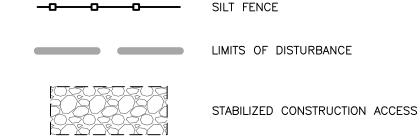
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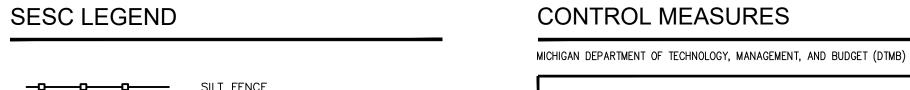
HOUSE



GRAND RIVER AVENUE

(100 FT. WD. - PUBLIC - R/W)





ER	OSION CONTROLS		
KEY	BEST MANAGEMENT PRACTICES	SYMBOL	WHERE USED
E6	MULCH		FOR USE IN AREAS SUBJECT TO EROSIVE SURFACE FLOWS OR SEVERE WIND OR ON NEWLY SEEDED AREAS.
E8	PERMANENT SEEDING	ANTE TO THE WAY THE WAY TO THE WAY THE	STABILIZATION METHOD UTILIZED ON SITES WHERE EARTH CHANGE HAS BEEN COMPLETED (FINAL GRADING ATTAINED).
	DIMENT CONTROL C	•	

SEI	DIMENT CONTROLS	3	
KEY	BEST MANAGEMENT PRACTICES	SYMBOL	WHERE USED
S51	SILT FENCE		USE ADJACENT TO CRITICAL AREAS, TO PREVENT SEDIMENT LADEN SHEE FLOW FROM ENTERING THESE AREAS
S53	STABILIZED CONSTRUCTION ACCESS		USED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE.
S55	SEDIMENT BASIN		AT THE OUTLET OF DISTURBED AREAS AND AT THE LOCATION OF A PERMANENT DETENTION BASIN.
S58	INLET PROTECTION FABRIC DROP		USE AT STORMWATER INLETS, ESPECIALLY AT CONSTRUCTION SITES

ER	OSION & SEDIMEN	T CONTROLS	
KEY	BEST MANAGEMENT PRACTICES	SYMBOL	WHERE USED
ES31	CHECK DAM		USED TO REDUCE SURFACE FLOW VELOCITIES WITHIN CONSTRUCTED AND EXISTING FLOW CORRIDORS.

XX TEMPORARY

PERMANENT

#### **EROSION CONTROL STANDARDS**

- 1. ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE.
- 2. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR FOR EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES, AND ANY NECESSARY REPAIRS SHALL BE PERFORMED WITHOUT DELAY.
- 3. EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT ON ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
- 4. CONTRACTOR SHALL APPLY TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES WHEN REQUIRED AND AS DIRECTED ON THESE PLANS. CONTRACTOR SHALL REMOVE TEMPORARY MEASURES AS SOON AS PERMANENT STABILIZATION OF SLOPES, DITCHES AND OTHER CHANGES HAS BEEN ACCOMPLISHED.
- 5. STAGING OF THE WORK WILL BE DONE BY THE CONTRACTOR AS DIRECTED IN THESE PLACES AND AS REQUIRED TO INSURE PROGRESSIVE STABILIZATION OF DISTURBED AREAS.
- 6. SOIL EROSION CONTROL PRACTICES WILL BE ESTABLISHED IN EARLY STAGES OF CONSTRUCTION BY THE CONTRACTOR. SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTING OF SILT OFF THE
- 7. A CERTIFIED STORM WATER OPERATOR WILL BE NAMED ON THE EGLE NOTICE OF COVERAGE FOR NPDES AS REQUIRED.
- 8. ALL DISTURBED AREAS ARE TO BE TOP SOILED AND SEEDED WITH THE FOLLOWING TOPSOIL TO BE SCREENED, 3" MIN. IN DEPTH, GRASS SEED 218 LBS PER ACRE, FERTILIZER 150 LBS PER ACRE, STRAW MULCH 3" DEPTH 1.5 TO 2 TONS PER ACRE.
- 9. HYDRO-SEEDING IS NOT ACCEPTABLE FOR SLOPES EXCEEDING 1%. ON SLOPES OVER 1%, STABILIZATION SHALL BE DONE WITH SEED AND STRAW MULCH WITH A TACKIFIER, OR STRAW BLANKETS PEGGED IN PLACE.

#### SOIL EROSION CONTROL MAINTENANCE SCHEDULE AND NOTES.

- 1. CONTRACTOR MUST OBTAIN A SOIL EROSION AND SEDIMENTATION CONTROL PERMIT FROM THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE PRIOR TO COMMENCING WORK.
- 2. EARTHWORK SHALL BE LIMITED TO THE PROPOSED SITE AS SHOWN ON THE PLAN.
- 3. CONTRACTOR SHALL INSPECT THE SOIL EROSION/SEDIMENTATION CONTROL DEVICES ONCE A WEEK AND/OR WITHIN 24 HOURS OF A RAINFALL EVENT WHICH RESULTS IN A STORM WATER DISCHARGE FROM THE SITE. ANY DAMAGE TO EROSION CONTROL MEASURES MUST BE REPAIRED IMMEDIATELY.
- 4. ALL MUD OR DEBRIS TRACKED ONTO EXISTING PUBLIC ROADS FROM THE SITE DUE TO CONSTRUCTION SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.
- 5. SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT-UP SEDIMENT WHEN THE SEDIMENT HEIGHT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE FENCE. THE CONTRACTOR IS RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR RE-BACKFILL THE SILTATION FENCE SHOULD IT FAIL OR BE DAMAGED DURING CONSTRUCTION.
- 6. PERMANENT STABILIZATION MUST BE COMPLETED WITHIN 30 DAYS OF FINAL
- 7. ACCESS ROADS MUST BE MAINTAINED AS NECESSARY, TO KEEP THEM EFFECTIVE, NEW LAYERS OF STONE MAY BE ADDED AS OLD LAYERS BECOME COMPACTED. STEPS SHOULD ALSO BE TAKEN TO REPAIR THE ACCESS ROADS IF RUTS OR PONDING WATER APPEARS.
- 8. INLET FILTERS SHOULD BE INSPECTED FOR BUILDUP OF SILT AND OTHER DEBRIS. THIS IS EVIDENT IF GEOTEXTILE/SOD STRUCTURE IS CAUSING FLOODING. MAINTENANCE WOULD CONSIST OF REMOVING OF SEDIMENTS WITH A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL. IF INLET FILTER IS BEYOND THIS LEVEL OF REPAIR, IT MAY BE NECESSARY TO REPLACE BOTH THE SOD AND GEOTEXTILE FILTER.
- 9. IF SOIL EROSION/SEDIMENT CONTROL MEASURES ARE INADEQUATE FOR THE SITE. THE PROPER EROSION CONTROL AUTHORITY MUST BE NOTIFIED.
- 10. ANY DEWATERING REQUIRED SHALL HAVE A DEWATERING PLAN SUBMITTED PRIOR TO STARTING THE ACTIVITY AND MAY REQUIRE EGLE APPROVAL.

**DTMB SOIL EROSION & SEDIMENTATION** 

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CLIENT:



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517-375-0555

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V TOUCHLES 120 GRAND F SE 1/4, S SHIP, LIVING

ORIGINAL ISSUE DATE:

PROJECT NO: 22-177 SCALE: 1" = 30'

FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

1/2"

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## **LCDC NOTES**

#### Top Soil & Soil Storage Areas:

• Top soil or soil storage areas shall be seeded and mulched, or matted with straw, immediately after the stripping process is completed, to prevent wind and water erosion.

#### Slopes and Ditches:

- 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. • Side slopes in excess of 3' horizontal to 1' vertical shall not be used except with a mechanical device such as a retaining wall, or terracing.
- Ditches with steep grades will need "stone flow checks" to prevent scouring of the ditch bottoms. They may be used as a temporary measure and removed once sufficient stabilization has been established. These shall be depicted on plans by the engineer. Indicate flow checks on all slopes 3.00% and greater.

#### **Detention/Retention, Sedimentation Ponds:**

- New land developments within Livingston County shall be equipped with detention/retention facilities for storm water in accordance with the Drainage Policies of the Livingston County Drain Commissioner.
- Inlets into detention ponds must not discharge at the same location as the outlet structure.
- Detention Pond Stand Pipe Outlet Detail must be the Livingston County Drain Commisioner's standard Detention Pond outlet, e.g. orifice outlets without sedimentation control devices are prohibited.
- Stand pipe structure must have a 2 ft. sump. • Detention Pond stand pipe structure shall show staggering of outlet holes at different elevations. This will minimize plugging and provide for more effective filtering.
- The stone around the stand pipe structure shall be refreshed with clean stone prior to completion of the project.
- Detention/Retention, Sedimentation Ponds shall be excavated, top soiled, seeded, mulched and tacked prior to the start of massive earth
- Inlets into Detention/Retention Ponds must be located within two feet of the bottom floor of the pond.

#### **Detention Pond Spillway:**

 Rip-rap proposed in the construction of the emergency spillway must be placed over keyed-in geo-fabric blanket.

#### Silt Fence:

 All commercial projects constructed in Livingston County shall install 36" high silt fence.

#### **Inlet Protection:**

- Sedimentation protection for catch—basin inlets. Silt sacks are the preferred choice in the winter months, because they are less likely to be disturbed by the process of snow plowing.
- Open—Pipe, inlet protection must be provided with straw bales, stone or geo-fabric.

#### **Outlet Protection:**

- All storm drains 15" in diameter or larger shall have animal guards installed to prevent entrance to the system.
- All rip-rap must be placed over keyed in geo-fabric.
- 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 over keyed in filter tabric. Silt traps shall be inspected atter each storm
- Splash blocks may be required depending on the outley flow rate or velocity.

## Tracking onto public roadway:

• It is required that each development have an ingress/egress of crushed stone to restrict tracking of material onto the Public Roadway. All commercial construction sites require a minimum 75-foot tracking mat shown at ingress/egress.

#### **Stabilization Standards:**

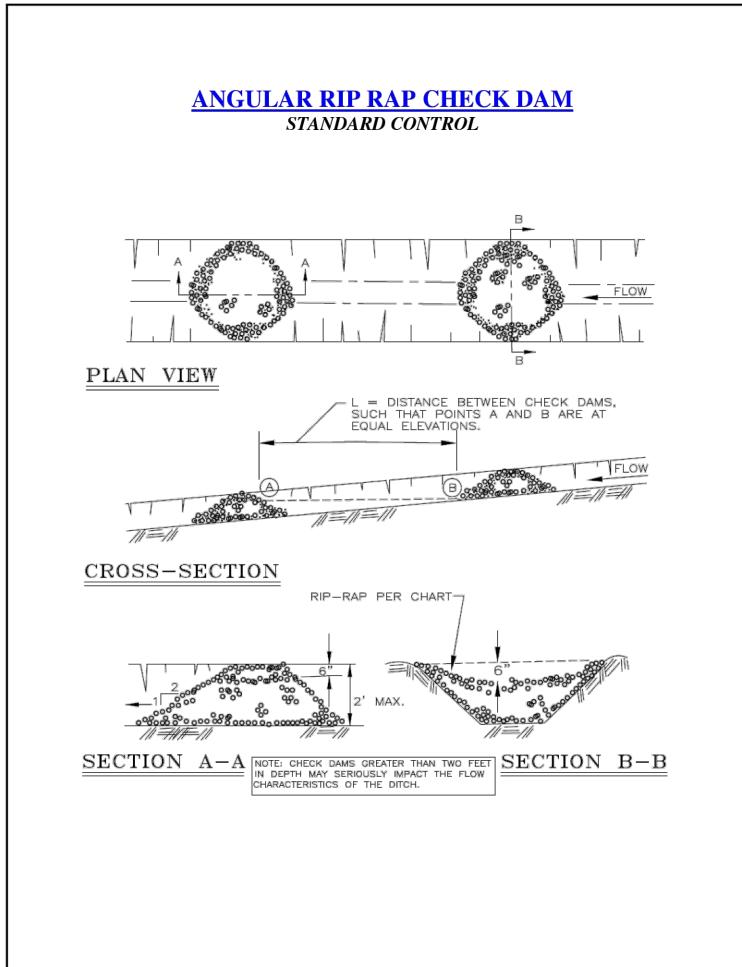
- For subdivision and site condominium developments: As of May 01, 2000, it is required that temporary stabilization of the entire site be completed and approval from the Livingston County Drain Commissioner"s Office obtained prior to the issuance of single family dwelling permits.
- For commercial or industrial sites, common areas shall be called out on plans, in accordance with Part 17, prescribed by R 323.1709 and R 323.1710, pursuant to PART 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act (Previously known as P.A. 347 of 1972) of Act 347, Public Acts OF 1972, as amended) indicating areas to be stabilized after 15 days of grade work. Areas to be outlined are as follows: detention/retention, drainage easements, utility easements, boulevards, etc.

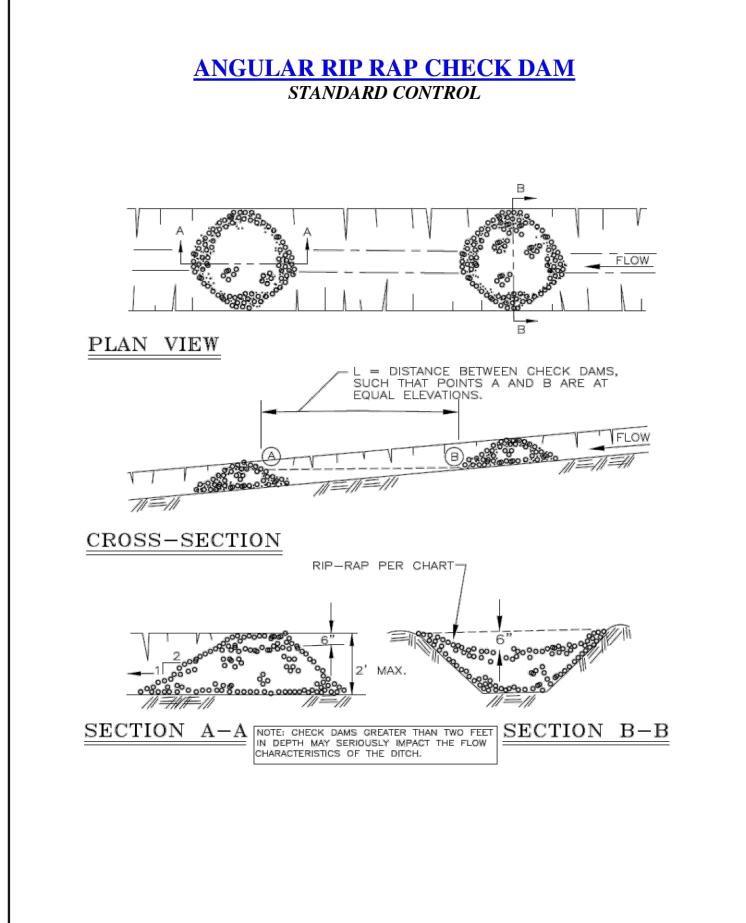
#### Seeding, Fertilizer and Mulch Bare Ground Ratio:

- This information shall be detailed on the construction plans.
- Top Soil Screened, 3" min. in depth
- 217.84 lbs per acre
- Grass Seed Fertilizer 150 lbs per acre
- Straw Mulch 3" in depth (All mulching must have a tie down) • Hydroseeding is not acceptable for slopes exceeding 1%, in such cases stabilization shall be done with seed and and straw mulch with a tackifier.

#### **36" SILT FENCE** STANDARD CONTROL SILT FENCE JOINT SECTION B-B (UNDISTURBED VEGETATION) - SUPPORT FENCE \*\*\* 1½" x 1½" STAKES -PLAN VIEW SPACING 6' MAX. WRAP -Salvaged edges (typ.) (TYP.) GEOTEXTILE FILTER FABRIC (MIN 10 GAL/MIN/SQ FT) 6" ANCHOR TRENCH MIN. SUPPORT FENCE -(IF REQUIRED) SILT FENCE B FRONT VIEW GEOTEXTILE FILTER FABRIC FASTENED ON UPHILL SIDE, SILT FENCE A AROUND EACH OTHER TWICE. TOWARDS EARTH DISRUPTION B COMPACTED EARTH ON UPHILL SIDE OF FILTER VEGETATION SILT FENCE B SILT FENCE JOINT ANCHOR TRENCH VERTICAL WALL SECTION B-B SECTION A-A

## **36" SILT FENCE GRAVEL FILTER** STANDARD CONTROL (ALL ATLERNATIVES MUST BE PRE-APPROVED BY THE INSPECTOR ON A CASE BY CASE BASIS) SWALE TO DIRECT FLOW - STONE FILTER MATERIAL TO THE STONE FILTER MDOT 6A STONE (NATURAL) 1½" x 1½"HARDWOOD STAKES DRIVEN - SILT FENCE (SP-2) INTO GROUND 1' MIN. PLAN VIEW SPACING 1½" x 1½" HARDWOOD -STAKES DRIVEN 6' MAX. INTO GROUND 1' MIN. 6" ANCHOR TRENCH GEOTEXTILE FILTER FABRIC (MIN 10 GAL/MIN/SQ FT) FRONT VIEW - STONE FILTER MATERIAL MDOT 6A STONE (NATURAL) GEOTEXTILE FILTER FABRIC ANCHOR TRENCH VERTICAL WALL CROSS SECTION -PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.





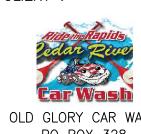


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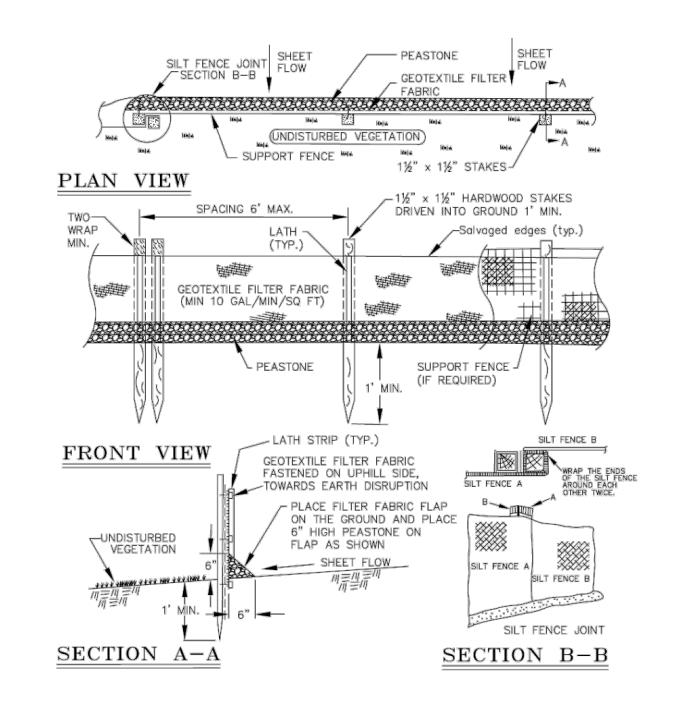
PROJECT NO: 22-177

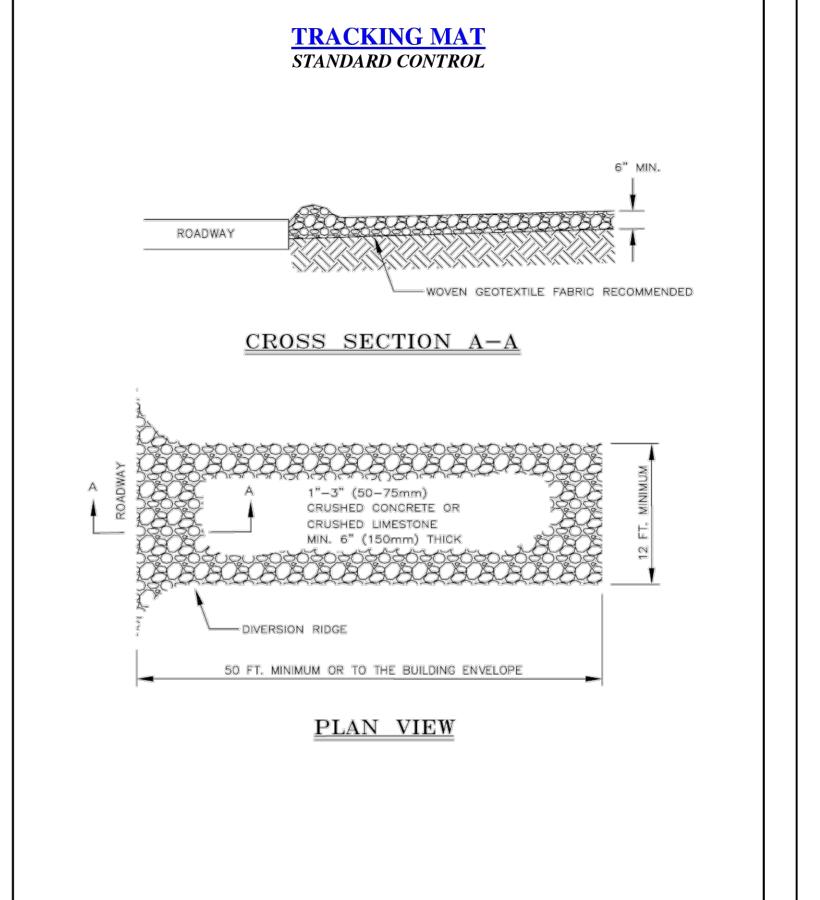
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SCALE: N/A

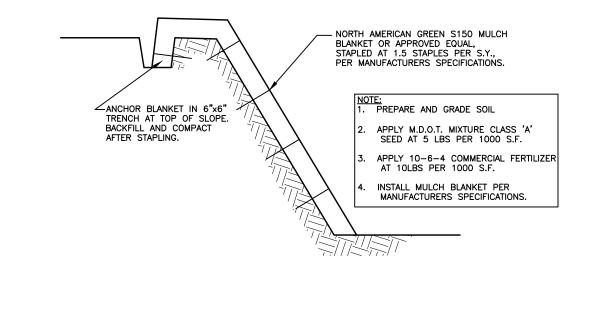
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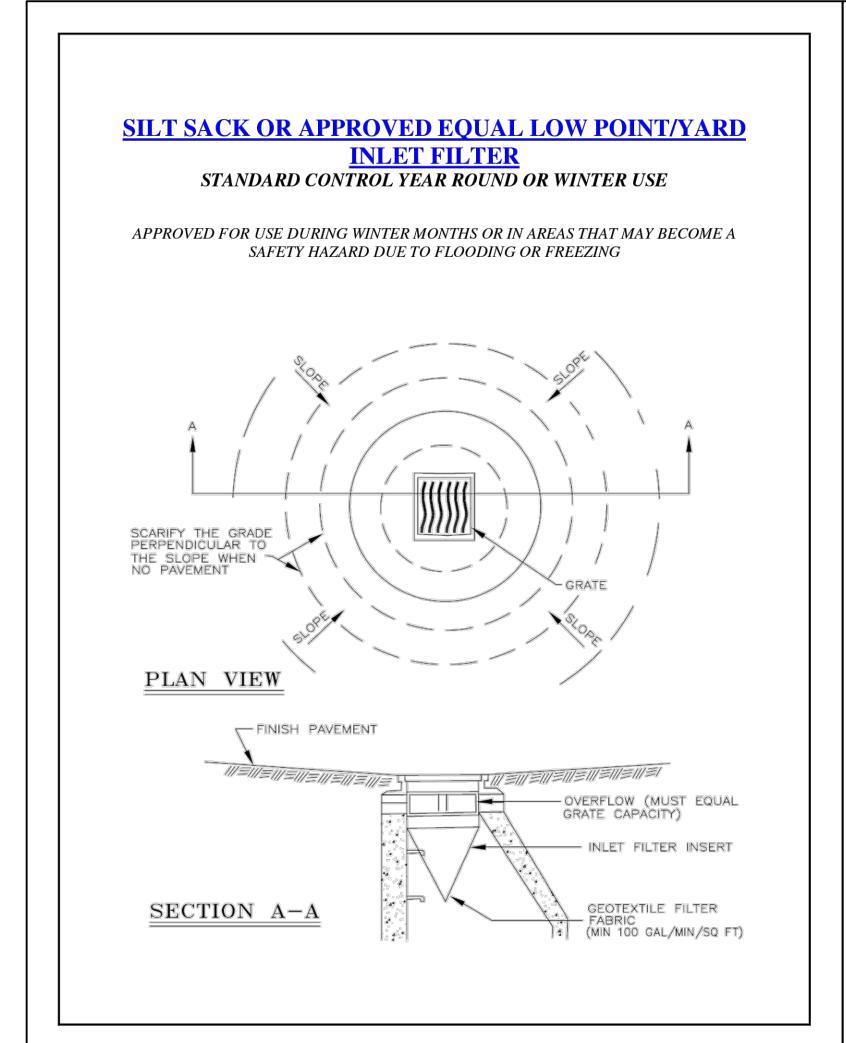
## **36" SILT FENCE** WINTER FROZEN GROUND INSTALLATION STANDARD CONTROL

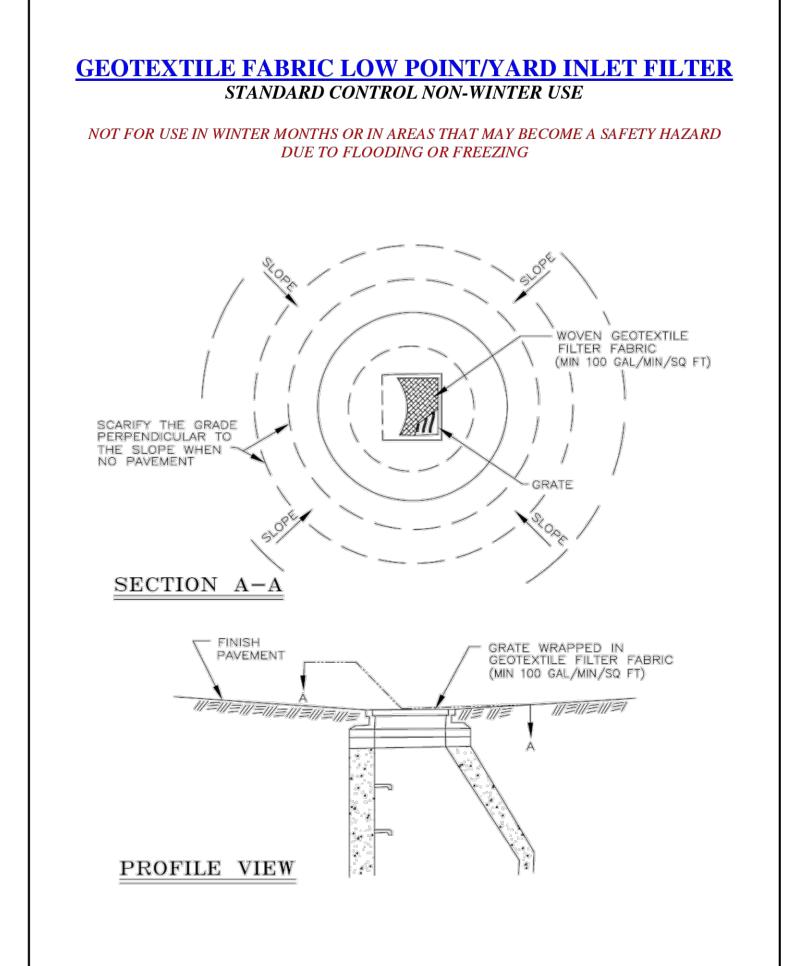


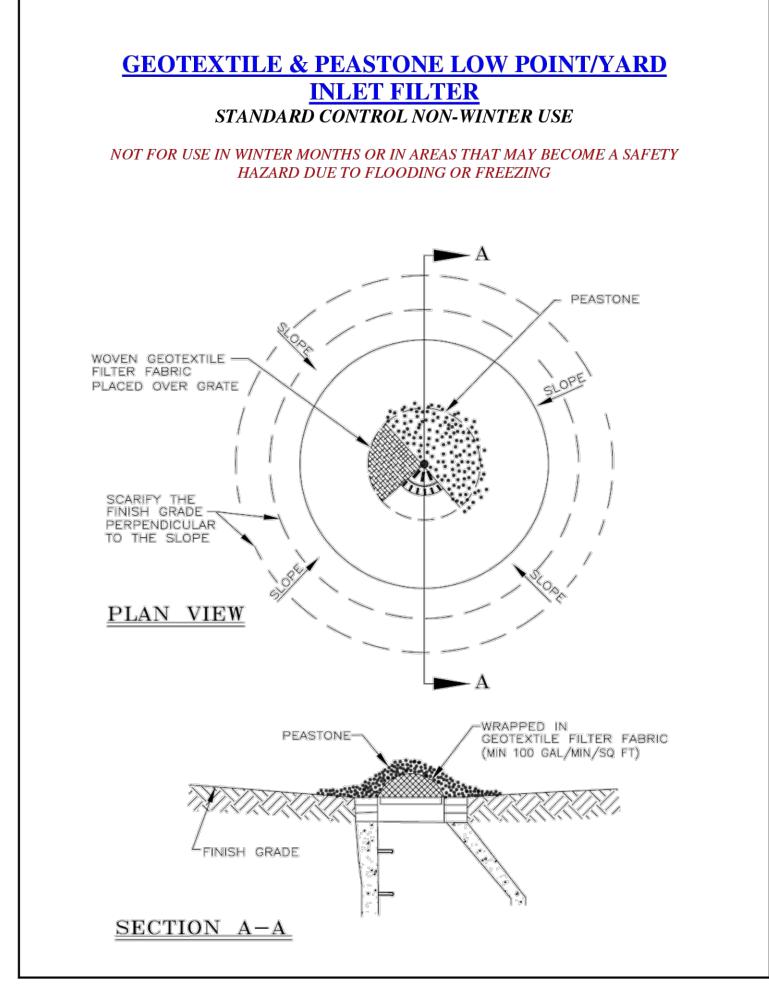


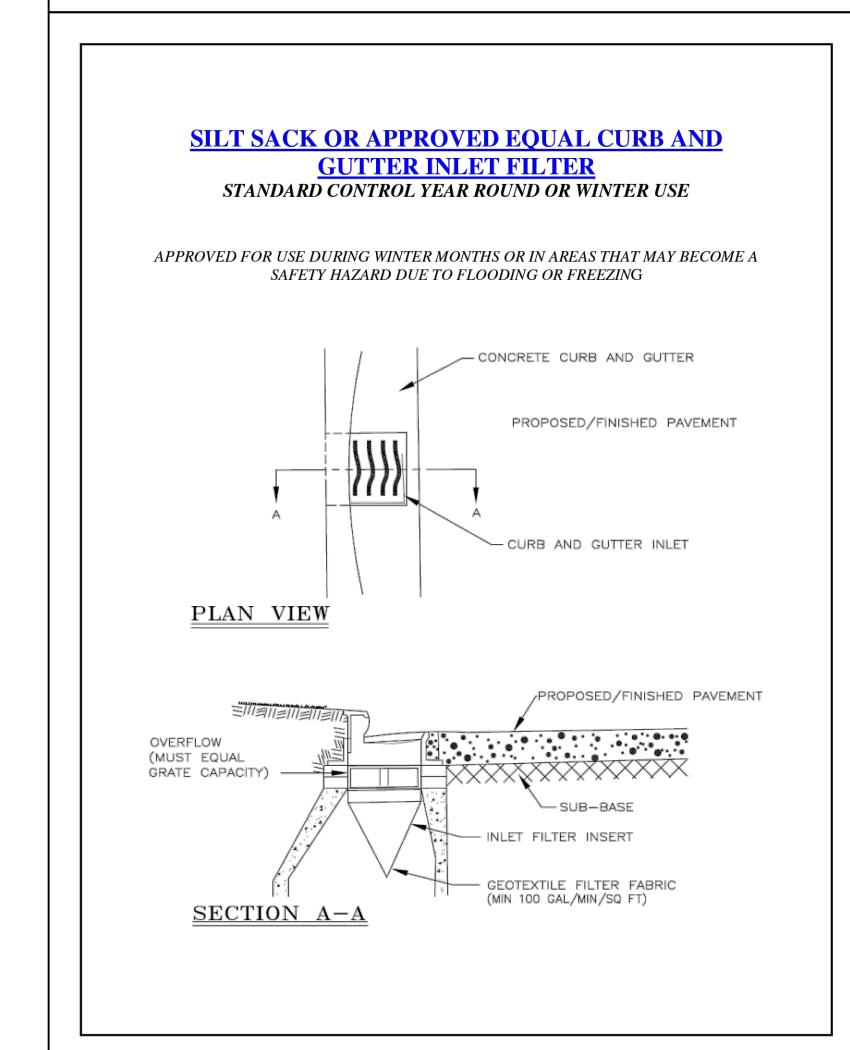
## **EROSION CONTROL BLANKET DETAIL**

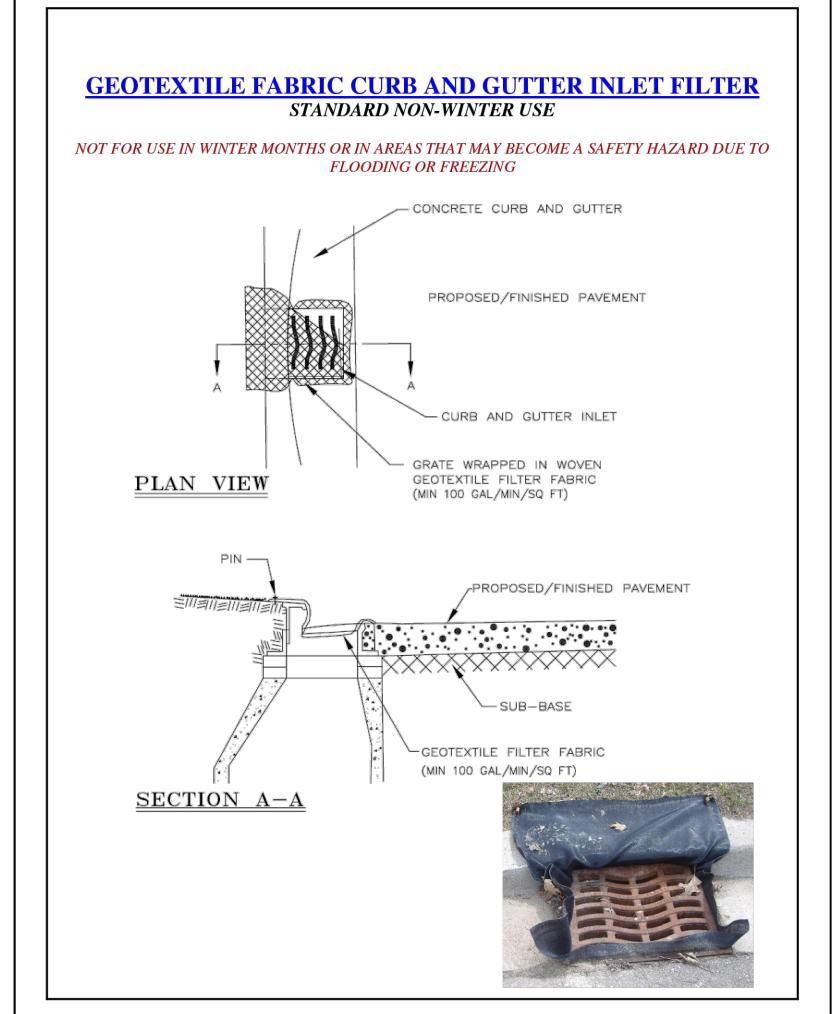


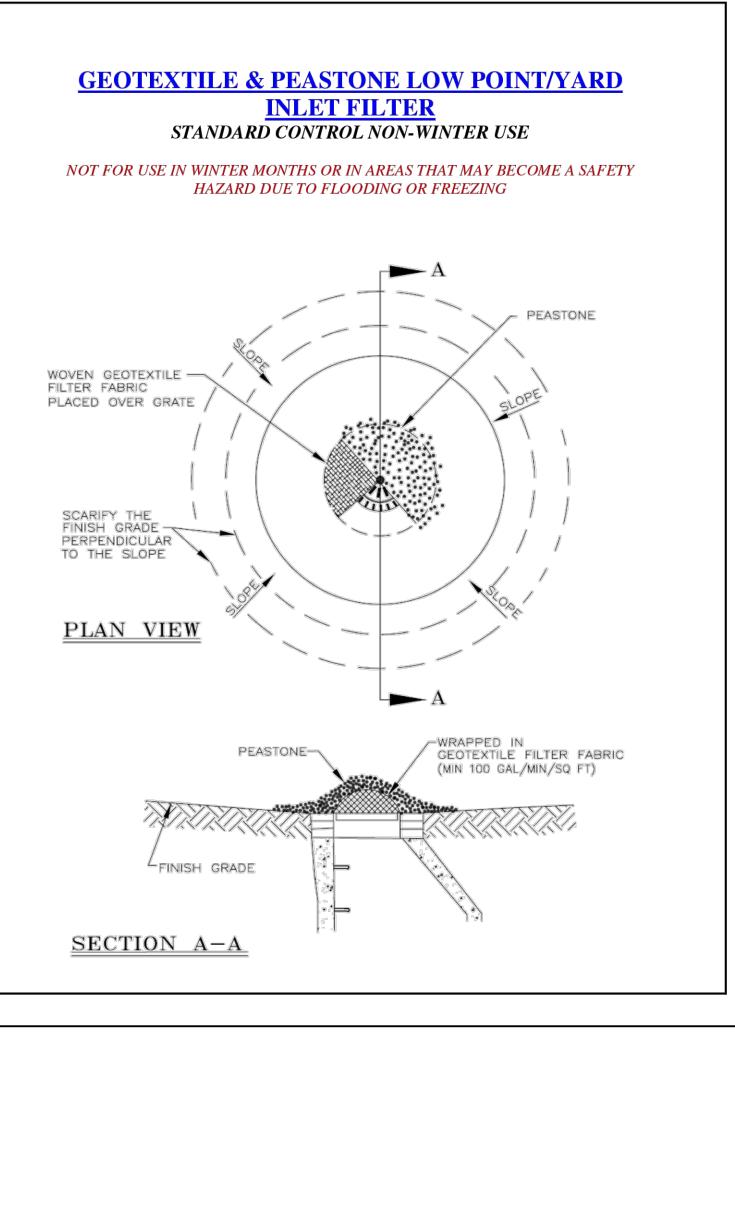












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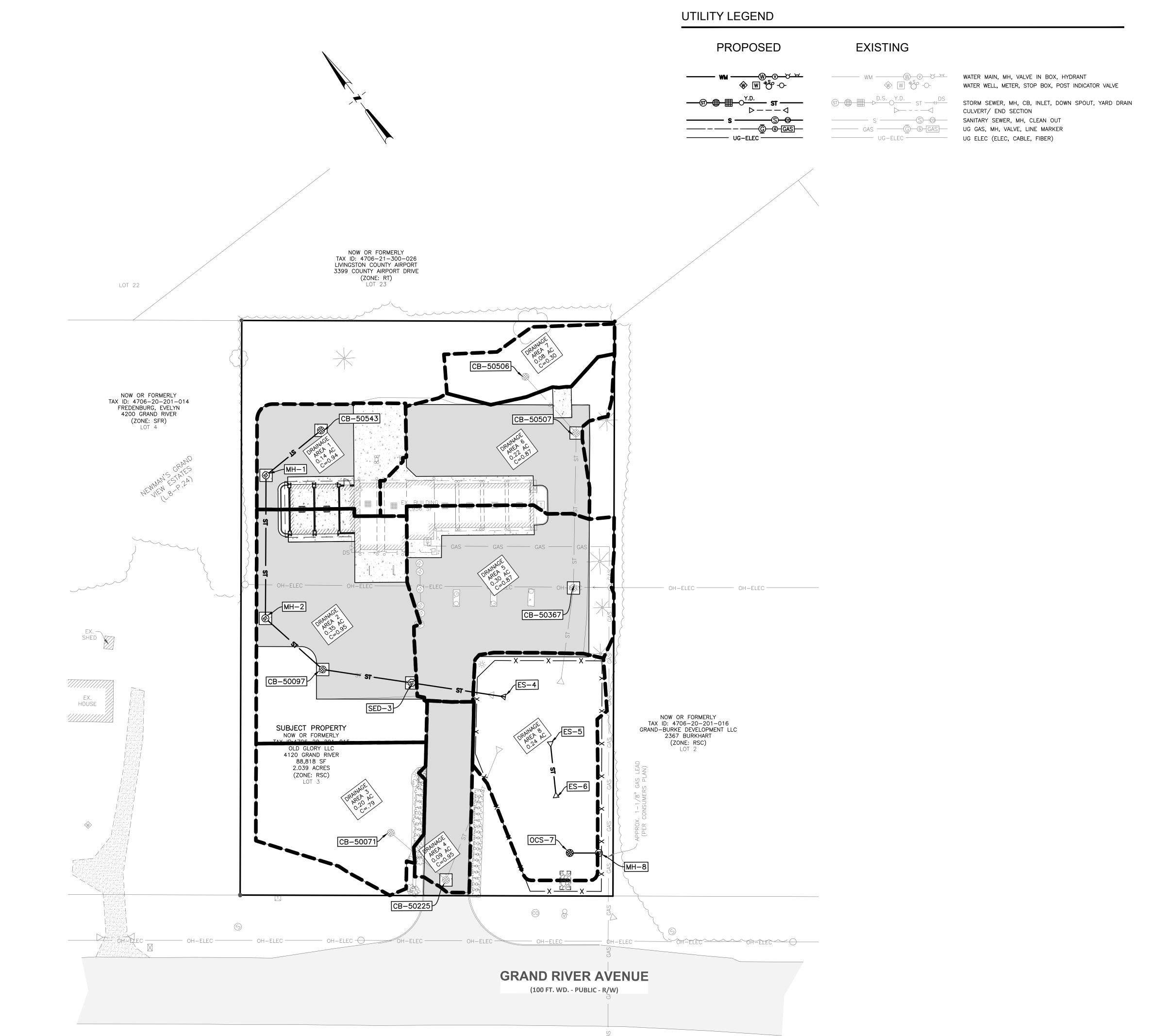
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ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

SCALE: N/A 0 1/2"

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PROJECT NO: 22-177 SCALE: 1" = 30'0 1/2" 1"

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	AREA (SF) AF	REA (AC)				AREA (SF) A	REA (AC)		
OVERALL	88,818	2.04			OVERALL	88,818	2.04		
CONTRIBUTING	55,835	1.28			CONTRIBUTING	70,567	1.62		
FLOWING OFF	32,983	0.76			FLOWING OFF	18,251	0.42		
			С	$A \times C$				С	$A \times C$
EX BUILDING	3,956		0.90	3,560	EX BUILDING	3,956		0.95	3,758
EX PAVEMENT	32,206		0.90	28,985	<b>EX PAVEMENT</b>	3,732		0.95	3,545
PR BUILDING	0		0.90	0	PR BUILDING	1,341		0.95	1,274
PR PAVEMENT	0		0.90	0	PR PAVEMENT	30,945		0.95	29,398
GRASS	19,673		0.20	3,935	GRASS	30,593		0.30	9, 178
TOT	ALS 55,835			36,481	TOTA	LS 70,567			47, 153
	$TOTALA \times C$		36 481	0.65		$TOTALA \times C$		47 153	0.67
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<b>SITE INFO</b> OVERALL AREA CONTRIBUTING ARE	EA (A)	= =	2.04 / 1.28 / 0.20	AC AC	SITE INFO  OVERALL AREA  CONTRIBUTING AREA  ALLOWABLE DISCHA	A (A)	= = =	70,567 2.04 / 1.62 / 0.20 (	4C 4C
<b>SITE INFO</b> OVERALL AREA CONTRIBUTING ARE ALLOWABLE DISCH	EA (A) IARGE (Qa)	= =	2.04 / 1.28 / 0.20	AC AC	SITE INFO  OVERALL AREA  CONTRIBUTING AREA  ALLOWABLE DISCHA	A (A) RGE (Qa)	= = =	70,567 2.04 / 1.62 / 0.20 (	4C

$V_{wq} = \frac{12" \times 43560 \times A \times C}{}$		$V_{wq} = \frac{12"}{12"} \times 43560 \times A \times C$			
QUIRED CHANNEL PROTECTION VOLUME		REQUIRED CHANNEL PROTECTION V	OLUME		
$V_{cp} = \frac{1.3"}{12"} \times 43560 \times A \times C$	3952 CF	$V_{cp} = \frac{1.3"}{12"} \times 43560 \times A \times C$	=	5108 CF	
QUIRED FOREBAY VOLUME		REQUIRED FOREBAY VOLUME			
TH DOWNSTREAM INFILTRATION Vf = Vwq		WITH DOWNSTREAM INFILTRATION VI	f= Vwq		
$V_f$ =	3040 CF	$V_f$	=	3929 CF	

$V_f$	=	3040 CF	$V_f$	=	3929 CF
REQUIRED EXTENDED DETENTION VOLUME	<b>=</b>		REQUIRED EXTENDED DETENTION VOLUI	ME	
$V_{ED} = \frac{1.9"}{12"} \times 43560 \times A \times C$	=	5776 CF	$V_{ED} = \frac{1.9"}{12"} \times 43560 \times A \times C$	=	7466 CF
EXTENDED DETENTION DISCHARGE RATE			EXTENDED DETENTION DISCHARGE RATI	E	
$Q_{ED} = \frac{V_{ED}}{172800}$	=	0.03 CFS	$Q_{ED} = \frac{V_{ED}}{172800}$	=	0.04 CFS
100 YR STORM INLET RATE			100 YR STORM INLET RATE		
$Q_{100in} = C \times A \times \frac{30.2033 \times 100^{0.2203}}{(T_c + 9.1747)^{0.8069}}$	=	4.46 CFS	$Q_{100in} = C \times A \times \frac{30.2033 \times 100^{0.2203}}{(T_c + 9.1747)^{0.8069}}$	=	5.77 CFS
100 YR STORM ALLOWABLE OUTLET RATE	į		100 YR STORM ALLOWABLE OUTLET RA	TE	
$Q_{100all} = A \times Q_a$	=	0.26 CFS	$Q_{100all} = A \times Q_a$	=	0.32 CFS
STORAGE CURVE FACTOR			STORAGE CURVE FACTOR		
$R = 0.206 - 0.15 \times ln\left(\frac{Q_{100all}}{Q_{100in}}\right)$	=	0.63	$R = 0.206 - 0.15 \times ln \left( \frac{Q_{100all}}{Q_{100in}} \right)$	=	0.64
100 YR STORM VOLUME IN			100 YR STORM VOLUME IN		
$V_{100in} = 18985 \times C \times A$	=	15900 CF	$V_{100in} = 18985 \times C \times A$	=	20551 CF
100 YR STORM STORAGE VOLUME			100 YR STORM STORAGE VOLUME		
$V_{1,00det} = V_{10,0in} \times R - V_{cn}$	=	6137 CF	$V_{100det} = V_{100in} \times R - V_{cn}$	=	8002 CF

REQUIRED DETENTION VOLUME

100 YR STORM STORAGE VOLUME CONTROLS

VOLUME SUMI	MARY				
FOREBAY VOL	UME	$V_f$	=	3,040 CF	
INFILTRATION	/OLUME	$V_{cp}$	=	3,952 CF	
EXTENDED DE	TENTION VO	DLUME			
		$V_{ED}$	=	5,776 CF	
100-YEAR VOL	UME	$V_{100}$	=	6,137 CF	
STORAGE ELE	VATIONS				
FOREBAY ELEVATION ELEVATION	= =	950.00 951.00		VOLUME 1 VOLUME 2 Vf	1 4 3
F ELEVATION	ON (Zf)	=	950.50	VI	3
INFILTRATION ELEVATION ELEVATION	= =	950.00 951.00		VOLUME 1 VOLUME 2	1
CP ELEVATION	DN (Zcp)	=	950.87	Vcp	3
EXTENDED DE ELEVATION ELEVATION	= =	951.00 952.00		VOLUME 1 VOLUME 2 Ved	4 7 6
ED ELEVATION	DN (Zed)	=	951.74		
100-YEAR ELEVATION ELEVATION	=	951.00 952.00		VOLUME 1 VOLUME 2 V100	4 7 7
100 ELEVATIO	N (Z100)	=	951.85	V 100	,
EXISTING DET	ENTION BA	SIN VOLUM	ΛΕ		
ELEVATION A	REA (FT) A	VG AREA (FT)	INC VOLUME (CF)	TTL VOLUME (CF)	
949	1,466	4 700			
950	2,126	1,796	1,796	1,796	
951	2,850	2,488 3,235	2,488	4,284	

953 4,447

		-		
=	3,040	CF		
=	3,952	CF		
=	5,776	CF		
=	6,137	CF		
).50	VOLUME 1 VOLUME 2 Vf		1,796 4,284 3,040	
).87	VOLUME 1 VOLUME 2 Vcp		1,796 4,284 3,952	
1.74	VOLUME 1 VOLUME 2 Ved		4,284 7,519 6,688	
1.85	VOLUME 1 VOLUME 2 V100		4,284 7,519 7,049	
ΛE	TTL VOLUME (CF)			
796	1,796			

4,033 **11,552** 

Read the Hints!

OUTLET CONTROL STR	UCTURE OR	IFICE CALCUL	ATIONS
CHANNEL PROTECTION	RATE CON	TROL (EXTEN	IDED DETENT
$Q_{ED} = \frac{V_{ED}}{T_{48}} = \frac{1}{2}$	$\frac{V_{ED}}{48 \times 3600}$	=	0.010 CF
OPENINGS AT BOTTOM	OF STORAG	GE ELEVATIOI	N
	$Z_{bttm}$	=	949.17
$H_{avg} = \frac{2}{3} \times (Z_s)$	$_{ED}-Z_{bttm})$	=	0.737 FT
$A_{ED} = {0.62}$	$\frac{Q_{ED}}{2 \times g \times H_{av}}$	<u> </u>	0.002 SF
HOLE HAS A DIAMETER			
1.0 INCH =	0.083	FT =	0.0055 SF
DETENTION TIME FOR	1	1.0 INCH D	IA HOLE
$Q_{ED(ACTUAL)} = A_{ED-HOL}$	$_{.E}$ $\times$ $0.62\sqrt{2}$	$2 \times g \times h =$	0.0233 CF
	$T_{rr} =$	$\frac{V_{ED}}{\times 3600} =$	20 1E UB

FLOW THROUGH ED CONTROLS AT 100 YEAR	AR STC	DRM
$H_{EDavg} = \frac{2}{3} \times (Z_{100} - Z_{bttm})$	=	1.67 FT
$Q_{ED(100yr)} = A_{ED-HOLE} \times 0.62\sqrt{2 \times g \times h}$	=	0.0351 CFS
$Q_{OFFSITE} = A_{OFFSITE} \times Q_a$	=	0.071 CFS
$Q_{rem} = Q_a - Q_{ED(100yr)} + Q_{OFFSITE}$	=	0.1389 CFS
$H_{100} = Z_{100} - Z_{ED}$	=	1.0531 FT
$A_{100} = \frac{Q_{rem}}{0.62\sqrt{2 \times g \times H_{100}}}$	=	0.0272 SF
HOLES HAVE A DIAMETER AND AREA OF 1.0 INCH = 0.083 FT	=	0.0055 SF
5 HOLES	=	0.0273 SF

100 YEAR VOLUME CONTROL

COMPOUND RUNC	OFF COEFFICIE	NT FOR ARI	EA 1	COMPOUND RUNOFF COEFFICIENT FOR AREA 5							
	AREA (SF)	AREA (AC)	С			AREA (SF)	AREA (AC)	С			
OVERALL	6248.49	0.14			OVERALL	13260.17	0.30				
CONTRIBUTING	6248.49	0.14			CONTRIBUTING	13260.17	0.30				
FLOWING OFF	0	0.00			FLOWING OFF	0	0.00				
				$A \times C$					$A \times C$		
EX BUILDING	368.1921		0.95	349.782	EX BUILDING	1287.1598		0.95	1222.		
EX PAVEMENT	2670.4061		0.95	2536.89	EX PAVEMENT	4644.3856		0.95	4412.1		
PR BUILDING	666.87		0.95	633.527	PR BUILDING	5793		0.95	5503.3		
PR PAVEMENT	2449.449		0.95	2326.98	PR PAVEMENT	0		0.95	(		
NATURAL AREAS	93.5728		0.30	28.0718	NATURAL AREAS	1535.6246		0.30	460.68		
TOTALS	6248.49			5875.24	TOTALS	13260.17			11599		
$COMPOUND C = \frac{1}{C}$	TOTALA ONTRIBUTIN		5875.24 6248.49	0.94	$COMPOUND C = \frac{1}{CC}$	TOTALA: ONTRIBUTIN		11599 13260.2	0.8		
COMPOUND RUNC	OFF COEFFICIE	NT FOR AR	EA 2		COMPOUND RUNO	FF COEFFICIE	ENT FOR ARI	EA 6			
	AREA (SF)	AREA (AC)	С			AREA (SF)	AREA (AC)	С			
OVERALL	15179.63	0.35			OVERALL	9507.49	0.22				
CONTRIBUTING	15179.63	0.35			CONTRIBUTING	9507.49	0.22				
FLOWING OFF	0	0.00			FLOWING OFF	0	0.00				
				$A \times C$					$A \times C$		
EX BUILDING	738.8791		0.95	701.935	EX BUILDING	1562.0149		0.95	1483.9		
EX PAVEMENT	5671.3349		0.95	5387.77	EX PAVEMENT	6741.5507		0.95	6404.4		

0.95 640.316 PR BUILDING

14372.2

0.95 7619.79 PR PAVEMENT

 $COMPOUND C = \frac{TOTAL A \times C}{CONTRIBUTING AREA} \qquad \frac{14372.2}{15179.6} \qquad 0.95 \qquad COMPOUND C = \frac{TOTAL A \times C}{CONTRIBUTING AREA} \qquad \frac{8249.56}{9507.49} \qquad 0.87$ 

0.30 22.3706 NATURAL AREAS 1203.9244

TOTALS 9507.49

COMPOUND RUNG	FF COEFFICIE	NT FOR ARI	EA 3	COMPOUND RUNOFF COEFFICIENT FOR AREA 7							
	AREA (SF)	AREA (AC)	С			AREA (SF)	AREA (AC)	С			
OVERALL	8594.37	0.20			OVERALL	3621.19	0.08				
CONTRIBUTING	8594.37	0.20			CONTRIBUTING	3621.19	0.08				
FLOWING OFF	0	0.00			FLOWING OFF	0	0.00				
				$A \times C$					$A \times C$		
EX BUILDING	0		0.95	0	EX BUILDING	0		0.95	0		
EX PAVEMENT	0		0.95	0	EX PAVEMENT	0		0.95	0		
PR BUILDING	0		0.95	0	PR BUILDING	0		0.95	0		
PR PAVEMENT	6498.2337		0.95	6173.32	PR PAVEMENT	0		0.95	0		
NATURAL AREAS	2096.1363		0.30	628.841	NATURAL AREAS	3621.19		0.30	1086.36		
TOTALS	8594.37			6802.16	TOTALS	3621.19			1086.36		
$COMPOUND C = \frac{1}{CC}$	TOTALA:		6802.16 8594.37	0.79	$COMPOUND C = \frac{1}{CO}$	TOTALA ×		1086.36 3621.19	0.30		

COMPOUND RUNOR	FF COEFFICIE	NT FOR AREA	4	COMPOUND RUNOFF COEFFICIENT FOR AREA 8							
	AREA (SF)	AREA (AC)	С			AREA (SF)	AREA (AC)	С			
OVERALL	3769.95	0.09			OVERALL	6484.98	0.15				
CONTRIBUTING	3769.95	0.09			CONTRIBUTING	6484.98	0.15				
FLOWING OFF	0	0.00			FLOWING OFF	0	0.00				
				$A \times C$					$A \times C$		
EX BUILDING	0		0.95	0	EX BUILDING	0		0.95	0		
EX PAVEMENT	3769.95		0.95	3581.45	EX PAVEMENT	0		0.95	0		
PR BUILDING	0		0.95	0	PR BUILDING	0		0.95	0		
PR PAVEMENT	0		0.95	0	PR PAVEMENT	0		0.95	0		
NATURAL AREAS	0		0.30	0	NATURAL AREAS	6484.98		0.30	1945.49		
TOTALS	3769.95			3581.45	TOTALS	6484.98			1945.49		
COMPOUND C -	$TOTALA \times$	⟨ <i>C</i> 3	581.45	0.95	COMPOUND C -	TOTALA	× C	1945.49	0.30		

											PR PAVEN	<b>MENT</b>		0		0.95	0	PR PAV	EMENT		0	0.95	0
											NATURAL	AREAS		0		0.30	0	NATUR	AL AREAS	6484.	98	0.30	1945.49
												TOTA	LS 3	3769.95			3581.45		TOTALS	6484.	98		1945.49
											COMPOU	ND C =		OTALA×C RIBUTING A		3581.45 3769.95	0.95	СОМРО	$DUND C = \frac{1}{6}$	TOTA. CONTRIBU	LA×C TING AREA	1945.49 6484.98	
				STORM S	EWER DE	SIGN						0	1			ENT ENGIN		GROUP A	SOCIATES	S, LLC	( )		
=CIA				t =	20											VILLE, MI							
6/n x R <sup>2</sup> /3 x S <sup>1</sup> /2				n1 =	0.01	HDPE & P	VC								517-223-3								
75/(t+25)				n2 =	0.013	CONC.																	
																		H.G. ELE	٧.	<b>INVERTEL</b>	.EV.	RIM ELEV. I	RIM ELEV.
OM STR	AREA	COEFF.		AREA	TOTAL	TIME	INT.	FLOW	PIPE	PIPE	PIPE	PIPE	PIPE	MIN PIPE	H.G.	VEL.	TIME	UP	DOWN	UP	DOWN	UP	DOWN
OSTR	Α	С	AxC	TOTAL	CxA	t	1	Q	CAP.	AREA	LENGTH	DIA.	SLOPE	SLOPE	SLOPE	FULL	FLOW	STREAM	STREAM	STREAM	STREAM	STREAM	STREAM
				Δt								1											

PR BUILDING

PR PAVEMENT

NATURAL AREAS

8020.831

TOTALS 15179.63

REQUIRED VOLUM	/IE SUMN	IARY			
INFILTRATION VOL	UME				
		$V_{cp}$	=	1,156 CF	
EXTENDED DETEN	ITION VC	DLUME			
		$V_{ED}$	=	1,690 CF	
100-YEAR VOLUM	E				
		$V_{100}$	=	1,865 CF	
ELEVATION ELEVATION	=	948.00 949.00		DLUME 1 DLUME 2 P	492 1,300 1,156
	<b>-</b> .	=			1,156
CP ELEVATION (	ZCP)	_	340.02		
EXTENDED DETEN	NOITI				
ELEVATION	=	950.00		DLUME 1	1,203
ELEVATION	=	951.00		DLUME 2	2,974
	7ad)	_	Ve	d	1,690
ED ELEVATION (	zeu)	=	950.28		
100-YEAR					
ELEVATION	=	950.00	VC	LUME 1	1,203
ELEVATION	=	951.00		DLUME 2	2,974
			V1	00	3,555
100 ELEVATION (			951.33		

6137 CF

REQUIRED DETENTION VOLUME

100 YR STORM STORAGE VOLUME CONTROLS

947 948	352 631	492 809	492	492 <b>1 300</b>
949 PROPOSED	986  DETENTION	BASIN VOLU		1,300
ELEVATION	AREA (FT)	AVG AREA (FT)	INC VOLUME (CF)	TTL VOLUME (CF)
949	986	1,203		
950	1,419	1,771	1,203	1,203
951	2,123	2,552	1,771	2,974
952	2,980	3,480	2,552	5,525
953	3979	-,	3,480	9,005

INC ELEVATION AREA (FT) AVG AREA VOLUME VOLUME (FT) (CF) (CF)

= 8002 CF

PROPOSED SUMP VOLUME

ATERAL	Ex. OCS(50421) - ES 4	0.15	0.70	0.105	0.150	0.105	20.00	3.89	0.41	5.65	1.77	119	18	0.29	0.18	0.29	3.20	0.62	950.54	950.19	949.33	948.99	952.67	948.99
	Ex. CB(50225) - ES 3	0.09	0.95	0.086	0.290	0.244	20.22	3.87	0.94	2.17	0.79	92	12	0.37	0.30	0.37	2.76	0.56	949.93	949.59	949.13	948.79	953.08	948.79
ATERAL	Ex. CB(50071) - Ex. CB(50225)		0.79	0.158	0.200	0.158	20.00	3.89	0.61	2.76	0.79	47	12	0.60	0.30	0.60	3.51	0.22	950.21	949.93	949.35	949.07	953.22	953.08
	Ex.CB(50367) - ES 2	0.30	0.87	0.261	0.600	0.476	20.72	3.83	1.82	2.47	0.79	62	12	0.48	0.30	0.48	3.14	0.33	949.94	949.64	949.14	948.84	953.29	948.8
	Ex. CB(50507) - Ex. CB(50367)		0.87	0.191	0.300	0.215	20.22	3.87	0.83	2.64	0.79	100	12	0.55	0.30	0.55	3.36	0.50	950.49	949.94	949.64	949.09	953.51	953.2
ATERAL	Ex. CB(50506) - Ex.CB(50507)		0.30	0.024	0.080	0.024	20.00	3.89	0.09	2.89	0.79	49	12	0.66	0.30	0.66	3.68	0.22	950.81	950.49	949.81	949.49	952.35	953.5
	EX 05(00001) - E0 1	0.00	0.00	0.000	0.400	0.101	21.22	0.10	1.70	2.01	0.10		12	0.02	0.00	0.02	2.00	0.12	010.00	040.00	010.10	040.00	002.71	010.0
	EX CB(50097) - ES 1	0.35	0.95	0.333	0.490	0.464	21.22	3.79	1.76	2.01	0.79	111	12	0.32	0.30	0.32	2.56	0.72	949.96	949.60	949.16	948.80	952.71	948.8
	MH 2 - Ex. CB(50097)	0.00	0.00	0.000	0.140	0.132	20.90	3.81	0.50	2.01	0.79	49	12	0.32	0.30	0.32	2.56	0.32	950.41	949.96	949.31	949.16	953.66	952.7
AIN KON	MH 3 - MH 2	0.14	0.00	0.132	0.140	0.132	20.30	3.86	0.51	2.01	0.79	92	12	0.32	0.30	0.32	2.56	0.60	950.41	950.41	949.61	949.31	954.42	953.6
AIN RUN	Ex. CB(50543)-MH 3	0.14	0.94	0.132	0.140	0.132	20.00	3.89	0.51	2.01	0.79	46	12	0.32	0.30	0.32	2.56	0.30	950.56	950.41	949.76	949.61	953.15	954.4
		ac.			ac.		min.	in/hr	c.f.s.	c.f.s.	sq. ft.	ft.	in.	%		%	ft/sec	min.						
					At																			
	TOSTR	Α	С	AxC	TOTAL	CxA	t	1	Q	CAP.	AREA	LENGTH	DIA.	SLOPE	SLOPE	SLOPE	FULL	FLOW	STREAM	STREAM	STREAM	STREAM	STREAM	STREA
	FROM STR	AREA	COEFF.		AREA	TOTAL	πме	INT.	FLOW	PIPE	PIPE	PIPE	PIPE	PIPE	MIN PIPE	H.G.	VEL.	TIME	UP	DOWN	UP	DOWN	UP	DOW
	1 170/(1/20)				116	0.010	00110.												H.G. ELE	٧.	INVERT EI	.EV.	RIM ELEV.	RIM ELI
	I = 175/(t+25)				n2 =		CONC.									011 220 0	~12							
	Q = A x 1.486/n x R <sup>2</sup> /3 x S <sup>1</sup> /2				n1 =		HDPE & P	VC.								517-223-3		10000						
	Q=CIA				t =	20											ERANS DE VILLE, MI							



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**ALLAN W.** ENGINEER NO. 6201043168

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THE LOCATIONS AND ELEVATIONS OF
EXISTING UNDERGROUND UTILITIES AS SHOWN
ON THIS DRAWING ARE ONLY APPROXIMATE
NO GUARANTEE IS EITHER EXPRESSED OF
IMPLIED AS TO THE COMPLETENESS OF
ACCURACY THEREOF. THE CONTRACTO
SHALL BE EXCLUSIVELY RESPONSIBLE FOR
DETERMINING THE EXACT UTILITY LOCATION:
AND ELEVATIONS PRIOR TO THE START OF
CONSTRUCTORY

CLIENT :

0.95 0

0.95 0

0.30 361.177

8249.56



POC: MATT MARTIN 517-375-0555

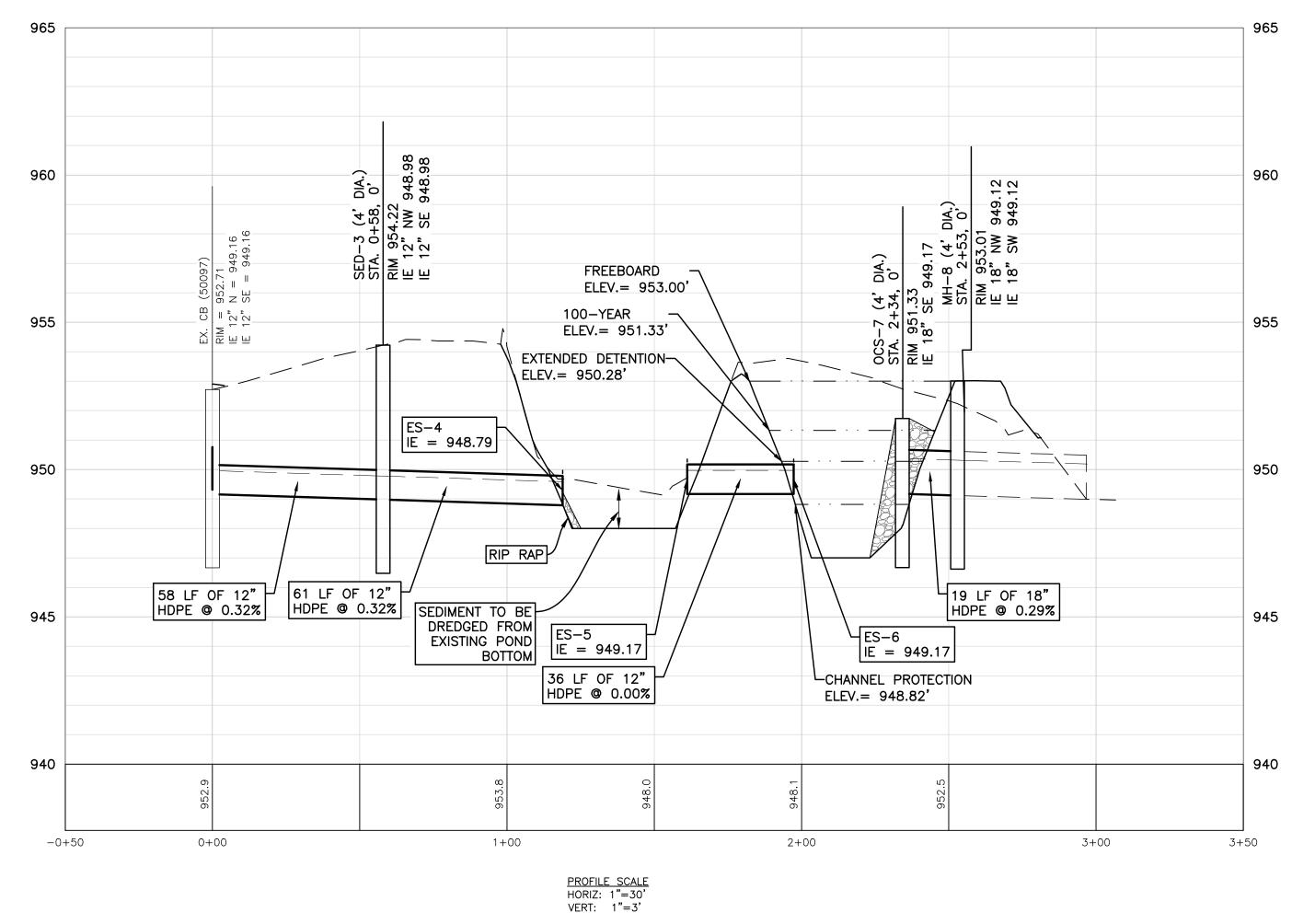
STORM WATER

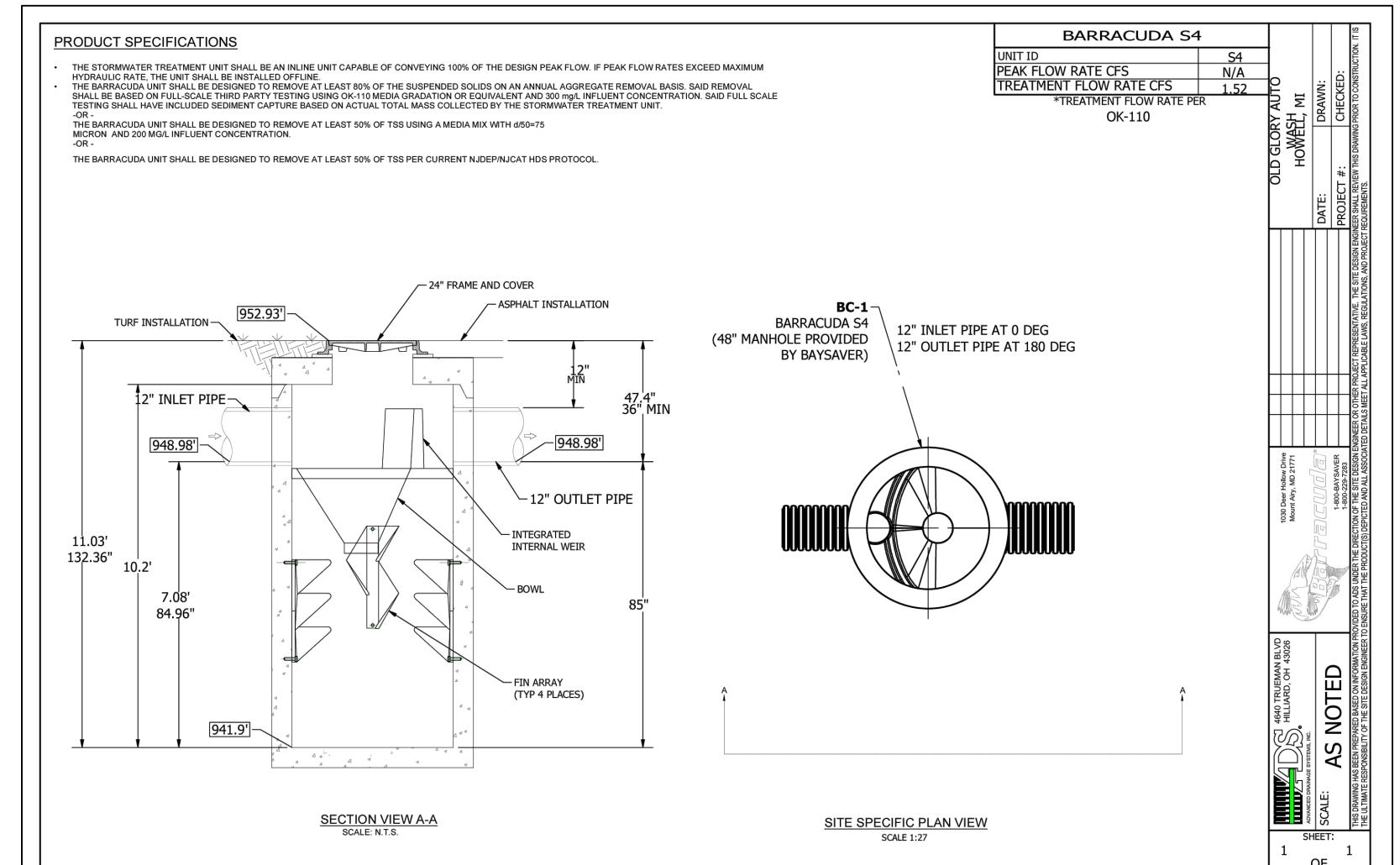
ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

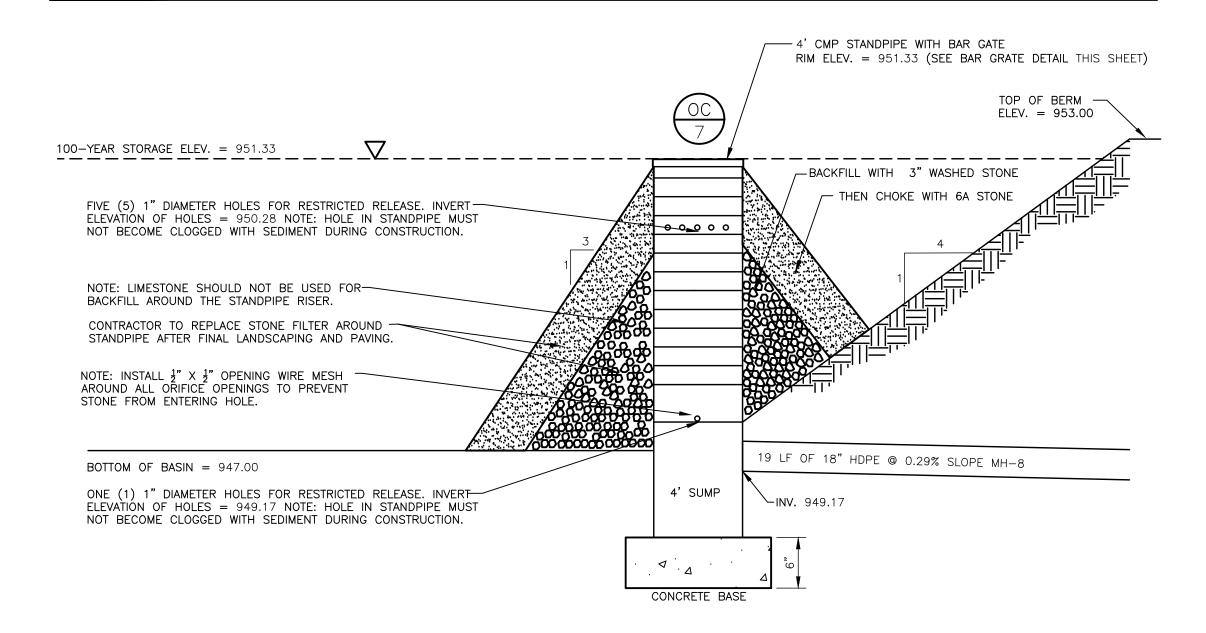
SCALE: 1" = 30'0 1/2" 1" FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

C-9.1

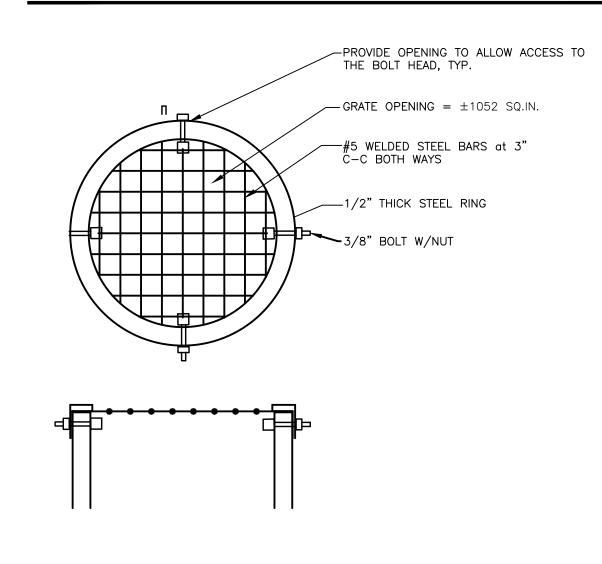




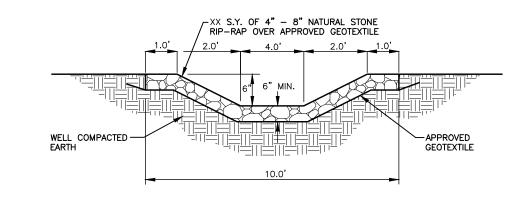
#### DETENTION OUTLET CONTROL STRUCTURE DETAIL



### BAR GRATE DETAIL - FOR OUTLET CONTROL STRUCTURE



## SPILLWAY DETAIL - OVERFLOW - RIP RAP



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IMPLIED AS TO THE COMPLETENESS C
ACCURACY THEREOF. THE CONTRACTC
SHALL BE EXCLUSIVELY RESPONSIBLE FO
DETERMINING THE EXACT UTILITY LOCATION
AND ELEVATIONS PRIOR TO THE START C
C O N S T R U C T I O N

CLIENT:



OLD GLORY CAR WASI PO BOX 328 FOWLERVILLE, MI 48836 POC: MATT MARTIN 517-375-0555

ORIGINAL ISSUE DATE:

PROJECT NO: 22-177 SCALE: 1" = 30'

1/2" FIELD: DRAWN BY: DC DESIGN BY:

CHECK BY: AP

C-9.2

## **GENERAL NOTES**

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE LOCAL MUNICIPALITY. THE LOCAL WATER AND/OR SEWER AUTHORITY, THE COUNTY D.P.W., THE COUNTY DRAIN COMMISSIONER. MICHIGAN DEPARTMENT OF TRANSPORTATION. MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES AND ENERGY, THE STATE OF MICHIGAN, AND THE COUNTY ROAD COMMISSION WHERE APPLICABLE.
- RULES, REGULATIONS OR LAWS OF ANY CONTROLLING GOVERNMENTAL AGENCY SHALL GOVERN, WHEN THEY ARE MORE STRINGENT THAN THE REQUIREMENTS OF
- SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT BETWEEN THESE PLANS AND SPECIFICATIONS FITHER AMONG THEMSELVES OR WITH THE REQUIREMENTS OF ANY AND ALL REVIEWING AND PERMIT—ISSUING AGENCIES, CONTRACTOR SHALL SEEK CLARIFICATION IN WRITING FROM THE ENGINEER BEFORE COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO SHALL BE AT SOLE EXPENSE TO THE
- THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND EQUIPMENT TO COMPLETE THE TYPE OF WORK WHICH IS BID, IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, DETAILS AND TO THE SATISFACTION OF THE OWNER AND OWNER'S REPRESENTATIVE.
- CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY: THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED. IN CONNECTION WITH THE PERFORMANCE WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.
- ANY WORK WITHIN STREET OR HIGHWAY RIGHT-OF-WAYS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE GOVERNMENTAL AGENCIES HAVING JURISDICTION AND SHALL NOT BEGIN UNTIL PERMITS HAVE BEEN ISSUED BY THESE GOVERNING AUTHORITIES.
- 7. ALL NECESSARY PERMITS, BONDS, INSURANCES, ETC., SHALL BE PAID FOR BY THE CONTRACTOR.
- 8. ALL ELEVATIONS SHOWN ARE BASED ON BENCHMARKS PROVIDED BY THE LOCAL MUNICIPALITY UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- 9. ALL ITEMS OF WORK NOT SPECIFICALLY INDICATED AS PAY ITEMS ON THE RAWINGS OR IN THE BID PACKAGE SHALL BE CONSIDERED INCIDENTAL ITEMS.
- 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL DURING THE PERIODS OF CONSTRUCTION.
- 11. AT LEAST THREE (3) WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT MISS DIG (1-800-482-7171) TO VERIFY THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES AND SHALL NOTIFY REPRESENTATIVES OF OTHER UTILITIES IN THE VICINITY OF THE WORK.
- 12. ALL PROPERTIES OR FACILITIES IN THE SURROUNDING AREAS, PUBLIC OR PRIVATE, DESTROYED OR OTHERWISE DISTURBED DUE TO CONSTRUCTION, SHALL BE REPLACED AND/OR RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.
- 13. MANHOLE, CATCH BASIN, GATE WELL RIMS AND HYDRANT FINISH GRADE ELEVATIONS MUST BE AS-BUILT AND APPROVED BY THE ENGINEER BEFORE THE CONTRACTOR'S WORK IS CONSIDERED COMPLETE. AGENCY REQUIREMENTS FOR RECORD DRAWINGS
- 14. CONTRACTOR SHALL REMOVE AND DISPOSE OF OFF-SITE ANY TREES, BRUSH, STUMPS, TRASH OR OTHER UNWANTED DEBRIS, AT THE OWNER'S DIRECTION, INCLUDING OLD BUILDING FOUNDATIONS AND FLOORS. THE BURNING OR BURYING OF TRASH, STUMPS OR OTHER DEBRIS WILL NOT BE ALLOWED.
- 15. ALL REFERENCES TO M.D.O.T. SPECIFICATIONS REFER TO THE MOST CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- 16. ALL CONTRACTORS BIDDING THIS PROJECT SHALL HAVE VISITED THE SITE TO BECOME THOROUGHLY FAMILIAR WITH THE SITE AND THE CONDITIONS IN WHICH THEY WILL BE CONDUCTING THEIR OPERATIONS. ANY VARIANCE FOUND BETWEEN THE PLANS AND EXISTING CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.
- 17. THE LOCATIONS AND DIMENSIONS SHOWN ON THE PLANS FOR EXISTING UNDERGROUND FACILITIES ARE IN ACCORDANCE WITH AVAILABLE INFORMATION PROVIDED BY THE UTILITY COMPANIES AND GOVERNMENTAL AGENCIES WITHOUT UNCOVERING AND MEASURING. THE DESIGN ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION OR THAT ALL EXISTING UNDERGROUND
- 18. THE OWNER MAY EMPLOY AND PAY FOR THE SERVICES OF AN ENGINEER TO PROVIDE ON-SITE INSPECTION AND VERIFY IN THE FIELD THAT ALL BACKFILL. PAVEMENTS AND CONCRETE CURB AND GUTTER HAVE BEEN PLACED AND COMPACTED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. IF, IN THE OPINION OF THE ENGINEER. THE WORK DOES NOT MEET THE TECHNICAL OR DESIGN REQUIREMENTS STIPULATED FOR THE WORK, THE CONTRACTOR SHALL MAKE ALL NECESSARY ADJUSTMENTS AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL MAKE NO DEVIATIONS FROM THE CONTRACT DOCUMENTS WITHOUT SPECIFIC WRITTEN APPROVAL OF THE OWNER.
- 19. ALL EXCAVATED MATERIAL REMOVED FROM THE SANITARY SEWER, STORM SEWER AND WATER MAIN TRENCHES UNDER. THROUGH AND WITHIN 3 FEET OF THE 45° ZONE OF INFLUENCE LINE OF EXISTING OR PROPOSED PAVING. SIDEWALK AREAS AND PER PLANS, NOT SUITABLE FOR BACKFILL, SHALL BE REMOVED FROM THESE AREAS AND DISPOSED OF.
- 20. THE CONTRACTOR SHALL RESTORE TO THEIR PRESENT CONDITIONS ANY PAVEMENT OR PUBLIC RIGHTS-OF-WAY THAT IS DISTURBED BY THE OPERATIONS OF THE CONTRACTOR. ALL RESTORATION WORK IN PUBLIC RIGHTS-OF-WAY SHALL BE PERFORMED TO THE SATISFACTION OF THE GOVERNMENT AGENCIES HAVING
- 21. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE AND LIGHTS TO PROTECT THE WORK AND SAFELY MAINTAIN TRAFFIC, IN ACCORDANCE WITH LOCAL REQUIREMENTS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION).
- 22. O.S.H.A. SAFETY REQUIREMENTS ALL WORK, WORK PRACTICE, AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL SAFETY, OCCUPATIONAL, HEALTH AND ENVIRONMENTAL REGULATIONS AND ALSO NFPA AND ANSI CODES AS APPLICABLE. ALL WORK INSIDE A CONFINED SPACE SUCH AS MANHOLES OR UNDERGROUND STRUCTURES SHALL BE COORDINATED WITH UTILITY OWNER AND ALL WORKER SAFETY REQUIREMENTS STRICTLY ENFORCED. LAND SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- 23. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE FOR OR SUPPLY TEMPORARY WATER SERVICE, SANITARY FACILITIES AND ELECTRICITY.
- 24. CONTRACTOR SHALL PROVIDE FOR THE CONTINUOUS OPERATION OF EXISTING FACILITIES WITHOUT INTERRUPTION DURING CONSTRUCTION UNLESS SPECIFICALLY AUTHORIZED OTHERWISE BY THE RESPECTIVE AUTHORITY.
- 25. THE CONTRACTOR SHALL NOTE EXISTING UNDERGROUND UTILITIES IN THE PROJECT PLANS. TRENCH BACKFILL FOR EXISTING UTILITIES SHALL BE EXAMINED CRITICALLY. ANY TRENCH WHICH, IN THE OPINION OF THE SOILS ENGINEER ARE FOUND TO BE SOFT, UNSTABLE, OR UNSUITABLE MATERIAL SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH SUITABLE MATERIAL. SAND BACKFILL SHALL BE USED UNDER PAVEMENT OR WITHIN 3 FEET OF THE 45° INFLUENCE LINE OF PAVEMENT OR STRUCTURES.

### **EROSION CONTROL STANDARDS**

- 1. ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO STANDARDS AND SPECIFICATIONS OF THE JURISDICTIONAL AGENCY UNDER PART 91 OF ACT 451 OF
- UNDER "MICHIGAN'S PERMIT-BY-RULE FOR CONSTRUCTION ACTIVITIES", PROMULGATED UNDER ACT 245, PUBLIC ACTS OF 1929 AS AMENDED, AN NPDES STORM WATER DISCHARGE COVERAGE PERMIT IS REQUIRED FOR ANY CONSTRUCTION ACTIVITY THAT DISTURBS 1 ACRES OR MORE OF LAND. A CERTIFIED STORM WATER OPERATOR IS REQUIRED FOR THE SUPERVISION AND INSPECTION OF THE SOIL EROSION CONTROL MEASURES AT THE CONSTRUCTION SITE IN ACCORDANCE WITH THE PROVISIONS OF THESE RULES.
- DAILY INSPECTIONS SHALL BE MADE BY CONTRACTOR WHILE WORKING TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES. ANY NECESSARY REPAIRS SHALL BE PERFORMED WITHOUT DELAY. ALL SOIL EROSION CONTROL PROVISIONS SHALL BE PROPERLY MAINTAINED DURING CONSTRUCTION.
- EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT ON ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES, AND PONDS.
- CONTRACTOR SHALL APPLY TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES WHEN REQUIRED AND AS DIRECTED ON THESE PLANS. CONTRACTOR SHALL REMOVE TEMPORARY MEASURES AS SOON AS PERMANENT STABILIZATION OF SLOPES, DITCHES, AND OTHER EARTH CHANGE AREAS HAVE BEEN COMPLETED.

#### EROSION CONTROL STANDARDS CONTINUED

- 6. STAGING THE WORK WILL BE DONE BY THE CONTRACTOR AS DIRECTED IN THESE PLANS AND AS REQUIRED TO ENSURE PROGRESSIVE STABILIZATION OF DISTURBED
- 7. SOIL EROSION CONTROL PRACTICES WILL BE ESTABLISHED IN EARLY STAGES OF CONSTRUCTION BY THE CONTRACTOR, SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTING OF SILT OFF THE
- 8. DUST SHALL BE CONTROLLED BY WATERING OR BY OTHER APPROVED MEANS HROUGHOUT ALL CONSTRUCTION OPERATIONS.
- 9. ALL WATER FROM DEWATERING OR SURFACE DRAINAGE FROM THE CONSTRUCTION SITE SHALL BE CONTROLLED TO FLIMINATE SEDIMENT CONTAMINATION OF OFF-SITE WATERWAYS OR STORM SEWERS. SUCH MEASURES SHALL BE APPROVED BY THE ENGINEER PRIOR TO ANY DEWATERING OR LAND DISTURBANCE.
- 10. PERMANENT SOIL EROSION CONTROL MEASURES FOR SLOPES, CHANNELS, DITCHES OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 5 CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH CHANGE HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHERE SIGNIFICANT EARTH CHANGE HAS BEEN COMPLETED OR WHERE SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED WITHIN CALENDAR DAYS. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND ESTABLISHED BEFORE A CERTIFICATE OF COMPLIANCE IS

### STORM SEWER SPECIFICATIONS

- THESE SPECIFICATIONS SHALL BE USED IN CONJUNCTION WITH THE GENERAL SPECIFICATIONS AND THE SPECIFICATIONS AND DETAIL SHEETS OF THE GOVERNING AGENCIES. IF ANY CONFLICT IS FOUND BETWEEN THE SPECIFICATIONS, THE STRICTER SPECIFICATIONS SHALL BE FOLLOWED.
- CONTRACTOR SHALL FURNISH CERTIFIED EVIDENCE THAT ALL MATERIAL TESTS AND INSPECTIONS HAVE BEEN PERFORMED AND THAT THE PRODUCT HAS BEEN MANUFACTURED IN COMPLIANCE WITH THE APPLICABLE SPECIFICATIONS.
- PROPER IMPLEMENTS, TOOLS AND FACILITIES SHALL BE PROVIDED AND USED FOR UNLOADING AND DISTRIBUTING MATERIALS ALONG THE LINE OF WORK. ANY PIPE OR FITTING DAMAGED IN TRANSPORTATION OR HANDLING SHALL BE REJECTED AND IMMEDIATELY REMOVED FROM THE JOB SITE
- 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFE STORAGE OF ALL MATERIAL INTENDED FOR THE WORK. HE SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO MATERIALS, EQUIPMENT AND WORK.
- 5. PIPE BEDDING, UNLESS OTHERWISE INDICATED, SHALL BE CL. II SAND, CRUSHED STONE OR ROUNDED GRAVEL. BEDDING MATERIAL SHALL HAVE 95% PASSING A 3/4" SIEVE AND AT LEAST 50% RETAINED ON A NO. 4 SIEVE.
- 6. POROUS FILTER MATERIAL FOR PERFORATED SUBSURFACE DRAINS SHALL BE CRUSHED ROCK OR GRAVEL GRADED BETWEEN 1-1/2" AND 3/4" OR PER PLANS
- 7. BACKFILL, UNLESS OTHERWISE NOTED, SHALL BE COARSE SAND, FINE GRAVEL OR EARTH HAVING A LOW PLASTICITY INDEX, FREE OF ROCKS, DEBRIS AND OTHER FOREIGN MATERIALS AND DEFINED AS ALL PASSING THROUGH A 3/8" SIEVE AND NOT MORE THAN 10% BY VOLUME PASSING THROUGH A 200-MESH SIEVE.
- STORM SEWER PIPING AND FITTINGS SHALL BE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS AND SHALL CONFORM TO THE FOLLOWING:
  - A. POLYVINYL CHLORIDE (PVC) AND ACRYLONITRILE BUTADIENE STYRENE (ABS) FOR PIPE UP TO AND INCLUDING 10" IN DIAMETER, SHALL CONFORM TO ASTM D3034. SDR 23.5 FOR PVC PIPE AND ASTM D2751 FOR ABS PIPE WITH ELASTOMETRIC GASKET JOINTS CONFORMING TO ASTM D3212 OR CHEMICALLY WELDED PIPE JOINTS CONFORMING TO ASTM F545.
- B. REINFORCED CONCRETE PIPE, FOR PIPE 12" IN DIAMETER AND UP, SHALL CONFORM TO ASTM C-76. CLASS IV UNLESS MODIFIED BY THE DRAWINGS. JOINTS SHALL BE MODIFIED GROOVED TONGUE WITH RUBBER GASKET CONFORMING TO ASTM C-443.
- C. PERFORATED SUBSURFACE DRAIN PIPE SHALL BE PVC CONFORMING TO ASTM D-2729 OR PERFORATED, CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONFORMING TO AASHTO M-294. JOINTS FOR PVC AND POLYETHYLENE PIPE SHALL BE PREFABRICATED COUPLING WITH SOLVENT
- 9. MANHOLES, CATCH BASINS, AND INLETS SHALL BE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS AND SHALL BE CONSTRUCTED OF THE FOLLOWING:
  - A. REINFORCED PRE-CAST CONCRETE MANHOLE SECTIONS INCLUDING CONCENTRIC OR ECCENTRIC CONES AND GRADE RINGS SHALL BE 4000 PSI CONCRETE AND CONFORM TO ASTM C-478-64T.
  - B. BRICK SHALL BE SOUND, HARD-BURNED THROUGHOUT AND OF UNIFORM SIZE AND QUALITY AND SHALL BE IN ACCORDANCE WITH AASHTO M 91,
  - C. CONCRETE MASONRY SHALL BE SOLID PRE-CAST SEGMENTAL UNITS CONFORMING TO ASTM C-139.

10. IRON CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 30. BEARING SURFACES

- BETWEEN CAST IRON FRAMES, COVERS AND GRATES SHALL BE MACHINED, FITTED TOGETHER AND MATCHED-MARKED TO PREVENT ROCKING, SYSTEM IDENTIFYING LETTERS 2" HIGH SHALL BE STAMPED OR CAST INTO ALL COVERS SO THAT THEY ARE PLAINLY VISIBLE. SEE MUNICIPALITY STANDARDS FOR ACTUAL WORDING.
- 11. CASTINGS SHALL BE MANUFACTURED BY EAST JORDAN IRON WORKS, INC., NEENAH FOUNDRY COMPANY OR EQUAL.
- 12. CONCRETE AND MASONRY MATERIALS FOR CONSTRUCTION OF STORM DRAINAGE STRUCTURES SHALL CONSIST OF THE FOLLOWING:
  - A. PORTLAND CEMENT SHALL BE STANDARD BRAND OF PORTLAND CEMENT CONFORMING TO ASTM C-150, TYPE I OR IA.
  - B. FINE AND COARSE AGGREGATES FOR CONCRETE SHALL BE PER ASTM C-33.
  - C. AGGREGATE FOR CEMENT MORTAR SHALL BE CLEAN, SHARP SAND CONFORMING TO ASTM C-144.
- D. HYDRATED LIME SHALL COMPLY WITH ASTM C-207, TYPE S.
- E. WATER SHALL MEET THE REQUIREMENTS OF MDOT SPEC SECTION 911.
- F. REINFORCING STEEL FOR CONCRETE SHALL BE INTERMEDIATE-GRADE NEW BILLET STEEL CONFORMING TO ASTM A-615, GRADE 40.
- 13. CONCRETE, UNLESS OTHERWISE NOTED, SHALL HAVE COMPRESSIVE STRENGTH AFTER 28 DAYS OF 3000 PSI MINIMUM WITH 3" MAXIMUM SLUMP.
- A. CONCRETE FILL BELOW GRADE MAY BE 2500 PSI AT 28 DAYS.
- B. CONCRETE. WHERE EXPOSED TO THE WEATHER, SHALL BE AIR-ENTRAINED. AIR ENTRAINMENT SHALL BE ACCOMPLISHED BY THE USE OF ADDITIVES CONFORMING TO ASTM C-260. AIR CONTENT SHALL BE 6% + 1%. ADDITIVE SHALL BE USED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S PRINTED
- C. READY-MIX CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ASTM
- 14. MORTAR SHALL BE SPECIFIED HEREINAFTER. USE METHOD OF MIXING MORTAR AT JOB SO THAT SPECIFIED PROPORTIONS OF MORTAR MATERIALS CAN BE CONTROLLED AND ACCURATELY MAINTAINED DURING WORK PROGRESS. MORTAR SHALL NOT BE MIXED IN GREATER QUANTITIES THAN REQUIRED FOR IMMEDIATE USE, WITH AMOUNT OF WATER CONSISTENT WITH SATISFACTORY WORKABILITY. RE-TAMPERING OF MORTAR IS NOT PERMITTED.
- A. MORTAR FOR LAYING BRICK OR CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C-270, TYPE M, AVERAGE COMPRESSIVE STRENGTH 2500 PSI MINIMUM AT 28 DAYS. MORTAR MIX SHALL BE PROPORTIONED BY VOLUME.
- B. MORTAR FOR PLASTERING SHALL CONSIST OF 1 PART PORTLAND CEMENT AND 2-1/2 PARTS SAND.
- C. MORTAR FOR GROUTING OF RIP-RAP SHALL CONSIST OF 1 PART PORTLAND CEMENT AND 3-1/2 PARTS SAND.
- 15. PERFORM ALL EXCAVATING AND TRENCHING TO DIMENSIONS AND ELEVATIONS INDICATED ON DRAWINGS.

#### STORM SEWER SPECIFICATIONS, CONTINUED

- 16. OPEN NO MORE TRENCH IN ADVANCE OF PIPE LAYING THAN IS NECESSARY TO
- 17. CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED ON DRAWINGS. WHERE EXCESSIVE OR UNAUTHORIZED EXCAVATION TAKES PLACE, THE OVERDEPTH SHALL BE BACKFILLED TO THE PROPER GRADE WITH COMPACTED BEDDING MATERIAL, AT NO EXPENSE TO THE OWNER.
- 18. WHERE UNSTABLE SOIL IS ENCOUNTERED, CONTRACTOR SHALL NOT PLACE PIPE UNTIL A SOLID BED HAS BEEN PROVIDED.
- 19. EXCAVATION FOR DRAINAGE STRUCTURES SHALL EXTEND A SUFFICIENT DISTANCE FROM THE WALLS AND FOOTINGS TO ALLOWS FOR FORMS, CONSTRUCTION OF WALLS, CONNECTIONS AND FOR INSPECTION.
- 20. PROVIDE REQUIRED TIMBER SHEETING, BRACING AND SHORING TO PROTECT SIDES OF EXCAVATION. DO NOT BRACE SHEETING AGAINST PIPE. PROVIDE SUITABLE LADDERS FOR SAFE ENTRY TO AND EXIT FROM EXCAVATION.
- 21. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE PILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF TRENCHES TO AVOID OVERLOADING, AND TO PREVENT SLIDES OR CAVE-INS.
- 22. WHEN WET EXCAVATION IS ENCOUNTERED. THE TRENCH SHALL BE DE-WATERED UNTIL THE PIPE HAS BEEN LAID AND BACKFILLED TO A POINT AT LEAST 1 FOOT
- 23. MANHOLES AND CATCH BASINS SHALL BE CONSTRUCTED OF BRICK, CONCRETE MASONRY UNITS OR PRE-CAST CONCRETE WITH CAST IRON FRAMES, COVERS AND
- 24. THE WALL THICKNESS OF MANHOLES AND CATCH BASINS CONSTRUCTED OF VARIOUS MATERIALS AND SET AT VARIOUS DEPTHS SHALL MEET THESE MINIMUMS. ADHERE TO REQUIREMENTS OF THE GOVERNING AGENCY IF THEY EXCEED THESE THICKNESSES:

•	<u>DEPTH</u>	BRICK.	CONCRETE BLOCK	PRE-CAS
•	0' - 10'	8"	6"	6"
•	10' - 16'	12"	8"	8"
•	16' – 25'	16"	12 <b>"</b>	12"

ALL OTHER SHEETING BRACING AND SHORING.

ABOVE TOP OF PIPE.

MANHOLE STEPS.

- 25. WHENEVER EXISTING MANHOLES OR SEWER PIPE ARE TO BE TAPPED, DRILL HOLES 4" CENTER, TO CENTER, AROUND THE PERIPHERY OF OPENINGS TO CREATE A PLANE OF WEAKNESS JOINT BEFORE BREAKING SECTION OUT.
- 26. MANHOLE STEPS SHALL BE BUILT INTO AND THOROUGHLY ANCHORED TO WALLS. STEPS SHALL BE FACTORY INSTALLED IN PRE-CAST STRUCTURES.
- 27. ALL PIPING ENTERING OR LEAVING DRAINAGE STRUCTURES SHALL BE ADEQUATELY SUPPORTED BY POURED IN-PLACE CONCRETE FILL FROM PIPE CENTER TO UNDISTURBED GROUND.
- 28. SET FRAMES IN FULL BED OF STIFF MORTAR OR BITUMINOUS MASTIC JOINTING COMPOUND AT FINAL ELEVATION.
- 29. ALL TIMBER SHEETING BELOW A PLANE 12" ABOVE TOP OF PIPE SHALL REMAIN IN PLACE IN ORDER NOT TO DISTURB PIPE GRADING. BEFORE BACKFILLING, REMOVE
- 30. BEDDING USED FOR TRENCH BOTTOM SHALL BE EXTENDED UP THE SIDES AND CAREFULLY PLACED AROUND AND OVER PIPE IN 6" MAXIMUM LAYERS. EACH LAYER SHALL BE THOROUGHLY AND CAREFULLY COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS PER ASTM D-1557 (MODIFIED PROCTOR) UNTIL 12" OF COVER
- 31. REMAINDER OF TRENCH SHALL BE BACKFILLED WITH SPECIFIED BACKFILL MATERIAL TO SPECIFIED SUBGRADE ELEVATION. BACKFILLING SHALL BE COMPACTED TO 90% OF MAXIMUM DRY DENSITY PER ASTM D-1557.
- 32. WITHIN 3' OF THE 45' INFLUENCE LINE OF THE SUBGRADE OF STREETS, DRIVES, PARKING LOTS AND OTHER AREAS TO HAVE OR HAVING IMPROVED HARD SURFACES, BACKFILL SHALL BE MATERIAL SPECIFIED AND SHALL BE DEPOSITED IN 6" LOOSE LAYERS AT OPTIMUM MOISTURE CONTENT (±2%) COMPACTED TO 95% OF MAXIMUM DRY DENSITY PER ASTM D1557. (MODIFIED PROCTOR) SUITABLE MATERIALS FOUND ON SITE MAY BE USED.
- 33. BEFORE BACKFILLING AROUND DRAINAGE STRUCTURES, ALL FORMS, TRASH AND DEBRIS SHALL BE REMOVED AND CLEARED AWAY. SELECTED EXCAVATED MATERIAL SHALL BE PLACED SYMMETRICALLY ON ALL SIDES IN 8" MAXIMUM LAYERS; EACH LAYER SHALL BE MOISTENED AND COMPACTED WITH MECHANICAL OR HAND TAMPERS.
- 34. AFTER INSTALLATION OF PIPES AND DRAINAGE STRUCTURES, CLEAN THEM, AND ADJUST TOPS TO FINISH GRADE. PIPE SHALL BE STRAIGHT BETWEEN STRUCTURES, WITH THE FULL INSIDE DIAMETER VISIBLE WHEN SIGHTING BETWEEN

35. ENDS OF HEADWALL AND END SECTIONS FOR PIPES LARGER THAN 6 INCHES.

SHALL BE FITTED WITH A #4 ROUND MINIMUM WELDED STEEL ROD GRATING. RODS

JOINTS, COMPACTED AS IT GOES, TRUE TO LINE. ALL JOINTS SHALL BE FILLED

- SHALL BE SPACED 6" O.C. MAXIMUM. WELD ROD AT ALL INTERSECTIONS. GRATE SHALL BE REMOVABLE FOR ACCESS AND CLEANING. 36. RIP-RAP SHALL BE LAID FROM THE BOTTOM UPWARD; STONES SHALL BE LAID BY HAND WITH 8" MINIMUM DIMENSION PERPENDICULAR TO GRADE WITH WELL-BROKEN
- WITH CEMENT MORTAR. SURFACE STONE TO BE EXPOSED. CLEAN JOINTS WITH 37. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO.

OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.

38. ALL CONNECTIONS TO EXISTING SEWERS SHALL BE PER MUNICIPAL REQUREMENTS, AND ALL COSTS INCLUDING TESTING AND/OR VIDEO OF SEWERS SHALL BE INCIDENTAL TO THE JOB.

THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS ing Grou 298 VETERANS DRIVE FOWLERVILLE.

MICHIGAN 48836 (OFFICE) 517-223-3512 MONUMENTENGINEERING.COI SERVICE DISABLED VETERAN OWNI SMALL BUSINESS (SDVOSB)

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One-Call Notification Organization 1-800-482-7171 www.missdig.org THE LOCATIONS AND ELEVATIONS EXISTING UNDERGROUND UTILITIES AS SHO DISTRIBUTION OF THE STATE OF THE COMPLETENCES OF THE COMPLETENCES OF THE COMPLETENCES OF THE CONTRACT SHALL BE EXCLUSIVELY RESPONSIBLE FOR THE EXACT UTILITY LOCATION AND ELEVATIONS PRIOR TO THE START ON STATE OF THE START ON STATE ON

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OLD GLORY CAR WAS FOWLERVILLE, MI 4883 POC: MATT MARTIN 517-375-0555

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ORIGINAL ISSUE DATE:

PROJECT NO: 22-177 SCALE: N/A

> 1/2" FIELD: DRAWN BY: DC DESIGN BY: CHECK BY: AP

#### GRADING AND EARTHWORK **SPECIFICATIONS**

- ALTHOUGH A SUB-SURFACE INVESTIGATION MAY HAVE BEEN MADE BY THE OWNER, THE BIDDER AND ANY SUB-CONTRACTORS SHALL MAKE A PERSONAL INVESTIGATION OF SITE AND EXISTING SURFACE AND SUB-SURFACE CONDITIONS. THE CONTRACTOR IS RESPONSIBLE TO ACQUAINT HIMSELF WITH CONDITIONS OF THE WORK AREA. THE CONTRACTOR IS ADVISED TO DETERMINE THE SUB-SURFACE SOIL CONDITIONS AND GROUND WATER CONDITIONS TO HIS OWN SATISFACTION PRIOR TO BIDDING. NO MODIFICATIONS TO THE UNIT PRICES BID FOR ANY ITEM WILL BE MADE DUE TO VARIABLE SUB-SURFACE CONDITIONS. DEWATERING, I DETERMINED NECESSARY BY THE CONTRACTOR, BY WELL POINTING OR DEEP WELLS WILL BE INCIDENTAL TO THE INSTALLATION COST OF THE ITEM.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING DETERMINED TO HIS SATISFACTION PRIOR TO THE SUBMISSION OF HIS BID THE CONFIRMATION OF THE GROUND. THE CHARACTER AND QUALITY OF THE SUBSTRATA, THE TYPES AND QUANTITIES OF MATERIALS TO BE ENCOUNTERED. THE NATURE OF THE GROUNDWATER CONDITIONS. THE PROSECUTION OF THE WORK, THE GENERAL AND LOCAL CONDITIONS INCLUDING RECENT CLIMATIC CHANGES. THE TIME OF YEAR IN WHICH CONSTRUCTION WILL TAKE PLACE AND ALL OTHER MATTERS WHICH CAN IN ANY WAY AFFECT THE WORK UNDER THIS CONTRACT.
- PRIOR TO COMMENCING THE EXCAVATION THE CONTRACTOR SHALLSUBMIT A PLAN OF HIS PROPOSED OPERATIONS AND TIME SCHEDULE TO THE OWNER & OWNERS REPRESENTATIVE FOR THEIR APPROVAL.
- THE CONTRACTOR SHALL CONSIDER, AND HIS PLAN FOR EXCAVATION SHALL REFLECT, THE EQUIPMENT AND METHODS TO BE EMPLOYED IN THE EXCAVATION AND WHAT METHODS WILL BE USED WHEN WET CONDITIONS ARE ENCOUNTERED REQUIRING GROUNDWATER CONTROL OR OTHER MOISTURE CONDITIONING. CONTRACTOR SHALL SUBMIT AN OUTLINE OF HIS EARTHWORK METHODS WHICH SHALL TAKE INTO ACCOUNT THE OVERALL CONSTRUCTION SCHEDULE. THE PRICES ESTABLISHED IN THE PROPOSAL FOR THE WORK TO BE DONE SHALL REFLECT ALL COSTS PERTAINING TO THE WORK. NO CLAIMS FOR EXTRAS BASED ON SUBSTRATA OR GROUNDWATER TABLE CONDITIONS OR MOISTURE CONDITIONING
- THE CONTRACTOR SHALL KEEP INFORMED AND THE OWNER'S REPRESENTATIVE INFORMED AT ALL TIMES AS TO A "FILL SURPLUS OR SHORTAGE" SITUATION. SHORTAGE OR SURPLUS OF SUITABLE MATERIAL AT THE CONCLUSION OF TH GRADING AND EARTHWORK OPERATION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND HE WILL BE REQUIRED TO SUPPLY THE DEFICIENCY OR DISPOSE OF THE SURPLUS WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL REMOVE VEGETATION, DEBRIS, UNSATISFACTORY SOIL MATERIALS, OBSTRUCTIONS, AND OTHER DELETERIOUS MATERIALS FROM GROUND SURFACE PRIOR TO CUT OR FILL OPERATIONS. SUCH MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR TO BE DISPOSED OF IN A LEGAL MANNER OFF
- MATERIALS FOR FILL OR BACKFILL REQUIRED TO GRADE THE SITE AND ACHIEVE DESIGN ELEVATIONS SHALL BE EITHER ON OR OFF-SITE SOILS WHICH ARE FREE OF ORGANIC MATTER AND DEBRIS. NO TOPSOIL SHALL BE USED AS ENGINEERED
- 8. NO FILL MAY BE PLACED UNTIL THE EXPOSED SURFACES HAVE BEEN APPROVED BY THE GEOTECHNICAL ENGINEER. ALL FILL MATERIALS SHALL BE
- 9. IF ANY UNKNOWN SUBSURFACE STRUCTURES ARE ENCOUNTERED DURING CONSTRUCTION, THEY SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE AND DESIGN ENGINEER PRIOR TO PROCEEDING.
- 10. ALL FILL MATERIAL SHALL BE PLACED AND COMPACTED AT THE OPTIMUM MOISTURE CONTENT OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- 11. NO FROZEN MATERIAL SHALL BE USED AS FILL NOR WILL ANY FILL BE PLACED ON A FROZEN BASE.
- 12. NO ROCK OR SIMILAR MATERIAL GREATER THAN 6" DIAMETER SHALL BE PLACED IN THE FILL UNLESS RECOMMENDATIONS FOR SUCH PLACEMENT HAVE BEEN SUBMITTED BY THE GEOTECHNICAL ENGINEER IN ADVANCE AND APPROVED BY THE OWNER AND OWNER'S REPRESENTATIVE.
- 13. COMPACT FILL MATERIAL TO AT LEAST THE FOLLOWING PERCENTAGE OF MAXIMUM DRY DENSITY, AS DETERMINED BY ASTM D-1557 (MODIFIED PROCTOR). NO DEVIATION FROM THESE COMPACTION DENSITIES WILL BE ALLOWED UNLESS SPECIFICALLY RECOMMENDED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE OWNER AND OWNER'S REPRESENTATIVE.
- % OF MAXIMUM DRY DENSITY FILL AREAS
- FILL UNDER BUILDING (EXTENDING 5' BEYOND FOOTINGS AT A SLOPE OF 1 ON 1)
- FILL UNDER PAVEMENT OR SIDEWALKS FILL PLACED UNDER OR BEHIND
- RETAINING WALLS ALL OTHER FILL
- 14. ALL FILL MATERIAL SHALL BE PLACED AND COMPACTED IN LIFTS, THAT WILL NOT EXCEED THE DEPTH IN WHICH THE COMPACTION EQUIPMENT CAN ACHIEVE THE MAXIMUM DENSITY REQUIRED FOR THE ENTIRE DEPTH OF THE MATERIAL PLACED IN
- 15. ALL AREAS WHERE FILL HAS BEEN PLACED OR THE EXISTING SOILS HAVE BEEN DISTURBED SHALL BE SUBJECT TO COMPACTION TESTING BY THE GEOTECHNICAL ENGINEER AND SHALL BE TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER, OWNER AND OWNER'S REPRESENTATIVE.
- 16. FILL MATERIAL UNDER PAVEMENTS OR STRUCTURES SHALL BE FREE OF ORGANIC OR DELETERIOUS MATERIALS. IT SHALL BE SUITABLE FOR SUPPORTING PAVEMENTS AND STRUCTURES WITHOUT ADVERSE SHRINKING OR SWELLING.
- 17. FILL MATERIAL IN BERMS AND LANDSCAPE AREAS SHALL BE SUITABLE TO SUPPORT GROWTH OF THE LANDSCAPING MATERIALS (TYPICAL FOR THE LOCAL CLIMATE) AND AS PROPOSED BY THE LANDSCAPE ARCHITECT.
- 18. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF, IN A LEGAL MANNER, ANY TREES, BRUSH OR DEBRIS THAT ARE WITHIN THE DESIGNATED CUTTING AND FILLING AREAS TO BRING THE SITE TO PROPOSED
- 19. THE CONTRACTOR SHALL STOCKPILE EXCAVATED MATERIAL ONLY IN DESIGNATED AREAS AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
- 20. DURING THE PERFORMANCE OF SITE GRADING OPERATIONS, THE SUBGRADE SHALL BE EXAMINED CRITICALLY, AND ANY AREAS DISCOVERED WHICH, IN THE OPINION OF THE OWNER'S REPRESENTATIVE OR GEOTECHNICAL ENGINEER. ARE SOFT AND LINSTABLE, SHALL BE FXCAVATED TO SUCH DEPTHS AS MAY BE NECESSARY TO INSURE SATISFACTORY SUPPORTING PROPERTIES AS DETERMINED BY THE GEOTECHNICAL ENGINEER. THESE AREAS OF EXCAVATION SHALL BE BACKFILLED IMMEDIATELY AND SHALL BE BROUGHT BACK TO THE ELEVATION OF THE SURROUNDING AREAS WITH APPROVED FILL MATERIAL AND IN ACCORDANCE WITH THE EARTH FILL CONSTRUCTION PROCEDURE.
- 21. NEWLY GRADED AREAS SHALL BE PROTECTED FROM THE ACTION OF THE ELEMENTS. ANY SETTLEMENT, DISPLACEMENT, PONDING OR WASHING OUT THAT MAY OCCUR PRIOR TO COMMENCING THE NEXT PHASE OF CONSTRUCTION SHALL BE REPAIRED, AND GRADES REESTABLISHED TO THE REQUIRED ELEVATIONS AND
- 22. THE FINISHED SUBGRADE SURFACE SHALL BE SHAPED TO INDICATED PROFILES AND SHALL BE REASONABLY SMOOTH AND FREE FROM IRREGULAR SURFACE CHANGES AND SHALL BE NO MORE THAN 1 INCH ABOVE OR BELOW THE INDICATED SUBGRADE ELEVATIONS.
- 23. THE GRADING CONTRACTOR SHALL BACKFILL ALL PARKING LOT PLANTERS AND LAWN AREAS TO WITHIN 2 INCHES OF THE TOP ADJACENT CURB GRADES. THE TOP 4 INCHES MINIMUM SHALL BE TOPSOIL, FREE FROM DEBRIS AND STONES LARGER THAN 1 INCH IN DIAMETER
- 24. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY PUMPS, DITCHING, WELL POINT SYSTEMS AND OTHER MEANS FOR REMOVING WATER FROM EXCAVATIONS. TRENCHES, SUBGRADES AND OTHER PARTS OF THE WORK. THE CONTRACTOR SHALL CONTINUE DE-WATERING OPERATIONS UNTIL THE WATER HAS BEEN REMOVED ENTIRELY. UPON COMPLETION OF WATER REMOVAL THE CONTRACTOR SHALL TAKE APPROPRIATE ACTION TO DRY THE SOILS, REGRADE TO PROPOSED ELEVATIONS AND COMPACT SOILS TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER AND OWNER'S REPRESENTATIVE
- 25. THE CONTRACTOR SHALL DISPOSE OF WATER IN A SAFE AND SANITARY WAY TO PREVENT FLOODING OR INJURY TO PUBLIC OR PRIVATE PROPERTY AND SHALL OBTAIN APPROVAL OF THE LOCAL GOVERNING AUTHORITY BEFORE DISCHARGING RUN-OFF WATER TO THEIR SYSTEM. SEE EROSION CONTROL NOTES FOR ADDITIONAL REQUIREMENTS.
- 26. THE CONTRACTOR SHALL PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING GRADES AND NEW GRADES.

#### BITUMINOUS PAVING SPECIFICATIONS

- REFERENCE SPECIFICATIONS WHERE APPLICABLE TO WORK UNDER THIS SECTION ARE REFERRED TO BY ABBREVIATION AS FOLLOWS:
  - A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO).
  - B. THE ASPHALT INSTITUTE (TAI)
  - C. MICHIGAN DEPARTMENT OF TRANSPORTATION/ CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION (MDOT)
  - D. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)
- AGGREGATE BASE COURSE SHALL MEET THE REQUIREMENTS OF SECTION 902 OF THE MDOT STANDARD SPECIFICATION FOR CONSTRUCTION AND SHALL CONSIST OF 21AA CRUSHED AGGREGATE. THE USE OF SLAG IS PROHIBITED.
- TACK COAT SHALL BE EMULSIFIED ASPHALT MEETING REQUIREMENTS OF MOOT SECTION 904. GRADE CSS-1H.
- 4. AGGREGATE SHALL CONSIST OF CRUSHED STONE, CRUSHED GRAVEL, A MIXTURE OF UNCRUSHED GRAVEL WITH EITHER CRUSHED STONE OR CRUSHED GRAVEL, OF OTHER INERT MATERIAL HAVING SIMILAR CHARACTERISTICS. IT SHALL BE COMPOSED OF CLEAN, TOUGH, DURABLE FRAGMENTS FROM AN EXCESS OF FLAT OR ELONGATED PIECES, AND SHALL BE FREE OF ORGANIC MATTER AND DELETERIOUS SUBSTANCES AND MEET THE REQUIREMENTS OF MDOT STANDARD SPECIFICATIONS, SECTION 902, 21AA. CONTRACTOR MAY USE CRUSHED HMA AGGREGATE SCREENED TO MEET THE REQUIREMENTS OF MDOT 21AA MATERIAL.
- 5. FINE AGGREGATE SHALL BE WELL GRADED FROM COARSE TO FINE AND CONSIST OF NATURAL SAND, STONE SCREENINGS, OR A BLEND OF NATURAL SAND AND STONE SCREENINGS. IT SHALL BE COMPOSED OF ROUGH SURFACED AND ANGULAR GRAINS OF QUARTZ OR OTHER HARD DURABLE ROCK AND MEET THE REQUIREMENTS OF MDOT STANDARD SPECIFICATIONS, SECTION 902 FOR CLASS II OR CLASS III GRANULAR MATERIAL. CONTRACTOR MAY USE CRUSHED HMA AGGREGATE SCREENED TO MEET THE REQUIREMENTS OF MDOT CLASS II OR CLASS
- ASPHALT CEMENT SHALL COMPLY WITH THE REQUIREMENTS OF MDOT SECTION
- 7. HOT MIXED ASPHALT (HMA) SHALL COMPLY WITH MDOT SECTION 501 OF STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- 8. BITUMINOUS LEVELING COURSE SHALL BE MDOT HMA, 13A, UNLESS OTHERWISE REQUIRED BY THE MUNICIPALITY OR ROAD AGENCY WITH JURISDICTION.
- 9. BITUMINOUS WEARING COURSE SHALL BE MDOT HMA, 36A UNLESS OTHERWISE REQUIRED BY THE MUNICIPALITY OR ROAD AGENCY WITH JURISDICTION. CONTRACTOR MAY SUBSTITUTE 13A WITH THE APPROVAL OF THE OWNER AND
- 10. THE CONTRACTOR SHALL SUBMIT, TO THE OWNER, TWO COPIES OF MATERIALS CERTIFICATES SIGNED BY MATERIAL PRODUCER AND CONTRACTOR. CERTIFICATES SHALL STATE THAT EACH MATERIAL ITEM MEETS SPECIFIED REQUIREMENTS.
- 11. THE CONTRACTOR SHALL SUBMIT TO THE GEOTECHNICAL ENGINEER, JOB-MIX FORMULAS FOR EACH REQUIRED ASPHALT AGGREGATE MIXTURE. MIX DESIGNS SHALL BE WITHIN ALLOWABLE TOLERANCES AS SPECIFIED BY MDOT FOR THE PARTICULAR APPLICATION.
- 12. SUBGRADE PREPARATIONS SHALL CONSIST OF THE FINAL MACHINING OF THE SUBGRADE IMMEDIATELY PRIOR TO PLACING THE BITUMINOUS BASE COURSE. THE SUBGRADE SHALL BE COMPACTED PER PLANS AND DETAILS. THE SUBGRADE SHALL BE TRUE TO LINE AND GRADE.
- 13. CRUSHED AGGREGATE BASE COURSE SHALL BE COMPACTED TO A DENSITY EQUAL TO AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 (MODIFIED PROCTOR).
- 14. BITUMINOUS CONCRETE PAVEMENT CONSTRUCTION METHODS SHALL CONFORM TO APPLICABLE PORTIONS OF SECTION 501 OF THE MDOT STANDARD SPECIFICATIONS
- 15. THE CONTRACTOR SHALL NOT PLACE THE AGGREGATE BASE COURSE OR THE BITUMINOUS BASE COURSE PRIOR TO THE APPROVAL OF THE SUBGRADE BY THE
- 16. EACH LIFT AND COURSE OF BITUMINOUS CONCRETE SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER, PRIOR TO THE PLACEMENT OF A SUCCEEDING COURSE
- 17. APPLY BITUMINOUS TACK COATS ONLY WHEN TEMPERATURE HAS NOT BEEN BELOW 35 DEGREES F. FOR 12 HOURS IMMEDIATELY PRIOR TO APPLICATION. CONSTRUCT BITUMINOUS CONCRETE WEARING COURSE ONLY WHEN ATMOSPHERIC OR LIFT IS CLEAN AND DRY. BASE COURSE MAY BE LAID WHEN TEMPERATURE IS ABOVE 35 DEGREES F. AND RISING AND APPROVED BY THE GEOTECHNICAL
- 18. THE BITUMINOUS CONCRETE SHALL BE TRANSPORTED FROM THE MIXING PLANT TO THE POINT OF USE IN VEHICLES CONFORMING TO THE REQUIREMENTS OF SECTION 501 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. DELIVERIES SHALL BE SCHEDULED SO THAT SPREADING AND ROLLING OF ALL BITUMINOUS CONCRETE PREPARED FOR ONE DAY'S RUN CAN BE COMPLETED DURING DAYLIGHT. UNLESS ADEQUATE ARTIFICIAL LIGHTING IS PROVIDED. HAULING OVER FRESHLY PLACED BITUMINOUS MAT SHALL NOT BE PERMITTED UNTIL THE BITUMINOUS CONCRETE HAS BEEN COMPACTED, AS SPECIFIED, AND ALLOWED TO COOL TO ATMOSPHERIC TEMPERATURE.
- 19. UPON ARRIVAL, THE BITUMINOUS CONCRETE SHALL BE SPREAD TO A THICKNESS NOT TO EXCEED 3-INCHES AND TO THE FULL WIDTH BY AN APPROVED BITUMINOUS PAVER. IT SHALL BE STRUCK OFF IN A UNIFORM LAYER OF SUCH DEPTH THAT, WHEN THE WORK IS COMPLETED, IT SHALL HAVE THE REQUIRED THICKNESS AND CONFORM TO THE GRADE AND CONTOUR INDICATED. THE SPEED OF THE PAVER SHALL BE REGULATED TO ELIMINATE PULLING AND TEARING OF THE RITUMINOUS MAT. LINESS OTHERWISE DIRECTED, PLACEMENT OF THE BITUMINOUS CONCRETE SHALL BEGIN ALONG THE CENTERLINE OF A CROWNED SECTION OR ON THE HIGH SIDE OF AREAS WITH A ONE—WAY SLOPE. THE BITUMINOUS CONCRETE SHALL BE PLACED IN CONSECUTIVE ADJACENT STRIPS HAVING A MINIMUM WIDTH OF 10 FEET, EXCEPT WHERE EDGE LANES REQUIRE LESS WIDTH TO COMPLETE THE AREA. TRANSVERSE JOINTS IN ADJACENT LANES SHALL BE OFFSET A MINIMUM OF 10 FEET. WHERE POSSIBLE, JOINTS SHALL BE LOCATED AT THE LANE EDGES.
- 20. ON AREAS WHERE IRREGULARITIES OR UNAVOIDABLE OBSTACLES MAKE THE USE OF MECHANICAL SPREADING AND FINISHING EQUIPMENT IMPRACTICAL, THE BITUMINOUS CONCRETE MAY BE SPREAD AND RAKED BY HAND TOOLS.
- 21. THE BITUMINOUS CONCRETE SHALL BE PLACED AT A TEMPERATURE OF NOT LESS THAN 250 NOR HIGHER THEN THE RECOMMENDED TEMPERATURE OF THE BINDER PRODUCER OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- 22. THE BITUMINOUS CONCRETE MIXTURE SHALL BE THOROUGHLY AND UNIFORMLY COMPACTED BY ROLLING. THE SURFACE SHALL BE ROLLED WHEN THE BITUMINOUS MAT HAS ATTAINED SUFFICIENT STABILITY SO THAT THE ROLLING DOES NOT CAUSE UNDUE DISPLACEMENT, CRACKING AND SHOVING. THE SEQUENCE OF ROLLING OPERATIONS SHALL BE AT THE DISCRETION OF THE
- 23. THE SPEED OF THE ROLLER SHALL, AT ALL TIMES, BE SUFFICIENTLY SLOW TO AVOID DISPLACEMENT OF THE HOT BITUMINOUS CONCRETE. ANY DISPLACEMENT OCCURRING AS A RESULT OF REVERSING THE DIRECTION OF THE ROLLER, OR FROM ANY OTHER CAUSE, SHALL BE CORRECTED AT ONCE. 24. SUFFICIENT ROLLERS SHALL BE FURNISHED TO HANDLE THE OUTPUT OF THE PLANT. ROLLING SHALL CONTINUE UNTIL ALL ROLLER MARKS ARE ELIMINATED,
- THE SURFACE IS OF UNIFORM TEXTURE AND TRUE TO GRADE AND CROSS-SECTION, AND THE REQUIRED FIELD DENSITY IS OBTAINED. 25. TACK COAT SHALL BE APPLIED TO THE SURFACE OF PREVIOUS LIFTS AND
- COURSES OF BITUMINOUS CONCRETE AND TO SURFACES ABUTTING OR PROJECTING INTO THE BITUMINOUS CONCRETE. 26. IMMEDIATELY BEFORE PLACING A SUCCEEDING LIFT OR COURSE OF BITUMINOUS

CONCRETE THE PRECEDING LIFT OR COURSE SHALL BE CLEARED OF ANY DEBRIS

- OR STANDING WATER BY APPROPRIATE METHODS. 27. TO PREVENT ADHESION OF THE BITUMINOUS CONCRETE TO THE ROLLER, THE WHEELS SHALL BE KEPT PROPERLY MOISTENED, BUT EXCESSIVE WATER WILL NOT
- 28. IN AREAS NOT ACCESSIBLE TO THE ROLLER, THE BITUMINOUS CONCRETE SHALL
- BE THOROUGHLY COMPACTED WITH HOT HAND TAMPERS. 29. ANY BITUMINOUS CONCRETE THAT BECOMES LOOSE AND BROKEN, MIXED WITH DIRT. OR IN ANY WAY DEFECTIVE SHALL BE REMOVED AND REPLACED WITH FRESH

HOT BITUMINOUS CONCRETE AND IMMEDIATELY COMPACTED TO CONFORM TO THE

30. THE CONTRACTOR SHALL PROVIDE AT LEAST TWO ROLLERS FOR EACH PAVER OPERATING ON THE WORK. THE CONTRACTOR SHALL USE ADDITIONAL ROLLERS AS REQUIRED TO OBTAIN THE SPECIFIED PAVEMENT DENSITY.

SURROUNDING AREA. THIS WORK SHALL BE DONE AT THE CONTRACTOR'S

EXPENSE. SKIN PATCHING SHALL NOT BE ALLOWED.

## BITUMINOUS PAVING SPECIFICATIONS.

- 31. THE CONTRACTOR SHALL CAREFULLY MAKE JOINTS BETWEEN OLD AND NEW PAVEMENTS, OR BETWEEN SUCCESSIVE DAYS' WORK, TO ENSURE A CONTINUOUS BOND BETWEEN ADJOINING WORK. CONSTRUCT JOINTS TO HAVE THE SAME TEXTURE, DENSITY AND SMOOTHNESS AS OTHER SECTIONS OF THE BITUMINOUS CONCRETE COURSE. THE CONTRACTOR SHALL CLEAN CONTACT SURFACES OF SAND, DIRT, OR OTHER OBJECTIONABLE MATERIAL AND APPLY TACK COAT BEFORE
- 32. THE CONTRACTOR SHALL TEST THE FINISHED SURFACE OF EACH BITUMINOUS CONCRETE COURSE FOR SMOOTHNESS, USING A 10 FOOT STRAIGHTEDGE APPLIED PARALLEL WITH AND AT RIGHT ANGLES TO CENTERLINE OF PAVED AREA. SURFACE SHALL NOT BE ACCEPTABLE IF EXCEEDING THE FOLLOWING TOLERANCES FOR SMOOTHNESS.
  - A. LEVELING COURSE SURFACE: 1/4 INCH, PLUS OR MINUS 1/4 INCH.
  - B. SURFACE COURSE: 1/4 INCH
- 33. THE CONTRACTOR SHALL TEST CROWNED SURFACES WITH A CROWN TEMPLATE, CENTERED AND AT RIGHT ANGLES TO THE CROWN. SURFACES WILL NOT BE ACCEPTABLE IF THE FINISHED CROWN SURFACES VARY MORE THAN 1/4 INCH FROM THE CROWN TEMPLATE.
- 34. AFTER FINAL ROLLING, THE CONTRACTOR SHALL NOT PERMIT VEHICULAR TRAFFIC ON THE BITUMINOUS CONCRETE PAVEMENT UNTIL IT HAS COOLED AND HARDENED, AND IN NO CASE SOONER THAN SIX HOURS OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- 35. THE AGGREGATE BASE MUST EXTEND A MINIMUM OF 1' BEHIND THE BACK-OF-CURB OR BEYOND EDGE OF PAVEMENT WHEN NO CURB IS PROPOSED.

#### CONCRETE CURB, SIDEWALK AND PAVEMENT SPECIFICATIONS

- 1. THESE SPECIFICATIONS SHALL GOVERN THE CONSTRUCTION OF ALL PAVEMENTS, CURB AND GUTTER. SIDEWALKS, SERVICE WALKS, DRIVEWAY APPROACHES, AND LOADING DOCK AREAS, AS INDICATED ON THE DRAWINGS.
- 2. REFERENCE SPECIFICATIONS WHERE APPLICABLE TO WORK UNDER THIS SECTION ARE REFERRED BY ABBREVIATION AS FOLLOWS:
  - A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO).
  - B. AMERICAN CONCRETE INSTITUTE (ACI)
  - C. MICHIGAN DEPARTMENT OF TRANSPORTATION/ CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION (MDOT)
- D. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) THE FINE AGGREGATE SHALL MEET ALL REQUIREMENTS OF SECTION 902 OF OF
- MDOT SPECIFICATION FOR NO. 2NS NATURAL SAND. THE COARSE AGGREGATE SHALL MEET ALL REQUIREMENTS OF SECTION 902 OF
- M.D.O.T. SPECIFICATIONS FOR 6AA COARSE AGGREGATE THE CONTRACTOR SHALL SUBMIT, TO THE OWNER, TWO COPIES OF MATERIALS
- CERTIFICATES SIGNED BY MATERIAL PRODUCER AND CONTRACTOR. CERTIFICATES SHALL STATE THAT EACH MATERIAL ITEM MEETS SPECIFIED REQUIREMENTS. THE CONTRACTOR SHALL SUBMIT. TO THE GEOTECHNICAL ENGINEER. JOB
- MIX-FORMULAS FOR EACH REQUIRED CEMENT-AGGREGATE MIXTURE. MIX DESIGNS SHALL BE WITHIN ALLOWABLE TOLERANCES AS SPECIFIED FOR THE PARTICULAR
- CONCRETE MIX SHALL BE AIR-ENTRAINED AND PROPORTIONED TO PROVIDE THE FOLLOWING:
- A. COMPRESSIVE STRENGTH AT 28 DAYS: 3500 PSI MIN., OR AS INDICATED
- B. TOTAL AIR CONTENT BY VOLUME: 5% TO 8%.
- C. SLUMP 3 INCH MAXIMUM, OR AS INDICATED ON PLANS. THE CONTRACTOR SHALL AT HIS EXPENSE FURNISH SAMPLES OF FRESH CONCRETE AND PROVIDE SAFE AND SATISFACTORY FACILITIES FOR OBTAINING THE
- 9. CONSTRUCT CONCRETE CURBING ONLY WHEN GROUND TEMPERATURE IS ABOVE 35 DEGREES F. AND BASE IS DRY.
- 10. ALL CEMENT USED IN CURB CONSTRUCTION SHALL BE PORTLAND CEMENT, TYPE I OR IA ASTM C-150.
- 11. WATER USED IN CONCRETE SHALL MEET THE REQUIREMENTS OF MDOT SECTION
- 12. AIR ENTRAINING ADMIXTURE SHALL BE SELECTED FROM THE MDOT QUALIFIED
- 13. ALL READY-MIXED CONCRETE SUPPLIERS MUST BE APPROVED BY THE OWNER AND MEET THE CURRENT REQUIRMENTS OF THE NATIONAL READY MIX CONCRETE ASSOCIATION (NRMCA). IF REQUESTED BY THE OWNER, SUBMIT A WRITTEN DESCRIPTION OF PROPOSED READY-MIXED CONCRETE MANUFACTURER, GIVING QUALIFICATIONS OF PERSONAL, LOCATION OF BATCHING PLANT, LIST OF PROJECTS SIMILAR IN SCOPE OF SPECIFIED WORK, AND OTHER INFORMATION AS MAY BE REQUESTED BY THE OWNER.
- 14. THE CONTRACTOR SHALL SUBMIT A STATEMENT OF PURCHASE FOR READY-MIXED CONCRETE: PRIOR TO ACTUAL DELIVERY OF CONCRETE, SUBMIT TO THE GEOTECHNICAL ENGINEER FOUR COPIES OF STATEMENT OF PURCHASE, GIVING THE DRY WEIGHTS OF CEMENT AND SATURATED SURFACE DRY WEIGHTS OF FINE AND COARSE AGGREGATES AND QUANTITIES, TYPE AND NAME OF ADMIXTURES (IF ANY) AND OF WATER PER CU.YD., THAT WILL BE USED IN THE MANUFACTURE OF THE CONCRETE. THE CONTRACTOR SHALL ALSO FURNISH EVIDENCE SATISFACTORY TO THE GEOTECHNICAL ENGINEER THAT THE MATERIALS TO BE USED AND PROPORTIONS SELECTED WILL PRODUCE CONCRETE OF THE QUALITY SPECIFIED. WHATEVER STRENGTHS ARE OBTAINED, THE QUANTITY OF CEMENT USED SHALL NOT BE LESS THAN THE MINIMUM SPECIFIED.
- 15. READY-MIXED CONCRETE DELIVERY TICKETS: SUBMIT ONE COPY OF EACH DELIVERY TICKET TO THE GEOTECHNICAL ENGINEER AND CONTRACTOR IN ACCORDANCE WITH SECTION 16 OF ASTM C94.
- 16. READY-MIXED CONCRETE SHALL BE BATCHED, MIXED AND TRANSPORTED IN ACCORDANCE WITH ASTM C94, AND COMPLY WITH ACI 304 "RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE," EXCEPT AS OTHERWISE SPECIFIED HEREIN.
- 17. READY-MIXED CONCRETE SHALL BE MIXED AND DELIVERED TO THE POINT OF DISCHARGE AT THE JOB BY MEANS OF A READY MIX CONCRETE TRUCK.
- 18. NO WATER FROM THE TRUCK WATER SYSTEM OR ELSEWHERE SHALL BE ADDED AFTER THE INITIAL INTRODUCTION OF THE MIXING WATER FOR THE BATCH. UNDER NO CIRCUMSTANCES SHALL THE APPROVED MAXIMUM WATER CONTENT BE EXCEEDED NOR SHALL THE SLUMP EXCEED THE MAXIMUM SPECIFIED.
- 19. DISCHARGE OF THE CONCRETE SHALL BE COMPLETED WITHIN 1-1/2 HOURS OR BEFORE THE DRUM HAS REVOLVED 300 REVOLUTIONS, WHICHEVER COMES FIRST, AFTER THE INTRODUCTION OF THE MIXING WATER TO THE CEMENT AND AGGREGATES OR THE INTRODUCTION OF THE CEMENT TO THE AGGREGATES.
- 20. IN HOT WEATHER (AIR TEMPERATURE 80-DEGREES F. AND ABOVE) OR UNDER CONDITIONS CONTRIBUTING TO QUICK STIFFENING OF THE CONCRETE, THE TIME SHALL BE REDUCED TO ONE HOUR.
- 21. CONCRETE DELIVERED IN COLD WEATHER (AIR TEMPERATURE 45-DEGREES F. AND LOWER) SHALL HAVE A TEMPERATURE NOT LESS THAN 60-DEGREES F. AT THE POINT OF DISCHARGE AT THE JOB, AND IN COMPLIANCE WITH ACI 306R "COLD WEATHER CONCRETING". CONCRETE PLACING WILL NOT BE PERMITTED WHEN THE AIR TEMPERATURE IS 35-DEGREES F. OR LOWER.
- 22. CONCRETE DELIVERED UNDER HOT WEATHER CONDITIONS CONTRIBUTING TO QUICK STIFFENING OF CONCRETE, OR IN AIR TEMPERATURE OF 80-DEGREES F. AND OVER, SHALL HAVE A TEMPERATURE BETWEEN 60- AND 80-DEGREES F. AT THE POINT OF DISCHARGE AT THE JOB, AND IN ACCORDANCE WITH ACI 305R "HOT WEATHER CONCRETING."
- 23. IN NO CASE SHALL THE MIXER OR TRUCK BE FLUSHED OUT ONTO THE STREET PAVEMENT, IN A CATCH BASIN OR SEWER MANHOLE, OR IN ANY PUBLIC RIGHT-OF-WAY. SEE SOIL EROSION CONTROL PLAN FOR CONCRETE WASHOUT
- 24. REINFORCEMENT BARS SHALL BE PER MDOT SECTION 905.
- 25. TIE WIRE SHALL BE BLACK, ANNEALED STEEL WIRE, NOT LESS THAN 16 GAUGE.

#### CONCRETE CURB, SIDEWALK AND PAVEMENT SPECIFICATIONS, CONTINUED

- 26. BAR SUPPORTS SHALL CONFORM TO THE BAR SUPPORT SPECIFICATIONS CONTAINED IN CONCRETE REINFORCING STEEL INSTITUTE'S (CRSI) "MANUAL OF STANDARD PRACTICE." PROVIDE CHAIRS, SPACERS AND OTHER DEVICES SUITABLE FOR PROPER SPACING SUPPORTING AND FASTENING REINFORCING BARS.
- 27. WHEN FORMS ARE USED AND THE CURB RADIUS IS LESS THAN 200 FEET. THE CURVED ALIGNMENT SHALL BE PROVIDED FOR BY EITHER STANDARD STEEL FORMS EQUIPPED WITH FLEXIBLE LINES OR BY FLEXIBLE FORMS. THE FORMS SHALL BE OF THE FULL DEPTH OF THE SECTION. CURB AND GUTTER FORMS SHALL BE SO CONSTRUCTED AS TO PERMIT THE INSIDE OF THE FORMS TO BE SECURELY FASTENED TO THE OUTSIDE FORMS.
- 28. ALL NEW CURB SHALL BE PLACED ONLY ON A PREPARED SUBGRADE, SMOOTH AND LEVELED TO THE GRADES ESTABLISHED BY THE ENGINEER.
- 29. COMPACT AND CUT-TO-GRADE SUBGRADE UNDER FORMS SO THAT FORMS WHEN SET WILL BE UNIFORMLY SUPPORTED FOR THE ENTIRE LENGTH. SECURELY STAKE AND BRACE OR TIE FORMS TO PREVENT LEAKAGE OF MORTAR. BRACING WITH
- 30. COAT SURFACES OF FORMS TO BE IN CONCRETE WITH A LIGHT CLEAR PARAFFIN OIL OR PARTING COMPOUND WHICH WILL NOT STAIN THE CONCRETE.

EARTH WILL NOT BE PERMITTED.

SO AS TO IMPART A ROUGH FINISH.

- 31. THE INTERIOR SURFACES OF CONCRETE CONVEYING EQUIPMENT SHALL BE MAINTAINED FREE OF HARDENED CONCRETE, DEBRIS, WATER, SNOW, ICE AND OTHER DELETERIOUS MATERIALS.
- 32. CURBING MAY BE CONSTRUCTED EITHER BY USE OF FORMS OR BY A MECHANICAL CURB AND GUTTER PAVER. PROVIDED THE REQUIRED FINISH, AND CROSS-SECTION, AS SHOWN ON DRAWINGS ARE OBTAINED. CONCRETE SHALL BE PLACED TO PROVIDE ONE COURSE MONOLITHIC STRUCTURE WITHOUT THE USE OF MORTAR TOPPING OR SAND-CEMENT DRIER. CONCRETE SHALL BE SPADED OR VIBRATED SUFFICIENTLY TO ENSURE SATISFACTORY CONSOLIDATION.
- 33. PROVIDE REINFORCEMENT FOR CONCRETE CURB AS SHOWN ON THE DRAWINGS. REINFORCEMENT SHALL BE KEPT CLEAN AND FREE FROM OBJECTIONABLE RUST BENDS OR KINKS IN REINFORCING BARS SHALL BE CORRECTED BEFORE PLACING. ALL REINFORCEMENT SHALL BE ACCURATELY LOCATED IN FORMS AND SECURELY HELD IN PLACE BEFORE AND DURING CONCRETE PLACING. BY SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.
- 34. THE CONCRETE CURB SURFACE SHALL BE STRUCK OFF THE REQUIRED CROSS-SECTION WITH A TEMPLATE. AFTER THE CONCRETE CURB HAS BEEN FLOATED TO AN EVEN SURFACE. THE CONTRACTION JOINT SHALL BE CUT AND ALL SLAB EDGES ROUNDED WITH A 1/2 INCH RADIUS EDGING TOOL THAT WILL FINISH TO A WIDTH OF 2 INCHES. AFTER THE CONCRETE HAS SLIGHTLY SET, A BROOM SHALL BE BRUSHED LIGHTLY ACROSS THE SURFACE PARALLEL TO FORMS
- 35. CONTRACTION JOINTS SHALL BE CUT IN CONCRETE CURBING AT MINIMUM 10' INTERVALS. THE JOINT SHALL CUT 1/4 INCH WIDE BY 1/3 THE DEPTH OF THE CONCRETE CURB SECTION. JOINTS SHALL ALSO BE LOCATED ADJACENT TO CURB
- 36. ISOLATION JOINTS SHALL BE PLACED IN CURBING AT TANGENT POINTS IN CURB RETURNS AT INTERSECTIONS, AT BOTH SIDES OF STRUCTURES LOCATED IN THE LINE AND IN RUNS OF CURB AT INTERVALS NOT EXCEEDING 400 FEET. ISOLATION JOINTS SHALL BE 1" THICK PRE-FORMED JOINT FILLER STRIPS. THE STRIPS SHALL EXTEND THE FULL DEPTH OF THE CONCRETE CURB SECTION. ISOLATION JOINTS SHALL BE PLACED IN CURB AT THE END OF EACH DAYS POUR AND WHEN ABUTTING PREVIOUSLY POURED CURB.
- 37. THE CURING COMPOUND SHALL BE A WHITE PARAFIN BASED COMPOUND SELECTED FROM MDOT'S QUALIFIED PRODUCTS LIST APPLIED AT 200 SQ/FT/GAL.
- 38. ALL CONTRACTION JOINTS IN CONCRETE CURB SECTIONS SHALL BE SEALED WITH EITHER HOT POURED JOINT SEALER OR COLD APPLIED JOINT SEALER.
- 39. SLIGHTLY UNDERFILL JOINT GROOVE WITH JOINT SEALER TO PREVENT EXTRUSION OF THE SEALER. REMOVE EXCESS JOINT SEALER MATERIALS AS SOON AFTER
- 40. FRESHLY PLACED CONCRETE SHALL BE PROTECTED AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE AT NOT LESS THAN 50 DEGREES F. NOR MORE THAN 80 DEGREES F. AND IN A MOIST CONDITION CONTINUOUSLY FOR TH PERIOD OF TIME NECESSARY FOR THE CONCRETE TO CURE. CHANGES IN TEMPERATURE OF THE CONCRETE DURING CURING SHALL BE AS UNIFORM AS POSSIBLE AND SHALL NOT EXCEED 5 DEGREES F. IN ANY ONE HOUR, NOR 50 DEGREES F. IN ANY 24 HOUR PERIOD.
- 41. COLD WEATHER PROTECTION: WHEN THE TEMPERATURE OF THE ATMOSPHERE IS 40-DEGREES F. AND BELOW, THE CONCRETE SHALL BE PROTECTED BY HEATING, INSULATION COVERING, OR COMBINATION THEREOF AS REQUIRED TO MAINTAIN THE IEMPERATURE OF THE CONCRETE AT OR ABOVE 50-DEGREES E. AND IN A MOIST CONDITION CONTINUOUSLY FOR THE CONCRETE CURING PERIOD. COLD WEATHER PROTECTION SHALL MEET THE REQUIREMENTS OF ACI 306R "COLD WEATHER
- 42. HOT WEATHER PROTECTION: WHEN THE TEMPERATURE OF THE ATMOSPHERE IS 90-DEGREES F. AND ABOVE, OR DURING OTHER CLIMATIC CONDITIONS WHICH WILL CAUSE TOO RAPID DRYING OF THE CONCRETE, THE CONCRETE SHALL BE PROTECTED BY WINDBREAKS, SHADING, FOG SPRAYING LIGHT COLORED MOISTURE RETAINING COVERING, OR A COMBINATION OF THEREOF AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE BELOW 80-DEGREE F. AND IN A MOIST CONDITION CONTINUOUSLY FOR THE CONCRETE CURING PERIOD. HOT WEATHER PROTECTION SHALL MEET THE REQUIREMENTS OF ACI 305R "HOT WEATHER
- 43. ALL FORMS, RAILS AND STAKES SHALL BE REMOVED WITHIN 24 HOURS AFTER PLACING THE CURB. EXPOSED EDGES OF CONCRETE SHALL BE IMMEDIATELY BACKFILLED OR SPRAYED WITH CURING COMPOUND
- 44. AFTER COMPLETION OF CONCRETE CURBING IN AN AREA, REMOVE ALL WEATHER PROTECTION MATERIALS, RUBBISH AND DEBRIS RESULTING FROM SPECIFIED WORK, SWEEP CONCRETE CURBS CLEAN, AND SEAL JOINTS.

45. ALL CEMENT USED IN SIDEWALK CONSTRUCTION SHALL BE PORTLAND CEMENT,

TYPE I OR IA ASTM C-150.

- 46. ALL NEW WALKS AND CONCRETE PAVEMENTS SHALL BE PLACED ONLY ON A PREPARED SUBGRADE, SMOOTHED AND LEVELED TO THE GRADES ESTABLISHED BY THE ENGINEER. IN CLAY SOILS THE SUBGRADE SHALL BE EXCAVATED 2-INCHES BELOW THE SIDEWALK BASE AND FILLED WITH APPROVED SAND MEETING MDOT CLASS II, SAND DESIGNATION.
- 47. CONSTRUCT CONCRETE SURFACE COURSE ONLY WHEN GROUND TEMPERATURE IS ABOVE 35 DEGREES F. AND BASE IS DRY.
- 48. SIDEWALKS SHALL PITCH TOWARD THE STREET OR AWAY FROM BUILDINGS WITH A MAXIMUM CROSS SLOPE OF 1/4-INCH PER FOOT OF WIDTH AND A MINIMUM CROSS SLOPE OF 1/8-INCH PER FOOT OF WIDTH. CROSS SLOPE DIRECTION TRANSITIONS SHALL BE ACCOMPLISHED IN LENGTHS OF 10 FEET OR LESS.
- 49. PRIOR TO PLACING THE CONCRETE, ALL DEBRIS, STONES, DIRT, ETC., SHALL BE REMOVED FROM THE SUBGRADE. THE SUBGRADE SHALL BE MOISTENED WITH WATER IN SUCH A MANNER AS TO THOROUGHLY WET THE MATERIAL WITHOUT FORMING PUDDLES OR POCKETS OF WATER. NO CONCRETE SHALL BE PLACED ON FROZEN SUBGRADE.
- 50. FORMS SHALL BE METAL OR WOOD AND OF AN APPROVED SECTION. THEY SHALL BE STRAIGHT, FREE FROM DISTORTION AND SHALL SHOW NO VERTICAL VARIATION GREATER THAN 1/8-INCH IN 10-FOOT LENGTHS FROM THE TRUE PLANE SURFACE ON THE TOP OF THE FORMS WHEN TESTED WITH A 10-FOOT STRAIGHTEDGE, AND SHALL SHOW NO LATERAL VARIATION GREATER THAN 1/4-INCH IN 10-FEET FROM THE TRUE PLANE SURFACE OF THE LATERAL FACE OF THE FORM WHEN TESTED WITH A 10-FOOT STRAIGHTEDGE. THEY SHALL BE OF THE DEPTH SPECIFIED FOR THE SIDEWALK, OR CONCRETE PAVEMENT PER PLANE AND DETAILS, AND BE SECURELY HELD IN PLACE AND TRUE TO LINE AND GRADE.
- 51. THE CONCRETE SHALL BE DEPOSITED CONTINUOUSLY IN THE FORMS IN SUCH A MANNER AS TO AVOID SEGREGATION AND IT SHALL BE THOROUGHLY TAMPED OR VIBRATED SO THAT THE FORMS ARE ENTIRELY FILLED AND THE CONCRETE THOROUGHLY CONSOLIDATED. THE SLABS SHALL BE PLACED IN SECTIONS OR BLOCKS IN ONE OPERATION AS A MONOLITH.
- 52. THE CONCRETE SURFACE SHALL BE STRUCK OFF TO A PLANE SURFACE WITH A STRAIGHTEDGE. AFTER THE CONCRETE HAS BEEN FLOATED TO AN EVEN SURFACE, THE CONTRACTION JOINT SHALL BE CUT AND ALL SLAB EDGES ROUNDED WITH A 1/2-INCH RADIUS EDGING TOOL THAT WILL FINISH TO A WIDTH OF 2-INCHES. AFTER THE CONCRETE HAS SLIGHTLY SET, A BROOM SHALL BE BRUSHED LIGHTLY ACROSS THE SURFACE AT RIGHT ANGLES TO FORMS SO AS TO IMPART A ROUGH FINISH.

53. CONTRACTION JOINTS SHALL BE PLACED AT RIGHT ANGLES TO THE EDGE OF THE

5-FEET IN 4" SIDEWALK, OR 8-FEET IN 6" SIDEWALK, OR AS SHOWN ON THE

SIDEWALK OR CONCRETE PAVEMENT AND PERPENDICULAR TO THE SURFACE AND AT A DEPTH OF AT LEAST 1/4 THE SLAB THICKNESS WITH A MINIMUM DEPTH OF 1-1/4-INCHES FOR SIDEWALKS AND 3-INCHES FOR CONCRETE PAVEMENT SLABS. 54. CONTRACTION JOINTS IN SIDEWALKS SHALL BE SPACED AT A MINIMUM OF EVERY

## CONCRETE CURB, SIDEWALK AND

- 55. ISOLATION PAPERS SHALL BE OF THE PRE-MOLDED, NON-EXTRUDING, ASPHALT IMPREGNATED TYPE, NOT LESS THAN 1/2-INCH THICK. THE LENGTH SHALL BE EQUAL TO THE WIDTH OF THE SLAB, AND THE DEPTH EQUAL TO THE THICKNESS
- OF THE SLAB PLUS 1-INCH. 56. ISOLATION JOINTS SHALL BE PLACED AT THE FOLLOWING LOCATION FOR

SIDEWALKS AND CONCRETE PAVEMENTS:

AND LOOSE PARTICLES, AND DRY SURFACE.

CONSTRUCTION DOCUMENTS.

- A. AT THE BACK OF THE CURB AND FRONT EDGE OF THE SIDEWALKS AND PAVEMENT SLABS ADJACENT TO EACH DRIVEWAY APPROACH AND SERVICE
- B. AT INTERVALS NOT TO EXCEED 50-FEET IN ALL PUBLIC SIDEWALKS.
- C. AT THE BACK OF THE CURB WHERE THE RAMPS EXTEND FROM THE KEY FLAG TO THE PAVEMENT.
- D. BETWEEN THE KEY FLAG AND THE RAMP IN ALL CASES, EXCEPT WHERE THERE ARE EXISTING EXPANSION JOINTS AT THE INTERSECTIONS OF THE SIDEWALKS AND THE KEY FLAG.
- E. AT ANY PLACE WHERE A SIDEWALK OR CONCRETE PAVEMENT ABUTS A BUILDING OR FIXED STRUCTURE.
- F. AT ANY OTHER LOCATIONS INDICATED ON THE PLAN.
- 57. CONTRACTION JOINTS IN THE CONCRETE PAVEMENT WILL BE AS FOLLOWS: A. TRANSVERSE JOINTS SHALL BE AT MAXIMUM 10-FOOT INTERVALS OR AS SHOWN ON PLANS AND DETAILS.
- B. LONGITUDINAL JOINTS SHALL BE AT MAXIMUM 12-FOOT INTERVALS OR AS SHOWN ON PLANS AND DETAILS.

### TRAFFIC LANE AND PARKING LOT MARKING

58. PRIOR TO APPLYING JOINT SEALER, CLEAN JOINT GROOVE OF FOREIGN MATTER

- PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, AND SERVICES NECESSARY TO COMPLETE ALL TRAFFIC LANE AND PARKING LOT MARKINGS AS INDICATED IN THE
- WORK INCLUDES, BUT NOT LIMITED TO PAINTING OF LETTERS, MARKINGS, STRIPES AND ISLANDS ON THE PAVEMENT SURFACE APPLIED IN ACCORDANCE WITH THIS SPECIFICATION AND AT THE LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
- TRAFFIC MARKING PAINT SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATION TT-P-1952F, WITH OR WITHOUT REFLECTORIZED BEADS AS REQUIRED ON THE PLANS, OR SHALL BE A PRODUCT FROM THE CURRENT MDOT QUALIFIED PRODUCTS LIST.
- 4. COLOR SHALL BE AS SPECIFIED ON THE PLANS OR AS FOLLOWS:
- A. TRAFFIC LANE STRIPING SHALL BE WHITE OR YELLOW REFLECTORIZED, AS SHOWN ON THE PLANS.
- B. TRAFFIC MARKING AND CURB FACES SHALL BE WHITE UNLESS NOTED OTHERWISE.
- C. PARKING LOT STRIPING SHALL BE WHITE, UNLESS NOTED OTHERWISE. D. HANDICAP STALL STRIPING MEETING CURRENT ADA REQUIREMENTS SHALL BE BLUE UNLESS NOTED OTHERWISE.
- THE PAINTING SHALL BE PERFORMED ONLY WHEN THE EXISTING SURFACE IS DRY AND CLEAN, WHEN THE ATMOSPHERIC TEMPERATURE IS ABOVE 40-DEGREES F. AND WHEN THE WEATHER IS NOT EXCESSIVELY WINDY, DUSTY OR FOGGY AND WHEN RAIN IS NOT FORECASTED FOR AT LEAST 2 HOURS AFTER PAINT IS
- 6. ALL EQUIPMENT FOR THE WORK SHALL BE APPROVED BY THE CONTRACTOR AND SHALL INCLUDE THE APPARATUS NECESSARY TO PROPERLY CLEAN THE EXISTING SURFACE, A MECHANICAL MARKING MACHINE. AND SUCH AUXILIARY HAND EQUIPMENT AS MAY BE NECESSARY TO SATISFACTORILY COMPLETE THE JOB.
- 7. THE MECHANICAL MARKER SHALL BE AN APPROVED ATOMIZING SPRAY-TYPE MARKING MACHINE SUITABLE FOR APPLICATION OF TRAFFIC PAINT. IT SHALL PRODUCE AN EVEN AND UNIFORM FILM THICKNESS AT THE REQUIRED COVERAGE AND SHALL BE DESIGNED SO AS TO APPLY MARKINGS OF UNIFORM CROSS-SECTIONS AND CLEAR-CUT EDGES WITHOUT RUNNING OR SPATTERING AND WITHIN THE L LIMITS FOR STRAIGHTNESS SET FORTH HEREIN. WHEN NEEDED. A DISPENSER SHALL BE FURNISHED, WHICH IS PROPERLY DESIGNED FOR ATTACHMENT TO THE MECHANICAL MARKER AND SUITABLE FOR DISPENSING THE
- REQUIRED QUANTITY OF REFLECTIVE BEADS. 8. SUITABLE ADJUSTMENTS SHALL BE PROVIDED ON THE SPRAYER/SPRAYERS OF A MACHINE FOR PAINTING THE WIDTH REQUIRED. MULTIPLE PARALLEL PASSES TO
- IMMEDIATELY BEFORE APPLICATION OF THE PAINT, THE EXISTING SURFACE SHALL BE DRY AND ENTIRELY FREE FROM DIRT, GREASE, OIL, ACIDS, DEBRIS, OR OTHER FOREIGN MATTER WHICH WOULD REDUCE THE BOND BETWEEN THE COAT OF PAINT AND THE PAVEMENT. THE SURFACE SHALL BE THOROUGHLY CLEANED BY SWEEPING AND BLOWING AS REQUIRED TO REMOVE ALL DIRT, DEBRIS AND LOOSE MATERIALS. AREAS WHICH CANNOT BE SATISFACTORILY CLEANED BY BROOMING AND BLOWING SHALL BE SCRUBBED AS DIRECTED WITH A WATER SOLUTION OF TRI-SODIUM PHOSPHATE (10% BY WEIGHT) OR AN APPROVED EQUAL SOLUTION AFTER SCRUBBING, THE SOLUTION SHALL BE RINSED OFF AND THE SURFACE

PAINT THE REQUIRED WIDTH WILL NOT BE ALLOWED.

- 10. EXISTING MARKINGS OR STRIPES WHICH ARE TO BE ABANDONED OR REMOVED SHALL BE OBLITERATED OR OBSCURED BY THE BEST METHODS SUITED FOR THE PURPOSE AND TO THE SATISFACTION OF THE OWNER OR OWNER'S
- 11. THE CONTRACTOR IS RESPONSIBLE FOR LAYING OUT A SAMPLE SECTION OF STRIPING WHICH IS TO BE APPROVED BY THE OWNER OR OWNERS REPRESENTATIVE AS TO QUALITY BEFORE THE CONTRACTOR MAY PROCEED WITH THE STRIPING. THE CONTRACTOR IS TO INSURE THAT ALL SUBSEQUENT STRIPING
- 12. ON THOSE SECTIONS OF PAVEMENTS WHERE NO PREVIOUSLY APPLIED FIGURES, MARKINGS, OR STRIPFS ARE AVAILABLE TO SERVE AS A GUIDE, SUITABLE LAYOUTS AND LINES OF PROPOSED STRIPES SHALL BE SPOTTED IN ADVANCE OF THE PAINT APPLICATION. CONTROL POINTS SHALL BE SPACED AT SUCH

MEETS THE QUALITY OF THE APPROVED SAMPLE APPLICATION.

INTERVALS AS WILL ENSURE ACCURATE LOCATION OF ALL MARKINGS. 13. THE CONTRACTOR SHALL PROVIDE AN EXPERIENCED TECHNICIAN TO SUPERVISE

THE LOCATION ALIGNMENT, LAYOUT, DIMENSIONS AND APPLICATION OF THE PAINT.

- 14. MARKINGS SHALL BE APPLIED AT THE LOCATIONS AND TO THE DIMENSIONS AND SPACING INDICATED ON THE PLANS OR AS SPECIFIED. PAINT SHALL NOT BE APPLIED UNTIL THE INDICATED ALIGNMENT IS LAID OUT AND THE CONDITIONS OF THE EXISTING SURFACE HAVE BEEN APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE.
- 15. THE PAINT SHALL BE MIXED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS BEFORE APPLICATION. THE PAINT SHALL BE THOROUGHLY MIXED AND APPLIED TO THE SURFACE OF THE PAVEMENT WITH THE MARKING MACHINE AT ITS ORIGINAL CONSISTENCY WITHOUT THE ADDITION OF THINNER. IF THE PAINT IS APPLIED BY BRUSH, THE SURFACE SHALL RECEIVE TWO (2) COATS; THE FIRST COAT SHALL BE THOROUGHLY DRY BEFORE THE SECOND COAT IS
- 16. A MINIMUM OF ONE (1) WEEK SHALL ELAPSE BETWEEN APPLICATION OF THE BITUMINOUS SEAL COAT, SLURRY SEAL OR THE PLACEMENT OF THE BITUMINOUS SURFACE COURSE AND THE MARKING OF THE PAVEMENT. THE PAINT SHALL NOT BLEED EXCESSIVELY, CURL, OR DISCOLOR WHEN APPLIED TO BITUMINOUS OR CONCRETE SURFACES. CURING COMPOUND MUST BE REMOVED FOR THE ENTIRE WIDTH OF THE PAINTED STRIPE OR SYMBOL PRIOR TO PAINTING NEW CONCRETE.
- 17. IN THE APPLICATION OF STRAIGHT STRIPES, ANY DEVIATION IN THE EDGES EXCEEDING 1/2-INCH IN 50-FEET SHALL BE OBLITERATED AND THE MARKING CORRECTED. THE WIDTH OF THE MARKINGS SHALL BE AS DESIGNATED WITHIN A TOLERANCE OF 5 PERCENT (5%). ALL PAINTING SHALL BE PERFORMED TO THE SATISFACTION OF THE OWNER OR OWNER'S REPRESENTATIVE BY COMPETENT AND EXPERIENCED EQUIPMENT OPERATORS, LABORERS, AND ARTISANS IN A NEAT AND WORKMANLIKE MANNER.
- 18. PAINT SHALL BE APPLIED UNIFORMLY BY SUITABLE EQUIPMENT AT A RATE OF 0.0094 GAL./S.F. FOR STENCILS AND 0.00313 GAL./FT. FOR STRIPING. PAINT APPLICATION SHALL PRODUCE AN AVERAGE WET FILM THICKNESS OF

19. AFTER APPLICATIONS OF THE PAINT, ALL MARKINGS SHALL BE PROTECTED WHILE

THE PAINT IS DRYING. THE FRESH PAINT SHALL BE PROTECTED FROM INJURY OR DAMAGE OF ANY KIND. THE CONTRACTOR SHALL BE DIRECTLY RESPONSIBLE AND SHALL ERECT OR PLACE SUITABLE WARNING SIGNS. FLAGS. OR BARRICADES. PROTECTIVE SCREENS OR COVERINGS AS REQUIRED. ALL SURFACES SHALL B PROTECTED FROM DISFIGURATION BY SPATTER, SPLASHES, SPILLAGE, DRIPPINGS OF PAINT OR OTHER MATERIAL.

PAVEMENT SPECIFICATIONS, CONTINUED



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ORIGINAL ISSUE DATE:

PROJECT NO: 22-177

SCALE: N/A 1/2"

DRAWN BY: DC

FIELD:

DESIGN BY: CHECK BY: AP

 $FILE: P: Projects \ 2022 \ 22-177 \ Old \ Glory \ Auto \ Wash \ Howell \ Dwg \ Engineering \ 22-177\_C-12.0\_Specs.dwg \ PLOT \ DATE: 1/25/2024 \ 4:25 \ PM-12.0\_Specs.dwg \ PLOT \ PL$ 

### general landscape notes:

COMMENCING

AS DETAIL SHOWN ON PLAN.

1. LANDSCAPE CONTRACTOR SHALL VISIT THE SITE, INSPECT EXISITING CONDITIONS, REVIEW PROPOSED PLANTINGS AND RELATED WORK, CONTACT THE OWNER AND/OR LANDSCAPE ARCHITECT WITH ANY CONCERNS OR DISCREPANCY BETWEEN THE PLAN, PLANT MATERIAL LIST, AND/OR SITE CONDITIONS.

2. PRIOR TO BEGINING OF CONSTRUCTION ON ANY WORK, CONTRACTORS SHALL VERIFY LOCATIONS OF ALL ON SITE UTILITIES. GAS, ELECTRIC, TELEPHONE, CABLE TO BE LOCATED BY CONTACTING MISS DIG 1-800-482-7171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, COORDINATE ALL RELATED WORK ACTIVITIES WITH OTHER TRADES AND REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER PRIOR TO

3. NUMERICAL VALUE ON THE LANDSCAPE QUANTITIES SPECIFIED ON THE PLAN TAKE PRECEEDENCE OVER GRAPHIC REPRESENTATION. VERIFY ANY CONCERN-DISCREPANCY WITH LANDSCAPE ARCHITECT.

4. ALL CONSTRUCTION AND PLANT MATERIAL LOCATION TO BE ADJUSTED ON

5. ALL SUBSTITUTIONS OR DEVIATIONS FROM THE LANDSCAPE PLAN MUST BE APPROVED BY HOWELL TOWNSHIP AND LANDSCAPE ARCHITECT IN WRITING 6. ALL LARGE TREES AND EVERGREENS TO BE STAKED, GUYED AND WRAPPED

7. PLANT BEDS TO BE DRESSED WITH MIN. 4" OF FINELY DOUBLE SHREDDED HARDBARK MULCH.

8. DIG SHRUB PITS I' LARGER THAN SHRUB ROOT BALLS AND TREE PITS 2' LARGER THAN ROOT BALL. BACK FILL WITH ONE PART TOP SOIL AND ONE PART SOIL FROM EXCAVATED PLANTING HOLE.

9. NATURAL COLOR, FINELY SHREDDED HARDWOOD BARK MULCH REQUIRED FOR ALL PLANTINGS.

10. REMOVE ALL TWINE, WIRE AND BURLAP FROM TREE AND SHRUB EARTH BALLS, AND FROM TREE TRUNKS. 4" THICK BARK MULCH FOR TREES IN 4' DIA. CIRCLE WITH 3" PULLED AWAY FROM TRUNK . 4" THICK BARK MULCH FOR SHRUBS AND 4" THICK BARK MULCH FOR PERENNIALS.

II. PLANT MATERIAL QUALITY & INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN ASSOCIATION OF NURSERYMEN LANDSCAPE STANDARDS.

12. DISTURBED LAWN AREAS TO RECEIVED LAWN SEEDING ON FINISH GRADE UNLESS NOTED OTHERWISE.

13. ALL PLANTING AREAS TO BE PREPARED WITH APPROPRIATE SOIL MIXTURES AND FERTILIZER BEFORE PLANT INSTALLATION. 14. PLANT TREES AND SHRUBS GENERALLY NO CLOSER THEN THE FOLLOWING

DISTANCES FROM SIDEWALKS, CURBS AND PARKING STALLS: a). SHADE TREES\_ b). ORNAMENTAL AND EVERGREEN TREES (CRAB, PINE, SPRUCE, ETC.)\_

c). SHRUBS THAT ARE LESS THAN I FOOT TALL

AND WIDE AT MATURITY\_

key quant.

GT

TR

LT

MF

AC

CC

PS

PD

SK

15. NO TREES OR EVERGREENS TO BE INSTALLED OVER ANY PROPOSED OR EXISTING UTILITY LINES AS SHOWN ON THE OVERALL LANDSCAPE PLAN. SEE ENGINEERING PLANS FOR LOCATION AND DETAILS.

16. WATERING OF ALL PLANTS AND TREES TO BE PROVIDED IMMEDIATELY AND MULCHING WITHIN 24 HOURS AFTER INSTALLATION.

botanical name

TILIA AMERICAN 'REDMOND'

LIRIODENDRON TULIPIFERA

AMELANCHIER CANADENSIS

MALUS FLORIBUNDA

CERCIS CANADENSIS

PICEA GLAUCA 'DENSATA

SYRINGA PATULA 'MISS KIM'

PINUS STROBUS

CANOPY AND EVERGREEN TREES

GLEDITSIA TRI. INERMIS 'SKYCOLE'

plant material list

3 x width of rootball

tree planting detail

common name

SKYLINE LOCUST

TULIPTREE

REDMOND LINDEN

EASTERN REDBUD

MISS KIM LILAC

EASTERN WHITE PINE

BLACK HILLS SPRUCE

JAPANESE FLOWERING CRABAPPLE

SHADBLOW SERVICEBERRY

17. ALL TREE PITS TO BE TESTED FOR PROPER DRAINAGE PRIOR TO TREE PLANTING. PROVIDE APPROPERATES DRAINAGE SYSTEM AS REQUIRED IF THE TREE PIT DOES NOT DRAIN SUFFICIENTLY.

18. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL LANDSCAPE PLANT MATERIALS AND IRRIGATION INSTALLATION FOR A PERIOD OF TWO YEAR BEGINNING AFTER THE COMPLETION OF LANDSCAPE INSTALLTION DATE APPROVED BY THE CITY OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE DURING AND AT THE END OF THE GUARANTEE PERIOD, ANY DEAD OR UNACCEPTABLE PLANTS, AS DETERMINED BY THE TOWNSHIP OR LANDSCAPE ARCHITECT, WITHOUT COST TO THE OWNER.

19. ANY PROPOSED LANDSCAPE PLANTINGS LOCATED ALONG PROPERTY LINE TO BE LOCATED A MIN. 4' DISTANCE, ANY PROPOSED PLANTINGS IN R.O.W AREAS TO RECIEVE PERMITS PRIOR TO INSTALLATION.

#### landscape requirement summary

greenbelt frontage	REQUIRED	PROVIDED
TOTAL LIN.FT. OF GRAND RIVER AVE. FRONTAGE 240' ± (240'± - 30' (DRIVE ACCESS) = 210'±)		
ONE (I) CANOPY OR EVERGREEN TREE PER 40 LN.FT	5	5
ONE (I) ORNAMENTAL TREE PER 100'(210' / 100 LN.FT = 2.1 TREES)	2	2
EIGHT (8) SHRUBS PER 40' LN.FT	42	41 + 1-NEM
screening west property line	REQUIRED	PROVIDED
TOTAL LIN.FT. OF GRAND RIVER AVE. FRONTAGE344' ±		
ONE (I) CANOPY TREE PER 30 LN.FT		II
ONE (I) ORNAMENTAL TREE PER 50'(344' / 50 LN.FT = 6.88 TREES)		7
EVERGREEN TREES 15' STRAGGERED 50% OF BERM LENGHT	. <u>II</u>	11
detention	REQUIRED	PROVIDED
TOTAL LIN.FT. OF DETENTION FREEBOARD 253' ±		2-NEM +
ONE (I) CANOPY TREE PER 30 LN.FT	5	3- EXISTIN

#### lawn area:

TEN (10) SHRUBS PER 50'.

SOD LAWN AREAS SHALL BE KENTUCKY BLUE GRASS BLEND GRASS IN A SOD NURSERY ON LOAM SOIL, SOD TO BE INSTALLED ON MINIMUM 4" TOPSOIL. SEEDED LAWN AREAS SHALL CONSIST OF THE FOLLOWING TYPES AND PROPORTIONS:

> 5% PERENNIAL RYE GRASS 10% RED FESCUE 25% CHEWING FESCUE 60% KENTUCKY BLUE GRASS

(253" / 50 L.FT = 5.06 TREES)

 $(253' / 50 LN.FT = 5.06 \times 10 = 50.6 SHRUBS)$ 

SEED MIX SHALL BE APPLIED AT A RATE OF 200 POUNDS PER ACRE AND WEED CONTENT SHALL NOT EXCEED 1%. SEED. PROVIDE A MINIMUM 4" TOP SOIL ON ALL

size

2 1/2" BB

2 1/2" BB

2 1/2" BB

2" BB

8' BB

8' BB

8' BB

8' BB

30" CONT.

evergreen planting detail

no scale

comments

MULTI-STEM

MULTI-STEM

LANDSCAPE MAINTENANCE PROCEDURES AND FREQUENCIES TO BE FOLLOWED SHALL BE SPECIFIED ON THE LANDSCAPE PLAN, ALONG WITH THE MANNER IN WHICH THE EFFECTIVENESS, HEALTH AND INTENDED FUNCTIONS OF THE VARIOUS LANDSCAPE AREAS ON THE SITE WILL BE ENSURED.

DRAINAGE.

DRAINAGE.

YEGETATION

1. LANDSCAPING SHALL BE KEPT IN A NEAT, ORDERLY AND HEALTHY GROWING CONDITION, FREE FROM DEBRIS AND REFUSE.

2. PRUNING SHALL BE MINIMAL AT THE TIME OF INSTALLATION, ONLY TO REMOVE DEAD OR DISEASED BRANCHES. SUBSEQUENT PRUNING SHALL ASSURE PROPER MATURATION OF PLANTS TO ACHIEVE THEIR APPROVED PURPOSE.

3. ALL DEAD OR DISEASED PLANT MATERIAL SHALL BE REMOVED AND REPLACED WITHIN SIX (6) MONTHS AFTER IT DIES OR IN THE NEXT PLANTING SEASON, WHICHEVER OCCURS FIRST. THE PLANTING SEASON FOR DECIDUOUS PLANTS SHALL BE BETWEEN MARCH IS AND NOVEMBER 15 OR UNTIL THE PREPARED SOIL BECOMES FROZEN. THE PLANTING SEASON FOR EVERGREEN PLANTS SHALL BE BETWEEN MARCH I AND JUNE I. PLANT MATERIAL INSTALLED TO REPLACE DEAD OR DISEASED MATERIAL SHALL BE AS CLOSE AS PRACTICAL TO THE SIZE OF THE MATERIAL IT IS INTENDED TO REPLACE.

OF TO 4" DEPTH.

# landscape maintenance notes:

EXISTING

50.6 VEGETATION

DISTURBED AREAS TO RECEIVE LAWN SEEDING ON FINISH GRADES. PROVIDE POSITIVE HATCHING DENOTES EXISTING TREES AND Building <u> AR-2</u> zoned SFR. Single Family Residential DISTURBED AREAS TO RECEIVE LAWN SEEDING ON FINISH GRADES. PROVIDE POSITIVE Detention APPROX. SANITARY LEAD (PER SURVEY PROVIDED) LANDSCAPE ~ (LS) AREA (SCREENING) (GREENBELT) GREENBEL (GREENBELT) (GREENBELT (GREENBEL (ACCESS

RI

Research &

Service Commercial HATCHING DENOTES EXISTING 1-PINES TO REMAIN AND CREDITED TOWARDS DETENTION POND TREE REQUIREMENTS \_240'-0" (GREENBELT) - EXISTING SIGN TO REMAIN -EXISTING 41-SHRUBS TO REMAIN AND CREDITED TOWARDS GREENBELT 3 STAKES PER TREE MAX Grand River Avenue FRONTAGE SHRUB REQUIREMENTS

Road, Howel Township, Michigan CROSS HATCHING DENOTES EXISTING YEGETATION TO REMAIN AND CREDITED TOWARDS sheet title: DETENTION POND SHRUB REQUIREMENTS LANDSCAPE **PLAN** HATCHING DENOTES EXISTING 2-PINES TO REMAIN AND CREDITED TOWARDS job no. / issue / revision date DETENTION POND TREE REQUIREMENTS LS24.004.02 SPA 2-2-2024

- APPROX. 12"

(PER HOWELL

1. SHRUB SHALL BEAR SAME RELATION TO FINISH

GRADE, IF DIRECTED BY LANDSCAPE ARCHITECT

PLANTING MIXTURE:

AMEND SOILS PER SITE

OF THE PLANT MATERIAL

SHRUBS PLANTED IN BEDS

SHALL HAVE ENTIRE BED MASS

EXCAVATED AND BACKFILLED

INSTALLED IN INDIVIDUAL HOLES.

REMOVE ALL NON-BIODEGRADABLE

MATERIALS COMPLETELY FROM THE

ROOTBALL. CUT AND REMOVE WIRE

BASKET AND BURLAP FROM TOP

WITH APPROVED PLANT MIX.

PLANTS SHALL NOT BE

HALF OF THE ROOTBALL

CONDITIONS AND REQUIREMENTS

GRADE AS IT BORE ORIGINALLY OR SLIGHTLY

HIGHER THAN FINISH GRADE UP TO 4" ABOVE

2. PRUNE ONLY DEAD OR BROKEN BRANCHES.

FOR HEAVY CLAY SOIL AREAS.

3. REMOVE ALL TAGS, STRING,

PLASTICS AND OTHER MATERIALS

checked by:

1-30-2024

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**OLD GLORY** 

**CAR WASH** 

FOWLERVILLE, MI

**OLD GLORY** 

**CAR WASH** 

4120 Grand River

project location:

PO BOX 328

48836

HATCHING DENOTES

VEGETATION

**RSC** 

Regional

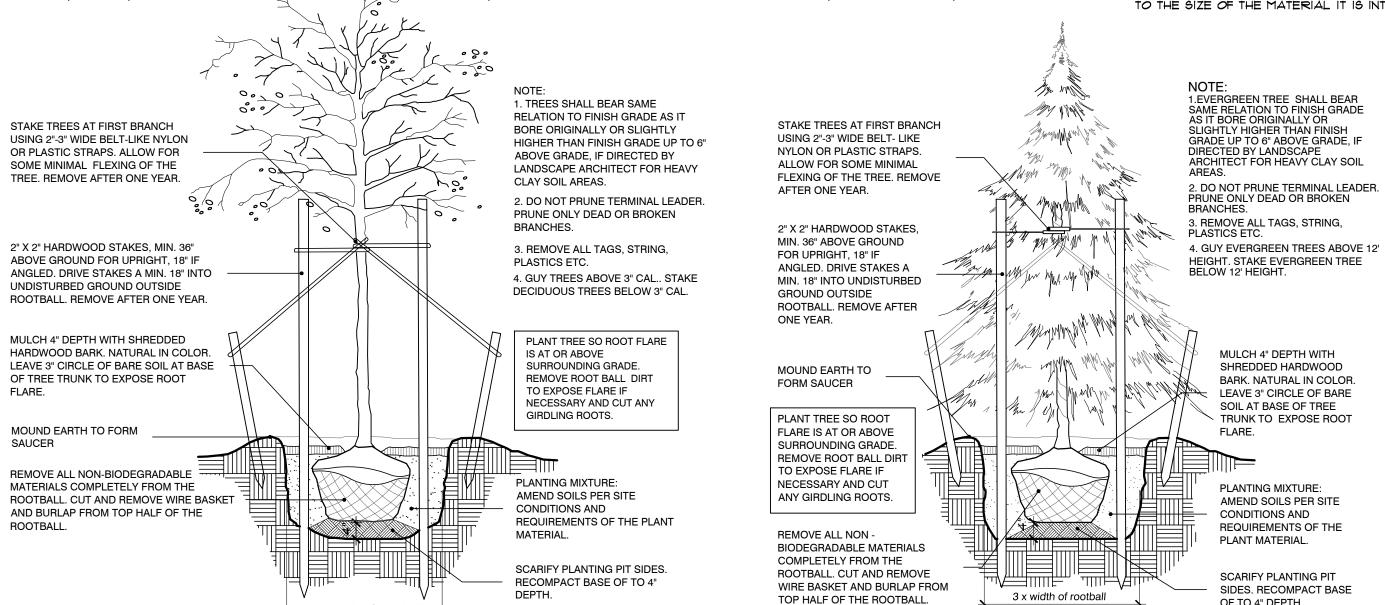
EXISTING TREES AND

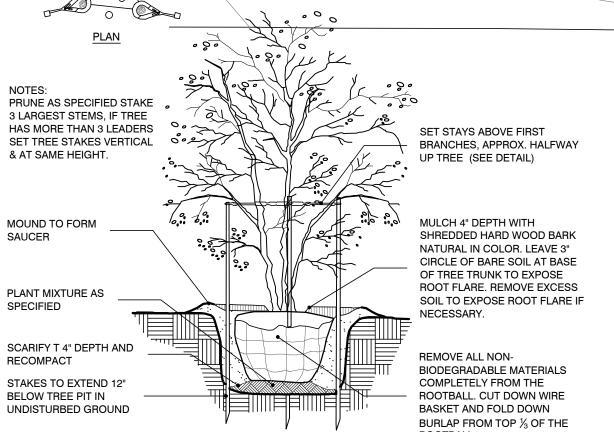
Do Not scale drawings. Use figured dimensions only

> 3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-717

For free location of public utility lines The location and elevations of existing underground utilities as shown on this drawing are only approximate. no guarantee is eithe expressed or implied as to the ompleteness of accuracy. contractor shall be exclusively responsible for determining the exact location and elevation prior to the start of

project no: LS24.004.02





LACE STRAPS TOGETHER

multi-stem tree planting detail

MUI CH 3" DEPTH WITH OF TREE TRUNK TO EXPOSE ROOT FLARE. MOUND EARTH TO FORM SAUCER REMOVE COLLAR OF ALL FIBER POTS. POTS SHALL BE CUT TO

PROVIDE FOR ROOT GROWTH REMOVE ALL NONORGANIC

CONTAINERS COMPLETELY.

SHREDDED HARDWOOD BARI NATURAL IN COLOR. LEAVE 3'

CIRCLE OF BARE SOIL AT BASE

SCARIFY PLANTING PITSIDES. RECOMPACT BASE OF TO 4" shrub planting detail

1" = 100'- 0'

sheet no:

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#### ABBREVIATIONS N.I.C. NOT IN CONTRACT ANCHOR BOLT D.S. DOWNSPOUT HIGH SPEC. SPECIFICATIONS NO. NUMBER ABOVE DWG. DRAWING H.B. HOSE BIB S.S. STAINLESS STEEL ABBREY, ABBREVIATION(S) DWR. DRAWER H/C HANDICAF NOM. NOMINAL STA. STATION AIR CONDITIONING HARDWOOD NON-COM NON-COMBUSTIBLE STANDARD ACOUSTICAL CEILING TILE HOLLOW METAL N.T.S. NOT TO SCALE STRUCTURAL H.M. STRUCT ACOUST. ACOUSTIC HORIZ. HORIZONTAL SUSP. SUSPENDED O.C. ON CENTER ELECTRONIC EQUIPMENT E.E.R. HGT. SYMMETRICAL AREA DRAIN HEIGHT OPERATOR CONTROL CENTER ROOM SURFACED FOUR SIDES ABOVE FINISH FLOOR HPL HIGH PRESSURE LAMINATE 0.D. OUTSIDE DIAMETER ELECTRICAL HEATING VENTILATION AIR CONDITIONING ALUM. ALUMINUM HVAC O.F. OVERFLOW ELEY/EL ELEYATION ANOD. ANODIZED OFF. OFFICE DOUBLE TEE MEMBER ELEV. ELEVATOR HYDRANT APPVD. APPROVED *O*FI OWNER FURNISH ITEM TREAD OR TEMPERED EMERG. **EMERGENCY** ARCH. ARCHITECTURAL OFO1 OWNER FURNISH OWNER T. & B. TOP AND BOTTOM ENGR. ENGINEER INSIDE DIAMETER T. & G. TONGUE AND GROOVE EXPANSION JOINT EJ. INCHES OWNER FURNISH CONTRACTOR OFCI BLDG. BUILDING TEMP. TEMPERED EQUIPMENT INSUL. INSULATION BLK. BLOCK INSTALL TELEPHONE EXISTING EX'G. INT. INTERIOR BEAM **OPPOSITE** THICK EXTERIOR INDIRECT WASTE BOTTOM OF STEEL B.O.S. OVERHEAD TOP OF CONCRETE EXP. EXPANSION BOTT. BOTTOM OPN'G. **OPENING** T.O.P. TOP OF PARAPET E.W.C. ELECTRIC WATER COOLER JANITOR JAN. T.O.M. TOP OF MASONRY E.W. EACH WAY PRESSURE TREATED **JOINT** T.O.S. TOP OF STEEL PWD. PLYWOOD CENTER TO CENTER JST. JOIST T.O.W. TOP OF WALL FLOOR DRAIN CER. CERAMIC TYP. TYPICAL FIRE EXTINGUISHER Q.T. QUARRY TILE CEM. CEMENT LAMINATE FINISH FLOOR CONTROL JOINT FIRE HOSE CABINET LAY. LAVATORY U.N.O. UNLESS NOTED OTHERWISE CLG./CEIL. CEILING LTG. LIGHTING FINISH RISER UR. URINAL LEVEL RAD. RADIUS C.M.U. CONCRETE MASONRY UNIT F.O. FINISHED OPENING LTWT. LIGHTWEIGHT R.D. ROOF DRAIN COL. COLUMN FACE OF CONCRETE VCT VINYL COMPOSITION TILE REFERENCE CONC. CONCRETE FOF FACE OF FINISH YERT. VERTICAL REFL. REFLECTED COMP. MAINT. MAINTENANCE COMPOSITION F.O.M. FACE OF MASONRY VEST. VESTIBULE REINF. REINFORCED MATL. MATERIAL CONT. CONTINUOUS F.O.S. FACE OF STUD REQUIRED REQ'D. CORR. MAX. MAXIMUM CORRIDOR F.R.P. FIBER REINFORCED PLASTIC RES. RESILIENT WIDE MACHINE BOLT FS FLOOR SINK ROOM WITH MECH. MECHANICAL CERAMIC TILE FEET ROUGH OPENING WATER CLOSET MET. METAL R.S. ROOF SUMP GAUGE WD. MOOD DOUBLE DBL. MEZZANINE MEZZ. ROOF CONDUCTOR GALVANIZED WROUGHT IRON GALV. MFR. MANUFACTURER WITHOUT GLASS W/O DIAMETER MINIMUM GLASS FIBER REINFORCED MISC. WEATHERPROOF G.F.R.G. SOLID CORE DIAG. DIAGONAL MISCELLANEOUS DIMENSION MASONRY OPENING SECT. SECTION M.O. GLASS FIBER REINFORCED CONCRETE G.F.R.C. DIR. DIRECTION SHEET MULLION SQUARE FOOT GRADE DOOR OPENING SIMILAR GYP. BD. GYPSUM BOARD SIMUL. SIMULATED DOOR G.W.B. GYPSUM WALL BOARD

#### SYMBOLS AND CONVENTIONS MATERIAL OF WORK DIVISION INDICATION INTERIOR ELEVATION TARGET ANGLE ELEVATION IDENTIFICATION NUMBER(6) INDICATES DIRECTION OF VIEW OR VIEWS F EXISTING (SAME NUMBER ON ON SHEET WHERE DRAWN) CHANNEL PLATE - SHEET IDENTIFICATION NUMBER (INDICATES SHEET NUMBER WHERE ELEVATION IS DRAWN) ¢ CENTER LINE ROOM NAME AND NUMBER IDENTIFICATION COLUMN INDICATION φ DIAMETER ROOM NAME SQUARE FEET ROOM IDENTIFICATION NUMBER WORK POINT OR ELEV BENCH MARK \_ COLUMN IDENTIFICATION LETTER OR NUMBER FOR NEW CONSTRUCTION DETAIL LOCATION IDENTIFICATION AND -SECTION DETAIL IDENTIFICATION NUMBER a AT (SAME NUMBER ON SHEET WHERE DRAWN) -DOOR NUMBER - REFER TO SCHEDULE - COLUMN IDENTIFICATION LETTER OR SHEET IDENTIFICATION NUMBER (INDICATES NUMBER FOR CONSTRUCTION AT SHEET WHERE SECTION DETAIL IS DRAWN) COLUMNS OF EXISTING STEEL \_FRAMING ONLY DETAIL LOCATION IDENTIFICATION DOOR INDICATION -PLAN OR SECTION DETAIL IDENTIFICATION NUMBER (SAME NUMBER ON SHEET WHERE DRAWN) EXISTING DOOR PROPOSED DOOR

#### GENERAL NOTES

- 1. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO ANY WORK AND SHALL BE RESPONSIBLE FOR ALL WORK AND MATERIALS INCLUDING THOSE FURNISHED BY SUBCONTRACTORS. CONTRACTOR SHALL ACCEPT PREMISES AS FOUND, OWNER ASSUMES NO RESPONSIBILITY FOR THE CONDITION OF THE EXISTING SITE OR EXISTING STRUCTURES AT THE TIME OF BIDDING OR THEREAFTER.
- 2. ALL CONSTRUCTION SHALL COMPLY WITH THE APPLICABLE BUILDING CODES AND LOCAL RESTRICTIONS. THE CONTRACTORS MUST COMPLY WITH THE CONTRACTOR REGISTRATION REQUIREMENTS OF ALL GOVERNING AUTHORITIES.
- 3. THE CONTRACTOR SHALL REPORT TO THE ARCHITECT ANY ERRORS, INCONSISTENCIES, OR OMISSIONS HE MAY DISCOVER. THE CONTRACTOR IS RESPONSIBLE FOR CORRECTING ANY ERRORS AFTER THE START OF CONSTRUCTION WHICH HAVE NOT BEEN BROUGHT TO THE ATTENTION OF THE ARCHITECT. THE MEANS OF CORRECTING ANY ERROR SHALL FIRST BE APPROVED BY THE ARCHITECT AND OWNER.
- 4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREIN OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE EXECUTION OF THE WORK.
- 5. ALL DEBRIS SHALL BE REMOVED FROM PREMISES AND ALL AREAS SHALL BE LEFT IN A CLEAN (BROOM) CONDITION AT ALL TIMES.
- 6. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THE SAFETY OF THE OCCUPANTS AND WORKERS AT ALL TIMES.
- 1. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL REPLACE OR REMEDY ANY FAULTY, IMPROPER OR INFERIOR MATERIALS OR WORKMANSHIP WHICH SHALL APPEAR WITHIN ONE (1) YEAR OR AS OTHERWISE SPECIFIED FOR A SPECIFIC COMPONENT AFTER THE COMPLETION AND ACCEPTANCE OF THE WORK UNDER THIS CONTRACT.
- 8. CITY OR TOWNSHIP APPROVED PLANS SHALL BE KEPT IN A PLAN BOX AND SHALL NOT BE USED BY WORKMEN. ALL CONSTRUCTION SETS SHALL REFLECT SAME INFORMATION. THE CONTRACTOR SHALL ALSO MAINTAIN, IN GOOD CONDITION, ONE COMPLETE SET OF PLANS WITH ALL THE REVISIONS, ADDENDUMS AND CHANGE ORDERS, ON TEH PREMISES AT ALL TIMES. THESE ARE TO BE KEPT UNDER THE CARE OF THE JOB SUPERINTENDENT..
- 9. THE ARCHITECT AND/OR OWNER WILL REVIEW SHOP DRAWINGS AND SAMPLES FOR CONFORMANCE WITH DESIGN CONCEPT OF THE PROJECT.
  THE OWNER AND/OR ARCHITECT'S APPROVAL OF A SEPARATE ITEM SHALL NOT INDICATE APPROVAL OF AN ASSEMBLY IN WHICH THE ITEM
  FUNCTIONS. USE ONLY MATERIALS SPECIFICALLY INDICATED IN CONTRACT DOCUMENTS, OR "APPROVED EQUAL" MATERIALS BY OTHER
  LISTED ACCEPTABLE MANUFACTURER'S. NOTE THAT "ACCEPTABLE MANUFACTURER" DOES NOT CONSTITUTE AUTOMATIC APPROVAL OF
  SPECIFIC MATERIALS BY ONE OR ALL OF THE LISTED ACCEPTABLE MANUFACTURERS. ARCHITECT RESERVES THE RIGHT OF FINAL
  DETERMINATION OF ACCEPTABILITY OF EACH ITEM.
- 10. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE USED TO IDENTIFY ACCESSIBLE FACILITIES.
- II. MINIMUM CLEAR WIDTH FOR HANDICAP PASSAGE IS 32 INCHES AT A POINT, I.E., DOORWAY AND 36 INCHES CONTINUOUSLY.
- 12. VISIT PROJECT SITE AND BECOME FULLY COGNIZANT OF ALL EXISTING ARCHITECTURAL, MECHANICAL, ELECTRICAL, STRUCTURAL AND SITE CONDITIONS, OR EXISTING CODE VIOLATIONS WHICH MAY AFFECT THE WORK.
- 13. NOTIFY ARCHITECT PRIOR TO SUBMITTING BID IF REVISIONS TO CONTRACT DOCUMENTS ARE NECESSARY TO RECTIFY ANY OF THE AFOREMENTIONED EXISTING CONDITIONS.
- 14. NO "EXTRAS" TO CONTRACT PRICE WILL BE ALLOWED AFTER RECEIVING BID IN ORDER TO RECTIFY EXISTING CONDITIONS IN ORDER TO MEET THE DESIGN INTENT OF THE CONTRACT DOCUMENTS OR SATISFY CODE REQUIREMENTS.
- 15. NO WORK IS TO BE INSTALLED PRIOR TO RETURN OF ARCHITECT REVIEWED SHOP DRAWINGS.
- 16. OPERATION AND MAINTENANCE MANUALS:
  - UPON COMPLETION OF PROJECT, SUBMIT TWO (2) COMPLETE BOUND SETS OF OPERATING AND MAINTENANCE MANUALS FOR ALL
    EQUIPMENT AND SYSTEMS INSTALLED IN THIS PROJECT.
  - MANUALS SHALL INCLUDE GUARANTEE(S), COMPLETE OPERATING INSTRUCTIONS, REPAIR PARTS LIST, PREVENTATIVE MAINTENANCE SCHEDULE, BELT AND FILTER SCHEDULE, AND LIST OF ALL SUBCONTRACTORS ASSOCIATED WITH THE WORK, INCLUDING TELEPHONE NUMBER AND CONTACT PERSON.
- 17. OPERATING AND MAINTENANCE INSTRUCTIONS:
  - PRIOR TO FINAL ACCEPTANCE BY OWNER, PROVIDE ALL PERSONNEL, EQUIPMENT, AND LABOR AS NECESSARY TO INSTRUCT OWNER'S
    PERSONNEL IN PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS AND EQUIPMENT INSTALLED IN THIS PROJECT. PROVIDE
    INSTRUCTIONAL SESSION DURING TIME PERIOD AGREED TO WITH OWNER.
- 18. PRIOR TO FINAL ACCEPTANCE BY OWNER, THOROUGHLY CLEAN ALL WORK INSIDE AND OUT AS APPLICABLE, AND LEAVE ALL SYSTEMS AND EQUIPMENT IN PERFECT WORKING ORDER. THOROUGHLY CLEAN ALL PLUMBING. FIXTURES, EXPOSED PIPING, FLOOR DRAIN GRATES, AND CLEANOUT COVERS AS APPLICABLE.
- 19. DEFECTIVE MATERIALS AND/OR EQUIPMENT MAY BE REPAIRED IN LIEU OF REPLACED WITH PRIOR APPROVAL OF ARCHITECT AND/OR OWNER.
- 20. DIMENSIONS TAKE PRECEDENCE OVER DRAWINGS. DO NOT SCALE DRAWINGS TO DETERMINE ANY LOCATIONS. THE ARCHITECT SHALL BE NOTIFIED IF ANY DISCREPANCY OCCURS PRIOR TO CONTINUING WITH WORK.
- 21. ALL PLAN DIMENSIONS ARE FROM CENTERLINE OR WALL FINISH UNLESS OTHERWISE INDICATED.
- 22. DETAILED DRAWINGS AND LARGER SCALE DRAWINGS TAKE PRECEDENCE OVER SMALL SCALE DRAWINGS.
- 23. FOR CONSTRUCTION DETAILS NOT SHOWN, USE THE MANUFACTURER'S STANDARD DETAILS OR APPROVED SHOP DRAWINGS/DATA SHEETS IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.
- 24. ALL WOOD BLOCKING IN CONTACT WITH MASONRY, CONC., STRUCT. STEEL, METAL ROOF DECK, OR IN EXTERIOR WALLS SHALL BE PRESSURE PRESERVATIVE TREATED (P.T.).
- 25. ALL ITEMS LOCATED WITHIN RETURN AIR PLENUMS SHALL BE NON-COMBUSTIBLE AND RATED FOR PLENUM USAGE. REFER TO SHEET G-001

## FOR FLAME SPREAD INFORMATION. METAL STUDS CARPENTRY CONTRACTOR IS TO DESIGN THE LIGHT GAUGE / COLD FORMED FRAMING ASSEMBLIES. REFER TO THE ARCHITECTURAL AND

CARPENTRY CONTRACTOR IS TO DESIGN THE LIGHT GAUGE / COLD FORMED FRAMING ASSEMBLIES. REFER TO THE ARCHITECTURAL AND STRUCTURAL PLANS & DETAILS FOR ADDITIONAL INFORMATION. ASSUME A DESIGN LIVE LOAD OF 5 PSF AND L/240 FOR THE INTERIOR PARTITIONS. REFER TO THE STRUCTURAL DRAWINGS FOR WIND DESIGN LOADS FOR THE EXTERIOR WALLS AND ASSUME L/240. ALL CONSTRUCTION IS TO BE DESIGNED TO SSMA STANDARDS. PROVIDE SHOP DRAWINGS PREPARED BY THE LIGHT GAUGE ENGINEER

### FIRE EXTINGUISHER KEY

NOTE: VERIFY FIRE EXTINGUISHER LOCATIONS WITH FIRE MARSHALL PRIOR TO ORDERING.

F.E.C. FIRE EXTINGUISHER CABINET S.R. SEMI-RECESSED

F.R. FULLY RECESSED S.M. SURFACE MOUNTED CABINET ON GW.B.

F.E.(S.M.) FIRE EXTINGUISHER WITH WALL MOUNTED BRACKET (SURFACE MOUNTED)

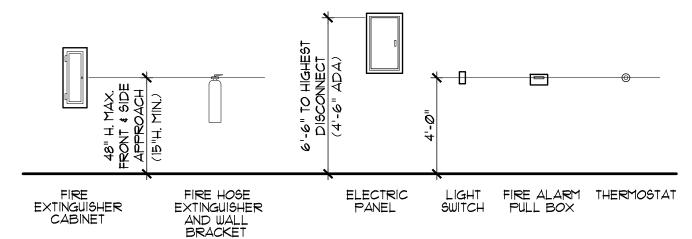
NOTE:

1. ALL EXTINGUISHERS ARE ASSUMED TO BE TYPE "ABC"
EXCEPT AS OTHERWISE NOTED ON THE PLANS.

- VERIFY ACTUAL FIRE EXTINGUISHER REQUIREMENTS WITH THE FIRE MARSHALL PRIOR TO ORDERING AND INSTALLING.

  2. CABINET TO BE JL. INDUSTRIES "AMBASSADOR"

  SERIES WITH TRIM RING FOR SEMI RECESSED CONDITION
- 2. CABINET TO BE J.L. INDUSTRIES "AMBASSADOR"
  SERIES WITH TRIM RING FOR SEMI-RECESSED CONDITION
  STEEL CONSTRUCTION WITH MANUFACTURERS PRIME COAT.
  SIZE CABINET PER EXTINGUISHER REQ. FIELD FINISH
  TO MATCH ADJACENT WALL.
- 3. MOUNT EXTINGUISHER CABINETS @ 54" AFF TO TOP OF CABINET. MOUNT BRACKET TYPE TO 48" AFF TO LEVER.
- 4. EXTINGUISHER LOCATIONS ON ARCHITECTURAL FLOOR PLANS ARE FOR REFERENCE ONLY, VERIFY LOCATIONS, TYPES & QUANTITY WITH LOCAL FIRE MARSHALL PRIOR TO INSTALLATION.



NOTE: REFER TO SHEET A-401 FOR TYPICAL WALL ELEVATIONS FOR ADDITIONAL MOUNTING HEIGHT INFORMATION.

GILLETT ASSOCIATES



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## OLD GLORY AUTO WASH

## 4120 GRAND RIVER ROAD HOWELL TOWNSHIP MICHIGAN

EAL



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