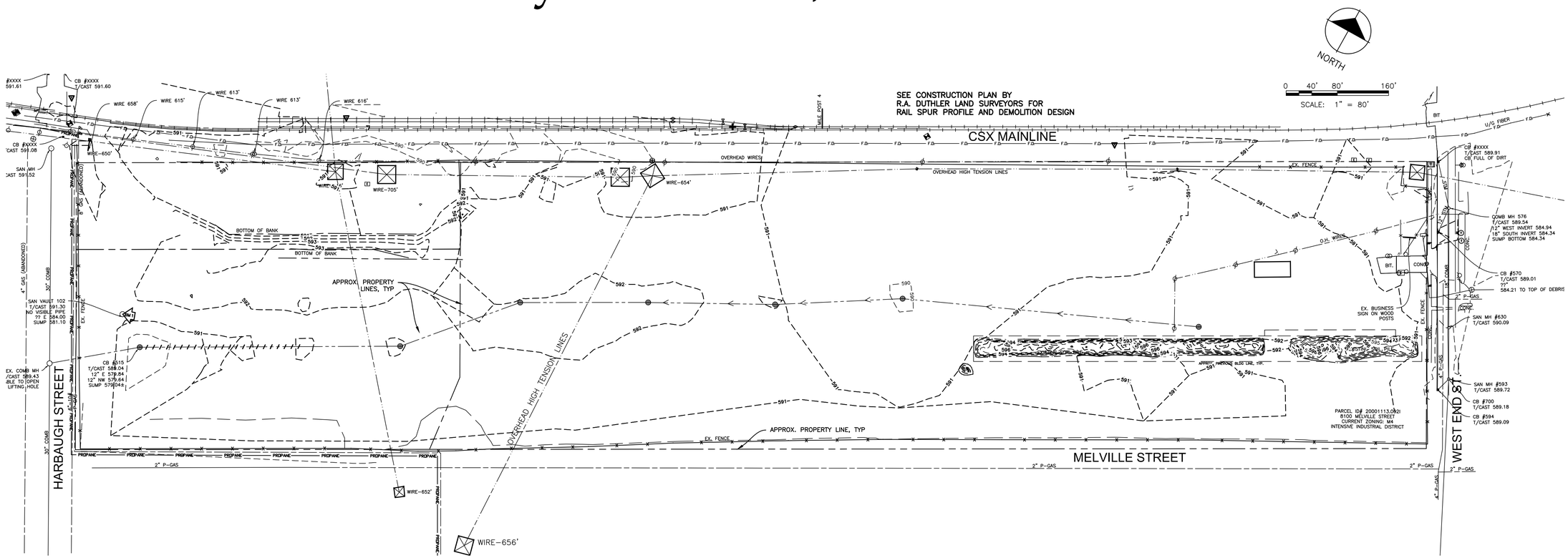
Crown Enterprises
8100 Melville Street
City of Detroit, MI 48209



REVISION INDEX

November 29, 2022
Revised January 24, 2023
Revised February 13, 2023
Revised April 27, 2023
Revised September 1, 2023
Revised October 4, 2023
Revised December 22, 2023
Revised January 25, 2024
Revised February 21, 2024
Revised March 12, 2024
Revised April 25, 2024 (New Sheets C7 & C8)

SHEET INDEX

SHEET TITLE	SHEET NO.
SITE DEMOLITION PLAN	C0
SITE LAYOUT PLAN	C1
SITE GRADING PLAN	C2
WEST STORM SEWER PLAN & PROFILE	C2A
STORMWATER CALCULATIONS	C3
STORMWATER DETAILS	C3A
SITE DETAILS	C4
SITE DETAILS	C5
LANDSCAPE PLAN	C6
SOIL EROSION CONTROL PLAN	C7
SOIL EROSION NOTES & DETAILS	C8

CONTRACTOR NOTE:

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS OF ALL EXISTING UTILITIES BEFORE COMMENCING CONSTRUCTION. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT OCCUR BY THEIR FAILURE TO EXACTLY LOCATED AND PRESERVE ANY ALL ALL UNDERGROUND UTILITIES.

PROJECT COORDINATE SYSTEM

MICHIGAN STATE PLANE COORDINATE SYSTEM, NAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 04.25.24

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
ENGINEER
No: 6201048309
REGISTERED PROFESSIONAL ENGINEER

04.25.2024

Know what's below. Call before you dig.

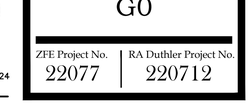
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Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	AS NOTED

Issue Date:	Issued for:
04.25.2024	Issued for Soil Erosion Control Permit
03.12.2024	Revised & Reissued for Reg. Review
02.21.2024	Revised & Reissued for Reg. Review
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01.24.2023	Revised & Reissued for Reg. Review
11.29.2022	Issued for Regulatory Review

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

TITLE SHEET

Drawing Number

G0

ZFE Project No.	RA Duthler Project No.
22077	220712

KEY NOTES

1. SALVAGE EX. MAILBOX PRIOR TO COMMENCING CONSTRUCTION. RELOCATE TO NEW LOCATION COORDINATED WITH OWNER.
2. EXISTING TEMPORARY JOB SITE TRAILER TO BE RELOCATED. COORDINATE NEW LOCATION WITH OWNER.
3. REMOVE OR RELOCATE EXISTING OVERHEAD WIRES.
4. COORDINATE EXISTING FENCE REMOVAL WITH PROPOSED FENCE INSTALLATION. REMOVE POSTS, AS REQUIRED FOR NEW INSTALLATION OF FENCE MATERIAL. SALVAGE EXISTING SLIDING GATE FOR REUSE. TEMPORARILY REMOVE EX. FENCE FOR INSTALLATION OF SEWER CONNECTION TO OFFICE TRAILER. REINSTALL AT EXISTING LOCATION FOLLOWING SEWER LEAD INSTALLATION.
5. REMOVE EX. CONCRETE SURROUNDING EX. WATER METER. PROTECT EXISTING WATER METER DURING DEMOLITION. CONFIRM METER OPERATION WITH CITY OF DETROIT WATER & SEWAGE DEPT. PRIOR TO CONNECTION OF NEW WATER SERVICE LINE.
6. PROTECT EX. CURB STOP DURING DEMOLITION. ADJUST TO FINISH GRADE IN NEW DRIVEWAY INSTALLATION. SEE GRADING SHEET.

SITE DEMOLITION LEGEND

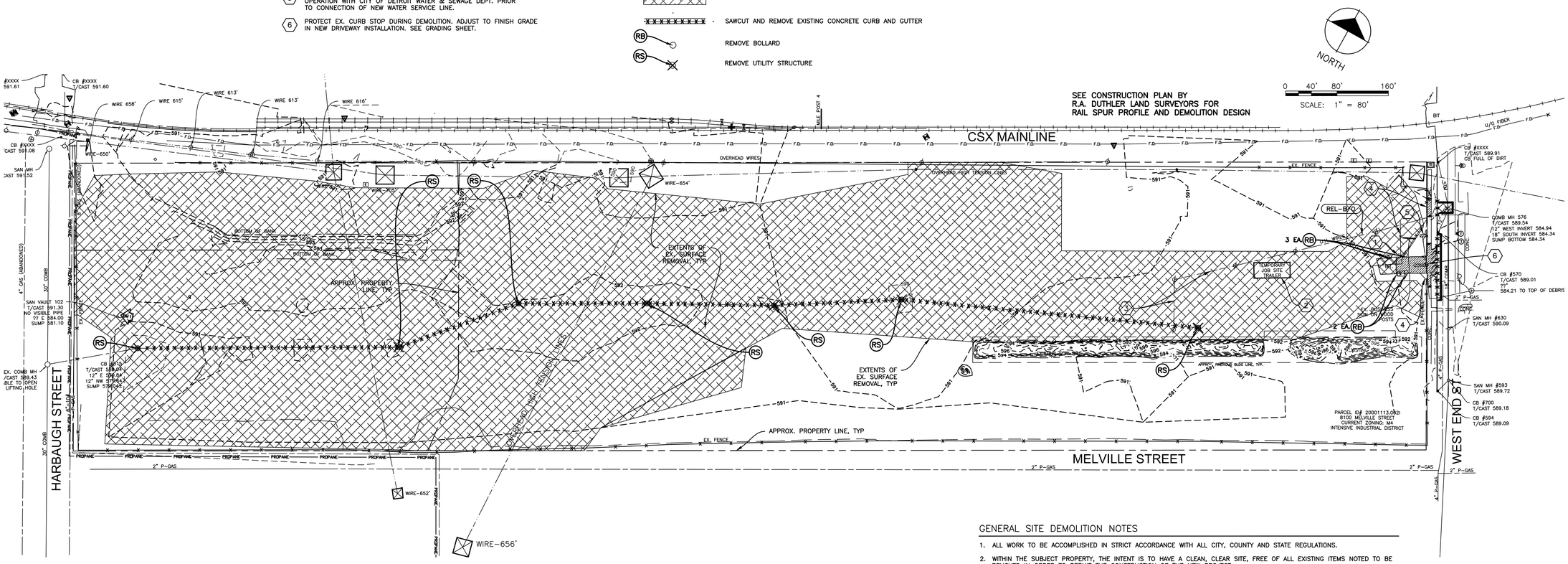
- REMOVE OR ABANDON EXISTING UTILITY LINE IN PLACE, CAP EXISTING ENDS IF ABANDONED IN PLACE
- SAWCUT EXISTING SURFACE AT DEMOLITION LIMIT
- REL-B/O — RELOCATED OR REMOVED UTILITY BY OTHERS
- SAWCUT AND REMOVE EXISTING ASPHALT PAVEMENT SURFACE
- SAWCUT AND REMOVE EXISTING CONCRETE PAVEMENT SURFACE
- LIMITS OF EARTH DISTURBANCE BASED ON DESIGN/ REMOVE EXISTING GRAVEL AND EARTHEN SURFACE
- SAWCUT AND REMOVE EXISTING CONCRETE CURB AND GUTTER
- RB — REMOVE BOLLARD
- RS — REMOVE UTILITY STRUCTURE

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MADB3 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

Know what's below. Call before you dig.



GENERAL SITE DEMOLITION NOTES

1. ALL WORK TO BE ACCOMPLISHED IN STRICT ACCORDANCE WITH ALL CITY, COUNTY AND STATE REGULATIONS.
2. WITHIN THE SUBJECT PROPERTY, THE INTENT IS TO HAVE A CLEAN, CLEAR SITE, FREE OF ALL EXISTING ITEMS NOTED TO BE REMOVED IN ORDER TO PERMIT THE CONSTRUCTION OF THE NEW PROJECT.
3. REMOVE AND DISPOSE OF ANY PAVEMENT, FENCING, DEBRIS AND RUBBISH REQUIRING REMOVAL FROM THE WORK AREA IN AN APPROVED OFFSITE LANDFILL.
4. THE CONTRACTOR SHALL SECURE ALL PERMITS FOR THE DEMOLITION AND DISPOSAL OF THE DEMOLITION MATERIAL TO BE REMOVED FROM THE SITE. THE CONTRACTOR SHALL POST BONDS AND PAY PERMIT FEES AS REQUIRED.
5. THE DETAILED PLANS MAY NOT REFLECT ALL UTILITIES ON THE SITE OR SURROUNDING STREETS AND PROPERTIES. THE CONTRACTOR SHALL VERIFY LOCATIONS AND EXISTENCE OF UTILITY SERVICES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CALL "MISS DIG" AT 1-800-482-7171 OR 811, 72 HOURS PRIOR TO CONSTRUCTION.
6. THE CONTRACTOR SHALL REMOVE ALL UTILITIES TO EXISTING STRUCTURES WHETHER SHOWN OR NOT OR ARRANGE FOR THE APPROPRIATE UTILITY COMPANY TO CUT AND CAP SERVICE PIPING AT THE PROPERTY LINE OR MAIN (AS REQUIRED). ALL SERVICES MAY NOT BE SHOWN ON THIS PLAN.
7. FOR ALL ITEMS NOTED TO BE REMOVED, REMOVE NOT ONLY THE ABOVE GROUND ELEMENTS, BUT ALL UNDERGROUND ELEMENTS AS WELL, INCLUDING BUT NOT NECESSARILY LIMITED TO: FOUNDATIONS, GRAVEL FILLS, ROOTS, OLD PIPES, ETC.
8. THE CONTRACTOR SHALL PROTECT ALL SURVEYING IRON PINS, MONUMENTS AND PROPERTY CORNERS DURING CONSTRUCTION. ANY CONTRACTOR DISTURBED PINS, MONUMENTS, ETC. SHALL BE RESET BY A LICENSED LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL RESTORE ANY UTILITY STRUCTURE, PIPES, PAVEMENT, CURBS, SIDEWALKS OR LANDSCAPED AREAS DISTURBED DURING DEMOLITION TO THEIR ORIGINAL CONDITION AND TO THE SATISFACTION OF THE OWNER.
10. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
11. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
12. SPECIFIC DEMOLITIONS ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE. AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT THE SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
13. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, FOUNDATION WALLS, UNDERGROUND UTILITIES, CONCRETE, ASPHALT, LANDSCAPING, PIPES, ETC.
14. THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN 15' OF CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH LOCAL CODES.
16. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE MICHIGAN MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MMTUCD) LATEST EDITION, OR AS DIRECTED BY THE GOVERNING AUTHORITY.
17. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
PROFESSIONAL ENGINEER
No: 6201048309
LICENSED PROFESSIONAL ENGINEER

03.12.2024

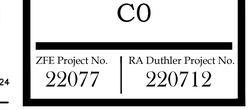
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Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	1" = 80'

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Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

SITE DEMOLITION PLAN

Drawing Number

C0

ZFE Project No.	RA Duthler Project No.
22077	220712

GENERAL SITE LAYOUT NOTES

1. ALL DIMENSIONS SHOWN ARE TO EDGE OF PAVEMENT, BACK OF CURB, FACE OF SIDEWALK, OUTSIDE FACE OF BUILDING, PROPERTY LINE, CENTER OF MANHOLE/CATCHBASIN OR CENTERLINE OF PIPE UNLESS OTHERWISE NOTED.
2. ALL DISTURBANCES INCURRED TO ANY ADJOINING PROPERTY DUE TO CONSTRUCTION OR DEMOLITION SHALL BE RESTORED TO THE PREVIOUS CONDITION OR BETTER, AND TO THE SATISFACTION OF THE OWNER, MUNICIPALITY OR STATE AUTHORITY.
3. PROPERTY LINE AND RIGHT-OF-WAY MONUMENTS SHALL NOT BE DISTURBED BY CONSTRUCTION, IF DISTURBED, THEY SHALL BE RESET BY A LICENSED PROCESSIONAL SURVEYOR TO THEIR ORIGINAL LOCATIONS AT THE CONTRACTOR'S EXPENSE.
4. PROOF ROLL ALL PAVEMENT AREAS. NOTIFY OWNER OF ANY UNACCEPTABLE AREAS.
5. THE CONTRACTOR SHALL PROVIDE RECORD DRAWINGS OF ALL CONSTRUCTION TO THE OWNER AT THE END OF CONSTRUCTION.
6. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF DETROIT CURRENT STANDARDS AND REGULATIONS.
7. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

KEY NOTES

1. SALVAGE EX. MAILBOX PRIOR TO COMMENCING CONSTRUCTION. RELOCATE TO NEW LOCATION COORDINATED WITH OWNER.
2. SALVAGE EX. SLIDING GATE. REPOSITION TO COORDINATE WITH PROPOSED DRIVEWAY AND FENCE INSTALLATION AND OWNERS REQUIREMENTS.

SITE SPECIFIC NOTES

1. ALL RUBBISH, TRASH OR DEBRIS WILL BE CONTAINED ON SITE WITHIN THE OFFICE BUILDING OR WITHIN SITE DUMPSTER UNTIL THEIR SCHEDULED PICK-UP BY A CONTRACTED PICK-UP SERVICE.
2. NO COAL OR COKE RELATED MATERIALS, PRODUCT'S, ETC. WILL BE STORED ON SITE AT ANY TIME.

GENERAL NOTES

1. THE CONTRACTOR SHALL OBTAIN A SEPARATE RIGHT-OF-WAY PERMIT FROM THE DEPT. OF PUBLIC WORKS, CITY ENGINEERING DIVISION, PERMIT OFFICE PRIOR TO WORK PERFORMED WITHIN THE PUBLIC RIGHTS-OF-WAY.

SITE FEATURE LEGEND

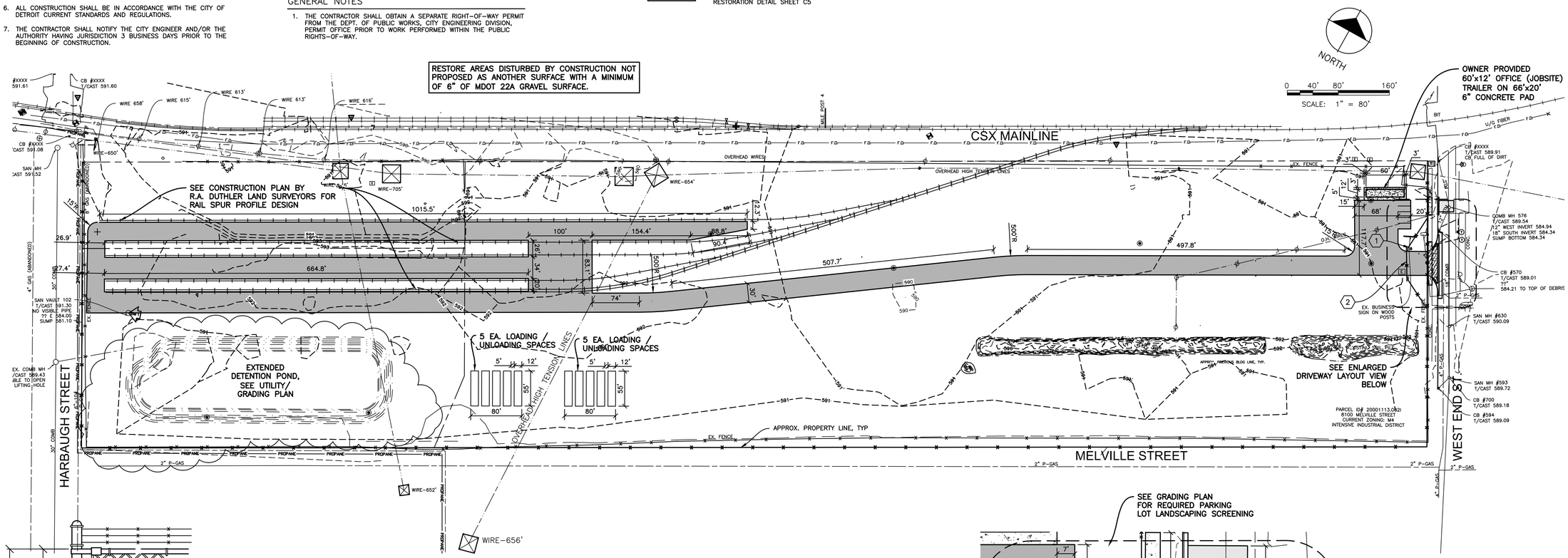
- 6" CONCRETE SURFACE
- 8" REINFORCED CONCRETE SURFACE
- INDUSTRIAL HEAVY-DUTY BITUMINOUS PAVEMENT
- WEST END STREET BITUMINOUS PAVEMENT RESTORATION, SEE CITY OF DETROIT UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION DETAIL SHEET C5
- CONCRETE CURB & GUTTER
- NEW CHAIN LINK FENCE, HEIGHT TO MATCH EXISTING

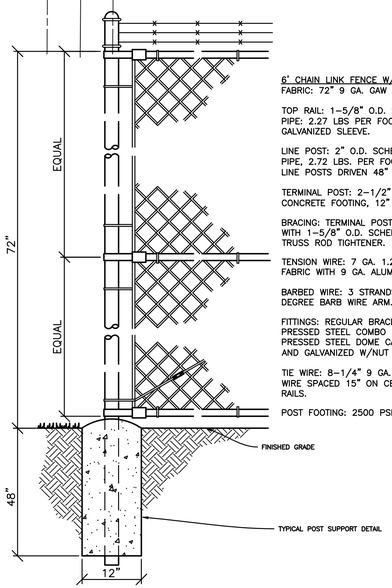
BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MADB3 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

Know what's below. Call before you dig.





6' CHAIN LINK FENCE W/BARB WIRE MATERIAL SPECIFICATION NOTES:
FABRIC: 72" 9 GA. GAW (2" MESH) KT CHAIN LINK FABRIC.

TOP RAIL: 1-5/8" O.D. SCHEDULE 40
PIPE: 2.27 LBS PER FOOT TOP RAIL 21" IN LENGTH, JOINED WITH 1-5/8" GALVANIZED SLEEVE.

LINE POST: 2" O.D. SCHEDULE 40
PIPE, 2.72 LBS. PER FOOT. LINE POSTS SET 10' ON CENTER MAX. SPACING. LINE POSTS DRIVEN 48" DEPTH.

TERMINAL POST: 2-1/2" O.D. SCHEDULE 40 PIPE 3.65 LBS. PER FOOT. CONCRETE FOOTING, 12" DIA., 48" DEPTH.

BRACING: TERMINAL POSTS BRACED AND TRUSSED TO THE NEAREST LINE POST WITH 1-5/8" O.D. SCHEDULE 40 PIPE AND 3/8" GALVANIZED TRUSS ROD & TRUSS ROD TIGHTENER.

TENSION WIRE: 7 GA. 1.2 OZ. TENSION WIRE ATTACHED TO BOTTOM OF FENCE FABRIC WITH 9 GA. ALUMNIUM (Lb. OF 96) HOG RING SPACED 24" ON CENTER.

BARBED WIRE: 3 STRANDS OF 12-1/2" GA. CL3 BARB WIRE ON GALVANIZED 45 DEGREE BARB WIRE ARM.

FITTINGS: REGULAR BRACE BAND AND GALVANIZED W/NUT CARRIAGE BOLD, PRESSED STEEL COMBO RAIL-END, GALVANIZED 45 DEGREE BARB WIRE ARM, PRESSED STEEL DOME CAP, 3/4" STEEL TENSION BAR, REGULAR TENSION BAND AND GALVANIZED W/NUT CARRIAGE BOLT.

TIE WIRE: 8-1/4" 9 GA. ALUMINUM TIE WIRE AND 6-1/2" 9 GA. ALUMINUM TIE WIRE SPACED 15" ON CENTER FOR LINE POSTS AND 24" ON CENTER FOR RAILS.

POST FOOTING: 2500 PSI CONCRETE

CANTILEVER GATE (MANUAL) MATERIAL SPECIFICATION NOTES:
FABRIC: 72" 9 GA. GAW (2" MESH) KT CHAIN LINK FABRIC.

BRACING: TERMINAL POSTS BRACED AND TRUSSED TO THE NEAREST LINE POST WITH 1-5/8" O.D. SCHEDULE 40 PIPE AND 3/8" GALVANIZED TRUSS ROD & TRUSS ROD TIGHTENER.

GATES: CANTILEVER GATE: FRAMEWORK OF 2" SCHEDULE 40 PIPE, 2.72 LBS. PER FOOT.

GATES BRACED AND TRUSSED AS NECESSARY. SAME FABRIC AS FENCE. BARBED WIRE INCLUDED ON ALL GATES.

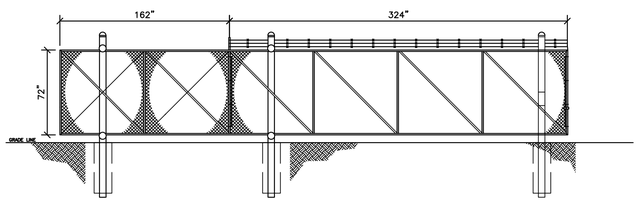
GATE AND LATCH POST: CANTILEVER GATE: 4" O.D. SCHEDULE PIPE, 9.10 LBS PER FOOT. CONCRETE FOOTING: 18" DIAMETER, 48" DEPTH.

BARBED WIRE: 3 STRANDS OF 12-1/2" GA. CL3 BARB WIRE ON GALVANIZED 45 DEGREE BARB WIRE ARM.

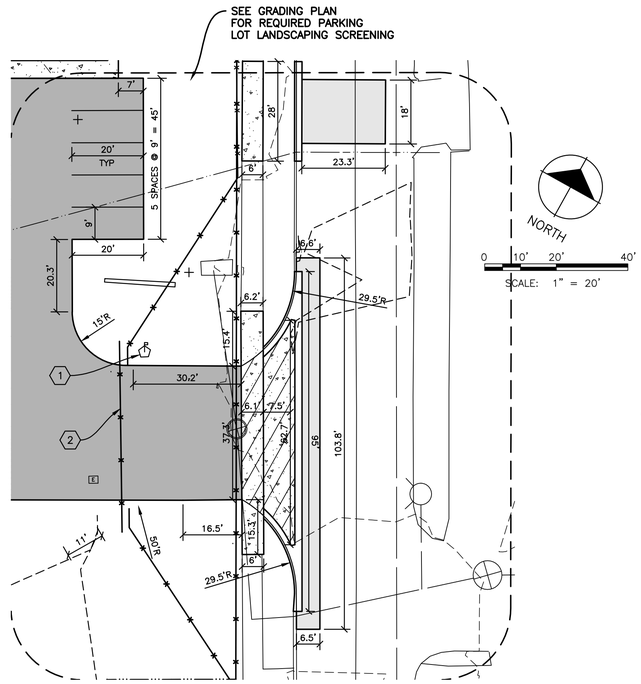
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TIE WIRE: 8-1/4" 9 GA. ALUMINUM TIE WIRE AND 6-1/2" 9 GA. ALUMINUM TIE WIRE SPACED 15" ON CENTER FOR LINE POSTS AND 24" ON CENTER FOR RAILS.

POST FOOTING: 2500 PSI CONCRETE



FENCE & GATE DETAILS
NO SCALE



ENLARGED DRIVEWAY LAYOUT VIEW

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

STATE OF MICHIGAN TAMMY ZIEMNICK FOSTER ENGINEER No: 6201048309 REGISTERED PROFESSIONAL ENGINEER
03.12.2024

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Project Manager:	TZF
Reviewed By:	JWF
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Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

SITE LAYOUT PLAN

Drawing Number

C1

ZFE Project No.	RA Duthler Project No.
22077	220712

KEY NOTES

1. INSTALL 70 LF OF 1"ø TYPE K COPPER WATER SERVICE. CONNECT NEW WATER SERVICE TO EXISTING WATER METER. ADJUST WATER METER TO GRADE.
2. INSTALL 6" SDR 23.5 PVC SEWER LEAD CONNECTION PER CITY OF DETROIT WATER & SEWAGE DEPT. DETAIL 333111-02. INSTALL CLEANOUT PER CITY OF DETROIT WATER & SEWAGE DEPT. DETAIL 333111-03. SEWER LINE CONNECTION AT INVERT ELEV 854.54 AT EX. MANHOLE IN ACCORDANCE WITH CITY OF DETROIT WATER & SEWAGE DEPT. DETAIL 333111-05.
3. COORDINATE OFFICE TRAILER ELECTRICAL CONNECTION WITH OWNER FOR POWER REQUIREMENTS AND DTE FOR INSTALLATION

SITE UTILITY AND GRADING LEGEND

PIPE CONTENTS ABBREVIATIONS	
GAS	NATURAL GAS
SAN	SANITARY SEWER
STM	STORM SEWER
WTR	WATER
FM	FORCE MAIN

PIPE MATERIAL ABBREVIATIONS	
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
DIP	DUCTILE IRON PIPE
NRCP	NON-REINFORCED CONCRETE PIPE
PE	POLYETHYLENE
PE PERF.	POLYETHYLENE PIPE PERFORATED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

- 12" STM — STORM SEWER & MANHOLE
- CATCH BASIN
- 6" U.D. — UNDERDRAIN
- ADJ — ADJUST EX. STRUCTURE CASTINGS
- 505 — PROPOSED CONTOUR ELEVATION
- 865.00 HP — PROPOSED HIGH POINT SURFACE SPOT ELEVATION
- 865.00 LP — PROPOSED LOW POINT SURFACE SPOT ELEVATION
- 865.00 BIT — PROPOSED EDGE OF BITUMINOUS PAVEMENT SPOT ELEVATION
- 865.00 EC — PROPOSED EDGE OF CONCRETE SURFACE SPOT ELEVATION
- 865.00 T/CAST — PROPOSED TOP OF CASTING SPOT ELEVATION
- 865.00 FG — PROPOSED FINISHED GRADE ELEVATION

BENCHMARKS & PROJECT COORDINATE SYSTEM

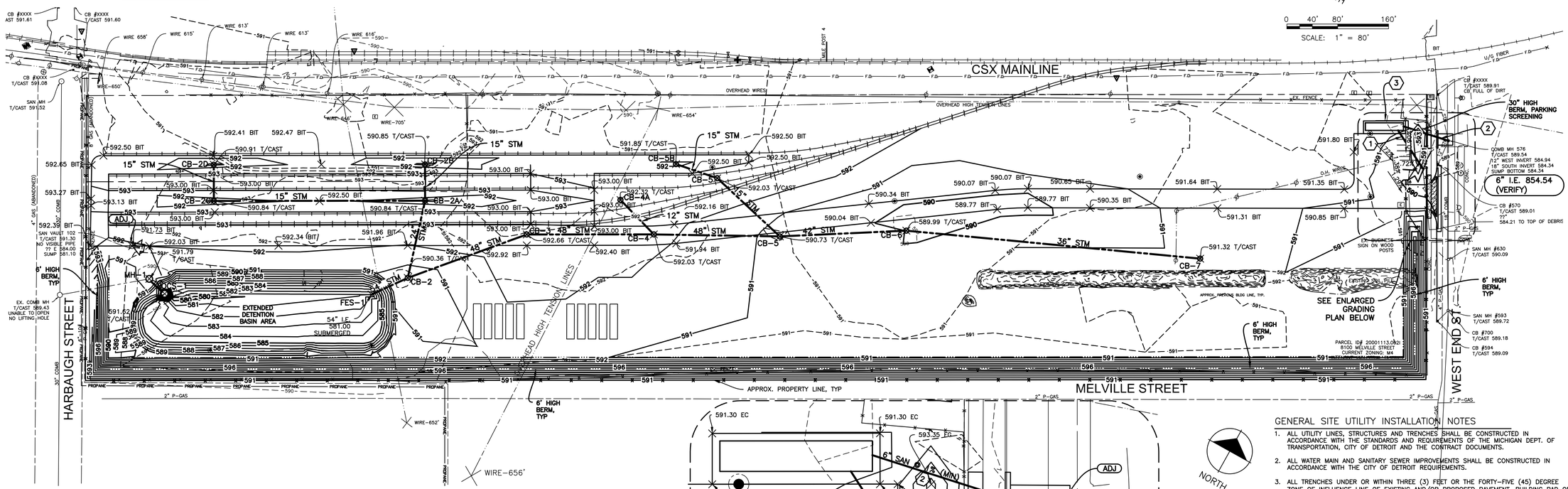
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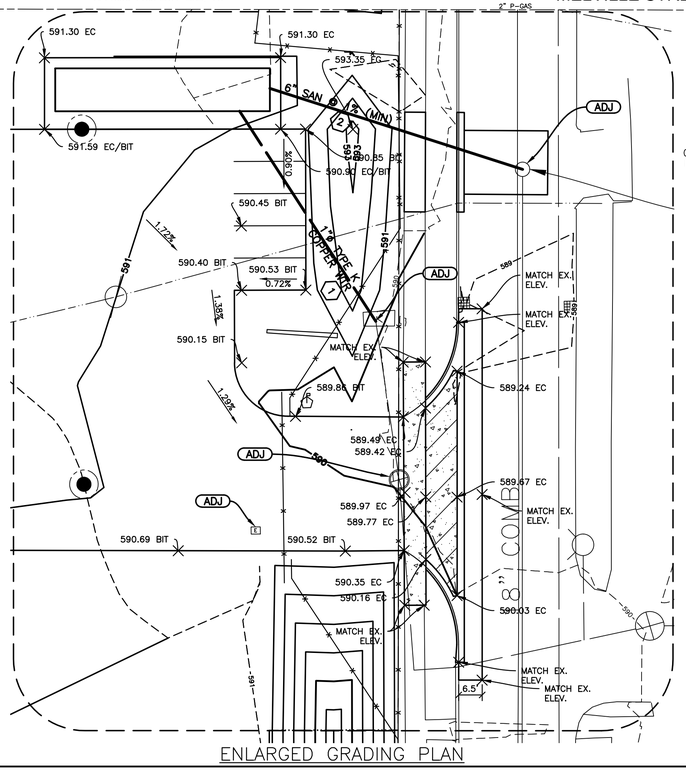
MICHIGAN STATE PLANE COORDINATE SYSTEM, MADB3 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

Know what's below. Call before you dig.

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

TOP OF RAIL ELEVATION WITHIN PROPOSED ASPHALT SURFACE IS 593.00.





GENERAL SITE UTILITY INSTALLATION NOTES

1. ALL UTILITY LINES, STRUCTURES AND TRENCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS AND REQUIREMENTS OF THE MICHIGAN DEPT. OF TRANSPORTATION, CITY OF DETROIT AND THE CONTRACT DOCUMENTS.
2. ALL WATER MAIN AND SANITARY SEWER IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF DETROIT REQUIREMENTS.
3. ALL TRENCHES UNDER OR WITHIN THREE (3) FEET OR THE FORTY-FIVE (45) DEGREE ZONE OF INFLUENCE LINE OF EXISTING AND/OR PROPOSED PAVEMENT, BUILDING PAD OR DRIVE APPROACH, ETC. SHALL BE BACKFILLED WITH MDOT CLASS II SAND COMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM MODIFIED PROCTOR DRY DENSITY IN ACCORDANCE WITH ASTM D1557. ALL OTHER TRENCHES TO BE COMPACTED PER CITY OF DETROIT REQUIREMENTS.
4. PHYSICAL CONNECTIONS SHALL NOT BE MADE TO WATER OR SANITARY LINES WITHOUT MEETING THE REQUIREMENTS OF THE GOVERNING AUTHORITY FOR TESTING, OBSERVATION, ETC. CONTRACTOR MUST COORDINATE WITH AUTHORITY DURING CONSTRUCTION.
5. BACKFILL AND BEDDING FOR ALL SEWERS LEADS SHALL BE IN ACCORDANCE WITH THE CITY OF DETROIT STANDARDS.
6. ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS ONLY AND HAVE BEEN COMPILED FROM THE LATEST AVAILABLE MAPPING. THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
7. GENERAL CONTRACTOR TO COORDINATE WITH THE LOCAL UTILITY COMPANIES FOR ALL LOCATIONS AND CONNECTIONS. A PRE-CONSTRUCTION MEETING WITH THE VARIOUS UTILITY PROVIDERS IS REQUIRED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY.
8. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY THE ELEVATION AND LOCATION OF ALL UTILITIES BY VARIOUS MEANS PRIOR TO BEGINNING ANY EXCAVATION. TEST PITS SHALL BE DUG AT ALL LOCATIONS WHERE SEWERS CROSS EXISTING UTILITIES, AND THE HORIZONTAL AND VERTICAL LOCATIONS OF THE UTILITIES SHALL BE DETERMINED. THE CONTRACTOR SHALL CONTACT THE OWNER OR ENGINEER IN THE EVENT OF ANY UNFORESEEN CONFLICTS BETWEEN EXISTING AND PROPOSED UTILITIES SO THAT AN APPROPRIATE MODIFICATION MAY BE MADE.
9. THE CONTRACTOR SHALL ENSURE THAT ALL UTILITY COMPANIES AND MUNICIPALITY STANDARDS FOR MATERIALS AND CONSTRUCTION METHODS ARE MET. THE CONTRACTOR SHALL PERFORM PROPER COORDINATION WITH THE RESPECTIVE UTILITY COMPANY. THE CONTRACTOR SHALL COORDINATE WORK TO BE PERFORMED BY THE VARIOUS UTILITY COMPANIES AND SHALL PAY ALL FEES FOR CONNECTIONS, DISCONNECTIONS, RELOCATIONS, INSPECTIONS, AND DEMOLITION.
10. ALL VALVE BOXES AND CURB BOXES SHALL BE ADJUSTED TO THE FINAL GRADES. ALL CURB BOXES SHALL BE LOCATED IN GRASSED AREAS UNLESS OTHERWISE NOTED ON THE PLANS.
11. MAINTAIN ADEQUATE SEPARATION BETWEEN SANITARY AND WATER SERVICES IN ACCORDANCE WITH CITY REQUIREMENTS.
12. ALL EXISTING PAVEMENT WHERE UTILITY PIPING IS TO BE INSTALLED SHALL BE SAW CUT AND REPLACED IN ACCORDANCE WITH THE PAVEMENT REPAIR REQUIREMENTS OF THE GOVERNING AUTHORITY.
13. RESTORE ALL DISTURBED GREENBELT AREAS TO PRE-CONSTRUCTION CONDITION IN ACCORDANCE WITH THE REQUIREMENTS OF THE GOVERNING AUTHORITY. UNLESS OTHERWISE INDICATED BY THE GOVERNING AUTHORITY, DISTURBED GREENBELTS AREAS SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE AND A MINIMUM OF 3" TOPSOIL, SEED AND MULCH APPLIED.

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
ENGINEER
No. 6201049305
LICENSED PROFESSIONAL ENGINEER

03.12.2024

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Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	1" = 80'

Issue Date:	Issued for:
02.21.2024	Revised & Reissued for Reg. Review
01.25.2024	Revised & Reissued for Reg. Review
12.22.2023	Revised & Reissued for Reg. Review
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02.13.2023	Revised & Reissued for Reg. Review
01.24.2023	Revised & Reissued for Reg. Review
11.29.2022	Issued for Regulatory Review

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

SITE GRADING PLAN

Drawing Number

C2

ZFE Project No.	RA Duthler Project No.
22077	220712

KEY NOTES

1. DOWNSTREAM OF OUTLET CONTROL STRUCTURE (OCS–1) INSTALL A 12"ø CHECKMATE ULTRAFLEX IN–LINE CHECK VALVE B RED VALVE COMPANY, INC. (OR APPROVED EQUAL) ON THE EXISTING COMBINE SEWER LINE. VERIFY SIZE OF EXISTING OUTLET PIPE PRIOR TO ORDERING TO ENSURE THE CORRECT DIAMETER FOR THE EXISTING PIPE. MATCH DIAMETER OF EXISTING PIPE.

2. INSTALL ANTI–SEEPAGE COLLAR, PER DETAIL ON THE DETENTION BASIN OUTLET PIPE PRIOR TO THE PIPE FOR ENTERING NEW 4' MH TO REPLACE EX. CB 515. ALL JOINTS FROM OCS–1 TO PROPOSED 4' STRUCTURE SHALL BE WATERTIGHT JOINTS.

3. MH–1 SHALL HAVE A SOLID LID ONLY, EJIW 1040 TYPE A OR EQUAL, INSTALLED

4. INSTALL 6" HDPE DRAIN PIPE FROM BOTTOM OF DETENTION POND ELEVATION 580.0 (APPROX). TO 4' DIAMETER PRECAST GATE VALVE & STRUCTURE (SEE DETAIL). CONNECT 6" HDPE OUTLET FROM PRECAST GATE VALVE STRUCTURE TO MH–1 AT ELEVATION 579.64 (VERIFY)

SITE UTILITY AND GRADING LEGEND

PIPE CONTENTS	ABBREVIATIONS
GAS	NATURAL GAS
SAN	SANITARY SEWER
STM	STORM SEWER
WTR	WATER
FM	FORCE MAIN

PIPE MATERIAL	ABBREVIATIONS
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
DIP	DUCTILE IRON PIPE
NRCP	NON–REINFORCED CONCRETE PIPE
PE	POLYETHYLENE
PE PERF.	POLYETHYLENE PIPE PERFORATED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

12" STM — STORM SEWER & MANHOLE

CATCH BASIN

6" U.D. — UNDERDRAIN

ADJ — ADJUST EX. STRUCTURE CASTINGS

505 — PROPOSED CONTOUR ELEVATION

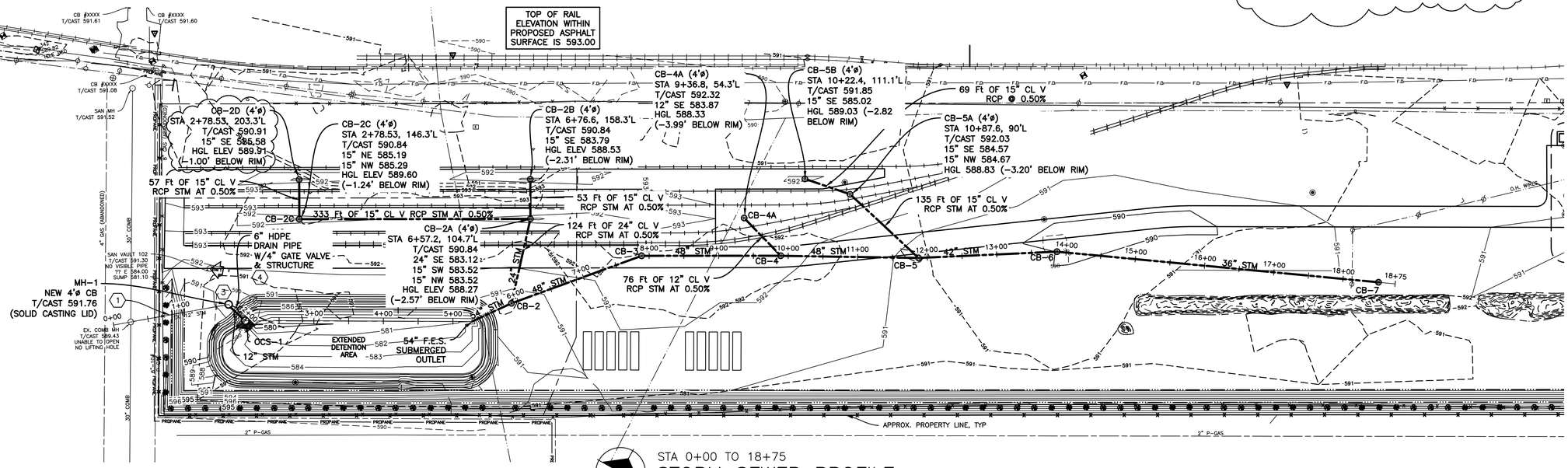
10–YEAR HYDRAULIC GRADE LINE (HGL)

HYDRAULIC GRADE LINE CALCULATIONS

EXTENDED DETENTION BASIN ELEVATION (SHOWN IN PROFILE VIEW)

LOCATION		10 YEAR HGL		HGL √
STRUCTURE LABEL		SLOPE	HEADLOSS IN PIPE	"Upstream" HGL ELEV.	Dist. Between Water Level and Rim
UPSTREAM	DOWNSTREAM	ft/ft	ft	ft	ft
		S'	H	HGL	
	CB-7				
CB-7	CB-6	0.0009	0.4062	589.18	2.14
	CB-5B				
CB-5B	CB-5A	0.0028	0.1946	589.03	2.82
CB-5A	CB-5	0.0027	0.3690	588.83	3.20
CB-6	CB-5	0.0011	0.3067	588.77	1.23
CB-4A	CB-4	0.0006	0.0452	588.33	3.99
CB-5	CB-4	0.0009	0.1743	588.46	2.27
CB-4	CB-3	0.0011	0.2249	588.29	3.74
	CB-2B				
CB-2B	CB-2A	0.0048	0.2527	588.53	2.31
CB-2A	CB-2	0.0036	0.4467	588.27	2.57
CB-3	CB-2	0.0012	0.2375	588.06	4.60
	CB-2D				
CB-2D	CB-2C	0.0055	0.3116	589.91	1.00
CB-2C	CB-2A	0.0053	1.7738	589.60	1.24
CB-2	FES-1	0.0009	0.0568	587.83	2.53
AREA 11	DET BASIN				
AREA 10A	DET BASIN				
FES-1	EXTENDED DETENTION ELEVATION 587.77				

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



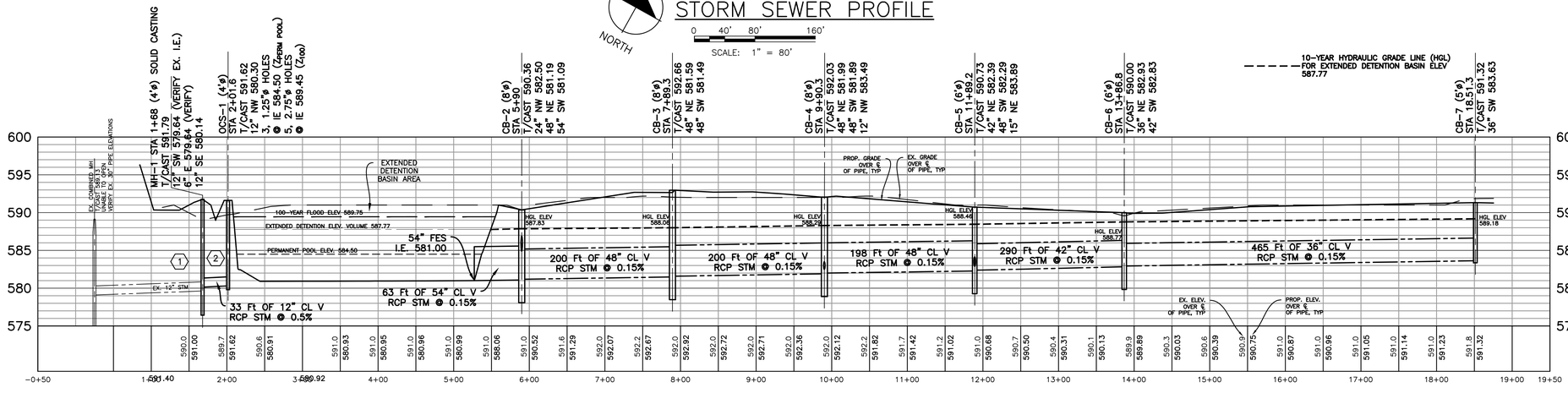
STA 0+00 TO 18+75

STORM SEWER PROFILE

NORTH

0 40' 80' 160'

SCALE: 1" = 80'



REVIEW DRAWING NOT FOR CONSTRUCTION PLOT DATE: 03.12.24

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX. FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

STATE OF MICHIGAN TAMMY ZIEMNICK FOSTER ENGINEER No: 6201049309 LICENSED PROFESSIONAL ENGINEER

03.12.2024

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11.29.2022	Issued for Regulatory Review

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

WEST STORM SEWER PLAN & PROFILE

Drawing Number

C2A

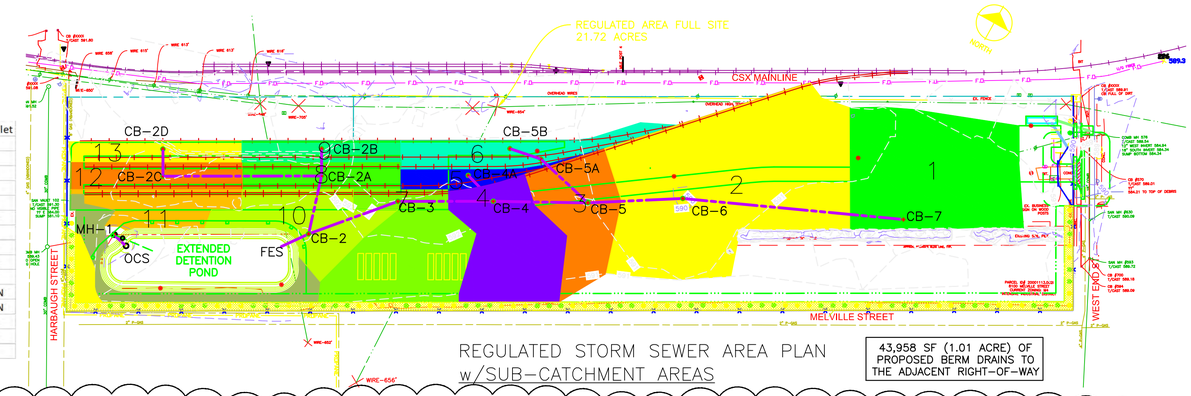
ZFE Project No.	RA Duthler Project No.
22077	220712

SITE AREA SUMMARY
TOTAL SITE AREA = 21.72 AC

DEVELOPMENT/CONSTRUCTION AREA = 12.63 AC

DEVELOPMENT AREA % OF TOTAL AREA =
12.63/21.72 = 58.2% > 50% OF TOTAL AREA

Area	No.	Square Feet (sf)	Acres (ac)	Drains to Inlet
Catchment Area	1	85,572	1.96	CB-7
Catchment Area	2	148,100	3.40	CB-6
Catchment Area	3	36,405	0.84	CB-5
Catchment Area	4	47,590	1.09	CB-4
Catchment Area	5	9,858	0.23	CB-4
Catchment Area	6	14,432	0.33	CB-5B
Catchment Area	7	56,418	1.30	CB-3
Catchment Area	8	19,057	0.44	CB-2A
Catchment Area	9	14,104	0.32	CB-2B
Catchment Area	10	34,998	0.80	CB-2
Catchment Area	10a	25,452	0.58	DET BASIN
Catchment Area	11	21,797	0.50	DET BASIN
Catchment Area	12	20,688	0.47	CB-2D
Catchment Area	13	15,706	0.36	CB-2D
		550,177 sf	12.63 acres	



REGULATED STORM SEWER AREA PLAN
w/SUB-CATCHMENT AREAS

43,958 SF (1.01 ACRE) OF PROPOSED BERM DRAINS TO THE ADJACENT RIGHT-OF-WAY

REVIEW DRAWING
NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

Know what's below. Call before you dig.

STORM SEWER PIPE DESIGN

LOCATION		AREA					CA			TIME			INTENSITY						DISCHARGE						PROFILE					DESIGN								10 YEAR	HGL	HGL √
STRUCTURE LABEL		GRASS	PAVEMENT	GRAVEL	INCR.	TOTAL	WEIGHTED C	INCR. C*A	CUM. C*A	TO INLET	IN PIPE	TOTAL	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR	PIPE LENGTH	"Upstream" INVERT OUT	"Downstream" INVERT IN	"Upstream" RIM	"Upstream" Cover Depth	COMPUTED DIAMETER	PIPE DIAMETER	PIPE DIAMETER	n VALUE	SLOPE	SLOPE	V FULL	PIPE CAPACITY	SLOPE	HEADLOSS IN PIPE	"Upstream" HGL ELEV.	Dist. Between Water Level and Rim
UPSTREAM	DOWNSTREAM	sq ft	sq ft	sq ft	acres	acres				min	min	min	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	cfs	cfs	cfs	cfs	cfs	cfs	ft	ft	ft	ft	ft	in	in	ft		ft/ft	%	ft/s	cfs	ft/ft	ft	ft	ft
		0.40	0.90	0.85	A	A'	C_AVG	C*A		T-	T_P	T_C=T-+T_P	i_2	i_5	i_10	i_25	i_50	i_100	Q_2=C_2*I_2*A	Q_5=C_5*I_5*A	Q_10=C_10*I_10*A	Q_25=C_25*I_25*A	Q_50=C_50*I_50*A	Q_100=C_100*I_100*A	L					D_COMP	D	D	n	S		V_FULL	Q_FULL	S_F	H	HGL	
AREA 1	CB-7		10737.67	74834.33	1.96	1.96	0.86	1.68	1.68	0	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	7.47	9.29	10.90	13.32	14.94	16.75																	
AREA 2	CB-7	CB-6		14654.44	133445.56	3.40	5.36	0.85	2.91	4.59	0	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	20.37	25.33	29.74	36.34	40.75	45.71	465	583.63	582.93	591.32	3.82	37.96	42	3.50	0.013	0.0015	0.15%	4.05	38.97	0.0009	0.4062	589.18	2.14
AREA 6		CB-5B		11992.00		0.28	0.28	0.90	0.25	0.25	5	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	1.10	1.37	1.61	1.96	2.20	2.47																	
AREA 6	CB-5B	CB-5A			14431.99	0.33	0.61	0.85	0.28	0.53	0	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	2.35	2.92	3.43	4.19	4.70	5.27	69	585.02	584.67	591.85	5.34	13.47	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0028	0.1946	589.03	2.82
AREA 6	CB-5A	CB-5				0.00	0.61		0.00	0.53	0	0.31	5.31	4.37	5.43	6.38	7.79	8.74	9.80	2.31	2.88	3.38	4.12	4.63	5.19	135	584.57	583.89	592.03	5.96	13.40	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0027	0.3690	588.83	3.20
AREA 3	CB-6	CB-5	250.00		36155.00	0.84	6.20	0.85	0.71	5.30	0	0.60	5.91	4.22	5.26	6.18	7.53	8.46	9.48	22.37	27.86	32.72	39.89	44.80	50.24	290	582.83	582.39	590.00	3.30	39.34	42	3.50	0.013	0.0015	0.15%	4.05	38.97	0.0011	0.3067	588.77	1.23
AREA 5	CB-4A	CB-4	5636.00		4222.00	0.23	0.23	0.59	0.13	0.13	5	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	0.60	0.74	0.87	1.06	1.19	1.34	76	583.87	583.49	592.32	7.20	8.05	12	1.00	0.013	0.0050	0.50%	3.21	2.52	0.0006	0.0452	588.33	3.99
AREA 4	CB-5	CB-4	3784.00		43806.00	1.09	7.90	0.81	0.89	6.72	0	0.39	5.39	4.34	5.40	6.35	7.75	8.69	9.75	29.17	36.30	42.61	52.03	58.38	65.47	198	582.29	581.99	590.73	4.03	43.44	48	4.00	0.013	0.0015	0.15%	4.43	55.63	0.0009	0.1743	588.46	2.27
AREA 7	CB-4	CB-3	5271.00	7610.00	43537.00	1.30	9.42	0.81	1.06	7.90	0	0.75	6.14	4.16	5.19	6.09	7.42	8.34	9.35	32.92	41.02	48.17	58.68	65.94	73.93	200	581.89	581.59	592.03	5.72	45.48	48	4.00	0.013	0.0015	0.15%	4.43	55.63	0.0011	0.2249	588.29	3.74
AREA 9		CB-2B		9658.00	5329.00	0.34	0.34	0.88	0.30	0.30	5	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	1.35	1.68	1.97	2.40	2.70	3.02																	
AREA 8	CB-2B	CB-2A		11312.00	7745.00	0.44	0.78	0.88	0.38	0.69	0	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	3.06	3.80	4.46	5.45	6.11	6.86	53	583.79	583.52	590.84	5.56	14.87	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0048	0.2527	588.53	2.31
AREA 10	CB-2A	CB-2		7713.00	27285.00	0.80	2.42	0.86	0.69	2.12	0	0.24	5.24	4.39	5.46	6.41	7.83	8.79	9.85	9.30	11.57	13.58	16.59	18.60	20.86	124	583.12	582.50	590.84	5.47	22.57	24	2.00	0.013	0.0050	0.50%	5.09	16.00	0.0036	0.4467	588.27	2.57
AREA 10	CB-3	CB-2				0.00	9.42		0.00	7.90	0	0.41	5.64	4.28	5.33	6.26	7.64	8.58	9.62	33.86	42.16	49.50	60.39	67.79	76.02	200	581.49	581.19	592.66	6.75	45.95	48	4.00	0.013	0.0015	0.15%	4.43	55.63	0.0012	0.2375	588.06	4.60
AREA 13		CB-2D		10651.00	5055.00	0.36	0.36	0.88	0.32	0.32	5	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	1.42	1.76	2.07	2.52	2.83	3.17																	
AREA 12	CB-2D	CB-2C		12825.00	7863.00	0.47	0.84	0.88	0.42	0.74	0	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	3.27	4.07	4.78	5.84	6.55	7.34	57	585.58	585.29	590.84	3.76	15.26	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0055	0.3116	589.91	0.93
	CB-2C	CB-2A				0.00	0.84		0.00	0.74	0	0.26	5.26	4.38	5.45	6.40	7.81	8.76	9.83	3.23	4.02	4.71	5.76	6.46	7.24	333	585.19	583.52	590.84	4.16	15.18	15	1.25	0.013	0.0050	0.50%	3.72	4.57	0.0053	1.7738	589.60	1.24
	CB-2	FES-1				0.00	11.84		0.00	10.02	0	1.49	6.75	4.02	5.02	5.89	7.16	8.06	9.04	40.29	50.27	59.05	71.80	80.79	90.56	63	581.09	581.00	590.36	4.31	49.09	54	4.50	0.013	0.0015	0.15%	4.79	76.16	0.0009	0.0568	587.83	2.53
	AREA 11	DET BASIN		10658.00	11139.00	0.50	0.50	0.87	0.44	0.44	5	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	1.94	2.42	2.84	3.47	3.89	4.36																	
	AREA 10A	DET BASIN	12260.00	1334.00	11858.00	0.58	0.58	0.64	0.37	0.37	5	0.00	5.00	4.44	5.52	6.48	7.92	8.88	9.96	1.65	2.05	2.41	2.94	3.30	3.70																	
	FES-1																																						587.77	

Site C Value Calculation of New Developed Area

AREA	UNITS	GRASS 0.40	CONCRETE 0.90	GRAVEL 0.85	TOTAL AREA	CUMULATIVE AREA	WEIGHTED C
Proposed Site Areas	sf	78,722	136,342	731,158	946,222		0.82
	acres	1.81	3.13	16.79	21.72	0.00	
SITE TOTAL	sf	78,722	136,342	731,158	946,222	0	0.82
	acres	1.81	3.13	16.79	21.72	0.00	

WEIGHTED SITE C_{prop} VALUE = 0.820

Site C Value Calculation of New Developed Area

AREA	UNITS	GRASS 0.40	CONCRETE 0.90	GRAVEL 0.85	TOTAL AREA	CUMULATIVE AREA	WEIGHTED C
Existing Site Areas	sf	78,722	1,910	865,590	946,222		0.81
	acres	1.81	0.04	19.87	21.72	0.00	
SITE TOTAL	sf	78,722	1,910	865,590	946,222	0	0.81
	acres	1.81	0.04	19.87	21.72	0.00	

WEIGHTED SITE C_{ex} VALUE = 0.813

Proposed Storm Basin Sizing

Area	Elevation	Depth	Incremental Volume, V_i	Cumulative Volume	
32101	584.5			0	Elev of permanent pool
33403	585	0.5	16,375	16,375	584.50
36050	586	1	34,718	51,093	V_{ED} storage volume
41513	587	1	38,749	89,842	is reached at elev.
44330	588	1	42,914	132,756	587.77
47203	589	1	45,759	178,515	
50133	590	1	48,660	227,175	100-year storage volume
53119	591	1	51,619	278,794	is reached at elev
					589.45

Basin Water Depth 6.50 ft
Basin Mean Depth 4.38 ft

Total Storage Volume Provided 278,794 cf
6.40 acre-ft

Total Storage Volume Required 200,295 cf
4.60 acre-ft

otal Storage Volume Required Extended Detention 122,816 cf
2.82 acre-ft

Pyrimoidal Equation

$V_i = (E2-E1)/3*(A_1+A_2+(A_1*A_2)^2$, where

V_i = Incremental Volume (cf)
A_1 = Area at elevation E_1 (cf)
A_2 = Area at elevation E_2 (cf)
E_1 = Lower Elevation (ft)
E_2 = Higher Elevation (ft)

Total Regulated Area (A) 946,222 sf $C_{pre\text{-}develop}$= 0.813 Q_r= 0.15 cfs/acre allowable peak discharge per acre
21.722 Acres $C_{post\text{-}develop}$= 0.820

Water Quality
Extended Detention Alternative Compliance Measures

V_{ED}= 6,897 * C * A
122,816 cft

Infrastructure 2-year peak flow control
Difference Cpre-develop and Cpost-develop
ΔC= 0.007

$V_{2\text{-}yr}$= 6,897 * ΔC * A
$V_{2\text{-}yr}$= 1014 cft

Flood Control for 100-year, 24-hour storm (Regulated Area > 5 acres)

Critical Storm Duration D_{100}
D_{100}= 50*[(Q_r/C)]$^{-0.984}$ Equation 4-8
D_{100}= 266 minutes

Design Storm Intensity (*i*)
i = (38.42*T$^{-0.208}$) / (12.33 + D_{100})$^{0.841}$ Equation 4-1
i = 0.880 in/hour T= 100 years

Required Detention Pond Storage, C
V_{100}= (60.5 * D_{100} * C * A* *i*) - (60 * D_{100} * Q_R * A) Equation 4-9
V_{100}= 200,295 cft

CONTROL OUTLET STRUCTURE DESIGN

Sizing Outlet Structure Holes for Extended Detention

Water Quality (ex detention) discharge should be released within time perio 48 hours

Q_{avg}=	0.71	cfs	Q = V_{ED}/(3600*T)		
h_{avg}=	1.635	ft	0.5 * [(Z_{ED} - $Z_{perm\ pool}$)]		
A=	0.1117167	ft^2	Q_{avg} / (C x ((2*g*h_{avg})^0.5))		
Hole Dia.	1.5	inches	Area of hole=	0.012272	ft^2
# of Holes=	9.1034981				
Use	3	holes	@ elevation	584.50	$Z_{perm\ pool}$
A_{actual}=	0.0368155	ft^2			
$Q_{ED\ actual}$=	0.7026611	cfs	Q_{actual}=C x A_{actual} x (2*g*h_{avg})^0.5		
Actual Time=	48.55	hours			
$T_{ED\ actual}$ is within	1%	of	48	hours	OK

Sizing for 100-year Flood Control Volume

Flood Control discharge should be released within time period 24 hours

Q_{allow}=	3.258	cfs	Q_{allow} * Total Area		
Q_0=	2.555		Q_{allow}-$Q_{ED\ actual}$		
h_{100}=	4.95	ft	(Z_{100}-$Z_{perm\ pool}$)		
A_{100}=	0.23084	ft^2	Q_0/C x ((2*g*h_{100})^0.5)		
Hole Dia.=	2.75	inches	Area of hole=	0.041247	ft^2
Hole # =	5.60				
Use	5	holes	@ elevation	589.45	Z_{100}
$A_{100(actual)}$=	0.2062352	ft^2	# of holes * Area of hole		
$Q_{100\ actual}$=	2.2829689	cfs	C x A_{actual} x ((2*g*h_{100})^0.5)		
Actual T_{100} =	24.37	hours	V_{100}/($Q_{100\ actual}$ * 3600)		
T_{100} is within	2%	of	24	hours	OK
$Q_{0\ actual\ total}$=	2.986	cfs	LESS THAN	Q_{allow} =	3.258 cfs
	0.137	cfs/acre			OK

100-YEAR ORIFICES NOT NEEDED BASED ON DWSD PLAN REVIEW COMMENT DATED 02-20-2024

Emergency Overflow Casting Height Calculation

Q_{allow}=	3.258	cfs	Q_{allow} for regulated area	
A_{emerg}=	1.94444	ft^2		
h_{emerg}=	0.0971388	ft	[Qallow/(5.376*A)]^2	
	1.1656651	ft		
$Z_{100\text{-}yr\ /\ emerg}$=	590.62	min	Z_{100}+h_{emerg}	Set Casting Height for Emergency Overflow

w/MDOT Type E Casting
Opening area (A) 280 in^2
1.944444444 ft^2

Summary of Controlling Input Factors			
Q_{allow}=	0.15	cfs/ac	Impervious
Q_0=	3.258	cfs	Impervious
V_{ff}=	1,014	ft^3	
V_{ED}=	122,816	ft^3	
V_{100}=	200,295	ft^3	
Z_{ff}=	controlled by extended detention		
Z_{ED}=	587.77		
Z_{100}=	589.45		
Z_{out}=	580.30		
$Z_{perm\ pool}$=	584.50		
C=	0.62	sharp-crested weir	
g=	32.2	ft/sec	
T_{ff}=		hours	
T_{ED}=	48	hours	
T_{100}=	24	hours	
Total Regulated Area =	21.72	acres	
	946,222	sf	

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
ENGINEER
No. 6201049309
REGISTERED PROFESSIONAL ENGINEER

03.12.2024

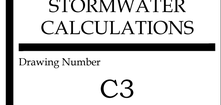
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Location Map



NO SCALE

Project Manager: TZF
Reviewed By: JWF
Engineer: TZF
Drafter: TZF
Drawing Scale: AS NOTED

Issue Date: Issued for:

02.21.2024	Revised & Reissued for Reg. Review
01.25.2024	Revised & Reissued for Reg. Review
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10.04.2023	Revised & Reissued for Reg. Review
09.01.2023	Revised & Reissued for Reg. Review
04.27.2023	Revised & Reissued for Reg. Review
02.13.2023	Revised & Reissued for Reg. Review
01.24.2023	Revised & Reissued for Reg. Review
11.29.2022	Issued for Regulatory Review

Project Name

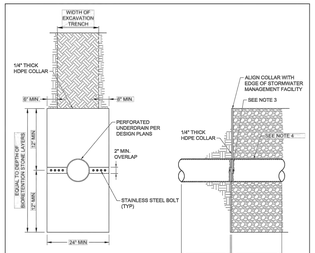
Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title
STORMWATER CALCULATIONS

Drawing Number
C3

ZFE Project No. 22077 | RA Duthler Project No. 220712



SECTION
ANTI-SEEP COLLAR

DETAIL A
UNDERDRAIN CONNECTION WITH ANTI-SEEP COLLAR

NOTES:
1. DIMENSION "H" SHALL BE MINIMUM OF 3X THE DIAMETER OF THE INTERSECTION PIPE.
2. COLLAR SHALL BE CONSTRUCTED OF HDPE. BOLTS SHALL BE GRADE 304 STAINLESS STEEL.
3. SEAL SURFACE OF PIPE AND ANTI-SEEP COLLAR WITH NON-SHRINK FLEXIBLE SEALANT THAT WILL ADHERE TO HDPE.
4. PIPE MATERIAL AND ID SNG WILL VARY BY FUNCTION.
5. THE PURPOSE OF THE ANTI-SEEP COLLAR IS TO PREVENT WATER STORED IN THE RESERVOIR LAYER FROM EXITING THE STORMWATER FACILITY THROUGH THE TRENCH BACKFILL AND RE-INFILTRATING INTO THE SEWER MAIN.

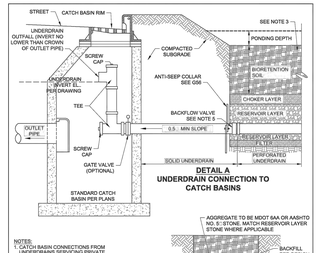
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REVISIONS

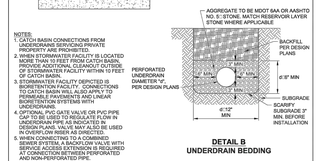
STORMWATER FACILITY ANTI-SEEP COLLAR

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 12/20/18 | DWG. No. G/56



DETAIL A
UNDERDRAIN CONNECTION TO CATCH BASINS



DETAIL B
UNDERDRAIN BEDDING

NOTES:
1. CATCH BASIN CONNECTIONS FROM UNDERDRAINS SERVICING PRIVATE PROPERTY ARE PROHIBITED.
2. WHEN STORMWATER FACILITY IS LOCATED MORE THAN 10 FEET FROM CATCH BASIN, UNDERDRAIN SHALL BE CONNECTED TO BOTTOM OF STORMWATER FACILITY WITHIN 10 FEET OF CATCH BASIN.
3. WHEN STORMWATER FACILITY DEPICTED IS BIORETENTION FACILITY, CONNECTIONS TO CATCH BASIN WILL ALSO APPLY TO PERMEABLE PAVEMENTS AND LINEAR BIORETENTION SYSTEMS WITH UNDERDRAIN.
4. OPTIONAL PVC GATE VALVE OR PVC PIPE CAP TO BE USED TO REGULATE FLOW IN UNDERDRAIN. SEE CITY STANDARD DESIGN PLANS. VALVE MAY ALSO BE USED IN OVERFLOW RISER AS DIRECTED.
5. WHEN CONNECTING TO A COMBINED SEWER SYSTEM, A BACKFLOW VALVE WITH ACCESS MANHOLE AND CLEANOUT IS REQUIRED AT CONNECTION BETWEEN PERFORATED AND NON-PERFORATED PIPE.

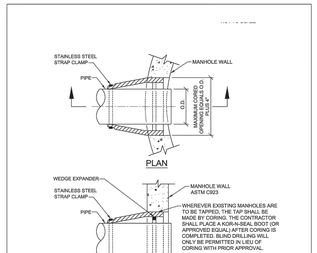
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REVISIONS

STORMWATER FACILITY UNDERDRAIN BEDDING AND CATCH BASIN CONNECTION

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: G/53
DATE: 12/20/18 | DWG. No.



NOTE:
1. ALL NEW PIPE OPENINGS FOR PROPOSED MANHOLES SHALL BE MADE BY MANHOLE MANUFACTURER.

WATERTIGHT RESILIENT CONNECTOR
FOR CONNECTING PROPOSED PIPES TO EXISTING MANHOLES AND EXISTING PIPES TO PROPOSED MANHOLES

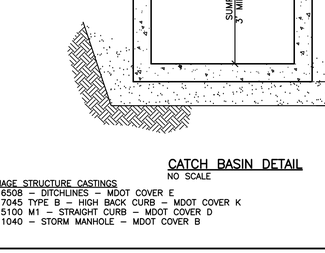
REV.	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

SEWER PIPE CONNECTION WITH MANHOLE

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 9/2018 | DWG. No. 333111-05



NOTES:
1. REFER TO DETAIL SHEET 330581-05 FOR MANHOLE ASSEMBLY TABLE □.
2. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ALL THE REQUIREMENTS OF "SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS" ASTM C-4□8 WITH SINGLE OFF-SET □ONT CONFORMS TO ASTM C-443.
3. EACH SECTION SHALL HAVE NOT MORE THAN TWO HOLES FOR HANDLING PURPOSES. THESE HOLES SHALL BE SATISFACTORILY PLUGGED WITH GROUT AFTER INSTALLATION.

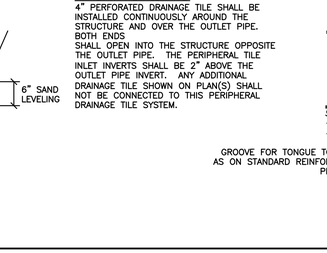
REV.	DESCRIPTION	DATE

REVISIONS

STANDARD MANHOLE PRECAST

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 09/2018 | DWG. No. 330581-03



□NA NOT AVAILABLE

NOTES:
1. SOME DIMENSIONS MAY VARY BY MANUFACTURER, DESIGN ENGINEER SHALL ENSURE DETAIL MEETS SHAD REQUIREMENTS.
2. SEE DETAIL SHEET 330581-05 FOR STANDARD MANHOLE PRECAST DESIGN.

MANHOLES ASTM C-4□8
WEIGHTS AND DIMENSIONS - US CUSTOMARY

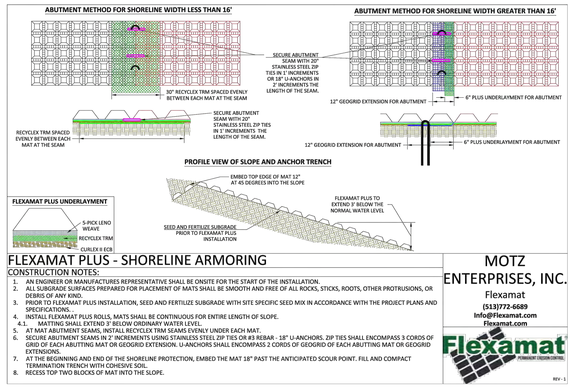
REV.	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

MANHOLE, ASSEMBLY

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE: NONE | SHEET: 1 OF 1
DATE: 09/2018 | DWG. No. 330581-05



FLEXAMAT PLUS - SHORELINE ARMORING

CONSTRUCTION NOTES:
1. AN ENGINEER OR MANUFACTURES REPRESENTATIVE SHALL BE ONSITE FOR THE START OF THE INSTALLATION.
2. ALL SUBGRADE SURFACES PREPARED FOR PLACEMENT OF MATS SHALL BE SMOOTH AND FREE OF ALL ROCKS, STICKS, ROOTS, OTHER PROTRUSIONS, OR DEBRIS OF ANY KIND.
3. PRIOR TO FLEXAMAT PLUS INSTALLATION, SEED AND FERTILIZE SUBGRADE WITH SITE SPECIFIC SEED MIX IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
4. INSTALL FLEXAMAT PLUS ROLLS, MATS SHALL BE CONTINUOUS FOR ENTIRE LENGTH OF SLOPE.
   4.1. MATTING SHALL EXTEND 3' BELOW ORDINARY WATER LEVEL.
5. AT MAT ABUTMENT SEAMS, INSTALL RECYCLEX TRM SEAMS EVENLY UNDER EACH MAT.
6. SECURE ABUTMENT SEAMS IN 2' INCREMENTS USING STAINLESS STEEL ZIP TIES OR #3 REBAR - 18" U-ANCHORS. ZIP TIES SHALL ENCOMPASS 3 CORDS OF GRID OF EACH ABUTTING MAT OR GEOGRID EXTENSION. U-ANCHORS SHALL ENCOMPASS 2 CORDS OF GEOGRID OF EACH ABUTTING MAT OR GEOGRID EXTENSIONS.
7. AT THE BEGINNING AND END OF THE SHORELINE PROTECTION, EMBED THE MAT 18" PAST THE ANTICIPATED SCOUR POINT. FILL AND COMPACT TERMINATION TRENCH WITH COHESIVE SOIL.
8. RECESS TOP TWO BLOCKS OF MAT INTO THE SLOPE.

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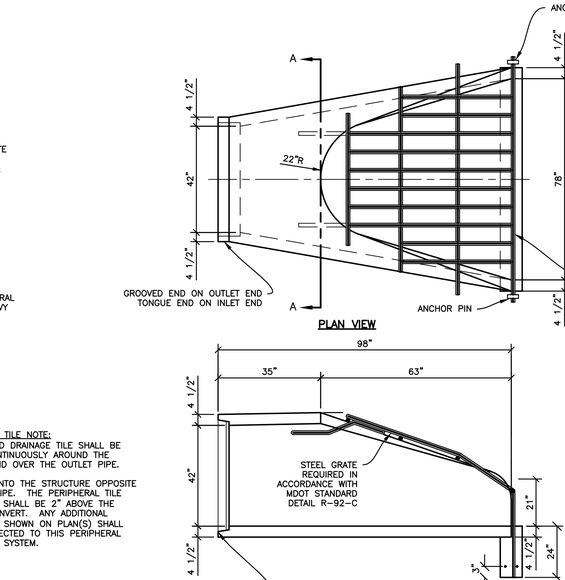
REV - 1

DETENTION POND BUFFER STRIP SURFACE TREATMENT (15' WIDE MIN.) SECTION DETAIL
SCALE: AS NOTED

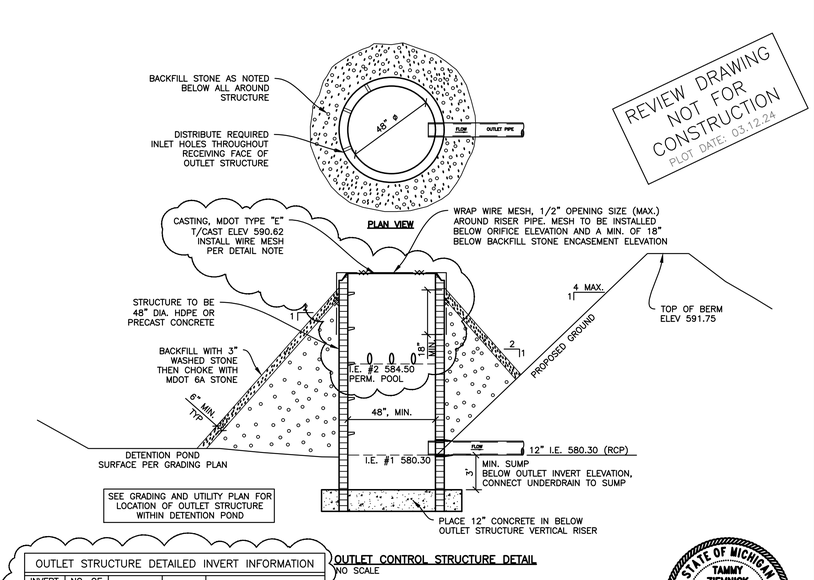
CATCH BASIN DETAIL
NO SCALE

4" PERFORATE TILE NOTE:
4" PERFORATED DRAINAGE TILE SHALL BE INSTALLED CONTINUOUSLY AROUND THE STRUCTURE AND OVER THE OUTLET PIPE. BOTH ENDS SHALL OPEN INTO THE STRUCTURE OPPOSITE THE OUTLET PIPE. THE PERIPHERAL TILE INLET INVERTS SHALL BE 2" ABOVE THE OUTLET PIPE INVERT. ANY ADDITIONAL DRAINAGE TILE SHOWN ON PLAN(S) SHALL NOT BE CONNECTED TO THIS PERIPHERAL DRAINAGE TILE SYSTEM.

DRAINAGE STRUCTURE CASTINGS
EJIW 6508 – DITCHLINES – MDOT COVER E
EJIW 7045 TYPE B – HIGH BACK CURB – MDOT COVER K
EJIW 5100 M1 – STRAIGHT CURB – MDOT COVER D
EJIW 1040 – STORM MANHOLE – MDOT COVER B



42" FLARED END SECTION DETAIL
NO SCALE



OUTLET STRUCTURE DETAILED INVERT INFORMATION				
INVERT NO.	NO. OF HOLES	HOLE DIA.	ELEV.	DESCRIPTION
1	N/A	N/A	580.30	12" RCP OUTLET PIPE SUBMERGED OUTLET
2	3	1.5" ø	584.50	PERMANENT POOL ELEVATION

OUTLET CONTROL STRUCTURE DETAIL
NO SCALE

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
ENGINEER
No. 6201049309
LICENSED PROFESSIONAL ENGINEER

03.12.2024

EXHIBIT B - STORM WATER OPERATION AND MANAGEMENT SYSTEM LONG-TERM MAINTENANCE PLAN

A. Physical Limits of the Storm Water Management System

The storm water management system (SWMS) subject to this long-term maintenance plan (Plan) is depicted on Sheets C2A and C2B (attached) to the permit and includes without limitation the storm sewers, swales, catch basins, manholes, inlets, bioretention system, detention system, outlet control structure and outlet pipe that conveys flow from the stormwater detention system to an existing combined sewer manhole in Harbaugh Street that outlets to an existing 30-inch combined sewer. For the purposes of this plan, the SWMS and all of its components as shown in Sheets C2A and C2B are referred to as "Crown Melville Rail Yard SWMS".

B. Time Frame for Long-Term Maintenance Responsibility

Crown Enterprises, LLC is responsible for maintaining the Crown Melville Rail Yard SWMS including complying with applicable requirements of the City of Detroit or Wayne County soil erosion and sedimentation control program until the City of Detroit releases the construction permit. Long-term maintenance responsibility for the Crown Melville Rail Yard SWMS commences when defined by the maintenance permit issued by the City of Detroit. Long-term maintenance continues in perpetuity.

C. Manner of Insuring Maintenance Responsibility

Crown Enterprises, LLC has assumed responsibility for long-term maintenance Crown Melville Rail Yard SWMS.

To ensure that the Crown Melville Rail Yard's SWMS is maintained in perpetuity, the map of the physical limits of the storm water management system on Sheets C2A and C2B, this plan (Exhibit B), will be recorded with the Wayne County Register of Deeds. Upon recording, a copy of the recorded documents will be provided to the City of Detroit.

D. Long-Term Maintenance Plan and Schedule

Table 1 identifies the maintenance activities to be performed, organized by category (monitoring/inspections, preventative maintenance and remedial actions). Table 1 also identifies site-specific work needed to ensure that the storm water management system functions properly as designed.

TABLE 1
STORM WATER MANAGEMENT SYSTEM LONG-TERM MAINTENANCE SCHEDULE

MAINTENANCE ACTIVITIES	SYSTEM COMPONENTS: Storm Collection System (Catch Basins, Manholes)	Bioretention and Detention System	Basin Inlets, Outlets & Gratings	Outlet Control Structures	Gravel and Pavement Areas	FREQUENCY
Monitoring/Inspection						
Inspect for Sediment Accumulation/Clogging	X	X	X	X	X	Annually
Inspect for Floatables, Dead Vegetation & Debris	X	X	X	X	X	Annually & After Major Events
Inspect for Erosion & Integrity of System and banks and berms	X	X	X		X	Annually & After Major Events
Inspect all components during wet weather & compare to Record Drawings	X	X	X	X	X	Annually
Monitor Plantings/Vegetation		X				Minimum of 2 times/ year
Ensure Maintenance Access Remain Open/Clear	X	X	X	X	X	Annually
Preventative Maintenance						
Mowing		X				Up to 2 times / year
Remove Accumulated Sediments	X	X	X	X	X	As-Needed (See Note Below)
Remove Floatables, Dead Vegetation & Debris	X	X	X	X	X	As Needed
Replace or wash/reuse stone riser debris				X		Every 3 years; more frequently if needed
Sweeping of Paved Surfaces					X	As Needed
Remedial Actions						
Repair/Stabilize Areas of Erosion	X				X	As Needed
Replace Dead Plantings & Reseed Bare Areas	X	X				As Needed
Structural Repairs	X	X	X	X	X	As Needed
Make Adjustments/Repairs to Ensure Proper Functioning	X	X	X	X	X	As Needed
Oil and Gas Spills					X	Immediately

PROJECT:	PROPERTY OWNER:	ENGINEER:	DATE: 08/11/2023
Crown Melville	Crown Enterprises, LLC	Ziemnick Foster Engineering, LLC	
Rail Spur Development	8100 Melville Street	426 S. Clinton Street	
City of Detroit	Detroit, MI 48209	Grand Ledge, MI 48837	SHEET 1 OF 1
		517-627-8086	

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Location Map



NO SCALE

Project Manager: TZF
Reviewed By: JWF
Engineer: TZF
Drafter: TZF
Drawing Scale: AS NOTED

Issue Date: Issued for:

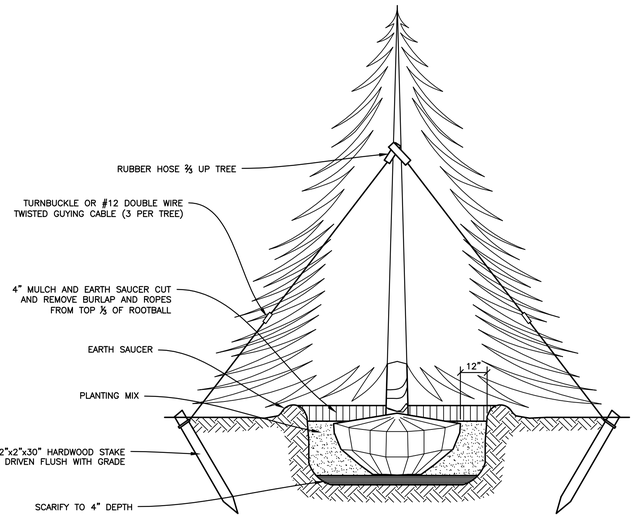
02.21.2024	Revised & Reissued for Reg. Review
01.25.2024	Revised & Reissued for Reg. Review
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10.04.2023	Revised & Reissued for Reg. Review
08.11.2023	Issued for Reg. Review

Project Name
Crown Enterprises, LLC
Wayne, Detroit, MI
Rail Advancement Project

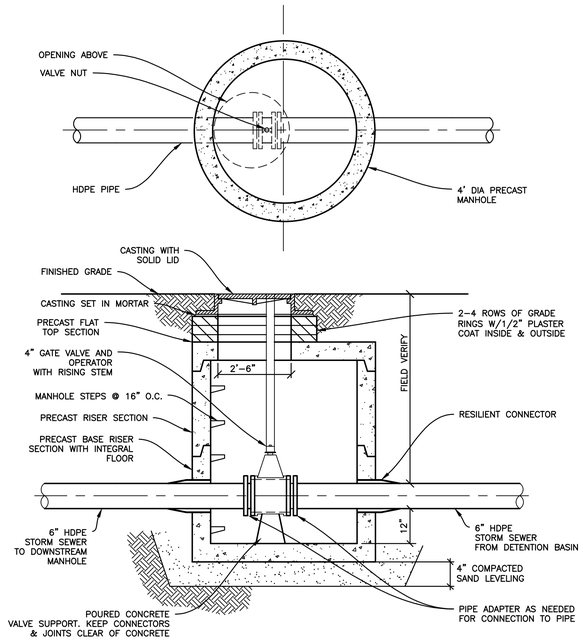
Drawing Title
STORMWATER DETAILS

Drawing Number
C3A

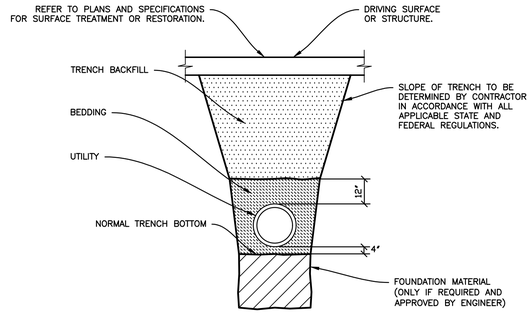
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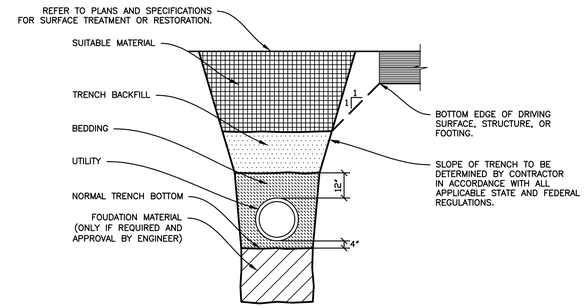
CONIFER PLANTING DETAIL: 6' HEIGHT AND GREATER
NO SCALE



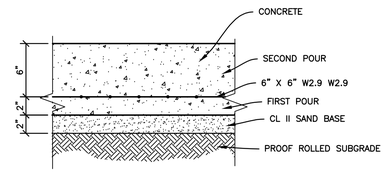
GATE VALVE & STRUCTURE
NO SCALE



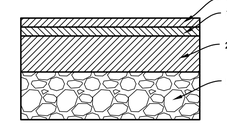
TRENCH BELOW DRIVING SURFACE OR STRUCTURE
NO SCALE



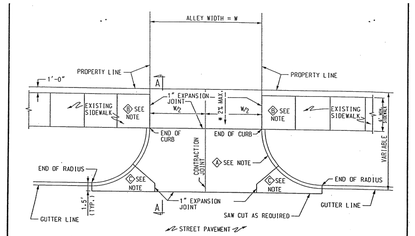
TRENCH ADJACENT TO DRIVING SURFACE OR STRUCTURE
NO SCALE



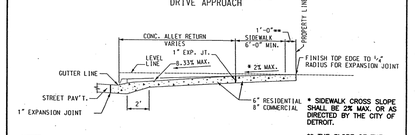
8" REINFORCED CONCRETE
NO SCALE



PAVEMENT SECTION
INDUSTRIAL HEAVY DUTY
NO SCALE



ALLEY RETURN OR COMMERCIAL DRIVE APPROACH



SECTION A-A

NOTES:
IF ALLEY IS PAVED, CONSTRUCT RETURN WITH 1" EXPANSION JOINT ON PROPERTY LINE.

Ⓑ RADIUS TO BE 10' UNLESS OTHERWISE SHOWN ON PAVING PLAN.

SIDEWALK FLAGS ABUTTING ALLEY SHALL BE 6" THICK. SIDEWALK SHALL BE REPLACED FOR A SMOOTH TRANSITION AND TO ATTAIN A CROSS SLOPE OF 2% MAX. OR AS DIRECTED BY THE CITY OF DETROIT.

Ⓚ KEY JOINT OR "B" JOINT IF REINFORCED PAVEMENT.

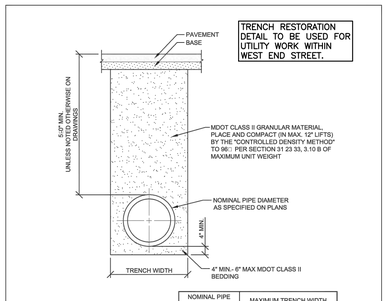
ALL DIMENSIONS ARE IN INCHES (") UNLESS OTHERWISE NOTED.

* SIDEWALK CROSS SLOPE SHALL BE 2% MAX. OR AS DIRECTED BY THE CITY OF DETROIT.

** THE SLOPE OF THE DRIVEWAY IN THE 1-FOOT SPACE ADJACENT TO THE PROPERTY LINE MAY BE ALTERED UP TO 10% TO MEET EXISTING CONDITIONS.

REV	DESCRIPTION	BY	APP'D	DATE
C	* SIDEWALK CROSS SLOPE	KSM	J.J.	2/1/07
B	METRIC TO ENGLISH UNIT SYSTEM	KSM	W.S.	N.H. 2/2/02
A	DESCRIPTION	Date	Dwn	Apvd	Spvr

PROPERTY OF BUREAU OF STREETS AND HIGHWAYS
DRAWN BY: K.S.M.
CHECKED BY: J.J.
APPROVED: ENGINEER OF STREETS
APPROVED: HEAD ENGINEER, CITY ENGINEER
CITY OF DETROIT
CITY ENGINEERING DIVISION, D.P.W.
STANDARD PLAN FOR
DETAIL OF ALLEY RETURN AND DRIVE APPROACH
01/07/08 PLAN DATE | DRAWING NO. 7 | DETAIL STANDARD NO. C-4384 | SHEET 1 OF 2



TRENCH RESTORATION DETAIL TO BE USED FOR UTILITY WORK WITHIN WEST END STREET.

NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:
1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. REFER TO PAVEMENT RESTORATION DETAILS FOR BASE AND PAVEMENT WIDTH.
3. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

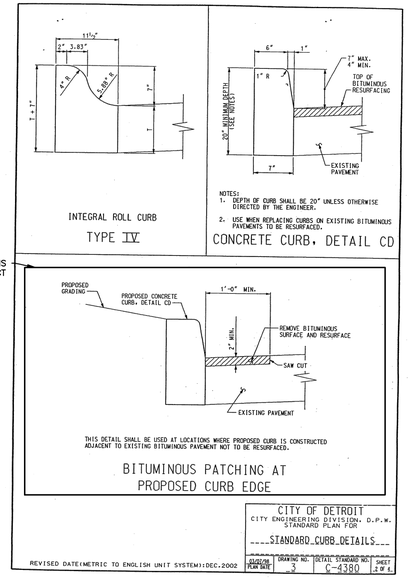
STANDARD TRENCH DETAIL FOR WATER MAIN UNDER ROAD BED, PARKING LOTS, SIDEWALKS, DRIVEWAYS, CURBS, GRAVEL ROADS AND ALLEYS

REV	DESCRIPTION	DATE
1	UPDATED	5/2020
REVISIONS		

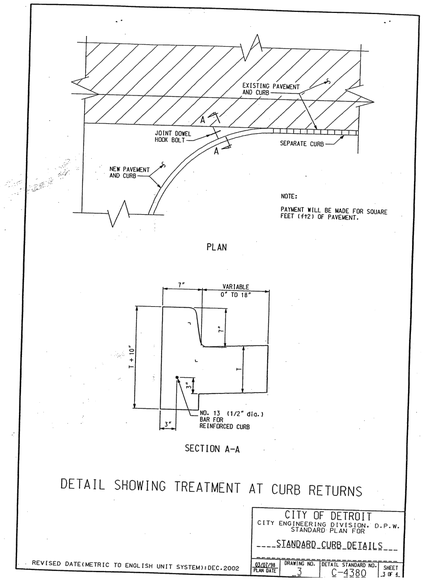
UTILITY TRENCH, WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION
SCALE NONE | SHEET 1 OF 3
DATE 9/2018 | DWG. No. 312333-04

USE ON THIS PROJECT



CITY OF DETROIT
CITY ENGINEERING DIVISION, D.P.W.
STANDARD PLAN FOR
STANDARD CURB DETAILS
01/07/08 PLAN DATE | DRAWING NO. 3 | DETAIL STANDARD NO. C-4380 | SHEET 2 OF 6
REVISED DATE(METRIC TO ENGLISH UNIT SYSTEM):DEC.2002



DETAIL SHOWING TREATMENT AT CURB RETURNS

CITY OF DETROIT
CITY ENGINEERING DIVISION, D.P.W.
STANDARD PLAN FOR
STANDARD CURB DETAILS
01/07/08 PLAN DATE | DRAWING NO. 3 | DETAIL STANDARD NO. C-4380 | SHEET 3 OF 6
REVISED DATE(METRIC TO ENGLISH UNIT SYSTEM):DEC.2002

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
ENGINEER
No. 6201048309
LICENSED PROFESSIONAL ENGINEER

03.12.2024

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426 S. Clinton Street
Grand Ledge, MI 48837
www.zfengineering.com | 517-627-8068

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Location Map



NO SCALE

Project Manager: TZF
Reviewed By: JWF
Engineer: TZF
Drafter: TZF
Drawing Scale: AS NOTED

Issue Date: Issued for:

02.21.2024	Reissued for Reg. Review
01.25.2024	Revised & Reissued for Reg. Review
12.22.2023	Revised & Reissued for Reg. Review
10.04.2023	Reissued for Reg. Review
09.01.2023	Revised & Reissued for Reg. Review
04.27.2023	Revised & Reissued for Reg. Review
02.13.2023	Revised & Reissued for Reg. Review
01.24.2023	Revised & Reissued for Reg. Review
11.29.2022	Issued for Regulatory Review

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

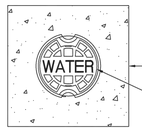
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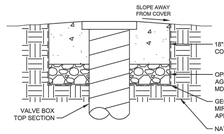
SITE DETAILS

Drawing Number

C4

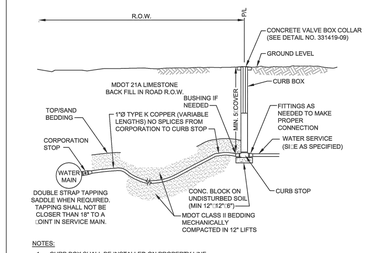
ZFE Project No. 22077 | RA Duthler Project No. 220712





NOTE:
1. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □4,000 PSI.

			CONCRETE VALVE BOX COLLAR	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
REV	DESCRIPTION	DATE	REVISIONS	SCALE NONE · SHEET 1 OF 1 · DATE 5/2020 · DWG. No. 331419-09



NOTES:
1. CURB BOX SHALL BE INSTALLED ON PROPERTY LINE.
2. TRENCH CONSTRUCTION / BACK FILL SHALL BE DONE IN SAME MANNER AS WATER MAIN TRENCH DETAIL.
3. IF EXISTING SERVICE RUN IS LEAD PIPE (P□), THEN REPLACE PER SPECIFICATIONS SECTION 33141□81.
4. WRAP CORPORATION AND SERVICE SADDLE WITH WAX TAPE CONFORMING WITH AWWA C21□.

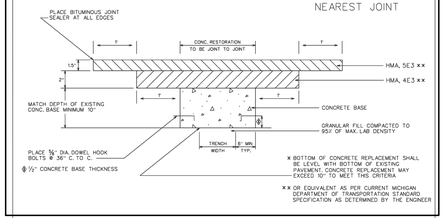
			CONNECTION, RESIDENTIAL SERVICE	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
REV	DESCRIPTION	DATE	REVISIONS	SCALE NONE · SHEET 1 OF 1 · DATE 5/2020 · DWG. No. 33141□01

USE MAJOR STREET RESTORATION FOR WEST END STREET UTILITY TRENCHES

WEST END STREET RESTORATION INFORMATION

MAJOR STREETS:

NOTE: PAVEMENT CUTS MUST EXTEND TO NEAREST JOINT

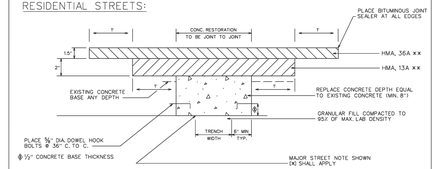


× BOTTOM OF CONCRETE REPLACEMENT SHALL BE LEVEL WITH BOTTOM OF EXISTING PAVEMENT. CONCRETE REPLACEMENT MAY EXCEED 10" TO MEET THIS CRITERIA

×× OR EQUIVALENT AS PER CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION AS DETERMINED BY THE ENGINEER

EXCEPTION:
TO ABOVE 3" HMA REPLACEMENT, WHEN PAVEMENT REPLACMENT IS 100 FEET FROM EITHER SIDE OF UNDERPASS REPLACE 10" MIN CONCRETE BASE WITH TOP OF CONCRETE LEVEL WITH TOP OF EXISTING CONCRETE AND REPLACE HMA SECTION AS EXISTING

RESIDENTIAL STREETS:



MAJOR STREET NOTE SHOWN DKI SHALL APPLY

×× OR EQUIVALENT AS PER CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION AS DETERMINED BY THE ENGINEER

ISOLATED CUT:
TRIM JOINT TO OBTAIN VERTICAL CUT

B							
A							
	DESCRIPTION	REV'D	CHK'D	APP'D	DATE	HMA SURFACE ON CONCRETE BASE UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION	CITY OF DETROIT CITY ENGINEERING DIVISION SURVEY BUREAU
	REVISIONS						
DRAWN BY	WLW	CHECKED	KSM				JOB NO.
DATE	08/29/18	APPROVED	SRB				DRWG.NO. 1 OF 2

CITY OF DETROIT NOTES

1. MILL (REMOVE) HMA PAVEMENT WITHIN AND BEYOND THE AREA OF TRENCH PAVEMENT REMOVAL IN ORDER TO DETERMINE LOCATION OF UNDERLYING CONCRETE BASE PAVEMENT JOINTS. MILL MINIMUM TO 1' BEYOND NEAREST CONCRETE JOINTS.
2. EXTEND UTILITY TRENCH CONCRETE PAVEMENT REMOVAL TO ALL CONCRETE PAVEMENT JOINTS AND / OR CURBS ADJACENT TO THE TRENCH AREA. REMOVAL SHALL BE "JOINT TO JOINT".
3. CONCRETE PAVEMENT CUTS SHALL BE MINIMUM 3' WIDE.
4. ALL PAVEMENT CUTS SHALL BE MINIMUM 1' WIDER THAN TRENCH WIDTH.
5. ALL REMOVALS SHALL BE SAWCUT STRAIGHT AND SQUARE (90 DEGREES).
6. CONCRETE RESTORATION PAVEMENT SHALL BE MDOT P1 MIX (3,500 PSI).
7. RESTORED CONCRETE PAVEMENT SHALL MATCH THICKNESS OF EXISTING CONCRETE PAVEMENT IN CONFORMANCE WITH MDOT STANDARDS DETAIL R-44-F.
8. RESTORED CONCRETE SHALL BE ANCHORED TO EXISTING CONCRETE PAVEMENT IN CONFORMANCE WITH MDOT STANDARD DETAIL R-44-F
9. APPLY HMA TACK COAT PER MDOT STANDARD SPECIFICATIONS SECTION 904.
10. RESTORE HMA PAVEMENT 3½" TO MATCH EXISTING, IN 2 LIFTS:
    1ST LIFT - 2" MDOT HMA 4E3 (13A RESIDENTIAL), COMPACTED, EXTENDED 1' BEYOND BASE CONCRETE REPAIR.
    2ND LIFT - 1½" MDOT HMA 5E3 (36A RESIDENTIAL), COMPACTED, EXTENDED 1' BEYOND 1ST LIFT.
11. BITUMINOUS JOINT SEALER SHALL BE PLACED AT ALL FINISHED HMA JOINTS.
12. ALL DISTRUBED PAVEMENT MARKINGS AND OTHER ASSETS, INCLUDING BIKE LANE DELINEATORS, WILL HAVE TO BE REPLACED AT THE COST OF THE PERMIT HOLDER, AND SHALL CONFORM TO THE LATEST CED / TED STANDARDS.
13. FOR OTHER RELATED SPECIFICATIONS (BACKFILL COMPACTION, MATERIALS, ETC...), REFER TO DIVISION 15 OF THE STANDARD SPECIFICATIONS FOR PAVING AND RELATED CONSTRUCTION.
14. NOTIFY THE CITY OF DETROIT ENGINEERING DEPARTMENT 24 HOURS PRIOR TO STARTING CONSTRUCTION.
15. ANY OPEN EXCAVATIONS ARE TO BE STEEL PLATED. IF EXCAVATIONS ARE IN THE PAVEMENT, THE PLATES ARE TO BE SPIKED AND RAMPED WITH COLD PATCH. CONTACT THE CITY WITH LOCATION OF THE STEEL PLATE.
16. THE CITY OF DETROIT REQUIRES ALL CONCRETE WORK TO BE STAMPED WITH A CONTRACTORS IDENTIFICATION STAMP.

B							
A							
	DESCRIPTION	REV'D	CHK'D	APP'D	DATE	HMA SURFACE ON CONCRETE BASE UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION	CITY OF DETROIT CITY ENGINEERING DIVISION SURVEY BUREAU
	REVISIONS						
DRAWN BY	WLW	CHECKED	KSM				JOB NO.
DATE	08/29/18	APPROVED	SRB				DRWG.NO. 2 OF 2

NOTE:
1. SEE SECTION 33 31 3.3.E

1	UPDATED	06/2020	WYE, CONNECTION AND EXTENSION	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
REV	DESCRIPTION	DATE	REVISIONS	SCALE NONE · SHEET 1 OF 1 · DATE 09/2018 · DWG. No. 333111-02

SIDE VIEW

FRONT VIEW

NOTES:
1. MINIMUM SEPARATION DISTANCE BETWEEN LATERALS: 5 FT
2. MINIMUM DEPTH OF COVER OVER PIPE: 2 FT

1	UPDATED	06/2020	CLEANOUT	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
REV	DESCRIPTION	DATE	REVISIONS	SCALE NONE · SHEET 1 OF 1 · DATE 9/2018 · DWG. No. 333111-03

NOTES:
1. FOR SEWERS 18" OR LESS A "Y" SADDLE MAY BE USED IF THE OUTSIDE DIA. OF THE TAP IS LESS THAN ONE HALF THE DIA. OF THE SEWER BEING TAPPED.
2. PROVIDE EXTENSION CLAMPS FOR 15" SEWERS AND LARGER.
3. CONCRETE BELOW PIPE IS ONLY REQUIRED FOR 15" SEWERS AND LARGER WITH STRAPS.

1	UPDATED	06/2020	CONNECTION, SADDLE TO LATERAL SEWER	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
REV	DESCRIPTION	DATE	REVISIONS	SCALE NONE · SHEET 1 OF 1 · DATE 09/2018 · DWG. No. 333111-01

NOTE:
1. ALL NEW PIPE OPENINGS FOR PROPOSED MANHOLES SHALL BE MADE BY MANHOLE MANUFACTURER.

WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PROPOSED PIPES TO EXISTING MANHOLES AND EXISTING PIPES TO PROPOSED MANHOLES

1	UPDATED	06/2020	SEWER PIPE CONNECTION WITH MANHOLE	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
REV	DESCRIPTION	DATE	REVISIONS	SCALE NONE · SHEET 1 OF 1 · DATE 9/2018 · DWG. No. 333111-05

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Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	AS NOTED

Issue Date: Issued for:

02.21.2024	Reissued for Reg. Review
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01.24.2023	Revised & Reissued for Reg. Review
11.29.2022	Issued for Regulatory Review

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

SITE DETAILS

Drawing Number

C5

ZFE Project No. 22077 | RA Duthler Project No. 220712

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 03.12.24

STATE OF MICHIGAN
TAMMY ZIEMNICK
PROJECT ENGINEER
No. 6201049309
LICENSED PROFESSIONAL ENGINEER
03.12.2024

SURFACE RESTORATION LEGEND

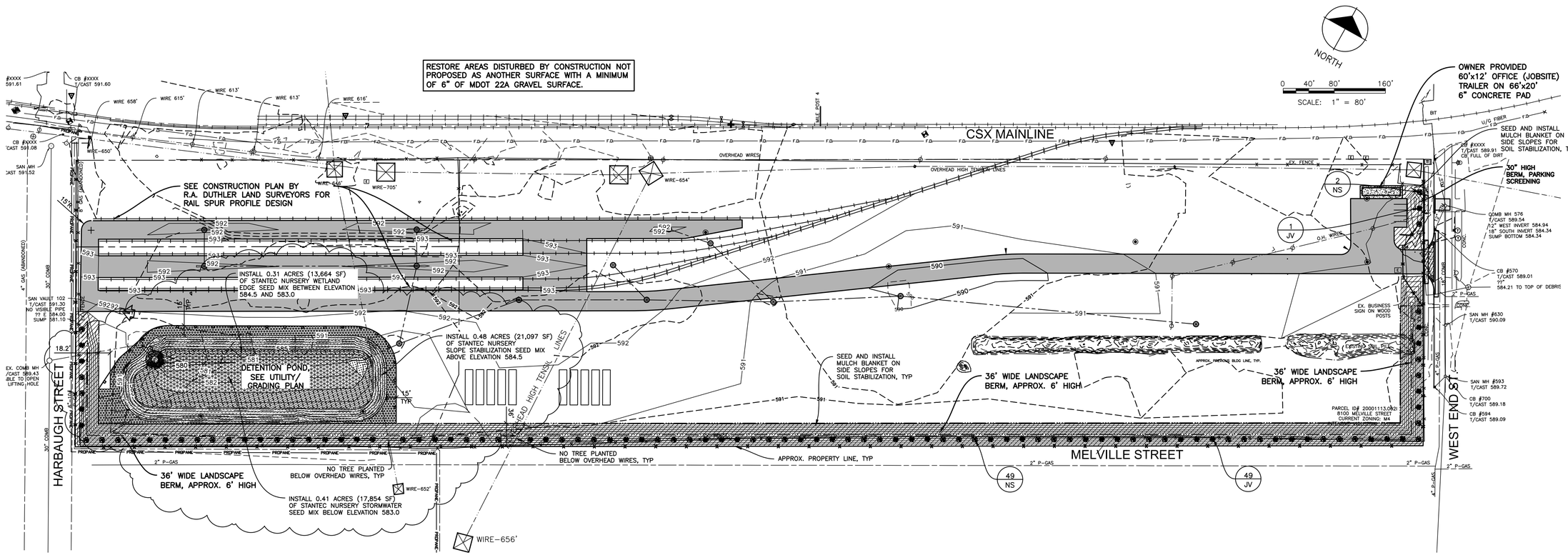
- SEED AND MULCH
- RIP RAP ARMOR
- 6" CONCRETE SURFACE
- BITUMINOUS PAVEMENT SURFACE
- STANTEC NURSERY STORMWATER SEED MIX INSTALLATION AREA
- STANTEC NURSERY WETLAND EDGE SEED MIX INSTALLATION AREA
- STANTEC NURSERY SLOPE STABILIZATION SEED MIX INSTALLATION AREA
- FLEXAMAT, TIED CONCRETE BLOCK MAT WITH UNDERLAYMENT INSTALLATION AREA, SEE DETAIL

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

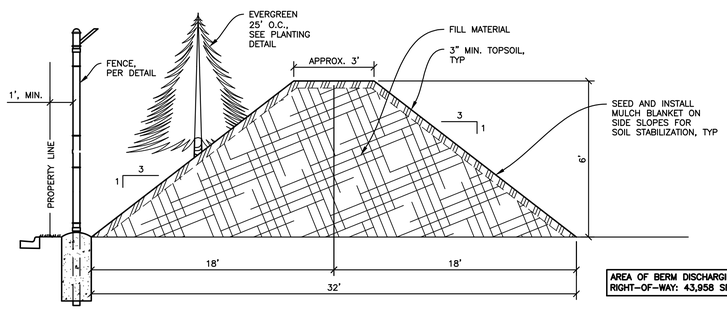
MICHIGAN STATE PLANE COORDINATE SYSTEM, MADB3 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

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



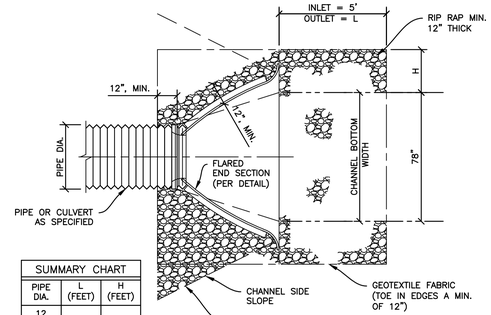
PLANT LIST						
KEY	QTY	SCIENTIFIC NAME	COMMON NAME	SIZE	ROOT	REMARKS
EVERGREEN TREES						
JV	50	Juniperus Virginiana	Eastern Red Cedar	8'	B&B	25' O.C.
NS	51	Picea abies	Norway Spruce	6'	B&B	25' O.C.

49 NS — NO. OF PLANTS; TYPE OF PLANT PER PLANT LIST KEY



AREA OF BERM DISCHARGING RIGHT-OF-WAY: 43,958 SF (1.01 ACRE)

PERIMETER EARTH BERM
NO SCALE



SUMMARY CHART		
PIPE DIA.	L (FEET)	H (FEET)
12	5	2
15		
18		
42	15	6
48		
54		
60		

NOTE:
"H" PROVIDES FOR RIP RAP UP TO THE MIDPOINT OF THE AVERAGE PIPE DIAMETER IN THE GROUPING.

"L" FOLLOWS MINIMUM APRON LENGTHS BASED ON EMPIRICAL FORMULA U.S.E.P.A. 1976 L=3Q/D3/2 FOR TAILWATERS GREATER THAN 0.50 (D=DIAMETER)

RIP RAP END TREATMENT
NO SCALE

PLANTING MIXTURE NOTES

1. MIXTURE SHALL BE A MIXTURE OF ⅓ TOPSOIL, ⅓ SAND, AND ⅓ PEAT. ADD FERTILIZER AT THE QUANTITY AS RECOMMENDED BY THE MANUFACTURER. PLANTING MIXTURE SHALL BE FREE FROM STICK, STONES, SOD CLODS AND OTHER MATERIAL WHICH MIGHT LEAVE POCKETS AROUND THE ROOTS.
2. TOPSOIL
   2.1. TOPSOIL SHALL BE FERTILE, FRIABLE, SNADY CLAY LOAM WITH ADMISTRURE OF SUBSOIL. TOPSOIL IS TO BE FREE OF GLASS, STONES GREATER THAN ONE (1) INCH IN ANY DIMENSION, WEEDS, UNDESIRABLE GRASSES AND OTHER EXTRANEOUS MATERIALS. TOPSOIL SHALL HAVE THE FOLLOWING RANGE OF VALUES:
   pH 5.0 TO 7.5
   SOLUABLE SALTS 500 PPM MAX
   ORGANIC CONTENT 5% TO 30%
   SILT CONTENT 35% TO 50%
   CLAY CONTENT 5% TO 10%
   DELETEREOUS MAT'L* 5% MAX
   *ROCK, GRAVEL, STONE, STICKS, ROOTS, SOD, ETC.
   2.2. COMPOST MAY BE MIXED WITH TOPSOIL TO OBTAIN THE DESIRED CONTENT, TOPSOIL IS TO BE FINAL SCREENED THROUGH A ½" MAXIMUM MESH SCREEN PRIOR TO DELIVERY TO THE PROJECT SITE. TOPSOIL SHALL BE PLACED IN 3-INCH MINIMUM THICKNESS THROUGHOUT.
3. SAND FOR PLANTING MIXTURE SHALL BE CLEAN, COURSE, UNGRADED SAND CONFORMING TO ASTM C3 FOR FINE AGGREGATES.
4. PEAT: GRANULATED RAW CANADIAN PEAT OR BALED CANADIAN PEAT CONTAINING NOT MORE THAN 9% MINERAL ON A DRY BASIS.

PLANTING NOTES

1. ALL PLANTING AREAS, INCLUDING TOPSOIL LANDSCAPING BERM, SHALL RECEIVE A MINIMUM OF 3-INCHES OF TOPSOIL.
2. DETENTION BASIN SHALL RECEIVE 24" OF PLANTING SOIL IN BOTTOM AND 12" OF PLANTING SOIL ON SIDE SLOPES.
3. STANTEC NURSERY SEED MIX APPLICATION RATES SHALL BE PER MANUFACTURER'S RECOMMENDATION.

REVIEW DRAWING NOT FOR CONSTRUCTION PLOT DATE: 03.12.24

STATE OF MICHIGAN TAMMY ZIEMNICK FOSTER ENGINEER No. 6201049309 LICENSED PROFESSIONAL ENGINEER
03.12.2024

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Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	1" = 80'

Issue Date:	Issued for:
02.21.2024	Reissued for Reg. Review
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Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

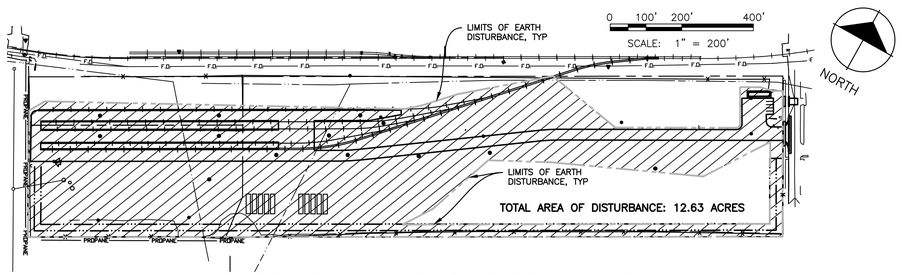
Drawing Title

LANDSCAPE PLAN

Drawing Number

C6

ZFE Project No. 22077 | RA Duthler Project No. 220712



SCHEMATIC VIEW OF LIMITS OF EARTH CHANGE

SITE UTILITY AND GRADING LEGEND

PIPE CONTENTS ABBREVIATIONS	
GAS	NATURAL GAS
SAN	SANITARY SEWER
STM	STORM SEWER
WTR	WATER
FM	FORCE MAIN

PIPE MATERIAL ABBREVIATIONS	
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
DIP	DUCTILE IRON PIPE
NRCP	NON-REINFORCED CONCRETE PIPE
PE	POLYETHYLENE
PE PERF.	POLYETHYLENE PIPE PERFORATED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
VCP	VITRIFIED CLAY PIPE

- 12" STM — STORM SEWER & MANHOLE
- CATCH BASIN
- 6" U.D. — UNDERDRAIN
- (ADJ) — ADJUST EX. STRUCTURE CASTINGS
- 505 — PROPOSED CONTOUR ELEVATION
- APPROX. LIMITS OF EARTH DISTURBANCE
- PERIMETER SILT FENCE
- 6" CONCRETE SURFACE
- INDUSTRIAL HEAVY-DUTY BITUMINOUS PAVEMENT
- 8" REINFORCED CONCRETE SURFACE
- WEST END STREET BITUMINOUS PAVEMENT RESTORATION, SEE CITY OF DETROIT UTILITY TRENCH CONSTRUCTION PAVEMENT RESTORATION DETAIL SHEET C5

BENCHMARKS & PROJECT COORDINATE SYSTEM

BM NO.: 1 ELEVATION: 591.30
TOP OF CASTING COMBINED SEWER VAULT 102
LOCATED APPROX. 60' EAST OF EX.
FENCELINE ON WEST SIDE OF PROPERTY

MICHIGAN STATE PLANE COORDINATE SYSTEM, MAD83 (MI GEOID 18) (GRS80), SOUTH ZONE, INTERNATIONAL FEET, GRID.

LEGAL DESCRIPTION – PARCEL #: 20001110.3

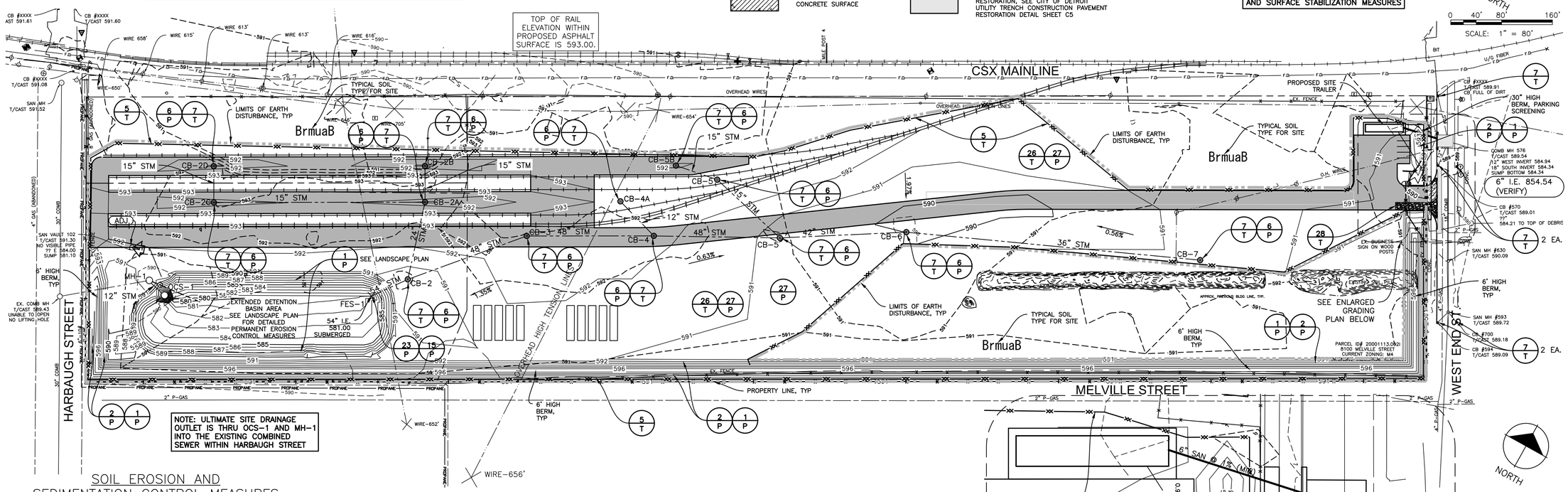
NORTH MELVILLE PART OF PC 340 LYING BETWEEN WEST END, MELVILLE, AND HARBAUGH BEGINNING ON THE SOUTH 437.79 FEET ON WEST LINE AND THE SOUTH 448.75 FEET ON THE EAST LINE, CONTAINING 21.96 ACRES, COMBINED ON 02/21/2023 FROM 2001110.001, 20001110.002L, 20001111, 20001112, 20001113.001, AND 20001113.002L

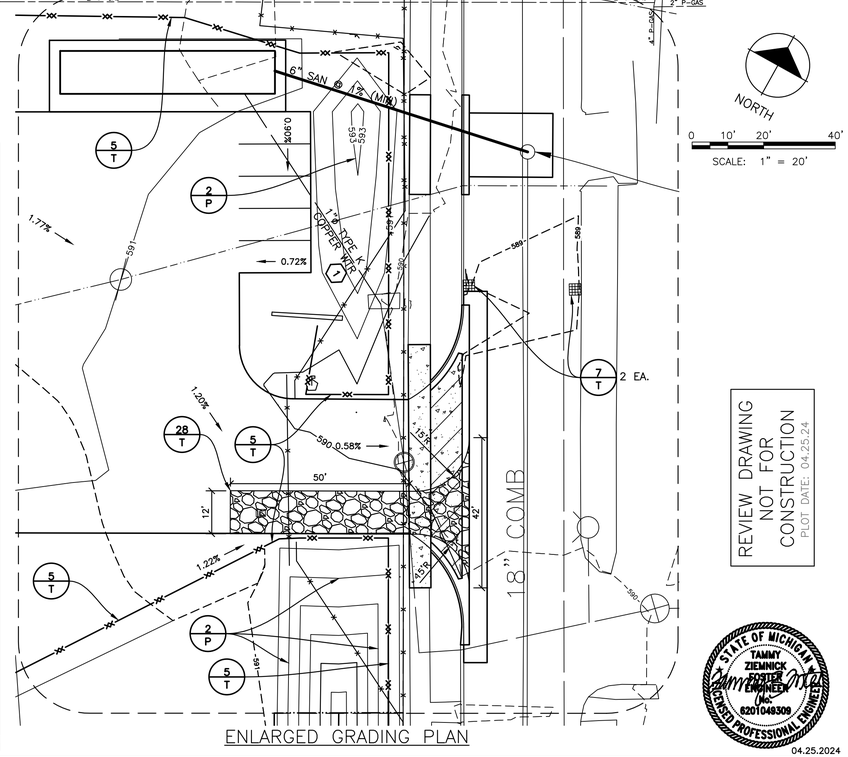
SITE SOIL TYPES

USDA NATURAL RESOURCE CONSERVATION SERVICE SOIL SURVEY DATA REPORTS THAT THE ENTIRE PROPERTY HAS THE SAME SOIL TYPE, BRMS–URBAN LAND COMPLEX – BrmuaB WITH 0 TO 4 PERCENT SLOPES

SEE LANDSCAPE PLAN FOR ADDITIONAL PERMANENT SOIL EROSION CONTROL AND SURFACE STABILIZATION MEASURES

Know what's below. Call before you dig.





SOIL EROSION AND SEDIMENTATION CONTROL MEASURES MACDC KEYING SYSTEM

KEY	SESC MEASURE	SYMBOL	WHERE USED
1	SEEDING		WHEN BARE SOIL IS EXPOSED, TEMPORARILY OR PERMANENTLY, TO EROSIVE FORCES FROM WIND AND OR WATER ON FLAT AREAS, MILD SLOPES, GRASSED WATERWAYS AND SPILLWAYS, DIVERSION DITCHES AND DIKES, BORROW AND STOCKPILE AREAS, AND SPOIL PILES.
2	MULCH		ON FLAT AREAS, SLOPES, GRASSED WATERWAYS AND SPILLWAYS, DIVERSION DITCHES AND DIKES, BORROW AND STOCKPILE AREAS, AND SPOIL PILES WHEN AREAS ARE SUBJECT TO RAINDROP IMPACT, AND EROSIVE FORCES FROM WIND OR WATER.
4	TREES, SHRUBS, VINES AND GROUND COVER		WHEN BARE SOIL OR RECENTLY VEGETATED SLOPES ARE EXPOSED TO EROSIVE FORCES FROM WIND AND/OR WATER.
5	PERIMETER SEDIMENT CONTROL MEASURES (SILT FENCE, STRAW WATTLES, ETC.)		AS A TEMPORARY MEASURE USED TO CAPTURE SEDIMENT FROM SHEET FLOW. MAY ALSO DIVERT SMALL VOLUMES OF SHEET FLOW TO PROTECTED OUTLETS.
6	CATCH BASIN		WHERE SURFACE WATER ACCUMULATES AND NEEDS AN OUTLET OR AN OPEN DRAIN DISCHARGES TO A STREAM OR DRAIN AT EROSIVE VELOCITIES. WITHIN AN ENCLOSED DRAIN SYSTEM TO PROVIDE AN INLET AND A SUMP.
7	STORM DRAIN INLET PROTECTION		AROUND THE ENTRANCE TO A CATCH BASIN OR AN INLET THAT WILL CAPTURE RUNOFF FROM AN EARTH CHANGE ACTIVITY.
15	RIPRAP		ALONG DRAIN BANKS, SHORELINES, OR WHERE CONCENTRATED FLOWS OCCUR. SLOWS VELOCITY, REDUCES EROSION AND SEDIMENT LOAD.
23	OUTFALL STABILIZATION		IN THE STREAM OR DRAIN BANK USUALLY ABOVE THE ORDINARY HIGH WATER MARK WHERE AN ENCLOSED DRAIN OR TILE DISCHARGES TO AN OPEN DRAIN.
26	DUST CONTROL		AS A TEMPORARY MEASURE ON EXPOSED AND UNSTABILIZED AREAS THAT MUST BE PROTECTED FROM WIND OR WATER EROSION.
27	STABILIZED SURFACE COVER		CAN BE USED IN ANY AREA WHERE A STABLE CONDITION IS NEEDED FOR CONSTRUCTION OPERATIONS, EQUIPMENT STORAGE OR IN HEAVY TRAFFIC AREAS. REDUCES POTENTIAL SOIL EROSION AND FUGITIVE DUST BY STABILIZING RAW AREAS.
28	STONE CONSTRUCTION ACCESS		AT LOCATIONS WHERE CONSTRUCTION EQUIPMENT WILL ENTER AND EXIT THE DRAIN EASEMENT AND TRACKING OF SOIL IS ANTICIPATED.

XX T TEMPORARY MEASURE

XX P PERMANENT MEASURE

STREET CLEANING SCHEDULE

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
SCRAPE STREETS		X	X	X	X	X	X
SWEEP STREETS				X			

SOIL EROSION CONTROL SEQUENCE OF CONSTRUCTION

ACTIVITY DESCRIPTION	JUNE 2024	JULY 2024	AUGUST 2024	SEPTEMBER 2024	OCTOBER 2024	NOVEMBER 2024	DECEMBER 2024	WINTER 2025	APRIL 2025
STONE TRACKING MAT INSTALLATION ATOP GEOTEXTILE LINER									
INSTALL PERIMETER SILT FENCE AND STORM STRUCTURE INLET PROTECTION ON EX. CATCH BASINS									
REMOVE EXISTING SURFACE TREATMENTS SCHEDULE FOR DEMOLITION									
BEGIN EXCAVATION AND GRADING FOR RAIL SPUR AND SITE WORK COMPONENTS									
EXCAVATE DETENTION BASIN, INSTALL APPROVED OUTLET CONTROL STRUCTURE, STABILIZE BASIN PRIOR TO PAVING COMMENCING									
INSTALL UNDERGROUND UTILITIES									
INSTALL STORM INLET PROTECTION FILTERS ON INSTALLED CATCH BASINS									
CONSTRUCT RAIL SPUR COMPONENTS									
INSTALL PAVEMENT AND AGGREGATE SURFACE TREATMENTS									
FINALIZE INSTALLATION OF PUBLIC UTILITIES									
ESTABLISH VEGETATION FOR ALL DISTURBED AREAS AND ROAD, AND RIGHTS-OF-WAY									
REMOVE ACCUMULATED SEDIMENT WITHIN DETENTION BASIN AND STORM INLETS TO PROPOSED DESIGN SPECIFICATIONS									
ESTABLISH PERMANENT, STABILIZED VEGETATION									
DORMANT SEEDING, IF NECESSARY AFTER NOVEMBER 1, 2024									
CALL SESC PERMITTING AUTHORITY FOR FINAL INSPECTION OF STABILIZED SITE									
REMOVE SILT FENCE AND STORM INLET PROTECTIONS									

REVIEW DRAWING NOT FOR CONSTRUCTION
PLOT DATE: 04.25.24

STATE OF MICHIGAN
TAMMY ZIEMNICK FOSTER
ENGINEER
No. 6201048309
REGISTERED PROFESSIONAL ENGINEER

04.25.2024

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Hard copy is intended to be 24"x36" when plotted. Scale(s) indicated and graphic quality may not be accurate for other sizes.

Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	1" = 80'

Issue Date: Issued for:

04.25.2024 Issued for Soil Erosion Control Permit

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title

SOIL EROSION CONTROL PLAN

Drawing Number

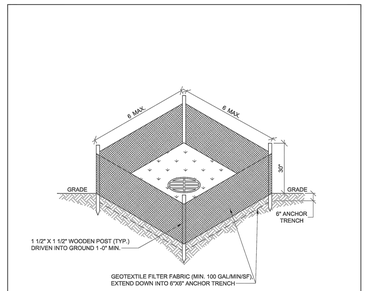
C7

ZFE Project No. 22077 | RA Duthler Project No. 220712

SOIL EROSION CONTROL & SEDIMENTATION CONTROL (SESC) PERFORMANCE REQUIREMENTS

1. CONSTRUCT AND MAINTAIN ALL SOIL EROSION CONTROL MEASURES IN ACCORDANCE WITH THE WAYNE COUNTY SOIL EROSION OFFICE, CITY OF DETROIT AND PROJECT DOCUMENT REQUIREMENTS.
2. SECURE PERMIT AND CONSTRUCT PROJECT IN COMPLIANCE WITH PART 91 OF ACT NO. 451 OF 1994 AS AMENDED, OF THE MICHIGAN COMPILED LAWS ENTITLED "SOIL EROSION AND SEDIMENTATION CONTROL" UNDER THE CONTROL OF THE WAYNE CO. DRAIN COMMISSION PERMIT AGENCY CHARGED WITH ADMINISTERING THE PROVISION OF THE ACT. FOLLOW THE PROCEDURES DELINEATED ON THE SESC PLAN AND CONSTRUCT AND MAINTAIN THE FACILITIES SHOWN ON THE DRAWINGS AND AS REQUIRED TO CONTROL WATER AND WIND EROSION DURING CONSTRUCTION OF THE PROJECT.
3. CONSTRUCT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES PRIOR TO STARTING CONSTRUCTION. MEASURES INDICATED ON THESE PLANS ARE CONSIDERED TO BE MINIMUM AND SHALL BE SUPPLEMENTED AS REQUIRED BY CONSTRUCTION PHASING AND SITE CONDITIONS.
4. ANY EROSION AND SEDIMENT FROM WORK ON THE SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT IN ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDED NATURAL AND MANMADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
5. ANY DEWATERING ACTIVITIES SHALL PASS THROUGH A FILTER PRIOR TO OUTLETTING INTO A STORM SYSTEM.
6. CONSTRUCT AND MAINTAIN INLET FILTERS AT ALL CATCH BASINS AND INLET STRUCTURES UNTIL PERMANENT MEASURES ARE IN PLACE.
   - 6.1. PAVED STORM INLETS SHALL BE PROTECTED BY A HIGH FLOW SACK TYPE INLET FILTER CONFORMING TO SILT SACK-HIGH FLOW BY ACE ENVIRONMENTAL OR INLET PROP-HIGH FLOW SEDIMENT BAG BY HANES GEO COMPONENTS OR CATCH-ALL INLET FILTERS BY MARATHON MATERIALS, INC. OR DANDY CURB SACK BY DANDY PRODUCTS, INC.
   - 6.2. BEEHIVE TYPE INLETS SHALL BE PROTECTED BY SedCage YARD INLET PROTECTION MANUFACTURED BY SedCatch ENVIRONMENTAL PRODUCTS, OR A BOX FILTER FABRIC FENCE CONFORMING TO CSI GEOTURF 36-INCH MDOT SPEC SILT FENCE SECURELY FIXED TO 2"x2" HARDWOOD STAKES SPACED NO MORE THAN 6.5-FEET ON CENTER, TIED TO 4-FOOT STEEL POSTS AT ALL FOUR CORNERS AND TRENCHED A MINIMUM OF 10-INCHES INTO THE GROUND. SEE WAYNE COUNTY DETAIL FOR REAR YARD GUARD.
7. A TEMPORARY CRUSHED ROCK TRACKING PAD WILL BE INSTALL AT THE CONSTRUCTION EXIT AS SHOWN ON THE PLAN. DIRECT ALL CONSTRUCTION TRAFFIC TO THIS EXIT. STONE EXITS MUST BE MAINTAINED WITH FRESH STONE AS NECESSARY TO MAINTAIN ANTI-TRACKING PROPERTIES. ADD ADDITIONAL STONE WHEN ACCESS ROAD BECOMES INEFFECTIVE DUE TO LOSS OF STONE OR COVERED WITH MUD.
8. ALL EXPOSED EARTH SHALL BE STABILIZATION WITH SEEDING AND/OR MULCH WITHIN FIVE (5) DAYS OF FINAL GRADING. SEDIMENT BASINS SHALL BE STABILIZED WITH SEED AND STRAW BLANKETS OR AS DETAILED ON THE LANDSCAPE PLAN. STRAW MULCH BLANKETS SHALL BE STAKED INTO THE GROUND FIVE (5) DAYS AFTER THE CONSTRUCTION OF THE SEDIMENT BASIN.
9. AN UNDISTURBED, VEGETATIVE BUFFER STRIP OF AT LEAST TWENTY-FIVE (25) FEET SHALL BE RETAINED AROUND RIVERS, CREEKS, STREAMS, WETLANDS, DRAINS AND OTHER SENSITIVE AREAS.
10. INSPECT THE SOIL EROSION AND SEDIMENT CONTROL DEVICES ONCE EACH WEEK AND WITHIN TWENTY-FOUR (24) HOURS OF A PRECIPITATION EVENT WHICH RESULTS IN A STORM WATER DISCHARGE FROM THE SITE. A LOG OF INSPECTION REPORTS SHALL BE MAINTAINED AND ACCESSIBLE IN ACCORDANCE WITH NPDES REQUIREMENTS.
11. SEEDING SHALL BE PREPARED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. INSPECT THE AREA AFTER SEEDING IS COMPLETED. AREAS THAT ARE BARE OR NOT MULCHED PROPERLY WILL NEED TO BE RE-SEEDED AND/OR RE-MULCHED.
12. MAINTAIN DUST CONTROL AT ALL TIMES DURING CONSTRUCTION. SPRINKLING TANK TRUCKS SHALL BE AVAILABLE AT ALL TIMES AND USED FOR ON-SITE DISTURBED AREAS, OR OTHER PLACES WHERE DUST BECOMES A PROBLEM AS A RESULT OF CONSTRUCTION EFFORTS.
13. PROMPTLY REMOVE ALL MUD, DIRT AND DEBRIS TRACKED ON EXISTING AND SURROUNDING ROADS FROM THE CONSTRUCTION SITE. AT A MINIMUM, STREET SCRAPING SHALL BE DONE AT THE END OF EACH WORKDAY; STREET SWEEPING SHALL BE DONE AT LEAST ONCE A WEEK DURING THE CONSTRUCTION PERIOD.
14. MAINTENANCE OF TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES SHALL BE THE CONTRACTORS RESPONSIBILITY DURING THE DURATION OF THE CONSTRUCTION PROJECT. UPON SATISFACTION OF WARRANTY PERIOD, MAINTENANCE OF THE PERMANENT SOIL EROSION CONTROL MEASURES WILL BE THE OWNERS RESPONSIBILITY.
15. NO DEWATERING IS CURRENTLY PLANNED. SHOULD DEWATERING BECOME NECESSARY DURING CONSTRUCTION, NOTIFY THE OWNER IMMEDIATELY.
16. STRAW MULCH BLANKETS SHALL BE USED ON SLOPES 3:1 OR GREATER (THREE (3)-FOOT HORIZONTAL, ONE (1)-FOOT VERTICAL).
17. DITCHES, SWALES, AND OTHER AREAS THAT WILL CHANNEL CONCENTRATED RUNOFF MUST BE STABILIZED WITHIN FIFTEEN (15) DAYS OF CONSTRUCTION. TEMPORARY ROCK CHECK DAMS MAY BE REQUIRED TO SLOW WATER TO NON-EROSIVE VELOCITIES IN AREAS OF CONCENTRATED FLOW.
18. AREAS OF EARTH CHANGE THAT ARE DISTURBED BEYOND THE FALL SEEDING DEADLINE (NOVEMBER 1ST) MAY REQUIRE DORMANT SEEDING AND STRAW MULCH SECURELY CRIMPED TO THE GROUND.
19. ROAD RIGHT-OF-WAYS MUST BE STABILIZED A MINIMUM WIDTH OF FIFTEEN (15)-FEET BACK OF CURB WITH SEED AND MULCH WITHIN FIVE (5) DAYS OF COMPLETING UTILITY WORK IN THE RIGHT-OF-WAY.
14. TOTAL AREA OF EARTH DISTURBANCE: 12.63 ACRES

APPLICABLE CITY OF DETROIT-ENGINEERING DIVISION STANDARD DETAILS FOR SOIL EROSION & SEDIMENTATION CONTROL MEASURES



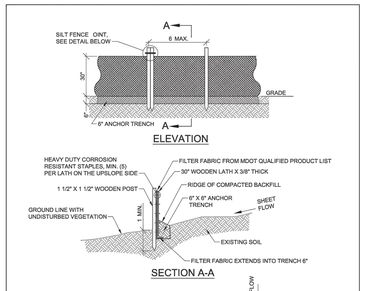
GENERAL NOTES:
1. REFER TO SILT FENCE DETAIL 015 13-02 FOR INSTALLATION PROCEDURES.
2. WEEKLY INSPECTION AND MAINTENANCE MUST BE PROVIDED TO INSURE THAT THE DRAIN GUARD OPERATES EFFICIENTLY.
3. SOD INTERIOR OF DRAIN GUARD UNLESS INDICATED OTHERWISE.
4. REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT AS NECESSARY, PER SPECIFICATION SECTION 015 13.

REV	DESCRIPTION	DATE
	REVISIONS	

DRAIN GUARD

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-01



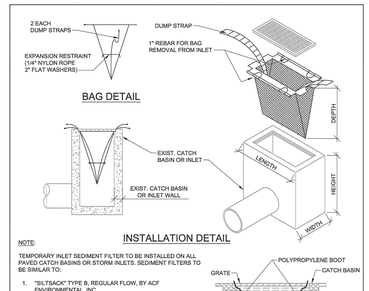
REV	DESCRIPTION	DATE
	REVISIONS	

EROSION CONTROL, SILT FENCE

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-02

SEE SESC PERFORMANCE REQUIREMENTS NOTE #6 FOR APPROVED PRODUCTS



NOTE:
TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. SEDIMENT FILTERS TO BE SIMILAR TO:
1. "SILTSACK" TYPE B, REGULAR FLOW, BY ACF ENVIRONMENTAL, INC.
2. "INLET PRO SEDIMENT BAG", STANDARD FLOW, WITH OPTIONAL FOAM DEFLECTOR BY HANES GEO COMPONENTS.
3. "DANDY CURB SACK" BY DANDY PRODUCTS, INC.
4. "BASIN BAG", REGULAR FLOW BY CSI GEOTURF, CLEAN FILTER AS NEEDED.

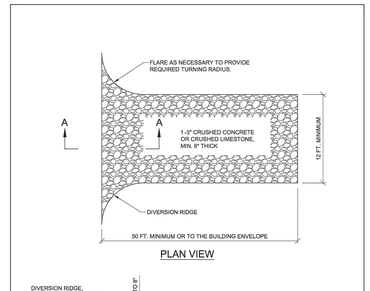
GENERAL NOTES
1. CONTRACTOR SHALL OBTAIN PERMISSION OF THE ENFORCING ROAD AGENCY BEFORE THIS TYPE OF CONTROL IS CONSTRUCTED IN THE ROAD RIGHT-OF-WAY.
2. CONTRACTOR SHALL KEEP CURBS GUTTER INLET FILTERS (AFTER PAVING) IN PLACE UNTIL ALL AREAS CONTRIBUTING TO THEM ARE STABILI ED WITH VEGETATION.
3. CONTRACTOR SHALL PERFORM WEEKLY INSPECTION AND MAINTENANCE TO ENSURE THAT THE CURB GUTTER INLET FILTER (AFTER PAVING) OPERATES EFFICIENTLY.

REV	DESCRIPTION	DATE
	REVISIONS	

INLET PROTECTION FABRIC DROP

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-05



REV	DESCRIPTION	DATE
	REVISIONS	

GRAVEL ACCESS APPROACH

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-0

SOIL EROSION AND SEDIMENTATION CONTROL
TEMPORARY FACILITIES

THE CONTRACTOR SHALL CONSTRUCT THIS PRO ECT IN COMPLIANCE WITH PART 91 OF ACT NO. 451 OF 1994, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, OF THE MICHIGAN COMPILED LAWS ENTITLED "SOIL EROSION AND SEDIMENTATION CONTROL" UNDER THE CONTROL OF THE LOCAL PERMIT AGENCY CHARGED WITH ADMINISTERING THE PROVISIONS OF THIS ACT. THE CONTRACTOR SHALL FOLLOW THE PROCEDURES DELINEATED BELOW AND CONSTRUCT AND MAINTAIN THE FACILITIES SHOWN ON THE DRAWINGS TO CONTROL WATER AND WIND EROSION DURING CONSTRUCTION OF THIS PRO ECT.

ALL DISTURBED SURFACE AREA (INCLUDING UTILITY TRENCHES) SHALL BE TEMPORARILY GRADED AND/OR DITCHED TO DIRECT ALL WATER RUNOFF FROM SUCH AREAS TO SEDIMENTATION CONTROL DEVICES WHICH WILL PREVENT WATER CARRYING ERODED SOIL FROM ENTERING A WATERCOURSE, SEWER, OR AD ACENT LANDS. SUCH SEDIMENTATION CONTROL DEVICES SHALL INCLUDE BUT NOT BE LIMITED TO PROTECTIVE DITCHES, SEDIMENT TRAPS, SEDIMENT FILTERS, DITCH TRAPS, PIPE BARRIERS, AND FILTERS AS DETAILED AND REQUIRED AND WHERE INDICATED ON THE DRAWINGS. AFTER THE PRO ECT WORK HAS BEEN COMPLETED, INSPECTED, AND APPROVED, THE CONTRACTOR SHALL REMOVE ALL SEDIMENTATION CONTROL DEVICES, MATERIAL, AND THEIR COLLECTED SILT AND DEBRIS AND RESTORE THE AREA IN ACCORDANCE WITH THE DRAWINGS.

IN ROADWAY AREAS TEMPORARY AGGREGATE SURFACING SHALL BE PLACED IMMEDIATELY AFTER THE BACKFILLING OPERATION HAS BEEN COMPLETED. POSITIVE DUST CONTROL MEASURES SHALL BE TAKEN AT ALL TIMES.

PERMANENT STABILI ATION SHALL BE COMPLETED WITHIN 5 DAYS OF FINAL EARTH CHANGE. FINAL CLEANUP AND RESTORATION WILL CONSIST OF FINAL GRADING, TOPSOILING, SEEDING AND MULCHING AND/OR SODDING OF ALL DISTURBED AREAS OF THE PRO ECT.

IF SEASONAL CONDITIONS PREVENT FINAL CLEANING AND RESTORATION, THE CONTRACTOR SHALL PROCEED WITH TEMPORARY STABILI ATION OF THE DISTURBED AREA. TEMPORARY STABILI ATION SHALL CONSIST OF ROUGH GRADING THE DISTURBED AREA IN ACCORDANCE WITH THESE SPECIFICATIONS. TEMPORARY STABILI ATION MATERIALS SHALL BE REMOVED AND DISPOSED OF AND FINAL CLEANUP AND RESTORATION SHALL BE COMPLETED NOT LATER THAN 5 DAYS AFTER SEASONAL CONDITIONS ALLOW PERFORMANCE OF THE REQUIRED WORK.

REV	DESCRIPTION	DATE
	REVISIONS	

SOIL EROSION SEDIMENTATION CONTROL, TEMPORARY FACILITIES

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-10

SOIL EROSION AND SEDIMENTATION CONTROL
MAINTENANCE NOTES

THE CONTRACTOR SHALL INSPECT SOIL EROSION AND SEDIMENTATION CONTROL DEVICES WEEKLY AND WITHIN 24 HOURS OF A SIGNIFICANT RAIN EVENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

MAINTENANCE INCLUDES ALL WORK NECESSARY FOR PROPER OPERATION OF THE DEVICES. DEVICES WHICH CAN NOT BE REPAIRED MAY NEED TO BE REPLACED. MAINTENANCE OF THE DEVICES SHALL BE PERFORMED WITHIN 24 HOURS OF INSPECTION.

SEDIMENT SHALL BE REMOVED AS NECESSARY TO MAINTAIN THE EFFECTIVENESS OF SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

SEDIMENT DEPOSITED ALONG SILT FENCE SHALL BE REMOVED WHEN IT REACHES 1/3 TO 1/2 THE HEIGHT OF THE FENCE.

TURF ESTABLISHMENT MEASURES SHALL BE MAINTAINED AS WOULD ANY OTHER DEVICES PRIOR TO ESTABLISHMENT OF PERMANENT TURF.

ALL MUD, DIRT AND DEBRIS TRACKED ONTO EXISTING ROADS FROM THIS SITE SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.

CONTRACTOR SHALL ENSURE THAT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES PROTECT AGAINST LOSS OF SOIL BY THE ACTION OF WATER, ICE, GRAVITY OR WIND.

REV	DESCRIPTION	DATE
	REVISIONS	

SOIL EROSION AND SEDIMENTATION CONTROL, MAINTENANCE NOTES

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-11

SUMMARY OF BASIC PRINCIPLES:

1. KEEP DISTURBED AREA AS SMALL AS POSSIBLE.
2. STABILI E AND/OR PROTECT DISTURBED AREAS AS SOON AS POSSIBLE.
3. KEEP STORM WATER RUNOFF VELOCITIES LOW.
4. RETAIN SEDIMENT WITHIN IMMEDIATE CONSTRUCTION AREA.

THE PURPOSE OF THIS PLAN IS TO SPECIFY METHODS FOR TEMPORARY EROSION CONTROL DURING CONSTRUCTION. IT IS INTENDED THAT MEASURES CALLED FOR IN THE SPECIFICATIONS AND SHOWN ON THESE STANDARD DETAILS PLANS BE STRICTLY ADHERED TO. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT CONSTRUCTION PROCEDURES UNDERTAKEN BE IN CONFORMANCE WITH THE STATE OF MICHIGAN ACT 451 OF 1994 PART 91, SOIL EROSION AND SEDIMENTATION CONTROL.

ALL SOIL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE REGULARLY MAINTAINED BY THE CONTRACTOR THROUGHOUT THE DURATION OF THE PRO ECT. COLLECTED SILT AND SEDIMENTATION SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE EFFECTIVENESS OF THE SILT TRAPS OR SEDIMENTATION CONTROL DEVICES. WHERE REQUIRED, THE CONTRACTOR SHALL REPLACE FILTER MATERIALS WHICH HAVE BECOME INEFFECTIVE DUE TO CONTAMINATION OR PHYSICAL DETERIORATION.

IF POSSIBLE, NO GRUBBING SHOULD BE DONE WITHIN 30' OF AN ACTIVE WATERCOURSE.

AGGREGATES PLACED IN STREAMS SHOULD CONTAIN A MINIMUM OF FINES. AS A GENERAL RULE FOR DAMS IN SMALL STREAMS, AT LEAST 50 STONE SHOULD BE 6" DIAMETER OR LARGER, 3" OR LARGER STONE SHALL BE USED FOR LINING STREAM BOTTOMS WHERE LINING IS REQUIRED.

ALL TEMPORARY EROSION CONTROL FACILITIES SHOULD BE REMOVED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION UNLESS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMI E SILTATION IN NEARBY DRAINAGE COURSES.

SURFACE DISRUPTION IN ADVANCE OF CONSTRUCTION INCLUDING CLEARING, GRADING OR SIGNIFICANT SOD REMOVAL SHALL BE LIMITED AS FOLLOWS, UNLESS PERMISSION IS OTHERWISE OBTAINED FROM THE GOVERNING AGENCY:

A. WET WEATHER SEASON (MARCH, APRIL, MAY) - 5 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

B. DRY WEATHER SEASON (UNE, ULY, AUGUST, SEPTEMBER, OCTOBER, NOVEMBER) - 10 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

C. COLD WEATHER SEASON (DECEMBER, ANUARY, FEBRUARY) - 15 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

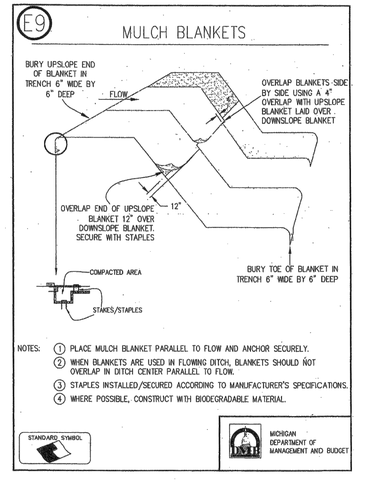
REV	DESCRIPTION	DATE
	REVISIONS	

SOIL EROSION AND SEDIMENTATION CONTROL, GENERAL NOTES

CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION

SCALE NONE | SHEET 1 OF 1 | DATE 09/2018 | DWG. No. 015 13-12

APPLICABLE FOR SESC MEASURE, KEY# 2 ON SESC PLAN SHEET C7



REVIEW DRAWING NOT FOR CONSTRUCTION PLOT DATE: 04.25.24

STATE OF MICHIGAN TAMMY ZIEMNICK FOSTER ENGINEER No. 6201049309 REGISTERED PROFESSIONAL ENGINEER

04.25.2024

Know what's below. Call before you dig.

R. A. DUTHLER LAND SURVEYORS
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Imlay City, MI 48444
www.duthlerlandsurveyor.com | 810.724.6532

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426 S. Clinton Street
Grand Ledge, MI 48837
www.zfengineering.com | 517-627-8068

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Location Map



NO SCALE

Project Manager:	TZF
Reviewed By:	JWF
Engineer:	TZF
Drafter:	TZF
Drawing Scale:	AS NOTED

Issue Date: Issued for:

04.25.2024 Issued for Soil Erosion Control Permit

Project Name

Crown Enterprises, LLC
Wayne, Detroit, MI

Rail Advancement Project

Drawing Title
SOIL EROSION NOTES & DETAILS

Drawing Number
C8

ZFE Project No. 22077 | RA Duthler Project No. 220712