1.0 Project Information - Project Overview, Background, Problem/Opportunity Statement, Project Status and Project File

Project Overview:

In accordance with the approved procedures contained in the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA), the Essex Region Conservation Authority (ERCA) and the City of Windsor have retained Landmark Engineers Inc. to carry out an environmental assessment of the Grand Marais Drain from Dougall Avenue to Walker Road. This Class EA is aimed at defining a scope of channel improvements to the previously unimproved sections along the drain corridor through this reach.

Background:

Over the past 4 years, ERCA, in conjunction with the City, has undertaken several studies and construction contracts aimed at improving and maintaining various segments of the Grand Marais Drain. This Environmental Assessment will address the next phase of the overall project by defining a scope of channel improvements for the remaining unimproved segments that occur between Dougall Avenue and Walker Road.

It should be noted that some of the unimproved segments of the drain have already had environmental assessments completed and designs prepared. An example of this situation is the 260 m segment of drain lying immediately upstream of the North Service Road. Given that it has been more than ten (10) years since the Notice of Filing was published for this drain segment, the current study will include a review of the planning and design process and the current environmental setting to ensure that the project and mitigation measures are still valid given the current planning context.

Problem / Opportunity Statement:

"This study will define a scope of channel improvements for the remaining unimproved segments of the Grand Marais Drain between Dougall Avenue and Walker Road, as well as develop a maintenance plan for the entire study area, which includes the management of accumulated sediments."

Project Status:

The Class EA process had been completed and the Project File has been compiled.

Project File:

Since this project is proceeding as a "Schedule B" activity under the Municipal Class Environmental Assessment, ERCA and the City of Windsor are required to maintain an official Project File that will be made available to the public for review and comment. The balance of this document represents the Project File.

2.0 Background Collection and Review

This section of the Project File summarizes the relevant background information that was obtained and reviewed as part of the Class EA process as well as secondary studies that were commissioned to support the EA process. This includes information pertaining to the existence of utilities in the vicinity of the study area as well as information from other related studies. The significance of all information collected is summarized below.

Bell Canada

The utility plan indicates that there are no Bell lines crossing or in the vicinity of the work areas. The location of all utilities shown on the plan should be regarded as approximate locations. Physical locates would be required prior to detailed design and construction in order to confirm actual locations.

Enwin Utilities

The large majority of existing power lines within the study area runs parallel to the drain. However, there is one overhead crossing mid-block between Dougall Avenue and South Cameron Boulevard. None of the overhead lines will be affected by the proposed improvements to the Grand Marais Drain.

The underground utilities plan indicates that there is a crossing along the side of the Turner Road Bridge. Enwin will be contacted during the planning stages of the proposed bridge to coordinate modifications or relocation of the affected utilities.

The location of all utilities shown on the plan should be regarded as approximate locations. Physical locates would be required prior to detailed design and construction in order to confirm their actual locations.

Geotechnical Report

Golder Associates was retained to collect samples of sediment and soil along the study area and document the results. The objectives of the sampling activities were to approximate the depth of sediment thickness at each of the five channel segments, collect samples for laboratory analysis to assess their chemical quality and to evaluate the disposal alternatives for the excess soil that would be generated from the proposed works.

The following is a summary of the findings:

- No evidence of potential impacts was observed in any of the shallow **soil** samples collected (Segments 1-5).
- Field evidence of potential impacts was observed in all **sediment** samples taken from Segments 2 through 4. The impacts appeared to be greater in **sediment** samples collected at greater depths.

- All of the tested **sediment** samples exceeded one or more sediment quality standards for metals, PAHs and PCBs. The highest concentrations were found in the deeper sediment samples collected at the culverts under the E.C. Row Expressway.
- All of the tested **soil** samples exceeded one or more of the levels identified in the Ministry of the Environment's (MOE) Table 1 or Table 3 soil quality standards. Based on these results, the soil would not be classified as 'inert fill'. Sediment excavated from areas with concentrations that exceed Table 3 soil quality standards would likely require landfill disposal if removed from the site.
- The segment from Dougall Avenue to South Cameron Boulevard is the least impacted of all 5 segments with only marginal exceedances of Table 1 soil quality standards. More options may be available for disposal or re-use of material from this segment.
- **The impacted sediments would NOT be characterized as hazardous and could be disposed of at a licensed non-hazardous landfill. Due to the saturated conditions of the sediment, special handling may also be required prior to off-site disposal.**

A copy of the entire Golder report can be found in Section 10 of this file.

Heritage Sites

Built Heritage:
There are no properties identified in the Windsor Municipal Heritage Register that abut the Grand Marais Drain within the study area.

Archaeological Heritage:
As part of this Class EA, AMICK Consultants Limited were engaged to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed improvements. Over the course of the physical assessment of the property that was completed during this study, no archaeological resources were encountered. Consequently, it is recommended that the proposed development be considered cleared of any further requirement for archaeological fieldwork. A summary of the information that was displayed at the Drop-In Centre is provided in Section 3, Drop-In Centre Slide 10. A copy of the entire AMICK report can be found in Section 8 of this file.

Hydro One

There are Hydro One transmission lines and facilities in the vicinity of the project area. Appropriate lead-time will be built into the project schedule in the event that the proposed works will require relocation or modification of the lines. Plans will be submitted to show the affected facilities.

Natural Heritage

BioLogic Inc. was retained to undertake an assessment of the Natural Heritage within the study area. The study included aquatic life as well as a terrestrial assessment to evaluate the existing flora and fauna. The following summarizes the findings of BioLogic Inc.

Aquatic:
The Grand Marais Drain has permanent flow and supports a number of warmwater fish species. However, the weir located at Dougall Avenue limits fish access to the Grand Marais Drain within the study area. There are no aquatic Species at Risk within the Grand Marais Drain.

The construction of the proposed works for the project will have temporary impacts to fish and fish habitat; however with naturalization of the stream banks and removal of the weir at Dougall Avenue, there will be net benefits for fish and fish habitat.

Flora:
Site specific floral investigations conducted for the study area did not find any floral species at risk within the study area. Habitat requirements of these floral species (i.e., prairie or wet, open deciduous forest habitat), does not exist in the study area.

Floral species at risk will need to be further assessed as part of the design process to ensure compliance with the federal *Species at Risk Act* (SARA) and provincial *Endangered Species Act* (ESA).

Fauna:
Site specific faunal investigations conducted for the study area identified potential snake habitat within the study area. The open fields adjacent to Segment 1 and within Segment 2, would provide suitable habitat for foraging, thermoregulation, nesting and hibernation. For Segment 3, 4 and 5 there was very little to no suitable habitat. At this time it has not been determined if the identified habitat is being used by the snake species at risk. Also, incidental occurrences of these species may be possible along the Grand Marais Drain.

Both the Common Five-lined Skink and the Eastern Foxsnake have identified regulated habitat that is protected under the provincial *Endangered Species Act* (ESA). All faunal species at risk, especially those with habitat regulations, will need to be further assessed as part of the design process to ensure compliance with the federal *Species at Risk Act* (SARA) and provincial *Endangered Species Act* (ESA).

Conclusion:
The construction of the proposed works for the project may cause temporary impacts to habitat for these species. Measures to mitigate this impact include construction timing windows, isolation of work area and naturalization and additional habitat creation. Specifics will be developed through the detailed design phase and permitting process for this project.

A copy of the entire BioLogic report can be found in Section 9 of this file.

Union Gas

Mapping from Union Gas was obtained and reviewed. A 400mm dia. gas main crosses over the channel just upstream of the bridge at North Service Road. A Gas Distribution Station is located just west of the drain. Construction beyond the station's iron fence will be prohibited. To avoid conflict with the gas distribution station and the 400mm dia. gas main, the new channel will be narrowed using a gabion basket type retaining wall. The proposed design and construction methodology of the channel at the gas main will be reviewed with Union Gas.

Physical locates would be required prior to detailed design and construction in order to confirm the location of the gas mains.

Windsor Utilities Commission

Relevant information was extracted from the City of Windsor's sewer atlas and was used to review the local storm sewer system that is tributary to the study area. The sewer atlas can be viewed on the City of Windsor's website (http://www.citywindsor.ca/visitors/Maps/Pages/MAPS-For-Residents.aspx - Scroll down to Municipal Address Atlas).

COGECO AND MNSI

COGECO™

RECORD OF LOCATION UNDERGROUND PLANT

REQUEST FOR STAKE-OUT SHOULD BE AT LEAST 48 HOURS (2 WORKING DAYS) PRIOR TO DIGGING.

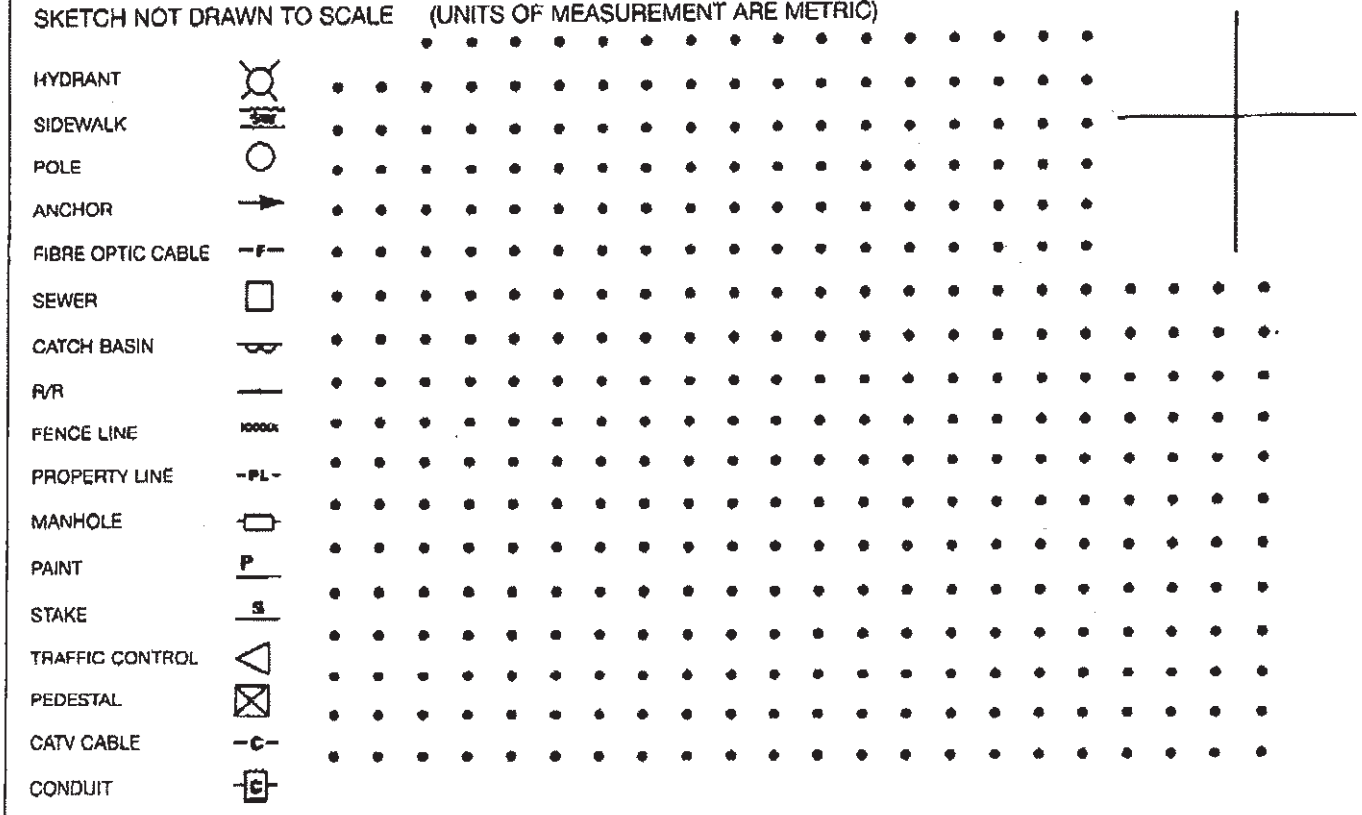
LOCATION	EC ROW DRAIN IMPROVEMENTS				SERIAL NO. 12339127 DWG. NO.
CONTACT NAME	LIZ MICHAUD - LANDMARK ENGINEERS				CONTACT PHONE 9728444
NATURE OF WORK	DESIGN AND PLANNING				
DATE REQUIRED	Y	M	D	TIME REC'D	RECEIVED BY JOE VOLDA - 519-7965858

ARRIVAL ON SITE	Y	M	D	TIME
	12	9	17	

METHOD OF IDENTIFICATION ☑ PAINT ☐ STAKE ☑ SKETCH ☑ OTHER (Specify)

REMARKS SEE ATTACHED DRAWING - BURIED COGECO FIBRE CROSSES DRAIN EAST OF TURNER
NO OTHER CABLES BURIED IN YOUR WORK AREA

SKETCH NOT DRAWN TO SCALE (UNITS OF MEASUREMENT ARE METRIC)



CAUTION

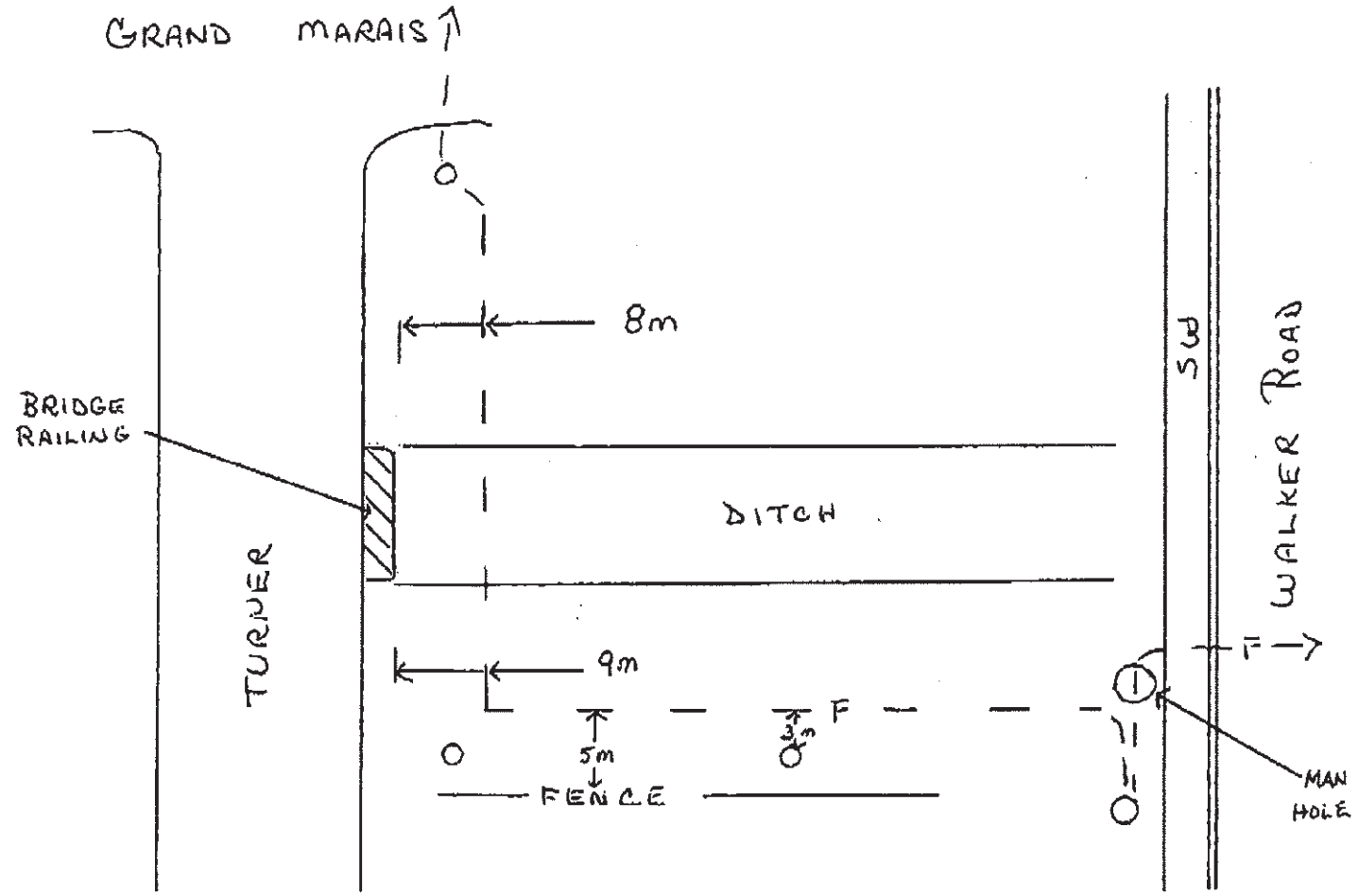
HAND DIG WITHIN 1 METRE OR 3.28 FEET OF MARKINGS

** EXPIRES 30 DAYS FROM DATE OF LOCATE COMPLETION

***SUBJECT TO TERMS AND CONDITIONS ON REVERSE. PLEASE READ BEFORE SIGNING

LOCATOR'S SIGNATURE	HRS.	ACCEPTED BY	COMPANY
JV		Jarred	

PART 1 (WHITE) PERSON RECEIVING LOCATE PART 2 (YELLOW) OFFICE Thank you for calling before you dig.


GRAND MARAIS
8m
BRIDGE RAILING
DITCH
TURNER
SB
WALKER ROAD
9m
5m
3m
F
FENCE
MAN HOLE


N

MNSI

RECORD OF LOCATION UNDERGROUND PLANT

REQUEST FOR STAKE-OUT SHOULD BE AT LEAST 48 HOURS (2 WORKING DAYS) PRIOR TO DIGGING.

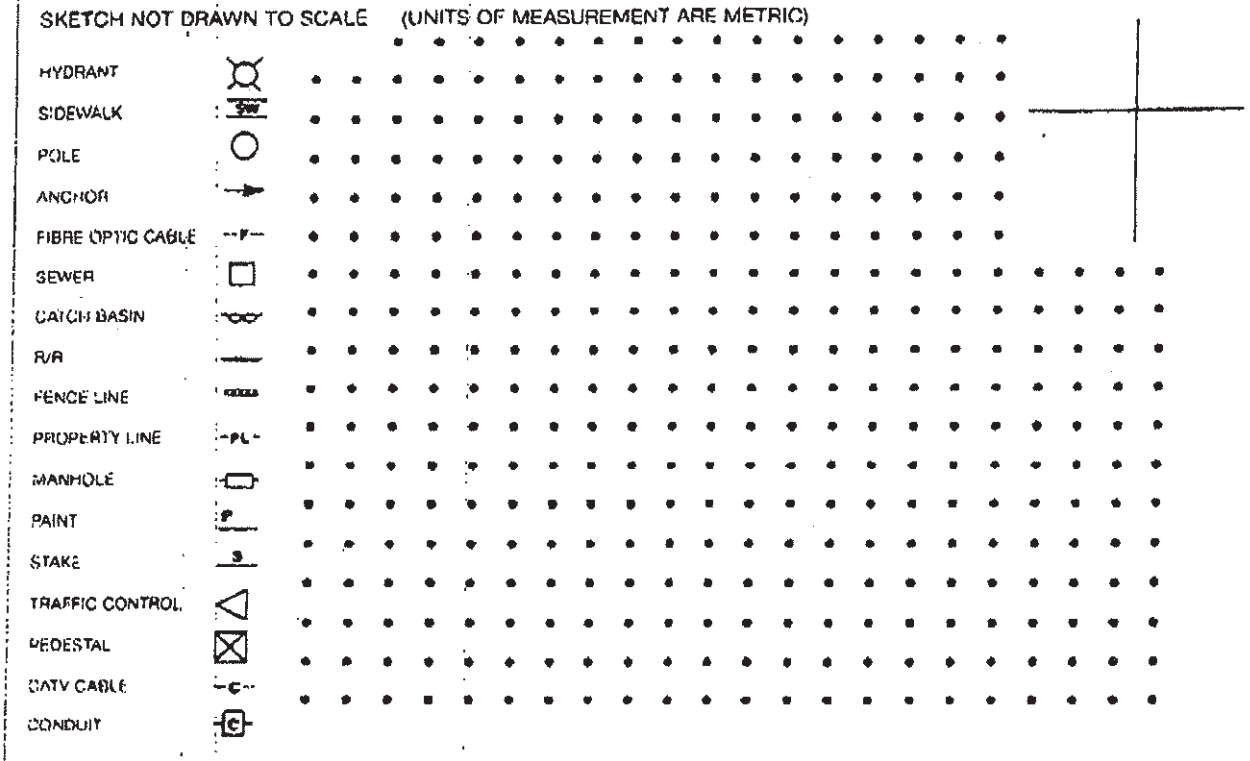
LOCATION	EC Row Drain Improvements				SERIAL NO. 12339127
					DWG. NO. 1 OF 4
CONTACT NAME	Liz Michaud - Landmark Engineers				CONTACT PHONE 9728644
NATURE OF WORK	Design & Planning				
DATE REQUIRED	Y	M	D	TIME REC'D	RECEIVED BY Joe V. -519-7965858

ARRIVAL ON SITE	Y	M	D	TIME	
	12	9	17		

METHOD OF IDENTIFICATION ☐ PAINT ☐ STAKE ☐ SKETCH ☑ OTHER (Specify)

REMARKS As Per Your Map and Our Site Visit Your Work Areas Are Clear of Any Buried MNSI Fibre

SKETCH NOT DRAWN TO SCALE (UNITS OF MEASUREMENT ARE METRIC)



CAUTION

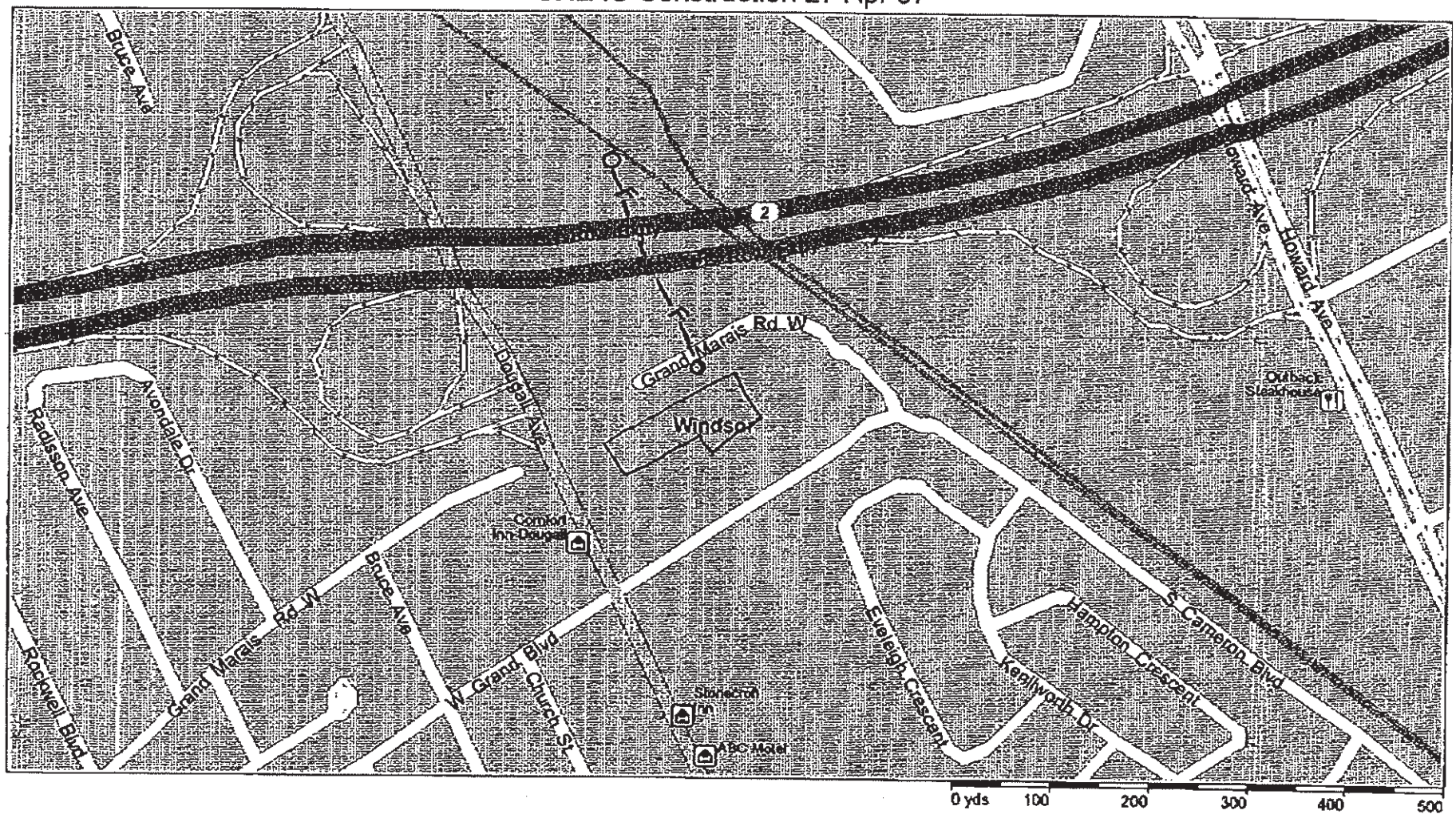
HAND DIG WITHIN 1 METRE OR 3.28 FEET OF MARKINGS

** EXPIRES 30 DAYS FROM DATE OF LOCATE COMPLETION

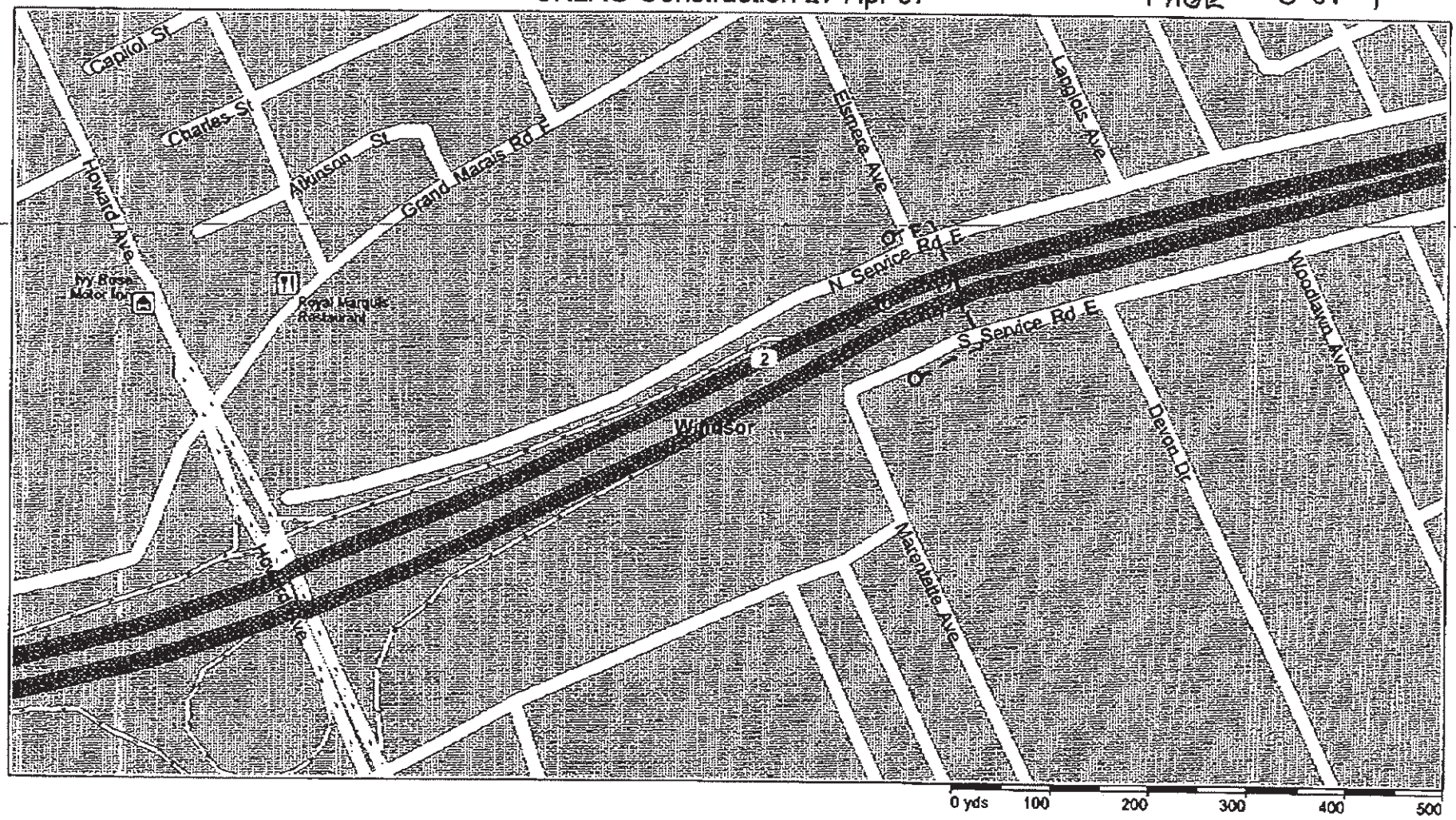
LOCATOR'S SIGNATURE	HRS.	ACCEPTED BY	COMPANY
JV		Jmed	

Thank you for calling before you dig.

CKLAG Construction 27 Apr 07

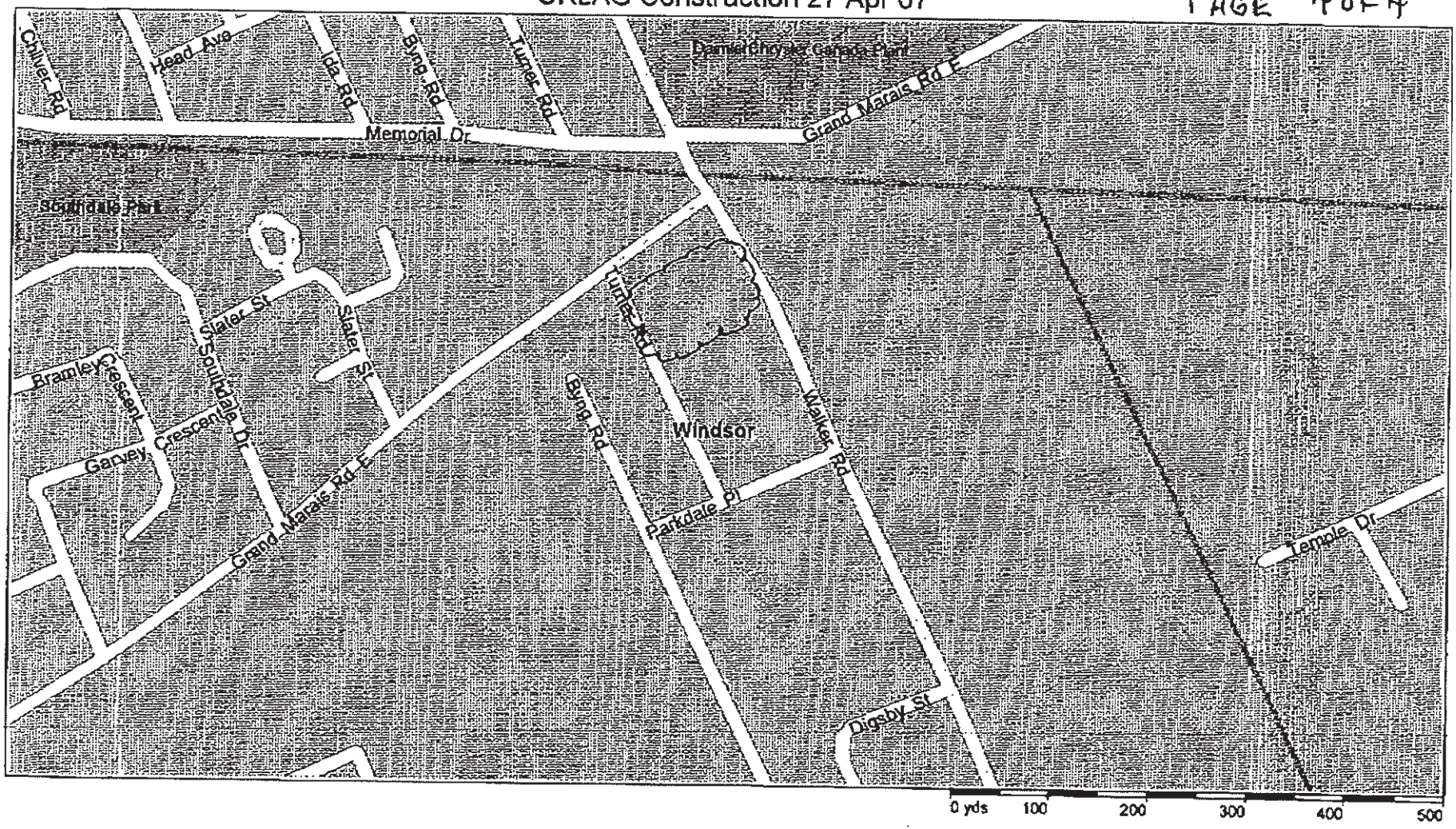


YOUR WORK AREA IS CLEAR OF MNSI FIBRE. IT'S BURIED BEHIND STRETCH MALL HEADING NORTH.



YOUR WORK AREA IS CLEAR OF MNSI FIBRE. CROSSES @ ELSMERE & N. SERVICE ROAD.

CKLAG Construction 27 Apr 07



NO MNSI FIBRE HERE

ENWIN UTILITIES

3-PHASE PRIMARY
2-PHASE PRIMARY } OVERHEAD & UNDERGROUND SYSTEMS
1-PHASE PRIMARY

INSULATED PVC SHEATHED CONDUCTOR (TREE CONDUCTOR) PRIMARY & SECONDARY MAPS

AP — AP — AP: ABANDONED PRIMARY

0 AL.: SECONDARY (120/240V. WIRE SIZE & MATERIAL)
SECONDARY SHOWING OPEN POINT
UNDERGROUND SECONDARY
600V 3ø OR 230V 3ø LINE (SECONDARY MAPS)
208V 3ø 4-WIRE LINE

AERIAL CABLE

OVERHEAD STREET LIGHT FEED WIRE
OVERHEAD STREET LIGHT FEED WIRE SHOWING OPEN POINT
OVERHEAD STREET LIGHT CONTROL WIRE
UNDERGROUND STREET LIGHT CABLE
OR: UNDERGROUND DUCT SYSTEM OR BURIED CABLE (SECONDARY & PRIMARY MAPS)

H-289: HYDRO PERMIT FOR JOINT USE BELL TELEPHONE POLE
B-389: BELL PERMIT FOR JOINT USE HYDRO POLE
C.N.T.-440: C.N. TEL. PERMIT FOR JOINT USE HYDRO POLE

1. O 2. ● D.D. 3. ● I.P.: 1. HYDRO POLE 2. STREET LIGHT POLE DUSK TO DAWN 3. STREET LIGHT IRON POLE
1. O S.P. 2. O P.P.: 1. STEEL POLE 2. PRIVATE POLE
1. 2. 3.: 1. TREE GUY 2. GUY 3. STUB POLE GUY
SECONDARY DWG. OLD SYMBOL FOR 4KV N/O OR N/C SWITCH (SEE 4KV OVERALL WALL MAP)
LATERAL POLE
NEW POLE (CONSTRUCTION DRAWINGS)

3ø TRANSFORMER PLATFORM (OVERHEAD PRIMARY MAPS & SECONDARY MAPS)
1. 2.: 1. 1-1ø TRANSFORMER POLE MOUNTED (SECONDARY MAPS)
2. 1-3ø OR 3-1ø TRANSFORMERS POLE MOUNTED (SECONDARY MAPS)
1. ▲ 2. △: 1. 1-3ø CUSTOMER OWNED TRANSFORMER (OVERHEAD PRIMARY MAPS)
2. 3ø TRANSFORMER TRANSFORMER (OVERHEAD PRIMARY MAPS)

B: 1-1ø SUBMERSIBLE TRANSFORMER (UNDERGROUND MAP) 1-1ø TRANSFORMER (PRIMARY MAP) PHASE INDICATED BY LETTER IN CIRCLE
W: 1-1ø - 16KV/2.4KV TRANSFORMER PHASE INDICATED BY LETTER, (PRIMARY MAPS SHOWING HV TRANSFORMERS)
R W B: 3-1ø - 27KV/4.16KV TRANSFORMERS PHASE INDICATED BY LETTER, (PRIMARY MAPS SHOWING HV TRANSFORMERS)

V12 214: 1. TRANSFORMER VAULT WITH NUMBER 2. MANHOLE WITH NUMBER
3ø PAD MOUNTED TRANSFORMER (SECONDARY MAPS, OVERHEAD & UNDERGROUND PRIMARY MAPS)
SE SE01234: PAD MOUNTED 3ø SECONDARY ENCLOSURE CABINET (SECONDARY MAPS & UNDERGROUND PRIMARY MAPS)
RB: INDOOR DRY TYPE TRANSFORMER, 600-120/240V, PHASES INDICATED BY LETTERS
B: SURFACE MOUNTED 1ø TRANSFORMER, PHASE INDICATED BY LETTER
G: IDENTIFIES TRANSFORMER SITES ASSOCIATED WITH A MICRO-FIT GENERATION CUSTOMER (PRIMARY & SECONDARY MAPS)
C.B.: CAPACITOR BANK WITH NUMBER

1. 2. H.H.: 1. FAULT INDICATOR (UNDERGROUND MAPS) 2. HAND HOLE
SUP: SUP - 50 PR ALPETH IN DUCT (UNDERGROUND MAPS)
AIR BREAK SWITCH
IN-LINE SWITCH OR LINE OPENER
42-F-5 OS 42-F-5 N.O.: 4.16KV SWITCH, DESIGNATION NUMBER IN CIRCLE (DOUBLE CIRCLE DESIGNATING NORMAL OPENS WILL BE DISCONTINUED). IF SWITCH IS OPEN IT WILL BE MARKED N.O.
NORMALLY OPEN SWITCH (PRIMARY 27.6 KV MAPS, DESIGNATION NUMBER INSIDE BOX)
LOAD BREAK SWITCH (PRIMARY 27.6 KV MAPS, DESIGNATION NUMBER INSIDE BOX)
SECT UNIT: SECTIONALIZING SWITCHING UNIT (IDENTIFIED BY STREET NAME ON WHICH IT IS LOCATED)
41: ENWIN 27.6/4.16 KV SUBSTATION (27.6 KV PRIMARY MAPS)
123 R — IDENTIFICATION NO. PHASE: SINGLE PHASE FUSED DISCONNECT SWITCH (4.16/2.4KV PRIMARY MAPS)
F.I.: 3ø TRIP 1ø RESET TYPE } UNDERGROUND PRIMARY MAPS
F.I.: 1ø TEST POINT TYPE
RC: RECLOSER

F234 15K: FUSED TAP (NUMBERED), ACCOMPANIED BY FUSE SIZE
'A' ENWIN IDENTIFICATION: M.T.C. KIOSK FOR ST. LIGHT (600 V.) - SEC. MAPS
456 60A R: STREETLIGHT RELAYS
457 60A R R: 2-POLE RELAY (WITH ONE NUMBER)
458 459 60A 60A R R: TWO SEPARATE RELAYS (WITH TWO NUMBERS)
P: PHOTO CELL
S: SECONDARY CONNECTION FOR STREET LIGHTING
P 455 60A: PHOTO ELECTRIC RELAY (OLD SYMBOL PR TO BE DISCONTINUED)
BK: STREETLIGHT BREAKER PANEL. POLE MOUNTED OVERHEAD FEED. STREETLIGHT MAPS

HYDRO EASEMENT NO.46: HYDRO EASEMENT (SECONDARY MAPS)
CUSTOMER CONNECTION AGREEMENT - CONTRACT NUMBERS (SECONDARY MAPS)
RAILWAY TRACKS
PROPERTY LINE (UNDERGROUND MAPS)

STREETLIGHT PANEL INDEX

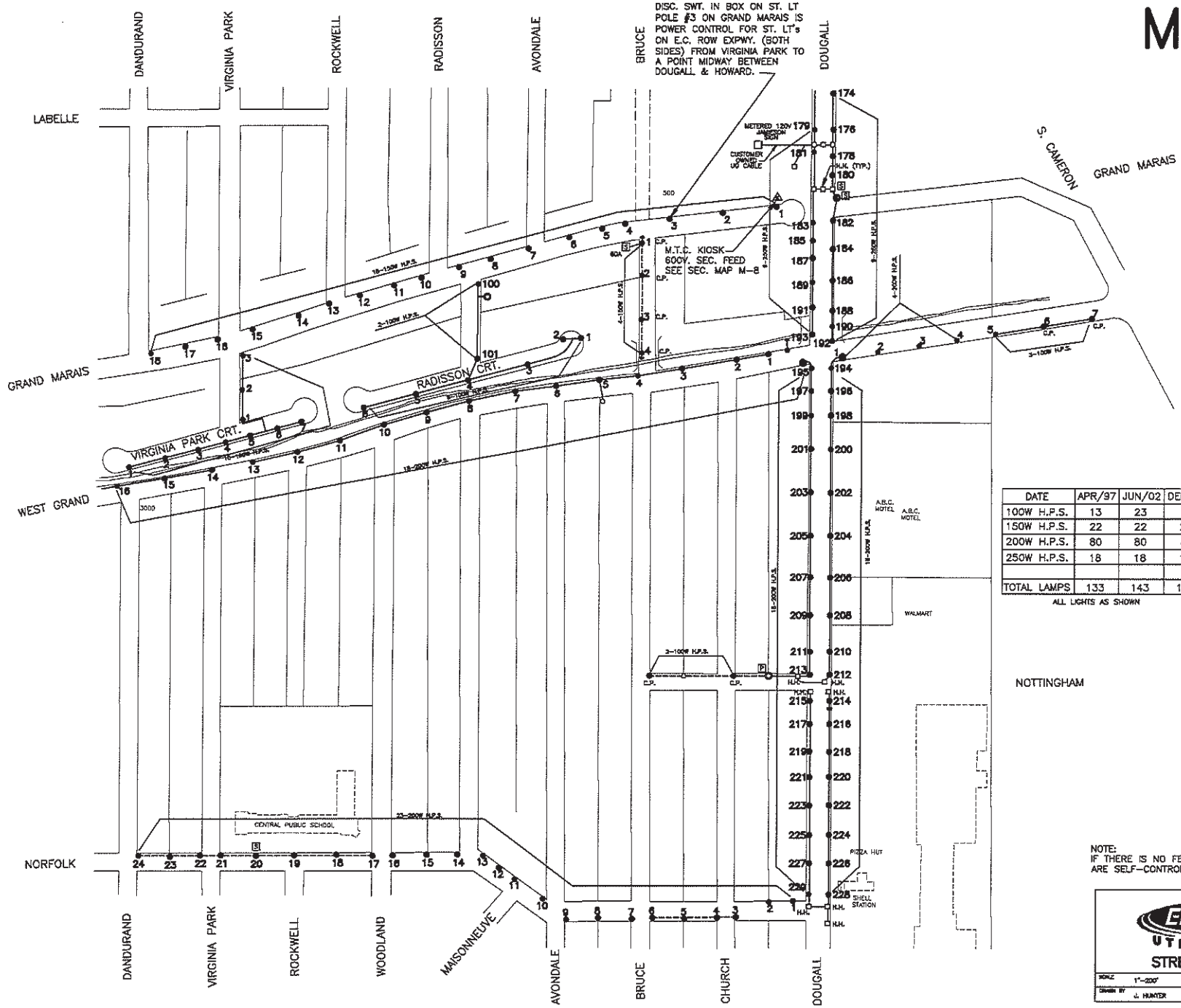
SITE	BREAKER #	STREETLIGHT #
5746	1	ASPEN SHORE AVE. - #2 & 4 PEPPERVINE STREET - #1
	2	ASPEN SHORE AVE. - #1, 3 & 5
	3	ASPEN SHORE AVE. - #6 & 8
	4	ASPEN SHORE AVE. - #7, 9, 11, 13
5750	1	ASPEN SHORE AVE. - #10, 12, 14, 16
	2	ASPEN SHORE AVE. - #17 & 19
	3	ASPEN SHORE AVE. - #15
	4	ASPEN SHORE AVE. - #18

LEGEND

ENWIN UTILITIES

NEW BOOK PRINTED ____________
REVISED JUNE 25/2010

M-8



DATE	APR/97	JUN/02	DEC/02	MAR/02	JUN/11
100W H.P.S.	13	23	5	10	10
150W H.P.S.	22	22	22	22	22
200W H.P.S.	80	80	81	81	82
250W H.P.S.	18	18	16	17	17
TOTAL LAMPS	133	143	124	130	131

ALL LIGHTS AS SHOWN

NOTTINGHAM

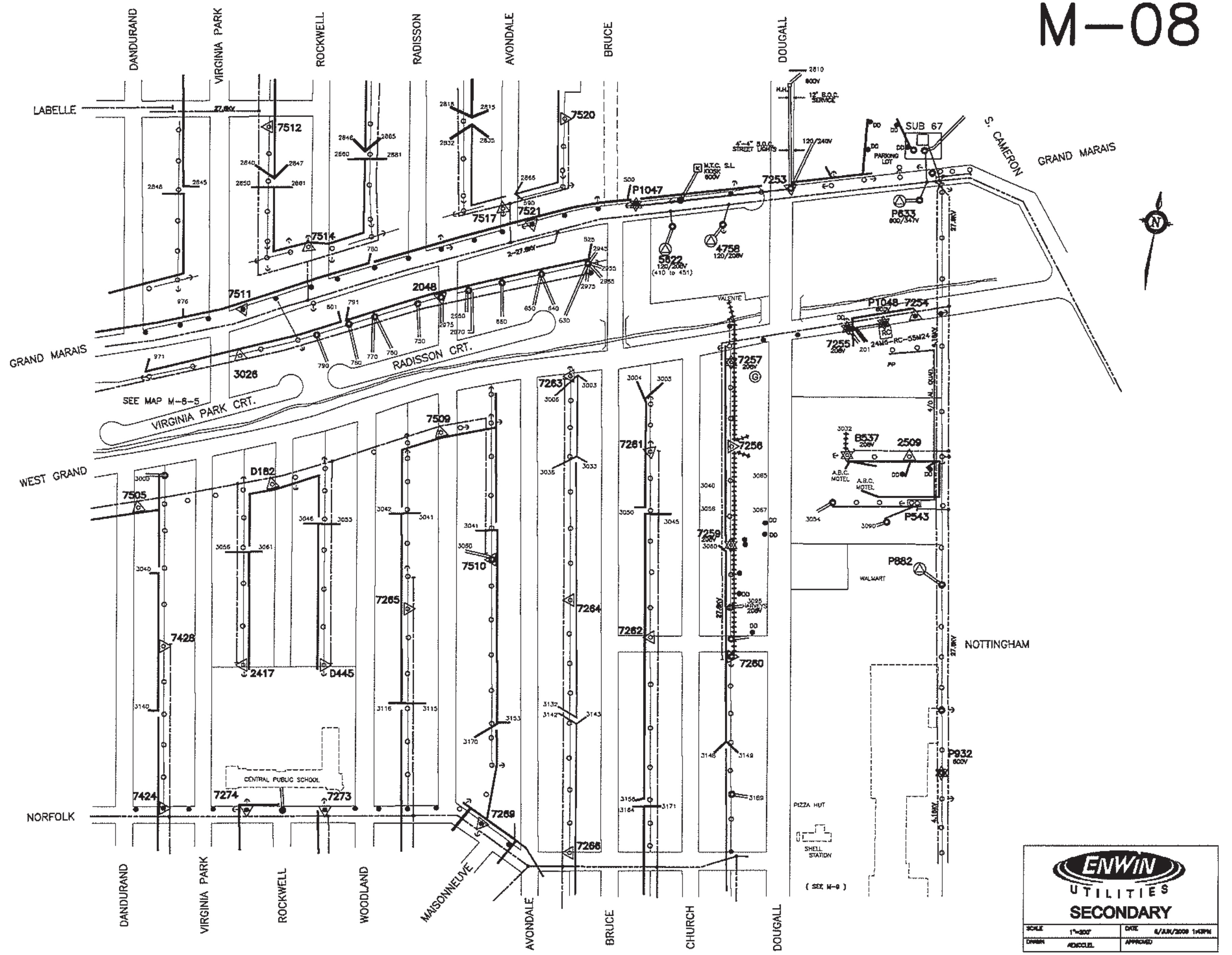
NOTE:
IF THERE IS NO FEED WIRE SHOWN, LIGHTS ARE SELF-CONTROLED

ENWIN UTILITIES

STREETLIGHT

SCALE 1"=200'	DATE 05/2008
DRAWN BY J. HUNTER	UPDATED

M—08

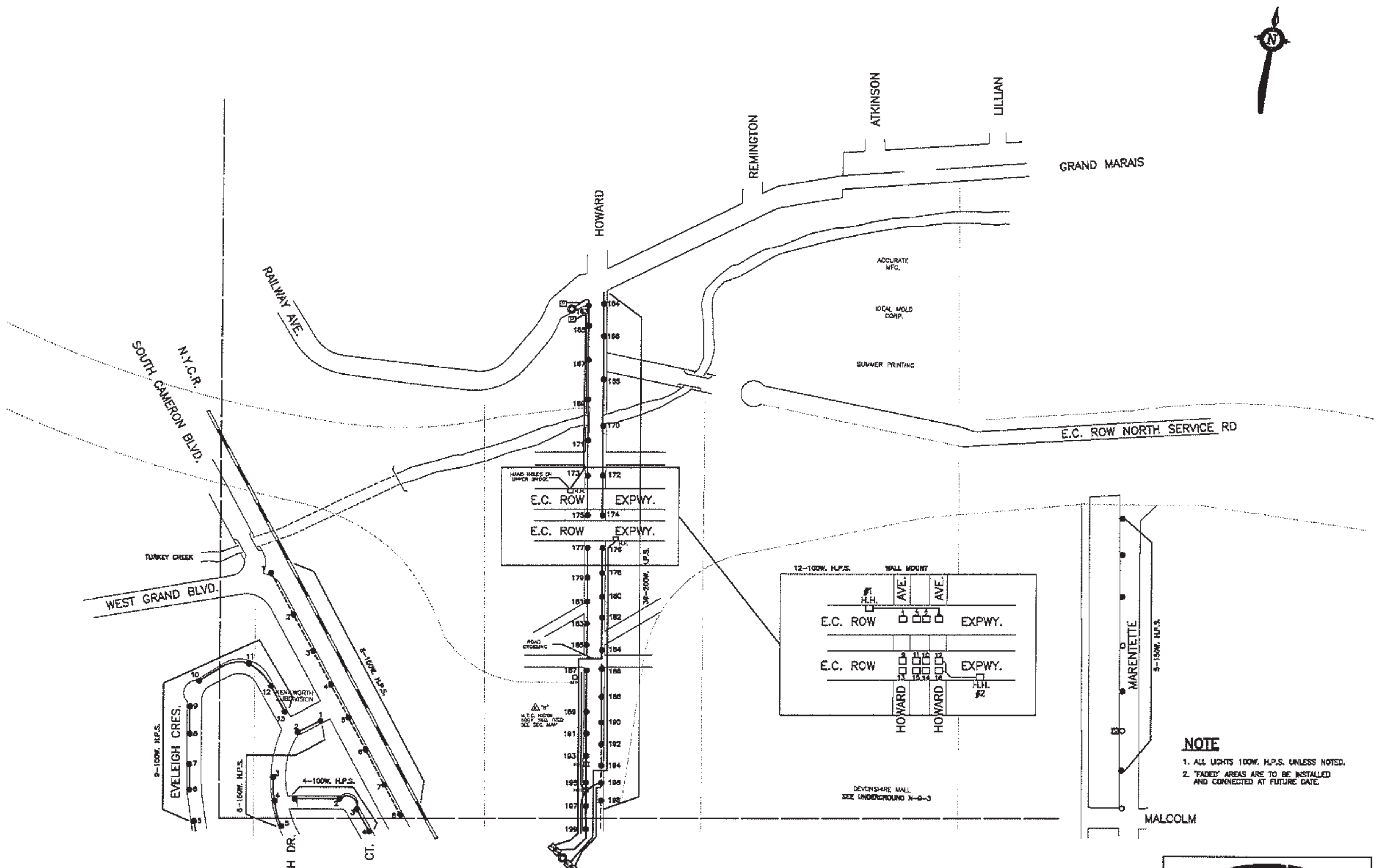


ENWIN UTILITIES

SECONDARY

SCALE	1"=200'	DATE	6/JUN/2009 1:43PM
DRAWN	ADACCLEL	APPROVED	

N-8



NOTE

1. ALL LIGHTS 100W. H.P.S. UNLESS NOTED.
2. "FADED" AREAS ARE TO BE INSTALLED AND CONNECTED AT FUTURE DATE.

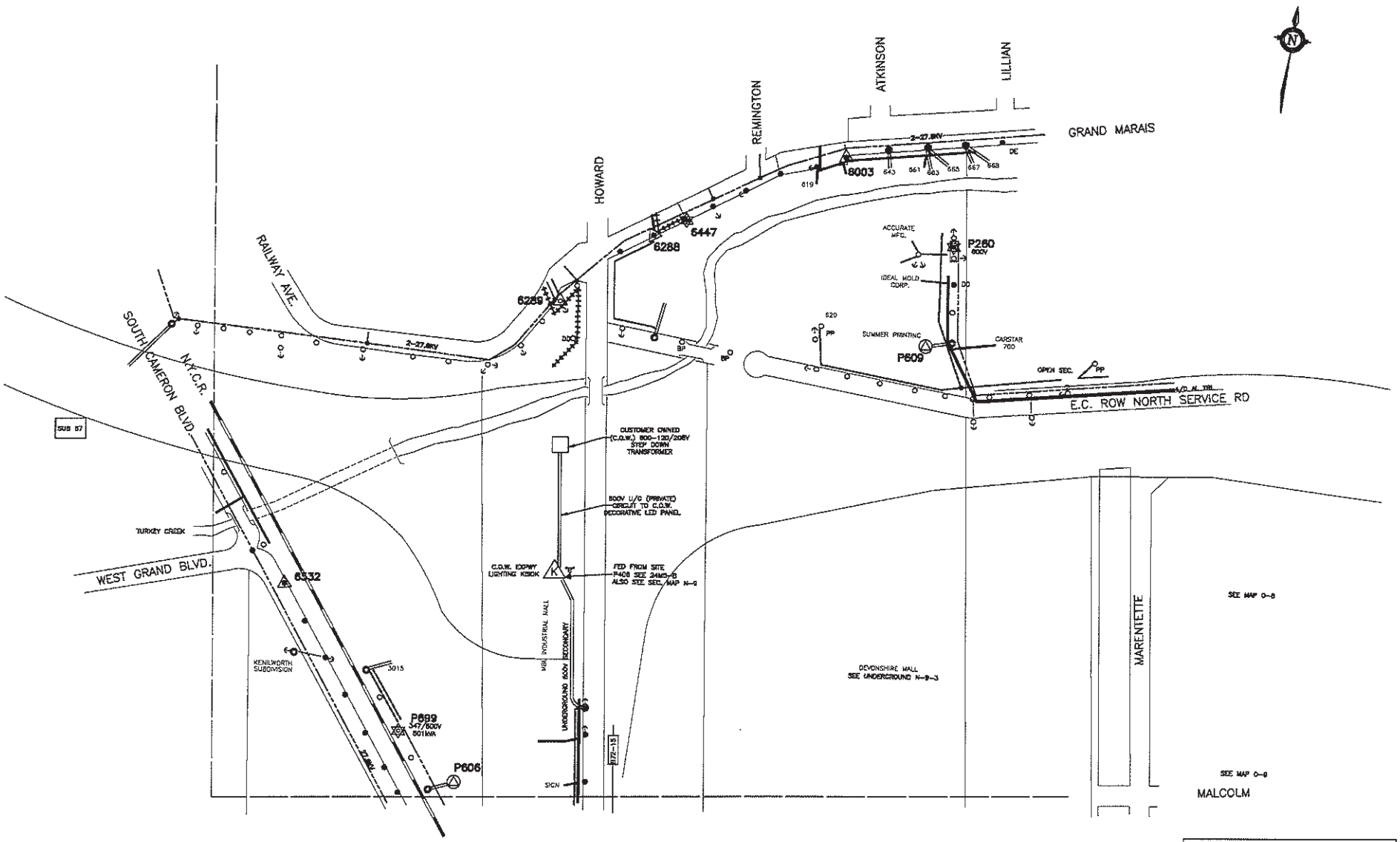
DATE	04/92	07/95	04/97
100 W.H.P.S.	12	21	25
150 W.H.P.S.	19	19	18
200 W.H.P.S.	41	41	40
TOTAL LAMPS	72	81	83

ENWIN UTILITIES

STREETLIGHT

SCALE 1"-200'	DATE 08/2004
DRAWN BY J.HUNTER	UPDATED

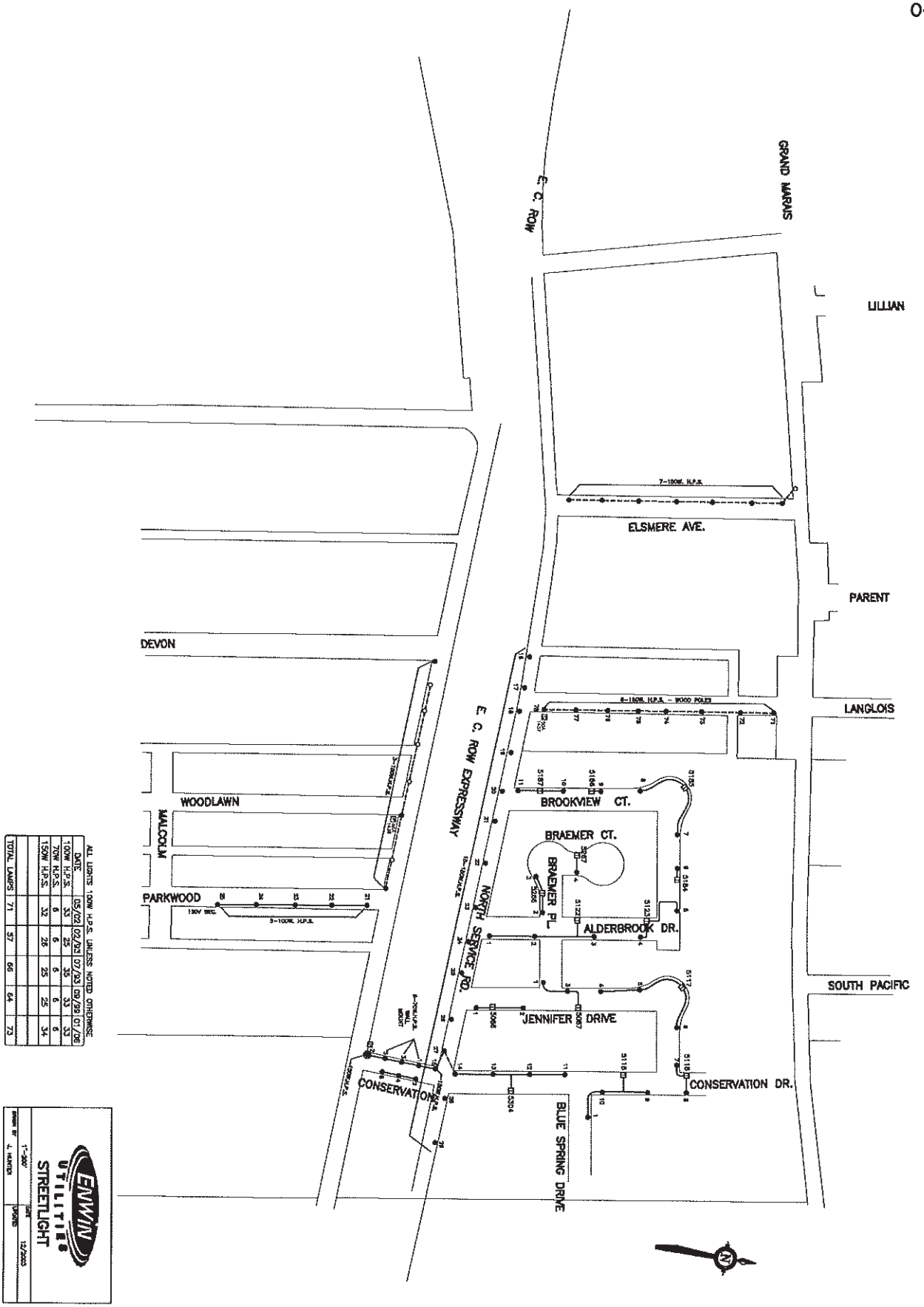
N-08



ENWIN UTILITIES

SECONDARY

SCALE	1"=200'	DATE	7/JUN/2008 11:40AM
DRAWN	ASSOCIATE	APPROVED	



ALL LIGHTS 150W H.P.S. UNLESS NOTED OTHERWISE

DATE	05/02	02/03	07/03	09/99	01/06
100W H.P.S.	33	25	35	33	33
70W H.P.S.	6	6	6	6	6
150W H.P.S.	32	26	25	25	34
TOTAL LAMPS	71	57	66	64	73

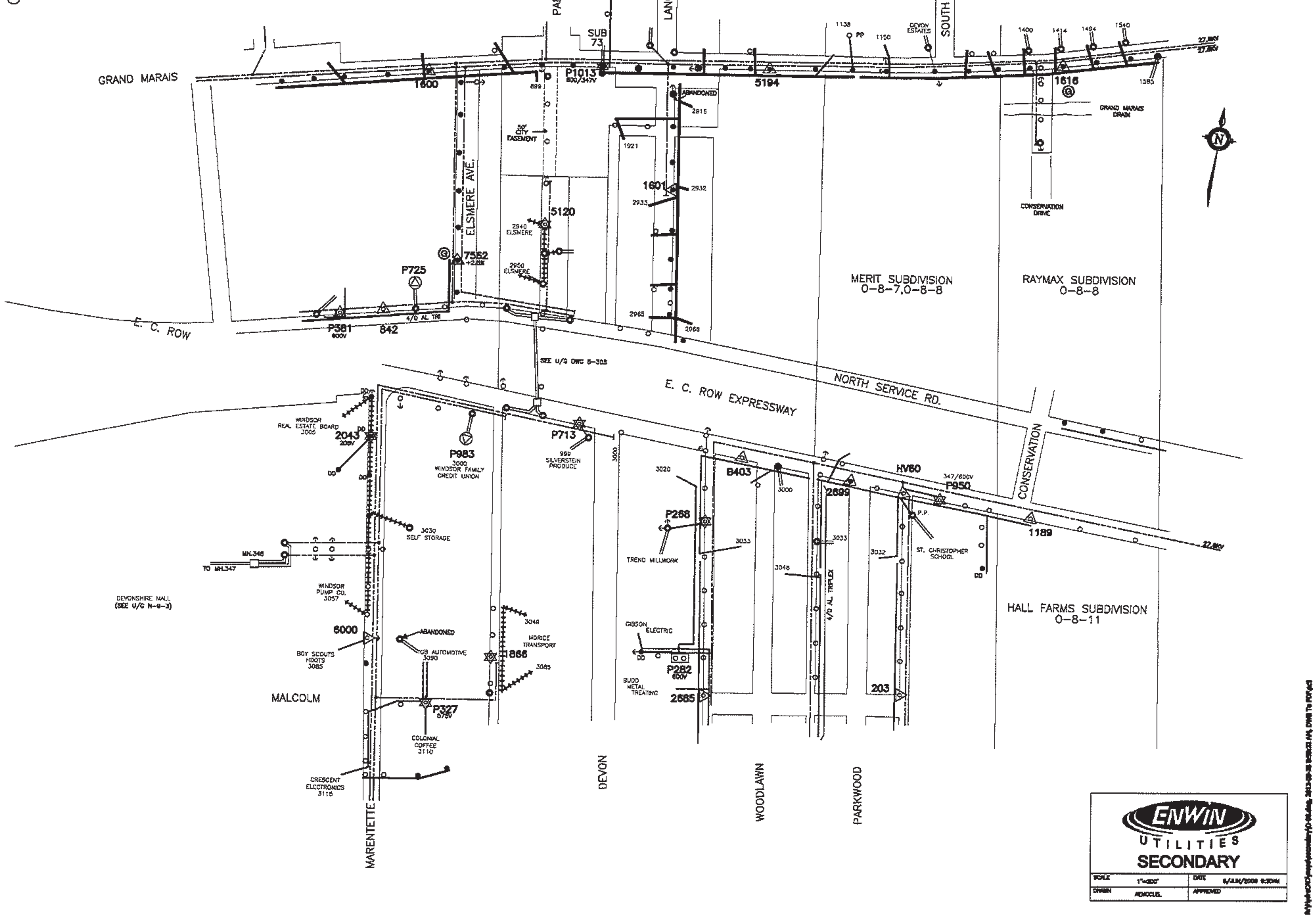
ENWIN UTILITIES

STREETLIGHT

DRAWN BY: A. HUNTER | SCALE: 1"=200' | DATE: 12/2003 | DRAWING

O-8

O-08


GRAND MARAIS
LILLIAN
PARENT
LANGLOIS
SOUTH PACIFIC
SUB 73
P1013
1600
5194
1616
ELSMERE AVE.
5120
1601
7552
P725
P381
842
E. C. ROW
E. C. ROW EXPRESSWAY
NORTH SERVICE RD.
CONSERVATION
MERIT SUBDIVISION 0-8-7,0-8-8
RAYMAX SUBDIVISION 0-8-8
HALL FARMS SUBDIVISION 0-8-11
P983
P713
B403
2699
HV60
P950
1189
P288
P282
2685
203
2043
6000
866
P327
WINDSOR REAL ESTATE BOARD
WINDSOR FAMILY CREDIT UNION
SILVERSTEIN PRODUCE
SELF STORAGE
TREND MILLWORK
ST. CHRISTOPHER SCHOOL
WINDSOR PUMP CO.
BOY SCOUTS
GB AUTOMOTIVE
MORICE TRANSPORT
GIBSON ELECTRIC
BUDD METAL TREATING
COLONIAL COFFEE
CRESCENT ELECTRONICS
DEVONSHIRE MALL (SEE U/G N-9-3)
ABANDONED
MALCOLM
MARENTETTE
DEVON
WOODLAWN
PARKWOOD
ENWIN UTILITIES
SECONDARY

P-7-11

MANHOLES ACCESS ON AN EASEMENT INSIDE CHRYSLER PROPERTY.

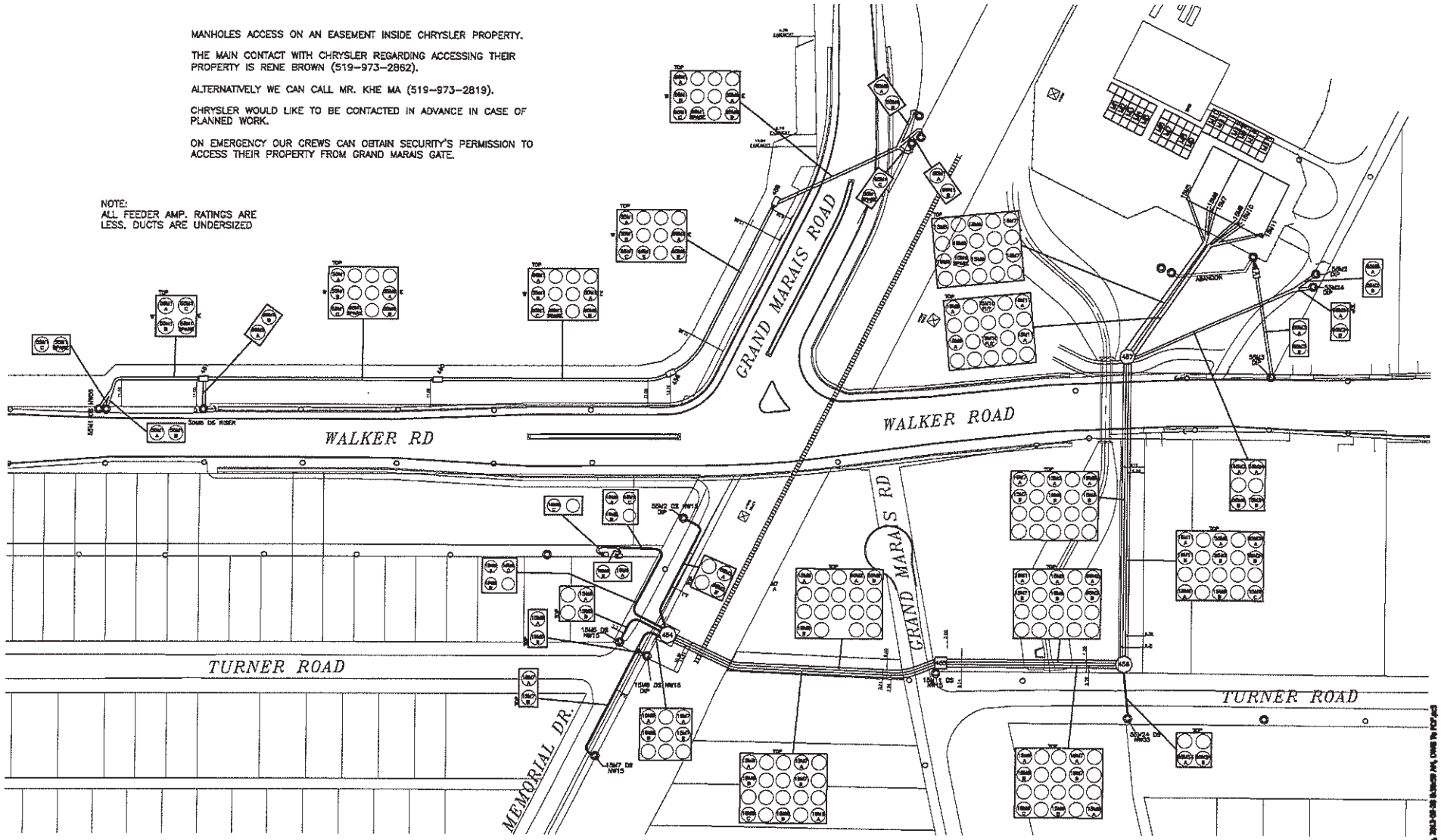
THE MAIN CONTACT WITH CHRYSLER REGARDING ACCESSING THEIR PROPERTY IS RENE BROWN (519-973-2862).

ALTERNATIVELY WE CAN CALL MR. KHE MA (519-973-2819).

CHRYSLER WOULD LIKE TO BE CONTACTED IN ADVANCE IN CASE OF PLANNED WORK.

ON EMERGENCY OUR CREWS CAN OBTAIN SECURITY'S PERMISSION TO ACCESS THEIR PROPERTY FROM GRAND MARAIS GATE.

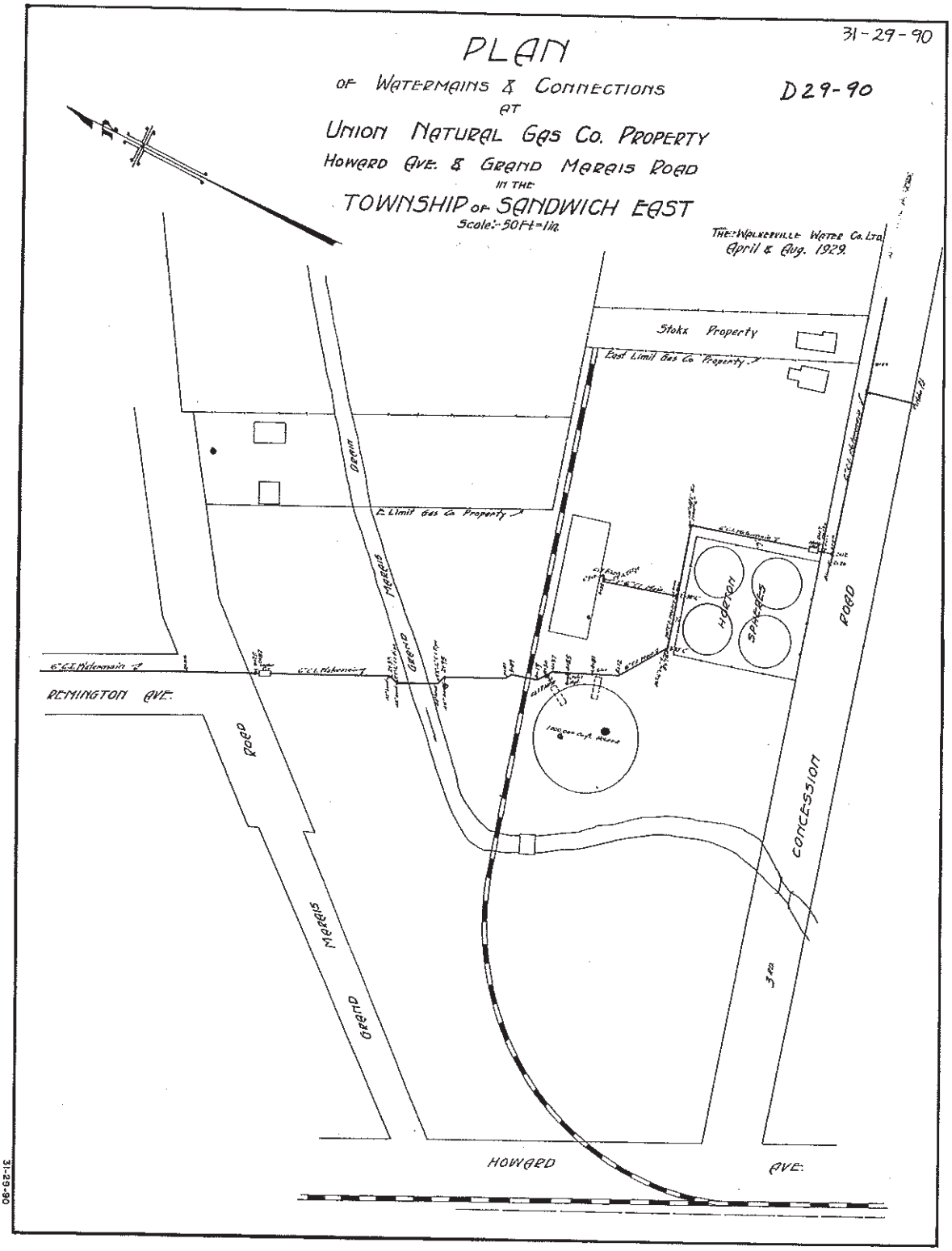
NOTE:
ALL FEEDER AMP. RATINGS ARE LESS. DUCTS ARE UNDERSIZED

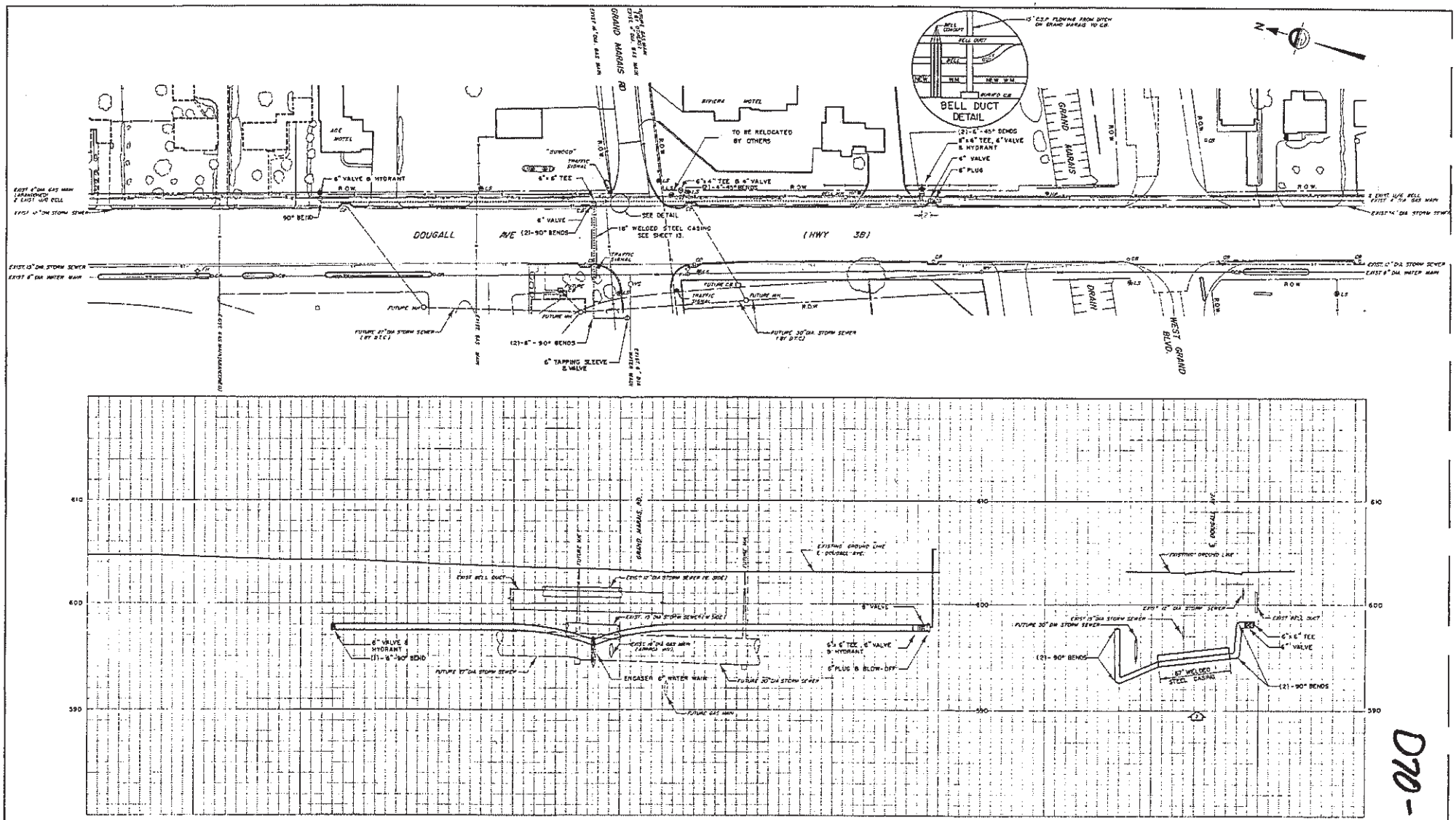


ENWIN UTILITIES

UNDERGROUND

SCALE	1:1000	DATE	6/FEB/2007 3:31PM
DRAWN	ASSIGNED	APPROVED	


31-29-90
PLAN
OF WATERMAINS & CONNECTIONS
AT
UNION NATURAL GAS CO. PROPERTY
HOWARD AVE. & GRAND MARAIS ROAD
IN THE
TOWNSHIP OF SANDWICH EAST
Scale:- 50 Ft = 1 in.
D29-90
THE WALKERVILLE WATER CO. LTD.
April & Aug. 1929.
Stokx Property
East Limit Gas Co. Property
E. Limit Gas Co. Property
Drain
GRAND MARAIS ROAD
6" C.I. Watermain
REMINGTON AVE.
HOWARD AVE.
CONCESSION ROAD
HORTON SPACES
31-29-90



RASTOR IMAGE HAS BEEN VERIFIED
AGAINST ORIGINAL

020-96

4	AS BUILT	10 JAN. 72	W.E.	DESIGN	W.K.R.
3	GAS MAINS ADDED ON PROFILE	6 NOV 71	E.S.	DRAWN	R.P.L.
2	GENERAL REVISIONS, PROFILE ACROSS DOUGALL ADDED	1 NOV 71	E.S.	CHECKED	W.K.R.
1	INVERT ELEVATION OF DRAIN ADDED	3 SEPT 71	J.R.	APPROVED	L.A.E.
NO.	REVISION	DATE	BY	DATE	29 JUNE 1971

WINDSOR UTILITIES COMMISSION

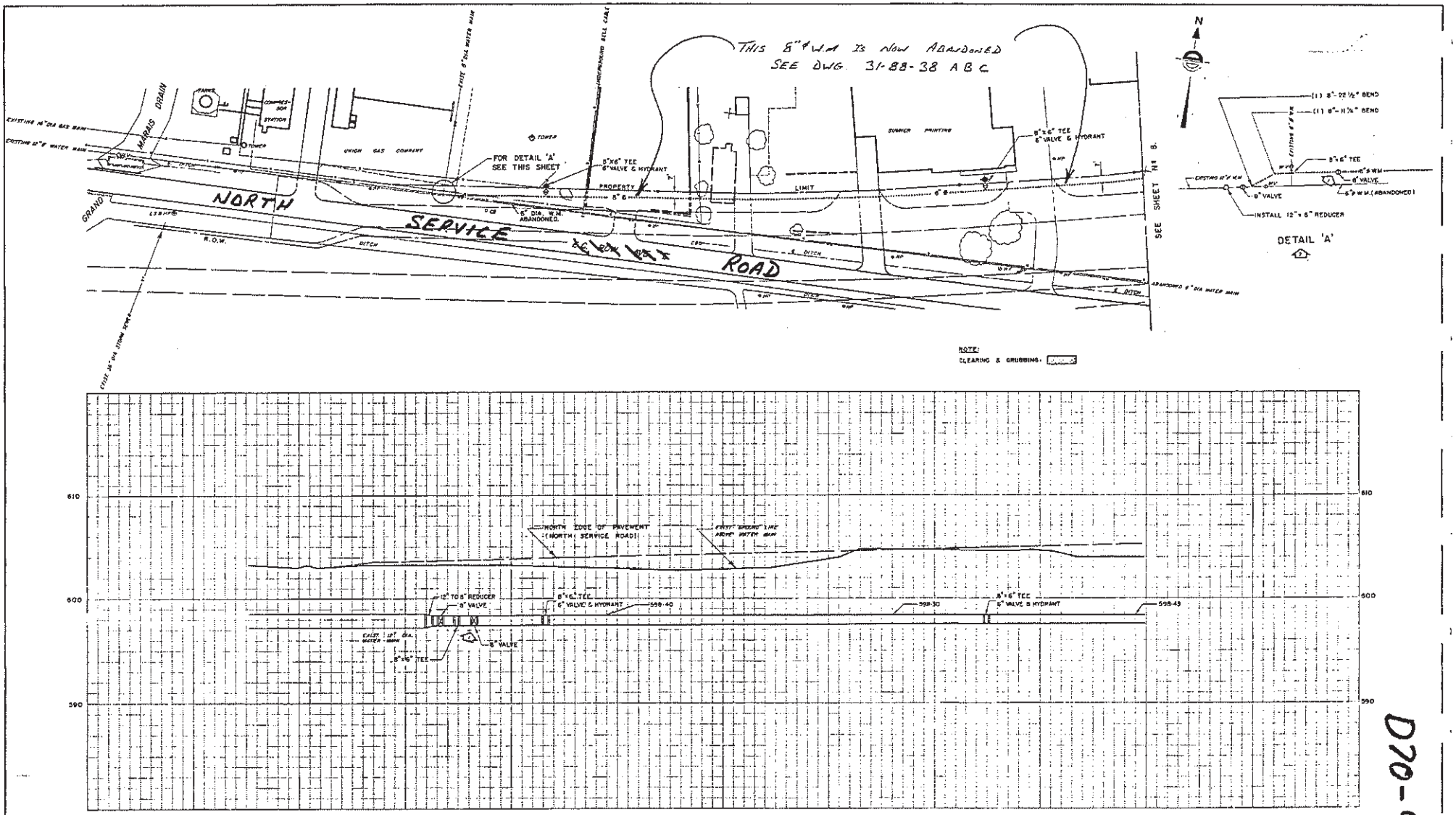
M.M. DILLON LIMITED
CONSULTING ENGINEERS

E. C. ROW EXPRESSWAY
WATER MAIN RELOCATION

DOUGALL AVENUE
FROM 300' N. OF GRAND MARAIS RD.
TO 300' S. OF GRAND MARAIS RD.

PROJECT NO. 6784-01
SHEET NO. 6

81-70-76



RASTOR IMAGE HAS BEEN VERIFIED
AGAINST ORIGINAL

H6-070

PRINT RECORD

AS BUILT

WINDSOR UTILITIES COMMISSION

M.M. DILLON LIMITED
CONSULTING ENGINEERS

No.	REVISIONS	DATE	BY
3	AS BUILT	11 APR. 72	M.E.
2	REVISED DETAIL 'A'	29 OCT. 71	T.C.S.
1	8" VALVE RELOCATED	3 SEPT. 71	J.P.

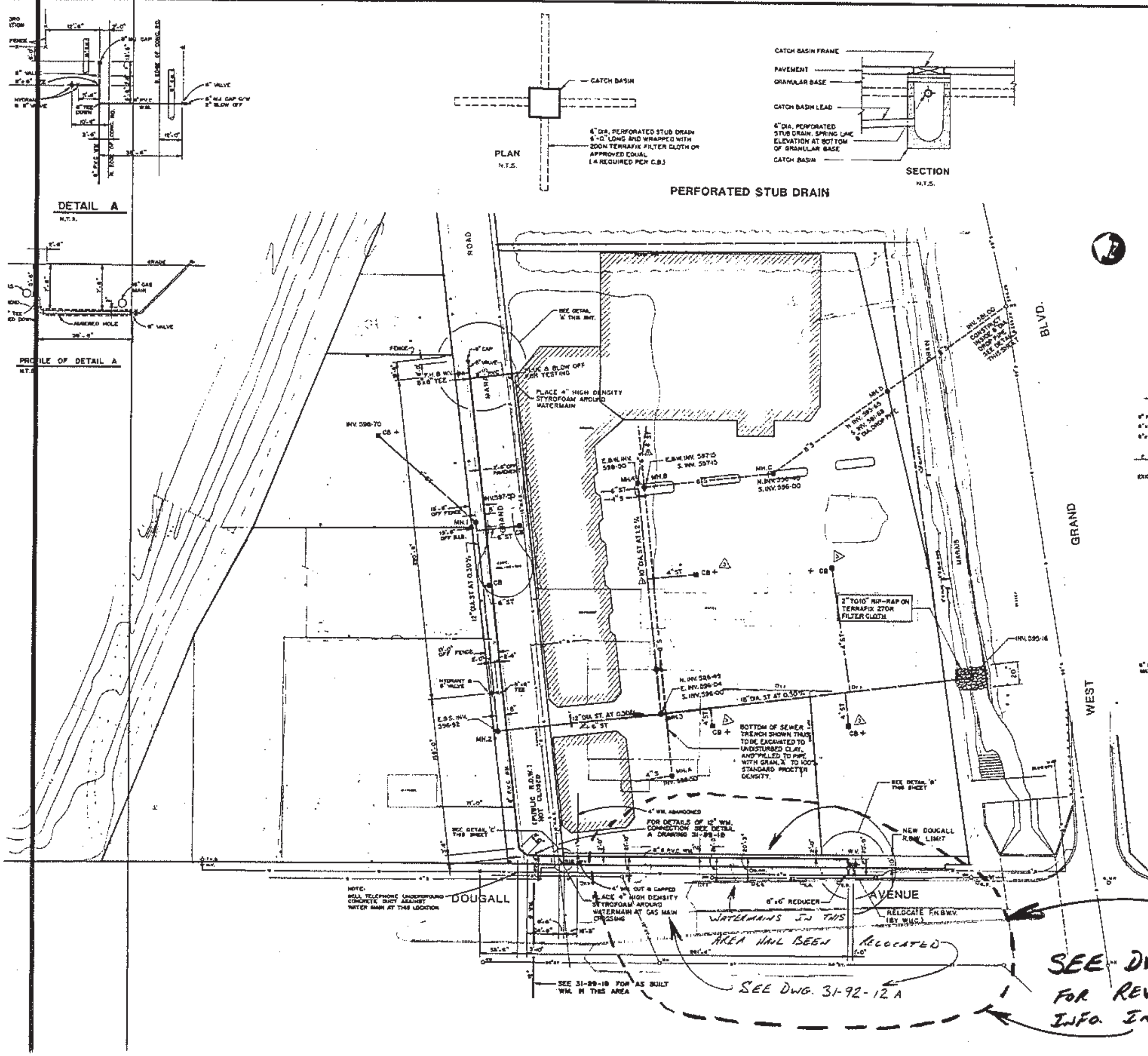
DESIGN N.R.B.
DRAWN M.A.A.
CHECKED N.R.B.
APPROVED L.D.C.
DATE 28 JUNE, 1971.
SCALE HOR. 1" = 40' VERT. 1" = 4'

E. C. ROW EXPRESSWAY
WATER MAIN RELOCATION

NORTH SERVICE ROAD
FROM GRAND MARAIS DRAIN
EASTERLY 1000 FEET

PROJECT NO. 6786-01
SHEET NO. 7
No. 10

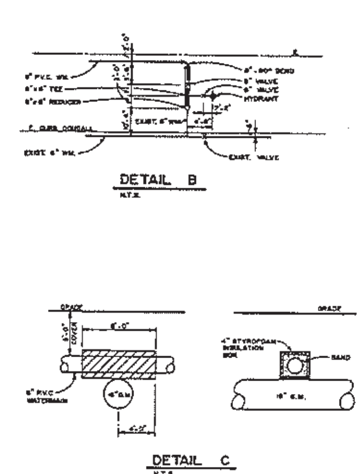
31-70-9H



RASTOR IMAGE HAS BEEN VERIFIED AGAINST ORIGINAL

NOTES

1. ALL WATERMAIN AND SEWER CONNECTIONS TO BE INSTALLED TO WITHIN 5' OF BUILDING FACE.
2. ALL WATERMAINS TO BE P.V.C. CLASS 150
3. ALL WATERMAINS AND SERVICES TO HAVE 5' MINIMUM COVER.
4. STORM SEWER PIPE TO BE CONC. A257-1 E.S.
5. 2" WATER SERVICE TO BE P.E. SERIES 160.
6. SEWER BEDDING TO BE CLASS 'B' EXCEPT CLASS 'A' TO FIRST PIPE JOINT OUTSIDE OF MANHOLE.
7. CB+ CATCH BASIN WITH EZ FLO RESTRICTOR PLATE BY GEIGER INDUSTRIES LTD.
8. SANITARY SEWERS TO BE PVC. SDR 35 AT 0.52%. (8" DIA.)
9. ALL CATCH BASIN LEADS TO BE PVC SDR 28 AT 1.0% MIN.
10. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS, LAYOUT ETC.
11. ALL SEWERS AND WATERMAINS TO BE BACKFILLED WITH GRANULAR 'C' COMPACTED TO 100% S.P.D.
12. FOUR STUB DRAINS SHALL BE INSTALLED AT ALL CATCH BASINS. SEE DETAILS THIS SHEET.
13. EZ FLO PLATE TO BE SECURED TO C.B. GRATES WITH STAINLESS STEEL STRAPS & POP RIVETS IN A MANNER APPROVED BY THE ENGINEER



DATE | ISSUED FOR

DETAIL NUMBER
LOCATION SHEET | DETAIL SHEET

DILLON
Consulting Engineers • Planners
Environmental Scientists

R. C. SPENCER

W. A. FRASER
ARCHITECT
305 VICTORIA AVENUE
WINDSOR - ONTARIO
N9A 4M7
PHONE 256-1981

PROJECT:
WEST GRAND SQUARE
SHOPPING CENTRE

CLIENT:

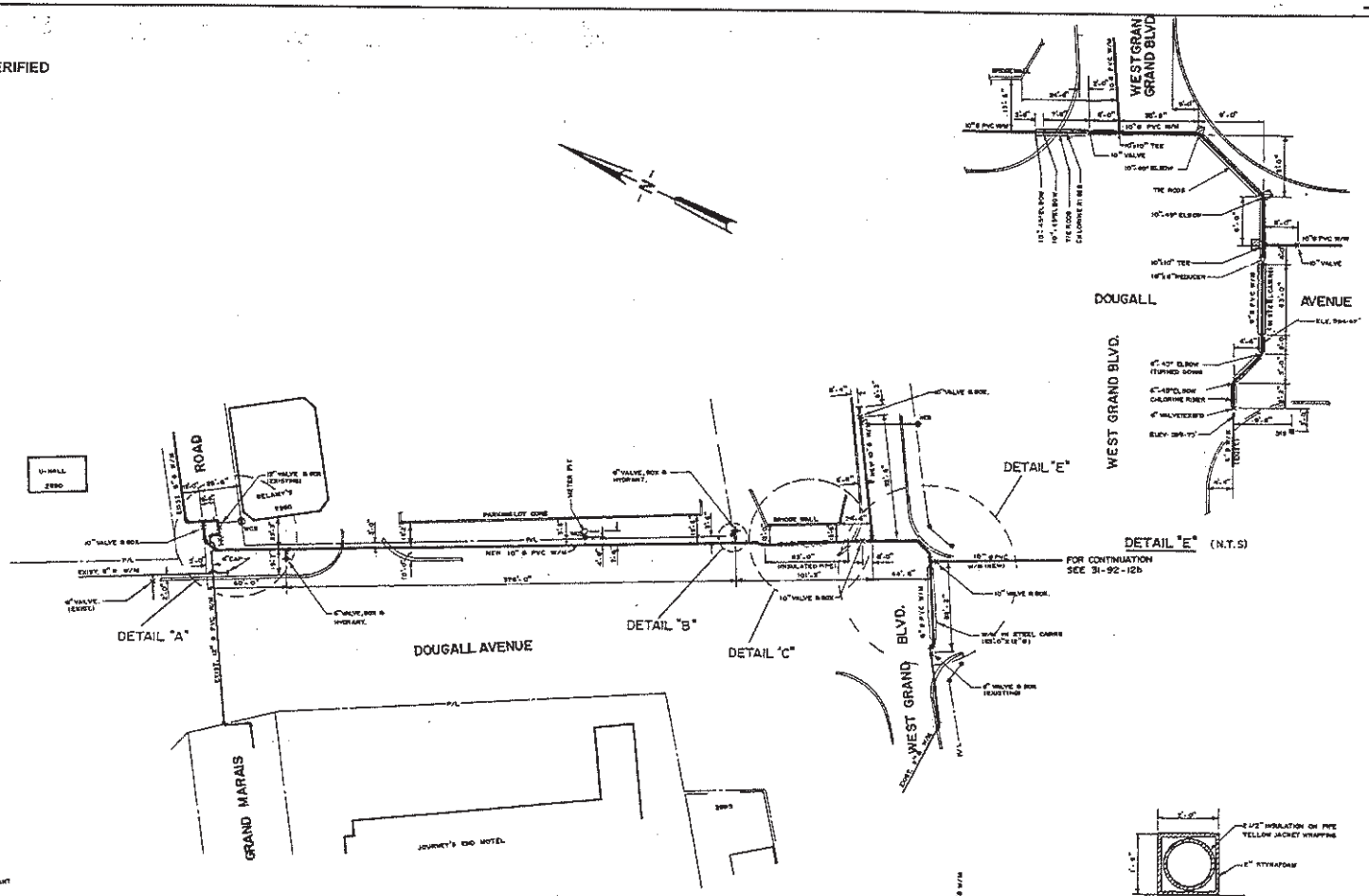
SCALE: 1" = 40'-0"

SHEET TITLE:
SITE SERVICES

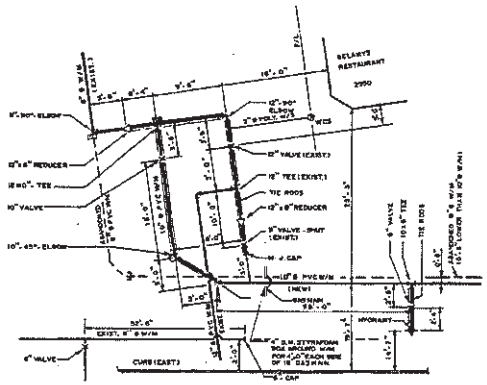
31-92-12a

D92-12A

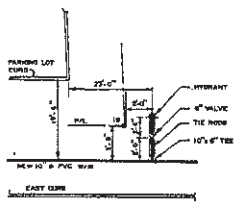
RASTOR IMAGE HAS BEEN VERIFIED
AGAINST ORIGINAL



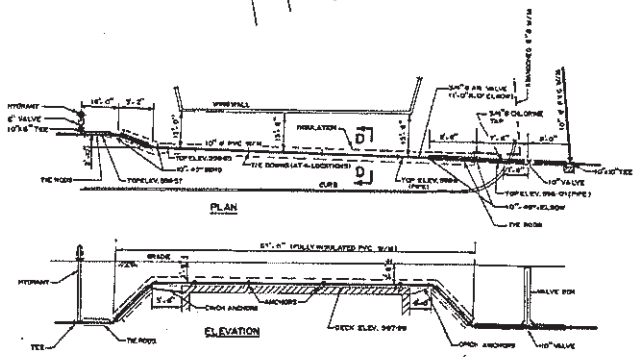
DETAIL "E" (N.T.S)



DETAIL "A" (N.T.S.)



DETAIL "B" (N.T.S.)



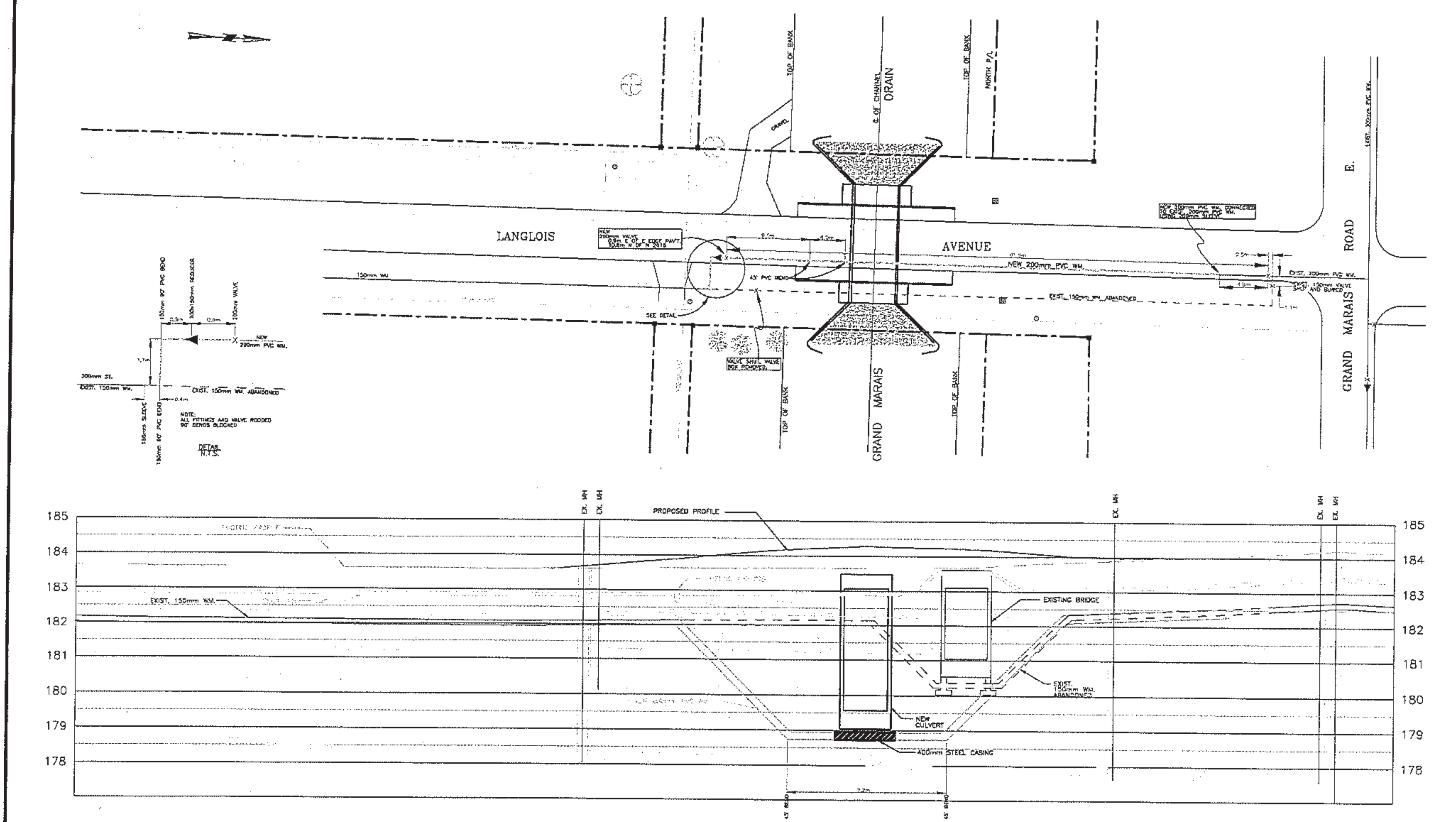
DETAIL "C" (N.T.S)

SECTION D-D (N.T.S.)

NOTE
ALL PIPES AND SERVICES HAVE TRACING WIRE.

AS BUILT 10" DIA. W/M
ON DOUGALL AVENUE

AS PER FIELD PRINTS AND FIELD BOOK No.312
REFERENCE DRAWING ,
CITY OF WINDSOR PROJECT No.3893-SHEET No.10-1
DATE: MAR.2/92 SCALE: 1"=40'-0"



REVISIONS/AS BUILT	
NOTES	DATE
M.O.E. APPROVAL	
CORE SAMPLES	
AS BUILT INFO. ADDED AS PER FIELD PRINTS	APR. 8 1998

LEGEND

PROPOSED WATERMAIN		GAS METER		PROPERTY LINE/ IRON BAR	
WATERMAIN/ WATER VALVE	X	UNDERGROUND BELL/PEDESTAL	B	TRAFFIC SIGN	+
HYDRANT		UNDERGROUND HYDRO		UTILITY POLE	
WATER SERVICE VALVE		UNDERGROUND TRAFFIC SIGNALS		GUY WIRE	
WATERMAIN REDUCER		SEWER		TREE/BUSH	
WATER METER PIT	(m)	CABLE T.V.		GRAVEL	
GAS MAIN/ GAS VALVE		MANHOLE	(B) (T) (W)	SEWER CLEAN OUT	
GAS SERVICE VALVE		CATCH BASIN		FENCE	

Lenco MacLaren
SNC·LAVALIN

NOTE
BEFORE DIGGING CALL

W.U.C. WATER	255-2761
BELL TELEPHONE LOCATES	970-4730
WINDSOR CABLE	972-6694
UNION GAS CO. ENGINEERING	250-8800
W.U.C. HYDRO	255-2703
CITY OF WINDSOR TRAFFIC SIGNALS	255-6761
CITY OF WINDSOR PUBLIC WORKS	255-6500

WINDSOR UTILITIES COMMISSION

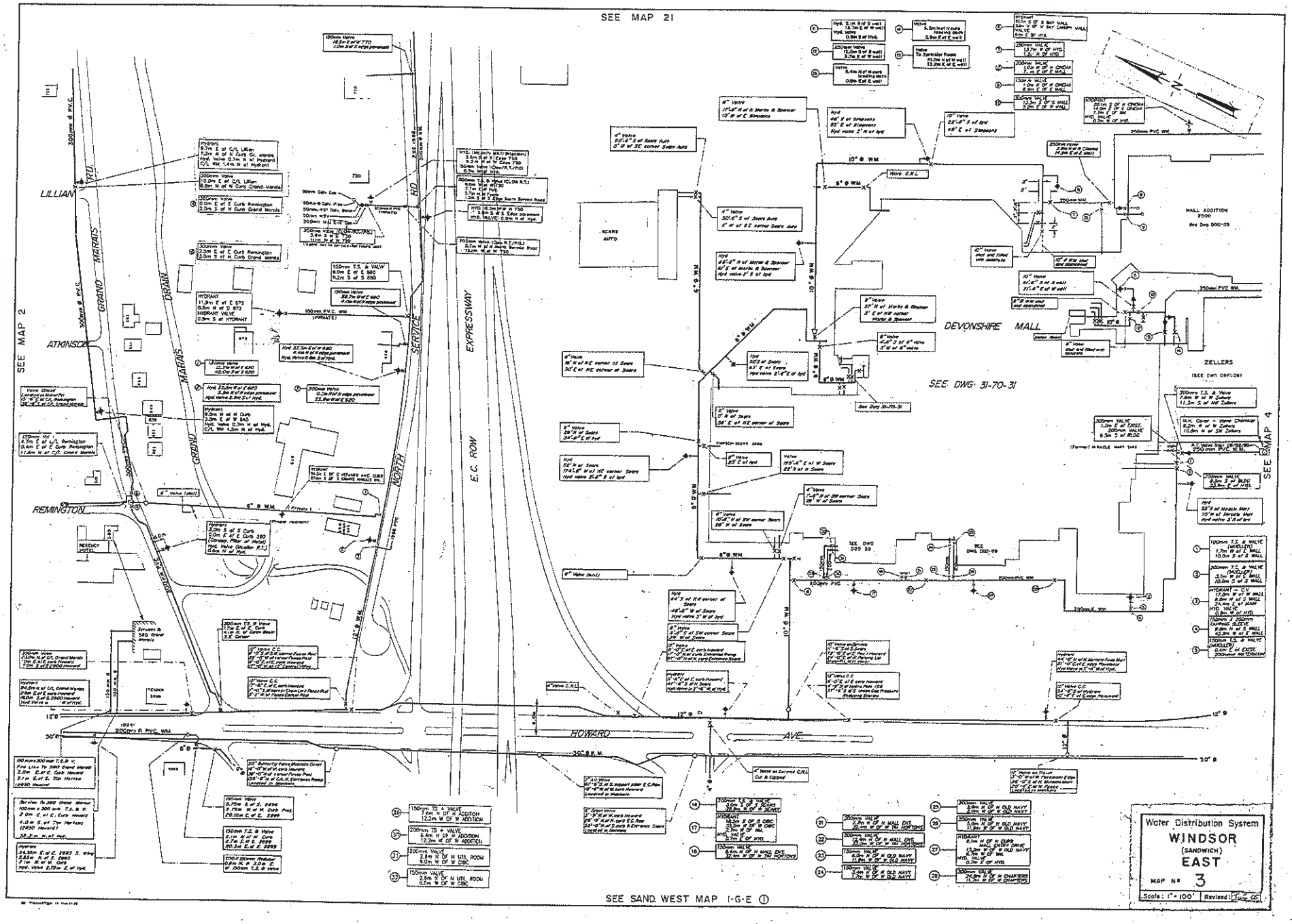
WATER ENGINEERING

APPROVED FOR CONSTRUCTION ____________

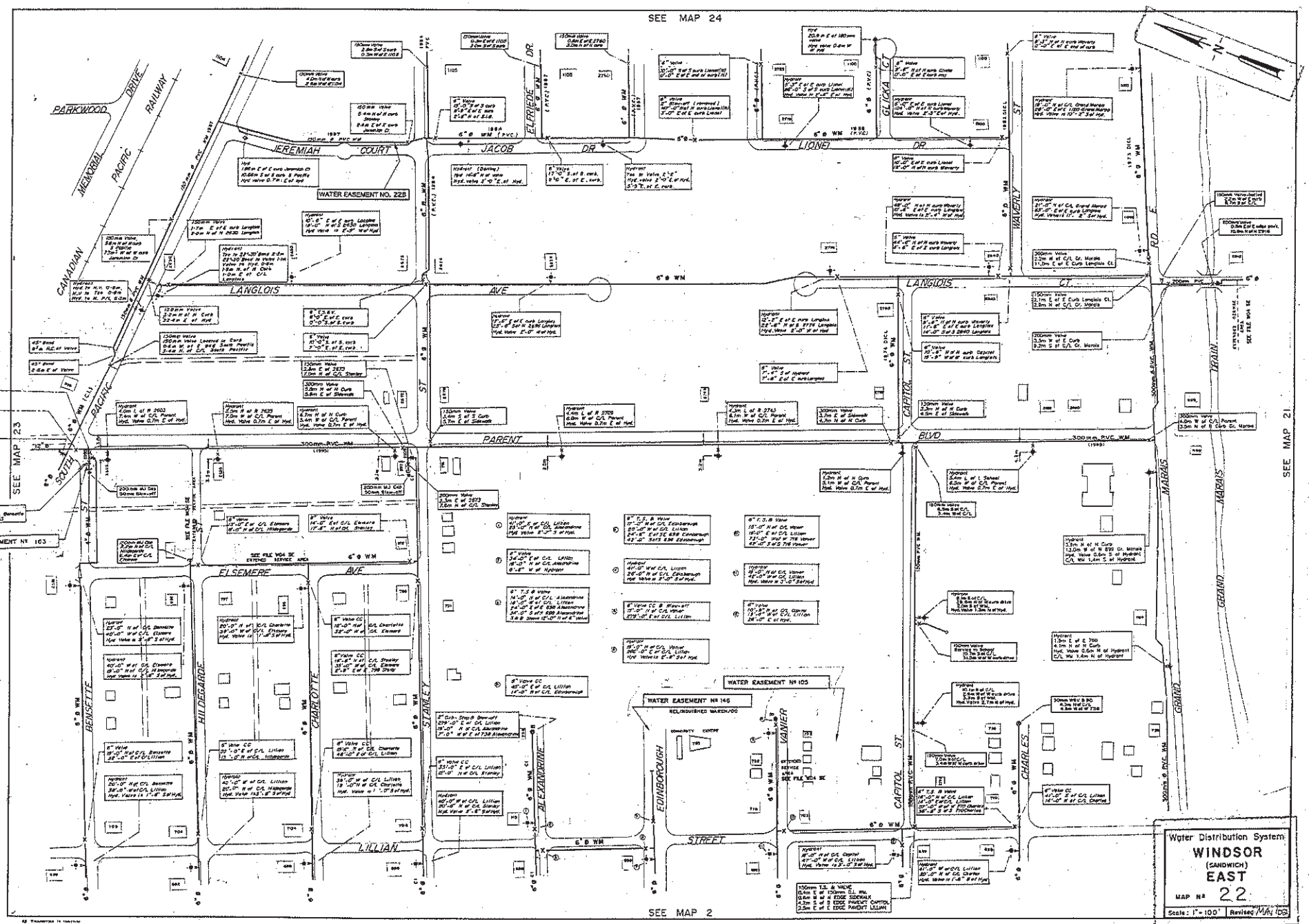
AS BUILT
200mm PVC WM.
on
LANGLOIS AVENUE
from
GRAND MARAIS RD.
crossing
GRAND MARAIS DRAIN

DRAWN	CHECKED	SCALE	
YC	A.N.	HORZ: 1:500 VERT: 1:50	
DATE	FIELD BOOK	WORK ORDER	DRAWING No.
AUG./97	NONE 341		D96-36

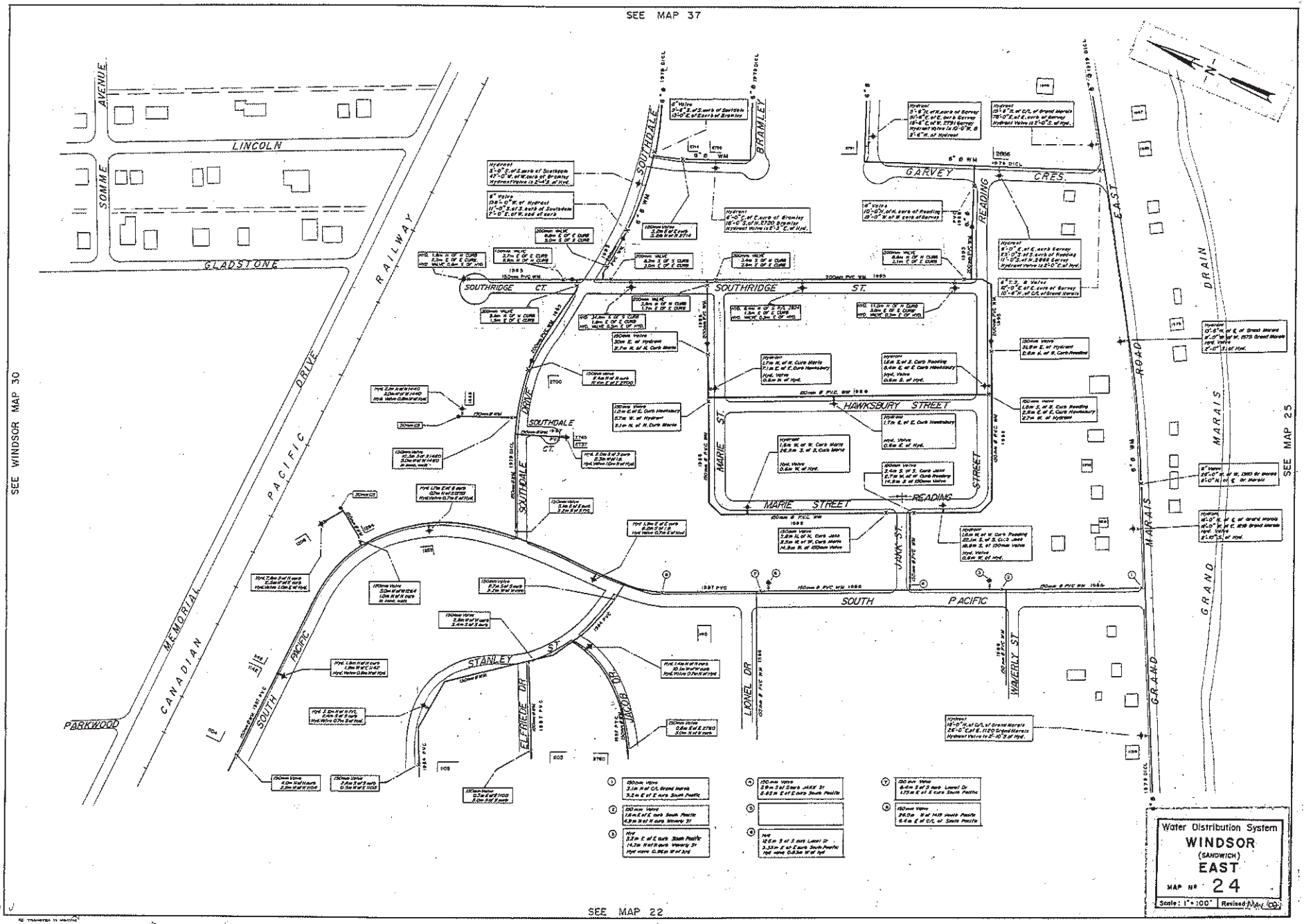
WINDSOR EAST MAP 3



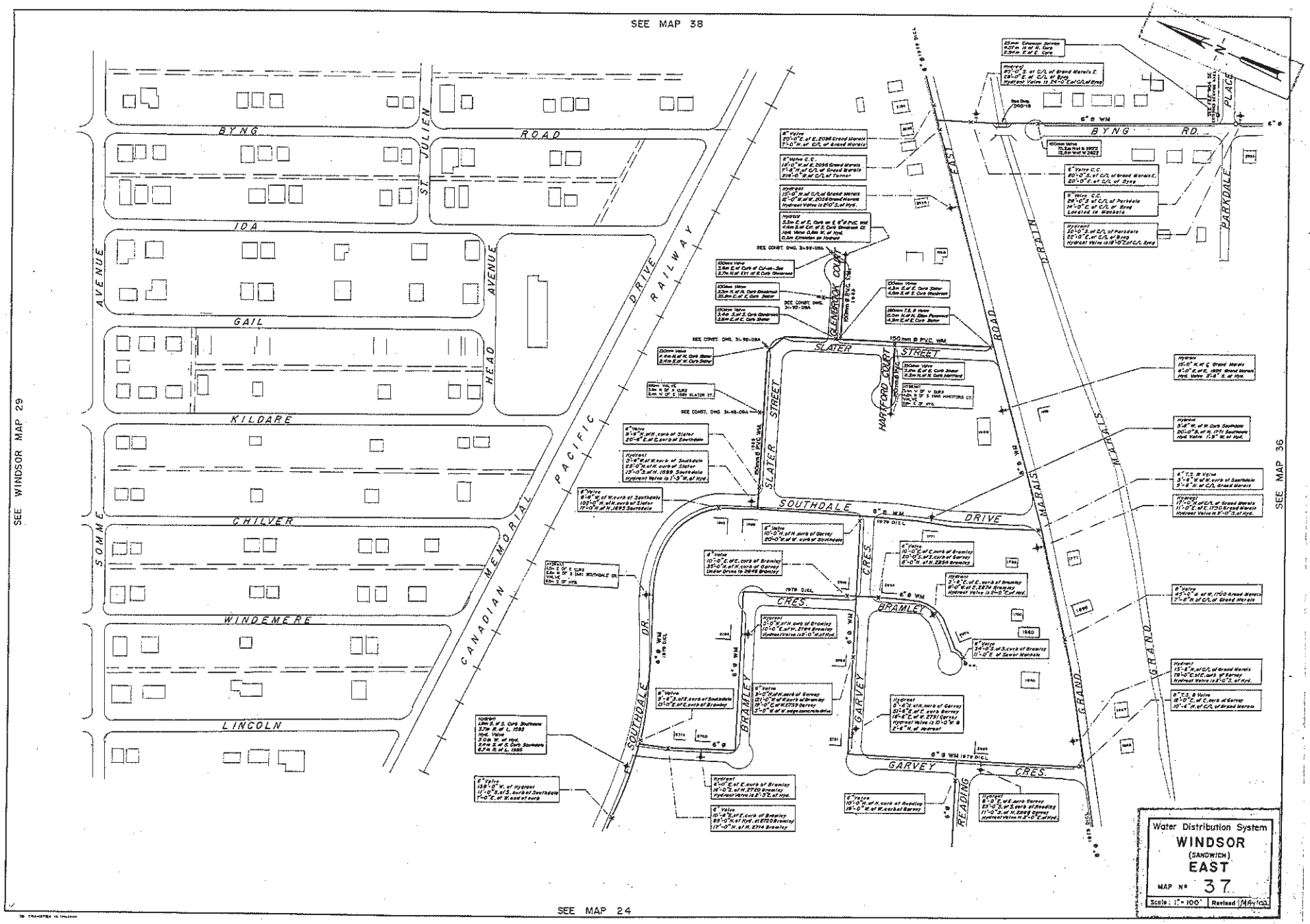
WINDSOR EAST MAP 22



WINDSOR EAST MAP 24

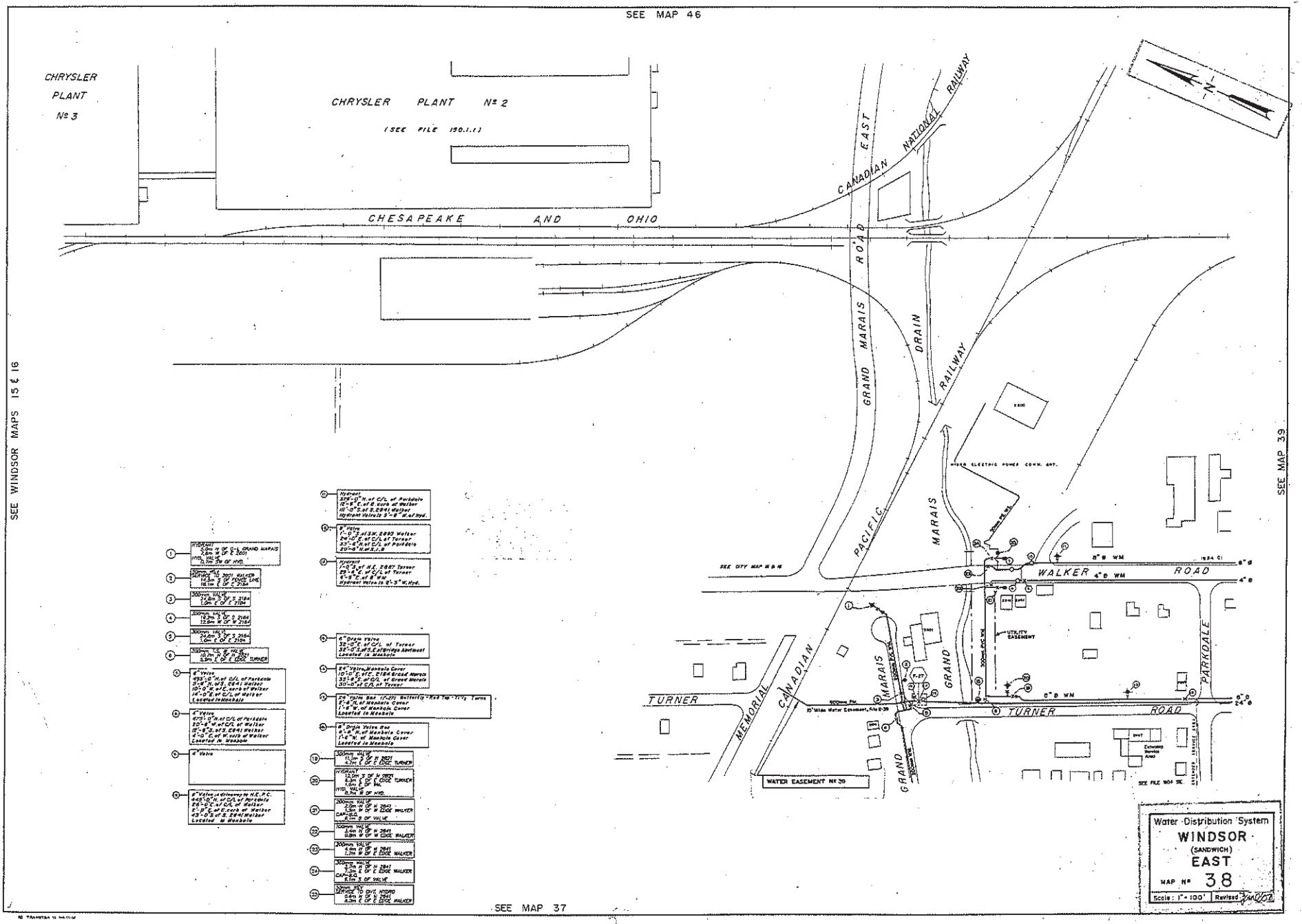


WINDSOR EAST MAP 37



WINDSOR EAST MAP 38

SEE MAP 46

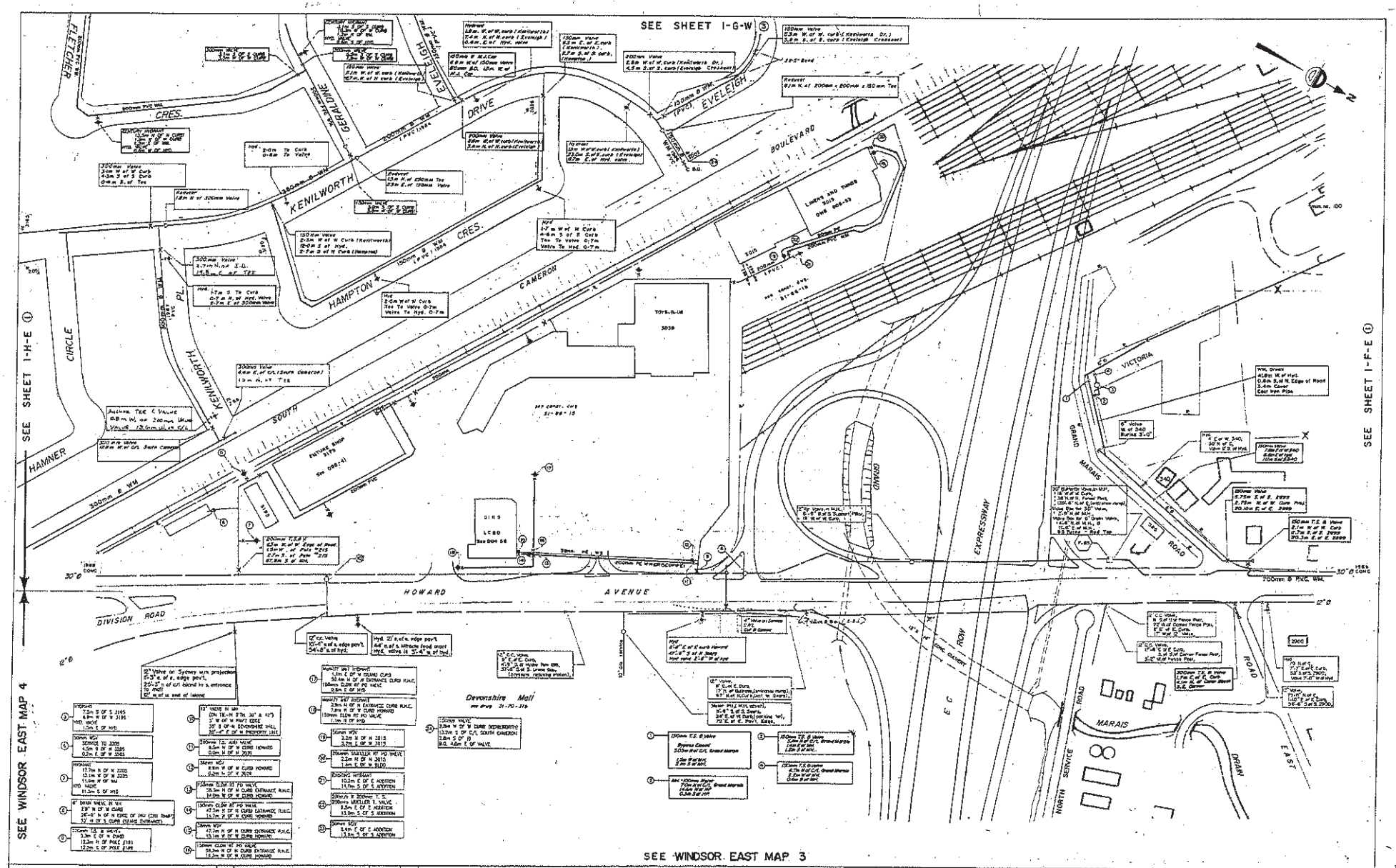


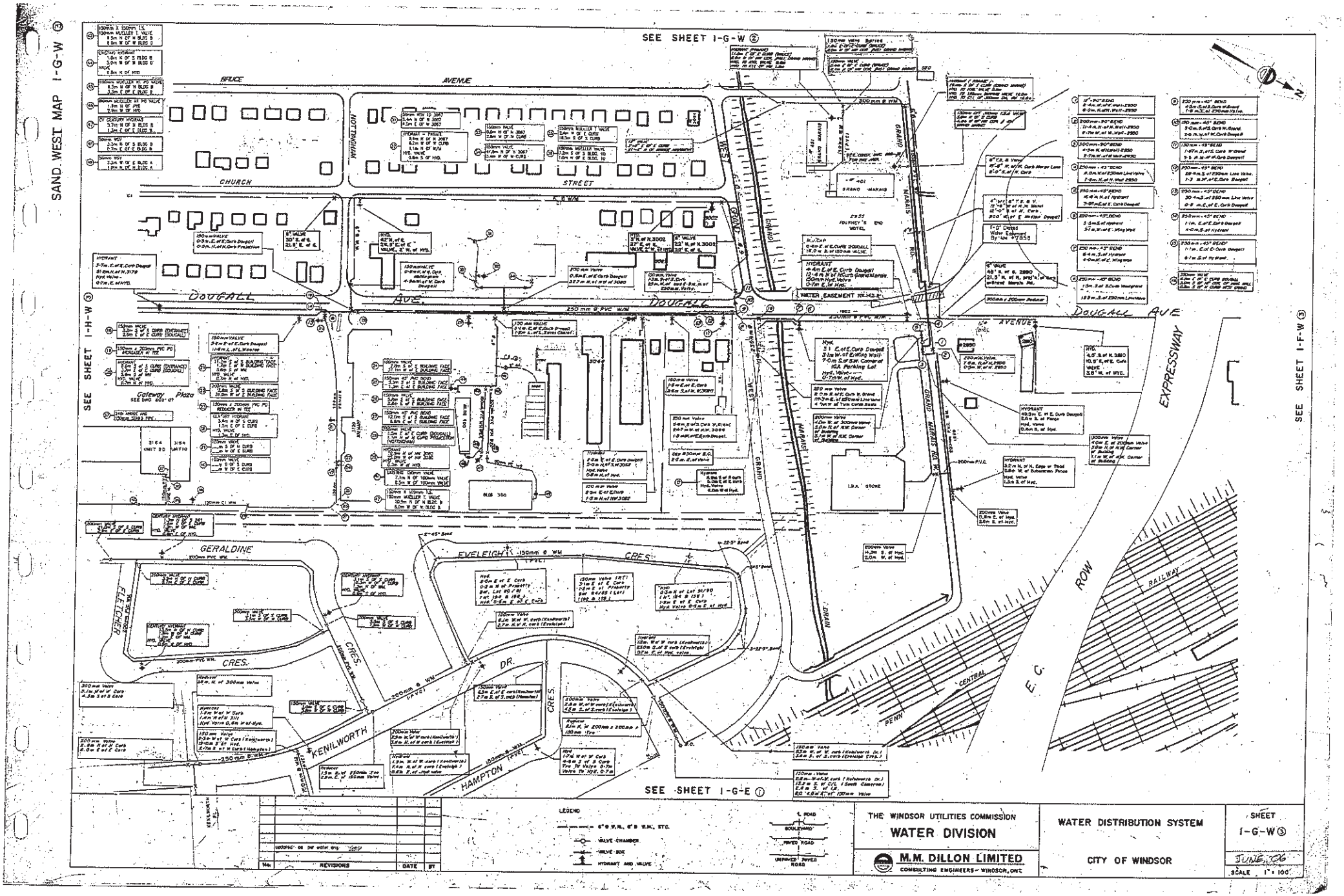
SEE WINDSOR MAPS 15 & 16

SEE MAP 39

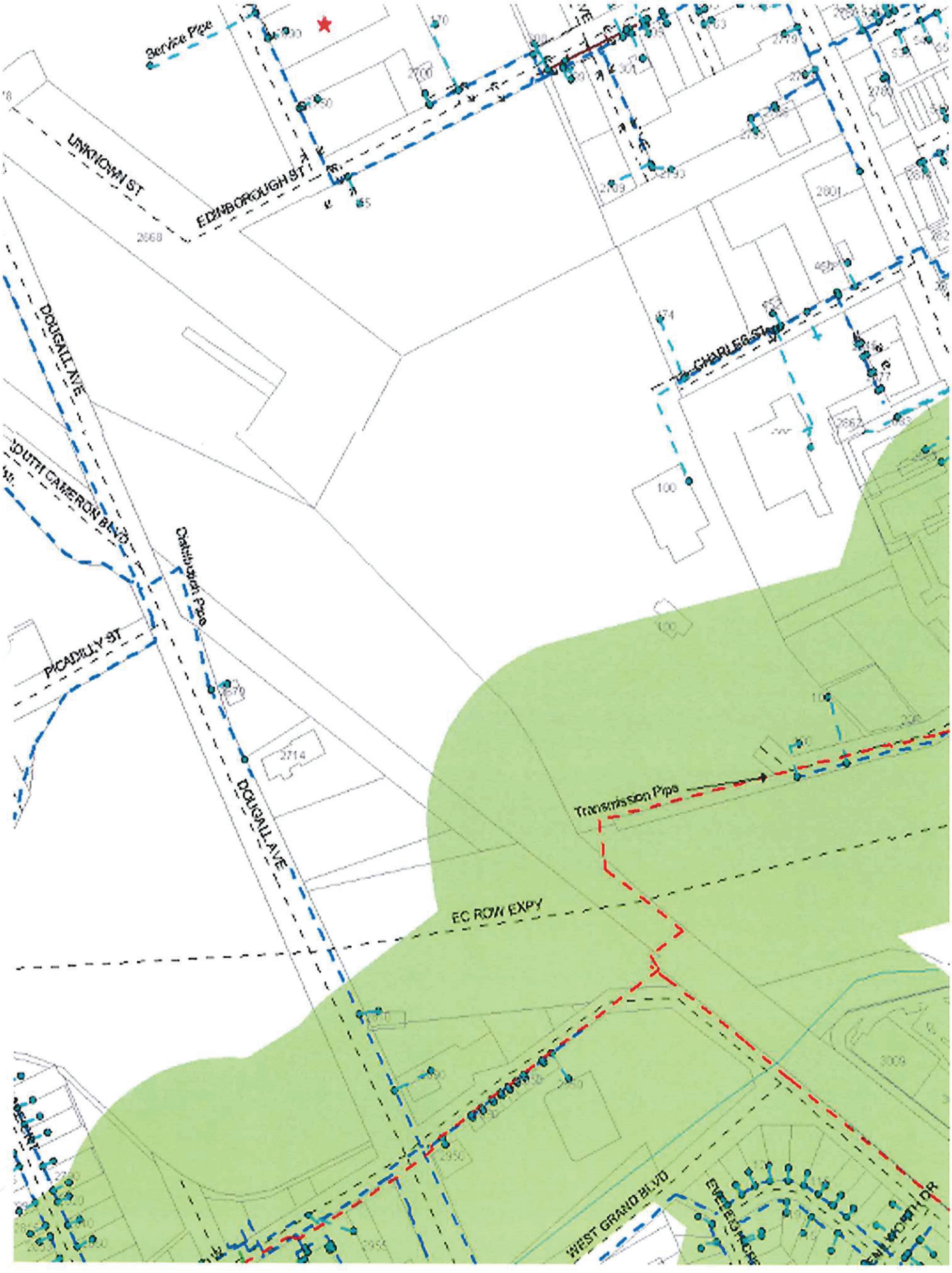
SEE MAP 37

Water Distribution System
WINDSOR
(SANDWICH)
EAST
MAP Nº 38
Scale : 1" = 100'
Revised

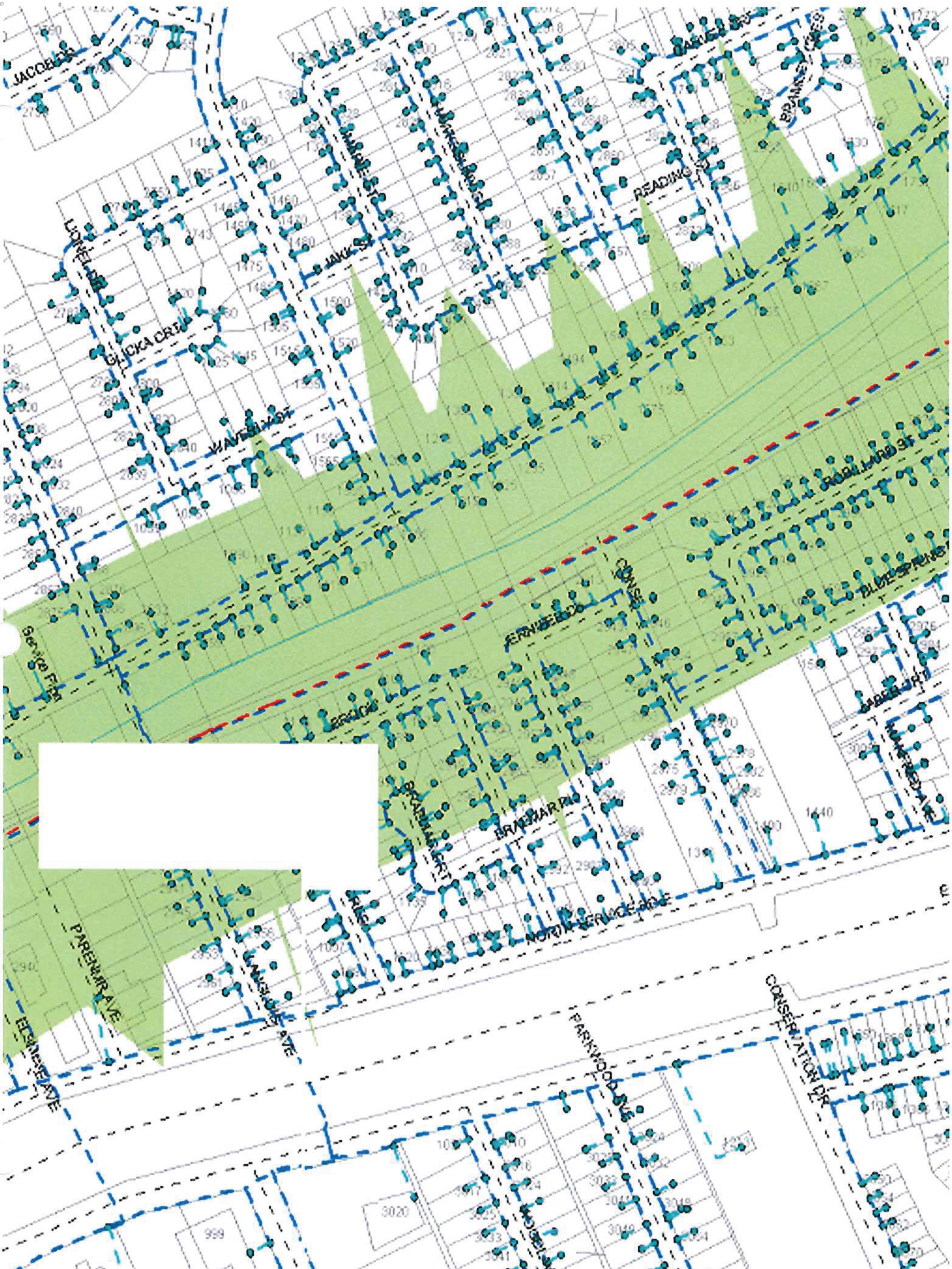

SEE SHEET I-G-W
SEE SHEET I-H-E
SEE SHEET I-F-E
SEE WINDSOR EAST MAP 4
SEE WINDSOR EAST MAP 3
SAND. WEST MAP I-G-E
FLETCHER CRES.
EVELEIGH DRIVE
EVELEIGH BOULEVARD
KENILWORTH CRES.
HAMPTON CIRCLE
CAMERON BLVD.
KENILWORTH PL.
HAMMER
SOUTH
HOWARD AVENUE
DIVISION ROAD
GRAND MARAIS ROAD
EXPRESSWAY
VICTORIA
NORTH SERVICE ROAD
MARAIS DRAIN
E.C. ROW
Devonshire Mall
LEGEND
WATER MAIN
VALVE CHAMBER
VALVE BOX
HYDRANT AND VALVE
THE WINDSOR UTILITIES COMMISSION
WATER DIVISION
M.M. DILLON LIMITED
CONSULTING ENGINEERS - WINDSOR, ONT.
WATER DISTRIBUTION SYSTEM
CITY OF WINDSOR
SHEET
I-G-E
AUG 06
SCALE 1" = 100'
No. REVISIONS DATE BY


SAND. WEST MAP I-G-W ③
SEE SHEET I-G-W ②
SEE SHEET I-H-W ③
SEE SHEET I-F-W ③
SEE SHEET I-G-E ①
BRUCE AVENUE
CHURCH STREET
DOUGALL AVE.
GERALDINE CRES.
EVELEIGH CRES.
KENILWORTH DR.
HAMPTON CRES.
GRAND MARAIS RD. W.
EXPRESSWAY
RAILWAY
Gateway Plaza
JOURNEY'S END MOTEL
I.B.A. STONE
WATER EASEMENT
LEGEND
THE WINDSOR UTILITIES COMMISSION
WATER DIVISION
M.M. DILLON LIMITED
CONSULTING ENGINEERS – WINDSOR, ONT.
WATER DISTRIBUTION SYSTEM
CITY OF WINDSOR
SHEET
I-G-W ③
JUNE '06
SCALE 1" = 100'
No. REVISIONS DATE BY

UNION GAS


Service Pipe
UNKNOWN ST
EDINBOROUGH ST
DOUGALL AVE
SOUTH CAMERON BLVD
PICADILLY ST
Distribution Pipe
DOUGALL AVE
Transmission Pipe
EC ROW EXPY
WEST GRAND BLVD
CHARLES ST


Distribution Pipe
Transmission Pipe
NORTH SERVICE RDE
EC ROW EXPY
SOUTH SERVICE RD
HOWARD AVE
Distribution Pipe
Service Pipe



GLICKA CRES
WAVERLY ST
JAKE ST
READING
ROBILLARD ST
CONSERVATION DR


GRAND MARAIS RD
MEMORIAL DR
SLATER ST
HARTFORD CRT
WALKER RD
TURNER RD
Service Pipe
Transmission Pipe
Distribution Pipe
PARKDALE PL
DIGBY ST
EXCEL
4TH SERVICE RD E
CROW EXPY
Service Pipe

3.0 Public Drop-In Centres

One Public Drop-In Centre was held on April 18th, 2013 for this Class EA. This section of the Project File contains reproductions of all of the display panels that were presented at the Public Drop-In Centre. A document that explains the purpose of each slide precedes the display panels.

The display material can also be viewed on the City of Windsor's website (www.citywindsor.ca). Simply entering 'Grand Marais Drain Study' in the Search Box on the top right corner of the City's Home Page will direct you to the project webpage. A screen capture of the webpage is attached at the end of this section.

3.0 Public Drop-In Centres

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CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Drop-In Centre – Presentation Slide Summaries

Introduction

This document is intended to facilitate review of the display slides by members of the public and review agencies that were not able to attend the Public Drop-In Centre on April 18th, 2013. The purpose of each slide is explained.

Welcome, Project Team, Purpose, Objective and Problem/Opportunity Statement (Slides 1 - 3)

- The first three slides are intended to introduce the project and welcomed visitors to the Drop-In Centre.

Environmental Assessment Process (Slides 3-4)

- The Environmental Process being followed for this project consists of the steps shown in this slide. We have currently completed steps 1 through 8. The study will now progress to steps 9 through 12.

Site Key Plan (Slide 4)

- The study area has been broken into 5 segments. This slide outlines the segments and the corresponding improvements proposed for each segment.

Environmental Inventory and Existing Conditions (Slide 5)

- This slide outlines what will be discussed in the following slides as well as some photos of existing conditions.

Natural Heritage Summary (Slides 7 - 10)

- Slides 7 to 9 summarize the findings of the biological inventory that was completed as part of the EA process.
- Slide 10 summarizes the findings of the areas archaeological assessment that was completed as part of the EA process.

Soil and Sediment Sampling (Slides 11-12)

- The soil and sediment sampling location and findings are presented on slides 11 and 12.

Opportunities and Constraints associated with Land Use (Slide 13)

- This slide illustrates the adjacent land uses along the Drain and discusses the opportunities and constraints they present.

Utilities (Slide 14)

- This slide illustrates the existing utilities in the vicinity of the study area.

Segment 1 (Slides 15-21)

- Slides 15-19 illustrate the plan, profile and sections of the proposed improvements through segment 1.

- Slide 20 provides examples of the proposed drop structures.
- Slide 21 provides examples of erosion control options being considered for segments 1, 4 and 5.

Segment 2 (Slide 22-24)

- Slide 22 illustrates the two options being considered for altering the culvert bottom. This culvert is located under the rail line that runs along South Cameron Boulevard.
- Slides 23 and 24 discuss the on-line pond proposed in segment 2.

Segment 3 (Slides 25-26)

- These slides discuss the options that were considered to deal the accumulation of sediments within the culverts.

Segment 4 (Slides 27-28)

- Slides 27 and 28 present the proposed improvements for segment 4. The design for this segment was previously completed by BTS Consulting Engineers in 2002.

Segment 5 (Slides 29-30)

- Slides 29 and 30 present the proposed improvements for segment 5.

Cost Estimate – Summary (Slide 31)

- This slide presents the estimated cost for each segment.

Next Steps (Slide 32)

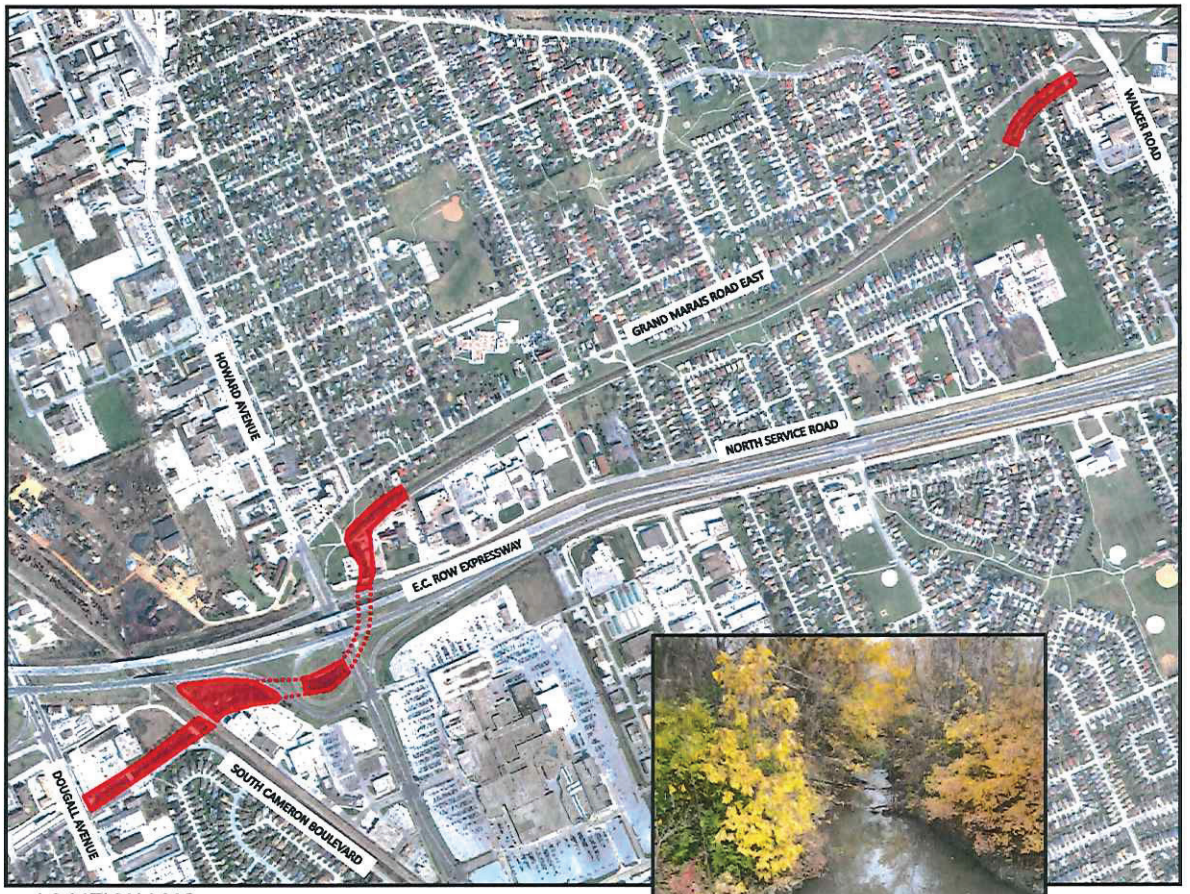
- This slide outlines the next steps that will be taken in the process of completing this Class EA.

CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Welcome to the Public Drop-In Centre

- All relevant information regarding this project (including the display material presented today) is available for public review on the City of Windsor's website (www.citywindsor.ca) by searching keywords 'Grand Marais Drain Study' in the upper right hand corner of the home page.
- Please sign in to record your attendance.
- Please review the display material and provide any comments on the Comment Sheet provided. You may submit your comments by mail/fax/e-mail or place them in the Comment Box.
- All comments for this Drop-In Centre must be received by May 3rd, 2013, to be given consideration in the preferred solution. Contact information for the Project Team is available in the handout provided.
- The Project Team members present will be pleased to discuss any questions you may have.



LOCATION MAP

TYPICAL SECTION

LEGEND:

Study Areas

Landmark Engineers Inc.

Essex Region Conservation Authority

The City of Windsor, Ontario, Canada

Project Team

This study has been initiated by the Essex Region Conservation Authority (ERCA), in cooperation with the City of Windsor. Landmark Engineers Inc. has been retained by ERCA to serve as the Lead Consultant on the project.

Any comments, questions or suggestions relevant to this study should be directed to the following primary members of the Project Team:

Daniel M. Krutsch, P.Eng.
Landmark Engineers Inc.
2280 Ambassador Drive
Windsor, Ontario, N9C 4E4
Phone: (519) 972-8052
Fax: (519) 972-8644
Email: dkrutsch@landmarkengineers.ca

Stan Taylor, P.Eng.
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311
Essex, Ontario, N8M 1Y6
Phone: (519) 776-5209
Fax: (519) 776-8688
Email: staylor@erca.org

Paul Mourad, P.Eng.
City of Windsor Public Works
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
Phone: (519) 255-6257 ext.6119
Fax: (519) 255-9847
Email: pmourad@city.windsor.on.ca

CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Purpose

This Drop-In Centre is intended to:

- Present the Problem / Opportunity Statement for the Project
- Introduce the members of the Project Team
- Present the scope of the Class Environmental Assessment (Class EA) process
- Define the study area and the existing conditions at the site
- Present the design alternatives that were considered
- Present the anticipated hydraulic impacts of the proposed improvements
- Present the sediment management plan
- Present the Preferred Solution
- Obtain feedback from local residents and community groups

Objective

The objective of this project is to improve portions of the Grand Marais Drain to provide adequate storm flow **capacity**, to deepen the drain to improve **outlet** to upstream segments and to improve slope **stability**.

Problem / Opportunity Statement

The following statement was developed by the Project Team to define the Problem / Opportunity to be addressed through this Class EA:

"This study will define a scope of channel improvements for the remaining unimproved segments of the Grand Marais Drain between Dougall Avenue and Walker Road, as well as develop a maintenance plan for the entire study area, which includes the management of accumulated sediments."

Environmental Assessment Process

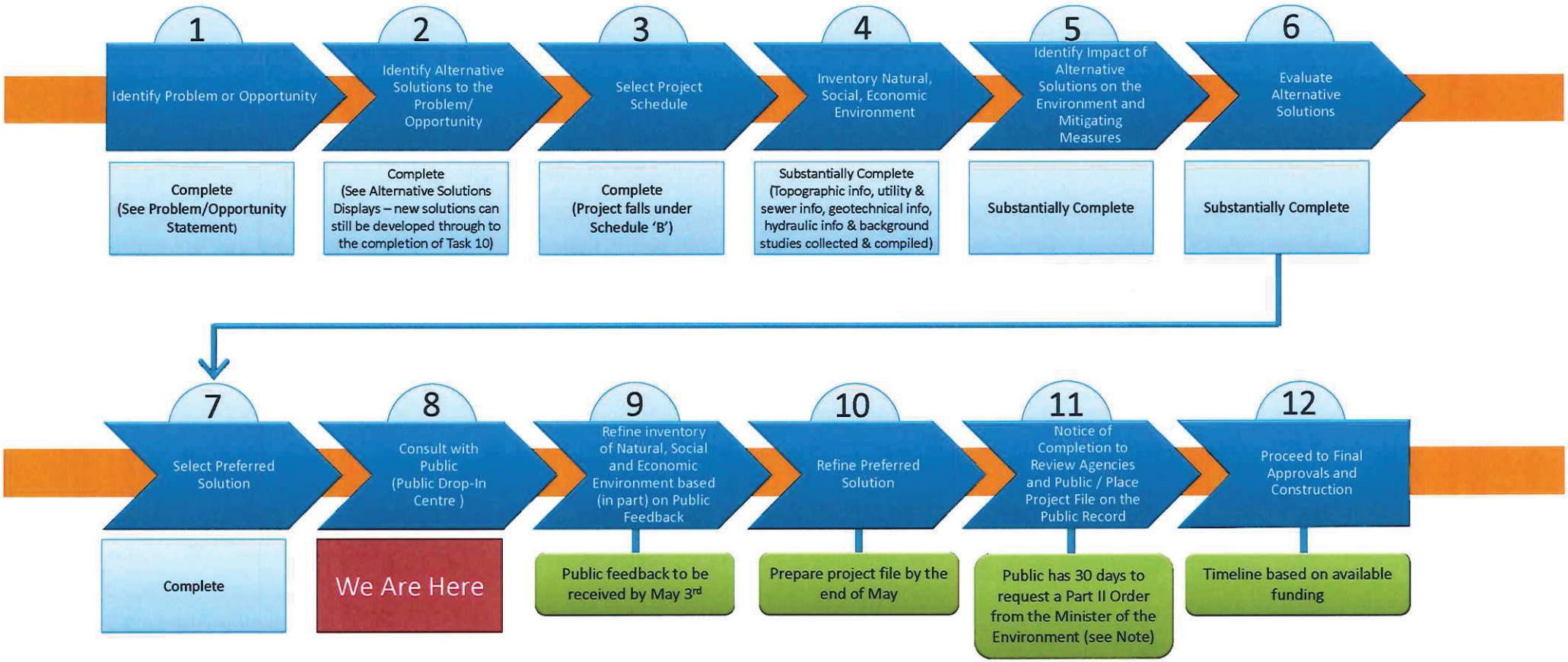
- This project will follow the planning process set out in the Municipal Engineers Association's *Municipal Class Environmental Assessment (Class EA)*. A copy of this document, which sets out the details of the approved Planning and Design Process for municipal projects (such as this), is on-site and is available for review.
- Since the Central Grand Marais Drain Study involves modifications to an existing facility, the Project Team has concluded that this project falls under Schedule 'B' of the *Municipal Class EA*.
- For 'Schedule B' projects, only **one** point of Public Consultation is **required**. Today's Open House will be the only Open House and will fulfill the Public Consultation requirement for this EA.

Landmark Engineers Inc. | Essex Region Conservation Authority | The City of Windsor, Ontario, Canada

CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Environmental Assessment Process



Note: In accordance with the terms of the Municipal Engineers Association's *Municipal Class EA*, if concerns regarding this project cannot be resolved with the Municipality, any member of the public may request that the Minister of the Environment make an order for the project to comply with Part II of the EA Act - requiring an individual EA (not Class EA).

Landmark Engineers Inc. | Essex Region Conservation Authority | The City of Windsor, Ontario, Canada

CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Site Key Plan

The study area has been broken into 5 segments. Each segment is in need of repair and/or maintenance to some degree. The following outlines the segment breakdowns and the corresponding improvements proposed for each segment.

- Segment 1 – Dougall Avenue to South Cameron Boulevard
  - The existing channel is undersized, overgrown and exhibiting localized instability of the channel banks.
  - The drop structure at Dougall Avenue requires substantial repairs or replacement.

- Segment 2 – Adjacent to Roundhouse Centre
  - This segment requires minor channel improvements and a maintenance plan.
  - The open land that abuts the E.C. Row Expressway provides the opportunity for establishment of an on-line quality and quantity control pond.

- Segment 3 – E.C. Row Expressway Culverts & Open Drain at Howard Avenue On-ramp to E.C. Row Expressway
  - The 4.2m high box culverts have accumulated sediments to a depth of 1.6m to 1.8m due to the elevated downstream channel invert and require a strategy for removal or on-site management.

- Segment 4 – From the E.C. Row Expressway extending 280m north of the North Service Road
  - Improvement of this segment was addressed in a Class EA prepared in 1992 by MacLaren Engineers and a detailed design was prepared by BTS Consulting Engineers in 2002.
  - The improvements that were identified at that time will be reassessed as part of the current EA.

- Segment 5 – Byng Road to Turner Road
  - Improvement of this segment was addressed in a Class EA prepared in 1992 by MacLaren Engineers.
  - The drain has been improved on both the upstream and downstream ends as part of other drain improvement projects. This section will be updated to match the cross section and capacity at either end.

Landmark Engineers Inc.

Essex Region Conservation Authority

The City of Windsor, Ontario, Canada

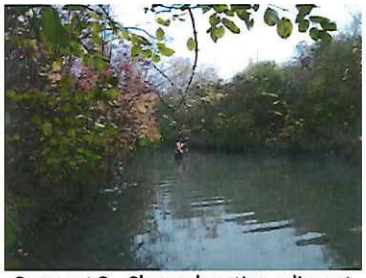
Environmental Inventory & Existing Conditions

The following displays are intended to present the environmental inventory that has been compiled by the Project Team. This inventory documents the existing conditions along the Grand Marais Drain and addresses the following categories:

- Natural Environment
  - Aquatic Habitat
  - Terrestrial Habitat
  - Species at Risk
- Social / Economic Environment
  - Adjacent Land Use
  - Heritage / Archaeological Resources
- Physical Environment
  - Drainage & Hydraulics
  - Physical Infrastructure (e.g., utilities, sewers, etc.)

Segment 1 - Drop Structure at Dougall Avenue.

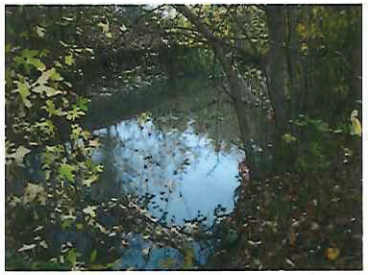
Segment 1 - Typical Section near South Cameron Boulevard.



Segment 2 - Channel section adjacent to the Roundhouse Centre.

Segment 4 - Just upstream of North Service Road Culvert.

Segment 4 - Weir just upstream of the E.C. Row Culverts at North Service Road.



Segment 5- Between Turner Road and Byng Road.

Natural Heritage Summary

Aquatic:

With the exception of Segment 3, the Grand Marais Drain within the study area is a straightened warmwater channel that has steep banks on both sides resulting in a trapezoid-shaped channel. Substrate throughout consisted primarily of rip rap/cobbles and gravel with smaller amounts of muck, silt and clay. Banks are vegetated with grasses, shrubs and trees. In Segment 3 the Grand Marais Drain is a concrete line channel.

The Grand Marais Drain has permanent flow and supports a number of warmwater fish species. However, the weir located at Dougall Avenue limits fish access to the Grand Marais Drain within the study area. There are no aquatic Species at Risk within the Grand Marais Drain.

Fishes captured within the Grand Marais Drain downstream of Dougall Avenue weir (July to October 2011 during repairs to the concrete lined channel):

Bluegill	*Lepomis megalotis*
Bluntnose Minnow	*Pimephales notatus*
Common Carp	*Cyprinus carpio*
Creek Chub	*Semotilus atromaculatus*
Fathead Minnow	*Pimephales promelas*
Gizzard Shad	*Dorosoma cepedianum*
Largemouth Bass	*Micropterus salmoides*
Pumpkinseed	*Lepomis gibbosus*
Rock Bass	*Ambloplites rupestris*
Smallmouth Bass	*Micropterus dolomieu*

The construction of the proposed works for the project will have temporary impacts to fish and fish habitat; however with naturalization of the stream banks and removal of the weir at Dougall Avenue, there will be net benefits for fish and fish habitat.

CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Natural Heritage Summary

Flora:

The following species at risk (SAR) are found within the area:

- Purple Twayblade (Liparis liliifolia) –Threatened provincially and Endangered federally
- Colicroot (Aletris farinose) – Threatened provincially and federally
- Willowleaf Aster (Symphyotrichum praealtum) – Threatened provincially and federally
- Dwarf Lake Iris (Iris lacustris) – Special Concern provincially and Threatened federally
- Swamp-rose Mallow (Hibiscus moscheutos) – Special Concern provincially and federally
- Climbing Prairie Rose (Rosa setigera) – Special Concern provincially and federally
- Shumard Oak (Quercus shumardii) – Special Concern provincially

Site specific floral investigations conducted for the study area did not find any floral species at risk within the study area. Habitat requirements of these floral species (i.e., prairie or wet, open deciduous forest habitat), does not exist in the study area.

Floral species at risk will need to be further assessed as part of the design process to ensure compliance with the federal *Species at Risk Act (SARA)* and provincial *Endangered Species Act (ESA)*.

Fauna:

The following species at risk (SAR) are found within the area:

- Common Five-lined Skink (*Plestiodon fasciatus*) - provincially and federally as Endangered
- Butler's Gartner Snake (*Thamnophis butleri*) - provincially Endangered and federally Threatened
- Eastern Foxsnake (*Pantherophis gloydi*) - provincially and federally Endangered

Site specific faunal investigations conducted for the study area identified potential snake habitat within the study area. The open fields adjacent to Segment 1 and within Segment 2, would provide suitable habitat for foraging, thermoregulating, nesting and hibernating. For Segment 3, 4 and 5 there was very little to no suitable habitat. At this time it has not been determined if the identified habitat is being used by the snake species at risk. Also, incidental occurrences of these species may be possible along the Grand Marais Drain.

Both the Common Five-lined Skink and the Eastern Foxsnake have identified regulated habitat that is protected under the provincial *Endangered Species Act* (ESA). All faunal species at risk, especially those with habitat regulations, will need to be further assessed as part of the design process to ensure compliance with the federal *Species at Risk Act* (SARA) and provincial *Endangered Species Act* (ESA).

The construction of the proposed works for the project may cause temporary impacts to habitat for these species. Measures to mitigate this impact include construction timing windows, isolation of work area and naturalization and additional habitat creation. Specifics will be developed through the detailed design phase and permitting process for this project.

(Natural Heritage Information provided by BioLogic Inc.)

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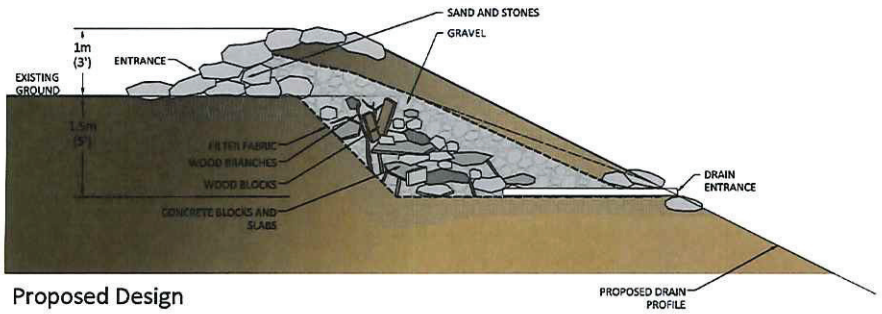
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

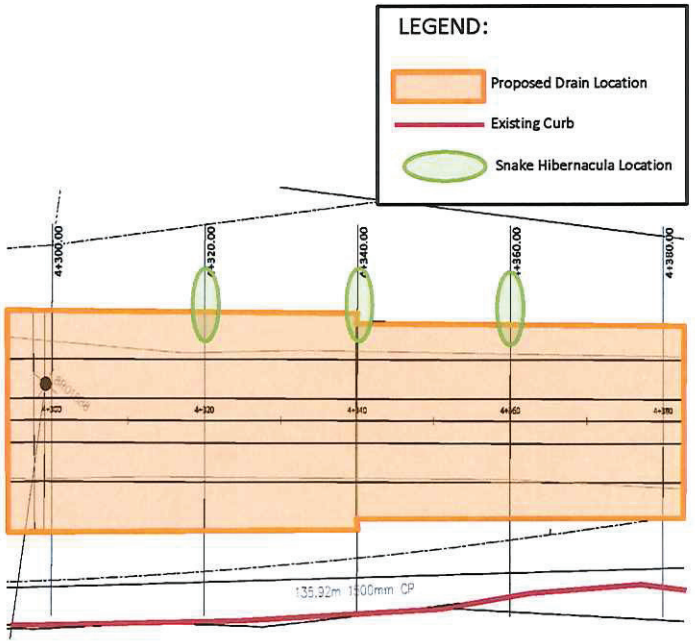
DOUGALL AVENUE TO WALKER ROAD

Habitat: Snake Hibernacula



Proposed Design

- Snake Hibernacula are underground chambers that snakes use through winter to protect them from the cold. Snakes prefer hibernacula that are close to the water table and have a temperature that remains above freezing.
- The proposed works may disturb some habitat that exists along the drain. Building hibernacula will replace any habitat that is disturbed during the works and deter snakes from seeking alternative habitat such as rock and log piles, retaining walls and building foundations.
- Building hibernacula will provide habitat opportunities for the snakes that are already around the property and that are supported by the existing landscape. **It will not attract additional snakes from other areas.**



Example Layout: Hibernacula spaced at 20m intervals along one side of the Drain.

Proposed Locations

- Segment 1 – Along north side of the second reach
- Segment 2 – Around pond area where space is available
- Segment 4 – Along north side past the trail crossing
- Segment 5 – Along north side adjacent to the open land

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Archaeological Potential

As part of the Environmental Assessment, research was conducted in order to determine the archaeological potential of the proposed project area.

- AMICK Consultants Limited was engaged to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed undertaking. The study area was subject to reconnaissance, photographic documentation and physical assessment.
- The background research indicates there is a potential for archaeological resources of Native origins in the vicinity of the study area based on proximity to a historical source of potable water. The research also suggests potential for archaeological resources of Euro-Canadian origins.
- **Archaeological potential** does not indicate that there are necessarily sites present. It means that environmental and historical factors suggest that there may be undocumented archaeological sites within lands that have not been subject to systematic archaeological research in the past.
- As a result of the physical assessment of the property, **no archaeological resources were encountered**. Consequently, it is recommended that the proposed undertaking be considered **cleared** of any further requirement for archaeological fieldwork. Any current or future condition of development respecting archaeological resources should be considered as addressed.

Heritage Sites in the Vicinity of the Grand Marais Drain

- A Heritage Site is characterized as a property listed on a municipal register or designated under the *Ontario Heritage Act* or is a federal, provincial or municipal historic landmark or site.
- There are **no** listed or designated heritage buildings or properties which form a part of the study area.

(Archaeological Information provided by AMICK Consultants Ltd.)

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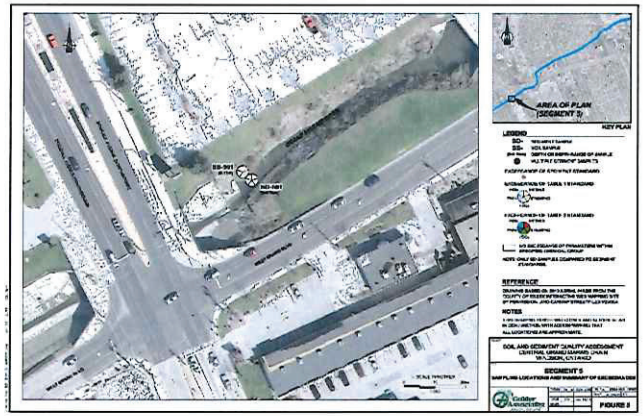
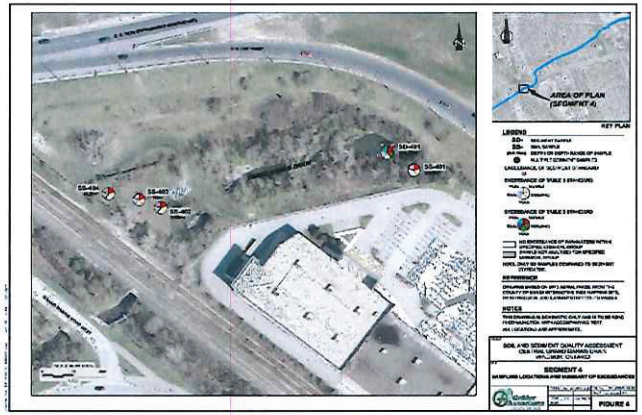
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

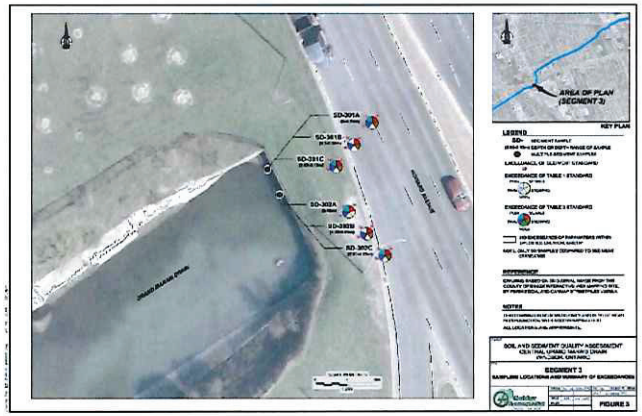
Soil and Sediment Sampling - Locations and Summary of Exceedances



Segment 1: Marginal exceedances in both the soil and sediment samples.



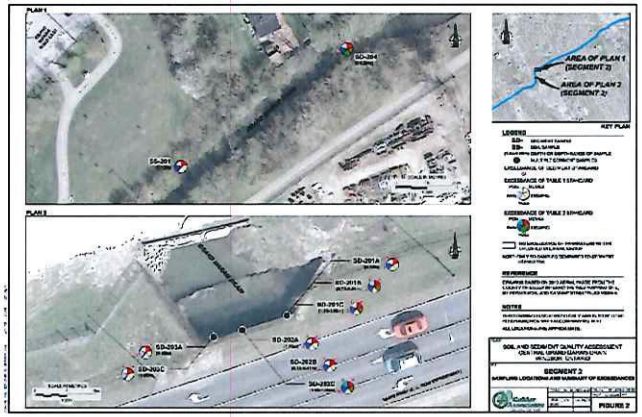
Segment 2: High concentrations of metals in both the soil and sediment samples.



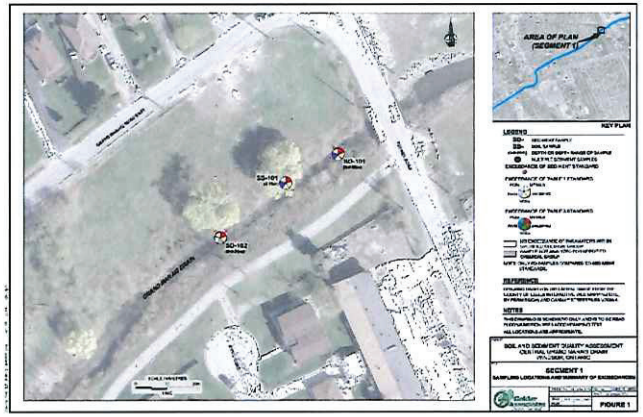
Segment 3: All sediment samples are highly impacted.

A copy of the entire report is available for review along with full sized copies of the plans shown here.

(Soil and Sediment Sampling performed by Golder Associates)



Segment 4: All sediment samples are highly impacted. The deepest samples being the most impacted.



Segment 5: High concentrations of metals in both the soil and sediment samples.

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CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Soil and Sediment Sampling – Summary of Findings

- No evidence of potential impacts was observed in any of the shallow **soil** samples collected (Segments 1-5).
- Field evidence of potential impacts were observed in all **sediment** samples taken from segments 2 through 4. The impacts appeared to be greater in **sediment** samples collected at deeper depths.
- All of the tested **sediment** samples exceeded one or more sediment quality standards for metals, PAHs and PCBs. The highest concentrations were found in the deeper sediment samples collected at the culverts under the E.C. Row Expressway.
- All of the tested **soil** samples exceeded one or more of the levels identified in the Ministry of the Environment's (MOE) Table 1 or Table 3 soil quality standards. Based on these results, the soil would not be classified as 'inert fill'. Sediment excavated from areas with concentrations that exceed Table 3 soil quality standards would likely require landfill disposal if removed from the site.
- The segment from Dougall Avenue to South Cameron Boulevard is the least impacted of all 5 segments with only marginal exceedances of Table 1 soil quality standards. More options may be available for disposal or re-use of material from this segment.
- **The impacted sediments would NOT be characterized as hazardous and could be disposed of at a licensed non-hazardous landfill. Due to the saturated conditions of the sediment, special handling may also be required prior to off-site disposal.**

Note:

Soil samples are samples that were collected from the area adjacent to the drain.

Sediment samples are samples that were collected from within the drain.

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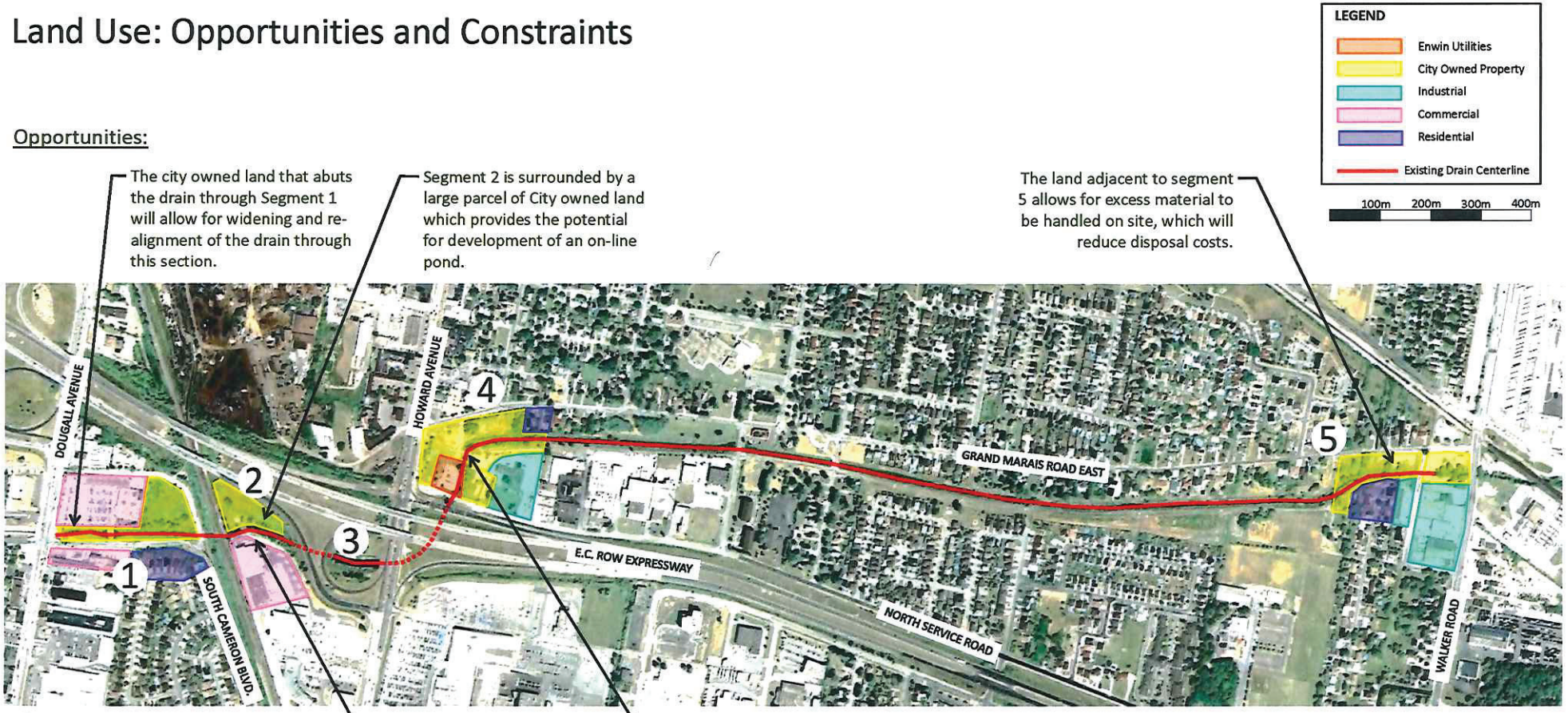
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Land Use: Opportunities and Constraints



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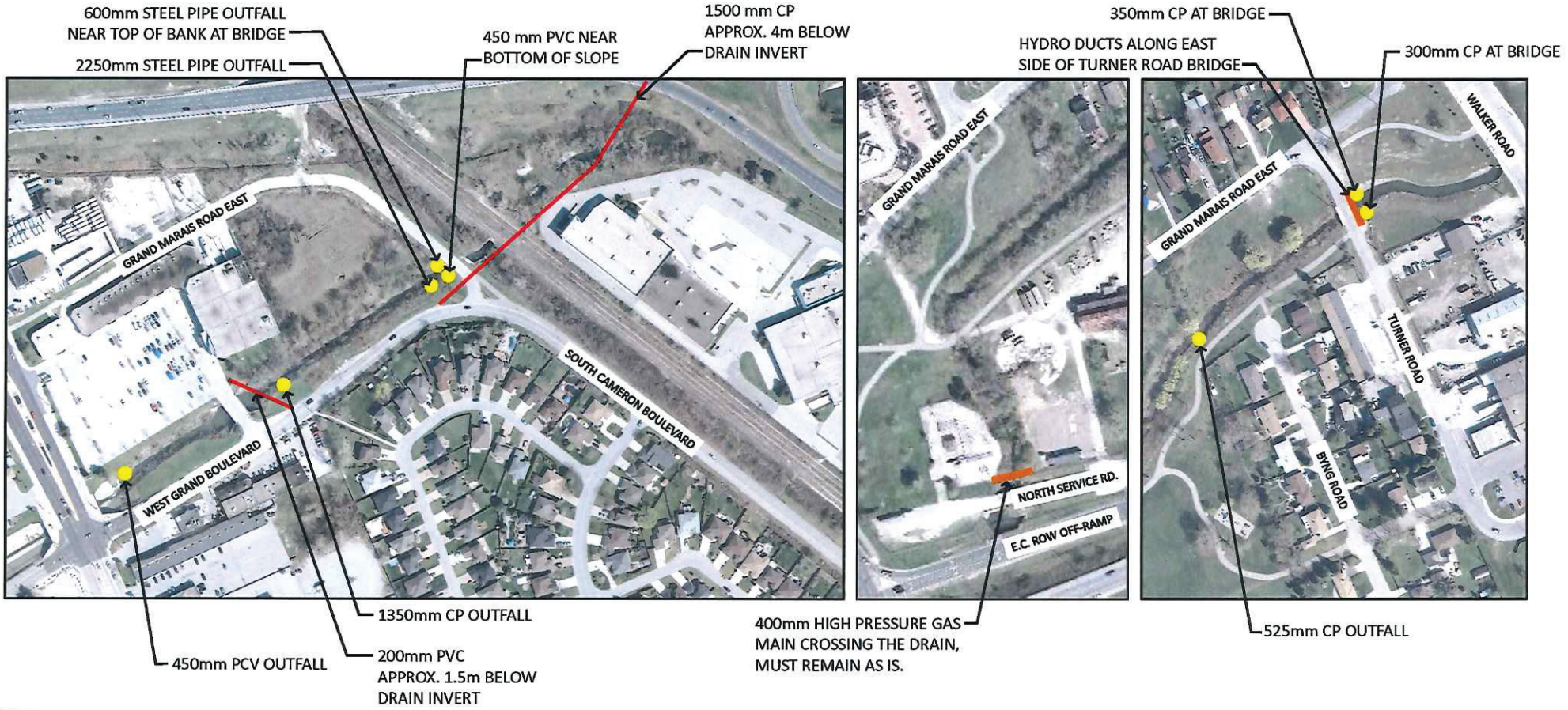
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Utilities

The majority of the Utilities in the vicinity of the study area run parallel to the drain. There are a few locations where existing utilities may be impacted by the proposed improvements as shown below. The outfalls will need to be adjusted to suit the proposed alignment.



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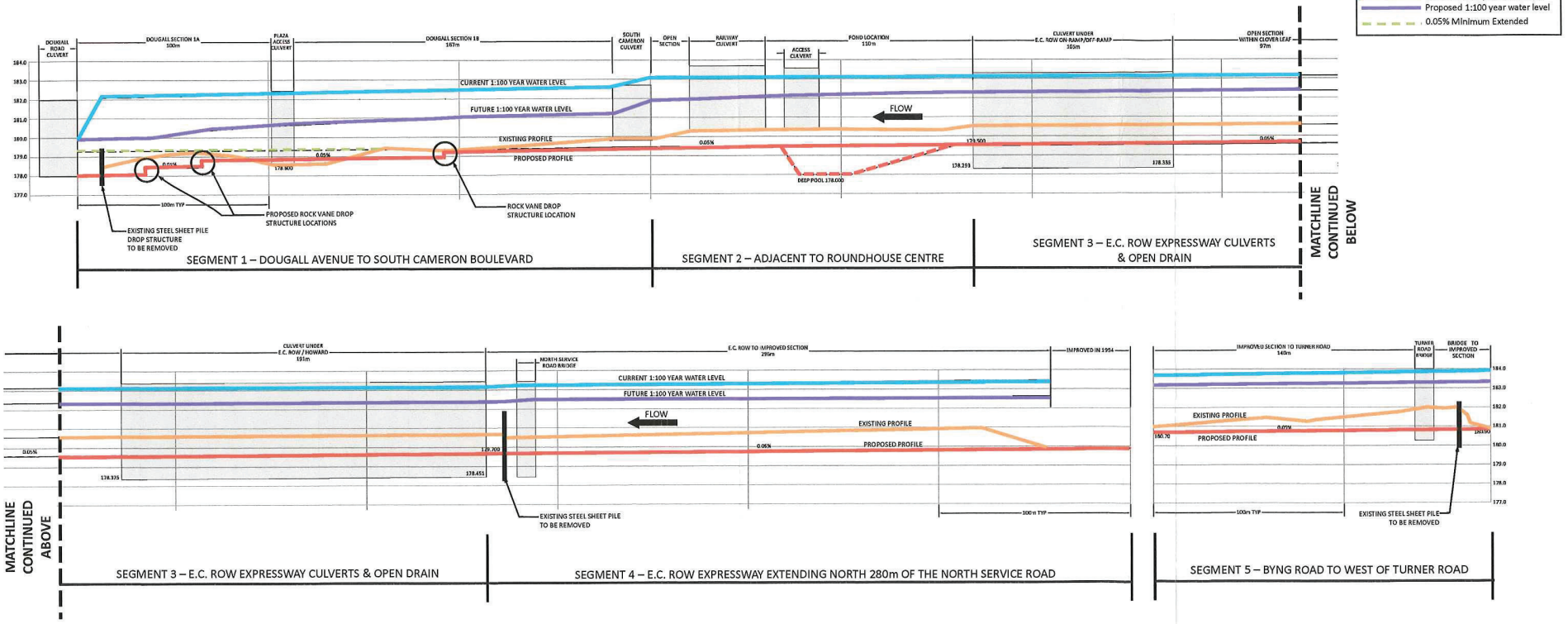
Preliminary Design Profile:



CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

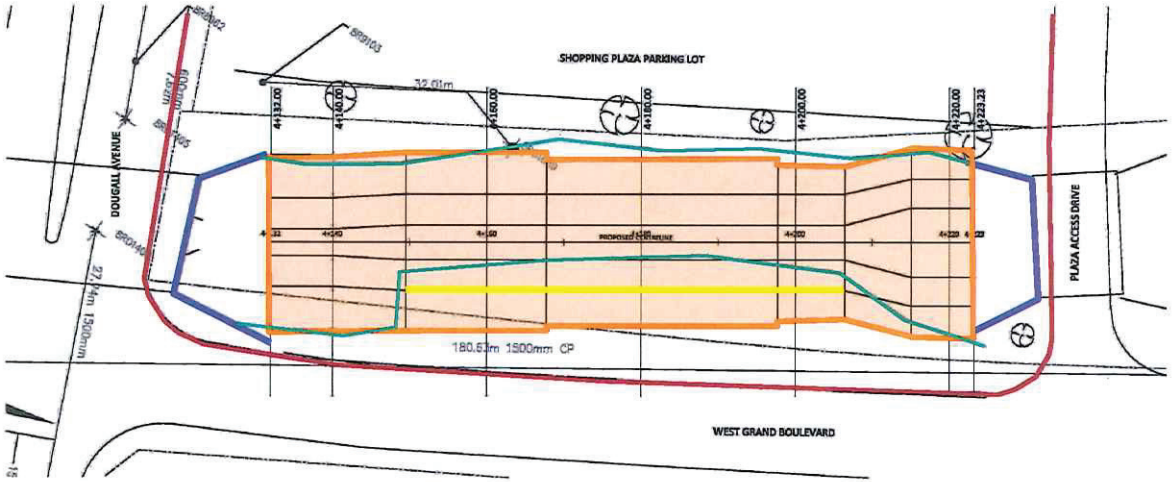
Segment 1A : Plan and Profile – Dougall Avenue to Plaza Entrance

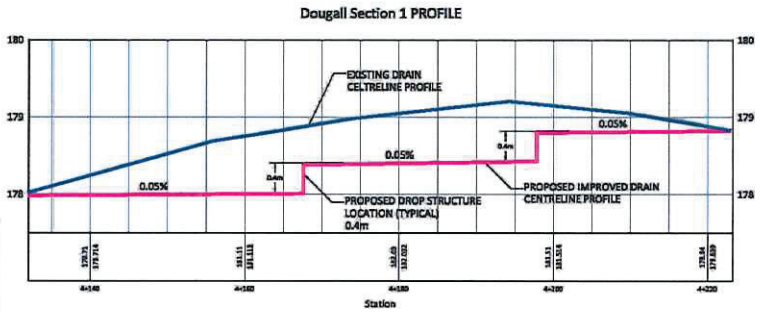
<u>Proposed Improvements:</u>

- Straighten drain alignment between the two culverts.
- Construct retaining wall along south side to preserve open land for future recreationway or sidewalk if desired by the City.
- Reduce grading of channel side slope to be no steeper than 2H:1V.
- Install rock vane drop structures to gradually transition the drain bottom down to meet the existing channel bottom at Dougall Avenue.
- Stabilize channel slopes with vegetation and erosion control treatments near channel bottom.

<u>Benefits:</u>

- Achieves objectives of project to improve hydraulic capacity of the drain and improve outlet to upstream drainage areas.
- Replacement of existing drop structure with rock vane structures allow for fish passage upstream.
- Improved aesthetics of local landscape.
- More cost effective and environmentally sustainable than other channel improvement options (i.e. concrete lined channel).





LEGEND:

- Proposed Drain Location/ Top of Slope
- Proposed Retaining Wall (optional)
- Existing Top of Slope
- Existing Concrete Culvert
- Existing Curb
- Proposed Drain Centreline Profile
- Existing Drain Centreline Profile

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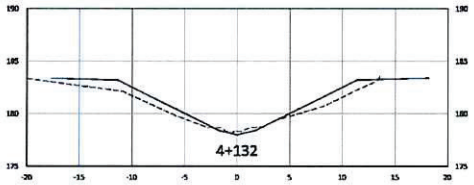
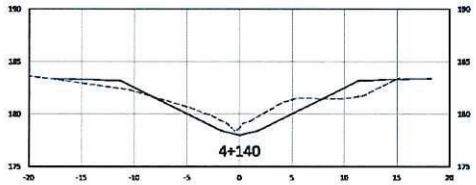
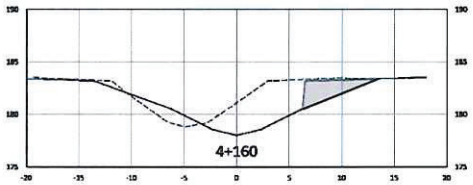
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

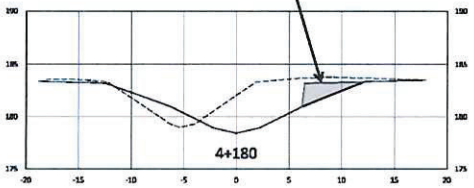
Segment 1A : Sections – Dougall Avenue to Plaza Entrance

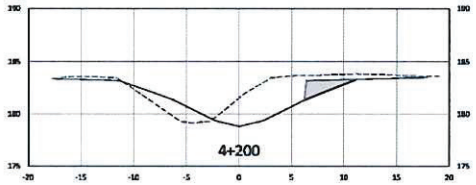


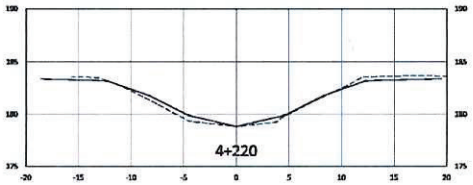


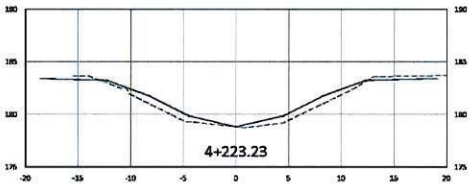


OPTIONAL RETAINING WALL (TYP)

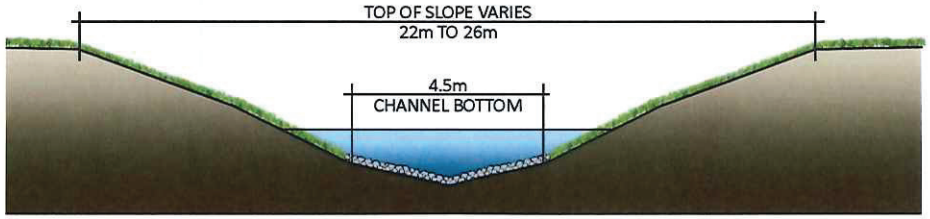




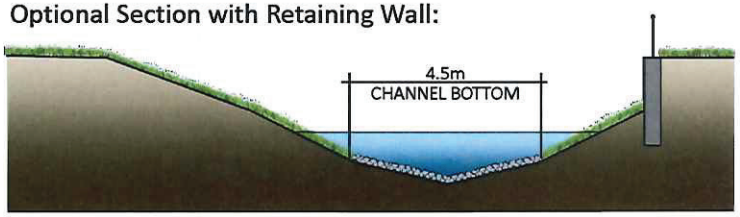




Typical Section:



Optional Section with Retaining Wall:



The retaining wall option provides more land on the south side of the drain and preserves the potential for connecting the recreationway in the future.

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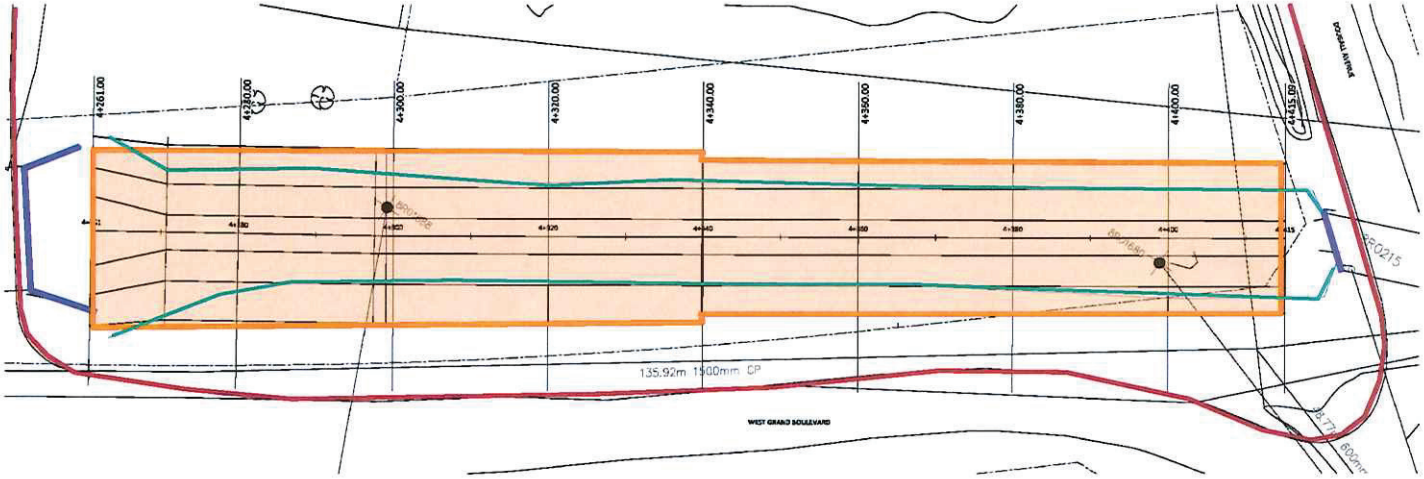
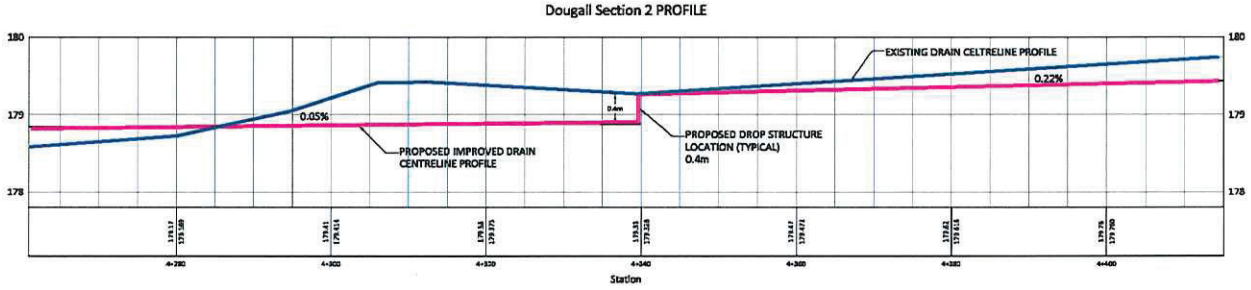
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Segment 1B : Plan and Profile – Plaza Entrance to South Cameron Boulevard

Refer to Segment 1A for description of proposed improvements and benefits.





LEGEND:

- Proposed Drain Location/ Top of Slope
- Existing Top of Slope
- Existing Concrete Culvert
- Existing Curb
- Proposed Drain Centreline Profile
- Existing Drain Centreline Profile

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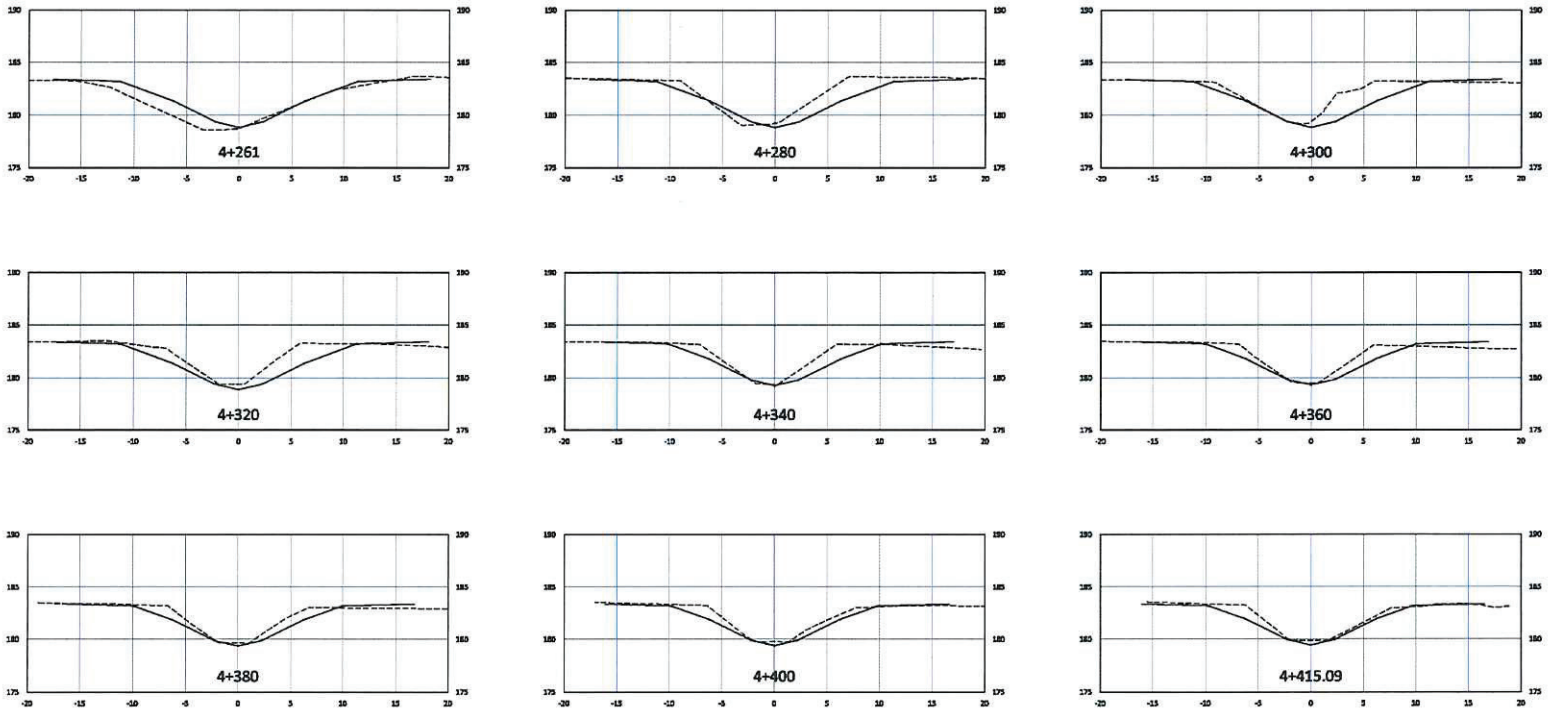
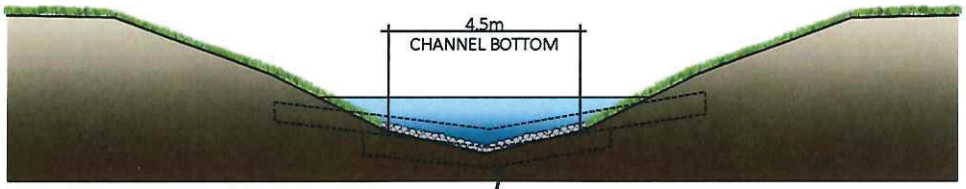
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Segment 1B : Sections - Plaza Entrance to South Cameron Boulevard



Typical Section :



DASHED LINES REPRESENT THE CROSS SECTION OF THE ROCK VANE DROP STRUCTURE

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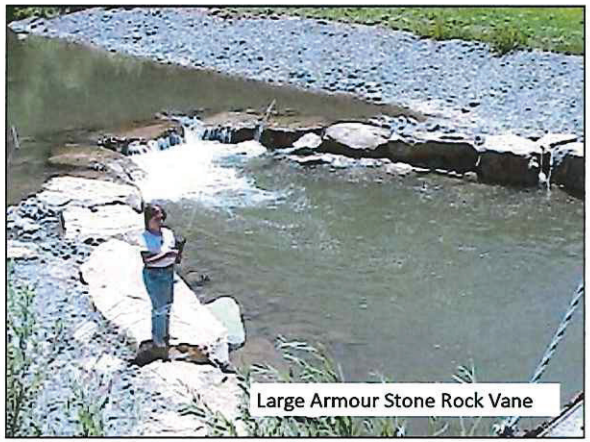
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

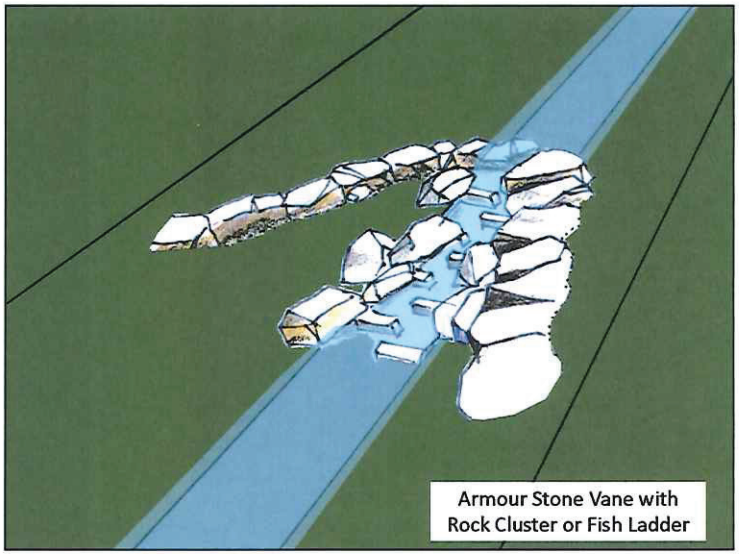
DOUGALL AVENUE TO WALKER ROAD

Segment 1 : Drop Structure Options

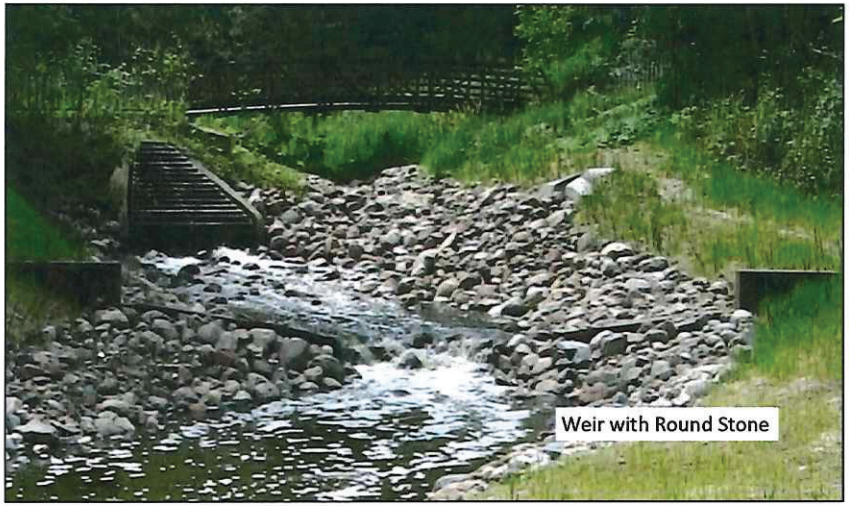
The following are variations of rock drop structure options to be installed along Segment1 of the project. Details will be resolved during final design.



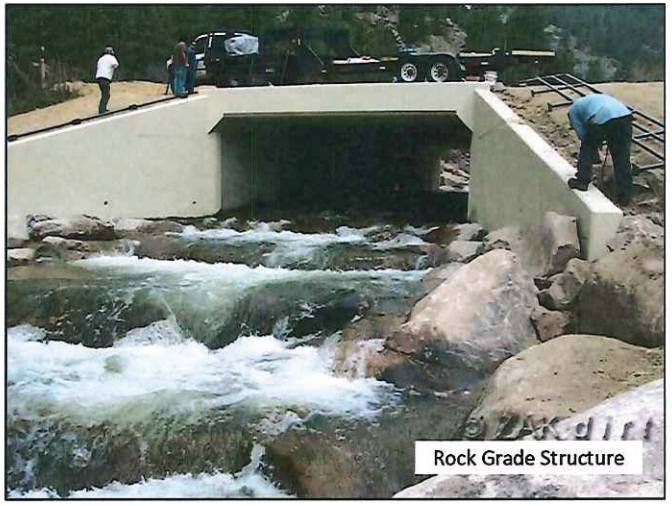
Large Armour Stone Rock Vane



Armour Stone Vane with Rock Cluster or Fish Ladder



Weir with Round Stone



Rock Grade Structure

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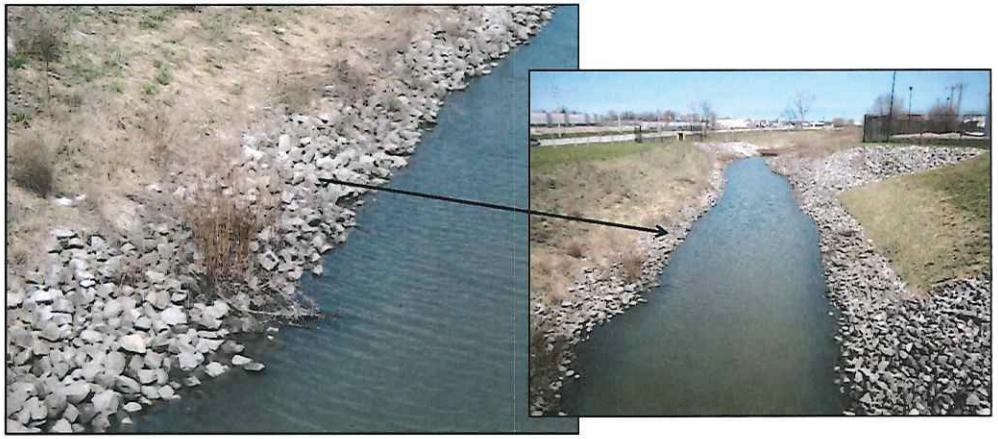
Erosion Control Options

The following are different products that could be used along the slope for erosion control.

Grass lined channel

ShoreMax – Soft Revetment Scour Protection Mat

TRMs – Turf Reinforcement Mats



Stone – Gabion lined channel banks

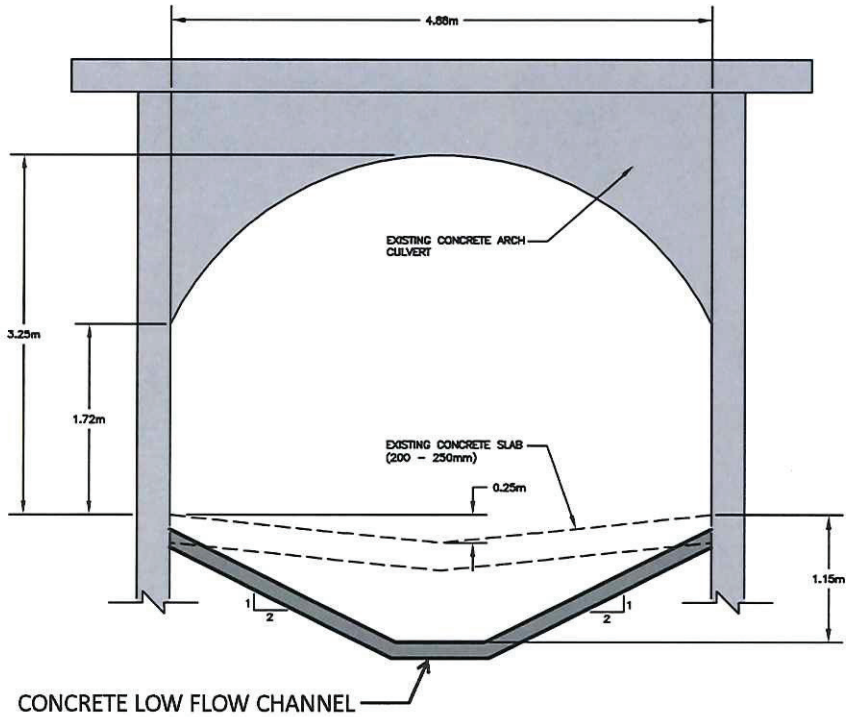
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

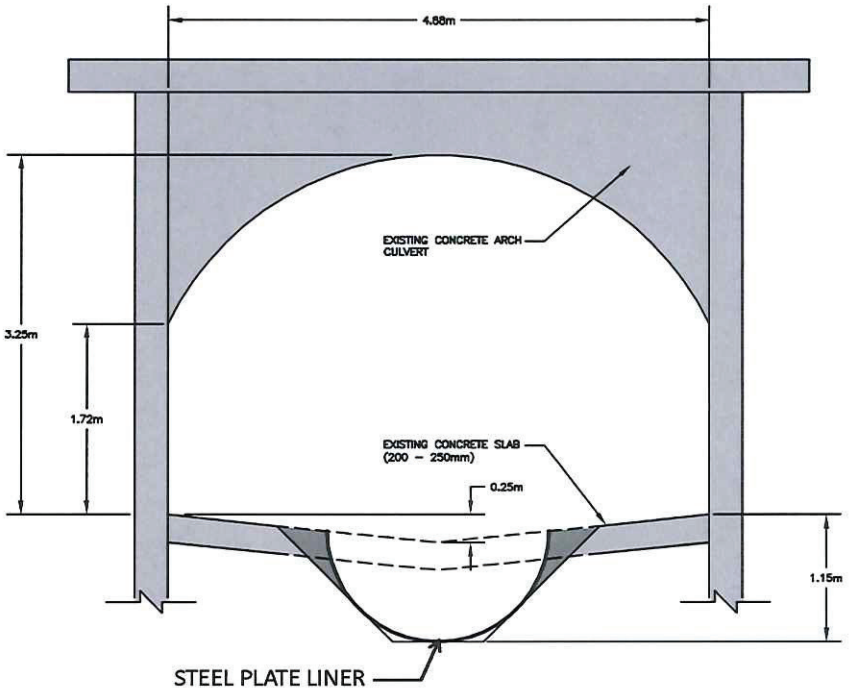
Segment 2: Outlet Culvert Options (under Railway)

The culvert invert (bottom elevation) under the railway line will need to be lowered approximately 1.15m to achieve proper outlet to upstream drain segments. At this time we are in consultation with Canadian National and Canadian Pacific Railways to determine the preferred option. Below are two options that are being considered for altering the culvert bottom.

Option 1: Remove the entire existing concrete slab and replace with a concrete low flow channel. This option significantly increases flow capacity.



Option 2: Remove the centre portion of the existing concrete slab and replace with a steel plate liner grouted in place. This option improves outlet to upstream with only a minor increase to flow capacity.



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CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

Segment 2: On-line Pond

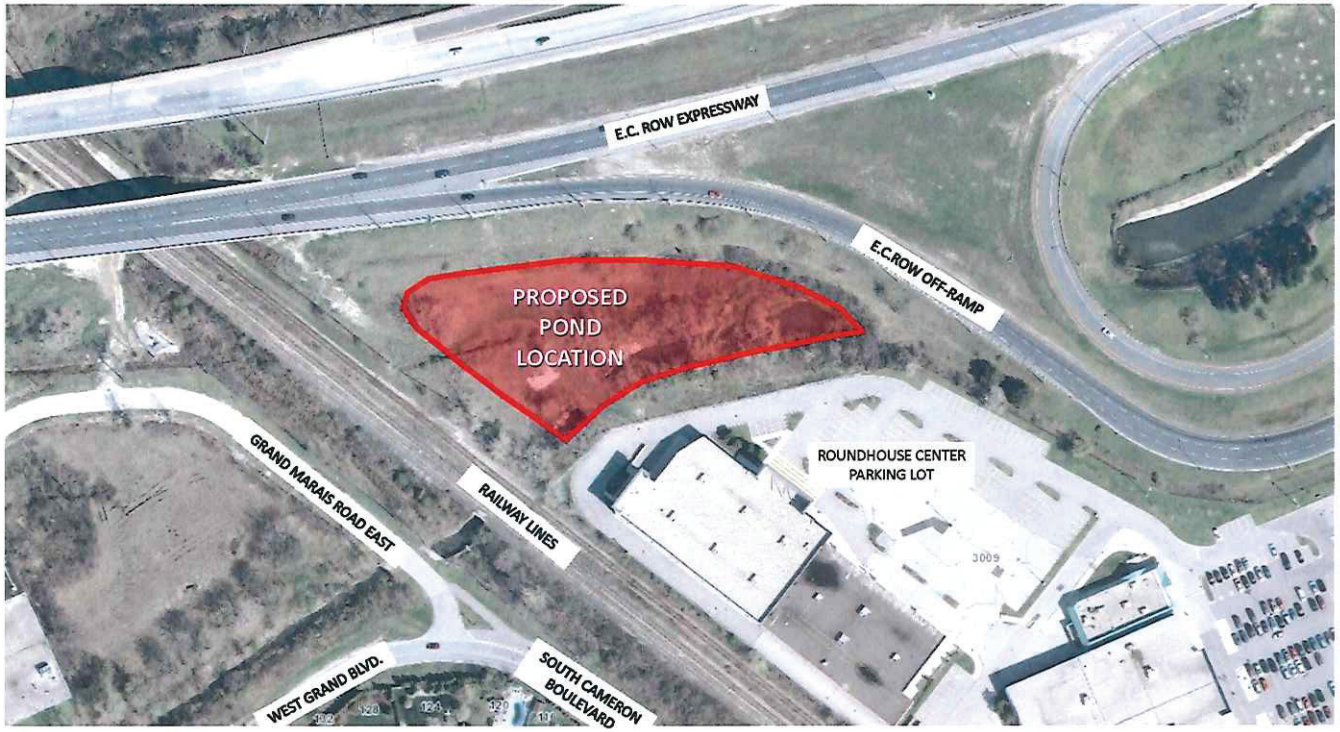
The proposed location of the pond is adjacent to the Roundhouse Centre just south of the E.C. Row Expressway. The development of a new on-line pond is being considered to provide sediment control and additional channel storage.

Proposed Improvements:

- Create an on-line pond with deep water pool for sediment collection.
- Provide access ramp into the pond to facilitate maintenance and sediment removal.
- Design a concrete weir to route flows through the pond during times of base flow.
- Deepen invert through the pool to provide outlet for upstream sections.

Benefits:

- Achieves objectives of project to improve hydraulic capacity of the drain and improve outlet to upstream drainage areas.
- Once the upstream segments are improved, sediments may be re-suspended and flow downstream. The pond creates a localized area for sediment accumulation.
- Accumulated sediments can be easily removed from the pond. Without the pond, the upstream segments would require dredging to remove accumulated sediment.



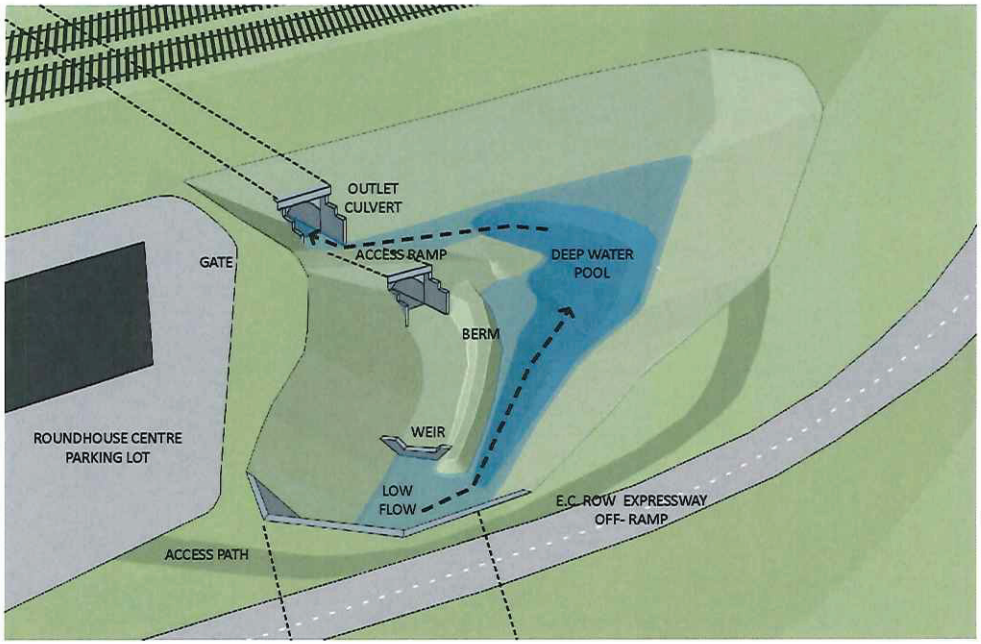
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

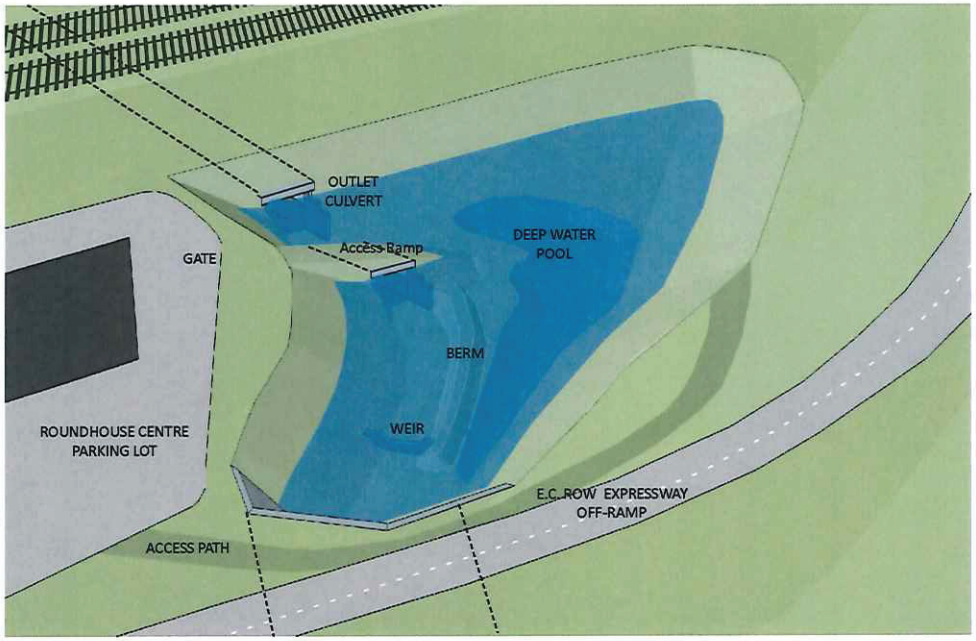
Segment 2: On-line Pond

An on-line pond is proposed adjacent to the Roundhouse Centre just south of the E.C. Row Expressway at Howard Avenue.

Low Flow Condition (with base flow water level):
During times of low flow, the water will be directed toward the deep water pool. This will allow for the sediments to settle out before the water continues downstream.



High Flow Condition (with 1:100 year water level):
During times of high flow, the basin will fill with water and the water will overtop the weir. The higher flows will outlet without disturbing any sediments that have accumulated in the deep pool area.



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Segment 3: Culvert Sediment Mitigation/Removal Alternatives

This segment of the project extends from the west side of the off-ramp/on-ramp of the E.C. Row Expressway to the north side of the west bound off-ramp to Howard Avenue. This segment of the drain was constructed circa 1970 during initial stages of construction of the expressway and consists generally of large concrete box culverts. It was designed to the same flow capacity standard as the concrete-lined portions of the drain that are located west of Dougall Avenue. Consequently, this portion of the drain is larger and deeper than needed to provide the required 1:100 year storm capacity. The bottom portion of the culverts have been accumulating sediments since the 1970s.

There were three options considered to deal with the accumulation of sediments in the culverts.

Option 1: Do nothing
This option entails leaving all accumulated sediments in place. Although the level of the sediments have reached an equilibrium at this time, once the downstream sections of the drain are improved to the proposed invert, the sediment would start to erode and migrate downstream. This option of leaving the sediments in place as-is was rejected due to the impact it would have on the downstream sections of the drain.

Option 2: Remove all sediment
This option entails the removal of all of the sediment in the culverts as well as within the open channel sections between the culverts. Due to the fact that the sediments are impacted, the cost of proper disposal of the material would be very high. The cost of excavation would also be high due to the limited access to the material and lack of staging area around the site. If all of the sediments were to be removed, the invert of the drain would be well below the upstream and downstream sections, creating a "depression" that would once again accumulate sediments if not filled in with stone. This option was rejected due to the cost implications of the option.

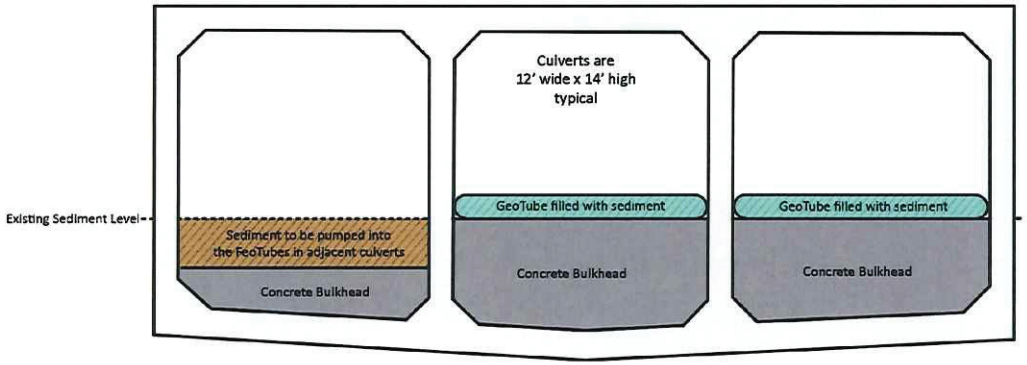
Option 3: Remove some sediment and cap in place
This option entails the removal of a portion of the sediments from the open channel section and one of the culverts to achieve the desired channel invert and stabilizing the remaining sediments in place. The culverts are oversized and contain excess capacity. Even with the amount of sediment present in the culverts at this time, the culverts contain enough capacity to convey the 1:100 year storm event. Given the excess capacity, it is not necessary to remove all of the sediments. This option is much more cost effective than Option 2, while achieving the objectives of maintaining capacity and improving outlet. This option is the **preferred solution** for this segment of the drain.

Two options for stabilizing the sediment in place are illustrated on the next slide.

Segment 3: Culvert Sediment Stabilization Options

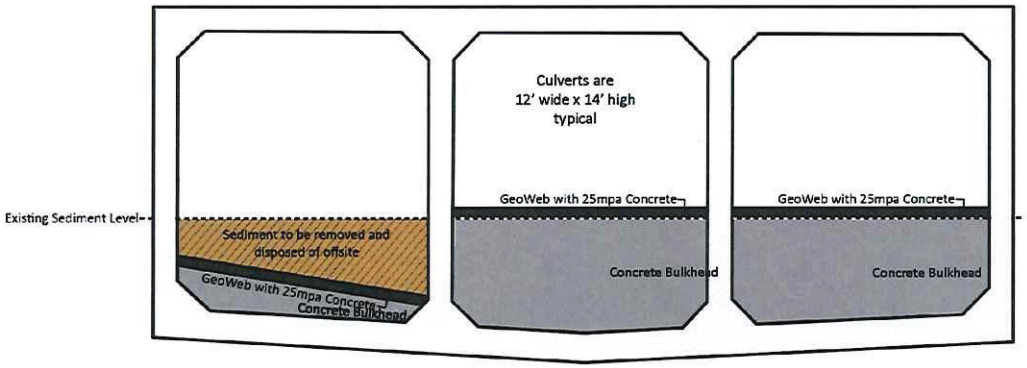
The following are options for stabilizing the sediments within the culverts under the E.C. Row Expressway and the east bound off-ramp/on-ramp at Howard Avenue.

GeoTube Bags:



Sediment from the first culvert will be hydraulically excavated and pumped into bags in the other two culverts. These bags will trap the sediments in place creating a cap over the sediments below.

GeoGrid:



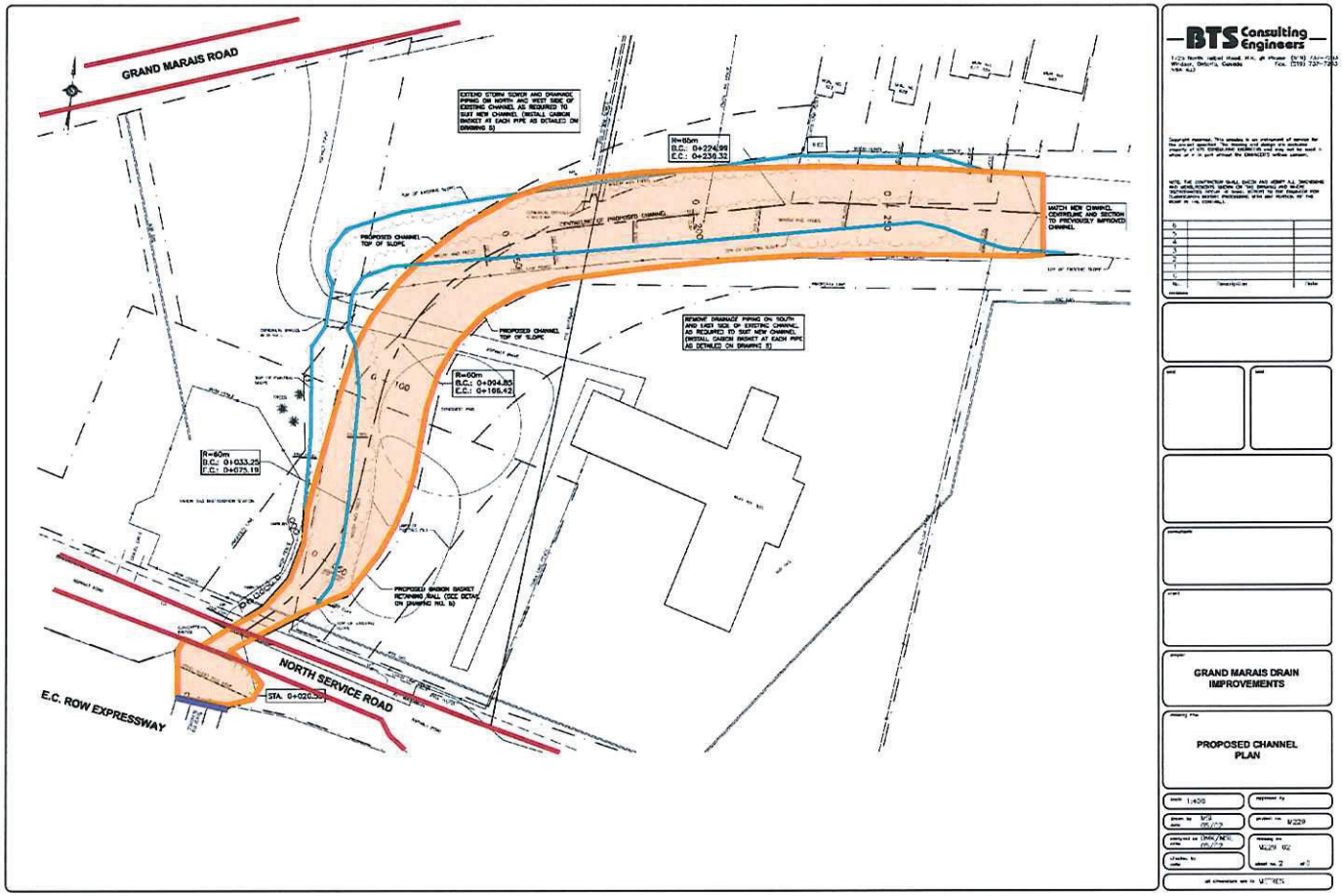
Sediment from the first culvert will be hydraulically removed and disposed of off-site. The remaining sediments will be capped with GeoWeb and the voids filled with concrete.

Segment 4: Plan – E.C. Row Expressway

The following slides present the proposed design for Segment 4. An EA was prepared in 1992 and detailed design of this segment was previously completed by BTS Consulting Engineers in 2002. Given that the EA was completed more than 10 years ago, it is required that the proposed work be reassessed under the provisions of the Environmental Assessment Act.

Proposed Improvements:

- Improve drain as proposed in the EA completed in 1992, consisting of a minor re alignment and enlargement of the channel to match the upstream channel cross section (improved in 1994).
- Remove weir at North Service Road.
- Deepen invert to connect to upstream invert.
- Construct new bridge for to accommodate recreationway over the drain.



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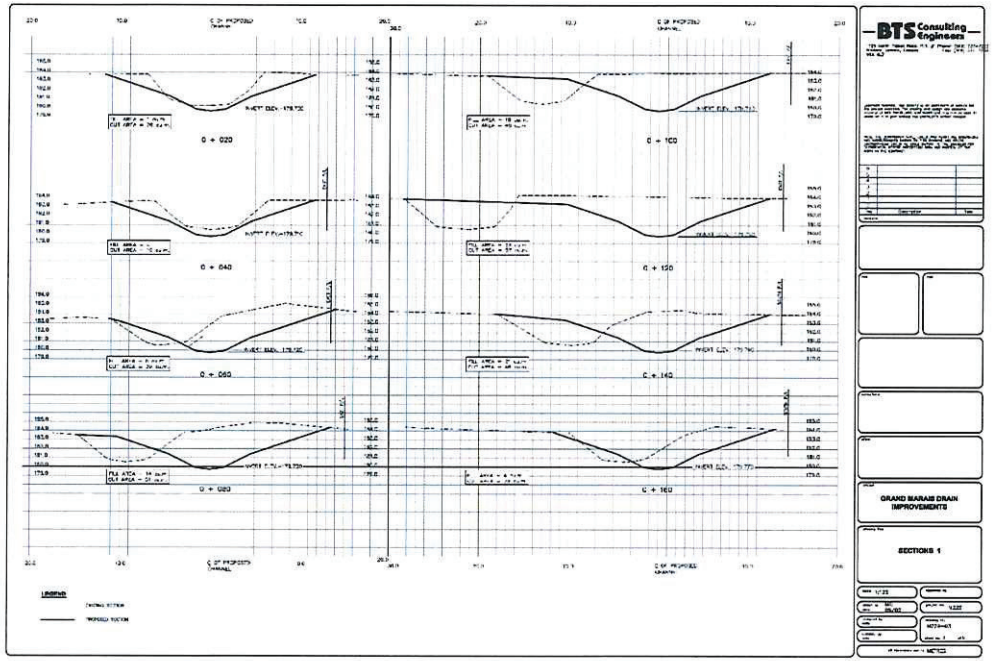
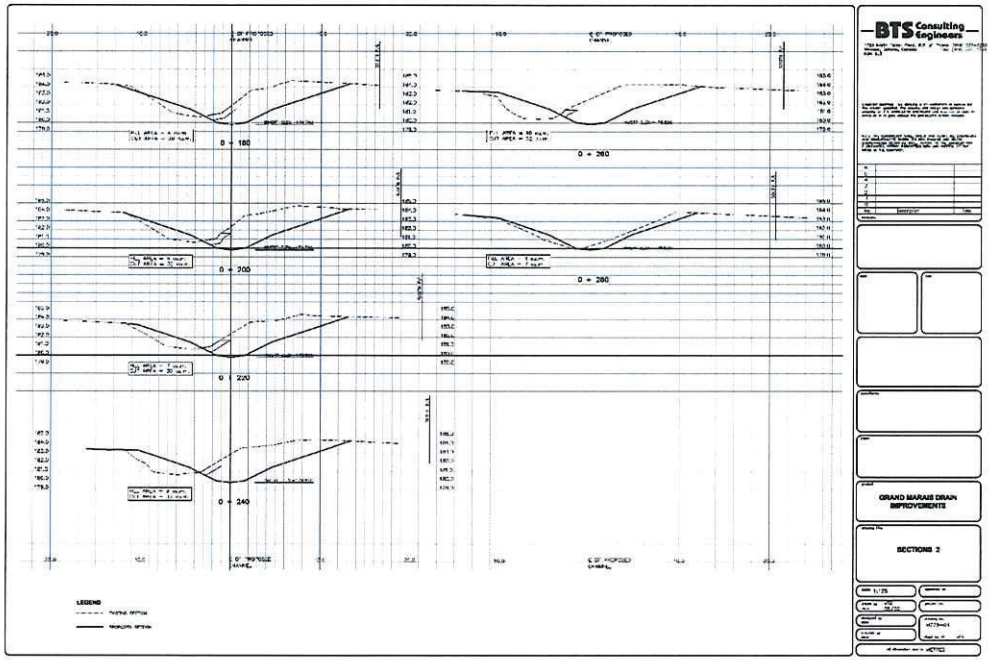
CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

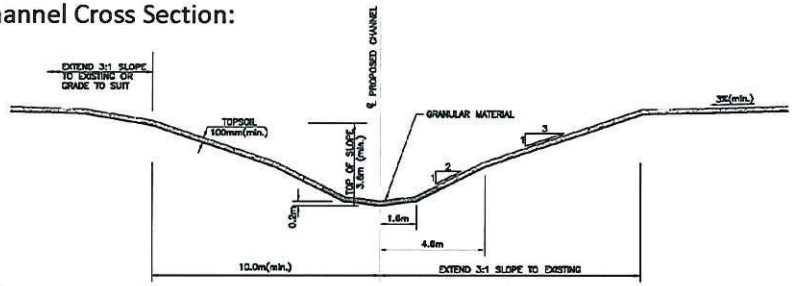
DOUGALL AVENUE TO WALKER ROAD

Segment 4: Sections



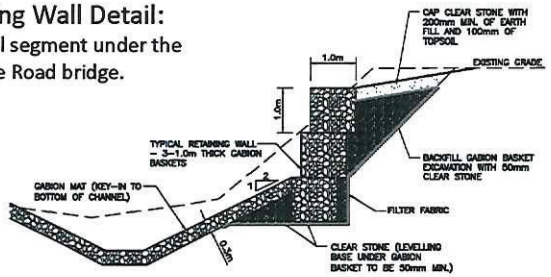


Typical Channel Cross Section:



Typical Gabion Basket Retaining Wall Detail:

This detail will be used for the channel segment under the gas line just north of the North Service Road bridge.



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CENTRAL GRAND MARAIS DRAIN CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WALKER ROAD

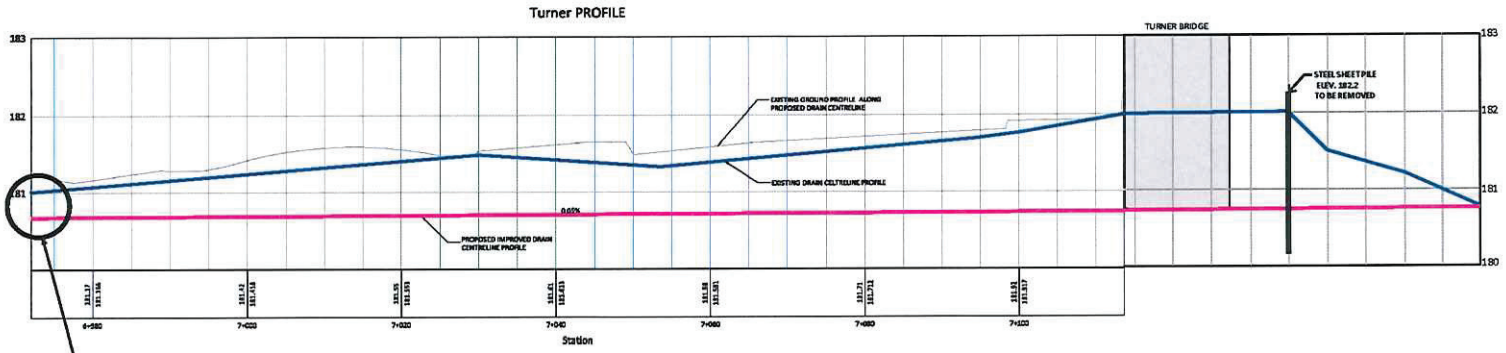
Segment 5: Plan and Profile

<u>Proposed Improvements:</u>

- Improve channel to match downstream cross-section.
- Construct new bridge at Turner Road.
- Repair existing storm outlets.
- Remove steel sheet pile upstream of Turner Road.
- Deepen section to meet proposed downstream invert.
- Deepen invert under bridge to meet existing upstream improved section invert.
- Dispose of excavated material on-site by creating a berm on the north side of the drain.

<u>Benefits:</u>

- Achieves objectives of project to improve hydraulic capacity of the drain and improve outlet to upstream drainage areas.
- Improved aesthetics of local landscape.
- Connection to upstream and downstream improved segments.
- Berm created from cut material to reduce offside disposal cost.



The downstream section was designed to meet the proposed drain centerline. Over time the section has sedimented in – which can been seen in the difference between the proposed and existing lines.

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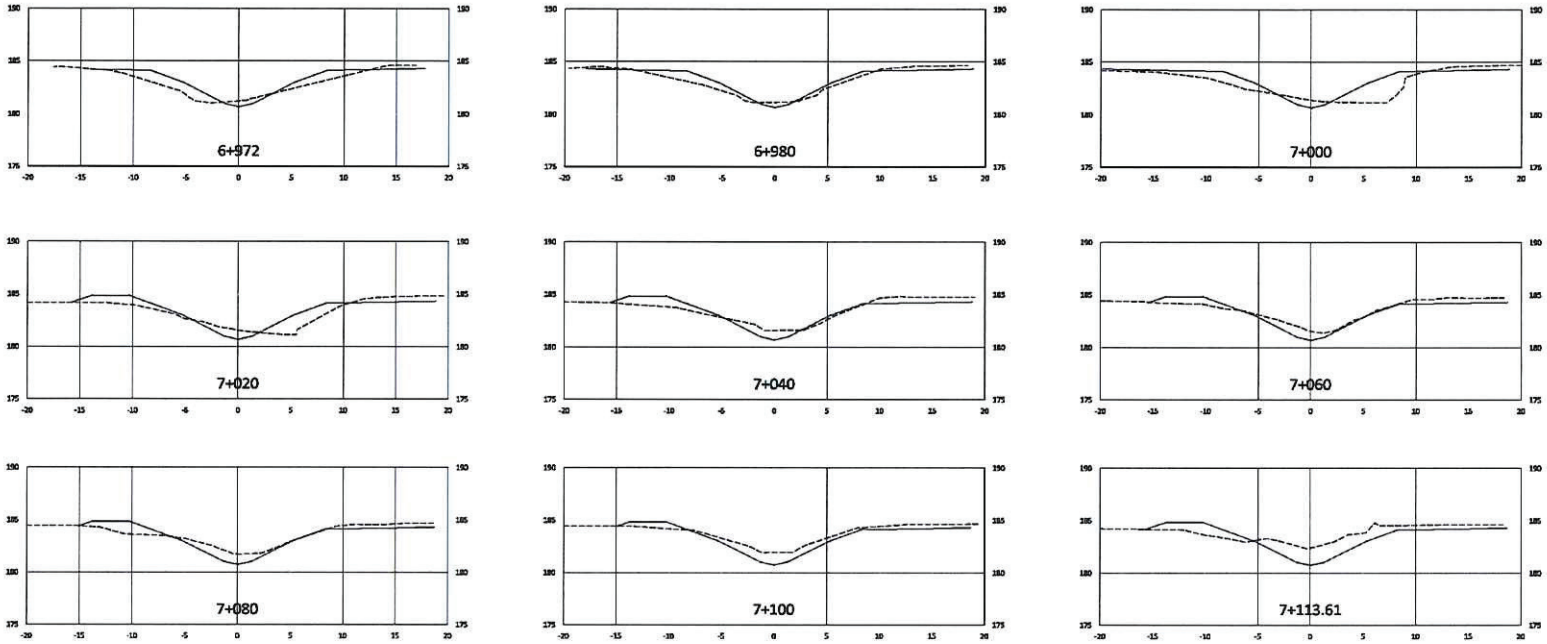
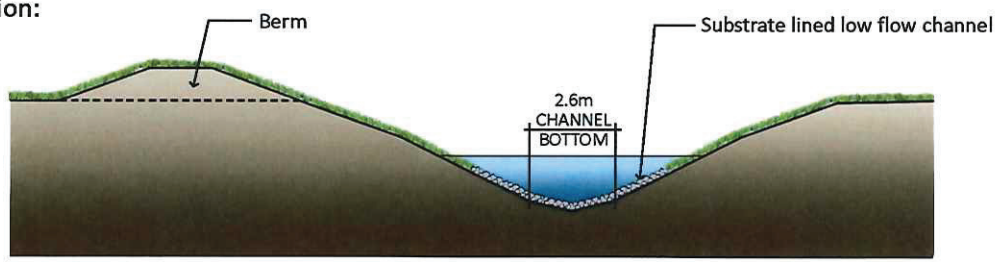
Segment 5: Sections



Typical Cross Section:



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Cost Estimate:

The project would be completed in stages. The following are the estimates for each Segment.

- Segment 1 – Dougall Avenue to South Cameron Boulevard: **$850,000**
  - Includes slope stabilization and re-alignment of the drain, rock structures to replace existing drop structure ($36,000), repair of outfalls and repairs to the South Cameron Road Bridge. Optional Extras – Retaining wall ($120,000) and Recreationway extension ($86,000)

- Segment 2 – Adjacent to Roundhouse Centre: **$1,500,000**
  - Includes the excavation and shaping of the proposed pond, construction of the low flow channel through the railway culvert, construct concrete weir and channel lining, and erosion protection where required.

- Segment 3 – E.C. Row Expressway Culverts & Open Drain at Howard Avenue On-ramp to E.C. Row Expressway: **$650,000**
  - Includes the removal and disposal of sediments from the open channel, GetTube system and headwalls ($320,000).

- Segment 4 – From the E.C. Row Expressway extending 280m North of the North Service Road: **$1,200,000**
  - Includes slope stabilization and re-alignment of the drain, new bridge across the drain ($250,000), reconstruction of the recreationway, removal of steel sheet pile at the North Service Road and retaining walls where required.

- Segment 5 – Byng Road to Turner Road: **$1,200,000**
  - Includes the slope stabilization and shaping of the drain, removal of steel sheet pile and gabion upstream of the bridge, total bridge reconstruction at Turner Road ($500,000) and replacement of recreationway .

The estimated costs represent construction costs including engineering. HST not included.

This project lends itself to phasing. Each segment could be completed as a separate phase starting at the downstream end, Segment 1. Segment 3 could also be broken into two phases, one for each culvert.

The total estimate for the entire project is: **$5,400,000**

Next Steps

- All comments received as a result of today's meeting will be reviewed by the Project Team and used to help refine the Preferred Solution.
- Once the Preferred Solution has been refined, the Project Team will notify the Review Agencies and begin the approvals process.
- A final description of the Preferred Solution will be prepared and included in the Project File and on the Project Website for public review. A Notice will be published, alerting the public that the 30-day public review period has commenced.
- Provided that all outstanding issues are resolved and no Part II Orders are requested, the project may proceed to final design, approvals and construction.

We encourage you to fill out a comment sheet so that your issues and concerns can be addressed early in the planning process and to have your comments become part of the public record. Thank you.

Environmental Assessments/Master Plans

- Banwell Corridor Environmental Assessment
- Completed Environmental Assessments
- Downtown Windsor Transportation Master Plan
- Grand Marais Drain Concrete Channel Environmental Assessment
- Riverfront Shoreline Environmental Assessment
- Grand Marais Drain Study and Environmental Assessement

Grand Marais Drain Study and Environmental Assessment

Project Status:

At this time a Preferred Solution has been identified. A Public Drop-In Centre was held on April 18th and the material presented there can be found below. Based on the feedback received from the public and stakeholders, the Preferred Solution is being refined. The project file is being prepared and will be completed in June.

Project Overview:

In accordance with the approved procedures contained in the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA), the Essex Region Conservation Authority (ERCA) and the City of Windsor have retained Landmark Engineers Inc. to carry out an environmental assessment of the Grand Marais Drain from Dougall Avenue to Walker Road. This Class EA is aimed at defining a scope of channel improvements to the previously unimproved sections along the drain corridor through this reach.

A key plan, depicting the limits of the study area, can be found at the following link: Key Plan of Study Area

Background:

Over the past 4 years, ERCA, in conjunction with the City, has undertaken several studies and construction contracts aimed at improving and maintaining various segments of the Grand Marais Drain. This Environmental Assessment will address the next phase of the overall project by defining a scope of channel improvements for the remaining unimproved segments that occur between Dougall Avenue and Walker Road.

It should be noted that some of the unimproved segments of the drain have already had environmental assessments completed and designs prepared. An example of this situation is the 260 m segment of drain lying immediately upstream of the North Service Road. Given that it has been more than ten (10) years since the Notice of Filing was published for this drain segment, the current study will include a review of the planning and design process and the current environmental setting to ensure that the project and mitigation measures are still valid given the current planning context.

Problem/Opportunity Statement:

At the outset of the Class EA process, the following Problem / Opportunity statement was developed to guide and direct the study:

"This study will define a scope of channel improvements for the remaining unimproved segments of the Grand Marais Drain between Dougall Avenue and Walker Road, as well as develop a maintenance plan for the entire study area, which includes the management of accumulated sediments."

Public Drop-In Centre - April 18th, 2013

A Public Drop-In was held on April 18th at the Fogolar Furlan Club of Windsor. All the information presented at the Drop-In Centre is provided below.

Public Drop-In Centre Slide Summary

Slide 1

Slide 2

Slide 3

Slide 4

Slide 5

Slide 6

Slide 7

Slide 8

Slide 9
Slide 10
Slide 11
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Slide 31
Slide 32

Contacts:

If you wish to provide input to the study team, or if you have any questions or concerns regarding the project, you may contact the following individuals:

Essex Region Conservation Authority
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City of Windsor
Mr. Paul Mourad, P.Eng.
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
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Landmark Engineers Inc.
Mr. Daniel M. Krutsch, P.Eng.
2280 Ambassador Drive
Windsor, Ontario, N9C 4E4
Phone: 519-972-8052
Email: dkrutsch@landmarkengineers.ca

All comments and input received from the public will be given due consideration and will be recorded in the Project File.

 Weather for Windsor, ON 20°CMostly Cloudy

4.0 Cost Estimate

This section of the Project File includes the cost information that was used to estimate the project budget.

This project lends itself to phasing. Each segment could be completed as a separate phase starting at the downstream end, Segment 1. Segment 3 could also be broken into two phases, one for each culvert. The estimated cost of the Preferred Design is $5.4 million which represents construction costs including engineering (HST not included).

Cost Estimate

Grand Marais Drain Environmental Assessment
Dougall Avenue to Walker Road

Reach 1: Dougall Avenue to South Cameron Boulevard

ITEM NO.	DESCRIPTION	ESTIMATED TOTAL PRICE
1.1	Clearing, grubbing and complete removal and disposal of small trees,	$ 20,000.00
1.2	Mobilization/Demobilization	$ 20,000.00
1.3	Sediment and Erosion Control	$ 20,000.00
1.4	Traffic Detours	$ 30,000.00
1.5	Remove existing SSP weir	$ 5,000.00
1.6	Construction Fencing	$ 15,000.00
1.7	Excavate and shape drain as indicated	
	a) Excavate	$ 40,000.00
	b) Fill	$ 20,000.00
	c) Trucking	$ 70,000.00
	d) Disposal	$ 150,000.00
1.8	Excavate and place armour stone	$ 35,000.00
1.9	Supply and place seed and mulch	$ 20,000.00
1.10	Snake Habitat	$ 10,000.00
1.11	Landscaping - trees and shrubs	$ 20,000.00
1.12	Concrete repairs to South Cameron Bridge	$ 40,000.00
1.13	Modify existing Storm Outlets	$ 30,000.00
1.4	Supply and place rip rap erosion protection as indicated	$ 50,000.00
	Subtotal	$ 595,000
	Contractor and Engineering Fees	$ 255,000
	Total	**$ 850,000**

Optional Items:

1.15	Supply and place retaining wall	$ 120,000.00
1.16	Construct asphalt recreationway	
	a) Supply and place 300mm of Granular 'A' base	$ 20,000.00
	b) Supply and place asphalt	$ 70,000.00
	Subtotal for Optional Items	$ 210,000
	Contractor and Engineering Fees	$ 90,000
	Total Including Optional Items	**$ 1,150,000**

Reach 2: Adjacent to Roundhouse Centre

ITEM NO.	DESCRIPTION	ESTIMATED TOTAL PRICE
2.1	Clearing and Grubbing	$ 40,000.00
2.2	Construction Fencing	$ 15,000.00
2.3	Mobilization/Demobilization	$ 40,000.00
2.4	Excavate and shape drain as indicated (E side of South Cameron)	$ 15,000.00
2.5	Construct low flow channel through railway culvert	
	a) Sawcut and remove concrete	$ 20,000.00
	b) supply and place concrete for low flow channel	$ 20,000.00
	c) Dam drain and pump water around working area	$ 15,000.00
2.6	Excavate proposed pond to grades and alignment as indicated	
	a) Excavate	$ 110,000.00
	b) Fill	$ 2,000.00
	c) Trucking	$ 160,000.00
	d) Disposal	$ 340,000.00
2.7	Construct weir upstream of culvert crossing as indicated	$ 10,000.00
2.8	Supply and place retaining wall	$ 40,000.00
2.9	Supply and place culvert	$ 30,000.00
2.10	Supply and place rip rap erosion protection as indicated	$ 25,000.00
2.11	Snake Habitat	$ 10,000.00
2.12	Landscaping - trees and shrubs	$ 20,000.00
2.13	Supply and place seed and mulch	$ 5,000.00
	Subtotal	$ 917,000
	Contractor and Engineering Fees	$ 420,000
	Total	**$ 1,500,000**

Reach 3: E.C. Row Expressway Culverts & Open Drain at Howard Avenue On-Ramp to E.C. Row Expressway

ITEM NO.	DESCRIPTION	ESTIMATED TOTAL PRICE
3.1	Remove Fence	$ 1,000.00
3.2	Construction Fencing	$ 5,000.00
3.3	Mobilization/Demobilization	$ 30,000.00
3.3	Pump sediment from one cell into GeoTubes of the two remaining cells	
	a) GeoTube Units	$ 110,000.00
	b) Polymer	$ 15,000.00
	c) Labour	$ 100,000.00
	d) Debris Shield	$ 50,000.00
3.4	Headwalls	$ 65,000.00
3.5	Dewater areas	$ 40,000.00
3.6	Remove Sediment from open section	$ 40,000.00
3.7	Disposal of Sediment from open section	$ 25,000.00
3.8	Replace Fence	$ 2,000.00
3.9	Replace Landscaping	$ 3,000.00
	Subtotal	$ 450,000
	Contractor and Engineering Fees	$ 200,000
	Total	**$ 650,000**

Reach 4: E.C. Row Expressway Extending 280m North of the North Service Road

ITEM NO.	DESCRIPTION	ESTIMATED TOTAL PRICE
4.1	Clearing and Grubbing	$ 15,000.00
4.2	Construction Fencing	$ 15,000.00
4.3	Mobilization/Demobilization	$ 40,000.00
4.4	Replace asphalt recreationway	
	a) Supply and place 300mm of Granular 'A' base	$ 15,000.00
	b) Supply and place asphalt	$ 50,000.00
4.5	Excavate, fill and shape drain as indicated	$ 265,000.00
4.6	Remove existing SSP	$ 3,000.00
4.7	Demolish existing bridge	$ 50,000.00
4.8	Retaining Wall - Gabion	$ 45,000.00
4.9	Construct new bridge	$ 250,000.00
4.10	Supply and place rip rap erosion protection as indicated	$ 70,000.00
4.11	Snake Habitat	$ 10,000.00
4.12	Supply and place seed and mulch	$ 7,000.00
	Subtotal	$ 835,000
	Contractor and Engineering Fees	$ 365,000
	Total	**$ 1,200,000**

Reach 5: Byng Road to Turner Road

5.1	Clearing and Grubbing	$	10,000.00
5.2	Traffic Detours	$	30,000.00
5.3	Construction Fencing	$	8,000.00
5.4	Mobilization/Demobilization	$	30,000.00
5.5	Excavate and shape drain as indicated	$	30,000.00
5.6	Demolish Tuner Road Bridge	$	100,000.00
5.7	Construct proposed bridge	$	500,000.00
5.8	Remove existing SSP and gabion upstream of bridge	$	3,000.00
5.9	Modify existing Storm Outlets	$	30,000.00
5.1	Supply and place rip rap erosion protection as indicated	$	40,000.00
5.11	Snake Habitat	$	10,000.00
5.12	Replace asphalt recreationway		
	a) Supply and place 300mm of Granular 'A' base	$	10,000.00
	b) Supply and place asphalt	$	30,000.00
5.13	Supply and place seed and mulch	$	3,000.00
	Subtotal	$	834,000
	Contractor and Engineering Fees	$	365,000
	Total	**$**	**1,200,000**

COST ESTIMATE TOTAL: $ 5,400,000

5.0 Additional Features and Considerations

This section provides discussion on additional features and considerations that were discussed after the Public Drop-In Centre was held. Some of the items are based on comments received from stakeholders and the public.

Central Grand Marais Drain
Additional Features and Considerations

1.0 Impacts and Mitigating Measures

Mobilization of Sediments Downstream:

During construction of the proposed channel improvements, there is potential for sediments, both impacted and non-impacted, to be remobilized or eroded and transported downstream. There are several measures that should be implemented in order to mitigate this potential, namely:

The improvements should be completed in phases, commencing with the downstream segment (Segment 1) and progressing upstream. The culverts under Howard Avenue and the E.C. Row Expressway, which substantially comprise Segment 3, contain the largest amount of sediment. It is recommended that the proposed pond that is in Segment 2 be completed prior to initiating the works in Segment 3, in order to facilitate impoundment of any sediment that may be mobilized. This may require the temporary installation of works within the pond area to enhance sediment removal, the details of which will be developed during final design stages of the project. All impounded sediments should be removed and disposed of properly, upon completion of the works entailed in Segment 3.

Loss of Vegetation along the Channel Banks and Impacts of Fish Habitat:

The existing channel banks within the 5 segments of the drain that require improvement are predominantly overgrown with a mix of herbaceous and woody vegetation. It is probable that this vegetation, particularly the woody vegetation that overhangs the drain, provides habitat to fishes and other aquatic organisms. Completion of the channel improvements will unavoidably require the substantial removal of this riparian vegetation. In order to avoid a permanent loss of fish habitat, it is recommended that an assortment of new fish habitat features be installed at suitable locations throughout the drain. The type of fish habitat features that should be considered are described in section *2.0 Fish Habitat Features*.

Loss of Snake Habitat:

The biological assessment that was completed identified a number of holes and borrows that could be utilized by snakes. The project is location in a region that is known to support two species of snakes that are listed as endangered. Considerable further study and field monitoring would be needed to confirm or disprove its existence within the study area.

In order to avoid further study, it has been assumed that the existing holes and borrows that exist within the study area are being utilized by snakes, and that the proposed improvements have the potential to destroy some of the existing snake habitat. To mitigate the potential for permanent destruction of habitat, we recommended building snake hibernacula along some segments of the proposed grass-lined channel segments – in particular Segments 1, 2 and 4. This intention was

presented at the Public Drop-In Centre, as well as sample design details of constructed snake hibernacula features. These features will be further developed during final design stages with input from the project environmental consultants (BioLogic Inc) and in consultation with the regulatory agencies.

2.0 Fish Habitat Enhancement Features

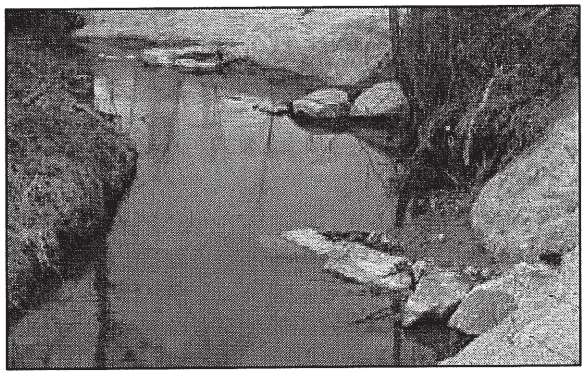
As presented above, substantial removal of trees from the existing drain banks will occur during construction of the proposed channel improvements. In order to mitigate this loss of fish habitat that will result from the substantial removal of existing riparian vegetation, the following fish habitat enhancement features are proposed.

Rock Vanes:

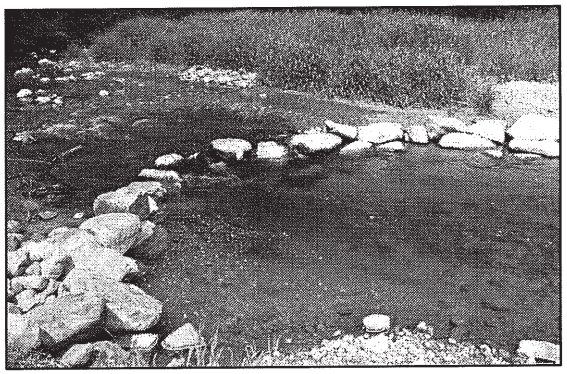
Rock vanes are believed to be an effective component of natural channel design and provide significant in-stream fish habitat. The vanes protect the river banks from erosion by directing the flow toward the center of the channel. The motion of the water flowing over the vanes also serves to create scour pools, adding cover to the channel and oxygen to the water - which ultimately improves the quality of in-stream habitat.

Single vanes typically extend approximately half way across the channel, and are aligned at a 20 to 30 degree angle to the channel bank. The large rocks that comprise the spine of the feature should be placed such that they are touching each other. An underlying layer of rocks defined as footer rocks are typically placed slightly downstream from the top course of rocks. Cross vanes are comprised of three components: two single vanes and a centre structure built perpendicular to the flow.

The two vanes form a 'V' shape and serve to slightly elevate the upstream water level, producing a downstream riffle. The rocks should be placed close together, leaving small voids that allow a small amount of flow to pass through the rocks. Geotextile fabric should also be placed upstream of the rocks, to prevent scouring under the structure.



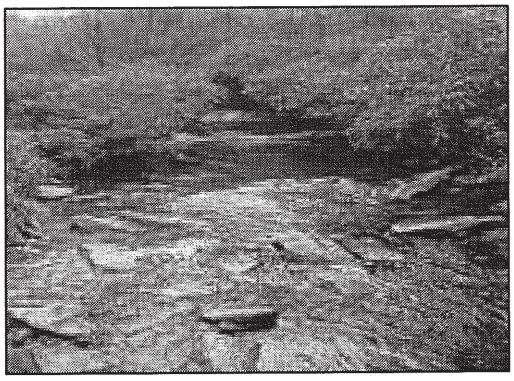
Single Vane



Cross Vane

Rock Clusters:

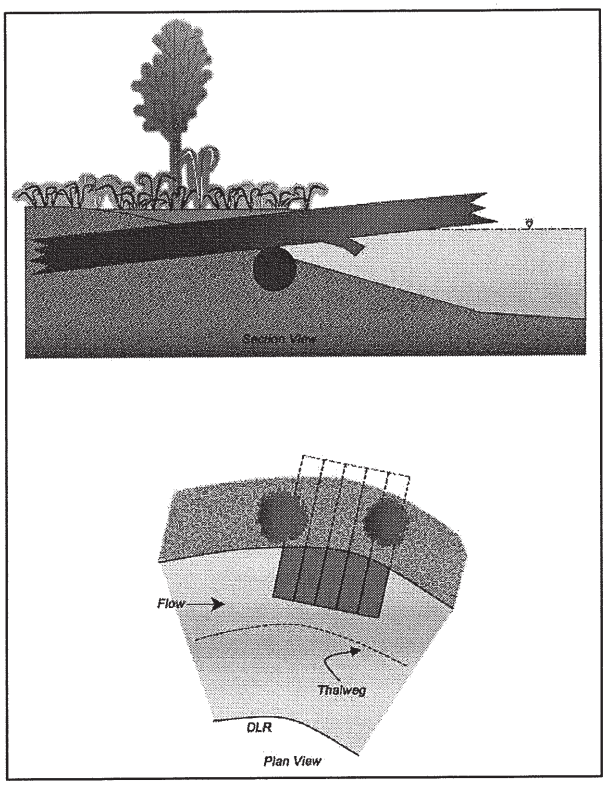
Rock clusters create points of flow convergence along the river. The clusters typically consist of 3-5 rocks (depending on size) and should be located on the inside radius of the channel. The rocks serve to maintain a stable channel form, which reduces erosion and prevents sedimentation. During times of higher flow velocity, they generate scour pockets and create eddies which diffuse light and provide cover for fish.



Rock Cluster

Log Shelter:

Log shelters are typically constructed as partially-buried cantilevered platforms along the water's edge, normally on the outside radius of the stream. These structures provide shade and protection for fish. The shelters are also effective at reducing erosion along the banks.



Log Shelter

Recommendations:

It is beyond the scope of this Class EA to establish the most appropriate locations and/or quantities of each feature. This would be more appropriately determined during detailed design of each segment in consultation with ERCA and the Department of Fisheries and Oceans (DFO).

It is intended that the fish habitat enhancement features would be most appropriately constructed within the channel segments that will be improved. However, there would be merit in installing some of these features within the segments of the Grand Marais channel that have been previously improved, particularly between Segments 4 and 5 and upstream of Segment 5. To this end, we recommend that candidate sites be identified in conjunction with the scoping of maintenance works that the City will be planning in the future. It would seem most practicable to install fish habitat enhancement features within the areas that will experience the greatest loss of existing cover.

3.0 Erosion Control

Various strategies for achieving an acceptable degree of erosion protection along the bottom of the channel were presented during the Drop-In Centre. Subsequently, further consideration has been given to methods of stabilizing the channel bottom, enhancing fish habitat and enhancing base flow, which includes the use of coir logs to promote natural shoreline protection and introducing a low flow channeling. These strategies are further discussed below.

CoirLogs:

Coir Logs are biodegradable, coconut fibre bio-rolls that work in harmony with nature, to protect and support channel banks (and other types of shorelines), while promoting restoration of aquatic environments. The dense rolls protect against scour and retain the bank while vegetation becomes established. They provide an ideal, stable growth substrate for plants and encouraging rapid establishment of plant colonies and healthy root systems. As roots mature to create an effective binding matrix the coir fibre progressively degrades, leaving a vegetation framework for erosion protection. The logs typically last an average of 5 years, depending on the density of the coir material and environmental conditions.

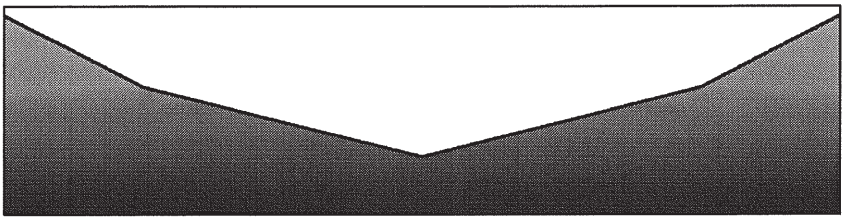
Logs installed along the banks

Logs prior to installation

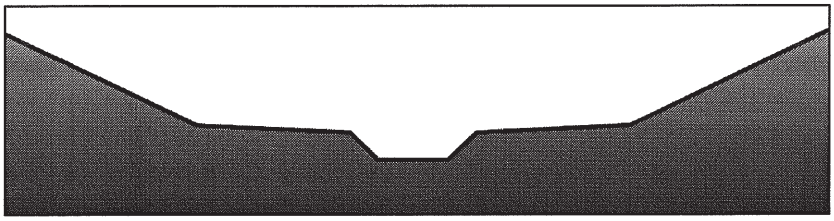
4.0 Channel Cross Section

Until very recently, it was proposed that the proposed channel cross section for Segments 1, 4 and 5 would match the design section that was developed by MacLaren Engineers Inc. for the channel improvements that were implemented between Segments 4 and 5. The channel bottom shape consisted of a 'V' section as illustrated below. As a result of discussions amongst the project team concerning fish habitat and base flow augmentation, consideration is being given to establishing a low flow channel to concentrate base flow to a narrow area, which would theoretically result in deeper water during base flow conditions. This option also presents the opportunity to enhance fish habitat. The low flow channel alternative is illustrated below. A

final decision concerning the preferred channel bottom shape will be made during final design, in consultation with regulatory agencies.



'V' Channel Bottom



Low Flow Channel Bottom