Functional Servicing Report

Mixed-Use Development
540 King Street East
Town of Cobourg

D.M. Wills Project No. 19-10927

D.M. Wills Associates Limited
Partners in Engineering, Planning and
Environmental Services
Peterborough

March 2022

Prepared for:
Sunnyside Village Inc.

WILLS

Summary of Revisions

Revision No.	Revision Title	Date of Release	Summary of Revisions
0	First Submission	March 29, 2022	

This report has been formatted considering the requirements of the Accessibility for Ontarians with Disabilities Act (AODA).

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1.0 Introduction

D.M. Wills Associates Limited (Wills) has been retained by Sunnyside Village Inc. to prepare a Functional Servicing Report (FSR) of the property located at 540 King Street East (Site), in the Town of Cobourg (Town). The FSR has been prepared in support of a rezoning, draft plan of condominium, and draft plan of subdivision application to be submitted by the planning consultant, FOTENN. The FSR provides preliminary servicing discussion and designs for the Site based on the concept plan provided by FOTENN for the application.

1.1 Site Location / Study Area

The Site is legally described as Part of Lot 10, Concession A; Described as Part 1, Plan 39R-374; Designated as PIN 51102-0224. The Site has 193 m of frontage on King Street East (County Road 2) and is bordered by an unopened road allowance to the west, the Canadian Pacific Railway to the north, existing rural residential to the east and future commercial land to the south. The Site location is shown in **Figure 1.**

The Site is a 3.97 hectare agricultural property, which currently includes a single residential dwelling with barns and associated silos, fields and vegetated areas.

The Town's Transportation Master Plan (August 2011) identifies the future construction of a new road and grade separation crossing over the Canadian Pacific / Canadian National (CN/CP) rail corridor within the unopened road allowance on the west of the Site. The proposed concept plan includes space to accommodate the grade separation.

The proposed development is a medium density residential development with 90 total residential units, approximately 1,400 m^2 of commercial space and community areas to create a mixed-use community within the Town. The proposed site includes:

- 7 detached homes, including the existing farm house which is to be preserved
- 4 semi-detached homes
- 55 townhouses
- 24 apartment style units above commercial space in the mixed-use blocks
- Larger barn to be preserved and restored as a commercial community amenity area

The proposed development also includes a private road and laneways that will be owned by the future condominium corporation. The concept plan provided by FOTENN is included in **Appendix A.**

Figure 1 - Site Location

1.2 Sourced Materials

This report relies on information provided from the sources listed below in **Table 1.**

Table 1 - Sourced Material Information

Provider	Date	Reference #	Documentation
FOTENN	2022-02-22	-	Concept Plan
DFP Surveyors	2020-02-14	P2020-001	Legal and Topographic Survey
Town of Cobourg	1989-10	7294	King Street As-Constructed Drawings
Lakeshore Utilities	2020-06-22	-	GIS Water Map Markup
Pinchin Ltd.	2021-08-23	275057	Environmental Impact Study
GHD	2020-05-26	11211226	Geotechnical Investigation
GHD*	2019-04-24	11192099-ODA1	Overall Drainage Plan, King St East Sewer Analysis
Engage*	2019-12-13	10841	Post-Development Storm Drainage Areas, East Village Subdivision – Phase 5

* Drainage figures were obtained from the Town's public website and are for reference purposes only.

2.0 Site Grading

2.1 Existing

The Site has generally level topography with an existing high point that splits the Site and directs approximately 30% of the drainage area east and the rest is directed to the west. The high point has an approximate elevation of 89.50 masl. The west area collects in a low-lying area along the property line, with an approximate low point elevation of 88.20 masl. The low-lying area spills west along the CP/CN rail corridor to a drainage feature through the East Village Subdivision (Phase 5). The drainage feature ultimately outlets to the King Street storm sewer.

Topographic survey and existing drainage figures are included in **Appendix A**.

2.2 Proposed

The proposed development is graded to direct drainage to an internal storm sewer network and stormwater management facilities. Proposed grading includes a safety/noise berm along the west boundary of the Site to meet the requirements of CP and CN rail.

The Site will require imported fill to bring proposed grades up to suitable elevations for gravity sewers and separation from groundwater, the estimated volume of fill is in the order of 20,000 m^3. The grading will match into original ground at the buffer of the low-lying area as recommended in the Environmental Impact Study.

The internal road network will convey overland flow to King Street and the west outlet to provide safe access (maximum 0.3 m of ponding) within the Site.

3.0 Site Servicing

3.1 Sanitary

3.1.1 Existing

There is existing sanitary sewer infrastructure within the King Street East right-of-way (ROW); the infrastructure includes a 250 mm diameter sewer main under the eastbound lane of King Street along the frontage of the Site, and a 375 mm diameter stub at the southwest corner of the Site. The 250 mm sewer services approximately five properties east of Willmott Street. The 375 mm stub is the upstream end of the Willmott Street trunk sewer. The trunk sewer is assumed to be sized for future developments within the Town's settlement area including 540 King Street East and the Cobourg East Community Secondary Plan as shown on Schedule A of the Town's Official Plan.

The existing property has a 150 mm diameter sanitary service that connects to the 250 mm King Street East sewer main that will be removed as part of the development.

King Street As-constructed drawings are included in **Appendix A.**

3.1.2 Proposed

The proposed development will include an internal sanitary sewer network in accordance with the Town's Engineering Design Guidelines (April 2015).

Sanitary mains in the development will be 200 mm diameter and will connect to the trunk sewer at King Street and Willmott Street. Individual services will be 150 mm diameter minimum and connect to the on-site sanitary mains. Proposed design sewage flows for the development are 4.78 L/s.

The proposed servicing is shown in **Appendix B**, sanitary design flows are included in **Appendix C**.

3.2 Storm Water

3.2.1 Existing

There is existing storm sewer infrastructure in the King Street East ROW that is divided by a high point similar to the one that exists on the Site.

Approximately 140 m east of Wilmott Street, a 375 mm diameter storm sewer drains easterly and ultimately outlets from 600 mm diameter storm sewer into a drainage course at the southwest corner of King Street and Normar Road.

Approximately 55 m west of the Site, a 300 mm diameter sewer drains westerly and outlets into the King Street East / Coverdale Avenue trunk storm sewer. There are no existing storm sewer connections for this property.

King Street As-constructed drawings are included in **Appendix A.**

3.2.2 Proposed

The existing storm sewer in the King Street East ROW west of the Site will need to be extended approximately 55 m to the proposed development to provide an outlet for proposed catchment area 101.

A new structure is proposed on the existing storm sewer system to the east of the Site to provide an outlet for proposed catchment area 200.

Storm water from the Site will be controlled to pre-development flows before it outlets to the municipal storm infrastructure.

Refer to the Preliminary Stormwater Management report, prepared by Wills, dated February 2022, for details on the proposed SWM strategy for the development.

The proposed servicing is shown in **Appendix B**.

3.3 Water

3.3.1 Existing Conditions

Municipal water in is available for the proposed development from a 300 mm ductile iron water main in the King Street East ROW. The water main is stubbed in the boulevard on the north side of King Street at the unopened road allowance.

The existing farmhouse on the Site is serviced by a 50 mm polyethylene water service tapped from the 300 mm stub. The 50 mm service will be removed as part of the development.

King Street As-constructed drawings are included in **Appendix A.**

3.3.2 Proposed Conditions

3.3.2.1 Fire Flow

The Fire Underwriters Survey, Water Supply for Public Fire Protection (1999) guideline was referenced to calculate the required fire flows to the proposed development. The preliminary fire flow calculations are provided in **Appendix C – Water Servicing**.

For the purpose of this development, the fire flow requirement is calculated based on the worst-case scenario: largest building massing with the smallest building separations (Stacked Towns Block R).

The calculated worst-case fire flow requirement for the proposed development is 15,000 L/min, rounded off to nearest 1,000 L/min from 14,945L/min (249.09 L/s).

3.3.2.2 Domestic Demand

The domestic water demand has been calculated based on the Ministry of Environment Design Guidelines for Drinking Water Systems (2008) and is summarized in **Table 2**.

Table 2 – Water Demand

Types	No. Units	Maximum Daily Demand (L/s)	Peak Hour Demand (L/s)
Singles and Semi-detached	11	0.67	1.00
Townhouses	55	2.76	4.15
Mixed Use (Apartments)	24	0.73	1.09
Sub-Total	**90**	**4.16**	**6.24**
Mixes Use (Commercial)	N/A	0.09	0.14
Total		**4.25**	**6.38**

The Mixed Use Blocks and the Mixed Use Barn Structure are anticipated to include commercial uses such as; retail, office, meeting spaces, and amenity areas, that make up a small portion of the development. Total floor area for these uses is approximately 1,830 m².

The domestic demand calculations are provided in **Appendix C.**

3.3.3 Proposed Servicing

Watermains will be sized based on the greater of the following flow scenarios:

- Max Day Demand + Fire Flow: 4.25 + 249.09 = 253.34 L/s
- Peak Hour Demand = 6.38 L/s

Max day plus Fire Flow, 253.34 L/s, is the larger of the flow scenarios and will determine the size of watermains for the development.

The proposed 150 mm diameter watermain will be looped on-site to eliminate dead ends where possible. Fire hydrants will be installed at maximum spacing of 150 m, to provide for a maximum fire hose length of 75 m.

Watermain sizing will be modelled with Lakeshore Utilities Services Inc. (LUSI) during detailed design. Detailed design may consider reductions to fire flow requirements by including sprinkler systems, increased fire separations, and / or alternative non-combustible construction methods. Detailed design will also include any requirements for backflow prevention, pressure boosting and water metering, based on the existing watermain capacity and pressures.

The proposed servicing is shown in **Appendix B**.

4.0 Utilities

4.1 Lakefront Utilities Services Inc.

LUSI is the hydro provider for the Town and has confirmed the overhead line (three-phase primary) in the King Street ROW can service the proposed development. Service details will be coordinated with LUSI during detailed design.

4.2 Gas

Enbridge Gas has confirmed natural gas is available in this area. There is an existing 4-inch high pressure main on the south side of the King Street ROW. Sizing and service requirements such as pressure reducing stations will be determined by Enbridge Gas during detailed design.

4.3 Telecommunications

Bell has confirmed underground services are available within the King Street East ROW. The availability of fibre and possible service upgrades will be determined by Bell during detailed design.

5.0 Conclusions

The preceding Functional Servicing Report demonstrates the requirements of site servicing are met in accordance with the municipal and provincial Guidelines.

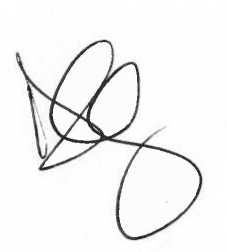
The site can be serviced as follows:

- Storm sewers for the minor storms will convey flows on-site in conjunction with Wills' Preliminary Stormwater Management Design and discharge to municipal infrastructure in the King Street right-of-way.
- Sanitary servicing will be provided through a connection to the 375mm diameter trunk main in Willmott Street.
- Water Servicing will be provided though a connection the 300mm diameter water main stub at King and Willmott Street and will include on-site looping.

If you require any further information, or have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

Mark Spiers, C.Tech.
Municipal Project Manager



Deborah Keay, P.Eng.
Senior Project Engineer

MS/dk/jh

6.0 Statement of Limitations

This report has been prepared by D.M. Wills Associates Limited on behalf of Sunnyside Village Inc. to address the requirements of the Town of Cobourg.

The conclusions and recommendations in this report are based on available background documentation and discussions with applicable agencies at the time of preparation.

The report is intended to determine the feasibility of the proposed development with respect to sanitary and water servicing of the subject lands. The design information provided in this report is preliminary in nature and is not to be used for construction purposes.

Any use that a third party makes of this report other than a functional servicing report for the proposed development is the responsibility of such third parties. D.M. Wills Associates Limited accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or action taken based on using this report for purposes other than a Functional Servicing Report for the property located at 540 King Street East, Cobourg.

Appendix A

Sourced Materials

SITE INFORMATION

SITE AREA	
Total Site Area:	3.97he

PARKING RATES	REQUIRED
Residential (Detached, Semi-detached):	2.0 p/unit
Residential (Townhouses):	1.0 p/unit
Mixed-Use	1.0 p/unit
Retail:	3 p/100m^2 GFA

SETBACKS	F.Y.	C.Y.	S.Y.	R.Y.
Detached	4.5m	2.4m	1.2m	7.5m
Semi-Detached	4.5m	2.4m	1.2m	7.5m
Townhouses	4.5m	2.4m	1.2m	-
Mixed-Use	1.8m	1.8	0m	-

DEVELOPMENT STATISTICS

RESIDENTIAL UNITS	
Detached:	7
Semi-Detached:	4
Townhouses:	55
Mixed-Use:	24
TOTAL:	90

PARKING	Required	Provided
Residential:	87	118
Visitor:	22	33
Commercial:	36	38
Subtotal:	145	190
Mixed Use Barn Structure:		49
Total:		239

OPEN SPACE	
Environmental Restoration Zone	0.255ha
Central Park	0.136ha
Barn Plaza	0.085ha

Sunnyside Village

540 King St, Cobourg

Concept Plan

LEGEND

- PROPERTY BOUNDARY
- ENVIRONMENTAL ZONE AND BUFFER
- FUTURE ROAD ROW WIDENING
- UNOPENED ROAD EMBANKMENT

No.	REVISION	DATE	BY
8	REVISED CONCEPT PLAN	2022.03.29	UMG
7	REVISED CONCEPT PLAN	2022.02.22	UMG
6	REVISED CONCEPT PLAN	2022.02.18	UMG
5	REVISED CONCEPT PLAN	2021.09.08	TK
4	PREFERRED CONCEPT PLAN	2021.06.18	TK
3	CONCEPT PLAN	2021.05.11	TK
2	CONCEPT PLAN	2021.04.23	TK
1	BASE PLAN	2021.04.07	TK

CLIENT

SUNNYSIDE VILLAGE INC.

FOTENN
Planning + Design
174 Spadina Avenue, Suite 304 Toronto, ON
616.789.4530 www.fotenn.com

DESIGNED	TK/UMG
REVIEWED	UM
DATE	2022.03.29

P1

SURVEYOR'S REAL PROPERTY REPORT

PART 1: PLAN OF SURVEY SHOWING TOPOGRAPHIC DETAIL OF

PART OF LOT 10
CONCESSION A
(GEOGRAPHIC TOWNSHIP OF HAMILTON)
TOWN OF COBOURG
COUNTY OF NORTHUMBERLAND

SCALE: 1:500

0m 5 10 25 50 metres

FRED PETRICH, B.Sc., O.L.S., O.L.I.P

METRIC

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE UTM GRID DERIVED BY GNSS OBSERVATIONS AND REFERRED TO UTM ZONE 17 (81° WEST LONGITUDE), NAD83 (CSRS)(2010).

BEARINGS HAVE BEEN ROTATED COUNTERCLOCKWISE ON THE FOLLOWING PLANS TO ACCOUNT FOR CONVERSION TO UTM GRID BEARINGS:
– P1, P2 BY 2° 01' 25"

ELEVATION NOTE

ELEVATIONS ARE GEODETIC, DERIVED BY RTK GPS OBSERVATIONS USING THE TOPNET REAL–TIME NETWORK SERVICE AND REFERRED TO CGVD28–1978 USING THE NRCAN HTv2.0 GEOID SEPARATION MODEL.

TEMPORARY BENCH MARK (TBM)

MAG NAIL IN CURB, AS SHOWN ON PLAN, HAVING AND ELEVATION OF 89.04.

HORIZONTAL COORDINATES

COORDINATES ARE GROUND.

LEGEND

■	DENOTES SURVEY MONUMENT FOUND
-□-	DENOTES SURVEY MONUMENT SET
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
IBø	DENOTES ROUND IRON BAR
WIT	DENOTES WITNESS
M	DENOTES MEASURED
S	DENOTES SET
PWF	DENOTES POST AND WIRE FENCE
CLF	DENOTES CHAIN LINK FENCE
BF	DENOTES BOARD FENCE
RF	DENOTES RAIL FENCE
OU	DENOTES ORIGIN UNKNOWN
PI	DENOTES PLAN 39R–374
P2	DENOTES PLAN 39R–3698
1142	DENOTES K.F LASHLEY LTD.
1056	DENOTES CULHAM, WALLACE & DAVIES LTD.
PED	DENOTES COMMUNICATIONS PEDESTAL
CB	DENOTES CATCHBASIN
GP	DENOTES GUY POLE
GV	DENOTES GAS VALVE
GW	DENOTES GUY WIRE
GM	DENOTES GAS METER
HM	DENOTES HYDRO METER
LS	DENOTES LIGHT STANDARD
UP	DENOTES UTILITY POLE
MH	DENOTES MANHOLE
WV	DENOTES WATER VALVE

PART 2: REPORT SUMMARY

DESCRIPTION: PART OF LOT 10, CONCESSION A; DESCRIBED AS PART 1, PLAN 39R–374; DESIGNATED AS PIN 51102–0224

REGISTERED EASEMENTS: NO EASEMENTS WERE RECORDED ON TITLE AT THE TIME OF THE SURVEY

COMPLIANCE WITH MUNICIPAL ZONING BY–LAWS: NOT CERTIFIED BY THIS REPORT

SIGNIFICANT OBSERVATIONS: NOTE THE POSITION AND TYPE OF FENCES AND BUILDINGS IN THE VICINITY OF THE PROPERTY LIMITS.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 30th DAY OF JANUARY, 2020.

FEBRUARY 14, 2020
DATE

FRED PETRICH B.Sc.
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2014697

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29(3).

SIB(1219)
20.12 (SET)
SIB(1142) 0.18W
N87°16'30"W (M) (N86°55'35"E P1)
36.14 (P1&S)
P.I.N. 51102–0237
62.04 (M) (62.79 P1)
N20°04'10"W (P1&M)
BEGINNING OF CURVE
INT
CANADIAN PACIFIC RAILWAY
P.I.N. 51102–0407
CENTERLINE OF SOUTH RAIL
IB(1219)
20.12
21.08 (M)
21.13 (P1)
PWF ON LINE
17.78 (P1&S)
N87°16'30"E (M)
(N86°55'35"E P1)
A=194.55 (M) (194.15 P1)
C=194.52 (M) (194.13 P1)
IRREGULAR POST & WIRE FENCE
N89°01'15"E (M)
(N91°27'26"W P1)
CENTERLINE OF SOUTH TRACK
POST & WIRE FENCE
R=3565.96 (M)
(3445.13 P1)
SIB(765) PWF 0.60N
IBø(1142)
(18.32 P2) 18.36 (M) (N21°06'25"W P2) N19°06'30"W (M)
PART 2, PLAN 39R–3698
IB(1142) LEANING EAST
(P2&S) 27.56
N17°56'26"W
5.85
0.05E
CONC. WALL
0.05E
N40°02'50"E 7.93 (P2&S)
106.02 (P2&SET)
N20°09'45"W (P2&SET)
POST & WIRE FENCE
RAIL FENCE
LOT 10 CONCESSION A
PART 1, PLAN 39R–3698
P.I.N. 51102–0223
ALLOWANCE BETWEEN LOTS 10 and 11
P.I.N. 51102–0237
ROAD
POST & WIRE FENCE
CHAIN LINK FENCE
N20°04'10"W (P1&M)
235.71 (M) (234.84 P1)
BUSH
MARSH
EDGE OF CULTIVATED FIELD
CULTIVATED FIELD
GRASS
PART 1, PLAN 39R–374
P.I.N. 51102–0224
STEEL CLAD FRAME BARN
BRICK BARN
SILOS
FFE=89.96
FFE=90.32
2 STOREY BRICK #540
DECK
HM
GRAVEL DRIVEWAY
HEDGE
BOARD FENCE
PWF 0.50W
BF 0.30W/0.10N
2.18 (P2&S) N20°14'25"E (P2&S)
SIB(MTO)
51.52 (P2&S)
66.44
42.13
10.40
10.25
10.90
S.W CORNER LOT 10, CON. A
SIB(OU) BENT, HELD BASE
10.06 (SET)
193.18 (M) (193.34 P1)
N69°45'35"E (P1,P2&M)
BELL MARKER PED
BELL MARKER
ASPHALT EDGE
BACK OF CURB
WHITE TRAFFIC LINE
YELLOW TRAFFIC LINE
(KNOWN AS) KING STREET EAST
(THE KING'S HIGHWAY No. 2, COUNTY ROAD No. 2)
(BY PLAN 242 (P–1947–14))
P.I.N. 51102–0529
TBM
MAG NAIL IN CURB
ELEV=89.04

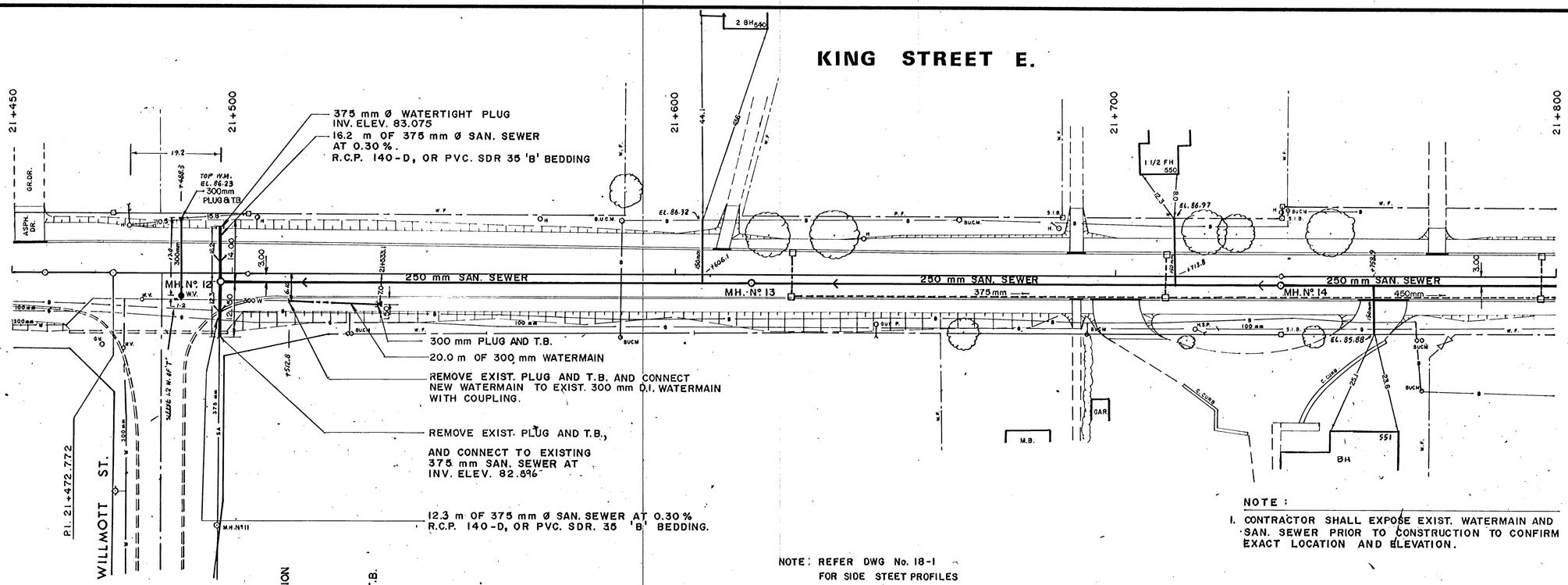
CLIENT: RESTORATION DEPOT INC.

THE WORK AND DRAWINGS HEREIN WERE COMPLETED FOR THE EXCLUSIVE USE OF OUR CLIENT AND NO RESPONSIBILITY IS ASSUMED TO ANY THIRD PARTIES OR SUBSEQUENT OWNERS.

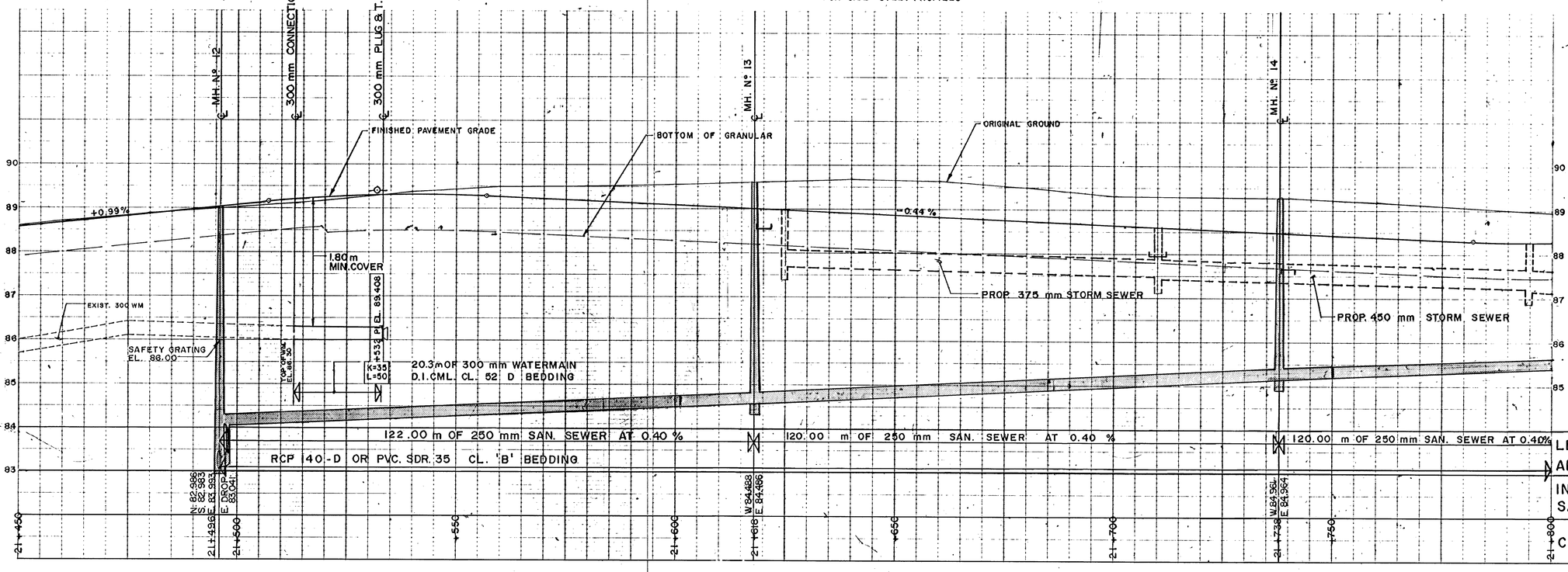
DONEVAN FLEISCHMANN PETRICH LTD.
ONTARIO LAND SURVEYORS
SUITE 1, 1101 BOUNDARY ROAD
PH1: 905–725–4795
PH2: 1–888–743–2222
FAX: 905–725–9957

DRAWN: MDM	CHECKED: AK	SHEET SIZE: A1	JOB No: P2020–001

KING STREET E.



NOTE: REFER DWG No. 18-1
FOR SIDE STEET PROFILES



totten sims hubicki associates

ENGINEERS ARCHITECTS AND PLANNERS

COBOURG WHITBY KINGSTON TORONTO BRACEBRIDGE OTTAWA SIMCOE

No.	DATE	BY	REVISIONS
1	OCT./89		AS CONSTRUCTED DETAILS ADDED

DESIGNED: S. B.
DRAWN: K. D. M.
CHECKED: J. S. R.
APPROVED: R. B. B.
SCALE: 1:500 HOR. 1:50 VERT.

TOWN OF COBOURG

KING STREET EAST – HIGHWAY NO. 2

SANITARY SEWERS AND WATER WORKS

DATE: JAN. 1988
PROJECT: 7294
DRAWING: 17

KING STREET E.

BLVD. WIDTH 2.5 | BLVD. WIDTH 3.0 | BLVD. WIDTH 4.0

+116 | +200 | +220

21+100 | 21+200 | 21+300 | 21+324 | 21+400 | 21+450

FH 459

RIP-RAP, 300mm DEPTH. (4.2 WIDE x 3.0 LENGTH)

CONCRETE HEADWALL PER AND GRATING PER OPSD-804.05 (TYPE 'A')

CONSTRUCT 3.0 WIDE FLAT BOTTOM DITCH, 2:1 SIDE SLOPES. 1220mm x 1920mm H.E.C.P

STRAW-HAY BALE CHECK DAM (REFER DWG 28-1)

WEST CONNECTION TO BE PLUGGED

℄ CONSTRUCTION

1500 mm | 1500 mm | +216.322 | 1500 mm | 300mm

5.00 | 5.00

CBG TYPE 'C'

S/W RAMP

R=10

CBG TERMINATION PER OPSD 608.01 (MOD. TYP)

LIMIT OF CONST. STA. 0+030

NOTE; REFER DWG. No. 13 FOR SIDE STREET PROFILES.

STONE PILLERS

STRAW-HAY BALE CHECK DAM (REFER DWG. 28-1)

730mm x 1150mm H.E.C.P

TREE PROTECTION BARRIERS

FON. GRAINS

BH 461 | BH 463 | BH 465 | BH 15

MAPLEWOOD BLVD.

FITZHUGH LANE

BLVD. WIDTH 7.0 | BLVD. WIDTH 3.0

℄ MAPLEWOOD BLV.

FINISHED PAVEMENT GRADE

ORIGINAL GROUND

BOTTOM OF GRANULAR

+0.42 % | -0.30 % | +0.99 %

1500 mm x 101 C.P. - 0.45 % B-I BEDDING, CL. 50-D

1500 mm x 87 C.P. - 0.45 % B-I BEDDING, CL 50-D

300mm x 100 C.P. - 0.99 %, B-I BEDDING, CL. 3

300mm x 12 C.P. +0.99 % B-I BEDDING, CL. 3

WEST CONNECTION TO BE PLUGGED

ACTUAL BEDROCK

K=35 L=26

K=30 L=38

GRANULAR 'A' AND GRANULAR 'B'

HOT MIX HL1 - 40mm (SURFACE COURSE), HL4 - 40mm (UPPER BINDER), HL4 - 50mm (LOWER BINDER)

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ENGINEERS ARCHITECTS AND PLANNERS

COBOURG WHITBY KINGSTON TORONTO BRACEBRIDGE OTTAWA SIMCOE

No.	DATE	BY	REVISIONS
1	OCT./89	P.C.	AS CONSTRUCTED DETAILS ADDED

DESIGNED: R. P. L.
DRAWN: J. R. M.
CHECKED: R. P. L.
APPROVED: H. D. G.
SCALE: 1:500 HOR. 1:50 VERT.

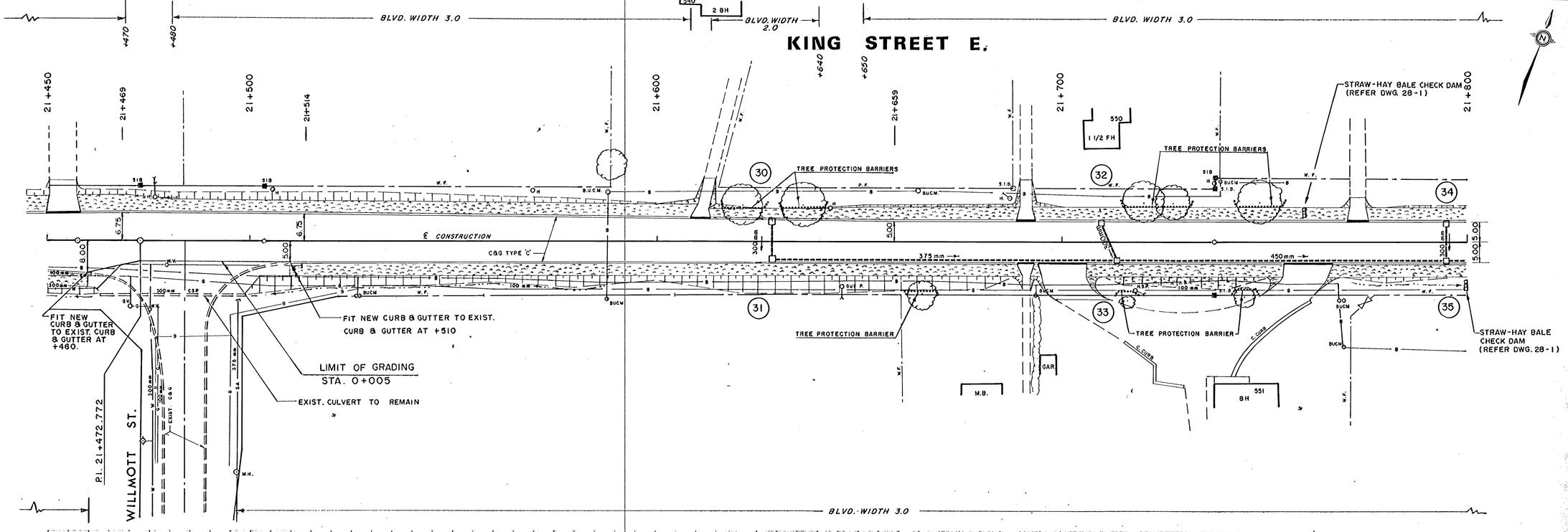
TOWN OF COBOURG

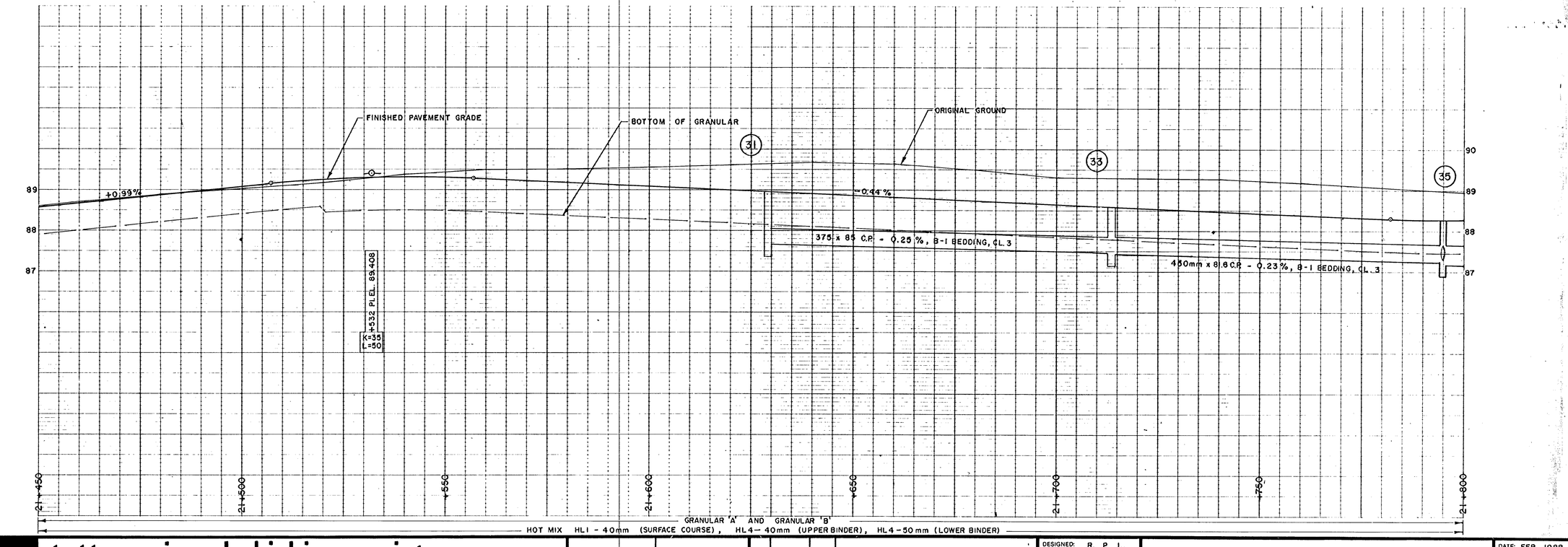
KING STREET EAST - HIGHWAY NO. 2

STREET CONSTRUCTION AND STORM SEWERS

DATE: FEB, 1988
PROJECT: 7294
DRAWING: 8

KING STREET E.





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ENGINEERS ARCHITECTS AND PLANNERS

COBOURG WHITBY KINGSTON TORONTO BRACEBRIDGE OTTAWA SIMCOE

No.	DATE	BY	REVISIONS
1	OCT./89	P.C.	AS CONSTRUCTED DETAILS ADDED

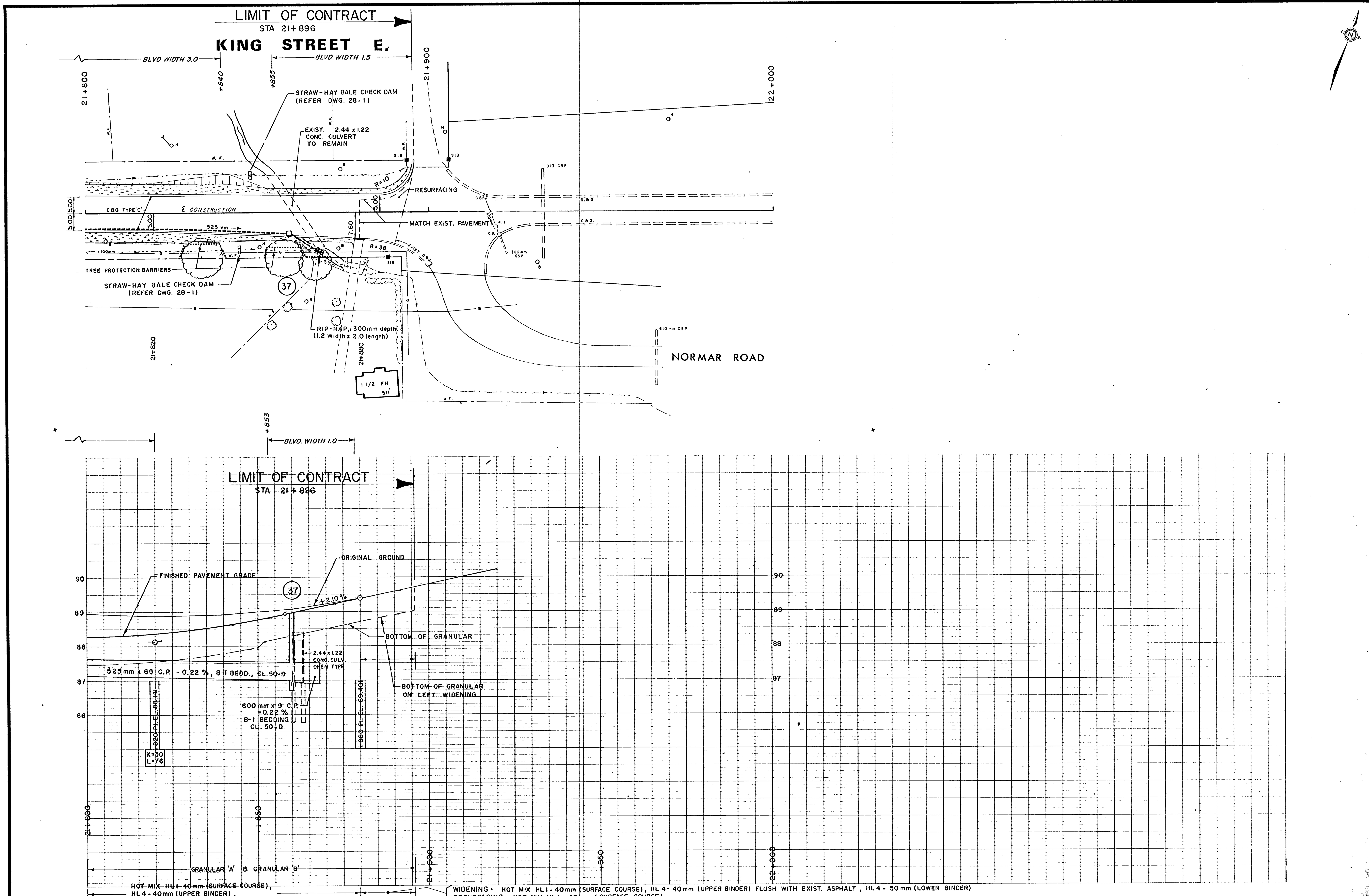
DESIGNED: R. P. L.
DRAWN: J. R. M.
CHECKED: R. P. L.
APPROVED: H. D. G.
SCALE: 1:500 HOR. 1:50 VERT.

TOWN OF COBOURG

KING STREET EAST – HIGHWAY NO. 2

STREET CONSTRUCTION AND STORM SEWERS

DATE: FEB, 1988
PROJECT: 7294
DRAWING: 10


LIMIT OF CONTRACT
STA 21+896
KING STREET E.
BLVD WIDTH 3.0
BLVD. WIDTH 1.5
21+800
+840
+855
21+900
22+000
STRAW-HAY BALE CHECK DAM (REFER DWG. 28-1)
EXIST. 2.44 x 1.22 CONC. CULVERT TO REMAIN
RESURFACING
CBG TYPE 'C'
℄ CONSTRUCTION
MATCH EXIST. PAVEMENT
TREE PROTECTION BARRIERS
STRAW-HAY BALE CHECK DAM (REFER DWG. 28-1)
37
RIP-RAP, 300mm depth (1.2 Width x 2.0 length)
21+820
21+880
1 1/2 FH
NORMAR ROAD
+853
BLVD. WIDTH 1.0
LIMIT OF CONTRACT
STA 21+896
ORIGINAL GROUND
FINISHED PAVEMENT GRADE
+2.10%
BOTTOM OF GRANULAR
2.44 x 1.22 CONC. CULV. OPEN TYPE
525mm x 65 C.P. - 0.22 %, B-1 BEDD., CL.50-D
BOTTOM OF GRANULAR ON LEFT WIDENING
600mm x 9 C.P. -0.22 % B-1 BEDDING CL. 50-D
+820 P.I. EL. 88.14
K=30 L=76
+880 P.I. EL. 89.40
90
89
88
87
86
21+800
+850
21+900
+950
22+000
GRANULAR 'A' & GRANULAR 'B'
HOT MIX HL1 40mm (SURFACE COURSE), HL 4-40mm (UPPER BINDER), HL 4- 50mm (LOWER BINDER)
WIDENING: HOT MIX HL1-40mm (SURFACE COURSE), HL 4- 40mm (UPPER BINDER) FLUSH WITH EXIST. ASPHALT, HL 4- 50mm (LOWER BINDER)
RESURFACING: HOT MIX HL1- 40mm (SURFACE COURSE)

totten sims hubicki associates

ENGINEERS ARCHITECTS AND PLANNERS

COBOURG WHITBY KINGSTON TORONTO BRACEBRIDGE OTTAWA SIMCOE

No.	DATE	BY	REVISIONS
1	OCT./89	P.C.	AS CONSTRUCTED DETAILS ADDED

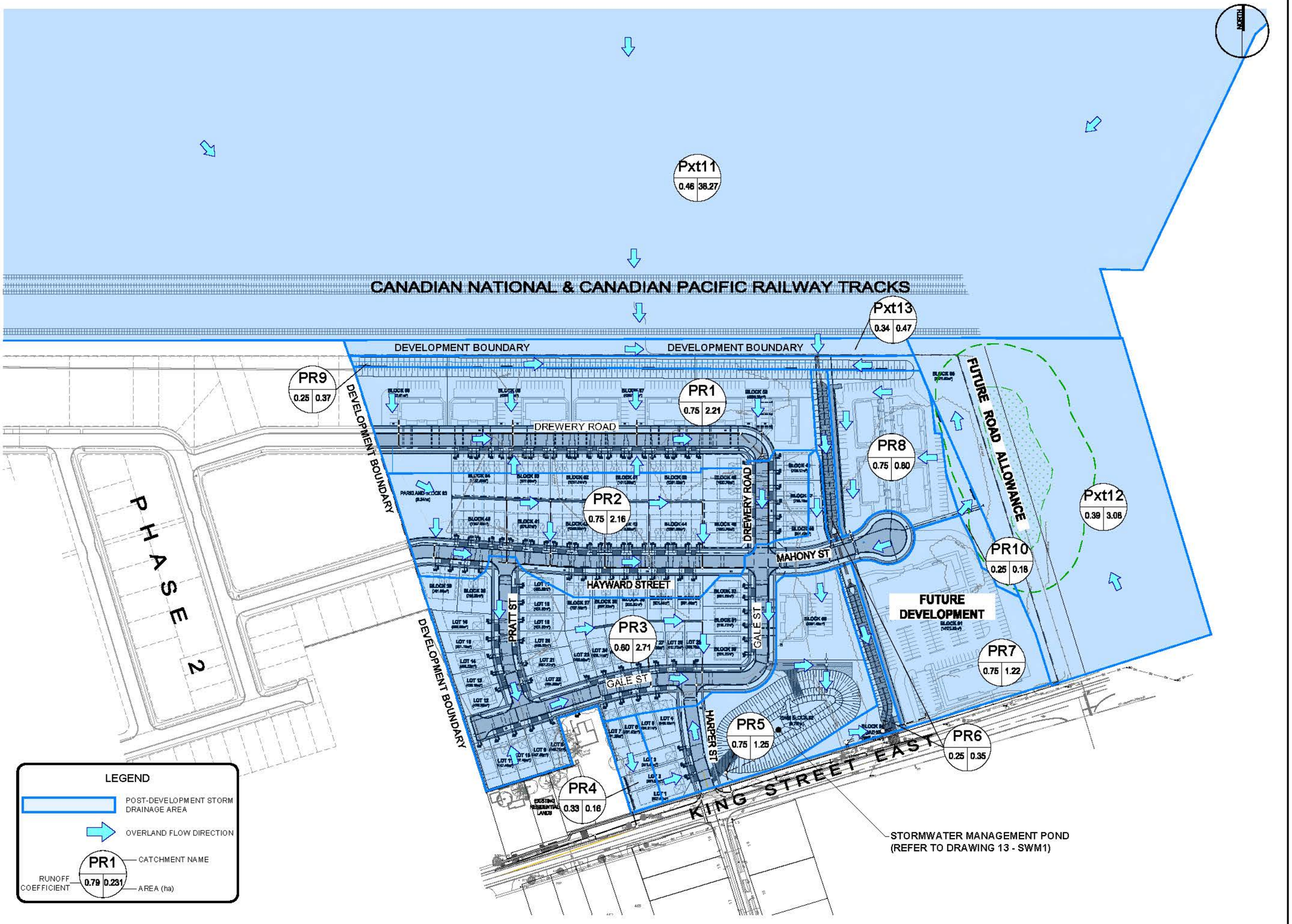
DESIGNED: R. P. L.
DRAWN: J. R. M.
CHECKED: R. P. L.
APPROVED: H. D. G.
SCALE: 1:500 HOR. 1:50 VERT.

TOWN OF COBOURG

KING STREET EAST - HIGHWAY NO. 2

STREET CONSTRUCTION AND STORM SEWERS

DATE: FEB, 1988
PROJECT: 7294
DRAWING: 12



SURVEY

TOPOGRAPHIC SURVEY PROVIDED BY IVAN S. WALLACE LAND SURVEYORS. BOUNDARY INFORMATION IS CERTIFIED AND IS COMPILED FROM PLAN OF SURVEY BY W.R. SNOW O.L.S. DATED SEPTEMBER 24, 1979 AND PLAN 39R-8810.

BENCHMARK

ELEVATIONS ARE GEODETIC AND REFERRED TO TOWN OF COBOURG BENCH MARK 08 AND HAVING A GEODETIC ELEVATION OF:

ELEV: 87.510m

NOTES:

1. ALL CONSTRUCTION AND MATERIALS TO BE IN ACCORDANCE WITH:
   - TOWN OF COBOURG DESIGN STANDARDS
   - ONTARIO PROVINCIAL STANDARD DRAWINGS & SPECIFICATIONS
   - APPLICABLE CONTRACT DOCUMENTS AND ALL SPECIFICATIONS REFERENCED HEREIN.
2. THE CONTRACTOR SHALL CONSTRUCT ALL WORK IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT, HEALTH AND SAFETY REGULATIONS FOR CONSTRUCTION PROJECTS.
3. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL PERMITS OR THIRD PARTY WORKS ASSOCIATED WITH SERVICING CONNECTIONS.
4. THE CONTRACTOR SHALL TAKE EXTREME CARE WHEN WORKING IN PROXIMITY TO EXISTING SERVICES.
5. THE CONTRACTOR SHALL RESTORE OR REPLACE DAMAGED SERVICES TO EXISTING OR BETER CONDITION.
6. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO EXISTING OR BETTER CONDITION, OR PER THE ENGINEERING AND LANDSCAPE SPECIFICATIONS REFERENCED HEREIN.
7. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL, BOOK 7, TEMPORARY CONDITIONS.
8. THE CONTRACTOR SHALL DISPOSE OF ALL WASTE MATERIALS IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT GUIDELINES AND LOCAL MUNICIPAL BYLAWS.

No.	REVISION	BY	DATE
7.	-	-	-
6.	-	-	-
5.	-	-	-
4.	-	-	-
3.	-	-	-
2.	ISSUED FOR 2ND SUBMISSION	JD	2019-12-13
1.	ISSUED FOR 1ST SUBMISSION	JD	2019-07-31

ENGAGE ENGINEERING

EAST VILLAGE SUBDIVISION - PHASE 5

TOWN OF COBOURG

POST-DEVELOPMENT STORM DRAINAGE AREAS

COBOURG, ONTARIO

DRAWN BY: B.SAUNDERS	STAMP:
DESIGNED BY: B.PARSONS	
APPROVED BY: B.PARSONS	
DATE: 2019-09-23	
SCALE: 1:2500	
PROJECT NUMBER: 18041	SHEET NAME: DA2.1
SHEET: 2 of 2	

18041-DA-NOV19

LEGEND:

1.00 ha / 0.45 / 23 — AREA IN HECTARES; RUNOFF COEFFICIENT; MANHOLE NUMBER

OVERLAND FLOW

DRAINAGE AREA BOUNDARY

27 — EXISTING STORM MANHOLE

No.	Revision	Drawn	Job Manager	Project Director	Date

Drawing Revisions

Note: * indicates signatures on original issue of drawing or last revision of drawing

GHD Inc.

N

0 40 80 120 160 200

SCALE 1:4000 AT ORIGINAL SIZE

GHD
65 Sunray Street
Whitby Ontario L1N 8Y3
T 1 905 668 6402 F 1 905 432 7677
E ytomail@ghd.com W www.ghd.com

Client: MASON HOMES

Project: 425 KING STREET EAST TRUNK SEWER ANALYSIS

Title: TRUNK SEWER OVERALL DRAINAGE AREA PLAN

Scale	AS SHOWN	DO NOT SCALE
Drawn	R.B.	
Designer	R.B.	
Drafting Check	K.E.	
Design Check	K.E.	
Approved (Project Director)	K.E.	
Date	APRIL 2019	

This Drawing must not be used for Construction unless signed as Approved

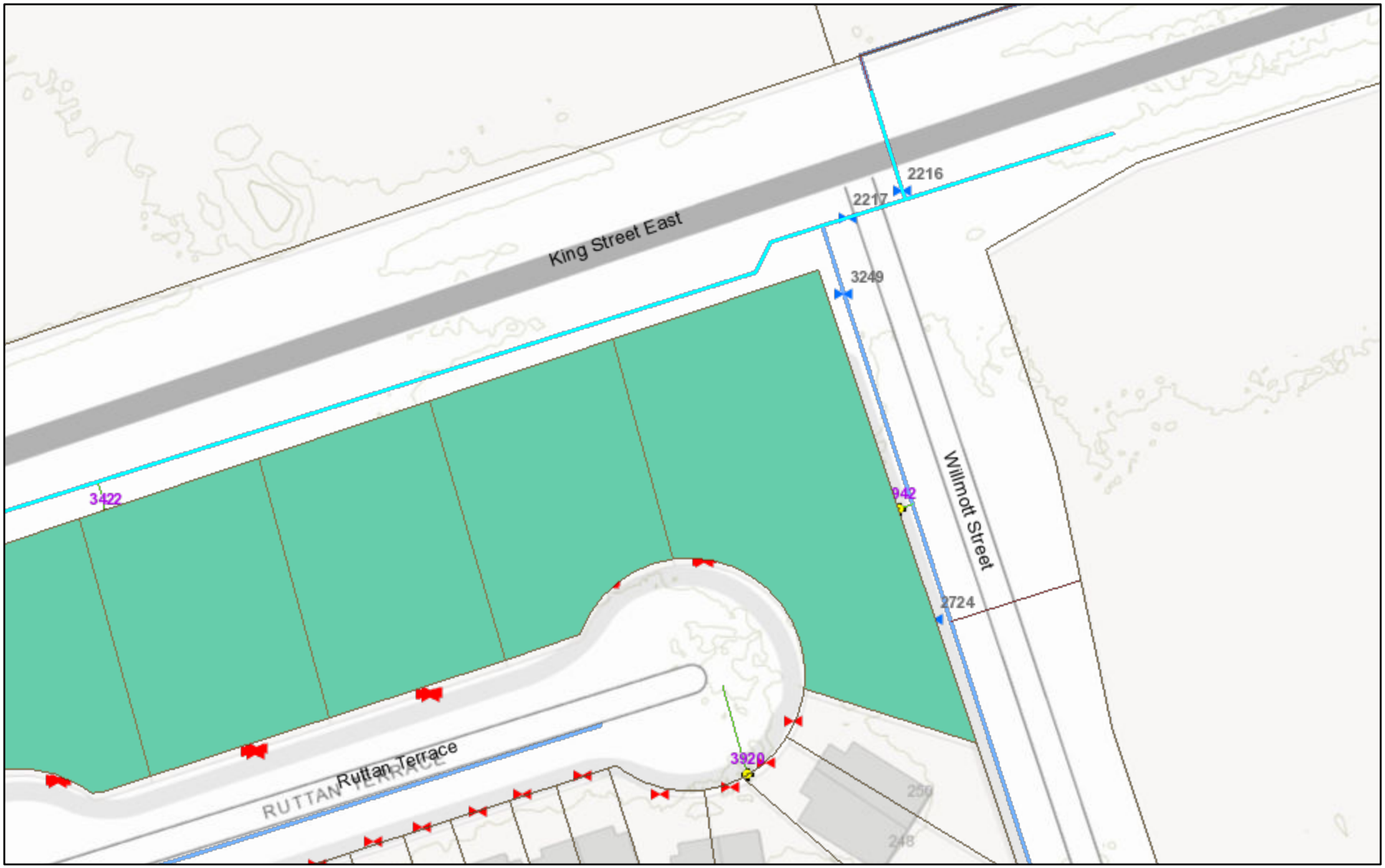
Drawing No. 11192099-ODA1

Original Size Arch D

Rev. A

Plot Date: 18 April 2019 - 2:01 PM Plotted by: Ryan Brackle Cad File No: G:\111\11192099\Technical\Water Resources\Letter\Figures\Figure 3 - Overall Drainage Plan.dwg

ArcGIS Web Map



6/22/2020, 11:58:51 AM

1:1,128

0 0.01 0.01 0.02 mi

0 0.01 0.02 0.04 km

Multiple Roll# Property

Property

Parks

Street Names

Distribution Zones

Water Main

Assumed

Future; On Maintenance; Under Construction

Abandoned; Removed

County

Private

Appendix B

Conceptual Servicing and Grading Plans

SANITARY STRUCTURES

MH ID	TOP OF GRATE	INVERT IN ELEVATION	INVERT OUT ELEVATION
212	89.88	–	85.35
211	89.03	84.81	84.78
210	89.40	85.19	85.16
209	89.47	84.36	84.33
208	89.77	85.29	85.26
206	89.42	84.53	84.50
207	88.17	85.28	85.25
205	89.25	84.13	84.10
204	89.19	84.03	84.00
203	88.90	83.78	83.75
202	89.02	83.35	83.32
201	89.03	83.27	83.24
200	89.94	83.11	83.08

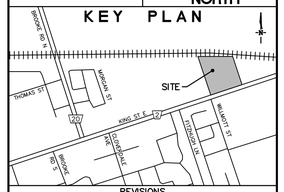
SANITARY SEWERS

UP STREAM MH	DOWN STREAM MH	LENGTH(m)	SLOPE
212	211	27.5	2.0%
211	209	45.0	1.0%
210	209	41.5	2.0%
209	204	62.0	0.5%
208	209	51.5	2.0%
208	206	74.5	1.0%
207	206	38.0	2.0%
206	205	74.0	0.5%
205	204	8.5	1.0%
204	203	45.5	0.5%
203	202	78.5	0.5%
202	201	6.0	1.0%
201	200	31.0	0.5%

TBM – ELEV=89.04
MAG NAIL IN CURB ON SOUTH SIDE OF KING STREET, SET BY DFP SURVEYORS FEB. 2020.

NORTH

KEY PLAN



REVISIONS

No.	Description	Date
1	FUNCTIONAL SERVICING REPORT	03/31/22

METRIC Dimensions are in METRES and/or MILLIMETRES unless otherwise shown

LEGEND TO BE READ IN CONJUNCTION WITH OPSD 100 SERIES

- 1200mm SANITARY MH
- 200mm SANITARY SEWER
- 150mm WATERMAIN
- 300mm STORM SEWER
- 1200mm STORM MH
- 1200mm STORM CBMH
- 600mm CATCH BASIN
- OGS — OIL GRIT SEPARATOR

WILLS
D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
Canada K9J 0B9
P. 705.742.2297
F. 705.748.9944
E. wills@dmwills.com

Project Name/Location

MIXED-USE DEVELOPMENT SUNNYSIDE VILLAGE INC.

540 KING STREET EAST, COBOURG

Drawing Title

CONCEPTUAL SEVICING PLAN

Drawn By: SF	SCALE: Horz. 1:500	Vert. –	
Designed By: MPS	Issue Date: MARCH 28, 2022		
Checked By: MPS	Project No.: 19–10927	Sht. No.:	
Engineer: DK	Dwg File No.: 10927 – MP	400	

NOT FOR CONSTRUCTION

0 5 10 15 20
1:500

CANADIAN NATION / CANADIAN PACIFIC RAIL CORRIDOR

EXISTING BARN FFE 90.00

BLOCK U (STACKED TOWNS) 12 UNITS

BLOCK V (MIXED USE) 8 UNITS

HERITAGE HOUSE FFE 91.60

BLOCK C (TOWNS) 6 UNITS

BLOCK B (TOWNS) 5 UNITS

BLOCK A (TOWNS) 6 UNITS

BLOCK D (TOWNS) 4 UNITS

BLOCK E (TOWNS) 4 UNITS

BLOCK R (STACKED TOWNS) 14 UNITS

BLOCK Q (STACKED TOWNS) 4 UNITS

BLOCK T (MIXED USE) 8 UNITS

BLOCK S (MIXED USE) 8 UNITS

BH1

BH2 (MW)

BH3

BH4

BH5

BH6 (MW)

BH7

BH8

BH9 (MW)

BH10

OGS

MH TC: 88.55 INV: 87.22

CBMH TC: 86.65 INV: 87.00

TBM MAG NAIL IN CURB ELEV=89.04

POLE TO BE RELOCATED

15.0m ENVIRONMENTAL BUFFER REFER TO EIS

AREA FOR GRADE SEPARATION CROSSING

UNOPENED ROAD ALLOWANCE

KING STREET EAST

WILLMOTT STREET

375mm SAN

300mm WATERMAIN

0 5 10 15 20

1:500

TBM – ELEV=89.04
MAG NAIL IN CURB ON SOUTH SIDE OF KING STREET, SET BY DFP SURVEYORS FEB. 2020.

NORTH

KEY PLAN

SITE

REVISIONS

No.	Description	Date
1	FUNCTIONAL SERVICING REPORT	03/31/22

METRIC	Dimensions are in METRES and/or MILLIMETRES unless otherwise shown
LEGEND	TO BE READ IN CONJUNCTION WITH OPSD 100 SERIES

WILLS

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
Canada K9J 0B9

P. 705.742.2297
F. 705.748.9944
E. wills@dmwills.com

Project Name/Location

MIXED-USE DEVELOPMENT SUNNYSIDE VILLAGE INC.

540 KING STREET EAST, COBOURG

Drawing Title

CONCEPTUAL GRADING PLAN

Drawn By: SF	SCALE: Horz. 1:500 Vert. –		
Designed By: MPS	Issue Date: MARCH 28, 2022		
Checked By: MPS	Project No.: 19-10927	Sht. No.:	
Engineer: DK	Dwg File No.: 10927 – MP	500	

NOT FOR CONSTRUCTION

Printed By: mspiers Printed On: March 31, 2022
z:\10900-10999\10927 – king street residential\02 drawings\current drawings\10927 – mp.dwg

Appendix C

Sanitary and Water Design Sheets

SANITARY SEWER DESIGN SHEET

Population Density						
Population Method Used:			Total Units			
Low Density			3.23	pers / unit		
Medium Density			2.68			
High Density			1.62			

Design Criteria		
Min. Velocity	0.60	m/s
Max. Velocity	3.00	m/s
Min. Diameter	200	mm
Max Capacity	80	%

Unit Flow Rates		
Domestic	364	L/cap./d
Industrial	90,000	L/ha./d.
Commercial	28,000	L/ha./d.
Institutional	112,000	L/ha./d.
Infiltration	0.26	L/ha./s.

Peaking Factor		
Dom. (Min/Max)	1.5	3.80
Industrial	2.0	
Commercial	2.5	
Institutional	2.0	

Project Information	
D.M. Wills Project	King St. Residential
D.M. Wills Project No.	10927
Project Location	King St. Hwy 2
Municipality	Cobourg
Design Standards	Town of Cobourg (February 2015)
Designed by	S. Robinson
Checked by	M. Spiers
Date	February 28, 2022
Design/As-built	Design

D.M. Wills Associates Ltd.
150 Jameson Drive
Peterborough, ON · K9J 0B9
Tel: (705) 742-2297
Fax: (705) 741-3568

Street Name	Manholes		Domestic									Industrial		Commercial		Institutional		Design Flow							Pipe Data								Comment
			Area		Type and No. of Units			Population		Peak		Area		Area		Area		Extraneous		Infilt.	Dom.	Ind.	Comm.	Inst.	Total	Type	Length	Grade	Dia.	Capacity	Percent	Velocity		
	From	To	Unit (ha)	Accum (ha)	Low Density	Medium Density	High Density	Unit	Accum.	Harmon (M)	Factor (M)	Unit (ha)	Accum (ha)	Unit (ha)	Accum (ha)	Unit (ha)	Accum (ha)	Unit (l/s)	Accum (l/s)	Q_{INF} (l/s)	Q_{DOM} (l/s)	Q_{IND} (l/s)	Q_{COM} (l/s)	Q_{INT} (l/s)	Q_{TOT} (l/s)		(m)	(%)	(mm)	Q_C (l/s)	Capacity (%)	Full (m/s)	Actual (m/s)	
540 King St East	Site	Stub	3.97	3.97	11	55	24	222	222	4.13	3.80	0.00	0.00	0.18	0.18	0.00	0.00	0.00	0.00	1.08	3.55	0.00	0.15	0.00	4.78	PVC	50.2	0.5	200	23.4	20.4%	0.75		
King St East	Stub	MH12	0.20	4.17	0	0	0	0	222	4.13	3.80	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	1.13	3.55	0.00	0.15	0.00	4.83	PVC	14.0	0.3	375	96.0	5.0%	0.87		
King St East	MH15	MH14	0.20	0.20	3	0	0	10	10	4.42	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.16	0.00	0.00	0.00	0.21	PVC	120.0	0.4	250	37.6	0.6%	0.77		
King St East	MH14	MH13	0.20	0.40	1	0	0	3	13	4.40	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.21	0.00	0.00	0.00	0.31	PVC	120.0	0.4	250	37.6	0.8%	0.77		
King St East	MH13	MH12	0.20	0.60	1	0	0	3	16	4.39	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.26	0.00	0.00	0.00	0.41	PVC	122.0	0.4	250	37.6	1.1%	0.77		
Willmott Street	MH12	D/S MH	0.20	4.97	0	0	0	0	238	4.12	3.80	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	1.34	3.81	0.00	0.15	0.00	5.29	PVC	12.5	0.7	375	146.7	3.6%	1.33		

Input Column
Formulated Column

U/S End of Pipe Run
D/S End of Pipe Run

Exceeds Max Capacity

Flow Calculations

$Q = V \times A$

$V = (^1/_n) \times R^{2/3} \times S^{1/2}$

Manning's n Values	
HDPE	0.010
PVC	0.013
Concrete	0.013
Clay	0.014
Brick	0.015

PROJECT INFORMATION

PROJECT LOCATION:	Town of Cobourg
DM WILLS PROJECT:	King Street Residential
DM WILLS PROJECT No.:	10927
DESIGNED BY:	S.Robinson
CHECKED BY:	M. Spiers
Date:	02/22/22

PRELIMINARY FIRE FLOWS - BLOCK R

CRITERIA USED: Fire Underwriters Survey
Water Supply for Public Fire Protection

CALCULATION 1:

F = 220 x C x √A

F= The required fire flow in litres per minute

C= 1.5 for wood frame construction
1.0 for ordinary construction
0.8 for non-combustible construction
0.6 for fire-resistive construction

A= Total floor area in m (all above ground floors)

A= 2,195.00 m^2

F= 10307.2 L/min

CALCULATION 2:

-25%	Non-Combustible	Rapid Burning	+25%
-15%	Limited Combustible	Free Burning	+15%
0%	**Combustible**		

F= 10307.2 L/min

CALCULATION 3:

Value from CALCULATION 2 can be reduced by up to 50% for sprinklering. No sprinklering is assumed at this time.

F= 0.0 L/min Reduction

CALCULATION 4:

N = + 10%
E = + 5%
S = + 10%
W = + 20%

Increase value from CALCULATION 2 by 45% for exposed structure separations.

F= 4638.23 L/min Increase

FINAL FIRE FLOW:

F= 14945.41 L/min
F= 249.09 L/s

PROJECT INFORMATION

PROJECT LOCATION:	Town of Cobourg
DM WILLS PROJECT:	King Street Residential
DM WILLS PROJECT No.:	10927
DESIGNED BY:	S. Robinson
CHECKED BY:	M. Spiers
Date:	02/22/22

PROPOSED DOMESTIC WATER DEMAND - Single and Semi Detached

CRITERIA USED: Ministry of Environment, Design Guidelines for Drinking Water Systems (2008)

DOMESTIC WATER DEMAND:	450	L/person/day	A
No. OF UNITS:	11	units	C
No. PERSONS/UNIT*:	3.2	persons/unit	D
MAX. DAY FACTOR:**	3.60		E
PEAK HOUR FACTOR:**	5		F

CALCULATIONS:

Total Residential Development fire Flow (flow previously calculated)

FF= 249.09 L/s

Average Day Demand:

F_{AvgD} = A xC x D

F_{AvgD} = 15988.5 L/Day

F_{AvgD} = 0.19 L/s

Maximum Day Demand:

$F_{MaxD} = F_{AvgD}$ x E

F_{MaxD} = 0.67 L/s

Peak Hour Demand:

$F_{PeakH} = F_{AvgD}$ x F

F_{PeakH} = 1.00 L/s

Total Maximum Demand: (Max Day + Fire Flow vs. Peak Hour)

$F_{Total} = F_{MaxD}$ +FF

F_{Total} = 249.76 L/s

Notes:

* Persons per unit assumed to be equivelant to Town of Cobourg Design Guidelines, Section D1.01, Design Flow for new residential

** Max Day and Peak Hour Factors taken from MOE design Guideline, Table 3-3: Peaking factors for Drinking-Water Systems serving fewer than 500 people. Assumed equivelant population of 300 people.

PROJECT INFORMATION	
PROJECT LOCATION:	Town of Cobourg
DM WILLS PROJECT:	King Street Residential
DM WILLS PROJECT No.:	10927
DESIGNED BY:	S. Robinson
CHECKED BY:	M. Spiers
Date:	02/22/22

PROPOSED DOMESTIC WATER DEMAND - Townhouses

CRITERIA USED: Ministry of Environment, Design Guidelines for Drinking Water Systems (2008)

DOMESTIC WATER DEMAND:	450	L/person/day	A
No. OF UNITS:	55	units	C
No. PERSONS/UNIT*:	2.68	persons/unit	D
MAX. DAY FACTOR:**	3.6		E
PEAK HOUR FACTOR:**	5.4		F

CALCULATIONS:

Total Residential Development fire Flow (flow previously calculated)

FF= 249.09 L/s

Average Day Demand:

F_{AvgD} = A xC x D

F_{AvgD} = 66330.0 L/Day

F_{AvgD} = 0.77 L/s

Maximum Day Demand:

$F_{MaxD} = F_{AvgD} \times E$

F_{MaxD} = 2.76 L/s

Peak Hour Demand:

$F_{PeakH} = F_{AvgD} \times F$

F_{PeakH} = 4.15 L/s

Total Maximum Demand: (Max Day + Fire Flow vs. Peak Hour)

$F_{Total} = F_{MaxD} + FF$

F_{Total} = 251.85 L/s

Notes:

* Persons per unit assumed to be equivelant to Town of Cobourg Design Guidelines, Section D1.01, Design Flow for new residential

** Max Day and Peak Hour Factors taken from MOE design Guideline, Table 3-3: Peaking factors for Drinking-Water Systems serving fewer than 500 people. Assumed equivelant population of 300 people.

PROJECT INFORMATION

PROJECT LOCATION:	Town of Cobourg
DM WILLS PROJECT:	King Street Residential
DM WILLS PROJECT No.:	10927
DESIGNED BY:	S.Robinson
CHECKED BY:	M. Spiers
Date:	02/22/22

PROPOSED DOMESTIC WATER DEMAND - Mixed Use (Apartments)

CRITERIA USED: Ministry of Environment, Design Guidelines for Drinking Water Systems (2008)

DOMESTIC WATER DEMAND:	450	L/person/day	A
No. OF UNITS:	24	units	C
No. PERSONS/UNIT*:	1.62	persons/unit	D
MAX. DAY FACTOR:**	3.6		E
PEAK HOUR FACTOR:**	5.4		F

CALCULATIONS:

Total Residential Development fire Flow (flow previously calculated)

FF= 249.09 L/s

Average Day Demand:

F_{AvgD} = A xC x D

F_{AvgD} = 17496.0 L/Day

F_{AvgD} = 0.20 L/s

Maximum Day Demand:

$F_{MaxD} = F_{AvgD} \times E$

F_{MaxD} = 0.73 L/s

Peak Hour Demand:

$F_{PeakH} = F_{AvgD} \times F$

F_{PeakH} = 1.09 L/s

Total Maximum Demand: (Max Day + Fire Flow vs. Peak Hour)

$F_{Total} = F_{MaxD} + FF$

F_{Total} = 249.82 L/s

Notes:

* Persons per unit assumed to be equivelant to Town of Cobourg Design Guidelines, Section D1.01, Design Flow for new residential

** Max Day and Peak Hour Factors taken from MOE design Guideline, Table 3-3: Peaking factors for Drinking-Water Systems serving fewer than 500 people. Assumed equivelant population of 300 people.

PROJECT INFORMATION			
PROJECT LOCATION:	Town of Cobourg		
DM WILLS PROJECT:	King Street Residential		
DM WILLS PROJECT No.:	10927		
DESIGNED BY:	S. Robinson		
CHECKED BY:	M. Spiers	**Date:**	02/22/22

PROPOSED DOMESTIC WATER DEMAND - Commercial

CRITERIA USED: Ministry of Environment, Design Guidelines for Drinking Water Systems (2008)

DOMESTIC WATER DEMAND*:	28	m³/hectare/day	A
AREA:	0.183		B
MAX. DAY FACTOR:**	1.5		C
PEAK HOUR FACTOR:**	2.4		D

CALCULATIONS:

Total Residential Development fire Flow (flow previously calculated)

FF= 249.09 L/s

Average Day Demand:

F_{AvgD} = A xB

F_{AvgD} = 5.12 m³/day

F_{AvgD} = 5124.00 L/Day

F_{AvgD} = 0.06 L/s

Maximum Day Demand:

$F_{MaxD} = F_{AvgD} \times E$

F_{MaxD} = 0.09 L/s

Peak Hour Demand:

$F_{PeakH} = F_{AvgD} \times F$

F_{PeakH} = 0.14 L/s

Total Maximum Demand: (Max Day + Fire Flow vs. Peak Hour)

$F_{Total} = F_{MaxD} + FF$

F_{Total} = 249.18 L/s

Notes:

* Allowance for commercial areas from section 3.4.3 of Design Guideline

**Max day factor of 1.5 assumed as per 3.4.3 of Deisgn Guidline to cover variations.

** Peak hour demand assumes 10 hours of operation per day.