

MEMO

DATE	February 14, 2020	PROJECT NO.	183-4877
RE	Harbour Street Hydro Improvements – Feasibility Assessment		

TO	John Velick	Manager, Engineering Services	Town of Collingwood
FROM	Kevin Morris	Founding Partner	C.F. Crozier & Associates
CC	Trevor Harvey	Project Coordinator	Town of Collingwood
	Stuart West	Engineering Services	Town of Collingwood
	Brandon MacDonald	Engineering Technologist	EPCOR
	Ted Burrell	Manager, Hydro Operations	EPCOR
	Jenn Mondell	Land Development Planner	Reid's Heritage Homes
	Kashif Saeed	Director, Mid-Rise	Reid's Heritage Homes

1.0 INTRODUCTION

C.F. Crozier & Associates (Crozier) has been retained by Reid's Heritage Homes to provide engineering services in support of the Site Plan application for the Royal Windsor at Balmoral Village (Block 2) in the Town of Collingwood. As a part of these services, Crozier is to conduct a feasibility assessment of the proposed hydro improvements on Harbour Street required to service Block 2. The following memorandum will assess the feasibility of extending the existing 44kV hydro system on Highway 26 via an overhead and underground corridor based on the information available and provide recommendations on the preferred solution.

2.0 BACKGROUND

Balmoral Village is a mixed-used adult lifestyle condominium development situated on a 9.5-hectare property and is located south of Harbour Street, northeast of the Georgian Trail, and northwest of Black Ash Creek. The Cranberry Golf Course operations yard is located west of the site and Highway 26 is located east of the site. Balmoral was previously used as a golf driving range, and the legal description of the property is Part Lot 45, Concession 10, former Town of Nottawasaga, now in the Town of Collingwood.

In April 2015, the Subdivision Agreement for Balmoral Village was executed. The utility designs for Balmoral Village were based on the expected number of units for each block. Refer to Table 1.

Table 1: Balmoral Village - Total Units Per Block (2015)

Block	Area (ha)	Land Use
1	4.27	46 Semi-Detached Bungalows 50 Townhouse Bungalows
2	0.86	109 Condominium Units
3	0.47	2,800 sq. m. of Commercial Space
4	1.82	127 Retirement Home Units 44 Senior Apartment Units 1,120 sq. m. Recreation Centre

Following the execution of the Subdivision Agreement in 2015, Site Plan Agreements were executed for Block 1 and Block 4 in 2016. The existing local 4kV hydro network was installed to service these two blocks and accounted for the expected electrical loading for the ultimate build-out of the subdivision. Refer to the Electrical Loading Summary (CFCA, 2015) enclosed.

The original electrical design was based on each block having the following loading on the primary loop feeder:

- Block 1 – 500kVA
- Block 2 – 300kVA
- Block 3 – 300kVA
- Block 4 – 300kVA

The overall Balmoral Village Subdivision subsequently received approvals for additional units, including an Official Plan Amendment in 2019 to raise the total allowable number of residential units within the subdivision from 300 to 314. The most recent breakdown is shown in Table 2.

Table 2: Balmoral Village - Total Units Per Block (2019)

Block	Area (ha)	Land Use
1	4.27	46 Semi-Detached Bungalows (Existing) 50 Townhouse Bungalows (Existing)
2	0.86	132 Condominium Units (Proposed)
3	0.47	1,858 sq. m. Commercial (Proposed) 35 Residential Units (Proposed)
4	1.82	127 Retirement Home Units (Existing) 49 Senior Apartment Units (Existing) 743 sq. m. Clubhouse (Existing)

Our office updated the loading calculations based on the most recent unit counts within Balmoral Village and calculations from the Electrical and Mechanical Engineer for the Royal Windsor. Block 2 had increased by 321kW from the initial calculations completed based on the proposed building footprints. Refer to the enclosed email from DEI. The 300kVA transformer that was originally accounted for in the electrical design for Balmoral Village is no longer sufficient for Block 2.

Block 2 will now require a minimum 750kVA transformer. Per EPCOR's conditions of service, the maximum transformer size that can be connected to a 4kV network is 500kVA. In addition, the total loading on the primary loop feeder would be equal to 1850kVA (Block 1 = 500kVA, Block 2 = 750kVA, Block 3 = 300kVA, Block 4 = 300kVA). The maximum kVA per loop feeder on the 4kV network is 1500kVA; therefore, external hydro improvements are required to service Block 2.

A pre-consultation meeting with the Town and EPCOR was held on November 6, 2019, and it was agreed that the existing 44kV hydro system on Highway 26 could be extended west on Harbour Street to service Block 2. The Town requested that a Feasibility Assessment be completed to determine the most practical method to extend this high voltage system (overhead vs underground).

Regardless of which option is deemed the most practical at the conclusion of this memo, the condominium boards and residents in the area will be notified of the proposed improvements, as requested by the Town.

3.0 PROBLEM STATEMENT

In order to provide hydro to the proposed development of Block 2 the existing 44kV hydro system on Highway 26 must be extended along Harbour Street.

4.0 DESIGN CONSIDERATIONS

4.1 Existing Underground Infrastructure

The existing underground utility corridor on the north side of Harbour Street is approximately 3m wide and includes buried hydro, Bell/Fibre, Rogers, private irrigation and possibly other utilities. The exact alignment and depth of the existing utilities may vary along Harbour Street, which adds complexity to the design and installation.

The south side of Harbour Street has not been considered as part of this Feasibility Assessment due to the presence of underground utilities including gas, 3.0 m concrete sidewalk, and potential impacts to existing Municipal drainage system.

4.2 Existing Surface Infrastructure

The boulevard on the north side of Harbour Street is approximately 7m wide and features existing fire hydrants, light poles, Bell/Rogers boxes, and a hydro vault. There are also five (5) entrances to private property and one intersection along the proposed alignment for the 44kV hydro service.

Our office completed a site walk with the Town and EPCOR on January 13, 2020 to review possible corridors for the 44kV hydro service. The Town confirmed that there were plans to urbanize Harbour Street in the future, which included installation of cobra head luminaires to improve the lighting within the Municipal Right-of-Way (ROW).

4.3 Grading and Alignment

The grading within the north boulevard along Harbour Street varies between Dawson Drive and Highway 26. Portions of the boulevard are relatively flat, but other sections feature shallow ditches with significant steep back slopes.

4.4 Existing Tree Line

There is an existing tree line along Harbour Street, which encroaches into the Municipal ROW on the north side of Harbour Street. The tree line will conflict with the proposed hydro improvements in some sections during initial installation and possible maintenance of the system once the project is complete. Any excavation within the boulevard to install an underground hydro system will impact the root structure of the existing trees. An overhead hydro system would need to provide clearance from the trees by trimming the branches or increasing the height of the poles above the trees.

Efforts will be made to maintain the existing trees wherever possible.

4.5 Ease of Future Maintenance

The proposed hydro improvements on Harbour Street will be owned and maintained by EPCOR post completion. During the pre-consultation meeting on November 6, 2019 it was determined that the proposed 44kV system should be designed to account for access for future maintenance.

4.6 Project Cost

The costs for the project would be shared between the parties that benefit from the proposed improvements. At the time this memorandum is being prepared, the sole beneficiary of the improvements is the Developer of Block 2. However, should the loading demand for Block 3 exceed the capabilities of the 4kV system within Balmoral Village they may also benefit from the proposed improvements and would share the costs.

During the site walk on January 13th, the Town indicated that they may wish to extend the 44kV hydro system along Harbour Street in the future. The proposed improvements may reduce the scope of work required for future expansion/development of lands west of Highway 26. The Developer would request consideration for any potential cost recovery that results from the future expansion.

5.0 SOLUTION OPTIONS

After reviewing the above design considerations, and in consultation with the Town/EPCOR, we have identified three (3) design alternatives to provide hydro servicing to Block 2. These options are listed below.

1. Underground Hydro Service;
2. Overhead Hydro Service With 45' Poles; and
3. Overhead Hydro Service with 70' Poles.

The three (3) options are summarized in the following sections:

5.1 Underground Hydro Service

Based on the available information, we know that the boulevard on the north side of Harbour Street has existing underground utilities including hydro, Bell, Rogers, public watermain, and private irrigation systems. The utilities can be located to find their approximate location; however, the depth may vary throughout the corridor.

In some sections along Harbour Street there is also a roadside ditch along the north side of the road, which increases the constraints for a possible corridor to install an additional underground utility. The constructability of an underground hydro service is also an issue due to the existing tree line. If a Contractor was to dig a trench for the installation, it would likely require the removal of the majority of trees within the ROW. The trees could possibly be retained if the hydro service was directionally drilled; however, EPCOR has advised that the proposed high voltage system would require trenching to install.

In terms of cost, the underground hydro service is the most expensive option to install. However, it is expected that there will be minimal maintenance costs associated with this option since the duct banks would be protected from most inclement weather events. During weather events or seasonally, where the water table is higher than normal, the ducts could be exposed/submerged in water, which over time could cause damage. Maintenance is more difficult to perform for this installation as the duct bank would be required to be excavated in order for repairs to be completed.

5.2 Overhead Hydro Service with 45' Poles

The existing utilities would need to be exposed with a vacuum truck in order to avoid conflicts with the hydro pole locations. There is flexibility in the placement of the poles, which can be field fit during construction. After completing a site walk with the Town and EPCOR on January 13, 2020 all parties were confident that a corridor would be available, subject to detailed design. If hydro poles were installed, the Town has indicated that they would request cobra head luminaires be installed to replace the existing light poles on Harbour Street. Refer to the enclosed email from the Town dated January 14, 2020. If the cobra head luminaires are incorporated into the upgrades on Harbour Street there may be cost sharing opportunities between the Town and Owners of Block 2.

The hydro poles can be installed on either the flat or steep grades along Harbour Street. The Town indicated that the preferred siting of the hydro poles would be as close to the limits of the Municipal ROW as possible. Due to the height of the poles, the overhead hydro service would conflict with many of the existing trees within the ROW and would mean a majority would have to be removed or trimmed to accommodate the hydro service and provide access for maintenance in the future.

This option would be the least expensive method of providing the hydro service to Block 2. However, the hydro poles and associated conductors would be exposed to high winds, ice accumulation and are more likely to be damaged during a storm with high intensity winds. Vehicles can also cause damage if an accident occurs causing a vehicle to hit the hydro poles.

Maintenance is easier to perform for this installation as the hydro poles and associated conductors are easily accessible.

5.3 Overhead Hydro Service with 70' Poles

An overhead hydro service with 70' poles addresses all the same design considerations as the hydro service with 45' poles. The difference between the two is that with the taller poles it would be possible to retain more trees within the Municipal ROW, subject to detailed design. However, the cost to install the hydro poles would increase.

6.0 EVALUATION OF OPTIONS

Based on the summaries in the previous section, the three (3) options for hydro servicing have been evaluated on whether or not they address the design considerations for the project.

Table 3: Evaluation of Options

Design Consideration	Option 1 – Underground Hydro Service	Option 2 – Overhead Hydro Service with 45' Poles	Option 3 – Overhead Hydro Service with 70' Poles
Existing Underground Infrastructure			
Existing Surface Infrastructure			
Grading & Alignment			
Existing Tree Line			
Ease of Future Maintenance			



Generally Not a Restriction



Can be Overcome with Careful Design



May Preclude use of Proposed Solution

7.0 PREFERRED SOLUTION

The overhead hydro service with 70' poles addresses all the design considerations for the project. Although the cost to install the poles is higher due to the increased height, it reduces the amount of work that must be done to provide a corridor for the overhead hydro service and makes it easier to maintain in the future by EPCOR. The preliminary corridor and Modified Harbour Street Cross-Sections have been prepared for the proposed 44kV Hydro Service and enclosed with this memo.

Should you have any questions regarding this memo, please do not hesitate to contact the undersigned. We would be happy to meet to review this memo in more detail to discuss the next steps for implementing the recommended option. The Developer would also appreciate the opportunity to discuss any potential cost sharing and/or cost recovery scenarios for this high voltage extension and streetlight replacement project. Thank you.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.



Kevin Morris, P. Eng.
Founding Partner
KM/gc

Encl.

Opinion of Probable Cost
Proposed 44kV Hydro System Corridor (DWG 101A)
Email correspondence with Town dated January 14, 2020
Email correspondence with DEI dated October 17, 2019

J:\100\183 - Landex Projects\4877-Balmoral Blk 2 Apts Civil\Memos\External Hydro Improvements\2020.02.14 Feasibility Assessment Memo - Comments.docx



Project No.: 362-4438
 Date: 14-Feb-20
 Completed by: AN
 Checked by: GC

Balmoral Village - Block 2 - Royal Windsor
Preliminary Opinion of Probable Costs - 44kV Utility Servicing (Underground)

NOTES:

- 1) Estimate of costs for servicing is subject to change based on comments from approval agencies.
- 2) Construction Estimates are based on 2019 tender prices in South Georgian Bay.
- 3) Quantities subject to change based on final approved hydro design.
- 4) It is assumed that removal of rock is not required and that native material is suitable or backfill.
- 5) Costs associated with EPCOR Utilities Inc. to complete field reviews, inspections and final connections is not included.

ITEM	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	TOTAL
SCHEDULE A - UTILITY WORKS					
External Improvements					
A1	Supply and Install 44kV primary loop feeder cables (underground installation) c/w restoration	340	m	\$ 700.00	\$ 238,000.00
A2	Road crossing c/w restoration (assume directional drilling installation; open cut will not be supported by the Town)	2	ea	\$ 15,000.00	\$ 30,000.00
A3	Supply and Install 70' in-span hydro pole c/w framing, grounding and overhead conductors complete with additional guying and framing for the 44kV extension.	1	LS	\$ 22,500.00	\$ 22,500.00
A4	Supply and Install Flush Mount Underground Pulling Vault	2	ea	\$ 5,000.00	\$ 10,000.00
A5	Supply and Install dead-end hydro pole c/w framing, grounding, overhead conductors and gang operated load break switch with fuse cluster	1	ea	\$ 90,000.00	\$ 90,000.00
Internal Improvements					
A6	Supply and Install primary meter unit c/w base and associated grounding	1	ea	\$ 10,000.00	\$ 10,000.00
A7	Supply and Install 750kVA/1MVA customer owned sub-station c/w base and associated grounding	1	ea	\$ 70,000.00	\$ 70,000.00
				Subtotal	\$ 470,500.00

SUMMARY OF OPC PRICES

SCHEDULE A - UTILITY WORKS	\$ 470,500.00
Contingency (15%)	\$ 70,575.00
Total	\$ 541,075.00



Project No.: 362-4438
 Date: 14-Feb-20
 Completed by: AN
 Checked by: GC

Balmoral Village - Block 2 - Royal Windsor
Preliminary Opinion of Probable Costs - 44kV Utility Servicing (45' Overhead System)

NOTES:

- 1) Estimate of costs for servicing is subject to change based on comments from approval agencies.
- 2) Construction Estimates are based on 2019 tender prices in South Georgian Bay.
- 3) Quantities subject to change based on final approved hydro design.
- 4) Costs associated with EPCOR Utilities Inc. to complete field reviews, inspections and final connections is not included.

ITEM	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	TOTAL
SCHEDULE A - UTILITY WORKS					
External Improvements					
A1	Supply and Install 45' hydro pole c/w framing, grounding and overhead conductors	7	ea	\$ 15,000.00	\$ 105,000.00
A2	Supply and Install 44kV primary loop feeder cables	1	LS	\$ 10,000.00	\$ 10,000.00
A3	Additional guying and framing for 44kV extension	1	LS	\$ 10,000.00	\$ 10,000.00
Internal Improvements					
A4	Supply and Install dead-end hydro pole c/w framing, grounding, overhead conductors and gang operated load break switch with fuse cluster	1	ea	\$ 90,000.00	\$ 90,000.00
A5	Supply and Install primary meter unit c/w base and associated grounding	1	ea	\$ 10,000.00	\$ 10,000.00
A6	Supply and Install 750kVA/1MVA customer owned sub-station c/w base and associated grounding	1	ea	\$ 70,000.00	\$ 70,000.00
				Subtotal	\$ 295,000.00

SUMMARY OF OPC PRICES

SCHEDULE A - UTILITY WORKS	\$ 295,000.00
Contingency (15%)	\$ 44,250.00
Total	\$ 339,250.00



Project No.: 362-4438
 Date: 14-Feb-20
 Completed by: AN
 Checked by: GC

Balmoral Village - Block 2 - Royal Windsor
Preliminary Opinion of Probable Costs - 44kV Utility Servicing (70' Overhead System)

NOTES:

- 1) Estimate of costs for servicing is subject to change based on comments from approval agencies.
- 2) Construction Estimates are based on 2019 tender prices in South Georgian Bay.
- 3) Quantities subject to change based on final approved hydro design.
- 4) Costs associated with EPCOR Utilities Inc. to complete field reviews, inspections and final connections is not included.

ITEM	DESCRIPTION	CONTRACT QUANTITY	UNIT	UNIT PRICE	TOTAL
SCHEDULE A - UTILITY WORKS					
External Improvements					
A1	Supply and Install 70' hydro pole c/w framing, grounding and overhead conductors	7	ea	\$ 17,500.00	\$ 122,500.00
A2	Supply and Install 44kV primary loop feeder cables	1	LS	\$ 10,000.00	\$ 10,000.00
A3	Additional guying and framing for 44kV extension	1	LS	\$ 10,000.00	\$ 10,000.00
Internal Improvements					
A4	Supply and Install dead-end hydro pole c/w framing, grounding, overhead conductors and gang operated load break switch with fuse cluster	1	ea	\$ 90,000.00	\$ 90,000.00
A5	Supply and Install primary meter unit c/w base and associated grounding	1	ea	\$ 10,000.00	\$ 10,000.00
A6	Supply and Install 750kVA/1MVA customer owned sub-station c/w base and associated grounding	1	ea	\$ 70,000.00	\$ 70,000.00
Subtotal					\$ 312,500.00

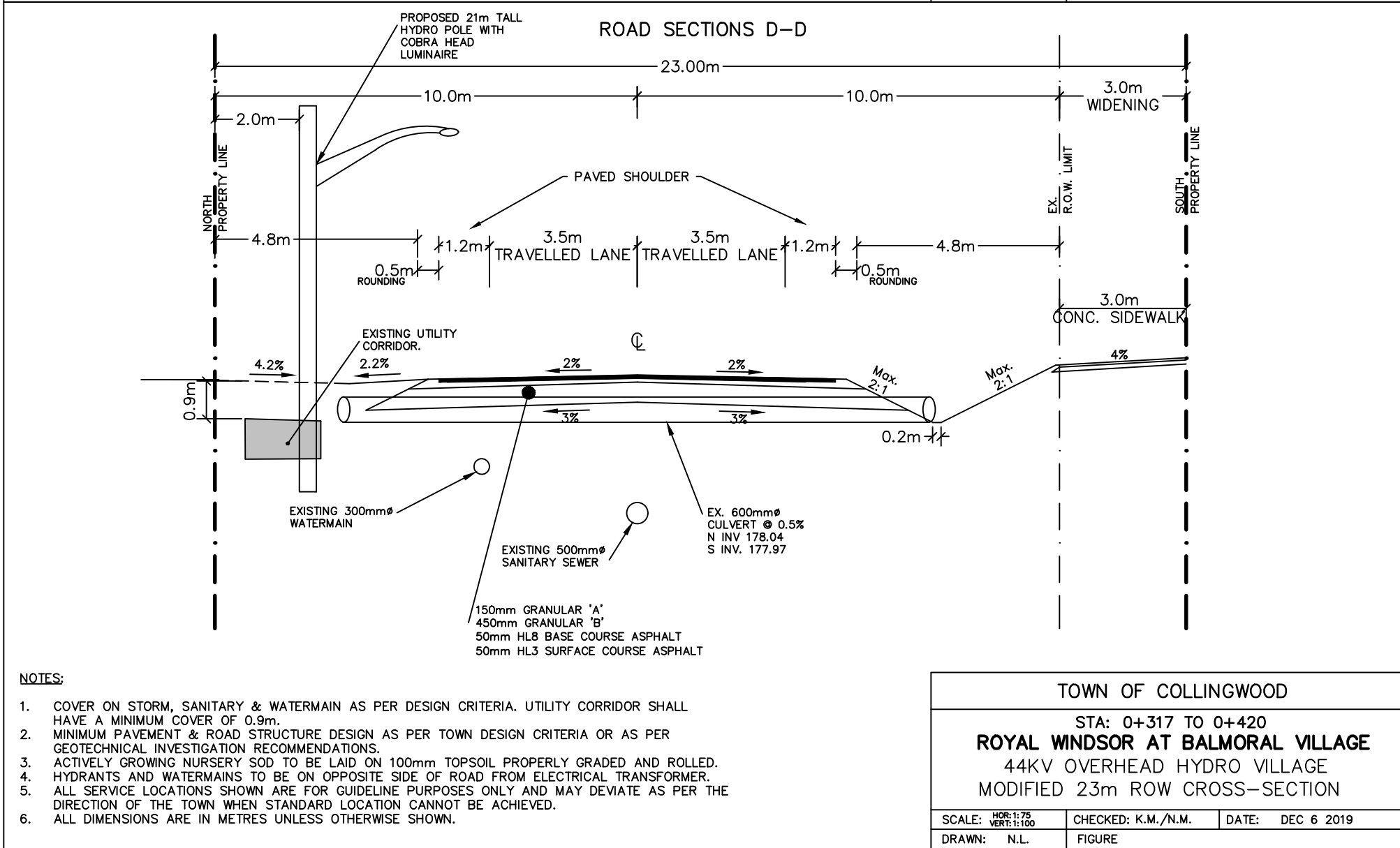
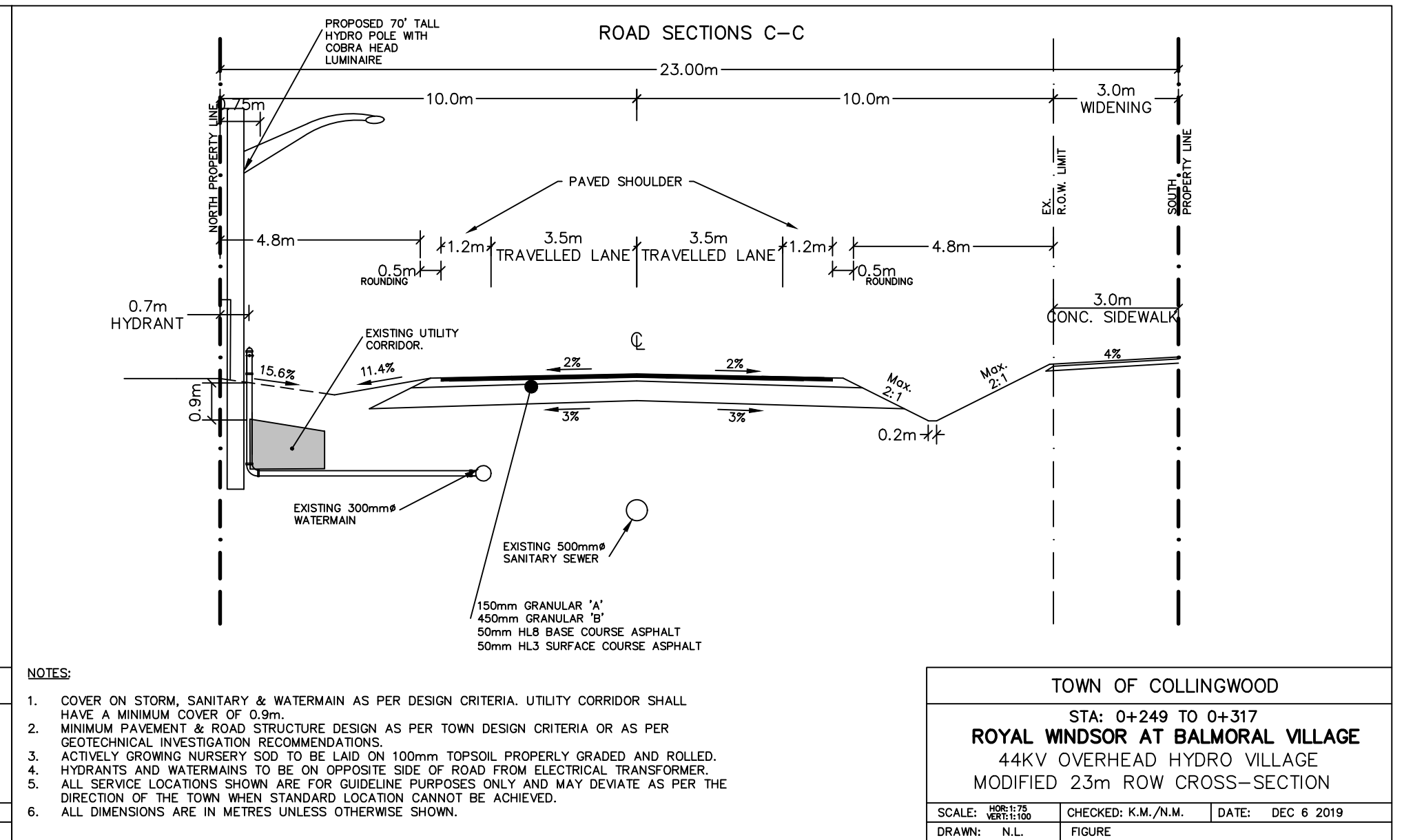
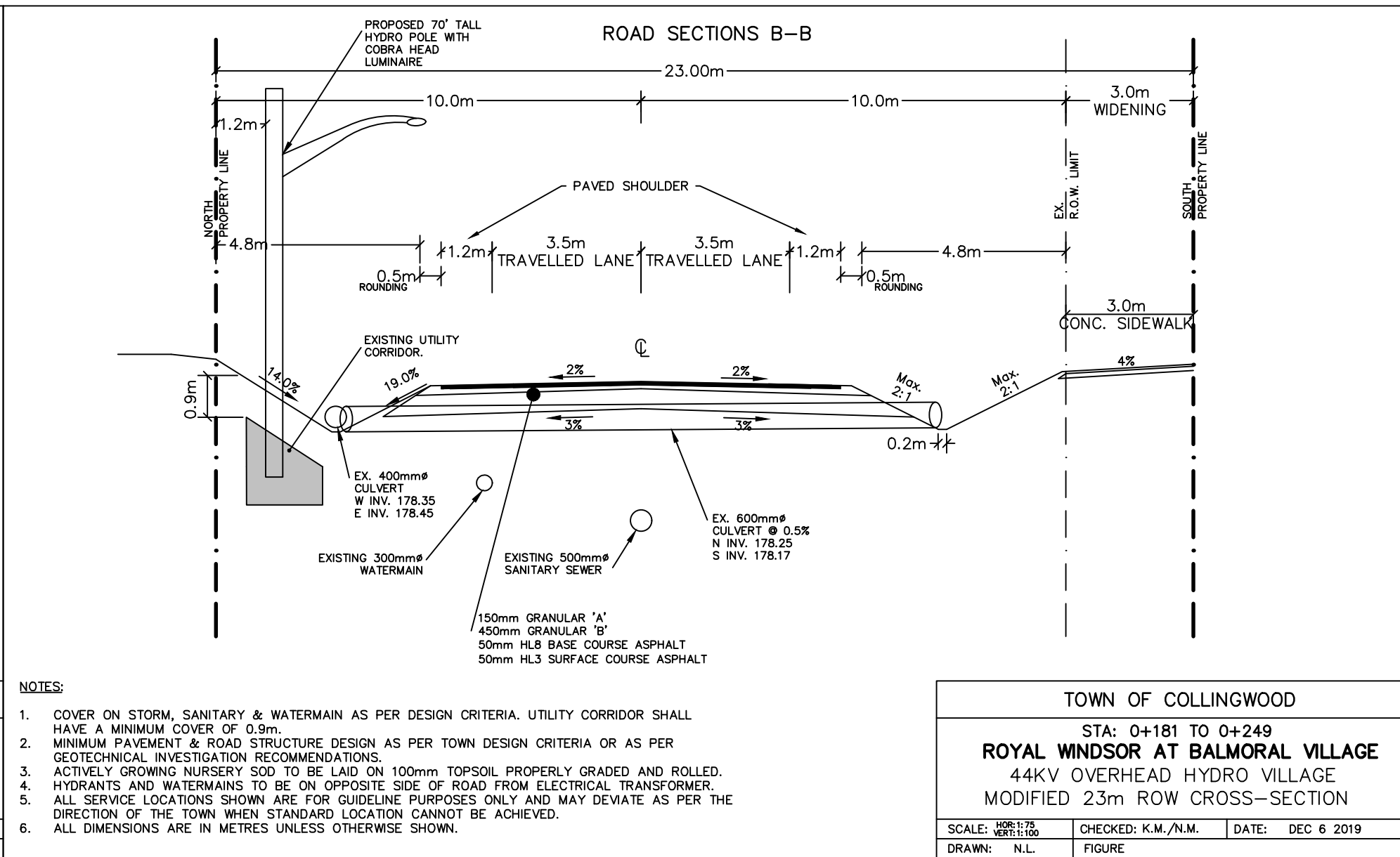
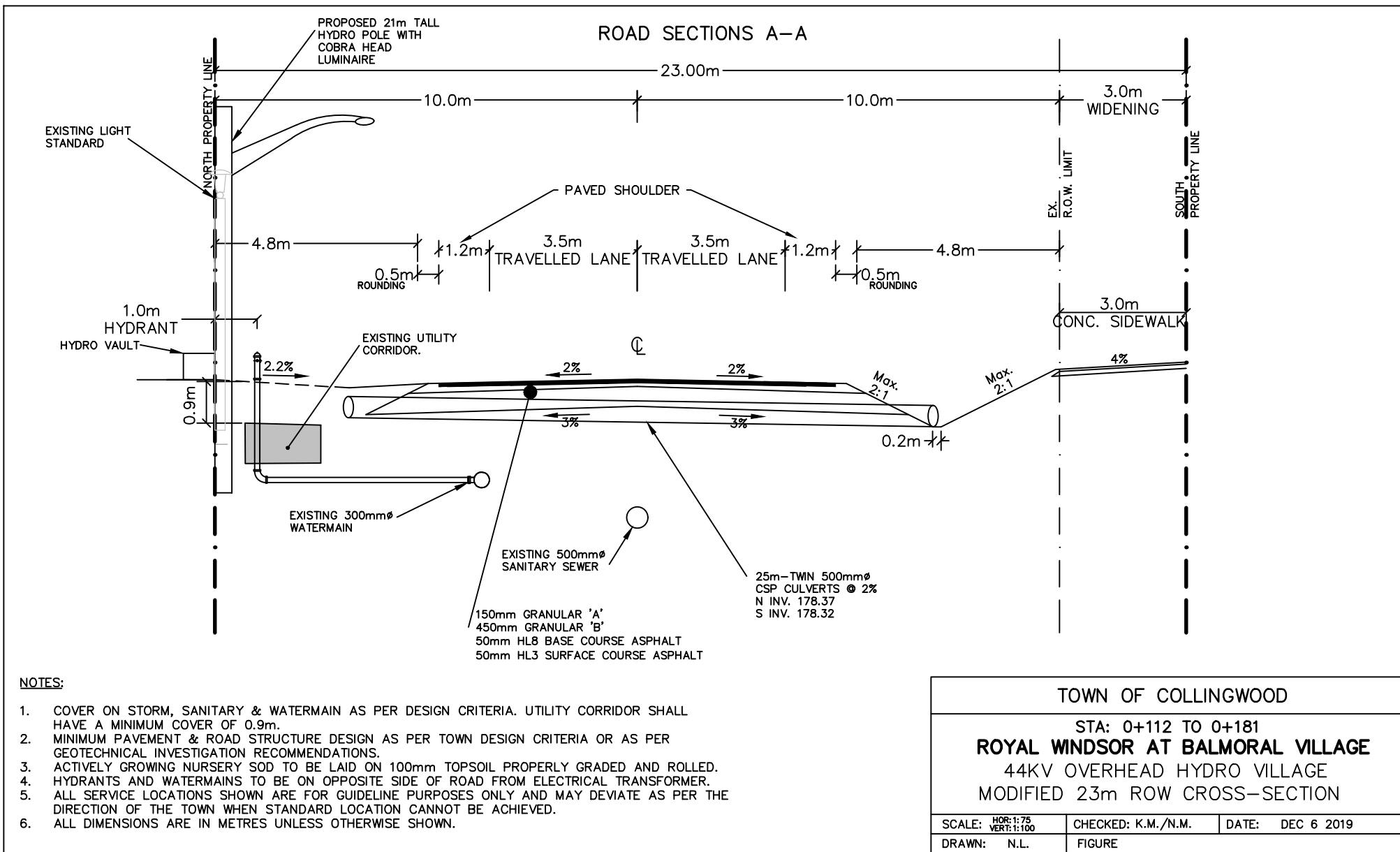
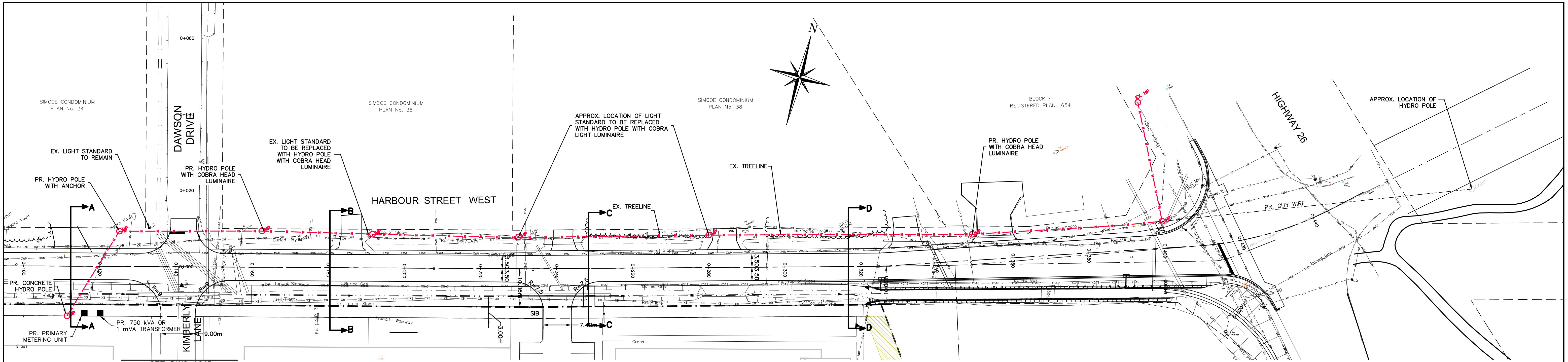
SUMMARY OF OPC PRICES

SCHEDULE A - UTILITY WORKS

\$ 312,500.00

Contingency (15%) \$ 46,875.00

Total \$ 359,375.00



Project
ROYAL WINDSOR AT BALMORAL VILLAGE
TOWN OF COLLINGWOOD

Drawing
PROPOSED 44KV HYDRO SYSTEM CORRIDOR
- HARBOUR STREET STA 0+90 TO 0+420

CROZIER & ASSOCIATES
Consulting Engineers

THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CROZIER-CA.COM

Drawn By: N.L. Design By: N.L./G.C. Project: **183-4877**

Scale: 1:500 Date: 12/06/2019 Check By: K.M./N.M. Drawing: **101A**

George Cooper

Subject: FW: Harbour Street 44kV Hydro Line Extension Meeting

From: Trevor Harvey <tharvey@collingwood.ca>

Sent: Tuesday, January 14, 2020 4:11 PM

To: Stuart West <swest@collingwood.ca>; Kevin Morris <kmorris@cfcrozier.ca>; George Cooper <gcooper@cfcrozier.ca>; Justin L'Abbe <jlabbe@cfcrozier.ca>; Brandon MacDonald <BMacDonald@epcor.com>

Cc: Ted Burrell <eburrell@epcor.com>

Subject: RE: Harbour Street 44kV Hydro Line Extension Meeting

Gentlemen, further to our site meeting yesterday, I would like to summarize some of our discussions. Feel free to do official minutes if desired.

- 1.) It appears that the best location is for an aerial line is located along the north/west property line. As close as possible to the right-of-way limit with Cranberry properties is ideal.
- 2.) The Town will look to install cobra head luminaires in the future and thus consideration in the design for this separate line should be included.
- 3.) The condominium boards and residents should be circulated with a newsletter prior to any tree trimming or removals so that they are aware. This should be done by the developer's representative. This will be a condition of municipal consent.

Trevor

George Cooper

Subject: FW: 19319 Royal Windsor - Electrical Loading (CFCA #183-4877) - DEI comments

From: Jeremy Jackson <JJackson@deiassociates.ca>

Sent: Thursday, October 17, 2019 7:52 AM

To: George Cooper <gcooper@cfcrozier.ca>; Kashif Saeed <ksaeed@heritagehomes.com>

Cc: Jim Dodd <jdodd@heritagehomes.com>; Jenn Mondell <jmondell@HeritageHomes.com>; 'Marc Begin' <marchb@knymh.com>; Kevin Morris <kmorris@cfcrozier.ca>; Nathan MacDonald <nmacdonald@cfcrozier.ca>; Andrew Nielson <ANielson@cfcrozier.ca>; Kevin Fox <KFox@deiassociates.ca>

Subject: RE: 19319 Royal Windsor - Electrical Loading (CFCA #183-4877) - DEI comments

Hello George.

Unfortunately ESA section 8 does not allow a building demand calc solely using basic area allowances. We have completed a load calculation which includes building areas, preliminary HVAC for the common areas and suites (based on central hot water, individual remote condensers), suite appliances, estimates for the elevators, etc. EV charging has not been accounted for at this time per our initial discussions with the team.

Current calculated demand for this 132 unit residential building is 840kW. Depending on what internal demand factors the utility would be applying based on similar existing buildings on their network, I would estimate that either a 750kVA or 1mVA transformer would be installed.

Regards,

Jeremy Jackson, P.Eng., Associate



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