Ledrew's Road – Cronin's Place Drainage Issue

Town of Conception Bay South, NL

PREPARED FOR:

Town of Conception Bay South
11 Remembrance Square
CBS, NL, A1W 3J1

Progressive Engineering & Consulting Inc.

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Prepared By:

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Date:

April 1, 2020

TABLE OF CONTENTS

1.0 Introduction

Progressive Engineering & Consulting Incorporated (PEC) is an engineering and consulting company located in Paradise, Newfoundland and Labrador. Darryl Mills, P.Eng and Kelly Hickey, CET both founded the company in 2012. On June 8, 2017 representatives from Progressive Engineering & Consulting Inc. met with staff from the Town of Conception Bay South in the area of Route 60, Ledrews Road, Jerathon Place, Cronin's Place and neighboring private properties to discuss the storm water drainage issues presently being experienced in the area. The Town staff guided members of PEC through the existing drainage infrastructure and highlighted different areas with suspected issues and locations with known problems

The area generally consists of open channel ditches, culverts of various diameters and a section of storm sewer running through the Cronin's Senior Guest Home Ltd. Property and the Country Trailer Sales 1999 Ltd. Property. We understand that most of the existing underground infrastructure is very old and the exact alignment is unknown. Specifically the pipes surrounding the Cronin's Senior Guest Home Ltd. property are suspected to be obstructed by blockages.

The resident residing in the Cronin's Senior Guest Home Ltd. property has reported several instances of this particular property experiencing flooding conditions in the past, which include water in the basement of this property. Just upstream of the property there is a 600mm CSP culvert which crosses the property. The exact direction and location of this pipe is unknown, however this particular pipe collects runoff from the upstream catchment area of Jerathon Place. On the corner of the Cronin's Senior Guest Home Ltd. Property, another 1200mm CSP pipe connects to the 600mm CSP culvert. The 600mm culvert is owned and maintained by the Town of Conception Bay South. The 1200mm CSP culvert collects runoff from upstream tributaries on Route 60 (Conception Bay Highway) and the Ledrew's Road catchment area.

The runoff from the upstream tributaries along Route 60 and Ledrew's Road are conveyed across Route 60 through a 1200mm diameter oval CSP culvert which connects to a manhole and another 1200mm CSP culvert that runs between Cronin's Senior Guest Home and Country Trailer Sales. This 1200mm CSP culvert is owned and maintained by the Department of Transportation and Works. The exact location of where this 1200mm CSP oval culvert joins the 600mm CSP culvert on the corner of the Cronin's Senior Guest Home Ltd. property is unknown. From here these two systems combine and pass under the parking lot of the Country Trailer Sales

1999 Ltd. property. The runoff from these two systems eventually discharges through a 900mm outfall at the end of the Country Trailer Sales 1999 Ltd. Property.

The issue for Cronin's Senior Guest Home Ltd. appears to be that there are two flow volumes converging on their property. The issue may lie in the fact that there is simply insufficient infrastructure to handle the flows associated with these catchment areas or that the infrastructure on that property is in poor condition or is partially blocked, or some combination of both.

The purpose of this report is to determine all of the contributing catchment areas associated with this system and how much runoff contributes to the local storm sewer in the area. Storm runoff calculations as outlined in the Town of Conception Bay South's Engineering Guidelines are completed. From here the key pieces of storm sewer infrastructure in the catchment areas described above are analyzed in terms of their available capacity.

At the conclusion of this report, design concepts and estimates for three alternatives will be provided to assist in redirecting the flow away from Cronin's Senior Guest Home Ltd. to help prevent drainage issues in the area.

1.1 Existing Infrastructure & Catchment Areas

The following is a breakdown of the existing storm sewer infrastructure that contributes runoff to the system running adjacent to Cronin's Senior Guest Home Ltd. The runoff currently enters this area from both Jerathon Place, some tributary catchments along Route 60 Conception Bay Highway as well as along Ledrew's Road. The existing infrastructure has been shown on drawing PR-2 in Appendix 'C'. This infrastructure conveys runoff from two major catchment areas; the Jerathon Place catchment as well as the Route 60/Ledrew's Road catchment area. These catchment areas are outlined in drawing PR-1 in Appendix 'A'. The Jerathon Place catchment area is primarily comprised of a single family residential area with some surrounding forested areas and totals approximately 2.26 HA. The Route 60/Ledrew's Road catchment area is a much larger catchment area comprised of a lower density single family residential area surrounded by substantial forested and wetland areas, totaling approximately 25.65 HA. It was determined that there is a significant catchment area that also contributes runoff to the Ledrew's Road catchment area south of Peacekeepers Way, notably in the Eagle River Drive subdivision

and portion of Tilley's Road South. This area is primarily single family residential area and contributes an additional 14.69 HA of catchment area

1.1.1 Jerathon Place

Jerathon place contains catch-basins with 200mm PVC SDR leads that convey runoff from the street to a roadside ditch that runs along the street on the west side of Jerathon Place. This ditch can be seen in Figure 1. Upstream of Jerathon Place there is a small area of land that slopes towards Jerathon Place. This runoff is collected by a cut-off ditch at the northern portion of the street and conveyed across Jerathon Place a 500mm CSP culvert c/w a concrete headwall as seen in Figure 2

Figure 1: Drainage Ditch - West Side of Jerathon Place

This ditch conveys runoff to a 500mm HDPE pipe which crosses Route 60 and discharges runoff into a drainage channel that meanders its way around the western side of Cronin's Place.

Figure 2: Headwall - Cut-off Ditch - Jerathon Place

The 500mm HDPE pipe which crosses Route 60 at the intersection with Jerathon Place can be seen in Figure 5. From here, this runoff enters a small drainage ditch that runs from west to east towards Cronin's Place and passes through a 600mm CSP culvert across Cronin's Place. This culvert then travels underground through the Seniors Home property on Cronin's Place and onto the Country Trailer Sales Ltd parking lot. This system eventually discharges through a 900mm CSP outfall at the corner of the Country Trailer Sales Ltd property. The exact path of travel and condition of this portion of the system is unknown and may be subject to severe blockages or damage. The 600mm CSP culvert at Cronin's Place can be seen in Figure 4 and the 900mm CSP outfall can be seen in Figure 3.

Figure 3: 900mm CSP Outfall - Country Trailer Sales Ltd.

Figure 4: 600mm CSP Culvert - Cronin's Place

1.1.2 Route 60 Conception Bay Highway/Ledrew's Road

Figure 5: Submerged Headwall - White Bear

The tributary catchment areas of Route 60 Conception Bay Highway and Ledrew's Road contribute the majority of the runoff that enters the Cronin's Place property. Ledrew's road extends to the south east where it eventually joins Peacekeepers Way. The catchment area of Ledrew' Road and surrounding forested areas discharge into roadside ditches and culverts along Route 60 as far east as Ledrew's Lumber Yard. Further upstream from this, portions of Tilley's Road South and Eagle River Drive and surrounding residential areas drain to a concrete headwall which is submerged at the rear of lots on White Bear Lane as shown in Figure 5. From here the runoff is conveyed through a 900mm CSP culvert to cross a dirt road where it runs adjacent to Peacekeepers Way. This runoff then travels to a low lying area where the runoff from the upstream development is conveyed through a 1000mm CSP culvert which crosses Peacekeepers Way and eventually joins the runoff associated with the Ledrew's Road catchment area. Before

the subdivision which includes Eagle River Drive was constructed, the runoff from this area, according to as-built drawings, was directed down Tilley's Road south, avoiding the catchment area of Ledrew's Road. This runoff is eventually conveyed to a 1200mm CSP culvert that crosses Route 60. This 1200 mm CSP culvert can be seen in Figure 7.

It's important to note that this 1200mm CSP culvert is significantly compressed and is in poor condition. It is recommended that this be addressed as soon as possible as it poses a potential flood risk in the area due to the reduced capacity of the culvert. This 1200mm CSP culvert crosses Route 60 and enters on the Cronin's Place property where it eventually converges with the 600mm CSP culvert upstream of Cronin's Place. This can be seen in the photograph on the following page on Figure 8

Figure 6: Compressed 1200mm CSP Culvert Crossing Route 60

Figure 7: Runoff Stream Leaving Culvert Crossing Peacekeepers Way

2.0 Runoff Computations

For the purposes of the analysis contained within this report, the catchment area described in the previous section was plotted on the Town's base mapping for reference, which can be seen in Appendix A.

Computations for storm runoff as per the Town of Conception Bay Souths Engineering Guidelines were carried out using the Rational Method for computing storm runoff for appropriate return periods.

Figure 8: 1200mm CSP Culvert Heading towards Cronin's Place Property

In accordance with these guidelines, the latest IDF curves for the City of St. John's and surrounding area were utilized to determine the rainfall intensity for the relevant catchment areas. This intensity was based on a one in 10 year return period with a duration of 10 minutes. A copy of these IDF curves can be seen in Appendix 'B'

Individual sections of storm sewer infrastructure were checked to verify if they have sufficient capacity. Calculations are provided in Appendix C. Based on these calculations, there are a number of culverts that are undersized. These are the existing 500mm HDPE pipe crossing Route 60 with the intersection of Jerathon Place and a 600mm CSP driveway culvert along Route 60. The 600mm CSP driveway culvert is actually downstream of a larger, 900mm HDPE culvert, which indicates that it is likely not sized appropriately. The 1200mm CSP oval culvert which crosses Route 60 is slightly undersized for a 10 year return period under existing conditions.

Future development within the Town was analyzed by reviewing the Town of Conception Bay South's zoning map was utilized to determine which areas are more likely to experience development and thus higher quantities of runoff. The majority of the catchment area for both Jerathon Place and Ledrew's Road are zoned for Residential Medium Density for present day as well as future development. To generate a future development flow rate for analysis, the runoff coefficients were increased to reflect the possibility of future developments originating from Ledrew's Road. It was determined that no additional infrastructure was undersized for future flow rates, other than the 600mm CSP driveway culvert and 500mm HDPE as noted in the existing conditions calculations.

All of the above results can be seen in tabulated excel spreadsheets attached as Appendices at the end of this report, which outline the maximum capacity of all receiving infrastructure and the actual computed runoff values for these infrastructure components.

For the purposes of calculating runoff to develop a new concept, a one in 10 year return period was used, in conjunction with future development runoff coefficients, to determine the required pipe sizes and the time of concentrations were calculated using the following formula.

$$Tc = \left[\frac{(2.1873 * L * n)}{\sqrt{s}}\right]^{0.467}$$

Where L= Length of catchment

N = Roughness Coefficient of Catchment

S = Average Slope of Catchment (m/m)

And 2.1873 is a dimensionless constant.

It was determined that the total amount of runoff that is associated with both the Ledrew's Road and Jerathon Place catchment areas with a 100 year return period is approximately = 2.8 m_s^3 for existing conditions and approximately 3.79m_s^3 for future flows. This flow rate allows us to determine the minimum required pipe size for the upgrade concepts discussed in the next section.

3.0 Upgrade Concepts

Given the large volume of flow that enters this catchment area and the corresponding large pipe size required as well as the fact that Route 60 is currently serviced by watermain and sanitary sewer, options to mitigate the issue present at Cronin's Senior Guest Home Ltd by upgrading the storm sewer system are limited. There are multiple storm runoff discharge locations that must be collected and diverted to new outfall locations for any alternatives. There is also potential for conflicts with existing service connections and existing watermain and sanitary sewers located in Route 60. Being able to physically fit large size diameter culverts to obtain minimum cover and slope while avoiding conflicts with existing water and sanitary sewer infrastructure also imposes limits on any proposed solutions.

Taking these factors into consideration, there are some available options which are discussed in this section. The infrastructure sized in these sections was completed using the 100 year – future development flow rates using the most up-to-date IDF curves from the City of St. John's. These IDF curves can be seen in Appendix 'B'. The Manning's equation was used to determine pipe capacities. Three options are presented in the following sections. All three options aim at either eliminating or reducing the total amount of runoff that enters the system on Cronin's Place and impacts the resident at the Cronin's Senior Guest Home Ltd. Concept drawings for the options discussed in this section can be seen in Appendix 'E' at the end of this report. Concept estimates were also completed for all three options, which provide insight into the expected construction costs for these options. These concept estimates can be seen in Appendix 'G'& 'H'.

3.1 Option #1

The first concept involved abandoning the existing 1200mm oval CSP culvert that crosses Route 60 near the driveway for Country Trailer Sales, as well as the 500mm HDPE culvert that crosses Route 60 at the intersection with Jerathon Place. By placing a berm at the beginning of the drainage channel that flows towards Cronin's Place and removing the existing 1200mm oval culvert, runoff from both the Jerathon and Ledrew's Road catchments can no longer enter onto private property on Cronin's Place. At a location just upstream of the existing 1200mm oval CSP culvert, west of Ledrew's Road, a new 1050mm HDPE pipe will be installed along with a new concrete headwall to pipe runoff along the shoulder of the road. This new pipe will be located on the south side of Route 60 to avoid the existing sanitary sewer and watermain services on the opposite side of the road. The new 1200mm HDPE pipe will connect to a new storm manhole #1 located at the intersection of Jerathon Place and Route 60. New 600mm HDPE culverts will convey runoff from the east and west side of Jerathon Place as well as the north side of Route 60 into this manhole #1. A new 1500mm HDPE storm pipe will run from manhole #1 into storm manhole #2 located opposite Craig's Lane. From here the pipe will travel down Craig's Lane, changing direction at new storm manhole #3, and discharge into a marshy area adjacent to Civic #4 Craig's Lane. A drainage channel would be constructed to divert runoff into the Kelligrews River. According to surrounding legal boundaries, it appears that there would be very little land acquisition required to place an outfall in this location.

The benefits of this option are that flow is completely diverted away from Cronin's Place and Country Trailer Sales and relocated further down the road. Discharging the runoff down Craig's Lane is beneficial because it completely avoids a separate system that leaves Walsh's Road, which discharges through a 600mm CSP culvert just to the west of Craig's Lane, reducing the complexity of construction and cost. It is also on the opposite side of the street of the existing watermain and sanitary sewer main, meaning that crossings with these services are kept to a minimum, except at locations where the new pipe crosses the street. A preliminary review of as-built drawings and field conditions indicates that the proposed storm sewer system can be installed to achieve the minimum grades required while providing minimum cover and separation from existing services. This must be confirmed in the field before a final decision is made.

The disadvantage of implanting this option is that it will likely require land acquisition and tear-up of asphalt on Craig's Lane.

Preliminary, Class "D" cost estimates were developed for this option and a detailed breakdown of the costs can be seen in Appendix'G'. We estimate that implementing Option 1 will cost approximately $360,710.31 including HST.

3.2 Option #2

The second option for mitigating the flooding issues present on the Cronin's Senior Guest Home Ltd. Property is as follows:

As mentioned previously, runoff from the Ledrew's Road catchment area enters roadside ditches along Route 60 prior to crossing Route 60 through a 1200mm oval CSP culvert. This 1200mm CSP pipe travels along Route 60 to the intersection with the entrance of Country Trailer Sales. Based on our calculations, this pipe is oversized and the required diameter is approximately 1200mm. From here, there are two potential options for routing the storm runoff. The existing system can be video inspected to determine its actual alignment and location, conditions and grades. If the investigation determines that the existing system is in acceptable condition and no issues are identified, then the existing storm sewer system can remain as is for this particular area.

If this system is not suitable for connection, the existing 1200mm CSP culvert across Route 60 can be removed and replaced with a new 1200mm HDPE pipe which could connect to the existing manhole. An additional 1200mm HDPE at a minimum slope of 1.5% can be installed through the Country Trailer Sales property to a new outfall as detailed on drawing PR-4 in Appendix C.

Similar to Option 1, remaining runoff from Route 60 and Jerathon Place is diverted into a new storm sewer system that ultimately discharges into the Kelligrews River via Craig's Lane.
A major benefit of this option is that it may be possible to utilize some existing infrastructure in the area, provided that this infrastructure is in suitable condition. It involves using less pipe and reduced disturbances to Route 60 and surrounding streets. At the same time, a large portion, if not all of the flow entering the Cronin's Senior Guest Home property from the Jerathon Place system is removed. However, this option will likely require land or easement acquisitions by the Town's behalf to allow construction of a new storm sewer system underneath the Country Trailer Sales property as well as adjacent to Civic #4 Craig's Lane. Further investigation into the condition of this system must also be completed prior to any final decisions.

Preliminary, Class "D" cost estimates were developed for this option and a detailed breakdown of the costs is provided in Appendix 'G'. We estimate that implementing Option 2 will cost approximately $324,857.90 including HST.

3.3 Option #3

Given the large volume of flow that enters the Ledrew's Road and Jerathon Place catchment, combining the flows and routing a new storm sewer system down Route 60 becomes challenging the further the distance you move west. As more runoff enters this system, the required pipe diameter becomes unreasonably large and several conflicts with sanitary sewer services, which have to cross Route 60, will undoubtedly occur.

However, there does exist an option to reduce the amount of runoff that actually enters the Ledrew's Road catchment by re-routing flows that come from the South of Peacekeepers way. As per aerial imagery, mapping and site visits by PEC staff, there appears to be three locations

where drainage from the south of Peacekeepers Way is conveyed through culverts which cross the highway. There is sufficient grade to construct an adequately sized ditch that can drain runoff from these areas and route these flows to discharge in the Kelligrews River. This would eliminate the flows south of Peacekeepers Way from entering the Ledrew's Road catchment area, reducing the required infrastructure upgrades downstream. It appears there is a natural river course that makes its way adjacent to Peacekeepers way. A properly constructed and defined channel would help sufficiently convey runoff along the side of the highway to a discharge point into the Kelligrews River. The upper and lower portions, as described in drawing PR-8, area already defined and should be deepened and cleaned to ensure a minimum cross-section of 1m depth, 1m bottom width and 1 to 1 side slopes. There is a section, as noted on drawing PR-8, where the natural stream is poorly defined and a ditch with the characteristics mentioned above should be constructed to ensure positive and efficient drainage along Peacekeepers Way.

There are currently two 6' diameter culverts that cross Peacekeepers Way that have sufficient capacity to convey the additional runoff associated with rerouting the runoff to this location. From visual inspection during site visits and looking at aerial photography, the Kelligrews River appears to be deep enough to handle the small additional flow associated with the rerouting of the storm sewer to this location, however accurate topographic survey of the rivers cross-sections at several locations along with analysis of subsequent flows in the river is required prior to pursuing this option to ensure properties along the river are not exposed to flood risks.

If the flow is rerouted away from the Ledrew's Road catchment, it opens up the potential for a variety of remedial upgrades similar to Options #1 and #2, except with smaller infrastructure which would lead to easier construction and less potential for conflicts with sanitary and watermain services which cross Route 60. Options #1A and #2A and estimates are proposed in Appendix'H'.

To reduce or eliminate the amount of land and/or easement acquisitions required by the Town, an additional option in conjunction with the ditch upgrades is proposed in this report.

Similar to Option 1, in Option 3 runoff from Ledrew's Road will be collected by a new 1050mm HDPE piped storm sewer system installed along the south side of Route 60 where it will

combine with the runoff associated with the Jerathon Place catchment area. However, instead of crossing at the location of the intersection with Craig's Lane, this option proposes to continue the 1050mm HDPE along the side of Route 60. The new storm system would eventually discharge into Kelligrew's Pond at the location of the bridge structure on Route 60. Again, like Options #1 and #2, the new 1200mm HDPE pipe will be placed at the opposite side of Route 60 as the existing watermain and sanitary services to avoid disturbances to these services. During the process of this upgrade, runoff from nearby lots and upstream runoff from Walsh's Road can be collected into the new proposed storm system. The existing 600mm CSP culvert discharging runoff from the Walsh's Road catchment can then be abandoned.

This option does involve a more challenging construction methodology as there are watermain and sanitary sewer crossings with the intersection of Walsh's Road. There would also likely be land and/or easement acquisitions along the front of those properties located adjacent to the existing bridge at Route 60.

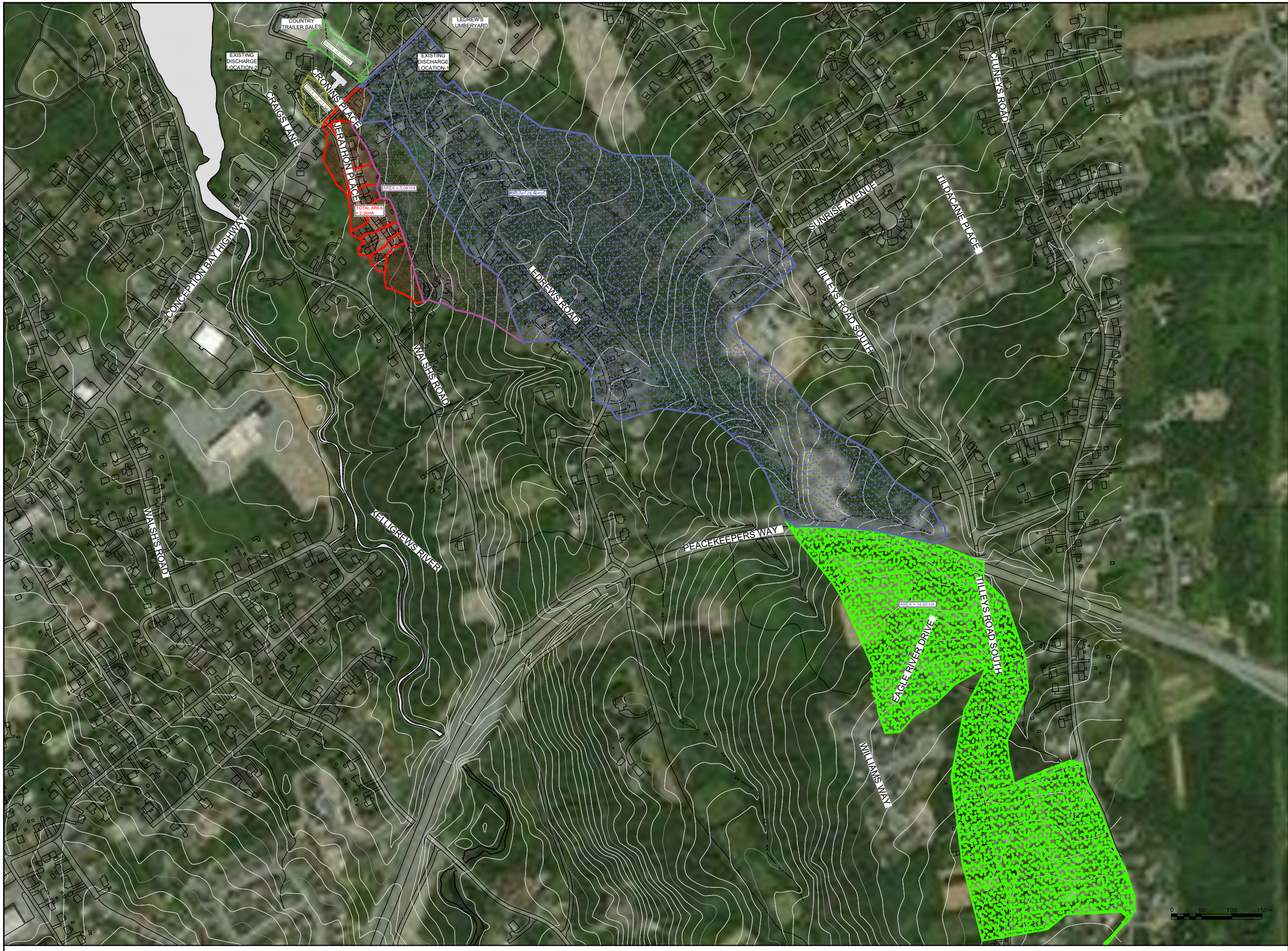
Preliminary Class "D" cost estimates or the work described in this section are attached in Appendix 'H'

4.0 Conclusion

In summary, there are potential solutions to divert storm runoff away from the Cronin's Place property that is currently experiencing flooding issues. The investigation into the existing infrastructure determined that the majority of the existing storm sewer infrastructure is sized appropriately and can handle the runoff computed as per the Town's Engineering Guidelines. However, there may be an issue with the convergence of the two systems at the edge of the Cronin's Place property as a result of a damaged pipe, or a partial or complete blockage. During a heavy rainfall and the large catchment areas associated with this system, the system may back up and result in flooding for this particular resident.

The three options proposed, including the attached concept drawings and concept estimates, will assist the town of Conception Bay South in making an informed decision moving forward to mitigate the issue present at the Cronin's Place property experiencing flooding issues.

APPENDIX 'A'
LEDREW'S ROAD/JERATHON PLACE CATCHMENT AREA



CONTRACTOR MUST VERIFY ALL DIMENSIONS AND CONDITIONS ON SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK. REPRODUCTIONS OF THIS DRAWING MAY HAVE BEEN REDUCED OR ENLARGED. REFER TO GRAPHIC SCALE. DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

A - PLAN, SECTION, ELEVATION, OR DETAIL No.
B - No. OF DRAWING WHERE 'A' IS ON SITE PLAN
C - No. OF DRAWING WHERE 'A' IS DETAILED

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

No.	REVISIONS	APP	DWN	DATE
B	REVISE FOR CLIENT REVIEW	V.B	C.L	20/02/28
A	ISSUED FOR CLIENT REVIEW	VB	C.L	19/12/20

NORTH:

STAMP:
REGISTERED PROFESSIONAL ENGINEER
VANESSA BARRY
SIGNATURE 20/02/28 DATE
PROVINCE OF NEWFOUNDLAND

Progressive Engineering & Consulting Inc.

PERMIT STAMP:
PROVINCE OF NEWFOUNDLAND AND LABRADOR
PERMIT HOLDER
This Permit Allows
PROGRESSIVE ENGINEERING & CONSULTING INC
To practice Professional Engineering in Newfoundland and Labrador.
Permit No. as issued by PEG N0566
which is valid for the year 2020

OWNER/CLIENT NAME:
TOWN OF CONCEPTION BAY SOUTH
NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
CATCHMENT AREAS

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	DEC. 2019	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-1	B

APPENDIX 'B'
CITY OF ST. JOHN'S IDF CURVE

12. St. John's A

This station was updated in CRA (2015). In addition, a new IDF curve was produced for Ruby Line. The updated IDF curves from CRA (2015) are reproduced below, with the addition of the 20-year return period.

12.1 St. John's A

This IDF curve was updated using 5-min data from Windsor Lake (City of St. John's station). The IDF curve decreased for short durations and increased for long durations during the update (Table 12.1). Where there are decreases greater than 5 percent, users should exercise caution when using the updated IDF curve, or use the EC IDF curve.

Table 12.1 Differences Between IDF Curves for St. John's A

Percent Difference in Precipitation Amount (%) (Difference in Precipitation Amount (mm))						
Duration	Return Period (years)					
	2	5	10	25	50	100
5-min	-1.7 (-0.1)	-4.3 (-0.3)	**-5.3** **(-0.4)**	**-6.2** **(-0.6)**	**-6.8** **(-0.7)**	**-7.2** **(-0.8)**
10-min	1.0 (0.1)	-1.7 (-0.2)	-2.8 (-0.3)	-3.8 (-0.5)	-4.4 (-0.6)	-4.9 (-0.8)
15-min	2.6 (0.2)	0.1 (0.0)	-1.0 (-0.1)	-2.0 (-0.3)	-2.5 (-0.5)	-2.9 (-0.6)
30-min	**5.0** **(0.6)**	**5.0** **(0.8)**	**5.0** **(1.0)**	**5.0** **(1.1)**	**5.1** **(1.3)**	**5.1** **(1.4)**
1-hr	**7.8** **(1.4)**	**11.0** **(2.5)**	**12.5** **(3.2)**	**13.8** **(4.1)**	**14.6** **(4.8)**	**15.3** **(5.4)**
2-hr	**9.1** **(2.2)**	**10.9** **(3.4)**	**11.6** **(4.3)**	**12.3** **(5.3)**	**12.7** **(6.1)**	**13.0** **(6.9)**
6-hr	**7.7** **(3.1)**	**12.5** **(6.4)**	**14.8** **(8.5)**	**17.0** **(11.3)**	**18.4** **(13.3)**	**19.5** **(15.3)**
12-hr	**7.5** **(3.9)**	**15.5** **(9.9)**	**19.4** **(13.8)**	**23.3** **(18.8)**	**25.7** **(22.5)**	**27.7** **(26.2)**
24-hr	**8.1** **(5.1)**	**13.9** **(10.5)**	**16.8** **(14.0)**	**19.6** **(18.6)**	**21.4** **(21.9)**	**22.8** **(25.3)**

Notes:
Red numbers indicate that the updated IDF curve is lower than the EC-IDF V2.3 IDF curve for that duration and return period.
Bold numbers indicate changes greater than 5 percent.

Office of Climate Change and Energy Efficiency

Short Duration Rainfall Intensity-Duration-Frequency Data
Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2015/10/30

ST JOHN'S A NL 8403506
Updated with 5-min data measured at Windsor Lake (City of St. John's Station) : 1999 - 2014
Latitude: 47 37'N Longitude: 52 44'W Elevation/Altitude: 140 m
Years/Années : 1949 - 2014 # Years/Années : 48

Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

	Year / Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
EC-IDF	1949	8.9	8.9	10.2	17.5	28.2	52.6	61.7	62.0	63.5
EC-IDF	1961	3.0	4.3	5.3	6.9	8.6	13.5	25.7	35.6	38.6
EC-IDF	1962	2.8	4.6	4.6	8.1	13.0	20.6	33.8	54.9	59.7
EC-IDF	1963	10.2	11.2	11.7	13.7	18.5	23.6	40.9	52.3	57.9
EC-IDF	1964	4.3	6.9	7.9	11.2	19.3	28.2	54.9	72.6	77.5
EC-IDF	1965	5.3	7.4	9.9	13.0	17.8	19.6	32.3	51.8	59.7
EC-IDF	1966	8.4	13.2	17.0	25.4	29.7	43.7	48.5	64.5	85.3
EC-IDF	1967	2.3	3.8	5.3	9.9	10.9	16.3	29.5	44.4	58.4
EC-IDF	1968	6.3	12.7	13.7	14.7	17.5	22.4	41.9	55.1	61.7
EC-IDF	1969	5.6	7.1	8.4	8.6	11.7	19.0	30.7	34.5	48.3
EC-IDF	1970	5.6	7.1	10.7	15.2	16.3	19.6	42.4	62.5	87.4
EC-IDF	1971	6.3	10.4	14.5	16.0	19.0	22.1	34.3	41.1	77.7
EC-IDF	1972	4.8	5.3	6.6	10.9	15.0	20.6	47.8	72.6	89.2
EC-IDF	1973	5.3	6.9	7.9	10.4	16.5	30.0	49.5	65.8	67.1
EC-IDF	1974	3.6	5.6	6.3	9.9	16.3	22.4	42.4	53.3	72.9
EC-IDF	1975	8.1	10.4	12.2	17.8	19.0	19.6	46.5	71.9	82.3
EC-IDF	1976	3.6	4.8	6.1	8.4	12.7	19.0	33.8	42.2	53.6
EC-IDF	1977	3.8	5.6	7.6	11.7	17.5	23.4	38.6	40.4	41.4
EC-IDF	1978	4.0	5.9	7.4	7.6	12.9	13.1	27.1	37.6	43.0
EC-IDF	1979	3.2	4.2	5.9	10.2	16.2	18.1	29.3	41.9	49.2
EC-IDF	1980	3.2	6.1	7.4	12.2	17.4	23.9	33.6	41.6	69.8
EC-IDF	1981	-99.9	-99.9	-99.9	-99.9	15.0	22.4	46.7	72.5	82.6
EC-IDF	1982	5.1	9.0	12.9	17.1	24.5	35.9	80.3	82.4	84.0
EC-IDF	1983	1.6	3.2	4.8	9.6	19.2	26.5	47.3	52.8	54.7
EC-IDF	1984	5.0	9.9	13.0	21.5	27.1	36.6	61.0	74.0	75.3
EC-IDF	1985	5.2	7.1	9.8	11.3	14.1	18.5	36.0	54.9	82.9
EC-IDF	1986	3.1	4.8	7.2	14.3	23.3	27.9	40.2	58.9	70.6
EC-IDF	1987	5.1	7.3	8.6	16.2	23.5	24.2	30.6	36.6	46.8
EC-IDF	1988	6.6	10.6	13.2	17.4	23.4	25.9	44.8	45.8	49.0
EC-IDF	1989	2.9	4.5	6.2	8.0	10.9	19.7	43.4	51.6	51.6
EC-IDF	1990	3.7	5.9	6.5	12.6	19.2	28.5	48.1	68.7	85.2
EC-IDF	1991	7.8	11.4	15.9	23.3	28.8	29.5	51.2	52.2	59.7
EC-IDF	1993	4.4	7.0	7.6	11.5	20.0	31.3	47.6	49.4	55.3
EC-IDF	1994	6.2	9.1	10.3	12.6	12.8	14.9	-99.9	-99.9	67.5
EC-IDF	1995	5.2	9.8	14.5	16.6	27.6	46.7	55.9	58.8	61.6
EC-IDF	1996	4.8	6.2	7.4	10.2	15.4	27.2	40.2	44.0	48.4
UPDATE	1999	3.2	5.0	6.6	9.0	15.3	25.1	42.4	63.4	99.3
UPDATE	2000	3.8	6.7	8.6	13.0	21.5	29.9	43.4	58.9	70.5
UPDATE	2001	4.8	8.8	11.5	19.5	33.7	62.0	107.1	147.7	149.6
UPDATE	2003	5.5	8.6	11.3	19.3	32.4	42.2	50.4	76.1	92.4
UPDATE	2004	3.9	7.4	10.6	17.2	23.6	26.1	59.0	71.5	76.6
UPDATE	2005	5.0	7.1	8.4	13.1	21.2	28.6	65.4	82.3	98.9
UPDATE	2006	4.8	8.1	11.1	17.5	30.4	36.4	51.9	53.7	58.5
UPDATE	2007	6.3	10.3	14.6	27.2	41.1	48.1	79.2	104.2	104.9
UPDATE	2009	5.0	6.6	7.4	10.6	16.9	24.7	46.7	58.2	65.0
UPDATE	2010	4.1	7.5	10.2	14.2	21.2	36.2	62.7	75.0	113.8
UPDATE	2011	3.2	4.8	7.3	12.0	15.7	20.6	33.3	38.1	54.9
UPDATE	2013	4.4	6.6	8.5	11.3	15.9	27.2	46.3	56.1	76.3
UPDATE	2014	5.5	9.6	13.3	19.4	25.8	37.9	48.7	61.0	73.7
	# Yrs. / Années	48	48	48	48	49	49	48	48	49
	Mean / Moyenne	4.9	7.4	9.5	13.9	19.9	27.6	46.6	59.3	70.5
	Std. Dev.	1.7	2.4	3.2	4.7	6.7	10.3	15.0	19.6	20.8

Écart-type Skew. Dissymétrie	0.92	0.48	0.54	0.90	0.94	1.32	1.73	2.15	1.29
Kurtosis	4.29	2.76	2.54	3.67	3.99	4.95	7.87	10.98	6.15

*-99.9 Indicates Missing Data/Données manquantes
* NM Indicates No Measurements/Aucunes mesures

Warning: annual maximum amount greater than 100-yr return period amount
Avertissement : la quantité maximale annuelle excède la quantité pour une période de retour de 100 ans

Year/Année	Duration/Durée	Data/Données	100-yr/ans
2000	6 h	107.1	93.8
2000	12 h	147.7	120.7
2001	2 h	62.0	60.0
2001	24 h	149.6	135.8
2007	1 h	41.1	41.0

****

Table 2a : Return Period Rainfall Amounts (mm)
Quantité de pluie (mm) par période de retour

****

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	20 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
UPDATE 5 min	4.6	6.1	7.2	8.1	8.5	9.4	10.4	48
UPDATE 10 min	7.0	9.1	10.5	11.9	12.3	13.6	14.9	48
UPDATE 15 min	8.9	11.7	13.6	15.3	15.9	17.6	19.3	48
UPDATE 30 min	13.1	17.2	20.0	22.6	23.4	26.0	28.6	48
UPDATE 1 h	18.8	24.7	28.6	32.4	33.6	37.3	41.0	49
UPDATE 2 h	25.9	35.0	41.1	46.9	48.7	54.4	60.0	49
UPDATE 6 h	44.1	57.4	66.2	74.6	77.3	85.6	93.8	48
UPDATE 12 h	56.1	73.4	84.9	95.8	99.3	110.1	120.7	48
UPDATE 24 h	67.1	85.5	97.7	109.4	113.1	124.5	135.8	49

* 5-min data were used for the update: all durations were updated

****

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits
Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

****

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	20 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
UPDATE 5 min	55.3	73.7	86.0	97.7	101.5	112.9	124.3	48
	+/- 5.4	+/- 9.1	+/- 12.4	+/- 15.6	+/- 16.7	+/- 19.9	+/- 23.2	48
UPDATE 10 min	42.0	54.8	63.2	71.3	73.9	81.8	89.6	48
	+/- 3.7	+/- 6.3	+/- 8.5	+/- 10.8	+/- 11.5	+/- 13.7	+/- 16.0	48
UPDATE 15 min	35.8	46.9	54.3	61.4	63.6	70.5	77.4	48
	+/- 3.3	+/- 5.5	+/- 7.4	+/- 9.4	+/- 10.0	+/- 12.0	+/- 14.0	48
UPDATE 30 min	26.2	34.4	39.9	45.2	46.9	52.0	57.1	48
	+/- 2.4	+/- 4.1	+/- 5.5	+/- 7.0	+/- 7.5	+/- 8.9	+/- 10.4	48
UPDATE 1 h	18.8	24.7	28.6	32.4	33.6	37.3	41.0	49
	+/- 1.7	+/- 2.9	+/- 3.9	+/- 5.0	+/- 5.3	+/- 6.3	+/- 7.4	49
UPDATE 2 h	12.9	17.5	20.5	23.4	24.3	27.2	30.0	49
	+/- 1.3	+/- 2.2	+/- 3.0	+/- 3.8	+/- 4.1	+/- 4.9	+/- 5.7	49
UPDATE 6 h	7.3	9.6	11.0	12.4	12.9	14.3	15.6	48
	+/- 0.7	+/- 1.1	+/- 1.5	+/- 1.9	+/- 2.0	+/- 2.4	+/- 2.8	48
UPDATE 12 h	4.7	6.1	7.1	8.0	8.3	9.2	10.1	48
	+/- 0.4	+/- 0.7	+/- 1.0	+/- 1.2	+/- 1.3	+/- 1.6	+/- 1.8	48
UPDATE 24 h	2.8	3.6	4.1	4.6	4.7	5.2	5.7	49
	+/- 0.2	+/- 0.4	+/- 0.5	+/- 0.6	+/- 0.7	+/- 0.8	+/- 1.0	49

* 5-min data were used for the update: all durations were updated

****

Table 3 : Interpolation Equation / Équation d'interpolation: R = A*T^B

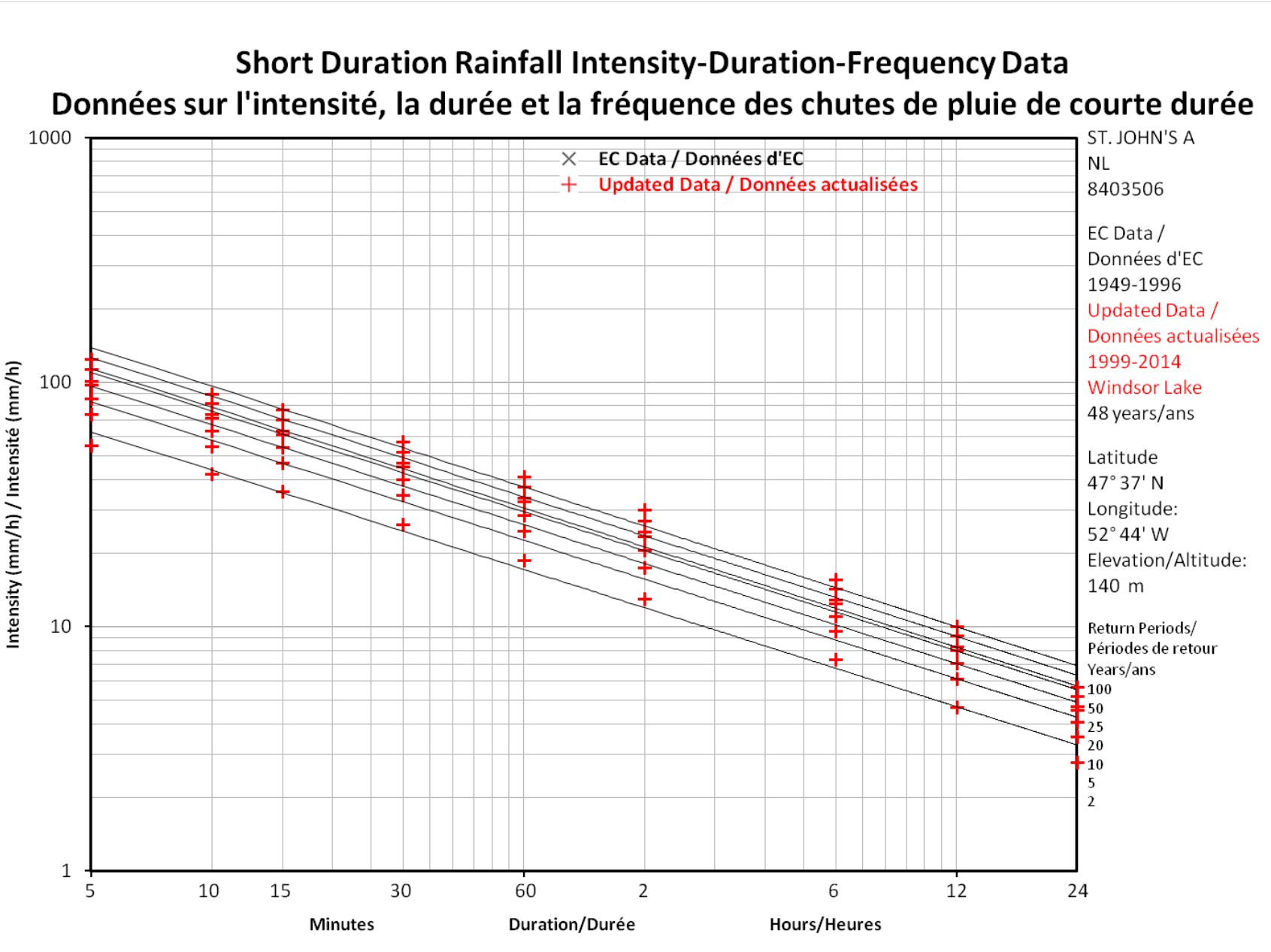
R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)

RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)
T = Rainfall duration (h) / Durée de la pluie (h)

****

Statistics/Statistiques	2 yr/ans	5 yr/ans	10 yr/ans	20 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans
Mean of RR/Moyenne de RR	22.9	30.1	35.0	39.6	41.1	45.6	50.1
Std. Dev. /Écart-type (RR)	18.3	24.2	28.2	32.0	33.1	36.8	40.5
Std. Error/Erreur-type	3.0	3.9	4.6	5.2	5.4	6.0	6.6
Coefficient (A)	17.2	22.5	26.1	29.5	30.6	34.0	37.3
Exponent/Exposant (B)	-0.521	-0.525	-0.527	-0.528	-0.528	-0.529	-0.530
Mean % Error/% erreur moyenne	7.4	7.9	8.2	8.4	8.4	8.6	8.8

Figure 12.1 St. John's A IDF Curve – Updated



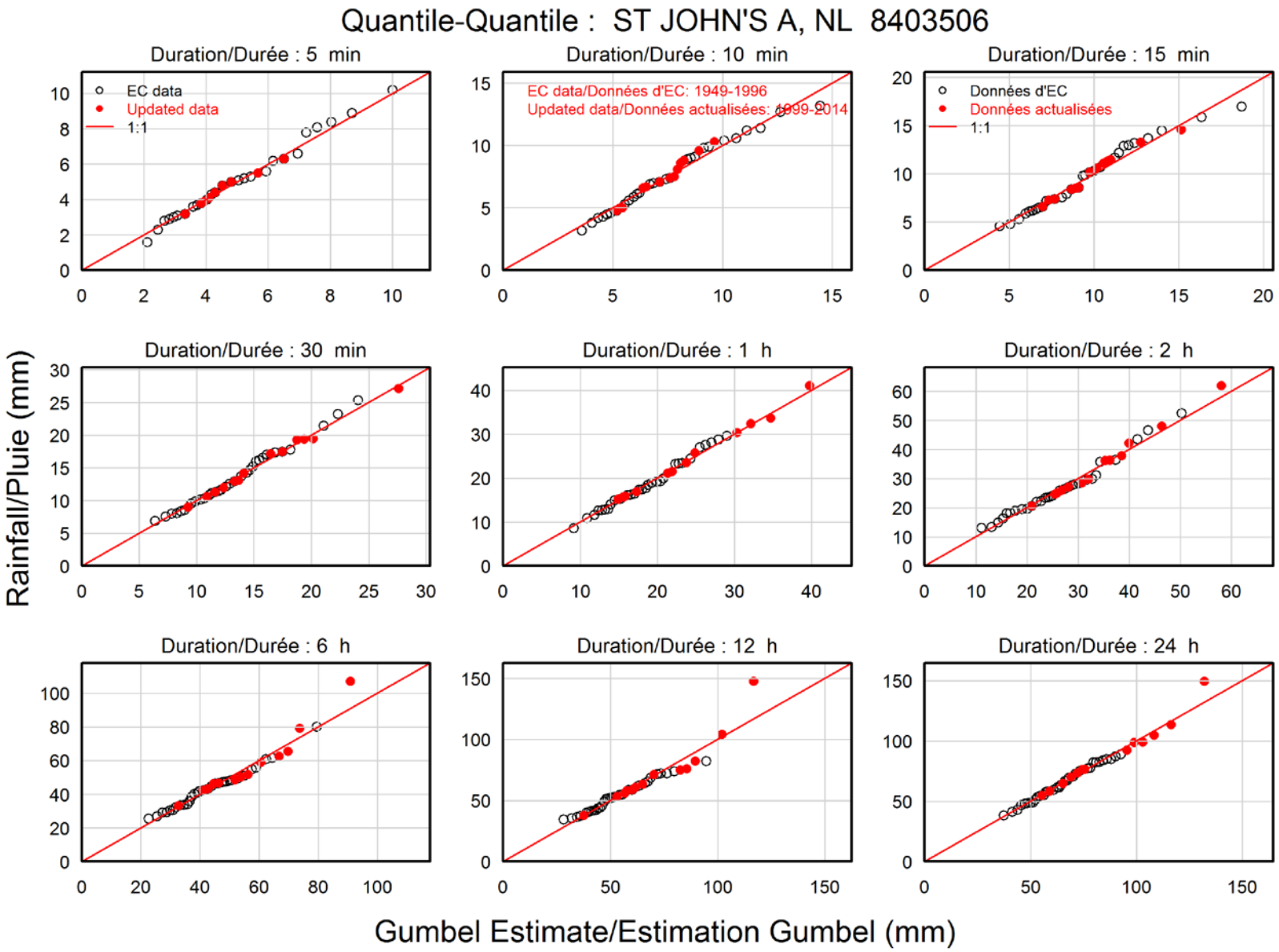


Figure 12.2 St. John's A Quantile-Quantile Plot – Updated

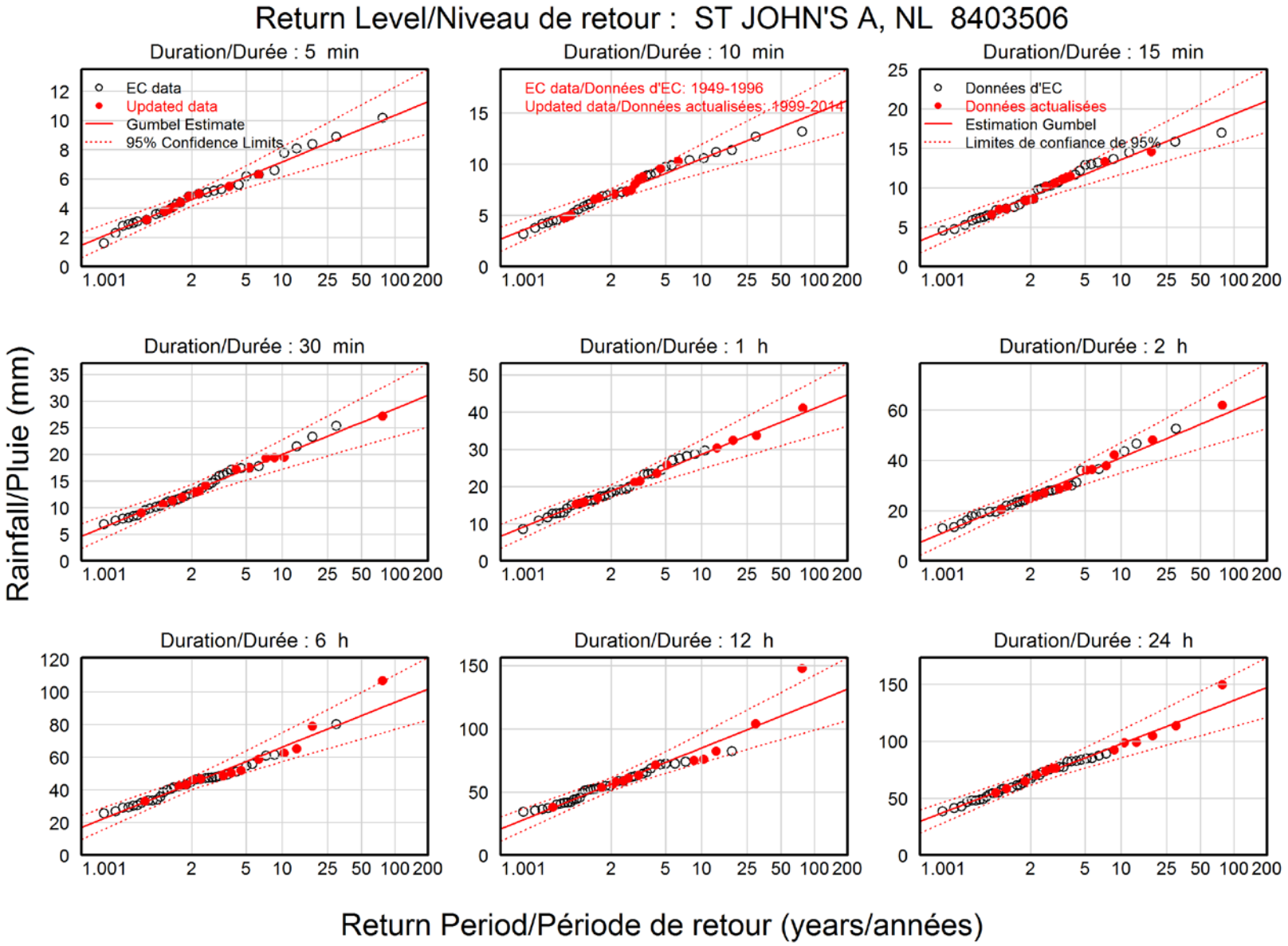


Figure 12.3 St. John's A Return Level Plot – Updated

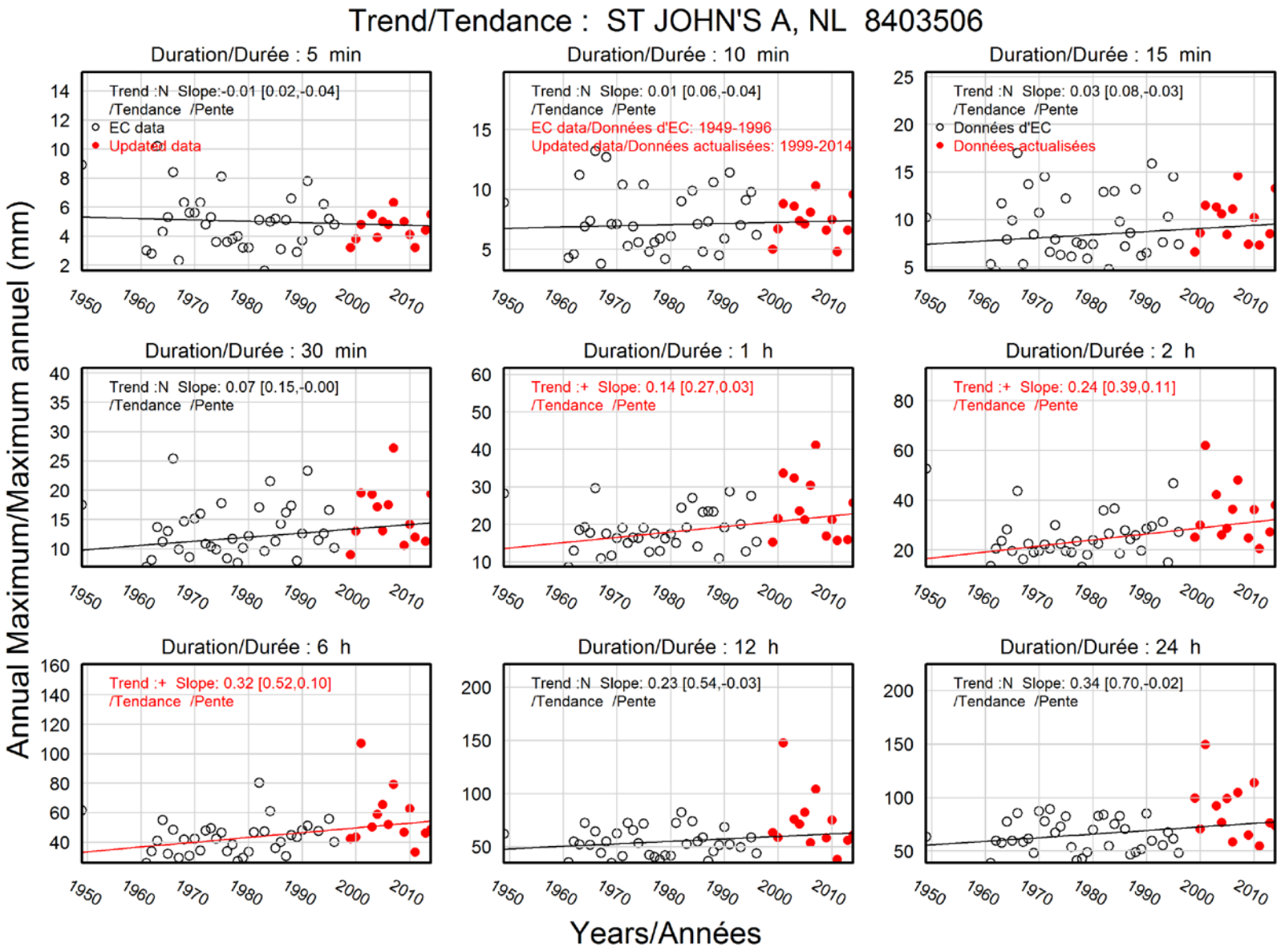
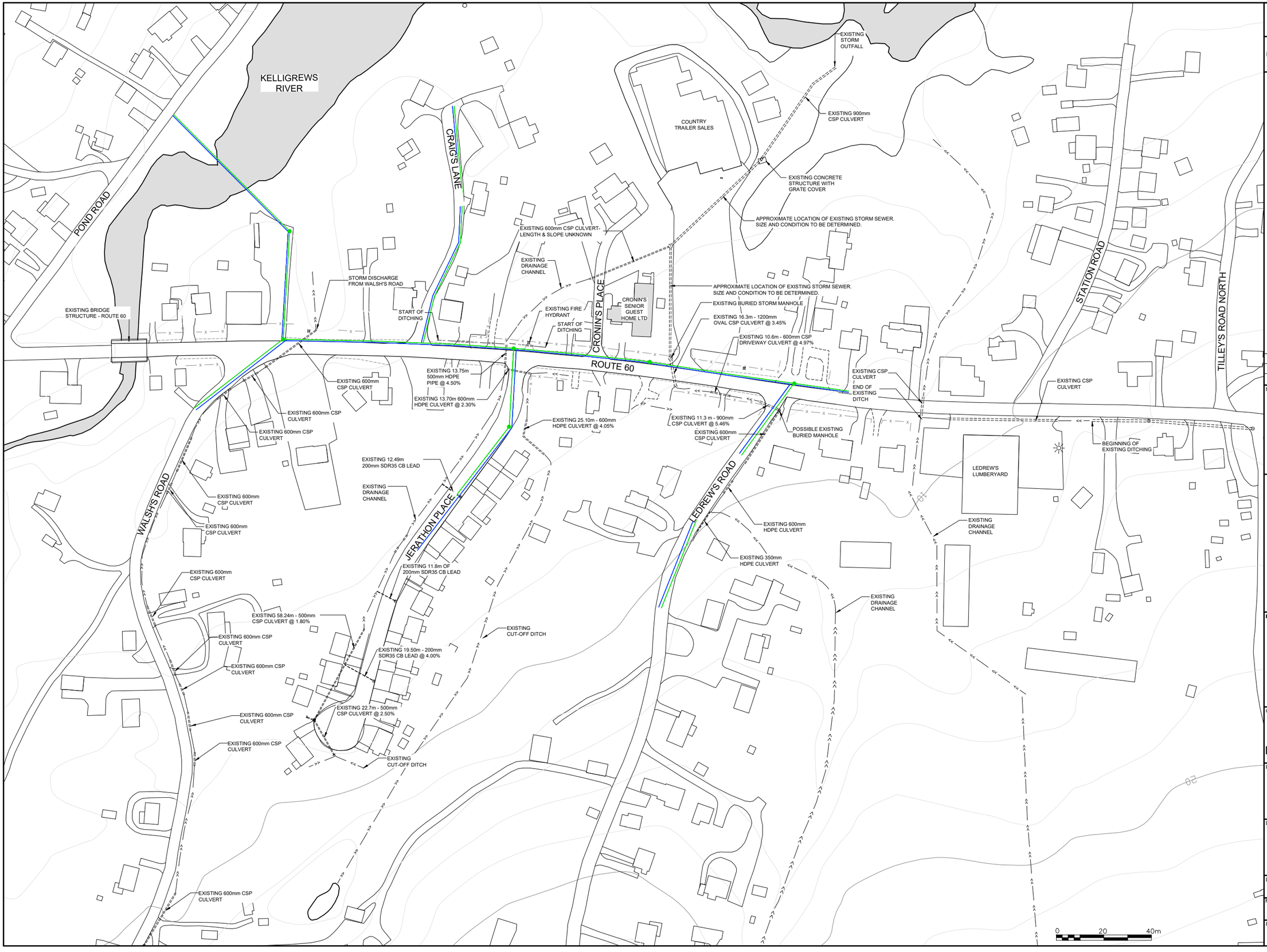


Figure 12.4 St. John's A Trend Plot – Updated

APPENDIX 'C'
EXISTING INFRASTRUCTURE



CONTRACTOR MUST VERIFY ALL DIMENSIONS AND CONDITIONS ON SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK. REPRODUCTIONS OF THIS DRAWING MAY HAVE BEEN REDUCED OR ENLARGED. REFER TO GRAPHIC SCALE. DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

A - PLAN, SECTION, ELEVATION, OR DETAIL No.
B - No. OF DRAWING WHERE 'A' IS ON SITE PLAN
C - No. OF DRAWING WHERE 'A' IS DETAILED

LEGEND	
SYMBOL	DESCRIPTION
	EXISTING SANITARY MANHOLE AND SEWER
	EXISTING STORM MANHOLE
	EXISTING STORM CATCH BASIN
	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	DITCH
x — x — x	FENCE

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

No.	REVISIONS	APP	DWN	DATE
B	REVISED FOR CLIENT REVIEW	V.B.	C.L.	20/03/31
A	ISSUED FOR CLIENT REVIEW	VB	CL	19/12/20

NORTH:

STAMP:

REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF NEWFOUNDLAND
VANESSA BARRY
SIGNATURE
20/03/31
DATE

Progressive Engineering & Consulting Inc.

PERMIT STAMP:

PROVINCE OF NEWFOUNDLAND AND LABRADOR
PEGL Newfoundland and Labrador
PERMIT HOLDER
This Permit Allows
PROGRESSIVE ENGINEERING & CONSULTING INC
To practice Professional Engineering in Newfoundland and Labrador.
Permit No. as issued by PEG N0566
which is valid for the year 2020

OWNER/CLIENT NAME:
TOWN OF CONCEPTION BAY SOUTH
NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
EXISTING INFRASTRUCTURE

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-2	B

APPENDIX 'D'
RUNOFF COMPUTATIONS & INFRASTRUCTURE CAPACITY CALCULATIONS

COMPUTATIONS FOR CAPACITIES OF STORM SEWER - EXISTING CONDITION

For: Town of Conception Bay South- Jerathon Place Catchments

				Runoff	Catchment	Catchment	Roughness	Rainfall	Total
Dwg No.	Location	Increment	Total	Coeff	Length	Slope	Coefficient	Intensity	Runoff
		(ha)	(ha)		(m)	(m/m)		(mm/hr)	(L/s)
1	Jerathon Place	0.37	0.37	0.40	101.73	0.04	0.06	68.00	27.96
2	Jerathon Place	0.13	0.50	0.40	79.15	0.03	0.06	68.00	37.78
3	Jerathon Place	0.19	0.69	0.40	39.84	0.00	0.06	68.00	52.14
4	Jerathon Place	0.26	0.95	0.40	70.55	0.06	0.06	68.00	71.78
5	Jerathon Place	0.23	1.18	0.40	59.85	0.01	0.06	68.00	89.16
6	Jerathon Place	0.18	1.36	0.40	52.54	0.09	0.06	68.00	102.76
7	Jerathon Place	0.25	1.61	0.40	119.00	0.01	0.06	68.00	121.65
8	Jerathon Place	0.39	2.00	0.40	99.58	0.02	0.06	68.00	151.35

COMPUTATIONS FOR CAPACITIES OF STORM SEWER - EXISTING CONDITION

For: Town of Conception Bay South - Ledrew's Road Catchment

Dwg No.	Location	Area Increment (ha)	Area Total (ha)	Runoff Coeff	Catchment Length (m)	Catchment Slope (m/m)	Roughness Coefficient	Rainfall Intensity (mm/hr)	Total Runoff (L/s)
PR-1	Ledrews Road	25.65	25.65	0.30	1252.00	0.05	0.43	68.00	1453.62
PR-1	Tilley's Road South & Eagle River Drive Subdivision	14.696	40.35	0.5	1028.71	0.0408	0.06	68	1388.07

COMPUTATIONS FOR CAPACITIES OF STORM SEWER

For: Town of Conception Bay South - Jerathon Place - Future Conditions

				Runoff	Catchment	Catchment	Roughness	Rainfall	Total
Dwg No.	Location	Increment	Total	Coeff	Length	Slope	Coefficient	Intensity	Runoff
		(ha)	(ha)		(m)	(m/m)		(mm/hr)	(L/s)
PR-1	Jerathon Place	0.37	0.37	0.50	101.73	0.04	0.06	68.00	34.95
PR-1	Jerathon Place	0.13	0.50	0.50	79.15	0.04	0.06	68.00	47.23
PR-1	Jerathon Place	0.19	0.69	0.50	39.84	0.00	0.06	68.00	65.17
PR-1	Jerathon Place	0.26	0.95	0.50	70.55	0.06	0.06	68.00	89.73
PR-1	Jerathon Place	0.23	1.18	0.50	59.85	0.01	0.06	68.00	111.45
PR-1	Jerathon Place	0.18	1.36	0.50	52.54	0.09	0.06	68.00	128.45
PR-1	Jerathon Place	0.25	1.61	0.50	119.00	0.01	0.06	68.00	152.07
PR-1	Jerathon Place	0.39	2.00	0.50	99.58	0.02	0.06	68.00	189.19

COMPUTATIONS FOR CAPACITIES OF STORM SEWER

For: Town of Conception Bay South - Ledrew's Road - Future Conditions

				Runoff	Catchment	Catchment	Roughess	Rainfall	Total
Dwg No.	Location	Increment	Total	Coeff	Length	Slope	Coefficient	Intensity	Runoff
		(ha)	(ha)		(m)	(m/m)		(mm/hr)	(L/s)
PR-1	Ledrews Road	25.65	25.65	0.50	1252.00	0.05	0.43	68.00	2422.69
PR-1	Tilleys Road South & Eagle River Drive Subdivision	14.696	40.35	0.50	1028.71	0.0408	0.06	68.00	1388.07

COMPUTATIONS FOR CAPACITIES OF STORM SEWER

For: Town of Conception Bay South - Jerathon Place 100 Year Flow Rates

				Runoff	Catchment	Catchment	Roughness	Rainfall	Total
Dwg No.	Location	Increment	Total	Coeff	Length	Slope	Coefficient	Intensity	Runoff
		(ha)	(ha)		(m)	(m/m)		(mm/hr)	(L/s)
PR-1	Jerathon Place	0.37	0.37	0.50	101.73	0.04	0.06	130.00	67.15
PR-1	Jerathon Place	0.13	0.50	0.50	79.15	0.04	0.06	140.00	97.60
PR-1	Jerathon Place	0.19	0.69	0.50	39.84	0.00	0.06	110.40	106.10
PR-1	Jerathon Place	0.26	0.95	0.50	70.55	0.06	0.06	130.00	171.88
PR-1	Jerathon Place	0.23	1.18	0.50	59.85	0.01	0.06	135.00	221.62
PR-1	Jerathon Place	0.18	1.36	0.50	52.54	0.09	0.06	135.00	255.38
PR-1	Jerathon Place	0.25	1.61	0.50	119.00	0.01	0.06	90.00	201.50
PR-1	Jerathon Place	0.30	1.91	0.50	99.58	0.02	0.06	110.40	293.32

COMPUTATIONS FOR CAPACITIES OF STORM SEWER

For: Town of Conception Bay South

				Runoff	Catchment	Catchment	Roughness	Rainfall	Tota
Dwg No.	Location	Increment	Total	Coeff	Length	Slope	Coefficient	Intensity	Runoff
		(ha)	(ha)		(m)	(m/m)		(mm/hr)	(L/s)
PR-1	Ledrews Road Catchment	25.65	25.65	0.50	1252.00	0.05	0.43	50.00	1781.39
PR-1	Tilley's Road South & Eagle River Drive Subdivision	14.696	40.35	0.50	1028.71	0.0408	0.06	68	1388.07

Culvert Name	Culvert Location	Length (Meters)	Approx. Slope (%)	Maximum Capacity (Cubic Meters/Second)	Total Received Amount of Runoff Entering Pipe (Cubic Meters/Second)	Culvert Over Capacity? (YES/NO)
500mm CSP	Jerathon Place	22.27	2.5	0.556	0.02796	NO
500mm CSP	Jerathon Place	58.24	1.8	0.4723	0.0378	NO
200mm SDR 35 CB Lead	Jerathon Place	19.5	4	0.0834	0.01436	NO
200mm SDR 35 CB Lead	Jerathon Place	11.863	1.044	0.0426	0.01965	NO
600mm HDPE	Jerathon Place	3.2	2.8125	1.2	0.0896	NO
600mm HDPE	Jerathon Place	3	0.9	0.6788	0.13	NO
200mm SDR 35 CB Lead	Jerathon Place	12.488	6.99	0.112	0.013	NO
500mm HDPE	Jerathon Crossing Route 60	13.755	4.5	0.7468	0.825586	YES

YES
NO

Culvert Name	Culvert Location	Length (Meters)	Approx. Slope (%)	Maximum Capacity (Cubic Meters/Second)	Total Received Amount of Runoff Entering Pipe (Cubic Meters/Second)	Culvert Over Capacity? (YES/NO)
600mm CSP Driveway Culvert	Route 60	10.654	2.5	0.6788	2.841	YES
1200mm Oval CSP Culvert	Route 60	16.263	3.45	5.0634	2.9	NO

YES
NO

Culvert Name	Culvert Location	Length (Meters)	Approx. Slope (%)	Maximum Capacity (Cubic Meters/Second)	Total Received Amount of Runoff Entering Pipe (Cubic Meters/Second)	Culvert Over Capacity? (YES/NO)
500mm CSP	Jerathon Place	22.27	2.5	0.556	0.03495	NO
500mm CSP	Jerathon Place	58.24	1.8	0.4723	0.04723	NO
200mm SDR 35 CB Lead	Jerathon Place	19.5	4	0.0834	0.01795	NO
200mm SDR 35 CB Lead	Jerathon Place	11.863	1.044	0.0426	0.02456	NO
600mm HDPE	Jerathon Place	3.2	2.8125	1.2	0.1142	NO
600mm HDPE	Jerathon Place	3	0.9	0.6788	0.1142	NO
200mm SDR 35 CB Lead	Jerathon Place	12.488	6.99	0.112	0.0017	NO
500mm HDPE	Jerathon Crossing Route 60	13.755	4.5	0.7468	1.0311	YES

YES
NO

Culvert Name	Culvert Location	Length (Meters)	Approx. Slope (%)	Maximum Capacity (Cubic Meters/Second)	Total Received Amount of Runoff Entering Pipe (Cubic Meters/Second)	Culvert Over Capacity? (YES/NO)
600mm CSP Driveway Culvert	Route 60	10.654	2.5	0.6788	3.81	YES
1200mm Oval CSP Culvert	Route 60	16.263	3.45	5.0634	3.94	NO

YES
NO

APPENDIX 'E'
UPGRADE CONCEPTS – WITHOUT DITCH UPGRADES

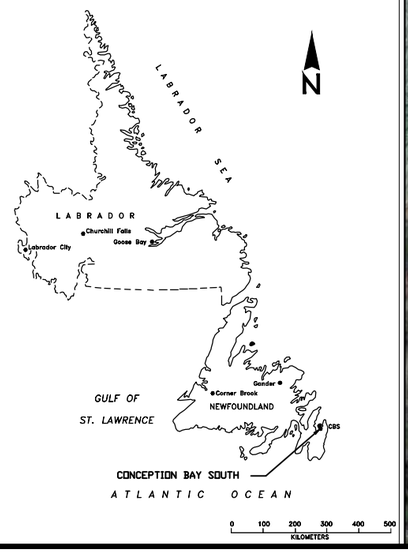
LIST OF DRAWINGS

LEDREW'S ROAD-CRONIN'S PLACE DRAINAGE ISSUE

TOWN OF CONCEPTION BAY SOUTH NEWFOUNDLAND & LABRADOR

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

LOCATION PLAN:



PEC

4 BREMIGENS BLVD., UNIT 201
PARADISE, NL, A1L 4A5
PHONE: (709) 368-7117
FAX: (709) 368-9446

REV B -
REVISED FOR CLIENT REVIEW MARCH 31, 2020

OWNER/CLIENT NAME:

THE TOWN OF CONCEPTION BAY SOUTH - NL

PROJECT No.:

2019-041

KELLIGREWS RIVER

NEW DITCH FOR DRAINAGE OUTFALL
DITCH TO KELLIGREWS RIVER

NEW OUTFALL.
EXACT LOCATION TO BE DETERMINED.

NEW STORM MANHOLE-3

NEW 1500mm Ø
HDPE STORM PIPE
@ 1.7% MINIMUM

CRAIG'S LANE

EXISTING SANITARY AND WATERMAIN
SIZE AND LOCATION TO BE CONFIRMED

EXISTING
DRAINAGE DITCH

COUNTRY
TRAILER SALES

EXISTING 600mm CSP CULVERT-
LENGTH & SLOPE UNKNOWN

CRONIN'S PLACE

CRONIN'S
SENIOR
GUEST
HOME LTD

EX.
DWY

BERM EXISTING DRAINAGE DITCH
TO PREVENT FLOW FROM PASSING
TOWARDS CRONIN'S PLACE

EXISTING POLES

EXISTING CSP
DWY CULVERTS

EXISTING POLES

EXISTING FIRE
HYDRANT

EXISTING MANHOLE AND STORM PIPE
DOWN STREAM TO BE ABANDONED

EXISTING 1200mm CSP
CULVERT TO BE REMOVED

EXISTING POLE

EXISTING FIRE
HYDRANT

EXISTING FIRE
HYDRANT

STORM DISCHARGE
FROM WALSH'S ROAD

EXISTING 600mm
CSP CULVERT

NEW STORM
MANHOLE-2

NEW STORM
MANHOLE-1

NEW 600mmØ
HDPE CULVERT

CONCEPTION BAY HIGHWAY

NEW CONCRETE
HEADWALL c/w HANDRAIL

EX. PARKING LOT

EX.
DWY

NEW 600mmØ
HDPE PIPE

NEW 1500mm Ø
HDPE STORM PIPE
@ 1.7% MINIMUM

NEW PRE-CAST
CONCRETE HEADWALL

NEW 600mmØ
HDPE CULVERT

EXISTING POLE

NEW 1200mm Ø
HDPE STORM PIPE
@ 1.7% MINIMUM

EXISTING POLE

WALSH ROAD

TINY'S BAR
AND GRILL

NEW PRE-CAST
CONCRETE
HEADWALL

EXISTING
DITCH

JERATHON PLACE

NEW 900mm Ø HDPE
DRIVEWAY CULVERT

APPROXIMATE LOCATION OF
EXISTING STORM MANHOLE

EXISTING 900mmØ CULVERT

LEDREW'S ROAD

0 5 15 25m

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LEGEND	
SYMBOL	DESCRIPTION
	EXISTING SANITARY MANHOLE AND SEWER
	EXISTING STORM MANHOLE
	EXISTING STORM CATCH BASIN
	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	DITCH
x — x — x	FENCE
	NEW STORM MANHOLE AND SEWER

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

No.	REVISIONS	APP	DWN	DATE
B	REVISED FOR CLIENT REVIEW	V.B.	C.L.	20/03/31
A	ISSUED FOR CLIENT REVIEW	VB	CL	19/12/20

NORTH:

STAMP:
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VANESSA BARRY
SIGNATURE
20/03/31
DATE
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Progressive Engineering & Consulting Inc.

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PERMIT HOLDER
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OWNER/CLIENT NAME:
TOWN OF CONCEPTION BAY SOUTH
NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
OPTION #1

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-3	B

KELLIGREWS RIVER

NEW DITCH FOR DRAINAGE OUTFALL
DITCH TO KELLIGREWS RIVER

NEW OUTFALL.
EXACT LOCATION TO BE DETERMINED.

NEW STORM
MANHOLE-4

NEW 1050mm Ø
HDPE STORM PIPE
@ 1.5% MINIMUM

CRAIG'S LANE

EXISTING SANITARY AND WATERMAIN
SIZE AND LOCATION TO BE CONFIRMED

EXISTING DRAINAGE
DITCH

EXISTING 600mm CSP CULVERT-
LENGTH & SLOPE UNKNOWN

POSSIBLE MANHOLE

EXISTING STORM SEWER SYSTEM - CONFIRM CONDITION, SIZE AND LOCATION

NEW 1200mm Ø HDPE STORM SEWER @ MIN. 1.5%.
NEW POTENTIAL ALIGNMENT MAY BE REQUIRED
BASED ON INVESTIGATION OF EXISTING SYSTEM.

CRONIN'S PLACE

CRONIN'S
SENIOR
GUEST
HOME LTD

COUNTRY
TRAILER
SALES

EXISTING STORM GRATE

NEW DITCH FOR DRAINAGE OUTFALL
DITCH TO KELLIGREWS RIVER

NEW OUTFALL.
EXACT LOCATION TO BE DETERMINED.

EX.
DWY

BERM EXISTING DRAINAGE DITCH
TO PREVENT FLOW FROM PASSING
TOWARDS CRONIN'S PLACE

EXISTING POLES

EXISTING
ROADSIDE
DITCH

EXISTING FIRE
HYDRANT

NEW STORM
MANHOLE -1

EXISTING POLE

EXISTING FIRE
HYDRANT

EXISTING FIRE
HYDRANT

STORM DISCHARGE
FROM WALSH'S ROAD

NEW 600Ø HDPE PIPE

NEW STORM
MANHOLE-3

NEW STORM
MANHOLE-2

EXISTING 600mm
CSP CULVERT

EX. PARKING LOT

NEW 1050mm Ø
HDPE STORM PIPE
@ 1.5% MINIMUM

NEW 600mmØ
HDPE PIPE

CONCEPTION BAY HIGHWAY

NEW 900mm Ø HDPE
DRIVEWAY CULVERT

EXISTING 900mm HDPE CULVERT

EXISTING POLE

EXISTING 1200mm CSP CULVERT

EXISTING POLE

NEW PRE-CAST CONCRETE
HEADWALL

NEW 600mmØ
HDPE CULVERT

NEW PRE-CAST
CONCRETE
HEADWALL

EXISTING
DITCH

TINY'S BAR
AND GRILL

WALSH ROAD

JERATHON PLACE

LEDREW'S ROAD

0 5 15 25m

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SYMBOL	DESCRIPTION
	EXISTING SANITARY MANHOLE AND SEWER
	EXISTING STORM MANHOLE
	EXISTING STORM CATCH BASIN
	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	DITCH
	FENCE
	NEW STORM MANHOLE AND SEWER

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SIGNATURE
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TOWN OF CONCEPTION BAY SOUTH
NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
OPTION #2

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-4	B

APPENDIX 'F'
UPGRADE CONCEPTS – WITH DITCH UPGRADES

KELLIGREWS RIVER

NEW DITCH FOR DRAINAGE OUTFALL DITCH TO KELLIGREWS RIVER

NEW OUTFALL. EXACT LOCATION TO BE DETERMINED.

NEW STORM MANHOLE-3

NEW 1200mm Ø HDPE STORM PIPE @ 1.7% MINIMUM

CRAIG'S LANE

EXISTING SANITARY AND WATERMAIN SIZE AND LOCATION TO BE CONFIRMED

EXISTING DRAINAGE DITCH

COUNTRY TRAILER SALES

EXISTING 600mm CSP CULVERT- LENGTH & SLOPE UNKNOWN

CRONIN'S PLACE

CRONIN'S SENIOR GUEST HOME LTD

EX. DWY

BERM EXISTING DRAINAGE DITCH TO PREVENT FLOW FROM PASSING TOWARDS CRONIN'S PLACE

EXISTING POLES

EXISTING CSP DWY CULVERTS

EXISTING FIRE HYDRANT

EXISTING MANHOLE AND STORM PIPE DOWN STREAM TO BE ABANDONED

EXISTING 1200mm CSP CULVERT TO BE REMOVED

EXISTING POLE

EXISTING FIRE HYDRANT

STORM DISCHARGE FROM WALSH'S ROAD

EXISTING 600mm CSP CULVERT

NEW STORM MANHOLE-2

NEW STORM MANHOLE-1

NEW 600mmØ HDPE CULVERT

CONCEPTION BAY HIGHWAY

NEW CONCRETE HEADWALL c/w HANDRAIL

EX. PARKING LOT

NEW 600mmØ HDPE PIPE

NEW 1200mm Ø HDPE STORM PIPE @ 1.7% MINIMUM

NEW PRE-CAST CONCRETE HEADWALL

NEW 600mmØ HDPE CULVERT

NEW 1050mm Ø HDPE STORM PIPE @ 1.7% MINIMUM

EXISTING POLE

NEW 900mm Ø HDPE DRIVEWAY CULVERT

APPROXIMATE LOCATION OF EXISTING STORM MANHOLE

EXISTING 900mmØ CULVERT

WALSH ROAD

TINY'S BAR AND GRILL

NEW PRE-CAST CONCRETE HEADWALL

EXISTING DITCH

JERATHON PLACE

LEDREW'S ROAD

0 5 15 25m

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	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	DITCH
	FENCE
	NEW STORM MANHOLE AND SEWER

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NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
OPTION #1A

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-5	B

KELLIGREWS RIVER

NEW DITCH FOR DRAINAGE OUTFALL
DITCH TO KELLIGREWS RIVER

NEW OUTFALL.
EXACT LOCATION TO BE DETERMINED.

NEW STORM MANHOLE-4

NEW 1050mm Ø HDPE STORM PIPE @ 1.5% MINIMUM

CRAIG'S LANE

EXISTING SANITARY AND WATERMAIN SIZE AND LOCATION TO BE CONFIRMED

EXISTING DRAINAGE DITCH

BERM EXISTING DRAINAGE DITCH TO PREVENT FLOW FROM PASSING TOWARDS CRONIN'S PLACE

EX. DWY

EXISTING POLES

EXISTING FIRE HYDRANT

STORM DISCHARGE FROM WALSH'S ROAD

EXISTING 600mm CSP CULVERT

WALSH ROAD

NEW STORM MANHOLE-3

NEW STORM MANHOLE-2

NEW 600Ø HDPE PIPE

NEW 600mmØ HDPE PIPE

NEW 1050mm Ø HDPE STORM PIPE @ 1.5% MINIMUM

EX. PARKING LOT

TINY'S BAR AND GRILL

NEW PRE-CAST CONCRETE HEADWALL

EXISTING DITCH

JERATHON PLACE

EXISTING 600mm CSP CULVERT-LENGTH & SLOPE UNKNOWN

CRONIN'S PLACE

CRONIN'S SENIOR GUEST HOME LTD

EXISTING ROADSIDE DITCH

EXISTING POLES

EXISTING FIRE HYDRANT

NEW STORM MANHOLE -1

EXISTING POLE

CONCEPTION BAY HIGHWAY

NEW PRE-CAST CONCRETE HEADWALL

NEW 600mmØ HDPE CULVERT

EX. DWY

EXISTING POLE

COUNTRY TRAILER SALES

EXISTING STORM GRATE

NEW DITCH FOR DRAINAGE OUTFALL
DITCH TO KELLIGREWS RIVER

NEW OUTFALL.
EXACT LOCATION TO BE DETERMINED.

POSSIBLE MANHOLE

EXISTING STORM SEWER SYSTEM - CONFIRM CONDITION, SIZE AND LOCATION

NEW 900mm Ø HDPE STORM SEWER @ MIN. 1.5%.
NEW POTENTIAL ALIGNMENT MAY BE REQUIRED
BASED ON INVESTIGATION OF EXISTING SYSTEM.

EXISTING FIRE HYDRANT

NEW 900mm Ø HDPE DRIVEWAY CULVERT

EXISTING 900mm HDPE CULVERT

EXISTING 1200mm CSP CULVERT

EXISTING POLE

LEDREW'S ROAD

0 5 15 25m

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	EXISTING STORM CATCH BASIN
	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	DITCH
	FENCE
	NEW STORM MANHOLE AND SEWER

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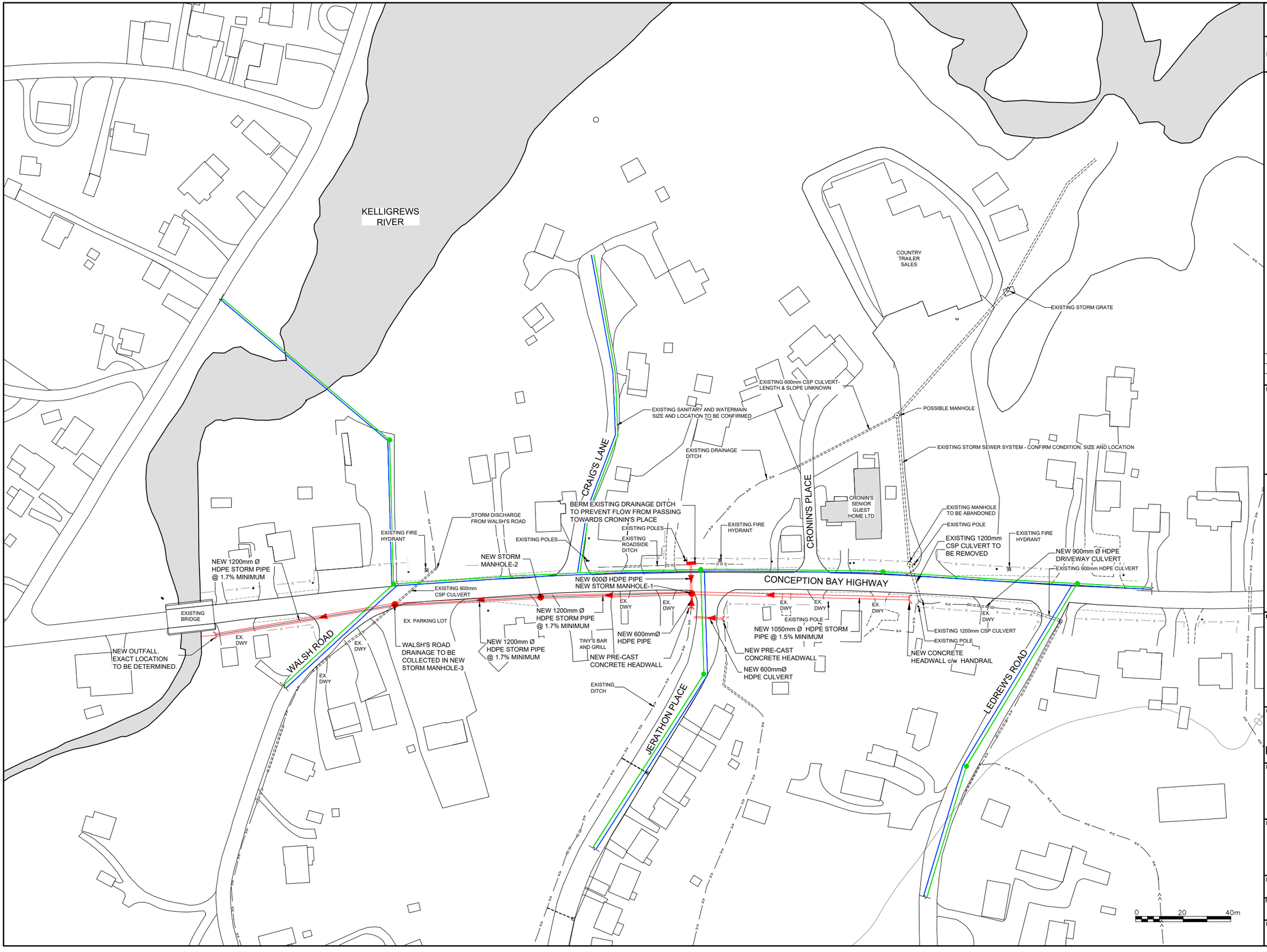
OWNER/CLIENT NAME:
TOWN OF CONCEPTION BAY SOUTH
NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
OPTION #2A

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-6	B



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LEGEND

SYMBOL	DESCRIPTION
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	EXISTING STORM MANHOLE
	EXISTING STORM CATCH BASIN
	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	DITCH
	FENCE
	NEW STORM MANHOLE AND SEWER

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PEGNL Newfoundland and Labrador Engineers and Geoscientists
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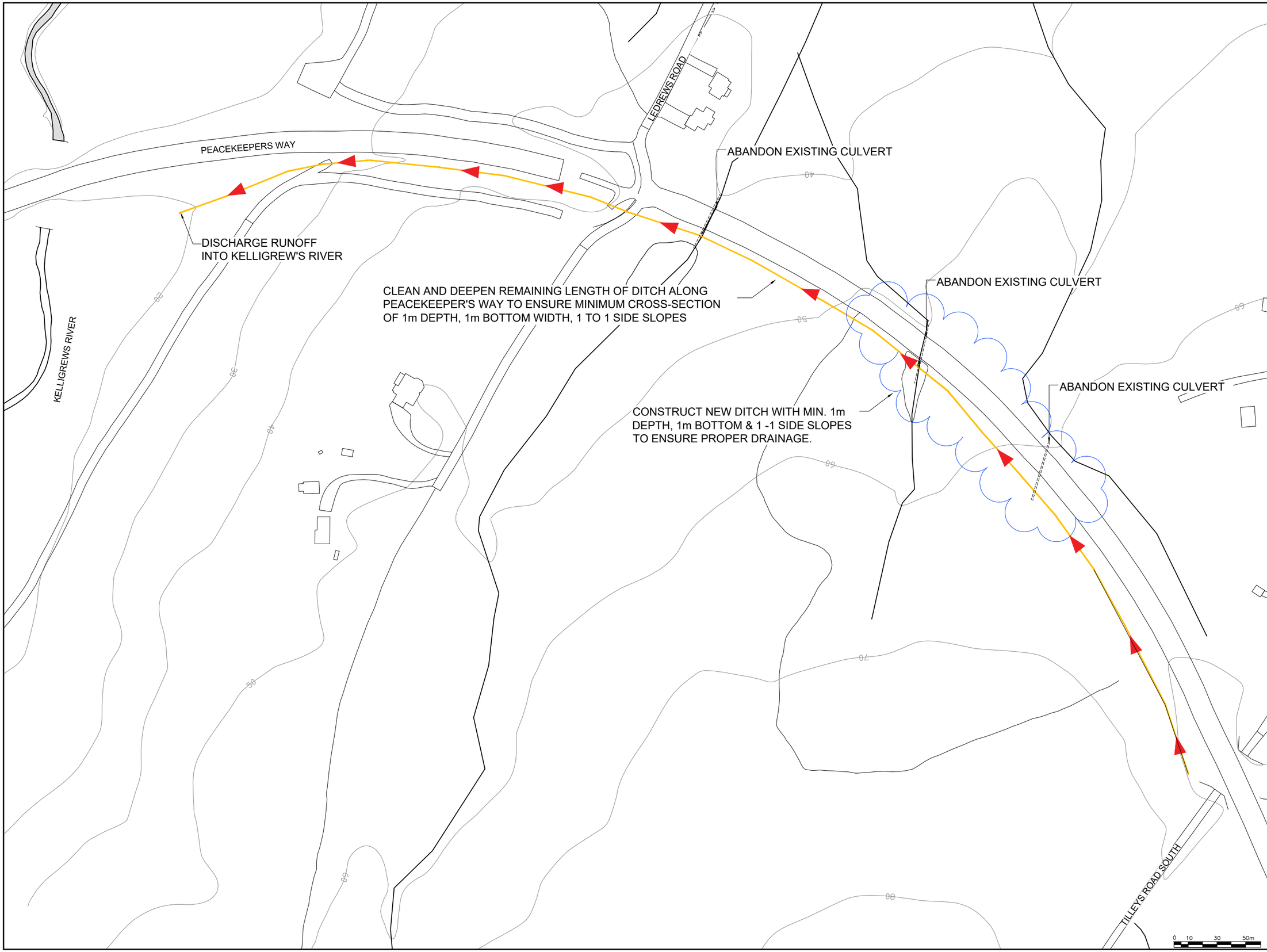
NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
OPTION #3

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-7	B



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	EXISTING STORM MANHOLE
	EXISTING STORM CATCH BASIN
	EXISTING WATERMAIN
	EXISTING FIRE HYDRANT
	EXISTING CULVERT
	PROPOSED DITCH
x — x — x	FENCE
	NEW STORM MANHOLE AND SEWER
	SECTION OF DITCH TO BE DEEPENED

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

No.	REVISIONS	APP	DWN	DATE
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NEWFOUNDLAND AND LABRADOR

PROJECT TITLE:
LEDREW'S ROAD
CRONIN'S PLACE
DRAINAGE ISSUE

DRAWING TITLE:
NEW PROPOSED DITCH
PEACEKEEPERS WAY

DRAWN BY:	DESIGNED BY:	APPROVED BY:
C.L.	C.L.	VB
MAE No:	DATE:	SCALE:
N/A	MAR 2020	AS SHOWN
PROJECT No:	DRAWING No:	REV:
2019-041	PR-8	B

APPENDIX 'G'
UPGRADE ESTIMATES – WITHOUT DITCH UPGRADES

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-1

BUDGET ESTIMATE: $360,710.31

APPENDIX "A" - QUANTITIES AND PRICES

The quantities set out in this schedule are estimated quantities only and are not to be taken as final quantities by the contractor. The unit prices bid shall include all labour, plant, materials, overhead, duties, and profit and all other obligations and liabilities under the contract. Do not include taxes in unit or lump sum prices, taxes due to be added on the last page of this schedule as indicated on the bottom. Totals shall be determined by multiplying the quantity by the tendered unit price.

SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
			CONSTRUCTION COST:		$360,710.31
			LAND ACQUISITION:		
			TOTAL:		$360,710.31
	DIVISION #1				
01010	MOBILIZATION & DEMOBILIZATION (Not greater than 5% if on the Island, or 10% if in Labrador, or 15% north of Cartwright, of item a. "sub-total" on last page)	LS	UNIT	$15,000.00	$15,000.00
01020	CASH ALLOWANCE (to be entered by Consultant)				
	Pole Relocation/shoring/bracing	Allowance		$10,000.00	$10,000.00
01560	ENVIRONMENTAL REQUIREMENTS				
	Silt Fence	M	50.00	$3.00	$150.00
01570	TRAFFIC REGULATIONS				
	Flagperson's Wages	HOUR	150.00	$25.00	$3,750.00
01710	REINSTATEMENT AND CLEANING				
	Fencing	M	60.00	$50.00	$3,000.00
	Ditching	M	30.00	$12.00	$360.00
	Remove, Relocate and/or Replace Culverts	M	15.00	$25.00	$375.00
	Supply & Placing Topsoil	M^2	300.00	$6.00	$1,800.00
	Supply & Placement of Sods	M^2	300.00	$6.00	$1,800.00
	DIVISION #2				
02070	SITEWORK, DEMOLITION & REMOVAL OF STRUCTURES				
	Removal of Catch Basins, Manholes & Ditch Inlets	EACH	1.00	$1,500.00	$1,500.00
	Removal of Culverts	M	80.00	$10.00	$800.00
02223	EXCAVATION, TRENCHING & BACKFILLING				
	Main Trench Excavation				
	Rock	M^3	238.50	$55.00	$13,117.50
	Common	M^3	715.50	$14.00	$10,017.00
	Granular Pipe Bedding				
	Type 1	M^3	344.11	$22.00	$7,570.36
	Imported Backfill				
	Common (To Create Berm)	M^3	150.00	$18.00	$2,700.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-1

BUDGET ESTIMATE: $360,710.31

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
	150mm Minus Blast Rock (To fill culverts removed)	M^3	40.00	$20.00	$800.00
	Supply & Placement of Marking Tape				
	- Metallic Tape	M	173.00	$1.00	$173.00
02233	SELECTED GRANULAR BASE & SUB-BASE MATERIALS				
	Class "A" Granular Base (shoulders 100mm)	tonne	70.56	$24.00	$1,693.44
	Class "A" Granular Base (driveways 150mm)	tonne	20.16	$24.00	$483.84
	Class "A" Granular Base	tonne	118.80	$24.00	$2,851.20
	Class "B" Granular Sub-Base	tonne	158.40	$22.00	$3,484.80
02270	RIP-RAP PROTECTION				
	Rip-Rap Hand Laid With Sod	M^3	6.00	$90.00	$540.00
02434	PIPE CULVERTS				
	Supply & Placement of Pipe Culvert				
	(Size) (Thickness) (Type)				
	900 mm HDPE 320kpa	M	10.00	$250.00	$2,500.00
	600 mm HDPE 320kpa	M	30.00	$210.00	$6,300.00
02481	CHANNEL EXCAVATION, CLEARING & DEEPENING				
	Channel Excavation				
	Common	M^3	80.00	$100.00	$8,000.00
	Cleaning & Deepening of Existing Channels	M	20.00	$25.00	$500.00
02547	ASPHALT TACK COAT				
	Supply & Placement of Asphalt Tack Coat	M^2	200.00	$0.75	$150.00
02574	RESHAPING & PATCHING ASPHALT PAVEMENT				
	Removal of Asphalt Pavement	M^2	350.00	$4.00	$1,400.00
	Replacment of Asphalt Pavement within Street ROW				
	Inc. 2x50mm layers of Surface Course Asphalt	M^2	200.00	$80.00	$16,000.00
	Replacment of Asphalt Pavement within for Driveways				
	Incl. 200mm Class 'A' & 50mm Surface Course Asphalt	M^2	150.00	$65.00	$9,750.00
	Cutting of Asphalt Pavement	M	320.00	$2.00	$640.00
02601	MANHOLES, CATCH BASINS, DITCH INLETS & VALVE CHAMBERS				
	Supply & Placement of Pre-cast Manholes				
	1.5M to 2M	EACH	3.00	$8,000.00	$24,000.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-1

BUDGET ESTIMATE: $360,710.31

APPENDIX "A" - QUANTITIES AND PRICES

The quantities set out in this schedule are estimated quantities only and are not to be taken as final quantities by the contractor. The unit prices bid shall include all labour, plant, materials, overhead, duties, and profit and all other obligations and liabilities under the contract. Do not include taxes in unit or lump sum prices, taxes due to be added on the last page of this schedule as indicated on the bottom. Totals shall be determined by multiplying the quantity by the tendered unit price.

SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
	Supply & Placement of Manhole Inflow Protectors	EACH	3.00	$120.00	$360.00
	Adjustment of Manhole Tops	EACH	3.00	$250.00	$750.00
02702	PIPE SEWER CONSTRUCTION				
	Supply & Placement of Storm Sewer				
	1500 mm HDPE 320kpa	M	173.00	$550.00	$95,150.00
	1200 mm HDPE 320kpa	M	92.00	$450.00	$41,400.00
	T.V. Camera Inspection Services	M	265.00	$3.00	$795.00
	DIVISION #3				
03300	CAST-IN-PLACE CONCRETE				
	Cast-in-Place Concrete Headwall c/w Handrails	EACH	2.00	$8,000.00	$16,000.00
	Cast-in-Place Concrete Headwall	EACH	2.00	$4,000.00	$8,000.00

a) SUB TOTAL **$313,661.14**

b) H.S.T. 15% OF SUB TOTAL **$47,049.17**

d) GRAND TOTAL **$360,710.31**

(Carry forward to page 1 of the Tender Form)

DEPT. OF MUNICIPAL AND PROVINCIAL AFFAIRS
Spec Set No. (Found on inside cover of Master Spec.)

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-2

BUDGET ESTIMATE: $324,857.90

APPENDIX "A" - QUANTITIES AND PRICES

The quantities set out in this schedule are estimated quantities only and are not to be taken as final quantities by the contractor. The unit prices bid shall include all labour, plant, materials, overhead, duties, and profit and all other obligations and liabilities under the contract. Do not include taxes in unit or lump sum prices, taxes due to be added on the last page of this schedule as indicated on the bottom. Totals shall be determined by multiplying the quantity by the tendered unit price.

SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
			CONSTRUCTION COST:		**$324,857.90**
			LAND ACQUISITION:		
			TOTAL:		**$324,857.90**
	DIVISION #1				
01010	MOBILIZATION & DEMOBILIZATION (Not greater than 5% if on the Island, or 10% if in Labrador, or 15% north of Cartwright, of item a. "sub-total" on last page)	LS	UNIT	$15,000.00	$15,000.00
01020	CASH ALLOWANCE (to be entered by Consultant)				
	Pole Relocation/shoring/bracing	Allowance		$10,000.00	$10,000.00
01560	ENVIRONMENTAL REQUIREMENTS				
	Silt Fence	M	50.00	$3.00	$150.00
01570	TRAFFIC REGULATIONS				
	Flagperson's Wages	HOUR	150.00	$25.00	$3,750.00
01710	REINSTATEMENT AND CLEANING				
	Fencing	M	40.00	$50.00	$2,000.00
	Ditching	M	30.00	$12.00	$360.00
	Remove, Relocate and/or Replace Culverts	M	15.00	$25.00	$375.00
	Supply & Placing Topsoil	M^2	100.00	$6.00	$600.00
	Supply & Placement of Sods	M^2	100.00	$6.00	$600.00
	DIVISION #2				
02070	SITEWORK, DEMOLITION & REMOVAL OF STRUCTURES				
	Removal of Catch Basins, Manholes & Ditch Inlets	EACH	1.00	$1,500.00	$1,500.00
	Removal of Culverts	M	80.00	$10.00	$800.00
02223	EXCAVATION, TRENCHING & BACKFILLING				
	Main Trench Excavation				
	Rock	M^3	135.00	$55.00	$7,425.00
	Common	M^3	585.00	$14.00	$8,190.00
	Granular Pipe Bedding				
	Type 1	M^3	380.84	$22.00	$8,378.48
	Imported Backfill				
	Common (To Create Berm)	M^3	150.00	$18.00	$2,700.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-2

BUDGET ESTIMATE: $324,857.90

APPENDIX "A" - QUANTITIES AND PRICES

The quantities set out in this schedule are estimated quantities only and are not to be taken as final quantities by the contractor. The unit prices bid shall include all labour, plant, materials, overhead, duties, and profit and all other obligations and liabilities under the contract. Do not include taxes in unit or lump sum prices, taxes due to be added on the last page of this schedule as indicated on the bottom. Totals shall be determined by multiplying the quantity by the tendered unit price.

SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
	150mm Minus Blast Rock (To fill culverts removed)	M^3	40.00	$20.00	$800.00
	Supply & Placement of Marking Tape				
	- Metallic Tape	M	260.00	$1.00	$260.00
02233	SELECTED GRANULAR BASE & SUB-BASE MATERIALS				
	Class "A" Granular Base (shoulders 100mm)	tonne	28.00	$24.00	$672.00
	Class "A" Granular Base	tonne	77.22	$24.00	$1,853.28
	Class "B" Granular Sub-Base	tonne	102.96	$22.00	$2,265.12
02270	RIP-RAP PROTECTION				
	Rip-Rap Hand Laid With Sod	M^3	6.00	$90.00	$540.00
02434	PIPE CULVERTS				
	Supply & Placement of Pipe Culvert				
	(Size) (Thickness) (Type)				
	900 mm HDPE 320kpa	M	10.00	$250.00	$2,500.00
	600 mm HDPE 320kpa	M	30.00	$210.00	$6,300.00
02481	CHANNEL EXCAVATION, CLEARING & DEEPENING				
	Channel Excavation				
	Common	M^3	80.00	$100.00	$8,000.00
	Cleaning & Deepening of Existing Channels	M	20.00	$25.00	$500.00
02547	ASPHALT TACK COAT				
	Supply & Placement of Asphalt Tack Coat	M^2	195.00	$0.75	$146.25
02574	RESHAPING & PATCHING ASPHALT PAVEMENT				
	Removal of Asphalt Pavement	M^2	475.00	$4.00	$1,900.00
	Replacment of Asphalt Pavement within Street ROW				
	Inc. 2x50mm layers of Surface Course Asphalt	M^2	195.00	$80.00	$15,600.00
	Replacment of Asphalt Pavement within for Driveways				
	Incl. 200mm Class 'A' & 50mm Surface Course Asphalt	M^2	280.00	$65.00	$18,200.00
	Cutting of Asphalt Pavement	M	430.00	$2.00	$860.00
02601	MANHOLES, CATCH BASINS, DITCH INLETS & VALVE CHAMBERS				
	Supply & Placement of Pre-cast Manholes				
	1.5M to 2M	EACH	4.00	$6,500.00	$26,000.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-2

BUDGET ESTIMATE: $324,857.90

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
	Supply & Placement of Manhole Inflow Protectors	EACH	4.00	$120.00	$480.00
	Adjustment of Manhole/Catch Basin Tops	EACH	4.00	$250.00	$1,000.00
02702	PIPE SEWER CONSTRUCTION				
	Supply & Placement of Storm Sewer				
	1050 mm HDPE 320kpa	M	180.00	$400.00	$72,000.00
	1200 mm HDPE 320kpa	M	80.00	$450.00	$36,000.00
	T.V. Camera Inspection Services	M	260.00	$3.00	$780.00
	DIVISION #3				
03300	CAST-IN-PLACE CONCRETE				
	Cast-in-Place Concrete Headwall c/w Handrails	EACH	2.00	$8,000.00	$16,000.00
	Cast-in-Place Concrete Headwall	EACH	2.00	$4,000.00	$8,000.00

a) SUB TOTAL **$282,485.13**

b) H.S.T. 15% OF SUB TOTAL **$42,372.77**

d) GRAND TOTAL **$324,857.90**

(Carry forward to page 1 of the Tender Form)

DEPT. OF MUNICIPAL AND PROVINCIAL AFFAIRS
Spec Set No. (Found on inside cover of Master Spec.) _____

APPENDIX 'H'
UPGRADE ESTIMATES – WITH DITCH UPGRADES

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-41 - OPTION-1A

BUDGET ESTIMATE: $485,209.76

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	2-Mar-20	APPROVED BY:	
			CONSTRUCTION COST:		$485,209.76
			LAND ACQUISITION:		
			TOTAL:		$485,209.76
	DIVISION #1				
01010	MOBILIZATION & DEMOBILIZATION (Not greater than 5% if on the Island, or 10% if in Labrador, or 15% north of Cartwright, of item a. "sub-total" on last page)	LS	UNIT	$15,000.00	$15,000.00
01020	CASH ALLOWANCE (to be entered by Consultant)				
	Pole Relocation/shoring/bracing	Allowance		$10,000.00	$10,000.00
01560	ENVIRONMENTAL REQUIREMENTS				
	Silt Fence	M	50.00	$3.00	$150.00
01570	TRAFFIC REGULATIONS				
	Flagperson's Wages	HOUR	150.00	$25.00	$3,750.00
01710	REINSTATEMENT AND CLEANING				
	Fencing	M	60.00	$50.00	$3,000.00
	Ditching	M	30.00	$12.00	$360.00
	Remove, Relocate and/or Replace Culverts	M	15.00	$25.00	$375.00
	Supply & Placing Topsoil	M^2	300.00	$6.00	$1,800.00
	Supply & Placement of Sods	M^2	300.00	$6.00	$1,800.00
	DIVISION #2				
02070	SITEWORK, DEMOLITION & REMOVAL OF STRUCTURES				
	Removal of Catch Basins, Manholes & Ditch Inlets	EACH	1.00	$1,500.00	$1,500.00
	Removal of Culverts	M	80.00	$10.00	$800.00
02223	EXCAVATION, TRENCHING & BACKFILLING				
	Main Trench Excavation				
	Rock	M^3	238.50	$55.00	$13,117.50
	Common	M^3	715.50	$14.00	$10,017.00
	Granular Pipe Bedding				
	Type 1	M^3	390.03	$22.00	$8,580.75
	Imported Backfill				
	Common (To Create Berm)	M^3	150.00	$18.00	$2,700.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-1A

BUDGET ESTIMATE: $485,209.76

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	2-Mar-20	APPROVED BY:	
	150mm Minus Blast Rock (To fill culverts removed)	M^3	40.00	$20.00	$800.00
	Supply & Placement of Marking Tape				
	- Metallic Tape	M	173.00	$1.00	$173.00
02233	SELECTED GRANULAR BASE & SUB-BASE MATERIALS				
	Class "A" Granular Base (shoulders 100mm)	tonne	70.56	$24.00	$1,693.44
	Class "A" Granular Base (driveways 150mm)	tonne	20.16	$24.00	$483.84
	Class "A" Granular Base	tonne	118.80	$24.00	$2,851.20
	Class "B" Granular Sub-Base	tonne	158.40	$22.00	$3,484.80
02270	RIP-RAP PROTECTION				
	Rip-Rap Hand Laid With Sod	M^3	6.00	$90.00	$540.00
02434	PIPE CULVERTS				
	Supply & Placement of Pipe Culvert				
	(Size) (Thickness) (Type)				
	900 mm HDPE 320kpa	M	10.00	$250.00	$2,500.00
	600 mm HDPE 320kpa	M	30.00	$210.00	$6,300.00
02481	CHANNEL EXCAVATION, CLEARING & DEEPENING				
	Channel Excavation				
	Common	M^3	460.00	$100.00	$46,000.00
	Cleaning & Deepening of Existing Channels	M	740.00	$25.00	$18,500.00
	200mm cobble stone	M^3	860.00	$75.00	$64,500.00
02547	ASPHALT TACK COAT				
	Supply & Placement of Asphalt Tack Coat	M^2	200.00	$0.75	$150.00
02574	RESHAPING & PATCHING ASPHALT PAVEMENT				
	Removal of Asphalt Pavement	M^2	350.00	$4.00	$1,400.00
	Replacment of Asphalt Pavement within Street ROW				
	Inc. 2x50mm layers of Surface Course Asphalt	M^2	200.00	$80.00	$16,000.00
	Replacment of Asphalt Pavement within for Driveways				
	Incl. 200mm Class 'A' & 50mm Surface Course Asphalt	M^2	150.00	$65.00	$9,750.00
	Cutting of Asphalt Pavement	M	320.00	$2.00	$640.00
02601	MANHOLES, CATCH BASINS, DITCH INLETS & VALVE CHAMBERS				
	Supply & Placement of Pre-cast Manholes				

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-1A

BUDGET ESTIMATE: $485,209.76

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	2-Mar-20	APPROVED BY:	
	1.5M to 2M	EACH	3.00	$8,000.00	$24,000.00
	Supply & Placement of Manhole Inflow Protectors	EACH	3.00	$120.00	$360.00
	Adjustment of Manhole Tops	EACH	3.00	$250.00	$750.00
02702	PIPE SEWER CONSTRUCTION				
	Supply & Placement of Storm Sewer				
	1200 mm HDPE 320kpa	M	173.00	$500.00	$86,500.00
	1050 mm HDPE 320kpa	M	92.00	$400.00	$36,800.00
	T.V. Camera Inspection Services	M	265.00	$3.00	$795.00
	DIVISION #3				
03300	CAST-IN-PLACE CONCRETE				
	Cast-in-Place Concrete Headwall c/w Handrails	EACH	2.00	$8,000.00	$16,000.00
	Cast-in-Place Concrete Headwall	EACH	2.00	$4,000.00	$8,000.00

a) SUB TOTAL	**$421,921.53**
b) H.S.T. 15% OF SUB TOTAL	**$63,288.23**
d) GRAND TOTAL	**$485,209.76**

(Carry forward to page 1 of the Tender Form)

DEPT. OF MUNICIPAL AND PROVINCIAL AFFAIRS
Spec Set No. (Found on inside cover of Master Spec.) _____

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-2A

BUDGET ESTIMATE: $454,232.90

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
			CONSTRUCTION COST:		**$454,232.90**
			LAND ACQUISITION:		
			TOTAL:		**$454,232.90**
	DIVISION #1				
01010	MOBILIZATION & DEMOBILIZATION (Not greater than 5% if on the Island, or 10% if in Labrador, or 15% north of Cartwright, of item a. "sub-total" on last page)	LS	UNIT	$15,000.00	$15,000.00
01020	CASH ALLOWANCE (to be entered by Consultant)				
	Pole Relocation/shoring/bracing	Allowance		$10,000.00	$10,000.00
01560	ENVIRONMENTAL REQUIREMENTS				
	Silt Fence	M	50.00	$3.00	$150.00
01570	TRAFFIC REGULATIONS				
	Flagperson's Wages	HOUR	150.00	$25.00	$3,750.00
01710	REINSTATEMENT AND CLEANING				
	Fencing	M	40.00	$50.00	$2,000.00
	Ditching	M	30.00	$12.00	$360.00
	Remove, Relocate and/or Replace Culverts	M	15.00	$25.00	$375.00
	Supply & Placing Topsoil	M^2	100.00	$6.00	$600.00
	Supply & Placement of Sods	M^2	100.00	$6.00	$600.00
	DIVISION #2				
02070	SITEWORK, DEMOLITION & REMOVAL OF STRUCTURES				
	Removal of Catch Basins, Manholes & Ditch Inlets	EACH	1.00	$1,500.00	$1,500.00
	Removal of Culverts	M	80.00	$10.00	$800.00
02223	EXCAVATION, TRENCHING & BACKFILLING				
	Main Trench Excavation				
	Rock	M^3	135.00	$55.00	$7,425.00
	Common	M^3	585.00	$14.00	$8,190.00
	Granular Pipe Bedding				
	Type 1	M^3	380.84	$22.00	$8,378.48
	Imported Backfill				
	Common (To Create Berm)	M^3	150.00	$18.00	$2,700.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-2A

BUDGET ESTIMATE: $454,232.90

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
	150mm Minus Blast Rock (To fill culverts removed)	M^3	40.00	$20.00	$800.00
	Supply & Placement of Marking Tape				
	- Metallic Tape	M	260.00	$1.00	$260.00
02233	SELECTED GRANULAR BASE & SUB-BASE MATERIALS				
	Class "A" Granular Base (shoulders 100mm)	tonne	28.00	$24.00	$672.00
	Class "A" Granular Base	tonne	77.22	$24.00	$1,853.28
	Class "B" Granular Sub-Base	tonne	102.96	$22.00	$2,265.12
02270	RIP-RAP PROTECTION				
	Rip-Rap Hand Laid With Sod	M^3	6.00	$90.00	$540.00
02434	PIPE CULVERTS				
	Supply & Placement of Pipe Culvert				
	(Size) (Thickness) (Type)				
	900 mm HDPE 320kpa	M	10.00	$250.00	$2,500.00
	600 mm HDPE 320kpa	M	30.00	$210.00	$6,300.00
02481	CHANNEL EXCAVATION, CLEARING & DEEPENING				
	Channel Excavation				
	Common	M^3	460.00	$100.00	$46,000.00
	Cleaning & Deepening of Existing Channels	M	740.00	$25.00	$18,500.00
	200mm cobble stone	M^3	860.00	$75.00	$64,500.00
02547	ASPHALT TACK COAT				
	Supply & Placement of Asphalt Tack Coat	M^2	195.00	$0.75	$146.25
02574	RESHAPING & PATCHING ASPHALT PAVEMENT				
	Removal of Asphalt Pavement	M^2	475.00	$4.00	$1,900.00
	Replacment of Asphalt Pavement within Street ROW				
	Inc. 2x50mm layers of Surface Course Asphalt	M^2	195.00	$80.00	$15,600.00
	Replacment of Asphalt Pavement within for Driveways				
	Incl. 200mm Class 'A' & 50mm Surface Course Asphalt	M^2	280.00	$65.00	$18,200.00
	Cutting of Asphalt Pavement	M	430.00	$2.00	$860.00
02601	MANHOLES, CATCH BASINS, DITCH INLETS & VALVE CHAMBERS				
	Supply & Placement of Pre-cast Manholes				
	1.5M to 2M	EACH	4.00	$6,500.00	$26,000.00

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-2A

BUDGET ESTIMATE: $454,232.90

APPENDIX "A" - QUANTITIES AND PRICES

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	1-Apr-20	APPROVED BY:	
	Supply & Placement of Manhole Inflow Protectors	EACH	4.00	$120.00	$480.00
	Adjustment of Manhole/Catch Basin Tops	EACH	4.00	$250.00	$1,000.00
02702	PIPE SEWER CONSTRUCTION				
	Supply & Placement of Storm Sewer				
	1050 mm HDPE 320kpa	M	180.00	$400.00	$72,000.00
	900 mm HDPE 320kpa	M	80.00	$350.00	$28,000.00
	T.V. Camera Inspection Services	M	260.00	$3.00	$780.00
	DIVISION #3				
03300	CAST-IN-PLACE CONCRETE				
	Cast-in-Place Concrete Headwall c/w Handrails	EACH	2.00	$8,000.00	$16,000.00
	Cast-in-Place Concrete Headwall	EACH	2.00	$4,000.00	$8,000.00

a) SUB TOTAL **$394,985.13**

b) H.S.T. 15% OF SUB TOTAL **$59,247.77**

d) GRAND TOTAL **$454,232.90**

(Carry forward to page 1 of the Tender Form)

DEPT. OF MUNICIPAL AND PROVINCIAL AFFAIRS
Spec Set No. (Found on inside cover of Master Spec.)

PROJECT: LEDREW'S ROAD / CRONIN'S PLACE DRAINAGE ISSUE

JOB #: 2019-041 - OPTION-3

BUDGET ESTIMATE: $526,429.69

APPENDIX "A" - QUANTITIES AND PRICES

The quantities set out in this schedule are estimated quantities only and are not to be taken as final quantities by the contractor. The unit prices bid shall include all labour, plant, materials, overhead, duties, and profit and all other obligations and liabilities under the contract. Do not include taxes in unit or lump sum prices, taxes due to be added on the last page of this schedule as indicated on the bottom. Totals shall be determined by multiplying the quantity by the tendered unit price.

SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	2-Mar-20	APPROVED BY:	
			CONSTRUCTION COST:		$526,429.69
			LAND ACQUISITION:		
			TOTAL:		$526,429.69
	DIVISION #1				
01010	MOBILIZATION & DEMOBILIZATION (Not greater than 5% if on the Island, or 10% if in Labrador, or 15% north of Cartwright, of item a. "sub-total" on last page)	LS	UNIT	$15,000.00	$15,000.00
01020	CASH ALLOWANCE (to be entered by Consultant)				
	Pole Relocation/shoring/bracing	Allowance		$10,000.00	$10,000.00
01560	ENVIRONMENTAL REQUIREMENTS				
	Silt Fence	M	50.00	$3.00	$150.00
01570	TRAFFIC REGULATIONS				
	Flagperson's Wages	HOUR	150.00	$25.00	$3,750.00
01710	REINSTATEMENT AND CLEANING				
	Fencing	M	100.00	$50.00	$5,000.00
	Ditching	M	30.00	$12.00	$360.00
	Remove, Relocate and/or Replace Culverts	M	15.00	$25.00	$375.00
	Supply & Placing Topsoil	M^2	480.00	$6.00	$2,880.00
	Supply & Placement of Sods	M^2	480.00	$6.00	$2,880.00
	DIVISION #2				
02070	SITEWORK, DEMOLITION & REMOVAL OF STRUCTURES				
	Removal of Culverts	M	100.00	$10.00	$1,000.00
02223	EXCAVATION, TRENCHING & BACKFILLING				
	Main Trench Excavation				
	Rock	M^3	236.25	$55.00	$12,993.75
	Common	M^3	850.50	$14.00	$11,907.00
	Granular Pipe Bedding				
	Type 1	M^3	431.02	$22.00	$9,482.44
	Imported Backfill				
	Common (To Create Berm)	M^3	150.00	$18.00	$2,700.00
	150mm Minus Blast Rock (To fill culverts removed)	M^3	40.00	$20.00	$800.00

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BUDGET ESTIMATE: $526,429.69

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	2-Mar-20	APPROVED BY:	
	Supply & Placement of Marking Tape				
	- Metallic Tape	M	292.00	$1.00	$292.00
02233	SELECTED GRANULAR BASE & SUB-BASE MATERIALS				
	Class "A" Granular Base (shoulders 100mm)	tonne	71.68	$24.00	$1,720.32
	Class "A" Granular Base (driveways 150mm)	tonne	20.16	$24.00	$483.84
	Class "A" Granular Base	tonne	150.48	$24.00	$3,611.52
	Class "B" Granular Sub-Base	tonne	200.64	$22.00	$4,414.08
02270	RIP-RAP PROTECTION				
	Rip-Rap Hand Laid With Sod	M^3	6.00	$90.00	$540.00
02434	PIPE CULVERTS				
	Supply & Placement of Pipe Culvert (Size) (Thickness) (Type)				
	900 mm HDPE 320kpa	M	10.00	$250.00	$2,500.00
	600 mm HDPE 320kpa	M	30.00	$210.00	$6,300.00
02481	CHANNEL EXCAVATION, CLEARING & DEEPENING				
	Common	M^3	460.00	$100.00	$46,000.00
	Cleaning & Deepening of Existing Channels	M	740.00	$25.00	$18,500.00
	200mm cobble stone	M^3	860.00	$75.00	$64,500.00
02547	ASPHALT TACK COAT				
	Supply & Placement of Asphalt Tack Coat	M^2	380.00	$0.75	$285.00
02574	RESHAPING & PATCHING ASPHALT PAVEMENT				
	Removal of Asphalt Pavement	M^2	520.00	$4.00	$2,080.00
	Replacment of Asphalt Pavement within Street ROW				
	Inc. 2x50mm layers of Surface Course Asphalt	M^2	380.00	$80.00	$30,400.00
	Replacment of Asphalt Pavement within for Driveways				
	Incl. 200mm Class 'A' & 50mm Surface Course Asphalt	M^2	140.00	$65.00	$9,100.00
	Cutting of Asphalt Pavement	M	487.00	$2.00	$974.00
02601	MANHOLES, CATCH BASINS, DITCH INLETS & VALVE CHAMBERS				
	Supply & Placement of Pre-cast Manholes				
	1.5M to 2M	EACH	3.00	$8,000.00	$24,000.00

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BUDGET ESTIMATE: $526,429.69

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SECTION	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
REV:	ISSUED FOR APPROVALS	DATE:	2-Mar-20	APPROVED BY:	
	Supply & Placement of Manhole Inflow Protectors	EACH	3.00	$120.00	$360.00
	Adjustment of Manhole Tops	EACH	3.00	$250.00	$750.00
02702	PIPE SEWER CONSTRUCTION				
	Supply & Placement of Storm Sewer				
	1200 mm HDPE 320kpa	M	200.00	$500.00	$100,000.00
	1050 mm HDPE 320kpa	M	92.00	$400.00	$36,800.00
	T.V. Camera Inspection Services	M	292.00	$3.00	$876.00
	DIVISION #3				
03300	CAST-IN-PLACE CONCRETE				
	Cast-in-Place Concrete Headwall c/w Handrails	EACH	2.00	$8,000.00	$16,000.00
	Cast-in-Place Concrete Headwall	EACH	2.00	$4,000.00	$8,000.00

a) SUB TOTAL **$457,764.95**

b) H.S.T. 15% OF SUB TOTAL **$68,664.74**

d) GRAND TOTAL **$526,429.69**

(Carry forward to page 1 of the Tender Form)

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