

## WSP Memo & Draft Stormwater Management Report



### MEMO

**TO:** Mr. Mike Bindas, Delivery Supervisor, Yellowhead Trail Portfolio  
**FROM:** Les Kruszewski, Senior Project Engineer, Municipal, WSP  
**SUBJECT:** Fort Road Widening Project, 12560 Fort Road, (Block A Plan 679HW), Property  
**DATE:** May 1, 2020, update June 1, 2020

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### PROJECT BACKGROUND

Modifications to Fort Road have been identified as part of the Yellowhead Freeway Conversion Program to support expected changes to traffic patterns in the area. Improvements on Fort Road include widening to 6 lanes, widening the CN underpass, and lowering Fort Road to increase the clearance at the CN underpass.

An adjacent project that closes the at grade intersection at 66 Street, in favor of a limited access interchange, results in the loss of north bound access on 66 Street for east bound traffic on Yellowhead Trail. A new industrial collector roadway (125 Avenue) is planned to provide access to the industrial areas near Fort Road to accommodate the displaced traffic from the 66 Street intersection closure. The proposed alignment for 125 Avenue runs west from 61 Street through 12560 Fort Road “the Subject Property” to 71 Street.

The Fort Road and 125 Avenue projects will require new stormwater management facilities to address local drainage issues and flooding at the CN underpass. Concurrently the City is working with EPCOR Drainage to allow for sewer separation of the combined sewer system in the project areas.

The boundary of local areas draining to the Fort Road low point under the CN underpass, the “sag”, are shown in **Figure 1** as dashed blue lines. The Subject Property is shown outlined in red near the middle of the figure. The new lanes for Fort Road and 125 Avenue are shown as well to provide a reference for the following discussion.

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Figure 1: Local Areas Draining to Fort Road Sag at CN Underpass

**PURCHASE REQUIREMENT**

The Subject Property is needed to accommodate the construction of the 125 Avenue roadway extension from Fort Road to 71 Street. The Subject Property is adjacent to lands previously acquired ("Previously Acquired ROW") by the City for the widening of Fort Road. A portion of the Subject Property will become the new road right-of-way (ROW) for 125 Avenue and 71 Street and the remainder will become remnant parcels on either side of the new road. Figure 2 shows the general arrangement of the new roadway, remnant lands and Previously Acquired ROW.

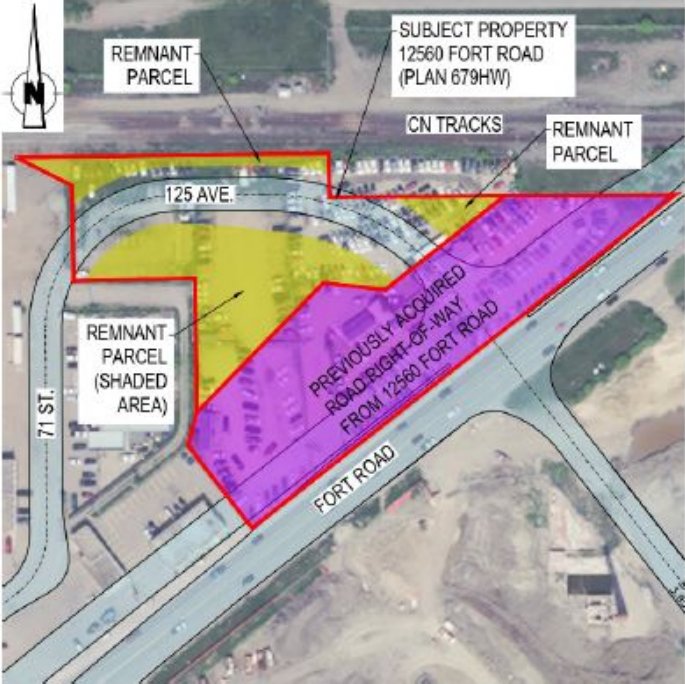


Figure 2: Subject Property, Remnants and Previously Acquired ROW

**STORMWATER EVALUATION**

As previously noted, stormwater management is required for the construction of Fort Road and 125 Avenue. The current Fort Road sag at the CN underpass is at risk of flooding during a 1 in 10 year storm event, as identified in a City of Edmonton study done by Sameng, 2017. Typically, an underpass of this nature would be designed to handle a 1 in 100 year storm event. The flooding at the sag presents a risk to drivers using this roadway. Without storm drainage improvements, this condition will worsen with the construction of 125 Avenue, the addition of lanes on Fort Road and the lowering of the roadway at the CN underpass.

To address the existing flooding issues and to accommodate the additional drainage from the new roadways, a new stormwater management plan for this area must be developed. Stormwater management for the proposed construction must consider:

- Additional drainage requirements due to the construction of the new lanes on Fort Road and 125 Avenue;
- Addressing the existing substandard drainage capacity at the CN underpass;





- Cost effective design and construction of drainage infrastructure including adequate sewer capacity and the safety of road users;
- Downstream effects of increased water flow into the existing sewer system;
- Changes to the existing sewer piping due to the lowering the sag;
- Separation opportunities of existing combined sewers within the project limits.

To address these points, we anticipate a combination of underground storage, oversized storm sewers and surface storage will be required.

### LAND PARCEL EVALUATION FOR STORMWATER STORAGE

An evaluation of the parcels of land near the project was done to determine the best location for development of stormwater management facilities.

Potential parcels included:

- Lot 2A, Block 1, Plan 0320253, east of Fort Road;
- Previously Acquired ROW west of Fort Road;
- The Subject Parcel.

Lot 2A, Block 1, Plan 0320253 requires expensive contaminated soil remediation before it could be used and therefore was discarded as a viable option.

A portion of the Previously Acquired ROW west of Fort Road will be utilized for the additional lanes of Fort Road and the remaining portions of this land will be utilized for drainage needs.

The Subject Property can also be used to intercept some drainage from 71 Street and 125 Avenue west of Fort Road that would otherwise drain to the underpass. A portion of the Subject Property can also be used in conjunction with the Previously Acquired ROW for siting underground storage to service the underpass storm drainage requirements. As such these two locations were chosen for development of stormwater storage facilities.

### STORMWATER MANAGEMENT SYSTEM LAYOUT

The Subject Property and the Previously Acquired ROW were used to develop a stormwater management concept plan to connect with the new storm sewer on Fort Road. The placement of the stormwater management facilities at this location provides several advantages. The location, adjacent to Fort Road, provides for safe maintenance access, minimizes storm sewer improvement requirements and creates an open space opportunity. **Figure 3** shows the concept layout for the dry pond, underground storage tank and the new storm sewer on Fort Road.



Figure 3: New Stormwater Management System Concept Layout

A new large diameter storm sewer will be installed on Fort Road from the sag location at the CN underpass to the underground storage tank. This is shown as a green line on Figure 3. The new storm sewer on Fort Road will more efficiently collect runoff water that previously drained to the existing over capacity combined sewer. The combined sewer will no longer be needed in the sag and will be removed.

The footprint of the large underground storage tank adjacent to Fort Road is shown as a solid blue area in Figure 3. The underground storage tank spans across a portion of the Subject Property and the Previously Acquired ROW. The tank is underground to allow runoff water to drain from the sag at the CN underpass to the tank by gravity.

On the west side of the Subject Property a dry pond is proposed to collect and detain runoff from 71 Street and 125 Avenue. This is an ideal location to intercept runoff that would otherwise drain to the sag. Any measures to reduce runoff flow to the sag reduces the potential extent of flooding at the underpass and reduces overall underground storage requirements.

The whole area containing the stormwater management facilities will be landscaped to provide an open space park. The dry pond, like many others in the city, will be accessible by the public when not holding water. It will only hold water during



infrequent large storms. The area above the underground storage tanks will be an open space and can be landscaped with trees and pathways providing an amenity to the surrounding neighbourhood. The open space area also compliments the Canada Packers Chimney Stack park site, a designated Municipal Historic Resource, across Fort Road, north of the Kathleen Andrews Transit building.

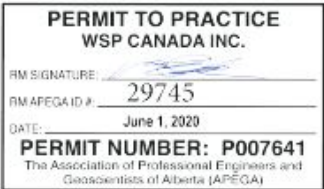
**SUMMARY**

After evaluating the potential locations for the project’s stormwater management facilities and infrastructure, the Previously Acquired ROW and a remnant portion of the Subject Property present the most viable location for the new stormwater management facilities. This location facilitates maintenance access providing a safer workplace for maintenance workers. The location also minimizes stormwater management improvement costs while contributing to combined sewer separation initiatives. Finally, it provides a great amenity and open space to complement the Canada Packers Chimney Stack park site.

On May 27, 2020 we recently completed a stormwater report for the project and have appended that to this report below as additional information.



Les Kruszewski, P.Eng.  
Senior Project Engineer



Corporate Permit



REFERENCE:

*The City of Edmonton, Underpass Flooding Study – Draft Report Final, Sameng Inc., May 2017*

# APPENDIX

# A

DRAFT REPORT – FORT ROAD WIDENING  
(YHT TO 66 STREET), 125 AVENUE AND FORT  
ROAD STORMWATER MANAGEMENT



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# FORT ROAD WIDENING (YHT TO 66 STREET)

## 125 AVENUE AND FORT ROAD STORMWATER MANAGEMENT

MAY 26, 2020



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FORT ROAD  
WIDENING (YHT TO 66  
STREET)

125 AVENUE AND FORT  
ROAD STORMWATER  
MANAGEMENT

CITY OF EDMONTON

TYPE OF DOCUMENT (VERSION)

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CLIENT REF:  
DATE: MAY 26, 2020

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May 26, 2020

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**Attention: Jolanta Wandzel-Mrugala, Engineering Program Manager**

Dear Jolanta

**Subject: Fort Road Widening Stormwater Management**

WSP is pleased to submit this Stormwater Management Report for the Fort Road Widening Project. The stormwater management report includes the new industrial collector, 125 Avenue and the concept drainage for the 66 Street at Yellowhead Trail.

Yours sincerely,

Blair Raymond  
Water Resources Engineer

WSPref: 191-13794-00

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FIRST ISSUE

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- A MODEL COMPARISON



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### 1 INTRODUCTION

Yellowhead Trail through the City of Edmonton is proposed to be upgraded to a freeflow roadway. The freeway is proposed to be six (6) lanes with additional lanes to meet operational demands as required. Direct access to Yellowhead Trail would be removed and intersections would be grade separated or closed.

The concept design for Fort Road includes widening of the roadway to provide three (3) through lanes in each direction from Yellowhead Trail to 66 Street and additional turn lanes at 125 Avenue. Also, 125 Avenue / 61 Street would be constructed from the intersection of 125 Avenue and 61 Street, west across Fort Road to 71 Street. The concept design for 125 Avenue / 61 Street includes one lane in each direction with additional turn lanes at Fort Road and 66 Street.

The concept design for 66 Street at Yellowhead Trail includes a grade separation with 66 Street going over Yellowhead Trail. Additionally, an on-ramp from 66 Street northbound to Yellowhead Trail eastbound would be constructed.

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## 2 BACKGROUND

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### 2.1 STUDY AREA

The study area includes the following roadways:

- Fort Road extending from Yellowhead Trail (YHT) northeast to 66 Street,
  - 125 Avenue extending from 61 Street and YHT west to 71 Street, and
  - 66 Street extending from 122 Avenue north to 124 Avenue including an eastbound on-ramp to YHT.
- 

### 2.2 SCOPE

The scope of the project includes the widening of Fort Road between YHT and 66 Street expanding from four lanes to six lanes, construction of 125 Avenue from 61 Street and YHT across Fort Road to 71 Street and re-aligning 66 Street to the west to allow construction of a bridge over YHT and an on-ramp for northbound to eastbound traffic from 66 Street to YHT.

The drainage scope is required to assess the impact of the roadway modifications on the existing drainage system and to provide preliminary design of the drainage system associated with the Fort Road and 125 Avenue modifications, and conceptual design of the drainage system associated with the proposed 66 Street modifications.

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### 2.3 DATA COLLECTION AND REVIEW

The data and information collected and reviewed included:

- City of Edmonton 0.5m contours
  - Aerial imagery
  - Existing sewer data from the City's DRAINS database
  - Record drawings
  - Pump Well 525 (PW 525) Drainage Structure Operation Description
  - The Global Trunk Model (GTM) for the City's combined and sanitary trunk sewers
  - Kennedale storm trunk model
  - Invert survey
  - YHT – 66 St – DRAIN – Drainage Concept Plan (ISL, 2020)
  - Yellowhead Trail East Widening – Drainage – Revision 1 (Stantec, 2020)
  - Underpass Flooding Study (Sameng Inc, 2017)
  - 66 Street LRT Crossing Drainage Study (Stantec, 2005)
  - Sewer and Drainage System Service Level Assessment and Upgrading Concept Development for 2006 Priority Sewer Rehabilitation Neighborhoods (Stantec 2008)
  - Upgrading Study for Mature Neighbourhoods, (ISL, 2012)
- 

### 2.4 DESIGN CRITERIA

The following design criteria were used in the development of the stormwater management plan:

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- The hydraulic grade line (HGL) for post development should not increase from the existing HGL for the 1:100 year storm event;
- Combined sewer overflow (CSO) volumes for post development should not increase from the existing CSO volumes;
- Where feasible the system should maintain drainage by gravity;
- Where feasible the combined system should be separated into separate storm and sanitary sewer systems.

## 2.5 APPROACH

The approach followed in the development of the drainage requirements for the project included the following tasks:

- Review background information including previous studies, local topography, preliminary roadway design, existing drainage systems and existing GTM and Kennedale storm trunk models.
- Revise the GTM and Kennedale storm trunk models to include the local drainage systems in the study area.
- Assess the existing drainage systems under the 1:100 year rainfall event to determine flow rates and HGLs.
- Update the trunk models to include the upgraded and additional roadways.
- Develop drainage requirements and model to assess performance compared to existing conditions and design criteria.

The existing GTM and Kennedale storm trunk models were modified by adding the local sewers in the project study area. These sewers were added by importing data from the DRAINS database and cross checking the information against record drawings.

The modeling was conducted in Mike Urban without the RTC (Real Time Control) module. As the existing GTM and Kennedale model have RTC elements in them, model results in the study area were compared in runs without the RTC module and those with the module supplied by EPCOR. Figures comparing the HGL at manholes in the study area are shown in Appendix A, for reference the manhole locations for the comparison are shown in Figure 7. Values of the peak HGL are shown in Table 2.1 below.

**Table 2.1 HGL Comparison**

LOCATION	PEAK HGL	
	With RTC	Without RTC
GTM		
MH 285423	656.300 m	655.545 m
MH 285227	656.569 m	656.181 m
Kennedale		
MH 285251	658.134 m	658.165 m
MH 285279	655.605 m	655.882 m

The comparison shows that the HGLs for the GTM do show some difference, between 0.4 m and 0.8 m in the peak HGL. Additionally, Figures A-1 and A-2 show that the HGL is generally similar throughout the simulation.

Comparing the results for the Kennedale Storm Trunk model indicates the peak HGLs have a difference of less than 0.3 m. Figures A-3 and A-4 show that the simulation without RTC generally peaks at the same time as the simulation with RTC, however the simulation without RTC maintains an elevated HGL for a longer period of time.

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The general similarity of the peak HGL in both of the GTM and Kennedale Storm Trunk models should provide reasonable results for storage sizing and comparison of system performance before and after the roadway upgrades.



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## 3 EXISTING DRAINAGE SYSTEM

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### 3.1 FORT ROAD

The storm drainage along Fort Road between the YHT and 66 Street contributes to the combined system. The catch basins along Fort Road from north of YHT to north of 126A Avenue drain to a 600/900 mm combined sewer running south along Fort Road. The 900 mm combined sewer discharges to a deep 1500 mm combined sewer just north of YHT.

The 1500 mm combined sewer continues south across YHT and past the storage tank (PW525) which provides storage for the YHT sags at Fort Road and CN ROW. The 1500 combined sewer continues in a southerly direction eventually conveying the flow to the Gold Bar Wastewater Treatment Plant.

The existing sewers along Fort Road are shown in Figure 1.

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### 3.2 125 AVENUE / 61 STREET

Storm drainage along 125 Avenue contributes to both the storm and sanitary systems. The eastern portion of 125 Avenue (and 61 Street) from YHT to the LRT/CN Rail west of 66 Street contributes to the storm system draining north to the Kennedale storm trunk. The western portion from the LRT/CN Rail west to 71 Street drains to the combined system.

The existing storm sewers in the vicinity of 125 Avenue / 61 Street include the following:

- 600 mm storm sewer crossing 61 Street at 125 Avenue,
- 675 mm storm going north from the intersection of 125 Avenue / 61 Street at 62 Street, and
- 600 mm storm sewer crossing 125 Avenue west of 66 Street beside the LRT / CN ROW.

The combined sewers along 125 Avenue include the following:

- 600 mm combined sewer on Fort Road,
  - 1500 mm combined sewer on Fort Road,
  - 300 mm combined sewer on 70 Street.
- 

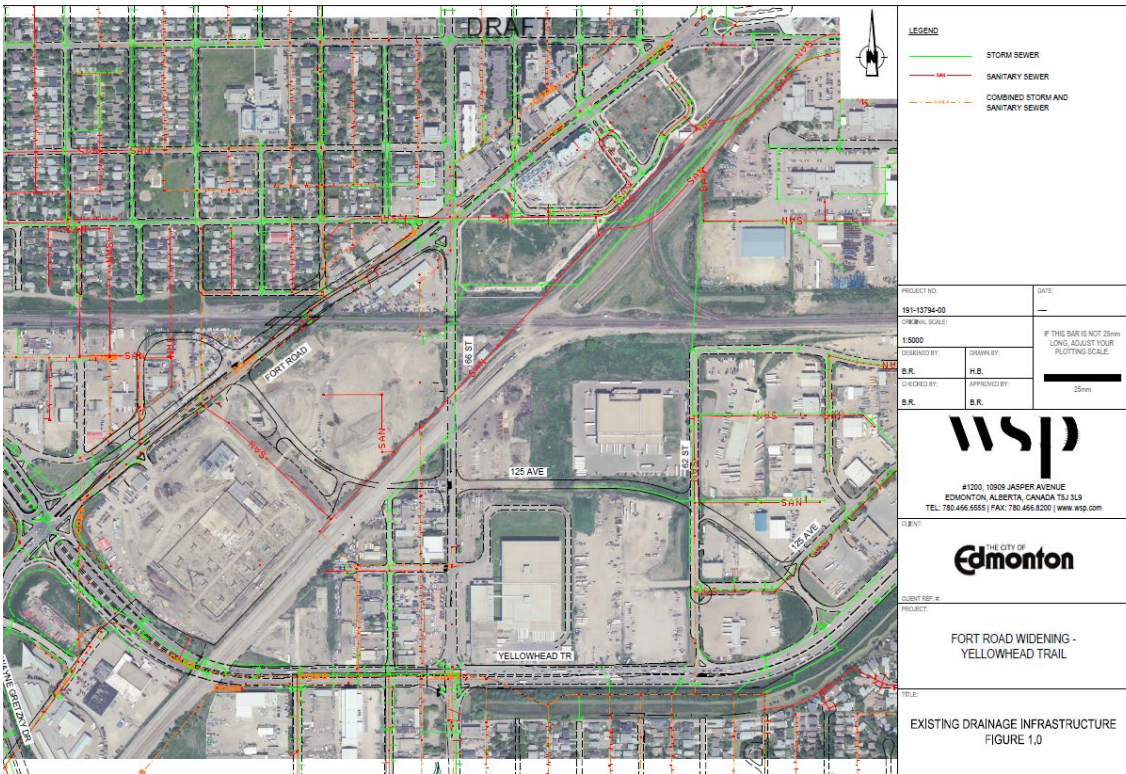
### 3.3 66 STREET

The storm drainage in the area contributes to both the storm and combined systems. YHT between 66 and 68 Streets as well as 66 Street drains to the storm system which drains north to the Kennedale storm trunk. YHT east of 66 Street and west of 68 Street drains to the combined sewer system draining west to the 1500 mm combined sewer.

The storm sewer at YHT and 66 Street is 375 mm in diameter. The combined sewer is a 1200 mm trunk which receives storm runoff from YHT between 66 Street and 61 Street as well as providing service to the Industrial Heights (sanitary) and Montrose (combined) neighbourhoods.

It should be noted that the sags on YHT at CN rail and Fort Road go to a storage facility (PW 525) prior to discharging to the 1500 mm combined sewer.

The existing sewers in the vicinity of 66 Street and YHT are also shown in Figure 1.





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# 4 SERVICING CONCEPT DEVELOPMENT

## 4.1 FORT ROAD

As indicated in Section 3.1, Fort Road is part of the combined sewer service area, with a 600/900 mm combined sewer providing local service and a deep 1500 mm combined sewer.

The 600 mm combined sewer at the sag in Fort Road under the CN rail line is approximately 3.0 m deep, resulting in cover of 2.4 m. The preliminary profile for Fort Road lowers the sag by approximately 1.2 m, resulting in cover being reduced to approximately 1.2 m. At this time, it is expected that the 600 mm sewer will be abandoned at the sag with the sewer diverted into the 1500 mm combined sewer.

Given the alignment of available sewers in the area there are two options for providing stormwater management:

- Option 1: Provide storage for the increased runoff and drain by gravity to the deep 1500 mm combined sewer.
- Option 2: Provide storage for the runoff and pump north to the Kennedale storm system. There is a 2400 mm storm sewer on 127 Avenue.

The storage structure for the storm runoff from the Fort Road sag is proposed to go between Fort Road, 125 Avenue and 71 Street, resulting in the 3000 mm combined sewer on the 71 Street alignment most likely being relocated to allow excavation and construction of the storage structure.

Figure 2 shows the concept for draining to the combined system and Figure 3 shows the concept for draining to the Kennedale storm system.

For Option 1 draining to the 1500 mm combined sewer, Manhole 285423 downstream of the connection to the combined sewer was used to compare the pre-development and post-development HGLs, the manhole location is shown in Figure 7. This comparison can be seen in Figure 8. This figure shows the 1:100 year, 4 hour peak HGL for post-development is slightly lower than for pre-development conditions.

The Kennedale Storm Trunk currently surcharges in severe rainfall events. Diverting the Fort Road sag from the combined system to the Kennedale system is an addition of service area to the trunk and there is no existing service area intercepted that would provide for an outlet rate without adding flows or increasing HGLs. Therefore, the Fort Road storage would have to be capable of storing all the runoff contributing to the sag and discharging when capacity is available in the storm system, which would require the pumping be controlled by level sensors on the Kennedale system.

The storage requirements for the 1:100 year, 4 hour storm for the two options are shown below in Table 4.1.

Table 4.1 Fort Road Storage Requirements

STORAGE OPTION	STORAGE REQUIREMENT
Option 1 – Combined System	2,807 m <sup>3</sup>
Option 2 – Kennedale Storm	2,812 m <sup>3</sup>

## 4.2 125 AVENUE / 61 STREET

As indicated in Section 3.2, the 125 Avenue area is serviced to the Kennedale storm basin, with three storm sewers crossing the road ROW at 125 Avenue, 62 Street and west of 66 Street at the LRT / CN ROW.

Based on the roadway profile for 125 Avenue the drainage will be split into three sections as follows:

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- 1 71 Street to LRT: This area will be draining towards Fort Road. Storage requirements are included in the analysis for Fort Road in Section 4.1.
- 2 LRT to east of 66 Street: This area drains to two small sags on either side of 66 Street.
- 3 East of 66 Street to 125 Avenue: This area is generally draining towards 62 Street.

The section of 125 Avenue between the LRT and east of 66 Street will drain to underground storage on 125 Avenue and discharge to the 600 mm storm running along the east side of the LRT. The section of 125 Avenue and 61 Street from east of 66 Street to 125 Avenue will drain to underground storage at 62 Street and discharge to the 675 mm storm sewer on 62 Street. The drainage concept for 125 Avenue is shown in Figure 4.

For the storage at 66 Street the pre and post development HGLs MH 285279, and for the storage at 62 Street MH 285279 was used to compare HGLs. These locations are also shown on Figure 7. The comparison for 66 Street is shown in Figure 9 and the comparison for 62 Street is shown in Figure 10. These figures show the 1:100 year, 4 hour peak HGL for post-development is equal to or lower than pre-development at both locations.

The resulting storage requirement for the 1:100 year, 4 hour storm for the two locations are shown below in Table 4.2.

**Table 4.2 125 Avenue Storage Requirements**

STORAGE LOCATION	STORAGE REQUIREMENT
125 Avenue / 66 Street	392 m <sup>3</sup>
125 Avenue / 62 Street	785 m <sup>3</sup>

## 4.3 66 STREET

As indicated in Section 3.3, the storm drainage is split between the Kennedale storm system and the combined system with 66 Street contributing the Kennedale system and YHT east of 66 Street contributing to the combined system.

There are two previous studies of the drainage in the vicinity of the 66 Street flyover of YHT.

- Yellowhead Trail East Widening – Drainage (Stantec) – This study proposed that the portion of YHT between 61 Street and east of 66 Street (West Storm Catchment) could be diverted to a dry pond or underground storage north of YHT and discharge to the storm system on 62 Street
- YHT – 66 St – DRAIN – Drainage Concept Plan (ISL) – This study developed the concept drainage requirements for the 66 Street flyover. This study proposed inline storage for the 66 Street eastbound on-ramp to YHT and adjacent YHT contributing to the combined system, and inline storage for the lane between 66 Street and 67 Street contributing to the storm system on YHT.

As a result, two options were reviewed for 66 Street.

- Option 1: Provide storage for the 66 Street on-ramp to YHT and adjacent YHT and discharge to the 1200 mm combined sewer on YHT.
- Option 2: Combine storage for the 66 Street on-ramp to YHT with the YHT West Storm Catchment and discharge north to the Kennedale Storm system via the 62 Street storm sewer.

The concept for Option 1 with 66 Street contributing to the combined system is shown in Figure 5 and Option 2 with 66 Street and the YHT West Storm Catchment contributing north to the Kennedale Storm System is shown in Figure 6.

For Option 1 draining to the 1200 mm combined sewer on YHT, Manhole 285227 downstream of the connection to the combined sewer was used to compare the pre and post development HGLs, the manhole location is shown in



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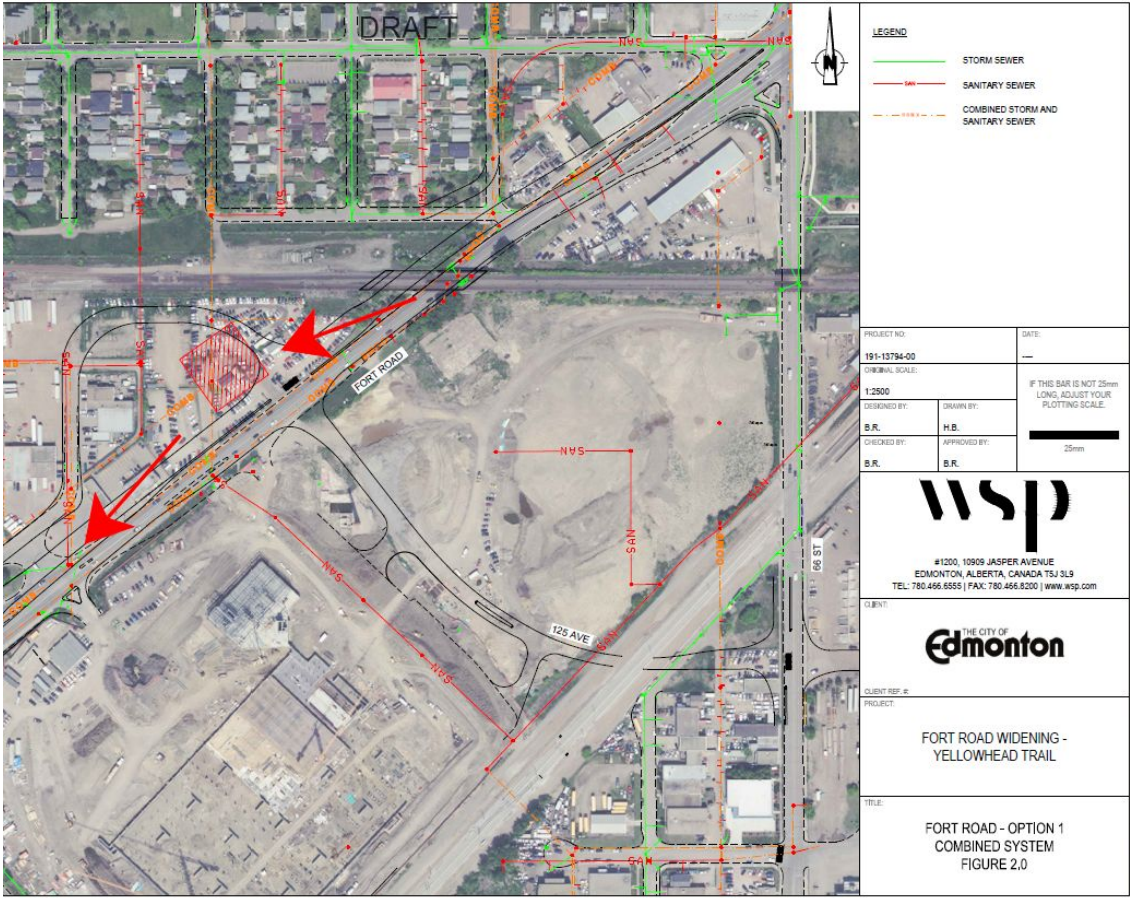
Figure 7. This comparison can be seen in Figure 11, which shows the 1:100 year, 4 hour peak HGL for post-development is slightly lower than for pre-development conditions.

Option 2 contributing north to the Kennedale Storm System was analysed in conjunction with the storage requirements of 125 Avenue detailed in Section 4.2 to capture the cumulative effects of the proposed work in the area.

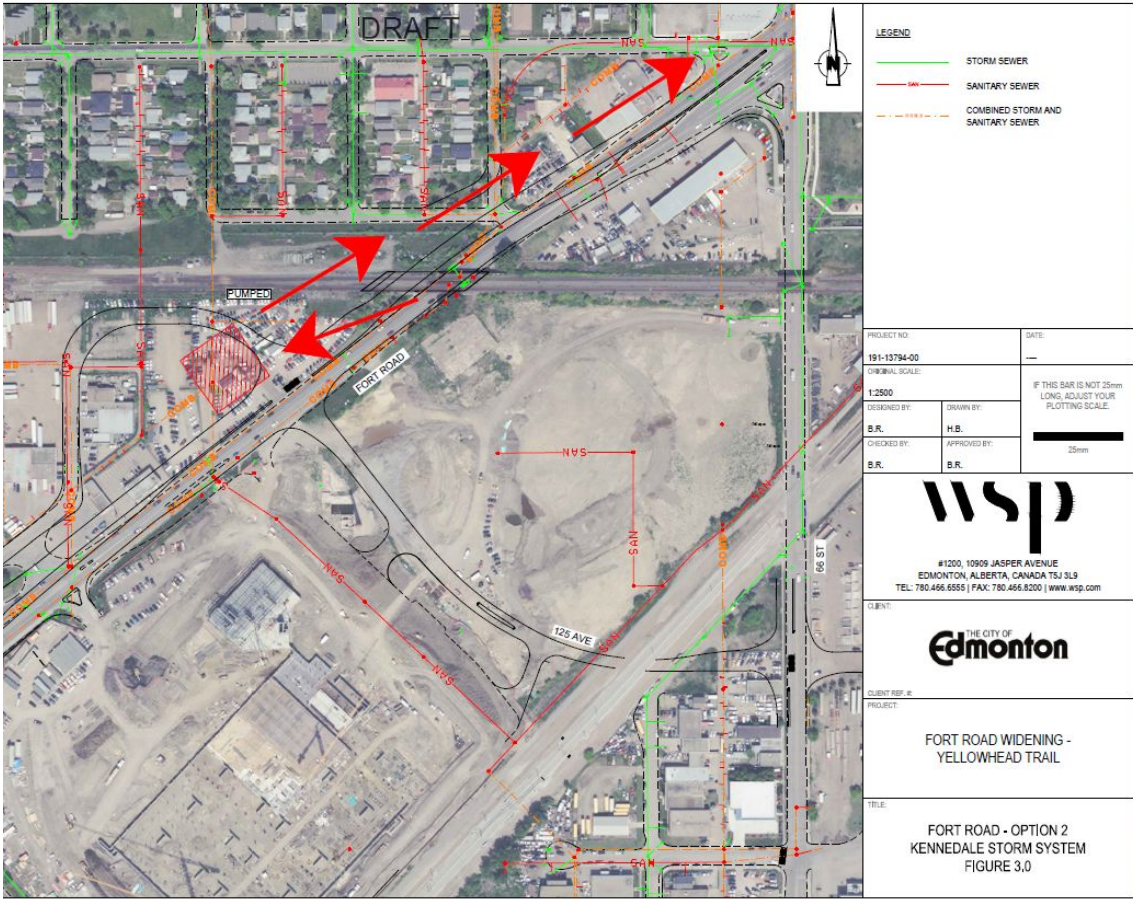
The storage requirements for the 1:100 year, 4 hour storm for the two options are shown below in Table 4.3.

**Table 4.3** 66 Street Storage Requirements

STORAGE OPTION	STORAGE REQUIREMENT
Option 1 – Combined System	309 m <sup>3</sup>
Option 2 – Kennedale Storm	5,348 m <sup>3</sup>

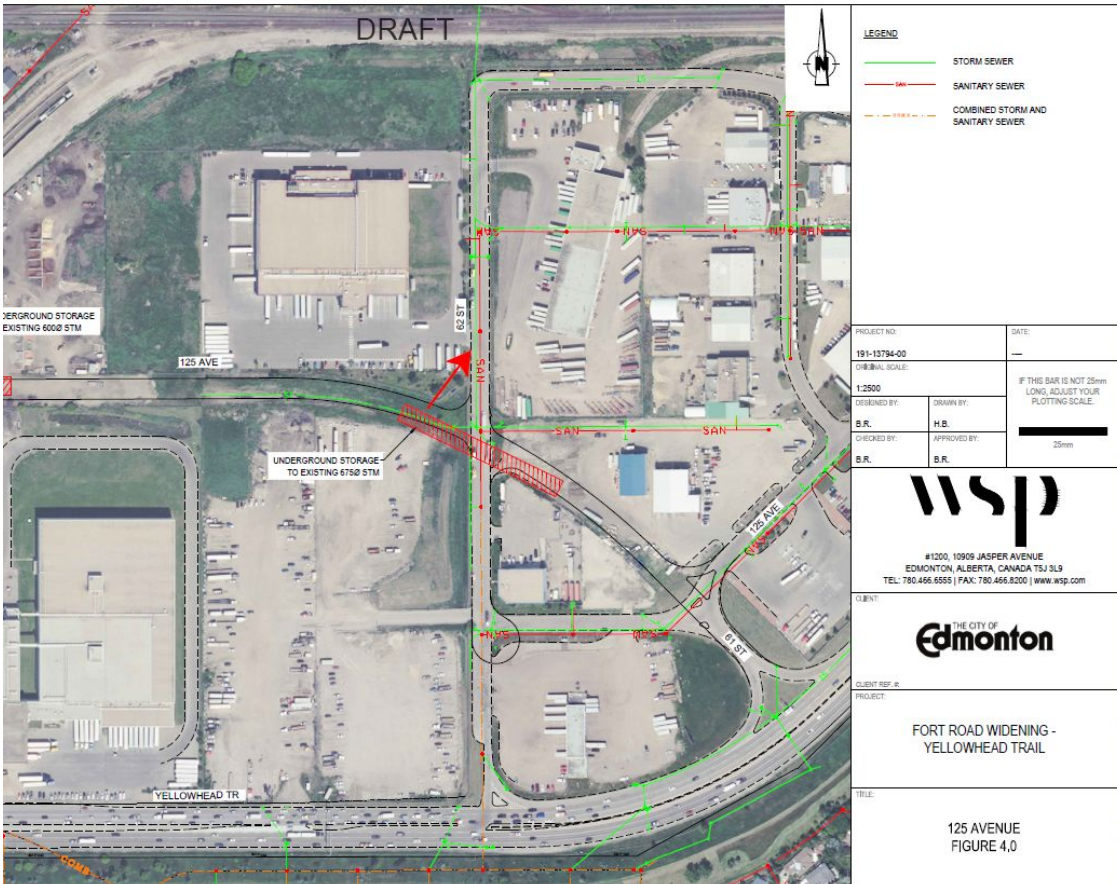


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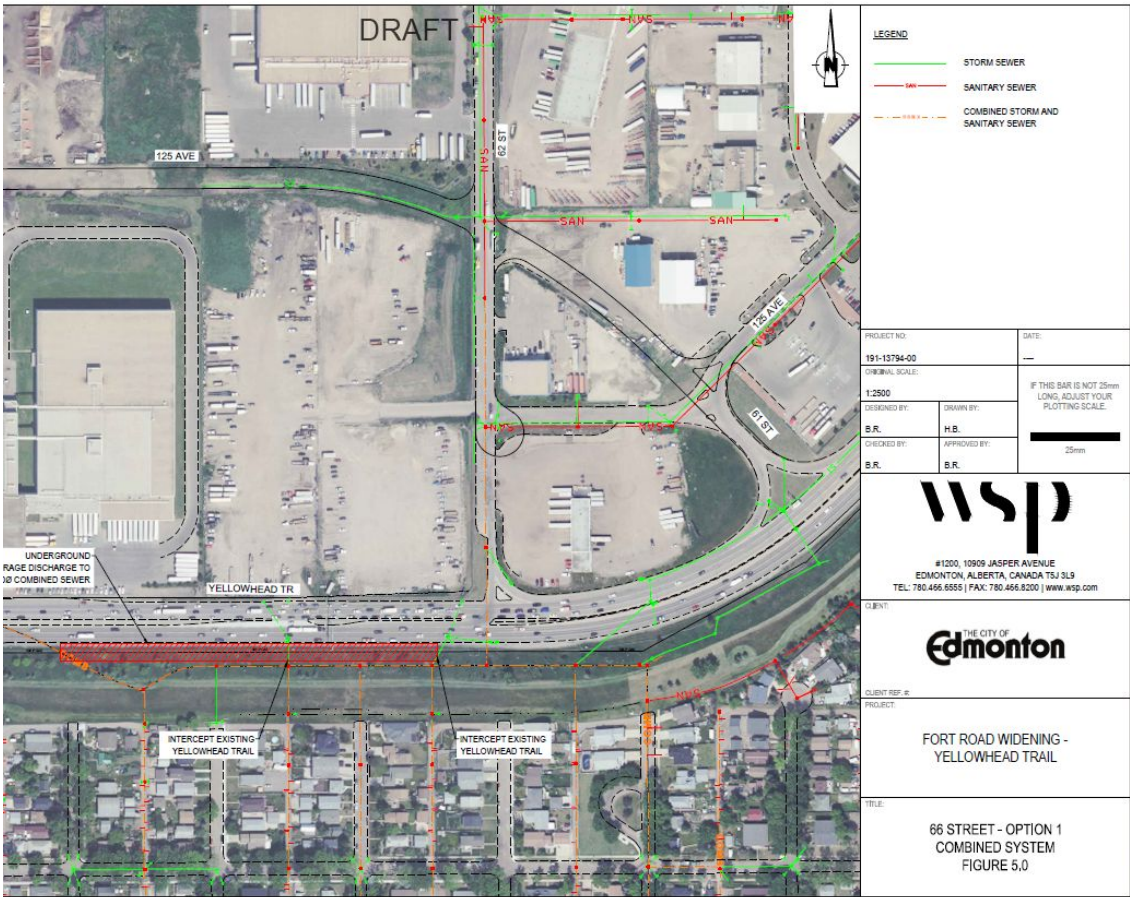
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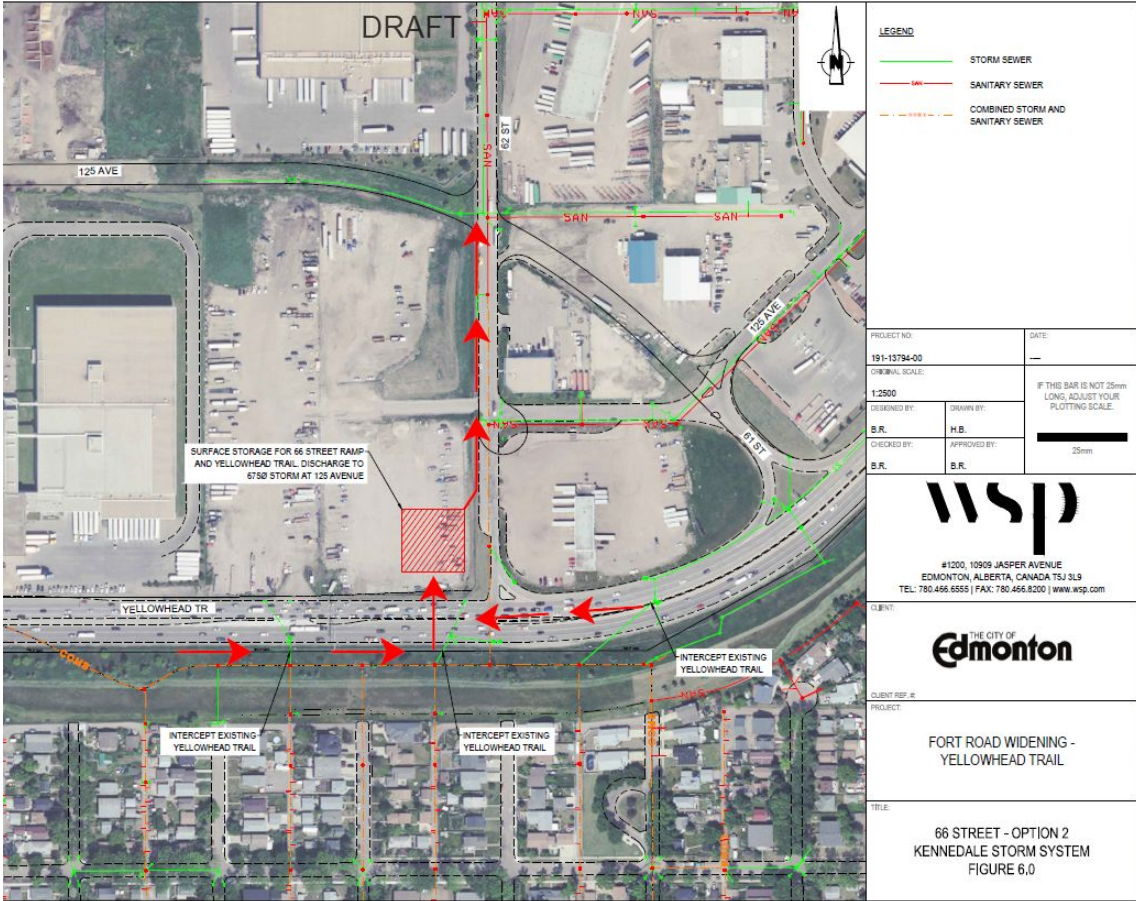


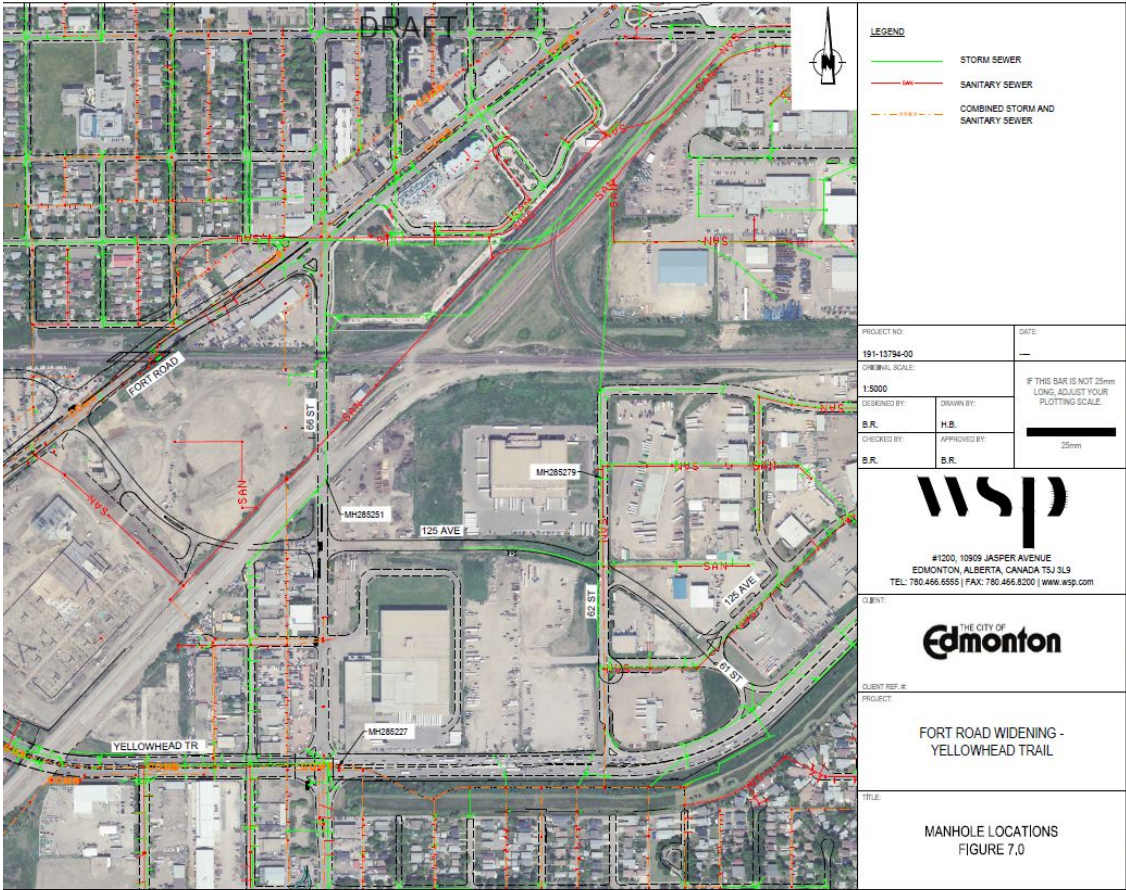
<p><b>LEGEND</b></p> <p>— STORM SEWER</p> <p>— SAN — SANITARY SEWER</p> <p>— COMBINED STORM AND SANITARY SEWER</p>	
PROJECT NO:	DATE:
191-13794-00	---
DESIGNED BY:	DRAWN BY:
B.R.	H.B.
CHECKED BY:	APPROVED BY:
B.R.	B.R.
<p>ORIGINAL SCALE:</p> <p>1:2500</p> <p>IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.</p> <p>25mm</p>	
<p><b>wsp</b></p> <p>#1200, 19009 JASPER AVENUE EDMONTON, ALBERTA, CANADA T5J 3L9 TEL: 780.466.6555   FAX: 780.466.8200   www.wsp.com</p>	
<p>CLIENT:</p> <p><b>THE CITY OF Edmonton</b></p>	
<p>CLIENT REF. #:</p> <p>PROJECT:</p> <p>FORT ROAD WIDENING - YELLOWHEAD TRAIL</p>	
<p>TITLE:</p> <p>125 AVENUE FIGURE 4.0</p>	

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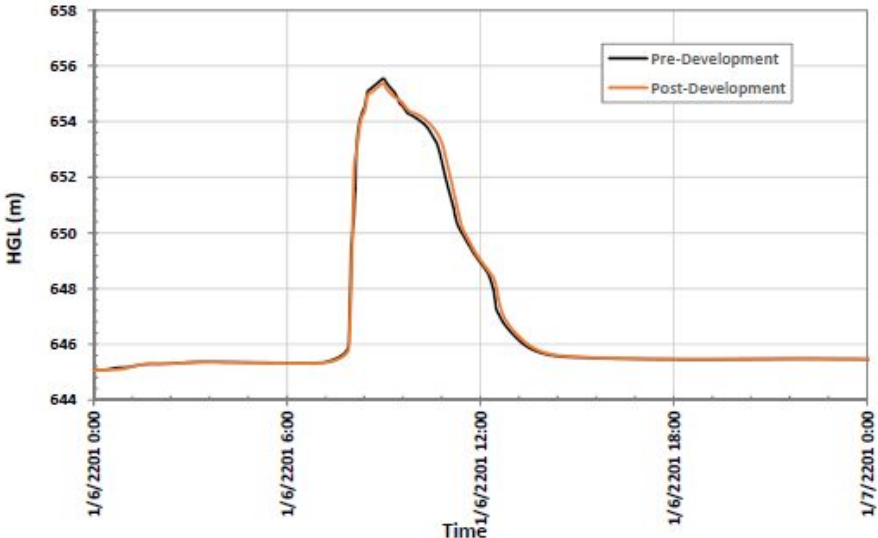


Figure 8: Fort Road Option 1 – HGL Comparison at MH 285423

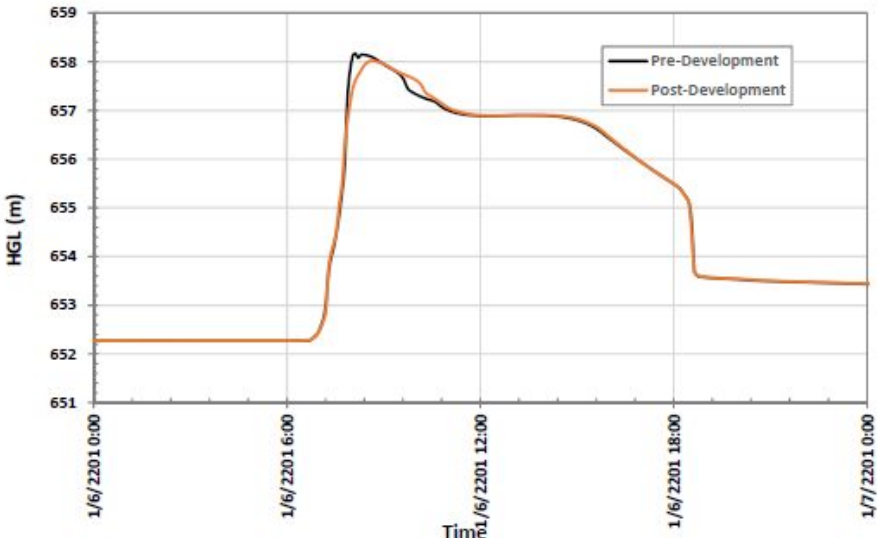


Figure 9: 125 Avenue/66 Street – HGL Comparison at MH 285251

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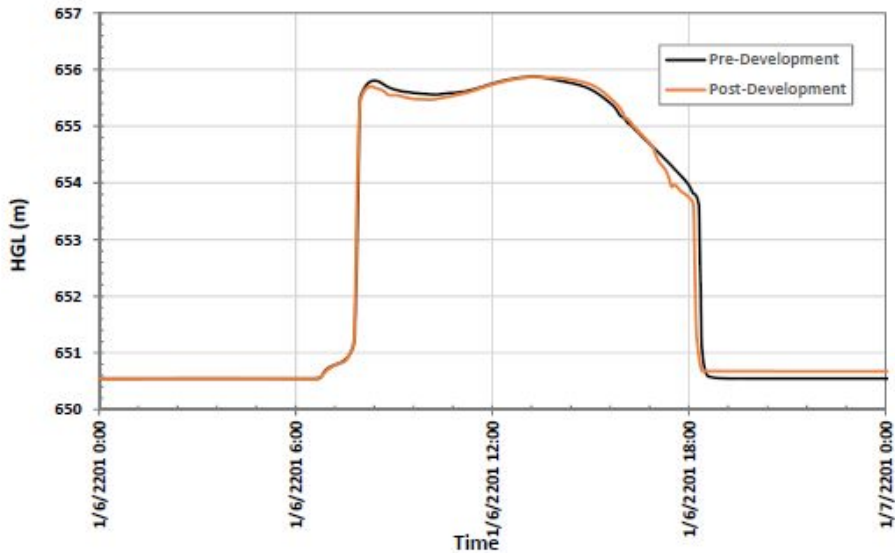


Figure 10: 125 Avenue/62 Street – HGL Comparison at MH 285279

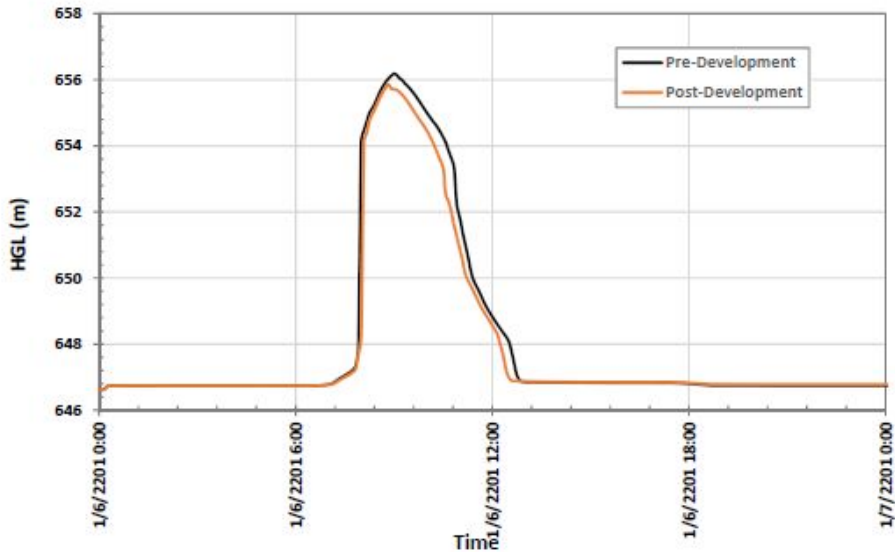


Figure 11: 66 Street Option 1 – HGL Comparison at MH 285227



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## 5 PROPOSED STORMWATER DRAINAGE CONCEPT

### 5.1 FORT ROAD

For the sag at Fort Road the storage requirements are similar for both discharge options, however removing the sag from the combined sewer service area and discharging to the Kennedale Storm Trunk requires a pump station as the storm trunk is too shallow to service storage for the Fort Road sag by gravity. The estimated probable cost for the two storage options is shown in Table 5.1 below.

**Table 5.1 Fort Road Storage Probable Costs**

STORAGE OPTION	PROBABLE COST
Option 1 – Combined System	\$ 7,700,000
Option 2 – Kennedale Storm	\$ 10,300,000

The probable cost for the storage at Fort Road is based 200 m<sup>3</sup> storage provided above ground and the remainder provided underground.

Due to the additional capital cost and ongoing operational cost of discharging to the Kennedale Storm system, it is recommended that the Fort Road sag storage discharge to the 1500 mm combined sewer as shown in Figure 2. With this option a storage volume of 2,807 m<sup>3</sup> is required.

### 5.2 125 AVENUE

Two storage locations are proposed along 125 Avenue, one at 66 Street and one at 62 Street, both locations where there is a sag in the 125 Avenue profile. The proposed drainage concept is shown in Figure 4. This concept requires storage volumes of:

- 392 m<sup>3</sup> at 66 Street for 125 Avenue between the LRT and east of 66 Street, and
- 785 m<sup>3</sup> at 62 Street for 125 Avenue from east of 66 Street to 125Avenue/61 Street.

With the storage at 66 Street there may be some opportunity for surface storage in the parcels immediately northwest and southwest of the intersection. The estimated probable cost for the two storage options is shown below in Table 5.2.

**Table 5.2 125 Avenue Storage Probable Cost**

STORAGE OPTION	PROBABLE COST
125 Avenue / 66 Street	\$ 410,000
125 Avenue / 62 Street	\$ 2,100,000

The probable cost for the storage at 66 Street is based 284 m<sup>3</sup> storage provided above ground and 108 m<sup>3</sup> provided underground. The storage at 62 Street is assumed to be provided underground.



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5.3 66 STREET

The options at 66 Street include underground storage along the on-ramp to YHT discharging to the combined system or storage north of YHT (property to be acquired) and discharge to the Kennedale storm system. The estimated probable cost for the two storage options is shown below in Table 5.3.

Table 5.3 66 Street Storage Requirements

STORAGE OPTION	PROBABLE COST
Option 1 – Combined System	\$ 880,000
Option 2 – Kennedale Storm	\$ 930,000

The probable costs assume Option 1 provides storage underground and Option 2 provides storage above ground in a dry pond. The Option 2 cost does not include land acquisition costs.

While the storage volume for discharge to the combined system is substantially less than for discharge to the Kennedale Storm system the construction costs are similar.

Given the similarity of construction costs, if land can be acquired for a dry pond north of YHT, the opportunity to divert this area to the Kennedale Storm system should be taken. Therefore, the proposed drainage concept is the dry pond north of YHT discharging to the Kennedale Storm system as shown in Figure 6.

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**APPENDIX**

**A** MODEL  
COMPARISON

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APPENDIX

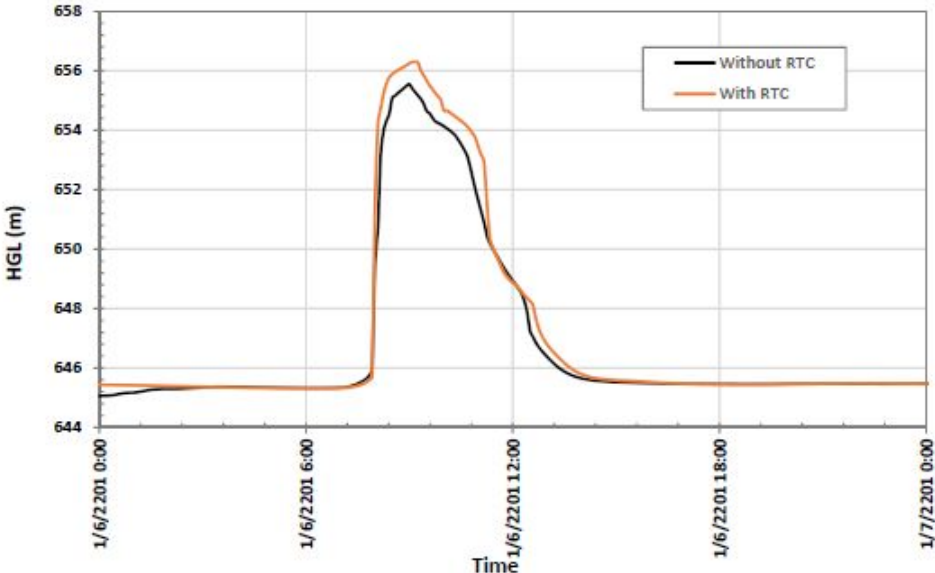


Figure A-1 GTM RTC Comparison – HGL at MH 285423

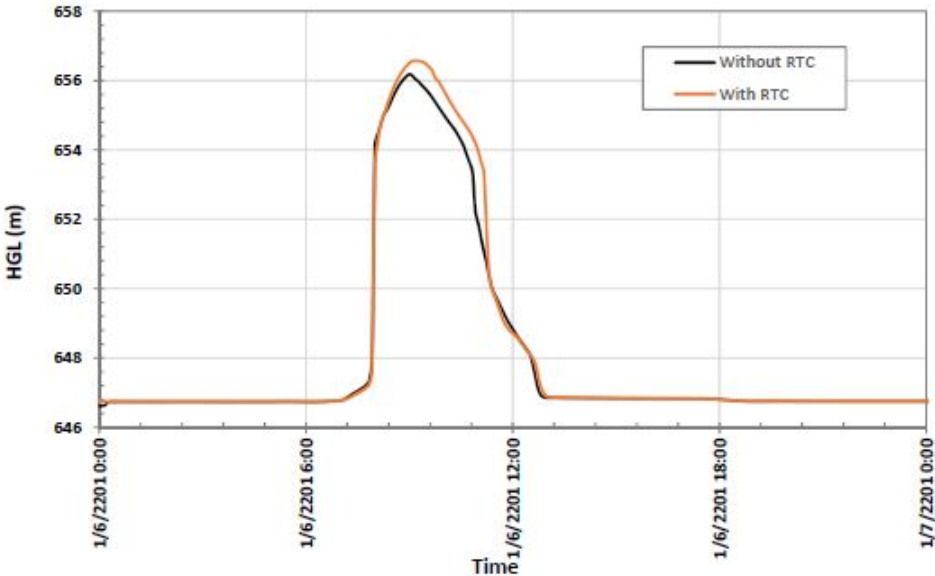


Figure A-2 GTM RTC Comparison – HGL at MH 285227

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APPENDIX

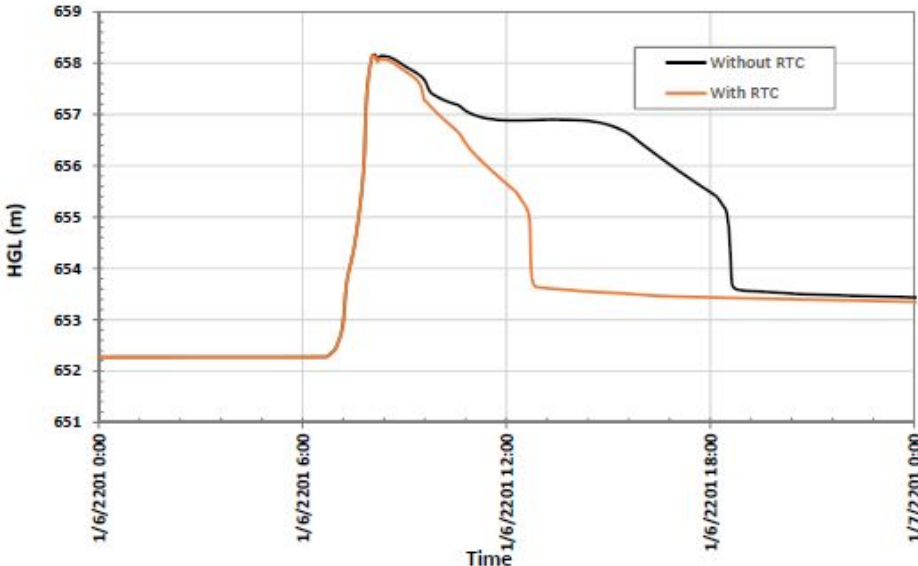


Figure A-3 Kennedale RTC Comparison – HGL at MH 285251

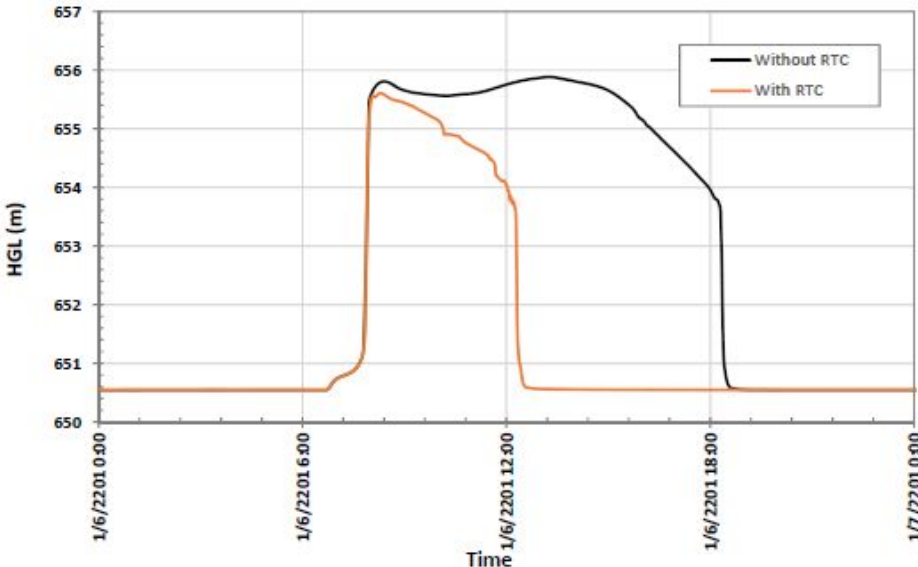


Figure A-4 Kennedale RTC Comparison – HGL at MH 285279