

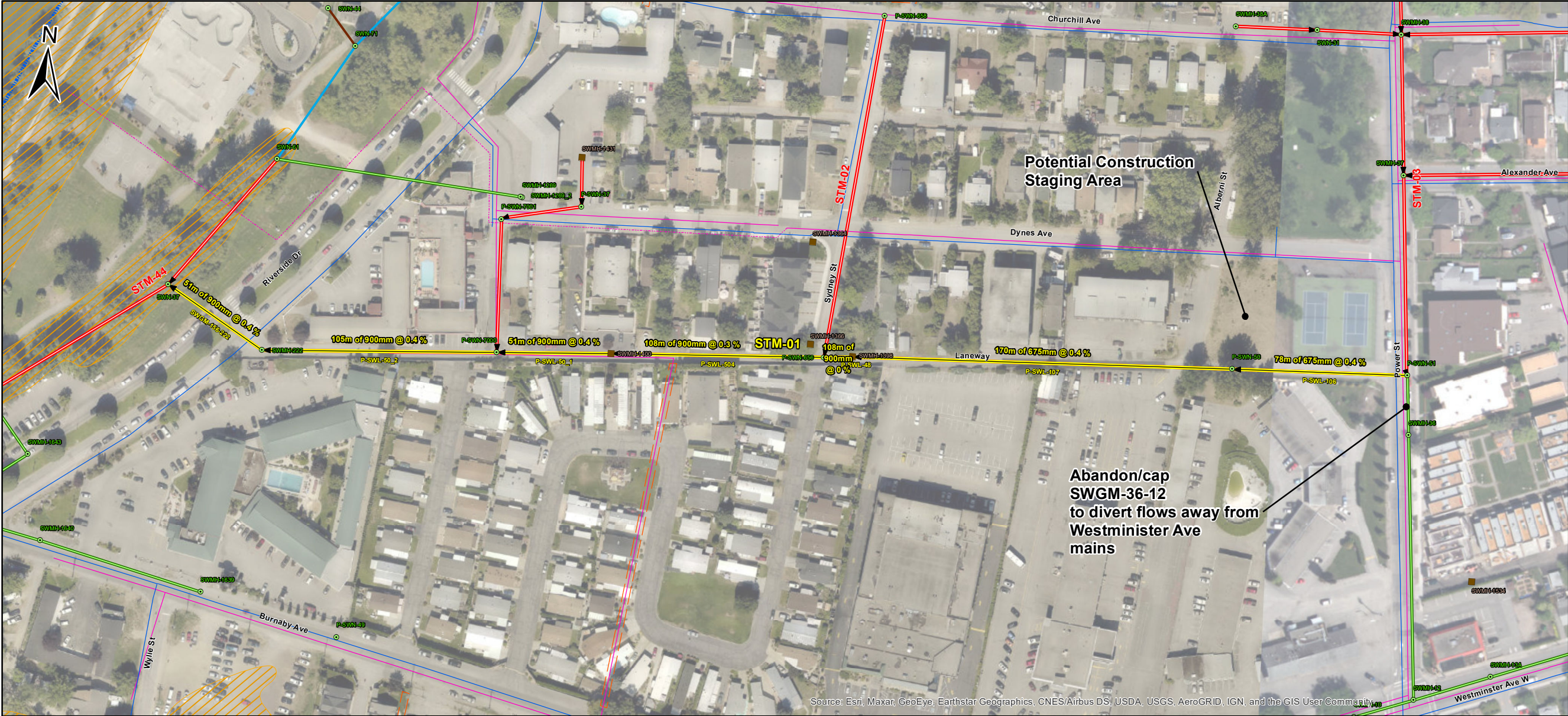
# APPENDIX

## APPENDIX

# F

## STORMWATER CAPITAL PROJECTS





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

STM-01



**Project Name:** Riverside Diversion  
**Project Number:** STM-01

**Project Timeline:** 1 to 5 Year  
**Project Priority:** High  
**Estimated Cost (\$ 2021):** \$ 1,065,500  
**Upgrade Driver:** Existing Deficiency  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**

The modeling results indicate downstream main along Westminister Ave. are at capacity under the minor (5-year) storm event. The City has also observed ferquent surcharing along Westminister Ave. when Okanagan Lake levels are high.

The proposed diversion mains will discharge significant flow away from the downstream Westminister Ave. system and reduce the degree of basement and overland flooding. The 375 mm dia. mains along Power St. should be abandoned as part of this project.

The proposed mains will discharge to existing wetlands west of Riverside Dr., which is designated as a hazard area due to high water levels in the Okanagan Channel. As such, offline storage should also be considered, where feasible.

This project can be done in conjunction with STM-02, STM-03 and STM-04, to create an independent minor system for the northwest corner of the City.

**COST CONSIDERATIONS**

This project will service existing users and infill development within the Northwest corridor that is either occurring now or identified in the OCP. The City Subdivision and Development Bylaw (2004-81) stipulates runoff from development must be limited to the 5-year return period pre-development flows and as such the load on the existing minor system should not increase. DCC costs are not applicable for this upgrade.

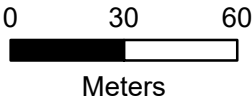
ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 39,600
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 20,000
1.3	Traffic Management	\$ 60,000
2.0	Earthworks	
2.1	Supply and Install New 900 mm Dia. Pipe	\$ 240,400
2.2	Supply and Install New 675 mm Dia. Pipe	\$ 155,200
2.3	Remove and Dispose Existing Pipe	\$ 59,400
2.4	Install New Manhole	\$ 8,000
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 178,100
3.2	Full Width Restoration	-
4.0	Land Acquisition	
4.1	Acquire Easements	-
4.2	Acquire Property	-
SUBTOTAL		\$ 760,700
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 114,200
5.2	Construction Contingency (25% of Subtotal)	\$ 190,200
TOTAL ESTIMATED COST		\$ 1,065,100

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	EFFECTIVE FLOW AREA OR EQUIVALENT DIA. (mm)	LENGTH (m)
P-SWL-106	P-SWN-51	P-SWN-50	New Main	-	675	78
P-SWL-107	P-SWN-50	SWMH-1398	New Main	-	675	169
P-SWL-48	SWMH-1398	SWMH-1400	New Main	-	900	109
P-SWL-50	SWMH-1400	SWMH-222	New Main	-	900	157
SWGM-156-222	SWMH-222	SWN-37	Upsize Existing Main	300	900	51
STM-01 Total						564

**Legend**

- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse

STM-01 Riverside Drive Diversion  
Stormwater Master Plan



Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-1**

Client: City of Penticton

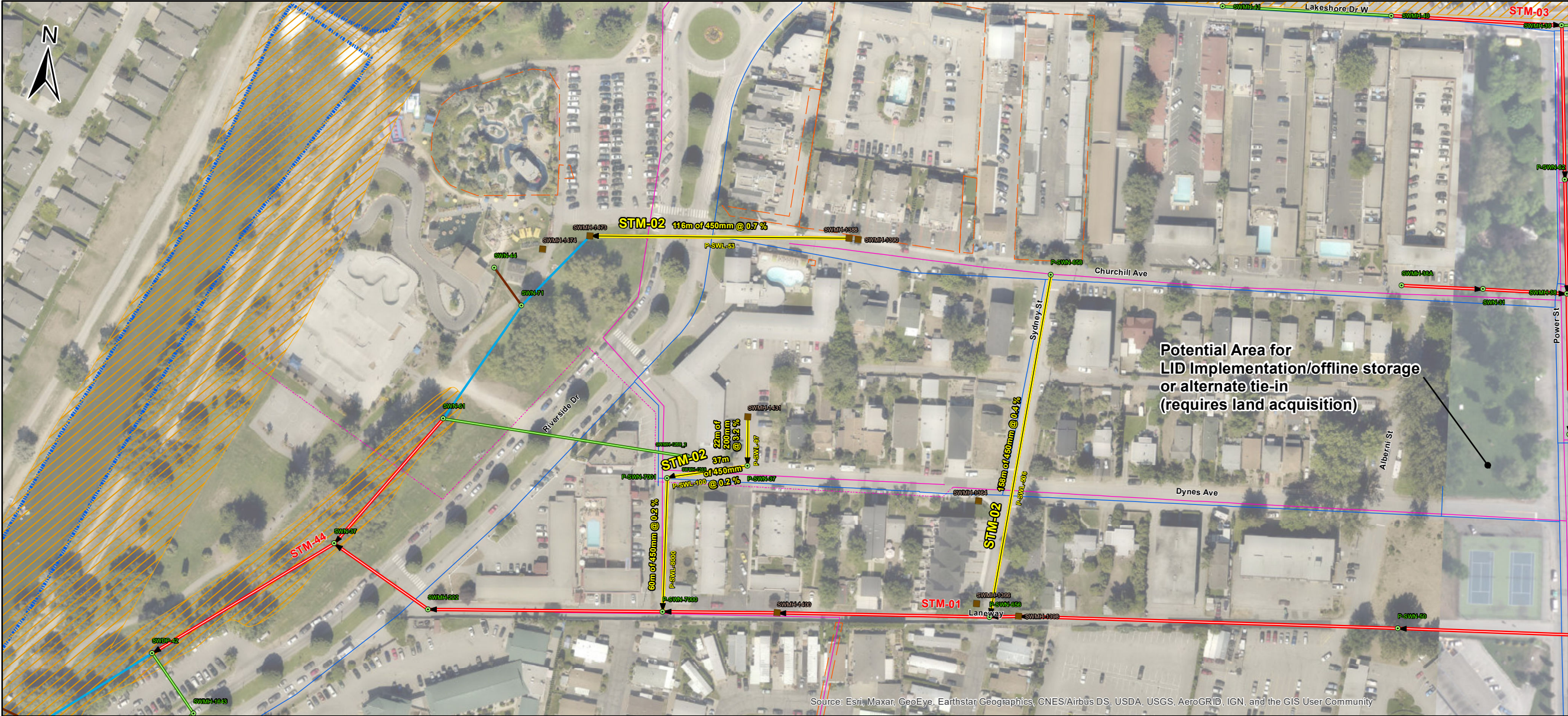


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**Project Name:** Churchill Avenue Improvements  
**Project Number:** STM-02

**Project Timeline:** 1 to 5 Year  
**Project Priority:** High  
**Estimated Cost (\$ 2021):** \$ 403,800  
**Upgrade Driver:** Existing Deficiency  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
The 2017 DMP recommended gravity mains along Riverside Dr from north to south to alleviate observed ponding and prevent asphalt deterioration.

The City installed drywells in 2020 to mitigate observed ponding. This project proposes constructing overflow pipes to connect drywells and allow runoff to discharge downstream into the Riverside Dr. wetland.

The proposed sewers will discharge to existing wetlands west of Riverside Dr, which have been identified as a hazard area due to high water levels in the Okanagan Channel.

The minimum building elevation for all infill developments along this corridor should be increased to minimize flood risk.

This project will prevent ponding along Riverside Dr. but increase the flows discharging to the existing wetlands. Potential wetland improvements (project STM-44) should be considered in conjunction with this project. STM-04 and STM-05 should also be considered in conjunction with this project.

**COST CONSIDERATIONS**  
This project will service existing users and infill development within the Northwest corridor that is either occurring now or identified in the OCP. The City Subdivision and Development Bylaw (2004-81) stipulates runoff from development must be limited to the 5-year return period pre-development flows and as such the load on the existing minor system should not increase. DCC costs are not applicable for this upgrade.

ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 16,200
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 9,000
1.3	Traffic Management	\$ 25,000
2.0	Earthworks	
2.1	Supply and Install New 450 mm Dia. Pipe	\$ 154,800
2.2	Supply and Install New 200 mm Dia. Pipe	\$ 6,700
2.4	Install New Manhole	\$ 4,000
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 72,700
3.2	Full Width Restoration	
4.0	Land Acquisition	
4.1	Acquire Easements	
4.2	Acquire Property	
SUBTOTAL		\$ 288,400
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 43,300
5.2	Construction Contingency (25% of Subtotal)	\$ 72,100
TOTAL ESTIMATED COST		\$ 403,800

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)
P-SWL-53	SWMH-1388	SWMH-1473	New Main	-	450	116
P-SWL-97	SWMH-1431	P-SWN-37	New Main	-	200	22
P-SWL-100	P-SWN-37	P-SWN-7001	New Main	-	450	37
P-SWL-8000	P-SWN-7001	P-SWN-7000	New Main	-	450	60
P-SWL-506	P-SWN-658	P-SWN-656	New Main	-	450	158
STM-02 Total						392

#### Legend

- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse

## STM-02 Churchill Avenue Improvements Stormwater Master Plan

0 30 60  
Meters

Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-2**

Client: City of Penticton



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STM-03



**Project Name:** Power St. (North) Improvements  
**Project Number:** STM-03

**Project Timeline:** 1 to 5 Year  
**Project Priority:** High  
**Estimated Cost (\$ 2021):** \$ 1,080,300  
**Upgrade Driver:** Existing Deficiency  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
The model indicates existing 300 to 375 mm dia. mains along the residential areas are at capacity for the minor (5-year) design storm event. The City has also observed frequent surcharging within the project limits during high water levels in the Okanagan Lake. The City should increasing the minimum building elevation for future infill developments to minimize flood risk.

The proposed works improves the capacity of the minor system and reduces the risk of overland flooding along Power St. This project should be done in conjunction with STM-01 to effectively divert all runoff west towards Riverside Dr. and ensure downstream system along Westminister Ave. has adequate capacity for the minor event.

The 375 mm dia. main discharging south to Westminister Ave. should be abandoned, as indicated in Project STM-01. This project can be done in conjunction STM-01, STM-02 and STM-04.

Pipe bursting or relining should be investigated during subsequent design phases.

**COST CONSIDERATIONS**  
This project will service existing users and infill development within the Northwest corridor that is either occurring now or identified in the OCP. The City Subdivision and Development Bylaw (2004-81) stipulates runoff from development must be limited to the 5-year return period pre-development flows and as such the load on the existing minor system should not increase. DCC costs are not applicable for this upgrade.

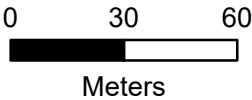
ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 40,400
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 21,000
1.3	Traffic Management	\$ 61,000
2.0	Earthworks	
2.1	Supply and Install New 600 mm Dia. Pipe	\$ 87,000
2.2	Supply and Install New 525 mm Dia. Pipe	\$ 110,600
2.3	Supply and Install New 450 mm Dia. Pipe	\$ 99,700
2.4	Supply and Install New 375 mm Dia. Pipe	\$ 30,500
2.5	Supply and Install New 300 mm Dia. Pipe	\$ 49,300
2.6	Supply and Install New 250 mm Dia. Pipe	\$ 26,100
2.7	Remove and Dispose Existing Pipe	\$ 60,500
2.8	Install New Manhole	\$ 4,000
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 181,500
3.2	Full Width Restoration	-
4.0	Land Acquisition	
4.1	Acquire Easements	-
4.2	Acquire Property	-
	<b>SUBTOTAL</b>	<b>\$ 771,600</b>
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 115,800
5.2	Construction Contingency (25% of Subtotal)	\$ 192,900
	<b>TOTAL ESTIMATED COST</b>	<b>\$ 1,080,300</b>

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)
P-SWL-54	SWMH-1611	P-SWN-62	New Main	-	300	107
SWGM-37-36	SWMH-37	P-SWN-51	Upsize Existing Main	375	600	90
SWGM-38-37	SWMH-38	SWMH-37	Upsize Existing Main	375	600	63
SWGM-38A-645	SWMH-38A	SWN-31	Upsize Existing Main	200	300	37
SWGM-39-38_1	SWMH-39	P-SWN-62	Upsize Existing Main	375	525	69
SWGM-39-38_2	P-SWN-62	SWMH-38	Upsize Existing Main	375	525	51
SWGM-40-39	SWMH-40	SWMH-39	Upsize Existing Main	300	375	76
SWGM-44-38	SWMH-44	SWMH-38	Upsize Existing Main	200	450	94
SWGM-45-44	SWMH-45	SWMH-44	Upsize Existing Main	200	250	76
SWGM-46-37	SWMH-46	SWMH-37	Upsize Existing Main	300	525	104
SWGM-47-46	SWMH-47	SWMH-46	Upsize Existing Main	300	450	107
SWGM-645-38	SWN-31	SWMH-38	Upsize Existing Main	200	450	37
<b>STM-03 Total</b>						<b>911</b>

Legend

- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse

STM-03 Power Street (North) Improvements  
Stormwater Master Plan



Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-3**

Client: City of Penticton

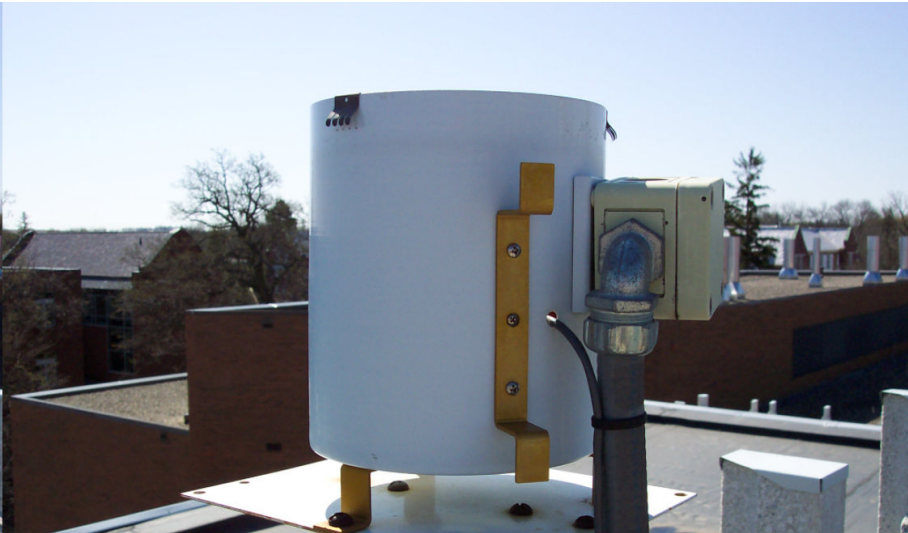


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**Project Name:** Install Rain Gauge  
**Project Number:** STM-04

**Project Timeline:** 1 to 5 Year  
**Project Priority:** High  
**Estimated Cost (\$ 2021):** \$ 21,800  
**Upgrade Driver:** N/A  
**Development Cost Charges:** N/A

**CONSIDERATIONS**  
Detailed rainfall data is essential for stormwater planning and design . As such, this project has been carried over from previous master plans. The City should install at least one gauge - preferably near the centre of the City of the City Public Works Yard.

The cost estimate is provided for supply and installation of one gauge.

Optional - A second gauge should also be installed in the Ellis or Penticton Creek watersheds to measure the effect of elevation on precipitation.

This project can be completed independent of all other projects.

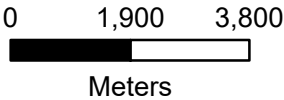
ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Rain Gauge and Installation	\$ 15,500
	SUBTOTAL	\$ 15,500
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 2,400
5.2	Installation Contingency (25% of Subtotal)	\$ 3,900
	TOTAL ESTIMATED COST	\$ 21,800



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STM-04 Install Rain Gauge  
Stormwater Master Plan

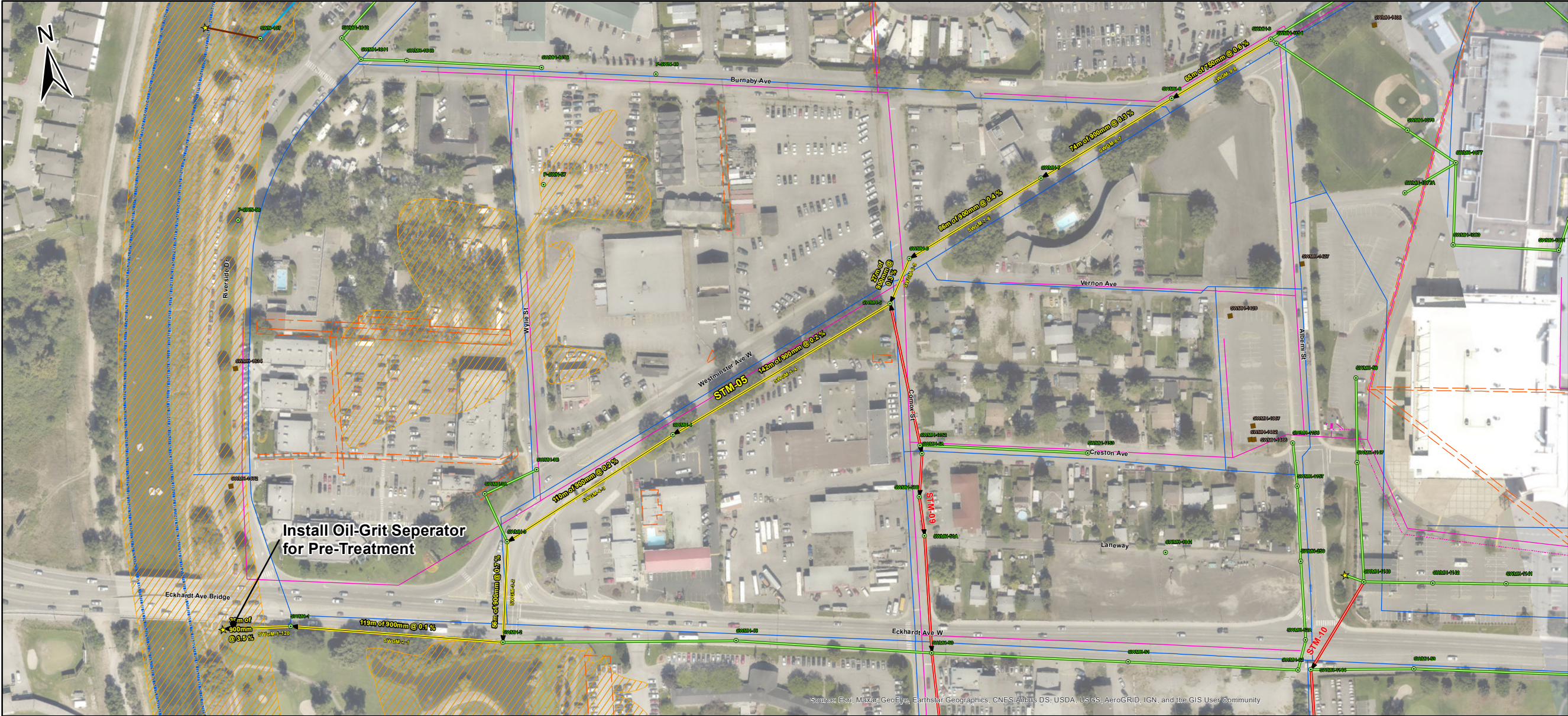


Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-4**

Client: City of Penticton







**Project Name:** Westminister Avenue Improvements  
**Project Number:** STM-05

**Project Timeline:** 5 to 10 Year  
**Project Priority:** Medium  
**Estimated Cost (\$ 2021):** \$ 1,465,200  
**Upgrade Driver:** Existing Deficiency  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
The Westminister Ave. mains currently collect runoff from large residential and industrial catchments, which have been identified to be approximately 80 - 90 % impervious. The model results indicate consistent flooding near the Eckhardt Ave. Bridge under the minor and major storm events. This project should be implemented after construction of high priority projects, as additional mitigation to reduce the overall risk of flooding observed by the City.

**This projects improves the existing capacity of the Westminister Ave. mains. Flow monitoring is recommended near the Eckhardt Ave. Bridge to confirm design flows prior to implementation as the high priority projects (STM-01, 03 and 06) will greatly reduce the runoff discharging to this system.**

This project should be implemented in conjunction with STM-09.

**COST CONSIDERATIONS**  
This project will service existing users and infill development within the Northwest corridor that is either occurring now or identified in the OCP. The City Subdivision and Development Bylaw (2004-81) stipulates runoff from development must be limited to the 5-year return period pre-development flows and as such the load on the existing minor system should not increase. DCC costs are not applicable for this upgrade.

ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 55,100
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 28,000
1.3	Traffic Management	\$ 83,000
2.0	Earthworks	
2.1	Supply and Install New 900 mm Dia. Pipe	\$ 506,200
2.2	Supply and Install New 750 mm Dia. Pipe	\$ 44,000
2.3	Remove and Dispose Existing Pipe	\$ 82,600
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 247,600
3.2	Full Width Restoration	
4.0	Land Acquisition	
4.1	Acquire Easements	
4.2	Acquire Property	
SUBTOTAL		\$ 1,046,500
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 157,000
5.2	Construction Contingency (25% of Subtotal)	\$ 261,700
TOTAL ESTIMATED COST		\$ 1,465,200

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	EFFECTIVE FLOW AREA OR EQUIVALENT DIA. (mm)	LENGTH (m)
SWGM-2-1	SWMH-2	SWMH-1	Upsize Existing Main	750	900	119
SWGM-3-2	SWMH-3	SWMH-2	Upsize Existing Main	750	900	56
SWGM-4-3	SWMH-4	SWMH-3	Upsize Existing Main	600	900	110
SWGM-5-4	SWMH-5	SWMH-4	Upsize Existing Main	600	900	142
SWGM-6-5	SWMH-6	SWMH-5	Upsize Existing Main	600	900	27
SWGM-7-6	SWMH-7	SWMH-6	Upsize Existing Main	600	900	86
SWGM-8-7	SWMH-8	SWMH-7	Upsize Existing Main	600	900	74
SWGM-9-8	SWMH-9	SWMH-8	Upsize Existing Main	600	750	65
STM-05 Total						680

**Legend**

- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Culvert
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Hazard Area
- Watercourse

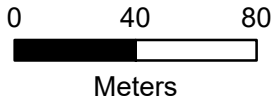


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## STM-05 Westminister Avenue Improvements Stormwater Master Plan



Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-5**

Client: City of Penticton







**STM-06**

**Project Name:** Power St. (South) Diversion  
**Project Number:** STM-06

**Project Timeline:** 1 to 5 Year  
**Project Priority:** High  
**Estimated Cost (\$ 2021):** \$ 968,300  
**Upgrade Driver:** Existing Deficiency  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
The Westminister Ave. mains currently convey runoff from large residential and commercial catchments, which can be routed towards existing 900 mm dia. Power St. mains. This project is consistent with the recommendations in the 2017 DMP.

This project will improve the existing capacity of Westminister Ave. main and reduce the risk of downstream flooding.

This project can be done in conjunction with STM-01 and STM-03.

**COST CONSIDERATIONS**  
This project will service existing users and infill development within the Northwest corridor that is either occurring now or identified in the OCP. The City Subdivision and Development Bylaw (2004-81) stipulates runoff from development must be limited to the 5-year return period pre-development flows and as such the load on the existing minor system should not increase. DCC costs are not applicable for this upgrade.

ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 38,800
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 20,000
1.3	Traffic Management	\$ 59,000
2.0	Earthworks	
2.1	Supply and Install New 900 mm Dia. Pipe	\$ 387,400
2.2	Install New Manhole	\$ 12,000
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 174,400
3.2	Full Width Restoration	-
4.0	Land Acquisition	
4.1	Acquire Easements	-
4.2	Acquire Property	-
SUBTOTAL		\$ 691,600
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 103,800
5.2	Construction Contingency (25% of Subtotal)	\$ 172,900
TOTAL ESTIMATED COST		\$ 968,300

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)
P-SWL-101	SWMH-15	P-SWN-55	New Main	-	900	89
P-SWL-102	P-SWN-55	P-SWN-54	New Main	-	900	116
P-SWL-103	P-SWN-54	P-SWN-53	New Main	-	900	82
P-SWL-104	P-SWN-53	SWMH-1161	New Main	-	900	222
STM-06 Total						510

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Open Channel

Watermain

Sanitary Main

City Easement

Hazard Area

Watercourse





Source: Esri, Maxar, GeoEye, Earthstar/Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-105	P-SWN-32	P-SWN-52	New Main	-	525	127	\$ 1,300	\$ 165,385
P-SWL-108	P-SWN-52	P-SWN-55	New Main	-	525	34	\$ 1,300	\$ 44,624
P-SWL-3	P-SWN-5	P-SWN-45	New Main	-	300	142	\$ 900	\$ 128,174
P-SWL-4	P-SWN-45	P-SWN-52	New Main	-	450	117	\$ 1,100	\$ 128,525
P-SWL-42	SWMH-246	P-SWN-32	New Main	-	525	124	\$ 1,300	\$ 161,409
STM-07 Total						545		\$ 628,116

Legend

- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- City Easement

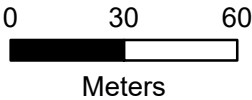


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STM-07 Rigsby Street  
Stormwater Master Plan

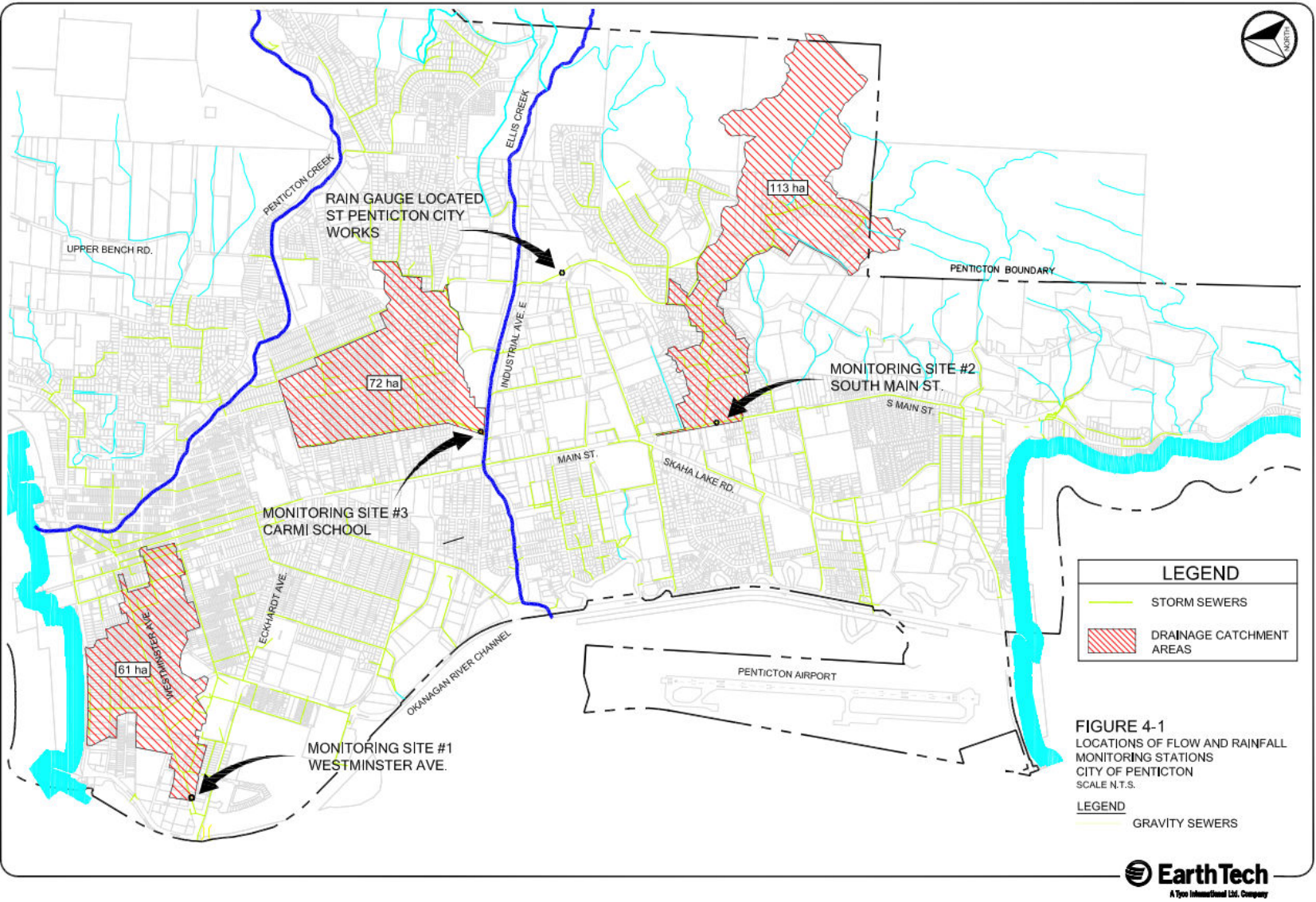


Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-7**

Client: City of Penticton







STM-08



**Project Name:** Flow Monitoring Program  
**Project Number:** STM-08  
**Project Timeline:** 1 to 5 Year  
**Project Priority:** High  
**Estimated Cost (\$ 2021):** \$ 145,000  
**Upgrade Driver:** N/A  
**Development Cost Charges:** N/A

**CONSIDERATIONS**  
A flow monitoring program commissioned specifically for the purposes of model calibration should be undertaken within the next 5-years to validate medium and low priority projects. City Engineering and Operations staff  
Flow monitoring was previously conducted at three sites shown in the map as part of the 2007 stormwater master plan. Additionally, a flow monitor was also installed one site in 2015 as part of the 2017 stormwater master plan update. Further flow monitoring is strongly recommended to increase model confidence within developed and undeveloped catchments. City Engineering and Operations staff should be consulted to select appropriate flow monitoring sites for calibration.  
The cost estimates provided include flow monitoring at five sites for a period of two months, and model calibration.

This project can be completed independent of all other projects.

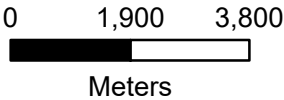
ITEM	DESCRIPTION	COST (2021 \$)
1.0	5 Sites - 2 months of Flow Monitoring	\$ 100,000
2.0	Model Calibration	\$ 45,000
TOTAL ESTIMATED COST		\$ 145,000



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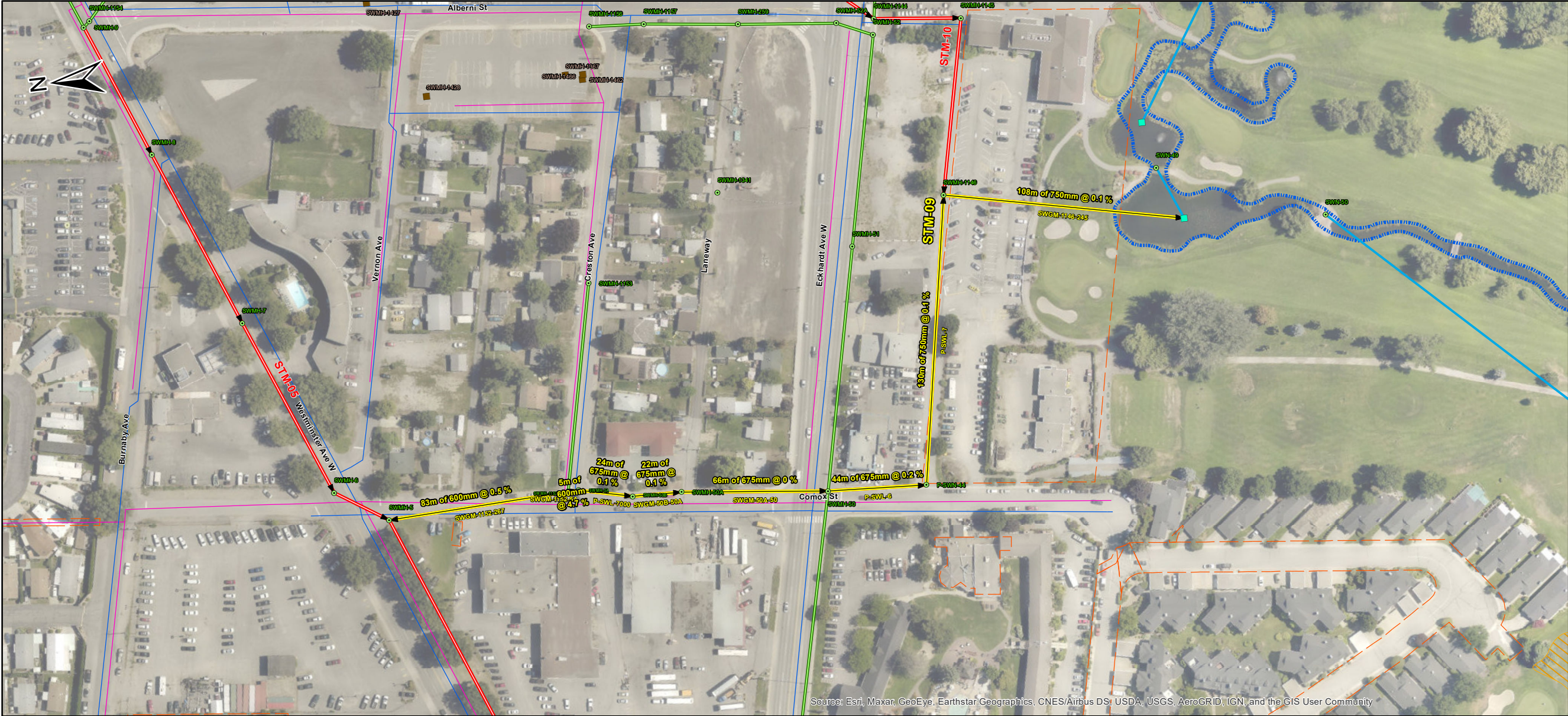
STM-08 Flow Monitoring Program  
Stormwater Master Plan



Project No.: 20M-00462-00  
Date: Apr 2021  
Figure No.: F-8







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

STM-09



**Project Name:** Comox Street Diversion  
**Project Number:** STM-09

**Project Timeline:** 5 to 10 Year  
**Project Priority:** Medium  
**Estimated Cost (\$ 2021):** \$ 828,600  
**Upgrade Driver:** Existing Deficiency  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
This project proposes diverting significant flows away from the Westminister Ave. mains, which are subject to frequent surcharging and flooding due to high water levels in the Okanagan Channel.

As part of this project, existing service mains along the Comox Street corridor will be upsized and reconstructed to allow discharge into the existing golf course drainage ponds.

**This projects improves the existing capacity of the Westminister Ave. mains. Flow monitoring is recommended near the Eckhardt Ave.Bridge to confirm design flows prior to implementation as the high priority projects (STM-01, 03 and 06) will greatly reduce the runoff discharging to this system.**

This project should be implemented in conjunction with STM-05.

**COST CONSIDERATIONS**  
This project will service existing users and infill development within the Northwest corridor that is either occurring now or identified in the OCP. The City Subdivision and Development Bylaw (2004-81) stipulates runoff from development must be limited to the 5-year return period pre-development flows and as such the load on the existing minor system should not increase. DCC costs are not applicable for this upgrade.

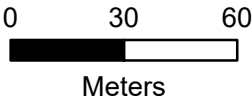
ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 31,100
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 16,000
1.3	Traffic Management	\$ 47,000
2.0	Earthworks	
2.1	Supply and Install New 750 mm Dia. Pipe	\$ 162,900
2.2	Supply and Install New 675 mm Dia. Pipe	\$ 97,800
2.3	Supply and Install New 600 mm Dia. Pipe	\$ 50,300
2.4	Remove and Dispose Existing Pipe	\$ 46,700
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 140,000
3.2	Full Width Restoration	
4.0	Land Acquisition	
4.1	Acquire Easements	
4.2	Acquire Property	
SUBTOTAL		\$ 591,800
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 88,800
5.2	Construction Contingency (25% of Subtotal)	\$ 148,000
TOTAL ESTIMATED COST		\$ 828,600

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)
P-SWL-6	SWMH-50	P-SWN-44	New Main	-	675	44
P-SWL-7	P-SWN-44	SWMH-1146	New Main	-	750	130
SWGM-1146-245	SWMH-1146	SWDA-C	Upsize Existing Main	300	750	108
SWGM-1152-267	SWMH-5	SWMH-1152	Upsize Existing Main	200	600	83
SWGM-50A-50	SWMH-50A	SWMH-50	Upsize Existing Main	300	675	66
P-SWL-7000	SWMH-5A	SWMH-50B	New Main	-	675	24
SWGM-1152-5A	SWMH-1152	SWMH-5A	Upsize Existing Main	250	600	5
SWGM-50B-50A	SWMH-50B	SWMH-50A	Upsize Existing Main	250	675	22
STM-09 Total						482

Legend

- 1.0m Manhole
- Dry Well
- Detention Pond
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- Easement
- Hazard Area
- Watercourse

STM-09 Comox Street Diversion  
Stormwater Master Plan



Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-9**

Client: City of Penticton

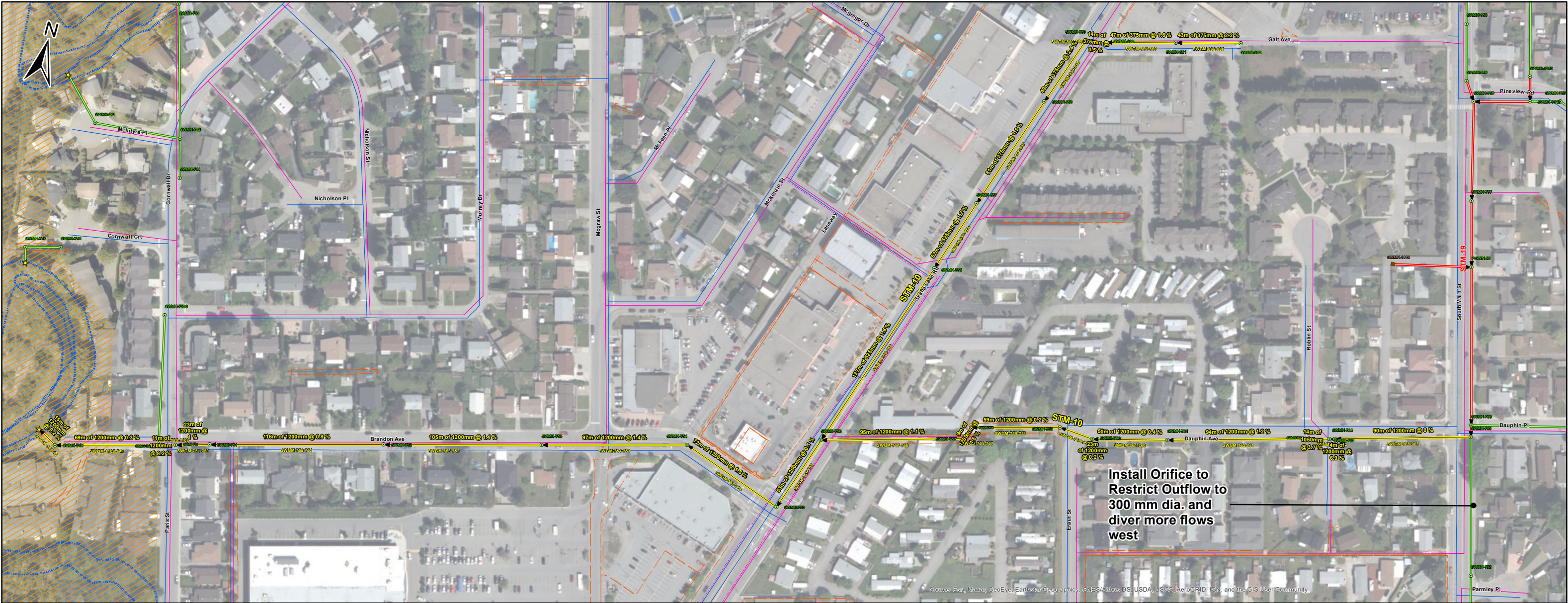


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PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1108-749	SWMH-1108	SWMH-749	Upsize Existing Main	900	1200	69	\$ 2,650	\$ 182,347
SWGM-749-19	SWMH-749	SWDP-19	Upsize Existing Main	900	1200	15	\$ 2,650	\$ 40,519
SWGM-750-1108	SWMH-750	SWMH-1108	Upsize Existing Main	900	1200	11	\$ 2,650	\$ 30,019
SWGM-751-750	SWMH-751	SWMH-750	Upsize Existing Main	900	1200	23	\$ 2,650	\$ 59,943
SWGM-752-751	SWMH-752	SWMH-751	Upsize Existing Main	900	1200	116	\$ 2,650	\$ 306,942
SWGM-753-752	SWMH-753	SWMH-752	Upsize Existing Main	900	1200	105	\$ 2,650	\$ 278,563
SWGM-754-753	SWMH-754	SWMH-753	Upsize Existing Main	900	1200	97	\$ 2,650	\$ 256,592
SWGM-755-754	SWMH-755	SWMH-754	Upsize Existing Main	900	1200	72	\$ 2,650	\$ 191,722
SWGM-756-755	SWMH-756	SWMH-755	Upsize Existing Main	900	1200	53	\$ 2,650	\$ 141,568
SWGM-757-756	SWMH-757	SWMH-756	Upsize Existing Main	900	1200	95	\$ 2,650	\$ 252,057
SWGM-758-757	SWMH-758	SWMH-757	Upsize Existing Main	900	1200	9	\$ 2,650	\$ 23,683
SWGM-759-758	SWMH-759	SWMH-758	Upsize Existing Main	900	1200	59	\$ 2,650	\$ 156,740
SWGM-760-759	SWMH-760	SWMH-759	Upsize Existing Main	900	1200	23	\$ 2,650	\$ 60,346
SWGM-761-760	SWMH-761	SWMH-760	Upsize Existing Main	900	1200	50	\$ 2,650	\$ 132,344
SWGM-762-761	SWMH-762	SWMH-761	Upsize Existing Main	900	1200	94	\$ 2,650	\$ 249,362
SWGM-763-762	SWMH-763	SWMH-762	Upsize Existing Main	900	1050	14	\$ 2,300	\$ 31,068
SWGM-764-763	SWMH-764	SWMH-763	Upsize Existing Main	900	1200	4	\$ 2,650	\$ 10,611
SWGM-765-764	SWMH-765	SWMH-764	Upsize Existing Main	900	1200	90	\$ 2,650	\$ 239,308
SWGM-856-756	SWMH-856	SWMH-756	Upsize Existing Main	300	525	137	\$ 1,300	\$ 177,748
SWGM-857-856	SWMH-857	SWMH-856	Upsize Existing Main	300	525	52	\$ 1,300	\$ 67,136
SWGM-858-857	SWMH-858	SWMH-857	Upsize Existing Main	300	375	81	\$ 1,050	\$ 85,475
SWGM-859-858	SWMH-859	SWMH-858	Upsize Existing Main	300	375	49	\$ 1,050	\$ 51,451
SWGM-860-859	SWMH-860	SWMH-859	Upsize Existing Main	300	375	14	\$ 1,050	\$ 14,352
SWGM-861-860	SWMH-861	SWMH-860	Upsize Existing Main	300	375	47	\$ 1,050	\$ 48,929
SWGM-862-861	SWMH-862	SWMH-861	Upsize Existing Main	300	375	43	\$ 1,050	\$ 45,149
STM-10 Total						1421	\$	3,133,973

Legend

★

Discharge Point

●

Storm Manhole

■

Dry Well

—

Existing Gravity Main

→

Proposed Project

→

Nearby Projects

—

Watermain

—

Sanitary Main

---

Sanitary Forcemain

□

City Easement

▨

Hazard Area

|||||

Watercourse

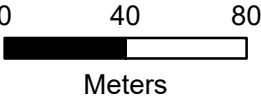


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# STM-10 Dauphin Ave. and Brandon Ave. Upgrades

## Stormwater Master Plan



Project No.:  
**20M-00462-00**

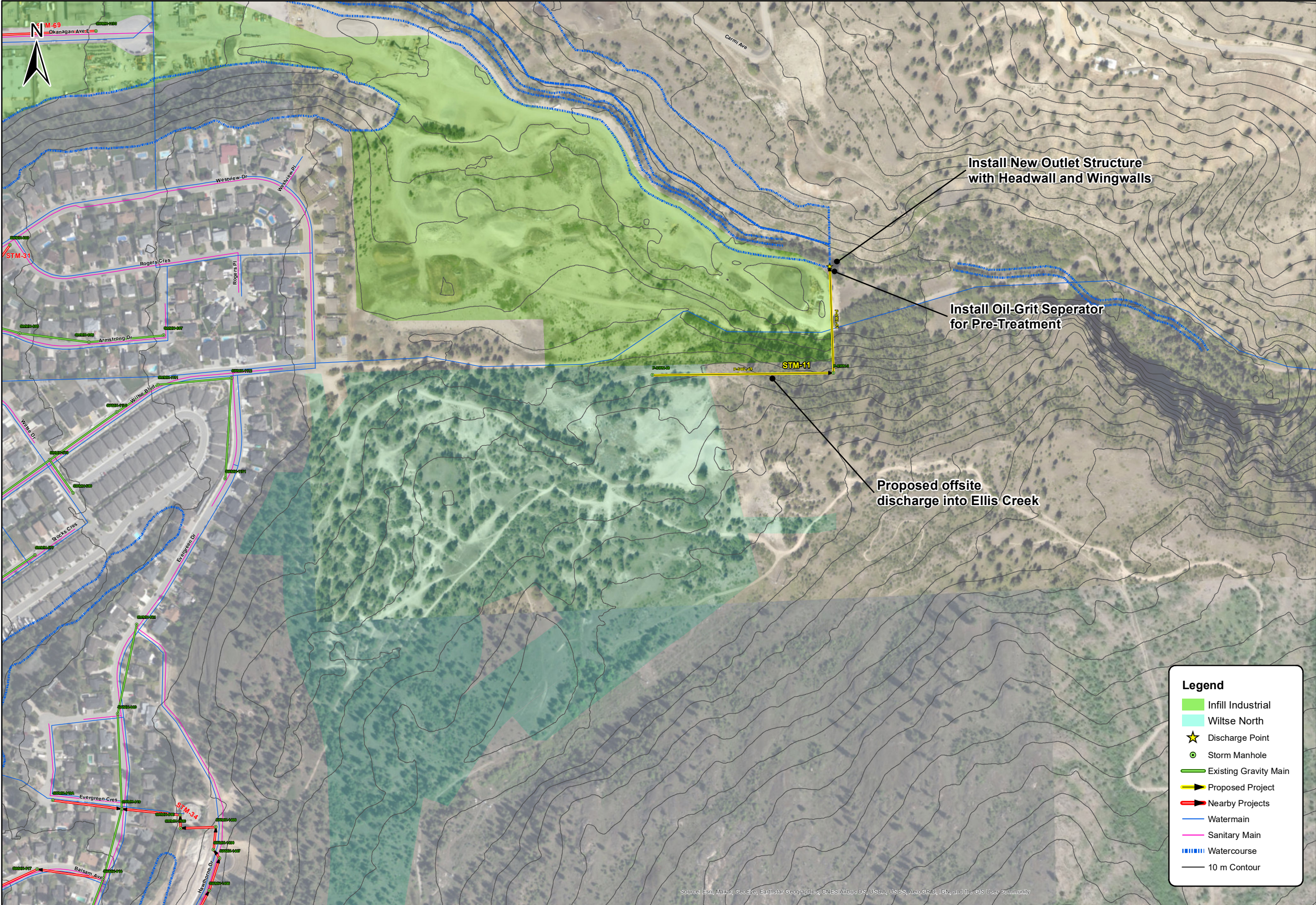
Date:  
**Apr 2021**

Figure No.:  
**F-10**

Client: City of Penticton







**STM-11**

**Project Name:** Wiltse North Development  
**Project Number:** STM-11

**Project Timeline:** 10 to 20 Year  
**Project Priority:** Low  
**Estimated Cost (\$ 2020):** \$ TBD (Developer-Driven)  
**Upgrade Driver:** Future Development  
**Development Cost Charges:** Applicable

**DESIGN CONSIDERATIONS**  
The modeling results indicate 300-450 mm diameter mains are required to service the Wiltse North development area. The proposed piped system can discharge offsite into Ellis Creek, with adequate pre-treatment control to enhance water quality.

The target post-development flow rate discharging into the Creek should not exceed the pre-development flow rate for the 5-year event, per City Bylaw.

The proposed alignment and cost estimate are subject to change based on developer grading plans and site layout.

**COST CONSIDERATIONS**  
This project will service future development south of Wiltse Blvd., as identified in the OCP. The developer is responsible for all drainage servicing costs and must control the post-development rate for the 5-year event, per City Bylaw.

**wsp**

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**STM-11 Wiltse North Development Stormwater Master Plan**

**PENTICTON IIMP**

0 75 150  
Meters

Project No.:  
**20M-00462-00**

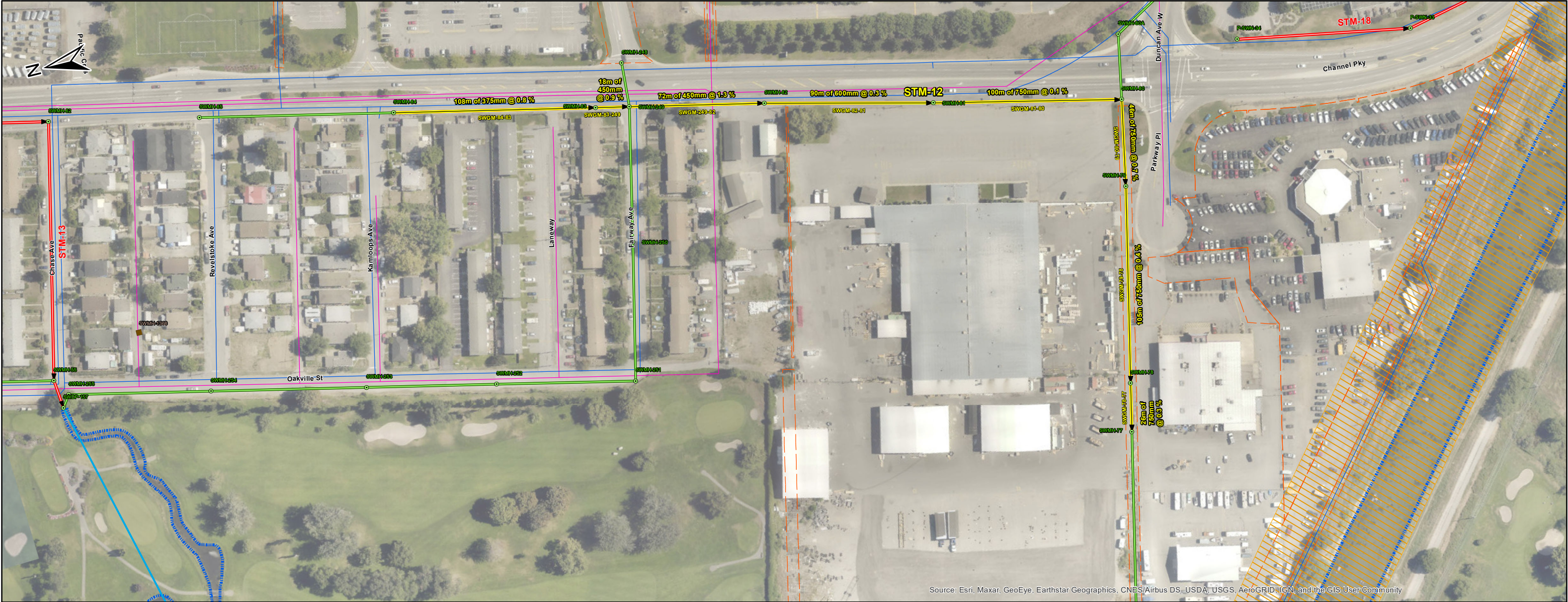
Date:  
**Apr 2021**

Figure No.:  
**F-11**

Client: City of Penticton

**CITY OF Penticton**





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-249-82	SWMH-249	SWMH-82	Upsize Existing Main	300	450	72	\$ 1,100	\$ 79,272
SWGM-78-77	SWMH-78	SWMH-77	Upsize Existing Main	300	750	26	\$ 1,800	\$ 46,438
SWGM-79-78	SWMH-79	SWMH-78	Upsize Existing Main	300	750	105	\$ 1,800	\$ 188,726
SWGM-80-79	SWMH-80	SWMH-79	Upsize Existing Main	300	750	46	\$ 1,800	\$ 83,201
SWGM-81-80	SWMH-81	SWMH-80	Upsize Existing Main	450	750	100	\$ 1,800	\$ 180,473
SWGM-82-81	SWMH-82	SWMH-81	Upsize Existing Main	375	600	90	\$ 1,500	\$ 134,798
SWGM-83-249	SWMH-83	SWMH-249	Upsize Existing Main	300	450	18	\$ 1,100	\$ 19,615
SWGM-84-83	SWMH-84	SWMH-83	Upsize Existing Main	250	375	108	\$ 1,050	\$ 113,033
STM-12 Total						565		\$ 845,556

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Open Channel

Watermain

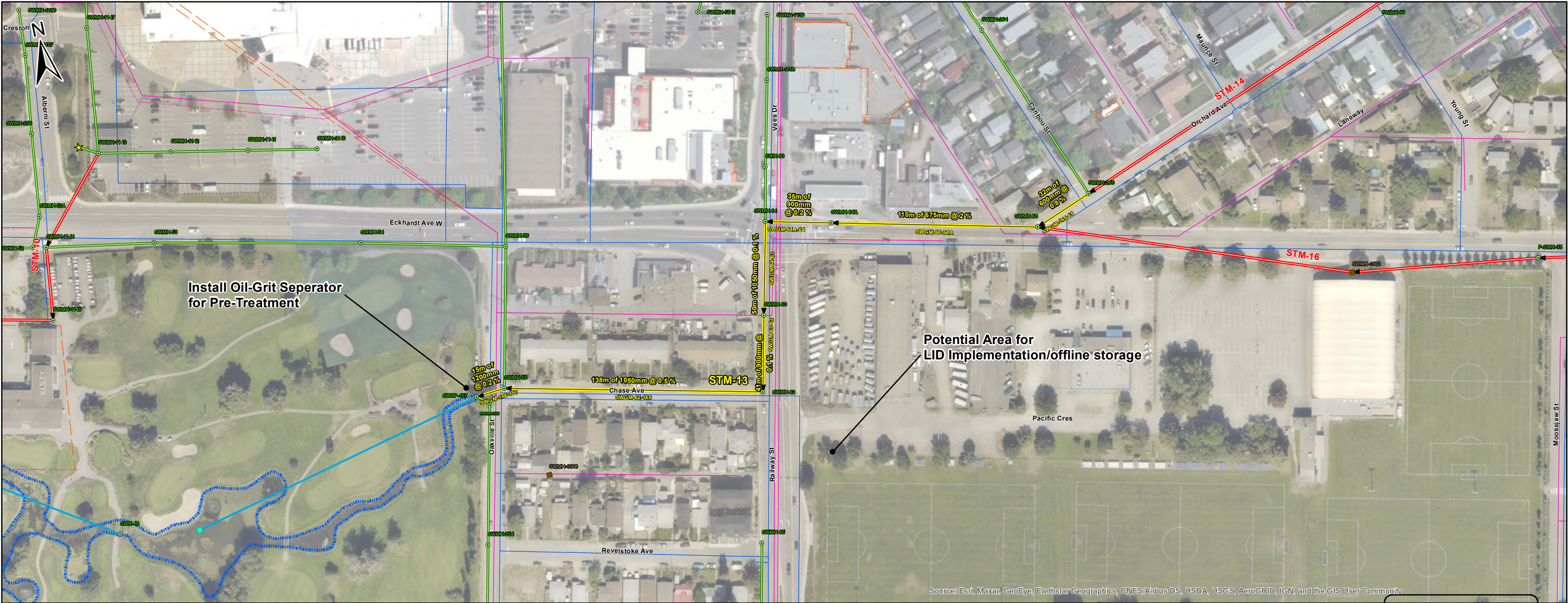
Sanitary Main

City Easement

Hazard Area

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-166-157	SWMH-55	SWDP-157	Upsize Existing Main	450	1200	15	\$ 2,650	\$ 40,558
SWGM-265-68	SWMH-265	SWMH-68	Upsize Existing Main	525	600	32	\$ 1,500	\$ 48,683
SWGM-62-166	SWMH-62	SWMH-55	Upsize Existing Main	450	1050	138	\$ 2,300	\$ 316,968
SWGM-63-62	SWMH-63	SWMH-62	Upsize Existing Main	450	900	41	\$ 2,000	\$ 81,580
SWGM-64-63	SWMH-64	SWMH-63	Upsize Existing Main	450	1050	50	\$ 2,300	\$ 114,588
SWGM-64A-64	SWMH-64A	SWMH-64	Upsize Existing Main	250	900	35	\$ 2,000	\$ 70,092
SWGM-68-64A	SWMH-68	SWMH-64A	Upsize Existing Main	250	675	110	\$ 1,650	\$ 181,327
STM-13 Total						421		\$ 853,795

- Legend**
- ★ Discharge Point
  - Storm Manhole
  - Dry Well
  - Detention Pond
  - Existing Gravity Main
  - Proposed Project
  - Nearby Projects
  - Open Channel
  - Watermain
  - Sanitary Main
  - - - Sanitary Forcemain
  - City Easement
  - Watercourse





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-69-265	SWMH-69	SWMH-265	Upsize Existing Main	250	600	187	\$ 1,500	\$ 280,133
SWGM-70-69	SWMH-70	SWMH-69	Upsize Existing Main	250	600	136	\$ 1,500	\$ 203,670
STM-14 Total						323		\$ 483,803

Legend

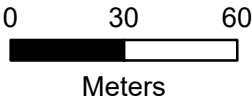
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- City Easement



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STM-14 Orchard Avenue and Eckhardt Avenue W.  
Stormwater Master Plan

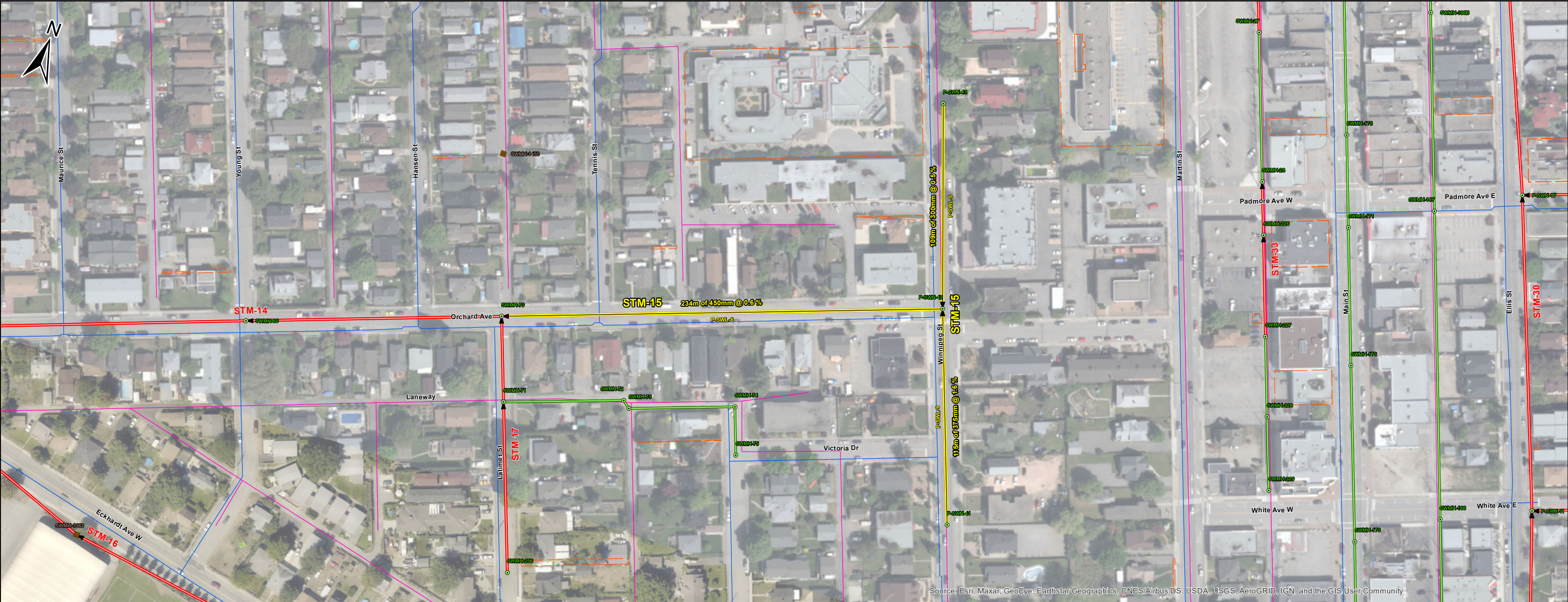


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-14

Client: City of Penticton





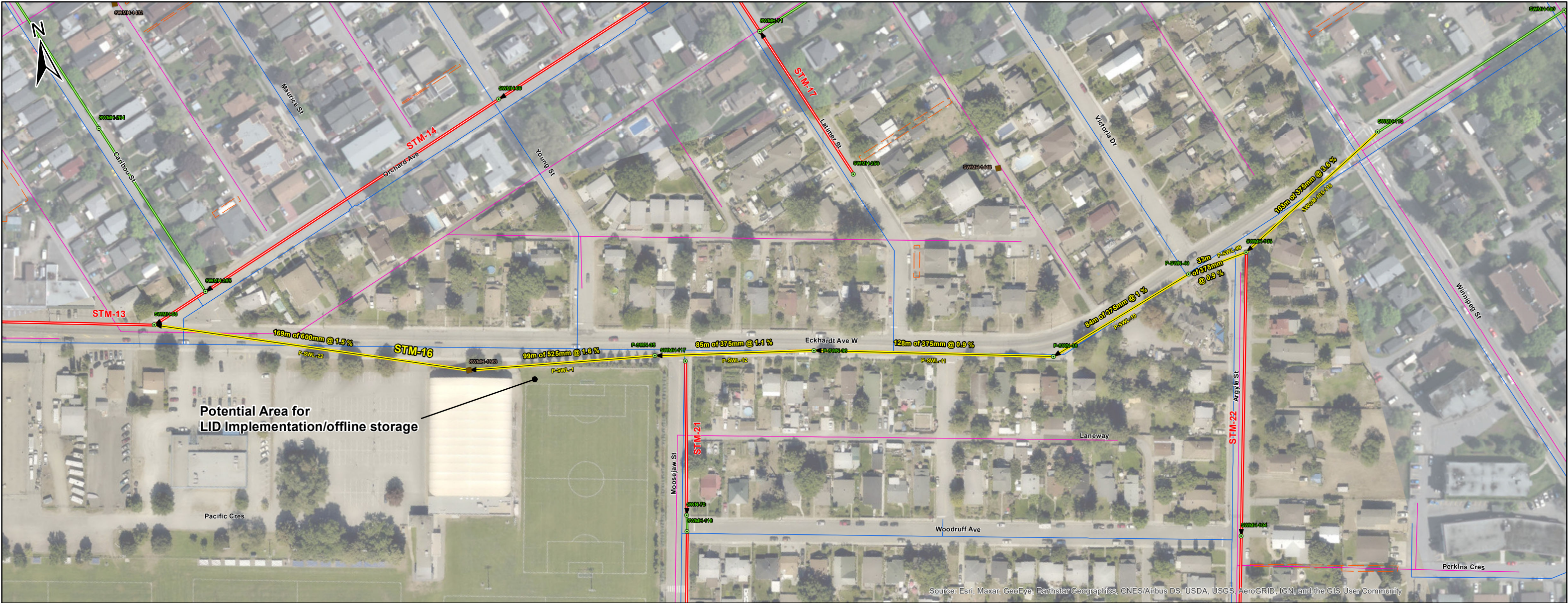


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-5	P-SWN-43	P-SWN-42	New Main	-	300	109	\$ 900	\$ 98,120
P-SWL-8	P-SWN-42	SWMH-70	New Main	-	450	234	\$ 1,100	\$ 257,829
P-SWL-9	P-SWN-41	P-SWN-42	New Main	-	375	115	\$ 1,050	\$ 120,416
STM-15 Total						458		\$ 476,365

- Legend
- Storm Manhole
  - Dry Well
  - Existing Gravity Main
  - Proposed Project
  - Nearby Projects
  - Watermain
  - Sanitary Main
  - City Easement





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-1	P-SWN-35	SWMH-1363	New Main	-	525	99	\$ 1,300	\$ 128,608
P-SWL-10	P-SWN-40	P-SWN-38	New Main	-	375	86	\$ 1,050	\$ 90,040
P-SWL-11	P-SWN-38	P-SWN-36	New Main	-	375	112	\$ 1,050	\$ 117,539
P-SWL-12	P-SWN-36	P-SWN-35	New Main	-	375	90	\$ 1,050	\$ 94,508
P-SWL-22	SWMH-1363	SWMH-68	New Main	-	600	170	\$ 1,500	\$ 255,531
P-SWL-99	SWMH-105	P-SWN-40	New Main	-	375	34	\$ 1,050	\$ 36,008
SWGM-105-118	SWMH-118	SWMH-105	Upsize Existing Main	200	375	103	\$ 1,050	\$ 108,472
STM-16 Total						695	\$	\$ 830,706

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

Sanitary Main

City Easement





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-256-71	SWMH-256	SWMH-71	Upsize Existing Main	250	300	91	\$ 900	\$ 81,548
SWGM-71-70	SWMH-71	SWMH-70	Upsize Existing Main	250	375	45	\$ 1,050	\$ 47,744
STM-17 Total						136	\$	129,292

Legend

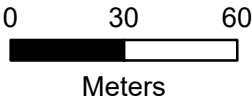
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- ➡ Proposed Project
- ➡ Nearby Projects
- Watermain
- Sanitary Main
- City Easement



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STM-17 Latimer Street Upgrades  
Stormwater Master Plan

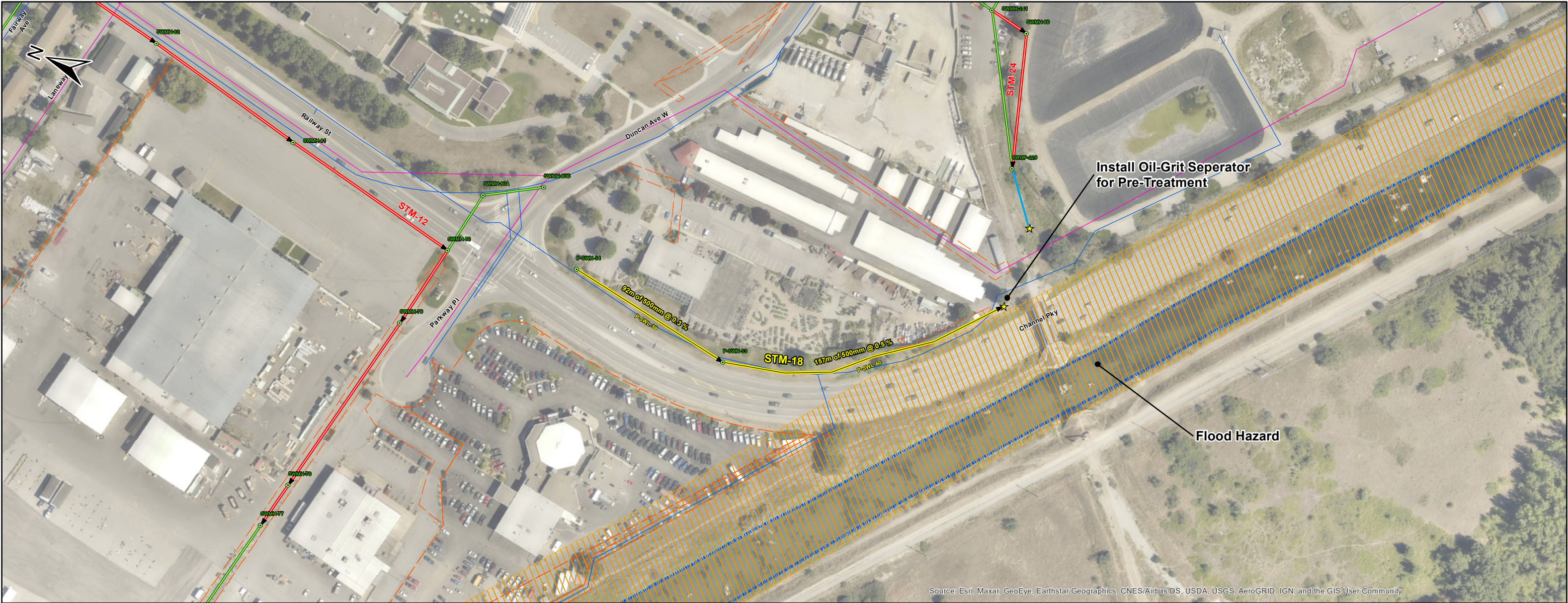


Project No.: 20M-00462-00  
Date: Apr 2021  
Figure No.: F-17

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DEPTH (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-59	P-SWN-34	P-SWN-33	Proposed Swale	-	500	92	\$ 300	\$ 27,691
P-SWL-60	P-SWN-33	SWN-120	Proposed Swale	-	500	157	\$ 300	\$ 46,952
STM-18 Total						249	\$	74,643

Legend

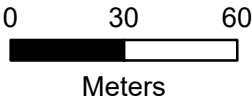
- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- ➡ Proposed Project
- ➡ Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse



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STM-18 Channel Parkway/Railway St. Swale System  
Stormwater Master Plan

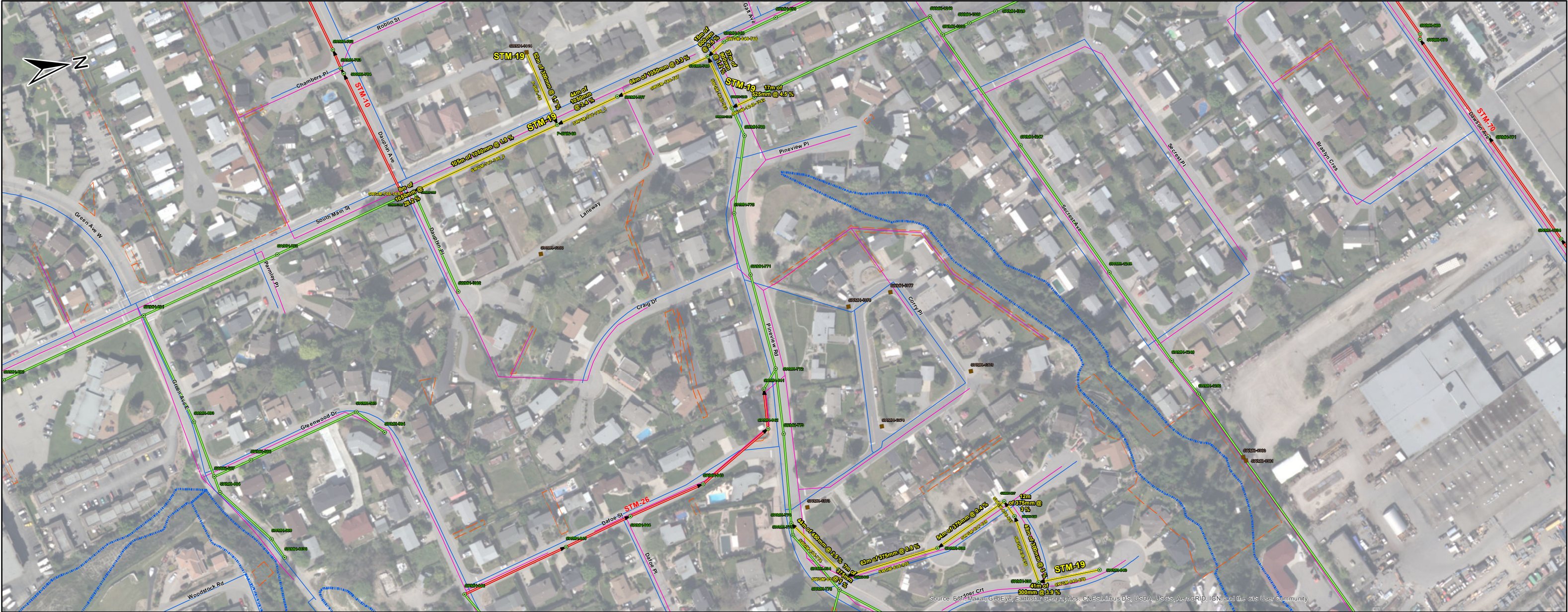


Project No.: 20M-00462-00  
Date: Apr 2021  
Figure No.: F-18

Client: City of Penticton






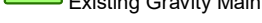


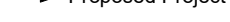
PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-37	SWMH-1382	SWMH-1327	New Main	-	200	10	\$ 750	\$ 7,743
P-SWL-38	SWMH-1414	P-SWN-68	New Main	-	300	52	\$ 900	\$ 47,071
SWGM-1246-1245	SWMH-1246	SWMH-1245	Upsize Existing Main	375	525	129	\$ 1,300	\$ 167,236
SWGM-1342-768	SWMH-1342	SWMH-768	Upsize Existing Main	750	900	37	\$ 2,000	\$ 74,858
SWGM-766-765	SWMH-766	SWMH-765	Upsize Existing Main	750	1050	8	\$ 2,300	\$ 18,165
SWGM-767-766_1	SWMH-767	P-SWN-68	Upsize Existing Main	750	1050	44	\$ 2,300	\$ 101,287
SWGM-767-766_2	P-SWN-68	SWMH-766	Upsize Existing Main	750	1050	105	\$ 2,300	\$ 242,066
SWGM-768-767	SWMH-768	SWMH-767	Upsize Existing Main	750	1050	66	\$ 2,300	\$ 151,646
SWGM-834-774	SWMH-834	SWMH-774	Upsize Existing Main	300	450	44	\$ 1,100	\$ 48,315
SWGM-835-834	SWMH-835	SWMH-834	Upsize Existing Main	300	375	7	\$ 1,050	\$ 7,350
SWGM-836-835	SWMH-836	SWMH-835	Upsize Existing Main	300	375	63	\$ 1,050	\$ 66,569
SWGM-837-836	SWMH-837	SWMH-836	Upsize Existing Main	300	375	54	\$ 1,050	\$ 56,699
SWGM-838-837	SWMH-838	SWMH-837	Upsize Existing Main	250	375	12	\$ 1,050	\$ 12,600
SWGM-839-838	SWMH-839	SWMH-838	Upsize Existing Main	250	300	48	\$ 900	\$ 42,908
SWGM-840-839	SWMH-840	SWMH-839	Upsize Existing Main	250	300	41	\$ 900	\$ 37,249
SWGM-849-768	SWMH-849	SWMH-768	Upsize Existing Main	300	600	15	\$ 1,500	\$ 22,256
STM-19 Total						753	\$ 1,104,019	


Legend


 Storm Manhole

 Dry Well


 Existing Gravity Main

 Proposed Project

 Nearby Projects

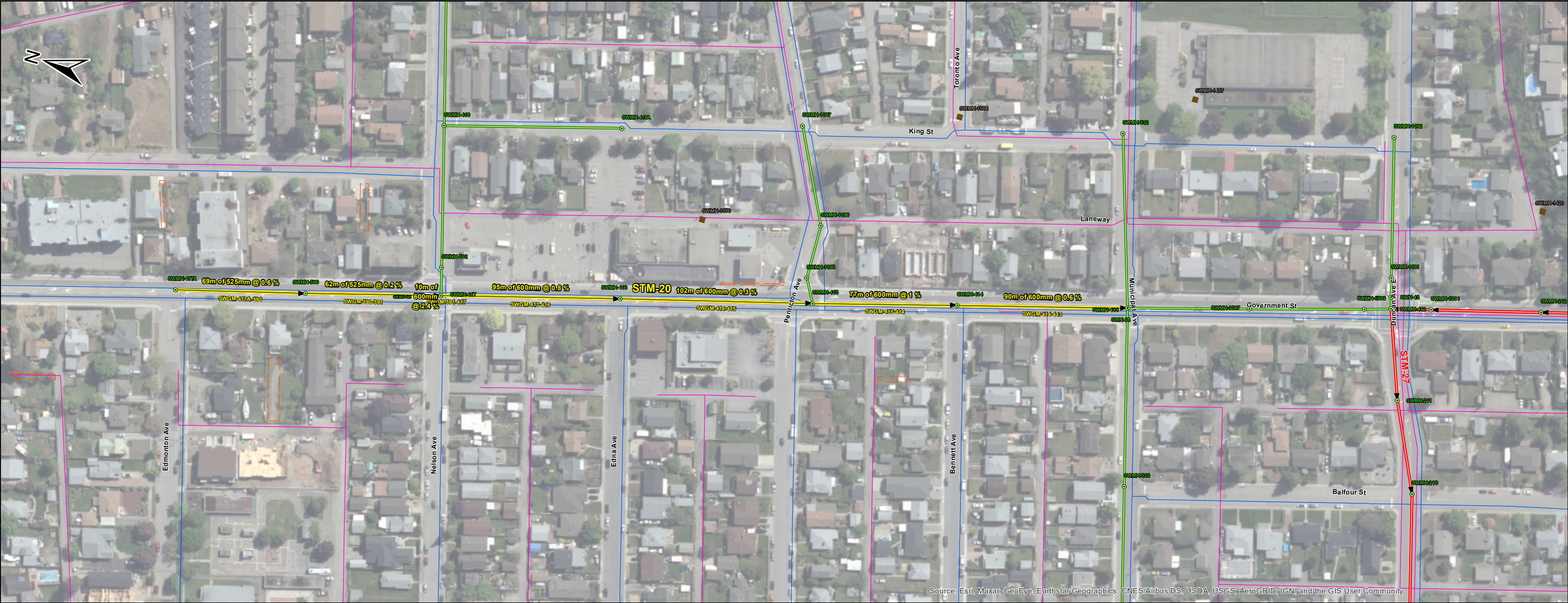
 Watermain

 Sanitary Main

 City Easement

 Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWG-M-414-413	SWMH-414	SWMH-413	Upsize Existing Main	450	600	90	\$ 1,500	\$ 135,614
SWG-M-415-414	SWMH-415	SWMH-414	Upsize Existing Main	450	600	77	\$ 1,500	\$ 115,338
SWG-M-416-415	SWMH-416	SWMH-415	Upsize Existing Main	375	600	102	\$ 1,500	\$ 153,153
SWG-M-417-416	SWMH-417	SWMH-416	Upsize Existing Main	375	600	95	\$ 1,500	\$ 143,199
STM-20 Total						365	\$	547,304

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

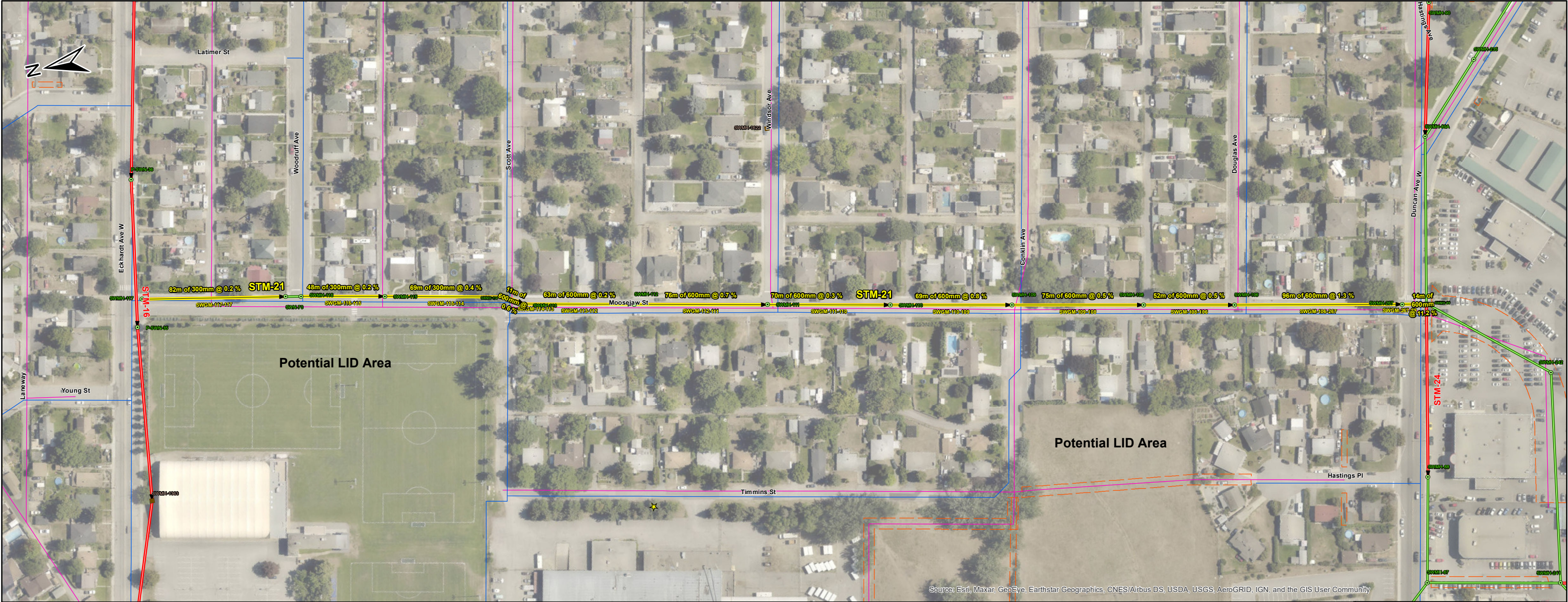
Nearby Projects

Watermain

Sanitary Main

City Easement





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-106-267	SWMH-106	SWMH-267	Upsize Existing Main	450	600	96	\$ 1,500	\$ 143,469
SWGM-108-106	SWMH-108	SWMH-106	Upsize Existing Main	450	600	52	\$ 1,500	\$ 77,982
SWGM-109-108	SWMH-109	SWMH-108	Upsize Existing Main	450	600	75	\$ 1,500	\$ 112,812
SWGM-110-109	SWMH-110	SWMH-109	Upsize Existing Main	450	600	69	\$ 1,500	\$ 103,872
SWGM-111-110	SWMH-111	SWMH-110	Upsize Existing Main	450	600	70	\$ 1,500	\$ 105,297
SWGM-112-111	SWMH-112	SWMH-111	Upsize Existing Main	450	600	76	\$ 1,500	\$ 114,149
SWGM-117-117	SWMH-117	SWMH-116	Upsize Existing Main	250	300	91	\$ 900	\$ 81,797
SWGM-267-89	SWMH-267	SWMH-89	Upsize Existing Main	450	600	14	\$ 1,500	\$ 20,877
SWGM-113-112	SWMH-113	SWMH-112	Upsize Existing Main	450	600	63	\$ 1,500	\$ 93,957
SWGM-114-113	SWMH-114	SWMH-113	Upsize Existing Main	450	600	11	\$ 1,500	\$ 16,610
SWGM-115-114	SWMH-115	SWMH-114	Upsize Existing Main	300	300	69	\$ 900	\$ 62,410
SWGM-116-115	SWMH-116	SWMH-115	Upsize Existing Main	300	300	48	\$ 900	\$ 43,139
STM-21 Total						734	\$	976,370

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

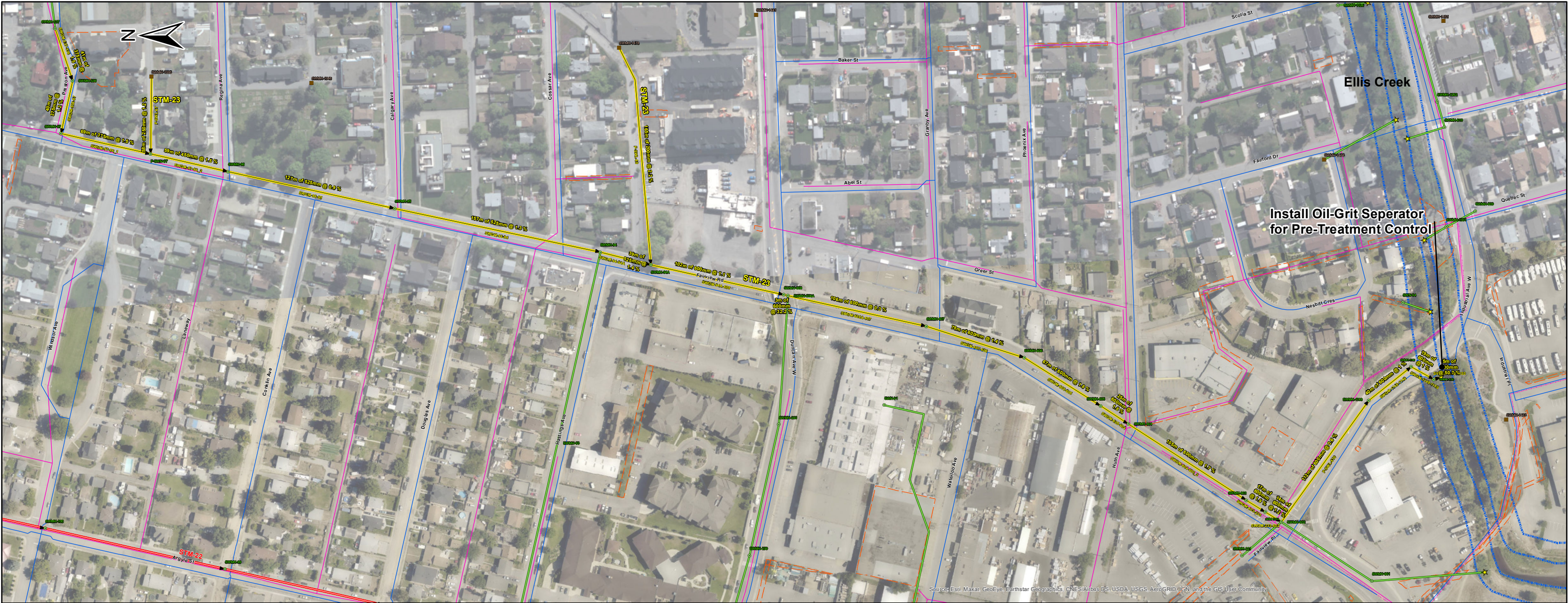
Sanitary Main

City Easement









PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-67	SWMH-1395	P-SWN-67	New Main	-	250	58	\$ 800	\$ 46,078
P-SWL-68	SWMH-1478	SWMH-94A	New Main	-	200	165	\$ 750	\$ 123,758
SWGM-536-97	SWMH-536	SWMH-97	Upsize Existing Main	300	375	40	\$ 1,050	\$ 42,362
SWGM-537-536	SWMH-537	SWMH-536	Upsize Existing Main	300	375	41	\$ 1,050	\$ 42,870
SWGM-605-604	SWMH-605	SWMH-604	Upsize Existing Main	450	600	25	\$ 1,500	\$ 37,017
SWGM-606-605	SWMH-606	SWMH-605	Upsize Existing Main	450	600	67	\$ 1,500	\$ 100,658
SWGM-607-606	SWMH-607	SWMH-606	Upsize Existing Main	450	600	78	\$ 1,500	\$ 116,486
SWGM-608-608A	SWMH-608	SWMH-608A	Upsize Existing Main	250	600	3	\$ 1,500	\$ 4,557
SWGM-608A-607	SWMH-608A	SWMH-607	Upsize Existing Main	375	600	106	\$ 1,500	\$ 158,553
SWGM-94-94A	SWMH-94	SWMH-94A	Upsize Existing Main	450	525	39	\$ 1,300	\$ 50,372
SWGM-94A-608	SWMH-94A	SWMH-608	Upsize Existing Main	450	600	102	\$ 1,500	\$ 152,403
SWGM-95-94	SWMH-95	SWMH-94	Upsize Existing Main	300	525	157	\$ 1,300	\$ 203,580
SWGM-96-95	SWMH-96	SWMH-95	Upsize Existing Main	250	525	127	\$ 1,300	\$ 165,348
SWGM-97-96_1	SWMH-97	P-SWN-67	Upsize Existing Main	250	375	69	\$ 1,050	\$ 71,941
SWGM-97-96_2	P-SWN-67	SWMH-96	Upsize Existing Main	250	450	59	\$ 1,100	\$ 65,297
SWGM-233-602	SWMH-233	SWMH-602	Upsize Existing Main	250	600	14	\$ 1,500	\$ 20,937
SWGM-603-233	SWMH-603	SWMH-233	Upsize Existing Main	250	600	17	\$ 1,500	\$ 25,212
SWGM-1148-1149	SWMH-1148	SWMH-1149	Upsize Existing Main	300	600	40	\$ 1,500	\$ 60,297
SWGM-1149-1150	SWMH-1149	SWMH-1150	Upsize Existing Main	300	600	19	\$ 1,500	\$ 28,836
SWGM-1150-1150	SWMH-1150	SWDP-226	Upsize Existing Main	300	600	5	\$ 1,500	\$ 8,219
P-SWL-510	SWMH-602	SWMH-1148	New Main	-	600	112	\$ 1,500	\$ 167,444
SWGM-604-603_3	SWMH-604	SWMH-603	Upsize Existing Main	300	600	105	\$ 1,500	\$ 156,999
STM-23 Total						1446	\$	1,849,223

Legend

- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Watercourse

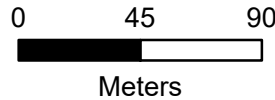


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STM-23 Fairview Road Improvements  
Stormwater Master Plan

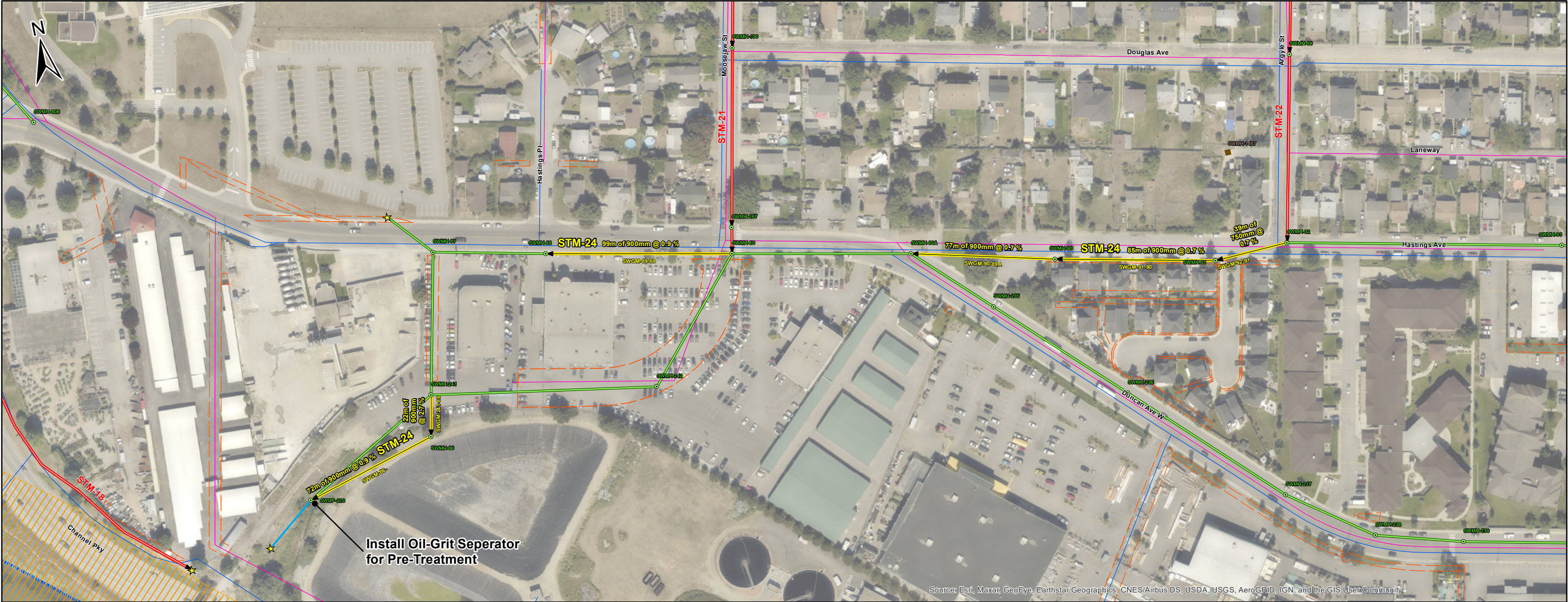


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-23

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-241-86	SWMH-241	SWMH-86	Upsize Existing Main	600	900	22	\$ 2,000	\$ 44,086
SWGM-86-	SWMH-86	SWDP-229	Upsize Existing Main	600	900	72	\$ 2,000	\$ 144,926
SWGM-89-88	SWMH-89	SWMH-88	Upsize Existing Main	600	900	99	\$ 2,000	\$ 198,418
SWGM-90-89A	SWMH-90	SWMH-89A	Upsize Existing Main	450	900	77	\$ 2,000	\$ 153,736
SWGM-91-90	SWMH-91	SWMH-90	Upsize Existing Main	450	900	85	\$ 2,000	\$ 170,684
SWGM-92-91	SWMH-92	SWMH-91	Upsize Existing Main	450	750	39	\$ 1,800	\$ 70,787
STM-24 Total						395	\$	782,637

Legend

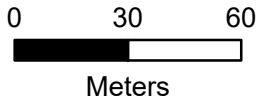
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse



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STM-24 Duncan Avenue Improvements  
Stormwater Master Plan

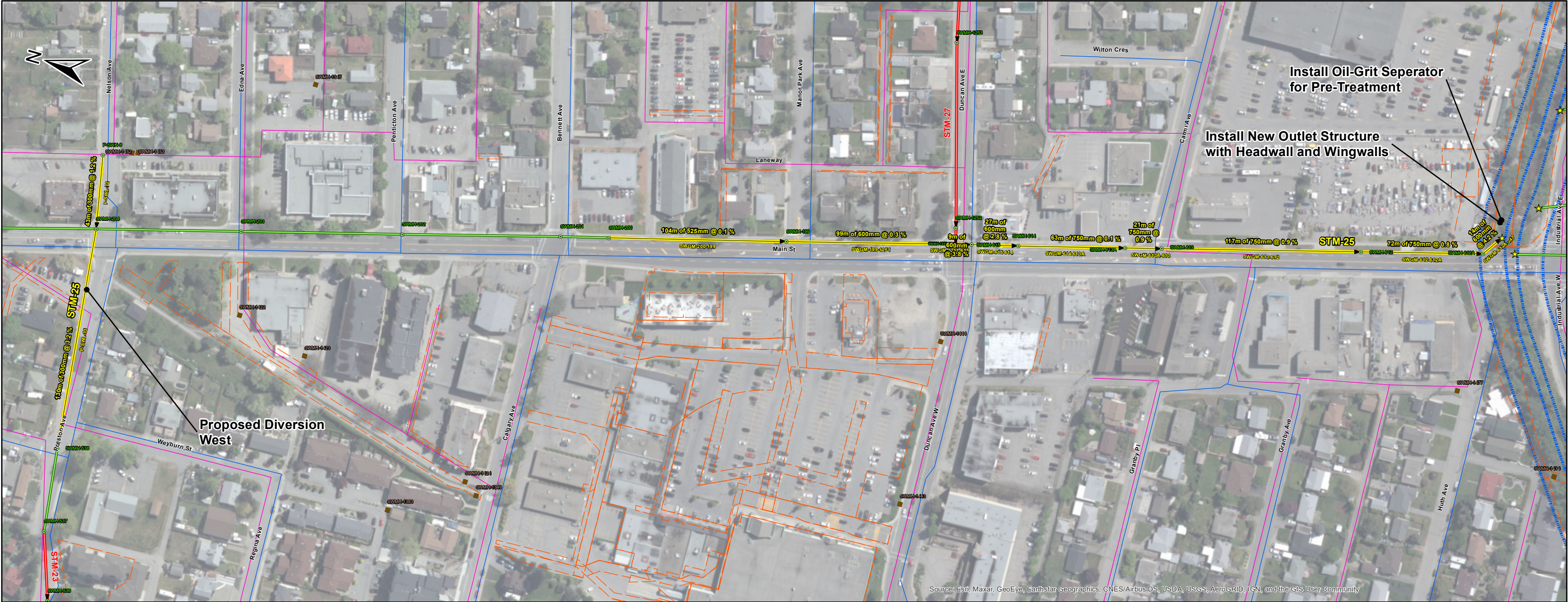


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-24

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)		TOTAL COST (2021 \$)
P-SWL-13	SWMH-204	SWMH-538	New Main	-	300	130	\$	900	\$ 117,239
P-SWL-72	P-SWN-8	SWMH-204	New Main	-	300	43	\$	900	\$ 39,017
SWGM-199-1251	SWMH-199	SWMH-1251	Upsize Existing Main	450	600	99	\$	1,500	\$ 148,448
SWGM-200-199	SWMH-200	SWMH-199	Upsize Existing Main	375	525	104	\$	1,300	\$ 135,155
SWGM-1251-615	SWMH-1251	SWMH-615	Upsize Existing Main	450	600	9	\$	1,500	\$ 14,049
SWGM-612-612A	SWMH-612	SWMH-612A	Upsize Existing Main	600	750	72	\$	1,800	\$ 128,912
SWGM-612A-247	SWMH-612A	SWDP-247	Upsize Existing Main	250	600	14	\$	1,500	\$ 21,453
SWGM-613-612	SWMH-613	SWMH-612	Upsize Existing Main	600	750	117	\$	1,800	\$ 209,747
SWGM-613A-613	SWMH-613A	SWMH-613	Upsize Existing Main	450	750	21	\$	1,800	\$ 38,615
SWGM-614-613A	SWMH-614	SWMH-613A	Upsize Existing Main	450	750	63	\$	1,800	\$ 112,840
SWGM-615-614	SWMH-615	SWMH-614	Upsize Existing Main	450	600	27	\$	1,500	\$ 40,968
STM-25 Total						700		\$	1,006,443

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

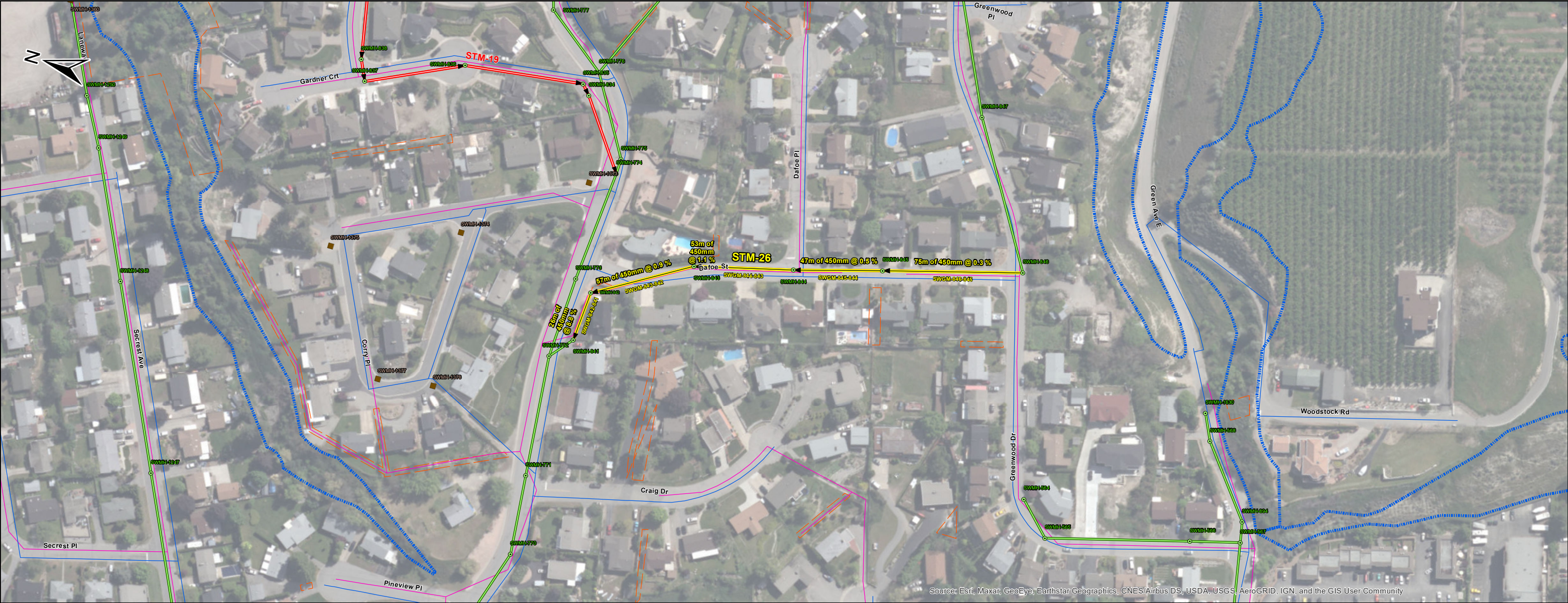
Watermain

Sanitary Main

City Easement

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGMM-842-841	SWMH-842	SWMH-841	Upsize Existing Main	350	450	26	\$ 1,100	\$ 29,080
SWGMM-843-842	SWMH-843	SWMH-842	Upsize Existing Main	350	450	57	\$ 1,100	\$ 62,409
SWGMM-844-843	SWMH-844	SWMH-843	Upsize Existing Main	350	450	53	\$ 1,100	\$ 58,124
SWGMM-845-844	SWMH-845	SWMH-844	Upsize Existing Main	350	450	47	\$ 1,100	\$ 52,164
SWGMM-846-845	SWMH-846	SWMH-845	Upsize Existing Main	350	450	75	\$ 1,100	\$ 82,000
STM-26 Total						258		\$ 283,776

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

Sanitary Main

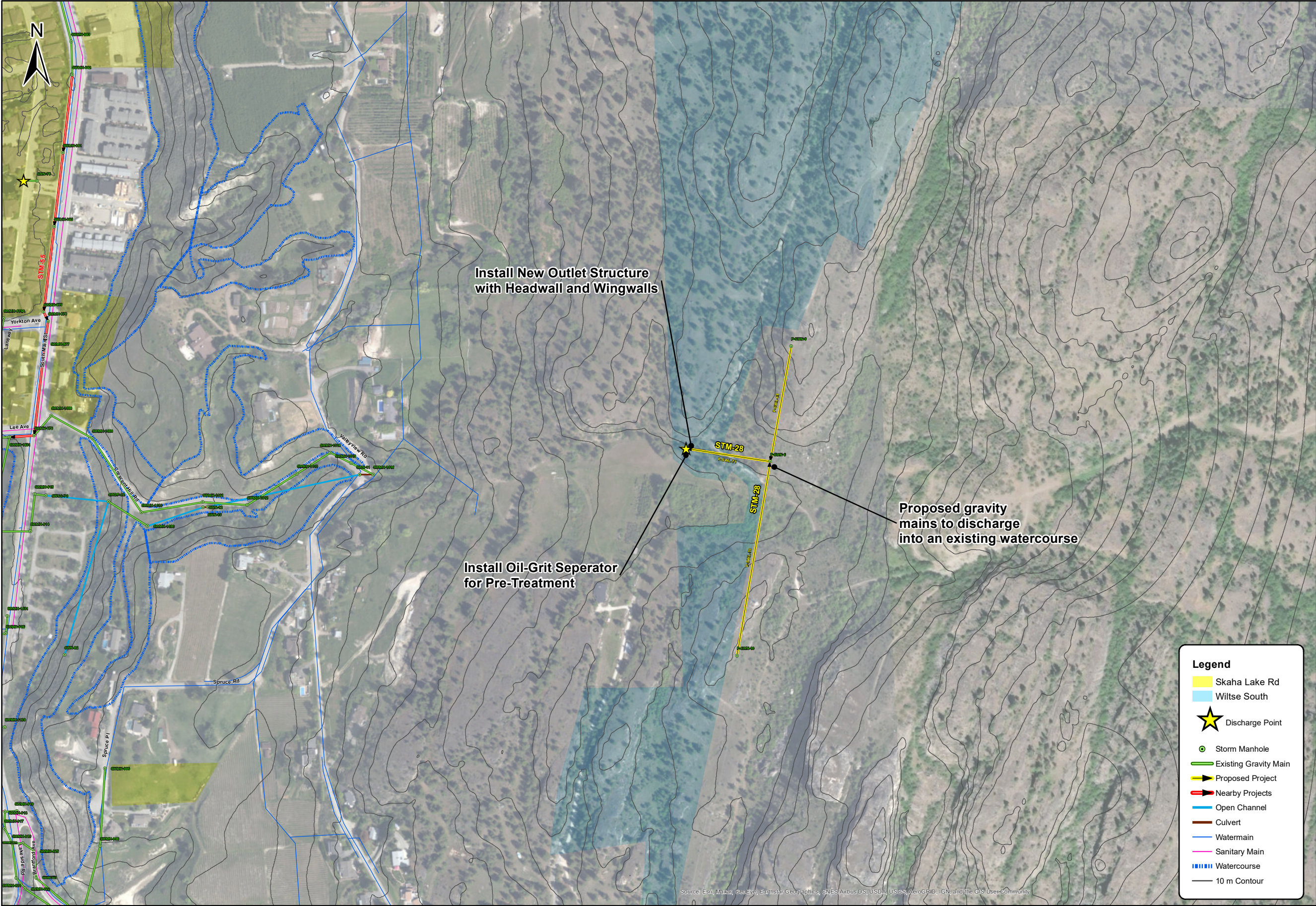
City Easement

Watercourse









**Project Name:**Wiltse South Development  
**Project Number:** STM-28

**Project Timeline:** 10 to 20 Year  
**Project Priority:** Low  
**Estimated Cost (\$ 2020):** \$ TBD (Developer-Driven)  
**Upgrade Driver:** Future Development  
**Development Cost Charges:** Applicable

**DESIGN CONSIDERATIONS**  
The modeling results indicate 300 to 450 mm diameter mains are required to service the proposed single family homes within the Wiltse South development area. The proposed piped system can discharge offsite into a natural watercourse. This project should consider adequate pre-treatment control to enhance water quality in the receiving watercourse.

The target post-development flow rate discharging into the watercourse should not exceed the pre-development flow rate for the 5-year event, per City Bylaw.

The proposed alignment and cost estimate are subject to change based on developer grading plans and site layout.

**COST CONSIDERATIONS**  
This project will service future development south of Wiltse Blvd., as identified in the OCP. The developer is responsible for all drainage servicing costs and must control the post-development rate for the 5-year event, per City Bylaw.

**Legend**

Skaha Lake Rd

Wiltse South

Discharge Point

Storm Manhole

Existing Gravity Main

Proposed Project

Nearby Projects

Open Channel

Culvert

Watermain

Sanitary Main

Watercourse

10 m Contour









PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-81	SWMH-1347	SWMH-182	New Main	-	250	92	\$ 800	\$ 73,959
SWGM-176-175	SWMH-176	SWMH-1320	Upsize Existing Main	300	525	81	\$ 1,300	\$ 105,864
SWGM-177-176	SWMH-177	SWMH-176	Upsize Existing Main	300	525	66	\$ 1,300	\$ 85,588
SWGM-178-177	SWMH-178	SWMH-177	Upsize Existing Main	300	450	84	\$ 1,100	\$ 92,286
SWGM-179-178	SWMH-179	SWMH-178	Upsize Existing Main	300	375	59	\$ 1,050	\$ 61,524
SWGM-91-189	SWMH-1320	SWMH-189	Upsize Existing Main	200	525	53	\$ 1,300	\$ 68,470
P-SWL-5001	SWMH-189	P-SWN-5000	New Main	-	525	43	\$ 1,300	\$ 56,261
P-SWL-5002	P-SWN-5000	P-SWN-11	New Main	-	525	160	\$ 1,300	\$ 207,945
P-SWL-5003	P-SWN-11	P-SWN-17	New Main	-	525	168	\$ 1,300	\$ 218,152
P-SWL-5004	P-SWN-17	P-SWN-4	New Main	-	600	155	\$ 1,500	\$ 233,135
P-SWL-5005	P-SWN-4	SWMH-225	New Main	-	600	264	\$ 1,500	\$ 396,132
SWGM-225-167	SWMH-225	SWDP-167	Upsize Existing Main	250	600	23	\$ 1,500	\$ 34,982
P-SWL-29	SWMH-192	P-SWN-19	New Main	-	250	77	\$ 800	\$ 61,697
P-SWL-30	P-SWN-13	P-SWN-4	New Main	-	200	98	\$ 750	\$ 73,371
P-SWL-31	P-SWN-18	P-SWN-17	New Main	-	250	84	\$ 800	\$ 67,119
P-SWL-35	P-SWN-19	P-SWN-11	New Main	-	250	86	\$ 800	\$ 68,883
P-SWL-65	SWMH-1465	SWMH-192	New Main	-	250	35	\$ 800	\$ 27,638
STM-30 Total						1628	\$ 1,933,006	

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

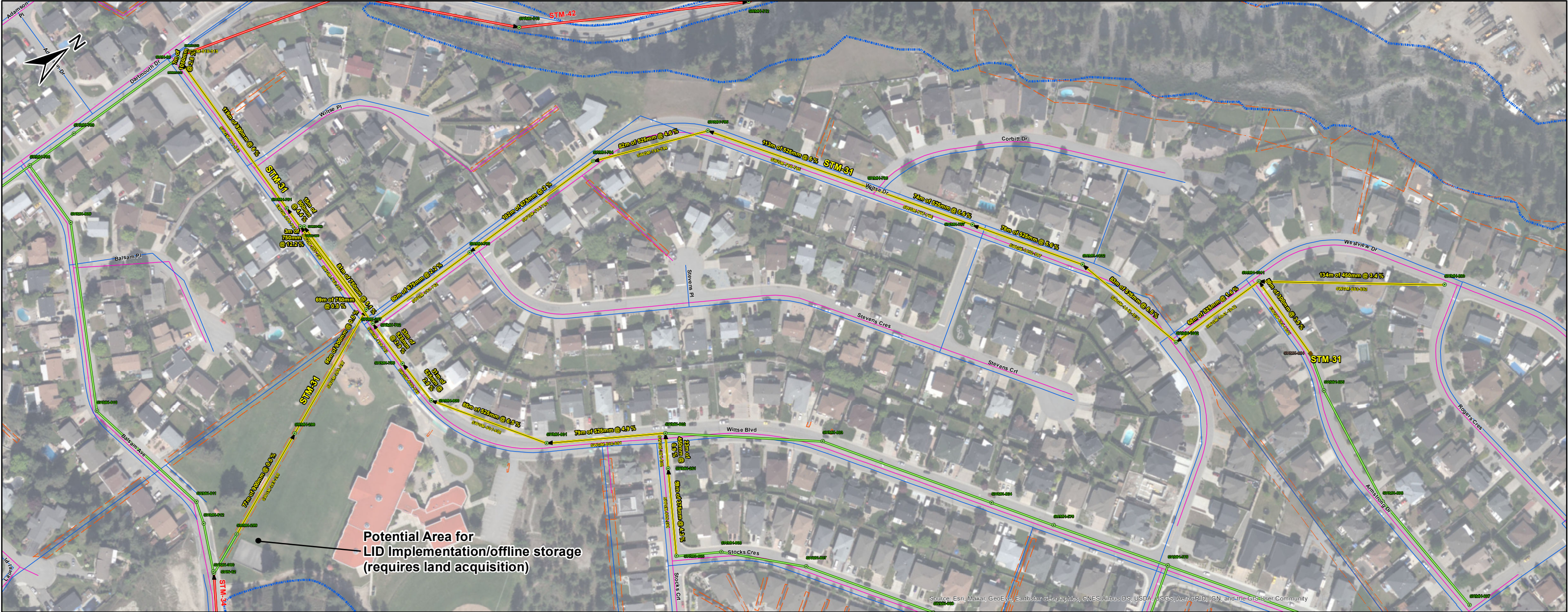
Watermain

Sanitary Main

City Easement

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1032-797	SWMH-1032	SWMH-797	Upsize Existing Main	375	525	78	\$ 1,300	\$ 101,134
SWGM-1041-1042	SWMH-1041	SWMH-1042	Upsize Existing Main	375	525	68	\$ 1,300	\$ 88,869
SWGM-1042-1032	SWMH-1042	SWMH-1032	Upsize Existing Main	375	525	83	\$ 1,300	\$ 107,536
SWGM-261-802	SWMH-261	SWMH-802	Upsize Existing Main	300	450	23	\$ 1,100	\$ 25,700
SWGM-295-791	SWMH-295	SWMH-791	Upsize Existing Main	600	900	15	\$ 2,000	\$ 29,798
SWGM-296-295	SWMH-296	SWMH-295	Upsize Existing Main	600	750	3	\$ 1,800	\$ 4,750
SWGM-297-296	SWMH-297	SWMH-296	Upsize Existing Main	600	750	69	\$ 1,800	\$ 124,310
SWGM-298-297	SWMH-298	SWMH-297	Upsize Existing Main	600	900	95	\$ 2,000	\$ 190,108
SWGM-299-298	SWMH-299	SWMH-298	Upsize Existing Main	600	900	77	\$ 2,000	\$ 154,702
SWGM-516-515	SWMH-516	SWMH-515	Upsize Existing Main	750	1050	7	\$ 2,300	\$ 15,014
SWGM-693-692	SWMH-693	SWMH-1041	Upsize Existing Main	300	450	134	\$ 1,100	\$ 146,874
SWGM-694-1041	SWMH-694	SWMH-1041	Upsize Existing Main	250	300	59	\$ 900	\$ 53,384
SWGM-791-516	SWMH-791	SWMH-516	Upsize Existing Main	600	900	119	\$ 2,000	\$ 238,132
SWGM-792-295	SWMH-792	SWMH-295	Upsize Existing Main	600	750	81	\$ 1,800	\$ 145,478
SWGM-793-792	SWMH-793	SWMH-792	Upsize Existing Main	525	675	80	\$ 1,650	\$ 132,012
SWGM-794-793	SWMH-794	SWMH-793	Upsize Existing Main	450	675	102	\$ 1,650	\$ 168,354
SWGM-795-794	SWMH-795	SWMH-794	Upsize Existing Main	450	525	82	\$ 1,300	\$ 106,860
SWGM-796-795	SWMH-796	SWMH-795	Upsize Existing Main	450	525	113	\$ 1,300	\$ 146,432
SWGM-797-796	SWMH-797	SWMH-796	Upsize Existing Main	375	525	74	\$ 1,300	\$ 96,572
SWGM-799-792	SWMH-799	SWMH-792	Upsize Existing Main	450	525	33	\$ 1,300	\$ 43,141
SWGM-800-799	SWMH-800	SWMH-799	Upsize Existing Main	450	525	31	\$ 1,300	\$ 40,222
SWGM-801-800	SWMH-801	SWMH-800	Upsize Existing Main	450	525	85	\$ 1,300	\$ 110,466
SWGM-802-801	SWMH-802	SWMH-801	Upsize Existing Main	450	525	79	\$ 1,300	\$ 102,993
SWGM-805-261	SWMH-805	SWMH-261	Upsize Existing Main	300	375	59	\$ 1,050	\$ 61,572
STM-31 Total						1649		\$ 2,434,413

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

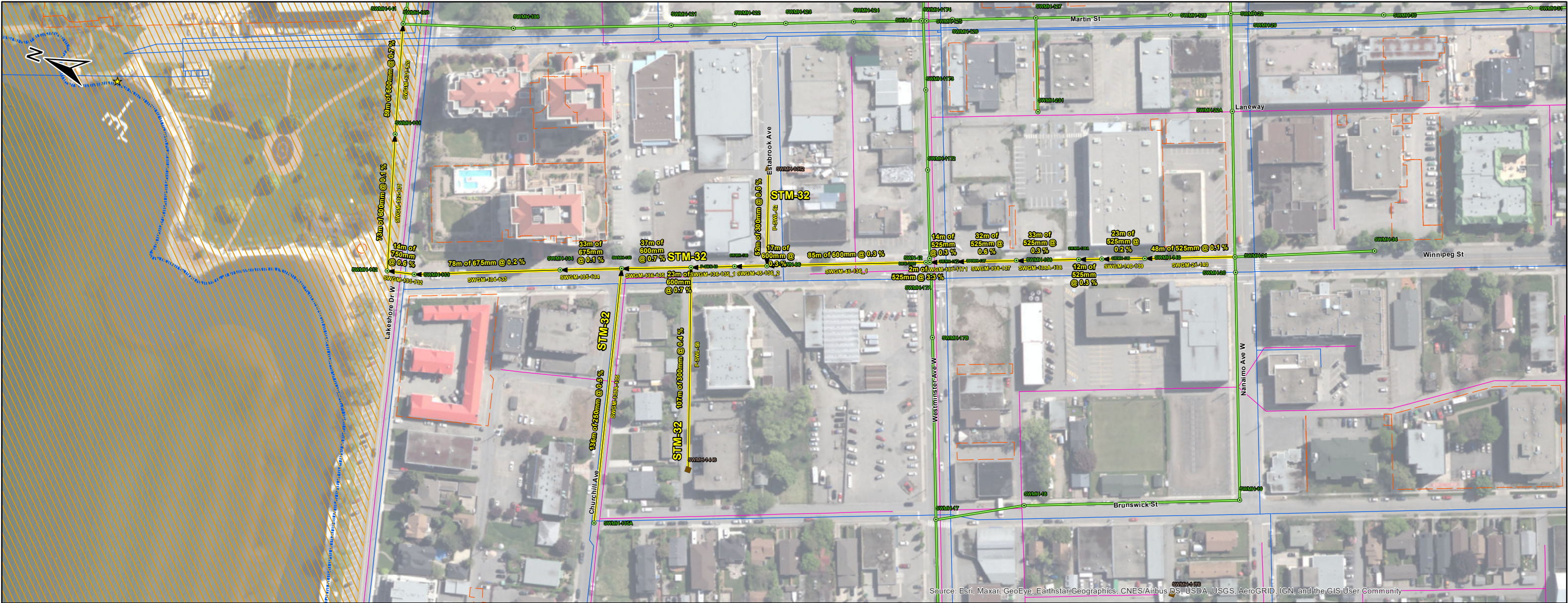
Watermain

Sanitary Main

City Easement

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-2	SWMH-1171	SWN-2000	New Main	-	525	2	\$ 1,300	\$ 2,634
P-SWL-58	SWMH-1446	P-SWN-65	New Main	-	300	107	\$ 900	\$ 96,739
P-SWL-62	SWMH-1372	P-SWN-66	New Main	-	300	52	\$ 900	\$ 46,396
SWGM-133-132	SWMH-133	SWMH-132	Upsize Existing Main	375	750	14	\$ 1,800	\$ 25,958
SWGM-134-133	SWMH-134	SWMH-133	Upsize Existing Main	450	675	78	\$ 1,650	\$ 128,327
SWGM-135-134	SWMH-135	SWMH-134	Upsize Existing Main	450	675	33	\$ 1,650	\$ 54,100
SWGM-135A-135	SWMH-135A	SWMH-135	Upsize Existing Main	150	250	136	\$ 800	\$ 108,895
SWGM-136-135_1	SWMH-136	P-SWN-65	Upsize Existing Main	375	600	23	\$ 1,500	\$ 34,781
SWGM-136-135_2	P-SWN-65	SWMH-135	Upsize Existing Main	375	600	37	\$ 1,500	\$ 55,205
SWGM-137-1171	SWMH-137	SWMH-1171	Upsize Existing Main	375	525	14	\$ 1,300	\$ 18,668
SWGM-138-137	SWMH-138	SWMH-137	Upsize Existing Main	375	525	32	\$ 1,300	\$ 41,254
SWGM-138A-138	SWMH-138A	SWMH-138	Upsize Existing Main	375	525	33	\$ 1,300	\$ 43,117
SWGM-139-138A	SWMH-139	SWMH-138A	Upsize Existing Main	375	525	12	\$ 1,300	\$ 16,107
SWGM-140-139	SWMH-140	SWMH-139	Upsize Existing Main	375	525	23	\$ 1,300	\$ 29,830
SWGM-21-140	SWMH-21	SWMH-140	Upsize Existing Main	375	525	48	\$ 1,300	\$ 62,121
SWGM-45-136_1	SWN-2000	P-SWN-66	Upsize Existing Main	450	600	85	\$ 1,500	\$ 126,819
SWGM-45-136_2	P-SWN-66	SWMH-136	Upsize Existing Main	450	600	17	\$ 1,500	\$ 25,989
STM-32 Total						746	\$	916,939

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Watermain

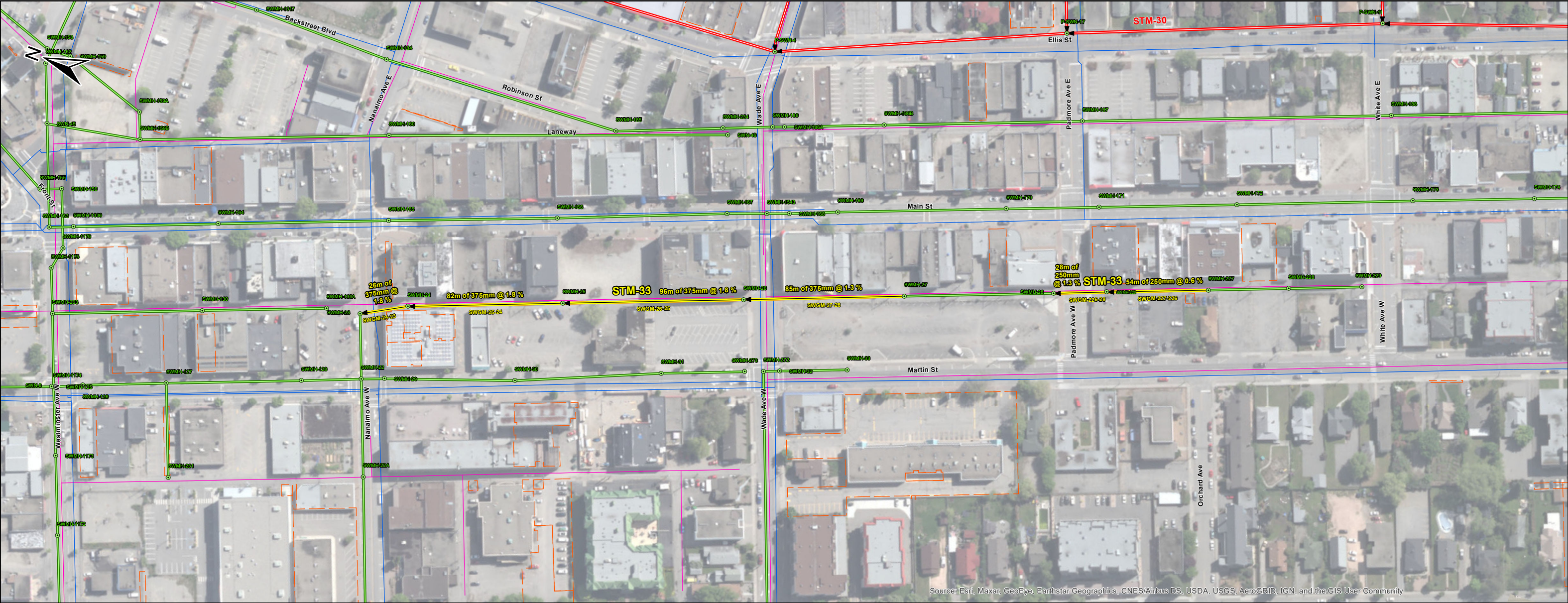
Sanitary Main

City Easement

Hazard Area

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-226-28	SWMH-226	SWMH-28	Upsize Existing Main	200	250	28	\$ 800	\$ 22,667
SWGM-227-226	SWMH-227	SWMH-226	Upsize Existing Main	200	250	54	\$ 800	\$ 43,162
SWGM-24-23	SWMH-24	SWMH-23	Upsize Existing Main	300	375	26	\$ 1,050	\$ 26,954
SWGM-25-24	SWMH-25	SWMH-24	Upsize Existing Main	300	375	82	\$ 1,050	\$ 86,408
SWGM-26-25	SWMH-26	SWMH-25	Upsize Existing Main	250	375	96	\$ 1,050	\$ 100,904
SWGM-27-26	SWMH-27	SWMH-26	Upsize Existing Main	250	375	85	\$ 1,050	\$ 89,608
STM-33 Total						372	\$	\$ 369,702

Legend

Storm Manhole

Existing Gravity Main

Proposed Project

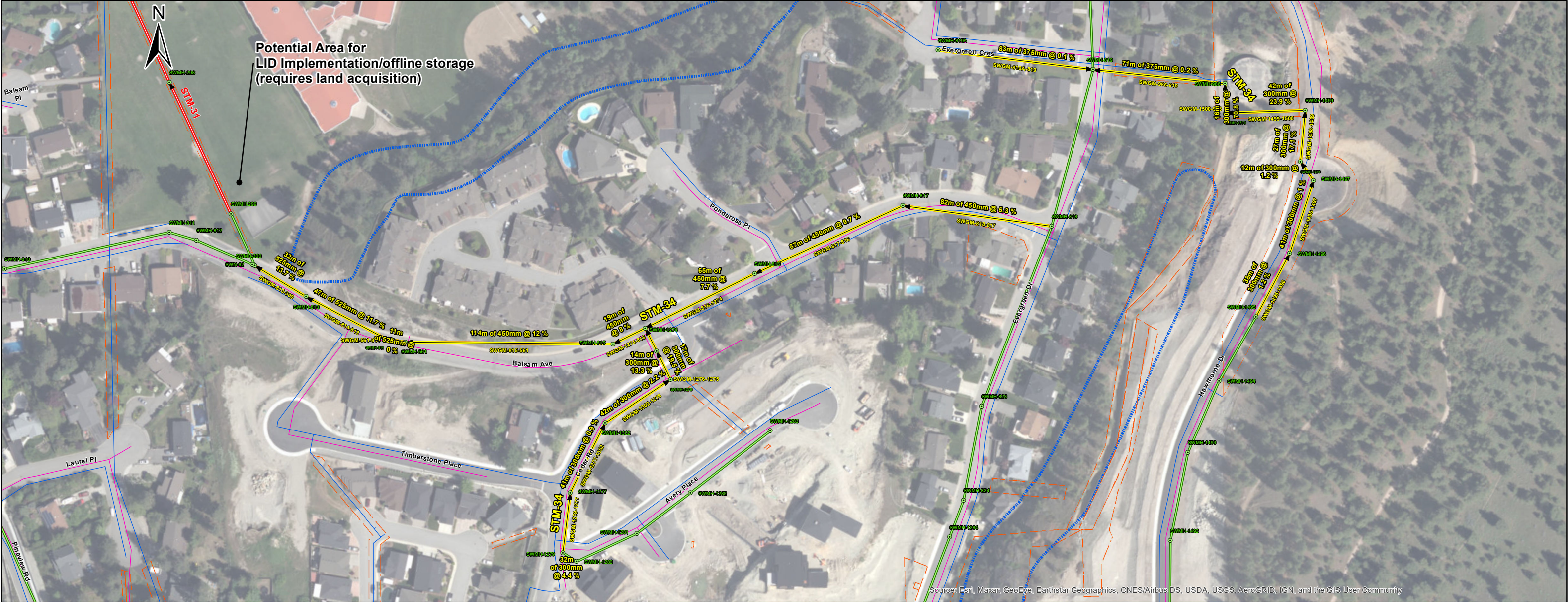
Nearby Projects

Watermain

Sanitary Main

City Easement





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)		TOTAL COST (2021 \$)	
SWGM-1274-815	SWMH-1274	SWMH-815	Upsize Existing Main	375	450	19	\$	1,100	\$	20,813
SWGM-1275-1274	SWMH-1275	SWMH-1274	Upsize Existing Main	250	300	14	\$	900	\$	12,225
SWGM-1276-1275	SWMH-1276	SWMH-1275	Upsize Existing Main	250	300	17	\$	900	\$	15,243
SWGM-1277-1302	SWMH-1277	SWMH-1302	Upsize Existing Main	250	300	41	\$	900	\$	37,342
SWGM-1279-1277	SWMH-1279	SWMH-1277	Upsize Existing Main	250	300	32	\$	900	\$	28,903
SWGM-1302-1276	SWMH-1302	SWMH-1276	Upsize Existing Main	250	300	42	\$	900	\$	37,579
SWGM-1495-1496	SWMH-1495	SWMH-1496	Upsize Existing Main	250	300	38	\$	900	\$	34,425
SWGM-1496-1497	SWMH-1496	SWMH-1497	Upsize Existing Main	250	300	41	\$	900	\$	36,809
SWGM-1497-1498	SWMH-1497	SWMH-1498	Upsize Existing Main	250	300	12	\$	900	\$	10,894
SWGM-1498-1499	SWMH-1498	SWMH-1499	Upsize Existing Main	250	300	27	\$	900	\$	24,671
SWGM-1499-1500	SWMH-1499	SWMH-1500	Upsize Existing Main	250	300	42	\$	900	\$	38,183
SWGM-1500-986	SWMH-1500	SWMH-986	Upsize Existing Main	250	300	16	\$	900	\$	14,126
SWGM-561-814	SWMH-561	SWMH-814	Upsize Existing Main	375	525	11	\$	1,300	\$	14,625
SWGM-813-300	SWMH-813	SWMH-300	Upsize Existing Main	450	525	32	\$	1,300	\$	41,448
SWGM-814-813	SWMH-814	SWMH-813	Upsize Existing Main	375	525	47	\$	1,300	\$	61,667
SWGM-815-561	SWMH-815	SWMH-561	Upsize Existing Main	375	450	114	\$	1,100	\$	125,051
SWGM-816-1274	SWMH-816	SWMH-1274	Upsize Existing Main	375	450	65	\$	1,100	\$	71,498
SWGM-817-816	SWMH-817	SWMH-816	Upsize Existing Main	375	450	87	\$	1,100	\$	95,762
SWGM-818-817	SWMH-818	SWMH-817	Upsize Existing Main	375	450	82	\$	1,100	\$	89,909
SWGM-819A-819	SWMH-819A	SWMH-819	Upsize Existing Main	250	375	83	\$	1,050	\$	87,339
SWGM-986-819	SWMH-986	SWMH-819	Upsize Existing Main	300	375	71	\$	1,050	\$	74,715
STM-34 Total						934			\$	973,224

Legend

Storm Manhole

Existing Gravity Main

Proposed Project

Nearby Projects

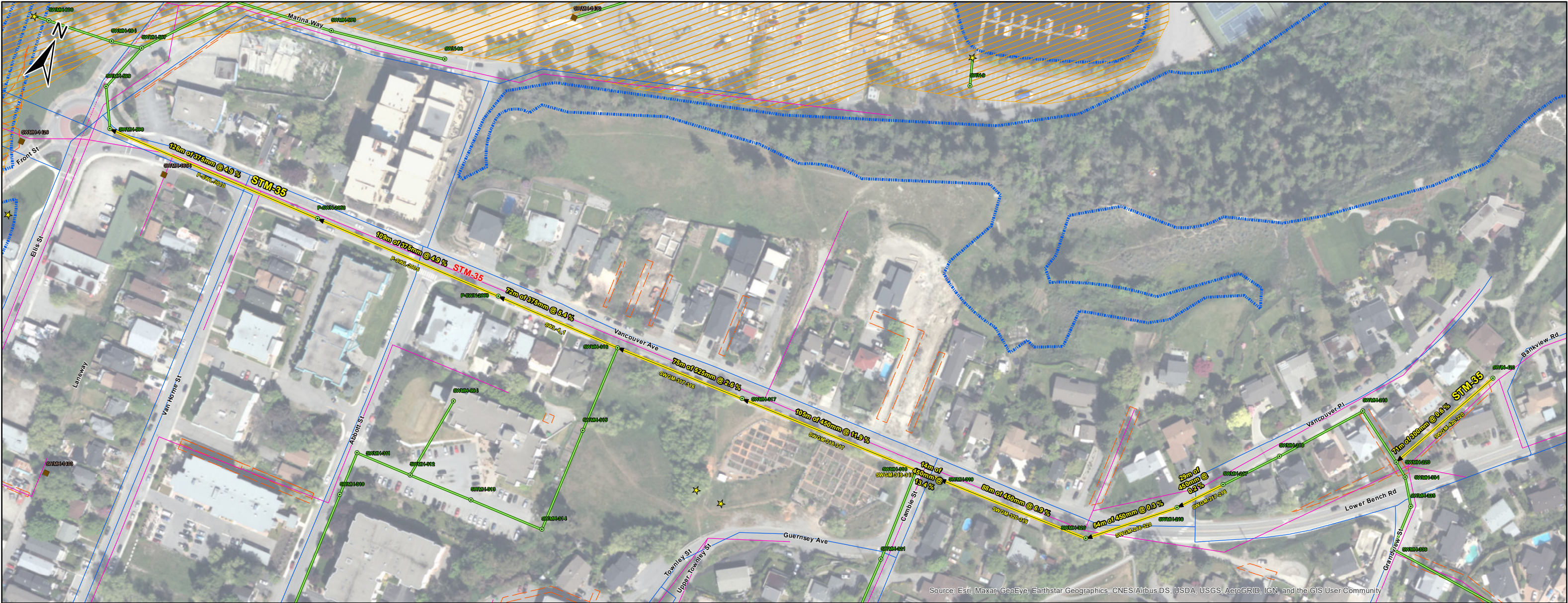
Watermain

Sanitary Main

City Easement

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-9000	SWN-67	SWN-141	New Main	-	900	4	\$ 2,000	\$ 7,670
SWGM-216-320	SWMH-216	SWMH-320	Upsize Existing Main	375	450	54	\$ 1,100	\$ 58,904
SWGM-217-216	SWMH-217	SWMH-216	Upsize Existing Main	375	450	29	\$ 1,100	\$ 31,655
SWGM-317-316	SWMH-317	SWMH-316	Upsize Existing Main	375	525	75	\$ 1,300	\$ 97,473
SWGM-318-317	SWMH-318	SWMH-317	Upsize Existing Main	375	450	105	\$ 1,100	\$ 115,151
SWGM-319-318	SWMH-319	SWMH-318	Upsize Existing Main	375	450	14	\$ 1,100	\$ 15,411
SWGM-320-319	SWMH-320	SWMH-319	Upsize Existing Main	375	450	88	\$ 1,100	\$ 96,468
SWGM-420-220	SWIN-420	SWMH-220	Upsize Existing Main	200	300	71	\$ 900	\$ 64,062
SWL-4_1	SWMH-316	P-SWN-2005	New Main	-	375	72	\$ 1,050	\$ 75,791
P-SWL-2005	P-SWN-2005	P-SWN-2050	New Main	-	375	109	\$ 1,050	\$ 114,930
P-SWL-2010	P-SWN-2050	SWMH-598	New Main	-	375	126	\$ 1,050	\$ 132,196
STM-35 Total						746		\$ 809,710

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

Sanitary Main

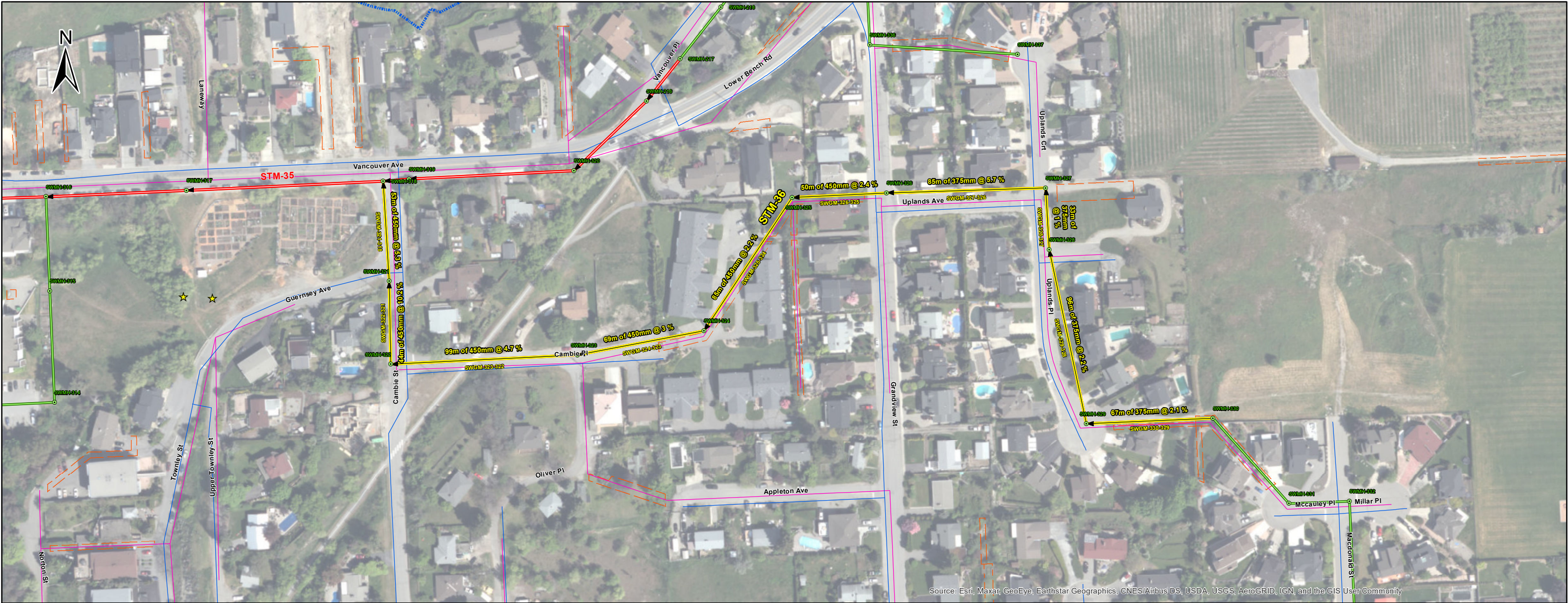
Sanitary Forcemain

City Easement

Hazard Area

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-321-318	SWMH-321	SWMH-318	Upsize Existing Main	375	450	53	\$ 1,100	\$ 58,649
SWGM-322-321	SWMH-322	SWMH-321	Upsize Existing Main	375	450	44	\$ 1,100	\$ 48,634
SWGM-323-322	SWMH-323	SWMH-322	Upsize Existing Main	375	450	99	\$ 1,100	\$ 109,408
SWGM-324-323	SWMH-324	SWMH-323	Upsize Existing Main	375	450	69	\$ 1,100	\$ 75,488
SWGM-325-324	SWMH-325	SWMH-324	Upsize Existing Main	375	450	85	\$ 1,100	\$ 93,508
SWGM-326-325	SWMH-326	SWMH-325	Upsize Existing Main	375	450	50	\$ 1,100	\$ 55,411
SWGM-327-326	SWMH-327	SWMH-326	Upsize Existing Main	300	375	85	\$ 1,050	\$ 88,956
SWGM-328-327	SWMH-328	SWMH-327	Upsize Existing Main	300	375	33	\$ 1,050	\$ 34,457
SWGM-329-328	SWMH-329	SWMH-328	Upsize Existing Main	300	375	96	\$ 1,050	\$ 100,863
SWGM-330-329	SWMH-330	SWMH-329	Upsize Existing Main	300	375	67	\$ 1,050	\$ 70,833
STM-36 Total						682		\$ 736,207

Legend

★

Discharge Point

●

Storm Manhole

—

Existing Gravity Main

→

Proposed Project

→

Nearby Projects

—

Watermain

—

Sanitary Main

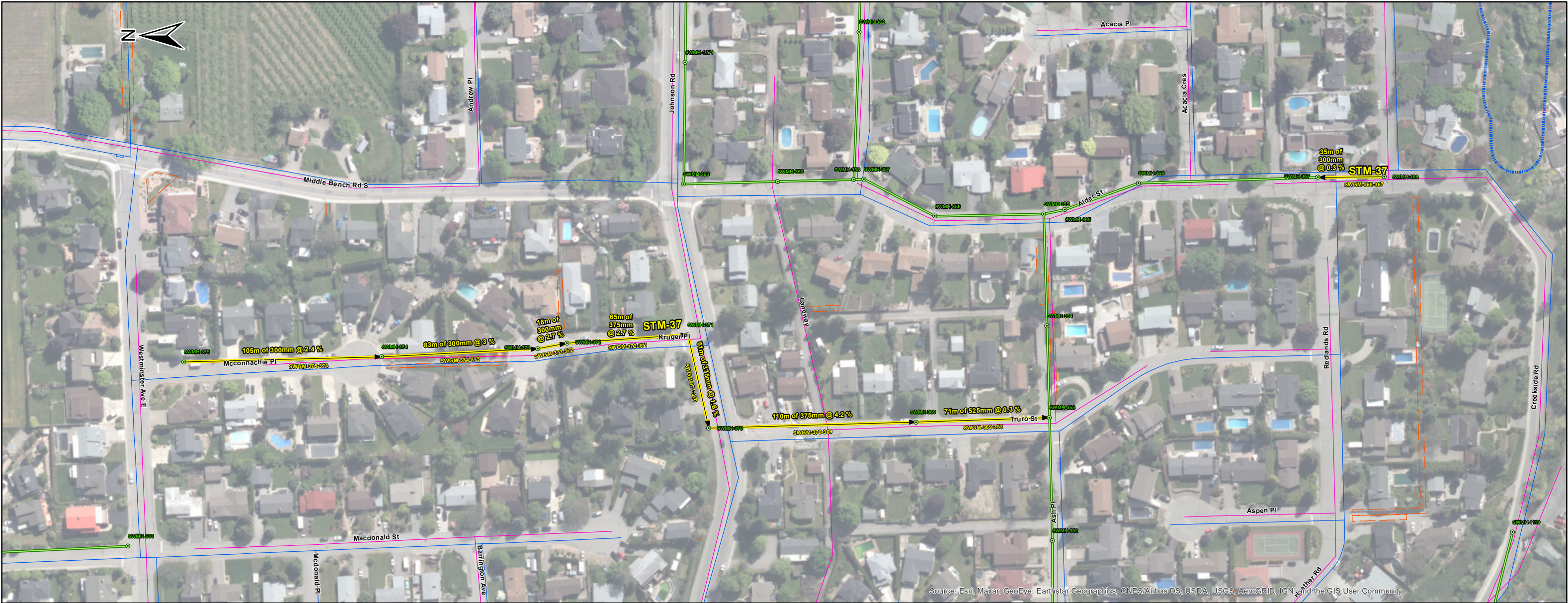
□

City Easement

▬▬▬▬▬

Watercourse





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-368-367	SWMH-368	SWMH-367	Upsize Existing Main	250	300	35	\$ 900	\$ 31,859
SWGM-369-353	SWMH-369	SWMH-353	Upsize Existing Main	300	525	71	\$ 1,300	\$ 92,232
SWGM-370-369	SWMH-370	SWMH-369	Upsize Existing Main	250	375	110	\$ 1,050	\$ 116,009
SWGM-371-370	SWMH-371	SWMH-370	Upsize Existing Main	250	375	51	\$ 1,050	\$ 53,549
SWGM-372-371	SWMH-372	SWMH-371	Upsize Existing Main	250	375	65	\$ 1,050	\$ 67,776
SWGM-373-372	SWMH-373	SWMH-372	Upsize Existing Main	250	300	16	\$ 900	\$ 14,055
SWGM-374-373	SWMH-374	SWMH-373	Upsize Existing Main	250	300	83	\$ 900	\$ 75,123
SWGM-375-374	SWMH-375	SWMH-374	Upsize Existing Main	250	300	105	\$ 900	\$ 94,780
STM-37 Total						537	\$	545,384

### Legend

- Storm Manhole
- Existing Gravity Main
- Proposed Project
- Watermain
- Sanitary Main
- City Easement
- Watercourse

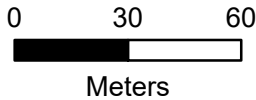


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## STM-37 McConnachie Pl., Kruger Pl., Turo St., Ash St. and Aider St. Upgrades Stormwater Master Plan



Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-37**

Client: City of Penticton











PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1117-549	SWMH-1117	SWMH-549	Upsize Existing Main	250	300	12	\$ 900	\$ 11,219
SWGM-344-343	SWMH-344	SWMH-343	Upsize Existing Main	600	750	73	\$ 1,800	\$ 131,719
SWGM-345-344	SWMH-345	SWMH-344	Upsize Existing Main	525	600	54	\$ 1,500	\$ 81,135
SWGM-379-378	SWMH-379	SWMH-378	Upsize Existing Main	250	450	9	\$ 1,100	\$ 9,525
SWGM-608-1117	SWN-41	SWMH-1117	Upsize Existing Main	250	300	78	\$ 900	\$ 70,155
STM-38 Total						226	\$	303,753


Legend


 Discharge Point


 Storm Manhole


 Existing Gravity Main


 Proposed Project

 Nearby Projects

 Watermain

 Sanitary Main

 City Easement

 Watercourse

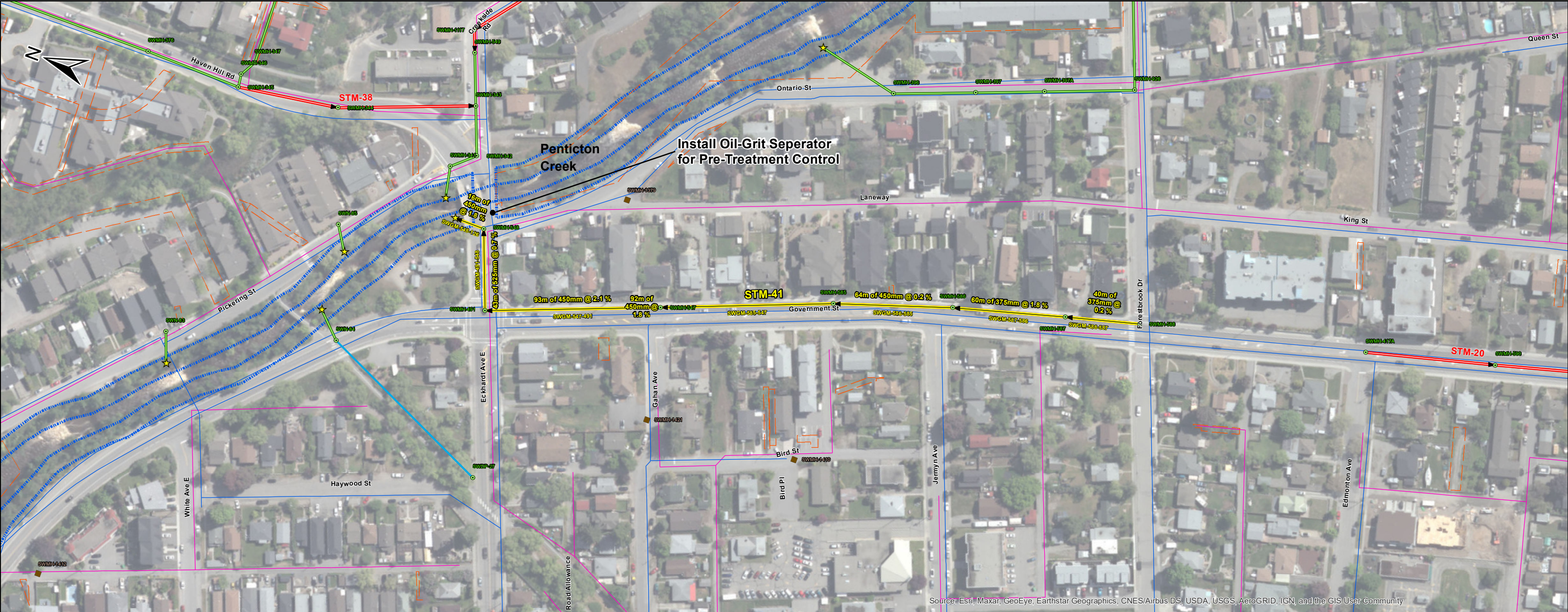












PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-491-548	SWMH-491	SWMH-548	Upsize Existing Main	375	525	43	\$ 1,300	\$ 56,549
SWGM-547-491	SWMH-547	SWMH-491	Upsize Existing Main	300	450	93	\$ 1,100	\$ 102,567
SWGM-548-126	SWMH-548	SWDP-126	Upsize Existing Main	250	450	16	\$ 1,100	\$ 17,929
SWGM-585-547	SWMH-585	SWMH-547	Upsize Existing Main	300	450	92	\$ 1,100	\$ 100,991
SWGM-586-585	SWMH-586	SWMH-585	Upsize Existing Main	300	450	64	\$ 1,100	\$ 69,949
SWGM-587-586	SWMH-587	SWMH-586	Upsize Existing Main	300	375	60	\$ 1,050	\$ 62,858
SWGM-588-587	SWMH-588	SWMH-587	Upsize Existing Main	300	375	40	\$ 1,050	\$ 41,831
STM-41 Total						408	\$	452,674

Legend

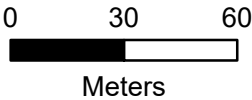
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Watercourse



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STM-41 Government Street Upgrades (North)  
Stormwater Master Plan

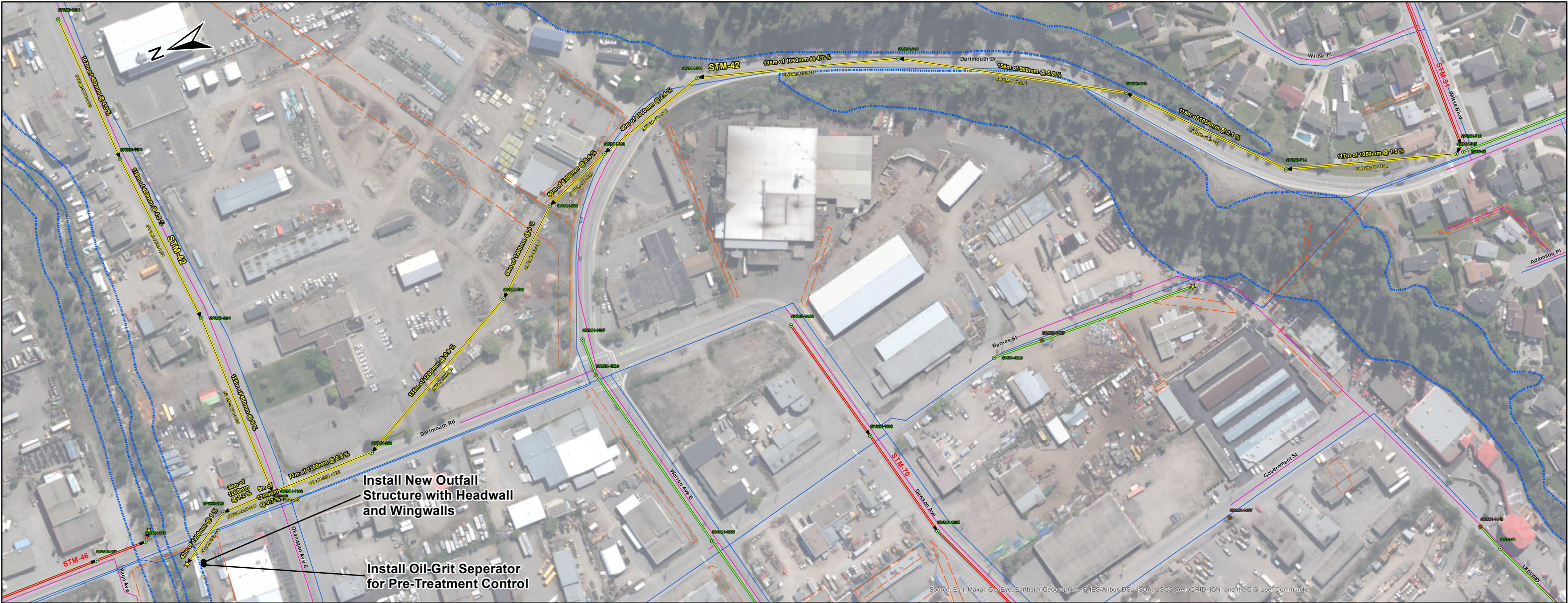


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-41

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1131-1132	SWMH-1131	SWMH-1132	Upsize Existing Main	375	450	125	\$ 1,100	\$ 137,608
SWGM-1132-290	SWMH-1132	SWMH-290	Upsize Existing Main	900	1200	5	\$ 2,650	\$ 14,005
SWGM-1133-1131	SWMH-1133	SWMH-1131	Upsize Existing Main	375	450	119	\$ 1,100	\$ 130,903
SWGM-1134-1133	SWMH-1134	SWMH-1133	Upsize Existing Main	375	450	102	\$ 1,100	\$ 111,873
SWGM-289-35	SWMH-289	SWDP-35	Upsize Existing Main	900	1200	42	\$ 2,650	\$ 111,297
SWGM-290-289	SWMH-290	SWMH-289	Upsize Existing Main	900	1200	30	\$ 2,650	\$ 79,871
SWGM-291-1132	SWMH-291	SWMH-1132	Upsize Existing Main	900	1200	71	\$ 2,650	\$ 188,097
SWGM-509-790	SWMH-509	SWMH-790	Upsize Existing Main	900	1200	69	\$ 2,650	\$ 183,505
SWGM-510-509	SWMH-510	SWMH-509	Upsize Existing Main	900	1200	50	\$ 2,650	\$ 133,351
SWGM-511-510	SWMH-511	SWMH-510	Upsize Existing Main	750	1050	80	\$ 2,300	\$ 183,540
SWGM-512-511	SWMH-512	SWMH-511	Upsize Existing Main	600	1050	135	\$ 2,300	\$ 310,171
SWGM-513-512	SWMH-513	SWMH-512	Upsize Existing Main	600	900	156	\$ 2,000	\$ 311,420
SWGM-514-513	SWMH-514	SWMH-513	Upsize Existing Main	750	1050	118	\$ 2,300	\$ 272,164
SWGM-515-514	SWMH-515	SWMH-514	Upsize Existing Main	750	1050	117	\$ 2,300	\$ 269,093
SWGM-790-291	SWMH-790	SWMH-291	Upsize Existing Main	900	1200	135	\$ 2,650	\$ 357,395
STM-42 Total						1354	\$	2,794,293

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

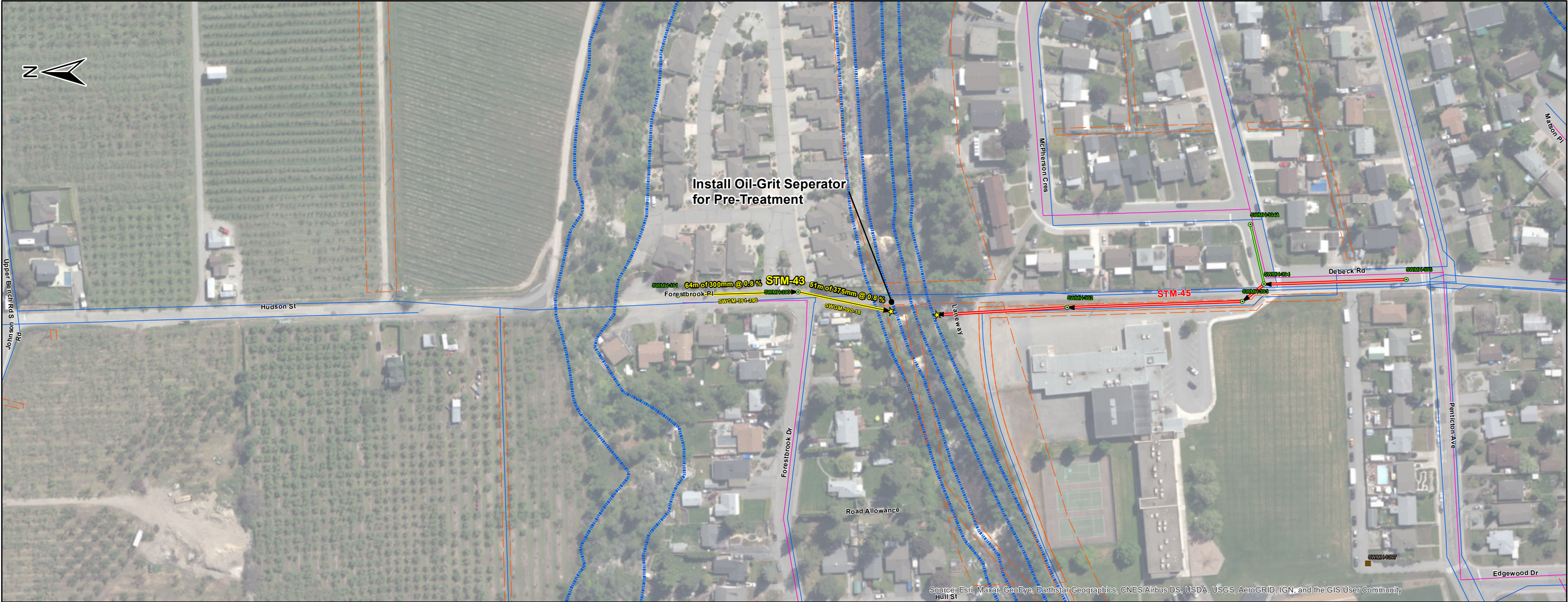
Watermain

Sanitary Main

City Easement

Watercourse





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-390-18	SWMH-390	SWDP-18	Upsize Existing Main	200	375	51	\$ 1,050	\$ 53,406
SWGM-391-390	SWMH-391	SWMH-390	Upsize Existing Main	150	300	64	\$ 900	\$ 57,662
STM-43 Total						115	\$	111,068

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

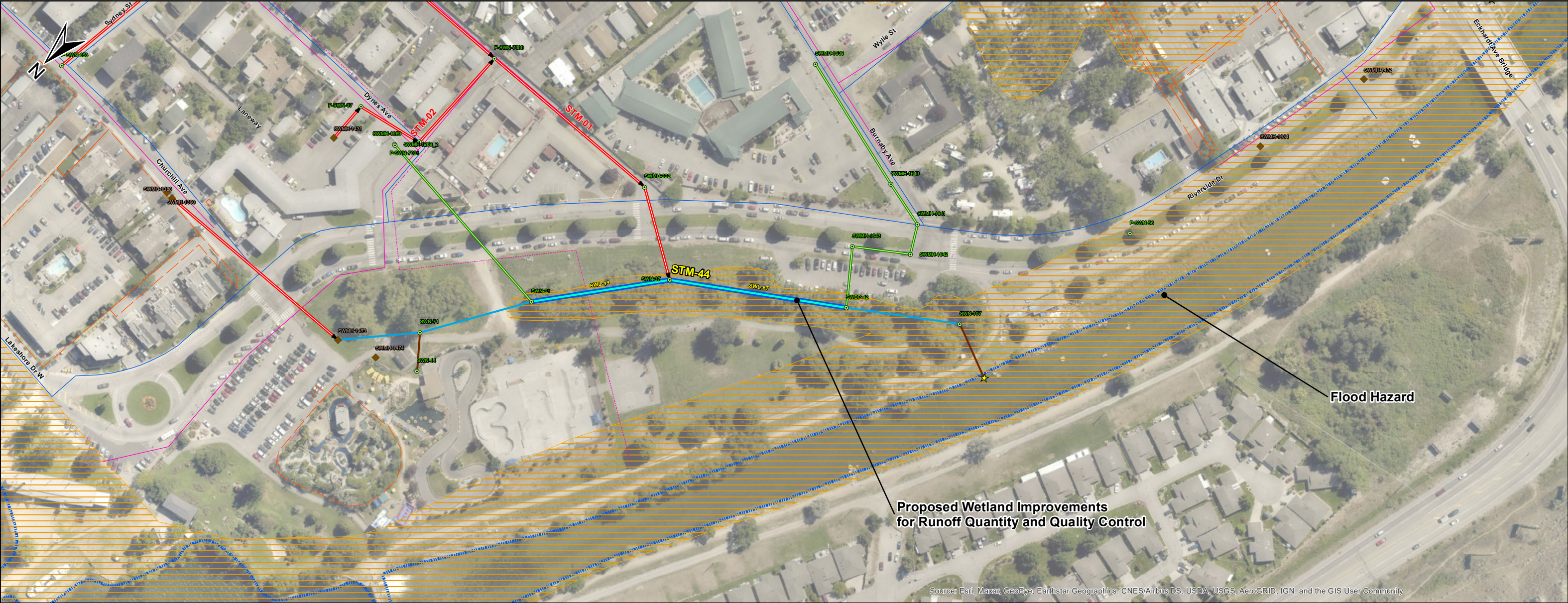
Watermain

Sanitary Main

City Easement

Watercourse





Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWL-49	SWN-61	SWN-37	Wetland Improvements	-	-	74	\$ 300	\$ 22,269
SWL-67	SWN-37	SWDP-42	Wetland Improvements	-	-	95	\$ 300	\$ 28,488
STM-44 Total						169	\$	50,757

Legend

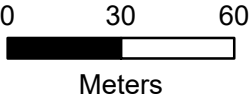
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Channel Improvements
- Nearby Projects
- Open Channel
- Culvert
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Hazard Area
- Watercourse



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STM-44 Riverside Drive Wetland Improvements  
Stormwater Master Plan

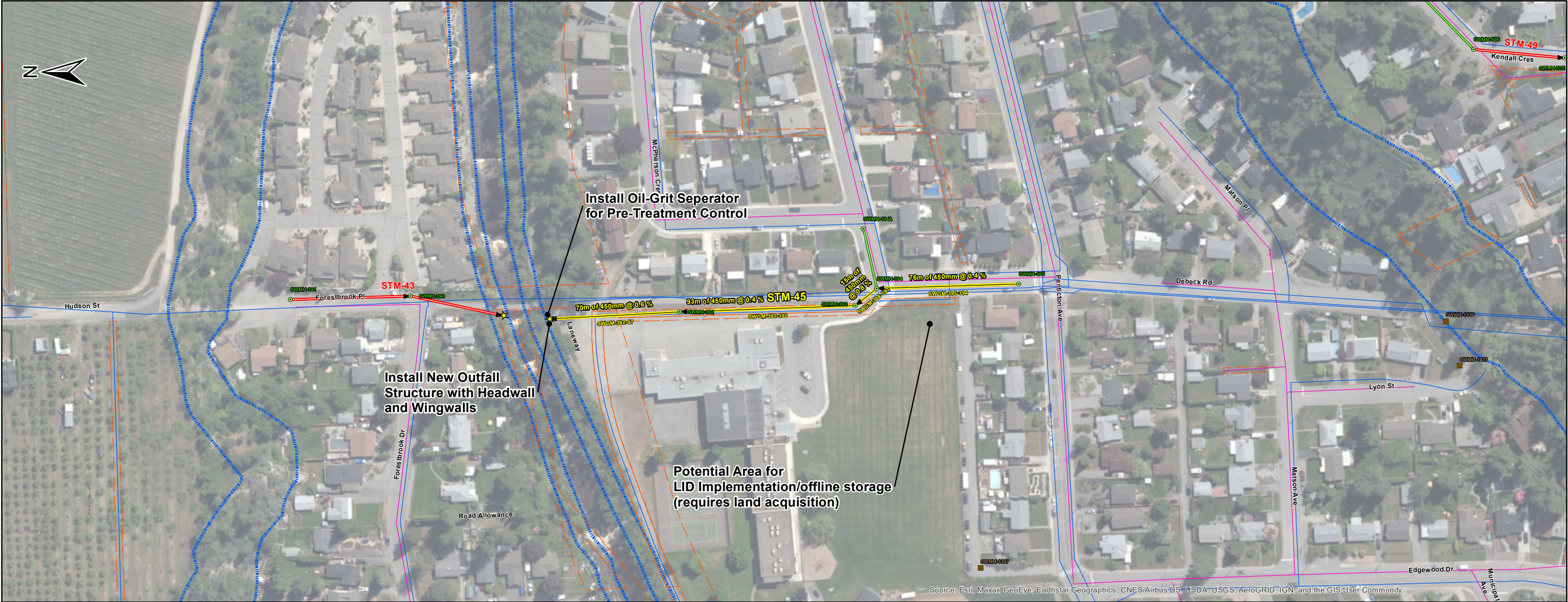


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-44

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-392-97	SWMH-392	SWDP-97	Upsize Existing Main	375	450	70	\$ 1,100	\$ 76,555
SWGM-393-392	SWMH-393	SWMH-392	Upsize Existing Main	375	450	93	\$ 1,100	\$ 102,729
SWGM-394-393	SWMH-394	SWMH-393	Upsize Existing Main	375	450	15	\$ 1,100	\$ 16,116
SWGM-395-394	SWMH-395	SWMH-394	Upsize Existing Main	300	450	76	\$ 1,100	\$ 83,227
STM-45 Total						253	\$	278,627

Legend

- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- City Easement
- Watercourse

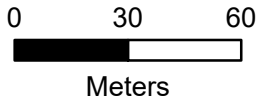


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STM-45 Debeck Road Upgrades  
Stormwater Master Plan

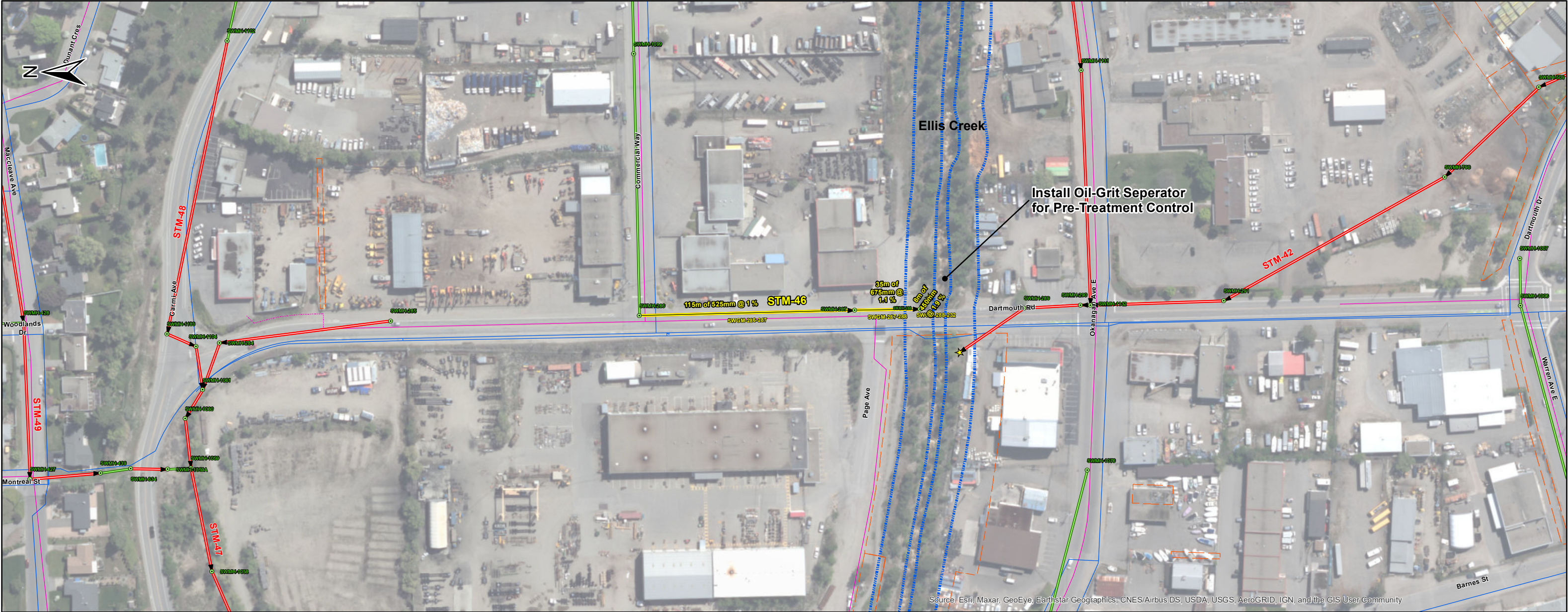


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-45

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-286-287	SWMH-286	SWMH-287	Upsize Existing Main	375	525	115	\$ 1,300	\$ 148,880
SWGM-287-288	SWMH-287	SWMH-288	Upsize Existing Main	375	675	35	\$ 1,650	\$ 57,319
SWGM-288-232	SWMH-288	SWDP-232	Upsize Existing Main	250	450	8	\$ 1,100	\$ 8,611
STM-46 Total						157		\$ 214,810

Legend

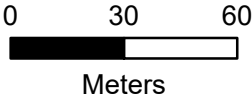
- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- - - Sanitary Forcemain
- City Easement
- Watercourse



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STM-46 Dartmouth Road Upgrades  
Stormwater Master Plan

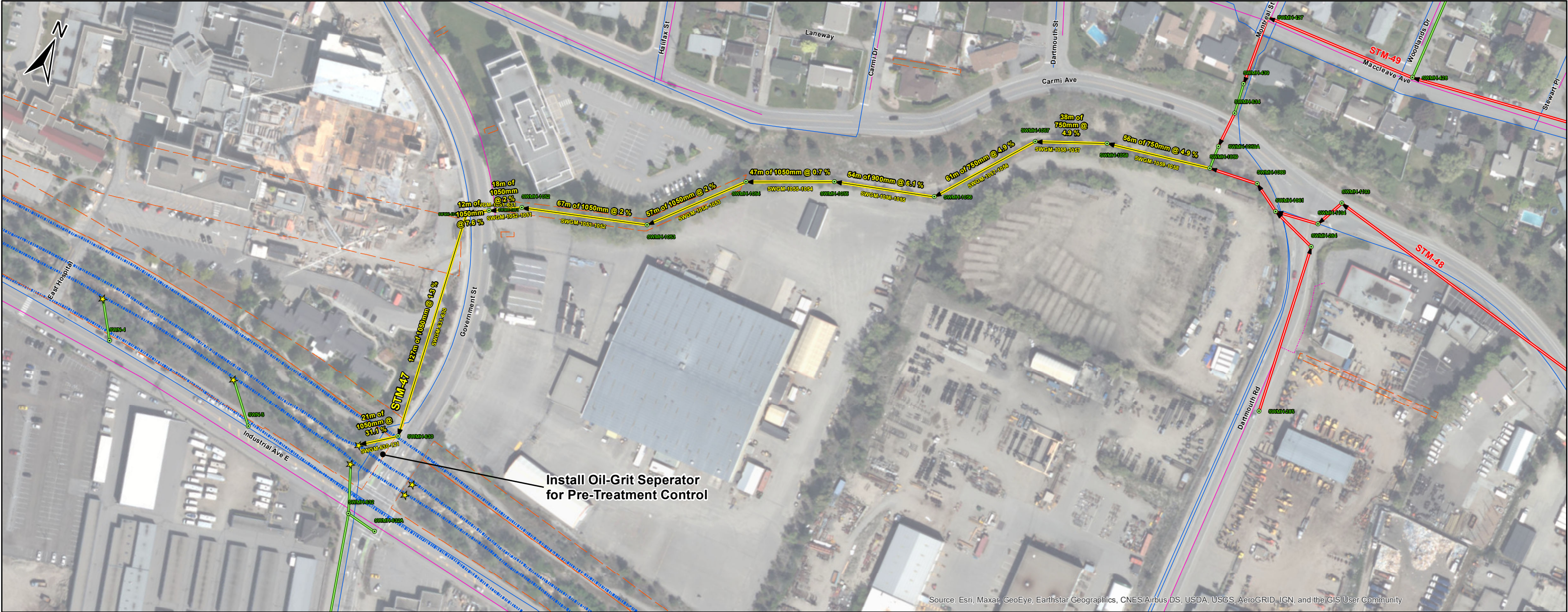


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-46

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1051-631	SWMH-1051	SWMH-631	Upsize Existing Main	675	1050	12	\$ 2,300	\$ 27,296
SWGM-1052-1051	SWMH-1052	SWMH-1051	Upsize Existing Main	675	1050	18	\$ 2,300	\$ 40,262
SWGM-1053-1052	SWMH-1053	SWMH-1052	Upsize Existing Main	675	1050	67	\$ 2,300	\$ 154,822
SWGM-1054-1053	SWMH-1054	SWMH-1053	Upsize Existing Main	675	1050	57	\$ 2,300	\$ 132,193
SWGM-1055-1054	SWMH-1055	SWMH-1054	Upsize Existing Main	675	1050	47	\$ 2,300	\$ 108,158
SWGM-1056-1055	SWMH-1056	SWMH-1055	Upsize Existing Main	600	900	54	\$ 2,000	\$ 107,510
SWGM-1057-1056	SWMH-1057	SWMH-1056	Upsize Existing Main	600	750	61	\$ 1,800	\$ 110,027
SWGM-1058-1057	SWMH-1058	SWMH-1057	Upsize Existing Main	600	750	38	\$ 1,800	\$ 69,043
SWGM-1059-1058	SWMH-1059	SWMH-1058	Upsize Existing Main	600	750	56	\$ 1,800	\$ 101,318
SWGM-630-121	SWMH-630	SWDP-121	Upsize Existing Main	750	1050	21	\$ 2,300	\$ 49,071
SWGM-631-630	SWMH-631	SWMH-630	Upsize Existing Main	750	1050	127	\$ 2,300	\$ 292,822
STM-47 Total						559		\$ 1,192,521

Legend

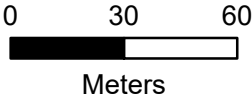
- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- ➔ Proposed Project
- ➔ Nearby Projects
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Watercourse



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STM-47 South of Carmi Avenue Improvements  
Stormwater Master Plan



Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-47

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-113	SWMH-1438	SWMH-1024	New Main	-	300	129	\$ 900	\$ 116,074
P-SWL-114	SWMH-1439	SWMH-1438	New Main	-	300	117	\$ 900	\$ 105,616
P-SWL-84	SWMH-1440	SWMH-1439	New Main	-	300	34	\$ 900	\$ 30,344
P-SWL-90	SWMH-1475	SWMH-1101	New Main	-	250	262	\$ 800	\$ 209,996
SWGM-1060-1059	SWMH-1060	SWMH-1059	Upsize Existing Main	375	525	26	\$ 1,300	\$ 34,411
SWGM-1061-1060	SWMH-1061	SWMH-1060	Upsize Existing Main	375	450	18	\$ 1,100	\$ 19,608
SWGM-1102-1103	SWMH-1102	SWMH-1103	Upsize Existing Main	375	450	162	\$ 1,100	\$ 178,648
SWGM-1103-1104	SWMH-1103	SWMH-1104	Upsize Existing Main	375	450	14	\$ 1,100	\$ 15,741
SWGM-1104-1061	SWMH-1104	SWMH-1061	Upsize Existing Main	375	450	31	\$ 1,100	\$ 34,191
SWGM-284-1061	SWMH-284	SWMH-1061	Upsize Existing Main	300	450	27	\$ 1,100	\$ 29,339
SWGM-285-284	SWMH-285	SWMH-284	Upsize Existing Main	300	375	92	\$ 1,050	\$ 97,111
STM-48 Total						914	\$	\$ 871,079

Legend

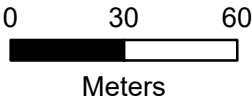
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement



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STM-48 Carmi Avenue Upgrades  
Stormwater Master Plan



Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-48

Client: City of Penticton











PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-865-866	SWMH-865	SWMH-866	Upsize Existing Main	300	600	38	\$ 1,500	\$ 57,254
P-SWL-109	P-SWN-27	SWMH-866	New Main	-	375	212	\$ 1,050	\$ 222,321
P-SWL-110	SWMH-865	SWMH-863	New Main	-	600	166	\$ 1,500	\$ 248,779
P-SWL-91	SWMH-863	P-SWN-58	New Main	-	600	176	\$ 1,500	\$ 263,904
P-SWL-93	P-SWN-58	SWDP-92	New Main	-	600	117	\$ 1,500	\$ 174,910
STM-50 Total						708	\$ 967,168	

Legend

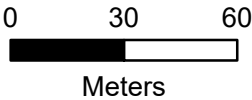
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Watermain
- Sanitary Main
- ... Sanitary Forcemain
- City Easement
- Watercourse



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STM-50 Yorkton Ave. Skaha Lake Road Diversion  
Stormwater Master Plan



Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-50

Client: City of Penticton







**Project Name:** Golf Course Drainage Ponds - Sediment Removal  
**Project Number:** STM-51

**Project Timeline:** 5 to 10 Year  
**Project Priority:** Medium  
**Estimated Cost (\$ 2021):** \$ 70,800  
**Upgrade Driver:** Asset Age  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
The model results indicate the original design of Ponds A, B, C, D and E do not provide adequate storage for the major (100-year) storm event. This is largely due to the use of future design storm (which incorporates the impact of climate change) as well as submerged outfall condition.

Urban runoff has been identified as one of the main sources contributing to the deterioration of water quality in receiving waterbodies. Stormwater runoff from urbanized areas commonly contains a wide range of contaminants including suspended solids, nutrients and heavy metals at concentrations significant higher than runoff from undeveloped watersheds. As such, and to maintain the original design performance, sediment removal should be considered given the ponds were originally constructed in the 1980s. Sediment levels can be measured prior to implementation, to validate the proposed project. The City should consider sediment removal to restore all ponds (A, B, C, D and E) to original design, to meet the original design level of service.

Proposed project will improve downstream water quality discharging to the Okanagan Channel. This project can be done in conjunction with medium priority project STM-09 or planned golf course upgrades.

**COST CONSIDERATIONS**  
This is a major system project to restore the pond to the original design condition. DCC costs are not applicable for this upgrade.

**ENVIRONMENTAL CONCERNS**  
- Ponds serve as habitat for Painted Turtles  
- Mitigate impact on aquatic and terrestrial species

ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 3,000
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 2,000
1.3	Traffic Management	\$ 5,000
2.0	Earthworks	
2.1	Sediment Removal and Disposal	\$ 30,000
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 10,500
3.2	Full Width Restoration	-
4.0	Land Acquisition	
4.1	Acquire Easements	-
4.2	Acquire Property	-
SUBTOTAL		\$ 50,500
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 7,600
5.2	Construction Contingency (25% of Subtotal)	\$ 12,700
TOTAL ESTIMATED COST		\$ 70,800

Legend

★

Discharge Point

●

Storm Manhole

■

Detention Pond

—

Weir

—

Existing Gravity Main

—

Nearby Projects

—

Open Channel

—

Watermain

—

Sanitary Main

---

Sanitary Forcemain

—

City Easement

▨

Hazard Area

|||||

Watercourse

wsp

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STM-51 Golf Course Drainage Ponds

Stormwater Master Plan

03060

Meters

Project No.:  
20M-00462-00

Date:  
Apr 2021

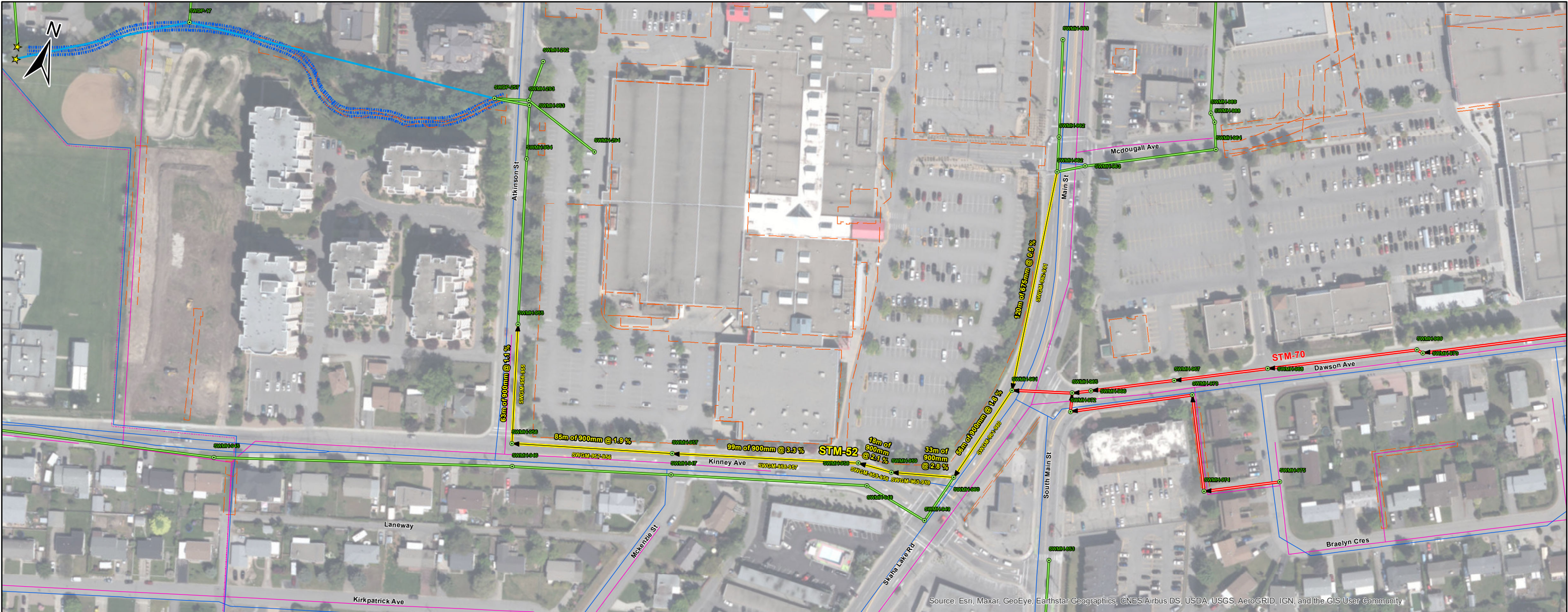
Figure No.:  
F-51

Client: City of Penticton

CITY OF

Penticton





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-956-955	SWMH-956	SWMH-955	Upsize Existing Main	750	900	63	\$ 2,000	\$ 126,996
SWGM-957-956	SWMH-957	SWMH-956	Upsize Existing Main	675	900	85	\$ 2,000	\$ 170,996
SWGM-958-957	SWMH-958	SWMH-957	Upsize Existing Main	600	900	99	\$ 2,000	\$ 198,396
SWGM-959-958	SWMH-959	SWMH-958	Upsize Existing Main	600	900	18	\$ 2,000	\$ 36,400
SWGM-960-959	SWMH-960	SWMH-959	Upsize Existing Main	600	900	33	\$ 2,000	\$ 66,672
SWGM-961-960	SWMH-961	SWMH-960	Upsize Existing Main	675	900	56	\$ 2,000	\$ 111,664
SWGM-962-961	SWMH-962	SWMH-961	Upsize Existing Main	600	675	120	\$ 1,650	\$ 198,083
STM-52 Total						476		\$ 909,207

Legend

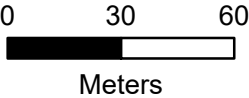
- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Watercourse



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STM-52 Kinney Avenue (East) Upgrades  
Stormwater Master Plan



Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-52

Client: City of Penticton





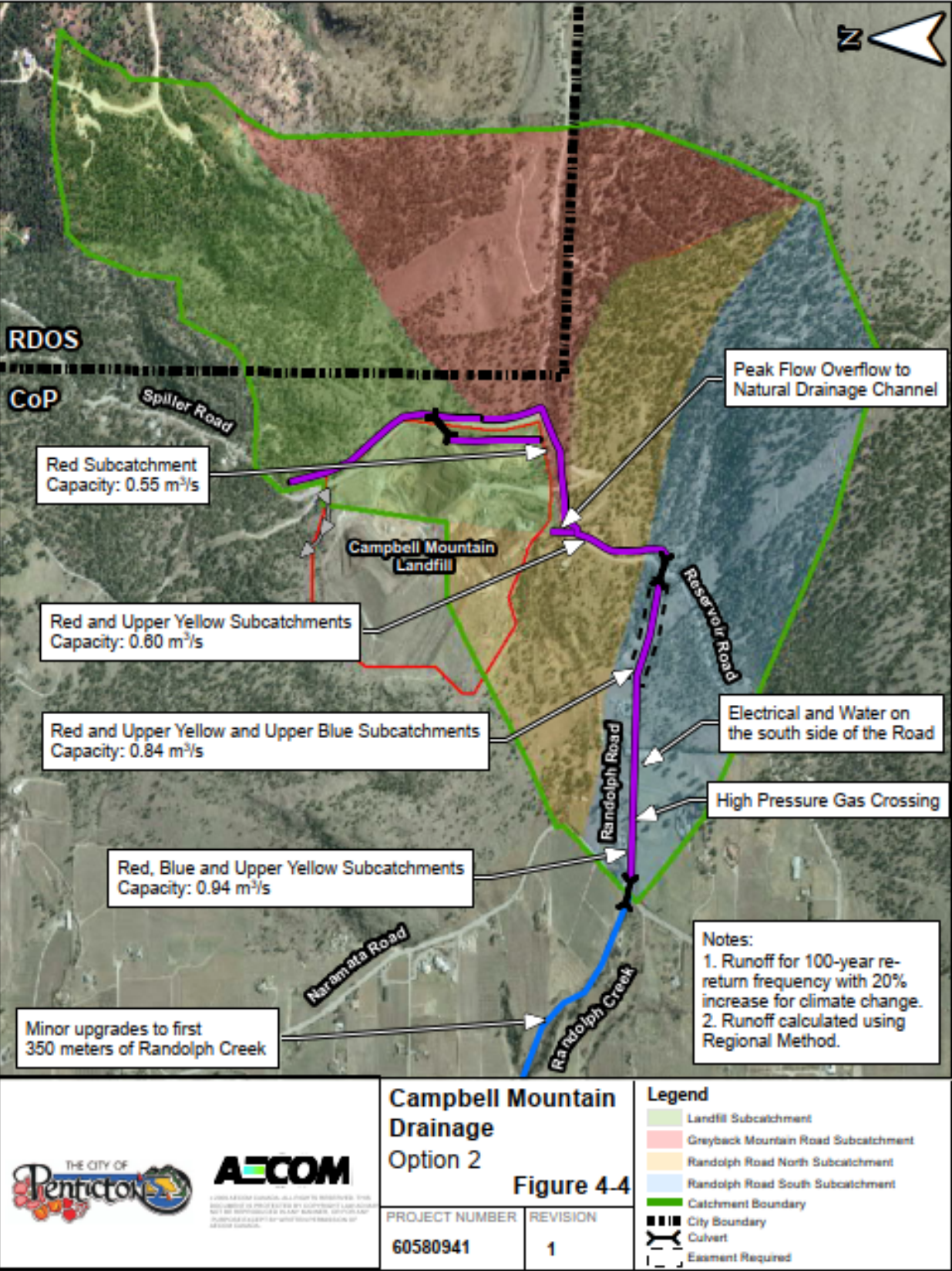
City of Penticton  
Campbell Mountain Drainage

Conceptual Level Capital Cost Estimate

Option 2

Item	Description	Phase	Quantity	Unit	Unit Price	Extension (\$)
1.0	General Requirements					
1.1	Mobilization and Demobilization	All	1	LS	\$ 25,000	25,000
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	All	1	LS	\$ 40,000	40,000
1.3	Survey and Record Drawings	All	1	LS	\$ 10,000	10,000
1.4	Traffic Management	All	1	LS	\$ 7,500	7,500
	Total 1.0 - General Requirements					83,000
2.0	Drainage Works (Channels, Pipes, etc.)					
2.1	Open Channels					
2.1.1	Spiller Road to Reservoir Road Crossing	4	680	lin.m.	\$ 150	102,000
2.1.2	Reservoir Road to Randolph Road	5	270	lin.m.	\$ 200	54,000
2.1.3	Randolph Road	3	130	lin.m.	\$ 250	32,500
2.1.4	Minor Ditching on Spiller Road	4	880	lin.m.	\$ 40	35,200
2.1.5	Minor Ditching within Landfill	4	500	lin.m.	\$ 40	20,000
2.2	Natural Channel Improvements					
2.2.1	Discharge to Randolph Creek	2	1	ea.	\$ 70,000	70,000
2.3	Buried Pipe and Culverts					
2.3.1	Culvert under Spiller Road, 450 mm	4	20	lin.m.	\$ 1,200	24,000
2.3.2	Flow controlled diversion from Landfill	4	100	lin.m.	\$ 200	20,000
2.3.3	Culvert at 1525 Randolph Road, 750 mm (incl. Gas Crossing)	3	20	lin.m.	\$ 1,200	24,000
2.3.4	Culvert at 1555 Randolph Road, 750 mm	3	50	lin.m.	\$ 1,200	60,000
2.3.5	Culvert at 1565 Randolph Road, 750 mm	3	40	lin.m.	\$ 1,200	48,000
2.3.6	Randolph Road West End to Naramata Road Culvert, 750 mm	3	130	lin.m.	\$ 1,200	156,000
2.3.7	Casing Under Naramata Road, 750 mm	1	1	LS	\$ 80,000	80,000
	Total 2.0 - Drainage Works (Channels, Pipes, etc.)					726,000
3.0	Land Acquisition					
3.1	Easment below Reservoir Road for 270 metre drainage path	4	1	LS	\$ 50,000.00	50,000
	Total 3.0 - Land Acquisition					50,000
	Sub-Total					\$ 859,000
	Professional Services (estimate at approximately 15%)					\$ 130,000
	Construction Contingency (approximately 25%)					\$ 210,000
	TOTAL ESTIMATED CAPITAL COST					\$ 1,200,000
	ESTIMATED PHASED COST (incl. 40% markup)	Subtotal		Small Proj. Premium		Project Cost
	Phase 1 - Naramata Rd Crossing	\$ 133,000		\$ 35,000		\$ 168,000
	Phase 2 - Randolph Creek Improvements	\$ 119,000		\$ 35,000		\$ 154,000
	Phase 3 - Improvements in Randolph Rd	\$ 477,000		\$ 65,000		\$ 542,000
	Phase 4 - Reservoir Rd Improvements	\$ 373,000		\$ 55,000		\$ 428,000
	Phase 5 - Natural Channel Improvements below Reservoir Rd	\$ 97,000		\$ 35,000		\$ 132,000
	PHASED APPROACH TOTAL ESTIMATED CAPITAL COST	\$ 1,200,000				\$ 1,430,000

1. Class D cost estimates to be used for options comparison.  
2. Report outlines phasing for Option 2.

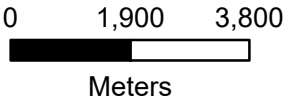


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**STM-53 Campbell Mountain Landfill  
R Drainage Upgrades  
Stormwater Master Plan**

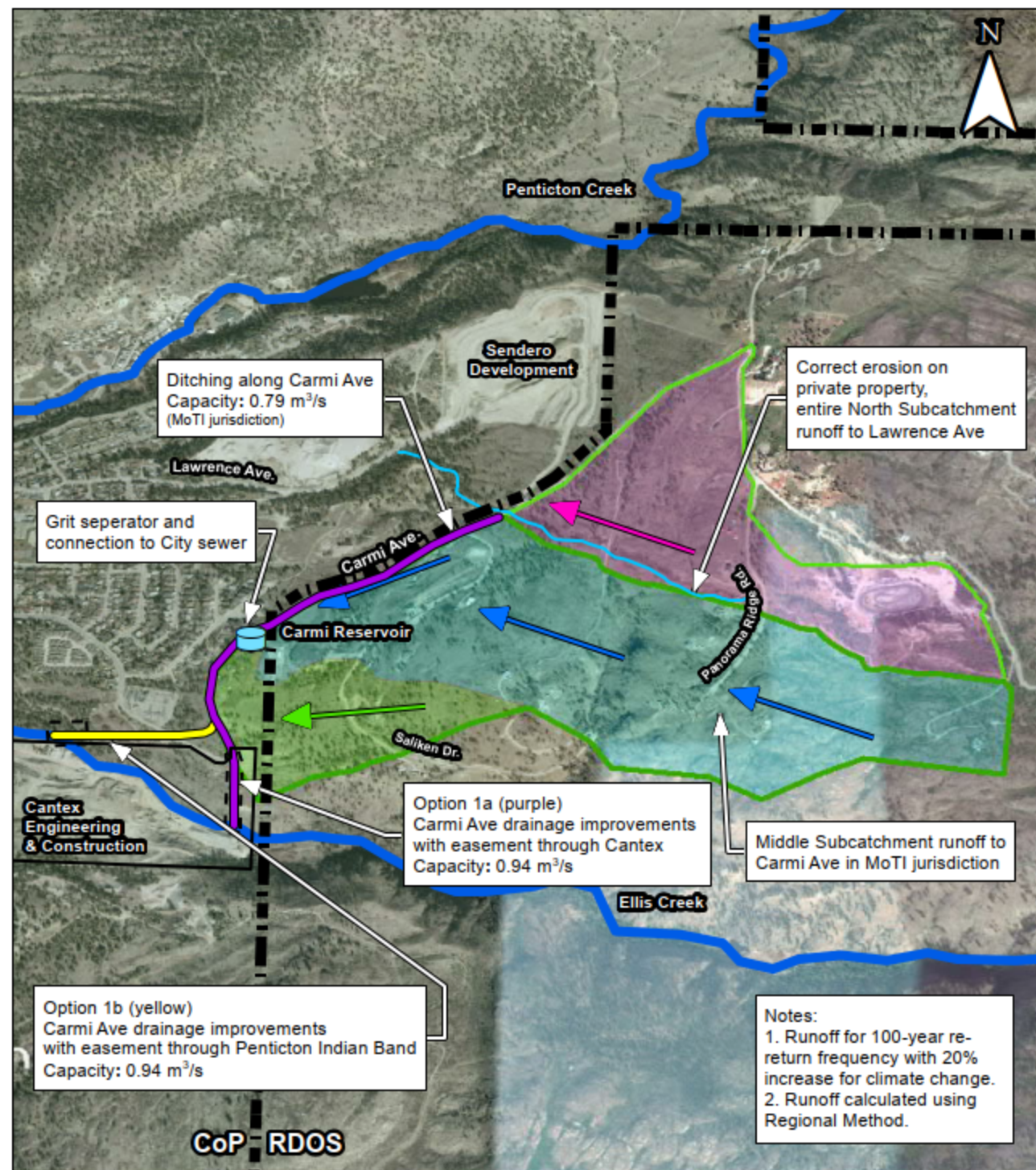


Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-53**

Client: City of Penticton







### Carmi Drainage

Option 1

Figure 4-1

PROJECT NUMBER	REVISION
60580939	0

#### Legend

- North Subcatchment
- Middle Subcatchment
- South Subcatchment
- Catchment Boundary
- City Boundary
- Easement

City of Penticton  
Carmi Drainage

#### Conceptual Level Capital Cost Estimate

Option 1a

Item	Description	Phase	Quantity	Unit	Unit Price	Extension (\$)
1.0	General Requirements					
1.1	Mobilization and Demobilization	All	1	LS	\$ 25,000	25,000
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	All	1	LS	\$ 50,000	50,000
1.3	Survey and Record Drawings	All	1	LS	\$ 10,000	10,000
1.4	Traffic Management	All	1	LS	\$ 8,000	8,000
Total 1.0 - General Requirements						93,000
2.0	Drainage Works (Channels, Pipes, etc.)					
2.1	Drainage Channels					
2.1.1	Private Property; Correct Erosion	1	1	LS	\$ 20,000	20,000
2.1.2	Upgrades Along Carmi Ave North of Carmi Reservoir	3	800	lin.m.	\$ 150	120,000
2.1.3	Resurface of Carmi Ave, asphalt, gravels; 9 m width	3	500	lin.m.	\$ 700	350,000
2.1.4	Ditching along east side of Carmi Ave	3	500	lin.m.	\$ 200	100,000
2.1.5	Rock removal allowance	3	1	LS	\$ 50,000	50,000
2.1.6	Drainage Channel through Cantex to Ellis Creek	3	230	lin.m.	\$ 300	69,000
2.2	Buried Pipe					
2.2.1	Culvert at 1760 Carmi Avenue, 750 mm	3	15	lin.m.	\$ 1,200	18,000
2.2.1	Hydrodynamic Separator w/ Connection to City Sewer	2	1	LS	\$ 100,000	100,000
Total 2.0 - Drainage Works (Channels, Pipes, etc.)						827,000
3.0	Land Acquisition					
3.1	Easement through Cantex Engineering and Construction	3	1	LS	\$ 50,000	50,000
Total 3.0 - Land Acquisition						50,000
Sub-Total						\$ 970,000
Professional Services (estimate at approximately 15%)						\$ 150,000
Construction Contingency (approximately 25%)						\$ 240,000
TOTAL ESTIMATED CAPITAL COST						\$ 1,360,000
ESTIMATED PHASED COST (incl. 40% markup)						
		Subtotal		Small Proj. Premium		Project Cost
Phase 1 - Private Property Erosion		\$ 42,000		\$ 25,000		\$ 67,000
Phase 2 - Hydrodynamic Separator		\$ 154,000		\$ 35,000		\$ 189,000
Phase 3 - Carmi Avenue Drainage Improvements		\$ 1,158,000		\$ 115,000		\$ 1,273,000
PHASED APPROACH TOTAL ESTIMATED CAPITAL COST		\$ 1,360,000				\$ 1,530,000

1. Class D cost estimates to be used for options comparison.
2. Report outlines phasing for Option 1a.

19-Dec-18



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## STM-54 Carmi Road Major System Upgrades Stormwater Master Plan

0 1,900 3,800  
Meters

Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-54**

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-876-1631	SWMH-876	SWMH-1631	Upsize Existing Main	750	900	30	\$ 2,000	\$ 59,210
SWGM-877-876	SWMH-877	SWMH-876	Upsize Existing Main	750	900	110	\$ 2,000	\$ 220,820
SWGM-878-877	SWMH-878	SWMH-877	Upsize Existing Main	750	900	28	\$ 2,000	\$ 55,578
SWGM-879-878	SWMH-879	SWMH-878	Upsize Existing Main	750	900	12	\$ 2,000	\$ 24,624
SWGM-880-879	SWMH-880	SWMH-879	Upsize Existing Main	750	900	103	\$ 2,000	\$ 206,432
SWGM-881-880	SWMH-881	SWMH-880	Upsize Existing Main	750	900	89	\$ 2,000	\$ 177,558
SWGM-882-881	SWMH-882	SWMH-881	Upsize Existing Main	750	900	94	\$ 2,000	\$ 188,994
STM-55 Total						467	\$	933,216

Legend

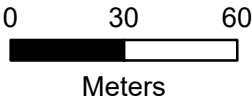
- ★ Discharge Point
- Storm Manhole
- Detention Pond
- Existing Gravity Main
- ➔ Proposed Project
- Open Channel
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse



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STM-55 South Main Street Improvements  
Stormwater Master Plan

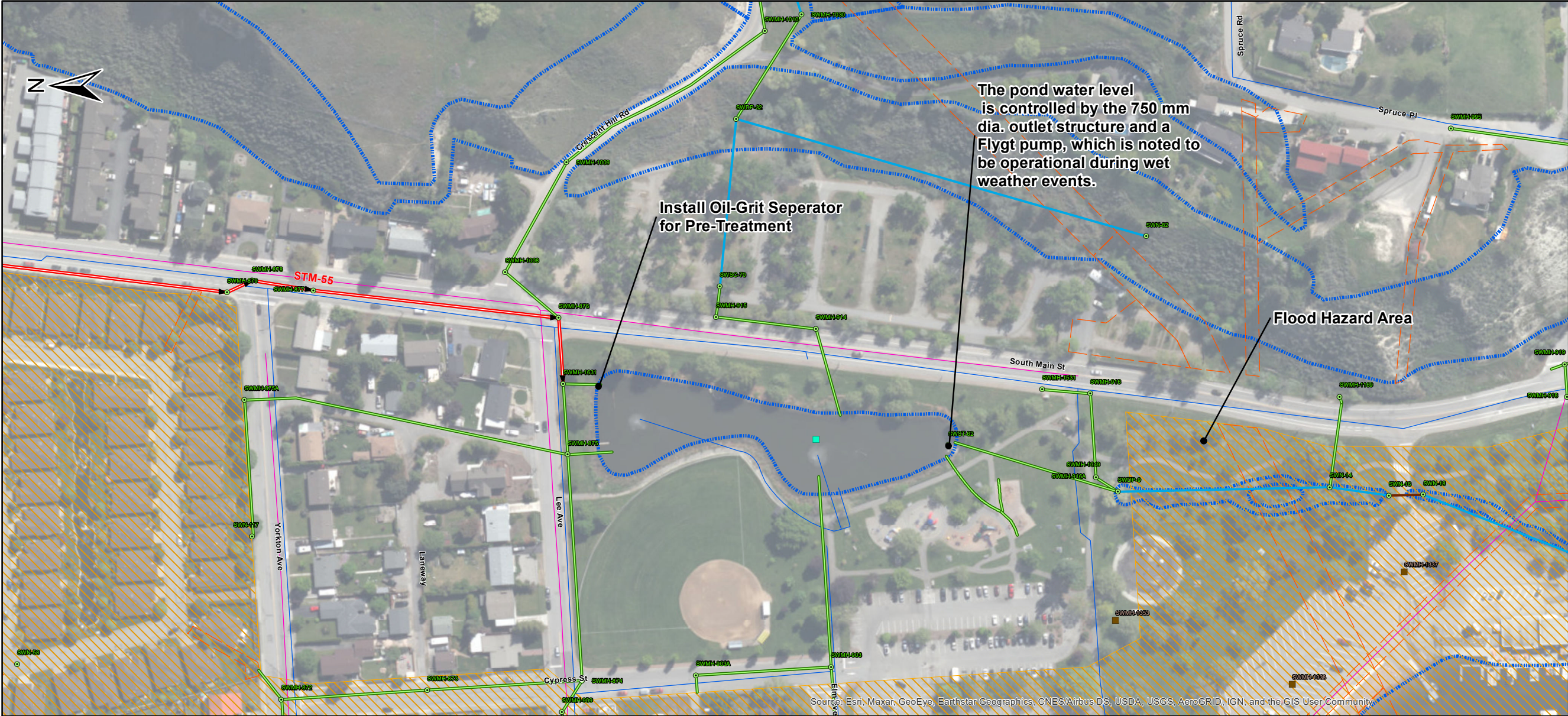


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-55

Client: City of Penticton







STM-56



**Project Name:** Skaha Lake Drainage Pond - Sediment Removal  
**Project Number:** STM-56

**Project Timeline:** 5 to 10 Year  
**Project Priority:** Medium  
**Estimated Cost (\$ 2021):** \$ 70,800  
**Upgrade Driver:** Asset Age  
**Development Cost Charges:** N/A

**DESIGN CONSIDERATIONS**  
The model results indicate the original design does not provide adequate storage for the major (100-year) design storm event. This is largely due to the use of future design storm (which incorporates the impact of climate change).

Urban runoff has been identified as one of the main sources contributing to the deterioration of water quality in receiving waterbodies. Stormwater runoff from urbanized areas commonly contains a wide range of contaminants including suspended solids, nutrients and heavy metals at concentrations significant higher than runoff from undeveloped watersheds. As such, and to maintain the original design performance, sediment removal should be considered given the pond was originally constructed in the 1980s. A pre-treatment Oil-Grit separator is also recommended as part of this project to enhance water quality treatment. Sediment levels can be measured prior to implementation, to validate the proposed project.

This project will improve downstream water quality discharging to Skaha Lake. This project can be done in conjunction with low priority projects STM-55 or planned park improvements which benefit the local community. There is a potential opportunity to reconstruct the existing asphalt recreational path around the pond in conjunction with this project, if required.

**COST CONSIDERATIONS**  
This is a major system project to restore the pond to the original design condition. DCC costs are not applicable for this upgrade.

**ENVIRONMENTAL CONCERNS**  
- Ponds serve as habitat for Painted Turtles  
- Mitigate impact on aquatic and terrestrial species

ITEM	DESCRIPTION	COST (2021 \$)
1.0	General Requirements	
1.1	Mobilization and Demobilization	\$ 3,000
1.2	Bonding, Insurance, Profit, Soft Costs, Etc.	\$ 2,000
1.3	Traffic Management	\$ 5,000
2.0	Earthworks	
2.1	Sediment Removal and Disposal	\$ 30,000
3.0	Surface Restoration	
3.1	Trench Path Restoration (4.0 m width)	\$ 10,500
3.2	Full Width Restoration	-
4.0	Land Acquisition	
4.1	Acquire Easements	-
4.2	Acquire Property	-
SUBTOTAL		\$ 50,500
5.0	Professional Services and Contingencies	
5.1	Professional Services (15% of Subtotal)	\$ 7,600
5.2	Construction Contingency (25% of Subtotal)	\$ 12,700
TOTAL ESTIMATED COST		\$ 70,800

Legend

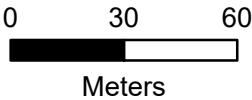
- Storm Manhole
- Dry Well
- Detention Pond
- Existing Gravity Main
- Nearby Projects
- Open Channel
- Culvert
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse



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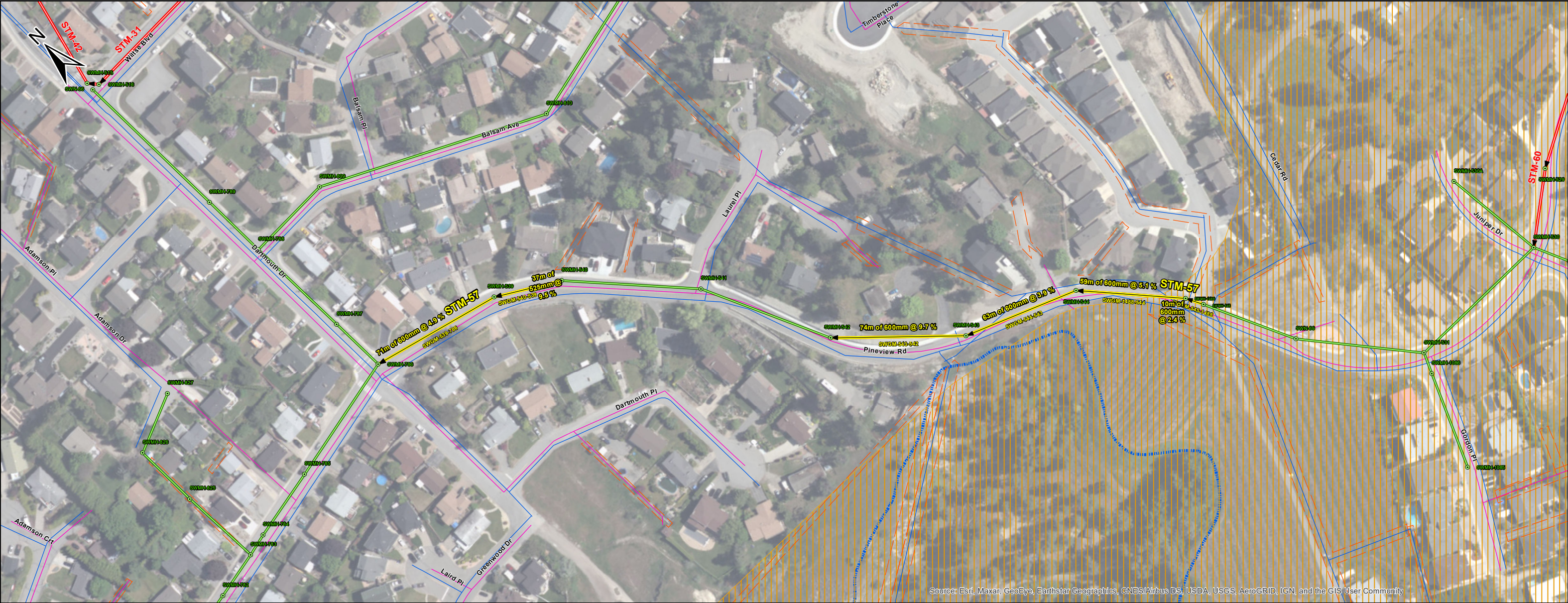
STM-56 Skaha Lake Drainage Pond  
Stormwater Master Plan



Project No.: 20M-00462-00  
Date: Apr 2021  
Figure No.: F-56







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1488-544	SWMH-1488	SWMH-544	Upsize Existing Main	450	600	59	\$ 1,500	\$ 88,262
SWGM-539-786	SWMH-539	SWMH-786	Upsize Existing Main	450	600	71	\$ 1,500	\$ 106,857
SWGM-540-539	SWMH-540	SWMH-539	Upsize Existing Main	450	525	37	\$ 1,300	\$ 47,984
SWGM-543-542	SWMH-543	SWMH-542	Upsize Existing Main	450	600	74	\$ 1,500	\$ 110,628
SWGM-544-543	SWMH-544	SWMH-543	Upsize Existing Main	450	600	63	\$ 1,500	\$ 94,781
SWGM-545-1488	SWMH-545	SWMH-1488	Upsize Existing Main	450	600	10	\$ 1,500	\$ 14,957
STM-57 Total						314	\$	463,468

Legend

Storm Manhole

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

Sanitary Main

City Easement

Hazard Area

Watercourse

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PENTICTON IIMP

STM-57 Pineview Drive Improvements

Stormwater Master Plan

03060

Meters

Project No.:  
20M-00462-00

Date:  
Apr 2021

Figure No.:  
F-57

Client: City of Penticton

CITY OF

Penticton





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-111	SWMH-1529	SWMH-1523	New Main	-	250	101	\$ 800	\$ 80,706
P-SWL-112	SWMH-1528	SWMH-1529	New Main	-	250	102	\$ 800	\$ 81,505
P-SWL-96	SWMH-1523	SWMH-444	New Main	-	375	204	\$ 1,050	\$ 214,592
SWGM-443-442	SWMH-443	SWMH-442	Upsize Existing Main	900	1050	131	\$ 2,300	\$ 301,102
SWGM-444-443	SWMH-444	SWMH-443	Upsize Existing Main	900	1050	37	\$ 2,300	\$ 84,008
SWGM-449-448	SWMH-449	SWMH-448	Upsize Existing Main	525	600	83	\$ 1,500	\$ 124,307
SWGM-450-449	SWMH-450	SWMH-449	Upsize Existing Main	525	600	85	\$ 1,500	\$ 127,542
SWGM-451-450	SWMH-451	SWMH-450	Upsize Existing Main	525	600	62	\$ 1,500	\$ 93,321
SWGM-452-451	SWMH-452	SWMH-451	Upsize Existing Main	525	600	89	\$ 1,500	\$ 133,295
SWGM-453-452	SWMH-453	SWMH-452	Upsize Existing Main	375	525	78	\$ 1,300	\$ 100,786
SWGM-454-453	SWMH-454	SWMH-453	Upsize Existing Main	375	525	73	\$ 1,300	\$ 94,604
SWGM-455-454	SWMH-455	SWMH-454	Upsize Existing Main	375	450	68	\$ 1,100	\$ 74,645
SWGM-456-455	SWMH-456	SWMH-455	Upsize Existing Main	375	450	73	\$ 1,100	\$ 80,746
SWGM-469-468	SWMH-469	SWMH-468	Upsize Existing Main	250	300	25	\$ 900	\$ 22,835
STM-58 Total						1210	\$	1,613,992

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

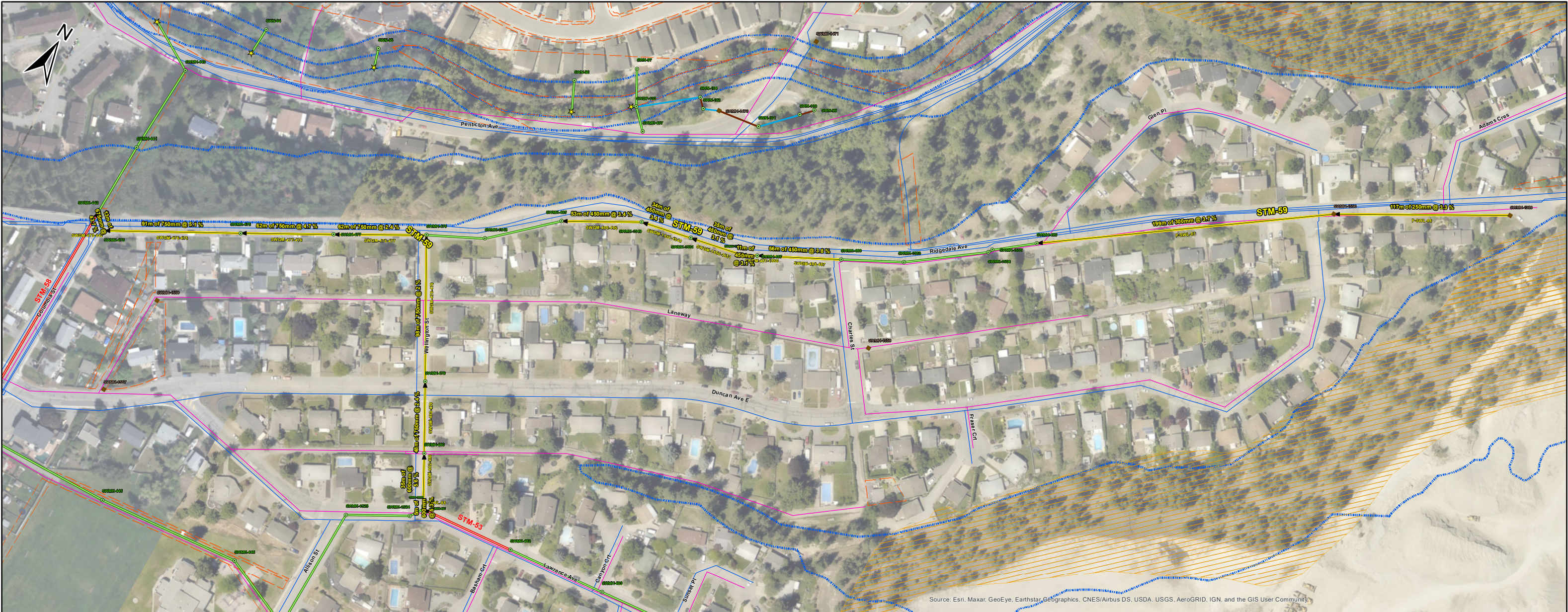
Sanitary Main

City Easement

Hazard Area

Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-85	SWMH-481	SWN-3000	New Main	-	600	5	\$ 1,500	\$ 7,344
P-SWL-86	SWMH-1389	SWMH-1556	New Main	-	250	117	\$ 800	\$ 93,342
P-SWL-87	SWMH-1556	SWMH-490	New Main	-	300	200	\$ 900	\$ 180,298
SWGM-1550-1551	SWMH-1550	SWMH-1551	Upsize Existing Main	375	450	35	\$ 1,100	\$ 38,590
SWGM-1551-1549	SWMH-1551	SWMH-1549	Upsize Existing Main	375	450	34	\$ 1,100	\$ 37,708
SWGM-475-442	SWMH-475	SWMH-442	Upsize Existing Main	525	675	13	\$ 1,650	\$ 21,803
SWGM-476-475	SWMH-476	SWMH-475	Upsize Existing Main	525	750	91	\$ 1,800	\$ 163,165
SWGM-477-476	SWMH-477	SWMH-476	Upsize Existing Main	525	750	62	\$ 1,800	\$ 111,251
SWGM-478-477	SWMH-478	SWMH-477	Upsize Existing Main	525	750	62	\$ 1,800	\$ 111,326
SWGM-479-478	SWMH-479	SWMH-478	Upsize Existing Main	450	750	98	\$ 1,800	\$ 175,948
SWGM-480-479	SWMH-480	SWMH-479	Upsize Existing Main	375	750	48	\$ 1,800	\$ 85,975
SWGM-486-485	SWMH-1549	SWMH-485	Upsize Existing Main	375	450	53	\$ 1,100	\$ 58,740
SWGM-487-1550	SWMH-487	SWMH-1550	Upsize Existing Main	375	450	11	\$ 1,100	\$ 11,972
SWGM-488-487	SWMH-488	SWMH-487	Upsize Existing Main	375	450	56	\$ 1,100	\$ 61,607
SWGM-662-480	SWN-3000	SWMH-480	Upsize Existing Main	375	600	35	\$ 1,500	\$ 52,185
STM-59 Total						919	\$	1,211,255

Legend

- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Culvert
- Watermain
- Sanitary Main
- City Easement
- Hazard Area
- Watercourse

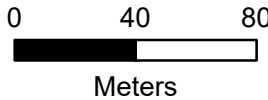


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STM-59 Ridgedale Avenue Upgrades  
Stormwater Master Plan

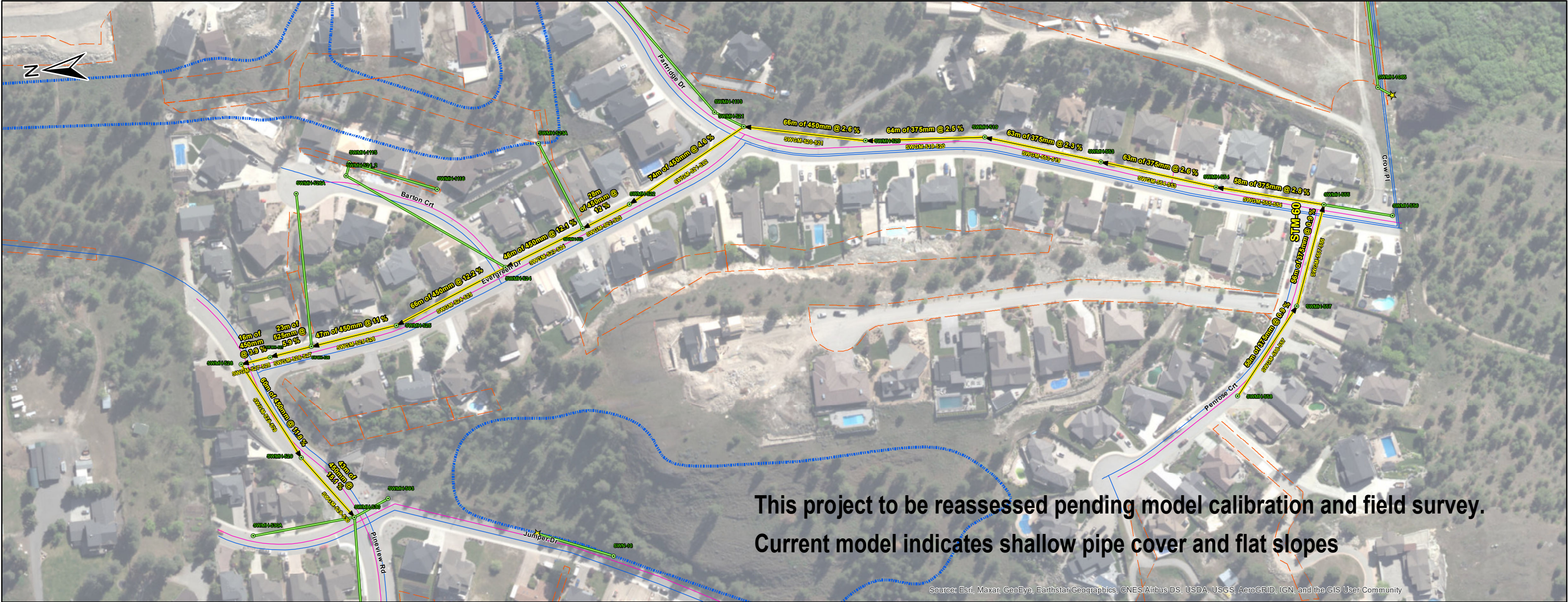


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-59

Client: City of Penticton











PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-519-520	SWMH-519	SWMH-520	Upsize Existing Main	300	375	64	\$ 1,050	\$ 66,695
SWGM-520-521	SWMH-520	SWMH-521	Upsize Existing Main	375	450	66	\$ 1,100	\$ 72,785
SWGM-521-522	SWMH-521	SWMH-522	Upsize Existing Main	375	450	74	\$ 1,100	\$ 81,562
SWGM-522-523	SWMH-522	SWMH-523	Upsize Existing Main	375	450	28	\$ 1,100	\$ 30,961
SWGM-523-524	SWMH-523	SWMH-524	Upsize Existing Main	200	450	46	\$ 1,100	\$ 50,556
SWGM-524-525	SWMH-524	SWMH-525	Upsize Existing Main	200	450	66	\$ 1,100	\$ 72,260
SWGM-525-526	SWMH-525	SWMH-526	Upsize Existing Main	200	450	47	\$ 1,100	\$ 51,343
SWGM-526-527	SWMH-526	SWMH-527	Upsize Existing Main	200	525	23	\$ 1,300	\$ 29,578
SWGM-527-528	SWMH-527	SWMH-528	Upsize Existing Main	200	450	16	\$ 1,100	\$ 17,317
SWGM-528-529	SWMH-528	SWMH-529	Upsize Existing Main	375	450	60	\$ 1,100	\$ 65,584
SWGM-529-530	SWMH-529	SWMH-530	Upsize Existing Main	375	450	43	\$ 1,100	\$ 47,276
SWGM-553-519	SWMH-553	SWMH-519	Upsize Existing Main	300	375	63	\$ 1,050	\$ 66,311
SWGM-554-553	SWMH-554	SWMH-553	Upsize Existing Main	300	375	63	\$ 1,050	\$ 66,019
SWGM-555-554	SWMH-555	SWMH-554	Upsize Existing Main	200	375	58	\$ 1,050	\$ 61,130
SWGM-557-555	SWMH-557	SWMH-555	Upsize Existing Main	350	375	56	\$ 1,050	\$ 58,568
SWGM-558-557	SWMH-558	SWMH-557	Upsize Existing Main	300	375	58	\$ 1,050	\$ 61,102
STM-60 Total						830	\$	899,044


Legend


 Discharge Point


 Storm Manhole


 Existing Gravity Main

 Proposed Project

 Watermain

 Sanitary Main

 City Easement

 Watercourse





PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1018-1017	SWMH-1018	SWMH-1017	Upsize Existing Main	900	1050	77	\$ 2,300	\$ 176,405
SWGM-1019-746	SWMH-1019	SWMH-746	Upsize Existing Main	750	1050	18	\$ 2,300	\$ 41,628
SWGM-1020-1019	SWMH-1020	SWMH-1019	Upsize Existing Main	750	1050	4	\$ 2,300	\$ 9,200
SWGM-1021-1020	SWMH-1021	SWMH-1020	Upsize Existing Main	750	1050	155	\$ 2,300	\$ 357,181
SWGM-1167-738A	SWMH-1167	SWMH-738A	Upsize Existing Main	300	450	67	\$ 1,100	\$ 73,587
SWGM-732-1021	SWMH-732	SWMH-1021	Upsize Existing Main	750	1050	38	\$ 2,300	\$ 87,690
SWGM-733-732	SWMH-733	SWMH-732	Upsize Existing Main	450	750	100	\$ 1,800	\$ 179,298
SWGM-734-733	SWMH-734	SWMH-733	Upsize Existing Main	450	1050	75	\$ 2,300	\$ 171,401
SWGM-735-734	SWMH-735	SWMH-734	Upsize Existing Main	450	1050	43	\$ 2,300	\$ 99,556
SWGM-736-735	SWMH-736	SWMH-735	Upsize Existing Main	450	900	69	\$ 2,000	\$ 137,122
SWGM-737-736	SWMH-737	SWMH-736	Upsize Existing Main	300	750	24	\$ 1,800	\$ 43,625
SWGM-738-737	SWMH-738	SWMH-737	Upsize Existing Main	300	750	122	\$ 1,800	\$ 219,605
SWGM-738A-738	SWMH-738A	SWMH-738	Upsize Existing Main	300	600	36	\$ 1,500	\$ 53,604
SWGM-739-738	SWMH-739	SWMH-738	Upsize Existing Main	300	525	128	\$ 1,300	\$ 166,306
SWGM-740-718	SWMH-740	SWMH-718	Upsize Existing Main	300	750	180	\$ 1,800	\$ 324,023
SWGM-740-736	SWMH-740	SWMH-736	Upsize Existing Main	300	750	92	\$ 1,800	\$ 165,751
SWGM-741-736	SWMH-741	SWMH-736	Upsize Existing Main	250	450	115	\$ 1,100	\$ 126,027
SWGM-742-734	SWMH-742	SWMH-734	Upsize Existing Main	300	600	51	\$ 1,500	\$ 76,563
SWGM-743-742	SWMH-743	SWMH-742	Upsize Existing Main	300	375	59	\$ 1,050	\$ 62,403
SWGM-744-743	SWMH-744	SWMH-743	Upsize Existing Main	250	375	53	\$ 1,050	\$ 55,913
SWGM-746-1018	SWMH-746	SWMH-1018	Upsize Existing Main	900	1050	40	\$ 2,300	\$ 92,458
STM-61 Total						1546		\$ 2,719,344

Legend

Discharge Point

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

Sanitary Main

Sanitary Forcemain

City Easement

Hazard Area

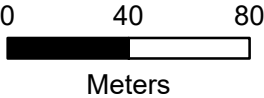
Watercourse



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# STM-61 Waterford Avenue Upgrades Stormwater Master Plan



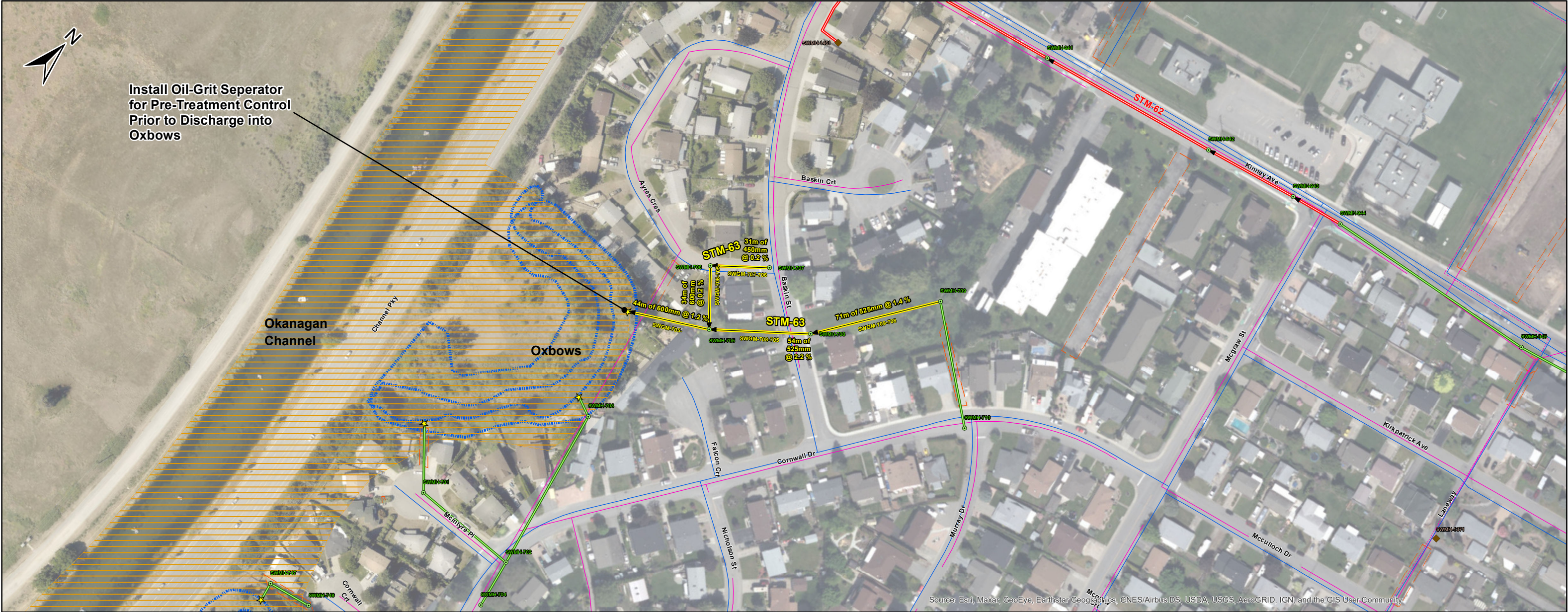
Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-61**











PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-705-	SWMH-705	SWDP-240	Upsize Existing Main	450	600	44	\$ 1,500	\$ 66,293
SWGM-706-705	SWMH-706	SWMH-705	Upsize Existing Main	375	600	34	\$ 1,500	\$ 51,047
SWGM-707-706	SWMH-707	SWMH-706	Upsize Existing Main	300	450	31	\$ 1,100	\$ 34,625
SWGM-708-705	SWMH-708	SWMH-705	Upsize Existing Main	250	525	54	\$ 1,300	\$ 70,203
SWGM-709-708	SWMH-709	SWMH-708	Upsize Existing Main	375	525	71	\$ 1,300	\$ 92,459
STM-63 Total						235	\$	314,625

Legend

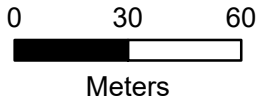
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Hazard Area
- Watercourse



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STM-63 Baskin Street Upgrades  
Stormwater Master Plan

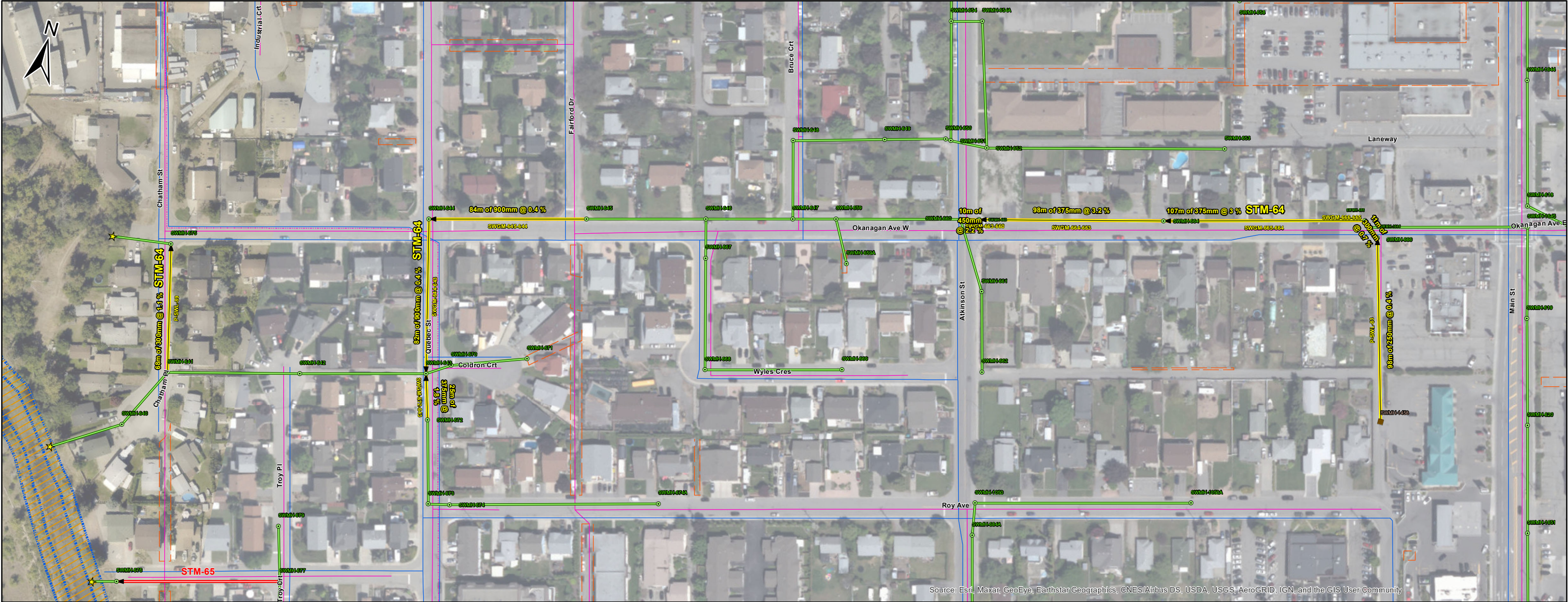


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-63

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
P-SWL-83	SWMH-1458	SWMH-666	New Main	-	250	98	\$ 800	\$ 78,271
P-SWL-89	SWMH-641	SWMH-675	New Main	-	300	68	\$ 900	\$ 61,620
SWGM-644-643	SWMH-644	SWMH-643	Upsize Existing Main	750	900	82	\$ 2,000	\$ 164,802
SWGM-645-644	SWMH-645	SWMH-644	Upsize Existing Main	750	900	84	\$ 2,000	\$ 167,996
SWGM-663-660	SWMH-663	SWMH-660	Upsize Existing Main	250	450	10	\$ 1,100	\$ 10,999
SWGM-664-663	SWMH-664	SWMH-663	Upsize Existing Main	300	375	98	\$ 1,050	\$ 103,079
SWGM-665-664	SWMH-665	SWMH-664	Upsize Existing Main	300	375	107	\$ 1,050	\$ 112,441
SWGM-666-665	SWMH-666	SWMH-665	Upsize Existing Main	250	300	11	\$ 900	\$ 10,195
SWGM-672-643	SWMH-672	SWMH-643	Upsize Existing Main	250	375	25	\$ 1,050	\$ 25,812
STM-64 Total						584	\$	735,216

Legend

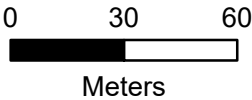
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- ▨ Hazard Area
- ▬ Watercourse



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STM-64 Okanagan Ave. W Improvements  
Stormwater Master Plan

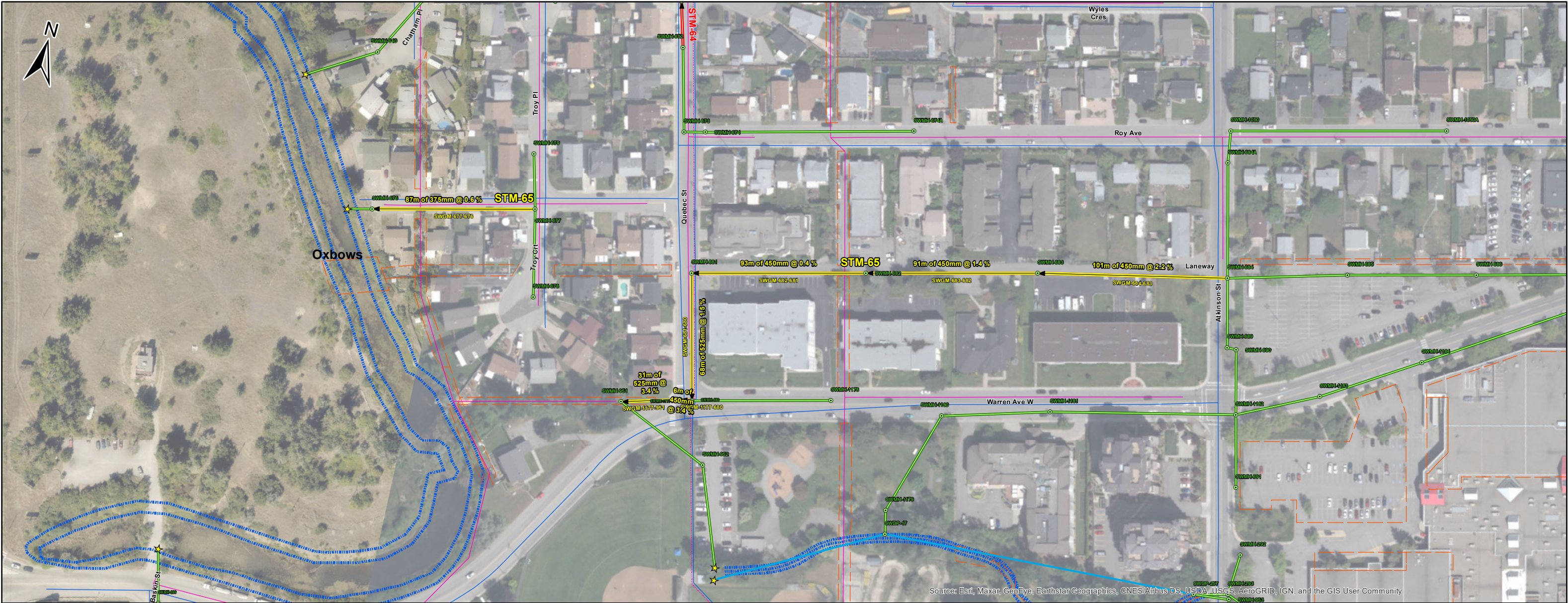


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-64

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1177-680	SWMH-680	SWMH-1177	Upsize Existing Main	300	450	6	\$ 1,100	\$ 6,980
SWGM-1177-951	SWMH-1177	SWMH-951	Upsize Existing Main	300	525	31	\$ 1,300	\$ 40,843
SWGM-677-676	SWMH-677	SWMH-676	Upsize Existing Main	250	375	87	\$ 1,050	\$ 91,138
SWGM-681-680	SWMH-681	SWMH-680	Upsize Existing Main	375	525	68	\$ 1,300	\$ 88,345
SWGM-682-681	SWMH-682	SWMH-681	Upsize Existing Main	300	450	93	\$ 1,100	\$ 102,069
SWGM-683-682	SWMH-683	SWMH-682	Upsize Existing Main	300	450	91	\$ 1,100	\$ 100,562
SWGM-684-683	SWMH-684	SWMH-683	Upsize Existing Main	300	450	101	\$ 1,100	\$ 111,588
STM-65 Total						478		\$ 541,526

Legend

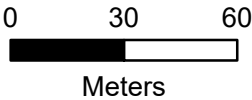
- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Open Channel
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Watercourse



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STM-65 Laneway North of Warren Street Improvements  
Stormwater Master Plan

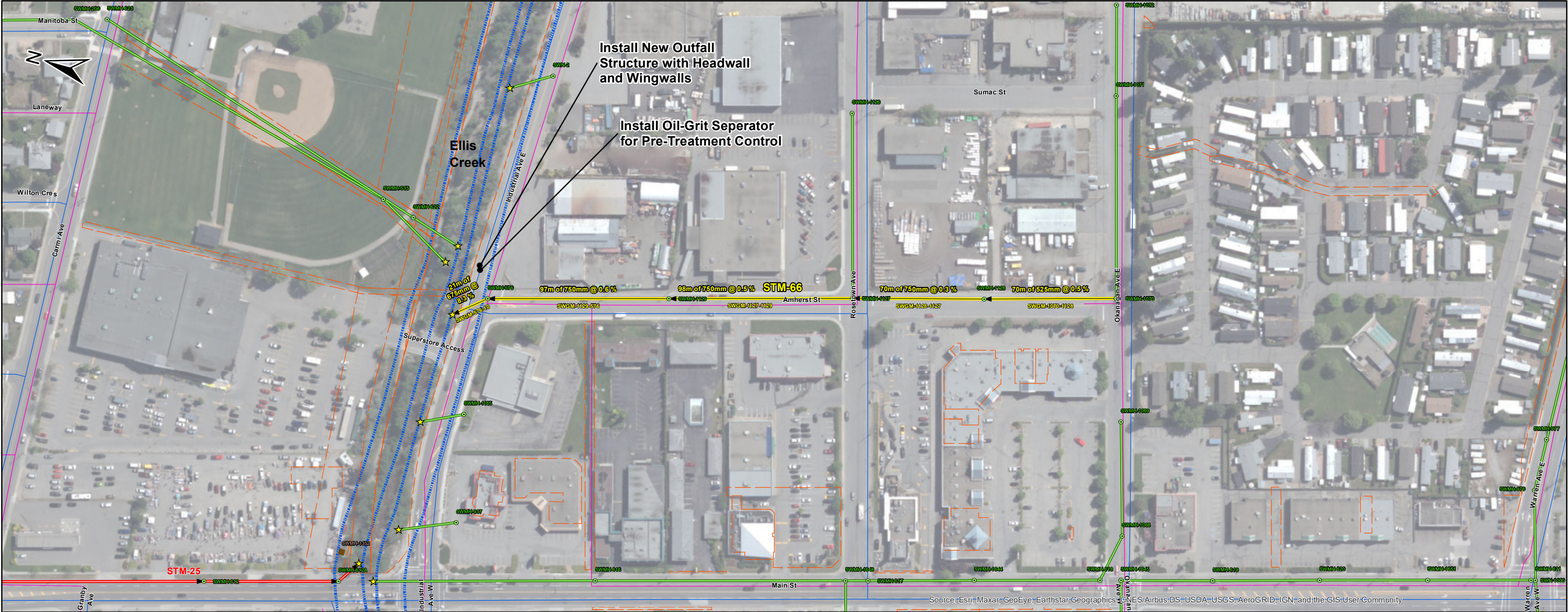


Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-65

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1070-1128	SWMH-1070	SWMH-1128	Upsize Existing Main	300	525	70	\$ 1,300	\$ 91,328
SWGM-1127-1129	SWMH-1127	SWMH-1129	Upsize Existing Main	350	750	98	\$ 1,800	\$ 175,741
SWGM-1128-1127	SWMH-1128	SWMH-1127	Upsize Existing Main	300	750	70	\$ 1,800	\$ 126,155
SWGM-1129-576	SWMH-1129	SWMH-576	Upsize Existing Main	350	750	97	\$ 1,800	\$ 173,905
SWGM-576-10	SWMH-576	SWDP-10	Upsize Existing Main	350	675	21	\$ 1,650	\$ 34,244
STM-66 Total						355	\$	601,373

Legend

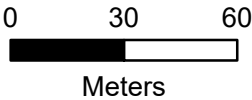
- ★ Discharge Point
- Storm Manhole
- Dry Well
- Existing Gravity Main
- ➡ Proposed Project
- ➡ Nearby Projects
- Watermain
- Sanitary Main
- City Easement
- Watercourse



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STM-66 Amherst Street Upgrades  
Stormwater Master Plan

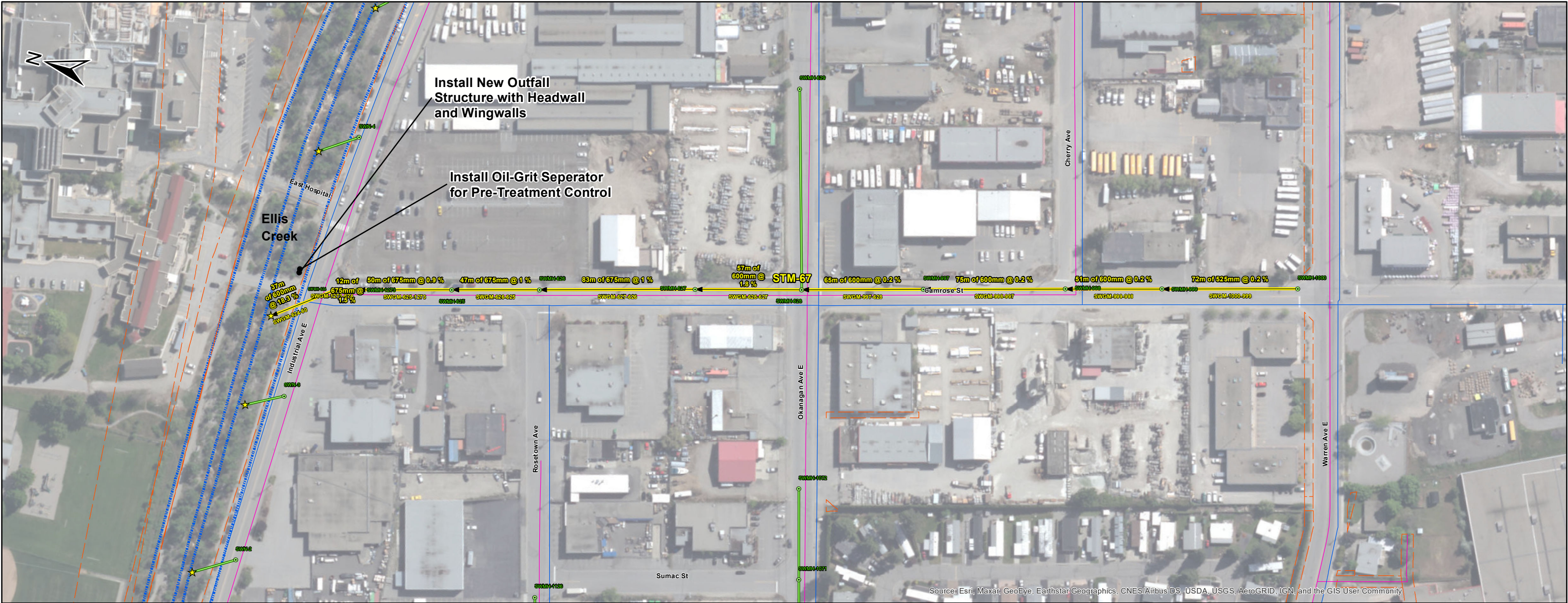


Project No.: 20M-00462-00  
Date: Apr 2021  
Figure No.: F-66

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1000-999	SWMH-1000	SWMH-999	Upsize Existing Main	450	525	72	\$ 1,300	\$ 93,920
SWGM-1273-624	SWMH-1273	SWMH-624	Upsize Existing Main	450	675	12	\$ 1,650	\$ 19,388
SWGM-624-60	SWMH-624	SWDP-60	Upsize Existing Main	450	600	37	\$ 1,500	\$ 56,175
SWGM-625-1273	SWMH-625	SWMH-1273	Upsize Existing Main	450	675	50	\$ 1,650	\$ 82,597
SWGM-626-625	SWMH-626	SWMH-625	Upsize Existing Main	450	675	47	\$ 1,650	\$ 77,151
SWGM-627-626	SWMH-627	SWMH-626	Upsize Existing Main	450	675	83	\$ 1,650	\$ 136,500
SWGM-628-627	SWMH-628	SWMH-627	Upsize Existing Main	450	600	57	\$ 1,500	\$ 85,002
SWGM-997-628	SWMH-997	SWMH-628	Upsize Existing Main	525	600	65	\$ 1,500	\$ 97,392
SWGM-998-997	SWMH-998	SWMH-997	Upsize Existing Main	450	600	75	\$ 1,500	\$ 113,247
SWGM-999-998	SWMH-999	SWMH-998	Upsize Existing Main	450	600	51	\$ 1,500	\$ 77,249
STM-67 Total						550	\$	838,619

Legend

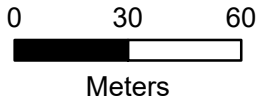
- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- ➡ Proposed Project
- Watermain
- Sanitary Main
- City Easement
- Watercourse



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STM-67 Camrose Street Upgrades  
Stormwater Master Plan

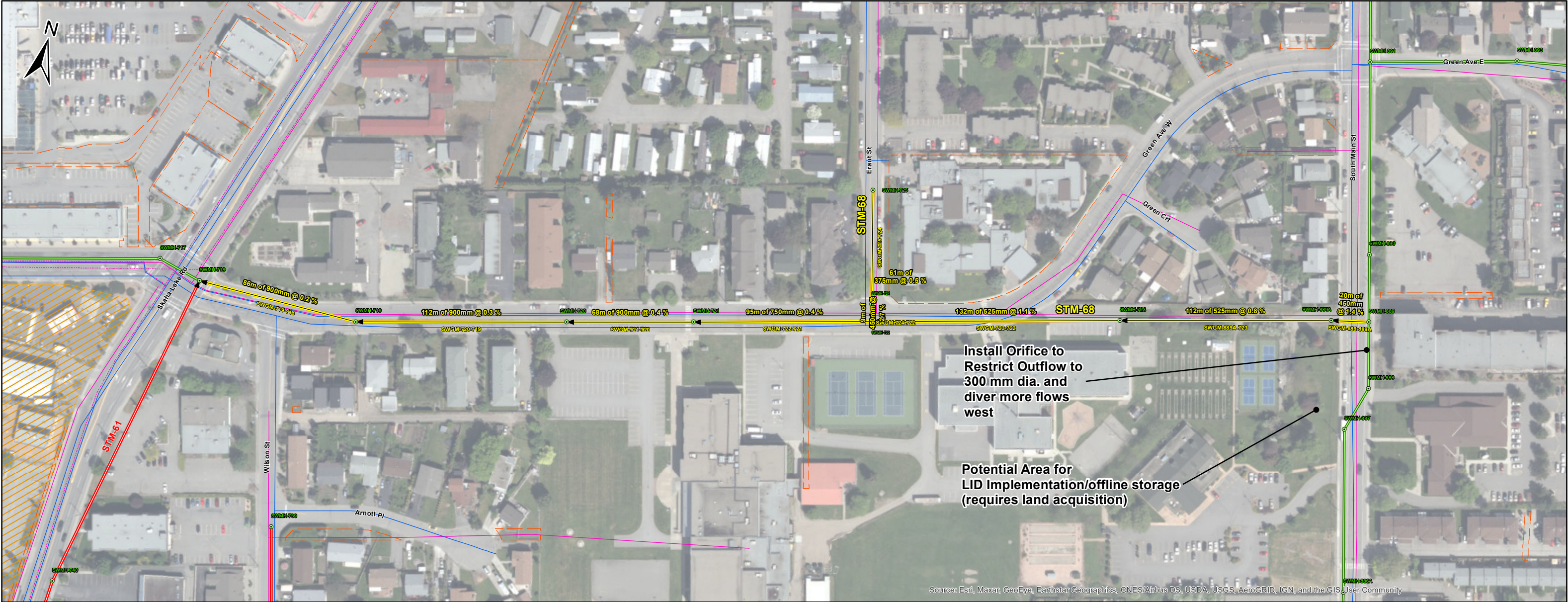


Project No.: 20M-00462-00  
Date: Apr 2021  
Figure No.: F-67

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-719-718	SWMH-719	SWMH-718	Upsize Existing Main	450	900	86	\$ 2,000	\$ 171,950
SWGM-720-719	SWMH-720	SWMH-719	Upsize Existing Main	450	900	112	\$ 2,000	\$ 224,404
SWGM-721-720	SWMH-721	SWMH-720	Upsize Existing Main	450	900	68	\$ 2,000	\$ 135,228
SWGM-722-721	SWMH-722	SWMH-721	Upsize Existing Main	450	750	95	\$ 1,800	\$ 170,537
SWGM-723-722	SWMH-723	SWMH-722	Upsize Existing Main	450	525	132	\$ 1,300	\$ 171,948
SWGM-724-722	SWMH-724	SWMH-722	Upsize Existing Main	250	450	9	\$ 1,100	\$ 10,019
SWGM-725-724	SWMH-725	SWMH-724	Upsize Existing Main	300	375	61	\$ 1,050	\$ 63,843
SWGM-889-889A	SWMH-889	SWMH-889A	Upsize Existing Main	300	450	20	\$ 1,100	\$ 21,999
SWGM-889A-723	SWMH-889A	SWMH-723	Upsize Existing Main	450	525	112	\$ 1,300	\$ 146,020
STM-68 Total						695	\$	1,115,949

Legend

- Storm Manhole
- Existing Gravity Main
- Proposed Project
- Nearby Projects
- Watermain
- Sanitary Main
- Sanitary Forcemain
- City Easement
- Hazard Area

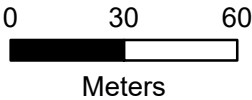


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STM-68 Green Avenue W. Upgrades  
Stormwater Master Plan

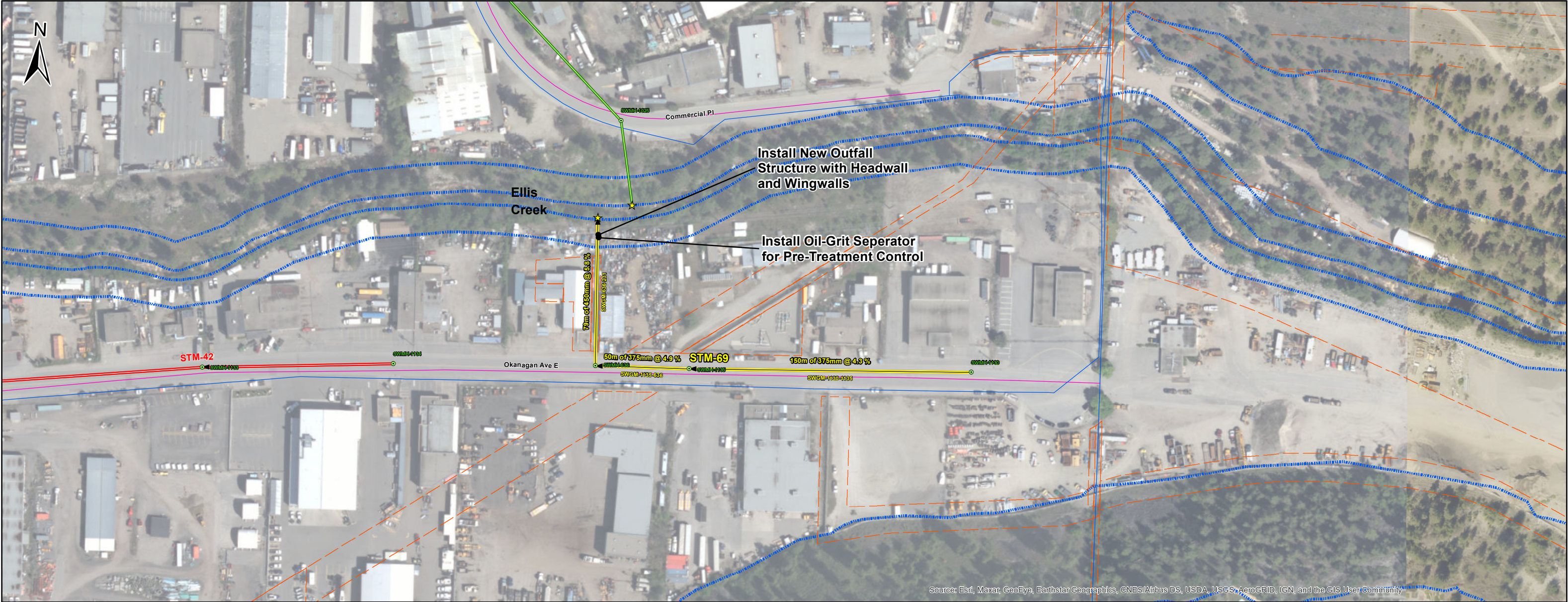


Project No.:  
**20M-00462-00**  
Date:  
**Apr 2021**  
Figure No.:  
**F-68**

Client: City of Penticton







Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- ★ Discharge Point
- Storm Manhole
- Existing Gravity Main
- ➡ Proposed Project
- ➡ Nearby Projects
- Watermain
- Sanitary Main
- City Easement
- Watercourse

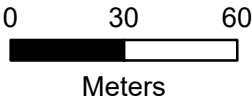
PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)
SWGM-1130-1135	SWMH-1130	SWMH-1135	Upsize Existing Main	300	375	150	\$ 1,050	\$ 157,833
SWGM-1135-636	SWMH-1135	SWMH-636	Upsize Existing Main	300	375	50	\$ 1,050	\$ 52,383
SWGM-636-231	SWMH-636	SWDP-231	Upsize Existing Main	300	450	79	\$ 1,100	\$ 86,896
STM-69 Total						279	\$	297,112



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STM-69 Okanagan Avenue E. Upgrades  
Stormwater Master Plan



Project No.:  
20M-00462-00  
Date:  
Apr 2021  
Figure No.:  
F-69

Client: City of Penticton







PIPE ID	INLET NODE	OUTLET NODE	DESCRIPTION	EX. DIA. (mm)	PROP. DIA. (mm)	LENGTH (m)	UNIT COST (2021 \$)	TOTAL COST (2021 \$)	
SWGM-1034-971	SWMH-1034	SWMH-971	Upsize Existing Main	300	600	83	\$ 1,500	\$	124,781
SWGM-1035-1034	SWMH-1035	SWMH-1034	Upsize Existing Main	300	525	64	\$ 1,300	\$	83,292
SWGM-1036-1035	SWMH-1036	SWMH-1035	Upsize Existing Main	300	450	118	\$ 1,100	\$	129,438
SWGM-1037-1036	SWMH-1037	SWMH-1036	Upsize Existing Main	300	450	123	\$ 1,100	\$	134,995
SWGM-1038-1037	SWMH-1038	SWMH-1037	Upsize Existing Main	300	375	94	\$ 1,050	\$	98,571
SWGM-1039-1038	SWMH-1039	SWMH-1038	Upsize Existing Main	300	375	78	\$ 1,050	\$	81,759
SWGM-1040-1039	SWMH-1040	SWMH-1039	Upsize Existing Main	300	375	90	\$ 1,050	\$	94,754
SWGM-965-961	SWMH-965	SWMH-961	Upsize Existing Main	450	750	32	\$ 1,800	\$	57,598
SWGM-966-965	SWMH-966	SWMH-965	Upsize Existing Main	450	750	10	\$ 1,800	\$	18,000
SWGM-967-966	SWMH-967	SWMH-966	Upsize Existing Main	250	750	45	\$ 1,800	\$	80,458
SWGM-968-967	SWMH-968	SWMH-967	Upsize Existing Main	250	750	50	\$ 1,800	\$	90,538
SWGM-969-968	SWMH-969	SWMH-968	Upsize Existing Main	250	750	80	\$ 1,800	\$	143,996
SWGM-970-969	SWMH-970	SWMH-969	Upsize Existing Main	250	750	4	\$ 1,800	\$	6,302
SWGM-971-970	SWMH-971	SWMH-970	Upsize Existing Main	250	750	79	\$ 1,800	\$	142,736
SWGM-972-965	SWMH-972	SWMH-965	Upsize Existing Main	200	375	10	\$ 1,050	\$	10,334
SWGM-973-972	SWMH-973	SWMH-972	Upsize Existing Main	200	300	65	\$ 900	\$	58,809
SWGM-974-973	SWMH-974	SWMH-973	Upsize Existing Main	200	300	52	\$ 900	\$	46,571
SWGM-975-974	SWMH-975	SWMH-974	Upsize Existing Main	200	300	41	\$ 900	\$	36,525
STM-70 Total						1117		\$	1,439,458

Legend

Storm Manhole

Dry Well

Existing Gravity Main

Proposed Project

Nearby Projects

Watermain

Sanitary Main

City Easement

Watercourse