

TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
October 6, 2023

7.2.7 Assignment 60-20

Assignment solutions include sewers south of Huntingwood Dr, north of Montgomery Ave discharging into Highland Creek (including Midland Ave, Havendale Rd, Scotland Rd, Emmeline Cres and Stubbswood Sq). Three alternative solutions have been identified to mitigate surface and basement flood risk within the assignment area.

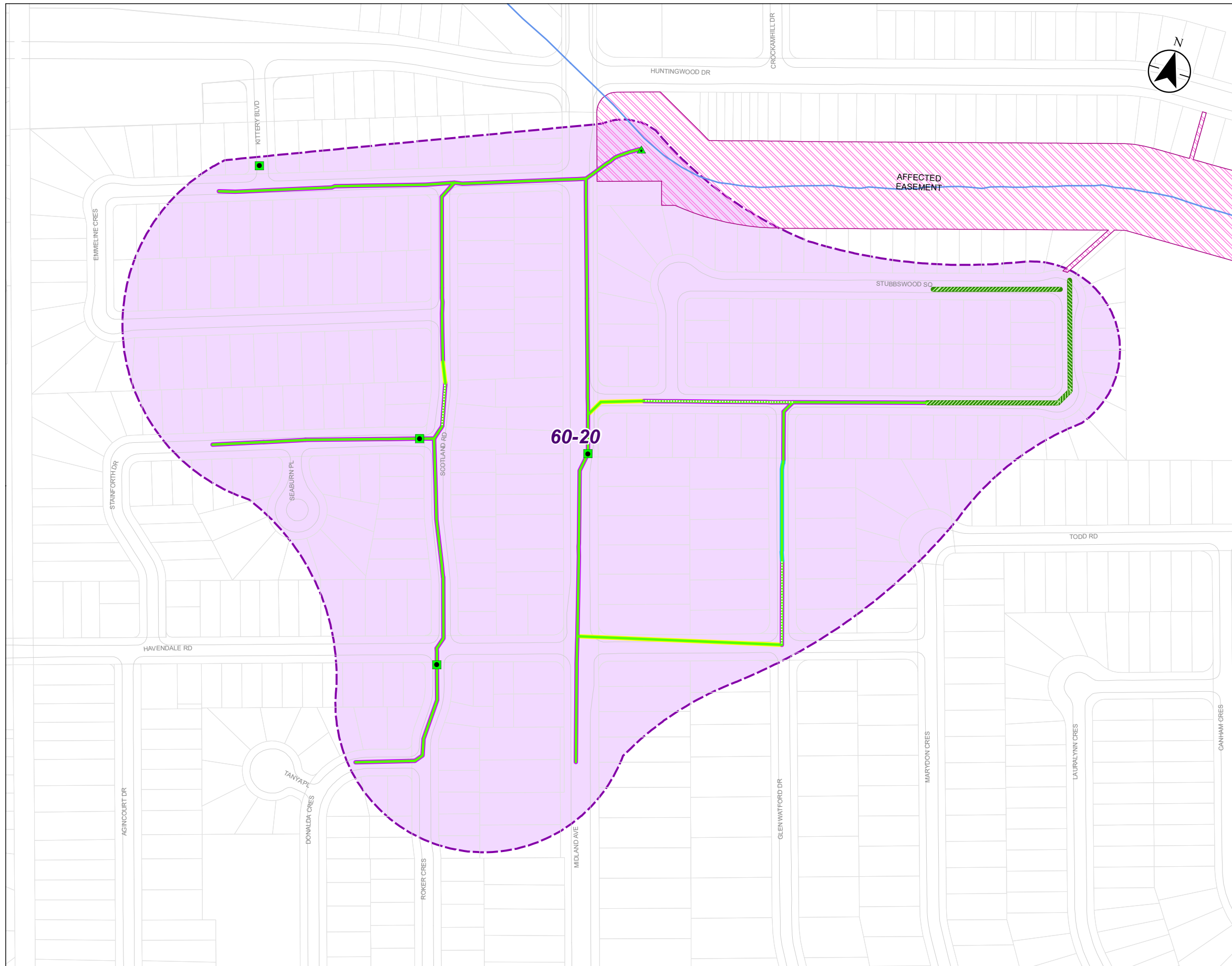
7.2.7.1 Alternative 1

Alternative 1 utilizes conveyance upgrades, sewer/flow redirection, in-line storage, and an outfall upgrade on City property to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—20** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades;
- Redirect storm flow from Stubbswood Sq and Glen Watford Dr west towards Midland Ave;
- New storm sewers on Havendale Rd between Glen Watford Dr and Midland Ave;
- Provide in-line storm storage on Stubbswood Sq upstream of easement;
- Realign and redirect storm sewers on Scotland Rd north from Stainforth Dr towards Emmeline Cres;
- Outfall upgrade in City-owned property; and,
- Realign sanitary and storm sewers to achieve required hydraulic separation.

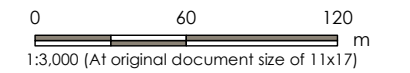


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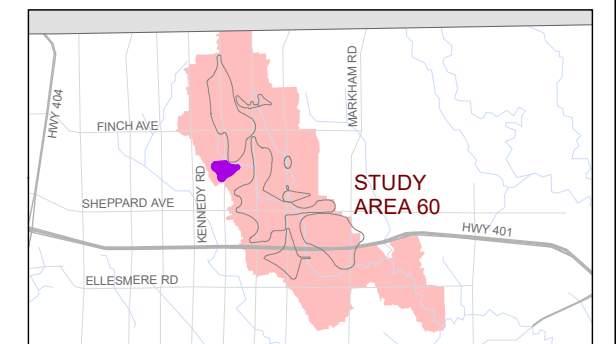


Legend

- Study Area
- Assignment Area
- Proposed Storm Solutions**
- Increase Inlet Capacity
- Upgrade Outfall
- New
- Replace
- Upgrade
- Realign and Upgrade
- Inline Storage
- Affected Easement



- Notes**
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Project Location: City of Toronto
 165660138 REVA
 Prepared by KDB on 2023-07-19

Client/Project
 CITY OF TORONTO
 BASEMENT FLOODING CAPACITY STUDIES
 BUNDLE F - STUDY AREA 60

Figure No.
7.20

Title
**Alternative 1 Solutions for
 Assignment 60-20**

TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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7.2.7.2 Alternative 2

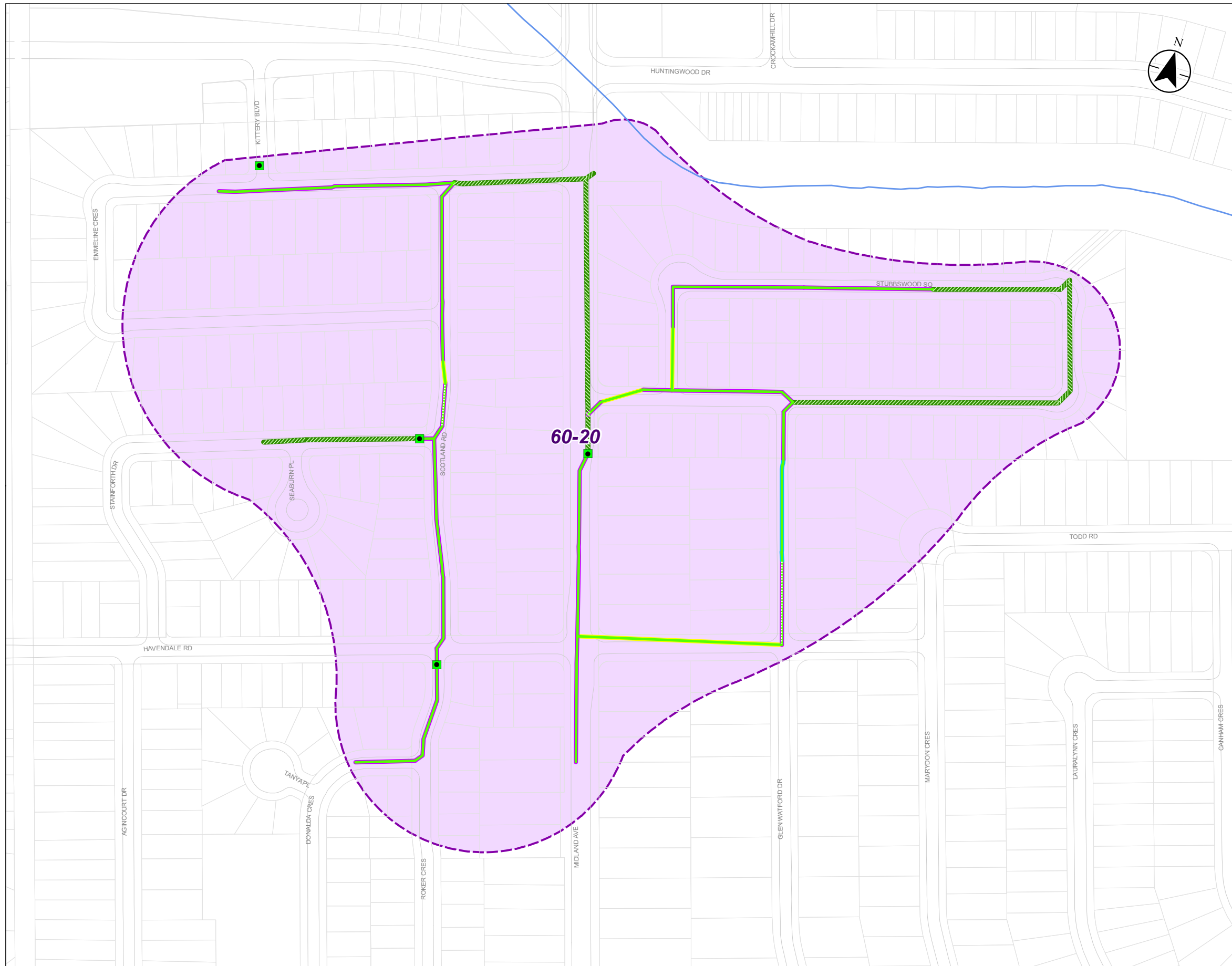
Alternative 2 utilizes conveyance upgrades, sewer/flow redirection, and in-line storage to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule A/A+.

Refer to **Figure 7—21** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades;
- New storm sewers on Havendale Rd between Glen Watford Dr and Midland Ave;
- Provide in-line storm storage along:
 - Midland Ave;
 - Emmeline Cres;
 - Stainforth Dr upstream of the outfall pipe;
 - Stubbswood Sq upstream of easement;
- Realign and redirect storm sewers on:
 - Scotland Rd north from Stainforth Dr towards Emmeline Cres;
 - Glen Watford Dr north of Havendale Rd;
- Split storm flow north and east on Stubbswood Sq from Midland Ave; and,
- Realign sanitary and storm sewers to achieve required hydraulic separation.

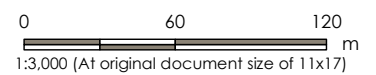


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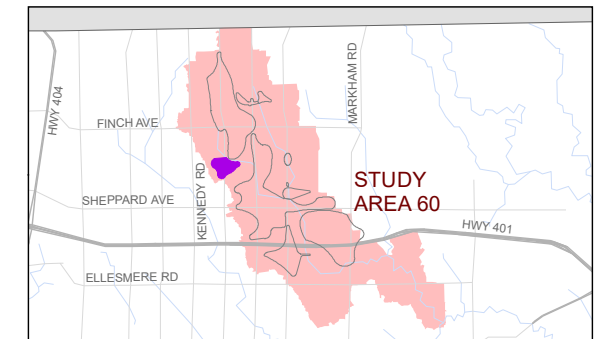
Legend

- Study Area
- Assignment Area
- Proposed Storm Solutions**
- Increase Inlet Capacity
- New
- Replace
- Upgrade
- Realign and Upgrade
- Inline Storage
- Affected Easement



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 BASEMENT FLOODING CAPACITY STUDIES
 BUNDLE F - STUDY AREA 60

Figure No.

7.21

Title

**Alternative 2 Solutions for
 Assignment 60-20**

TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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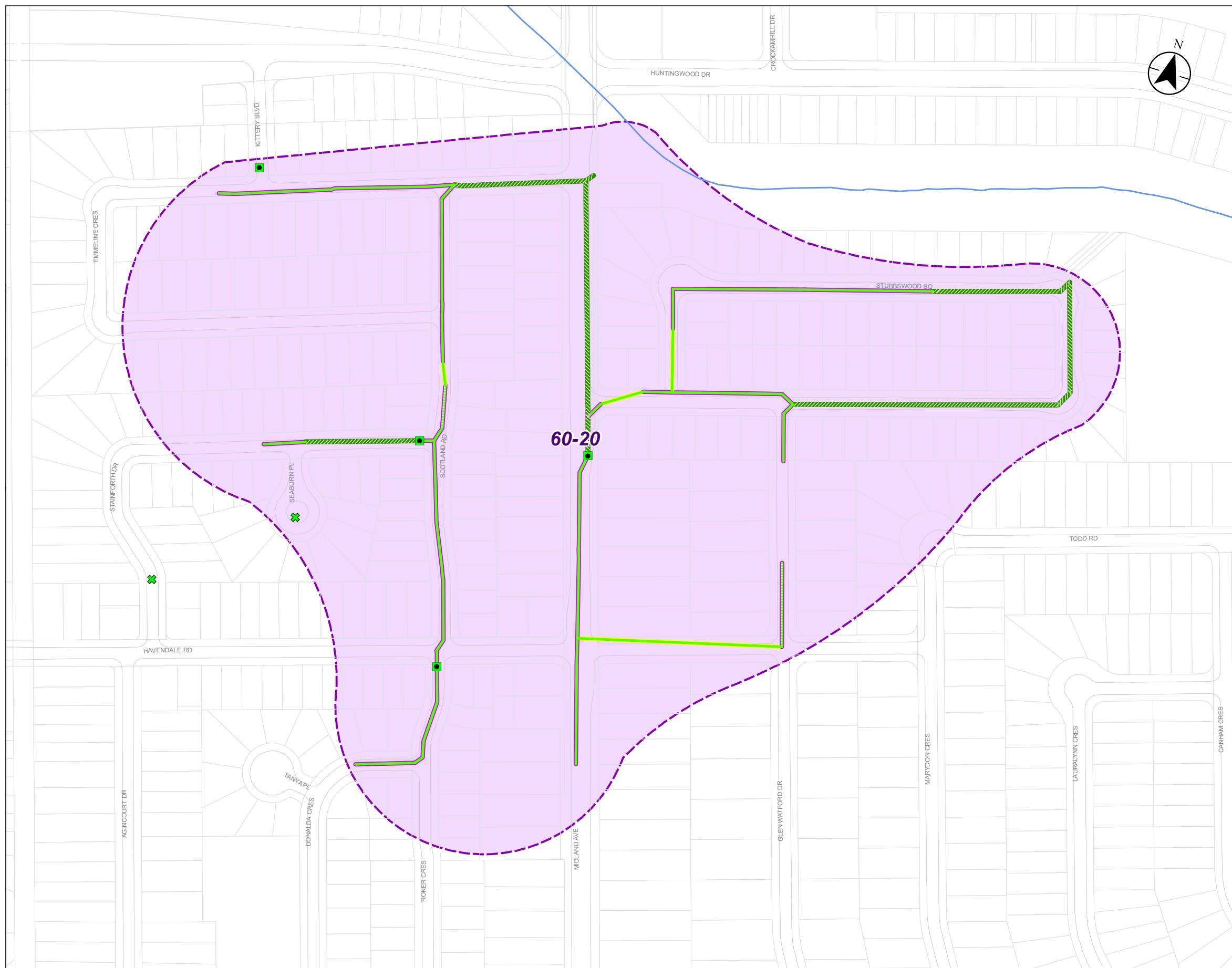
7.2.7.3 Alternative 3

An additional alternative was developed as part of the EA process that followed the Area 60 Study Report submission in May 2022. Alternative 3, which is a hybrid alternative of Alternatives 1 and 2, utilizes conveyance upgrades, catchbasin reduction within ROW, and reduced in-line storage without requiring an outfall upgrade to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule A/A+. Refer to **Figure 7—22** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades;
- The number of catchbasins within ROW reduced to optimize overland flow and meet allowable flow depth;
- New storm sewers on Havendale Rd between Glen Watford Dr and Midland Ave;
- Provide optimized in-line storage on:
 - Midland Ave;
 - Emmeline Cres;
 - Stainforth Dr upstream of outfall pipe;
 - Stubbswood Sq upstream of easement;
- Realign and redirect sewers on:
 - Scotland Rd north from Stainforth Dr towards Emmeline Cres;
 - Glen Watford Dr north of Havendale Rd;
- Split flow north and east on Stubbswood Sq from Midland Ave; and,
- Realign sanitary and storm to achieve required hydraulic separation.

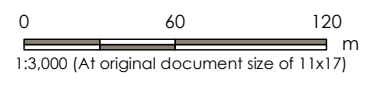


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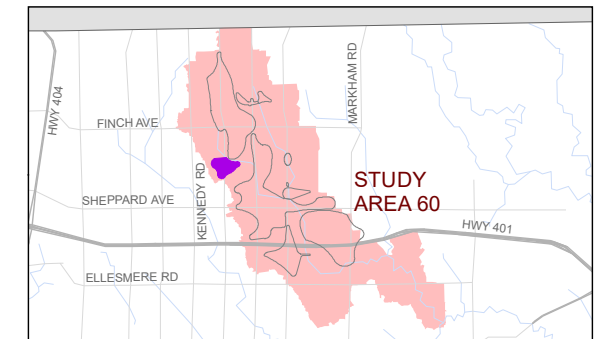
Legend

- Study Area
- Assignment Area
- Proposed Storm Solutions**
- Increase Inlet Capacity
- Remove CBs
- New
- Upgrade
- Realign and Upgrade
- Inline Storage
- Affected Easement



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 BASEMENT FLOODING CAPACITY STUDIES
 BUNDLE F - STUDY AREA 60

Figure No.
7.22

Title
**Alternative 3 Solutions for
 Assignment 60-20**

TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
October 6, 2023

7.2.8 Assignment 60-21

Assignment solutions include sewers in the area bounded by Sheppard Ave E to the north, Markham Rd to the east, Milner Ave to the south, and East Highland Creek (Markham Branch) to the west, as well as sewers along Progress Ave. Three alternative solutions have been identified to mitigate surface and basement flood risk within the assignment area.

7.2.8.1 Alternative 1

Alternative 1 utilizes increased inlet capacity, conveyance upgrades, flow redirection, in-line storage, and an outfall upgrade to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—23** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades along Milner Ave, Crown Acres Crt, Forest Crt, Scunthrope Rd, Pennybrook Ln, Spring Forest Sq, Prince William Crt, Wyper Sq, Havenview Rd, Carlingwood Crt, Glenstroke Dr, Invergordan Ave, Massie St, Plum Brook Cr, Mid-Dominion Acres, and Progress Ave;
- Redirect storm flows west on Crown Acres Crt to Scunthrope Rd to avoid private property;
- Redirect storm flows south along Scunthrope Rd to Milner Ave;
- Redirect storm flows from Havenview Rd east along Invergordan Ave;
- Provide storm in-line storage on Kentish Cres and Invergordan Ave upstream of private property and easement with outfall, respectively, on Carlingwood Crt and Invergordan Ave upstream of private properties, and on Milner Business Crt upstream of private property;
- Outfall upgrade in City-owned property to East Highland Crk (Markham Branch);
- Disconnect sanitary flow to Invergordan Ave and divert flow south along Scunthrope Rd to Milner Ave; and,
- Sanitary conveyance upgrades along Milner Ave west of Executive Crt.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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7.2.8.2 Alternative 2

Alternative 2 utilizes increased inlet capacity, conveyance upgrades, flow redirection, and in-line storage to avoid an outfall upgrade to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule A/A+. Refer to **Figure 7—24** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades along Milner Ave, Crown Acres Crt, Forest Crt, Scunthrope Rd, Pennybrook Ln, Spring Forest Sq, Prince William Crt, Wyper Sq, Havenview Rd, Carlingwood Crt, Glenstroke Dr, Invergordan Ave, Massie St, Plum Brook Cr, Mid-Dominion Acres, and Progress Ave;
- Redirect storm flows west on Crown Acres Crt to Scunthrope Rd to avoid private property;
- Redirect storm flows south along Scunthrope Rd to Milner Ave and east to Markham Rd;
- Redirect storm flows from Havenview Rd east along Invergordan Ave
- Provide in-line storm storage on Kentish Cres and Invergordan Ave upstream of private property and easement with outfall, respectively, on Carlingwood Crt and Invergordan Ave upstream of private properties, and on Milner Ave between Scunthrope Rd and Markham Rd and between Mid-Dominion Acres and the outfall to avoid outfall upgrade;
- Disconnect sanitary flow to Invergordan Ave and divert flow south along Scunthrope Rd to Milner Ave; and,
- Sanitary conveyance upgrades along Milner Ave west of Executive Crt.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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7.2.8.3 Alternative 3

An additional alternative was developed as part of the EA process that followed the Area 60 Study Report submission in May 2022. Alternative 3 utilizes increased inlet capacity, conveyance upgrades, in-line storage, flow redirection from Invergordan Ave to White Haven Park tank storage, and an outfall upgrade to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—25** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades along Milner Ave, Crown Acres Crt, Forest Crt, Scunthrope Rd, Pennybrook Ln, Spring Forest Sq, Prince William Crt, Wyper Sq, Havenview Rd, Carlingwood Crt, Glenstroke Dr, Invergordan Ave, Massie St, Plum Brook Cr, Mid-Dominion Acres, and Progress Ave;
- Redirect storm flows west on Crown Acres Crt to Scunthrope Rd to avoid private property;
- Redirect storm flows south along Scunthrope Rd to Milner Ave;
- Redirect storm flows from Havenview Rd east along Invergordan Ave;
- Provide in-line storm storage on Kentish Cres and Invergordan Ave upstream of private property and easement with outfall, respectively, on Carlingwood Crt and Invergordan Ave upstream of private properties, and on Milner Business Crt upstream of private property;
- Outfall upgrade in City-owned property to East Highland Creek (Markham Branch)
- Tank storm storage (6,400 m³) in White Haven Park and new sewers through private property on east of White Haven Public School to divert flow to storage;
- Disconnect sanitary flow to Invergordan Ave and divert flow south along Scunthrope Rd to Milner Ave; and,
- Sanitary conveyance upgrades along Milner Ave west of Executive Crt.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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7.2.9 Assignment 60-22

Assignment solutions include sewers in area bounded by Finch Ave E to the north, CPR property to the east, Highway 401 to the south, and Midland Ave to the west. Three alternative solutions have been identified to mitigate surface and basement flood risk within the assignment area.

7.2.9.1 Alternative 1

Alternative 1 utilizes increased inlet capacity, conveyance upgrades, flow redirection, in-line storage, and outfall upgrades to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—26** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades along Leeswood Cres, Chartland Blvd S, Brimley Rd, Dibgate Blvd, Idehill Cres, Broomfield Dr, Commandar Blvd, McGriskin Rd, Sheppard Ave E, Shorting Rd, McCowan Rd, Pitfield Rd, Charterhouse Rd, Brownspring Rd, Terryhill Cres, Cleethorpes Blvd, Keyworth Trl, Gritanni Ln, Dennet Dr, Marydon Cres, Shilton Rd, and Heather Rd;
- Provide in-line storm storage on Hoseyhill Cres upstream of easement; on Sheppard Ave E just west of Shorting Rd; on Rubic Cres across Brimley Rd near Gritanni Ln; and Redbud Cres upstream of easements and private property; on Heather Rd west of Shilton Rd; on Shilton Rd north of Frances Cres; and on Brimley Rd north of Heather Rd;
- Redirect storm flows west from Dibgate Blvd on Huntingwood Dr to Brimley Rd, on McGriskin Rd west to Shorting Rd to avoid private property, on Sheppard Ave E and Brimley Rd towards outfall on Sheppard Ave E to avoid sewers within CPR property, and on Dennet Dr east to Brimley Rd;
- Outfall upgrades in City-owned property to East Highland Creek (Markham Branch) on Brimley Rd, Sheppard Ave E, McCowan Rd, and off of Brimley Rd/Heather Rd intersection;
- Sanitary conveyance upgrades on Sheppard Ave E east of Brimley Rd; and,
- Provide in-line storage for sanitary system on Terryhill Cres, Brownspring Rd, Sheppard Ave E, Dennet Dr, and Commander Blvd.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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7.2.9.2 Alternative 2

Alternative 2 utilizes increased inlet capacity, conveyance upgrades, flow redirection, and additional in-line storage to avoid outfall upgrades and to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule A/A+. Refer to **Figure 7—27** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades along Leeswood Cres, Chartland Blvd S, Brimley Rd, Dibgate Blvd, Idehill Cres, Broomfield Dr, Commander Blvd, McGriskin Rd, Sheppard Ave E, Shorting Rd, McCowan Rd, Pitfield Rd, Charterhouse Rd, Brownspring Rd, Terryhill Cres, Cleethorpes Blvd, Keyworth Trl, Gritanni Ln, Dennet Dr, Marydon Cres, Shilton Rd, and Heather Rd;
- Provide storm in-line storage on Hoseyhill Cres upstream of easement; on Dibgate Blvd, Huntingwood Dr and Brimley Rd to avoid the outfall upgrade; on Sheppard Ave E just west of Shorting Rd; on Harrisfarm Gt just south of Sheppard Ave E; on Rubic Cres across Brimley Rd near Gritanni Ln; on Redbud Cres upstream of easements and private property; on Pitfield Rd between Terryhill Cres and Brownspring Rd; cascading in-line storage along Sheppard Ave E between Brimley Rd and the outfall; on Dennet Dr west of Shilton Rd, on Heather Rd west of Shilton Rd; on Shilton Rd north of Frances Cres; and on Brimley Rd north of Heather Rd;
- Redirect storm flows west from Dibgate Blvd on Huntingwood Dr to Brimley Rd, on McGriskin Rd west to Shorting Rd to avoid private property, on Sheppard Ave E and Brimley Rd towards outfall on Sheppard Ave E to avoid sewers within CPR property, on McCowan Rd south to Sheppard Ave E to avoid outfall upgrades, and on Dennet Dr east to Brimley Rd;
- Sanitary conveyance upgrades on Sheppard Ave E east of Brimley Rd; and,
- Provide in-line storage for sanitary system on Terryhill Cres, Brownspring Rd, Sheppard Ave E, Dennet Dr, and on Commander Blvd.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
October 6, 2023

7.2.9.3 Alternative 3

An additional alternative was developed as part of the EA process that followed the Area 60 Study Report submission in May 2022. Alternative 3 utilizes increased inlet capacity throughout with areas of decreased inlet capacity to reduce required pipe upgrades, conveyance upgrades, flow redirection, additional in-line storage to avoid most outfall upgrades, and outfall upgrades on Sheppard Ave E and McCowan Rd to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—28** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades along Leeswood Cres, Chartland Blvd S, Brimley Rd, Dibgate Blvd, Idehill Cres, Broomfield Dr, Commander Blvd, McGriskin Rd, Sheppard Ave E, Shorting Rd, McCowan Rd, Pitfield Rd, Charterhouse Rd, Brownspring Rd, Terryhill Cres, Cleethorpes Blvd, Keyworth Trl, Gritanni Ln, Dennet Dr, Marydon Cres, Shilton Rd, and Heather Rd;
- The number of catchbasins within ROW reduced to optimize overland flow and meet allowable flow depth;
- Provide in-line storm storage on Hoseyhill Cres upstream of easement; Brimley Rd to avoid the outfall upgrade; on Rubic Cres across Brimley Rd near Gritanni Ln; on Redbud Cres upstream of easements and private property; on Dennet Dr west of Shilton Rd; on Heather Rd west of Shilton Rd; on Shilton Rd north of Frances Cres; and on Brimley Rd north of Heather Rd;
- Redirect storm flows west from Dibgate Blvd on Huntingwood Dr to Brimley Rd, on McGriskin Rd west to Shorting Rd to avoid private property, on Sheppard Ave E and Brimley Rd towards outfall on Sheppard Ave E to avoid sewers within CPR property, and on Dennet Dr east to Brimley Rd;
- Outfall upgrades in City-owned property to East Highland Creek (Markham Branch) on Sheppard Ave E, and McCowan Rd;
- Sanitary conveyance upgrades on Sheppard Ave E east of Brimley Rd, and on Brimley Rd; and,
- Provide in-line storage for sanitary system on Terryhill Cres, Brownspring Rd, Sheppard Ave E, Dennet Dr, and on Commander Blvd.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
October 6, 2023

7.2.10 Assignment 60-24

Assignment solutions include sewers on McCowan Rd discharging into East Highland Creek. Four alternative solutions have been identified to mitigate surface and basement flood risk within the assignment area.

7.2.10.1 Alternative 1

Alternative 1 utilizes conveyance upgrades and two outfall upgrades, one within City ROW and one within City property, to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—29** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades;
- Outfall upgrade to Highland Creek within City ROW; and,
- Outfall upgrade to Highland Creek within City-Owned Property.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
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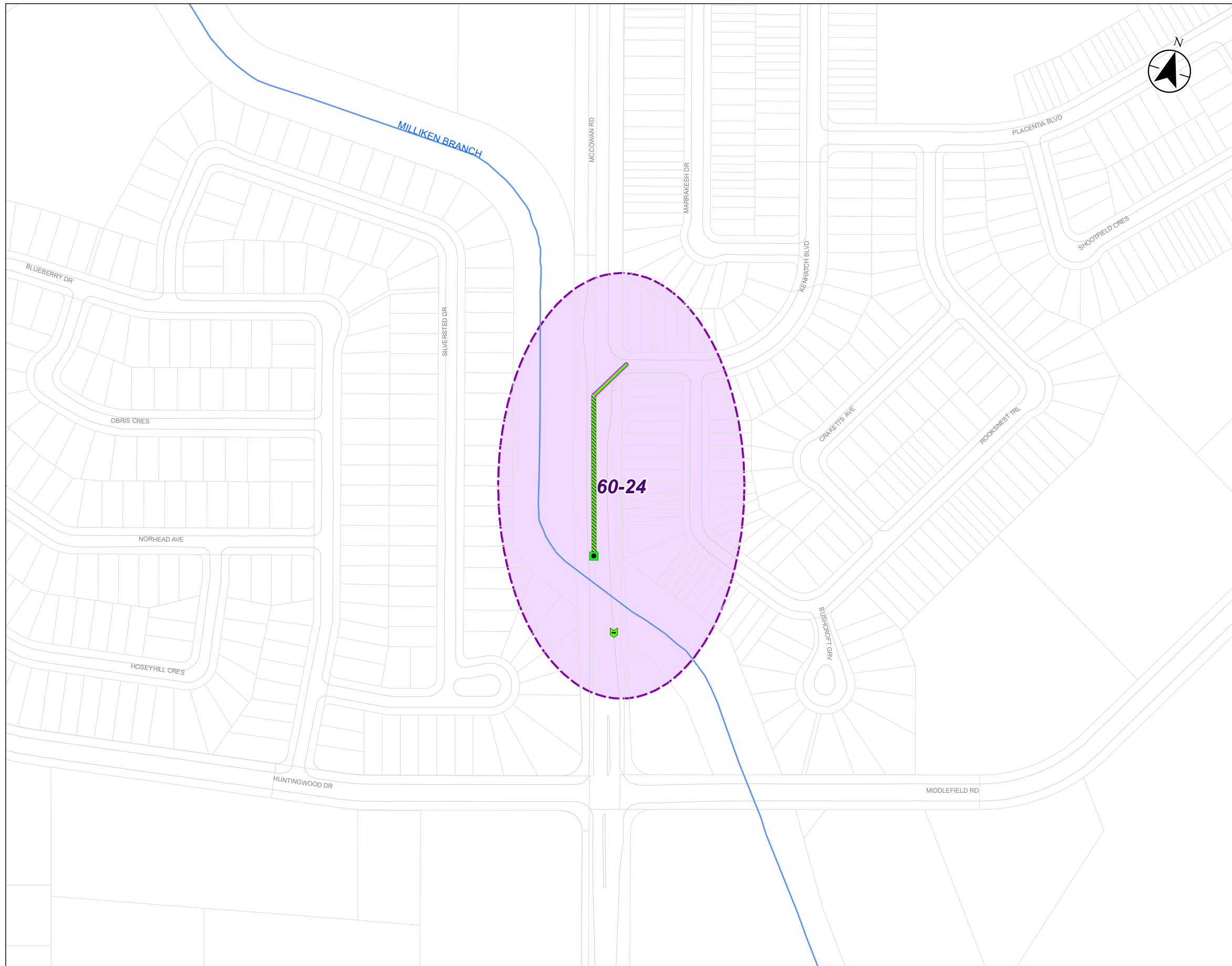
7.2.10.2 Alternative 2

Alternative 2 utilizes conveyance upgrades, in-line storage, inlet restriction with ICDs, and overland flow re-routing to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—30** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades upstream of northern outfall;
- Significant storm in-line storage along McCowan Rd, upstream of northern outfall;
- Decrease inlet capacity with ICDs upstream of southern outfall; and,
- Remove curb and provide overland flow route to watercourse.

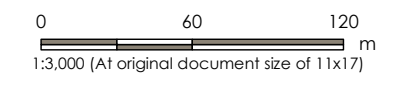


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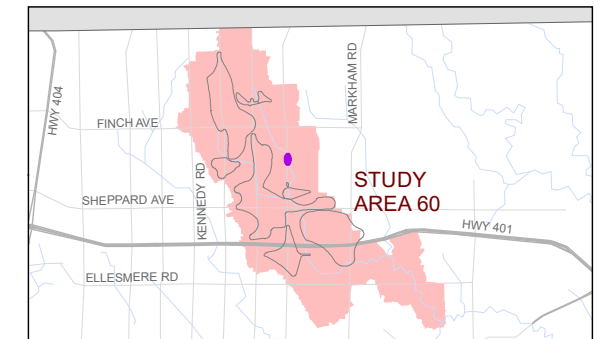


Legend

- Study Area
- Assignment Area
- Proposed Storm Solutions**
- Increase Inlet Capacity
- Inlet Control Device, Depress Curb
- Upgrade
- Inline Storage
- Affected Easement



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BASEMENT FLOODING CAPACITY STUDIES
BUNDLE F - STUDY AREA 60

Figure No.: **7.30**

Title: **Alternative 2 Solutions for Assignment 60-24**

TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
October 6, 2023

7.2.10.3 Hybrid Alternative 1 & 2

Two additional alternatives were developed as part of the EA process that followed the Area 60 Study Report submission in May 2022. The first includes a Hybrid Alternative 1 & 2 that utilizes conveyance upgrades, an outfall upgrade within City ROW, inlet restriction with ICDs, and overland flow re-routing to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—31** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades upstream of northern outfall;
- Outfall upgrade to Highland Creek within City ROW;
- Decrease inlet capacity with ICDs upstream of southern outfall; and
- Remove curb and provide overland flow route to watercourse.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

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7.2.10.4 Alternative 3

The second additional alternative developed, Alternative 3, utilizes conveyance upgrades, inlet restriction by catchbasin removal, overland flow re-routing, and no outfall upgrades to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—32** for details. A summary of this alternative solution is outlined below:

- Increase storm inlet capacity and provide conveyance upgrades upstream of northern outfall;
- Catchbasins at intersection of Kenhatch Blvd and McCowan Rd removed;
- Decrease storm inlet capacity by removing catchbasins upstream of southern outfall; and,
- Remove curb and provide overland flow route to watercourse.



TORONTO BASEMENT FLOODING CAPACITY STUDIES – BUNDLE F STUDY AREA 60: EA PROJECT FILE

Development and Assessment of Alternatives
October 6, 2023

7.2.11 Assignment 60-27

Assignment solutions include sewers along Brimwood Blvd and Melva Cres. Three alternative solutions have been identified to mitigate surface and basement flood risk within the assignment.

7.2.11.1 Alternative 1

Alternative 1 utilizes increased inlet capacity, conveyance upgrades, and an outfall upgrade to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule B. Refer to **Figure 7—33** for details. A summary of this alternative solution is outlined below:

- Storm conveyance upgrades along Brimwood Blvd (between East Highland Creek (Markham Branch) and Amanda Dr) and Melva Cres;
- Increased storm inlet capacity on Melva Cres and Wellpark Blvd at Brimwood Blvd; and,
- Upgrade outfall on Brimwood Blvd in City-owned property to East Highland Creek (Markham Branch).



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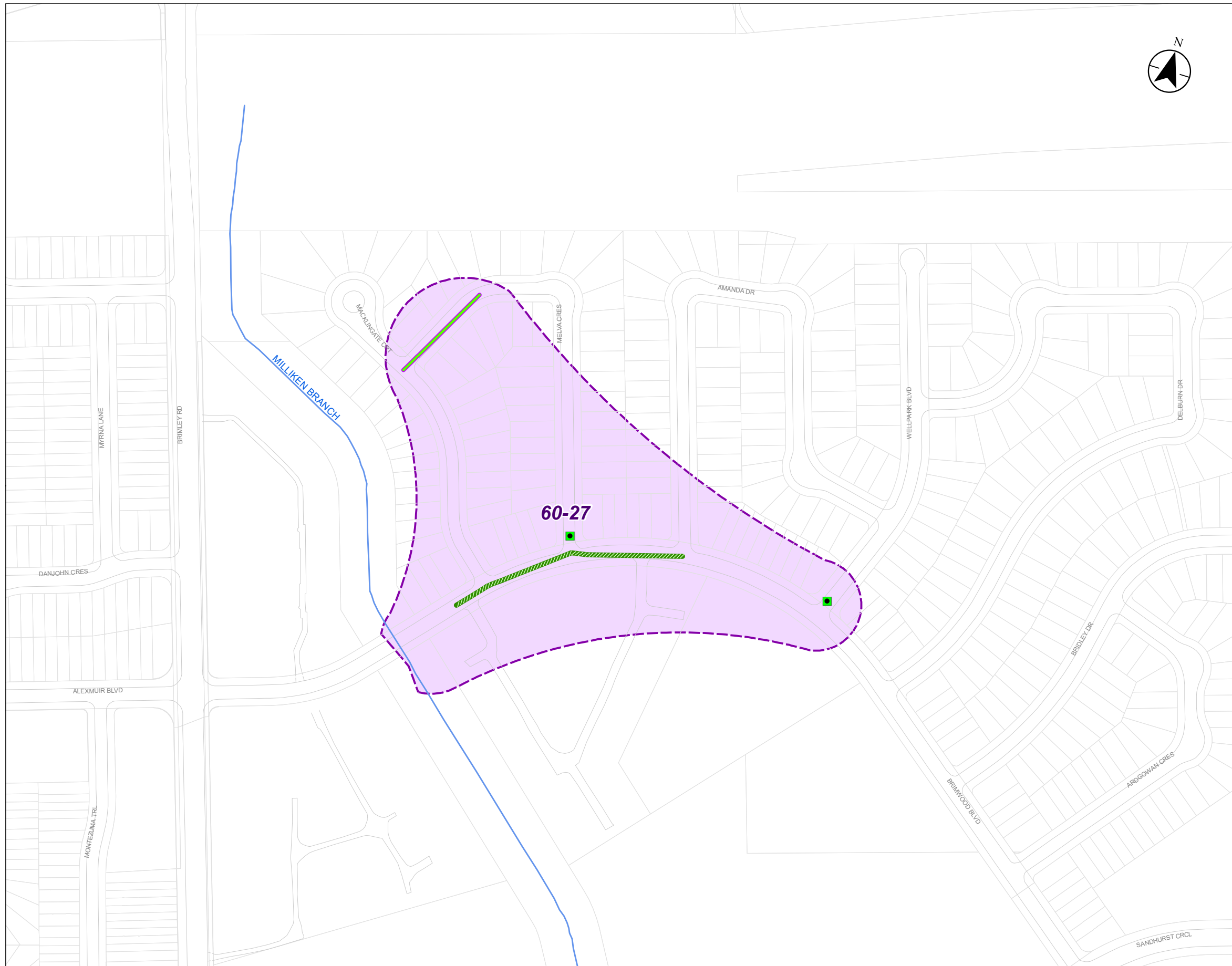
7.2.11.2 Alternative 2

Alternative 2 utilizes increased inlet capacity, conveyance upgrades, and in-line storage to avoid outfall upgrade and to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule A/A+. Refer to **Figure 7—34** for details. A summary of this alternative solution is outlined below:







- In-line storm storage on Brimwood Blvd to avoid outfall upgrade to East Highland Creek (Markham Branch);
- Storm conveyance upgrades along Melva Cres; and,
- Increased storm inlet capacity on Melva Cres and Wellpark Blvd at Brimwood Blvd.

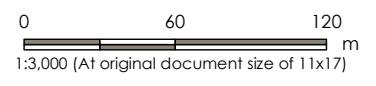


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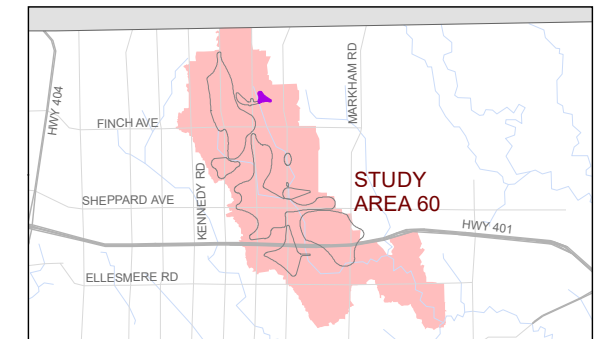


Legend

-  Study Area
-  Assignment Area
- Proposed Storm Solutions**
-  Increase Inlet Capacity
-  Upgrade
-  Inline Storage
-  Affected Easement



- Notes**
1. Coordinate System: NAD 1983 CSRS MTM 10
 2. Contains information licensed under Toronto Water Asset Mapping User Agreement.
 3. Contains information made available under the Toronto and Region Conservation Authority Open Data Licence v 1.0, Open Government Licence – Toronto, and Open Government Licence – Ontario.



Project Location: City of Toronto
165660138 REVA
Prepared by KDB on 2023-07-19

Client/Project
CITY OF TORONTO
BASEMENT FLOODING CAPACITY STUDIES
BUNDLE F - STUDY AREA 60

Figure No.
7.34

Title
Alternative 2 Solutions for Assignment 60-27

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7.2.11.3 Alternative 3

An additional alternative was developed as part of the EA process that followed the Area 60 Study Report submission in May 2022. Alternative 3 utilizes adjusted inlet capacity and conveyance upgrades to mitigate surface and basement flood risk. Due to the proposed work, this alternative is Schedule A/A+. Refer to **Figure 7—35** for details. A summary of this alternative solution is outlined below:

- Storm conveyance upgrades along Brimwood Blvd (between Macklingate Crt and Amanda Dr) and Melva Cres;
- Increased storm inlet capacity on Melva Cres and Wellpark Blvd at Brimwood Blvd; and
- Remove CBs on Brimwood Blvd at Amanda Dr.



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7.3 OPINION OF PROBABLE COSTS

The opinion of probable costs for the flood solution alternatives were developed using version 4.1 of the City's CET and Guidelines. The tool is designed to be used throughout the various stages of each solution including planning, preliminary design, detailed design, and pre-tender. The CET is used for construction costs only, and not engineering fees. Line 8 of the CET was used for the cost estimates, which includes the Total Construction Cost and 30% contingency, and is exclusive of HST. For additional details on the CET, please refer to **Section 6.3 of Attachment #3 - TM3**.

The total opinion of probable costs using Line 8 of the CET for each alternative of the 10 Schedule B Assignments are summarized below:

- Assignment 60-02
 - Alternative 1 is \$96,985,256;
 - Alternative 2 is \$133,077,383; and
 - Alternative 3 is \$109,915,112.
- Assignment 60-11
 - Alternative 1 is \$9,796,294;
 - Alternative 2 is \$4,987,790; and
 - Alternative 3 is \$2,732,362.
- Assignment 60-12
 - Alternative 1 is \$636,991; and
 - Alternative 2 is \$0.
- Assignment 60-14
 - Alternative 1 is \$2,829,321;
 - Alternative 2 is \$7,406,141; and
 - Alternative 3 is \$113,315.
- Assignment 60-18
 - Alternative 1 is \$12,628,001;
 - Alternative 2 is \$20,894,063; and
 - Alternative 3 is \$10,489,537.
- Assignment 60-20
 - Alternative 1 is \$24,810,088;
 - Alternative 2 is \$53,275,272; and
 - Alternative 3 is \$47,782,290.
- Assignment 60-21
 - Alternative 1 is \$64,490,609;
 - Alternative 2 is \$73,051,132; and
 - Alternative 3 is \$92,393,846.



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- Assignment 60-22
 - Alternative 1 is \$142,120,227;
 - Alternative 2 is \$206,363,597; and
 - Alternative 3 is \$156,339,655.
- Assignment 60-24
 - Alternative 1 is \$2,297,209;
 - Alternative 2 is \$3,810,652;
 - Hybrid Alternative 1&2 is \$1,727,523; and
 - Alternative 3 is \$1,683,244.
- Assignment 60-27
 - Alternative 1 is \$3,949,720;
 - Alternative 2 is \$6,434,273; and
 - Alternative 3 is \$3,143,155.

7.4 EVALUATION OF ALTERNATIVE SOLUTIONS

Alternatives were evaluated based on fourteen (14) criteria. Each criterion was ranked either high, medium, or low impact with a corresponding score of 1,2, or 3 respectively. A "low" ranking represents the lowest impact and most desirable, while a "high" represents the highest impact and least desirable. Once each criterion was evaluated, the score from all criteria was totaled. The evaluation matrices for each of the Schedule B assignments are included in **Appendix C**. The criteria that were evaluated are summarized below:

- **Construction risks:** Potential for construction difficulties due to soil, bedrock, and groundwater. Proximity to existing foundations, etc. Maneuverability of equipment during construction. Conflicts with existing infrastructure/other utilities.
- **Operations and Maintenance Requirements:** Complexity/simplicity of infrastructure maintenance. Expected life span.
- **Hydraulic Performance:** Improvement or decline in performance with respect to conveyance and upstream/downstream water levels. Expected Level-of-Service. Ability to meet HGL and flood control criteria. Resiliency and ability to accommodate extreme events.
- **Approvals:** Approvals needed/ risks. Acceptance from city stakeholder/ operators.
- **Terrestrial Systems:** Potential to impact natural Woodlands or significant trees. Potential to impact sensitive vegetative species or wildlife habitat brackets (wildlife linkages) and ESAs.
- **Aquatic Systems:** Potential to impact or enhance aquatic habitat in receiving watercourse. Potential to increase erosion in receiving water course.



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- **Effect on Urban Green Space/ Open Space/ Recreational Uses:** Quality and quantity of open space. Urban tree removal. Loss of use during construction. Impacts to recreational activities e.g., pathways, boating, etc.
- **Cultural Heritage Values or Features:** Symbolic cultural value – cultural landscapes. Potential for heritage significance and built heritage. Potential for archaeological significance.
- **Disruption to Community:** Duration of construction. Traffic access and service impacts. Permanent structures that would impact views or aesthetics. Impact. For odor or noise.
- **Impact on Level of Service:** Potential for flooding and ponding during the full range of wet weather events.
- **Property Issues:** Ownership (city owned versus public private possessions), site in ROW or land acquisition. Replacement of existing features (e.g., sheds, etc.).
- **Affordability:** Capital cost, near term affordability. Economic burden on community. Cost of property or easement. Cost relative to other strategies.
- **Sustainability:** Inspection and maintenance cost. Life cycle cost, long term affordability. Economic burden on community. Cost relative to other strategies.
- **Asset Renew Integration Opportunities:** Opportunity to integrate proposed works with asset renewal needs.

A summary of the recommended alternative for each of the Schedule B assignments is below:

- Assignment 60-02: Alternative 1 is selected as the recommended alternative for Assignment 60-02 due to the lower capital cost, reduced long-term maintenance, and lower community disruption. This alternative is classified as a Schedule B undertaking.
- Assignment 60-11: Alternative 2 is selected as the recommended alternative for Assignment 60-11 as it avoids significant constructability challenges with upgrades under Highway 401 and has a lower cost. Low-risk hydraulic issues remain present under Alternative 3 which are addressed with Alternative 2. This alternative is classified as a Schedule A/A+ undertaking.
- Assignment 60-12: Alternative 2 is selected as the recommended alternative solution for Assignment 60-12. This alternative is a Do Nothing approach due to the very low flood risk for the area.
- Assignment 60-14: Alternative 3 is selected as the recommended alternative solution for Assignment 60-14 due to the significantly lower capital cost, limited long-term maintenance requirements, and reduced constructability challenges since there is no work on McCowan Rd with very low flood risk. This alternative is considered a Schedule A/A+ undertaking.



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- Assignment 60-18: Alternative 3 is selected as the recommended alternative for Assignment 60-18 due to lower capital cost. This alternative is classified as a Schedule A/A+ undertaking.
- Assignment 60-20: Alternative 1 is selected as the recommended alternative solution for Assignment 60-20 due to lower capital cost with the least community disruption. This alternative is classified as a Schedule B undertaking due to the proposed outfall works.
- Assignment 60-21: Alternative 2 is selected as the recommended alternative solution for Assignment 60-21 as it avoids an outfall upgrade. This chosen alternative is classified as a Schedule A/A+ undertaking.
- Assignment 60-22: Alternative 2 is selected as the recommended alternative solution for Assignment 60-22 as it avoids multiple outfall upgrades through in-line storage upgrades. This alternative is classified as a Schedule A/A+ undertaking.
- Assignment 60-24: Alternative 3 is selected as the recommended alternative solution for Assignment 60-24 as it avoids outfall upgrades or inline storage, has greater hydraulic performance within the pipe, and a lower capital cost compared to Alternatives 1 and 2. This chosen alternative is classified as a Schedule B undertaking due to the proposed overland regrading from the ROW.
- Assignment 60-27: Alternative 3 is selected as the recommended alternative solution for Assignment 60-27 as it avoids an outfall upgrade and has the lowest capital cost. This alternative is classified as a Schedule A/A+ undertaking.

