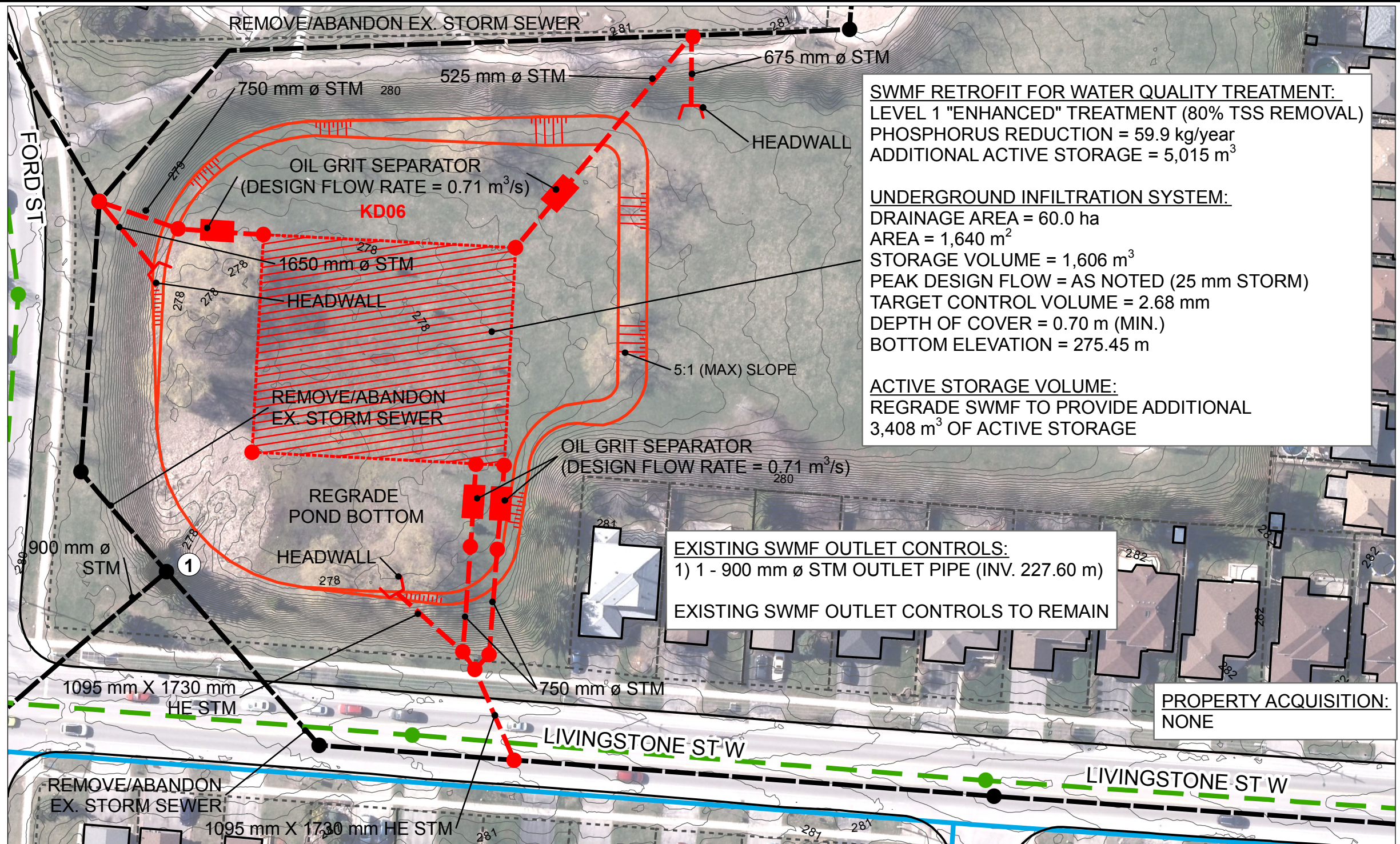


**Appendix N:
Final Preferred Solutions
Conceptual Designs – Kidd's
Creek Watershed**



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LEGEND

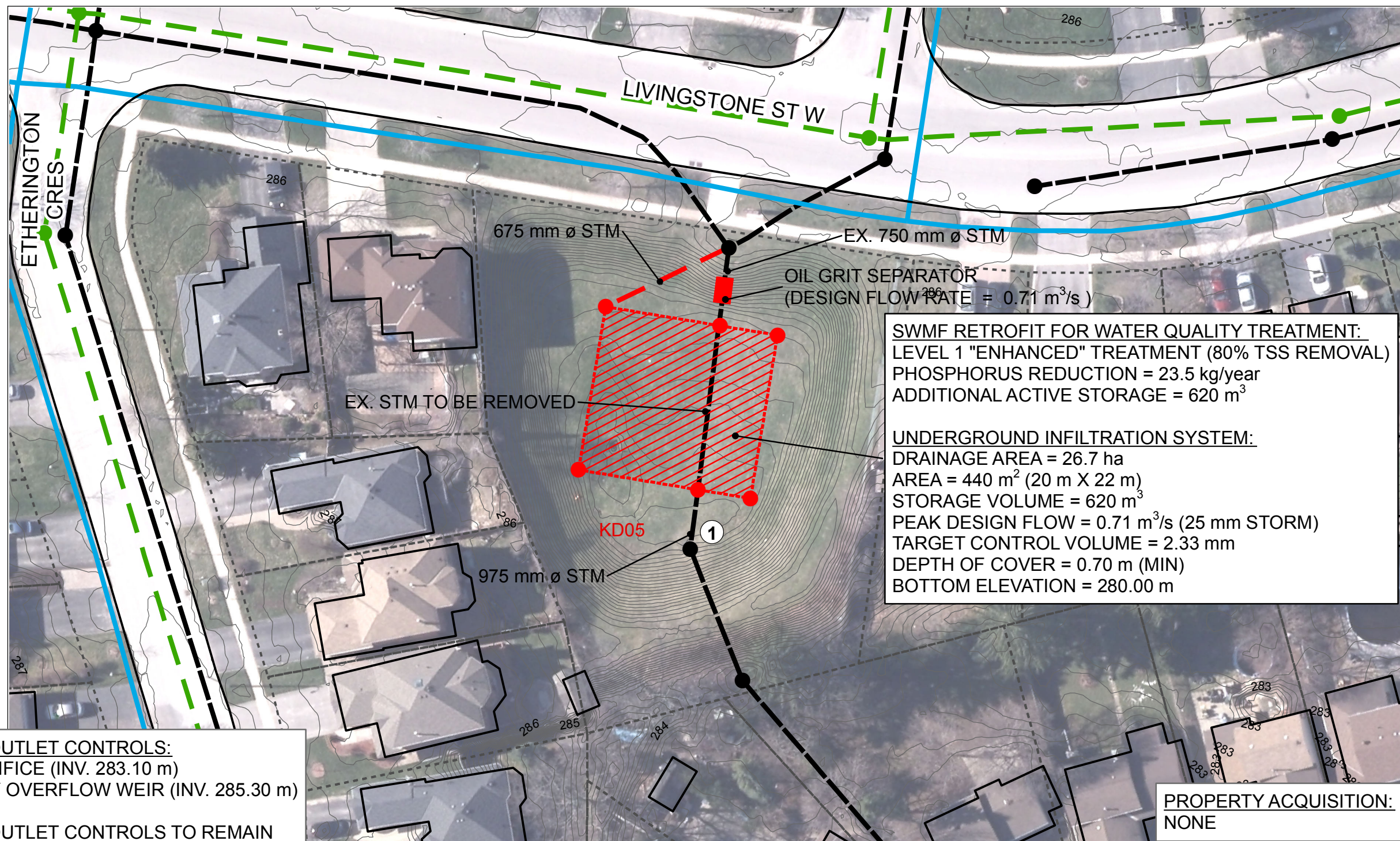
- PR STORM MAINTENANCE HOLE
- PR. STORM SEWER
- EX. SANITARY SEWER
- EX. SANITARY MAINTENANCE HOLE
- ▨ PR. LID
- EX. WATERMAIN
- EX. STORM MAINTENANCE HOLE
- EX. STORM SEWER
- EX. WATERCOURSE
- ▨ EX. PROPERTY LINE
- ▨ PROPERTY ACQUISITION

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 1
SWMF RETROFIT No. 11 (KD06)
KIDD'S CREEK WATERSHED

SCALE = 1:750

DATE: MARCH 2019



LEGEND

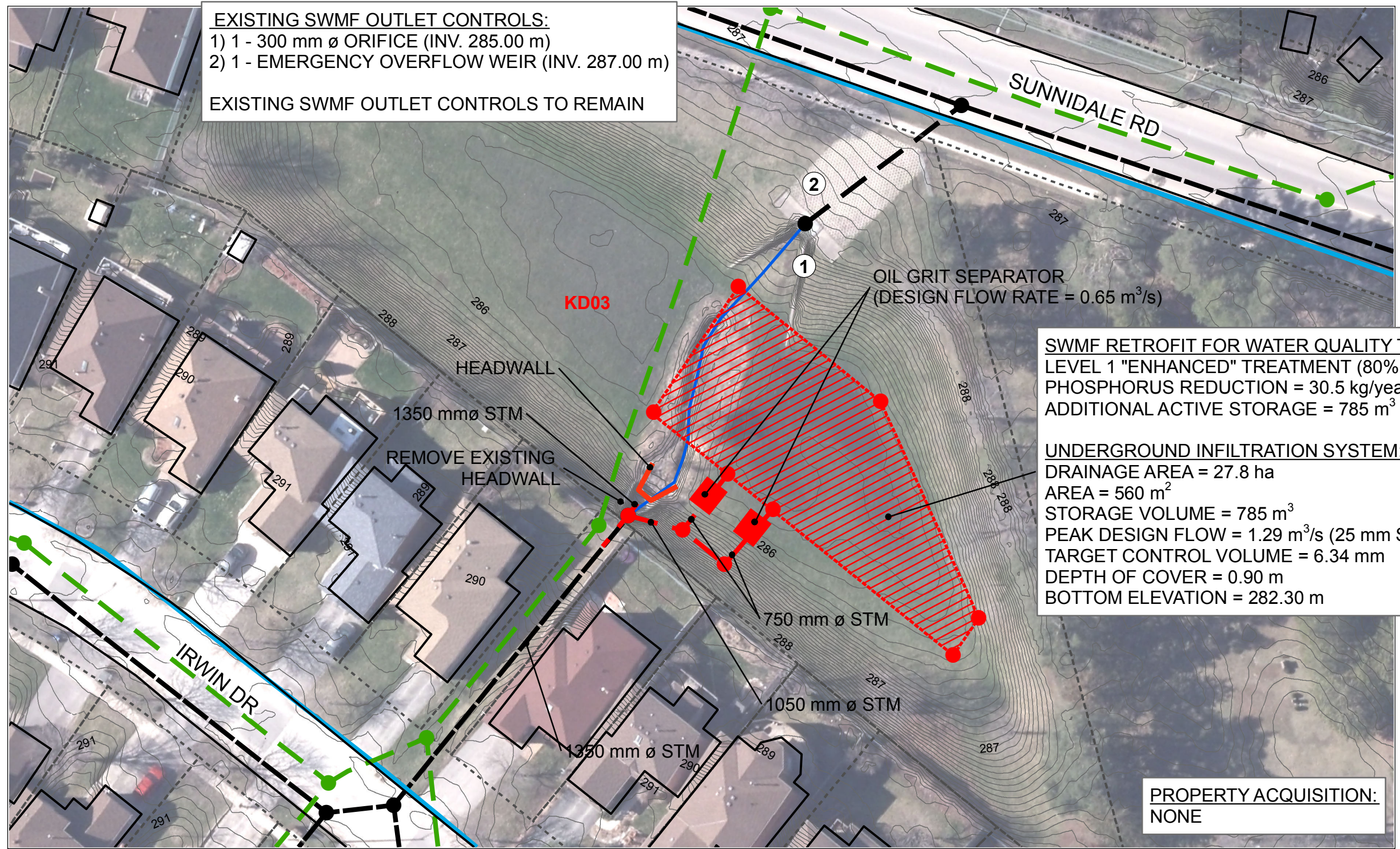
●	PR STORM MAINTENANCE HOLE	—	EX. WATERMAIN
—	PR. STORM SEWER	●	EX. STORM MAINTENANCE HOLE
—	EX. SANITARY SEWER	—	EX. STORM SEWER
●	EX. SANITARY MAINTENANCE HOLE	—	EX. WATERCOURSE
▨	PR. LID	—	EX. PROPERTY LINE
		▨	PROPERTY ACQUISITION

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 2
 SWMF RETROFIT No. 18 (KD05)
 KIDD'S CREEK WATERSHED

SCALE = 1:500

DATE: MARCH 2019



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LEGEND

- | | |
|--|--|
| ● PR STORM MAINTENANCE HOLE | — EX. WATERMAIN |
| — PR. STORM SEWER | ● EX. STORM MAINTENANCE HOLE |
| — EX. SANITARY SEWER | — EX. STORM SEWER |
| ● EX. SANITARY MAINTENANCE HOLE | — EX. WATERCOURSE |
| ▨ PR. LID | - - - EX. PROPERTY LINE |
| | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

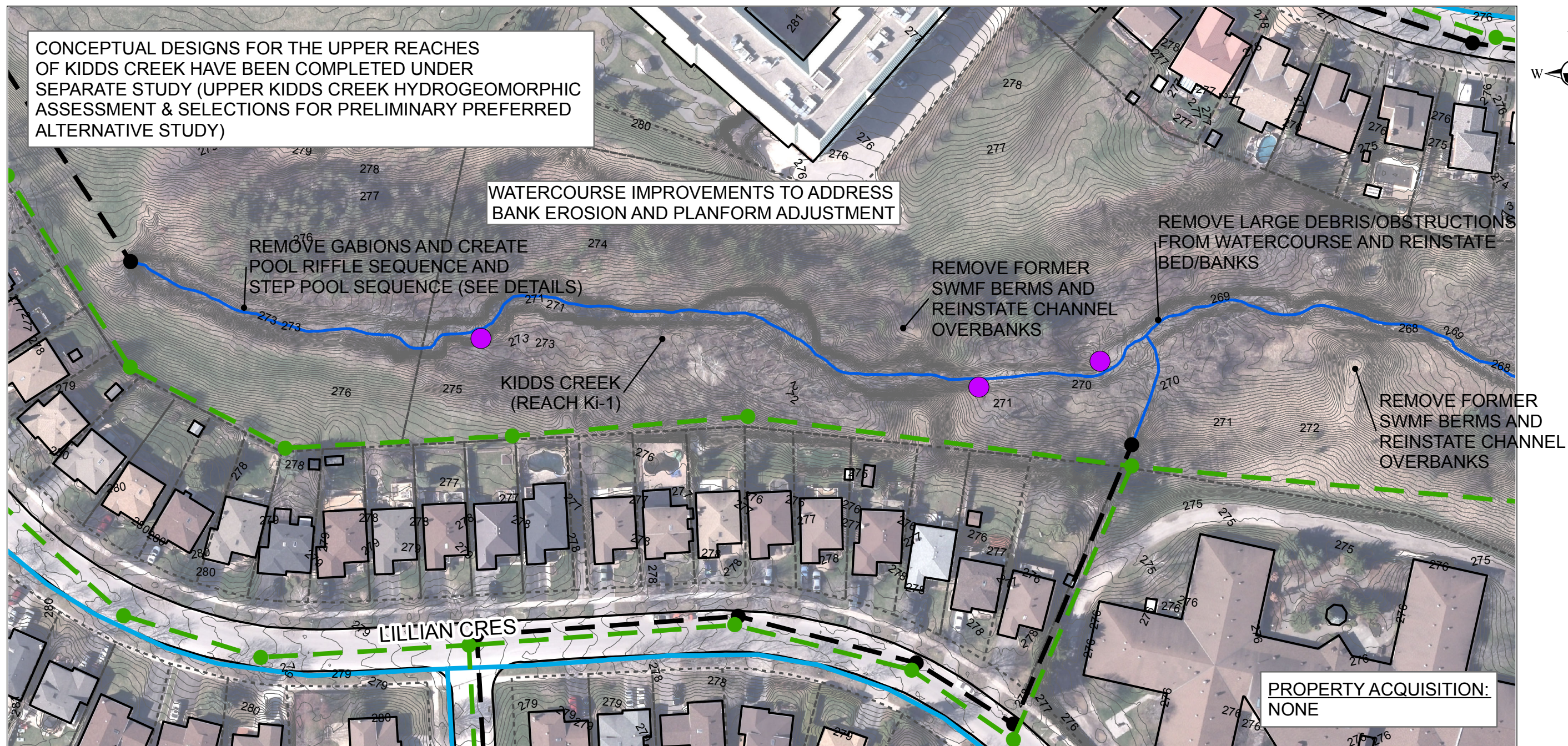
PROJECT No. 3
 SWMF RETROFIT No. 13 (KD03)
 KIDD'S CREEK WATERSHED

SCALE = 1:500

DATE: MARCH 2019

CONCEPTUAL DESIGNS FOR THE UPPER REACHES OF KIDDS CREEK HAVE BEEN COMPLETED UNDER SEPARATE STUDY (UPPER KIDDS CREEK HYDROGEOMORPHIC ASSESSMENT & SELECTIONS FOR PRELIMINARY PREFERRED ALTERNATIVE STUDY)

WATERCOURSE IMPROVEMENTS TO ADDRESS BANK EROSION AND PLANFORM ADJUSTMENT



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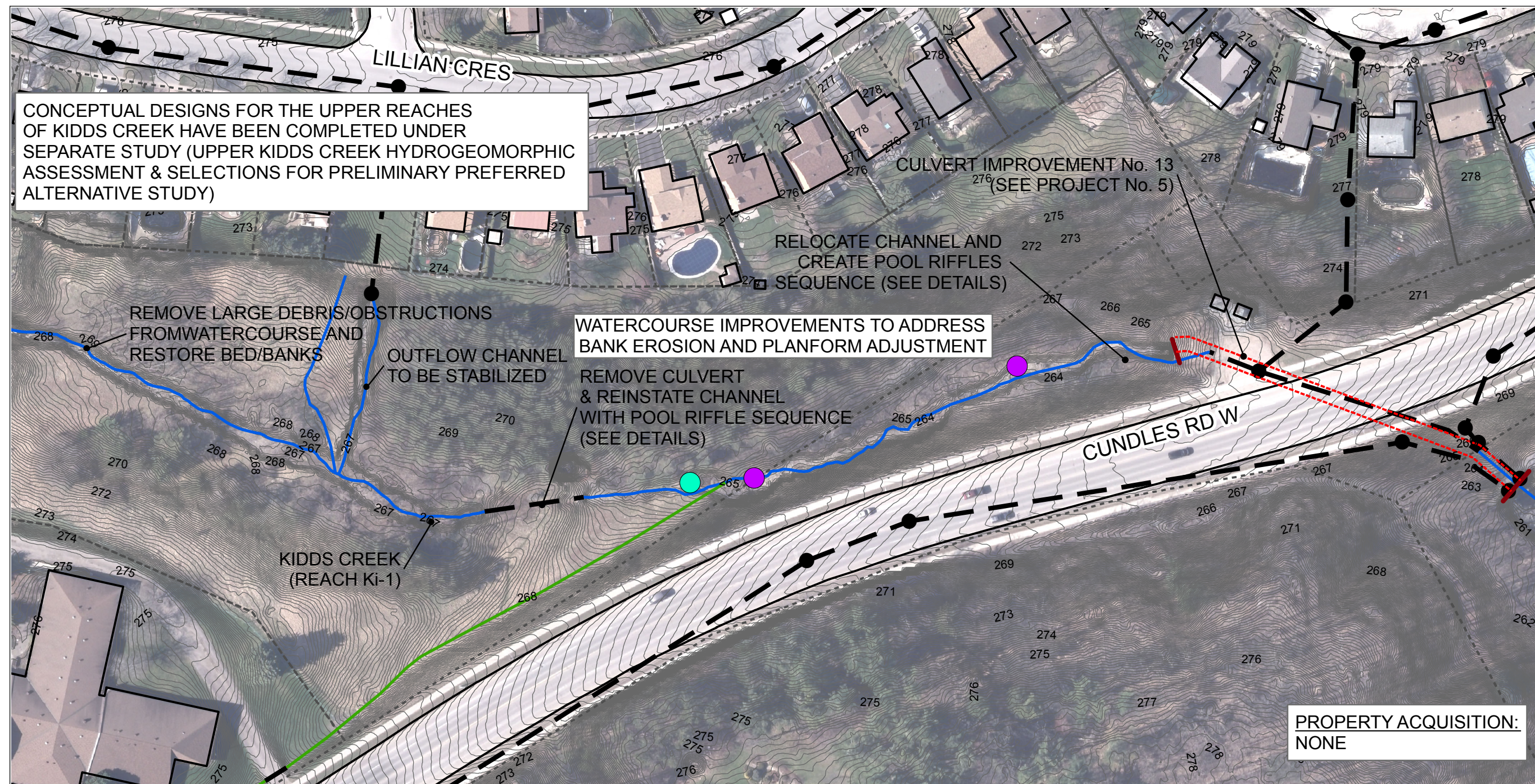
LEGEND

- | | |
|--|--|
| ● BANK EROSION | --- EX. SANITARY SEWER |
| ● BED EROSION/ KNICKPOINT | --- EX. WATERCOURSE |
| ● INFRASTRUCTURE AT RISK | --- EX. WATERMAIN |
| ● PR. STORM MAINTENANCE HOLE | ● EX. STORM MAINTENANCE HOLE |
| --- PR. STORM SEWER | --- EX. STORM SEWER |
| ● EX. SANITARY MAINTENANCE HOLE | EX. PROPERTY LINE |
| | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 4
WATERCOURSE IMPROVEMENT No. 1
KIDD'S CREEK WATERSHED
(SHEET 1 OF 2)
SCALE = 1:1,000

DATE: MARCH 2019



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LEGEND

- | | |
|--|---|
| ● BANK EROSION | — EX. SANITARY SEWER |
| ● BED EROSION/ KNICKPOINT | — EX. WATERCOURSE |
| ● INFRASTRUCTURE AT RISK | — EX. WATERMAIN |
| ● PR. STORM MAINTENANCE HOLE | ● EX. STORM MAINTENANCE HOLE |
| — PR. STORM SEWER | — EX. STORM SEWER |
| ● EX. SANITARY MAINTENANCE HOLE | EX. PROPERTY LINE |
| | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN FINAL PREFERRED ALTERNATIVE SOLUTION

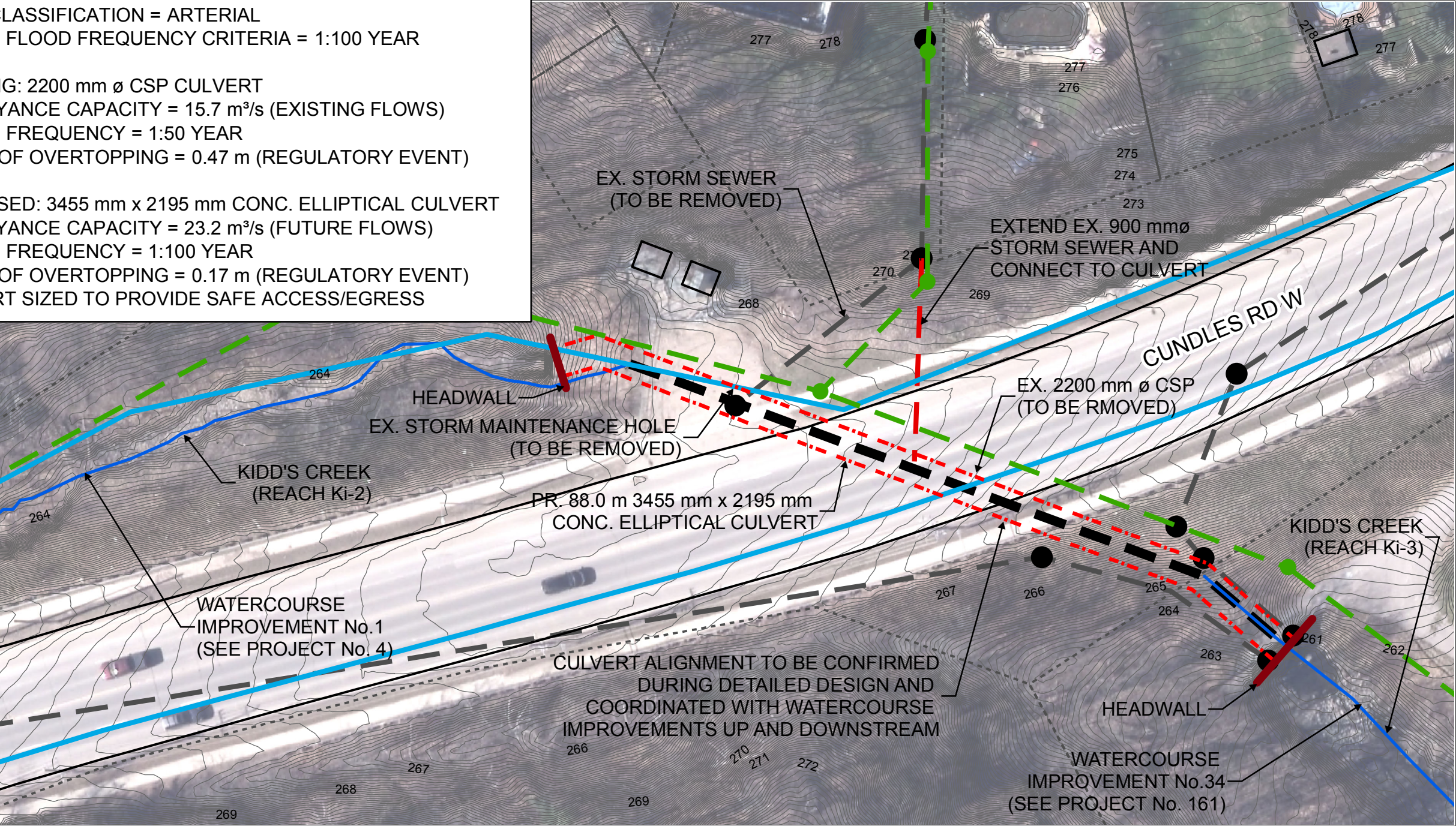
PROJECT No. 4
WATERCOURSE IMPROVEMENT No. 1
KIDD'S CREEK WATERSHED
(SHEET 2 OF 2)
SCALE = 1:1,000

DATE: MARCH 2019

CUNDLES ROAD W.:
ROAD CLASSIFICATION = ARTERIAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: 2200 mm ø CSP CULVERT
CONVEYANCE CAPACITY = 15.7 m³/s (EXISTING FLOWS)
DESIGN FREQUENCY = 1:50 YEAR
DEPTH OF OVERTOPPING = 0.47 m (REGULATORY EVENT)

PROPOSED: 3455 mm x 2195 mm CONC. ELLIPTICAL CULVERT
CONVEYANCE CAPACITY = 23.2 m³/s (FUTURE FLOWS)
DESIGN FREQUENCY = 1:100 YEAR
DEPTH OF OVERTOPPING = 0.17 m (REGULATORY EVENT)
CULVERT SIZED TO PROVIDE SAFE ACCESS/EGRESS



PROPERTY ACQUISITION:
NONE



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LEGEND

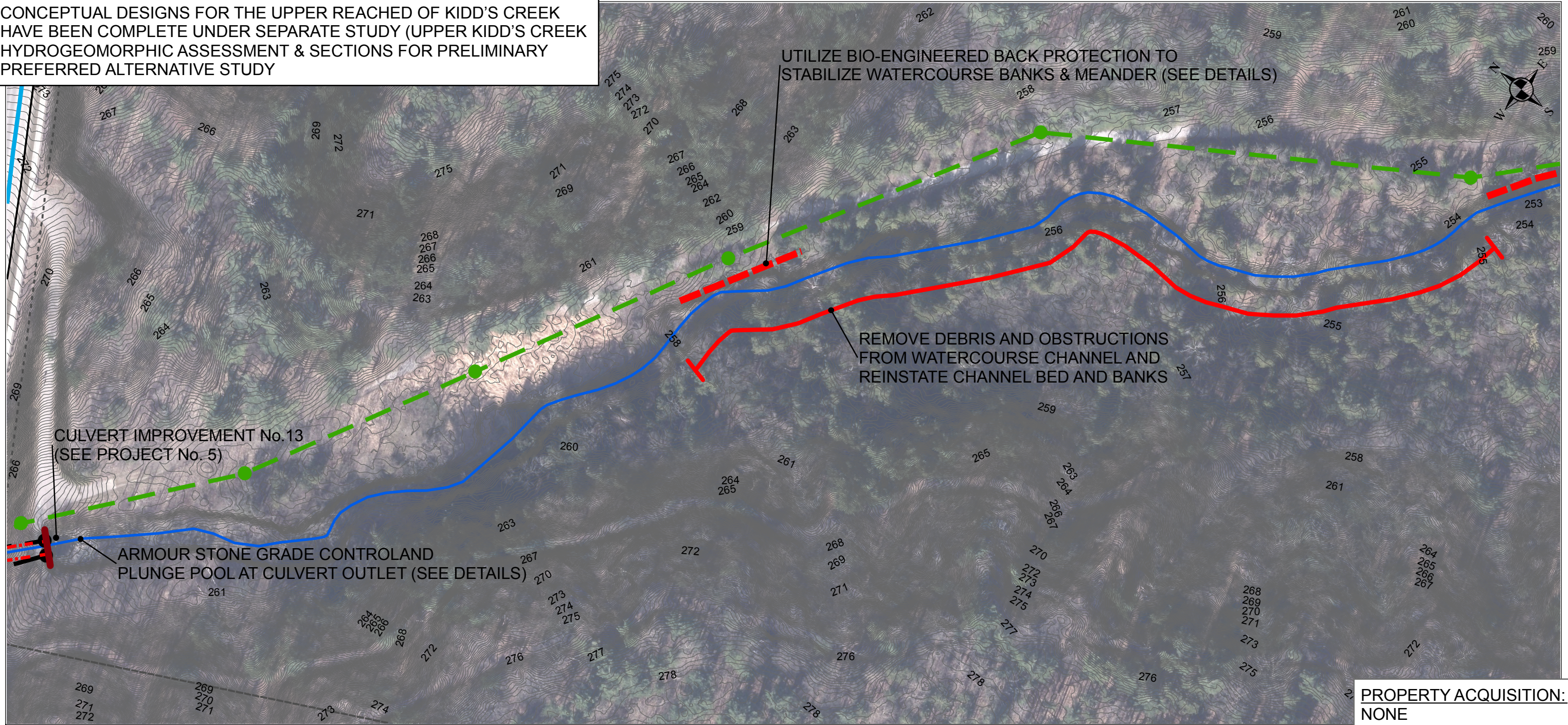
- | | |
|------------------------------|---------------------------------|
| --- PR. CULVERT | --- EX. SANITARY SEWER |
| --- PR. STORM SEWER | ● EX. SANITARY MAINTENANCE HOLE |
| ● PR STORM MAINTENANCE HOLE | --- EX. WATERMAIN |
| --- EX. STORM SEWER | --- EX. CULVERT |
| ● EX. STORM MAINTENANCE HOLE | --- EX. PROPERTY LINE |
| --- WATERCOURSE | --- PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 5
CULVERT IMPROVEMENT No. 13
(CUNDLES ROAD WEST)
KIDD'S CREEK WATERSHED
SCALE = 1:500

DATE: MARCH 2019

CONCEPTUAL DESIGNS FOR THE UPPER REACHED OF KIDD'S CREEK HAVE BEEN COMPLETE UNDER SEPARATE STUDY (UPPER KIDD'S CREEK HYDROGEOMORPHIC ASSESSMENT & SECTIONS FOR PRELIMINARY PREFERRED ALTERNATIVE STUDY



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LEGEND

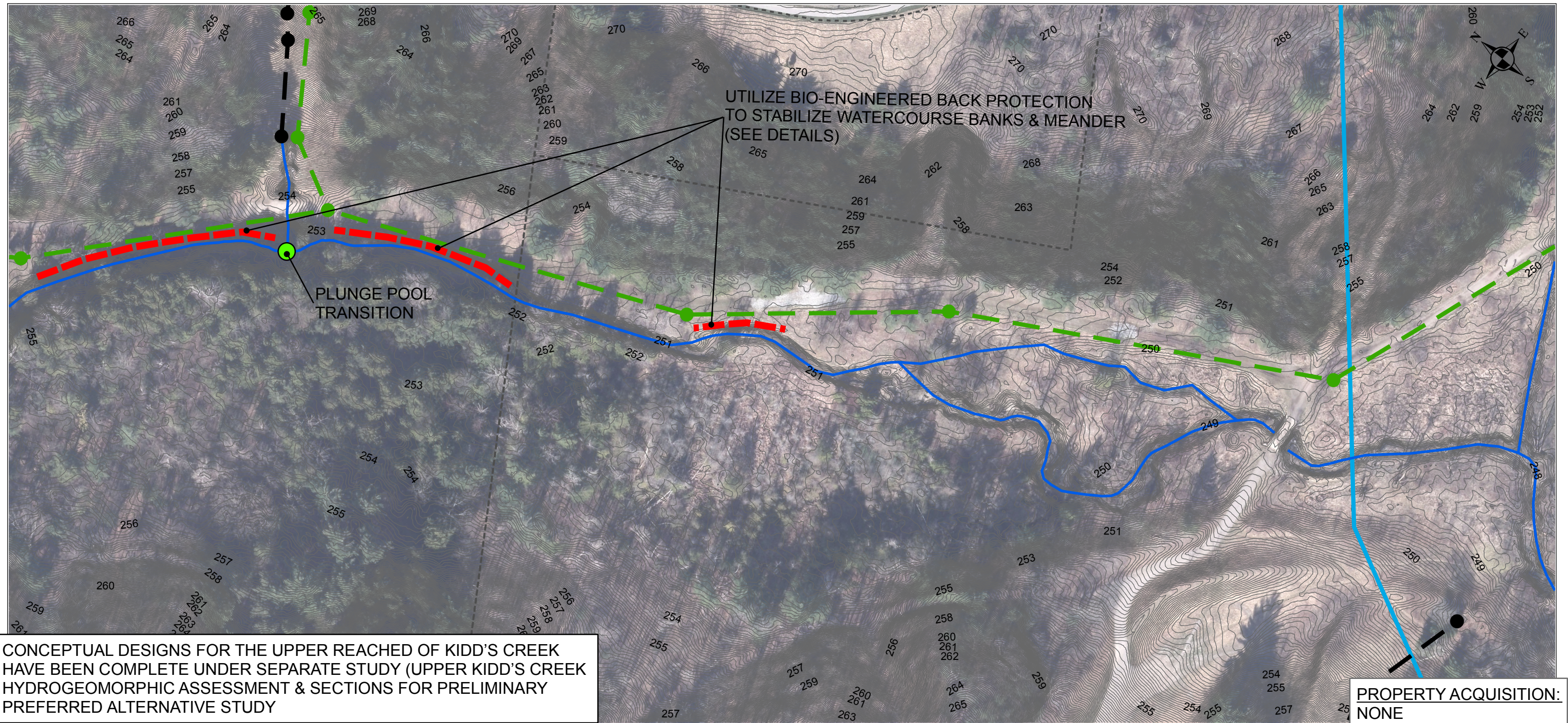
- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 161
WATERCOURSE IMPROVEMENT No. 34
KIDD'S CREEK WATERSHED
(SHEET 1 OF 3)

SCALE = 1:1,000

DATE: MARCH 2019



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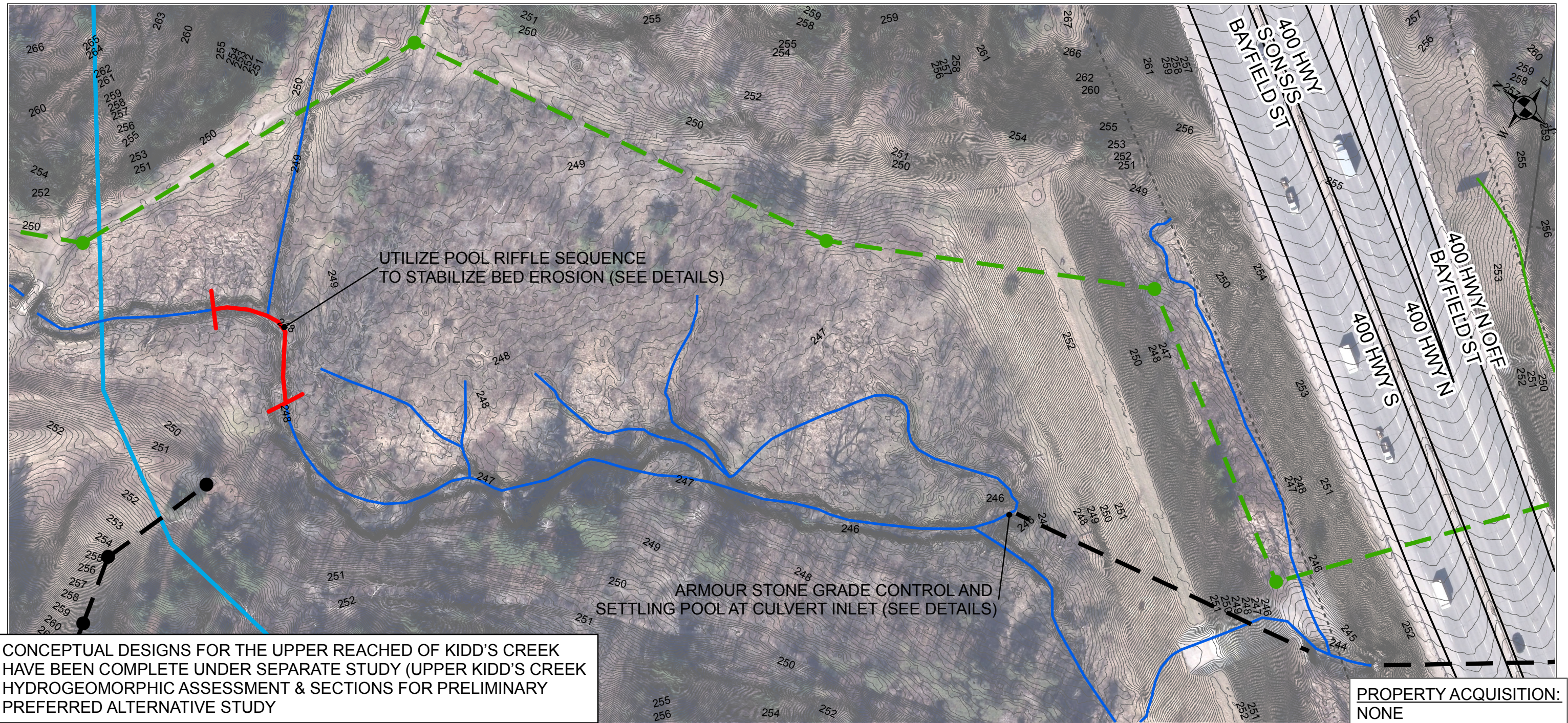
LEGEND

- | | | | |
|--|----------------------------|--|-------------------------------|
| | BANK EROSION | | EX. SANITARY MAINTENANCE HOLE |
| | BED EROSION/ KNICKPOINT | | EX. SANITARY SEWER |
| | INFRASTRUCTURE AT RISK | | EX. WATERCOURSE |
| | PLUNGE POOL TRANSITION | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 161
WATERCOURSE IMPROVEMENT No. 34
KIDD'S CREEK WATERSHED
(SHEET 2 OF 3)
SCALE = 1:1,000

DATE: MARCH 2019



CONCEPTUAL DESIGNS FOR THE UPPER REACHES OF KIDD'S CREEK HAVE BEEN COMPLETE UNDER SEPARATE STUDY (UPPER KIDD'S CREEK HYDROGEOMORPHIC ASSESSMENT & SECTIONS FOR PRELIMINARY PREFERRED ALTERNATIVE STUDY)



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LEGEND

- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 161
WATERCOURSE IMPROVEMENT No. 34
KIDD'S CREEK WATERSHED
(SHEET 3 OF 3)

SCALE = 1:1,000

DATE: MARCH 2019




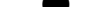








PROPOSED TRUNK STORM SEWER SIZE TO BE REVIEWED
AT DETAILED DESIGN TO REDUCE DEPTH OF OVERTOPPING



THE CITY IS TO PROGRESSIVELY ACQUIRE LAND OR EASEMENTS FOR DRAINS, WATERCOURSES AND STORAGE AREAS CROSSING OR UPON PRIVATE PROPERTY WHERE IT IS CONSIDERED IN THE CITY'S INTEREST TO DO SO (BY-LAW 90-92: TO PROHIBIT OBSTRUCTION OF DRAINS & WATERCOURSES). PROPERTY ACQUISITION VIA EASEMENT, BLOCK, LOT OR PARCEL IS TO THE CITY'S DISCRETION.



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- | | | | |
|---|-------------------------------|---|----------------------------|
|  | PR. WATERCOURSE |  | EX. STORM MAINTENANCE HOLE |
|  | PR. TRUNK SEWER |  | EX. WATERMAIN |
|  | PR. CULVERT |  | WATERCOURSE |
|  | EX. SANITARY SEWER |  | EX. CULVERT |
|  | EX. SANITARY MAINTENANCE HOLE |  | EX. PROPERTY LINE |
|  | EX. STORM SEWER |  | PROPERTY ACQUISITION |

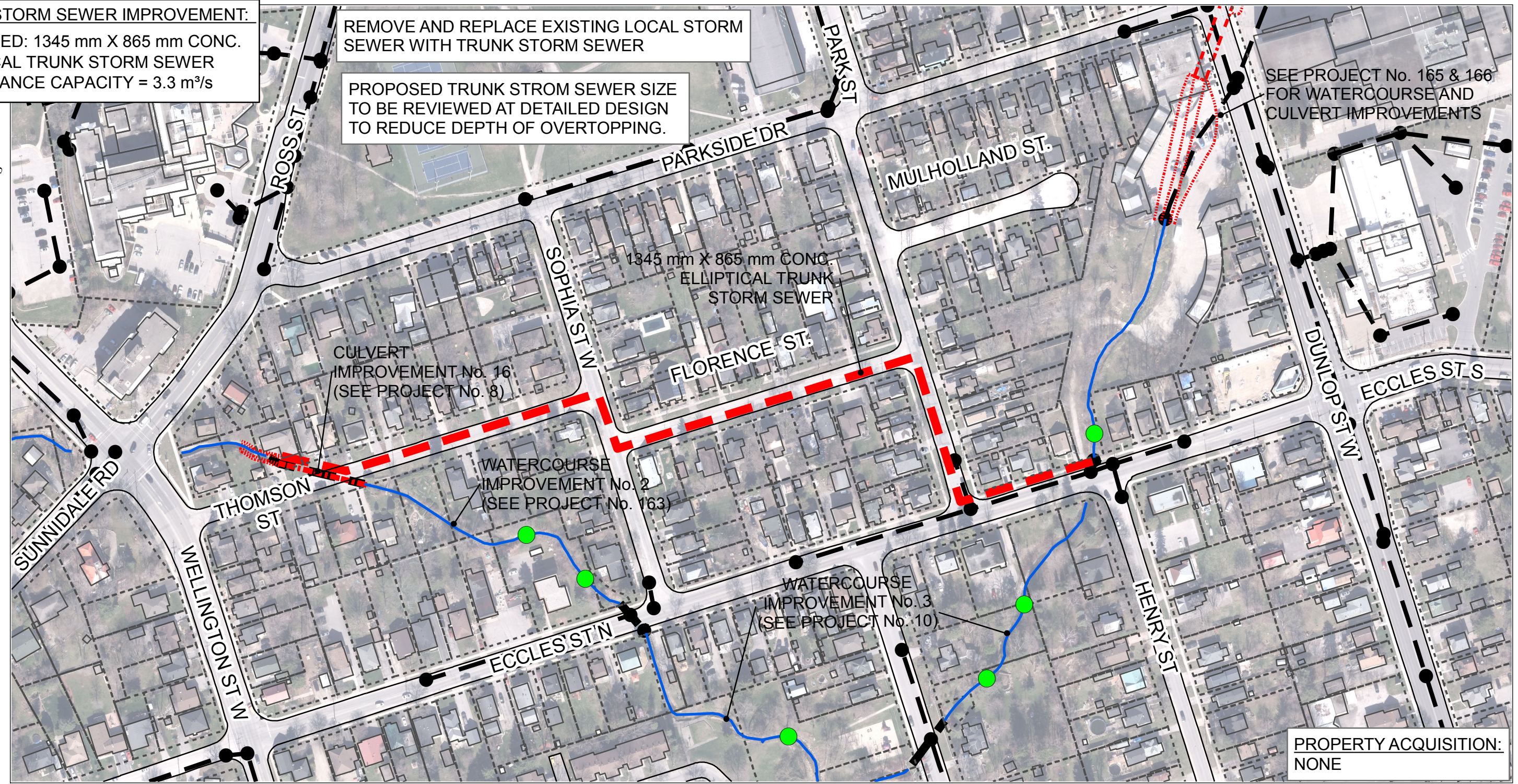
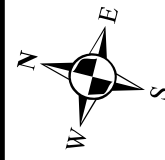
DATE: MARCH 2019

TRUNK STORM SEWER IMPROVEMENT:
 PROPOSED: 1345 mm X 865 mm CONC.
 ELLIPTICAL TRUNK STORM SEWER
 CONVEYANCE CAPACITY = 3.3 m³/s

REMOVE AND REPLACE EXISTING LOCAL STORM
 SEWER WITH TRUNK STORM SEWER

PROPOSED TRUNK STORM SEWER SIZE
 TO BE REVIEWED AT DETAILED DESIGN
 TO REDUCE DEPTH OF OVERTOPPING.

SEE PROJECT No. 165 & 166
 FOR WATERCOURSE AND
 CULVERT IMPROVEMENTS



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LEGEND

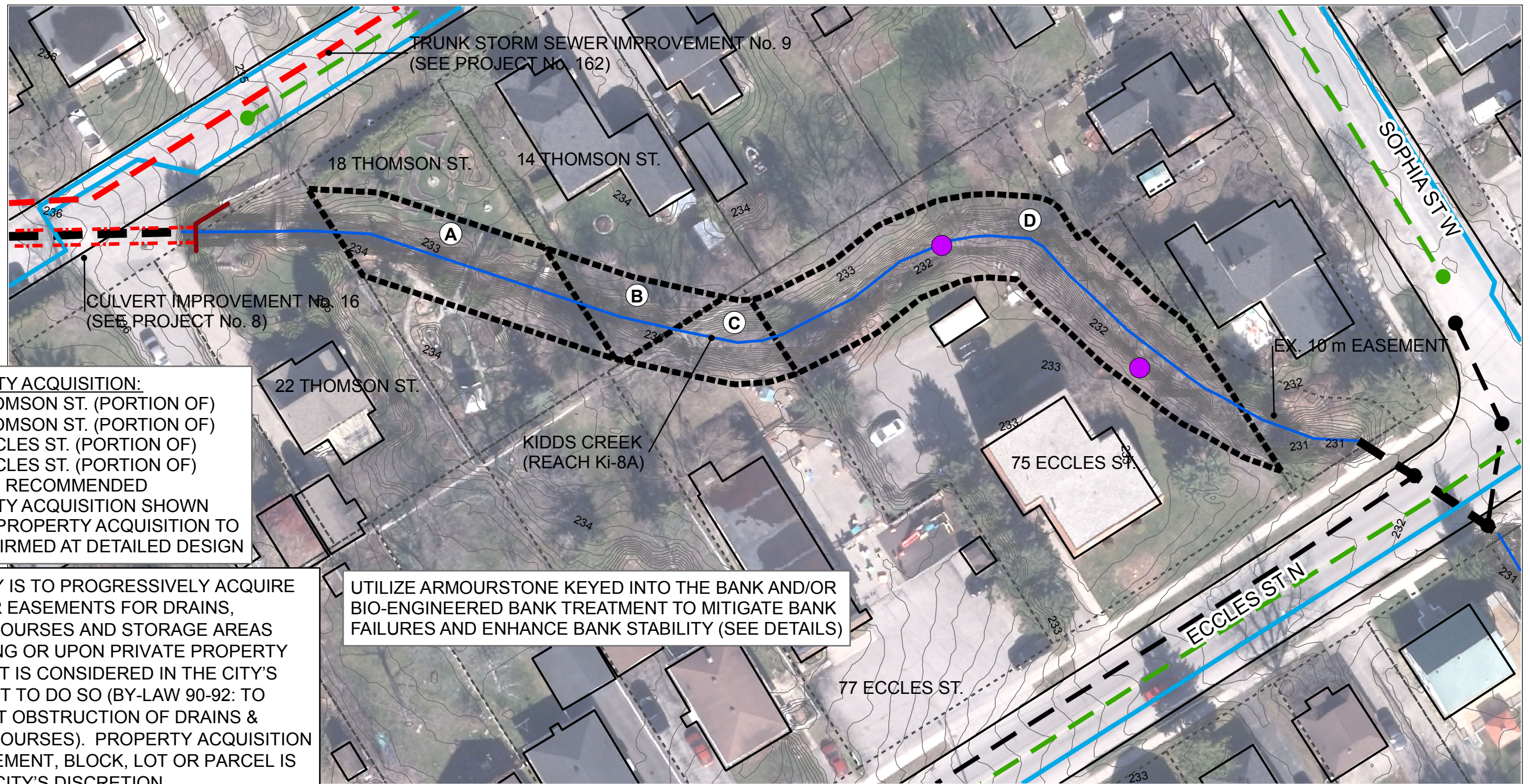
- EX. WATERCOURSE
- 27
- EX. STORM MAINTENANCE HOLE
- EX. CULVERT
- EX. STORM SEWER
- EXISTING EROSION SITES
- EX. PROPERTY LINE

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 162
 TRUNK STORM SEWER No. 9
 KIDDS CREEK WATERSHED

SCALE = 1:2,000

DATE: MARCH 2019



PROPERTY ACQUISITION:
 A) 18 THOMSON ST. (PORTION OF)
 B) 14 THOMSON ST. (PORTION OF)
 C) 77 ECCLES ST. (PORTION OF)
 D) 75 ECCLES ST. (PORTION OF)
 MINIMUM RECOMMENDED
 PROPERTY ACQUISITION SHOWN
 ACTUAL PROPERTY ACQUISITION TO
 BE CONFIRMED AT DETAILED DESIGN

THE CITY IS TO PROGRESSIVELY ACQUIRE
 LAND OR EASEMENTS FOR DRAINS,
 WATERCOURSES AND STORAGE AREAS
 CROSSING OR UPON PRIVATE PROPERTY
 WHERE IT IS CONSIDERED IN THE CITY'S
 INTEREST TO DO SO (BY-LAW 90-92: TO
 PROHIBIT OBSTRUCTION OF DRAINS &
 WATERCOURSES). PROPERTY ACQUISITION
 VIA EASEMENT, BLOCK, LOT OR PARCEL IS
 TO THE CITY'S DISCRETION.

UTILIZE ARMOURSTONE KEYED INTO THE BANK AND/OR
 BIO-ENGINEERED BANK TREATMENT TO MITIGATE BANK
 FAILURES AND ENHANCE BANK STABILITY (SEE DETAILS)



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 written consent of the Corporation of the City of Barrie.

LEGEND

- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 163
 WATERCOURSE IMPROVEMENT No. 2
 KIDD'S CREEK WATERSHED

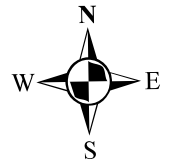
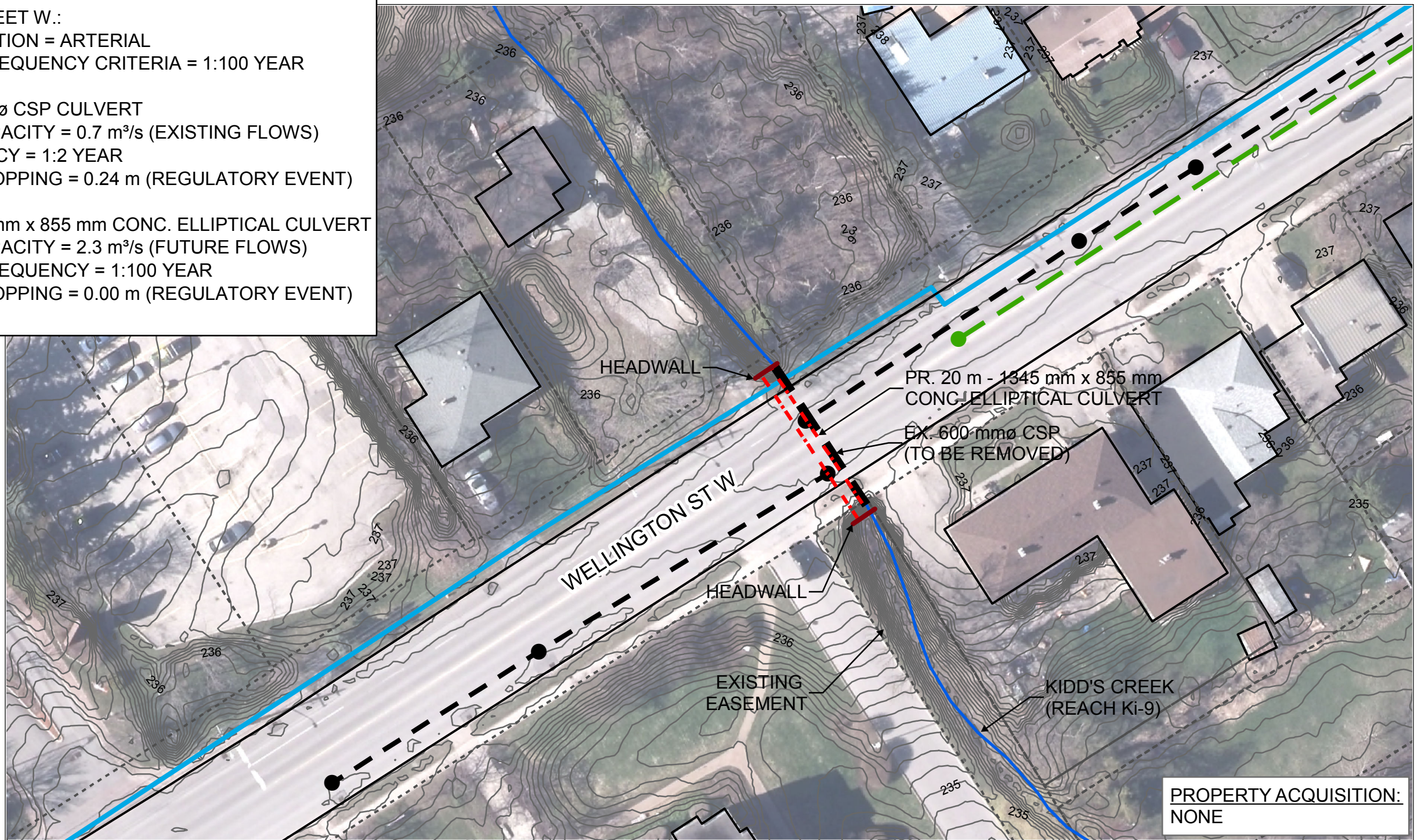
SCALE = 1:500

DATE: MARCH 2019

WELLINGTON STREET W.:
ROAD CLASSIFICATION = ARTERIAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: 600 mm \varnothing CSP CULVERT
CONVEYANCE CAPACITY = 0.7 m³/s (EXISTING FLOWS)
DESIGN FREQUENCY = 1:2 YEAR
DEPTH OF OVERTOPPING = 0.24 m (REGULATORY EVENT)

PROPOSED: 1345 mm x 855 mm CONC. ELLIPTICAL CULVERT
CONVEYANCE CAPACITY = 2.3 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY = 1:100 YEAR
DEPTH OF OVERTOPPING = 0.00 m (REGULATORY EVENT)



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LEGEND

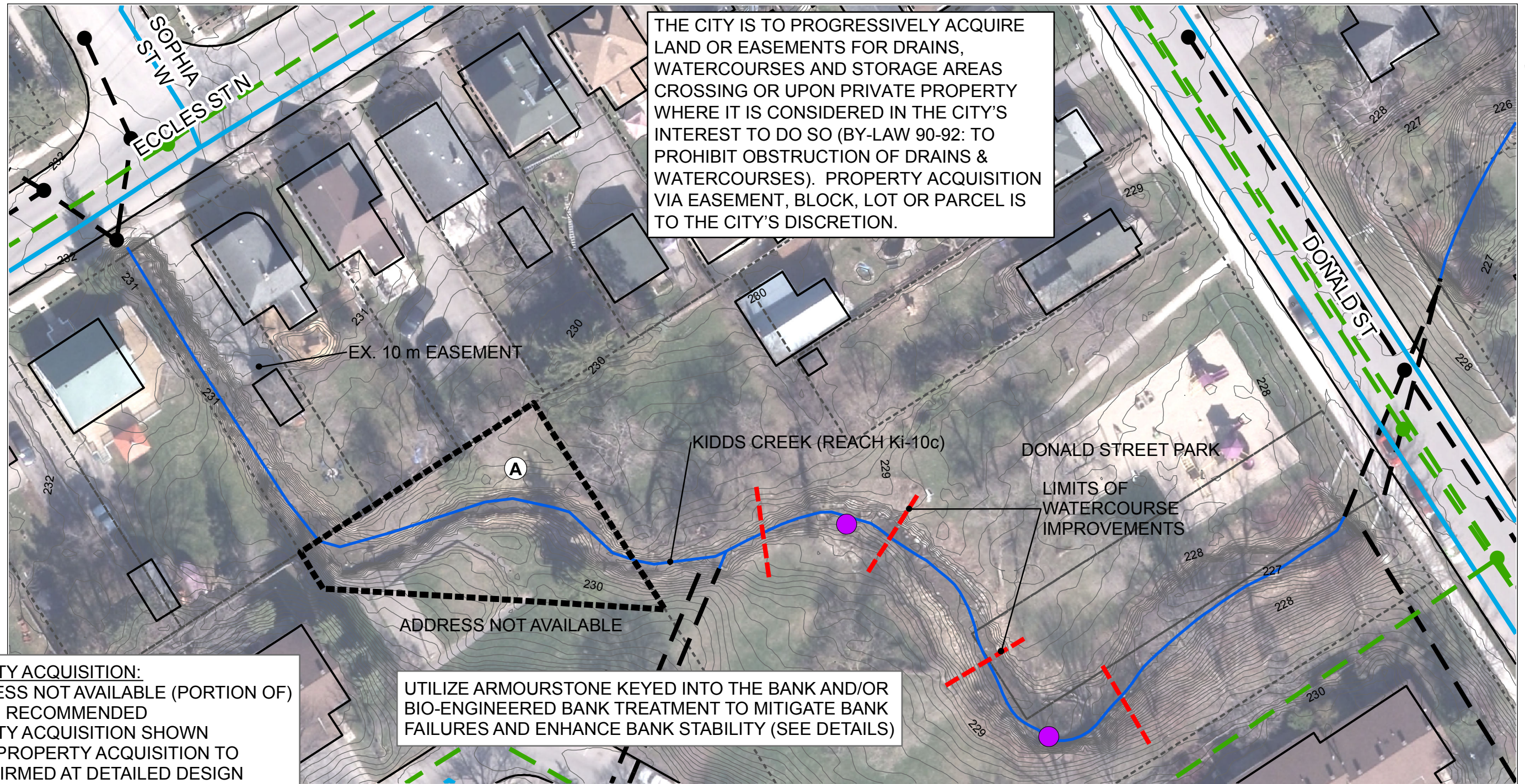
- | | |
|------------------------------|---------------------------------|
| --- PR. CULVERT | --- EX. SANITARY SEWER |
| --- PR. STORM SEWER | ● EX. SANITARY MAINTENANCE HOLE |
| ● PR STORM MAINTENANCE HOLE | --- EX. WATERMAIN |
| --- EX. STORM SEWER | --- EX. CULVERT |
| ● EX. STORM MAINTENANCE HOLE | --- EX. PROPERTY LINE |
| --- WATERCOURSE | --- PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 9
CULVERT IMPROVEMENT No. 18
(WELLINGTON STREET WEST)
KIDD'S CREEK WATERSHED

SCALE = 1:500

DATE: MARCH 2019



PROPERTY ACQUISITION:
A) ADDRESS NOT AVAILABLE (PORTION OF)
MINIMUM RECOMMENDED
PROPERTY ACQUISITION SHOWN
ACTUAL PROPERTY ACQUISITION TO
BE CONFIRMED AT DETAILED DESIGN

UTILIZE ARMOURSTONE KEYED INTO THE BANK AND/OR
BIO-ENGINEERED BANK TREATMENT TO MITIGATE BANK
FAILURES AND ENHANCE BANK STABILITY (SEE DETAILS)



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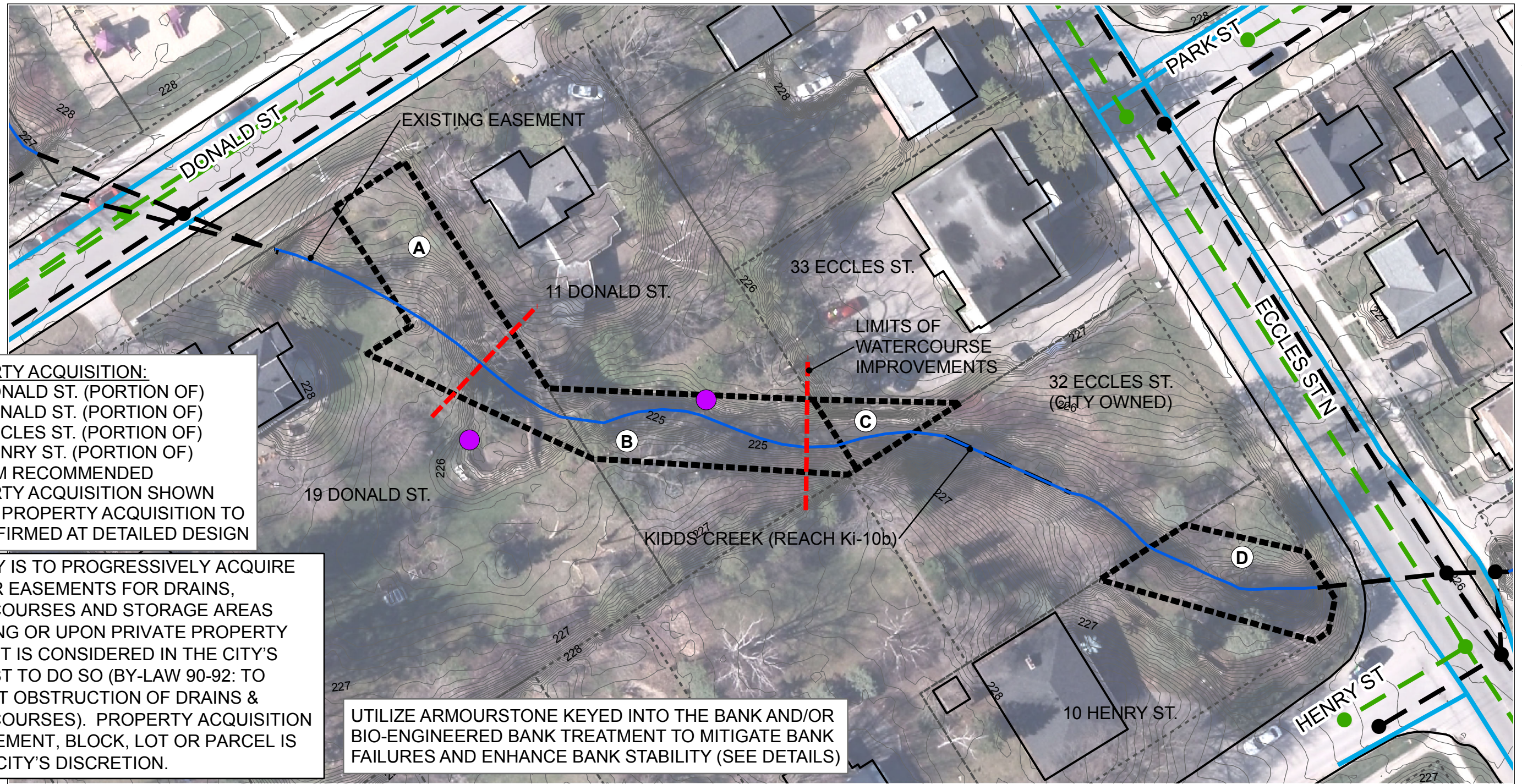
LEGEND

- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 10
WATERCOURSE IMPROVEMENT No. 3
KIDD'S CREEK WATERSHED
(SHEET 1 OF 3)
SCALE = 1:500

DATE: MARCH 2019



PROPERTY ACQUISITION:
 A) 19 DONALD ST. (PORTION OF)
 B) 11 DONALD ST. (PORTION OF)
 C) 38 ECCLES ST. (PORTION OF)
 D) 10 HENRY ST. (PORTION OF)
 MINIMUM RECOMMENDED
 PROPERTY ACQUISITION SHOWN
 ACTUAL PROPERTY ACQUISITION TO
 BE CONFIRMED AT DETAILED DESIGN

THE CITY IS TO PROGRESSIVELY ACQUIRE
 LAND OR EASEMENTS FOR DRAINS,
 WATERCOURSES AND STORAGE AREAS
 CROSSING OR UPON PRIVATE PROPERTY
 WHERE IT IS CONSIDERED IN THE CITY'S
 INTEREST TO DO SO (BY-LAW 90-92: TO
 PROHIBIT OBSTRUCTION OF DRAINS &
 WATERCOURSES). PROPERTY ACQUISITION
 VIA EASEMENT, BLOCK, LOT OR PARCEL IS
 TO THE CITY'S DISCRETION.

UTILIZE ARMOURSTONE KEYED INTO THE BANK AND/OR
 BIO-ENGINEERED BANK TREATMENT TO MITIGATE BANK
 FAILURES AND ENHANCE BANK STABILITY (SEE DETAILS)



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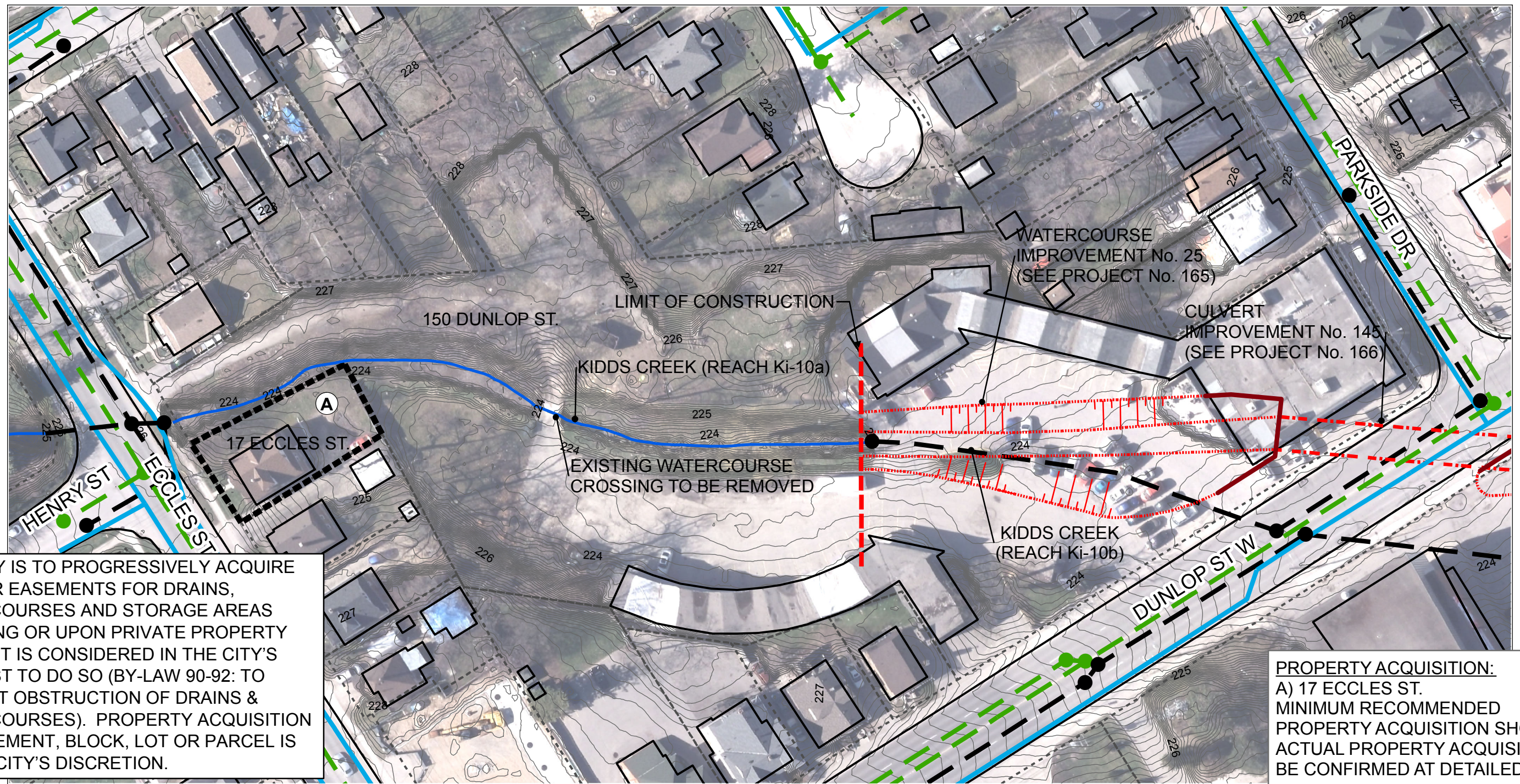
LEGEND

- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 10
 WATERCOURSE IMPROVEMENT No. 3
 KIDD'S CREEK WATERSHED
 (SHEET 2 OF 3)
 SCALE = 1:500

DATE: MARCH 2018



THE CITY IS TO PROGRESSIVELY ACQUIRE LAND OR EASEMENTS FOR DRAINS, WATERCOURSES AND STORAGE AREAS CROSSING OR UPON PRIVATE PROPERTY WHERE IT IS CONSIDERED IN THE CITY'S INTEREST TO DO SO (BY-LAW 90-92: TO PROHIBIT OBSTRUCTION OF DRAINS & WATERCOURSES). PROPERTY ACQUISITION VIA EASEMENT, BLOCK, LOT OR PARCEL IS TO THE CITY'S DISCRETION.

PROPERTY ACQUISITION:
A) 17 ECCLES ST.
MINIMUM RECOMMENDED PROPERTY ACQUISITION SHOWN
ACTUAL PROPERTY ACQUISITION TO BE CONFIRMED AT DETAILED DESIGN



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LEGEND

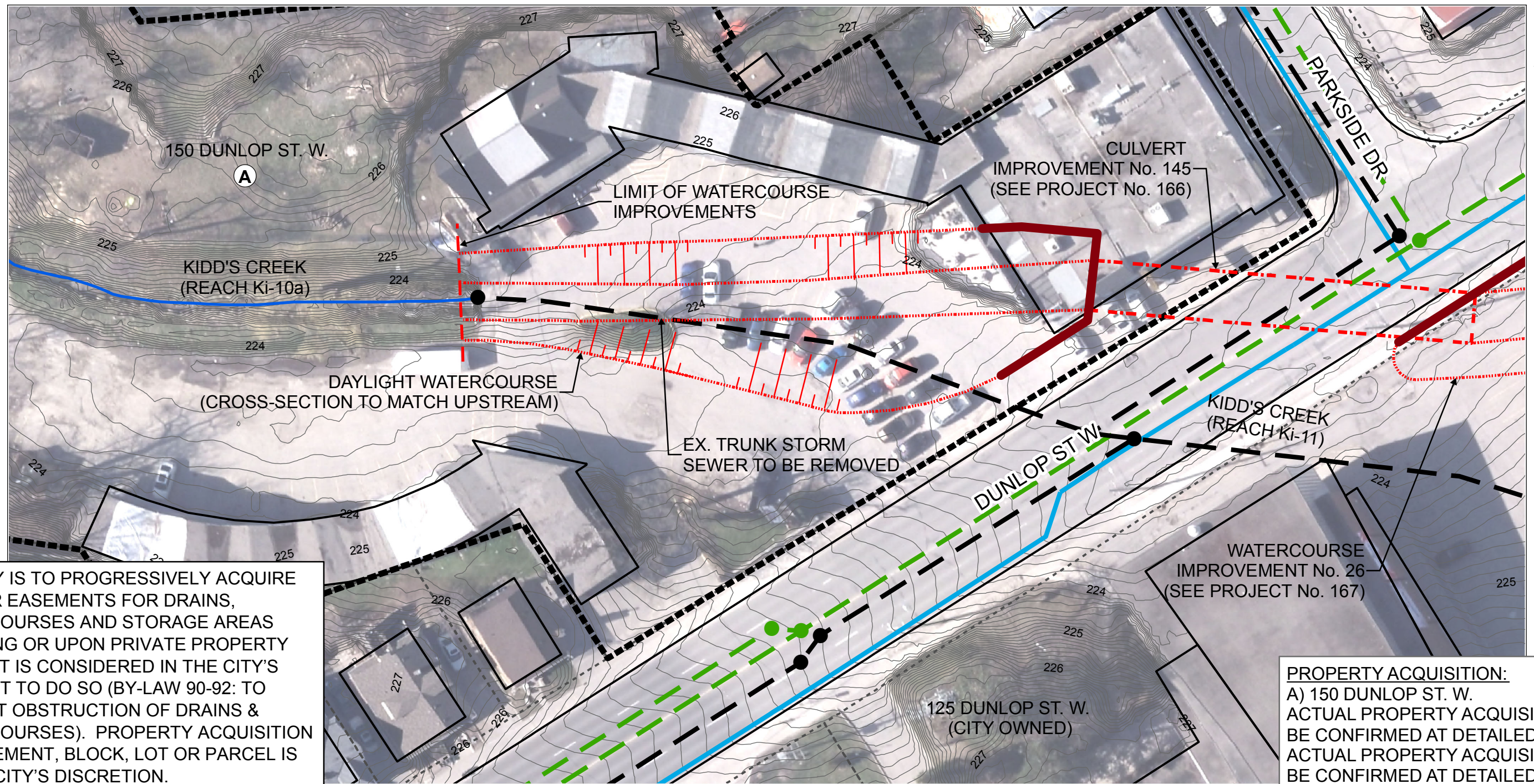
- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | PROPERTY ACQUISITION | | |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 10
WATERCOURSE IMPROVEMENT No. 3
KIDD'S CREEK WATERSHED
(SHEET 3 OF 3)

SCALE = 1:750

DATE: MARCH 2019



THE CITY IS TO PROGRESSIVELY ACQUIRE LAND OR EASEMENTS FOR DRAINS, WATERCOURSES AND STORAGE AREAS CROSSING OR UPON PRIVATE PROPERTY WHERE IT IS CONSIDERED IN THE CITY'S INTEREST TO DO SO (BY-LAW 90-92: TO PROHIBIT OBSTRUCTION OF DRAINS & WATERCOURSES). PROPERTY ACQUISITION VIA EASEMENT, BLOCK, LOT OR PARCEL IS TO THE CITY'S DISCRETION.

PROPERTY ACQUISITION:
A) 150 DUNLOP ST. W.
ACTUAL PROPERTY ACQUISITION TO BE CONFIRMED AT DETAILED DESIGN
ACTUAL PROPERTY ACQUISITION TO BE CONFIRMED AT DETAILED DESIGN



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LEGEND

- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 165
WATERCOURSE IMPROVEMENT No. 25
KIDD'S CREEK WATERSHED

SCALE = 1:500

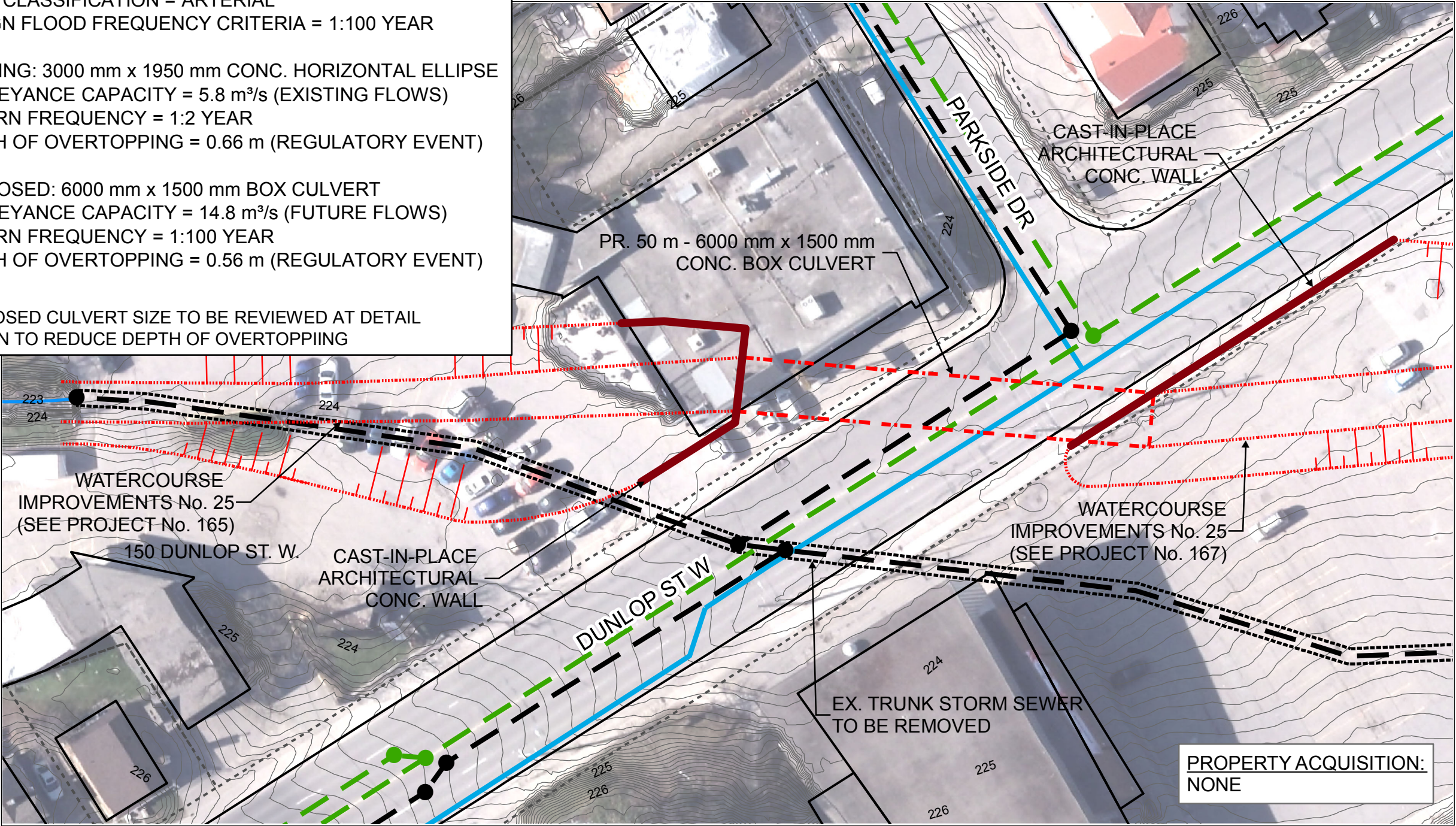
DATE: MARCH 2019

DUNLOP STREET W.:
ROAD CLASSIFICATION = ARTERIAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: 3000 mm x 1950 mm CONC. HORIZONTAL ELLIPSE
CONVEYANCE CAPACITY = 5.8 m³/s (EXISTING FLOWS)
RETURN FREQUENCY = 1:2 YEAR
DEPTH OF OVERTOPPING = 0.66 m (REGULATORY EVENT)

PROPOSED: 6000 mm x 1500 mm BOX CULVERT
CONVEYANCE CAPACITY = 14.8 m³/s (FUTURE FLOWS)
RETURN FREQUENCY = 1:100 YEAR
DEPTH OF OVERTOPPING = 0.56 m (REGULATORY EVENT)

PROPOSED CULVERT SIZE TO BE REVIEWED AT DETAIL
DESIGN TO REDUCE DEPTH OF OVERTOPPING



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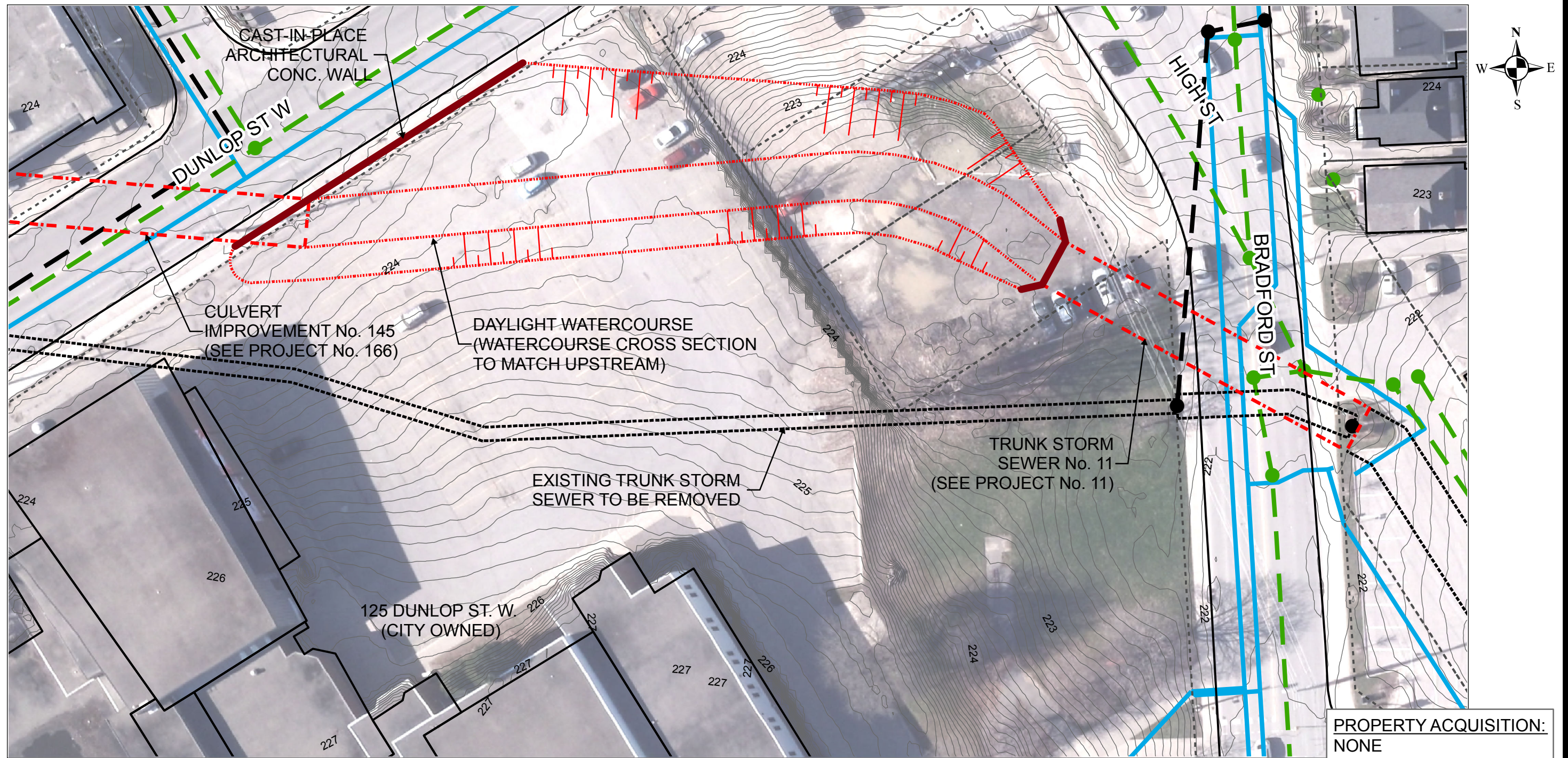
LEGEND

- | | |
|------------------------------|---------------------------------|
| --- PR. CULVERT | --- EX. SANITARY SEWER |
| --- PR. STORM SEWER | ● EX. SANITARY MAINTENANCE HOLE |
| ● PR STORM MAINTENANCE HOLE | --- EX. WATERMAIN |
| --- EX. STORM SEWER | --- EX. CULVERT |
| ● EX. STORM MAINTENANCE HOLE | --- EX. PROPERTY LINE |
| --- WATERCOURSE | --- PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 166
CULVERT IMPROVEMENT No. 145
(DUNLOP STREET WEST)
KIDD'S CREEK WATERSHED
SCALE = 1:500

DATE: MARCH 2019



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LEGEND

- | | | | |
|--|-------------------------------|--|----------------------------|
| | BANK EROSION | | EX. SANITARY SEWER |
| | BED EROSION/ KNICKPOINT | | EX. WATERCOURSE |
| | INFRASTRUCTURE AT RISK | | EX. WATERMAIN |
| | PR. STORM MAINTENANCE HOLE | | EX. STORM MAINTENANCE HOLE |
| | PR. STORM SEWER | | EX. STORM SEWER |
| | EX. SANITARY MAINTENANCE HOLE | | EX. PROPERTY LINE |
| | | | PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 167
WATERCOURSE IMPROVEMENT No. 26
KIDD'S CREEK WATERSHED

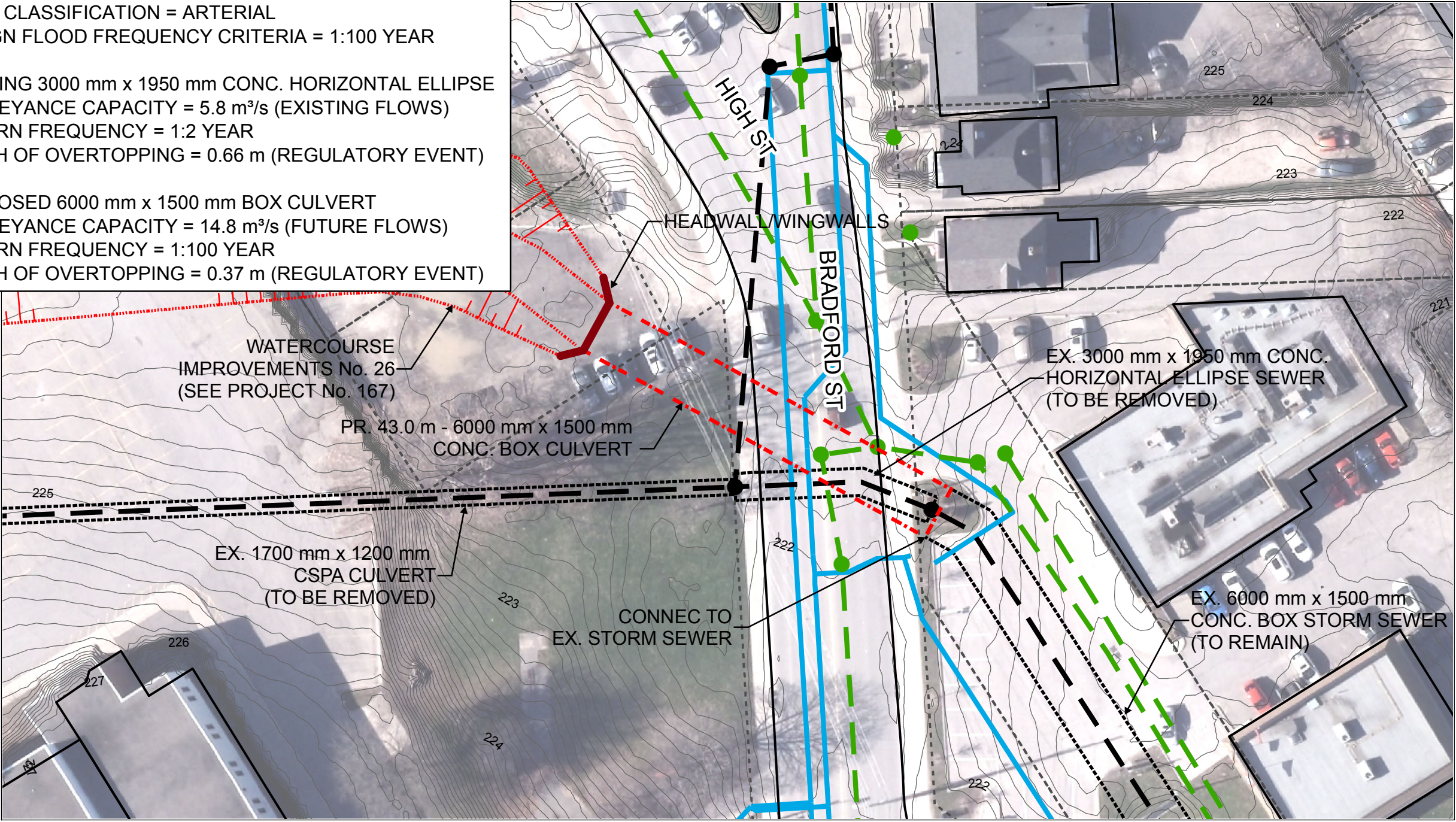
SCALE = 1:500

DATE: MARCH 2019

BRADFORD STREET
ROAD CLASSIFICATION = ARTERIAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING 3000 mm x 1950 mm CONC. HORIZONTAL ELLIPSE
CONVEYANCE CAPACITY = 5.8 m³/s (EXISTING FLOWS)
RETURN FREQUENCY = 1:2 YEAR
DEPTH OF OVERTOPPING = 0.66 m (REGULATORY EVENT)

PROPOSED 6000 mm x 1500 mm BOX CULVERT
CONVEYANCE CAPACITY = 14.8 m³/s (FUTURE FLOWS)
RETURN FREQUENCY = 1:100 YEAR
DEPTH OF OVERTOPPING = 0.37 m (REGULATORY EVENT)



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LEGEND

- | | |
|------------------------------|---------------------------------|
| --- PR. CULVERT | --- EX. SANITARY SEWER |
| --- PR. STORM SEWER | ● EX. SANITARY MAINTENANCE HOLE |
| ● PR STORM MAINTENANCE HOLE | --- EX. WATERMAIN |
| --- EX. STORM SEWER | --- EX. CULVERT |
| ● EX. STORM MAINTENANCE HOLE | --- EX. PROPERTY LINE |
| --- WATERCOURSE | --- PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 11A
TRUNK STORM SEWER No. 11
KIDDS CREEK WATERSHED
SCALE = 1:500

DATE: MARCH 2019