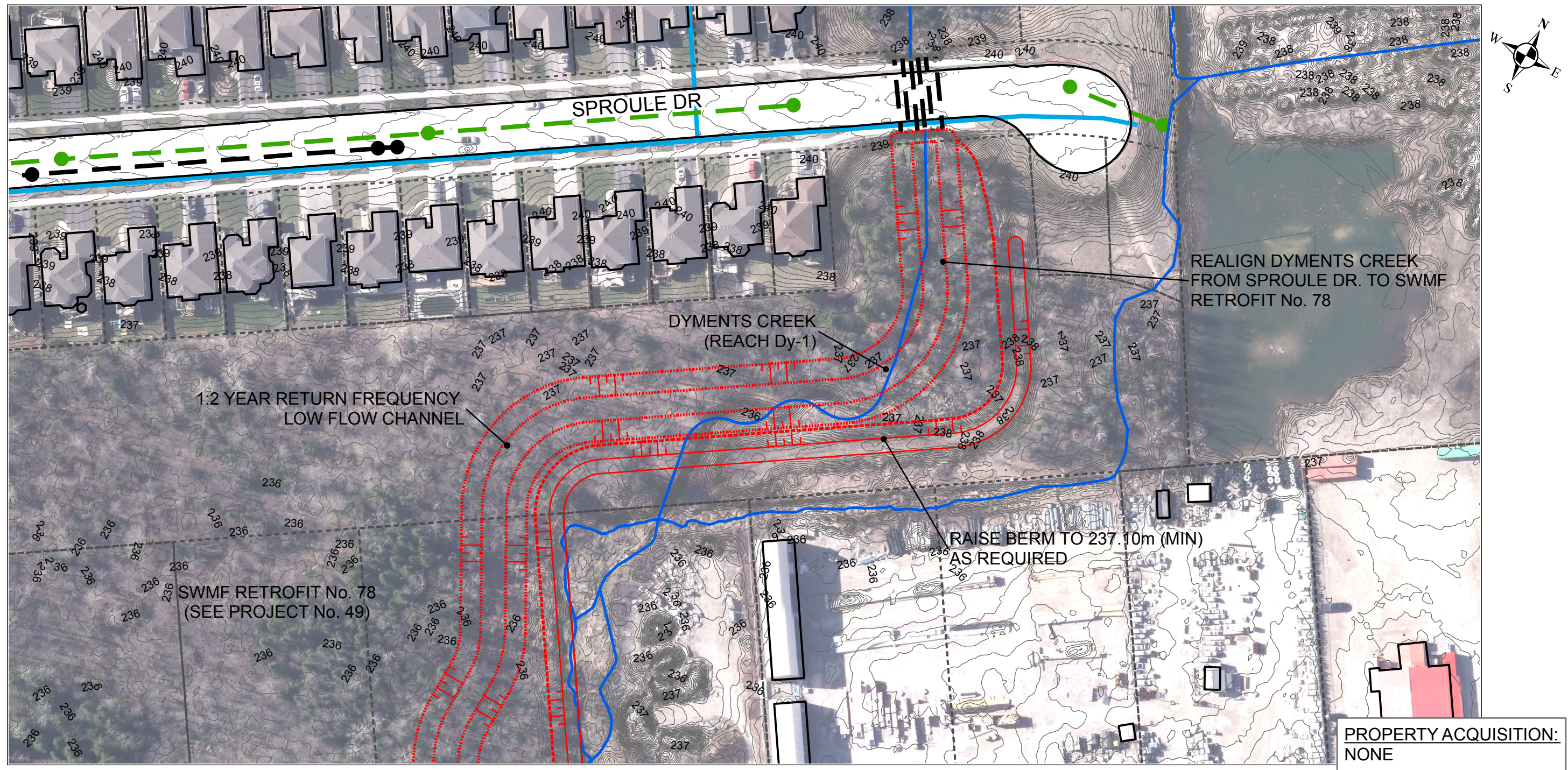


**Appendix N:
Final Preferred Solutions
Conceptual Designs – Dyments
Creek Watershed**



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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 |

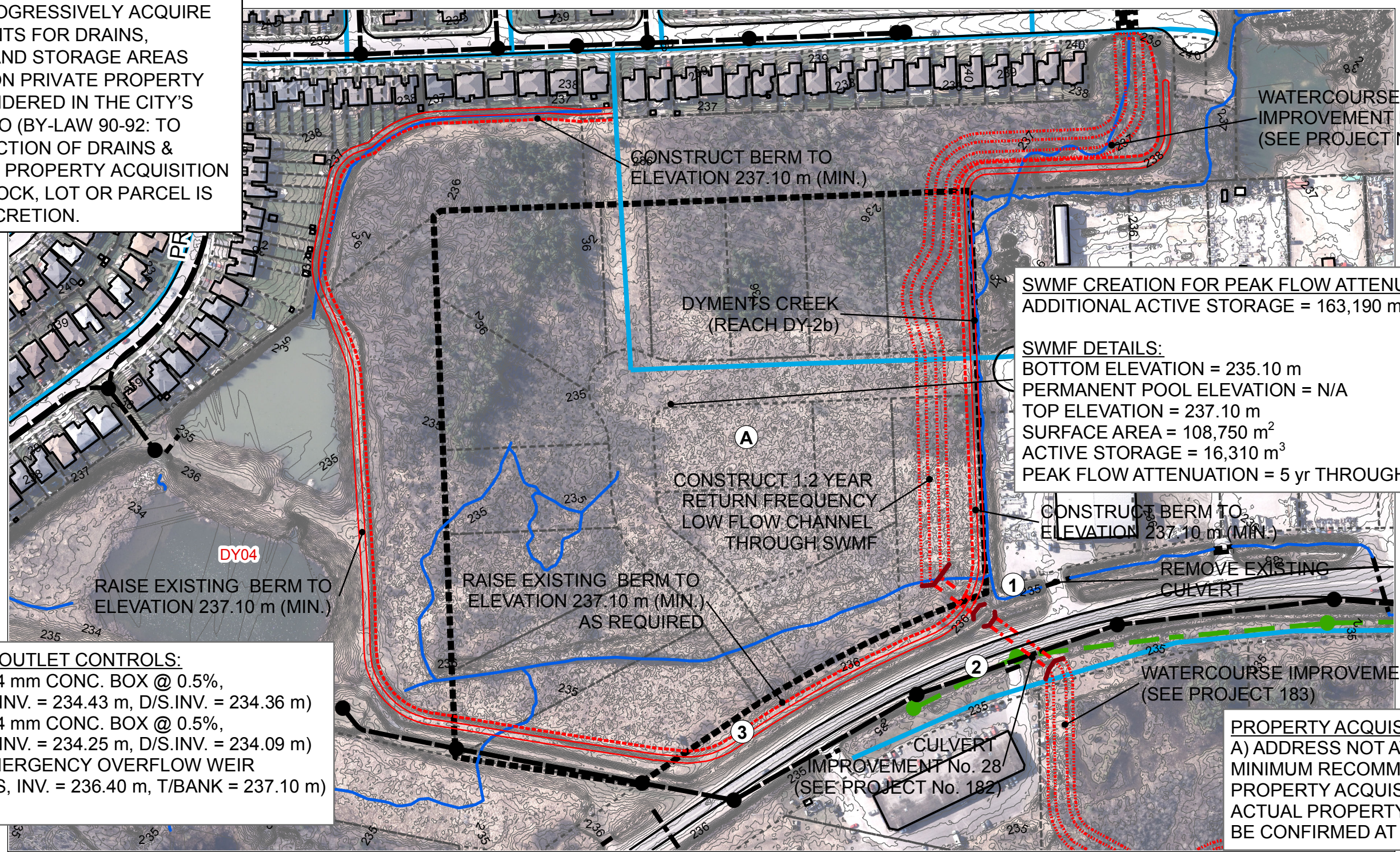
DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 49
WATERCOURSE IMPROVEMENT No. 29
DYMENTS CREEK WATERSHED

SCALE = 1:1,000

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.



SWMF CREATION FOR PEAK FLOW ATTENUATION:
ADDITIONAL ACTIVE STORAGE = 163,190 m³

SWMF DETAILS:
BOTTOM ELEVATION = 235.10 m
PERMANENT POOL ELEVATION = N/A
TOP ELEVATION = 237.10 m
SURFACE AREA = 108,750 m²
ACTIVE STORAGE = 16,310 m³
PEAK FLOW ATTENUATION = 5 yr THROUGH REGIONAL STORM

- PROPOSED SWMF OUTLET CONTROLS:**
- 1) 1 - 2438 mm X 914 mm CONC. BOX @ 0.5%,
15 m LONG, (U/S.INV. = 234.43 m, D/S.INV. = 234.36 m)
 - 2) 1 - 3048 mm X 914 mm CONC. BOX @ 0.5%,
33 m LONG, (U/S.INV. = 234.25 m, D/S.INV. = 234.09 m)
 - 3) 1 - 55 m WIDE EMERGENCY OVERFLOW WEIR
(5:1 SIDE SLOPES, INV. = 236.40 m, T/BANK = 237.10 m)

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



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LEGEND

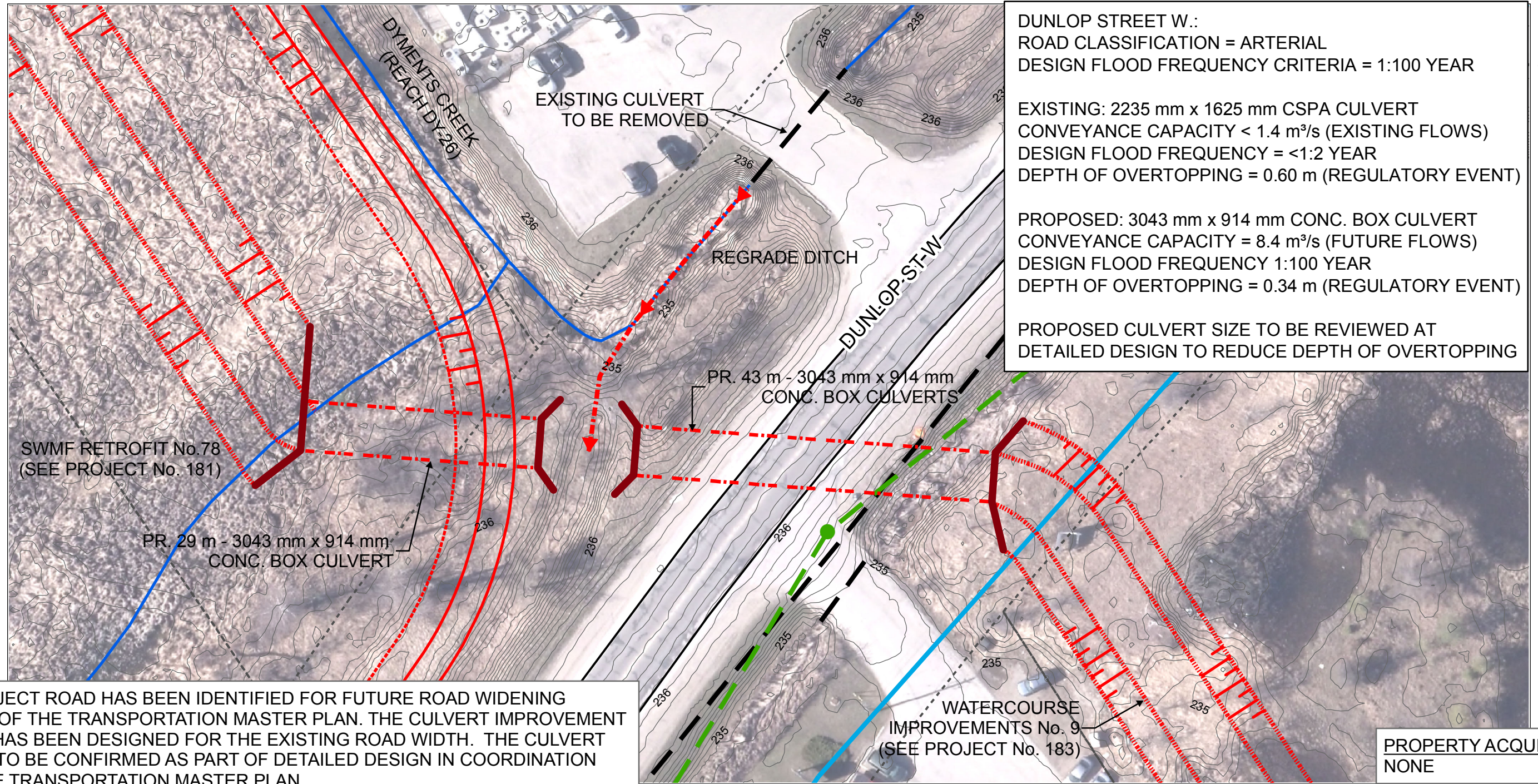
- | | |
|---------------------------------|------------------------------|
| ● PR STORM MAINTENANCE HOLE | — EX. WATERMAIN |
| — PR. STORM SEWER | ● EX. STORM MAINTENANCE HOLE |
| — EX. SANITARY SEWER | — EX. STORM SEWER |
| ● EX. SANITARY MAINTENANCE HOLE | — EX. WATERCOURSE |
| ▨ PR. LID | ▨ EX. PROPERTY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

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 181
SWMF RETROFIT No. 78
DYMENTS CREEK WATERSHED

SCALE = 1:2,500

DATE: MARCH 2019



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

EXISTING: 2235 mm x 1625 mm CSPA CULVERT
 CONVEYANCE CAPACITY < 1.4 m³/s (EXISTING FLOWS)
 DESIGN FLOOD FREQUENCY = <1:2 YEAR
 DEPTH OF OVERTOPPING = 0.60 m (REGULATORY EVENT)

PROPOSED: 3043 mm x 914 mm CONC. BOX CULVERT
 CONVEYANCE CAPACITY = 8.4 m³/s (FUTURE FLOWS)
 DESIGN FLOOD FREQUENCY 1:100 YEAR
 DEPTH OF OVERTOPPING = 0.34 m (REGULATORY EVENT)

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

THE SUBJECT ROAD HAS BEEN IDENTIFIED FOR FUTURE ROAD WIDENING AS PART OF THE TRANSPORTATION MASTER PLAN. THE CULVERT IMPROVEMENT SHOWN HAS BEEN DESIGNED FOR THE EXISTING ROAD WIDTH. THE CULVERT LENGTH TO BE CONFIRMED AS PART OF DETAILED DESIGN IN COORDINATION WITH THE TRANSPORTATION MASTER PLAN.



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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 |

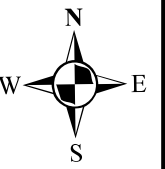
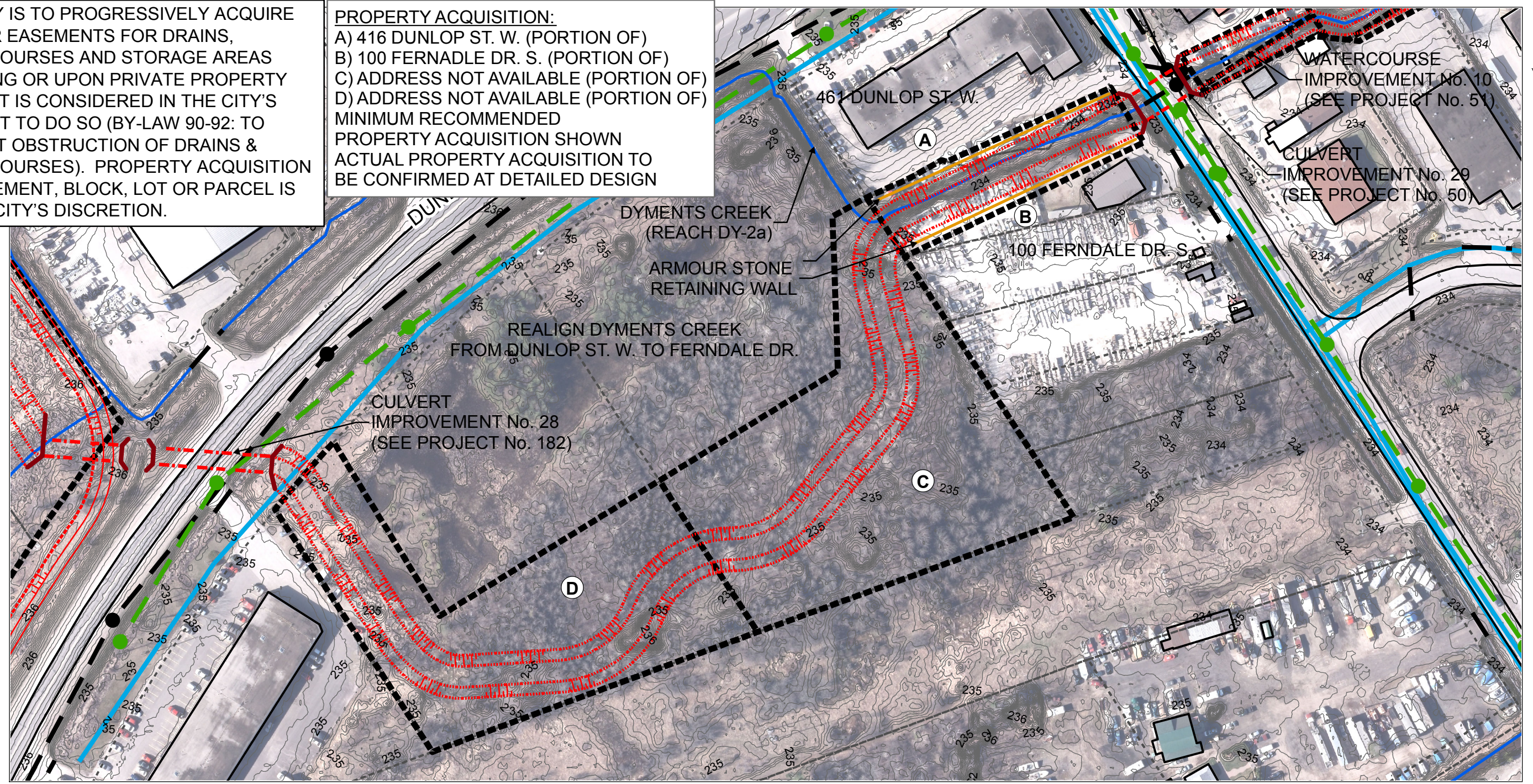
DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 182
 CULVERT IMPROVEMENT No. 28
 (DUNLOP ST. W.)
 DYMENTS CREEK WATERSHED
 SCALE = 1:500

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) 416 DUNLOP ST. W. (PORTION OF)
 B) 100 FERNDALE DR. S. (PORTION OF)
 C) ADDRESS NOT AVAILABLE (PORTION OF)
 D) ADDRESS NOT AVAILABLE (PORTION OF)
 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. 183
 WATERCOURSE IMPROVEMENT No. 9
 DYMENTS CREEK WATERSHED

SCALE = 1:1,500

DATE: MARCH 2019

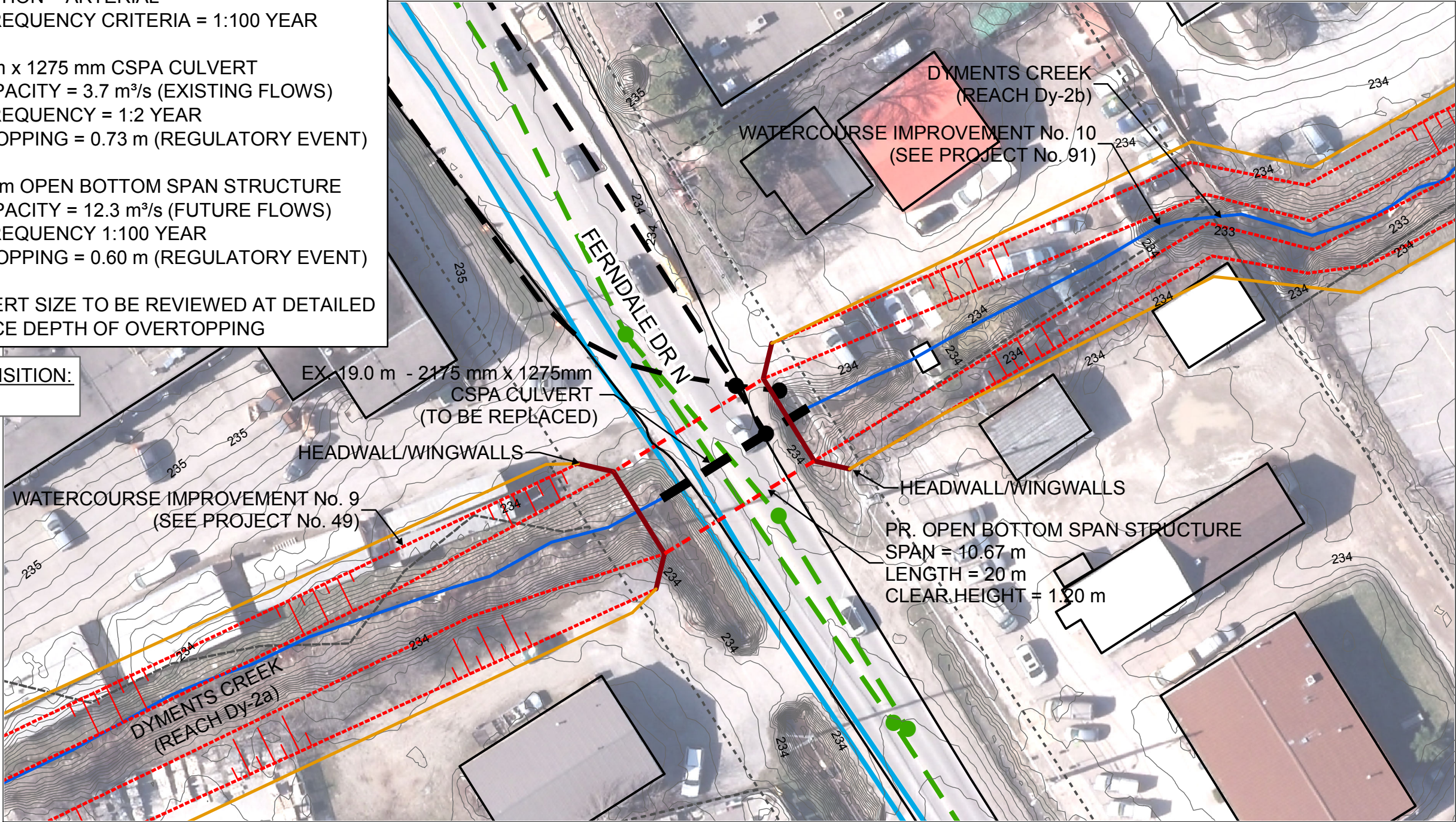
FERNDALE DRIVE N.:
ROAD CLASSIFICATION = ARTERIAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: 2175 mm x 1275 mm CSPA CULVERT
CONVEYANCE CAPACITY = 3.7 m³/s (EXISTING FLOWS)
DESIGN FLOOD FREQUENCY = 1:2 YEAR
DEPTH OF OVERTOPPING = 0.73 m (REGULATORY EVENT)

PROPOSED: 10.67 m OPEN BOTTOM SPAN STRUCTURE
CONVEYANCE CAPACITY = 12.3 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY 1:100 YEAR
DEPTH OF OVERTOPPING = 0.60 m (REGULATORY EVENT)

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

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 |

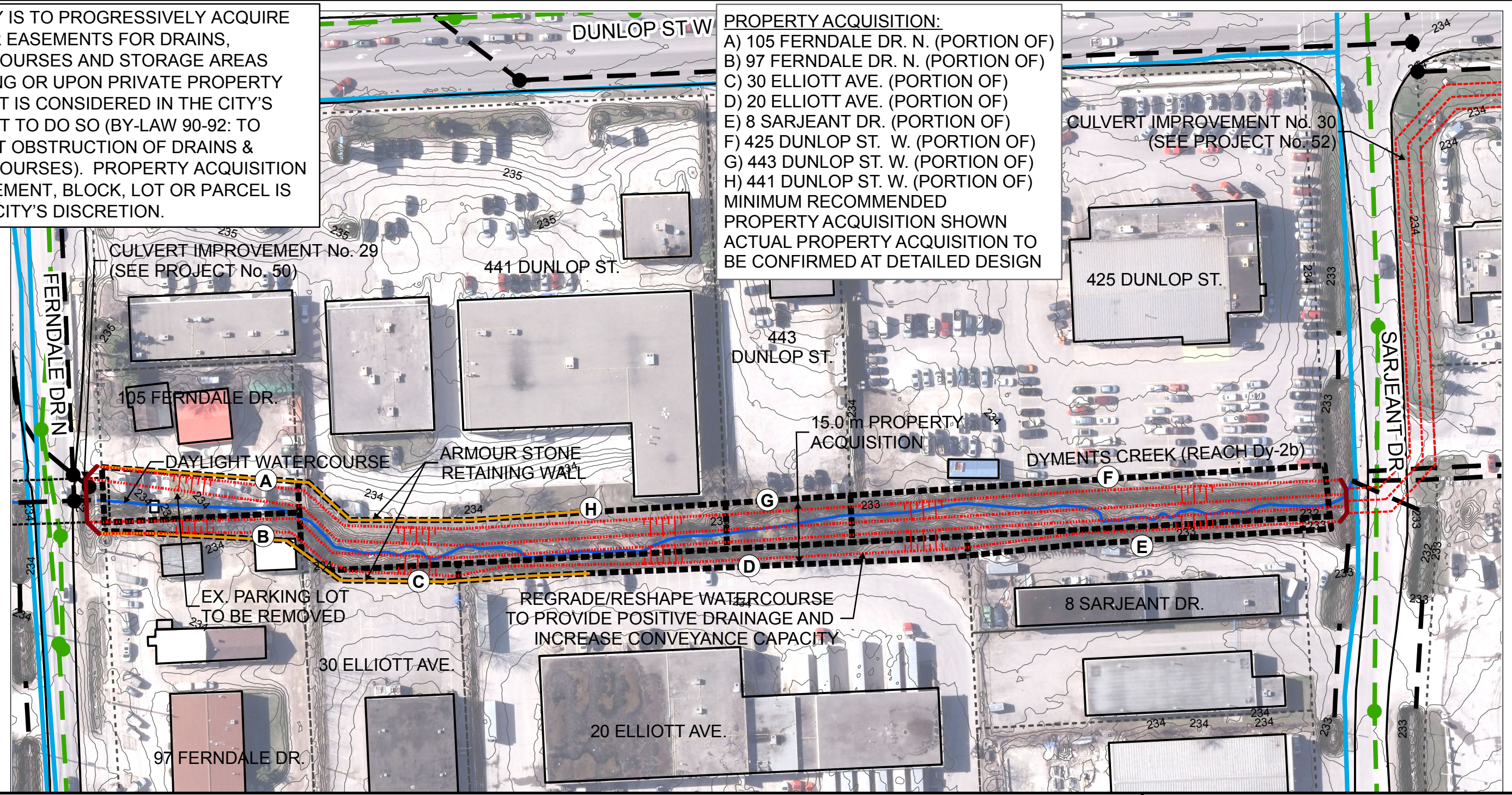
DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 50
CULVERT IMPROVEMENT No. 29
(FERNDAL DR. N.)
DYMENTS CREEK WATERSHED
SCALE = 1:500

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) 105 FERNDAL DR. N. (PORTION OF)
B) 97 FERNDAL DR. N. (PORTION OF)
C) 30 ELLIOTT AVE. (PORTION OF)
D) 20 ELLIOTT AVE. (PORTION OF)
E) 8 SARJEANT DR. (PORTION OF)
F) 425 DUNLOP ST. W. (PORTION OF)
G) 443 DUNLOP ST. W. (PORTION OF)
H) 441 DUNLOP ST. W. (PORTION OF)
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 |

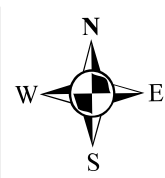
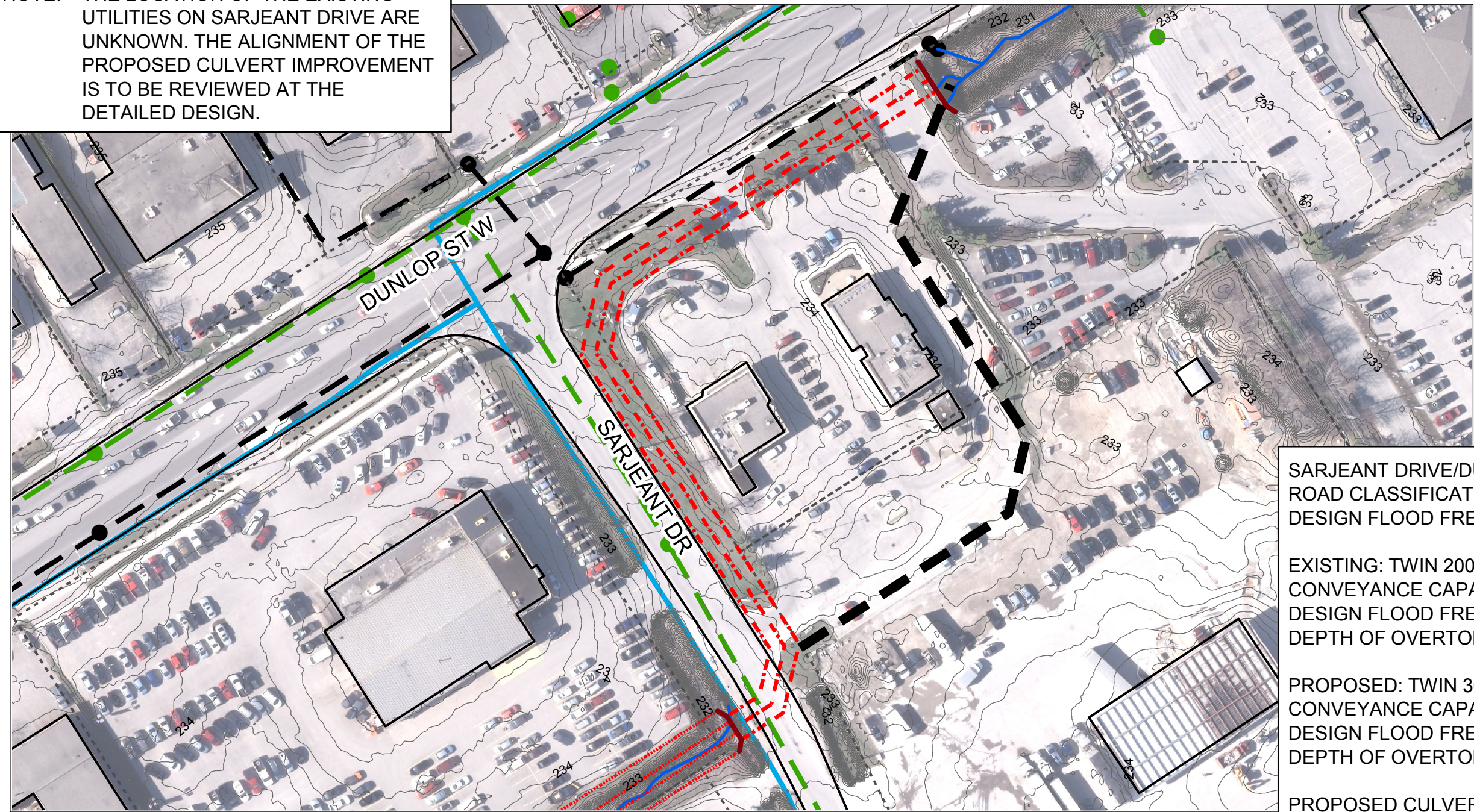
DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 51
WATERCOURSE IMPROVEMENT No. 10
DYMENTS CREEK WATERSHED

SCALE = 1:1,000

DATE: MARCH 2019

NOTE: THE LOCATION OF THE EXISTING UTILITIES ON SARJEANT DRIVE ARE UNKNOWN. THE ALIGNMENT OF THE PROPOSED CULVERT IMPROVEMENT IS TO BE REVIEWED AT THE DETAILED DESIGN.



PROPERTY ACQUISITION:
NONE

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

EXISTING: TWIN 2000 mm x 1500 mm CSPA CULVERTS
CONVEYANCE CAPACITY = 8.0 m³/s (EXISTING FLOWS)
DESIGN FLOOD FREQUENCY = 1:10 YEAR
DEPTH OF OVERTOPPING = 0.49m (REGULATORY EVENT)

PROPOSED: TWIN 3000 mm x 1500 mm BOX CULVERTS
CONVEYANCE CAPACITY = 18.0 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY 1:100 YEAR
DEPTH OF OVERTOPPING = 0.44 m (REGULATORY EVENT)

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



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LEGEND

- CULVERT (PREFERRED ROUTE)
- PR. STORM SEWER
- PR STORM MAINTENANCE HOLE
- EX. STORM SEWER
- EX. STORM MAINTENANCE HOLE
- WATERCOURSE

- EX. SANITARY SEWER
- EX. SANITARY MAINTENANCE HOLE
- EX. WATERMAIN
- EX. CULVERT
- EX. PROPERTY LINE
- PROPERTY ACQUISITION

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 52
CULVERT IMPROVEMENT No. 30
(SARJEANT DR.)
DYMENTS CREEK WATERSHED
SCALE = 1:1,000

DATE: MARCH 2019

HART DRIVE:
ROAD CLASSIFICATION = MINOR COLLECTOR
DESIGN FLOOD FREQUENCY CRITERIA = 1:50 YEAR
MDP RECOMMENDED FLOOD
FREQUENCY CRITERIA = 1:100 YEAR

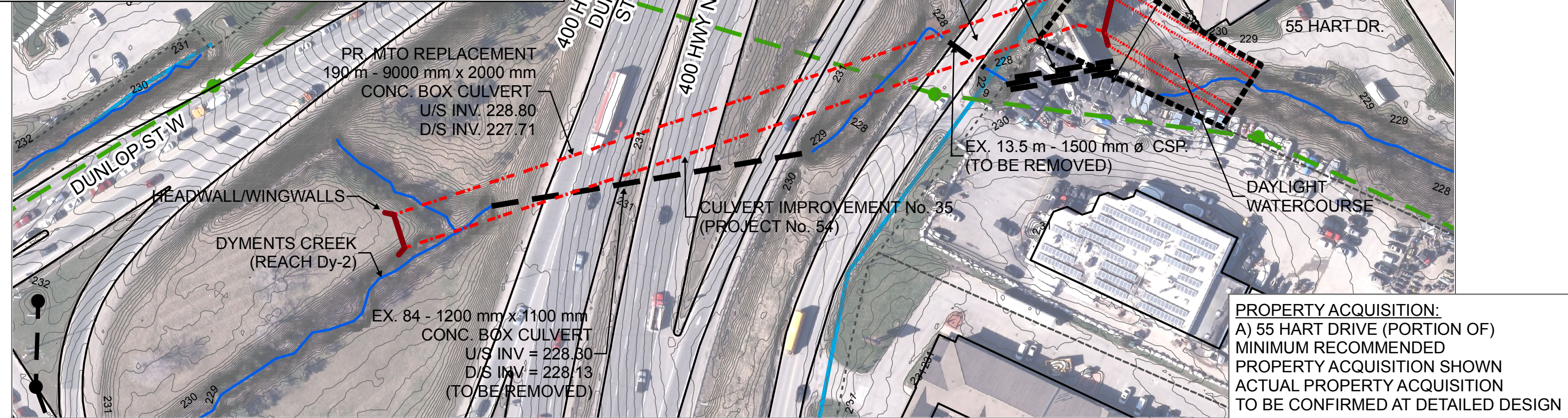
EXISTING: 1500 mm Ø CSP CULVERT
CONVEYANCE CAPACITY < 3.7 m³/s (EXISTING FLOWS)
DESIGN FLOOD FREQUENCY < 1:2 YEAR
DEPTH OF OVERTOPPING = 0.70 m (REGULATORY EVENT)

PROPOSED: 9000 mm X 2000 mm CONC. BOX CULVERT
CONVEYANCE CAPACITY = 54.0 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY REGIONAL (HURRICANE HAZEL) STORM
DEPTH OF OVERTOPPING = 0.00 m (REGULATORY EVENT)

CONCEPTUAL DESIGNS OF CULVERT IMPROVEMENT No. 33 HAVE BEEN
PREPARED UNDER A SEPARATE STUDY (DRAWINGS AND HYDROLOGY
REPORT – PRELIMINARY DESIGN HIGHWAY 400)

MTO PROPOSED CULVERT IMPROVEMENTS TO BE
COMPLETED AS PART OF HIGHWAY 400 IMPROVEMENTS

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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written consent of the Corporation of the City of Barrie.

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. 54, 55 & 56
CULVERT IMPROVEMENT No. 32 & 33
& WATERCOURSE IMPROVEMENT No. 11
DYMENTS CREEK WATERSHED

SCALE = 1:1,000

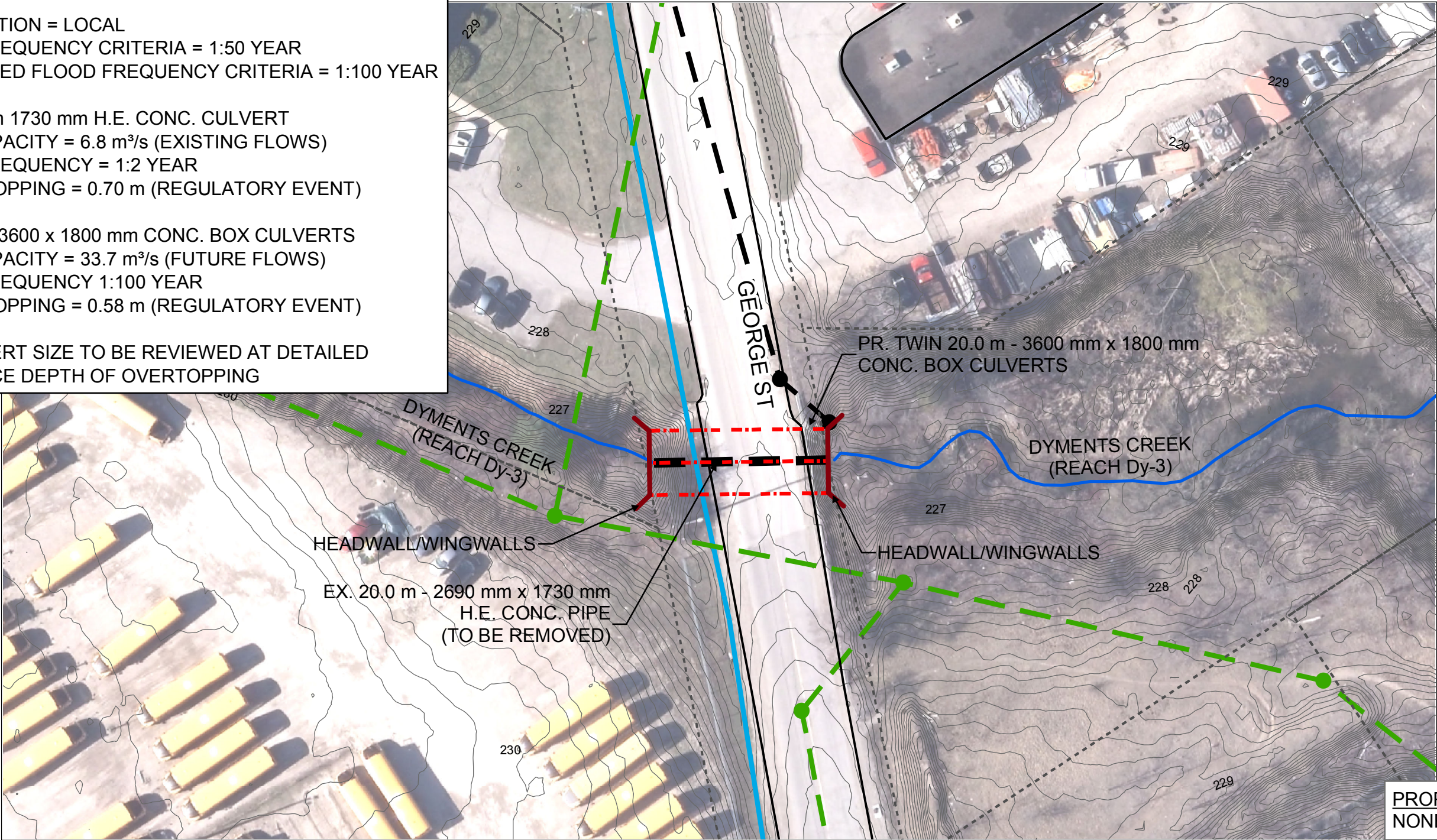
DATE: MARCH 2019

GEORGE STREET:
ROAD CLASSIFICATION = LOCAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:50 YEAR
MDP RECOMMENDED FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: 2960 mm 1730 mm H.E. CONC. CULVERT
CONVEYANCE CAPACITY = 6.8 m³/s (EXISTING FLOWS)
DESIGN FLOOD FREQUENCY = 1:2 YEAR
DEPTH OF OVERTOPPING = 0.70 m (REGULATORY EVENT)

PROPOSED: TWIN 3600 x 1800 mm CONC. BOX CULVERTS
CONVEYANCE CAPACITY = 33.7 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY 1:100 YEAR
DEPTH OF OVERTOPPING = 0.58 m (REGULATORY EVENT)

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



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. 57
CULVERT IMPROVEMENT No. 34
(GEORGE ST.)
DYMENTS CREEK WATERSHED
SCALE = 1:500

DATE: MARCH 2019

EXISTING SWMF OUTLET CONTROLS:

- 1) 1 - 1050 mm Ø OUTLET PIPE (INV. = 224.30 m)
- 2) 1 - EMERGENCY OVERFLOW WEIR
(5:1 SIDE SLOPES, INV. = 225.90 m)

EXISTING SWMF OUTLET CONTROLS TO BE REMOVED

PROPOSED SWMF OUTLET CONTROLS:

- 3) 2 - 2100 mm X 2100 mm CONC. BOX CULVERTS

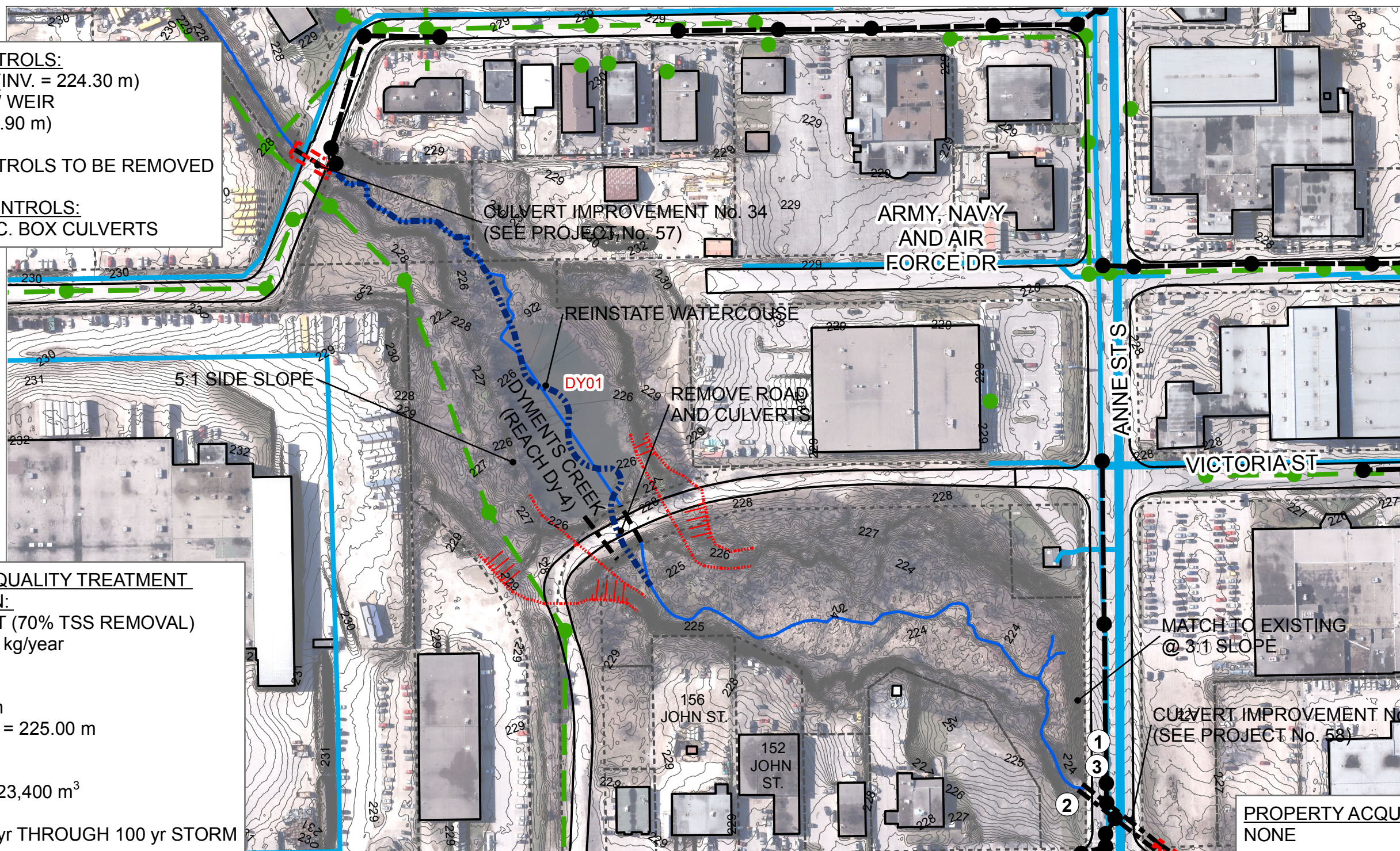
SWMF RETROFIT FOR WATER QUALITY TREATMENT

AND PEAK FLOW ATTENUATION:

LEVEL 2 "NORMAL" TREATMENT (70% TSS REMOVAL)
PHOSPHORUS REDUCTION = 0 kg/year

SWMF DETAILS:

BOTTOM ELEVATION = 223.00 m
PERMANENT POOL ELEVATION = 225.00 m
TOP ELEVATION = 227.75 m
SURFACE AREA = 30,457 m²
PERMANENT POOL VOLUME = 23,400 m³
ACTIVE STORAGE = 62,810 m³
PEAK FLOW ATTENUATION = 2 yr THROUGH 100 yr STORM



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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 |
| --- PR. WATERCOURSE | ▨ PROPERTY ACQUISITION |

DRAINAGE MASTER PLAN
FINAL PREFERRED ALTERNATIVE SOLUTION

PROJECT No. 169 & 170
CULVERT IMPROVEMENT 35 &
SWMF RETROFIT No. 79 (DY01)
DYMENTS CREEK WATERSHED

SCALE = 1:2,000

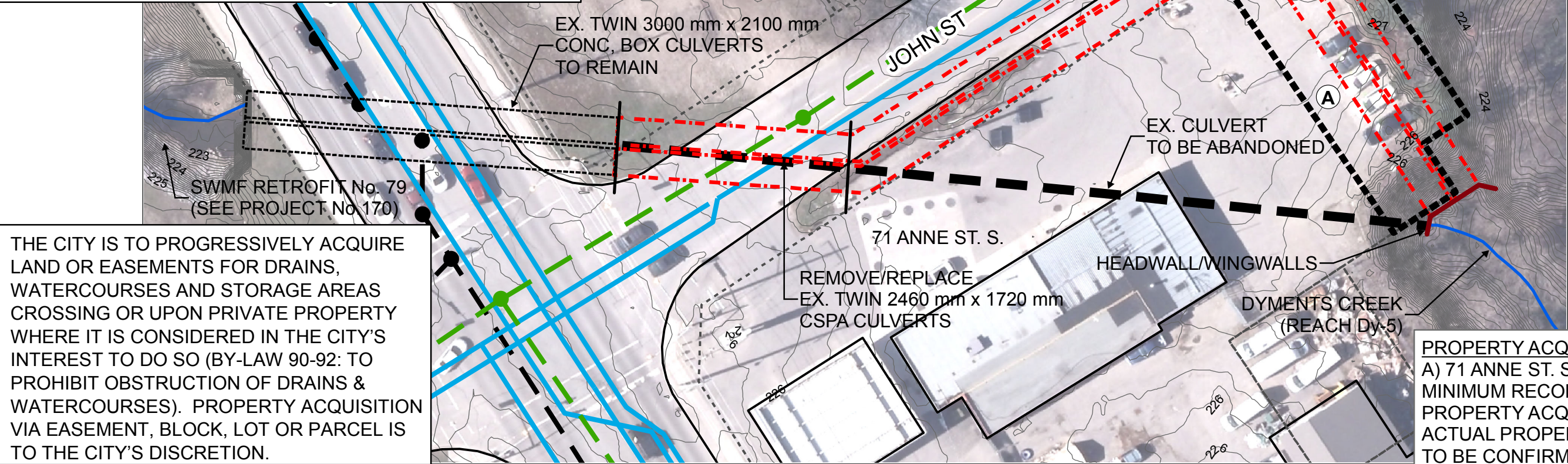
DATE: MARCH 2019

JOHN STREET AND ANNE STREET S.:
ROAD CLASSIFICATION = ARTERIAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: TWIN 2460 mm x 1720 mm CSPA CULVERTS
CONVEYANCE CAPACITY = 13.9 m³/s (EXISTING FLOWS)
DESIGN FLOOD FREQUENCY = 1:10 YEAR
DEPTH OF OVERTOPPING = 0.83 m (REGULATORY EVENT)

PROPOSED: TWIN 3000mm x 2100 mm CONC. BOX CULVERTS
CONVEYANCE CAPACITY = 28.9 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY 1:100 YEAR
DEPTH OF OVERTOPPING = 0.69 m (REGULATORY EVENT)

PROPOSED CULVERT SIZE TO BE REVIEWED AT DETAILED
DESIGN TO REDUCE OVERTOPING



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) 71 ANNE ST. S. (PORTION OF)
MINIMUM RECOMMENDED
PROPERTY ACQUISITION SHOWN
ACTUAL PROPERTY ACQUISITION
TO BE CONFIRMED AT DETAILED DESIGN



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The information contained in this drawing is solely for the use of the Corporation of the City of Barrie for the purpose for which it has been prepared and Tatham Engineering Ltd. undertakes no duty or accepts any responsibility to any third party who may rely upon this drawing. This drawing may not be used for any purpose other than that provided in the Contract between the Corporation of the City of Barrie and Tatham Engineering Ltd. nor may any detail or element of this drawing be removed, reproduced, electronically stored or transmitted in any form with the express written consent of the Corporation of the City of Barrie.

LEGEND

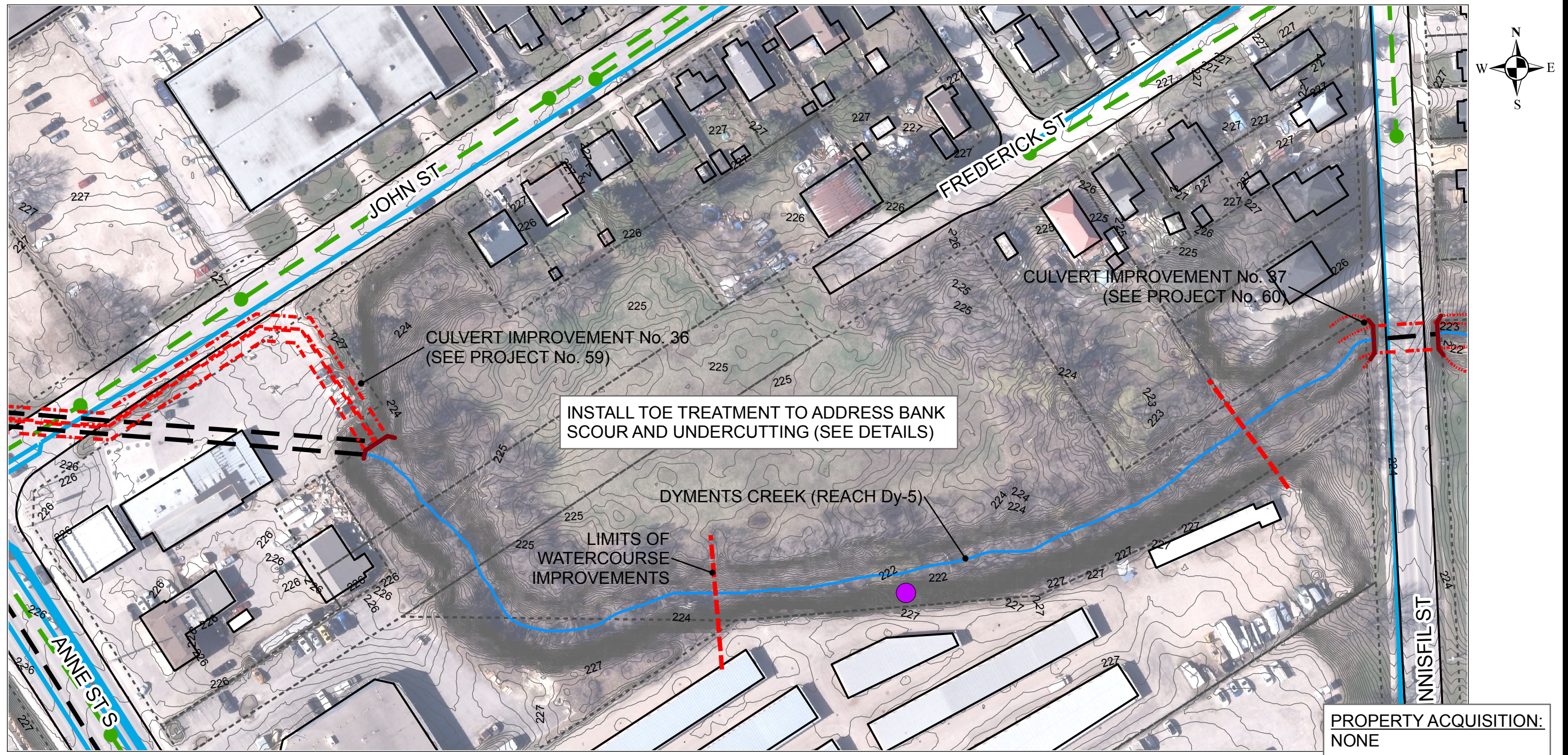
- | | |
|------------------------------|---------------------------------|
| --- PR. CULVERT | --- EX. SANITARY SEWER |
| --- PR. STORM SEWER | ● EX. SANITARY MAINTENANCE HOLE |
| ● PR STORM MAINTENANCE HOLE | --- EX. WATERMAIN |
| --- EX. STORM SEWER | --- EX. CULVERT |
| ● EX. STORM MAINTENANCE HOLE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

DRAINAGE MASTER PLAN **FINAL PREFERRED ALTERNATIVE SOLUTION**

PROJECT No. 58
CULVERT IMPROVEMENT No. 36
(ANNE ST. S. & JOHN ST.)
DYMENTS 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.59
WATERCOURSE IMPROVEMENT No. 12
DYMENTS CREEK WATERSHED

SCALE = 1:1,000

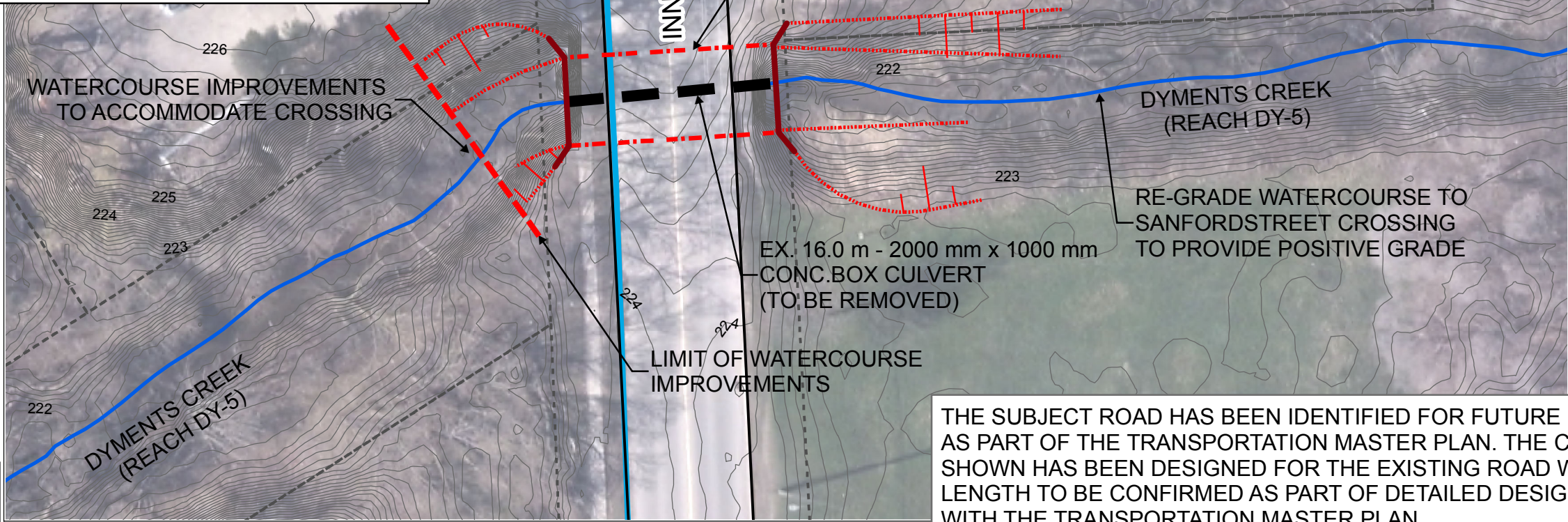
DATE: MARCH 2019

INNISFIL STREET:
ROAD CLASSIFICATION = MINOR COLLECTOR
DESIGN FLOOD FREQUENCY CRITERIA = 1:50 YEAR
MDP RECOMMENDED FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: 2000 mm x 1000 mm CONC. BOX CULVERT
CONVEYANCE CAPACITY = 4.2 m³/s (EXISTING FLOWS)
DESIGN FLOOD FREQUENCY = 1:2 YEAR
DEPTH OF OVERTOPPING = 1.01 m (REGULATORY EVENT)

PROPOSED: 6.71 m OPEN BOTTOM SPAN STRUCTURE
CONVEYANCE CAPACITY = 26.0 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY 1:50 YEAR
DEPTH OF OVERTOPPING = 0.78 m (REGULATORY EVENT)

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



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. 60
CULVERT IMPROVEMENT No. 37
(INNISFIL STREET)
DYMENTS CREEK WATERSHED
SCALE = 1:400

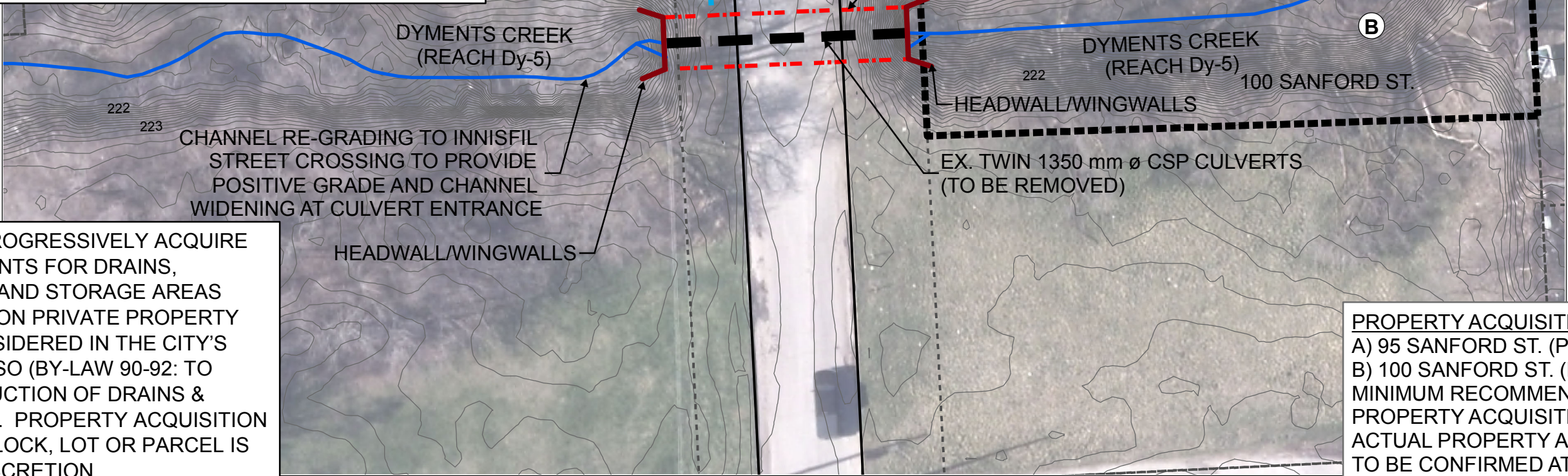
DATE: MARCH 2019

SANDFORD STREET:
ROAD CLASSIFICATION = URBAN LOCAL
DESIGN FLOOD FREQUENCY CRITERIA = 1:50 YEAR
MDP RECOMMENDED FLOOD FREQUENCY CRITERIA = 1:100 YEAR

EXISTING: TWIN 1350 mmø CSP CULVERTS
CONVEYANCE CAPACITY = 9.0 m³/s (EXISTING FLOW)
DESIGN FLOOD FREQUENCY = 1:5 YEAR
DEPTH OF OVERTOPPING = 0.78 m (REGULATORY EVENT)

PROPOSED: 4200 mm X 2100 mm CONC. BOX CULVERT
CONVEYANCE CAPACITY = 26.3 m³/s (FUTURE FLOWS)
DESIGN FLOOD FREQUENCY 1:50 YEAR
DEPTH OF OVERTOPPING = 0.77 m (REGULATORY EVENT)

PROPOSED CULVERT 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.

PROPERTY ACQUISITION:
A) 95 SANFORD ST. (PORTION OF)
B) 100 SANFORD ST. (PORTION OF)
MINIMUM RECOMMENDED
PROPERTY ACQUISITION SHOWN
ACTUAL PROPERTY ACQUISITION
TO BE CONFIRMED AT DETAILED DESIGN



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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

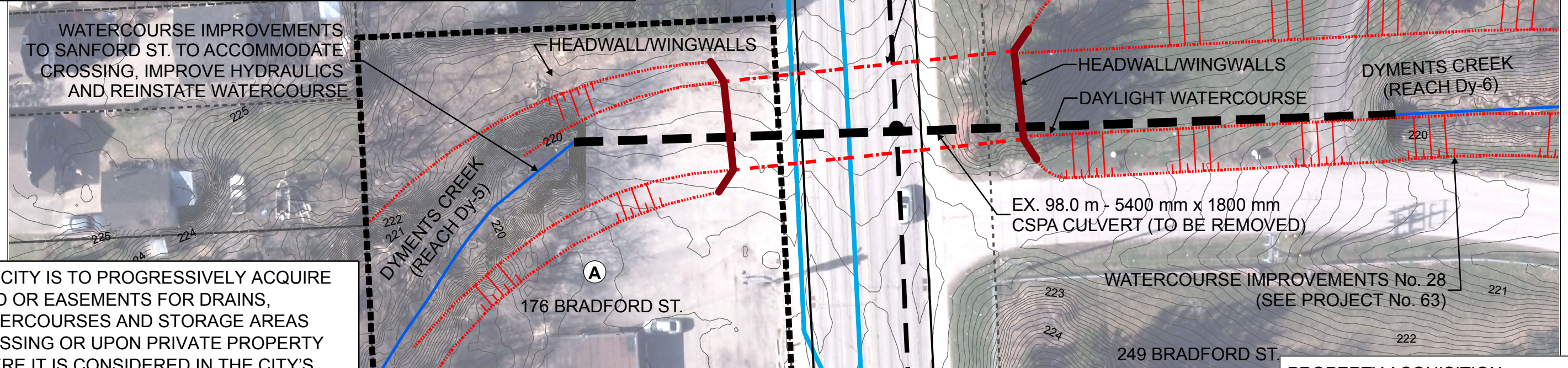
PROJECT No. 61
CULVERT IMPROVEMENT No. 38
(SANFORD ST.)
DYMENTS CREEK WATERSHED
SCALE = 1:400

DATE: MARCH 2019

BRADFORD STREET:
 ROAD CLASSIFICATION = ARTERIAL
 DESIGN FLOOD FREQUENCY CRITERIA = 1:100 YEAR
 MDP RECOMMENDED FLOOD FREQUENCY CRITERIA = REGULATORY STORM

EXISTING: 5400 mm x 1800 mm CSPA CULVERT
 CONVEYANCE CAPACITY = 21.5 m³/s (EXISTING FLOWS)
 DESIGN FLOOD FREQUENCY = 1:25 YEAR
 DEPTH OF OVERTOPPING = 0.86 m (REGULATORY EVENT)

PROPOSED: 10.67 m OPEN BOTTOM SPAN STRUCTURE
 CONVEYANCE CAPACITY = 30.1 m³/s (FUTURE FLOWS)
 DESIGN FLOOD FREQUENCY 1:100 YEAR
 DEPTH OF OVERTOPPING = 0.37 m (REGULATORY EVENT)



WATERCOURSE IMPROVEMENTS
 TO SANFORD ST. TO ACCOMMODATE
 CROSSING, IMPROVE HYDRAULICS
 AND REINSTATE WATERCOURSE

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.

THE SUBJECT ROAD HAS BEEN IDENTIFIED FOR FUTURE ROAD WIDENING
 AS PART OF THE TRANSPORTATION MASTER PLAN. THE CULVERT IMPROVEMENT
 SHOWN HAS BEEN DESIGNED FOR THE EXISTING ROAD WIDTH. THE CULVERT
 LENGTH TO BE CONFIRMED AS PART OF DETAILED DESIGN IN COORDINATION
 WITH THE TRANSPORTATION MASTER PLAN.

PROPERTY ACQUISITION:
 A) 176 BRADFORD ST.
 MINIMUM RECOMMENDED
 PROPERTY ACQUISITION SHOWN
 ACTUAL PROPERTY ACQUISITION
 TO BE CONFIRMED AT DETAILED DESIGN



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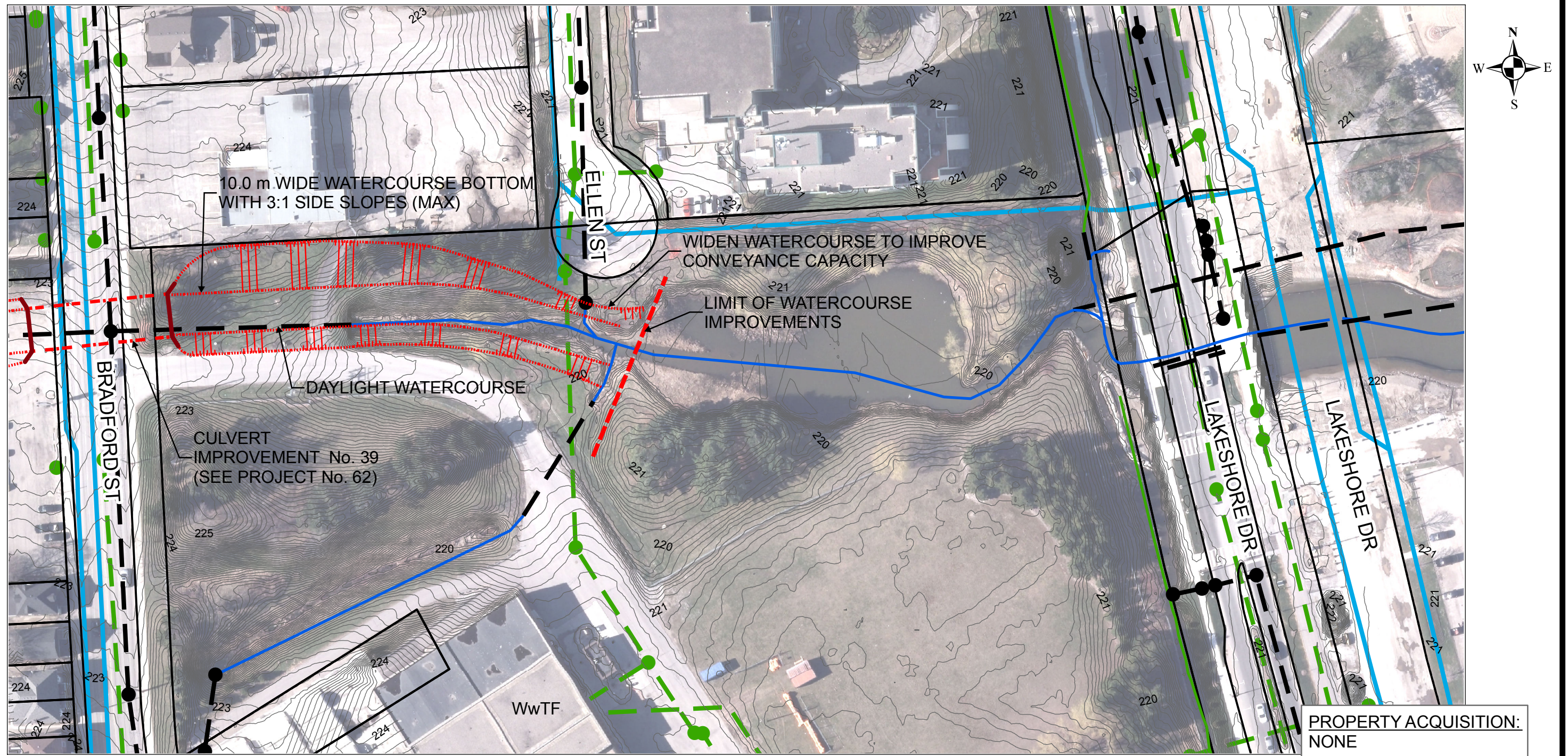
LEGEND

- | | |
|------------------------------|---------------------------------|
| --- 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. 62
 CULVERT IMPROVEMENT No. 39
 (BRADFORD STREET)
 DYMENTS 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. 63
WATERCOURSE IMPROVEMENT No. 28
DYMENTS CREEK WATERSHED

SCALE = 1:1,000

DATE: MARCH 2019