



TOWN OF MINTO

MUNICIPAL SERVICING AND DESIGN STANDARDS

April 2016

Updated – August, 2020

Updates Included in 2020 Edition of Municipal Servicing and Design Standards

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PART I

PROCEDURE AND DESIGN CRITERIA FOR MUNICIPAL SERVICING STANDARDS

Municipal servicing includes all works on existing and future Municipal Right-of-Ways, properties and easements.

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MANUAL OF MUNICIPAL SERVICING AND DESIGN STANDARDS

THE CORPORATION OF THE TOWN OF MINTO

1.0 GENERAL REQUIREMENTS

The Town of Minto has adopted the following procedure for development of private lands requiring the design, construction and approval of Municipal Services. This policy applies to developers that require site plan approval from the Town under Section 40 of the Planning Act, or for a subdivision approval under Section 50 of the Planning Act. A subdivision approval can include severance or consent agreement where municipal services are extended to service a lot or lot(s) on an existing road allowance, or a draft plan of subdivision where a subdivision agreement is signed to provide full municipal services on new road allowances created through the draft plan process.

1.1 PRE-CONSULTATION

The Town will allow for one (1) pre-consultation meeting. For which after an application along with a cash deposit will be required for administration and technical review process. Prior to the Town reviewing any projects requiring site plan, severance or subdivision approval the Town, at its sole discretion, may require the Developer to provide a pre-servicing report which discusses the requirements for the project. The report will cover but is not necessarily limited to the following items:

- a) Reference to the Town's Municipal Servicing Standards in effect at the time of the report;
- b) Location of the water supply, storm drainage outlet and sanitary sewer outlet for the project in keeping with the Town's current municipal requirements;
- c) Any special requirements with respect to the services to be provided or a change in the Town's normal servicing requirements;
- d) Easements which are known to be required by the Town and such other legal and property matters as the Town may be aware of at the time; The Town will provide plan and profile drawings of existing services where available to assist with preparing the pre-consultation report. For straight forward projects this step may be combined with the Plan Submission stage with written or email approval from the Town.

1.2 DELIVERABLES

All Municipal Servicing requiring an extension to existing municipal services or opening up new serviced lands shall be undertaken and/or supervised by a Professional Engineer (Engineer) registered with the Professional Engineers of Ontario, or a Consulting Engineering Firm authorized to practice in the province. All designs and drawings are to be in metric units.

1.2.1 Plan Submission

The Engineer shall submit digital, copies of plans, specifications and pertinent design calculations for the proposed Municipal Services in accordance with the requirements of the Town. One hard copy of the drawings and calculations shall be supplied with the digital submission.

- a) Where applicable, the plans to be submitted shall include the following:
 - i) A copy of the plan for registration in the case of a subdivision or such other legal survey plan(s) as may be available; the digital plans, specifications and other documentation submitted will be reviewed by the Town through its development Committee of staff consisting of the Public Works Director, Chief Building Official, Water Foreman, Sewer Foreman, Road and Drainage Superintendent, Town appointed Consulting Engineer and other staff necessary for thorough review of the project. Where necessary, written comments in email on the digital plans will be returned to the Consulting Engineer noting any required revisions with a view to minimizing the number of changes to the plan and in particular the number of printed plans prepared for the project.;
 - ii) General plan(s) of the project showing all municipal services;
 - iii) Area grading plan showing all road and lot drainage provisions including adjacent properties;
 - iv) A storm sewer drainage and storm water management plan including the entire area to be drained;
 - v) A sanitary sewer drainage plan including the entire area to be serviced;
 - vi) Plan and profile of all proposed streets and services;
 - vii) Plans showing miscellaneous details;
 - viii) Landscape plans;
 - ix) Tree and plant preservation plans;
 - x) Sediment and erosion control plans;
 - xi) Utility servicing plans including lighting;
 - xii) Such other plans as may be required for Site Plan/Subdivision Agreements.

- b) Where applicable the design calculations shall include:
 - i) Storm sewer design sheet;
 - ii) Stormwater Management Report;
 - iii) Sanitary sewer design sheet;
 - iv) Design notes on pipe strengths and bedding requirements;
 - v) Water distribution and fire flow calculations;
 - vi) Lighting design including photometric calculations;
 - vii) Geotechnical report including recommendations for roadways, parking lots, driveways, groundwater levels and sub-drain requirements;
 - viii) Traffic and noise abatement studies;
 - ix) Detailed cost breakdown of all Municipal Services to be provided.

The plans, specifications and other documentation submitted will be reviewed by the Town. Where necessary, one copy of information submitted will be returned to the Consulting Engineer noting any required revisions.

Where applicable, the Town will require copies of the approvals from the appropriate regulatory agencies: Ministry of Environment, Conservation and Parks (MECP); Maitland Valley Conservation Authority (MVCA); Saugeen Conservation Authority (SVCA); Ministry of Transportation (MTO); County of Wellington.

No construction work shall begin on any project until the developer has provided written proof to the satisfaction of the Town that approvals have been received from the regulatory agencies and the requirements of the subdivision or development agreement have been complied with including applicable security deposit. Right of way works to be completed prior to the issuance of a Building Permit to the satisfaction of the Public Works department.

The Engineer or Consulting Engineering Firm responsible for the works shall be required to provide full-time inspection during construction. The Engineer shall also be responsible for the submission of digital .dwg AutoCAD drawings to make a complete set of "As Recorded" drawings, following the completion of the works. Drawings are to be on 24" x 36" (610 mm x 915 mm) sheets. If items described in the drawings approved by the Town were constructed in variance to the designs illustrated in the approved proposed construction drawings, then the "As Recorded" submissions should be revised and/or edited to accurately reflect how the work in question was actually built. "As Recorded" drawings should also include: locations and inverts of sanitary and storm services; locations of water services.

The Engineer or Consulting Engineering Firm responsible for the project shall coordinate with the Town all necessary water, sanitary and storm system inspections during the maintenance period.

1.3 ACCEPTANCE OF SERVICES

1.3.1 Preliminary Acceptance

New services installed under this policy shall be secured in a servicing/subdivision and/or site plan agreement to the satisfaction of the Town.

- a) The Consulting Engineers for the Town and Westario Power or Hydro One have recommended approval to the Town of the written certification from the Developer's Consulting Engineer that all such services have been constructed and installed in accordance with the approved plans, specifications and the agreements; and
- b) The Developer has paid all monies payable by them to the Town and Westario Power or Hydro One.

Following which Town Council may, by resolution, grant *Preliminary Acceptance* of the applicable services and thereafter the said services shall be subject to the one-year guarantee and maintenance period.

Applicable services for *Preliminary Acceptance* are as follows:

- i) All underground services including sanitary sewers, storm sewers, stormwater management facility (if applicable) and watermain;
- ii) all roads including curbs and base asphalt;
- iii) stop signs at street intersections;
- iv) final grading, topsoil and seeding of parks.
- v) street lights, if applicable

1.3.2 Final Acceptance

Following which Town Council may by resolution grant *Final Acceptance* of all or part of the applicable services constituting a stage of servicing at a date at least one year after the date of the Preliminary Acceptance for such services, provided the Developer has paid all monies payable by them to the Town and Westario Power or Hydro One, and the Consulting Engineer for Town and Westario Power or Hydro One:

- a) Is satisfied the applicable services have been completely installed;

- b) Is satisfied that no repairs or maintenance work on the applicable services remains to be completed;
- c) Is satisfied that all standard iron bars, concrete monuments or monumentation of higher standard which were disturbed in the course of building, have been restored by or at the expense of the Developer and that a certificate from the Ontario Land Surveyor or other evidence satisfactory to the Town's solicitor has been provided to confirm that all such monumentation has been located and, where necessary, replaced;
- d) Has approved the formal certification from the Developer's Consulting Engineers to the Town and Westario Power and/or Hydro One certifying that all applicable works and services have been completely installed in accordance with the approved plans, specifications and the agreements; and
- e) Has received similar copy of all "As Recorded" drawings and electronic copy thereof including the Approved Grading plan.

No operation of, or connection to, existing municipal services without prior approval from the Town of Minto Public Works Department will be permitted.

For items not specifically covered by the Municipal Standards, the minimum criteria to be used will be referenced in the Ontario Provincial Standard Drawings (OPSD), Ontario Provincial Standard Specifications (OPSS), Ministry of Environment, Conservation and Parks (MECP), Ministry of Transportation (MTO), or other recognized authority, and when conflicts arise, the Town's decision will be binding.

All works within the municipal right of way as a result of private development will require a cost estimate and a 100% security deposit of that value. Depending on the value of right of way works, the Town will tender the works for the developer or the developer may use a pre-qualified contractor at Town discretion.

All Right of Way works including boulevards, asphalt roadways etc. are to be completed to the satisfaction of the Town or their Engineer. All works shall be overseen by Town staff or their Engineer.

2.0 PLAN AND DRAWING SPECIFICATIONS

The plans and drawings shall be prepared as follows:

2.1 GENERAL PLAN DRAWINGS

- a) Minimum scale of 1:1000.
- b) Indicate a north arrow and construction north arrow.
- c) Show a title block.
- d) All survey elevations should be referred to a metric geodetic benchmark.
- e) Show all the existing and proposed lots, blocks, easements, road allowances and street names.
- f) Show all existing and proposed curbs and sidewalks.
- g) Show the direction of flow for all existing and proposed sewers and ditches.
- h) Show all existing and proposed sewer sizes, maintenance holes, catchbasins and stormwater detention areas.
- i) Show all existing and proposed watermain sizes including valves and hydrants.
- j) Show all existing and proposed services and utilities.
- k) Show existing and proposed lighting/street lights
- l) Show all existing structures, vegetation, natural features on, or adjacent to the subject property.
- m) Show proposed phasing.
- n) Show all abutting properties and land usage.
- o) Show a table for a list of revisions.

2.2 PLAN AND PROFILE DRAWINGS

The plan and profile drawings shall be prepared in accordance with the Standard Drawings, to the satisfaction of the Town, and as follows:

- a) All plans and profiles must be drawn at a minimum scale of 1:500 horizontally and 1:50 vertically.

- b) Indicate a north arrow.
- c) Show a title block and key plan.
- d) All elevations should be referred to a metric geodetic municipal benchmark.
- e) Show all existing and proposed lots, blocks, easements, road allowances and street names.
- f) Show all existing and proposed curbs and sidewalks.
- g) All existing basement elevations must be shown on the profile (where applicable).
- h) Show all existing and proposed sewer and watermain lengths, types and class of pipe, type of pipe bedding, grades and direction of flow, roadways, and include all services on both plan and profile drawings.
- i) Show all existing structures, landscaping, natural features on, or adjacent to the subject property.
- j) Show dimensions and curb radii.
- k) Where the plans are amended or revised after they have been approved by the Town Engineer, the date of amendment or revision shall be noted in the table for the list of revisions on the plan, and resubmitted to the Town Engineer.

2.3 LOT GRADING PLAN DRAWINGS

Applicable to all developments including infill lots

Refer to Section 7.0

3.0 SANITARY SEWERS

3.1 APPROVAL OF DESIGN/PLANS

Plans of the entire system shall be submitted to the Ministry of the Environment and the Municipal Engineer for approval. This submission shall consist of an overall plan, a plan and profile of each main sewer drawn to the same scale as the roads, together with typical details of house service connections, pipe bedding, manhole covers, all special bends and connections and other appurtenances. Approval for construction will not be given until the Certificate of Approval for both sewers and sewage treatment facilities has been received from the Ministry of the Environment and Climate Change.

3.2 SEWER DESIGN

3.2.1 Pipe Sizing

- a) Minimum Size - Sewermain or Collector:
 - i) 200 mm
 - ii) Decreases in pipe size from upstream to downstream will not be permitted.
 - iii) Sanitary sewers with service connections to each lot or block shall be provided in accordance with the Ministry of Environment, Conservation and Parks Guidelines and the following Town of Minto design criteria.
 - iv) All sanitary sewers shall be designed so that the hydraulic gradeline under peak flow condition is equal to or below the obvert of the pipe. Velocities shall be sufficient for self-cleansing in the mains.
- b) Sizing - Sewermain or Collector:
 - i) Sewer Capacity: Manning's Formula (full flow)

$$Q = VA = \left(\frac{1.49}{n}\right) AR^{\frac{2}{3}} S^{\frac{1}{2}}$$

Where;

Q = Flow Rate (m³/s)

V = Velocity (m/s)

A = Flow Area (m²)

n = Manning's Roughness Coefficient (unitless)

R = Hydraulic Radius (m)

S = Pipe Slope (m/m)

- c) Population:
 - i) Based on Official Plan and Zoning By-Law maximum densities or;
 - ii) Residential - Maximum Densities from Official Plan or Zoning By-Law or other criteria as determined from capacities of existing trunk services and facilities.
- d) Domestic Flows: 450 L/cap.d. (litres per capita per day) for New Design
- e) Extraneous Flows: 0.15 L/ha.s (litres per hectare per second)
- f) Peaking Factor:
 - i) Commercial peaking factor of 1.0
 - ii) Residential (Harmon Formula) $M = 1 + \frac{14}{4 + Pop^{0.5}}$
 - iii) Industrial: Taken from Appendix “B” of the Ministry of Environment, Conservation and Parks Guidelines.
- g) Minimum Velocity: 0.6 m/s based on actual flow
- h) Maximum Velocity: 3.0 m/s
- i) Pipe Roughness: Manning’s “n” value 0.013 for concrete and PVC pipes.

3.3 SEWER CONSTRUCTION

3.3.1 Pipe Material

- a) All sewer mains shall be PVC SDR 35, unless otherwise approved by the Town’s Engineer. For a list of approved product types and connections, refer to Table 2 in Appendix “B”.

3.3.2 Pipe Location

- a) All sewer mains shall be located within the centre line of the roadway as shown on the Town of Minto typical road cross-sections. Refer to Standard Drawings R1 and R2 in Appendix “A”.

3.3.3 Pipe Depth

- a) 2.0 m minimum depth of cover
- b) Where minimum depth of cover cannot be achieved, pipe insulation shall be required in accordance with Standard Drawing S4 in Appendix “A”.

3.3.4 Pipe Bedding

- a) Minimum bedding at the discretion of public works and is dependent upon flexible or rigid pipe.
- b) Refer to Table 1 in Appendix “A” for applicable Ontario Provincial Standard Drawings.

3.3.5 Manhole Connections

- a) Minimum Spacing is 100 m for pipes up to 1200 mm diameter.
- b) Minimum of 1200 mm manhole diameter or as manufacturer’s specifications.
- c) Pre-benched structures to be used where possible.
- d) Approved “Kor-N-Seal” pipe adaptors shall be used for the connection of all pipes at maintenance holes.
- e) All external joints to be completed with “Denso” tape along the joints.
- f) Drop structure required where the inlet and outlet inverts differ by more than 0.9 m.
- g) Invert Drops: Determined by hydraulic calculations for all junctions and transition maintenance holes.

| | | |
|-----------------|----------------|-------|
| For all others: | 0° Turn | 20 mm |
| | 10° – 45° Turn | 50 mm |
| | 46° – 90° Turn | 80 mm |

3.3.6 Manhole Adjustments

- a) Castings to be left at base asphalt elevation and adjusted to finished elevation prior to surface asphalt.
- b) Precast concrete adjustment units to be used complete with “Denso” tape along joints.
- c) Minimum 150 mm adjustment allowance
- d) Maximum 300 mm adjustment allowance

- e) No brick, block or steel lift rings permitted

3.4 SERVICE CONNECTIONS

3.4.1 General Criteria

- a) Minimum grade on service pipes 2%; maximum 8%
- b) All connections to be made with an approved manufactured prefabricated “Tee” or approved equivalent unless connecting to an existing main, where stainless steel straps and saddle may be permitted. Refer to Table 1 in Appendix “A” for applicable Ontario Provincial Standards Drawings.
- c) Maintenance hole or clean-outs are required at property line where individual services from the Municipal system are not provided for all of the following development types:
 - i) Residential – clean-out
 - ii) Multiple Residential – manhole
 - iii) Commercial – clean-out
 - iv) Industrial – manhole
 - v) Institutional – manhole

3.4.2 Pipe Sizing

- a) Minimum 125 mm or match to existing for:
 - i) Residential (single detached, semi-detached, townhouses)
- b) Minimum 125 mm for:
 - i) Commercial;
 - ii) Industrial;
 - iii) Condominium and;
 - iv) Institutional
- c) Decreases in pipe size from upstream to downstream will not be permitted.

3.4.3 Pipe Material

- a) All sanitary services shall be PVC DR 28, unless otherwise approved by the Town's Engineer. For a list of approved product types and connections, refer to Table 2 in Appendix "B".

3.4.4 Pipe Location

- a) All residential units including; single detached, semi-detached, row or block townhouses shall be located 1.5 m to the left (facing property) of the centre of the lot and 1.5 m to the left of the water service. The minimum separation between services at property line shall be 1.5 m. Refer to Standard Drawings S1 and S2 in Appendix "A" for service layouts.
- b) All commercial, industrial and institutional service to be located to the left (facing property) of the watermain. The minimum separation between services at property line shall be 1.5 m.

3.5 INSPECTIONS

Closed circuit T.V. (CCTV) inspections will be required at the following three (3) intervals:

- a) Prior to Preliminary Acceptance (after base asphalt and curb is placed), this also includes services to Property Line.
- b) Prior to surface asphalt
- c) Prior to Final Acceptance of Development, this also includes services to Property Line.

Additional closed circuit T.V. (CCTV) inspections of services maybe required prior to occupancy of building.

3.6 TESTING AND FLUSHING

Maintenance Holes shall be tested in accordance with the most updated version of OPSS 407.

Sanitary sewers shall be tested in accordance with OPSS.MUNI 410.

4.0 STORM DRAINAGE

4.1 APPROVAL OF DESIGN/PLANS

Storm drainage systems including lot grading, catchbasins and piped outlets shall be designed with consideration being given to Major and Minor systems. Minor systems are to be conveyed to the receiver (stormwater management facility or watercourse) via sewers. Major flows are to be conveyed via adequate overland flow routes.

The storm drainage system shall adhere to the Ministry of Environment Conservation and Parks, Guidelines and the following Town of Minto design criteria. Approval for construction will not be given until the Certificate of Approval for the sewers has been received from the Ministry of the Environment and all other applicable government agency approvals has been received.

4.2 DESIGN CRITERIA

4.2.1 Rainfall Data

Rainfall data is to be generated using the Ontario Ministry of Transportation - MTO IDF Curve Look-Up website for the specific development site location.

Website is as follows:

http://www.mto.gov.on.ca/IDF_Curves/map_acquisition.shtml

4.2.2 Design Storm

The stormwater management system shall be designed using MIDUSS Hydrologic Modeling Software or an alternate approved hydrologic model/calculation method. The Developer's Engineer shall use the 3 hour Chicago storm distribution or the 6 hour SCS Type II distribution, depending on developments location within the local conservation authority (See part c)). Post-development runoff flows shall be controlled to pre-development levels for rainfall events with return periods between 2 year and 100 year storm events. The design of the stormwater management system shall be in accordance with the latest version of the "Stormwater Management Practices, Planning and Design Manual", as prepared by the Ministry of the Environment and Climate Change. The Minor and Major storm systems shall be designed as follows;

- a) Minor System:
 - i) 1/5 Year storm local sewers
 - ii) 1/10 Year storm for driveway culverts for rural systems
 - iii) 1/10 Year storm for downtown business commercial development and trunk collector sewers
 - iv) 1/25 Year storm for road culverts for rural systems

- b) Major System:
 - i) 1/100 Year for overland flow routes
- c) Rainfall Distribution: 3 hour Chicago (MVCA Watersheds)
6 hour SCS Type II (SVCA Watersheds)
- d) Runoff Coefficients: the drainage area shall include all lands which will outlet through one common system. The design shall take into consideration the eventual use of all the lands within the drainage area and assign the appropriate coefficient to the lands based on the designation in the Official Plan. Run-off coefficients to be used in storm sewer design with the Rational Method within the following ranges:
 - i) Asphalt, concrete, roof areas 0.90 – 1.00
 - ii) Grassed areas, parkland, agricultural 0.15 – 0.35
 - iii) Commercial 0.75 – 0.85
 - iv) Industrial 0.65 – 0.75
 - v) Residential:
 - Single Family 0.40 – 0.45
 - Semi-detached 0.45 – 0.60
 - Row housing, Town housing 0.50 – 0.70
 - Apartments 0.60 – 0.75
 - Institutional 0.40 – 0.75
- e) Time of Concentration:
 - i) Major System: Bransby Williams 10 minute minimum
 - ii) Minor System: Bransby Williams 10 minute minimum

4.3 SEWER DESIGN

- a) Pipe Roughness:
 - i) Manning's "n" value, 0.013 for concrete, and PVC pipes.
 - ii) Manning's "n" value, 0.024 for corrugated steel pipes.

- a) Manning's Formula (full flow):

$$Q = VA = \left(\frac{1.0}{n}\right) AR^{\frac{2}{3}} S^{\frac{1}{2}}$$

Where;

Q = Flow Rate (m³/s)

V = Velocity (m/s)

A = Flow Area (m²)

n = Manning's Roughness Coefficient (unitless)

R = Hydraulic Radius (m)

S = Pipe Slope (m/m)

- c) Culverts: MTO Drainage Manual, Section 'D'
- d) Maximum allowable pipe velocity: 6.0 m/s

4.4 STORM SEWER CONSTRUCTION

4.4.1 Pipe Location

- b) Storm sewer shall be located within the street, with lateral connections to the catchbasins located along gutter lines and in accordance with the Town of Minto typical road cross-sections. Refer to Standard Drawing R1 in Appendix "A".

4.4.2 Pipe Material

- a) For a list of approved product types and connections, refer to Table 2 in Appendix "B".

4.4.3 Pipe Bedding

- a) Refer to Table 1 in Appendix "A" for applicable Ontario Provincial Standard Drawings.

4.4.4 Pipe Depth

- a) 1.2 m minimum depth of cover
- b) Where minimum depth of cover cannot be achieved, pipe insulation shall be required in accordance with Standard Drawing S4 in Appendix "A".

4.4.5 Pipe Slope

- a) Regardless of flow velocities obtained, the minimum design grades for pipe storm sewer shall be as follows:

| Sewer Size (mm) | Minimum Slope in metres Per 100 metres |
|-----------------|---|
| 300 | 0.22 |
| 350 | 0.17 |
| 375 | 0.15 |
| 400 | 0.14 |
| 450 | 0.12 |
| 525 | 0.10 |
| 600 | 0.08 |

4.4.6 Maintenance Hole/Catchbasin Size/Spacing

- a) Manhole Spacing:
- i) 100 m for pipes up to 1200 mm diameter.
 - ii) 150 mm for pipes greater than 1200 mm diameter
- b) Catchbasin Spacing:
- i) 75 m maximum except at intersections where no surface drainage across intersecting streets will be permitted.
- c) In-Line Drain Spacing:
- i) Where storm sewers are extended along rear yard swales behind multiple unit blocks, in-line drains are to be installed every two (2) units, located 1.0 m upstream of lot line.
- d) Twin Inlet Catchbasins:
- i) Required at all sag points
- e) Minimum Size:
- i) Maintenance Holes shall be a minimum of 1200 mm diameter or as manufacturer's specifications.
 - ii) 200 mm diameter where only lot services are connected for residential.

- iii) Trunk - 300 mm
- iv) Single Catchbasin leads - 250 mm
- v) Twin Inlet Catchbasin leads - 300 mm
- vi) Culvert - 450 mm diameter
- f) Blind Connections:
 - i) Not permitted to storm sewers under 900 mm diameter.
- g) Sumps:
 - i) 450 mm diameter pipes and under require 600 mm sump in catchbasins and maintenance holes.
- h) Benching:
 - i) Required for pipes over 450 mm diameter

4.4.7 Manhole Connections

- a) Brick, block and non-shrink grout shall be used for the connection of all pipes at structures.

4.4.8 Manhole Adjustments

- a) Castings to be left at base asphalt elevation and adjusted to finished elevation prior to surface asphalt.
- b) Precast concrete adjustment units to be used.
- c) Minimum 150 mm adjustment allowance.
- d) Maximum 300 mm adjustment allowance.
- e) No brick block or steel lift rings permitted.
- f) All lots to have service connection for foundation drain sump pumps. Gravity connections at building are not permitted except where foundation drain is 0.5 m higher than street property line elevation. Refer to Standard Drawing S3 in Appendix "A".

4.5 SERVICE CONNECTIONS

- a) Service Pipe:
 - i) Minimum size - 100 mm
 - ii) Minimum Grade - 1%
 - iii) Minimum depth at Property Line - 1.2 m
 - iv) Services to be located 1.5 m minimum from side lot line, for singles locate on low side of lot. One (1) service/residential unit for singles, semis, row or block townhouses. Refer to Standard Drawing S1 and S2 in Appendix "A" for service layout.
- b) Roof Drains: All roof drains shall discharge to surface a minimum of 5.0 m back from street property line.
- c) Storm Sewer Outlets: Suitable bank and stream bottom erosion protection must be provided, i.e. Headwalls, rip rap, CSP end section, etc.
- d) Sub-drain: Minimum 6.0 m – 100 mm diameter geotextile wrapped subdrain required upstream of all storm structures and in both directions at sags in the road profile. Additional subdrain as required by geotechnical consultant.

4.6 STORMWATER MANAGEMENT REQUIREMENTS

- a) Quality Control: In accordance with the latest version of "Stormwater Management Planning and Design Manual", March 2003 by the Ministry of Environment, Conservation and Parks or most recent version thereof.
- b) Quantity Control: Control of post-development runoff flows to pre-development levels for rainfall events with return periods between 5 and 100 years. Over-control maybe required to satisfy downstream constraints.
- c) All hazard lands, wetlands, Environmentally Sensitive Areas (ESAs), Areas of Natural or Scientific Interests (ANSIs) and floodlines are to be identified on drawings.

- d) Facility configuration and landscaping to incorporate design recommendations outlined in the document entitled “Stormwater Management Planning and Design Manual, March 2003 as adopted by the Maitland Valley Conservation Authority (MVCA) and Saugeen Valley Conservation Authority (SVCA). A copy of the document is available upon request.
- e) Sediment/Erosion Control: Town discretion. Dependent upon the size/detail of development a separate plan may be required.
- f) All Stormwater Management Facilities shall be subject to Class Environmental Assessment requirements which includes; Ministry of Environment, Conservation and Parks (MECP) and Maitland Valley Conservation Authority (MVCA) or Saugeen Valley Conservation Authority (SVCA) approvals.
- g) Fencing: 1.5 m minimum high galvanized chain link fence will be required on property line where residential property abuts stormwater management facilities. Alternative fencing to the satisfaction of Town Public Works staff.

5.0 WATERMAINS

5.1 DESIGN CRITERIA

Details not included in notes below are shown on the Town of Minto Standard Drawings.

The Developer's contractor shall not operate any valve or hydrant on the existing water distribution system without prior approval from the Town of Minto Public Works Department.

Watermains with services to each lot or block shall be provided in accordance with the Ministry of Environment, Conservation and Parks (MECP) Guidelines and the following Town of Minto design criteria:

5.1.1 Pipe Sizing

- | | | |
|----|-----------------|---|
| a) | Capacity: | Hazen-Williams formula in accordance with current Ministry of Environment and Climate Change design criteria. |
| b) | Population: | Refer to Part 3.2.1 – Pipe Sizing in Section - 3.0 Sanitary Sewers. |
| c) | Design Flow: | Greater of Maximum Daily Demand plus Fire Flow or peak demand flow. |
| d) | Average Day: | 450 L/cap.d (litres per capita per day) |
| e) | Peaking Factor: | In accordance with current Ministry of Environment and Climate Change design criteria (maximum peaking factor 4.0). |
| f) | Minimum Size: | 150 mm diameter watermain |
| g) | Minimum Depth: | 2.0 m for mains and services |

5.1.2 Pipe Location

- a) Watermain shall be located within the street, in accordance with the Town of Minto typical road cross-sections. Refer to Appendix "A" - Standard Drawing R1.

5.1.3 Pipe Material

- a) Refer to Appendix "B" - Table 2

5.1.4 Pipe Bedding

- a) Refer to Appendix "A" - Table 1

5.1.5 Valves and Fittings

- a) Fittings:
 - i) Ductile Iron, mechanical joint, AWWA C110 approved, pressure rating 1035 kPa.
- b) Valves:
 - i) Same as the number of streets at an intersection with valve located at extension of Property Line of intersecting street.
 - ii) Maximum 200 m spacing on straight runs.
 - iii) Maximum 250 m spacing on trunk lines.
 - iv) Chambers will be required for all valves over 300 mm diameter (OPSD-1101.01)
- c) Valve Type: Refer to Appendix "B" - Table 2
- d) Valve Boxes: Refer to Appendix "B" - Table 2 and Appendix "A" - Standard Drawing W2

5.1.6 Hydrants

- a) Hydrant Type:
 - i) Refer to Appendix "B" - Table 2 and Appendix "A" - Standard Drawing W3
 - ii) All hydrants to be painted Red with Black Storz cap, and Yellow Bonnets.
 - iii) Anchor tees to be used with hydrant installation.
- b) Hydrant Spacing: 150 m maximum

5.1.7 Service Connections

- a) Service Pipe:
 - i) Minimum 25 mm diameter service or match existing, whichever is greater.
 - ii) Multiple Residential up to 6 units to be a minimum 32 mm diameter service greater than 6 units is to be a minimum 50 mm diameter service.

- iii) Industrial developments to be a minimum 25 mm service unless water demand calculations are shown.
- iv) Domestic fire flow requirements may increase minimum size. Where size is increased for fire flows then a separate 25 mm diameter service for potable water use shall be installed a minimum of 15 m from the building.
- v) All services to be Municipex, Series 200 polyethylene – 200 psi rated pipe or Type “K” copper; unless otherwise approved by the Town of Minto Public Works Department.
- vi) 75 mm PVC sleeves, 300 mm maximum length, are required where curb stops are located in driveways.
- vii) Temporary plastic blow-off pipes are required for all unconnected services.
- viii) Water meter installation, Refer to Appendix “A” - Standard Drawing W6.
- ix) Refer to Appendix “B” - Table 2

5.1.8 Anodes and Mechanical Joints

- a) Anodes:
 - i) DZP-24, 10.9 kg shall be installed on all connections to existing iron watermain.
 - ii) DZP-12, 5.4 kg shall be installed on all iron fittings, valves, services etc.
 - iii) Sacrificial Zinc nuts may be added in conjunction with anodes.
- b) Mechanical Joint Restraints:
 - i) “Grip Ring” Pipe Restrainer manufactured by Romac Industries Inc.
 - ii) Uni-Flange Series 1300 manufactured by Ford Meter Box Company Inc.
 - iii) “MJ Field Lok”, Series PV manufactured by Clow Canada.
 - iv) Series 350 Restrainers manufactured by Clow Canada.

5.2 TESTING PROCEDURES

Refer to Appendix “C”

5.2.1 Chemicals and Materials

- a) All Chemicals and materials used in the alteration or operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set by both the American Water Works Association (“AWWA”) and the American National Standards Institute (“ANSI”) safety criteria standards NSF/60, NSF/61 and NSF/372.
 - i) In the event that the standards are updated, the owner may request authorization from the Director to use any on hand chemicals and materials that previously met the applicable standards.
 - ii) The requirement for the owner to comply with NSF/372 shall come into force no later than July 27, 2018.

6.0 ROADWAYS / DRIVEWAY ENTRANCES

6.1 DESIGN CRITERIA

The following Town of Minto Road Design Criteria for residential roads applies to local and collector streets.

6.1.1 Standard Road Section

- a) The residential roadway section is shown on Standard Drawings R1 in Appendix “A”. This section designates standard location for all Municipal Services and other utilities.

6.1.2 Road Geometric Standards

- a) Streets with 20 m Right-Of-Way will have a minimum pavement width of 8.5 m. This width does not include the concrete gutter.
- b) The minimum pavement radii for intersections shall be 10.0 m and 16.8 m on a cul-de-sac with an island and 13.0 m on a cul-de-sac without an island (permanent or temporary).
- c) The minimum property radius on a cul-de-sac shall be 20.0 m.

6.1.3 Driveway Entrance Geometric Standards

- a) Multiple Residential, Condominiums and Institutional developments;
 - i) Minimum entrance width with no “on street parking” = 6.0 metres
 - ii) Minimum entrance width with “on street parking” = 8.0 metres
 - iii) Minimum entrance radii = 9.0 metres
 - iv) Signage to be in accordance with Ontario Traffic Manual Book 5
 - v) Where applicable, sidewalk permitted through entrance with a minimum concrete thickness of 150 mm.
- b) Industrial developments;
 - i) Minimum entrance width = 8.0 metres
 - ii) Maximum entrance width = 15.0 metres
 - iii) Minimum entrance radii = 15.0 metres
 - iv) Signage to be in accordance with Ontario Traffic Manual Book 5
 - v) No sidewalk through entrances
- c) Commercial developments;
 - i) Minimum entrance width = 6.0 metres
 - ii) Minimum entrance width for trucks = 8.0 metres
 - iii) Minimum entrance radii = 15.0 metres

- iv) Signage to be in accordance with Ontario Traffic Manual Book 5
- v) Where applicable, sidewalk permitted through entrance with a minimum concrete thickness of 150 mm.

6.1.4 Rural Road Section

- a) The rural road section is shown on Standard Drawing R2 in Appendix “A”. In the case of rural roads located away from urban centres and mainly used by local traffic, the Town will consider for local development, reducing the rural standards to match existing conditions of roads in that specific area.
- b) The following standards are to be followed, however, specific conditions may warrant some change. Any change will require approval from the Town of Minto.
- c) Minimum Grade: To maintain 0.5% minimum on gutter grade.
- d) Maximum Grade: 8.0 %
- e) Vertical Curves: Vertical curves to effect gradual change between tangent grades are to be used in accordance with the MTO Geometric Design Standards.
- f) Horizontal Curves: Use in accordance to MTO Geometric Design Standards.
- g) Cross Fall: 2.0 % minimum
- h) Asphalt Depth:
 - i) 90 mm Minimum (50 mm HL 4 and 40 mm HL 3 compacted) on Local Residential.
 - ii) 100 mm Minimum (60 mm HL 4 and 40 mm HL 3 compacted) on Collector and Arterial.
 - iii) 50 mm HL 4 on temporary cul-de-sac or temporary access roads.
- i) Granular Depth:
 - i) Minimum 150 mm Granular “A”
 - ii) Minimum 450 mm Granular “B”

Note: Depending on soil conditions and a geotechnical report, but no less than.

6.1.5 Curb and Gutter

- a) Concrete Curb and Gutter shall be constructed on both sides of all streets in accordance with Table 1 and Standard Drawing R1 and R2 of Appendix “A”. Back of curb to be keyed to account for sidewalk.
- b) Driveway cuts shall not be made until after building foundation is constructed. All cuts shall be mechanically cut in accordance with specifications approved by the Town of Minto.
- c) Driveway ramps between back of curb and sidewalk or Property Line where there is no sidewalk shall be paved with 50 mm Hot Mix Asphalt HL 3F (compacted).

6.1.6 Sidewalks

- a) Concrete sidewalks 1.8 m wide shall be provided on both sides of residential collector and arterial streets and one side on residential local streets. Hand railings shall be provided where three (3) or more steps are required. Ramps shall be provided at all intersections with curb. Minimum 100 mm depth of Granular “A” base and 125 mm thickness of concrete unless through an entrance than 150 mm thickness is required. Expansion joint material is to be bituminous impregnated fibreboard. Concrete shall be in accordance with OPSS 351.

6.1.7 Walkways

- a) Pedestrian walkways shall be concrete, 1.8 m wide with 1.5 m minimum height galvanized chain link fence on each side within property limits. Minimum Right-Of-Way width is to be 6.0 m. Bollards are to be installed 1.1 m either side of centre of walkway, at both ends of the walkway. Bollards are to be 150 mm x 150 mm x 2.4 m pressure treated wood exposed and buried 1.2 m.
- b) Minimum Right-Of-Way to be increased to 9.0 m where servicing and walkway exist through same corridor.

6.1.8 Boulevards

- a) All boulevards shall be graded, topsoiled with a minimum depth of 200 mm and sodded from the property line to the back of curb.

6.1.9 Traffic Control and Street Name Signs

- a) Traffic control signs will be provided at locations designed by the Town and shall be in accordance with the “Ontario Traffic Manual – Book 5”. Traffic signs and posts will be provided and installed by the Municipality at the Developer’s expense.

- b) Street name sign will be provided at locations designated by the Town and will have a green background and white lettering (both sides), reflectorized and mounted on galvanized steel 60 mm diameter x 3.2 m posts in accordance with the Town of Minto specifications. Where streets are named after Veterans they will be white background, green lettering and red poppy (green centre) at left side of sign. At each intersection there shall be erected an approved double unit street name sign.

6.1.10 Daylighting Triangle

- a) Minimum 7.5 metre x 7.5 metre Daylighting Triangle to be provided at all intersections.
- a) For all other Daylighting refer to Town of Minto Zoning By-law

6.1.11 Parking

- b) Refer to Town of Minto Zoning By-law

6.1.12 Easements

- a) Minimum 6.0 m easements required for single municipal services, minimum 9.0 m easements required for two (2) municipal services. Where more than two (2) services are to be accommodated by an easement consult with the Town for specific easement requirements.
- b) For rear yard storm sewers 300 mm diameter or less, and catchbasins, minimum easement width to be 3.0 m, with centre of catchbasin offset 1.0 m upstream of property line. For storm sewers larger than 300 mm diameter consult with Town for specific easement requirements.

7.0 LOT GRADING

7.1 LOT GRADING PLANS

Lot grading plans shall be prepared in accordance with the Standard Drawings G1 and G2 of Appendix “A” to the satisfaction of the Town and as follows:

- a) Lot Grading Plans must be drawn at a minimum scale of 1:500.
- b) Indicate a north arrow.
- c) Show a title block including date, name of consultant and owner.
- d) All elevations should be referenced to a metric geodetic municipal benchmark.
- e) Show all existing and proposed lot numbers and blocks.
- f) Show all proposed rear lot catchbasins, pipes, top of grate elevations and inverts and easements.
- g) Show a table for a list of revisions.
- h) Show existing contours.
- i) Show existing and proposed elevations at lot corners.
- j) Show adjacent topography and drainage patterns.
- k) Show all existing structures, landscaping, natural features on, or adjacent to the subject property.
- l) Indicate specified house grade, top of foundation elevations, steps in foundation, low openings and garage floor elevations including proposed driveway grade.
- m) Show proposed road grades and elevations on all streets with arrows indicating direction of slope.
- n) Show proposed elevations along boundary of all blocks abutting single family and semi-detached lots in the development.
- o) The approval of a drainage plan is related to drainage only. It is the responsibility of the Developer to ensure that the drainage plan compliments the land and suits the houses to be constructed.

- p) Show all temporary erosion control measures to be in place during the construction period and permanent erosion control works to be left in place after construction.
- q) The maximum side slopes on swales should be 3 horizontal to 1 vertical. All swales must have a minimum depth of 150 mm. swales within the development are to be centered on property lines. Swales abutting existing properties are to be constructed entirely within development lands.
- r) The maximum slope of all embankments should be 3:1. Where grades greater than 3:1 are proposed a retaining wall should be constructed. All 3:1 or steeper are to be indicated on the plan, clearly defining the limits of the slope.
- s) The proposed direction of overland flow shall be indicated on the plans by arrows. High points and all changes in grade are to be clearly noted on the plan, with spot elevations.
- t) The Town Engineer may require details of all terracing and slope treatment and in depth cross-sections to be provided, with the lot grading plan.
- u) All Regional Flood and Fill Lines, verified by the Conservation Authority, must be indicated on lot grading plans where developments are adjacent to existing watercourses.
- v) Topsoil shall be stripped in all cut and fill areas and stockpiled for reuse during final lot grading operations.
- w) Multiple unit blocks are subject to approval through the site plan approval process, individual site plan agreements are required for each block.
- x) Show existing and proposed fencing.

7.2 DRAINAGE PLANS

The Drainage Plan shall indicate the proposed grading of all the lands to be developed and how all the lands adjacent to the subdivision which drain through the property are to be provided.

8.0 UTILITIES AND STREET LIGHTING

8.1 UTILITIES

All Hydro (Westario and Hydro One), Bell, Wightman, Eastlink and other utilities shall be underground and placed in accordance with current Hydro Servicing Standards, current Ontario Electrical Safety Code as set out by the Electrical Safety Authority, Bell Canada and/or local utility company regulations and standards, as well as Ontario Provincial Standards.

8.2 STREET LIGHTING

All developments shall be provided with street lighting in accordance with the current municipal requirements as follows:

- a) The minimum standard for street lighting shall be 46 Watt LED Lamp set on 9.0 metre concrete poles, or as directed by the Town. Each light must be controlled by dusk to dawn photo-electrical cell. Power feed shall be completely underground. The lights shall generally be placed to the outside of the curved roads. The maximum allowable spacing along the street between the lights shall be based on Road Classification. Particular care shall be taken to adequately illuminate the intersections and cul-de-sacs.
- b) Street Light Details:
 - i) Luminaries for local roadways will be a decorative, Contempo, post top.
 - ii) Luminaries for collector roadways will be cobra-head.

Street lighting type to be confirmed by Town Public Works staff. Satisfactory evidence that the Developer has entered into an agreement providing for the installation of underground hydro and street lighting must be submitted to the Town prior to the execution of a Subdivision Agreement.

For detailed specifications refer to Westario Power or Hydro One.

9.0 LANDSCAPING

9.1 BOULEVARDS

- a) All boulevards shall have a minimum depth of 200 mm topsoil plus sod.

9.2 PARKS

- a) All parks shall have a minimum depth of 200 mm topsoil, seed and mulch.
- b) Seed mix shall be as follows:

| Type | Amount |
|----------------------------|--------|
| Nu Blue Kentucky Bluegrass | 25% |
| Baren Kentucky Bluegrass | 25% |
| Herald Creeping Red Fescue | 15% |
| Wilma Chewing Fescue | 10% |
| Pinnacle Turf Type Per Rye | 25% |

- c) All topsoil shall be in conformance with OPSS 570.

9.3 TREES

- a) Trees shall be placed in front of every lot on private property a minimum 300 mm from the street property Line.
- b) On corner lots a tree shall be planted every 15.0 m on the adjacent sideyard of the flanking street.
- c) Trees are to be planted so as not to interfere with other street functions or services when the tree matures. Where it is not possible to conform with the foregoing, the trees shall be planted at alternate locations approved by the Town.
- d) Planting of trees shall be as detailed on Standard Drawings L1 of Appendix "A". They shall be watered at time of planting and every two (2) weeks thereafter up to the expiration of the guarantee period. The guarantee period shall be one (1) year from the date of planting and the period for planting shall be Spring and Fall only.

- e) All trees shall be No. 1 nursery stock, 2.5 m minimum height with a minimum caliper of 60 mm measured 300 mm above ground level.
- f) All tree species shall be approved by the Town.
- g) All areas for planting shall be stabilized with sod or seed as required, prior to planting of trees.

9.4 PARK AND RECREATIONAL AREAS

- a) The Town may request that the Park or Recreation Areas dedicated for a development be provided with a suitable entrance and graded and seeded so that they are suitable for recreational use.
- b) The area to be dedicated for park use shall be reviewed with the Town on submission of the Preliminary Draft Plan. Requirements for entrances, services, grading and seeding will be finalized at time of engineering drawing review. The Town may also request that a different area than that proposed by the Developer be set aside for a park due to the physical features of the site.
- c) Where park land abuts private lands a 1.5 m high galvanized chain link fence shall be installed.

10.0 SPECIFICATIONS

All Municipal Services shall be constructed in accordance with specifications approved by the Town of Minto.

For partial list refer to Appendix "A" - Table 1, Standard Drawings and Appendix "B" - Table 2, Approved Material and Product List.

11.0 STANDARD SUBDIVISION / SITE PLAN AGREEMENT

Standard subdivision design review checklist used by the Town for the review of engineering drawings is attached with this Manual; Refer to Appendix “D”. This list may assist the design engineer with main items required for submission to the Town.

Appendix “A”

Standard Drawings

APPENDIX “A” - STANDARD DRAWINGS

Where the Ontario Provincial Standard Drawing No. has been indicated, this Standard shall apply. Where a Town of Minto Standard Drawing No. has been indicated in addition to the Ontario Provincial Standard Drawing No., the latter shall be read in conjunction with the Town of Minto Standard. Should there be an inconsistency between the Standards, The Town of Minto Standard shall take precedence.

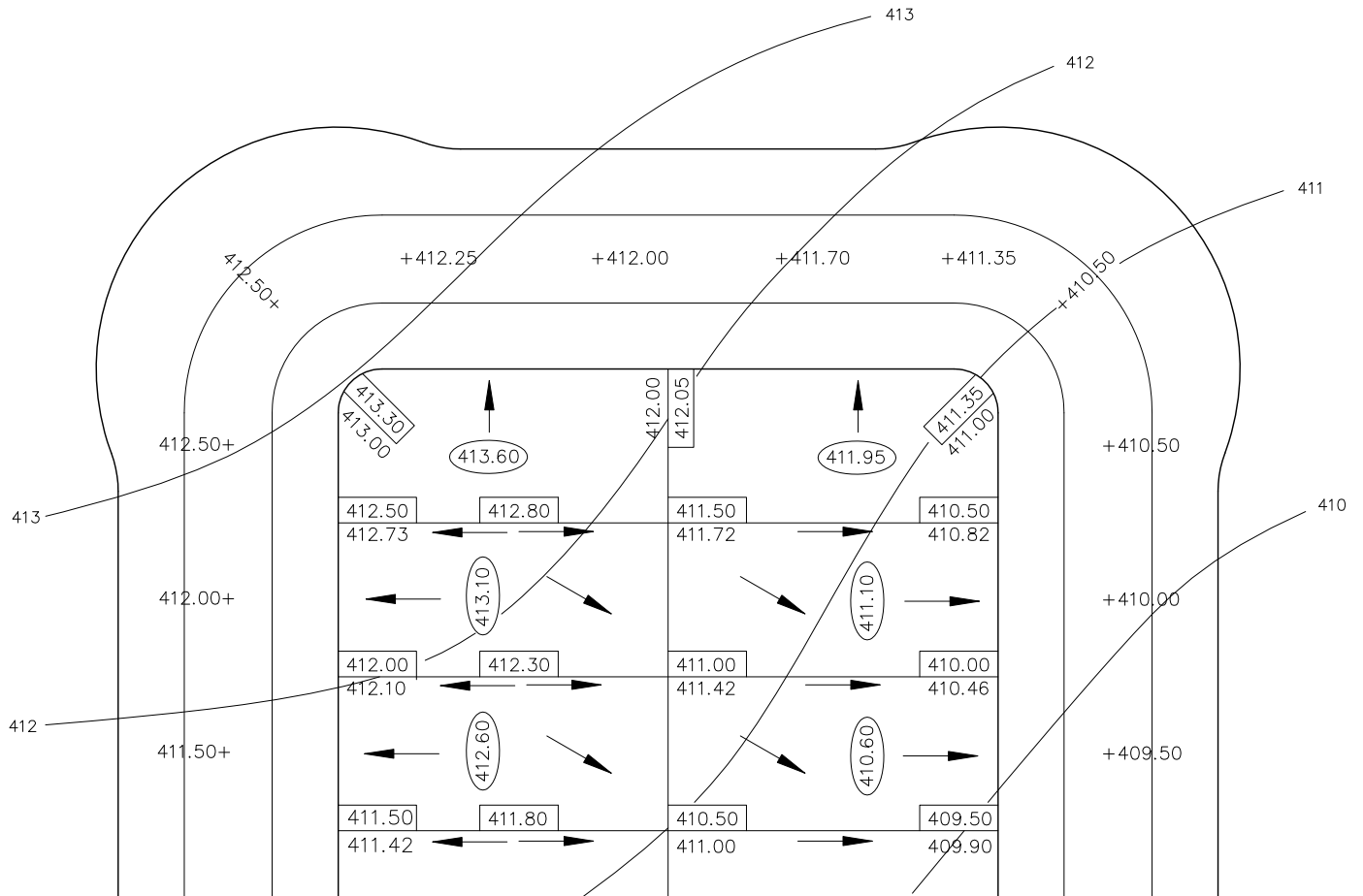
The Town of Minto reserves the right to update its Standards from time to time and any person using them should ensure they have a copy of the current listing prior to proceeding with a project.

In all cases, the latest revisions of the Standard Drawings as of the date the design is completed shall be used. For The Town of Minto Standards, the Standard number includes the month and year of the latest revision of the Standard.

| <u>TABLE 1: STANDARD DRAWINGS</u> | | | |
|---|--|-----------------------------------|--------------------------------------|
| TITLE | ONTARIO PROVINCIAL STANDARD DRAWING | Town of Minto STANDARD | REVISIONS AND UPDATES |
| Pipe Bedding-Granular 'A' Cover Material-Granular 'A' or sand | 802.010, 802.013, 802.030 to 802.034 | | |
| M.H. Frame and Cover | | | |
| a) Standard-Sanitary | 401.010 (Type "A") | - | |
| b) Standard-Storm | 401.010 (Type "B") | - | |
| c) Watertight-Sanitary | 401.030 | - | |
| Catchbasin Frame and Grate | 400.110 | - | |
| Ditch Inlet Catchbasin Frame and Grate | 403.010 | Special where required | |
| M.H. Steps | 405.010 (Hollow Aluminium) | - | |
| Safety Platform, Aluminum | 404.020 to 404.022 | | |
| M.H. (precast) | Section 700 | - | |
| Catchbasins (precast) | Section 700 | - | |
| Catchbasin M.H. (precast) | Section 700 | - | |
| M.H. Benching | 701.021 | - | |
| Internal Drop Structure for Existing M.H. | 1003.030 | - | |
| 25 mm Blow Off Installation | - | W1 | Rev. 0, March '16 |
| Valve and Box* | - | W2 | Rev. 1, March '20 |
| Hydrant Setting * | 1105.010 | W3 | Rev. 1, March '20 |
| Connection of New Watermain to Existing Watermain | - | W4 | Rev. 0, March '16 |
| Connection of New Watermain to Existing Watermain | - | W5 | Rev. 0, March '16 |
| Typical Water Meter Installation | - | W6 | Rev. 0, March '16 |
| Air-Vacuum Release Valve Chamber | - | W7 | Rev. 0, March '16 |
| Frost Collar Installation for Curb Stop Boxes Located in Driveways** | - | W8 | Rev. 0, March '20 |

TABLE 1: STANDARD DRAWINGS

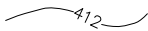
| TITLE | ONTARIO PROVINCIAL STANDARD DRAWING | Town of Minto STANDARD | REVISIONS AND UPDATES |
|---|--|---------------------------|-----------------------------|
| Non-Metallic Water Service Connection Detail for Non-Metallic Watermain 25mm and 50mm Diameter Services** | 1104.010, 1104.020 | W9 | Rev 0, March '20 |
| Metallic Water Service Connection Detail for Non-Metallic Watermain 25mm and 50mm Diameter Services** | 1104.010, 1104.020 | W10 | Rev 0, March '20 |
| Thrust Blocks | 1103.010, 1103.020, 1103.021 | - | |
| 20 m Right-Of-Way* | - | R1 | Rev. 1, March '20 |
| Typical Rural Section* | - | R2 | Rev. 1, March '20 |
| Concrete Sidewalk (125 mm Concrete) (100 mm Granular "A" minimum) | 310.01 | - | |
| Sidewalk Ramps | 310.03 | - | |
| Barrier Curb and Gutter | 600.04 | - | |
| Barrier Curb | 600.11 | - | |
| Asphalt Gutter | 601.01 | - | |
| Lot Grading Plan - General | - | G1 | Rev. 0, March '16 |
| Lot Grading Plan - Townhouse | - | G2 | Rev. 0, March '16 |
| Typical Servicing Layout - Single and Semi-Detached | - | S1 | Rev. 0, March '16 |
| Typical Servicing Layout for Infill Lot(s)- Single and Semi-Detached** | | S2 | Rev. 0, March '20 |
| Typical Servicing Layout – Townhouse* | | S3 | Rev. 1, March '20 |
| Typical Servicing Layout for Infill Lot(s)- Townhouse** | - | S4 | Rev. 0, March '20 |
| Sewer Service Connection with Cleanout** | 1006.010 | S5 | Rev. 0, March '20 |
| Sewer Service Connection for Sewer Mains \geq 4.0m Deep** | 1006.010 | S6 | Rev. 0, March '20 |
| Sump Pump / Storm Connection* | - | S7 | Rev. 1, March '20 |
| Typical Insulation Detail* | - | S8 | Rev. 1, March '20 |
| Deciduous Tree Planting Detail | - | L1 | Rev. 0, March '16 |
| Bare-Root Tree Planting Detail** | - | L2 | Rev. 0, March '20 |
| Transformer Location and Gas Routing Detail** | - | U1 | Rev. 0, March '20 |



LEGEND

412.73

EXISTING LOT
CORNER ELEV.



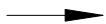
EXISTING CONTOURS
@ 1m OR LESS

+410.50

PROPOSED C ROAD
ELEV. @ 20m STA.

411.45

PROPOSED LOT
CORNER ELEV.



PROPOSED SURFACE
DRAINAGE & DIRECTION

411.95

PROPOSED ELEVATION
OF TOP OF FOUNDATION

REQUIREMENTS

DRIVEWAY GRADES 1% – 6%

WALKWAY GRADES 2% – 6%

LOT GRADES 2% – 6%

BUILDING GRADE 450mm HIGHER
THAN HIGHEST FRONT LOT CORNER

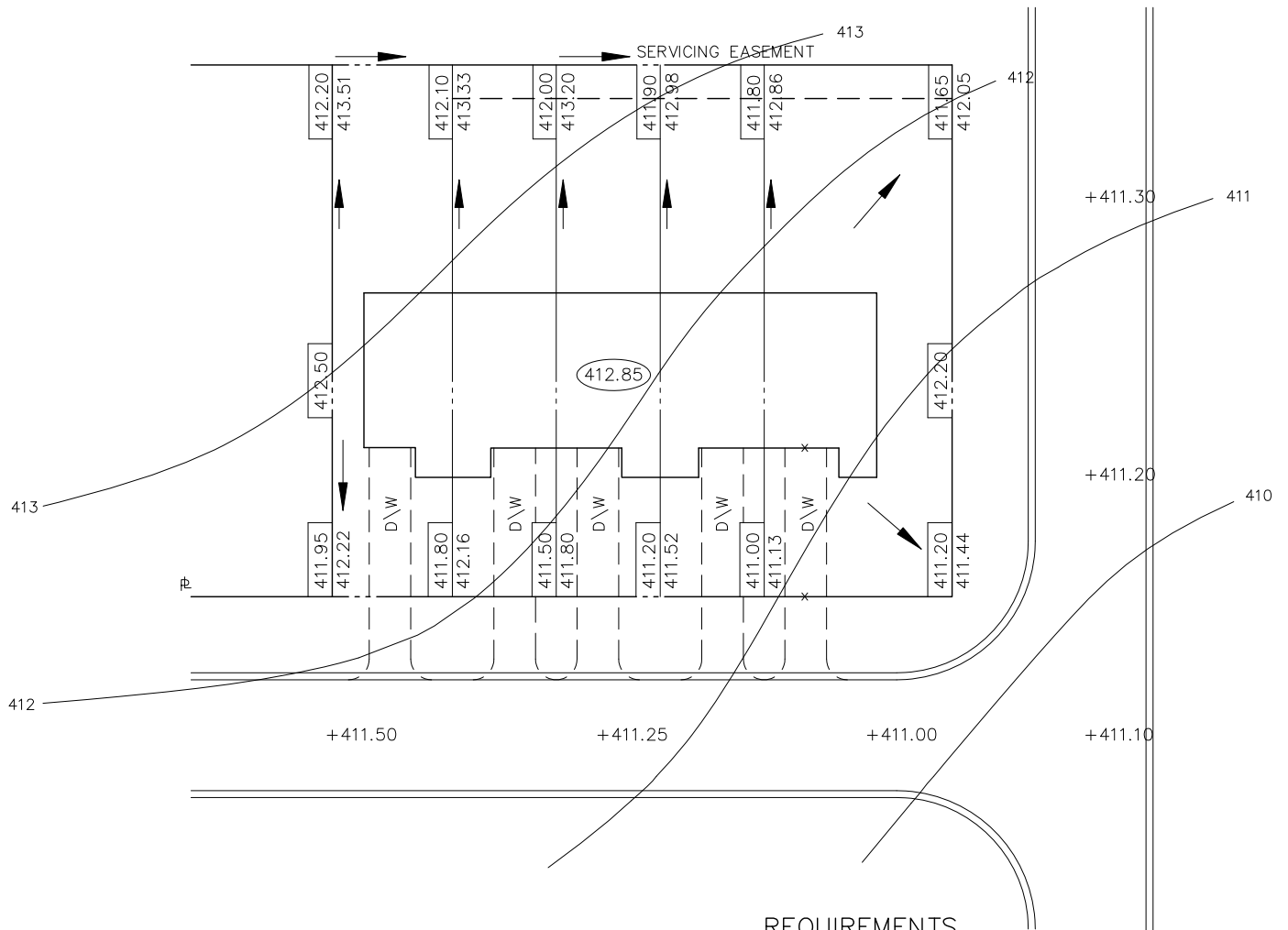
ALL SIDE & REAR YARD SWALES TO
BE ON LOT LINES, MIN. GRADE 2%,
MIN. DEPTH 150mm, MAX. SLOPE 3:1

MAX. DISTANCE WITHOUT CATCHBASIN
TO BE 75m.

PROPOSED GRADE AT BUILDING TO BE
MIN. 150mm LOWER THAN PROPOSED
TOP OF FOUNDATION ELEVATION

HIGH GROUND WATER ELEVATIONS
TO BE SHOWN.

| | | |
|-----------------------------|---------------------|-----------|
| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| LOT GRADING PLAN GENERAL | STD. G1 | |



LEGEND

412.73

EXISTING LOT
CORNER ELEV.

+410.50

EXISTING CONTOURS
@ 1m OR LESS

411.45

PROPOSED C ROAD
ELEV. @ 20m STA.

411.95

PROPOSED LOT
CORNER ELEV.

PROPOSED SURFACE
DRAINAGE & DIRECTION

PROPOSED ELEVATION
OF TOP OF FOUNDATION

REQUIREMENTS

DRIVEWAY GRADES 1% – 6%

WALKWAY GRADES 2% – 6%

LOT GRADES 2% – 6%

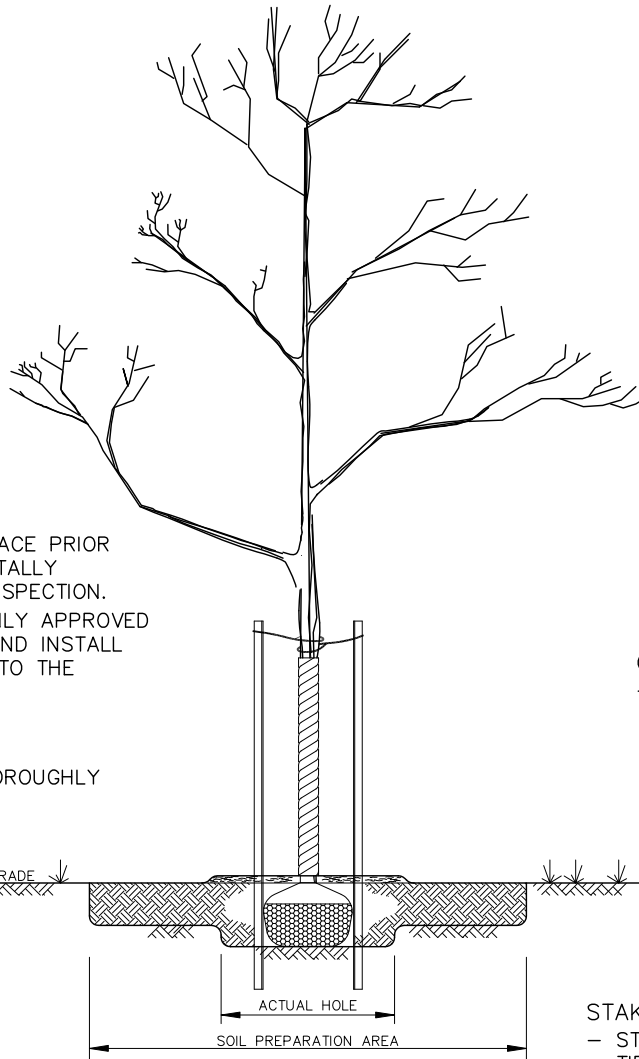
BUILDING GRADE 450mm HIGHER
THAN HIGHEST FRONT LOT CORNER

ALL SIDE & REAR YARD SWALES TO
BE ON LOT LINES, MIN. GRADE 2%,
MIN. DEPTH 150mm, MAX. SLOPE 3:1

PROPOSED GRADE AT BUILDING TO BE
MIN. 150mm LOWER THAN PROPOSED
TOP OF FOUNDATION

HIGH GROUND WATER ELEVATIONS
TO BE SHOWN.

| | | |
|-------------------------------|---------------------|-----------|
| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| LOT GRADING PLAN TOWNHOUSE | STD. G2 | |



SOIL AMENDMENT:

- EXISTING TOPSOIL TO BE AMENDED WITH TRIPLE-MIX WHERE REQUIRED.

PLANTING SOIL:

- HOLE TO BE BACKFILLED AND CONCURRENTLY TAMPED AND WATERED TO ELIMINATE AIR POCKETS.

PLANTING DEPTH:

- IN HEAVY CLAY OR POORLY DRAINED SOIL, ALL WOODY PLANTS TO BE PLACED SO THAT THE ROOT COLLAR IS POSITIONED 75mm–100mm HIGHER THAN SURROUNDING GRADE.

TRUNK PROTECTION:

- TRUNK WRAPPING IN PLACE PRIOR TO PLANTING TO BE TOTALLY REMOVED FOR TRUNK INSPECTION.
- WHEN REQUIRED USE ONLY APPROVED TREE WRAP MATERIAL AND INSTALL FROM THE GROUND UP TO THE LOWEST BRANCHES.

WATERING:

- ENSURE TREES ARE THOROUGHLY WATERED AT PLANTING.

CROWN PRUNING:

- PRUNE AT PLANTING TO CAREFULLY REMOVE DEAD, BROKEN, DAMAGED & INTERFERING BRANCHES, DOUBLE LEADERS & NARROW ANGLE BRANCH UNIONS. THIN HEAD WHEN & WHERE APPLICABLE.

MULCHING:

- MULCH WITH SHREDDED BARK OR COMPOSTED HARDWOOD CHIPS TO A MAXIMUM DEPTH OF 100mm, OVER AN AREA OF THE ROOTBALL. KEEP MULCH 150mm AWAY FROM TRUNK.
- FOR OTHER TYPES OF MULCHING, REFER TO SPECIFICATIONS.

PLANTING AREA:

- ACTUAL HOLE TO BE 300mm WIDER AROUND PERIMETER OF ROOTBALL.
- SOIL PREPARATION AREA TO BE 5X ROOTBALL DIAMETER.
- SCARIFY SOIL PREPARATION TO A DEPTH OF 300mm FOR AERATION.

STAKES AND TIES:

- STAKE IMMEDIATELY.
- TIE USING BIODEGRADABLE MATERIAL SUCH AS FOLDED BURLAP, ETC.
- STAKES TO BE PLACED TO PREVENT DAMAGE TO ADJACENT BRANCHES.
- USE 50mm x 50mm x 2m WOOD STAKES OR METAL T-BARS DRIVEN SECURELY INTO GROUND. ALIGN STAKES WITH PREVAILING WINDS.
- APPLY RODENT PROTECTION WHERE REQUIRED.

ROOTBALL, BURLAP, TWINE:

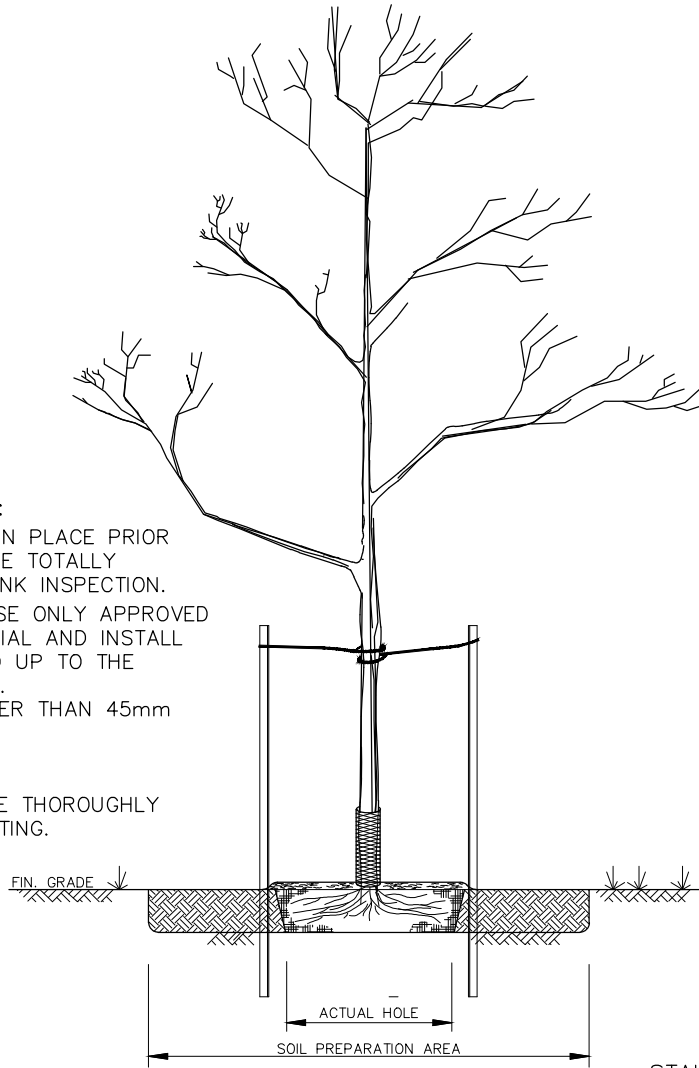
- CUT AND REMOVE ALL WIRE, ROPE, BURLAP AND TWINE FROM AROUND TRUNK AND THE TOP 1/3 OF THE ROOTBALL.

IMPORTANT:

SOME OR ALL NOTES MAY NOT APPLY TO THE SPECIAL REQUIREMENTS OF A SPECIES OR A PLANTING ENVIRONMENT.

BACKGROUND INFORMATION PROVIDED FROM LANDSCAPE ONTARIO.
DRAWING PROVIDED BY TRITON ENGINEERING SERVICES LIMITED.

| | | |
|-----------------------------------|---------------------|-----------|
| TOWN OF MINTO | DATE APRIL, 2015 | REV. 0 |
| DECIDUOUS TREE PLANTING DETAIL | STD. L1 | |



SOIL AMENDMENT:

- EXISTING TOPSOIL TO BE AMENDED WITH TRIPLE-MIX WHERE REQUIRED.

PLANTING SOIL:

- HOLE TO BE BACKFILLED AND CONCURRENTLY TAMPED AND WATERED TO ELIMINATE AIR POCKETS.

PLANTING DEPTH:

- PLANT TO BE PLACED SO THAT THE ROOT COLLAR IS POSITIONED AT THE SAME LEVEL AS IN THE NURSERY FIELD.
- CARE SHOULD BE TAKEN TO AVOID EXCESSIVE SETTLEMENT OF ROOTS FOLLOWING PLANTING.

CROWN PRUNING:

- PRUNE AT PLANTING TO CAREFULLY REMOVE DEAD, BROKEN, DAMAGED & INTERFERING BRANCHES, DOUBLE LEADERS & NARROW ANGLE BRANCH UNIONS. THIN HEAD WHEN & WHERE APPLICABLE.

TRUNK PROTECTION:

- TRUNK WRAPPING IN PLACE PRIOR TO PLANTING TO BE TOTALLY REMOVED FOR TRUNK INSPECTION.
- WHEN REQUIRED USE ONLY APPROVED TREE WRAP MATERIAL AND INSTALL FROM THE GROUND UP TO THE LOWEST BRANCHES.
- WRAP TREES LARGER THAN 45mm CALIBER.

WATERING:

- ENSURE TREES ARE THOROUGHLY WATERED AT PLANTING.

MULCHING:

- MULCH WITH SHREDDED BARK OR COMPOSTED HARDWOOD CHIPS TO A MAXIMUM DEPTH OF 100mm, OVER AN AREA OF THE ROOTBALL. KEEP MULCH 150mm AWAY FROM TRUNK.
- FOR OTHER TYPES OF MULCHING, REFER TO SPECIFICATIONS.

PLANTING AREA:

- ACTUAL HOLE TO BE 300mm WIDER AROUND PERIMETER OF ROOT SYSTEM.
- SOIL PREPARATION AREA TO BE 5X ROOT DIAMETER.
- SCARIFY SOIL PREPARATION TO A DEPTH OF 300mm FOR AERATION.

STAKES AND TIES:

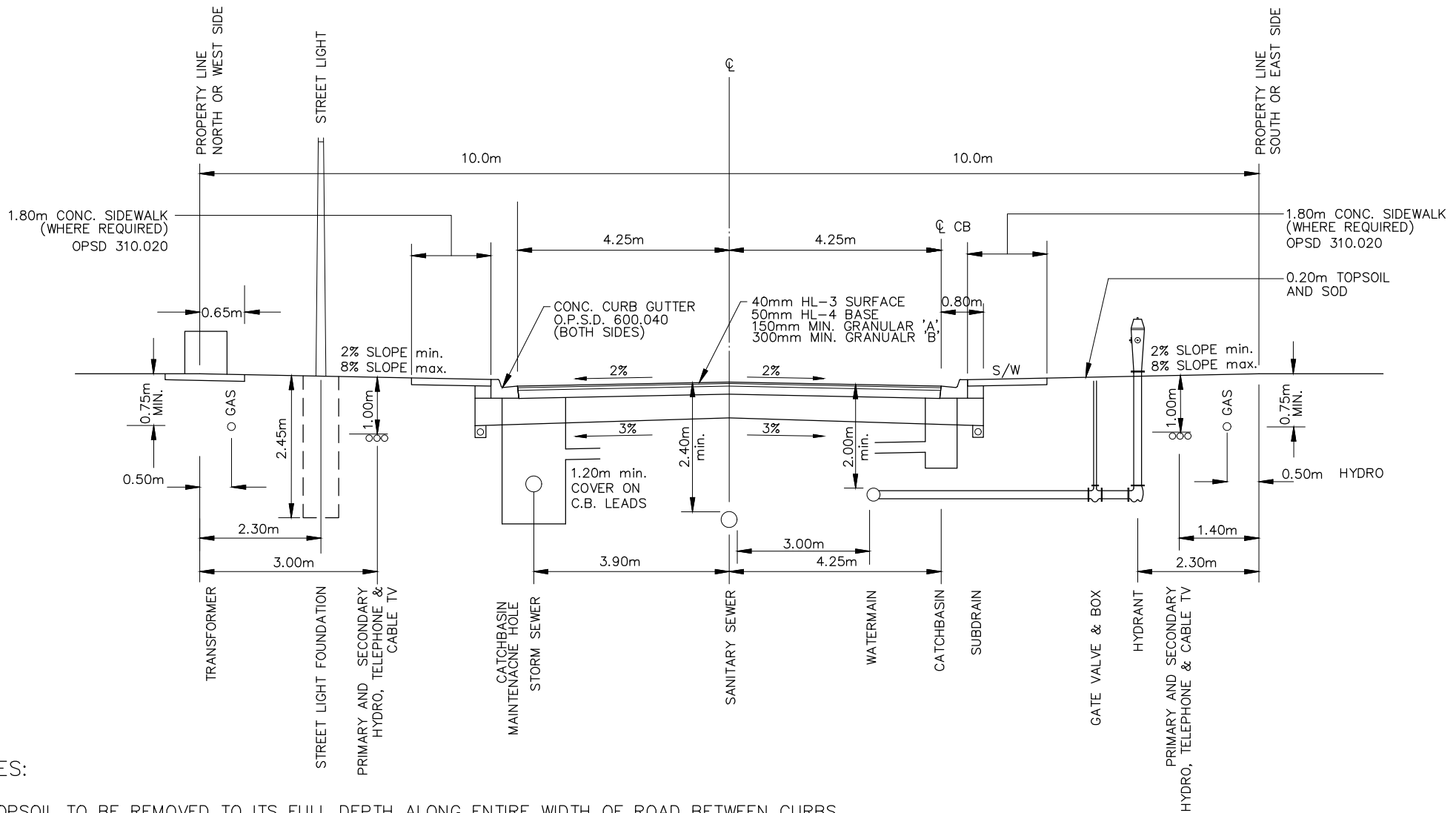
- STAKE BEFORE PLANTING.
- TIE USING BIODEGRADABLE MATERIAL SUCH AS FOLDED BURLAP, ETC.
- STAKE TO BE PLACED TO PREVENT DAMAGE TO ADJACENT BRANCHES.
- USE 50mm x 50mm x 2m WOOD STAKE OR METAL T-BAR DRIVEN SECURELY INTO GROUND. ALIGN STAKE WITH PREVAILING WINDS.
- APPLY RODENT PROTECTION WHERE REQUIRED.

IMPORTANT:

SOME OR ALL NOTES MAY NOT APPLY TO THE SPECIAL REQUIREMENTS OF A SPECIES OR A PLANTING ENVIRONMENT.

BACKGROUND INFORMATION PROVIDED FROM LANDSCAPE ONTARIO.
DRAWING PROVIDED BY TRITON
ENGINEERING SERVICES LIMITED.

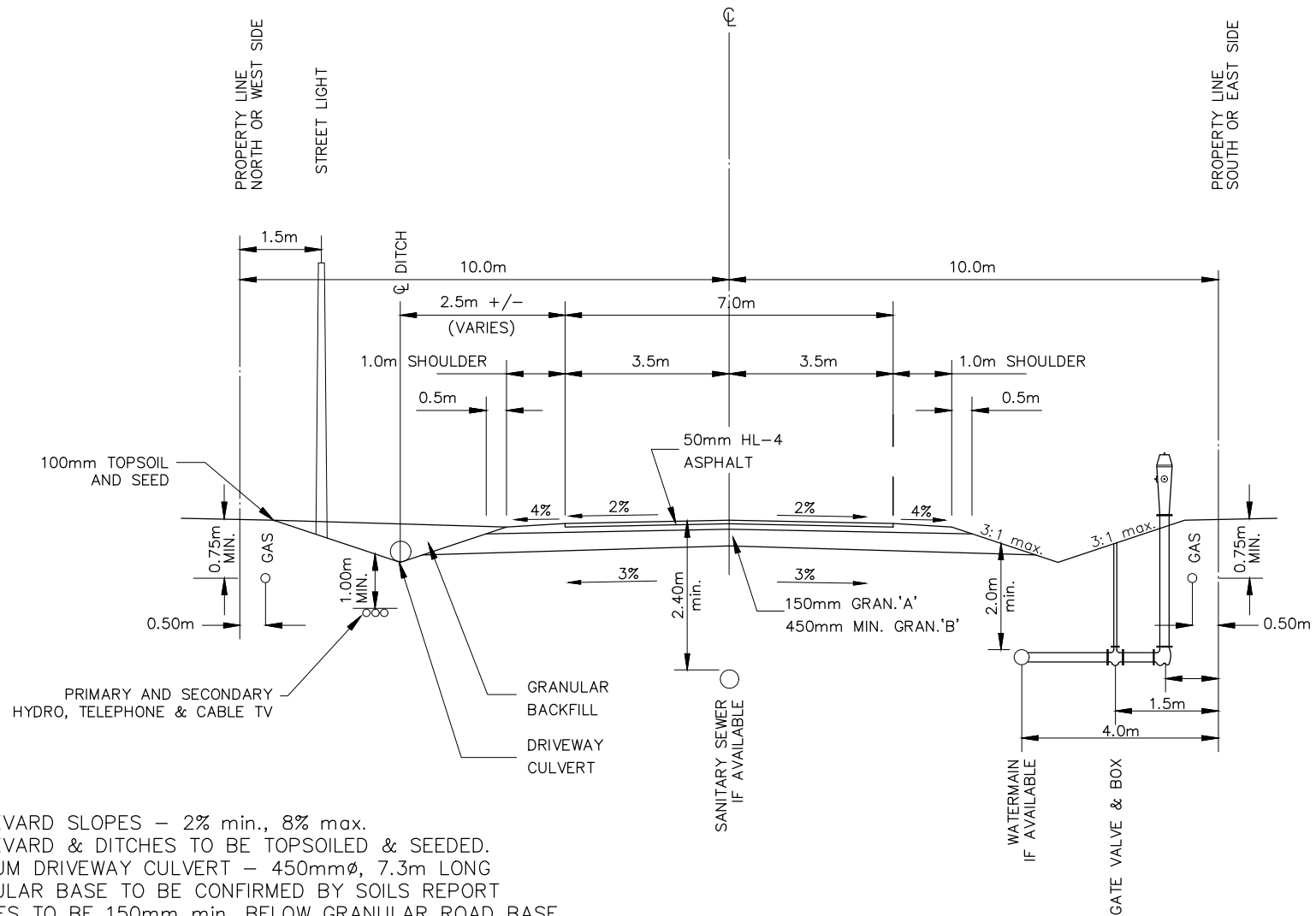
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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 0 |
| BARE-ROOT TREE PLANTING DETAIL | STD. L2 | |



NOTES:

1. TOPSOIL TO BE REMOVED TO ITS FULL DEPTH ALONG ENTIRE WIDTH OF ROAD BETWEEN CURBS
2. BOULEVARD TO BE FULLY SODDED AS SPECIFIED
3. ROAD CROSSING DEPTHS FOR UTILITIES - HYDRO 1.2m
- TELEPHONE, UNION GAS, CABLE TV 1.0m
- WATER 2.00m
4. ALL WATER SERVICE BOXES TO BE SET AT PROPERTY LINE
5. ROAD DESIGN TO BE CONFIRMED BY GEOTECHNICAL DESIGN
6. STREET LIGHTING TO BE ON SAME SIDE OF STREET AS SIDEWALK, WHERE POSSIBLE

| | | |
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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 1 |
| STANDARD CROSS-SECTION LOCAL STREET - 20.0m R.O.W. | STD. R1 | |

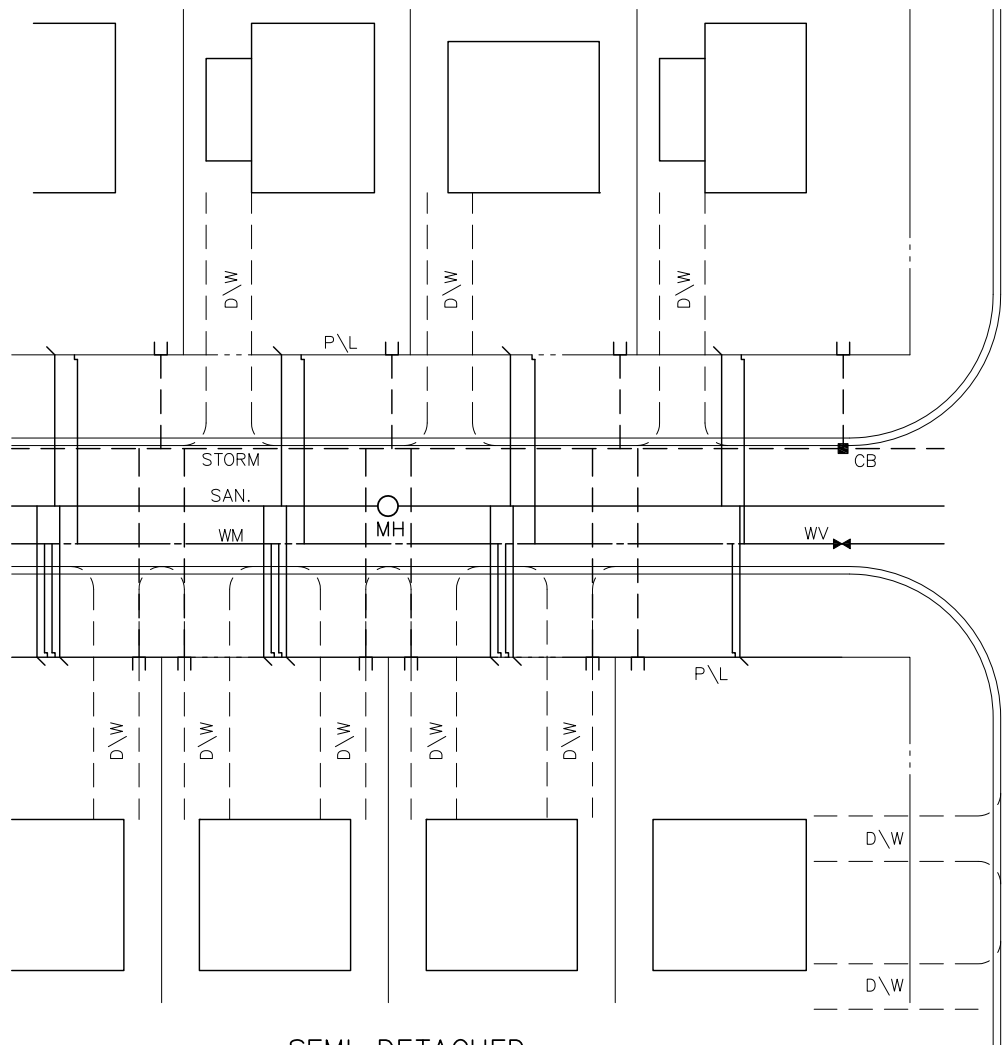


NOTES:

1. BOULEVARD SLOPES – 2% min., 8% max.
2. BOULEVARD & DITCHES TO BE TOPSOILED & SEEDED.
3. MINIMUM DRIVEWAY CULVERT – 450mm ϕ , 7.3m LONG
4. GRANULAR BASE TO BE CONFIRMED BY SOILS REPORT
5. DITCHES TO BE 150mm min. BELOW GRANULAR ROAD BASE.
6. MINIMUM ROAD GRADE – 0.50%
7. MAXIMUM ROAD GRADE – 8.0%
8. TREES TO BE PLANTED EVERY 20m ALONG BOTH SIDES OF ROAD ALLOWANCE.
9. STREET LIGHTING TO BE PROVIDED ON ONE SIDE OF ALL ROADWAYS.
10. ALL HYDRO, BELL AND OTHER UTILITIES TO BE UNDERGROUND.

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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 1 |
| STANDARD CROSS-SECTION RURAL ROAD – 20.0m R.O.W. | STD. R2 | |

SINGLE FAMILY



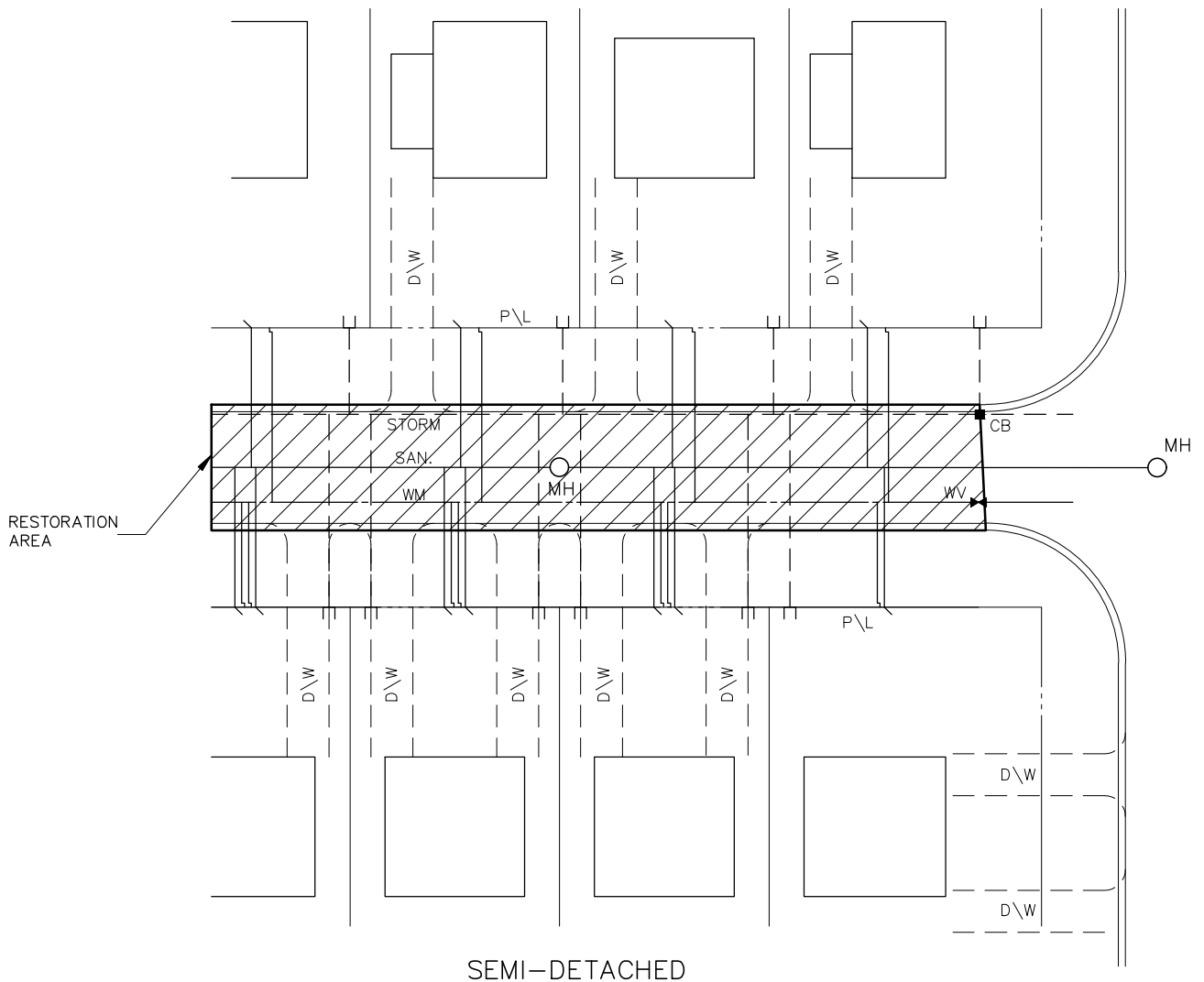
SEMI-DETACHED

NOTES:

1. 1.0m min. BETWEEN SEWER & WATER SERVICE CONNECTIONS AT CENTRE OF LOT.
2. STORM SEWER SERVICES 1.5m min. FROM SIDE LOT LINE FOR SINGLE FAMILY.
3. WATERMAIN VALVES, HYDRANTS & CATCHBASINS NOT TO BE LOCATED IN WALKWAYS OR DRIVEWAYS.
4. ALL SERVICES TO RUN IN A STRAIGHT LINE, PERPENDICULAR TO C\O OF ROAD FROM MAIN TO PROPERTY LINE.

| | | |
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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| TYPICAL SERVICING LAYOUT SINGLE AND SEMI-DETACHED | STD. S1 | |

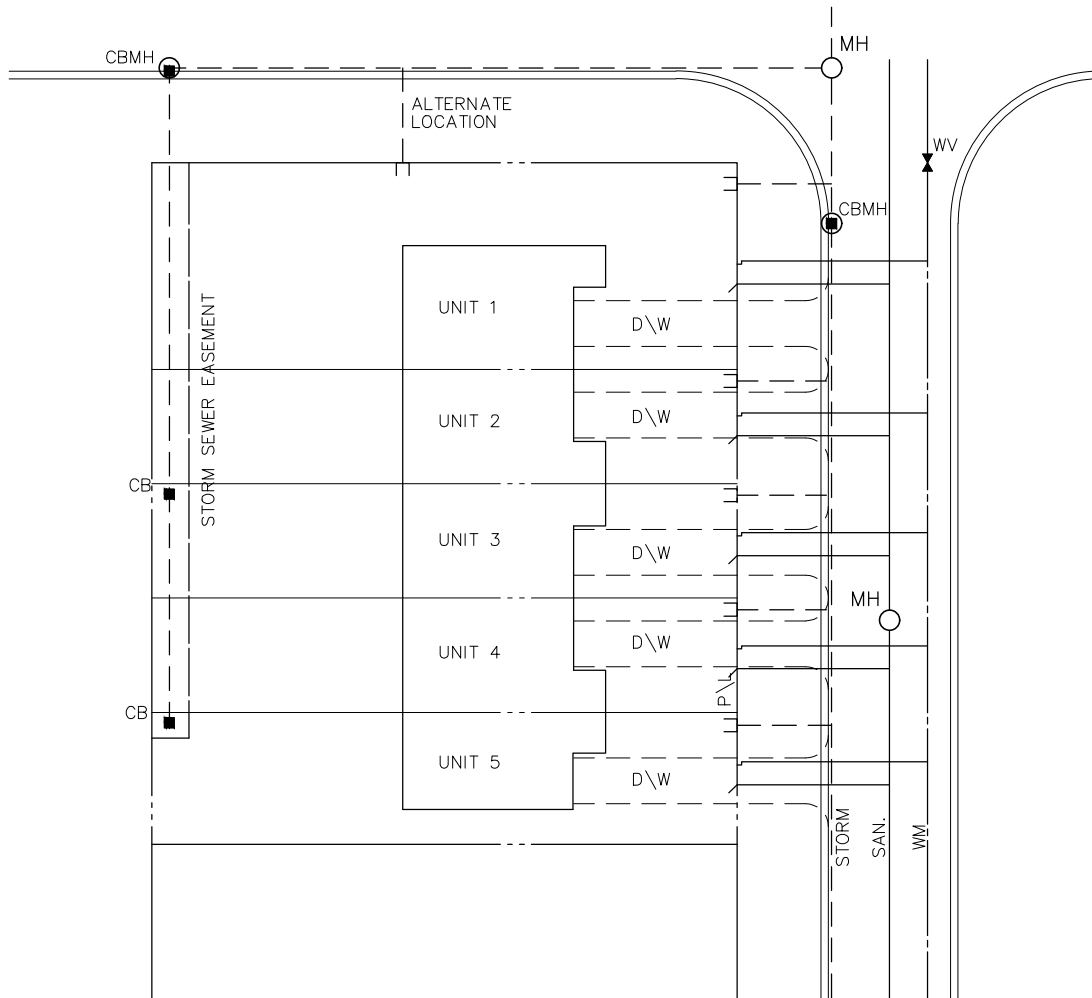
SINGLE FAMILY



NOTES:

1. 1.0m min. BETWEEN SEWER & WATER SERVICE CONNECTIONS AT CENTRE OF LOT.
2. STORM SEWER SERVICES 1.5m min. FROM SIDE LOT LINE FOR SINGLE FAMILY.
3. WATERMAIN VALVES, HYDRANTS & CATCHBASINS NOT TO BE LOCATED IN WALKWAYS OR DRIVEWAYS.
4. ALL SERVICES TO RUN IN A STRAIGHT LINE, PERPENDICULAR TO ϕ OF ROAD FROM MAIN TO PROPERTY LINE.
7. RESTORATION OF EXISTING R.O.W. SHALL BE AS FOLLOWS:
ASPHALT TO BE FULLY RESTORED
EDGE OF PAVEMENT TO EDGE OF PAVEMENT
AND FULLY ENCOMPASS SERVICING.
8. CURB SHALL BE RESTORED (IF APPLICABLE) INCLUDING REQUIRED CURB CUTS.

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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 0 |
| TYPICAL SERVICING LAYOUT FOR INFILL LOTS SINGLE AND SEMI-DETACHED | STD. S2 | |

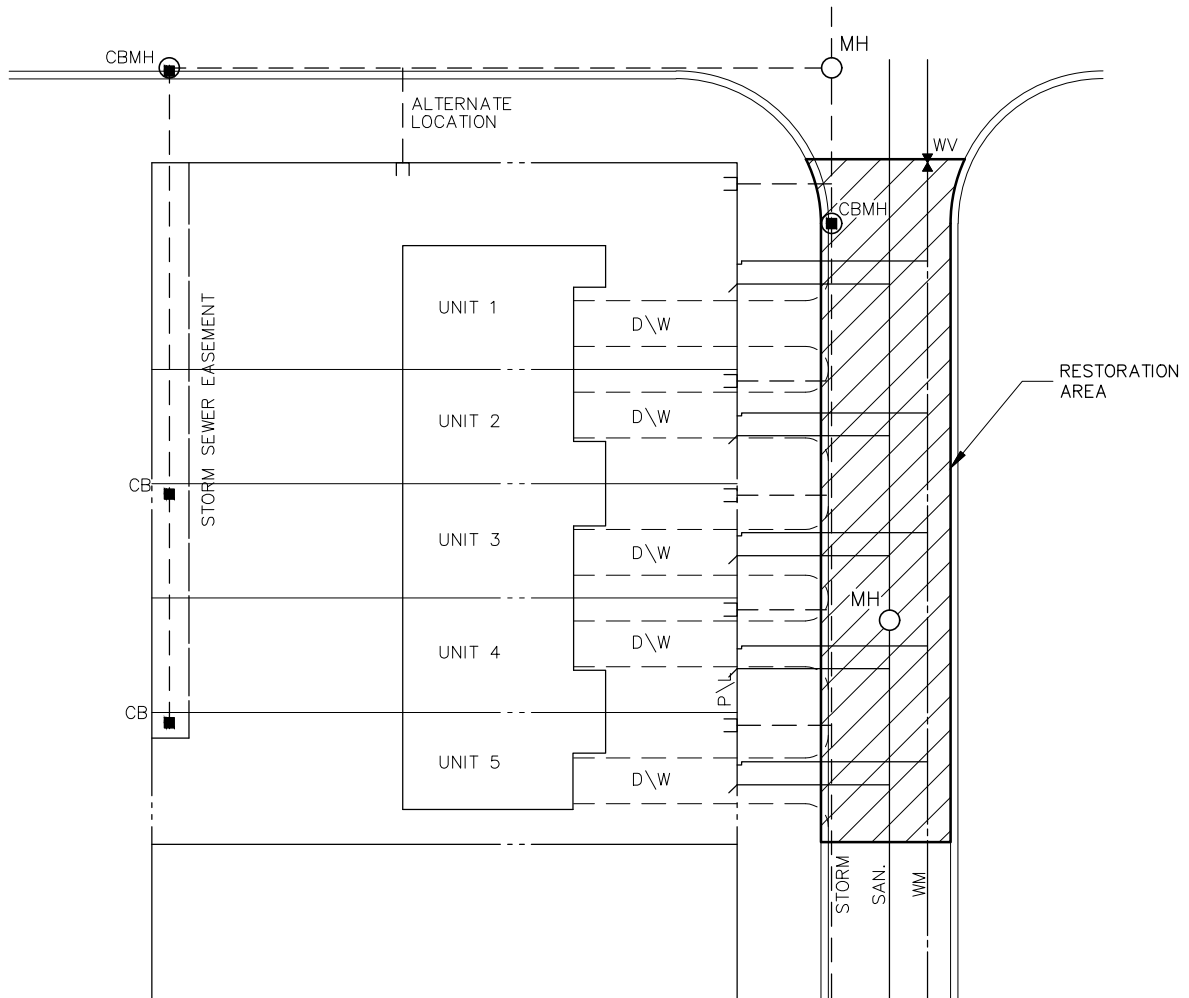


TOWNHOUSE

NOTES:

1. 1.0m min. BETWEEN SEWER & WATER SERVICE CONNECTIONS AT CENTRE OF LOT.
2. STORM SEWER SERVICES 1.5m min. FROM LOW SIDE LOT LINE.
3. WATERMAIN VALVES, HYDRANTS & CATCHBASINS NOT TO BE LOCATED IN WALKWAYS OR DRIVEWAYS.
4. ALL SERVICES TO RUN IN A STRAIGHT LINE, PERPENDICULAR TO ϕ OF ROAD FROM MAIN TO PROPERTY LINE.
5. NUMBER OF TOWNHOUSE UNITS MAY VARY.
6. WHERE TOWNHOUSE BLOCK IS ADJACENT TO SINGLE FAMILY HOUSING, 1.8m HIGH BOARD FENCING WILL BE REQUIRED ALONG COMMON PROPERTY LINE

| | | |
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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 1 |
| TYPICAL SERVICING LAYOUT TOWNHOUSE | STD. S3 | |

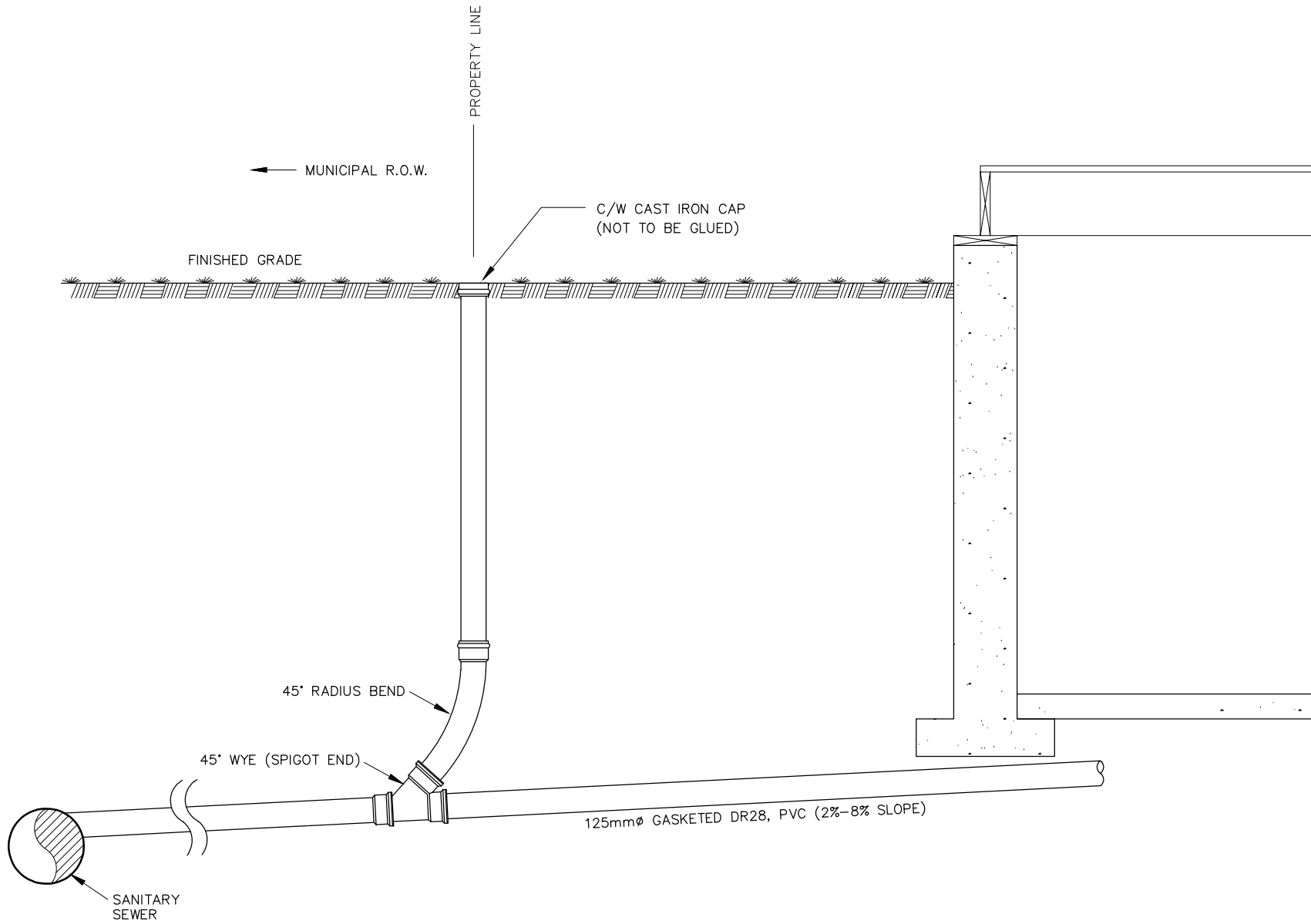


TOWNHOUSE

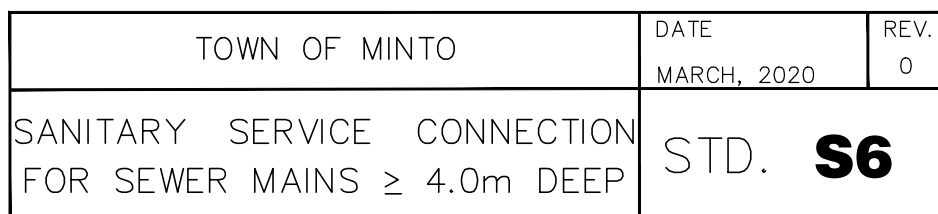
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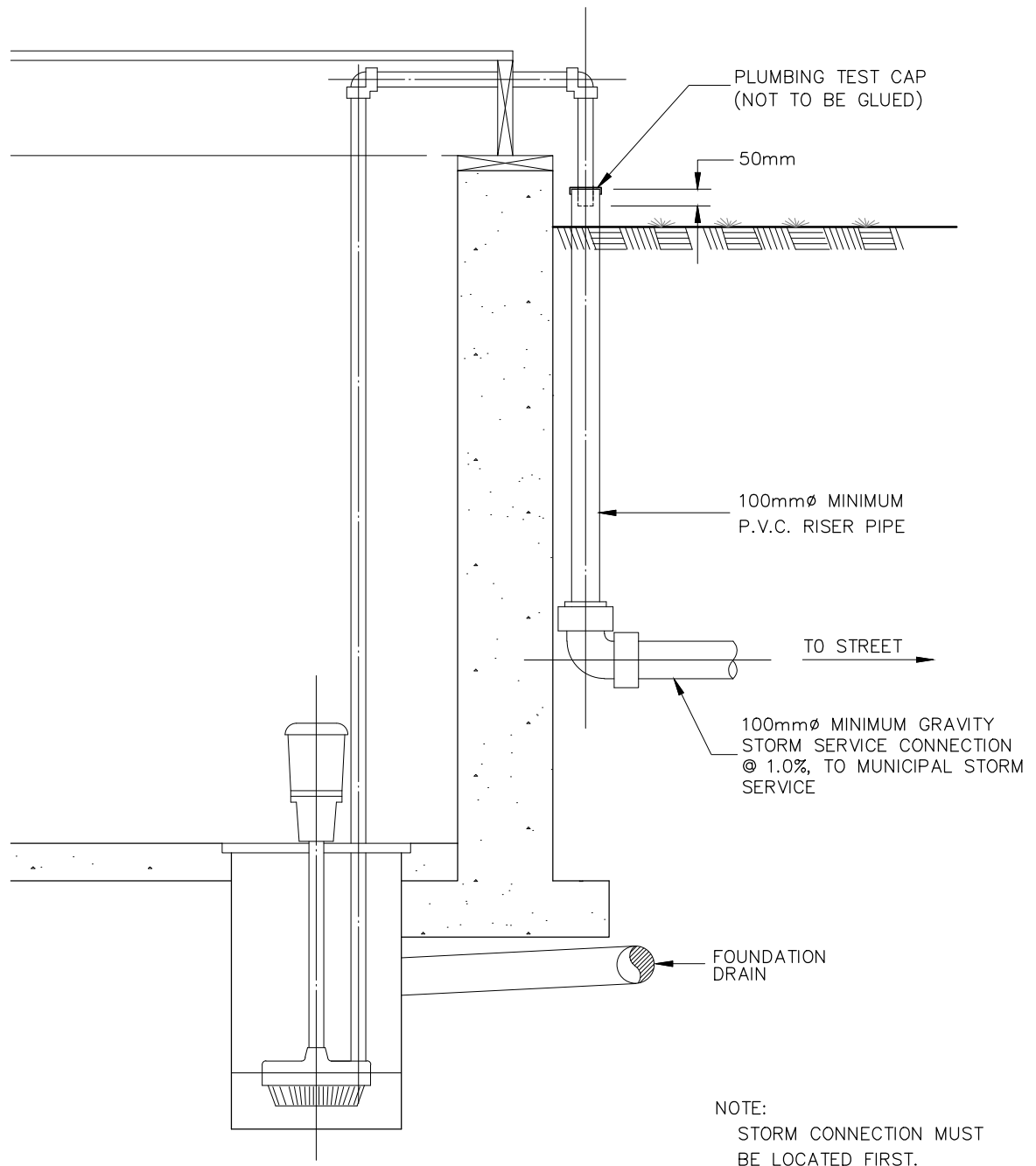
1. 1.0m min. BETWEEN SEWER & WATER SERVICE CONNECTIONS AT CENTRE OF LOT.
2. STORM SEWER SERVICES 1.5m min. FROM LOW SIDE LOT LINE.
3. WATERMAIN VALVES, HYDRANTS & CATCHBASINS NOT TO BE LOCATED IN WALKWAYS OR DRIVEWAYS.
4. ALL SERVICES TO RUN IN A STRAIGHT LINE, PERPENDICULAR TO ϕ OF ROAD FROM MAIN TO PROPERTY LINE.
5. NUMBER OF TOWNHOUSE UNITS MAY VARY.
6. WHERE TOWNHOUSE BLOCK IS ADJACENT TO SINGLE FAMILY HOUSING, 1.8m HIGH BOARD FENCING WILL BE REQUIRED ALONG COMMON PROPERTY LINE
7. RESTORATION OF EXISTING R.O.W. SHALL BE AS FOLLOWS: ASPHALT TO BE FULLY RESTORED
EDGE OF PAVEMENT TO EDGE OF PAVEMENT
AND FULLY ENCOMPASS SERVICING.
8. CURB SHALL BE RESTORED (IF APPLICABLE) INCLUDING REQUIRED CURB CUTS.

| | | |
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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 0 |
| TYPICAL SERVICING LAYOUT FOR INFILL LOTS TOWNHOUSE | STD. S4 | |

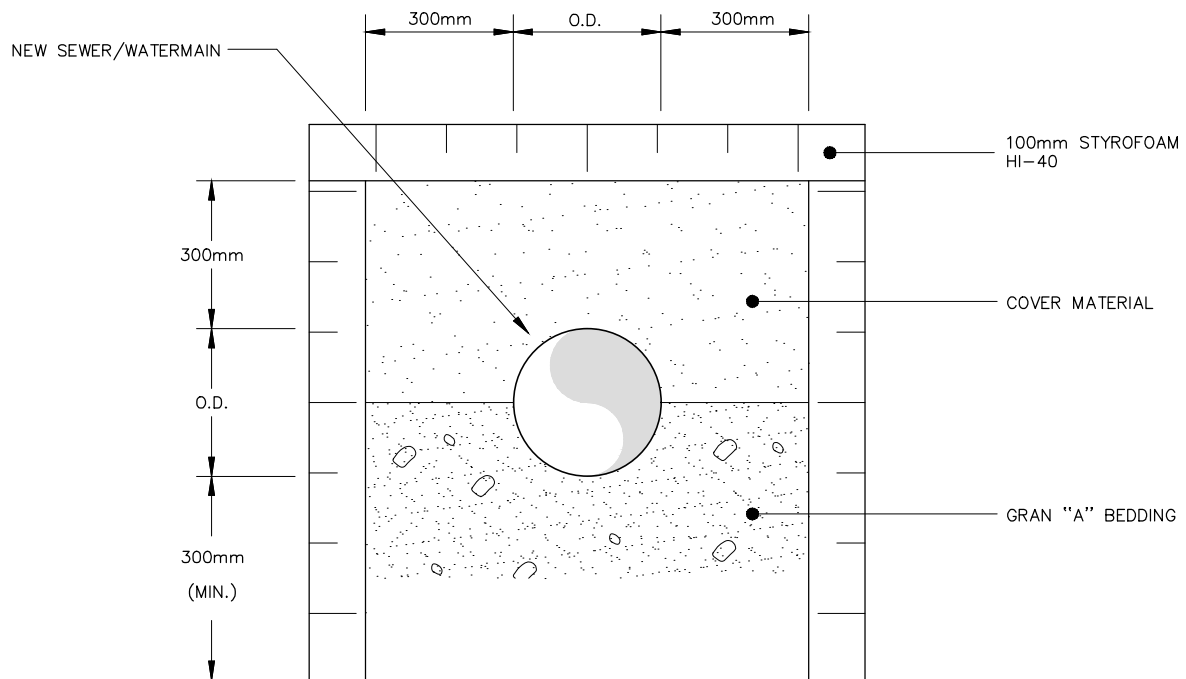


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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 0 |
| SANITARY SERVICE CONNECTION WITH CLEAN-OUT | STD. S5 | |

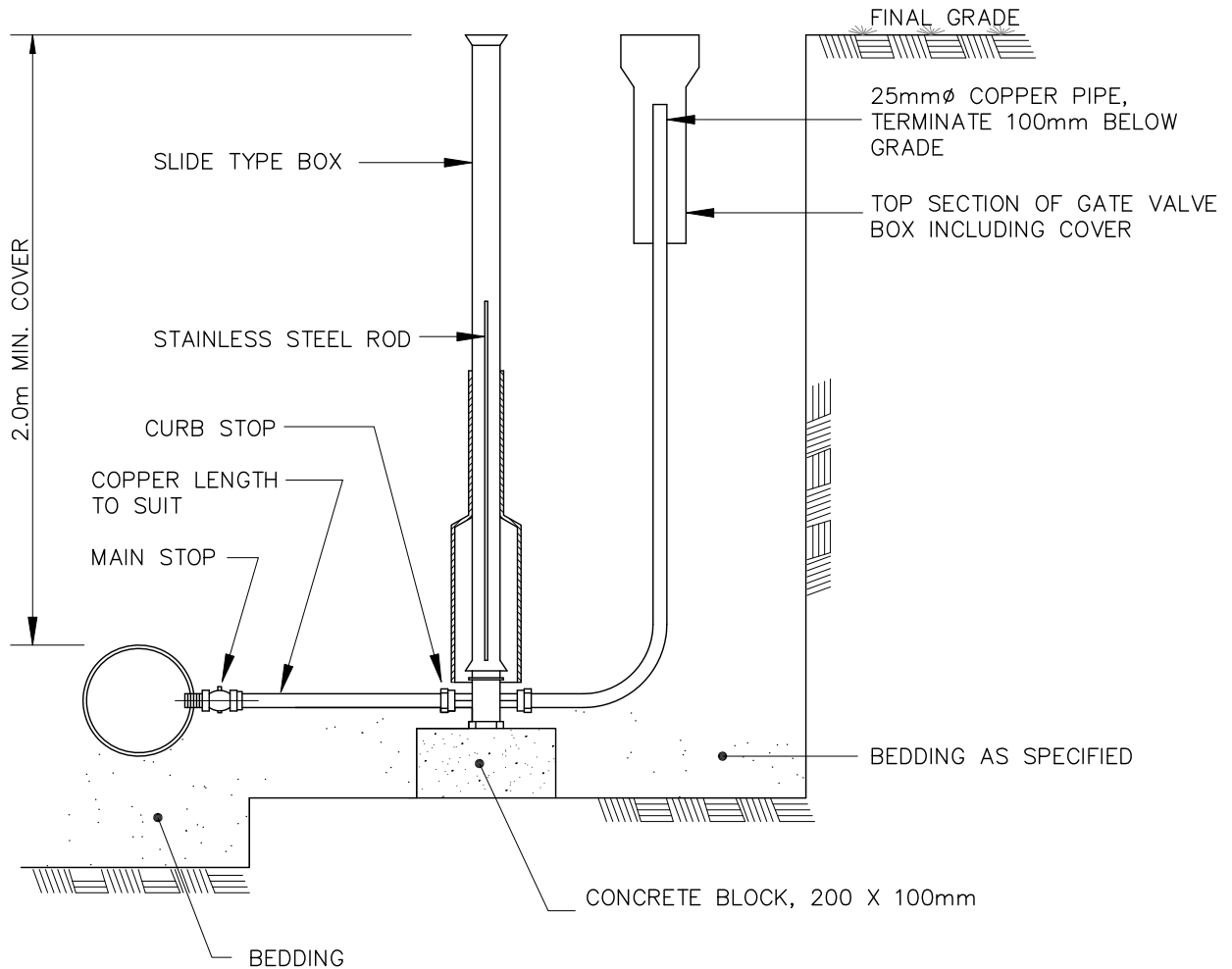




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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| SUMP PUMP TO STORM SEWER CONNECTION | STD. S7 | |



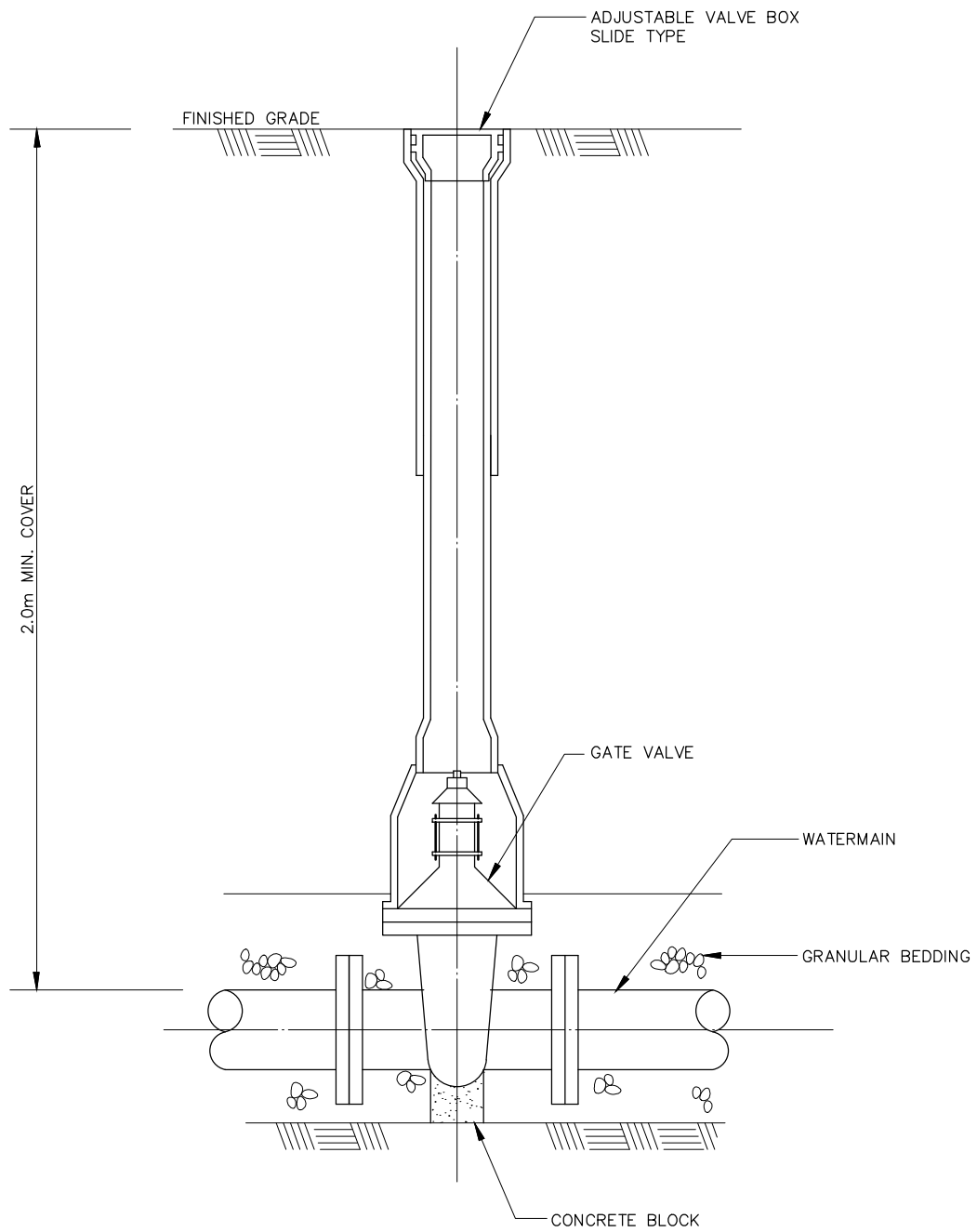
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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| TYPICAL PIPE INSULATION DETAIL | STD. S8 | |



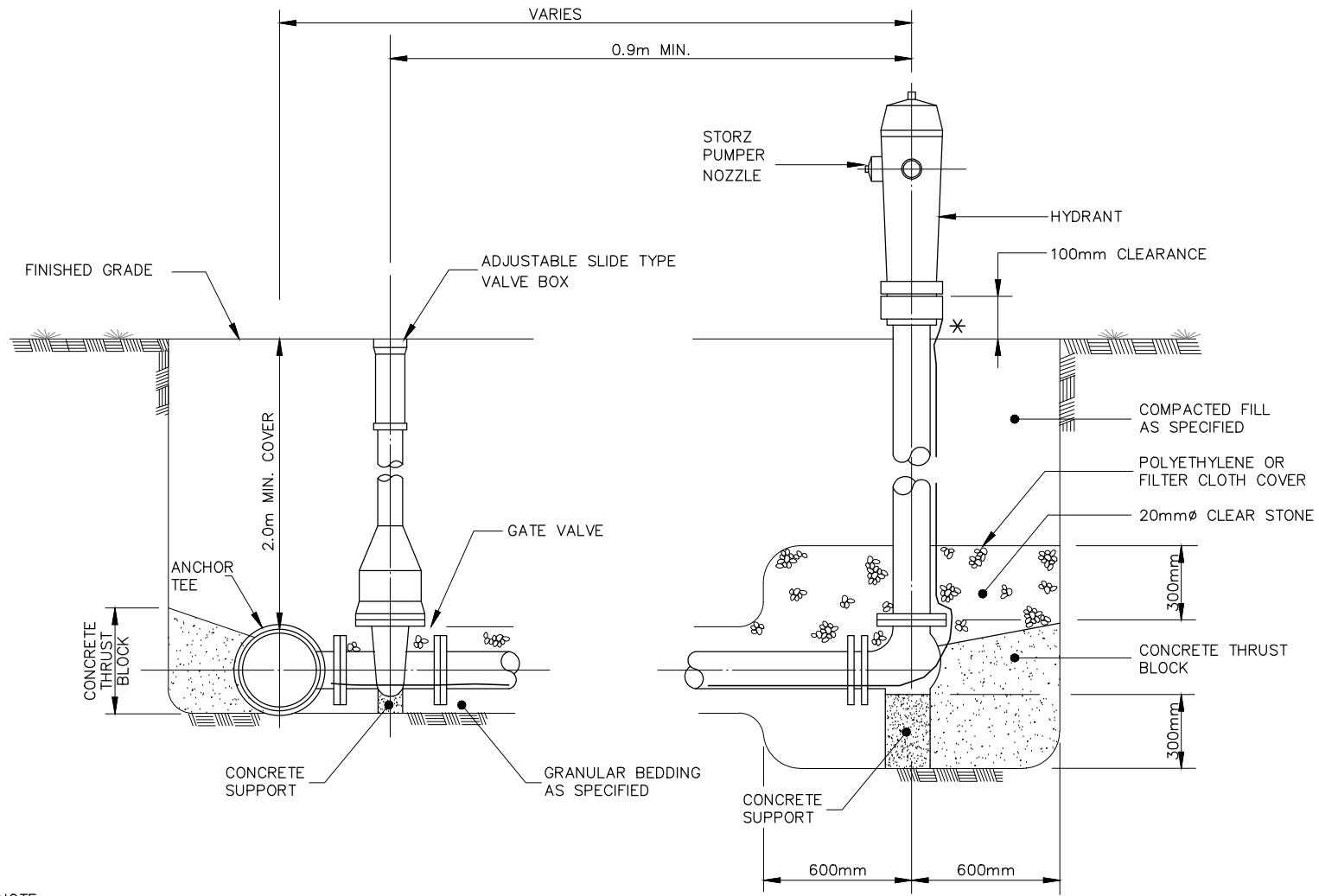
NOTES:

1. SADDLES SHALL BE USED FOR PLASTIC PIPE.
2. ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SHOWN.

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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| 25mm BLOW OFF INSTALLATION | STD. W1 | |



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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 1 |
| VALVE AND VALVE BOX | STD. W2 | |

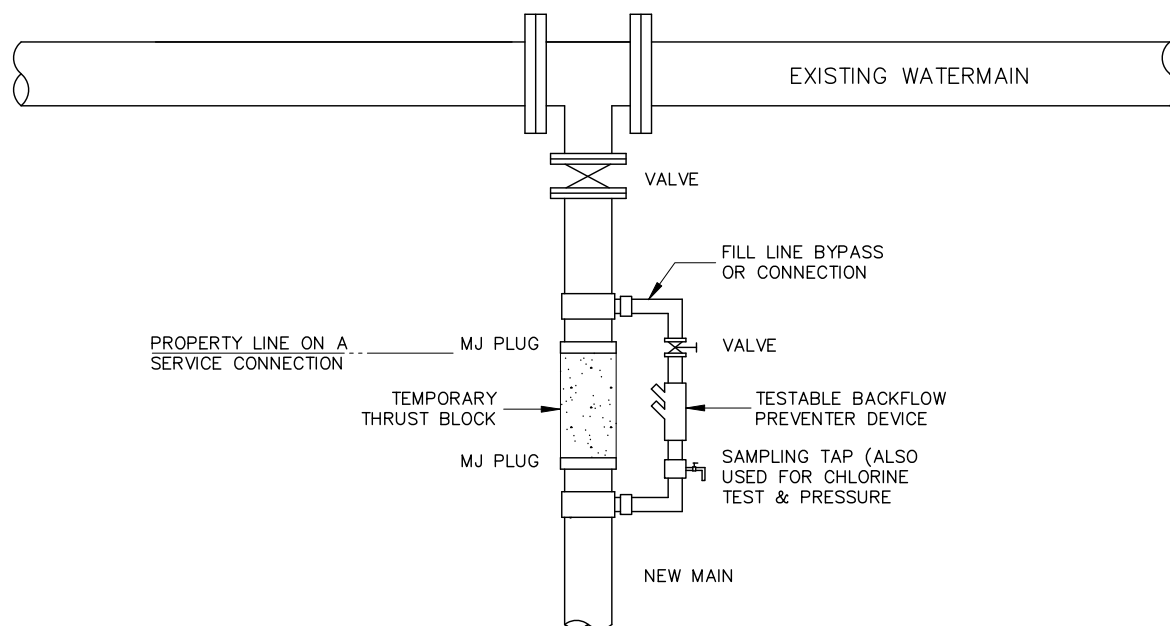


NOTE:

HYDRANT TO BE SET PLUMB
WITH EXTENSIONS TO SUIT DEPTH
OF LEAD. LEAD TO BE SET LEVEL.

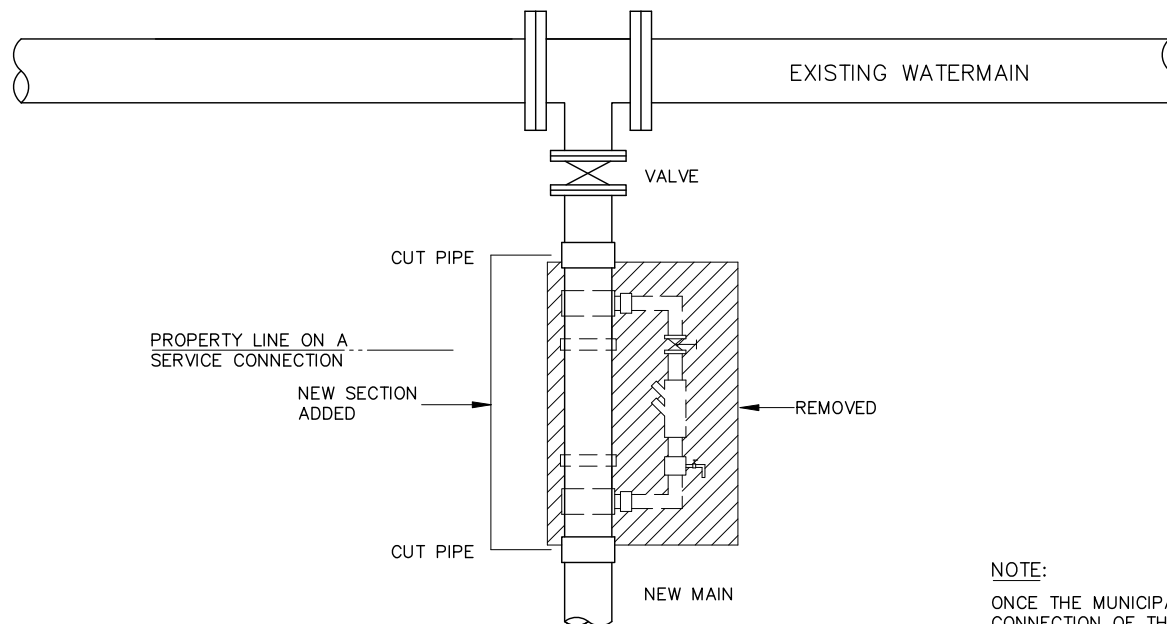
* CONNECT TRACER WIRE
TO UNDERSIDE OF LOWER
FLANGE OF FIRE HYDRANT
AND TO BE MADE ACCESSIBLE

| | | |
|---------------|---------------------|-----------|
| TOWN OF MINTO | DATE MARCH, 2020 | REV. 1 |
| HYDRANT SET | STD. W3 | |



TYPICAL TEMPORARY CONNECTION
ON WATERMAINS OR SERVICES
100mm OR LARGER

| | | |
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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| CONNECTION OF NEW WATERMAIN TO EXISTING WATERMAIN | STD. W4 | |

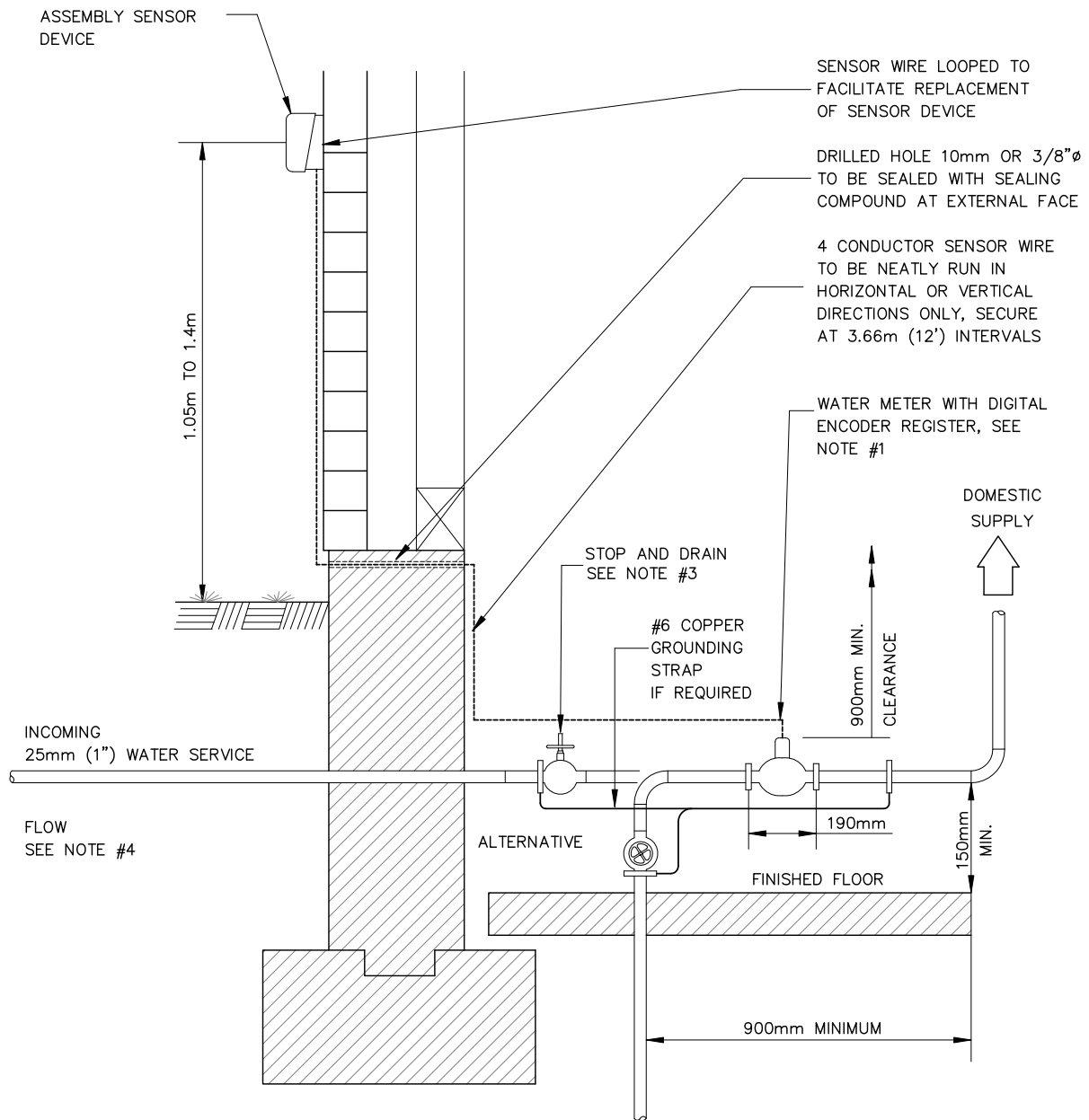


TYPICAL TEMPORARY CONNECTION
ON WATERMAINS OR SERVICES
100mm OR LARGER

NOTE:

ONCE THE MUNICIPALITY AUTHORIZES FOR THE CONNECTION OF THE NEW MAIN TO THE EXISTING WATERWORKS SYSTEM, THE PERFORATED SECTIONS OF THE MAIN FOR THE JUMPER LINE MAY BE CUT OFF AT THE INDICATED LOCATIONS, THE JUMPER LINE REMOVED AND A NEW SECTION OF MAIN ADDED.

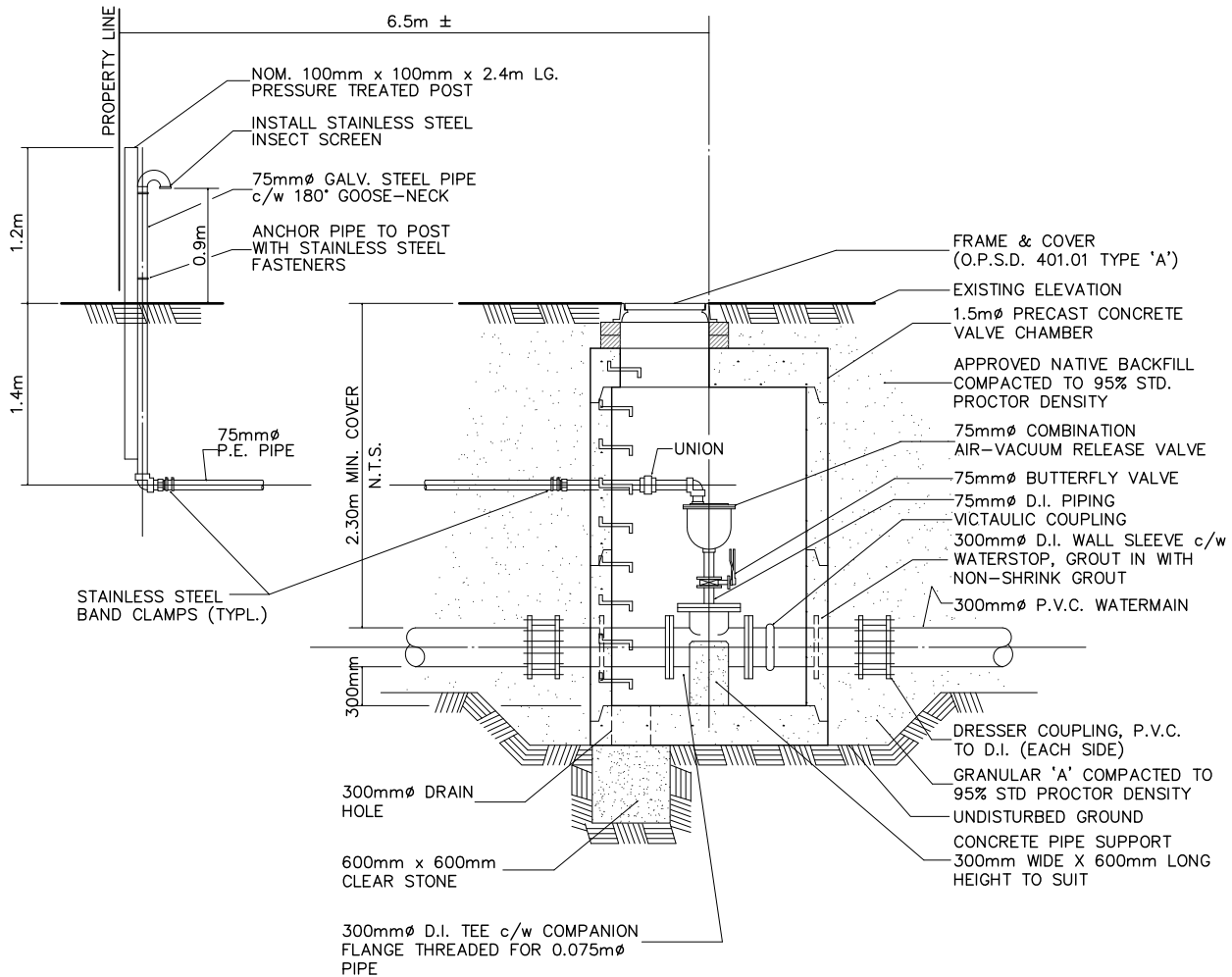
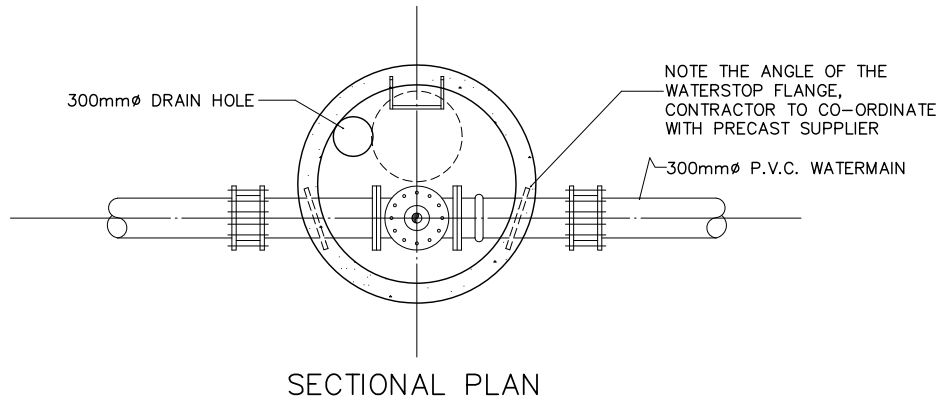
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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| CONNECTION OF NEW WATERMAIN TO EXISTING WATERMAIN | STD. W5 | |



NOTES:

1. - METER SHALL BE ONE TRADE SIZE SMALLER THAN SERVICE PIPE. REGISTRATION IN CUBIC METRES. THREADED CONNECTIONS.
2. - SUPPLY AND INSTALL REMOTE READOUT DEVICE ON OUTSIDE WALL WITHIN 2.0m OF THE FRONT WALL AND ON THE SAME SIDE AS THE HYDRO METER. REMOTE READOUT DEVICE SHALL BE SUITABLE FOR TOUCH READ AUTOMATED READING AND BILLING SYSTEM.
3. - STOP AND DRAIN VALVE TO BE THE SAME SIZE AS INCOMING PIPE.
4. - METER SHALL BE INSTALLED USING THREADED CONNECTIONS ONLY.

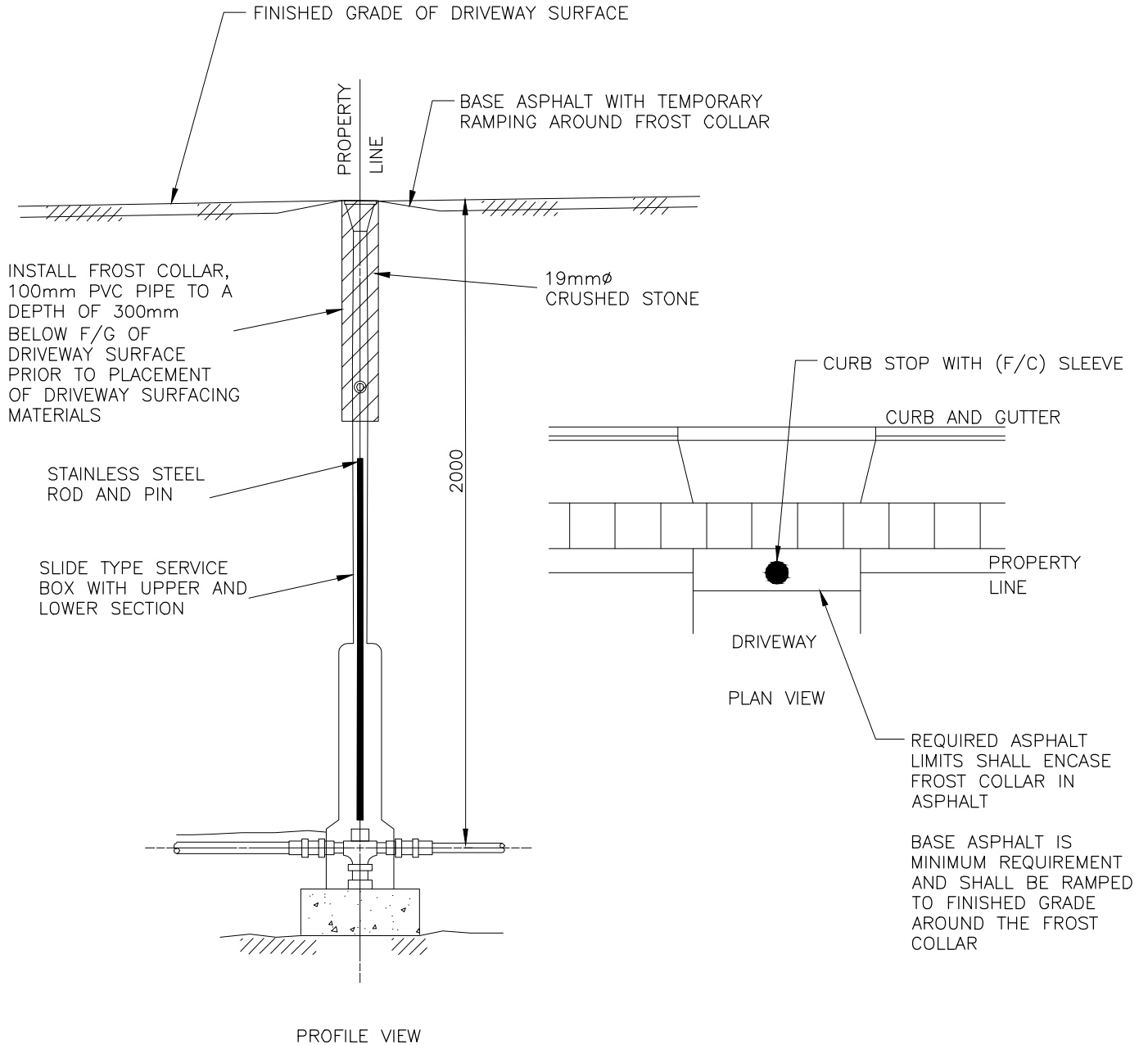
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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| TYPICAL WATER METER INSTALLATION | STD. W6 | |



TYPICAL SECTION

- NOTE: — D.I. FITTINGS AND PIPE SHALL BE TREATED WITH 'DENSO' PETROLATUM CORROSION PROTECTION SYSTEM.
- DRESSER COUPLINGS TO HAVE STAINLESS STEEL BOLTS, WASHERS & NUTS.
- FOR GENERAL ARRANGEMENT SEE SECTIONAL PLAN ABOVE.

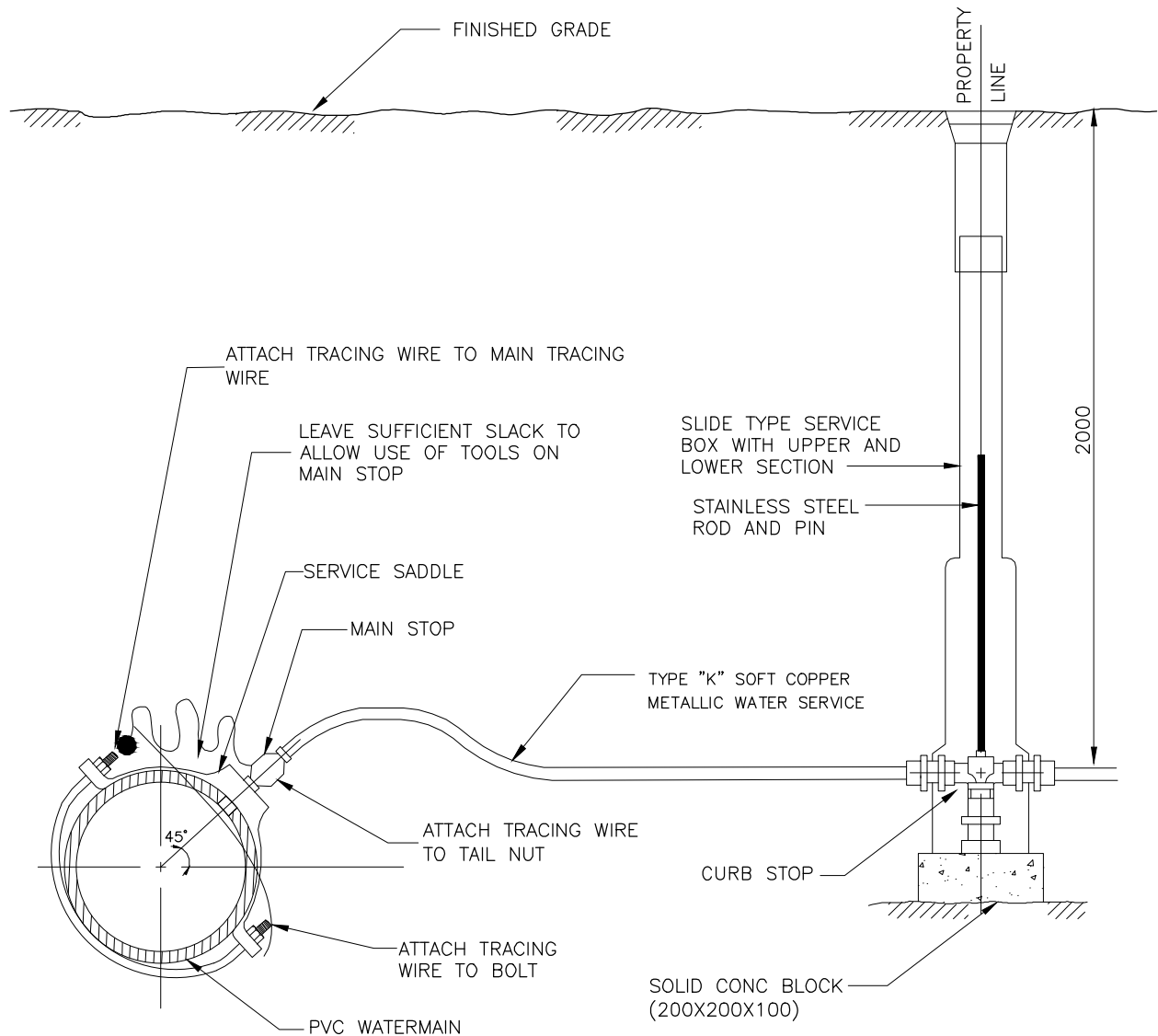
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| TOWN OF MINTO | DATE MARCH, 2016 | REV. 0 |
| AIR-VACUUM RELEASE VALVE CHAMBER | STD. W7 | |



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
2. TOP OF FROST COLLAR SLEEVE TO BE SET AT THE ELEVATION OF FINISHED SURFACE.
3. IF ONLY PLACING THE BASE COAT OF ASPHALT, THE ASPHALT SHALL BE RAMPED AROUND THE SLEEVE UP TO FINISHED GRADE TO PREVENT DAMAGE TO THE SLEEVE.
4. ASPHALT RAMPING NOT REQUIRED WHEN DRIVEWAY IS FULLY COMPLETED TO FINISHED GRADE WITH SURFACE ASPHALT.
5. CURB STOPS ARE TO BE SET ON PROPERTY LINE AND IN LANDSCAPED AREAS WHENEVER POSSIBLE.

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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 0 |
| FROST COLLAR INSTALLATION FOR CURB STOP BOXES LOCATED IN DRIVEWAYS | STD. W8 | |



NOTES:

1. ANY JUNCTION MADE IN SERVICE PIPE BETWEEN MAIN STOP AND CURB STOP TO BE MADE WITH APPROVED COUPLINGS.
2. ALL WATER SERVICES TO BE INSTALLED 90° TO THE LONGITUDINAL AXIS OF THE WATERMAIN.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
4. THE TRACING IS TO BE CONNECTED AT THREE LOCATIONS: THE MAIN TRACING WIRE, THE SADDLE/MAIN STOP (AT BOLT) AND THE CURB STOP (AT TAIL NUT). AN INSULATOR, SUCH AS LENGTH OF APPROVED PLASTIC WATER SERVICE PIPE IS REQUIRED TO BE INSTALLED BETWEEN THE CURB STOP AND METALLIC SERVICE ON THE PRIVATE SIDE IN ORDER TO SEPARATE SYSTEMS. A MINIMUM 12 lb. ANODE IS TO BE ATTACHED TO THE PRIVATE SIDE METALLIC SERVICE.
5. THE TRACING WIRE SHALL NOT BE CONNECTED TO ANY FITTINGS OR ANODES (FUNCTION AS A CORROSION PROTECTION SYSTEM).

| | | |
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| TOWN OF MINTO | DATE MARCH, 2020 | REV. 0 |
| METALLIC WATER SERVICE CONNECTION DETAIL FOR NON-METALLIC WATERMAIN 25mm AND 50mm DIAMETER SERVICES | | STD. W10 |

Appendix “B”

Material and Product List

| TABLE 2: APPROVED MATERIAL AND PRODUCT LIST | | |
|--|--------------|---|
| SERVICE | ITEM | APPROVED PRODUCTS |
| SANITARY | Sewer Pipe | PVC SDR 35 up to 375mm diameter pipe Concrete CSA#A257.1/A257.2 |
| | Service Pipe | PVC SDR 28 to building foundation |
| | Connections | Kor-N-Seal (manholes) Prefab tees or Kor-N-Tee (services) |
| | Adjustments | 150mm Min. and 300mm max concrete riser complete with "Denso" tape along all joints |
| STORM | Sewer Pipe | 375 mm diameter or less: <ul style="list-style-type: none"> - PVC SDR 35 - IPEX "Ultra Rib" - Loc Pipe "Loc PVC" - Concrete-CSA A257.1 (non-reinforced) - Concrete-A257.2 (reinforced) - HDPE Boss 2000, 320 kPa stiffness c/w Ultra Stab 75 joint - Royal Rib "Korflo" 450 mm diameter or greater <ul style="list-style-type: none"> - Concrete-CSA A257.1 (non-reinforced) - Concrete-A257.2 (reinforced) All rear yard catchbasin leads to be concrete. |
| | Service Pipe | PVC SDR 28 to building foundation |
| | Connections | Kor-N-Seal (PVC) Adaptor with band (ribbed) Prefab tee (services) Kor-N-Tee (services) |
| | Culverts | <ul style="list-style-type: none"> - Galvanized CSP, minimum 1.6 mm thickness with 0.3 m minimum cover. - HDPE corrugated Boss 2000, 320 kPa stiffness c/w Ultra Stab 75 joint with 0.6 m minimum cover. |
| | Watermain | C900 PVC Class 150 (DR 18), B 137.3 with Ring-Tite Joints and Tracer Wire. |
| WATER PIPE | Valves | Mueller Resilient Wedge Gate Valve AWWA C-509, mechanical joint with: <ul style="list-style-type: none"> - Fusion-bonded epoxy coating - Bronze stem - Open counter clockwise Or; Clow Resilient Wedge Gate Valve AWWA C-509, F-6100 mechanical joint with: <ul style="list-style-type: none"> - Fusion-bonded epoxy coating - Bronze stem - Open counter clockwise - |

TABLE 2: APPROVED MATERIAL AND PRODUCT LIST

| SERVICE | ITEM | APPROVED PRODUCTS |
|------------|-----------------------------|--|
| | Hydrants | <p>All with "Storz" pumper connection and open counter clockwise</p> <ul style="list-style-type: none"> - Canada Valve, Century - Canada Valve, B-50-B-24 (Specific heritage locations) - Clow Canada, Brigadier Series M-67-B |
| | Corporation Stop | <ul style="list-style-type: none"> - Series FB1000 (no lead), AWWA x copper compression assembly by Ford Meter Box Company Inc. - Cambridge Brass, Ball Style, Series 301, AWWA x CB assembly - Mueller Canada, Mueller 300 Ball Type, B-25008, AWWA x Mueller "CC" |
| | Curb Stop | <p>ALL ROD AND PIN SHALL BE STAINLESS STEEL</p> <ul style="list-style-type: none"> - Series B44 (no lead), copper compression x copper Compression be Ford Meter Box Company Inc. - Cambridge Brass, Ball Style, Series 202, CB compression x CB compression - Mueller Canada, Mueller 300 Ball Type, B25209, Mueller "CC" x Mueller "CC" assembly |
| | Saddle | <ul style="list-style-type: none"> - FS 323 (stainless, double bolt) by Ford Meter Box Company Inc. - Cambridge Brass, Series 403 Stainless Steel Type 304 Double Bolt, AWWA Thread - Robar 2616DB, AWWA Thread |
| | Anodes | <ul style="list-style-type: none"> - DZP-24, 10.9 kg installed on iron watermain - DZP-12, 5.4 kg installed on iron fittings, valves and services etc. - Sacrificial Zinc nuts in conjunction with anodes if required |
| WATER PIPE | Mechanical Joint Restraints | <ul style="list-style-type: none"> - "Grip Ring" pipe restrainer manufactured by Romac Industries - Uni-Flange Series 1300 manufactured by Ford Meter Box Company Inc. - "MJ Field Lok" Series PV manufactured by Clow Canada - Series 2000PV manufactured by EBAA Iron Sales Inc. |
| | Tracer Wire | <ul style="list-style-type: none"> - 12 gauge wire, 7 strand copper with plastic coating attached to underside of bottom flange of Fire Hydrant (Std. Dwg. No. W3) |
| | Water Service Material | <ul style="list-style-type: none"> - Municipex plastic, manufactured by REHAU Unlimited Polymer Solutions - Poly Series 200 - Copper Seamless Type "K" |
| | Water Meters | <ul style="list-style-type: none"> - T-10 I900T by Neptune Technology Group |

Appendix “C”
Water Works
Testing Procedures

1. *Temporary watermain connection shall be as follows:*

- a) No new watermain shall be connected to an existing watermain until all testing procedures have been completed and approved by the Town of Minto Public Works Department.
- b) The new watermain shall be kept isolated from the existing waterworks system using a physical separation until satisfactory bacteriological testing has been completed and accepted by the Town. Water required to fill the new main for hydrostatic pressure testing, disinfection and flushing shall be supplied through a temporary connection between the existing water system and the new main (refer to Standard Drawing W4 and W5). The temporary connection shall include an appropriate and approved cross-connection control device (reduced pressure zone backflow preventer or a double check valve assembly). Public Works Department will require written certification of the backflow preventer operation is in accordance with CAN/Canadian Standard Association – B64 Series Manual.
- c) At the beginning of each new watermain installation, a minimum of one (1) swab shall be installed. Swabbing of the new watermain shall be completed prior to hydrostatic testing.

2. *Hydrostatic Testing (Reference OPSS – 701.07.22):*

- a) Hydrostatic testing shall be conducted under the supervision of the Town of Minto Public Works Department upon completion of the watermain including services and backfilling.
- b) A test section shall be either a section between valves or the completed watermain.
- c) Test pressure shall be 1035 kPa.
- d) The test section shall be filled slowly with water and all air shall be removed from the pipeline. A twenty-four (24) hour absorption period may be allowed before starting the test. The test section shall be subjected to the specified continuous test pressure for two (2) hours.
- e) The leakage is the amount of water added to the test section to maintain the specified test pressure for the test duration. The measured leakage shall be compared with the allowable leakage as calculated for the test section. The allowable leakage is 0.082 litres per millimeter of pipe diameter per kilometer of watermain for the two (2) hour test period.
- f) If the measured leakage exceeds the allowable leakage, all leaks shall be located and repaired and the test section shall be retested until a satisfactory result is obtained.
- g) **Watermain Pressure Test Form shall be completed for all installations. Form is as shown on the last page of this Appendix.**

3. *Flushing and Disinfecting Watermains (Reference OPSS – 701.07.23):*

- a) Flushing and disinfecting operations shall be conducted under the supervision of the Town of Minto Public Works Department. The Public Works shall be notified at least two (2) business days in advance of the proposed date on which flushing and disinfecting operations are to commence.
- b) Liquid chlorine solution shall be introduced so that the chlorine is distributed throughout the section being disinfected. The chlorine shall be applied so that the chlorine concentration is 50 mg/L minimum throughout the section. The system shall be left charged with the chlorine solution for twenty-four (24) hours.

| TABLE 1: CHLORINE CONCENTRATIONS AND CONTACT TIMES FOR NEW WATERMAINS | | | |
|--|-----------------------------|---------------------------------------|---|
| Disinfection Method | Minimum Contact Time | Initial Chlorine Concentration | Maximum Allowable Decrease in Chlorine Concentration |
| Tablet or Continuous Feed | 24 hours | ≥ 25 mg/L | 40% of Initial Chlorine Concentration to a Maximum of 50 mg/L |

- c) Sampling and testing for chlorine residual will be carried out by the Town of Minto Public Works Department. The chlorine residual will be tested in the section after twenty-four (24) hours. If tests indicate a chlorine residual of 25 mg/L minimum, the section shall be flushed completely and recharged with water normal to the operation of the system. If the test does not meet the requirements, the chlorination procedure shall be repeated until satisfactory results are obtained.
- d) Watermain shall be flushed in a sequence approved by the Town of Minto Public Works Department. The Public Works may permit or require the flushing to be carried out in stages as sections of the system are completed. Flushed sections shall be protected from contamination.
- e) The Contractor shall provide acceptable equipment and chemical additives to dechlorinate the water that must be wasted. Chlorinated water discharged to the sanitary sewer shall be discharged at such a low flow rate or dechlorinated prior to discharge so that there is no possibility of chlorine residual remaining in the wastewater when it reached the waste water treatment plant. Total residual chlorine in water discharged into storm sewers, drainage ditches or watercourses shall not exceed 0.2 mg/L.

- f) Recharge the watermain with Municipal water and flush via a 20 mm maximum diameter pipe for twenty-four (24) hours.
- g) After final flushing, and before the watermain is approved for connection of the new main to the existing water system two (2) consecutive sets of water samples, taken at least twenty-four (24) hours apart, shall be collected, every 350 metres, plus from the end of the line and from each branch. Certified staff from the Public Works Department shall collect for bacteriological samples.
- h) All water samples will be collected by the Town of Minto Public Works Department and analyzed by a certified laboratory. Two (2) – 200 ml bacteriological sample (bottles supplied by the Town – ONLY) must be obtained at each location. The sample form is to be filled out requesting for PA and background analysis and is to include the samplers license number. Each sample collected must include a “Total and Free Chlorine residual” reading.
- i) The Town will pay Laboratory expenses for the initial first set of sampling required for bacteriological results. If the disinfection fails to produce satisfactory samples, disinfection and testing shall be repeated at the contractor’s expense including water usage until satisfactory samples have been obtained.
- j) The Town of Minto minimum requirements for acceptability of bacteriological tests are:

| | |
|-----------------|--------------------------------|
| E-coli Coliform | 0 CFU/100 ml |
| Total Coliform | 0 CFU/100 ml |
| Background | not greater than 25 CFU/100 ml |

4. *Commissioning of New Main*

- a) When all of the tests including the bacteriological samples are satisfactory, approval from the Public Works Department for the main to be connected to the existing water system must be obtained.
- b) All new piping and appurtenances placed in the connection of the new main and existing waterworks system must be disinfected with a 1.0% solution of sodium hypochlorite or equivalent method.
- c) The system shall not be put into operation until clearance has been given by the Town of Minto Public Works Department.



Town of Minto

Watermain Pressure Test Form (To Be Completed For All New Installations)

Project: _____ Contract No: _____

Area: _____ Date: _____

Contractor: _____

Required Test Pressure: _____

Pipe Material: _____

Diameter (mm): _____

Length Tested: _____

*Allowable Leakage in litres = $0.082 \times \frac{\text{Dia. (mm)} \times \text{Length (m)}}{1000}$ FOR 2 HOURS
(OPSS 441.07.24.03)*

Minimum time test required (hours): _____

Maximum volume loss allowed for (hours): _____ (litres): _____

Actual period of time the main was under pressure (hours): _____

Actual measured volume loss (litres): _____

Test Results: Satisfactory ☐ Unsatisfactory ☐

Comments:

Public Work's
Signature

Contractor's
Signature

Inspector's
Signature

TOWN OF MINTO
Watermain Pressure Test Form
(To Be Completed For All New Installations)

Project: _____ Contract No: _____

Area: _____ Date: _____

Contractor: _____

Required Test Pressure: _____

Pipe Material: _____

Diameter (mm): _____

Length Tested: _____

Allowable Leakage in litres = $0.082 \times \text{Dia. (mm)} \times \frac{\text{Length (m)}}{1000}$ FOR 2 HOURS
(OPSS 441.07.24.03)

Minimum time test required (hours): _____

Maximum volume loss allowable for (hours): _____

Actual period of time the main was under pressure (hours): _____

Actual measured volume loss (litres): _____

Test Results: ☐ Satisfactory ☐ Unsatisfactory

Comments:

Chlorine Required in litres = $0.039 \times \text{Dia. (m)}^2 \times \text{Length (m)} \times 12\% \times \text{Concentration of Chlorine (decimal)}$

Public Work's
Signature

Contractor's
Signature

Inspector's
Signature

Appendix “D”

Subdivision Design Review Checklist

**SUBDIVISION DESIGN REVIEW
CHECK LIST**

Project No.:

Submission No.:

Review Date:

Project Name:

Reviewed By:

SANITARY:

- | | | | |
|-------------------|---------------------------------------|---|--|
| Maintenance Hole: | <input type="checkbox"/> Spacing | <input type="checkbox"/> Sizing | <input type="checkbox"/> Location |
| | <input type="checkbox"/> Type | <input type="checkbox"/> Drop Structure | <input type="checkbox"/> Safety Grate |
| | <input type="checkbox"/> Benching | <input type="checkbox"/> Steps | <input type="checkbox"/> Frame and Cover |
| Sewer: | <input type="checkbox"/> Design Flows | <input type="checkbox"/> Sizing | <input type="checkbox"/> Depth |
| | <input type="checkbox"/> Clearance | <input type="checkbox"/> Type | <input type="checkbox"/> Bedding |
| Services: | <input type="checkbox"/> Type | | |

Comments:

WATER:

- | | | | |
|------------|---------------------------------------|----------------------------------|--------------------------------------|
| Watermain: | <input type="checkbox"/> Design Flows | <input type="checkbox"/> Sizing | <input type="checkbox"/> Depth |
| | <input type="checkbox"/> Type | <input type="checkbox"/> Bedding | <input type="checkbox"/> Tracer Wire |
| Hydrants: | <input type="checkbox"/> Type | <input type="checkbox"/> Spacing | <input type="checkbox"/> Location |
| Valves: | <input type="checkbox"/> Type | <input type="checkbox"/> Spacing | <input type="checkbox"/> Location |
| Services: | <input type="checkbox"/> Sizing | <input type="checkbox"/> Type | <input type="checkbox"/> Location |

Comments:

STORM:

Maintenance Hole/Catchbasins:

- | | | |
|--|---|---------------------------------------|
| <input type="checkbox"/> Spacing | <input type="checkbox"/> Sizing | <input type="checkbox"/> Location |
| <input type="checkbox"/> Type | <input type="checkbox"/> Inlet Capacity | <input type="checkbox"/> Safety Grate |
| <input type="checkbox"/> Frame and Grate/Cover | | |

Sewer:

- | | | |
|--------------------------------------|----------------------------------|--------------------------------|
| <input type="checkbox"/> Design Flow | <input type="checkbox"/> Sizing | <input type="checkbox"/> Depth |
| <input type="checkbox"/> Type | <input type="checkbox"/> Bedding | |

Major:

- | | | |
|--------------------------------------|---------------------------------|-----------------------------------|
| <input type="checkbox"/> Design Flow | <input type="checkbox"/> Sizing | <input type="checkbox"/> Location |
|--------------------------------------|---------------------------------|-----------------------------------|

Comments:

STORMWATER MANAGEMENT:

Quantity:

- | | | |
|---|---------------------------------------|------------------------------------|
| <input type="checkbox"/> Conservation Authority | <input type="checkbox"/> Requirements | <input type="checkbox"/> Modelling |
| <input type="checkbox"/> Pond Design | <input type="checkbox"/> Storm | |

Quality:

- | | |
|---------------------------------------|--------------------------------------|
| <input type="checkbox"/> Requirements | <input type="checkbox"/> Pond Design |
|---------------------------------------|--------------------------------------|

Comments:

SEDIMENT/EROSION CONTROL:

Sediment:

- | | | |
|-------------------------------------|--|-------------------------------|
| <input type="checkbox"/> Silt Fence | <input type="checkbox"/> Straw Bales | <input type="checkbox"/> Pond |
| <input type="checkbox"/> Stockpiles | <input type="checkbox"/> Catchbasin Covers | |

Erosion:

- | | | |
|--|---------------------------------------|---------------------------------------|
| <input type="checkbox"/> Ditch Inverts | <input type="checkbox"/> Culvert Ends | <input type="checkbox"/> Storm Outlet |
|--|---------------------------------------|---------------------------------------|

Comments:

ROAD:

X-Sections, Alignment, and Geometrics:

- | | | |
|---------------------------------------|---|----------------------------------|
| <input type="checkbox"/> Type | <input type="checkbox"/> Grades | <input type="checkbox"/> Curb |
| <input type="checkbox"/> Granular "A" | <input type="checkbox"/> Granular "B" | <input type="checkbox"/> Asphalt |
| <input type="checkbox"/> Subdrain | <input type="checkbox"/> Sidewalk | <input type="checkbox"/> Signs |
| <input type="checkbox"/> Radius | <input type="checkbox"/> Sight Distance | <input type="checkbox"/> Parking |
| <input type="checkbox"/> Grading | <input type="checkbox"/> Lighting | |

Comments:

LOT GRADING:

- | | | | |
|-----------|--|--|---|
| Drainage: | <input type="checkbox"/> Min./Max. Slopes | <input type="checkbox"/> Swales | <input type="checkbox"/> Building Clearance |
| | <input type="checkbox"/> Roof Leaders | <input type="checkbox"/> Existing Elevations | |
| Building: | <input type="checkbox"/> T/Foundation Elev. | <input type="checkbox"/> B/Floor Elev. | <input type="checkbox"/> Garage Floor Elev. |
| | <input type="checkbox"/> Regional Floodlines | | |

Comments:

UTILITIES:

- | | | | |
|--------------------|--------------------------------|-------------------------------|--------------------------------|
| Existing/Proposed: | <input type="checkbox"/> Gas | <input type="checkbox"/> Bell | <input type="checkbox"/> Cable |
| | <input type="checkbox"/> Hydro | | |

Comments:

DRAFT PLAN CONDITIONS:

- ☐ Are conditions satisfied?

MISCELLANEOUS:

- | | |
|--|---|
| <input type="checkbox"/> Status of Municipal Infrastructure Regarding Class EA Process | |
| <input type="checkbox"/> Geotechnical Report | <input type="checkbox"/> Agency Approvals |
| <input type="checkbox"/> Electrical/Lighting | |
| <input type="checkbox"/> Landscaping | <input type="checkbox"/> Fencing |

Comments: