



Development Standards

MANUAL

Town of Essex

February 2022

essex
Where you belong

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Transition Policy

The policies and requirements in this manual shall take effect as of the date of the manual. For any current development agreements the requirements of those conditions of the development agreements shall apply. For any future phases, the requirements of this manual shall apply unless superseded by a new development agreement.

Versioning History

Corporation of Town of Essex Development Manual - Version 1.0 – Published February 2022

Definitions

Developer – Land owner or designated agent of the property for proposed development.

Subdivision – An area of land divided into plots for sale.

Dwelling – A building comprised of one (1) or more dwelling units, including single family homes and multi-residential units.

Condominium – A building or complex of buildings containing a number of individually owned apartments or houses established under the Condominium Act.

Multi-Residential Unit – Classification of housing where multiple separate housing units for residential inhabitants are contained within one building or several buildings within one complex.

Acceptance – Following a technical review, the Town of Essex accepts privately constructed utilities and roadway as being constructed to the Municipal standards.

Assumption – Following a technical review, the Town of Essex accepts privately constructed utilities and roadway (with conditional maintenance period), the Municipal right-of-way and associated utilities become Municipal property.

Contractor – An independent entity that undertakes/enters a contract to furnish certain number or quantity of goods, material, equipment, personnel, and/or services that meet or exceed stated requirements or specifications, at a mutually agreed upon price and within a specified timeframe to another independent entity called contractee, principal, or project owner.

Engineer – A Professional Engineer registered under the Professional Engineer’s Act of Ontario (hereinafter called the “Engineer”). The Engineer may be employed by a consulting firm, or consist of multiple engineers responsible for their specific expertise related to the design of development.

Professional Service – May be an Engineer, and/or may consist of a professional company or consultant with expertise in the specific field of question (i.e. – Environmental assessment by environmental specialist).

Abutting Property – Includes two or more parcels of land in which there are not intervening pieces of land between property lines of the abutting parcels.

Phased Development – Also can mean staged, in reference to development of lands that are intended to be parts of single development that may require processes of application, approval, design, and construction to be split or combined in terms of timelines and documentation.

Works – Describe and include any physical aspect within development, new or existing, pertaining to infrastructure.

As-Built Drawings - Design drawings that are modified to reflect current conditions of infrastructure or elevations (i.e. lot grading), following construction of a feature. These drawings reflect any changes to the infrastructure, from design, that occurred during construction. Also referred to as Record Drawings.

Harmony - When used in this document related to new development, harmony refers to the expected continuation of existing property conditions without negative impact from new development. Harmony must be achieved in respect to lot grading, stormwater flow, abutting land use, and general character of neighbouring building types (both aesthetic and land use type, i.e. - commercial vs residential).

Finished Grade - Describes a final elevation on the subject site following construction. This typically relates to the final geodetic elevation of soil as left by a builder at the specified location including: Lot corners, Side yard Lot Line, Rear Yard Lot Line, and Finished Grade around house or other building. Finished grade of building on the Consultant's lot grading design indicates the elevation of landscaping soils abutting foundation walls. It is expected that any building construction meets the required flood elevation of all openings to the building prescribed by the local Conservation Authority, and that foundation walls meet standards set out in the 'Ontario Building Code' in relation to finished grade at foundation.

Low Impact Development (L.I.D) - Low-impact development is a term used to describe a land planning and engineering design approach to manage stormwater runoff as part of green infrastructure. LID emphasizes conservation and use of on-site natural features to protect water quality. These practices mimic the natural water balance by promoting increased evapotranspiration, infiltration and groundwater recharge, and lower surface runoff volumes and flow rates.

Green Infrastructure – Refers to utilization of ecological systems (natural and engineered) that contribute to Low Impact Development, to mimic the natural water cycle.

Grey Infrastructure – Refers to traditional methods of infrastructure design, using man-made materials for water management.

Completion – Substantial completion or completion of works refers to the level of completion required for the Town of Essex to approve request made to Town of Essex. Completion is site specific, in accordance with Site Plan Agreement, and at the discretion of the Town of Essex.

Introduction

In an effort to streamline and ensure a fair and equitable development review process, the Corporation of the Town of Essex has consolidated its development requirements in this Development Manual.

It is hoped that the Town's development community will find this a useful document. This manual will be updated from time to time, and any suggestions on improving this document should be forwarded to the municipality. The dates of the revisions are noted at the bottom of each page and in the Revisions Section of this manual. You should confirm with the Corporation of the Town of Essex that you have the most up-to-date revision prior to making use of the contents of this manual.

Throughout the remainder of this document, the Corporation of the Town of Essex will be referred to as “Town of Essex”.

This Development Manual also refers to Ontario Provincial Standard Drawings (OPSD) and Ontario Provincial Standard Specifications (OPSS). Unless noted otherwise in the Transition Policy (above) of this manual, the latest edition of this documents applies.

Finally, nothing in this manual shall supersede the requirements of senior levels of government (Provincial, Federal) or is intended to conflict with the requirements of other agencies, including the Essex Region Conservation Authority (ERCA), Hydro One, ELK Energy Inc., Enbridge Gas, Cogeco Cable and Bell Canada. Please report any conflicts to the Town of Essex.

1.0 Development Requirements Prior to Construction

1.1 Pre-Application and Complete Application Requirements

The Town of Essex Official Plan (found [here](#)) sets out the objectives and policies to guide the short-term and long-term physical development of all lands within the Town of Essex (Essex). The Town of Essex Zoning By-law specifically establishes and regulates the use of land by implementing the policies of the Official Plan. The Official Plan contains policies requiring application meetings and complete applications.

A pre consultation meeting is required for any contemplated development needing:

- an amendment to the Official Plan
- an amendment to the Zoning By-law (including a Temporary Use by-law)
- approval of a Site Plan
- approval of a Draft Plan of Subdivision or Plan of Condominium
- a Consent to sever
- a Minor Variance
- any other application under the Planning Act

For an application to be considered complete within the meaning of the Planning Act, all applications must be accompanied by submit the following:

- The prescribed application fee
- A completed and signed application form
- All information required by the Planning Act or the associated regulations
- Information required by the Planning Act or the associated regulations
- Information or material required by other sections of this Plan

All required information, support studies and material will be identified in the pre-consultation process, and may include information, studies or material to address the following matters:

- Planning Justification
- Infrastructure and servicing
- Stormwater management
- Transportation, traffic and parking
- Cultural heritage
- Archaeological resources

- Natural environment
- Contaminated or potentially contaminated sites
- Soil test and groundwater quality
- Nuisance, noise hazard or safety issues
- Urban design
- Market impact
- Financial impact
- Greenhouse water capacity
- Accessible design for the built environment
- Impact on Climate and Source Water
- Other studies or reports identified through the pre- consultation process

The list of supporting information, above, does not preclude the Town of Essex or its delegated approval authorities from requiring other supporting information in order for an application to be deemed complete. The Town of Essex may require further information after the pre-consultation has occurred in response to new circumstances that may impact the decision-making process. The terms of reference for supporting information, including any scoping of studies, will be as directed by the Town of Essex.

All supporting information must be prepared by a qualified professional retained by and at the expense of the applicant. The Town of Essex may refuse to accept the supporting information if the quality of the submission is unsatisfactory or it fails to adequately address the established terms of reference.

The Town of Essex may require a peer review of any supporting information by an appropriate agency or qualified professional at the expense of the applicant.

The Town of Essex may require electronic and hard copy versions of supporting information to be submitted in an acceptable format.

The Town of Essex may require applicants who amend development applications to participate in one or more additional pre-application consultation meetings, and may require the submission of revised or additional information before the Town of Essex will consider the amended application complete under the Planning Act.

The Town of Essex will issue a notice of a complete application in accordance with the Planning Act.

1.2 Development Agreements

All developments must be designed and constructed in accordance with the requirements of this Development Standards Manual and the corresponding Development Agreement.

The Development Agreement will set out specific requirements for each development. Where in conflict, the Development Agreement will supersede the requirements of this manual.

The Development Agreement will be prepared by the Town of Essex at the cost of the Developer. The Developer will be required to submit the following documents for approval and to assist with the preparation of the Development Agreement:

- Deed confirming registered owner
- Contract drawings
- Contract specifications
- Copy of tender (or a certified cost estimate for services as provided by the Developer's Engineer and approved by the Manager of Capital Works and Asset Management)

No work can proceed in the development until the agreement is executed by both parties and all financial securities and insurances are provided.

The agreement will be registered against the lands by the Developer's Solicitor who will then send a confirmation of the registration to the Town clerk and Director of Development Services.

Flow charts illustrating the steps in the development process for consent/minor variance, zoning bylaw amendments, official plan amendments, site plan control, and plan of subdivision are included in **Appendix A**.

A typical Development Agreement is included in **Appendix C**. This typical Development Agreement should be used for format only. Specific details of the Development Agreement will be set out as part of the process that is outlined in this manual.

1.3 Approvals

Owners are required to obtain all necessary approvals. Generally, multi-lot creation (five or more lots) will proceed under the Plan of Subdivision process. In limited cases, multi-lot creation may proceed by severance in areas where the premature extension of any major municipal service is not required, and if approved by Council by execution of a development agreement.

Developers should contact the various approving authorities to ascertain permit fee, approval fees and required time periods to obtain these approvals.

The development cannot proceed until these approvals are received and copies of the approvals have been filed with the Town of Essex. General list, not limited to the agencies provided, can be seen in **Section 8 – Agencies, Approvals, and Notifications**.

1.4 Plans

All draft plans shall be neatly drawn to scale. The boundaries of the development shall be staked and certified by an Ontario Land Surveyor. A reproducible copy of the plan shall be submitted, along with an electronic copy. The draft plan shall also show sufficient ground elevations, referenced to geodetic elevations, to identify the drainage patterns. Physical features of the site and abutting lots should be shown. These physical features include drainage ditches, swales, municipal drains, trees, poles, roads, shorelines, buildings, etc.

A flow chart illustrating the Municipality's policy in approving draft plans can be found in **Appendix A**.

The requirements for design and servicing drawings are described in **Section 6 – Design Drawings**.

1.5 Lot Creation

A plan of subdivision shall generally be required where:

- A new road or extension to an existing road is required; or
- Five or more lots are to be created and/or the owner is retaining sufficient lands for the development of additional lots; or
- The Town of Essex deems it necessary for the proper development of the lands.

All new developments under a Plan of Subdivision must be in HARMONY with existing developments, in regards to elevation, grading, and appearance.

A consent will only be considered where a plan of subdivision is deemed by the Town of Essex to be unnecessary, and where the application conforms to the policies of the Official Plan.

Developers will be required to pay park impost fees when new residential and non-residential lots are created through consent.

Developers shall contact the Town of Essex for information regarding the current policy and payment of fees.

1.6 Parkland Dedication, Acquisition Fees and Development

Where a contribution of land is deemed unnecessary by the Town of Essex, Developers will be required to pay parkland acquisition fees in accordance with the regulations of the Planning Act, R.S.O. 1990.

Where the Town of Essex has required parkland to be included as part of a development, it shall be the responsibility of the Developer to service the park to the satisfaction of the Development Agreement and in consultation with the Parks and Facilities Department.

Developers should contact the Town of Essex if any clarification is needed regarding the current policy and fees.

Please refer to the Official Plan (OP found [here](#)) for further information on parkland policies. Policies in the OP are subject to change and will supersede any information indicated in this development manual.

1.7 Allocation and Phasing of Services

To ensure that the proper allocation and phasing of municipal services proceeds in a fiscally sustainable and cost-effective manner, it is the policy of the Town of Essex that development proposals will be accompanied by a servicing review conducted by the proponent in consultation with the Town of Essex.

When sewage treatment servicing capacity does not exist for a proposed development, the Town of Essex will defer the processing and granting of conditional draft approval of the planning application until sufficient uncommitted reserve treatment capacity is available, or until a construction contract is awarded for the creation of the needed treatment capacity, and a servicing agreement and securities are in place to ensure that such treatment capacity will be available to service the development within one year of the granting of conditional draft plan approval. These conditions also apply to water treatment capacity – within Town of Essex jurisdiction. Development within Union Water service area must be done in consultation with Union Water. Draft-approved plans of subdivision may only proceed to final approval and registration if sufficient uncommitted reserve treatment capacity continues to exist.

The Town of Essex acknowledges that developments may proceed in phases. Prior to the commencement of construction, the Developer shall submit, for municipal approval, a phasing plan. The following factors in establishing the phasing of development proposals in Primary and Secondary Urban Centres shall be considered:

- The logical extension of municipal services that avoids, where possible, large undeveloped tracts of land between the existing developed area and the proposed development.

- Proposed temporary drainage infrastructure to maintain existing drainage patterns (where applicable).
- Impacts to residents in previously developed phases.
- The maintenance of a compact form and pattern of development is maintained.
- The cost effectiveness and fiscal sustainability of all municipal service extensions.
- Reserving servicing capacity for redevelopment, infilling and intensification as a first priority.
- Firefighting protection: All dead-end streets shall have turn-arounds and shall meet the requirements of the Ontario Building Code. Temporary dead-ends shall not exceed 250m in length measured to the end of the cul-de-sac. Any dead-end portion of the access route longer than 90 m must have a turn-around.

If a draft plan approval lapses because the conditions were not fulfilled within a prescribed timeframe as outlined in the conditions of approval, the Town of Essex may assign the servicing allocation to other developments or areas of the Town of Essex, or hold the capacity in reserve.

When considering lot creation in areas on partial and/or private sewage systems, it must be confirmed that there is sufficient reserve sewage system capacity and reserve water system capacity within a municipal sewage treatment facility and/or a municipal water service treatment facility or private communal sewage service system and/or a private communal water service system. The determination of sufficient reserve sewage system capacity would include treatment capacity for hauled sewage from private communal sewage services and individual on-site sewage services. Where Municipal services become available, the Town of Essex requires connection to Municipal sewers and watermain.

1.8

Endangered Species Act, 2007

The Endangered Species Act (ESA) 2007 is a law of General Application that is binding on everyone, including landowners, corporations, municipal and provincial governments. The ESA applies all the time, regardless of approvals under other legislation and the Ontario Ministry of Environment, Conservation & Parks (MECP) is the only approval authority under the ESA 2007.

If the following applies to a proposed application, the Applicant must consult MECP.

- Natural features as defined in PPS (woodlands, wetlands, valleylands, etc.) on or within approximately 30 m of the proposed construction/activity footprint.
- Watercourses, natural vegetation, overgrown grass, hedgerows, drainage features, hay fields, debris/rock piles, old foundations, and barn/structures located on-site and proposed to be disturbed as part of the application.

Applicants should engage MECP as early as possible when it is anticipated that a project may have impacts to SAR species and/or their habitat or if you are unsure if your project will impact SAR species and/or their habitat. The SAR Technical Memo attached as **Appendix D**, outlines the process for engaging MECP. The proponent should contact MECP for the latest version of the SAR Technical Memo. All inquiries should be made to SAROntario@ontario.ca.

1.9 Integrated Accessibility Standards

All development within the Town of Essex shall adhere to provincial guidelines and mandates for accessibility in accordance with O. Reg. 191/11: Accessibility for Ontarians with Disabilities Act, 2005, S.O. 2005, as the same may be amended from time to time, and such other succeeding statutes.

Public spaces must be designed with consideration for all abilities and occupations. Publicly available documentation put forth for review and comment to the public and the posting of information signage shall adhere to A.O.D.A display standards for the inclusion of all parties receiving information.

1.10 Consulting Engineer and Professional Services

All Developers shall retain a Professional Engineer (Engineer) who shall design all services. Full-time, on-site inspection during the installation of the services must be provided under the guidance of a Professional Engineer. The Consulting Engineer shall be so designated by and in good standing with the Association of Professional Engineers of Ontario and should have previous land development experience.

All reports, drawings and specifications shall be signed, sealed and dated by a Professional Engineer licensed in the Province of Ontario and employed by a consulting engineering firm or personally designated as a Consulting Engineer. Professional services used on a development are not limited to a single Professional Engineer. Multiple professional engineers may undertake design and sealing of their respective portions of the project related to their specialty.

The Consulting Engineer must carry Errors and Omissions Insurance in the minimum amount of \$2,000,000. The Consulting Engineer must indicate, in writing, to the Town of Essex, that they intend to renew their insurance policy on an annual basis.

The Engineer shall be responsible to carry out the design of all services including:

- The preparation of design drawings
- The preparation of specifications and contract documents
- The preparation of studies and reports

- Assistance in obtaining approvals
- Full-time, on-site inspection during service installations
- Preparation of field records
- Chairing and preparing minutes of pre-construction meetings and regular job meetings
- Co-ordination of the installation of other utilities (hydro, gas, bell, cable tv)
- Preparation of as-built drawings
- The preparation of lot grading sheets (elevations and drainage information from abutting properties must be included with any design)
- Subgrade elevation verification
- Attendance at the final inspection meeting

Professional Services firm also applies to any report taking on professional responsibility. This may apply to biology, environmental, geotechnical, archeology reports etc.

1.11 Specifications, Special Provisions and Contract Documents

All development documents shall include specifications and contract documents prepared in accordance with **Appendix E** – “Guidelines, Professional Engineer Providing Land Development/Redevelopment Engineering Services, 1994” (complying with any amendments to this document in the future). Specifications and contract documents shall be prepared on 8½ x 11 paper, single or double sided printing, neatly bound with a cover clearly describing the particulars of the development. The first sheet shall include the date, name and telephone number of the Engineer who prepared the documents.

The specifications and contract documents shall include the following:

- Information to Tenderers
- Form of Tender
- Form of Agreement
- Special Provisions
- Technical Specifications
- General Conditions

The specifications and contract documents shall refer to the Ontario Provincial Standard Specifications and Ontario Provincial Standard Drawings wherever applicable, except as amended or extended by the Town of Essex requirements.

1.12

Studies and Reports

Specific developments may require the completion of special studies and reports prior to the Town of Essex granting approval for the development. Special studies and reports may also be a requirement of the approving authorities such as the County of Essex or Essex Region Conservation Authority (ERCA).

The costs of these studies shall be borne by the Developer. A partial list of studies that have been required in the past include:

- Traffic Impact Studies
- Storm Water Management Studies (in accordance with the Windsor/Essex Region Stormwater Management Standards Manual) (found [here](#))
- Functional Servicing Studies, including transportation servicing, stormwater servicing, sanitary servicing, watermain servicing, utilities and materials
- Noise and Vibration Studies
- Market Feasibility and Impact Studies
- Archaeological Studies
- Fill and Floodline Studies
- Groundwater Impact Studies, including highly vulnerable aquifers and significant recharge areas
- Environmental Site Assessments
- Fish Habitat Mitigation Studies
- Geotechnical Reports
- Environmental Impact Studies
- Low Impact Development Studies

During pre-consultation discussions, the proponent shall present grey and green solutions where applicable for the Town of Essex review. If green LID solutions are not feasible, the proponent shall display reasoning and research to determine this. Developers are also advised that certain proposed works to be undertaken by Developers may be subject to the requirements of the Environmental Assessment Act and Environmental Protection Act. Contact the Ministry of the Environment, Conservation and Parks (MECP) for further details.

1.13 Insurance and Indemnification

Developers shall provide liability insurance to protect the Town of Essex. Developers shall ensure that their consultant, sub-consultants, and general contractors also carry liability insurance.

The liability insurance shall:

- be provided in a form satisfactory to the Town of Essex
- be for a minimum amount of \$2,000,000
- name the Town of Essex as an additional insured
- name the Town of Essex consultants as additional insured
- be maintained in full force and effect until the development and/or the work(s) have been accepted or assumed (as the case may be) by the Town of Essex
- have an automatic notification to the Town of Essex by the Insurer, advising the Town of Essex that the insurance will end in 90 days

Notwithstanding the limits of the insurance, the Developer shall indemnify the Town of Essex against all or any claims or losses arising out of the development.

The Town of Essex may consider accepting the general contractor's insurance in fulfillment of this requirement provided the Developer is named as an additional insured and the conditions noted in this section are met.

1.14 Sureties

1.14.1 Performance

To ensure due and proper performance of the work, Developers are required to provide cash or an irrevocable letter of credit in an amount equal to 50% of the value of the development. Upon acceptance, that amount is reduced to 25% of the development cost. The remaining 25% is returned to the Developer after assumption from the Town of Essex.

For higher risk developments, Developers may be required to increase letter of credit amount to 100% of the development cost, at the discretion of the Town of Essex.

The value of the securities to be provided shall be based upon the full amount of construction costs including all taxes. If there is no tender, the Consulting Engineer shall provide an estimate of the value of the work. The Town of Essex reserves the right to verify the value of the work and amend the Consulting Engineer's estimate accordingly. The Consulting Engineer's estimate as amended by the Town of Essex shall be used for establishing the amount of the securities.

1.14.2 Delayed Work

Developers shall note that if the Town of Essex agrees and/or requests that some of the work be delayed (i.e., surface asphalt), performance securities for 100% of the outstanding works will be required in addition to the maintenance security. The value of the existing maintenance security can be reduced to cover 100% of the outstanding value of the delayed work once the maintenance period for the work that was not delayed has expired. The Town of Essex will not accept any other forms of security.

1.14.3 Maintenance

Unless otherwise noted in the Development Agreement, Developers are required to provide cash or an irrevocable Letter of Credit in an amount equal to 25% of the value of the development. Securities will be released at the end of the maintenance period, which will be one year (minimum) following the date of the Town of Essex letter accepting the services (based on rectification of construction deficiencies and confirmation from the Developer's consultant).

1.14.4 Site Plan Agreements

To ensure due and proper performance of the work agreed to as part of a site plan control agreement, a security deposit will be required in an amount that is proportional to the size and significance of the development (at discretion of the Town of Essex) and required works as determined by the Town of Essex. The percent value of this item will be determined at the time of Site Plan Agreement. The security deposit shall be in the form of either an irrevocable letter of credit or as cash to be kept in an interest bearing account by the Town of Essex. The security deposit (including interest) will be returned to the Developer within 30 days of being notified by the Town's Director of Infrastructure and Chief Building Official that all required works as set out in this agreement have been substantially completed, with any deficiencies corrected, all to the satisfaction of the Municipality and are in compliance with any applicable federal, provincial or municipal statute, by-law or regulation.

1.14.5 Subdivision Agreement

Specific details of each Subdivision Agreement will be set out as part of the process as outlined in this manual. All Developments must be designed and constructed in accordance with the requirements of this Development Manual and the corresponding Subdivision Agreement.

The Subdivision Agreement will set out specific requirements for each Development. In case of conflict the Subdivision Agreement will supersede the requirements of this manual.

The Subdivision Agreement will be prepared by the Town of Essex at the cost of the Developer.

No connections to services or utilities can be constructed until agreements are executed and securities and insurance have been delivered to the Town of Essex. If the Developer chooses to proceed with installations ahead of agreements and securities, there is risk that the services may not be accepted.

The Town of Essex quality management requires subdivision construction observation/inspection and subdivision final inspection. The subdivision inspection will include full-time inspection by the designated consulting firm and the final inspection will include a final walk-through with the consulting firm and the Town of Essex to address any outstanding items.

Acceptance of water and wastewater facilities constructed under the Subdivision Agreement shall be communicated in writing by the Town of Essex Engineering to both the Developer's consultant and the Planning Services Department. The Planning Services and Infrastructure Services will act to administrate the terms of the Subdivision Agreement. Additional applications may be required as part of the subdivision approval process including: consent, minor variance, zoning by-law amendments, official plan amendments, site plan control, and plan of subdivision Flow charts illustrating the steps in the development process are included in **Appendix A**.

1.15 Easements and Right-of-Ways

Developers shall provide all easements to the Town of Essex, as deemed necessary. The Developer shall retain the services of an Ontario Land Surveyor to prepare all reference plans.

Unless otherwise approved by the Town of Essex, no permanent structures including trees, fences and shrubs but excluding driveways, shall be placed on right-of-ways or easements except for fences on side and rear lot lines. The Town of Essex will not be responsible to restore any permanent structure located on easements, except for driveways. Any trees, shrubs or landscaping structures will not be restored unless approval of placement had been obtained by the Developer through permit.

Developers shall submit to the Town of Essex a copy of all signed purchase/sale agreements for the lots which clearly states the conditions being encumbered on the easements on the purchased lot and the Town of Essex unrestricted rights to enter upon the easements to maintain, repair or replace municipal services. Easement language should be approved by the Town prior to registering on title. Proof that plans and easements have been registered on title should also be provided to the Town.

1.16 Oversizing and Off-Site Costs

In order to ensure that development in the Town of Essex proceeds in an orderly and cost effective manner, Developers may be required to oversize municipal services to accommodate future developments. Oversizing includes, but is not limited to, larger pipe diameter and increased depths, increased road widths and sidewalk widths, power distribution and other services.

As well, Developers may be required to complete off-site works in order to facilitate development. Typical off-site works include trunk sewers to a suitable outlet, watermain connections to a suitable feeder, road widening, intersection improvements, traffic signal installation and downstream drainage works.

The Developer's Consulting Engineer will provide an estimate of the oversizing and off-site costs.

The Town of Essex will establish the cost sharing method to be used in attributing oversizing and off-site costs, and will use its best efforts in recovering these costs on behalf of the Developer. However, the Town of Essex does not guarantee that Developers will be repaid the oversizing or off-site costs.

1.17 Development Charges

In order to finance the construction of trunk municipal services and other growth related capital facilities, the Town of Essex will assess development charges to each buildable lot or unit. These development charges are payable at the time building permits are issued. Development charges are amended from time to time and are approved by Council. Developers should contact the Town of Essex for information regarding the current development charge amounts.

1.18 Multi Lot Creation by Consent

In consultation with the County of Essex, the Town of Essex may agree to permit multi-lot creation by the consent process, rather than by the plan of subdivision process, all of the requirements noted in this Development Manual shall apply including the preparation and approval of a Stormwater Management Plan. Refer to the Town of Essex Official Plan (latest version available [here](#)), as well as the County of Essex Official Plan policies for specific requirements about multi lot creation by consent.

1.19

Pre-Construction Meeting (For Subdivision Development)

No later than seven days before construction is to commence, the Developer's Consulting Engineer shall call and chair a pre-construction meeting. The Consulting Engineer, general contractor and municipal representatives must attend.

It is also desirable to have the Developer and the Consulting Engineer's site inspector and representatives from the various utility companies in attendance. The meeting shall include but not be limited to the following items:

- Status of contract documents
- Submission of insurance certificates, irrevocable Letter of Credit, Sureties and Work Place Safety Insurance Board clearance
- Ministry of Labour notification
- Notification to residents, schools, buses and emergency services
- Supervisory staff
- Emergency telephone numbers and home telephone numbers
- Construction access routes (haul routes)
- Schedule
- Noise and dust control
- Municipal inspection notification suppliers and subcontractors
- Specific project items
- Preconstruction survey photos
- Traffic control detouring
- Schedule of site meetings

The Consulting Engineer will provide minutes of meetings within one week from meeting date, or at least one week prior to construction commencement date, whichever comes first.

2.0 General Requirements During and Immediately After Construction

2.1 Public and Agency Notification

Prior to the start of construction, the Consulting Engineer shall arrange to notify all affected public agencies and emergency response agencies of the impending start date and completion date of the project. As well, the Consulting Engineer shall notify all abutting property Developers of the impending construction. The following information shall be included in the notification:

- brief description of project
- construction start date
- scheduled completion date
- temporary road closures
- contact people from the Contractor and Consulting Engineer, including their phone numbers

Refer to **Section 8: Agencies, Approvals, and Notifications** for partial list of required notifications.

2.2 Job Meetings

The Consulting Engineer shall chair and prepare minutes of construction site job meetings. Meetings are to be held at two-week intervals unless the Municipality agrees that a longer interval is acceptable. The Consulting Engineer's project manager or project engineer and the site inspector along with the contractor's project manager and job superintendent (or foreman) shall attend the job meetings. Minutes shall be distributed within one week of the meeting date.

2.3 Consultants Inspection and Quality Assurance Testing Services

The Consulting Engineer shall provide full-time on-site inspection services during the construction activity. The Inspector's skills shall be suitable for the inspection tasks to be undertaken. The Town of Essex reserves the right to request a change to the consultant's inspector if the Town of Essex believes the inspector is not qualified.

The Consulting Engineer's site inspector shall ensure that the work is constructed in accordance with the contract documents and shall keep adequate records of the work.

As a minimum, the following documents are to be prepared by the site inspector:

- Diary indicating daily progress of work, labour and equipment on site
- Measurement of relevant quantities

- Discussions with general public and agency representatives
- Log of any accidents
- Record drawing details (including grades, sizes, materials, inverts, etc. of all services)
- As-Built drawing details

The Consulting Engineer shall arrange for quality assurance testing by an independent testing firm. Tests shall include:

- Granular material sieve analysis
- Engineered fill
- Asphalt extraction and gradation analysis
- Compaction tests of native, granular, asphalt materials
- Concrete: compressive strength samples, air content, and slump tests
- Air tests for storm and sanitary sewers
- Storm and sanitary camera inspections including private drain connections
- Watermain pressure tests, leak tests, disinfection tests
- High potential tests of electrical distribution system
- Other tests called for in contract documents or as may be required by the Town of Essex

Two copies of all test certificates shall be neatly bound, indexed and provided to the Town of Essex at the time the as-built drawings are submitted.

The Consulting Engineer shall note that all underground works including watermains and sewers (but excluding hydro and other utilities) shall be tested and approved (including flushing and sewer inspection) before curb & gutter and asphalt are completed in the field.

2.4 Municipal Inspection

The Town of Essex will carry out its own independent inspection as deemed necessary. As a minimum, the Town of Essex will inspect the subgrade excavation, granular base prior to placing curbs, granular base prior to asphalt paving, and testing of watermains and sewers. The Consulting Engineer will give the Town of Essex 48 hours' notice prior to these inspections. Should sufficient notice not be given, and the Contractor proceeds with the work, the Town of Essex will not accept the services without further testing, which may include total or partial removal of pavement, curbs, etc. All this additional testing will be at the Contractor's expense. It is therefore imperative that the Contractor's schedule be made available to the Town of Essex at the job meetings, and the Town of Essex be promptly advised of any changes to this schedule.

The following mandatory meetings will be required during construction:

- Engineering Fill Placement
- Pre-Road Cut
- Pre-Curb Pour
- Pre-Pave
- Pre-Maintenance Period Inspection
- Final Inspection

2.5 Clean-up

The Developer and his Contractor shall maintain the construction site in a neat and tidy manner. Dust shall be controlled by wetting or establishing vegetative ground cover. Debris blown-off the site shall be cleaned up on a daily basis. All mud and dirt tracked off-site shall be cleaned frequently to the satisfaction of the Town of Essex Director of Infrastructure, or their delegate.

All vacant lots, owned by the developer, shall be maintained at the Developer's expense. Periodic maintenance will be required to remove debris, to eliminate standing water, and to cut weeds. All waste materials must be properly disposed to eliminate the risk of injury and to maintain a healthy environment to all surroundings.

The decision of the Town of Essex regarding clean up shall be considered final. Should the Developer and his Contractor not clean-up in a timely manner, the Town of Essex will arrange to have the work done by others, or its own forces, and will invoice the Developer for its costs. As a security for any works completed by the Town of Essex in this regard, the Developer shall deposit with the Town of Essex a sum of \$300 per lot to a maximum amount of \$5,000 prior to construction commencement.

2.6 Municipal Acceptance of Services and Assumption of Development

Once all of the required municipal services are completed, the Developer will be required to transfer ownership of the services to the Town of Essex. This is a two-step process as outlined below.

1. Once the services are installed and all deficiencies corrected, the Town of Essex representative will inspect the development and advise Council by report that the Town of Essex should "accept the services" and that the maintenance period should begin. The Town of Essex reserves the right to request a video inspection of the sewers in order to assist in its determination at the Developer's expense. The date of the Town of Essex letter accepting the services is the commencement date of the maintenance period. During the maintenance period, it will be the Developer's sole responsibility to

maintain all the services including but not limited to cleaning catch basins, maintaining the general condition of the vacant lots and road right-of-ways as established in the Subdivision Agreement, maintaining settlements and ploughing snow.

2. Within 30 days prior to the expiration of the maintenance period, the Consulting Engineer is to arrange for a field inspection with the Town of Essex, Contractor and Consulting Engineer. All sewers and services shall be flushed clean and video inspected. Catch basins shall be cleaned and all settlements repaired prior to the municipal inspection. Provided there are no outstanding deficiencies and all development agreement requirements have been satisfied, including payment of all accounts and the receipt of a statutory declaration that all accounts have been paid, the municipal representative will submit a report to Council requesting that Council 'assume the development'. The issuance of a Certificate of Assumption to the Developer results in the transfer of ownership of the services to the Town of Essex, after which the Developer is no longer obligated to maintain or repair the services.

From time to time, the Developer or the Town of Essex may request that not all services be installed prior to requesting "acceptance of services" by the Town of Essex. For example, surface asphalt and sidewalks are normally delayed to minimize damage to these services during house construction. Should some of the services be delayed, the acceptance and assumption of these services will be based on the completion of these particular services and the expiration of the maintenance period for these particular services. In this case, there will be more than one acceptance date of the services and more than one assumption date of that portion of the development. Financial securities will require time extensions to not less than 90 days beyond the anticipated date of Council's assumption of the development.

2.7 Maintenance Period

The maintenance period shall be one year from the date of the Town of Essex letter accepting the services.

The delaying of the surface course of asphalt and sidewalks will not prevent Council from accepting the remaining services. The maintenance security and liability insurance must remain in force for the duration of the maintenance period. The Director of Infrastructure Services will issue a letter to assume storm, sanitary, water, base asphalt, and sidewalk following council resolution.

The Developer is obligated to perform (or pay for) all maintenance and repairs to the services (should the Town of Essex undertake this work) during the maintenance period, including sewer flushing, weed control, snow removal and street cleaning of mud and debris.

Unless otherwise noted in the Development Agreement, the Developer is required to provide cash or an irrevocable Letter of Credit in an amount equal to 25% of the value of the development. Securities will be released at the end of the maintenance period.

See **Section 1.14** for Sureties information.

2.8 Lot Servicing Sheets/Registered Lot Creation Drawings

The Consulting Engineer shall provide copies of lot servicing sheets and registered lot creation drawings (i.e. M-Plans, R-Plans). Two copies of each (lot servicing and registered lot creation drawings), and one electronic copy of each shall be submitted to the Manager of Planning Services and the Infrastructure Department. The lot servicing sheets shall show design lot grades, sidewalk widths, design setbacks from property line, easements, noise attenuation walls, and the location, elevation, material, and size of lot services (storm, sanitary, water). Municipal addressing is provided by the Town's Building Department and should be included on each set. 100% of the performance holdback will be held until the lot servicing sheets are provided.

Home builders will be required to follow the lot servicing sheets for design elevations of lot grading, to the satisfaction of the Chief Building Official. See Section 3.1.11 for further details.

The form of the lot servicing sheets is included in **Appendix F**. Blank copies are available from the Town of Essex.

2.9 As-Built Drawings

As-Built drawings shall be prepared by the Consulting Engineer and must have all elevations and grades, shown in plan or profile, reference to a geodetic benchmark and indicate the 'as constructed' world coordinated location, size, and material of:

- Storm and sanitary manholes
- Catch basins
- Storm and sanitary sewer lines
- Stormwater Management Facilities
- Waterlines, including backflow prevention devices
- Water valves, Fire Hydrants
- Meter chambers, including detail of water meter and related plumbing
- Municipal connections

Wherever possible, underground utilities located relative to property lines shall also be located relative to surface features. The As-Built drawings shall be dated and noted "As-Built Drawings".

Two drawing sets in each CAD and PDF format shall be provided in electronic format (USB drive).

As-Built drawings must be submitted within 60 days from the date of Council's "acceptance of the services". Maintenance hold-back will not be returned until drawings have been submitted to the Town of Essex. 100% of the maintenance holdback will be held until As-built Drawings have been submitted.

2.10 Building Permit

In accordance with the requirements of the Ontario Building Code, construction cannot commence on any buildings until a building permit is issued. This is Provincial legislation administered by the Town of Essex. The Town of Essex does not have the authority to waive this Provincial legislative requirement. Building permits will not be issued until such time as Council has "accepted the services" as outlined in **Section 2.6 Municipal Acceptance of Services and Assumption of Development**.

If works are in a regulated area, a permit or clearance will be required from ERCA prior to a Building Permit being issued. Additional works may be required if the area falls under the *Drainage Act*.

In order to issue building permits, the Town of Essex Chief Building Official must have a complete set of documents and be assured that the buildings have full municipal services (including base asphalt, firefighting access, potable water, heat, power, streetlights and railway requirements satisfied for those lots impacted by the presence of the railway). Streetlights must be operational within 60 days of building permit issuance.

Developers are cautioned that the Chief Building Official will not be in a position to advise that building permits are available until:

- lot servicing sheets have been submitted in accordance with subsection 3.8
- registered lot creation plans have been submitted in accordance with subsection 3.8

If As-Built drawings have not been submitted within 60 days from the date which Council "accepted the services", the Chief Building Official will not continue to issue building permits.

2.10.1 Removal of Hold – Building Permit Issuance

The Chief Building Official may issue building permits in advance of the completion of all required works, at the discretion of the Town of Essex and in accordance with the site specific Subdivision Agreement. The developer must provide the Town of Essex with a phasing/dwelling style composition plan and it must be approved before the draft plan approval so it can be included as a condition of development agreement. Building permits will only be issued if the following conditions are met:

- the distribution of the homes are identified on a draft plan and approved at the time of pre-consultation;
- the subdivision agreement has been executed;
- the dwelling unit can be connected to water and sewer services;
- the base coat of asphalt has been installed, to the satisfaction of the Director of Infrastructure, in the road allowance in front of and abutting the lot for which the building permit is being sought;
- all works necessary to meet the railway requirements are installed for a dwelling that is within 300 metres of the rail right-of-way;
- a surveyor's certificate has been received by the Municipality pertaining to the lot for which the building permit is being sought;
- it is clearly noted on the building permit that occupancy of the dwelling unit will not be permitted until the Developer has completed all required works, except the top coat of asphalt and sidewalk, to the satisfaction of the Director of Infrastructure and that all Agreements to Purchase affecting the subject property will provide a notice regarding the restriction pertaining to occupancy. Such notice will be required on all Agreements to Purchase until such time as the required works, excluding the top coat of asphalt and sidewalk, are completed to the satisfaction of the Director of Infrastructure;
- all Agreements to Purchase affecting the subject property will provide a notice regarding the restriction pertaining to occupancy, and a copy of which will be filed with the Town of Essex. Such notice will be required on all Agreements to Purchase until such time as the required works, excluding the top coat of asphalt, are completed to the satisfaction of the and Infrastructure Services Division; and,
- a letter of authentication is received from the Developer confirming support for the building permit issuance.

3.0 Infrastructure Requirements of Development

3.1 General Infrastructure

Unless noted otherwise in the subsequent Subsections of Chapter 4 or in the Development Agreement, the Town of Essex will require full municipal services for all developments. These services on the right-of-way or within easements shall include:

- Asphalt paved roads
- Sidewalks
- Concrete curb and gutter
- Precast concrete catchbasins with cast iron frame and grates
- Road subdrains
- Storm sewers and services
- Sanitary sewers and services
- Precast concrete manholes with cast iron frames & covers, safety landing (when required) and aluminum ladder rungs
- PVC pipe watermains with cast iron fittings and/or PVC fittings, valves and fire hydrants with Storz couplings or pumper fittings
- Private service connections including storm and sanitary PDC's, and copper or polyethylene water services. Check valves are required on sump pump discharge lines. Backflow prevention is required on residential sanitary lines. Private sewage ejectors may be required, subject to Town review of hydraulic gradeline and basement depths.
- Underground power distribution with pad mounted transformers
- Street lighting
- Other services including telephone, cable TV, gas and fibre optic cables
- Water meters
- Joint use trenches
- Water sample stations
- Tree planting as per **Section 7.4 – Tree Planting**
- Extra conduit for future use

3.1.1 Right-of-Ways, Cul-de-Sacs

The right-of-way design specifications are contained in **Appendix B** of this document.

The preferred right-of-way width for local roads shall be 20 metres.

Cul-de-sacs shall be permitted when they are 150 metres or less in length measuring from the intersecting right-of-way to the end of the cul-de-sac.

Any concept plan pertaining to the undeveloped portions of the Lakeshore residential area west of the Colchester Hamlet can be developed subject to the approval of Council, even though the concept plan may not be consistent with the right-of-way policy of the Manual.

In addition, Council may consider allowing for a semi-urban standard, as depicted in **Figure CS 1B of Appendix B**, for development in this area.

For collector roads, right-of-way widths shall range between 20 and 22 metres depending on the anticipated traffic volumes.

For arterial roads, contact the Town of Essex.

3.1.2 Pavement Widths

The preferred pavement width for local roads shall be a minimum of 8.5 metres unless noted otherwise (measured between face of curbs).

The private road widths for condominium type developments shall also be between 7.3 and 8.5 metres, depending on the local development circumstances (measured between face of curbs).

For collector roads, the road pavement width shall range between 8.5 metres and 10 metres depending on anticipated traffic volumes.

For arterial roads, contact the Town of Essex.

The actual street pattern, street widths, including number of access locations, turning lanes, intersection signalization, shall be identified through a traffic study carried out by the Developer's Consulting Engineer or a Subconsultant experienced in traffic engineering.

Where provided, crosswalk pavement markings shall comply with the Manual of Uniform Traffic Control Devices for Canada and be slip resistant.

Developers are encouraged to contact the Town of Essex early in the process to determine whether a traffic study is required.

3.1.3 Minimum Turning Radius

Unless specifically noted otherwise, all intersection streets shall have a minimum radius (measured at curb face) of 9 metres. Cul-de-sacs shall have a minimum radius (measured at curb face) of 12 metres for residential areas and 15 metres for industrial areas. This includes temporary cul-de-sacs installed as a result of development phasing conveyance. Refer to **Figure CS-1D of Appendix B** for additional details.

3.1.4 Sidewalks, Bikeways, Walking Trails, Multi-Use Pathways

The Town of Essex requires that 1.5 metre wide sidewalks be located on both sides of all arterial and collector roads and on one side of all local roads. Notwithstanding this requirement, where a collector road forms part of the planned recreation-way for the Town of Essex, a hard surfaced bikeway/recreation-way with a minimum width of 2.44 metres (8.0 feet) shall be located on the side of the street opposite the sidewalk. Any other requirements for sidewalks will be noted in the Development Agreement. The Town of Essex encourages bikeways, walking trails, and multi-use pathways in all new developments. Must follow OTM Book 18+ Guidelines and Mandates.

3.1.5 Tactile Walking Surfaces, Crosswalks and Crossing Components

At intersections, a tactile walking surface shall have the following design features (Must follow OTM Book 18+ Guidelines and Mandates):

- Have the base surface level with the surrounding surface, or with its edges beveled and not more than 3mm above the surface to which it is applied
- Be slip-resistant
- Have any smooth adjacent walking surface smooth for at least 600 mm

Crosswalks shall have the following design features:

- Be at least 1800 mm wide between pavement markings (where provided)
- Have a running slope not steeper than in a ratio of 1:20 (5%)
- Have a cross slope:
 - Not exceeding 2% for crossings with stop control
 - Not exceeding 3% for crossings without stop control, or
 - In the case of mid-block pedestrian crossings, matching the street or highway grade, and
- Where crossing rail tracks at grade:
 - Be level and flush with the top of the rail at its outer edges
 - Be aligned with the top of the rail between the rails
 - Where possible, have wheel flange way openings not more than 64mm at non-freight rail tracks or 76 mm at freight rail tracks, and
 - Have tactile attention indicator surface, spanning the width of the pedestrian crossing and located so that the edge nearest the rail crossing is between 1800 and 4600 mm from the centreline of the nearest rail.

Pedestrian crossing components shall be located to:

- Limit exposure to vehicular traffic by following a line that is perpendicular to the vehicular route being crossed
- Be fully outside all motor vehicle and cycling lanes of the parallel roadway

- In the case of refuge islands and medians, where possible, have all components (e.g., curb ramps, blended transitions, crosswalk segments) in a single continuous lateral alignment; and,
- Have curb ramps or blended transitions
 - Lead people directly into the crossing area designated for pedestrian use; and
 - Be located at the side of the crosswalk furthest from the parallel vehicular roadway.

3.1.6 Roundabout Intersections

A roundabout intersection having a pedestrian route of travel shall:

- Have the pedestrian route alongside the roadway delineated from the vehicular route by curbs or other elements to preclude passage where a pedestrian street crossing is not intended
- At each approach roadway that intersects the pedestrian route, have a marked pedestrian crossing that:
 - Complies with section 3.1.5 of this manual
 - Is located at least 7.6 m from the circulation traffic lanes
- Have a tactile direction indicator surface to indicate the junction of a crosswalk and pedestrian route alongside the roadway, which:
 - Extends from the centreline of the ramp or blended transition across the full width of the pedestrian route alongside the roadway
 - Is 600 mm long
- For roundabout intersections with single-lane approach and exit legs, provide at each crosswalk a YIELD here to pedestrians sign that complies with the Manual of Uniform Traffic Control Devices for Canada
- At roundabouts with multi-lane pedestrian street crossings
 - Have entry and exit lanes of the roundabout separated by a splitter island
 - Have on the splitter island a channelized pedestrian route to ensure pedestrians follow the intended route
 - Have separate offset pedestrian crossings for entry and exit lanes of the roundabout
 - Have for each multi-lane segment of a pedestrian street crossing an accessible pedestrian signal (APS). Signals shall clearly identify which pedestrian street crossing segment the signal services

3.1.7 Driveways

Only one driveway per unit will be permitted for single unit dwellings, semi-detached dwellings and townhouse (multi-unit) developments. A separate driveway will not be permitted for a second dwelling unit. Two driveways may be permitted for commercial, industrial and institutional developments as determined through site plan control. Driveways will not be

permitted within site visibility triangles. In urban areas, the homeowner/builder will be required to hard surface the driveway apron (the area between the paved portion of the street and the front lot line) and the private driveway. However, driveway aprons nor the driveway itself shall exceed 7.62 metres (25 feet) in width and shall not be constructed sooner than one (1) year after completion of underground works located beneath the driveway and not later than two (2) years after the issuance of a building permit for the dwelling on the lot. If there is a sidewalk proposed to run through the driveway, the homeowner is required to only hard surface the area between the paved portion of the street and the limit of the sidewalk (partial apron). If the entire driveway is to be hard surfaced in advance of the sidewalk being installed by the Developer, the hard surfacing material must be concrete and a permit will be required to confirm appropriate grading. A permit may also be required from ERCA and/or the County of Essex if there is a potential impact to a regulated area or a County Road.

Refund of the required indemnity deposit submitted at the time of the building permit issuance will also be subject to the satisfactory completion of the hard surfacing of the driveway apron. The building permit applicant will be solely responsible for any necessary repairs to the sidewalk, concrete curb and asphalt road caused by the construction of the home abutting that lot, regardless of who caused the damage. This shall apply to all residential lots in registered plans of subdivision and other subdivision type development for which development agreements are required.

3.1.8 Potable Water Supply Protection

“Ontarians deserve access to clean, safe water.” This means keeping water free of pollutants and contaminants that could harm the environment and human health. The Government of Ontario is moving forward on a series of initiatives to preserve water quality, including new legislation, regulations, standards, and requirements.

The Town of Essex is obligated to provide a safe, reliable potable water supply to its customers. Working in that direction, the Town of Essex requires Developers to follow all government policies and regulations as well as local By-Laws and regulations. These regulations include:

- Environmental Protection Act
- Ontario Water Resources Act
- Clean Water Act
- Safe Drinking Water Act
- Drinking Water Systems Regulation
- Occupational Health and Safety Act and Regulations for Construction Projects
- Town of Essex By-Laws and other applicable regulations
- Essex Region Source Protection Plan

To determine if your property is in a vulnerable area and what policies apply, please use ERCA's online mapping tool or the MECP interactive mapping tool.

3.1.9 Backflow Prevention

The Town of Essex will require the installation of backflow prevention devices on all fire lines. Unless specifically allowed otherwise by the Town of Essex, all services larger than 19 mm shall have backflow preventive devices installed in an accessible location inside of the building, subject to the approved site plan. However, there may be times where a backflow prevention device will be required outside the building, at the discretion of the Town of Essex. Backflow prevention devices are required for all industrial, commercial, institutional (ICI) and multi-unit residential buildings and structures four stories and up. Backflow prevention devices may not be required for single occupancy, residential type buildings or small, single tenant commercial occupancy buildings (at discretion of the Town).

A single water service will supply water to the building from the municipal watermain and shall be equipped with an isolation valve at the property line or another location that is approved by the Town of Essex. The potable water line will be teed off of the single water service at the property line and will be equipped with an isolation valve, a backflow preventer and a water meter. The single water service line will be equipped with a backflow preventer to be located within the building and shall serve as the fire protection water line.

The location of the water meter on the potable water line will be at the discretion of the Town of Essex.

These appurtenances for industrial, commercial, institutional (ICI) development shall be paid for and maintained at the Developer's expense, according to the requirement of the Town of Essex. All water meters are supplied by the Town of Essex and must be placed in a location sufficient for remote reading capability.

3.1.10 Fire Protection

The fire protection water line will be used solely for firefighting purposes. In some cases, fire lines will be required to be metered, unless the Developer can demonstrate that water cannot be used for any purpose other than firefighting. Fire hydrant locations and spacing shall be approved by the Town of Essex, and must have a maximum spacing of 150 metres. Generally, fire hydrants should be located at intersections and adjacent to gaps in central boulevards. Otherwise, fire hydrants should be located near side property lines. On private property, fire protection appurtenances and fire hydrant maintenance shall be paid for and maintained at the Owner's (deed holder's) expense, according to the requirement of the Town of Essex.

3.1.11 Elevation Certificates

Elevation certificates will be required at 2 distinct times of residential development, including:

1. **Foundation Wall Elevation Certificate** will be required from a registered Ontario Land Surveyor (OLS) for all residential Development lots. A registered Ontario Land Surveyor is required to record, verify, and sign-off an elevation certificate to confirm elevations at top of foundation wall, prior to any further construction atop the foundation (framing, masonry etc.) for all development within a plan of subdivision.

Failure to submit Foundation Wall Elevation Certificate prior to building framing, deems building permit no longer valid.

2. **Lot Grading Elevation Certificate** will be required from a registered Ontario Land Surveyor (OLS) for all residential Development lots. A registered Ontario Land Surveyor is required record, verify, and sign-off an elevation certificate to confirm elevations of the main building opening, percent slope of front yard/rear yard/side yard, property corner elevations, and rear yard catch basin rim elevation, for all development within a plan of subdivision. ***Failure to submit verified lot grading elevation certificate will deny approval of occupancy permit.*** Lot Grading Elevation Certificate is available in **Appendix F** of this manual, and available from the Town of Essex.

All new developments (regardless of previous land use, and abutting property land uses) must be in harmony with adjacent lands. It is the responsibility of the Developer and their Consulting Engineer to ensure that there are no negative impacts on adjacent lands regarding lot grading, erosion, and drainage.

Administered by the Chief Building Official – failure to adhere to these terms will result in mandatory remediation, approved by the Town of Essex, by the Builder/Developer infringing on these terms.

3.1.12

Development in Close Proximity to Railways

Developers are to note the following procedures and requirements that the Town of Essex will require for all developments abutting or in close proximity to railway right-of-ways:

- Developer shall obtain written comments from the Railway Company and submit a copy of the railway's comments to the Town of Essex
- Developer shall address safety issues in case of train derailments. These safety issues shall include setbacks, safety berms or other safety measures in the design
- Developer shall complete a noise and vibration study. This study shall provide site specification recommendations
- Developer shall address trespass issues
- Developer shall obtain and pay for permissions and specifications required for utilities crossing railway right-of-ways

Notwithstanding any other requirements, the Developer must comply with the Railway's principal main line requirements.

All infrastructure works shall be the property of the Developer (and subsequent property owners), who shall maintain these infrastructure works in a good state of repair in perpetuity and cause no changes to be made (wear and tear excepted) and save and except for those replacement upgrades as may be required by the Town and/or Railway Company from time to time acting reasonably. All purchase and sale agreements shall clearly state that property owners are responsible for maintenance and repair of these facilities as directed by the Railway Company and the Town of Essex. In the event that the property owner fails to be in compliance with this requirement, the Town shall reserve the right to perform such maintenance/replacement at the cost of the property owner and such costs may be collected by the Town in the same manner as taxes. The Developer (and subsequent property owners) shall, further to this requirement, grant easements in favour of the Town of Essex and the Railway Company, to enable inspection and ensure compliance with this requirement from time to time. All purchase and sale agreements shall clearly state this requirement and shall require a written acknowledgment from the purchases of these requirement and agreeing that such property owners are responsible for maintenance, repair and replacement thereof as may be required.

All works necessary to meet the railway requirements must be installed prior to the issuance of any building permit for a dwelling that is within 300 metres of the rail right-of-way.

Noise barrier walls shall be constructed from decorative or plain precast concrete panels or such other materials and in such manner as set out in a noise or noise and vibration emission mitigation plan approved by the Town prior to the execution of a site plan control agreement, where required, or the issuance of building permits. Safety berms required by the Railway Company shall have minimum side slopes of 3:1 and minimum 2.5 meter top width unless otherwise specified by the Railway Company. Future maintenance of the berm and wall and their replacement shall be the responsibility of the property owner, who shall maintain the berm and wall in good practise.

3.1.13

Development in Close Proximity to Waterfront, Environmentally Sensitive Areas

Notwithstanding any other provision of the By-laws of the Town of Essex, no person shall hereafter erect any permanent or temporary building or structure, including a swimming pool, other than a building or structure associated with drainage works or for protection against flooding and erosion in any zone within the stipulations outlined in the Zoning By-law. This includes all ERCA regulated areas, and a permit / clearance from ERCA may be required. For more information, please refer to the County of Essex Official Plan and Schedules, Town of Essex Official Plan and Schedules, ERCA online mapping tool, Town of Essex online mapping tool, and the 2020 PPS.

Where new developments are allowed in shoreline communities, strong consideration should be given to maintaining/establishing vegetation to mitigate shoreline erosion prior to any new development. The most successful and least costly approach to dealing with erosion problems on shorelines involves mimicking nature's own design and using native vegetation as much as possible.

Soft armoring techniques (sometimes called bio-engineering) involves creating a naturally occurring slope with a combination of natural elements which includes rock and vegetation.

Soft techniques will absorb the energy of the waves along the shoreline, which reduces erosion, strengthens the shoreline, prevents ongoing maintenance, enhances the natural habitat, filters nutrients and pollution from upland runoff, and helps improve water quality.

The following options should be considered as soft armoring solutions to protecting shorelines:

- **Logs and Rocks:** When trees fall onto a bank or into the water, it acts as a nursery for many plants and wildlife species as it decays. It also helps to stabilize the shoreline and bank by obstructing the movement of runoff and the action of waves on the shore. By placing logs in strategic locations, it can help protect the shoreline in a natural looking manner. By placing rocks in strategic locations, it can help protect banks at drainage outfalls or gullies, break the force of waves and provide shelter for fish and other wildlife.
- **Live Staking:** This method can be done by taking woody plants that are native to the area and driving them into the dirt or substrate of the eroded area so they can sprout roots and grow. Live staking is relatively low cost and can be easily done by the landowner.
- **Brush Mattress:** A brush mattress consists of a thick (15 to 30 cm) blanket of living cuttings and soil fill that is placed on a stream bank or lake shore to simultaneously re-vegetate and armor the bank. This method works well on badly eroded slopes, as the dense layer of brush increases roughness and protects the bank from scour. As the live branches root and grow, they provide cover and reinforcement for the soil underneath. If these mats are used on stream banks, they trap sediments during high water, and eventual plant growth will enhance aquatic habitat.
- **Vegetated Rip-Rap:** Vegetated rip-rap combines the rock revetment techniques with vegetative techniques. It consists of a layer of stone or boulder armoring that is vegetated using pole planting, brush layering and live staking. This technique works best for waterways or inland lakes where continuous and resistive bank protection measures are needed. Plants incorporated into the riprap will create a more natural look to the shoreline as well as create habitat for aquatic and terrestrial wildlife.

Depending on the development in proximity to the shoreline, soft armoring techniques alone may not provide the long-term erosion protection needed to obtain a permit. During pre-consultation discussions, the proponent shall present grey and green solutions where

applicable for review by the Town of Essex and the applicable regulatory authority (i.e. ERCA). If green LID solutions are not feasible or sufficient, the proponent shall display reasoning and research to determine this.

3.1.14 Storm Drainage Systems Maintained Under the Drainage Act

It is the policy of the Town of Essex that ratepayers who benefit directly from municipal services shall pay the cost to operate and maintain these municipal services. As such, the Town of Essex recognizes that storm drainage systems in particular, provide benefit to a limited service area. Therefore, unless noted otherwise in the Development Agreement, Developers will be required to:

- Agree that the storm drainage system, including sewers, pumping stations and stormwater management systems, may be incorporated into a municipal drainage report at the Developer's expense, for assessment of future maintenance and operating costs.
- Agree to incorporate adequate language in all Purchase/Sale Agreements of the lots, including setbacks from municipal drains, acknowledgement from the purchaser that the storm drainage system is part of a municipal drain pursuant to the Drainage Act and that the purchaser will not object to any costs assessed to the property under the requirements of the Drainage Report.
- Provide setbacks from municipal drains on drawings and PDC sheets.

3.2 Residential Sites

3.2.1 General

The general requirements of **Subsection 3.2** shall apply and govern except as amended or extended herein.

3.2.2 Semi-Urban Developments

Notwithstanding that it is the policy of the Town of Essex to require curb and gutter on all new streets, the Town of Essex may consider reducing the municipal standard for new developments abutting existing developments that have been developed to semi-urban standards (no curb and gutter).

This special relief will require a Council resolution, and Developers are encouraged to obtain Council approval early in the development process. As a guide to Developers, Council will consider the following factors in granting this exemption:

- Specific locations designated in the Official Plan to permit residential development in semi-urban settings.
- The relative size of the proposed development and other adjacent lands that are designated for residential development in the Official Plan. The smaller the new development is in

comparison to the neighbourhood, the more likely semi-urban development will be permitted.

- The size of the lots. Generally, estate size lots (frontages of 30 metres or more) are candidates for semi-urban development.
- The adequacy of downstream storm sewer outlets. Less than desirable storm sewer outlets support semi-urban construction.
- The absence of sanitary sewers.

3.2.3 Road Classification

Arterial streets are defined by the Town of Essex as part of a traffic study. Contact the Town of Essex for details.

Collector residential streets will be defined in the Development Agreement and are streets that provide the major or access and egress point to the development in the area. These streets will be the major access route for firefighting and emergency service vehicles to the development and will generally indirectly service more than 200 residential units. The estimated minimum annual average daily traffic (AADT) when the site and surrounding area is developed would be 1000.

Collector roads may have restricted and/or controlled access. All other residential streets are classified as local residential streets.

3.2.4 Driveways

All residential driveways shall have a hard or permeable surface from curb and gutter or pavement edge (except for semi-urban developments), to the property line or easement line, whichever is farthest from the street. Acceptable hard surface driveway materials are asphalt and concrete. Acceptable permeable surfaces include the following:

- **Porous Asphalt:** A hot-mix asphalt with a reduced amount of sand or fines, which allows for increased interconnected pore space for water to drain through the pavement into a crushed stone reservoir and base. To maintain proper infiltration rates through the paving layer, the amount of asphalt binder in the mix must be minimized to prevent clogging of voids.
- **Pervious Concrete:** The design of pervious concrete differs from standard concrete because the fines have been removed from the concrete mix and different cementitious materials and chemicals have been added, such as fly ash and air entraining agents. The finished product will look similar to conventional concrete, except it typically has a rougher surface and allows for infiltration into the ground. Pervious concrete is also available in precast concrete panels that are placed together on site.

Please note that the above permeable surface options are only a few examples, and the consultant should be diligent in evaluating other permeable pavement options, in consultation with the Town of Essex.

Generally, permeable pavement is recommended for low-volume and low-speed applications with limited turning traffic. The use of permeable paving can potentially reduce the size and extent of downstream stormwater collection, conveyance and detention.

Developments are subject to runoff review by the Town of Essex, and may be subject to compensate for increased runoff by physical or financial means on individual or full development sites.

3.2.5 Condominiums

In Condominium type development where the Town of Essex will not assume the roadway and other services, the development standards shall be established in the corresponding Site Plan Agreement.

3.3 Commercial Sites

3.3.1 General

The general requirements of **Subsection 3.1** shall apply and govern except as may be extended or amended herein.

3.3.2 Storm Water Management Facilities

Should Developers use the parking areas as temporary ponds to store storm water, the maximum depth of ponding for a 1:100 year storm (major system) shall be 300 mm. For a 1:5 year storm (minor system), the hydraulic grade line (HGL) shall be maintained below ground elevations.

More stringent HGL requirements may be required at the discretion of the Town of Essex and/or ERCA based on known flooding issues or other site-specific conditions.

LID stormwater control measures are strongly encouraged when developing commercial sites. LID examples for commercial use include bioretention systems, bioswales, rain gardens, green roofs, and interlocking concrete pavers. Rainwater harvesting systems for commercial use should be large pre-fabricated cisterns, which can range from 750 to 40,000 litres in size.

Commercial sites are likely to provide a large number of parking spots. It is recommended that planting areas be used as small scale LID units to capture and treat a portion of the parking lot runoff through filtration and infiltration.

3.4 Industrial Sites

3.4.1 General

The general requirements of **Subsection 3.1** shall apply and govern except as may be extended or amended herein.

3.4.2 Roads

The minimum road width shall be 10 metres measured between face of curbs (right-of-way widths determined by Town, site specific). A geotechnical investigation defining the pavement cross section parameters is mandatory.

The intersection turning radius shall be 15 metres. A cul-de-sac radius, if permitted, shall be 15 metres.

3.4.3 Storm Water Management Facilities

Should Developers use the parking areas as temporary ponds to store storm water, the maximum depth of ponding for a 1:100 year storm (major system) shall be 300 mm. For a 1:5 year storm (minor system), the hydraulic grade line (HGL) shall be maintained below ground elevations.

More stringent HGL requirements may be required at the discretion of the Town of Essex and/or ERCA based on known flooding issues or other site-specific conditions.

Loading ramps are not permitted to be used as a stormwater management facility, however a maximum depth of 300mm is permitted for major systems, as some depth is inevitable based on their typical low elevation and the hydraulics of the system.

3.5 Institutional Sites

3.5.1 General

The general requirements of **Subsection 3.1** shall apply and govern except as may be extended or amended herein.

3.5.2 Storm Water Management Facilities

Should Developers use the parking areas as temporary ponds to store storm water, the maximum depth of ponding for a 1:100 year storm (major system) shall be 300 mm. For a 1:5 year storm (minor system), the hydraulic grade line (HGL) shall be maintained below ground elevations.

More stringent HGL requirements may be required at the discretion of the Town of Essex and/or ERCA based on known flooding issues or other site-specific conditions.

3.6 Recreational/Park Sites

3.6.1 General

The general requirements of **Subsection 3.1** shall apply and govern except as may be extended or amended herein. All parkland must be fine graded and hydro-seeded by the Developer within 12 months of acceptance of the abutting services on maintenance. A minimum 75% consistent germination is required as determined by the Town of Essex. All park sites abutting residential shall be fenced to the satisfaction of the Town of Essex.

3.6.2 Parking and Access Areas

All parking areas and access areas shall be hard surfaced with asphalt, concrete or paving stones to control dust and provide adequate drainage

3.6.3 Storm Water Management Facilities

All play areas or passive areas used for stormwater storage should only contain infrequent flood events, yet serve as a recreational land for the majority of the time. Surface ponding in parkland should be limited to storms meeting the minor 5-year storm, or greater, at the discretion of the Town of Essex. Proponents are advised that lands serving as a storm water storage area or other storm water management facility are not deemed to form part of a parkland dedication mandated under subsection 1.6, **Parkland Dedication, Acquisition Fees and Development**, of this Manual.

Suitable LID stormwater control measures are also encouraged on recreational sites, including (but not limited to) bioretention, bioswales and rain gardens.

Consideration should also be given to developing natural and constructed shade, as well as water filling stations on public property such as parks, community centres, and splash pads.

3.7 Greenhouse Developments

3.7.1 General

By law, to operate a greenhouse in Ontario, you must:

- Get a Permit to Take Water, if you take more than 50,000 litres of water of any given day from a lake, stream, river, pond or groundwater source
- Get approval from the Ministry of the Environment, Conservation and Parks to discharge sewage, including storm water, process water and sanitary sewage
- Get approval to use, operate, establish, alter, extend or replace new or existing sewage works
- Properly store and handle pesticides

- Hold a pesticide license or certificate such as the Greenhouse/Interior Plant exterminator license or Grower Pesticide Safety Grower Certificate to apply certain pesticides

3.7.2 Site Plan

Site plans for greenhouses must show the following items, at minimum:

- Adherence to all local by-laws regarding odour and light pollution requirements
- Dimensions of the property
- Location and size of all buildings (existing and proposed)
- External doors and accesses, entrances, driveways, parking areas
- Loading and truck movement areas
- Outdoor storage areas, central storage and collection areas for waste materials under the Environmental Protection Act (if permitted)
- Outdoor lighting
- Signage
- Supplementary housing facilities
- Landscaping
- MTO corridor restrictions (if any)
- SWM facilities
- Fuel storage facilities

All lighting specifications are subject to approval by the Town of Essex. The setback from property line to the top of the bank of any swale for maintenance access purposes shall be 2.0m or as otherwise approved by the Town of Essex.

3.7.3 Stormwater Management

As outlined in the Town of Essex Official Plan, stormwater management will generally be required for greenhouse development, to ensure runoff is controlled in such a manner that development does not increase peak flows and that potential pollution is mitigated, typically on site, to address potential negative and adverse effects downstream or into Lake Erie.

The Town of Essex will require developers to undertake stormwater management studies and works pursuant to the legislation, guidelines and municipal standards in effect in order to address these issues. Stormwater management plans, acceptable to the Town of Essex, Essex Region Conservation Authority (ERCA) and Ministry of the Environment, Conservation and Parks (MECP), will be required in advance of Site Plan Control (SPC) approval.

3.7.4 Wastewater Management

Where a private sewage system with a daily design flow of less than 10,000 l/day is required, an application for a permit must be obtained from the Building Department and design shall be as required by the Ontario Building Code. Private sewage systems exceeding the daily design flow

of 10,000 l/day require a Certificate of Approval from the Ministry of the Environment, Conservation and Parks (MECP).

3.7.5 Construction Plans

Greenhouses are classified as Part 4 structures under the Ontario Building Code and as such are required to be designed by a Professional Engineer. Structural plans, showing the design of footings and the greenhouse structure, stamped by a Professional Engineer, must be submitted along with the Permit application.

3.7.6 Inspection Requirements

The Developer's Engineer shall conduct reviews of each stage of construction as specified at the time of Building Permit Issuance. Copies of the reports arising from these reviews must be submitted to the Building Department within 48 hours of the Engineer's visit to the site.

The Town of Essex may conduct periodic inspections where there is a stormwater outlet to a municipal drain.

3.7.7 Parking and Access Area Requirements

The portion of the entrance that is within the municipal right-of-way shall be hard surfaced to the satisfaction of the Town of Essex prior to commencement of construction.

The location of the driveways, parking areas and the extent of the hard surfacing required must be addressed in the Site Plan.

3.8 Indemnity Deposits

Developers shall either pay for or arrange to have the lot purchaser deposit indemnity fees at the time building permits are issued. These fees are to ensure that:

- Agreed to work is completed, including rear yard drainage
- Any damage to the municipal infrastructure is repaired at the purchaser's expense
- All streets are kept cleaned
- Any standing water is drained
- All weeds are cut
- Dust from the site is controlled
- Driveway approaches are constructed
- Water meter is installed and inspected
- Location of municipal service connections is submitted
- Service connections are in working order (water valve, metal caps on cleanouts, etc.)
- As-built Drawings are submitted, if required

The Developer should contact Public Works (PW) for inspections at least 24 hours prior to installing the driveway, and the Town of Essex for the value of the current indemnity deposit. The indemnity deposit will be returned in part or in full at the time that all the conditions are satisfied and a final inspection is completed and deficiencies list is cleared.

3.9 Transportation Policy Guidelines

The Transportation Policy Guidelines are applicable to non-residential development only. They consist of Parking, Walking and Cycling, Road Classification, and Subdivision Design. These Policy Guidelines are available upon request at the Town of Essex.

4.0 Design Criteria

4.1 General

The following design criteria shall apply as minimum requirements unless specifically noted otherwise in the Development Agreement, superseded by Provincial or Federal legislation, or reports/studies from a geotechnical investigation.

4.2 Regulatory Requirements and Submittals

The Consulting Engineer shall make all applications and submissions necessary to obtain an Environmental Compliance Approval (ECA), including addendums, from the Ministry of the Environment, Conservation and Parks (MECP) for all works proposed prior to commencing any work on-site.

Upon completion of the works and prior to maintenance securities being released, the Town of Essex shall be provided with electronic copies in PDF and Word format, as well as three (3) hard copies of a complete & detailed Operating & Maintenance Manual and separate Project Documentation Manual all bound in 3-“D” ring binder(s) that include the following:

- O&M documentation for all components and equipment used on the project including warranty information, commissioning reports and signed letters of certifications from suppliers regarding installation, service and operation (training to be included for operations staff).
- Annual maintenance report templates for all control and pump equipment including voltage, current and Megger results from the manufacturer.
- Contingency plans to address potential malfunctions and/or emergency site conditions.
- Operational controls narrative.
- Standard Operating Procedures and/or Operations Manual covering the operation of the pump station.
- Environmental Compliance Approval (ECA).
- Three (3) copies of full size project “construction record” drawings in both printed form and PDF & AutoCAD electronic formats on USB drive.
- Final electrical inspection certificate from electrical safety authority (ESA).
- MECP Form 1
- Copy of final commissioning report from Engineer for watermain, pump station and stormwater.
- All spare parts shall be turned over to the Town of Essex or its operating Authority.

4.3

Roads

Asphalt pavement structures shall consist of the following minimum material thickness:

- Local Roads:
 - Granular 'A' Base - 400 mm (On Native)
 - Granular 'A' Base - 450 mm (On Engineered Fill)
 - Superpave 19.0 Base Asphalt - 135 mm at curb; 75 mm at centreline
 - Superpave 12.5 Surface Asphalt - 40 mm at curb; 40 mm at centreline
- Collector Roads:
 - Granular 'A' Base - 400 mm (On Native)
 - Granular 'A' Base - 450 mm (On Engineered Fill)
 - Superpave 19.0 Base Asphalt - 135 mm at curb; 75 mm at centreline
 - Superpave 12.5 Surface Asphalt - 40 mm at curb; 40 mm at centreline
- Industrial Roads:
 - Granular 'A' Base - 450 mm (On Native)
 - Granular 'A' Base - 450 mm (On Engineered Fill)
 - Superpave 19 Base Asphalt - 175 mm at curb; 75 mm at centreline
 - Superpave 12.5 Surface Asphalt - 50 mm at curb; 55 mm at centreline

These minimum thicknesses apply unless otherwise determined based on the results of a geotechnical investigation.

Granular 'A' materials shall meet the minimum requirements of OPSS 1010 and shall be compacted to a minimum 100 percent of the Standard Proctor maximum dry density. Recycled material shall not be used for granular road base.

Asphalt materials shall consist of asphalt cement having a penetration grade of 85-100 and shall conform to OPSS 1101. A qualified material testing company shall be retained by the Contractor to design the asphalt and pavement mixes, which must be submitted to the Town of Essex for review. The use of recycled asphalt in the final product shall not exceed 15 percent.

Pavements shall be designed to provide adequate drainage of stormwater runoff as well as drainage of the granular road base. Accordingly, the following minimum standards shall apply:

- Subdrains with Filter Sock:
 - SUB -DRAIN 150mm diameter heavy-duty perforated Big 'O' for all roads.
 - Constructed continuously along the back of curbs at a gradient equal to the longitudinal pavement slope (or minimum 0.30 percent) and connected to roadway catch basins or other appropriate outlet. Refer to standard detail in **Appendix B**.

- Curb-Inlet Catch Basins:
 - OPSD 610.030 (with bars).
 - Catch basins placed at intersections for proper drainage and spaced for road drainage from no more than 90m per catch basin per lane.
 - Curb inlet catch basins must have frame and grate on all road types. With bars (See **Appendix B**).
 - Placed at intersections for proper drainage.
 - Spacing for road drainage no more than 383m² asphalt catchment area per catch basin.
 - Regular catch basins (OPSD 705.010) to be used where curb inlets are obstructed from installation.
- Longitudinal Grade:
 - Desirable minimum: 0.5%
 - Absolute minimum: 0.3%
 - Maximum: 5.0%
- Road Radius:
 - Minimum turning radius: 9 m
 - Minimum cul-de-sac radius, including temporary cul-de-sacs for subdivision phasing: 12m
- Crossfall:
 - Desirable: 3.0%
 - Minimum: Concrete 2.0%; Asphalt 3.0%
- In intersection areas and cul-de-sacs:
 - Desirable minimum 1.0% with absolute minimum being 0.6%
- Concrete Curbs and Gutters:
 - OPSD 600.04 (with modified gutter depth)

4.4 Sidewalks/Recreation ways

Concrete sidewalks shall be constructed in accordance with OPSS 351 and OPSD 310.01, 310.030. Sidewalks shall be constructed through driveways/entrances unless noted otherwise herein. Sidewalk widths shall be:

- Residential:
 - 1.5m wide, increased to 1.8 m wide when constructed adjacent to curb and gutter
 - Minimum thickness 150 mm at road radius and driveways, 125 mm elsewhere
 - Base Material 150 mm of Granular 'A'

- Commercial, Industrial, Institutional:
 - 1.5 m wide, increased to 1.8 m wide when constructed adjacent to curb and gutter
 - Minimum Thickness 150 mm at road radius and driveways, 125 mm elsewhere
 - Base material 200 mm of Granular 'A'

All sidewalks shall be constructed through driveways and thickened accordingly. Expansion joints shall only be used when abutting facilities. At any intersection, concrete sidewalk ramps and asphalt multi use pathway ramps shall comply with OPS 310.030. Furthermore, **Figure S5** of **Appendix B** shall be included in the referenced drawings. The Accessibility for Ontarians with Disabilities Act (AODA) was established in 2005 outlining accessibility standards for organizations, including Municipalities.

Ontario Regulation 119/11, Accessibility for Ontarians with Disabilities Act (AODA), was amended by Ontario Regulation 413/12 to include Part IV.1, Design of Public Space Standards (Accessibility Standards for the Built Environment). The amendment to the regulation came into force January 1, 2013 by municipalities among other obligated organizations. The Act does not require existing sidewalks or wheelchair ramps to be retrofitted or replaced.

In order to comply with the Act requirements, the exterior path must have a minimum clear width of 1500 mm. This width can be reduced to 1200mm to serve as a turning space where the exterior path connects with a curb ramp. Where the curb ramp is provided at a pedestrian crossing, it must have tactile walking surface indicators that:

- have raised tactile profiles
- have a high tonal contrast with the adjacent surface
- are located at the bottom of the curb ramp
- are set back between 150mm and 200mm from the curb edge
- are a minimum of 610mm in depth
- extend the full width of the curb ramp

The Developer shall install all sidewalks at the time of completion of the underground services to the minimum specifications outlined in this section, and must meet new requirements, including all utilities, and road construction (up to base asphalt). The Developer is responsible for sidewalk damage during maintenance period. For developments, any review and approval of development drawings includes the requirement for tactile walking surface indicators at all municipal sidewalk curb ramps. Additionally, the required type to be used is the Access Tile tactile system, part # ACC-R-2436-XX, epoxy coated (yellow). The Town of Essex may require a delay in the schedule to install sidewalks based on the level of building activity and/or to allow for the consolidation of utility trenches as determined by the Director of Infrastructure.

Developers will be responsible to maintain and repair damaged sidewalks, for one year from the Town of Essex “acceptance of services”. The Developer shall also include sidewalks shown on the lot grading sheets submitted to the Town of Essex, prior to the issuance of building permits to home builders.

Recreation ways shall be a minimum of 2.44 metres wide. The minimum asphalt thickness shall be 80mm Superpave 12.5, and 100mm Superpave 12.5 at driveways. The minimum Granular ‘A’ thickness shall be 250mm. The base is to be 300mm wider than the asphalt on each side. Recreationways shall also be constructed through driveways and thickened accordingly.

4.5 Sanitary Sewers

Sanitary sewers and appurtenances shall be constructed in accordance with the approved contract documents prepared by the Consulting Engineer. The minimum design criteria are noted below. Imported Granular ‘B’ backfill per OPSS 1101 shall be used beneath all pavements and within 1 metre of the back of curb.

Table 1: Sanitary Design Criteria

Design Component	Design Criteria	
Population Density	Low-Medium Density Residential 3 persons per unit High Density Residential Based on anticipated use	Dry industrial 35 persons per hectare Commercial Based on anticipated use
Average Domestic Flow Peaking Factor	450 litres per capita per day Harmon formula applied to average domestic flow $(1+14)/(4+P^{0.5})$ P = population in thousands Minimum Peaking Factor = 2.0	
Extraneous Flow	0.21 litres per hectare per second	
Minimum Velocity for Pipe Flowing Full	1.0 m/s for first run, 0.6 m/s for remaining	
Maximum Velocity	3.0 metres per second	
Manning’s Coefficient of Roughness	0.013 (Smooth Wall Pipe)	
Minimum Pipe Size	200 mm diameter	
Maximum Manhole Spacing	90 m preferred, maximum 120 m	
Minimum Manhole Size	1200 mm	
Benching	To be in accordance with OPSD 701.021	

Design Component	Design Criteria
Other Manhole Notes	All manholes are to be equipped with Cretex Inflow Dish with water tight gasket and diffuser valve
Drop Structure	Bowl Type, minimum 1500 mm maintenance holes, minimum height of 600 mm from the inlet pipe invert to the bottom of channel
Minimum Service Connection Size	Single – 125 mm diameter All cleanouts require a 125 mm metal cap
Minimum Service Grade	2%
Other Servicing Notes	<ul style="list-style-type: none"> All services shall include a tee and a cleanout at the property line The cleanout should project more than 0.3m above the ground level for inspection and should have a minimum separation distance of 1.5 m from an adjacent service Service connections to manholes are not permitted Double connections and tee-wye connections are generally not permitted, however the first two services on the first run of sewer are required to be wyed Residential services must have a backflow preventor.
Pipe Material	PVC DR35 – sanitary sewer (<450mm) PVC DR28 – sanitary private services Concrete (65-D min.) – reinforced for sewers 450 mm diameter or larger

Design submissions must include the following:

- A drainage plan showing all relevant land uses within each sub drainage area and calculation information (design parameters such as area, population and lots shall be shown).
- Design calculations indicating land use, densities, design flows, velocities, capacities, pipe sizes, etc. on the sanitary design sheets.
- Profiles should show size, type, strength classification, length, inverts of pipes, location, diameter and rim elevation of maintenance hole.
- Sampling manholes

The Consulting Engineer shall confirm the availability and location of an appropriate outlet with the Town of Essex, shall complete the final design and obtain a Certificate of Approval from the Ministry of the Environment, Conservation and Parks (MECP) prior to construction. Work on private property shall conform to the ECA.

4.5.1 Private On-Site Wastewater Treatment Facilities

In those instances where land is designated for development in the Town of Essex Official Plan and an extension of servicing from an existing municipal wastewater treatment facility is not available or practical at the time that development wishes to proceed, the Town of Essex will consider the use of a private on-site wastewater treatment facility in compliance with the relevant Town of Essex Official Plan policies, the County of Essex Official Plan, and the 2020 Provincial Policy Statement (PPS).

Where a site is approved for a private on-site wastewater treatment facility, the Town of Essex will require, as a condition of site plan approval, that the Developer agree to connect to the municipal wastewater treatment facility where services are available as determined by the Town of Essex. The Town of Essex will also require that the appropriate buy-in fee or development charge be paid by the Developer at site plan approval.

A separate agreement would be required for the operation of the plant. The Developer would be responsible to maintain the plant while it is operating within normal parameters for at least 6 months. The Town of Essex would then take over operation following that time period.

4.5.2 Sanitary Pumping Stations

Sanitary pumping stations shall be designed and constructed in accordance with the Town of Essex approved construction drawings and specifications prepared by a Professional Engineer licensed in the Province of Ontario.

Drawings and specifications shall meet the following minimum design criteria. Please note that the Town of Essex shall reserve the right to amend and/or impose additional requirements to those noted herein at any time.

Where pumping stations are approved, stainless steel products and appurtenances will be selected over galvanized and other treated surfaces to minimize the effects of corrosion from sewage and weather. All pumping stations will be provided with an emergency power outlet suitable for use with portable emergency generators to be used by the Public Works Department in the event of a power failure to the pumping station. All stations will be equipped with alarm systems connected by telephone lines to the Town's water treatment plant, all at the Developer's expense. Permanent back-up generators may be required, at the Developer's expense, and at the discretion of the Town.

Refer to the typical sanitary sewer pump station drawing depicted in **Figures SA3-SA5 in Appendix B** which shall serve as the basis of design within the Town of Essex. These standard drawings shall also serve as a reference to assist the Consulting Engineer in the design and preparation of detailed construction drawings.

Contemplated changes/deviations/customization of the design/arrangement/configuration depicted in these drawings to suit a specific design/situation/circumstance/location/etc. shall first be reviewed with and approved by the Town of Essex on a case by case basis prior to implementation.

The sewage retention period shall be adequate to allow for transportation time and shall not be less than 4 hours under average daily flow rates plus infiltration.

4.5.2.1**Site Selection**

The site shall be accessible from a municipal street and sized to provide for the parking of vehicles used for inspecting and maintaining the station. Access must also be provided for a standby electrical generating system where required. Access shall also be provided for the storage or removal of snow. All access roads and parking areas shall be paved with asphalt. Minimum lot size shall be based primarily on being able to remove and replace entire station without encroaching on adjacent private property and shall take into consideration a minimum 1:1 soil slope during excavation while meeting the objectives in the paragraph above. Site shall be graded to ensure proper surface drainage and landscaped to be compatible with the surrounding neighborhood. Landscaping design shall be submitted and approved by the Town for any areas adjacent to road right of ways. Any associated buildings shall be designed to be permanent, durable and aesthetically pleasing and compatible with other buildings in the area.

4.5.2.2**Pumping Station Design**

Pumping stations shall be designed in accordance with Ministry of Environment (MOE) guidelines and specifications herein. Wet well submersible pump stations shall also be designed in accordance with Ministry of Environment Specification No.3 – Standard Specification for Submersible Sewage Pumps – Issue No. 2 – March 1984 and specifications herein. The specifications herein will supersede the MOE guidelines should there be any contradictions between the two documents. All pump stations shall be fitted with an external electrical weatherproof plug for connection of a mobile emergency standby electrical generator in a manner suitable to and approved by the Town. Permanent emergency standby electrical generator facilities shall be provided in all cases where flooding and backup of sewage into private buildings can occur and where the uses of mobile emergency standby electrical generators are not practical or desired by the Town. The need and type of emergency standby power shall be reviewed with the Town and MOE Regional Staff early in the design stage. The sewage retention period shall be adequate to allow for transportation time and shall not be less than 4 hours under average daily flow rates plus infiltration. One or more pumps capable of pumping the peak design flow with an additional stand-by pump (this is known as firm capacity).

System head calculations shall be undertaken in accordance with MOE Guidelines for Design of Sanitary Sewage Systems and MOE Specification No. 3 as noted herein and per the following:

- Hazen-Williams Coefficient of C=120 for low water level, C=130 for median water level and C = 140 for high water level conditions
- Minimum force main velocity of 0.76 meters per second (2.5 feet per second)
- Maximum force main velocity of 2.3 meters per second (7.5 feet per second)
- Minimum pump cycle time of 10 minutes

Only pumps manufactured by Xylem Flygt shall be used in the Town. The use of alternative manufacturers must be approved by the Town on a case by case basis due to or to suit specific circumstances.

Pumping stations shall generally be circular in design and constructed of precast or cast in place reinforced concrete using Type 20 cement. They shall have a minimum inside diameter of 3.0 meters and shall include at minimum, the following items all of which are to be detailed in the projects construction drawings and specified in the project's specification documents. Refer also to details in the typical sanitary pump station drawings contained herein for reference and additional requirements in **Figures SA-3, SA-4, and SA-5**.

- **Access hatches** shall be of the lockable, single leaf, insulated roof scuttle design of aluminum construction with a minimum clear opening of 762 mm x 914 mm, and fitted with Type 316 stainless steel hardware complete with continuous piano hinge, gas assist springs, hold open arms with handles, flush recessed lock with provisions for padlock and designed to withstand minimum live load of 150 pounds per square foot using min. 6mm thick aluminum tread plate all as manufactured & supplied by MSU Mississauga or approved equal.
- **Pump/Equipment hatches** shall be of the lockable, single leaf cast-in-place design of aluminum construction with a minimum clear opening of 914 mm x 914 mm for 3000 mm diameter chambers and 914 mm x 1220 mm for 3600 mm diameter chambers to allow complete removal and replacement of pumps. Hatches shall be fitted with Type 316 stainless steel hardware complete with stainless steel hinges, gas assist springs, hold open arms with handles, flush recessed lock with provisions for padlock and designed to withstand minimum live load of 150 pounds per square foot using min. 6mm thick aluminum tread plate. Hatch shall also come complete with hinged orange colour safety grate and retractable safety post & chain all as manufactured & supplied by MSU Mississauga, Flygt or approved equal.
- **Access ladders** shall be fabricated, heavy duty design of aluminum construction having a width of 500 mm. Ladder shall be supported off chamber wall using flanged brackets at maximum spacing of 1200 mm and Type 316 stainless hardware. Top of ladder shall be fitted with heavy duty, retractable, double post access rails all as manufactured & supplied by MSU Mississauga or approved equal.

- **Platforms** shall be fabricated and of all aluminum construction (T-6061) with Type 316 stainless steel hardware complete with channel & angle support framing and “close mesh (4.76mm)” aluminum “serrated” grating fastened to framing using Type 316 stainless steel hold down clips at minimum 500mm centers (min of 4 hold down clips per panel). Provide hinged grating section for access to lower level having minimum clear opening of 762 mm x 914 mm fitted with aluminum or stainless steel hinges and lifting handles All edges and holes through grating shall be banded. Platform shall also be fitted with safety handrail of welded double rail design and aluminum alloy 6063-T6 or 6351-T6 construction with clear anodized finish. Pipe rails shall be 38mm diameter, IPS Schedule 40 complete with bottom flanged posts at max spacing of 1800 mm and 150 mm high x 6 mm thick aluminum kick plates fastened to bottom of posts. Platform shall also be fitted with 1040 high aluminum post & chain assembly for personnel safety around the hinged grating section. Removable posts shall be set in floor sockets & fitted with two rows of Type 316 stainless steel chain on 3 sides complete with stainless steel eyehooks and spring loaded hooks to engage the eyehooks.
- **Sewage pumps** shall be of the non-clog submersible design with separate pump base discharge connection and dual sliding rail system. Pumps to be rated for 600 volts, 3 phase, 60 hertz operation and certified for Class 1, Group D, Division 1 hazardous environments. Each pump to be equipped with a mix flush valve and lift chain of hot dip galvanized steel construction. In addition, each pump to be fitted with leakage detectors capable of sensing stator over temperature and liquid in stator housing complete with automatic reset once the fault has cleared, LED fault indications, dedicated dry output contact closures for temperature and leakage faults using Flygt Mini-CAS II Supervision relay. Pump power cables to be supported from stainless steel cable support grips above with min. 3 meters slack after installation. Pump surfaces to be finished with an epoxy coating system for corrosion protection. Provide a chain hoist with sufficient load chain and grip eye lifting device for proper removal and installation of each pump. All as manufactured and supplied by Xylem/Flygt Canada – Npump.
- **Pump rails** shall be of Schedule 80 hot dip galvanized steel piping construction. Intermediate and upper guide bar holders including pump lift chains and chain hooks shall also be of hot dip galvanized steel construction with Type 316 stainless steel hardware.
- **Pump discharge piping** shall be to ASTM A-774/778 Type 316L stainless steel welded construction, I.D. pipe size with minimum thickness of 11 gauge (3.2mm) (0.125-inch). Fittings shall be prefabricated, smooth flow, long radius type. Joints shall be welded except at valves & equipment where flanged type backing flanges and rolled van stone collars are to be used. Backing flanges to be min. hot dip galvanized steel construction drilled to ANSI B16.1, Class 125, thickness T3 for 150 psi test pressure. Victaulic couplings and victaulic

flange adaptors of hot dip galvanized steel construction are to be used where shown on the typical sanitary pump station drawings contained herein. All joint fasteners to be Type 316 stainless steel. All piping and fittings to be pickled and passivized after fabrication and field welding to achieve a consistent finish and appearance. As manufactured and supplied by Douglas Barwick Inc. or approved equal.

- **Gate valves** shall be of the resilient wedge type to AWWA C509 Class 200W and/or AWWA C515 Class 250W with manual handwheels and gear operators. Manual square nut operators and stainless steel extension stems shall be implemented where shown on the typical sanitary pump station drawings contained herein. Valve to be of ductile iron construction, bronze mounted with rubber encapsulated modified wedge disk and nonrising stem with O-ring seals and flange x flange ends drilled to ANSI B16.1, Class 125. Valve to open by turning counterclockwise. All exposed fasteners to be Type 316 stainless steel. The exterior and interior of the valve shall be coated with an NSF/ANSI 61 approved fusion bonded epoxy coating system. As manufactured by Mueller, Clow, American AVK or approved equal.
- **Swing check valves** shall be of the rubber flapper design to AWWA C508. Valve shall be full globe style body with domed access cover and flexible disc made of Buna-N (NBR) and steel reinforcement with disc accelerator. Body shall be of ductile iron construction with all stainless steel trim and flange x flange ends drilled to ANSI B16.1 Class 125. Valve shall be fitted with screw type backflow actuator to enable opening of valve during no flow conditions and a mechanical indicator to provide disc position indication on valve. All exposed fasteners to be Type 316 stainless steel. The exterior and interior of the valve shall be coated with an NSF/ANSI 61 approved fusion bonded epoxy coating system. As manufactured by Val-Matic - Surgebuster Swing Check Valve Series 7200.
- **Curved sluice gate** shall be fabricated from Type 316L stainless steel to AWWA C501 requirements. Gate shall consist of wall thimble, gate frame, yoke, threaded stem, stem extension and stem guides all constructed from Type 316L stainless steel and assembled using Type 316 stainless steel fasteners and hardware. Stem guide liner, side & top seals to be constructed from polyethylene with bottom seal from neoprene rubber. Leakage rate shall not exceed 0.05 l/gpm per linear foot of seal against both seating and unseating head. Gate to be controlled with manual operator on top of chamber using pedestal constructed of hot dip galvanized steel with geared hand crank and aluminum stem cover with graduated window for valve position indication. All hardware and fasteners to be Type 316 stainless steel. As manufactured and supplied by Armtec, Fontaine or Rodney Hunt.
- **Sewage air release & vacuum break valve** shall be suitable for air release and vacuum break functions during pipeline filling, pipeline drawing, water column separation, normal operation and surge alleviation. Body to be compact single chamber design of stainless steel and/or epoxy coated construction with all fasteners and hardware in Type 316 stainless

steel. Float, seat and all moving parts to be of Type 316 stainless steel construction. Valve shall incorporate over-pressure safety feature and optional 6mm ports fitted with Type 316 stainless steel ball valves, nipples and caps. As manufactured by Vent-O-Mat - Series RGX.

- **Vent pipes** for both shallow and deep chamber levels of hot dip galvanized steel construction complete with 180 degree gooseneck having a bolted flange arrangement fitted with both bird & insect screens sandwiched between the flanges. Vents shall have min. inside diameter of 100mm for 3000mm diameter chambers and 150mm diameter for 3600mm diameter chambers.
- **Above Ground Free Standing Fixed Davit Bases** are for general purpose use for most applications. These are either attached to concrete or other structural materials such as steel. Review exact socket requirements with Town at time of specification preparation.
- **All fasteners and hardware** including brackets in interior & exterior of pump chamber shall be minimum Type 316 stainless steel construction.
- **All thrust restraint and pipe support brackets** including fasteners shall be of minimum Type 316 stainless steel construction.
- **Levels sensor** shall be of the ultrasonic type. The level transmitter shall be equipped with auxiliary relays (minimum three) configurable to control pumps for drawing down the pumping well in a lead-lag process and automatically alternate pump duty. Level transducer is to be supported from its own cable using a strain relief cord grip and hung within a 150mm diameter PVC standpipe accessible from above the top slab via the equipment hatch or dedicated access cover (so as to avoid having to enter the chamber) all as shown and detailed in the typical sanitary pump station drawings contained herein. As manufactured and supplied by Siemens-Milltronics Multi-Ranger 100 w/XPS-15.
- **Alarm Float Switches** shall be micro tilt switch type Ex approved version with sufficient cable length to reach control panel without splices and complete with Type 316 stainless steel horizontal hanger, stainless steel or PVC strain relief cord grips and Type 316 stainless steel sway and control rings all as manufactured and supplied by Xylem Flygt Canada.

All pumping stations shall be fitted with electrical service entrance & pump control panels and mounted on standalone aluminum channel support system positioned minimum 1500mm from closest edge of pump chamber (to avoid Class 1 Division 1 or 2 hazardous environment classification). Electrical & controls work shall conform to the following requirements and be detailed in the projects construction drawings and specified in the project's specification documents.

Refer also to details in the typical sanitary pump station drawings contained herein for reference and additional requirements.

- Supply & Installation of electrical & control works shall meet the minimum requirements of Ontario electrical safety code.
- Electrical and control works shall be designed and constructed in accordance with approved detailed construction drawings & specifications prepared and sealed by a Professional Electrical Engineer licensed in the Province of Ontario competent in undertaking this type of work. Refer to details in the typical sanitary pump station drawings contained herein for reference and additional requirements.
- Electrical design shall include procurement and coordination of both the power supply from electrical supply authority and telephone lines from Bell Canada.
- Electrical design shall also include provisions (external plug) for connecting a portable/mobile emergency standby generator set in a manner acceptable to the Town of Essex for installations where a permanent emergency standby generator will not be provided.
- Panels shall be fitted with automatic dialer and/or SCADA equipment to relay alarms to the Town's operating authority. Exact requirements are to be reviewed with the Town and their operating authority early in the design stage.
- Service entrance shall be 600 volts, 3 phase, 60 hertz of sufficient capacity to meet pump station requirements. 3 phase power shall be implemented where available and desirable by the Town.
- All current protection must be accomplished thru the use of thermal/ magnetic circuit breakers having sufficient interrupting ratings.
- Each sewage pump to be controlled thru a Hand-Off-Auto selector switch and monitored with an hour meter.
- External alarm light for high-high level float switch with push-to-test lamp push button.
- All electrical & control panels, cabinets, enclosures, boxes, fasteners and all hardware shall be of Type 316 stainless steel construction.
- All pumps and associated wiring from the wet well shall be continuous without splices and terminate to a junction box (with terminal strips) located prior to the EYS fittings in accordance with the Electrical Safety Code. Wet well wiring to continue from the junction box through EYS fittings into the pump control panel.
- All electrical equipment to be manufactured and supplied by Allen Bradley, Siemens, Square D or approved equal. Electrical components shall be in full compliance with the NEMA standards and have a NEMA rating identification (IEC components with NEMA equivalent ratings are not acceptable).

- Minimum 3-pair phone line system to facilitate alarm monitoring system.
- Alarm monitoring system as follows:
 - DSC alarm system and minimum zone requirements and features as follows:
 - Key pad entry and delay of 30 seconds
 - Monitor A/C power failure within 30 second delay on dial out
 - Monitor door security
 - Monitor door entry and closing
 - Monitor high level float (first stage)
 - Monitor high-high level float (second stage)
 - Monitor pump failure for each pump
 - Test signal programmed for 1700 hours daily
 - Entire alarm system to be supplied and wired by Security One Alarm Systems
 - All zones to be monitored 24 hours and programmed to dial out to Security One Alarm Systems
 - Alarms to also be monitored at Denis St. Pierre WPCP thru the plant's existing SCADA system receiving signals from the DSC alarm network. Retain the services of the Town's approved system integrator to program the new alarms into the SCADA system.

During the maintenance period, the Developer will be responsible for all costs incurred by the Town excluding hydro, telephone and Security One monitoring services. Hydro, telephone and Security One monitoring services to be set up through the Town's Infrastructure Services Department for all storm & sanitary pump stations. Should any major repairs to a pump station that is under maintenance be required, the Town will advise the Developer who will be given opportunity to make repairs through their contractor within reasonable time period. Should Developer not carry out repairs within reasonable time period, as determined by Town, then the Town will carry out all required repairs and all costs incurred shall be assessed to and be borne by the Developer.

4.6

Storm Sewers and Stormwater Management

Storm sewers and appurtenances shall be constructed in accordance with the approved contract documents prepared by the Consulting Engineer. The minimum design criteria are noted below:

Table 2: Storm Design Criteria

Design Element	Design Criteria
Design Method	Rational Formula
Standard Return Period	1 in 5 years Storm Event
Rainfall Intensity	$I = a / (t+b)^c$ (Check AES Windsor Airport data for parameters)
Run-off Coefficients	Asphalt, concrete, roof area = 0.95 Gravel = 0.70 Grass – Sandy Soil = 0.15 Grass – Clay Soil = 0.20 Residential Single Family = 0.60 Residential Single Family (lot size under 500m ²) = 0.70 Residential Semi-Detached = 0.70 Residential Townhouse = 0.80 Industrial/Commercial = 0.90
Minimum Velocity for Pipe Flowing Full	0.80 metres per second
Manning's Roughness Coefficient for Storm Sewers	0.013 (Smooth Wall Pipe)
Minimum Cover	1.07 metres
Maximum Manhole Spacing	Less than 900 mm diameter: 120 metres 900 mm diameter or greater: 150 metres
Minimum Manhole Size	1200 mm
Benching	To be in accordance with OPSD 701.021
Minimum Service Connection Size	Single – 150 mm diameter Double connections not permitted All cleanouts require a 150mm metal cap
Pipe Material Main Lines Services	450 mm or less: PVC or Reinforced Concrete Greater than 450 mm: Reinforced Concrete (65-D min.) PVC SDR28
Additional Notes	Other pipe materials will be considered in rural areas if requested in writing at the discretion of the Director of Infrastructure. All services shall include a tee and cleanout at the property line. The cleanout shall not project more than 0.3 m above ground level for inspection. Check valves are required on sump pump discharge lines.

Please note that the parameters indicated in **Table 2** are subject to change in accordance with latest revision of the Windsor/Essex Stormwater Management Standards Manual (found [here](#)).

Class 'B' bedding and cover material shall be Granular 'A', compacted to 98 percent of the Standard Protector Maximum Dry Density, to the dimensions detailed on the Contract Drawings. The bedding should extend minimum 150mm below the sewer pipe to at least 300mm above the pipe.

All new developments shall have their downspouts outlet onto the finished grade of the lot with storm water directed away from the building without impacting adjacent properties. Splash pads should be used to prevent erosion at the downspout outlet. Downspouts should only be connected to the storm sewer system if health and safety is a concern due to slips, trips and/or falls.

The Consulting Engineer shall confirm the availability and location of an appropriate outlet with the Town of Essex and shall complete the final design and obtain a Certificate of Approval from the Ministry of the Environment, Conservation and Parks (MECP) prior to construction. Work on private property shall conform to the ECA.

Design plans submitted must include the following:

- A drainage area plan showing catchment areas (to include design parameters, i.e. area and runoff coefficient).
- Design calculations indicating design flows, slopes, velocities, capacities, pipe sizes, runoff coefficients, etc.
- Profiles should show size, type, strength classification, length, inverts of pipe, location, and rim elevations of maintenance holes, catch basins, etc.
- Details of grading, berms, catch basins or other facilities to handle storm drainage on public reserve parcels. These features are to be incorporated in an overland drainage plan for the subdivision. If a subdivision is being constructed in phases, each phase requires detailed overland flow routes and temporary drainage conditions.

4.6.1 Stormwater Pumping Stations

Stormwater pumping stations shall be designed in accordance with Ministry of Environment, Conservation and Parks (MECP) and the Windsor/Essex Region Stormwater Management guidelines (found [here](#)) and specifications herein.

During the maintenance period, the Developer will be responsible for all costs incurred by the Town of Essex that are associated with the pump station. Hydro, telephone, and Security One monitoring services to be set up through the Town of Essex for all storm and sanitary pump stations.

Should any major repairs to a pump station that is under maintenance be required, the Town of Essex will advise the Developer who will be given the opportunity to make repairs through their contractor within a reasonable time period. Should Developer not carry out repairs within a reasonable time period, as determined by the Town of Essex, then the Town of Essex will carry out all required repairs and all costs incurred shall be assessed to and be borne by the Developer.

4.6.2 Storm Water Management Guidelines

Storm water management facilities shall be constructed in accordance with the approved contract documents as well as the approved Storm Water Management Plan, prepared by the Consulting Engineer and approved by the Town of Essex and the Essex Region Conservation Authority (ERCA). The minimum design criteria are noted below:

- The Storm Water Management Plan shall be prepared to address the specific Municipal, Regional (ERCA) and Provincial (MECP and NDMNRF) requirements to control stormwater quantity and quality.
- In all cases, stormwater quality measures shall be incorporated to address provincial water quality guidelines, including short term measures to control soil erosion during construction of site services. As a minimum standard of quality control, suspended solid removal via settling, filtration or hydrodynamic separation is required. Pre-consultation with ERCA and the Town of Essex is required to identify any specific water quality objectives for the watershed and receiving watercourse(s).
- It is recommended that watershed adopt an allowable release rate based on the hydraulic capacity of the receiver(s). This approach relies upon a hydraulic analysis.
- In the absence of watershed planning studies or drainage plans, pre-consultation with ERCA and the Town of Essex is mandatory to discuss and confirm an appropriate allowable release rate.
- The stormwater management facility shall be designed to current Best Management Practices and subject to the approval of the Town of Essex, MECP and ERCA.
- On-site measures to control stormwater quantity for industrial and commercial developments will be permitted, including temporary parking lots.
- Rooftop storage is not permitted due to a lack of municipal control over the practice. Green roof infrastructure may be acceptable with supporting maintenance agreement and restrictive covenant with owner to prevent alteration to system. However, while green roof infrastructure may be acceptable and even encouraged where appropriate, the available storage capacity of any rooftop system will not be accounted for in the required available storage for any particular site/development since maintenance and prevention of alterations to the system cannot be guaranteed even with agreements in place.

- Where it can be demonstrated that the design outflow from the storage facility will never be impeded by its receiver, then the storage volume requirements can be determined via a hydrodynamic analysis, which considers the varying outflow rate in response to the stage-outflow relationship of the flow control element(s).
- Runoff coefficients must be in accordance with **Table 2** under **Subsection 4.6** of this development manual. To identify the soil type for the subject site, please refer to the Essex Region Conservation Authority Public Interactive Mapping.
- For sites less than 2 hectares, the Modified Rational Method may be accepted. However, the 100-year runoff coefficient must be based on equation 3.3.2.2 in the Windsor/Essex Region Stormwater Management Standards Manual.
- Stormwater infrastructure should be evaluated based on a “stress test” event, which is defined as 150 mm of rainfall. Supporting discussion and rationale for the proposed increase is provided in Section 3.9 of the Windsor/Essex Region Stormwater Management Standards Manual. For rural conditions, use an SCS Type II distribution. For urban conditions, use a Chicago 100-year 24-hour distribution with uniform distribution of the additional 42 mm.
- The lowest opening into a building should be a minimum of 0.3 m above the Regulatory Flood Level or on-site calculated 100-year water storage elevation, whichever is greater. The lowest opening elevation should also consider the “stress test” assessment. Additional floodproofing measures may be warranted based on Building Code requirements and/or site-specific risks and potential for damages. Refer to Section 1.5 of the Windsor/Essex Region Stormwater Management Manual for discussion related to risk.
- Surface ponding on roads and parking lots shall not exceed 0.3 m in depth or less (under 1:100 year storm event conditions). For high traffic roadways, lower depths may be required.
- Side slopes shall be no steeper than 6:1 (horizontal: vertical) within 3.0 m on either side of the normal water level (NWL). Average slope from NWL to top of bank shall be no steeper than 5:1.
- Stormwater ponds shall have backflow prevention for outlets into high risk flooding areas.

For additional information regarding stormwater management requirements, please refer to the Windsor/Essex Region Stormwater Management Standards Manual (found [here](#)).

In regards to SWM facility access, a maintenance pathway around the pond should be provided for cleanout purposes. A minimum setback of 3-5m should be implemented from the property line to the top of bank for equipment access.

The Consulting Engineer shall obtain an ECA from the Ministry of the Environment, Conservation and Parks (MECP) as well as approval from the Essex Region Conservation Authority (ERCA) prior to commencing with construction.

4.6.3 Considerations for Climate Adaptation

The Consulting Engineer should refer to the **Town of Essex Climate Control Adaptation Plan** (Essex CCAP) (found [here](#)) when undertaking stormwater management design for a new development. Some of the main takeaways are as follows:

- **Reducing Overland Flow:** Limit impermeable surfaces as much as possible and utilize more pervious surfaces in landscaping in order to reduce the amount of overland flow.
- **Drainage Issues:** Prescribed buffer strips and xeriscaping should be considered to reduce peak drainage flows.

The following identifies examples for LID stormwater control measures based on land use type, any alternative measures are encouraged for review by The Town of Essex:

Municipal Right-of-Way or Easement

- **Third Pipe Systems:** Consisting of a perforated stormwater exfiltration pipe laid in a granular bedding. This system may be constructed as part of the storm sewer system or as a perimeter French drain in the boulevard. Third pipe-systems are designed for both conveyance and infiltration of stormwater runoff.
- **Bioretention Systems:** A vegetated basin that collects stormwater at the source for infiltration and filtration. Bioretention systems can be covered with landscaped plantings and mulch, or grass (naturalized or sod). Bioretention has an advantage over other practices because it can vary in size, shape and placement. They can be designed to accommodate large volumes of stormwater runoff or designed to treat small drainage areas. Most bioretention systems will require an underdrain and an overflow catch basin connected to the storm sewer.
- **Infiltration Swales or Dry Swales:** Swales may be designed to convey stormwater runoff as part of the minor or major system. In favourable soil conditions, the infiltration swale may be able to retain stormwater runoff at-source whereas the dry swale will result in slower flow rates in comparison to a storm sewer system.

Single Family Residential

Within single family subdivisions, LID features are to be located within the municipal ROW or dedicated municipal easement, where they can be accessed and maintained. These LID features may include permeable pavers, rain gardens/bioretention systems, or rainwater harvesting systems.

- **Rainwater Harvesting System:** This system intercepts, conveys and stores rainfall for future use. The rain that falls upon a catchment surface, such as a roof, is collected and conveyed into a storage tank. For residential uses, rain barrel storage tanks typically range from 190 to 400 litres in size. Rainwater harvesting systems provide the combined benefit of conserving potable water and reducing stormwater runoff. When harvested rainwater is used to irrigate landscaped areas, the water is either evapotranspired by vegetation or infiltrated into the soil, thereby helping to maintain pre-development water balance.

Multi-family, Commercial, and Institutional Sites

Bioretention system, bioswales, rain gardens, green roofs, permeable pavers, rainwater harvesting systems, or any other LID features are encouraged for multi-family, commercial and institutional sites. In large parking lot areas, it is recommended that planters be used as small scale LID units to capture and treat a portion of the parking lot runoff through filtration and infiltration. The infiltration type planter box shall be designed to infiltrate 200 gallons over a 48 hour period.

- **Green Roofs:** A roof of a building that is partially or completely covered with vegetation and growing mediums for plants, trees, shrubs, grasses and flowers planted over a waterproofing membrane. It may also include additional layers such as a root barrier, drainage and irrigation systems.

4.7 Watermains

Design and installation shall be in accordance with the Town of Essex requirements and provincial regulation. A network analysis and transient pressure analysis may be required if requested by the Town of Essex. Watermain and appurtenances shall be constructed in accordance with the approved contract documents prepared by the Consulting Engineer. The Consulting Engineer shall obtain the Fire Chief's approval for Fire Hydrant location. The minimum design criteria are noted below:

Minimum Pipe Size: 150 mm diameter

Minimum Cover: 1.5 metres

Hydrant Spacing: At intersections and spaced at maximum 150 metres

Valve Spacing: At intersections and spaced at maximum 250 metres

Lot Service Connections: Minimum - 19 mm; Maximum - 250 mm

Table 3: Watermain Material Specifications

Specifications	
Watermains	<ul style="list-style-type: none"> PVC DR18, Class 150, AWWA C900-905
Fittings	<ul style="list-style-type: none"> Ductile Iron, cement or epoxy lined, Class 250 or PVC Class 150, DR18, to AWWA C907, certified to CSA B137.2, colour coded blue. All fittings to be M.J. type or push-on type.
Joints	<ul style="list-style-type: none"> Bell and Spigot with rubber rings to SATM D3139. Restrained with mechanical restraint devices.
Fasteners	<ul style="list-style-type: none"> All fasteners to include Duratron sacrificial zinc bolt caps
Denso Corrosion Prevention System	<ul style="list-style-type: none"> Anti-corrosion material consisting of Paste Primer, Mastics and Petrolatum tape that complies with CSA Z-245-30 and is CFIA approved. All materials to be from the same manufacturer to ensure compatibility and optimal performance. Additional coating of Denso Paste must be applied to the outside of the Denso tape installation to provide additional barrier and to facilitate closing of all seams. Denso Corrosion Prevention Systems to be used on all gate valves, all fittings, all restraint systems & fasteners, and all mechanical & flanged joints.
Mechanical Joint Systems	<ul style="list-style-type: none"> T-bolts and nuts, low alloy steel in accordance with ANS/AWWA C11/A21.11 All bolts and nuts on mechanical joint system shall include Protecto caps at every bolt 90 grams, 20mm diameter.
Flanged Joints System	<ul style="list-style-type: none"> Nuts, bolt and washers for all flanged joints shall be Type 304 stainless steel conforming to ASTM A193, Grade B8M, Class 1 and ASTM 194, Grade 8M nuts.
Gate Valves and Boxes	<ul style="list-style-type: none"> AWWA C509, Class 200W Iron body, bronze mounted, modified wedge disc. Non rising stem with O-ring seals. Open by turning counter-clockwise. 50mm square operating nut extended to within 150mm of finished grade with mechanical joint to ANSI A21.11. All valves 100mm or larger to be installed with galvanized operating rod extensions to within 150mm of the top of the valve box. For tapping gate valve or connection to flanged outlets, ends shall be flanged and mechanical joints to ANSI B16.1 and ANSI A21.11 <p><u>Approved Models:</u></p> <ul style="list-style-type: none"> Mueller Canada resilient wedge gate valve. Equivalent resilient wedge gate valve approved by Essex Water Department.

Specifications

Fire Hydrants	<ul style="list-style-type: none"> • Hydrants shall conform to AWWA C502. • Each hydrant shall have 2-65mm hose nozzles and one 117mm pumper nozzle with 'Storz' type pumper outlet configuration. • Drainage holes to be plugged unless otherwise directed by the Water Department. • Anti-tampering devices must be installed on new hydrants until the majority of construction is complete. • Staging for Flow Testing is as follows: <ul style="list-style-type: none"> ○ All new watermain work must be 100% complete including all tie-ins, services, etc. ○ The Contractor shall be responsible for providing a certified and competent contractor to complete flow tests of all newly installed hydrants in accordance with NFPA 291. ○ Flow test results are to be submitted electronically to the Town of Essex for review and approval before painting. ○ Once flow tests have been approved, the contractor shall be responsible for painting all barrels and caps for all newly installed hydrants in accordance to NFPA 291. Colour coding is based on flow test results. (Figure W-4, Fire Hydrant Flow Colour Codes). • The underground ductile iron shall be coated with bitumen or epoxy, and shall be encased with 8 mil thick polyethylene encasement as per AWWA C105. • All hydrants shall have a secondary gate valve to isolate from the system. • All fire hydrants to have reflective placards, supplied by Essex Water Department. <p><u>Approved Models:</u></p> <ul style="list-style-type: none"> • Mueller Century
Restraining devices	<ul style="list-style-type: none"> • Provide thrust restraint on all fittings such as valves, bends, tees, and pipe bells that are liable to draw off or blow off. • Thrust restraints shall be concrete thrust blocks and/or mechanical restraint devices. • All elbows, tees, valves, hydrants to be restrained. • Where mechanical restraint devices are used, the watermain joints shall be restrained at three (3) pipe lengths away from both sides of the joint.
Concrete Thrust Blocks	<ul style="list-style-type: none"> • To OPSD 1103.01, 1103.02 and standard detail in contract drawings for pipe sizes of 350mm diameter and smaller. • Shall conform to OPSS 1350 with a nominal minimum 28 day compressive strength of 20 MPa. • Type 20 Portland cement shall be used in all cases. • A polyethylene bond breaker shall be used against the fitting and all joints and bolts to be protected. • Shall be used in conjunction with the mechanical restraint equipment where required.

Specifications	
	<ul style="list-style-type: none"> The sized and position will vary according to pipe size, fitting type, test pressure, and soil conditions.
Mechanical Thrust Restraint Devices	<ul style="list-style-type: none"> Unflange Series 1500 or Star Series 4000 for PVC pipe at gray/ductile iron fittings and valves 150 to 300 mm diameter. Uniflange Series 1350/1360 or Clow Series 350/360 or Star Series 1200 (as applicable) at PVC fittings 150 to 300 mm diameter. Connect all valves to other appurtenances using 12mm diameter stainless steel threaded rods, washers, and nuts. Fastening hardware on thrust restraining systems shall be either epoxy coated, stainless steel or hot dip galvanized including bolts, rods, washers and nuts.
Tracer Wire and Installation	<ul style="list-style-type: none"> All plastic pipe to include #12 AWG Superflex - 1230 CCS Tracer Wire (Blue) by Copperhead Industries with SnakeBite locking connectors. Insulating mastic tape to be used to wrap connector (Plymoute Bishop 10 polyseal). <i>Installation:</i> Tracer wire shall be laid immediately alongside and at the bottom of the new watermain pipe. Tracer wire must run outside the valve box and inserted through the hole provided at the top of the valve box. A minimum 6 inch lead (tail pipes) must be provided at the end of the valve box/curb for tracing purposes. Tracing wire to be fastened to the curb box with "tape only". Tracer wire at hydrants are to be terminated in an access box as shown in Appendix B, Figure W-16. Care must be taken not to damage the plastic coating. No bare copper wire shall be exposed. The Contractor shall provide protection of the tracer wire at all splices. Contractor shall use jell filled caps when joining tracer wire. "Dryconn waterproof connector" manufactured by King Innovation or similar product approved by the Town of Essex representative. Upon completion of the watermain, the tracer wire will be tested by the Town of Essex and any breaks in continuity must be repaired by the contractor at his expense.
Private Services	<ul style="list-style-type: none"> Copper, Type 'K' Poly must have a tracer wire installed with it from the main to the curbstop, accessible at the service box. Service saddles to be double bolt [s.s] stainless steel. All private service fittings to be lead-free brass, compression type. Curbstops to be non-draining, to AWWA C-800-89.

Specifications

	<ul style="list-style-type: none"> • Excess water service line coiled at property line is not permitted as the goose-neck provides sufficient slack. Water service connections are to be a direct connection to the house with no coiling. • Curbstops to be lead-free brass type • No. 7 service box and rod. Curb box to be arch type with brass pentagon plug, with stainless steel rod and pin. • See Appendix B, Figure W-18, W-19 for meter pit details. • Unless approved by the Town of Essex, all services larger than 25 mm shall have backflow preventative devices installed within the building and must be accessible. • Minimum 19 mm dia.
Installation	<ul style="list-style-type: none"> • All watermain pipes shall be delivered to the work area with end covers at both ends and a tamper evident seal on only the bell end, as required by OPSS 441. • The connection of a new watermain into the existing water distribution infrastructure shall utilize a tapping sleeve, unless otherwise approved by the Manager of Environmental Services, or the designate. • All new mains shall be swabbed using high density foam swabs. • New watermain shall be beeded in sand, with no large or sharp aggregate, from 150 mm below the pipe invert to 150 mm above the pipe crown.
Flushing, Testing, and Disinfection	<ul style="list-style-type: none"> • All service connections to be dry tapped before pressure testing and chlorinating. • See Appendix B for chlorination and testing procedures.
Preparation of Trench and Dewatering	<ul style="list-style-type: none"> • The trench shall be excavated to the alignment and depth prescribed by the Engineer, and shall be refilled at the Contractor's expense with material acceptable to the Engineer, in such a manner as the Town of Essex Representative or designate may direct. • The width of the trench shall meet the requirements of the Occupational Health & Safety Act and be sufficient to permit the pipe to be laid and joined property, and the backfill to be placed and compacted. • The Contractor shall furnish, put in place and maintain such sheeting and bracing as may be required to support the sides and roof of the excavation and to prevent any movement that can in any way injure personnel, pipe or appurtenances, diminish the necessary width of the excavation, or otherwise injure or delay the work or endanger adjacent structures. • If the Town of Essex Representative or designate is of the opinion that at any point inadequate support has been provided, they may order additional supports put in at the expense of the Contractor. Compliance with such order shall not release the Contractor from his responsibility for the adequacy of such supports. • If voids are formed outside the sheeting they shall be immediately filled and rammed with suitable material. If necessary, additional sheeting shall be driven outside the existing sheeting to prevent settlement of the adjacent ground.

Specifications

	<ul style="list-style-type: none"> • Where sheeting and bracing is to be removed, it shall be done so that adjacent facilities and properties are not damaged. All voids left or caused by the withdrawal of sheeting shall be immediately refilled with suitable material and compacted. • Where timber or steel is used in sheeting, bracing or coffer damming has been left in place for the convenience or to serve the interests of the Contractor, the Contractor shall receive no additional payment.
Separation from Stormwater and Sewage Works	<ul style="list-style-type: none"> • Sewers and watermains located parallel to each other shall be constructed in separate trenches, maintaining a clear horizontal separation distance of at least 2.5 m measured from pipe edge to pipe edge. Exceptions are as follows: <ul style="list-style-type: none"> ○ Under unusual conditions, where a significant portion of the construction will be in rock, or where it is anticipated that severe dewatering problems will occur or where congestion with other utilities will prevent a clear horizontal separation of 2.5 metres, a watermain may be laid closer to a sewer, provided that the elevation of the crown of the sewer is at least 0.5 metres below the invert of the watermain. Such separation shall be of in-situ material or compacted backfill. ○ Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to watermain standards of construction and shall be pressure tested, in accordance with Division 701 of the OPSS (Ontario Provincial Standards Specification, published by Ontario Ministry of Transportation) at a pressure of 350 kPa, with no leakage. ○ In rock trenches, facilities should be provided to permit drainage of the trench to minimize the effects of impounding of surface water and/or leakage from sewers in the trench. • Under practicable conditions, watermains shall cross above sewers with sufficient vertical separation to allow for proper bedding and structural support of the watermain and sewer. • When it is not possible for the watermain to cross above the sewer, the watermain passing under a sewer shall be protected by: <ul style="list-style-type: none"> ○ Providing a vertical separation of at least 0.5 metres between the invert of the sewer and the crown of the watermain; sewer and the crown of the watermain ○ Providing adequate structural support for the sewers to prevent excessive deflection of joints and settling, and ○ Ensuring that the length of water pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer. • Alternatively, when adequate vertical separation cannot be achieved with crossings of watermain and sewer, either the watermain or the sewer line should be encased in a watertight carrier pipe which extends 3m (10 ft) on both sides of the crossing, measured perpendicular to the watermain.

Specifications	
	<ul style="list-style-type: none"> No watermain shall pass through or come in contact with any part of a sewer access/maintenance hole, septic tank, tile field, subsoil treatment system or other source of contamination.
Notification to Users	<ul style="list-style-type: none"> Residents or commercial and industrial establishments that will be without water service for any period of time during the progress of the work are to receive at least 24 hours' notice from the Town of Essex. Where work is completed by a contractor, notice is to be provided by the Contractor performing the work.
Connection to Existing Watermain	<ul style="list-style-type: none"> The work shall be to furnish all labour and equipment to connect to existing watermains, saw-cutting of existing mains and abandoning of existing mains (including capping). The Contractor shall also excavate the trenches to the required dimensions; sheet, brace and support the adjoining ground or structures where necessary; and handle all drainage or groundwater. The Contractor shall provide a minimum of two (2) working water pumps at all times for the purpose of removing water from the excavation site. All work related to isolating of existing mains, shutdown of existing water valves will be performed by the Town of Essex Water Services Department. The Contractor shall notify and coordinate this work with the Town of Essex Water Services Department as part of this item. When a watermain tie-in is required, a maximum of one (1) length of watermain pipe will be allowed (at a time) to be disinfected for the purpose of putting the watermain back into service, the same day. This work will be at the discretion of the Town of Essex Water Operator "ONLY". All work completed under this provision, shall be witnessed by the Town of Essex Water Service Department. A minimum of 24 hours notice shall be given by the Developer for scheduling purposes. The Town of Essex must approve the tapping equipment and methods. The Contractor shall note that the supply and installation of all caps and blow-offs required and as detailed on the contractor drawings shall be incidental to this item. In order to properly swab and flush watermains, the Contractor shall install full size blow-offs at the end of new watermains, as indicated on the contract drawings and directed by the Town of Essex Representative or designate. Subsequent to flushing and swabbing, the Contractor shall remove full size blow-offs and install permanent 50 mm diameter blow-offs. Contractor to note that all blow-offs are to be restrained to the last fitting.
Lead-Free Materials	<ul style="list-style-type: none"> All materials that come into contact with potable drinking water shall meet NSF 61 and NSF 372. All brass in contact with potable water will be heavy wall design made no lead material as defined in section 4 of current C800 specification. Treading will be in accordance with latest revisions of AWWA C800 specifications.

Specifications

- Parts not in contact with potable water may be made of other material suited for buried water services as specified in AWWA C800.
- All Ball valve, couplings and adapters will be pressure rated for 300 PSI.
- Ball valves will be supplied with blowout proof stainless steel stems with double SBR or NBR O-ring stem seal.
- Stem and cap assembly will be two-piece design and will withstand minimum 200 ftp of torque.
- Ball seats will be made with unfilled Teflon for resilience and minimal friction.
- Ball will be uncoated lead free cast brass design.
- All waterworks fittings and ball valves will be guaranteed for a minimal 40 years against factory defects.
- All fittings will have a lifetime guaranteed against lead leach ate from the casting.
- All ball valve will be factory tested in the open and closed position.
- Yield Strength, Tensile Strength and percentage of elongation will be similar to 85-5-5-5 (Red Brass).
- No lead fittings will be Cambridge Brass or approved equal.

Design and installation shall be to the satisfaction of the local water and fire departments.

The Consulting Engineer shall obtain a Certificate of Approval from the Ministry of the Environment, Conservation and Parks (MECP) prior to construction. This will include completion of “Form 1 – Record of Watermain Authorized as a Future Alteration”. Work on private property shall conform to the Ontario Building Code.

4.7.1 Water Sampling Station

All new watermain shall be equipped with water sampling stations as detailed in **Appendix B, Figure W-1**. One station will be required for developments up to 100 lots, and an additional sampling station may be required for every additional 100 lots or less. The location of the water sampling stations shall meet the approval of the Manager of Environmental Services and shall be shown on the construction drawings.

4.8 Street Lighting and Power Distribution

4.8.1 Design Criteria

The minimum design criteria for the design of street lighting and power distribution are noted below. All materials shall be compliant with Canadian Standards, as a minimum, and suitable for its intended application. The project Designer shall verify all existing services to the best of their knowledge and coordinate all new lighting, power distribution and communication services to avoid conflicts with other trades.

4.8.2 Submission Requirements for Outdoor Lighting

Every development requires the submission of an Outdoor Lighting Plan, the designer must submit the following information as a minimum for review by the Town of Essex:

- Location of all buildings, structures, property lines, parking, loading and amenity areas.
- Location of all lights, poles and transformer units.
- Mounting height, quantity, orientation and arrangement of all lighting.
- Type of light source.
- Manufacturer's catalogue information and detail of the fixture.
- Illumination levels for all proposed fixtures.
- Calculation summary indicating the minimum value, maximum value, maximum-to-minimum ratio and average-to-minimum ratio.
- Submission should include the project name, designer and date whether on a cover sheet or on the drawings itself.
- Include all external lighting to the site under evaluation where it may be considered to be a relevant contribution to the new site.
- Extend photometric analysis past site property lines to evaluate any horizontal illumination that would contribute to light trespass onto neighbouring properties.
- All other relevant information.

4.8.3 Power Distribution

The power distribution system consisting of the primary and secondary power feeders, transformers and underground infrastructure shall be designed in accordance with the appropriate power supply authority requirements. The Developer is responsible to obtain the approval of the appropriate power supply authority prior to construction.

4.8.4 General Lighting Notes

- Street lighting design shall be based on road and pedestrian classification as defined by the authority having jurisdiction. Classifications may be found within the Illuminating Engineering Society of North America (IESNA) standards for roadway lighting (RP-8-00), and luminaire classification system for outdoor luminaires (TM- 15-11), and/or the Transportation Association of Canada (TAC) guide book. The designer is responsible to review the latest edition of all codes and standards to ensure all lighting levels, intensity and uniformity ratios are achieved.
- Every effort should be made to align street lights with side lot lines between parcels. Designer shall follow the Town of Essex cross section details.
- Electrical ground grid or rods to be installed as per all applicable local codes, regulations and/or standards.

- Distribution patterns may vary depending on the design application. Other distribution patterns may be accepted upon review of a complete photometric drawing submission to the Town of Essex provided by the Designer.
- It is the Designer's responsibility to ensure the appropriate pole height, class and diameter are specified in order to suit the application and maintain the lighting levels as recommended by standards noted in note 1. If changes to the specified poles noted above are required, the Designer shall contact the Town of Essex with the Designer's recommendations to be approved prior to implementation.
- All new subdivisions and/or roadways shall be designed with LED lighting. Where new phases are constructed off existing subdivisions and/or roadways, contact the Town of Essex for direction.
- The Developer is responsible for the illumination of all newly created intersections.
- The joint IESNA (Illuminating Engineering Society North America) and IDA (International Dark Sky Association) societies MLO (Model Lighting Ordinance) BUG system (Backlight-Uplight-Glare) was implemented to provide a more accurate and consistent rating system for light fixtures that will provide enhanced control with glare and light trespass and will reduce overall light pollution than the conventional full, semi and non "cutoff" rating system. The BUG system was released as an IES Technical Memorandum TM-15. The BUG rating system employs zones of intended use and evaluates the desired light fixture by % of total lumens at various angles in specified defined quadrants that represent backlight, uplight and glare.
- The Designer will attempt to implement fixtures that will be rated in accordance with the joint IDA and IES lighting design guideline to minimize light pollution and to better evaluate the proposed light fixture, utilizing fixtures that are compliant with the ratings of the zone intended for use.

4.8.5 Streetlight Materials

Street Lighting Luminaires – Light Emitting Diode (LED)

- Standard (Refer to **Figure E-1** in **Appendix B**)
 - Cobrahead style, small body with 12, 24 or 36 LEDs or medium body with 48, 60 or 72 LEDs as required providing adequate illumination, Type II Max throw, distribution, with glass lens. The luminaire driver current will be based upon the design fixture selected, with a 4000K colour temperature complete with NEMA or 7-pin photocell receptacle and control. Assembly to come with 120V driver or otherwise to suit site conditions. Colour to match the pole noted below. LED Roadway Lighting, "RoadFocus" by Signify.
 - Cobrahead Style, small body with 12, 24, or 36 LEDs as required providing adequate illumination, ANZ high distribution, with glass lens. The luminaire driver current will be based upon the design fixture selected, with a 4000K colour temperature for residential/minor collector and industrial cul-de-sacs (as defined in RP-8, latest revision),

complete with NEMA or 7-pin photocell receptacle and control. Assembly to come with 120V driver or otherwise to suit its site conditions. Colour of the luminaire to match the pole noted below. LED Roadway Lighting, “NXT” series luminaire. Catalogue number NXT-xxS-0-7-4AH.

- **Decorative – Glass Option (Refer to Figures E-2 and E-3 in Appendix B)**
 - Acorn style, 100W (525 mA) solid state LED source or as otherwise required to provide adequate illumination, with clear prismatic glass refractor, Type III asymmetric distribution, 4000 K colour temperature, standard finial, shorewood style cover and NEMA twistlock receptacle and DTL twistlock photocell control. Modern style swing open housing. Assembly to come with auto-sensin 120 V driver or otherwise to suit site conditions. Colour to match the pole noted below. Holophane, Grandville Classic Utility “Postlite LED” luminaire. Catalogue number GVD3-P50-40K.

Poles

- **Standard (Refer to Figures E-4 in Appendix B)**
 - Class A (light duty), spun concrete, round symmetrically tapered shaft, direct buried style, mould finish, suitable for a standard elliptical arm. Overall pole length shall be 30’-0”. Stresscrete catalogue number E-300-APR-G-MOO.
 - Class A (light duty), spun concrete, round symmetrically tapered shaft, direct buried style, etched Eclipse finish, suitable for a standard elliptical arm. Overall pole length shall be 30’-0”. Stresscrete catalogue number E-300-APR-G-E11.
- **Decorative (Refer to Figures E-4 in Appendix B)**
 - Class A (light duty), prestressed concrete, octagonal symmetrically straight shaft with flared base, direct buried style, polished “Midnight Lace” finish complete with a 35” outside diameter tenon and 40” height. Pole length above finished grade shall be 18’-0”. Stresscrete catalogue number KBH18-E10-DB-140-35/40.
 - Class A (light duty), prestressed concrete, octagonal symmetrically straight shaft with flared base, direct buried style, polished “Eclipse Black” finish complete with a 35” pitsode diameter tenon and 40” height. Pole length above finished grade shall be 18’-0”. Stresscrete catalogue number KBH18-E11-DB-140-35/40.

Arms

- **Standard (Refer to Figures E-5 in Appendix B)**
 - Side mounted tapered elliptical aluminum arm. Overall arm length shall be 4’-0” or as otherwise required to suit the application, and approved by the Town of Essex.

4.8.6 Light Intensity Standards

- The following Principles are to be adopted for the lighting of private and public lands, subject to Site Plan approval, in the Town of Essex:

- Contribute to personal safety
 - Support the supervision of secure areas
 - Assist in way finding
 - Conserve energy
 - Preserve the experience of the night sky
 - Respect the privacy of residential space
 - Respect animal habitat
 - Heighten the enjoyment of public space and night time activity
 - Apply the above listed guiding principles consistently
- To insure the provisions of adequate and safe, full cut off lighting levels, bonding for the provision of on-site lighting may be required as a condition of site plan approvals.
 - Lighting plans and photometric data including IES format files (as required) must be prepared, and all lighting be installed and maintained by the Developer, in accordance with lighting plans, to their best ability (for all development sites of 2300 m² building lot, or greater) which will be approved and enforced by the Town of Essex.
 - The Sign By-law 1350 (as amended), shall be reviewed with regards to externally lit billboards and electronic changing copy signs and their impact on the night sky and traffic safety.
 - The lighting requirements for public right-of-ways and other publicly owned lands will be reported by the Town of Essex Administration to Council on every application.

All Site Plan applications, in their review and approval, shall be consistent with the Guiding Principles in Recommendation and implement as required the techniques included in “Techniques to Implement Lighting Guiding Principles”, **Section 4.8.7** below.

4.8.7 Techniques to Implement Lighting Guiding Principles

- Contribute to personal safety
 - Provide minimum illumination in accordance with Table 1: Illumination Requirement
 - Locate lamps so as to avoid glare
 - Provide additional shielding of lamp fixtures to avoid glare
 - Provide uniform lighting without sudden light to dark transitions
 - Provide overlap of light distribution
 - Provide illumination to articulate steps
 - Coordinate spacing and height of lamps with landscaping to ensure lighting coverage is not interrupted
- Support the supervision of secure areas
 - Provide illumination in accordance with Table 7: Illumination Requirements

- Provide good colour rendering for identification purposes using acceptable street lighting standards outline in Section 6
- Provide sufficient lighting coverage including building recesses or inside corners
- Assist in finding way
 - Provide illumination to improve legibility of notes, landmarks and circulation areas
 - Align lamps in consistent, recognizable and unambiguous patterns
 - Provide a uniform and modest brightness along paths of travel
- Conserve energy
 - Maintain light levels within recommended range set out in Table 1: Illumination Requirements
 - Employ alternatives to best conserve energy
 - Dim down lighting to minimum levels after normal operating hours (where required/ requested)
- Preserve the experience of the night sky
 - Light pollution is considered undesirable and many feel that it reduces the enjoyment of night sky.
 - Provide full cut-off lighting (zero percent of peak intensity radiating above 90 degrees and 10 percent of peak intensity above 80 degrees) or employ low cut-off where full cut-off lighting alternatives are not feasible, as approved by the Town of Essex. As LED fixtures can't be fully evaluated in terms of full, semi-cutoff or non-cutoff terms, and as the movement towards anti-light pollution increases, a new system has been implemented jointly by IESNA and IDA to evaluate luminaires. The MLO (Model Lighting Ordinance) uses the BUG (note 8) rating of the fixture shall be in compliance with TM-15, issued by IESNA and IDA.
 - For all area lighting, luminaries should be equipped with devices for re-directing light such as shields, visors or hoods.
 - Beacon lights are strongly discouraged unless the application requires such lighting, and as approved by the Town of Essex.
- Respect the privacy of residential space
 - Locate lamps to direct light away from neighbouring properties
 - Provide supplementary shielding of lamps to direct light away from neighbouring properties
 - Provide lamp fixture mounting heights that avoid glare to the vantage point of neighbouring residential units
 - Provide recessed light fixtures that avoid glare to the vantage point of neighbouring residential units
- Respect animal habitat

- Direct illumination away from abutting Municipal Parks and naturalized areas on abutting private lands
- Heighten the enjoyment of public space and night time activity
 - Provide minimum illumination to encourage night time use
 - Minimize glare using shielding of fully recessed light fixtures, as required
 - Reveal the salient features of a site using a combination of diffused and spot lighting
- Apply the above listed standards consistently
 - Provide photometric plans and lamp specifications for use by Municipal staff in the review of site plan applications and for inclusion in site plan development approval agreements

Illuminance determines the amount of light incident on a surface, measured in lux or footcandles. Illuminance levels provide an effective method of measuring the performance of a lighting design therefore Designers shall use the Illuminance method for their analysis.

Illuminance uniformity is measured by the ratios Maximum to Minimum and Average to Minimum. These ratios provide a measure of the consistency of lighting across a site and provide assurance that the illuminance is within a range that the human eye can properly discern all objects in its field of view.

The following chart indicates the required illuminance levels for various types of facility’s or usages.

Table 4: Illuminance Requirements

Uses	Horizontal Illumination (footcandles)		Vertical Illumination (footcandles)	
	Min.	Max.	Min.	Max.
Uncovered Parking Area	0.5	4.0	0.5	4.0
Covered Parking Area	2.0	10.0	5	25.0
Covered Outdoor Area	0.5	10.0	5	25.0
Walkway	0.5	2.0	0.5	5.0
Principle Building Entrance	3.5	8.0	3.5	8.0
Loading and Garage Storage Area	1.0	2.0	5.0	25.0
Covered Gas Pumping Area	5.0	25.0	5.0	50.0
Outdoor Active Recreation Facility Values vary per recreational activity and shall be verified with IESNA standards (latest edition)	1.0	150.0	1.0	150.0
Auto Dealership Display	1.0	8.0	1.0	8.0

Uses	Horizontal Illumination (footcandles)		Vertical Illumination (footcandles)	
	Min.	Max.	Min.	Max.
Outdoor Storage Yard	1.0	2.5	1.0	2.5
All Non-residential uses at normal non-business hours (11:00 pm to 5:00 am) and when employees other than security personnel are not present	0.5	2.0	0.5	2.0
All other uses	0.5	2.0	0.5	10.0

None of the minimums noted above apply to adjacent property lines.

Illumination levels at all property lines shall be as close to 0.0 foot-candles as possible to respect private properties surrounding the area.

Fully shielded is assumed in all references.

Luminaires will be full cut-off unless otherwise provided with IESNA BUG rating.

4.8.8 Other Services

Other services such as, but not limited to, voice, data, and television shall be coordinated by the Designer unless otherwise advised. These services and associated conduit routing shall be clearly identified in road crossings, on cross-sections, etc.

4.9 Backfill and Compaction

Trench backfill and compaction shall generally be in conformance with the minimum requirements outlined in the OPSDs for Trench Backfill Details, as well as the Excess Soil Regulations (O-Reg 406.19). For all open cut trenches within the roadway, approved granular shall be used. Granular trench backfill should be brought up 50 mm to 100 mm above subgrade. This process is to ensure that during road cut operations, granular trenches are fully exposed in the subgrade. Based on site specific soil conditions, geotechnical recommendations for alternative degrees of native backfill compaction should be confirmed by a qualified geotechnical engineer. Recycled materials are acceptable, provided they meet provincial requirements.

The following OPSDs should be referenced as required: OPSD 802.010, 802.013, 802.014, 802.020, 802.023, 802.024, 802.030, 802.031, 802.032, 802.033, 802.034, 802.050, 802.051, 802.052, 802.053 and 802.054.

4.10 Restoration and Landscaping

Restoration of all boulevard areas disturbed as a result of the construction of site services shall be completed to match the existing conditions or 100 mm topsoil and nursery sod for maintained lawn areas. Restoration of all boulevard areas disturbed as a result of the construction of site services shall be completed to match the existing conditions, but not less than 100 mm topsoil and hydroseed or mulch for maintained lawn areas.

The Developer must have a landscape plan prepared by a professional landscaping firm and it is to be reviewed and approved by the Town of Essex (if determined to be required during pre-consult meeting). The following guidelines should be considered by the landscape firm in the landscape design for median/ boulevard areas:

- The plan should be designed with low maintenance features in mind.
- The plan should strive to provide environmental benefits for the community.
- The plan should have tree and plant species that are native, diverse, disease resistant, and have high climate adaptability.
- The plan should create a more aesthetically pleasing environment.
- The plan should include additional features such as trees, shrubbery, landscape stone or mulch, decorative rocks, and other pleasing features.
- The plan should enhance a sense of personal safety and reduce the opportunity of crime by facilitating the unobstructed observation of public spaces and areas (Crime Prevention through Environmental Design).

The general principles of CPTED are outlined below:

Natural Surveillance: Criminals do not want to be seen. Barriers like shrubs, clutter, or shadows can impair visibility/view corridors. The correct placement of these barriers prevents loss of natural surveillance/self-policing.

Territoriality: Owners tend to protect their space through visible border definition. Fences, pavement treatments, and art murals are some ways of expressing ownership. Identifying intruders and law breakers is easier in well-defined spaces.

Access Control: Properly located entrances, exits, fencing, and lighting can discourage criminal behaviour. It may be a tasteful, well placed sign, or a parking lot with highly visible pavement markings.

Target Hardening: Use motion-activated flood lighting in the “back” of public areas.

Activity Management: Encouraging legitimate activity in public spaces discourages crime. Increase the sense of natural surveillance and sense of ownership.

Behaviour Engineering: Changes in the placement and arrangement of physical attributes influences behaviour; essentially “Architectural Risk Management.”

The Developer will also make an effort to salvage any existing landscaping located within the public right-of-way and in the interest of public relations, wherever practical offer to transplant and/or replace plantings to the abutting owners.

4.11 Recycled Materials

Only recycled material approved by the Province and the Town of Essex may be used. Developers shall contact the Town of Essex for the current list of approved material.

The Town of Essex reserves the right to request engineering and environmental reports on the acceptability of the recycled material for specific intended uses at the Developer's expense.

4.12 Other Utilities

The Consulting Engineer will be responsible to coordinate the efforts of other public utilities as a result of conflicts with proposed services and/or upgrading to accommodate the new development. Other utilities include hydro, gas, bell, cable and Canada Post Services.

5.0 Construction Specifications Package for Tendering

5.1 General

The Consulting Engineer shall make reference to the latest Ontario Provincial Standard Specifications (OPSS) and Municipal Specifications in the Contract Documents for construction of site services, including any amendments and extension outlined herein. In case of a conflict between OPSS and Municipal Specifications, Municipal Specifications shall govern.

The Consulting Engineer shall also incorporate climate considerations and remove any procurement policy barrier that would exclude consideration of climate change impacts in the design of new community infrastructure.

5.2 Ontario Provincial Standards Specification

There are currently no amendments or extensions to the OPSS.

5.3 Municipal Specifications

Municipal specifications are included in this document, as well as **Appendix B** (Drawings and Details)

6.0 Design Drawings

6.1 General

All development documents shall include design and servicing drawings. The Applicant shall ensure that pre-consultation takes place with the Infrastructure Services Department prior to the preparation of any design drawings.

Drawings shall be prepared in accordance with **Appendix E** - "Guidelines, Professional Engineers Providing Land Development/Redevelopment Engineering Services, 1994".

In general, the drawings shall be on "C" size paper (550 mm x 850 mm), shall be signed and sealed by a Professional Engineer licensed in Ontario, and shall include the following:

- Benchmark Location and Description (referred to geodetic elevations), with reference to the coordinate system used
- Key Plan
- Legend and Index
- Existing Conditions and Removals
- Road Alignment, Road Elevations, Pavement Widths
- Plan and Profile Sheets (showing road grades, sewer grades, watermain grades, manhole locations, sizes, and materials)
- Storm and sanitary sewer design sheets
- Utility Cross Sections
- Grading Plans (including lot grading)
- Power Distribution and Road Lighting Plans
- Miscellaneous Details (including bedding and backfill)
- Stormwater Flow Details
- Stormwater Retention Pond Details (size, landscaping)
- Landscaping Plans (stamped by a registered Landscaping Architect)

The drawings shall refer to Ontario Provincial Standard Drawings wherever applicable, except as amended or extended by the Town Essex requirements.

The Consulting Engineer shall complete contract drawings for site services in metric units and in electronic format for review by the Town of Essex. Drawings shall generally include the level of design detail outlined in **Section 4.0**, as required.

All geographic data must be submitted in a standard real-world coordinate system. The preferred projected coordinate system is NAD83 (CSRS) UTM Zone 17N. If another system is used it must be documented.

6.2 Electronic Drawing Requirements

The following are minimum requirements for the submission of electronic drawing files to the Municipality.

6.2.1 AutoCAD Version

Drawing files should be submitted in **AutoCAD 2018** or a more recent version.

6.2.2 Lettering Sizes

Minimum size for existing features should be L60.

Minimum size for new construction features should be L80 with L100 used for notes.

Where non-standard text fonts are used, these font files must be provided with the drawings.

6.2.3 Pen Weight

The following table lists suggested pen sizes from the PSPC National CADD Standard, Ontario Region:

Table 5: Pen Sizes

Pen No.	Line Width	% Intensity	Printed Colour
1 (Red)	0.25	100%	Black
2 (Yellow)	0.18	100%	Black
3 (Green)	0.35	100%	Black
4 (Cyan)	0.25	100%	Black
5 (Blue)	0.06	100%	Black
6 (Magenta)	0.35	100%	Black
7 (White)	0.35	100%	Black
8 (Gray)	0.18	100%	Black
9	0.18	100%	Black
10	0.18	100%	Black
11	0.25	100%	Black
12	0.25	100%	Black
13	0.06	100%	Black
14	0.6	100%	Black
15	0.7	100%	Black
16	0.25	100%	251 (Medium-dark gray)
17	0.35	100%	251 (Medium-dark gray)
18	0.5	100%	251 (Medium-dark gray)

Pen No.	Lind Width	% Intensity	Printed Colour
19	0.7	100%	251 (Medium-dark gray)
20	0.25	100%	Pen colour
21-24	0.25	100%	Pen colour
25	0.18	100%	Black
26-29	0.25	100%	Pen colour
30	0.5	100%	Black
40	0.25	100%	Pen colour
80	0.25	100%	Pen colour
100	0.25	100%	253 (Gray)
101	0.35	100%	253 (Gray)
102	0.5	100%	253 (Gray)
103	0.7	100%	253 (Gray)
104	0.25	100%	250 (Dark gray)
105	0.35	100%	250 (Dark gray)
106	0.5	100%	250 (Dark gray)
107	0.7	100%	250 (Dark gray)
108-109	0.25	100%	Pen colour
110	0.12	100%	Black
111-149	0.25	100%	Pen colour
150	0.06	100%	Object colour
151-210	0.25	100%	Pen colour
211	1	100%	Black
212	1.5	100%	Black
213	2	100%	Black
214-255	0.25	100%	Pen colour

6.2.4 Layers

In general, all different object types should be on separate layers. Nothing shall be drawn on layer 0.

The following is a suggested layering method:

- Property lines, right-of-way lines, SIB's, IB's, etc., should be on their own layers (eg. Right-of-Way lines should be on layers PL, SIB's and IB's should be on layer SIB).

- Existing features and utilities should be on layers with prefix X so that they may be manipulated easily (eg. Existing Bell should be on layer XBELL and existing edge of pavement should be on layerXEP).
- New utilities should be on layers with the prefix U (new sanitary sewer on USAN, new storm sewer on USTORM, etc.).
- New road features (ditches, edge of pavement, sidewalks, etc.) should be on layers with the prefix RN (RNDITCH, RNEP, RNWS).
- All profile layers should have the prefix P.

6.2.5 Multiple Drawings

Where multiple drawings are used to develop a final drawing, all individual drawings should be coordinated about insertion point 0,0,0 and, where possible, be coordinated in the World Coordinate System.

Individual drawings should be inserted intact on layer O and not need to be scaled, rotated or manipulated in any way.

When the size of drawings dictates, hatch should be done on separate drawings using the same layering method as stated above.

6.2.6 Elevation Data

Features which contain a third dimension or elevation data (z value) must have the elevation value within the attribute data. Elevation data submitted in CAD format must be part of the feature.

6.2.7 File Transfer

Large drawings (larger than 10MB) should be transferred as multiple disk zip files using Winzip or Pkzip. Older compression programs should not be used.

If you wish to use other compression programs than those mentioned above, please confirm that the Town of Essex has access to this program.

6.3 Documentation

A list of all files being submitted is required.

CAD data shall include metadata for each layer including within the file. This documentation will provide information on the source of the data, feature type (point, line, polygon, etc.), source date and a general description of what is shown on the layer(s). It should be clearly defined, the period for which the drawings are relative (Construction drawings, As-built Drawings, etc.).

GIS data submissions must include all items from b. above as well as metadata for each of the featured geographic data attributes. This will include a complete description of each attributes definition as well as a description of what each of the attribute values mean for each field.

Methods used for data collection and the horizontal and vertical accuracy should be documented and submitted for all data deliverables.

6.4 Drawing Accuracy

All line and arc segments in the digital drawing file must be drawn to legal survey accuracy and must mathematically close to form the perimeter of each lot or block. All files are to be projected to the North American Datum 1983 (NAD 83) Geographic Coordinate System.

The distances and bearings of each line and arc segment in the digital file must coincide with the distances and bearings of each line segment on the hard copy plan of subdivision registered at the Land Titles office.

It is acknowledged that it is not possible to mathematically close each lot or block on the digital plan of subdivision using the distances and bearings of each line and arc segment described on the hard copy plan of subdivision.

It is acceptable to round off the units and angles in the digital plan of subdivision in order for the distances and bearings of each line and arc segment to coincide with the distances and bearings on the hard copy plan of subdivision.

6.5 Ontario Provincial Standard Drawings (OPSD)

The latest OPSD shall be referenced as part of the contract documents and shall include any amendments or extensions as outlined herein. In case of a conflict between OPSD and Municipal Standard Drawings (MSD), the MSD shall govern. There are currently no amendments or extension to the OPSD.

6.6 Municipal Standard Drawings

The current Municipal Standard Drawings are included in the **Appendix B**.

7.0 Miscellaneous

7.1 Signs and Pavement Markings

The Developer will be responsible for the installation of all new regulatory, warning and street name signing in accordance with the Manual of Uniform Traffic Control Devices. The Developer shall pay for all required signs including “no parking” signs. The Developer must provide the Town of Essex with a pavement marking and sign layout plan during the design phase. This plan must include locations of all signs to be used.

The Developer shall be responsible to maintain all existing roadway signing as well as temporary signing required as a result of the construction. No existing signs are to be removed or covered without the written approval from the Town of Essex.

The following pavements markings shall be provided by the Developer within five days of asphalt placement:

- Stop Bars
- Yellow centreline marking to a 30 m distances from stop bars on local roads
- Yellow centreline marking continuous on all collector roads
- Crosswalk marking, where specified in the Development Agreement
- Auxiliary lane markings including arrows, where specified in the Development Agreement

Temporary pavement markings on the base course and surface course of asphalt shall be organic solvent-based paint including reflectorizing glass beads in accordance with OPSS 1712 and 1750.

Permanent pavement markings on the surface course of asphalt shall be field reacted polymeric pavement marking materials in accordance with OPSS 1714, such as Lafrentz "System 400" or approved equivalent (Flint Coatings) having a minimum marking thickness of 2.0 mm.

Permanent Pavement markings design to be delivered to Town of Essex Infrastructure Department for review with the design and servicing drawings.

7.2 Barriers and Guide Rails

Dead end barriers shall be constructed at all temporary cul-de-sac and/or ends of roadways, which are to be extended in subsequent phases.

7.3 Community Mailboxes

Community Mail Boxes (CMB) must be coordinated with Canada Post and approved by the Town of Essex. They must be built on a concrete pad 150 mm thick (150 mm Granular A Base).

The concrete pad will be installed by the Developer and will vary according to the size of the super mail box. If possible, CMBs should be built adjacent to sidewalks and with a car bay for easy access. All mailboxes shall be the CMB style and shall be lagged to the concrete pad with bolts. The location of these CMBs must be established prior to the issuance of building permits.

7.4 Tree Planting

The number of trees required for the development is, as follows:

- Single Family Residential: 1 - 60 mm calliper tree required per lot
- Semi-detached Residential: 1 - 60 mm calliper tree required for each unit
- Townhouse Units: 3 - 60 mm calliper trees required per 4 units
- Industrial Lots: 3 - 60mm caliper trees per lot

The Town of Essex will determine the species of the trees, and the trees shall be planted to Town of Essex specifications in the public right-of-way in front of each newly developed lot.

7.5 Extra Conduit for Future Use

The Town of Essex will require an extra conduit at joint use trenches and road crossings to be installed in the same trench as the hydro, Bell and cable for future use. The minimum size of the conduit shall be 100 mm and the conduit shall consist of PVC material within road crossings and joint use trenches. Coordination of all utilities shall be done prior to construction.

8.0 Agencies, Approvals, and Notifications

Table 6: Agencies, Approvals, and Notifications

Plan / Permit / Required Study/Notification	Proponent / Approval Agency
Draft Plan of Subdivision	Town of Essex, County of Essex Planning Department
Final Plan of Subdivision	Town of Essex, County of Essex Planning Department
Stormwater Management	Town of Essex, MECP, ERCA
Storm and Sanitary Sewer	Town of Essex & MECP
Watermains	Town of Essex & MECP
Road Connections and Setbacks	Town of Essex
Shorelines, Fill and Flood lines	Essex Region Conservation Authority (ERCA), Ministry of Natural Resources, and Department of Fisheries and Oceans
Fish Habitat	Federal, Administered by DFO
Provincial Road Connections and Setbacks	Provincial, MTO
Development in Close Proximity to Railways	Consultation with governing Railway Companies
Notification	Town of Essex Fire & EMS (Ambulance)
Notification	Canadian Coast Guard (re: Navigable Waters)
Notification	Ministry of Transportation (re: Provincial roads)
Notification	Essex Police Department
Notification	School Boards
Notification	Transportation Services
Notification	Ministry of Labour
Notification	Sewage / Water Treatment Plant Operating Authorities
Notification	County Engineer (re County roads)
Coordination / Consultation	ELK Energy
Coordination / Consultation	Hydro One
Coordination / Consultation	Union Water
Coordination / Consultation	Ontario Clean Water Agency
Coordination / Consultation	Essex Powerlines
Coordination / Consultation	Enbridge Gas Inc.

Plan / Permit / Required Study/Notification	Proponent / Approval Agency
Coordination / Consultation	Cogeco Cable
Coordination / Consultation	Bell Canada
Duty to Consult	First Nations / Ministry of Indigenous Affairs
Municipal Drainage	Town of Essex, ERCA

Appendix A

Process Flow Charts

PROCESS FLOW CHARTS – Table of Contents

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CONSTRUCTION DRAWING APPROVAL 9

ACCEPTANCE AND ASSUMPTION OF SERVICES 10

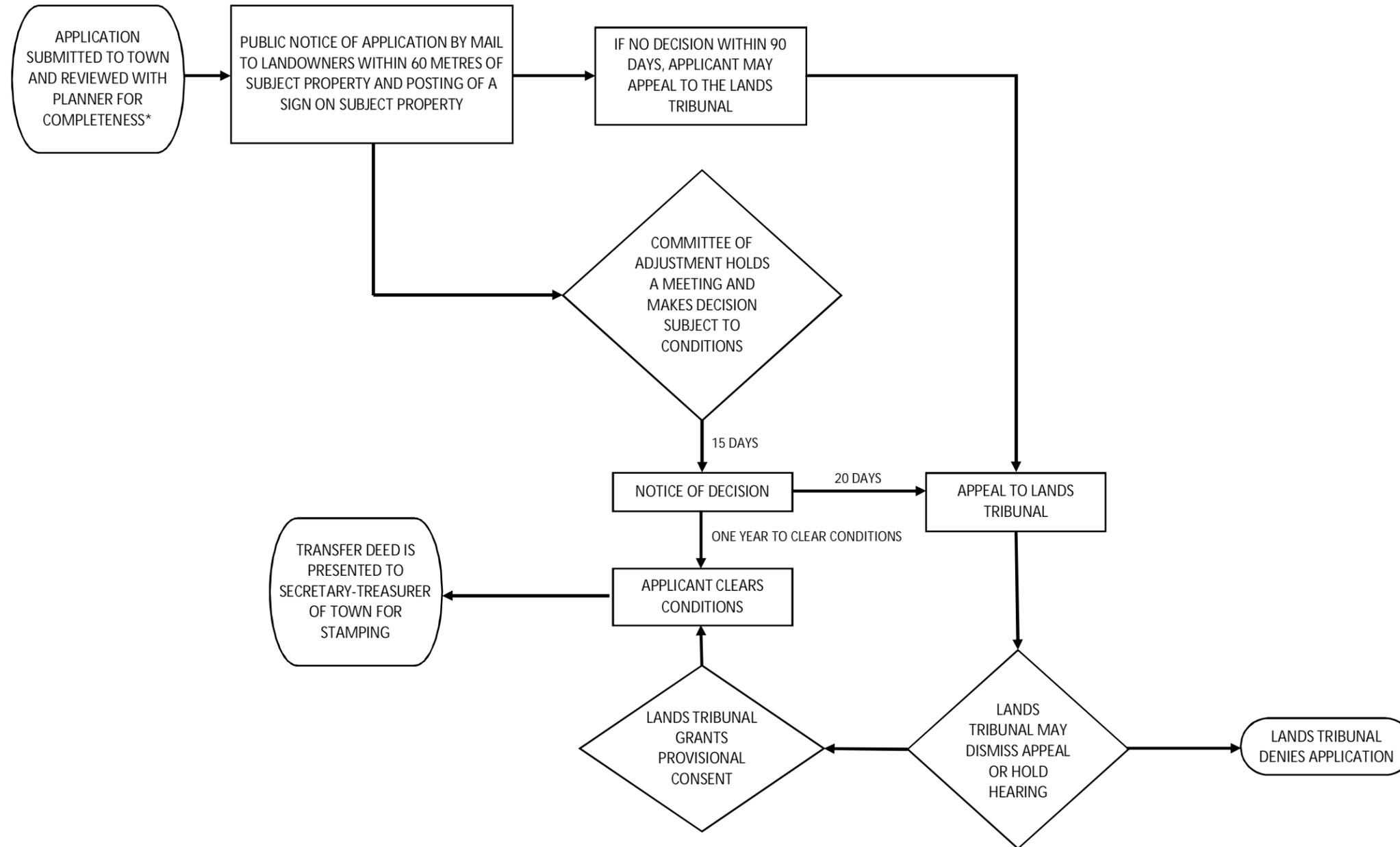
REMOVAL OF HOLDING (H) SYMBOL 11

PART LOT CONTROL EXEMPTION 12

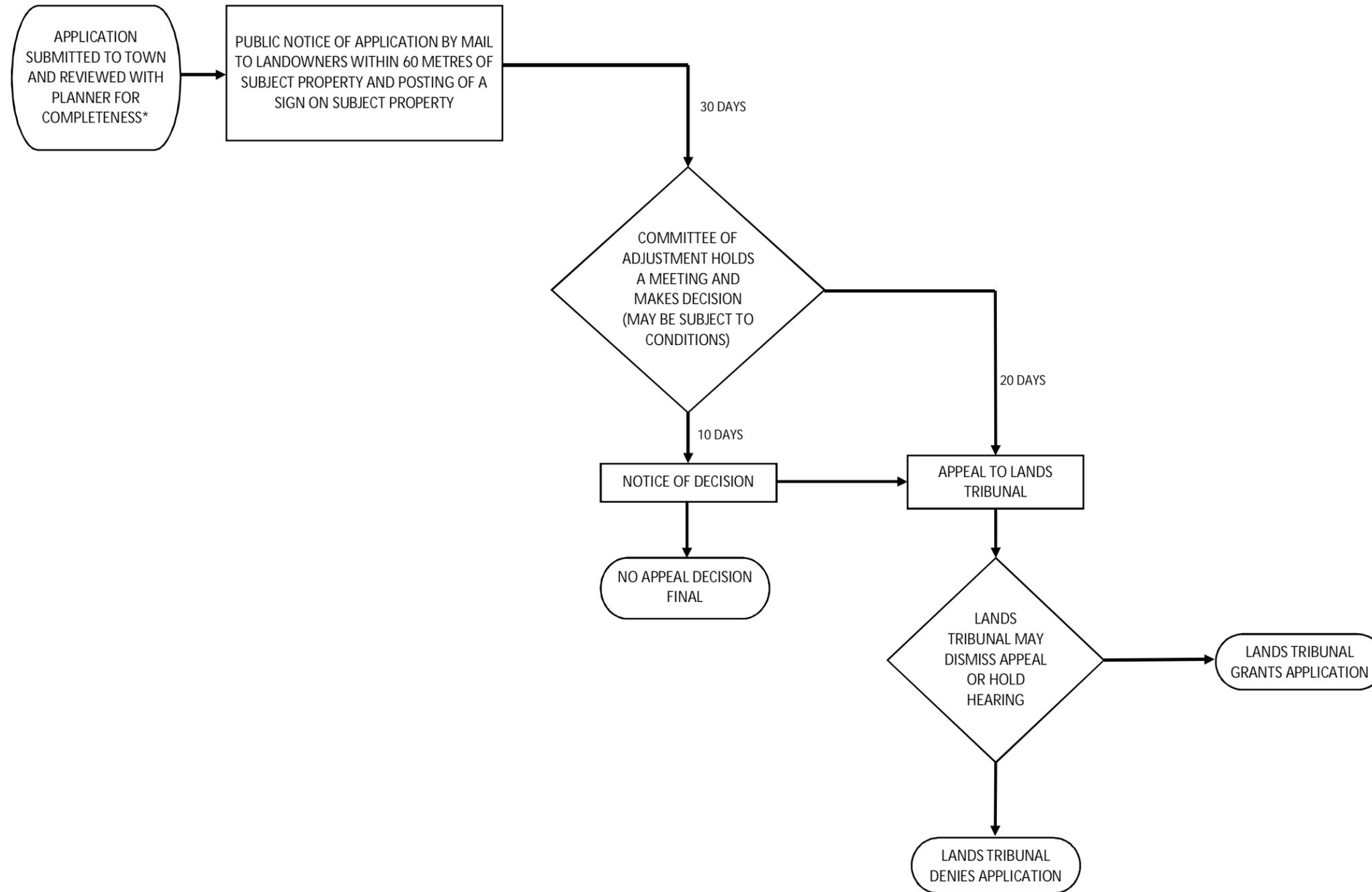
Acronyms 13

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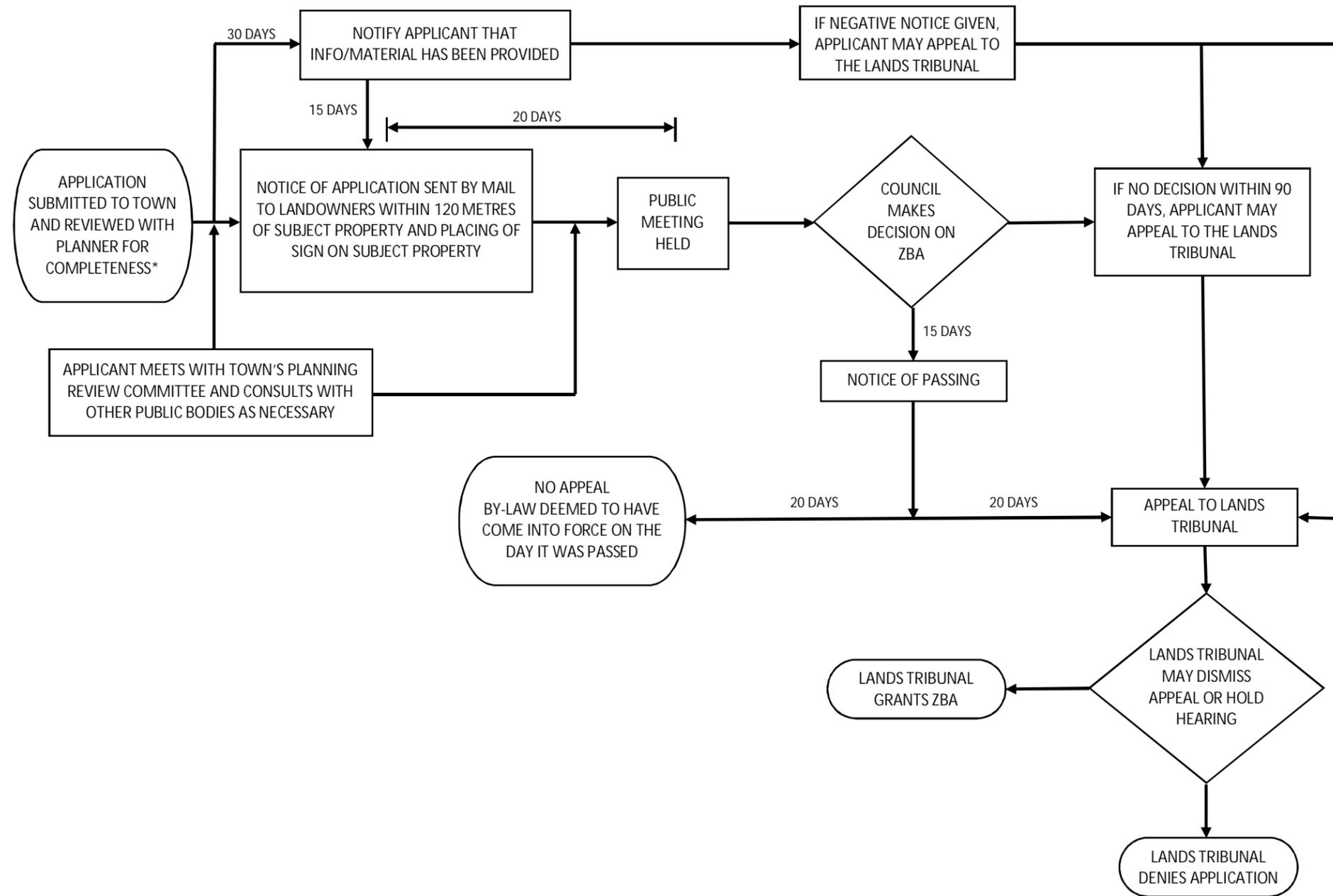
CONSENT TO SEVER



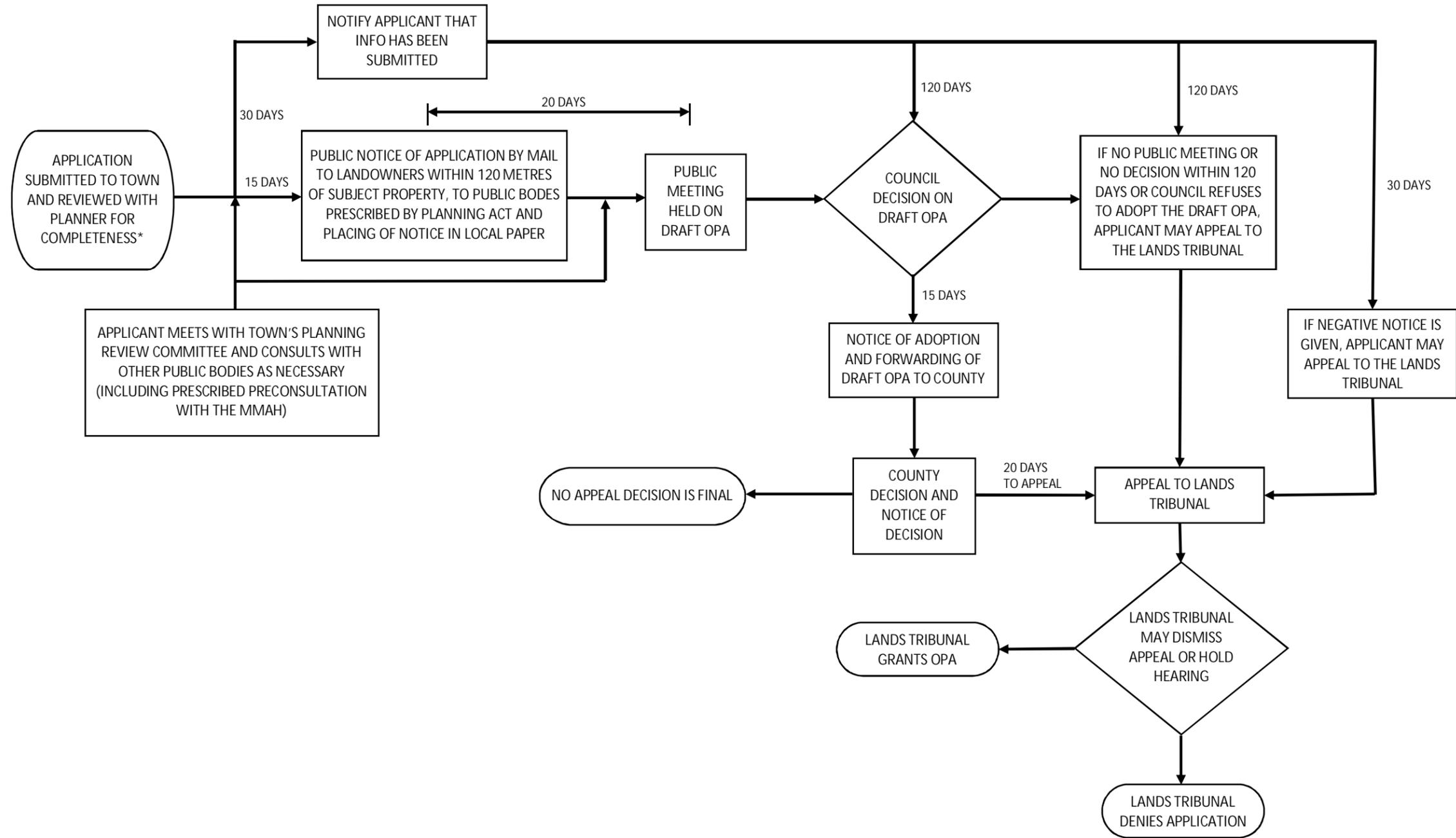
MINOR VARIANCE



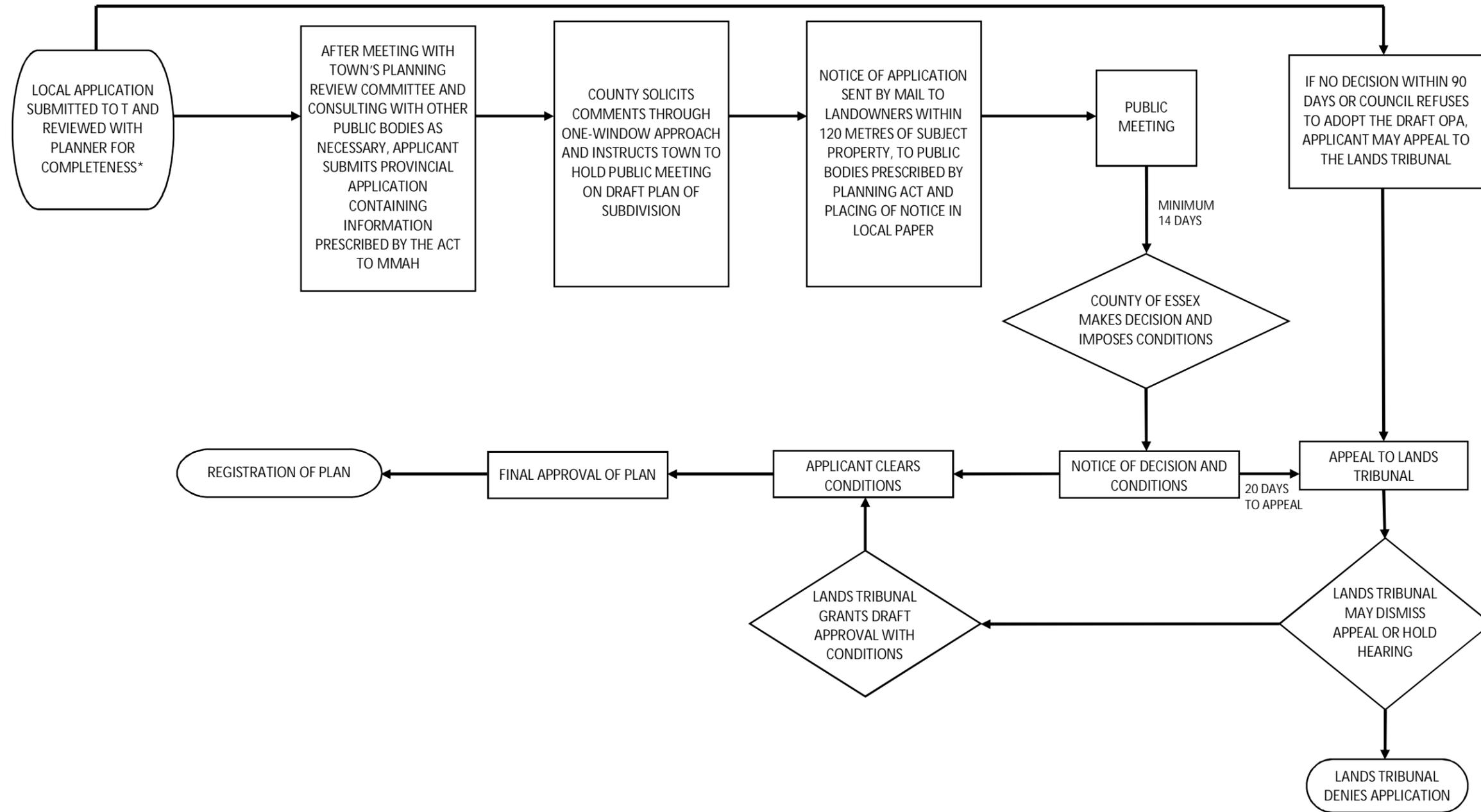
ZONING BY-LAW AMENDMENT



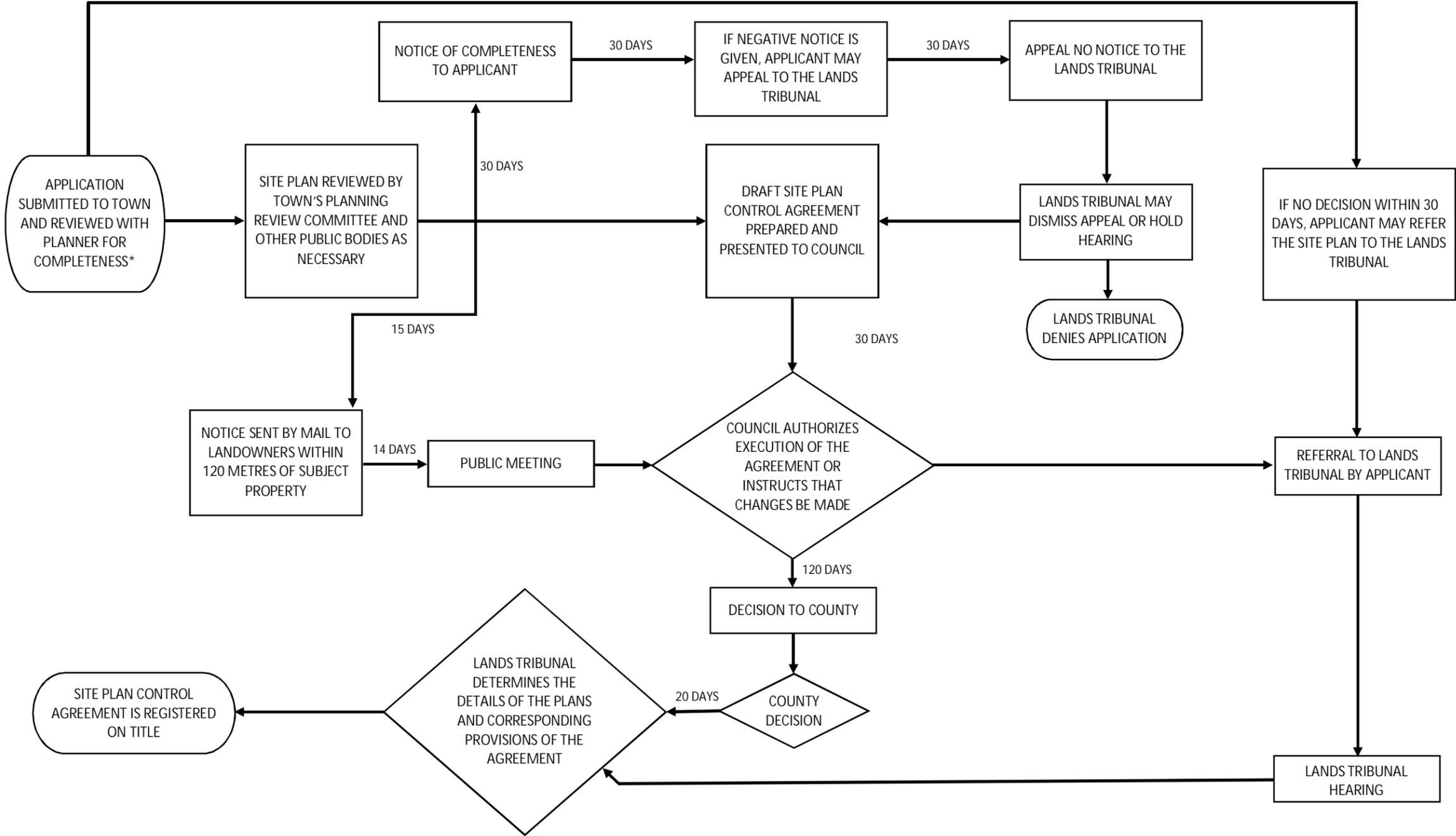
OFFICIAL PLAN AMENDMENT



PLAN OF SUBDIVISION REVIEW

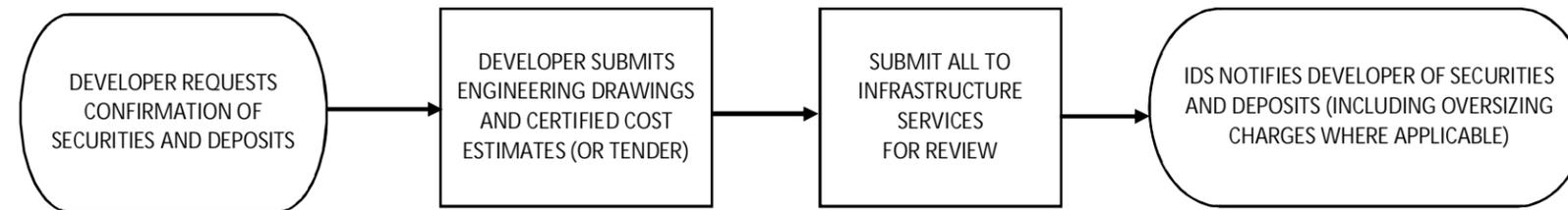


SITE PLAN APPROVAL



CALCULATION OF SECURITIES AND DEPOSITS

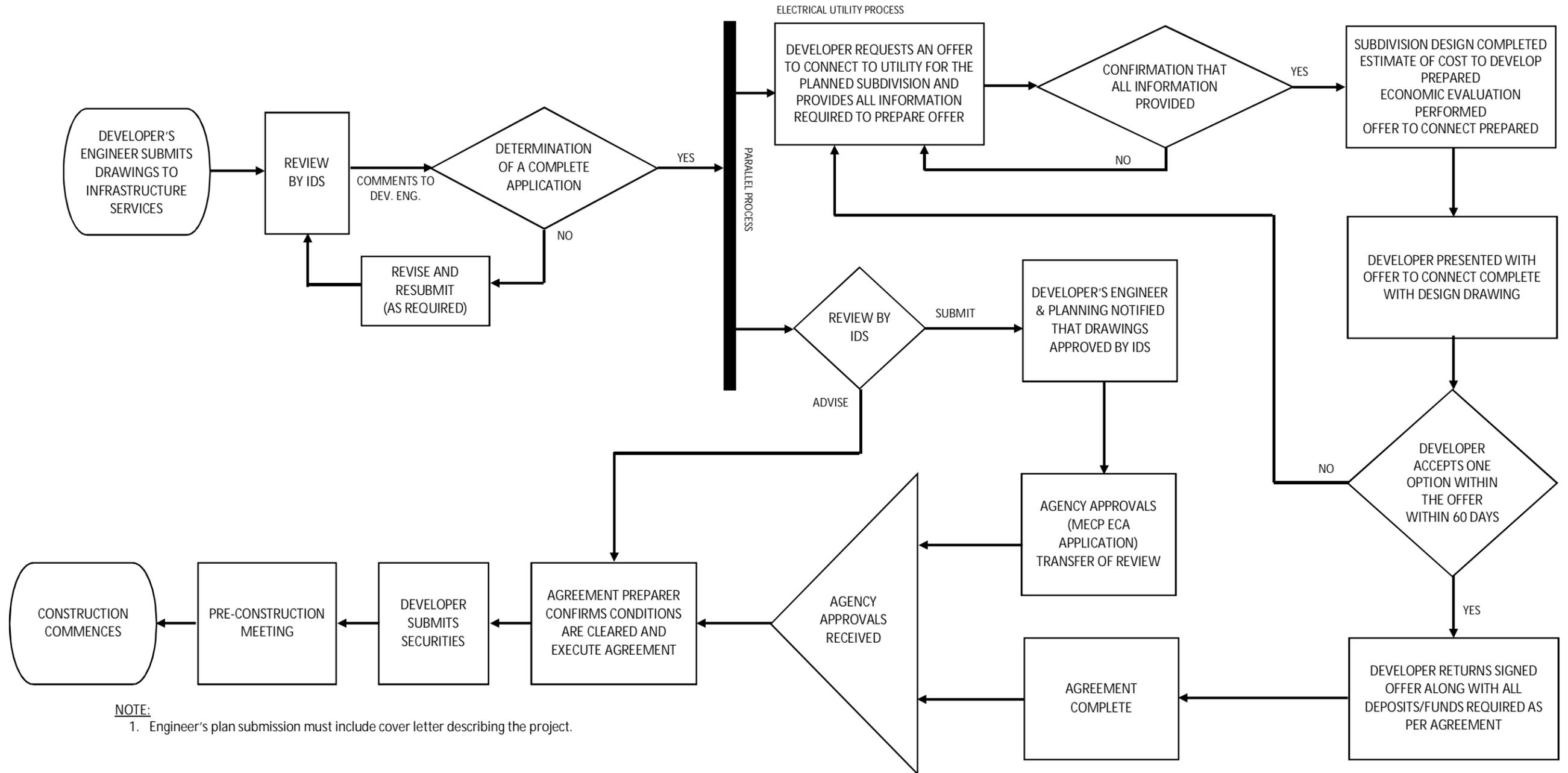
(INCLUDING OVERSIZE CHARGES)



NOTE:

1. Process described here is a sub-process to other flow charts, as indicated.

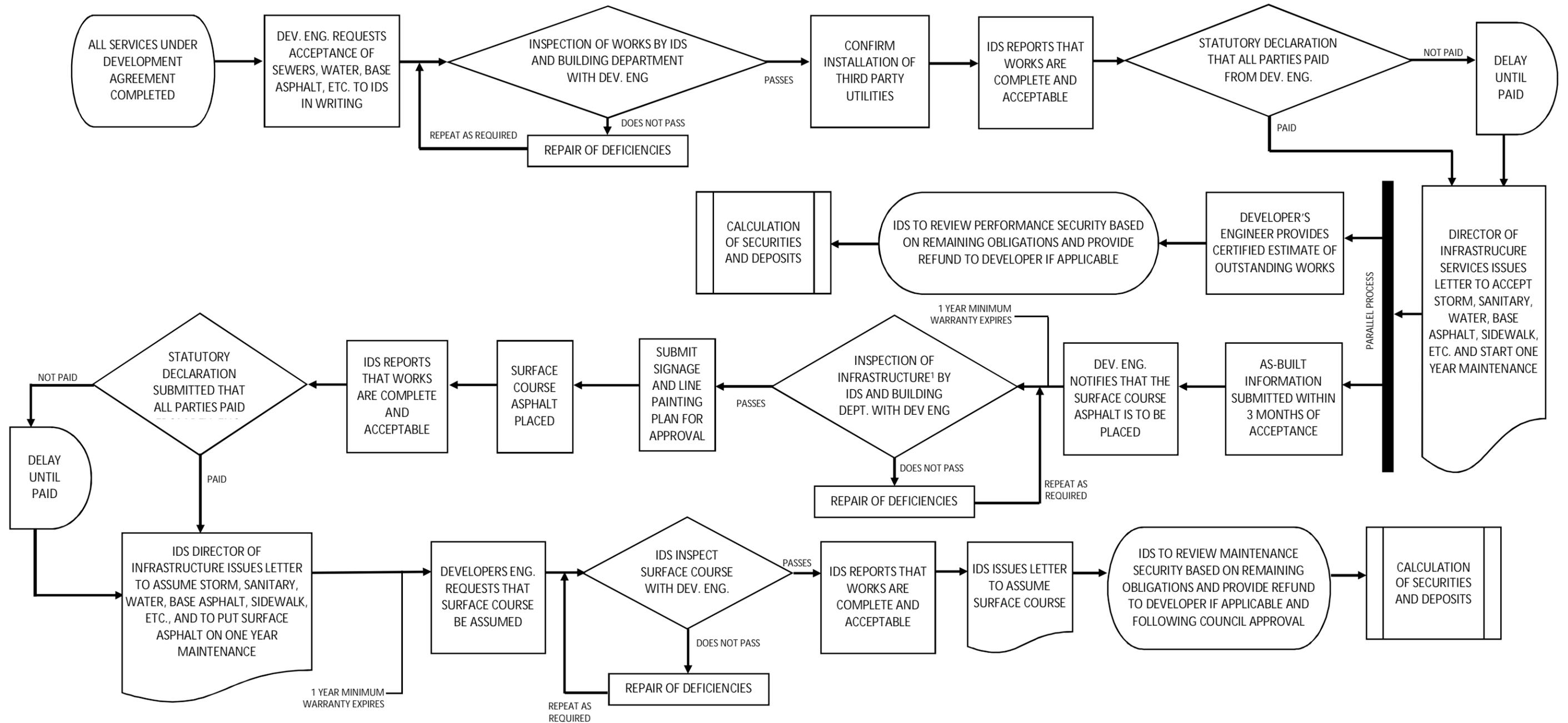
CONSTRUCTION DRAWING APPROVAL



NOTE:

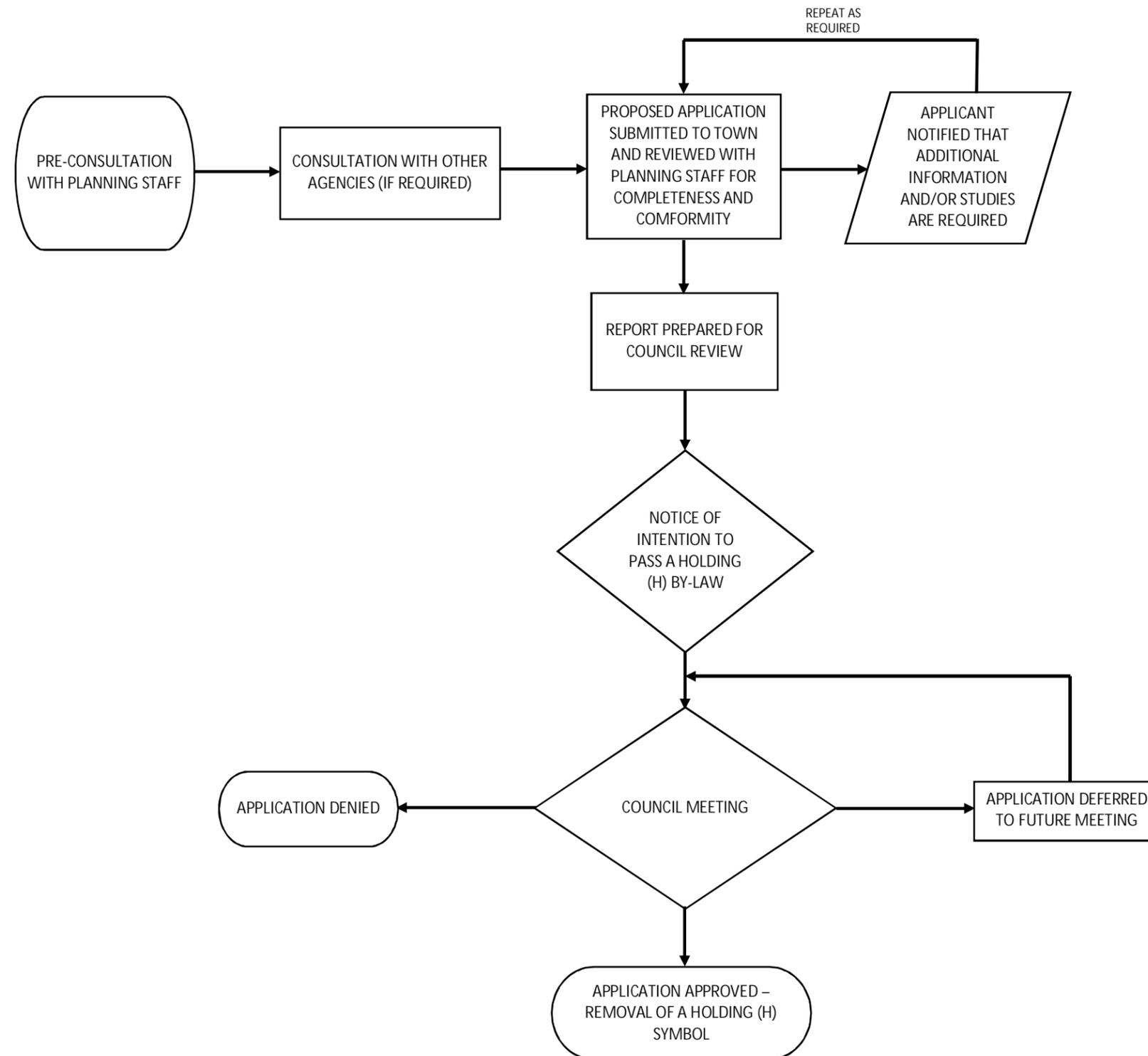
1. Engineer's plan submission must include cover letter describing the project.

ACCEPTANCE AND ASSUMPTION OF SERVICES

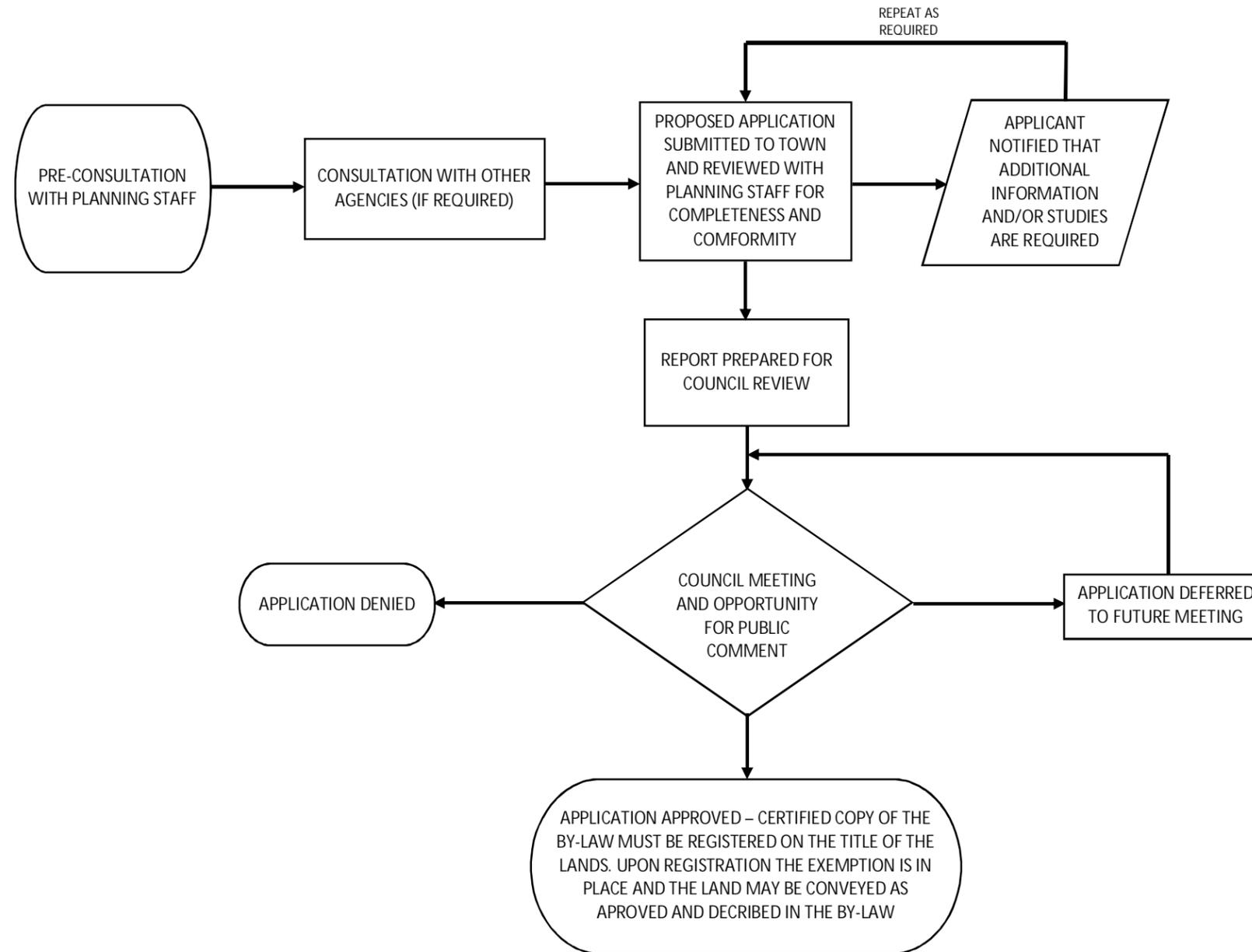


NOTE:
 1. Storm, sanitary, water, base asphalt, sidewalk. (sewer to be videoed)

REMOVAL OF HOLDING (H) SYMBOL



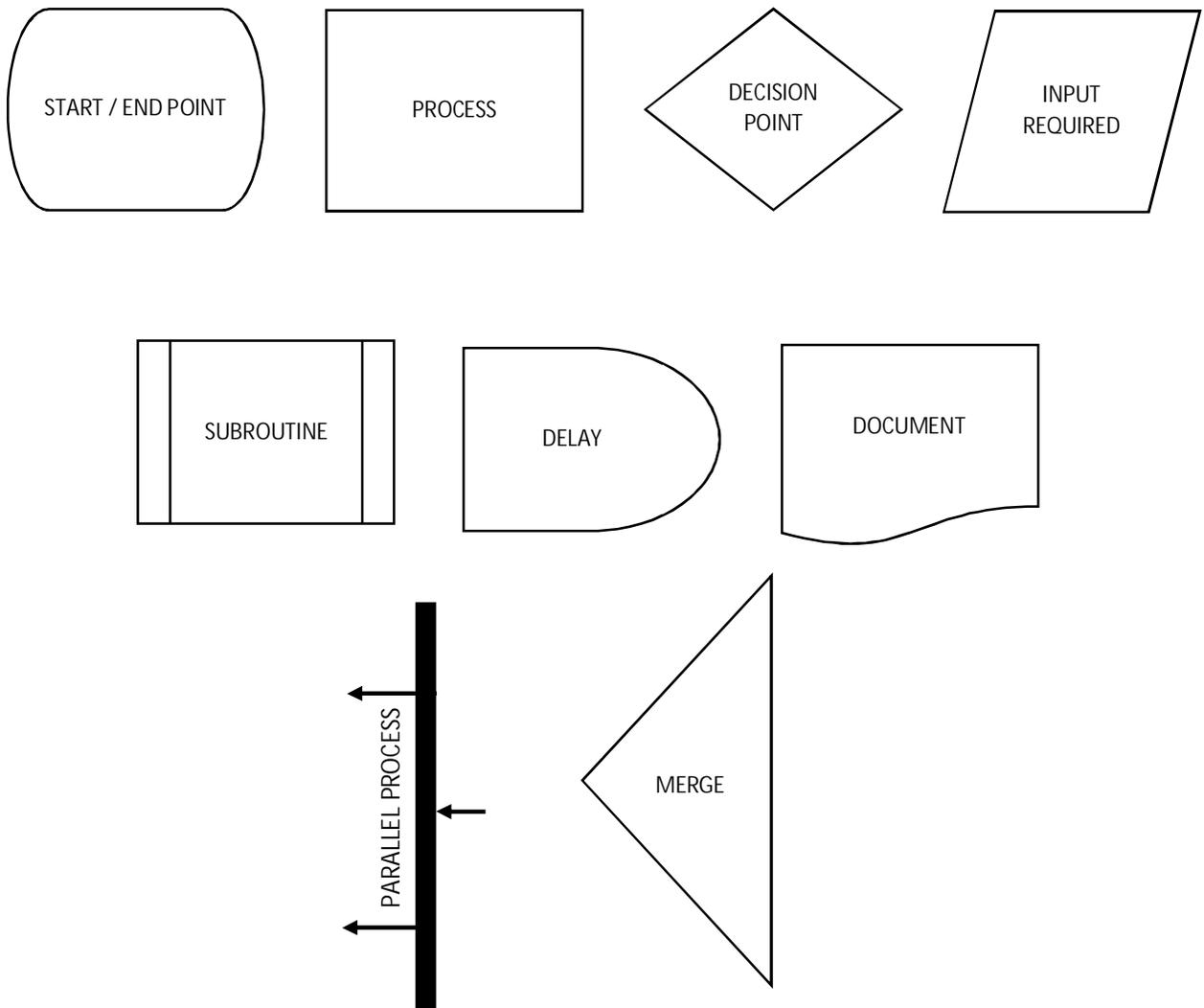
PART LOT CONTROL EXEMPTION



Acronyms

- OLT Ontario Land Tribunal
- ZBA Zoning By-Law Amendment
- OPA Official Plan Amendment
- MMAH Ministry of Municipal Affairs and Housing
- IDS Infrastructure Development Services
- MECP Ministry of the Environment, Conservation, and Parks

Legend



Appendix B

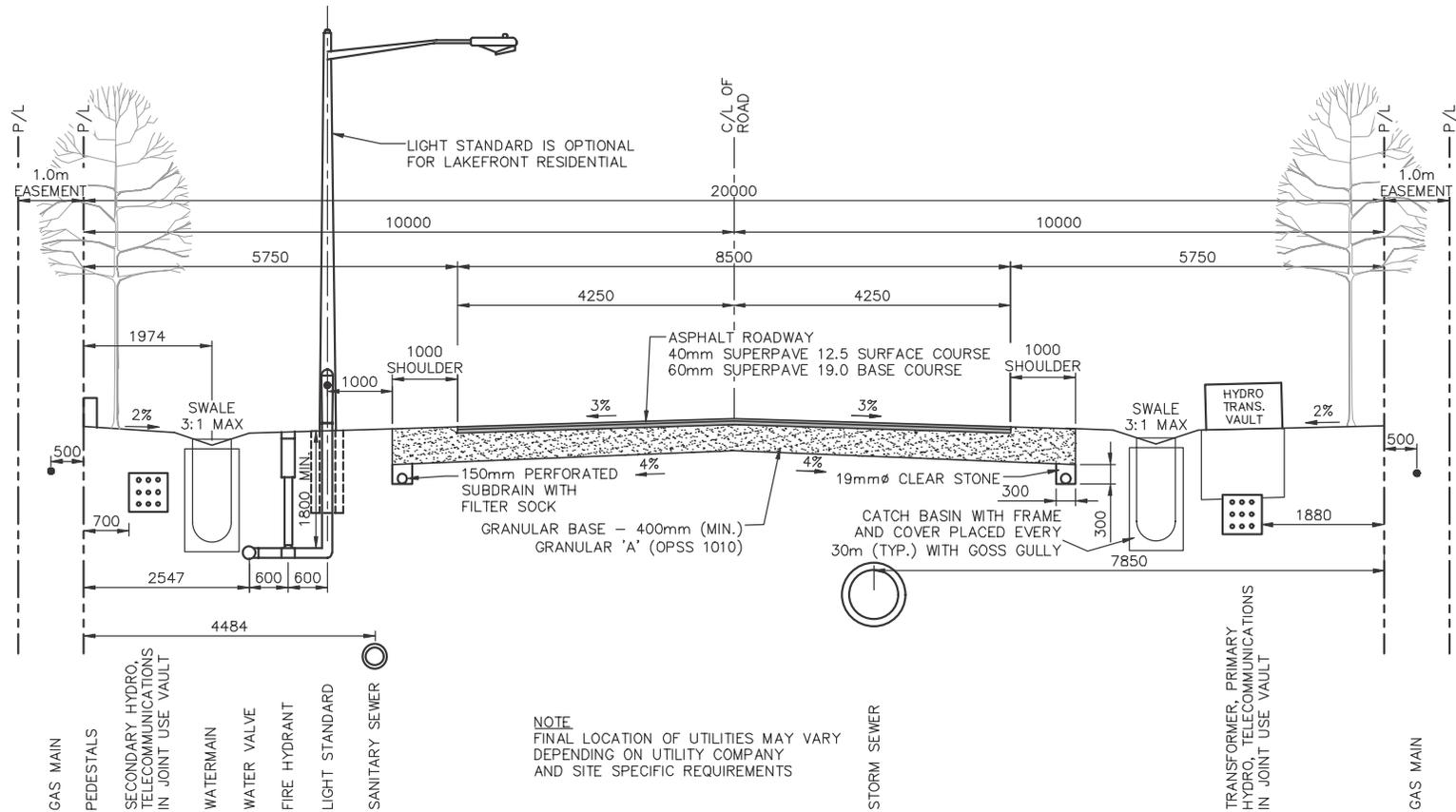
Design Drawings and Details

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CS-1A	Typical Road Cross Sections of 20m R.O.W. – Urban Development
CS-1B	Typical Road Cross Section of 20m R.O.W. – Semi-Urban Development
CS-1C	Typical Road Cross Section of 20m R.O.W. – Cul-de-Sac
CS-1D	Typical Road Cross Section of 20m R.O.W. – Temporary Cul-de-Sac
CS-2A	Typical Road Cross Section of 22m R.O.W. – Major Collector Road
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CS-3A	Typical Road Cross Section of 22m R.O.W. – Collector Road with Boulevard (Without Parking)
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ST2	Precast Concrete Catchbasin (With Filter Cloth)
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ST9	Suggested Method of Installation of a 4-unit Town House Storm Drainage System
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NOTES:

1. THE ABOVE CROSS SECTION IS INTENDED TO BE A GUIDELINE FOR LOCATION OF UTILITY CORRIDORS WITHIN NEW SUBDIVISIONS AND ROADWAYS. THE CORRIDOR LOCATIONS SHOULD ALSO BE CONSIDERED WHERE POSSIBLE WHEN NEW UTILITY PLANTS ARE TO BE CONSTRUCTED WITHIN EXISTING ROAD ALLOWANCES.
2. VERTICAL DIMENSIONS TO UTILITY PLANT ARE GUIDELINES ONLY AND SHOULD BE CONFIRMED WITH THE UTILITY COMPANY. DIMENSIONS SHOWN ARE TO TOP OF FINISHED GRADE, AND IT IS THEREFORE ESSENTIAL THAT GRADING BE COMPLETED TO OUTER EDGE OF RIGHT-OF-WAY BEFORE UTILITY INSTALLATION AND BE WITHIN 15cm OF FINAL GRADE.
3. NO TWO (2) ABOVE GROUND UTILITIES ON THE SAME LOT FRONTAGE.
4. HYDRO AND TELECOMMUNICATIONS TO BE INSTALLED IN JOINT TRENCH.
5. SIDEWALK TO BE 1.50m WIDTH ONE SIDE OF R.O.W. ONLY FOR LOCAL STREETS. SIDEWALK TO BE 1.50m WIDTH BOTH SIDES OF R.O.W. FOR COLLECTOR AND ARTERIAL STREETS. 2.5m MULTI-USE PATH MAY BE REQUESTED IN LIEU OF SIDEWALK. PATH MUST BE CONSTRUCTED WITH 75mm ASPHALT AND 250mm OF GRAN 'A'. GRANULAR BASE MUST BE A MINIMUM 150mm WIDER ON EACH SIDE OF ASPHALT.
6. WATER SERVICE CURB STOPS MUST BE PLACED AT PROPERTY LINE.
7. SANITARY & STORM CLEANOUTS ON PROPERTY LINE WITH APPROVED METAL CAPS.
8. ADDITIONAL CONDUIT SHALL BE INSTALLED IN JOINT USE TRENCH

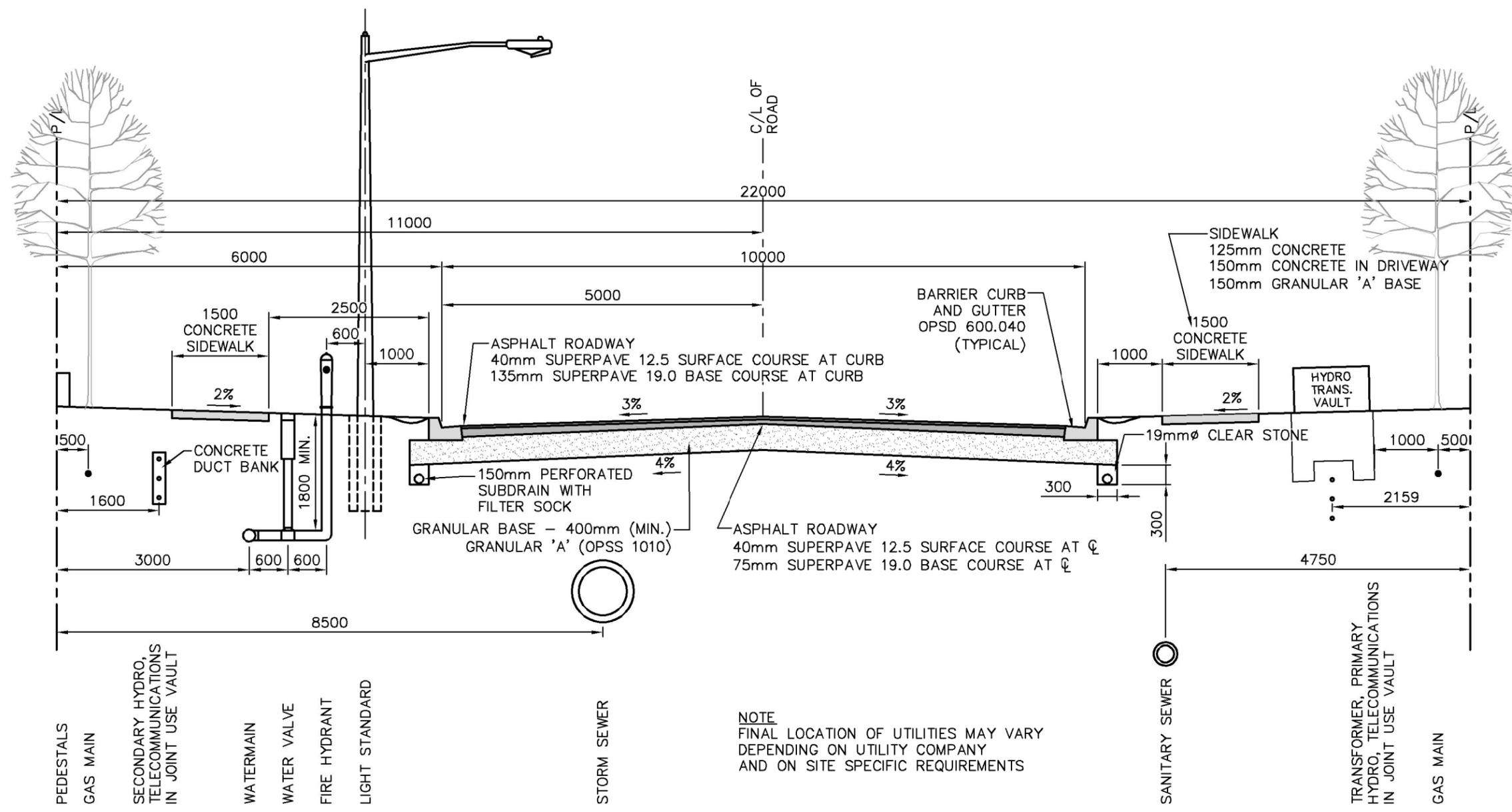
DRAWING: 01/20/2021 REVISED: 06/01/2021 20m R.O.W. (SEMI-URBAN DEVELOPMENT) - 20m R.O.W. (SEMI-URBAN DEVELOPMENT)
 DATE: 2022-01-24 11:15:17 AM 1:100 SCALE 1:1 PLOT SCALE: 1:1000



No.	2	January 14, 2022
	1	June 01, 2021
		Revision Date

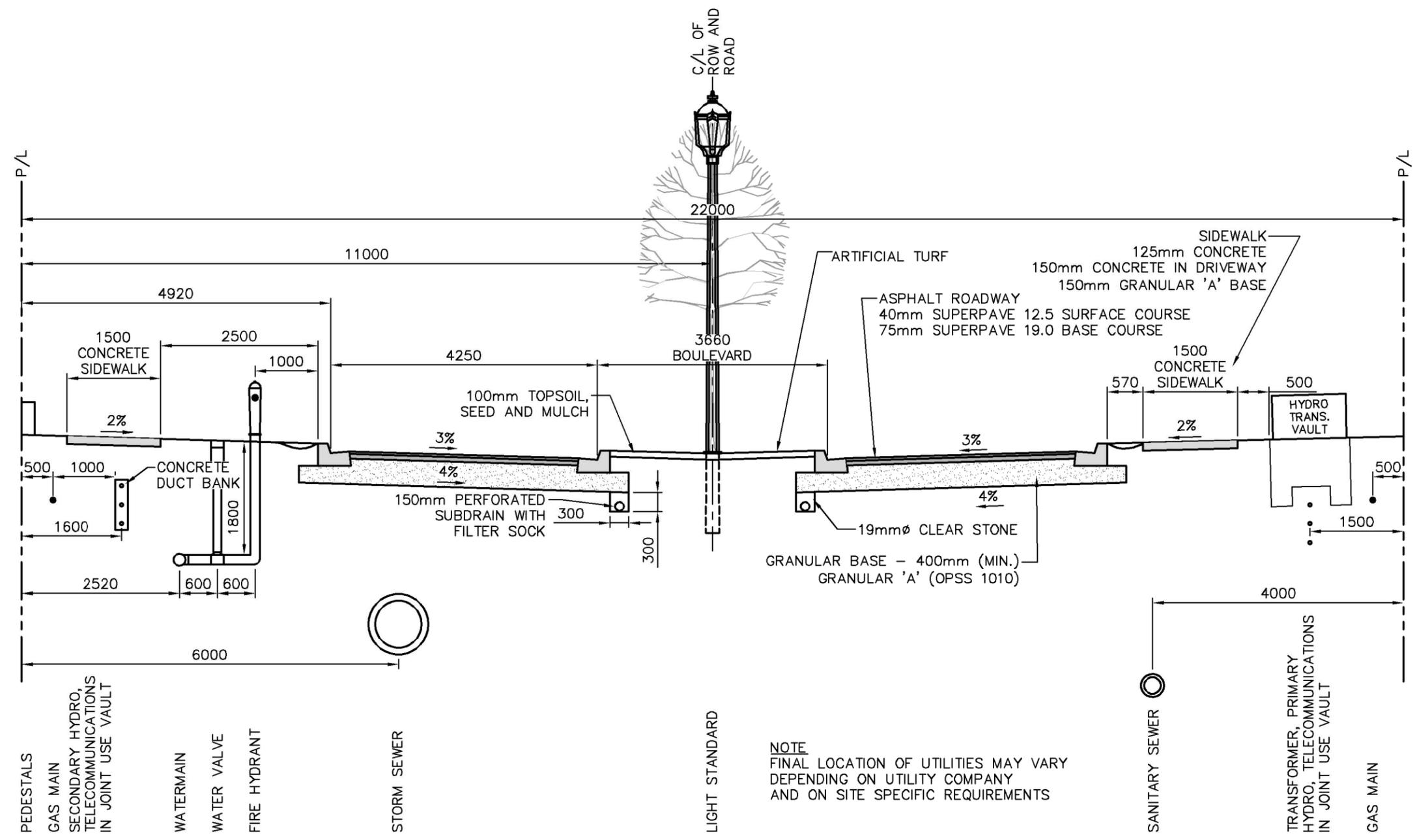
Town of Essex Development Manual

Figure CS-1B
Typical Road Cross Section
20m R.O.W. - SEMI-URBAN DEVELOPMENT



NOTES:

1. THE ABOVE CROSS SECTION IS INTENDED TO BE A GUIDELINE FOR LOCATION OF UTILITY CORRIDORS WITHIN NEW SUBDIVISIONS AND ROADWAYS. THE CORRIDOR LOCATIONS SHOULD ALSO BE CONSIDERED WHERE POSSIBLE WHEN NEW UTILITY PLANTS ARE TO BE CONSTRUCTED WITHIN EXISTING ROAD ALLOWANCES.
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3. NO TWO (2) ABOVE GROUND UTILITIES ON THE SAME LOT FRONTAGE.
4. HYDRO AND TELECOMMUNICATIONS TO BE INSTALLED IN JOINT TRENCH.
5. SIDEWALK TO BE 1.50m WIDTH ONE SIDE OF R.O.W. ONLY FOR LOCAL STREETS. SIDEWALK TO BE 1.50m WIDTH BOTH SIDES OF R.O.W. FOR COLLECTOR AND ARTERIAL STREETS. 2.5m MULTI-USE PATH MAY BE REQUESTED IN LIEU OF SIDEWALK. PATH MUST BE CONSTRUCTED WITH 75mm ASPHALT AND 250mm OF GRAN 'A'. GRANULAR BASE MUST BE A MINIMUM 150mm WIDER ON EACH SIDE OF ASPHALT.
6. WATER SERVICE CURB STOPS MUST BE PLACED AT PROPERTY LINE.
7. SANITARY & STORM CLEANOUTS ON PROPERTY LINE WITH APPROVED METAL CAPS.

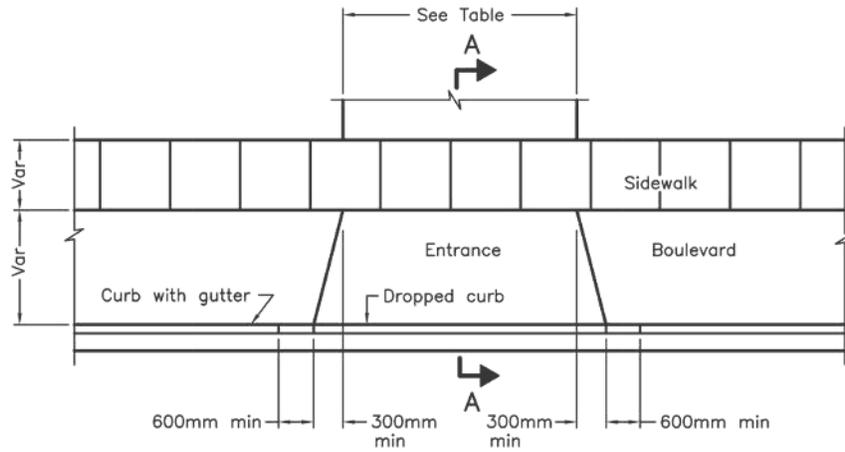


NOTES:

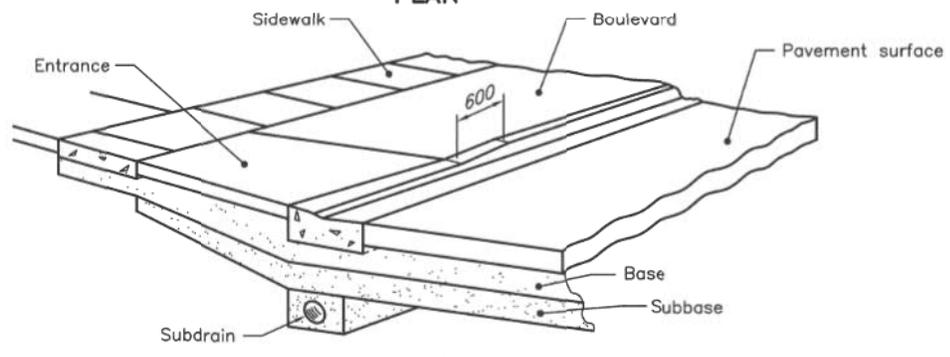
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2. VERTICAL DIMENSIONS TO UTILITY PLANT ARE GUIDELINES ONLY AND SHOULD BE CONFIRMED WITH THE UTILITY COMPANY. DIMENSIONS SHOWN ARE TO TOP OF FINISHED GRADE, AND IT IS THEREFORE ESSENTIAL THAT GRADING BE COMPLETED TO OUTER EDGE OF RIGHT-OF-WAY BEFORE UTILITY INSTALLATION AND BE WITHIN 15cm OF FINAL GRADE.
3. NO TWO (2) ABOVE GROUND UTILITIES ON THE SAME LOT FRONTAGE.
4. HYDRO AND TELECOMMUNICATIONS TO BE INSTALLED IN JOINT TRENCH.
5. SIDEWALK TO BE 1.50m WIDTH ONE SIDE OF R.O.W. ONLY FOR LOCAL STREETS. SIDEWALK TO BE 1.50m WIDTH BOTH SIDES OF R.O.W. FOR COLLECTOR AND ARTERIAL STREETS. 2.5m MULTI-USE PATH MAY BE REQUESTED IN LIEU OF SIDEWALK. PATH MUST BE CONSTRUCTED WITH 75mm ASPHALT AND 250mm OF GRAN 'A'. GRANULAR BASE MUST BE A MINIMUM 150mm WIDER ON EACH SIDE OF ASPHALT.
6. WATER SERVICE CURB STOPS MUST BE PLACED AT PROPERTY LINE.
7. SANITARY & STORM CLEANOUTS ON PROPERTY LINE WITH APPROVED METAL CAPS.



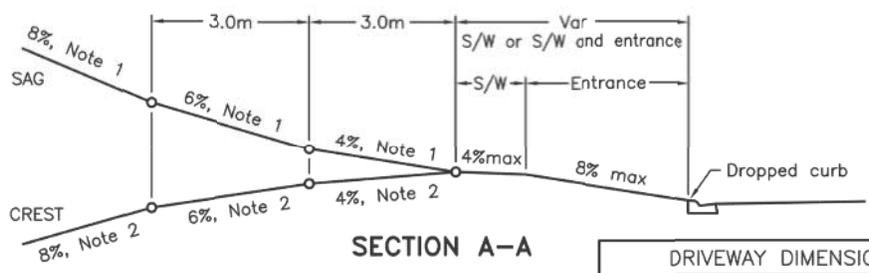
No.	1	June 01, 2021
		Revision Date



PLAN



ISOMETRIC VIEW



SECTION A-A

NOTES:

- 1 Maximum upgrade shall be 10%.
- 2 Maximum downgrade shall be 8%.

A All dimensions are in millimetres unless otherwise shown.

DRIVEWAY DIMENSIONS				
LAND USE	WIDTH m			
	Single		Double	
	min	max	min	max
Residential	3.0	4.3	6.0	7.3

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev	1	
URBAN RESIDENTIAL ENTRANCE	OPSD 351.010			
<p>NOTES</p> <p>1. SEE DETAIL D-3 FOR STANDARD CROSS SECTIONS</p> <p>2. CONCRETE DRIVEWAYS TO BE 150mm (6") COMPACTED GRANULAR 'A' AND 150mm (6") 30 MPa CONCRETE (AIR ENTRAINED 6% +/- 1.5 %).</p> <p>3. ASPHALT DRIVEWAYS TO BE 250mm (10") COMPACTED GRANULAR 'A' AND 75mm (3") ASPHALT SURFACE.</p> <p>4. PAVING STONE DRIVEWAYS TO BE 250mm (10") COMPACTED GRANULAR 'A' WITH PAVING STONE SURFACE.</p> <p>5. ONLY ONE DRIVEWAY PER LOT IS PERMITTED.</p>				

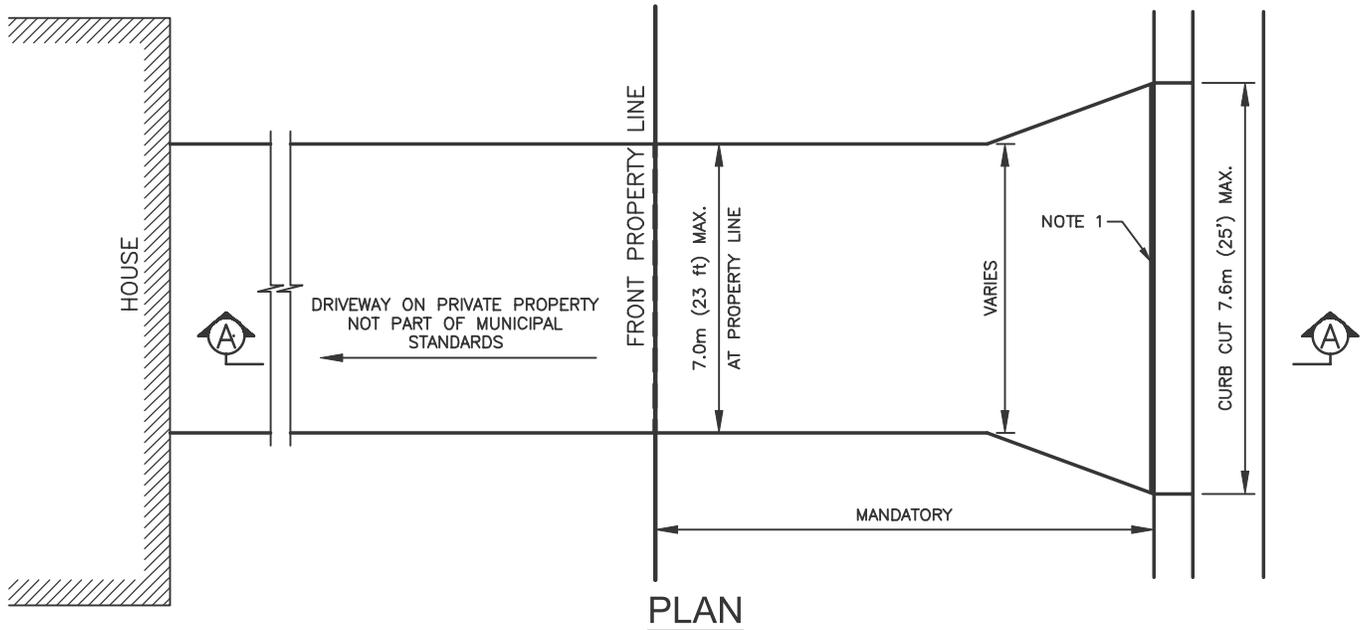
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 PLOT DATE: 2022-01-24 @ 11:15:20 AM PLOT SCALE: 1:1 PLOT STYLE: DILLON-STANDARD.CTB



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2	January 14, 2022
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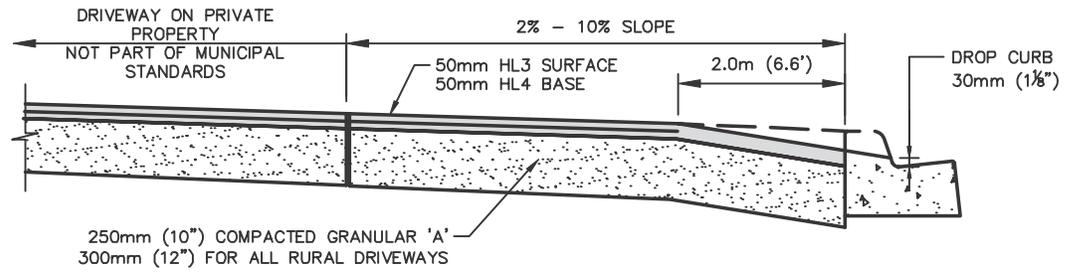
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Figure D-1
 Urban Residential Entrance
 OPSD 351.010

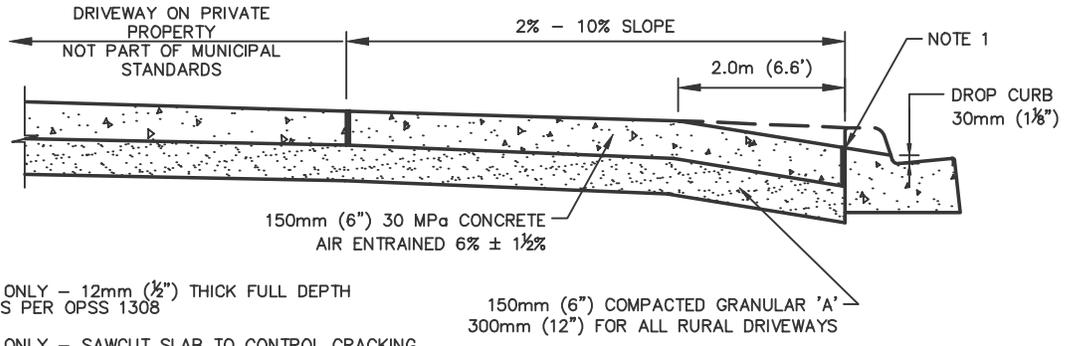


PLAN

ASPHALT SECTION A-A



CONCRETE SECTION A-A



NOTES

1. FOR CONCRETE DRIVEWAYS ONLY – 12mm (½”) THICK FULL DEPTH PREMOLDED JOINT FILLER AS PER OPSS 1308
2. FOR CONCRETE DRIVEWAYS ONLY – SAWCUT SLAB TO CONTROL CRACKING.
3. ONLY ONE DRIVEWAY PER LOT IS PERMITTED.

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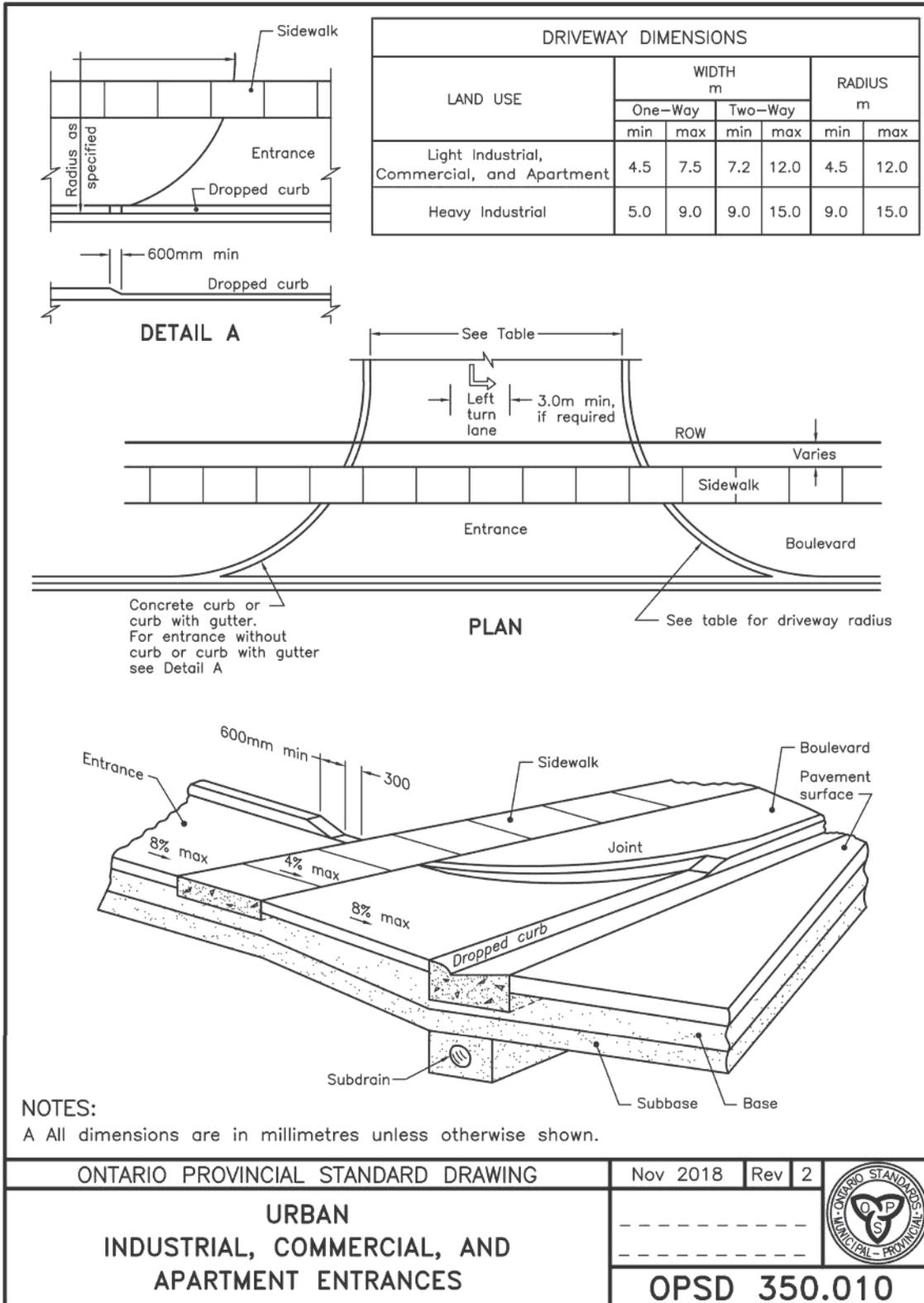


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Figure D-1A

Residential Driveway Entrance Without Sidewalks



NOTES

1. CONCRETE SURFACES MUST HAVE 250mm OF COMPACTED GRANULAR 'A' AND 150mm OF 30 MPa CONCRETE, AIR ENTRAINED 6% +/- 1.5%.
2. ASPHALT SURFACE MUST HAVE 200mm OF COMPACTED GRANULAR 'A' AND 225mm OF ASPHALT SURFACE.



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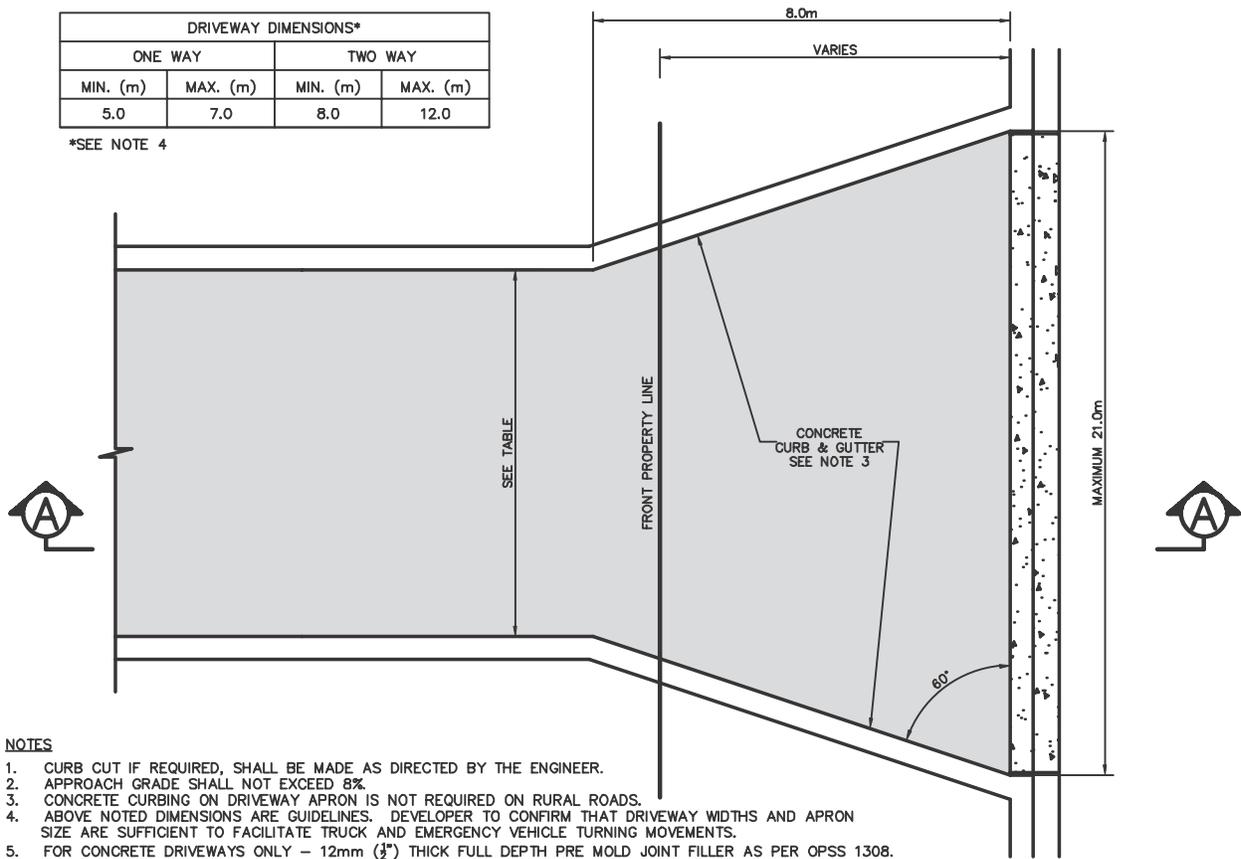
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Figure D-2
Urban Industrial, Commercial, & Apartment Entrance - OPSD 350.010

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 PLOT DATE: 2022-01-24 @ 11:15:22 AM PLOT SCALE: 1:1 PLOT STYLE: DILLON-STANDARD.CTB

DRIVEWAY DIMENSIONS*			
ONE WAY		TWO WAY	
MIN. (m)	MAX. (m)	MIN. (m)	MAX. (m)
5.0	7.0	8.0	12.0

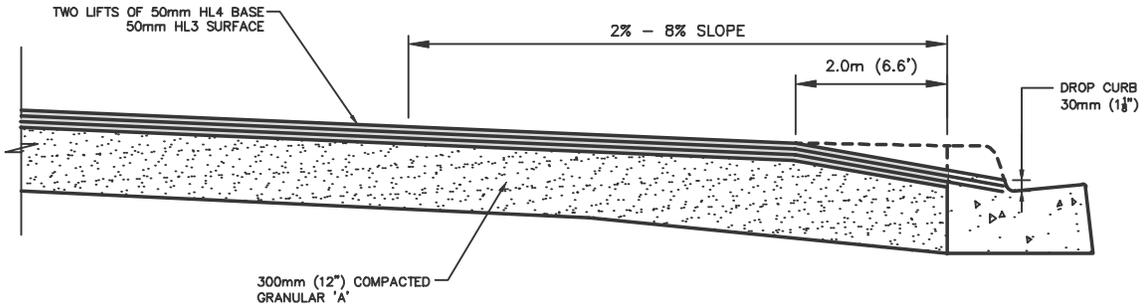
*SEE NOTE 4



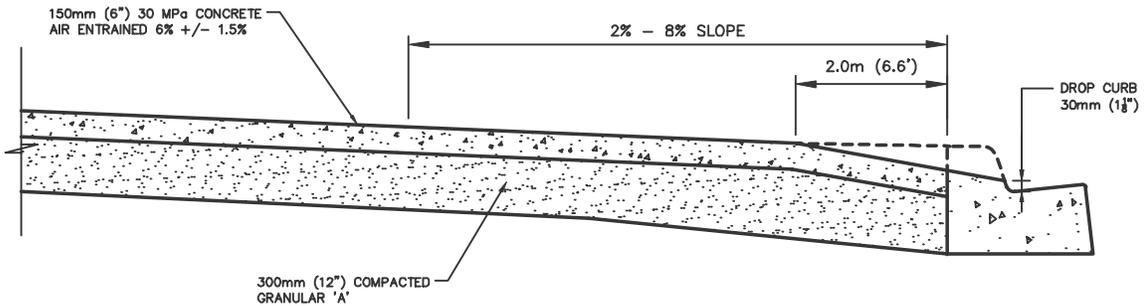
NOTES

1. CURB CUT IF REQUIRED, SHALL BE MADE AS DIRECTED BY THE ENGINEER.
2. APPROACH GRADE SHALL NOT EXCEED 8%.
3. CONCRETE CURBING ON DRIVEWAY APRON IS NOT REQUIRED ON RURAL ROADS.
4. ABOVE NOTED DIMENSIONS ARE GUIDELINES. DEVELOPER TO CONFIRM THAT DRIVEWAY WIDTHS AND APRON SIZE ARE SUFFICIENT TO FACILITATE TRUCK AND EMERGENCY VEHICLE TURNING MOVEMENTS.
5. FOR CONCRETE DRIVEWAYS ONLY - 12mm (1/2") THICK FULL DEPTH PRE MOLD JOINT FILLER AS PER OPSS 1308.
6. FOR CONCRETE DRIVEWAYS ONLY - SAWCUT SLAB TO CONTROL CRACKING
7. WIRE MESH IS NOT PERMITTED TO BE PLACED WITHIN THE MUNICIPAL SECTIONS OF THE DRIVEWAY.

ASPHALT SECTION A-A



CONCRETE SECTION A-A



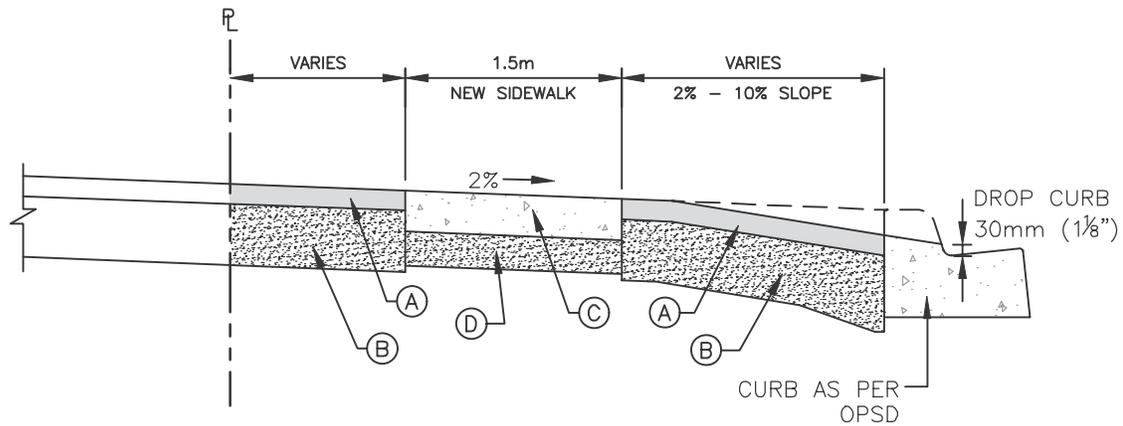
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Figure D-2A
 INDUSTRIAL DRIVEWAY ENTRANCE
 WITHOUT SIDEWALK



SECTION

	URBAN RESIDENTIAL DRIVEWAY		RURAL RESIDENTIAL DRIVEWAY		
	ASPHALT	CONCRETE	ASPHALT	CONCRETE	GRAVEL
A	50mm (2") HL3 SURFACE 50mm (2") HL4 BASE	150mm (6") 30 MPa CONCRETE	50mm (2") HL3 SURFACE 50mm (2") HL4 BASE	150mm (6") 30 MPa CONCRETE	N/A
B	250mm (10") COMPACTED GRANULAR 'A'	150mm (6") COMPACTED GRANULAR 'A'	300mm (12") COMPACTED GRANULAR 'A'	150mm (6") COMPACTED GRANULAR 'A'	300mm (12") COMPACTED GRANULAR 'A'
C	150mm (6") 32 MPa CONCRETE	150mm (6") 32 MPa CONCRETE	150mm (6") 32 MPa CONCRETE	150mm (6") 32 MPa CONCRETE	150mm (6") 32 MPa CONCRETE
D	150mm (6") COMPACTED GRANULAR 'A'	150mm (6") COMPACTED GRANULAR 'A'	150mm (6") COMPACTED GRANULAR 'A'	150mm (6") COMPACTED GRANULAR 'A'	150mm (6") COMPACTED GRANULAR 'A'

	INDUSTRIAL, COMMERCIAL & RESIDENTIAL DRIVEWAY	
	ASPHALT	CONCRETE
A	50mm (2") HL3 SURFACE TWO LIFTS OF 50mm (2") HL4 BASE	200mm (8") 30 MPa CONCRETE
B	300mm (12") COMPACTED GRANULAR 'A'	200mm (8") COMPACTED THICKNESS G.B.C.'A'
C	200mm (8") 32 MPa CONCRETE	200mm (8") 32 MPa CONCRETE
D	200mm (8") COMPACTED GRANULAR 'A'	200mm (8") COMPACTED GRANULAR 'A'

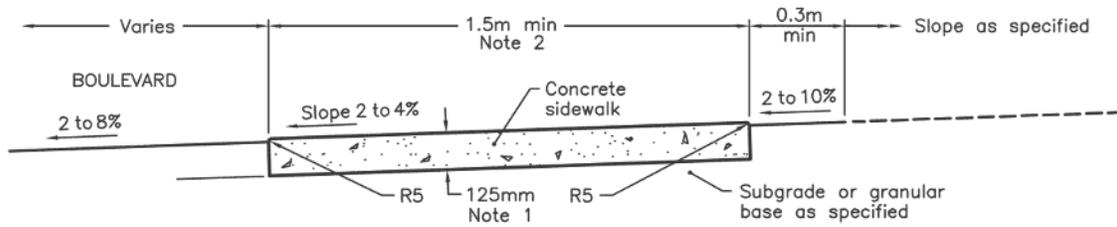
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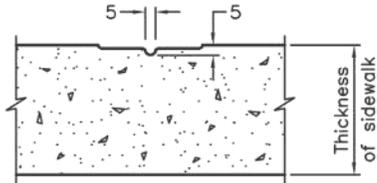
No.	Revision Date
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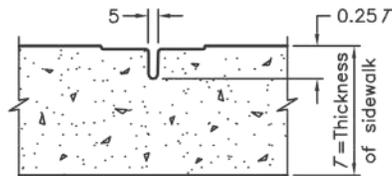
Figure D-3
Residential, Industrial, Commercial,
& Apartment Entrances - Sections



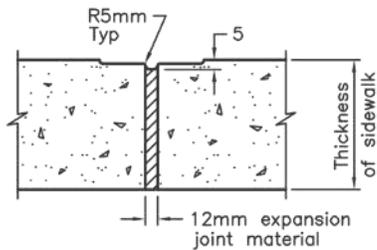
TYPICAL SECTION



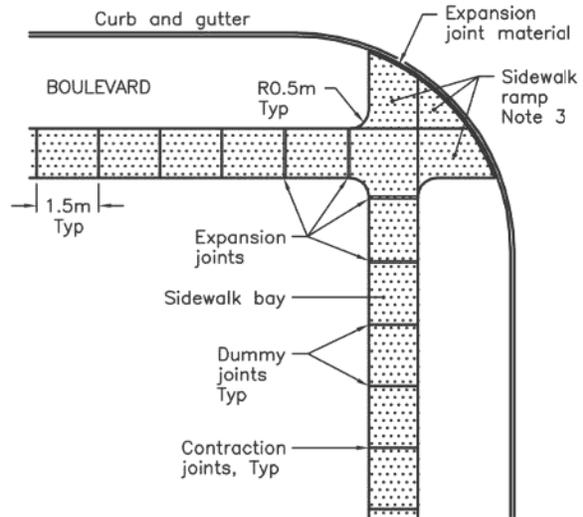
DUMMY JOINT (OPTIONAL)



CONTRACTION JOINT



EXPANSION JOINT



JOINT LAYOUT

NOTES:

- 1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
 - 2 Sidewalk width shall be wider when specified.
 - 3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.032, 310.033 and 310.039.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev 2	
CONCRETE SIDEWALK		-----		
		OPSD 310.010		

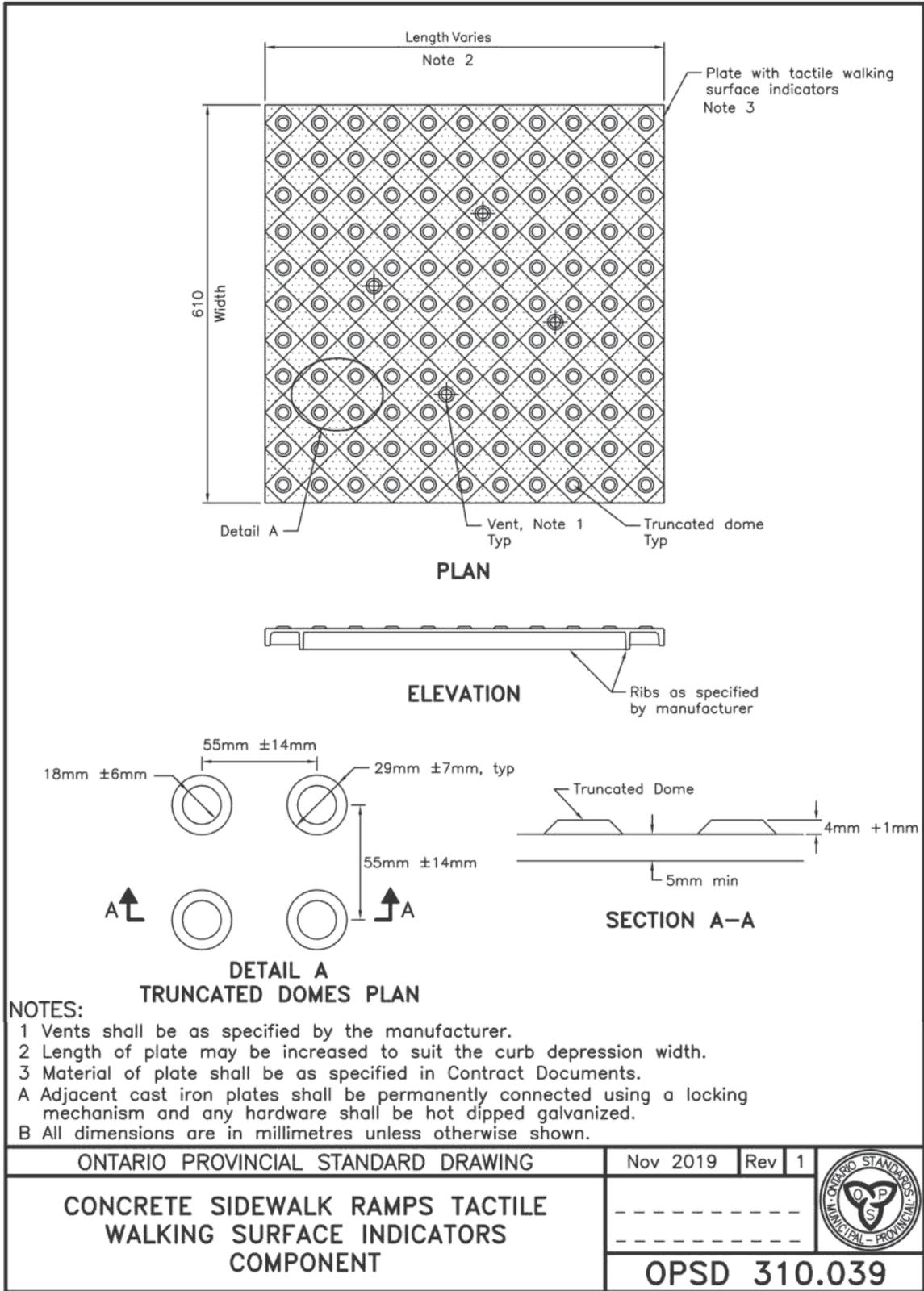
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Figure D-4
 CONCRETE SIDEWALK
 OPSD 310.010 (MODIFIED)



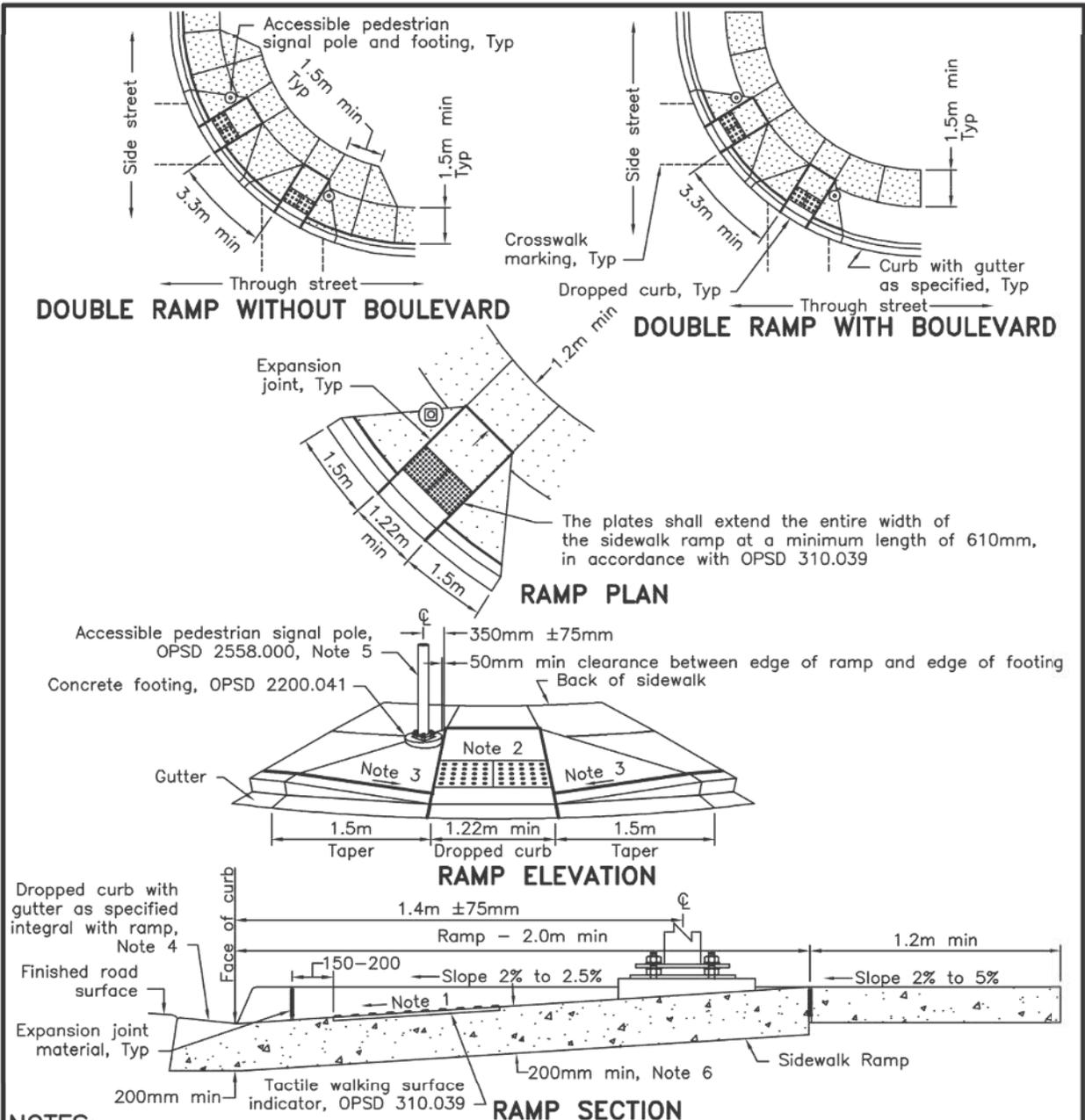
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Figure D-5
 TACTILE PLATES
 OPSD 310.039



- NOTES:**
- 1 Slope of ramp shall not exceed 8%.
 - 2 Cross slope of ramp shall not exceed 2% in either direction.
 - 3 Cross slope of flared side of ramp shall not exceed 8%.
 - 4 Dropped curb at ramp shall be modified to eliminate 30 mm step at gutter.
 - 5 Accessible pedestrian signal to have tactile arrow that aligns with direction of crosswalk.
 - 6 Minimum thickness of ramp is 200mm. Minimum thickness of sidewalk and flared sides adjacent to ramp is 150mm.
- A Where only one crosswalk is present at an intersection, only one curb ramp is required.
 B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	1	
CONCRETE SIDEWALK RAMPS AT SIGNALIZED INTERSECTIONS				
OPSD 310.030				

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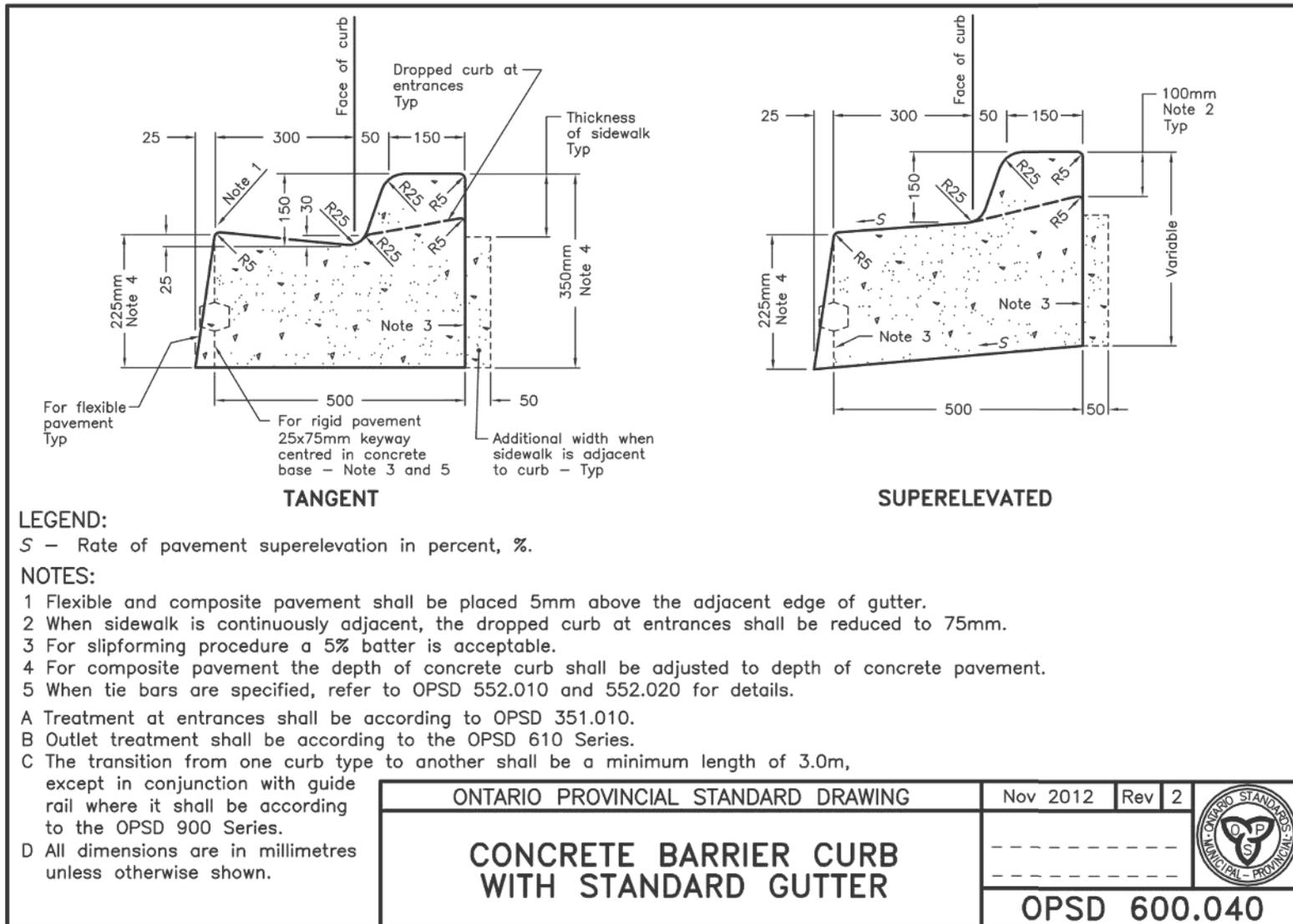


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Figure D-6
 CONCRETE SIDEWALK RAMPS AT
 SIGNALIZED INTERSECTION

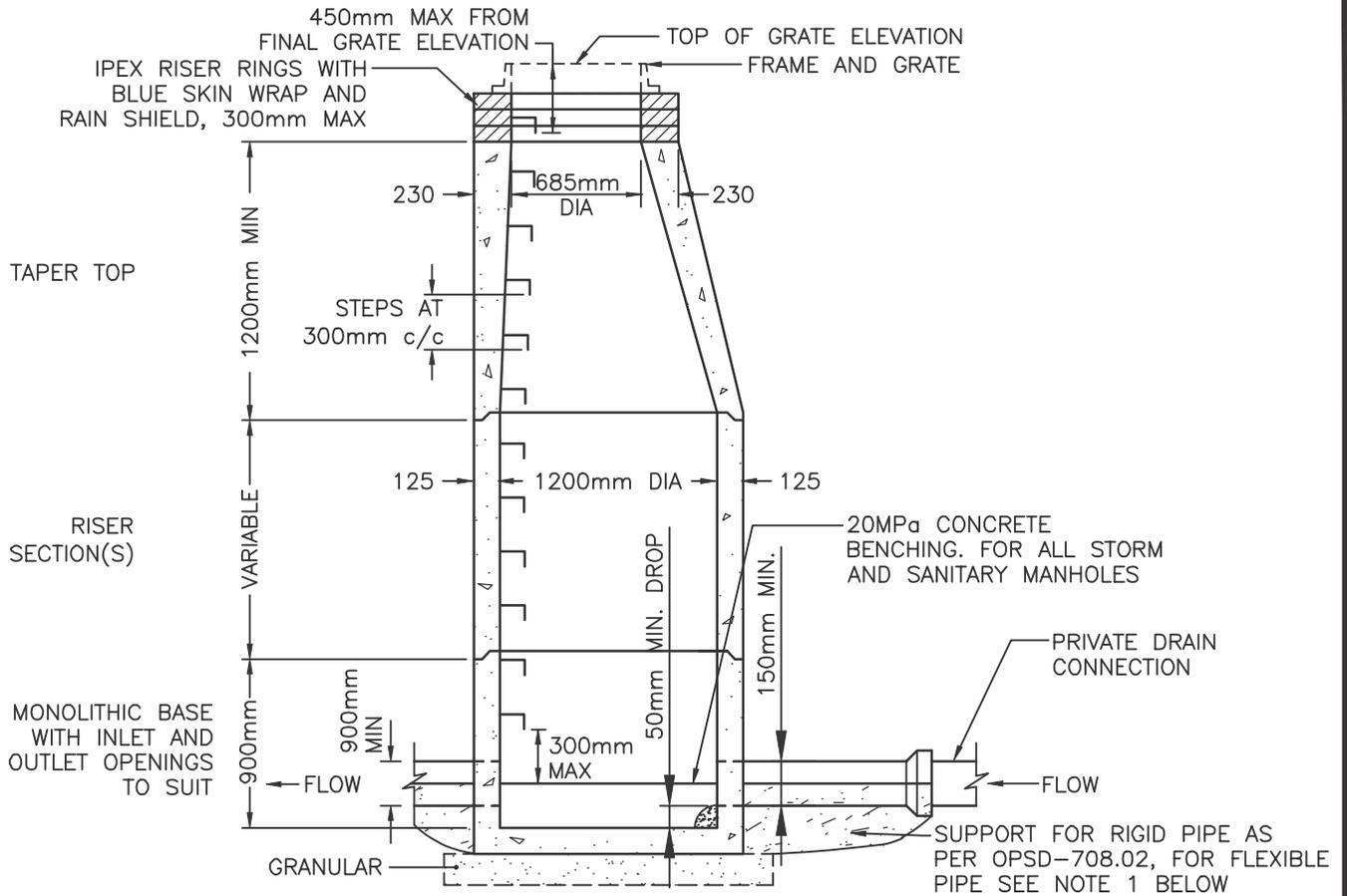
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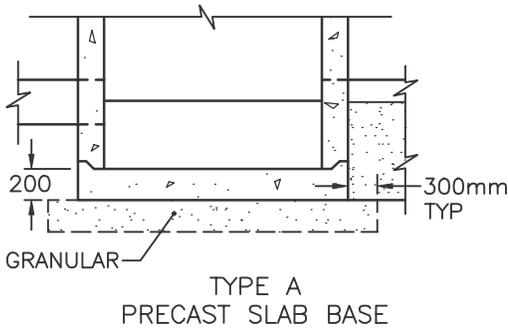
2	January 14, 2022
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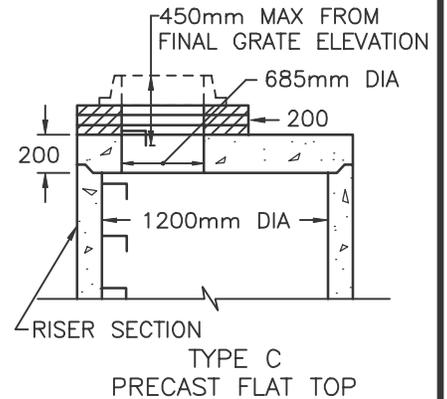
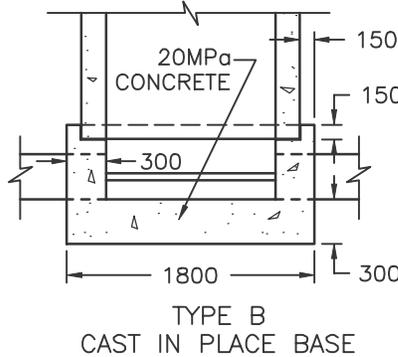
Figure D-8
 CONCRETE BARRIER CURB WITH STANDARD GUTTER



BOTTOM RISER SECTION WITH INLET AND OUTLET OPENINGS TO SUIT



ALTERNATIVES



FLEXIBLE JOINT 300mm MAX. FROM MANHOLE WALL, IN LIEU OF CONCRETE CRADLE.

TYPE D

APPROVED FLEXIBLE WATERTIGHT PIPE CONNECTOR IN MH OPENING IN LIEU OF CONCRETE CRADLE.

TYPE E

PIPE SUPPORT AT MANHOLE

NOTES:

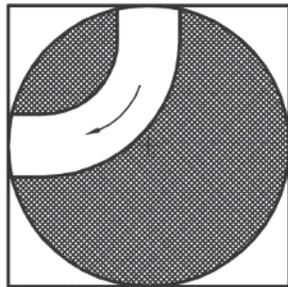
- FOR FLEXIBLE PIPE USE TYPES 'D' OR 'E' PIPE SUPPORT ONLY.
- GRANULAR BACKFILL TO BE PLACED TO A MINIMUM THICKNESS OF 300mm ALL AROUND.
- SPECIAL BASE DESIGN REQUIRED FOR DEPTHS GREATER THAN 10.0m.
- FILL LIFTING HOLES AND PIPE CONNECTIONS AND PARGE ADJUSTMENT UNITS ON OUTSIDE 15mm THICK WITH 1:3 NON-SHRINK MORTAR MIX.
- PRECAST CONCRETE COMPONENTS AS PER OPSD-701.03.
- USE ALTERNATIVE BASE, TOP, PIPE SUPPORT OR CONNECTOR, STEPS, FRAME AND COVER AND/OR BENCHING WHERE SPECIFIED.
- STRUCTURES EXCEEDING 5.0m IN DEPTH TO INCLUDE SAFETY GRATE AS PER OPSD-404.02.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.



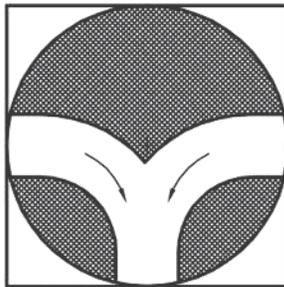
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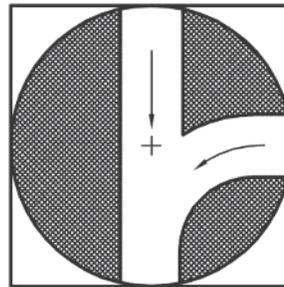
Figure S-1
SAMPLING MANHOLE
1200mm DIAMETER



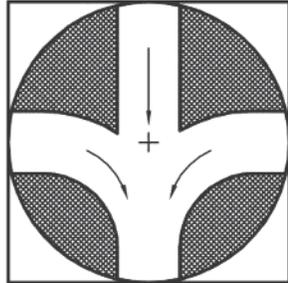
1. Right angle bend



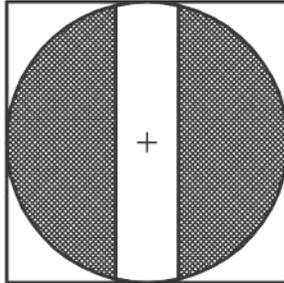
2. Tee connection



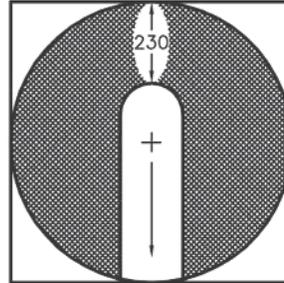
3. Three way junction



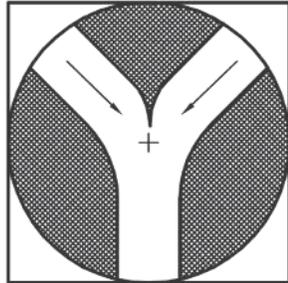
4. Four way junction



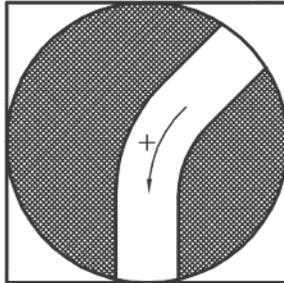
5. Straight through



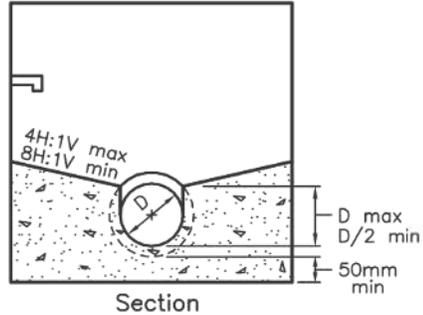
6. Dead end



7. Wye connection



8. 45° bend



Section

MAXIMUM SIZE HOLE IN THE WALL IN PRECAST RISER SECTIONS					
Maintenance Hole Diameter	No. 1-4	No. 5 and 6	No. 8	No.7	
				Inlet Hole	Outlet Hole
1200	700	860	780	700	860
1500	860	1220	960	860	1170
1800	1220	1485	1220	1220	1485
2400	1485	2020	1760	1485	2020
3000	1930	2450	2300	1930	2450
3600	2470	3085	2730	2470	3085

NOTES:

- 1 Slopes shall be maintained from the outlet hole opening for top of benching.
- A Concrete for benching shall be 30MPa.
- B When benching is hand-finished, it shall be given wood float finish, channel shall be given steel trowel finish.
- C Benchng slope and height shall be as specified.
- D When specified, maintenance holes that are 1200mm in diameter with a uniform channel for 200 or 250mm pipe may be prebenched at the manufacturer with standardized benching slope and channel orientation.
- E All dimensions are nominal.
- F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 4	
MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES	-----		
OPSD 701.021			

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Figure S-2
 MAINTENANCE HOLE BENCHING
 AND PIPE OPENING DETAILS

Tapered top
See alternatives C
and D

Riser sections
as required

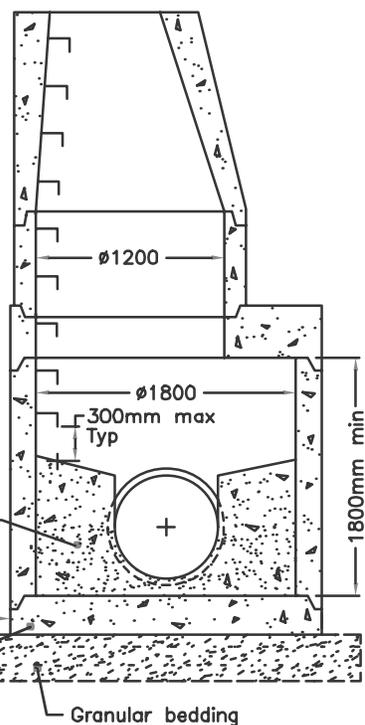
Transition slab
See alternative B

Riser sections
as required

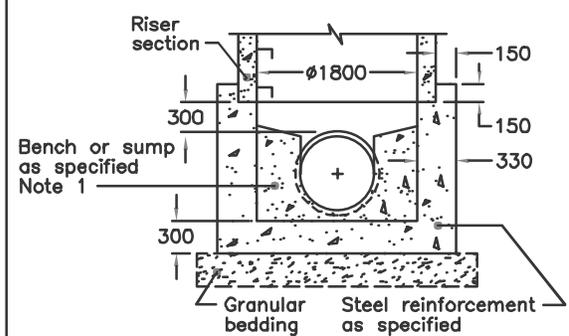
Bench or sump
as specified
Note 1

300mm
Typ

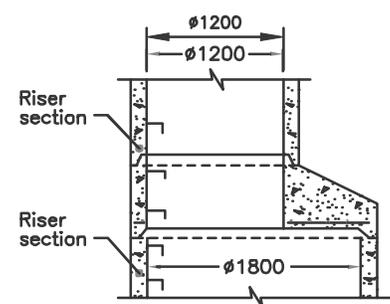
Precast slab
base
See alternative A



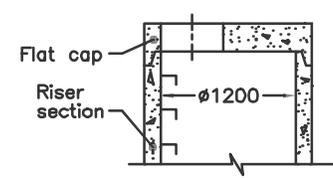
ALTERNATIVES



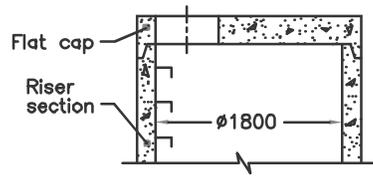
A CAST-IN-PLACE BASE



B TAPERED TRANSITION SLAB



C 1200mm PRECAST FLAT CAP



D 1800mm PRECAST FLAT CAP

NOTES:

- 1 For sump detail, see OPSD 701.010.
- A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
- B Precast concrete components shall be according to OPSD 701.030, 701.031, 701.050, 701.051, 703.012, 703.022, and 706.020.
- C Structures exceeding 5.0m in depth shall include safety platform according to OPSD 404.020 or 404.022.
- D Pipe support shall be according to OPSD 708.020.
- E For benching and pipe opening details, see OPSD 701.021.
- F For adjustment unit and frame installation, see OPSD 704.010.
- G All dimensions are nominal.
- H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

**PRECAST CONCRETE
MAINTENANCE HOLE**
1800mm DIAMETER

Nov 2014 Rev 5



OPSD 701.012

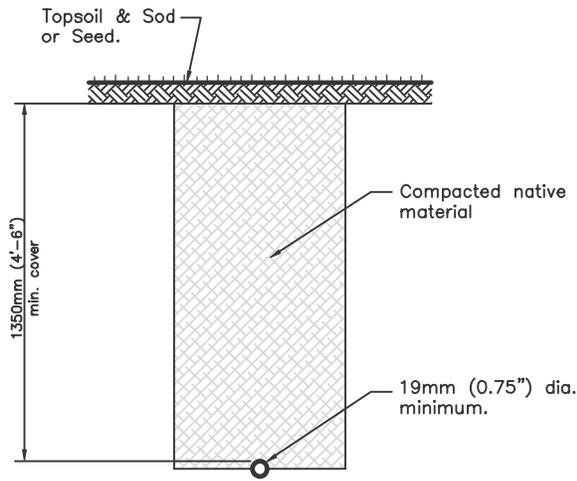


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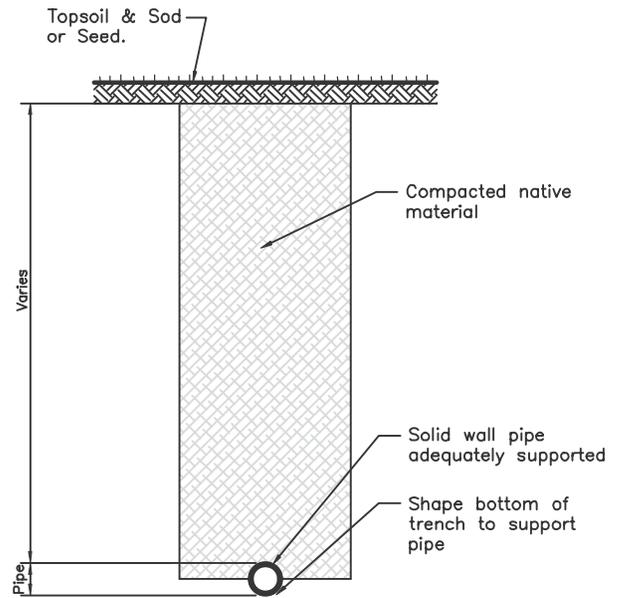
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Figure S-3
PRECAST MAINTENANCE HOLE
1800mm DIAMETER

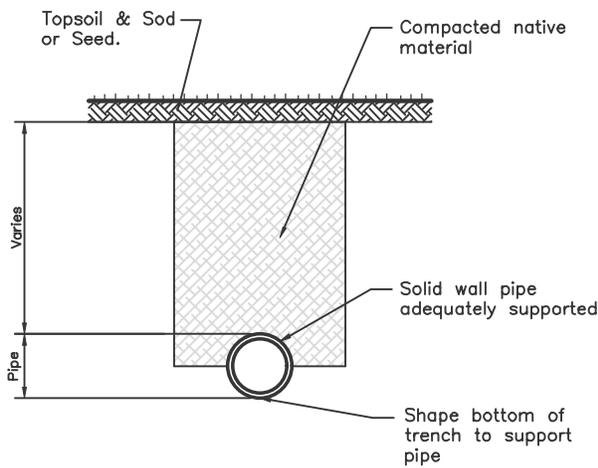
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WATER

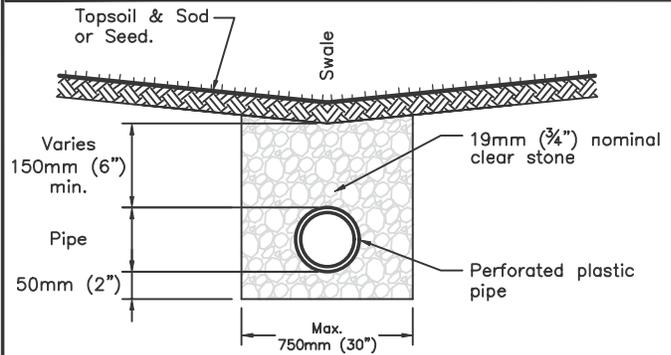


SANITARY DRAIN



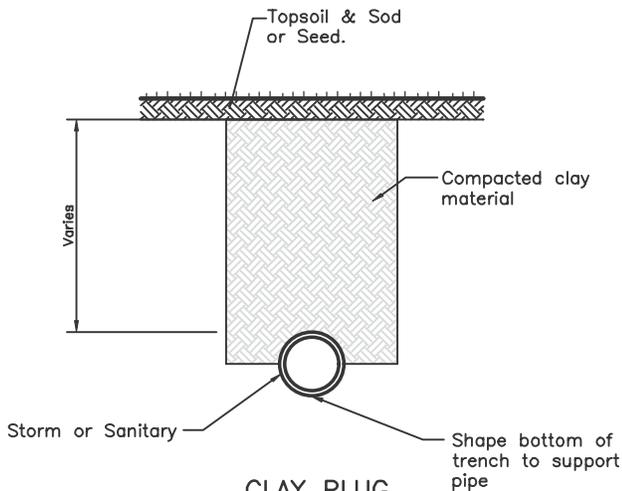
STORM DRAIN – SOLID PIPE

From 3.0m (10') back of house to front lot line.



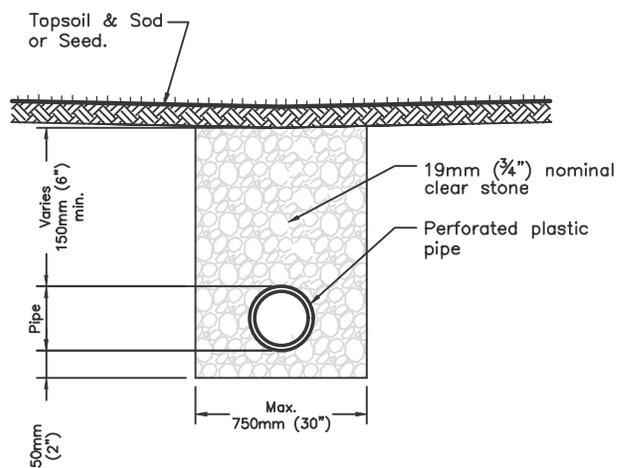
REAR YARD DRAIN

Setback 1.5m (5') from rear property line.



CLAY PLUG

To extend 3.0m (10') along trench.



STORM DRAIN – PERFORATED PIPE

From rear yard to 3.0m (10') from back of house.

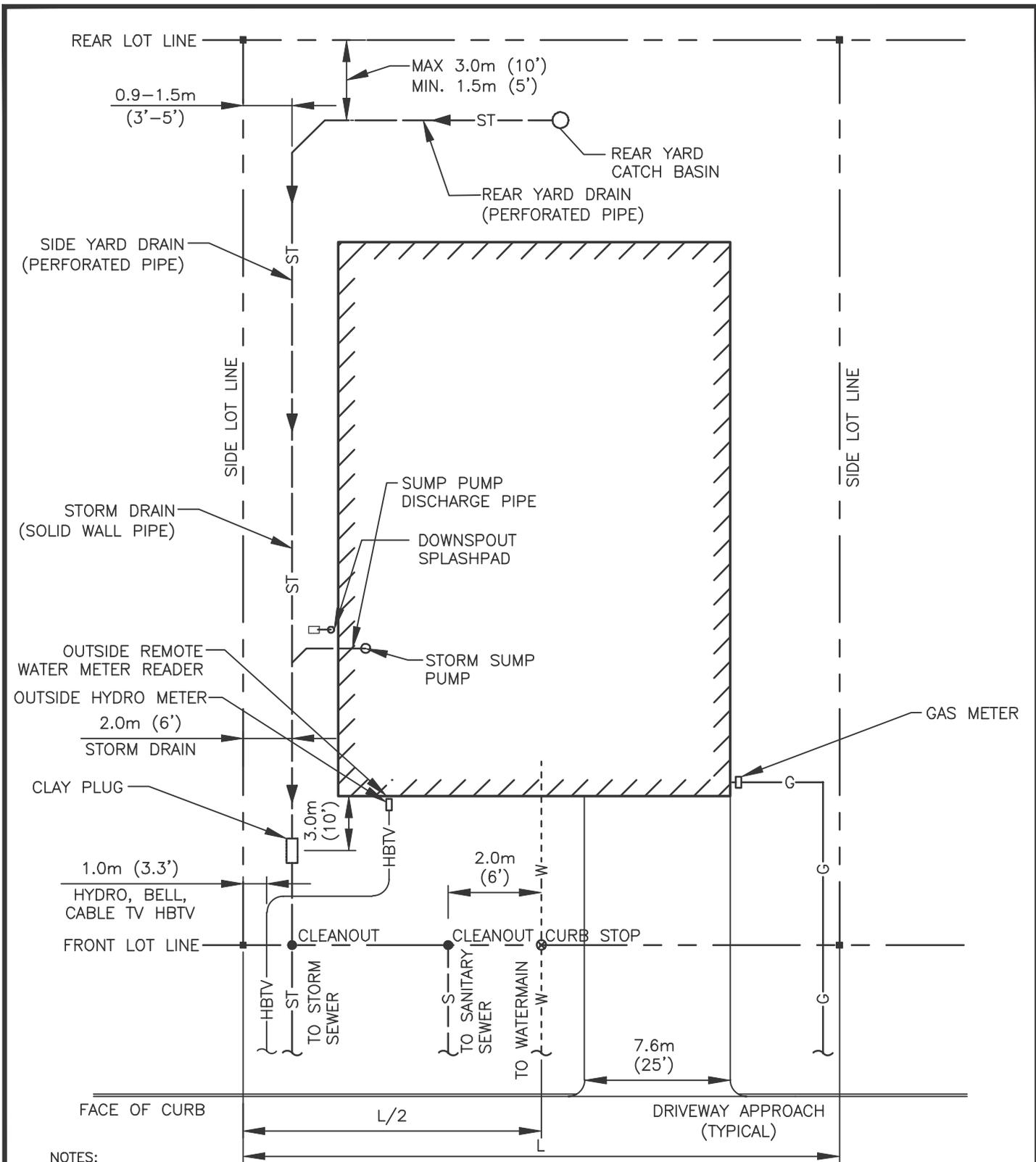
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1	June 01, 2021

Town of Essex Development Manual

Figure S-4
 PRIVATE SERVICE CONNECTIONS
 BEDDING AND BACKFILL



NOTES:

1. OFFSETS SHOWN ARE TYPICAL, THEY MAY VARY BASED ON SERVICING DRAWINGS.
2. SEE O.B.C. FOR CLEANOUT SPACING.
3. REAR YARD CATCH BASIN LOCATION TO BE APPROVED BY TOWN.
4. AVOID SANITARY CLEANOUT IN DRIVEWAYS AND WATER VALVE BOXES.
5. MAINTAIN 1.5m SEPARATION BETWEEN SERVICES IF POSSIBLE.
6. GASKET FITTINGS ONLY.
7. DOWNSPOUTS DISCHARGE TO GROUND SURFACE UNLESS OVER SIDEWALKS, DRIVEWAYS, OR OTHER HARD SURFACES.
8. ALL CLEANOUT CAPS TO BE FOUNDRY STEEL CLEANOUT CAP

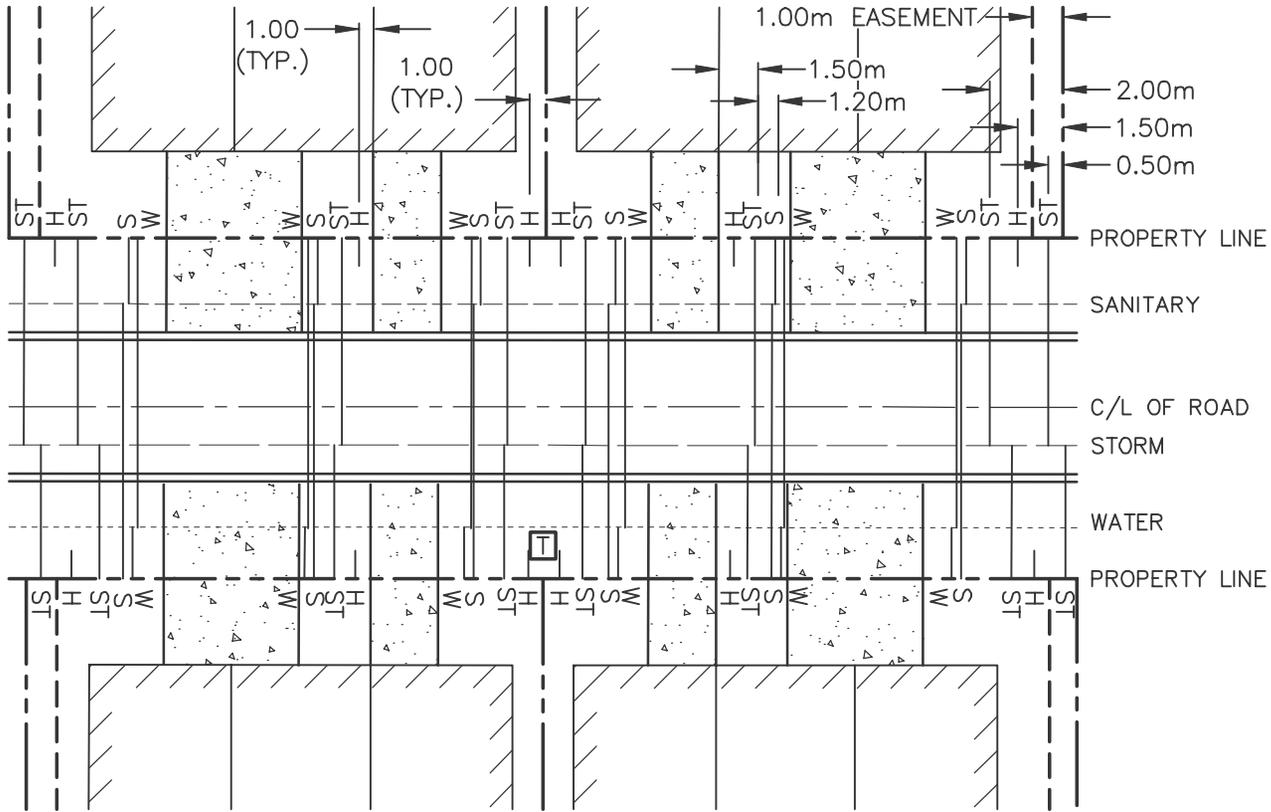
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Figure S-5
SINGLE LOT SERVICE LOCATIONS



NOTE:
 SERVICE CONNECTION TO BE KEPT OUT OF DRIVEWAYS WHERE POSSIBLE

NOTE:
 SANITARY AND WATER SERVICES TO BE INSTALLED IN THE SAME TRENCH WITH SHELF WITH 0.5m HORIZONTAL SEPARATION.

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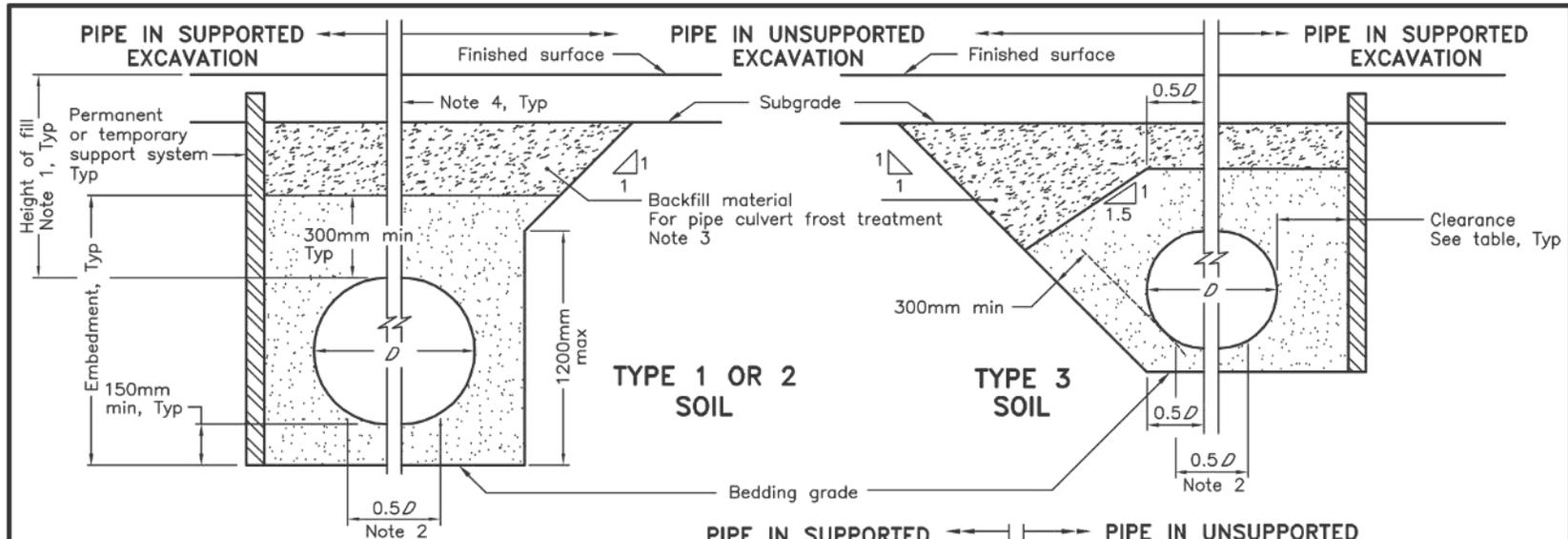


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Figure S-6
 MULTI-UNIT LOT SERVICE LOCATIONS

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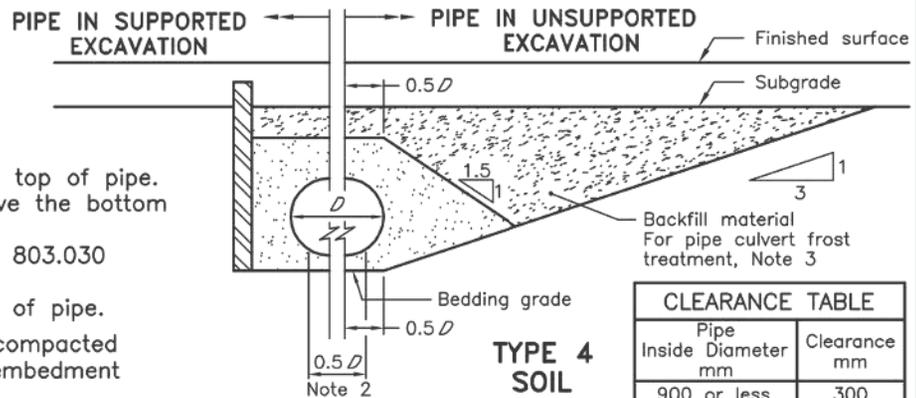


LEGEND:

D - Inside diameter

NOTES:

- 1 Height of fill is measured from the finished surface to top of pipe.
 - 2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
 - 3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
 - 4 Condition of excavation is symmetrical about centreline of pipe.
- A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
- B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
- C All dimensions are in metres unless otherwise shown.



CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

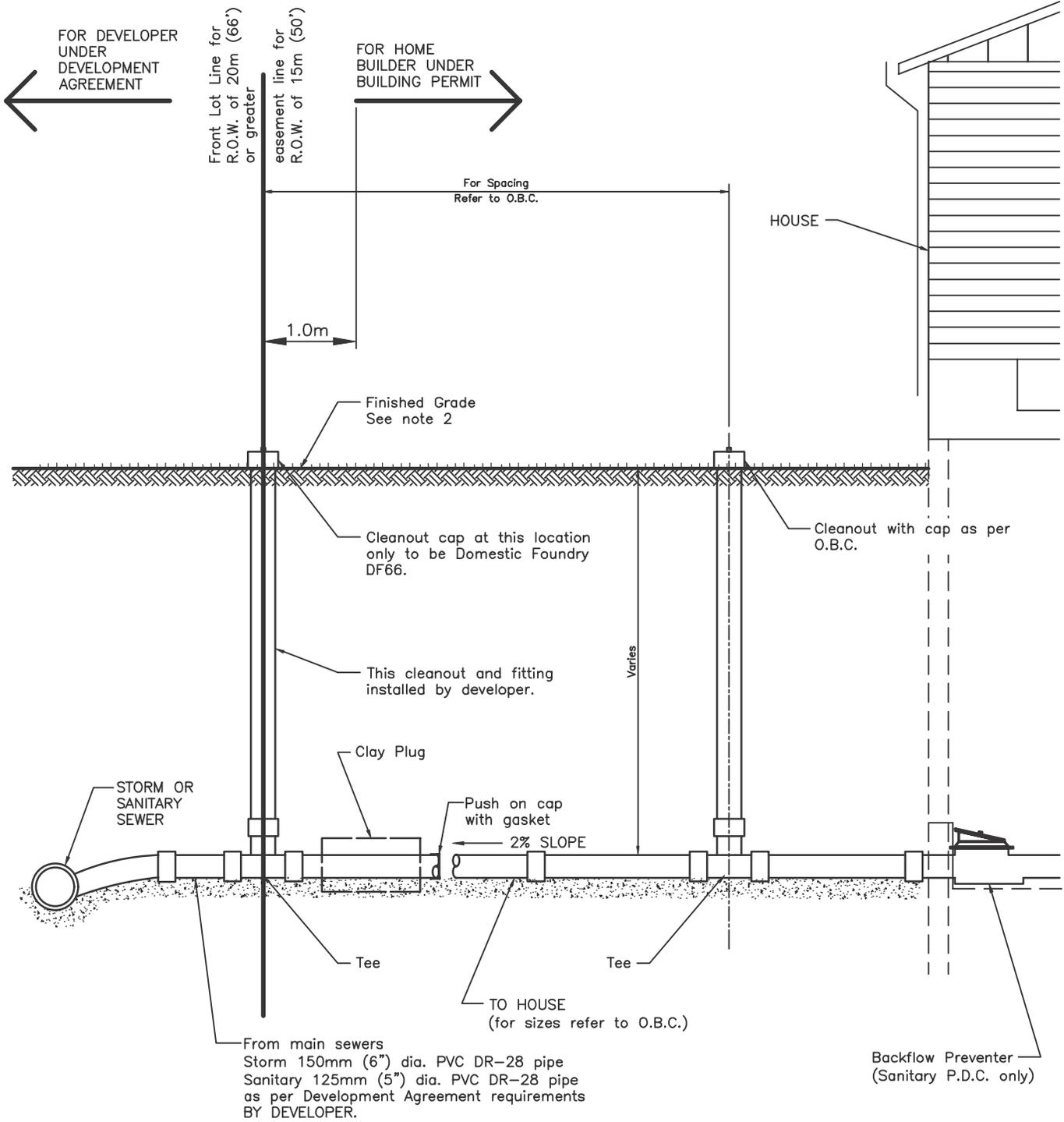
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3	
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION	-----		
OPSD 802.010			



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Figure S-7
 FLEXIBLE PIPE EMBEDMENT AND
 BACKFILL EARTH EXCAVATION - OPSD 802.010



NOTE

1. All materials to be in compliance with O.B.C. and installed as per manufacturers recommendations.
2. All cleanouts to be visible for inspection. Do NOT bury.
3. Another 2.5m of pipe is required inside property.
4. No glued fittings underground.
5. Alternative location for service connection to be approved by Chief Building Official

From main sewers
 Storm 150mm (6") dia. PVC DR-28 pipe
 Sanitary 125mm (5") dia. PVC DR-28 pipe
 as per Development Agreement requirements
 BY DEVELOPER.

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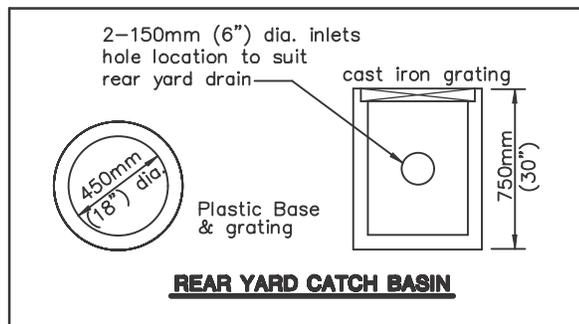
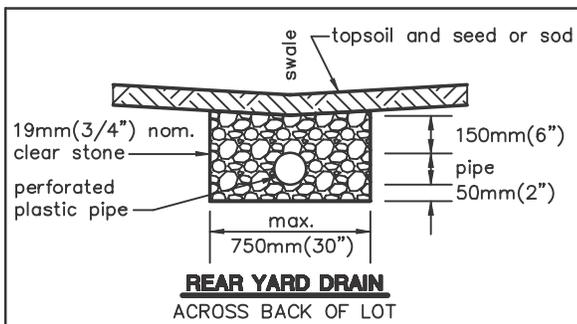
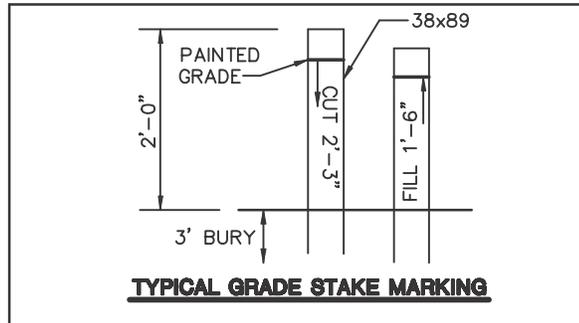
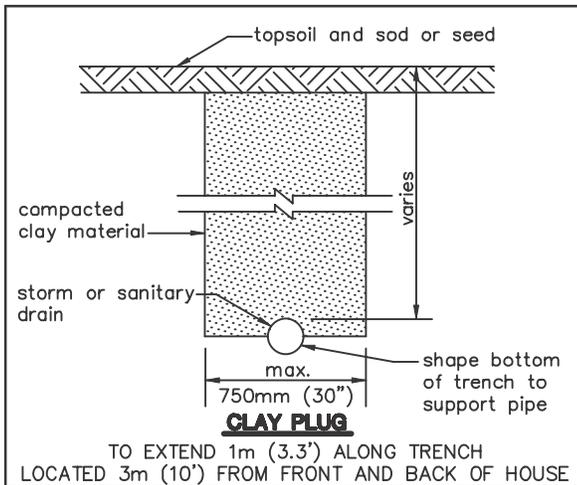
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Figure S-8
 SANITARY AND STORM SERVICE CLEAN OUT

NOTES:

1. Place a 38x89x1500mm long (2"x4"x5') wood stake at each lot corner and at side yards adjacent to house. Mark the cut or fill to finished grade from top of stake on each stake. All stakes to remain in place until Chief Building Official approves final lot grading.
2. Optional Big "O" for storm drainage.
3. Reference Elevation –



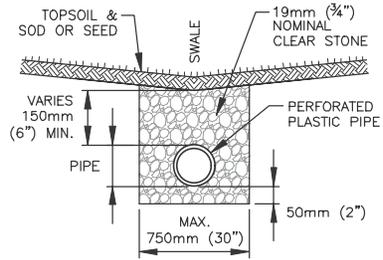
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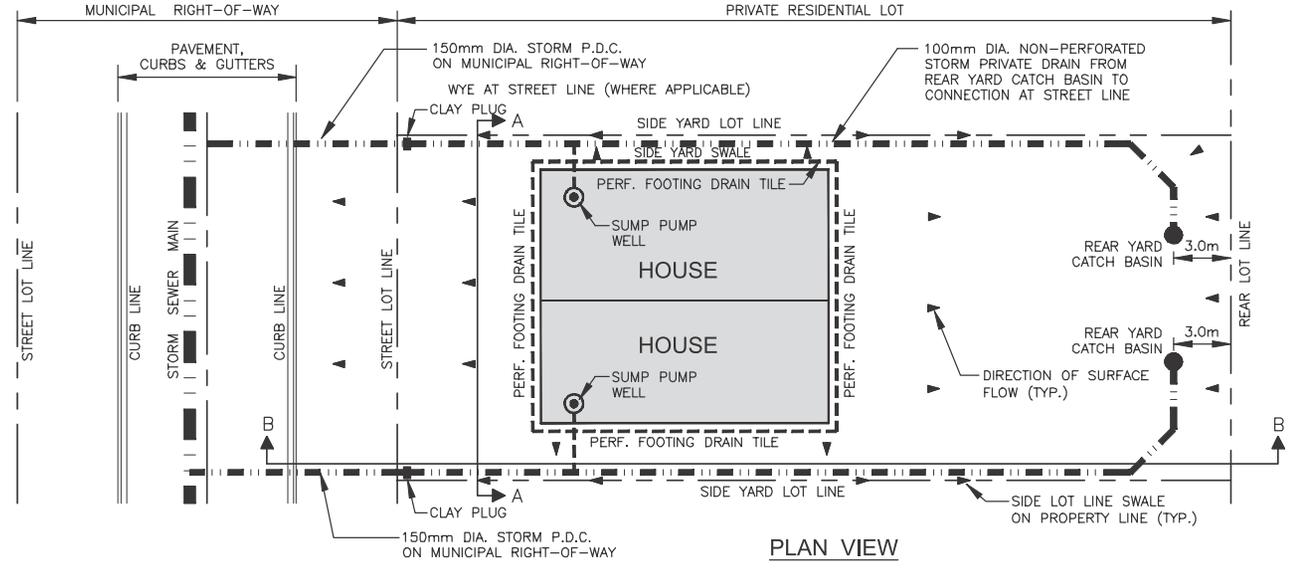
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Figure LG-1
LOT GRADING AND SERVICES DETAIL SHEET



NOTE:
SETBACK 1.5m (5')
FROM REAR PROPERTY LINE.

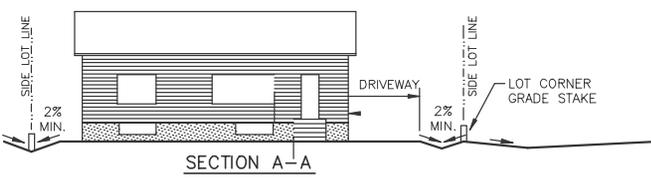
REAR YARD DRAIN



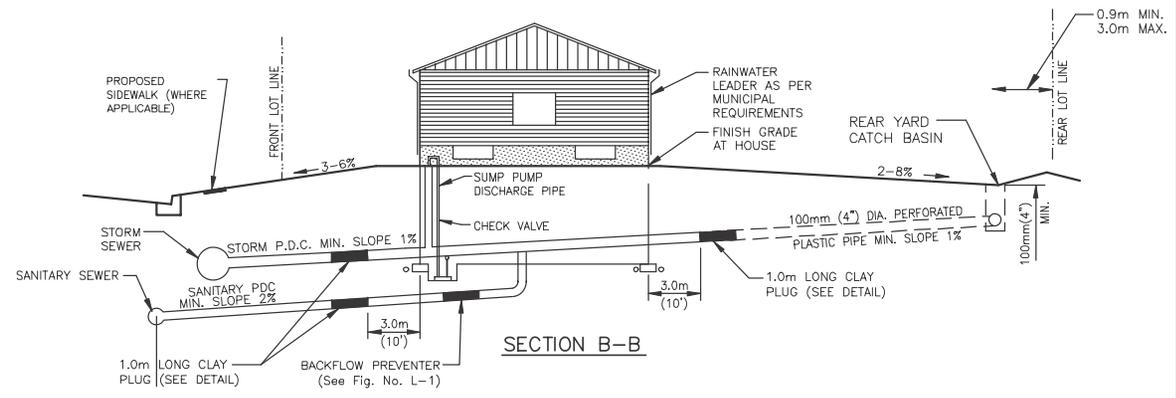
PLAN VIEW

ABUTTING SIDE YARD CONDITION
side yard swale on side lot line - grade to front and rear of lot

ABUTTING REAR YARD CONDITION
side yard swale between house and side lot line on lot - grade to front and rear of lot



SECTION A-A

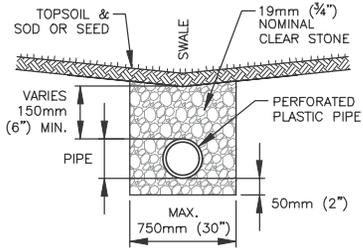


SECTION B-B

DRAWING: 01 PLAN, REVISION: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

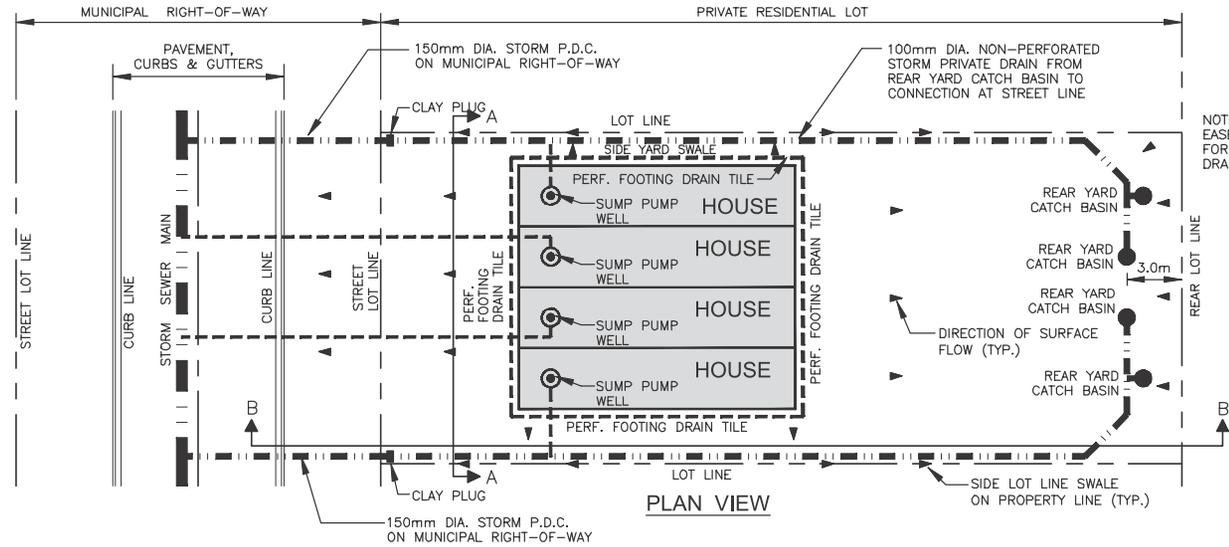


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NOTE:
SETBACK 1.5m (5')
FROM REAR PROPERTY LINE.

REAR YARD DRAIN



NOTE: MAINTENANCE
EASEMENT REQUIRED
FOR REAR YARD
DRAINAGE SYSTEM

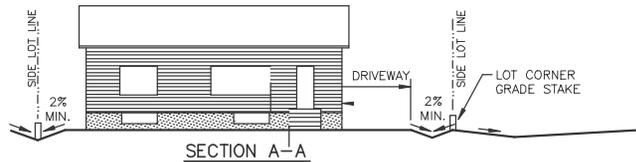
PLAN VIEW

ABUTTING SIDE YARD CONDITION

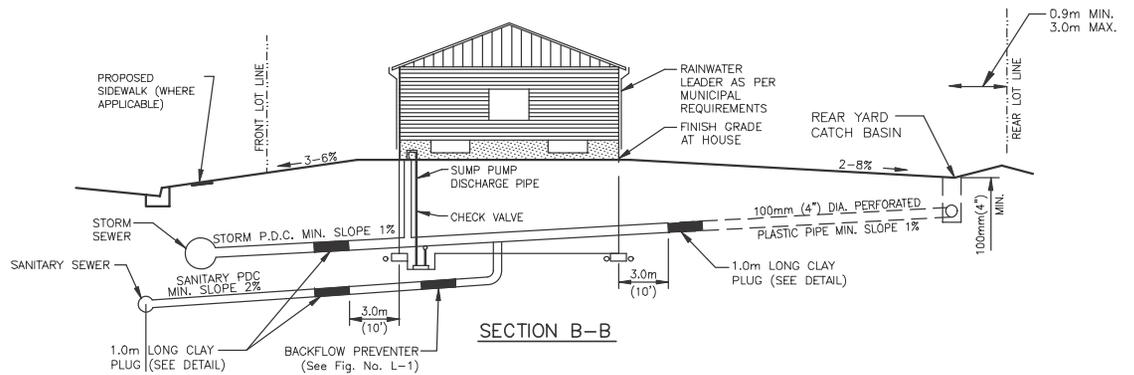
side yard swale on side lot
line - grade to front and
rear of lot

ABUTTING REAR YARD CONDITION

side yard swale between house and
side lot line on lot - grade to front
and rear of lot



SECTION A-A



SECTION B-B

DRAWING: 01/20/2021 REVISED: 06/01/2021 TOWN OF ESSEX DEVELOPMENT MANUAL - LOT GRADING AND DRAINAGE
 PROJECT: 2021-01-24 @ 11:15:47 AM LOT SWALE LOT PLUG SWALE SIDE SWALE SIDE SWALE

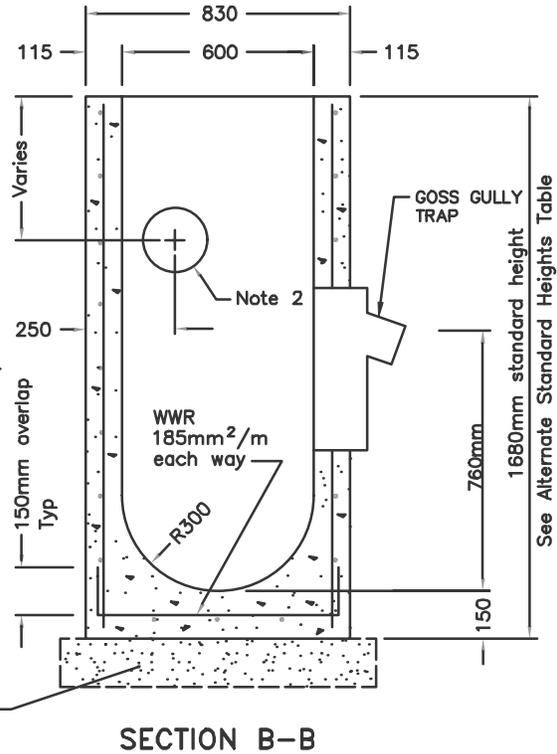
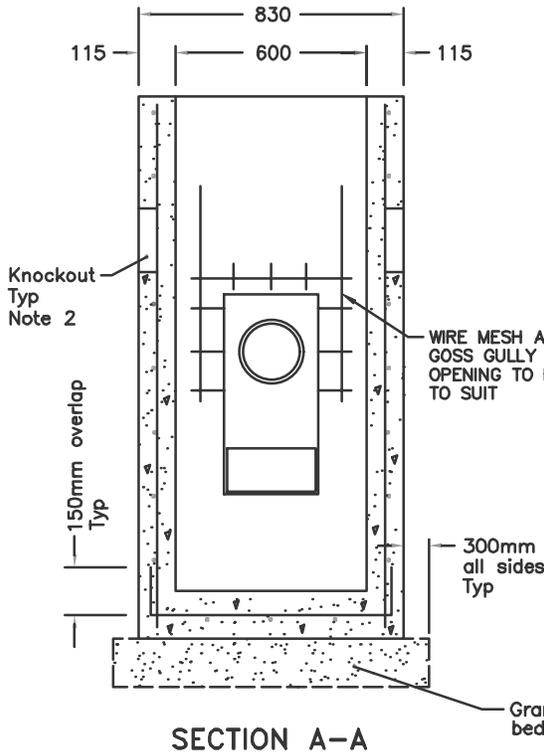
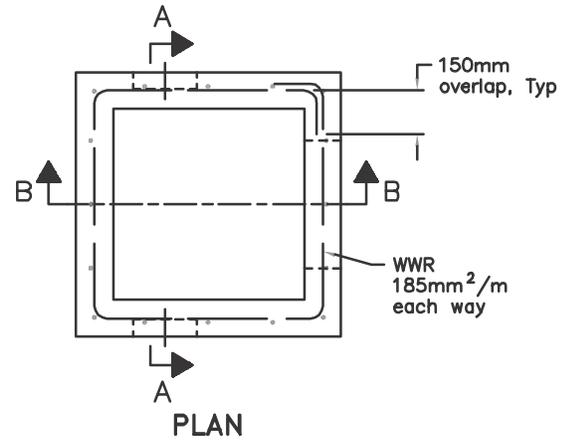


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Figure LG5
LOT GRADING AND DRAINAGE
4-UNIT TOWNHOUSE

ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380



NOTES:

- 1 Outlet hole size 525mm diameter maximum, location as required.
- 2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
- A Centre reinforcing in base slab and walls ± 20 mm.
- B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
- C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
- D Pipe support shall be according to OPSD 708.020.
- E All dimensions are nominal.
- F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3	
PRECAST CONCRETE CATCH BASIN	-----		
600x600mm	OPSD 705.010		

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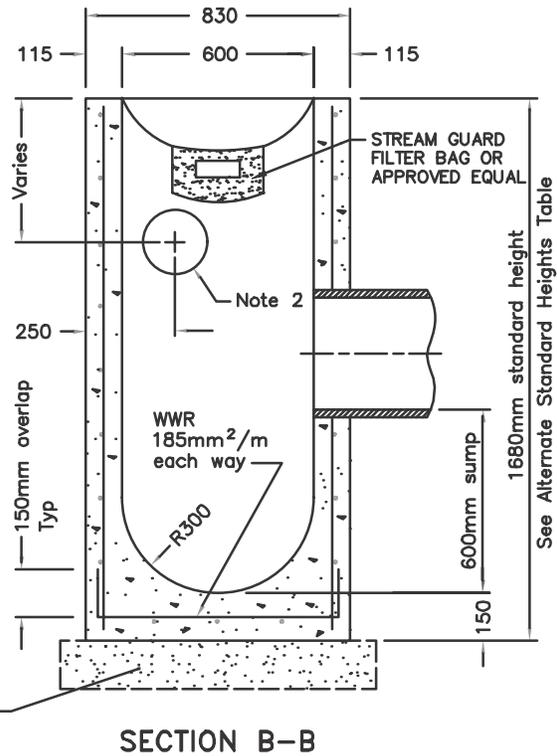
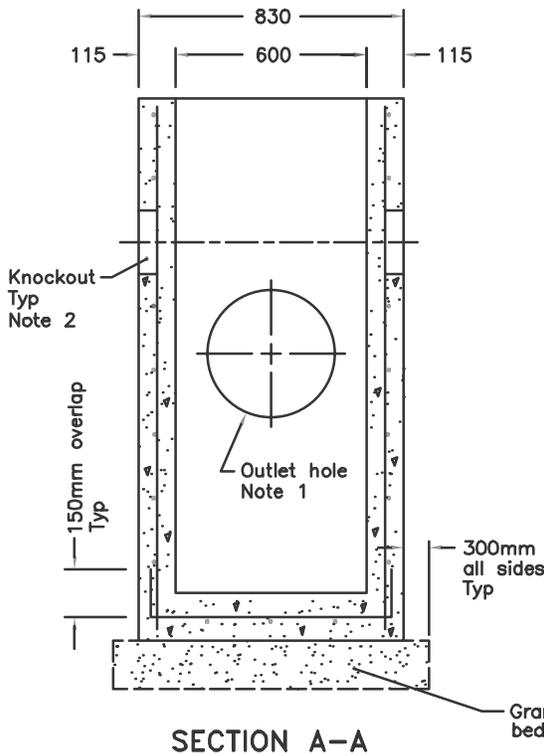
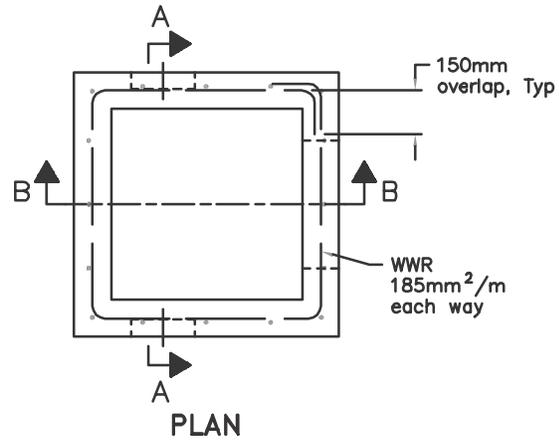


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Figure ST-1
 PRECAST CONCRETE CATCHBASIN
 (WITH GOSS GULLY TRAP)

ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380



NOTES:

- 1 Outlet hole size 525mm diameter maximum, location as required.
- 2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
- A Centre reinforcing in base slab and walls ± 20 mm.
- B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
- C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
- D Pipe support shall be according to OPSD 708.020.
- E All dimensions are nominal.
- F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2014	Rev 3	
PRECAST CONCRETE CATCH BASIN		-----		
600x600mm		OPSD 705.010		

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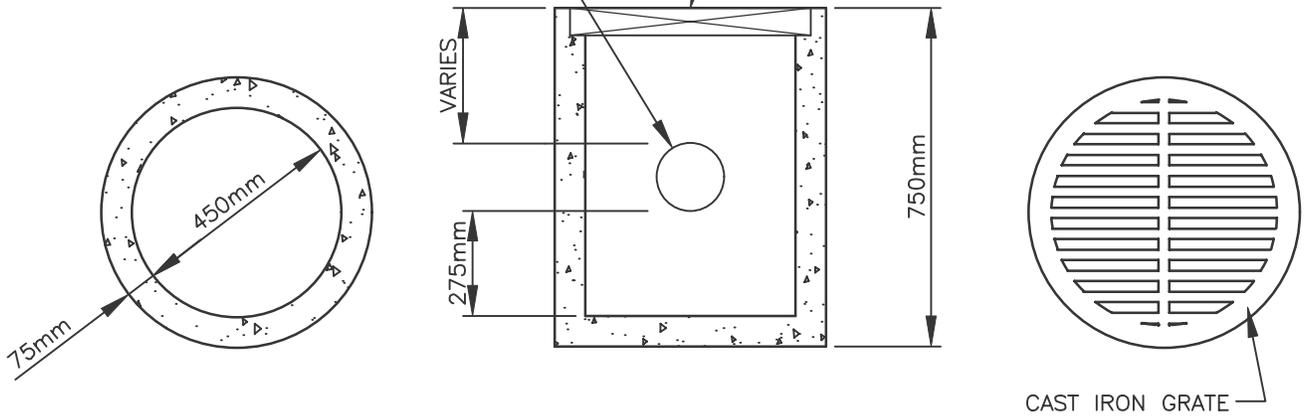


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Figure ST-2
 PRECAST CONCRETE CATCHBASIN
 (WITH FILTER CLOTH)

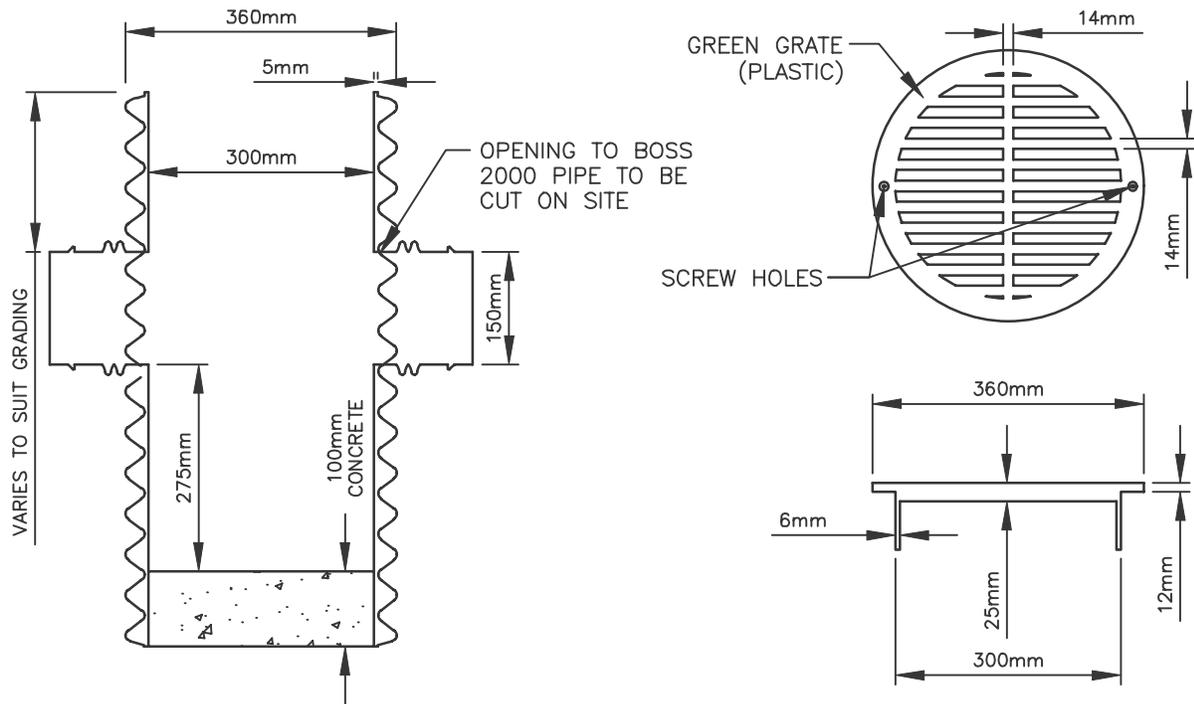
2-150mm DIA. INLETS.
HOLE LOCATION TO
SUIT REAR YARD DRAIN.



NOTE:

1. CONCRETE TO BE 30 MPa, AIR ENTRAINED 6% ± 1 ½%.
2. ALTERNATE REAR YARD CATCH BASINS MAY BE ACCEPTABLE. CHECK WITH CHIEF BUILDING OFFICIAL.

REAR YARD CATCH BASIN
(CONCRETE)



REAR YARD CATCH BASIN
(PLASTIC)

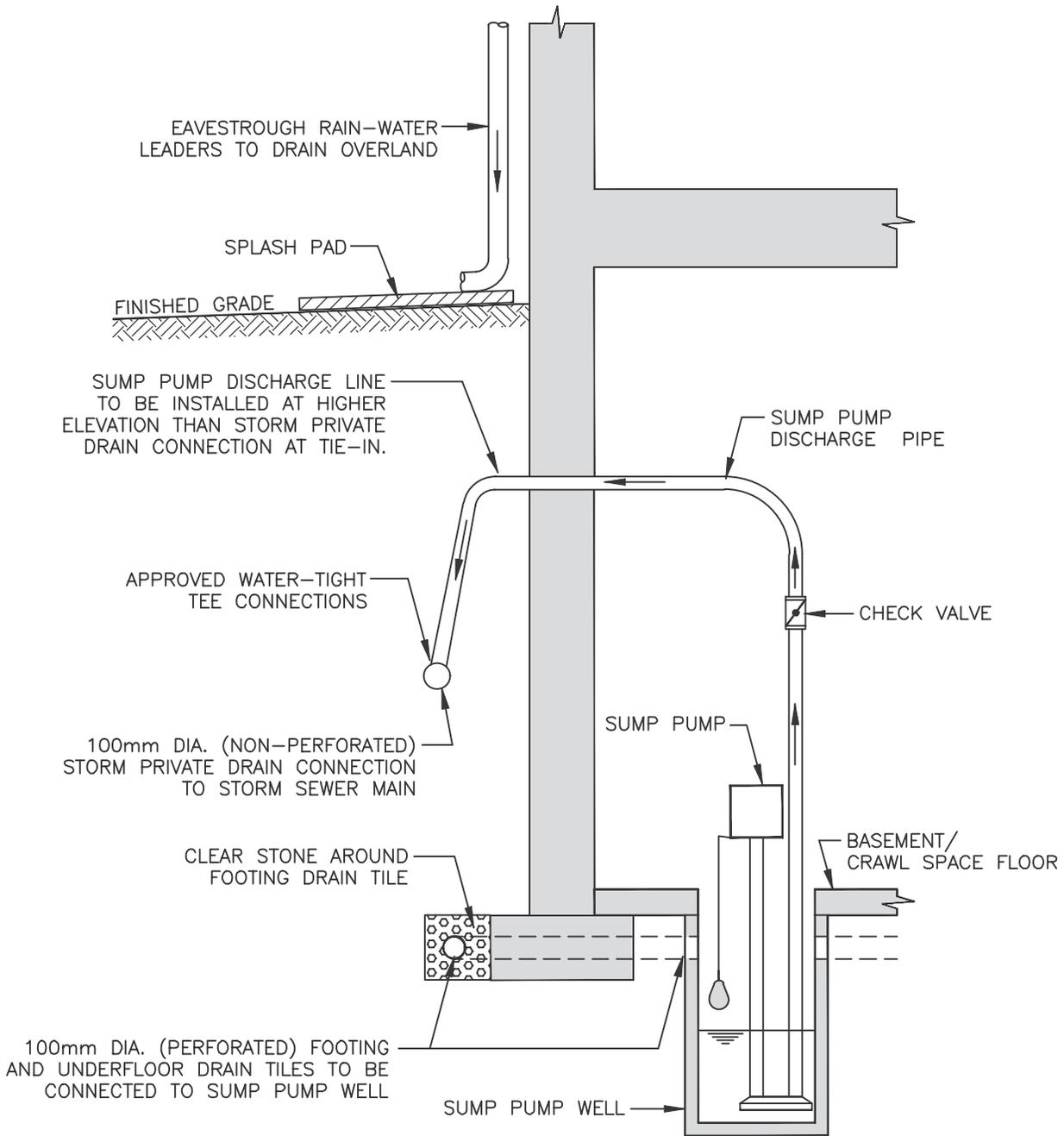
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Figure ST-3
REAR YARD CATCHBASIN



NOTES:

1. PERFORATED FOOTING DRAIN, WITH CROSS-OVERS CONNECTED TO SUMP PIT.
2. ALL PLUMBING/DRAINAGE PIPING AND FITTINGS SHALL BE INSTALLED TO CONFORM TO THE ONTARIO BUILDING CODE AND LATEST AMENDMENTS.
3. SUPPORT PIPING TO WALL. DRAWING IS FOR ILLUSTRATION PURPOSE ONLY.

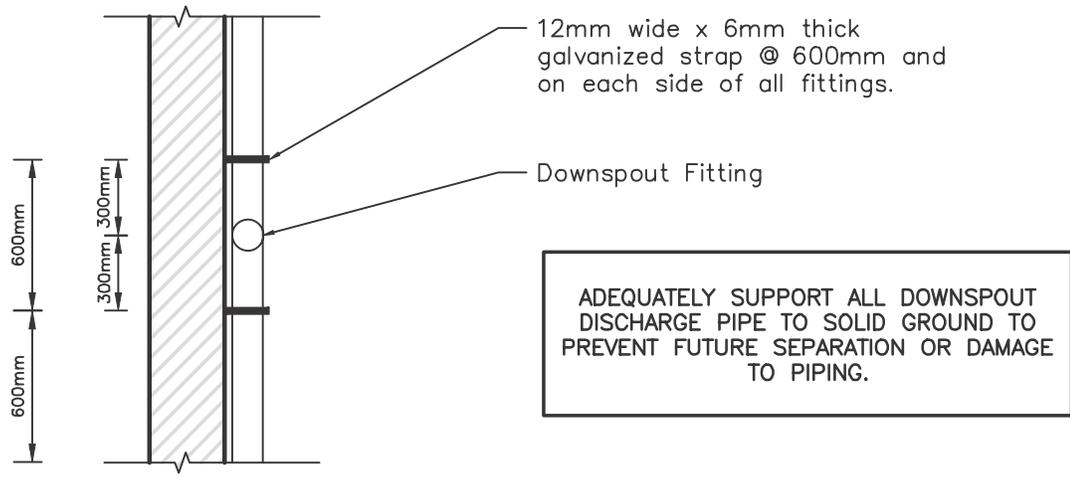
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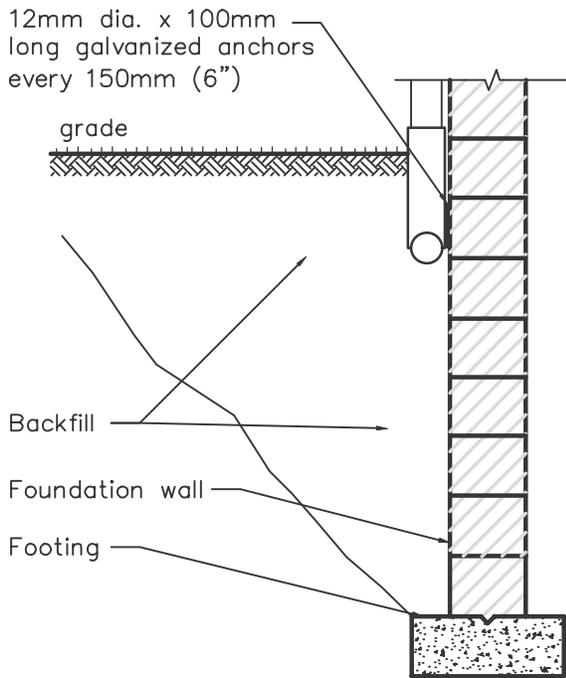
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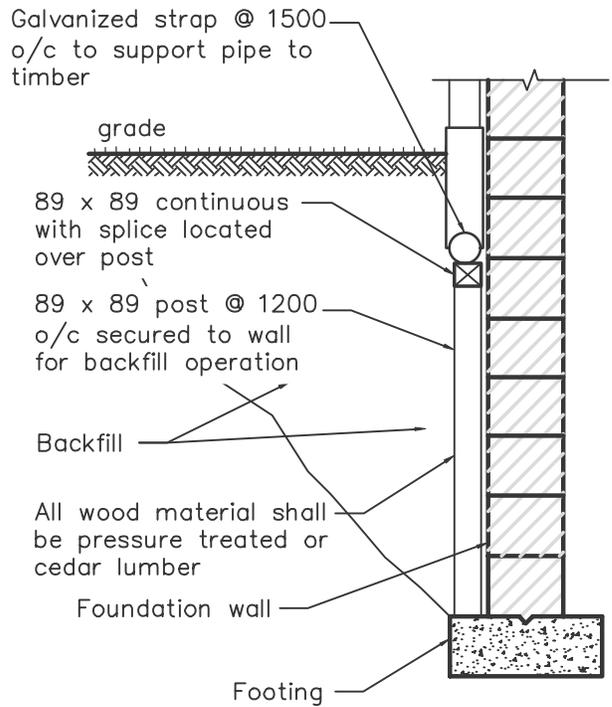
Figure ST-4
 FOOTING DRAIN, SUMP PUMP AND
 DISCHARGE PIPE DETAILS



PLAN



WALL SECTION ALTERNATIVE NO. 1
(PREFERRED)



WALL SECTION ALTERNATIVE NO. 2

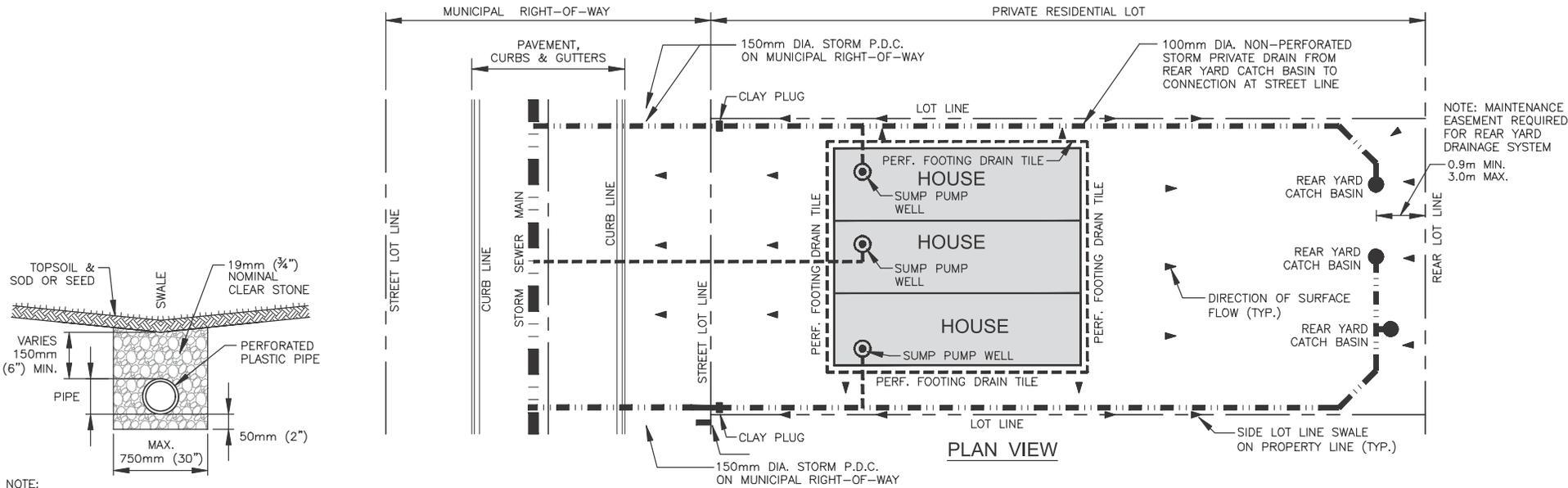
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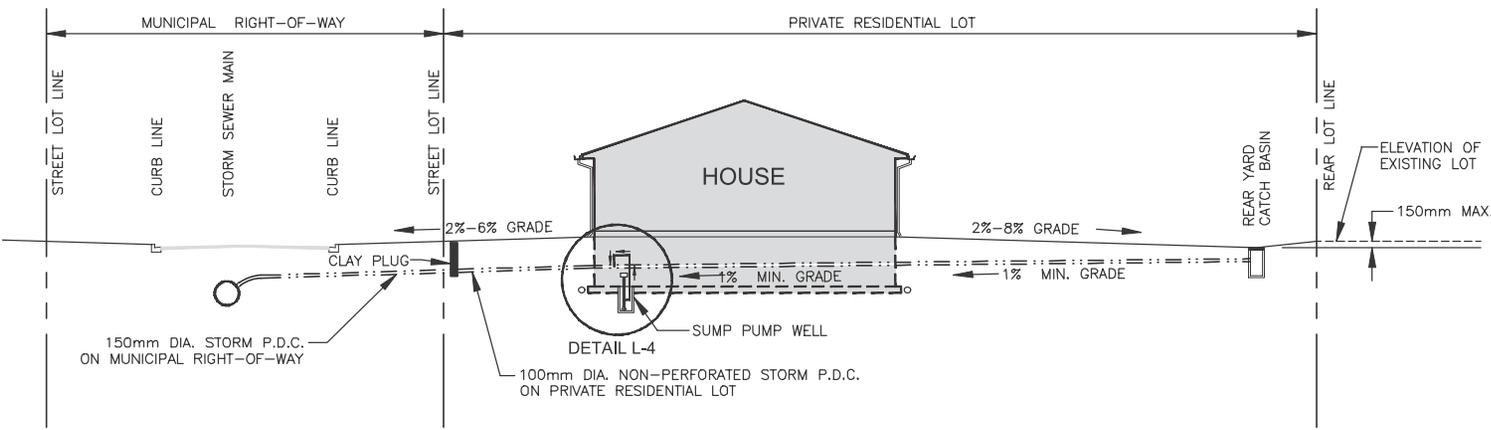
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Figure ST-5
DOWNSPOUT DISCHARGE PIPE SUPPORT



REAR YARD DRAIN

NOTE:
SETBACK 1.5m (5')
FROM REAR PROPERTY LINE.



PROFILE VIEW

DRAWING: 01 PLAN, REVISION: 01/2021, PROJECT: 2020-2021, SHEET: 01 OF 02, DATE: 01/14/2021, DRAWN BY: J. BROWN, CHECKED BY: M. BROWN, APPROVED BY: M. BROWN, TOWN OF ESSEX, 100 MAIN STREET, WESTPORT, MA 01886

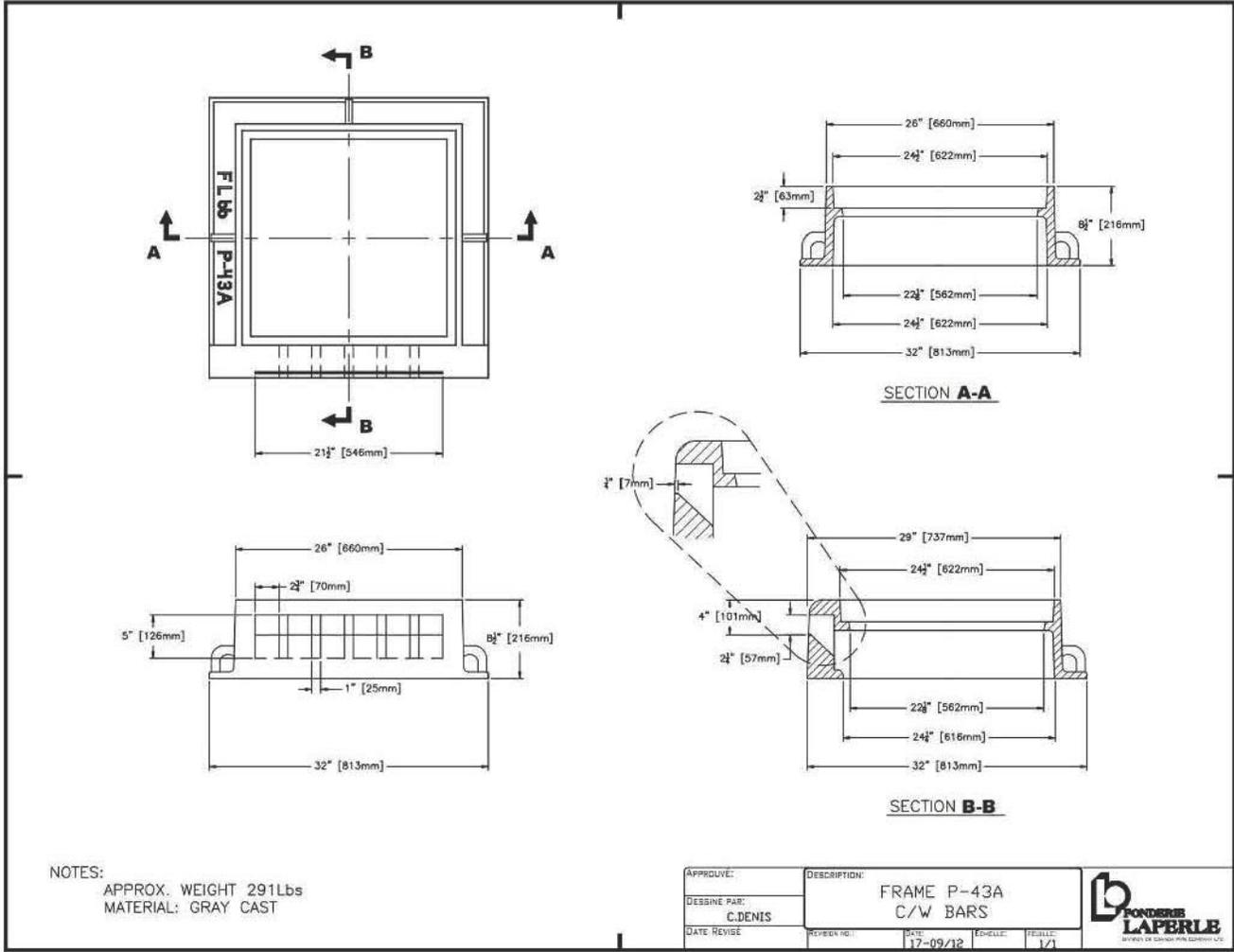


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Figure ST-8

SUGGESTED METHOD OF INSTALLATION FOR A 3-UNIT TOWNHOUSE STORM DRAINAGE SYSTEM



FILENAME: C:\PW\WORKING DIRECTORY\PROJECTS 2020\33\KP\VMS45610\203349-FIG-CON CG DEC 14.DWG PLOTTED BY: PINSONNEAULT, LOUIS
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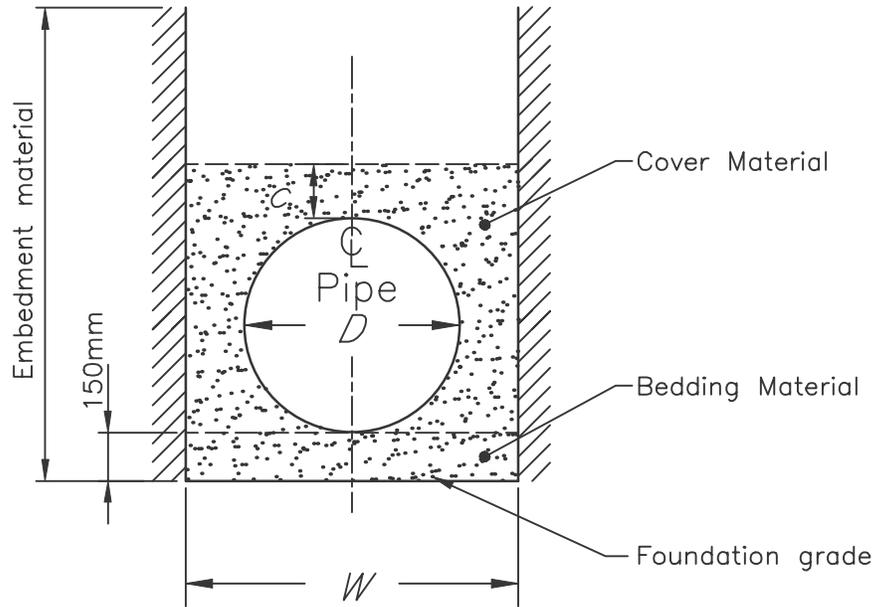


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Figure ST-10
INLET CATCH BASIN FRAME
WITH BARS DETAIL

PIPE IN TRENCH



EARTH AND ROCK EXCAVATION

NOTES:

1. Backfill according to OPSD-803.04
2. All dimensions are in millimetres or metres unless otherwise shown.
3. Bedding material to be in accordance with the Ontario Building Code

LEGEND:

- D - Inside diameter
- W - Minimum width of bedding:
 $D + 800\text{mm}$ for $D \leq 1000\text{mm}$
 $1.67D$ for $1000\text{mm} < D < 1800\text{mm}$
 $D + 1200\text{mm}$ for $D \geq 1800\text{mm}$.
- c - Pipe Diameter $< 600\text{mm}$ $c = 300\text{mm}$,
 - Pipe Diameter $\geq 600\text{mm}$ $c = \frac{\text{Dia.} + 300}{4}$

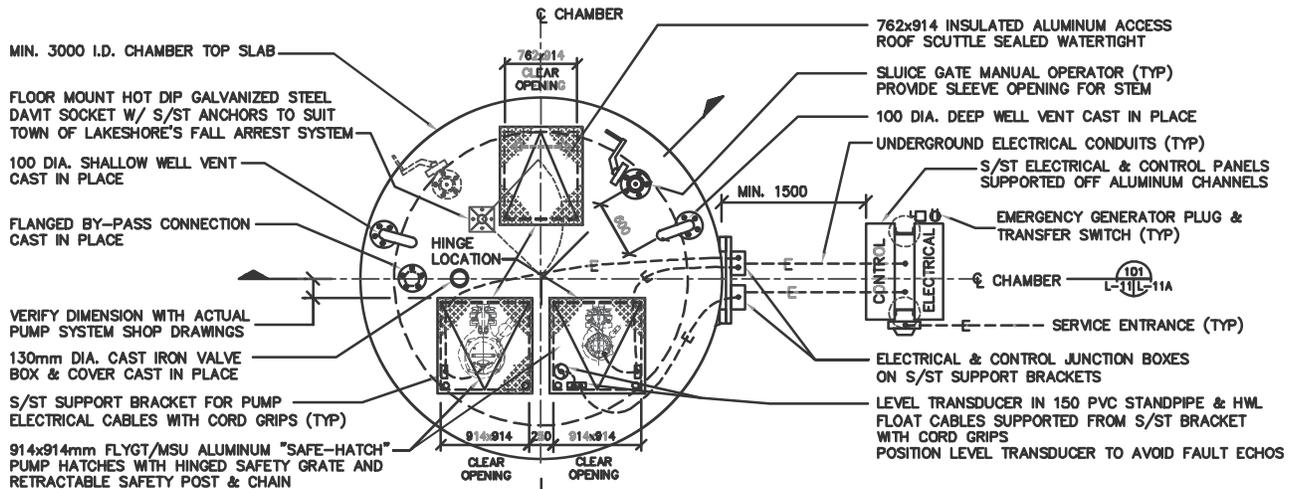
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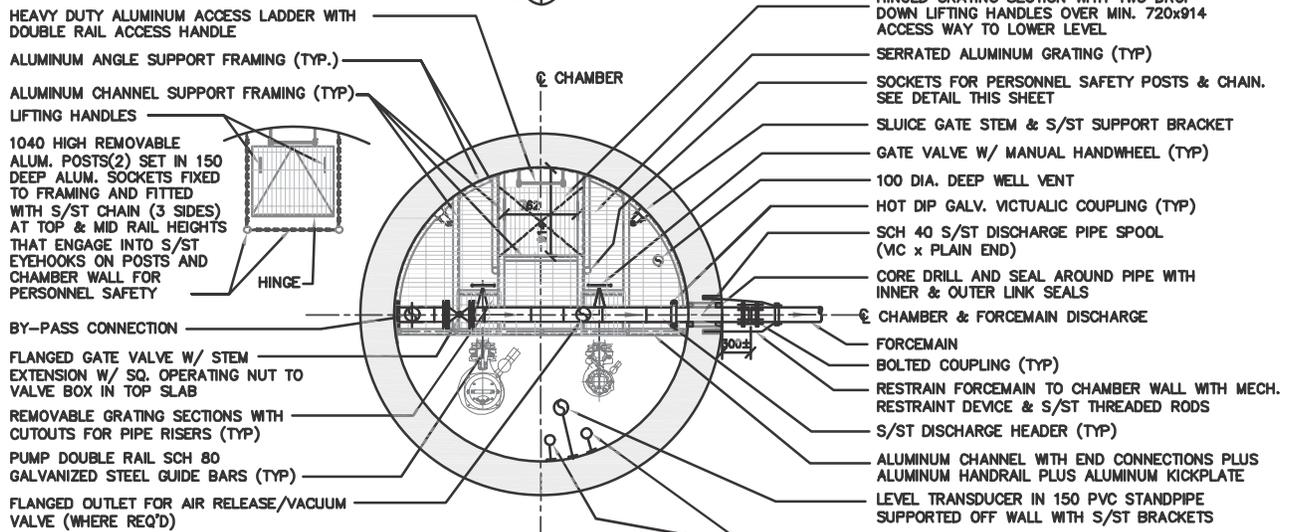
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Figure SA-1
BEDDING FOR SANITARY SEWERS
FLEXIBLE PIPE



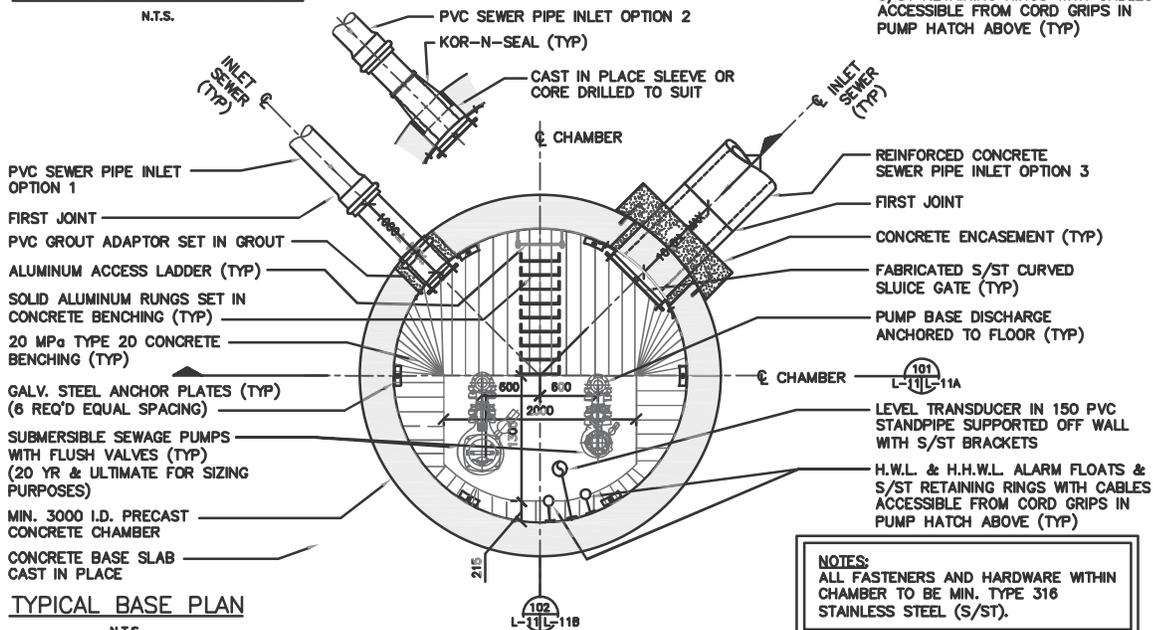
TYPICAL TOP PLAN

N.T.S.



TYPICAL PLATFORM PLAN

N.T.S.



TYPICAL BASE PLAN

N.T.S.

NOTES:
ALL FASTENERS AND HARDWARE WITHIN CHAMBER TO BE MIN. TYPE 316 STAINLESS STEEL (S/S/T).

This standard drawing serves as a reference to assist the Engineer in the design and preparation of detailed construction drawings. Contemplated changes/deviations/customization of the design/arrangement/configuration depicted in this drawing to suit a specific design/situation/circumstance/location/etc. shall first be reviewed with and approved by the Town of Lakeshore on a case by case basis prior to implementation.

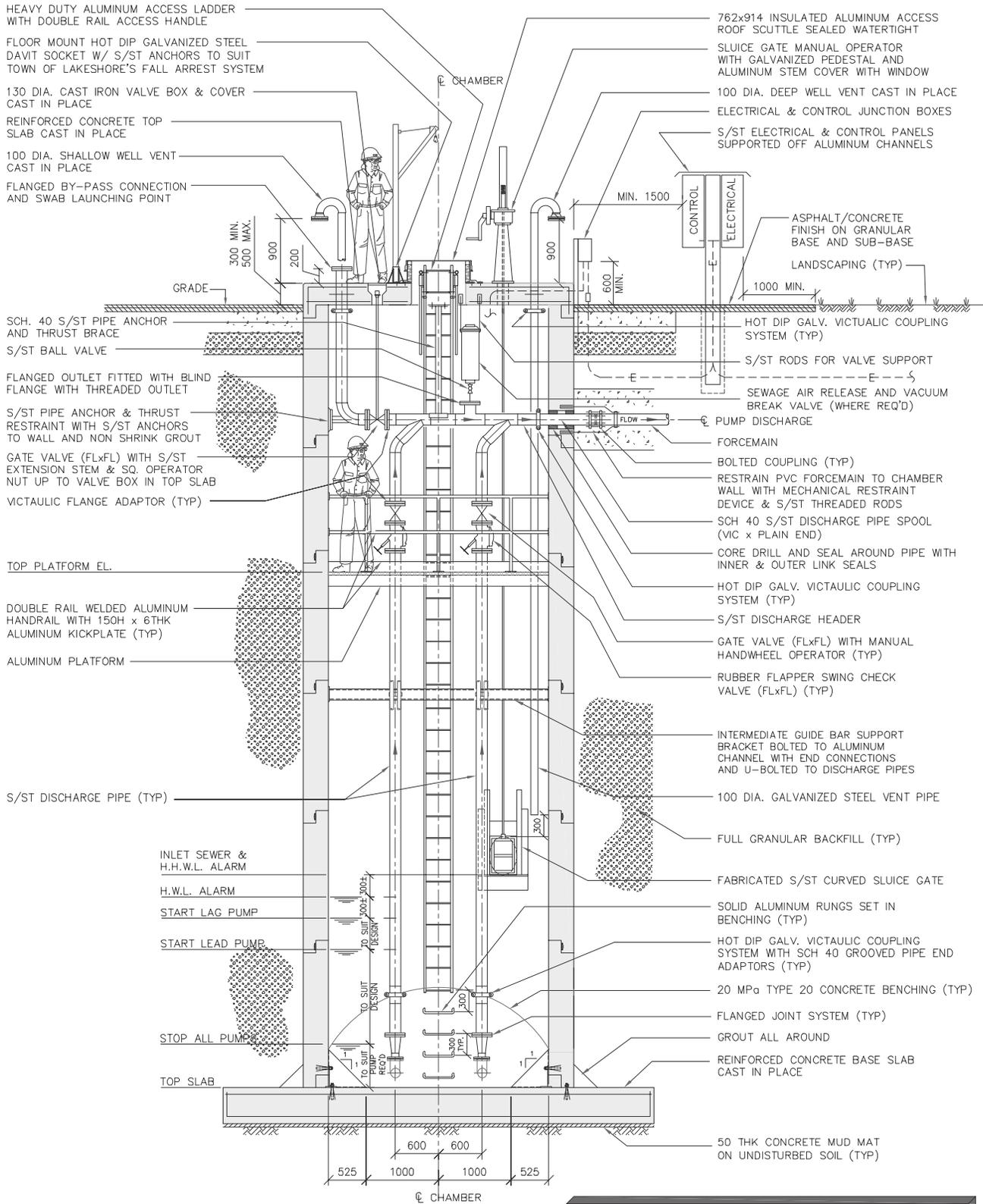
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Figure SA-3
TYPICAL SANITARY PUMP STATION (3000mm DIA.)
PLAN VIEWS



NOTES:
 ALL FASTENERS AND HARDWARE WITHIN CHAMBER TO BE MIN. TYPE 316 STAINLESS STEEL (S/ST).

This standard drawing serves as a reference to assist the Engineer in the design and preparation of detailed construction drawings. Contemplated changes/deviations/customization of the design/arrangement/configuration depicted in this drawing to suit a specific design/situation/circumstance/location/etc. shall first be reviewed with and approved by the Town of Lakeshore on a case by case basis prior to implementation.

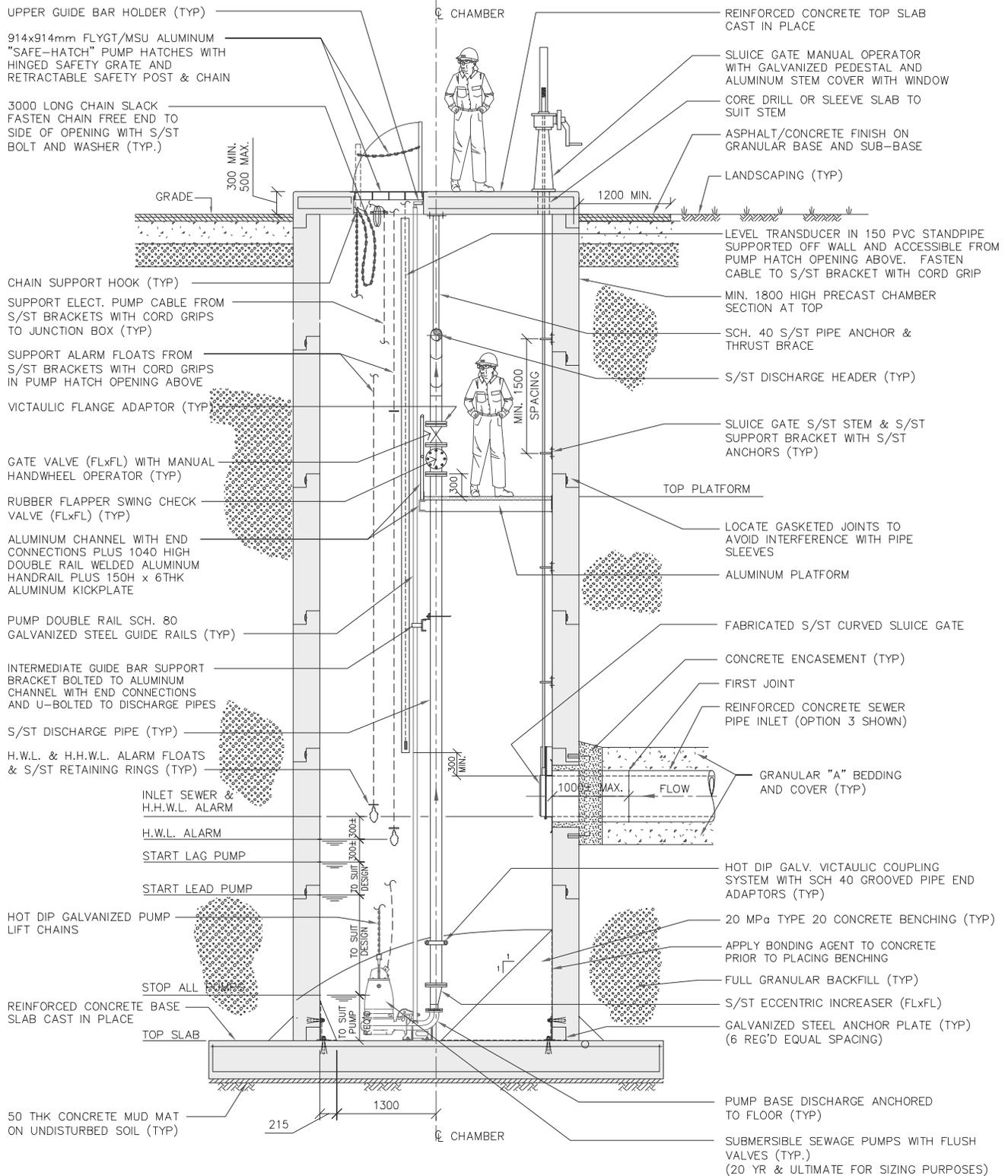
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Figure SA-4
 TYPICAL SANITARY PUMP STATION (3000mm DIA.)
 CROSS SECTION



NOTES:
 ALL FASTENERS AND HARDWARE WITHIN
 CHAMBER TO BE MIN. TYPE 316
 STAINLESS STEEL (S/ST).

This standard drawing serves as a reference to assist the Engineer in the design and preparation of detailed construction drawings. Contemplated changes/deviations/customization of the design/arrangement/configuration depicted in this drawing to suit a specific design/situation/circumstance/location/etc. shall first be reviewed with and approved by the Town of Lakeshore on a case by case basis prior to implementation.

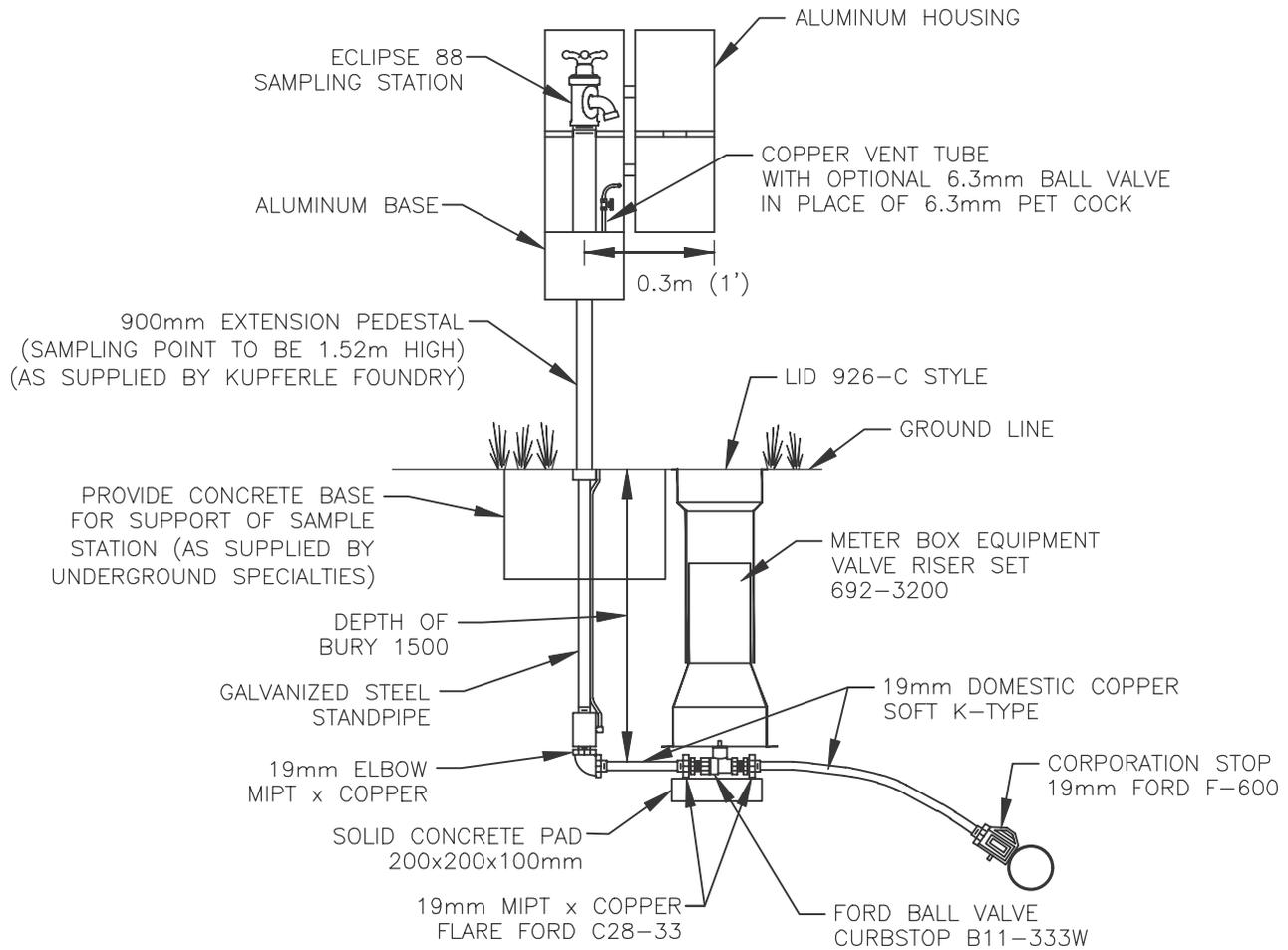
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Figure SA-5
 TYPICAL SANITARY PUMP STATION (3000mm DIA.)
 CROSS SECTION



NOTES:

1. SAMPLING STATIONS SHALL BE 1.5m BURY, WITH A 19mm FIP INLET, AND A (19mm HOSE OR UNTHREADED) NOZZLE.
2. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NONREMOVABLE, ALUMINUM-CAST HOUSING.
3. WHEN OPENED, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND THE WATER WILL FLOW IN AN ALL BRASS WATERWAY.
4. ALL WORKING PARTS WILL ALSO BE OF BRASS AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING. EXTERIOR PIPING SHALL BE GALVANIZED STEEL (BRASS PIPE ALSO AVAILABLE).
5. A COPPER VENT TUBE WILL ENABLE EACH STATION TO BE PUMPED FREE OF STANDING WATER TO PREVENT FREEZING AND TO MINIMIZE BACTERIA GROWTH.
6. ECLIPSE NO. 88 SAMPLING STATION SHALL BE MANUFACTURED BY KUPFERLE FOUNDRY, ST. LOUIS, MO 63102.

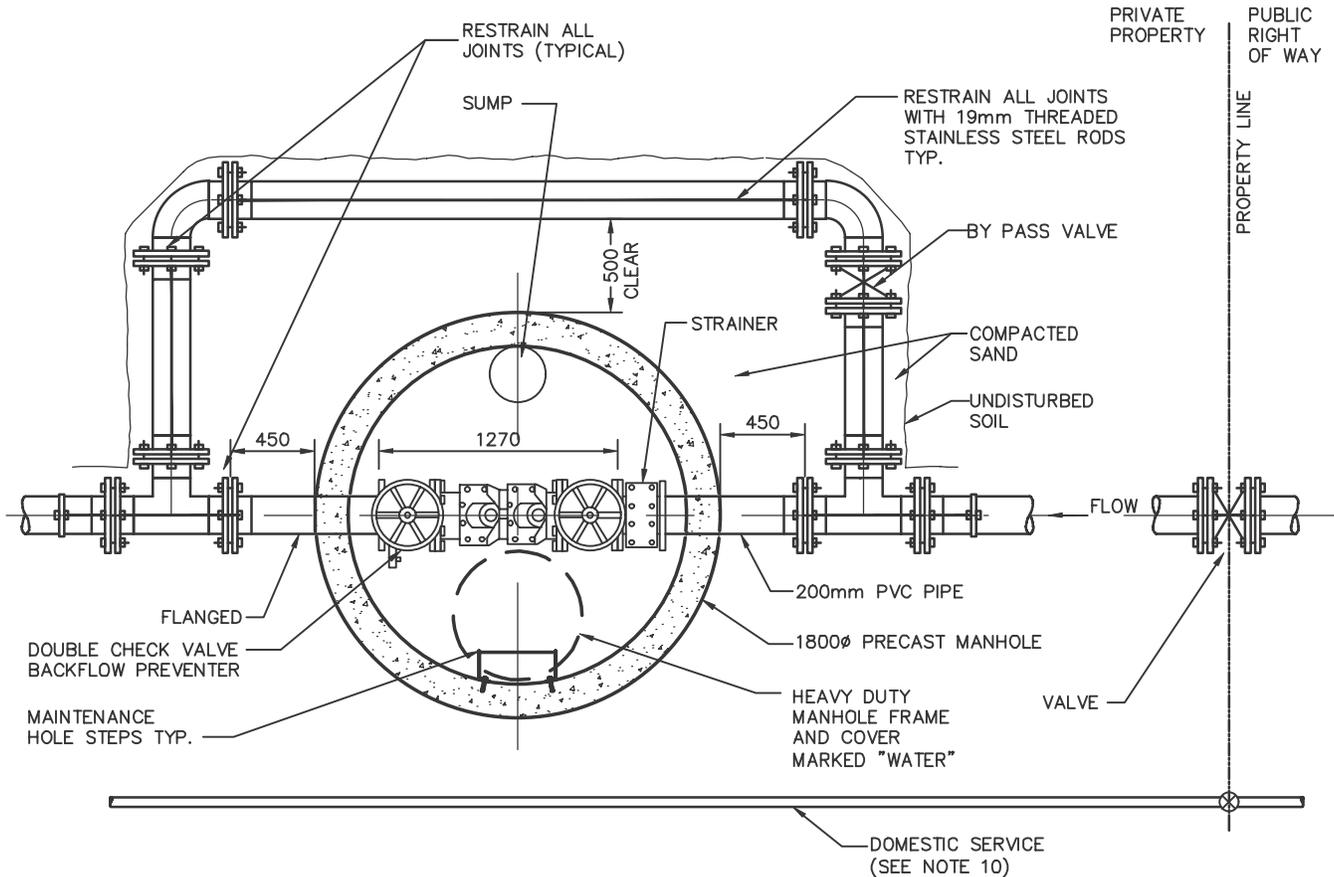
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Figure W-1
 ECLIPSE No. 88
 WATER SAMPLING STATION



SECTION PLAN

GENERAL NOTES

1. PRECAST CHAMBERS SHALL HAVE 600mm CLEARANCE AROUND ALL PIPING FOR MAINTENANCE PURPOSES.
2. METERS SHALL BE AS MANUFACTURED BY NEPTUNE OR APPROVED EQUAL.
3. BACKFLOW PREVENTERS SHALL BE AS MANUFACTURED BY WATTS OR APPROVED EQUAL.
4. STRAINER DEVICE SHALL BE AS MANUFACTURED BY NEPTUNE OR APPROVED EQUAL.
5. PROPERTY LINE VALVES SHALL BE AS MANUFACTURED BY MUELLER OR APPROVED EQUAL.
6. REMOTE READER SHALL BE APPROVED BY TOWN OF ESSEX.
7. MANHOLES DESIGNED TO CARRY CL-625-ONT TRUCK TO CANADIAN HIGHWAY BRIDGE DESIGN CODE, CAN/CSA-S6-00
8. MANHOLE RUNGS TO BE AS PER OPSD 405-020
9. STAMPED SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER OF ONTARIO TO BE SUBMITTED
10. DOMESTIC WATER SERVICE TO BE CONNECTED SEPARATELY TO WATERMAIN ON PUBLIC RIGHT-OF-WAY.

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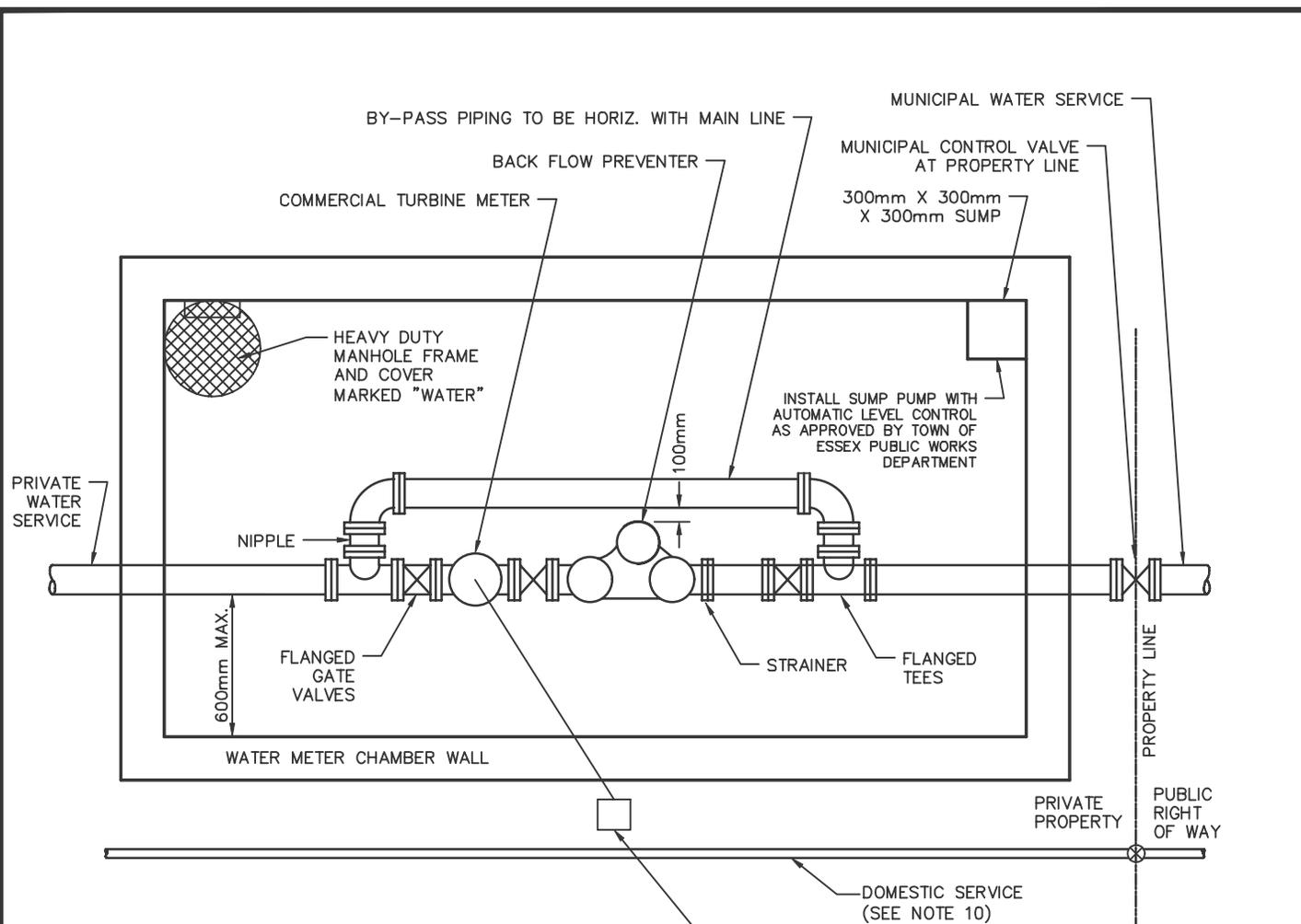
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Figure W-2

ECLIPSE No. 88

BACKFLOW PREVENTION CHAMBER



GENERAL NOTES

1. PRECAST CHAMBERS SHALL HAVE 600mm CLEARANCE AROUND ALL PIPING FOR MAINTENANCE PURPOSES.
2. METERS SHALL BE AS MANUFACTURED BY NEPTUNE OR APPROVED EQUAL.
3. BACKFLOW PREVENTERS SHALL BE AS MANUFACTURED BY WATTS OR APPROVED EQUAL.
4. STRAINER DEVICE SHALL BE AS MANUFACTURED BY NEPTUNE OR APPROVED EQUAL.
5. PROPERTY LINE VALVES SHALL BE AS MANUFACTURED BY MUELLER OR APPROVED EQUAL.
6. REMOTE READER SHALL BE APPROVED BY THE TOWN OF ESSEX.
7. MANHOLES DESIGNED TO CARRY CL-625-ONT TRUCK TO CANADIAN HIGHWAY BRIDGE DESIGN CODE, CAN/CSA-S6-00
8. MANHOLE RUNGS TO BE AS PER OPSD 405-020
9. STAMPED SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER OF ONTARIO TO BE SUBMITTED.
10. DOMESTIC WATER SERVICE TO BE CONNECTED SEPARATELY TO WATERMAIN ON PUBLIC RIGHT-OF-WAY.

100mm x 100mm x 2500mm LONG PRESSURE TREATED POST FOR REMOTE METER READING MIN. EMBEDMENT 1200mm BELOW GRADE

MINIMUM CHAMBER SIZES	WIDTH	LENGTH	HEIGHT
50mm DIA. WATER SERVICE	1.7m	3.0m	2.4m
100mm DIA. WATER SERVICE	2.1m	4.5m	2.4m
150mm DIA. WATER SERVICE	2.4m	5.1m	2.4m

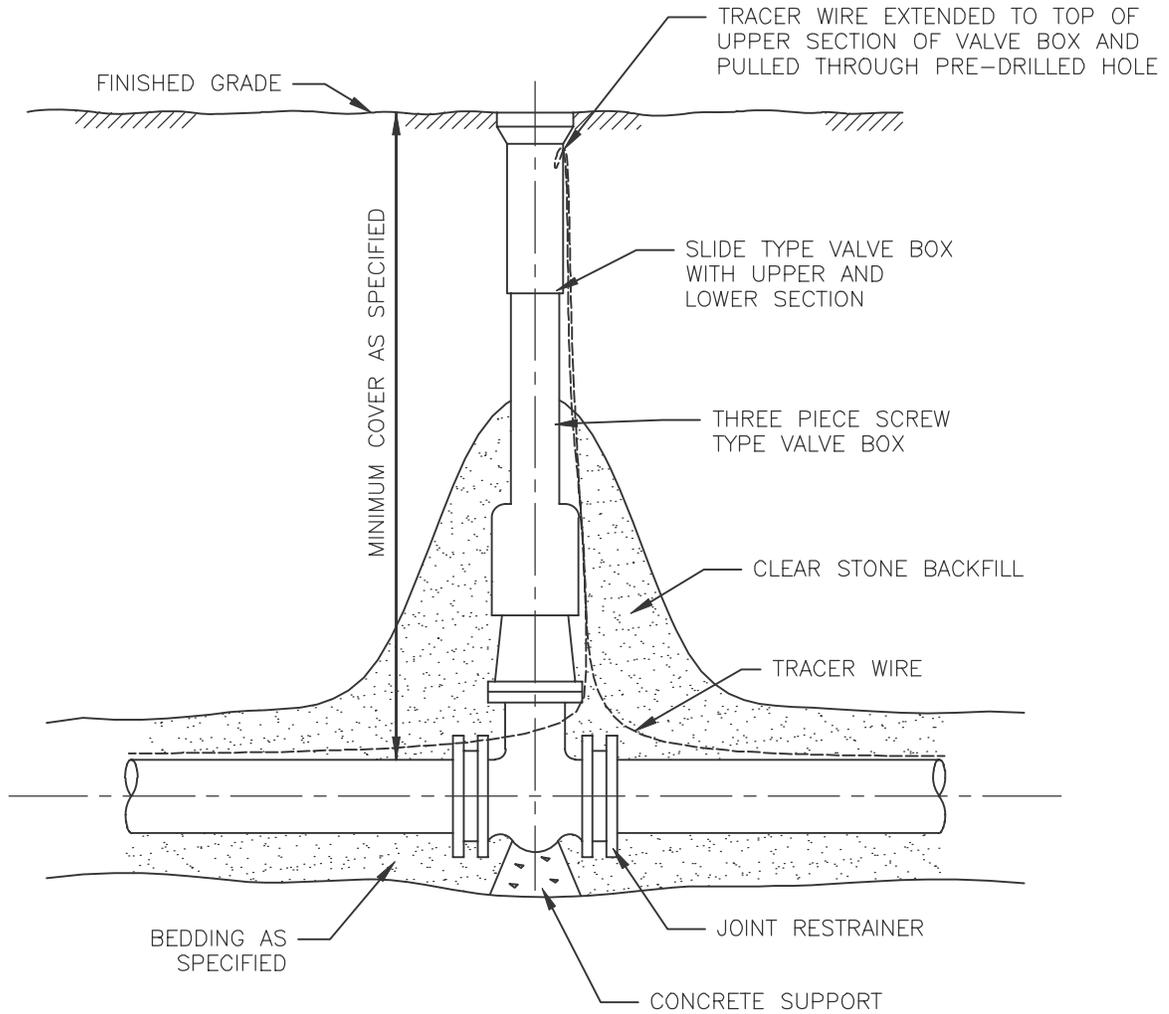
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Figure W-3
BACKFLOW PREVENTION WITH WATER METER



NOTES:

- A ALL CONCRETE THRUST BLOCKS TO BE POURED AGAINST UNDISTURBED GROUND.
- B BOND BREAKER TO BE USED BETWEEN THE CONCRETE AND THE FITTINGS AND APPURTENANCES.
- C BOLTS AND NUTS FOR BURIED FLANGE TO FLANGE CONNECTIONS ARE TO BE STAINLESS STEEL.
- D FLANGE OF STANDPIPE EXTENSIONS NOT TO BE IN FROST ZONE.
- E ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
- F USE DENSO WRAPPING IF REQUIRED BY PUBLIC WORKS. (PROJECT SPECIFIC)

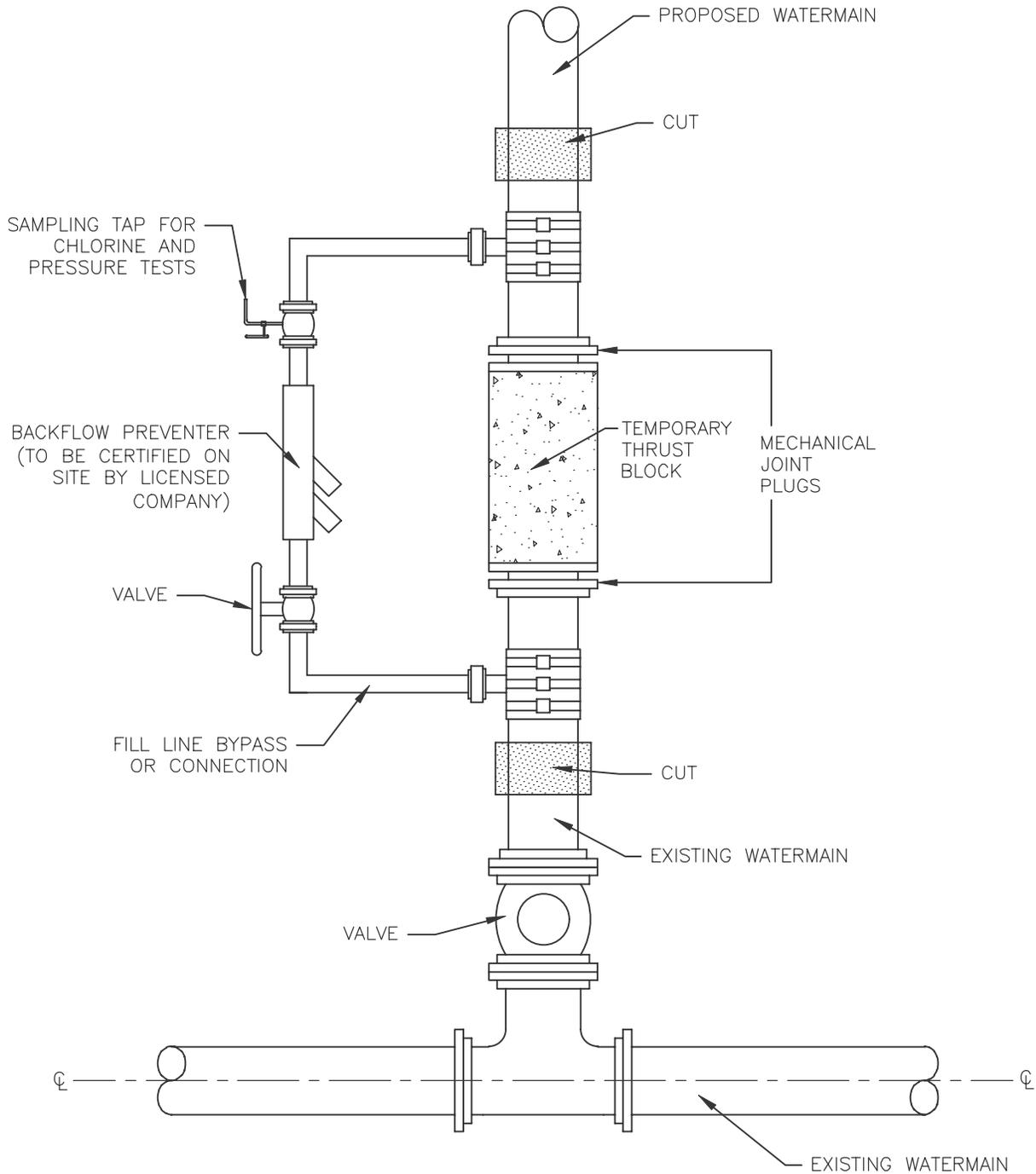
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Figure W-4
WATER VALVE



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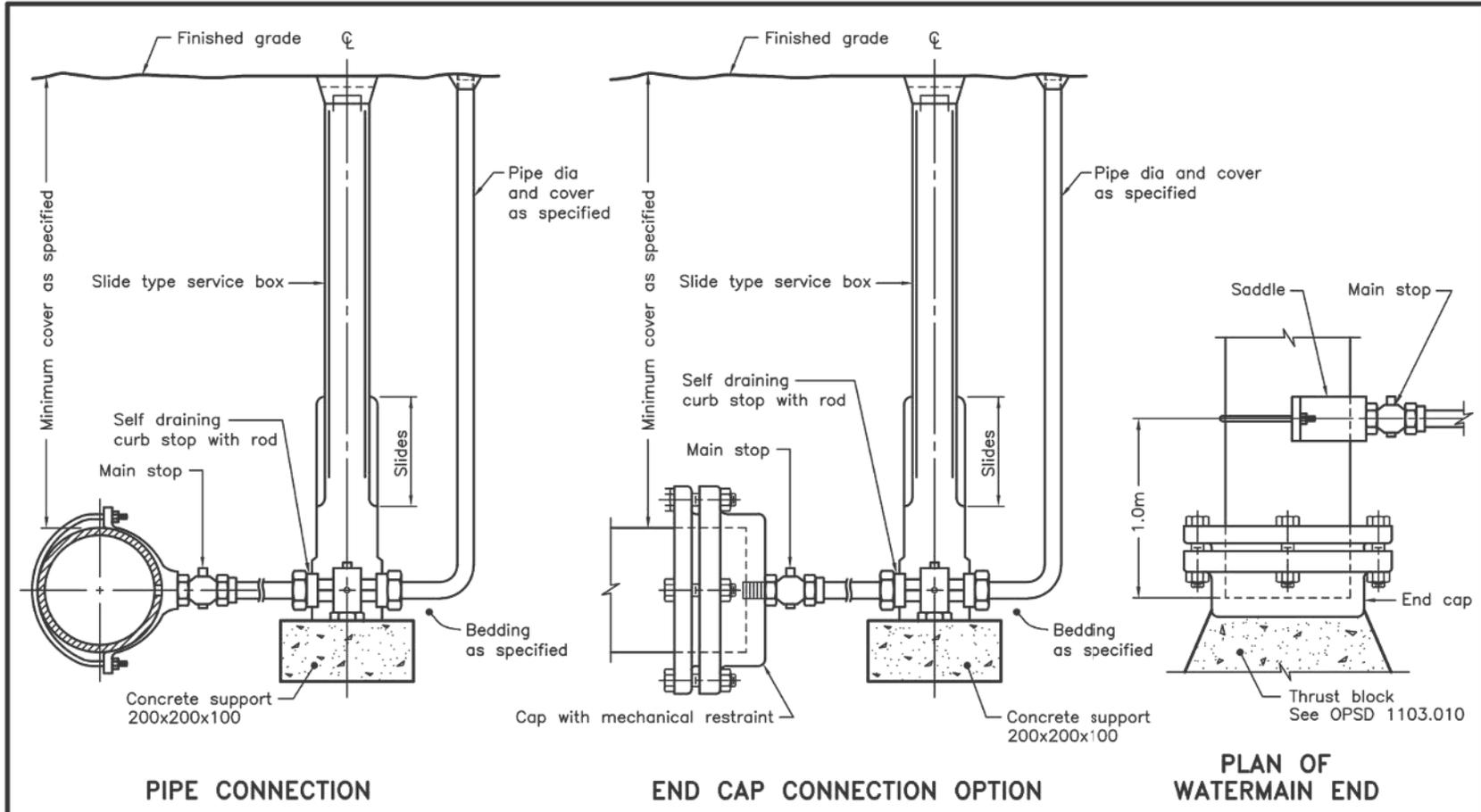


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Figure W-5
 CONNECTION OF NEW WATERMAIN
 TO EXISTING WATERMAIN

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NOTES:
 A Backfill material within 500mm of service box shall be native or imported, as specified.
 B Refer to applicable regulations for end of pipe treatment.
 C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2018	Rev 3
BLOW OFF INSTALLATION			
		OPSD 1104.030	

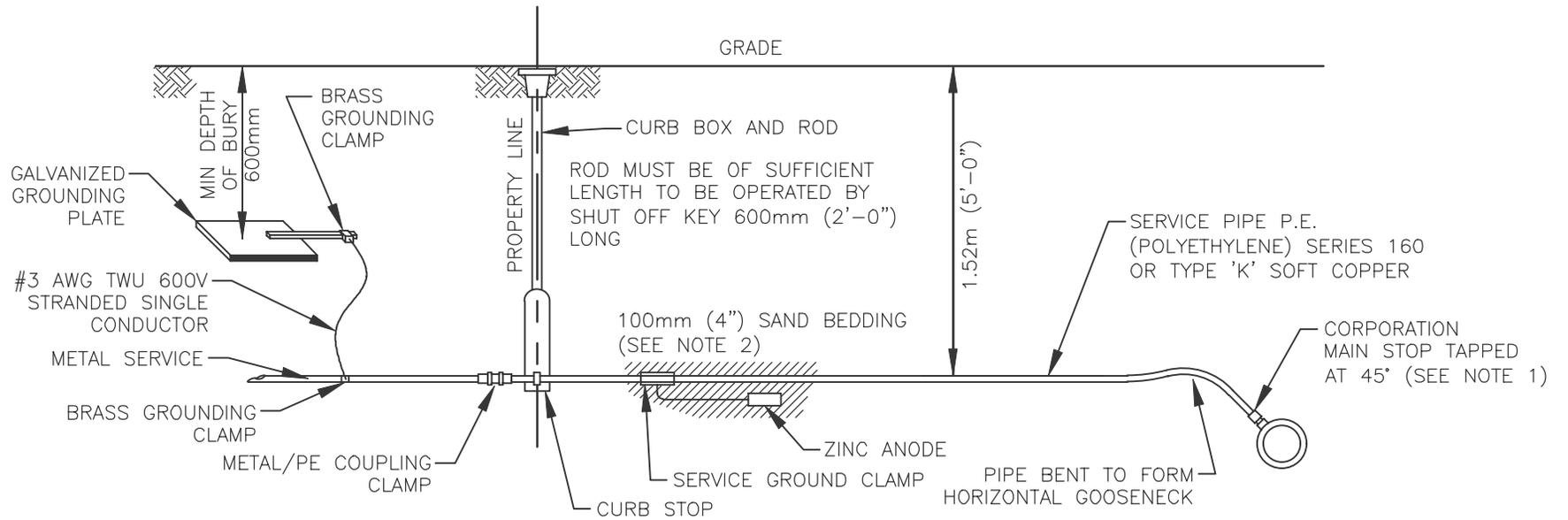


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Figure W-6

TYPICAL WATERMAIN BLOW-OFF
 OPSD 1104.030



NOTES:

1. SERVICE SADDLE WILL BE REQUIRED.
2. FOR A PLASTIC SERVICE PIPE AND ANODE IS NOT REQUIRED
3. FOR COPPER SERVICES:
 - A. SERVICES ARE TO BE PROTECTED BY A ZINC ANODE.
 - B. SERVICE GROUND CONNECTOR TO BE COATED WITH T.C. MASTIC OR WRAPPED WITH "SCOTCHFILL" ELECTRICAL PUDDY OR APPROVED EQUAL.
 - C. ANODE TO BE PLACED AT LEAST 3'-4"(1000mm) AWAY FROM WATER SERVICE AND AS DEEP AS THE BOTTOM OF THE SERVICE.

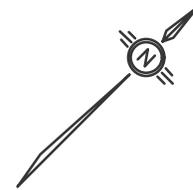
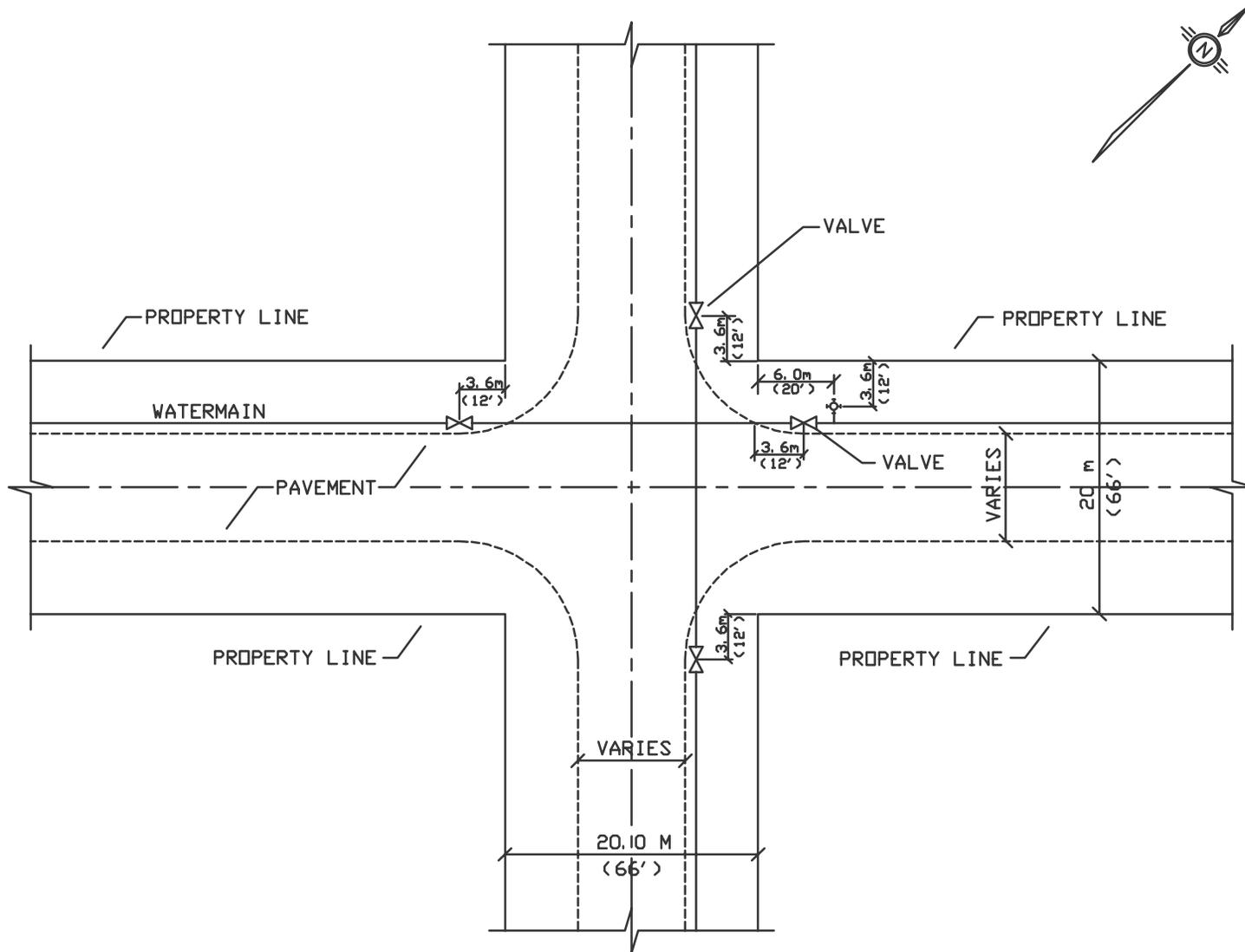
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Figure W-7
 STANDARD INSTALLATION OF A
 3/4" (19mm) TO 2" (50mm) WATER SERVICE



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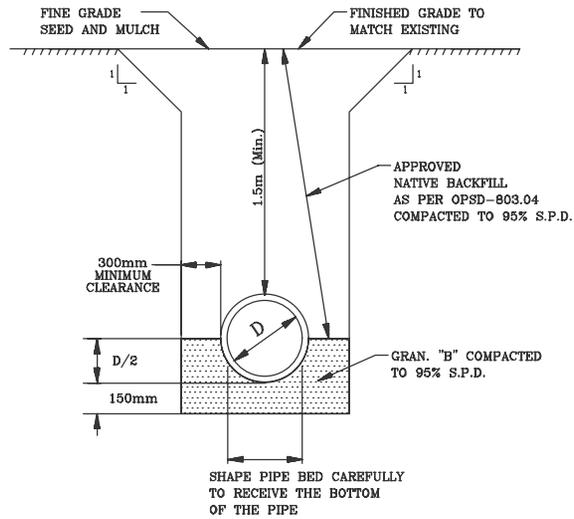


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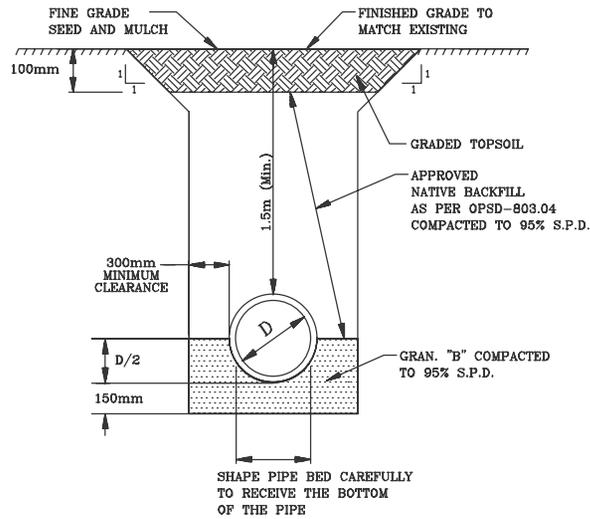
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Figure W-8
 STANDARD URBAN PLACEMENT OF MAIN VALVES
 AND HYDRANTS FOR 20m ROAD ALLOWANCE

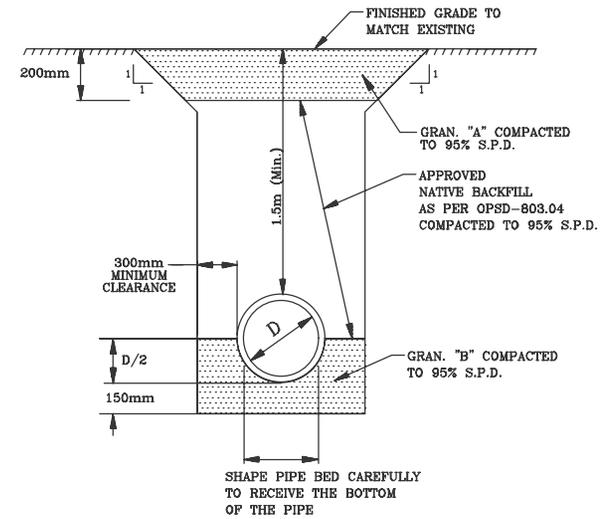
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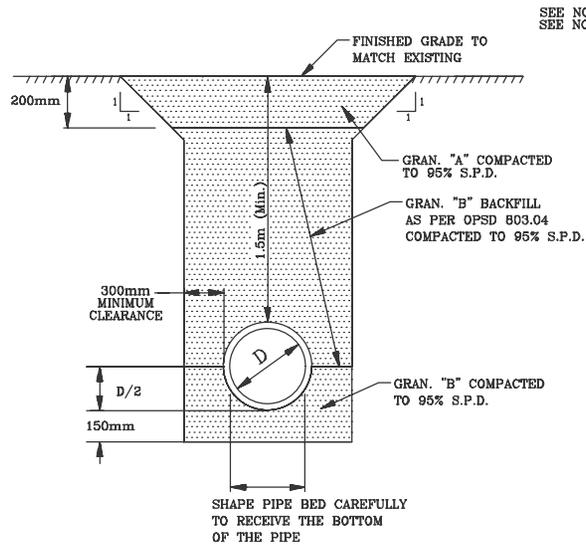
WITHIN GRASSED AREAS



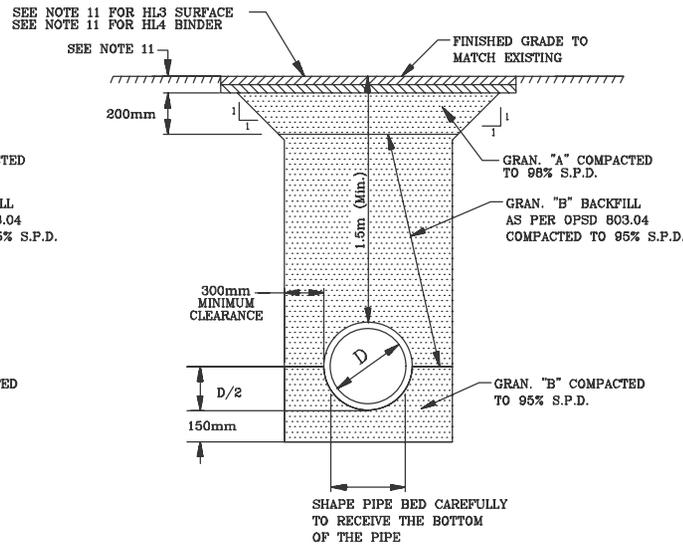
WITHIN DESIGNATED LAWN AREAS



WITHIN GRANULAR ROAD SHOULDER



WITHIN GRANULAR/NATIVE MATERIAL DRIVEWAY CROSSINGS



WITHIN ASPHALT AREAS

NOTES:

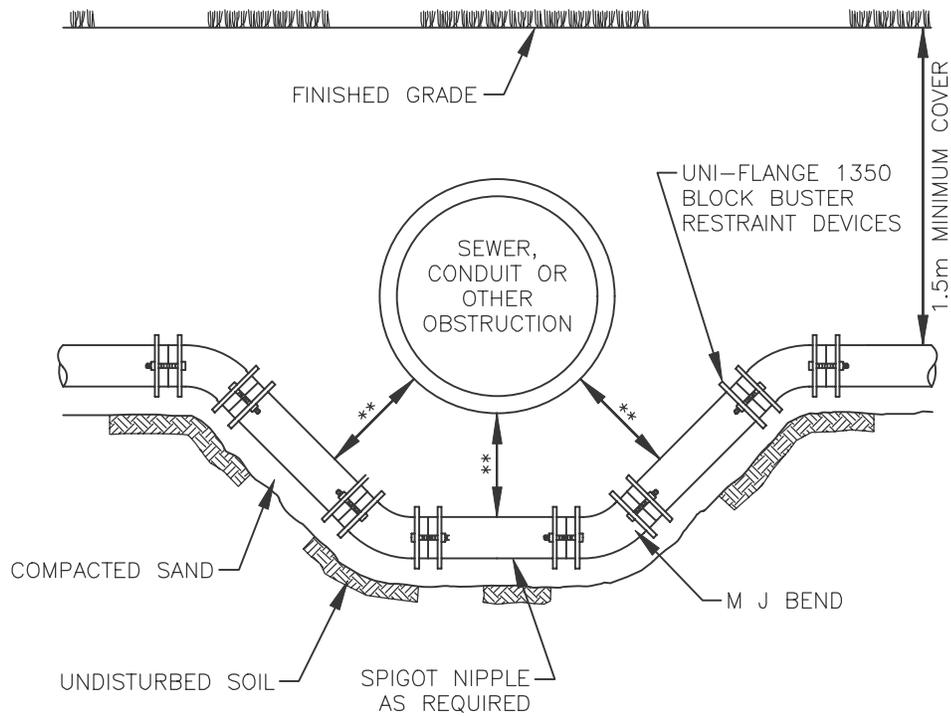
1. ALL EXCAVATIONS SHALL MEET REQUIREMENTS OF OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
2. CO-ORDINATE ALL UTILITY LOCATES IN FIELD PRIOR TO CONSTRUCTION.
3. ROAD CROSSINGS TO BE BORED OR OPEN CUT AS SPECIFIED.
4. ALL THRUST BLOCKS TO BE CONSTRUCTED AS SHOWN IN OPSD 1103.010
5. STANDARD 25mm DIAMETER WATER SERVICE CONNECTIONS TO BE AS SHOWN IN OPSD 1104.020 AND OPSD 1104.010. FINAL LOCATIONS TO BE CONFIRMED AT TIME OF CONSTRUCTION.
6. HYDRANT INSTALLATION TO BE AS SHOWN IN OPSD 1105.010 OFFSET AS DIRECTED IN FIELD.
7. RESTORE DRIVEWAYS AND ROADWAYS TO MATCH EXISTING. (SEE SPECS.)
8. RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
9. RESTORE ALL GRASSED AREAS AND DESIGNATED LAWN AREAS AS SPECIFIED.
10. ALL CULVERTS END WALL TREATMENT AND TILE DRAINS REMOVED DURING THE PROCESS OF COMPLETING THE WORK ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS. DAMAGED MATERIALS ARE TO BE REPLACED WITH APPROVED NEW MATERIALS OF SIMILAR SIZE.
11. THICKNESS OF HL3 SURFACE AND HL4 BINDER SHALL BE AT LEAST THE SAME THICKNESS AS ASPHALT ORIGINALLY REMOVED



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Figure W-9
 TYPICAL WATER CONNECTION FOR
 INSTITUTIONAL / COMMERCIAL / INDUSTRIAL



NOTES:

1. RETAINER GLANDS SHALL BE INSTALLED AT EACH MECHANICAL JOINT.
2. ** 1.0m MIN SEPARATION AT ROADSIDE CULVERTS.
3. ** 2.5m MIN SEPARATION AT OPEN/CLOSED MUNICIPAL DRAINS

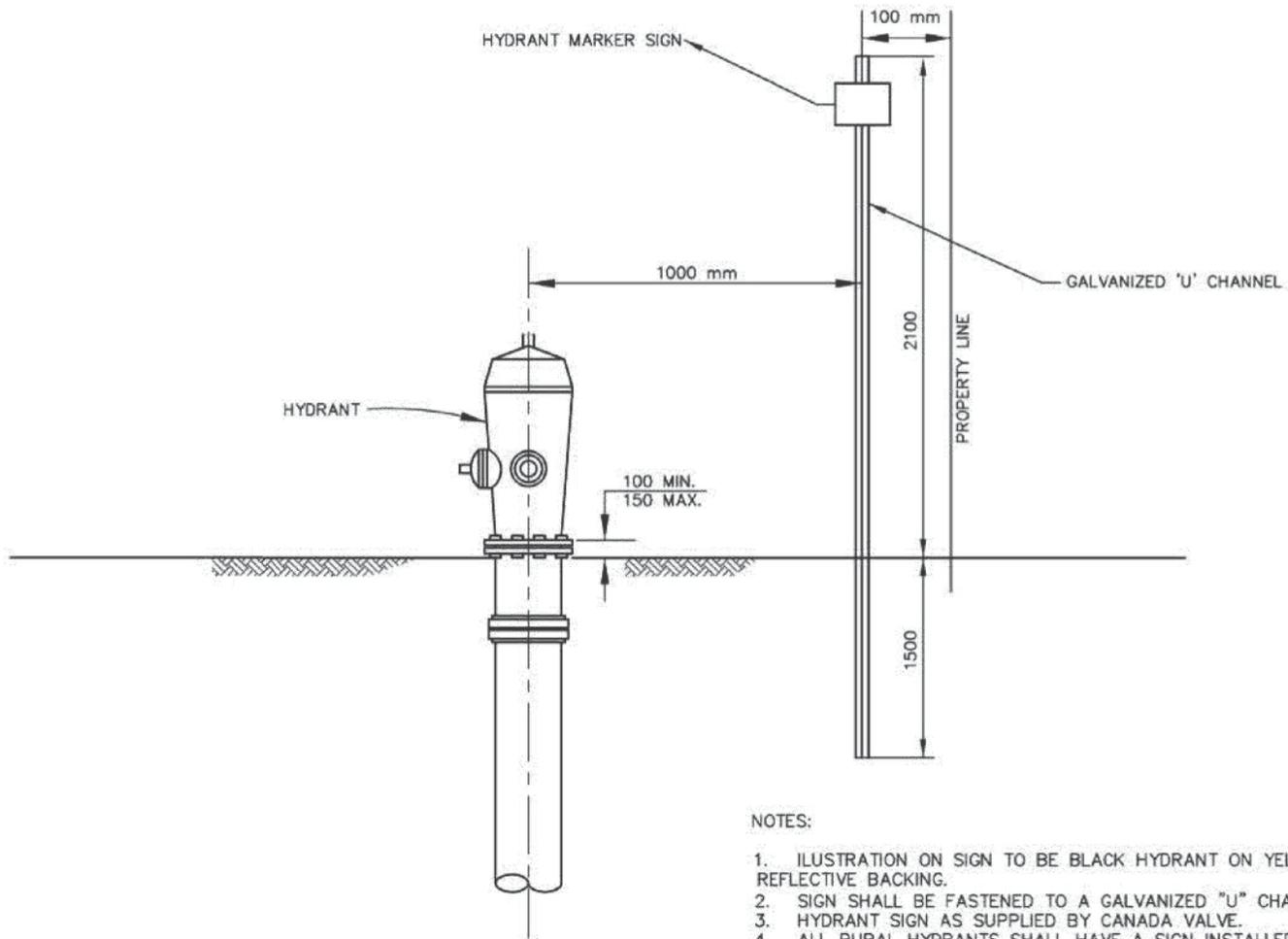
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Figure W-10
 WATERMAIN DEFLECTION UNDER SEWER



NOTES:

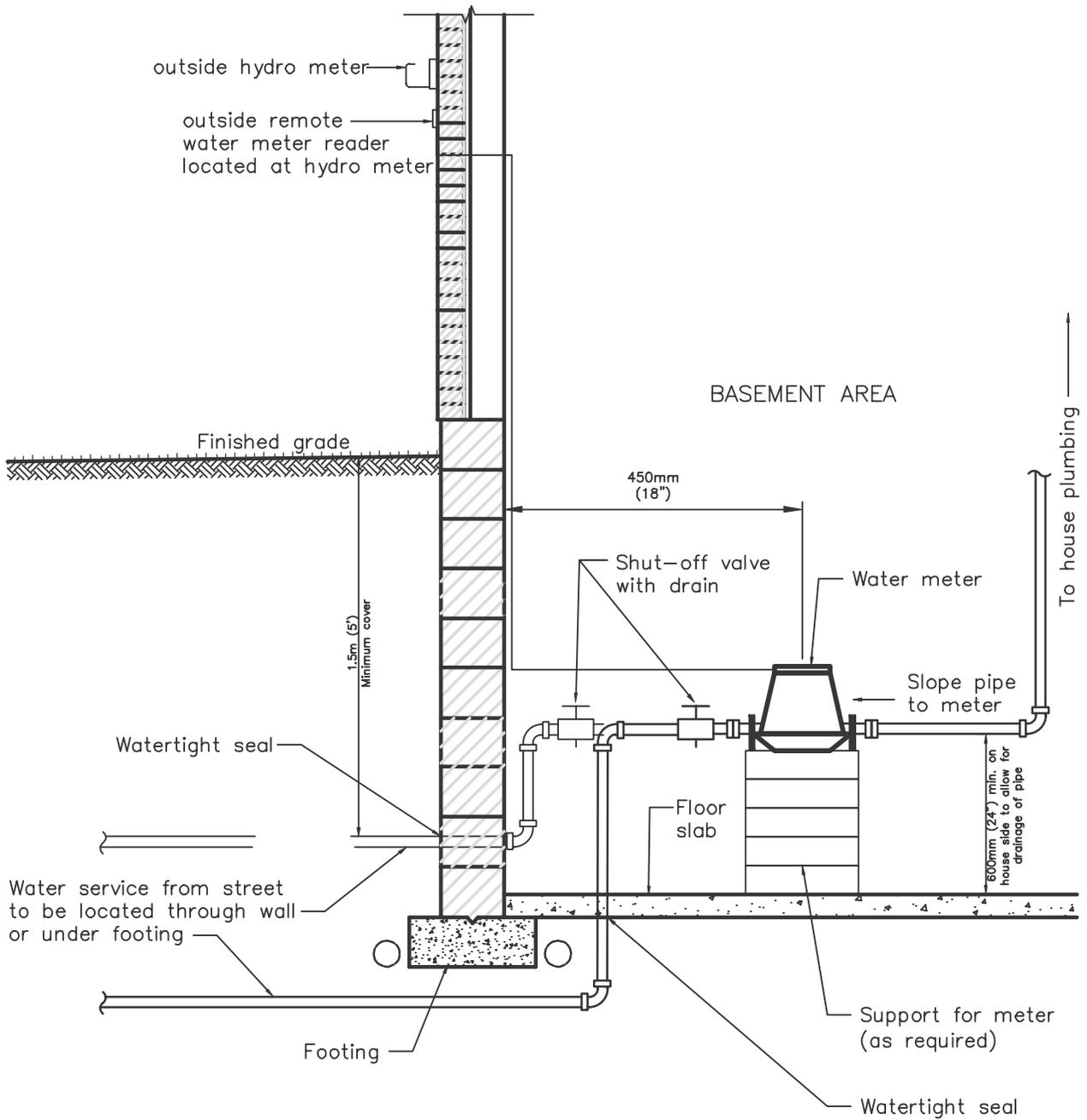
1. ILLUSTRATION ON SIGN TO BE BLACK HYDRANT ON YELLOW REFLECTIVE BACKING.
2. SIGN SHALL BE FASTENED TO A GALVANIZED "U" CHANNEL.
3. HYDRANT SIGN AS SUPPLIED BY CANADA VALVE.
4. ALL RURAL HYDRANTS SHALL HAVE A SIGN INSTALLED.
5. URBAN HYDRANTS SHALL HAVE SIGNS IF REQUIRED BY THE TOWN OF ESSEX.



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Town of Essex Development Manual

Figure W-11
 STANDARD HYDRANT MARKER



NOTE:

1. Secure meter and piping to structure.

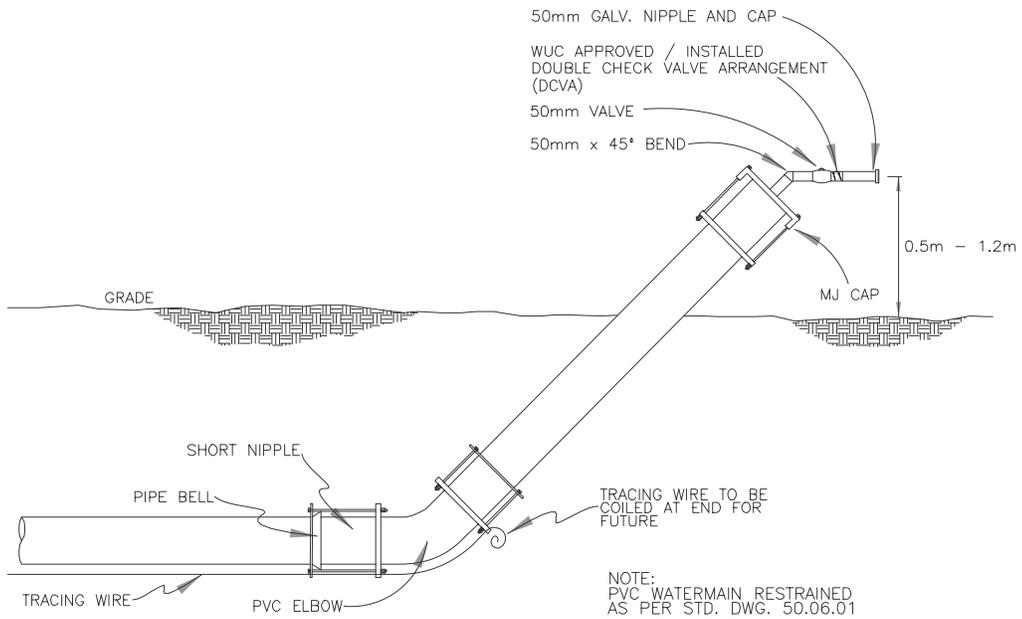
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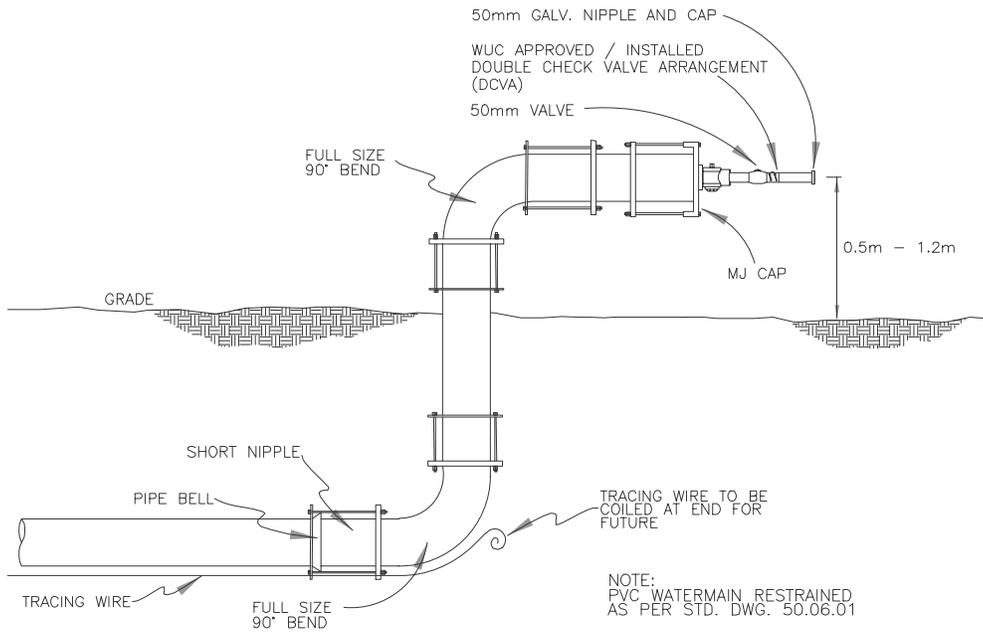
No.	Revision Date
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Figure W-12
 INTERNAL WATER METER



NOTE:
 ALL 50mmØ BLOW-OFF ASSEMBLIES SHALL
 BE CONSTRUCTED FROM NEW PIPE MATERIALS.



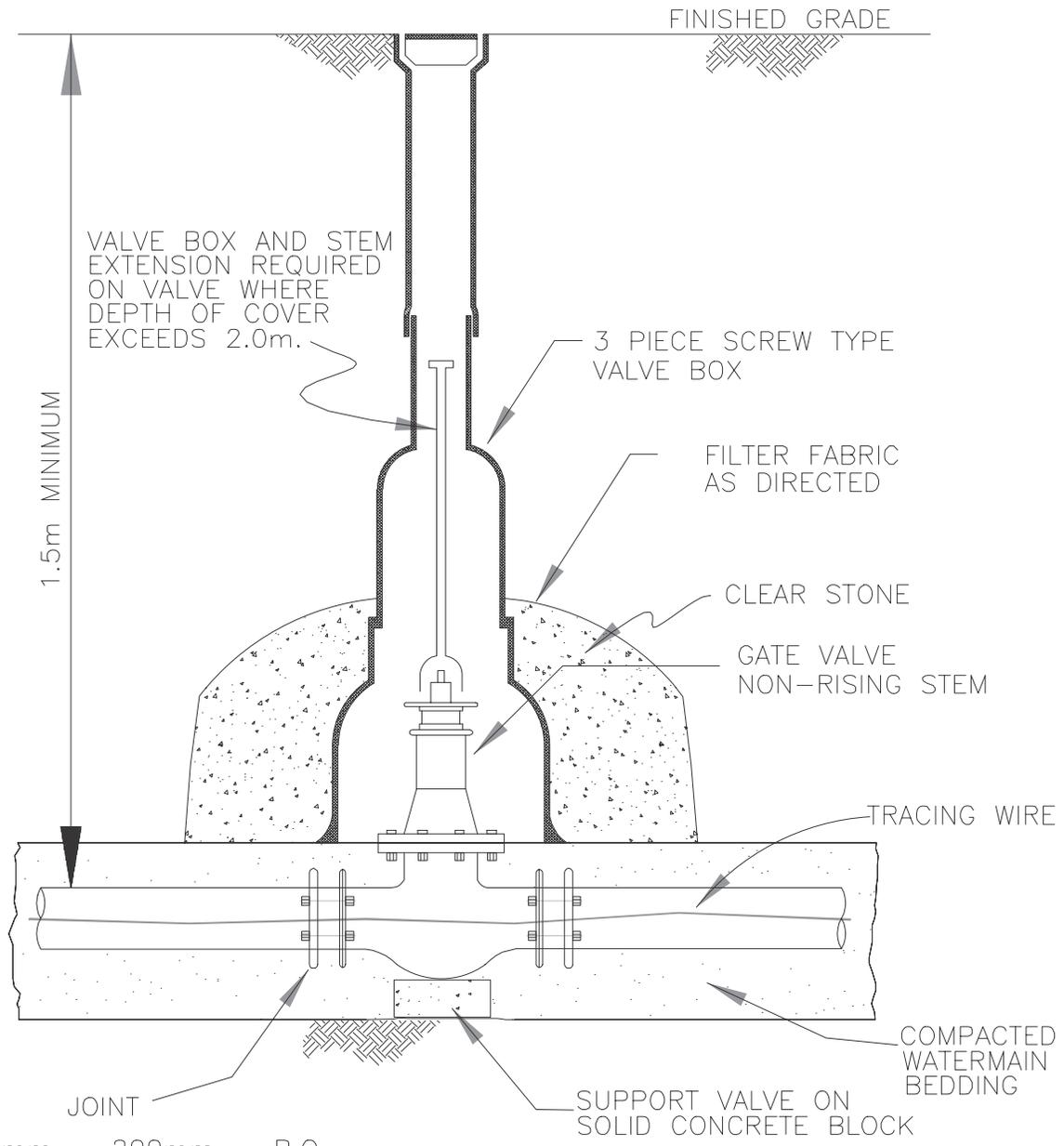
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Figure W-13
 TEMPORARY FULL SIZE BLOW OFF DETAILS



100mm - 200mm - P.O.
 250mm - 300mm - M.J. WITH APPROVED RESTRAING GLAND RINGS

NOTE:
 COMPACT ALL BACKFILL AROUND ALL VALVE BOXES TO ASSURE THAT THEY REMAIN VERTICLE AFTER TRENCH SETTLES.

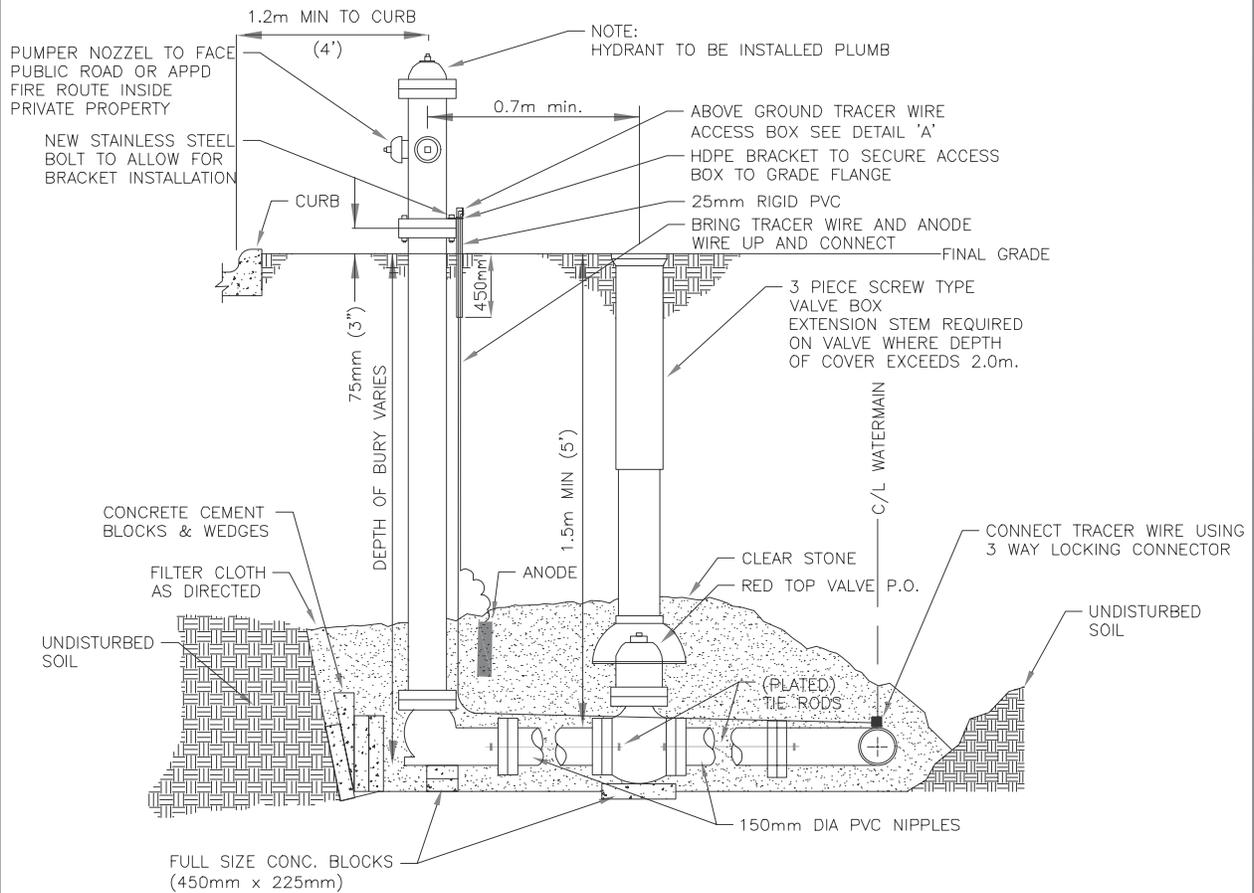
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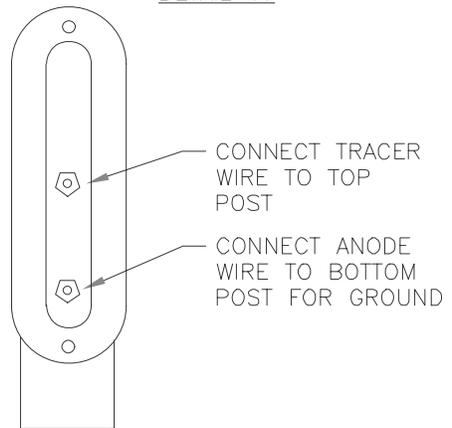
No.	Revision Date
1	June 01, 2021
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Figure W-14
 VALVE SETTING ON A PVC WATERMAIN



DETAIL 'A'



COBRA T2 TEST STATION

NOTES:

1. ALL STEEL BOLTS AND TIE RODS TO BE CAPPED WITH SAC CAPS.
2. ALL HYDRANTS ON PUBLIC R.O.W. SHALL BE FLOW TESTED, COLOUR CODED AND PAINTED AS PER WUC STD DWG 50.04.03



FIRE HYDRANT INSTALLATION WITH TEE AND VALVE

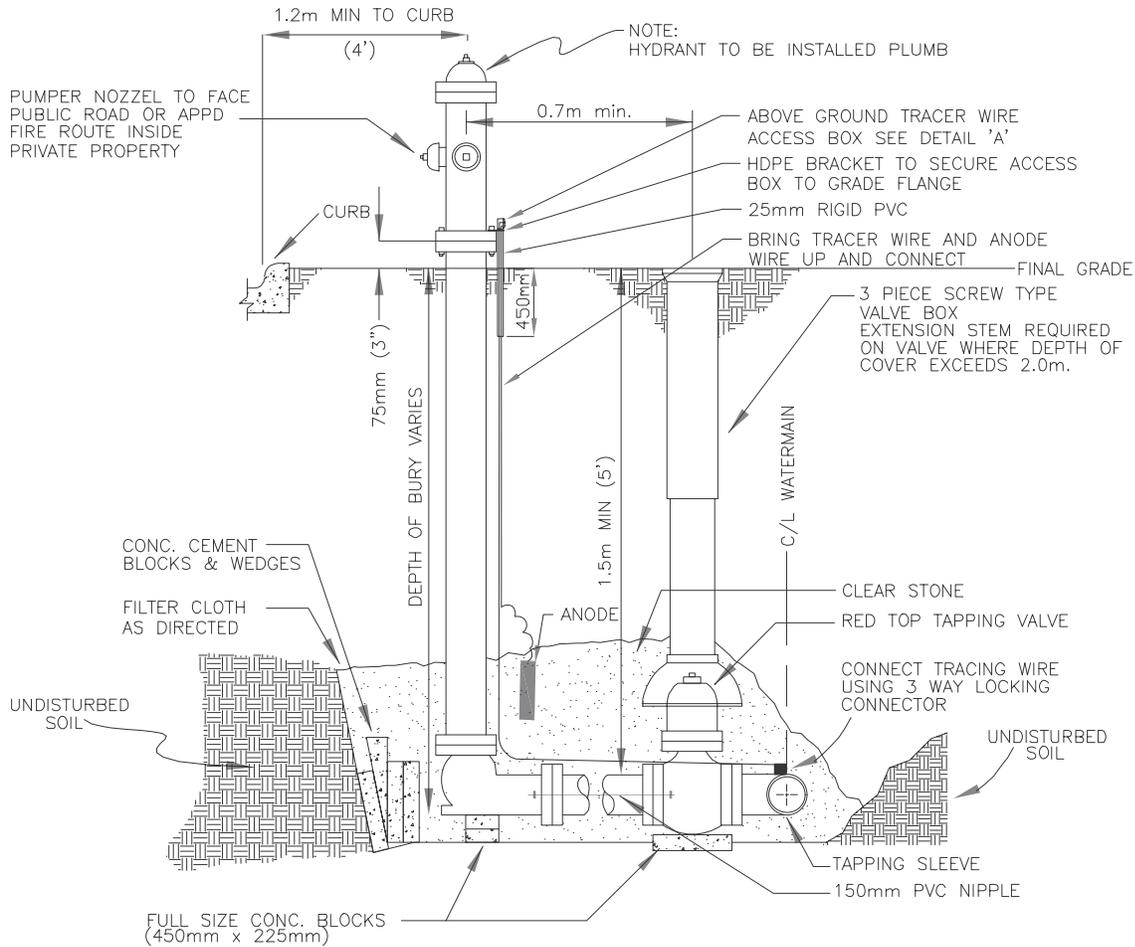
DRAWN BY:	CHECKED BY:	APPROVED BY:	REVISION DATE:	DWG. NO.:
	V.S.	N.P.	NOVEMBER 2015	50.04.01



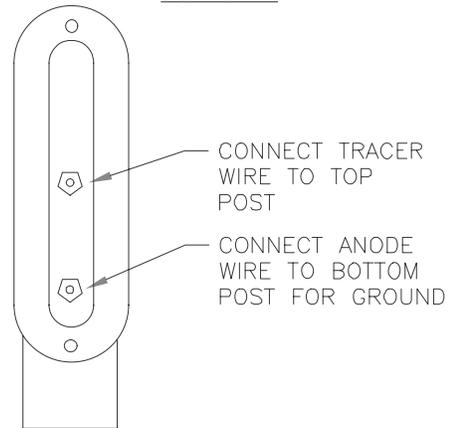
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Figure W-15
FIRE HYDRANT INSTALLATION WITH TEE AND VALVE

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		Revision Date



DETAIL 'A'



COBRA T2 TEST STATION

NOTES:

1. ALL STEEL BOLTS AND TIE RODS TO BE CAPPED WITH SAC CAPS.
2. ALL HYDRANTS ON PUBLIC R.O.W. SHALL BE FLOW TESTED, COLOUR CODED AND PAINTED AS PER WUC STD DWG 50.04.03



WINDSOR UTILITIES COMMISSION

FIRE HYDRANT INSTALLATION WITH TAPPING VALVE

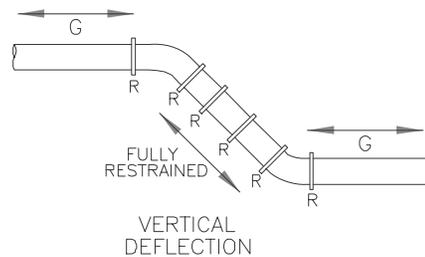
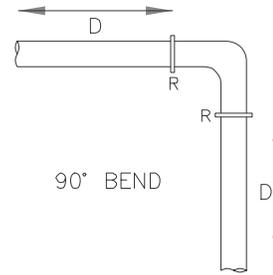
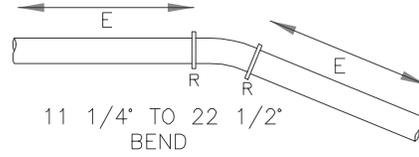
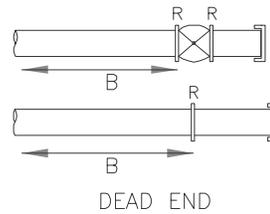
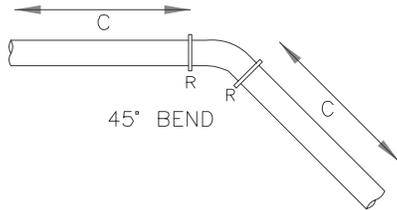
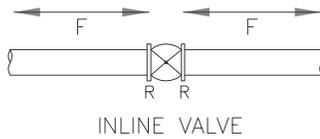
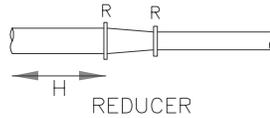
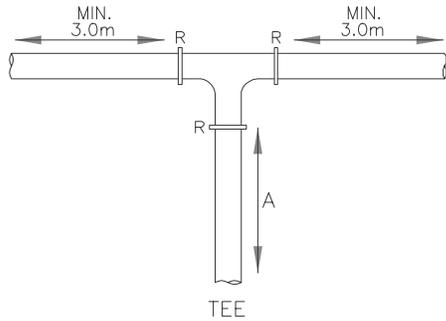
DRAWN BY:	CHECKED BY: V.S.	APPROVED BY: N.P.	REVISION DATE: NOVEMBER 2015	DWG. NO.: 50.04.02
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Figure W-16
FIRE HYDRANT INSTALLATION WITH TAPPING VALVE

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PVC PIPE THRUST RESTRAINT										
MIN. LENGTH OF PVC WM. TO BE RESTRAINED (m)										
PIPE DIA. / LENGTH	100mm (4")	150mm (6")	200mm (8")	250mm (10")	300mm (12")	350mm (14")	400mm (16")	450mm (18")	500mm (20")	600mm (24")
A	0.0	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	27.0
B	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	39.0
C	3.0	3.0	3.0	6.0	6.0	6.0	6.0	6.0	9.0	9.0
D	6.0	6.0	9.0	9.0	12.0	12.0	15.0	15.0	18.0	21.0
E	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	6.0	6.0
F	3.0	6.0	6.0	9.0	9.0	12.0	12.0	15.0	15.0	18.0
G	3.0	6.0	6.0	9.0	9.0	12.0	12.0	15.0	15.0	18.0
H	0.0	6.0	6.0	6.0	6.0	6.0	12.0	12.0	12.0	12.0

NOTE:

- 'R' DENOTES RESTRAINT DEVICE
- RESTRAINT LENGTHS BASED ON 'CL' TYPE SOIL CONDITIONS TYPICALLY FOUND AT A DEPTH OF 1.5 METERS. REFER TO ASTM D2487 FOR COMPLETE DESCRIPTION. IN AREAS WHERE SAND IS PREVALENT OR PIPE IS SITUATED BELOW WATER TABLE, RESTRAINED LENGTHS WILL BE DETERMINED BY THE ENGINEER.
- REDUCER DIMENSION 'H' ASSUMES ONE REDUCTION IN PIPE SIZE. IF REDUCTION IS GREATER THAN ONE PIPE SIZE, RESTRAINED LENGTH WILL BE DETERMINED BY THE ENGINEER.



WINDSOR
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**PVC PIPE JOINT
THRUST RESTRAINT**

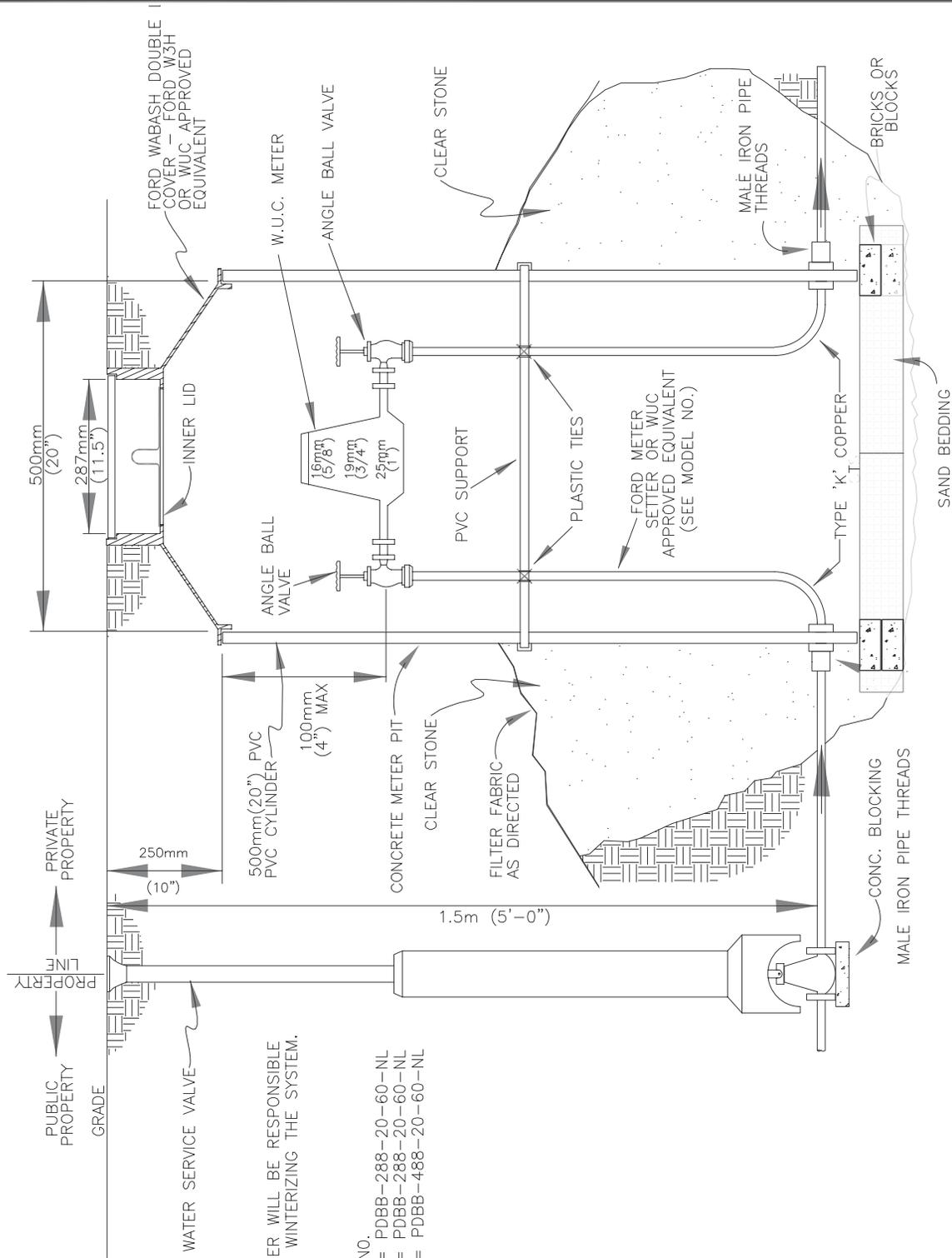
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	V.S.	N.P.	JUNE 04/2010	50.06.01



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Figure W-17
PVC PIPE JOINT
THRUST RESTRAINT

1	June 01, 2021
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NOTE:
 1. OWNER WILL BE RESPONSIBLE FOR WINTERIZING THE SYSTEM.

MODEL NO.
 16mm = PDBB-288-20-60-NL
 19mm = PDBB-288-20-60-NL
 25mm = PDBB-488-20-60-NL



CONCRETE METER PIT FOR 16mm, 19mm AND 25mm METERS IN BLVD

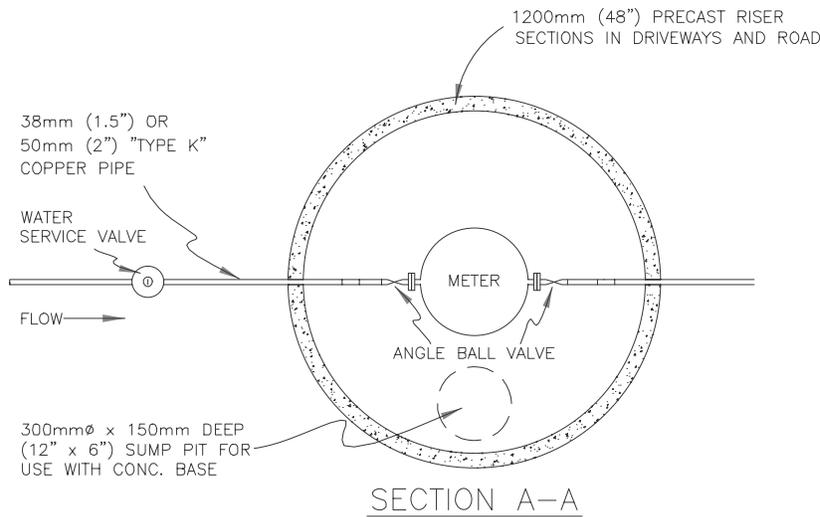
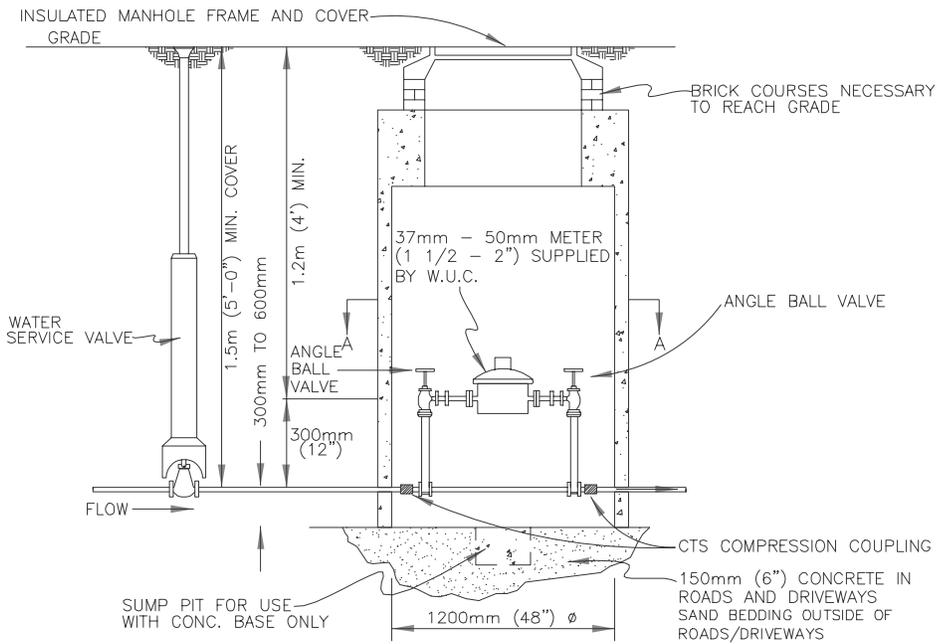
DRAWN BY:	CHECKED BY: V.S.	APPROVED BY: N.P.	REVISION DATE: MARCH/2015	DWG. NO.: 50.08.02
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Figure W-18
 CONCRETE METER PIT FOR 16mm, 19mm AND 25mm METERS IN BLVD

No.	Revision Date
1	June 01, 2021



NOTE:

1. OWNER WILL BE RESPONSIBLE FOR WINTERIZING THE SYSTEM

FORD 70 SERIES COPPER SETTER OR EQUIVALENT MODEL NO.

37mm = VBB76-12-44-66-G-NL

50mm = VBB77-12-44-77-G-NL



CONCRETE METER PIT AND SETTERS FOR FLANGED METER SETTINGS - 40mm AND 50mm

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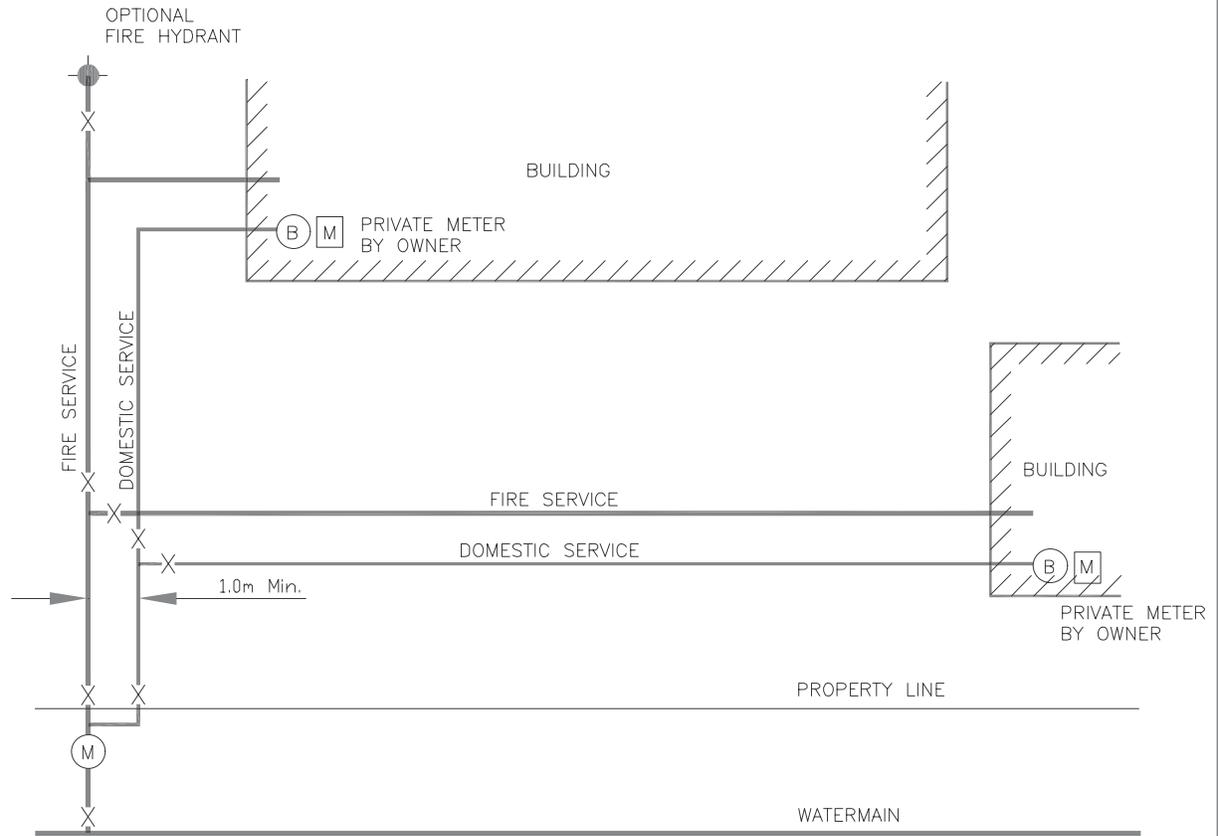


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Figure W-19

CONCRETE METER PIT AND SETTERS FOR FLANGED METER SETTINGS - 40mm AND 50mm

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LEGEND

- (B) BACKFLOW PREVENTER
- (M) METER IN CHAMBER
- [M] PRIVATE METER BY OWNER
- X VALVE & BOX

NOTE:
 PREMISE BACKFLOW PREVENTERS ON NEW INSTALLATIONS SHALL BE RP TYPE AND BE INSTALLED AS THE SERVICE ENTERS THE BUILDING BEFORE ANY CONNECTIONS OCCUR.



WATER SERVICING FOR MULTIPLE BUILDINGS ON ONE LOT FOR INDUSTRIAL, COMMERCIAL, INSTITUTIONAL

DRAWN BY:	CHECKED BY: B.J.O.	APPROVED BY: N.P.	REVISION DATE: MAY/2016	DWG. NO.: 50.09.01
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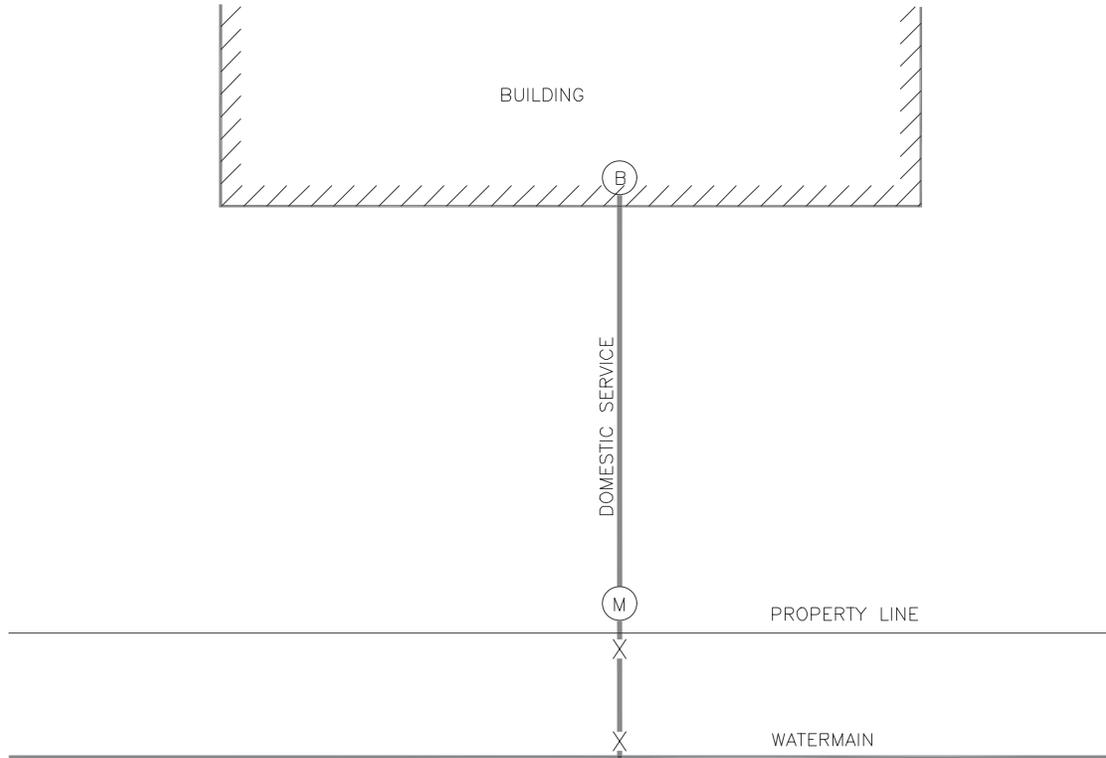


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Figure W-20

WATER SERVICING FOR MULTIPLE BUILDINGS ON ONE LOT FOR INDUSTRIAL, COMMERCIAL, INSTITUTIONAL



LEGEND

- (B) BACKFLOW PREVENTER
- (M) METER IN CHAMBER
- X VALVE & BOX

NOTE:
PREMISE BACKFLOW PREVENTERS ON NEW INSTALLATIONS SHALL BE RP TYPE AND BE INSTALLED AS THE SERVICE ENTERS THE BUILDING BEFORE ANY CONNECTIONS OCCUR.



DOMESTIC WATER SERVICE FOR INDUSTRIAL, COMMERCIAL, INSTITUTIONAL

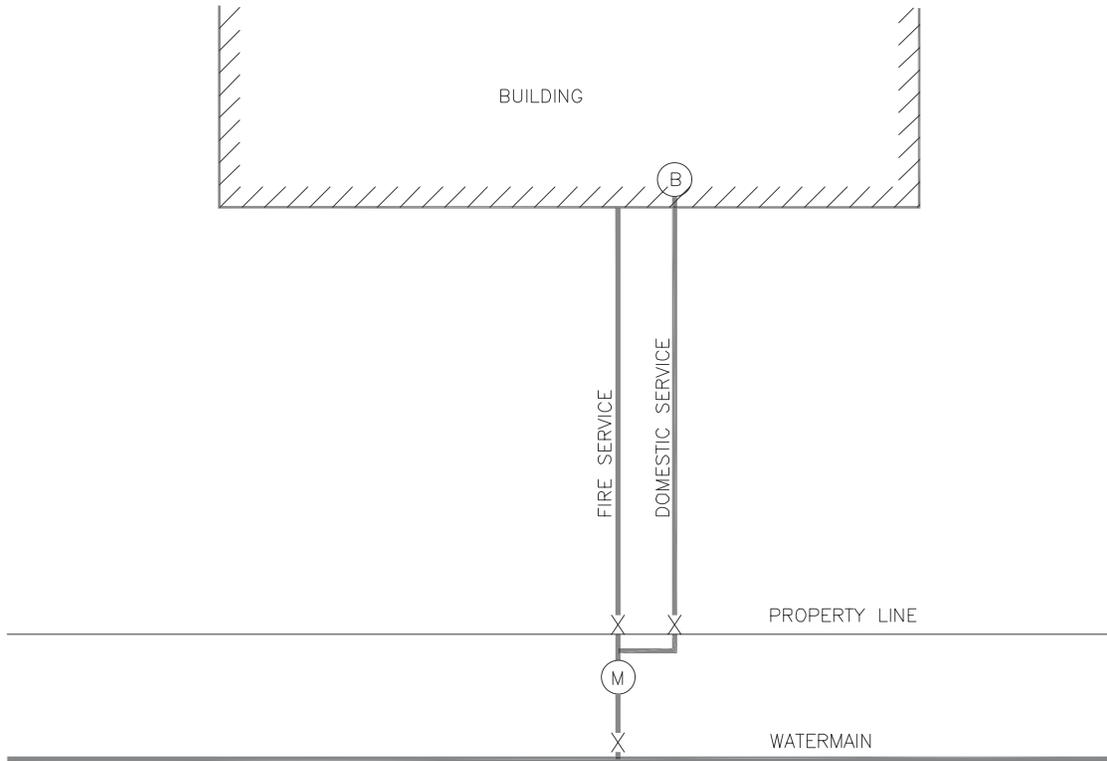
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Figure W-21
DOMESTIC WATER SERVICE FOR INDUSTRIAL, COMMERCIAL, INSTITUTIONAL



LEGEND

- (B) BACKFLOW PREVENTER
- (M) METER IN CHAMBER
- X VALVE & BOX

NOTE:
 PREMISE BACKFLOW PREVENTERS ON NEW INSTALLATIONS SHALL BE RP TYPE AND BE INSTALLED AS THE SERVICE ENTERS THE BUILDING BEFORE ANY CONNECTIONS OCCUR.



FIRE AND DOMESTIC WATER SERVICING FOR INDUSTRIAL, COMMERCIAL, INSTITUTIONAL

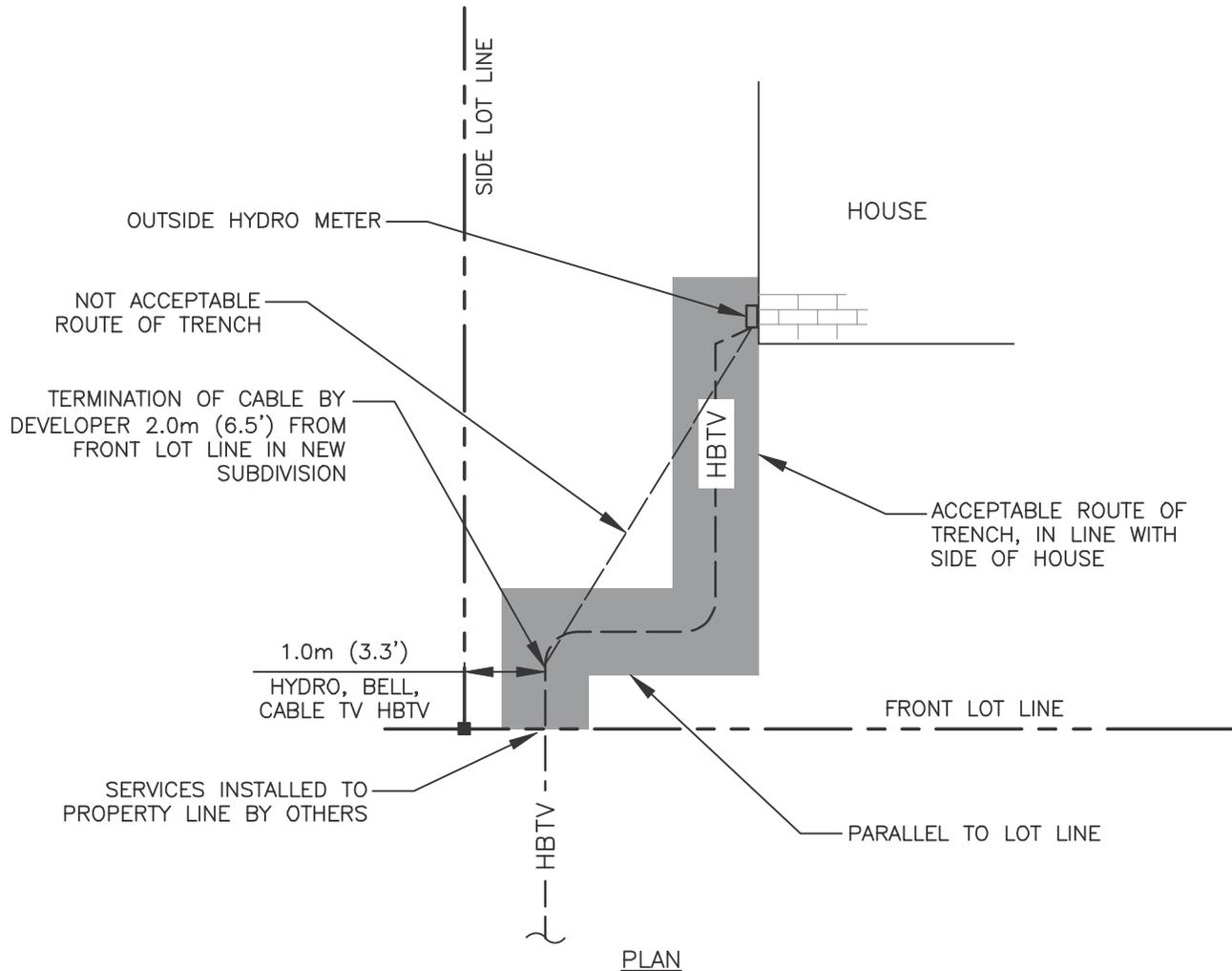
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Figure W-22
 FIRE AND DOMESTIC WATER SERVICING FOR INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL

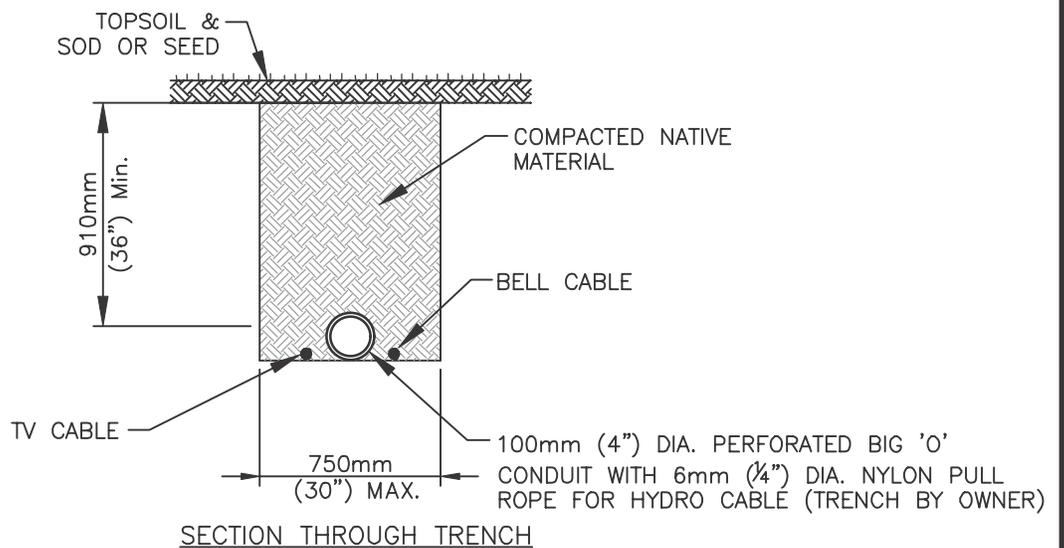
No.	1	June 01, 2021
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PLAN

NOTE:

1. OBTAIN APPROVAL FROM ENTEGRUS/HYDRO ONE OFFICE FOR METER LOCATION ON HOUSE.
2. DO NOT BURY BIG 'O' CONDUIT UNTIL AFTER HYDRO CABLE INSTALLATION AND AFTER INSPECTION BY ENTEGRUS/HYDRO ONE.



SECTION THROUGH TRENCH

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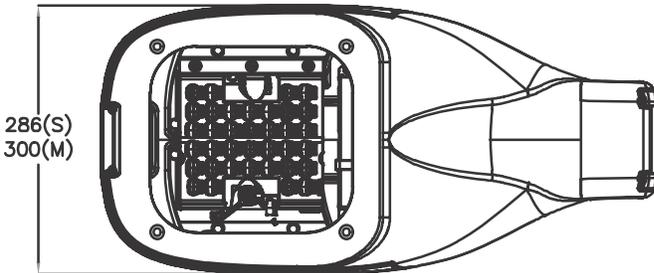
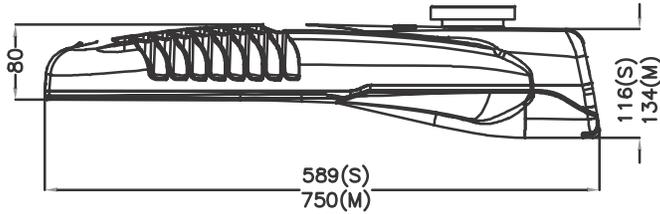
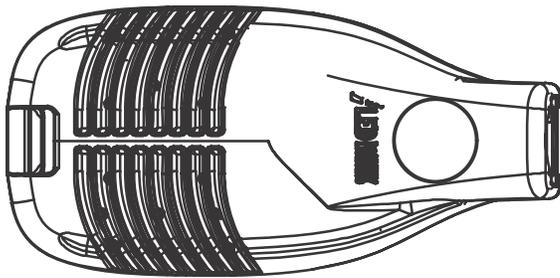
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Figure U-1
TRENCH FOR HYDRO, BELL AND
CABLE TV SERVICES

LUMINAIRE SPECIFICATIONS

CATALOGUE NO.: NXT-xxS/M-0-7-2ES/4AH
 MANUFACTURER: LED ROADWAY
 IES DESIGNATION: TYPE II STANDARD;
 UNLESS OTHERWISE APPROVED
 LIGHT SOURCE: LED
 LINE VOLTAGE: 120V
 OPTIONS: NEMA PHOTOCELL RECEPTACLE
 PHOTOCELL
 PAINT: BLACK
 (TO BE CONFIRMED)



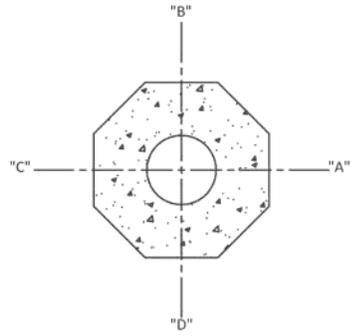
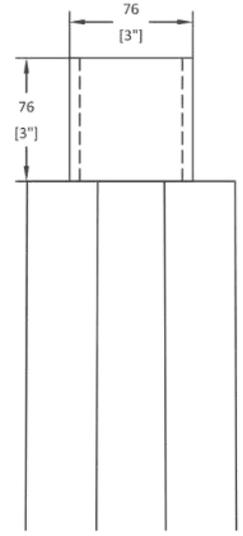
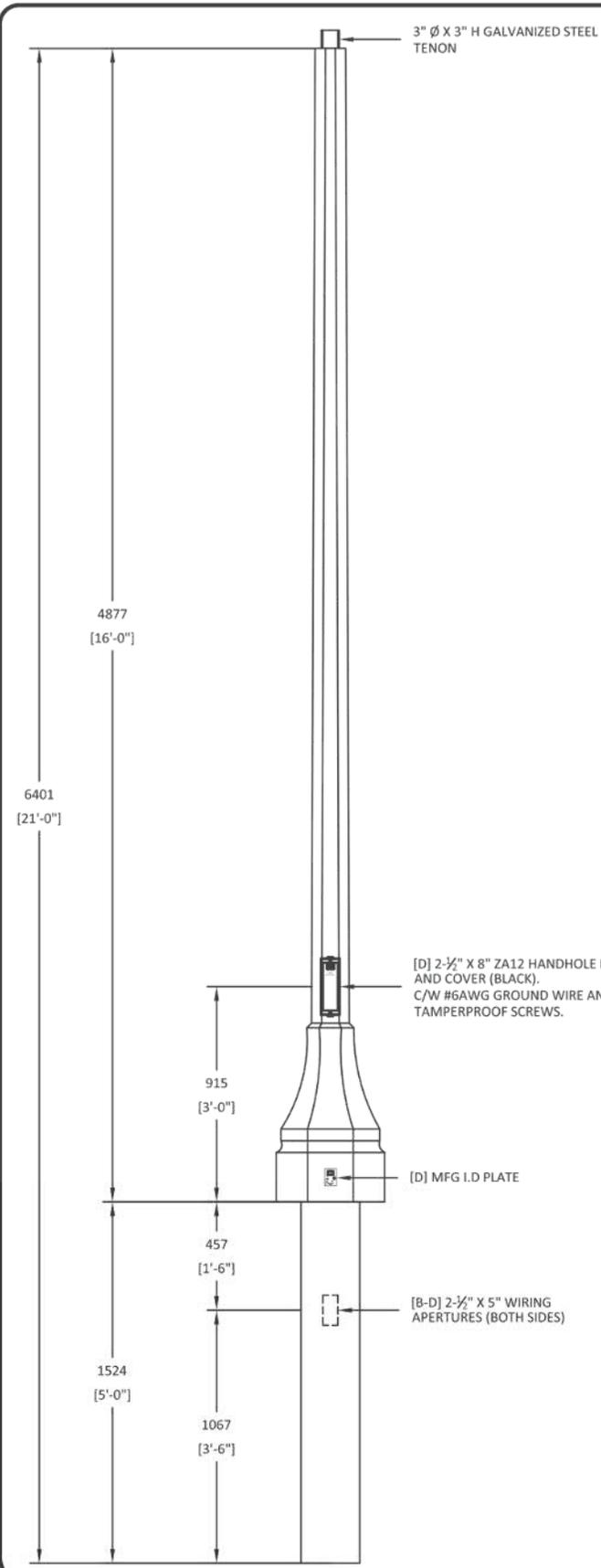
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Figure E-1
 STANDARD STREET LIGHTING
 LED SOURCE



NOTES:
 1. ALL POLES TO BE MANUFACTURED TO CSA A14(LATEST REVISION) SPECIFICATION FOR SPUN CONCRETE POLES.

IT IS RECOMMENDED THAT A PROFESSIONAL ENGINEER EVALUATE THE SOIL CONDITIONS ON SITE, CONFIRMING REQUIRED BURIAL DEPTH, HOLE DIAMETER AND MATERIAL TO BE USED.

	UTILITY STRUCTURES INC. 61 BONGARD AVE OTTAWA, ON CANADA K2E 6V2 T: 613 225.6398 F: 613 225.1681 TF: 800 267 6466 www.utilitystructures.com		
	POLE CODE: WE-210-A-3-BE-30		
POLE STYLE: WESTMOUNT COLOR: BLACK ECLIPSE COATING: ACRYLIC SEALER TIP DIA.: 5 1/16" Ø BUTT DIA.: 9 3/4" Ø	LENGTH: 21'-0" [6.4m] FINISH: ETCHED APPROX. WEIGHT: 1335 lbs QUANTITY: 17 CLASS: A		
PROJECT NAME: Kimball S.D CUSTOMER NAME: Acuity Brands		CUST. PO#: ---	
DRAWN BY: L.V APR'V'D BY: R.C REVISION #: 1	POLE DRAWING #: we210aEssex		

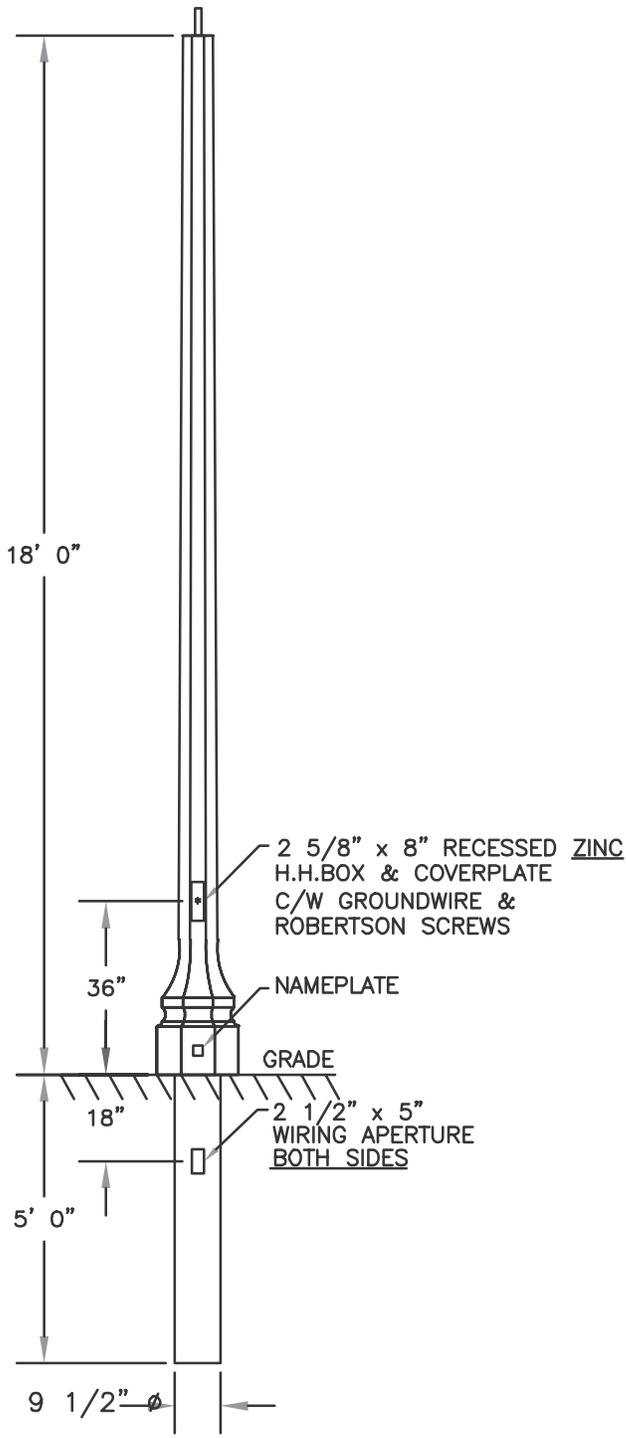
FILENAME: C:\PW\WORKING DIRECTORY\PROJECTS_2020\3349\3349-FG-CON CG DEC 14.DWG PLOTTED BY: PINSONNEAULT, LOUIS
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No.	Revison Date
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Figure E-3
 DECORATIVE GLASS STREET LIGHTING
 LED SOURCE



POLE SPECIFICATIONS

CATALOGUE NO.: KBH18-E10
DB 140-35/40
MANUFACTURER: STRESSCRETE
SECTION: OCTAGONAL
COLOUR: MIDNIGHT LACE
FINISH: ETCHED
POLE TOP: 6 3/16" FL/FL
POLE BUTT: 9 1/2" ϕ
POLE LENGTH: 18' 0"
(ABOVE GROUND)
APPROX WEIGHT: 1,410 lbs
MIN. RACEWAY: 1 1/8" ϕ

COATINGS REQUIRED:

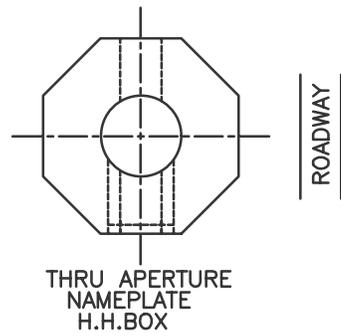
-2 COATS ACRYLIC (JB)
FULL LENGTH

POLE SPECIFICATIONS

CATALOGUE NO.: KBH18-E11
DB 140-35/40
MANUFACTURER: STRESSCRETE
SECTION: OCTAGONAL
COLOUR: ECLIPSE
FINISH: ETCHED
POLE TOP: 6 3/16" FL/FL
POLE BUTT: 9 1/2" ϕ
POLE LENGTH: 18' 0"
(ABOVE GROUND)
APPROX WEIGHT: 1,410 lbs
MIN. RACEWAY: 1 1/8" ϕ

COATINGS REQUIRED:

-2 COATS ACRYLIC (JB)
FULL LENGTH



TOP VIEW

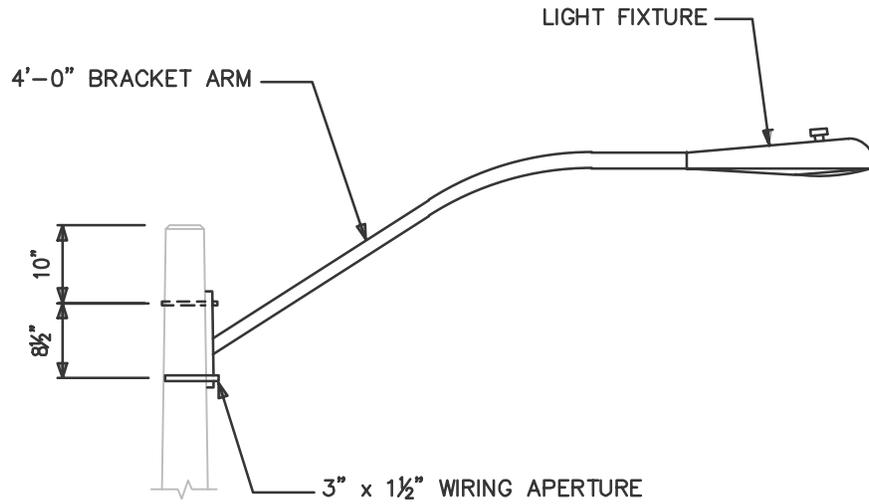
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PLOT DATE: 2022-01-24 @ 11:17:21 AM PLOT SCALE: 1:1 PLOT STYLE: DILLON-STANDARD.CTB



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Figure E-4
STREET LIGHTING
DECORATIVE POLE



FILENAME: C:\PW\WORKING DIRECTORY\PROJECTS 2020\33\MP\UN45610\203349-FG-CON CG DEC 14.DWG PLOTTED BY: PINSONNEAULT, LOUIS
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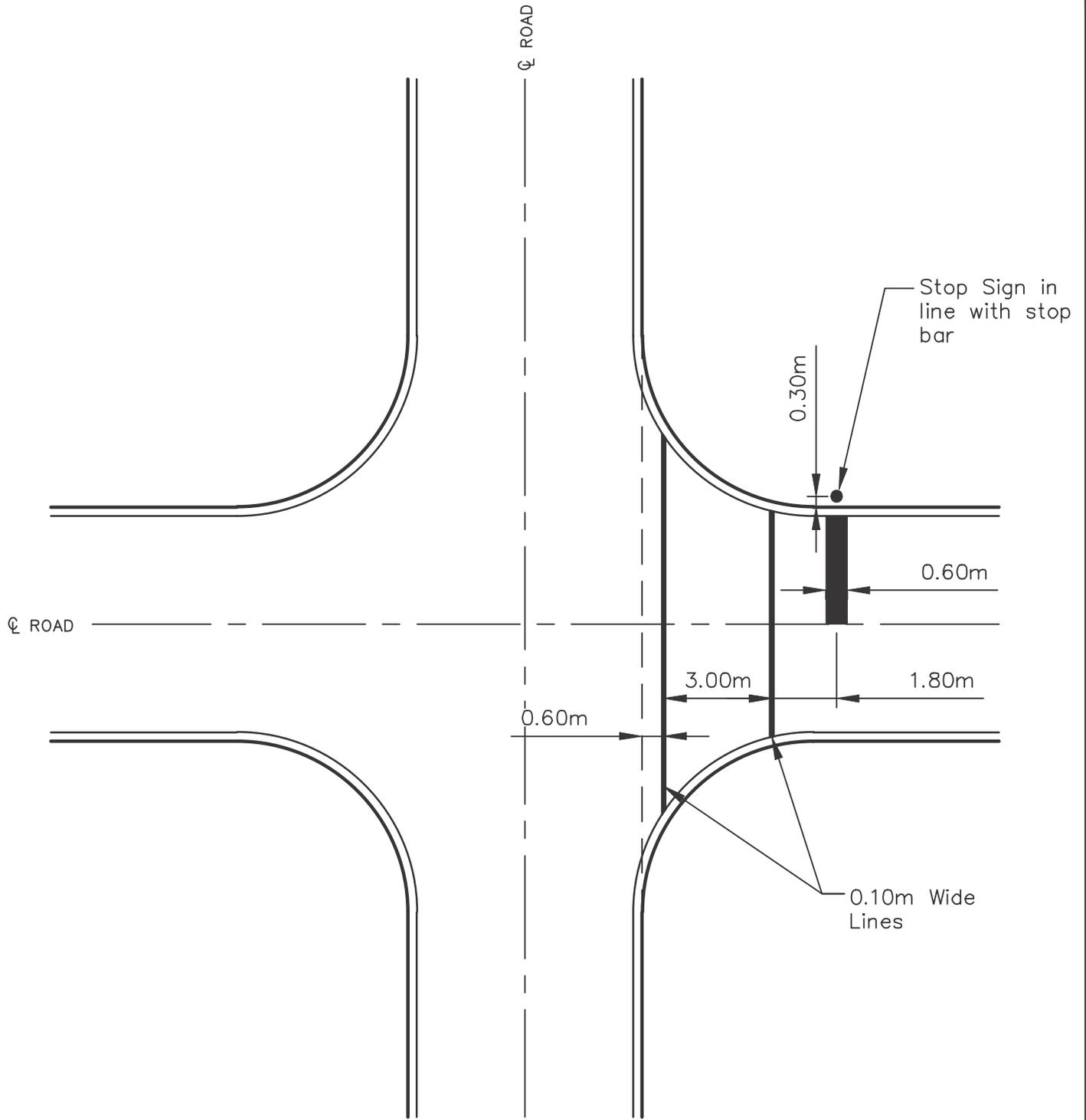


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Figure E-5
 STREET LIGHTING
 STANDARD ARM

FILENAME: C:\PW\WORKING DIRECTORY\PROJECTS 2020\33049\04545610_203349-FG-COR-CG DEC 14.DWG PLOTTED BY: PINSONNEAULT, LOUIS
 PLOT DATE: 2022-01-24 @ 11:17:23 AM PLOT SCALE: 1:1 PLOT STYLE: DILLON-STANDARD.CTB



NOTE

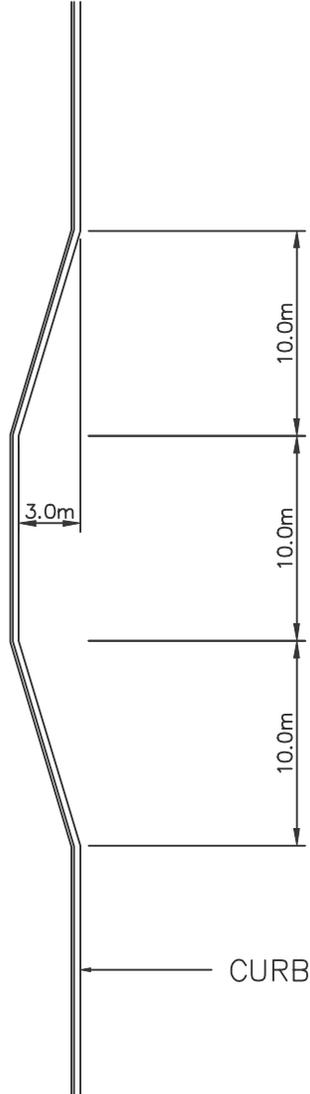
1. All Dimensions are referenced to back of curb.



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Figure R-1
 TYPICAL CROSSWALK LINE PAINTING PLAN



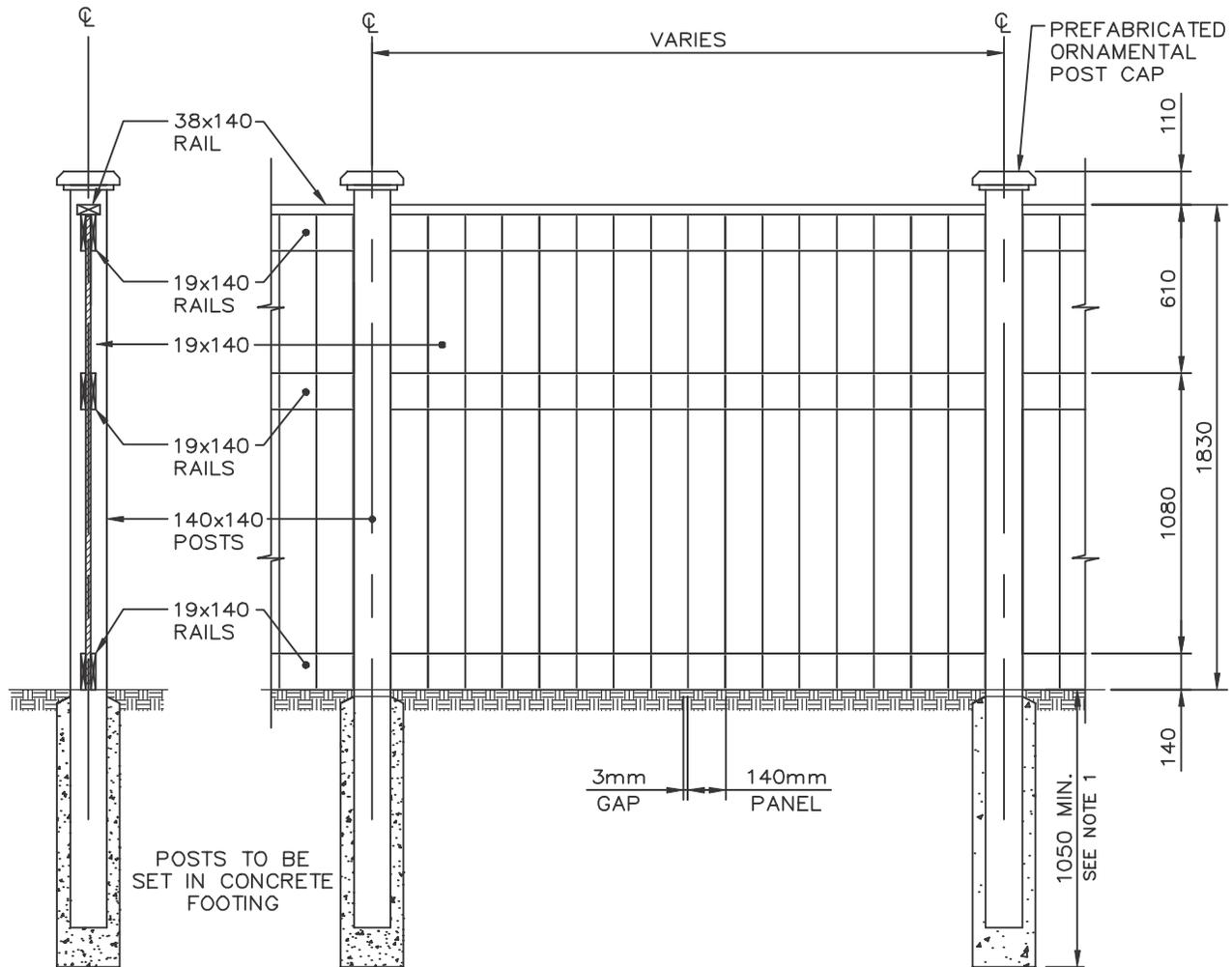
CURB



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Figure R-2
 TYPICAL COMMUNITY MAILBOX CAR BAY



TYPICAL WOOD SCREEN FENCE PANEL
N.T.S.

NOTES

- 1 DESIGN TO BE COMPLETED BY A PROFESSIONAL ENGINEER.
- 2 ALL LUMBER TO BE PRESSURE TREATED WOOD. AFTER ERECTING FENCE, ALL CUT ENDS TO BE TREATED.
- 3 AS SUPPLIED BY CREATIVE HOMESCAPES OR APPROVED EQUAL.

FILENAME: C:\PW\WORKING DIRECTORY\PROJECTS 2020\33049\04845610\203349-FG-CON CG DEC 14.DWG PLOTTED BY: PINSONNEAULT, LOUIS
 PLOT DATE: 2022-01-24 @ 11:17:25 AM PLOT STYLE: DILLON-STANDARD.CTB



No.	Revision Date
2	January 14, 2022
1	June 01, 2021

Town of Essex Development Manual

Figure R-3
1830mm HIGH WOOD FENCE DETAIL

NOTICE

NO THRU TRAFFIC

SUBDIVISION SECTION AND ROADS

NOT ASSUMED

BY THE MUNICIPALITY

USE AT YOUR OWN RISK

FILENAME: C:\PW\WORKING DIRECTORY\PROJECTS 2020\3304\PROJECTS\45610\203349-FG-CON CG DEC 14.DWG PLOTTED BY: PINSONNEAULT, LOUIS
PLOT DATE: 2022-01-24 @ 11:17:22 AM PLOT STYLE: DILLON-STANDARD.CTB

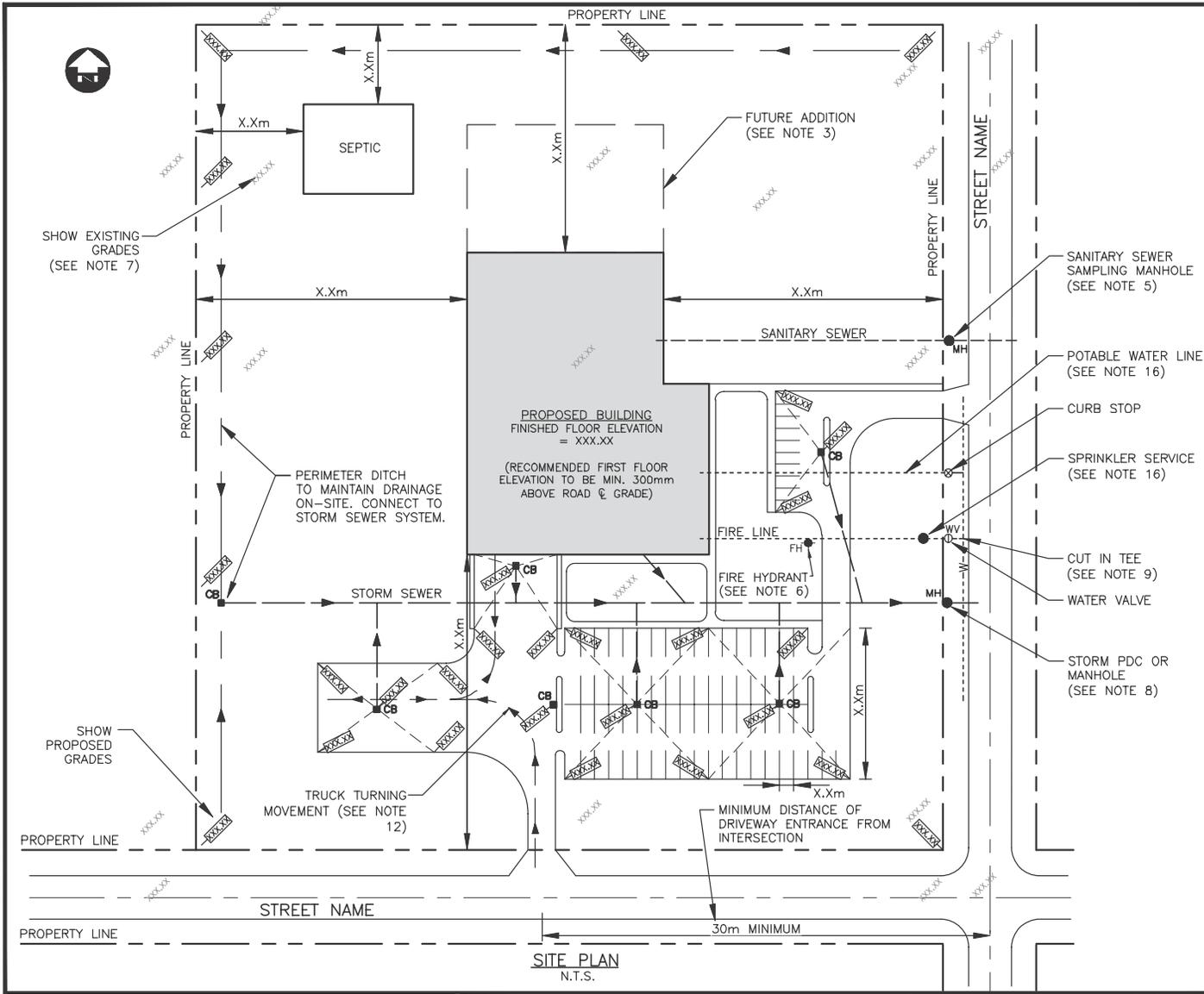


No.	Revision Date
2	January 14, 2022
1	June 01, 2021
No.	Revision Date

Town of Essex Development Manual

Figure R-4
UNASSUMED DEVELOPMENT SIGN

PLANS: 01/19/2021 REVISED: 02/09/2021 11:17:28 AM NOT SCALE TO POST SHALL BE SHOWN IN PROPORTION TO SCALE
 DATE: 2022-01-24 11:17:28 AM NOT SCALE TO POST SHALL BE SHOWN IN PROPORTION TO SCALE



- GENERAL NOTES:**
1. SITE SERVICES: TYPE, SIZE, SLOPE, DEPTH AND LOCATIONS TO BE SHOWN.
 2. DEVELOPER SHALL SUBMIT REQUIRED STUDIES AS MAY BE REQUIRED FOR EACH DEVELOPMENT. (FOR LIST OF POSSIBLE STUDIES REQUIRED, SEE DEVELOPMENT MANUAL).
 3. FUTURE PHASING TO BE SHOWN IF APPLICABLE.
 4. PLAN MUST SHOW THE LOCATION, SIZE, HEIGHT, TYPE, AND DISTANCE FROM PROPERTY LINES OF ALL EXISTING AND PROPOSED BUILDINGS AND STRUCTURES ON THE SUBJECT LAND (INCLUDING SEPTIC SYSTEMS).
 5. ALL PROPERTY LINES AND EASEMENTS SHALL BE ACCURATELY SHOWN, DIMENSIONED AND LABELED. ANY PROPERTY REQUIRED FOR FUTURE ROAD WIDENINGS AS REQUIRED BY THE MUNICIPALITY SHALL BE ACCURATELY SHOWN.
 6. SANITARY SAMPLING MANHOLE AS PER FIGURE S-1 LOCATED AT PROPERTY LINE.
 7. FIRE HYDRANT LOCATIONS TO BE SHOWN AND SUBMISSION MADE TO THE TOWN OF ESSEX CHIEF FOR APPROVAL.
 8. EXISTING GRADES TO BE SHOWN ON THIS LOT AND ADJACENT PROPERTY. ALSO INDICATE FINISHED FLOOR ELEVATION OF ADJACENT BUILDINGS.
 9. UNLESS OTHERWISE NOTED IN SUBDIVISION SERVICING AGREEMENT, CONTROL STORM WATER RUNOFF RATES TO PRE-DEVELOPMENT CONDITIONS. ORIFICE LOCATED IN MANHOLE AT PROPERTY LINE PREFERRED. CALCULATIONS ARE REQUIRED TO BE SUBMITTED.
 10. CONNECTIONS TO EXISTING WATERMAINS TO BE CUT-IN-TEES.
 11. ALL WORK ON PUBLIC RIGHT-OF-WAY REQUIRES A PUBLIC WORKS PERMIT, RESTORE TO EXISTING CONDITION WITH FULL GRANULAR BACKFILL ('A' OR 'B') COMPACTED TO 100% S.P.D. (GEOTECH CERTIFIED) OR UNSHRINKABLE FILL.
 12. PARKING, DRIVEWAYS, AND LOADING SPACES TO BE PAVED. DRIVEWAYS, PARKING AISLES, PARKING SPACES, LOADING SPACES TO BE DIMENSIONED.
 13. TRUCK TURNING MOVEMENTS FOR LOADING AND DELIVERIES TO BE CONFINED WITHIN PRIVATE PROPERTY. (NO BACKING IN OFF ROADWAY). SEE ZONING BY-LAW.
 14. NOTE USE OF BUILDING, (3.1.2.1 ONTARIO BUILDING CODE CLASSIFICATION). OCCUPANT LOAD, SPRINKLERED, COMBUSTIBLE, NON-COMBUSTIBLE.
 15. SEE DEVELOPMENT MANUAL FOR APPLICABLE MUNICIPALITY STANDARDS.
 16. AS-CONSTRUCTED DRAWINGS ARE REQUIRED AND ARE TO BE SUBMITTED TO THE MUNICIPALITY.
 17. APPROXIMATE LOCATION OF ALL NATURAL AND ARTIFICIAL FEATURES (I.E. BUILDINGS, ROADS, RAILWAYS, WATERCOURSES, DRAINAGE, WOODED AREAS) ARE TO BE SHOWN IN THE SUBJECT AREA.
 18. LANDSCAPING TO BE IN ACCORDANCE WITH SPCA.

SITE PLAN
N.T.S.

		Town of Essex Development Manual	
		Figure SP-1	
		TYPICAL INDUSTRIAL / COMMERCIAL / INSTITUTIONAL / MULTI-UNIT RESIDENTIAL SITE PLAN REQUIREMENTS	
No.	Revision Date	2	January 14, 2022
1	June 01, 2021		

Appendix C

Typical Agreements

The Corporation of the Town of Essex

By-Law Number 2065

Being a By-Law to enter into a Site Plan Control Agreement between:

The Corporation of the Town of Essex and

(XXXXXXX)

Whereas pursuant to Section 41 of the Planning Act, R.S.O. 1990 and Amendments thereto, (XXXXXXX) is desirous of constructing an industrial facility to accommodate an equipment sales and rental agency on the lands legally described as Parts XX and XX on XXXXXXXXXXXXXXX, and as such is required to enter into a Site Plan Control Agreement with the Town of Essex;

And Whereas the subject lands are designated as a site plan control area pursuant to Section 41 of the Planning Act, R.S.O. 1990 and Amendments thereto;

And Whereas pursuant to Section 41 of the Planning Act, R.S.O. 1990 and Amendments thereto, municipalities may enter into such agreements;

Now therefore be it resolved that the Council of the Town of Essex enacts as follows:

That the Mayor and Clerk be directed to affix their signatures, on behalf of the Corporation of the Town of Essex, to Schedule 1 attached hereto and forming part of this Bylaw, for the purpose of executing the Site Plan Control Agreement.

Read a first, a second and a third time and finally passed on September 21, 2021.

Mayor

Clerk

Schedule 1

The Corporation of the Town of Essex

Site Plan Control Agreement

This agreement made in triplicate, on September 21, 2021

Between:

XXXXXXX

hereinafter called

The Owner of the First Part

And

The Corporation of the Town of Essex

hereinafter called

The Corporation of the Second Part

Whereas an application has been made by the Owner for approval of a development within the limits of the Town of Essex which lands are more particularly described as XXXXXXXXXXXXXXXXX

And Whereas the proposed development is in accordance with the Official Plan of the Corporation as amended from time to time;

And Whereas the Corporation has enacted by-laws being by-laws designating the said lands as a site plan control area, pursuant to Section 41(2) of the Planning Act, R.S.O. 1990, as amended;

And Whereas where site plan control is in effect, Section 41 of the Planning Act, R.S.O. 1990, as amended requires the approval of plans and drawings by the Corporation prior to development and the Corporation may require the Owner to enter into an agreement respecting certain prescribed matters;

And Whereas the Owner wishes to undertake a development on the lands municipally known as XXXXXXXXX in accordance with the site plan, prepared by XXXXXXXXXXXXXXXXX

Now Therefore This Agreement Witnesseth that in consideration of the aforesaid mentioned premises and in consideration of the sum of Five Dollars (\$5.00) now paid by the Owner to the Corporation (the receipt of which is hereby expressly acknowledged), the parties hereto covenant and agree one with the other as follows:

1. The Owner hereby agrees to construct, provide, install and maintain for the life of the proposed development, to the satisfaction of and at no expense to the Corporation, all buildings, structures, landscaping, fencing, light standards, walkways, vehicular and bicycle parking and access areas, garbage disposal facilities, grading and provision for storm, surface and waste water, and other facilities in accordance with the approved site plan and site servicing drawings prepared by XXXXXXXXXXXX and on file with the Corporation, and in accordance with all the applicable provisions of the Corporation's Zoning By-law and such other relevant by-laws, as amended, and to the satisfaction of the Corporation;

Landscaping

2. The Owner hereby agrees to install all such landscaping identified and in accordance with the site plan on file with the Corporation, to the satisfaction of the Corporation. The Owner agrees that all landscaped areas shall be maintained in good practice exclusively for landscaping purposes save and except for permitted signage and such other facilities permitted or required by the Town or utility provider;

Parking and Access Areas

3. The Owner hereby agrees to construct and install all entrances, driveways, curbing, including pavement markings, and identification and directional signs in accordance with the approved site plan on file with the Corporation and in a manner satisfactory to the Corporation. The Owner further agrees to maintain all parking and driveway areas to the satisfaction of the Corporation;
4. The Owner hereby agrees to provide off-street parking spaces in accordance with the Corporation's Comprehensive Zoning By-law Number 1037 in the locations depicted in the site plan on file with the Corporation. Once required parking spaces and manoeuvring aisles are paved with a hard surface, the Owner further agrees to delineate all required parking spaces by pavement markings to the satisfaction of the Corporation.
5. The Owner hereby agrees to provide two (2) barrier free parking space in the location identified in the site plan on file with the Corporation, to be identified by a restricted parking post mounted sign at the head of the parking space, and flanked by an access aisle of 1.5 metres in width;

Storm Water Management Facilities

6. The Owner hereby agrees to construct and maintain for the life of the development the stormwater management facilities identified on the site plan on file with the Corporation and in accordance with the Stormwater Management report and site servicing drawings prepared by Aleo Associates INC and dated August 20, 2021;

Lighting

7. All lighting erected on light standards shall be directed inward and downward within the property and shielded so as to reduce, as much as technically possible, direct light penetration beyond the property lines. The Owner hereby agrees to orient, shield, install and maintain all other outside lighting in such a manner so as to direct all outside lighting away from abutting municipal road allowances and all other properties. The Owner further agrees to use only full cut-off fixtures for any and all new outside lighting purposes;

Signs

8. The Owner hereby agrees to obtain approvals and permits from the Ministry of Transportation (MTO) for the installation of any signs, including temporary development signs, visible from Highway 3 prior to installation;
9. The Owner hereby agrees to obtain approvals and permits from the Corporation's Building Division for the installation of any signs to ensure compliance with Corporation's Sign Bylaw, Bylaw1350, and any amendments thereto;

Special Provisions

10. The Owner hereby agrees to obtain approvals and permits from the Ministry of Transportation (MTO) prior to any grading, construction, or site alterations;
11. The Owner acknowledges that at the date of this agreement, South Talbot Road North is an existing construction zone, and hereby agrees to coordinate any site access and work the Highway 3 design team through the Corridor Management Office of the Ministry of Transportation (MTO);
12. The Owner acknowledged that there is no gas service along the front of the site and hereby agrees to obtain the necessary approvals from the Ministry of Transportation (MTO) and the Town of Essex for any application to Enbridge Gas to extend the gas main;
13. The Owner acknowledges that the lands fall within the regulated area of XXXXXXXXX and XXXXXXXXXXXXXXXXXXXX and are thus subject to the Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation under the Conservation Authorities Act (Ontario Regulation No. 158/06). The Owner hereby agrees to obtain a permit and/or clearance from the Essex Region Conservation Authority (ERCA) prior to any construction or site alteration or other activities affected by Section 28 of the *Conservation Authorities Act*;
14. The Owner hereby agrees to contact the Essex Region Risk Management Official (RMO) for the ERCA, prior to the installation of any fuel storage on this site, to ensure that appropriate actions are taken to mitigate any potential drinking water threats;

General Provisions

15. The Corporation hereby agrees to return the balance of the security deposit received on (Month XX, 20XX) to the Owner within 30 days of being notified by the Town's Manager of Capital Projects and Chief Building Official that all required works as set out in this agreement have been completed and any deficiencies corrected to the satisfaction of the Corporation and are in compliance with any applicable federal, provincial or municipal statute, by-law or regulation;
16. The Owner agrees to pay all outstanding Realty Taxes to the Corporation in advance of any building permit being issued for the proposed development;
17. The Owner hereby agrees to remove at no expense to the Corporation all snow from all driveways, parking and access areas and to remove and dispose of all refuse from the Subject Lands;
18. The Owner shall keep the municipal roads adjacent to the Subject Lands free from dirt and debris caused by the construction on the Subject Lands;
19. The Owner shall keep the grass and/or weeds upon the Subject lands trimmed so as not to exceed twenty centimetres (8 inches) in height during the course of the construction period;
20. The Owner shall, at its entire expense, restore any curbs, gutters, pavements, sidewalks, drains or landscaped areas on the municipal roads which are damaged during construction and construct any new curbs, gutters, pavements, sidewalks, drains and landscaped areas on the municipal roads abutting the Subject Lands, all to the satisfaction of the Corporation;
21. The Owner hereby agrees to notify all local, provincial or federal authorities having jurisdiction as to their proposed program of work and shall obtain all necessary permits and/or approvals which may be required from any authority having jurisdiction;
22. The Owner agrees to commence and complete construction of the building, parking, landscaping and all other facilities required under this agreement and zoning by-law within two (2) years of the date of execution of this agreement, all to the satisfaction of the Town, unless otherwise dictated by this agreement, or this agreement may, at the option of the Corporation, be deemed to be null and void;
23. The Owner hereby agrees to pay to the Corporation the applicable development charges, in accordance with the Town's Development Charges Bylaw, as may be amended from time to time, in advance of any building permit being issued by the Corporation;
24. The Owner hereby agrees to pay all costs incurred by the Corporation with respect to this Agreement, and without limiting the generality of the foregoing, shall include legal, planning, engineering and administrative costs;

25. The Owner acknowledges and agrees that pursuant to subsection (11) of Section 41 of the Planning Act, R.S.O. 1990, as amended, Section 325 of the Municipal Act applies to all requirements of this agreement. If the Owner neglects to undertake any matter or thing required to be done by this agreement and such default continues, in addition to other remedies available to it, the Corporation may direct that such matter or thing shall be done at the expense of the Owner and the Corporation may recover the expense incurred in doing it and the Owner hereby authorizes the Corporation to enter upon the said land and do such matter or thing;
26. This agreement may be amended at any time with the consent of the Corporation and the registered Owner of the said lands at the time of such amendment;
27. If any term, covenant or condition of this agreement shall, to any extent, be declared invalid or unenforceable, the remainder of this Agreement shall not be affected thereby and each term, covenant or condition of this agreement shall be valid and be enforced to the fullest extent permitted by law;
28. The Owner hereby agrees to the registration of the within agreement in the Land Registry Office for the County of Essex (No. 12) by the Corporation's solicitor and at the entire expense of the Owner;
29. This Agreement is not assignable by the Owner (or any person claiming through or under the Owner) unless the assignee thereof shall first in writing covenant and agree with the Corporation to assume the burdens and obligations imposed upon the Owner under this Agreement and to undertake with the Corporation to observe and perform the obligations herein imposed upon the Owner;
30. This agreement shall inure to the benefit of the Corporation and shall be binding upon the Owners and their respective heirs, executors, administrators, successors and authorized agents.
31. The Corporation shall not be required to issue a building permit for the said development until all the preconstruction provisions of this Agreement have been complied with.

In Witnesseth Whereof, the said parties hereunto affixed their signatures and corporate seals attested to by the hands of their proper officers, duly authorized in that behalf.

Signed, sealed and delivered in the presence of:

The Corporation of the Town Of Essex

Per: _____

Mayor

Per: _____

Clerk

Per: _____

(XXXXXXXXXX)

I have the authority to sign on behalf of

XXXXXXX

Appendix D

Species at Risk Technical Memo

Ministry of Natural
Resources and Forestry
615 John Street North
Aylmer ON N5H 2S8
Tel: 519-773-9241
Fax: 519-773-9014

Ministère des Richesses
naturelles et des Forêts
615, rue John Nord
Aylmer ON N5H 2S8
Tél: 519-773-9241
Télé: 519-773-9014



Technical Bulletin: Aylmer District Species at Risk Screening Process

This technical bulletin outlines the process for engaging the Ministry of Natural Resources and Forestry (**MNRF**) Aylmer District Office regarding the *Endangered Species Act, 2007* (**ESA**).

The ESA provides protection for species listed as Endangered or Threatened on the [Species at Risk in Ontario List](#). Individuals receive protection under Section 9 and their habitat is protected under Section 10. The ESA is a law of general application that is binding on everyone in the province of Ontario, and applies to both private and public lands. MNRF Aylmer District provides review of a project's compliance under the ESA by responding to species at risk (**SAR**) information requests (Stage 1) and project screening requests (Stage 2) only when both of the following conditions are met:

1. The request comes directly from the property owner or their delegate (e.g. consultants) on their behalf; and,
2. A specific project/activity is proposed by the property owner.

MNRF Aylmer District Contact Information

All ESA-related requests must be submitted to MNRF Aylmer District via our ESA inbox at ESA.Aylmer@ontario.ca

NOTE: *MNRF response time is between 8 and 10 weeks after receipt of all required information, due to the high volume of requests received.*

Stage 1: Information Request

To ensure due diligence under the ESA, MNRF encourages property owners and/or their delegates proposing to conduct site alteration (such as construction, vegetation/debris removal, site grading, etc.) to request SAR information from Aylmer District prior to beginning site alteration and/or conducting SAR surveys. For MNRF to respond to an information request, the following information is required:

- Proponent information (name, mailing address, and email address);
- Property location and mapping (municipal address and/or lot and concession);
- Digital photos of the property, including the vegetation on-site, if available;
- General description of all proposed activities and extent of development footprint (e.g. residential, driveway, vegetation clearing). Maps / site layout drawings are beneficial;
- Current state of vegetation, property maintenance/management (e.g. frequency of mowing), and recent property landscape history / changes (i.e. for the last five years);
- Timing and duration of proposed activities;
- Copies of past correspondence with MNRF about the property, if applicable; and,
- Status of municipal planning or Environmental Assessment process, if any.

Once the above information has been provided, MNRF will review available SAR data to determine if SAR species and/or their habitat(s) are known or likely to occur on or in the general area of the property. MNRF's response will be one of the following:

1. There is a **low** likelihood for SAR species and/or habitat to occur and/or be impacted
 - Further project screening / comment from MNRF will not be needed unless recommendations to avoid impacts cannot be followed or significant changes to the project are made (e.g. natural vegetation proposed to be removed).

2. SAR species and/or habitat are **known** to occur on or near the property, or there is a **high** likelihood for SAR species and/or habitat to occur
 - MNRF may recommend that field assessments by a qualified biologist are needed to determine whether the proposed project may contravene the ESA.
 - It is expected that the retained qualified biologist will use the information provided by MNRF to scope and design the field assessments, including identifying appropriate species-specific survey methodologies and timing.
 - MNRF can provide guidance on field assessments (i.e. protocols or proposed work plans). Some field assessment methodologies may require MNRF authorizations under the ESA and the *Fish and Wildlife Conservation Act*.
 - After field assessments have been completed, proceed to Stage 2.

NOTE: MNRF strongly recommends that no on-site activity (i.e. site alteration, vegetation/debris removal, etc.) occur until Stage 2 is complete, in order for proponents to demonstrate due diligence and remain in compliance with the ESA. Failure to comply with this recommendation could result in a contravention of the ESA and possible compliance / enforcement action.

Stage 2: Project Screening / IGF Review

Following MNRF's recommendations, a qualified biologist should complete appropriate field assessments and submit the results in an [Information Gathering Form \(IGF\)](#) to initiate a project screening request.

Link to IGF:

<http://www.forms.ssb.gov.on.ca/mbs/ssb/forms/ssbforms.nsf/MinistryResults?Openform&SRT=T&MAX=5&ENV=WWE&STR=1&TAB=PROFILE&MIN=018&BRN=21&PRG=31>

MNRF will review the IGF to determine whether the project is likely to contravene the ESA (Section 9 and/or Section 10). MNRF's response will be one of the following:

1. Contravention under the ESA is **not likely** to occur:
 - A response will be provided, which could include recommendations necessary to avoid impacts to SAR; or,

2. Contravention under the ESA is **likely** to occur:
 - MNRF will recommend options for seeking approval under the ESA, such as applying for a permit or assessing eligibility for alternative regulatory processes. Please be advised that applying for a permit does not guarantee approval and processes can take several months before a permit may be issued.

Appendix E

Guidelines for Professional Engineers Providing Land Development/ Redevelopment Engineering Services

GUIDELINE

**Professional Engineers
Providing Land Development/
Redevelopment Engineering
Services**

1994

Published by
Association of Professional Engineers of Ontario

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on behalf of the Professional Practice Committee

SCOPE

This Professional Engineers Ontario guideline is for engineers providing land development or redevelopment professional engineering services, and for those responsible for regulatory review and appraisal of land development or redevelopment applications. It should be read in conjunction with the Foreword and Glossary common to all PEO guidelines.

1. PREDESIGN SERVICES

1.1 General

Pre-design services are generally provided before draft plan finalization. When engineers are not engaged before draft plan approval, these services should be provided before engineers undertake detailed design. Engineers should recognize and identify specific land development approval requirements and any concomitant constraints early in the land development process, and communicate these to the client, in order to minimize potential conflict and loss of valuable time, and to protect the client's financial interests.

Pre-design services may include advisory services, project familiarization and feasibility studies.

1.2 Advisory Services

These may include some or all of :

- ◆ determining the availability of municipal and other services;
- ◆ relating proposed land development servicing requirements to official, secondary and other approved plans;
- ◆ establishing design criteria for engineering works;
- ◆ recommending policies to implement and control development;
- ◆ consulting with regulatory authorities to coordinate infrastructure requirements;
- ◆ assessing the impact of policies on subdivision agreements;
- ◆ assessing boundary conditions and potential external improvements resulting from proposed development;
- ◆ preparing preliminary cost estimates for land purchase decisions;
- ◆ recommending a subsurface investigation and characterization program, including appropriate geoenvironmental audits;
- ◆ reviewing existing agreements on cost sharing and/or front-ending, and advising on their implications;
- ◆ reviewing the nature, extent and time of required approvals for each stage of the proposed development;
- ◆ assessing the feasibility of developments relying on private sewage disposal and/or water supply systems;
- ◆ assessing storm drainage, temporary onsite storage and runoff water quality requirements, and
- ◆ advising on the potential limitations of environmental constraints, flood protection zones, hazard land designations, ecologically sensitive natural features and similar constraints.

1.3 Project Familiarization

This may include some or all of:

- ◆ reviewing municipal servicing capacity constraints;
- ◆ interagency coordination, as necessary;
- ◆ exploring cooperative approaches with adjacent owners;
- ◆ reviewing municipal practices for provision of stormwater quantity and quality control, according to guidelines established by the Ministry of Natural Resources and the appropriate conservation authorities, and
- ◆ determining project status and needs under the *Environmental Assessment Act*.

Engineers should become familiar with the project site, topography, drainage, existing municipal services, transportation infrastructure and draft plan proposals, in order to determine design objectives. Engineers should also deal with the appropriate regulatory authorities to determine or negotiate:

- ◆ information on existing and proposed municipal services, roads and other facilities;
- ◆ municipal standards and criteria for design and presentation of plans and proposals;
- ◆ municipal practice for providing such major services as: trunk sewers and watermains, roads and required widths and treatments, intersection signalization, grade separation structures and stream improvements, including requirements for fish habitat preservation and enhancement;
- ◆ municipal requirements for development or subdivision agreements;
- ◆ municipal policies on cost sharing and levies; and
- ◆ municipal and utility bonding requirements.

1.4 Feasibility Studies

Engineers should study appropriate alternative options for routes, major services, methods of construction and materials for the proposed land development, for capital cost and land economy. The feasibility study should demonstrate a clear understanding of the purpose, concept and limitations of the proposed development by considering:

- ◆ engineering design parameters;
- ◆ preliminary design briefs on viable alternatives;
- ◆ compliance of alternatives with engineering design parameters;
- ◆ requirements of other design professionals;
- ◆ resolution of unusual problems through creative approaches, including suggested changes to municipal standards;
- ◆ mechanisms to satisfy the requirements of jurisdictional authorities;
- ◆ preliminary estimates of capital costs for alternatives and staging, together with appropriate cost/benefit analyses and comparisons, including operating and maintenance, as required; and
- ◆ the need for additional qualified professional services, including those of hydrogeologists, geoenvironmentalists and fish biologists. In advising clients on additional professional services, engineers should prepare appropriate terms of reference, and review results in light of the alternatives being considered.

The engineer's report should describe preliminary design concepts, alternatives, constraints resolved or imposed, preliminary cost estimates and cost/benefit analyses. It should recommend an alternative with supporting rationale, and include documents, correspondence, drawings and other information required for detailed design of the selected alternative.

2. DETAILED DESIGN

2.1 General

Detailed design involves developing and preparing a final design, including standards and specifications, for economically constructing and operating all of the facilities within the development, as intended. Engineers should prepare surface grading and drainage plans, showing functional relationships between buildings, infrastructure and the developed environment. These should include details of stormwater detention, slope stability, erosion control during construction and, later, protection of fish habitat, and compliance with all natural and regulatory requirements.

2.2 Functional Report

This is the basis for detailed design and should be submitted to the client and the appropriate authorities, to obtain approval in principle before commencing final design. Functional reports should support the draft plan application, and include the following basic data in drawings and text:

- ◆ a copy of the draft plan, showing existing and proposed grades and surface features;
- ◆ a master watershed drainage plan, showing the routing of sanitary and storm drainage systems;
- ◆ water supplies, including domestic and fire flows and pressures;
- ◆ infrastructure design, pedestrian facilities, and basic dimensions of special structures;
- ◆ measures taken to comply with local and provincial jurisdictional requirements, including conservation authority requirements, and
- ◆ proposed construction scheduling and operational features and constraints.

2.3 Design Considerations

In preparing the final design, engineers should:

- ◆ develop detailed surface grading and drainage design criteria, incorporating municipal design requirements. This would include defining perimeter and internal lot grades and building elevations, perimeter block grades and all required drainage structures and swales. Engineers should also relate the design to final road grades and storm sewer design.
- ◆ conduct field surveys, to obtain profiles, cross-sections and topographical information for designing roadways, sewers, lot grading, surface grading and drainage, and to verify the accuracy of photogrammetric mapping. Field surveys should be undertaken after an Ontario land surveyor prepares a final plan of survey and stakeout of the road allowance and lot fabric, and extend beyond the limits of the subject lands, if such external information is significant to preparing the design. In subdivisions where extensive cuts and fills are required to comply with lot grades, engineered fill may be necessary. Engineers should assume responsibility for the placement of engineered fill, especially for services and building foundations. The control of engineered fill, or imported earth borrow, is critical to the design of private sewage disposal systems and private well installations. Engineers should aim to achieve an economic and practical balance between excavation and filling. They should also provide rough grading plans of the area, identifying all fill and cut sections larger than 400 mm, to minimize the dust nuisance to precompletion home occupants and the potential damage to infrastructure in the future.
- ◆ design and prepare flow sheets and hydrological and hydrogeological design briefs for surface and underground storm drainage systems and external drainage flow. Engineers should consider overland routing for emergency overflow and storms exceeding the design capacity of the storm sewer system, so that buildings are adequately protected.
- ◆ design the sanitary sewer system, to accommodate adequately the intended population density and land use, allowing for peak flow and low flow conditions, according to the appropriate regulatory requirements. Engineers should design sewage pumping stations forming part of the sanitary sewer system, to minimize future maintenance and operating costs, as well as initial capital cost.
- ◆ design the water distribution system, to provide domestic fire service appropriate to the land use and with adequate system security, according to good waterworks practice and fire underwriters' regulations;

- ◆ design the roadway system according to current standards and specifications and the geometric standards and criteria established for the development, including provisions for on- and off-street parking as approved. The roadway system design should include, as appropriate, considerations of pedestrian and community safety, including illumination, crosswalks, signalization and signage. Engineers should specify the pavement design and materials quality and compaction criteria.
- ◆ design grade separation structures and culverts, including associated retaining structures and approaches;
- ◆ incorporate appropriate considerations of ecology and tree preservation in the design, and
- ◆ propose architectural styles for buildings compatible with the intended development concept.

2.4 Drawings

Engineers should prepare contract drawings to the standards established, and referenced to an Ontario land surveyor's legal surveys, using the Canada Land Inventory coordinate grid system, where available.

Design drawings should indicate proposed road grades, existing ground contours, parcel dimensions, casements, service connection locations, surface appurtenance locations within the road allowance, existing and final grade elevations at lot corners and along block limits, internal final lot and block grades, embankments, structures, sales, driveway constraints, catchbasins and leads, building types and other relevant information, including the use of engineered fill. In anticipation of building construction and excavation, a rough grading plan may be required to achieve site balancing of earthworks most economically.

2.4.1

The general plan should present a summary of all proposed facilities and services, with street names and lot numbers related to the legal survey plan, registered or to be registered.

2.4.2

The plan and profile for each street should be drawn in sufficient detail to enable construction. The plans should show the locations of sewers, watermains, curbs, sidewalks, maintenance holes, catchbasins, hydrants, valves and other facilities or structures, including street names, lot numbers, lot widths, and reference to adjacent plans. The profile should show invert elevation of sewers (including maintenance hole connections), the length, grade and class of sewer pipe and bedding detail for each section, as well as the length and grade of each tangent or roadway section, the elevation of the existing ground and other relevant details.

2.4.3

The sanitary and storm drainage area plans should define the drainage areas and design criteria for sanitary and storm facilities.

2.4.4

Cross-sections and other standard drawings should include the design details of nonstandard construction, and refer to applicable standards and special provisions. Engineers should use supplementary drawings to illustrate the design of appurtenant structures, if these cannot readily be shown on the plan and profile, or on the general plan.

2.4.5

Surface grading and drainage control drawings, based on legal surveys, should define the requirements and restrictions on surface grading, drainage, and structures.

2.4.6

Utilities coordination drawings, if required, should show all above-ground features and known locations of underground services.

2.5 Schedules for Subdivision Agreement

Engineers should prepare schedules required by municipal authorities, for inclusion in the subdivision or land development/redevelopment agreement. These should include an estimate of costs for financial securities and insurance. Engineers should participate in preparing the subdivision agreement, related to the assumption of roads, and ensure that lot grading is carried out in accordance with design.

2.6 Draft Conditions

Engineers should assist in satisfying conditions of draft approval.

2.7 Control Procedures

Driveway construction over private lands is an area of significant concern in new residential subdivisions. Engineers should be proactive in supervising/controlling driveway grades to the established standards. Engineers should also provide advice on control procedures, and carry out all authorized procedures, including:

- ◆ reviewing, correcting and approving builder site plans, prepared in sufficient detail to provide exact grading and drainage definition for the lot or blocks in relationship to the proposed building and lot grading plan, including top of footing elevations;
- ◆ applying location information on the drawings for street lights and buried service utilities, and
- ◆ reviewing builders' plans for driveway locations and building setbacks for traffic visibility at corners.

2.8 Specifications

These should be complete, clear and concise, describing the work's general scope, various classes, method of measurement and payment. The document should follow normal specification practice, including special provisions and nonstandard sections for special elements in the contract. Nomenclature should be the same as that used in drawings.

2.9 Contract Documents

These should include general and special conditions, priorities, specifications and plans, in addition to forms of tender with estimates of quantities of materials and work required. Engineers should prepare a cost estimate following preparation of the tender documents but before tendering, for acceptance by the client. Plans, schedules and applications for approval should be submitted to the client and regulatory authorities, for review and approval. Engineers should communicate with the regulatory authorities, to discuss the design and provide explanations, help further the land development application's approval.

Engineers should participate in the tendering procedure and make recommendations on the award of the contract, based on the tender bids received.

2.10 Submission of Plans, Tender Call and Contract Award

Tenders should include details of all draft plan conditions, permits/approvals and the subdivision agreements required.

3. ADMINISTRATION DURING CONSTRUCTION

3.1 General

Engineers designing the project should provide general administration services during construction to completion. These usually include:

- ◆ administration of construction contracts for each contract, to ensure general compliance with plans and specifications, and
- ◆ other development-related office and field services exclusive of contract administration, when so required.

Engineers acting as regulators should administer the development agreement according to the rules and regulations imposed on the proposed development.

3.2 Administration

Administration during construction includes:

- ◆ preparing payment certificates and processing contractor requests and claims;
- ◆ ensuring that work is executed in general conformity with plans and specifications;
- ◆ considering and evaluating alternative methods, equipment and materials, to achieve the desired end results;
- ◆ monitoring schedules and budgets;
- ◆ preparing, in conjunction with regulatory or approving authorities, work deficiency lists;
- ◆ advising on, and coordinating installation of, servicing utilities;
- ◆ reviewing shop drawings and other proprietary specifications for general conformity to the intent of project design. Where such drawings bear the seal of a professional engineer, reliance will be placed on the designer's calculations, unless otherwise specifically stated in the review.
- ◆ preparing "as-built" drawings;
- ◆ organizing and recording site meetings and construction-related decisions, and
- ◆ arranging quality control testing and providing quality assurance.

3.3 Resident Services

Engineers may offer to provide resident staff for contract supervision, inspection and layout. The extent of the requirement for resident staff is determined by development agreement obligations, client objectives, contractor's competence, site conditions and other factors, separately or in combination. Engineers should, after taking all such factors into account, recommend the extent of resident supervision services required, avoiding duplication of any services provided by municipal authorities.

Site resident services may include some or all of:

- ◆ field layout, or checking the contractor's field layout;
- ◆ periodic or continuous supervision of construction, to ensure conformance with approved plans and agreements;
- ◆ materials, time and equipment auditing services, including assessment and cost estimation of any extras associated with change orders. Field measurements of quantities. Maintenance of daily diaries and work sheets, signed by the contractor and the resident staff.
- ◆ issuance of change initiation orders to the client, where justified by site conditions, with adequate explanation and proposed methods for monitoring the change order;
- ◆ inspection of the works to confirm conformity with regulatory/approved conditions;
- ◆ follow-up inspection, audit and approval of corrective actions and works, and
- ◆ quality control and assurance testing, using independent laboratories and agencies as appropriate, for manufactured and natural products and materials specified.

4. RELATED SERVICES

4.1 General

Engineers or selected subconsultants may perform the following related services, under agreement with the client:

- ◆ legal, topographical, condition and location surveys of existing utilities and conduits;
- ◆ geoenvironmental audits and subsurface characterization studies;
- ◆ environmental impact surveys and studies; and
- ◆ natural resource inventories and surveys, including fauna and flora characterization for ecologically sensitive developments.

4.2 Public Hearings

Engineers may be required to conduct public hearings, to publicize the project and inform the public and affected communities on the scope of the proposed development. In such cases, engineers should prepare plans of the proposed development, and arrange for public hearings by suitable advertisement and notice, in concurrence with the affected municipal, provincial and other regulatory authorities.

Engineers should conduct or assist with the conduct of such public hearings and, from the input received, propose conceptual or design alterations that satisfy public and regulatory concerns and the client's development objectives, through negotiations and additional studies if necessary.

4.3 Additional Design Services

Engineers may be required to provide the following additional services in connection with proposed land developments:

- ◆ change or add to the design, specifications or contract documents, as dictated by circumstances beyond the engineer's control;
- ◆ review and assess the impact of proposed adjacent developments and the requirements of regulatory authorities;
- ◆ conduct storm water management studies;
- ◆ provide engineering services required under the *Environmental Assessment Act*;
- ◆ review or prepare reinforcing bar schedules and shop drawings;
- ◆ review or provide town planning services, and
- ◆ retain specialized services (e.g., geotechnical, geoenvironmental, architectural, landscaping, inspection and testing, quality control, project management, project audit) on behalf of the client.

4.4 Additional Administrative Services

Engineers may also be required to provide additional administrative services, including:

- ◆ easement negotiations;
- ◆ participation in legal, zoning and similar meetings;
- ◆ coordinating with utilities/services regarding installation schedules and unique locations;
- ◆ preparing cost sharing agreements;
- ◆ preparing detailed cost analysis, procuring and scheduling special applications for grants, loans, tax rebates and contributions from municipalities and other developers;
- ◆ administering financial arrangements;

- ◆ administering agreements of purchase and sale with builders;
- ◆ calculating and verifying extended footing charges;
- ◆ coordinating separate construction contracts and other consultants' work;
- ◆ attending special site meetings, dealing with extraordinary or extensive field problems, or situations not anticipated during design;
- ◆ providing computer services, except where a computer is used for design under the percentage schedule, or for the consulting engineer's normal office administration;
- ◆ providing operating manuals, plant start-up and operating personnel training;
- ◆ preparing special theoretical designs, reports and documents required for a project's approval and financing;
- ◆ providing translation of contractual documents or reports, conversion to metric or imperial units, and preparation of drawings for reduction, and
- ◆ assisting in having all constructed works assumed by the agencies having jurisdiction.

4.5 Additional Field Services

The following are examples of additional field services:

- ◆ arranging for subsurface environmental audits, and soil and groundwater testing;
- ◆ conducting surveys, to ensure that buildings are constructed in conformity with approved site and lot grading plans;
- ◆ conducting surveys and inspections, to ensure conformity of lot grades with approved plans, note deficiencies, supervise, and inspect rectification, and
- ◆ certifying that construction and grading are in accordance with the approved plans, as required.

4.6 Administering Subdivision and Development Agreements

When required by clients, engineers should:

- ◆ maintain sufficiently detailed records of construction progress that municipalities can authorize adjustments in subdivision securities;
- ◆ ensure that the scheduling and order of construction conforms to the requirements of the subdivision agreement and the appropriate regulatory authority, and will achieve the most efficient and economical end product;
- ◆ maintain records and follow-up procedures, to ensure that securities, liability coverage, etc., are maintained in, and reduced to, the correct amounts and form required during the term of the development agreement;
- ◆ ensure that full-time inspection services are being carried out by either their resident staff or municipal inspectors;
- ◆ assume responsibility for ensuring that terms of the subdivision agreement are being followed, and
- ◆ provide written declaration to the local municipality, stating that all subdivision works have been constructed according to the subdivision agreement, approved engineering drawings and the municipality's design criteria before "final acceptance" under municipal bylaws.



**Professional Engineers
Ontario**

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M2N 6K9

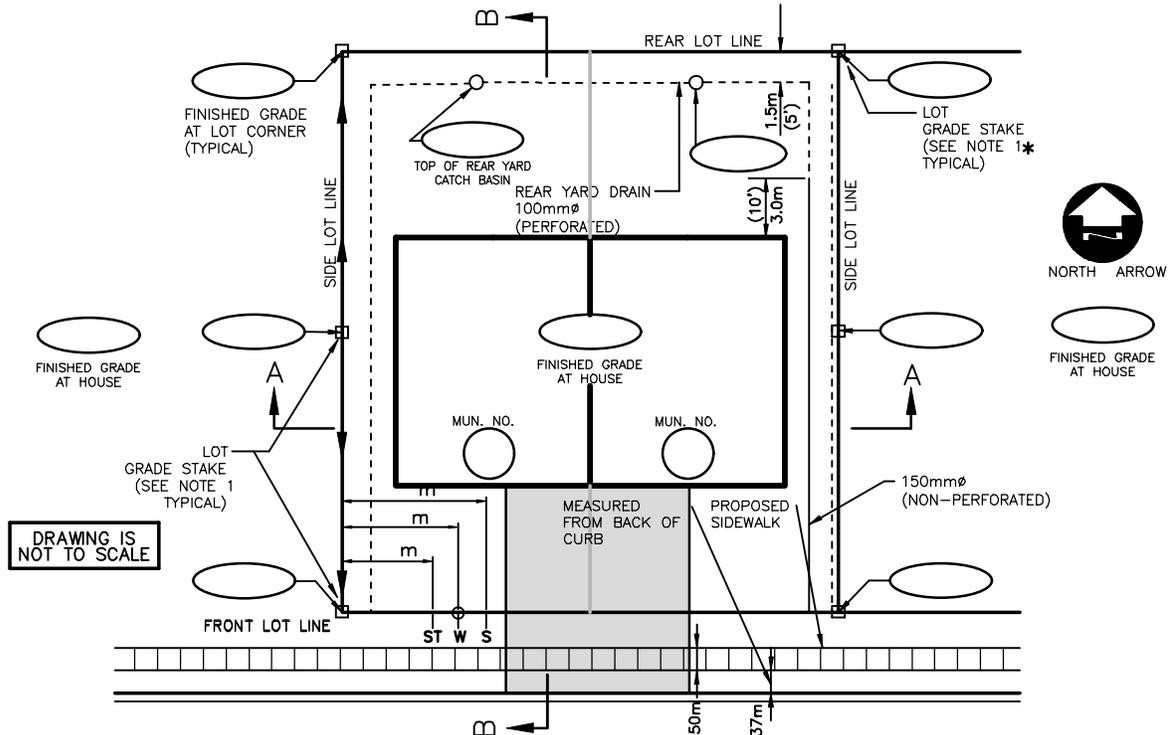
Tel: 416 224-1100 or 1-800-339-3716
Fax: 416 224-8168 or 1-800-268-0496

Enforcement Hotline: 416 224-9528 Ext. 1444

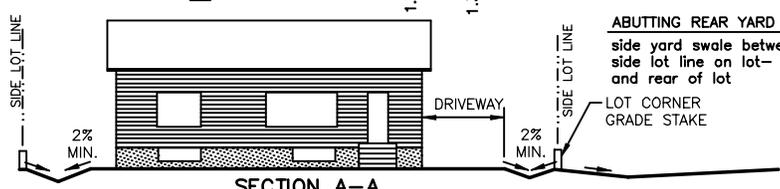
Website: www.peo.on.ca

Appendix F

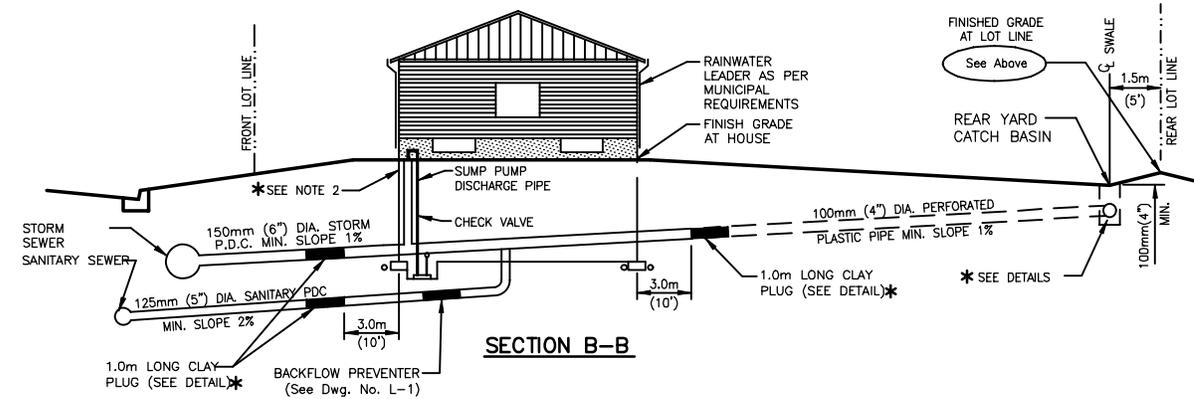
Lot Servicing Sheets



ABUTTING SIDE YARD CONDITION
side yard swale on side lot line - grade to front and rear of lot



ABUTTING REAR YARD CONDITION
side yard swale between house and side lot line on lot - grade to front and rear of lot



	STORM (ST)	SANITARY (S)	WATER (W)
SIZE:	150mm (6") DIA.	125mm (5") DIA.	mm (") DIA.

INVERT ELEVATION AT R.O.W. LIMIT: _____
NAD83 COORDINATES: _____

Municipal No. _____
Plan 12M- _____ PART _____

LOT _____

Date _____
Consultant _____
Inspector _____

HOME BUILDER SIGN-OFF
I hereby agree to grade the land within the lot boundaries in accordance with the elevations and dimensions as shown above.
DATE _____ SIGNED _____

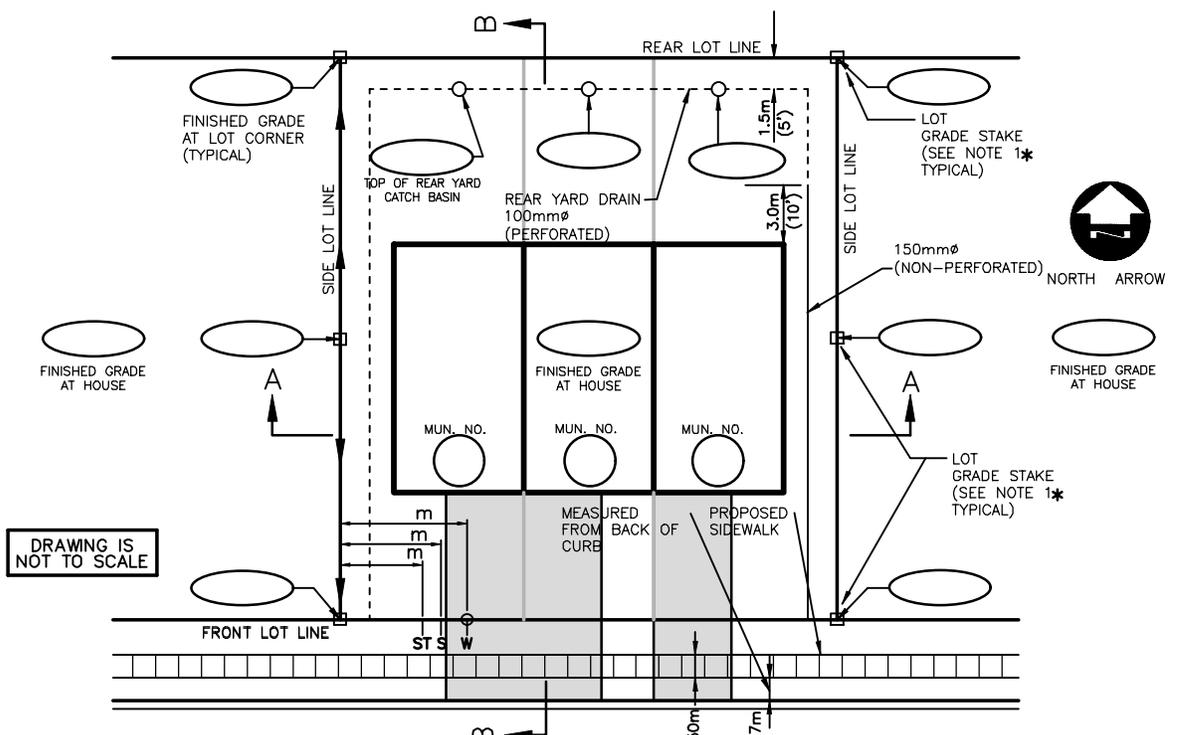
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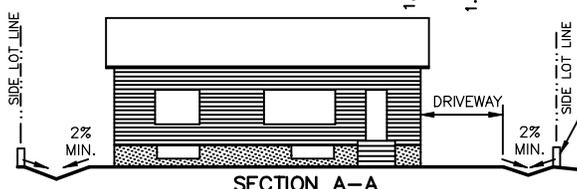
1	June 01, 2021
No.	Revision Date

Town of Essex Development Manual

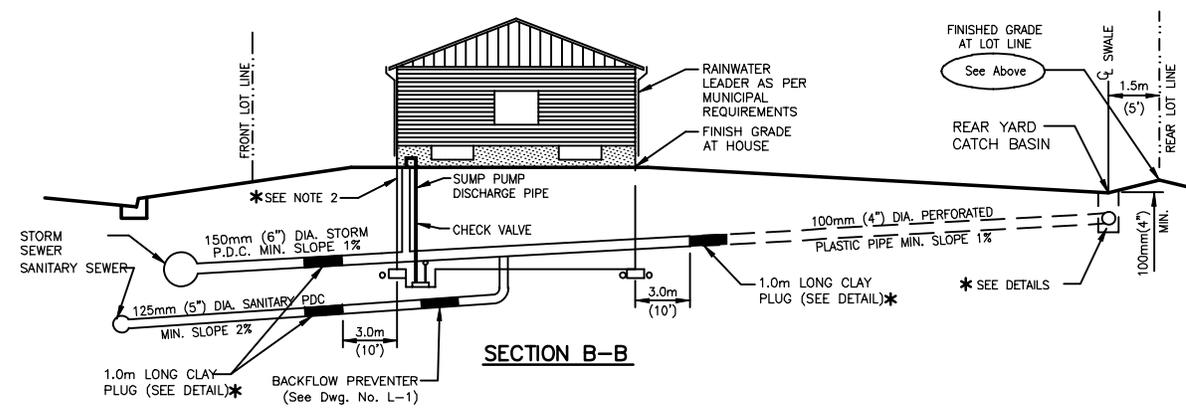
CONSULTANT LOT GRADING DESIGN AND SERVICING AS-BUILT FOR SEMI-DETACHED



ABUTTING SIDE YARD CONDITION
side yard swale on side lot line – grade to front and rear of lot



ABUTTING REAR YARD CONDITION
side yard swale between house and side lot line on lot – grade to front and rear of lot



	STORM (ST)	SANITARY (S)	WATER (W)
SIZE:	150mm (6") DIA.	125mm (5") DIA.	mm (") DIA.
INVERT ELEVATION AT R.O.W. LIMIT:	_____	_____	_____
NADB3 COORDINATES:	_____	_____	_____

Municipal No. _____
Plan 12M- _____ PART _____

LOT _____

Date _____
Consultant _____
Inspector _____

HOME BUILDER SIGN-OFF
I hereby agree to grade the land within the lot boundaries in accordance with the elevations and dimensions as shown above.
DATE _____ SIGNED _____

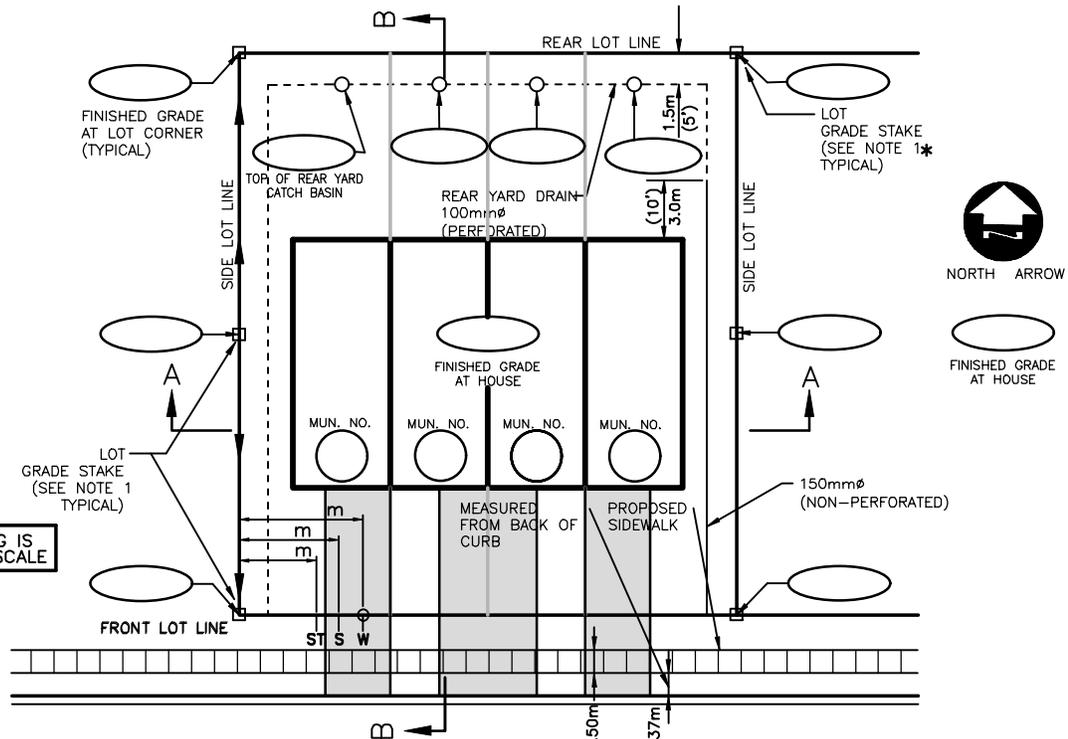
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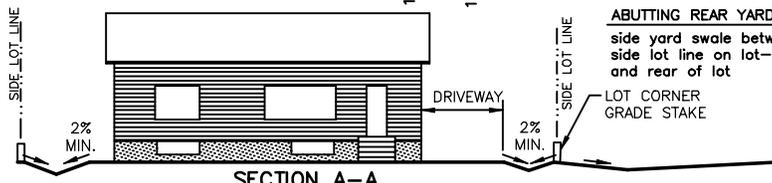
Town of Essex Development Manual

CONSULTANT LOT GRADING DESIGN AND SERVICING AS-BUILT FOR 3-UNIT TOWNHOUSE

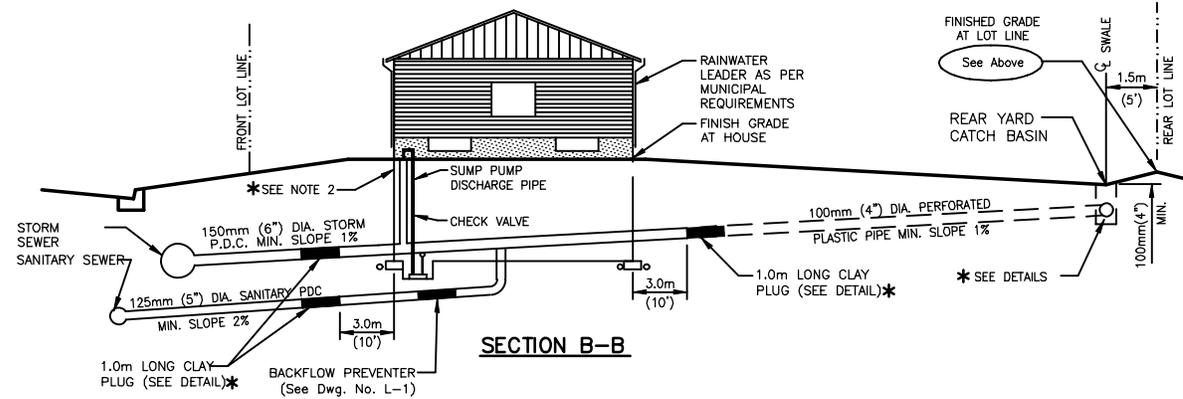


DRAWING IS NOT TO SCALE

ABUTTING SIDE YARD CONDITION
side yard swale on side lot line - grade to front and rear of lot



ABUTTING REAR YARD CONDITION
side yard swale between house and side lot line on lot - grade to front and rear of lot



STORM (ST) SIZE: 150mm (6") DIA.
SANITARY (S) SIZE: 125mm (5") DIA.
WATER (W) SIZE: mm (") DIA.

INVERT ELEVATION AT R.O.W. LIMIT: _____
 NAD83 COORDINATES: _____

Municipal No. _____
 Plan 12M- _____ PART _____

LOT _____

Date _____
 Consultant _____
 Inspector _____

HOME BUILDER SIGN-OFF
 I hereby agree to grade the land within the lot boundaries in accordance with the elevations and dimensions as shown above.
 DATE _____ SIGNED _____

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1	June 01, 2021
No.	Revision Date

Town of Essex Development Manual
CONSULTANT LOT GRADING DESIGN AND SERVICING AS-BUILT FOR 4-UNIT TOWNHOUSE

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