

# **Vaughan Metropolitan Centre**

## **UTILITY MASTER PLAN**

**May 24, 2017**

## Executive Summary

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The Vaughan Metropolitan Centre (VMC) is under construction. The fast-paced development activity in the VMC currently underway comes as a result of strategic investments and partnerships with the development community in delivering public transit, infrastructure, development and public realm initiatives that are attracting new office, mixed-use and residential development to Vaughan's downtown.

With a projected population target of 50,000 people by 2051, and an interim target of 25,000 residents by 2031, the City of Vaughan has developed a number of foundational planning and engineering documents to guide the design and development of the VMC. These documents have set the vision and place making framework for the downtown as "an intense, dynamic community that in time will become the heart of the city, economically, culturally and physically", and include the VMC Secondary Plan, Streetscape and Open Space Plan, Urban Design Guidelines, various Environmental Assessment Servicing Master Plans, among others... The timely planning and implementation of public infrastructure is at the forefront of delivering the construction of a downtown with such qualities and aspirations.

As recommended by the City's Development Facilitator, LiveWorkLearnPlay, the Utility Master Plan is a fundamental study that will assist the City, developers and design consultants to properly plan for utility servicing to support the VMC full build. The goal of the project is to optimize the City's investment in the public realm to fulfil the vision of the VMC Secondary Plan as a walkable, vibrant, pedestrian oriented downtown. The Master Plan will ensure that utilities and infrastructure are adequately designed, integrated and coordinated with the downtown's new public realm comprised of new urban level of service streetscapes, cycling facilities, medians, parks and open spaces. The intent is to help the reader understand the City's vision for an infrastructure network where a hierarchy of utility corridors has been established along the VMC's proposed street network to facilitate the downtown's buildout, while ensuring that streetscape and infrastructure investments are highly integrated.

The Master Plan was developed through a collaborative process that involved landowners, developers, their consultants, City staff and other stakeholders, namely utility service providers from Alectra (formerly PowerStream), Enbridge, Bell, Rogers and other telecommunication agencies.

High-level design guidelines (street cross sections and best practice precedents) are included to illustrate the City's intention in ensuring that public realm components (i.e. walkways, trees, lighting, street furniture, etc.) are properly coordinated with proposed utilities.

Note that the potential conversion of the overhead hydro lines fronting Jane Street and Highway 7 are outside the scope of this report.

Lastly, an infrastructure development application process map is included in this document to provide guidance to streamline the multi-tiered design process.

## Table of Contents

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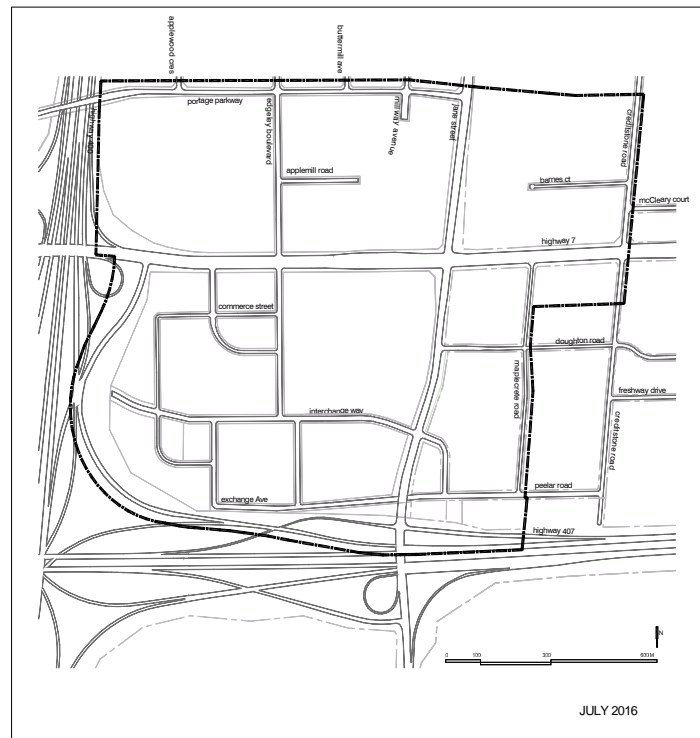
<b>Part 1:</b>	<b>Background Analysis</b>	<b>Page 4</b>
<b>Part 2:</b>	<b>VMC Public Utilities Planning</b>	<b>Page 8</b>
<b>Part 3:</b>	<b>Utility Corridor Design Guidelines</b>	<b>Page 17</b>
<b>Part 4:</b>	<b>Implementations and Recommendations</b>	<b>Page 26</b>
<b>Part 5:</b>	<b>Appendices</b>	<b>Page 27</b>

# Part 1 – Background Analysis

## 1. Background Analysis

### 1.1. Current Conditions and Growth Projections:

The Vaughan Metropolitan Center (VMC) is geographically located within the City of Vaughan, Ontario bordered by Highways 400 and 407 to the west and south, Portage Parkway to the North and Creditstone Road to the east. Schedule A shows the existing municipal street network through the VMC.

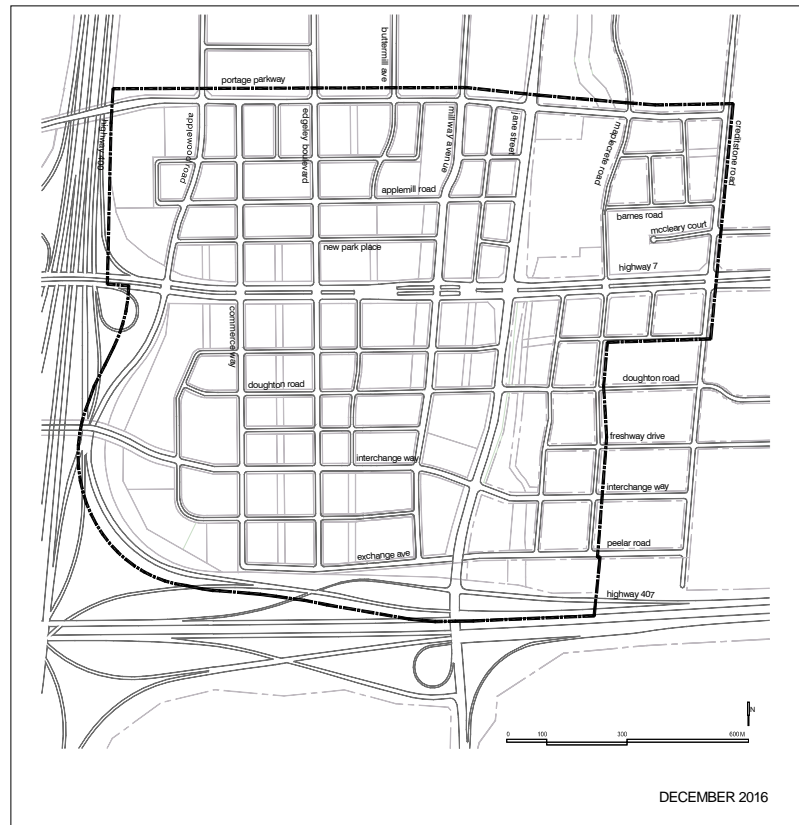


#### LEGEND

 Vaughan Metropolitan Centre Boundary

### SCHEDULE A: EXISTING STREET NETWORK AND VMC BOUNDARY

By 2031 the VMC will achieve its medium term built-out target, and will be transformed from its current land usage into a vibrant mixture of residential buildings (~12,000 units), high end employment and new retail centres (~1,500,000 ft<sup>2</sup> employment and ~750,000 ft<sup>2</sup> retail) and municipal parks all connected to the surrounding communities via the latest rapid transit systems and public realm improvements. Schedule B shows the proposed ultimate municipal street network through the VMC.



#### LEGEND

 Vaughan Metropolitan Centre Boundary

### SCHEDULE B: PROPOSED ULTIMATE MUNICIPAL STREET NETWORK

Along with this intensification of land usage, the Shallow Service Utility Systems (Hydro, Gas, Street Lighting and Communications Systems) must, in turn, be upgraded to provide the additional servicing capacity required for the communities. Accordingly, this Master Plan is prepared to aid in the implementation of the additional utility installation. Given the ever evolving nature of utility servicing and lengthy development timeline for the VMC, the recommendations offered herein should be viewed as a framework and set of guidelines that will facilitate the coordination with proposed development plans and infrastructure to support development in the VMC. The City will review various servicing options on a case by case basis as they are presented.

As of January 2017, the Shallow Service Utility Providers are as follows:

1. Alectra Utilities Corporation provides hydro servicing to the area.
2. Enbridge Gas Distribution Inc. provides natural gas servicing to the area.
3. Bell Canada and Rogers Cable Communications Inc. provide telecommunications services to the area.

As time progresses, other shallow service utility providers may become viable alternates to the ones listed above. The City of Vaughan will review utility service provider applications to ensure that the implementation of their services is both warranted and in keeping with the municipal vision for the VMC.

## 1.2. Planning Context:

The landscape of Vaughan is transitioning from traditional suburban forms of development into new urban formats as the City intensifies. To guide this transition, foundational planning and policy frameworks have been established to set the vision for higher level of service urban streetscapes in Vaughan's many intensification areas, including the VMC.

As outlined in the *City-Wide Streetscape Implementation Manual*, "Intensification areas will host greater population density than currently exists in Vaughan. The additional density will place a greater demand for space in the right-of-way for pedestrians, cyclists and vehicular traffic and greater demand and stress on the public utility network from adjacent land uses. The public utility network will need to add additional capacity to accommodate development which will require more space in the streetscape. In the interest of high quality urban pedestrian environments, it is recommended that public utilities be located underground." (*City-Wide Streetscape Implementation Manual, Section 6*). Note that in this context the intent is not to utilize submersible transformers and switchgear but rather to install them in building basements or in grade level room enclosures. Where these accommodations cannot be met then a barrier will be erected to keep utility equipment out of sight from road right of way subject to Municipal Approval.

Streets play a significant role in the vitality, livability and character of a city. Investment in high quality streetscapes as important pieces of infrastructure that help create a sense of place, attract investment and define the social space for everyday life is a key strategy in the City's growth and transformation, particularly for the new downtown.

"The Streetscape Plan for the VMC envisions an urban approach to streetscape design requiring greater emphasis on a higher quality pedestrian and social environment as well as places for cyclists, on-street parking and transit. These increasing demands for space within the right-of-way also place additional coordination requirements on utilities and municipal services." (*VMC Streetscape and Open Space Plan*, 6.5)

Thoughtful attention to how the many elements of a street fit together from the outset is necessary to build a cohesive and sustainable city, to maximize shared investment, and to help coordinate future development with the public realm. Above ground public utilities physically and visually congest the streetscape and take away valuable amenity space. In recognition of this, the *VMC Secondary Plan* states that:

- 4.4.9 Generally, all electrical and telecommunication cabling within right-of-ways, including proposed piping for district energy, shall be located underground. The integration of required above ground utility infrastructure in adjacent buildings shall be encouraged. Any utility boxes required within the right-of-way shall be well integrated with the design of the streetscape.
- 4.4.10 The Region will be requested to provide space to accommodate the undergrounding of utilities along Highway 7 and Jane Street, and to protect for such an opportunity in the planning and design of new infrastructure.

Tree planting must be thoroughly coordinated with infrastructure and utilities located above and below ground to minimize disruption and ensure adequate space and growing conditions for mature trees. No public utilities should be located under street trees to avoid root conflicts.

### 1.3. Stakeholder Consultation Summary:

This report was prepared in consultation with Alectra Utilities (formerly PowerStream), Enbridge, Bell and Rogers. All utility information contained herein is based on current standards and specifications as of the date of preparation (January 2017) and is subject to change as technologies, standards and requirements evolve. It is critical for all new developments to contact all of the utilities very early on in the design process to ensure that services can be brought into the buildings in keeping with the respective requirements of the various utilities and with the City of Vaughan requirements as set out in this manual.

## Part 2 – VMC Public Utilities Planning

### 2. Vaughan Metropolitan Centre Public Utilities Planning

#### 2.1. Alectra Utilities Corporation (formerly PowerStream Inc.)

The existing Alectra Hydro System is shown in Schedule C.



#### LEGEND

- Existing 3-Phase Underground 28kV
- Existing 3-Phase Overhead 28kV
- Existing 3-Phase Overhead 8.32kV

#### SCHEDULE C: PROPOSED ULTIMATE MUNICIPAL STREET NETWORK

Note that the existing overhead hydro system shown throughout the City of Vaughan Right-of-ways in the VMC may be required to be converted to underground as a City of Vaughan stipulation in issuing a building permit. Alectra will confirm, through the design process, the total cost to convert the overhead to underground attributable to the Developer/Builder.

In general, buildings along an existing right of way will be considered a Connection by Alectra Utilities Corporation. The process to have Alectra bring power to the site is itemized by the Industrial, Commercial and Institution (ICI) Submission Guideline {Reference Appendix 5.1.}. Once the design process is initiated with Alectra they will confirm point of supply and provide an offer to connect agreement based on the particulars of the proposed building.

In adhering to the City of Vaughan's requirements to have all utilities hidden there may be cases where developer(s)/builder(s) will be responsible to provide their own customer owned equipment such as transformers. In addition, easement(s) and access agreement(s) may also be required in favour of Alectra Utilities.

Alectra's Service Application Form also attached {Reference Appendix 5.2.}. This form, along with the required legal documentation specified, will be required at the time of Service Application which should occur very early on in the building design process.

Within the VMC Alectra will support the City of Vaughan request to have electrical equipment integrated in the development built form, and not encumbering the Right of Way wherever possible. Existing equipment such as above grade switchgear may be considered redundant and removed from site. New Hydro equipment such as Switchgear and Transformers should be hidden within a building's underground parking area provided that proper clearances and access can be achieved. Alternately, Alectra will allow their above ground equipment to be installed in an above ground hydro vault, dedicated structure, or inconspicuously integrated within the building façade. Alectra should be contacted at the beginning of the design stage of development to confirm their specific requirements for the proposed building site. City's Urban Design Team will need to approve any above grade equipment in the public and private realm.

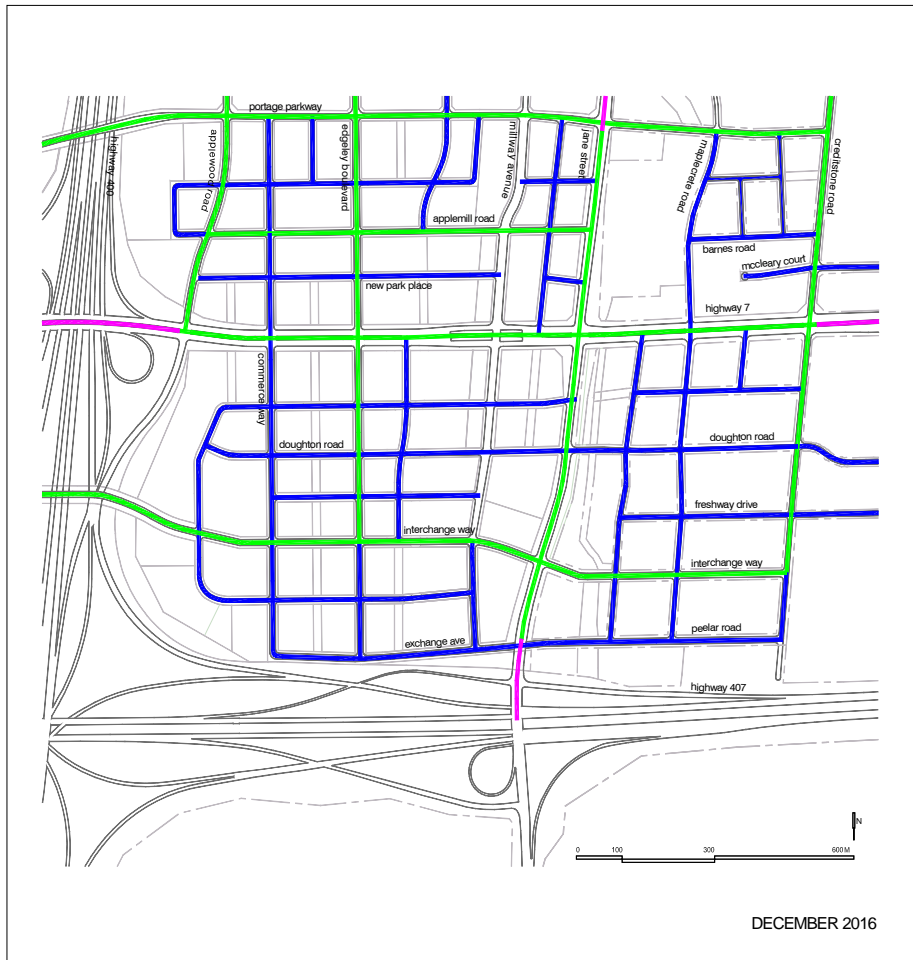
Note that Alectra adheres to the Level of Service Cross Section outlined in the 2014 City Wide Streetscape Implementation Manual and Financial Strategy to determine the type of duct bank structure to be used. The four levels are as follows;

1. Basic Level of Service – Direct Buried in Ducts
2. Standard Urban Level of Service – Direct Buried in Ducts
3. Enhanced Level of Service – Concrete Encased Duct Bank
4. Premium Level of Service – Concrete Encased Duct Bank

Regardless of the Level of Service, below grade cable chambers with access manholes may be utilized per Alectra requirements.

If the Alectra is requested to relocate existing above ground equipment feeding existing building(s) then the city/builder will have to initiate discussion with the existing building's owner(s) to accommodate the new hydro equipment at no cost to Alectra. All Alectra's cost associated with the relocation will be 100% chargeable by them.

For the purposes of Municipal Street Lighting and traffic signalization, single phase pad mounted transformers may be required to be initially installed in the Municipal Boulevard. If this is the case, the City will require the builder of the lot with the existing transformer to relocate it along with its associated connections to the same location as the three phase transformer feeding the building. The municipality would then need to be named on the easements to allow them to access their street lighting disconnect panel and associated wires. Schedule D shows a proposed Hydro Master Plan with ultimate feeder cable circuit routing.



#### LEGEND

- Hydro Overhead Feeder
- Hydro Underground 600 Amp Feeder
- Hydro Underground 200 Amp Local

#### SCHEDULE D: PROPOSED ULTIMATE HYDRO NETWORK

#### 2.2. Enbridge Gas Distribution Inc.

Given the capacity of gas required to service a building in the VMC, Enbridge has to service the community through steel pipes of varying sizes. They will also require regulator stations at various locations which, by code, must be located outside any

building or enclosure. Enbridge will site the regulator stations on an as needed basis dependent upon the servicing requirements that evolve throughout the development of the VMC. Should Enbridge require a regulator station, they will typically require an easement of approximately 3.5m x 3.5m (to be confirmed by Enbridge given the size of regulator required). The location of the regulator station will need to be vetted through and approved by the City of Vaughan to ensure that the aesthetic impact of the unit is minimized.

Schedule E shows the existing Enbridge Plant within the VMC. It is the intention of this Utility Master Plan to locate and build over time Enbridge's larger diameter High Pressure mains within the Main Collector Roads as identified in Schedule F (Proposed Enbridge Network), while smaller diameter service mains are planned to go through the Limited Capacity Local Roads. For either road type, Enbridge's current policies require that they install steel main in an exclusive trench.



#### LEGEND

- Existing 12" Steel High Pressure Gas Main
- Existing 4" Steel High Pressure Gas Main
- Existing 2" Steel High Pressure Gas Main
- Existing 4" Steel Intermediate Pressure Gas Main
- Existing 2" Steel Intermediate Pressure Gas Main

### SCHEDULE E: EXISTING ENBRIDGE NETWORK

Schedule F shows a proposed routing for Enbridge Plant within the ultimate VMC.



#### LEGEND

- 12" Steel High Pressure Gas Main
- 4" Steel High Pressure Gas Main
- 4" Steel Intermediate Pressure Gas Main

#### SCHEDULE F: PROPOSED ENBRIDGE NETWORK

Like Hydro, Gas servicing must be applied for on a per service basis. To initiate service with Enbridge the applicant should contact Enbridge Customer Connections at 1-888-427-8888. From there the applicant will be contacted by the appropriate Area Department to move forward with the required process and confirm the Enbridge contact for the project. The applicant will be required to provide site plans and a filled out application form (found at <https://www.enbridgegas.com/eApp/CreateGasApplication.aspx>.) Upon

review of the application, Enbridge will confirm required routing, connection points and potential costs of servicing the building. Once all agreements are in place and drawings approved, Enbridge will have their general contractor extend their main as required and install the service to the building. It should be noted that Enbridge currently requires approximately 1 year from project initiation to construction.

### 2.3. Communications Servicing

As of the issuance of this report, both Bell and Rogers are utilizing fibre optic servicing architecture. Again, specific application will have to be made to one or both regarding the servicing of the building. Any equipment required by the communications equipment specifically related to the servicing of a given site, must be located on the site itself and not in the municipal boulevard. Typically, the duct provision from lot line to electrical room is supplied by the builder in accordance with Bell and Rogers' respective requirements.

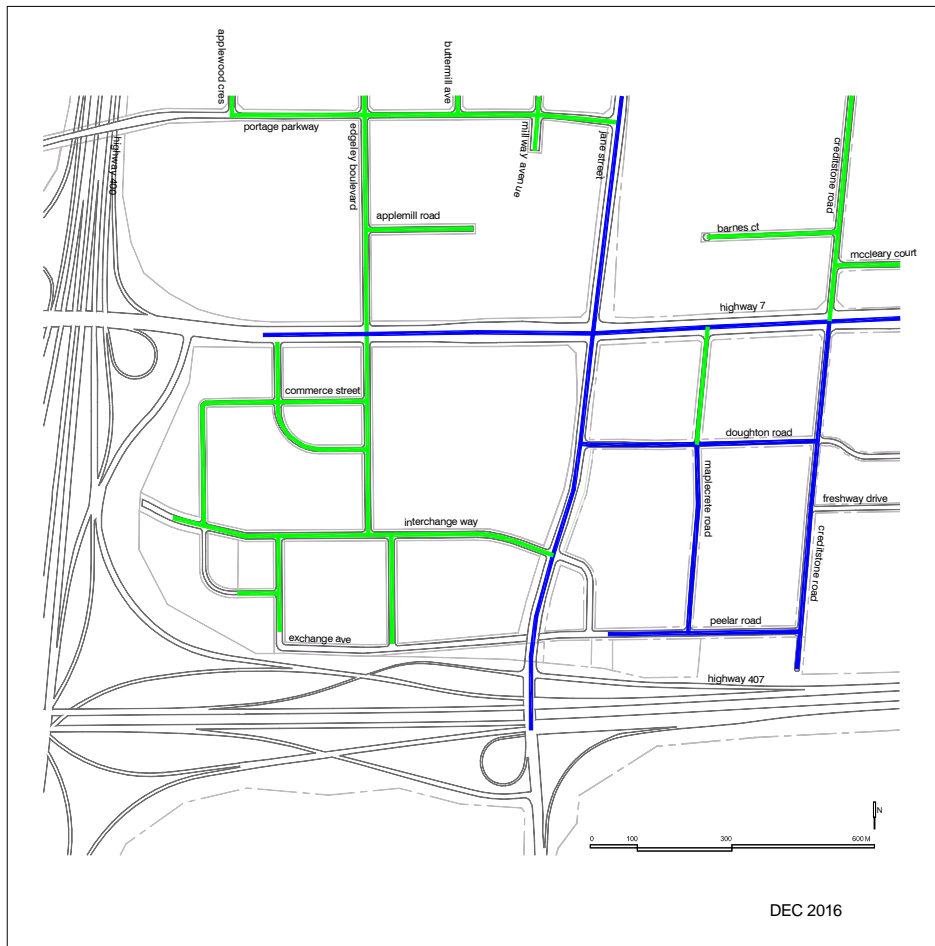
Currently in the existing VMC only Bell has duct and cables installed in the municipal boulevards. Schedule G shows the extent of existing Bell plant within the VMC. Rogers has confirmed that they will be interested in the possibility of providing service to new buildings and it is recommended that Rogers be invited to service any new buildings and let them confirm viability. Schedule H shows a proposed routing for Communications Plant within the ultimate VMC.

Like Street Light Supply Transformers, the communications companies may require flush to grade pull boxes to be installed in temporary locations throughout the municipal boulevard. As the VMC is developed it is expected that all such pull boxes either be removed or relocated within the property as part of site plan. This will allow the boulevard to be completed without hindrance. Bell and Rogers should be notified to coil sufficient fibre cable in all such boxes to allow for relocation to permanent on site location.

Since both Bell and Rogers utilize ducted fibre optic cable to service new buildings, they will be able to pull new fibre through existing ducts should expanded capacity be required.

At the time of the creation of this report, ubiquitous wifi throughout the community is not offered by either Rogers or Bell but this service may be offered in the near future.

## SCHEDULE G: EXISTING COMMUNICATIONS (BELL/ROGERS) NETWORK



### LEGEND

- Existing Overhead Fiber Optic/Copper
- Existing Underground Fiber Optic/Copper

Existing Copper facilities are being over laid with fiber optic throughout the area.



#### LEGEND

— Fiber Optic Network

#### SCHEDULE H: PROPOSED COMMUNICATIONS (BELL/ROGERS) NETWORK

## Part 3 – Utility Corridor Design Guidelines

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### 3. Utility Corridor Design Guidelines

#### 3.1. Vaughan Metropolitan Centre Utility Corridor Plan

In general, the shallow service utility infrastructure must be designed to minimize the total amount of space required in Municipal Boulevards. Furthermore, the City of Vaughan requires that utility equipment be placed out of line of site from the boulevards, parks and open space to minimize the visual impact on the urban streetscape and investment in the public realm. Note that the treatment of utilities within Region of York Right-of-Ways (Highway 7 and Jane Street) is outside the scope of this report. It is understood that both Jane Street and Highway 7, which run through the VMC, will also be used by the utilities as main utility servicing corridors but all work within these right of ways will also be subject to Region of York approval. It is the City of Vaughan's position that, ultimately, all utility installations throughout the Region of York right-of-ways should also be converted to underground.

The City of Vaughan Right-of-Ways through the VMC can be categorized as follows:

1. VMC Special Collector Roadways
2. VMC Major/Minor Collector Roadways
3. VMC Local Roadways
4. VMC Mews

**The Special Collectors will accommodate only those utilities that absolutely must be installed to service the adjacent lands.** The City's intention is to minimize utility installation through these roads in order to preserve as much space as is possible for high end boulevard treatment in accordance with the vision of the VMC Streetscape and Open Space Plan. Any corridor designated "Special Collector" by the City will require specific approval in accordance with City of Vaughan standards and specifications. Currently, Millway Avenue is being designed as a Special Collector and the proposed cross sections A-A to E-E as prepared by SCS Consulting Group Ltd. {reference Appendix 5.3.} show both the existing and proposed utility locations.

**The VMC Major/Minor Collectors (typically along the 28-33m Right of Ways) will provide the locations where the bulk of major utility infrastructure is to be placed.** It is proposed that higher capacity infrastructure such as the Hydro Feeder System, High Pressure Gas mains, Gas Regulators and Fibre Communication Hubs be routed through these boulevards to provide service to the community.

The streets designated as main utility servicing corridors will be as follows:

Portage Parkway

Applewood Road

Commerce Way

Edgeley Boulevard

Millway Avenue

Creditstone Road

Interchange Way

**Limited Capacity Local Roads typically run between Major Collectors and are intended to have minimal utility infrastructure within the municipal boulevard.** Only those utilities that are expressly required to service the lands fronting these roads because they cannot be serviced from the boulevards along the Major Collectors will be allowed.

No Capacity Corridors (Mews) are intended to have no utilities running through them with the exception of municipal lighting as required. These will typically be side streets between Limited Capacity Local Roads.

We reiterate that due to the nature of the servicing requirements, Hydro, Street Lighting, Bell and Rogers cables and associated ducts will be installed in a common trench. Enbridge Gas will be installed in an exclusive trench throughout the VMC.

Wherever possible, the shallow service utilities will utilize existing plant to service new buildings thereby minimizing the disruption to the existing municipal boulevards fronting adjacent properties. Architects should review servicing connection points with the shallow service utilities prior to completing designs of the buildings and associated electro-mechanical rooms to minimize shallow service utility work required within the municipal boulevards.

Schedule I shows the designation of each right of way through in the ultimate VMC street network.



NOVEMBER 2015

#### LEGEND

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|---|--|
| <span style="display: inline-block; width: 20px; height: 10px; background-color: yellow; border: 1px solid black;"></span> arterials (width to be consistent with Region of York Official Plan) | <span style="display: inline-block; width: 20px; border-bottom: 2px dashed purple;"></span> mews or local streets (15-17 m) (see Policy 4.3.17)                      |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: cyan; border: 1px solid black;"></span> minor arterial (33 m)  | <span style="display: inline-block; width: 20px; border-bottom: 2px solid black;"></span> Colossus Drive overpass corridor protection area (see Policy 4.3.11)       |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: blue; border: 1px solid black;"></span> major collectors (28-33 m)   | <span style="display: inline-block; width: 20px; height: 10px; background-color: purple; border: 1px solid black;"></span> see Policy 4.3.2                          |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: orange; border: 1px solid black;"></span> special collector (33 m)   | <span style="display: inline-block; width: 20px; height: 10px; background-color: black; border: 1px solid black;"></span> see Policy 4.3.18                          |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: red; border: 1px solid black;"></span> minor collectors (23-26 m)  | <span style="display: inline-block; width: 20px; height: 10px; background-color: black; border: 1px solid black;"></span> see Policy 6.3.2                           |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: purple; border: 1px solid black;"></span> local streets (20-22 m)  | <span style="display: inline-block; width: 20px; height: 10px; background-color: black; border: 1px solid black;"></span> Special Study Area 'A' (See Policy 4.3.10) |

### SCHEDULE I: STREET NETWORK

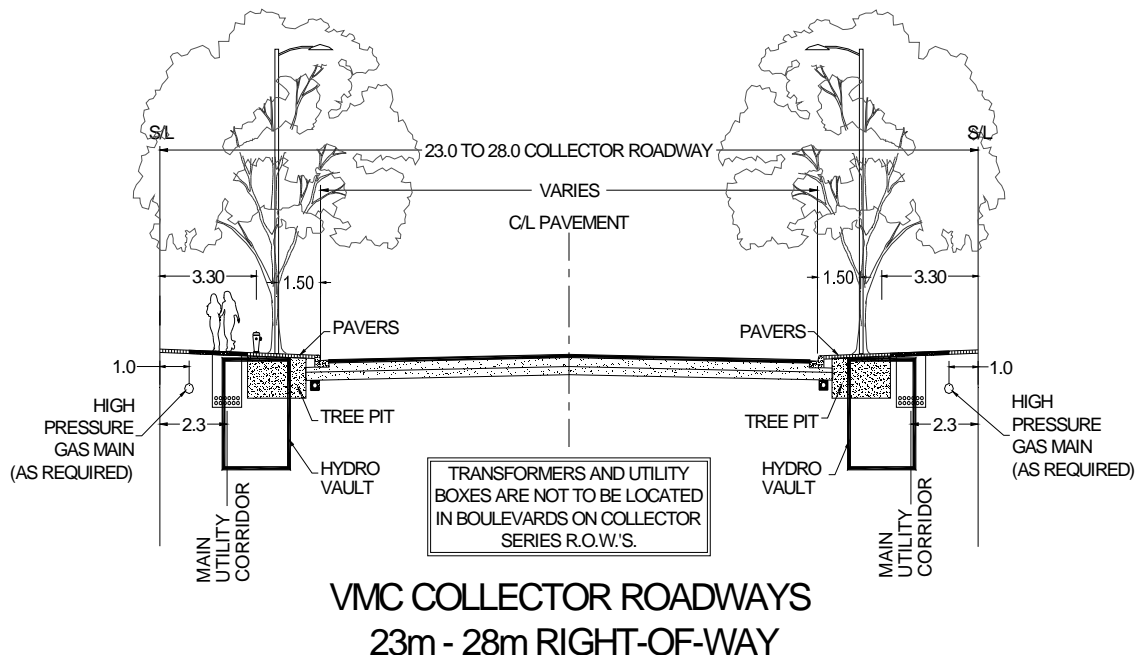
In order to aid in the prospective Developer's preliminary utility investigations Schedules showing existing Alectra (Hydro), Enbridge (Gas) and Bell (Communications) are included in their respective Sections of this report. In some cases, the shallow service utility companies will have to expand their existing system to meet additional capacities required by developments. In these instances they are to follow, to the best of their abilities, the Ultimate VMC Utility Master Plans.

It is the City of Vaughan's requirement that all equipment required to service a particular development be installed on the property of that development. This would include, but not be limited to, Hydro Switchgear, Hydro Transformers, Enbridge Regulator Stations, Bell and Rogers Hubs, Grade Level Boxes and Pedestals. It is the City's requirement that all above grade equipment be incorporated within the built form and out of the site lines of pedestrians through the VMC. In order to ensure that ultimate streetscape fronting the development is not disturbed at a later date, the City may, at its discretion, require additional ducts be installed in the joint use trench to accommodate future hydro and telecommunications provisions. These requirements will be confirmed on a site by site basis.

### 3.2. Street Cross Sections

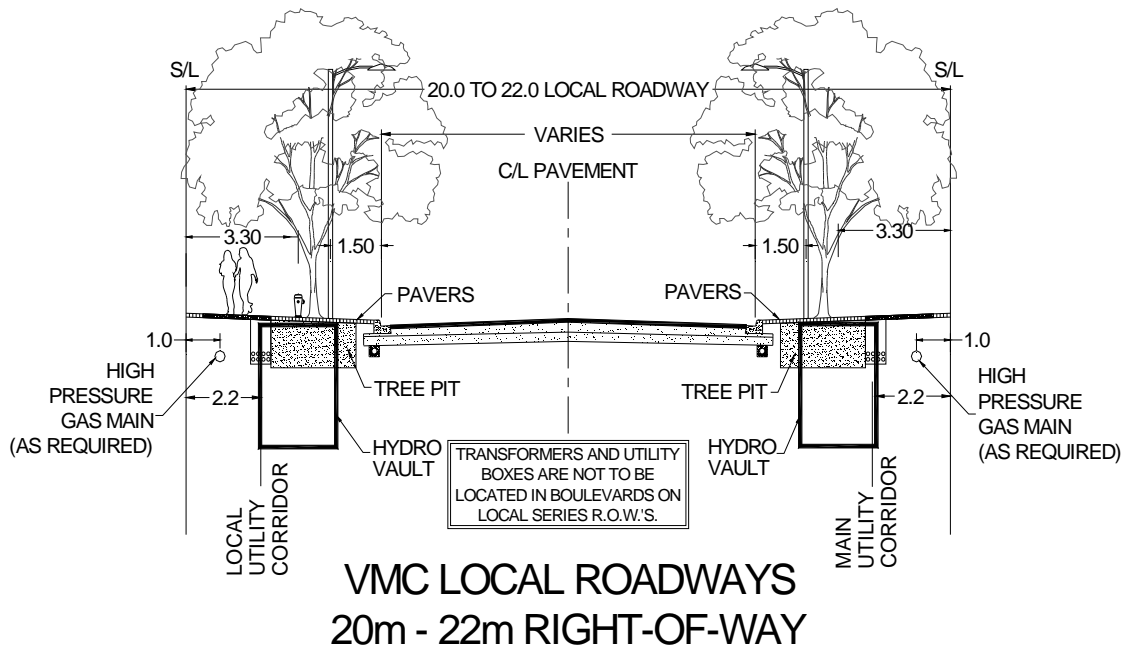
Typical cross sections are shown herein but they may be subject to change should the constraints of a new site preclude their use in current form. All proposed changes would be subject to City of Vaughan review and approval.

#### 3.2.1. Main Utility Corridor (Major/Minor Arterial and Special Collectors)



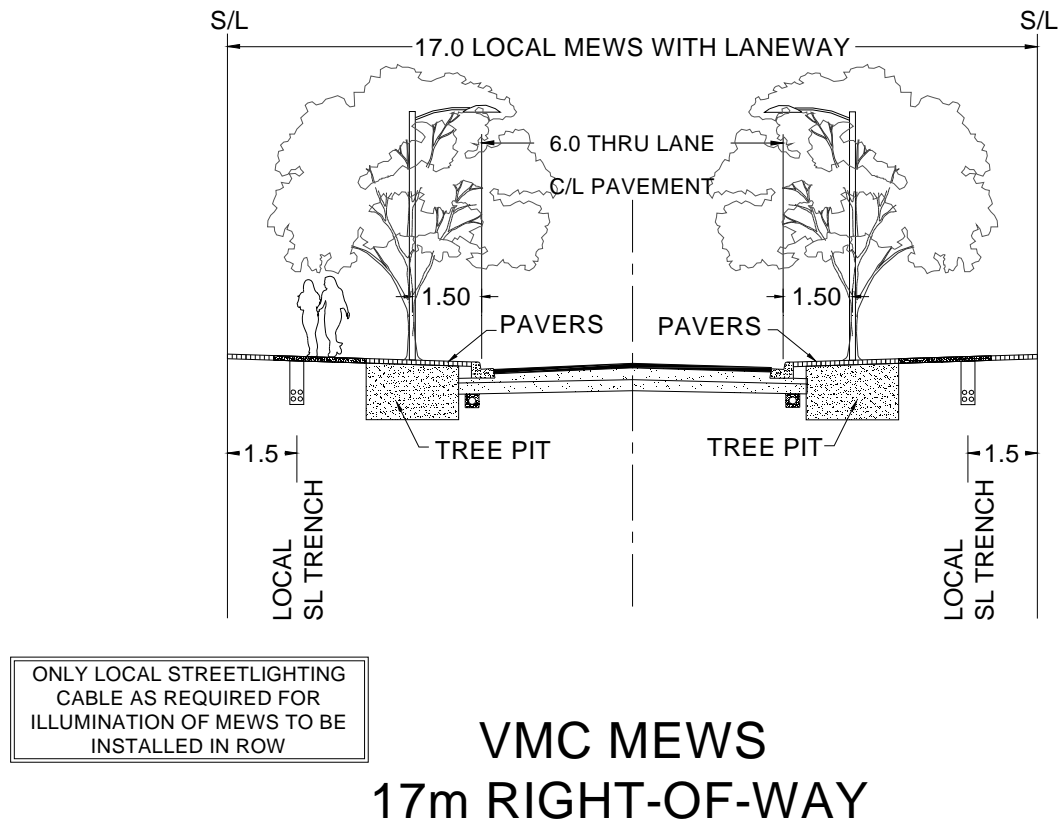
VMC Collector Roadways will be the main utility servicing corridors. Hydro, Communications and Street Lighting cables and ducts are to be installed in the proposed utility corridor and gas has their own offset because they will be servicing the VMC with steel gas mains and cannot install them in a common trench with the other utilities. The utility trench is both wider and deeper in order to provide adequate space for larger, community feeder infrastructure. Below grade Hydro Vaults may be required in certain locations to facilitate electrical servicing.

### 3.2.2. Minor Utility Corridor (Minor Collectors and Local Streets)



VMC Local Roadways will be used for only those utilities required to be installed to service the blocks of land fronted by the local roadway. Hydro, Communications and Street Lighting cables and ducts are to be installed in the proposed utility corridor and gas has their own offset because they will be servicing the VMC with steel gas mains and cannot install them in a common trench with the other utilities. The utility trench is not as wide nor as deep as the one on the Collector Roadways because only local servicing is allowed through these boulevards. Below grade Hydro Vaults may be required in certain locations to facilitate electrical servicing.

### 3.2.3. Mews



VMC Mews will not be used for utility servicing. The specified trench is intended only for municipal street lighting duct and cable.

### 3.3. Precedents

#### 3.3.1. Enbridge Gas Treatment

Integrate gas meter with building design.



**Gas meter screen.** Example of gas meter enclosed within a discrete perforated-metal box located immediately adjacent to building's loading access (*Office Tower, VMC*).



Gas meter integrated into building façade (*Residential mid-rise buildings south Etobicoke*).

Gas meter within the boulevard where not integrated with the building façade is not acceptable.

### 3.3.2. Alectra Hydro Infrastructure Treatment

#### Hydro Transformer and/or Switch Gear in the public realm



**Hydro transformer and switch gear screening.** Where development phasing requires the location of hydro infrastructure within the public realm, the design of screens/fences should be integrated with the overall building's façade configuration. Ultimately, hydro infrastructure should be located within the building envelope.

### 3.4. Municipal Street, Mews and Park Lighting

In order to maintain a unique aesthetic identity in the VMC, the City of Vaughan has selected the Capella Series of Fixtures currently manufactured by Lumec (or approved equivalent) as defined through the VMC Streetscape and Open Space Plan. These fixtures are to be 3000k LED and mounted on straight, round, base mounted, cast aluminum pole. The wattage of the fixture as well as the height and offset of the pole will vary depending on road cross section and required lighting level. {Reference Appendix 5.4. for Product Overview and Technical Information of the Capella Series of Street Lights}

To support the public realm vision for the VMC as developed through the Design Guidelines, mews and park lighting poles are to be of similar style and light source.

All street lighting designs must be certified by a Consulting Engineer in complete accordance with all City of Vaughan latest standards and specifications.

Power supplies for the municipal street lighting system are to be located within the buildings throughout the VMC in order to minimize the negative aesthetic impact of the power supply pedestals.

## **Part 4 – Implementation and Recommendations**

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### **4. Implementations and Recommendations**

#### **4.1. Developer Application Process**

Upon initiation of a detailed site plan design, the Builder and/or their utility co-ordination consultant will meet with Alectra, Enbridge, Bell and Rogers to discuss the development and associated utility servicing. Various applications and associated drawings will be submitted in accordance with the respective requirements of the various utilities at time of submission.

The Builder will submit to the City a drawing showing the proposed servicing design of the utilities from connection to their existing system to the demarcation point in the building. This submission to the City will also include a topographical drawing showing all existing utilities in the municipal boulevard fronting the site with a letter detailing how all utilities will be adjusted to meet the Vaughan Metropolitan Centre Guidelines. This process must be completed and approved by the City of Vaughan prior to site plan approval.

#### **4.2. Recommendations**

##### **4.2.1.1.1.**

The City will review, in consultation with the Shallow Service Utility Providers, and confirm on a site by site basis whether additional ducts will be required to be installed through the municipal boulevards fronting the site to provide future provision for Hydro, Communications and Street Lighting installations. The purpose of the provisional ducts will be to minimize boulevard disruption at a later date.

## **Part 5 – Appendices**

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- 5. Appendices
  - 5.1. PowerStream Industrial, Commercial and Institutional (ICI) Submission Guideline  
January 2015
  - 5.2. PowerStream Service Application Information Form (Sample Only)
  - 5.3. Special Collector Millway Avenue Cross Sections A-A to E-E Inclusive
  - 5.4. Product Overview and Technical Information Capella Series Street Light Assemblies

## Appendix 5.1

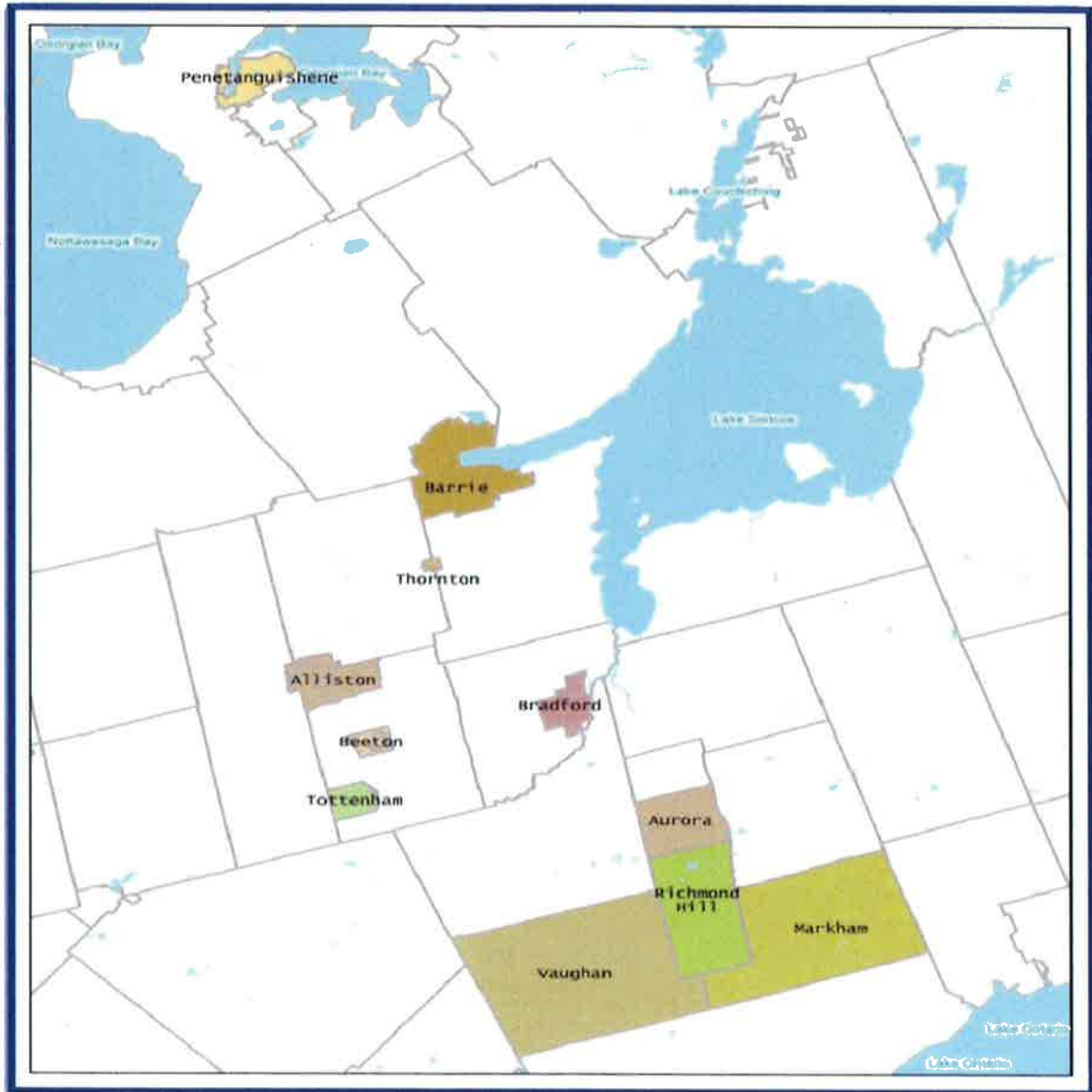
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## **PowerStream Distribution Design Department**

**Industrial, Commercial and Institutional (ICI)**  
**Submission Guideline**  
**January 2015**

## PowerStream's Service Territory



## 1. Introduction

PowerStream has prepared this guideline for submission of an Industrial, Commercial or Institutional (ICI) project in order to assist our Customers and their representatives to understand the respective responsibilities.

Our expectation is that the Customer and their Consultant are familiar with PowerStream's Conditions of Service (COS) <http://www.powerstream.ca/app/pages/COS.jsp>. This document outlines PowerStream's operating practices and connection policies and the obligations of the Customer. In addition to this document, Consultants must be familiar with PowerStream's Standards for single or three phase transformers, metering, voltage guidelines and clearances.

We have extracted some of the highlights which we believe will assist you and ask that you contact the appropriate Supervisor (North or South) at a very early stage of your project to discuss availability of supply and supply voltage, a connection point from PowerStream's electrical distribution system (EDS), anticipated project scheduling and assist you with any issues regarding your site.

## 2. Residential High Rises

To better service PowerStream's future residential customers and provide increased reliability, residential high density projects will require servicing as per below.

- Where a property has more than one residential building and load < 1000kVA: one transformer can service these buildings on a radial feed.
- When there is more than one residential building and load > 1000kVA: more than one transformer is required and the primary supply must be looped complete with two connections to the same supply feeder.

## 3. Technical & Legal Requirements

The Customer and/or Consultant are to supply:

- Service Application Information Form (SAIF) for all metered services (a separate form is required for sub-services >400amps) which, you will receive from our New Connections Department (Tel: 1-877-963-6900 ext.25713) or utilize PowerStream's self-service application on the PowerStream web site under the Business Section.
  - The form must be complete and include connected and demand loading,
  - Service size and secondary voltage requirement,
  - Size of the facility and proposed use of the facility.
  - An accurate in-service date for the connection of the Customer's service is required.
- Electrical consultant's and contractor's contact information.
- A current parcel register is required to identify the property owner on title and the legal description of the property, without this we cannot prepare the Offer to Connect (OTC).

#### 4. Drawings

- All Drawings submitted to PowerStream must be in AutoCAD-2010 drawing format and include the following: *Please note the Electrical Site Plan and Single Line Diagram drawing must contain a P.Eng stamp, or Consultant must provide a PDF version of these drawings with stamp.*
- Electrical Site Plan to include transformer foundation location details and duct bank details to current PowerStream Standards (PowerStream Standards available at any time on request). All existing/proposed infrastructures on road allowances or private property to be shown free of all conflicts.
- Single Line Diagram
- Architectural Site Plan, showing all site servicing to the proposed facility and existing poles, street lights and municipal services (hydrants, manholes and catchbasins)
- Grading plans
- Customer's Consultant to review the proposed transformer location with respect to clearances and PowerStream's access.

##### Clearances:

- Clearance from overhead lines, existing structures, landscaping, windows and doors, other utilities as per PowerStream Standards, Ontario Building Code, CSA and ESA.
- No servicing can go through the grounding grid that surrounds the transformer; Consultant must review the Site Servicing drawing to ensure that any conflicts are resolved.
- No landscaping or fencing is allowed within 2.0m of all sides of the transformer and not within 3.0m of the transformer doors (Std.17-140) as this will impede the ventilation of the transformer as well as create an unsafe situation.

##### Access:

- PowerStream requires access to the transformer at any time for maintenance as well as possible switching.
- PowerStream must be able to access the transformer from the Customer's property.
- Transformer should not be installed any more than 4.5m from a hard surface in order to place the transformer on the foundation.

#### 5. Installation Responsibilities

The responsibilities outlined below represent a "typical" 3 phase primary service and the installation of a PowerStream owned transformer.

##### Customer:

- All on site civil work
- Supply and install the primary and secondary duct bank on private property
- Supply and install the transformer foundation and grounding grid and bollards if required
- Supply and install metering cabinets/sockets or switchboards as required
- PowerStream approval/Inspection for all the above prior to and during installation

## PowerStream

- Supply & install primary cable
- Supply & install transformer
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- Revenue metering

For Customer Owned Transformer installation or upgrades refer to PowerStream's COS or contact PowerStream Subdivisions and New Services Department.

## 6. Project Timing

An outline of a typical ICI projects process is described below.

- Customer/Consultant will contact the PowerStream Supervisor (North or South) to discuss project. Drawings and/or SAIF will be sent to the Supervisor
- Supervisor will assign the project to a Technician
- Technician will allocate the transformer for this project (a \$10,000 deposit required)
- Technician reviews drawings for compliance to standards
- Technician will contact the Consultant to discuss the drawings/documents any errors or omissions will be discussed and resolved until the submission meets PowerStream's approval
- Technician will prepare a design and estimate
- Technician will prepare an OTC
- Technician will obtain Road Authority Consent and Road Occupancy Permit (if required)
- Customer will sign the OTC and provide the full payment less deposit if previously provided
- Technician will prepare work order package and issue to construction
- PowerStream will return a fully executed OTC to the Customer
- PowerStream to provide the Customer/Electrical Contractor with our work order drawing which includes contact information for PowerStream Inspection, Lines and Metering departments.

### **PowerStream Inc.**

161 Cityview Boulevard  
Vaughan, Ontario, L4H 0A9

#### **SOUTH:**

##### **Attention:**

Barry Stephens  
Supervisor, New Services  
Tel: (905) 532-4425  
Fax: (905) 532-4401  
E-mail: [barry.stephens@powerstream.ca](mailto:barry.stephens@powerstream.ca)

#### **NORTH:**

Stephen Cranley, C.E.T.  
Supervisor, Subdivisions & New Services  
(705) 722-7222 ext. 31297  
(705) 722-9040  
[stephen.cranley@powerstream.ca](mailto:stephen.cranley@powerstream.ca)

# URBAN DESIGN GUIDELINES

## 1. Multi-building High Rise Residential Condominiums

1. Where a property has more than 1 building, and has a load of less than 1,000kVA, then one transformer feeding multiple buildings is acceptable. See Figure 2. Site plan geography is important, since distance on secondary cables must be considered – more transformers may be required.
2. Where a property has more than 1 building, and has a total load that exceeds 1,000kVA, then one transformer per building is required. The primary system must be looped and have 2 connections to the same supply feeder. An open point must be established. See Figures 3 and 4.
3. The transformers can be padmounted or indoor vault type, where PowerStream will own, operate and maintain the units. For vault type configurations, solid dielectric switches will be used.
4. If a customer insists on using dry type transformers, PowerStream will insist that a switching room will be required for each transformer. Room specifications will be by PowerStream, and must be part of the development's facilities. The switching rooms will permit PowerStream to maintain a loop feed and open point system, similar to the vault and padmount scenarios. The drawback is that PowerStream would not have control over the customer-owned transformers and cables; however, the primary loop system would allow lengthy outages to be limited to a single building. See Figure 5.
5. If the load on the property is below 10,000 kVA connected, a 200A loop system will be applied.
6. If the load on the property exceeds 10,000 kVA connected, a 600A loop system will be applied.

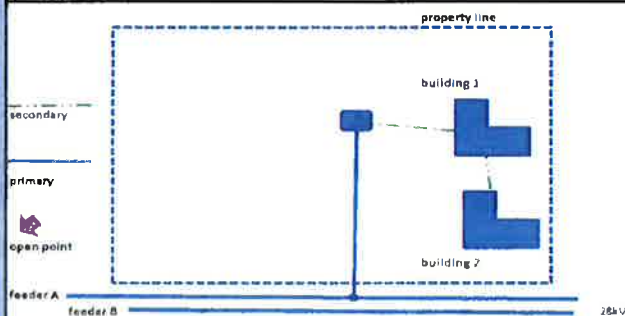


FIGURE 2: 2 BUILDING CONNECTION less than 1,000kVA

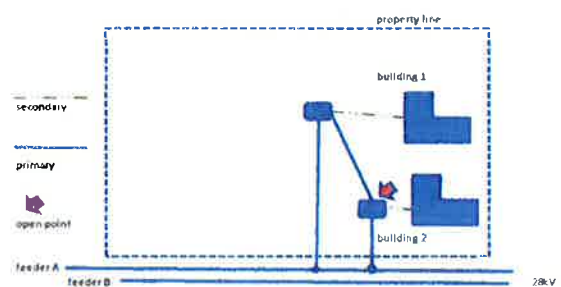


FIGURE 3: 2 BUILDING CONNECTION greater than 1,000kVA

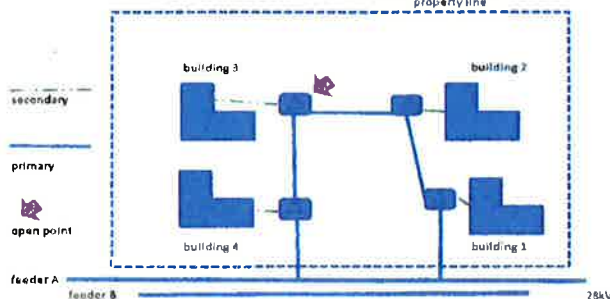


FIGURE 4: MULTI BUILDING CONNECTION greater than 1,000kVA

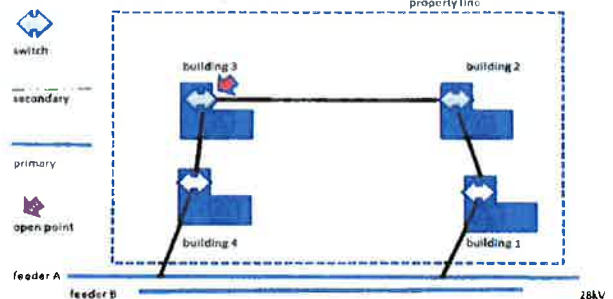


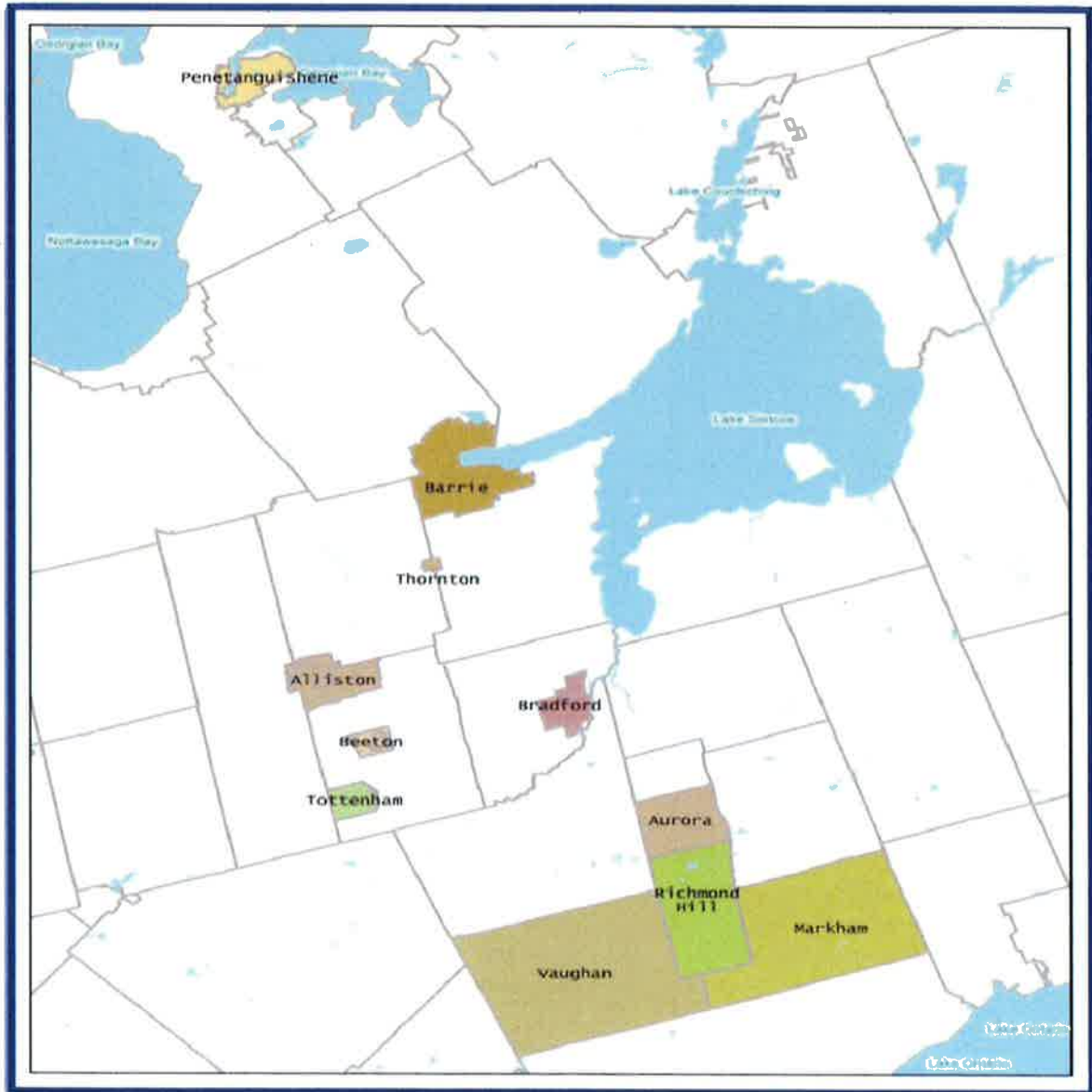
FIGURE 5: DRY TYPE TRANSFORMERS greater than 1,000kVA



**PowerStream Distribution Design  
Department**

**Industrial, Commercial and Institutional (ICI)  
Submission Guideline  
January 2015**

## PowerStream's Service Territory



## 1. Introduction

PowerStream has prepared this guideline for submission of an Industrial, Commercial or Institutional (ICI) project in order to assist our Customers and their representatives to understand the respective responsibilities.

Our expectation is that the Customer and their Consultant are familiar with PowerStream's Conditions of Service (COS) <http://www.powerstream.ca/app/pages/COS.jsp>. This document outlines PowerStream's operating practices and connection policies and the obligations of the Customer. In addition to this document, Consultants must be familiar with PowerStream's Standards for single or three phase transformers, metering, voltage guidelines and clearances.

We have extracted some of the highlights which we believe will assist you and ask that you contact the appropriate Supervisor (North or South) at a very early stage of your project to discuss availability of supply and supply voltage, a connection point from PowerStream's electrical distribution system (EDS), anticipated project scheduling and assist you with any issues regarding your site.

## 2. Residential High Rises

To better service PowerStream's future residential customers and provide increased reliability, residential high density projects will require servicing as per below.

- Where a property has more than one residential building and load < 1000kVA: one transformer can service these buildings on a radial feed.
- When there is more than one residential building and load > 1000kVA: more than one transformer is required and the primary supply must be looped complete with two connections to the same supply feeder.

## 3. Technical & Legal Requirements

The Customer and/or Consultant are to supply:

- Service Application Information Form (SAIF) for all metered services (a separate form is required for sub-services >400amps) which, you will receive from our New Connections Department (Tel: 1-877-963-6900 ext.25713) or utilize PowerStream's self-service application on the PowerStream web site under the Business Section.
  - The form must be complete and include connected and demand loading,
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- Electrical consultant's and contractor's contact information.
- A current parcel register is required to identify the property owner on title and the legal description of the property, without this we cannot prepare the Offer to Connect (OTC).

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- Customer's Consultant to review the proposed transformer location with respect to clearances and PowerStream's access.

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### **PowerStream Inc.**

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(705) 722-9040  
[stephen.cranley@powerstream.ca](mailto:stephen.cranley@powerstream.ca)

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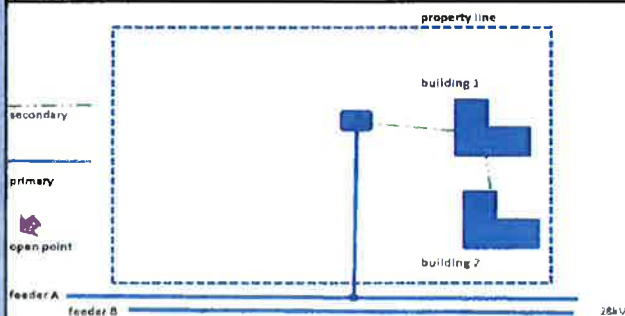


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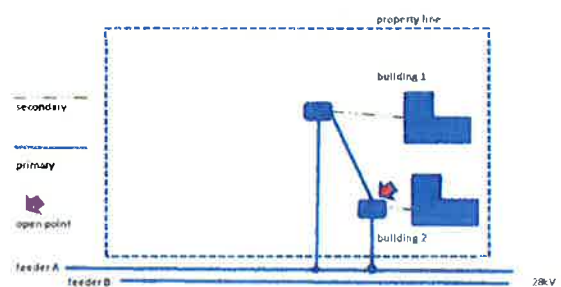


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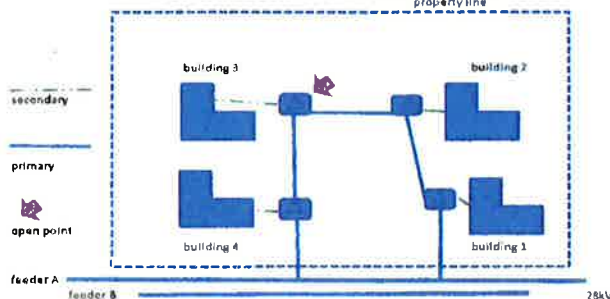


FIGURE 4: MULTI BUILDING CONNECTION greater than 1,000kVA

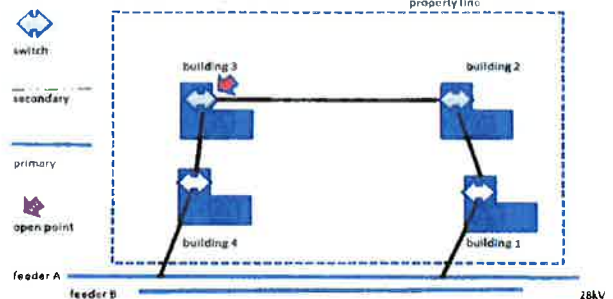


FIGURE 5: DRY TYPE TRANSFORMERS greater than 1,000kVA

## Appendix 5.2

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# Service Application Information Form

## Sample Only

REFERENCE NUMBER :

Service Application Form to be completed and returned with the following documentation in order to prepare the Offer to Connect and or Easements if required:

1. A copy of a current Parcel Register or Abstract of Title to include the property owner's name, address, telephone and fax numbers and pin number.
2. Title documents pertaining to the subject property to include the transfer deed of land, any encumbrances/Certificate of incorporation and any Amendments showing the current correct Corporate name and address as filed with the appropriate Government office

Please ensure that the reference number is included on your Electrical Inspection Certificate.

<b>CUSTOMER INFORMATION</b>			
Name: _____			
Account Number: _____		Telephone: _____	
Service Address: _____		Postal Code: _____	
Billing Address: _____			
<b>SITE INFORMATION</b>			
Site Name: _____		Single: _____	Multiple: _____
Site Location: _____			
Site Contact: _____		Telephone: _____	
HEATING			
Gas: _____	Electric: _____	Electrical Supplemental: _____	
<b>SERVICE</b>		<b>CONTACT INFORMATION</b>	
New: _____	Upgrade: _____	PowerStream South: 1-877-963-6900 Markham, Richmond Hill and Vaughan Supervisor: Barry N. Stephens ext 24425 Technicians: Paul Yuen ext 24414 Susan DiBratto ext 24577 Greg Paterson ext 25071 PowerStream North: 1-877-963-6900 Aurora, Alliston, Barrie, Beeton, Bradford, West Gwillimbury, Penatanguishene, Thornton, Tottenham Supervisor: Stephen Cranley ext 31297 Technicians: Dan Perks ext 31262 Geoff Harris ext 31325 Kim Fitz Randolph ext 31270	
Service Size: _____	A Trip: _____ A		
Service Voltage: _____ V			
Required in Service Date: _____			
<b>BUSINESS OPERATION</b>			
Hrs: _____	Days: _____		
<b>BUILDING SIZE</b>			
Office square Footage: _____			
Warehouse Square Footage: _____			
Manufacturing Square Footage: _____			
Total: _____			
<b>ELECTRICAL LOADS</b>			
Type of Production: _____			
Connected Load: _____ kW			
Demand Expected: _____ kW			
<b>MOTOR LOADS (IF POSSIBLE)</b>			
Total Horse Power: _____			
<b>EXISTING CUSTOMERS ONLY</b>			
Present Location (if applicable): _____			
Area Square Feet: _____			
Reason for Moving: _____			
Existing Account Number: _____			
Company: _____			
Signature: _____		Date: _____	
Name: _____			
Please Print			

Please return the completed Application Form to the appropriate area Supervisor as noted above in Contact Information

Sample Only

# Service Application Information Form

## Sample Only

REFERENCE NUMBER :

Service Application Form to be completed and returned with the following documentation in order to prepare the Offer to Connect and or Easements if required:

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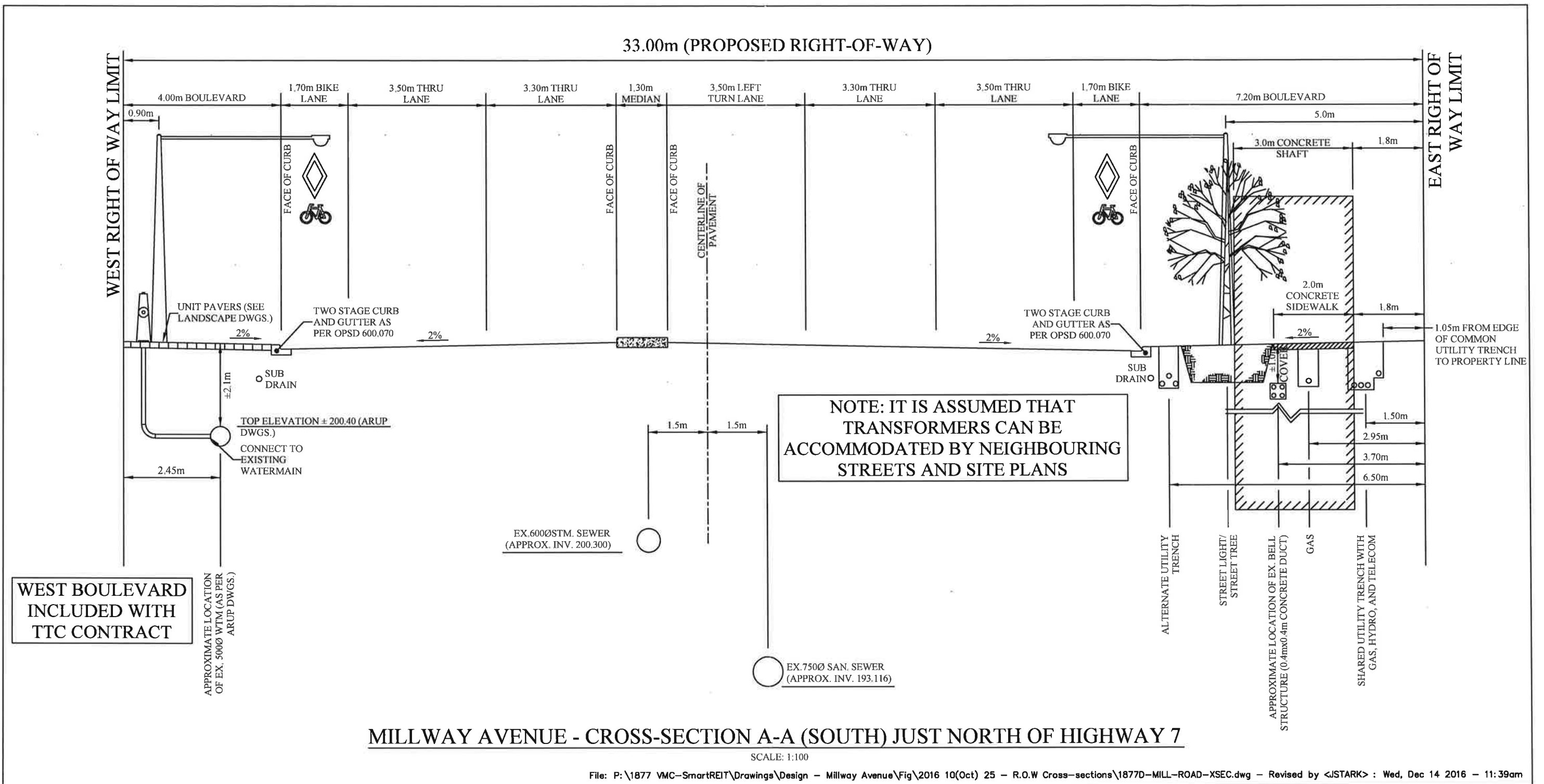
<b>CUSTOMER INFORMATION</b>			
Name: _____			
Account Number: _____		Telephone: _____	
Service Address: _____		Postal Code: _____	
Billing Address: _____			
<b>SITE INFORMATION</b>			
Site Name: _____		Single: _____	Multiple: _____
Site Location: _____			
Site Contact: _____		Telephone: _____	
HEATING			
Gas: _____	Electric: _____	Electrical Supplemental: _____	
<b>SERVICE</b>		<b>CONTACT INFORMATION</b>	
New: _____	Upgrade: _____	PowerStream South: 1-877-963-6900 Markham, Richmond Hill and Vaughan Supervisor: Barry N. Stephens ext 24425 Technicians: Paul Yuen ext 24414 Susan DiBratto ext 24577 Greg Paterson ext 25071 PowerStream North: 1-877-963-6900 Aurora, Alliston, Barrie, Beeton, Bradford, West Gwillimbury, Penatanguishene, Thornton, Tottenham Supervisor: Stephen Cranley ext 31297 Technicians: Dan Perks ext 31262 Geoff Harris ext 31325 Kim Fitz Randolph ext 31270	
Service Size: _____	A Trip: _____ A		
Service Voltage: _____ V			
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<b>BUSINESS OPERATION</b>			
Hrs: _____	Days: _____		
<b>BUILDING SIZE</b>			
Office square Footage: _____			
Warehouse Square Footage: _____			
Manufacturing Square Footage: _____		Multiple Occupancy	
Total: _____		# of units      Service size	
<b>ELECTRICAL LOADS</b>		_____ X 30 Amp	
Type of Production: _____		_____ X 60 Amp	
Connected Load: _____ kW		_____ X 100 Amp	
Demand Expected: _____ kW		_____ X 200 Amp	
<b>MOTOR LOADS (IF POSSIBLE)</b>		*Separate service form required for any	
Total Horse Power: _____		sub-service 400 Amps and above	
<b>EXISTING CUSTOMERS ONLY</b>			
Present Location (if applicable): _____			
Area Square Feet: _____			
Reason for Moving: _____			
Existing Account Number: _____			
Company: _____			
Signature: _____		Date: _____	
Name: _____			
Please Print			

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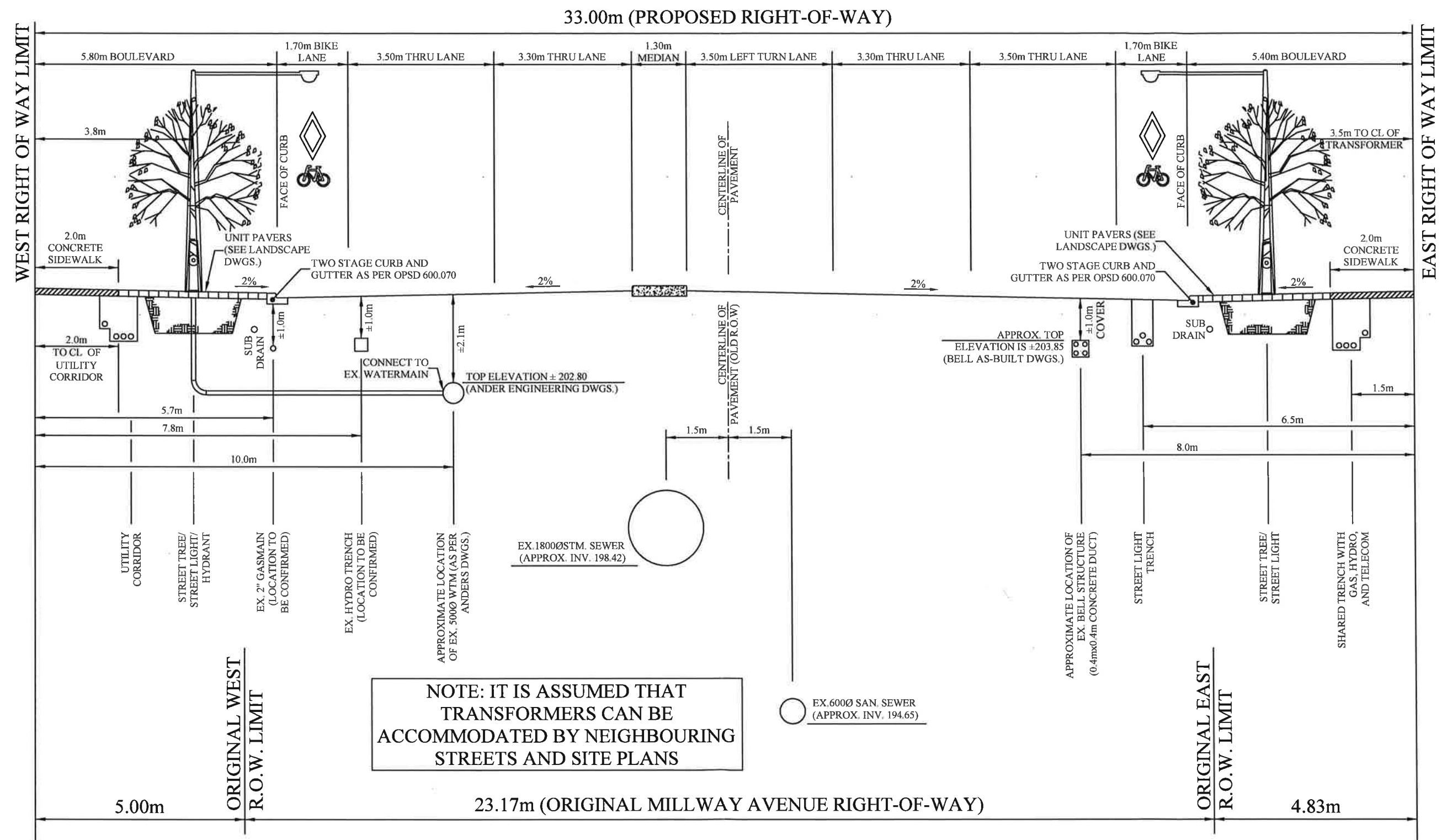
Sample Only

## Appendix 5.3

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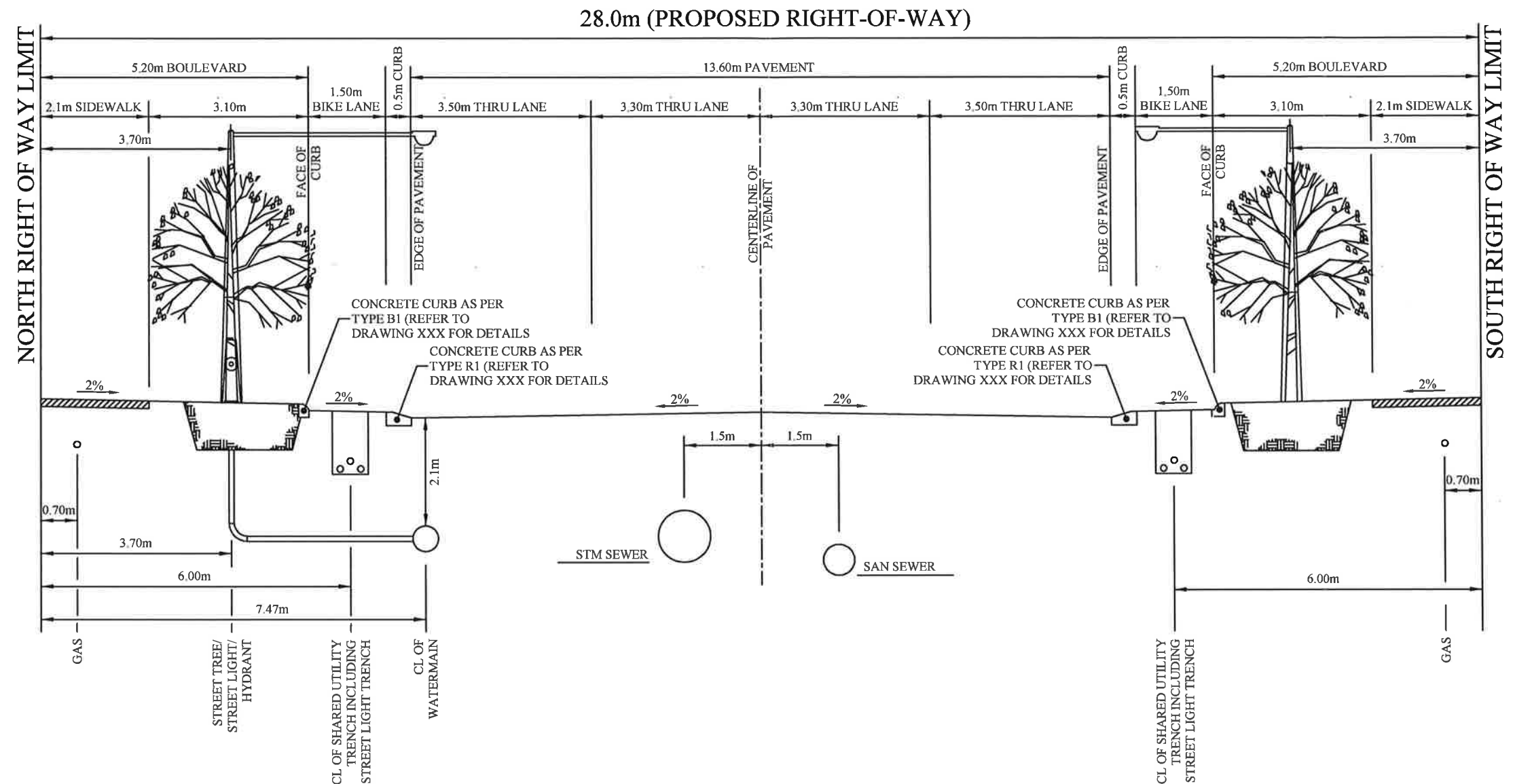






MILLWAY AVENUE - CROSS-SECTION C-C (NORTH) JUST SOUTH OF PORTAGE PARKWAY

SCALE: 1:100

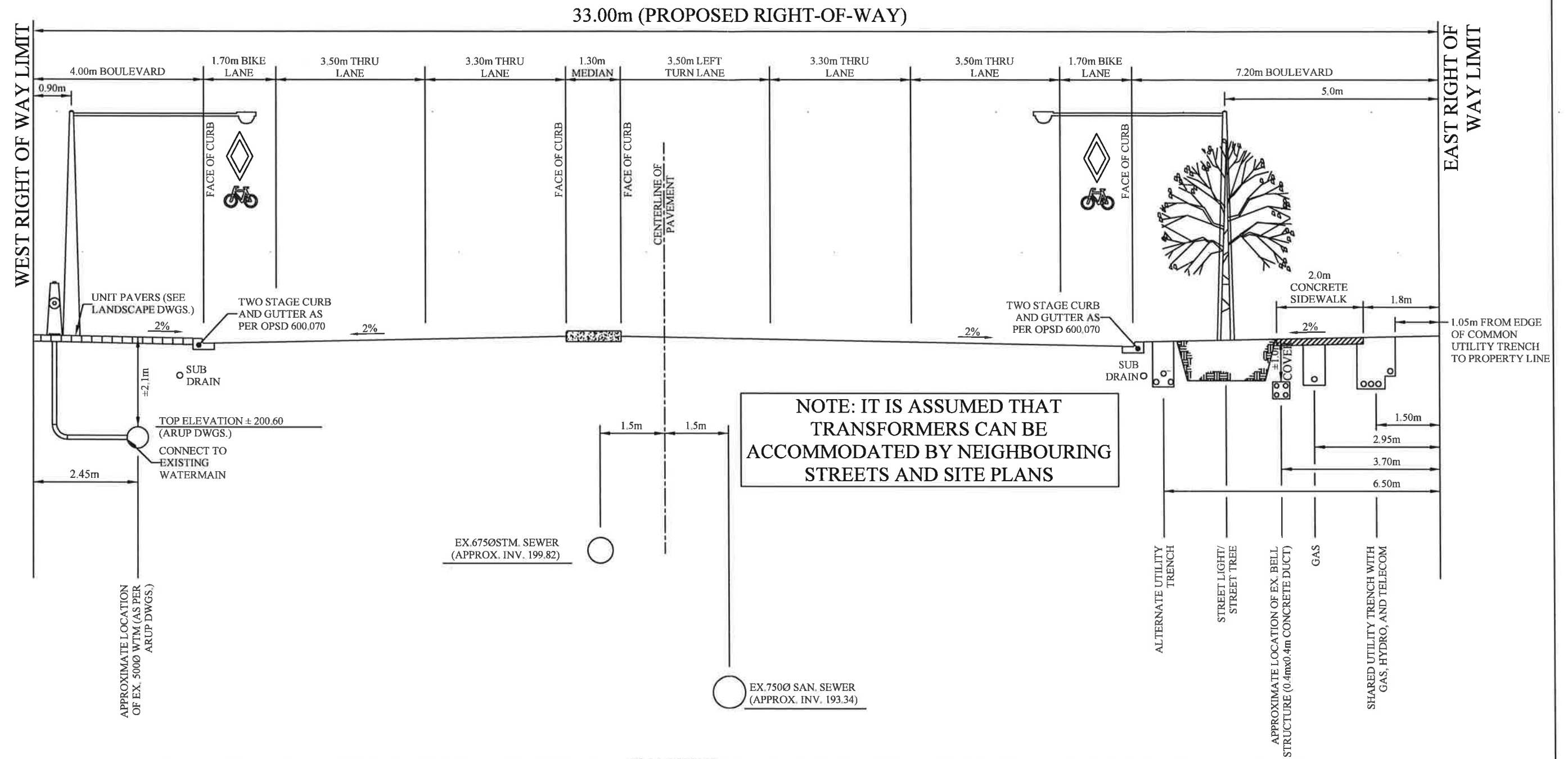


ULTIMATE & INTERIM

### APPLE MILL ROAD - CROSS-SECTION D-D (TYPICAL SECTION)

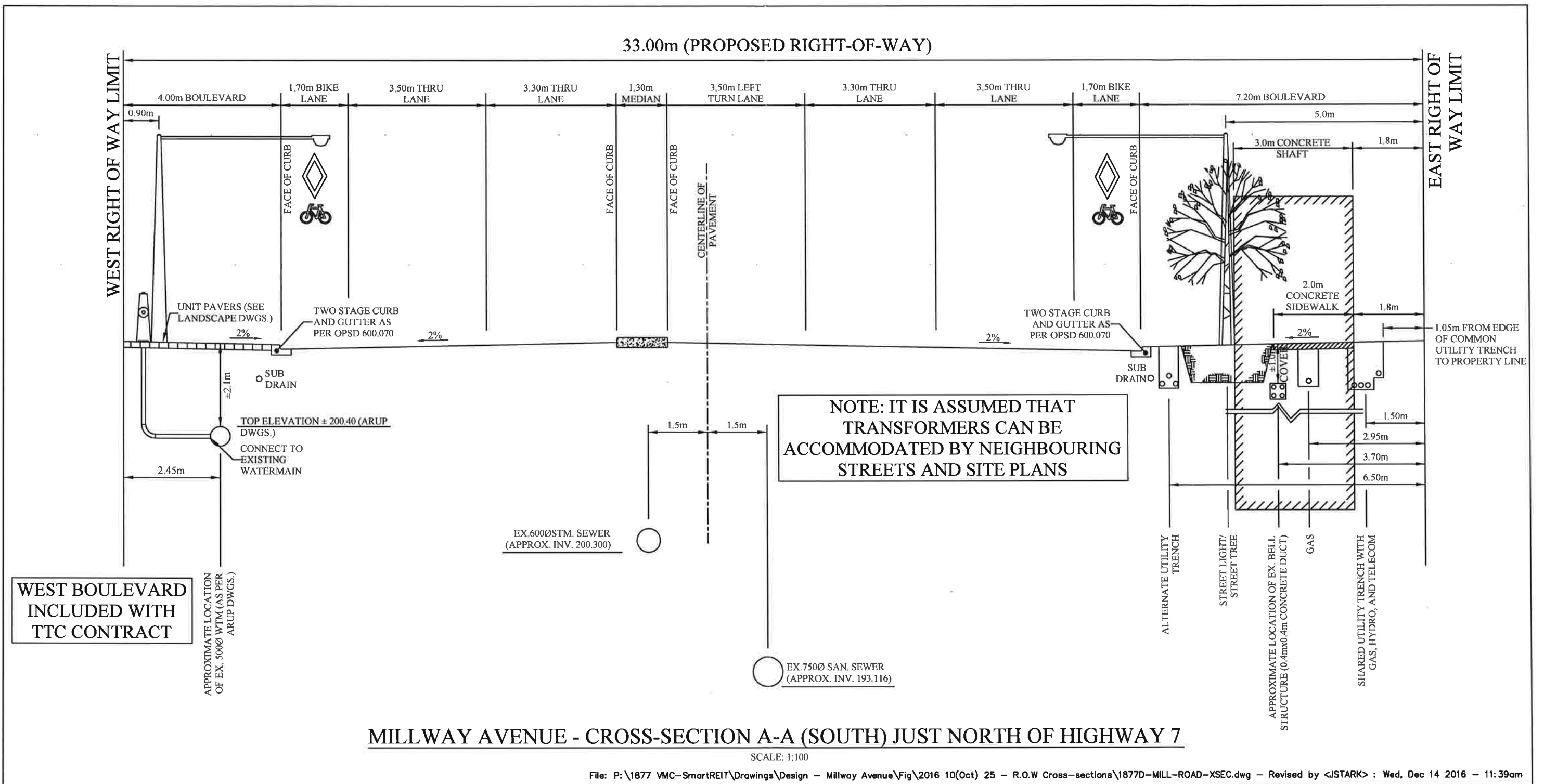
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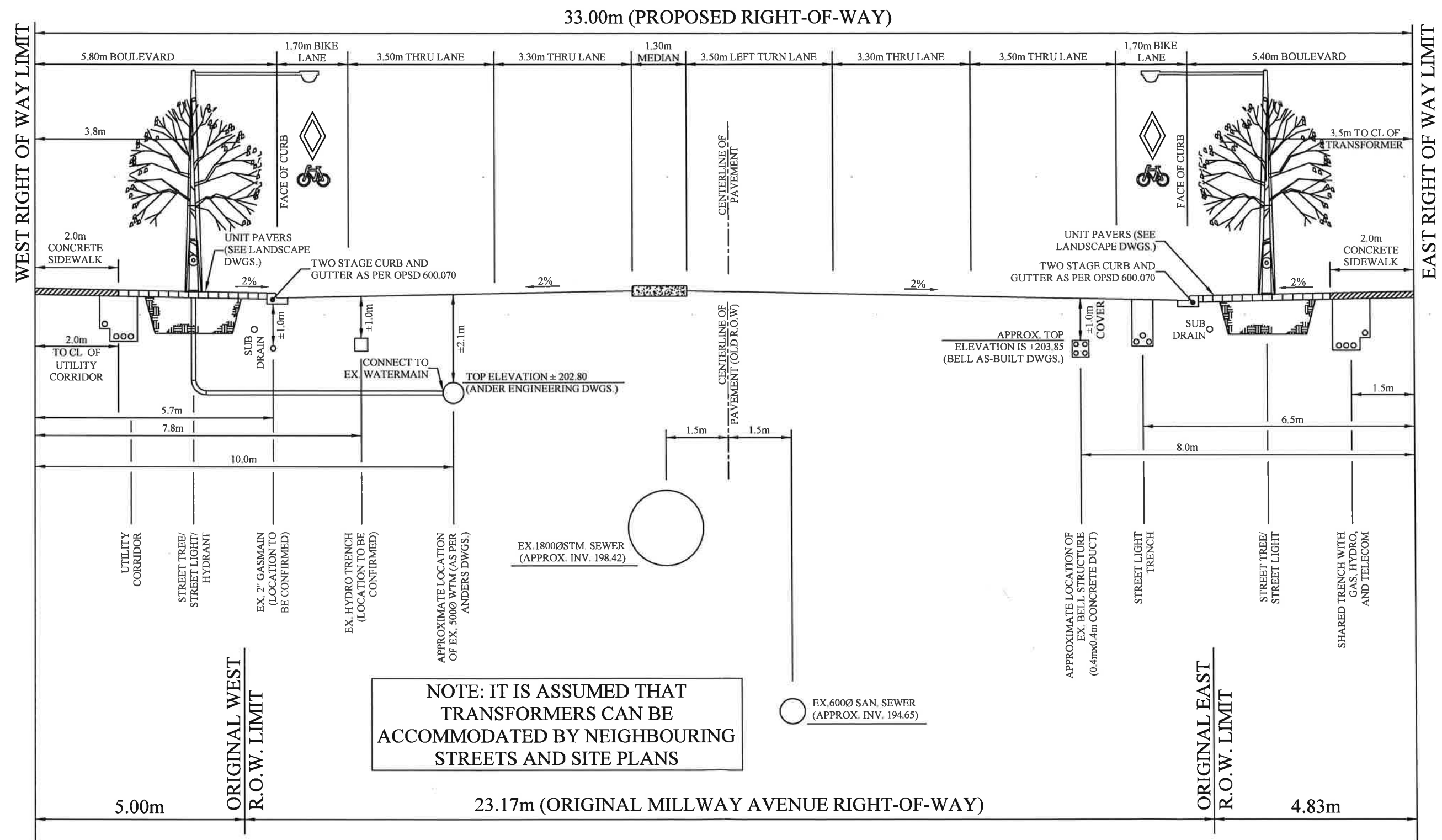


# **MILLWAY AVENUE - CROSS-SECTION E-E (SOUTH) BETWEEN NEW PARK PLACE AND APPLE MILL ROAD**

SCALE: 1:100



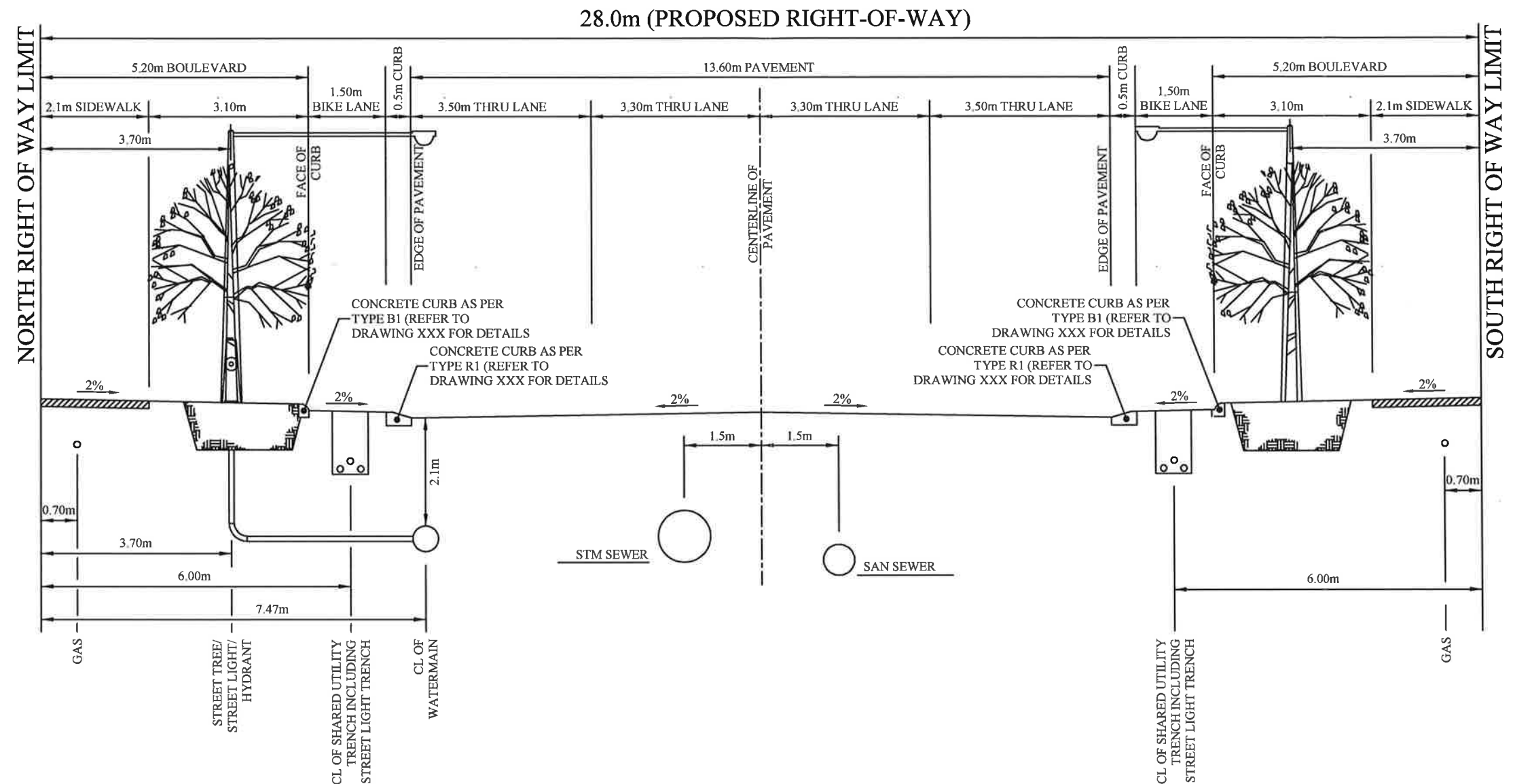




NOTE: IT IS ASSUMED THAT TRANSFORMERS CAN BE ACCOMMODATED BY NEIGHBOURING STREETS AND SITE PLANS

MILLWAY AVENUE - CROSS-SECTION C-C (NORTH) JUST SOUTH OF PORTAGE PARKWAY

SCALE: 1:100

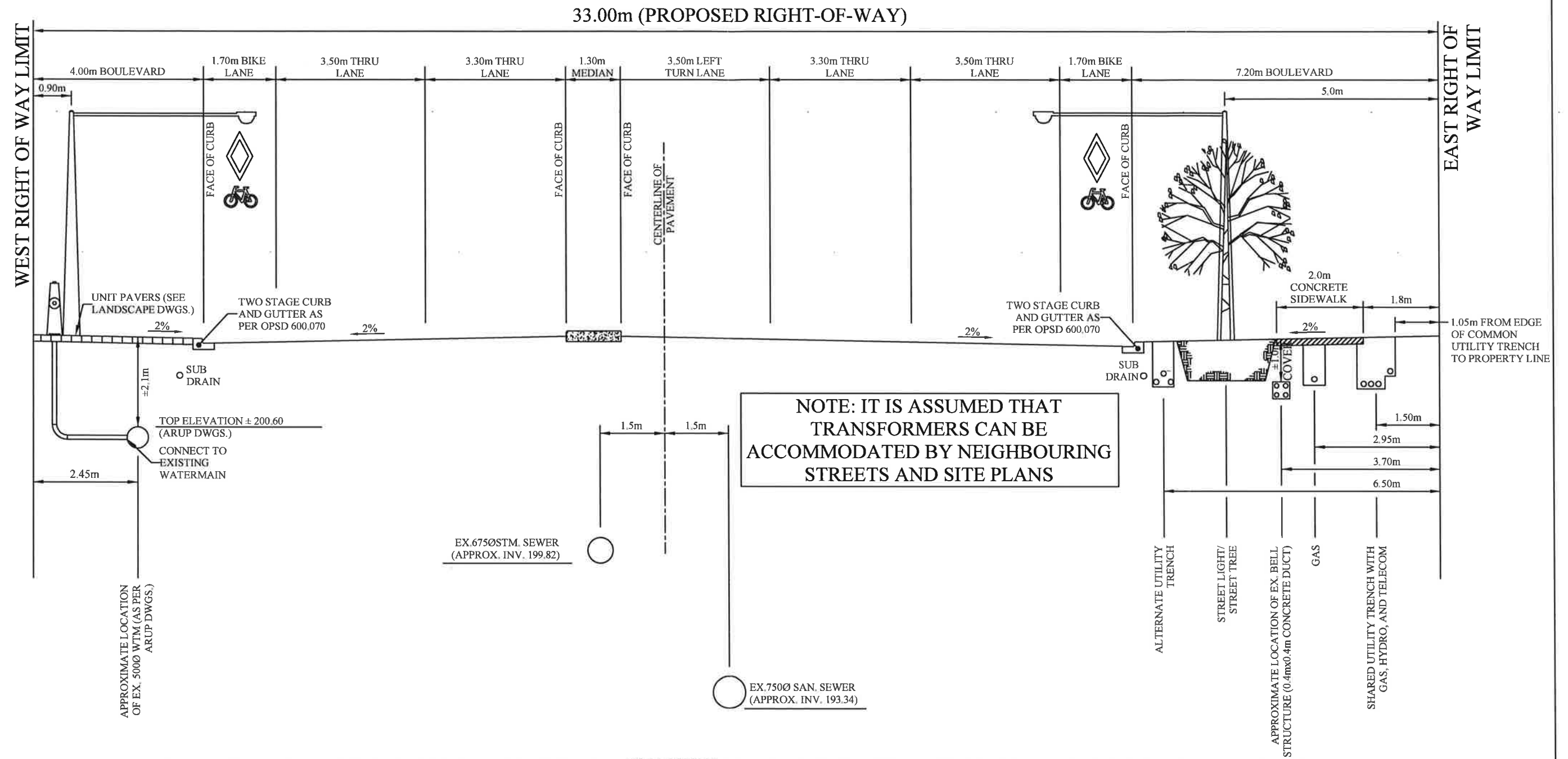


ULTIMATE & INTERIM

### APPLE MILL ROAD - CROSS-SECTION D-D (TYPICAL SECTION)

SCALE: 1:100

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# **MILLWAY AVENUE - CROSS-SECTION E-E (SOUTH) BETWEEN NEW PARK PLACE AND APPLE MILL ROAD**

SCALE: 1:100

## Appendix 5.4

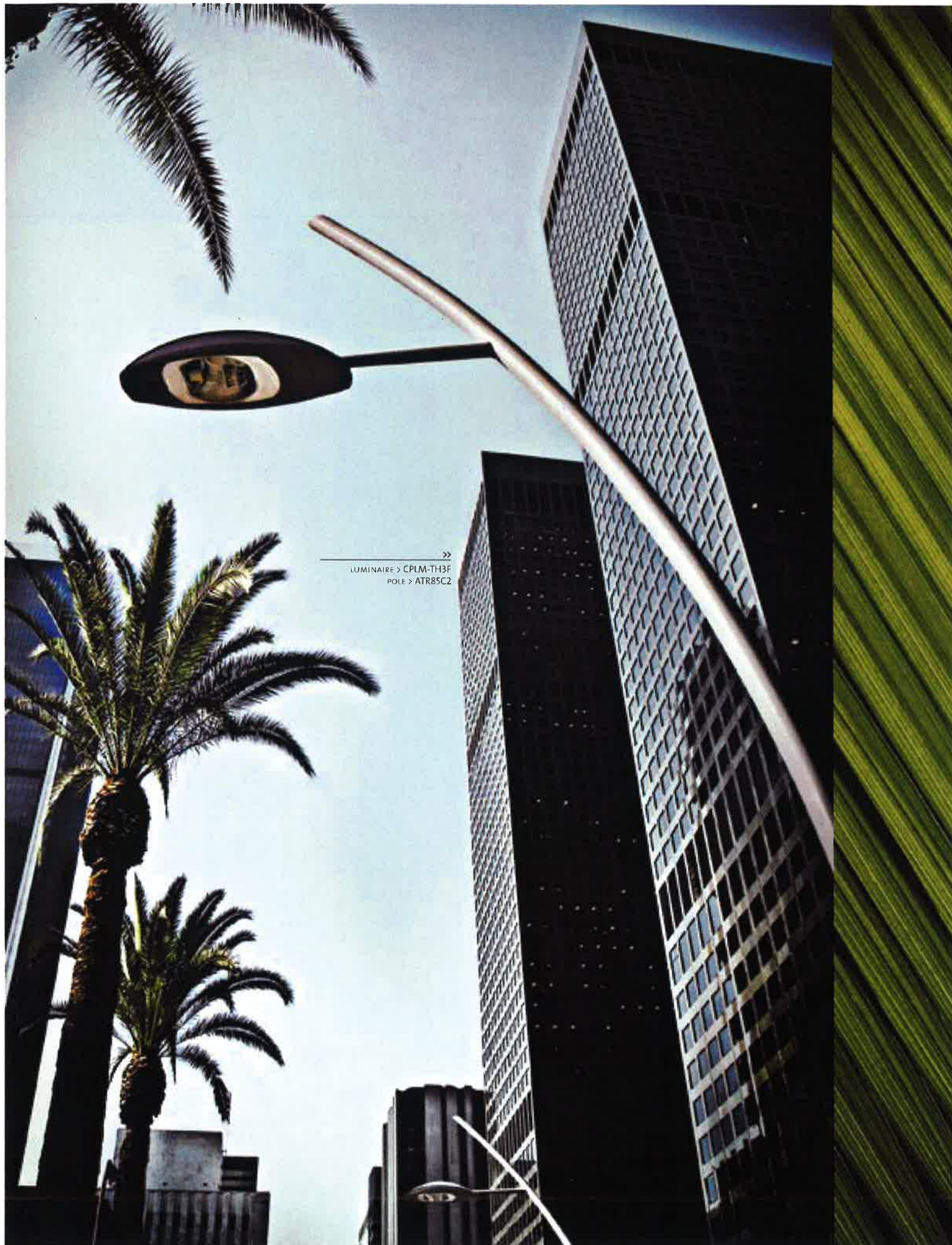
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# CAPELLA

## SERIES

**Product Overview and Technical information >>**



>>

LUMINAIRE > CPLM-TH3F  
POLE > ATR85C2



Some luminaires of this series are IDA (International Dark-Sky Association) approved.



CPLM



CPLS

# CAPELLA

## SERIES

**Inspired by movement /** Inspired by the splendor of movement, the Capella is one of the most adaptable luminaires on the market. With its graceful curves and sweeping lines it contributes to the beautification of any environment and enhances the visual impact of any project. >>





## ADAPTABILITY

**The Capella comes in two sizes to maximize its potential and appeal.** The smaller version is perfect for lighting alleyways, pathways, sidewalks and small roadways while the larger version is ideal for city streets and boulevards. The two complement each other and can be used in tandem to add a measure of grace and fluidity to any area, big or small.

## PERFORMANCE

**Photometric performance at its finest. With the Capella you get exceptional light distribution and spread as well as efficiency and durability.** Full cut-off optics protect the night sky, energy efficiency protects the environment, and high-quality aluminum construction protects Capella's beauty for years to come. Durable, reliable, with easy toolfree maintenance, the Capella is as tough and practical as it is beautiful.

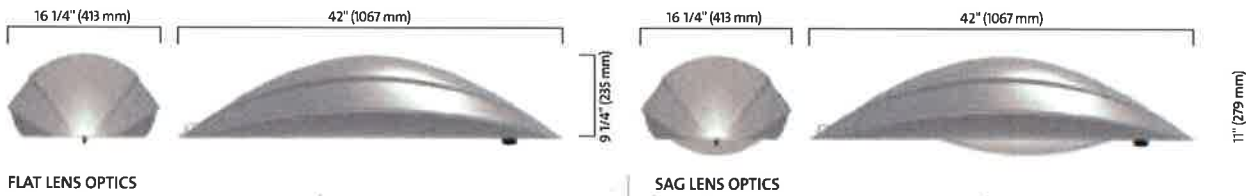


# BENEFITS

- Pure lines with high visual appeal.
- Exceptional durability and reliability.
- Simple, toolfree maintenance.
- Superior photometric performance.
- Respectful of the environment and the night sky.

# LUMINAIRES

Conform to the UL 1598 and CSA C22.2 No. 250.0-08 standards



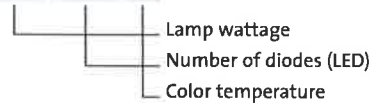
## CPLM

EPA: 0,83 sq. ft.  
Weight: 55 lbs (25 kg)



# LAMPS / LED

## LAMP CODE DEFINITION / 40W 49LED 4K



LED = Philips Lumileds Rebel ES, CRI = 70, CCT = 4000K (+/- 350K)

LED rated life = 100,000 hrs<sup>1</sup> - Driver rated life = 50,000 hrs

LUMINAIRE	LAMP	TYPICAL DELIVERED LUMENS <sup>2</sup>		TYPICAL LAMP WATTAGE (W)	TYPICAL SYSTEM WATTAGE <sup>3</sup> (W)	TYPICAL CURRENT @ 120 V (A)	TYPICAL CURRENT @ 240 V (A)	TYPICAL CURRENT @ 277 V (A)	LED CURRENT (mA)	HP5 EQUIVALENT <sup>4</sup>	LUMINAIRE EFFICACY RATING (LM/W)	
		FLAT LENS	SAG LENS								FLAT LENS	SAG LENS
CPLM	40W49LED4K-ES	4025	4070	42	47	0.39	0.20	0.17	285	100 W	86	87
	65W49LED4K-ES	5385	5440	65	72	0.60	0.30	0.26	428	100 W	75	76
	90W49LED4K-ES	6450	6515	90	102	0.85	0.43	0.37	571	150 W	63	64

<sup>1</sup> L70 = 100,000 hrs (at ambient temperature = 25°C and forward current = 700 mA).

<sup>2</sup> May vary depending on the optical distribution used.

<sup>3</sup> System wattage includes the lamp and the LED driver.

<sup>4</sup> Compared to Capella (equivalence should always be confirmed by a photometric layout).

WATTAGE	LE2F / LE2S LE3F / LE3S LE4F / LE4S LE5F / LE5S
40W49LED4K-ES	✓
65W49LED4K-ES	✓
90W49LED4K-ES	✓

✓ : Available N/A: Not available

# VOLTAGE

120 / 208 / 240 / 277 / 347<sup>1</sup> / 480<sup>1</sup>

<sup>1</sup> Comes with a step-down transformer with 40W49LED4K-ES and 65W49LED4K-ES.

# OPTICAL SYSTEMS / LED



## Flat lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass flat lens permanently sealed onto the lower part of the heat sink.

LE2F: Asymmetrical  
LE3F: Asymmetrical  
LE4F: Asymmetrical  
LE5F: Symmetrical (square)  
> House shield available in option (HS)



## Sag lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass sag lens permanently sealed onto the lower part of the heat sink.

LE2S: Asymmetrical  
LE3S: Asymmetrical  
LE4S: Asymmetrical  
LE5S: Symmetrical (square)  
> House shield available in option (HS)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

# LAMPS / HID

WATTAGE	TH2 / TH3	TH2F / TH3F
50 MH, medium	✓	✓
70 MH, medium	✓	✓
100 MH, medium	✓	✓
150 MH, medium	✓	✓
200 MH, mogul	✓ <sup>1</sup>	✓ <sup>1</sup>
320 MH, mogul	✓	✓ <sup>2</sup>
175 PSMH, mogul	✓	N/A
250 PSMH, mogul	✓	✓
400 PSMH, mogul	✓	N/A
35 HPS, mogul	✓	✓
50 HPS, mogul	✓	✓ <sup>1</sup>
70 HPS, mogul	✓	✓ <sup>1</sup>
100 HPS, mogul	✓	✓ <sup>1</sup>
150 HPS, mogul	✓	✓ <sup>1</sup>
200 HPS, mogul	✓	✓
250 HPS, mogul	✓	✓
400 HPS, mogul	✓	✓

✓ : Available N/A : Not available

<sup>1</sup> Use only with ED17 medium base lamp.

<sup>2</sup> Use only with short version LCL 5 3/4" of T15 mogul base lamp.

<sup>3</sup> Use only with short version LCL 5" of T15 mogul base lamp.

# OPTICAL SYSTEMS / HID

(Lamps not included)



## FLAT LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a flat tempered-glass lens.

TH2F: Full cut-off (II)  
TH3F: Full cut-off (III)



## SAG LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a sagged tempered-glass lens.

TH2: Cut-off (II)  
TH3: Cut-off (III)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

# VOLTAGE

HID<sup>1</sup> & MASTERCOLOR<sup>®</sup>: 120 / 208 / 240 / 277 / 347 / 480

CosmoPolis<sup>™</sup>: 120 / 208 / 240 / 277

<sup>1</sup> Multi-top ballast also available.

<sup>1</sup> Only available with 60 CW.

## CosmoPolis<sup>™</sup> / new generation of ceramic metal halide lamp

WATTAGE	TH2 / TH3	TH2F / TH3F
60 CW	✓	✓
90 CW	✓	✓

✓ : Available

## MasterColor<sup>®</sup> / new generation of ceramic metal halide lamp

WATTAGE	TH2 / TH3	TH2F / TH3F
210 MCE	✓	✓

✓ : Available

# LAMPS / QL

WATTAGE	TH	THF
55 QL	✓	✓
85 QL	✓	✓

✓ : Available

High frequency generator for induction lamp (4000K).

Instant start. Operating range 50-60 Hz or DC.

Lamp minimum starting temperature -40F (-40 °C).

# OPTICAL SYSTEMS / QL

(Lamps not included)



## FLAT LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a flat tempered-glass lens.

THF: Full cut-off (II)



## SAG LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a sagged tempered-glass lens.

TH: Cut-off (II)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

# VOLTAGE

120 / 208 / 240 / 277

➤ Multi-top ballast also available.

# LUMINAIRE OPTIONS

- HS** House shield
- PH8** Quarter-turn photoelectric cell
- SAR** Short arm for round pole  
(E.P.A.: 0.25 sq. ft. / Weight: 2.6 lbs (1.2 kg))

Philips Lumec reserves the right to substitute materials or change the manufacturing process of its products without prior notification.  
For the latest updates go to [www.philips.com/lumec](http://www.philips.com/lumec).

**PHILIPS**  
**LUMEC**

# FINISHES

(Consult Philips Lumec's Color Chart for complete specifications)

The specially formulated **Lumital** powder coat finish is available in a range of many standard colors.

## ORDERING SAMPLE

PRODUCT	LAMP	OPTICAL SYSTEM	VOLTAGE	OPTIONS	FINISH
CPLM	250 HPS	TH2F	120	HS	NP

## MAINTENANCE



### ACCESS TO INTERNAL COMPONENT

The luminaire opens by simply turning the compression twist lock located underneath the luminaire at the front end. The hood can then be pivoted along a incorporated hinge found at the back of the luminaire. When opened, a safety cord holds in place the bottom part of the luminaire.



### ACCESS TO LAMP

A simple quarter-turn of the sealed shutter provides easy access to the lamp. Quick-disconnect terminals between the lamp and the ballast tray ensure safe and easy lamp replacement.

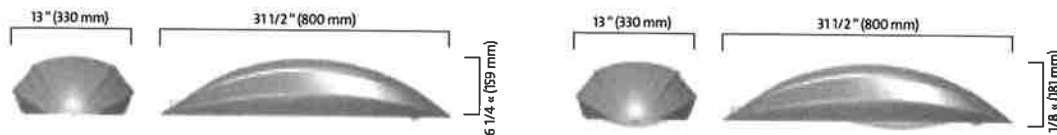


### ACCESS TO BALLAST

The toolfree drop-in unitized ballast tray is slipped into the ballast box. Here again, the use of quick-disconnect terminals ensures safe and easy ballast maintenance.

# LUMINAIRES

Conform to the UL 1598 and CSA C22.2 No. 250.0-08 standards



FLAT LENS OPTICS

CPLS

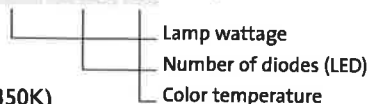
EPA: 0,47 sq. ft.

Weight: 30 lbs (13.6 kg)

SAG LENS OPTICS

## LAMPS / LED

LAMP CODE DEFINITION / 40W 49LED 4K



LED = Philips Lumileds Rebel ES, CRI = 70, CCT = 4000K (+/- 350K)

LED rated life = 100,000 hrs<sup>1</sup> - Driver rated life = 50,000 hrs

LUMINAIRE	LAMP	TYPICAL DELIVERED LUMENS <sup>2</sup>		TYPICAL LAMP WATTAGE (W)	TYPICAL SYSTEM WATTAGE <sup>3</sup> (W)	TYPICAL CURRENT @ 120 V (A)	TYPICAL CURRENT @ 240 V (A)	TYPICAL CURRENT @ 277 V (A)	LED CURRENT (mA)	HPS EQUIVALENT <sup>4</sup>	LUMINAIRE EFFICACY RATING (LM/W)	
		FLAT LENS	SAG LENS								FLAT LENS	SAG LENS
CPLS	40W30LED4K-ES	2965	3000	40	45	0.38	0.19	0.16	400	70 W	66	67
	60W30LED4K-ES	4025	4070	60	68	0.57	0.28	0.25	600	100 W	59	60

<sup>1</sup> L70 = 100,000 hrs (at ambient temperature = 25°C and forward current = 700 mA).

<sup>2</sup> May vary depending on the optical distribution used.

<sup>3</sup> System wattage includes the lamp and the LED driver.

<sup>4</sup> Compared to Capella (equivalence should always be confirmed by a photometric layout).

WATTAGE	LE2F / LE2S LE3F / LE3S LE4F / LE4S LE5F / LE5S
40W30LED4K-ES	✓
60W30LED4K-ES	✓

✓ : Available N/A: Not available

## VOLTAGE

120 / 208 / 240 / 277

## OPTICAL SYSTEMS / LED



### Flat lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass flat lens permanently sealed onto the lower part of the heat sink.

LE2F: Asymmetrical  
LE3F: Asymmetrical  
LE4F: Asymmetrical  
LE5F: Symmetrical (square)  
> House shield available in option (HS)



### Sag lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass sag lens permanently sealed onto the lower part of the heat sink.

LE2S: Asymmetrical  
LE3S: Asymmetrical  
LE4S: Asymmetrical  
LE5S: Symmetrical (square)  
> House shield available in option (HS)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

## LAMPS / HID

WATTAGE	2H / 4H	2HF / 4HF
50 MH, medium	✓	✓
70 MH, medium	✓	✓
100 MH, medium	✓	✓
150 MH, medium	✓	✓
175 MH, medium	✓	✓
35 HPS, medium	✓	✓
50 HPS, medium	✓	✓
70 HPS, medium	✓	✓
100 HPS, medium	✓	✓
150 HPS, medium	✓	✓
18 CF	✓	✓
26 CF	✓	✓
32 CF	✓	✓
42 CF	✓	✓

✓ : Available N/A : Not available

> Socket: GX24Q-2 (18W), GX24Q-3 (26W)(32W), GX24Q-4 (42W), triple tube for compact fluorescent (lamp not included).

## OPTICAL SYSTEMS / HID

(Lampes non incluses)



### FLAT LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a flat tempered-glass lens.

2HF: Full cut-off (II)  
4HF: Full cut-off (IV)



### Optique / LENTILLE EN SAILLIE

Bloc optique scellé composé d'un réflecteur hydroformé scellé de façon permanente sur une lentille en saillie en verre trempé.

2H: Défilé (II)  
4H: Défilé (IV)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

## VOLTAGE

HID<sup>1</sup>: 120 / 208 / 240 / 277 / 347 / 480

CosmoPolis™: 120<sup>2</sup> / 208 / 240 / 277

<sup>1</sup> Multi-top ballast also available.

<sup>2</sup> Only available with 60 CW.

## CosmoPolis™ / new generation of ceramic metal halide lamp

WATTAGE	2H / 4H	2HF / 4HF
60 CW	✓	✓
90 CW	✓	✓

✓ : Available

## LUMINAIRE OPTIONS

**HS** House shield

**PH** Photoelectric cell

## FINISHES

*(Consult Philips Lumec's Color Chart for complete specifications)*

The specially formulated **Lumital** powder coat finish is available in a range of many standard colors.

## ORDERING SAMPLE

PRODUCT	LAMP	OPTICAL SYSTEM	VOLTAGE	OPTIONS	FINISH
CPLS	150 HPS	2HF	120	PH7	NP

## MAINTENANCE



### ACCESS TO INTERNAL COMPONENT

The luminaire opens by simply turning the compression twist lock located underneath the luminaire at the front end. The hood can then be pivoted along a incorporated hinge found at the back of the luminaire. When opened, a safety cord holds in place the bottom part of the luminaire.



### ACCESS TO LAMP

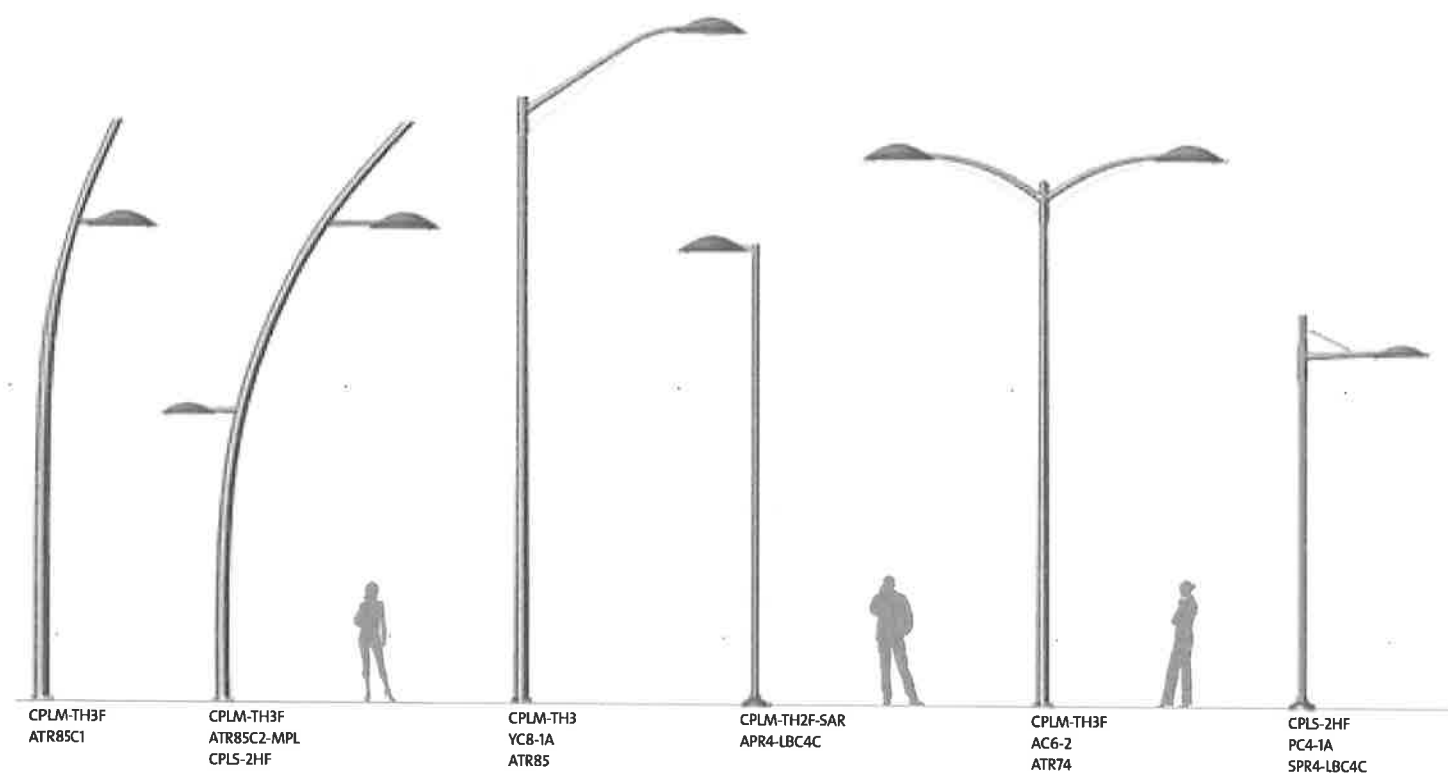
A simple quarter-turn of the sealed shutter provides easy access to the lamp. Quick-disconnect terminals between the lamp and the ballast tray ensure safe and easy lamp replacement.



### ACCESS TO BALLAST

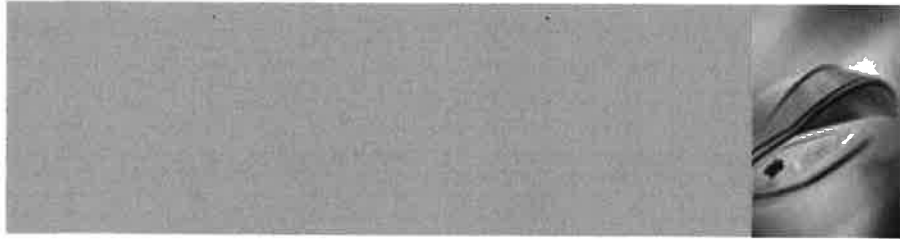
The toolfree drop-in unitized ballast tray is slipped into the ballast box. Here again, the use of quick-disconnect terminals ensures safe and easy ballast maintenance.

# ASSEMBLY EXAMPLES





>>  
LUMINAIRE > CPLM-TH3F  
POLE > ATR85C2-MF  
MID-POLE LUMINAIRE > CPLS-2HF



**[www.philips.com/lumec](http://www.philips.com/lumec)**

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For the details of our different agents and representatives, please consult the **Contact us** section of our Website.

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/ Some luminaires use fluorescent or high intensity discharge (HID) lamps that contain small amounts of mercury. Such lamps are labeled "Contains Mercury" and/or with the symbol "Hg." Lamps that contain mercury must be disposed of in accordance with local requirements. Information regarding lamp recycling and disposal can be found at [www.lamprecycle.org](http://www.lamprecycle.org)



The choice to not print paper brochures anymore but to make them available on-line is an example of the positive environmental actions that Philips Lumec has decided to undertake. This not only considerably reduces our paper consumption but also guarantees the exactitude of the information our clients receive.



# CAPELLA

## SERIES

**Product Overview and Technical information >>**



>>

LUMINAIRE > CPLM-TH3F  
POLE > ATR85C2



Some luminaires of this series are IDA (International Dark-Sky Association) approved.



CPLM



CPLS

# CAPELLA

## SERIES

**Inspired by movement /** Inspired by the splendor of movement, the Capella is one of the most adaptable luminaires on the market. With its graceful curves and sweeping lines it contributes to the beautification of any environment and enhances the visual impact of any project. >>





## ADAPTABILITY

**The Capella comes in two sizes to maximize its potential and appeal.** The smaller version is perfect for lighting alleyways, pathways, sidewalks and small roadways while the larger version is ideal for city streets and boulevards. The two complement each other and can be used in tandem to add a measure of grace and fluidity to any area, big or small.

## PERFORMANCE

**Photometric performance at its finest. With the Capella you get exceptional light distribution and spread as well as efficiency and durability.** Full cut-off optics protect the night sky, energy efficiency protects the environment, and high-quality aluminum construction protects Capella's beauty for years to come. Durable, reliable, with easy toolfree maintenance, the Capella is as tough and practical as it is beautiful.

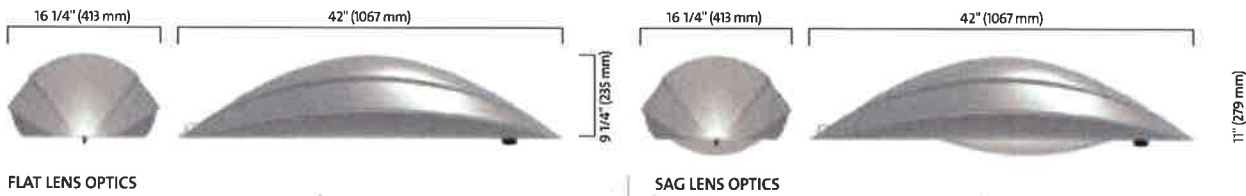


# BENEFITS

- Pure lines with high visual appeal.
- Exceptional durability and reliability.
- Simple, toolfree maintenance.
- Superior photometric performance.
- Respectful of the environment and the night sky.

# LUMINAIRES

Conform to the UL 1598 and CSA C22.2 No. 250.0-08 standards



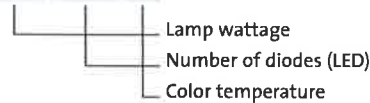
## CPLM

EPA: 0,83 sq. ft.  
Weight: 55 lbs (25 kg)



## LAMPS / LED

### LAMP CODE DEFINITION / 40W 49LED 4K



LED = Philips Lumileds Rebel ES, CRI = 70, CCT = 4000K (+/- 350K)

LED rated life = 100,000 hrs<sup>1</sup> - Driver rated life = 50,000 hrs

LUMINAIRE	LAMP	TYPICAL DELIVERED LUMENS <sup>2</sup>		TYPICAL LAMP WATTAGE (W)	TYPICAL SYSTEM WATTAGE <sup>3</sup> (W)	TYPICAL CURRENT @ 120 V (A)	TYPICAL CURRENT @ 240 V (A)	TYPICAL CURRENT @ 277 V (A)	LED CURRENT (mA)	HP5 EQUIVALENT <sup>4</sup>	LUMINAIRE EFFICACY RATING (LM/W)	
		FLAT LENS	SAG LENS								FLAT LENS	SAG LENS
CPLM	40W49LED4K-ES	4025	4070	42	47	0.39	0.20	0.17	285	100 W	86	87
	65W49LED4K-ES	5385	5440	65	72	0.60	0.30	0.26	428	100 W	75	76
	90W49LED4K-ES	6450	6515	90	102	0.85	0.43	0.37	571	150 W	63	64

<sup>1</sup> L70 = 100,000 hrs (at ambient temperature = 25°C and forward current = 700 mA).

<sup>2</sup> May vary depending on the optical distribution used.

<sup>3</sup> System wattage includes the lamp and the LED driver.

<sup>4</sup> Compared to Capella (equivalence should always be confirmed by a photometric layout).

WATTAGE	LE2F / LE2S LE3F / LE3S LE4F / LE4S LE5F / LE5S
40W49LED4K-ES	✓
65W49LED4K-ES	✓
90W49LED4K-ES	✓

✓ : Available N/A: Not available

## VOLTAGE

120 / 208 / 240 / 277 / 347<sup>1</sup> / 480<sup>1</sup>

<sup>1</sup> Comes with a step-down transformer with 40W49LED4K-ES and 65W49LED4K-ES.

## OPTICAL SYSTEMS / LED



### Flat lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass flat lens permanently sealed onto the lower part of the heat sink.

LE2F: Asymmetrical  
LE3F: Asymmetrical  
LE4F: Asymmetrical  
LE5F: Symmetrical (square)  
> House shield available in option (HS)



### Sag lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass sag lens permanently sealed onto the lower part of the heat sink.

LE2S: Asymmetrical  
LE3S: Asymmetrical  
LE4S: Asymmetrical  
LE5S: Symmetrical (square)  
> House shield available in option (HS)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

# LAMPS / HID

WATTAGE	TH2 / TH3	TH2F / TH3F
50 MH, medium	✓	✓
70 MH, medium	✓	✓
100 MH, medium	✓	✓
150 MH, medium	✓	✓
200 MH, mogul	✓	✓
320 MH, mogul	✓	✓
175 PSMH, mogul	✓	N/A
250 PSMH, mogul	✓	✓
400 PSMH, mogul	✓	N/A
35 HPS, mogul	✓	✓
50 HPS, mogul	✓	✓
70 HPS, mogul	✓	✓
100 HPS, mogul	✓	✓
150 HPS, mogul	✓	✓
200 HPS, mogul	✓	✓
250 HPS, mogul	✓	✓
400 HPS, mogul	✓	✓

✓ : Available N/A : Not available

<sup>1</sup> Use only with ED17 medium base lamp.

<sup>2</sup> Use only with short version LCL 5 3/4" of T15 mogul base lamp.

<sup>3</sup> Use only with short version LCL 5" of T15 mogul base lamp.

# OPTICAL SYSTEMS / HID

(Lamps not included)



## FLAT LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a flat tempered-glass lens.

TH2F: Full cut-off (II)  
TH3F: Full cut-off (III)



## SAG LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a sagged tempered-glass lens.

TH2: Cut-off (II)  
TH3: Cut-off (III)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

# VOLTAGE

HID<sup>1</sup> & MASTERCOLOR<sup>®</sup>: 120 / 208 / 240 / 277 / 347 / 480

CosmoPolis<sup>™</sup>: 120 / 208 / 240 / 277

<sup>1</sup> Multi-top ballast also available.

<sup>1</sup> Only available with 60 CW.

## CosmoPolis<sup>™</sup> / new generation of ceramic metal halide lamp

WATTAGE	TH2 / TH3	TH2F / TH3F
60 CW	✓	✓
90 CW	✓	✓

✓ : Available

## MasterColor<sup>®</sup> / new generation of ceramic metal halide lamp

WATTAGE	TH2 / TH3	TH2F / TH3F
210 MCE	✓	✓

✓ : Available

# LAMPS / QL

WATTAGE	TH	THF
55 QL	✓	✓
85 QL	✓	✓

✓ : Available

High frequency generator for induction lamp (4000K).

Instant start. Operating range 50-60 Hz or DC.

Lamp minimum starting temperature -40F (-40 °C).

# OPTICAL SYSTEMS / QL

(Lamps not included)



## FLAT LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a flat tempered-glass lens.

THF: Full cut-off (II)



## SAG LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a sagged tempered-glass lens.

TH: Cut-off (II)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

# VOLTAGE

120 / 208 / 240 / 277

➤ Multi-top ballast also available.

# LUMINAIRE OPTIONS

- HS** House shield
- PH8** Quarter-turn photoelectric cell
- SAR** Short arm for round pole  
(E.P.A.: 0.25 sq. ft. / Weight: 2.6 lbs (1.2 kg))

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For the latest updates go to [www.philips.com/lumec](http://www.philips.com/lumec).

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# FINISHES

(Consult Philips Lumec's Color Chart for complete specifications)

The specially formulated **Lumital** powder coat finish is available in a range of many standard colors.

## ORDERING SAMPLE

PRODUCT	LAMP	OPTICAL SYSTEM	VOLTAGE	OPTIONS	FINISH
CPLM	250 HPS	TH2F	120	HS	NP

## MAINTENANCE



### ACCESS TO INTERNAL COMPONENT

The luminaire opens by simply turning the compression twist lock located underneath the luminaire at the front end. The hood can then be pivoted along a incorporated hinge found at the back of the luminaire. When opened, a safety cord holds in place the bottom part of the luminaire.



### ACCESS TO LAMP

A simple quarter-turn of the sealed shutter provides easy access to the lamp. Quick-disconnect terminals between the lamp and the ballast tray ensure safe and easy lamp replacement.

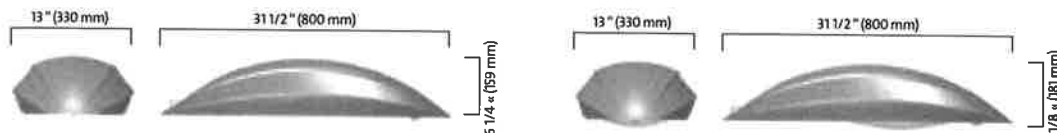


### ACCESS TO BALLAST

The toolfree drop-in unitized ballast tray is slipped into the ballast box. Here again, the use of quick-disconnect terminals ensures safe and easy ballast maintenance.

# LUMINAIRES

Conform to the UL 1598 and CSA C22.2 No. 250.0-08 standards



FLAT LENS OPTICS

CPLS

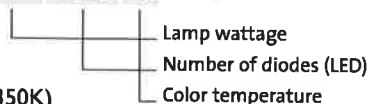
EPA: 0,47 sq. ft.

Weight: 30 lbs (13.6 kg)

SAG LENS OPTICS

## LAMPS / LED

LAMP CODE DEFINITION / 40W 49LED 4K



LED = Philips Lumileds Rebel ES, CRI = 70, CCT = 4000K (+/- 350K)

LED rated life = 100,000 hrs<sup>1</sup> - Driver rated life = 50,000 hrs

LUMINAIRE	LAMP	TYPICAL DELIVERED LUMENS <sup>2</sup>		TYPICAL LAMP WATTAGE (W)	TYPICAL SYSTEM WATTAGE <sup>3</sup> (W)	TYPICAL CURRENT @ 120 V (A)	TYPICAL CURRENT @ 240 V (A)	TYPICAL CURRENT @ 277 V (A)	LED CURRENT (mA)	HPS EQUIVALENT <sup>4</sup>	LUMINAIRE EFFICACY RATING (LM/W)	
		FLAT LENS	SAG LENS								FLAT LENS	SAG LENS
CPLS	40W30LED4K-ES	2965	3000	40	45	0.38	0.19	0.16	400	70 W	66	67
	60W30LED4K-ES	4025	4070	60	68	0.57	0.28	0.25	600	100 W	59	60

<sup>1</sup> L70 = 100,000 hrs (at ambient temperature = 25°C and forward current = 700 mA).

<sup>2</sup> May vary depending on the optical distribution used.

<sup>3</sup> System wattage includes the lamp and the LED driver.

<sup>4</sup> Compared to Capella (equivalence should always be confirmed by a photometric layout).

WATTAGE	LE2F / LE2S LE3F / LE3S LE4F / LE4S LE5F / LE5S
40W30LED4K-ES	✓
60W30LED4K-ES	✓

✓ : Available N/A: Not available

## VOLTAGE

120 / 208 / 240 / 277

## OPTICAL SYSTEMS / LED



### Flat lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass flat lens permanently sealed onto the lower part of the heat sink.

LE2F: Asymmetrical  
LE3F: Asymmetrical  
LE4F: Asymmetrical  
LE5F: Symmetrical (square)  
> House shield available in option (HS)



### Sag lens

IP66 rated optical system, composed of individual pre-oriented lens to achieve desired distribution, assembled with a tempered-glass sag lens permanently sealed onto the lower part of the heat sink.

LE2S: Asymmetrical  
LE3S: Asymmetrical  
LE4S: Asymmetrical  
LE5S: Symmetrical (square)  
> House shield available in option (HS)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

## LAMPS / HID

WATTAGE	2H / 4H	2HF / 4HF
50 MH, medium	✓	✓
70 MH, medium	✓	✓
100 MH, medium	✓	✓
150 MH, medium	✓	✓
175 MH, medium	✓	✓
35 HPS, medium	✓	✓
50 HPS, medium	✓	✓
70 HPS, medium	✓	✓
100 HPS, medium	✓	✓
150 HPS, medium	✓	✓
18 CF	✓	✓
26 CF	✓	✓
32 CF	✓	✓
42 CF	✓	✓

✓ : Available N/A: Not available

> Socket: GX24Q-2 (18W), GX24Q-3 (26W)(32W), GX24Q-4 (42W), triple tube for compact fluorescent (lamp not included).

## OPTICAL SYSTEMS / HID

(Lampes non incluses)



### FLAT LENS optics

Sealed optical chamber consisting of an hydroformed reflector permanently sealed on a flat tempered-glass lens.

2HF: Full cut-off (II)  
4HF: Full cut-off (IV)



### Optique / LENTILLE EN SAILLIE

Bloc optique scellé composé d'un réflecteur hydroformé scellé de façon permanente sur une lentille en saillie en verre trempé.

2H: Défilé (II)  
4H: Défilé (IV)

\* Photometry available on Philips Lumec web site [www.philips.com/lumec](http://www.philips.com/lumec).

## VOLTAGE

HID<sup>1</sup>: 120 / 208 / 240 / 277 / 347 / 480

CosmoPolis™: 120<sup>2</sup> / 208 / 240 / 277

<sup>1</sup> Multi-top ballast also available.

<sup>2</sup> Only available with 60 CW.

## CosmoPolis™ / new generation of ceramic metal halide lamp

WATTAGE	2H / 4H	2HF / 4HF
60 CW	✓	✓
90 CW	✓	✓

✓ : Available

## LUMINAIRE OPTIONS

**HS** House shield

**PH** Photoelectric cell

## FINISHES

*(Consult Philips Lumec's Color Chart for complete specifications)*

The specially formulated **Lumital** powder coat finish is available in a range of many standard colors.

## ORDERING SAMPLE

PRODUCT	LAMP	OPTICAL SYSTEM	VOLTAGE	OPTIONS	FINISH
CPLS	150 HPS	2HF	120	PH7	NP

## MAINTENANCE



### ACCESS TO INTERNAL COMPONENT

The luminaire opens by simply turning the compression twist lock located underneath the luminaire at the front end. The hood can then be pivoted along a incorporated hinge found at the back of the luminaire. When opened, a safety cord holds in place the bottom part of the luminaire.



### ACCESS TO LAMP

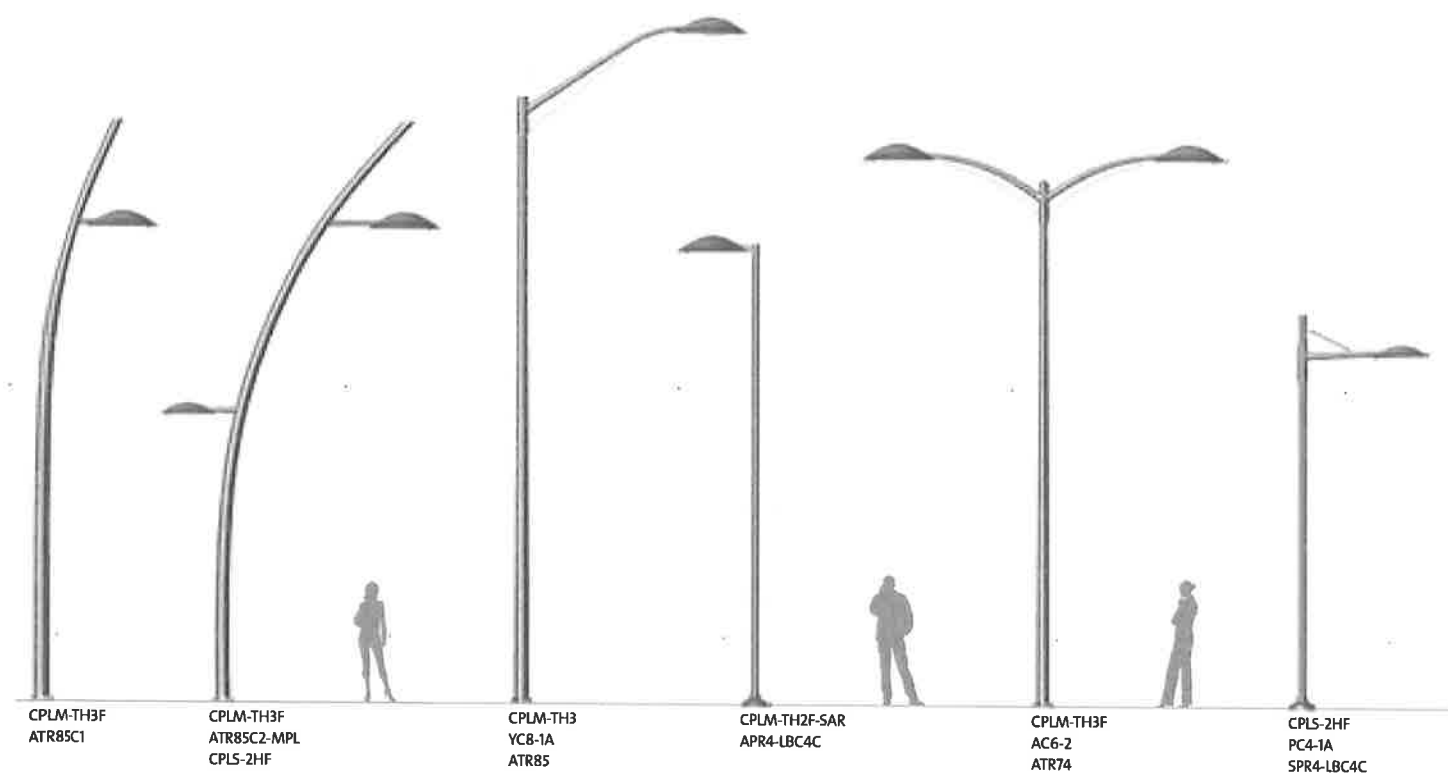
A simple quarter-turn of the sealed shutter provides easy access to the lamp. Quick-disconnect terminals between the lamp and the ballast tray ensure safe and easy lamp replacement.



### ACCESS TO BALLAST

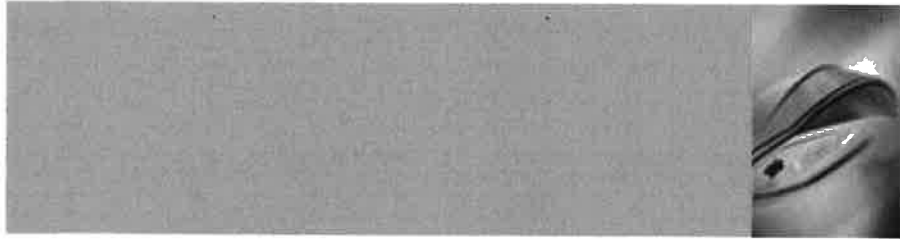
The toolfree drop-in unitized ballast tray is slipped into the ballast box. Here again, the use of quick-disconnect terminals ensures safe and easy ballast maintenance.

# ASSEMBLY EXAMPLES





>>  
LUMINAIRE > CPLM-TH3F  
POLE > ATR85C2-MF  
MID-POLE LUMINAIRE > CPLS-2HF



**[www.philips.com/lumec](http://www.philips.com/lumec)**

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/ Some luminaires use fluorescent or high intensity discharge (HID) lamps that contain small amounts of mercury. Such lamps are labeled "Contains Mercury" and/or with the symbol "Hg." Lamps that contain mercury must be disposed of in accordance with local requirements. Information regarding lamp recycling and disposal can be found at [www.lamprecycle.org](http://www.lamprecycle.org)



The choice to not print paper brochures anymore but to make them available on-line is an example of the positive environmental actions that Philips Lumec has decided to undertake. This not only considerably reduces our paper consumption but also guarantees the exactitude of the information our clients receive.