

TECHNICAL MEMORANDUM

To: Livia McEachern, P.Eng., City of Welland
Ali Khan, M.A.Sc., P.Eng., City of Welland
RVA: 226408

From: Michael Kong, C.E.T., R.V. Anderson Associates Limited
Altaf Hussain, P.Eng., R.V. Anderson Associates Limited

Date: April 10, 2025

Subject: Transportation Master Plan – Appendix 5 – Road Classification Technical Memorandum, City of Welland

1.0 Introduction

As part of the ongoing Transportation Master Plan (TMP) study, it has been identified that a reclassification of roads within the City of Welland is necessary. Therefore, the road system within the City of Welland has been assessed using a formal set of road classification criteria. The set of criteria was made with reference to the *Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (2017)*, with specific modifications made to calibrate the criteria to the City of Welland context.

1.1 Road Class Types

Freeways and **Expressways** are roadways of the highest order, usually consisting of multi-lane (more than four total through lanes including two through lanes in each direction), high-speed highways that generally accommodate long-distance travels between different cities and regions. Although they are often used interchangeably, freeways are defined as highways limited to through traffic, with access to the corridor only being provided by interchanges, whereas expressways consist of a divided roadway for through traffic, with access provided through interchanges or controlled access points.

Secondary/King's Highway generally consist of 2-lane or 4-lane (one lane or two lanes in each direction) corridors that transfer traffic between freeways and arterials. They may be divided or undivided, with at-grade intersections and the potential for short sections of Freeways within the overall corridor.

Arterial Roads are higher-order corridors that are intended to accommodate relatively high volumes of traffic and provide efficient, uninterrupted movement for through volumes (barring interruptions from traffic signals along the corridor). Resultantly, majority of resident and emergency vehicle trips will utilize an arterial roadway at some point in their route.

Collector Roads are intended to carry moderate traffic volumes, with traffic movement and land access having a similar level of importance. In the ideal road system, collector roads will garner traffic from local streets, eventually connecting to the foregoing higher-order roadways to accommodate the larger portion of travel.

Local Roads are intended to provide access to their adjacent land uses. These roadways generally carry much lower volumes than the other classifications, as they are only intended to service trip ends (either origin or destination of a trip).

2.0 Road Classification Characteristics

2.1 Land Use

The classification of a roadway is heavily influenced by the characteristics of the adjacent land uses. This is because as the nature and intensity of a land use changes, so does the demand that is placed on the adjacent transportation network. For example, in predominantly industrial areas, there will be an increased desire for efficient movement of goods, whereas residential areas desire a greater emphasis on multimodal movements, on-street parking, and land access.

It should be noted that the classification of urban roads contrasts significantly from rural roads, as rural roads are designed to achieve different purposes (i.e., rural roads are designed to accommodate a greater percentage agricultural vehicles). As such, the classifications of urban and rural roads are usually completed separately with their own respective characteristics.

2.2 Service Function

Roadways are generally designed to serve a certain purpose, with the primary objective of any roadway being to provide either uninterrupted flow of traffic, access to land, or a balanced combination of both. It is generally understood that the primary objective for freeways and arterials is to provide uninterrupted flow of traffic at higher speeds, as the intended purpose of higher order roads is to enable efficient movement of people and goods. In contrast, the intended function of local roadways is to provide access to land, which generally results in an increased number of traffic disruptions (i.e., pedestrian

crossings) and lower posted speeds. A combination of traffic movement and land access is typically provided by a collector road, which establishes balance through limiting the number of site accesses and fostering higher operating speeds than local roads.

In addition to the intended service function, the roadway classification should also consider the traffic volumes carried by the roadway. Higher order roads are designed to carry larger traffic volumes through increased right-of-way width.

2.3 Connections

An important characteristic of road classification is to create a connected and continuous network of roadways with similar functions. By doing so, road users can transfer between roadways without controverting the intended use of the roadway (i.e., using a local road as a cut-through route when its intended function is land access). **Table 2.1** summarizes the road classification connections for the ideal road network.

Table 2.1 – Ideal Network Road Classification Connections

Road Classification	Connections					
	Local	Collector	Arterial	King's Highway	Expressway	Freeway
Local	✓	✓	•	•	X	X
Collector	✓	✓	✓	•	•	•
Arterial	•	✓	✓	✓	✓	✓
King's Highway	•	•	✓	✓	✓	✓
Expressway	X	•	✓	✓	✓	✓
Freeway	X	•	✓	✓	✓	✓

✓ indicates that the two (2) road classifications are an ideal connection.

• indicates that connecting the two (2) road classifications should be avoided, where possible.

X indicates that the two (2) road classifications should not connect under any circumstance.

As shown in **Table 2.1**, the ideal road network maintains connection between roadways of similar function. There are some circumstances where the ideal connections cannot be made, which may result in locals connecting with arterials and collectors connecting with expressways/freeways; while these connections are not preferable, they commonly occur in many municipalities and are sometimes unavoidable. There are some connections, however, such as local roads and freeways, that should not be implemented under any circumstance.

2.4 Design Consistency

The geometric characteristics of a roadway play an impactful role in shaping the behaviour of its road users. In terms of road classification, the intent should be to provide consistency among roadways with the same classification so that drivers inherently understand the function and purpose of each roadway. Similar to the road classification connections, there will be circumstances where two (2) roadways with significantly different cross-sections meet the criteria for the same classification; in these cases, efforts should be made to provide consistency through operating speeds and driver workload.

As part of the ongoing Official Plan (OP) update for the City, the existing road typical cross-sections were revised. These revised typical cross-sections have been considered in the assessment of each roadway and are briefly described as follows:

Local Road Typical Cross Section consists of a 20-metre-wide right-of-way and provides a 1.5-metre-wide sidewalk on at least one side, a 2-metre-wide boulevard on both sides, and a single 4-metre-wide vehicular travel lane in each direction.

Collector Road Typical Cross Section consists of a 23-metre-wide right-of-way and provides a 1.5-metre-wide sidewalk on one side, and either a 1.5-metre-wide sidewalk or 3-metre-wide multi-use path (MUP) on the other side. The asphalt width is 9 metres, with allocation for vehicles, cyclists, and other roadway amenities being prescribed as needed.

Arterial Road Typical Cross Section consists of a 26-metre-wide right-of-way, providing a 1.5-metre-wide sidewalk on both sides and a 14-metre-wide asphalt width for appropriate allocation of vehicular travel lanes, cycling facilities, and other roadway amenities as needed.

The typical roadway cross sections are provided in **Appendix 1**.

3.0 City of Welland Road Classifications

3.1 Classification Criteria

As part of the review of the City's road network, a set of standard road classification criteria has been formulated, with the details of each criterion being calibrated to the context of Welland.

Many of the higher order roadways within the City of Welland are under the jurisdiction of the Region of Niagara or Ministry of Transportation of Ontario (MTO), with the remaining City-owned corridors being classified as locals, collectors, and arterials. However, given

that the City roads represent a wide variety of classification criteria, it is recommended that the City further aggregate the collector classification into minor collectors and major collectors.

The proposed road classification assessment for the City roads is shown in **Table 3.1**.

Table 3.1 – City of Welland Proposed Urban Road Classification Criteria

Criteria	Locals	Minor Collector	Major Collector	Arterial
Service Function	Land access is primary consideration	Traffic movement and land access of equal importance	Traffic movement and land access of equal importance	Traffic movement is primary consideration
Typical Traffic Volume (veh/day)	< 3,000	< 5,000	5,000 – 12,000	> 10,000
Flow Characteristics	Interrupted flow	Interrupted flow	Interrupted flow	Uninterrupted flow except at traffic signals
Posted Speed (km/h)*	40	40 – 50	50 – 60	60 – 70
Vehicle Type	Passenger and service vehicles	Passenger and service vehicles	All types	All types
Desirable Connections	Locals, collectors	Locals, collectors, arterials	Locals, collectors, arterials	Collectors, arterials, expressways, freeways
Transit Service	Not permitted	Generally avoided	Permitted	Permitted
Accommodation of Cyclists**	No restrictions or special facilities.	MUP on one side	No restrictions. Dedicated facilities recommended	No restrictions. Dedicated facilities recommended
Accommodation of Pedestrians	Sidewalk on one side	Sidewalk on both sides, unless MUP on one side	Sidewalks provided on both sides	Sidewalks provided on both sides
On-Street Parking	One or both sides	One or both sides	One or both sides	No parking
Traffic Calming	Where warranted	Where warranted	Not permitted	Not permitted
Minimum Intersection Spacing (m)	60	60	120	200
Typical Right-of-Way Width (m)	20	23	23-26	26

*School zones or other regulatory restrictions could further reduce posted speed

**Use OTM Book 18 as a guide to select the correct cycling facility for the roadway.

It is important to note that most roadways, especially in older communities, will not correspond solely with one section. In these cases, there is a certain degree of ambiguity

regarding the roadway's hierarchy and planning judgement must be applied to properly assign the appropriate classification.

4.0 Recommended Road Classifications

Using the methodology outlined in foregoing sections, a reclassification of all City-owned roadways has been completed utilizing the proposed criteria noted in **Table 3.1**, in addition to 2051 horizon year planning modelling information that is reflective of housing and employment intensification within the City. **Table 4.0** presents the list of roadways within Welland that have an updated classification.

Table 4.0 – Recommended Updated Classifications for City of Welland Roads

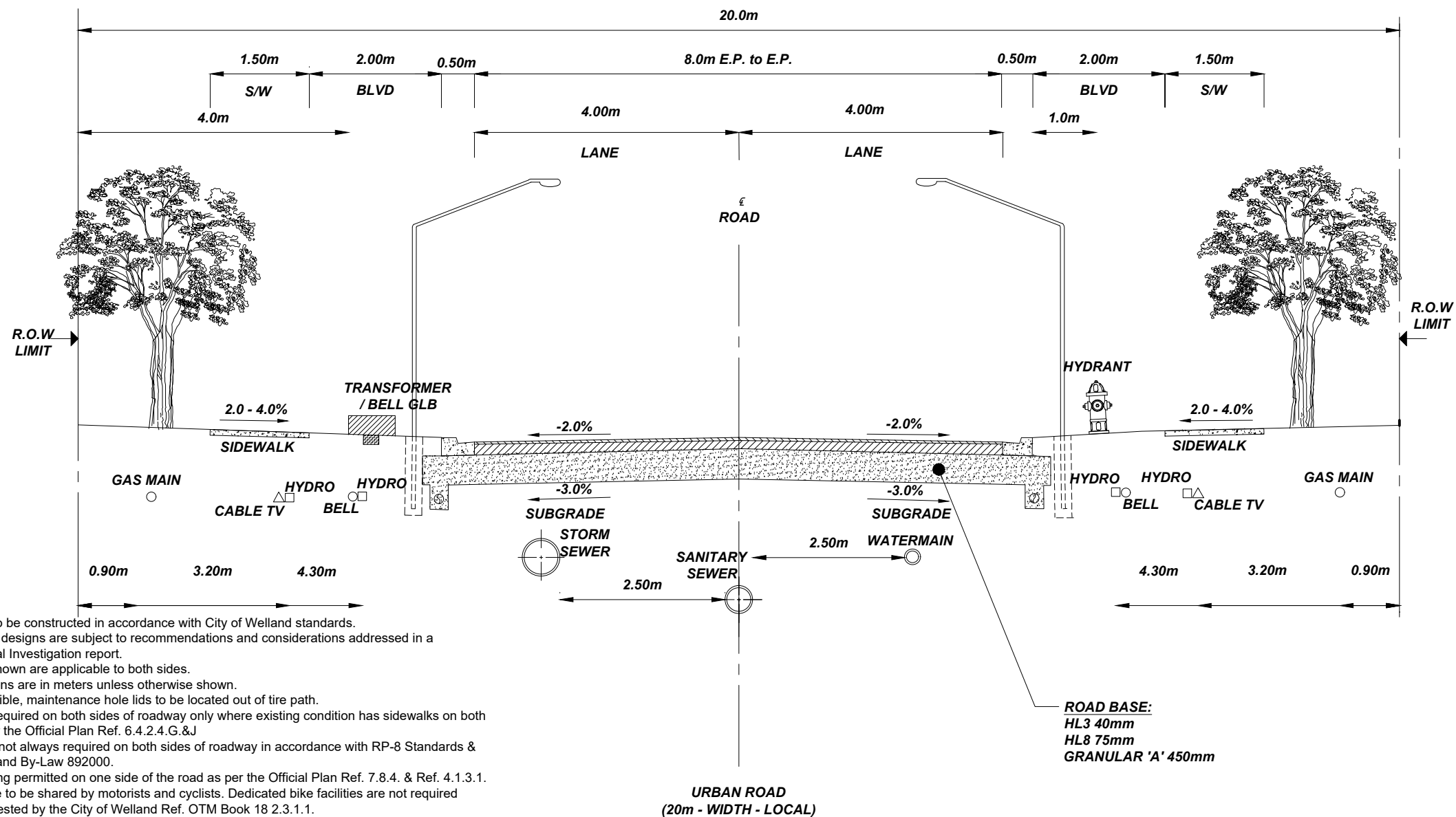
Roadway	Segment		Existing Classification	Proposed Classification
	West/North Limit	East/South Limit		
Aqueduct Street	Thorold Road	Chippawa Street	Collector	Local
Broadway	Riverside Drive	Prince Charles Drive	Collector	Major Collector
Burgar Street	Division Street	Lincoln Street	Collector	Minor Collector
Clare Avenue	Municipal Boundary	Webber Road	Collector	Major Collector
Colbeck Drive	Prince Charles Drive	Southern Terminus	Collector	Minor Collector
Colbeck Drive	Webber Road	South Pelham Road	Local	Major Collector
Daimler Parkway	Highway 406	Midland Place/Shoreview Drive	Local	Major Collector
Denistoun Street	West Main Street	Lincoln Street	Collector	Major Collector
Division Street	East Main Street	Burgar Street	Collector	Major Collector
Downs Drive	River Road	Ross Street	Collector	Minor Collector
Elm Street	Forks Road	Municipal Boundary	Collector	Major Collector
Fell Street	Merritt Street	Church Street	Collector	Local
First Avenue	Woodlawn Road	Prince Charles Drive	Collector	Major Collector
Fitch Street	Prince Charles Drive	First Avenue	Collector	Major Collector
Fitch Street	First Street	Shotwell Street	Local/Collector	Minor Collector

Roadway	Segment		Existing Classification	Proposed Classification
	West/North Limit	East/South Limit		
Forks Road	Prince Charles Drive	Easterly Terminus	Collector	Major Collector
Hagar Street	Burgar Street	Wellington Street	Collector	Minor Collector
Hellems Avenue	East Main Street	Lincoln Street	Collector	Major Collector
Memorial Park Drive	Lincoln Street	Ontario Road	Collector	Major Collector
Merritt Street	Fitch Street	Fell Street	Collector	Local
Ontario Road	Southworth Street	Memorial Park Drive	Collector	Major Collector
Plymouth Road	Lincoln Street	Ontario Road	Collector	Major Collector
Primeway Drive	River Road	Woodlawn Road	Local	Major Collector
Quaker Road	Niagara Street	Towpath Road	Collector	Major Collector
Ridge Road	Rusholme Road	Highway 58A	Collector	Major Collector
River Road	Municipal Boundary	South Pelham Road	Local	Major Collector
River Road	Woodlawn Road	East Main Street	Collector	Minor Collector
River Road	Primeway Drive	Woodlawn Road	Local	Major Collector
Riverside Drive	Princes Charles Drive	Webber Road	Arterial	Major Collector
Ross Street	Downs Drive	East Main Street	Collector	Minor Collector
Rusholme Road	Ridge Road	Highway 58A	Collector	Major Collector
South Pelham Road	Webber Road	River Road	Collector	Major Collector
Thorold Road	Niagara Street	Chippawa Street	Collector	Major Collector
Towpath Road	Quaker Road	Municipal Boundary	Local	Major Collector
Wellington Street	East Main Street	Lincoln Street	Collector	Arterial
Willson Road	Willson Way	Fitch Street	Collector	Minor Collector
Willson Road	Fitch Street	Endicott Terrace	Collector	Local

APPENDIX 1

Typical Roadway Cross Sections





CITY OF WELLAND

INFRASTRUCTURE AND DEVELOPMENT SERVICES

July 21, 2023

Drawn By:
B.W.

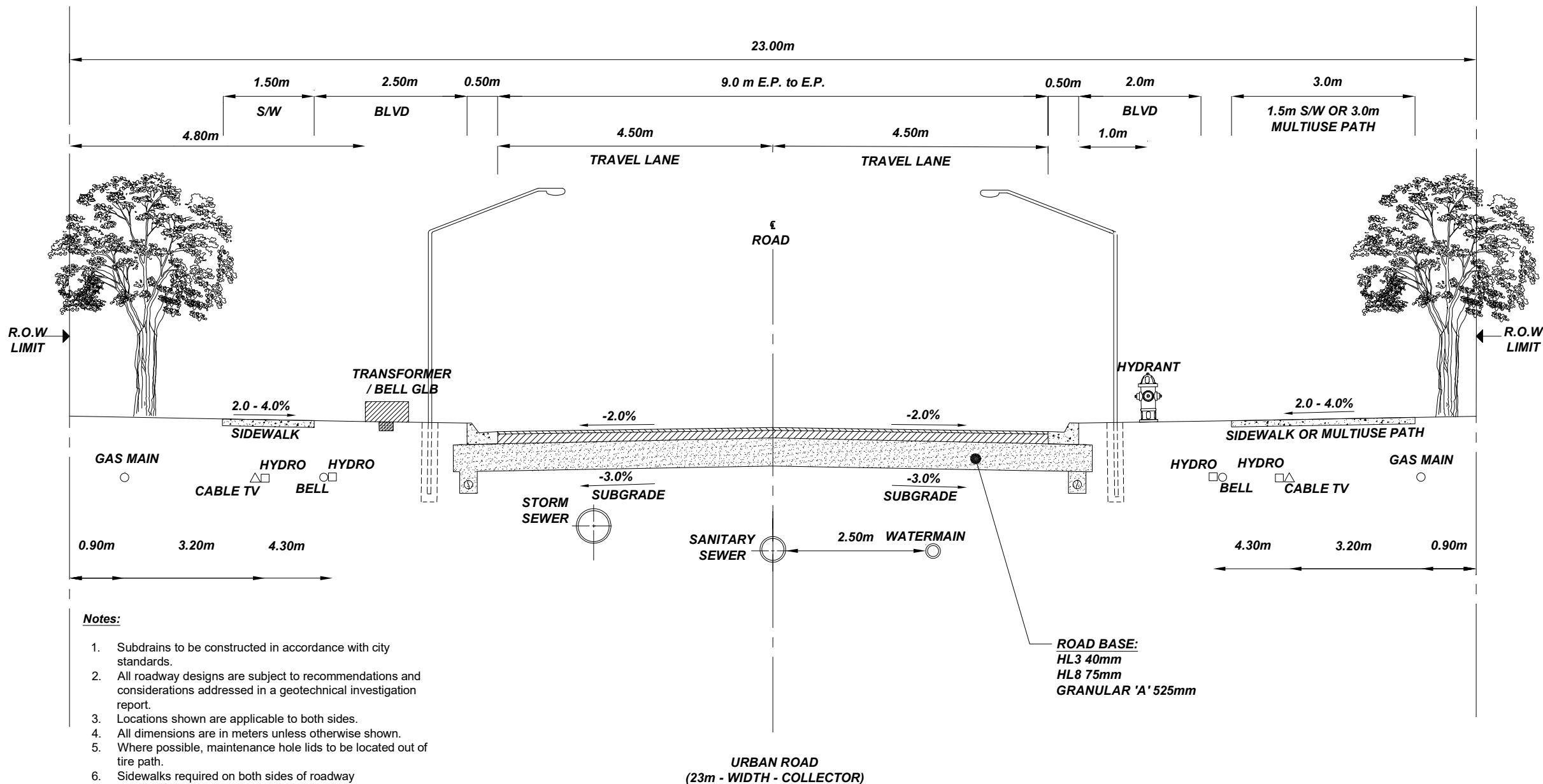
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Checked By:
J.T.

Dwg No:
W-1

Revision:
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TYPICAL ROAD SECTION
 URBAN-LOCAL ROAD (20m WIDTH)



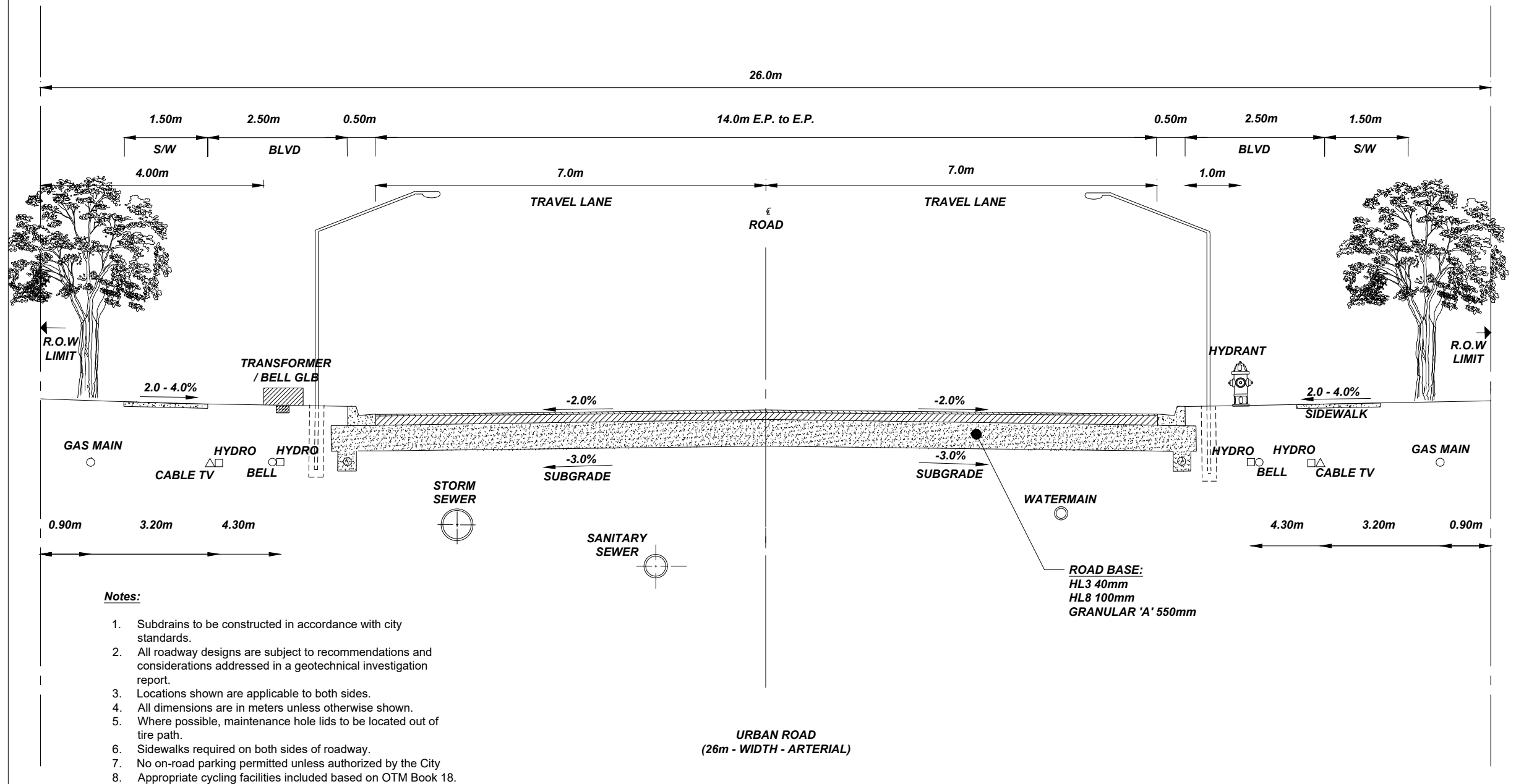
CITY OF WELLAND
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Date: July 21, 2023
 Drawn By: B.W.

Scale: N.T.S.
 Checked By: J.T.

Dwg No: W-4
 Revision: -

TYPICAL ROAD SECTION
 URBAN-COLLECTOR ROAD (23m WIDTH)



CITY OF WELLAND

INFRASTRUCTURE AND DEVELOPMENT SERVICES

July 21, 2023

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B.W.

N.T.S

Checked By:
J.T.

Dwg No:
W-5

Revision:
-

TYPICAL ROAD SECTION
URBAN-ARTERIAL ROAD (26m WIDTH)