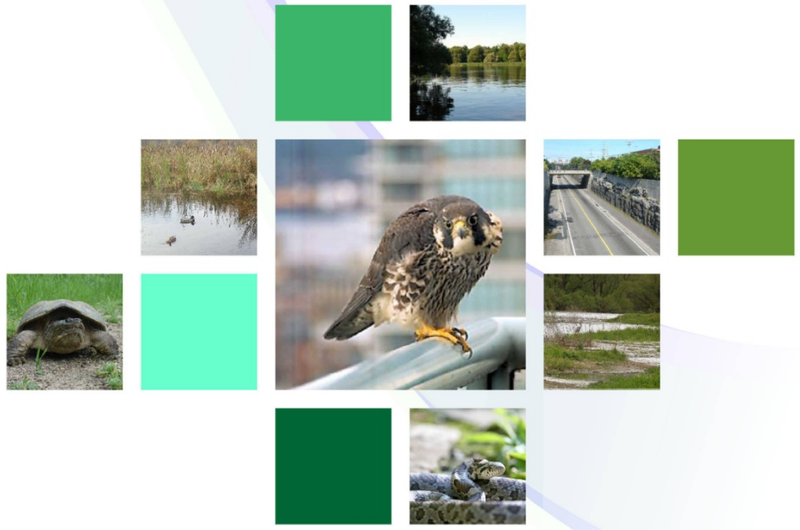
5.0 ENVIRONMENTAL SETTING

This section of the report provides a comprehensive overview of existing environmental conditions within the study area. It is intended to document social and natural conditions against which alternative designs were evaluated and the recommended plan assessed.

Sections Include:

5.1 Study Area Location and Boundaries
5.2 Social Environment
5.3 Natural Environment
5.4 Consultation on the Environmental Setting



5.1 Study Area Location and Boundaries

5.1.1 Physical Boundaries

The study area, illustrated in Figure 5-1, extends generally from Tunney's Pasture in the west to Blair Road in the east, encompassing the existing Transitway corridor between those points east and west of the downtown.

Between Tunney's Pasture and Bayview Station, the study area is narrowly defined by the existing Transitway corridor. At Bayview Station, the study area widens out to address future potential LRT connections to Gatineau (via the Prince of Wales railway bridge) and Riverside South (via the existing O-Train corridor). In the vicinity of LeBreton Flats, the study area extends north to the Ottawa River to cover the approaches to the Chaudière and Portage interprovincial bridges.

Through the downtown core, the study area covers the area between Wellington Street and Laurier Avenue West to King Edward Avenue in order to consider possible alternative alignments for the downtown transit tunnel, which is an area of special focus for the project. East of the Rideau Canal, the study area encompasses parts of Lowertown and the Byward Market in order to cover the approaches to the Alexandra and Macdonald-Cartier interprovincial bridges. South of Laurier Avenue to the Rideau River, the study area narrows to reflect the constraints of the University of Ottawa campus area, Nicholas Street and the existing Transitway. Through the Queensway interchange and through Lees Station the study area is quite narrow reflecting the substantial investment in coordinated infrastructure and the presence of coal tar contamination, which would require extensive remediation if the existing structures require modification. The Rideau River bridge is designed for LRT, and is the only crossing of the river that was considered.

East of the Rideau River, the study area extends southward to Industrial Avenue and east of St. Laurent Boulevard before narrowing again at the Highway 417/Aviation Parkway interchange. The widening of the study area east of the Rideau River addresses potential site locations for the Maintenance and Storage Facility needed to support operation of the DOTT project.

Figure 5-1: Study Area

5.1.2 Temporal Boundaries

The temporal boundaries of the project encompass all phases of project implementation, including planning and design, construction and operation. Given that the lifespan of the LRT project is anticipated to be over 100 years, decommissioning has not been considered as part of the environmental assessment.

5.2 Social Environment

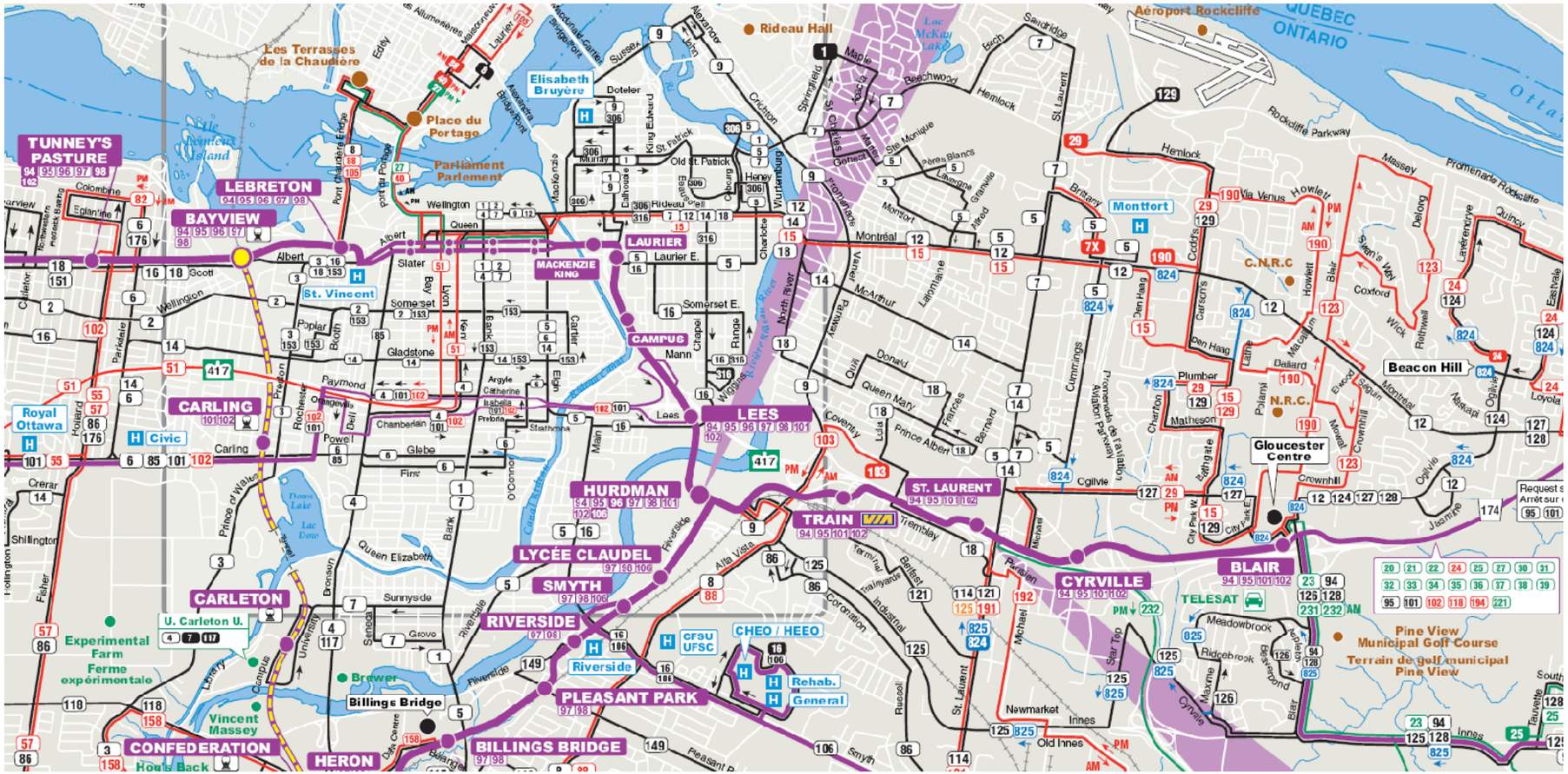
5.2.1 Transportation Network

This section contains information on the existing transportation network within the study area, including transit, roads, and railway, marine, pedestrian and cycling networks. Information was obtained from existing digital mapping, the City's existing and updated TMP, transportation studies, city intersection counts, structural assessments, and other available information related to and impacting on the study area.

5.2.1.1 Existing Transit Services

The existing transit network within the study area consists of local, regional and rapid transit services operated primarily by the City of Ottawa (OC Transpo). Other transit services are provided by the Société de transport de l'Outaouais (STO) and private carriers serving outlying rural communities within and beyond the City of Ottawa's boundaries. Figure 5-2 illustrates the existing OC Transpo network within the project study area.

Figure 5-2: Existing OC Transpo Network

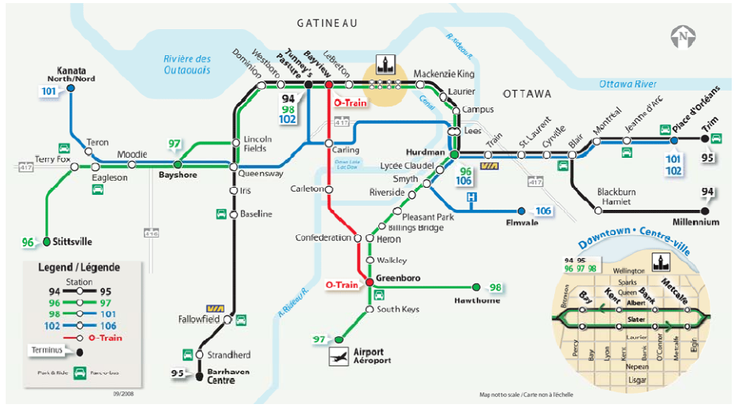


5.2.1.1.1. Rapid Transit Network

OC Transpo currently operates both BRT (Transitway) and LRT (O-Train) rapid transit systems which connect downtown Ottawa with outlying areas to the west, east and south. Within the study area there are 17 existing rapid transit stations or stops.

The rapid transit network within the study is made up of segments of the West, Central Area, East and Southeast Transitways (Bus Rapid Transit) and the O-Train (Light Rail Transit). The West, East and Southeast Transitways are grade-separated bus-only roadways, while the Central Area Transitway is comprised of reserved on-street bus lanes running in the Albert and Slater corridors between Empress Avenue and Waller Street. The O-Train is a grade-separated diesel light railway which connects to the West Transitway at Bayview Station. The City of Ottawa's existing rapid transit network is illustrated in Figure 5-3, and is described in more detail below.

Figure 5-3: Existing OC Transpo Rapid Transit Network



West Transitway

The West Transitway begins at LeBreton Station and extends west through Lincoln Fields Station to Bayshore and Kanata. It is a two-lane facility with additional passing lanes at Transitway stations. A mixture of local, peak express and rapid transit bus services use the West Transitway. The primary rapid transit services are operated by routes 95 and 96, which operate on headways as low as 2 minutes during the peak periods. During the peak period, approximately 180 buses an hour travel along the West Transitway in the peak direction.

At the western end of the study area the Transitway corridor is located in an open cut which runs parallel to Scott Street, on the north side of this arterial roadway. East of Tunney's Pasture Station, the Transitway rises above grade where it crosses over Bayview Avenue and the O-Train corridor. East of Bayview Station the Transitway descends back to grade and runs through the LeBreton Flats area, adjacent to an aqueduct structure. The West Transitway ends at Booth Street, which is crossed at-grade via a signalized intersection. A second signalized intersection controls movements on and off of Albert Street. There are three stations on the West Transitway within the study area.

Tunney's Pasture Station serves a large federal employment centre with an employment base of approximately 10,000. This is a multi-level station with local services on the surface and the Transitway operating below grade. An access ramp to the below-grade Transitway is located immediately west of Tunney's Pasture Station. Forty-four bus routes service this station, eight of which terminate there. It serves all the Transitway routes and is the terminus station for Transitway routes 94, 98 and the cross-town route 102. Two STO bus routes cross the Ottawa River using the Champlain Bridge and terminate at Tunney's Pasture Station, using the upper level platform. There are 6,800 daily boardings at this Station; with approximately 500 and 1,400 boardings in the morning and afternoon peak hours respectively. The station accommodates 313 and 257 OC Transpo bus movements in the morning peak hour and afternoon peak hour.

Bayview Station provides a connection to the O-Train (LRT) service and walking transfers to local bus services on Albert Street. The station also serves adjacent existing and future development lands. There are 2,200 daily boardings at Bayview Station with 200 and 250 boardings in the weekday morning and afternoon peak hour, respectively.

West of Bayview Station, a bus access to Albert Street is provided, along with a lay-up/staging area containing 10 bus parking spots. Depending on the time of day and time of year this facility is fully used and frequently operates over capacity.

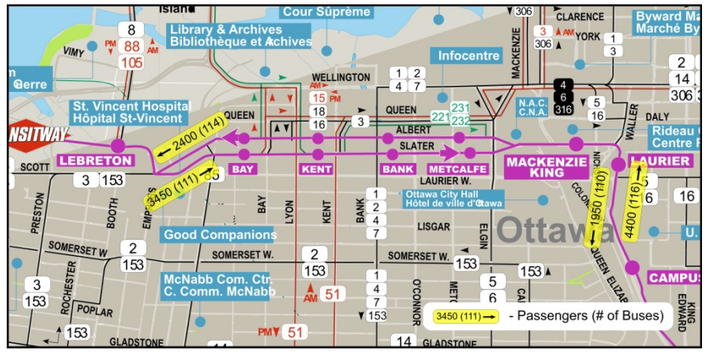
LeBreton Station is located at Booth Street, and is the main transfer point for OC Transpo customers traveling to and from downtown Gatineau via the Chaudière Crossing. There are 68 OC Transpo routes which serve LeBreton Station with 25 terminating there. While in the past LeBreton Station has typically been a transfer point only, the recent opening of the Canadian War Museum and new entertainment venues on this site generate a large number of passengers with LeBreton Station as their destination when these events are being held. LeBreton Station is connected to the City/NCC multi-use pathway system. There are approximately 5,150 daily boardings at LeBreton Station, with 1,000 and 800 boardings in the weekday morning and afternoon peak hour, respectively.

East of LeBreton Station, rapid transit services continue into downtown Ottawa via the Central Area Transitway.

Central Area Transitway

The Central Area Transitway provides rapid transit service to the downtown area and connects to the East and West Transitway corridors to provide seamless service across the downtown. The Central Area Transitway carries the majority of the transit riders in downtown Ottawa in terms of the number of passengers and the number of buses using the corridor, as well as the number of routes. The primary rapid transit services (Routes 94, 95, 96, 97, 98 and 99) use this corridor, as do numerous other local transit routes and virtually all of the peak period and express services connecting suburban communities directly with the downtown. Currently the peak hour, peak direction passenger volume reaches 10,000 customers in the afternoon on the approaches to the Central Area Transitway. Recent peak period ridership counts for the Central Area Transitway are shown in Figure 5-4.

Figure 5-4: Central Area Transitway Ridership and Bus Volumes



Weekday AM Peak Period

Weekday PM Peak Period

Between Empress Avenue (in the west) and Waller Street (in the east), the Central Transitway runs along reserved bus lanes within the Albert Street (westbound) and Slater Street (eastbound) corridors. These roads are currently comprised of three through traffic lanes: one reserved bus lane (in effect from 6:00 a.m. to 6:00 p.m. Monday-Friday) and two lanes for general purpose travel. Curbside parking and loading is provided along both Albert and Slater Streets, located between the sidewalk and reserved bus lane. General purpose traffic must therefore use the reserved bus lane to access the parking/loading area as well access driveways serving buildings along the street, or to make a right-turn at an intersection (where permitted). There are 12 signalized intersections along the Central Area Transitway, which must accommodate pedestrians, cyclists, automobiles, trucks and bus traffic running along and across the Central Area Transitway. East of Waller Street the Central Area Transitway enters a short-section of bus-only roadway, before ending at Laurier Avenue, which is crossed at a signalized intersection.

There are four existing downtown stations along the Central Area Transitway between LeBreton Station and the Rideau Canal. These are; Bay, Kent, Bank, and Metcalfe. An additional bus stop exists east of LeBreton Station, at the intersection of Albert/Empress to serve an adjacent community facility (Good Companions).

The downtown Transitway stations all have similar characteristics, and serve a mix of local and rapid transit services. The stations are located at the curb and generally consist of one or more large bus shelters located behind the sidewalk, with no other amenities provided. Buses tend to arrive together in the peaks and while platforms are designed to accommodate four buses loading simultaneously, the number of passengers often requires the fourth bus to stop a second time to serve customers, which decreases service reliability.

Mackenzie-King Station is located at the south end of the Rideau Centre shopping mall, and is a major downtown transit hub. All of the principal Rapid Transit routes are served at this station, along with the express routes, peak period-only routes and local routes. There is an indoor waiting area attached to the Rideau Centre and the Major-General George R. Pearkes Building (Department of National Defence Headquarters) and the two sides are linked by a pedestrian crosswalk and an underpass between the two buildings. Due to the high density and connections this is one of the busiest stations within the downtown with 19,200 daily boardings and 1,080 and 2,720 boardings in the weekday morning and afternoon peak hour, respectively.

While some local bus routes are served at Mackenzie-King Station (Routes 8, 85, 86 and 87), local transit service is typically accessed on Rideau Street, at the north end of the Rideau Centre. A 24-hour publicly accessible pedestrian connection is provided through the Rideau Centre to connect from Mackenzie King station to the Rideau Street services, where seven local OC Transpo Routes and 25 STO routes currently operate. Late night service (after 1:00 AM) on the rapid transit routes is also provided at this location to better serve late night customers.

Laurier Station serves the northern end of the University of Ottawa campus and provides transfers to local buses serving the Sandy Hill neighbourhood. The station is located on a short section of bus-only roadway, which is four lanes wide to allow buses to pass other buses stopped at the station. A fence has recently been installed between the northbound and southbound lanes to control pedestrian movement across the roadway. Signalized intersections at the north (Waller Street) and south (Laurier Avenue) ends of the station allow pedestrians to cross between the platforms. Despite signage, unauthorized vehicles occasionally enter the Transitway via these intersections.

The station is of a similar design to the other downtown Transitway stations, with the bus stops sharing sidewalk space with pedestrian traffic travelling through the station. The sidewalk along the east side of the station is particularly constrained. New bus shelters have been incorporated into the recently completed University of Ottawa Demarais Building located on the west side of the station.

South of Laurier Station, rapid transit service continues along the East Transitway.

East Transitway

The East Transitway begins at Laurier Avenue and extends east through Hurdman Station to Blair Station and beyond to Orléans. Within the study area it is a two-lane facility with additional passing lanes at Transitway stations. A mix of local, peak express and rapid transit services use the East Transitway. The primary rapid transit services are operated by routes 94, 95, which operate on headways as low as 2 minutes during the peak periods. During the peak period and in the peak direction, approximately 180 buses an hour travel along the East Transitway west of Hurdman Station.

South of Laurier Avenue, the Transitway is located at-grade, between Nicholas Street and the University of Ottawa campus. South of the campus, the Transitway crosses over Mann Avenue and descends to cross under Highway 417 before entering Lees Station. South of Lees Station, the Transitway curves and rises up to cross over the Rideau River before swinging east to enter Hurdman Station, where the Southeast Transitway diverges. East of Hurdman Station, the East Transitway curves to the north and east before crossing over Riverside Drive and then descending to enter Train Station, which is located below-grade in an open cut. Between Train and St. Laurent Station, the Transitway continues in an open cut along the south side of Highway 417 before crossing under Highway 417 and entering St. Laurent Station, which is located on the lower level of a two-level bus terminal (local routes used the upper level). East of St.

Laurent Station the Transitway runs at-grade and generally parallel to the north side of Highway 417 and OR 174 before entering Blair Station. East of Blair Station, the East Transitway continues on to Orléans using shoulder lanes along OR 174. There are seven stations on the East Transitway within the study area.

Campus Station is the primary rapid transit station serving the University of Ottawa. The station also serves the Sandy Hill neighbourhood and development located on the west side of the Rideau Canal, reached by an adjacent pedestrian bridge (Corktown Bridge).

Lees Station serves adjacent high-density residential development and provides for transfers to local bus services on Lees Avenue. Two major cross-town bus services (Routes 101 and 102) enter and depart the East Transitway at Lees Station via bus ramps located north of the station which connect to Lees Avenue and Robinson Avenue.

Hurdman Station is a key transfer point along the existing rapid transit network, located at the junction of the East and Southeast Transitways. Currently 86 individual routes use Hurdman Station, with 50 of them having their terminus at this location. There are 25,000 daily boardings at Hurdman Station; with 3,550 and 2,950 boardings in the weekday morning and afternoon peak hour, respectively. In addition, Hurdman Station also hosts Scotiabank Place Special Events Connexion 400 service, and incorporates an intercity Greyhound Bus stop. There are a number of walk-in passengers both from the apartments and condos in the vicinity and also from the turn-around area just south of the station which acts as a passenger and taxi pick-up/drop-off zone. The station is directly linked to the City/NCC multi-use pathway system and has bike racks on location.

The lay-out of Hurdman Station is long centre-island platform with eastbound buses on the north side and westbound buses on the south side. East of the station there is a bus lay-up/staging area that has space for 22 buses. In the weekday afternoon peak period, this area is fully utilized and over capacity, with additional buses parked around the periphery of the station platform area. A bus access ramp which connects to the signalized Industrial/Riverside intersection and Terminal Avenue is provided east of the station.

Train Station is located adjacent to the main VIA Rail station serving the City of Ottawa. Passengers can connect between rapid transit and inter-city rail services between Ottawa-Toronto and Ottawa-Montreal. The station also serves adjacent office development. A planned pedestrian overpass of Highway 417 will link this station to recreational, commercial and residential land uses located north of the station. A bus access ramp to Tremblay Road is provided east of the station.

St. Laurent Station is a multi-level Transitway station with direct access to the St. Laurent Shopping Centre. The lower level Transitway platform is within a 400m long tunnel that also passes under Highway 417 (the Queensway), with a cross section comprising two lanes in each direction. It is used by Transitway and express buses, while the upper surface level is used by local bus routes. Buses can gain access to the lower Transitway level using the ramps located to the east of the station. There is another access ramp located just east of Train Station although there are no bus routes that currently use it. All the buses on the lower level at St.

Laurent Station also serve Train and Hurdman Stations. Currently 44 individual routes use St. Laurent Station, of which six have their termination point. There are 14,460 daily boardings at St. Laurent Station; with approximately 1,300 and 1,500 boardings in the morning and afternoon peak hours respectively. Platforms are shared on the lower level for Inter-city (Greyhound) and regional buses. The station accommodates 310 bus movements in the morning peak hour and 228 in the afternoon peak hour.

Cyrville Station provides for local walk-in access from adjacent development located north and south of Highway 417. Eight all-day and 23 peak / express bus routes serve this station. No bus routes terminate at this station.

Blair Station is a multi-level Transitway station which acts as a transit hub for local and rapid transit services. Access is provided to an adjacent retail shopping mall (Gloucester Centre), with a pedestrian overpass providing connections to office development located south of OR 174.

Currently 37 individual bus routes use Blair Station, five of which terminate at this location. There are 9200 daily boardings at Blair Station; with approximately 1,000 boardings in each of the weekday morning and afternoon peak hours. The station also accommodates 271 bus movements in the AM and 192 in the PM peak hours. Bus access ramps exist at the east and west ends of the station and a small bus-lay-up area exists adjacent to the local (lower level) bus platforms.

Southeast Transitway

The Southeast Transitway begins at Hurdman Station and travels south to Billings Bridge Plaza, South Keys and the Ottawa Macdonald-Cartier International Airport. It is a two lane two-lane facility with additional passing lanes at Transitway stations. The primary rapid transit service is provided by routes 97, 98 and 99, while a mix of local, peak period and peak express buses provide service between downtown Ottawa and communities in the southeast area of the City of Ottawa.

O-Train

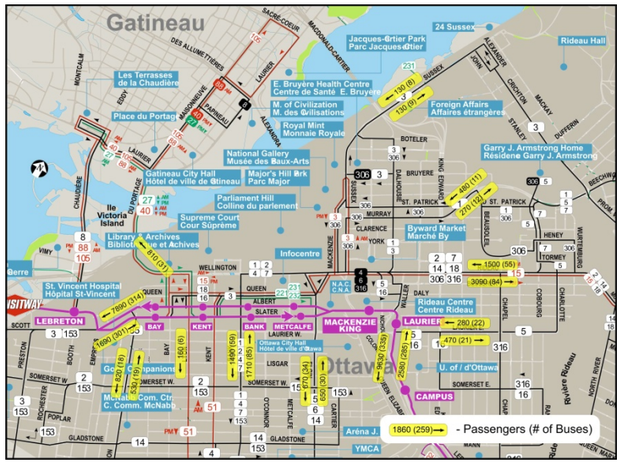
The O-Train corridor begins at Bayview Station in the north and extends a distance of 8 km to Greenboro Station in the south, where a connection with the Southeast Transitway is provided. O-Train service is provided on a 15-minute frequency in the peak periods. The O-Train carries approximately 1,000 and 1,050 passengers in the weekday morning and afternoon peak periods respectively and in excess of 10,000 passengers daily.

5.2.1.1.2. Local Transit Network

Within the study area OC Transpo operates a number of local services using Lyon, Kent, Bank, Elgin, Wellington and Queen Streets to travel through downtown west of the Canal, which then converge at Confederation Square before proceeding onto Rideau Street. From Rideau Street these services disperse onto Sussex, Dalhousie, and Nicholas Streets, or continue east on Rideau Street. Between 40 and 50 buses cross the Rideau Canal on Rideau Street during the peak hour, depending on the time of day and the direction. The number of buses operating on each of the individual streets approaching Rideau Street ranges from as low as 5 to as high as 30 in the peak direction during the peak hour. Figure 5-5 shows recent local route ridership data provided by OC Transpo.

Figure 5-5: OC Transpo Local Route Ridership and Bus Volumes

Weekday AM Peak Period



Weekday PM Peak Period

5.2.1.1.3. Société de transport de l'Outaouais (STO) Transit Services

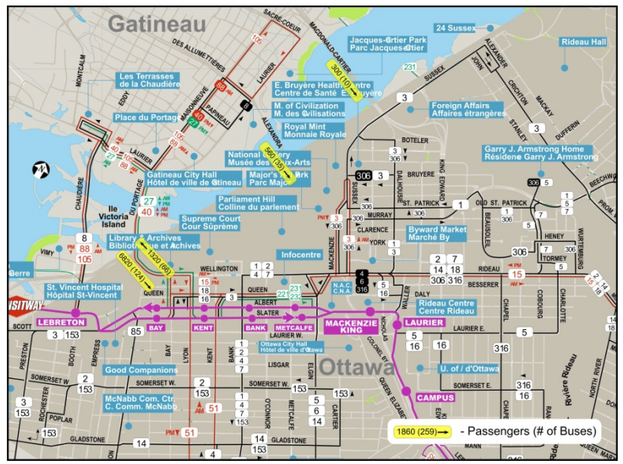
STO provides transit services linking Gatineau with downtown Ottawa. The majority of the STO buses serving Ottawa mix with general purpose traffic on Wellington Street and use the dedicated bus lanes located on Rideau Street between King Edward Avenue and Sussex Drive, mixed with OC Transpo service. In-service STO buses cross the Ottawa River on either the Alexandra or the Portage Bridges. Those services crossing on the Alexandra Bridge generally follow a one-way route using St. Patrick/Murray, King Edward, Rideau and Wellington Streets to Portage Bridge. Services crossing on the Portage Bridge use Wellington and Rideau Streets before turning around on Cumberland Street, George Street and King Edward Avenue to return back to the Portage Bridge via Rideau and Wellington Streets. Some of the buses on peak period STO services dead-head to the start of their route or return back to Gatineau via the Macdonald-Cartier Bridge and King Edward Avenue. STO service in the Wellington/Rideau corridor is approximately 120 buses in the peak direction during the weekday afternoon peak hour and carries as many as 4,400 passengers.

There are ongoing issues of STO bus layover in the Lowertown area. The City of Ottawa has recently constructed a small lay-by area for buses on King Edward Avenue to accommodate parked buses east of the downtown prior to the commencement of afternoon service.

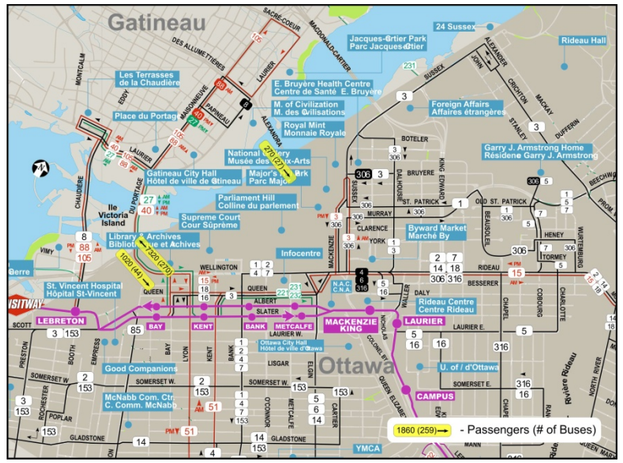
STO will shortly commence the construction of an exclusive BRT system (Rapibus) serving the City of Gatineau, with connections to Ottawa's central area. The effect of this service will be an increase in the number of STO buses entering into Downtown Ottawa over time. Recognizing the need to coordinate rapid transit services on either side of the Ottawa River, the NCC has initiated a strategic planning study to assess options for the integration of rapid transit services in the core areas of National Capital region.

Figure 5-6 summarizes STO inbound and outbound ridership data as provided by STO for the weekday peak periods.

Figure 5-6: STO Ridership and Bus Volumes



Weekday AM Peak Period



Weekday PM Peak Period

5.2.1.1.4. Regional/Inter-city Bus Services

Regional transit services are offered between downtown Ottawa and towns and villages on the outskirts of Ottawa through a number of privately owned companies. The regional transit routes (500 series) typically use portions of the Transitway network to access the downtown and travel through one or more of Bayview, LeBreton and Hurdman Stations, providing transfer points allowing those riders to reach other destinations. There are currently 22 trips from the regional transit network that use the Central Area Transitway.

- There are 13/11 trips on Route 530 in the weekday AM and PM Peak from/to Clarence Creek/Rockland to Ottawa/Gatineau operated by Leduc Bus Lines. These buses operate with a 10-15 minute frequency.
- Leduc Bus Line service also operates Route 520 Leduc Bus Line from Hawkesbury with one bus per day in the peak direction through the downtown ending at Tunney's Pasture.

- Lalonde Bus Lines have service on Route 535 which offers 3 trips from Bourget to Ottawa/Gatineau with roughly a 20 minute frequency.
- 417 Bus Line Ltd. offers service to/from Ottawa for the communities of Casselman, Embrun, Limoges, Crysler, Bourget, Cheney and Vars. Route 539 has one bus per peak period. There are also 3 bus routes (with one bus each) that use Laurier Avenue (Routes 536, 537 and 538).
- Route 526 from Russell and Route 525 from Limoges are operated by Bergeron Bus Lines.
- Delaney Bus Lines operates out of Cornwall on the Central Area Transitway with one bus for Route 515.
- Howard Bus Service operates Route 509 from Merrickville.
- Kemptville Transportation Services have service from Kemptville on Routes 542 and 543.
- First Student from Winchester operates Route 540 and Transport Thom operates Route 500 from Arnprior, Route 502 from Pakenham/Almonte and Route 503 from Perth.

Greyhound Canada operates Inter-City coach services between Ottawa and Montreal which use portions of the existing Transitway between Laurier and St. Laurent Stations, stopping upon request to pick-up or drop-off passengers at intermediate stations.

5.2.1.1.5. Accessible Transit

The majority of OC Transpo regular routes are served by low floor accessible buses. Currently 91% of all trips are accessible trips using low floor buses. The remaining high floor buses will be phased out as the fleet is updated.

Para Transpo is a door to door transportation service for persons with disabilities, which prevent them from being able to use OC Transpo's regular, fixed-route transit service. Para Transpo vehicles can use portions of the Transitway network to reach their destinations while avoiding traffic congestion on the road network.

5.2.1.1.6 Peak Period Transit Conditions

Peak period transit conditions within the study area are influenced in large part by existing traffic conditions on the road network, particularly within the downtown area, and the large volume of ridership destined to or originating at major stop locations along the Central Area Transitway.

Transitway operations within the downtown area (between LeBreton and Laurier Station) are characterized by crowded stops, substantial pedestrian activity and a steady stream of buses. These operations can influence the convenience, ride quality and comfort, frequency and reliability of the service.

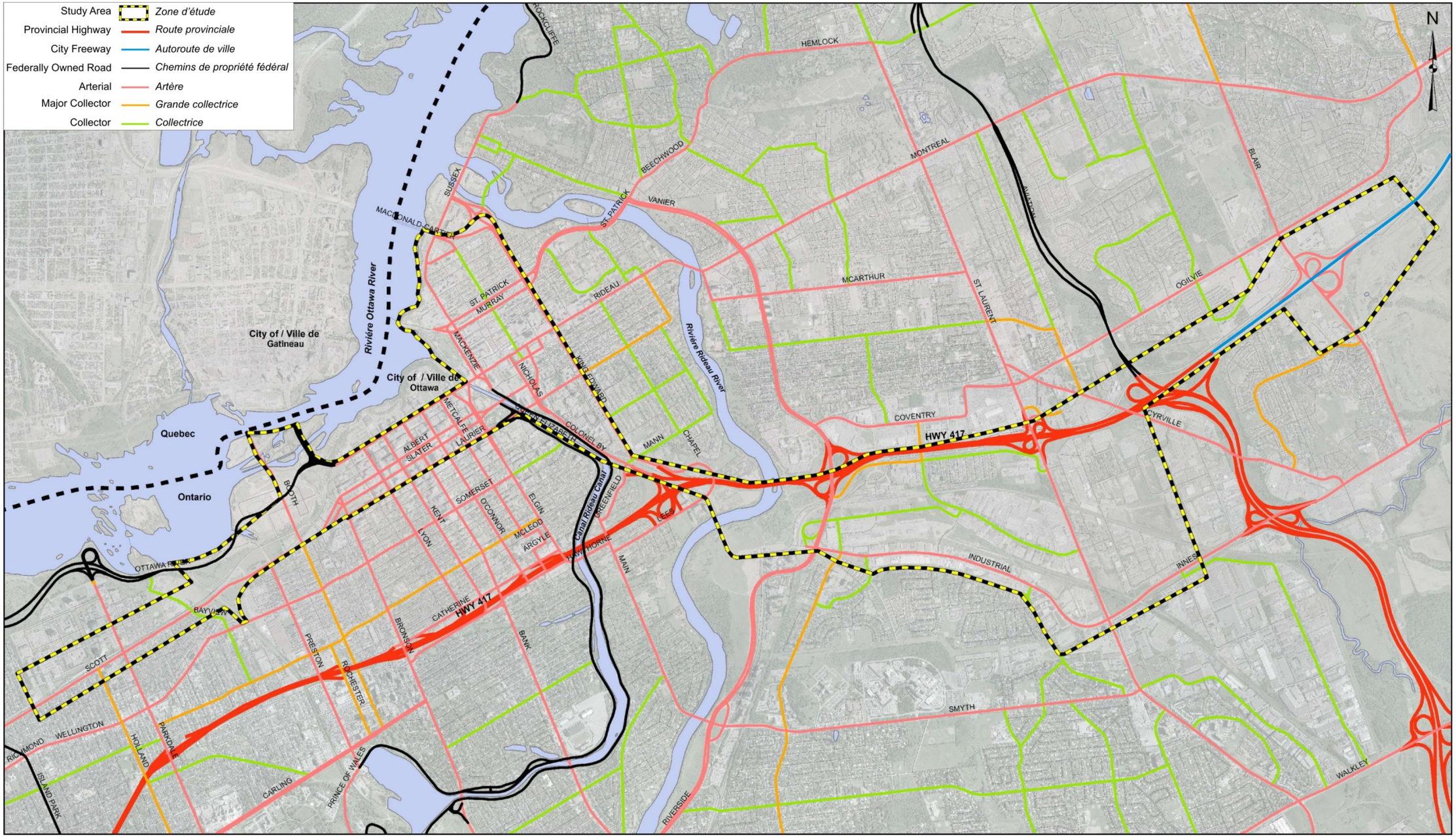
The critical time of day for bus operating capacity on the Central Area Transitway is the afternoon peak period, and the critical direction is eastbound on Slater Street and the Mackenzie King Bridge where bus volumes are the highest. The most congested point on Slater Street is the stop east of Metcalfe Street. Delays on this portion of the downtown Transitway affect not only customers heading east at that time, but also customers across the entire transit system as buses delayed on their eastbound trips from the downtown result in delays on subsequent trips on to other parts of the system. This has been recognized for a number of years, and since 2004, ridership growth east from the downtown has been managed by the judicious assignment of high-capacity articulated buses and scheduling of trips at this critical time. Based on experience the scheduled level of service has been kept at or below 180 bus trips per hour in order to maintain service reliability. Since September 2008, this 180 bus trip per hour service cap has been in place in both eastbound and westbound directions.

The morning is less of a restriction because most passengers are stepping off buses by all doors and walking directly away from the bus towards their destination. Few passengers board buses on the Central Area Transitway during the morning peak. In the afternoon, most passengers are arriving at station platforms, joining the group of customers already there, waiting for a bus on a particular route, moving along the platform to the point where their bus stops, and largely boarding by the front door and paying their fare or showing their pass (Boarding by the rear doors is permitted for pass holders on articulated buses only). More buses can therefore be accommodated through the downtown in the weekday morning peak period than in the weekday afternoon peak period.

5.2.1.2 Road Network

The project study area is served by an extensive road network consisting of federal parkways and bridges, a major provincial highway (Highway 417 - The Queensway) and a grid of City arterial, collector and local roadways. The study area road network supports a wide range of functions including automobile travel, goods movement, transit, cycling, pedestrians, servicing and ceremonial activities. The study area road network is illustrated in Figure 5-7.

Figure 5-7: Road Network



5.2.1.2.1 Roadway Characteristics

Existing roadway right-of-ways within the study area are typically at the maximum width identified in the City's Official Plan (OP), with little or no opportunity to provide for additional roadway capacity. Table 5-1 provides a listing (categorized by section) of major study area roadways, their classification, right-of-way, number of lanes, assumed directional capacity, and existing traffic volumes. The information used to populate the table was obtained by referring to the City of Ottawa's OP and available intersection turning movement data.

Table 5-1: Study Area Roadway Characteristics

Road Name	Segment	Classification	ROW Protection (m)	# of lanes / Dir	Directional Capacity (veh/h)	AM Peak Hour Volume (veh/h)		PM Peak Hour Volume (veh/h)	
						NB / EB	SB / WB	NB / EB	SB / WB
Albert Street	*Empress – Bronson*	Arterial	40	2WB, 1EB	1600 WB, 800 EB	1350	950	1050	1500
Albert Street	*Bronson – Mackenzie King*	Arterial	Variable	2WB+Bus Lane	1600	-	600	-	750
Alexandra Bridge	*West of Mackenzie*	NCC Roadway	-	1	1000	350	275	600	325
Aviation Parkway	*Ogilvie - Highway 417*	NCC Roadway	-	2	2000	600	350	450	800
Bank Street	*Wellington – Laurier*	Arterial	20	1	800	225	250	250	400
Bayswater Avenue	*Somerset - Scott*	Collector	23	1	600	150	250	350	200
Belfast Road	*North of Tremblay*	Major Collector		1	800	350	575	625	450
	South of Tremblay	Collector		1	800				
Blair Road	*Ogilvie - OR174*	Arterial	44.5	2	1800	1800	900	1600	1800
	OR174 - Innes	Arterial	37.5	2/1	1200	800	900	1100	1100
Booth Street	*Chaudière Bridge – LeBreton*	Arterial	30	2	1600	875	1050	1350	1000
	LeBreton – Fleet	Arterial	32	2	1600	925	925	1350	750
	Fleet – Aqueduct	Arterial	30	2	1600				
	Aqueduct – Wellington	Arterial	28	2	1600	800	1100	1200	700
Boteler Street	*Sussex – Dalhousie*	Arterial	20	1	1000	75	950	75	800
Bronson Avenue	*South of Albert*	Arterial	23	2	1200	550	175	575	450
Colonel By Drive	*South of Wellington*	NCC Roadway	-	2	1825	1250	175	1825	225
Cumberland Avenue	*Besserer – Rideau*	Arterial	20	2NB	1000	350		650	
Cyrville Road	*Ogilvie - Innes*	Arterial	37.5	1	800	500	700	800	600
Dalhousie Street	*Besserer – Boteler*	Collector	23	1	600	350	550	500	550
Elgin Street	*Wellington – Laurier*	Arterial	40	2	1200	900	775	900	1000
Greenfield Avenue	*West of King Edward*	Arterial	23	1	800	400	375	375	425
Highway 417	*Hurdman Bridge*	MTO Highway	-	4	7000				
	Split - Innes	MTO Highway	-	2	4,400	2300	4300	3700	2800
Holland Avenue	*Tunney's Pasture - Wellington*	Major Collector	26	1	800	500	300	500	400
Kent Street	*Wellington – Laurier*	Arterial	20	3NB	1600	1000	-	1300	-
King Edward Avenue	*Macdonald-Cartier Bridge – Rideau*	Arterial	40	3	3400	1300	3350	3100	1625
	Rideau – Laurier	Arterial	20	2	1200	450	1000	850	750
	Laurier – Mann	Arterial	20	1	1000	600	1000	700	1000
	Mann – Highway 417	Arterial	26	1	800				
Laurier Avenue	*Bronson – Elgin*	Arterial	20	1	1000	550	550	600	700
	Elgin – Nicholas	Arterial	26	2	1600	550	1150	1175	800

Road Name	Segment	Classification	ROW Protection (m)	# of lanes / Dir	Directional Capacity (veh/h)	AM Peak Hour Volume (veh/h)		PM Peak Hour Volume (veh/h)	
						NB / EB	SB / WB	NB / EB	SB / WB
	Nicholas – King Edward	Arterial	23	1	750	525	575	725	350
Lees Avenue	*Main to Highway 417*	Arterial	23	1	800	150	400	150	350
Lyon Street	*Wellington – Laurier*	Arterial	20	3SB	1600	-	1000	-	1000
Macdonald Cartier Bridge	*North of Sussex*	NCC Roadway	-	3	4800	1300	3000	3100	1500
Mackenzie avenue	*Wellington – St. Patrick*	Arterial	20	2SB	1600	-	1250	-	950
Mackenzie-King Bridge	*Elgin – Waller*	Arterial	20	1+Bus Lane	800	500	400	525	300
Metcalfe Street	*Wellington – Laurier*	Arterial	20	3NB	1600	775	-	650	-
Murray Avenue	*Alexandra Bridge – King Edward*	Arterial	20	2EB	1000	450	-	750	-
Nicholas Street	*Rideau – Laurier*	Arterial	20	2SB	1600	1150	100	1475	175
	Laurier – Highway 417	Arterial	26	2	2000	1000	950	1075	1525
O'Connor Street	*Wellington – Laurier*	Arterial	20	3SB	1600	-	775	-	1200
Ogilvie Road	*St. Laurent – Blair*	Arterial	44.5	2	2000	700	1800	1800	1000
Ottawa River Parkway	*West of Portage Bridge*	NCC Parkway	-	2	2000	1800	750	1100	1300
OR174	*Highway 417 – Blair*	City Freeway	Existing	2	4,000	2,600	3,900	3,900	2,800
Parkdale Avenue	*Ottawa River Parkway - Wellington*	Major Collector	26	1	800	350	525	675	500
Portage Avenue	*North of Wellington*	NCC Roadway	-	2+HOV	2400	1425	1725	2200	1050
Queen Street	*Bronson – Elgin*	Local	-	1	600	400	425	525	250
Rideau Street	*Sussex – King Edward*	Arterial	30	1+Bus Lane	800	500	800	550	500
Riverside Drive	*Highway 417 – Industrial*	Arterial	44.5	3	2700	2350	1875	2700	1800
Scott Street	*Island Park - Holland*	Arterial	26	2	1200	900	425	500	700
	Holland - Bayview	Arterial	26	2	1200	800	500	900	800
Slater Street	*Empress – Bronson*	Arterial	40	2EB +Bus Lane	1200	450	-	550	-
	Bronson – Mackenzie King	Arterial	Variable	2EB +Bus Lane	1200	850	-	800	-
Sparks Street	*Lyon – Elgin*	Local (Pedestrian Mall)	-	n/a	n/a				
St. Laurent Avenue	*Coventry – Highway 417*	Arterial	44.5	3	2000	1350	1800	1800	1900
	Highway 417 - Innes	Arterial	44.5	2	1600	1200	1300	1500	1400
St. Patrick Street	*Alexandra Bridge – King Edward*	Arterial	20	2WB	1000	-	800	-	500
Sussex Drive	*Wellington – King Edward*	Arterial	20	2NB	1700	1050	950	1700	600
Terminal Avenue	*West of Riverside – Belfast*	Collector	Existing	1	600				
Transitway	*Dominion – Bayview*	Transitway	Existing	Bus Lane	n/a	75	50	50	50
	Bayview – MacKenzie King	Transitway	Existing	Bus Lane	n/a				
	MacKenzie King- St. Laurent	Transitway	Existing	Bus Lane	n/a	200	175	175	175
	St. Laurent - Blair	Transitway	Existing	Bus Lane	n/a				
Tremblay Road	*East of Riverside*	Major Collector	Existing	2	800	400	200	500	350
Waller Street	*Rideau – Nicholas*	Arterial	23	1/2	1200	800	300	1200	200
Wellington Street	*East of Portage Bridge*	Arterial	26	2	2500	2500	1150	1050	2450
Wellington/Albert	*Preston - Empress*	Arterial	32	2	1000	1000	900	800	900

5.2.1.2.2 Peak Period Traffic Conditions

At the strategic level, screenline analyses of traffic volumes and capacities are considered an appropriate indicator of traffic performance. Classification and occupancy data were obtained from the City of Ottawa for screenlines surrounding the study area. Table 5-2 provides a summary of the assumed directional capacity, existing traffic volumes (passenger car units), and maximum volume-to-capacity ratio.

Table 5-2: Screenline Volumes and Capacities

Screenline Name and Composition		Directional Screenline Capacity (pcu)	Peak Hour Volume AM(PM) (pcu)		Maximum v/c
			Inbound	Outbound	
Interprovincial					
Screenline 3	Chaudiere Bridge Portage Bridge	3,925	3,525 (2,175)	1,950 (3,725)	0.95
Screenline 4	Alexandria Bridge MacDonald-Cartier	5,725	5,250 (2,950)	2,350 (4,950)	0.92
Rideau River					
Screenline 19	Bronson / Dunbar Bank / Billings Smyth / McIlraith	5,670	5,250 (2,950)	2,350 (4,950)	0.93
Screenline 32	Queensway / Hurdman	7,350	7,475 (5,500)	5,375 (5,850)	1.0+
Screenline 33	Sussex St. Patrick Cummings Bridge Minto Bridges	4,900	2,850 (3,150)	3,150 (3,650)	0.75
CPR					
Screenline 27	Carling Prince of Wales Colonel By	3,280	2,150 (2,450)	1,700 (2,875)	0.88
Screenline 28	Highway 417	8,400	6,225 (4,000)	4,625 (5,050)	0.75
Screenline 29	Ottawa River Parkway	5720	2,625 (2,700)	1,875 (3,075)	0.54
	Scott Somerset Gladstone				
Smyth Hydro					
Screenline 54	Riverside St. Laurent Alta Vista Russell	4700	3,100 (4,950)	4,600 (4,175)	1.0+
Greens Creek					
Screenline 16	Innes Montreal OR174 Rockcliffe	11,080	9,575 (3,725)	2,550 (8,125)	0.86

The majority of the screenlines that are in close proximity to the study area are currently operating near or at capacity during the peak hours.

Traffic conditions within the study area during peak periods (typically weekday morning and afternoon commuting hours) are very busy, with many intersections operating at or near practical capacity. Due to a combination of the volume of traffic, high turning volumes, bus volumes and high pedestrian traffic, many intersections are congested and it can take more than one "green" phase to advance through an intersection. A detailed operational assessment of the key signalized intersections has not been completed as part of this assessment of baseline conditions.

5.2.1.2.3 Future Traffic Volume Projections

The high-level assessment of infrastructure needs is based primarily upon volume projections generated using the TRANS Travel Demand forecasting Model. The Model reflects population and employment growth for the City of Ottawa at the year 2031 planning horizon. Table 5-3 provides a summary of the growth in transit person trips and automobile person trips at the same strategic screenlines indentified previously. These modelled data demonstrate the heavy reliance on transit in future years to accommodate the expected growth in total person trips between now and the year 2031.

Table 5-3: Projected Person Trips by Screenline

	Transit Person Trips			Automobile Person Trips			Total Person Trips		
	Base	2031	Growth	Base	2031	Growth	Base	2031	Growth
#2,3,4: Interprovincial	5100 / 5900	11,800 / 11,100	+132% / +88%	14,200 / 13,300	15,800 / 15,500	+11% / +17%	19,300 / 19,200	27,600 / 26,600	+43% / +39%
#19/32: Rideau River Central / Queensway	11,650 0 / 9950	16,200 / 15,800	+39% / +59%	14,000 / 14,700	14,900 / 15,100	+7% / +3%	25,650 / 24,650	31,100 / 30,900	+21% / +25%
#27/28/29: CPR	9200 / 7800	17,500 / 17,100	+90% / +119%	16,000 / 16,400	16,700 / 16,100	+4% / +2%	25,200 / 24,200	34,200 / 33,200	+44% / +37%
#33: Rideau River North	4300 / 3600	5700 / 5300	+33% / +47%	3600 / 4100	4600 / 4900	+28% / +20%	7900 / 7700	10,300 / 10,200	+30% / +35%
#16: Green's Creek	6000 / 5100	8400 / 7800	+40% / +53%	11,300 / 10,800	11,100 / 10,200	-2% / -6%	17,300 / 15,900	19,500 / 18,000	+13% / +13%

5.2.1.2.4 Community Neighbourhood Traffic Considerations

Broad community concerns with respect to congestion on the downtown road network and the social, economic and environmental impacts of automobile/truck traffic in the downtown area are well documented. Areas within and adjacent to the study area (Lowertown, Sandy Hill, Centretown) have historically had issues with spill-over and cut-through traffic using local roadways to bypass congestion and avoid turning restrictions along the arterial road network. Traffic calming has been implemented along several roadways in these communities in order to reduce traffic speeds and the volume of cut-through traffic.

The impact from the large volume of truck traffic using the King Edward/Rideau/Waller/Nicholas corridor to travel between Ontario and Québec is an ongoing issue within the study area. The current *Interprovincial Crossings Environmental Assessment* study is examining options for the construction of an

additional roadway crossing between Ottawa and Gatineau in order to provide additional interprovincial traffic capacity and an alternate truck route which avoids downtown streets.

5.2.1.3 Pedestrian/Cycling Network

The pedestrian, cycling and recreational pathway network is illustrated in Figure 5-8, and described below.

5.2.1.3.1 Pedestrian Network

Most roads within the study area are provided with sidewalks on at least one side, apart from Highway 417, on which pedestrians are forbidden. Nicholas Street, south of Laurier Avenue also has no sidewalks as it functions as an extension of the Highway 417 on/off ramps, with no development fronting onto this segment of the roadway.

Sparks Street between Lyon and Elgin, and William Street between Rideau and George have been converted to pedestrian-only thoroughfares. Dedicated pedestrian access also exists through the Rideau Centre shopping mall (publically accessible 20 hours/day) and Freiman Mall. The study area also contains many other pedestrian-oriented spaces such as squares, plazas and courtyards, which support civic and ceremonial activities. The City's multi-use pathway network provides additional walking facilities through the study area, primarily alongside the Rideau Canal and Ottawa River.

Pedestrian activity within the study area varies significantly. Areas with the highest concentration of pedestrian demand include the University of Ottawa campus, Byward Market, Rideau Street and the downtown area (during office hours). During special events, extremely large crowds are accommodated within the study area. Up to 500,000 people can attend Canada Day festivities in the area surrounding Parliament Hill.

5.2.1.3.2 Cycling Network

Although the vast majority of the existing roads in the vicinity of the study Corridor do not have specific facilities for cyclists, a number have delineated bicycle lanes or widened curb lanes to accommodate cyclists. The NCC and City of Ottawa also provide a network of multi-use pathways within the study area which cater to commuter and recreational cycling traffic. Primary cycling activity occurs along the Ottawa and Rideau Rivers, and Rideau Canal.

The City's new Cycling Plan identifies a network of cycling routes which would see implementation of dedicated cycling facilities on major roadways within the study area.

5.2.1.4. Railways

There are two active rail corridors located within the study area. In the west end of the study area is a north-south rail corridor which historically provided a rail link between Ottawa and Gatineau via the Prince of Wales railway bridge. This connection has been severed at the south approach to the bridge and no rail service has operated across the Ottawa River for several years. This rail corridor is now owned by the City of Ottawa (Capital Railway) and currently used by OC Transpo to provide diesel LRT service (O-Train) between Bayview and Greenboro Stations as described previously. Future rapid transit plans identify expanded rapid transit (LRT) service in this corridor from Bayview to the Riverside South community. A future connection to Gatineau via the Prince of Wales Bridge is also being protected and will be studied in more detailed as a part of the NCC's *Interprovincial Rapid Transit Integration Strategic Planning Study*.

In the east end of the study area, VIA Rail operates passenger rail service into and out of Ottawa using the NCC Train Station located east of Riverside Drive on Tremblay Road. This rail corridor is located adjacent (south/east) to the existing Transitway alignment between Terminal Avenue and Train Station. This rail line carries all Ottawa-Toronto VIA Rail service, and those Ottawa-Montréal trains originating from or destined to Fallowfield Station. There is no scheduled freight traffic currently using this segment of the rail corridor.

5.2.1.5. Navigable Waterways

Within the study area, navigable waterways include the Rideau Canal and Rideau River.

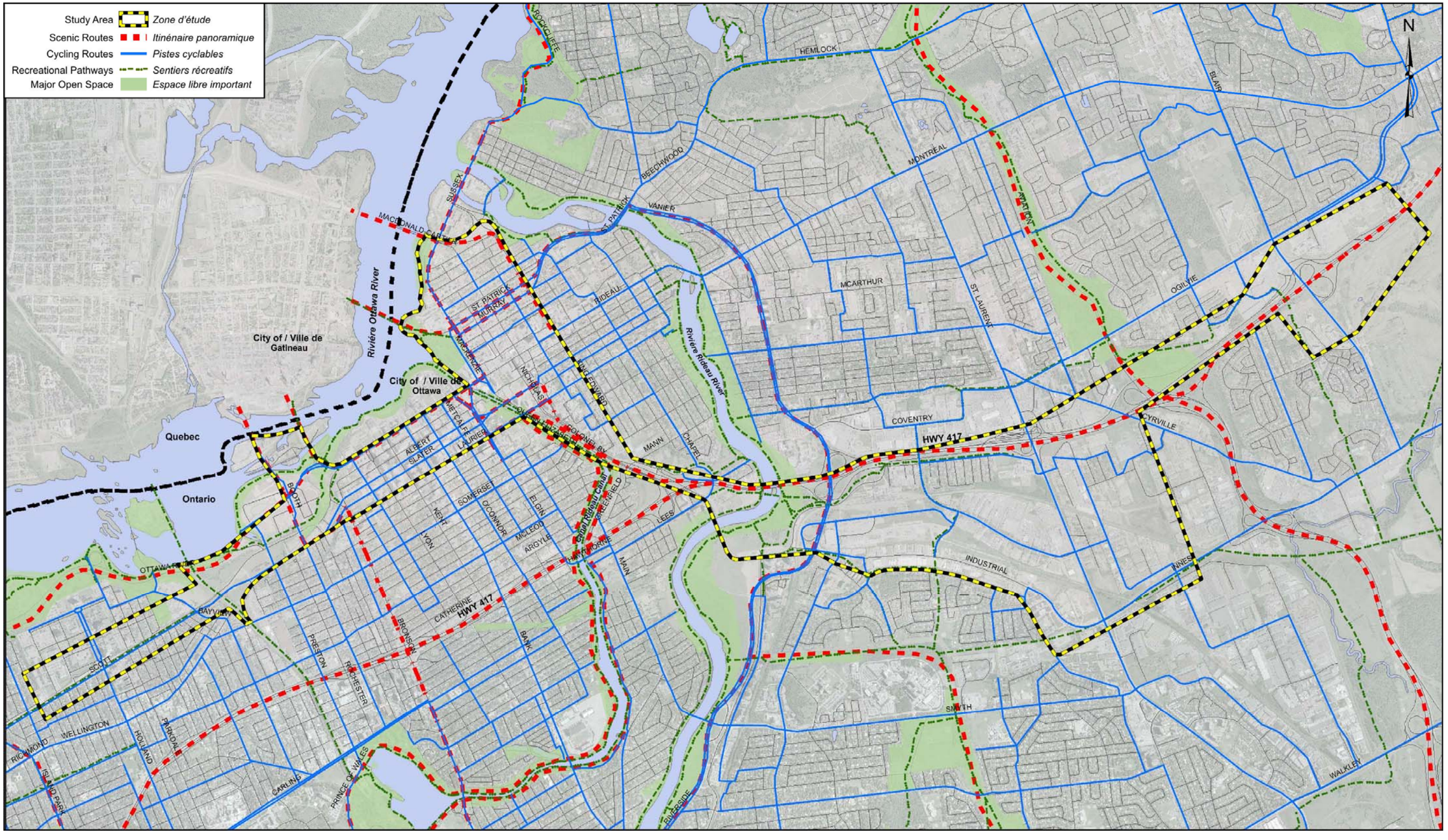
The Rideau Canal sees a significant amount of recreational boating activity during its open season (generally May to October), with approximately 2200 boats using the Canal per year through the study area. For approximately 10-12 weeks during mid-winter, the Rideau Canal transforms from a navigable channel to one of the world's longest skating rinks, with over one million skaters using the Canal for recreation and commuting. The annual Winterlude festival is held for three weeks in February, attracting a significant amount of visitors to the Canal area.

The Rideau River hosts water-based activities such as flat water canoeing, kayaking, and sportfishing in the summer and fall periods.

5.2.2 Land Use Environment

Land uses within the DOTT project study area are governed by a complex policy framework comprised of Federal, Provincial and Municipal land use policies. Likewise, the pattern of existing and planned land uses is very diverse, including Downtown Ottawa, redevelopment sites, major rivers, open space corridors, employment areas, major transportation infrastructure, and portions of existing neighbourhoods.

Figure 5-8: Pedestrian/Cycling Network



This section outlines the policy framework and discusses those policies and regulations that directly affect the planning and development of lands and infrastructure in the study area. This is followed by a description of the existing land use and ownership patterns, major land uses, community facilities, and real estate market conditions.

5.2.2.1 Federal Land Use Policy

The Federal policy context consists of the NCC's *Plan for Canada's Capital*. The objectives of that plan are further elaborated in other plans including the *Canada's Core Area Sector Plan*, and the *Sparks Street* and *LeBreton Flats Area Plans.*

The *Plan for Canada's Capital* (PFCC) influences the entire study area. The Planning Principles described in the PFCC signals the Federal government's understanding of the City of Ottawa's planning directions and the need to jointly cooperate in the planning and development of the National Capital Region. The Plan seeks to assist in the improvement of the City's quality of life by fostering healthy communities and facilitating the provision of services and facilities to meet current and future needs.

The following are key areas of federal interest associated with the DOTT Study as expressed in the NCC's plans:

- The area encompassing LeBreton Flats, the downtown core, and the Byward Market is designated as part of the Capital Core Area. This area is intended as the "preferred location for headquarters activities of most federal departments and agencies as well as non-governmental organisations" (Section 3.1).
- The majority of federal employees in the National Capital Region work in the Core Area.
- The Parliamentary and Judicial Precinct, LeBreton Flats, Confederation Boulevard, the Victoria and Chaudiere Islands are major aspects of the Core Area in relation to the DOTT study.
- Colonel By Drive, Queen Elizabeth Drive, and the Ottawa River Parkway are Capital Parkways linking the Core Area to urban areas to the south and west.
- The Parkways are located within or adjacent to Capital Urban Greenspace settings, including Rideau Canal corridor, and the Ottawa River shoreline, and each are flanked with important links of the Capital Pathway system.
- Highway 417 is designated as a Capital Arrival route and the Vanier Parkway / Riverside Drive corridor is a designated Scenic Entry route.
- Various Landmark Buildings (federal) are located in the Capital Core Area as are Capital Parks, including Confederation Park, Major Hill Park, and the Commons at LeBreton Flats.
- National Capital Institutions include the National Arts Centre, the Canadian War Museum, and the National Gallery of Canada.
- Outside of the Capital Core Area, important federal interests include the Ottawa Train Station, the RCMP Headquarters and Tunney's Pasture.

5.2.2.2 Provincial Land Use Policy

The Provincial Policy Statement (PPS) came into effect in 2005. The PPS contains policies relating to matters of Provincial interest associated with land use planning and development, including infrastructure such as public transit. The policy thrusts of the PPS are in building strong communities, making wise use and management of resources, and protecting health and safety of Ontario residents.

The following are key matters of provincial interest associated with the DOTT study as expressed in the PPS in regards to building strong communities:

- Necessary infrastructure to enable healthy, liveable and safe communities are to be made available to meet current and projected needs;
- Land use densities and mixes are to be appropriate for and support infrastructure (including public transit) that is planned or available;
- Intensification and redevelopment are to be promoted where it can be accommodated with existing or planned infrastructure;
- A coordinated, integrated and comprehensive approach should be used when planning for infrastructure and other planning matters;
- Infrastructure should be provided in a coordinated, efficient and cost-effective manner to accommodate projected needs;
- The efficient use of existing infrastructure should be optimized before developing new infrastructure;
- Infrastructure should be strategically located to support emergency services;
- Transportation systems (including public transit) should be safe and energy efficient;
- Transportation systems should maintain connectivity within and among various modes, including connections across jurisdictional boundaries;
- Land use patterns, densities and mixes should be promoted that minimize the length and number of vehicle trips and that support plans for public transit and other alternative transportation modes;
- Efficient, cost-effective and reliable multi-modal transportation systems should be provided and integrated with those of adjacent systems of other jurisdictions;
- Corridors and rights-of-way for transit and infrastructure facilities should be planned for and protected to meet current and projected needs;
- The planning of major facilities (including public transit) should be appropriately designed and located to prevent adverse effects from odour, noise, other contaminants, and to minimize risk to public health and safety;

- Long term economic prosperity should be supported by maintaining and enhancing the vitality and viability of downtowns;
- Energy efficiency and improved air quality is to be supported through promotion of public transit and alternative transportation modes; and
- Major employment and travel-intensive uses are to be well served by public transit.

Section 2.0 of the PPS contains policies that seek to protect natural heritage, water, agricultural, mineral, and cultural heritage and archaeological resources. Policies restrict development or site alteration within or adjacent to defined natural heritage resources such as significant wetlands, woodlands, valleylands, wildlife habitat, and areas of natural and scientific interest (ANSIs). Section 3.0 of the PPS contains policies that seek to reduce the potential for public cost or risk from natural or man-made hazards. Site alteration is controlled in hazardous lands including those areas impacted by flooding hazards and/or erosion hazards. If the DOTT project results in site alteration of any of these features or hazards, the applicable policies of the PPS will apply.

Section 3.2.2 of the PPS also requires that contaminated sites be remediated as necessary prior to any "activity on the site associated with the proposed use" so that there are no adverse effects as defined in the *Environmental Protection Act*.

5.2.2.3 Municipal Land Use Policy

The municipal policy and regulatory context affecting the study area is established in the City of Ottawa Official Plan, including Secondary Plans and Community Design Plans, as well as the applicable Zoning By-Law(s).

City of Ottawa Official Plan

The City of Ottawa's OP was adopted by City Council in May 2003. The OP sets out a growth management strategy that emphasizes urban intensification and increased mixed-use development with a focus on rapid transit as a means to address travel demand through efficient land use development. The OP emphasizes the development of compact, integrated land uses to encourage a shift from automobile travel to walking, cycling and public transit use. In June 2009, City Council adopted changes to the Official Plan as a result of their legislated 5-year review. The amended Official Plan continues to focus on intensification in which Rapid Transit plays a major role.

The study area is affected by a large number of City of Ottawa Official Plan land use designations as shown on Figure 5-9.

Table 5-4 provides a matrix of the primary land use designations that influence development within the six sections of the study corridor.

Notwithstanding these designations and corresponding policy sections, Policy 10 under Section 3.1 entitled Generally Permitted Uses, states that "municipal services and facilities are permitted in all land use designations on Schedules A and B, subject to the policies set out in this and other applicable sections of the Plan". Exceptions to this provision wherein generally permitted uses are excluded include the following designations: Natural Environment Areas; Significant Wetlands; Sand and Gravel and Limestone Resource Areas; Flood Plains; and on Unstable Slopes.

Table 5-4: Applicable Official Plan Land Use Designations by Segment

Official Plan Designations	Tunney's Pasture	Bayview	LeBreton	Downtown	Lees	Hurdman	Train	St. Laurent	Cyrville	Blair
Schedule B Urban Policy Plan										
Central Area		✓	✓	✓						
Employment Area								✓	✓	
General Urban Area	✓	✓			✓			✓	✓	✓
Arterial Mainstreet								✓		
Mixed Use Centre	✓	✓			✓	✓	✓	✓	✓	✓
Major Open Space			✓	✓		✓			✓	
Greenbelt Rural										✓
Natural Environment Area										✓

Urban Policy Plan – Schedule B

The study area is covered by eight (8) land use designations with corresponding policy direction as follows. Mixed Use Centre, General Urban Area, and Central Area policies influence land use planning for the majority of the corridor.

Central Area

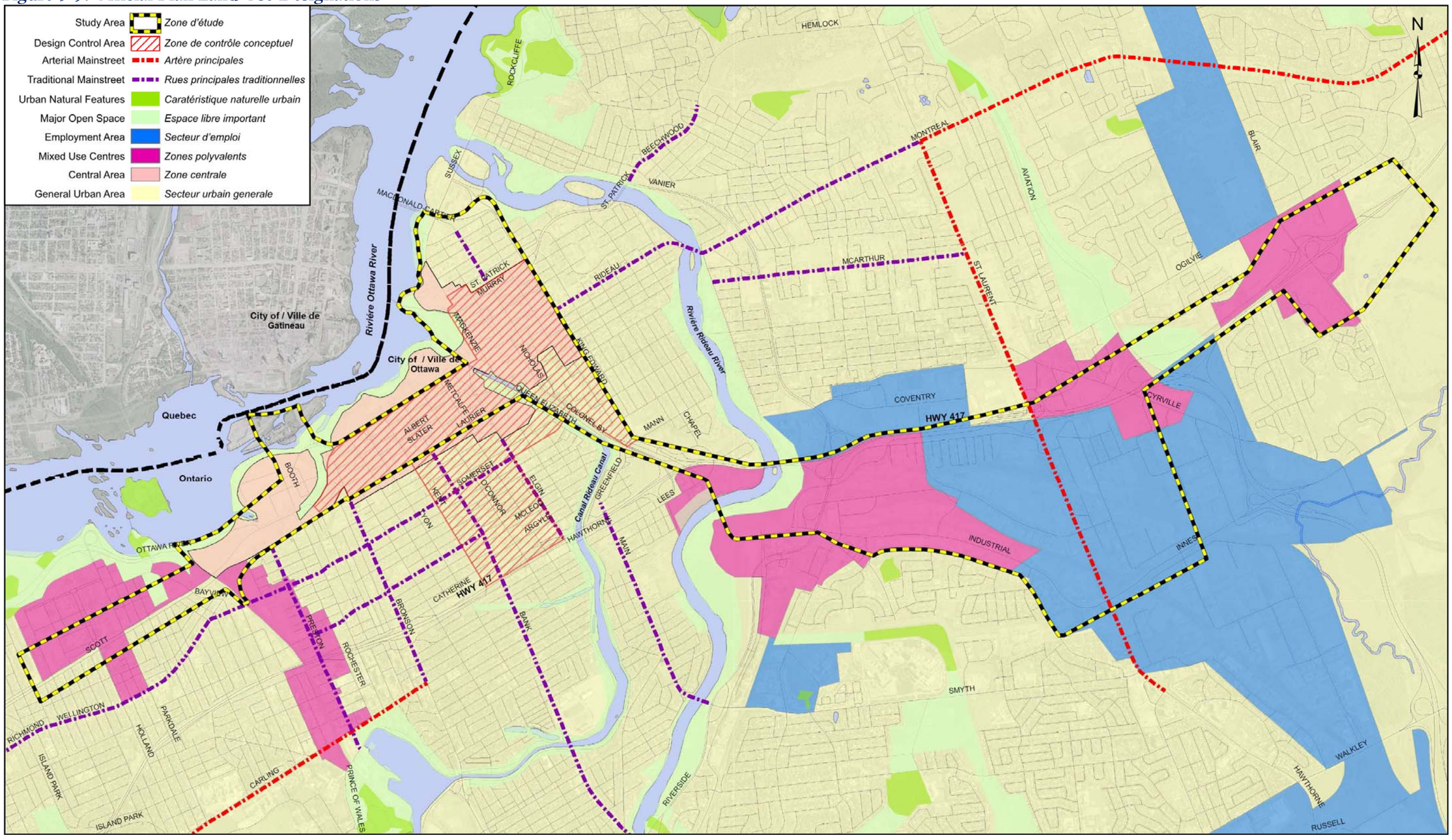
The Official Plan identifies the *Central Area* as the "economic and cultural heart of the city, and the symbolic heart of the nation, based on its unique combination of employment, government, retail, housing, entertainment and cultural activities". Planning for this area must ensure that walking, cycling and transit have priority. This designation covers the downtown core portion of the study area as well as LeBreton Flats, Rideau Street, and the Byward Market.

Within this area, the Rideau Centre is a major shopping centre that also meets the Official Plan definition as a Major Community Facility. Major Community Facilities service the entire City and possibly beyond, require convenient access and high levels of municipal services and transportation, and typically occupy large sites. The Official Plan requires that any new Major Urban Facilities must be located at a rapid transit station.

Arterial Mainstreet

The Arterial Mainstreet designation is intended to provide adjoining neighbourhoods with a range of daily goods and services, and may also provide a more specialized function that may draw others from beyond the adjacent neighbourhood. The plan encourages intensification along mainstreets. The City's intent is that arterial mainstreets will achieve a more compact, mixed-use and pedestrian oriented development pattern over time. St. Laurent Boulevard is the only street with this designation within the study area. The character of and individual street is realized through the preparation of a Community Design Plan.

Figure 5-9: Official Plan Land Use Designations



Employment Area

One of the objectives of the Official Plan is to ensure over the long term, sufficient areas of land are preserved primarily for the places of business and economic activity. Employment lands provide for a wide range of economic activities and jobs. Employment areas are designated to enable a variety of functions that would otherwise not be ideally located in commercial or residential areas namely industrial uses and other non-compatible uses due to noise, lights and shift-work operation. The proposed LRT Maintenance and Storage Facility is located within this designation.

General Urban Area

This designation permits all types and densities of housing as well as employment, shopping, service, industrial, cultural, leisure, parks, entertainment and institutional uses. To conserve the local nature of neighbourhoods, where uses are proposed that are intended to serve wider parts of the city, such as transit, these should be directed to the edges of neighbourhoods and situated along higher-order roads where the needs of these facilities can be more easily met and controlled. This designation covers only a small portion of the study area, being the University of Ottawa, St. Laurent Station and the Nicholas Street corridor to the south of it. The University and St. Laurent Shopping Centre meet the definition of a Major Community Facility.

Mixed Use Centre

These centres are limited in number and are strategically located on the city's rapid-transit network and adjacent to major roads. Transit supportive land uses such as offices, high schools, hotels, retail uses and high and medium density residential development are encouraged to locate in these areas. The planning for these areas must consistently ensure that the centres are transit-oriented and that the functional integration of transit and surrounding uses is achieved.

Mixed Use Centres exist at the west end of the study area (the Bayview, City Centre and Preston Street areas), and at the east end of the study area (the University of Ottawa 200 Lees Campus, Hurdman Station, and the Train Lands area). Significant redevelopment potential exists in these areas.

Major Open Space

The purpose of this designation is to protect the larger open spaces in the City that are available for public use and enjoyment. This includes large parks, open space corridors, parkway corridors, and corridors reserved for rapid transit and major roads. These spaces are typically in public ownership. In the study area, this designation covers lands in the corridors along the Rideau River, Rideau Canal, Ottawa River and in the vicinity of the Aviation Parkway. Public transit is a permitted land use in Major Open Spaces where they, "maintain the overall quality and character of the open space, protect natural and cultural features, and enhance public access and opportunities for leisure use" (Section 3.3.1.3.c).

Downtown Ottawa Design Strategy

Downtown Ottawa was the subject of planning studies that were approved and implemented as an Official Plan Amendment in 2007. One key aspect of that study was the boundary delineation of the "downtown" area and the various precincts that form it. These precincts include the Bank Street Corridor, Business Precinct, ByWard Market Precinct, Central Area Precinct, Centretown East Precinct, Downtown West Precinct, Retail/Arts & Theatre Precinct, and the University Precinct. A plan for the escarpment areas (west of Bronson Avenue) has also been prepared.

Another key aspect of the strategy is the enactment of a "design control area" with associated approval requirements for new development and redevelopment in Downtown Ottawa.

Secondary Plans and Community Design Plans

The City of Ottawa Official Plan is supported by a collection of Secondary Plans, Site Specific Policies, and Community Design Plans. The plans contain complementary and more detailed policy direction for given areas and neighbourhoods in the City. The study area is influenced by the policies of the Central Area Secondary Plan and the Sandy Hill Secondary Plan, and two Community Design Plans. There are no Site Specific Policies affecting the study area.

Central Area Secondary Plan

The Central Area Secondary Plan provides detailed planning guidance for specific sub-areas in the Central Area of the City. The sub-areas include the Core, the Parliamentary Precinct, the Byward Market, the Rideau/Congress Centre, the Canal, Lowertown, Sandy Hill West, Uppertown, LeBreton Flats, Rideau Street, Sparks Street, and Bank Street. Polices for the sub-areas highlight the importance of rapid transit improvements and potential for integration with future development.

Sandy Hill Secondary Plan

The Sandy Hill Secondary Plan provides detailed planning guidance for the Sandy Hill Community. The area is generally bounded by Rideau Street to the north, Nicholas Street to the west, the Rideau River to the east, and Hwy 417 to the south. This area includes the University of Ottawa. The main thrust of the plan is to preserve and enhance Sandy Hill as a stable, historic residential neighbourhood together with the integrated development of the University. An emphasis on public transportation and bicycle and pedestrian networks is made. Through-auto traffic is to be directed around the neighbourhood rather than into it.

Community Design Plans

A number of Community Design Plan are currently underway centred around Ottawa's character streets. Those within the study area include:

- Old Ottawa East Community Design Plan (University of Ottawa's Lees Avenue Campus);
- Rideau Street Urban Design Study; and the
- Wellington Street Community Design Plan

These Community Design Plans will provide a vision and a means to implement that vision in ways that will satisfy both

community aspirations and the relevant strategic growth management policies of the Official Plan.

Bayview/Somerset Area Secondary Study

Bayview Yard and surrounding area are designated as a mixed-used centre. City Council's growth management strategy is to direct new development to appropriate locations within the designated urban area, including mixed-use centers. The development concept recommended by the Bayview/Somerset Area Secondary Planning Study was approved by City Council on January 12, 2005. The approved concept proposes approximately 1,470 residential units (with the civic use at the south end of the Bayview Yard) or 1,590 residential units (with a mixed-use development at the south end of the Bayview Yard), of which 25 percent are intended to be affordable housing units in accordance with the Official Plan policies.

City of Ottawa Zoning By-Law

The City of Ottawa adopted a new comprehensive Zoning By-Law 2008-250 on June 25, 2008. This ZBL replaces the various Zoning By-Laws of the former municipalities now forming the City of Ottawa, including City of Ottawa Zoning By-Law 93-98 that regulated lands within the DOTT study area. The zoning map is provided on Figure 5-10.

In accordance with Section 87, a rapid transit network is permitted in all zones, and the provisions of the Zoning By-Law do not apply to this use. In addition to land uses that may be permitted in the applicable zone, several specified uses are permitted within a rapid transit station, including: bank machine, convenience store, personal service business, fast food restaurant, take-out restaurant, retail store, and service or repair shop. In addition, land uses in the vicinity of rapid transit stations (up to 800m) may be eligible for reductions in the rate of required parking in accordance with the provisions of Section 101. A wide range of zones apply to the study area. These zones generally correspond to the policy direction of the City of Ottawa Official Plan.

Tunney's Pasture is zoned Mixed Use Centre Zone. A range of zones cover the adjacent lands to the transitway between Tunney's Pasture and Bayview stations from higher density residential zones, to institutional, general mixed-use to open space and leisure zones and industrial zones. The lands surrounding the corridor between the Bayview Station and LeBreton Station have a combination of zones, including higher density residential zones. The majority of the designated Central Area is zoned Mixed Use Downtown. The neighbourhood to the north of the Byward Market has a range of zones including Residential Fourth Density, Parks and Open Space, and Traditional Mainstreet.

The University of Ottawa is zoned Major Institutional on both the main campus and the 200 Lees Campus. The Ottawa Train Station is zoned as Ground Transportation Facility, with portions of the Train Lands zoned Mixed Use Centre in keeping with the corresponding Official Plan designation. The Parks and Open Space zones are found along the Rideau Canal and Ottawa River corridors, as well as a vast area to the east of Rideau River within the study area.

It is important to note that some lands adjacent to the banks of Rideau River and Ottawa River are subject to a Flood Plain Hazard overlay. Notwithstanding the exemption provided by Section 87 of the ZBL, Flood Plain lands are also regulated by the Conservation Authorities Act. The regulations of that act, and the policies of the PPS, apply to those lands.

St. Laurent Shopping Centre is zoned General Mixed-Use while lands to the east are zoned for light industrial and the lands to the west, up to and including Cyrville Station, are zoned Mixed-Use Centre. The lands to the east of Cyrville Station are zoned Open Space and Mixed-Use Centre up to and including Blair Station.

The proposed site for the LRT Maintenance and Storage Facility is located within an existing industrial/commercial area and is currently zoned General Industrial. The site is surrounded by a Light Industrial Zone to the east and north east, medium density residential to the north and northwest, mixed-use centre to the southwest and general industrial zone to the south.

5.2.2.4 Existing Land Uses

The study area consists of a wide diversity of land uses, including significant residential, employment, government, cultural, institutional, and recreational uses. The intensity and diversity of land use varies considerably from one end of the study area to the other. Figure 5-11 illustrates the diversity of land use, and Figure 5-12 illustrates major land uses.

A brief description of the existing land uses is provided below for each segment of the DOTT study area.

Tunney's Pasture

Tunney's Pasture is a designated Federal Node in the *Plan for Canada's Capital* and currently home to a number of Federal departments. The office complex is currently undergoing a master planning process that will guide redevelopment of the 48.6 hectare (120-acre) site, which is home to 10,000 public servants. Being the current proposed terminus of the proposed DOTT project, the campus's integration with transit will be an important aspect of the master planning process. Tunney's Pasture is bordered on the west by low-density residential and to the east by medium density residential.

Figure 5-10: City of Ottawa Zoning By-Law Map

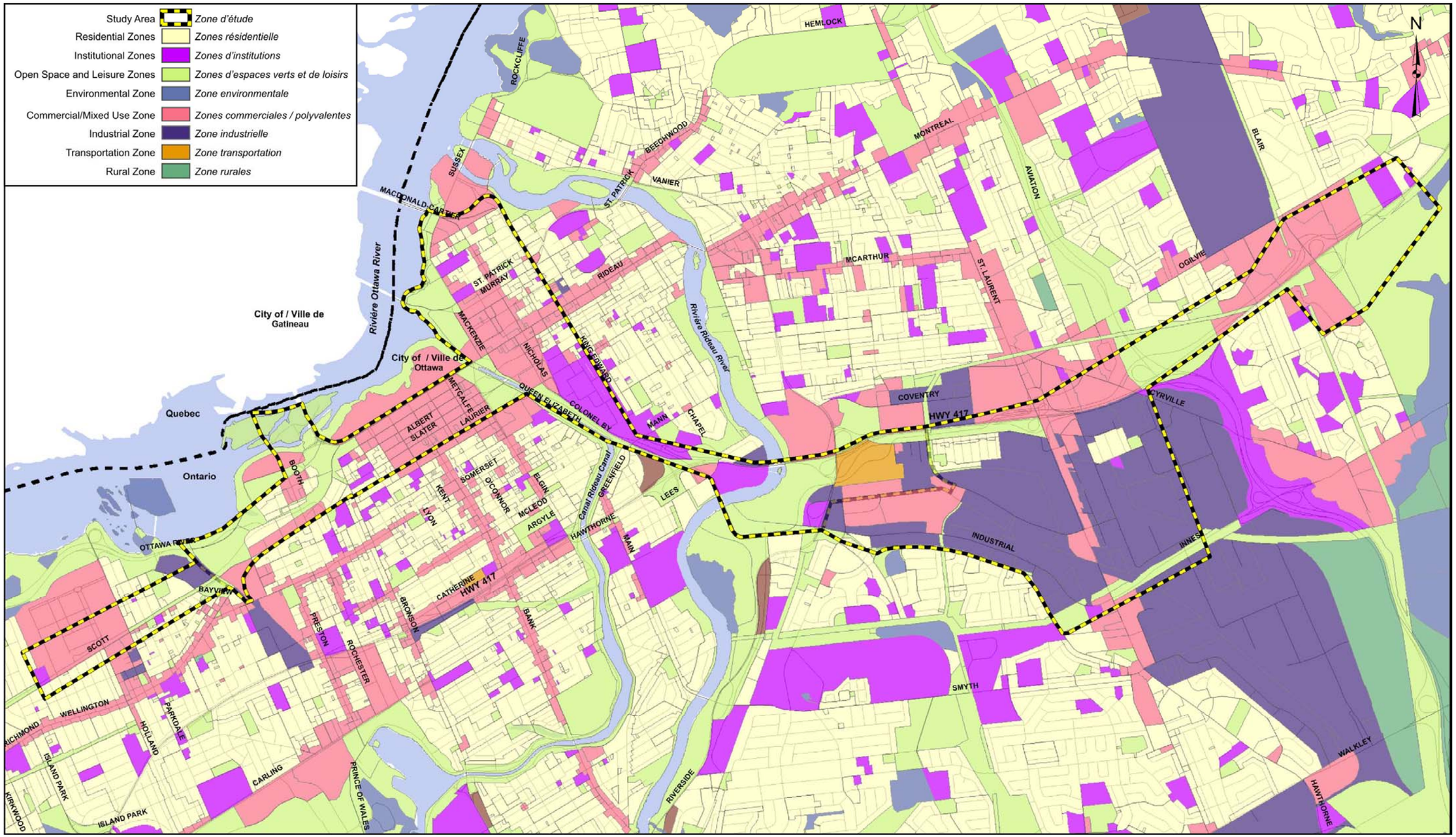


Figure 5-11: Existing Land Use

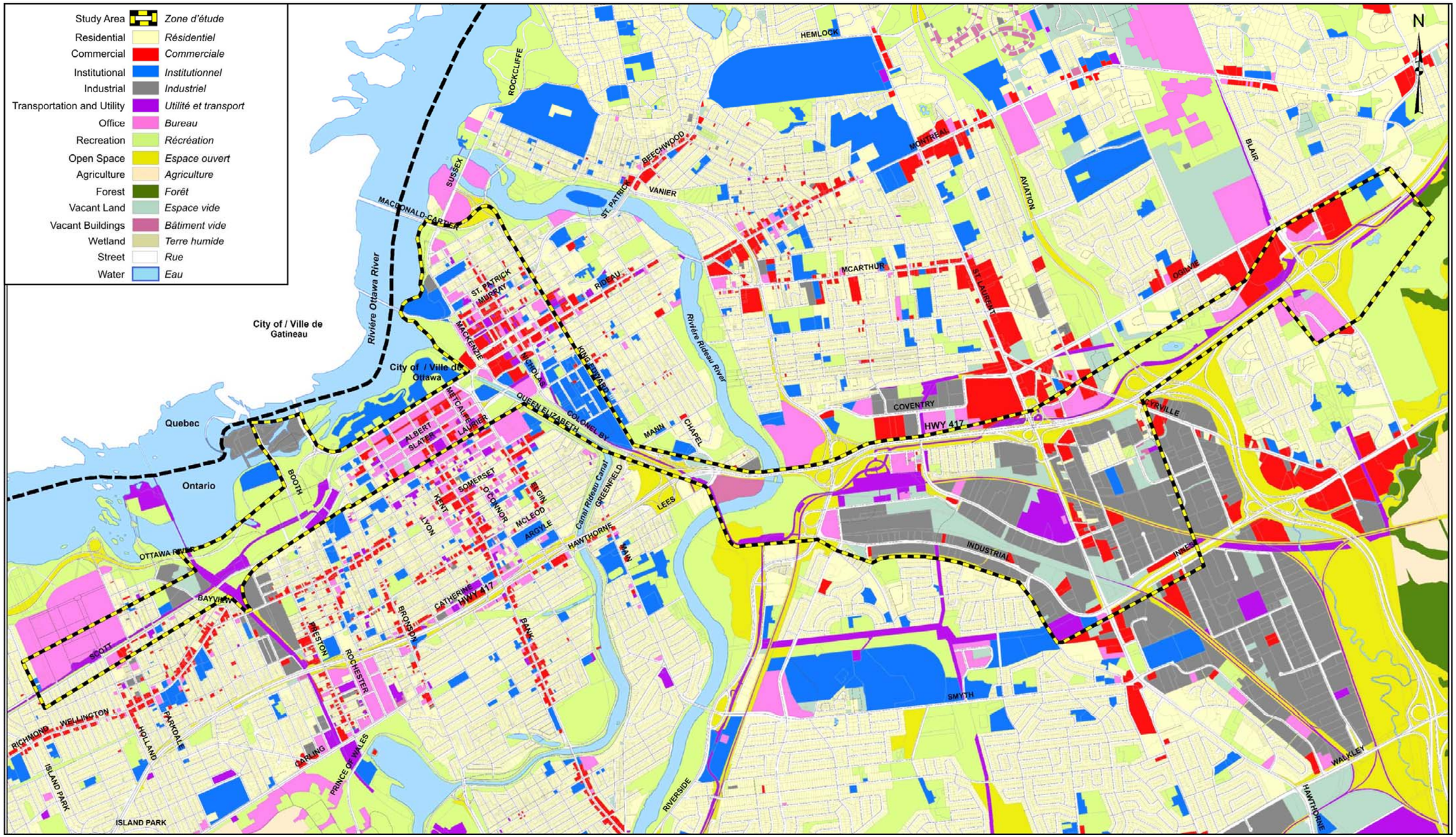
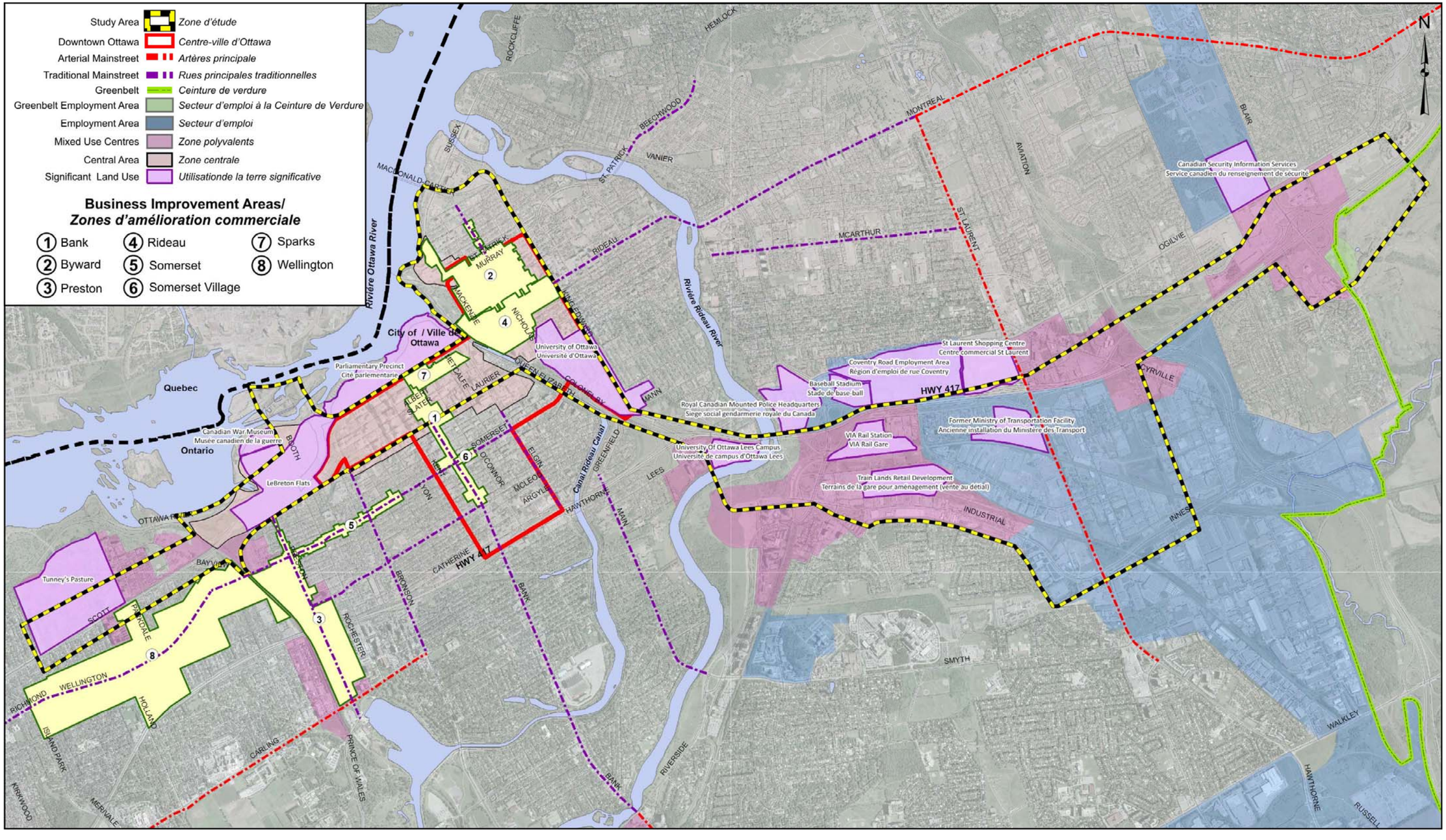


Figure 5-12: Major Employment and Business Improvement Areas



Bayview
The Bayview area is situated at and adjacent to the west of LeBreton Flats. The Bayview area has been the subject of various planning studies that respond to the area's location adjacent to the O-Train line and the opportunity for intensive redevelopment. Much of the lands are currently vacant or underutilized but are anticipated to be redeveloped with medium to high density mixed land uses that are integrated with rapid transit stations.

The Hintonburg and Mechanicsville communities lie to the west of this area, and the Preston Street and Somerset areas lie to the south. The emerging LeBreton Flats area forms part of the study area to the east.

LeBreton
The LeBreton Flats area lies to the east of the Bayview Area within the DOTT study area. It is undergoing redevelopment in accordance with the NCC's plans for a new urban community with a mixture of land uses. The plans provide for up to 4,500 dwelling units, 90,000 m^2 of office space, and 20,000 m^2 of retail space. The 40,000 m^2 Canadian War Museum and its adjacent open spaces along the Ottawa River was the first phase of development, having opened in 2005. Other developments are now proceeding in a phased manner.

The LeBreton Flats community is framed within an open space setting that includes the Ottawa River Parkway and Ottawa River Pathway. A large central park, the Common, will be a central component of the community. This will abut LeBreton Boulevard, a major road through the community.

The Ottawa River area lies to the north of LeBreton Flats. This area includes the Victoria and Chaudière Islands and Chaudière Falls and is referred to in the NCC's Core Area Sector Plan as the former "industrial waterfront" of the Cities of Ottawa and Gatineau. Although industrial uses predominate, the existing character is expected to be replaced with uses more befitting their geographic setting within the Nation's capital.

The Portage Bridge runs along the east side of this area, and the Booth Street Bridge runs along its west side. The Ottawa River and the City of Gatineau lie to the north.

Downtown
As described earlier, Downtown Ottawa was the subject of a Downtown Ottawa Urban Design Strategy that was approved in 2007. Uses in the "downtown" section of the DOTT study area are predominately high density, high rise offices and hotels. A significant amount of retail and service uses are located at street level, with additional amounts at one-level below-grade and one level above-grade.

The Parliamentary and Judicial Precinct is adjacent to the downtown area, north of Wellington Street. This large federally owned area accommodates Canada's Parliament Building and other important federal institutions. The area is planned in accordance with the NCC's *Capital Core Area Sector Plan*.

The blocks east of Elgin Street, west of the Rideau Canal, accommodate a range of major public facilities of three levels of government. These include the City of Ottawa City Hall, the Provincial Court House, and the National Arts Centre.

Many buildings in downtown Ottawa have parking structures, both below-grade and above-grade. A few surface parking lots continue to exist, although these lots are prime redevelopment sites that are zoned to accommodate high density buildings.

North and east of the downtown core is the historic ByWard Market, Rideau Street, the Rideau Centre, and the Congress Centre. The ByWard Market is Ottawa's cultural and entertainment centre and is recognized as part of Downtown Ottawa. This area accommodates the historic ByWard Market (food and crafts market), as well as many restaurants, bars, nightclubs, and small retail shops. Rideau Street is also a historic mainstreet in this area and is an important transit street. The overall area also includes residential uses and has experienced a recent surge in activity in the construction of high density residential uses. The Rideau Centre is planned for a major redevelopment while the site of the former Congress Centre is currently being redeveloped as the new Ottawa Convention Centre scheduled to open in April 2011.

The Lowertown area lies to the north of the ByWard Market. This is an established residential area with a range of housing types and ages and many buildings with historical significance. The north end of Dalhousie Street has a mainstreet function, with street oriented retail and service uses. A few City parks are located within the community, and riverside open spaces lie adjacent to it.

Campus
The University area includes the main campus of the University of Ottawa, the Rideau Canal, and the Nicholas/Transitway corridor. The University is developing according to its Master Plan which is being updated. Efforts have been made to "pedestrianize" the interior of the campus and to improve connectivity to the adjacent transitway station.

The Corkstown Bridge over the Rideau Canal connects the university campus to Centretown. The Sandy Hill community lies to the east of the campus. The Rideau Canal zone has been designated a UNECSO World Heritage Site. It is situated within a federally owned open space and parkway corridor that includes Colonel By Drive and Queen Elizabeth Drive, and associated recreational paths.

Lees
A node of high density residential uses exists to the west and south of the Lees station. The University of Ottawa owns the former Lees Campus of Algonquin College, located on the

northwest side of the Rideau River, at the Lees Station. This site has the potential for redevelopment.

The City has identified lands in this area as underutilized. These lands include the right-of-ways associated with the Transitway, Nicholas Street, and connecting ramps to Hwy 417, as well as other vacant sites such as the lot on Robinson Avenue utilized by the City as a temporary snow disposal facility. These lands have been the subject of an ongoing research by the City as part of the *Nicholas Mann Gateway* study.

Hurdman

The Hurdman area includes those lands on either side of the Rideau River in the vicinity of the East Transitway and Highway 417. There is an abundance of urban land to the north and west of the Hurdman Station that is candidate for redevelopment. Much of that land is owned by the NCC, is publicly accessible, and is currently used for passive recreation purposes. Some higher density residential development has occurred to the south of the station, along Riverside Drive. The Alta Vista community lies to the southeast.

Train Station

The Ottawa Train Station area lies to the east of Riverside Drive and to the south of Hwy 417 and the Transitway which runs along its the south side. The Ottawa Train Station at 200 Tremblay Road is operated by Via Rail Canada, as the City's only passenger rail service provider. Some vacant and underutilized industrial lands lie to the south of the rail line, north of Terminal Avenue. The Ottawa Train Lands is a recently developed major retail development that lies on the south side of Terminal Avenue.

A mix of low density residential uses and employment uses are adjacent to the study area to the east. The RCMP Headquarters, the City's baseball stadium, and the Hampton Inn hotel complex lies to the north of the study area, on the north side of Hwy 417. Other retail and employment uses lie to the east of that, along Coventry Road.

St. Laurent

St. Laurent Shopping Centre is a regional scale shopping centre that is presently integrated with the existing BRT transit station. To the west of the station, in the designated mixed-use centre is a mixture of medium profile offices uses, hotel and motel businesses and other low density commercial uses.

Cyrville

Cyrville Station is the western extent of the Cyrville Mixed-Use Centre located immediately adjacent to the north side of the 417. Lands east of Cyrville Station, associated with the Aviation Parkway are designated open space and currently do not contain any recreational facilities. Beyond the existing office development, some higher density residential development is located north of the station between Cyrville Road and Ogilvie Road. A mixture of industrial and smaller commercial businesses are located on the south side of the 417 along and south of Cyrville Drive.

Blair

The existing Blair Station is currently integrated to the Gloucester Centre, a community Shopping Centre. While contained in the Blair-174 mixed-use centre, the station is largely surrounded by lower density retail immediately adjacent to the corridor to the north, with medium density residential beyond, and a small complex of higher density office development on the east side of Blair Road on the north. An enclosed pedestrian overpass of Road 174 provides direct access to the station from the office complex located on the south side of the highway. An existing federal facility also exists on the north side of Ogilvie Road across from the Gloucester Centre.

5.2.2.4.1 Land Ownership

Figure 5-13 illustrates the pattern of land ownership in the study area, together with a table that provides a breakdown of land ownership by land area. The information is provided by the City of Ottawa's geographic information systems data base.

The data reports that 293 ha (29%) of the total 1,025 ha DOTT study area is owned by the City of Ottawa. This is explained by the large amount of land used as public streets. The NCC owns 157.87 ha (15%), including large acreages in the Bayview area, LeBreton area, and Hurdman areas. There exists 45 ha (4%) of other Federal lands. Private lands comprise 428 ha (41%) of the study area. 84 ha (8%) are Provincially-owned, most of which is the Hwy 417 corridor. Water comprises 16 ha (4%) of the area, including the bed and shore of portions of the Ottawa River, Rideau River, and Rideau Canal that form part of the study area. A small amount of land, 16 ha (2%) is described as "Other undetermined Public Ownership". Most of these are associated with roadways.

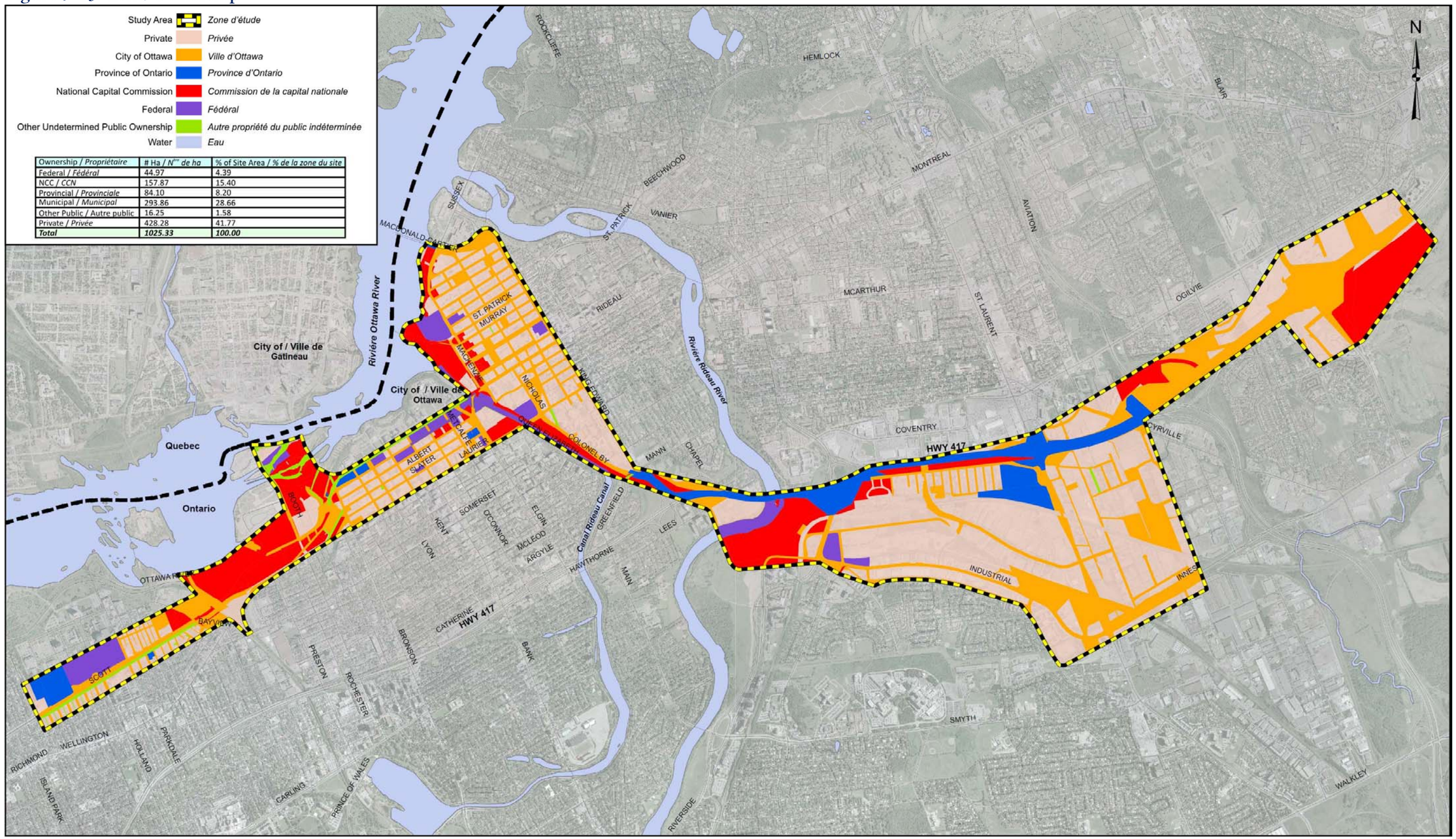
5.2.2.5 Vacant/Redevelopment

While most of the developable land within the study area has been built-out, there exists the potential for the DOTT project to encourage redevelopment in proximity to future rapid transit stations. Redevelopment in proximity to new rapid transit stations which follows the principles of transit-oriented development will assist in meeting City OP goals and objectives with respect to intensification and transit modal split.

Significant redevelopment potential exists at the western end of the study area surrounding the existing Tunney's Pasture, Bayview and LeBreton Transitway Stations. The City's ongoing *Escarpment Area Planning Study* envisages extending redevelopment to the east in order to integrate the LeBreton area with downtown Ottawa.

Within the downtown area, there are a limited number of vacant parcels remaining which could support significant redevelopment. Many of those currently have development applications in play, and are only awaiting to secure a major tenant before proceeding. Significant sites in the downtown with redevelopment potential include:

Figure 5-13: Land Ownership



Ownership / *Propriétaire*	# Ha / *N^mes de ha*	% of Site Area / *% de la zone du site*
Federal / *Fédéral*	44.97	4.39
NCC / *CCN*	157.87	15.40
Provincial / *Provinciale*	84.10	8.20
Municipal / *Municipal*	293.86	28.66
Other Public / Autre public	16.25	1.58
Private / *Privée*	428.28	41.77
Total	***1025.33***	***100.00***

- The north and south sides of Slater Street, west of Bay Street (Former Ottawa Technical High School)
- The northeast corner of the Albert/Kent intersection
- The north side of Slater Street between Bank and O'Connor Streets
- The northwest corner of the Slater/Metcalfe intersection
- The south side of Slater Street, west of Bank Street
- A parcel located between Slater Street and Albert Street, west of Elgin Street
- The south side of Rideau Street, east of the Rideau Centre shopping mall

East and south of the downtown, the University of Ottawa campus contains several parking lots and open spaces which could be redeveloped for university-related purposes. The University of Ottawa also owns a large parcel of land located on the south side of Lees Avenue, east of the Lees Transitway Station (former Algonquin College site). Two smaller redevelopment sites exist adjacent to Lees Station, along the north side of Lees Avenue.

There are several parcels of land in the vicinity of Hurdman Station which could be redeveloped, although there are significant environmental concerns associated with portions of these lands.

There are opportunities to redevelop vacant and underutilized lands south of the VIA Rail Station, along the north side of Terminal Avenue. The emerging "Train Yards" retail area also has the potential for future redevelopment as a Mixed-Use Centre. To the north of the Via Rail Station, the RCMP National Headquarters and lands along the south side of Coventry Road contain the potential for future redevelopment.

St. Laurent Shopping Centre has recently submitted plans for a major expansion consisting of both retail and office uses to the northwest of the existing mall, which is connected directly into St. Laurent Station. To the south of St. Laurent Station, a parcel of land formerly occupied by provincial (MTO) buildings has been acquired by Public Works and Government Services Canada, who are planning a major mixed-use development with a potential pedestrian bridge across Highway 417 to provide a direct connection into St. Laurent Station.

Lands adjacent to Cyrville Station have potential for significant intensification on existing surface parking lots within the Queensway Corporate Centre. A new office building is currently under construction at the northwest corner of the intersection of Labelle Street and Cyrville Road. Future phases of the "Place des Gouverneurs" residential development located immediately adjacent to Cyrville Station will result in additional high density residential development.

At Blair Station there is the potential for redevelopment of the Gloucester Centre shopping mall and additional development within existing office parks located south and east of the station area. A significant expansion to an existing federal office complex north of Ogilvie Road is currently under construction.

5.2.2.6 Downtown Office Market Overview

Demand for office space in Ottawa's downtown has been strong over the past few years and is anticipated to remain so for the foreseeable future. The current vacancy rate for office space in downtown Ottawa is 4.9%. Based on employment forecasts prepared in support of the City's OP review, it is anticipated that office employment growth within the downtown area will be in the range of 1,000 jobs per year out to the year 2031. This translates into a demand of approximately 200,000 square feet of office development per year. As there are few vacant parcels of land which can accommodate large-scale development in the downtown it is expected that there will be continued pressure to redevelopment underutilized properties within and adjacent to the downtown area.

5.2.2.7 Downtown Retail Market Overview

Due to strong recent employment gains in the Ottawa-Gatineau region, the city has experienced healthy increases in consumer spending in recent years. Retail sales growth is anticipated to remain stable in the downtown given the strength and forecast growth in the office sector. Current downtown vacancy rates for retail space are under 2%. Retail growth within the study area will likely consist of ground floor retail space within new high-density office building developments and expansion of the Rideau Centre.

5.2.2.8 Downtown Residential Market Overview

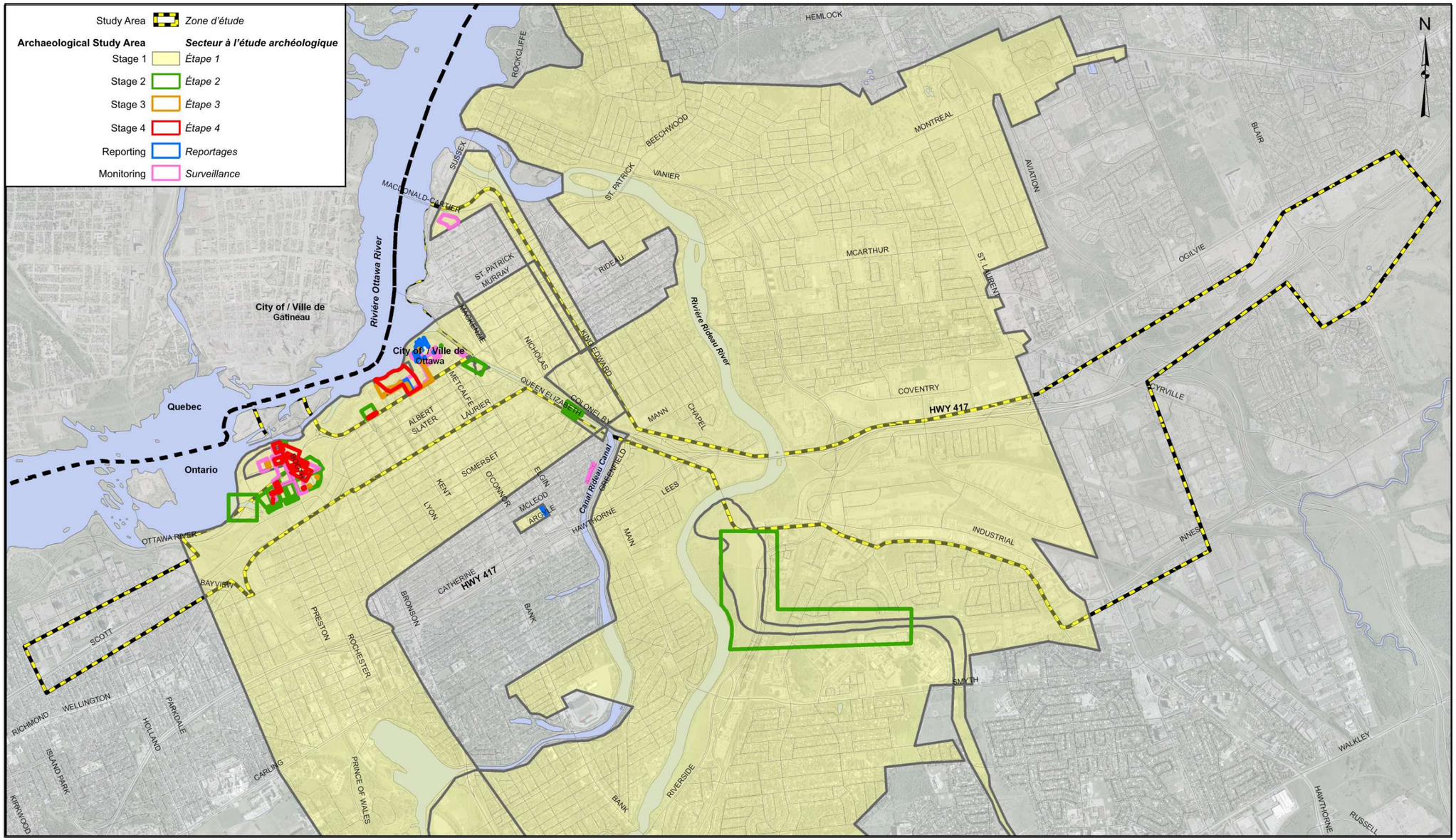
Recent trends across Canada have seen increased demand for high-density residential (condominium) developments within the downtown areas of most major metropolitan areas. In Ottawa, there are several significant projects which have been completed recently, including high profile buildings at 700 Sussex and in the Byward Market. There are currently 24 residential condominium projects proposed, approved or under construction within the core area, representing approximately 2,800 residential units.

5.2.3 Social/Cultural Environment

5.2.3.1 Archaeology/Heritage Resources

The study area covers a large area in downtown Ottawa which includes sections of both Gloucester and Nepean Townships. A Stage 1 (overview) report on existing archaeological and heritage resources within the study area was undertaken to identify known resources in the area of the DOTT Project, to provide information on previous archaeological studies conducted in the area and to assess the archaeological potential of the subject properties (see Appendix C, Archaeological/Heritage Resources Overview Report). The investigation included a review of the site data listing from the Ontario Ministry of Culture and a review of the relevant archaeological, historical and environmental data pertaining to the study area. Parks Canada, the National Capital Commission and archaeological consultants working in the Ottawa area were contacted for current information on registered archaeological sites and previous archaeological assessments undertaken within the study area. The City of Ottawa, the National Capital Commission and the

Figure 5-14: Previous Archaeological Investigations



any construction were to have an impact on them. Within the City's built heritage database, individual properties are Graded, with Grade 1 buildings being considered "prime heritage buildings"; Grade 2 buildings "integral components of a heritage district"; Grade 3 buildings "heritage components of an area" while Grade 4 buildings are generally modern but still considered significant elements in a heritage area.

Figure 5-15 displays the location of the Listed and Graded Heritage Buildings and those Designated under section IV of the Ontario Heritage Act within the DOTT study area. The map outlines the entire parcel of land associated with a heritage property and is color coded to indicate the category of its heritage status (Designated, Grade, Listed). It should be noted that overlapping designated properties have been ordered such that the highest designation is on the top, possibly obscuring the view of other, smaller properties that have a lower designation on them as well. A complete listing of all of the Heritage Properties, showing all designations and addresses is available in Appendix C.

Figure 5-16 displays the federally owned Heritage Properties. The blue buildings are Recognized, while the pink buildings are Classified. A complete listing of the Federal Heritage Buildings and their addresses can be found in Appendix C.

The DOTT study area encompasses all or parts of six Heritage Conservation Districts. These include the Byward Market, Cathedral Hill, Lowertown West, Sandy Hill West, Sparks Street and Bank Street. A complete listing of all of the properties within these districts is included in Appendix C.

5.2.3.2 Cultural Landscapes

Cultural Landscapes are groups of features made by people. The arrangement of features illustrates noteworthy relationships between people and their surrounding environment. They can provide the contextual and spatial information necessary to preserve, interpret or reinforce the understanding of important historical settings and changes to past patterns of land.

The National Capital Commission has designated four cultural landscapes within the City of Ottawa, two of these fall within the DOTT study area and a third lies adjacent to it. These include the Rideau Canal, Confederation Boulevard, the Central Experimental Farm and Parliament Hill. Both the Rideau Canal and Confederation Boulevard lie within the study area and Parliament Hill borders it. These cultural landscapes have been designated based on their historical importance to Canada's Capital Region.

The National Capital Commission has developed a five-step process for assessment of cultural landscapes in Canada's Capital Region:

1. Identification of sites at three scales (i.e. large, for the region as a whole; medium, for major river corridors and green areas; and small, for landscapes such as Parliament Hill) and within various categories (designed, evolved or associative, as well as pathway, node or area landscape);
2. Research (intellectual, through the writings of major planners and politicians, and physical, as expressed in maps and images over time);
3. Evaluation (i.e. the assignment of heritage value at local, national and capital levels, the latter representing a unique intersection of local and national);
4. Communication (through dissemination of statements of significance); and
5. Management (application of principles, site selection, research, evaluation and communication).

The National Capital Commission has not yet completed assessments of the cultural landscapes designated within or adjacent to the DOTT study area.

5.2.3.3 Character Areas

The NCC, through its Core Area Sector Plan has designated "character areas", which apply to most lands within the central portion of the study area. These Character Areas are illustrated on Exhibit 5-17. There are three types of Character Area designation, reflecting the different role played by the federal government in each area. These designations are: Leadership; Partnership; and Support.

Leadership Character Areas are defined as "areas where the vast majority of property ownership is federal, and where the function and land uses are symbolic and Capital in nature".

Leadership Character Areas that fall within the boundaries of the DOTT study area and their primary objectives are:

- *Parliamentary & Judicial Precincts: Plan, protect and interpret the Parliamentary & Judicial Precincts as the symbolic and political heart of the nation, as a national and international landmark, and as centre stage for national celebrations.*

- *Sussex Drive North: Preserve and enhance the sites and environs of the Official Residences of the Prime Minister and Governor General of Canada, reinforce ceremonial routes and functions in this area, and continue to plan the area as an important international precinct in the National Capital Region.*

- *Sussex Drive South: Maintain this area as home to a number of nationally significant cultural institutions, commemorations, public programs and open spaces, as well as the location of several diplomatic missions.*

- *The Islands and LeBreton Flats North: Celebrate the industrial, aboriginal and natural heritage of this area, establish a land bridge between the downtowns of Ottawa and Gatineau, and plan for a variety of uses, programs and open spaces that create an unparalleled public experience.*

Figure 5-15: Heritage Buildings

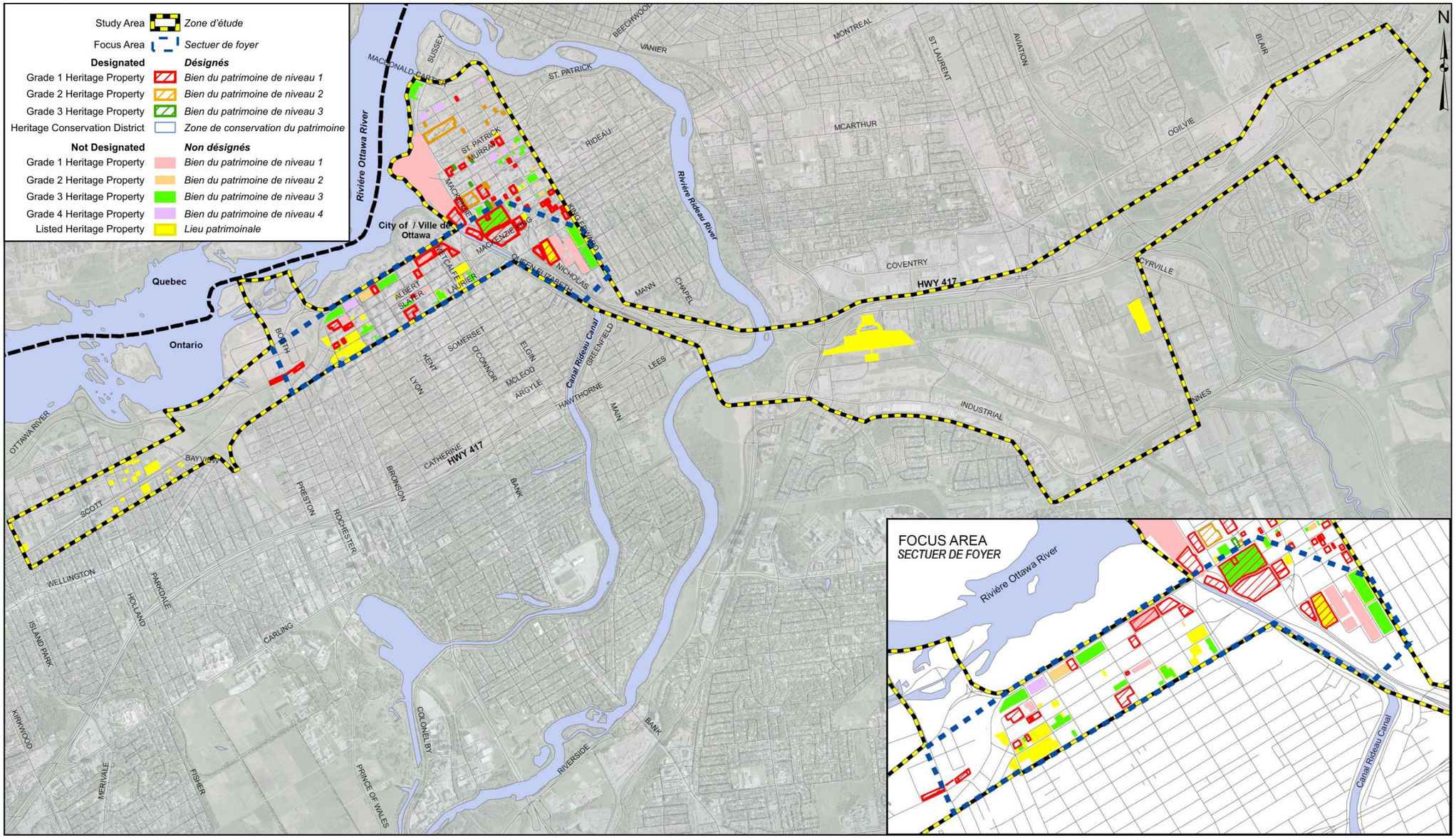


Figure 5-16: Federally-owned Heritage Properties

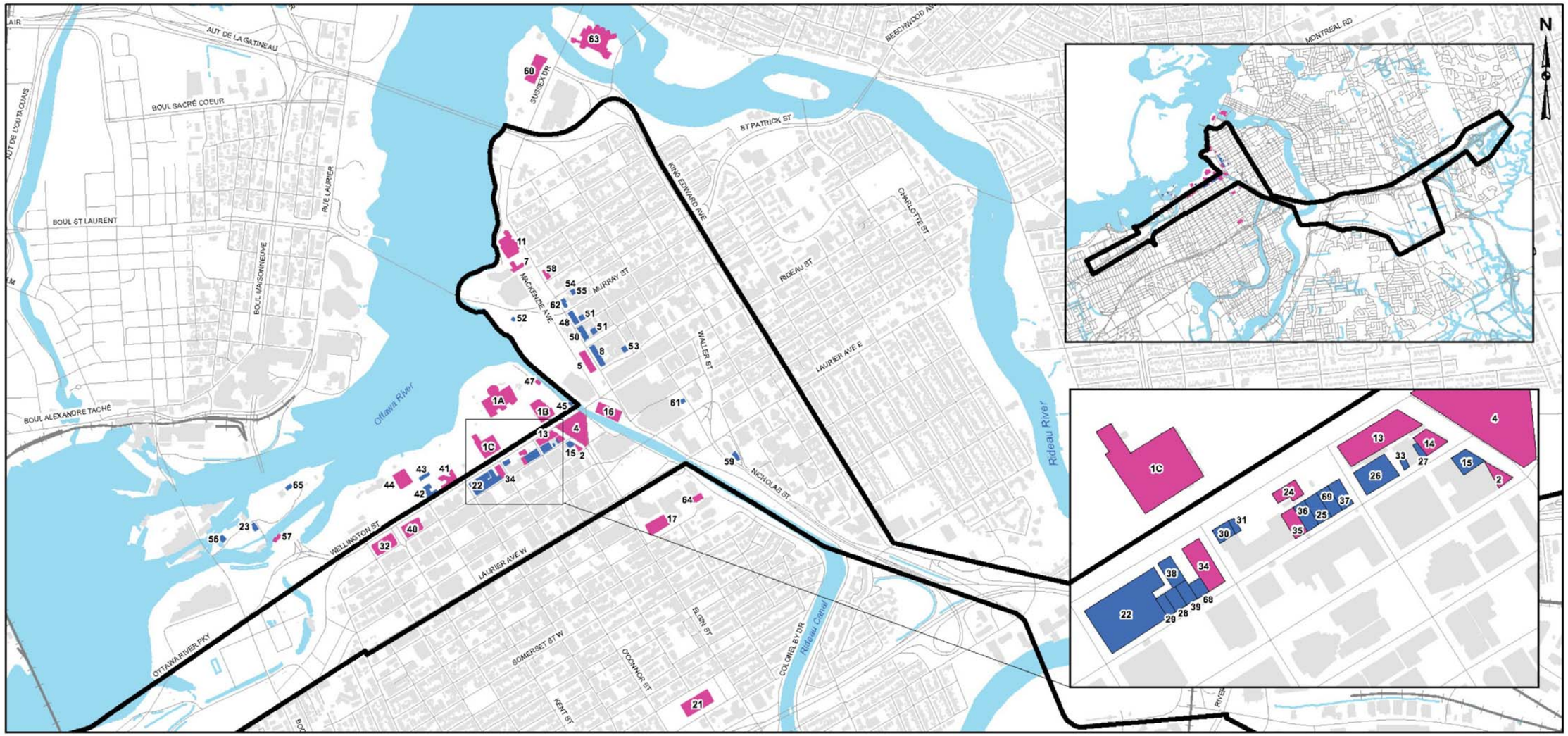
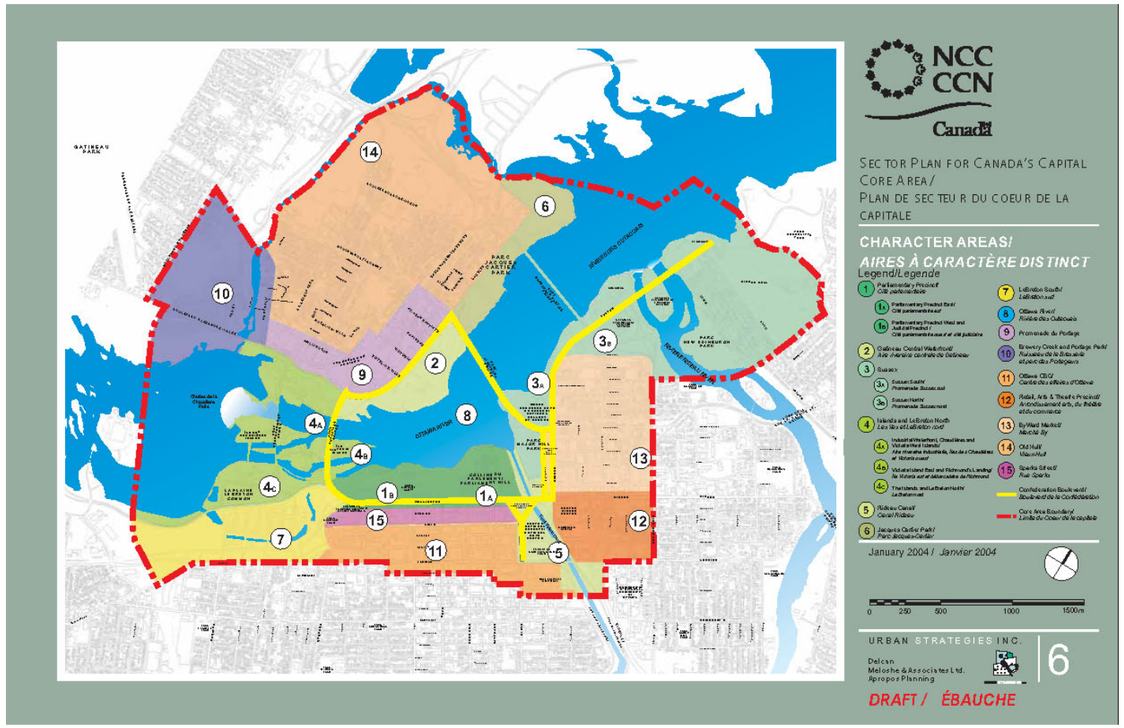


Figure 5-17: Character Areas



- *The Rideau Canal: Enhance the role of the Canal as one of the key structuring physical features of the National Capital Region, redefine the Canal area's open spaces and structures as urban waterfront parks oriented to the Canal, and work with Parks Canada and the City of Ottawa to establish strong pedestrian linkages along and over the Canal and between the Canal and neighbouring streets and districts.*

Partnership Character Areas are defined as areas "where land ownership is shared between the federal and municipal levels of government and the private sector, and where certain Capital functions take place or exist. These Areas are often places of strong connection or interface between the Capital and Civic realms.

Partnership Character Areas which fall within the boundaries of the DOTT study area and their primary objectives are:

- *Sparks Street: Promote the revitalization of the Sparks Street Mall and the realization of the potential of the blocks south of Wellington which face Parliament, improve the integration of this area with other areas in the Core, and promote a new identity for the area as a desirable destination by the encouragement of mixed uses, an increased level of programming and services for the public, and by accenting the sense of place and history.*

- *LeBreton Flats South: Plan and develop a lively, mixed-use neighbourhood that functions independently, but is also better linked with the Ottawa Central Business District, LeBreton North and the Islands.*

Support Character Areas are defined as areas "where the federal government owns little or no property, and where the principal activities and functions are municipal/urban or private (not federal and Capital)".

Support Character Areas that fall within the boundaries of the DOTT study area and their primary objectives are:

- *Civic Arts, Theatre & Retail Precinct: Support the City of Ottawa in efforts aimed at creating a centre or nucleus of local arts and culture in this location, at resolving problems of transportation (people and goods movement), and at improving the pedestrian experience along Rideau Street, all in a manner which achieves a respect for and balance with the character of the adjacent Sandy Hill neighbourhood.*

- *The Ottawa Central Business District (CBD): Support the City of Ottawa in actions to reinforce the CBD and enhance its quality, to consolidate links between the Capital and civic realms, to diversify land use and increase the amount of residential development in the area, and to revitalize the urban fabric through enhanced design quality of both buildings and streetscapes.*

- *The ByWard Market: Support the City of Ottawa in the preservation and enhancement of the Market area as a lively, mixed-use, heritage district, and in the strengthening of linkages and relationships between the Market and the neighbouring Capital realm.*

5.2.3.4 Aesthetics / Vistas and Views

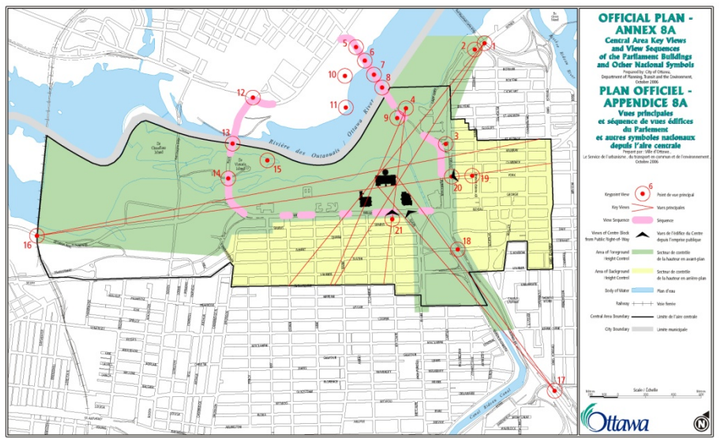
The City of Ottawa OP contains policies which seek to protect and enhance significant public views within the core area. In addition, 21 key viewpoints have been designated in the OP, of which 13 fall within the DOTT study area. These are as follows:

- The centreline of Sussex Drive where it intersects with the centreline of the MacDonald-Cartier Bridge;
- approximately mid-point along Sussex Drive between the MacDonald-Cartier Bridge and Boteler Street;
- Sussex Drive at the forecourt of the National Gallery;
- the summit of Nepean Point;
- the viewing platform at the south end of Alexandra Bridge;
- on the Portage Bridge, south of Victoria Island;
- the eastern end of Victoria Island;
- the point on the Ottawa River Parkway above the CPR tracks from which the traveller approaching from the

west obtains the best view of the Parliament Buildings and other national symbols;
- a point on Nicholas Street north of the Queensway exit, from which the traveller first obtains a clear view of the silhouette of the Parliament Buildings, representing the beginning of a continuous sequence of views moving north along Nicholas Street;
- the viewing platform on the Mackenzie King Bridge above the Rideau Canal;
- York Street at By Ward Street;
- York Street at Sussex Drive, and;
- Metcalfe Street at Sparks Street.

Figure 5-18 illustrates the key views and view sequences within the core area of the City of Ottawa.

Figure 5-18: Key Views and View Sequences



5.2.3.5 Streetscaping

Streetscape conditions vary greatly within the study area, from the highly urban environments downtown and in the Byward Market to the suburban areas surrounding Hurdman and Train Stations.

Policies by the City of Ottawa and the NCC influence design and development in the area of study. Recent streetscape policies by the city of Ottawa that complement the OP and the *Downtown Ottawa Urban Strategy* include *Transit-Oriented Development Guidelines*, *Right-of-Way Lighting Policy*, *Design Guidelines for Arterial Mainstreets* and *Design Guidelines for Traditional Mainstreets*. Secondary Plans and Community Design Plans also contain objectives and policies with respect to streetscape conditions within their planning areas.

Sidewalks and Street Furniture

Sidewalks in the area of study area are the product of different NCC, former municipality and City of Ottawa standards which have evolved over time. The OP and the *Downtown Ottawa Urban Design Strategy* serve as Ottawa's current guides for sidewalk design.

In many places within the study area sidewalks are narrow and fall below current City standards. In recent years the City has required that new developments increase their setback from the curb and increase the sidewalk width. This strategy can be seen at the World Exchange Plaza and the BDC Building along Queen and Slater streets.

Typical sidewalk furniture includes bus shelters, benches, bicycle racks, litter receptacles, recycling receptacles and newspaper boxes. There is great variety in the type, quality and amount of street furniture provided along streets within the study area. New street furniture appears on recently revitalized streets (such as Bank Street between Wellington and Laurier) and special streets designated by the City or the NCC. On other streets the street furniture can be decades old. OC Transpo has a particular style used for street furniture provided at transit stations, and private development has contributed other individual styles and materials at specific locations, such as World Exchange Plaza.

The City of Ottawa is currently undertaking a *Street Design Policy* study, which will develop criteria for the performance of street furnishings to address issues such as compatibility with the character of an area, design consistency, durability, repair, preventing clutter and pedestrian obstructions, safety and security, and accessibility.

Lighting

The City of Ottawa's *Right-of-Way Lighting Policy* was approved by Council in October of 2007. It regulates typical lighting in the right-of-way and allows for special lighting in special areas. Special areas are outlined below:

Downtown

The Central Area and the Sparks Business Improvement Areas are considered special areas with respect to lighting in the City of Ottawa Right-of-Way Lighting Policy. Sparks Street is also a Heritage Conservation District, which is treated as a special area. Bank Street is considered a special area as it is a Traditional Mainstreet.

The typical downtown street is illuminated by a cobra head style fixture mounted on a tapered concrete post. Generally speaking, there is one at each corner and one on one side of the middle of the block. Overhead wires appear west of Bay or Lyon Streets, depending on the north / south, where the cobra head style fixture is mounted on wood telephone poles. There is new specialty lighting at the revitalized portion Bank Street that harmonizes with the street furniture design. Sparks Street also employs specialty lighting that is historically-styled.

University

There are a variety of lighting types used in this area. The campus uses several types of outdoor post-mounted lights along

their pathways, the tunnel below the Transitway uses ceiling mounted fluorescents, the canal area uses both heritage looking and contemporary post-mounted light fixtures and the transit station uses fluorescent lighting within the bus shelter and post-mounted round style fixtures on the platform.

Market

The *Right-of-Way Lighting Policy* considers Heritage Conservation Districts and traditional mainstreets, of which there are ten in the Byward Market, to be "special areas" with respect to lighting. At least four forms of lighting are employed in the Market area. On a smaller scale there are historically-styled cast metal lamp posts with five lamp globes. These often support a circular Byward Market poster or flower baskets. A simpler version of the historically-styled model carries just two globes. The higher level lights are various "shoe box" types supported on a concrete pole. These often have two Byward Market flags at mid height.

The Rideau Business Improvement Area is considered a special area under the Right-of-Way Lighting Policy.

Train Station

Special lighting (globe lights) are present at-grade (above the level of the Transitway) as a part of the Via Train Station lighting design.

5.2.4 Municipal Services and Utilities

The existing municipal servicing within the study area consists of a mix of major trunk sewers and watermains, local sewers and watermains plus hydro, Bell and telecommunication duct banks, and natural gas pipelines. In some locales within the study area there are over 10 different buried services and utilities, ranging from 100 mm diameter gas pipes and hydro ducts up to 1800 mm diameter combined sewer and rectangular Bell ducts. In addition, there are service and access manholes, individual building services and surface catchbasins and leads. Figure 5-19 is a composite drawing showing the underground services and utilities within the study area.

Given that the majority of the proposed DOTT alignment is located along existing Transitway corridors, there are limited impacts expected to existing utilities. Within the downtown area, a tunnel has the advantage of being constructed beneath the existing municipal services and utilities, however, station and tunnel access points, the portals, and alignment holes during construction will need to take into account the existing buried infrastructure. Significant municipal services that may have an effect on the proposed DOTT are identified in the following subsections.

5.2.4.1 Watermains

Watermains are typically located at a relatively shallow depth below grade, with a typical minimum cover of 2.4 m. The following watermains are 600 mm diameter and larger and are the main trunk mains through the study area. These watermains are shown on Figure 5-19.

- Wellington/Albert from Bayview to Bronson – 1296 mm diameter High Pressure Transmission Main (HPTM)
- north of the transitway from Bayview to Fleet - 1676 mm diameter Low Pressure Transmission Main (LPTM)
- Commissioner/Bronson from Fleet to Laurier – 1372 mm diameter
- Wellington from Fleet to Elgin – 610 mm diameter
- Slater from Bronson to Elgin – 610 mm diameter
- Elgin from Wellington to Laurier – 610 mm diameter
- Laurier from Elgin to the Rideau Canal – 914 mm diameter
- Laurier from the Rideau Canal to King Edward – 762 mm diameter
- Lees from Transitway to Queensway – 1220 mm diameter
- Queensway from Lees to Belfast – 1220 to 1067 mm diameter
- East of Rideau River from Queensway to Hurdman Station – 1220 mm diameter
- Tremblay from Hurdman Station to the Train Station - 1220 mm diameter

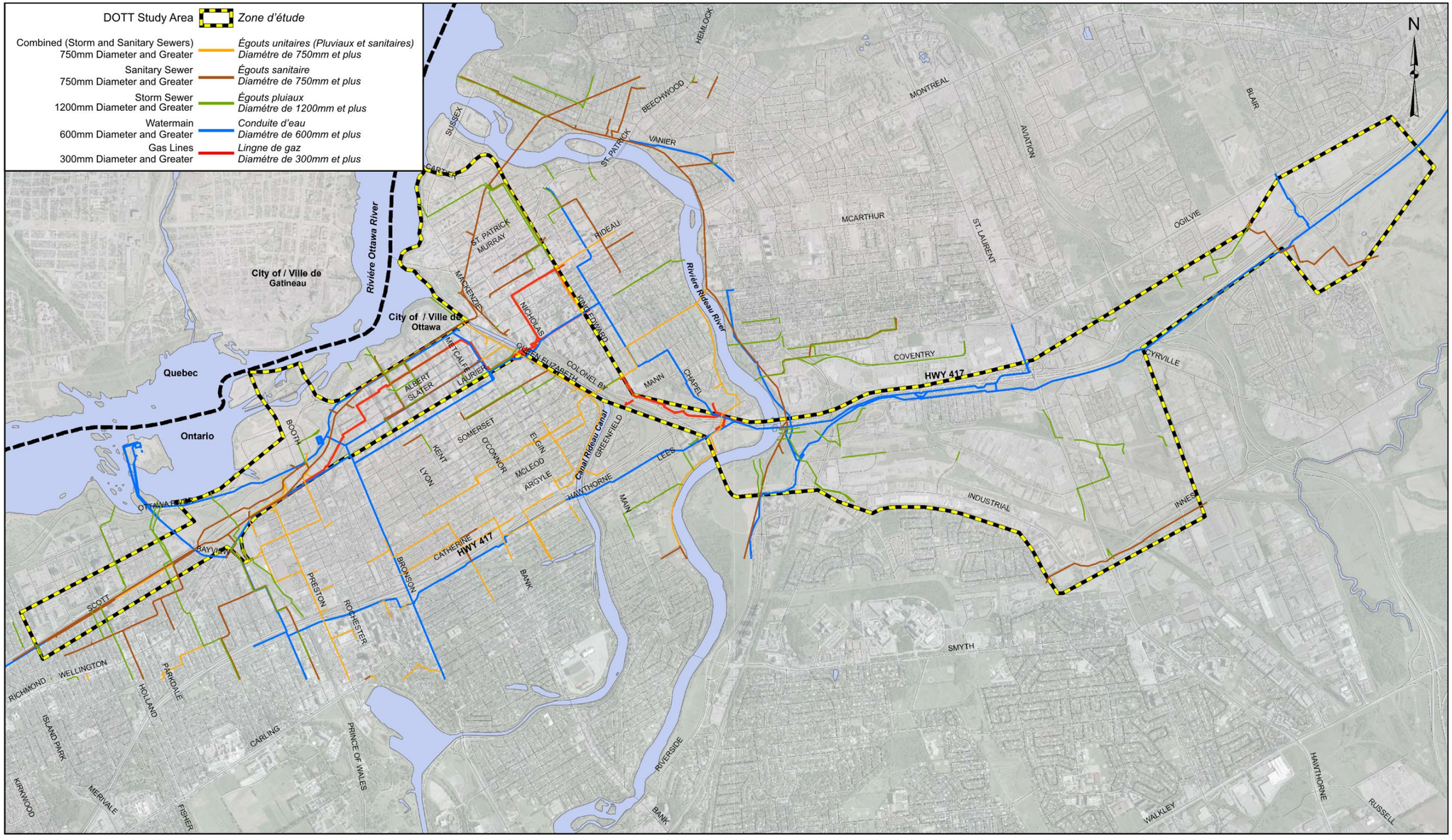
5.2.4.2 Sewers

In the study area between Bayview Road and Booth Street there are a number of large diameter sanitary and combined sewers – the Cave Creek Collector (CCC), West Nepean Collector (WNC), Preston Street Sewer and Booth Street Sewer. The proposed alignment of the transit corridor in this area will need to take into account major access points to the collector sewer system such as the Booth Street Regulator located in the vicinity of Booth Street and Wellington Street.

In the downtown area from Booth Street to the Rideau Canal the main sewer is the Interceptor Outfall Sewer (IOS) which flows eastward along Wellington Street from the Booth Street Regulator and crosses beneath the Rideau Canal at Rideau Street. There is also the Kent Street Sewer located between Lisgar Street (south of the study area) and Wellington Street, and the Rideau Canal Interceptor (RCI) along the west side of the Rideau Canal.

On the east side of the Rideau Canal, the Department of Public Works Tunnel (DPW) provides storm and sanitary drainage for the DND Headquarters building located northwest of Laurier/Nicholas intersection. The DPW tunnel consists of a 1.37 m x 2.67 m storm tunnel with a 0.45 m sanitary pipe inside. The tunnel/sewers extend northward from the Mackenzie King Bridge along the east side of Colonel By Drive. There are major accesses to the tunnel northeast of the Mackenzie King Bridge/Colonel By Drive and northeast of Daly Avenue/Colonel By Drive.

Figure 5-19: Utilities



Between approximately Mann Avenue and Blair Station the transit facility is expected to be above ground. The major sewers and facilities in this section are the Rideau River Interceptor and the Lees Avenue Storm Water Lechate facility located on the west side of the Rideau River and the Rideau River Collector located on the east side of the river.

Combined and sanitary sewers 750 mm diameter and larger, and storm sewers 1200 mm diameter and larger are shown on Figure 5-19. The following pipe sizes and inverts can be used for the initial vertical alignments of the tunnel portion of the proposed DOTT project:

- IOS at Booth and Wellington – 1.8 m diameter; invert approximately 44.8 m
- IOS at Wellington and the Rideau Canal – 1.8 m diameter; invert approximately 41.8 m
- Kent Street Sewer at Queen Street – 0.9 m diameter; invert approximately 66.0 m
- RCI at Laurier Avenue – 1.95 m arch; invert approximately 52.1 m
- RCI at Wellington Street – 1.95 m arch; invert approximately 48.3 m
- DPW at Mackenzie King Bridge – 1.37 m x 2.67 m tunnel; invert approximately 50.6 m
- DPW at Rideau – 1.37 m x 2.67 m tunnel; invert approximately 47.1 m

5.2.4.3 Natural Gas

Natural Gas distribution systems are prevalent throughout the Study Area, and every street within the downtown study area from Wellington to Laurier. Bronson to Elgin, has at least one gas line currently in operation. There are some major distribution lines of significant size (300 mm in diameter) along the western portion of Albert Street and most of Sparks, Elgin, Laurier and Nicholas. In general, the Central Registry Plans show a great deal of abandoned gas main of various sizes along almost all downtown streets, suggesting much of the gas distribution system has been or is in the process of being updated and replaced. In addition to the large 300 mm mains, most mains currently in service are 50 mm or 100 mm in diameter, with several 150 mm mains and a few 200 mm mains. Detailed investigation at various locations will be necessary to confirm the extent of abandoned vs. live mains when contemplating relocations for surface to transit tunnel infrastructure. Laurier/Nicholas, Laurier/Elgin, and Albert Street near Bank are some of the potential locations where both in-service and abandoned gas mains are prevalent. Most gas mains are buried within 1 m of the surface; larger distribution mains may be deeper. Figure 5-19 illustrates the main gas lines found within the study area.

5.2.4.4 Hydro One and Ottawa Hydro

Hydro underground duct is prevalent throughout the study area on all downtown streets and throughout most of the Byward Market. All streets within the downtown study area from Wellington to Laurier, Bronson to Elgin have at least two hydro duct runs, one along each side of the street. All hydro services in the downtown area are located underground; aerial services exist in areas to the east and west of downtown. Within the study area, Albert, Slater, Laurier and Elgin are the streets with the most dense hydro duct networks; in some areas there are three or even four parallel duct banks within the ROW. There is a major Hydro Ottawa transformer station located on Slater Street, between Metcalfe and Elgin.

Hydro ducts tend to be buried within 1 m to 2 m of the road surface and are usually concrete encased where they are buried below traffic bearing surfaces. Chambers exist at all four corners of most downtown intersections, and can be quite large. Underground service connections are present to each building. Many of the duct banks cross over or under one another, and there is usually interconnect at each intersection between duct banks on either side of each street through the chambers at each corner. Hydro duct banks typically cross underneath Bell duct banks. Hydro ducting crosses the Rideau Canal at the three bridge locations (Wellington, Mackenzie King and Laurier) on the structures.

A major Hydro One Transmission line crosses the existing Transitway corridor in the vicinity of Belfast Road, and the connecting track between the Maintenance and Storage Facility and the LRT mainline will run in close proximity to an existing hydro pylon.

5.2.4.5 Telecommunications

Bell telecommunications plant is prevalent throughout the study area, in particular in the downtown core and Byward Market. Every street in the downtown core and Byward Market area contains at least a portion of underground duct, while major streets such as Albert, O'Connor, Bank, Slater, Metcalfe, Elgin and Rideau contain two or more duct runs throughout most of their length. At least one service duct enters each customer building. Some larger buildings have several separate service duct entrance locations.

There is a major switching station located on the south side of Albert Street between O'Connor Street and Bank Street. Two major portals exist to the station; one on the west side of O'Connor between Albert and Slater Street, another on the north side of Albert about 52 m east of Bank. Each portal contains numerous, separate duct banks that may be located anywhere from 0.6 m below road grade down to well over 3.0 m below road grade.

Typically, Bell telecommunications plant in dense urban areas is contained within concrete encased duct bank with anywhere from a few to dozens of individual ducts. Bell Chambers exist throughout the study area and consist of chambers up to 4.7 m x 4.9 m in size, some are narrower but even longer, up to 7 m. Small chambers typically have one manhole entrance at street level, while larger chambers typically have two but can have up to four manhole entrances. There are instances where Bell duct has been abandoned but remains underground in several locations throughout the study area.

Bell Ducts cross the Rideau Canal at the three existing bridge locations (Wellington, Mackenzie King and Laurier), and one also crosses underneath the Rideau Canal just south of the Mackenzie King Bridge.

Allstream has exclusive plant in some specific locations, notably at the intersections of Slater/Kent and Queen/O'Connor, along Metcalf Street from north of Sparks Street to Queen, and along Laurier Avenue west of Elgin Street. There is also Allstream underground plant along the east side of the Rideau Canal from Laurier Avenue south, and in the intersection of Laurier/King Edward and near York Street and King Edward Avenue.

Rogers Cable has underground plant along major east-west streets downtown, including Queen, Albert, Slater, and along north south streets including Metcalfe, O'Connor, and portions of Bank, Kent, Lyon and Bay. Underground service along Slater appears to originate at the Albert/Slater split. Service connections are underground to most major downtown buildings. Rogers' plant also crosses the Rideau Canal under Wellington Street and is present along Laurier, and along the east side of the Rideau Canal. Rogers shares plant with several other telecommunications companies, including 360 Networks, Grouptel, Videotron and Telus. Shared underground plant is identified in the master servicing plan where its location is known.

5.2.4.6 Other Utilities

District Heating

The District Heating system is a distribution system for heating by steam that is part of the Public Works and Government Services Canada (PWGSC) infrastructure. Both steam and distillate lines originate from the central heating plant adjacent to the Parliament Hill complex north of Wellington Street. The lines include a 200 mm diameter steam pipe in a 475 mm casing, a 100 mm condensate pipe in a 375 mm casing, and two 250 mm water pipes, all of which run down Bank Street and service several Federal Government owned buildings on either side of the street. These utilities terminate in the building block between Albert, Bank, Slater and Kent.

Another heating distribution system originates from the block bounded by Albert, Elgin, Slater, and Metcalfe and appears to service the underground parking garage for the National Arts Centre before continuing south to service other buildings along Elgin Street.

Other Utilities

Numerous other utilities exist throughout the study area, although not all are indicated on the composite utility plan for the central area. Among the types of utilities that exist underground are the following:

- Fire Alarm communication lines along Elgin Street, Laurier Avenue, King Edward Avenue and a portion of Slater Street. These may be mostly, if not completely, abandoned.
- Streetlight ducting (Sparks, Wellington, York, Sussex and Clarence) these are in addition to Hydro Ducts and are also newly installed along both sides of the Ottawa River Parkway and Booth Street in the vicinity of the Canadian War Museum.
- Traffic Light ducting (these occur across all approaches to all legs of any signalized intersection, use 3 to 5 manholes per location, and are usually 0.6 to 0.9 m below surface. Some traffic duct interconnects to Bell Manholes, while traffic ducting can also exist as interconnecting duct between adjacent intersections, such as along the Ottawa River Parkway through to Wellington/Rideau, down Lyon, along portions of Laurier, and along other streets such as Elgin, Dalhousie and King Edward among others. All ducting is usually concrete encased when installed below a roadway, and is usually the closest ducting to the surface, i.e. it usually crosses above Bell and Hydro ducts.
- Audio Cable is located along Sparks Street for a short distance to Wellington Street.

The above should not be considered a comprehensive list. There may be other utilities located within the study area which will need to be considered as the project advances.

5.2.5 Drainage and Stormwater Management

Nearly all of the existing drainage and stormwater management (SWM) systems along the surface portions of the proposed corridor LRT were designed for the existing Transitway. As a linear system, the corridor cuts across numerous drainage basins and, as such, drains to numerous outlets. There are no existing SWM facilities that serve the corridor, with the exception of the recently constructed Sandy Hill flood control facilities.

Beginning at Tunney's Pasture and moving east towards Bayview Station, drainage is provided by the existing 3800 mm x 2000 mm twin box sewer. This sewer is located under the Transitway and was sized to intercept a number of trunk storm outlets that were cut off by the Transitway trench. This sewer drains west to east and turns north at Merton Street and ultimately discharges to the Ottawa River. Runoff from the top of the O-Train overpass drains west to the twin box sewer outlet. From the Bayview Station area to Lloyd Street, drainage is conveyed through storm sewers ranging from 525mm to 1500mm, outletting to the 2100mm x 2100mm Tailrace sewer, and discharges to the Tailrace downstream of the Fleet Street Water Pumping Station. From Lloyd Street to the proposed West Portal location, surface drainage is picked up by local sewers which ultimately discharge to the Tailrace sewer. The Tailrace supports fish habitat and is used for body contact recreation (whitewater paddling). There is also a major combined sewer overflow (CSO) outlet at the Tailrace. This CSO outlet will be maintained over the long term, although measures will be put in place to reduce the frequency and volume of CSO discharges.

Surface drainage along the alignment of the proposed LRT tunnel discharges to a number of local and trunk sewer systems, outletting to the Ottawa River, the Rideau Canal, and the Sandy Hill combined sewer area (CSA). Since the tunnel portion of LRT project is generally 30-40 m below grade, the surface drainage above is not discussed further.

Immediately beyond the proposed East Portal, there is a very short section of the corridor where drainage is to the existing Sandy Hill CSA. Most of the drainage from within the Sandy Hill CSA is managed to limit the risk of basement flooding in the large bowl area located in the south part of the area. Flood

control facilities include a surface storage pond and an underground tank. With the exception of some major system drainage outletting directly to the Rideau River, all storm and sanitary drainage in the Sandy Hill area is conveyed to the Rideau River Collector (RRC) on the east side of the Rideau River. The RRC flows are managed at the Keefer Regulator, with most of the flow directed to the Robert O. Picard Environmental Centre (ROPEC) for treatment via the Ottawa Interceptor Sewer, with the remainder overflowing to the Ottawa River. A new real time control (RTC) facility has been designed for the Keefer regulator location that will result in substantial reductions in overflows.

The majority of the drainage between the proposed East Portal and the Rideau River is to existing 750mm and 1375mm storm outlets that discharge to the Rideau River in the vicinity of the existing Transitway crossing. South of the Rideau River, Transitway runoff is drained to Hurdman Station, and into a 1650 mm outlet sewer which drains to the Rideau River. Drainage from Hurdman Station to just east of Alta Vista drive is also directed to the Rideau River via two 1200 mm outlet sewers. Transitway drainage from just east of Michael Street to just east of Alta Vista Drive is provided by a 1650 – 1950 mm trunk sewer draining west along the corridor to the Rideau River immediately south of Highway 417. These sewers were designed to intercept flows from an existing trunk sewer on Tremblay Road, providing relief to a pre-existing 1200 – 1950 mm trunk sewer.

Drainage from just east of Michael Street to Blair Station is directed to the Cyrville Drain via four outlets. The section west of Cyrville drain is serviced by 600 and 675mm outlets that discharge into Cyrville Drain north of the Transitway near the Aviation Parkway. The majority of the section east of Cyrville Drain is serviced by a 1050 mm storm sewer that is graded east to west, discharging to the east bank of the Cyrville Drain where it crosses under the Transitway.

Existing drainage from the industrial area corresponding to the proposed Maintenance and Storage Facility location southeast of the Transitway between Belfast and St. Laurent is provided locally by existing 450mm and 900mm storm sewers on Belfast Road. These sewers drain to an existing 1050 mm sewer on Terminal Road, which discharges to the Rideau River via an existing 1950 mm sewer. This outlet is between the 1950 mm Transitway outlet described previously, and the Highway 417 crossing of the Rideau River.

5.2.6 Structures

There are a variety of significant structures within and adjacent to the DOTT Study area, as described in Table 5-5.

Table 5-5: Structures Within and Adjacent to DOTT Study Area

Structure	Description
Northwestern Avenue over West Transitway	Single span rigid frame concrete structure over two Transitway lanes and carrying 4 lanes of Northwestern Avenue.
Ross Avenue over West Transitway	Single span rigid frame concrete structure over two Transitway lanes and carrying 2 lanes of Ross Avenue.
Bus Access Driveway over West Transitway	Single span rigid frame concrete structure over four Transitway lanes and carrying 1 lane of bus traffic.
Tunney's Pasture Station Pedestrian Overpass	Single span post tensioned concrete structure spanning over 4 lanes of the West Transitway.
Holland Avenue over West Transitway	Single span rigid frame concrete structure carrying Holland Avenue over the West Transitway.
Parkdale Avenue over West Transitway	Single span rigid frame concrete structure over two Transitway lanes and carrying 4 lanes of Parkdale Avenue.
Hinchey Avenue over West Transitway	Single span rigid frame concrete structure over two Transitway lanes and carrying 2 wide lanes of Hinchey Avenue.
Carruthers Avenue over West Transitway	Single span rigid frame concrete structure over two Transitway lanes and carrying 3 lanes of Carruthers Avenue.
West Transitway over Bayview Road	Single span rigid frame concrete structure spanning 4 lanes of Bayview Road and carrying 2 lanes of the West Transitway.
West Transitway over O-Train Corridor	This three-span post-tensioned concrete structure carries the West Transitway over the O-Train corridor.
Scott Street over O-Train corridor	This three-span concrete structure carries Scott Street over the O-Train corridor.
LeBreton Aqueduct	Constructed in the 1870's, this open aqueduct is approximately 600m in length and 6 m to 8 m in width. It runs parallel to the West Transitway and conveys water from the Ottawa River to the Fleet Street Pumping Station. It also contains a watermain that conveys treated water from the Lemieux Island Water Purification Plant to the Fleet Street Pumping Station.
Plaza Bridge	Originally two bridges (Sappers and Dufferin) dating to the late 1800's. It consists of three span concrete vaulted arches over the Rideau Canal, former railway and locks access road carrying Wellington Street and Elgin Street East. Part of the arch over the former railway is occupied by the Canadian Museum of Contemporary Photography. There is an abandoned tunnel east of the former railway arch. Utility tunnels north of the bridge connect the Chateau Laurier to the Government Conference Centre (former Ottawa Union Station).The arches are supported by buttress/counterfort walls on the exterior.
Mackenzie-King Bridge	This bridge consists of four structures: A concrete structure over the NAC parking levels; A concrete post and beam three-span structure spanning Queen Elizabeth Drive, the Rideau Canal and the southbound lanes of Colonel By Drive; A steel viaduct structure spanning over the northbound lanes of Colonel By Drive and the Congress Centre, and; A three-span concrete structure over Nicholas Street. The Bridge carries four lanes of traffic including two dedicated transit lanes, and two bicycle lanes from Elgin Street to Waller Street.
Laurier Bridge	Originally built in the early 1900's, this structure is a three-span concrete slab on steel girders and centre steel arch structure spanning over Colonel By Drive, Rideau Canal and Queen Elizabeth Drive.
Rideau Canal	A UNESCO world heritage site, constructed between 1827 and 1832. The Canal was originally constructed as a Deep Cut which was reinforced with sheet piling in 1884. The Piling was replaced by concrete walls in 1914.
Pedestrian Underpass of Nicholas Street and the East Transitway at Campus Station	Single span rigid frame concrete structure carrying 4 lanes of Nicholas Street and 2 lanes of the East Transitway, providing access to the Campus Transit Station from the west.
East Transitway over Mann Avenue	A single span concrete slab-on-steel girder structure spanning Mann Avenue and carrying the Central Area Transitway.
East Transitway under Nicholas Street	*A three*-span post-tensioned concrete structure spanning the Central Area Transitway and carrying the Nicholas Avenue northbound on-ramp.
East Transitway under Queensway	A single span rigid frame concrete structure spanning the Central Area Transitway and carrying The Queensway (Highway 417).
Central Area Transitway under Lees Avenue	A single span rigid frame concrete structure spanning the Central Area Transitway carrying Lees Avenue.
Central Area Transitway Rideau River Crossing	A three-span post-tensioned concrete bridge carrying the Central Area Transitway over the Rideau River. This bridge structure is seismically secure and designated an emergency route by the City of Ottawa.
East Transitway over Riverside Drive	A two-span concrete deck on steel girder structure spanning Riverside Drive, carrying the East Transitway and a multi-use pathway.
VIA Rail over Riverside Drive	A two-span concrete deck on steel girder structure Riverside Drive, carrying two rail tracks.
East Transitway under NCC Train Station Access Road (East & West)	Two three-span post-tensioned concrete structures spanning over the East Transitway carrying the approach roads to the NCC Train Station.
Train Station Pedestrian Overpass	A single-span steel truss pedestrian structure spanning over the East Transitway at Train Transitway Station. This structure and provides access between the eastbound and westbound platforms and the NCC Train Station.
East Transitway under Tremblay Road	A two-span concrete beam structure carrying Tremblay Road over the East Transitway.
East Transitway under Belfast Road	A single-span rigid frame concrete structure carrying Belfast Road over the East Transitway.
East Transitway under Highway 417	Single span rigid frame concrete structure spanning 4 lanes of the Southeast Transitway and carrying 8 lanes of Queensway.
St. Laurent Station Pedestrian Overpass	Single span steel truss pedestrian structure spanning over 4 lanes of the East Transitway. Pedestrian structure within tunnel under the St. Laurent Transitway Station.
Highway 417/St. Laurent Boulevard interchange south to westbound on-ramp over East Transitway	Two span concrete structure spanning 4 lanes of East Transitway; two lanes of local transit traffic; and carrying the Queensway westbound on-ramp.

Structure	Description
St. Laurent Boulevard over East Transitway	Two span concrete structure carrying 6 lanes of St. Laurent Boulevard over 4 lanes of the Transitway.
Highway 417/St. Laurent Interchange north to westbound on-ramp over East Transitway (1of 2)	Two span concrete structure spanning 4 lanes of the East Transitway and carrying the Queensway westbound on-ramp.
Highway 417/St. Laurent Interchange north to westbound on-ramp over East Transitway (2 of 2)	Single span rigid frame concrete structure over two Transitway lanes and carrying 1 lane of Queensways on-ramp.
Highway 417/St. Laurent Boulevard Interchange Westbound Off-ramp over East Transitway	Two span post-tensioned concrete structure spanning 2 lanes of the East Transitway and carrying the Queensway westbound off-ramp to Lemieux Street.
Cyrville Road over East Transitway	Single span rigid frame concrete structure carrying 2 lanes of Cyrville Road over 4 lanes Transitway traffic.
Southbound Aviation Parkway over East Transitway	Single span rigid frame concrete structure carrying 2 southbound lanes of the Aviation Parkway over 2 lanes of Transitway traffic.
Northbound Aviation Parkway over East Transitway	Single span rigid frame concrete structure carrying 2 southbound lanes of the Aviation Parkway over 2 lanes of Transitway traffic.
East Transitway over Cyrville Drain	Concrete frame culvert structure carrying 2 lanes of the east Transitway over Cyrville Drain.
Blair Station Pedestrian Overpass	Multiple span concrete pedestrian structure spanning over the Transitway Station and OR 174.
Blair Station Pedestrian Underpass	Single span rigid frame concrete structure under the East Transitway.
Blair Road over East Transitway	Concrete structure carrying seven lanes of Blair Road over four lanes of Transitway traffic.
Prince of Wales Bridge	A steel truss bridge across the Ottawa River, consisting of six spans between the Ontario shore and Lemieux Island, and a further seven spans between Lemieux Island and the Quebec shore. It carries a single rail track, which is currently not in active service.
Chaudière Crossing	First constructed in 1826, the crossing consists of many separate structures: Bronson Channel Span, which consists of two spans of precast pre-tensioned hollow core concrete slabs; Ottawa Hydro Electric Power Commission (OHEPC) Channel Span, which is a single span precast pre-tensioned hollow core concrete deck structure; Buchanan Channel Span, which is a large diameter structural steel plate culvert; Union Bridge, which is a single span steel through truss spanning the main channel of the Ottawa River; Two stone masonry arch structures, Arch No. 1 and Arch No. 3; Hull Trestle, which is a steel girder supported on latticed steel columns and concrete foundations, and ; Hull Causeway, which is a four-span steel plate girder bridge with a reinforced concrete deck slab, supported on reinforced concrete abutments, a reinforced concrete pier and two transverse support trusses.
Portage Bridge	Built in 1973, this bridge consists of six structures: Pedestrian and Service Road Tunnel (Ottawa), which is a two-level reinforced concrete frame; Pedestrian Tunnel near "The Mill" (Ottawa), which is also a reinforced concrete frame; Parking Garage (roof), a reinforced concrete frame; Bronson Channel Span, which is a three-span continuous post-tensioned structure with cast-in-place voided slabs; Main Bridge (Ottawa/Hull), which is a three-span continuous steel box girder composite with reinforced concrete deck, and; Railway Underpass (Hull), which is a simple span reinforced concrete frame.
Alexandra Bridge	Built in 1901, this bridge is a nineteen-span steel truss and trestle. The bridge is 575m long and carries two traffic lanes with a timber plank sidewalk on the west side dedicated to pedestrian/bicycle traffic. The northbound traffic lane rides on steel grating while the southbound lane has a concrete deck.
Macdonald-Cartier Bridge	Built in 1965, this bridge is a five-span continuous steel box girder and concrete deck structure. The bridge has an overall length of 618 m and carries six lanes of traffic with sidewalks on both sides of the structure.

5.2.7 Noise, Air Quality and Vibration

A qualitative assessment of the existing conditions of noise, air quality and ground vibrations within the study area was undertaken to determine baseline conditions for these factors. This qualitative assessment describes the existing noise, air quality, and ground vibration conditions caused by current traffic levels for representative locations as they affect building occupants. The evaluation is based partly on previous noise, air quality, and vibration work done within the study area, supplemented with a variety of additional preliminary calculations for noise and air quality, updated to current traffic levels for selected intersections and locations. Appendix E provides more detailed information on noise, air quality and vibration issues within the study area.

The existing impacts of noise, air quality and ground vibrations due to road traffic on the selected sites and intersections, summarized in Table 5-7, have been determined as described below.

The primary sources of noise, air quality, and ground vibrations in the study area are roadway vehicles including: gasoline and diesel powered passenger vehicles, trucks and buses. Stationary sources of noise, air quality, and ground vibrations also exist within the study area, as identified below.

The primary sources of noise and air pollution, other than traffic, would be rooftop mechanical equipment supporting building operations. No significant ground vibrations would emanate from these types of sources. Typical sources of this nature in the study area are: Tunney's Pasture government complex, the St. Laurent and Gloucester shopping centres, and various other commercial buildings along the Transitway corridor. Furthermore, since each major building would have undergone a provincial screening, any impact would fall within the provincial guidelines taking all sources into consideration. The primary sensitive receptors in the study area are schools, and residential neighbourhoods along the Transitway corridor.

5.2.7.1 Noise

Traffic noise impacts are commonly evaluated at the outdoor living area (OLA) of residences and public leisure spaces. The outdoor and indoor environment, with the outdoor environment being the most critical, is controlled by noise guidelines formalized by the Ministry of the Environment (MOE) based on industry practice and experience. Based on our quantitative assessment measured against the applicable MOE guidelines, the following categories have been developed to depict the existing noise conditions for the study area.

The following categories are used in classifying the roadways and intersections in Table 5-7 and illustrated in Figure 5-20:

- SEVERE – Hourly noise levels at receivers are expected to exceed 65 dBA;
- MODERATE – Hourly noise levels at receivers are expected to fall in the range of 60 to 65 dBA;
- LOW – Hourly noise levels are expected to fall below 60 dBA.

5.2.7.2 Air Quality

Air quality in urban areas is influenced primarily by vehicle emissions, among other sources.

The most significant pollutants include Nitrogen Oxides (NOx), and Particulate Matter (PM10, PM2.5). Carbon Monoxide (CO), and Hydrocarbons (HC) are generally of secondary importance, due to the relatively high tolerance levels reflected in the health and odours criteria. The MOE sets limits on the maximum allowable level of pollutants, at receptors, resulting from

vehicular traffic (see Table 5-6). Based on our quantitative assessment measured against the applicable MOE guidelines, the following categories have been developed to depict the existing air quality conditions for the study area. The following categories were used to evaluate the roadways and intersections in Table 5-7 and illustrated in Figure 5-21:

- SEVERE -- Selected pollutants (NOx, PM10, PM2.5) are expected to approach MOE standards on a regular basis;
- MODERATE -- Selected pollutants (NOx, PM10, PM2.5) are expected to approach MOE standards occasionally;
- LOW -- Selected pollutants (NOx, PM10, PM2.5) are expected to rarely approach MOE standards.

Table 5-6: Provincial Air Quality Criteria

POLLUTANT	AAQC (mg/m^3)		LIMITING EFFECT
Oxides of Nitrogen (NOx)	0.40 (1 hr)	0.20 (24 hr)	Health
Carbon Monoxide (CO)	36.2 (1 hr)	15.7 (24 hr)	Health
Hydrocarbons (HC)	35.0 (1/2 hr)	12.0 (24 hr)	Health
Particulate Matter (PM < 44 μm)	0.10 (1/2 hr)	0.12 (24 hr)	Visibility
Particulate Matter (PM_{10} < 10 μm)	Unavailable	0.05 (24 hr)	Health
Particulate Matter ($PM_{2.5}$ < 2.5 μm)	Unavailable	0.03 (24 hr)	Health

5.2.7.3 Vibration

Troublesome ground vibrations are mainly produced by vehicles driving over uneven or rough surfaces and propagating through the soil to impact adjacent structures and their occupants. In addition to human response, the importance of structural vibrations resulting from vehicle traffic depends on the building function. While low levels of vibrations can be perceptible and annoying to people, sensitive building functions often are more critical for controlling incoming vibrations to the structures. For example, high-tech or laboratory buildings may display a higher sensitivity to vibrations as compared to residential or industrial settings. The following categories were used to estimate vibration impacts, assuming that no vibration sensitive uses are nearby the intersections and roadways in Table 5-7 and illustrated in Figure 5-22. Specific sensitive building uses require a higher degree of protection, which would be assessed on a case by case basis.

- SEVERE Vibrations at receptors exceed 4 mm/s peak particle velocity (ppv) and are likely to cause frequent adverse reactions with building occupants;
- MODERATE Vibrations at receptors fall between 0.5 to 4 mm/s ppv and are likely to cause occasional adverse reactions in the building occupants.

Table 5-7: Classification Of The Impact Due To Existing Vehicle Traffic In The Study Area On Ambient Noise, Air Quality, And Ground Vibrations

Relevant Roads and/or Intersections	Nearby Occupancy	Impact		
		Noise	Air Quality	Vibrations
Scott Street and Holland Avenue	Residential; Institutional; Business	moderate	moderate	moderate
Scott Street and Bayview Road	Residential; Commercial; Recreational	moderate	moderate	moderate
LeBreton Flats	Residential; Commercial; Open	moderate	moderate	moderate
Albert Street and Kent Street	Residential; Business	severe	severe	moderate
Kent Street and Laurier Avenue	Residential; Commercial; Business	severe	severe	moderate
Metcalfe and Queen Street	Commercial; Light Industrial	severe	severe	moderate
Slater Street and Bank Street	Business; Commercial	severe	severe	moderate
Elgin Street and Laurier Avenue	Commercial; Institutional	severe	severe	moderate
Laurier Avenue	Residential	severe	severe	moderate
and O'Connor Street				
King Edward Avenue and Rideau Street	Residential; Commercial; Business	severe	severe	moderate
King Edward and George Street	Residential; Commercial; Business	severe	severe	moderate
King Edward and Murray Street	Residential; Commercial; Business	severe	severe	moderate
King Edward and Boteler Street	Residential; Commercial; Business	severe	severe	moderate
Dalhousie Street and Rideau Street	Commercial; Office	severe	moderate	moderate
Nicholas and Laurier	Residential; Institutional	severe	moderate	moderate
Hurdman OC Station	Residential; Open	moderate	moderate	moderate
Hwy 417 and Nicholas	Residential; Open	moderate	moderate	moderate
Belfast Road and Tremblay Road	Residential; Commercial	severe	severe	moderate
Cyrville Road and Transitway	Residential; Commercial; Light Industrial	severe	severe	moderate
Birchmount Drive and Cedarcroft Crescent	Residential; Open	moderate	moderate	moderate
Aurele Street and Eugene Street	Residential	moderate	moderate	moderate

Figure 5-20: Qualitative Assessment of Existing Noise Levels

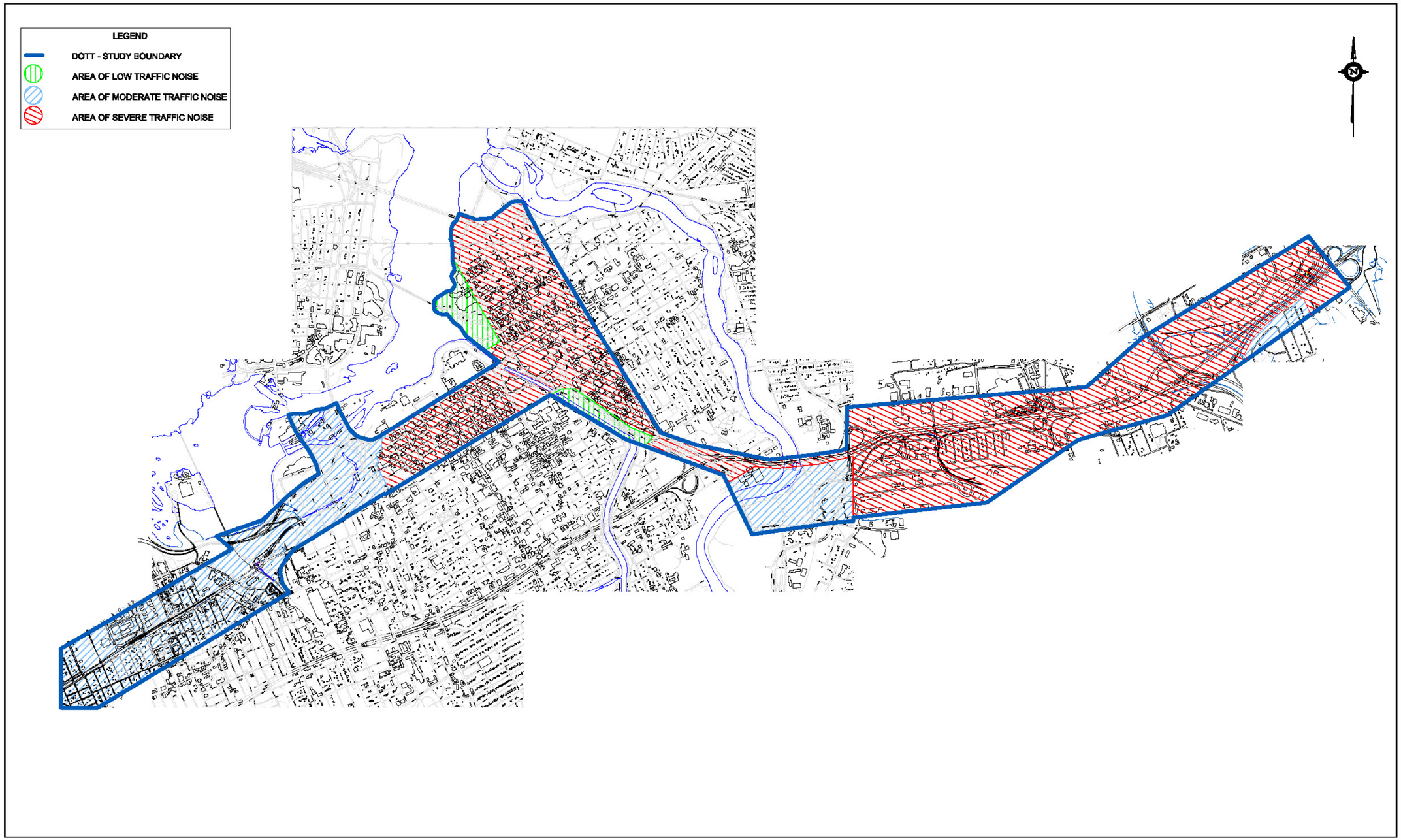


Figure 5-21: Qualitative Assessment of Existing Air Quality

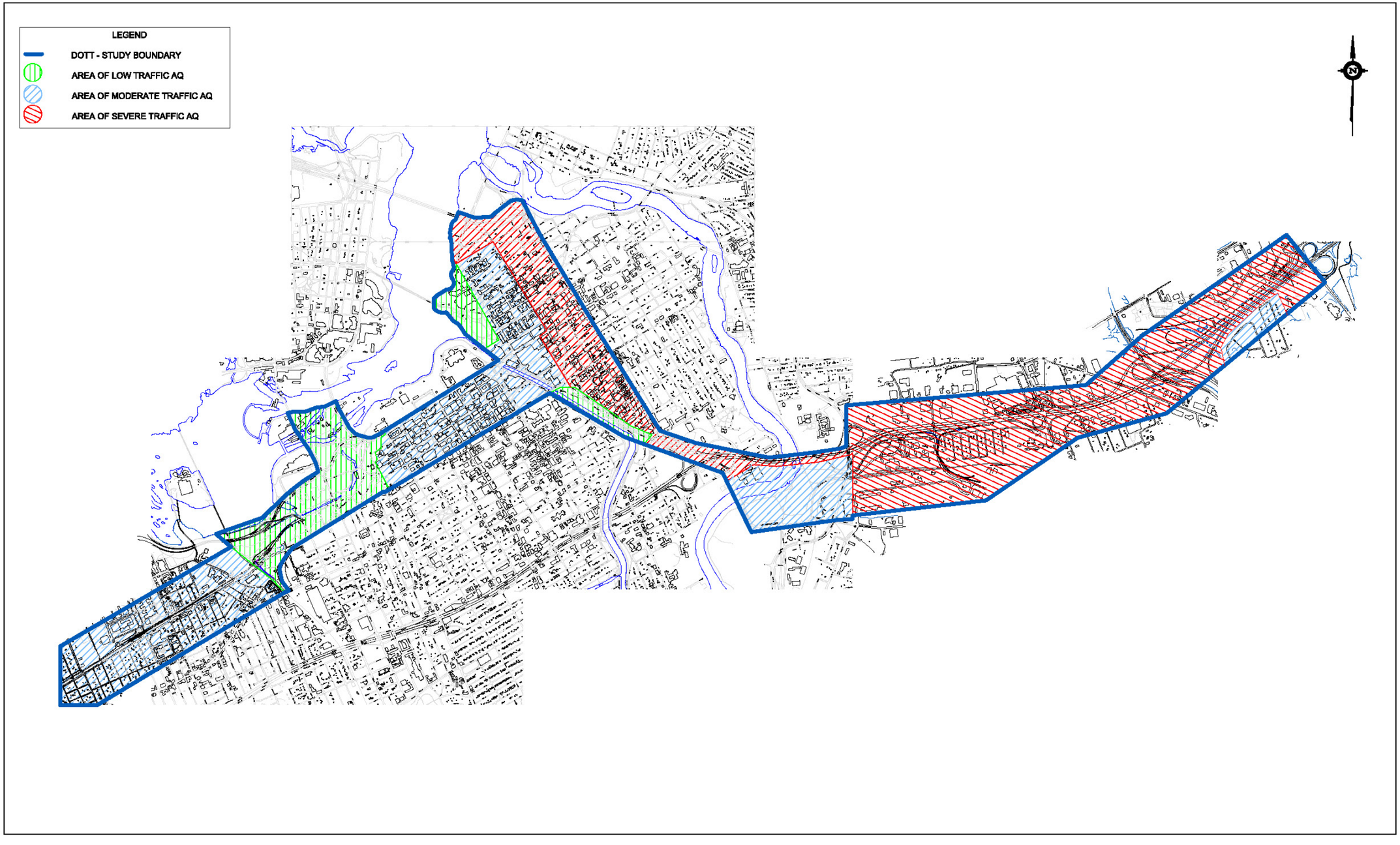
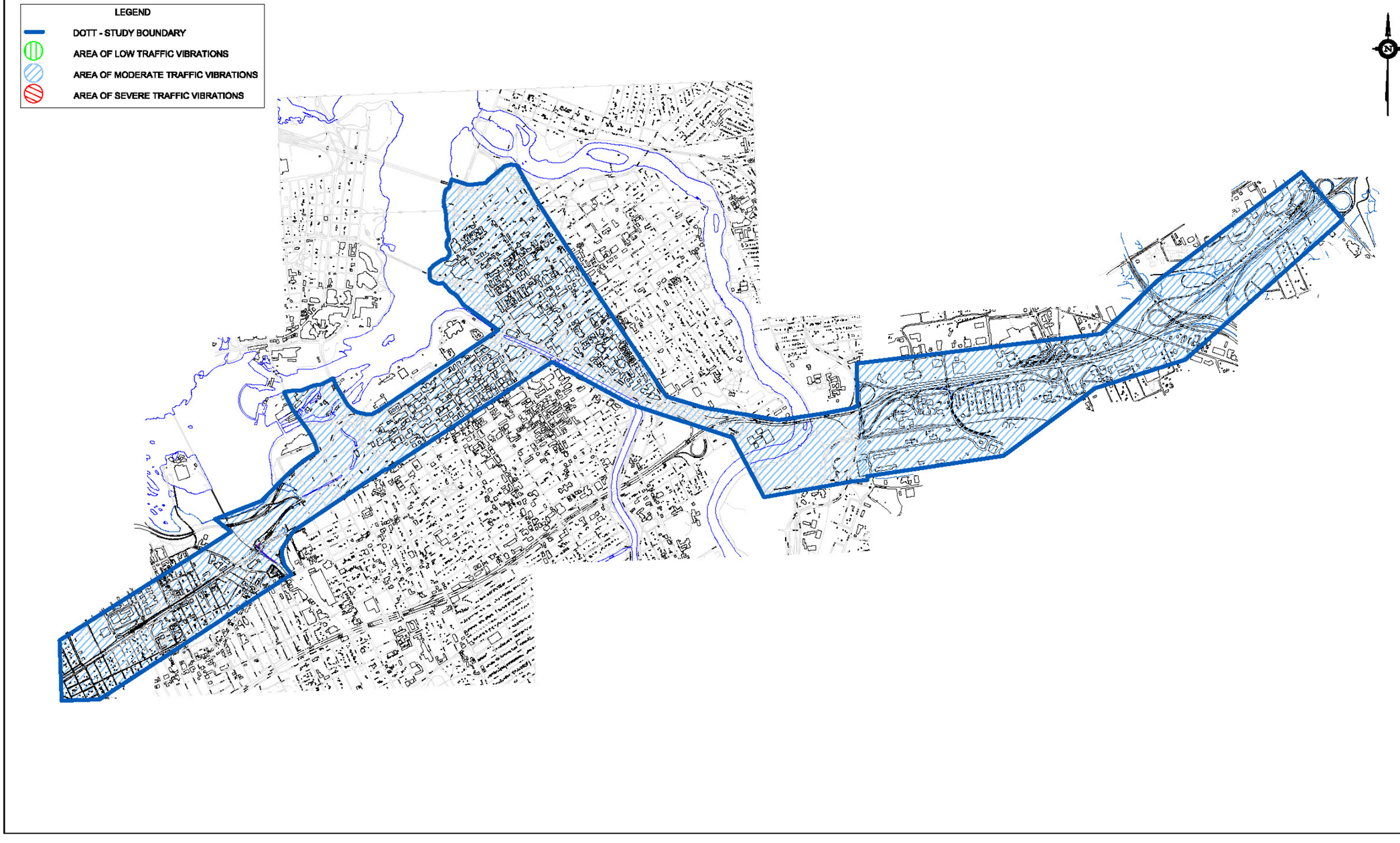


Figure 5-22: Qualitative Assessment of Existing Vibration Levels



5.2.8 Environmental Contamination

An environmental study was carried out to identify existing and former operations/activities that may have created potential environmental impacts within the study area. The results of this study are contained in Appendix D (Geotechnical and Environmental Overview Report). Figure 5-23 illustrates areas of environmental contamination within the study area.

The following sources were reviewed as part of the environmental study: the City of Ottawa Historical Land Use Inventory database (HLUI), the Ecolog ERIS Report (July 21, 2008) that includes the results from searches of 45 environmental related databases, and the 1878, 1948 and 1956 City of Ottawa Fire Insurance Plans (FIPs). The following reports were also reviewed as part of the desk-top study: *Old Landfill Management Strategy Part I – Identification of Sites, City of Ottawa, Ontario*[1], *Mapping and Assessment of Former Industrial Sites City of Ottawa*[2], and existing Phase I ESA and Phase II ESA reports prepared for properties within the study area. The objective is to represent the environmentally contaminated sites in such a way to envisage the quantity and degree of potentially contaminated sites that may be encountered within the study area.

Potential sources of contamination were ranked as high, medium or as low based on the nature of the activities at each location as follows:

- HIGH RANKING
  Gasoline service stations, garages, auto repair shops, pulp mills, dry cleaners, heavy industrialized land use, coal gasification plants, landfills, spills of large or unknown quantities, presence of fuel and/or chemical storage tanks, sites with spills reported to have a confirmed environmental impact and Group I sites (Intera, 1988).

- MEDIUM RANKING
  Auto repair shops, construction and renovation companies, manufacturing plants, industrial facilities, laundry facilities, older chemical laboratories, foundry and/or metal works, battery or ignition repair, mica works, coal (i.e. coal burners), railways, electronic and electrical equipment industries, transport industries, federally contaminated sites, sites licensed for the use pesticides, sites with spills reported to have a possible environmental impact, and Group II sites (Intera, 1988).

- LOW RANKING
  Warehouses, storage facilities, wood and coal yards, breweries, photography shops, printing and engraving activities (older companies) older dental facilities, lumber companies, harness fabrication companies, wholesale of electrical and electronic machinery, equipment and supplies, sites with spill reported to have no anticipated environmental impact, and Group III sites (Intera, 1988).

Activities that were indicated to be of minimal concern were not included in the ranking system.

The western part of study area includes two landfills, 31 HLUI–listed high ranking sites, 5 Ecolog ERIS- listed high ranking sites and 5 FIP-listed high ranking sites. The high ranking sites include landfills and gasoline service stations. The HLUI high ranking sites around Manchester Avenue are associated with one fill area that has been divided into multiple parcels. The area further to the east of Manchester Avenue includes former land uses such as: tanner, bed manufacturer, chemical products industry and railway lands. Overall, this area is a mixed residential/commercial area with some light industrial activities including; restoration shops, metal works, a wire manufacturer and a former mill. This section also includes part of the federal government complex, Tunney's Pasture.

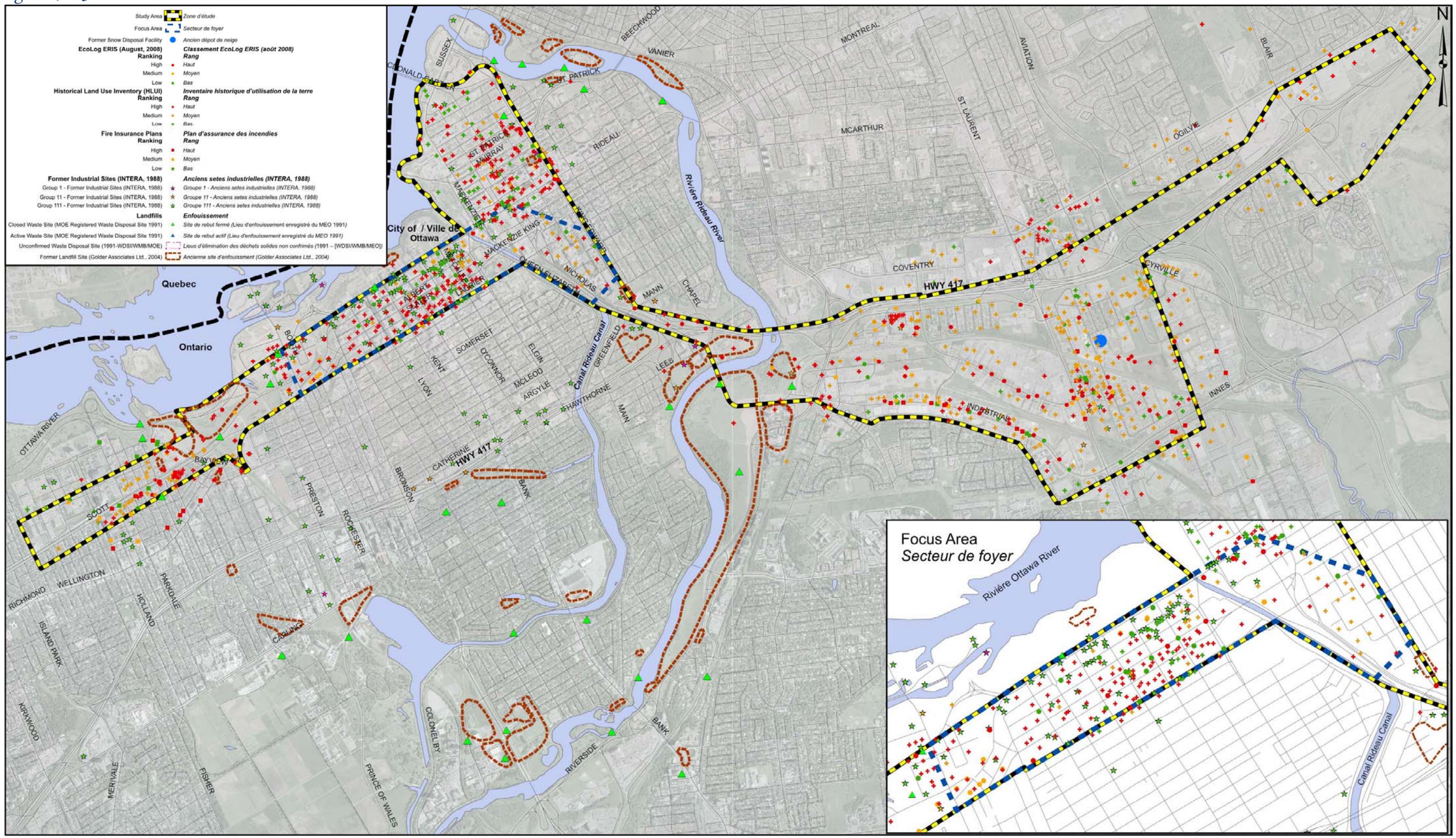
The section from Bayview to the Escarpment includes two closed landfills and a snow dump, 33 HLUI listed high ranking sites, and 3 Ecolog ERIS listed high ranking sites. The high-ranking HLUI listed and Ecolog ERIS sites include former industrial sites (i.e., printing, lumber, pulp and paper mills, casting, oil production and refining, foundries, laboratories, brewing, paint manufacturing, and rail yards), former auto-related sites (i.e., service stations, tire companies, garages and dealerships), and a few dry cleaners. Numerous above-ground and under-ground storage tanks are known to have existed in this area. LeBreton Flats was a neighbourhood of mixed residential, commercial and industrial land uses that was expropriated by the NCC in the 1960s. The long development history of LeBreton Flats, and the heavily industrialized nature has led, essentially, to the entire area being of environmental concern. The LeBreton Flats area is currently being redeveloped and some site remediation has been carried out.

The section between the Escarpment and the Rideau Canal includes 88 HLUI listed high ranking sites, and 8 Ecolog ERIS listed high ranking sites. The high-ranking HLUI and Ecolog ERIS sites include former industrial sites (i.e., numerous printers, especially along Sparks Street, foundries and iron works, machine shops, a hydro-electric distribution station, a lumber yard, car and heavy equipment manufacturing, electric plating, engraving, carbon and ribbon manufacturing and dyeing), former auto-related sites (i.e., service stations, tire companies, garages and dealerships), and several dry cleaners. Numerous above-ground and under-ground storage tanks are known to have existed in this area. The distribution of sites of environmental concern is quite uniform across this area.

The section from the Rideau Canal to Laurier Avenue includes one closed landfill, 97 HLUI listed high ranking sites, and 3 Ecolog ERIS listed high ranking sites. The high-ranking HLUI and Ecolog ERIS sites include former industrial sites (i.e., printing, engraving, iron works, wood milling, tanneries, manufacturing, foundry, coal gasification and paint works), former auto-related sites (i.e., service stations, tire companies, garages and dealerships), and several cleaners. Numerous above-ground and under-ground storage tanks are known to have

[1] Golder Associates Ltd., Report on Old Landfill Management Strategy Phase 1 – Identification of Sites, City of Ottawa, Ontario, 2004.
[2] Intera Technologies Limited with M. Carter and J. Weiler, Mapping and Assessment of Former Industrial Sites, City of Ottawa, 1988.

Figure 5-23: Areas of Environmental Contamination



existed in this area. A former coal gasification plant existed at the northwest corner of York Street and King Edward Avenue. The distribution of sites of environmental concern is mostly to the north of Besserer Street in this area.

The section from Laurier Avenue to the Rideau River includes two closed landfills, 16 HLUI listed high ranking sites, and 4 Ecolog ERIS listed high ranking sites. The high-ranking HLUI and Ecolog ERIS sites are generally situated on the alignments of former rail lines along the existing Nicholas Street, East-West Transitway and Highway 417 corridors. The sites of greatest environmental concern include the closed landfill adjacent to the Rideau River, the rail lines and associated lands (i.e., oil companies), and the former coal gasification plant in the vicinity of the Lees Avenue transitway station.

The section from the Rideau River to the Via Rail Station includes two closed landfills, 13 HLUI listed high ranking sites, and 3 Ecolog ERIS listed high ranking sites. The high-ranking HLUI and Ecolog ERIS sites are generally situated east of the Via Rail station and along Terminal Avenue. The sites of greatest environmental concern include the closed landfills adjacent to the Rideau River, the rail lines and associated lands (i.e., Via Rail and Canadian National), light industrial (i.e. paving, excavating and ornamental brass works) land use between the Via Rail Station and the Rideau River, and petroleum bulk storage and gasoline service stations along Terminal Avenue, from the Transitway to Belfast Avenue.

The results of the environmental inventory within the east study area have been mapped as shown on Figure 403 in Appendix D. The east study area includes 41 HLUI-listed high ranking sites, 35 Ecolog ERIS high ranking sites and 15 FIP listed high ranking sites. The high ranking sites include: bulk fuel storage facilities, gasoline service stations, drycleaners and a junkyard. The central part of the area includes the current OC Transpo maintenance facility and a former snow disposal facility. After 1950 the area was developed with mixed industrial/commercial land uses with higher density industrial activities occurring in the vicinity of Industrial Avenue, Belfast Road and the Michael Street Industrial Area.

5.3 Natural Environment

5.3.1 Physical Environment

A Geotechnical study was carried out to identify existing conditions which may impact or be impacted by the project. Appendix D contains the complete report, which is summarized below.

Data collection was carried out using a variety of sources. Published information and maps from the Geological Service of Canada and the Ontario Geological Service within the study areas were used as the basis for the geotechnical study. This available information was augmented with information from databases containing information on previous site investigations within the study area.

5.3.1.1 Goetechnical Overview

Regional Geological Conditions

The study area lies within the minor physiographic region known as the Ottawa Valley Clay Plain, as delineated in *The Physiography of Southern Ontario*[3], that lies within the major physiographic region of the Ottawa-St. Lawrence Lowland.

The Ottawa Valley Clay Plain region is characterized by relatively thick deposits of sensitive marine clay, silt and silty clay that were deposited within the Champlain Sea basin. These deposits, known as the Champlain Sea clay or Leda clay, overlie relatively thin, commonly reworked glacial till and glaciofluvial deposits, that in turn overlie bedrock.[4] This region is underlain by a series of sedimentary rocks, consisting of shales, limestones, dolostones and sandstones that are, in turn, underlain by igneous and metamorphic bedrock of the Precambrian Shield.

[3] Chapman, L.J. and D.F. Putnam. *The Physiography of Southern Ontario*, Ontario Geological Survey Special Volume 2, Third Edition, 1984. Accompanied by Map P.2715, Scale 1:600,000.

[4] Belanger, J.R. "Urban Geology of Canada's National Capital Area", in *Urban Geology of Canadian Cities*, Geological Association of Canada Special Paper 42, Ed. P.F. Karrow and O.L. White, 1998.

Surficial Geology

The clay in the Ottawa area is a marine clay deposited at the end of the last ice age when Ottawa was covered by the Champlain Sea. From a geotechnical perspective, this clay is highly compressible and sensitive to disturbance and the effects of groundwater lowering. Structures founded on or within this silty clay may undergo significant settlements if the groundwater level is lowered for an extended period of time.

The glacial till in the Ottawa area, which is often encountered underlying the Champlain Sea clay, typically consists of a reworked deposit of cobbles and boulders in a matrix of silty sand containing varying amounts of gravel and clay.

The clay in the Ottawa area is a marine clay deposited at the end of the last ice age when Ottawa was covered by the Champlain Sea. From a geotechnical perspective, this clay is highly compressible and sensitive to disturbance and the effects of groundwater lowering. Structures founded on or within this silty clay my undergo significant settlements if the groundwater level is lowered for an extended period of time.

Figure 5-24 illustrates surficial geology within the study area.

Bedrock

The bedrock underlying the glacial till in the Ottawa area typically consists of shales and/or limestone. The shale bedrock, where it occurs, typically overlies limestone bedrock and may extend to limited depths of tens of metres. The shale and limestone are sedimentary bedrocks with typically near horizontal bedding.

The upper portion of the bedrock, within about 1 to 2 metres of the bedrock surface, is typically weathered and/or fractured. The rock quality generally increases with depth below the weathered/fractured zone of the bedrock.

Bedrock geology within the study area is illustrated in Figures 5-25 and 5-26.

Groundwater

The water table within the study area is generally indicated to be between 1 and 5 metres depth although it extends to deeper

Figure 5-24: Surficial Geology

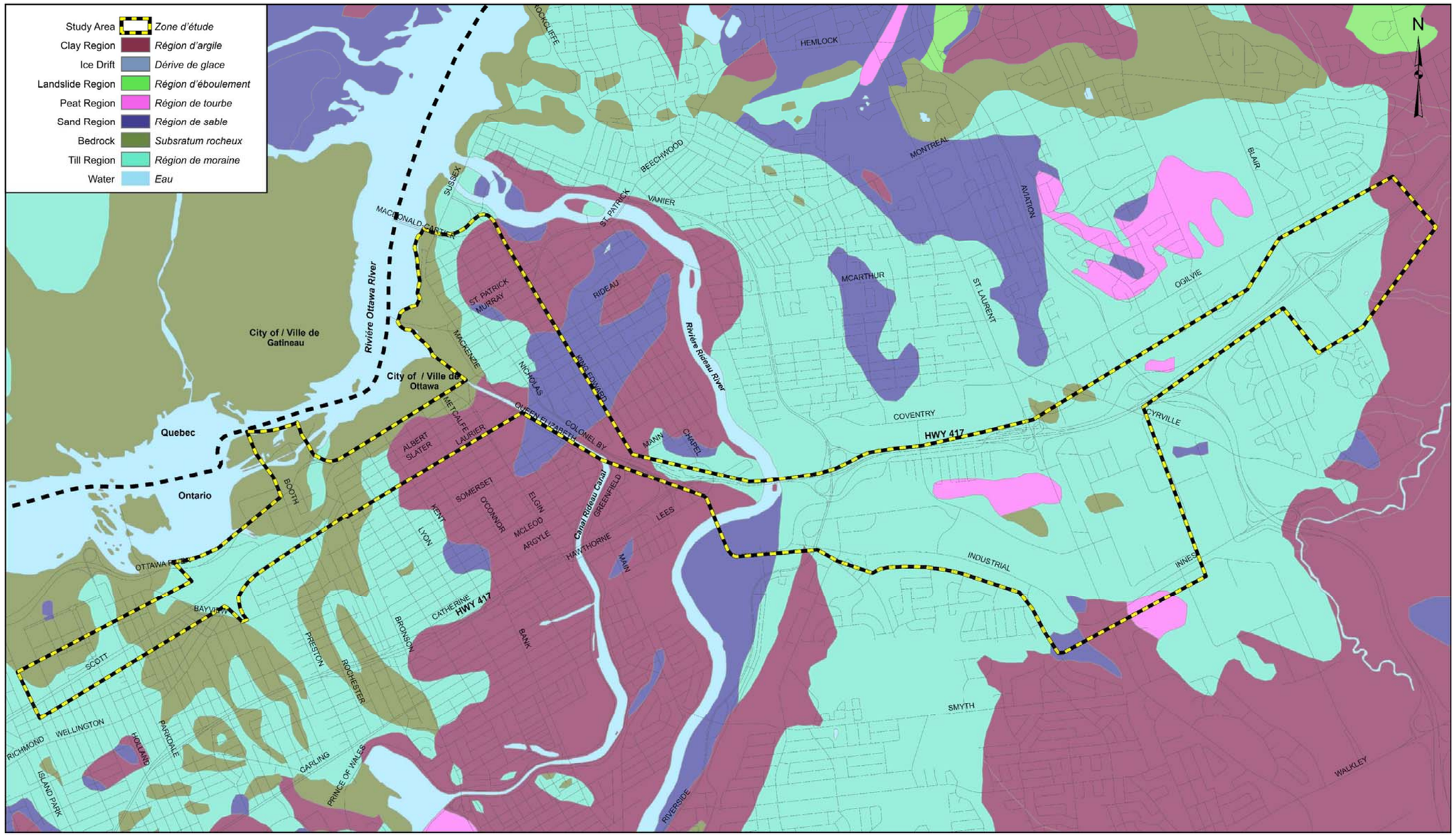


Figure 5-25: Bedrock Geology

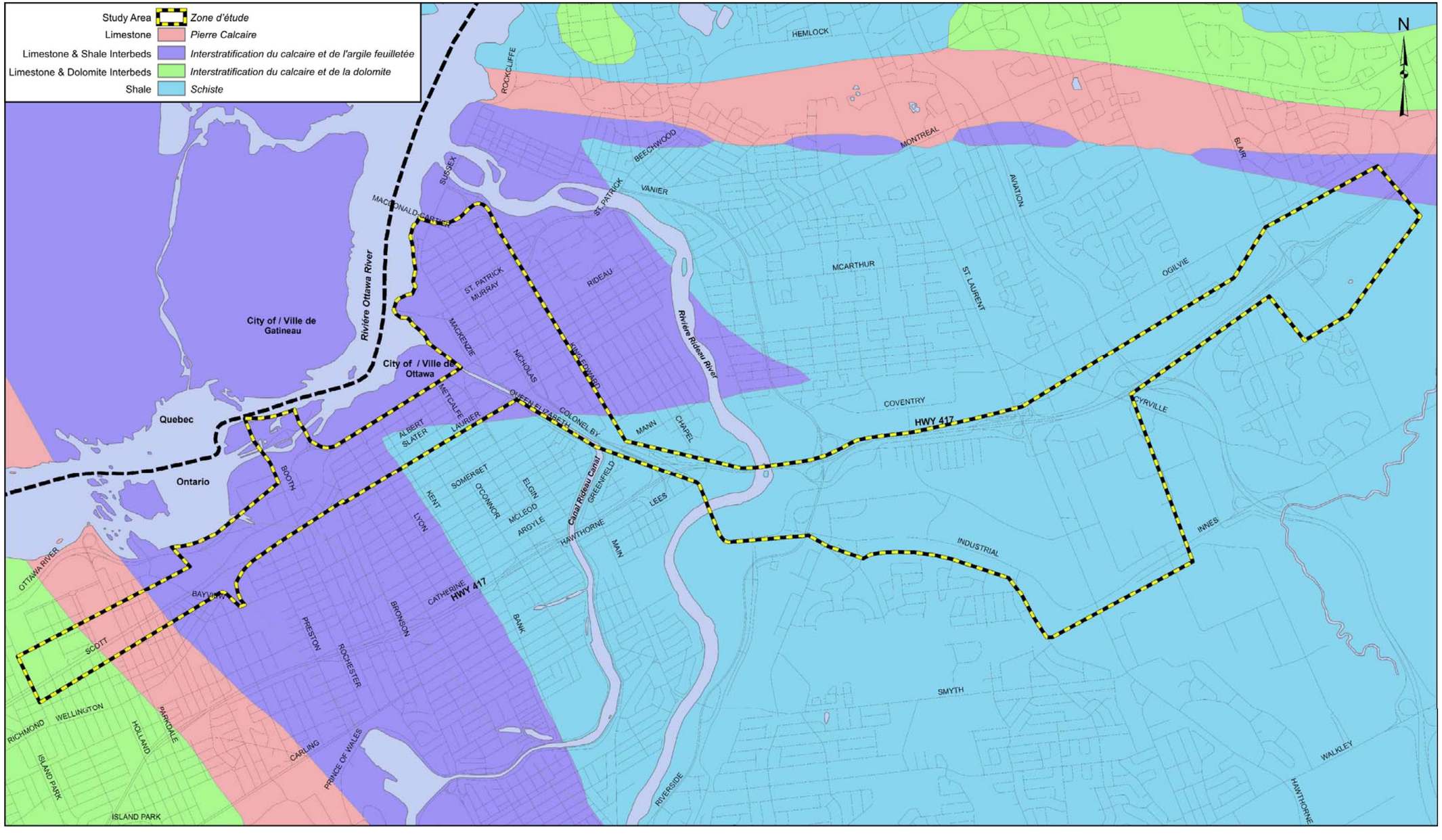
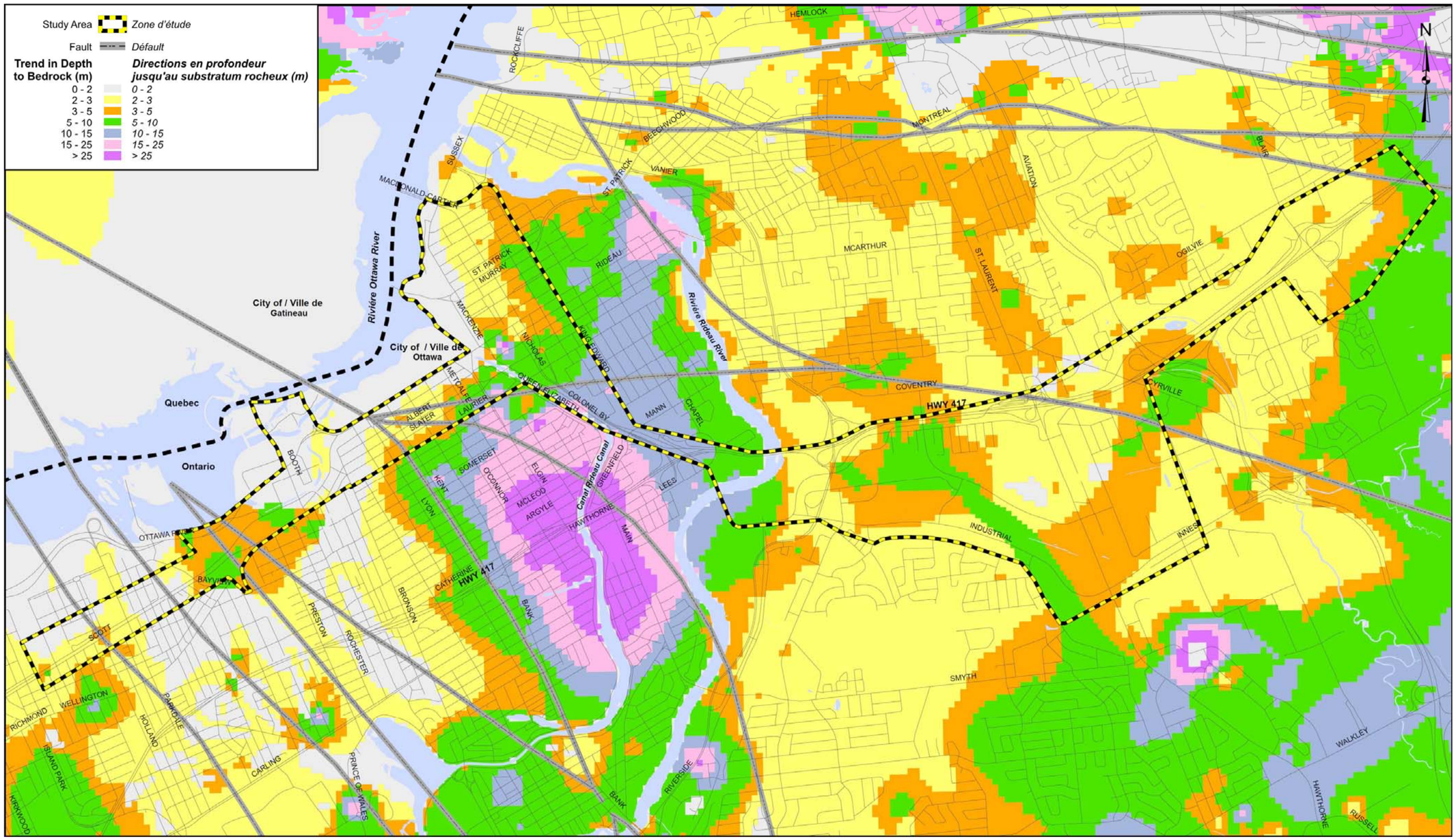


Figure 5-26: Trend in Depth to Bedrock



depths ranging from about 5 to 10 metres south of Laurier Avenue and east of the Rideau Canal. Below the water table pores in the soil and rock are fully saturated with water, flowing at rates and in directions influenced by topography, soil or rock type, and existing sub-surface structures such as deep building foundations and associated drainage systems, and sewers. The major receptors of groundwater flow in the study area are the Ottawa River, Rideau River and Rideau Canal. Other receptors of groundwater flow potentially include drainage systems and sewers.

There is no aquifer of significance in the study area due mainly to the low permeability of the bedrock formations (limestone with *intact* hydraulic conductivity in the order of 10^{-7} centimetres per second, or lower). However, it is possible that significant quantities of groundwater can be produced from highly fractured bedrock zones. Due to the urban development, it is expected that groundwater quality is generally poor; however, the groundwater is not used for drinking water as the area is serviced with municipally supplied water.

5.3.2 Biological Environment

The study area contains a number of forested and green space areas, crosses a portion of Rideau Canal and the Rideau River, and is bordered to the north by the Ottawa River. This review of existing environmental conditions serves to identify known significant species and habitats within, and surrounding, the study area.

5.3.2.1 Vegetation

Wetlands

No Provincially or Locally significant wetlands were identified within the boundaries or within 5kms of the study area. A wetland complex, known as the CMHC National Office Lands/Carson Grove – Wetland, was identified outside of the study area boundary, but within 5km of the study area. This wetland complex was not classed as provincially or locally significant.

Natural Areas

Urban Natural Features are areas of natural landscape, such as woods, wetlands, watercourses and ravines, which contribute to urban area biodiversity by providing wildlife habitat. These areas are also often utilized by area residents. These areas may be present on City, provincial, federal, and privately owned lands.

Six Urban Natural Area sites are located within the study area (Table 5-8).

Table 5-8: Urban Natural Areas

UNA site no.	UNA name	Area	Ranking	Ownership
166	Presland Park Woods	1.0 ha	low	Private
164	Eastway Gardens Woods	3.8 ha	Low	Province
68	Aviation Parkway South	10.3 ha	Low	City Of Ottawa
74	City Park Woods	0.8 ha	Low	Private
69	Queensway Park	0.8 ha	low	City Of Ottawa
67	Aviation Parkway North	20.7 ha	Moderate	City, NCC
73	NRC Woods South	26.8 ha	Moderate	Federal Land

Major Open Spaces

Major Open Spaces are generally located on public lands and include areas such as large parks and corridors along major rivers, parkway corridors, and corridors set aside for rapid-transit and major roads. These areas are an integral part of the City's Greenspace Network, and serve to improve the quality of life for residents and contribute to health of the natural environment.

Within the study area Major Open Spaces were identified along much of the shoreline of the Ottawa and Rideau Rivers and the Rideau Canal.

Natural Heritage Areas

One Area of Natural and Scientific Interest (ANSI) was identified within the study area: an Earth Science ANSI located between the Portage and Chaudière bridges. No locally or provincially significant wetlands, Urban Natural Areas (UNA) or Environmentally Sensitive Area (ESA) designations were identified within the study area. Figure 5-27 illustrates natural areas within the study area.

Four Earth Science ANSIs were identified within 5km of the study area: Kippewa Drive, St. Laurent-Montreal Road, Sawmill Creek Shales, and Alta Vista.

5.3.2.2 Wildlife

Birds

The study area is within three 10 x 10 km Ontario Breeding Bird Alas squares (18VR42, 18VR43 and 18VR53). The Ontario Breeding Bird Atlas was an extensive survey of all breeding birds in Ontario conducted the first time in 1981-1985 and repeated for the second atlas in 2001-2005. Summaries for these three squares identified a total of 132 species of birds.

Significant bird species identified within these squares include one Special Concern species, the black tern (Chlidonias niger). The cattail marsh and riverine habitat for this species is outside the study area.

In addition, two Threatened species as identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) have been found within the atlas squares: the common nighthawk (Chordeiles minor) and chimney swift (Chaetura pelagica). The nighthawk nests on rooftops of buildings and forages over a variety of urban and open space landscapes. The chimney swift nests primarily in old brick chimneys.

Three species area listed as regionally rare for the Ottawa area (OBBA, 2005). These breeding species included the double-crested cormorant (Phalacrocorax auritus), herring gull (Larus argentatus), and yellow-billed cuckoo (Coccyzus americanus). There were also 28 species listed as area sensitive. Area sensitive species are those which require a specific quantity and quality of contiguous habitat in which to successfully breed.

Table 5-9 lists bird species present within the Ottawa area

Figure 5-27: Natural Areas

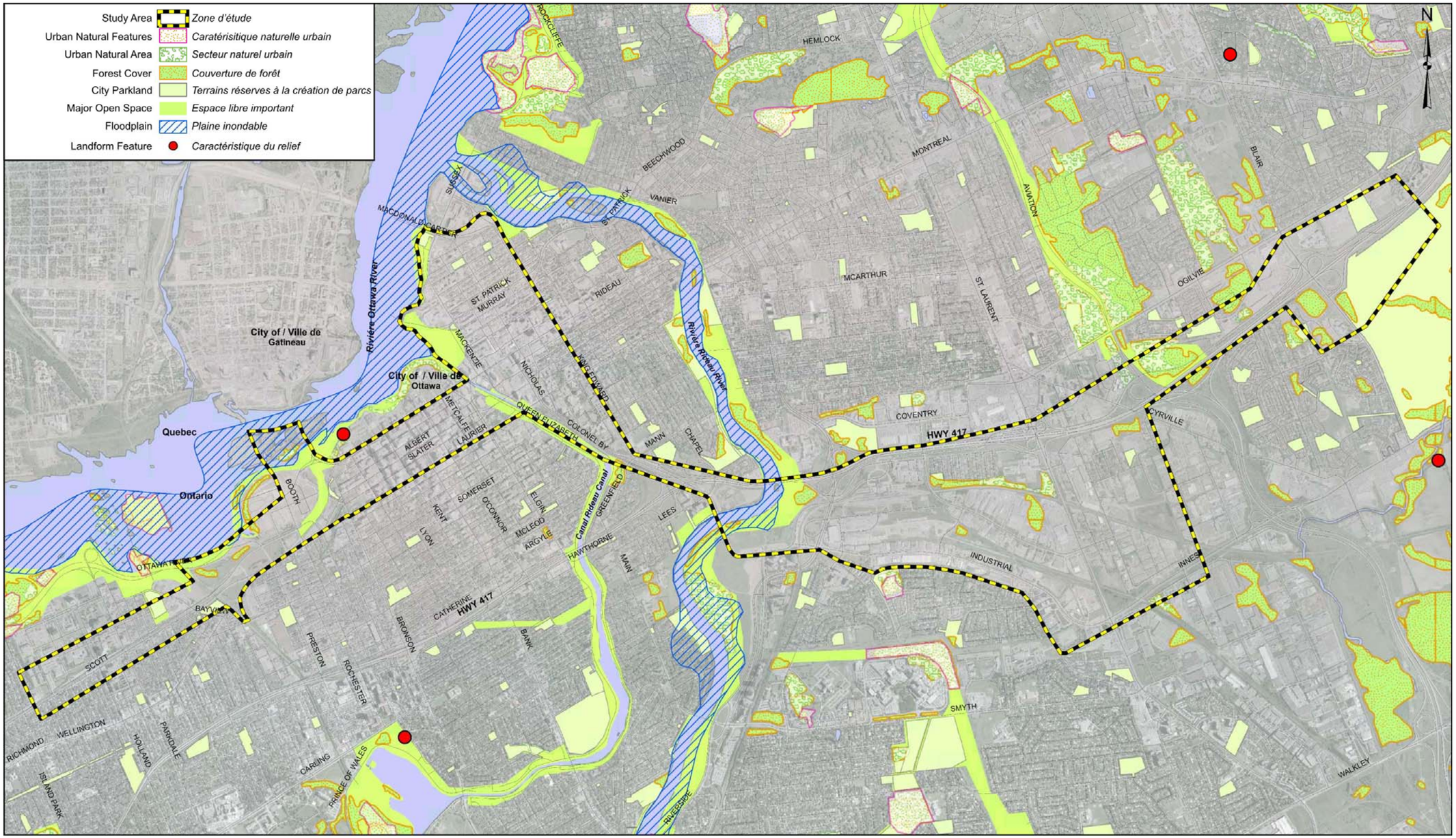


Table 5-9: Bird Species in the Ottawa Area

Common Name	Area Sensitive	Regionally Rare (Ottawa)	Provincial Status	COSEWIC Status
Alder Flycatcher				
American Bittern	✓			
American Black Duck				
American Crow				
American Goldfinch				
American Kestrel				
American Redstart	✓			
American Robin				
American Wigeon				
American Woodcock				
Baltimore Oriole				
Bank Swallow				
Barn Swallow				
Barred Owl	✓			
Belted Kingfisher				
Black Tern	✓		Special Concern	Not at Risk
Black-billed Cuckoo				
Black-capped Chickadee				
Black-crowned Night-Heron				
Black-throated Green Warbler	✓			
Black-white Warbler	✓			
Blue Jay				
Blue-winged Teal				
Bobolink	✓			
Broad-winged Hawk	✓			
Brown Creeper	✓			
Brown Thrasher				
Brown-headed Cowbird				
Canada Goose				
Carolina Wren				
Cedar Waxwing				
Chestnut-sided Warbler				
Chimney Swift				Threatened
Chipping Sparrow				
Clay-colored Sparrow				
Cliff Swallow				
Common Grackle				
Common Merganser	✓			
Common Moorhen				
Common Nighthawk				Threatened
Common Raven				
Common Snipe				
Common Tern				
Common Yellowthroat				
Cooper's Hawk	✓			
Double-crested Cormorant		✓		
Downy Woodpecker				
Eastern Kingbird				
Eastern Meadowlark	✓			
Eastern Phoebe				
Eastern Screech-Owl				
Eastern Wood-Pewee				
European Starling				
Field Sparrow				
Grasshopper Sparrow				
Great Crested Flycatcher				
Gray Catbird				
Gray Partridge				
Great Horned Owl				
Green Heron				
Green-winged Teal				
Hairy Woodpecker	✓			
Herring Gull		✓		
Hermit Thrush				
Hooded Merganser				
Horned Lark				
House Finch				
House Sparrow				
House Wren				
Indigo Bunting				
Killdeer				
Least Flycatcher	✓			
Lesser Scaup				
Magnolia Warbler	✓			
Mallard				
Marsh Wren				
Merlin				
Mourning Dove				
Mourning Warbler				
Nashville Warbler				
North Rough-winged Swallow				
Northern Cardinal				
Northern Flicker				
Northern Harrier	✓			
Northern Mockingbird				
Northern Pintail				
Northern Rough-winged Swallow				
Northern Shoveler				
Northern Waterthrush	✓			
Osprey				
Ovenbird	✓			
Peregrine Falcon			Threatened	Special Concern
Pied-billed Grebe				
Pileated Woodpecker	✓			
Pine Siskin				
Pine Warbler	✓			
Purple Finch				
Purple Martin				
Red-breasted Nuthatch	✓			
Red-eyed Vireo				
Red-tailed Hawk				
Red-wing Blackbird				
Ring-billed Gull				
Ring-necked Duck				
Ring-necked Pheasant				
Rock Dove				
Rose-breasted Grosbeak				
Ruby-crowned Kinglet				
Ruby-throated Hummingbird				
Ruffed Grouse				
Savannah Sparrow	✓			
Scarlet Tanager	✓			
Sharp-shinned Hawk	✓			
Song Sparrow				
Sora				
Spotted Sandpiper				
Swamp Sparrow				
Tree Swallow				
Turkey Vulture				
Upland Sandpiper	✓			
Veery	✓			
Vesper Sparrow				
Virginia Rail				
Warbling Vireo				
White-breasted Nuthatch	✓			
White-throated Sparrow				
Willow Flycatcher				
Wilson's Phalarope				
Wood Duck				
Wood Thrush				
Yellow Warbler				
Yellow-bellied Sapsucker	✓			
Yellow-billed Cuckoo		✓		
Yellow-rumped Warbler				

Mammals

A total of 60 mammal species have been identified within, or in proximity, to the Ottawa District (Sankey, 2008). As the list encompasses the whole district, including historic and extirpated records, not all of the species are likely to be found in an urban setting. Nonetheless, the presence of some of the uncommon to very rare species within the study area may be plausible and determining the likelihood of significant species presence, and available habitat, would require field investigation. Table 5-10 lists mammal species within the Ottawa area.

Table 5-10: Mammal Species within the Ottawa Area

Common Name	Scientific Name	Abundance in Ottawa District	Status	
			OMNR	COSEWIC
northern short-tailed shrew	*Blarina brevicauda*	abundant		
woodchuck	*Marmota monax*	abundant		
meadow vole	*Microtus pennsylvanicus*	abundant		
white-footed mouse	*Peromyscus leucopus*	abundant		
raccoon	*Procyon lotor*	abundant		
gray squirrel	*Sciurus carolinensis*	abundant		
common shrew	*Sorex cinereus*	abundant		
eastern chipmunk	*Tamias striatus*	abundant		
beaver	*Castor canadensis*	common		
southern red-backed vole	*Clethrionomys gapperi*	common		
star-nosed mole	*Condylura cristata*	common		
big brown bat	*Eptesicus fuscus*	common		
porcupine	*Erethizon dorsatum*	common		
northern flying squirrel	*Glaucomys sabrinus*	common		
snowshoe hare	*Lepus americanus*	common		
little brown bat	*Myotis lucifugus*	common		
mink	*Mustela vison*	common		
striped skunk	*Mephitis mephitis*	common		
ermine	*Mustela erminea*	common		
white-tailed deer	*Odocoileus virginianus*	common		
muskrat	*Ondatra zibethicus*	common		
deer mouse	*Peromyscus maniculatus*	common		
eastern cottontail	*Sylvilagus floridanus*	common		
red squirrel	*Tamiasciurus hudsonicus*	common		
red fox	*Vulpes vulpes*	common		
coyote	*Canis latrans*	uncommon		
southern flying squirrel	*Glaucomys volans*	uncommon	Special Concern	
river otter	*Lontra canadensis*	uncommon		
long-tailed weasel	*Mustela frenata*	uncommon		
house mouse	*Mus musculus*	uncommon		
woodland jumping mouse	*Napaeozapus insignis*	uncommon		
Norway rat	*Rattus norvegicus*	uncommon		
smoky shrew	*Sorex fumeus*	uncommon		
black bear	*Ursus americanus*	uncommon		
meadow jumping mouse	*Zapus hudsonius*	uncommon		
hoary bat	*Lasiurus cinereus*	uncommon		
moose	*Alces alces*	rare		
gray wolf	*Canis lupus*	rare		
European hare	*Lepus europaeus*	rare		
silver-haired bat	*Lasionycteris noctivagans*	rare		
eastern red bat	*Lasiurus borealis*	rare		
northern long-eared bat	*Myotis septentrionalis*	rare		
hairy-tailed mole	*Parascalops breweri*	rare		
pygmy shrew	*Sorex hoyi*	rare		
fisher	*Martes pennanti*	rare (extirpated locally, being re-introduced)		
cougar	*Felis concolor*	very rare	Endangered	Data Deficient
bobcat	*Lynx rufus*	very rare		
Canada lynx	*Lynx canadensis*	very rare		
marten	*Martes americana*	very rare		
eastern small-footed bat	*Myotis leibii*	very rare		
eastern pipistrelle	*Pipistrellus subflavus*	very rare		
water shrew	*S.palustris*	very rare		
southern bog lemming	*Synaptomys cooperi*	very rare		
Virginia opossum	*Didelphis virginiana*	some records close to the District		
badger	*Taxidea taxus*	a record close to District	Endangered	Endangered
wolverine	*Gulo gulo*	one extraterritorial record (Quebec)	Threatened	Special Concern
wapiti (elk)	*Cervus elaphus*	extirpated locally by 1800		
caribou	*Rangifer tarandus*	extirpated locally by 1900	Threatened	Threatened
harbor seal	*Phoca vitulina*	no records since 1884 (when Ottawa River damed)		
nutria or coypu	*Myocastor coypus*	escapes (doesn't survive winter)		

Herptofauna

Records of for a total of 31 reptile and amphibian species have been identified within the City of Ottawa limits (NHIC, 2008). Six of the species identified are classified as a Species At Risk provincially and/or nationally. Table 5-11 lists reptiles and amphibian species within the City of Ottawa limits.

Table 5-11: Reptiles and Amphibians within the City of Ottawa

Common Name	Scientific Name	Status	
		OMNR	COSEWIC
Salamanders			
Common Mudpuppy	*Necturus maculosus*		
Red-spotted Newt	*Notophthalmus viridescens viridescens*		
Jefferson / Blue-spotted Salamander Complex	*Ambystoma jeffersonianum-laterale* "complex"		
Jefferson / Blue-spotted Salamander polyploids	*Ambystoma jeffersonianum - laterale* polyploids		
Spotted Salamander	*Ambystoma maculatum*		
Northern Two-lined Salamander	*Eurycea bislineata*		
Northern Redback Salamander	*Plethodon cinereus*		
Frogs & Toads			
American Toad	*Bufo americanus americanus*		
Spring Peeper	*Pseudacris crucifer*		
Western Chorus Frog	*Pseudacris triseriata*		Threatened
Gray Treefrog	*Hyla versicolor*		
Wood Frog	*Rana sylvatica*		
Northern Leopard Frog	*Rana pipiens*		
Pickerel Frog	*Rana palustris*		
Green Frog	*Rana clamitans melanota*		
Mink Frog	*Rana septentrionalis*		
Bullfrog	*Rana catesbeiana*		
Turtles			
Common Snapping Turtle	*Chelydra serpentina*	Special Concern	Special Concern
Common Musk Turtle	*Sternotherus odoratus*	Threatened	Threatened
Midland Painted Turtle	*Chrysemys picta marginata*		
Red-eared Slider	*Trachemys scripta elegans*	*non-native*	
Map Turtle	*Graptemys geographica*	Special Concern	Special Concern
Blanding's Turtle	*Emydoidea blandingi*	Threatened	Threatened
Spotted Turtle	*Clemmys guttata*	Endangered	Endangered
Snakes			
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*		
Northern Ribbon Snake	*Thamnophis sauritus septentrionalis*	Special Concern	Special Concern
Northern Water Snake	*Nerodia sipedon sipedon*		
Northern Redbelly Snake	*Storeria occipitomaculata occipitomaculata*		
Smooth Green Snake	*Liochlorophis vernalis*		
Northern Ringneck Snake	*Diadophis punctatus edwardsi*		
Eastern Milk Snake	*Lampropeltis triangulum*	Special Concern	Special Concern

Fish Species

A total of 77 different species have been identified within the Ottawa River from between the Chats Falls and Carillion generating stations (Haxton & Chubbard, 2002), including six species of conservation concern. This portion of the river encompasses the shoreline of the study area and confluences of Rideau River and Rideau Canal. It is possible that fish species caught in the Ottawa River may also be present within the lower reaches and mouth of the Rideau River and Rideau Canal. Table 5-12 lists fish species for the Ottawa River and Rideau River.

Table 5-12: Fish Species for the Ottawa River and Rideau River

Common Name	Scientific Name	Rideau River [1][2]	Ottawa River [3]	Status	
				OMNR	COSEWIC
northern pike	*Esox lucius*	X	X		
muskellunge	*Esox masquinongy*	X	X		
American eel	*Anguilla rostrata*		X	END	SC
American brook	*Lampetra appendix*		X		
northern brook	*Ichthyomyzon fossor*		X	SC	SC
silver lamprey	*Ichthyomyzon*		X		
lake sturgeon	*Acipenser fulvescens*		X	SC	THR
longnose gar	*Lepisosteus osseus*		X		
lake herring (cisco)	*Coregonus artedi*		X		
alewife	*Alosa*	X	X		
American shad	*Alosa sapidissima*		X		
rainbow smelt	*Osmerus mordax*		X		
mooneye	*Hiodon tergisus*		X		
burbot (ling)	*Lota lota*		X		
central mudminnow	*Umbra limi*	X	X		
common carp	*Cyprinus carpio*	X	X		
longnose dace	*Rhinichthys*	X	X		
northern redbelly	*Phoxinus eos*		X		
finescale dace	*Phoxinus neogaeus*		X		
brassy minnow	*Hybognathus*	X	X		
common shiner	*Luxilus cornutus*	X	X		
golden shiner	*Notemigonus*	X	X		
emerald shiner	*Notropis atherinoides*	X	X		
rosyface shiner	*Notropis rubellus*		X		
blackchin shiner	*Notropis heterodon*	X	X		
blacknose shiner	*Notropis heterolepis*		X		
spottail shiner	*Notropis hudsonius*	X	X		
spotfin shiner	*Cyprinella spiloptera*		X		
sand shiner	*Notropis stramineus*		X		
mimic shiner	*Notropis volucellus*	X	X		
eastern silvery	*Hybognathus regius*	X	X		
fathead minnow	*Pimephales promelas*		X		
bluntnose minnow	*Pimephales notatus*	X	X		
cutlip minnow	*Exoglossum*		X	THR	
pearl dace	*Margariscus*	X	X		
creek chub	*Semotilus*	X	X		
fallfish	*Semotilus corporalis*	X	X		
trout-perch	*Percopsis*	X	X		
brook stickleback	*Culaea inconstans*	X	X		
ninespine stickleback	*Pungitius pungitius*		X		
white sucker	*Catostomus*	X	X		
longnose sucker	*Catostomus*		X		
quillback	*Carpiodes cyprinus*		X		
silver redhorse	*Moxostoma*	X	X		
greater redhorse	*Moxostoma*	X	X		
shorthead redhorse	*Moxostoma*	X	X		
river redhorse	*Moxostoma*		X	SC	SC
channel catfish	*Ictalurus punctatus*	X	X		
brown bullhead	*Ameiurus nebulosus*	X	X		
black bullhead	*Ameiurus melas*		X		
yellow bullhead	*Ameiurus natalis*		X		
tadpole madtom	*Noturus gyrinus*		X		
margined madtom	*Noturus insignis*		X		
stonecat	*Noturus flavus*		X		
banded killifish	*Fundulus diaphanus*	X	X		
brook silverside	*Labidesthes sicculus*	X	X		
rock bass	*Ambloplites rupestris*	X	X		
pumpkinseed	*Lepomis gibbosus*	X	X		
bluegill	*Lepomis macrochirus*	X	X		
longear sunfish	*Lepomis megalotis*		X		
smallmouth bass	*Micropterus dolomieu*	X	X		
largemouth bass	*Micropterus*	X	X		
black crappie	*Pomoxis*	X	X		
white crappie	*Pomoxis annularis*		X		
Iowa darter	*Etheostoma exile*		X		
johnny darter	*Etheostoma nigrum*	X	X		
tesselated darter	*Etheostoma olmstedi*	X	X		
channel darter	*Percina copelandi*		X	THR	THR
fantail darter	*Etheostoma flabellare*		X		
yellow perch	*Perca flavenscens*	X	X		
logperch	*Percina caprodes*	X	X		
walleye	*Sander vitreus*	X	X		
sauger	*Sander canadensis*		X		
brown trout	*Salmo trutta*		X		
freshwater drum	*Aplodinotus*	X	X		
slimy sculpin	*Cottus cognatus*		X		
mottled sculpin	*Cottus bairdi*	X	X		

[1] Rideau River Biodiversity Project. 2007. Canadian Museum of Nature (http://nature.ca/rideau/index-e.html)
[2] Niblett Environmental Associates Inc. 2005. East-West Light Rapid Transit Natural Features and Literature Review.
[3] Review of the historical and existing natural environment and resources on the Ottawa River. 2002. Ontario Ministry of Natural Resources.

Green's Creek Watershed

The study area captures parts of the Green's Creek watershed. A number of small feeder streams and ditches are included within the study area. Green's Creek is considered a warmwater fishery. Table 5-13 lists fish species for this watershed.

Table 5-13: Fish Species for Green's Creek Watershed

Common Name	Scientific Name
common shiner	*Luxilus cornutus*
pearl dace	*Margariscus margarita*
golden shiner	*Notemigonus crysoleucas*
emerald shiner	*Notropis atherinoides*
spottail shiner	*Notropis hudsonius*
northern redbelly dace	*Phoxinus eos*
bluntnose minnow	*Pimephales notatus*
fathead minnow	*Pimephales promelas*
blacknose dace	*Rhinichthys atratulus*
longnose dace	*Rhinichthys cataractae*
creek chub	*Semotilus atromaculatus*
white sucker	*Catostomus commersonii*
northern pike	*Esox lucius*

Common Name	Scientific Name
central mudminnow	*Umbra limi*
trout-perch	*Percopsis omiscomaycus*
brook stickleback	*Culaea inconstans*
rock bass	*Ambloplites rupestris*
pumpkinseed	*Lepomis gibbosus*
bluegill	*Lepomis macrochirus*
largemouth bass	*Micropterus salmoides*
black crappie	*Pomoxis nigromaculatus*
johnny darter	*Etheostoma nigrum*
yellow perch	*Perca flavescens*
logperch	*Percina caprodes*
sauger	*Sander canadensis*
Total Number of Species: *25*	

Fish Spawning Areas

A review of the environmental consultant's GIS database identified walleye spawning grounds located near the mouths of Rideau Canal and Rideau River.

Species at Risk

Table 5-14 lists species at risk found within or adjacent to the study area. The "S-Rank" is a ranking system developed by the Natural Heritage Information Centre to set protection priorities for rare species and natural communities within Ontario. Further detail on mitigation measures to address potential impacts on species at risk are identified in Section 10.0.

Table 5-14: Species at Risk

Common Name	Scientific Name	Last Date Recorded	Provincial Status	S-Rank	Within Study Area	Within 5km of Study Area
Peregrine Falcon	*Falco peregrinus anatum*	1997	Threatened	S2S3B	X	
Greater Redhorse	*Moxostoma valenciennesi*	1983	Sensitive	S3		X
Lake Sturgeon	*Acipenser fulvescens*	2000	Sensitive	S3	X	X
Northern Brook Lamprey	*Ichthyomyzon fossor*	1982	Special Concern	S3		X
Eastern Pipistrelle	*Pipistrellus subflavus*	1890	Sensitive	S3?	X	
Northern Long-eared Bat	*Myotis septentrionalis*	1967	Sensitive	S3?	X	
Small-footed Bat	*Myotis leibii*	1962	May be at risk	S2S3	X	
Blanding's Turtle	*Emydoidea blandingii*	2003	Threatened	S3		X
Common Snapping Turtle	*Cheldra serpentine*	2009	Special Concern	S3	X	
Milksnake	*Lampropeltis triangulum*	1978	Special Concern	S3	X	
Stinkpot	*Sternotherus odoratus*	1987	Threatened	S3		X
Eastern Red Damsel	*Amphiagrion saucium*	1935	n/a	S3		X
Elusive Clubtail	*Stylurus notatus*	1940	n/a	S2		X
Moustached Clubtail	*Gomphus adelphus*	Pre-1941	n/a	S3		X
Skillet Clubtail	*Gomphus ventricosus*	1924	n/a	S1		X
A Lichen	*Steinia geophana*	2000?	n/a	S1		X
A Lichen	*Vezdaea leprosa*	2000?	n/a	S1?		X
a moss	*Brachythecium calcareum*	1899	May be at risk	S2		X
a moss	*Fontinalis sullivantii*	1972	May be at risk	S1		X
Branching Bur-reed	*Sparganium androcladum*	1894	May be at risk	S1		X
Giant Pinedrops	*Pterospora andromedea*	1982	May be at risk	S2		X
Houghton's Umbrella-sedge	*Cyperus houghtonii*	1969	Sensitive	S3?		X
Limestone Oak Fern	*Gymnocarpium robertianum*	1941	May be at risk	S2		X
Long-stemmed Waterwort	*Elatine triandra*	1891	Sensitive	S3		X
Northern Dropseed	*Sporobolus heterolepis*	1947	Sensitive	S3		X
Pitch Pine	*Pinus rigida*	1969	May be at risk	S2S3		X
Ram's-head Lady's-slipper	*Cypripedium arietinum*	1950?	Sensitive	S3		X
Threadfoot	*Podostemum ceratophyllum*	1989	May be at risk	S2	X	X

Management Strategies

The main guiding document used by the Kemptville District Ontario Ministry of Natural Resources office is the Strategic Fisheries Management Framework for the Ottawa River. Although outdated, the Carleton District Fisheries Management Plan (1985-2000) is still being followed. The Rideau Valley Conservation Authority also has completed a watershed plan for the Lower Rideau River.

5.4 Consultation on the Environmental Setting

The existing conditions data developed during the project planning phase was presented and discussed at the Consultation Group meetings of 26 October 2008, and incorporated into the display panels and presentation of the first Public Open House (26 February 2009). Existing conditions data developed as part of the Maintenance and Storage Facility site selection exercise was presented and discussed at the Consultation Group meetings of 22 June 2009, and incorporated into the display panels of the second Public Open House (24 June 2009).

The existing conditions data developed above was also incorporated into the display panels of the fourth Public Open House (23 February 2010) for the Environmental Assessment phase of the project.