APPENDIX D:
Technical Reports

Stantec

Memo

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Reference: Valley Inn Bridge Replacement - Natural Environment Technical Memo

Stantec Consulting Ltd. (Stantec) was retained by the City of Hamilton to conduct a natural heritage features assessment and constraints analysis in support of the replacement of the Valley Inn Bridge (the bridge) over Carroll's Bay. The Study Area includes the bridge crossing location and the area within an approximately 120 m radius of the bridge.

1 METHODS

1.1 BACKGROUND DATA COLLECTION SOURCES

The following background documentation and related information sources were reviewed to identify natural heritage features and constraints in the Study Area:

- Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) digital mapping of natural heritage features (MNRF 2021a)
- Satellite imagery (Google Earth Pro 2020)
- Conservation Halton (CH) Regulation Limit Mapping (CH 2018)
- City of Hamilton Urban Hamilton Official Plan (City of Hamilton 2013)
- City of Burlington Official Plan (City of Burlington 2018)
- Halton Region Official Plan (Regional Municipality of Halton 2018)
- Important Bird and Biodiversity Areas in Canada (IBA Canada 2021)

A list of species at risk (SAR) and species of conservation concern (SOCC) with potential to occur in the Study Area was prepared by reviewing the following sources:

- MNRF Land Information Ontario (LIO) digital mapping of natural heritage features (MNRF 2021a)
- Fisheries and Oceans Canada (DFO) Aquatic SAR Maps – Ontario (DFO 2019a)
- Natural Heritage Information Centre (NHIC) database (MNRF 2021b)
- Species at Risk in Ontario (SARO) List Schedule 2 & 3 (MECP 2020)
- *Species at Risk Act* (SARA), Schedule 1 (Government of Canada 2021)
- 2nd Ontario Breeding Bird Atlas (Cadman et al. 2007)

- Atlas of Mammals of Ontario (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019)
- The Ontario Butterfly Atlas (Toronto Entomologists' Association [TEA] 2021)
- iNaturalist Database (iNaturalist 2021)
- eBird Database (eBird 2021)

These resources generally do not provide the exact locations of species occurrence, with accuracy ranging from 1 km^2 (NHIC) to 10 km^2 (wildlife atlases) or to municipal boundaries or watersheds. Results were therefore screened to assess their relevance to the Study Area and species were removed from consideration if no suitable habitat was observed in the Study Area (e.g., open-water aquatic species).

Definitions for Species at Risk and Species of Conservation Concern

For the purpose of this screening, SAR are defined as:

- Endangered and Threatened species that are on the Species at Risk in Ontario (SARO) list and protected by the provincial *Endangered Species Act,* 2007 (ESA)
- Endangered and Threatened aquatic species that are listed on Schedule 1 of the federal *Species at Risk Act,* 2002 (SARA) and protected by the SARA

Species of Conservation Concern (SOCC) are defined as:

- Special Concern species on the SARO list
- Endangered, Threatened and Special Concern terrestrial species listed on Schedule 1 of SARA, but not protected by the ESA.
- Species with provincial ranks of S1 to S3. Provincial ranks (S ranks) are used by the NHIC to set protection priorities for rare species and vegetation communities. They are based on the number of occurrences in Ontario and are not legal designations. Provincial S ranks are defined as follows:

  S1: Critically imperiled; usually fewer than 5 occurrences
  S2: Imperiled; usually fewer than 20 occurrences
  S3: Vulnerable; usually fewer than 100 occurrences
  S4: Apparently secure; uncommon but not rare, usually more than 100 occurrences
  S5: Secure, common, widespread and abundant
  ? S-rank followed by a "?" indicates the rank is uncertain

1.2 AGENCY CONSULTATION

Agency consultation has moved to a proponent driven process for the agencies responsible for SAR (i.e., the Ministry of the Environment, Conservation and Parks [MECP] and DFO) and proponents are directed to review the background documentation and related information sources outlined above. As such, specific information request packages were not submitted and only background sources listed in Section 1.1 above were used to collect background natural heritage information.

1.3 FIELD INVESTIGATIONS

Stantec conducted a site visit on December 12, 2020 to identify and record existing site conditions. Field investigations conducted included Ecological Land Classification of vegetation communities, migratory bird nest survey, bat habitat assessment, SAR habitat assessments, significant wildlife habitat (SWH) assessments and fish habitat assessments. Surveys were also conducted to assess whether the natural heritage features that were identified through the background data collection process were present in the Study Area.

1.3.1 Ecological Land Classification

Initial characterization of existing vegetation communities was completed by interpreting available aerial imagery. Vegetation was identified, and communities were verified and assessed in the field within the Study Area. Community characterizations (ecosites and vegetation types) were based on the Ontario Ecological Land Classification (ELC) system (Lee et. al., 2008). Dominant vegetation species within each community were recorded. Common names and scientific nomenclature of the species observed follow the provincial *Ontario Species List - Vascular Plants* provided by the NHIC (MNRF 2021c). Provincial significance of vegetation communities and plant species was based on the rankings assigned by the NHIC (MNRF 2021c).

1.3.2 Migratory Bird Nest Survey

Migratory birds and their nests are protected under the *Migratory Bird Convention Act, 1994* (MBCA), and are afforded protection on all lands. Bridges have the potential to provide nesting habitat for Barn Swallow (*Hirundo rustica*), which is protected by the ESA and MBCA, and other species that are protected by the MBCA, such as Cliff Swallow (*Petrochelidon pyrrhonota*) and Eastern Phoebe (*Sayornis phoebe*). The bridge was searched for the presence of migratory bird nests during the field investigations.

1.3.3 Bat Maternity Roost Tree Survey

Trees in the Study Area were assessed for potential suitability as bat maternity roosts, with a focus on trees directly adjacent to the bridge crossing. The assessment followed the recommended methods in the MNRF Guelph District *Bat and Bat Habitat Surveys of Treed Habitats* (MNRF 2017) which was based in part on the *Bat and Bat Habitat Guidelines* (MNRF 2011). Although the protocol was developed for treed communities, Stantec took a conservative approach and also applied the protocol to isolated trees in the Study Area.

According to the MNRF Guelph District protocol, the best candidate trees for maternity colonies are likely to contain several characteristics (to be considered a potential treed roost habitat, not all habitat characteristics listed below needed to be present), which include:

- Height – where trees are tallest in the stand
- Diameter – where trees have a large diameter at breast height (DBH)
- Loose/peeling bark – where trees have a large amount of peeling/loose bark
- Cavity height – where cavity height is high on the tree (>10 m high)
- Open canopy – located in an area of open canopy for accessibility in and out of tree
- Decay – where the tree exhibits early stages of decay

Surveys focused on all trees that were > 10 cm in DBH in the Study Area. The following data were also recorded for trees over 10 cm DBH with cavities or a large amount of peeling bark:

- GPS location
- tree species
- Diameter at breast height
- tree height
- cavity height

1.4 HABITAT ASSESSMENT METHODS

1.4.1 Species at Risk Habitat Suitability Assessment

SAR habitat suitability assessments were completed in the Study Area concurrently during the site visit. These assessments focused on the identification of potential SAR habitat features (e.g., SAR bat maternity roost trees) or occurrences (e.g., butternut (*Juglans cinerea*)). SAR habitat suitability assessments were completed for species protected under the provincial *Endangered Species Act,* 2007 (ESA) that may occur in the area, including species identified in the NHIC database and Ontario wildlife atlases during the literature review process. If encountered, these features were identified, recorded and assessed for potential use by SAR and wildlife species occurrences were observed by sight, sound and/or through distinctive signs (e.g., tracks, scat).

1.4.2 Significant Wildlife Habitat Assessment

The MNRF's Significant Wildlife Habitat Technical Guide (SWHTG) (MNR 2000) describes significant wildlife habitat (SWH) in four categories:

1. Seasonal concentration areas
2. Rare vegetation communities or specialized habitats for wildlife
3. Habitat for SOCC (excluding habitat for Endangered or Threatened species)
4. Animal movement corridors

Habitats within the Study Area were assessed for candidate SWH, as defined in the Ecoregion 7E Criterion Schedule (MNRF 2015). Wildlife observations and evidence of wildlife (e.g., tracks, burrows, vocalizations) were recorded during the site visit. Targeted species-use surveys are generally required to determine if candidate features qualify as confirmed SWH. Because targeted species-use surveys were not conducted, identified SWH features were considered candidate, unless they were confirmed through direct observations or background review.

1.4.3 Fish Habitat Assessment

The fish habitat assessment characterized potential fish habitat in the watercourses at the Valley Inn pedestrian bridge location, based on the presence/absence of key aquatic habitat elements such as instream cover, aquatic and riparian vegetation and water depth.

Carroll's Bay was surveyed by walking the shoreline and visually documenting physical habitat characteristics. If present, fish habitat features were identified, characterized, and recorded with Stantec field forms, digital data collection software (ArcGIS) and a digital camera. Fish community sampling was not conducted during the field investigation due to the availability of background data and the potential presence of aquatic SAR.

2 RESULTS

2.1.1 Terrestrial Background Data Collection

2.1.1.1 Natural Heritage and Planning Documentation

Schedule B of the *Natural Heritage System of the Urban Hamilton Official Plan* (City of Hamilton 2013) identifies the project Footprint and surrounding Study Area as a "Core Area". There were no Region of Halton "Core Environmental Features" identified within the Study Area (Regional Municipality of Halton 2018). Schedule M of the *Natural Heritage System of the City of Burlington Official Plan* describes the Study Area as a "Key Natural Feature" (City of Burlington 2018).

Valley Inn Bridge is located within the CH Regulation Limit (CH 2018). The Study Area is within the Dundas Valley and Dundas Marsh Important Bird Area (Site Number 0N005).

The LIO database search indicates that the Study Area contains a Winter Waterfowl Concentration Area within Carroll's Bay, and an Area of Natural and Scientific Interest (ANSI), Life Science within the Grindstone Marshes see Attachment A, **Figure 1**.

2.1.1.2 Species at Risk

A desktop background review of species databases identified 27 SAR that have been previously documented as occurring in the atlas square associated with the Study Area or have the potential to occur within the Study Area. A list of the terrestrial SAR identified during the background review is provided in **Table 1.**

Table 1: SAR Species with Potential to Occur in the Valley Inn Bridge Study Area

Species	Status	
	Ontario ESA, SARO List	**Federal SARA, Schedule 1**
Plants		
Butternut (*Juglans cinerea*) [4]	Endangered	Endangered
Eastern Flowering Dogwood (*Cornus florida*) [4]	Endangered	Endangered
Hoary Mountain-mint (*Pycnanthemum incanum*) [4]	Endangered	Endangered
Red Mulberry (*Morus rubra*) [4]	Endangered	Endangered
Birds		
Bank swallow (*Riparia riparia*) [2,5]	Threatened	Threatened
Barn swallow (*Hirundo rustica*) [2,5]	Threatened	Threatened
Bobolink (*Dolichonyx oryzivorus*)[1,2]	Threatened	Threatened
Cerulean Warbler (*Setophaga cerulea*) [1]	Threatened	Endangered

Table 1: SAR Species with Potential to Occur in the Valley Inn Bridge Study Area

Species	Status	
	Ontario ESA, SARO List	**Federal SARA, Schedule 1**
Chimney Swift (*Chaetura pelagica*) [2]	Threatened	Threatened
Eastern Meadowlark (*Sturnella magna*) [1,2]	Threatened	Threatened
Least Bittern (*Ixobrychus exilis)* [2]	Threatened	Threatened
Louisiana Waterthrush (*Parkesia motacilla)* [2]	Threatened	Threatened
Prothonotary Warbler (*Protonotaria citrea)* [2]	Endangered	Endangered
Yellow-breasted Chat (*Icteria virens)* [1]	Endangered	Endangered
Mammals		
Eastern small-footed myotis (*Myotis leibii*) [4]	Endangered	No Status
Little brown myotis (*Myotis lucifungus*) [4]	Endangered	Endangered
Northern myotis (*Myotis septentrionalis*) [4]	Endangered	Endangered
Tri-colored bat (*Perimyotis subflavus*) [4]	Endangered	Endangered
Butterflies		
Mottled Duskywing (*Erynnis martialis)* [6]	Endangered	Endangered
Amphibians		
Jefferson Salamander (*Ambystoma jeffersonianum)* [1]	Endangered	Endangered
Reptiles		
Blanding's Turtle (*Emydoidea blandingi)* [1,3]	Threatened	Threatened
Eastern Spiny Softshell *(Apalone spinifera spinifera)* [1,3]	Endangered	Endangered

[1] NHIC Database (MNRF 2021b)
[2] Ontario Breeding Bird Atlas (Cadman et. al., 2007)
[3] Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)
[4] Species at Risk in Ontario List (MECP 2020)
[5] eBird Database (eBird 2021)
[6] Ontario Butterfly Atlas (TEA 2021)

2.1.1.3 Species of Conservation Concern

A desktop background review of species databases identified 30 SOCC that have been previously documented as occurring in the atlas square associated with the Study Area or have the potential to occur within the Study Area. A list of the terrestrial SOCC identified during the background review is provided in **Table 2.**

Table 2: SOCC Species with Potential to Occur in the Valley Inn Bridge Study Area

Species	Status	
	Ontario ESA or Provincial Rank	**Federal SARA, Schedule 1**
Plants		
Gray-headed Prairie Coneflower (*Ratibida pinnata*)[1,6]	Provincial S3 Rank	
Wild Four O'clock *(Mirabilis nyctaginea)* [6]	Provincial S2 Rank	
Birds		
Bald Eagle (*Haliaeetus leucocephalus)* [2,5]	Special Concern	
Black-crowned Night-Heron *(Nycticorax nycticorax)* [2,5]	Provincial S3B, S3N Rank	
Canada Warbler (*Cardellina canadensis*) [1]	Special Concern	Threatened
Caspian Tern (*Hydroprogne caspia)* [2,5]	Provincial S3B Rank	
Eastern Wood-Pewee (*Contopus virens*) [2,5]	Special Concern	Special Concern
Golden-winged Warbler (*Vermivora chrysoptera)* [2]	Special Concern	Threatened
Grasshopper Sparrow (*Ammodramus savannarum*)[2]	Special Concern	Special Concern
Great Egret (*Ardea alba)* [2,5]	Provincial S2B Rank	
Peregrine Falcon (*Falco peregrinus*)[5]	Special Concern	Special Concern
Redhead (*Aythya americana*) [2,5]	Provincial S2B,S4N Rank	
Red-headed Woodpecker (*Melanerpes erythrocephalus*)[2]	Special Concern	Endangered
Red-necked Grebe (*Podiceps grisegena)* [5]	Provincial S3B,S4N Rank	Not at Risk
Wood Thrush (*Hylocichla mustelina*)[2]	Special Concern	Threatened
Insects		
Monarch (*Danaus plexippus*) [4,7]	Special Concern	Special Concern
Black Dash (*Euphyes conspicua)* [7]	Provincial S3 Rank	
Cicada Killer *(Sphecius speciosus)* [1]	Provincial S1S2 Rank	
Amber-winged Spreadwing *(Lestes eurinus)* [8]	Provincial S3 Rank	
Arrowhead Spiketail *(Cordulegaster obliqua)* [8]	Provincial S1 Rank	
Azure Bluet *(Enallagma aspersum)* [8]	Provincial S3 Rank	
Delta-spotted Soiketail *(Cordulegaster diastatops)* [8]	Provincial S3 Rank	
Double-striped Bluet *(Enallagma basidens)* [8]	Provincial S3 Rank	
Painted Skimmer *(Libellula semifasciata)* [8]	Provincial S2 Rank	
Pronghorn Clubtail *(Gomphus graslinellus)* [8]	Provincial S3 Rank	
Unicorn Clubtail *(Arigomphus villosipes)* [8]	Provincial S2S3 Rank	
Reptiles		
Eastern Milksnake (*Lampropeltis Triangulum*) [1,3]	Not at Risk	Special Concern

Table 2: SOCC Species with Potential to Occur in the Valley Inn Bridge Study Area

Species	Status	
	Ontario ESA or Provincial Rank	Federal SARA, Schedule 1
Eastern Musk Turtle (*Sternotherus odoratus*)[1,3]	Special Concern	Special Concern
Eastern Ribbon Snake (*Thamnophis sauritus*)[3]	Special Concern	Special Concern
Northern Map Turtle (*Graptemys geographica*)[1,3]	Special Concern	Special Concern
Snapping Turtle (*Chelydra serpentina*)[1,3]	Special Concern	Special Concern

[1] NHIC Database (MNRF 2021b)
[2] Ontario Breeding Bird Atlas (Cadman et. al., 2007)
[3] Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019)
[4] Species at Risk in Ontario List (MECP 2020)
[5] eBird Database (eBird 2021)
[6] iNaturalist Database (iNaturalist 2021)
[7] Ontario Butterfly Atlas (TEA 2021)
[8] Ontario Odonata Atlas Database (Ontario Odonata Atlas 2021)

2.1.2 Terrestrial Field Investigations

2.1.2.1 Ecological Land Classification

The Study Area is located near the Royal Botanical Gardens on lands owned by the City of Hamilton. The surrounding Royal Botanical Gardens lands are comprised of paved recreational trails, mowed lawn, open water, marsh, shoreline, and planted landscape vegetation. Carroll's Bay, Sunfish Pond and Grindstone Marshes are restored wetland habitat that is connected to Lake Ontario and Grindstone Creek. Descriptions of vegetation communities identified in the Study Area are detailed in **Table 3** below. Vegetation communities located within the Study Area are shown on **Figure 2**.

Table 3: Ecological Land Classification Vegetation Types in the Valley Inn Bridge Study Area

ELC TYPE	Community Description
Open Water (OA)	
Open Water (OA)	The OA community consists of Carroll's Bay, Sunfish Pond and Grindstone Marshes. This is restored wetland habitat that is connected to Lake Ontario and Grindstone Creek. There was no emergent vegetation observed in the pond.
Shoreline (SH)	
Open Shoreline (SHO)	Open shoreline adjacent to the Valley Inn Bridge. No vegetation visible in the community.
Shrub Shoreline (SHS)	Shrub shoreline community north of the Valley Inn Bridge. Species unconfirmed due to timing of site visit.
Willow Mineral Shrub Shoreline Type (SHSM1-1)	Willow Mineral Shrub Shoreline along the eastern edge of Carroll's Bay. Willow shrub species (*Salix* spp.) dominated the community. Larger willows were scattered throughout the canopy, with a few Manitoba Maple (*Acer negundo*)

Table 3: Ecological Land Classification Vegetation Types in the Valley Inn Bridge Study Area

ELC TYPE	Community Description
Willow Mineral Shrub Shoreline Type / Cattail Mineral Shallow Marsh Type (SHSM1-1/MASM1-1)	Willow Mineral Shrub Shoreline with mix of Cattail Mineral Shallow Marsh along the western edge of Carroll's Bay. Willow shrub species and cattail (*Typha* sp.) dominated the community. Larger willows were scattered throughout the canopy, with a few Manitoba Maple (*Acer negundo*).
Shallow Marsh (MAS)	
Cattail Mineral Shallow Marsh Type (MASM1-1)	Cattail Mineral Shallow Marsh community along the edge of Sunfish Pond. Cattail (*Typha* sp.) dominated the community.
Meadow (MEM)	
Dry - Fresh Mixed Meadow Ecosite (MEMM3)	Mixed Meadow community adjacent to CN Rail. Mix of grass and wildflower species. Observed from a distance due to inaccessibility.
Woodland (WO)	
Fresh - Moist Poplar Deciduous Woodland Type (WODM5-1)	The WOD5-1 community is adjacent to the Valley Inn Bridge and CN Rail. The canopy is dominated by poplar (*Populus* spp.), and Manitoba Maple.
Forest (FO)	
Dry – Fresh Oak – Hardwood Deciduous Forest Type (FODM2-4)	The FODM2-4 community is upland of the open water communities on the eastern portion of the Study Area. The canopy was dominated by Red Oak (*Quercus rubra*), and maple species (Acer sp.).
Constructed (CV)	
Transportation (CVI_1)	This is comprised of the CN Rail property to the west of the Study Area and Spring Gardens Road to the east.
Residential (CVR)	Suburban community along the east side of the Study Area.
Green Lands (CGL)	
Parkland (CGL_2)	The CGL_2 community is comprised of mowed lawn, paved recreational trails and planted landscape trees within the Valley Inn Bridge Study Area.

The ELC vegetation communities identified in the Study Area are common in southern Ontario.

2.1.2.2 Bird Nests

No bird nests, including Barn Swallow, were identified under the Valley Inn Bridge proposed for replacement.

2.1.2.3 Bats

There were no suitable bat maternity roost trees directly adjacent to the Valley Inn Bridge. Suitable roost trees may occur in the nearby FOD community; however, this area will not be impacted by the bridge replacement.

2.1.2.4 Terrestrial Species at Risk Habitat Suitability Assessment

Potential habitat for ten (10) SAR (including four bat species referenced collectively as SAR bats) was identified in the Valley Inn Bridge Study Area during the SAR habitat assessment. Of these ten species, only one (Blanding's Turtle) is likely to be present within the Project Footprint. The general SAR habitat assessment is provided in **Attachment B** and the site specific assessment is provided in Table 4.

Table 4: Terrestrial SAR Habitat Assessment for the Valley Inn Bridge Study Area

Species	Habitat Availability	Survey Results
Terrestrial Species		
Barn Swallow	Valley Inn Bridge has the potential to provide nesting habitat for Barn Swallow. Foraging habitat is available over Carroll's Bay, Sunfish Pond and the Grindstone Creek marshes.	**ABSENT** – No Barn Swallow nests were observed under Valley Inn Bridge.
Least Bittern	The Grindstone Marshes within the Study Area have the potential to provide nesting and foraging habitat for Least Bittern.	**ABSENT** – No recent observations have been documented in the Study Area. Suitable habitat may be provided in Study Area within Grindstone Marshes. Suitable habitat absent from the Project Footprint.
Blanding's Turtle	The Grindstone Marshes within the Study Area provide suitable habitat. Carroll's Bay and Sunfish Pond are potential movement corridors to this habitat.	**PRESENT** – Recent observations have been documented within the Study Area. Suitable habitat is present within Grindstone Marshes, surrounding habitat and Project Footprint are suitable movement corridors.
Eastern Flowering Dogwood	The FOD community within the Study Area may supprt this species. Valley Inn Bridge Project Footprint does not provide suitable habitat for this species.	**ABSENT** – No recent observations have been documented in the Study Area. Suitable habitat may be provided in Study Area within the FOD community. Observations have been documented in adjacent Royal Botanical Gardens (RBG) properties.
Hoary Mountain Mint	The FOD community within the Study Area may supprt this species. Valley Inn Bridge Project Footprint does not provide suitable habitat for this species.	**ABSENT** – No recent observations have been documented in the Study Area. Suitable habitat may be provided in Study Area within the FOD community. Observations have been documented in adjacent properties.
Myotis sp. (Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-coloured Bat)	Isolated planted trees in the Study Area have the potential to provide habitat for roosting Endangered bats.	**ABSENT** – There were no cavity trees idenitified within the Project Footprint during the site visit. Suitable trees may exist in the FOD community within the Study Area.

2.1.3 Significant Wildlife Habitat

Evaluation criteria and the SWH assessment results appear in **Attachment C.** A brief description of the four SWH categories is provided below:

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. Only the best examples of these concentration areas are usually designated as SWH. The following Seasonal Concentration Areas were identified in the Study Area:

- Confirmed habitat for waterfowl stopover and staging area (aquatic) was identified in Carroll's Bay, Sunfish Pond and Grindstone Marshes (ecosites OA/MASM1-1).
- Confirmed habitat for raptor wintering area was identified in woodland habitats (FODM2-4 and WODM5-1).
- Confirmed habitat for shorebird migratory stopover area was identified in Carroll's Bay, Sunfish Pond and Grindstone Marshes (ecosites SHSM1-3 and SHSM1-8).
- Confirmed habitat for migratory landbird stopover areas is present in woodlands (ecosites FODM2-4 and WODM5-1) within the Study Area.
- Candidate habitat for bat maternity colonies is present within the FOD2-4 community within the Study Area
- Candidate habitat for turtle wintering areas was identified in Carroll's Bay, Sunfish Pond and Grindstone Marshes (ecosites OA/MASM1-1).
- Candidate snake hibernaculum occurs within the Study Area.

Rare or Specialized Habitat

Rare or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. No rare habitats were observed in the Study Area.

The following candidate specialized habitats for wildlife were identified in the Study Area:

- Candidate amphibian breeding habitat (woodland and wetland) is present within the Study Area.

Species of Conservation Concern

There are four types of SOCC: those which are rare, those whose populations are significantly declining, those which have been identified as being at risk from certain common activities and those with relatively large populations in Ontario compared to the remainder of the globe.

Rare species are considered at five levels: globally rare, federally rare with designations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), provincially rare with designations by the Committee on the Status of Species at Risk in Ontario (COSSARO), regionally rare (at the Site Region level),

and locally rare (in the municipality or Site District). This is also the order of priority that should be assigned to the importance of maintaining species. While these species are considered rare, they are not regulated under the ESA or the federal *Species at Risk Act*. Species designated as Special Concern provincially or federally are included as SOCC. A habitat assessment for SOCC that fall into this category that have ranges that overlap with the Study Area is located in **Attachment C**. The presence or absence of these species would need to be assessed through completion of targeted surveys at the appropriate time of year.

Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to habitat loss such as marsh, open country and shrub/early successional breeding birds.

The results of the SOCC habitat assessment is presented in **Attachment C**. Candidate habitat for the following terrestrial SOCC was identified in the Valley Inn Bridge Study Area:

- Marsh breeding birds are present within Sunfish Pond and Grindstone Marshes
- Gray-headed Prairie Coneflower
- Wild Four o'clock
- Redhead
- Black-crowned Night-Heron
- Bald Eagle
- Red-headed Woodpecker
- Eastern Wood-Pewee
- Eastern Musk Turtle
- Northern Map Turtle
- Snapping Turtle
- Cicada Killer
- Amber-winged Spreadwing
- Double-striped Bluet
- Unicorn Clubtail
- Pronghorn Clubtail
- Delta-spotted Spiketail
- Painted Skimmer
- Black Dash
- Monarch

Animal Movement Corridors

Migration corridors are areas that are traditionally used by wildlife to move to one habitat from another. This is usually in response to different seasonal habitat requirements. There is one type of animal movement corridor in Ecoregion 7E - amphibian movement corridors. Candidate amphibian movement corridor is present within the Study Area.

2.1.4 Fish and Fish Habitat Background Data

Carroll's Bay has a warmwater thermal regime (MNRF 2020a). The Bay is within the River Mouth Management Zone described in the *Hamilton Harbour and Watershed Fisheries Management Plan* (Bowlby et al 2009). The fish community of the river mouth (of Grindstone Creek) and Carroll's Bay are dominated by sunfishes and bluntnose minnows (Bowlby et al 2009). The river mouth of Grindstone Creek provides significant spawning and nursery habitat for Northern Pike (*Esox lucius*). Carroll's Bay is considered part of Lake Ontario (Harrison 2011) and supports the following fish species, varying with the time of year: Alewife

(*Alosa pseudoharengus*), Bowfin (*Amia calva*), Common Carp (*Cyprinus carpio*), Yellow Perch (*Perca flavescens*), White Perch (*Morone americana*), Largemouth Bass (*Micropterus salmoides*), Northern Pike, Brook Silverside (*Labidesthes sicculus*), Common Shiner (*Luxilus cornutus*) and Fathead Minnow (*Pimephales promelas*). Royal Botanical Gardens completed a fish community survey in Carroll's Bay in June 2009 and the following fish species were captured: Bluegill (*Lepomis macrochirus*), Gizzard Shad (*Dorosoma cepedianum*), Largemouth Bass, Logperch (*Percina caprodes*), Pumpkinseed (*Lepomis gibbosus*), Round Goby (*Neogobius melanostomus*), White Perch and Yellow Perch (Clayton 2010).

Historically, Carroll's Bay supported a number of mussel species including, but not limited to: Paper Pondshell (*Utterbackia imbecillis*), Giant Floater (*Pyganodon grandis*), Eastern Ellipito (*Elliptio complanata*) and Zebra Mussel (*Dreissena polymorpha*) (Harrison 2011). A goal of the Fisheries Management Plan for the River Mouth Management Zone was to increase the spawning capacity for fish species from Hamilton Harbour, such as Northern Pike and Largemouth Bass, and to reduce Carp and Goldfish populations (Bowlby et al 2009).

There are records of the following aquatic species at risk in Carroll's Bay within 200 m upstream and downstream of the Valley Inn Bridge: Spotted Gar (*Lepisosteus oculatus*), Lilliput (*Toxolasma parvum*), Eastern Pondmussel (*Ligumia nasuta*) and Mapleleaf (*Quadrula quadrula*) (DFO 2019a). American Eel (*Anguilla rostrata*) may also occur in Carroll's Bay (MNRF 2020b). The status of these species under both the ESA and the SARA are summarized in Table 5.

Table 5: Aquatic SAR Documented in Carroll's Bay

Species	SAR Legislation and Species Status	
	Ontario ESA	**Federal SARA (Schedule 1)**
Fish		
Spotted Gar[1]	Endangered	Endangered
American Eel[2]	Endangered	No Status, Not on Schedule 1
Mussels		
Lilliput[1]	Threatened	Endangered
Eastern Pondmussel[1]	Special Concern	Special Concern
Mapleleaf[1]	Special Concern	Special Concern

[1] DFO 2019a

[2] MNRF 2020b

2.1.5 Fish Habitat Assessment Field Investigations

Fish Habitat

Water enters Sunfish Pond and Carroll's Bay from the northwest capturing flow from lower Grindstone Creek. At the time of the December 2020 field investigation, the water level was low (as indicated by exposed nearshore substrates) and water velocity at the Valley Inn Bridge was slow. The bridge abutments are quarried rocks that extend into the water (**Attachment D**). The west abutment was tilted to the south. The wetted width under the bridge was approximately 12 m at the time of the December 2020 field investigation.

On the upstream side of the bridge, the west bank appears natural, moderately stable and well vegetated with mature tree and shrub species. Due to the low water level at the time of the survey, areas of scour were visible along the shoreline closer to the Valley Inn Bridge. The shoreline consisted mainly of organics with lesser amounts of cobble and gravel. The natural shoreline continues for approximately 50 m upstream (north), after which the bank is diverted abruptly to the east via a constructed partition of approximately 2 m tall cut coniferous trees. This partially submerged partition extends for approximately 115 m (to the north end of the Spring Gardens Road vehicle bridge) and separates Sunfish Pond from Carroll's Bay. A partially submerged grate located near the west end of the partition and is believed to assist in keeping large, mature Common Carp (*Cyprinus carpio*) out of Sunfish Pond.

On the south (east) shoreline upstream of the bridge, the shoreline consisted mainly of large, quarried rock associated with the bridge and a mix of cobble, gravel and sand. Farther east, the shoreline becomes naturalized and well vegetated with cattail and shrub species. This naturalized south shoreline continues upstream to the south side of the Spring Gardens Road bridge. Low water levels assisted with determining substrate and in-water cover upstream of the Valley Inn Bridge. Though moderately turbid during the survey, substrate appeared to consist mainly of sand and muck in deeper water and a mix of sand, muck and coarser substrates (cobble and gravel) closer to the shoreline. Instream cover appeared to be limited to the treed, sparse cobble area near the Valley Inn Bridge abutments. Water depth under the bridge at the time of the field investigation was approximately 1 m.

Downstream of the Valley Inn Bridge, Carroll's Bay is wide and long and is considered Lake Ontario proper. Immediately downstream of the bridge, minor instream cover was provided by the large, quarried rock of the bridge abutments and there were moderate amounts of cobble and gravel. The west bank was well-vegetated and stable with planted cattail and terrestrial meadow species for approximately 200 m south of the bridge. This shoreline and the railway embankment were restored by CN Rail following track expansion in 2016/2017, in accordance with recommendations from the Draft Carroll's Bay Habitat Restoration Feasibility Study (Harrison 2011). The goal of the planting project was to stabilize the shoreline and embankment with native plant species and creating nesting habitat near the shore, while also preventing turtles from accessing the rail line. The south (east) bank was a mix of sand and gravel with sparse cobble. There was little to no riparian cover along the south side of the walking trail that leads to the bridge. Once the shoreline turns to the south (approximately 75 m east of the bridge), vegetation on the shoreline becomes dense, with mature tree and shrub species. The low water level exposed areas of lake bed and substrate that consisted mainly of sand with muck and detritus. In-stream cover appeared limited to shoreline cattails and a potentially deeper water in the offshore area of the bay.

No fish were observed during the December 2020 field investigation; however, empty mussel shells were observed in the exposed substrate downstream (south) of the bridge. The shells were identified as Giant Floater (*Pyganodon grandis*) and Quagga mussels (*Dreissena bugensis*).

As indicated by the background data, Carroll's Bay provides habitat for a diverse fish community and provides habitat for a range of life stages. Carroll's Bay and Sunfish Pond appear to offer suitable spawning and nursery habitat for game fish such as Northern Pike, Largemouth Bass and Yellow Perch.

Aquatic Species at Risk Habitat Suitability

If present, the extent to which Spotted Gar occur in the Study Area is not known. A single Spotted Gar was captured by the Ministry of Natural Resources (MNR) in Hamilton Harbour in 2010 (Staton et al 2012); however, location data are not available. The Recovery Strategy stated that further sampling was required to determine whether a reproducing population exists in the area. No Spotted Gar were captured in the Study Area in a DFO survey in 2011 that targeted the species (Glass and Mandrak 2014). At capture sites in Lake

Erie, adult Spotted Gar are found in the shallow warm waters of coastal wetlands with abundant vegetation. In general, the species prefers quiet pools, backwaters and bays with an abundance of aquatic vegetation preferred substrates include silt, clay and sand (MNRF 2016). Although the habitat in the Study Area may be suitable for the species, there are no recent records of Spotted Gar in the Study Area or Hamilton Harbour (i.e., since 2010).

In Canada, American Eel is found in fresh water and salt water areas that are accessible from the Atlantic Ocean. In Ontario, American Eels can be found as far inland as Algonquin Park. Mature eels (10-25 years old) return to the Sargasso Sea to spawn (MacGregor et al 2013). The American Eel uses a broad diversity of habitats during its growth period. Growing eels are primarily benthic, utilizing substrate (rock, sand and mud), bottom and woody debris, and submerged vegetation for protection and cover (MacGregor et al 2013). Vegetation and interstitial spaces consisting of rock piles, logs and other complex structures are important to eels as cover, particularly during daylight hours, and should be protected as habitat (MacGregor et al 2013). Habitat in the Study Area may be suitable for American Eel.

Lilliput has been detected throughout western Hamilton Harbour (Carroll's Bay), the lower Grindstone estuary (Sunfish Pond, Blackbird Marsh) and Cootes Paradise (DFO 2014). Lilliput targeted sampling occurred in 2011 to determine if a population of the species was still present. Two live individuals were detected from a single site in Sunfish Pond (Smith and Morris unpubl. data in DFO 2014). Mussel sampling by visual search in 2012 resulted in the observation of two live individuals in Sunfish Pond, one individual in Grindstone Creek and four in Cootes Paradise. Lilliput is found in a variety of habitats, from small to large rivers to wetlands and the shallows of lakes, ponds and reservoirs. It prefers to burrow in soft substrates (river and lake bottoms) of mud, sand, silt or fine gravel. Although there is no information regarding recent surveys of the species in the Study Area, habitat within the permanently wetted areas of Carroll's Bay provide potential habitat for Lilliput.

3 NATURAL HERITAGE CONSTRAINTS

This section provides a summary of natural heritage features that were identified in the Study Area.

- Terrestrial SAR species potentially present based on background data and habitat suitability in Sunfish Pond and Grindstone Marshes: Blanding's Turtle
- Confirmed SWH based on habitat suitability, field observations and background data sources: waterfowl stopover and staging area (aquatic; ecosites OA/MASM1-1), raptor wintering area (ecosites FODM2-4 and WODM5-1), shorebird migratory stopover area (ecosites SHSM1-3 and SHSM1-8), and migratory landbird stopover areas (ecosites FODM2-4 and WODM5-1).
- Candidate SWH based on habitat suitability but not confirmed through habitat use studies: bat maternity colonies, turtle wintering areas, snake hibernaculum, wetland amphibian breeding habitat, marsh breeding birds habitat, amphibian movement corridor, potential habitat for SOCC (Gray-headed Prairie Coneflower, Wild Four o'clock, Redhead, Black-crowned Night-Heron, Bald Eagle, Red-headed Woodpecker, Eastern Wood-Pewee, Eastern Musk Turtle, Northern Map Turtle, Snapping Turtle)
- Aquatic SAR species potentially present based on background data and habitat suitability: American Eel, and Lilliput. Habitat within the permanently wetted areas of Carroll's Bay and Sunfish Pond provide potential habitat for Lilliput. American Eel may also use habitat within the Study Area. DFO records are indicative of records of Spotted Gar; however, supporting documents do not indicate they have been identified in the Study Area.

4 MITIGATION MEASURES

4.1 STANDARD MITIGATION MEASURES

The following standard mitigation measures/best practices are provided to reduce potential impacts to natural heritage features during construction:

- Delineate the Project Footprint with tree protection fencing prior to construction to reduce impacts to adjacent natural features.
- Wash, refuel and/or service equipment a minimum of 30 m from surface waters to reduce the risk of deleterious substances from entering surface waters. Check machinery regularly for fluid leaks.
- Thoroughly clean construction machinery prior to entering the site to reduce the potential for establishment of highly invasive species such as Phragmites. No *Phragmites* was observed in the Study Area, however it is known to be present in Hamilton Harbour and extensive control measures have been undertaken by RBG in the Grindstone Marshes to eliminate the species from this area.
- To reduce the potential for spread of insect pests such as the Emerald Ash Borer, trees cut should be disposed of on site (either through spreading of wood chips or trees cut and sawed into logs).
- Develop a Spill Management Plan and have it on site for implementation in the event of an accidental spill. Keep an emergency spill kit on site.
- Stabilize and re-vegetate areas of disturbed/exposed soil, as soon as practicably possible with native seed mixes and woody vegetation.
- Maintain erosion and sediment control measures until the restoration measures have been assessed and determined to be secure and stable.

4.2 EROSION AND SEDIMENT CONTROL

An erosion and sediment control (ESC) plan should be developed and employed during construction to reduce the risk of erosion and the entry of sediment into surface water and other natural features. Mitigation included in the plan should include the following measures:

- Implement project-specific temporary ESC measures per prior to starting work (e.g. silt fence and/or sediment logs).
- Keep additional ESC materials available on site to provide a contingency supply in the event of an emergency.
- Monitor and maintain erosion and sediment controls, as required. Controls are to be removed only after the soils of the construction area have stabilized and vegetation cover has re-established.
- Stabilize materials requiring stockpiling (fill, topsoil, etc.) and keep a safe distance (> 30 m) from watercourses.

4.3 PROTECTION OF MIGRATORY BIRDS

The MBCA provides legal protection of migratory birds and their nests in Canada. Construction timing must consider restrictions imposed by the MBCA. To avoid damaging or disturbing bird nests and contravening the MBCA, the timing of any vegetation clearing should occur outside of the primary nesting period (i.e., the period when the percent of total nesting species is greater than 10% based on Environment Canada's Nesting Calendars and the period for which due diligence mitigation measures are generally recommended).

The primary nesting period (PNP) identified for southern Ontario is April 1 - August 31, although nesting also infrequently occurs outside of this period (Environment Canada 2014). Vegetation removal during this core nesting period is not recommended; however, if required, a nest survey may be carried out by a qualified person in simple habitats such as an urban park, a vacant lot with few possible nest sites, a previously cleared area, or a structure (Government of Canada 2019). If a migratory bird nest is located within the work area at any time, a no-disturbance buffer will be delineated. This buffer will be maintained for the entire duration of the nest activity, which will be determined using periodic checks by the avian biologist. The radius of the buffer generally varies from 5 m - 60 m depending on the sensitivity of the nesting species. The Project will not resume within the nest buffer until the nest is confirmed to be no longer active.

4.4 WILDLIFE PROTECTION

The following mitigation measures are recommended to avoid impacts to wildlife during Project construction.

- A visual search of the work area will be conducted before work commences each day, particularly for the period when most wildlife is active (generally April 1 to October 31). Visual inspections will locate and avoid snakes, turtles and other ground dwelling wildlife such as small mammals. Visual searches will include inspection of machinery and equipment left in the work area overnight prior to starting equipment.

- If wildlife is encountered, work at that location will stop, and the animal(s) will be permitted reasonable time to leave the work area on their own.

- Contractors should be made aware of the turtle nesting period (May 15 to September 15) and potential for turtle nesting during Project construction. Sediment fencing should be installed along the limits of the work zone to reduce the potential for turtles to enter the construction area. If possible, installation of sediment fencing will occur before May 15 or after September 15 (i.e., outside of turtle nesting season) to restrict the movement of nesting turtles into the work zone. If installation of fencing occurs during the turtle nesting season, it is recommended that the area be searched for evidence of turtles or nests prior to installation of fencing. Further specifications for reptile exclusion fencing should follow Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing (MNR 2013) and Best Management Practices for Mitigating the Effects of Road Mortality on Amphibian and Reptile Species at Risk in Ontario (MNRF 2016). The exclusion fencing is to be maintained around the work area for the duration of the turtle nesting activity period and checked daily to identify any repairs that may be needed. Fencing should be repaired immediately.

- If a nesting turtle is encountered during construction at any time, the turtle should not be disturbed. Work in the area must stop until the turtle has completed nesting and/or vacated the area. The nest site should be noted (but not marked) and the City, RBG and MECP should be contacted for direction. Turtle nests are protected under the Fish and Wildlife Conservation Act (FWCA); therefore, a confirmed nest should not be disturbed.

- Any sediment and erosion control measures, such as fencing or blanket, utilized on the site during construction will avoid products with plastic mesh due to risk of entanglement of snakes or other wildlife.
- Any observations of species at risk or species of conservation concern (e.g., Blanding's Turtle) should be reported to MECP and MNRF within 48 hours. Species at risk should not be handled, harassed, or moved in any way, unless they are in immediate danger.

4.5 PROTECTION OF FISH AND FISH HABITAT

Implementation of the following measures will protect fish and fish habitat during construction if in-water work is required:

- Reduce the duration of in-water work to the extent possible.
- Conduct in-water work during periods of low flow to allow work in water to be isolated from flows.
- Schedule in-water work to occur during the applicable in-water work timing window. Based on the fish species and warmwater thermal regime of Carroll's Bay, in-water work can occur from July 16 to March 14 (no in-water work from March 15 to July 15) (MNR 2013). The Guelph District MNRF can be contacted to request confirmation or revision to the in-water work timing window.
- If in-water work is required, develop and implement a project-specific fish relocation plan and mussel relocation plan to relocate fish and mussels from within an in-water work area. The Contractor must obtain a Licence to Collect Fish for Scientific Purposes from the MNRF prior to the commencement of in-water work.
- Screen water intake pipes to prevent entrainment or impingement of fish following the measures as outlined in DFO's Interim Code of Practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (DFO 2020a).
- Where applicable, manage and treat dewatering discharge to reduce the risk of erosion and/or release of sediment-laden or contaminated water to surface waters.

5 PERMITTING CONSIDERATIONS

5.1 CONSERVATION AUTHORITIES

5.1.1 Conservation Authorities Act

Development within Conservation Halton's Regulation Limit is subject to the policies outlined in Ontario Regulation 162/06 under the *Conservation Authorities Act*; and further correspondence with the Conservation Authorities is recommended to confirm potential permitting requirements associated with the proposed bridge replacement. Stantec will facilitate the follow up and coordination of regulatory permit submissions for the necessary permit(s).

5.2 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

5.2.1 Endangered Species Act, 2007

The provincial *Endangered Species Act* (ESA) prohibits the killing, harming, harassing, capturing or taking of a living member of a species listed as Threatened, Endangered or Extirpated by the Species at Risk in Ontario (SARO) list (O. Reg 230/08) (S.9), or the damage to habitat of similarly designated species (S.10). An exception is where a permit is issued under S.17(2) of the same act or the Activity is registered under Ontario Regulation 242/08.

Based on preliminary assessment, no impacts to the habitat of terrestrial SAR are anticipated. However, Blanding's Turtle is known from the Study Area and individuals may be encountered during construction. As such, the following actions are recommended to avoid harm to the species:

- Installation of exclusion fencing to keep Blanding's Turtles out the construction zone. See Section 4.4, above, for timing and methods of placement.
- Observations of species at risk (e.g., Blanding's Turtle) or species of conservation concern should be reported to MECP and MNRF within 48 hours. Species at risk should not be handled, harassed, or moved in any way, unless they are in immediate danger.
- Consultation with MECP upon completion of detailed design in order to confirm mitigation measures and determine authorization requirements, if any.
- Targeted surveys for plants and wildlife are recommended if the project footprint changes.

Due to the potential presence of American Eel, Lilliput and possibly Spotted Gar, MECP should be consulted if in-water work is required, to determine authorization requirements for provincially regulated aquatic species at risk.

5.3 FISHERIES AND OCEANS CANADA

5.3.1 Fisheries Act

The *Fisheries Act* prohibits causing the death of fish and he harmful alteration, disruption or destruction (HADD) of fish habitat, unless authorized by the Minister of Fisheries, Oceans and the Canadian Coast Guard. This applies to work being conducted in or near watercourses or waterbodies that support fish and fish habitat. The fish and fish habitat protection provisions of the *Fisheries Act* apply to all fish and fish habitat in Canada.

Following guidance and criteria provided on DFO's website regarding mitigation, waterbody types and codes of practice, proponents determine whether their projects in or near water will require review by DFO (DFO 2020b). In cases where impacts to fish and fish habitat cannot be avoided, proponents submit a Request for Review form to DFO. DFO will review the project to identify the potential risks of the project to the conservation and protection of fish and fish habitat and will work with the proponent to provide advice and guidance on how to comply with the *Fisheries Act*. If the project can avoid impacts to fish and fish habitat,

project approval is not required. If impacts cannot be avoided, proponents must apply for a *Fisheries Act* Authorization, and may be required to develop a habitat offsetting or compensation plan.

Details of the replacement bridge will be assessed to determine the need for review by DFO; however, if in-water work is not proposed, DFO review under the *Fisheries Act* will not likely be required. If plans are revised and the need for in-water work is identified, design details and construction methods will need to be reviewed to determine if the replacement should be reviewed by DFO under the *Fisheries Act* through the submission of a Request for Review form.

5.3.2 Species at Risk Act

The federal *Species at Risk Act* (SARA) prohibits the killing, harming, harassing, capturing or taking of an individual of a species that is listed as an Extirpated, Endangered or Threatened species in Schedule 1 of the Act. It also prohibits the damage or destruction of the habitat of a species that is listed as an Extirpated, Endangered or Threatened species in Schedule 1 of the Act.

If the need for in-water work is identified, DFO consultation would determine if a SARA Permit is needed for the project, due to the potential presence of Spotted Gar and Lilliput. DFO screens projects for SAR impacts through the Request for Review form discussed above.

6 NEXT STEPS

The following steps are recommended as part of detailed design:

- Consultation with MECP once design details and staging plans are available to confirm mitigation measures and determine authorization requirements, if any, for provincially regulated species at risk.
- Consultation with RBG is recommended to obtain input on post-construction restoration measures.
- Targeted surveys for plants and wildlife are recommended if the project footprint or construction methods change.
- If work is required below the normal high water level, submit a Request for Review to DFO for review under the *Fisheries Act* and for screening under the *Species at Risk Act*.

7 CLOSURE

Stantec was retained by the City of Hamilton to conduct a natural heritage features assessment and constraints analysis in support of the replacement the Valley Inn Bridge.

Based on the site conditions and assessment of SAR, SOCC and SWH, negative impacts on the habitat features or species noted in this assessment are not anticipated, assuming mitigation measures are successfully designed and implemented. Confirmation of permit and licence requirements with the MECP, MNRF, DFO and CH is recommended. The area should be restored in a timely manner to reduce the risk of potential secondary impacts associated with circumstances such as erosion and sediment transport and undesirable invasive species propagation.

Reference: Valley Inn Bridge Replacement - Natural Environment Technical Memo

Please contact the undersigned if you have questions regarding the information provided.

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Attachments:
Attachment A: Figure 1
Figure 2
Attachment B: SAR Habitat Assessment
Attachment C: SWH and SOCC Habitat Assessment
Attachment D: Photographic Record – Fisheries

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ATTACHMENT A
Figures

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

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Legend

- Valley Inn Bridge
- Study Area
- Direction of Flow
- Thermal Regime, Cold
- Thermal Regime, Warm
- Railway
- Watercourse (Intermittent)
- Watercourse (Permanent)
- ANSI, Life Science
- Conservation Authority Administrative Boundary
- Waterfowl Winter Concentration Area
- Thermal Regime, Warm
- Aquatic Species at Risk Distribution
- Waterbody
- Wetland, Provincially Significant
- Wetland, Not evaluated per OWES
- Wooded Area
- Greenbelt Natural Heritage System
- Niagara Escarpment Plan Boundary
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.

- Niagara Escarpment Plan
- Greenbelt Natural Heritage System

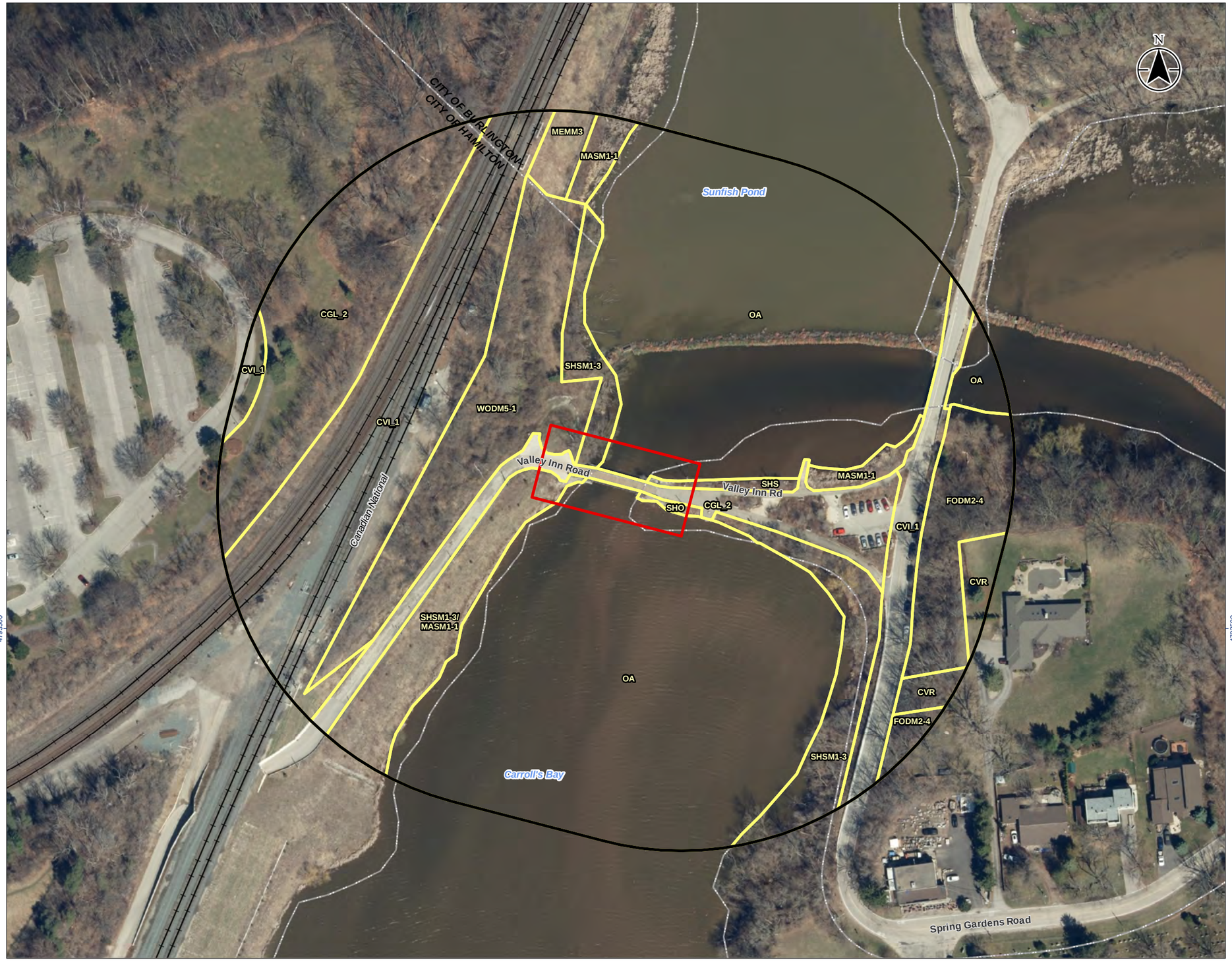
Project Location
City of Hamilton

165001203 REV4
Prepared by JW on 2021-05-13

Client/Project
CITY OF HAMILTON
SCHEDULE B MUNICIPAL CLASS EA
VALLEY INN BRIDGE

Figure No.
1

Title
Background Data



Stantec

Legend

- Railway
- Municipal Boundary, Lower
- Study Area
- Valley Inn Bridge
- ELC

ELC Code

CGL_2 (Parkland)
CVI_1 (Transportation)
CVR (Residential)
FODM2-4 (Dry – Fresh Oak – Hardwood Deciduous Forest Type)
MASM1-1 (Cattail Mineral Shallow Marsh Type)
MEMM3 (Dry - Fresh Mixed Meadow Ecosite)
OA (Open Water)
SHO (Open Shoreline)
SHS (Shrub Shoreline)
SHSM1-3 (Willow Mineral Shrub Shoreline Type)
WODM5-1 (Fresh - Moist Poplar Deciduous Woodland Type)

0 0.085 km

1:1,500 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Imagery obtained from © First Base Solutions, 2020. Hamilton Wentworth Region 2019, Halton Region 2019.

Project Location
City of Hamilton

165001203 REV4
Prepared by JW on 2021-05-13

Client/Project
CITY OF HAMILTON
SCHEDULE B MUNICIPAL CLASS EA
VALLEY INN BRIDGE

Figure No.
2

Title
ELC

ATTACHMENT B
SAR Habitat Assessment

Attachment B: Habitat Potential in the Valley Inn Bridge Study Area for Threatened or Endangered Species

Species	Habitat Preference	Habitat Potential
PLANTS		
Butternut	Found in a variety of habitats throughout Southern Ontario, including woodlands and hedgerows (Farrar 1995).	**Species Absent.** Butternut was absent from the Study Area.
Eastern Flowering Dogwood	Eastern flowering dogwood is an understory plant of dry to fresh deciduous and mixed forests, which frequently grows on the tops of slopes or other dry microsites, and occasionally in moister areas where no flooding occurs; preferred soils range from sand to sandy loam and clay loam (COSEWIC 2007).	**Habitat Present.** May occur in FOD community within Study area.
Hoary Mountain-mint	Dry oak woods and openings; known only from Hamilton and Halton Regions (Oldham and Brinker 2009). Requires open, dry, sandy-clay habitats in open-canopied deciduous forests on warmer-than-normal slopes (COSEWIC 2000).	**Habitat Present.** May occur in FOD community within Study area.
Red Mulberry	Red Mulberry occurs in moist forests habitats including river valleys, floodplains, swales, sandspits, and slopes of the Niagara Escarpment (COSEWIC 2014).	**Habitat Absent.** No moist forest habitats within the Study Area.
BIRDS		
Bank Swallow	The Bank Swallow excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil, and the sides of sand and gravel pits. Single nests may occur, although colonies are typical and range from two to several thousand. Adjacent grasslands and watercourses are used for foraging habitat (Cadman et al., 2007).	**Habitat Absent.** Bank Swallow habitat was not observed in the Study Area.
Barn Swallow	Nest on walls or ledges of barns and other human-made structures such as bridges, culverts or other buildings; forages in open areas for flying insects (COSEWIC 2011a).	**Habitat Absent.** Barn Swallow nests were not observed on structures in the Study Area.
Bobolink	Nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures (COSEWIC 2010a).	**Habitat Absent.** Suitable large grassland habitat was absent from the Study Area.

Attachment B: Habitat Potential in the Valley Inn Bridge Study Area for Threatened or Endangered Species

Species	Habitat Preference	Habitat Potential
Cerulean Warbler	The Cerulean Warbler breeds mainly in mature deciduous or swamp forest. The species generally prefers tracts over 100 ha in size but it has been found to breed in woodlots as small as 10 ha (Hamel, 2000). In Ontario, the species is generally associated with large oak or bitternut hickory trees (Cadman et al., 2007). The most important limiting factor affecting this species is habitat loss and degradation on breeding and wintering grounds due to logging practices; habitat fragmentation and parasitism by the Brown-headed Cowbird are also considered threats (COSEWIC, 2010b).	**Habitat Absent.** Suitable mature deciduous or swamp forest was absent from the Study Area.
Chimney Swift	Chimney Swift use chimneys for roosting and breeding, as well as walls, rafters, or gables of buildings and, less frequently, natural structures such as hollow trees, tree cavities and cracks in cliffs (Cadman et al., 2007).	**Habitat Absent.** Suitable chimneys or large hollow trees were absent from the Study Area.
Eastern Meadowlark	Meadows, hayfields and pastures; also, other open habitat types including mown lawn (COSEWIC 2011b). Prefers large (~5 ha), low-lying wet grasslands with abundant litter (COSEWIC 2011b).	**Habitat Absent.** Suitable large grassland habitat was absent from the Study Area.
Least Bittern	The Least Bittern is a relatively small bird that nests in freshwater marshes where dense aquatic vegetation occurs with woody vegetation and open water. They are found most commonly in marshes greater than 5 ha in size (Gibbs et al., 1992).	**Habitat Present.** May occur in the adjacent Grindstone Marsh.
Louisiana Waterthrush	In Ontario, this species prefers deciduous and mixed forests with a strong Eastern Hemlock component, in deeply incised ravines (Cadman et al. 2007). It will also inhabit large flooded tracts of mature deciduous swamp forest. It shows a preference for nesting along pristine headwater streams and associated wetlands occurring in large expanses of mature forest and less frequently inhabits wooded swamps (COSEWIC, 2006).	**Habitat Absent.** Breeding habitat required for this species was not observed within the Study Area.
Prothonotary Warbler	This warbler is a habitat specialist, nesting exclusively in tree cavities, usually overhanging open water, found in deciduous swamps and floodplains (Cadman et al., 2007). Breeding populations are highly localized because of extreme habitat specificity, and are vulnerable to habitat destruction. Considered endangered in Canada	**Habitat Absent.** Breeding habitat required for this species was not observed within the Study Area.

Attachment B: Habitat Potential in the Valley Inn Bridge Study Area for Threatened or Endangered Species

Species	Habitat Preference	Habitat Potential
Yellow-Breasted Chat	Likely never common here, most records in the province are from the Carolinian region (Eagles, 1987). The Yellow-breasted Chat prefers scrubby, early successional habitat; dense tangles of grape vine and raspberry are features of most breeding sites. Yellow-breasted Chats have been recorded in shrub thickets, woodland edges, hedgerows, regenerating abandoned fields and young coniferous plantations, and in hydro and rail rights-of-way (Cadman et al. 2007).	**Habitat Absent.** Breeding habitat required for this species was not observed within the Study Area.
MAMMALS		
Small-footed Myotis	Small-footed myotis hibernate in caves and abandoned mines in winter, and roost under rocks, in rock outcrops, buildings, under bridges, or in caves, mines, or hollow trees in the spring and summer (MNRF 2017).	**Suitable Habitat Present.** Candidate maternity roost trees may be present within suitable ELC communities.
Little Brown Myotis	Trees, buildings and bridges for roosting; trees for nesting; caves and mines for hibernation (COSEWIC 2013).	**Suitable Habitat Present.** Candidate maternity roost trees may be present within suitable ELC communities.
Northern Myotis	Caves provide overwintering habitat (COSEWIC 2013). Rarely uses human-made structures for roosting (COSEWIC 2013).	**Suitable Habitat Present.** Candidate maternity roost trees may be present within suitable ELC communities.
Tri-colored Bat	Found in a variety of habitats; caves provide overwintering habitat (COSEWIC 2013).	**Suitable Habitat Present.** Candidate maternity roost trees may be present within suitable ELC communities.
AMPHIBIANS		
Jefferson Salamander	The Jefferson Salamander is terrestrial during the adult stage and inhabits upland deciduous forests with suitable breeding areas including limestone sinkhole ponds, kettle ponds, vernal pools and other natural basins. Breeding areas are often ephemeral and are fed by spring runoff, groundwater, or springs. In Canada, the species is associated with mature, Carolinian forests. Suitable habitat is often only available in fragmented deciduous woodlots of marginal agricultural land (COSEWIC 2010c).	**Habitat Absent.** Breeding habitat required for this species was not observed within the Study Area.

Attachment B: Habitat Potential in the Valley Inn Bridge Study Area for Threatened or Endangered Species

Species	Habitat Preference	Habitat Potential
BUTTERFLIES		
Mottled Duskywing	Mottled Duskywing is associated with the larval food plants, which in Ontario are Prairie Root and New Jersey Tea. These plant species generally grow in dry, sandy soils within oak or pine woodlands, along roadsides, hydro corridors, riverbanks, oak savannas, shady hillside, tallgrass prairies and alvars (Linton 2015).	**Habitat Absent.** Breeding habitat required for this species was not observed within the Study Area.
FISH		
American Eel	In Canada, American Eel is found in fresh water and salt water areas that are accessible from the Atlantic Ocean. In Ontario, American Eels can be found as far inland as Algonquin Park. The American Eel uses a broad diversity of habitats during its growth period. Growing eels are primarily benthic, utilizing substrate (rock, sand and mud), bottom and woody debris, and submerged vegetation for protection and cover (MacGregor et al 2013). Vegetation and interstitial spaces consisting of rock piles, logs and other complex structures are important to eels as cover, particularly during daylight hours	**Suitable Habitat Present.** Habitat in the Study Area within Carroll's Bay may be suitable for American Eel.
Spotted Gar	At capture sites in Lake Eerie, adult Spotted Gar are found in the shallow warm waters of coastal wetlands with abundant vegetation. In general, the species prefers quiet pools, backwaters and bays with an abundance of aquatic vegetation. Preferred substrates include silt, clay and sand (MNRF 2016).	**Suitable Habitat Present.** Although the habitat in the Study Area within Carroll's Bay may be suitable for the species, there are no recent records of Spotted Gar in the Study Area or Hamilton Harbour.
MOLLUSCS		
Lilliput	Lilliput is found in a variety of habitats, from small to large rivers to wetlands and the shallows of lakes, ponds and reservoirs. It prefers to burrow in soft substrates (river and lake bottoms) of mud, sand, silt or fine gravel (DFO 2014).	**Suitable Habitat Present.** Although there is no information regarding recent surveys of the species in the Study Area, habitat within the permanently wetted areas of Carroll's Bay provide potential habitat for Lilliput.

Attachment B: Habitat Potential in the Valley Inn Bridge Study Area for Threatened or Endangered Species

Species	Habitat Preference	Habitat Potential
REPTILES		
Blanding's Turtle	Blanding's Turtles frequent lakes, ponds, and marshes, and prefer shallow water with abundant aquatic vegetation and a soft bottom (MacCulloch, 2002). They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults usually occupy open or partially vegetated sites, whereas juveniles occupy areas with thick aquatic vegetation including sphagnum, water lilies and algae. Nesting occurs in dry conifer or mixed hardwood forests, up to 410 m from any body of water, in loose substrates including sand, organic soil, gravel and cobblestone, nesting may also occur along gravel roadways (COSEWIC 2005).	**Habitat Present.** May occur in the adjacent Grindstone Marsh.
Eastern Spiny Softshell	Spiny Softshell Sub-populations in Ontario occur in the east, associated with the Ottawa and St. Lawrence River, and south, associated with Lake Erie, especially the Sydenham and Thames Rivers (COSEWIC 2002). Spiny softshells require sandy beaches and riverbanks for nesting, shallow soft-bottomed water bodies to function as nurseries and refugia, basking areas and deep pools for thermoregulation, and riffle areas for foraging, habitat features may occur over a large area, as long as the intervening habitat doesn't prevent the turtles from travelling between them (COSEWIC 2002).	**Habitat Absent.** Breeding habitat required for this species was not observed within the Study Area

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ATTACHMENT C:
SWH And SOCC Habitat Assessment

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Seasonal Concentration Areas			
Waterfowl Stopover and Staging Area (Terrestrial)	Fields with sheet water or utilized by tundra swans during spring (mid-March to May), or annual spring melt water flooding found in any of the following Community Types: Meadow (CUM1), Thicket (CUT1). Agricultural fields with waste grains are commonly used by waterfowl, and these are not considered SWH unless used by Tundra swans in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee Areas.	ELC surveys were used to assess features within the Study Area that may support waterfowl stopover and staging areas (terrestrial).	**No candidate habitat** for Waterfowl Stopover and Staging Areas (Terrestrial) occurred within the Study Area.
Waterfowl Stopover and Staging Area (Aquatic)	The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. The combined area of the ELC ecosites and a 100 m radius area is the SWH. Sewage treatment ponds and storm water ponds do not qualify as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify.	ELC surveys were used to assess features within the Study Area that may support waterfowl stopover and staging areas (aquatic).	Carroll's Bay, Valley Inn and Grindstone Marshes (OA/MASM1-1) are present within the Study Area. These aquatic and wetland areas are known for the to accommodate large aggregations of waterfowl according to the site description for the Dundas Valley and Dundas Marsh IBA. Species noted during the site visit include: Canada Goose, Mallard, Hooded Merganser, Common Merganser, and Bufflehead **Confirmed habitat** for waterfowl stopover and staging (aquatic) is present within the Study Area.
Shorebird Migratory Stopover Area	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of amour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October.	ELC surveys were used to assess features within the Study Area that may support migratory shorebirds.	Shorelines are present within the Study Area (SHSM1-3 and SHSM1-8). Seasonally flooded, muddy and un-vegetated shoreline habitat occurs directly adjacent to the project area. The Dundas Valley and Dundas Marsh IBA is known to provide important stopover habitat for migrating shorebirds. **Confirmed habitat** for shorebird stopover areas is present within the Study Area.

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat. The following community types: Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD)		
Raptor Wintering Area	At least one of the following Forest Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in combination with one of the following Upland Community Types: Meadow (CUM), Thicket (CUT), Savannah (CUS), Woodland (CUW) (<60% cover) that are >20 ha and provide roosting, foraging and resting habitats for wintering raptors. Upland habitat (CUM, CUT, CUS, CUW), must represent at least 15 ha of the 20 ha minimum size.	ELC surveys conducted by Stantec in December 2020 were used to assess features within the Study Area that may support wintering raptors.	The Study Area contains a suitable amount of FOD/Upland habitat and shoreline habitat. According to the IBA site description for Dundas Valley and Dundas Marsh, the Study Area is confirmed to provide important habitat for raptors. Bald Eagles are observed in concentrations within Hamilton Harbour in winter (Stantec obs.). One Bald Eagle was observed during the site visit. **Confirmed habitat** for raptor wintering areas is present within the Study Area.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and karsts. May be found in these Community Types: Crevice (CCR), Cave (CCA).	ELC surveys were used to assess features within the Study Area that may support bat hibernacula.	No crevices, caves or abandoned mines are located within the Study Area. **No candidate** habitat for bat hibernacula occurred within the Study Area.
Bat Maternity Colonies	Maternity colonies considered significant wildlife habitat are found in forested ecosites. Either of the following Community Types: Deciduous Forest (FOD) or Mixed Forest (FOM), that have>10/ha wildlife trees >25cm diameter at breast height (dbh). Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees	ELC surveys were used to assess features within the Study Area that may support bat maternity colonies.	The Study Area contains a forested community (FOD2-4) which may provide suitable Bat Maternity habitat. This community, however is not adjacent to the Project Footprint. **Candidate habitat** for bat maternity colonies present within the Study Area, but not within the Project Footprint.

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.		
Turtle Wintering Areas	Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA) and Open Water (OA). Shallow water (SA), Open Fen (FEO) and Open Bog (BOO). Northern Map turtle- open water areas such as deeper rivers or streams and lakes can also be used as over-wintering habitat. Water has to be deep enough not to freeze and have soft mud substrate. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen.	ELC surveys were used to assess features within the Study Area that may support areas of permanent standing water but not deep enough to freeze.	Carroll's Bay, Valley Inn and Grindstone Marshes (OA/MASM1-1) are present within the Study Area, providing suitable wintering habitat for Snapping, Midland Painted and Northern Map Turtles. **Candidate habitat** for Turtle Wintering area present within the Study Area.
Snake Hibernacula	Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Any ecosite in southern Ontario other than very wet ones may provide habitat. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1).	ELC surveys and wildlife assessments were used to assess features within the Study Area that may support snake hibernacula.	Rocky areas adjacent to Carroll's Bay, Valley Inn and Grindstone Marshes (OA/MASM1-1) may provide suitable areas for snake hibernaculum. **Potential** snake hibernaculum occurs within the Study Area.
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (CUM), Thicket (CUT), Bluff (BL), Cliff (CL). Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil	ELC surveys were used to assess features within the Study Area that may support colonial bird breeding habitat.	No eroding banks, sandy hills, borrow pits, steep slopes and sand piles were present within the Study Area. **No candidate** habitat for bank or cliff colonial nesting birds occurs within the Study Area.

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation.		
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	Identification of stick nests in any of the following Community Types: Mixed Swamp (SWM), Deciduous Swamp (SWD), Treed Fen (FET). The edge of the colony and a minimum 300 m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH. Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.	ELC surveys were used to assess features within the Study Area that may support colonial bird breeding habitat (Trees/Shrubs).	No large stick nests were observed during Stantec surveys. **No candidate** habitat for tree/shrub colonial nesting birds occurred within the Study Area.
Colonial-Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula within a lake or large river. For Brewer's Blackbird close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM1-6), Shallow Marsh (MAS1-3), Meadow (CUM), Thicket (CUT), Savannah (CUS).	ELC surveys were used to assess features within the Study Area that may support colonial bird breeding habitat (Ground).	No rocky islands or peninsulas are present within the Study Area. In southern Ontario, Brewer's Blackbird known occurrences are primarily restricted to the Bruce Peninsula; none are known to occur in the Study Area region and it is considered a" very rare irregular spring and autumn transient" (Cadman et al., 2007; Weir, 2008) **No candidate** habitat for ground colonial nesting birds occurred within the Study Area.
Migratory Butterfly Stopover Areas	Located within 5 km of Lake Ontario A combination of ELC communities, one from each land class is required: Field (CUM, CUT, CUS) and Forest (FOC, FOM, FOD, CUP) Minimum of 10 ha in size with a combination of field and forest habitat present	ELC surveys were used to assess features within the Study Area that may support migratory butterfly stopover areas.	The Study Area contains FOD and CUM habitat (FODM2-4 and MEMM3) and is located within 5 km of the Lake Ontario shoreline. Candidate Significant Wildlife Habitat for migratory butterfly stopover areas occurs within the Study Area, however it is not adjacent or related to the Project Footprint.

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Landbird Migratory Stopover Areas	The following community types: Forest (FOD, FOM, FOC) or Swamp (SWC, SWM, SWD) Woodlots must be >10 ha in size and within 5 km of Lake Ontario – woodlands within 2 km of Lake Ontario are more significant	ELC surveys and GIS analysis were used to assess features within the Study Area that may support landbird migratory stopover areas.	The Study Area is located within 5 km of the Lake Ontario shoreline, the FOD community makes up a vast network that is >10ha. Dundas Valley and Dundas Marsh IBA provides important migratory stopover habitat for landbirds. **Confirmed habitat** for migratory landbird stopover areas is present within the Study Area.
Deer Winter Congregation Areas	Woodlots typically > 100 ha in size unless determined by the MNR as significant. (If large woodlots are rare in a planning area >50ha) All forested ecosites within Community Series: FOC, FOM, FOD, SWC, SWM, SWD Conifer plantations much smaller than 50 ha may also be used	No studies required as the MNR determines this habitat.	No deer winter congregation areas were identified by the MNR within the Study Area. **No candidate** habitat for deer winter congregation areas occurs within the Study Area.
Rare Vegetation Communities			
Cliffs and Talus Slopes	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT Most cliff and talus slopes occur along the Niagara Escarpment	ELC surveys were used to assess features within the Study Area that would be considered cliffs or talus slopes.	No cliffs or talus slopes were identified within the Study Area. **No candidate** wildlife habitat for cliffs or talus slopes occurs within the Study Area.
Sand Barrens	Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. Vegetation can vary from patchy and barren to tree covered but less than 60%. Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be sand barrens.	No sand barrens were identified within the Study Area. **No candidate** wildlife habitat for sand barrens occurs within the Study Area.

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Alvars	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover. Any of the following Community Types: ALO1(Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry-Fresh Pine Coniferous Forest), FOC2 (Dry-Fresh Cedar Coniferous Forest), CUM2 (Bedrock Cultural Meadow), CUS2 (Bedrock Cultural Savannah), CUT2-1 (Common Juniper Cultural Alvar Thicket), or CUW2 (Bedrock Cultural Woodland) An Alvar site > 0.5 ha in size	ELC surveys were used to assess features within the Study Area that would be considered to be alvar communities.	No alvars were identified within the Study Area. **No candidate** wildlife habitat for alvars occurs within the Study Area.
Old-growth Forest	Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. No minimum size criteria t in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest) Forests greater than 120 years old and with no historical forestry management was the main criteria when surveying for old-growth forests.	ELC surveys were used to assess features within the Study Area that would be considered to be old-growth forest communities.	No old growth forests were identified within the Study Area. **No candidate** wildlife habitat for old growth forests occurs within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Savannahs	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In Ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savannah Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savannah Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be savannah communities.	No savannahs were identified within the Study Area. **No candidate** wildlife habitat for savannahs occurs within the Study Area.
Tall-grass Prairies	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. In Ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be tall-grass communities.	No tall grass prairies were identified within the Study Area. **No candidate** wildlife habitat for tall grass prairies occurs within the Study Area.
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG	ELC surveys were used to assess features within the Study Area that would be considered to be other rare vegetation communities.	No rare vegetation communities were identified within the Study Area. **No candidate** wildlife habitat for rare vegetation communities occurs within the Study Area.

Attachment C Wildlife Habitat Assessment and SOCC in the Valley Inn Bridge Study Area

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Specialized Habitat for Wildlife			
Waterfowl Nesting Area	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 Note: includes adjacency to Provincially Significant Wetlands	ELC surveys were used to assess features within the Study Area that may support nesting waterfowl. Habitats adjacent to wetlands without standing water were not considered candidate SWH.	The upland shoreline of Carroll's Bay, Valley Inn and Grindstone Marshes (OA/MASM1-1) provide habitat suitable for waterfowl nesting. **Candidate** wildlife habitat for waterfowl nesting areas is present within the Study Area.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	ELC surveys and Woodland Assessments were used to assess features within the Study Area that may support nesting, foraging and perching habitat for large raptors.	No large stick nests were identified within the FOD that occurred within the Study Area. **No candidate** wildlife habitat for Osprey or Bald Eagle habitat occurs within the Study Area.
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands combined >30 ha and with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	ELC surveys, Woodland Assessments and GIS analysis were used to assess features within the Study Area that may support nesting habitat for woodland raptors.	There is no interior habitat within the Study Area, and no stick nests were identified in woodland/forest communities during field surveys. **No candidate** wildlife habitat for woodland raptor nesting occurs within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Turtle Nesting Areas	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, BOO1, FEO1 Best nesting habitat for turtles is close to water, away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support turtle nesting areas.	No ELC communities were identified within the Study Area that are generally associated with potential candidate wildlife habitat for turtle nesting areas. It is likely that Turtles nest along the adjacent railway and within the garden and trail paths. THeser however are not protected as SWH. No other potential turtle nesting areas were observed within the Study Area.
Seeps and Springs	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system	The presence of seeps and springs was recorded during spring and summer field investigations.	No seeps or springs were observed within the Study Area.
Amphibian Breeding Habitat (Woodland)	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD Presence of a wetland, lake, or pond within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat	ELC surveys were used to assess features within the Study Area that may support woodland breeding amphibians.	The FOD community adjacent to Carroll's Bay, Valley Inn and Grindstone Marshes is likely to provide suitable habitat. **Candidate** amphibian breeding habitat (woodland) is present within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Amphibian Breeding Habitat (Wetland)	ELC Community Classes SW, MA, FE, BO, OA and SA. Wetland areas >120 m from woodland habitats. Wetlands and pools (including vernal pools) >500 m^2 (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation.	ELC surveys were used to identify wetland habitat features within the Study Area including those that may support bullfrogs (i.e., natural open aquatic and marsh habitats greater than 1 ha in size).	The upland shoreline of Carroll's Bay, Valley Inn and Grindstone Marshes (OA/MASM1-1) and marsh itself provide suitable amphibian breeding habitat. **Candidate** habitat for wetland amphibian breeding is present within the Study Area.
Species of Conservation Concern			
Marsh Bird Breeding Habitat	All wetland habitats with shallow water and emergent aquatic vegetation. May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: Swamp (SW), Marsh (MA) and Meadow (CUM) Community Types.	ELC surveys were used to identify marshes with shallow water and emergent vegetation that may support marsh breeding birds.	The shoreline of Valley Inn and Grindstone Marshes (OA/MASM1-1) and marsh itself provide suitable habitat for breeding marsh birds. **Candidate** habitat for marsh breeding birds is present within the Study Area.
Woodland Area-sensitive Bird Breeding Habitat	Habitats >30ha where interior forest is present (at least 200 m from the forest edge); typically >60 years old. These include any of the following Community Types: Forest (FO), Treed Swamp (SW)	ELC surveys and GIS analysis were used to determine whether woodlots that occurred within the Study Area that were >30 ha with interior habitat present (>200 m from edge).	No woodlots exceeded 30 ha in size within the Study Area. **No candidate** wildlife habitat for woodland area-sensitive breeding bird habitat occurs within the Study Area.
Open Country Bird Breeding Habitat	Grassland areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (CUM).	ELC surveys and GIS analysis were used to identify grassland communities within the Study Area that may support area-sensitive breeding birds.	No non-agricultural grassland communities >30 ha were identified within the Study Area. **No candidate** wildlife habitat for open country breeding bird habitat occurs within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Shrub/Early Successional Bird Breeding Habitat	Oldfield areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (CUT), Savannahs (CUS), or Woodlands (CUW).	ELC surveys and GIS analysis were used to identify large CUT, CUS or CUW communities that may support shrub/early successional breeding birds.	Suitable communities were not identified within the Study Area. **No candidate** wildlife habitat for shrub/early successional breeding bird habitat occurs within the Study Area.
Terrestrial Crayfish	Meadow marshes and edges of shallow marshes (no minimum size). Vegetation communities include MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3. Construct burrows in marshes, mudflats, meadows Can be found far from water	ELC surveys were used to identify shallow marsh and meadow marsh communities that occurred within the Study Area.	Grindstone Marshes (OA/MASM1-1 within the Study Area may provide suitable habitat. No Terrestrial Crayfish chimneys were observed within the Study Area.
Special Concern and Rare Wildlife Species (i.e. all special concern and S1-S3 species)			
Wild Four o'clock (*Mirabilis nyctaginea*)	Found along railroads, roadsides, dumps, shores, and other disturbed, usually dry ground (Reznicek et al 2011a).		Species is known to occur along the restored slope adjacent to the CN Rail. This is just outside of the Study Area. Observations have been documented on iNat within the Study Area.
Gray-headed Prairie Coneflower (*Ratibida pinnata*)	Occurs in or near prairie remnants (including roadsides and fencerows), at margins of swamps, and in dry open ground. (Reznicek et al 2011b).		May be present along the CN Rail corridor within the Study Area. Observations have been documented on iNat within the Study Area.
Redhead (Aythya americana)	Redheads breed mainly in the seasonal ponds and other wetlands. They have been confirmed at breeding within the 10x10km square (Cadman et al., 2007).		Breeding habitat may be suitable within the Study Area.
Red-necked Grebe (Podiceps grisegena)	In North America, the Red-necked Grebe breeds mainly on small inland lakes and other waterbodies in northern prairie, western parkland, and forest habitats (Stout and Nuechterlein, 1999). Its breeding range is from Alaska through the prairies to Quebec, and parts of northern Washington and Minnesota. Most nesting areas in Ontario are in the		Breeding Habitat required for this species was not observed within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	northwest where it is sparsely populated (Cadman et al., 2007). The Red-necked Grebe winters on northern coastlines on the Atlantic and Pacific.		
Caspian Tern (Hydroprogne caspia)	The Caspian Tern generally nests in colonies and prefers sparsely vegetated flat rocky islands, beaches, and sandy shores of James Bay and the Great Lakes in Ontario (Cuthbert and Wires, 1999). It usually nests on the more elevated areas of islands and it often found nesting with Ring-billed Gulls (Cadman et al., 2007)		Habitat required for this species was not observed within the Study Area.
Great Egret (Ardea alba)	During the breeding season they live in colonies in trees or shrubs with other waterbirds, ranging across the southeastern states and in scattered spots throughout the rest of the U.S. and southern Canada (Cornell Universoty 2019a).		Breeding habitat required for this species was not observed within the Study Area.
Black-crowned Night-Heron (Nycticorax nycticorax)	Black-crowned Night-Herons are common in wetlands across North America, including saltmarshes, freshwater marshes, swamps, streams, rivers, lakes, ponds, lagoons, tidal mudflats, canals, reservoirs, and wet agricultural fields. They require aquatic habitat for foraging and terrestrial vegetation for cover (Cornell Universoty 2019b.)		Species is known to occur in the area.
Bald Eagle *(Haliaeetus leucocephalus)*	Almost always nests near water, usually on large lakes. Large stick nests are placed in trees located within mature woodlots. They usually require 250 ha of mature forest for breeding, however, along Lake Erie, where the lake provides a valuable food source; the eagles will nest in smaller woodlots or even single trees (Sandilands, 2005). This species has experienced a relatively recent and substantial increase in population as well as an expansion in range following a decline during the mid-20th century (Cadman et al, 2007).		No Bald Eagle and Osprey Nesting was identified within the Study Area. However there was an abundance of Foraging and Perching Habitat. Bald Eagle was observed during the site visit.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Golden-winged Warbler *(Vermivora chrysoptera)*	The Golden-winged warbler is confined to southern Ontario with local concentrations along the southern edge of the Canadian Shield, primarily around southeastern Georgian Bay and north of Kingston. This species has experienced a rapid decline in population size over the past decade likely due to natural succession of habitat and hybridization with the Blue-winged warbler. Breeding occurs in successional scrub habitats bordered by forests and nests are constructed on the ground (Cadman et al, 2007). Preference is shown towards early successional scrub (10-30 years into succession) and the species will not persist when the stage of succession has succeeded their requirements. Parasitism by Brown-headed Cowbirds may also be playing a role in population declines (COSEWIC 2006).		Habitat required for this species was not observed within the Study Area.
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	Occupies a wide range of habitats, but most are characterized by open areas for feeding; snags for roosting, and a secure food supply. This species requires multiple snags for nesting, roosting, and foraging. Some of the habitats used are: open deciduous and riparian woodlands, orchards, parks, savanna-like grasslands, beaver ponds with snags, forest edges, burned forests, and flooded bottomland forests. Habitats are similar in both breeding and wintering range, but winter distribution most determined by presence of food. Have been known to move north in winter if mast is heavy (N.A.S. 2012).		Snags in the FOD community may provide suitable habitat for this species.
Peregrine Falcon (*Falco peregrinus*)	Traditionally, in Ontario, it has been a rare breeder, preferring suitable rock cliffs, particularly those adjacent to water. More recently the species has been released in various urban centers in Ontario where it successfully nests on tall buildings. Relatively recent increases in abundance and distribution		Breeding habitat required for this species was not observed within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	are owing to now established populations in natural areas and urban environments, both of which are separate and distinct populations. These increases reflect the large-scale recovery efforts across the species range (Cadman et al, 2007). Despite significant recovery from population declines due to exposure to organochlorine pesticides, particularly DDT, limiting factors still include pesticide use in the species' wintering range as well as human disturbance at nest sites and increased legal and illegal harvest for falconry (COSEWIC 2007).		
Eastern Wood-Pewee (*Contopus virens*)	The Eastern Wood-Pewee is a forest bird of deciduous and mixed woods. Nest-site selection favors open space near the nest, typically provided by clearings, roadways, water, and forest edges. Nests are cryptic as they are covered with lichens, typically appearing like a knot on top of a branch and little is known about nesting behavior (Cadman et al, 2007).		Breeding habitat present within the FOD community in the Study Area.
Wood Thrush (*Hylocichla mustelina*)	Wood Thrush prefer deciduous and mixed forests in southern Ontario, ranging from small and isolated to large and contiguous woodlots. The presence of tall trees and a thick understory are preferred (Cadman et al., 2007).		Habitat required for this species was not observed within the Study Area.
Grasshopper Sparrow (*Ammodramus savannarum*)	The Grasshopper Sparrow inhabits drier more open grasslands than most other sparrows. It prefers short, sparse grass with patches of exposed ground. The Grasshopper sparrow prefers to nest rough or unimproved pastures and in drier, sparsely vegetated grasslands at least 30 ha in size (Cadman et al. 2007).		Habitat required for this species was not observed within the Study Area.
Eastern Milksnake *Lampropeltis triangulum*	Eastern Milksnake favours open woodlands, fields and farm buildings and are commonly associated with rural areas (COSEWIC 2002b).		Habitat required for this species was not observed within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Eastern Musk Turtle (*Sternotherus odoratus*)	This species occurs in rivers, lakes and ponds with a slow current and soft bottom, and usually inhabits shallow water (Ontario Nature 2020).		Carroll's Bay, Sunfish Pond and Gindstone Marsh may provide Suitable habitat.
Eastern Ribbonsnake (*Thamnophis sauritus*)	Restricted to southern Ontario, where it is quite local, and is usually found close to water (Lamond, 1994). They often frequent the edge of shallow ponds, streams, marshes, swamps, or bogs with dense vegetation nearby that provides cover, with abundant exposure to sunlight and upland areas for nesting (COSEWIC, 2002c). Ontario ribbonsnakes have been found to hibernate in animal burrows or rock crevices (Lamond, 1994).		Grindstone Marsh may provide habitat for this species.
Northern Map Turtle (*Graptemys geographica*)	Map turtles are highly aquatic and inhabit slow moving, large rivers and lakes with soft bottoms and abundant aquatic vegetation. Basking sites include rocks and deadheads adjacent to deep water (COSEWIC 2002d) Nesting occurs in soft sand or soil and at a distance from the water, hibernation is communal and occurs at the bottoms of lakes (MacCulloch, 2002). Females leave the water in June to nest (MacCulloch, 2002).		Carroll's Bay, Sunfish Pond and Gindstone Marsh provides Suitable habitat.
Snapping Turtle (*Chelydra serpentina*)	Snapping Turtles inhabit ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms. Females show strong nest site fidelity and nest in sand or gravel banks at waterway edges in late May or early June (COSEWIC, 2008).		Carroll's Bay, Sunfish Pond and Gindstone Marsh provides Suitable habitat.
Cicada Killer (*Sphecius speciosus*)	Forest edges, gardens, waste places; nests in the ground (Borror & White, 1998).		May occur within the Parkland habitat in the surrouding Study Area.
Amber-winged Spreadwing (*Lestes eurinus*)	This species is found throughout southeast Canada and the northern half of eastern United States. It prefers ponds and small lakes (WATRI 2021a).		Carroll's Bay, Sunfish Pond and Gindstone Marsh may provide Suitable habitat.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Azure Bluet (*Enallagma aspersum*)	In southern Ontario, the Azure Bluet (Enallagma aspersum) has become adapted to man-made ponds and is typically found in shallow, often temporary and fishless, pools and ponds that entirely freeze in the winter (Catling and Brownell, 2000).		Habitat required for this species was not observed within the Study Area.
Double-striped Bluet (*Enallagma basidens*)	The Double-striped Bluet (Enallagma basidens) is found around ponds, especially artificial ponds including pit and quarry sites, but also along rivers (Catling and Brownell, 2000).		Grindstone Marsh may provide suitable habitat.
Unicorn Clubtail (*Arigomphus villosipes*)	The Unicorn Clubtail (Arigomphus villosipes) inhabits ponds and sluggish streams with little emergent vegetation and mucky bottoms. This species is found frequently on the ground, typically on areas with exposed soil (Jones et al., 2008).		Grindstone Marsh may provide suitable habitat.
Pronghorn Clubtail (*Gomphus graslinellus*)	The Pronghorn Clubtail (Gomphus graslinellus) is found around streams, ponds and lakes (Catling and Brownell, 2000).		Carroll's Bay, Sunfish Pond and Gindstone Marsh may provide Suitable habitat.
Delta-spotted Spiketail (*Cordulegaster diastatops*)	The delta-spotted spiketail can be found at sunny seepages and small streams, usually spring runs, including boggy ones (WATRI 2021b).		Grindstone Marsh may provide suitable habitat.
Arrowhead Spiketail (*Cordulegaster obliqua*)	Usually found at forest rivulets that are spring-fed and have a muck bottom, sometimes with rocks or in small rapid stream (WATRI 2021c).		Habitat required for this species was not observed within the Study Area.
Painted Skimmer (*Libellula semifasciata*)	The Painted Skimmer can be found in marshy bays, ponds, and streams (Catling and Brownell, 2000).		Carroll's Bay, Sunfish Pond and Gindstone Marsh may provide Suitable habitat.
Black Dash (*Euphyes conspicua*)	Boggy marshes, wet meadows, and marshy stream banks (Lotts and Naberhaus 2017).		Grindstone Marsh in the surrounding Study Area may provide suitable habitat.
Monarch (*Danaus plexippus*)	Forage and nest in open habitat (i.e., meadows, grasslands and pastures) with various milkweed species (Asclepias spp.) and/or wildflowers such as goldenrods		MEMM3 communities may provide suitable habitat for this species.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	(Solidago spp.), asters (Aster spp.) and yarrow (Achillea millefolium) (COSEWIC 2016).		
Animal Movement Corridors			
Amphibian Movement Corridor	Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland).	Identified after Amphibian Breeding Habitat - Wetland is confirmed. Movement corridors should be considered when amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat (Wetland).	Candidate amphibian breeding habitat occurs within the Study Area and potential for amphibian movement corridors. **Candidate** amphibian movement corridor.

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(WATRI) Wisconsin Aquatic and Terrestrial Resources Inventory. 2021c. Retrieved January 18, 2021, from http://wiatri.net/inventory/odonata/speciesaccounts/SpeciesDetail.cfm?TaxaID=60

ATTACHMENT D:
Photographic Record

Photo 1: Facing west towards Valley Inn Bridge from east end of the bridge.

Photo 2: Downstream side of the Valley Inn Bridge, facing west from the east abutment.

Photo 3: Upstream side of the Valley Inn Bridge; west abutment.

Photo 4: East bridge abutment, facing downstream (south) towards Carroll's Bay

Photo 5: Upstream side of the Valley Inn Bridge, facing the west shoreline and abutment.

Photo 6: Downstream (south) of the Valley Inn Bridge, facing upstream (north).

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Client/Project
City of Hamilton 165001203

Attachment
D

Page
1 of 1

Title
Valley Inn Bridge Replacement
Photographic Record – December 12, 2020

Cultural Heritage Impact Assessment, Bridge 457, Valley Inn Bridge

FINAL REPORT

April 14, 2021

File: 165001203

Prepared for:

City of Hamilton
71 Main Street West
Hamilton, Ontario L8P 4Y5

Prepared by:

Stantec Consulting Ltd
600-171 Queens Avenue
London, Ontario N6A 5J7

Executive Summary

Between 2014 and 2016 the City of Hamilton (the City) retained Stantec Consulting Ltd. (Stantec) to undertake a review of the bridges included in the 2010 *Bridge Management Software* to identify potential for cultural heritage value or interest (CHVI). In the *City of Hamilton Bridge Master Plan Heritage Bridge Inventory Review*, Stantec identified 25 bridges where additional assessment is required. It was recommended that this assessment be contained within a Cultural Heritage Evaluation Report (CHER). The CHER for Bridge 457, also referred to as the Valley Inn Bridge, was completed by Stantec in 2017.

The Valley Inn Bridge was evaluated against *Ontario Regulation 9/06* (O. Reg 9/06) and the *City of Hamilton Bridge Guideline*. The bridge was found to have CHVI and have high heritage value as a Class C structure. As a Class C bridge with CHVI, it was determined that the Valley Inn Bridge required a Cultural Heritage Impact Assessment (CHIA) in the event that removal and/or modifications are proposed for this structure. The CHIA must address anticipated impacts to the heritage attributes identified for the bridge.

The City of Hamilton is conducting a Municipal Class Environmental Assessment (MCEA) study on the replacement of the Valley Inn Bridge. The bridge is a Modular Double Single Bailey Truss bridge located at the confluence of Grindstone Creek and Lake Ontario. The Valley Inn Bridge was installed in 1964 as a temporary structure after the previous crossing collapsed. Bailey Truss bridges were developed during the Second World War as a bridge type that was portable, quick to erect, and easy to adjust for different loads and spans.

The proposed removal and replacement of the Valley Inn Bridge is a direct impact and the following mitigation measures are recommended:

1) Replacement of the Valley Inn Bridge with a historically sympathetic design. A historically sympathetic design does not need to recreate or replicate the existing Valley Inn Bridge. Instead, it should continue to support the character of the area and retain the landmark status of the crossing over Grindstone Creek. The existing Valley Inn Bridge serves as a local landmark, and a new structure should maintain the distinctive nature of the crossing. This can be accomplished by implementing sympathetic design qualities which evoke the former crossing without replicating it, such as wood decking, the stone abutments, and the distinctive pattern of the truss structure. The city has provided Stantec with drawings of the proposed replacement structure and it contains sympathetic design qualities such as a truss and wood decking.

2) Documentation, salvage, and commemoration of the existing Valley Inn Bridge. Documentation activities should consist of the full heritage recording of the bridge through photography, photogrammetry, or LiDAR scan. Salvage activities should consist of the identification and recovery of re-useable bridge components by a reputable salvage company or charity. Materials that should be considered for salvage include the steel truss superstructure and stone abutments (if not retained). The documentation and salvage should be accompanied by a commemoration of

the bridge to interpret its value. The commemoration should include interpretive text that overviews the history of the Valley Inn Bridge, the historical significance of the Bailey Truss design, and an overview of the history of bridge crossings at the confluence Grindstone Creek and Lake Ontario. In addition to interpretive text there is the potential that salvaged materials from the bridge can be incorporated into the commemorative aspect. The documentation and salvage work should be carried out under the direction of a Cultural Heritage Specialist in good professional standing with the Canadian Association of Heritage Professionals (CAHP) while the commemoration and interpretation should be carried out by a person(s) with knowledge of the history of the City of Hamilton.

The executive summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

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Glossary

Built heritage resource	Means one or more significant buildings, structures, monuments, installations or remains associated with architectural, cultural, social, political, economic or military history and identified as being important to a community. These resources may be identified through designation or heritage conservation easement under the Ontario Heritage Act, or listed by local, provincial or federal jurisdictions.
Cultural heritage landscape	A defined geographical area of heritage significance which has been modified by human activities and is valued by a community. It involves grouping(s) of individual heritage features such as structures, spaces, archaeological sites, and natural elements, which together form a significant type of heritage form, distinctive from that of its constituent elements or parts. Examples may include, but are not limited to, heritage conservation districts designated under the Ontario Heritage Act; and villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value.
Cultural heritage resources	Includes built heritage, cultural heritage landscapes, and marine and other archaeological sites. The Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) is responsible for the administration pf the Ontario Heritage Act and is responsible for determining policies, priorities and programs for the conservation, protection and preservation of Ontario's heritage, which includes cultural heritage landscapes, built heritage and archaeological resources.

Abbreviations

CAHP	Canadian Association of Heritage Professionals
CHER	Cultural Heritage Evaluation Report
CHIA	Cultural Heritage Impact Assessment
CHVI	Cultural Heritage Value or Interest
LiDAR	Light Detection and Ranging
MA	Master of Arts
MCEA	Municipal Class Environmental Assessment
MEA	Municipal Engineers Association
MHSTCI	Ministry of Heritage, Sport, Tourism, and Culture Industries

1.0 INTRODUCTION

1.1 STUDY PURPOSE AND METHODS

In 2014, the City of Hamilton (the City) retained Stantec Consulting Ltd. (Stantec) to undertake a review of bridges included in the 2010 *Bridge Management Software* to identify potential for cultural heritage value or interest (CHVI). The goal of the review was to identify where a bridge required additional study to determine CHVI prior to establishment of the schedule of a Municipal Class Environmental Assessment (MCEA). This was done in response to the *Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist* (the Checklist) released by the Municipal Engineers Association (MEA) in March 2013 and revised in April 2014 (Municipal Engineers Association 2014) (see Appendix A). In 2015, the MCEA Manual was further modified to provide more direction regarding bridges over 40 years old (MCEA 2015).

In response, in 2014 Stantec conducted a pre-screening exercise to identify bridges within the City that required further assessment to assist the City with scheduling and budget planning for future road and bridge improvements. A total of 25 bridges were identified where cultural heritage assessment is required as indicated by the MEA Checklist prior to the initiation of a MCEA. Stantec recommended that a Cultural Heritage Evaluation Report (CHER) be prepared for each of the 25 bridges identified in that review, in advance of any modifications. As part of the pre-screening exercise, a CHER was completed for the Valley Inn Bridge, which included an evaluation of the bridge against *Ontario Regulation (*O. Reg.) *9/06* (Government of Ontario 2006a) and the *City of Hamilton Heritage Bridge Guideline and Heritage Bridge Conservation* (Hamilton Bridge Guideline) (City of Hamilton 2006a). The CHER determined that the Valley Inn Bridge has CHVI and moderate heritage value as a Class C structure. The heritage attributes identified for the Valley Inn Bridge include:

- Stone abutments that are remnants of the previous bridge at this location
- Bridge components associated with the Bailey Truss bridge design including, but not limited to:
  - Modular panels with top and bottom chords, verticals, and diagonals
  - Timber decking
  - Longitudinal stringers
  - Transverse transoms
  - Horizontal bracers
  - End posts

As a bridge with CHVI, the 2017 CHER recommended that a Cultural Heritage Impact Assessment (CHIA) be completed in the event that removal and/or modifications are proposed for this structure. Presently, the City of Hamilton is planning the removal of the Valley Inn Bridge.

This report is a CHIA that evaluates the impacts to the Valley Inn Bridge and proposes mitigation options. This CHIA was prepared according to the City of Hamilton CHIA Terms of Reference (ToR) (2014). As described in the ToR, this CHIA includes:

- A location plan showing and describing the contextual location of the site, an existing site plan, current floor plans of built structures (where appropriate), a proposed site plan, proposed building elevations, and proposed interior plans;
- Identification and evaluation of all potentially affected cultural heritage resource(s), including detailed site history and cultural heritage resource inventory containing textual and graphic documentation;
- A description of the proposed development or site alteration and alternative forms of the development and/or site alteration;
- A description of all cultural heritage resources to be affected by the development and its alternative forms;
- A description of the measures necessary to mitigate the adverse effects of the development and/or site alteration and its alternative forms;
- A description of the measures necessary to mitigate the adverse effects of the development and/or site alterations and its alternatives upon the cultural heritage resource(s), including:
  - The means by which the existing cultural heritage resources shall be integrated within the proposed development and/or site alteration; and,
  - The manner in which commemoration of cultural heritage resources to be removed shall be incorporated within the proposed development and/or site alteration
- Any photographic records, maps, or other documentary materials found during the historical research of the property as well as present-day photographs taken during research; and,
- A detailed list of cited materials.

In addition, the MHSTCI Info Sheet #5 in *Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Info Sheet #5) was reviewed (Government of Ontario 2006b). This document provides guidance on the assessment of impacts based on CHVI resulting from a proposed change. This CHIA also follows the *City of Hamilton Heritage Bridge Guideline* (City of Hamilton 2006a) document to determine appropriate mitigation measures.

The Valley Inn Bridge is a Modular Double Single Bailey Truss bridge that was constructed in 1964. The bridge was installed in 1964 as a temporary structure after the previous bridge collapsed. The Valley Inn Bridge is located 535 metres east of York Boulevard and carries Valley Inn Road across the confluence of Grindstone Creek and Lake Ontario, just northwest of Carrol's Point, at the border of the former Townships of East and West Flamborough, now the City of Hamilton (Figure 1). A site assessment was undertaken on January 18, 2021 by Frank Smith, Cultural Heritage Specialist. The weather conditions were overcast with occasional snow flurries, and seasonably cold temperatures. Due to the ongoing COVID19 pandemic, historical resources such as universities, archives, and libraries could not be consulted. Research was limited to online sources, digitized sources, and the Stantec corporate library.

Stantec

Legend
- Study Area
- Railway
- Municipal Boundary, Lower

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Imagery obtained from © First Base Solutions, 2020. Hamilton Wentworth Region 2019, Halton Region 2019.

- Niagara Escarpment Plan
- Greenbelt Natural Heritage System

Project Location
City of Hamilton

165001203 REV4
Prepared by JW on 2021-02-24

Client/Project
CITY OF HAMILTON
CULTURAL HERITAGE IMPACT ASSESSMENT, BRIDGE 457, VALLEY INN BRIDGE

Figure No.
1

Title
Study Area

2.0 ENVIRONMENTAL ASSESSMENT FRAMEWORK

2.1 REQUIREMENTS

The requirement to consider cultural heritage in Class EAs is discussed in the *Municipal Class Environmental Assessment* (MCEA) (Municipal Engineers Association 2015) and the revised 2020 *Provincial Policy Statement* (PPS) (Government of Ontario 2020). The MCEA process considers the cultural environment, including built heritage resources and cultural heritage landscapes, as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking a Class EA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative.

The MCEA further suggests that cultural heritage resources that retain heritage attributes should be identified early in the EA process and that these resources should be avoided where possible. Where avoidance is not possible, potential impacts to these attributes should be identified and minimized. Adverse impacts should be mitigated per provincial and municipal guidelines.

2.2 MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

In 2000, the Minister of the Environment, Conservation, and Parks approved the MCEA proposed by the. This included a provision to complete a heritage assessment for any bridge over the age of 40 years. Since this time, a series of amendments and clarifications have been made to the MCEA process. One of these clarifications was released in 2003 by the MEA regarding the inclusion of a 40-year threshold for schedule determination. The intent of the MEA was to provide for the protection of potentially significant bridges throughout the province; the 40-year threshold is generally accepted by both the federal and provincial authorities as a preliminary screening measure for CHVI. The MCEA was most recently amended in 2015.

To provide clarity regarding the 40-year threshold for schedule determination, the MEA released guidelines in the form of a series of questions contained within a Checklist. This Checklist assists the proponent in the determination of future study requirements is provided in Appendix A. The MCEA requirements for bridges are covered in Part B of the Checklist. In this section, there are 19 “Descriptions” to which answers of “Yes” or “No” are required. Requirements for additional studies are determined based on the responses to each question. There are three basic steps to carrying out the requirements of the Checklist and these are outlined in Section 2.2.1.

2.2.1 The Process

Step 1: Undertake *Municipal Heritage Bridges Cultural, Heritage and Archaeological Checklist* (Part B) to determine if the bridge may have CHVI.

1. If no potential for CHVI is identified, then the proposed work can be a considered a Schedule A or A+ Class EA and no further investigation regarding cultural heritage is required.

- Schedule A:
  - These projects are limited in scale, have minimal adverse environmental effects, and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the full Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities (Municipal Engineers Association 2015: A-3).
- Schedule A+:
  - These projects are similar to Schedule A projects in that they are pre-approved. Where they differ is in notice issued to the public. Schedule A+ projects include municipal infrastructure projects where, although the public has no ability to change the outcome, they are notified of planned work. These EAs are typically approved by municipal councils through budget or special project funding. There is also more flexibility in the ways in which the public is notified of this work and varies greatly from one municipality to the next (Municipal Engineers Association 2015: A-4).

2. If potential for CHVI is identified, then proceed to Step 2.

Step 2: Undertake a cultural heritage evaluation of the bridge against O. Reg. 9/06of the *Ontario Heritage Act* (OHA) and prepare a CHER.

1. If the bridge is determined not to contain CHVI as per O. Reg. 9/06 then the CHER should be submitted to the proponent for review and approval. No further work is required and an EA is not triggered from a cultural heritage perspective.
2. If the bridge is determined to contain CHVI as per O. Reg. 9/06, prior to schedule determination, further work will be required in the form of an HIA. Once the proponent understands the proposed (or potential) scope of work, proceed to Step 3.

Step 3: Undertake an HIA to assess the impacts of the proposed change/impact, identify mitigation measures, and establish a conservation strategy, if needed.

1. If no impacts to the heritage attributes identified in the CHER will result from the proposed work, then the HIA should be submitted to the proponent for review and approval. No further work is required and the proposed work can be considered a Schedule A or A+ EA from a cultural heritage perspective.
2. If the HIA determines that the project has the potential to impact the resource, proceed to Schedule B or C to consider alternative solutions. As part of the HIA, mitigation measures to lessen the impacts of

the proposed undertaking and a conservation strategy should be prepared. The HIA should be submitted to the proponent for review and approval and to the MTCS for review and comment.

- Schedule B:
  - These projects have the potential for some adverse environmental impacts. The proponent is required to undertake a screening process involving mandatory contact with directly affected public and relevant review agencies (i.e. MHSTCI), to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects general include improvements and minor expansions to existing facilities (Municipal Engineers Association 2015: A-4).
- Schedule C:
  - These projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the MCEA. Schedule C projects require the preparation and filing of an Environmental Study Report (ESR) for review by the public and relevant agencies. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities (Municipal Engineers Association 2015: A-4).

This report represents “Step 3” of the MCEA process and the result is a CHIA that identifies impacts and mitigation measures to ensure that the cultural heritage value of the Valley Inn Bridge is conserved. A flowchart depicting the MCEA Process as it pertains to municipal bridges is provided in Plate 1 below.

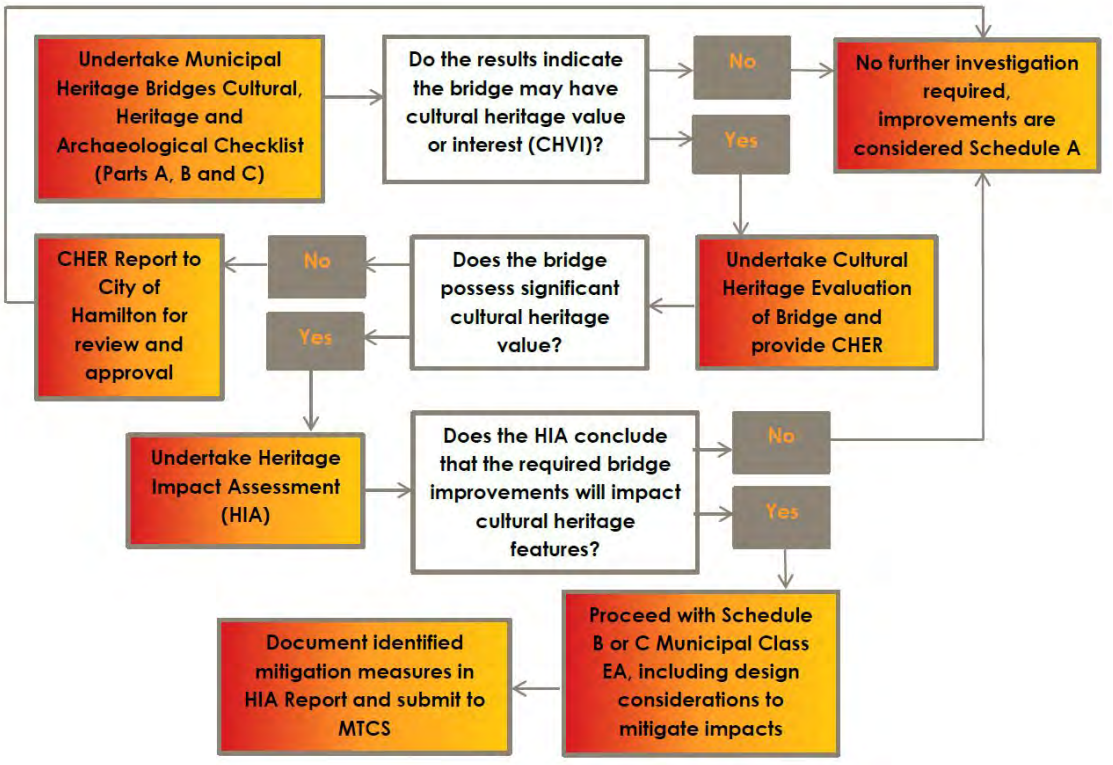

Plate 1: Flowchart of the MCEA Process

2.2.2 Determining Project Schedule

Generally, the MCEA Project Schedule is determined by the magnitude of the environmental impacts resulting from the project. As such, projects with minimal impacts are carried out under Schedules A or A+, projects with moderate adverse impacts are carried out under Schedule B, and projects with the potential for significant environmental effects are carried out under Schedule C.

In the case of bridges found to have CHVI, all reconstruction and/or alteration activities to the structure, or grading activities adjacent to the structure, should be carried out under Schedules B or C. As indicated in Appendix 1 of the MCEA , projects involving a bridge with CHVI that cost less than $2.4 million should be carried out under Schedule B and projects with a cost greater than $2.4 million should be carried out under Schedule C (Municipal Engineers Association 2015). While the magnitude of the impact to the bridge and the cost of the project can be used to determine the whether to proceed under Schedule B or C, the MCEA notes that the divisions among project Schedules is often not distinct and proponents are encouraged to document their rationale for the selection (Municipal Engineers Association 2015: Appendix 1).

3.0 HISTORICAL SUMMARY

3.1 INTRODUCTION

The following historical summary was prepared in 2017 by Stantec for the City of Hamilton as part of the CHER completed for the Valley Inn Bridge.

3.2 LOCATION AND PHYSIOGRAPHY

The Valley Inn Bridge is located on the former Valley Inn Road, now a pedestrian trail between the Cities of Hamilton and Burlington. The bridge carries a pedestrian trail over Carroll's Bay Marsh, part of Burlington Bay. The bridge is situated within the Royal Botanical Gardens, the largest botanical garden in Canada and a National Historic Site. Located in a 1100-hectare (2,718.15 acres) nature sanctuary, the bridge is situated with a natural area surrounded by water, trees, gardens, and trails (Royal Botanical Gardens No Date [n.d.]). The Study Area boundary was defined by the bridge structure and embankments surrounding the structure.

The Study Area is situated within the Norfolk Sand Plain physiographic region within southwestern Ontario (Chapman and Putnam 1984: 113). Within the City, the sand plain is hemmed in by the shores of Lake Ontario and the Niagara Escarpment to the north, west, and south. Positioned on the western part of Lake Ontario and east of the City, the Burlington Bay was formed by a natural sand spit that was originally open to Lake Ontario at the north end. In its early development, the depth of the water over this natural channel restricted access to the Bay, thus eliminating the natural inclination towards development of a major port (Chapman and Putnam 1984:120). Earlier cargoes had to be shipped into Hamilton by small boats as the waterfront itself was not easily accessible to the roads leading to already settled areas. What resulted was a shift in early development away from Hamilton and towards Dundas and Burlington, which were both more accessible.

Challenging topography, caused largely by the escarpment, made access to the waterway from Hamilton prohibitive, which restricted trade and settlement. In 1826, the Desjardins Canal was constructed to open access to the harbour but ultimately facilitated trade to Dundas not Hamilton (Chapman and Putnam 1984:120). With the arrival of the railway in the mid-19th century, and utilization of previously disregarded lands, Hamilton began to take better advantage of its abundant natural resources.

Directly east of Hamilton the sand plain is replaced by limestone. Limestone and dolostone deposits along the Niagara Escarpment contributed greatly to the development of the steel industry in Hamilton; both were used as flux in smelters throughout the region (Chapman and Putnam, 1984: 120). Hamilton also made use of shale from the Niagara Escarpment for making brick, tile, and other ceramic products. The location of the site of shale in particular is on the eastern side of the Escarpment as it drops from the ridge to Hamilton Harbour, forming a steep descent towards the lake (Chapman and Putnam, 1984: 120). The position of natural resources complimented the growing railway hub.

Situated west of Burlington Bay is Cootes Paradise, an approximately 1,500 acre provincially significant wetland that is designated an Important Bird Area of National Significance and Important Amphibian and Reptile Area (Cootes To Escarpment 2017). In 1927, the Cootes Paradise Sanctuary was established as a provincial wildlife reserve and in 1941 it became part of the Royal Botanical Gardens (Parks Canada 2015). The Study Area is situated in the Grindstone Creek Watershed. The watershed comprises an area of 99 square kilometres and supplies 14 percent of the water into Burlington Bay (Conservation Halton 2017). Grindstone Creek enters Burlington Bay immediately below the bridge structure.

3.3 SURVEY AND SETTLEMENT

The Study Area is located over Grindstone Creek between Lot 14, Concession 1, in the former Township of East Flamborough and on Lot 29, Concession 1, in the former Township of West Flamborough. The area was surveyed in 1793 using a single-front system by District Provincial Land Surveyor Augustus Jones (Waterdown East Flamborough Centennial Committee [WEFCC] 1967: 11). The township survey was laid out in relation to the survey of the Governor's Road (Dundas Street), also completed by Jones from 1793 to 1795. A party of Queen's Rangers opened the road to serve as a military connection road between the Great Lakes and the St. Clair River. It was named by Lieutenant Governor John Graves Simcoe for Henry Dundas, Secretary of State for the British Home Department (Magel 1998: 30).

The township name of Flamborough was chosen by Simcoe after a small east coast village in Yorkshire, England (Waterdown-East Flamborough Heritage Society & Archives [WEFHS] 2017). It was surveyed into west and east portions that remained administratively joined until 1854 (Hamilton Public Library 2017a). The west portion was laid out in the shape of a triangle with the Governor's Road serving as the base. It had 11 concessions running west to east that were numbered north from Governor's Road (Burkholder 1950). The east portion had fourteen concessions running south to north, with a broken front along Burlington Bay. Lots in the township are numbered east to west. Both portions of the township were laid out using the single-front system, with each concession comprised of long and narrow lots that were approximately 200 acres in size (Plate 2). Lot sizes in the Township of West Flamborough are irregular, due to its triangular shape and Cootes Paradise along the southeast portion (Green et al. 1997: 2).

Plate 2: Single-Front System (Dean 1969)

The first settlers in the Township of West Flamborough were Ann Morden and her family, United Empire Loyalists, who arrived in 1787. When Jones surveyed the township, he noted the Morden family as squatters in the Dundas Valley (Woodhouse 1965: 10). After the Township of West Flamborough was surveyed the Mordens petitioned for Loyalist land grants, with Anne and her sons (John, David, Ralph, Moses, and James) receiving parcels totaling 1,780 acres in the township (Woodhouse 1965: 12). Other early settlers prior to 1800 included Andrew Vanevery, John Purbus, Isaac Durham, William Chrysler, David Vanevery, Frederick Schram, John Rosebrough, Peter Vanevery, Isaac Smith, John Showers, Michael Showers, William Frances, Harcar Lyons, and James Durand (Woodhouse 1965: 12).

The first settler to the Township of East Flamborough was David Fonger, who arrived in 1783. He was followed by William Applegarth in 1791 (Green et al 1997: 5). Land grants were given beginning in 1796, in the lower portions of the township. One of the first grants was given to Alexander McDonnelll in 1796, which included 800 acres on Grindstone Creek (WEFCC 1967: 12).

3.4 19TH CENTURY DEVELOPMENT

3.4.1 Township of West Flamborough

Settlement in the Township of West Flamborough developed primarily along the waterways, which acted as a source of power for mills, and at road intersections. Numerous mills developed along watercourses in the township and by 1823 the township had 11 grist mills and eight sawmills in operation (Page & Smith 1875: III). The largest community to develop in the township was Dundas, situated west of the Study Area. In 1801, Edward Peer purchased 30 acres on Spencer Creek and built the first mill in Dundas known as Dundas Mills. It was purchased by the Hatt brothers by 1808 (Woodhouse 1965: 14).

The community of Dundas flourished in the 19th century as it was located at the junction of large roadways and on the shoreline of Cootes Paradise Marsh. The town developed around Hatt's mill, with inns and stores constructed to serve settlers while their grain was ground at the mill. It developed into a trading and transportation centre in the township (Freeman 2001: 21). The community received the first post office in the township in 1814 and was given the name Dundas after the main thoroughfare in the settlement, Dundas Street (Conservation Hamilton n.d).

Dundas' growth accelerated with the construction of the Desjardins Canal between 1826 and 1837. The canal was constructed along the mouth of Spencer Creek to connect Dundas with Burlington Bay. Dundas served as the location for company headquarters and offices, as well as a community for workers (Page & Smith 1875: IX). Following the construction of the Desjardins Canal, Dundas became a busy port on Lake Ontario (Freeman 2001: 37). It was incorporated as a town on July 28, 1847 (Page & Smith: IX).

With the construction of the Great Western Railway (G.W.R.) in 1854, Dundas witnessed a shift from canal shipments to utilization of the railway for the shipment of goods. By the late 1870s, the G.W.R. network reached from Toronto to Niagara, including service to London, Windsor, Sarnia, Kincardine, and three of the Great Lakes. To increase accessibility to the City, the Hamilton & Dundas Street Railway was incorporated in 1875, and a line was opened in May 1880 (TrainWeb 2017). By the end of the 19th century, the Town of Dundas had become one of the major manufacturing towns in the province with

industries producing goods such as flour, cotton, clothing, agricultural implements, and furniture (Page & Smith 1875: IX).

3.4.2 Township of East Flamborough

Settlement in the Township of East Flamborough developed primarily at road intersections and along Grindstone Creek, which acted as a source of power for mills. The first mill in the township was constructed on the creek in 1807 by William and John Applegarth (Green et al 1997: 5). In 1805, Alexander Brown purchased McDonnell's property on the creek and constructed a sawmill near the Great Falls, just south of Dundas Street (WEFHS & A n.d.). A settlement developed around Brown's mill, at the crossroads of Dundas Street and Mill Street (Green et al 1997: 18).

In 1823, Ebenezer Griffin purchased Brown's property and subdivided it into village lots. As part of the village survey the settlement was given the name Waterdown. By 1841, most of the lots within the village were sold to settlers (WEFCC 1967: 41). By 1846, Waterdown had a population of 200, with two grist mills, two sawmills, a carding machine, cloth factory, two stores, a tannery, two taverns, a saddler, scythe factory, cooper, tailor, shoemaker, and a blacksmith (Smith 1846: 205). Waterdown continued to grow throughout the 19th century, with the influence of the mill and factory operations on Grindstone Creek. As the valley surrounding the creek was filled with industrial activity it became known as Smokey Hollow [WEFHS & A n.d.). In June 1878, the Village of Waterdown was incorporated with a population of about 1,000 (Flamborough Review October 2010).

South of Waterdown and east of the Study Area, Alexander Brown constructed a wharf in the 1820s at the foot of Waterdown Road, on Lot 6 of the Broken Front. Brown's wharf became the major point of export for products in the township. In the 1840s, Brown, in an agreement with the Ontario navigating Company of Toronto, was commissioned to supply the company's steamships with cordwood for their boilers. By 1860, a settlement developed around the wharf known as Aldershot Corners (Green et al 1997: 7).

By 1867, all the lots in the township had been taken up (Green et al 1997: 3). In 1883, the Township reached a population of 2,377, with the villages of Aldershot, Carlisle, Clappison, Flamboro Centre, Mountsberg and Waterdown (1883: 54). The largest village was Waterdown, with a population of about 700 (Irwin 1883: 168).

3.5 20TH CENTURY DEVELOPMENT

3.5.1 Township of West Flamborough

At the turn of the 20th century, the Township of West Flamborough witnessed a change in settlement patterns as retired farmers began to move into the Town of Dundas from the surrounding township. The proximity of Dundas to the City of Hamilton also created the possibility for many town residents to work in Hamilton while maintaining their home in Dundas (Meyers 1954: 42). Dundas had reached its industrial peak in the late 19th century, falling from 61 manufacturing industries in 1890 to 17 in 1901 (Meyers 1954: 25). At this time, Hamilton was booming and offered more employment opportunities. Nonetheless,

industries continued to play an important role in the Dundas economy. Large industries that attracted residents in Dundas included the Steel Company of Canada (Stelco), Dominion Steel Castings Ltd. (Dofasco Inc.), National Steel Car Corporation, and Canadian Westinghouse (Bailey 1983: 81).

Traffic surrounding the Study Area increased with the development of better roads and highways beginning in the 1920s. In 1920, the Department of Public Highways Ontario (DPHO) assumed the roadway north of the Study Area, from Hamilton to Owen Sound and established Highway 6 (Bevers 2015). In the 1930s, north of the Study Area, the Department of Highways Ontario (DHO) began plans for the construction of a highway from London to Hamilton that would run parallel to Dundas Street. The project was delayed due to the Second World War and a shift in priorities for the DHO for other highways in the province. The highway, known as King's Highway 403, was constructed in the early 1960s and completed from Hamilton to Brantford in 1966. Highway 403 was further extended east to reach the Queen Elizabeth Way in 1982 and west to Woodstock to connect with Highway 401 in 1988 (Bevers 2017).

In January 2001, the Towns of Flamborough and Dundas amalgamated with the City of Hamilton (Hamilton Public Library 2017b). Dundas remains a small suburban community within the City, with a population of 24,710 in 2006 (Social Planning & Research Council 2008).

3.5.2 Township of East Flamborough

At the beginning of the 20th century, east of the Study Area remained a rural agricultural portion of the Township of East Flamborough. To the north, the Village of Waterdown witnessed a decreased period of development at the beginning of the 20th century, influenced by the lowered water levels on Grindstone Creek, which led to mill closures (City of Waterfalls 2017). In the early 1900s the population of Waterdown had fallen to 750 (Flamborough Review October 2010).

The east portion of the Study Area remained in the Township of East Flamborough until 1958, when Concessions 1 and 2 and the Broken Front, were amalgamated into the Town of Burlington (Green et al 1997: 5). North of the Study Area, Highway 403 was extended through the Township of East Flamborough in 1963, from the Desjardins Canal Bridge, in the City of Hamilton, east to the Queen Elizabeth Way in the Town of Burlington (Bevers 2017). Development increased following construction of Highway 403, east of the Study Area, with the replacement of farms with subdivisions (Gike 2014). Burlington was incorporated as a City in 1974 (City of Burlington 2009). Due to its close proximity to the Greater Toronto Area and the City of Hamilton, the City of Burlington is a fast-growing city in the province. Burlington's population increased from 150,836 in 2001, to 175,779 in 2011 (Statistics Canada 2006, 2011).

In January 1974, adjacent to the Study Area, the Township of East Flamborough became part of the Regional Municipality of Hamilton-Wentworth. In January 2001, the township was amalgamated into the City of Hamilton (WEFHS & A n.d.).

3.6 SITE HISTORY

The Study Area is located over Grindstone Creek between Lot 14, Concession 1, in the former Township of East Flamborough and on Lot 29, Concession 1, in the former Township of West Flamborough. The 1793, survey map of the Townships of West and East Flamborough, lists no occupants on the two properties (Plate 3). Valley Inn Road, through the Study Area, is an early 19th century thoroughfare that provided a principal link between Hamilton and York (now Toronto). In the early 19th century, the Valley Inn Hotel opened adjacent to the bridge, serving travelers on the route between Hamilton and York. The hotel was reputedly built by John Yakes of the Township of East Flamborough and was a two storey frame structure (Flamborough Review November 2010).

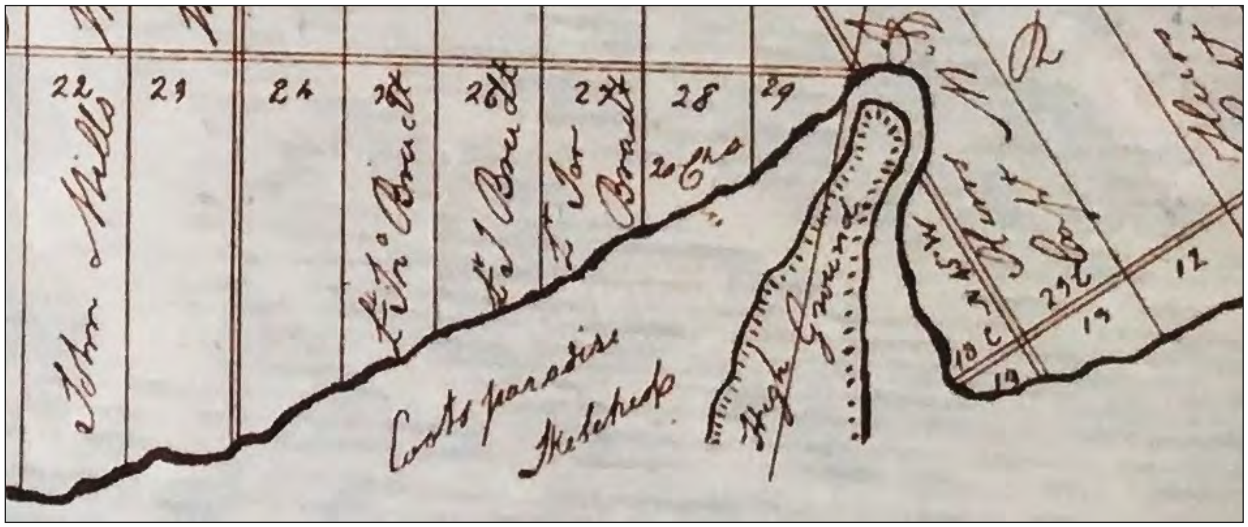

Plate 3: Townships of West and East Flamborough Survey Map 1793 (Hamilton Public Library, Local History & Archives)

Valley Inn Road served as a military route during the War of 1812, while just east of the Study Area on what is known as Carroll's Point, a stockade was built and served as a strategic position (Houghton 2003: 151). While on the northern end of the isthmus were barracks, a magazine, and a store building (Canada's Historic Places n.d.).

By 1859, the Map of the County of Wentworth shows a structure across Burlington Bay, between the two lots, with Peter Carroll listed as the property owner of the Study Area (Figure 2). Carroll also owned the adjacent Lot 13, Concession 1, and the Broken Front in the Township of East Flamborough. As Carroll's property occupied a point on Burlington Bay, it became known as Carroll's Point.

Peter Carroll (1806-1876) was born in the Township of Oxford to Isaac Carroll and Sarah McCollum. He studied land surveying and became a qualified Deputy Provincial Land Surveyor on October 14, 1828. He initially lived and worked near Ingersoll, Ontario. He assisted Colonel Talbot in the completion of township and road surveys in the London District. Carroll also served as a land agent for the sale of Crown lands in the Counties of Oxford, Brant, and Wentworth. He married Henrietta Martin in 1836. In 1846, following the

survey of Hamilton Harbour, Carroll relocated to Hamilton where he took a position as a government agent for the sale and management of Government Lands (Association of Ontario Land Surveyors [AOLS] 2003: 100).

Carroll became an influential entrepreneur in Upper Canada through his involvement in numerous businesses, politics, and land speculation around Hamilton. Carroll oversaw the construction of gravel roadways around the City and was the director of the G.W.R., the Niagara Suspension Bridge Company, the Gore Bank and the Bank of Brantford (AOLS 2003: 101). In about 1855, Carroll constructed a stone residence, Rock Bay Castle on the adjacent property, Lot 13, Broken Front, in the Township of East Flamborough (Plate 4). Rock Bay Castle was a large mansion where Carroll would host lavish parties with guests travelling from Hamilton across Valley Inn Road (Gillies 2015).

Plate 4: Rock Bay Castle, ca. 1880s (Hamilton Public Library, Local History & Archives)

In the 1868 City of Hamilton and County of Wentworth Directory, Carroll is listed as a freeholder on the adjacent property Lot 13, Broken Front (Sutherland 1868: 84). Carroll (age 64) is listed on the 1871 Census of Canada, in the Township of East Flamborough, along with his wife Henrietta (age 54) (Library and Archives Canada 1871). While on a business trip in France, Carroll contracted smallpox and died a few days later when he returned home on September 18, 1876 (Archives of Ontario, Wentworth 1876:

155). The residence burnt down in about 1908 and in 1919 the property was purchased by the City of Hamilton from the Town of East Flamborough for the creation of a new cemetery (City of Hamilton 2017).

The Valley Inn Bridge was replaced with a steel structure in 1897. Photographs from the early 20th century show the structure and the adjacent bridge (Plate 5 to Plate 6). The 1909 Topographic Map of the City shows the bridge along Valley Inn Road and the adjacent hotel to the west (Figure 3). Valley Inn Road is also shown on J.W. Tyrell's 1922 City of Hamilton Map (Figure 4). With the construction of the high bridge on Highway 2 at the Rock Gardens and Wolfe Island in 1926 and 1927, the road through Valley Inn was reduced to a local road. This change is evident on the 1938 Topographic Map of the City, with Highway 2 shown north of the Study Area (Figure 2). By 1928, the Valley Inn Hotel stood empty and in November was destroyed by fire when sparks from a passing train started a blaze on the roof. Another fire on site in 1959 destroyed the remaining buildings related to the hotel (Flamborough Review November 2010).

The bridge collapsed beneath the weight of a truck on May 5, 1964. The Township of West Flamborough replaced the bridge with a one lane Bailey Truss bridge, on the original abutments. The bridge was initially intended to be a temporary structure, loaned to the Township of West Flamborough from the DHO (City of Hamilton Bridge Files 1965). In 2009, in By-Law No. 09-089, the bridge was permanently closed to vehicle traffic, but permitted its use as a trail for pedestrians and cyclists (City of Hamilton Bridge Files 2009).

The Valley Inn Bridge has been part of the Around the Bay Road Race since its inception in the City in 1894. The 30 kilometre race that circles Hamilton Harbour is the oldest in North America and helped established the City as a hub for long distance runners. The race also set the stage for some of Canada's top athletes, including William Sherring, Jack Caffery, Fred Hughson, Tom Longboat, James Duffy, Gerald Cote, Jerome Drayton, Scotty Rankine, and Peter Maher (Around the Bay Road Race 2017). The route of the race changed for two years between 2015 and 2017 due to construction on the adjacent Canadian National Railway bridge (Billiald 2017).

Plate 5: Valley Inn Road and Hotel ca. 1900-1905 (Hamilton Public Library, Local History & Archives)

Plate 6: Valley Inn Hotel looking northeast ca. 1900-1905 (Hamilton Public Library, Local History & Archives)

Plate 7: Valley Inn Bridge looking northeast 1960 (Hamilton Public Library, Local History & Archives)

Plate 8: Valley Inn Bridge looking southeast 1973 (Source: Hamilton Public Library, Local History & Archives)

3.7 STRUCTURE TYPE

The Valley Inn Bridge is a Modular Double Single Bailey Truss bridge that was constructed in 1964. The bridge was installed in 1964 as a temporary structure after the previous bridge collapsed. Bailey Truss bridges were developed during the Second World War as a standard military bridge type that was portable, quick to erect, and easy to adjust for different loads and spans (Historic Bridges 2017). Bailey Truss bridges were used extensively by the Allied forces during the Second World War and many were sold after the war for other uses (Parson Brinckerhoff and Engineering and Industrial Heritage 2005:2-25). Bailey Truss bridges are considered a late truss design and are still built in the present day. Bailey Truss bridges use a unique pony truss design composed of modular, X-shaped panels. The height and width of this bridge type is widely variable as it was designed to be adaptable to a variety of environments.

The terminology used for Bailey Truss bridges differs from traditional truss terminology (Historic Bridges 2017). Floor beams are called ‘transoms’ and are secured using transom clamps. Sway brackets and bracing frames are also used for these bridges. Bailey Truss bridges are highly adaptable and examples dating to the Second World War are regarded as having the highest cultural heritage value.

3.8 BRIDGE DESIGNER

The original drawings for this bridge are unavailable and the original bridge designer is unknown. However, the Valley Inn Bridge follows the Bailey Bridge design developed by Sir Donald Coleman Bailey, a British engineer. Bailey joined the staff of the Experimental Bridging Establishment of the Ministry of Supply in 1929 (Encyclopedia Britannica 2017). By 1940, he had developed an idea for a prefabricated military bridge that was light weight, could provide temporary spans, and was capable of supporting heavy loads. Bailey was knighted in 1946 for his bridge design, which is widely regarded as a valuable contribution to the Allied victory in the Second World War (Encyclopedia Britannica 2017).

Stantec

Legend

Study Area (approximate)

MAP NOT TO SCALE

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Source: Surtees, Robert. 1859. Map of the County of Wentworth. Hamilton: Hardy Gregory Lithographer & Engraver.

Project Location
City of Hamilton

165001203 REV1
Prepared by JW on 2021-02-24

Client/Project
CITY OF HAMILTON
CULTURAL HERITAGE IMPACT ASSESSMENT,
BRIDGE 457, VALLEY INN BRIDGE

Figure No.
2

Title
County of Wentworth, 1859

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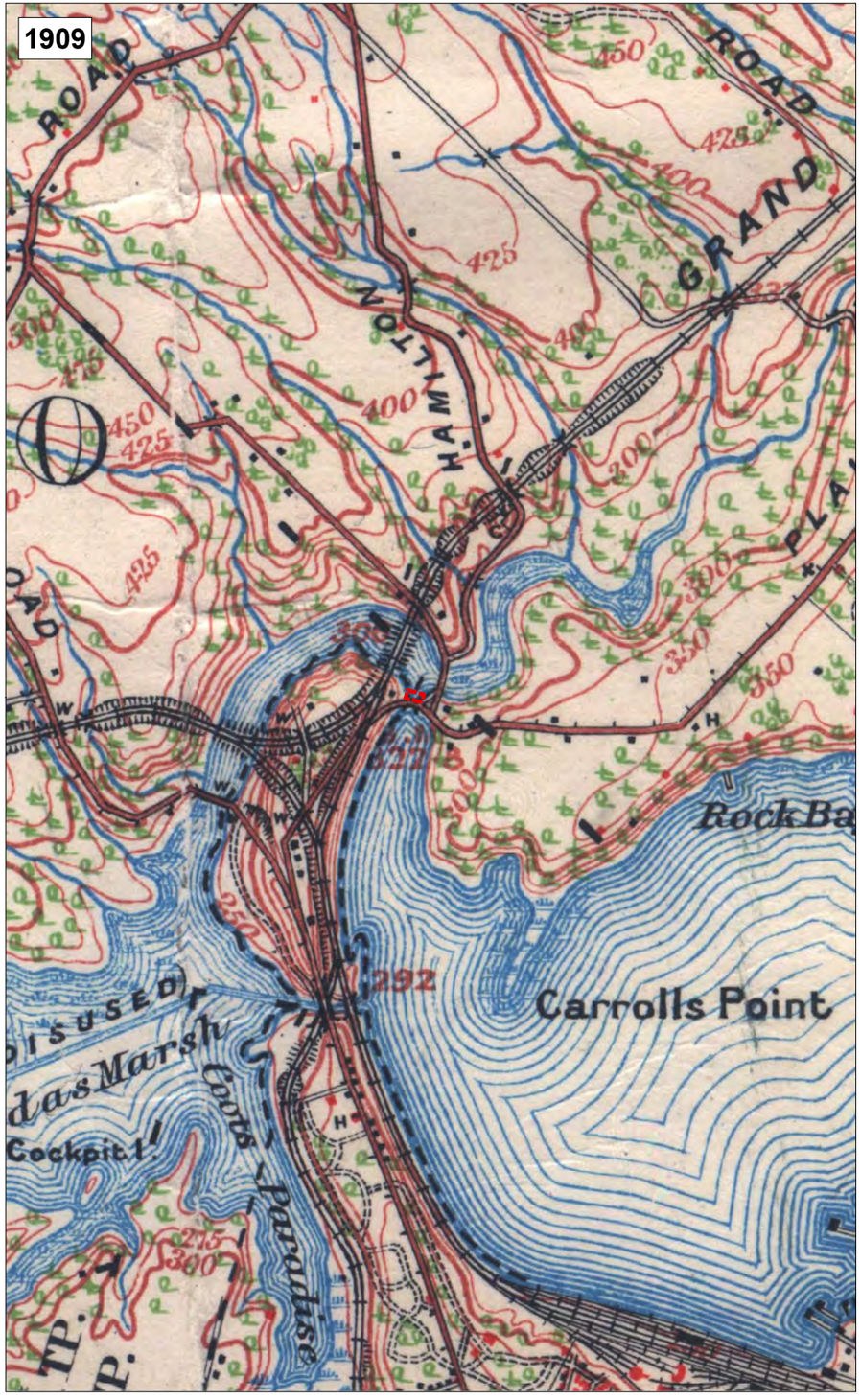

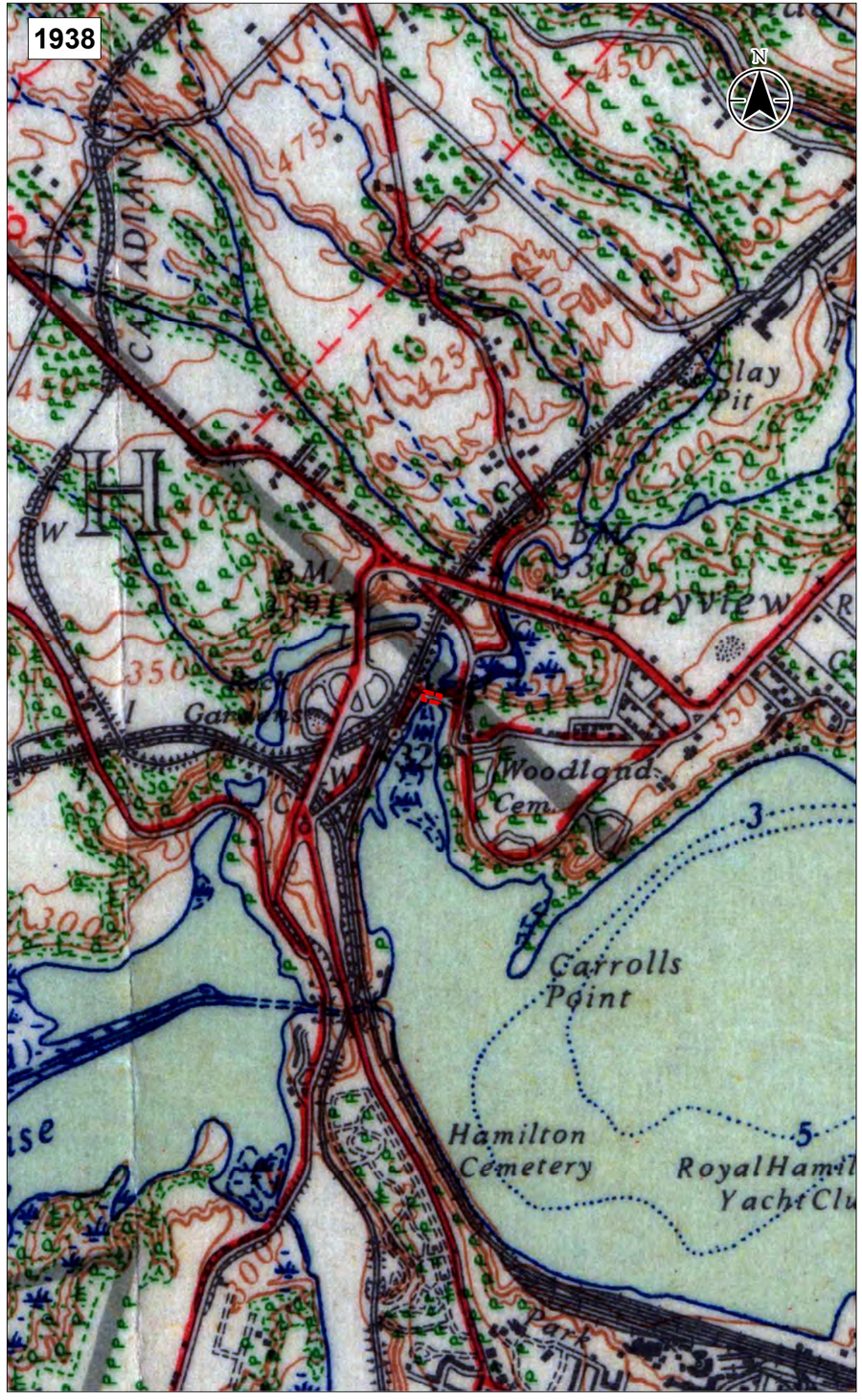

Stantec

Legend

Study Area (approximate)

MAP NOT TO SCALE

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Source: Department of Militia & Defence. 1909. Topographic Map, Ontario, Hamilton Sheet. Surveyed in 1907 - 1909.
3. Source: Department of Militia & Defence. 1938. Original Survey 1909. Resurveyed in 1935 with Photography by R.C.A.F. Published in 1938.

Project Location
City of Hamilton

165001203 REV1
Prepared by JW on 2021-02-24

Client/Project
CITY OF HAMILTON
CULTURAL HERITAGE IMPACT ASSESSMENT,
BRIDGE 457, VALLEY INN BRIDGE

Figure No.
3

Title
Topographic Map 1909 and 1938

Stantec

Legend

Study Area (approximate)

MAP NOT TO SCALE

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Source: Tyrell, J.W. & Co. 1922. Map of the City of Hamilton. Hamilton: J.W. Tyrell & Co.

Project Location
City of Hamilton

165001203 REV1
Prepared by JW on 2021-02-24

Client/Project
CITY OF HAMILTON
CULTURAL HERITAGE IMPACT ASSESSMENT, BRIDGE 457, VALLEY INN BRIDGE

Figure No.
4

Title
Map of Hamilton, 1922

4.0 SITE DESCRIPTION

4.1 INTRODUCTION

As outlined in Section 1.1, a site visit was conducted on January 18, 2021 by Frank Smith, Cultural Heritage Specialist. Weather conditions were overcast with occasional flurries and temperatures were seasonably cold. The site visit consisted of a pedestrian survey of the bridge. The bridge is closed to all traffic and staff documented the bridge from both the west and east approaches.

4.2 LANDSCAPE CONTEXT

The Valley Inn Bridge is located on Valley Inn Road, a roadway closed to vehicular traffic (the bridge itself is closed to all traffic, including pedestrians). The bridge is set in a valley and carries Valley Inn Road across the confluence of Grindstone Creek and Lake Ontario, northwest of Carrol's Point (Plate 9). The west approach to the bridge and the bridge itself are located in the City of Hamilton and the east approach to the bridge is located within the City of Burlington. The Valley Inn Bridge is located adjacent to the Royal Botanical Gardens (RBG), a National Historic Site of Canada (Plate 10). The Valley Inn Bridge is situated adjacent to the conservation area section of the RBG, which includes more than 800 hectares of marsh, shallow lake, woodland, meadows, escarpment face, and agricultural land (Parks Canada 2017). The riparian habitats associated with the bridge are an important turtle nesting site and have been enhanced with naturalized plantings on the Burlington side.

The east approach to the bridge contains a parking lot, walking trail with a scenic lookout, and the alignment of Valley Inn Road, which is closed to vehicular traffic. The walking trail and road alignment are asphalt paved and wooden utility poles with cobra head streetlighting luminaries run along the north edge of the walking path (Plate 11). The area contains naturalized vegetation and natural plantings in various stages of ecological succession.

The west approach to the bridge contains the alignment for Valley Inn Road, which is closed to vehicular traffic. The roadway is asphalt paved and descends in elevation from its starting point just east of York Boulevard. The roadway is overpassed by railway tracks approximately 200 metres east of York Boulevard (Plate 12). The roadway east of the overpass runs north-south and is bordered by a steel guide rail, wooden utility poles, and a metal pole with signage along the east side of the roadway and a steep embankment leading to the railway tracks on the west side of the roadway (Plate 13). As Valley Inn Road completes its descent into the valley, it turns east and leads toward the bridge alignment (Plate 14). The area in the vicinity of the bridge alignment is paved in concrete and contains naturalized vegetation and natural plantings in various stages of ecological succession (Plate 15).

Plate 9: Looking northwest from Spring Gardens Road to the Valley Inn Bridge and the confluence of Lake Ontario and Grindstone Creek

Plate 10: Looking east to RBG lands, east of Valley Inn Bridge

Plate 11: Looking east at walking trail (left fork), road alignment (right fork), from Valley Inn Bridge

Plate 12: Railway overpass, looking southwest

Plate 13: Looking south on Valley Inn Road

Plate 14: Curve at Valley Inn Road, looking west

Plate 15: Concrete paving just west of bridge, looking east

4.3 VALLEY INN BRIDGE

Detailed information regarding the Valley Inn Bridge was taken from the 2017 CHER prepared for the bridge, which incorporated information contained in the 2015 OSIM report prepared for the bridge. The OSIM report provides a construction date of 1964 for the bridge.

The Valley Inn Bridge is a single span Modular Double Single Bailey Truss bridge (Plate 16). The bridge has a total deck length of 30.9 metres and an overall structural width of 5 metres (City of Hamilton 2015). The bridge has a posted weight limit of five tonnes but is currently closed to all traffic, including pedestrians. The bridge contains a wood plank deck with wood barrier posts and a steel tube railing atop these posts (Plate 17). The deck is supported by steel I-beams, steel stringers, and steel cross bracing (Plate 18). The truss superstructure of the bridge contains steel chords and steel vertical/diagonals, transverse transoms, and horizontal bracing at the top and bottom of the trusses (Plate 19 and Plate 20). The original end posts of the bridge are still in place and are located beside the new timber barriers. The bridge abutments are stone and were part of the previous bridge built in 1897 (Plate 21 and Plate 22).

Plate 16: Valley Inn Bridge, looking northeast

Plate 17: Wood decking, wood barriers, and steel tube railing, looking east

Plate 18: Stringers, I-beams, and cross bracing supporting decking, looking northwest

Plate 19: Truss superstructure, looking northwest

Plate 20: Truss superstructure, looking southeast

Plate 21: Stone abutment and original southwest end post (denoted by arrow), looking south

Plate 22: Stone abutment on west side of bridge, looking northeast

4.4 MODIFICATION

The Valley Inn Bridge was rehabilitated in 2003. As noted in the rehabilitation drawings (Appendix B), the following modifications were made to the bridge:

- Removal of the existing brick retaining wall
- Construction of new retained soil system wall
- Removal and replacement of existing timber curbs, floor planks, and stringers
- Replacement of two transoms and one panel of stringers
- Replacement of deteriorated floor planks
- Removal and replacement of existing asphalt ramps at approaches at each end of the bridge

- Repair of broken sway brace in panel number 3
- Installation of new timber deck planks
- Installation of new railings
- Repositioning of shifted/moved armour stone elements

5.0 SUMMARY OF CULTURAL HERITAGE VALUE

5.1 SUMMARY

The Valley Inn Bridge met seven out of nine criteria of O. Reg. 9/06 (1i, 1iii, 2i, 2iii, 3i, 3ii, and 3iii) and scored 49 points out of 100 per the Hamilton Bridge Guideline. A full evaluation is contained in the CHER prepared for the City of Hamilton by Stantec in 2017. Based on the evaluation contained in the CHER, the Valley Inn Bridge can be considered to have moderate heritage value as a Class C structure according to the *City of Hamilton Heritage Bridge Guideline*. Therefore, the Valley Inn Bridge has CHVI according to O. Reg. 9/06 and the Hamilton Bridge Guideline.

The following statement of CHVI was prepared for the CHER for the Valley Inn Bridge, completed in 2017 by Stantec for the City of Hamilton.

5.2 STATEMENT OF CULTURAL HERITAGE VALUE OR INTEREST

The Valley Inn Bridge is the only Modular Bailey Truss bridge in the City of Hamilton. It was originally installed as a temporary structure but has remained in place since 1964 when the previous bridge collapsed. As the only example of this bridge type in the City, the Valley Inn Bridge is a rare bridge. The Bailey bridge design was developed at the outset of the Second World War and is credited with being an influencing factor in the Allied victory. Sir Donald Coleman Bailey was knighted following the war to recognize the importance of this design. This innovative bridge design is noted for being modular, light weight, and able to take heavy loads. The Valley Inn Bridge was erected as a temporary structure but has remained in use for 53 years. The durability of this bridge is a product of the high degree of technical achievement of the Bailey bridge design. The Valley Inn Bridge is made of pre-fabricated components (i.e. steel panels, bracing frames, transoms, end posts) that were assembled on site. These components were widely available following the Second World War and do not display a high degree of craftsmanship or artistic merit.

The Valley Inn Bridge has a direct historical association with the Around the Bay Road Race, which dates to 1894. The 30 kilometre race, which circles Hamilton Harbour, is the oldest in North America and helped established the City as a hub for long distance runners. In addition, the Valley Inn Bridge the modular design developed by Sir Donald Coleman Bailey, a British engineer. Bailey bridges were used extensively during the Second World War and Bailey was knighted in 1946 for this design and its contribution to the Allied victory.

During the early 19th century, Valley Inn Road was a principle thoroughfare that linked Hamilton and Toronto. The importance of this road was diminished when the High Bridge was constructed in 1926. Built in 1964, the Valley Inn Bridge is not directly related to the historical significance of Valley Inn Road. Rather, the historical value of the Valley Inn Road lies with its associations to the Around the Bay Road Race and Sir Donald Coleman Bailey.

The Valley Inn Bridge is the third bridge built in this location. The stone abutments are remnants of the previous bridge, which was built in 1897. The Valley Inn Bridge was erected as a temporary bridge after the 1897 bridge collapsed under the weight of a truck. While the Valley Inn Bridge is the third bridge built in this location, it has contextual value in its own right since it is a defining structure in the valley and supports the character of the area. The Valley Inn Bridge is functionally, historically, and visually linked to its surroundings as a bridge over Grindstone Creek. This bridge is well-used by local anglers and bird watchers and is a visual focal point of the valley. Further, it is historically linked to its surroundings and is part of the annual Around the Bay Road Race. As a rare and visually distinctive structure, this bridge likely acts as a landmark to the local community and to those participating in the Around the Bay Road Race.

The heritage attributes of the Valley Inn Bridge include:

- Stone abutments that are remnants of the previous bridge at this location
- Bridge components associated with the Bailey bridge design including, but not limited to:
  - Modular panels with top and bottom chords, verticals, and diagonals
  - Timber decking
  - Longitudinal stringers
  - Transverse transoms
  - Horizontal bracers
  - End posts

6.0 ASSESSMENT AND MITIGATION

6.1 DESCRIPTION OF THE PROPOSED UNDERTAKING

Stantec was retained to complete a MCEA study for the proposed replacement of the Valley Inn Bridge with a modern structure to facilitate use by the public. Due to the closure of the bridge, replacement and other alternatives are under investigation in the ongoing MCEA study. Although the study will consider all alternatives, for the purpose of the CHIA, it is anticipated that the bridge will be removed. Drawings of the proposed bridge replacement are contained in Appendix C.

In addition to the current MCEA, a 2006 Class EA study of the Valley Inn Bridge determined that the bridge contained a number of structural deficiencies, including medium to severe corrosion and severe material loss. The rehabilitation carried out in 2003 was emergency repair work intended to be a short-term solution for the bridge (City of Hamilton 2006b). In the interest of pedestrian safety, the bridge has been closed to all traffic since December 2019 (City of Hamilton 2019).

6.2 IMPACT ASSESSMENT

The assessment of impacts on heritage resources is based on the impacts defined in the MHSTCI *InfoSheet #5: Heritage Impact Assessments and Conservation Plans from the Heritage Resources in the Land Use Planning Process Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006b). Impacts to heritage resources may be direct or indirect. Direct impacts include:

- **Destruction** of any, or part of any, significant heritage attributes or features
- **Alteration** that is not sympathetic, or is incompatible, with the historic fabric and appearance

Indirect impacts to cultural heritage resources do not result in the direct destruction or alteration of the feature or its heritage attributes, but may indirectly affect the cultural heritage value of a property by causing:

- **Shadows** created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden
- **Isolation** of a heritage attribute from its surrounding environment, context or a significant relationship
- **Direct or indirect obstruction** of significant views or vistas within, from, or of built and natural features
- **A change in land** use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces
- **Land disturbances** such as a change in grade that alters soil, and drainage patterns that adversely affect an archaeological resource

(Government of Ontario 2006b)

Table 1: Evaluation of Potential Direct Impacts

Direct Impact	Relevance to Valley Inn Bridge
Destruction of any, or part of any, *significant heritage attributes* or features.	The City of Hamilton is proposing to remove the Valley Inn Bridge, which would result in its destruction. Destruction of the bridge would result in the loss of the identified heritage attributes, its historical associations and contextual value. **Therefore, mitigation measures are required.**
Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance.	The City of Hamilton is proposing to remove the bridge. No alterations or modifications are planned for the structure. **Therefore, no mitigation measures are required.**

Table 2: Evaluation of Potential Indirect Impacts

Indirect Impact	Relevance to Valley Inn Bridge
Shadows created that alter the appearance of a *heritage attribute* or change the viability of a natural feature or plantings, such as a garden	The City of Hamilton is proposing to remove the bridge, so there will be a direct impact. Once removed indirect impacts will not be a concern. **Therefore, no mitigation measures are required.**
Isolation of a *heritage attribute* from its surrounding environment, context or a *significant* relationship	The City of Hamilton is proposing to remove the bridge, so there will be a direct impact. Once removed indirect impacts will not be a concern. **Therefore, no mitigation measures are required.**
Direct or indirect obstruction of *significant* views or vistas within, from, or of built and natural features	The City of Hamilton is proposing to remove the bridge, so there will be a direct impact. Once removed indirect impacts will not be a concern. **Therefore, no mitigation measures are required.**
A change in land use such as rezoning a battlefield from open space to residential use, allowing new *development* or *site alteration* to fill in the formerly open spaces	The City of Hamilton is proposing to remove the bridge, so there will be a direct impact. Once removed indirect impacts will not be a concern. **Therefore, no mitigation measures are required.**
Land disturbances such as a change in grade that alters soil, and drainage patterns that adversely affect an *archaeological resource*	The City of Hamilton is proposing to remove the bridge, so there will be a direct impact. Once removed indirect impacts will not be a concern. **Therefore, no mitigation measures are required.**

6.2.1 Summary of Impact Assessment

The City is proposing to remove the Valley Inn Bridge. This will have a direct impact on its identified cultural heritage value and heritage attributes. Therefore, mitigation measures are required.

6.3 ALTERNATIVES

Section 4.2 of the *City of Hamilton Heritage Bridge Guideline and Heritage Bridge Conservation* document provides guidance on the alternatives that should be considered when impacts are anticipated to a bridge with cultural heritage value. The alternatives are arranged in a continuum from strategies with the least impact to the structure and its heritage value (most preferable), to those with the most impact (least preferable). The alternatives, and their relevance to the Valley Inn Bridge, are presented in Table 3.

Table 3: Considered Alternatives

Alternative	Relevance to Valley Inn Bridge
a) retention of existing bridge and restoration of missing or deteriorated elements where physical or documentary evidence (e.g. photographs or drawings) can be used for their design;	The 2006 Class EA Study determined that retention and rehabilitation/restoration of the bridge is not feasible from a technical perspective given the existing structural problems of the bridge and the lack of a navigable clearance. In addition, a restoration would not address the structural problems of the bridge and the bridge would require ongoing maintenance. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**
b) retention of existing bridge with no major modifications undertaken;	The 2006 Class EA study determined that retention of the bridge with no major modifications undertaken is not feasible. This would result in the bridge being at high risk of failure and the continued deterioration of the structure. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**
c) retention of existing bridge with sympathetic modification;	The 2006 Class EA study determined that retention of the existing bridge is not feasible from a technical perspective given the existing structural problems and lack of a navigable clearance. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**
d) retention of existing bridge with sympathetically design new structure in proximity;	The 2006 Class EA study determined that retention of the existing bridge and construction of a new bridge within close proximity is not a preferred alternative. Construction of a new bridge would necessitate changes to the existing grade and footprint of the surrounding area and would not retain the existing character of the area, which is a single lane crossing. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**
e) retention of existing bridge no longer in use for vehicle purposes but adapted for pedestrian walkways, cycle paths, scenic viewing, etc.;	The Valley Inn Bridge was originally built for vehicular purposes but in recent years was only open to pedestrians. In 2019, the bridge was closed to pedestrians due to safety concerns. Retaining the bridge as a pedestrian crossing would not address the structural issues of the bridge. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**
f) relocation of bridge to appropriate new site for continued use (see d) or adaptive re-use (see e);	Relocation of the bridge to a new site would sever the bridge from its contextual value. In addition, it is unclear if the bridge could withstand relocation due to structural deficiencies. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**
g) retention of bridge as heritage monument for viewing purposes only;	Retention of the bridge as a heritage monument for viewing purposes only would impact trail access to pedestrian users and is not compatible with the trail network of the area. **Accordingly, this alternative is not suitable for the Valley Inn Bridge.**

Table 3: Considered Alternatives

Alternative	Relevance to Valley Inn Bridge
h) replacement/removal of existing bridge with salvage of elements/members of heritage bridge for incorporation into new structure or for future conservation work or displays;	The Valley Inn Bridge contains materials that are relatively rare and have salvage potential. Specifically, elements of the truss structure, wooden decking could be salvaged or incorporated into a new structure. **This alternative is suitable for the Valley Inn Bridge.**
i) replacement/removal of existing bridge with full recording and documentation of the heritage bridge.	The removal of the Valley Inn Bridge is planned to facilitate use by the public. The Valley Inn Bridge should be subject to full documentation prior to demolition. **This alternative is suitable for the Valley Inn Bridge.**

6.3.1 Summary of Alternatives

The City of Hamilton is proposing to remove and replace the Valley Inn Bridge. Retention or relocation of the bridge was not determined to be feasible or warranted. Generally, retention *in situ* is the preferred option when addressing any structure where CHVI has been identified, even if limited. In the case of the Valley Inn Bridge, retention *in situ* as a monument for viewing purposes is not compatible with the character of the area, which is that of a single span crossing at the confluence of Lake Ontario and Grindstone Creek. Retention as a monument would result in either the permanent closing of the crossing or necessitate the construction of a second crossing at a new location. Construction of a new crossing would require the alteration of the trail network in a sensitive ecological environment. Therefore, retention *in situ* is not an appropriate option for the Valley Inn Bridge.

Where retention *in situ* is not feasible or preferred, relocation is often the next option considered to mitigate the loss of a heritage resource. As with retention, relocation of a structure, or structures, must be balanced with the CHVI identified. Relocation removes the resource from its contextual setting but allows for the preservation of noteworthy heritage attributes. This is a viable option where the CHVI identified merits preservation and the integrity of the structure is determined to be sound. In the case of the Valley Inn Bridge, while it does contain design and physical value, this is due to it being a rare example of this bridge type within the City and that it demonstrates a high degree of technical achievement as a temporary bridge that has remained in place for over 50 years. Relocation would diminish the design and physical value of the bridge since it would no longer be in use. Additionally, the contextual value of the bridge would be diminished as it would no longer support the character of the area, its functional, historical, and visual link with Grindstone Creek would be severed, and its landmark status would also be severed. Therefore, relocation is not an appropriate option for the Valley Inn Bridge.

Therefore, replacement of the bridge with elements of the existing bridge or replacement of the bridge with a full recording and documentation of the bridge is the preferred alternative. These two preferred alternatives from a heritage perspective are discussed further in Section 6.4.

6.4 MITIGATION

The Valley Inn Bridge has CHVI and moderate heritage value as a Class C structure. As the City is proposing to remove the structure, the following mitigation options have been prepared. Two mitigation options from the *Ontario Heritage Bridge Guideline* are cited in Section 4.2 of the *City of Hamilton Heritage Bridge Guideline and Heritage Bridge Conservation* document. These mitigation options are suggested where the removal of a bridge is planned. The mitigation options, are:

- replacement/removal of existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowance for the use of modern materials;
- replacement/removal of existing bridge and construction of a new bridge with historically sympathetic design qualities to the heritage bridge, with allowances for the use of new technologies and materials.

One additional mitigation option is also presented:

- salvage of bridge components for incorporation into new structure or for future conservation work or displays and documentation and commemoration of the existing bridge prior to demolition.

Each option is discussed and its applicability to the Valley Inn Bridge is discussed further in Section 6.4.2. and 6.4.3.

6.4.1 Ontario Heritage Bridge Guidelines Mitigation Options

Replacement/removal of existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowance for the use of modern materials: Typically, replication of a heritage structure is not recommended as a mitigation measure as it creates a false sense of history. In the case of the Valley Inn Bridge, replacement of the bridge with a replication should not be considered an appropriate mitigation measure. The Bailey Truss bridge was inherently designed to be a temporary structure and was designed for military use during the Second World War. Following the war, the bridge was adopted for civilian use as a temporary crossing.

The Valley Inn Bridge was intended to be a temporary bridge and was originally loaned to the City by the DHO. Replacement of the Valley Inn Bridge with a replicated but now permanent Bailey Truss bridge would run contrary to the core concept of the Bailey Truss bridge as a temporary structure.

Replacement/removal of existing bridge and construction of a new bridge with historically sympathetic design qualities to the heritage bridge, with allowances for the use of new technologies and materials. While replication of the Valley Inn Bridge is not considered an appropriate mitigation measure, replacement with historically sympathetic design qualities is an appropriate mitigation measure. A historically sympathetic design does not need to recreate or replicate the existing Valley Inn Bridge. Instead, it should continue to support the character of the area and retain the landmark status of the crossing over Grindstone Creek. The existing Valley Inn Bridge serves as a local landmark, and a new structure should maintain the distinctive nature of the crossing. This can be accomplished by implementing sympathetic design qualities which evoke the former crossing without replicating it, such as wood decking, the stone abutments, and the distinctive pattern of the truss structure. The drawings of the

proposed replacement bridge are contained in Appendix C. These drawings indicate a sympathetically designed truss structure with wood decking is planned for the crossing.

6.4.2 Documentation, Salvage, and Commemoration

Detailed documentation and salvage is often the preferred mitigation strategy where retention or relocation is not feasible or warranted. Documentation creates a public record of the structure, or structures, which provides researchers and the general public with a land use history, construction details, and photographic record of the resource. Through the selective salvage of identified heritage attributes and other materials, the CHVI of the property can be retained, if in a different context. Documentation and salvage acknowledge the heritage attributes in their current context and, where feasible, allows for reuse. Documentation should be carried out in advance of any changes made to the bridge.

While documentation and salvage is not a preferred mitigation option, it is an appropriate strategy, as retention *in situ*, relocation and re-use are not feasible options for the bridge. If documentation and salvage is selected as the approach, further, documentation of the existing conditions of the bridge and landscape setting, should be carried out prior to any alteration or construction activity.

Salvage can be completed at the discretion of City of Hamilton. Salvage activities may be undertaken by a reputable salvage company. In order to facilitate salvage activities, the following is a recommended list of materials to be salvaged, where feasible.

- Steel truss superstructure
- Stone abutments (if not retained for new structure)

In addition to documentation and salvage of the Valley Inn Bridge, a commemoration of the bridge to interpret its value should be undertaken along with the documentation and salvage report. The commemoration should include interpretive text that overviews the history of the Valley Inn Bridge, the historical significance of the Bailey Truss design, and an overview of the history of bridge crossings at the confluence of Grindstone Creek and Lake Ontario. In addition to interpretive text, salvaged materials from the bridge can be incorporated into the commemorative aspect. The proposed drawings for the replacement bridge indicate that a section of the truss will be retained for commemorative purposes and interpretive materials will be designed.

7.0 RECOMMENDATIONS

The Valley Inn Bridge has CHVI per O. Reg 9/06 and has moderate heritage value as a Class C structure per the *City of Hamilton Heritage Bridge Guideline*. The City plans to remove and replace the Valley Inn Bridge. This will result in a direct impact to the bridge and the following mitigation measures are required:

1) Replacement of the Valley Inn Bridge with the historically sympathetic design included in Appendix C. A historically sympathetic design does not need to recreate or replicate the existing Valley Inn Bridge. Instead, it should continue to support the character of the area and retain the landmark status of the crossing over Grindstone Creek. The existing Valley Inn Bridge serves as a local landmark, and a new structure should maintain the distinctive nature of the crossing. This can be accomplished by implementing sympathetic design qualities which evoke the former crossing without replicating it, such as wood decking, the stone abutments, and the distinctive pattern of the truss structure. The proposed replacement bridge includes sympathetic design qualities such as a truss structure and wood decking.

3) Documentation, salvage, and commemoration of the existing Valley Inn Bridge. Documentation activities should consist of the full heritage recording of the bridge through photography, photogrammetry, or LiDAR scan. Salvage activities should consist of the identification and recovery re-useable bridge components by a reputable salvage company or charity. Materials that should be considered for salvage include the steel truss superstructure and stone abutments (if not retained). The documentation and salvage should be accompanied by a commemoration of the bridge to interpret its value. The commemoration should include interpretive text that overviews the history of the Valley Inn Bridge, the historical significance of the Bailey Truss design, and an overview of the history of bridge crossings at the confluence of Grindstone Creek and Lake Ontario. In addition to interpretive text, salvaged materials from the bridge can be incorporated into the commemorative aspect. The documentation and salvage work should be carried out under the direction of a Cultural Heritage Specialist in good professional standing with the Canadian Association of Heritage Professionals (CAHP) while the commemoration and interpretation should be carried out by a person(s) with knowledge of the history of the City of Hamilton.

8.0 CLOSURE

This report has been prepared for the sole benefit of the City of Hamilton, and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Yours truly,

STANTEC CONSULTING LTD.

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APPENDIX A

Municipal Heritage Bridges Cultural, Heritage, And Archaeological Resources Checklist

Municipal Heritage Bridges
Cultural, Heritage and Archaeological
Resources Assessment Checklist

This checklist was prepared in March 2013 by the Municipal Engineers Association to assist with determining the requirements to comply with the Municipal Class Environmental Assessment. View all 4 parts of the module on Structures Over 40 Years at www.municipalclassea.ca to assist with completing the checklist.

Project Name:

Location:

Municipality:

Project Engineer:

Checklist completed by:

Date:

NOTE: Complete all sections of Checklist. Both Cultural Heritage and Archaeological Sections must be satisfied before proceeding.

Part A - Municipal Class EA Activity Selection

Description	Yes	No
Will the proposed project involve or result in construction of new water crossings? This includes ferry docks.	❒ Schedule B or C	❒ Next
Will the proposed project involve or result in construction of new grade separation?	❒ Schedule B or C	❒ Next
Will the proposed project involve or result in construction of new underpasses or overpasses for pedestrian recreational or agricultural use?	❒ Schedule B or C	❒ Next
Will the proposed project involve or result in construction of new interchanges between any two roadways, including a grade separation and ramps to connect the two roadways?	❒ Schedule B or C	❒ Next

Description	Yes	No
Will the proposed project involve or result in reconstruction of a water crossing where the structure is less than 40 years old and the reconstructed facility will be for the same purpose, use, capacity and at the same location? (Capacity refers to either hydraulic or road capacity.) This include ferry docks.	❒ Schedule A+	❒ Next
Will the proposed project involve or result in reconstruction of a water crossing, where the reconstructed facility will not be for the same purpose, use, capacity or at the same location? (Capacity refers to either hydraulic or road capacity). This includes ferry docks.	❒ Schedule B or C	❒ Next
Will the proposed project involve or result in reconstruction or alteration of a structure or the grading adjacent to it when the structure is over 40 years old where the proposed work will alter the basic structural system, overall configuration or appearance of the structure?	❒ Next	❒ Assess Archaeological Resources

Part B - Cultural Heritage Assessment

Description	Yes	No
Does the proposed project involve a bridge construction in or after 1956?	❒ Next	❒ Prepare CHER Undertake HIA
Does the project involve one of these three bridge types?	❒ Rigid frame Next ❒ Simple Support Next ❒ Structural Steel Next	❒ Prepare CHER Undertake HIA
Does the bridge or study area contain a parcel of land that is subject of a covenant or agreement between the owner of the property and a conservation body or level of government?	❒ Prepare CHER Undertake HIA	❒ Next

Description	Yes	No
Does the bridge or study area contain a parcel of land that is listed on a register or inventory of heritage properties maintained by the municipality?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is designated under Part IV of the Ontario Heritage Act?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is subject to a notice of intention to designate issued by a municipality?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is located within a designated Heritage Conservation District?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is subject to a Heritage Conservation District study area by-law?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is part of a National Historic Site?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is part of a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	❒ Prepare CHER Undertake HIA	✟❒ Next
Does the bridge or study area contain a parcel of land that is designated under the Heritage Railway Station Protection Act?	❒ Prepare CHER Undertake HIA	❒ Next

Description	Yes	No
Does the bridge or study area contain a parcel of land that is identified as a Federal Heritage Building by the Federal Heritage Building Review Office (FHBRO)	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is the subject of a municipal, provincial or federal commemorative or interpretive plaque that speaks to the Historical significance of the bridge?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain a parcel of land that is in a Canadian Heritage River watershed?	❒ Prepare CHER Undertake HIA	❒ Next
Will the project impact any structures or sites (not bridges) that are over forty years old, or are important to defining the character of the area or that are considered a landmark in the local community?	❒ Prepare CHER Undertake HIA	❒ Next
Is the bridge or study area adjacent to a known burial site and/or cemetery?	❒ Prepare CHER Undertake HIA	❒ Next
Is the bridge considered a landmark or have a special association with a community, person or historical event in the local community?	❒ Prepare CHER Undertake HIA	❒ Next
Does the bridge or study area contain or is it part of a cultural heritage landscape?	❒ Prepare Cher Undertake HIA	❒ Assess Archaeological Resources

PART C - HERITAGE ASSESSMENT

Description	Yes	No
Does the Cultural Heritage Evaluation Report identify any Heritage Features on the project?	❒ Undertake HIA	❒ Part D - Archaeological Resources
Does the Heritage Impact Assessment determine that the proposed project will impact any of the Heritage Features that have been identified?	❒ Schedule B or C	❒ Part D - Archaeological Resources

PART D - ARCHAEOLOGICAL RESOURCES ASSESSMENT

Description	Yes	No
Will any activity, related to the project, result in land impacts/significant ground disturbance?	❒ Next	❒ Schedule A - proceed
Have all areas, to be impacted by ground disturbing activities, been subjected to recent extensive and intensive disturbances and to depths greater than the depths of the proposed activities?	❒ Schedule A - proceed	❒ Next
Has an archaeological assessment previously been carried out that includes all of the areas to be impacted by this project?	❒ Next	❒ Archaeological Assessment
Does the report on that previous archaeological assessment recommend that no further archaeological assessment is required within the limits of the project for which that assessment was undertaken, and has a letter been issued by the Ministry of Tourism, Culture and Sport stating that the report has been entered into the Ontario Public Register of Archaeological Reports?	❒ Schedule A - proceed	❒ Obtain satisfaction letter - proceed

** Include Documentation Summary in Project File**

APPENDIX B
Valley Inn Bridge Drawings

Hamilton

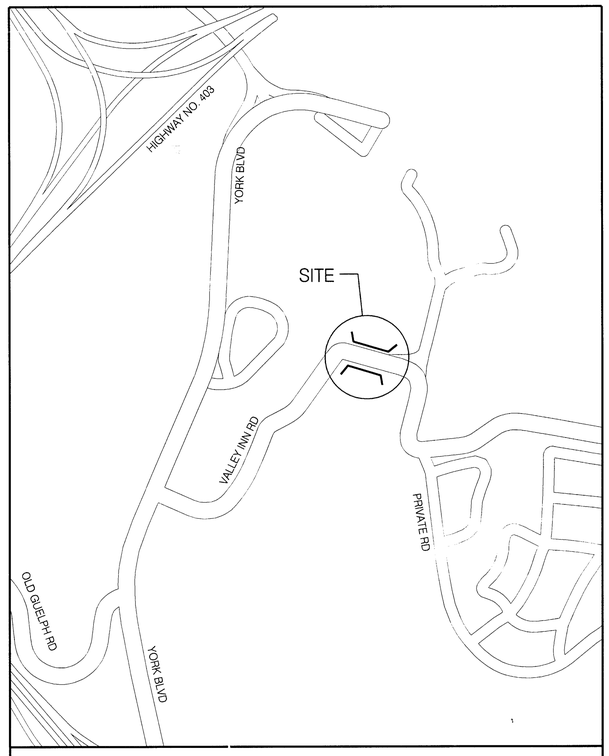
PUBLIC WORKS DEPARTMENT

General Manager, Peter M. Crockett, P. Eng.

Quotation No. Q6-03 (BR)

VALLEY INN ROAD BRIDGE No. 457
OVER GRINDSTONE CREEK

BRIDGE REHABILITATION



KEY PLAN
NTS

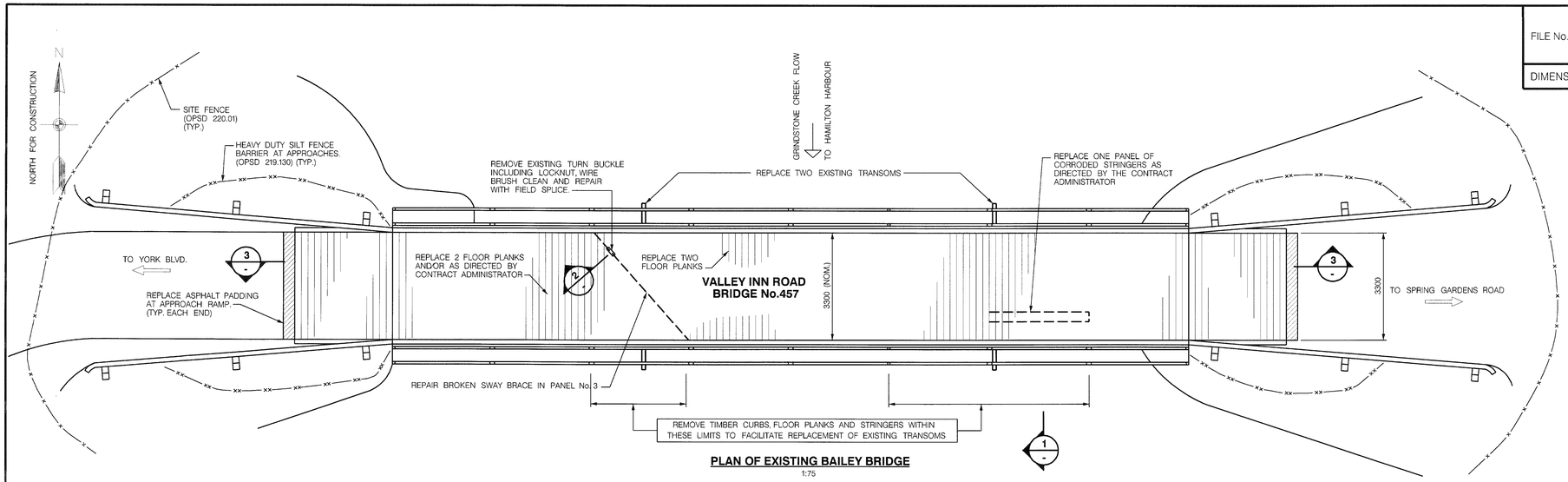
Issued for : Tender☐ Construction☐

Quotation No. Q6-03 (BR)

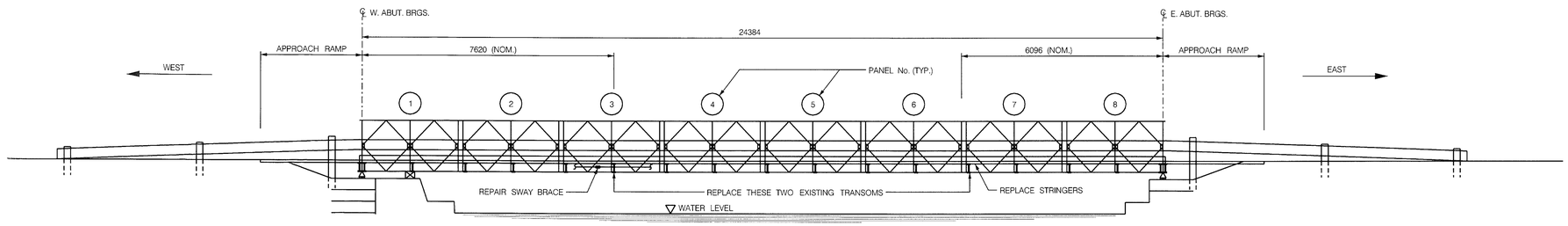
City of Hamilton

FILE No.	CONTRACT No. Q3-06(BR) ~~PW03-46 (BR)~~	SHEET No.
	DRAWING No. 03-M-10	1 OF 2

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED



PLAN OF EXISTING BAILEY BRIDGE
1:75



ELEVATION
1:75

GENERAL NOTES:

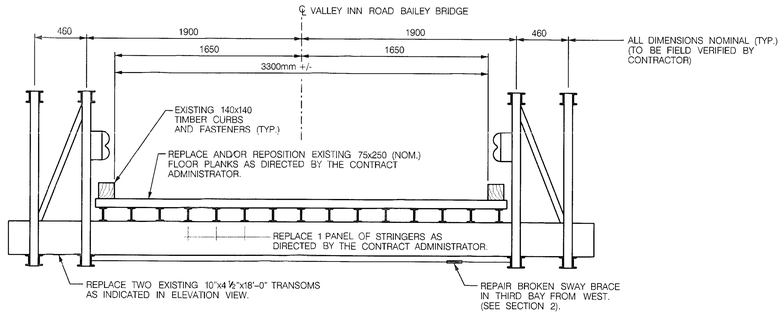
1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS OF THE EXISTING WORK ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE REPAIR WORK.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
3. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, WATER, ETC. DURING CONSTRUCTION OPERATIONS. CONTRACTOR'S METHOD OF PROTECTION SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF WORK.
4. DRAWINGS ARE NOT TO BE SCALED.
5. NEW DESIGNATED TIMBER DECK PLANKS SHALL BE SPF GRADE No.2 WITH THE TOP SURFACE UNFINISHED.
6. STRUCTURAL STEEL FOR THE PROPOSED SWAY BRACE SPLICE ANGLE REPAIR SHALL COMFORM TO CSA STANDARD CANCSA-G40.21–M92 OR ASTM SPECIFICATION A588 AND SHALL BE GRADE 350A.
7. THE BROKEN SWAY BRACE SHALL BE REPAIRED AS SHOWN OR REPLACED.

SCOPE OF WORK:

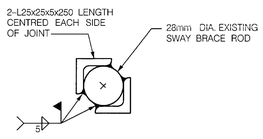
1. PLACE TRAFFIC SIGNS INCLUDING TEMPORARY BARRIERS AND SITE FENCE EACH SIDE OF BRIDGE TO ENABLE CLOSURE OF VALLEY INN ROAD TO VEHICULAR AND PEDESTRIAN TRAFFIC.
2. PLACE ENVIROMENTAL PROTECTION SYSTEM(S) AS REQUIRED.
3. TEMPORARILY REMOVE EXISTING TIMBER CURBS, FLOOR PLANKS AND STRINGERS FROM BAILEY BRIDGE AS SHOWN.
4. REPAIR BROKEN SWAY BRACE IN THIRD PANEL FROM WEST.
5. REPLACE TWO EXISTING TRANSOMS AND ONE PANEL OF STRINGERS AS INDICATED.
6. REPLACE SIX OF THE FLOOR PLANKS IN WORST CONDITION WITH NEW AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
7. REINSTALL EXISTING FLOOR PLANKS AND REINSTALL EXISTING TIMBER CURBS AND FASTENERS EACH SIDE.
8. REMOVE AND REPLACE EXISTING ASPHALT RAMPS AT APPROACHES EACH END OF BRIDGE.
9. REMOVE TEMPORARY TRAFFIC SIGNS, BARRIERS, SITE FENCE, ENVIRONMENTAL PROTECTION SYSTEM AND OPEN THE BRIDGE TO TRAFFIC.

LIST OF DRAWINGS:

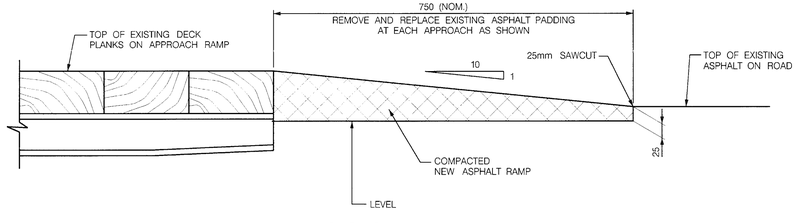
1. GENERAL ARRANGEMENT & REPAIR DETAILS
2. MISCELLANEOUS DETAILS



SECTION 1 / 1:25



SECTION 2 / 1:2



SECTION 3 / 1:5

No.	REVISIONS	INITIAL	DATE	DRAWN BY: A.K.L.	DATE: OCTOBER 28, 2003

SCALES
AS SHOWN

J. T. BROWN — S-N NO. — PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

J. T. BROWN — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO — 03.28.03

Manager of Construction
Jerry Parisotto, P. Eng.

Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
Transportation, Operations and Environment Department

VALLEY INN RD BRIDGE No. 457 OVER GRINDSTONE CREEK

BRIDGE REHABILITATION

GENERAL ARRANGEMENT AND REPAIR DETAILS

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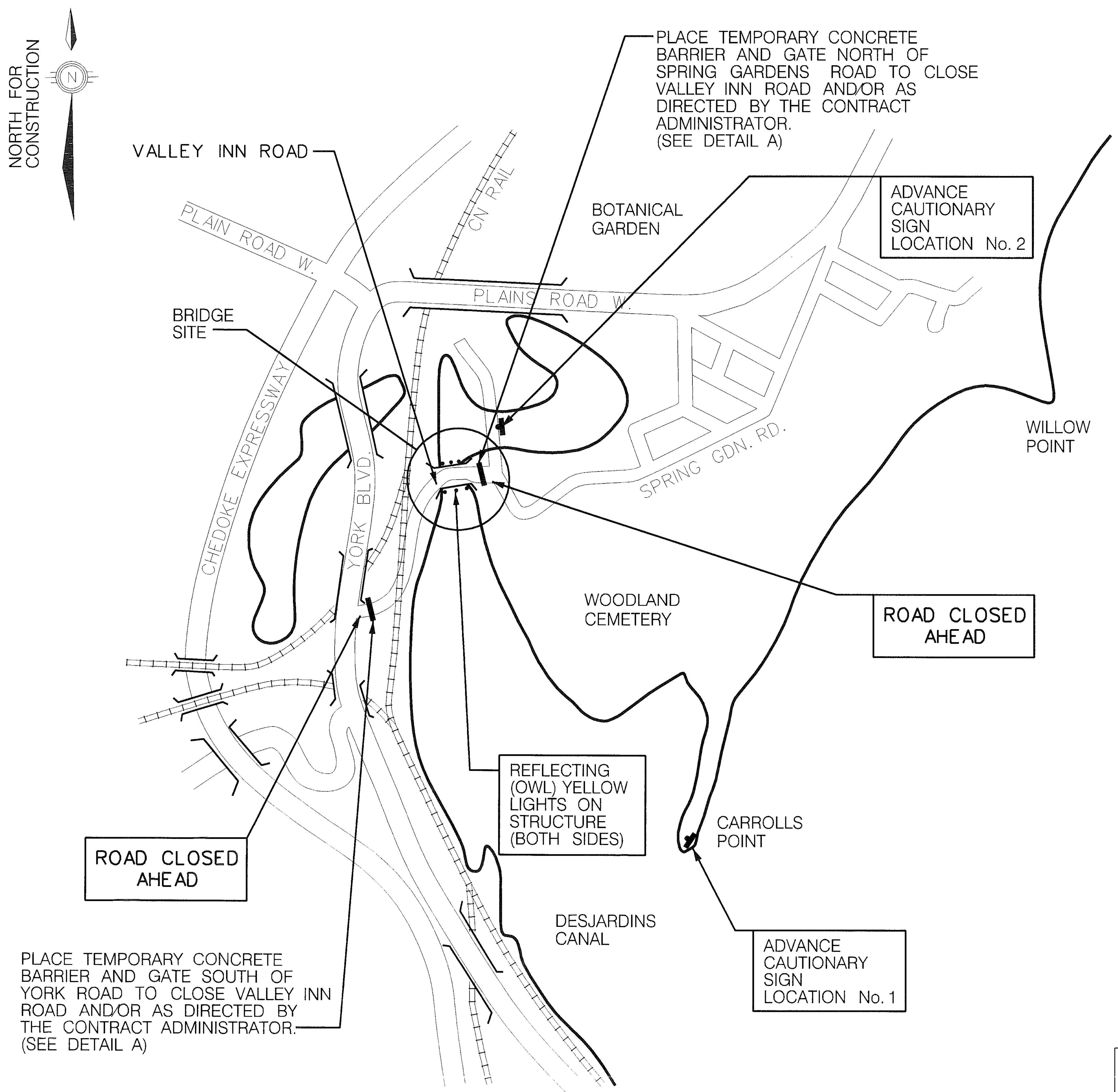
FILE No.	CONTRACT No. ~~PW-03-40 (BR)~~ Q3-06(BR) DRAWING No. 03-M-10	SHEET No. 2 OF 2

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

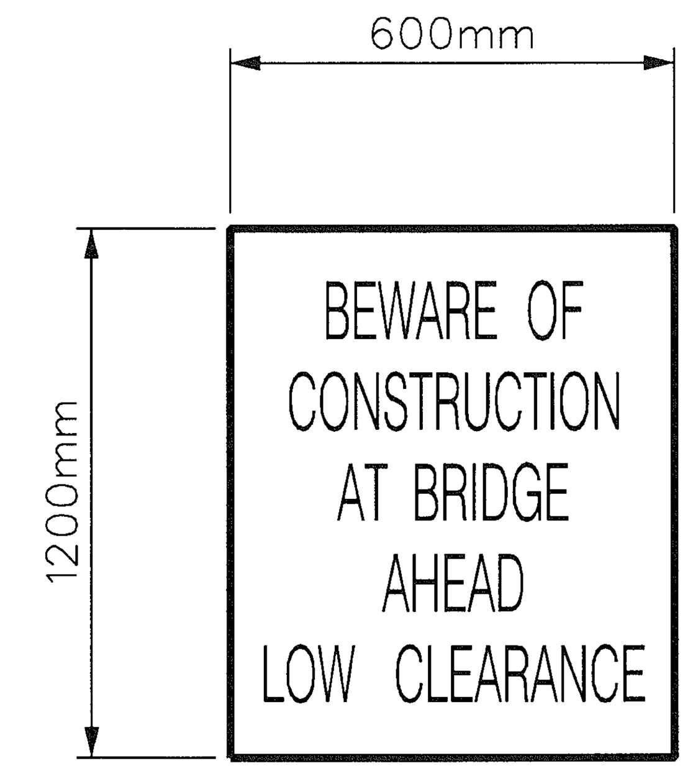
NOTE

TEMPORARY SIGNING SHALL BE PROVIDED AND SHALL CONFORM TO THE MINISTRY OF ONTARIO TRAFFIC MANUAL (OTM), BOOK 7 – TEMPORARY CONDITIONS AND/OR AS SPECIFIED BY THE CITY OF HAMILTON.



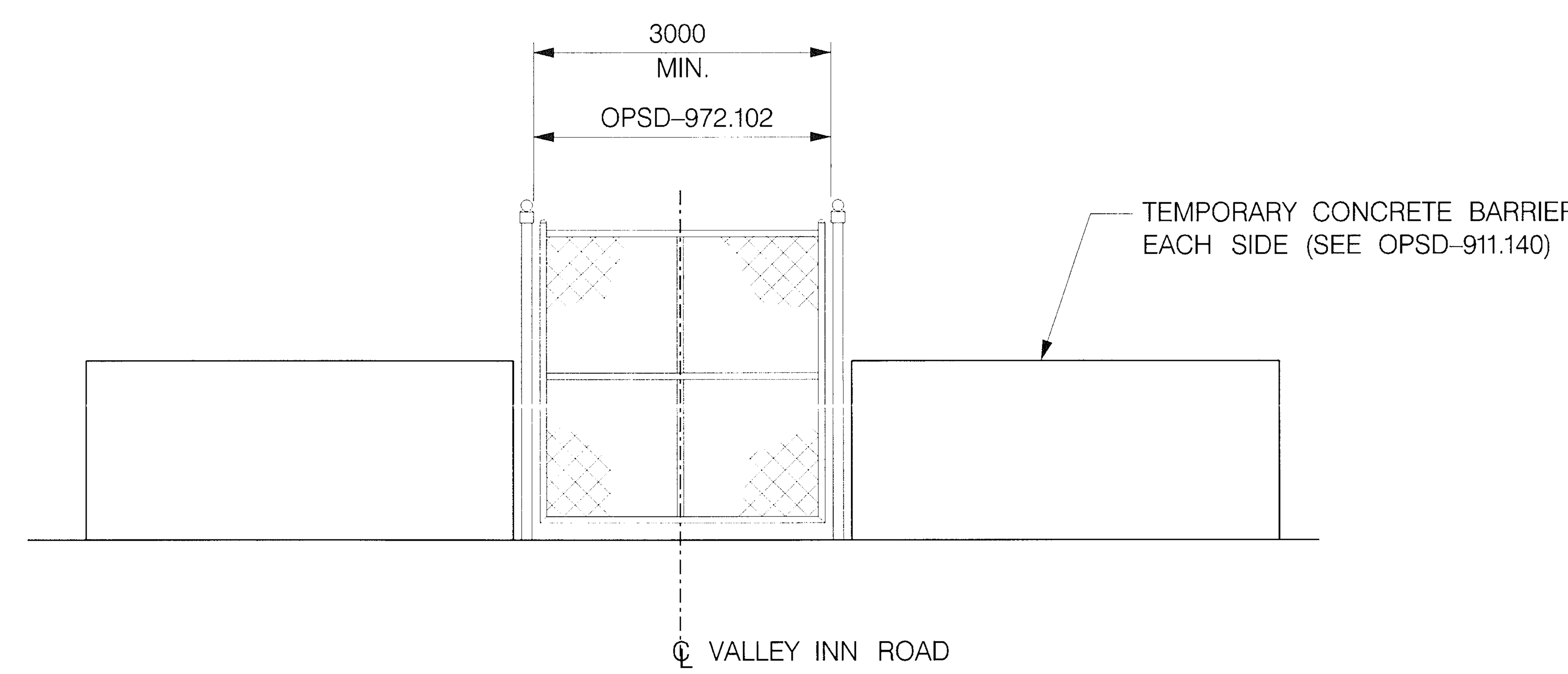
PLAN OF VALLEY INN ROAD CLOSURE

N.T.S.



ADVANCE CAUTIONARY SIGN DETAILS

N.T.S.



DETAIL A

N.T.S.

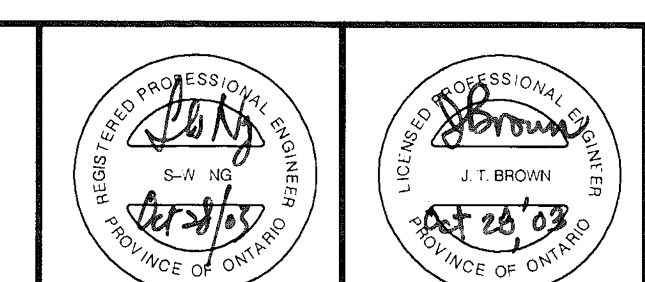
APPLICABLE STANDARD DRAWINGS:

OPSD 911.140 GUIDERAIL SYSTEM, CONCRETE BARRIER
OPSD 972.102 FENCE, CHAIN LINK COMPONENT – GATE

No.	REVISIONS	INITIAL	DATE	DRAWN BY: A.K.L.	DATE: OCTOBER 28, 2003

SCALES

NOT TO SCALE



Manager of Construction
Jerry Parisotto, P. Eng.
Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
Transportation, Operations and Environment Department

VALLEY INN RD BRIDGE No. 457
OVER GRINDSTONE CREEK
BRIDGE REHABILITATION
MISCELLANEOUS DETAILS

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LIST OF DRAWINGS

PLAN No.	SHEET No.	STREET NAME	DESCRIPTION
03-M-10	1	(BRIDGE REHABILITATION)	GENERAL ARRANGEMENT
	2		MISCELLANEOUS DETAILS

LEGEND

EXIST SEWER MANHOLE SMH
EXIST CATCH BASIN CB
EXIST DITCH INLET DI
EXIST DITCH OUTLET DO
EXIST DOUBLE CB DCB
EXIST STORM SEWER
EXIST SANITARY SEWER
EXIST COMBINED SEWER

EXIST FIRE HYDRANT HYD
EXIST WATER SERVICE VALVE SV
EXIST VALVE CHAMBER VC
EXSIT WATERMAIN

TRAFFIC HANDHOLE HH
TRAFFIC JUNCTION BOX TJB
TRAFFIC LIGHT TL
TRAFFIC MANHOLE TMH
TRAFFIC PARKING METER PM
TRAFFIC DOUBLE METER DPM
TRAFFIC DUCT

EXIST GAS VALVE GASVLV
EXIST GASMAIN

EXIST BELL MANHOLE BMH
EXIST BELL PHONE BOOTH PHONE
EXIST BELL PEDESTAL PED
EXIST BELL CONDUIT

EXIST HYDRO MANHOLE HMH
EXIST HYDRO VAULT HYV
EXIST HYDRO CONDUIT

COAX UTILITY

ROAD SIGN RDS
POLES BP UP CHP ULS WHP

RAILROAD CROSSING SIGN RXR
RAILROAD TRACKS

PAVING STONE PS
CONCRETE C
ASPHALT A
GRAVEL G
CONCRETE CURB CC
WOOD TIES WT
COMBINED WALK & CURB C W&C
BOULEVARD BLVD
RETAINING WALL RW

FULL SIDEWALK RECONSTRUCTION

SIDEWALK REPAIR ONLY

SIDEWALK TO REMAIN AS PER FIELD DECISION BY ENGINEER PRIOR TO CONSTRUCTION

ARROWS AT RADII INDICATE WHEELCHAIR RAMP LOCATIONS AND DIRECTION

LIMIT OF CONSTRUCTION

GENERAL NOTES

Roadway Construction

1) All gutter grades shall be 0.75% min slope to catch basins.

2) Radii to be improved where possible, up to 9 meters maximum where there is sufficient property. Contractor to verify property lines for improvements with the City of Hamilton prior to construction.

3) Contractor shall co-ordinate the removal and reinstallation of existing parking meters and/or street signs with the City of Hamilton Traffic Department.

4) Approaches on Arterial Roads:
-All residential approaches to be min 5.0m wide at curb line and all commercial approaches to be min 7.50m wide at curb line

-All apron approaches shall not exceed a maximum slope of 8.0% toward the road.

5) All driveway repairs shall have a minimum slope of 2.0% toward the road.

6) Traffic Duct Information
-Cap ends of all unused ducts
-Install ducts under sidewalk only if sidewalk is to be reconstructed.
-Leave fish rope in all ducts.

7) Road Cross Fall for Arterial Roads
-At all arterial cross streets, cross fall shall be 1.0%
-At all local cross streets cross fall shall be 2.0%

8) Curb Face Height When False Grading
-Min curb face height shall be 100mm
-Max curb face height shall be 180mm

Watermain Construction

1) Watermain to be tested prior to connection to existing watermains using temporary caps or plugs. Pipe closures where required to be supplied by contractor. A reduced pressure zone backflow preventer according to the following sizing is required on temporary supply lines used for filling and flushing of watermains :

Watts Series 009 (16 to 50mm dia.)
Watts Series 909 (75 to 200mm dia.)
Hersey FRP II (19 to 50mm dia.)
Hersey 6CM (75 to 100mm dia.)

2) Contractor to supply and install all adaptor pieces if required in order to connect to existing watermains.

3) Where "Hyprotec" watermains are specified all new closure pipe, sleeves and hydrant leads shall be 'Hyprotec' pipe.

4) Minimum 1.60m cover over proposed watermain (unless otherwise noted).

5) Replace all existing water services having diameter less than 19mm with 19mm dia Type 'K' soft copper water service as per RWS-700, sheet 2.

Replace all existing alloy water services of diameter greater than or equal to 19mm with Type 'K' soft copper water service of same diameter as per RWS-700, sheet 2 or RWS-701.

Reconnect all remaining existing water services to the proposed watermain. (38mm or 50mm connection as per OPSD 1104.02 with approved tapping saddle).

6) Where proposed watermain crosses an existing watermain, plug the abandoned watermain, (ie. points of disconnection, hydrant and valve removals etc.) with a minimum 300mm length of concrete.

7) Install all untested watermain joints with restrained joints, "Ebba Megalug" or approved equivalent.

8) Contractor to supply 100mm and 50mm temporary by-pass piping and temporary hydrants (where required).

9) Watermain Deflection - Maximum allowable per joint in accordance with RHW Specifications Manual (see OPSS Ammendments Volume 1)

Sewer Construction

1) Denotes basement elevations north/east side of street

2) Denotes basement elevations south/west side of street

3) All existing sanitary drains are to be connected to proposed sanitary sewer.

All existing and proposed storm drains and catch-basin leads are to be connected to proposed storm sewer.

4) 'D' - denotes 150mm dia junction and riser unless otherwise noted.

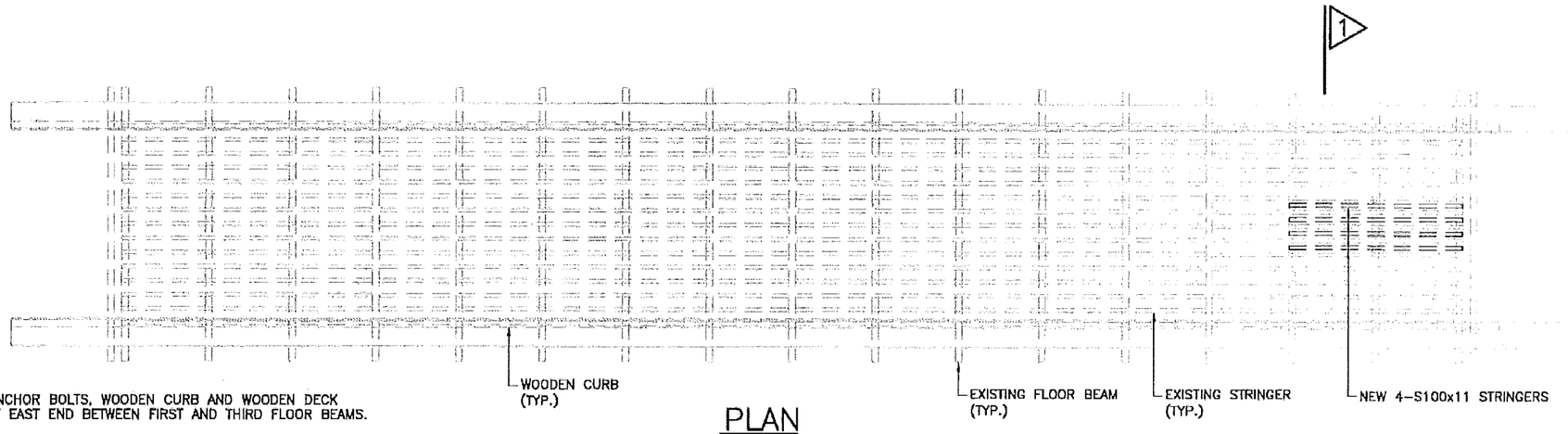
Q3-06(BR)
PW-03-46 (BR)
Contract No.

BRIDGE 457 – Valley Inn Road – BRIDGE REPAIR

Contract No. C13-23-13

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED	CONTRACT No. C13-23-13 DRAWING No. 15-M-27	SHEET No. S1 OF 1

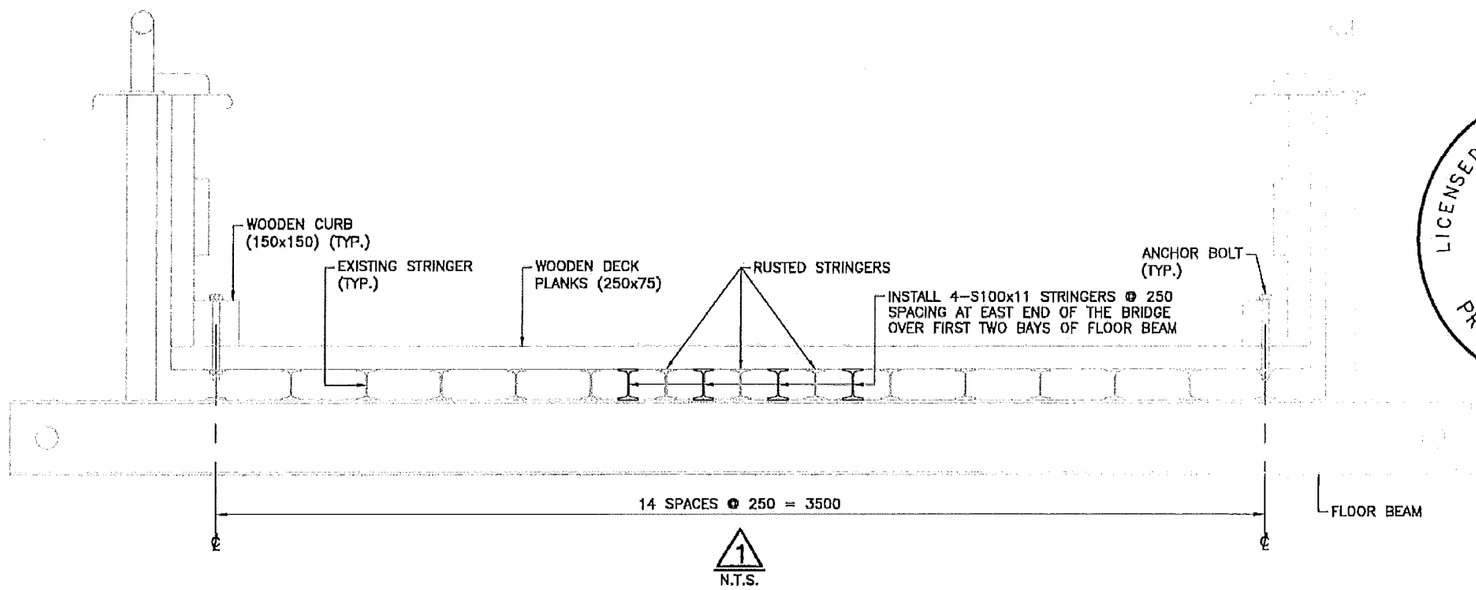
CONSTRUCTION NORTH



PLAN
N.T.S.

NOTES:

1. REMOVE ANCHOR BOLTS, WOODEN CURB AND WOODEN DECK PLANKS AT EAST END BETWEEN FIRST AND THIRD FLOOR BEAMS.
2. PLACE TOTAL FOUR (4) NEW 3200mm LONG S100x11I–BEAM AS SHOWN IN THE SKETCH.
3. INSTALL REMOVED WOODEN DECK PLANKS, WOODEN CURB AND ANCHOR BOLTS AT THE ORIGINAL LOCATION.



LICENSED PROFESSIONAL ENGINEER
J. K. NAIK
100114853
July 27/15
PROVINCE OF ONTARIO

No.	REVISIONS	INITIAL	DATE
0	ISSUED FOR PERMIT & CONSTRUCTION	KT	JULY 2015

DRAWN BY: | DATE:
REFERENCE MATERIAL:
Geodetic Bench Mark Index No. Elevation=
Borehole Report –

DESIGN: J.N.
DRAWN: W.A.

MMM GROUP

Project Manager – Structures
Rafael Sandoval, P.Eng.
Manager of Capital Rehab & Tech Ops
Brian Hughes, P. Eng.

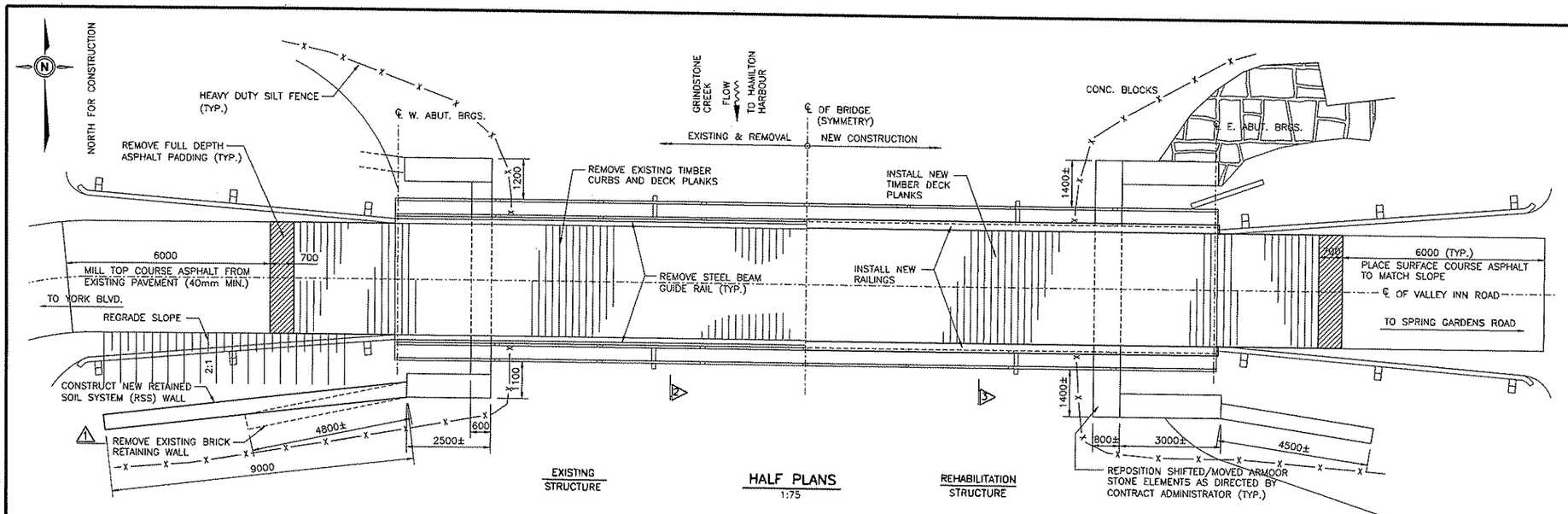
CITY OF HAMILTON
Public Works Department

BRIDGE 457 – VALLEY INN ROAD
BRIDGE REPAIR
STRINGER REPAIR DETAIL

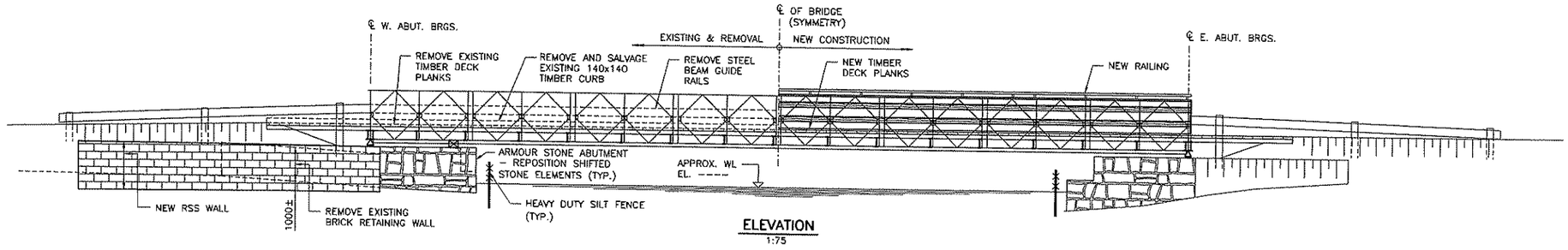
VALLEY INN ROAD
(Bridge 457)

FILE No.	CONTRACT No. PW-07-00 (H) DRAWING No. -	SHEET No. 1 OF 3

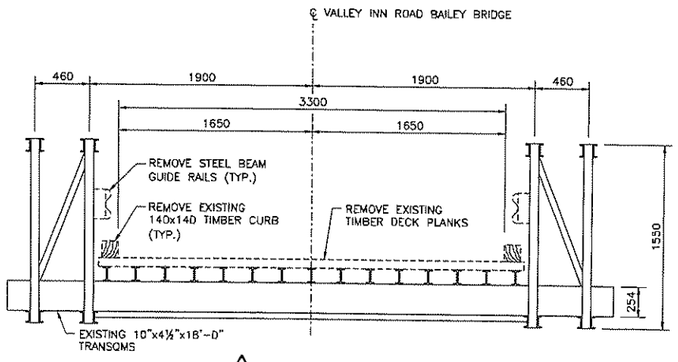
DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED



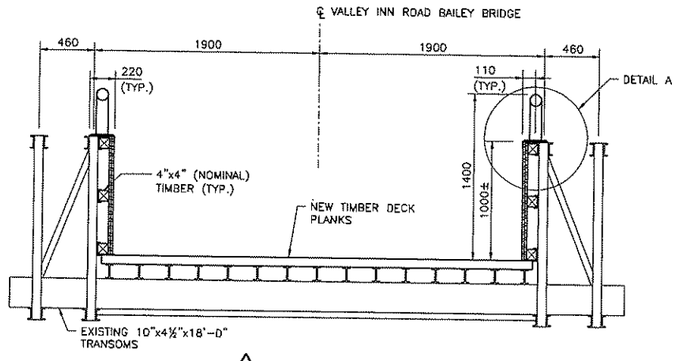
HALF PLANS
1:75



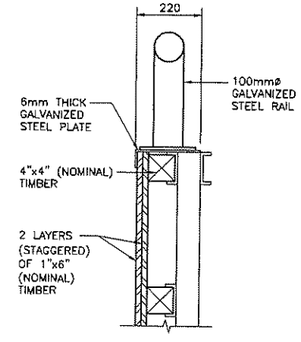
ELEVATION
1:75



2 EXISTING & REMOVAL
1:25



3 REHABILITATION
1:25



DETAIL A
1:10

GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS OF THE EXISTING WORK ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE REPAIR WORK.
2. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, WATER, ETC. DURING CONSTRUCTION OPERATIONS. CONTRACTOR'S METHOD OF PROTECTION SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF WORK.
3. DRAWINGS ARE NOT TO BE SCALED.
4. NEW TIMBER DECK PLANKS SHALL BE SPF GRADE No.2 WITH THE TOP SURFACE UNFINISHED.

SCOPE OF WORK:

1. PLACE TRAFFIC SIGNS INCLUDING TEMPORARY BARRIERS AND SITE FENCE EACH SIDE OF BRIDGE TO ENABLE CLOSURE OF VALLEY INN ROAD TO VEHICULAR AND PEDESTRIAN TRAFFIC.
2. PLACE ENVIROMENTAL PROTECTION SYSTEM(S) AS REQUIRED.
3. REMOVE EXISTING TIMBER CURBS ON BAILEY BRIDGE AS SHOWN.
4. REMOVE EXISTING TIMBER PLANKS ON BAILEY BRIDGE.
5. INSTALL NEW TIMBER DECK PLANKS.
6. INSTALL NEW TIMBER BEAMS, WALLS AND GALVANIZED STEEL PLATES COMPLETE WITH RAILINGS.
7. REMOVE AND REPLACE EXISTING ASPHALT RAMPS AT APPROACHES EACH END OF BRIDGE.
8. REMOVE TEMPORARY TRAFFIC SIGNS, BARRIERS, SITE FENCE, ENVIRONMENTAL PROTECTION SYSTEM AND OPEN THE BRIDGE TO TRAFFIC.

LIST OF DRAWINGS:

1. GENERAL ARRANGEMENT
2. RETAINING WALL DETAILS
3. RAILING AND MISCELLANEOUS DETAILS

No.	REVISIONS	INITIAL	DATE

DRAWN BY: M.WU
DATE: DECEMBER, 2008

SCALES
AS SHOWN

LICENSED PROFESSIONAL ENGINEER — M. ASANTE-MANSO — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — S. V. TENG — 100056210 — PROVINCE OF ONTARIO

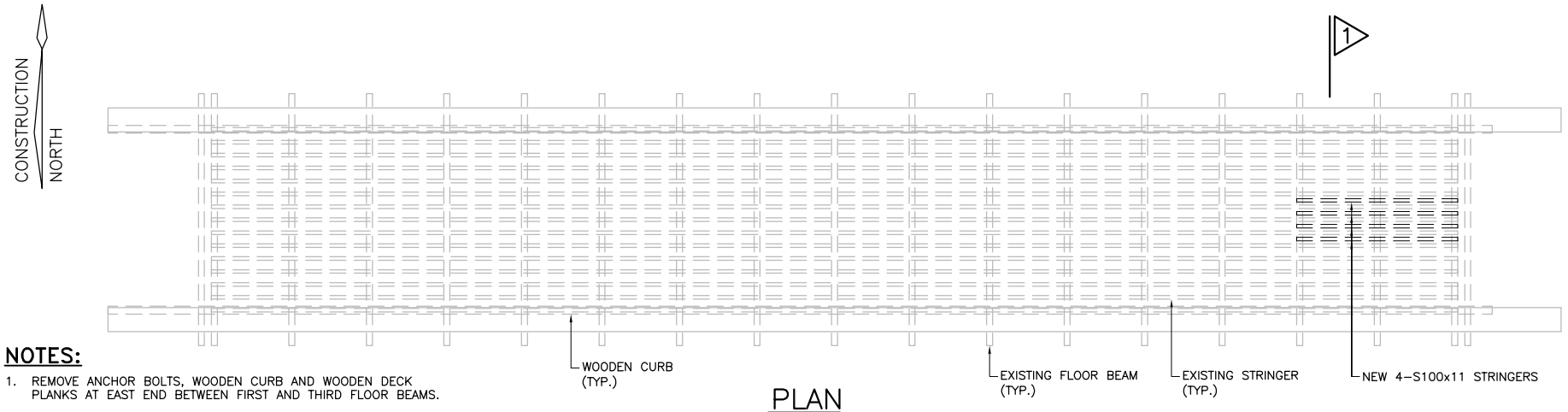
Manager of Construction
Jerry Parisotto, P. Eng.
Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
Public Works Department

CONSULTANT
SNC·LAVALIN

VALLEY INN ROAD
OVER GRINDSTONE CREEK (Bridge 457)
Bridge Rehabilitation
GENERAL ARRANGEMENT

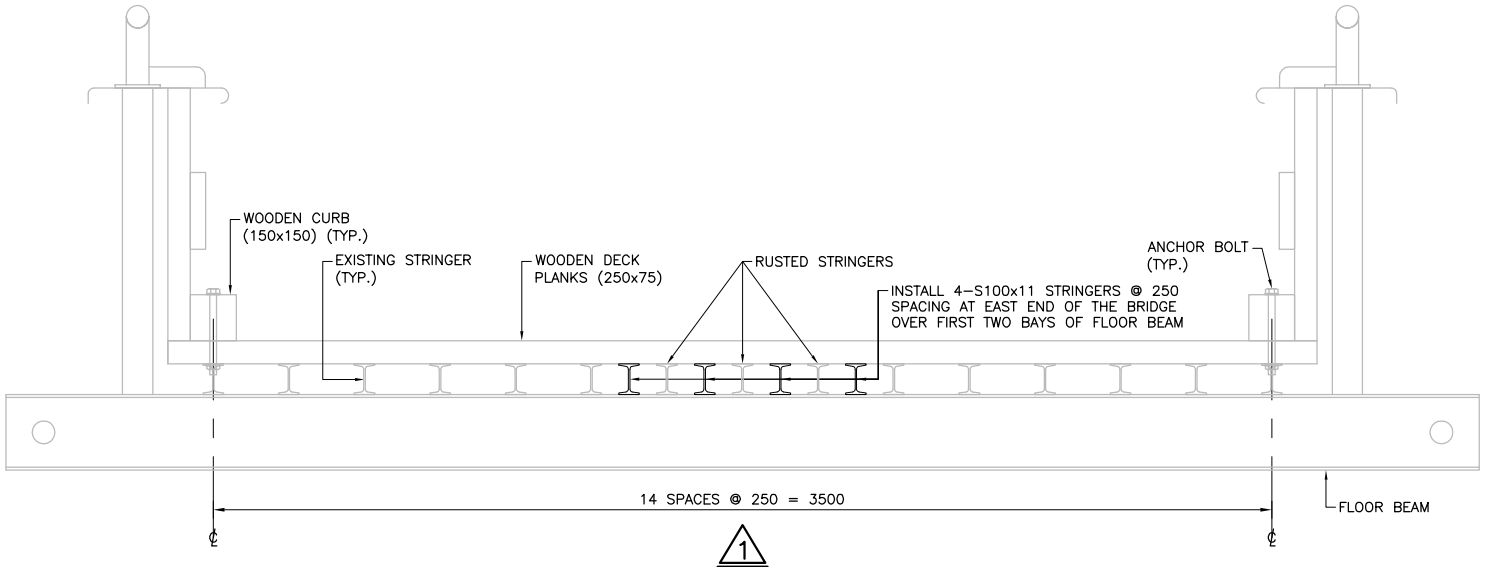
P:\33160\Trans\1000-Structure



PLAN
N.T.S.

NOTES:

1. REMOVE ANCHOR BOLTS, WOODEN CURB AND WOODEN DECK PLANKS AT EAST END BETWEEN FIRST AND THIRD FLOOR BEAMS.
2. PLACE TOTAL FOUR (4) NEW 3200mm LONG S100x11I–BEAM AS SHOWN IN THE SKETCH.
3. INSTALL REMOVED WOODEN DECK PLANKS, WOODEN CURB AND ANCHOR BOLTS AT THE ORIGINAL LOCATION.



1
N.T.S.

S:\2015\32\3215065\300\3215065–300–Sketch.dwg

MMM GROUP

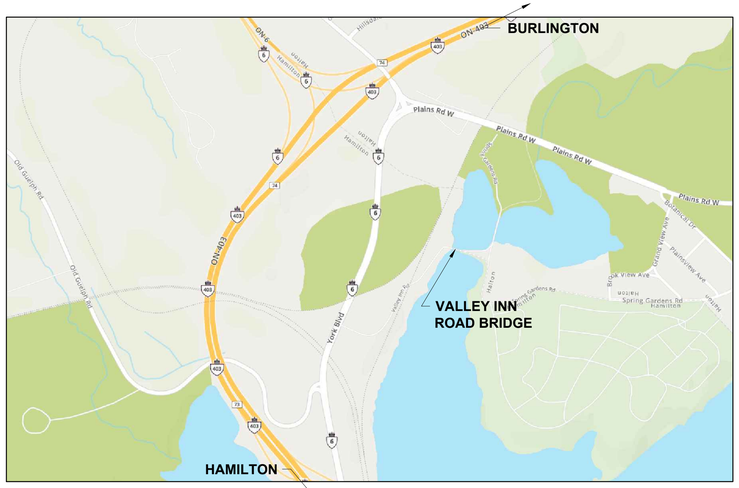
DESIGN: J.N.	VALLEY INN ROAD BRIDGE **CITY OF HAMILTON**	DATE: JUL/15
DRAWN: W.A.	**STRINGER REPAIR DETAIL**	DRAWING: SK–01

APPENDIX C
Drawings of Proposed Work

BRIDGE 457 - VALLEY IN ROAD - BRIDGE REHABILITATION

20-BR-06 (01)

CONTRACT No.	C15-63-20 (BR)	SHEET No.
DRAWING No.	20-BR-06 (01)	01 OF --



1 LOCATION PLAN

VALLEY INN BRIDGE REHABILITATION

BACKGROUND

The Valley Inn Bridge has historically been an important means of crossing Hamilton Harbour and Grindstone Creek. There was a wooden bridge at this location in the 1800's that was replaced by a steel truss structure in the early 1900's. That bridge collapsed in the mid 1960's when an overweight truck crossed the span. The bridge was replaced on an emergency basis with the present modular Bailey bridge.

The Bailey bridge has now reached the end of its life span due to severe corrosion of many of its members. The deterioration has resulted in the closure of the bridge, first to vehicle traffic and finally to pedestrian traffic.

The Bailey bridge and the cut stone abutments of the original truss bridge are considered of historical importance. It is proposed to protect the original stone abutments and install a new bridge that reflects the character and history of the site.

SCOPE OF WORK

1. Removal of the existing Bailey bridge, including wood decking, approach ramps and corroded bearings and foundation boxes at each end.
2. Removal of wooden railings and barriers on both sides at each end of the bridge.
3. Removal of trees and brush that has grown into the existing bridge structure.
4. Retention of two 10 feet long modular double truss sections that are in the best condition, for future use as supports for interpretive signage.
5. Protection of the existing cut stone abutments from any further damage and replacement of some stones have fallen into the water.
6. Installation of new engineered fill and concrete pad foundations at each end.
7. Fabrication and installation of new steel truss bridge with a load capacity of 5 tonnes.
8. Installation of new timber deck and wooden railings and barriers.
9. Grading and installation of asphalt paved approach ramps to blend existing approaches to the profile of the new bridge.
10. Installation of new fencing/barriers at each end to direct traffic onto the bridge.
11. Installation of new foundations for two interpretive signs and installation of Bailey Truss sections.
12. Restoration of site to repair damage caused by construction activities.

STRUCTURAL STEEL SPECIFICATIONS

1. Conform to latest edition of CSA Standard CAN3-S16.1, Steel Structures for Buildings, Limit States Design for design, fabrication and erection of new steel bridge.
2. Conform to latest edition of CSA Standard W59, Welded Steel Construction (Metal-Arc Welding) for welding.
3. Use a welding company certified in accordance with CSA Standard W47.1, Certification of Companies for Fusion Welding Steel Structures, for welding of steel components.
4. Use weathering grade steel, conforming to ASTM Standard A847 and A500, with a minimum yield strength (Fy) of 350 MPa and a tensile strength (Ft) of 480 MPa.
5. Use Low-Alloy welding electrodes such as E8018-C3 for welding weathering steel. Confirm compatibility of welding electrodes for use with weathering steel.
6. Submit fabrication and erection drawings of steel bridge that indicate materials and all dimensions to Engineer for review prior to fabrication.
7. The fabrication will be inspected by a certified welding inspector prior to transporting bridge to site for installation. Correct welding defects noted in the inspections.
8. Inspect site and make allowances for existing utilities and overhead lines when planning installation and erection of new bridge.
9. Erect new bridge without damaging existing cut stone abutments and entering watercourse.

CONCRETE SPECIFICATIONS

1. Conform to latest edition of CSA Standard CAN3-A23.1, Concrete Materials and Methods of Concrete Construction, for concrete work.
2. Use concrete with a minimum compressive strength of 35 MPa, designed to meet exposure Class C1. Concrete supplier is responsible for concrete mix proportioning in accordance with Alternative 1 of Table 11 of CSA A23.1. Density of concrete is normal. Entrained air content 5.5% +/- 1.5% at point of discharge.
3. Use Type 10 normal Portland cement with a maximum of 30% slag cement conforming to CSA A363.
4. Use 20 mm maximum coarse aggregate size. Use aggregates from non alkali reactive sources.
5. Use maximum water cement ratio of 0.38. Use mid range superplastizer to achieve placement slump of at least 200 mm +/- 50 mm.
6. Submit concrete mix designs for review by the engineer.
7. Have concrete sampled and tested for strength, slump and air content by an accredited testing agency in accordance with CSA and ASTM methods.
8. Wet cure concrete for a period of at least 5 days.
9. Finish concrete surfaces with a smooth wood float finish free of holes and poorly consolidated concrete.
10. Provide adequate cold weather or hot weather protection for placed concrete. Prevent frost damage to freshly placed concrete. Provide protection details to Engineer in advance of undertaking work.

CONCRETE REINFORCEMENT SPECIFICATION

1. Use deformed steel billet bars conforming to CSA Standard G0.12, Grade 400.
2. Submit shop drawings of reinforcement details to Engineer for review prior to fabrication.
3. Place reinforcement in accordance with recommendations of the Reinforcing Steel Institute
4. Minimum cover to reinforcement from face of forms, top of slab or exposed surface is 60mm. Minimum cover for reinforcement from underside of slab is 75mm.

FOUNDATION NOTES

1. Do not excavate below the ground water table.
2. Place filter fabric and backfill in accordance with the drawings.
3. Prevent damage to existing abutments and stone walls.
4. Install erosion protection around excavated areas and prevent surface water from entering the surrounding watercourses.
5. Remove excavated material from the site and dispose in accordance with Province of Ontario regulations. Do not reuse excavated material on site.

WOOD NOTES

1. Use Western Red Cedar, rough dressed, Structural Grade No. 2 or better and Appearance Grade B for railings. Use rough dressed, Structural Grade No. 1 for posts.
2. Use galvanized bolts and hardware for fastenings.
3. Conform to CSA Standard O86 for design and fabrication of timber members and connections. Make holes for lag screws and bolts perpendicular to the face of the mating surfaces.
4. Plane corners of rails to remove splinters.
5. Make joints tight and square. Install posts plumb in both axes and square to line of railings.

No.	REVISIONS	INITIAL	DATE

REFERENCE MATERIAL

Geodetic BenchMark Index No.
Borehole Report -

ACTIVITIES	
Surveyed By:	####
Survey Date:	
Drawn By:	RM
Drawn Date:	NOV. 2020
Design By:	TR
Design Date:	SEP. 2020

SCALES

R.V. Anderson Associates Limited
engineering • environment • infrastructure
RVA Project No: #######

Project Manager (Structures)
Rafael G. Sandoval, P. Eng.

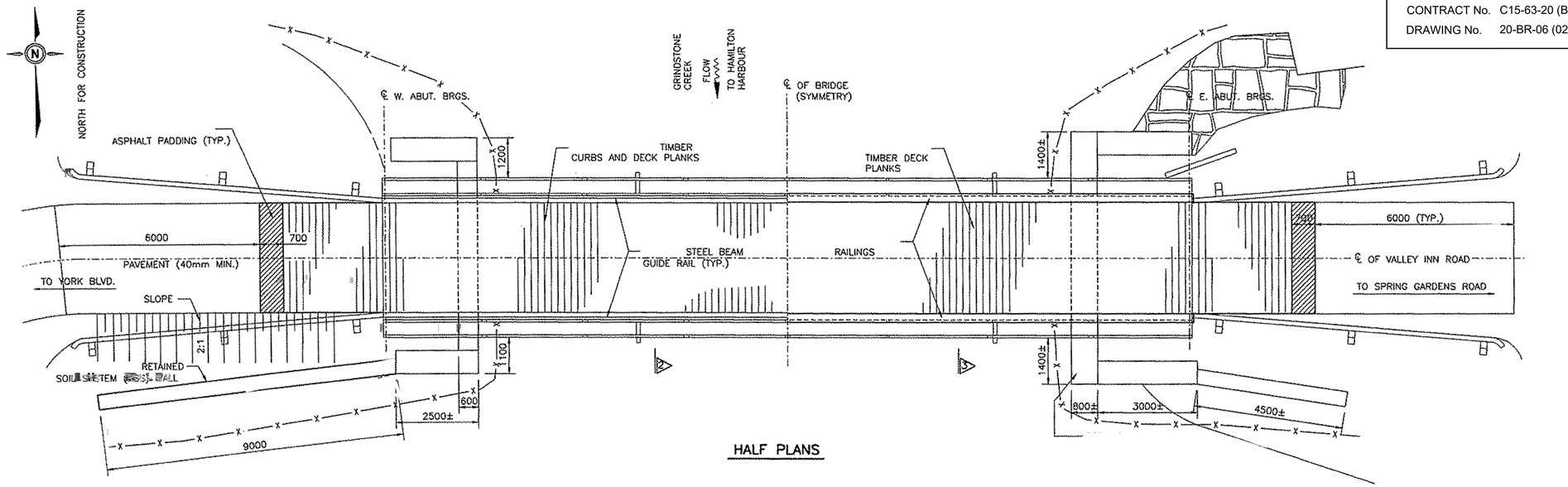
Manager of Engineering Services

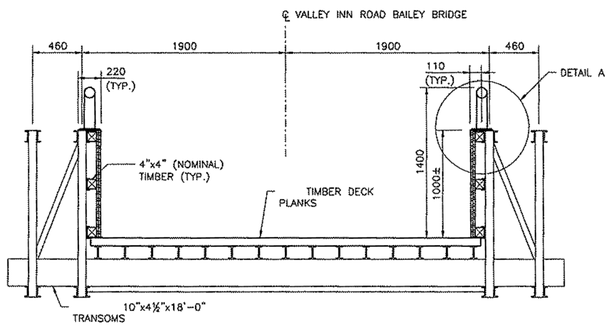
Hamilton
Public Works Department

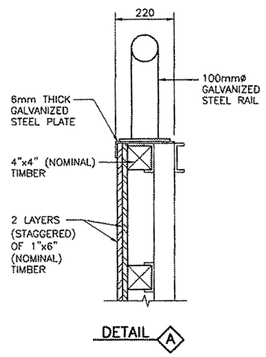
BRIDGE 457
VALLEY IN ROAD
SITE PLAN
BRIDGE REHABILITATION

CONTRACT No. C15-63-20 (BR)	SHEET No.
DRAWING No. 20-BR-06 (02)	02 OF --

BRIDGE 457 - VALLEY IN ROAD - BRIDGE REHABILITATION







NOTES:
1. THIS DRAWING IS REPRODUCED FROM AN IMAGE OF AN EXISTING DRAWING AND IS NOT TO SCALE.
2. ??? REMOVAL / DEMOLITION NOTES ???

No.	REVISIONS	INITIAL	DATE

REFERENCE MATERIAL
Geodetic BenchMark Index No.
Borehole Report -

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Survey Date:	
Drawn By:	RM
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SCALES

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engineering • environment • infrastructure
RVA Project No: #######

Project Manager (Structures)
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Hamilton
Public Works Department

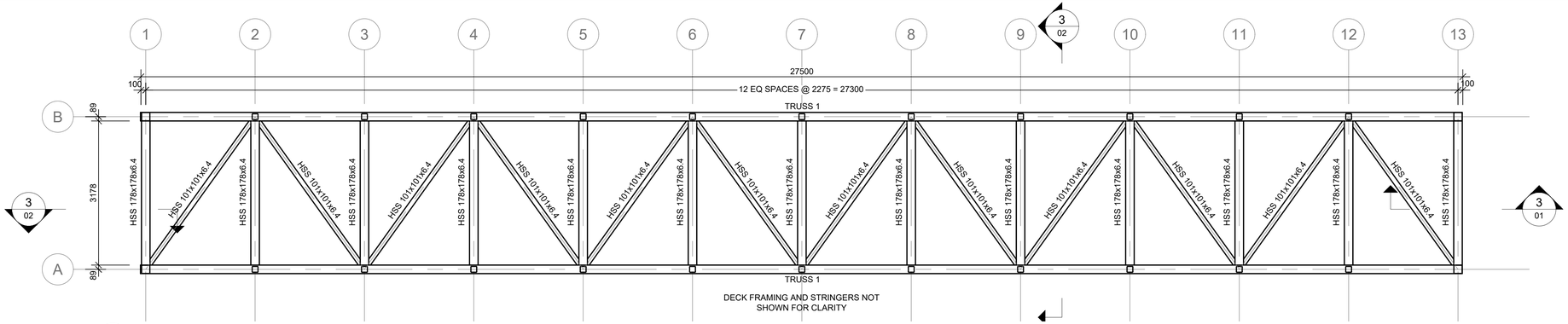
BRIDGE 457
VALLEY IN ROAD
EXISTING BRIDGE - REMOVAL
BRIDGE REHABILITATION

20-BR-06 (02)

BRIDGE 457 - VALLEY IN ROAD - BRIDGE REHABILITATION

20-BR-06 (03)

CONTRACT No.	C15-63-20 (BR)	SHEET No.
DRAWING No.	20-BR-06 (03)	03 OF --



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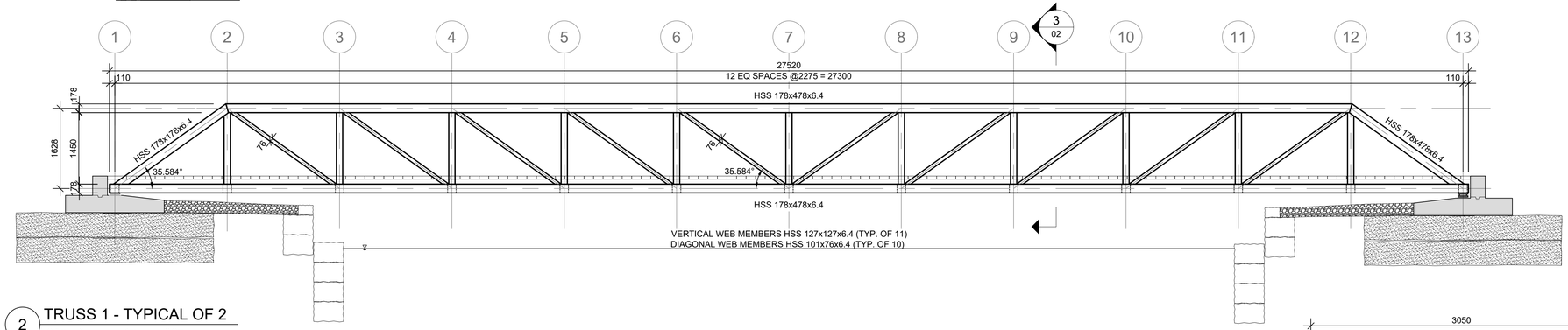

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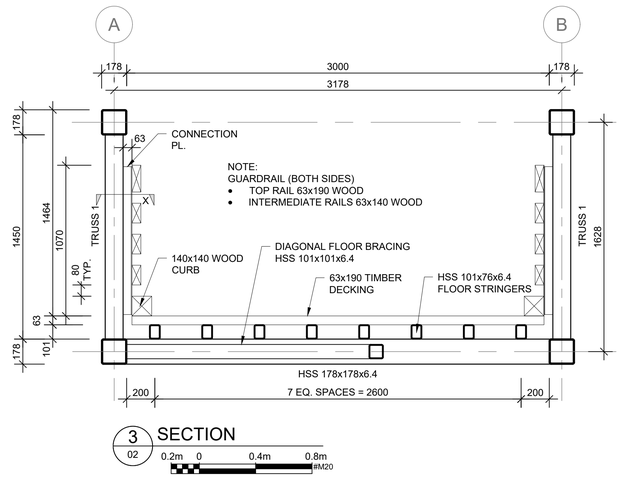

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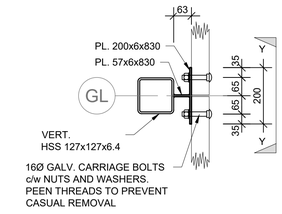

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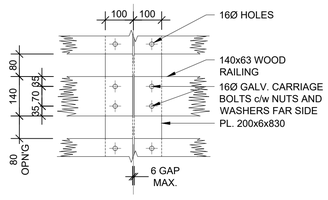

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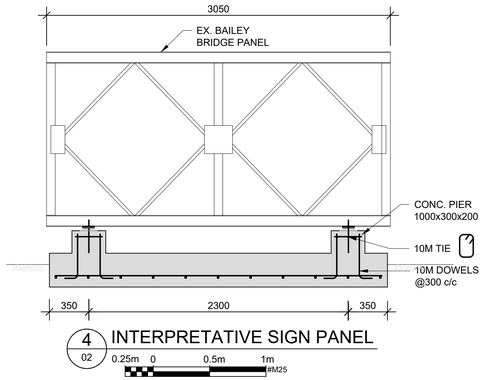

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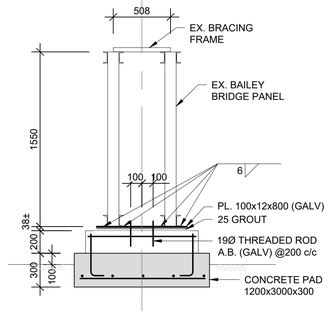

No.	REVISIONS	INITIAL	DATE

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	Survey Date:	--
	Drawn By:	RM
	Drawn Date:	OCT. 2020
	Design By:	TR
Geodetic BenchMark Index No.	Design Date:	SEP. 2020
Borehole Report -		

SCALES

R.V. Anderson Associates Limited
engineering • environment • infrastructure

RVA Project No: #######

Project Manager (Structures)
Rafael G. Sandoval, P. Eng.

Manager of Engineering Services

Hamilton **Public Works Department**

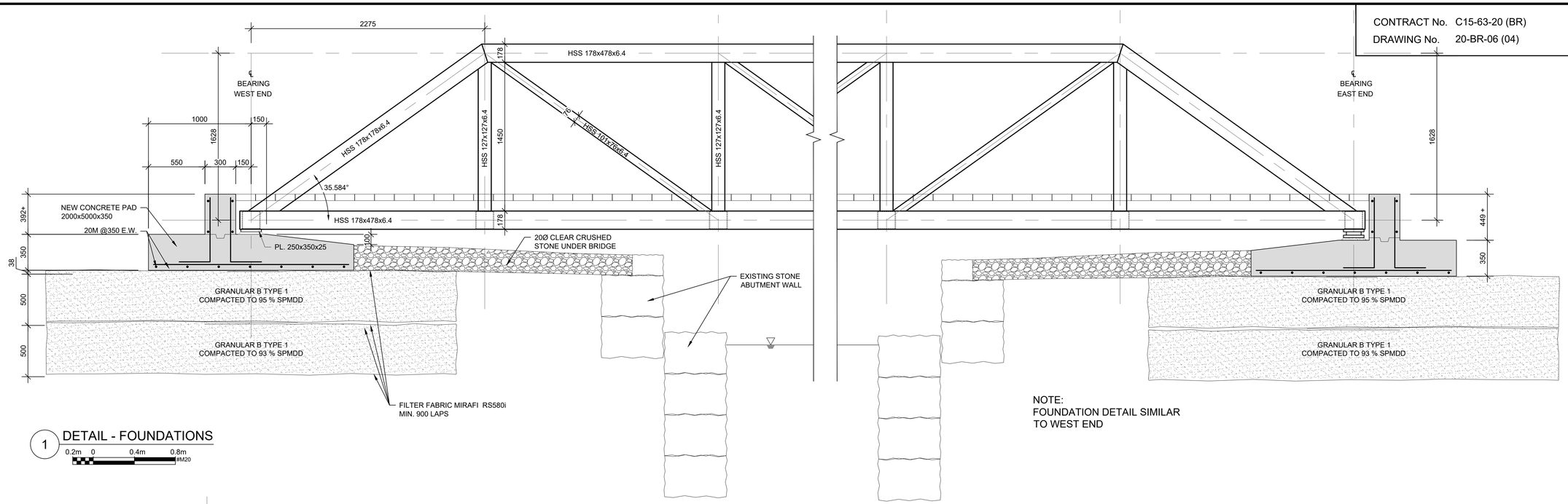
BRIDGE 457
VALLEY IN ROAD
FRAMING - PLANS AND SECTIONS
BRIDGE REHABILITATION

CONTRACT No. C15-63-20 (BR)
DRAWING No. 20-BR-06 (04)

SHEET No. 04 OF --

BRIDGE 457-BRIDGE REHABILITATION

20-BR-06 (04)



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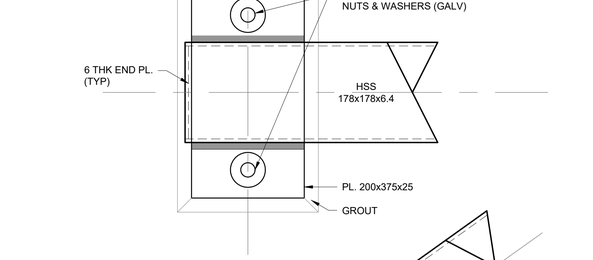

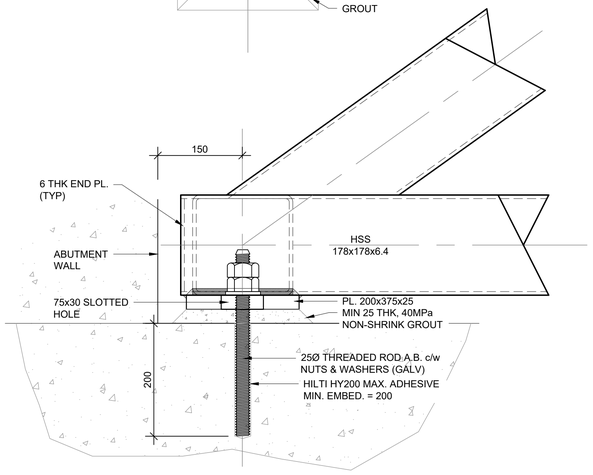

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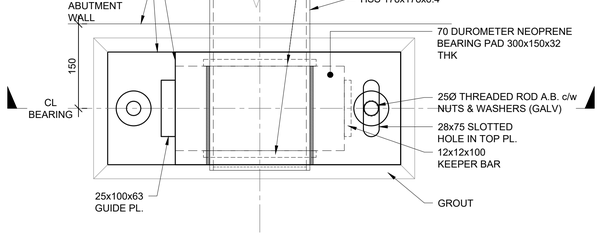

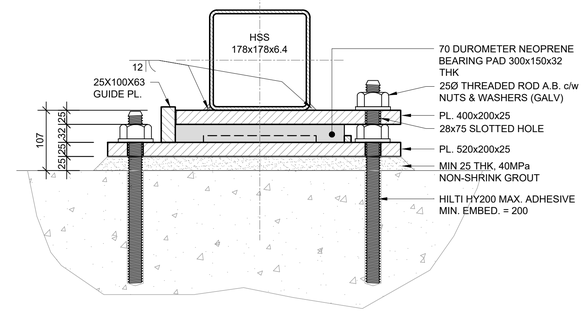

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No.	REVISIONS	INITIAL	DATE

REFERENCE MATERIAL

Geodetic BenchMark Index No.
Borehole Report -

ACTIVITIES	
Surveyed By:	####
Survey Date:	
Drawn By:	RM
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Design By:	TR
Design Date:	SEP. 2020

SCALES

R.V. Anderson Associates Limited
engineering • environment • infrastructure
#######

Project Manager (Structures)
Rafael G. Sandoval, P. Eng.

Manager of Engineering Services

Hamilton Public Works Department

BRIDGE 457
VALLEY IN ROAD
DETAILS
BRIDGE REHABILITATION

Documentation Report, Bridge 457, Valley Inn Bridge

FINAL REPORT

May 14, 2021

Prepared for:

City of Hamilton
71 Main Street West
Hamilton, Ontario L8P 4Y5

Prepared by:

Stantec Consulting Ltd.
600-171 Queens Avenue
London, Ontario N6A 5J7

Project Number: 165001203

Executive Summary

The City of Hamilton (the City) retained Stantec Consulting Ltd. (Stantec) to prepare a documentation report for the Valley Inn Bridge, Bridge 457, in the City of Hamilton, Ontario. In 2017, a Cultural Heritage Evaluation Report (CHER) was prepared for the Valley Inn Bridge. The CHER determined that the Valley Inn Bridge has cultural heritage value or interest (CHVI) and moderate heritage value as a Class C structure.

The City of Hamilton is proposing to remove and replace the Valley Inn Bridge with a modern structure to facilitate use by the public. In 2021, Stantec completed a Cultural Heritage Impact Assessment (CHIA) for the Valley Inn Bridge. The CHIA determined that the proposed removal and replacement of the Valley Inn Bridge would have direct impacts on the heritage attributes identified for the bridge. The CHIA recommended documentation, salvage, and commemoration of the bridge as an appropriate mitigation measure along with replacement of the Valley Inn Bridge with the historically sympathetic design provided by the City.

The preferred approach is a blended commemoration approach that combines documentation, commemoration, and salvage to mitigate the impacts arising from the removal and replacement of the Valley Inn Bridge. Therefore, the following recommendations are made:

- The Documentation Report and the accompanying photo log and photos sent via FTP should be retained on file with the City of Hamilton and a copy should be deposited at the Local History and Archives Collection at the Hamilton Public Library. This will create a public record of the Valley Inn Bridge that will be accessible to the public.
- The blended commemoration approach should incorporate the display of the salvaged materials alongside the three interpretive panels prepared as part of this Documentation Report. The panels and salvaged components should be displayed in close proximity to the original location of the bridge. As the Bailey Truss design is inherently modular, displaying a section or sections of salvaged modular panels will aid in the interpretation and understanding of the Bailey Truss Bridge design.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Table of Contents

LIST OF FIGURES

Project Personnel

Project Manager:	Adam Renaud, P.Eng.
Heritage Consultant:	Meaghan Rivard, MA, CAHP
Report Writer:	Frank Smith, MA
GIS Specialist:	Julie Werner, BA
Quality Reviewer:	Parker Dickson, MA
Independent Reviewer:	Tracie Carmichael, BA, B.Ed.

Abbreviations

AODA	Accessibility for Ontarians with Disabilities Act
BA	Bachelor of Arts
CAHP	Canadian Association of Heritage Professionals
CHER	Cultural Heritage Evaluation Report
CHIA	Cultural Heritage Impact Assessment
CHVI	Cultural Heritage Value or Interest
HABS	Historic American Building Survey
LiDAR	Light Detection and Ranging
MA	Master of Arts
MCEA	Municipal Class Environmental Assessment
MEA	Municipal Engineers Association
MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries
NPS	National Park Service
P.Eng	Professional Engineer
RBG	Royal Botanical Gardens

1.0 INTRODUCTION

1.1 STUDY PURPOSE

The City of Hamilton (the City) retained Stantec Consulting Ltd. (Stantec) to prepare a Documentation Report for the Valley Inn Bridge, Bridge 457, in the City of Hamilton, Ontario. The study area associated with the Valley Inn Bridge, Bridge 457, is illustrated on Figure 1. In 2017, a Cultural Heritage Evaluation Report (CHER) was prepared by Stantec for the Valley Inn Bridge (Stantec 2017). The CHER determined that the Valley Inn Bridge has cultural heritage value or interest (CHVI) and moderate heritage value as a Class C structure (Stantec 2017). The heritage attributes identified by Stantec (2017) for the Valley Inn Bridge include:

- Stone abutments that are remnants of the previous bridge at this location.
- Bridge components associated with the Bailey Truss bridge design including, but not limited to modular panels with top and bottom chords, verticals, and diagonals; timber decking; longitudinal stringers; transverse transoms; horizontal bracers; and end posts.

The City is proposing to remove and replace the Valley Inn Bridge with a modern structure to facilitate use by the public. In 2021, Stantec completed a Cultural Heritage Impact Assessment (CHIA) for Valley Inn Bridge (Stantec 2021). The CHIA determined that the proposed removal and replacement of the Valley Inn Bridge would have direct impacts on its identified CHVI and heritage attributes. The CHIA recommended documentation, salvage, and commemoration of the bridge as appropriate mitigation measures along with replacement of the Valley Inn Bridge with the historically sympathetic design provided by the City. This documentation report is intended to fulfill the documentation, salvage, and commemoration recommendation of the CHIA.

1.2 METHODS

At present, there are no regulatory frameworks in Ontario that guide the preparation of documentation reports. Further, the City does not currently have Terms of Reference for heritage documentation reports. As best practice, this heritage documentation report adheres generally to the National Park Service's (NPS) Historic American Buildings Survey (HABS) photography guidelines (NPS 2015). As such, this heritage documentation report comprises:

- A general description of the history of the site and its development.
- Representative photographs of the properties, with a photographic key plan.
- A FTP link to the City providing photographs and corresponding photograph log (see Appendix A).

The fieldwork for this report was carried out on January 18, 2021 by Frank Smith, Cultural Heritage Specialist, with Stantec. Weather conditions during the visual inspection were overcast with occasional snow flurries, and seasonably cold temperatures.

DOCUMENTATION REPORT, BRIDGE 457, VALLEY INN BRIDGE

Introduction
May 14, 2021

This report contains photographs of the north, south, east, and west sides of the bridge, and photographs of the bridge and its heritage attributes determined by the CHER. Photographs were taken on January 18, 2021 using a Nikon D5300 at a size of 6,000 pixels by 4,000 pixels at 300 dots per inch.

590000
590500
591000
4794000
4793500
4793000

Grindstone Creek
N
REGIONAL MUNICIPALITY OF HALTON
CITY OF BURLINGTON
CITY OF HAMILTON
403
Plains Road West
Long Pond
Royal Botanical Gardens Hendrie Valley Sanctuary
Royal Botanical Gardens Lake Garden
Botanical Drive
Grand View Avenue
Highway Avenue
Plains View Avenue
Valley Inn Rd
Brook View Avenue
Royal Botanical Gardens Rock Garden
York Boulevard
Spring Gardens Road
Canadian Pacific
Canadian National
Lake Ontario
Woodland Cemetery
Old Guelph Road

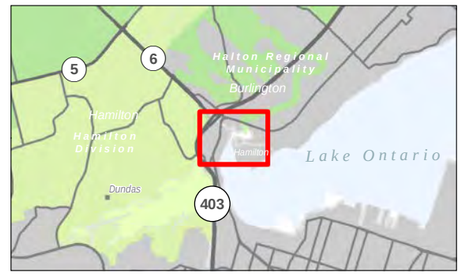
Stantec

Legend
- Study Area
- Railway
- Municipal Boundary, Lower

0 100 200 Meters
1:5,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Imagery obtained from © First Base Solutions, 2020. Hamilton Wentworth Region 2019, Halton Region 2019.

- Niagara Escarpment Plan
- Greenbelt Natural Heritage System



Project Location
City of Hamilton

165001203 REV4
Prepared by JW on 2021-04-30

Client/Project
CITY OF HAMILTON
DOCUMENTATION REPORT
BRIDGE 457, VALLEY INN BRIDGE

Figure No.
1

Title
Study Area

2.0 DOCUMENTATION

2.1 INTRODUCTION

The Valley Inn Bridge is located on Valley Inn Road, a roadway closed to vehicular traffic (the bridge itself is closed to all traffic, including pedestrians). The bridge is set in a valley and carries Valley Inn Road across the confluence of Grindstone Creek and Lake Ontario, northwest of Carroll's Point. The west approach to the bridge, and the bridge itself, are located in the City of Hamilton, and the east approach to the bridge is located within the City of Burlington. The Valley Inn Bridge is located adjacent to the Royal Botanical Gardens (RBG), a National Historic Site of Canada.

The CHER and CHIA prepared by Stantec provide a full site description of the Valley Inn Bridge and its history (Stantec 2017, Stantec 2021). A summary of the history of the Valley Inn Bridge and an expanded Site Description based on the CHIA is provided below. A key plan of the photos in the site description is provided in Figure 2.

2.2 VALLEY INN BRIDGE HISTORY

The Valley Inn Bridge is a Modular Double Single Bailey Truss bridge that was constructed in 1964. The bridge was installed as a temporary structure after the previous bridge collapsed. Bailey Truss bridges were developed during the Second World War as a standard military bridge that was portable, quick to erect, and easy to adjust for different loads and spans (Historic Bridges 2017). Bailey Truss bridges were used extensively by the Allied forces during the Second World War and many were sold after the war for other uses (Parson Brinckerhoff and Engineering and Industrial Heritage 2005:2-25). Bailey Truss bridges are considered a late truss design and are still built today. Bailey Truss bridges use a unique pony truss design composed of modular, X-shaped panels. The height and width of this bridge type is widely variable as it was designed to be adaptable to a variety of environments.

The terminology used for Bailey Truss bridges differs from traditional truss terminology (Historic Bridges 2017). Floor beams are called 'transoms' and are secured using transom clamps. Sway brackets and bracing frames are also used for these bridges. Bailey Truss bridges are highly adaptable, and examples dating to the Second World War are regarded as having the highest cultural heritage value (Historic Bridges 2017).

2.3 SITE DESCRIPTION

2.3.1 Landscape Context

The east approach to the bridge contains a parking lot, walking trail with a scenic lookout, and the alignment of Valley Inn Road (which is closed to vehicular traffic). The bridge is set in a valley and carries Valley Inn Road across the confluence of Grindstone Creek and Lake Ontario, northwest of Carroll's Point (Plate 1). The west approach to the bridge and the bridge itself are located in the City of Hamilton and the east approach to the bridge is located within the City of Burlington. The Valley Inn Bridge is located adjacent to the Royal Botanical Gardens (RBG), a National Historic Site of Canada (Plate 2).The walking trail and road alignment are asphalt paved and wooden utility poles with cobra head streetlighting luminaries run along the north edge of the walking path (Plate 3). The area contains naturalized vegetation and natural plantings in various stages of ecological succession.

The west approach to the bridge contains the alignment for Valley Inn Road (which is closed to vehicular traffic). The roadway is asphalt paved and descends in elevation from its starting point just east of York Boulevard. The roadway is overpassed by railway tracks approximately 200 metres east of York Boulevard (Plate 4). The roadway east of the overpass runs north-south and is bordered by a steel guide rail, wooden utility poles, a metal pole with signage along the east side of the roadway, and a steep embankment leading to the railway tracks on the west side of the roadway (Plate 5). As Valley Inn Road completes its descent into the valley, it turns east and leads toward the bridge alignment (Plate 6). The area in the vicinity of the bridge alignment is paved in concrete and contains naturalized vegetation and natural plantings in various stages of ecological succession (Plate 7).

Plate 1: Looking northwest from Spring Gardens Road to the Valley Inn Bridge and the confluence of Lake Ontario and Grindstone Creek

Plate 2: Looking northeast to RBG lands, east of Valley Inn Bridge

Plate 3: Looking east at walking trail (left fork), road alignment (right fork), from the Valley Inn Bridge

Plate 4: Railway overpass, looking southwest

Plate 5: Looking southwest on Valley Inn Road, southwest of the Valley Inn Bridge

Plate 6: Curve at Valley Inn Road, looking west

Plate 7: Concrete paving just west of bridge, looking east

2.3.2 Valley Inn Bridge

The Valley Inn Bridge is a single span Modular Double Single Bailey Truss bridge (Plate 8 and Plate 9). The bridge has a total deck length of 30.9 metres and an overall structural width of 5.0 metres (City of Hamilton 2015). The bridge has a posted weight limit of five tonnes but is currently closed to all traffic, including pedestrians. The bridge contains a wood plank deck with wood barrier posts and a steel tube railing atop these posts (Plate 10 and Plate 11). The deck is supported by steel I-beams (also called transoms) and steel stringers (Plate 12 and Plate 13). The truss superstructure of the bridge contains steel chords and steel vertical/diagonals, and horizontal bracing at the top and bottom of the trusses (Plate 14 to Plate 17). The original end posts of the bridge are still in place and are located beside the new timber barriers. The bridge abutments are stone and were part of a previous bridge built in 1897 which had collapsed (Plate 18 to Plate 21).

Plate 8: Valley Inn Bridge, looking northeast

Plate 9: Valley Inn Bridge, looking southwest

Plate 10: Wood decking, wood barriers, and steel tube railing, looking east

Plate 11: Wood decking, wood barriers, and steel tube railing, looking west

Plate 12: Stringers, I-beams, and cross bracing supporting decking, looking northwest

Plate 13: Stringers, I-beams, and cross bracing supporting decking, looking northeast

Plate 14: Truss superstructure, looking northwest

Plate 15: Truss superstructure and abutments, looking southeast

Plate 16: Horizontal cross bracing, looking east

Plate 17: Bracing details, looking northwest

Plate 18: Original southwest end post, looking southeast

Plate 19: Stone abutment on west side of bridge, looking northeast

Plate 20: Stone abutment on west side of bridge, looking southeast

Plate 21: Stone abutment on east side of bridge, looking southwest

2.3.3 Modification

The Valley Inn Bridge was rehabilitated in 2003. As noted in the rehabilitation drawings (see Appendix B), the following modifications were made to the bridge:

- Removal of the existing brick retaining wall.
- Construction of new retained soil system wall.
- Removal and replacement of existing timber curbs, floor planks, and stringers.
- Replacement of two transoms and one panel of stringers.
- Replacement of deteriorated floor planks.
- Removal and replacement of existing asphalt ramps at approaches at each end of the bridge.
- Repair of broken sway brace in panel number 3.
- Installation of new timber deck planks.
- Installation of new railings.
- Repositioning of shifted/moved armour stone elements.

Stantec

Legend

- Photo Location and Direction
- Study Area
- Railway
- Municipal Boundary, Lower

0 25 50 Meters

1:1,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Imagery obtained from © First Base Solutions, 2020. Hamilton Wentworth Region 2019, Halton Region 2019.

Project Location
City of Hamilton

165001203 REV4
Prepared by JW on 2021-04-30

Client/Project
CITY OF HAMILTON
DOCUMENTATION REPORT
BRIDGE 457, VALLEY INN BRIDGE

Figure No.
2

Title
Photo Key Plan

V:\165\50\active\165001203\design\gis\MXD\Heritage\ReportFigures\Documentation Report\1203 Fig02 DR Photo_final.mxd Revised: 2021-04-30 By: jwetmohl

3.0 COMMEMORATION

3.1 INTRODUCTION

Three commemorative panels have been prepared to interpret the significance of the Valley Inn Bridge. The first panel establishes and interprets the history and significance of the crossing at the confluence of Grindstone Creek and Lake Ontario; the second interprets the history of the present-day Valley Inn Bridge; and the third contains a more general history and interpretation of the significance of Bailey truss bridges. The preparation of the commemorative panels has been prepared using the best practices for interpretive writing, including clarity, simplicity of style, and brevity. In general, interpretive panels should be limited to around 150 words to avoid fatiguing the reader (British Columbia Museum Association 2019; NPS 1960).

The City currently has no approved standard for interpretive signage, and sign color, design, graphics, and placement are not standardized. However, the City notes that interpretive signage should include the following elements (City of Hamilton 2019):

- Ensure compliance with Accessibility for Ontarians with Disabilities Act.
- Single pedestal or double pedestal.
- Designs and placement result of consultation with various City divisions and community groups.

The text of the commemorative panels is sourced from the CHER prepared for the Valley Inn Bridge in 2017 by Stantec (2017) and supplemented with additional research. Due to the province-wide COVID-19 lockdown, archival institutions and libraries could not be visited to locate relevant historical photographs to accompany the commemorative panel text. Photographs available online have been selected to accompany the commemorative panels, but the City may wish to explore the option of using alternative photos possibly available at libraries, archives, and other institutions once COVID19 restrictions are lifted. It is believed that the online photographs, provided below, are within the public domain and are available for use. However, prior to use the City should verify that these photos are available for reproduction.

3.2 PANEL ONE (VALLEY INN ROAD)

Title: Valley Inn Road

Text: Valley Inn Road has its origins as an important early 19th century link between Hamilton and Toronto and was used as a military route during the War of 1812. By the middle of the 19th century, a bridge was built across Grindstone Creek and a nearby hotel named the Valley Inn served weary travelers. The hotel was located on the west side of the bridge and closed by the early 20th century before being destroyed by fire in 1928. A second fire destroyed any remaining structures associated with the hotel in 1959. The original mid-19th century Valley Inn Bridge was replaced by a steel truss bridge in 1897, which remained until 1964. Valley Inn Road and its bridges have been an important part of the Around the Bay Road Race since 1894 and the steep incline of Valley Inn Road is known as “Heartbreak Hill” amongst runners (Stantec 2017; Canadian Running 2020).

Commemoration
May 14, 2021

Word Count: 147

Suggested Photos:

Plate 22: Valley Inn Road and Hotel *circa* 1900-1905 (Hamilton Public Library, Local History & Archives)

Plate 23: Valley Inn Hotel looking northeast *circa* 1900-1905 (Hamilton Public Library, Local History & Archives)

Plate 24: Valley Inn Road Bridge looking northeast in 1960 (Hamilton Public Library, Local History & Archives)

3.3 PANEL TWO (VALLEY INN BRIDGE, 1964-2021)

Title: Valley Inn Road Bridge, 1964-2021

Text: The first bridge across Grindstone Creek on Valley Inn Road was built in the mid-19th century and was replaced in 1897 by a steel truss bridge. On May 5, 1964, the bridge collapsed under the weight of a truck. At the time of the collapse, the bridge was located where the borders of Burlington, Hamilton, and Flamborough met. Serious discussion arose regarding which municipality was responsible for the replacement of the Valley Inn Bridge and the matter eventually landed in court. While the municipalities debated responsibility, the province offered to loan a Bailey Truss Bridge as a temporary solution. At the request of the province, the 47th Field Squadron of the Royal Canadian Engineers installed the Bailey Truss Bridge on top of the existing stone abutments. The bridge installed was believed to be a surplus bridge from the Second World War and was likely manufactured in Britain (Stantec 2017; City of Hamilton 2002; Flamborough Review 2010).

Word Count: 147

Suggested Photographs:

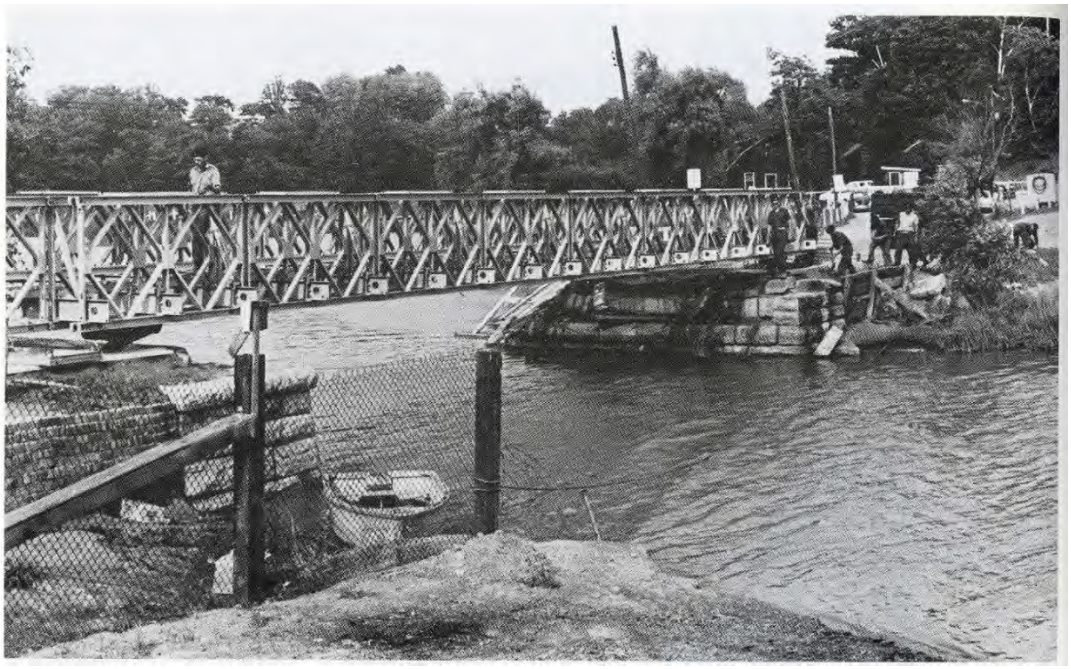


Plate 25: The 47th Field Squadron of Royal Canadian Engineers installing the Valley Inn Bridge in 1964(Evans 2000)

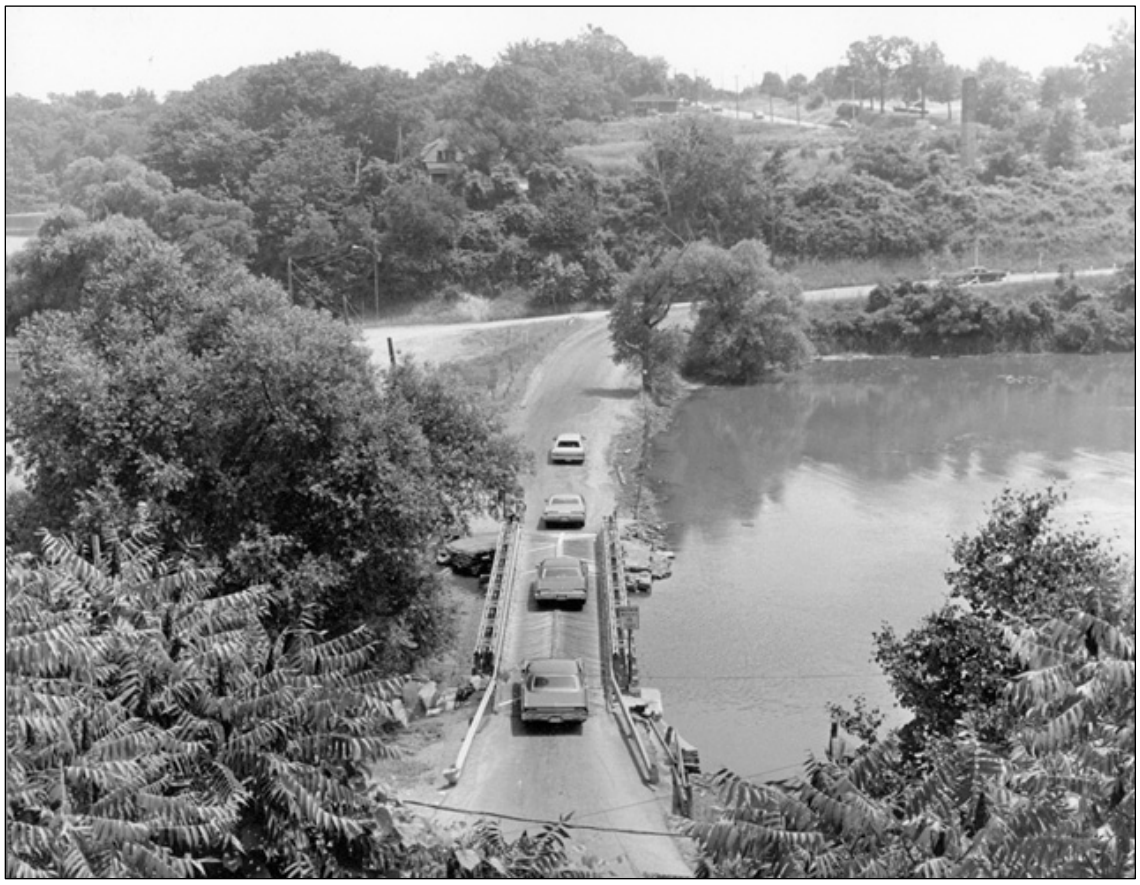


Plate 26: Valley Inn Road Bridge looking southeast in 1973 (Hamilton Public Library, Local History & Archives)

3.4 PANEL THREE (BAILEY TRUSS BRIDGES)

Title: Bailey Truss Bridges

Text: Between 1964 and 2021, the Valley Inn Bridge was a Bailey Truss Bridge. This bridge type was first developed during the Second World War and played an important role in the Allied victory. During the war, the Allies needed a bridge design that could be quickly erected and serve as a temporary crossing. In response, the British engineer Sir Donald Coleman Bailey designed the Bailey Truss Bridge in 1940. His design was prefabricated, light weight, portable, easily adjustable to different lengths, and could support heavy loads. As a result, it was widely utilized in the Second World War as a temporary water crossing. In recognition of the important role of the Bailey Truss Bridge to the war effort, Bailey was knighted in 1946. After the war, many Bailey Bridges were sold for civilian use and the Baily Truss Bridge remains a popular design into the 21st century (Stantec 2017).

Word Count: 145

Suggested Photographs:

Plate 27: Personnel of the 18th Field Company, Royal Canadian Engineers, constructing a Bailey Truss Bridge in the Netherlands in 1945 (Library and Archives Canada 1945)

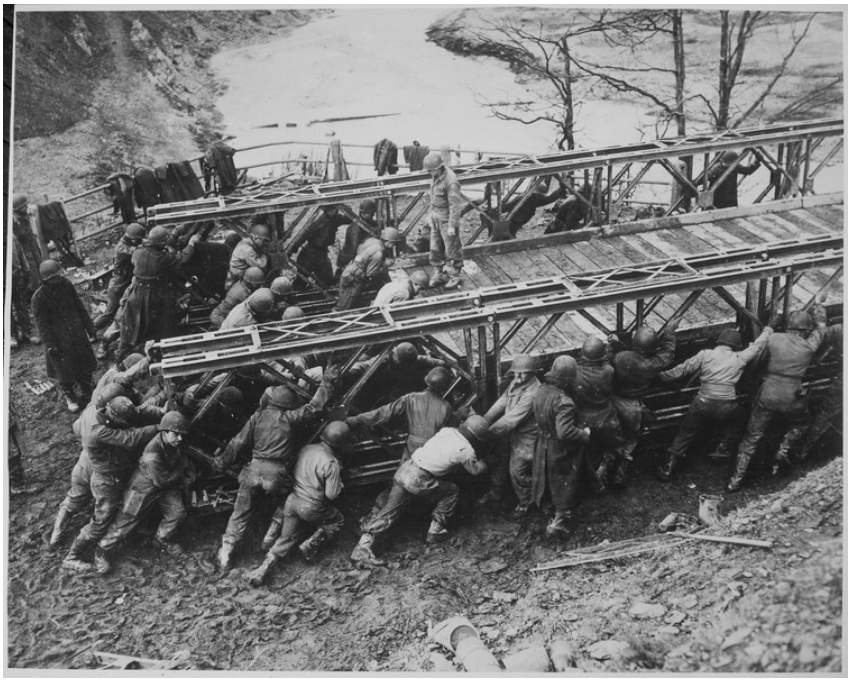


Plate 28: American engineers erecting a Bailey Truss Bridge during the Second World War (United States National Archives 2021)

Plate 29: An armoured vehicle of the 12th Manitoba Dragoons crosses a Bailey Bridge in France in 1944 (Library and Archives Canada 1944)

Plate 30: Donald Bailey with a model of the Bailey Truss Bridge in 1944 (Imperial War Museum 1944)

4.0 SALVAGE

Through the selective salvage of identified heritage attributes and other materials, the CHVI of the property can be retained, albeit in a different context. These salvaged materials can provide a tangible and physical link to the former Valley Inn Bridge and be used to facilitate the interpretation and commemoration of the Valley Inn Bridge. The following is a recommended list of identified heritage attributes to be salvaged, where feasible:

- Segments of modular panels with top and bottom chords, vertical, and diagonals.
- Segment of timber decking.
- Segment of transverse transoms.
- Segment of horizontal bracers.
- End posts.

The bridge segments to be salvaged should be determined based on estimated condition and age. Where possible, original segments of the bridge should be salvaged instead of components that may have been replaced or updated.

5.0 RECOMMENDATIONS

5.1 BLENDED COMMEMORATION APPROACH

The preferred approach is a blended commemoration approach that combines documentation, commemoration, and salvage to mitigate the impacts arising from the removal and replacement of the Valley Inn Bridge. Therefore, the following recommendations are made:

- The documentation report and the accompanying photo log and photos sent via FTP should be retained on file with the City and a copy should be deposited at the Local History and Archives Collection at the Hamilton Public Library. This will create a public record of the Valley Inn Road Bridge that will be accessible to the public.
- The blended commemoration approach should incorporate the display of the salvaged materials alongside the three interpretive panels prepared as part of this documentation report. The panels and salvaged components should be displayed near the original location of the bridge. As the Bailey Truss design is inherently modular, displaying a section or sections of salvaged modular panels will aid in the interpretation and understanding of the Bailey Truss Bridge design.

6.0 CLOSURE

This report has been prepared for the sole benefit of the City of Hamilton, and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Yours truly,

STANTEC CONSULTING LTD.

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Cell: (226) 927-3586
tracie.carmichael@stantec.com

7.0 REFERENCES

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References
May 14, 2021

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APPENDIX A
PHOTO LOG

Photo Log

The Photo Log accompanies an FTP link containing approximately 357 megabytes of data. The photo number indicated in the below table corresponds to the photo's file name on the disc. Photographs from the January 18, 2021 site visit are included and were taken using a Nikon D5300 at a size of 6,000 pixels by 4,000 pixels at 300 dots per inch.

Photo Number	Description
001	Looking west on Valley Inn Road to Valley Inn Bridge from east bridge approach
002	Looking west on Valley Inn Road to Valley Inn Bridge from east bridge approach (alternate view)
003	Looking north towards RBG lands and railway tracks from east bridge approach
004	Looking south towards Lake Ontario from east bridge approach
005	Looking west on Valley Inn Road to Valley Inn Bridge from east approach
006	Looking west at Valley Inn Bridge from east approach
007	Looking west at Valley Inn Bridge, showing railing and decking
008	Looking northwest at Valley Inn Bridge, showing railing, truss structure, abutments, and transoms
009	Looking northwest at Valley Inn Bridge, showing railing, truss structure, abutments, and transoms (alternate view)
010	Looking northwest at Valley Inn Bridge, showing railing, truss structure, abutments, and transoms (alternate view)
011	Looking northwest at truss superstructure, showing modular panels and transoms
012	Looking northwest at Valley Inn Bridge, showing railing, truss structure, abutments, and transoms (alternate view)
013	Looking southwest at Valley Inn Bridge showing railing, truss structure, transoms, and abutments
014	Looking southwest at Valley Inn Bridge showing railing, truss structure, transoms, and abutments (alternate view)
015	Looking west at Valley Inn Bridge showing timber decking and railing
016	Looking southwest at Valley Inn Bridge, showing truss superstructure, transoms, and abutments (alternate view)
017	Looking southwest at closeup of transom
018	Looking southwest at Valley Inn Bridge showing railing, truss structure, transoms, and abutments (alternate view)
019	Looking south showing end post and truss structure
020	Looking south showing modular panels and end post
021	Looking southwest at Valley Inn Bridge from Spring Gardens Road
022	Looking southwest at Valley Inn Bridge from Spring Gardens Road (alternate view)
023	Looking southwest at Valley Inn Bridge from Spring Gardens Road (alternate view)
024	Looking southwest at Valley Inn Bridge from Spring Gardens Road (alternate view)
025	Looking south down Spring Gardens Road from Valley Inn Road intersection
026	Looking northwest at Valley Inn Bridge from Spring Gardens Road (alternate view)
027	Looking northwest at Valley Inn Bridge from Spring Gardens Road (alternate view)
028	Looking north towards Valley Inn Bridge from Valley Inn Road, west approach

Photo Number	Description
029	Looking northeast towards Valley Inn bridge from Valley Inn Road, west approach
030	Looking northeast towards Valley Inn Bridge from west approach (alternate view)
031	Valley Inn Bridge, looking east, showing timber decking and railings
032	Valley Inn Bridge, looking east at west approach
033	Looking east at Valley Inn Bridge, showing timber decking, transoms, and railing
034	Looking east at Valley Inn Bridge showing timber decking and railing
035	Focus on timber decking on west end of bridge
036	Looking northeast at truss structure, transoms, and abutments
037	Looking northeast at truss structure, transoms, and abutments (alternate view)
038	Looking northeast at truss structure, transoms, and abutments (alternate view)
039	Looking east at horizontal bracing
040	Looking northeast at truss structure, transoms, and abutments (alternate view)
041	Looking north at modular panels (truss structure), transoms, and end posts
042	Focus on stone abutment on west side of bridge, looking north
043	Looking northeast at truss structure, transoms, and abutments (alternate view)
044	Looking northeast at underside of bridge
045	Looking northeast at truss structure, transoms, and abutments (alternate view)
046	Looking west from west approach
047	Looking southeast at truss structure, transoms, and abutments
048	Looking northeast at truss structure and abutments, showing modular panels (truss structure)
049	Focus on stone abutment on west end of bridge, looking south
050	Looking south at northwest end post
051	Looking southeast at modular panels (truss structure) and transoms
052	Looking southeast at truss structure, transoms, and abutments (alternate view)
053	Looking southeast at truss structure, transoms, and abutments (alternate view)
054	Looking southeast at truss structure, transoms, and abutments (alternate view)
055	Focus on transoms, looking southeast

APPENDIX B
Valley Inn Bridge Drawings

Hamilton

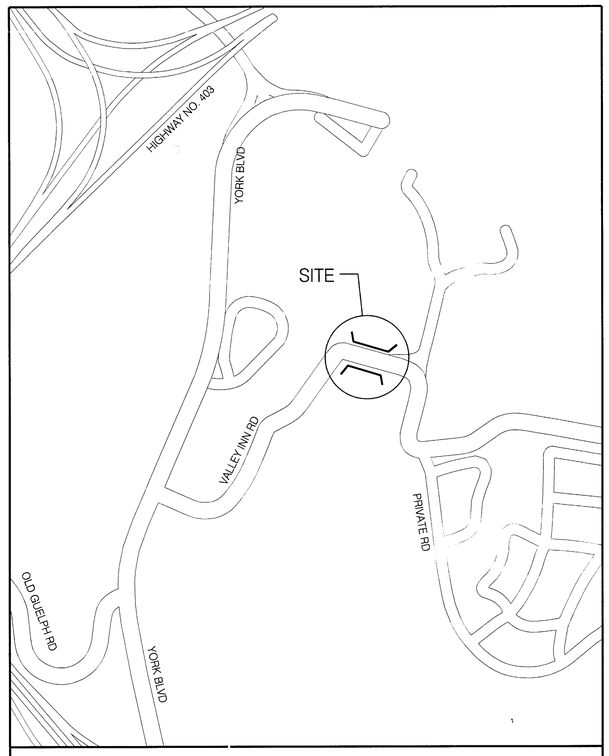
PUBLIC WORKS DEPARTMENT

General Manager, Peter M. Crockett, P. Eng.

Quotation No. Q6-03 (BR)

VALLEY INN ROAD BRIDGE No. 457
OVER GRINDSTONE CREEK

BRIDGE REHABILITATION



KEY PLAN
NTS

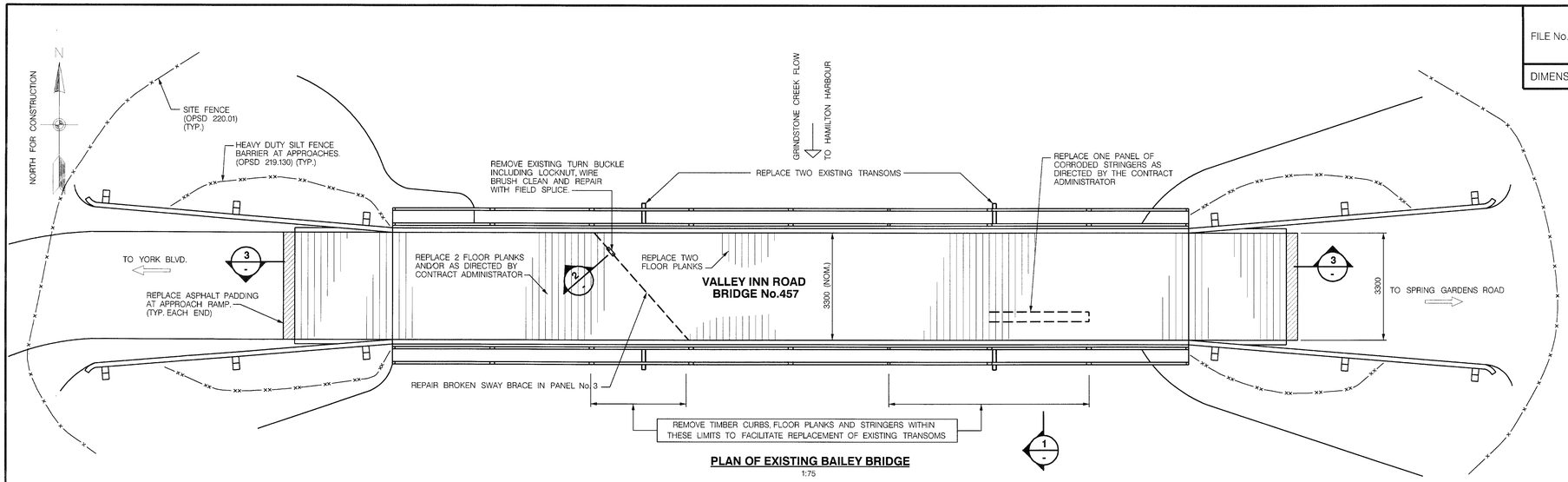
Issued for : Tender☐ Construction☐

Quotation No. Q6-03 (BR)

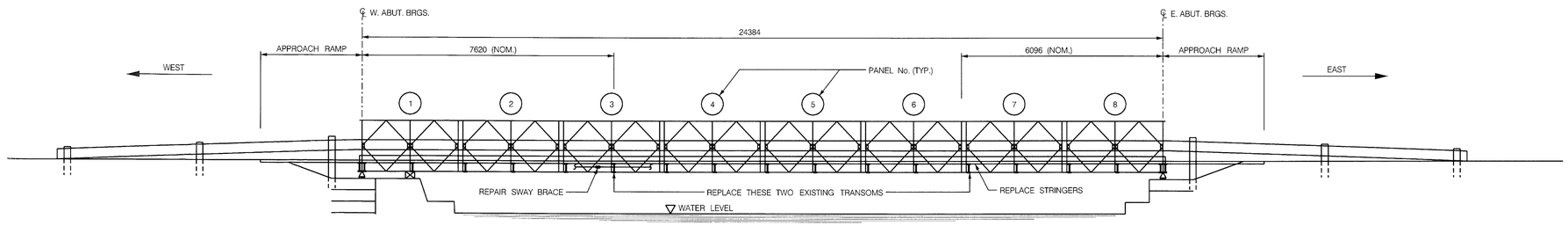
City of Hamilton

FILE No.	CONTRACT No. Q3-06(BR) ~~PW03-46 (BR)~~	SHEET No.
	DRAWING No. 03-M-10	1 OF 2

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED



PLAN OF EXISTING BAILEY BRIDGE
1:75



ELEVATION
1:75

GENERAL NOTES:

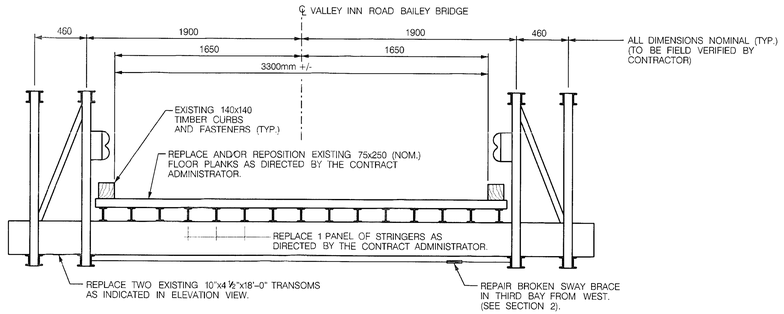
1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS OF THE EXISTING WORK ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE REPAIR WORK.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
3. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, WATER, ETC. DURING CONSTRUCTION OPERATIONS. CONTRACTOR'S METHOD OF PROTECTION SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF WORK.
4. DRAWINGS ARE NOT TO BE SCALED.
5. NEW DESIGNATED TIMBER DECK PLANKS SHALL BE SPF GRADE No.2 WITH THE TOP SURFACE UNFINISHED.
6. STRUCTURAL STEEL FOR THE PROPOSED SWAY BRACE SPLICE ANGLE REPAIR SHALL COMFORM TO CSA STANDARD CANCSA-G40.21–M92 OR ASTM SPECIFICATION A588 AND SHALL BE GRADE 350A.
7. THE BROKEN SWAY BRACE SHALL BE REPAIRED AS SHOWN OR REPLACED.

SCOPE OF WORK:

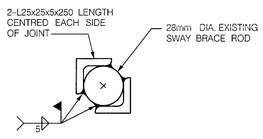
1. PLACE TRAFFIC SIGNS INCLUDING TEMPORARY BARRIERS AND SITE FENCE EACH SIDE OF BRIDGE TO ENABLE CLOSURE OF VALLEY INN ROAD TO VEHICULAR AND PEDESTRIAN TRAFFIC.
2. PLACE ENVIROMENTAL PROTECTION SYSTEM(S) AS REQUIRED.
3. TEMPORARILY REMOVE EXISTING TIMBER CURBS, FLOOR PLANKS AND STRINGERS FROM BAILEY BRIDGE AS SHOWN.
4. REPAIR BROKEN SWAY BRACE IN THIRD PANEL FROM WEST.
5. REPLACE TWO EXISTING TRANSOMS AND ONE PANEL OF STRINGERS AS INDICATED.
6. REPLACE SIX OF THE FLOOR PLANKS IN WORST CONDITION WITH NEW AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
7. REINSTALL EXISTING FLOOR PLANKS AND REINSTALL EXISTING TIMBER CURBS AND FASTENERS EACH SIDE.
8. REMOVE AND REPLACE EXISTING ASPHALT RAMPS AT APPROACHES EACH END OF BRIDGE.
9. REMOVE TEMPORARY TRAFFIC SIGNS, BARRIERS, SITE FENCE, ENVIRONMENTAL PROTECTION SYSTEM AND OPEN THE BRIDGE TO TRAFFIC.

LIST OF DRAWINGS:

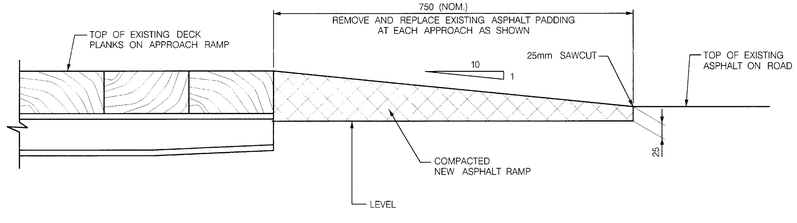
1. GENERAL ARRANGEMENT & REPAIR DETAILS
2. MISCELLANEOUS DETAILS



SECTION 1 / 1:25



SECTION 2 / 1:2



SECTION 3 / 1:5

No.	REVISIONS	INITIAL	DATE	DRAWN BY: A.K.L.	DATE: OCTOBER 28, 2003

SCALES
AS SHOWN

J. T. BROWN — S-N NO. — PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

J. T. BROWN — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO — 03.28.03

Manager of Construction
Jerry Parisotto, P. Eng.

Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
Transportation, Operations and Environment Department

VALLEY INN RD BRIDGE No. 457 OVER GRINDSTONE CREEK

BRIDGE REHABILITATION

GENERAL ARRANGEMENT AND REPAIR DETAILS

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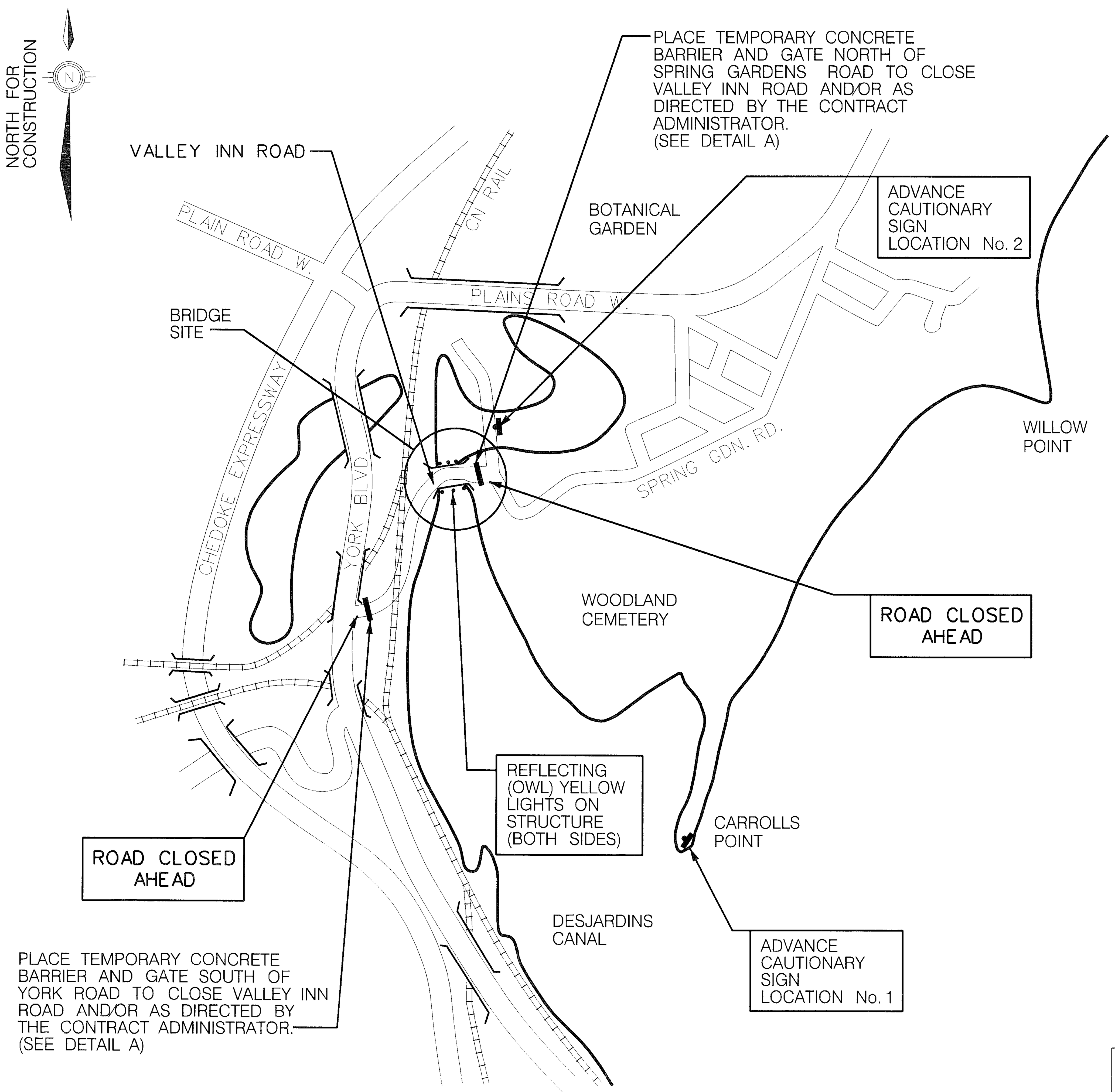
FILE No.	CONTRACT No. Q3-06(BR)	SHEET No.
	DRAWING No. 03-M-10	2 OF 2

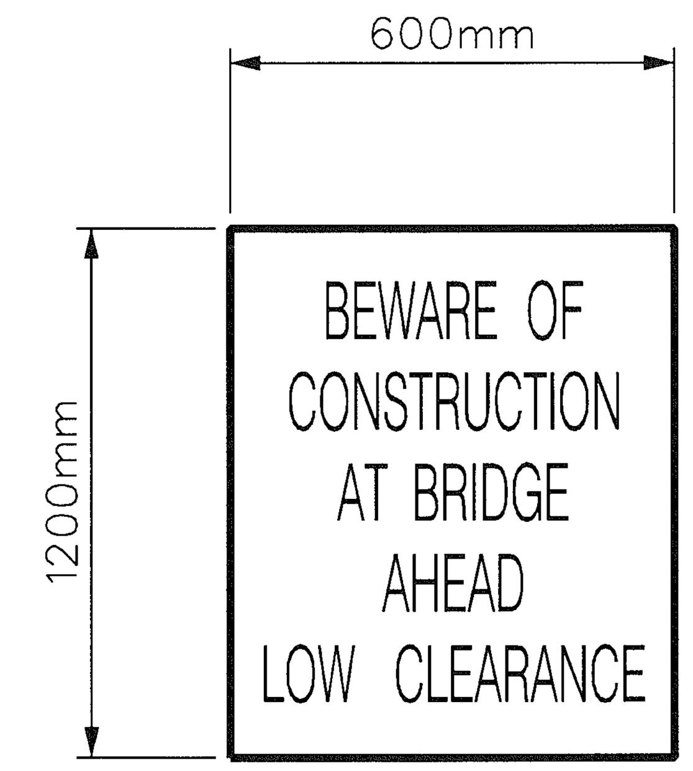
DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

NOTE

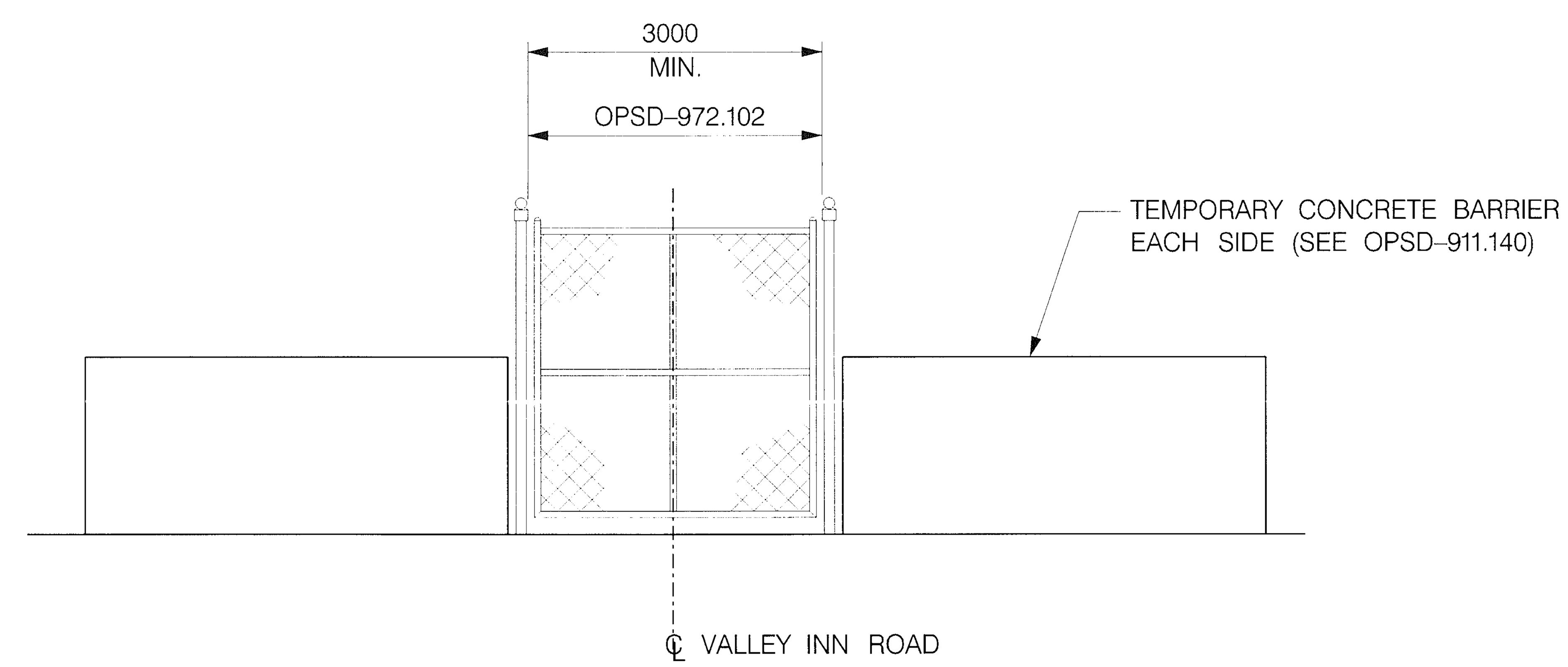
TEMPORARY SIGNING SHALL BE PROVIDED AND SHALL CONFORM TO THE MINISTRY OF ONTARIO TRAFFIC MANUAL (OTM), BOOK 7 – TEMPORARY CONDITIONS AND/OR AS SPECIFIED BY THE CITY OF HAMILTON.



PLAN OF VALLEY INN ROAD CLOSURE
N.T.S.



ADVANCE CAUTIONARY SIGN DETAILS
N.T.S.



DETAIL A
N.T.S.

APPLICABLE STANDARD DRAWINGS:

OPSD 911.140 GUIDERAIL SYSTEM, CONCRETE BARRIER
OPSD 972.102 FENCE, CHAIN LINK COMPONENT – GATE

No.	REVISIONS	INITIAL	DATE	DRAWN BY: A.K.L.	DATE: OCTOBER 28, 2003

SCALES
NOT TO SCALE

Manager of Construction
Jerry Parisotto, P. Eng.
Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
Transportation, Operations and Environment Department

VALLEY INN RD BRIDGE No. 457 OVER GRINDSTONE CREEK
BRIDGE REHABILITATION
MISCELLANEOUS DETAILS

i:\trans\proj\331375\500cad\Valley-misc.dgn
LEETO 2003-10-28 03:34:44 PM

LIST OF DRAWINGS

PLAN No.	SHEET No.	STREET NAME	DESCRIPTION
03-M-10	1	(BRIDGE REHABILITATION)	GENERAL ARRANGEMENT
	2		MISCELLANEOUS DETAILS

LEGEND

EXIST SEWER MANHOLE SMH
EXIST CATCH BASIN CB
EXIST DITCH INLET DI
EXIST DITCH OUTLET DO
EXIST DOUBLE CB DCB
EXIST STORM SEWER
EXIST SANITARY SEWER
EXIST COMBINED SEWER

EXIST FIRE HYDRANT HYD
EXIST WATER SERVICE VALVE SV
EXIST VALVE CHAMBER VC
EXSIT WATERMAIN

TRAFFIC HANDHOLE HH
TRAFFIC JUNCTION BOX TJB
TRAFFIC LIGHT TL
TRAFFIC MANHOLE TMH
TRAFFIC PARKING METER PM
TRAFFIC DOUBLE METER DPM
TRAFFIC DUCT

EXIST GAS VALVE GASVLV
EXIST GASMAIN

EXIST BELL MANHOLE BMH
EXIST BELL PHONE BOOTH PHONE
EXIST BELL PEDESTAL PED
EXIST BELL CONDUIT

EXIST HYDRO MANHOLE HMH
EXIST HYDRO VAULT HYV
EXIST HYDRO CONDUIT

COAX UTILITY

ROAD SIGN RDS
POLES BP UP CHP ULS WHP

RAILROAD CROSSING SIGN RXR
RAILROAD TRACKS

PAVING STONE PS
CONCRETE C
ASPHALT A
GRAVEL G
CONCRETE CURB CC
WOOD TIES WT
COMBINED WALK & CURB C W&C
BOULEVARD BLVD
RETAINING WALL RW

FULL SIDEWALK RECONSTRUCTION

SIDEWALK REPAIR ONLY

SIDEWALK TO REMAIN AS PER FIELD DECISION BY ENGINEER PRIOR TO CONSTRUCTION

ARROWS AT RADII INDICATE WHEELCHAIR RAMP LOCATIONS AND DIRECTION

LIMIT OF CONSTRUCTION

GENERAL NOTES

Roadway Construction

1) All gutter grades shall be 0.75% min slope to catch basins.

2) Radii to be improved where possible, up to 9 meters maximum where there is sufficient property. Contractor to verify property lines for improvements with the City of Hamilton prior to construction.

3) Contractor shall co-ordinate the removal and reinstallation of existing parking meters and/or street signs with the City of Hamilton Traffic Department.

4) Approaches on Arterial Roads:
-All residential approaches to be min 5.0m wide at curb line and all commercial approaches to be min 7.50m wide at curb line

-All apron approaches shall not exceed a maximum slope of 8.0% toward the road.

5) All driveway repairs shall have a minimum slope of 2.0% toward the road.

6) Traffic Duct Information
-Cap ends of all unused ducts
-Install ducts under sidewalk only if sidewalk is to be reconstructed.
-Leave fish rope in all ducts.

7) Road Cross Fall for Arterial Roads
-At all arterial cross streets, cross fall shall be 1.0%
-At all local cross streets cross fall shall be 2.0%

8) Curb Face Height When False Grading
-Min curb face height shall be 100mm
-Max curb face height shall be 180mm

Watermain Construction

1) Watermain to be tested prior to connection to existing watermains using temporary caps or plugs. Pipe closures where required to be supplied by contractor. A reduced pressure zone backflow preventer according to the following sizing is required on temporary supply lines used for filling and flushing of watermains :

Watts Series 009 (16 to 50mm dia.)
Watts Series 909 (75 to 200mm dia.)
Hersey FRP II (19 to 50mm dia.)
Hersey 6CM (75 to 100mm dia.)

2) Contractor to supply and install all adaptor pieces if required in order to connect to existing watermains.

3) Where "Hyprotec" watermains are specified all new closure pipe, sleeves and hydrant leads shall be 'Hyprotec' pipe.

4) Minimum 1.60m cover over proposed watermain (unless otherwise noted).

5) Replace all existing water services having diameter less than 19mm with 19mm dia Type 'K' soft copper water service as per RWS-700, sheet 2.

Replace all existing alloy water services of diameter greater than or equal to 19mm with Type 'K' soft copper water service of same diameter as per RWS-700, sheet 2 or RWS-701.

Reconnect all remaining existing water services to the proposed watermain. (38mm or 50mm connection as per OPSD 1104.02 with approved tapping saddle).

6) Where proposed watermain crosses an existing watermain, plug the abandoned watermain, (ie. points of disconnection, hydrant and valve removals etc.) with a minimum 300mm length of concrete.

7) Install all untested watermain joints with restrained joints, "Ebba Megalug" or approved equivalent.

8) Contractor to supply 100mm and 50mm temporary by-pass piping and temporary hydrants (where required).

9) Watermain Deflection - Maximum allowable per joint in accordance with RHW Specifications Manual (see OPSS Ammendments Volume 1)

Sewer Construction

1) Denotes basement elevations north/east side of street

2) Denotes basement elevations south/west side of street

3) All existing sanitary drains are to be connected to proposed sanitary sewer.

All existing and proposed storm drains and catch-basin leads are to be connected to proposed storm sewer.

4) 'D' - denotes 150mm dia junction and riser unless otherwise noted.

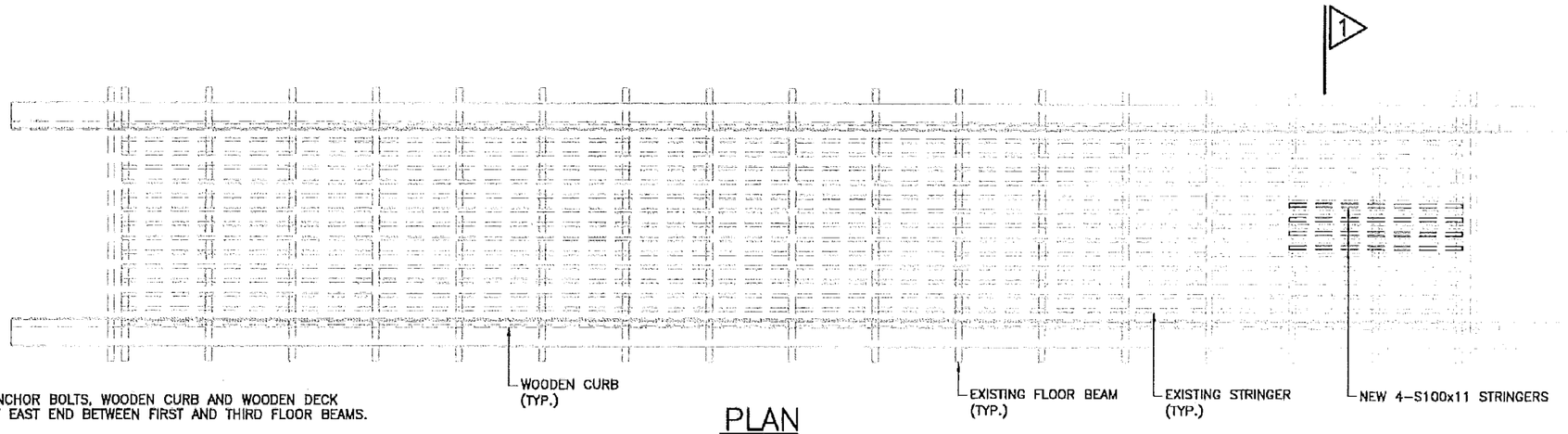
Q3-06(BR)
PW-03-46 (BR)
Contract No.

BRIDGE 457 – Valley Inn Road – BRIDGE REPAIR

Contract No. C13-23-13

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED	CONTRACT No. C13-23-13 DRAWING No. 15-M-27	SHEET No. S1 OF 1

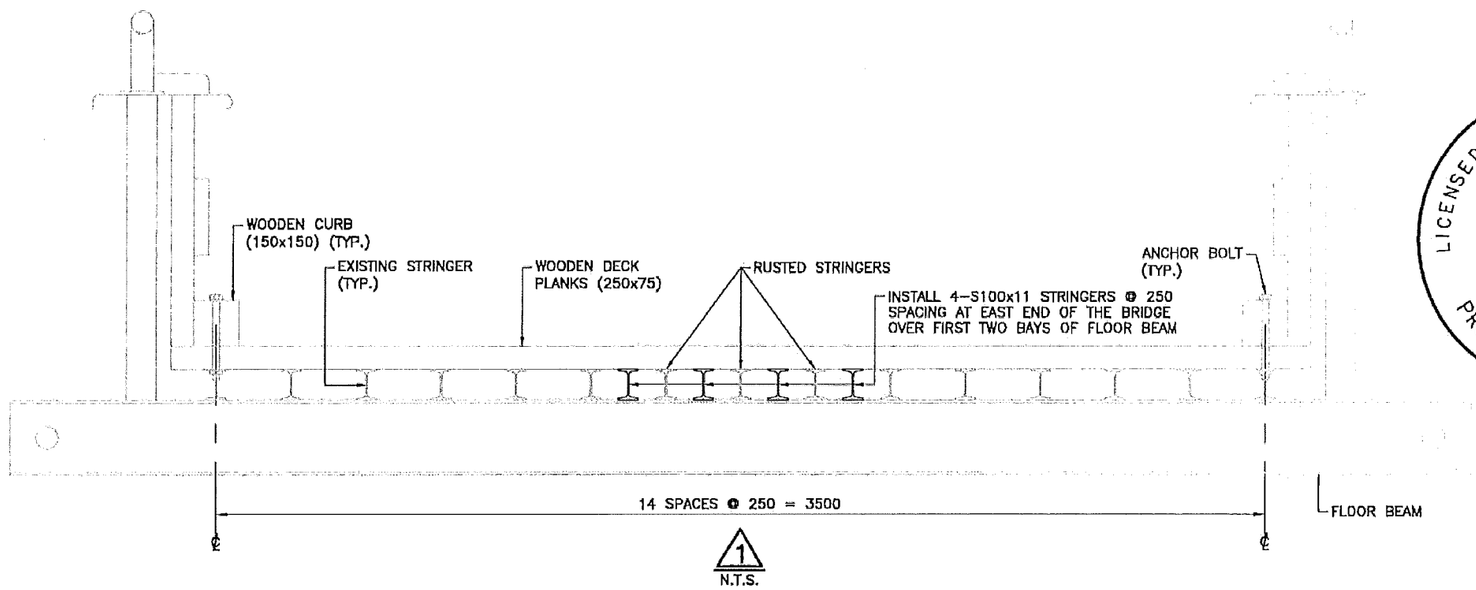
CONSTRUCTION NORTH



PLAN
N.T.S.

NOTES:

1. REMOVE ANCHOR BOLTS, WOODEN CURB AND WOODEN DECK PLANKS AT EAST END BETWEEN FIRST AND THIRD FLOOR BEAMS.
2. PLACE TOTAL FOUR (4) NEW 3200mm LONG S100x11I–BEAM AS SHOWN IN THE SKETCH.
3. INSTALL REMOVED WOODEN DECK PLANKS, WOODEN CURB AND ANCHOR BOLTS AT THE ORIGINAL LOCATION.



LICENSED PROFESSIONAL ENGINEER
J. K. NAIK
100114853
July 27/15
PROVINCE OF ONTARIO

No.	REVISIONS	INITIAL	DATE
0	ISSUED FOR PERMIT & CONSTRUCTION	KT	JULY 2015

DRAWN BY: | DATE:
REFERENCE MATERIAL:
Geodetic Bench Mark Index No. Elevation=
Borehole Report –

DESIGN: J.N.
DRAWN: W.A.

MMM GROUP

Project Manager – Structures
Rafael Sandoval, P.Eng.
Manager of Capital Rehab & Tech Ops
Brian Hughes, P. Eng.

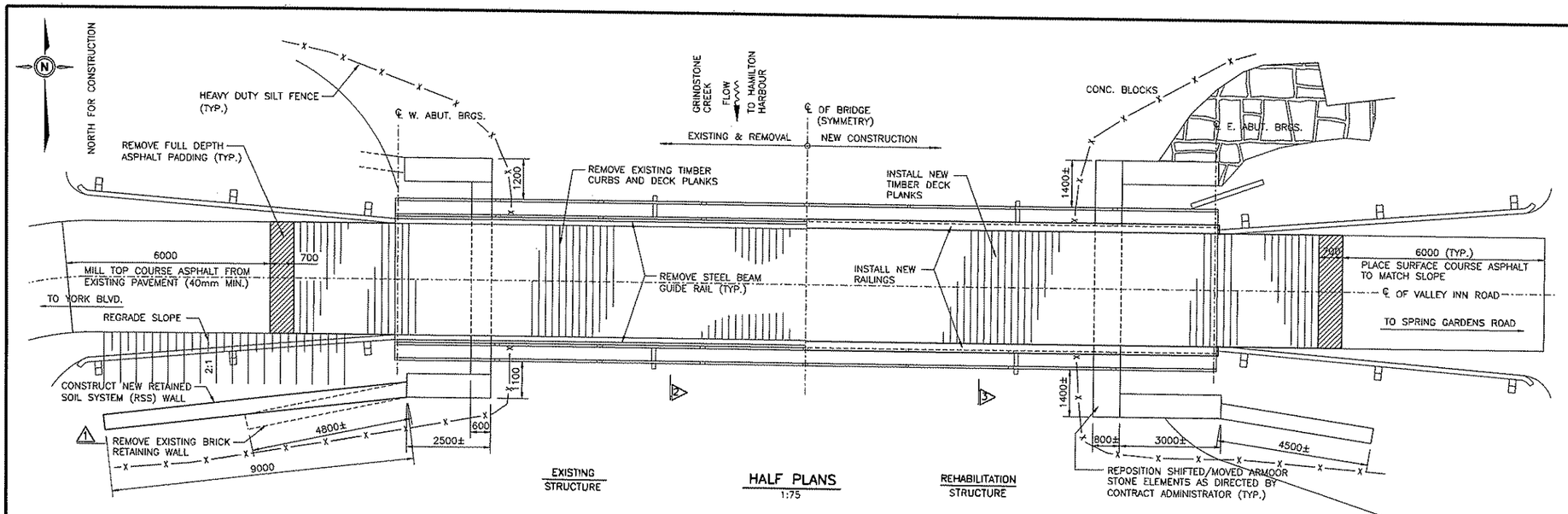
CITY OF HAMILTON
Public Works Department

BRIDGE 457 – VALLEY INN ROAD
BRIDGE REPAIR
STRINGER REPAIR DETAIL

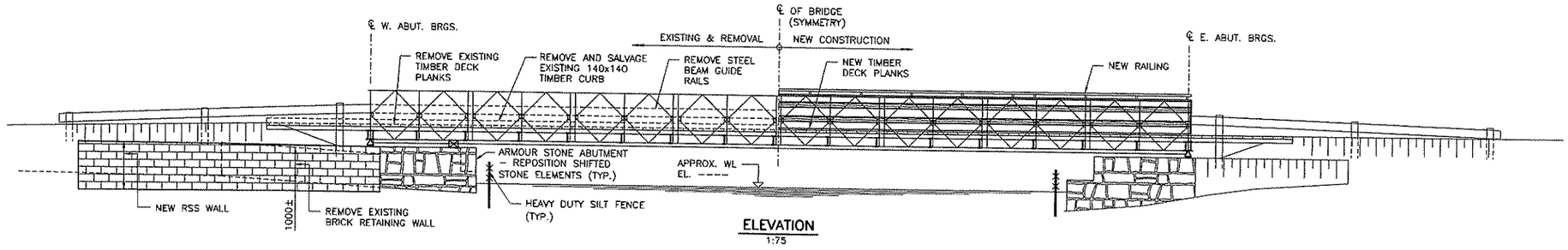
VALLEY INN ROAD
(Bridge 457)

FILE No.	CONTRACT No. PW-07-00 (H) DRAWING No. -	SHEET No. 1 OF 3

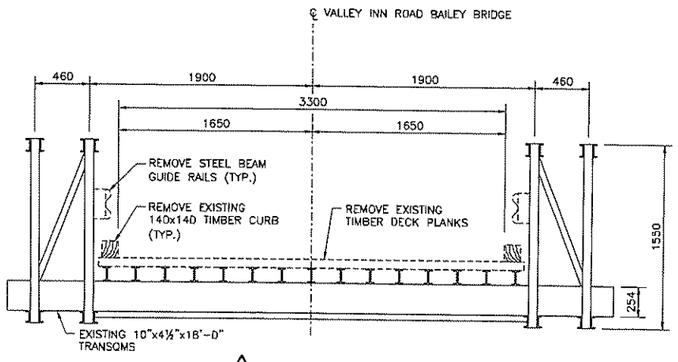
DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED



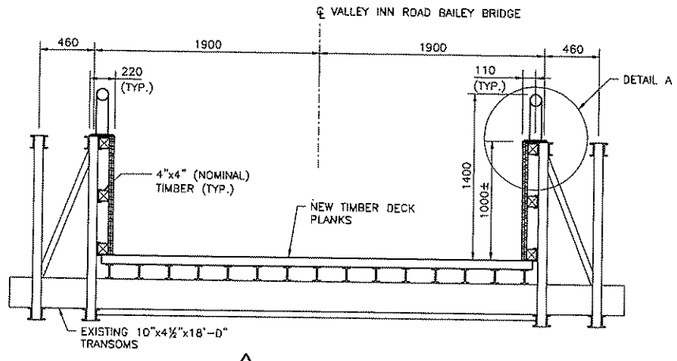
HALF PLANS
1:75



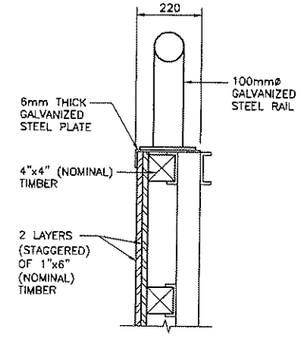
ELEVATION
1:75



2 EXISTING & REMOVAL
1:25



3 REHABILITATION
1:25



DETAIL A
1:10

GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS OF THE EXISTING WORK ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE REPAIR WORK.
2. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, WATER, ETC. DURING CONSTRUCTION OPERATIONS. CONTRACTOR'S METHOD OF PROTECTION SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF WORK.
3. DRAWINGS ARE NOT TO BE SCALED.
4. NEW TIMBER DECK PLANKS SHALL BE SPF GRADE No.2 WITH THE TOP SURFACE UNFINISHED.

SCOPE OF WORK:

1. PLACE TRAFFIC SIGNS INCLUDING TEMPORARY BARRIERS AND SITE FENCE EACH SIDE OF BRIDGE TO ENABLE CLOSURE OF VALLEY INN ROAD TO VEHICULAR AND PEDESTRIAN TRAFFIC.
2. PLACE ENVIROMENTAL PROTECTION SYSTEM(S) AS REQUIRED.
3. REMOVE EXISTING TIMBER CURBS ON BAILEY BRIDGE AS SHOWN.
4. REMOVE EXISTING TIMBER PLANKS ON BAILEY BRIDGE.
5. INSTALL NEW TIMBER DECK PLANKS.
6. INSTALL NEW TIMBER BEAMS, WALLS AND GALVANIZED STEEL PLATES COMPLETE WITH RAILINGS.
7. REMOVE AND REPLACE EXISTING ASPHALT RAMPS AT APPROACHES EACH END OF BRIDGE.
8. REMOVE TEMPORARY TRAFFIC SIGNS, BARRIERS, SITE FENCE, ENVIRONMENTAL PROTECTION SYSTEM AND OPEN THE BRIDGE TO TRAFFIC.

LIST OF DRAWINGS:

1. GENERAL ARRANGEMENT
2. RETAINING WALL DETAILS
3. RAILING AND MISCELLANEOUS DETAILS

No.	REVISIONS	INITIAL	DATE

DRAWN BY: M.WU
DATE: DECEMBER, 2008

SCALES
AS SHOWN

LICENSED PROFESSIONAL ENGINEER — M. ASANTE-MANSO — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — S. V. TENG — 100056210 — PROVINCE OF ONTARIO

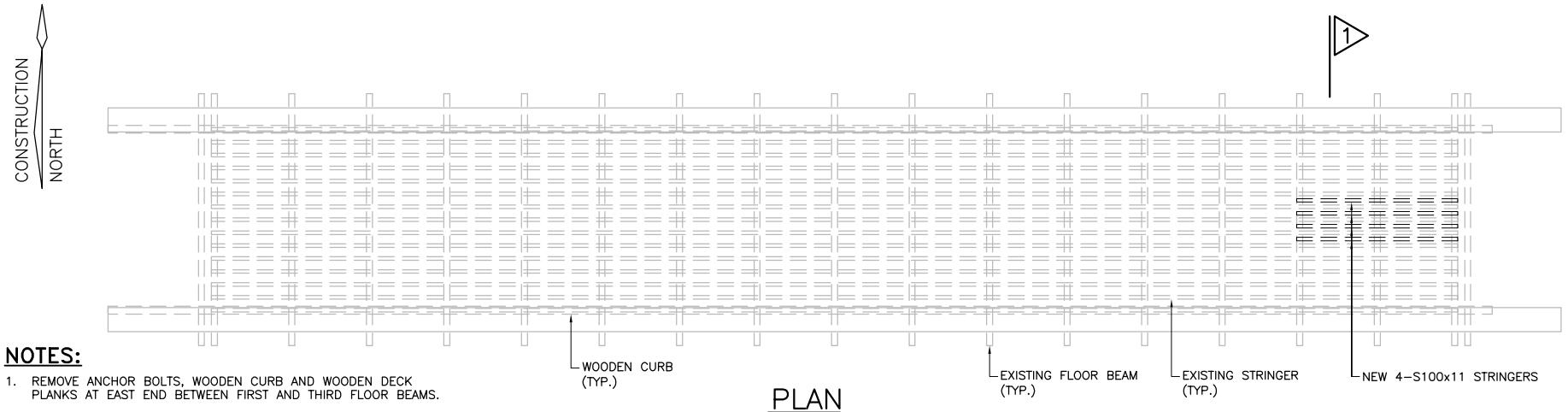
Manager of Construction
Jerry Parisotto, P. Eng.
Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
Public Works Department

CONSULTANT
SNC·LAVALIN

VALLEY INN ROAD
OVER GRINDSTONE CREEK (Bridge 457)
Bridge Rehabilitation
GENERAL ARRANGEMENT

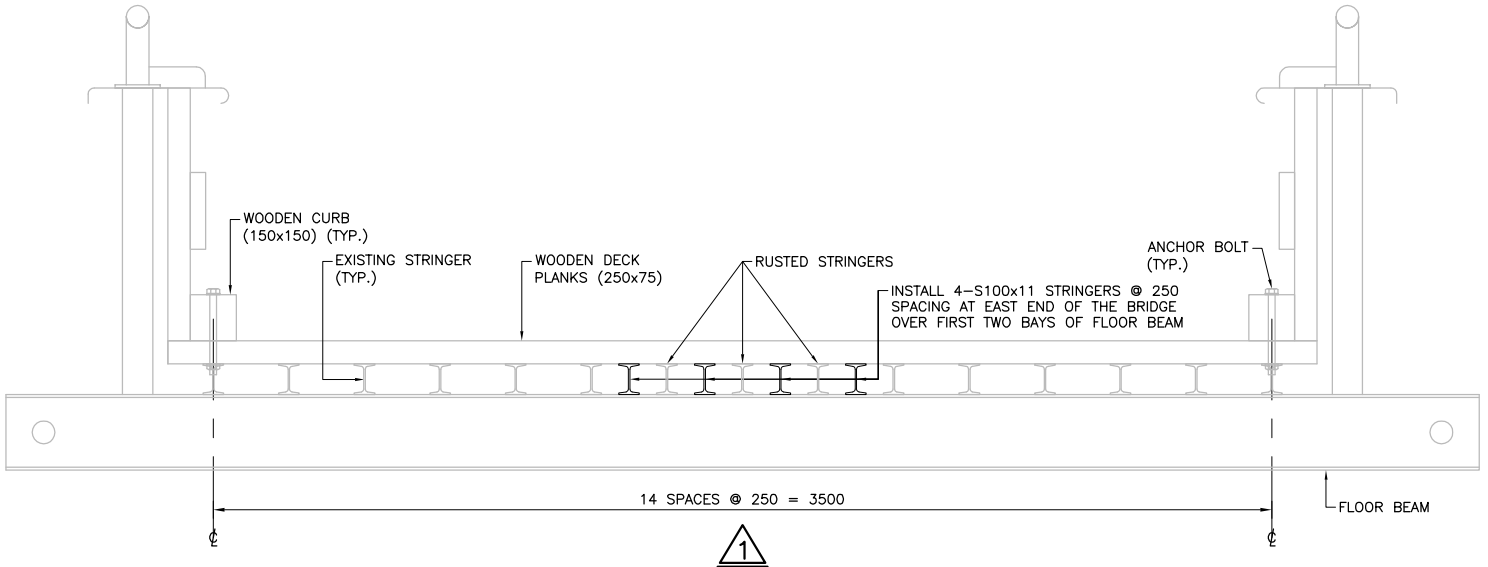
P:\33160\Trans\1000-Structure



PLAN
N.T.S.

NOTES:

1. REMOVE ANCHOR BOLTS, WOODEN CURB AND WOODEN DECK PLANKS AT EAST END BETWEEN FIRST AND THIRD FLOOR BEAMS.
2. PLACE TOTAL FOUR (4) NEW 3200mm LONG S100x11I–BEAM AS SHOWN IN THE SKETCH.
3. INSTALL REMOVED WOODEN DECK PLANKS, WOODEN CURB AND ANCHOR BOLTS AT THE ORIGINAL LOCATION.



1
N.T.S.

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MMM GROUP

DESIGN: J.N.	VALLEY INN ROAD BRIDGE **CITY OF HAMILTON**	DATE: JUL/15
DRAWN: W.A.	**STRINGER REPAIR DETAIL**	DRAWING: SK–01