Final

ArcelorMittal Dofasco Kenilworth Avenue Boat Slip Remediation Project

Project Description

Prepared for
ArcelorMittal Dofasco

August 2015

CH2MHILL®
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Acronyms and Abbreviations

-	not applicable
’	minute
”	second
°	degree
µg/g	microgram per gram
ANSI	Area of Natural and Scientific Interest
AOC	area of concern
Boat Slip	Kenilworth Avenue Boat Slip
CEAA	Canadian Environmental Assessment Agency
CEAA 2012	*Canadian Environmental Assessment Act*
CH2M HILL	CH2M HILL Canada Limited
cm	centimetre
CSO	combined sewer outfall
DFO	Fisheries and Oceans Canada
EA	environmental assessment
EC	Environment Canada
ECA	Engineered Containment Area
ha	hectare
Harbour	Hamilton Harbour
km	kilometre
km^2	square kilometre
LEL	lowest effect level
m	metre
mm	millimetre
m^2	square metre
m^3	cubic metre
m^3/h	cubic metre per hour
MNR	Ontario Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
MOECC	now the Ontario Ministry of Environment and Climate Change
N	north
NPA	*Navigation Protection Act*
NPP	Navigation Protection Program

O&M	operations and maintenance
O. Reg.	Ontario Regulation
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
ppb	part per billion
ppm	part per million
Project	proposed ArcelorMittal Dofasco Boat Slip Remediation Project
RAP	Remedial Action Plan
SEL	severe effect level
site	1130 Burlington St. E, Hamilton, Ontario
St.	Street
TC	Transport Canada
TCLP	toxicity characteristic leaching procedure
U.S.	United States
W	west

SECTION 1

General Information and Contact(s)

1.1 Nature of the Proposed Project

ArcelorMittal Dofasco is proposing to proceed with the remediation of the Kenilworth Avenue Boat Slip (Boat Slip), which is located adjacent to Piers 20 and 21 (Figure 1) at 1495 Burlington Street (St.) E, Hamilton, Ontario (site). Remediation and enhancement of environmental conditions within the Boat Slip would assist in delisting Hamilton Harbour (Harbour) as one of 43 areas of concern (AOCs) identified as per the 1978 amended *Great Lakes Water Quality Agreement* between Canada and the United States (U.S.) as amended in 2012.

The Boat Slip is currently located on ArcelorMittal Dofasco property along the southern shore of the Harbour. The facility has been in operation since the 1950s, and the majority of the waterfront area has been modified and expanded through infilling to support site activities. The Boat Slip is actively used from April to December in any given year by bulk carriers to transport materials, including coal and iron ore concentrates, throughout and beyond the Great Lakes. Historical practices at the site have led to the Boat Slip sediments containing elevated concentrations of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and metals.

The proposed ArcelorMittal Dofasco Boat Slip Remediation Project (Project) will involve the following activities to address the elevated concentrations of sediment measured within the Boat Slip:

- The construction of an Engineered Containment Area (ECA) along the eastern shoreline of the Boat Slip to encapsulate the majority of PAH- and metals-contaminated sediment.
- Installation and operation of a mobile, temporary water treatment system that will be set up onsite to manage water generated during the dredging.
- The encapsulation of sediments within the Boat Slip containing PCBs greater than 50 micrograms per gram (µg/g) using an engineered cap.
- The relocation of sediments with concentrations of total PAHs exceeding 100 µg/g outside of the ECA footprint into the ECA; the volume of sediments to be relocated are estimated to be less than 40,000 cubic metres (m^3). Sediments found to have naphthalene exceeding 100 µg/g will be transported off-site for disposal as hazardous waste. Sediments with total PAH concentrations less than 100 µg/g will remain in place and will not be dredged.
- Placement of a sand cap over the areas that have been dredged to manage post-dredge residual contamination.
- Long-term monitoring of the ECA to confirm that it continues to function as designed.

The following Project Description has been prepared in accordance with the *Canadian Environmental Assessment Act* (CEAA 2012) and in support of this proposed remediation Project.

1.2 Proponent Information

1.2.1 Name of Designated Project

The name of the Project for the purposes of this Project Description is the “ArcelorMittal Dofasco Boat Slip Remediation Project.”

1.2.2 Name of Proponent

ArcelorMittal Dofasco is currently the sole proponent for the Project.

1.2.3 Address of the Proponent

The Address of the Proponent is:

ArcelorMittal Dofasco
1330 Burlington St. E.
Ontario, Canada
L8N 3J5

1.2.4 Chief Executive Officer

The President and Chief Executive Officer of ArcelorMittal Dofasco is Sean Donnelly.

1.2.5 Principal Contact Person

The proponent contact information for the ArcelorMittal Dofasco Boat Slip Remediation Project is:

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1.3 Project Description Consultation

The following list identifies parties that were consulted during the preparation of the Project Description:

- Canadian Environmental Assessment Agency (CEAA)
- Fisheries and Oceans Canada (DFO)
- Environment Canada (EC)
- Ontario Ministry of the Environment (MOE), now the Ontario Ministry of Environment and Climate Change (MOECC)

Initial consultations with regulatory agencies began in 2009. On September 22, 2010, a work plan was provided to the MOE and CEAA, which detailed a proposed scope of work to carry out geotechnical and geoenvironmental sampling within the Boat Slip. Feedback on this work plan was received from both the MOE and EC, and consolidated feedback was received in an email from Sarah Day/MOE on October 20, 2010. Based on this feedback, the proposed sampling work plan was revised (resubmitted to both CEAA and the MOE on January 11, 2011), and as discussed in greater detail (Section 1.5), the geotechnical and geoenvironmental sampling work was completed in 2011. The results of this sampling work were summarized in the report entitled: *Geotechnical/Geo-environmental Investigation Kenilworth Boat Slip*, which was provided to CEAA and the MOE on August 12, 2011.

Based on the results of this report, a meeting was held on January 12, 2012, at the Canadian Centre for Inland Waters with the regulatory agencies likely to be involved in the Project, including the MOE, EC, CEAA, and DFO. Following this meeting, in 2013, CH2M HILL prepared an additional sampling plan entitled *ArcelorMittal Dofasco Kenilworth Street Boat Slip Supplemental Investigation Work Plan,* which was intended to better characterize the vertical and horizontal extent of PCBs, PAHs, and metals within the Boat Slip. Comments on the additional sampling plan were received from the MOE March 11, 2013, and from EC on March 13, 2013. These were incorporated into an amended sampling plan, which CH2M HILL sent out on March 15, 2013. Both the MOE and EC responded on March 18, 2013, acknowledging receipt of the amended sampling plan. This work was carried out between March 28 and April 15, 2013, and CH2M HILL submitted the final report entitled *ArcelorMittal Dofasco Kenilworth Boat Slip 2013 Sediment Sampling Results* to CEAA and EC on August 22, 2013.

A letter was sent from ArcelorMittal Dofasco to CEAA on May 22, 2014, detailing the Project as it is currently proposed. Several discussions ensued, and on September 8, a letter was received from CEAA that indicated at least one component of the Project meets the definition of “hazardous waste” in Section 1 of the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. As a result, ArcelorMittal Dofasco must provide CEAA with a Project Description that meets the requirements of the *Prescribed Information for a Description of a Designated Project Regulations* if the Project is to proceed. The Project Description (contained herein) will be reviewed by Agency Officials and other parties, including Aboriginal peoples and the public, to determine environmental assessment (EA) applicability.

1.4 Federal and Provincial Environmental Assessment and Regulatory Requirements

1.4.1 Federal Involvement

This Project Description is being submitted to determine whether an EA is required and if so, what Agency involvement is necessary.

1.4.1.1 Federal Financial Support

ArcelorMittal Dofasco is the sole proponent for the proposed Project. There is currently no federal financial assistance being provided to, or being sought by, the proponent to enable the Project to proceed.

1.4.1.2 Federal Lands

The remediation will be completed within ArcelorMittal Dofasco property. ArcelorMittal Dofasco owns the Boat Slip/waterlot as well as the adjacent lands to the east, west and south. As such, no part of the Project is anticipated to involve federal lands. It is noted that the Hamilton Port Authority (a federal Authority) owns the waterlot north of the Boat Slip (Figure 2). As shown on this figure, it is anticipated that the HPA waterlot is located approximately 450 m away from the northern limit of dredging within the Boat Slip. It is not anticipated that this Project will have an appreciable effect on Federal Lands because dredging and sediment placement is occurring within the southernmost portion of the Boat Slip and a barrier will be installed to prevent the migration of sediments outside of the Boat Slip.

1.4.1.3 Federal Environmental Assessment and Regulatory Requirements

CEAA 2012

According to the CEAA 2012, at least one component of the Project meets the definition of "hazardous waste" in Section 1 of the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. Two chemicals were measured at levels exceeding their respective criteria; therefore, would be designated as hazardous wastes. PCBs were measured at concentrations greater than 50 µg/g, and total naphthalene was measured at levels greater than 100 µg/g. Note that the MOECC however, does not consider naphthalene at the concentrations measured in the Boat Slip to be hazardous wastes.

As described in Section 2, all sediments containing PCBs greater than 50 µg/g will remain in place and will be covered by an engineered cap. The engineered cap is intended to provide physical isolation of the contaminated sediment sufficient to reduce exposure due to direct contact, and also reduce the ability of burrowing organisms to move contaminants to the surface (bioturbation). It will be designed to minimize potential erosion of the cap, which will reduce the potential for resuspension and transport of contaminated sediments.

The CEAA 2012 was reviewed for this Project in consultation with the CEAA and EC. Section 29 of the Schedule under the Regulations Designating Physical Activities indicates that "the construction, operation, decommissioning and abandonment of a new facility used exclusively for the treatment, incineration, disposal or recycling of hazardous waste" triggers the application of the CEAA 2012. The proposed remedial strategy for this Project involves the in situ encapsulation of the sediments containing PCBs greater than 50 µg/g. With respect to naphthalene, the ECA will be constructed such that its footprint will be located overtop of the majority of sediments containing naphthalene with concentrations over 100 µg/g. Sediment from areas outside of the ECA where preliminary investigations indicated that naphthalene may be at concentrations over 100 µg/g will be dredged and segregated from other dredged sediments for additional testing. It is likely that the sediments from these areas will temporarily be placed onto a barge within the Boat Slip. Additional chemical analyses will be completed on these sediments and the concentrations of naphthalene determined. If in fact, the sediments possess naphthalene concentrations over 100 µg/g, they will be dewatered for off-site disposal as a hazardous waste and transferred to an appropriately licensed landfill. If the sediments are determined to possess naphthalene concentrations below 100 µg/g, they will be placed within the ECA either by a mechanical dredge or hydraulically. The sediments placed within the ECA will be covered with an engineered cap. The combination of the sheet pile used to construct the ECA and the engineered cap placed on top of the sediments will provide physical isolation of the sediments from the environment. After construction of the ECA, a long-term monitoring program will be implemented to ensure that it is functioning as designed.

Fisheries and Oceans Canada

The Federal Minister of the DFO has the legislative responsibility for the administration and enforcement of the *Fisheries Act*. The *Fisheries Act* protects and conserves fish and fish habitats, and has the power to deal with damage to fish habitat, destruction of fish, obstruction of fish passage, necessary flow requirements for fish, and the control of deleterious substances. Any proposed works and activities that may alter or damage

fish habitat must be reviewed and authorized by the DFO. The Conservation Authorities have agreements with DFO in the evaluation and processing of applications; therefore, they would also have to be consulted. Conservation Authority involvement is discussed under the Provincial Agencies section in this document. DFO also has requirements under the *Species at Risk Act* for fish species.

DFO has been consulted on this Project since 2009. Though the *Fisheries Act* was amended in 2012, it is still expected that DFO will be involved in the Project.

Environment Canada and Canadian Wildlife Services

Several acts administered by EC may apply to the Project, including the *Federal Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulation*, as already noted, the Federal *Species at Risk Act*, and the *Migratory Birds Act*. As such, EC Project review and approval may be required.

Transport Canada

The *Navigation Protection Act* (NPA) is an Act of Parliament that authorizes and regulates interferences with the public right of navigation. A primary purpose of the NPA is to regulate works and obstructions that risk interfering with navigation in the navigable waters listed in the schedule to the act. A work, for purposes of the NPA, is anything, whether temporary or permanent, that is made by humans, and that is in, on, over, under, though, or across any navigable water in Canada. Transport Canada (TC) administers the NPA through the Navigation Protection Program (NPP). Based on the nature of this Project, the Minister (of Transport) will have to be notified and an approval obtained through the NPP.

1.4.2 Provincial Involvement

The MOECC will have regulatory involvement in the Project. Though the Harbour is a federally regulated waterbody, and as such, provincial regulatory approvals are not usually required, marine construction projects typically have to be approved by the MOECC under the *Environmental Protection Act* and the *Ontario Water Resources Act*. For example, a Permit to Take Water under the *Ontario Water Resources Act* is required for any project that involves the taking or diversion of water. The *Environmental Protection Act* must also be considered due to the potential for adverse effects as a result of the presence of chemicals in sediment above regulatory guidelines and the use and placement of fill materials in an ECA. A Provincial Environmental Compliance Approval will likely also be required for the ECA.

The Hamilton Conservation Authority will be involved in the Project, as they regulate development in the area through the *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses: Regulation 161/06* under Ontario Regulation (O. Reg.) 97/04. Conservation Authorities have agreements with the DFO to assist in *Fisheries Act* project reviews.

Given the nature of the Project and that the area surrounding the ArcelorMittal Dofasco property is zoned as M-5 General Industrial under the City of Hamilton zoning bylaw, no municipal planning requirements or involvement is anticipated at this time. However, the municipality will continue to be consulted during completion of this Project to address any planning requirements.

1.5 Previous Environmental Studies

Dating back to 1989, several environmental studies have taken place within the Boat Slip in relation to characterizing its sediment quality. In 2003, a summary report entitled *DOFASCO Boatslip, Assessment of Sediment Contamination, Summary of Investigations Prior to 1997 and 1997, 1998 and 1999 Sediment and Biological Investigations* was prepared by the MOE and EC. This section summarizes the primary findings of each investigation from that report.

In 1994, EC collected 50 sediment cores within the Boat Slip, ranging from surficial samples up to a total depth of 88 centimetres (cm). Samples were collected from the surface using a corer and submitted for PAH analysis. Sediment depth was observed to be greater along the eastern edge of the Boat Slip and lesser on the western side due to navigation dredging and ship traffic. Sediment was also observed to be deeper at

the southern end or head of the Boat Slip due to boats not travelling up its entire length. Analytical results revealed that over the length of the Boat Slip, sediments are highly irregular in depth and in measured concentrations of total PAHs. Distribution of PAHs with depth indicated concentrations in excess of 100,000 parts per million (ppm) in the deeper layers. The highest subsurface PAH concentrations were found in the center and the eastern side of the channel, and appeared to have be localized to within 25 metres (m) of the southern end of the Boat Slip.

The head and inland portion of the Boat Slip was found to contain the highest concentration of total PAHs. It was concluded that the sediment was highly contaminated with coal tars and coal dust. Additional sampling in 1995 focused on the deeper sediments (0.5-1.65m); it was noted that PAH contamination occurred deeper than 1.5 m in some areas at the maximum depth sampled.

In 1995, three studies of the Boat Slip were conducted:

1. A treatability study by Water Technology International Corporation determined that coarse material contained the bulk of the PAH contamination and that the sediment was also highly contaminated with heavy metals.
2. Another treatability study determined that the sediments appeared to respond to biological treatment (ex situ solid-phase bioremediation).
3. A ship traffic study determined that ship passage greatly increased turbidity due to sediment resuspension.

In 1996, EC completed a detailed coring study of the southern end of the Boat Slip to determine the spatial variability of contaminants in the sediment. Fifteen cores were collected, and high levels of total PAHs were found up to a depth of 4 m. In general, the sediment's total PAH concentrations were observed to decrease with distance from the head of the Boat Slip, but were still measured exceeding either the MOE (1993) lowest effect level (LEL) or the severe effect level (SEL) sediment guidelines.

Based on the results of these investigations, it was determined that additional studies were required, mainly to determine whether the sediments in the Boat Slip were having an adverse environmental impact on aquatic organisms, to determine the impact of the Kenilworth combined sewer outfall (CSO), and to develop specific cleanup targets.

Mussel biomonitoring was conducted in 1997. Seven sampling stations (including one local background location) were set up to monitor the mussels' uptake of PAHs from the water column and to characterize surficial sediments. Sediment toxicity and bioaccumulation was assessed using laboratory sediment bioassays. The mussel tissue analysis indicated that PAH compounds were present in mussel tissue in all locations within the Boat Slip. Concentrations at the background location were approximately half of those measured within the Boat Slip.

To determine the extent of contamination within the Boat Slip compared to adjacent areas, additional monitoring stations in the Harbour were added. The program was expanded to include mussel monitoring, sediment trap monitoring, sediment chemical assessment, benthic community assessment, and laboratory sediment bioassays. Concentrations of total PAHs in mussel tissue parallel the concentrations in sediment (that is, they are both higher at the head of the Boat Slip and decrease towards the mouth). Stations within the Harbour showed lower and similar concentrations of PAHs (compared to within the Boat Slip) and were considered to be representative of the background conditions in the Harbour.

It was also observed that there was no difference in the mussel tissue metals concentrations based on locations sampled within the Boat Slip; this was attributed to the organisms' ability to regulate the uptake of metals. However, PCB concentrations were found to be as high as 400 parts per billion (ppb) in mussel tissue. Distribution of PCBs was similar to that of PAHs (that is, highest at the head and decreasing towards the mouth). PCB concentrations in tissue samples from the Harbour were either at trace levels or less than

detection limits. It was also determined that the CSO did not appear to be a major source of PAH contamination to the Boat Slip.

The sediment trap study assessed the concentration of PAHs in suspended sediments. The data indicated that the levels of PAHs in suspended sediments within the Boat Slip are elevated higher than those in the general Harbour. The data collected also suggest that the movement of impacted sediments is towards the mouth of the Boat Slip.

Additional sediment sampling was conducted in 1999 at 20 locations (eight transects). Samples were analyzed for PAHs, PCBs, metals, and nutrients. Transect 1 (head of the Boat Slip) had the highest concentrations of total PAHs (528 ppm). These results were compared to those from 1997 and revealed a high degree of variability in the deposition of PAHs, especially in the southern end. Previously collected data report higher PAH concentrations in the deeper sediments, suggesting that the deposition of cleaner material is occurring.

Various sediment bioassays were conducted on the samples collected from 1997 through 1999. The 1997 results indicated that the sediment from all sampling locations within the Boat Slip (except for the background station) were acutely toxic to the mayfly and the midge. At concentrations exceeding 100 ppm for total PAHs, there was an increased likelihood for acute toxicity to both the mayfly and the midge. Results from sediments collected in 1998 and 1999 from the Harbour indicate that sediments in the Harbour are not toxic to sediment-dwelling organisms. Fathead minnow (*Pimephales promelas*) tissue analyzed for PCBs suggests that PCBs are bioavailable and being accumulated within fish tissue (sediments were collected from within the Boat Slip and Harbour). A benthic community assessment was conducted, and the findings were similar to that of the sediment bioassay testing in that organisms dwelling within the sediment were more likely to be affected than those dwelling in the water column (for example, minnows).

In 2008, a sediment investigation was conducted to assess remediation options and develop a conceptual design for remediation of the contaminated sediments. The results of that investigation, which are summarized in the report *Sediment Investigation and Feasibility Study for the Boat Slip Remediation Project* (CH2M HILL, 2009), recommended that the sediments be managed by constructing an ECA within the site's footprint. The ECA would be located at the southern end of the site, where a sheet pile wall would be installed into the bedrock to contain the relocated sediments.

To further this conceptual design, a geotechnical and geoenvironmental investigation was completed in early 2011, entitled *Geotechnical/Geoenvironmental Investigation Kenilworth Boat Slip* (CH2M HILL, 2011). The investigation indicated that favourable conditions exist at the site for the construction of an ECA. The results of the investigation also revealed the presence of PCBs exceeding 50 µg/g in sediment samples collected from two boreholes near the southern end of the site. Given that the sediment samples were found to contain PCBs exceeding 50 ppm µg/g, they are considered a PCB-containing material.

O Reg. 362, Section 1, defines PCB materials as "materials containing PCBs at a concentration of more than fifty parts per million (ppm) by weight whether the material is liquid or not," and as a result, they are classified as hazardous waste under O. Reg. 347, Section 1. Consistent with the report recommendations and the comments referenced in the letter from the MOE to Jim Kroetsch of CH2M HILL, dated January 4, 2012, as well as during a discussion that took place on January 12, 2012, between ArcelorMittal Dofasco, CH2M HILL, and various regulatory agencies (including the MOE, EC, CEAA, and DFO), it was determined that additional delineation of this area of contamination was necessary prior to commencing remedial activities.

To further delineate the extent of elevated concentrations of chemicals within the Boat Slip, a sediment sampling work plan was prepared and circulated to the various regulatory agencies indicated herein on February 27, 2013, for review and consensus (CH2M HILL, 2013a). Comments on the work plan were received from the MOE March 11, 2013, and from EC on March 13, 2013. These were incorporated into an amended work plan, which was sent out on March 15, 2013 (CH2M HILL, 2013b). Both the MOE and EC responded on March 18, 2013, acknowledging receipt of and consensus on the amended work plan.

Field work associated with this additional investigation was completed between March 28 and April 15, 2013, and included the advancement of 18 boreholes in strategic locations across the site. The results of the investigation allowed for a better determination of contaminant distribution and sediment thickness at the site, especially for PCBs exceeding 50 µg/g and total PAHs exceeding 100 µg/g. Based on the samples collected and modeling of sediment thickness, there is a total of approximately 100,000 m^3 of sediments containing PAHs exceeding 100 µg/g and 20,000 m^3 of sediments containing PCBs greater than 50 µg/g in concentration. Consistent with previous findings, the toxicity characteristic leaching procedure (TCLP) analyses indicated that the sediment samples are not considered leachate toxic; thus, are not considered as hazardous waste under O. Reg. 347. The analytical data showed that in all locations where metals concentrations exceeded their respective MOE SEL, the total PAHs in these samples were in excess of 100 µg/g. Thus, if the proposed remediation strategy addresses locations where total PAH concentrations exceed 100 µg/g, it will also address the metals-contaminated sediments.

1.6 Regional Environmental Studies

The Randle Reef Sediment Remediation Project can be considered a regional environmental study that will provide pertinent information on environmental conditions for this Project. EC is leading the development and implementation of the multi-partnered Randle Reef Project which is located adjacent to and west of the ArcelorMittal Dofasco property in Hamilton Harbour, Ontario. Randle Reef is considered to be one of the more complex and highly contaminated Canadian AOCs in the Great Lakes. The purpose of the Randle Reef project is to remediate zones of sediments contaminated with high levels of PAHs. The project is intended to reduce the exposure of organisms in the Harbour to the most persistent toxic substances in the sediments, and ultimately to reduce the risk of exposure to aquatic and terrestrial biota, including humans. The Randle Reef project is similar to the Kenilworth Avenue Boat Slip Remediation Project in that both involve the management and remediation of sediments with a similar suite of contaminants. The Randle Reef project involves the construction of a capped engineered containment facility, a portion of which will be used as a marine terminal and for ongoing port operations. The ECA being constructed as part of the Boat Slip Project however, will not be designed for commercial use and marine operations, and instead is being constructed solely for the long-term containment of contaminated sediments.

In October of 2012, a Comprehensive Study Report was prepared by the Randle Reef Sediment Remediation Project Technical Task Group. The Comprehensive Study Report and it's supporting studies provides a detailed documentation of environmental conditions in the area, as well as a thorough assessment of the activities and effects expected as part of that project which are also relevant to the Boat Slip Project. The findings presented in the Comprehensive Study Report concluded that, taking into consideration the implementation of proposed mitigation measures, the Randle Reef project will not likely result in any significant residual adverse environmental effects. The report also indicated that there were many positive benefits of the Randle Reef Sediment Remediation Project, including reducing the source of contamination to the rest of the Harbour. It should be noted that the scope of the Randle Reef project is more complex and involved than the Boat Slip Project; however, the goals and positive benefits of both projects are similar.

SECTION 2

Project Information

2.1 General Description

ArcelorMittal Dofasco is proposing to proceed with the remediation of the Kenilworth Avenue Boat Slip. Historical practices at the site have led to the Boat Slip sediments containing elevated concentrations of PCBs, PAHs, and metals. The proposed approach for the Boat Slip Remediation Project involves:

- The construction of an ECA along the eastern shoreline of the Boat Slip to encapsulate the majority of sediments containing elevated concentrations of PAHs and metals.
- Installation and operation of a mobile, temporary water treatment system that will be set up onsite to manage water generated during dredging.
- The encapsulation of sediments containing PCBs greater than 50 µg/g using an engineered cap.
- The relocation of sediments with concentrations of total PAHs exceeding 100 µg/g outside of the ECA footprint into the ECA; the volume of sediments to be relocated are estimated to be less than 40,000 cubic metres (m^3). Sediments found to have naphthalene exceeding 100 ug/g will be transported off-site for disposal as hazardous waste. Sediments with total PAH concentrations less than 100 µg/g will remain in place and will not be dredged.
- An engineered sand cap will be placed over dredged areas to manage post-dredge residual contamination that may be present as a result of sediment resuspension during dredging. It will also provide habitat for fish and benthic invertebrates within the Boat Slip.
- Long-term monitoring of the ECA to confirm that it continues to function as designed.

2.2 Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem and Hamilton Harbour RAP

Areas of Concern (AOCs) are locations identified in the 1987 amendment to the Canada-United States Great Lakes Water Quality Agreement (GLWQA) where environmental quality is significantly degraded. Environmental quality in these AOCs must be restored in order to achieve the Canada-Ontario Agreement (COA)'s vision of a healthy, prosperous, and sustainable Great Lakes Basin Ecosystem. The COA is a work-sharing Agreement that outlines how Canada and Ontario will cooperate and coordinate their efforts to improve environmental quality of the Great Lakes ecosystem.

Hamilton Harbour was recognized as one of the most degraded bodies of water in the Great Lakes (IJC, 1985) and as a result, was identified as an AOC. When an area is designated as an AOC, the IJC requires the area to develop and implement a Remedial Action Plan (RAP). An AOC is a geographic site that has one or more of the fourteen Beneficial Use Impairments (BUIs) as defined in the amended GLWQA. A BUI is ". . . a change in the physical, chemical or biological integrity of the Great Lakes system sufficient to cause any of the following:

i) restrictions on fish and wildlife consumption;
ii) tainting of fish and wildlife flavour;
iii) degradation of fish and wildlife populations;
iv) fish tumours or other deformities;
v) bird or animal deformities or reproduction problems;
vi) degradation of benthos;
vii) restrictions on dredging activities;
viii) eutrophication or undesirable algae;

ix) restrictions on drinking water consumption, or taste or odour problems;
x) beach closings;
xi) degradation of aesthetics;
xii) added costs to agriculture or industry;
xiii) degradation of phytoplankton and zooplankton populations; and
xiv) loss offish and wildlife habitat." (IJC, 1987)

A RAP was prepared in 1992, and an update in 2002, with the goal of restoring environmental health to Hamilton Harbour and delisting it as an AOC. Delisting refers to the removal of Hamilton Harbour from the government held list of AOCs on the Great Lakes, which will occur when all the criteria in the Hamilton Harbour RAP are met. Sediment remediation is viewed by the Hamilton Harbour RAP as a necessary element in a series of improvements in order to reduce current impairments. Environment Canada is the lead federal agency responsible for the Hamilton Harbour RAP and the eventual de-listing of this AOC and the MOECC is the lead provincial agency for the RAP. The Hamilton Harbour RAP is grouped into three organizational units. The first is the RAP Forum, which involved over 50 stakeholders who developed and updated the RAP from 1998 to 2002. The RAP Forum is reconvened when it is deemed necessary. The second organizational unit is the Bay Area Implementation Team (BAIT), which is a group of 17 agencies from government, industry, academia and the community charged with the responsibility of implementing the RAP. The third organizational unit is the Bay Area Restoration Council (BARC), which is a confederation of community stakeholders devoted to revitalizing Hamilton Harbour and its watershed. BARC's mandate includes monitoring, assessing and promoting the RAP. As described in this Project Description, ArcelorMittal Dofasco has and continues to meet and consult with the BAIT and BARC groups as part of their public consultation activities. ArcelorMittal Dofasco will meet regularly with these and other groups as necessary to discuss the Project following completion of the PD screening process.

Previous sediment investigations and toxicity studies have shown that the concentrations of contaminants currently within the Boat Slip are at sufficiently elevated levels to cause adverse effects on aquatic biota. The Boat Slip Project is located within the Hamilton Harbour RAP and it is first and foremost, a sediment remediation project. When complete, the Project will remove a source of potential contamination to water and sediment quality from the Harbour. The goal of the Project is to provide a net improvement to environmental health within the Harbour which will assist in reducing the number and type of BUIs present and thus positively contribute to delisting of the Harbour as an AOC.

2.3 Designated Physical Activities

According to the CEAA 2012, at least one component of the Project meets the definition of "hazardous waste" in Section 1 of the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. Two chemicals were measured at levels exceeding their respective criteria; therefore, would be designated as hazardous wastes. PCBs were measured at concentrations greater than 50 µg/g, and total naphthalene was measured at levels greater than 100 µg/g. Note that the MOECC does not consider naphthalene at the concentrations measured in the Boat Slip to be hazardous wastes.

As described in Section 2, all sediments containing PCBs greater than 50 µg/g will remain in place and will be covered by an engineered cap. The engineered cap is intended to provide physical isolation of the contaminated sediment sufficient to reduce exposure due to direct contact, and also reduce the ability of burrowing organisms to move contaminants to the surface (bioturbation). It will be designed to minimize potential erosion of the cap, which will reduce the potential for resuspension and transport of contaminated sediments.

The CEAA 2012 was reviewed for this Project in consultation with the CEAA and EC. Section 29 of the Schedule under the Regulations Designating Physical Activities indicates that "the construction, operation, decommissioning and abandonment of a new facility used exclusively for the treatment, incineration, disposal or recycling of hazardous waste" triggers the application of the CEAA 2012. The proposed remedial

strategy for this Project involves the in situ encapsulation of the sediments containing PCBs greater than 50 µg/g. With respect to naphthalene, the ECA will be constructed such that its footprint will be located overtop of the majority of sediments containing naphthalene with concentrations over 100 µg/g. Sediment from areas outside of the ECA where preliminary investigations indicated that naphthalene may be at concentrations over 100 µg/g will be dredged and segregated from other dredged sediments for additional testing. It is likely that the sediments from these areas will temporarily be placed onto a barge within the Boat Slip. Additional chemical analyses will be completed on these sediments and the concentrations of naphthalene determined. If in fact, the sediments possess naphthalene concentrations over 100 µg/g, they will be dewatered for off-site disposal as a hazardous waste and transferred to an appropriately licensed landfill. If the sediments are determined to possess naphthalene concentrations below 100 µg/g, they will be placed within the ECA either by a mechanical dredge or hydraulically. The sediments placed within the ECA will be covered with an engineered cap. The combination of the sheet pile used to construct the ECA and the engineered cap placed on top of the sediments will provide physical isolation of the sediments from the environment. After construction of the ECA, a long-term monitoring program will be implemented to ensure that it is functioning as designed. The proposed remedial strategy for addressing the different fractions of sediment is summarized in Table 2-1 below.

TABLE 2-1
Proposed Sediment Remedial Strategy

Sediment Fraction	Proposed Remedial Strategy
Sediments with total PAHs < 100 µg/g	Sediments to remain in place and not be dredged as they are below the adverse effect threshold
All sediments with PCBs exceeding 50 µg/g	Isolate in place by covering with an engineered cap
All contaminated sediments within the proposed ECA Footprint	Isolate in place by containment within the proposed ECA
All contaminated sediments outside the proposed ECA with total PAHs > 100 µg/g and naphthalene < 100 µg/g	Dredge sediments and place into ECA which will be covered by an engineered cap
All contaminated sediments outside the proposed ECA in areas where naphthalene has previously been measured at concentrations > 100 µg/g	Dredge sediments, temporarily place onto barge and undertake confirmatory chemical sampling. If naphthalene concentrations < 100 µg/g then place into ECA; if naphthalene concentrations > 100 µg/g, then dewater for off-site disposal as a hazardous waste and transfer to an appropriately licensed landfill.

The physical works and activities involved in managing the sediment fractions as described above, have been interpreted to comprise “the construction, operation, decommissioning and abandonment of a new facility used exclusively for the treatment, incineration, disposal or recycling of hazardous waste” which is a designated Physical Activity under the Regulation.

2.4 Components and Activities

This section provides a description of the components and activities associated with the proposed Project.

2.4.1 Physical Works

The initial or site preparation project phase is described in Section 2.4.4. The physical works/structures that will be created during the construction phase to support this Project include the following:

- Construction of an ECA to encapsulate and manage sediments containing PAHs greater than 100 µg/g and metals exceeding their respective SELs
- Installation and operation of a mobile, temporary water treatment system that will manage water generated during the dredging

- Encapsulation of sediments containing PCBs greater than 50 µg/g using an engineered cap
- Placement of an engineered sand cap over the dredged areas to manage post-dredge residual contamination that may be present as a result of sediment resuspension during dredging

2.4.1.1 ECA Construction

As much space as possible is needed within the Boat Slip to facilitate ArcelorMittal Dofasco's shipping operations. In situ capping of all sediments within the Boat Slip is an unacceptable approach as it would reduce water depths and freighters would not be able to use a significant portion of the area. This would cause significant adverse impacts to ArcelorMittal Dofasco operations. Therefore, the sediment remediation strategy includes the construction of an ECA to contain dredged sediments on the opposite shoreline from the ArcelorMittal Dofasco shipping dock. This option has many of the advantages of in situ capping (e.g., physical isolation of sediments) and it is a much more environmentally sustainable approach than excavation and offsite disposal as the material does not need to be dewatered and eventually trucked offsite to a licensed landfill.

The sediment remediation strategy involves dredging sediments containing PAHs greater than 100 µg/g and placement into an ECA that will be constructed along the eastern shore of the Boat Slip. As noted previously, the analytical data showed that in all locations where metals concentrations exceeded their respective MOE SEL, the total PAHs in these samples were in excess of 100 µg/g. Therefore, the remedial strategy also addresses the metals-contaminated sediments with the removal of sediments with total PAH concentrations in excess of 100 µg/g. The ECA is an engineered containment structure that provides for both dewatering and permanent storage of dredged sediments. An appropriately designed and constructed ECA provides long-term effectiveness and permanence in isolating contaminated sediments from the environment. ECAs are being successfully used for dredged sediment disposal throughout the Great Lakes. Onsite ECAs constructed from portions of boat slips are also commonly used for sediment disposal for other AOCs (for example, the Waukegan Harbor AOC and the St. Louis River/Interlake/Duluth Tar AOC) and an ECA is currently being planned as part of the Randle Reef Project. The preferred location and configuration of the ECA (shown in Figure 3) was selected as it is removed from potential impacts to three water outfalls, it minimizes the size of the ECA footprint and potential impacts to aquatic habitat, and it does not impede ArcelorMittal Dofasco's shipping operations. ArcelorMittal Dofasco has two non-contact water outfalls: one located in the southwestern corner and one in the southeastern corner of the Boat Slip. The City of Hamilton owns the Kenilworth combined storm sewer outfall (CSO), which is located 470 m from the southern end of the Boat Slip. Due to considerations during construction (for example, physical disturbance and destruction of outfall headwalls), the ECA will be located approximately 86 m from the Kenilworth CSO. Therefore, the ECA is anticipated to be about 264 m long (Figure 3).

The height of the ECA will match the elevation of the western dock and will be high enough to avoid flooding and minimize overtopping by waves during storm events. The bulkhead is anticipated to extend approximately 12 m above the proposed dredged depth, which is approximately 2 m above the water level. The ECA has been designed so that when sediments are initially placed into it, there will be approximately 1 m from the cap to the top of the bulkhead. An approximately 35-cm-thick engineered cap will be installed, and after sediment consolidation, it will settle to below the water surface (Figure 4). In order to accommodate the outfalls and the quantity of sediment to be dredged and placed within the ECA, the ECA will extend out approximately 44 m from the eastern shoreline into the middle of the Boat Slip and be approximately 264 m long. The configuration of the ECA, however, may be adjusted during detailed design.

The bulkhead for the ECA will be constructed of steel sheet piles due to the height of the barrier wall and the structural integrity and design specifications of the material required to anchor it into the deeper bedrock. Steel sheet piles are the industry standard for the construction of these types of ECAs and are widely used throughout North America. The ECA itself will also likely be constructed using steel sheet piling, which allows a sealant to be injected into the joints between the piles to minimize the potential for migration of sediments from the ECA into the water.

After the dredged material has been placed into the ECA, it will be capped to physically isolate it and prevent direct and indirect human and ecological exposure to the contaminated sediments. An engineered cap consisting of sand (20 cm minimum thickness) and gravel (15 cm minimum thickness) will be installed to block the exposure of humans and non-human biota (for example, benthic invertebrates, plants, and birds) to the contaminated sediments (Figure 4). The sand layer will chemically isolate the contaminants, and the gravel layer will prevent bioturbation from disturbing the sand layer. The inside of the ECA will never be developed; therefore, it will not disturbed. Within the confines of the ECA, the cap will be protected from wind and wave erosion and action. Long-term monitoring (for example, visual surveys) will be conducted to evaluate the integrity of the steel sheet piles and the cap.

The construction of the ECA within the Boat Slip may result in the loss of aquatic habitat. It should be acknowledged however, that few fish have been observed within the Boat Slip and habitat quality is poor due to the elevated concentrations of contaminants in the sediments and as a result of shipping activity and physical habitat disturbance. The Boat Slip remediation project is an enhancement project as it will mitigate exposure of aquatic flora and fauna in the long-term to contaminated sediments through physical isolation within the ECA. Sediment quality and, therefore, aquatic habitat quality will be significantly improved within the Boat Slip area. Through consultation with DFO, measures to compensate for the loss of fish habitat as a result of the ECA construction could be implemented and may include things such as the placement of rock material along the lower portion of the outside bulkhead wall face and along the eastern shoreline of the Boat Slip to improve the quantity and quality of fish habitat over current conditions.

2.4.1.2 Water Treatment System

A mobile, temporary water treatment system will be set up onsite to treat excess water from the ECA. Treated water will be discharged either back into the Boat Slip or into ArcelorMittal Dofasco's sewer system. The water treatment system will be permitted provincially, and through the municipality if applicable, through a mobile environmental compliance approval including provisions for the treatment and release of effluent meeting applicable discharge criteria. Excess water in the ECA will be as a result of the dredged sediment slurry and precipitation. Withdrawing water from the ECA will create an inward gradient from the Harbour into the ECA during disposal operations. It is expected that a 50 m^3/hour capacity mobile, water treatment system consisting of chemical addition with sedimentation, mixed media filtration, and granular activated carbon will be needed.

2.4.1.3 In Situ Capping

The most appropriate approach in managing the sediments containing PCBs exceeding 50 µg/g is to minimize the disturbance of these sediments and to encapsulate them in place using a specifically designed, engineered cap. The Boat Slip is as an ideal location to complete in situ capping given that these sediments are located in a hydraulically isolated position at the end of the Boat Slip and are at a relatively deep water depth, thus minimizing the likelihood of erosion from events such as storms, ice scour, and prop wash. Risks to construction workers and other humans from contaminants are not a concern during cap installation as the careful placement of an engineered cap on top of the sediments would leave them relatively undisturbed. The placement of this cap will mitigate exposure to humans, fish and aquatic species and thus provide significant and long-term net environmental benefits. This option is more sustainable than offsite disposal, as the contaminated material does not need to be dredged, mechanically dewatered and trucked offsite for treatment, likely by thermal destruction. There is a significant potential for risks to humans and the aquatic and terrestrial environments from physically removing and managing these hazardous sediments onsite and offsite either from planned events or because of accidents and malfunctions.

Sediment cap design will be undertaken during the detailed design phase; however, it will likely include layers of geotextile, sand, gravel, and larger rock, such as quarry spall. The engineered cap would be intended to provide physical isolation of the contaminated sediment that would be sufficient to reduce exposure due to direct contact, and also reduce the ability of burrowing organisms to move contaminants to the surface (bioturbation). It would be designed to minimize potential erosion of the cap, which will

minimize the potential for resuspension and transport of contaminated sediments. Long-term monitoring of the cap as discussed below would be undertaken to ensure that cap integrity and performance is maintained.

2.4.1.4 Post-dredge Residuals Management

After dredging has been completed, a sand cap will be placed over the dredged areas within the Boat Slip. The sand cover will manage post-dredge residual contamination that is present as a result of sediment resuspension during dredging, sediment overlying the clay layer that remains after excavation, and contamination within the clay layer. The cover will consist of a 15- to 20-cm layer of sand, which will prevent exposure of the residual contamination to ecological receptors in the biologically active zone and water column. It will also provide habitat for fish and benthic invertebrates within the Boat Slip.

2.4.2 Project Size and Production Capacity

Based on the sediment characterization work completed to date, the size of the area containing sediments with PCBs exceeding 50 µg/g that will be covered by an engineered cap is approximately 66 m wide by 120 m long. The volume of sediment that is proposed to be dredged (that is, located outside of the capped area and ECA footprint) and placed into the ECA is less than 40,000 m^3. This includes the application of a 20 percent contingency allowance to address anticipated uncertainty with field delineations and variations that may be encountered during dredging and verification testing. Based on estimated volumes of contaminated sediments required to be managed, the production capacity/dimensions of the ECA are 44 m wide by 264 m long. The exact dimensions of the ECA will be refined during the detailed design stage.

2.4.3 Project Expansion

This Project involves the installation of an engineered cap as well as the construction of an ECA. As these are new features, the Project does not involve an expansion.

2.4.4 Description of Incidental Physical Activities

The physical activities that are proposed to be undertaken to support the Project are described below. The site preparation project phase is expected to be completed over a two month period and will be undertaken prior to the construction project phase and associated activities. Sediment dredging and placement into the ECA will be completed during the construction project phase which is expected to extend approximately from October 2016 to the end of June 2017. Monitoring of the cap and ECA will be completed during the long-term time period/project phase.

- Site Preparation and Equipment Mobilization
- Dredging of sediments with concentrations of total PAHs exceeding 100 µg/g from outside of the ECA footprint to within the ECA
- Sediment Placement into ECA
- Long-term Monitoring

2.4.4.1 Site Preparation

As this is an active facility and the Boat Slip area is developed, only a minor amount of work will be needed to prepare the site and establish a construction staging area. A limited amount of vegetation will have to be removed along the eastern portion of the Boat Slip where the ECA will be constructed. Once the staging area has been prepared, vehicles and equipment will be mobilized to the site. Silt fences and erosion control measures (for example, around water and perimeter areas) will be installed around the area of proposed construction.

2.4.4.2 Sediment Dredging

Given the nature of the Project and sediment characteristics, dredging of the contaminated sediments is likely going to be completed by mechanical dredging. Mechanical dredging buckets are similar to land-based crane and bucket excavators. The bucket is dropped through the water column and penetrates into the

sediment by gravity. The bucket is closed and then lifted from the sediment through the water column. When the bucket is above the water surface, it will be moved to deposit the dredged material into the ECA for disposal. A hydraulic dredge could be used as well which would create a sediment and water slurry that would be pumped by pipeline into the ECA. A large amount of water must be added to slurry the sediments for transport through the pump and pipeline. The volume of water added is typically five to ten times the in-place volume of sediment removed. Both methods are acceptable, and the dredging contractor will determine which method will be used.

Mechanical dredges remove sediment at nearly the same in situ density and water content. However, some additional water is typically included because the bucket cannot be filled completely with sediment, and water is captured at the top of the bucket. Mechanical dredges typically include a volume of water equivalent to 20 to 50 percent of the bucket capacity. The production rate of a mechanical dredge can vary from 48 to 190 cubic metres per hour (m^3/h), depending on the bucket size, depth of cut, depth of water, and material transport system.

An enclosed environmental bucket will likely be used that has been designed to remove sediment in relatively thin layers and creates a closure seal to reduce sediment loss, which minimizes sediment resuspension during dredging. Enclosed environmental buckets also minimize water loss during retrieval. Some environmental buckets use hydraulic cylinders to close the clamshell, which provides a tighter seal and further reduces sediment loss. Based on the results of the sediment investigations, the depth of dredging will be into the top of the native clay.

During dredging operations, best environmental management practices (BMPs) will be used to minimize environmental impacts. This will include the installation of barriers prior to dredging, such as silt or bubble curtains, at the northern limit of construction within the Boat Slip to mitigate the migration of suspended sediments offsite and into the Harbour. These practices will also include adaptive monitoring to adjust activities to site specific water and weather conditions. Dredging is also expected to be completed from January to March during a relatively, non-sensitive environmental time period.

2.4.4.3 Long-term Monitoring

A robust, long-term monitoring program will be implemented to monitor the condition of the in situ cap and ECA and that they are operating as designed.

2.5 Emissions, Discharges, and Waste

The following sections provide a description of potential wastes that are likely to be generated during any phase of the Project and plans to manage those wastes.

2.5.1 Atmospheric Emissions

The only sources of atmospheric contaminant emissions anticipated from this Project are from the equipment used during the excavation of sediments and construction of the ECA, as well as from trucks used to mobilize and demobilize equipment and materials to the site. Atmospheric emissions were considered in developing the remedial strategy and are considered to be significantly lower with in situ capping and placement of sediments into the ECA as compared to sediment removal, mechanical dewatering and trucking to an offsite landfill. BMPs will be utilized to minimize atmospheric emissions. These will include a variety of measures including maintenance of vehicles, boats, dredge and equipment in good condition, equipped with air emission controls as applicable, and operated within regulatory requirements, including meeting local authority's emission requirements. Unnecessary idling of vehicles and equipment will be avoided.

With respect to dust, the sediments that will be dredged and relocated will be relatively moist and therefore, will not generate dust to any appreciable amount. ArcelorMittal Dofasco has an extensive road flushing and sweeping program to minimize road dust and to reduce track out. The condition of the roads are monitored throughout the day and cleaning frequency is modified as required. A camera network is also

present and will be used to view the work areas to determine the requirement for and performance of dust control operations. Other BMPS will also be implemented to control dust including that workers and equipment operators will be instructed regarding dust control methods, the extent of disturbed areas will be minimized, areas will not be cleared/exposed for extended periods of time, and erosion and sediment control measures will be installed and left in place until the Project is complete and the site has stabilized. As such, it is not anticipated that fugitive dust emissions from Project activities will have likely effects on the environment.

BMPs will also be implemented to mitigate impacts with respect to noise. The measures include conducting work during normal business hours and in accordance with the local noise bylaw, ensuring equipment and vehicles are in good working order, are equipped with proper noise emission controls and that there is no excessive idling/running of vehicles and equipment, monitor and mitigate public complaints by keeping a record of complaints and addressing issues raised by the public should they arise, and the construction work will be completed during the winter which will mitigate impacts to birds and mammals.

2.5.2 Liquid Discharges

A mobile, temporary water treatment system will be set up onsite to treat excess water from the ECA prior to discharging the water back into the Boat Slip. The excess water in the ECA comes from the dredged sediment slurry and precipitation. It is expected that a 50-m^3/h capacity mobile water treatment system consisting of chemical addition with sedimentation, mixed-media filtration, and granular activated carbon will be needed. The system will be provincially, and municipally if necessary, permitted through a mobile environmental compliance approval, including provisions for the treatment and release of effluent meeting applicable discharge criteria. This water treatment system will discharge water back into the environment that will meet the applicable discharge criteria.

2.5.3 Waste Management

The only wastes anticipated to be generated during the proposed sediment remediation Project likely include:

- Typical construction waste, such as packaging used to protect construction materials during shipping, disposable personal protective equipment, and disposable sampling equipment. This material will be managed in accordance with local regulations through ArcelorMittal Dofasco, likely as municipal solid waste.
- Waste generated from the analysis of samples and from the carbon and filter media used to treat the excess water from the ECA. This waste will be managed by the laboratories contracted to complete the analysis in accordance with O. Reg. 347 and local regulations.

A robust reduce, re-use and recycling program will be implemented for this Project. In addition, ArcelorMittal Dofasco will not only consider waste management options during the design, but will also look at designing the Project with sustainability principles in mind including considerations for sourcing materials that have better environmental footprints, are produced locally, etc.

2.6 Construction, Operation, Decommissioning, and Abandonment Phases

2.6.1 Scheduling, Duration, and Staging of Key Project Phases

The Boat Slip remediation project is proposed to occur at a time when the impact to terrestrial and aquatic flora and fauna will be minimized as well as over a period of time when there will be minimal interference with shipping operations which could have significant economic impacts to ArcelorMittal Dofasco. There is no shipping traffic within the Boat Slip from the beginning of January to the end of March in any given year and therefore, cap installation and dredging will be completed during that period. The construction of the ECA and installation of the water treatment system will take approximately two months and needs to be completed prior to dredging in January. Based on site conditions and the current proposed scope of work, it

is expected that the site preparation and equipment mobilization project phase will take approximately two months to complete as well. Therefore, ArcelorMittal Dofasco is proposing to initiate work/the Project in August 2016 so that dredging can be completed during the winter and, with the exception of monitoring, the Project is expected to be completed by the end of June 2017.

2.6.1.1 Site Preparation and Equipment Mobilization Project Phase/Short-term Time Period

The site preparation and equipment mobilization project phase will take approximately two months and extend from sometime in August to October. As this is an active facility and the Boat Slip area is developed, only a minor amount of work will be needed to establish a construction staging area as well as prepare the site. Site preparation will include clearing, grubbing, and grading activities, especially along the eastern shoreline; modification of roadways to enhance access along the Boat Slip; and service installation. Only a limited amount of vegetation will have to be removed along the eastern portion of the Boat Slip where the ECA will be constructed. Once the site has been prepared, vehicles, equipment and construction materials will be mobilized to the site. Silt fences and erosion control measures (for example, around water and perimeter areas) will be installed around the area of proposed construction.

2.6.1.2 Construction Project Phase/Mid-term Time Period

Construction and sediment management activities will likely begin in October and will initially involve ECA construction which will be completed in December prior to dredging. Cap installation, sediment dredging and placement within the ECA, the installation of any fisheries compensation measures along the base of the ECA and/or along the eastern Boat Slip shoreline are expected to be completed by the end of March but may extend into April. Once these activities have been completed, demobilization and decommissioning of all temporary services and structures, including the water treatment system will be undertaken and will likely take two months to complete. Therefore, the overall construction project phase will extend from approximately October 2016 to the end of June 2017.

ECA Construction and Water Treatment System Installation

One of the main activities to be undertaken involves the installation of steel sheet piling and the creation of the bulkhead in order to construct the ECA. A mobile temporary water treatment system will also be set up which will be permitted provincially, and with the municipality if needed, through a mobile environmental compliance approval. The ECA needs to be constructed and the water treatment system set up prior to dredging and will therefore take place from October until December.

In Situ Capping

To address sediments containing PCBs exceeding 50 µg/g, the remedial strategy proposes using an engineered cap to encapsulate the sediments in their existing location. Cap design will be undertaken during the detailed design phase; however, it will likely include layers of geotextile, sand, gravel, and larger rock, such as quarry spall. The engineered cap would be intended to provide physical isolation of the contaminated sediment that would be sufficient to reduce exposure due to direct contact, and also reduce the ability of burrowing organisms to move contaminants to the surface. It would also be designed so as to minimize potential erosion of the cap, which will minimize the potential for resuspension and transport of contaminated sediments. Environmental impacts will also be reduced as capping will be completed over the winter (January to March) during a relatively, non-sensitive biological time period.

Sediment Dredging and Placement within ECA

Given the nature of the Project and sediment characteristics, dredging is likely going to be completed by a mechanical dredge. An enclosed environmental bucket will likely be used that has been designed to remove sediment in relatively thin layers and creates a closure seal to reduce sediment loss, which minimizes sediment resuspension during dredging. During dredging operations, BMPs will be used to minimize environmental impacts. This will include the installation of barriers prior to dredging, such as silt or bubble curtains, at the northern limit of construction within the Boat Slip, to prevent the migration of suspended

sediments offsite and into the Harbour. BMPs will also include adaptive monitoring to adjust activities to site specific water and weather conditions. Environmental impacts will also be minimized as dredging will be completed from January to March during a relatively, non-sensitive biological time period.

Post-dredge Residuals Management

After dredging has been completed and all sediment has been placed within the ECA, a sand cap will be placed over the dredged areas within the Boat Slip. The sand cover will manage post-dredge residual contamination that is present as a result of sediment resuspension during dredging. The cover will consist of a 15- to 20-cm layer of sand, which will prevent exposure to the possibility of residual contamination to ecological receptors in the biologically active zone and water column. It will also provide habitat for fish and benthic invertebrates within the Boat Slip. The sand cap will be installed after dredging and will therefore take place at the end of March but may possibly extend into April.

2.6.1.3 Operations and Maintenance Phase/Long-term Time Period

The Operations and Maintenance (O&M) Phase or long-term time period will begin in approximately July 2017. The O&M Phase pertains to monitoring and extends indefinitely. It involves visual monitoring of the structural integrity of the ECA, water quality monitoring within the Boat Slip and any required maintenance activities to the cap and/or ECA.

2.6.1.4 Decommissioning Phase

No plans for decommissioning were considered as part of this Project. The cap and ECA are expected to remain in place over the long-term and as a result, they will not be decommissioned in the foreseeable future.

2.6.2 Main Project Activities

Table 2-2 presents a summary of the main activities that will take place during each Project phase.

TABLE 2-2
Main Activities during each Project Phase

Project Phase	Schedule
Site Preparation and Equipment Mobilization Phase/Short-term Time Period • Clearing, grubbing, and grading activities, including along eastern shoreline • Modification of roadways to enhance access to the Boat Slip • Service installation • Mobilization of materials and equipment to the Boat Slip	August and September 2016
Construction Phase/Mid-term Time Period • Installation of BMPs and environmental control measures (e.g., bubble or silt curtain in Boat Slip) • Mobilization, installation, and operation of temporary water treatment system • Installation of sheet piling, and construction of the ECA • Cap installation over sediments containing PCBs exceeding 50 µg/g • Dredging outside of ECA footprint and placement of sediments into ECA • Placement of sand cap over dredged areas of Boat Slip • Capping of sediments within the ECA • Demobilization of equipment, and decommissioning of all temporary services and structures, including water treatment system	October 2016 to June 2017 Note: To minimize impacts to aquatic organisms, the project is aiming to complete the dredging portion of this phase between January and March during a relatively, non-sensitive biological time period

TABLE 2-2
Main Activities during each Project Phase

Project Phase	Schedule
O&M Phase /Long-term Time Period • Inspections of the cap and ECA to monitor integrity and function • Water quality monitoring to confirm cap and ECA function	July 2017 onwards
Decommissioning Phase • No plans for decommissioning, as ECA is not proposed to be decommissioned in foreseeable future	Not applicable

SECTION 3

Project Location

3.1 Project Description

3.1.1 Coordinates

The entrance to the Boat Slip is located at latitude 43 degrees (°) 16 minutes (') 33 seconds (") north (N), longitude 79°47'45" west (W).

3.1.2 Site Map and Plan

The site is located along the southern shore of Hamilton Harbour at 1495 Burlington St. E., Hamilton, Ontario, L8N 3J5. The Boat Slip is adjacent to Piers 20 and 21, at the end of Kenilworth Avenue N in the southeastern corner of the Harbour. Land access to the site is via ArcelorMittal Dofasco Gate 15 off Ottawa Street. The location of the site is shown in Figure 1. The Project will be completed within ArcelorMittal Dofasco property. ArcelorMittal Dofasco owns the Boat Slip/waterlot and the lands immediately surrounding it. As the nearest federal land is located approximately 450 m away from the northern limit of dredging within the Boat Slip, no part of the Project is anticipated to involve federal lands.

ArcelorMittal Dofasco is Canada's largest steel producer and has been located in Hamilton, Ontario since 1912 (Dofasco Inc., 2008). At that time, the company was called the Dominion Steel Casting Company and manufactured castings for Canadian Railways. Later named Dominion Foundries and Steel, the company merged with its subsidiary, Hamilton Steel Wheel Company, in 1917. The name was officially changed to Dofasco Inc. in 1980. Dofasco was purchased by Europe-based steelmaker Arcelor in 2006, who later merged with Mittal Steel to become ArcelorMittal Dofasco.

The Boat Slip is located within Hamilton Harbour, which is a triangular-shaped, deep, freshwater bay. The Harbour is approximately 31 square kilometres (km^2) in size, and is located in the western end of Lake Ontario. A 7-kilometre (km)-long sand bar shelters the bay from Lake Ontario. The southern edge of the Harbour supports the largest concentration of heavy industry in Canada. Integrated iron and steel industries dominate. The site is surrounded on all sides by heavy industry; land use in the immediate area consists of active industrial and marine-related industrial uses. Recreational uses are also present within the Harbour, including sailing, windsurfing, and fishing.

The surface area of the water within the Boat Slip is approximately 144,000 square metres (m^2), with a shore perimeter of approximately 2,500 m. The water depths encountered within the Boat Slip range from approximately 3.66 to 9.75 m. Sediment thickness ranges from 0.61 to 6.10 m. Sediment is generally thicker on the eastern side of the Boat Slip, as this side is not used for navigation. According to a 1997 study (Irvine et. al, 1997), resuspension of sediment due to ship traffic is more pronounced in areas with shallower water. This study also showed that the sediment bed within the Boat Slip may be eroded between 1 to 8 millimetres (mm) due to ship passage.

3.1.3 Location Plan

The location plan for the site is provided in Figure 1.

3.1.4 Site Photographs

As part of the project description, the following photographs are provided of the property and Boat Slip.

Photo 1
Aerial View of the ArcelorMittal Dofasco Site

Photo 2
View of ArcelorMittal Dofasco Site at Night

Photo 3
View of ArcelorMittal Dofasco Boat Slip

3.1.5 Project Proximity to Residences, Traditional Territories, Federal Lands

The site is located in a heavy industrial area, and there are no residential areas in close proximity to the site. Based on aerial photographs the nearest residential property is approximately 830m from the Dofasco Property boundary and approximately 1200 m from the edge of the estimated work area (Figure 2).

As shown on Figure 5, the nearest First Nation Community to the site is the Six Nations Indian Reserve no. 40. The edge of the Six Nations Community is approximately 26km from the site.

The nearest Federal Lands are those owned by the Hamilton Port Authority (HPA) located directly to the north of the Boat Slip (Figure 2). Based on this figure, it is anticipated that the HPA waterlot is located approximately 450 m away from the northern limit of dredging within the Boat Slip.

As shown on Figure 6, the site is located approximately 55km from the closest US-Canada International border.

3.2 Land and Water Use

3.2.1 Zoning Designations

The southern edge of Hamilton Harbour supports the largest concentration of heavy industry in Canada. Integrated iron and steel industries are dominant. The site is surrounded on all sides by heavy industry; land uses in the immediate area consist of active industrial and marine-related industrial uses. The site is located mainly on reclaimed land and is zoned 'K' Heavy Industrial. The open water of the Harbour is also used by commercial and recreational boaters. According to HPA mapping, the ArcelorMittal Dofasco site (Piers 20 and 21) is bordered by U.S. Steel (formerly Stelco Inc.) to the west (Piers 16 to 18) and a site marked as "future development" (Pier 22) to the east. The Pier 22 property was recently acquired by the Hamilton Port Authority,

who plan to construct a new wharf, as well as expand existing cargo handling facilities. Pier 22 formerly housed the Stelco Inc. Rod Mill facility. Note that a marine terminal will not be constructed as part of this Project and that the sole purpose of the ECA is for the long-term management of non-hazardous sediments.

The proximity of the site to important environmental sites (Cootes Paradise, Hendrie Valley, Windermere Basin, Burlington Bar, and the Niagara Escarpment) is shown in Figure 7. There are no designated heritage features on or adjacent to the site; however, the Harbour has played a major role in the City of Hamilton's industrial heritage.

A 4-km portion of the Burlington Bar known as the Hamilton Beach Strip has been designated as a Life Science Area of Natural and Scientific Interest (ANSI), which means that the Ontario Ministry of Natural Resources (MNR) has recognized it as having provincially or regionally significant representative ecological features (MNR, 2008). The landform is considered provincially significant due to its size and also because of its proximity to the similar but older sand bars within the bay, which separate the Harbour from the Cootes Paradise and Hendrie Valley wetland areas.

The Niagara Escarpment and Cootes Paradise are the two most prominent natural features located in the area. The Niagara Escarpment is known as the most prominent topographical feature of southern Ontario; the rocky landform stretches 725 km from Queenston (Niagara River) to Tobermory. In 1990, the United Nations Educational, Scientific and Cultural Organization designated the Niagara Escarpment a World Biosphere Reserve. Cootes Paradise is an 840-hectare (ha) wildlife sanctuary and wetland located at the western end of the Harbour. The surface area of the open water is approximately 250 ha, with a mean water depth of 0.7 m. The wetland is a provincially significant coastal wetland complex containing both marsh and swamp wetland types, and has, itself, has been listed as a Life Science Site ANSI by MNR. The Harbour is known as a significant but contaminated ecosystem; it contains the only large, deep water, and littoral aquatic system in the region.

Hamilton Harbour was recognized as one of the most degraded bodies of water in the Great Lakes (IJC, 1985) and as a result, was identified as an AOC. When an area is designated as an AOC, the IJC requires the area to develop and implement a RAP. An AOC is a geographic site that has one or more of the fourteen BUIs as defined in the amended GLWQA. Sediment remediation is viewed by the Hamilton Harbour RAP as a necessary element in a series of improvements in order to reduce current BUIs. Previous sediment investigations and toxicity studies have shown that the concentrations of contaminants currently within the Boat Slip are at sufficiently elevated levels to cause adverse effects on aquatic biota. The Boat Slip Project is located within the Hamilton Harbour RAP and it is first and foremost, a sediment remediation project. When complete, the Project will remove a source of potential contamination to water and sediment quality from the Harbour. The goal of the Project is to provide a net improvement to environmental health within the Harbour which will assist in reducing the number and type of BUIs present and thus positively contribute to delisting of the Harbour as an AOC.

3.2.2 Legal Property Description

The legal description of the Boat Slip area is as follows: Lot 3, Broken Front Concession, Township of Barton, Plan 62R-483. The waterlot and the land on the south, east and west are owned by ArcelorMittal Dofasco. The HPA (a federal Authority) owns a waterlot located approximately 450 m away from the northern limit of dredging within the Boat Slip.

3.2.3 Land Use

Public access to the site is not permitted, and security measures are in place to restrict access. Recreational uses (for example, boating and fishing) can occur in proximity to the site within the open water of the Harbour.

The Boat Slip is not used for commercial, recreational, or Aboriginal fisheries.

3.2.4 Land Use by Aboriginal Peoples

The site and adjacent ArcelorMittal Dofasco lands are not currently used by First Nations. The site is located on reclaimed land; therefore, it is likely that there would be no historical or cultural interest to the First Nations.

SECTION 4

Federal Involvement

4.1 Financial Support

This Project is funded by ArcelorMittal Dofasco, and no federal support is currently being provided.

4.2 Federal Lands

The remediation will be completed within ArcelorMittal Dofasco property. ArcelorMittal Dofasco owns the Boat Slip/waterlot and the lands immediately surrounding it. As such, no part of the Project is anticipated to involve federal lands. It is noted that the HPA waterlot is located approximately 450 m away from the northern limit of dredging within the Boat Slip. It is not anticipated that this Project will have an appreciable effect on Federal Lands however, as dredging and sediment placement is occurring in the southern most portion of the Boat Slip and a barrier will be installed to prevent the migration of sediments to outside of the Boat Slip.

4.3 Federal Permits, Licenses, or Other Authorizations

4.3.1 Fisheries and Oceans Canada

The Federal Minister of the DFO has the legislative responsibility for the administration and enforcement of the *Fisheries Act*. The *Fisheries Act* protects and conserves fish and fish habitats, and has the power to deal with damage to fish habitat, destruction of fish, obstruction of fish passage, necessary flow requirements for fish, and the control of deleterious substances. Any proposed works and activities that may alter or damage fish habitat must be reviewed and authorized by the DFO. The Conservation Authorities have agreements with DFO in the evaluation and processing of applications; therefore, they would also have to be consulted. DFO also has requirements under the *Species at Risk Act* for fish species.

DFO has been consulted on this Project since 2009. Though the *Fisheries Act* was amended in 2012, it is still expected that DFO will be involved in the EA process and that a Project authorization under the *Fisheries Act* may be required.

4.3.2 Environment Canada and Canadian Wildlife Services

Several acts administered by EC will apply to the Project, including the *Federal Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulation*, as noted, the Federal *Species at Risk Act,* and the *Migratory Birds Act*. As such, EC Project review and approval will be required.

4.3.3 Transport Canada

The NPA is an Act of Parliament that authorizes and regulates interferences with the public right of navigation. A primary purpose of the NPA is to regulate works and obstructions that risk interfering with navigation in the navigable waters listed on the act's schedule. A work, for purposes of the NPA, is anything, whether temporary or permanent, that is made by humans, and that is in, on, over, under, though, or across any navigable water in Canada. TC administers the NPA through the NPP. Based on the nature of this Project, the Minister (of Transport) will have to be notified and an approval obtained through the NPP.

SECTION 5

Environmental Effects

5.1 Physical and Biological Setting

Hamilton Harbour is a triangular-shaped, deep, freshwater bay located on the western end of Lake Ontario, and has an area of approximately 31 km^2. The bay is protected from Lake Ontario by a 7-km long baymouth sand bar (Burlington Bar). As indicated, a section of the Burlington Bar has been designated as an ANSI. Dredging and landfilling operations have dramatically changed the natural configuration of the bay. The only remaining natural shoreline in the Harbour is at the western end, as the southern and eastern shorelines consist almost entirely of fill. The Harbour was identified by the IJC (consisting of the governments of Canada and the U.S.) as an AOC in the Great Lakes region. Since 1986, a RAP has been in place for the Hamilton Harbour ecosystem by both the Ontario and Canada governments.

The Burlington Ship Canal (located beneath the Skyway Bridge), cut through the Burlington Bar, provides boat access to the Harbour, which has been developed as a deep water industrial port. The Harbour handles the largest volume of cargo and shipping traffic within the Great Lakes, with cargo including coal and iron ore (for use in the production of steel), salt and sand, grains and soybeans, liquid fertilizer, and petroleum products.

Various industrial and Port of Hamilton piers and waterways are located adjacent to the Boat Slip within the Harbour. The series of wharves and quays (including the ArcelorMittal Dofasco Boat Slip) were created from predominantly fill materials as a result of land reclamation from the 1960s through the 1980s. Dredged materials from the Harbour may have been used for land and shoreline reclamation. Fill materials generated from the steel industry and sediment of unknown quality were also used for land reclamation purposes.

The ArcelorMittal Dofasco-owned property adjacent to the Boat Slip on the western side is generally flat, with a break wall and road; loading and unloading of cargo ships occur from this side of the Boat Slip. Along the eastern side of the Boat Slip, aggregate piles approximately 2 m high run the length of the Boat Slip. Towards the northern edge, some vegetation is present (evergreen trees). The lake level is estimated at approximately 1.8 m below the general site grade. The inferred groundwater flow is north towards the Harbour. The site and adjacent properties are supplied with municipal water. Potable water for the City of Hamilton is supplied via a piped municipal distribution system, which does not draw from groundwater sources.

Species of birds that frequent and nest in the Hamilton Harbour area include various duck species, gulls, herons, terns, cormorants, swans, and geese. The west-end of Lake Ontario, including Hamilton Harbour, is an important local and regional habitat areas for waterfowl; in particular, the Windermere Basin and Cootes Paradise.

The surface water area of the Harbour is approximately 2,150 ha, with an average depth of 13 m and a maximum depth of 26 m. Approximately 17 percent of the Harbour is littoral zone; however, due to environmental stresses, less than 1 percent of this area contains aquatic vegetation.

The Harbour and, in particular, Cootes Paradise are important fish habitats. Historically, significant fish habitat was lost along the southern shoreline with the reclamation of land. Currently, fish habitat is generally restricted to the eastern and western shores of the Harbour and Cootes Paradise. The RAP (Stage 1 Report) states that there is no suitable fish habitat along the southern shore east of the former Lax property (now the Bayfront Park), which includes the Boat Slip. The 1992 RAP (Stage 2 Update) outlines goals to recreate fish habitat and re-establish some key species such as pike, bass, perch and sunfish. Species of fish that are commonly found in the Harbour include bass, pike, perch, carp, alewife, shad, crappies, and catfish. These species could potentially be present within the Boat Slip, however, are likely transient due to the lack of habitat within the Boat Slip due to shipping traffic.

Note that the Project will be completed within ArcelorMittal Dofasco property. ArcelorMittal Dofasco owns the Boat Slip/waterlot and the lands immediately surrounding it. As such, no part of the Project is anticipated to involve federal lands. The nearest Federal Lands are those owned by the HPA located directly to the north of the Boat Slip.

5.2 Potential Changes to Fish, Plants, and Migratory Birds

The sections below provide an overall description of the existing Harbour environment with respect to fish and fish habitat, marine plants and migratory birds. One of the main concerns with respect to potential environmental impacts as a result of the Project, is the suspension of sediment during in-situ capping and dredging. The movement of suspended sediments during these activities could adversely affect aquatic habitats and biota in offsite areas including federal lands. To mitigate offsite impacts, BMPs will be installed and implemented prior to and during the course of these activities. Additionally, monitoring will be completed during these activities to ensure efficiency of dredging operations and BMP effectiveness, and to address the offsite movement of sediment. BMPs will include, but are not limited, to the use of experienced dredging contractors, monitoring of site and weather conditions so that work takes place under favourable conditions, installation of a silt and/or air bubble (pneumatic) curtain, utilization of an environmental bucket, utilization of dredge positioning equipment and software, debris removal prior to dredging, modification of dredging sequence and number of vertical cuts, and utilization of a cutterhead with the least aggressive design necessary to efficiently remove the sediment and use of specially-designed plain suction dredge to minimize residual sediments if using a hydraulic dredge.

Silt curtains and especially air bubble or pneumatic curtains, which will be employed for this Project, have been shown to be very effective in controlling the offsite migration of suspended sediments. Silt curtains are well tested and are proven engineering controls commonly used in the dredging industry. The percentage of sediments anticipated to be released from the Boat Slip area to the aquatic environment outside of the working area during remedial activities will be very minimal. Silt curtain effectiveness for example, was assessed as part of a project conducted in Halifax Harbour. It was found that the silt curtain reduced suspended solids by approximately 98% from concentrations of 400 mg/L within the work area to 5 mg/L outside of the area during rock filling and dredging operations (USEPA, 1994). The site layout and physical setting of the project (enclosed, quiescent waters) is ideal, and it is anticipated turbidity levels in the water column outside of the curtain will be 80 to 90% lower than the levels inside the curtain enclosure (USACE ERDCTN-DOER-E21 guidance, Silt Curtains as a Dredging Project Management Practice, September 2005). Further, CH2M has more recently used a turbidity control innovation called an air bubble curtain on two dredging projects in Wisconsin with good success. A perforated pipe is laid on the bottom of the waterway and air continuously forced up through the water column creates a wall of air bubbles that knocks suspended particles down. Post-dredge performance monitoring on the USEPA Kinnickinnic River Great Lakes Legacy Act project showed several feet of sediment buildup immediately below the curtain, demonstrating the effectiveness of the curtain in eliminating suspended particle migration (Remedial Action Report, Kinnickinnic River Sediment Removal Project, CH2M HILL, March 2011). Lastly, given that there is the potential for oil sheens to occur on the top of the water surface during remedial activities, BMPs will include deploying an oil boom across the Boat slip to absorb oil and further protect the aquatic environment.

Once capping and dredging has been completed, a 15- to 20-cm sand cap will be placed over the dredged area to prevent the potential exposure of residual sediment contamination to ecological receptors. This will provide enhanced aquatic habitat for fish and aquatic invertebrates. Furthermore, to compensate for the loss of aquatic habitat, albeit of poor quality, within the Boat Slip due to ECA construction, it is likely that rock material will be placed along the base of the ECA as well as potentially along portions of the eastern Boat Slip shoreline. This will provide new and higher quality aquatic habitat within the Boat Slip.

The Boat Slip and the adjacent lands to the east, south and west are owned by ArcelorMittal Dofasco and as such, no part of the Project is anticipated to involve federal lands. The HPA (a federal Authority) owns the waterlot to the north of the Boat Slip; however, as described above, it is not anticipated that this Project will

effect Federal Lands. In fact, the goal of the Project is to address sediment contamination in the Boat Slip and in combination with some habitat enhancements, it is expected that the Project will result in positive environmental changes.

5.2.1 Fish and Fish Habitat

Previous environmental investigations and toxicity studies have shown that the concentrations of contaminants currently within the Boat Slip are at sufficiently elevated levels to cause adverse effects on aquatic biota. The purpose of this Project is to enhance environmental and aquatic habitat conditions within the Boat Slip through the remediation of contaminated sediments. The ECA is being placed over the largest quantity of the most contaminated material present within the Boat Slip. Therefore, this area is expected to be of limited quality with respect to fish habitat.

As noted above, the RAP (Stage 1 Report) states that there is no suitable fish habitat along the southern shore, east of the former Lax property (now the Bayfront Park), which includes the Boat Slip. The fish community within Hamilton Harbour is diversified, with 19 families, 42 genera, and 59 species present. Species of fish that are commonly found in the Harbour include bass, pike, perch, carp, alewife, shad, crappies, and catfish. According to the Comprehensive Study Report (RRSRPTTG, 2012), the state of the fishery in the Harbour has improved however, it is in poor condition and is reflective of an unhealthy ecosystem with a shortage of high quality habitat in the littoral zone. For many species, like native cyprinids and centrarchids, there is still relatively little suitable habitat. The study noted that water quality in the Harbour continues to be poor and significant improvements are required before physical and environmental habitat conditions will be suitable to improve conditions for native fishes.

Two species of fish currently found in the Harbour are currently designated as SAR; the American eel (*Anguilla rostrata*) and bigmouth buffalo (*Ictiobus cyprinellus*) (RRSRPTTG, 2012). The American eel was assessed as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in April 2006. The status was re-examined by COSEWIC in May 2012 and it was designated as Threatened. It is not currently listed under the federal Species at Risk Act. The American eel was listed as Endangered under the Ontario Endangered Species Act, 2007. The current status of the American eel in the Harbour is unknown. They were captured in electrofishing surveys conducted in each year between 1988 and 1998 but they were not captured in 2002 and 2006 (RRSRPTTG, 2012). The bigmouth buffalo is currently assessed by COSEWIC (April 2009) and under the federal SARA (June 2011) as being of Special Concern (http://www.dfo-mpo.gc.ca/species-especes/species-especes/bigmouth-buffalo-grande-bouche-eng.htm). According to the Comprehensive Study Report (RRSRPTTG, 2012), bigmouth buffalo were caught in the Harbour in 2002 and 2006 by DFO. This species is thought to be extending its range in the Great Lakes and the extent of the population in the Harbour remains unknown. Some species of turtles which are considered Species at Risk inhabit the Harbour; however, none have been observed onsite and suitable habitat does not exist within the Boat Slip.

These species could potentially be present within the Boat Slip however, they are likely transient due to the lack of habitat and high degree of disturbance within the Boat Slip. Anecdotal evidence to support this was provided through observations conducted during sediment sampling in mid-December 2008 and at the beginning of January 2009. It is known that at that time of year, fish are frequently observed in nearby boat slips and inlets, especially in association with the presence of storm and warm water outfalls. Three outfalls are located within the ArcelorMittal Dofasco Boat Slip, and no fish were observed near the outfalls or elsewhere within the Boat Slip during the December and January investigations. Moreover, no biota were observed within the sediment samples collected in support of the Feasibility Study (CH2M HILL, 2009). This observation includes the absence of invertebrates, such as oligochaete worms, chironomids, zebra mussels, and zooplankton. There was also no sign of algae or vascular aquatic plants.

Dredging and capping will be completed to physically isolate the contaminated sediments and mitigate exposure to the environment. As described above, prior to and during cap placement and dredging, BMPs will be installed to prevent the migration of sediments suspended into offsite areas including federal lands.

Visual and water quality monitoring will also be undertaken during these activities to confirm that the BMPs are functioning as designed and that there are no offsite impacts including to federal lands. Dredging will be halted or modified depending on the results of the monitoring. Dredging will also be completed during the winter which is a relatively non-biologically sensitive time period. Once dredging has been completed, a 15- to 20-cm sand cap will be placed over the area to prevent the potential exposure of residual sediment contamination to ecological receptors. It will also provide habitat for fish and benthic invertebrates within the Boat Slip. To compensate for the loss of aquatic habitat, albeit of poor quality, within the Boat Slip due to ECA construction, it is likely that rock material will be placed along the base of the ECA as well as potentially along portions of the eastern Boat Slip shoreline. This will provide new and higher quality aquatic habitat within the Boat Slip. Overall, it is expected that the productive capacity of the area and conditions within the Boat Slip will be enhanced as a result of this Project and no impacts to fish and fish habitat on federal or other lands is expected.

5.2.2 Marine Plants

As noted, very little aquatic vegetation is expected to be present within the Boat Slip due to environmental conditions and shipping traffic. Very little aquatic vegetation was also observed in the Randle Reef area as well (RRSRPTTG, 2012). The Comprehensive Study Report also indicated that the types and quantities of aquatic vegetation within the Harbour are now lower than historic conditions and that species richness and composition continues to be indicative of degraded environments. Suspended sediments, algal blooms and the lack of protected, shallow-slope shoreline remain problematic for the submerged aquatic vegetation community of the Harbour.

As described above, BMPs and monitoring will be implemented to prevent/mitigate effects to marine plants on federal or other lands. Dredging is also going to take place during the winter and not during the marine plant growing season. The installation of a sand cap after dredging and installation of rock materials along the ECA and eastern shoreline are expected to improve habitat conditions within the Boat Slip area. It is likely that only minor and short-term impacts may be possible to marine plants but to only those within the site/Boat Slip area. It is therefore expected that the Project will not adversely affect, and in fact is expected to enhance, aquatic vegetation/marine plants over the long-term due to habitat enhancements.

5.2.3 Migratory Birds

Species of birds that frequent and nest in the Hamilton Harbour area include various duck species, gulls, herons, terns, cormorants, swans, and geese. The west-end of Lake Ontario, including Hamilton Harbour, is an important local and regional habitat areas for waterfowl; in particular, the Windermere Basin and Cootes Paradise.

Given environmental conditions, shipping traffic and marine operational activities, and that this is an active facility, negligible terrestrial habitat is present and is of poor quality and few migratory birds are expected to use the Boat Slip area. Only relatively common bird species which are transient inhabitants of the general area have been observed, such as the mallard duck (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), double-crested cormorant (*Phalacrocorax auritus*), ring-billed gull (*Larus delawarensis*), pigeon (*Columba livia*), house sparrow (*Passer domesticus*) and common starling (*Sturnus vulgaris*). No Species at Risk have been recorded onsite although some are known to inhabit the Harbour. The majority of the construction activities will take place from October to March, which is outside of the breeding bird timing window. It is also expected that based on the type of work, and implementation of monitoring and BMPs, that impacts would be limited to the Boat Slip/site area only. Therefore, impacts are not anticipated to migratory birds and habitat located offsite on federal or other lands.

5.3 Potential Environmental Changes

One of the main concerns with respect to potential environmental impacts as a result of the Project, is the suspension of sediment during in-situ capping and dredging. In water work will be completed during a relatively non-sensitive biological period and offsite impacts will be mitigated through the installation and

implementation of BMPs prior to and during the course of these activities. Additionally, visual and water quality monitoring will be completed during these activities to confirm efficiency of dredging operations and BMP effectiveness, and to address the offsite movement of sediment. Once dredging has been completed, a 15- to 20-cm sand cap will be placed over the area to prevent the potential exposure of residual sediment contamination to ecological receptors. The Project will be completed on ArcelorMittal Dofasco owned lands and as such, no adverse effects are anticipated to federal lands.

As indicated above, no impacts are expected to fish and fish habitat, marine plants or migratory birds. In fact, the goal of the project is to address sediment contamination in the Boat Slip and in combination with some habitat enhancements, it is expected that the Project will result in positive environmental changes.

5.4 Aboriginal Peoples

As indicated in Section 3.1.5 and shown on Figure 5, the nearest First Nation Community to the site is the Six Nations Indian Reserve no. 40 which is approximately 26km from the site. The site itself and adjacent ArcelorMittal Dofasco lands are not currently used by First Nations and as they are located on reclaimed land, it is unlikely that the project area would have historical, archaeological, or cultural interest to the First Nations. Furthermore, access to the Boat Slip is restricted, and given the conditions present, the Project is not expected to impact Aboriginal Peoples.

It is noted that in the Randle Reef Comprehensive Study Report, that in 2003, the Six Nations provided a letter of support to Environment Canada for the Randel Reef project and indicated “that they had no apparent indication of any further impacts to traditional uses at this time” (RRSRPTTG, 2012). In addition, in 2008 an email from the Manager of the Six Nations Eco Center indicated that he had reviewed the Randle Reef information provided and that his office found no indication of further impacts to traditional land use at that time. (RRSRPTTG, 2012). Furthermore in 2009, the Métis Nation of Ontario also indicated that they are supportive of the Randel Reef project (RRSRPTTG, 2012). As Randle Reef is of a similar nature (but a much larger scale) and located near to the proposed ArcelorMittal Dofasco project it is anticipated that the project will similarly have no impact on Aboriginal Peoples.

SECTION 6

Consultation with Aboriginal Groups

6.1 Aboriginal Group Interest

The site and adjacent ArcelorMittal Dofasco lands are not currently used by First Nations. The site is located on reclaimed land; therefore, it is likely that there would be no historical or cultural interest to the First Nations. A review of the Randle Reef Comprehensive Study Report indicated that there could be up to five aboriginal groups who may have interest in the Project. These include: the Six Nations of the Grand River Treaty (Six Nations); Haudenosaunee (Six Nations Traditional Council); Mississaugas of the New Credit; the Huron-Wendat First Nation; and the Métis Nation of Ontario. As part of the Randle Reef EA, consultation in the form of providing background information (2003), sending copies of the project description (2008) and sending copies of draft comprehensive study reports (2009-2010), was undertaken to solicit input from each of these aboriginal groups; however, limited response was received. Responses received from the Aboriginal groups as part of the Randle Reef included:

- In 2004, Environment Canada gave a presentation on the Randle Reef project to the Six Nations. In follow up to this meeting, some residents had asked if the project would have any effect on turtles but no further questions or responses were received.
- As indicated above, the Six Nations (in 2003) and Métis Nation of Ontario (in 2009) expressed support for the Randle Reef Project and the Six Nations (in 2008) indicated that the Randle Reef project had no apparent further impacts to traditional land use at that time.
- In 2008, Environment Canada spoke with the Chief of the New Credit First Nation who had expressed interest in arranging a presentation on the Randle Reef project. Subsequently Environment Canada left a voice message to arrange a time but no response was ever received.
- In 2009, the Métis Nation of Ontario requested a meeting to discuss the project, and a meeting occurred in October 2009. No other communication around this meeting was received. (RRSRPTTG, 2012).

6.2 Consultation Activities

To date, no engagement or consultation with Aboriginal groups has taken place with respect to this project

6.3 Key Comments and Concerns

No comments or concerns have been received by Aboriginal Groups.

6.4 Engagement, Consultation, and Information-gathering Plan

To engage Aboriginal Groups during the regulatory review and approvals process, a robust stakeholder engagement plan will be implemented for the Project. Specific items that may be completed to ensure that the Aboriginal Groups have an opportunity to be engaged and consulted on the Project may include:

- Sending letters describing the proposed Project to each of the Aboriginal groups identified that may have an interest in the project that include a link to or copy of the project description and offering a description of opportunities on how the Aboriginal groups can be become engaged and consulted during the Project.
- Sending information directly to each of the Aboriginal Groups regarding Project consultation activities/presentations and soliciting input/feedback.
- Sending each of the Aboriginal Groups periodic updates on the status of the Project by mail or email.
- Providing links to or sending information on Project document review requirements.

SECTION 7

Consultation with Public and Other Parties

As indicated in Section 1.3, initial consultations with CEAA (who circulated all information provided to EC and the DFO) and the MOECC (then, the MOE) began as early as 2010. Consultations included:

- Providing a work plan to the MOE and CEAA on September 22, 2010, detailing a proposed scope of work to carry out geotechnical and geoenvironmental sampling within the Boat Slip. Feedback on this work plan was received from both the MOE and EC, and consolidated feedback was received in an email from Sarah Day/MOE on October 20, 2010.
- Providing the results of sampling in the report entitled *Geotechnical/Geo-environmental Investigation Kenilworth Boat Slip* to CEAA and the MOE on August 12, 2011.
- Attending a meeting hosted by CEAA on January 12, 2012, at the Canadian Centre for Inland Waters, where the path forward for this Project was discussed. The MOE were also in attendance at this meeting.
- Providing an additional sampling plan entitled *ArcelorMittal Dofasco Kenilworth Street Boat Slip Supplemental Investigation Work Plan* (CH2M HILL, 2013) that proposed to better characterize the vertical and horizontal extent of PAHs, metals, and PCBs in the Boat Slip. Comments on the additional sampling plan were received from the MOE March 11, 2013, and from EC on March 13, 2013. These were incorporated into an amended sampling plan, which was sent out on March 15, 2013. Both the MOE and EC responded on March 18, 2013, acknowledging receipt of the amended sampling plan.
- This work was carried out between March 28 and April 15, 2013, and the final report entitled *ArcelorMittal Dofasco Kenilworth Boat Slip 2013 Sediment Sampling Results* was sent to CEAA and EC on August 22, 2013.
- ArcelorMittal Dofasco sent a letter to CEAA on May 22, 2014, detailing the proposed Project. Comments on the contents of this letter were received from CEAA by email on October 3, 2014, and indicated that ArcelorMittal Dofasco would need to prepare a Project Description in accordance with the CEAA 2012 in order to proceed with the Project.

7.1 Comments and Concerns

To date, ArcelorMittal Dofasco has not received any comments or concerns specific to this project.

7.2 Stakeholder Consultation Activities

ArcelorMittal Dofasco held two presentations with the Bay Area implementation Team (BAIT) as well as one with the ArcelorMittal Dofasco Community Liaison Committee on the need, scope and schedule for the project. Representatives of the groups that attended these presentations include:

- Public and Local residents
- Bay Area Restoration Council,
- City of Burlington,
- City of Hamilton,
- Conservation Halton,
- Fisheries and Oceans Canada,
- Environment Canada,
- Hamilton Conservation Authority,
- Hamilton Port Authority,
- Hamilton Industrial Environmental Association,
- Hamilton-Halton Home Builders' Association,

- Hamilton Waterfront Trust ,
- McMaster University,
- Ministry of the Environment and Climate Change,
- Ontario Ministry of Natural Resources,
- Royal Botanical Gardens,
- The Regional Municipality of Halton,
- City of Hamilton Public Health Services,
- Environment Hamilton,
- Clean Air Hamilton and
- U. S. Steel Canada.

7.3 Consultation with Other Jurisdictions

Consultation with other jurisdictions has been described above as well as in Section 1.3.

7.4 Stakeholder engagement program

As noted under Aboriginal engagement, a stakeholder engagement program will be developed and implemented for the Project. Specific stakeholder engagement activities will include as a minimum continued presentations to the Bay Area implementation Team (BAIT) on the status of the Project. ArcelorMittal Dofasco will also meet, as required depending on Project progress, status and interest, with their Community Liaison Committee starting in 2015. Information will be provided on the scope, status, and schedule for the Project.

Depending on the needs and interests of stakeholders, further engagement activities will be planned including a public information session.

SECTION 8

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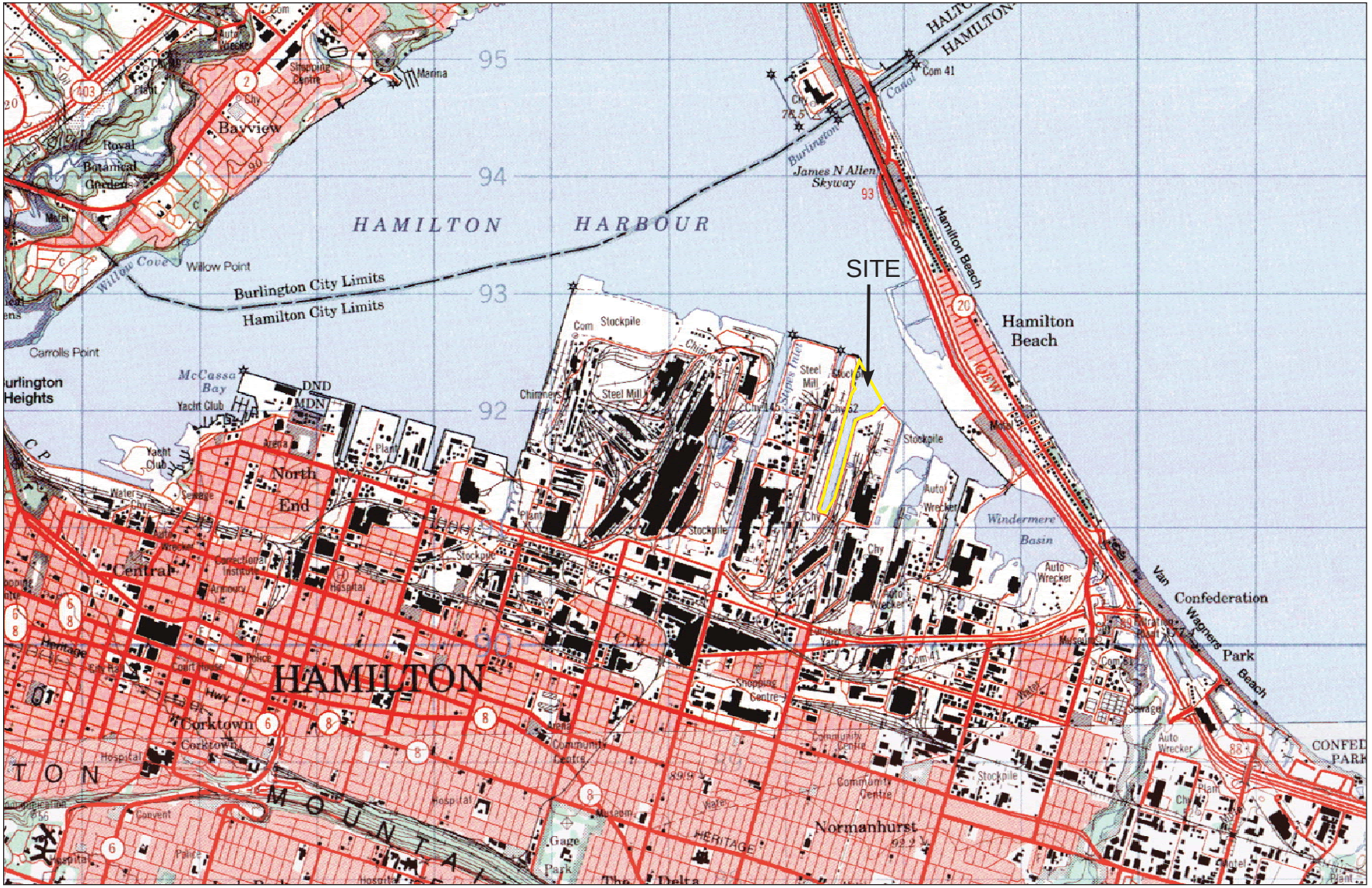
Figures

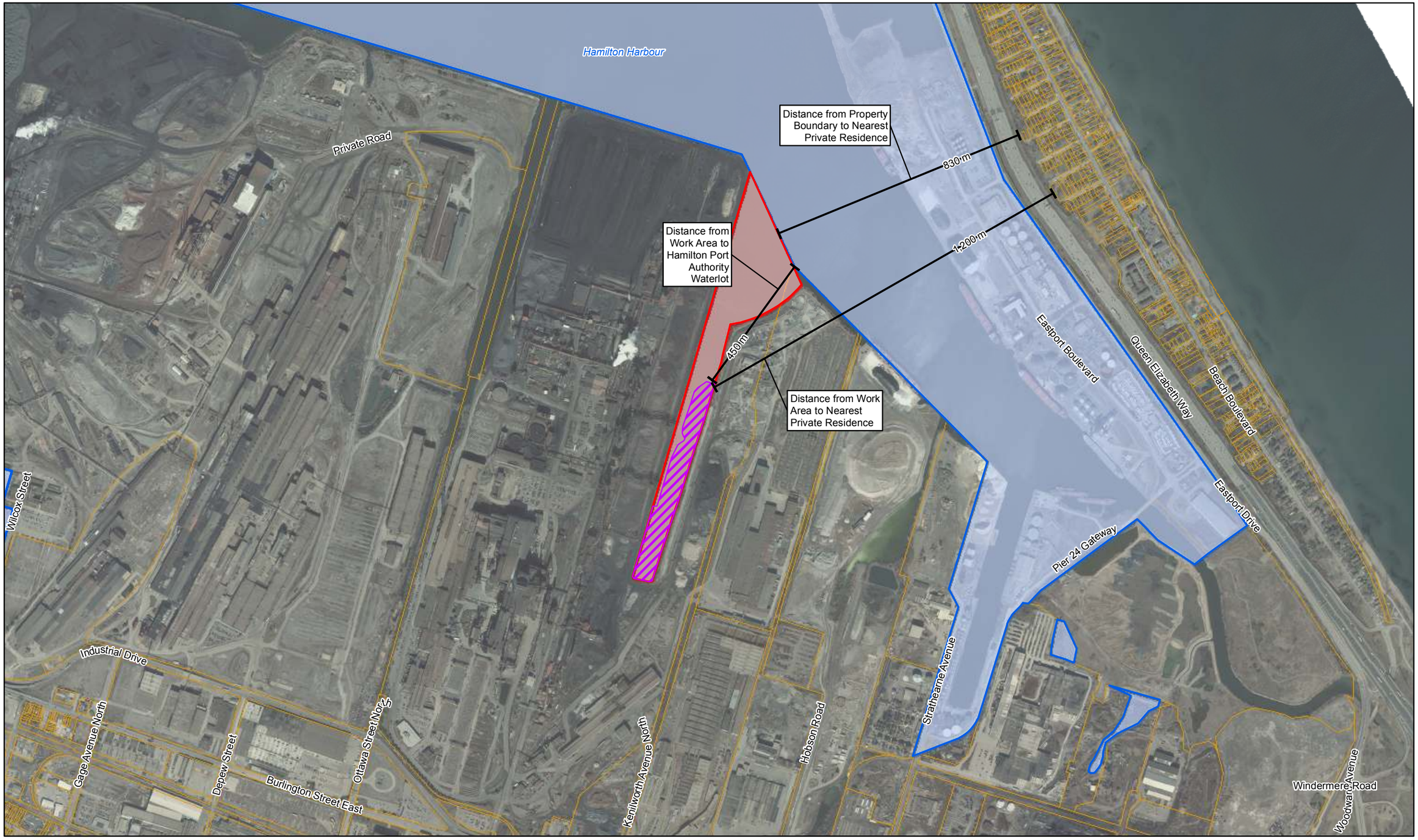


SOURCE: Produced under licences granted by Her Majesty the Queen in right of Canada, represented by the Department of Natural Resources, and by SoftMap©.

FIGURE 1
SITE LOCATION, HAMILTON HARBOUR

ArcelorMittal Dofasco Inc.,
Boatslip Remediation Project

CH2MHILL



N

0 150 300

Metres

- Approximate Distance
- Estimated Work Area
- Project Area
- Port Authority Boundary (Federal Land)
- Property Boundary

Notes:
1. Aerial Photograph - December 2012 Data set is copyrighted by First Base Solutions Inc. and licensed to CH2M HILL.
2. Property boundaries source: City of Hamilton.
3. Hamilton Port Authority Lands take from the Hamilton Port Authority Landuse Plan, Stantec 2002.

Figure 2
Project Area
ArcelorMittal Dofasco Boat Slip Remediation Project
ArcelorMittal Dofasco Inc.
Hamilton, Ontario

CH2MHILL

\\WATERLOO\PROJ\DOFASCOINC\656897ARCELORMITTAL\GIS\MAPFILES\PROJECTAREA.MXD EA022055 7/15/2015 3:06:22 PM

0 50 100
Metres

N

- Sediment Sample Location (2011)
- Sediment Sample Location (2008)
- Sediment Sample Location (2013)

Proposed ECA Location 264, x 44m

Notes:
1. Aerial Photograph - December 2012 Data set is copyrighted by First Base Solutions Inc. and licensed to CH2M HILL.

Figure 3
Proposed Location and Dimension of ECA

ArcelorMittal Dofasco Inc.
Boatslip Remediation Project
Hamilton, Ontario

CH2MHILL

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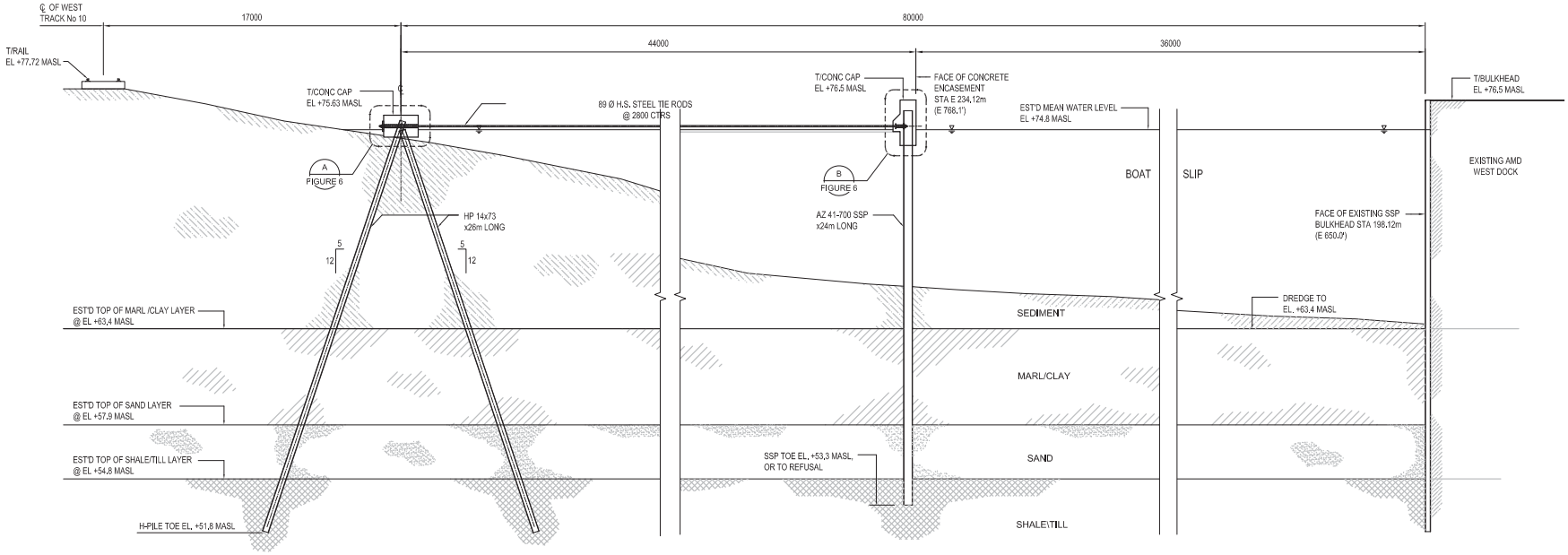


1 SECTION
1:250

NOTE:
SSP BULKHEAD AND A-FRAME ANCHORAGE DESIGN AS SHOWN IS BASED ON THE BEST GEOTECHNICAL DATA THAT WAS MADE AVAILABLE. THE SHALE/TILL LAYER (QUEENSTON SHALE FORMATION) IS ESTIMATED AT EL. +54.8 MASL. HOWEVER, ITS DEPTH IS NOTED AS EL. +48.8 MASL ON ONE OF THE REFERENCE DRAWINGS PROVIDED BY AMD.

NOTES
1. DIMENSIONS IN MILIMETERS UNLESS OTHERWISE NOTED

JAN 21, 2010

LEGEND
MASL METERS ABOVE SEA LEVEL

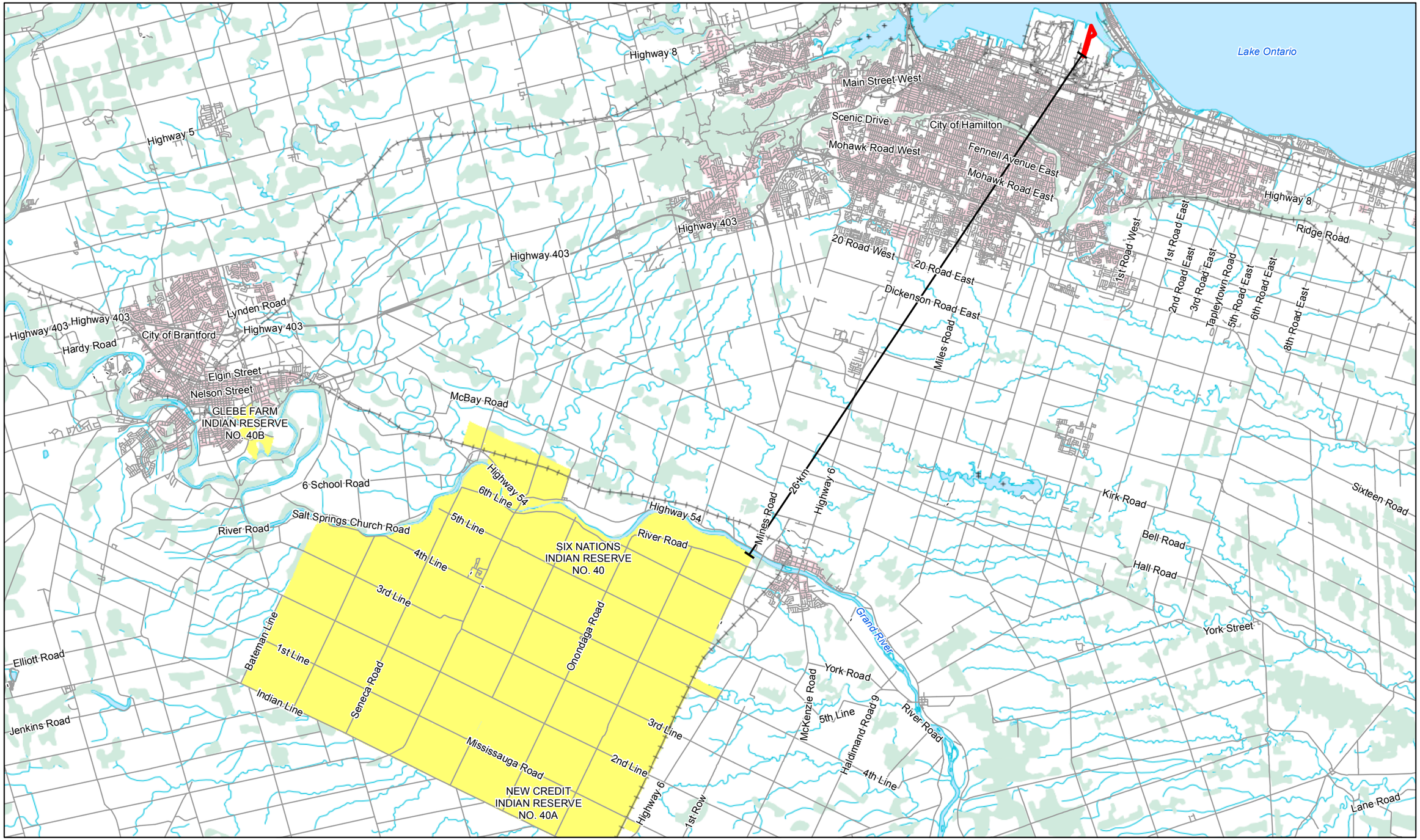
SEDIMENT MARL/CLAY SAND SHALE/TILL

Figure 4
Draft Conceptual Cross Section of ECA

ArcelorMittal Dofasco Inc.
Boat Slip Remediation Project
Hamilton, Ontario

PROJECT# 394794

CH2MHILL



Notes:
1. Aerial Photograph - December 2012 Data set is copyrighted by First Base Solutions Inc. and licensed to CH2M HILL.
2. Property boundaries source: City of Hamilton.

Figure 5
First Nations Land in South / Central Ontario
ArcelorMittal Dofasco Boat Slip Remediation Project
ArcelorMittal Dofasco Inc.
Hamilton, Ontario

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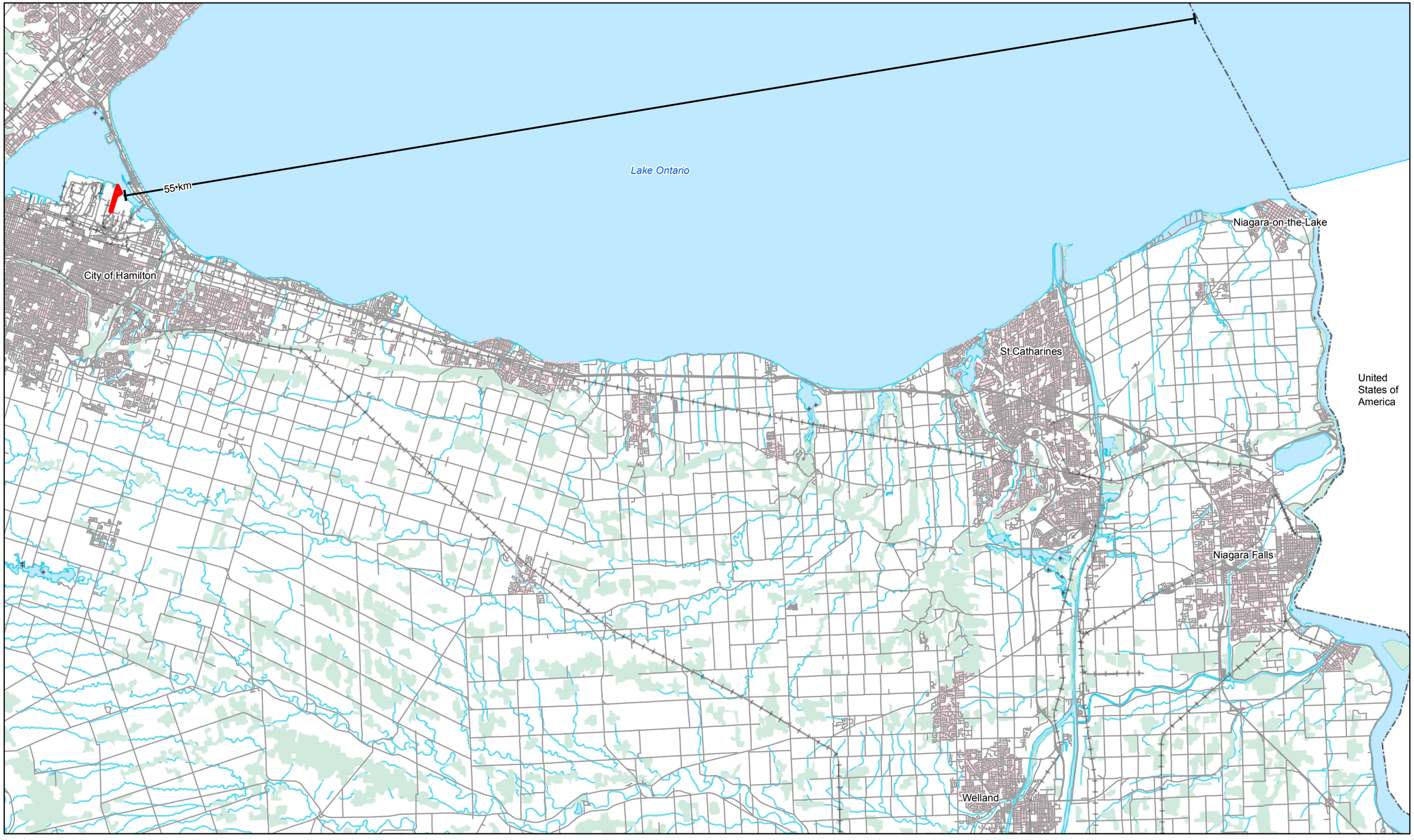

N

0 2 4

Kilometres

Distance to International Border

Road

Project Area

Figure 6
Distance to the International Border
ArcelorMittal Dofasco Boat Slip Remediation Project
ArcelorMittal Dofasco Inc.
Hamilton, Ontario

CH2MHILL

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LEGEND

- Niagara Escarpment
- Windermere Basin
- Hendrie Valley
- Burlington Bar
- Cootes Paradise

FIGURE 7
PROXIMITY OF THE SITE TO DESIGNATED ENVIRONMENTAL OR CULTURAL AREAS
ArcelorMittal Dofasco Inc.,
Boatslip Remediation Project

CH2MHILL