

## Lakeview Village

### Docking Feasibility Study

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## Docking Feasibility Study

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## Executive Summary

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This report provides a high-level review of the feasibility of docking facilities at the Lakeview Village development. The Lakeview Village development is located at the former Lakeview Generating Station site on the Lake Ontario waterfront in Mississauga. The plant was shut down in 2005. The marine facilities associated with the former plant remain and include the Western Pier extending into the Lake and the West Shoreline inside the existing marina basin at Lakefront Promenade Park. The 72-hectare (177-acre) site was purchased by Lakeview Community Partners Limited in 2018 and is being transformed into a sustainable, mixed-use residential community. Twenty-seven hectares (67 acres), including the entire shoreline and the Western Pier, will be transferred to the City of Mississauga for public space. The draft Lakeview Village Development Master Plan has been submitted for review and community consultation. The Plan contemplates a boat docking facility at the West Shoreline and boat docking and vessel mooring at the Western Pier.

Docking at the West Shoreline is feasible, subject to several considerations. The site demonstrates many key attributes of a good docking site: good location; enough water area for mooring boats; protected from waves; adequate depth; safe access to navigable water and enough land base to accommodate the onshore facilities needed to support the docking activity. Ownership of water lots and easements will need to be reviewed to confirm the acceptability of installing docks and associated mooring facilities. Approximately 54 slips could be accommodated in the water area presented in the draft Master Plan. The available depth will constrain the boat mix to power boats and smaller sailboats. As an undeveloped site, there is potentially enough space to support the onshore facilities, however this space is not allocated in the present development plan.

Onshore facilities for a basic service docking facility would typically include road access, parking, and a building with manager's office, washroom, showers, lockers and laundry. Typically, these are for transient (visiting) boaters, but can also accommodate seasonal users. It is not expected that a full-service marina, with fuel services, sewage pump outs, winter storage, haul outs, repair services and onshore recreational facilities, would be provided. Transient moorings will require management (e.g., dock attendants) to facilitate and control docking and provide security. Potential noise from overnight docking requires assessment.

Provision of docking at the West Shoreline should be supported by a market demand analysis for basic docking services and facilities, development of a docking program, a financial analysis of docking operating expenses and capital cost estimates for docks, services and landside facilities. The analysis would inform decisions regarding the number of slips, boat mix (length, type) and split between seasonal and transient slips.

The Western Pier can be adapted for safe public access and use, specifically pedestrian and cyclists (assembly) occupancy loads, seasonal recreational features (e.g., kiosks) and service and emergency vehicles, provided appropriate safety measures and user features are implemented, including railings, lighting and life safety stations. The Western Pier is in good condition and has the structural capacity and adequate alongside depths to allow the mooring of tall ships or other large vessels and the docking of small craft; the Pier was originally designed and used for large bulk carriers up to 225 m in length with a draft of 8 m. The width of the conveyance on the west side of Pier is about 10 m and may restrict mooring on the west side. The width of the conveyance on the east side of the Pier is greater than 40 m and is suitable for mooring. Wave exposure at the Pier must be considered when assessing the feasibility of docking/mooring at the Pier. The southwest face of the Pier is exposed to frequent south to southwesterly waves. The northeast face of the Pier is more sheltered, but still exposed to southeasterly waves. Therefore, the feasibility of docking or mooring is dependent on the vessel size and use and frequency and length of time of mooring. Further study of the wave climate at the Pier would be required to determine the safe conditions for mooring. A dock at water level and a pedestrian ramp down to the boat dock would be needed for small-craft mooring. Renewal of the fendering would be required for mooring larger vessels.

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# 1. Introduction

This report provides a high-level review of the feasibility of docking facilities at the Lakeview Village development. The Lakeview Village development is located at the former Lakeview Generating Station site on the Lake Ontario waterfront in Mississauga. The generating station was constructed in the late 1950's and early 1960's by lakefilling out from the shoreline that existed at that time. In 2005 the plant was shut down and the above-grade structures were removed or demolished. The marine facilities associated with the former power plant remain and include the Western Pier extending into Lake Ontario.

The 72-hectare (177-acre) site was purchased by Lakeview Community Partners Limited in 2018 and is being transformed into a sustainable, mixed-use residential community (see Figure 1.1). Twenty-seven hectares (67 acres) of the land, including the entire shoreline and the Western Pier, will be transferred to the City of Mississauga for public waterfront space. The Lakeview Connection lakefill project, presently under construction, is located to the east of the site. Lakefront Promenade Park (LPP) with the existing breakwater and protected marina basin (public City of Mississauga Lakefront Promenade Marina and private Port Credit Yacht Club) is to the west.

Lakeview Community Partners has submitted the draft Lakeview Village Development Master Plan (Figure 1.1). Review, community consultation and refinement of the Master Plan will be taking place prior to City Council approval. The Master Plan contemplates a boat docking facility at the West Shoreline and boat docking and vessel mooring at the Western Pier.



Figure 1.1: Lakeview Village preliminary Master Plan (2018/10/22)

## 2. Docking at West Shoreline

The Master Plan presents a concept for docking at the West Shoreline (see Figure 2.1). The Plan illustrates a concept for four main docks and a shore-parallel boardwalk. The site adequately demonstrates the six key attributes of a good docking/marina site. A docking facility at the West Shoreline is feasible, subject to several considerations.



Figure 2.1: Master Plan concept for docking facility at West Shoreline (circled in red)

### 2.1 Attributes of a Good Docking/Marina Site

The six key attributes of a good marina site are as follows:

- **Good location** (i.e., adjacent to, or near users; public access; attractions) – The West Shoreline docking area is situated immediately adjacent to the new proposed Lakeview Village development.
- **Enough water area for mooring boats** – There is enough water area for mooring boats in the Lakefront Promenade Park basin at the West Shoreline. However, ownership of water lots and easements will need to be reviewed to confirm the acceptability of installing docks and associated mooring facilities.

- **Protected mooring basin** – The water area adjacent to the West Shoreline is well within the Lakefront Promenade Park marina basin and is well protected from Lake Ontario wave action by the existing breakwaters as demonstrated by experience at the other marinas within the basin and previous wave studies<sup>1</sup>. Ice conditions within the basin in the winter are manageable. Further discussion of the ice conditions is provided in Section 2.2.7.
- **Adequate mooring depth** – The available water depth for mooring is limited by the existing bathymetry near the West Shoreline but is adequate for mooring power boats and small sailboats. The maximum size of boat will be constrained. Further discussion of water depth is provided in Section 2.2.6.
- **Safe access to navigable water** – There is good, safe access to navigable water past the Port Credit Yacht Club, through the existing opening and out to the open lake. Dredging of a navigation (approach) channel is not required.
- **Sufficient land base** – As Lakeview Village is a new development, there is a sufficient land base to accommodate the onshore marina facilities required to support the docking. Presently, the development plan does not show an area for onshore marina facilities, beyond a small structure on at the boardwalk. The onshore facilities are discussed in Section 2.2.3.

## 2.2 Discussion of Docking at West Shoreline

### 2.2.1 In-Water Docking Plan Concept

It is expected that docks at the West Shoreline would be floating docks. A boardwalk parallel to the shore is envisioned on the concept plan. The boardwalk would be fully accessible to the public. Two ramps would be provided down to the boardwalk from the public promenade alongside the West Shore; at least one of the ramps would meet accessibility requirements.

The concept plan presently shows four main docks extending out perpendicular from the shore-parallel boardwalk. In the area shown, about 115 m by 40 m, it is expected that only three main docks could be accommodated. Each main dock would serve slips on both sides with perhaps 18 slips total per main dock (two slips per finger dock) depending on depth restrictions and slip width (boat size). The total number of slips would be approximately 54. This concept is simply indicative of the potential number slips based on the space indicated and is not a final plan. Fewer slips could be provided, and a greater number of slips is possible. The number of slips would be evaluated through a market demand and docking programming study.

Docking for fifty-four boats is similar in scale to the docking at the City of Mississauga Credit Village Marina in the mouth of the Credit River, which has 64 slips, approximately three-quarters of which are transient slips. The nearby City of Mississauga Lakefront Promenade Marina has 176 slips, none of which are dedicated transient slips. The Port Credit Yacht Club is a private club.

The depth constraints indicate that the mix of boats will be primarily made up of motor craft, and a small number of sailboats with a keel depth of approximately 1.5 m. Available depth is discussed in Section 2.2.6.

<sup>1</sup> Baird, 1999. Lakefront Promenade Park Entrance Channel Study Final Report, Public Works and Government Services Canada



## 2.2.2 In-Water Docking Facilities

It is expected that the in-water docking facilities would include the following basic services and features:

- A pedestal at each slip that delivers potable water, and 30-amp and 50-amp electric power service
- Wi-Fi
- Dock boxes
- Lighting for the floating docks, boardwalk and ramps; low glare lighting is preferred
- Life safety stations (sign with emergency numbers, life saving ring with rope, ladder with hooked ends, long pole with hooked end mounted on steel frame/posts)
- Egress ladders (with minimum 2 rungs extending below the low water) mounted directly on the shorewalls or docks
- Navigation aids in accordance with the Canada Shipping Act, Private Buoy Regulations
- Docking shall comply with guidelines expressed in the Accessibility for Ontarians with Disabilities Act, 2005 (AODA).

Fuel and sanitary sewage pump out services are not anticipated; these are available at Lakefront Promenade Marina. Other features of a full-service marina, including repair services, marine supplies and haul out are not expected; Section 2.2.3 provides further discussion of the onshore facilities.

## 2.2.3 Onshore Facilities

Onshore facilities for a basic service marina or docking facility would typically include road access, parking, manager's office and a marina centre with washroom, showers, lockers and laundry. Typically, these are for transient boaters, but can also accommodate seasonal users. It is not expected that a full-service marina would be provided, which generally would include fuel services, sewage pump outs, haul outs, repair services, winter boat storage and onshore recreational facilities.

The number of parking spaces to be provided is dependant on the land available, the number of boat slips, the number and distribution of residents, transient boaters and other visitors and traffic patterns. Guidelines<sup>2</sup> suggest 0.5 to 0.7 cars per slip (peak) and 0.3 to 0.4 cars per slip (typical) for parking for boaters. It might be assumed that additional parking at the marina would not be required for users who are also residents of Lakeview Village because of their proximity to the docking. An additional 0.2 to 0.4 cars per slip for non-boaters (i.e., visitors to waterfront) may be appropriate. A minimum of 1 handicap space for every 50 regular spaces should be provided, however City requirements would govern. Assuming 50 boat slips for discussion purposes, and no marina parking required for transient boaters or provided for Lakeview Village residents, it would be necessary to provide an area to accommodate about 10 to 20 parking spaces adjacent to the docking.

On-site winter boat storage is generally an important part of the operating revenue of a marina. The space requirement is variable but is approximately 50 m<sup>2</sup>/boat (e.g., 40 boats would require about 2000 m<sup>2</sup>). Emergency fire access should be provided. If parking is provided, it could be used for boat storage in the off-season. However, open winter boat storage facilities are typically unsightly and can block the viewscape to the water causing aesthetic concerns. There are security issues to consider; a fenced, secure area is preferred by boaters when storing their boats. Dryland summer storage (space used to store trailers, cradles and blocks) has not been considered.

<sup>2</sup> Small Craft Harbours Branch, 1992. Planning Guidelines for Recreational Harbours in Ontario. Department of Fisheries and Oceans.



## 2.2.4 Environmental Considerations

Improving water quality and enhancing aquatic habitat within the LPP marina basin are important aspects of providing a sustainable and desirable waterfront development. Provision of docking will increase the number of boats which will increase the stress on the environment within the harbour (e.g., increased risk of accidental fuel or sewage spillage, discharge of grey water, litter). As part of the overall planning and design process for Lakeview Village, a water quality measurement programme was initiated in the fall of 2018 and will continue in 2019. Aquatic vegetation growth may be a concern. At the same time, strategies to improve the aquatic habitat are being developed. The docking plan will be included in these strategies.

The docking plan will incorporate best management practices for environmental protection:

- Permeable surfaces and buffer strips to control surface runoff and to reduce direct discharge of contaminants to the water basin. Storm water drainage will be subject to best management practices to mitigate the entry of pollutants and nutrients into the marina basin.
- Established regulations and guidelines for environmental quality control will be followed for marina operations.
- Ontario “Clean Marine” guidelines ([www.cleanmarine.ca](http://www.cleanmarine.ca); Ontario Marine Operators Association) will be applied.

The likely environmental impacts of the proposed docking plans will be assessed. Early consultations with the regulatory agencies is proposed.

## 2.2.5 Docking Management

Transient (visiting) docking will require management (e.g., dock attendants) to facilitate and control docking and provide security. Potential noise impacts to nearby residents of Lakeview Village due to overnight docking will be considered.

Measures would be implemented to improve safety between motorized boats and sailboats and non-motorized users (e.g., canoe, kayak and paddleboards). A safe speed limit (no wake) will be established for safety.

The docking management at Lakeview should include regular meetings with the other users of the LPP marina basin to manage the marina basin uses, resolve issues and plan for special events.

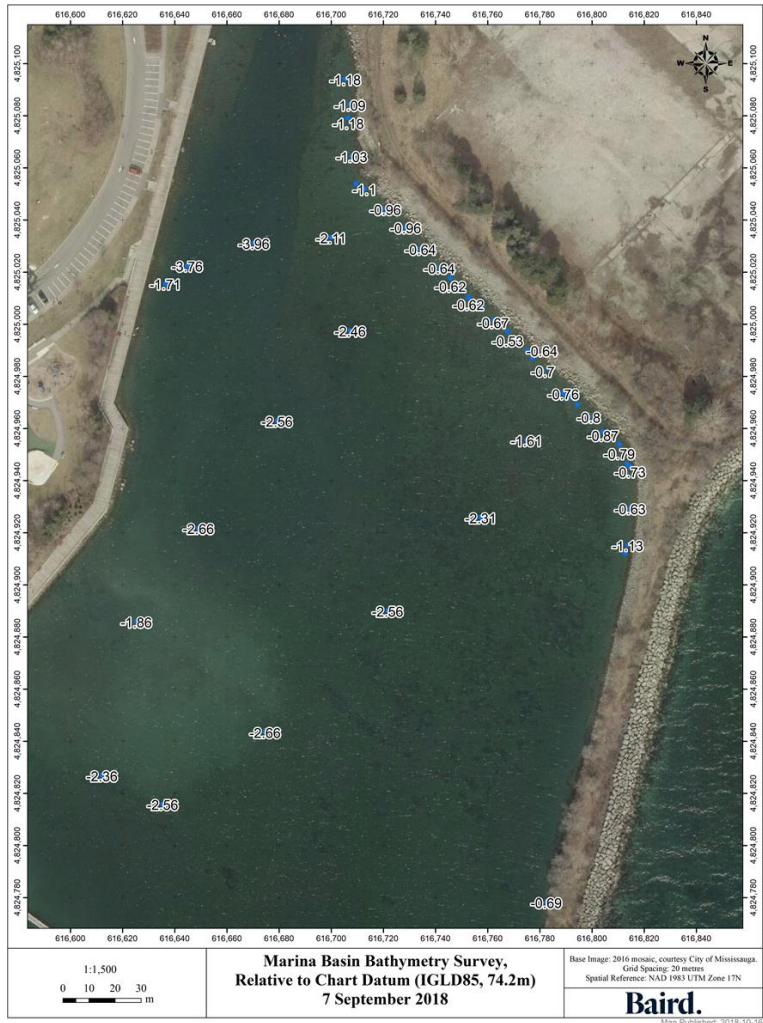
By-laws should be enacted to control docking activities including moorings, off-season activities, insurance requirements for boaters using moorings, and use of municipal parking areas.

## 2.2.6 Available Depths

Docking will be limited to power boats and small sailboats.

Depths, lakebed elevations and water levels in this section of the report are referenced to Lake Ontario Chart Datum (CD), which is 74.2 metres International Great Lakes Datum (IGLD 1985) unless otherwise specified. To obtain the equivalent elevation referenced to Canadian Geodetic Vertical Datum (CGVD) at Toronto, deduct 0.05 m; at Port Credit deduct 0.04 m.

Based on a limited number of depth soundings taken by Baird in 2018 (see Figure 2.2) in the LPP marina basin the lakebed elevation at the docking area is variable but typically about -0.5 m to -0.8 m Chart Datum (CD) near the shore edge and -1.6 m to -2.1 m CD about 30 m from the shore edge. Generally, the lake bottom elevation decreases from southeast to northwest. Additional sounding data will be obtained.



**Figure 2.2: Depth soundings at West Shoreline and Lakefront Promenade Park basin (Baird, 2018)**

The boating season is typically considered to extend from mid-May to mid-October. Records from 1962 to 2018 show that 90% of the time the daily water level exceeds +0.5 m CD (74.7 m) in May, reaches +0.7 m CD (74.9 m) in late June and then declines to about +0.3 m CD (74.5 m) by mid-October. Therefore, approximately 90% of the time, it can be expected that the available water depth during the boating season, based on the lower level in mid-October, is about 0.8 m to 1.1 m near the shore and 1.9 m to 2.4 m at a distance about 30 m from the water's edge.

The depths suggest that the conceptual dock layout presently shown in the Master Plan would be reversed with the longer main docks at the southeasterly end (to reach out further to appropriate depths) and the shorter main docks at the northwesterly end where the water is slightly deeper closer to shore. Boats requiring less draft would be docked in the shallower areas.

At this time, it is not expected that dredging would be undertaken to provided for moorings at the West Shore.

Suitable depths for marinas are 2 m to 3 m below Chart Datum<sup>3</sup>. More specifically, the depth required for boats is generally considered to be the maximum draft of the boats using the docking plus an additional allowance of a minimum 0.3 m for unsurveyed shallow spots and sedimentation plus one-half the wave height within the basin. The acceptable wave height limit for usability is typically about 0.15 m to 0.3 m for user comfort. The wave height criteria above which the relative motion of the boat and dock could cause some minor damage is about 0.3 m to 0.6 m. The West Shoreline location is reasonably well sheltered, and it is expected that wave heights would not exceed approximately 0.5 m. The 0.3 m depth allowance for waves was selected, based on one-half the wave height. Therefore, the total depth required is the maximum boat draft plus 0.6 m.

The draft of power boats is about 0.7 m to 0.8 m for boats 9.1 m (30 ft) long and about 1.1 m for boats of 13.4 m (44 ft) length; the depth required would be 1.3 m to 1.7 m. Docks for these power boats would need to be about 15 m from shore. The draft for 9.8 m (32 ft) long sail boats is about 1.6 m; and about 1.9 m for 13.4 m (44 ft) long sailboats and 2.2 m for 16.4 (54 ft) long sailboats. The depth required would be about 2.2 m to 2.8 m, indicating that sailboats would need to be located at the outer limit of the docking, furthest from shore.

### 2.2.7 Ice

Prior to the shut down of the generating station, ice formation within the marina basin at Lakefront Promenade Park had not been a significant issue largely due to the warm water that was discharged from the plant through the basin. Since the generating station closed in 2005, more ice now forms in the basin during winter. At the Lakefront Promenade Marina, the floating docks are left in place over the winter; the mooring restraints are detached, which helps reduce the risk of damage. This is a standard mitigation method for floating docks in sound ice. Port Credit Yacht Club has experienced damage to some of their docks over the winter. When a basin is partially covered with ice, and the dockage is partly frozen within the sound ice sheet and partially in weak ice or open water, the greatest opportunity for damage to the docks occurs. This is the case for the damaged PCYC docks. Open water nearer the entrance to the marina basin occurs in part because Lake Ontario outside the marina entrance rarely freezes and wave action through the breakwater entrance does not allow the area of the marina basin closest to the entrance to freeze over. The Lakefront Promenade Marina and the West Shoreline docking area are both more distant from the entrance where wave agitation is less than near the entrance. When a basin is only partially covered with ice, but the dockage is locked fast within that ice, there is a risk of damage occurring to the floating dockage systems, but the risk is not as significant as the case where the dockage is not locked within the primary ice sheet.

## 2.3 Docking Market Demand and Programming

A market demand analysis was not included in the scope of this study. The user requirements and programming for the docking at the West Shoreline of Lakeview Village have not yet been determined. This study primarily considers the technical feasibility of the docking. While a market demand analysis has not been completed, it can be expected that the addition of 15,000 to 20,000 new residents at Lakeview Village will increase the demand for seasonal slips and that with the proper in-water and onshore facilities there will be a demand for transient slips.

Provision of docking at the West Shoreline should be supported by a market demand analysis for marina facilities, development of a marina program, a financial analysis of marina operating expenses and capital cost estimates for docks, services and landside facilities. The demand analysis would inform decisions regarding the number of slips to be provided, the boat mix (length, type) and the split between seasonal and transient (visitor) slips.

<sup>3</sup> Small Craft Harbours Branch, 1992. Planning Guidelines for Recreational Harbours in Ontario. Department of Fisheries and Oceans.

### 3. Docking/Mooring at Western Pier

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The Master Plan contemplates docking/mooring at the Western Pier (see Figure 3.1).

The Western Pier consists of a shore-connected, 200 m long, rubble mound mole connected to a 350 m long cellular steel sheet pile structure with a concrete cap. The Western Pier was initially constructed in 1960 and extended circa 1965. It was designed to function as a pier for unloading coal from ships (i.e., large bulk carriers up to 225 m in length with a draft of 8 m; Figure 3.2). The ships moored on either side of the pier. The coal was unloaded down through a hopper structure on the pier to a conveyor system that ran in a covered tunnel in the pier. The tunnel exited to the surface on the mole; from there the conveyor system moved the coal above grade to the coal stockpile. The conveyor system has been removed from the site. The tunnel in the pier remains.

It is feasible for the Western Pier to be used in the future for transient small-craft docking and mooring of larger vessels. The Western Pier is in good condition and has the structural capacity and adequate alongside depths to allow the mooring of tall ships or other large vessels and the docking of small craft. The Pier has enough water area for vessel mooring and boat docking and ready access to navigable water. The width of the conveyance on the west side of Pier is about 10 m and may restrict mooring on the west side. The width of the conveyance on the east side of the Pier is greater than 40 m and is suitable for mooring. The Pier can be adapted for safe public access and use, specifically pedestrian and cyclists (assembly) occupancy loads, seasonal recreational features (e.g., kiosks) and service and emergency vehicles, provided appropriate safety measures and user features are implemented, including railings, lighting and life safety stations.

The level of exposure of docked vessels to wave action at the Pier, particularly for small craft, is of concern. The southwest face of the Pier is exposed to frequent south to southwesterly waves. The northeast face of the Pier is more sheltered, but still exposed to southeasterly waves. Therefore, the feasibility of providing for docking or mooring is dependent on the vessel size and use and frequency and length of time of mooring. For example, large vessels routinely moored along the southwesterly side of the Pier in the past, as they unloaded coal for the former plant. However, docking of small craft on the southwest side is a concern due to the wave exposure. It may be possible to provide for temporary small-craft mooring on the east side through the provision of a dock at the water level. While a floating boat dock might not be feasible due to the wave exposure, the dock could be attached to the side of the pier above the water (i.e., cantilevered from the side) and thus be less susceptible to damage during some storm events. Further detailed analysis of the wave conditions, particularly during the boating season, is presently being undertaken to inform any decision regarding the provision of small-craft docking facilities alongside of the Pier.

A boating dock should be fully accessible to the public. A ramp would be necessary from the top of the Pier to the dock which would be located closer to the water level. A railing may be required along the pier side of the dock because of the circular nature of the steel sheet pile cells and the recessed nature of the arcs that connect the cells. At least one ramp should be AODA compliant.

For the mooring of larger vessels, proper fendering would be provided. The fendering could be of a temporary nature if used infrequently or attached permanently if frequent use was contemplated. The decision on the type of fendering will depend on the nature of the large vessels mooring. The existing chains and remaining rubber fenders might be incorporated into the fendering system depending on vessel mooring requirements. The existing bollards can be used for mooring. Additional ramps may be required to safely embark and disembark passengers. If vessel mooring is implemented water supply for domestic use and fire protection must be provided. Electric power would be required for plug-in boat service at the boat tie-ups. No sanitary sewage collection system is envisaged, as this would require either holding tanks or a connection to the municipal system, possibly requiring grinder pumps and a force main.





Figure 3.1: Master Plan concept for docking/mooring at Western Pier



Figure 3.2: Historical mooring of bulk carrier ship at Western Pier