

Existing / Proposed Infrastructure

EX18.7 Appendix A Part 4

As set out early in this report the site already has some infrastructure in place. In addition there are a significant number of infrastructure projects proposed in and around the Expo site. Following preliminary discussion with stakeholders a set of assumptions, upon which this study is based, has been made as to the status and completion of these projects by 2025.

The Figure 6.1 illustrates the key assumptions as to the completed infrastructure that will serve the site. Where infrastructure is not shown as complete it is assumed that the site is broadly in its current condition

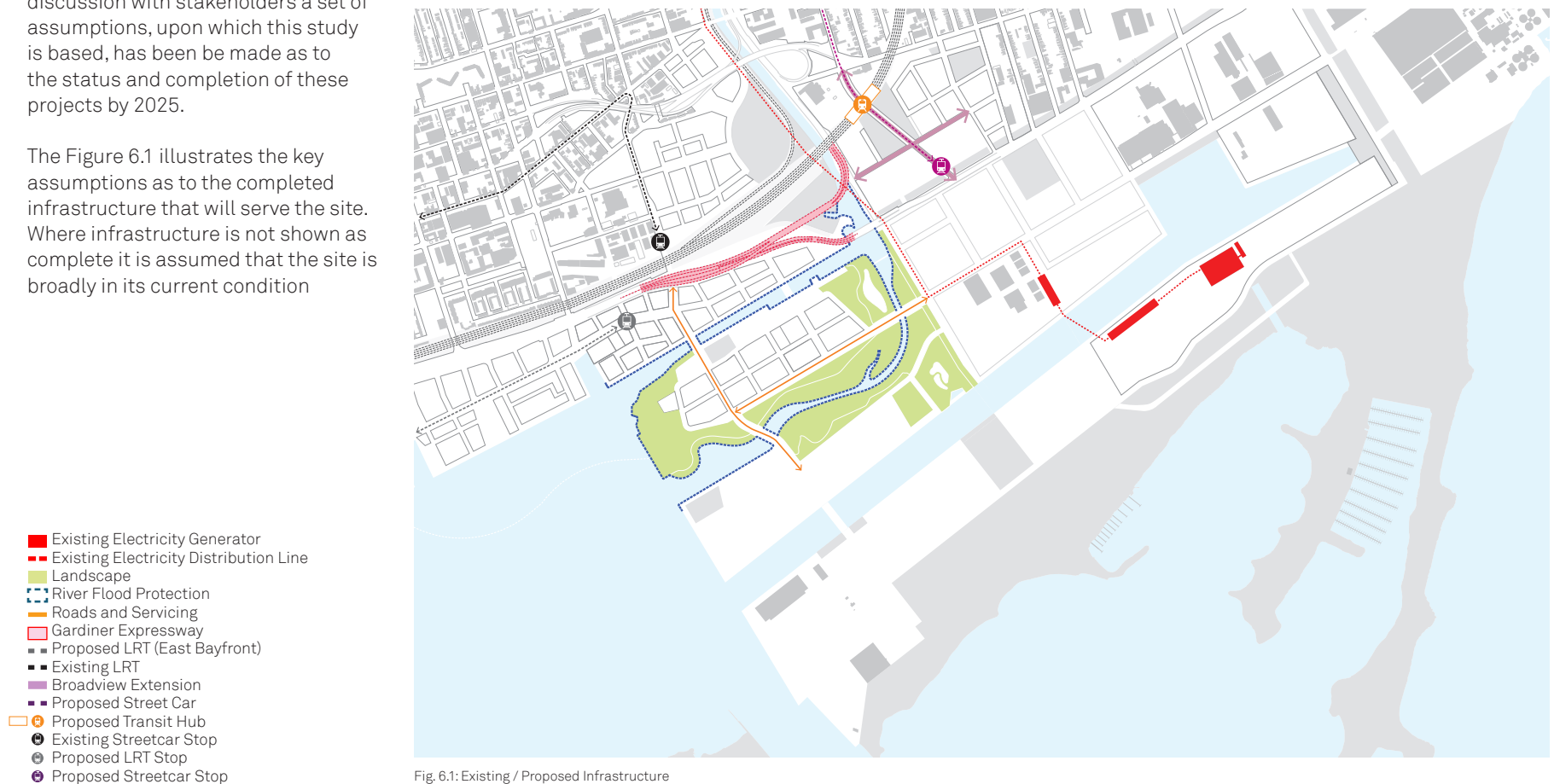


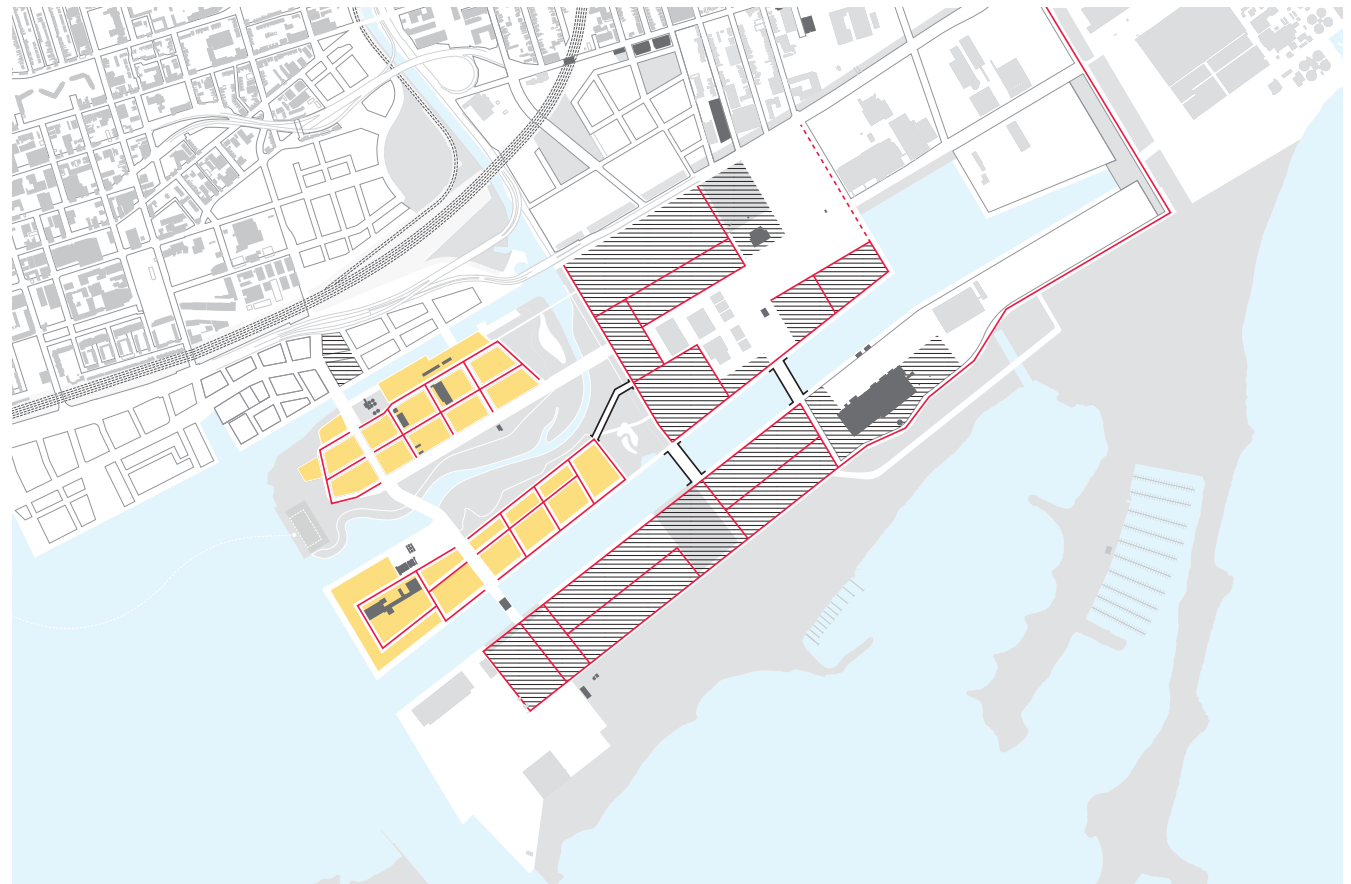
Fig. 6.1: Existing / Proposed Infrastructure

Proposed Permanent Infrastructure

In order to serve the needs of the Expo the following infrastructure is proposed. These items of infrastructure are part of the future infrastructure needs of the Port Lands:

- Permanent Road - The Expo layout makes use of the future development layout and allows the future permanent roads to be built now in their permanent locations. These roads will both serve the Expo and the future development.
- Utility Servicing - Rather than significant temporary servicing being installed to serve the Expo that would then need to be replaced to serve the future development it is proposed to make use of the road network to build a permanent utility network. This would be sized to meet both Expo and future development needs. In addition to the utility works within the Expo site it is expected that connections would be required to the surrounding networks. In addition some off-site reinforcement works may be required and these works would need to be planned in conjunction with the relative utility agencies as part of broader network improvements already planned.
- Some earthworks and environmental remediation will be required to a number of the sites north of the ship canal and east of Don Roadway. These works are required to create a suitable platform both for future development and for the Expo. In the case of the Expo the process, in particular environmental approvals, may need to be expedited to meet the Expo's time frame.
- For other Expo sites, while significant earthworks are not expected, general site clearance and preparation will be required.
- Three new permanent bridges are proposed as shown in Figure 6.2. All of these are in locations provided in the long term development plans and will both serve the Expo and future developments. In addition the existing bridge along Unwin Avenue will be rebuilt to accommodate the larger road.
- Some permanent works to the ship channel will also be undertaken. These are expected to be relatively minor and will allow barges to dock safely during the Expo, but also provide the foundation for the ship channel to be an active waterfront as the area is developed.
- Within this Expo proposal it is not proposed to remove the overhead power lines or reconfigure and underground the electrical infrastructure located adjacent to the Hearn.

The permanent infrastructure works are illustrated in Figure 6.2. In addition to the permanent infrastructure works across there site a range of other permanent works are proposed. These works are expected to form part of the long term works on the site as part of the already planned development. This includes restoration of heritag buildings and the construction of some of the Expo pavilions or features where these will be a long term legacy facility.



- Remediation, earthworks and servicing
- ▨ Site servicing and demolition / clearance
- Road and Servicing
- - - Service Corridor
- ⌌ New Bridge

Fig. 6.2: Proposed Permanent Infrastructure

Proposed Temporary Infrastructure and Overlay

In order for the Expo to function, an overlay of temporary infrastructure is required. This includes a wide range of items including transport, security and emergency services which are described in other parts of this report

Other overlay items include:

- Servicing for all the Expo sites and facilities, which will make use of the permanent connections provided
- Temporary landscaping and surfacing across the site, in particular on the pavilion plots
- Temporary pedestrian bridges, in particular across Lake Shore Boulevard.
- Barges and ships to support Expo facilities and pavilions along the Ship Canal.
- Temporary lighting, fencing, back-up power, signage, scaffold structures and many other items required in an event of this scale. At this stage of design the particular details of these are not known and so the requirement for these has been developed based on standard provisions for world Expos.

The general layout of these overlay provision can be seen in Figure 6.3.

- General Expo Overlay
- Light Overlay in Parks
- Barges and Waterfront Facilities
- Temporary Footbridge
- Temporary Site Services and Landscape



Fig. 6.3: Proposed Temporary Overlay



Fig. 6.4: © November 2016 - BDP - Temporary Landscape at the UK Pavilion - Milan Expo - Rights Reserved



Fig. 6.5: © 2016- Petr Janda Architects - (A)VOID Floating Gallery - Prague - Rights Reserved



Fig. 6.6: © 2004 - Ingemar - Floating Exhibition Pavilion - Venice - Rights Reserved

7 IMPLEMENTATION SCHEDULE

Assumption

A preliminary implementation sequence has been developed to look at how the Expo works and can be implemented. There are two key parts to this which must both be implemented in order for the Expo to be hosted. The first are non-Expo projects, the second is the Expo work, including both permanent and temporary works being implemented

- **Non-Expo projects:** these have already been listed and described earlier in this document and include the Lower Don River works, including flood protection, land for and infrastructure works, East Bayfront LRT and the transport hub in the Unilever site.

- **Expo work:** this consists in broad terms of the permanent infrastructure, temporary infrastructure, transport, pavilions and temporary Expo overlay

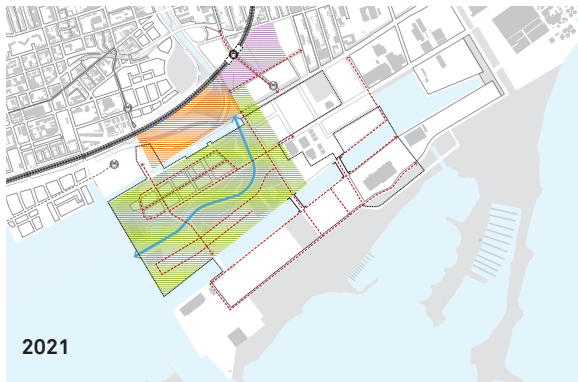
In addition, there are many other projects in Toronto and in particular the Port Lands and surrounding areas planned to be implemented up to 2025. These include both road and rail transit projects as well as utility infrastructure. Preliminary discussions have been held with the City of Toronto and other parties to understand how these interface with the Expo. It is understood that some adjustments to these projects may be required in order to facilitate effectively the implementation of the Expo.

The following diagrams are based on the assumption of the project timings previously detailed in this document that sets out a possible approach for the implementation of the Expo works. This schedule requires a collaborative approach with other projects and with authorities to ensure that work can be undertaken concurrently and that approvals can be progressed in parallel where required.

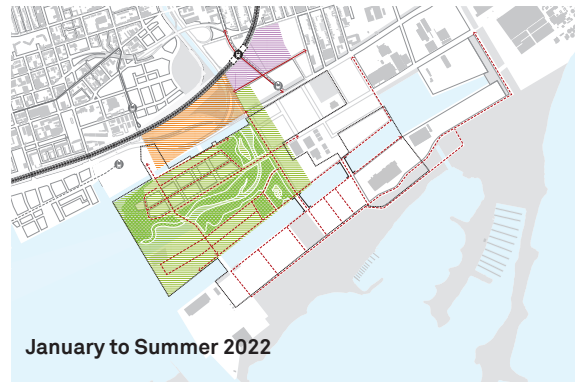
The following diagrams illustrate the development of the Expo infrastructure in 6 months intervals from 2022 to 2025.



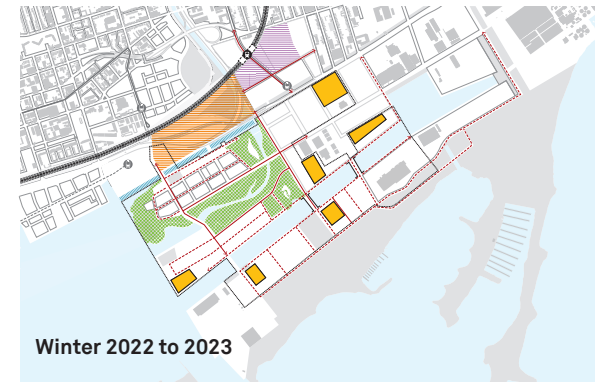
2020 and earlier



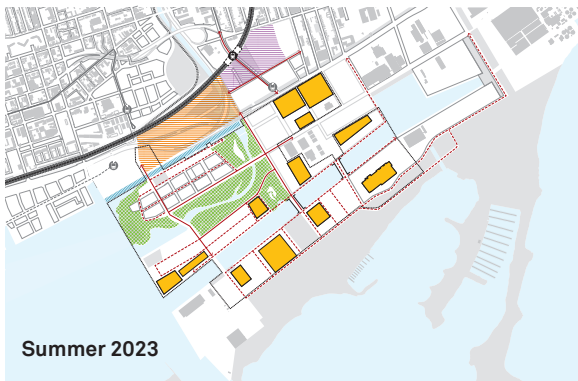
2021



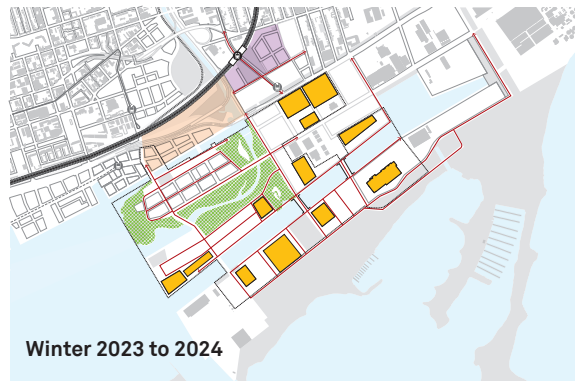
January to Summer 2022



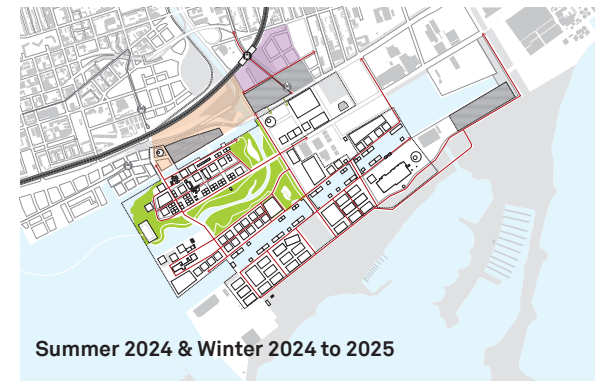
Winter 2022 to 2023



Summer 2023



Winter 2023 to 2024



Summer 2024 & Winter 2024 to 2025

Key Projects Timeline

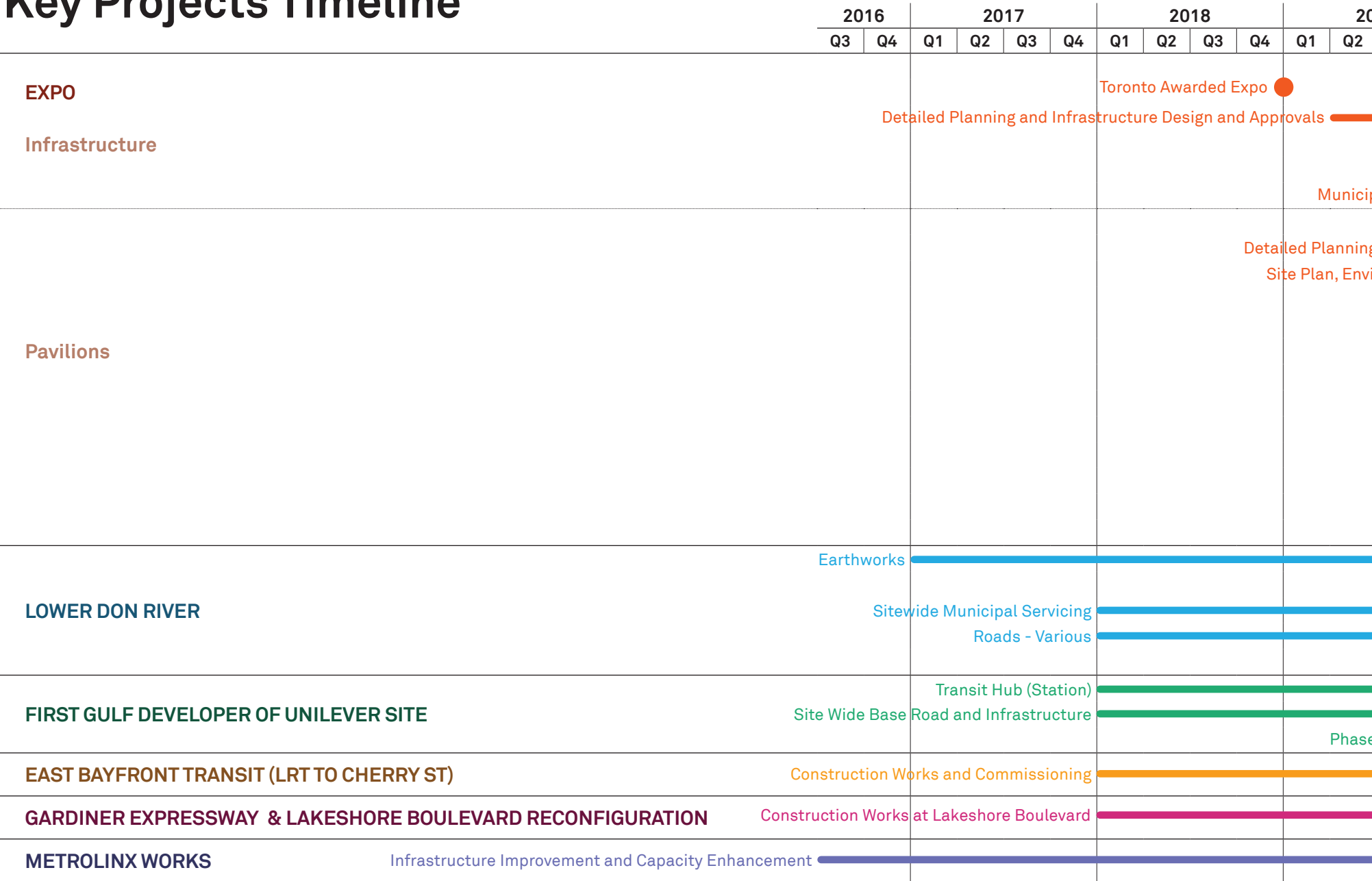
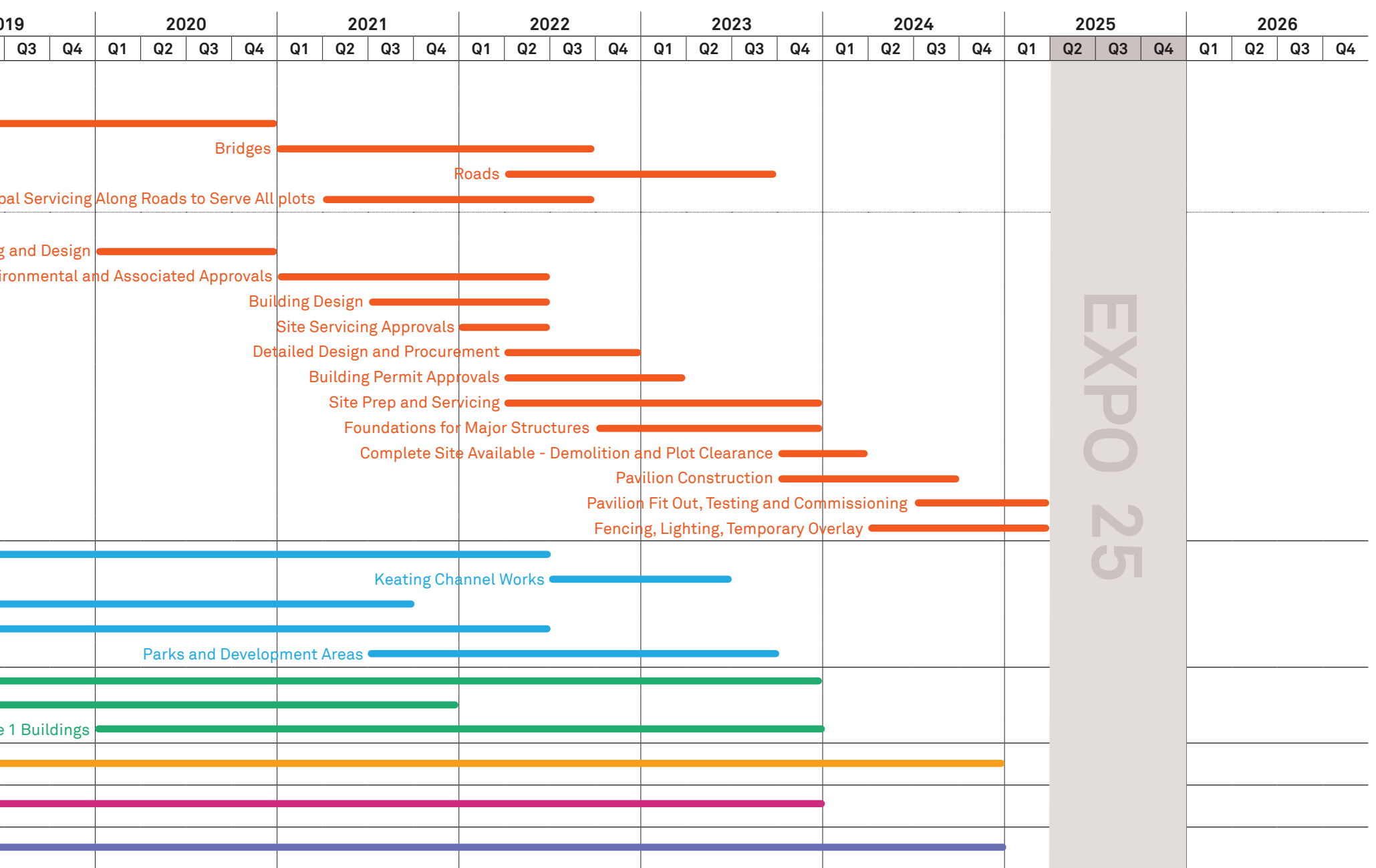


Fig. 7.1: Infrastructure Implementation Schedule - Key Projects Timeline



EXPO 25

SCHEDULE - DIAGRAMS SHOWING EXPO IN 6 MONTH INTERVALS FROM 2022 TO 2025

2020 and Earlier

During 2020 and earlier no significant Expo site works are expected. During this time a number of existing planned projects will need to be progressing on and around the site including: East Bayfront Transit; Unilever Site development and transit hub; and the Lower Don River Works.

By 2020 the new main Lower Don River earthworks are expected to be well progressed with road and servicing work progressing.



Fig. 7.2: Infrastructure Implementation Schedule - 2020 and earlier

2021

During 2021, with the bulk of the earthworks and river works for the Lower Don River Works will be complete and it is expected that the first of the Expo works can commence. During 2021 it is proposed that the permanent servicing across the Expo site, that would also serve the Expo, would be installed. The permanent bridges being proposed as part of the Expo can also start construction.

-  New Permanent Bridge Construction
-  Ongoing - Road and Servicing
-  Ongoing - Transport Project
-  Completed - Transport Project
-  Ongoing - Villiers Island Channel
-  Ongoing - Unilever Site Transport Hub
-  Ongoing - Villiers Island Earthwork
-  Ongoing - Gardiner Project
-  Ongoing - Unilever Site Earthwork
-  Expo Site Boundary

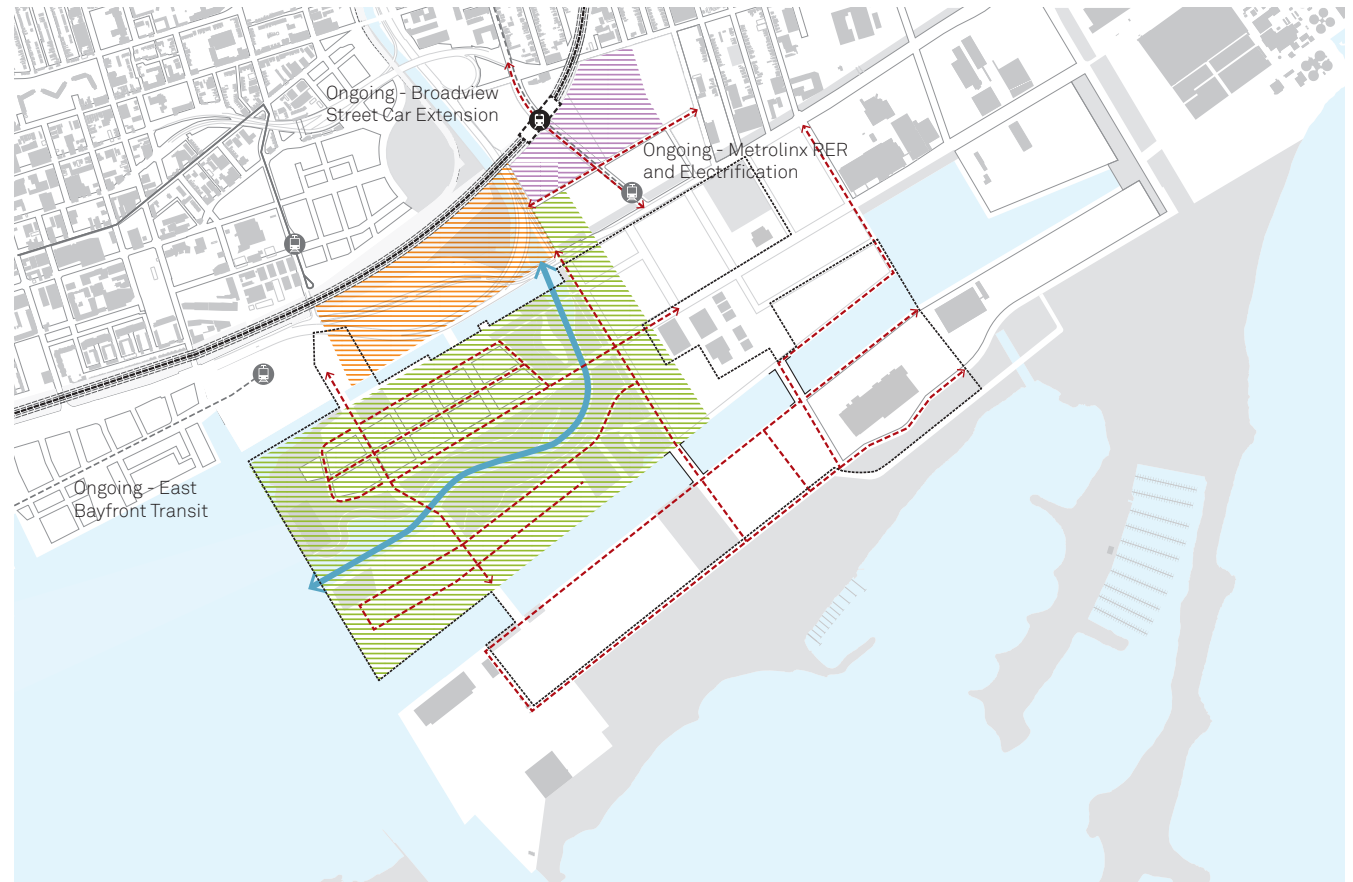


Fig. 7.3: Infrastructure Implementation Schedule - 2021

January to Summer 2022

During 2022, as the earthworks complete the permanent road network can also be built out across the site with servicing and bridges work continuing. The completion of the earthworks also allows for the parks and public realm as part of the Lower Don River Works to start.

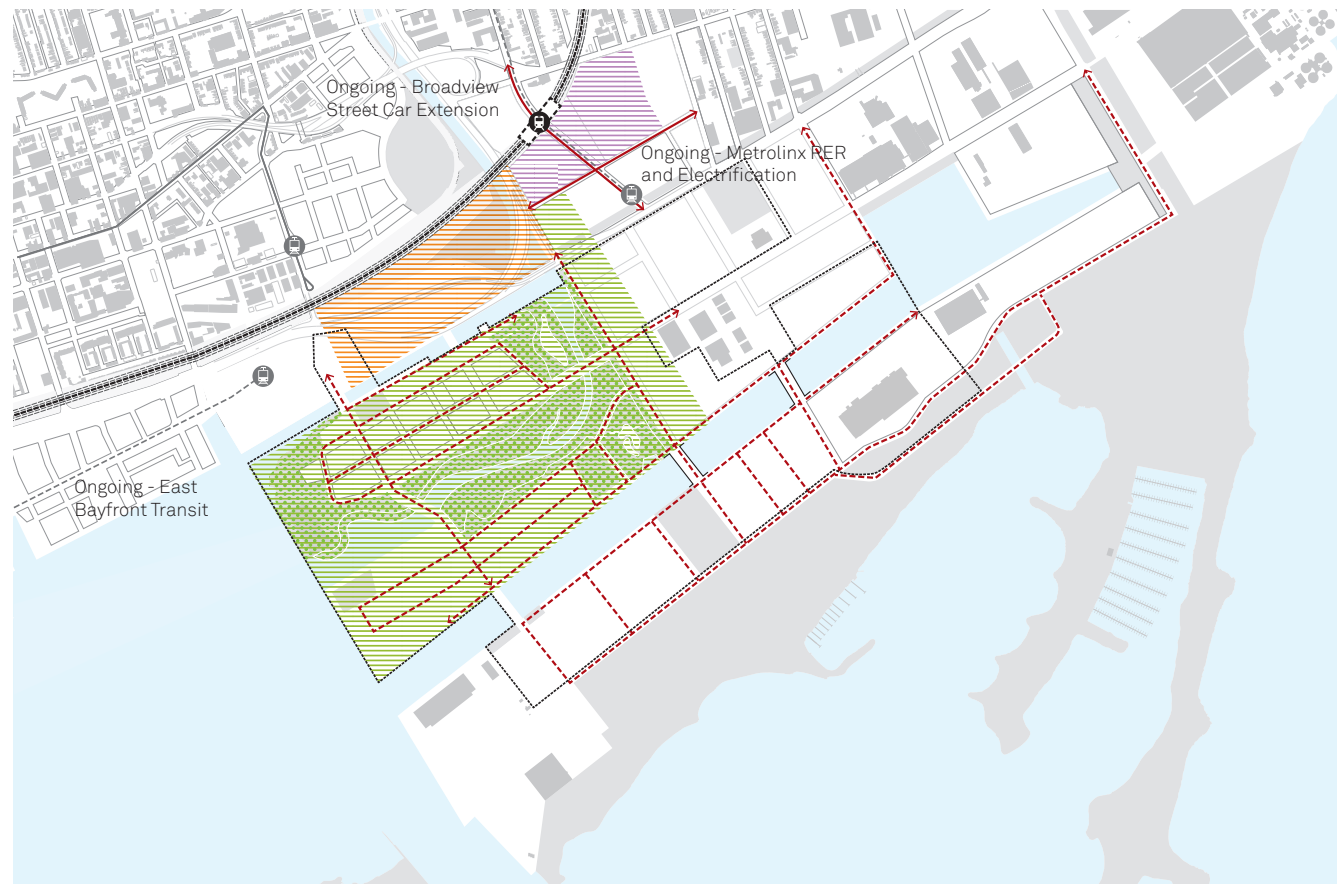


Fig. 7.4: Infrastructure Implementation Schedule - January to Summer 2022

- New Permanent Bridge Construction
- Completed - Road and Servicing
- Ongoing - Road and Servicing
- Ongoing - Transport Project
- Completed - Transport Project
- Ongoing - Unilever Site Transport Hub
- Ongoing - Villiers Island Earthwork
- Ongoing - Gardiner Project
- Ongoing - Unilever Site Earthwork
- Ongoing - Parks and Development Areas
- Expo Site Boundary

Winter 2022 to 2023

By late 2022 earthworks and the key roads will be complete. This allows for:

- Site preparation to start for many of the individual Expo sites, including earthwork and remediation and installation of site specific services.
- Foundation works for some of the larger Expo structures can also start on selected sites.

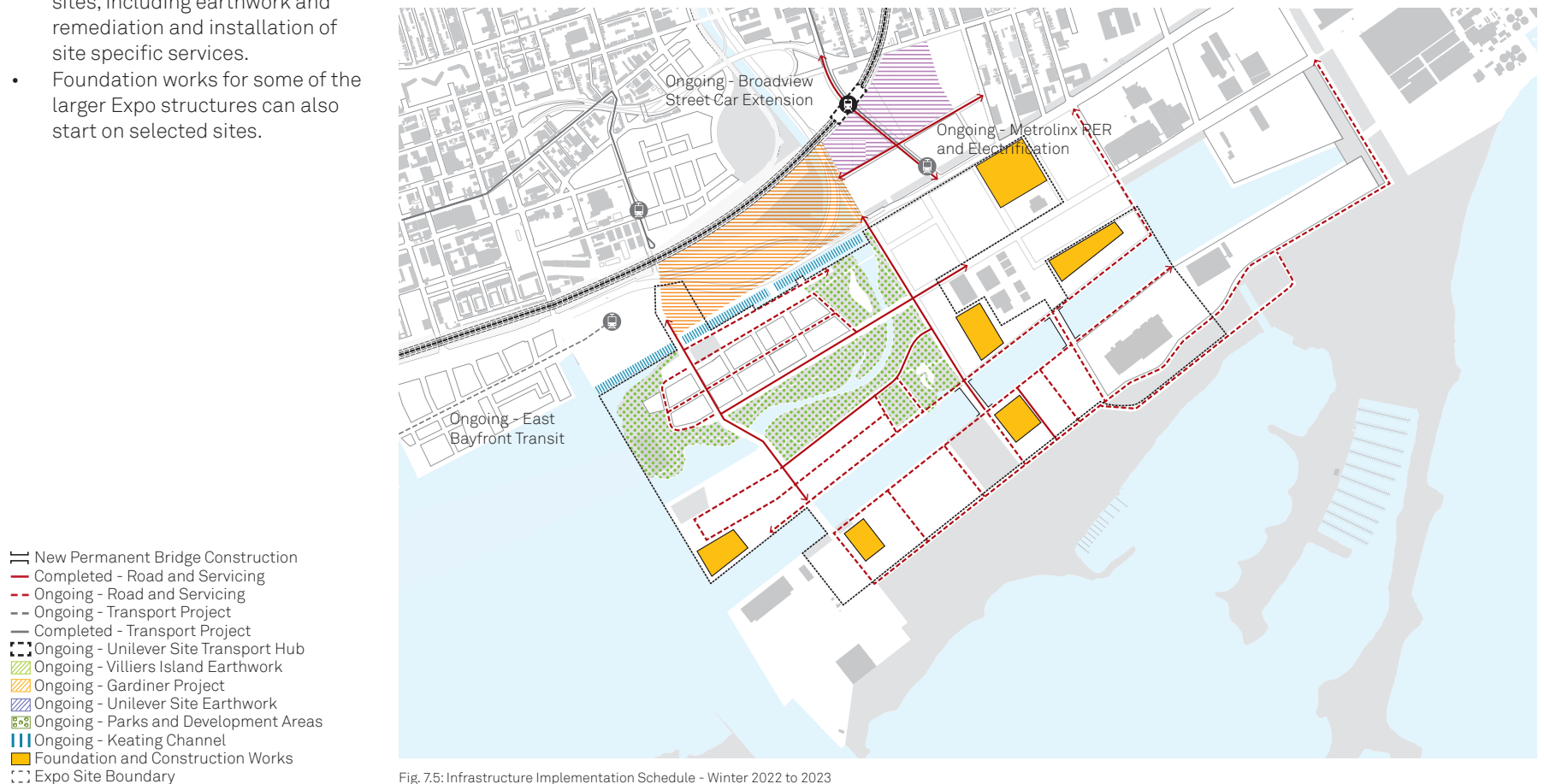


Fig. 7.5: Infrastructure Implementation Schedule - Winter 2022 to 2023

Summer 2023

By this time the Lower Don River Works project will be almost complete with the final landscaping underway. The permanent road and servicing work across the Expo site will also be completing. It is expected that the permanent bridges could be complete by this stage. This allows for:

- Continued site preparation works for all sites away from the Gardiner Project and Villiers Island with temporary paving and services being installed.
- Foundations installation and then superstructure for major structures to be continued and completed through the summer
- Many other pavilions starting ground and superstructure works.

- ▬ New Permanent Bridge Construction
- Completed - Road and Servicing
- - Ongoing - Road and Servicing
- Ongoing - Transport Project
- - Completed - Transport Project
- ⊠ Ongoing - Unilever Site Transport Hub
- ▨ Ongoing - Villiers Island Earthwork
- ▧ Ongoing - Gardiner Project
- ▩ Ongoing - Unilever Site Earthwork
- ⊞ Ongoing - Parks and Development Areas
- ▬ Ongoing - Keating Channel
- Foundation and Construction Works
- ⌈ Expo Site Boundary

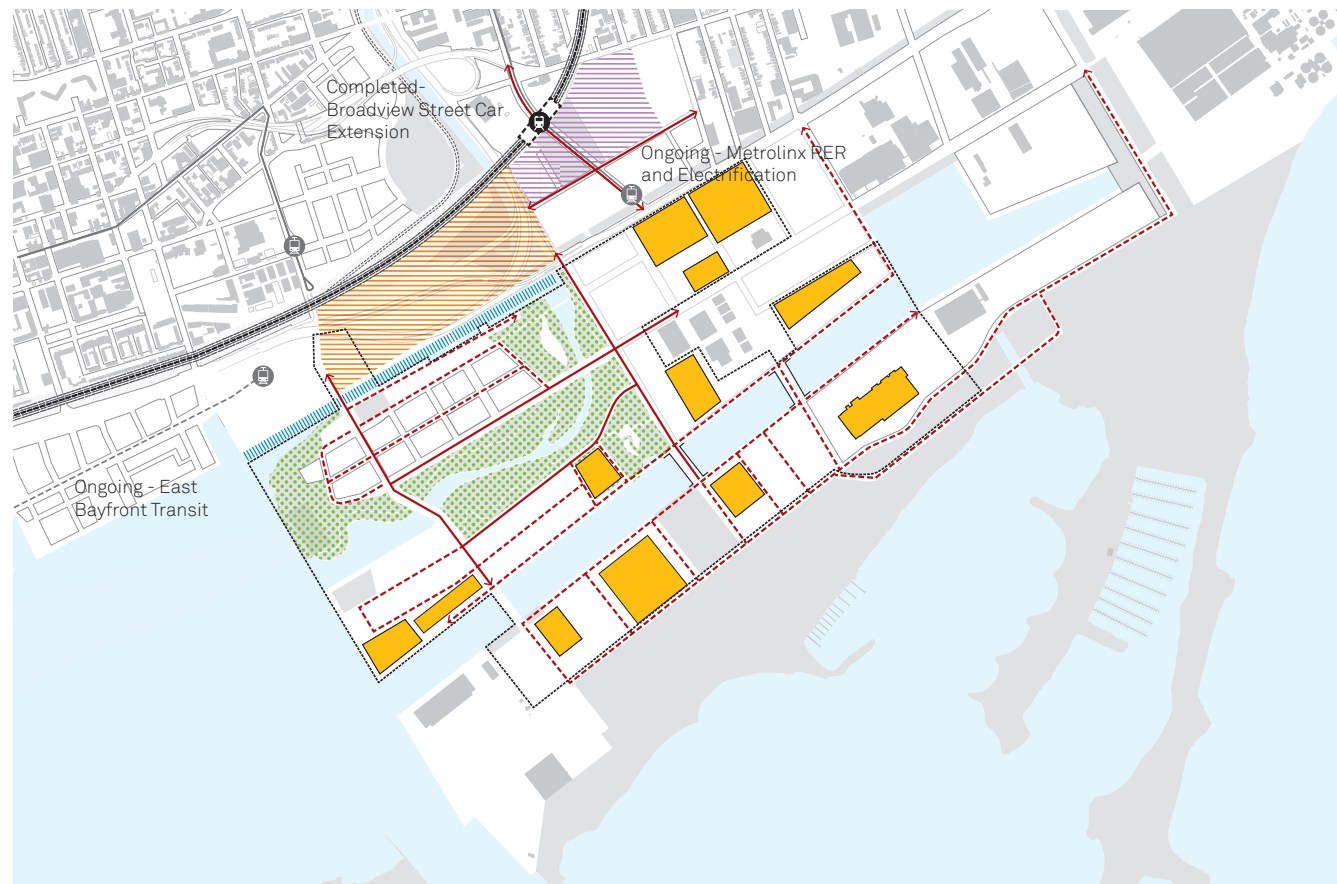


Fig. 7.6: Infrastructure Implementation Schedule - Summer 2023

Winter 2023 to 2024

At this point is expected that most of the Expo site would be handed over to start preparation works with the Lower Don River Works landscaping reaching completion. Works would include:

- Site clearance and general preparation works
- Superstructure for many structures ongoing.

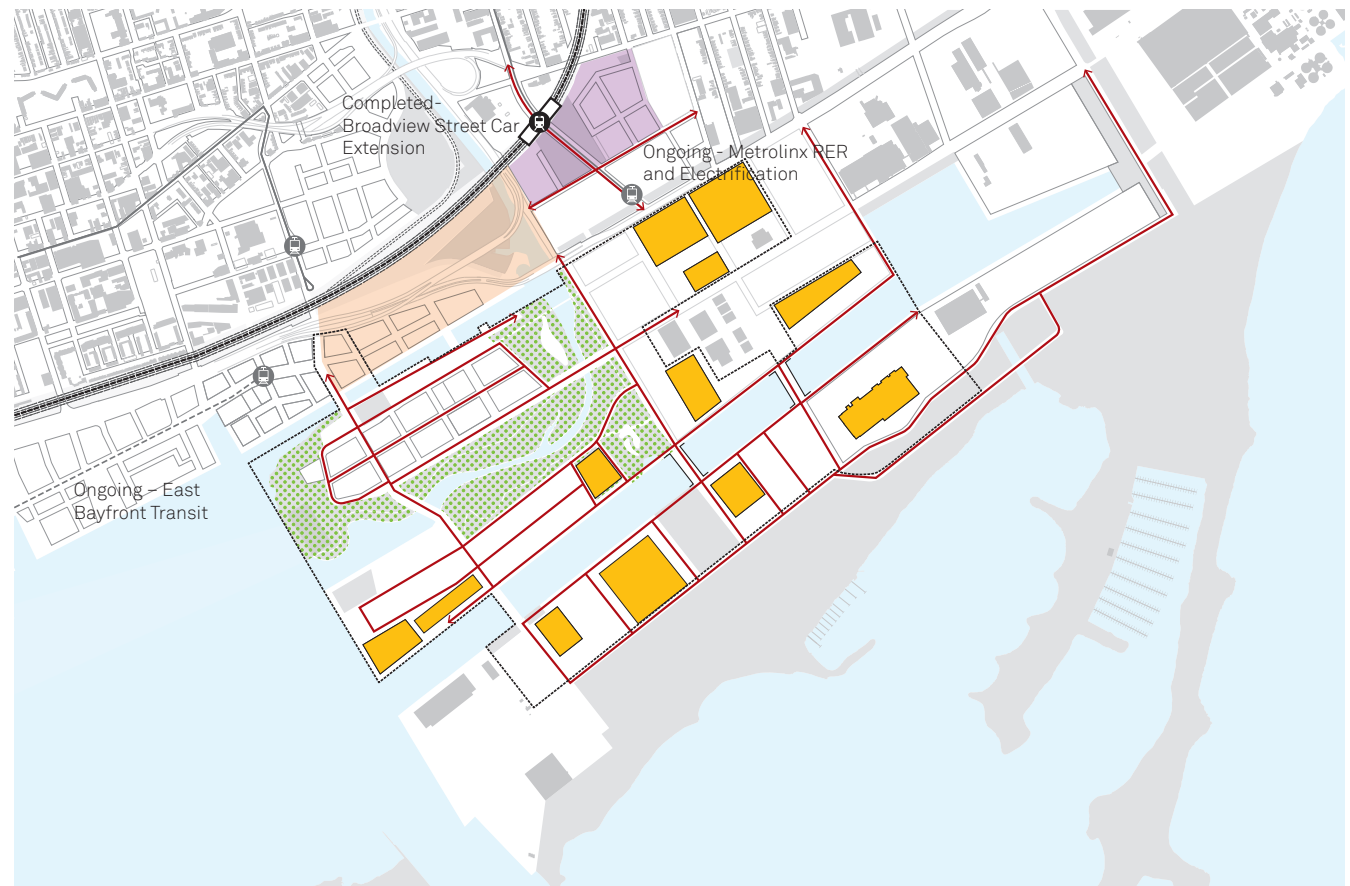


Fig. 7.7: Infrastructure Implementation Schedule - Winter 2023 to 2024

Summer 2024

During the summer preparations for the Expo would be in full swing with:

- All pavilion and other building construction underway
- Parking and other transport facilities under construction
- Fencing and other temporary facility work could start as required
- Temporary foot bridges over Lake Shore Boulevard being built
- Barges all arriving

Winter 2024 to 2025

Preparation works would continue throughout the winter, though with more focus on:

- Pavilion works and smaller overlay structures
- Fit out and commissioning of all facilities
- Additional temporary facilities arriving on site
- Securing the site, testing facilities and training staff and volunteers.

- New Permanent Bridge Construction
- Completed - Road and Servicing
- - Ongoing - Transport Project
- Completed - Transport Project
- Completed - Gardiner Project
- Completed - Unilever Site Earthwork
- Completed - Parks and Development Areas
- Pavilion Structure
- ⌈ ⌋ Expo Site Boundary



Fig. 7.8: Infrastructure Implementation Schedule - Summer 2024 & Winter 2024 to 2025

Key Opportunities and Risks

As shown in the conceptual schedule the implementation of the Expo relies on several events taking place in a sequence, such as completion of part of the Don River works before road and services can be installed, which themselves are required for the pavilions to be constructed, which then allow them to be fitted out. Some key risks and opportunities in this schedule have been identified.

RISKS

- Delay in a funding decision beyond April 2017 or delay in implementation and construction of the Lower Don River works would effect the overall construction schedule for the expo. An accelerated schedule would be required potentially resulting in additional costs.
- Approval delays, particularly environmental – as the schedule for ground works and building up the site platforms and roads for the Expo must be closely integrated with the river naturalisation works.
- Delay in implementation of the transit network improvement proposed by Metrolinx. These works are part of a large integrated set of works and in order to deliver the needs of the Expo works are required not only near the Expo site but in many other locations on the network. This includes currently capacity constraints at Union Station platforms.
- Ability to ramp up transit services temporarily to meet demands, particularly on streetcars, busses and GO rail.

In the case of the Don River Works, which if delayed could have a substantial impact on other Expo works it is recommended to develop contingency measures for this project to recover the schedule if required. Such measures could include alternative construction methods such as bringing in or exporting more material to help construction sequencing, working 24 hours a day or expediting key approvals.

Other measures available to manage these risks include coordinating construction schedules, refining the masterplan to de-link it from major projects such as the Gardiner Expressway work or putting some non-Expo projects on hold during the key construction periods.

OPPORTUNITIES

- The Expo's location on the waterfront with major ship access to site offers an opportunity for large quantities of materials to be delivered directly to the site. This can reduce the burden on existing roads and aid construction.
- The use of modular construction not only can facilitate the reconstruction and re-use of venues or parts of them in other locations but can also significantly reduce construction duration.
- The use of off-site construction is a large opportunity for this Expo site. This could be as simple as construction of large parts of the proposed bridges elsewhere along Lake Ontario and brought in by boat, to parts of all of a pavilion, being built in another country being brought in by boat and either moored in place or lifted to the final pavilion site.

- There is opportunity for Expo works, particularly road and site servicing activities to be integrated into existing proposed construction projects such as waterfront Toronto's Don River naturalisation works. This would reduce interfaces between contractors and allow greater schedule flexibility and opportunities to efficiencies of scale.

Construction Considerations

A number of construction related areas have been considered at a high level during this study to review the feasibility of the Expo and have included discussions with contractors operating in Toronto and Ontario. These are summarised in the following points:

- **Construction Market Capacity** – the Expo and associated infrastructure projects will require considerable construction resources however this is expected to be manageable in the context of the overall Toronto and Ontario construction capacity.
- **Site Access** – The site has good overall access including to the Gardiner Expressway and Don Valley Parkway. In addition the site benefits from very good access to Port facilities which could support major deliveries of prefabricated materials from international locations.
- **Permits and Approvals** – as with many major cities obtaining all the permits and approvals required can be a time consuming process. The construction of multiple buildings utilizing different design firms and contractors will likely create additional challenges in the approvals process. Overall support from City of Toronto provincial and federal leaders will reduce this challenge however the appointment of a 'task force', an 'Expo 2025 Approvals Protocol', or other expedited approach to approvals is strongly recommended.
- **Overall Construction Strategy** – in order to maximize efficiency and effectiveness of the Expo construction, the project could be broken into distinct scopes of work including Site, Pavilion Zones and Tenant Construction. The site works, including road and utility works would be overseen by a single General Contractor or Construction Manager. Pavilion works would be broken into zones and within each of these zones a single contractor would oversee key elements including the major foundation and structural works and manage all construction logistics.
- **Tenant Space Construction** – The design, permitting and construction of 'tenant spaces' works by participating countries likely poses a schedule risk to the Expo. This can be mitigated by assisting countries in the approvals process, by the more substantial works being undertaken by main contractors and by identifying typical finishes which are known to be available and competitively priced in the local market. If tenant work is behind schedule the countries will have the opportunity to secure this shortlisted material to complete their works quickly.

CRITICAL ENABLING PROJECTS

This site analysis study has been based on a number of assumptions on the status of third party projects and activities. The role that these projects have in supporting the Expo varies with some playing a supporting but not critical role while others are essential to the feasibility of the Expo in the Port Lands. Based on this preliminary work, the projects or activities currently identified as being critical to the feasibility of hosting an Expo on the site in 2025 are:

- Lower Don River Flood Protection Works – as illustrated by the schedule, this work must commence on time and be completed in line with its current schedule to allow time for the implementation of the infrastructure, building construction and overlay works to support the Expo. This project will need to start as currently scheduled in 2017. It is also recommended that within the contracts or this project there are provisions for changes that would allow future Expo infrastructure works to be undertaken.
- Expedited Approvals – related to the Lower Don River Works, the infrastructure, road and site preparation work will need to follow on or be undertaken concurrently with Lower Don River Works allowing very little time for approvals. Additionally all of the many pavilions and other facilities will require approvals. In order to manage this and meet the overall schedule a coordinated and expedited process for both City of Toronto and Provincial approvals is required for this project. This could be through an Expo specific planning and approval body.
- Completion and commissioning of the transport hub at or near the Unilever site including capacity improvement in the broader rail network to serve the station as this station is the only high capacity transit hub in close proximity to the site. It would be difficult to provide effective alternatives to this station with the equivalent transit capacity and connectivity to the broader rail network.

8 LEGACY

Throughout this site analysis study one of the objectives has been to align the proposals with the future plans for the site, in particular the infrastructure works allowing much of this to be permanent.

In addition to this the proposals create a range of other legacy opportunities. Specific Legacy ideas are discussed in Lords report. These ideas such as the Indigenous Affairs Museum and Park can be accommodated in the buildings and spaces discussed here.

Affordable Housing - Physical and Social Legacy

Critical to the attraction and retention of young talent, affordable housing should be a legacy priority for Toronto Expo. Both pavilions and accommodation buildings provided for Expo have the potential to be converted into affordable homes in legacy. The current proposals plan to provide 1,000 affordable housing units across the city.

Quality Transport Infrastructure – Physical and Economic Legacy

The transportation systems that bring staff and visitors to and from the Expo site for the six months of the event will be essential to the long term success of this part of the city. Strong physical links between the Port Lands and downtown Toronto will make this area attractive to the type of private developers, businesses and individual talent that the city is hoping to bring to the Port Lands.

Digital Infrastructure - Physical and Economic Legacy

Robust digital infrastructure connecting the businesses and institutions based in the Port Lands with the rest of the city and beyond will be vital to the success of this area. Robust digital infrastructure, building on that already underway in the Port Lands, will underpin the Port Lands' place in the physical and virtual tech corridors developing across North America. With good planning the digital infrastructure installed for the event will be of a suitable design and specification to remain into legacy.

Heritage Buildings – Physical and Cultural Legacy

Across the site there are a number of heritage buildings. With the exception of the Hearn, due to the scale of works required, it is currently included in the proposals that all of these buildings are both used during the Expo and then prepared ready for future permanent uses. These uses can align with both proposed opportunities such as the Indigenous Affairs Cultural Center but can also become community centers and other facilities as set out in Waterfront Toronto's masterplan.

Landmark Building - Physical and Cultural Legacy

Waterfront Toronto's masterplan calls for a number of Catalytic Cultural facilities. There is opportunity for a number of the Expo's most inspiring pavilions to be permanent structures and taken on this role in support of the long term masterplan.

Permanent Buildings – Physical and Economic Legacy

The media center proposed for the Expo is located within the future Pinewood Studios masterplan. There is an opportunity for this to be a permanent media building designed for the long term masterplan use and adapted to work with the Expo. We would propose that as the Expo plans are developed further opportunities are explored around the site with current and future land owners to align further temporary buildings with permanent uses.



Fig. 8.1: © March 2016 - Waterfront Toronto - Background + Context, Review Exercise - Rights Reserved



Fig. 8.2: The African American Museum in Philadelphia



Fig. 8.3: Google's new futuristic campus in North Bayshore district of Mountain View, CA

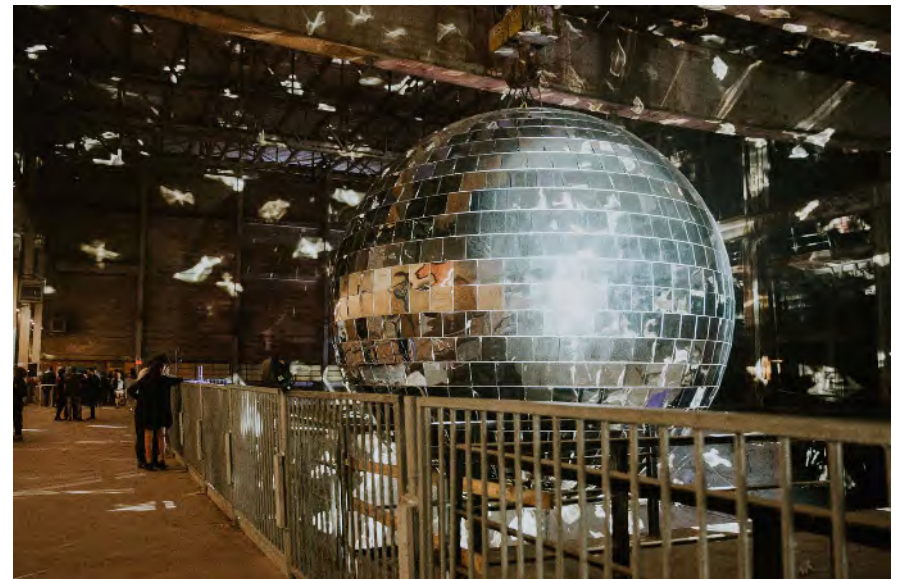


Fig. 8.4: Luminato Festival at The Hearns, June 2016

CONCLUSION

The Port Lands site has been identified as the most viable site for hosting the Toronto Expo 2025 as it has the necessary capacity and can fulfill the requirements as specified by the BIE. Based on discussions with Waterfront Toronto there is a unique opportunity in their planning for an Expo in 2025 as much of the core infrastructure can be in place but significant development works will not have taken place. The Port Lands offers an area that could provide all the necessary infrastructure and provisions needed for a World Expo and can turn the underutilized site into a new urban asset that will exemplify the ambitions of a future sustainable, green, vibrant mixed use community and become a new piece of Toronto's revitalised waterfront. The site is of sufficient size and is comparable to previous Expos. There are viable transport solutions either currently planned or that could be implemented, coupled with appropriate demand management measures to bring visitors to and from the site.

In order to verify the spatial suitability of the Port Lands site we have developed and tested a number of possible masterplans. The masterplan we propose is led by Waterfront Toronto's existing framework plan. By adopting this plan for the Expo we maximise the amount of legacy infrastructure that will be delivered, activate a number of important heritage buildings and showcase this new city quarter. Additionally this masterplan could allow a number of the Expo pavilions and facilities to be constructed as permanent facilities and planned with legacy in mind.

This feasibility is conditional on a number of considerations which are discussed in this report. The three most critical of these are:

- Implementation of Lower Don Flood Protection works in line with the current schedule for these work.
- Implementation of the new GO station on the First Gulf Site (East Harbour Development) and associated capacity and infrastructure improvement works to the rail network by Metrolinx.
- The successful implementation of an expedited process for City and Provincial approvals, both for infrastructure and building works for the Expo and interfacing projects.



ARUP