APPENDIX A

WSP EXECUTIVE SUMMARY

CITY OF WINNIPEG

CHIEF PEGUIS TRAIL EXTENSION WEST FROM MAIN STREET TO BROOKSIDE BOULEVARD

EXECUTIVE SUMMARY

MARCH 2019

ORIGINAL



CHIEF PEGUIS TRAIL EXTENSION WEST FROM MAIN STREET TO BROOKSIDE BOULEVARD

EXECUTIVE SUMMARY

CITY OF WINNIPEG

WSP PROJECT NO.: 16M-02381-01
CITY OF WINNIPEG PROJECT NO.: 770-2016
DATE: MARCH 2019

WSP
111-93 LOMBARD AVENUE
WINNIPEG, MB, CANADA R3B 3B1

TEL.: +1 204 943-3178
FAX: +1 204 943-4948
WSP.COM

WSP Canada Inc.

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE (DRAFT)	REVISION 1	REVISION 2	REVISION 3	REVISION 4	REVISION 4
Remarks	Draft	Revised Draft	Final Draft	Revised Final Draft	Final Version	Revised Final Version
Date	March 7, 2018	June 26, 2018	September 27, 2018	December 21, 2018	January 25, 2019	March 20, 2019
Prepared by	Kenn Rosin	Kerra Mruss	Kerra Mruss	Kerra Mruss	Kerra Mruss	Kerra Mruss
Signature						
Checked by	Richard Tebinka	Richard Tebinka	Richard Tebinka			
Signature						
Authorised by	Kerra Mruss	Kerra Mruss	Kerra Mruss	Kerra Mruss	Kerra Mruss	Kerra Mruss
Signature						
WSP Project number	16M-02381-01	16M-02381-01	16M-02381-01	16M-02381-01	16M-02381-01	16M-02381-01
City of Winnipeg Project Number	770-2016	770-2016	770-2016	770-2016	770-2016	770-2016

SIGNATURES

PREPARED BY

Kerra Mruss, M.Sc., P.Eng., FEC
Project Manager (WSP)

REVIEWED BY

Richard Tebinka, P.Eng.
QA/QC Lead (WSP)

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TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 Study Background 1

1.2 Study Area 1

1.3 Study Team 2

1.4 Existing Conditions 3

2 PUBLIC ENGAGEMENT 6

3 FUNCTIONAL AND PRELIMINARY DESIGN 7

3.1 Roadway Design 8

3.2 Traffic Analysis 9

3.3 Structures 10

3.4 Pedestrian and Cycling Facilities 11

3.5 Transit 14

3.6 Utility Relocations 14

3.7 Drainage 15

3.8 Traffic Noise Assessment 15

3.9 Environmental Assessment 16

3.10 Geotechnical Analysis 16

3.11 Public Realm 18

3.12 Property 18

3.13 Project Delivery Method Assessment 20

3.14 Construction Staging and Implementation Plan 20

3.15 Class 3 Cost Estimate 21

4 CPT EXTENSION WEST FROM MAIN STREET TO MCPHILLIPS STREET ONLY 24

4.1 Study Area 24

4.2 Property Acquisition Requirements 24

4.3 Class 3 Cost Estimate 25

5 RECOMMENDATIONS 26

TABLES

TABLE 3.1: SUMMARY OF ESTIMATED ACQUISITION COSTS – MAIN STREET TO BROOKSIDE BOULEVARD. 20
TABLE 3.2: CONSTRUCTION STAGING AND IMPLEMENTATION – MAIN STREET TO BROOKSIDE BOULEVARD 22
TABLE 3.3: CPT EXTENSION COST ESTIMATE – MAIN STREET TO BROOKSIDE BOULEVARD 23
TABLE 4.1: SUMMARY OF ESTIMATED ACQUISITION COSTS – MAIN STREET TO MCPHILLIPS STREET ONLY 24
TABLE 4.2: CPT EXTENSION COST ESTIMATE – MAIN STREET TO MCPHILLIPS STREET ONLY 25

FIGURES

FIGURE 1.1: STUDY AREA 5
FIGURE 3.1: EXISTING AND PROPOSED PEDESTRIAN AND CYCLING FACILITIES 13
FIGURE 3.2: SECTION THROUGH CORRIDOR SHOWING PLANTING AND LANDFORM STRATEGIES 18

1 INTRODUCTION

1.1 STUDY BACKGROUND

The City of Winnipeg's Transportation Master Plan (TMP) includes the Chief Peguis Trail (CPT) as a major transportation facility and an important component of the City's strategic road network. CPT is intended to provide a continuous east-west link between the east and west sections of the Perimeter Highway (PTH 101) via CentrePort Canada Way, in order to accommodate the travel demand associated with future residential, commercial, and industrial growth in north Winnipeg. Formerly identified in the 1968 Winnipeg Area Transportation Study as the northern portion of the suburban beltway, and later as the Kildonan Corridor, CPT has been part of several transportation plans prepared by the City since the 1960's. The first section of CPT, between Main Street and Henderson Highway, was completed in 1990, and an eastern extension between Henderson Highway and Lagimodiere Boulevard was completed in 2011.

Residential and employment growth in the northern part of Winnipeg and adjacent Capital Region Municipalities over the next 25 years will result in increased travel demand to/from this area of Winnipeg. This increase in travel demand will be multi-modal, but a significant portion will be vehicle trips. There is a need to mitigate the impact of this increase in vehicular trip making on the existing street system and also to accommodate future regional traffic growth.

WSP Canada Group Limited (WSP) was retained to develop a **Functional and Preliminary Design of the CPT Extension West from Main Street to Brookside Boulevard.**

The **Functional Design Report** was completed by WSP in September 2017. This report documented the study background, existing conditions, design criteria, traffic analysis, public engagement and the Functional Design of the CPT Extension West from Main Street to Brookside Boulevard for both the Initial Four-Lane Phase and Future Six-Lane Expansion Configuration. The Functional Design included roadway design and alignment, intersection / interchange configuration, structural design, pedestrian and cyclist facilities, transit, drainage, utility relocations, noise assessment, construction staging, Class 4 cost estimate, road safety audit, environmental assessment, value engineering, risk assessment, and public engagement.

The **Preliminary Design Report** was completed by WSP in February 2019. This report expands upon the design components recommended in the Functional Design Report for the Initial Four-Lane Phase. The Preliminary Design elements of the CPT Extension include traffic analysis, roadworks, intersections, interchanges, pedestrian and cycling facilities and structures, transit facilities, utility relocations, drainage requirements, noise assessment, environmental assessment, geotechnical analysis, public realm (landscaping and public art), property (property acquisition and title plot), project delivery method assessment, construction staging, Class 3 cost estimate and affordability review. The Preliminary Design also included an independent road safety audit and additional public engagement.

Following the completion of the Preliminary Design for the CPT Extension west from Main Street to Brookside Boulevard, the City requested WSP to investigate the extension of CPT from Main Street to McPhillips Street only as a potential Part 1 of the Initial Four-Lane Phase. Part 1 of the Initial Four-Lane Phase would include a single-point urban interchange (SPUI) at the intersection of CPT and Main Street and a three-legged at-grade signalized intersection at CPT and McPhillips Street. The results of the additional analysis and design are included in a separate addendum and are summarized in Section 5.0 of this Executive Summary.

1.2 STUDY AREA

The study area identified for the CPT extension, shown in **Figure 1.1** on page 4, extends from Main Street to Brookside Boulevard. In addition to CPT, the major streets that are part of the study area include:

— Main Street from Leila Avenue/Partridge Avenue to Red River Boulevard;

- Ferrier Street/McGregor Street from Templeton Avenue to Murray Avenue;
- McPhillips Street from Leila Avenue to Murray Avenue;
- Pipeline Road from Templeton Avenue to Mollard Road;
- Dr. Jose Rizal Way from Jefferson Avenue to Mollard Road;
- Brookside Boulevard immediately north and south of CPT; and
- Leila Avenue from Ritchie Street to the new Dr. Jose Rizal Way.

The Initial Four-Lane Phase (previously known as the Initial Stage in the Functional Design Report) for the full project limits (Main Street to Brookside Boulevard) of the CPT Extension includes:

- Four lanes on CPT from Main Street to Brookside Boulevard;
- Single-point urban interchange (SPUI) at the intersection of CPT and Main Street;
- Diamond interchange at the intersection of CPT and McPhillips Street;
- At-grade intersections at CPT with Ferrier Street, Pipeline Road, Dr. Jose Rizal Way, and Brookside Boulevard;
- Extension of Dr. Jose Rizal Way, realignment of Ferrier Street / McGregor Street and upgrades on Main Street, McPhillips Street and Pipeline Road; and
- Pedestrian and cycling overpasses of Main Street south of CPT, of CPT west of Ferrier Street and of CPT at Amber Trails.

The Future Six-Lane Expansion Phase (previously known as the Ultimate Stage in the Functional Design Report) of the CPT Extension includes:

- Six lanes on CPT from Main Street to Brookside Boulevard;
- Single-point urban interchange (SPUI) at the intersection of CPT and Main Street;
- Diamond interchange at the intersections of CPT with McPhillips Street, Ferrier Street, Pipeline Road, Dr. Jose Rizal Way and Brookside Boulevard;
- Extension of Dr. Jose Rizal Way, realignment of Ferrier Street / McGregor Street and upgrades on Main Street, McPhillips Street and Pipeline Road; and
- Pedestrian and cycling overpasses of Main Street south of CPT, of CPT west of Ferrier Street, of CPT at Amber Trails, and of Brookside Boulevard south of CPT.

1.3 STUDY TEAM

The **CPT Study Team** included individuals from the following consulting firms:

- WSP Canada Group Limited – Project Management, Traffic Forecasts and Operations, Roadway Design, Pedestrians and Cyclists, Transit, Consultation, Public Engagement, Land Use Planning, Environmental, Structural Design, Utilities, Land Drainage, Safety Review and Project Delivery.
- Amec Foster Wheeler – Geotechnical, Pavement Design.
- HTFC Planning & Design – Landscape Architecture/Accessible Design, Pedestrians and Cyclists.
- Stevenson Advisors – Real Estate and Property Assessment.
- Barnes & Duncan – Title Plot.
- Industrial Technology Centre – Noise Forecasts.
- Faithful+Gould – Value Engineering and Risk Workshop Facilitation.
- Winnipeg Arts Council – Public Art.

1.4 EXISTING CONDITIONS

The study area for this project contains a mix of **existing land uses** along its length including:

- Commercial development and a cemetery along Main Street north of CPT;
- The North End Sewage Treatment Plant on the west side of Main Street south of CPT;
- The Kildonan Golf Course on the east side of Main Street south of CPT;
- Single-family residential on the north side of the future CPT from immediately west of Main Street to the CPR Winnipeg Beach rail line;
- Industrial development and a cemetery on the south side of the future CPT from the CPR Winnipeg Beach rail line to McPhillips Street;
- Rural agricultural land and a new residential development on the north side of the future CPT from the CPR Winnipeg Beach rail line to McPhillips Street;
- Rural agricultural land on the north side of the future CPT from McPhillips Street to Pipeline Road;
- Commercial development and agricultural land on the south side of the future CPT from McPhillips Street to Pipeline Road;
- Residential development on the south side of the future CPT from Pipeline Road to Dr. Jose Rizal Way;
- Rural agricultural land on the north side of the future CPT from Pipeline Road to Dr. Jose Rizal Way; and
- Rural agricultural land on the north and south sides of the future CPT from Dr. Jose Rizal Way to Brookside Boulevard.

There are a limited number of **existing pedestrian and cycling facilities** in the study area. There are multi-use paths to the east and west of the Kildonan Settlers Bridge, a sidewalk on the south side of the Kildonan Settlers Bridge and sidewalks on both sides of Main Street and Henderson Highway. Improvements to the multi-use paths on both sides of the Kildonan Settlers Bridge are being undertaken as part of the Chief Peguis Greenway Extension from Main Street to Henderson Highway proposed for implementation in 2018/2019.

There are **several existing transit routes** serving portions of the study area, as well as **two CPR rail lines** in the study area that the CPT Extension will cross:

- CPR Winnipeg Beach Subdivision, a north-south rail line located between Main Street and Ferrier Street; and
- CPR Arborg Subdivision, a north-south rail line located between Pipeline Road and King Edward Street.

The study area contains **several major and minor utility systems**, both above and below ground, that serve the City of Winnipeg. These systems are concentrated in three key areas:

- Main Street right-of-way;
- Near the North End Sewage Treatment Plant; and
- Manitoba Hydro high-voltage transmission corridor just west of McPhillips Street.

With respect to existing **environmental conditions**, the majority of the study area consists of cultivated or hayed agricultural fields with areas of interspersed wetlands and remnants of aspen forest and wet meadow/wetlands. The Ferrier Forest is the largest natural area within the study area and consists of aspen forest and wet meadow areas. The City of Winnipeg Naturalist Services Branch has assessed four natural areas within the study area that include the following:

- Frog Plains wetland, roughly located along the CPR Winnipeg Beach right-of-way;
- Ferrier Forest, roughly located within existing City of Winnipeg right-of-way west of Ferrier Street between Murray Avenue and the Bergen Cut-off;
- Old Kildonan wetland, roughly located east of Pipeline Road between Templeton Avenue and Storie Road; and

— Ritchie Street wetland, roughly located in the southeast quadrant of the intersection of Ritchie Street and Mollard Road.



Figure 1.1: Study Area

2 PUBLIC ENGAGEMENT

In conjunction with the City of Winnipeg, a Public Engagement Plan (PEP) was developed to guide the public engagement process for the CPT Extension West study. The PEP outlined the public engagement objectives and the methodology for engaging with landowners, stakeholders, and members of the general public. These groups were engaged both in-person and online in order to introduce the study and collect feedback.

The goal of the project's public engagement program was to provide study information to the public and collect feedback throughout the study in order to:

- Inform the community of the intended plans;
- Help plan pedestrian and cycling infrastructure and amenities;
- Help identify connections to community destinations;
- Ensure the project complements adjacent development;
- Address the requirements of the Environmental Act License; and
- Meet with affected landowners and identify property requirements.

Phase I of public engagement commenced in February 2017. The intent of Phase I was to present study and background information, learn about local knowledge on issues and opportunities, and seek comments on the recommended draft design. Public engagement in Phase I included stakeholder meetings, landowner meetings, a public information session, and an online comment form.

Throughout Phase I, a total of 225 comment forms were submitted to the project team (113 paper submissions and 112 online submissions). Feedback from Phase I was generally supportive of the project, with the majority of concerns being about the need to design and build the extension in a timely manner. The public also expressed concerns about traffic signals, too many intersections, increased traffic on streets connecting to CPT, and preservation of Frog Plain Park, and noted that it was time north Winnipeg received funding for large scale infrastructure projects rather than south Winnipeg and satisfaction with the proposed pedestrian and cycling infrastructure within the limits of the project.

Phase II of public engagement commenced in October 2017. Its intent was to present the final recommended Preliminary Design and seek input from the public and stakeholders. Public engagement in Phase II included stakeholder meetings, landowner meetings, a public information session, and an online comment form. A 3D video fly-through of the design was presented online and at the public information session.

Throughout Phase II, a total of 218 comment forms were submitted to the project team (163 paper submissions and 55 online submissions). Feedback from Phase II was also generally supportive of the project, and comments included a desire to have the extension constructed as soon as possible. Landowners expressed concerns about the timing and process of property acquisition, and the public provided comments about limiting the number of traffic signals, providing sound attenuation, preserving the natural environmental adjacent to the corridor, and implementing the proposed pedestrian and cycling infrastructure.

A number of additional comments and suggestions were also received via the online survey and comment forms and are included in the public engagement reports. The complete public engagement reports for the CPT Extension West study were posted online on the project website.

3 FUNCTIONAL AND PRELIMINARY DESIGN

A Functional Design of the CPT Extension West from Main Street to Brookside Boulevard was completed by WSP in September 2017 for both the Initial Four-Lane Phase and Future Six-Lane Expansion Configuration. The various components of the Initial Four-Lane Phase and Future Six-Lane Expansion Configuration are illustrated in **Figure 1.1**. The Functional Design included the following components:

- Roadway design;
- Roadway alignment;
- Intersection / interchange configuration;
- Structural design;
- Pedestrian and cyclist facilities;
- Transit;
- Drainage;
- Utility relocations;
- Noise assessment;
- Construction staging;
- Class 5 cost estimate;
- Road safety audit;
- Environmental assessment;
- Value engineering; and
- Risk Assessment.

The results of the Functional Design analysis are summarized in the **Chief Peguis Trail Extension West from Main Street to Brookside Boulevard Functional Design Report** (**Functional Design Report**).

The Preliminary Design of the Initial Four-Lane Phase of the CPT Extension refines and expands upon the design components recommended in the Functional Design for the Initial Four-Lane Phase of the CPT Extension. It includes:

- Design criteria;
- Traffic analysis for the study area;
- Roadway and intersection design;
- Pedestrian and cycling facilities;
- Structures;
- Transit facilities;
- Utility relocations;
- Drainage requirements;
- Traffic noise assessment;
- Environmental assessment;
- Geotechnical analysis;
- Public realm (landscaping and public art);
- Property (property acquisition and title plot);
- Project delivery method assessment;

- Construction staging;
- Class 3 cost estimate; and
- Affordability review.

The results of the Preliminary Design analysis are summarized in the **Chief Peguis Trail Extension West from Main Street to Brookside Boulevard Preliminary Design Report** (**Preliminary Design Report**). Figures illustrating the Preliminary Design concept are included in **Appendix B**.

3.1 ROADWAY DESIGN

The recommended Initial Four-Lane Phase and Future Six-Lane Expansion Configuration of the CPT Extension from Main Street to Brookside Boulevard, based on the analysis undertaken, are described below.

- **CPT – Main Street to Brookside Boulevard:** It is recommended that CPT initially consist primarily of a four-lane divided roadway with a rural cross-section and raised median with variable right-of-way from Main Street to Brookside Boulevard. The ultimate cross-section of CPT would be a six-lane divided cross-section which would add one lane in each direction by widening into the median. The timing for the Six-Lane Expansion Configuration and associated future interchanges will depend on traffic growth along the CPT Extension and operations at the study area intersections.
- **Main Street (Figure 4 in Appendix B):** As part of the Initial Four-Lane Phase of the CPT Extension project, it is recommended that Main Street be widened to a six-lane divided roadway from the existing six-lane section south of CPT to Ridgecrest Avenue to accommodate projected future travel demand. The existing Main Street/CPT intersection would be replaced with a single-point urban interchange.
- **Ferrier Street (Figure 3 in Appendix B):** As part of the Initial Four-Lane Phase of the CPT Extension project, it is recommended that McGregor Street be extended as a two-lane roadway north from Templeton Avenue and realigned to connect to Ferrier Street around the Bergen Cut-off. Ferrier Street would then be realigned approximately 80 metres east of its existing right-of-way and widened from a two-lane undivided to a four-lane divided roadway approximately 250 metres south of CPT. Ferrier Street will then intersect with CPT and be reduced from a four-lane divided to a two-lane undivided roadway at its intersection with Murray Avenue. In the future, if required, Ferrier Street could be widened to four lanes throughout and/or extended north from Murray Avenue to accommodate future development. Additional right-of-way has been identified to allow for the implementation of a future diamond interchange at CPT and Ferrier Road.
- **McPhillips Street (Figure 3 in Appendix B):** As part of the Initial Four-Lane Phase of the CPT Extension project, it is recommended that McPhillips Street be widened to a six-lane divided roadway from Leila Avenue to North Point Boulevard to accommodate existing and projected future travel demand. The McPhillips Street/CPT intersection would be constructed as a diamond interchange.
- **Pipeline Road (Figure 2 in Appendix B):** To allow for Pipeline Road to intersect CPT at an appropriate angle, it is recommended that, as part of the Initial Four-Lane Phase of the CPT Extension project, Pipeline Road be realigned and widened to a four-lane divided roadway from north of Templeton Avenue to north of Storie Road. Storie Road would be realigned to accommodate the realignment of Pipeline Road and enable access to the homes on Storie Road to be maintained. Additional right-of-way has been identified to allow for the implementation of a future diamond interchange at CPT and Pipeline Road.
- **Dr. Jose Rizal Way/King Edward Street/Leila Avenue (Figures 1 and 2 in Appendix B):** It is recommended that, as part of the Initial Four-Lane Phase, Dr. Jose Rizal Way be extended north as a four-lane divided roadway from Water Ridge Path, intersect CPT and continue north, reducing to a two-lane undivided section and connecting with King Edward Street approximately 300 metres north of CPT. Leila Avenue would extend north from Ritchie Street/Amberstone Road to a new east-west roadway that would connect to Dr. Jose Rizal Way and King Edward Street south of CPT. Due to the close proximity of King Edward Street to Dr. Jose Rizal Way, the connection of King Edward Street to CPT was not considered viable. Therefore, it is recommended that King Edward Street be closed from its intersection with Dr. Jose Rizal Way north of CPT

to immediately south of CPT at Division Avenue. Additional right-of-way has been identified to allow for the implementation of a future diamond interchange at CPT and Dr. Jose Rizal Way.

- **Brookside Boulevard (Figure 1 in Appendix B):** Other than channelization at the CPT/Brookside Boulevard intersection, it is recommended that no other modifications be undertaken on Brookside Boulevard as part of the Initial Four-Lane Phase of the CPT Extension project. Additional right-of-way has been identified to allow for the implementation of a diamond interchange at the CPT/Brookside Boulevard intersection at such time as CPT is extended west into the RM of Rosser and connects to CentrePort Canada Way.
- **Kildonan Settlers Bridge (Figure 4 in Appendix B):** As part of the Initial Four-Lane Phase of the CPT Extension project, it is recommended that CPT east of Main Street be widened to six lanes from Main Street to west of Henderson Highway to accommodate the required interchange ramps at CPT and Main Street. This would require modifications to the Kildonan Settlers Bridge over the Red River to allow for construction of new eastbound and westbound lanes. The substructure of the Kildonan Settlers Bridge was designed to accommodate widening into the median to create three lanes in each direction. CPT would transition back to a four-lane divided roadway west of the CPT/Henderson Highway intersection.

The City of Winnipeg retained Fireseeds North Infrastructure Corporation to undertake an independent Road Safety Audit (RSA) of the Preliminary Design of the proposed CPT Extension. The RSA followed the procedure outlined in the Transportation Association of Canada's (TAC) *Canadian Road Safety Audit Guide* (Transportation Association of Canada, 2001) for a Preliminary Design stage RSA. The Guide states that an RSA is "a formal and independent safety review of a road transportation project by an experienced team of safety specialists, addressing the safety of all road users." The methodology includes a start-up meeting, site visits, an audit analysis, an audit report, a findings meeting with the City and WSP, and a response report from WSP. The RSA identified potential safety issues associated with the Preliminary Design and recommended possible treatments. A number of the recommended treatments were accepted by the City and were incorporated into the Preliminary Design. Specific treatments for right-turn cut-off crossings have not been included in the Preliminary Design as the City is currently considering multiple options for city-wide implementation. Guidance would be provided by the City during the Detailed Design.

Both flexible Asphalt Concrete Pavement (ACP) and rigid Jointed Plain Concrete Pavement (JPCP) structures were considered for the CPT Extension. Consistent with traditional and current local practice, pavements were designed using the 1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures. Life cycle cost analysis for both the asphalt and concrete pavement alternatives was undertaken for a 50-year life cycle. The asphalt roadway option is recommended due to its lower initial construction cost and Net Present Value, and the fact that the existing CPT roadway from Henderson Highway to Lagimodiere Boulevard is an asphalt roadway. Asphalt concrete pavement sections for CPT should consist of:

- 50 mm Type 1A HMA;
- 155 mm Type III HMA;
- 75 mm of 20 mm Crushed Base Course;
- 150 mm of 50 mm Crushed Sub-Base;
- 555 mm of 150 mm Crushed Sub-Base; and
- Geotextile Fabric.

3.2 TRAFFIC ANALYSIS

Future traffic volumes for the horizon years were estimated based on the *2016 CPT Functional Study* forecast traffic volumes, existing traffic counts and TransCAD model forecasts provided by the City of Winnipeg Public Works Department. Additional weekday a.m. and p.m. peak hour traffic counts were also obtained from the City of Winnipeg for some streets and intersections. The weekday a.m. and p.m. peak hours were both analysed as these are generally the busiest times and therefore most critical periods for traffic on Winnipeg's Regional Street network.

The segment of CPT from Main Street to McPhillips Street will serve as a connection to Precincts D, E F, and G. Based on data currently available to the City of Winnipeg, these Precincts will primarily be building out between 2031

and 2041, and the City's traffic model identifies that this segment of CPT will only slightly relieve pressure on the closest parallel route, Leila Avenue, and will have little impact on routes south of it. The Perimeter Highway to the north is also not at capacity.

The City's VISUM Transportation Model estimates volumes for the Main Street to McPhillips Street segment of CPT are forecast to be approximately 30,600 vehicles per day in 2026 (assumed opening day), due due to influx of traffic that would be using this extension in conjunction with the existing Chief Peguis Trail segment, as an alternate and preferred route over using the North Perimeter as the main East-West corridor in North Winnipeg. Traffic volumes for the McPhillips Street to Brookside Boulevard segment of CPT are forecast to be 12,500 to 17,300 vehicles per day in 2026 (assumed opening day).

The same model estimates the traffic volumes for the Main Street to McPhillips Street segment of CPT to be 38,400 vehicles per day in 2041, and estimates the traffic volumes for the McPhillips Street to Brookside Boulevard segment of CPT to be 22,000 to 29,000 vehicles per day in 2041. Some signalized intersections along the CPT Extension corridor are forecast to operate at levels of service E or F during peak periods in 2041, which indicates that these intersections are approaching capacity.

3.3 STRUCTURES

The design includes the following structures for the **Initial Four-Lane Phase**:

- **Modifications to the Kildonan Settlers Bridges (Figure 4 in Appendix B):** The existing Kildonan Settlers bridges are in generally good overall condition based on the OSIM inspection performed by WSP in October 2016. An additional 3.7 metre lane and 1.0 metre exterior shoulder will be provided in both the westbound and eastbound directions to accommodate the Initial Four-Lane Phase. One additional trapezoidal steel girder of similar size to the existing will be added to the inside of the existing girder lines for each structure. A 3.0 metre deck widening and barrier replacement will be provided in the westbound direction, and 3.6 metre deck widening and barrier replacement will be provided in the eastbound direction. 2018-19 rehabilitation work on the eastbound bridge includes widening of the existing sidewalk from 1.5 metres clear, from back of F-shape concrete traffic barrier to sidewalk curb, to 2.6 metres clear. This involves demolition of the existing concrete traffic barrier and reconstructing it 1.1 metres north. Kildonan Settlers bridge modifications as part of the CPT Extension will be north of the 2018-2019 sidewalk widening limits on the eastbound structure and full width on the westbound structure. It is likely that deck rehabilitation would be performed at the same time as widening of the Kildonan Settlers Bridges to reduce construction mobilization and traffic control costs and to limit bridge shut down. The recommended rehabilitation method for the bridge decks is to perform partial deck demolition to the underside of the top reinforcement layer. Galvanic anodes will be installed and attached to exposed areas of the existing epoxy coated reinforcement to act as a sacrificial anode, preventing corrosion of the existing reinforcement when the anodes are active. Any damaged epoxy coating of the rebar during construction will be repaired as needed. A new HPC overlay will be installed on the decks and will act as the wearing surface.
- **CPT Overpass at Main Street (Figure 6 in Appendix B):** The proposed Main Street overpass consists of twin structures on CPT over Main Street. Use of piers were not possible within the single point urban interchange; therefore, the required clear span length of the proposed structures was 76 metres, spanning over the single point interchange lanes and two 4.5 metre wide multi-use trails. Steel trapezoidal girders are proposed to limit exterior exposure of the girders to the environment and to ease inspection. Each superstructure will consist of two 2600 mm deep trapezoidal steel box girders with 250 mm concrete deck and 90 mm asphalt wearing surface with hot poured rubberized waterproofing membrane and protection board.
- **CPT Overpass at McPhillips Street (Figure 5 in Appendix B):** The proposed McPhillips Street overpass consists of twin structures on CPT over McPhillips Street. Due to the back-to-back turning lane indents in the median beneath the structures and an existing land drainage sewer in the vicinity of the median, the recommended proposed structure was chosen to clear span McPhillips Street without any piers. For a 63 metre span, steel trapezoidal girders are recommended to reduce the costs of the superstructure and embankments, and to ease inspection with walkthrough girders. Each proposed superstructure consists of

three 2100 mm deep trapezoidal steel box girders with 225 mm concrete deck and 90 mm asphalt wearing surface with hot poured rubberized waterproofing membrane and protection board.

- **Main Street Pedestrian and Cycling Overpass South of CPT (Figure 6 in Appendix B):** A pedestrian and cycling overpass will be provided over Main Street south of CPT with a clear width of 4.5 metres for shared access between pedestrians and cyclists. Due to the various existing buried utilities in the vicinity of the median at the proposed overpass location, the recommended proposed structure was chosen to clear span Main Street without any piers to limit impact to the services and avoid the need for their relocation. A single-span bridge with an 81.6 metre bearing-to-bearing box-style steel truss and closed-style abutments with mechanically stabilized earth (MSE) walls along the approach embankments was the recommended option at this location
- **CPT Pedestrian and Cycling Overpass West of Ferrier Street (Figure 3 in Appendix B):** A pedestrian and cycling overpass will be provided over CPT west of Ferrier Street with a clear width of 3.5 metres for shared access between pedestrians and bicyclists. The two-span (29.35 metre - 29.35 metre) overpass will span approximately 58 metres over CPT. A prefabricated, steel tubular-section Pratt truss bridge is proposed due to ease in installation and shallow depth below deck elevation to reduce embankment heights, and successful historical use throughout the City.
- **CPT Pedestrian and Cycling Overpass at Amber Trails (Figure 2 in Appendix B):** A pedestrian and cycling overpass will be provided over CPT with a clear width of 3.5 metres for shared access between pedestrians and bicyclists. The single-span, 51.3 metre overpass will span CPT. A prefabricated, steel tubular-section Pratt truss bridge is proposed due to ease in installation and shallow depth below deck elevation to reduce embankment heights, and successful historical use throughout the City.

The design includes the following four additional grade separations for the **Future Six-Lane Expansion Configuration**:

- **Pipeline Road Overpass at CPT (Diamond Interchange):** The Pipeline Road overpass is a diamond interchange that consists of twin structures on CPT over Pipeline Road. A 2-span (39.2m-35.5m) bridge, with semi-integral abutments, and continuous deck is proposed.
- **CPT Overpass at Dr. Jose Rizal Way (Diamond Interchange):** The Dr. Jose Rizal Way overpass is a diamond interchange that consists of one structure on Dr. Jose Rizal Way over Chief Peguis Trail. A 4-span (20m-26m-26m-20m) bridge, with semi-integral abutments, and continuous deck is proposed.
- **Brookside Boulevard Overpass at CPT (Diamond Interchange):** The overpass is a diamond interchange that consists of twin structures on CPT over Brookside Boulevard. A 4-span (19m-25.2m-25.2m-19m) bridge, with semi-integral abutments, and continuous deck is proposed.
- **Brookside Boulevard Pedestrian and Cycling Overpass South of CPT:** A pedestrian and cycling overpass is provided over Brookside Boulevard south of CPT with a clear width of 4.5 metres for shared access between pedestrians and bicyclists. A 2-span (27.4m-30.9m) steel truss bridge, with perched closed style abutments behind MSE head walls, and a reinforced concrete wall pier is proposed.

3.4 PEDESTRIAN AND CYCLING FACILITIES

Joint use pedestrian and cycling facilities are an integral part of the CPT Extension and 4.5 metre asphalt multi-use pathways are planned to run along the south side of the CPT Extension from Main Street to Brookside Boulevard and along the north side of the CPT Extension from Main Street to a proposed pedestrian and cyclist overpass between Pipeline Road and Dr. Jose Rizal Way. The pathway on the north side can be extended west to Brookside Boulevard as the adjacent area north of CPT develops. These pathways are shown on **Figure 3.1** and linkages to existing pedestrian and cycling facilities are proposed at various locations along the route.

As part of the Initial Four-Lane Phase, pedestrian and cycling grade separations are proposed at three locations:

- Over Main Street south of CPT (Figure 6 in Appendix B);
- Over CPT west of Ferrier Street (Figure 3 in Appendix B); and

— Over CPT north of Amber Trails (Figure 2 in Appendix B).

A fourth pedestrian and cycling grade separation over Brookside Boulevard south of CPT is planned as part of the Future Six-Lane Expansion Configuration.

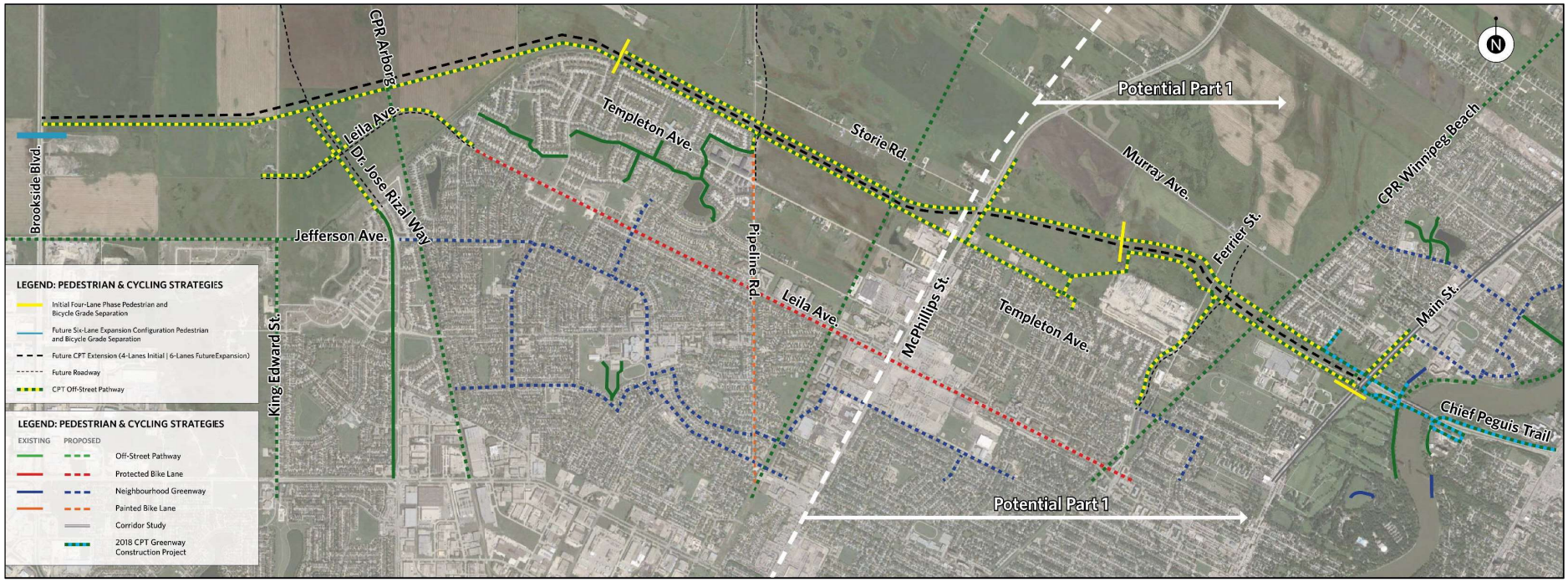

Figure 3.1: Existing and Proposed Pedestrian and Cycling Facilities

3.5 TRANSIT

Winnipeg Transit has indicated that transit may initially operate on the CPT Extension with a route or a few routes that will use it as a link between communities on either side of CPT. Additional transit service could be added along the corridor in the future depending on demand.

Park and ride sites at four potential areas along the CPT corridor were reviewed:

- Main Street near CPT;
- McPhillips Street near CPT;
- Pipeline Road near CPT; and
- Brookside Boulevard near CPT.

Following review of the proposed park and ride sites with Public Works and Winnipeg Transit, it was determined that the Initial Four-Lane Phase should include a park and ride at Main Street only, as the McPhillips Street, Pipeline Road and Brookside Boulevard alternatives need to be planned and designed with the adjacent neighbourhoods to more clearly define park and ride requirements for these areas in the future as development continues.

The Main Street park and ride would be located in the northwest quadrant of the intersection with CPT immediately south of the existing commercial development on Main Street (Dollarama, Starbucks, etc.). This site is located on City property and could provide approximately 200 parking stalls, with some parking within the site potentially being shared with the adjacent property owner. This is shown in Figure 6, in Appendix B.

3.6 UTILITY RELOCATIONS

The proposed CPT Extension is to be developed in mostly greenfield land that is currently used for farming, with the exception of the area near Main Street. The proposed CPT Extension is expected to have minimal impact on city owned utilities and non-city utility crossings. Relocations, adjustments, and crossings are concentrated in the area near Main Street. Minor work is required in the area near McPhillips Street.

WATERMAINS

No watermain works are planned for the CPT Extension and there is minimal impact to the existing system. The exception is at Main Street where a 400/600 mm feedermain and 300 mm watermain need to be relocated in the vicinity of the interchange structure. Valve chambers near the interchange structure will require further analysis, including a loading assessment and evaluation of special requirements for any construction work nearby.

WASTEWATER SEWERS

There is minimal impact to the existing system of wastewater sewers. The exception is at Main Street where a 1,350 mm wastewater interceptor sewer in the vicinity of the interchange structure piers needs to be taken into account. As this interceptor sewer is vital to City infrastructure, it cannot be removed and relocation is unlikely. The interchange structure piers have therefore been designed to have minimal impact on this sewer, and their location must not be moved during further stages of design. A second interceptor sewer crosses Main Street at the location of the proposed interchange MSE ramp and will require further analysis, including a loading assessment and evaluation of special requirements for any construction work nearby.

NON-CITY UTILITIES

There are various gas mains, as well as hydro and fibre optic cables crossing the CPT Extension right-of-way. WSP contacted all utilities in the area and relocations of some existing gas mains, hydro and cable lines will be required. The Detailed Design phase should include a full-scale utility locate and survey to ensure all utility locations are confirmed, with hydrovac and elevation surveys to confirm depth as required.

All overhead utilities crossing the CPT Extension will be buried with the exception of a high-voltage distribution corridor crossing the proposed right-of-way. As this link is vital to Manitoba Hydro infrastructure, it cannot be relocated.

3.7 DRAINAGE

The CPT Extension crosses through several City of Winnipeg drainage districts and terminates at Brookside Boulevard. The land drainage design concepts are based on the information provided in previous reports that have been prepared for these drainage districts and projects within these districts. These reports include the *West Kildonan Land Drainage District Study, July 1991*, prepared by UMA Engineering Ltd., several development servicing reports for the Amber Trails, Waterford Green, and Ambergate Developments prepared by Stantec Consulting, 2010 to 2016, and the 2016 CPT Functional Study prepared by Morrison Hershfield.

The drainage design covers the areas of the new right-of-way for the CPT Extension as well as some adjacent catchments required to be serviced by the CPT system including the North End Sewage Treatment Plant expansion areas. Modifications to the existing LDS system on McPhillips Street, Ferrier Street, on CPT east of the Red River, and on Main Street will be required. These modifications are mostly minor in nature and will be designed in the future when the Detailed Design of the project is undertaken.

Main Street to McPhillips Street is largely a rural cross-section design utilizing parallel ditch systems to collect and convey runoff. It is designed to incorporate all runoff from the CPT right-of-way, as well as the existing areas located south of CPT. All areas located north of CPT will be drained separately by systems incorporated into future new developments. A stormwater basin is required to service the right-of-way and will be located between McPhillips Street and Ferrier Street. Inclusion of the stormwater basin in this segment of the system will serve to attenuate peak flows to the existing outfall from the CPT area and mitigate impacts on the existing systems.

McPhillips Street to Brookside Boulevard will also utilize a rural cross-section design with parallel ditches conveying the runoff to piped collection systems except for at-grade intersections which will utilize an urban design section. Due to the northerly shift in the CPT alignment, the drainage areas to be serviced by these connections have increased resulting in increased runoff rates. To control inflow rates to the existing connections in accordance with the original design capacities, permanent storage facilities will be constructed to buffer the inflow.

3.8 TRAFFIC NOISE ASSESSMENT

The City of Winnipeg *Motor Vehicle Noise Policies and Guidelines, October 11, 1984*, establishes a noise level limit of 65dBA Ldn measured at the limits of the outdoor recreational area on a residential property. The policy defines the outdoor recreational area as *"a ground level outdoor living area adjacent to residential units accommodating a variety of outdoor activities."*

WSP retained Industrial Technology Centre to conduct a noise analysis and prepare forecasts for the proposed CPT Extension from Main Street to Brookside Boulevard. The analysis was completed during the Functional Design phase using forecast 2041 traffic volumes and found that forecast noise levels at the back of residential properties along the proposed CPT corridor do not meet the City's requirement for the implementation of sound walls (65 dBA Ldn); however, the levels are above 60 dBA Ldn at some locations. The City of Winnipeg therefore requested that WSP and ITC conduct a sensitivity analysis to review whether higher traffic volumes would result in some residential properties exceeding the sound threshold. The sensitivity analysis increased traffic volumes by 10 and 20 percent to determine the projected traffic levels with these increases.

The analysis indicated that there is some sensitivity to varying the traffic volumes by up to 20 percent, but noise level increases were not significant. Based on the findings and discussions with City staff, it is recommended that noise mitigation be provided at Wisteria Way and Endcliffe Place but not at Moselle Drive and Baltic Bay. Noise mitigation requirements for Moselle Drive and Baltic Bay should be revisited when an interchange is constructed at CPT and Pipeline Road. Residential properties on Wisteria Way and Endcliffe Place currently feature an existing berm with a

wooden fence. It is recommended that noise mitigation be provided by replacing the wooden fence with a concrete sound wall.

3.9 ENVIRONMENTAL ASSESSMENT

An Environment Act Proposal report has been prepared for future submission to Manitoba Sustainable Development, Environmental Approvals Branch in support of an Environment Act License based on the Preliminary Design for the CPT Extension West from Main Street to Brookside Boulevard. As per the *Classes of Development Regulation* under the *Environment Act*, this Project is considered to be a Class 3 Development.

The environmental effects assessment for the project involved evaluating the potential interactions between the project components and the biophysical and socioeconomic resources in order to determine key effects. The biophysical resources assessed included climate, air quality, soils and terrain, groundwater, vegetation, wildlife and habitat, aquatic environment, and species of conservation concern. The socioeconomic resources that were assessed included land and resource use, active transportation systems, parks and protected areas, and public safety and health. Where adverse project effects were noted, mitigation measures were proposed to avoid, minimize or remedy adverse environmental effects.

Pre-construction monitoring recommendations include:

- Consulting a qualified avian biologist to assess risks and develop mitigation plans for migratory birds should vegetation clearing need to occur during the breeding bird season;
- Exclusion fencing should be installed and monitored around the Frog Plains Park wetland/natural area in early April to prevent amphibian species from entering construction zones in this area;
- Complete a pre-construction geophysical assessment for specific right-of-way as identified; and
- Complete a Heritage Resource Impact Assessment for specific right-of-way as identified.

Construction monitoring recommendations include:

- An Environmental Management System and corresponding Environmental Management Plans be developed for the Project prior to construction in order to assess environmental aspects of the Project and identify appropriate best management practices and mitigation measures, including the ones outlined in this Environment Act Proposal in order to minimize potential effects from the Project on the environment; and
- Complete construction monitoring for heritage resources for specific right-of-way as identified.

Following construction and clean-up activities, a post-construction inspection of the Project footprint should be undertaken to identify any potential problems, and a post-construction inspection report will be prepared. If problem areas are noted, site-specific rehabilitation programs will be identified in the inspection report and implemented, and the problem areas will be monitored.

Based on the review of existing biophysical and human environmental components, assessment of anticipated effects and application of identified mitigation measures, the proposed CPT Extension is not anticipated to result in any significant adverse effects.

3.10 GEOTECHNICAL ANALYSIS

Amec Foster Wheeler Environment & Infrastructure Ltd. completed a geotechnical investigation and provided geotechnical recommendations for the design and construction of roadways, earthworks, and foundations in support of the CPT Extension.

Geotechnical recommendations and observations based on the investigation undertaken include:

- **Clay Fill Embankments:** Slope stability results indicate that clay unreinforced embankments can be built to the maximum design height of eight metres at slopes of 6H:1V and satisfy long-term stability requirements without the addition of slope improvement measures. Long-term embankment slopes of 4H:1V and 5H:1V

can be considered for embankment heights up to three metres and five metres, respectively. Prefabricated Vertical Drains (PVD's) will be required to maintain the short-term FS for embankment fill heights greater than six metres assuming maximum permissible porewater pressure response coefficients in native (i.e., Bbar=0.8) and fill soils (ru=0.3). Construction staging may also be required to control excess porewater pressure within the lacustrine clay foundation in the event that permissible porewater pressures are exceeded during construction.

- **MSE Walls:** Various MSE wall options were considered to satisfy various design requirements. The preferred options include either rockfilled columns or lightweight fill materials. Typically, MSE walls with a maximum reinforced zone width to wall height ratio of 2H can be constructed in combination with rockfilled columns extending into the silt till. Alternatively to granular reinforced MSE walls, lightweight fill materials can be considered for a width of lightweight fill to wall height ratio of 2.8H provided that either a key or ribs are used to provide the necessary sliding resistance. Foundation drainage and construction staging will also be required for MSE walls constructed with either reinforced granular or lightweight fill materials to maintain short term stability. Decisions to start, stop, and resume fill placement will be made throughout construction based on the results of monitoring instrumentation during construction.
- **Predicted Settlement:** Elastic and consolidation analyses were completed to assess the settlement potential of MSE walls and clay fill embankments. The total settlement at the surface of a given embankment was taken as the sum of the settlement of the embankment (clay) fill, elastic settlement of the silt till, and primary consolidation settlement of the lacustrine clay. Results indicate a total settlement potential of approximately 730 mm for an eight metre high clay fill embankment, of which 120 mm is estimated to occur within the clay fill, and 600 mm is due to primary consolidation of the compressible lacustrine clay. Settlement within the underlying silt till is expected to be negligible in comparison and will occur as construction proceeds. Results for clay fill embankment heights of 3.0 metres, 5.0 metres and 6.1 metres are also outlined in the geotechnical report Design of Earthworks. Either granular reinforced MSE walls over a clay foundation reinforced with rockfilled columns or MSE walls constructed using lightweight fills will reduce the amount of settlement significantly, and as such, large differential settlements (in the order of 400 mm) between MSE walls and the retained clay fill embankments should be expected within short distances.
- **Foundation Drainage:** The time for the lacustrine clay to achieve targets of 90 percent, 95 percent, and 100 percent of primary consolidation was also analyzed. Analyses of consolidation time with the application PVDs were also completed to accelerate consolidation settlements of the native lacustrine clay. Results are sensitive to the soil parameters, in particular the coefficient of compressibility. For instance, 95 percent consolidation without vertical drains can be achieved over a range of 34 to 500 years for a 21.5 metre thick clay layer at Main Street depending on the typical range of soil parameters selected. Similar variability is observed at the other sites as noted in the Design of Earthworks Report available in Appendix G-2. The time to achieve this consolidation can be reduced to between 1.1 and 16.7 years where PVDs are installed in a equilateral triangular pattern spaced as close as 1.0 metre centers, again depending on the range of soil parameters selected. Given the high variability observed, more rigorous geotechnical analyses should be completed at the Detailed Design stage of the project when more data from other projects currently built in the City of Winnipeg become available. It is emphasized that the time to consolidate will vary depending on the actual foundation soil conditions and the observed rates of pore-water pressure dissipation.
- **Foundations:** Based on the subsurface conditions at the test hole locations and anticipated bridge foundation loads, driven steel piles are recommended as the preferred foundation alternative for support of bridge/overpass structures. It is anticipated that driven steel piles at the various overpass locations could be driven through the overburden with ease to 'practical refusal' in the underlying till or bedrock; where 'practical refusal' is defined by a driving stress limit of 90 percent of the yield strength (Fy) of the steel for steel piles, and a maximum penetration resistance of 15 blows per 25 mm (or a minimum pile set of 1.67 mm). The ultimate geotechnical resistance at the Ultimate Limit State (ULS) of a steel pile driven to 'practical refusal' was determined as 0.67FyAs, where As is the cross-sectional steel area.

3.11 PUBLIC REALM

The site for the CPT Extension is vast, covering almost 10 kilometres. Approximately 75 percent of the corridor runs through open agricultural land, with the remainder touching on aspen/oak forest, wetlands and suburban greenspace. The dense aspen forest stand, referred to in this study as Ferrier Forest, is rated as Grade B habitat by Naturalist Services. Another feature of note adjacent to the corridor is Frog Plain Park, a designated historic site and natural area set aside by the City as frog habitat.

Landscaping design and rehabilitation recommendations for the CPT Extension include planting design, protection and restoration of natural areas, earthwork, accessibility and safety, transit stops, rest areas, pathway lighting, integration, and heritage features. A proposed section through the CPT Extension showing planting and landform strategies is shown in **Figure 3.2**.

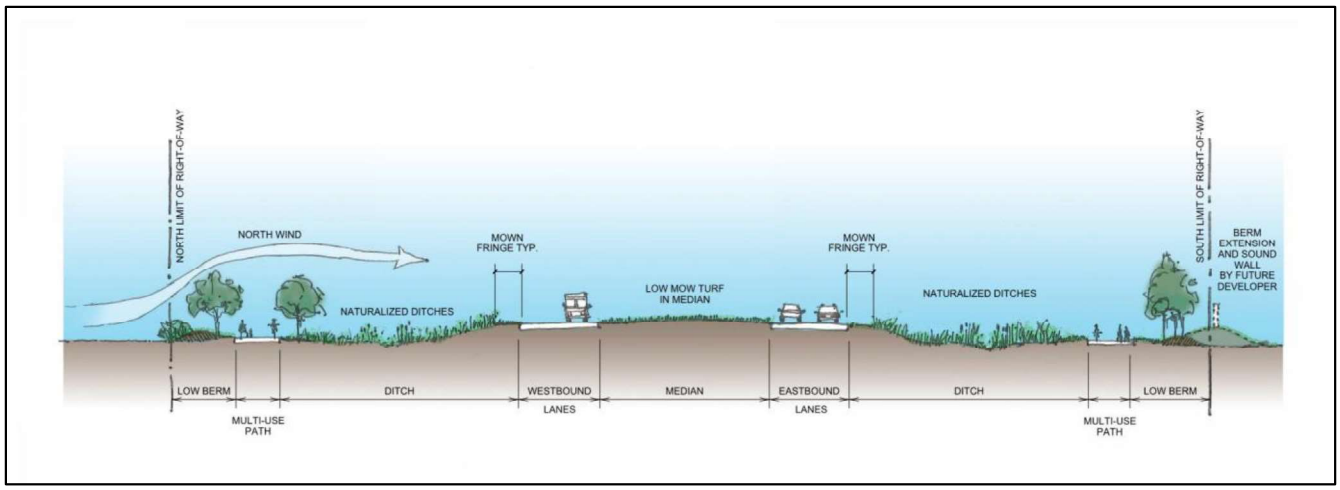

Figure 3.2: Section through Corridor Showing Planting and Landform Strategies

In addition, a new 22-hectare (55 acre) park is proposed between Ferrier Street and the McPhillips Street diamond interchange (see figure 3 of 6 in **Appendix B**). The park will include a retention pond that will be constructed as a naturalized wetland, and could also include a multi-purpose open lawn, a parking lot and staging area, a toboggan hill, space for community gardens, and a network of recreational trails through the Ferrier Forest. The toboggan hill could make use of some of the excess material excavated for roadway construction, and sledding could occur off the pedestrian bridge embankment toward the pond.

The Winnipeg Arts Council developed a public art master plan for the CPT Extension. The plan identifies project-specific design elements within the corridor and 'concepts' such as Metis history and multi-generational farming drawn from the natural and cultural history of the area that could serve as inspiration for the works. Incorporation of public art will be further addressed during the future Detailed Design phase of the project.

3.12 PROPERTY

Properties required for the proposed design were provided to Land Assessment Specialists Stevenson Advisors to develop property value assessments of the properties directly impacted by the proposed project right-of-way. A total of 61 properties were identified for full or partial takings in order to accommodate the project alignment. A summary of the estimated property acquisitions is provided in **Table 3.1**.

Total Cost Estimate of Required Property Takings and Due Compensation for Impairments to Remaining Properties is $42.5 Million in 2026 dollars.

A Title Plot was created by Barnes & Duncan Surveying, Geomatics and Engineering based on the proposed Preliminary Design and under the supervision of a Manitoba Land Surveyor. The Title Plot was provided to the City of Winnipeg under separate cover and includes a plan showing the affected properties, each Certificate of Title, and each instrument affecting each Certificate of Title. The Title Plot includes data for a total of 259 holdings.

Table 3.1: Summary of Estimated Acquisition Costs – Main Street to Brookside Boulevard

PROPERTY TYPE		NUMBER OF PROPERTIES
Full Takings	Residential	8
	Commercial	2
	Agricultural	6
Partial Takings	Residential	5
	Commercial	14
	Industrial	7
	Agricultural	19
Total		**61**

3.13 PROJECT DELIVERY METHOD ASSESSMENT

A project delivery method assessment was completed by WSP to assist the City in developing an understanding of the various procurement options available to deliver the project. Design-Bid-Build, Design-Build-Finance, and Design-Build-Finance-Maintain delivery options were analyzed, evaluated and compared using methodology largely based on P3 Canada's *New Building Canada Fund, Procurement Options Analysis Guide,* which is made up of the following components:

- Project Overview;
- Procurement Options Suitability;
- Preliminary Public Private Partnership Screening;
- Qualitative Analysis;
- Market Sounding;
- Quantitative Analysis; and
- Recommendation of Preferred Delivery Method.

Based on the three levels of analysis (qualitative, quantitative analysis and market sounding), the Design Build Finance Maintain (DBFM) demonstrated the greatest Value for Money and was deemed by WSP to be the best suited option. A procurement approach based on DBFM is therefore recommended to the City.

3.14 CONSTRUCTION STAGING AND IMPLEMENTATION PLAN

As most of the CPT Extension will be constructed on currently vacant land, construction staging plans for the majority of the project are not critical. However, the construction of the interchanges at Main Street and McPhillips Street as part of the Initial Four-Lane Phase of the CPT Extension necessitated development of more detailed staging plans.

- **CPT and Main Street Interchange:** Two construction staging alternatives were developed for the proposed CPT and Main Street interchange. Alternative 1 features an offline alignment where Main Street traffic is detoured to the west of the existing roadway alignment via a temporary roadway. Alternative 2 features an online alignment where Main Street traffic is detoured on the existing and new Main Street roadway. Both alternatives require four construction stages in order to undertake the construction of the single-point diamond interchange at CPT and Main Street and maintain traffic on both CPT east of Main Street and Main Street at all times, except for short-term full closures during off-peak or nighttime periods. The Class 3 cost estimates were developed using Alternative 1 as the recommended alternative.

— **CPT and McPhillips Street Interchange:** In order to undertake the construction of the diamond interchange at CPT and McPhillips Street and maintain traffic on McPhillips Street at all times, except for short-term full closures during off-peak or nighttime periods, four construction stages will be required.

WSP prepared a construction staging and implementation plan for the CPT Extension assuming that the project is undertaken in a conventional or "design-bid-build" manner. The project assumes a six-year schedule to completion, as shown in **Table 3.2**.

It should be noted that if the project were to be undertaken as a Design Build Finance Maintain (DBFM) project, as was recommended in the project delivery method assessment report, the construction schedule could potentially be reduced and the project could be completed in less time.

3.15 CLASS 3 COST ESTIMATE

WSP compiled a Class 3 cost estimate for the CPT Extension. The cost estimates were developed in present value for an asphalt CPT roadway. The cost estimates are summarized and presented in **Table 3.3**. The total estimated cost of the project is approximately $449.1 million, based on the project being funded in 2020, and its completion in 2026.

Table 3.2: Construction Staging and Implementation – Main Street to Brookside Boulevard

YEAR	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
QUARTER	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Planning & Design																								
Property Acquisition																								
Detailed Design																								
Liaison with Utilities, CPR & City																								
Drainage & Utilities																								
CPT Utilities																								
Lakes & Ponds																								
LDS Works																								
Side Streets Utilities																								
Kildonan Settlers Widening																								
Foundation																								
Substructure																								
Superstructure																								
Bridge Approaches																								
Roadworks																								
CPT (Main-McPhillips)																								
CPT (McPhillips-Brookside)																								
Other Streets																								
Main Street Interchange																								
McPhillips Street Interchange																								
Pedestrian Bridges																								
Main Street																								
Ferrier Street																								
Amber Trails																								
Other																								
Signs & Public Art																								
Landscaping																								
Ferrier Park																								
Park-and-Ride																								

Table 3.3: CPT Extension Cost Estimate – Main Street to Brookside Boulevard

ITEM	ESTIMATED COST (NEAREST $ THOUSAND)
Chief Peguis Trail - Henderson Highway (West) to McPhillips Street (West)	
Main Street Interchange	$22,321
McPhillips Street Interchange	$15,180
Kildonan Settlers Bridge Widening and Associated Works	$24,894
Pedestrian and Cycling Overpasses - Ferrier & Main	$9,970
Roadworks	$68,841
AT Pathways & Corridor Amenities	$5,094
Land Drainage System	$13,360
Railway Crossing	$1,948
Construction Detour	$4,154
Overhead Sign Structures	$4,304
Other Costs (Park & Ride, Permanent Markings, Impact Attenuators, Sounds Walls, Public Art)	$5,895
Chief Peguis Trail - McPhillips Street (West) to Brookside Boulevard	
Pedestrian and Cycling Overpasses – Amber Trails	$4,974
Roadworks	$55,784
AT Pathways & Corridor Amenities	$4,368
Land Drainage System	$13,686
Railway Crossings	$3,518
Other Costs (Permanent Markings, Impact Attenuators, Public Art)	$4,023
Construction Sub-Total	***$262,314***
Engineering Costs	$27,339
Utility Costs	$28,643
Other Costs (Land Acquisition and Traffic Management)	$43,388
Contingencies Costs	$70,025
Project Sub-Total Before Charges	***$431,709***
Overhead / Admin Charges	$8,734
Corporate Interest	$8,634
MAIN STREET TO BROOKSIDE BOULEVARD TOTAL	**$449,078**

4 CPT EXTENSION WEST FROM MAIN STREET TO MCPHILLIPS STREET ONLY

4.1 STUDY AREA

The City requested WSP to investigate the extension of CPT from Main Street to McPhillips Street only. In this scenario, the intersection of CPT and Main Street will be a single-point urban interchange as in the Preliminary Design Report, and the intersection of CPT and McPhillips Street will be a three-legged at-grade T-intersection. Intersections along the CPT extension from Main Street to McPhillips Street only are generally forecast to operate at acceptable levels of service for the horizon years.

Based on the results of the traffic analysis, the design criteria approved for the CPT Extension West Study, and the design recommended in the Preliminary Design Report, a functional design was prepared for the extension of CPT west from Main Street to McPhillips Street only. The design includes the realignment of McGregor Street / Ferrier Street, the widening of McPhillips Street to six lanes from Leila Avenue to north of CPT, and 4.5 metre asphalt multi-use pathways along the north and south sides of the CPT Extension from Main Street to McPhillips Street. Pedestrian and cycling grade separations are planned over Main Street south of CPT and over CPT west of Ferrier Street.

4.2 PROPERTY ACQUISITION REQUIREMENTS

For the CPT Extension from Main Street to McPhillips Street only, 29 properties were identified for full or partial takings in order to accommodate the project alignment. A summary of the estimated property acquisitions is provided in **Table 4.1**.

Total Cost Estimate of Required Property Takings and Due Compensation for Impairments to Remaining Properties is $10.2 Million in 2026 dollars.

Table 4.1: Summary of Estimated Acquisition Costs – Main Street to McPhillips Street Only

PROPERTY TYPE		NUMBER OF PROPERTIES
Full Takings	Residential	1
	Commercial	2
	Agricultural	1
Partial Takings	Residential	3
	Commercial	13
	Industrial	7
	Agricultural	2
Total		**29**

4.3 CLASS 3 COST ESTIMATE

WSP compiled a Class 3 cost estimate for the CPT Extension West from Main Street to McPhillips Street only. The cost estimates were developed in present value for an asphalt CPT roadway. The cost estimates are summarized and presented in **Table 4.2**. The total estimated cost of the project is approximately $247.1 million, based on the project being funded in 2020, and its completion in 2026.

Table 4.2: CPT Extension Cost Estimate – Main Street to McPhillips Street Only

ITEM	ESTIMATED COST (NEAREST $ THOUSAND)
Chief Peguis Trail - Henderson Highway (West) to McPhillips Street (West)	
Main Street Interchange	$21,477
Kildonan Settlers Bridge Widening and Associated Works	$24,169
Pedestrian and Cycling Overpasses - Ferrier & Main	$9,955
Roadworks	$66,221
AT Pathways & Corridor Amenities	$4,998
Land Drainage System	$12,620
Railway Crossing	$1,869
Construction Detour	$3,621
Overhead Sign Structures	$2,605
Other Costs (Park & Ride, Permanent Markings, Impact Attenuators, Sounds Walls, Public Art)	$5,774
Construction Sub-Total	***$153,309***
Engineering Costs	$16,706
Utility Costs	$17,711
Other Costs (Land Acquisition and Traffic Management)	$10,791
Contingencies Costs	$39,022
Project Sub-Total Before Charges	***$237,539***
Overhead / Admin Charges	$4,851
Corporate Interest	$4,751
MAIN STREET TO MCPHILLIPS STREET ONLY TOTAL	**$247,141**

5 RECOMMENDATIONS

The following recommendations are offered:

- The City of Winnipeg should investigate constructing the park and ride parking lot as part of the upcoming upgrades to the North End Sewage Treatment Plant.
- Both flexible Asphalt Concrete Pavement and rigid Jointed Plain Concrete Pavement structures were considered for the CPT Extension. Life cycle cost analysis for both the asphalt and concrete pavement alternatives was undertaken for a 50-year life cycle. The asphalt roadway option is recommended due to its lower initial construction cost and Net Present Value, and the fact that the existing CPT roadway from Henderson Highway to Lagimodiere Boulevard is an asphalt roadway. Asphalt concrete pavement sections for CPT should consist of:
  - 50 mm Type 1A HMA;
  - 155 mm Type III HMA;
  - 75 mm of 20 mm Crushed Base Course;
  - 150 mm of 50 mm Crushed Sub-Base;
  - 555 mm of 150 mm Crushed Sub-Base; and
  - Geotextile Fabric.
- Class 3 costs estimates were derived using the above pavement design. This will be revisited during the Detailed Design phase to ensure design is up to current City standards.
- Based on the three levels of analysis (qualitative, quantitative analysis and market sounding), the Design Build Finance Maintain demonstrated the greatest Value for Money and was deemed by WSP to be the best suited option for the project. A procurement approach based on Design Build Finance Maintain is therefore recommended for the Initial Four-Lane Phase of the CPT Extension.