4. Existing Environment

Baseline information regarding the Local and Regional Project Areas was gathered using:

- Available desktop information
- Environmental studies that overlapped with Project Local and Regional Areas from 2018 to 2020
  - Spring auditory amphibian survey (May 2018) focused in wetland areas
  - Baseline noise data (May and August 2018)
  - Summer vegetation survey (June 2018) in representative vegetation communities
  - Fall vegetation survey (September and October 2018) with additional emphasis on wetland areas and the Project Site
- Fish and fish habitat survey (Milani, 2013)

4.1 Physical Environment

4.1.1 Physical Setting

The physiographical location of the Project can be described using the Ecological Land Classification (ELC) system, used for overseeing ecological resources within Canada in a geographical representation. The Project is categorized as being within the following subsets of the ELC, which are also illustrated in **Figure 4-1**:

- **Boreal Plain Ecozone**, which encompasses the;
- **Interlake Plain Ecoregion**, which contains the; and
- **Steinbach Ecodistrict** within which the Project is located.

The Steinbach Ecodistrict has an annual average temperature of 2.4°C and annual precipitation is approximately 510 mm, of which approximately 410mm as snow (Smith et al., 1998). Summers are typically short and warm, with winters being long and cold. Vegetation within the Ecodistrict is dominated primarily by trembling aspen and some balsam poplar, with willow and red-osier dogwood being typically understory shrub species (Smith et al., 1998). A substantial area of the Ecodistrict is cultivated for agricultural use (Smith et al., 1998).

4.1.2 Geology/Topography

The topography of the Steinbach Ecodistrict can be described as smooth relief with gentle slopes that range from level to 5% (Smith et al., 1998). These slopes are characteristic of glaciolacustrine plain and gently undulating glacial till and glaciofluvial terraced plain (Smith et al., 1998). The topography of the Ecodistrict slopes at approximately 1.0m per km northwestward towards the Red River. Changes in topography have been noted in areas where sandy and ridged terraces occur (Smith et al., 1998).

Topography in the Project Site is level to very gently sloping. Topography elevations in the Project Site and surrounding area are illustrated in **Figure 4-2**. Within the Project Site, elevations range from 274 masl to 280 masl.

Basemap: Manitoba Land Initiative

Vivian Sand Facility Project
Physiographic Setting
CanWhite Sands Corp.

AECOM
Figure: 4-1

Project Management Initials:
Designer:
Checked:
Approved:
ANSI B 279.4mm x 431.8mm

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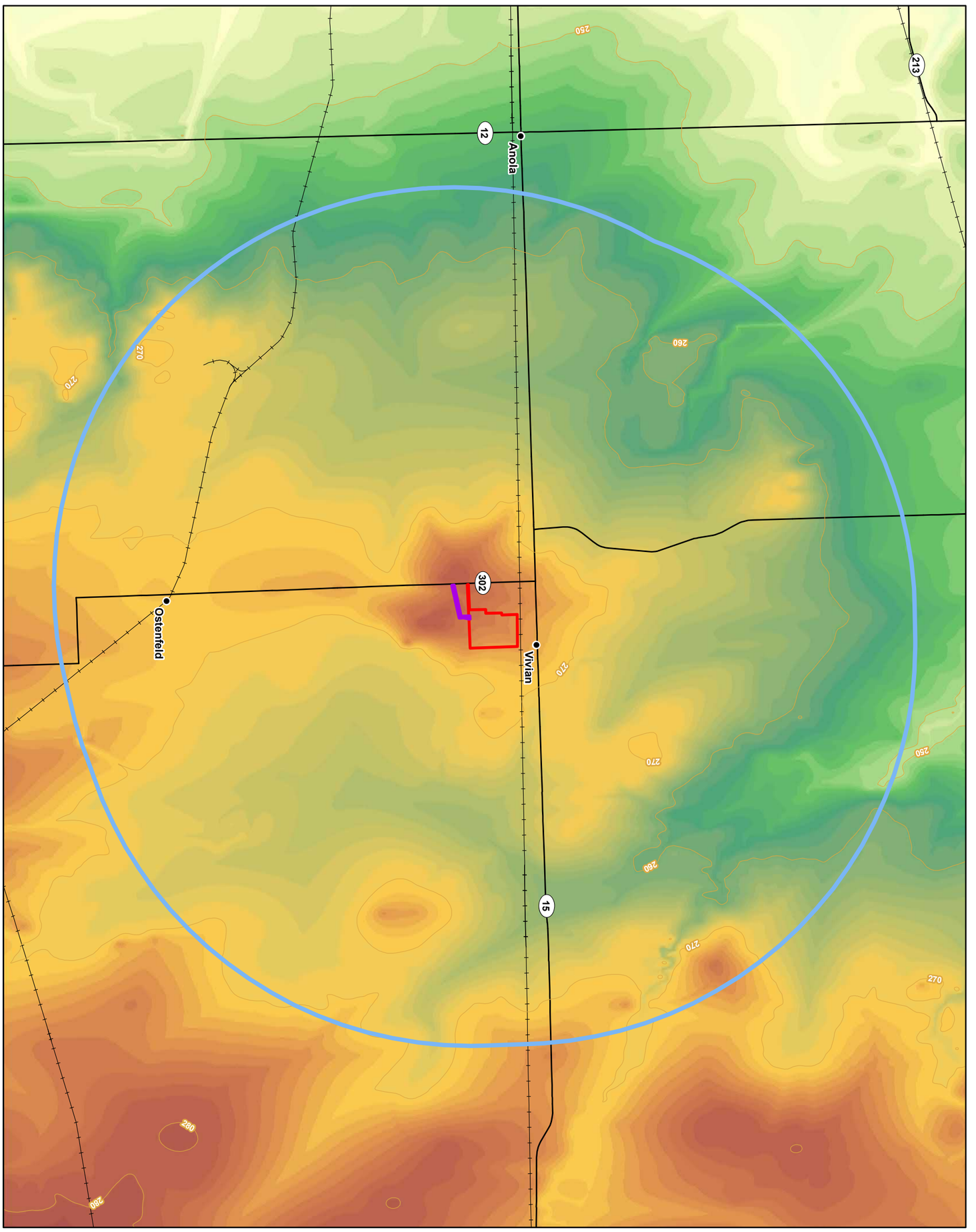

Legend

- Project Site
- Project Site – Temporary Use
- Regional Project Area
- Contour (10 m Interval)

General Features

- Highway
- Railway

Elevations (m)

High : 327

Low : 228

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NAD 1983 UTM Zone 14N

1 0.5 0 1 2 3
km

Basemap: Manitoba Land Initiative; Canvec; NRCan

Vivian Sand Facility Project
Topography
CanWhite Sands Corp.

AECOM

Figure: 4-2

4.1.3 Soils

The Steinbach Ecoregion, within which the Project Site is located, consists of well to imperfectly drained Dark Gray and Black Chernozems that have developed atop thin, discontinuous glaciolacustrine veneers that overlay extremely calcareous, water-eroded glacial till (Smith et al., 1998). As a result of improved drainage capabilities within the lowland areas of the Ecodistrict, a significant percentage of soils are used for cultivation of agricultural crops such was wheat and other cereals, oil seeds, and hay crops (Smith et al., 1998).

Soils of the Project Site occur within the Pelan Series of provincial soils (Manitoba Agriculture, Food and Rural Initiatives, 2010). The Pelan Series consists of imperfectly drained Gleyed Dark Gray Chernozem soils developed on thin moderately to strongly calcareous, coarse textured deltaic or lacustrine deposits overlying stony, extremely calcareous glacial till. The surface texture ranges from loamy fine sand to fine sand. A thin stone lime or pebble layer may be present at the contact of the overlay and the extremely calcareous till. Permeability is moderate in the surface layers and moderately slow in the subsoil; this results in impeded internal drainage and temporary saturation conditions following snow melt or above normal precipitation. Precipitation runoff is slow. Additional information on the soil characteristics within the Project Site are provided in **Appendix A.**

4.1.4 Groundwater

The main source of potable water within the RM of Springfield is groundwater from the carbonate aquifer which is known to be of variable quality (Friesen Drillers, 2019). Groundwater in the vicinity of the Project is typically sourced from one of two targeted aquifer zones, the Red River Carbonate Formation or Winnipeg Sandstone Formation, with some wells in the overlying till. The carbonate aquifer is a significant source of ground water supply for municipal, industrial, rural residential and agricultural uses throughout a large portion of south-eastern and central Manitoba (Betcher, et al., 1995).

The Winnipeg Formation (sandstone), underlies the carbonate aquifer throughout the Project area. This aquifer is confined and hydraulically separated from the overlying carbonate rocks of the Red River Formation by an upper shale bed (Betcher, 2008).

Both aquifers, the carbonate and sandstone, are recharged in the Sandilands area to the east of the RM of Springfield with the groundwater flow from east to west. The Sandilands is a major sand and gravel moraine series that lies directly on the bedrock sub crop of both Paleozoic sequences (Friesen Drillers, 2019). Recharge occurs from snow melt and rainfall in the Sandilands.

Discharge occurs for both aquifers from residential, agricultural and industrial use as well as natural discharge. Natural discharge from the carbonate aquifer enters the Red River, the Winnipeg Floodway and potentially other streams and creeks. Discharge from the sandstone aquifer is likely by slow seepage near or beneath Lake Winnipeg (Betcher, 2008).

4.2 Atmospheric Environment

4.2.1 Air Quality

The closest regional influences on air quality are associated with adjacent agriculture and open-pit aggregate/quarry operations, vehicle traffic on RM of Springfield gravel roads both within and adjacent to the Project Site, traffic on PR 302 and Provincial Trunk Highway (PTH) 15 (both less than 1 km from the Project Site) and the adjacent CN rail line 70 m north of the Project Site. Existing baseline air quality

parameters for the Project Site were estimated to complete an air quality impact assessment for this Project (Section 6.3.1; **Appendix B)**.

4.2.2 Noise and Vibration

The above-described influences on regional air quality (Section 4.2.1), would also contribute to noise levels at the Project Site. Based on the planned equipment use and activities, the Project is not expected to be a source of significant vibration. Therefore, vibrations are not considered further in this report. Noise has limited distance influence depending on the nature of the noise source (e.g. size, weight and type of facility machinery) and landscape features surrounding the sources of noise that may act to attenuate noise (e.g. tree cover; Yip et al., 2017; Albert, 2004; and surrounding geology, e.g. Kumar et al., 2016).

Existing noise at the Project Site is currently primarily influenced by the same human-generated that influence air quality as described above in Section 4.2.1 (e.g. PTH 15; CN rail line) and by natural sounds such as ambient weather (e.g. wind). Existing baseline noise and estimated Project-related noise levels are provided in a noise impact assessment for this Project (Section 6.3.3; **Appendix C**).

4.3 Aquatic Environment

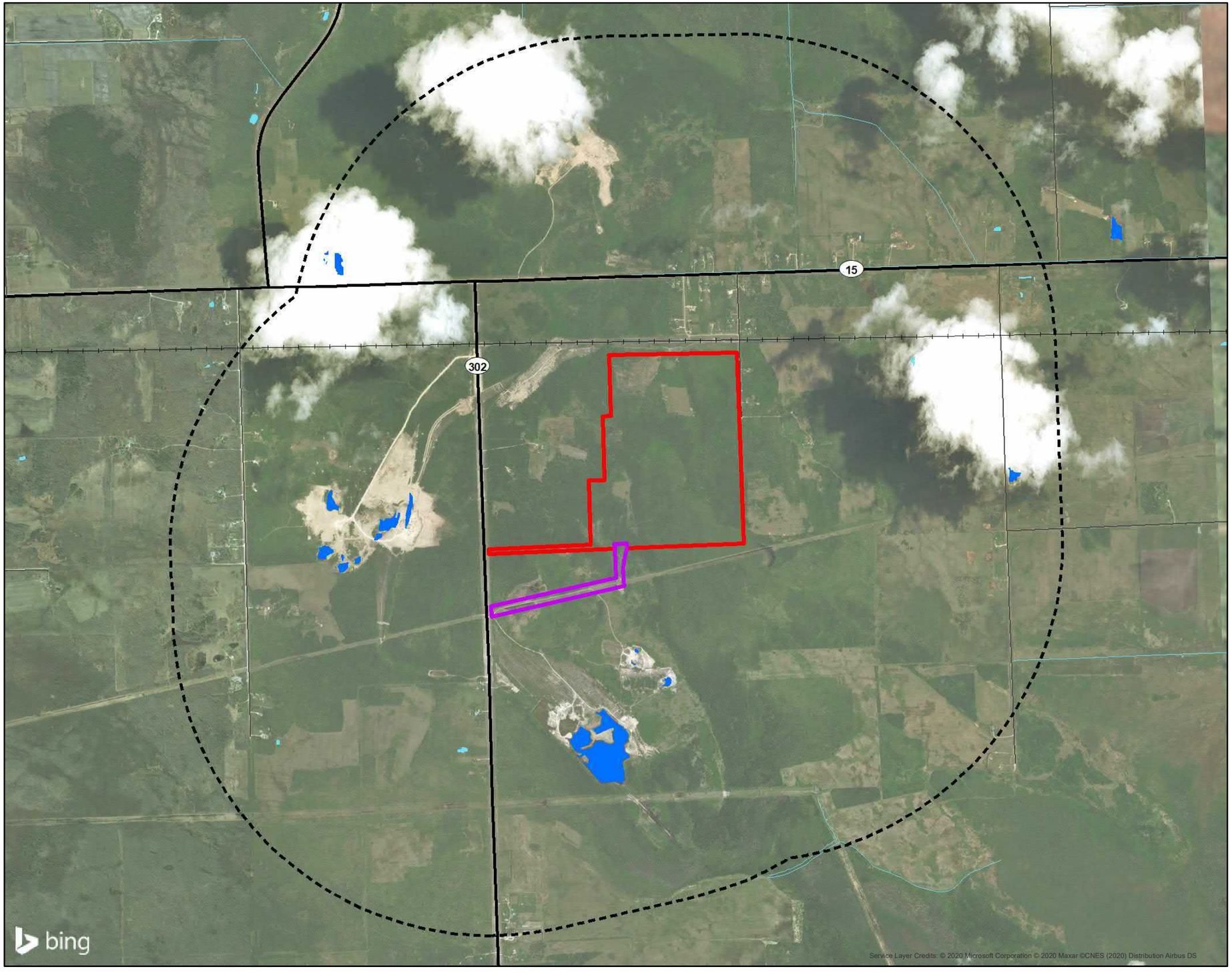
4.3.1 Surface Water and Drainage

There are no lakes, rivers or streams within the Project Site (**Figure 4-3**). The Brokenhead River is the closest major waterbody which is located within 6 kms of the Project Site to the east.

The on-line Atlas of Canada Toporama mapping tool (Natural Resources Canada, n.d.) indicates surface water drainage at the Project Site occurs within ditches and low drainage areas. Surface water drainage flows east for approximately 1 km along roadside ditches before entering a low drainage area flowing northwest. Water connects to another roadside ditch flowing north, then turning east, water discharges into the Brokenhead River, which flows north for approximately 65 km until connecting to Lake Winnipeg.

4.3.2 Fish and Fish Habitat

The Project Site contains no fish habitat. Although the Local Project Area has some wetlands, artificial ponds and ephemeral drainage areas primarily due to aggregate quarries and other developments in the area, there are no direct connections of these waterbodies with known or expected fish habitat. The nearest confirmed or expected fish habitat to the Project Site is the Brokenhead River and approximately 6 km east of the Project Site (Milani, 2013).



Legend

- Project Site
- Project Site – Temporary Use
- Local Project Area

Hydrography

- Permanent Waterbody
- Intermittent Waterbody
- Watercourses including Ditches and Drains

General Features

- Highway
- Road
- Railway

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NAD 1983 UTM Zone 14N

250 125 0 250 500
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Basemap: Canvec

AECOM

Figure: 4-3

Vivian Sand Facility Project
Waterbodies in the Project Site Area
CanWhite Sands Corp.

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Project Management Initials: Designer: Checked: Approved:
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4.4 Terrestrial Environment

4.4.1 Vegetation

The most recent (2019) GoogleEarth® Satellite imagery indicates that approximately 86% of the 114 ha of land within the Project Site is naturally vegetated (primarily forested) with the remaining land area having been previously cleared/disturbed. Information from the Manitoba Forest Resource Inventory, and on-site general reconnaissance in select locations within the Project Site (**Appendix D**) indicate that the majority of the Project Site consists of trembling aspen (*Populous tremuloides*) and aspen-dominant / bur oak (*Quercus macrocarpa*) stands. Occasional tamarack (*Larix laricina*), black spruce (*Picea mariana*), balsam poplar *(Populus balsamifera*) and balsam fir (*Abies balsamea*) / aspen-mixedwood stands occur within the Project Site. Common understory shrub species include American hazel (*Corylus Americana*), red-osier dogwood (*Cornus sericea*), wild rose (*Rosa* spp.) and willow (*Salix* spp.). A wet and dense willow and alder (*Alnus glutinosa*) dominated area extends from the southeast corner to the centre of the Project Site.

No land cover or habitats considered rare for the Regional Project Area were observed in the Project Site during terrestrial reconnaissance of the Project Site. The areas and percentages of land cover types, dominant tree species and forest age classes within the Project Site as compared to the Regional Project Area are provided in **Table 4-1**, **Table 4-2** and **Table 4-3**[4] and are illustrated in **Figure 4-4**, **Figure 4-5** and **Figure 4-6**. Photographs of represented cover types observed within the Project Site during the terrestrial reconnaissance investigations are provided in **Appendix D.**

[4] *Landcover information is from the latest Manitoba Lands Initiative online database and may not reflect* ***recent*** *land disturbance activities within the Project Site as can be viewed in the most recent (2019) GoogleEarth® Satellite imagery (Figure 4-8 in Section 4.6.4).*

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Project Management Initials: Designer: Checked: Approved: ANSI B 279.4mm x 431.8mm

AECOM

Figure: 4-4

Legend

- Project Site
- Project Site – Temporary Use
- Regional Project Area

Cover Type

- Treed Muskeg
- Willow / Alder
- Marsh - Muskeg
- Fields (Agriculture)
- Meadow
- Shelter Belts
- Developed
- Forested
- Water

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NAD 1983 UTM Zone 14N

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km

Basemap: Manitoba Land Initiative - Manitoba Forest Resource Inventory

Vivian Sand Facility Project
Cover Types in the Regional Project Area
CanWhite Sands Corp.

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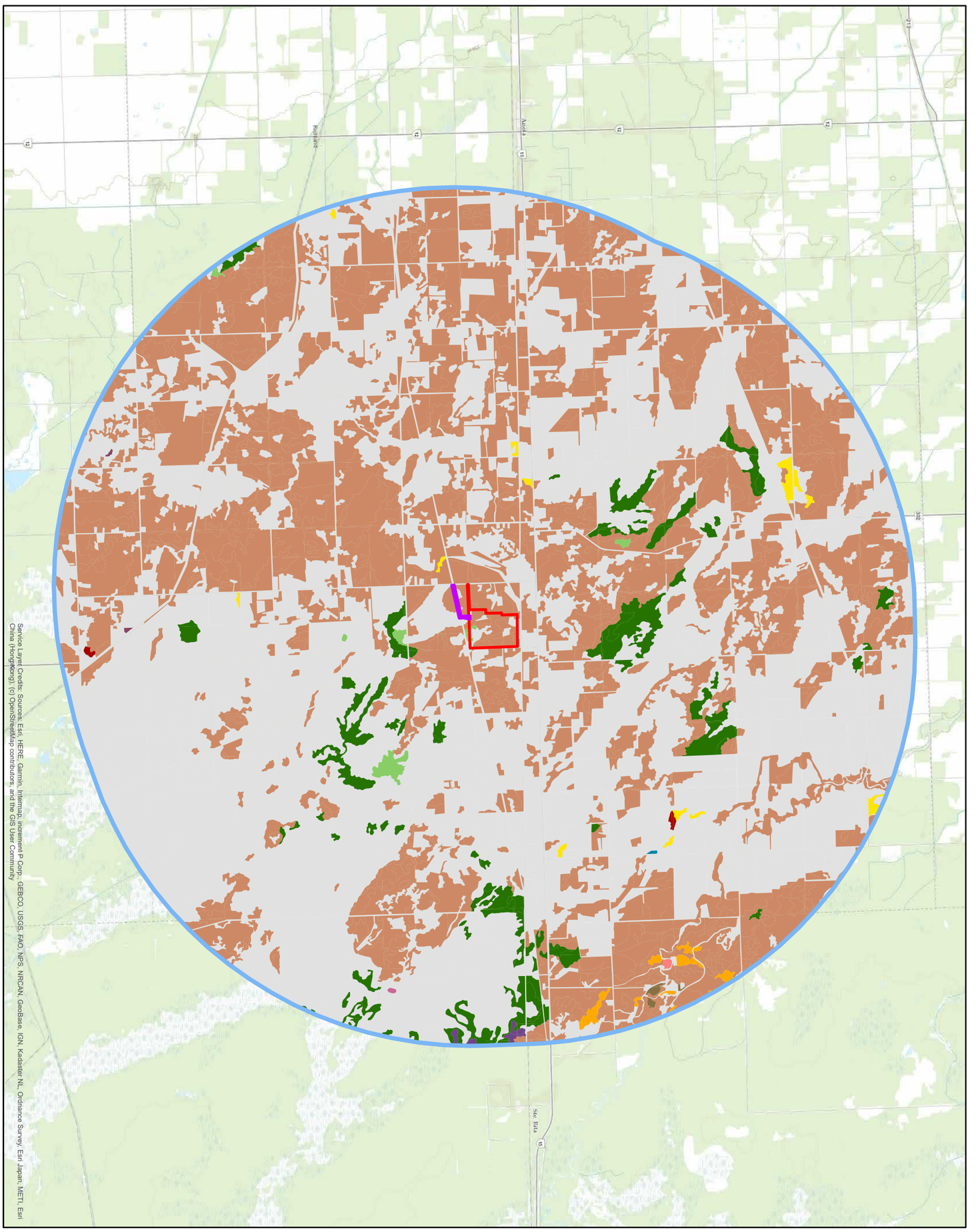


Legend

- Project Site
- Project Site – Temporary Use
- Regional Project Area

Dominant Tree Species

- Non-Forested
- Jack Pine
- Tamarack Larch
- Trembling Aspen
- White Birch
- Black Spruce
- Oak
- White Spruce
- Ash
- Balsam Fir
- Balsam Poplar
- Eastern Cedar
- Manitoba Maple

1:100,000
NAD 1983 UTM Zone 14N

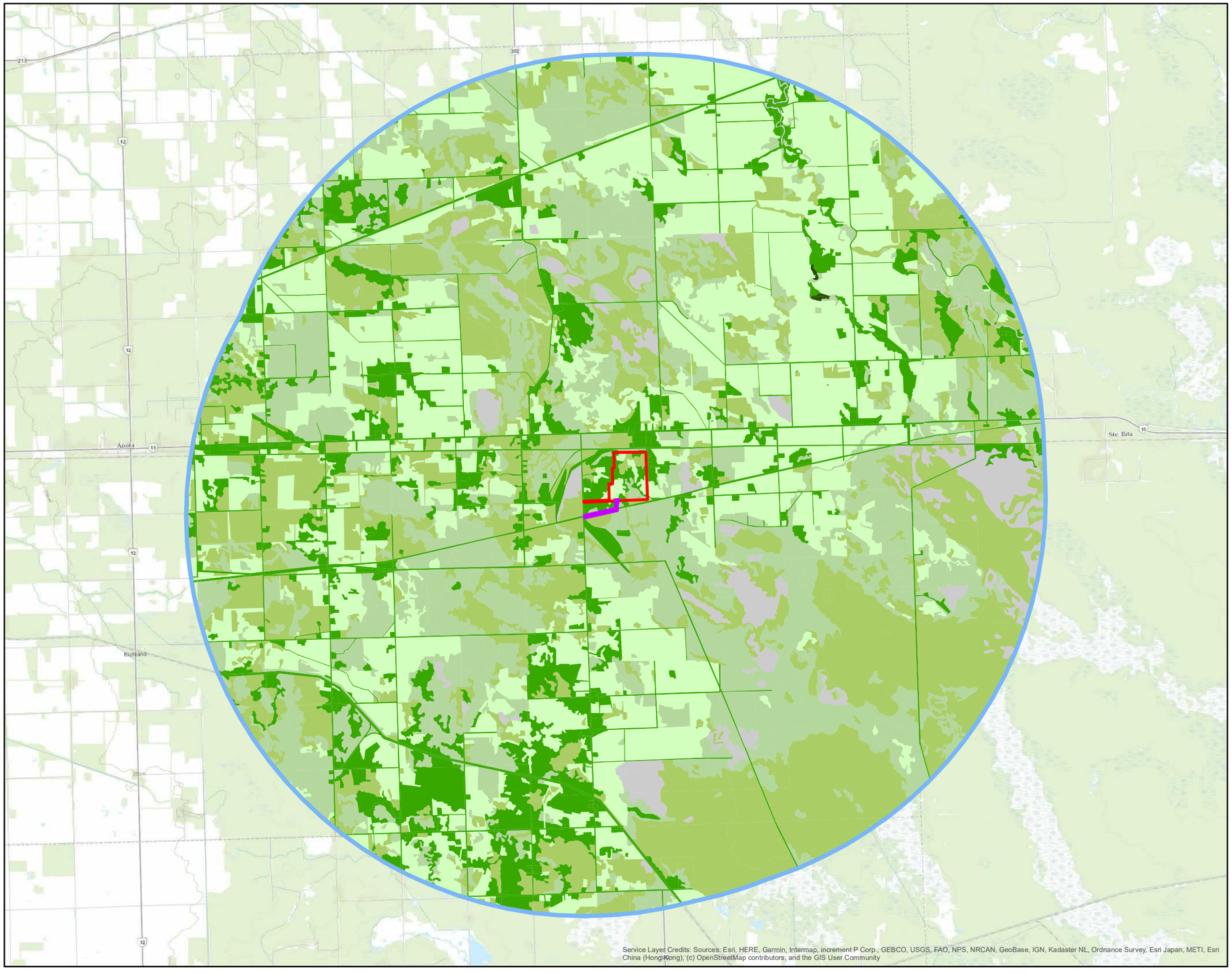
1 0.5 0 1 2 3
km

Basemap: Manitoba Land Initiative - Manitoba Forest Resource Inventory

Vivian Sand Facility Project
Dominant Tree Species in the Regional Project Area
CanWhite Sands Corp.

AECOM

Figure: 4-5



Legend

- Project Site
- Project Site – Temporary Use
- Regional Project Area

Forest Age Class *

- Not Forested
- Young (< 3 m)
- Young (> 3 m)
- Immature
- Mature
- Overmature

* Forest age information is based on the Manitoba Forest Resource Inventory data for 'Cutting Class' which is based on size, vigour, state of development and maturity of a stand for harvesting purposes.

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Basemap: Manitoba Land Initiative - Manitoba Forest Resource Inventory

AECOM

Figure: 4-6

Vivian Sand Facility Project
Forest Age Classes in the Regional Project Area
CanWhite Sands Corp.

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Project Management Initials: Designer: Checked: Approved:
ANSI B 279.4mm x 431.8mm

Table 4-1: Land Cover in the Project Site and Regional Project Area

Cover Type	Project Site		Regional Project Area	
	Hectares (ha)	Percent (± 1%)	Hectares (ha)	Percent (± 1%)
Forested	83	74	15,350	41
Fields (Agriculture)	10	9	9,979	27
Marsh - Muskeg	0	0	3,676	10
Meadow	10	9	2,562	7
Developed	3	3	2,273	6
Willow / Alder	6	5	2,264	6
Treed Muskeg	0	0	866	2
Water	0	0	44	0
Shelter Belts	0	0	2	0

Project Site = 114 ha; Regional Project Area = 37,016 ha
Source: Manitoba Land Initiative, 2017

Table 4-2: Dominant Tree Species in the Project Site and Regional Project Area

Tree Species	Project Site		Regional Project Area	
	Hectares (ha)	Percent (± 1%)	Hectares (ha)	Percent (± 1%)
Non-Forested	29	26	21,668	59
Trembling Aspen	81	72	14,064	38
Black Spruce*	0	0	1,018	3
Oak*	0	0	77	0
Jack Pine	0	0	66	0
Tamarack Larch	2	2	66	0
Balsam Fir*	0	0	23	0
White Spruce	0	0	12	0
Ash	0	0	10	0
White Birch	0	0	5	0
Balsam Poplar*	0	0	3	0
Eastern Cedar	0	0	2	0
Manitoba Maple	0	0	2	0

Source: Manitoba Land Initiative, 2017
*Occur in mixedwood areas smaller than detectable by the Manitoba Forest Resource Inventory

Table 4-3: Forest Age Classes in the Project Site and Regional Project Area

Forest Age Class*	Project Site		Regional Project Area	
	Hectares (ha)	Percent (± 1%)	Hectares (ha)	Percent (± 1%)
Young (< 3 m)	33	29	11,087	30
Immature	22	20	10,104	27
Young (> 3 m)	16	14	9,445	26
Mature	41	37	5,180	14
Not Categorized	0	0	1,191	3
Over-mature	0	0	9	0

Source: Manitoba Land Initiative, 2017

* Forest age information is based on the Manitoba Forest Resource Inventory data for 'Cutting Class' which is based on size, vigour, state of development and maturity of a stand for harvesting purposes.

4.4.2 Wildlife

Wildlife species expected to occur within the Project Site and throughout the Local and Regional Project Areas are those species that typically occur within the Steinbach Ecodistrict (Smith et al., 1998). Ungulate species include white-tailed deer and occasionally moose. A variety of furbearer species would occur within the landcover types within the Project Site with the most common likely being grey squirrel, red squirrel, smaller rodent species, snowshoe hare, red fox, coyote, American woodchuck and striped skunk. The occasional presence of black bears would also be expected.

According to the Manitoba Breeding Bird Atlas (2018), at least 60 bird species are likely to breed within the landcover types that occur within the Project Site, the majority of which are migratory birds protected under the federal *Migratory Birds Convention Act, 1994*.

Amphibian surveys were conducted within the Regional Project Area during May 14 to 18, 2018. boreal chorus frogs were consistently heard in marshes with open water centres and extensive emergent plant growth along the margins. This type of wetland does not occur within the Project Site. The Project Site has some limited areas of dense willow and alder wet meadows. Few frogs were heard calling in this type of wetland during the May 2018 surveys in the Regional Project Area. Other common amphibians expected to occur within the Project Site where suitable habitat occurs include wood frog, Northern leopard frog, spring peeper, Canadian toad and American toad. The red-sided garter snake is the reptile species most likely to occur in the Project Site (iNaturalist, n.d.)

4.4.3 Species of Conservation Concern

Manitoba Conservation Data Centre has compiled a list of Species of Conservation Concern for plant and animal species that are "rare, disjunct, or at risk throughout their range or in Manitoba and in need of further research" (Manitoba Conservation Data Centre, 2017). A full list of Species of Conservation Concern for the Interlake Plain Ecoregion, within which the Project Site is located, is included in **Appendix E.**

Plant 'Species at Risk[5]' that may occur within the Project Site are those listed in **Table** 4-4.

Table 4-4: Plant Species at Risk in the Interlake Plain Ecoregion that may occur in the Project Site

Common Name	Scientific Name	MBESEA Status	SARA Status	Probability of Occurrence within the Project Site
Rough Agalinis	*Agalinis aspera*	Endangered	Endangered	**Low** - Within Manitoba, this species occurs mainly in moist, sparsely vegetated areas with calcareous soils[a]. - A limited amount of habitat occurs at the Project Site. - This species is known to occur only in small populations in Manitoba south of Brandon, in the southern Interlake, and south of Birds Hill Provincial Park[a]. - As of 2012, only 15 extant known populations occur in Manitoba, the closest of which being a population south of Birds Hill Provincial Park, approximately 40 km north-west of the Project Site[a].
Western Silvery Aster	*Aster sericeus*	Threatened	Threatened	**Low - Moderate** - Western silvery aster occurs in dry open environments such as prairies and fields, as well as openings in oak and trembling aspen woodlands[b]. - This species grows in course calcareous, gravelly and sandy soil. They are generally found in undisturbed sites but can be found along roadside ditches and gravel pits[b]. - In Manitoba, this species occurs in patchy populations ranging from north-east of Winnipeg south to the US border[b]. - 20 extant populations occur in Manitoba, with the closest population occurring near the Town of Beausejour, approximately 20 km north of the Project Site. Other populations exist in the Birds Hill gravel esker complex, south of Birds Hill Provincial Park[b].

[a]Environment Canada 2015
[b]Environment and Climate Change Canada (ECCC) 2017

[5] *'Species at Risk' are defined for the purpose of this report as those species listed in The Endangered Species and Ecosystems Act of Manitoba (MBESEA) and/or those listed as 'Endangered' or 'Threatened' in Schedule 1 of the federal Species at Risk Act (SARA).*

Wildlife Species at Risk that may occur in the area of the Interlake Plain Ecoregion within which the Project Site occurs include those listed in **Table 4-5**.

Table 4-5: Wildlife Species at Risk in the Interlake Plain Ecoregion

Common Name	Scientific Name	MBESEA Status	SARA Status	Probability of Occurrence within the Project Site
Little Brown Bat/Myotis and Northern Long-eared Bat/Myotis	*Myotis lucifugus* and *Myotis septentrionalis*	Endangered	Endangered	**Low (maternity roosting) to High (foraging)** - Summer maternity colonies are established in buildings or cavities of large diameter trees[a]. The Project Site has few mature to over mature trees of suitable diameter for potential maternity cavity roost sites. - Foraging occurs over water, along waterways, forest edges, and forest gaps, in areas where insects are present[a]. - Both species of bats require limestone/karst caves as winter hibernacula. There are non known hibernacula found in the Project Site. - The probability of hibernacula occurring in the Project Site is unlikely a there are no recorded limestone/karst caves found the Project Region[b].
Common Nighthawk	*Chordeiles minor*	Threatened	Threatened	**Low** - Very little potentially suitable nesting habitat occurs at the Project Site for this ground-nesting species, i.e., cleared areas, burned areas, rocky outcrops; and peat bogs[c] for foraging - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 10%
Eastern Whip-poor-will	*Caprimulgus vociferus*	Threatened	Threatened	**Low to Moderate** - A limited amount of potentially suitable habitat occurs at the Project Site for this ground-nesting species, i.e., semi-open forests or patchy forests with clearings such as forests that are regenerating following major disturbances[d] - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 10% to 20%

Common Name	Scientific Name	MBESEA Status	SARA Status	Probability of Occurrence within the Project Site
Barn Swallow	*Hirundo rustica*	Not Listed	Threatened	**Unlikely** - This species builds a mud cup nest which adheres to vertical surfaces under overhangs[e] - No natural nesting habitat (e.g. cliff overhang), or man-made structures such as buildings that are preferred nesting habitat, occur within the proposed Project footprint
Bank Swallow	*Riparia*	Not Listed	Threatened	**Unlikely** - No steep riparian bank habitat occurs at the Project Site that would be suitable nesting habitat for this species which burrows into banks for nesting[f]
Golden-winged Warbler	*Vermivora chrysoptera*	Threatened	Threatened	**Low** - A limited amount of potentially suitable habitat occurs at the Project Site for this species, i.e., mature forest (**Figure 4-6** and **Table 4-3**) where canopy gaps create a patchy shrub layer that is comparable to the understorey of early successional sites, or the shrubby edge of wetlands[g] - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 10% to 20%
Canada Warbler	*Cardellina canadensis*	Endangered	Threatened	**Low** - This species uses a wide range of forest types (deciduous, coniferous, and mixed) with well developed shrub and forest floor, as well as in post disturbance and old-growth riparian shrub forests[h]. - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 0% to 10% and is more likely found further east of the Regional Project Area
Olive-sided Flycatcher	*Contopus virens*	Threatened	Threatened	**Low** - This species occurs primarily in coniferous or mixed forest with tall trees and tall snags for perching along open areas such as burns, wet areas such as bogs, and post-clearcut forest harvesting areas[i]. There is little potentially suitable nesting habitat within the Project Site for this species. - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 10%.

Common Name	Scientific Name	MBESEA Status	SARA Status	Probability of Occurrence within the Project Site
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Threatened	Threatened	**Low to Moderate** **-** This species occurs in a variety of habitat, including grasslands, forest edges, orchards, pastures, riparian forests, roadsides, and vegetated urban areas. In Manitoba, this species is strongly associated with trembling aspen forest with snags or trees with dead limbs in grazed cattle lots[j]. - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 20% to 40%
Short-eared Owl	*Asio flammeus*	Threatened	Special Concern	**Low** - This species nests on the ground in larger open grassland areas including marsh/bog and fen habitat and rarely in agriculture fields. Although some marsh habitat occurs within the Local Project Area, the area extent is very limited and likely not sufficient for nesting Short-eared Owls[k] - Probability of observation of this species in the Regional Project Area has been determined by the Atlas of the Breeding Birds of Manitoba to be approximately 20%
Eastern Tiger Salamander	*Ambystoma tigrinium*	Not Listed	Endangered	**Low** - This species inhabits areas where sandy or friable soils surround fishless, semi-permanent to permanent water bodies. All known occurrences in Manitoba are from six locations in the Steinbach Ecodistrict within which the Project is located, but approximately 50 km or more south of the Project Site [l].

[a] COSEWIC 2013a
[b] Bilecki 2003
[c] COSEWIC 2018a
[d] Environment and Climate Change Canada (ECCC) 2018
[e] COSEWIC 2011
[f] COSEWIC 2013b
[g] ECCC 2016a
[h] ECCC 2016b
[i] Environment Canada 2016b
[j] ECCC 2019
[k] COSEWIC 2008
[l] COSEWIC 2013c

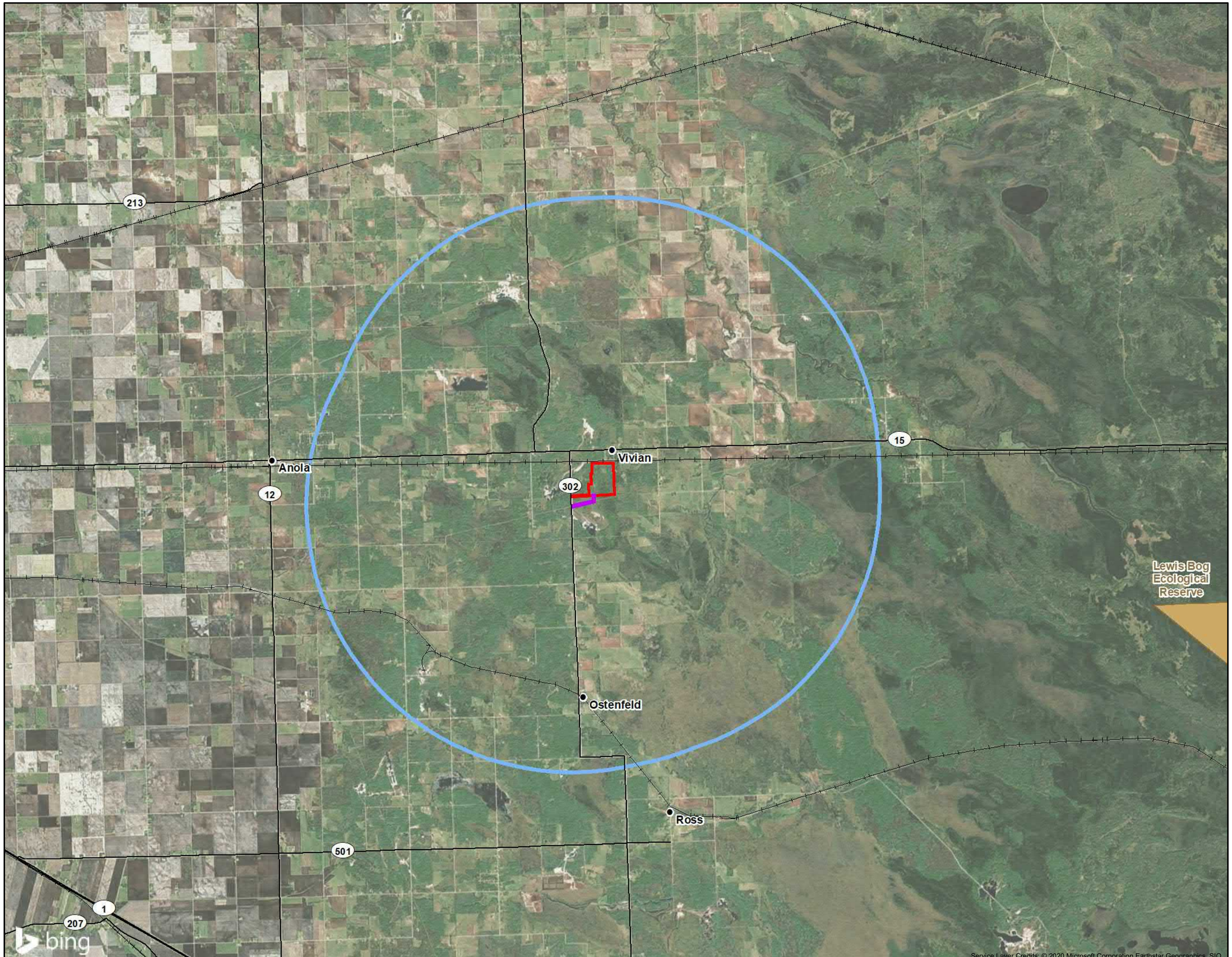
4.4.4 Parks and Protected Areas

The nearest designated park to the Project Site is Birds Hill Provincial Park located approximately 30 km to the northwest of the Project Site (**Figure 4-7**). The park provides year-round recreational activities such as hiking, cycling, skiing, horseback riding along a network of established trails (Manitoba Conservation and Climate, n.d.).

The following are the closest ecological reserves to the Project Site (distance in parentheses);

- Lewis Bog Ecological Reserve (21 km east)
- Ste. Anne Bog Ecological Reserve (28 km south)
- Brokenhead River Ecological Reserve (33 km north)
- Cedar Bog Ecological Reserve (34 km southeast)

The closest Wildlife Management Areas (WMA) to the Project Site are the Mars Hill WMA located approximately 36 km north, and the Whitemouth Bog WMA located approximately 38 km northeast of the Project Site. Mars Hill WMA protects important wintering habitat for deer, moose and black bear, and is well-known as a top birding site in Manitoba (Manitoba Conservation and Climate, 2020). The Whitemouth Bog WMA was established in 2007 around the Whitemouth Bog Ecological Reserve to protect a calcareous fen which is a rare wetland type. The Whitemouth Bog WMA is a peatland dominated by black spruce and tamarack with a wide variety of wetland vegetation including several species of conservation concern (Manitoba Conservation and Climate, 2020).



Legend

- Project Site
- Project Site – Temporary Use
- Regional Project Area

Parks and Protected Areas

- Ecological Reserve

General Features

- Highway
- Railway

N W E S

1:150,000
NAD 1983 UTM Zone 14N

2 1 0 2 4 6 km

Basemap: Manitoba Land Initiative

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Figure: 4-7

Vivian Sand Extraction Project
Parks and Protected Areas
CanWhite Sands Corp.

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Filename: L:\ENVIRONMENT\GIS\STEPHANIE CLARKE\WINNIPEG\VIVIAN_60625656\02_MXDS\VIVIAN SAND FACILITY PROJECT\H004-7_60625356_FACILITY_PARKSPROTECTEDAREAS.MXD

4.5 Indigenous Peoples

The Project Site is located within Treaty No. 1 area (Indian and Northern Affairs Canada, 2017). There are no First Nation reserve lands within the Local or Regional Project Area. The closest First Nation reserve lands to the Project Site is the Brokenhead Ojibway Nation's Na-Sha-Ke-Penais Indian Reserve (3 ha) surrounded by East St. Paul and located 40 km northwest of the Project Site.

The Regional Project Area is within an area recognized by the Manitoba Metis Federation as an area for Metis Natural Resource Harvesting (The Metis Economic Development Organization, 2018) which corresponds with the Manitoba Conservation and Climate Game Hunting Area (GHA) number 35 within which the Project Site is located (Manitoba Sustainable Development 2019).

The Project Site is comprised of land held in fee simple by private landowners and/or land used for municipal and public purposes and is currently zoned for 'aggregate' by the RM of Springfield (Section 4.6.4). Therefore, the Project Site itself is not currently available for the exercise of Indigenous or Treaty rights.

4.6 Socioeconomic Environment

The proposed Project is located entirely within the RM of Springfield. Considering the proximity of Winnipeg (35 km west) and other surrounding rural municipalities in addition to the RM of Springfield, there are expected to be sufficient worker skills, trades and services available to support Project construction and operation within a reasonable commuting distance.

The demographic profile, labour force and employment related statistics for the surrounding Rural Municipalities and the City of Winnipeg are described below in Sections 4.6.1 and 4.6.2 to demonstrate the workforce potential availability for the life of the Project for populations within reasonable commute time from the proposed Project Site. The Regional Project Area represents the population regions that would be a potential source of employees, trades and services located within a reasonable commute time from the proposed Processing Facility.

4.6.1 Demographic Profile

The statistical data presented in this section reflect the most recent Statistics Canada information available and do not reflect changes to the current labour force that have resulted from the coronavirus (COVID-19) pandemic of 2020. **Table 4-6** shows that the Regional Project Area is increasing in population, with a range in population increase from 0.6% in the RM of Whitemouth, to 12.5% in the RM of Taché.

Table 4-6: Population of Regional Project Area Communities

Regional Project Area - Populations								Province
Population	**RM of Springfield**	**RM of Taché**	**RM of Reynolds**	**RM of Broken-head**	**RM of White-mouth**	**RM of Lac du Bonnet**	**City of Winnipeg**	**Manitoba**
2016 Census	15,342	11,568	1,338	5,122	1,557	3,121	705,244	1,278,365
2011 Census	14,069	10,284	1,285	4,635	1,548	2,930	663,617	1,208,268
Population Change (%)	9.0	12.5	4.1	10.5	0.6	6.5	6.3	5.8

Source: Statistics Canada, 2017

Table 4-7 provides the population of the regional project area communities by age groups. The regional project area has a higher average age (41.3 years) and median age (43.7 years) in comparison to the Province (39.2 years and 38.3 years respectively).

Table 4-7: Distribution of Regional Project Area Communities by Age Groups

Regional Project Area - Populations								Province
Population – Age (years)	**RM of Springfield**	**RM of Taché**	**RM of Reynolds**	**RM of Broken-head**	**RM of White-mouth**	**RM of Lac du Bonnet**	**City of Winnipeg**	**Manitoba**
0 – 14 (%)	18.9	25.1	15.3	19.0	16.1	9.3	16.8	19.1
15 – 64 (%)	67.3	66.6	65.7	67.3	63.7	64.3	67.5	65.4
64 and over (%)	13.9	8.3	19.0	13.5	20.3	26.2	15.6	15.6
85 and over (%)	0.9	0.4	1.1	0.9	2.9	1.3	2.4	2.3
Average age of population	39.9	34.4	43.1	39.6	43.8	48.6	39.9	39.2
Median age of population	42.1	34.8	47.1	41.0	47.6	54.2	38.8	38.3

Source: Statistics Canada, 2017

4.6.2 Labour Force and Employment

The statistical data presented in this section reflect the most recent Statistics Canada information available and do not reflect changes to the current labour force that have resulted from the coronavirus (COVID-19) pandemic of 2020. **Table 4-8** presents the 2016 education levels for the Regional Project Area and the Province of Manitoba. The region has a higher percentage of the population that has not completed high school, and also has a higher percentage of the population that has completed an apprenticeship, trades, or completed a college or non-university certificate of diploma in comparison to the Province.

Table 4-8: Education Attainment of Regional Project Area Communities

	Regional Project Area - Populations							Province
Education (aged 25 – 64)	**RM of Springfield**	**RM of Taché**	**RM of Reynolds**	**RM of Broken-head**	**RM of White-mouth**	**RM of Lac du Bonnet**	**City of Winnipeg**	**Manitoba**
Total population aged 25-64	8,400	6,070	710	2,855	745	1,445	378,780	654,670
Certificate, diploma or degree (%)	9	15	28	16	39	16	10	14
Secondary (high) school diploma or equivalency (%)	29	30	26	31	21	30	27	28
Apprenticeship or Trades certificate, diploma or degree (%)	13	13	12	16	12	14	7	8
College or non-university certificate or diploma (%)	24	25	25	23	20	26	21	21
University certificate or diploma below bachelor level (%)	4	3	1	3	2	6	3	3
University certificate, diploma or degree at bachelor level or above (%)	21	14	8	11	7	9	33	25

Source: Statistics Canada, 2017

The statistical data presented in this section reflect the most recent Statistics Canada information available and do not reflect changes to the current labour force that have resulted from the coronavirus (COVID-19) pandemic of 2020. **Table 4-9** presents labour force indicators including the total population aged 15 years and over, population in the labour force and participation, employment and unemployment rates for the Regional Project Area and the Province of Manitoba. The 2016 participation and employment rates in the Regional Project Area are higher on average in comparison to the Province, while the unemployment rates are lower, except for the RM of Reynolds which has an unemployment rate of 9.2%.

Table 4-9: Labour Force Indicators of Regional Project Area Communities

Regional Project Area - Populations								Province
Labour Force	**RM of Springfield**	**RM of Taché**	**RM of Reynolds**	**RM of Broken-head**	**RM of White-mouth**	**RM of Lac du Bonnet**	**City of Winnipeg**	**Manitoba**
Total Population aged 15 and over	12,215	8,650	1,105	4,090	1,205	2,460	571,580	1,001,305
In the Labour Force	8,600	6,375	705	2,985	800	1,400	383,300	662,155
Participation Rate (%)	70.4	73.7	63.8	73.0	66.4	56.9	67.1	66.1
Employment Rate (%)	67.3	70.7	57.9	69.2	65.1	53.3	62.7	61.7
Unemployment Rate (%)	4.5	4.2	9.2	5.4	1.9	6.4	6.5	6.7

Source: Statistics Canada, 2017

4.6.3 Infrastructure and Services

4.6.3.1 Transportation

Road

The Project Site can be accessed from the PTH 15 just south of Vivian near the intersection with PR 302 (**Figure 1-2**). The proposed Project design includes the construction of an access road to the Processing Facility that will intersect with PR 302 (Section 2.5).

Air

There are no airports/aerodromes in the Regional Project Area. The closest aerodrome is the Beausejour/AV-Ranch Airpark located 20 km north-northwest of the Project Site and 4 km southwest of the town of Beausejour. The largest regional airport is the Winnipeg James Armstrong Richardson International Airport located in Winnipeg, approximately 60 km west of the Project Site.

Rail

As indicated in Section 2.2, an existing CN rail line is located within 70 m north of the Project Site which will accommodate the transportation of the sand product by rail to markets (**Figure** 1-2).

4.6.3.2 Emergency Services

Fire

The closest fire halls to the Project Site servicing the RM of Springfield include the following (RM of Springfield, 2020; driving distance and direction from the Project Site in parentheses):

- Anola Fire Station #2 (12 km west)
- Oakbank Fire Station #1 (34 km northwest)
- Springfield Industrial Area Fire Station #3 (40 km west)

Medical Services, Ambulance and Hospital

Medical Responder Programs are run out of each of the above-described fire halls to support medical emergencies in the RM of Springfield. Each station has two to three personnel who respond directly to the incident in private vehicles and are equipped with medical bags, automated external defibrillators (AEDs) and communication equipment (RM of Springfield, 2020).

Ambulance services are available through calling 911. The nearest hospitals to the Project Site include the Beausejour Hospital located 24 km north and the Ste. Anne Hospital located 38 km south. The nearest full-care 24-hour hospital is the St. Boniface Hospital in Winnipeg located 49 km west of the Project Site.

Police

Police services in the vicinity of the Project Site include the Springfield Police Service at 686 Main Street in Oakbank and RCMP services at 625 Balsam Crescent in Oakbank, both of which are located approximately 34 km northwest of the Project Site (RM of Springfield, 2020).

4.6.3.3 Community Services

Communications

The nearest cellular service tower is located adjacent to the town of Anola approximately 14 km west of the Project Site. Available cellular service providers include Bell MTS, Telus and Rogers.

Electricity

Manitoba Hydro provides electric power to industries and residents in the Regional Project Area (Manitoba Hydro, n.d.).

Water and Wastewater

The RM of Springfield provides potable water services sourced from municipal groundwater wells to a total population of approximately 1,300 within the communities of Anola, Oakbank and Dugald which are the closest communities to the Project Site supplied with municipal water services (Manitoba Sustainable Development, n.d.; RM of Springfield, 2019). The majority of the Regional Project Area is individually serviced by private groundwater wells.

The nearest wastewater treatment facility to the Project Site is the RM of Springfield wastewater treatment lagoon system located in NE 11-11-5 EPM, 24 km west of the Project Site. (Manitoba Conservation, 2010).

Solid and Hazardous Waste Disposal

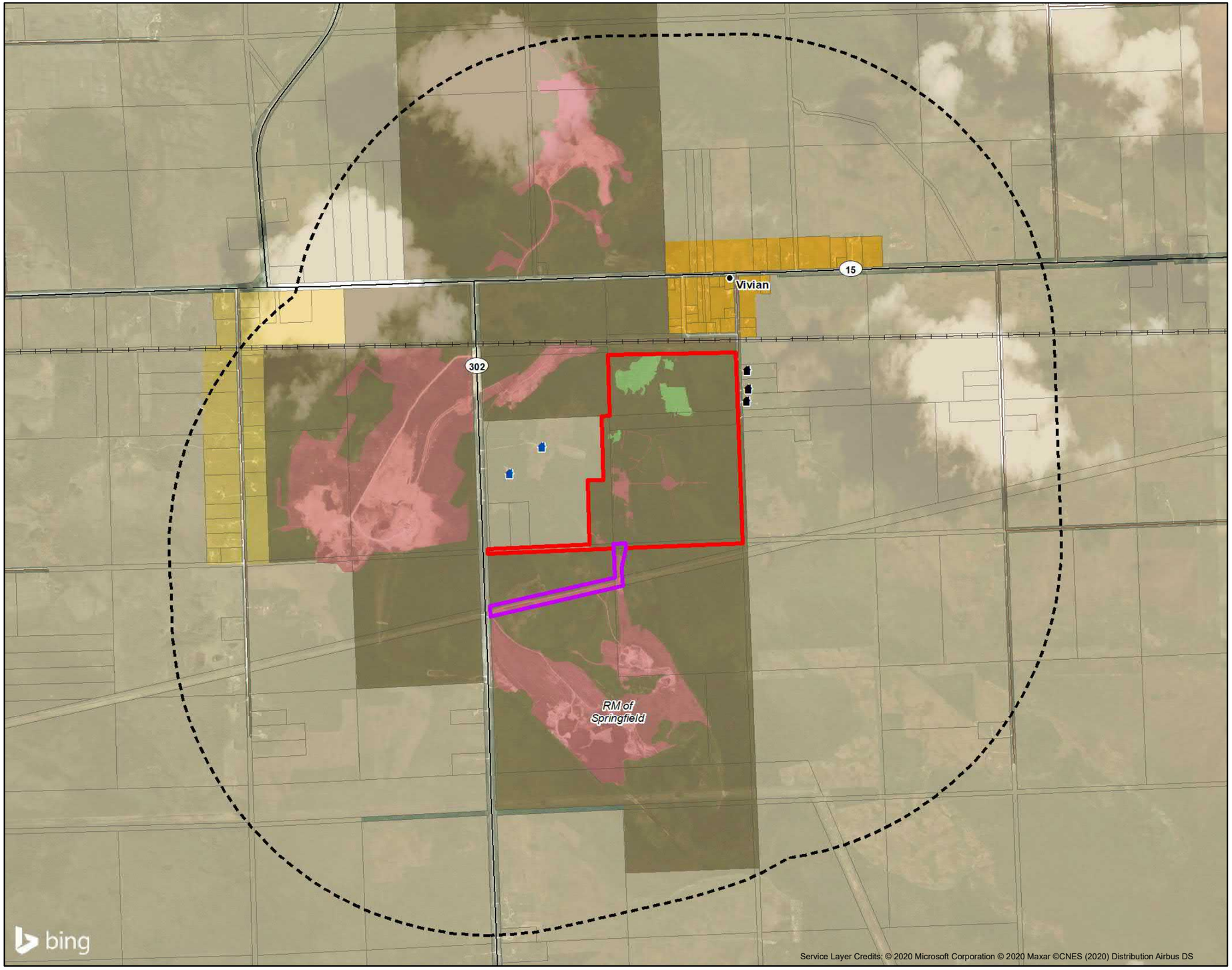
The Rural Municipality of Springfield contracts BFI Canada to manage its waste and recycling programs at the local transfer stations (RM of Springfield, 2020).

The nearest waste transfer stations to the Project Site Area are the Oakwood Transfer Station located 11 km north of the Project Site and the Hillside Transfer Station located 40 km northwest of the Project Site. The nearest large-capacity landfill is the Brady Road Resource Management Facility in Winnipeg located 63 km southwest from the Project Site.

The nearest commercial hazardous waste facility, which also accepts household hazardous waste (e.g. oils and other petroleum products), is the Miller Environmental facility located at 1451 Saskatchewan Ave. in northwestern Winnipeg approximately 57 km west of the Project Site.

4.6.4 Land and Resource Use

Information from the Manitoba Lands Initiative geodatabase indicates that land use within the Project Site is designated as quarry/mine use with adjacent land areas having the same designation in addition to agriculture and residential development land use classifications (**Figure 4-8**). The RM of Springfield Development Plan (RM of Springfield, 2018) has designated land within the Project Site as ‘aggregate’ with surrounding designated land uses having the same designation in addition to ‘mixed rural and agriculture’ use, ‘general development’ and ‘agriculture preserve area’ designations (**Figure 4-9**).



Legend

- Project Site
- Project Site – Temporary Use
- Local Project Area

Land Use

- Rural/Agricultural
- Rural Residential
- Settlement Centre
- Industrial
- Quarry and Mineral Exploration Activities
- Previous Tree Cutting / Harvesting Activities in the Project Site Area

Nearest Residences

- Nearest Residences to the Rail Loop* Infrastructure
- Nearest Residences to the Wet Plant and Dry Plant* General Site Area

General Features

- Highway
- Road
- Railway
- Assessment Parcel

NOTE:
* Refer to Figure 2-2 for the locations of Processing Facility Components

N
W E
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1:25,000
NAD 1983 UTM Zone 14N

250 125 0 250 500 750
m

Basemap: Manitoba Government; Canvec; NRCan

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Figure: 4-8

Vivian Sand Facility Project
Land Use within the Local Project Area
CanWhite Sands Corp.

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Project Management Initials: Designer: Checked: Approved: ANSI B 279.4mm x 431.8mm

Key Map

Legend

- Project Site
- Project Site – Temporary Use
- Local Project Area

Development Plan Designations *

- Agricultural Preserve Area
- Mixed Rural and Agricultural Area
- Aggregate
- General Development
- Rural Residential
- Natural Resource Area

General Features

- Highway
- Road
- Railway
- Assessment Parcel

* RM of Springfield. 2018. Rural Municipality of Springfield Development Plan. May 17, 2018

N
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1:25,000
NAD 1983 UTM Zone 14N

250 125 0 250 500 750 m

Basemap: Manitoba Government; Canvec; NRCan

AECOM

Figure: 4-9

Vivian Sand Facility Project
Development Plan Designations within the Local Project Area
CanWhite Sands Corp.

Last saved by: STEPHANIE.CLARK (2020-06-18) Last Plotted: Thu Jun 18, 2020
Filename: L:\ENVIRONMENT\GIS\STEPHANIE CLARKE\WINNIPEG\VIVIAN_60625656\02_MXDS\VIVIAN SAND FACILITY PROJECT\TH004-9_60625356_FACILITY_DEVELOPMENTPLAN.MXD
Project Management Initials: Designer: Checked: Approved: ANSI B 279.4mm x 431.8mm

4.6.4.1 Agriculture

No land within the Project Site is designated in the RM of Springfield Development Plan for agriculture use (RM of Springfield, 2018). There is land immediately west and east of the Project Site designated in the RM of Springfield Development Plan as either ‘Mixed Rural and Agriculture Area’ or ‘Agriculture Preserve Area’ (**Figure 4-9**).

4.6.4.2 Aggregate Extraction

The RM of Springfield Development Plan has designated all land within the Project Site as ‘Aggregate’, meaning the land is prioritized for aggregate extraction in a manner compatible with adjacent land uses and the environment (**Figure 4-9**).

The Project Site is adjacent to land areas currently or previously disturbed by surficial gravel extraction operations (**Figure 4-8**). Within the Project Site, approximately 6.7% of the land area has been previously disturbed by aggregate quarry and exploration activities such as trails and mineral exploration sites.

4.6.4.3 Residential

The hamlet of Vivian is the closest concentration of residential developed land and is primarily located adjacent to PTH 15 immediately north of the existing CN rail line. The CN rail line is 70 m north of the Project Site (**Figure 4-8**).

The nearest residences from the center of the sand Wet Plant and Dry Plant general site location are two rural properties located approximately 615 m and 720 m to the northwest, and east of PR 302 (**Figure 4-8**). The nearest residences to the proposed rail loop infrastructure are rural properties located east of Station Road 44 E and within approximately 80 m to 100m east of the proposed rail loop infrastructure (**Figure 4-8**).

4.6.4.4 Other Land Use

In addition to areas previously disturbed by quarry activities (Section 4.6.4.2), approximately 6.7% of the Project Site has previously been cleared by forest clearcutting activity (**Figure 4-8**), an area of disturbance similar to the area previously disturbed by aggregate extraction and exploration activities (Section 4.6.4.2). The access road within the Manitoba Hydro easement that is proposed to be used for the Project construction phase is also part of a network of regularly maintained recreational off-road vehicle/snowmobile trails (Snoman, n.d.).

4.6.5 Heritage Resources

A screening request to the Manitoba Historic Resources Branch (HRB) was submitted on March 10, 2020 for the proposed Project to determine if there are any potential heritage resources that may be affected by the Project and if a Heritage Resources Impact Assessment (HRIA) is required. Historic Resources Branch determined in a communication dated March 25, 2020 that due to the potential for historic resources to occur within the Project Site, a HRIA was required prior to the initiation of Project activities in the Project Site (**Appendix F**).

On May 12 and 13, 2020, a qualified archaeologist conducted an HRIA of the Project Site in accordance with Historic Resources Branch requirements. Only one heritage resource site was found which consisted of bison bones with evidence of human processing cut marks on the bones predating the 1870s. The HRIA report, which also provides a historical overview of the general Project area is provided in **Appendix G**. Prior to the HRIA being completed at the Project Site in May 2020, there were no registered archaeological

sites located within the Regional Project Area (i.e. within 10 km of the Project Site). The on-site archaeological investigation found the Project Site to have a low potential for undiscovered heritage resources (**Appendix G**).

5. Engagement Program

5.1 Early Project Communications

In April 2019 during the early planning phase, CanWhite held public meetings in Anola, Richer and La Broquerie, Manitoba to introduce CanWhite and provide information about the potential for a future silica sand project in their regional areas. The proposed location for the Processing Facility had not been determined at that time; therefore, public feedback regarding a proposed silica sand processing facility was not obtained during these early public engagement meetings.

5.2 Engagement Program for the Proposed Project

This section provides information on how the currently proposed Project was communicated to potentially affected public and stakeholders.

Due to the coronavirus (COVID-19) pandemic of 2020, information regarding the proposed Project was communicated through an Engagement Program focused on potentially affected public and stakeholders through methods that did not include in-person meetings to respect physical distancing protection measures.

The Engagement Program was designed to provide the public and stakeholders with the opportunity to review Project information, provide feedback and share any questions or concerns regarding the proposed Project.

5.2.1 Communication Materials

CanWhite provided a variety of communication and consultation outlets to reach all interested members of the public, property owners, review agencies, indigenous communities and other stakeholders to solicit comments and feedback relating to the Vivian Sand Project. The methods include:

- A Project email (info@viviansandproject.com) launched May 11, 2020
- A Project toll-free number: 1-888-436-5238 launched May 11, 2020
- Information Flyers sent out May 11, 2020
- Newspaper advertisement posted in *The Clipper* local newspaper on May 14, 2020
- A Project website www.viviansandproject.com launched May 18th, 2020
- Mail-out information packages sent out May 21, 2020
- A Virtual Open House presentation held May 26, 2020, 7:00 pm

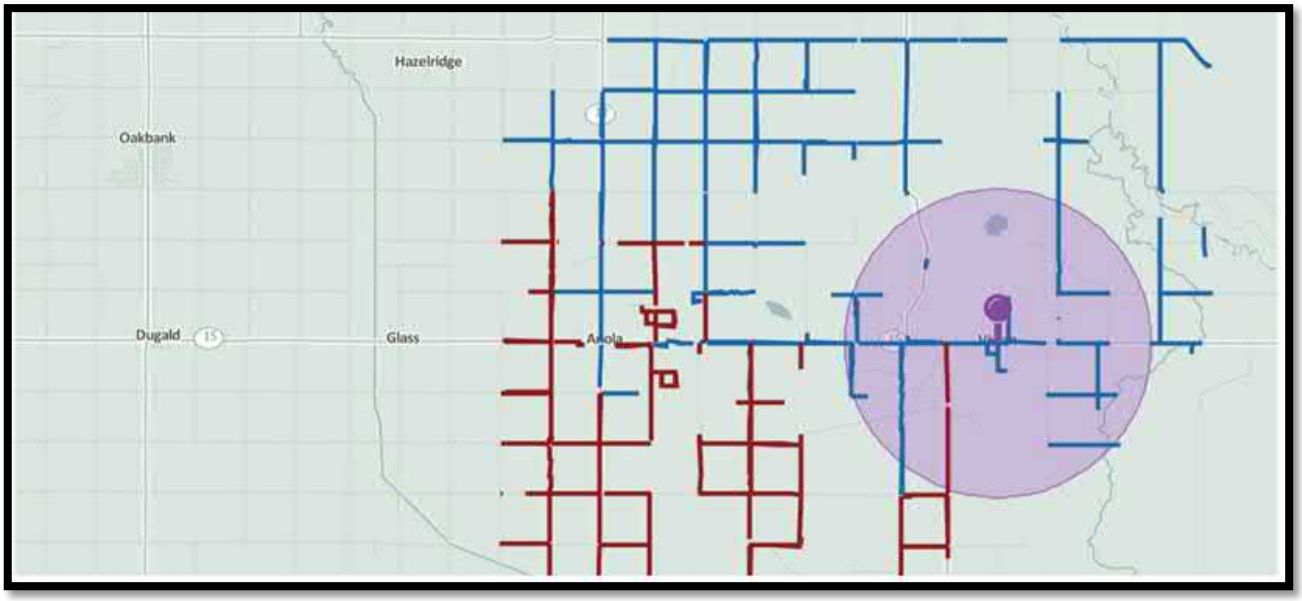
The public communication materials that were used for the Project Engagement Program are provided in **Appendix H**.

A briefing with the RM of Springfield Council was held prior to the formal Virtual Open House event on May 19, 2020 at 12:00 PM. During this briefing, the engagement plan, public presentation, website and information package materials were presented to Council for review.

Members of the public were initially contacted through the mail-out of information flyers to addresses on mailing routes, any portions of which are located within 5 km of the Project Site. The information flyers were

delivered to 1074 homes and 13 apartments between May 14, 2020 and May 15, 2020. The packages and flyers were delivered along two mailing routes (**Figure 5-1**).

Figure 5-1: Distribution Map of Project Information Package Mailouts



Note: The two mailing routes, any portions of which are located within a 5 km radius of Vivian (purple circle), are indicated as red and blue lines

An additional 20 information packages were mailed to the RM of Springfield municipal office on May 21, 2020. CanWhite also received 12 requests for information packages from residents that were mailed-out in May 2020.

An advertisement was published on May 14, 2020 in the local newspaper (The Clipper) informing the public about the Project, Virtual Open House, project website launch date (May 18th, 2020), Project email and toll-free CanWhite contact number. Members of the public that were interested in more information, looking to register for the Virtual Open House or to provide any comments and/or questions were directed to the Project website to send an email to info@viviansandproject.com or to call the toll-free number 1-888-436-5238.

CanWhite maintained a record of correspondences throughout the consultation phase to track and respond to all emails and/or calls pertaining to the project. Emails received were provided with an immediate autoreply informing the public that their inquiry would be responded to within two business days. Phone calls received after the Virtual Open House was held were provided with a reply within two business days. Responses to questions about the Project received by phone prior to the Virtual Open House were incorporated into the responses provided in **Appendix I**.

A formal Virtual Open House in the form of a live Project presentation by CanWhite followed by a question and answer session was held on May 26, 2020 from 7:00 PM to 9 PM. The media platform used to hold the open house was Zoom. Registration for the Virtual Open House was completed through the Project email and/or phone number. CanWhite pre-registered attendees through Zoom. Each registration was provided with a unique URL to join the meeting. A total of 44 participants registered for the Virtual Open House. Thirty-nine individuals attended the meeting (28 joined online and 11 individuals phoned in).

Participants in the Virtual Open House were asked to provide any comments and/ or questions through a commentary button provided by the Zoom online platform. Questions submitted through email prior to the Virtual Open House and live during the presentation were addressed at the end of the presentation.

5.2.2 Public Input Received

The questions and comments from the public received through the Engagement Program efforts pertaining to the proposed Processing Facility Project, and CanWhite responses, are provided in **Appendix I**.

The comments and questions received regarding the Facility Project were mostly received either during the Zoom Virtual Open House meeting by submission of questions through the Zoom application or through email. Four completed feedback (survey) forms were also mailed to CanWhite. Two of the feedback forms had questions regarding the extraction activities that will be addressed this summer as part of the separate Extraction Project Engagement Program. One of the four feedback forms indicated no concerns with the proposed Processing Facility Project and that they have property for sale in the vicinity of the Project. The fourth feedback form indicated general concerns about noise, water quality and the rail component of the Project and also asked questions about the hours and number of days of Project operation, potential effects to property values, if the Project will generate benefits to the local communities including Vivian, and how the land will be changed with the Project.

A total of 74 questions/comments from 14 individuals are summarized in **Appendix I**. The questions and comments from six of the 14 individuals accounted for 72% of the 74 questions/comments received.

Approximately 20% of the 74 questions/comments received were related to air quality including dust (16%), and water usage including groundwater concerns (15%). Eight questions/comments received (11%) were questions related to employment/labour force, infrastructure and services improvements or general Project benefits. Three questions/comments (5%) were related to traffic and types of vehicles used, and three comments (4%) were related to noise concerns. The remaining questions were mostly related to inquiries regarding Project operations (**Appendix I**).

Some participants raised questions about extraction of the sand resource that will be processed in the facility. Primarily the questions focused on whether there would be open pit mines in the area; if groundwater would be affected; and if subsidence of the land would occur. CanWhite’s sand extraction methods will not involve open pits. The resource is found approximately 61 m (200 feet) underground and it will be accessed by temporary drill holes similar to those used widely in the area for water. These drill holes will be located temporarily on small sites for relatively brief periods of time. Sand and water exist naturally in the target sandstone formation and during extraction they will flow one-way to the surface as a slurry, assisted only by air. CanWhite expects that this method will pose no greater risk to groundwater than the method used to access groundwater for domestic purposes which is widespread in the area.

In general, CanWhite has advised the public that its planning is focused on ensuring that extraction will not result in risk either to groundwater quality/quantity or subsidence of the surface.

The extraction-related questions received to date have been saved and they will be answered specifically and in detail during a planned Public Open House/Information Session in the summer of 2020 which will focus on the Extraction Project. These questions and answers also will be included with the materials filed in the *Environment Act* application for the Extraction Project.

5.2.3 Minor Project Update

During the Public Engagement Program communications about the proposed Project in May 2020, it was communicated that the area to be cleared would be approximately 16 times smaller than a section of farmland. After May 2020, a permanent access road to the Processing Facility was added as a Project component, changing the area to be cleared from approximately 16.5 ha to approximately 17 ha, which is 15 times smaller than a section of farmland rather than 16 times smaller than a section of farmland.

6. Environmental Assessment and Mitigation Measures

This section identifies the potential Project effects on the biophysical and socioeconomic environmental components, describes mitigation measures included in the design of the Project to avoid or minimize potential Project effects and determines the residual adverse impacts remaining, if any, after the application of mitigation measures.

The scope of this environmental assessment regarding spatial and temporal boundaries and the environmental components to be assessed has been described in Section 3.

6.1 Effects Assessment Methods

Table 6-1 identifies the biophysical and socioeconomic components that may be potentially affected by the Project due to the potential for interactions with the Project activities and components. Potential interactions were identified based on:

- Professional judgement;
- An understanding of Project components, construction methods, operation processes and the assumption that standard environmentally responsible construction techniques and operating procedures will be applied in the course of project construction, operation and decommissioning/closure; and
- Input received from local communities, the public, stakeholders and communications with regulators (Section 5).

Table 6-1: Environmental Component Potential Interactions with the Project

ACTIVITY	BIOPHYSICAL COMPONENTS										SOCIO-ECONOMIC COMPONENTS			
	Physical			Atmospheric		Terrestrial			Aquatic					
	Topography	Soil	Groundwater	Air Quality (dust, noise)	Climate / Greenhouse Gases	Vegetation	Wildlife	Species of Conservation Concern	Surface Water Quality	Fish and Fish Habitat*	Heritage Resources	Land and Resource Use	Human Health and Well-being	Indigenous and Treaty Rights** Aesthetics
CONSTRUCTION														
Mobilizing construction equipment, materials and crew to and from Project Site including improvement of existing construction access road as needed	X	X		X	X	X	X	X	X		X	X	X	
Vegetation clearing, grubbing and leveling for facility and other infrastructure	X	X		X	X	X	X	X	X		X	X	X	
Stockpiling cleared woody debris/organics/soil	X	X		X	X	X	X	X	X		X	X	X	
Disposing of large woody debris (trees)	X	X		X	X		X	X				X	X	
Drilling two groundwater wells for Processing Facility use (i.e. emergency fire suppression; sinks, showers and toilets)	X	X	X	X	X	X	X	X	X		X	X	X	
Construction of Processing Facility, including rail loop	X	X		X	X	X	X	X	X		X	X	X	
Disposing of miscellaneous construction wastes		X					X	X					X	
OPERATION and MAINTENANCE														
Mobilizing operations and maintenance equipment, materials and crew to and from Project Site				X	X		X	X					X	
Sand processing including Processing Facility domestic groundwater use			X	X	X								X	
Transporting sand to main CN rail line from the Processing Facility via railcars, rail loop and railway spurs				X	X		X	X					X	
Disposing of miscellaneous operation and maintenance wastes		X					X	X					X	
DECOMISSIONING/CLOSURE														
Mobilizing decommissioning/closure equipment, materials and crew to and from Project Site				X	X		X	X					X	
Dismantling or demolishing, and removal of, Processing Facility components				X	X		X	X					X	
Spreading organics/soil and revegetating previously disturbed areas	X	X		X	X	X	X	X					X	
Disposing and recycling of waste materials		X					X	X					X	

* No fish habitat occurs within the Project Site. Therefore, Project related activities are not anticipated to interact with fish or fish habitat. Protected spaces such as parks and other protected areas do not occur within the Project Site.
** Project activities are not anticipated to adversely impact Indigenous and Treaty Rights (Section 6.6.5).

The framework for determining environmental impacts of the Project on environmental components includes the following:

- Determine potential adverse effects of the Project on environmental components;
- Apply mitigation measures to avoid or minimize potential adverse effects;
- Determine the residual environmental impacts, which are those adverse environmental effects that remain after the application of mitigation measures; and
- Evaluate the residual environmental impacts based on defined effects evaluation criteria.

The criteria used to evaluate residual environmental impacts are defined in **Table 6-2**, noting that the defined criteria is used as a general guide and may be modified to more appropriately evaluate impacts to specific environmental components.

Table 6-2: Environmental Effects Assessment Criteria

Criteria Term	Definition			
Magnitude of Effect:	Refers to the estimated percentage of population or resource that may be affected by activities associated with the construction, operation and decommissioning/closure of the Project. Where possible and practical, the population or resource base has been defined in quantitative or ordinal terms (e.g. hectares of soil types, units of habitat). Magnitude of effect has been classified as less than (<) 1%, 1% to 10%, or greater than (>) 10% of the population or resource base. Where the magnitude of an effect was determined as virtually immeasurable or represented a potential change that was within the natural variation of population or resource levels, the effect was considered Negligible. An exception to this is regarding human health effects where, for example adverse health issues due to the Project and affecting 1% of the population would still be considered major			
	Negligible (immeasurable)	Minor (<1%)	Moderate (1 to 10%)	Major (>10%)
Direction of Effect:	Refers to whether an effect on a population or a resource is considered to have a positive, adverse or neutral effect			
	Positive	Adverse	Neutral	
Duration of Effect:	Refers to the time it takes a population or resource to recover from the effect. If quantitative information was lacking, duration was identified as short term (<1 year), Moderate term (1 to 10 years) and long term (>10 years)			
	Short term (<1 year)	Moderate (1 to 10 years)	Long term (>10 years)	
Frequency:	Refers to the number of times an activity occurs over the Project phase and is identified as once, rare, intermittent or continuous			
	Once	Rare	Intermittent	Continuous
Scope of Effect:	Refers to the spatial area potentially affected by the effect and categorized as Project Site, Local Project Area or Regional Project Area as defined in **Section 3.2**. Where possible, quantitative estimates of the resource affected are provided			
	Project Site	Local Project Area	Regional Project Area	
Reversibility:	Refers to if an adverse effect is likely to be reversed after completion of the activity or Project decommissioning/closure			
	Reversible	Irreversible		

The significance of residual environmental impacts is commented on where applicable regulatory criteria exist such as a regulatory threshold (e.g. air quality guidelines are exceeded due to Project activities). In the absence of such regulatory thresholds, an overall characterization of the impact is provided, taking into consideration the assessment criteria as described above in **Table 6-2**.

Environmental effects that may be caused as a result of accidents and malfunctions are discussed separately in Section 6.9.

6.2 Physical Environment

6.2.1 Geology/Topography

Magnitude of Effect: Minor
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Intermittent
Scope of Effect: Project Site
Reversibility: Reversible

Project construction activities including clearing, levelling, construction of laydown areas, and construction of the Processing Facility and permanent access road (**Figure 1-2**) will have a temporary effect on the Project Site topography. The establishment of two on-site water wells will have a minor impact on the Project Site geological layers in the locations of two well sites. Wet sand stockpiles and sand reject piles will vary in height during project operations, peaking in the fall each year, as wet sand is transferred to the Dry Plant (Section 2.1.1). Sand reject piles, that will not exceed an average height above ground of 8.5 m (28 ft) (Section 2.3.2), will also vary in size as reject sand is disposed of in accordance with regulations. As is the case with buildings and other Project components, the stockpiles are not considered part of the natural topography.

The following measures will be implemented to avoid or minimize Project effects on topography:

- Where applicable, existing roads, trails and other previously disturbed areas will be utilized to minimize disturbance to the natural topography.
- Levelling and grading will occur upon Project decommissioning to return the landscape to elevations typical to the surrounding area.

While measurable disturbances will be imposed on topographic features, disturbances will be limited to the Project Site. With the application of the above described mitigation measures, impacts on topography have been assessed as being minor.

6.2.2 Soils

Magnitude of Effect: Minor
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Intermittent
Scope of Effect: Project Site
Reversibility: Reversible

Construction activities have the potential to cause soil erosion, including clearing, levelling, and construction of the site access road, Wet Plant and Dry Plant, rail loop and associated Project components. Soil erosion can potentially increase during high wind and precipitation events, which are expected to be most frequent during the months of May to September. Soil erosion may affect other environmental components, such as air quality (e.g. dust from soil disturbance), water quality, and vegetation.

To mitigate the effects of soil erosion, the following measures will be incorporated:

- An Erosion and Sediment Control Plan will be implemented for the construction and decommission phases of the Project.
- Areas disturbed during the construction phase that are not required for the Project operation phase (e.g. equipment laydown areas) will be revegetated as quickly as feasible to stabilize the soil and minimize soil erosion.
- During the Project decommissioning phase, after Project components have been removed, the landscape will be leveled and graded, and disturbed areas will be revegetated as quickly as feasible to stabilize the soil and minimize soil erosion.

With the application of the above measures, the potential for soil erosion and associated adverse impacts to the surrounding environment are anticipated to be minor and restricted to the Project Site.

6.2.3 Groundwater

Magnitude of Effect: Negligible
Direction of Effect: Adverse
Duration of Effect: Short term
Frequency: Intermittent
Scope of Effect: Project Site
Reversibility: Reversible

Withdrawal of groundwater has the potential to adversely affect regional aquifer quantity and quality.

The local water usage in the area is 52.8 US Gallons/day/person (200 L/day/person) (Friesen Drillers, 2019). Therefore, a household of four, would use approximately 211 US gallons/day (800 L/day). The Processing Facility is proposed to use 200 – 300 US gallons/day (757 – 1,136 L/day). The Processing Facility is proposed to use 200 – 300 US gallons/day (757 – 1,136 L/day), which is the approximate daily usage of a household of four to six people. It is anticipated that the water well will be completed in the Red River Formation carbonate aquifer which is known to be relatively thick and permeable beneath the Project Site.

Groundwater required for the Processing Facility will be drawn using a standard submersible water well pump as is typically used for any domestic, industrial or commercial water well. The water supply well will be constructed by a licensed well drilling contractor in accordance with the Manitoba *Groundwater and Water Well Act* and its supporting regulations, including the Groundwater and Water Well Regulation and the Well Standards Regulation.

Pumping tests were performed on the Project Site in 2019 by CanWhite and Friesen Drillers to determine the effects of continuous water usage at the Project Site for the estimated Project Facility pumping rates of 200 – 300 US gallons per day (757 – 1,136 L/day).

Results of this testing indicated that drawdown effects were localized, occurring only at the Project Site, with limited to no effects within 31 m (100 ft) of the pumping well to the monitoring well. All water levels were continuously recorded with transducers in the monitoring well located on the Project Site as well as domestic wells on surrounding properties. During testing, little to no decline in water levels was observed in the wells at the Project Site. Further, no impact was observed on water levels in any of the nearby domestic wells.

The following measures are expected to minimize the need for more than the proposed quantity of water to be withdrawn from the wells on the Project Site:

- Process water will be recycled into the Wet Plant for reuse in a continuous loop.
- Excess water not required for the sand wash process (Wet Plant) or dust control activities will be recycled back into the slurry loop system in a dedicated enclosed return water pipe, removing the need for any draw of groundwater for Wet Plant usage.
- Water not required for recycling will be stored in a surface water tank for reuse as required.
- Low flow toilets and sinks will be installed for employee usage.

The following measures are expected to effectively mitigate risks to groundwater quality posed by groundwater withdrawal on the Project Site:

- Groundwater wells established at the Project Site for the Processing Facility will be decommissioned (sealed) when no longer required in accordance with applicable regulation.
- Groundwater wells will be constructed by a licensed well drilling contractor in accordance with the Groundwater and Water Well Regulation and the Well Standards Regulation.
- Operations will incorporate the measures described in Section 6.9.2 designed to prevent leaks and spills of substances which could affect groundwater quality.

Based on the understanding of the hydrogeology of the area surrounding the Project Site and in consideration of the results of the groundwater testing described above and with the application of the above mitigation measures, utilization of groundwater at the Project Site is expected to be at rates that will not exceed the ability of the aquifer to recharge and are therefore sustainable. The potential risks to groundwater quality are assessed to be adequately mitigated. Therefore, impacts on groundwater are assessed to be negligible. The effects are expected to be short term because groundwater levels in the aquifer are anticipated to recover quickly following cessation of pumping, which will occur over winter months each year. The seasonal operation of the Processing Facility will allow for aquifer recovery during periods of time when operations have stopped and following closure.

6.3 Atmospheric Environment

6.3.1 Air Quality

Magnitude of Effect: Minor to Negligible
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Local to Regional Project Area
Reversibility: Reversible

Regional air quality may be potentially affected by Project components and activities that generate dust (stockpiles; gravel roads), greenhouse gasses (e.g. vehicles used during all phases of the Project; Processing Facility equipment) and through the potential for the generation of fugitive dust from Project construction and decommissioning activities.

6.3.1.1 Air Dispersion Modelling Results

Air dispersion modeling was performed to estimate air quality at sensitive receptors (nearest residents to the Processing Facility) under the worst-case scenario conditions that could occur for this Project (**Appendix B**). The Project operations were assessed in accordance with the Draft Guidelines for Air Quality Dispersion Modelling Manitoba (Manitoba Conservation 2006) using the AERMOD air dispersion

model to predict maximum ground-level concentrations, as well as maximum predicted concentrations at selected nearby sensitive receptors, of the following:

- Dust (including silica dust):
  - Particulate Matter with a diameter of 2.5 micrometres and less ($PM_{2.5}$)
  - Particulate Matter with a diameter of 10 micrometres and less (PM_{10})
  - Total Suspended Particulate (TSP)
- Other air quality parameters:
  - Carbon Monoxide (CO)
  - Nitrogen Dioxide (NO_2)
  - Sulfur Dioxide (SO_2)

Model results were compared with the Manitoba Ambient Air Quality Criteria (MAAQC 2005). The results of the air dispersion modeling, including description of assumptions and mitigation measures factored into the assessment, are provided in **Appendix B** (Air Quality Assessment Report).

In summary, the modelled concentrations of the above-listed air quality parameters were well below the MAAQC provincial guidelines at sensitive receptors. Distances to nearest residences (sensitive receptors) from the CanWhite property line vary from 54 m to 1,115 m (refer to Figure 1 and Table 3 in **Appendix B**).

The air dispersion modeling considered the mitigation measures included in the design of the Project to minimize potential Project effects to air quality which are as follows:

- Overs/fines sand reject pile associated with the Wet Plant and the overs/fines sand reject pile associated with the Dry Plant (**Figure 2-2**) will be kept damp by misting with additional water to mitigate the potential for fugitive dust generation, as needed (e.g. during hot, dry and windy weather); during the winter months, these sand reject piles will be covered with a mesh system (similar to a fishing net) that will allow snow and ice to accumulate on sand reject piles to act as a natural containment to control dust.
- The sand Dry Plant, including all dry sand conveyors and transfer points, will be enclosed with all transfer points under negative pressure to mitigate dust. The dryer is equipped with a baghouse to capture dust generated from the drying process.
- The dry sand product will be loaded into covered grain hopper-type railcars using a retractable sand transfer spout; a method designed to control fugitive dust.
- Natural vegetation buffers will be left around the Processing Facility to limit the potential for dust dispersion to the Local Project Area and reduce wind impact.
- During hot, dry weather, wet sand will be continuously deposited along the length of the stockpiles.
- Appropriate speed limits will be posted on the permanent Processing Facility access road (30 km/hr) and within the Project Site to minimize the potential for dust generation.
- Water will be applied to the permanent Processing Facility access road to minimize dust generation as needed (e.g. during hot, dry weather).
- Emissions will be minimized by regularly maintaining equipment and vehicles and minimizing idling of vehicles.

Although the height of the sand stockpiles may exceed the height of the surrounding treeline at times during the operation phase, dispersion modelling has predicted that dust from the stockpiles will not exceed MAAQC provincial guidelines at any of the sensitive receptors.

The modelling predicted that exceedances of the MAAQC would occur only 0.3% of the time that the Processing Facility is in operation (between one and five exceedances every five years), and only under

the worst-case emissions scenario. The extent of any exceedance will be limited to within 20 m to 70 m (up to approximately 2/3 length of a football field) from the CanWhite property boundary. The point of this potential exceedance is more than 450 m from the nearest residence. There is no exceedance beyond the property boundary in any other direction or circumstance.

The model does not incorporate natural dust suppression that can occur from rain and snow. During the fall/winter months, the surface of the wet sand stockpiles will freeze which will act as a natural containment to control dust. The model considers the worst-case scenario of hot, dry wind, when sand stockpiles are at their maximum heights. Therefore, predicted concentrations that occur during fall/winter months (when sand stockpiles have the highest potential to be at their maximum height) have been over-estimated.

The reject sand piles, which include the fines sand reject pile that is most prone to airborne dispersion during dry and windy conditions, will not exceed the height of the surrounding treeline. Dust from the fines sand reject pile will also be kept wet by stockpiling the reject sand in a wet (not dry) condition and misting the sand reject piles with water during non-winter months.

With the incorporation of dust from the permanent gravel access road into the air dispersion modeling, the results showed potential exceedances of MAAQC provincial guidelines for particulate matter (gravel road dust) up to 300 m beyond the future CanWhite property line.

However, the potential effects of the access road on air quality were modelled very conservatively, with all traffic on the road simultaneously. Precipitation is expected to reduce access road emissions on about one-third of days in summer and this mitigative effect also was not included in the modelling.

6.3.1.2 Dust Management and Monitoring

As an additional measure to further mitigate the potential for off-site migration of dust from the stockpiles and access road, CanWhite will develop and implement a Dust Management Plan. This Plan, which will be in place during all phases of the Project, will provide procedures for the implementation of measures to control Project related dust, and will include provisions for monitoring and cleanup of the localized migration of fugitive dust from the stockpiles should this occur.

Components of the Dust Management Plan will include the following:

- Dust (particulate matter) will be monitored in the ambient air during the Project construction and operation phases to confirm that mitigation measures that have been put in place are effective and to allow for the implementation of addition engineering and/or operational controls to further control dust if required.
- The monitoring program will include the periodic collection of air samples at sampling stations established throughout the Processing Facility and at the nearby sensitive receptors as identified during air quality modelling.
- The monitoring program will also include sampling and testing for silica dust (total quartz and respirable crystalline) to ensure the potential for silica dust exposure is effectively controlled and mitigated.
- CanWhite will consult with MBCC prior to initiation of construction to determine an acceptable monitoring frequency for both the general (total) dust and silica dust monitoring programs.

The Dust Management Plan will be prepared and submitted to MBCC for review and approval prior to the initiation of construction activities.

6.3.1.3 Summary of Impacts on Air Quality

Based on the above air dispersion modeling results, assumptions as outlined in the detailed report (**Appendix B**), and application of the above mitigation measures, the impacts of the Project on air quality in the Regional Project Area are assessed as negligible to minor. The results of the modeling predict no exceedances of air quality guidelines at the nearest residences under the worst-case scenario conditions for any of the parameters that were modeled (e.g. dust, including silica dust; **Appendix B**).
Impact assessment information for greenhouse gas (GHG) emissions is summarized in Section 6.3.2.

6.3.2 Climate/Greenhouse Gases

Magnitude of Effect: Negligible
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Beyond the Regional Project Area
Reversibility: Irreversible

To estimate the annual emissions of greenhouse gases (GHG), emissions of carbon dioxide (CO_2), methane (CH_4) and Nitrous Oxide (N_2O) were estimated from onsite activities associated with the long-term Project operation after the natural gas line is installed in one to two years post-construction (**Appendix B**). Estimated GHG emissions associated with Project equipment are summarized in **Table 6-3.**

Table 6-3: Greenhouse Gas Annual Emissions (CO_2e)

Emission Sources	Annual Usage Rate	CO_2e (tonnes/year)
Direct Emissions		
Propane Combustion Dryer (Year 1-2)	4,949,422 m^3	27,791
Natural Gas Combustion Dryer (after Year 2)	12,090,044 m^3	24,837
Equipment Exhaust	Variable-depending on engine size and annual utilization	1,053
Vehicles on the Access Road	Variable-depending on engine size and annual utilization	35
	Total Direct (Year 1-2)	**28,879**
	Total Direct (after Year 2)	**25,925**
Indirect Emissions		
Electricity Usage (annual total)	19,998,337 kWh	8,399
	Total Indirect	**8,399**
	Total per Annum (Year 1-2)	**37,278**
	Total per Annum (after Year 2)	**34,324**

The following measures to minimize the production of GHG emissions will be applied:

- Emissions will be minimized by regularly maintaining equipment and vehicles and minimizing idling of vehicles.
- Vehicles and equipment will meet required emission standards.
- Power use for the long-term operation of the project will be obtained from hydropower via a planned power line and planned installation of a natural gas line which will minimize the need for power from GHG-emitting diesel generators.

Overall, the project is estimated to generate approximately 34,324 tonnes of CO_2e annually during dryer operations with natural gas which is 0.00016% of the reported emissions in 2018 which were 21.8 Mt

CO_2e from Manitoba, and 0.000005% of the reported 729 Mt CO_2e from Canada in 2018 (**Appendix B**). Therefore, the impact of the Project on GHG contributions to the atmosphere is assessed as negligible.

6.3.3 Noise

Magnitude of Effect: Negligible
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Local Project Area
Reversibility: Reversible

Noise generated by Project activities has the potential to adversely affect wildlife (Section 6.5.2) and could result in nuisance noise to people living within the Local Project Area. A Noise Impact Assessment was completed for this Project to predict the potential noise level generated by Project components and activities at the nearest points of reception representative of the most exposed noise sensitive residential dwellings surrounding the Project Site in each direction (**Appendix C**). Project components expected to generate noise that may contribute to noise levels at the nearest points of reception are described in **Appendix C**. Examples of the noise-generating components modeled include the primary sources of noise associated with the Project operations in the Wet Plant and Dry Plant such as dewatering cyclones/screens and sprays, pumps, dryers and dry screens, and combustion fans, earth-moving equipment (e.g. wheel loader, dozers, grader, and backhoe) and sand transferring and handling equipment including conveyors, trippers and radial stackers. Sources of noise associated with the Rail Load Out and rail loop components of the Project (e.g. train car loading and movements) were also included in the noise modeling predictions.

The noise assessment (**Appendix C**) evaluated the worst-case scenarios that may occur during one hour of operation to determine the maximum potential noise impact at the points of reception. The noise assessment concluded that Project activities during the construction and operation phases are predicted to not exceed the Manitoba Guidelines for Sound Pollution limits at the eight nearest residences to the Project which range in distance from 720 m west of the Processing Facility to 2.5 km southeast of the Processing Facility (see Table 3-1 and Figure 3-1 in **Appendix C**).

The surrounding Project Site consisting primarily of forest (Section 4.4.1) is anticipated to attenuate (reduce) noise generated by the Processing Facility at the points of reception. In addition to the noise attenuation effect of the forest vegetation surrounding the Project Site, the following measures will be implemented to reduce noise generated from Project activities:

- The Dry Plant will be an enclosed building which will minimize dry sand processing noise.
- The shape of the rail loop will allow the locomotive to pull the train right through the Rail Load Out without the need to regularly decouple or couple individual cars which would be a source of noise; a smaller railcar mover will be used if a railcar needs to be removed or added to the train (e.g. for maintenance).
- Construction equipment and vehicles will be kept well maintained and will be fitted with mufflers, and other noise mitigation equipment as required.
- Unnecessary idling and revving of engines will be avoided.
- Noise monitoring will be conducted during Project commissioning to determine if any noise mitigation (e.g. berms) will be needed.

In consideration of the above measures to minimize noise levels due to Project operations and predicted results of the Noise Impact Assessment (**Appendix C**), it is anticipated that potential noise levels at the

nearest residences will be adequately attenuated. Noise disturbances to wildlife are expected to be moderate in the vicinity of Project construction and operation activities but are not expected to measurably affect wildlife populations within the Interlake Plain Ecoregion within which the Project is located. Based on the results of the Noise Impact Assessment (**Appendix C**), expected noise levels at receptors within the Local Project Area are assessed as negligible.

6.4 Aquatic Environment

6.4.1 Surface Water Quality

Magnitude of Effect: Negligible
Direction of Effect: Adverse
Duration of Effect: Short term
Frequency: Intermittent
Scope of Effect: Local Project Area
Reversibility: Reversible

Residual effects from clearing, levelling, compacting, and construction of the Processing Facility have the potential to increase surface water runoff within the Project Site and Local Project Area. Removal of existing vegetation also can pose a risk to surface water quality as more sediment will be exposed to surface water drainage, potentially resulting in sediment laden runoff water.

As indicated in Section 4.3.1, the Project Site contains no surface water apart from roadside ditches. The Local Project Area has some wetlands, artificial ponds and ephemeral drainage areas primarily associated with aggregate quarries and other developments in the area, but these surface waters are not directly connected with permanent natural waterways.

The following mitigation measures will be implemented to avoid or minimize potential effects on surface water quality:

- Construction of ditching within the Project Site, as required, will assist in directing runoff flow and maintaining natural drainage pathways through low areas and will contain water runoff from disturbed areas.
- Construction of the permanent access road to the Processing Facility will include the installation of culverts to equalize surface water flow and maintain natural drainage pathways as required.
- No harmful chemicals will be used in the processing of sand.
- As per Section 2.3.1, wastewater from staff washrooms, shower facilities and staff kitchen will be directed to a septic system that will be regularly maintained and monitored for correct functioning.
- As per Section 6.2.2, an approved Erosion and Sediment Control Plan will be implemented for the construction and decommissioning phases of the Project.

With the application of the above described mitigation measures, the impacts on surface water are assessed as negligible.

6.4.2 Fish and Fish Habitat

Project related impacts on fish and fish habitat are not anticipated due to the lack of fish habitat within the Project Site and Local Project Area (Section 4.3.2), and application of an Erosion and Sediment Control Plan as indicated in Section 6.2.2.

6.5 Terrestrial Environment

6.5.1 Vegetation

Magnitude of Effect: Minor (Project Site) to Negligible (Local Project Area)
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Intermittent
Scope of Effect: Project Site (vegetation clearing) to Local Project Area (dust deposition)
Reversibility: Reversible

Approximately 17 hectares (ha) of naturally vegetated area is expected to be cleared within the Project Site to construct the Project, but excluding the temporary access road which currently exists (**Section 2.5**). That area to be cleared is approximately 15 times smaller than a section of farmland which is 260 ha. The estimated Project footprint area is provided in **Table 6-4**.

Table 6-4: Estimated Area of the Project Footprint

Project Components	
Permanent Components	**Area (ha)**
Processing Facility including the Wet Plant, Dry Plant and associated components as listed in **Section 1.1**	6.9
Permanent access road (7 m wide x 1 km long)	0.7
Rail loop (approximate 30 m width footprint to accommodate curvature of loop line of sight X 3.5 km rail track length)	10.5
Total Project Footprint Area	18.1
Total Previously Cleared / Disturbed Area with Project Footprint Area	1.1
Total Naturally Vegetated Area Requiring Clearing to accommodate the Project Footprint	**17.0**

Note: Total land area within the Project Site within which project components will be located is 114 ha.

Approximately 15% of the land within the Project Site will need to be cleared of natural vegetation to accommodate the construction and operation of the Project. Land within the centre of the rail loop which consists mostly of forested land that will be partly cleared for line of sight at the rail loop curves. The types of naturally vegetated land cover that will be cleared (i.e., forest, meadow and willow/alder) are common within the Regional Project Area (**Section 4.4.1**).

The following mitigation measures will be implemented to avoid or minimize potential effects of clearing on vegetation:

- Areas to be cleared of vegetation will be minimized to the extent feasible and will be clearly marked to avoid clearing more than required.
- Usable trees/wood will be cut and stacked at the Project Site for local use as firewood for no longer than one year or disposed of in accordance with applicable regulations.
- Areas disturbed during Project construction, not required for Project operations, will be allowed to revegetate naturally and will be augmented using an approved native seed mixture and native plantings if required.
- A Revegetation Monitoring Program will be implemented after Project construction to determine the success of the revegetation program and determine if follow-up reseeding or replanting is required. The monitoring program will include monitoring during the growing season until the seedlings appear to be established.

Clearing impacts on vegetation are limited to the Project Site and are assessed as minor due to:

- Limited amount of clearing required for Project construction; and
- The site reclamation and revegetation procedures that will occur during Project decommissioning to return the landscape to pre-construction conditions to the extent feasible.

Vegetation within the Project Site and Local Project Area can also be harmed by dust deposition on the surface of plants which may prevent adequate photosynthesis and other life functions of vegetation (Farmer, 1993). Dust will be generated during the construction, operation and closure phases of the Project as follows:

- During the construction phase, dust generation will result from the construction of the Processing Facility and associated infrastructure primarily due to clearing and levelling activities;
- During the construction and operation phases of the Project, use of a gravel road to access the Project Site and Processing Facility by employees will contribute to dust emissions; and
- During the decommissioning phase, dust deposition will be generated from cleanup and removal of the Processing Facility.

Effects of dust deposition are assessed to be minor due to the application of the mitigation measures listed in the air quality Section 6.3.1 to control dust.

With the application of the above mitigation measures, the overall Project impacts to vegetation are assessed as minor within the Project Site and negligible within the Local Project Area.

6.5.2 Wildlife

Magnitude of Effect: Negligible
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Intermittent
Scope of Effect: Regional Project Area
Reversibility: Reversible

Project activities that disrupt the natural environment (e.g. vegetation clearing, noise) are the primary contributors to potential effects on wildlife. Wildlife management focuses on regional wildlife populations because wildlife populations (e.g. deer) are typically not measurably affected if only an individual or small number of individuals are affected within a relatively small spatial area (e.g. the home range of a deer). Therefore, the spatial scope of the assessment of the Project impacts on wildlife has been conducted in consideration of the Regional Project Area. The availability of nearby alternative habitat for wildlife is also taken into consideration when assessing the potential effects of a development on wildlife.

The limited amount of natural vegetation clearing within the Project Site that is required for Project construction (17 ha; Section 6.5.1) is unlikely to substantially affect wildlife populations within the Regional Project Area because:

- The Project Site currently provides sub-optimal wildlife habitat (generally) due to existing disturbances from previous tree cutting activities, recent aggregate quarry and exploration activities such as trails and mineral exploration sites, and the current adjacent aggregate and agriculture land use activities and adjacent roadways (Section 4.6.4);
- The types of landcover used by wildlife that will be cleared during Project construction are common in the Regional Project Area (Section 4.4.1);

- The amount of naturally vegetated area that will be cleared for the Project is approximately 0.07% of the naturally vegetated area that occurs within the Regional Project Area which consists of approximately 33% previously disturbed landcover due to human development such as agriculture, residential areas and aggregate quarries.

Noise generated during Project construction, operation and decommissioning phases is expected to influence wildlife behaviour (e.g. area avoidance) to varying degrees within the Project Site and Local Project Area depending on the type of wildlife (U.S. National Parks Service, 2018). Noise generated within the Project Site is not expected to be of a magnitude that would substantially affect wildlife populations within the Regional Project Area because:

- Project-generated noise is not expected to be substantial beyond the Project Site (**Appendix C**); and
- Wildlife species present in the vicinity of the Project are anticipated to be accustomed (habituated) to some level of noise (U.S. National Parks Service, 2018) due to the presence of existing developments (e.g. aggregate quarries; CN rail line; Provincial Roads).

Additional potential effects of the Project on wildlife include the following:

- Light pollution emanating from the Processing Facility within the Project Site can also disturb wildlife and alter natural wildlife behaviour for wildlife that may be present within the zone of influence of site lighting (e.g. Dominoni, 2017).
- The minor increase in vehicle traffic in the Regional Project Area as a result of Project construction and operation activities (Section 6.7) is anticipated to result in a minor increase the risk of vehicle collisions with wildlife given the relatively small spatial scale of the Project Site and overall minor increase in Regional Area traffic.

The following measures will be applied to minimize potential adverse effects to wildlife resulting from Project activities:

- Areas to be cleared of vegetation will be minimized to the extent feasible and will be clearly marked to avoid clearing more than required.
- Vegetation clearing will take place outside of the spring and summer months to the maximum extent feasible to avoid disturbance to breeding birds and other spring breeding wildlife species.
- Vegetation clearing will not take place during the peak breeding bird season for this 'Zone B4' area: April 25 – August 15 (when 90% of bird species in the area are known to nest); pre-clearing nest searches will be conducted no more than 5 days prior to clearing during the 'shoulder' nesting season outside of this 'peak' nesting timeframe (i.e., April 14 – 24 and August 16 – 24; Government of Canada, 2018), as needed.
- Areas disturbed during Project construction, not required for Project operations, will be allowed to revegetate naturally and will be augmented using an approved native seed mixture and native plantings if required.
- Noise mitigation as proposed in Section 6.3.3 will be applied.
- Measures to control dust generation will be applied as described in Section 6.3.1.
- Fully shielded directional lighting fixtures will be used to focus light specifically to work areas, parking lot and the Processing Facility to minimize the dispersal of light to the surrounding Project Site.
- The permanent Project Site access road will have a posted speed limit of 30 km/hr.
- Employees and contractors will be required not to feed or harass wildlife.

With the application of the above mitigation measures, Project impacts to the Regional Project Area wildlife populations are assessed as negligible. The Project is also not anticipated to have a measurable effect on wildlife populations within the Interlake Plain Ecoregion.

6.5.3 Species of Conservation Concern

Magnitude of Effect: Minor to Negligible
Direction of Effect: Adverse
Duration of Effect: Long term
Frequency: Once
Scope of Effect: Regional Project Area
Reversibility: Reversible

Species of conservation concern that potentially occur in the Regional Project Area (Section 4.4.3; **Appendix E**) are not expected to experience a substantial decrease in regional populations as a result of Project activities due to:

- The limited amount of cleared vegetation/habitat that will be required for the Project (Section 6.5.1);
- Prevalence of similar cover types within the Regional Project Area, and the application of measures indicated in Sections 6.5.1 and 6.5.2 to mitigate adverse effects of the Project on vegetation and wildlife in general.

Therefore, the Project impacts to regional populations of species of conservation concerns are assessed as minor to negligible, depending on the species of conservation concern and their habitat preferences.

6.6 Socioeconomic Environment

6.6.1 Labour Force and Employment

Magnitude of Effect: Moderate
Direction of Effect: Positive
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Regional Project Area
Reversibility: Reversible

According to the labour force and education/training statistics provided in Section 4.6.2, there will be potentially employable people in the Local and Regional Project Areas having the skills, training and experience required for Project employment positions. Other supply and services contracts associated with the construction and operation of the Project will provide additional long-term economic opportunities.

As indicated in Section 2.6, approximately 20 to 30 people will be employed under contract for site clearing and Project construction. The need for local suppliers and other business to support the construction phase is likely to provide indirect employment for up to 60 additional people. Once construction is complete, there will be approximately 40 to 50 people employed for the Processing Facility operations. Employment opportunities associated with the Project will be advertised as needed within the Regional Project Area and will be a positive, long-term and continuous benefit for the Regional Project Area.

6.6.2 Infrastructure and Services

6.6.2.1 Emergency Services

Magnitude of Effect: Minor
Direction of Effect: Neutral/Adverse
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Regional Project Area
Reversibility: Reversible

Emergency services (i.e., fire, policing and ambulance) in the Regional Project Area have the potential to be utilized more often potentially resulting in limitations to the current availability and response times for these regional services. To mitigate potential adverse effects of the Project on Regional Project Area emergency services, CanWhite will incorporate the following measures:

- An Emergency Response Plan will be available on-site during Project construction and operation that will clearly outline appropriate emergency response protocol.
- An on-site groundwater well will be dedicated to emergency fire suppression.
- CanWhite will notify the RM of Springfield emergency services when Project construction and operation will begin.
- Measures to avoid accidents and malfunctions as described in Section 6.9 will be applied.

With the application of the above measures, the Project impacts on regional emergency services are anticipated to be minor.

6.6.2.2 Community Services

Magnitude of Effect: Moderate (benefit)
Direction of Effect: Neutral to Positive
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Local and Regional Project Area
Reversibility: Reversible

Water requirements for the Processing Facility will be sustainably sourced from two wells on the Processing Facility property with water quantities used in accordance with regulatory requirements, as applicable.

Existing Local or Regional Project Area wastewater treatment systems will not be used. Wastewater from staff washrooms, shower facilities and staff kitchen will be directed to a septic system that will be regularly maintained and monitored for correct functioning (Section 2.3.1).

Solid waste will be transported by a licensed local contractor to be disposed at a local licenced landfill to an amount that would be sustainable for the local landfill. Otherwise, solid waste will be transported 63 km to the Brady Road Landfill managed by the City of Winnipeg.

CanWhite may initiate agreements for local / regional community services that would be beneficial for both the RM of Springfield and the Project. Examples of services and supplies that would be needed for the Project that could be supplied by local and/or regional community services include: uniform and laundry services; shop supplies; janitorial services; fuel, oil and grease supply; grounds keeping and

snow removal; small tools and equipment supply; garbage removal; office supplies; Project road maintenance; catering; health, safety supplies; shipping and expediting.

CanWhite will require natural gas services to be installed to the Project site which will provide opportunities for others to utilize this natural gas line that will be brought into the Local Project Area.

The Project will likely require upgraded communications services that may require an additional cell tower in the local area. As part of discussions with communication services companies, CanWhite will discuss the requirement logistics and options which may include an additional cell tower capable of accommodating improved internet services or installation of fibre optics cables along a natural gas line for the Project which would improve internet services.

The RM of Springfield community services (e.g. municipality water system upgrades) would potentially benefit from the additional tax revenue realized from the Project being located within the RM of Springfield.

In consideration of the benefits to the Local and Regional Project Area from the opportunity for local business to supply required goods and services, there is anticipated to be an overall moderate positive impact to community services.

6.6.3 Land and Resource Use

Magnitude of Effect: Minor
Direction of Effect: Adverse/ Positive
Duration of Effect: Long term
Frequency: Continuous
Scope of Effect: Project Site to Local and Regional Project Areas
Reversibility: Reversible

As indicated in **Figure 4-9**, the Project Site is currently designated for industrial use and will continue to be used for industrial purposes.

Use of the permanent gated portion of the Project Site will be limited to CanWhite operations and access will be controlled accordingly. As indicated in Section 2.5, the Project Site access road will be gated at the CanWhite property line to control access to the Project Site. Other existing trails will be blocked (e.g. with pre-cast concrete blocks) appropriately signed to control access to the CanWhite property and Processing Facility as a public safety measure.

During the time when CanWhite will be using the Manitoba Hydro power line access road easement with the permission of Manitoba Hydro during the Project construction phase (expected to be four months to a year), there will be a temporary increase in vehicle traffic along that segment of road which is also used by Manitoba Hydro, snowmobilers and other recreational off-road vehicles (Section 4.6.4.4). The potential for disruption to recreational users will cease on completion of the permanent Processing Facility access road (in a different location described in Section 2.5).

Based on an extensive previous study of property values in the vicinity of silica sand extraction and processing facility locations in the United States, which found that there were “no documented circumstances of industrial sand mining causing a community-wide reduction of property values” (The Heartland Institute, 2016), property values in the Local Project Area are not expected to be adversely affected by the Project. CanWhite will be bringing in a new natural gas line and will likely be requiring

improved cellular service to the Local Project Area which is expected to benefit local properties in the vicinity of these services.

6.6.4 Human Health

Magnitude of Effect: Negligible
Direction of Effect: Adverse
Duration of Effect: Long Term
Frequency: Continuous
Scope of Effect: Local and Regional Project Areas
Reversibility: Reversible

Project activities have the potential to adversely affect human health through:

- Increased traffic due to employees and contractors accessing the Project Site;
  - Emissions from vehicles affecting air quality; and
  - Higher potential for traffic accidents;
- Dust and noise generated by Project activities.

Mitigation measures that will avoid or minimize potential adverse effects on human health are the following:

- Measures to avoid or minimize adverse effects on air quality (Section 6.3.1) and effects on climate (Section 6.3.2) will be applied.
- Measures to control noise will be applied (Section 6.3.3).
- All CanWhite employees will abide by the standards, procedures and training required under *The Workplace Safety and Health Act* as well as CanWhite's internal Health and Safety Program and Emergency Response Plan.
- Employee Orientation and Safety training will be mandated for all new hires in addition to required yearly safety reviews for existing staff.
- In accordance with Part 12 of Hearing Conservation and Noise Control Regulation, an initial noise exposure assessment will be undertaken prior to commissioning of the facility, and appropriate measures implemented (such as hearing protection), depending on the results of the assessment. During operation and closure, a reassessment will be done if any alterations, renovations or repairs of the workplace are undertaken.
- Applicable personal protective equipment (PPE) will be provided to employees. Where required, visitor orientation and PPE will be provided when visitors enter employee only areas.
- Special training in relation to the handling of silica will be administered to all employees.

Through the implementation of the measures referenced above, impacts to human health are assessed as negligible.

6.6.5 Effects on Indigenous and Treaty Rights

The Project is not expected to adversely impact the exercise of Indigenous or Treaty rights because:

- No fish or fish habitat will be affected by the Project (Section 6.4.2);
- The Project Site is private land, accessible only for the purposes of the Project;
- The residual environmental impact of the Project on vegetation beyond the Project Site is assessed to be negligible (Section 6.5.1); and
- The residual environmental impact of the Project on regional wildlife populations is assessed to be negligible (Section 6.5.2).

6.6.6 Heritage Resources

Magnitude of Effect: Minor
Direction of Effect: Adverse
Duration of Effect: Long Term
Frequency: Continuous
Scope of Effect: Project Site
Reversibility: Irreversible

Activities related to Project construction and operations that disturb the land may have the potential to disturb or destroy heritage resources (e.g. unknown archaeological sites). Project activities that disturb the land include clearing and grubbing to prepare the site for Project construction.

A Project Site screening request was submitted to the Manitoba Historic Resources Branch (HRB) to determine the need for a Heritage Resources Impact Assessment (HRIA). HRB determined that a HRIA was required for the Project Site prior to the land being disturbed due to Project activities (**Appendix F**). A HRIA was conducted in the Project Site on May 12 and 13, 2020. The HRIA report documenting the results of the HRIA is provided in **Appendix G** with a summary of the findings provided in Section 4.6.5. The on-site archaeological investigation found that there is a low potential for undiscovered heritage resources to be disturbed as a result of Project activities.

The HRIA report provided in **Appendix G** provides recommended mitigation measures to protect unknown heritage resources that may be discovered at the Project Site. As recommended in the HRIA report, CanWhite will have a Heritage Resources Protection Plan in place prior to the initiation of Project construction activities which will provide guidance to construction contractors to protect heritage resources. If heritage resources are discovered within the Project Site, work will be stopped, HRB will be advised, and the discovered historic resources will be recorded by an archaeologist and adequately protected as required.

With the application of the above described mitigation measures, the impacts on heritage resources are assessed as minor.

6.7 Traffic

Magnitude of Effect: Minor
Direction of Effect: Adverse
Duration of Effect: Long Term
Frequency: Continuous
Scope of Effect: Regional Project Area
Reversibility: Reversible

The increase in Local and Regional Project Area traffic will be not substantial for the following reasons:

- The sand will not be transported by haul truck which will limit traffic associated with the Project to contractors and Processing Facility operation staff during the Project construction and operation phases.
- Processing Facility staff will be limited to approximately 20 to 30 personnel during the construction phase and approximately 40 to 50 personnel during the operation phase of the Project (Section 2.6) with staff arrivals and departures being staggered daily to accommodate the 24 hours, seven days/week operation schedule. Additional minor traffic will be related to weekly supply/parts deliveries and contractors for services such as waste disposal.

- Most traffic will travel along a Processing Facility access road less than 1 km in length, then will travel two km on PR 302 north to PTH 15. Therefore, the use of local roads beyond the short section of PR 302 will be minor.

6.8 Aesthetics

Magnitude of Effect: Minor
Direction of Effect: Adverse
Duration of Effect: Long Term
Frequency: Continuous
Scope of Effect: Project Site
Reversibility: Reversible

The impact of the Project on the aesthetics of the Local Project Area is anticipated to be minor for the following reasons:

- Treed areas adjacent to public roads, local residences and within the Project Site are expected to provide a line of sight barrier to the Project components (e.g. sand silos; stockpiles). Therefore, there will not be a clear view of the Processing Facility from a public road or residence.
    - Most the Project Site area will remain forested and clearing to accommodate the Project footprint will be minimized to the extent feasible (refer to mitigation described in Section 6.5.1 'Vegetation').
- The transmission line towers (approximately 34 m tall) that are present along the proposed temporary access road within the Manitoba Hydro easement (Section 2.5 'Access') are not visible within the Local Project Area except when looking down the cleared transmission line corridor, or the area immediately adjacent to the corridor. Therefore, the tallest Project components (i.e. the sand silos at 42 m tall each and maximum height of sand stockpiles during fall at 28.7 m tall) are also not expected to be visible from a public road or residence given the distance from the Project components to public roads and residences and treed areas blocking the line of sight.
    - Distances to the nearest residences are provided in **Appendix B** (Air Quality Report) and **Appendix C** (Noise Impact Assessment Report).
    - Distance from the centre of the Wet Plant and Dry Plant area where stockpiles and silos will be located to the nearest public road is approximately 790 m to the west (to PR 302), and 450 m north to the road/trail along the Manitoba Hydro transmission line easement that is used by the public for recreational purposes (e.g. snowmobiling).

6.9 Accidents and Malfunctions

To minimize the probability of accidents and malfunctions, the proposed Project phases will be conducted in accordance with applicable regulatory requirements. The following sections provide additional details on precautionary measures that will be implemented by CanWhite to further minimize the potential for accidents and malfunctions to occur.

6.9.1 Worker Health and Safety

Worker protection in Manitoba is regulated through standards, procedures and training under *The Workplace Safety and Health Act,* Workplace Safety and Health Regulation M.R. 217/2006. Safety equipment and personal protective equipment will be supplied to employees and workers. Contractors

and visitors will be subject to site specific environmental health and safety orientation for all phases of the Project.

6.9.2 Spills and Leaks

Environmental effects may occur due to fuel and chemical spills from diesel fuel, lubricants, oils and hydraulic fluids. An accidental release of hazardous materials and/or equipment fluids could occur from improper storage and handling procedures. Accidental releases have the potential to affect air, surface water, groundwater and soils, with consequential effects on vegetation, aquatic resources and possibly human health and safety.

The following standard procedures will be implemented to prevent spills from occurring during Project activities:

- Diesel tanks used on-site will be self-contained aboveground storage tank(s);
- When servicing requires drainage or pumping of lubricating oils or other fuels from equipment, a groundsheet of suitable material and size will be spread on the ground to catch all fluid in the event of a leak or spill. An adequate supply of suitable absorbent material and any other supplies and equipment necessary to immediately clean up spills will also be available;
- Storage and disposal of liquid wastes and filters from equipment maintenance, and residual material from spill clean-up will be contained in an environmentally safe manner and in accordance with existing regulations;
- Waste oils, fuels, and other hazardous wastes will be handled in a safe manner. Staff will be required to transport, store and handle all such substances as recommended by the suppliers and/or manufacturers and in compliance with applicable federal, provincial and municipal regulations. Manitoba Conservation and Climate will be notified immediately if a reportable spill occurs;
- Fuels, oils or other hazardous materials will be stored in designated areas;
- Storage sites will be inspected regularly for compliance;
- Personnel on-site will be trained in how to deal with spills, including knowledge of how to properly deploy site spill kit materials which will be available on-site;
- Spill kits will be stationed and readily available for easy access;
- Service and repairs of equipment will be performed by trained personnel;
- Vehicles and Equipment will have pre shift inspections and walk arounds to ensure no fluid leaks, primarily from the fuel system and/or hydraulics. Any detected leak will result in the unit being pulled from service until repaired. All service and repairs will be logged and tracked in the units operating and maintenance logs. A manufacturer defined maintenance and preventative care will be practiced by CanWhite and its employees; and
- Fuel and chemical handlers will be trained and qualified, and appropriate emergency response measures will be in place and readily available.

Taking into account application of the above mitigation measures as necessary, and assuming the implementation of safe work practices, the risk of spills and leaks is considered to be appropriately mitigated.

6.9.3 Fires and Explosions

The presence of mechanical equipment, fuels and other hazardous materials creates a potential for fires and explosions. Such incidents can harm on-site personnel, cause equipment damage and lead to a release of contaminants, resulting in consequent effects to other environmental components (air, surface water, groundwater, plants, wildlife, aquatic resources and aesthetics).

Necessary precautions will be taken to prevent fire hazards at the Project Site; including but not limited to:

- Removal of flammable waste on a regular basis and disposal at a licenced disposal facility;
- Workers will be provided with appropriate fire prevention training;
- Appropriate fire extinguishers will be available on the Project Site. Such equipment will comply with and be maintained to the manufacturers' standards and employees will be appropriately trained in their use;
- Storage, transportation and use of hazardous materials, including flammable waste, will comply with regulatory requirements;
- On-site fire prevention/response equipment will be checked on a routine basis and in accordance with local fire safety regulations to maintain proper working order;
- CanWhite will have a dedicated groundwater well on-site for fire suppression protection which will be regularly inspected for compliance;
- Greasy or oily rags or materials subject to spontaneous combustion will be deposited and stored in appropriate receptacles. This material will be removed from the Project Site on a regular basis and be disposed of at licenced waste disposal facility; and
- Smoking will be restricted to designated areas.

With the measures outlined above, and assuming implementation of safe work practices, the risk of fires and explosions is assessed to be appropriately mitigated.

6.9.4 Transportation Accidents

An increase in traffic due to employee and contractor traffic to and from the Project Site has the potential to increase the likelihood for transportation accidents. Transportation accidents can consequently result in the release of pollutants to the environment such as fuel and oils, or materials that the vehicles colliding are transporting (e.g. silica sand; construction wastes). Such accidental releases to the environment could potentially result in secondary effects on other environmental components (e.g. groundwater contamination through seepage, decline in surface water quality through runoff) or tertiary effects on vegetation (e.g. decline of growth potential due to soil contamination), wildlife, aquatic resources and human health.

The following measures will be employed to reduce the risk of transportation accidents:

- The sand product will be transported from the Processing Facility directly by rail to markets rather than using transport trucks.
- The rail loop component of the Project will be constructed in accordance with the most recent applicable engineering specifications.
- Personnel retained to drive and operate vehicles and construction equipment will have a valid appropriate-Class Manitoba Driver's License with a copy provided to CanWhite.
- Speed limits on access roads, local road and Provincial Highways will continue to be implemented. Signage and speed limits on the PR 302 and PTH 15 are regulated by the Province of Manitoba.

The above noted measures are assessed to appropriately mitigate the potential risk of transportation accidents during all phases of the Project.

6.9.5 Power Failure

Backup power for critical infrastructure and equipment during the Project phases will be supplied to the Project Site via two diesel generators (Section 2.8).

The supply of backup power is anticipated to appropriately mitigate the potential risks of a power failure that may result in malfunctions and accidents, and adverse effects to the environment during all Project phases.

6.10 Summary of Environmental Effects and Mitigation Measures

Table 6-5 summarizes potential environmental effects of the proposed Project and the design features, standard operating procedures and other mitigation measures that will be implemented.

Table 6-6 summarizes potential accidents and malfunctions and measures to reduce the risk of such occurrences.

With the application of proposed mitigation measures, adverse environmental impacts of the Project are expected to be sufficiently mitigated summarizes potential environmental effects of the proposed Project and the design features, standard operating procedures and other mitigation measures that will be implemented.

Table 6-5: Summary of Environmental Assessment and Mitigation Measures

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
PHYSICAL ENVIRONMENT				
Geology / Topography	Construction	Clearing, levelling, construction of laydown areas, and construction of the sand Processing Facility including access road improvements as needed.	Where applicable, existing roads and trails and other previously disturbed areas will be utilized to minimize disturbance to the natural topography.	Minor
	Decommissioning	Removal of Project infrastructure and rehabilitation of disturbed areas.	Levelling and grading will occur upon Project decommissioning to return the landscape to elevations typical to the surrounding area.	
Soil Erosion	Construction	Clearing, levelling, construction of laydown areas, and construction of the sand Processing Facility including access road improvements as needed.	An Erosion and Sediment Control Plan will be implemented for the construction and decommission phases of the Project.	Minor
			Areas disturbed during the construction phase that are not required for the Project operation phase (e.g. equipment laydown areas) will be revegetated as quickly as feasible to stabilize the soil and minimize soil erosion.	
	Decommissioning	Removal of Project infrastructure and rehabilitation of disturbed areas.	During the Project decommissioning phase, after Project components have been removed, the landscape will be leveled and graded, and disturbed areas will be revegetated as quickly as feasible to stabilize the soil and minimize soil erosion.	
Groundwater	Operation	Withdrawing quantities of groundwater water that exceed capacity of the source aquifer may potentially affect the regional groundwater aquifer and potentially affect regional aquifer quantity and quality.	Process water will be recycled into the Wet Plant for reuse in a continuous loop.	Negligible
			Excess water not required for the sand wash process (Wet Plant) or dust control activities will be recycled back into the slurry loop system in a dedicated enclosed return water pipe, removing the need for any draw of groundwater for Wet Plant usage.	
			Water not required for recycling will be stored in a surface water tank for reuse as required.	
			Low flow toilets and sinks will be installed for employee usage.	

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
			Groundwater wells established at the Project Site for the Processing Facility will be decommissioned (sealed) when no longer required in accordance with applicable regulations.	
			Groundwater wells will be constructed by a licensed well drilling contractor in accordance with the Groundwater and Water Well Regulation and the Well Standards Regulation.	
			Operations will incorporate the measures described in Section 6.9.2 designed to prevent accidents or spills of substances which could affect groundwater quality.	
ATMOSPHERIC ENVIRONMENT				
Air Quality	Construction, Operation and Decommissioning	Generation of greenhouse gases from Project equipment. Dust generation from construction traffic along the main roads and temporary trails, and during other Project activities.	Overs/fines sand reject pile associated with the Wet Plant and the overs/fines sand reject pile associated with the Dry Plant will be kept damp by misting with additional water to mitigate the potential for fugitive dust generation, as needed (e.g. during hot, dry and windy weather); during the winter months, these sand reject piles will be covered with a mesh system (similar to a fishing net) that will allow snow and ice to accumulate on sand reject piles to act as a natural containment to control dust.	Minor to Negligible
			The sand Dry Plant, including all dry sand conveyors and transfer points, will be enclosed with all transfer points under negative pressure to mitigate dust. The dryer is equipped with a baghouse to capture dust generated from the drying process.	
			The dry sand product will be loaded into covered grain hopper-type railcars using a retractable sand transfer spout; a method designed to control fugitive dust	
			Natural vegetation buffers will be left around the Processing Facility to limit the potential for dust dispersion to the Local Project Area.	
			Appropriate speed limits will be posted on the permanent Processing Facility access road (30 km/hr) and within the Project Site to minimize the potential for dust generation.	
			Water will be applied to the permanent Processing Facility access road to minimize dust generation as needed (e.g. during hot, dry weather).	
			Emissions will be minimized by regularly maintaining equipment and vehicles and minimizing idling of vehicles.	
			A Dust Management Plan will be in place during all phases of the Project. This Plan will provide procedures for the implementation of measures to control dust at the Processing Facility and will include provisions for	

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
			monitoring and cleanup of the localized migration of fugitive dust from stockpiles should this occur. The Plan will also include a dust monitoring program that will include sampling and testing for silica dust (total quartz and respirable crystalline) to ensure the potential for silica dust exposure is effectively controlled and mitigated.	
Climate / Greenhouse Gases	Construction, Operation, and Decommissioning	Processing Facility operations including use of diesel and natural gas fuel sources; use of heavy machinery, equipment, vehicles, locomotive and railcar mover and any additional tools or equipment that consumes fuel.	Emissions will be minimized by regularly maintaining equipment and vehicles and minimizing idling of vehicles.	Negligible
			Vehicles and equipment will meet required emission standards.	
			Power use for the long-term operation of the project will be obtained from hydropower via a planned power line and planned installation of a natural gas line which will minimize the need for power from GHG-emitting diesel generators.	
Noise	Construction, Operation and Decommissioning	Noise from the Processing Facility, including rail, operations and sources of noise from heavy equipment during Project construction and decommissioning such as bulldozers and excavators.	The Dry Plant will be an enclosed building which will minimize dry sand processing noise.	Negligible
			The shape of the rail loop will allow the locomotive to pull the train right through the Rail Load Out without the need to regularly decouple or couple individual cars which would be a source of noise; a smaller railcar mover will be used if a railcar needs to be removed or added to the train (e.g. for maintenance).	
			Construction equipment and vehicles will be kept well maintained and will be fitted with mufflers, and other noise mitigation equipment as required.	
			Unnecessary idling and revving of engines will be avoided.	
			Noise monitoring will be conducted during Project commissioning to determine if any noise mitigation (e.g. berms) will be needed.	
AQUATIC ENVIRONMENT				
Surface Water Quality	Construction, Operation, and Decommissioning	Clearing, leveling, compacting, ditching for water drainage as required; stockpiling materials during site preparation and establishment of	Construction of ditching within the Project Site, as required, will assist in directing runoff flow and maintaining natural drainage pathways through low areas and will contain water runoff from disturbed areas.	Negligible
			Construction of the permanent access road to the Processing Facility will include the installation of culverts to equalize surface water flow and maintain natural drainage pathways as required.	
			No harmful chemicals will be used in the processing of sand.	

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
		associated laydown areas; stockpiling wet sand and overs/fines; removal of Project infrastructure and rehabilitation of disturbed areas.	Wastewater from staff washrooms, shower facilities and staff kitchen will be directed to a septic system that will be regularly maintained and monitored for correct functioning. An approved Erosion and Sediment Control Plan will be implemented for all phases of the Project.	
Fish and Fish Habitat	Construction, Operation and Decommissioning	Not applicable.	Due to the lack of fish habitat within the Project Site and Local Project Area, and application of an Erosion and Sediment Control Plan, Project related impacts on fish and fish habitat are not anticipated.	None
TERRESTRIAL ENVIRONMENT				
Vegetation	Construction, Operation and Decommissioning	Clearing, leveling, compacting, ditching for water drainage as required; operation of machinery and activities that produce dust; removal of Project infrastructure and rehabilitation of disturbed areas.	Areas to be cleared of vegetation will be minimized to the extent feasible and will be clearly marked to avoid clearing more than required. Usable trees/wood will be cut and stacked at the Project Site for local use as firewood for no longer than one year or disposed of in accordance with applicable regulations. Areas disturbed during Project construction, not required for Project operations, will be allowed to revegetate naturally and will be augmented using an approved native seed mixture and native plantings if required. A Revegetation Monitoring Program will be implemented after Project construction to determine the success of the revegetation program and determine if follow-up reseeding or replanting is required. The monitoring program will include monitoring during the growing season until the seedlings appear to be established. Mitigation measures to control dust (see **Air Quality** component in this table) will be applied to minimize accumulation of dust on vegetation.	Minor (Project Site) to Negligible (Local Project Area)
Wildlife	Construction, Operation, and Decommissioning	Vegetation clearing; human presence and noise related to Project construction, operation and decommissioning activities such as operation of machinery; increased human presence at the Project	Areas to be cleared of vegetation will be minimized to the extent feasible and will be clearly marked to avoid clearing more than required. Vegetation clearing will take place outside of the spring and summer months to the maximum extent feasible to avoid disturbance to breeding birds and other spring breeding wildlife species. Vegetation clearing will not take place during the peak breeding bird season for this 'Zone B4' area: April 25 – August 15 (when 90% of bird species in the area are known to nest); pre-clearing nest searches will be conducted no more than 5 days prior to clearing during the 'shoulder' nesting season	Negligible

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
		Site Area and increased traffic at the Project Site and adjacent Local Project Area.	outside of this 'peak' nesting timeframe (i.e., April 14 – 24 and August 16 – 24; Government of Canada, 2018), as needed.	
			Areas disturbed during Project construction, not required for Project operations, will be revegetated using an approved native seed mixture and native plantings as required.	
			Mitigation measures to control noise (see **Noise** component in this table) and dust (see **Air Quality** component in this table) will be applied.	
			Fully shielded directional lighting fixtures will be used to focus light specifically to work areas, parking lot and the Processing Facility to minimize the dispersal of light to the surrounding Project Site.	
			The permanent Project Site access road will have a posted speed limit of 30 km/hr.	
			Employees and contractors will be required not to feed or harass wildlife.	
Species of Conservation Concern	Construction, Operation, and Decommissioning	As above for the **Vegetation** and **Wildlife** components.	Mitigation measures as listed for the **Vegetation** and **Wildlife** components above will be applied.	Minor to Negligible
SOCIOECONOMIC ENVIRONMENT				
Labour Force and Employment	Construction, Operation and Decommissioning	Employment and contract services required for Project construction, operation and decommissioning phases.	Employment opportunities associated with the Project will be advertised as needed within the Regional Project Area.	None (adverse) to Moderate (benefit)
Emergency Services	Construction, Operation, and Decommissioning	Accidents, malfunctions and extreme natural events such as storms.	An Emergency Response Plan will be available on-site during Project construction and operation that will clearly outline appropriate emergency response protocol.	Minor
			An on-site groundwater well will be dedicated to emergency fire suppression.	
			CanWhite will notify the RM of Springfield emergency services when Project construction and operation will begin.	
			Measures to avoid accidents and malfunctions as described in Section 6.9 will be applied.	
Community Services	Construction, Operation, and Decommissioning	Requirement for use of Local and Regional Project Area goods and services (contractor services); utility services	Water requirements for the Processing Facility will be sustainably sourced from two wells on the Processing Facility property with water quantities used in accordance with regulatory requirements, as applicable	None (adverse) to Moderate (benefit)
			Existing Local or Regional Project Area wastewater treatment systems will not be used. Wastewater from staff washrooms, shower facilities and staff	

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
		(electricity; natural gas; cellular services).	kitchen will be directed to a septic system that will be regularly maintained and monitored for correct functioning.	
			Solid waste will be transported by a licensed local contractor to be disposed at a local licenced landfill to an amount that would be sustainable for the local landfill. Otherwise, solid waste will be transported 63 km to the Brady Road Landfill managed by the City of Winnipeg.	
			CanWhite will require natural gas services to be installed to the Project site which will provide opportunities for others to utilize this natural gas line that will be brought into the Local Project Area.	
			CanWhite will discuss the requirement logistics and options which may include an additional cell tower capable of accommodating improved internet services or installation of fibre optics cables along a natural gas line for the Project which would improve internet services.	
			The RM of Springfield community services (e.g. municipality water system upgrades) would potentially benefit from the additional tax revenue realized from the Project being located within the RM of Springfield.	
Land and Resource Use	Construction, Operation, and Decommissioning	Use of the Project Site for the construction and operation of the Project and temporary use of Manitoba Hydro easement.	CanWhite will be using the Manitoba Hydro power line access road easement with the permission of Manitoba Hydro during the Project construction phase (expected to be four months to a year), there will be a temporary increase in vehicle traffic along that segment of road which is also used by Manitoba Hydro, snowmobilers and other recreational off-road vehicles. The potential for disruption to recreational users will cease on completion of the permanent Processing Facility access road (in a different location described in Section 2.5)	Minor (adverse); Minor (benefit)
			CanWhite will be bringing in a new natural gas line and will likely be requiring improved cellular service to the Local Project Area which is expected to benefit local properties in the vicinity of these services.	
Human Health	Construction, Operation, and Decommissioning	Increased traffic due to employees and contractors accessing the Project Site; dust and noise generated by Project activities; light pollution from the Processing Facility;	Mitigation measures that will avoid or minimize potential adverse effects on human health are those that will be implemented to control noise (See **Noise** component in this table), avoid or minimize effects on air quality (see **Air Quality** component in this table) and avoid or minimize effects on climate (see **Climate/Greenhouse Gasses** component in this table).	Negligible
			All CanWhite employees will abide by the standards, procedures and training required under The Workplace Safety and Health Act as well as CanWhite's internal Health and Safety Program and Emergency Response Plan.	

Environmental and Social Component	Project Phase	Sources of Potential Effects	Summary of Measures *	Residual Adverse Impact
		altered viewscape (aesthetics) of the land; disruption to previous uses of the Project Site and adjacent Local Project Area land.	Employee Orientation and Safety training will be mandated for all new hires in addition to required yearly safety reviews for existing staff.	
			In accordance with Part 12 of Hearing Conservation and Noise Control Regulation, an initial noise exposure assessment will be undertaken prior to commissioning of the facility, and appropriate measures implemented (such as hearing protection), depending on the results of the assessment. During operation and closure, a reassessment will be done if any alterations, renovations or repairs of the workplace are undertaken.	
			Applicable personal protective equipment (PPE) will be provided to employees. Where required, visitor orientation and PPE will be provided when visitors enter employee only areas.	
			Special training in relation to the handling of silica will be administered to all employees.	
Effects on Indigenous and Treaty Rights	Construction, Operation, and Decommissioning	Potential effects as above **Land and Resource Use and Health and Well-being** components.	The Project is not expected to adversely impact the exercise of Indigenous or Treaty rights because: • No fish or fish habitat will be affected by the Project (Section 6.4.2); • The Project Site is private land, accessible only for the purposes of the Project; • The residual environmental impact of the Project on vegetation beyond the Project Site is assessed to be negligible (Section 6.5.1); and • The residual environmental impact of the Project on regional wildlife populations is assessed to be negligible (Section 6.5.2).	None anticipated[6]
Heritage Resources	Construction and Decommissioning	Clearing, leveling, compacting, ditching for water drainage as required; removal of Project infrastructure and rehabilitation of disturbed areas	CanWhite will apply mitigation measures to protect potential heritage resources as required by the HRB and as indicated in an Environment Act Licence for the Project.	Minor
			If heritage resources are discovered within the Project Site, work will be stopped, HRB will be advised, and the discovered historic resources will be recorded by an archaeologist and adequately protected as required.	
			A Heritage Resources Protection Plan will be in place prior to the initiation of Project construction activities which will provide guidance to construction contractors to protect heritage resources.	

[6] *Note: there are no First Nation reserve lands within the Local or Regional Project Area.*

Table 6-6: Summary of Potential Accidents and Malfunctions and Measures to Mitigate Risk of Occurrence

Risks Associated with Accidents and Malfunctions	Project Phase	Possible Consequences	Measures to Reduce Risk of Occurrence	Conclusion
Worker Health and Safety	Construction, Operation and Decommissioning	Risk of workplace accidents affecting worker health.	Worker protection in Manitoba is regulated through standards, procedures, and training under the Workplace Safety and Health Regulation, M.R. 217/2006.	Risk is assessed to be appropriately mitigated
			Safety equipment and personal protective equipment will be supplied to employees and workers.	
			Contractors and visitors will be subject to site specific environmental health and safety orientation for all phases of the Project.	
Spills and Leaks	Construction, Operation and Decommissioning	Spills and leaks from diesel fuel, lubricants, oils, hydraulic fluids, and other hazardous materials can have adverse effects to air quality, water quality, groundwater quality, wildlife, plants and human health and safety.	Diesel tanks used on-site will be self-contained aboveground storage tank(s).	Risk is assessed to be appropriately mitigated
			When servicing requires drainage or pumping of lubricating oils or other fuels from equipment, a groundsheet of suitable material and size will be spread on the ground to catch all fluid in the event of a leak or spill. An adequate supply of suitable absorbent material and any other supplies and equipment necessary to immediately clean up spills will also be available.	
			Storage and disposal of liquid wastes and filters from equipment maintenance, and residual material from spill clean-up will be contained in an environmentally safe manner and in accordance with existing regulations.	
			Waste oils, fuels, and other hazardous wastes will be handled in a safe manner. Staff will be required to transport, store, and handle all such substances as recommended by the suppliers and/or manufacturers and in compliance with applicable federal, provincial, and municipal regulations. Manitoba Conservation and Climate will be notified immediately if a reportable spill occurs.	
			Fuels, oils, or other hazardous materials will be stored only in designated areas.	
			Storage sites will be inspected regularly for compliance.	
			Personnel on-site will be trained in how to deal with spills, including knowledge of how to properly deploy site spill kit materials which will be available on-site.	
			Spill kits will be stationed and readily available for easy access.	
			Service and repairs of equipment will only be performed by trained personnel.	
			Vehicles and Equipment will have pre shift inspections and walk arounds to ensure no fluid leaks, primarily from the fuel system and/or hydraulics. Any detected leak will result in the unit being pulled from service until repaired. All service and repairs will be logged and tracked in the units operating and maintenance logs. A manufacturer defined maintenance and preventative care will be practiced by CanWhite and its employees.	

Risks Associated with Accidents and Malfunctions	Project Phase	Possible Consequences	Measures to Reduce Risk of Occurrence	Conclusion
			Fuel and chemical handlers will be trained and qualified, and appropriate emergency response measures will be in place and readily available.	
Fires and Explosions	Construction, Operation and Closure	Accidental fires and explosions from mechanical equipment, fuels, and other hazardous materials may result in loss of equipment and infrastructure, worker health and safety risk, and deterioration or loss of natural habitat.	Removal of flammable waste on a regular basis and disposal at a licenced disposal facility.	Risk is assessed to be appropriately mitigated
			Workers will be provided with appropriate fire prevention training.	
			Appropriate fire extinguishers will be available on the Project Site. Such equipment will comply with and be maintained to the manufacturers' standards, and employees will be appropriately trained in their use.	
			Storage, transportation and use of hazardous materials, including flammable waste, will comply with regulatory requirements.	
			On-site fire prevention/response equipment will be checked on a routine basis and in accordance with local fire safety regulations to maintain proper working order.	
			CanWhite will have a dedicated groundwater well on-site for fire suppression protection which will be regularly inspected for compliance.	
			Greasy or oily rags or materials subject to spontaneous combustion will be deposited and stored in appropriate receptacles. This material will be removed from the Project Site on a regular basis and be disposed of at licenced waste disposal facility.	
			Smoking will be restricted to designated areas.	
Transportation Accidents	Construction, Operation and Decommissioning	Vehicular collisions (human health and safety, traffic disruption, road closure, release of contaminants) and wildlife collisions (loss of wildlife, human health and safety, road closures).	The sand product will be transported from the Processing Facility directly by rail to markets rather than using transport trucks.	Risk is assessed to be appropriately mitigated
			The rail loop component of the Project will be constructed in accordance with the most recent applicable engineering specifications.	
			Personnel retained to drive and operate vehicles and construction equipment will have a valid appropriate-Class Manitoba Driver's License with a copy provided to CanWhite.	
			Speed limits on access roads, local road and Provincial Highways will continue to be implemented. Signage and speed limits on the PR 302 and PTH 15 are regulated by the Province of Manitoba.	
Power Failure	Construction, Operation and Decommissioning	Loss of power potentially leading to equipment malfunctions and accidents.	Backup power for all critical infrastructure and equipment will be supplied to the Project Site via two diesel generators.	Risk is assessed to be appropriately mitigated

7. Decommissioning

The decommissioning of the Project will generally include the following activities:

- Removal of buildings, and foundations as applicable;
- Removal and disposal of miscellaneous infrastructure (e.g. power lines, generators);
- Removal of fuel and oil tanks, as applicable;
- Testing and remediation of contaminated soils, as required;
- Decommissioning (sealing) of the two on-site Processing Facility water wells;
- Re-grading and contouring of previously disturbed areas; and
- Revegetation of disturbed areas to restore the landscape to native conditions to the extent feasible.

Following revegetation through reseeding efforts at the decommissioned Project Site, the establishment of shrubs and trees is expected to be evident within 5 to 10 years following closure.

At the Project end of life, the Project Site will be returned to a natural state to the extent feasible.

8. Follow-up Plans

Follow-up programs verify the accuracy of the environmental assessment of a project and determine the effectiveness of measures taken to mitigate the potential adverse environmental effects of the project. The following programs will be implemented during the construction, operation, and decommissioning phase of the Project:

- An Erosion and Sediment Control Plan will be implemented for the construction and decommissioning phases of the Project.
  - An environmental monitor will be included in the construction team to monitor activities for compliance with the Erosion and Sediment Control Plan.
- A Heritage Resources Protection Plan will be in place prior to the initiation of Project construction activities which will provide guidance to construction contractors to protect heritage resources.
- A Dust Management Plan as described in Section 6.3.1.2, which includes dust monitoring, will be developed and will be in place during all phases of the Project to confirm that mitigation measures that have been put in place are effective and to allow for the implementation of additional engineering and/or operational controls to further control dust if required.
- Noise monitoring will be conducted during Project commissioning to determine if any noise mitigation (e.g. berms) will be needed.
- An Emergency Response Plan will be available on-site during all Project phases that will clearly outline appropriate emergency response protocol.
- Vegetation in areas temporarily disturbed by construction activities is expected to naturally re-establish. A Revegetation Monitoring Program will be implemented after Project construction to determine the success of the revegetation program and determine if follow-up reseeding or replanting is required. The monitoring program will include monitoring during the growing season until the seedlings appear to be established.
- The septic system will be regularly maintained and monitored for correct functioning, in accordance with the Onsite Wastewater Management Systems Regulation under *The Environment Act*.
- Diesel fuel, oil, lubricant, chemical and hazardous wastes storage areas will be inspected in accordance with applicable legislation and associated regulations and guidelines, including *The Dangerous Goods Handling and Transportation Act* of Manitoba and applicable regulations;
- The fabric dust filters in the baghouse will be regularly inspected and, when required, changed as per manufacturer specifications.

9. Conclusion

Overall, the adverse residual effects of the proposed Project are expected to be Negligible to Minor in magnitude and mitigable with the measures incorporated into the Project design and recommended herein. The results of the effects assessment are summarized as follows:

Geology/Topography

Impacts on topography have been assessed as being minor.

While measurable disturbances will be imposed on topographic features during Project construction and operation, disturbances will be limited to the Project Site. Effects on topography will be minimized by using existing roads, trails and other previously disturbed areas to the extent feasible to minimize disturbance to the natural topography. Levelling and grading will occur upon Project decommissioning to return the landscape to elevations typical to the surrounding area.

Soils

The potential for soil erosion and associated adverse impacts to the surrounding environment are anticipated to be minor and restricted to the Project Site.

Areas disturbed during the construction phase that are not required for the Project operation phase will be revegetated as quickly as feasible to stabilize the soil and minimize soil erosion. An Erosion and Sediment Control Plan will be implemented for the construction and decommissioning phases of the Project.

Groundwater

The potential risks to groundwater quality are assessed to be adequately mitigated, and therefore the impacts on groundwater are assessed to be negligible.

Utilization of groundwater at the Project Site is expected to be at rates that will not exceed the ability of the aquifer to recharge and are therefore sustainable. The local water usage in the area is 52.8 US Gallons/day/person (200 L/day/person) (Friesen Drillers, 2019). Therefore, a household of four would use approximately 211 US gallons/day (800 L/day). The Processing Facility is proposed to use 200 – 300 US gallons/day (757 – 1,136 L/day), which is the approximate daily usage of a household of four to six people.

Results of testing indicate that drawdown effects will be localized, occurring only at the Project Site, with limited to no effects within 31 m (100 ft) of the pumping well to the monitoring well. During testing, little to no decline in water levels was observed in the wells at the Project Site. Further, no impact was observed on water levels in any of the nearby domestic wells.

Air Quality

Air dispersion modeling was performed to estimate air quality at sensitive receptors under the worst-case scenario conditions that could occur for this Project. The results of the modeling predict no exceedances

of air quality guidelines at the nearest residences for any of the parameters that were modeled (e.g. dust, including silica dust).

The sand Dry Plant, including all dry sand conveyors and transfer points, will be enclosed with all transfer points under negative pressure to mitigate dust. The dryer is equipped with a baghouse to capture dust generated from the drying process. The dry sand product will be stored in enclosed silos prior to being directly loaded into covered grain hopper-type railcars using a retractable sand transfer spout which is a method designed to control fugitive dust.

The two sand stockpiles are not anticipated to generate dust because they will be wet, and most fines will have been removed during the slurry transport and dewatering process prior to stockpiling. Fines that may be generated will remain in the water and will be contained through the wet process. The fines will move through the system ending with a belt press where they will be pressed into wet ‘mud cake’ style bundles for handling. Dust generation from the overs/fines reject sand piles will be controlled by keeping the reject piles damp by misting with additional water to mitigate the potential for fugitive dust generation, as needed (e.g. during hot, dry and windy weather).

Water will be applied to the permanent access road for the Processing Facility to minimize dust generation as needed. The access road will also have natural vegetation buffers which will limit the potential for dust dispersion to the Local Project Area.

CanWhite will develop and implement a Dust Management Plan that will be in place during all phases of the Project. This Plan will provide procedures for the implementation of measures to control dust at the Processing Facility and will include provisions for monitoring and cleanup of the localized migration of fugitive dust from stockpiles should this occur. The Plan will also include a dust monitoring program that will include sampling and testing for silica dust (total quartz and respirable crystalline) to ensure that the potential for silica dust exposure is being effectively controlled and mitigated.

Climate/Greenhouse Gases (GHGs)

The impact of the Project on GHG contributions to the atmosphere is assessed as negligible.

Overall, the Project is estimated to generate approximately 34,324 tonnes of CO_2e annually during dryer operations with natural gas which is 0.00016% of the reported emissions in 2018 which were 21.8 Mt CO_2e from Manitoba, and 0.000005% of the reported 729 Mt CO_2e from Canada in 2018.

Noise

Based on the results of a Noise Impact Assessment, Project activities during the construction and operation phases are predicted to not exceed the Manitoba Guidelines for Sound Pollution limits at the eight residences nearest to the Project which range in distance from 720 m west of the Processing Facility to 2.5 km southeast of the Processing Facility.

The surrounding Project Site consisting primarily of forest is anticipated to attenuate (reduce) noise generated by the Processing Facility at the nearest points of reception (residences). The Dry Plant will be an enclosed building which will minimize dry sand processing noise. The shape of the rail loop will allow the locomotive to pull the train right through the Rail Load Out without the need to regularly decouple or couple individual cars which would be a source of noise. A smaller railcar mover will be used if a railcar needs to be removed or added to the train (e.g. for maintenance).

Noise monitoring will be conducted during Project commissioning to determine if any noise mitigation (e.g. berms) will be needed.

Surface Water Quality

The impacts on surface water are assessed as negligible.

The Project Site contains no surface water apart from roadside ditches. The Local Project Area has some wetlands, artificial ponds and ephemeral drainage areas primarily associated with aggregate quarries and other developments in the area, but these surface waters are not directly connected with permanent natural waterways.

Construction of ditching within the Project Site, as required, will assist in directing runoff flow and maintaining natural drainage pathways through low areas and will contain water runoff from disturbed areas. The wet process will not discharge water to the land surface. A non-toxic biodegradable flocculant will be used for fines settling in a contained system.

Construction of the permanent access road to the Processing Facility will include the installation of culverts to equalize surface water flow and maintain natural drainage pathways as required.

An Erosion and Sediment Control Plan will be implemented for the construction and decommissioning phases of the Project. Wastewater from staff washrooms, shower facilities and staff kitchen will be directed to a septic system that will be regularly maintained and monitored for correct functioning.

Fish and Fish Habitat

Project related impacts on fish and fish habitat are not anticipated due to the lack of fish habitat within the Project Site and Local Project Area, and application of an Erosion and Sediment Control Plan.

Protected and other Vegetation

The overall Project impacts to vegetation are assessed as minor within the Project Site and negligible within the Local Project Area.

Approximately 17 hectares (ha) of naturally vegetated area is expected to be cleared within the Project Site for Project construction which is 15 times smaller than a section of farmland which is 260 ha. Approximately 14% of the Project Site has been previously cleared/disturbed. The types of naturally vegetated land cover that will be cleared (i.e., forest, meadow and willow/alder) are common within the Regional Project Area. No land cover considered rare for the Regional Project Area was observed in the Project Site during terrestrial reconnaissance of the Project Site. Vegetation species at risk are not expected to occur within the Project Site.

Areas to be cleared of vegetation will be minimized to the extent feasible and will be clearly marked to avoid clearing more than required. Areas disturbed during Project construction, not required for Project operations, will be allowed to revegetate naturally and will be augmented using an approved native seed mixture and native plantings if required.

A Revegetation Monitoring Program will be implemented after Project construction to determine the success of the revegetation program and determine if follow-up reseeding or replanting is required. Site

reclamation and revegetation procedures will occur during Project decommissioning to return the landscape to pre-construction conditions to the extent feasible.

Protected and other Wildlife

Project impacts on the Regional Project Area wildlife populations are assessed as negligible. The types of naturally vegetated land cover (wildlife habitat) that will be cleared (i.e., forest, meadow and willow/alder) are common within the Regional Project Area. The Project is also not anticipated to have a measurable effect on wildlife populations within the Interlake Plain Ecoregion.

Minimizing vegetation clearing to the extent feasible will limit adverse effects to wildlife habitat and will mitigate noise from Project activities. Noise will also be minimized by the measures described above for the noise topic. Wildlife species present in the vicinity of the Project are anticipated to be accustomed (habituated) to some level of noise due to the presence of existing developments (e.g. aggregate quarries; CN rail line; Provincial Roads).

Vegetation clearing will take place outside of the spring and summer months to the maximum extent feasible to avoid disturbance to breeding birds and other spring breeding wildlife species. Vegetation clearing will not take place during the peak breeding bird season (April 25 – August 15).

The minor increase in vehicle traffic in the Regional Project Area as a result of Project construction and operation activities is anticipated to result in a minor increase in the risk of vehicle collisions with wildlife given the relatively small spatial scale of the Project Site and overall minor increase in Regional Project Area traffic.

Labour Force and Employment

Employment opportunities associated with the Project will be a positive, long-term and continuous benefit for the regional area within a reasonable commute time to the Processing Facility.

Approximately 20 to 30 people will be employed under contract for site clearing and Project construction. The need for local suppliers and other business to support the construction phase is likely to provide indirect employment for up to 60 additional people. Once construction is complete, there will be approximately 40 to 50 people employed for the Processing Facility operations.

Infrastructure and Services

The Project is expected to have minor impacts on regional emergency services because an on-site groundwater well will be dedicated to emergency fire suppression, and an Emergency Response Plan will be available on-site during Project construction and operation that will clearly outline appropriate emergency response protocol. Standard mitigation measures to avoid accidents and malfunctions will also be applied.

Community Services

Municipal water and wastewater treatment services will not be impacted by the Project because water requirements for the Processing Facility will be sustainably sourced from two wells on the Processing Facility property, and wastewater from staff washrooms, shower facilities and staff kitchen will be directed to an on-site septic system. The RM of Springfield community services (e.g. municipality water system

upgrades) could potentially benefit from the additional tax revenue realized from the Project being located within the RM of Springfield.

Solid waste will be transported by a licensed local contractor to be disposed of at a local licenced landfill.

CanWhite will require natural gas services to be installed to the Project site which could provide opportunities for others to utilize this natural gas line that will be brought into the local area. The Project will likely require upgraded communications services that may require an additional cell tower in the local area capable of accommodating improved internet services or installation of fibre optics cables along a natural gas line for the Project. This could improve internet services in the area.

Land and Resource Use

The Project Site is currently designated for industrial use and will continue to be used for industrial purposes. The Project Site access road will be gated at the CanWhite property line to control access to the Project Site. Other existing trails will be blocked (e.g. with pre-cast concrete blocks) and appropriately signed to control access to the CanWhite property and Processing Facility as a public safety measure.

CanWhite will be using the Manitoba Hydro power line easement during construction and the initial stage of operation (expected to last four months to a year). There will be a temporary increase in vehicle traffic along that segment of road which is also used by Manitoba Hydro, snowmobilers and other recreational off-road vehicles. The potential for disruption to recreational users will cease on completion of the permanent Processing Facility access road.

Property values in the Local Project Area are not expected to be adversely affected by the Project. An extensive previous study of property values in the vicinity of silica sand extraction and processing facility locations in the United States indicated no documented circumstances of industrial sand mining causing a community-wide reduction of property values. CanWhite will be bringing in a new natural gas line and will likely be requiring improved cellular service to the Local Project Area which is expected to benefit local properties in the vicinity of these services.

Human Health

The measures that will be applied to minimize adverse effects on air quality (e.g. dust) and noise (as summarized above) are expected to adequately mitigate adverse effects on human health both on and off the Project Site. The results of air dispersion modeling predict no exceedances of air quality guidelines at the nearest residences for any of the parameters that were modeled (e.g. dust, including silica dust).

All CanWhite employees will abide by the standards, procedures and training required under *The Workplace Safety and Health Act* as well as with CanWhite's internal Health and Safety Program and Emergency Response Plan. Employee Orientation and Safety training will be mandated for all new hires in addition to required yearly safety reviews for existing staff. All required personal protective equipment (PPE) will be provided to employees. Special training in relation to the handling of silica will be administered to all employees. Where required, visitor orientation and PPE will be provided when visitors enter employee only areas. Therefore, the risk of adverse impacts on human health is determined to be negligible.

Indigenous and Treaty Rights

The Project is not expected to adversely impact the exercise of Indigenous or Treaty rights because:

- No fish or fish habitat will be affected by the Project;
- The Project Site is private land, accessible only for the purposes of the Project;
- The residual environmental impact of the Project on vegetation beyond the Project Site is assessed to be negligible; and
- The residual environmental impact of the Project on regional wildlife populations is assessed to be negligible.

Heritage Resources

Results of an on-site archaeological investigation indicated that there is a low potential for undiscovered heritage resources to be disturbed as a result of Project activities. As recommended in the Heritage Resources Impact Assessment report, CanWhite will have a Heritage Resources Protection Plan in place prior to the initiation of Project construction activities which will provide guidance to construction contractors to protect heritage resources.

Traffic

The increase in Local and Regional Project Area traffic will be not substantial because the sand will not be transported by haul truck. Facility staff will be limited to approximately 20 to 30 personnel during the construction phase and approximately 40 to 50 personnel during the operation phase of the Project with staff arrivals and departures being staggered daily to accommodate the 24 hours, seven days/week operation schedule. Most traffic will travel along a Processing Facility access road less than 1 km in length, then will travel two km on PR 302 north to PTH 15. Therefore, the use of local roads beyond the short section of PR 302 will be minor.

Follow-up Plans and Overall Assessment

The follow-up plans and monitoring programs that will be implemented include, but are not limited to, the following: Erosion and Sediment Control Plan; Heritage Resources Protection Plan; Dust Management Plan including Dust Monitoring; Noise Monitoring; Emergency Response Plan; and Revegetation Monitoring Program.

It is recommended that mitigation measures, follow-up plans and monitoring programs described in this report be implemented to avoid or minimize potential environmental effects and/or identify unanticipated adverse effects early so that appropriate adaptive management action can be undertaken.

In summary, based on the proposed Project description and with the application of the proposed mitigation measures and follow-up plans outlined in this Environment Act Proposal, adverse residual environmental impacts resulting from the Project are expected to be sufficiently mitigated. The success of the Project is anticipated to be a substantial benefit to the local and regional area communities in terms of training, employment, and potential business opportunities related to the services that will be required for the Project and the tax revenue that will be realized with the proposed Project being located in the RM of Springfield.

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