



Master Site Development Plan

West Cochrane Gravel Pit

NE 15-26-05 W5M (Title # 141P219)
N/2 14-26-05 W5M (Title # 151 199 374)
W/2 13-26-05 W5M (Title # 151 199 374 +1)
NE 13-26-05 W5M, SE 24-26-05 W5M (Title # 141 167 388)
SE 13-26-05 W5M (Title # 141 167 387)
SW 18-26-04 W5M (Title 141 167 389)
NW 18-26-04 W5M, SW 19-26-04 W5M (Title # 141 167 390)
SE 18-26-04 W5M, NE18-26-04 W5M (Title # 141 167 053)

BURNCO Rock Products Ltd.

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Master Site Development Plan

1.0 Introduction

BURNCO Rock Products Ltd. (BURNCO) is a family owned Alberta based company that has been in operation since 1912. Today, BURNCO is a fourth-generation construction materials company with over sixty locations in Alberta, British Columbia, Saskatchewan, Colorado and Texas. BURNCO produces high quality aggregates, paving asphalt, and ready-mix concrete.

BURNCO takes great pride in its sites and works every day to ensure they are having the least possible impact on neighbors and the community while continuing to supply the aggregates needed for local projects.

Sites currently operated in Rocky View County include:

- | | |
|-------------------------|----------------------------|
| • Irricana Gravel Pit | 304 hectares (751 acres) |
| • Burma Gravel Pit | 194 hectares (480 acres) |
| • Springbank Gravel Pit | 246 hectares (608 acres) |
| • Indus Gravel Pit | 553 hectares (1,368 acres) |

These sites have been successfully operated for decades. In that time, BURNCO has learned effective strategies for impact assessment and control. This includes a commitment to meaningful noise, dust and traffic control measures. These include screening berms, enclosed equipment, road upgrades, and a willingness to engage with neighbors and stakeholders. BURNCO has had great success with such measures and holds all projects to a high standard of performance.

1.1 The West Cochrane Gravel Pit

BURNCO currently operates a gravel pit at NW 13-26-05 W5M located northwest of the Town of Cochrane, Alberta. This site is 61 hectares in size. It contains an estimated 2,500,000 tonnes of aggregates and is selling roughly 125,000 tonnes of material annually. Operations include earthmoving, aggregate crushing, and loading trucks. This site was permitted in 2012 with a design capacity of 500,000 tonnes per year. It opened in 2016 after the completion of an intersection upgrade at Range Road 51 in support of the project.

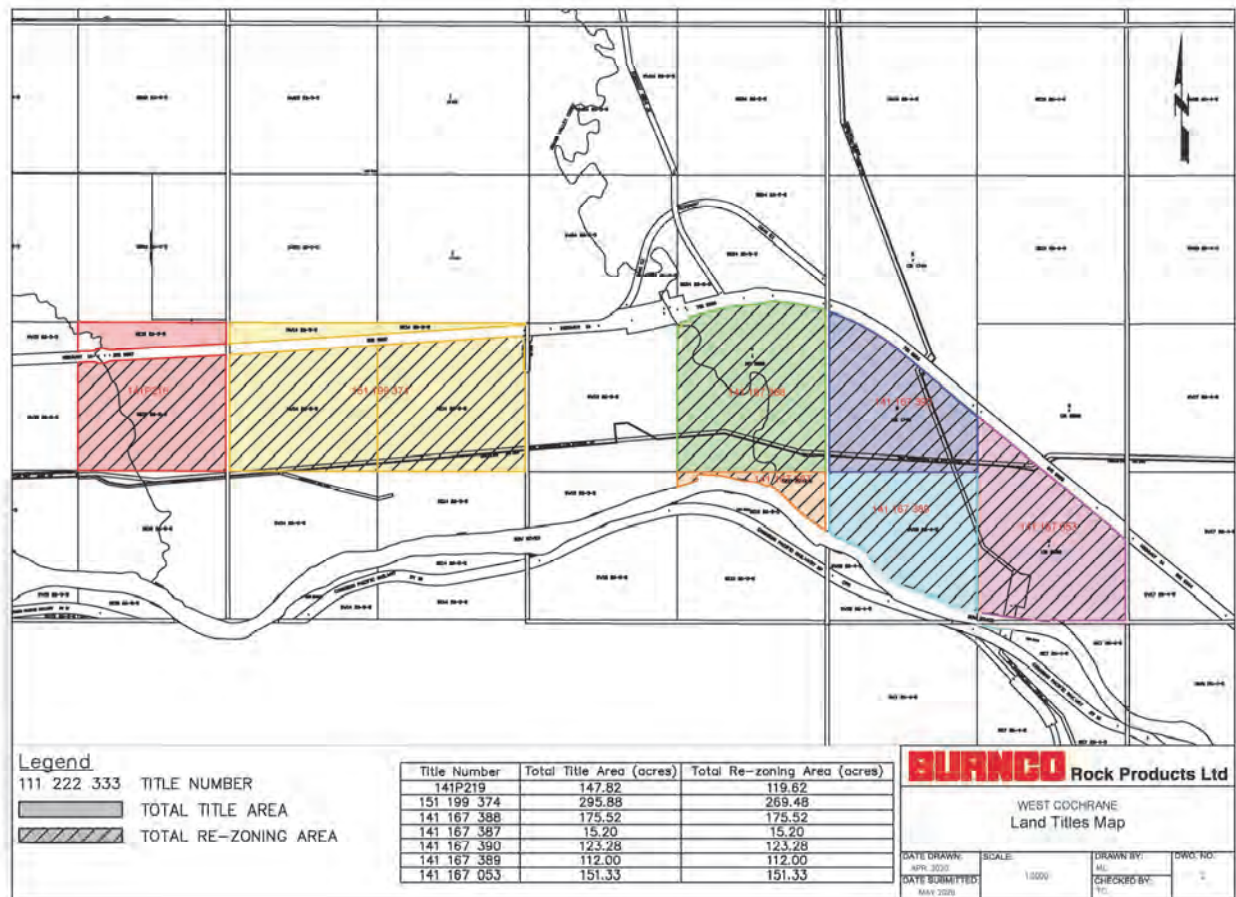
BURNCO is now proposing to increase the overall size of the pit to 452 hectares of contiguous lands through the inclusion of adjacent land parcels. In total, the Project Area contains an estimated 15,000,000 tonnes of aggregate and is expected to operate for 30 to 35 years. No change in annual design capacity is being proposed.

The project would include the following parcels:

- | | |
|------------------|--|
| • Existing Site: | NW 13-26-05 W5M (Title # 151 199 374 +1) |
| • Proposed: | NE 15-26-05 W5M (Title # 141P219) |
| • Proposed: | N/2 14-26-05 W5M (Title # 151 199 374) |
| • Proposed: | NE 13-26-05 W5M, SE 24-26-05 W5M (Title # 141 167 388) |
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Figure 1: Project Map – Parcel Locations



Aggregate from this site will be used to supply local projects in Rocky View County and in the Town of Cochrane. Washing capacity at this site will also allow BURNCO to supply premium aggregates to its network of asphalt and concrete plants in the Greater Calgary Area. BURNCO has a number of sites in Rocky View that currently serve this vital role as a supply of premium materials, however they are nearing depletion and BURNCO views the West Cochrane site as a replacement.

In support of this application, BURNCO has spent considerable time and effort planning the West Cochrane Gravel Pit:

- Two open houses held over a period of 24 months,
- Biophysical Assessment,
- Environmental Noise Impact Assessment,
- Air Quality Assessment,
- Groundwater Impact Assessment,
- Visual Resources Assessment,
- Traffic Impact Assessment,
- Historical Resources Impact Assessment,
- Stormwater Management Plan,
- Erosion and Sediment Control (ESC) Plan, and
- Detailed Mining and Reclamation Plans.



West Cochrane Gravel Pit – Master Site Development Plan

This planning has been used to develop a Master Site Development Plan which follows in this document. This document provides summary of the development, operation and closure plans for this project.

It is BURNCO's belief that by following the Project Activities Plan for the proposed development, that BURNCO's West Cochrane Gravel Pit can continue to operate in a socially and environmentally responsible manner for many years to come.

1.2 Location and Ownership

The lands are located along the Bow River in Rocky View County and are directly northwest of the Town of Cochrane. The total proposed development area is 452 hectares. The various properties are privately held and BURNCO has entered into lease agreements with the owners for gravel mining. In addition, there are a number of undeveloped road allowances within the project footprint which will need to be addressed prior to any development occurring of these lands.

Table 1: Land Ownership and Occupancy

Location Municipal Address or 1/4-Sec-Twp-Rge-Mer	Registered Owners Name, Address and Phone Number	Occupants Name, Address and Phone Number
NE 15-26-05 W5M (Title # 141P219) N/2 14-26-05 W5M (Title # 151 199 374) W/2 13-26-05 W5M (Title # 151 199 374 +1)	David H. McDougall Ranch Limited Box 1172, Cochrane, AB T4C 1B2 (David Dutchik) (250) 261-9962	Gravel Pit Tenant: (All Lands) BURNCO Rock Products Ltd. Farming: (All Lands) David H. McDougall Ranch Limited Box 1172, Cochrane, AB T4C 1B2 (David Dutchik) (250) 261-9962
NE 13-26-05 W5M, SE 24-26-05 W5M (Title # 141 167 388) SE 13-26-05 W5M (Title # 141 167 387) SW 18-26-04 W5M (Title 141 167 389) NW 18-26-04 W5M, SW 19-26-04 W5M (Title # 141 167 390) SE 18-26-04 W5M, NE18-26-04 W5M (Title # 141 167 053)	Tricycle Lane Ranches Ltd. 200, 155 Glendeer Circle SE PO Box 1480, Station "T" Calgary, Alberta T2H 2P9 (403) 640-9355	Residential Tenant: (SE 18) Triple S Cattle Company 53193 Highway #1 Calgary, Alberta T3Z 3G8 Farming Tenant: (All Lands) Triple S Cattle Company 53193 Highway #1 Calgary, Alberta T3Z 3G8

Policy #1

BURNCO will secure appropriate approvals to excavate aggregate and develop within all onsite Road Allowances and will follow applicable terms and conditions as negotiated with the County and Alberta Transportation.

1.3 Current Land Use

The land in the proposed expansion area is currently registered as A-GEN (Agricultural – General District). The NE 15-26-05 W5M, NW 14-26-05, and NE 14-26-05 W5M are presently farmed as pasture and cultivated land. The remaining lands are pasture and hayland. There is also a residence on the SE 18-26-04 W5M, which is rented.

The NW 13-25-06 W5M is zoned S-NAT (Special – Natural Resource District) and is operated by BURNCO as an active gravel pit (the McDougall Ranch Pit). This site has a municipal Development Permit (DP # PRDP20175123), a Provincial Code of Practice Registration (Registration # 254757-00-00), as well as two water licenses (No. 00396954-00-00 and No. 00396952-00-00) for the diversion of water from the Bow River, which will supply water for BURNCO's aggregate washing activities. BURNCO also holds a Water Act approval which allows for excavation of gravel from within the groundwater table in NW 13 (No 00430788-00-00). A copy of these permits is provided as part of BURNCO's Land Use Application.

Policy #2

BURNCO will secure an approved Registration from Alberta Environment & Parks under the Code of Practice for Pits before commencing operations.

Policy #3

Aggregate development within the MSDP area shall comply with all relevant municipal, provincial and federal legislation, regulations and policies.

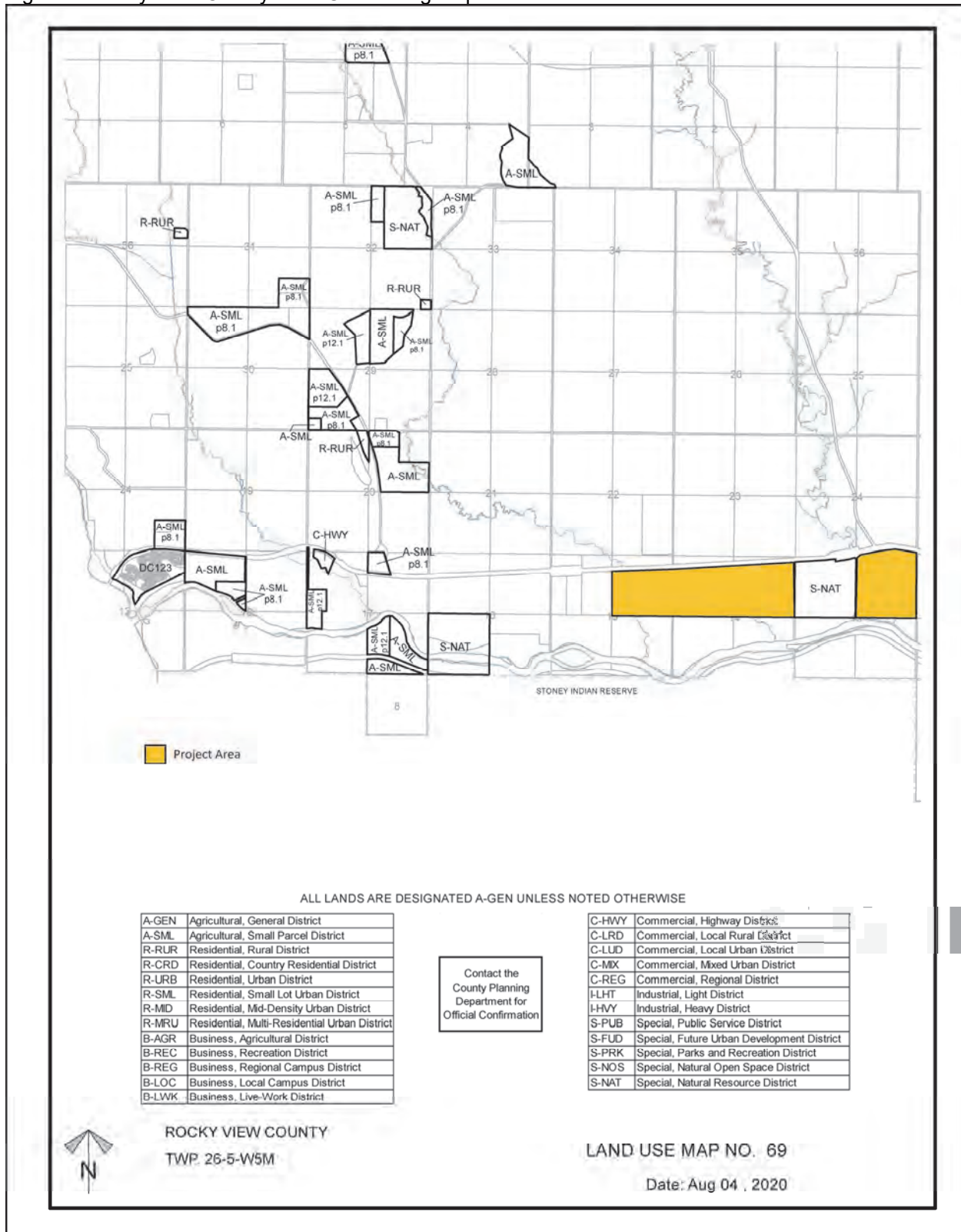
1.4 Adjacent Lands

Lands to the north and east of the project site are privately held and are currently being ranched. The majority of these lands are owned by either Tricycle Lane Ranches Ltd (which leases BURNCO land for a portion of the gravel pit) or McKendrick Ranches Ltd. Lands to the south of the project site include the Bow River which runs along the southern boundary of the eastern portion proposed expansion area. South of the western portion of the project there is a vacant acreage and a number of private landowners farming and ranching on lands between the river and the project site. The Stoney Nakoda First Nation reserve is located on lands south of the Bow River. Lands to the west of the project site include a number of acreages. Finally, a large gas plant, known as the Wildcat Gas Plant is located one mile to the west of the project site.

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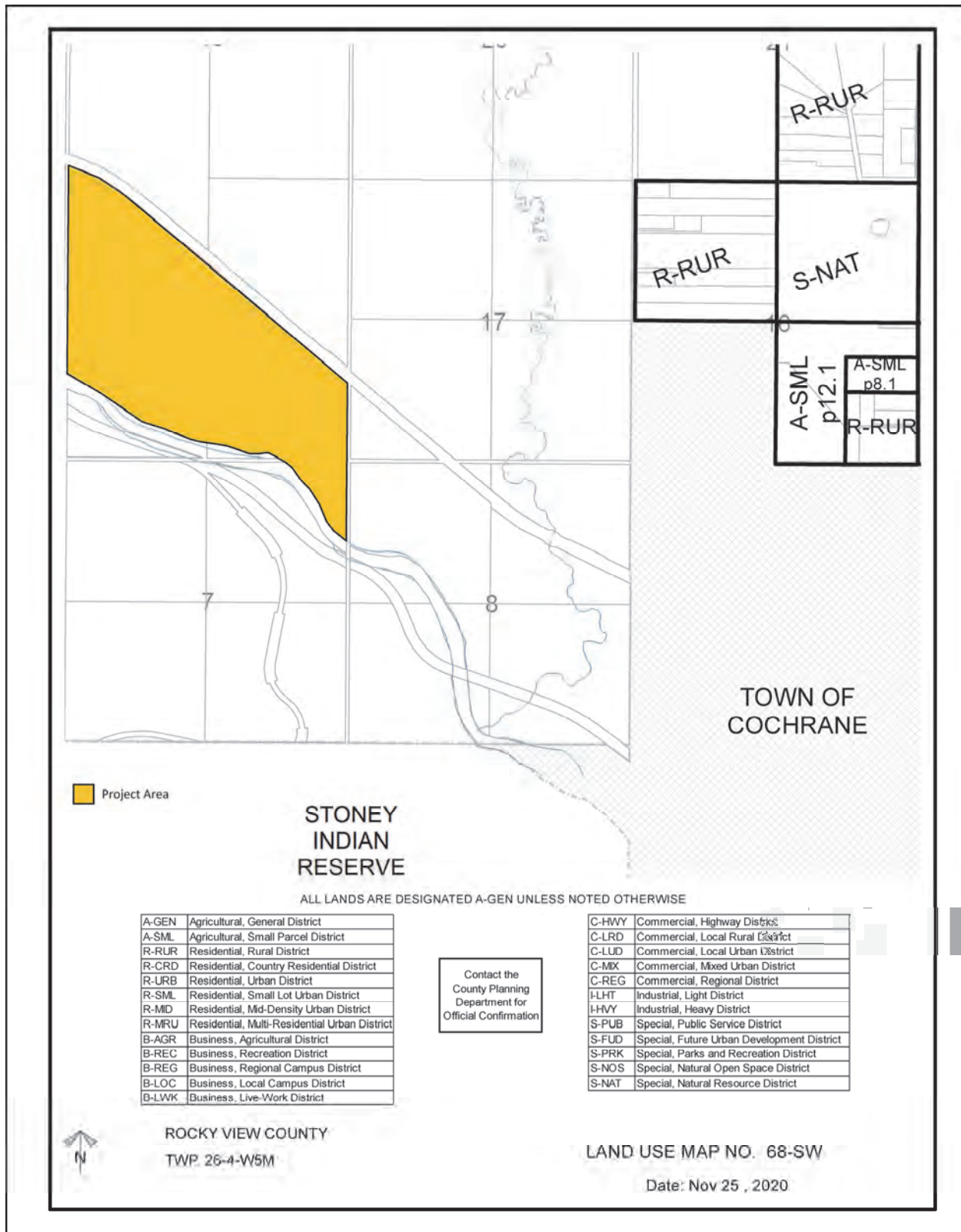
Figure 2: Rocky View County Land Use Zoning Map 1



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Figure 3: Rocky View County Land Use Zoning Map 2



1.5 Consultation Process and Results

Consultation related to the Project Activities Plan for these lands was undertaken over the past thirty-six months. Two open houses were held to provide the community with project information and seek public input. Open house materials and results are provided as part of BURNCO's Land Use Application.

Open House #1:

Event Details:

- April 17, 2018 from 4pm to 8pm held at the Cochrane Rancho House Conference Center,
- 32 invitations were mailed to properties located within 1 mile of the project,
- Invitations extended to Rocky View County staff, Rocky View Councilors, and Town of Cochrane staff,
- Event provided preliminary project information to the public and sought input prior to detailed design work and assessment.

Results:

- 13 attendees on sign in sheet,
- Event displays communicated by email following the event,
- 2 comment sheets received,
- Top concerns were truck traffic, noise, dust, groundwater, and property values.

Open House #2:

Event Details:

- March 9, 2020 from 4pm to 8pm held at the Cochrane Rancho House Conference Center,
- 35 invitations were mailed to properties located within 1 mile of the project,
- Invitations extended to Rocky View County staff, Rocky View Councilors, and Town of Cochrane staff,
- Event provided detailed design work and assessment for the project.

Results:

- 16 attendees on sign in sheet,
- Event displays communicated by email following the event,
- 4 comment sheets received,
- Top concerns were truck traffic, biophysical impacts, erosion and sediment control, groundwater, and property values.

In addition, a number of local residents were engaged during the site assessment process as visits were required to their properties in order to gather data on water wells, and capture images for use in the visual impact assessment. The main concerns voiced by residents were:

- Nuisances via increase truck traffic and impacted haul routes,
- Impacts on wetlands and local wildlife,
- Ground water impacts,
- Erosion and sediment control, and
- Property values.

This report will address and speak to the various concerns that residents voiced and illustrate the mitigation measures BURNCO intends to implement to address them.

2.0 Site Analysis

2.1 Topography

The project site is located north west of the Town of Cochrane, north of the Bow River. The area is characterized by level to hummocky surface expression with some steep and terraced areas with slopes ranging from 2% to 30%. The majority of the Project Area contains gently undulating to hummocky surface expression with slopes ranging from 0.5% to 5%. Small portions of the Project Area (approximately 7%), have rough broken (steep) and terraced (river) surface expressions with slopes between 15% and 30%.

2.2 Vegetation and Wildlife

Matrix Solutions Inc. (Matrix) was retained by BURNCO to complete a Biophysical Impact Assessment (BIA) in association with the proposed expansion. The BIA is used to guide project development and to minimize the potential negative effects of the Project on biophysical resources during planning, design, construction, operation, and reclamation stages. The BIA is also intended to support applications for municipal and provincial permits and authorizations required for the operation of this development. This assessment was completed in 2019 and is provided as part of BURNCO's Land Use Application.

Both desktop assessments and field surveys were conducted to assess the vegetation, wetlands, and wildlife. Information gathered was then integrated in to the assessments as appropriate. Summaries on vegetation, wetlands and wildlife from the Matrix report are as follows:

Vegetation

Eight vegetation communities were observed within the Project Area (Figure 2). The most extensive vegetation community within the Project Area is grazed native grassland comprising 215.2 ha (58.8%; Table 7; Figure 2). Agricultural land includes cropland, comprised 64.8 ha (17.7%) and tame pasture, comprised 36.8 ha (10.1%). The vegetation community native grassland on slopes encompasses the steep slopes adjacent to the riparian area of the Bow River (15.6 ha, 4.3%). These slopes have a higher potential for rare plants and higher risk of erosion. Dominant species for each vegetation community observed are provided in Table 7. During field surveys, 101 vegetation species were observed. Vegetation species observed according to vegetation community are presented in Appendix F.

*Four noxious weeds were observed in the Project Area (Figure 2; Table 8), including common toadflax (*Linaria vulgaris*), creeping/Canada thistle (*Cirsium arvense*), perennial sow-thistle (*Sonchus arvensis*), and hound's tongue (*Cynoglossum officinale*). Noxious weeds were scattered throughout tame pasture, native grassland, and shrubland areas. No prohibited noxious weeds were observed.*

*Other non-native and agronomic species observed include smooth brome (*Bromus inermis*), timothy (*Phleum pratense*), dandelion (*Taraxacum officinale*), goat's-beard (*Tragopogon dubius*) and clover (*Trifolium spp.*).*

An ACIMS desktop database search was completed before the field surveys. There were 98 tracked plant species and 8 tracked vegetation communities with the potential to occur in the Foothills Parkland (Appendix G; AEP 2017b).

*Based on the ACIMS desktop search, marsh gentian (*Gentiana fremontii*) was previously recorded within and near the Project Area and may occur within the planned area of disturbance. Marsh gentian was not observed during field surveys. The Project Area is located within AEP wildlife sensitivity ranges for limber pine (*Pinus flexilis*). Limber pine was not observed during field surveys.*

During the field surveys, no rare plant species or rare plant communities (AEP 2018a; AEP 2017a) were observed within the Project Area. No federally-listed rare species (Government of Canada 2011) were observed in the Project Area.

Direct effects on vegetation will be limited to active access and operational areas, where vegetation will be cleared. Clearing of vegetation communities will be limited to the Project Area most of which are native grasslands; effects will be negative in direction; high in magnitude with a high probability of occurrence. Effects of vegetation clearing will also be long term and continuous during operations. With the implementation of progressive reclamation, effects are reversible in the long term. Native species can be planted in the short and medium term, but restoring the species diversity will be a long-term effect. Prediction confidence is high based on a good understanding of the impacts of vegetation clearing in native prairie. Predicted residual effects on vegetation are rated as not significant.

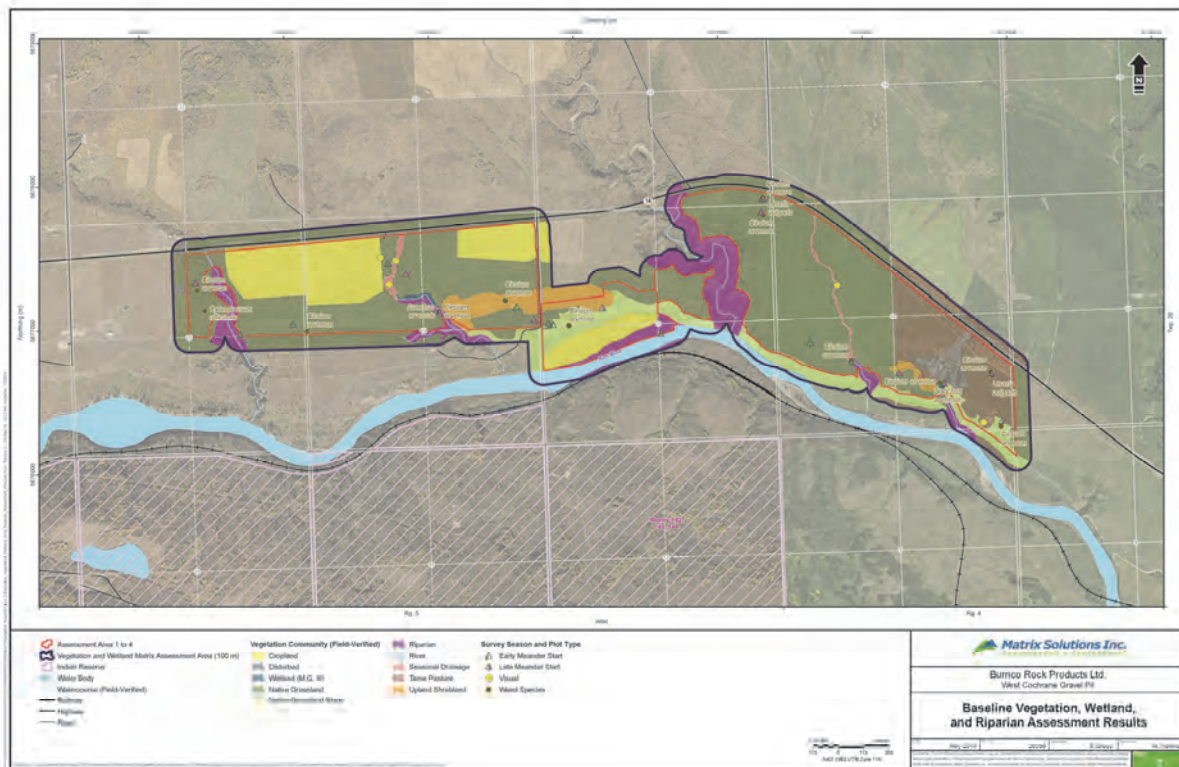
To ensure that potential environmental effects are reduced or eliminated during Project construction and operation, a number of general and site-specific mitigation measures are recommended and presented in Table 14. Other mitigations are based on requirements and guidelines of federal and provincial regulatory agencies, current industry standards, and professional experience and judgement. Project design, construction techniques, and operational practices are also accounted for as part of these mitigations.

Wetlands

Two seasonal (III) graminoid marshes were observed within the Project Area with a total area of 1.1 ha (0.3%; Table 7; Figure 2). Both marshes were adjacent to riparian vegetation communities. The footprint included 7.0 ha of riparian area (1.9%; Table 7; Figure 2). Seasonal drainages observed are areas where water may flow during spring runoff, but are not classified as wetlands or watercourses.

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Figure 4: Vegetation and Wetlands in the Project Study Area

**Wildlife**

A review of government and scientific research studies and government database queries were conducted to identify wildlife species, including wildlife species at risk (SAR), and sensitive wildlife areas that may occur in the Project Area.

A literature review indicated that 79 wildlife SAR may occur in or near the site, including 3 amphibians, 3 reptiles, 65 birds, and 8 mammals (Appendix H). A review of FWIMT data within approximately 5 km of the Project Area indicated that several wildlife SAR have been historically observed within or adjacent to the Project Area (northern leopard frog, wandering garter snake, trumpeter swan, sora, piping plover, great blue heron, northern pygmy-owl, osprey, peregrine falcon, prairie falcon, barn swallow, Baltimore oriole, least flycatcher, eastern kingbird, western wood-pewee, grizzly bear; Appendix H; AEP 2018b).

The Project Area passes through three provincially designated wildlife sensitivity zones including:

- sensitive raptor range for bald eagle, golden eagle and prairie falcon
- sharp-tailed grouse survey area
- key wildlife and biodiversity zone (KWBZ) - associated with the Bow River (AEP 2018c)

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Wildlife surveys were conducted as per the Sensitive Species Inventory Guidelines (SSIG; GoA 2013a). Surveys were carried out under the appropriate research licences/collection permits provided by Alberta Environment and Parks (AEP).

As per permit requirements, results of the surveys will be submitted to AEP upon completion.

- sharp-tailed grouse surveys (on 7 May and 8 May 2018);
- raptor stick nest survey (on 23 May 2018); and
- breeding bird survey (23 May and 4 June 2018).

During the sharp-tailed grouse surveys, no sharp-tailed grouse or leks were observed. No other SAR or important wildlife features (e.g., dens, hibernacula) were detected.

During the raptor stick nest survey, a total of 20 raptors of four different species were detected (i.e., American kestrel, bald eagle, red-tailed hawk, Swainson's hawk; Table 7). No other SAR or important wildlife features (e.g., dens, hibernacula) were detected.

Table 2: Raptors and Raptor Nests Detected During Raptor Stick Nest Survey

Common Name	Scientific Name	AEP Status ¹	COSEWIC Status ²	SARA Status ³	Number Observed	Number of Associated Nests Detected
American kestrel	<i>Falco sparverius</i>	Sensitive	-	-	5	-
Bald eagle	<i>Haliaeetus leucocephalus</i>	Sensitive	Not at Risk	-	2	1
Red-tailed hawk	<i>Buteo jamaicensis</i>	Secure	Not at Risk	-	10	3
Swainson's hawk	<i>Buteo swainsoni</i>	Secure	-	-	3	-

1. Alberta Wild Species General Status Listing - 2015 (GoA 2017)
2. Species at Risk Public Registry (Government of Canada 2011)
3. SARA (Government of Canada 2018)

During the breeding bird surveys, a total of 337 individuals of 30 breeding bird species were detected including four SAR (i.e., barn swallow, eastern kingbird, least flycatcher, Sprague's pipit; Table I1 of Appendix I; Figure 8). Approximately 53% of the birds detected were located more than 100 m from a survey point.

Incidental species observations included two bird SAR (i.e., great blue heron and American kestrel). No other SAR or other important wildlife habitat features (e.g., hibernacula, leks) were detected during the surveys. All wildlife species (incidental and target) detected during all surveys are included as Table I2 of Appendix I.

Approximately 89% of the habitat within the Project Area has been previously impacted (e.g., cropland, pasture, grazing). The majority of the Project Area consists of native grassland and tame pasture which may be suitable habitat for sharp-tailed grouse, breeding birds, small mammals (e.g., badger, ground squirrel), and grazing ungulates. The native grassland habitat has been impacted by grazing, with 100% of the habitat (215.2 ha) being grazed by cattle, and approximately 80% being heavily grazed. A moderate concentration of ground squirrel burrows was observed during the field assessments. In addition to native prairie and tame pasture, the Project Area includes cropland (64.8 ha) that may provide habitat for breeding birds, but would be impacted during the breeding season by agriculture activities. Land use of the area is summarized in Section 5.1 and Table 3.

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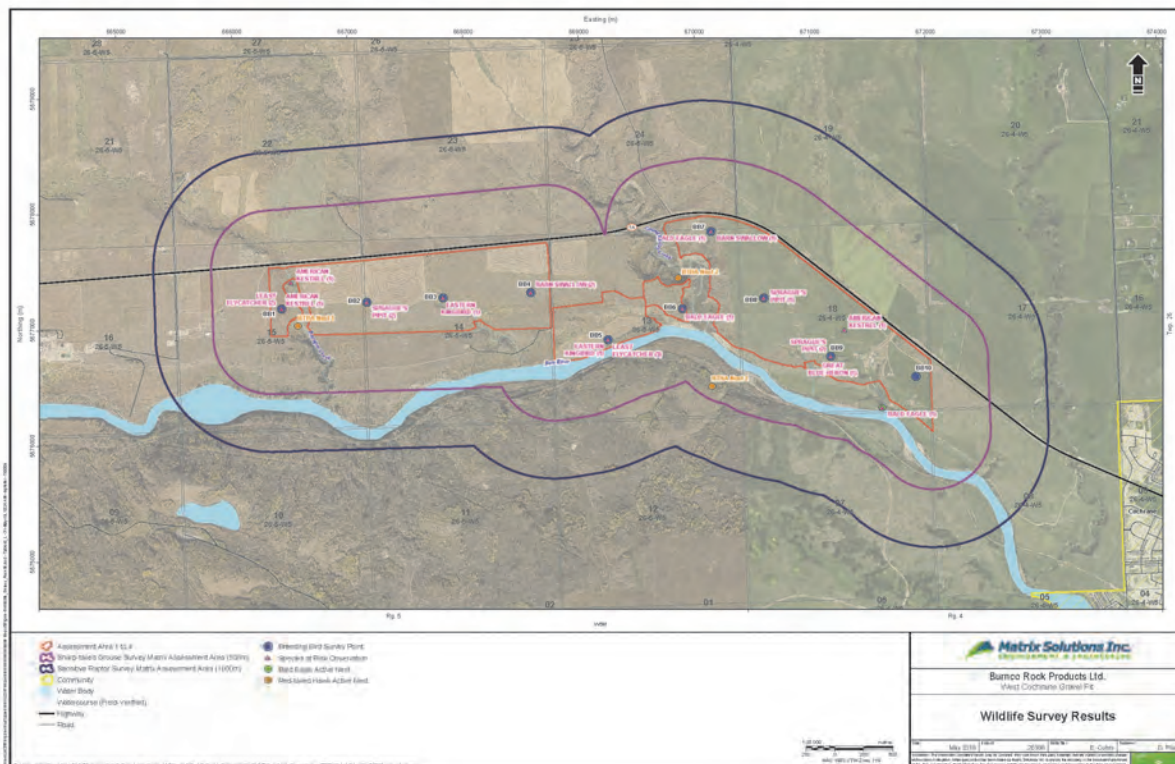
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A variety of habitat types exist along the Bow River. There are cliffs which contain suitable habitat for cliff nesting birds, although no cliff nests were identified during the field assessments.

Based on a desktop review of habitat within the Project Area, Matrix recommended the completion of a fish habitat assessment. The fish habitat assessment was conducted by a Qualified Aquatic Environmental Specialist on November 8, 2018. Beaupre Creek, Grand Valley Creek, and three unnamed watercourses were assessed during the site visit. The assessment area was accessed via truck, utilizing existing roads or by foot. The weather was sunny with temperatures below -4°C. The assessment utilized the collection of data to: identify and document important fish and fish habitat features within the watercourses, assess the watercourses' sensitivity to the proposed Project activities and develop general and site-specific mitigation measures to avoid or mitigate potential impacts to fish and fish habitat.

A review of aerial imagery of Beaupre Creek, Grand Valley Creek, and the most westerly unnamed watercourse did not identify any impediments or barriers to fish migration to the confluence with the Bow River. Resident fish species from the Bow River, in the vicinity of the confluence, could migrate into the watercourses if suitable species-specific fish habitat (spawning, rearing, feeding, or overwintering) exists. The two most easterly unnamed watercourses exhibit an absence of a defined bed and banks and are not connected to the Bow River. They do not provide fish habitat at any time of the year. anthropocentric disturbances, such as coyotes and small rodents.

Figure 5: Wildlife Survey Results



2.3 Soil

In support of the Project, Matrix Solutions Inc. (Matrix) was retained to complete a Biophysical Impact Assessment (BIA) for the Project area, which included an assessment of soils. This assessment was completed in 2019 and is provided as part of BURNCO's Land Use Application. The conclusions of the soils assessment from Matrix are as follows:

The Project Area is located within the Soil Correlation Area (SCA) 8 - Thick Black Soil Zone of Southwestern Alberta. The area is characterized by level to hummocky surface expression with some steep and terraced areas with slopes ranging from 2% to 30%. The majority of the Project Area contains gently undulating to hummocky surface expression with slopes ranging from 0.5% to 5%. Small portions of the Project Area (approximately 7%), have rough broken (steep) and terraced (river) surface expressions with slopes between 15% and 30%. Approximately 87% (318.2 ha) of the proposed Project Area is underlain by glaciolacustrine parent material, and 13% (46.5 ha) of the proposed Project Area is underlain by glaciofluvial parent material (Table 4). The remaining area of the Project Area (0.3% or 1 ha) was characterized by roads and disturbance units.

Soils within the Project Area were classified using field data collected in July 2018. Two soils series were identified within the Project Area and include the Maycroft (MFT) and Lindbrook (LBK) series (99.7% of Project Area). A small portion of the Project Area (0.3%) contained disturbed soils (Table 4; Figure 7). Detailed information, including stripping depths for each soil is provided in Section 5.4.2.1 and 5.4.2.2.

The Maycroft soil series: *are moderately fine-textured soils developed on glaciolacustrine parent material and contain moderately well to well-drained Orthic Black Chernozem (87% of the Project Area) and imperfectly drained Gleyed Orthic Black Chernozems soils developed on fine-textured glaciofluvial parent material (0.1% of the Project Area). Surface expression ranges from gently undulating to undulating, hummocky to terraced (river) with slope gradients of 0.5% to 30%. Gleyed (gl) and calcareous (ca) variants were present within the Project Area, indicating imperfect drainage and periodic reduction and alkaline earth carbonates were found in the B horizon, respectively (LCRC et al. 1993).*

This soil series was rated 3 (H,M,T) for land suitability for agriculture indicating the soil in this class has slight limitations that could restrict growth of crops or require additional special management practices due to inadequate heat units (H), moisture (M) and slopes steep enough to incur water erosion or to limit or impede cultivation (T) (Appendix D).

The soil suitability for reclamation for topsoil was rated "fair" based on texture and calcium carbonate and "fair" for subsoil based on reaction (slightly alkaline), texture and consistency (Appendix E). The wind erosion potential for the Maycroft soil series is low and slope dependent for water erosion potential; it is rated low on slope gradients <5%, moderate on slopes 5% to 10% and high on slopes greater than 15%. Slopes greater than 15% are found in conjunction with the terraced river areas (LCRC et al. 1993).

The Lindbrook soil series: *are well-drained Orthic Regosols developed on coarse glaciofluvial sand parent material (12.5% of the Project Area). Regosolic soils do not contain a recognizable B subsoil horizon and are considered weakly developed soils (SCWG 1998).*

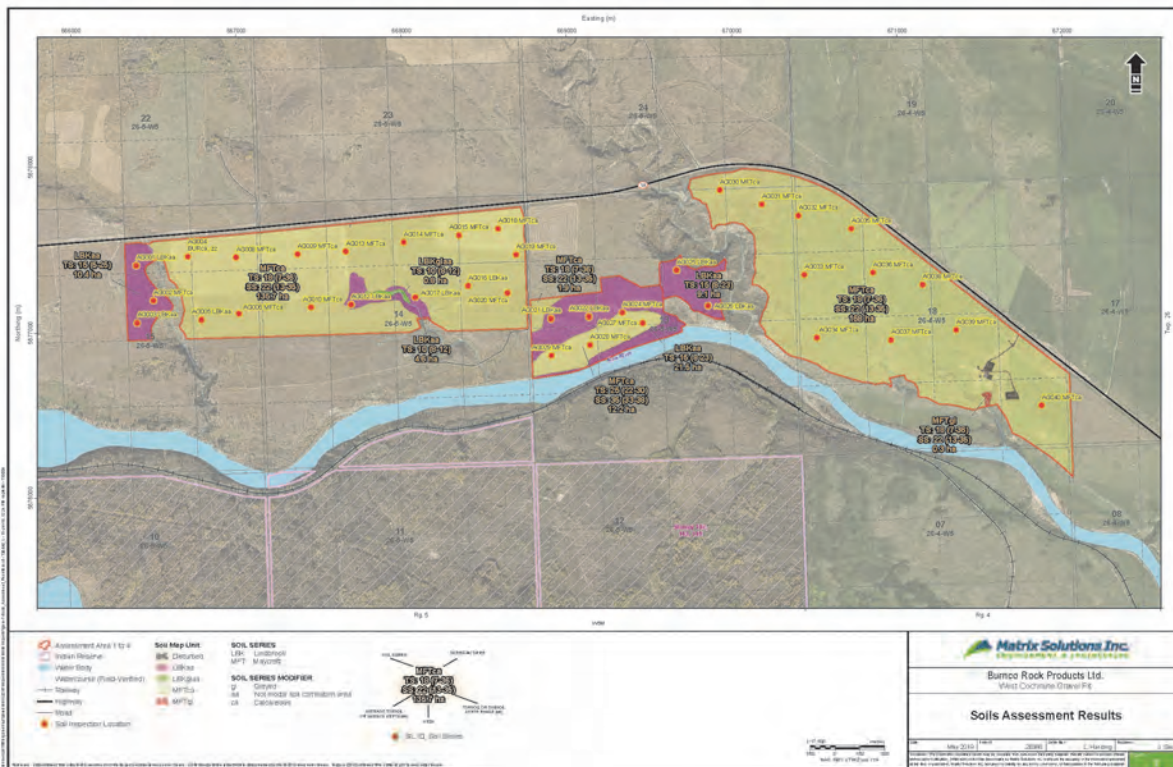
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Surface expression ranges from gently undulating, inclined-undulating, rough broken (steep) and terraced (river) with slope gradients of 0.5% to 30%. Gleyed (gl) variants were present (0.2% of the Project Area), indicating imperfect drainage and periodic reduction within the soil profile (LCRC et al. 1993).

This soil series had two ratings: Class 4 and 7. Areas rated 4 (H,M,W,T) had limitations such as inadequate heat units (H), moisture (M), excess water limiting to crop production (W) and slopes steep enough to incur water erosion or to limit or impede cultivation (T). Areas with higher stone content were rated Class 7 (H,M,E,P) due to additional limitation such as a thin A horizon (E), and land is sufficiently stony to limit crop production (P) (Appendix D).

The soil suitability for reclamation for topsoil was rated “fair” in areas with reduced stone content based on stoniness and calcium carbonate equivalent. In areas with high stone content, the topsoil was rated “poor” based on stone content and high calcium carbonate equivalent (Appendix E). The wind erosion potential for the Lindbrook soil series was moderate and slope dependent for water erosion potential; it is rated low on slope gradients <5%, moderate on slopes 5% to 10% and high on slopes greater than 15% (LCRC et al. 1993).

Figure 6: Gravel Pit Soil Inspection Sites



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2.4 Resource

In support of the Project, Matrix Solutions Inc. (Matrix) was retained to complete a Biophysical Impact Assessment (BIA) for the Project area, which included an assessment of soil depths. This assessment was completed in 2019 and is provided as part of BURNCO's Land Use Application. As part of this assessment, Matrix completed 37 inspection sites and was used to determine the following soil depths divided into applicable land parcels:

• NE 15 (141P219)	Topsoil: <u>14.6 cm</u>	Subsoil: <u>15.7 cm</u>
• NW 14 (151 199 374)	Topsoil: <u>15.8 cm</u>	Subsoil: <u>16.3 cm</u>
• NE 14 (151 199 374)	Topsoil: <u>16.6 cm</u>	Subsoil: <u>15.7 cm</u>
• NE 13 / SE 24 (141 167 388)	Topsoil: <u>23.3 cm</u>	Subsoil: <u>12.3 cm</u>
• SE 13 (141 167 387)	Topsoil: <u>21.0 cm</u>	Subsoil: <u>16.5 cm</u>
• SW 18 (141 167 389)	Topsoil: <u>18.5 cm</u>	Subsoil: <u>25.5 cm</u>
• NW 18 / SW 19 (141 167 390)	Topsoil: <u>15.8 cm</u>	Subsoil: <u>24.2 cm</u>
• SE 18 / NE 18 (141 167 053)	Topsoil: <u>17.5 cm</u>	Subsoil: <u>15.5 cm</u>

The existing operation in NW 13 has been in operation since 2016. A preconstruction soil assessment was completed on these lands by Twerdoff & Associates Inc. in 2013 and is provided as part of BURNCO's Land Use Application. This assessment determined the following soil depths:

• NW 13 / SW 13 (151 199 374 +1)	Topsoil: <u>12.7 cm</u>	Subsoil: <u>13.9 cm</u>
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The site has also been tested by auger drill, hammer drill and excavator to determine the depth, extent, and quality of aggregate. In all 79 test holes/pits were logged across the site for use in assessing horizon C (overburden) and gravel depths:

• NE 15 (141P219)	Overburden (OB): <u>2.4 m</u>	Gravel: <u>6.0 m</u>
• NW 14 (151 199 374)	Overburden (OB): <u>2.2 m</u>	Gravel: <u>3.9 m</u>
• NE 14 (151 199 374)	Overburden (OB): <u>2.5 m</u>	Gravel: <u>5.4 m</u>
• NE 13 / SE 24 (141 167 388)	Overburden (OB): <u>3.9 m</u>	Gravel: <u>5.5 m</u>
• SE 13 (141 167 387)	Overburden (OB): <u>0.3 m</u>	Gravel: <u>7.6 m</u>
• SW 18 (141 167 389)	Overburden (OB): <u>1.1 m</u>	Gravel: <u>5.8 m</u>
• NW 18 / SW 19 (141 167 390)	Overburden (OB): <u>8.5 m</u>	Gravel: <u>5.2 m</u>
• SE 18 / NE 18 (141 167 053)	Overburden (OB): <u>3.0 m</u>	Gravel: <u>5.7 m</u>
• NW 13 / SW 13 (151 199 374 +1)	Overburden (OB): <u>1.6 m</u>	Gravel: <u>6.1 m</u>

Averages for the entire project are:

• Topsoil:	<u>17.3 cm</u>
• Subsoil:	<u>17.3 cm</u>
• Overburden:	<u>2.8 m</u>
• Aggregate:	<u>5.7 m</u>

2.5 Storm Water

In support of the Project, Matrix Solutions Inc. (Matrix) was retained to complete a Stormwater Management Plan (SMP) for the Project. A complete copy of the Matrix report can be found as part of BURNCO's Land Use Application. An overview of the results is as follows:

The development area is located on a large plateau north of the Bow River. The area consists of predominantly pasture and cultivated land. The lands are generally flat to slightly undulating with an overall gradient to the south toward the flood plain of the Bow River. Five water courses have been identified within the project area: Grand Valley Creek, Beaupre Creek, and three unnamed water courses. Several wetlands have also been identified in the project area (Matrix 2019).

Catchment boundaries were delineated using LiDAR data for the project site (provided by BURNCO) and additional topographical data upstream of the project site (20K digital elevation model data provided by AltaLIS Ltd.).

Highway 1A is located directly north of the project area. All offsite drainage originates from areas north of the project site where it crosses the highway, collecting along the highway ditch on the south side of the road prior to entering the project site at various locations. Grand Valley Creek and Beaupre Creek both have large upstream catchment areas (8,971 and 3,096 ha, respectively), resulting in high flows during flood events.

These flows are carried across Highway 1A via large diameter culverts (approximately 3,600 and 3,200 mm, respectively) before draining south to the Bow River. The remainder of the offsite drainage entering the site is conveyed across Highway 1A through several 800 mm diameter culverts (note: all culvert sizes and locations are approximate) and cattle crossings. Drainage from these areas flows along the southern highway ditch before entering the project area as overland flow at low points along the ditch or via channelized flow through the ditches on either side of existing Range Road 51. The existing drainage for the contributing catchments is shown on Figure 3. Figure 4 shows existing onsite drainage. The total areas and Highway 1A crossing details are summarized in Table 2.

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Figure 7: Stormwater Management Plan – Existing Upstream Drainage



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Figure 8: Stormwater Management Plan – Existing On-Site Drainage

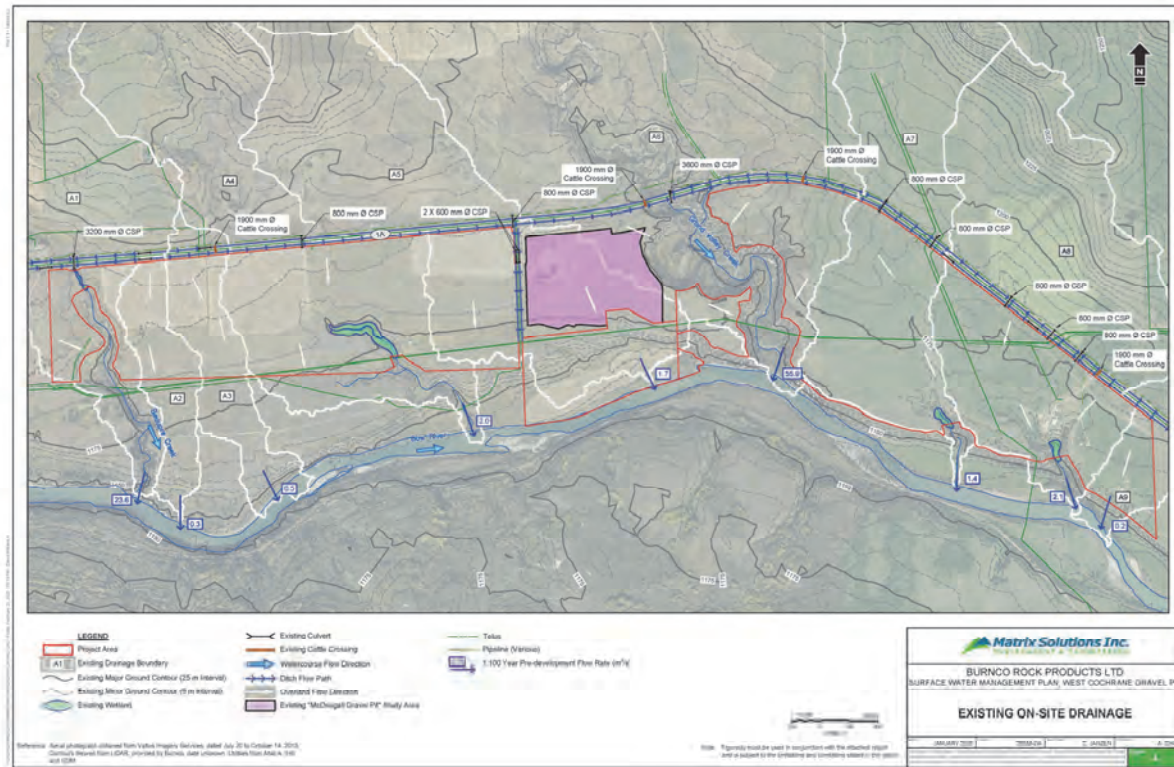


Table 3: Existing Drainage Areas

Drainage Area	Total Area (ha)	Area Within Project Boundary (ha)	Highway 1A Crossing	Onsite Receiving Water Body
A1	3,133.5	24.6	3,200 mm culvert	Beaupre Creek
A2	29.5	15.7	N/A	Overland Flow
A3	41.5	18.4	1,900 mm cattle crossing	Overland Flow
A4	227.4	60.0	800 mm culvert	Unnamed Watercourse
A5	184.3	60.1	800 mm culvert	Overland Flow
A6	9,058.8	43.9	3,600 mm culvert	Grand Valley Creek
A7	180.8	62.0	2 × 800 mm culvert	Unnamed Watercourse
A8	192.3	59.6	3 × 800 mm culvert + 1,900 mm cattle crossing	Unnamed Watercourse
A9	19.0	8.0	N/A	Overland Flow

2.6 Groundwater

Matrix Solutions Inc. (Matrix) was retained by BURNCO to conduct a groundwater impact assessment of the proposed development. A complete copy of the Matrix report can be found as part of BURNCO's Land Use Application. The objectives of this evaluation were to describe the hydrology and groundwater resources within the Project area and to evaluate the potential effects on groundwater that may be caused by the Project. An overview of the results is as follows:

Levelton Consultants Ltd. conducted a groundwater evaluation of the McDougal Ranch Gravel Pit and surrounding area in 2014 (Appendix 9). The groundwater evaluation included an existing groundwater monitoring well network located in Sections 13, 14, and 15 of 026-05 W5M. Findings from the Levelton evaluation as well as information from the groundwater monitoring wells were used to support this groundwater impact assessment. Test hole data outlining overburden, gravel thickness, depth to bedrock, and top of gravel and bottom of gravel surfaces were supplied by BURNCO throughout the project area.

Surficial deposits overlie bedrock over most of the assessment area, except where bedrock has been exposed due to erosional processes. A series of boreholes have been installed in the assessment areas, with surficial sediments thicknesses ranging from 2 m more proximal to recent erosional features, up to 16 m in non-eroded areas.

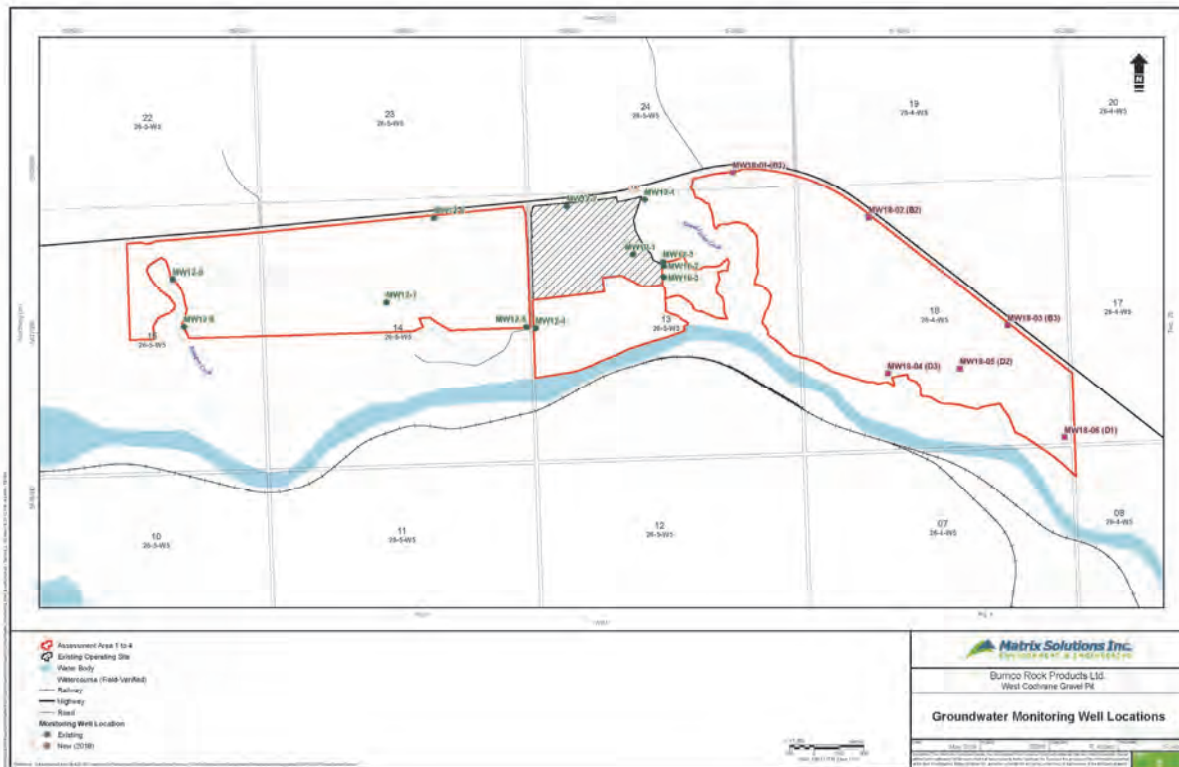
The upper most sediments at the site consist of gravel, sand and gravel, clay, silty clay, and clay till. The main surficial depositional processes in the study area include glacial, glaciolacustrine, glaciofluvial, and recent fluvial deposition of the modern day Bow River (Bayrock and Reimchen 1980; Fisher, T.G. 1999).

The installation of six groundwater monitoring wells (MW18-01, MW18-02, MW18-03, MW18-04, MW18-05, and MW18-06) was completed between 23 July 2018 and 30 August 2018 using a Becker Hammer drill rig by Earth Drilling of Calgary, Alberta. The six new well locations are shown along with the existing 12 monitoring well network in Figure 5, resulting in an 18 monitoring well network to characterize site geology and hydrogeology. Under the supervision of Matrix, 2018 boreholes were drilled to the top of bedrock, with descriptions of soil and rock from the drill cuttings (returns) recorded on field logs.

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Figure 9: Groundwater Monitoring Wells



Field-verified surveys (FVS) were conducted on June 18, 2018, and between May 28 to September 16, 2019, to supplement the FVS that was conducted by Levelton in 2014 and BURNCO in 2016. The FVS aimed to obtain baseline information about local water users and to establish their proximity to the site. A questionnaire modified from the Alberta Environment Guide to Groundwater Authorization (AENV 2011) was used to conduct an interview with the landowners. A search of well and landowner information from Alberta Environment and Parks (AEP) and AbaData™ (Abacus 2018) within a 1.6 km radius of 18-026-04 W5M and N-15-026-05 W5M was conducted to identify residential wells. A review of the county maps and an open house meeting held by BURNCO was used to identify and contact landowners via telephone. At the discretion of the landowners, the surveys were conducted in person at the property, or over the telephone. A portion of the FVS was conducted by Ann McNabb and McKendrick Ranches Ltd. on the water sources at Ann McNabb's and McKendrick Ranches properties.

A 1.6 km search of water wells and licenced water users was conducted by Levelton surrounding the N½-14, W½-13 and NE-15-026-05 W5M study area. Matrix supplemented this by conducting a 5 km radius search at the centre of the western assessment area (area 4) at 18-026-04 W5M and a 1.6 km radius search surrounding N-15-026-05 W5M to identify any new water wells or licences following the Levelton search.

A search of well information from AEP water well database (AEP 2018a) was completed on October 18, 2018 and March 21, 2019 and identified 203 records within a 5 km radius of 18-026-04 W5M and 1.6 km radius of N-15-026-05 W5M (Figure 6). These include 179 water wells, 4 flowing shot holes, and 2 springs.

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The wells ranged in depth from 6.10 to 260.00 m bgs and the majority of the wells are listed for domestic and stock use. Based on the listed completion information and associated depth to bedrock for the water wells, 166 out of the 179 wells are interpreted to be completed in the bedrock and 3 wells are interpreted to be completed in sand and gravel. The groundwater wells interpreted to be completed in the sand and gravel are located greater than 735 m to the north and west of the west end of the site and are listed as domestic and stock use. The records for the remaining 13 wells did not include adequate information to determine the depth to bedrock. The water well information suggests that the surficial deposits are generally neither a dependable nor significant water supply aquifer in the area. The presence of four flowing shot holes and two springs in the records, and eight springs in the FVS suggest that the site is near or within a groundwater discharge area.

A search of active surface and groundwater licences within a 5 km radius of 18-026-04 W5M and 1.6 km radius of N-15-026-05 W5M identified 50 diversion licenses as of October 19, 2018 and March 21, 2019. The search identified 23 active groundwater licences, sourced from unnamed aquifers, while the remaining 27 licences are granted for surface water use. Out of the 27 surface water licences, 10 are sourced from the Bow River, 10 from unnamed streams, 2 from Cochrane Lake, 2 from Grand Valley Creek, 1 from Beaupré Creek, 1 from Jumpingpound Creek, and 1 from surface runoff.

Of the 23 active groundwater diversion licences, only 1 is located within the project boundary. There are two registered groundwater diversions (water wells) licenses at this location and both are installed within the bedrock. Another registered water well diversion, proximal to the site boundary, is located downgradient and completed within the bedrock. Sixteen of the registered water well diversions are located upgradient of the site and the remaining four registered water well diversions are located downgradient of the site (Figure 7). The groundwater well (GIC 386518) completed within sand and gravel does not have a registered groundwater diversion licence.

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Figure 10: Search Area Water Well Locations

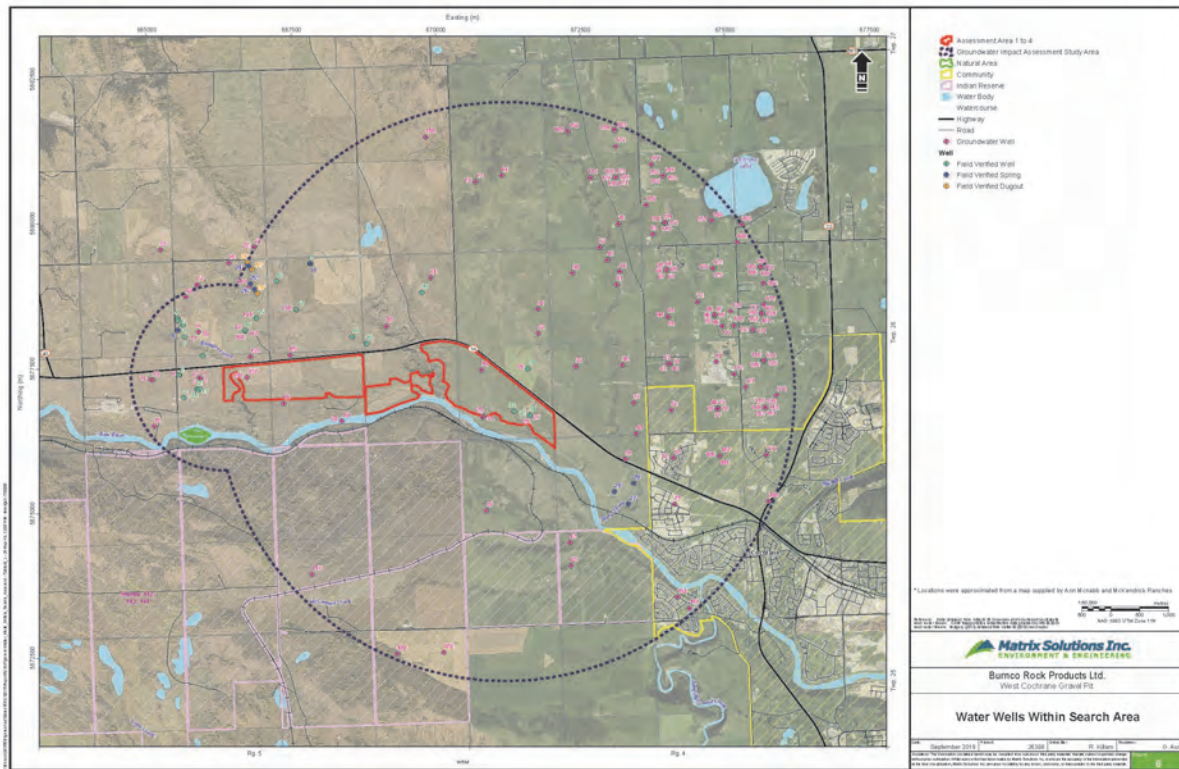
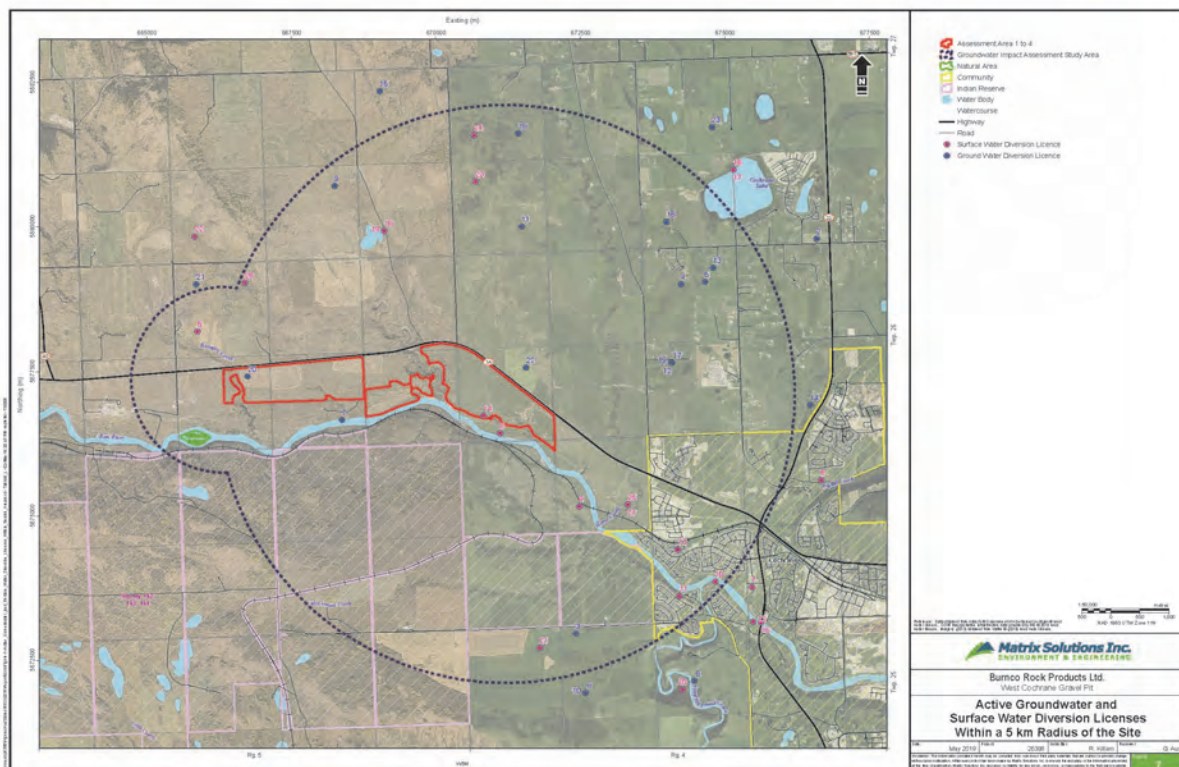


Figure 11: Search Area Water Licenses



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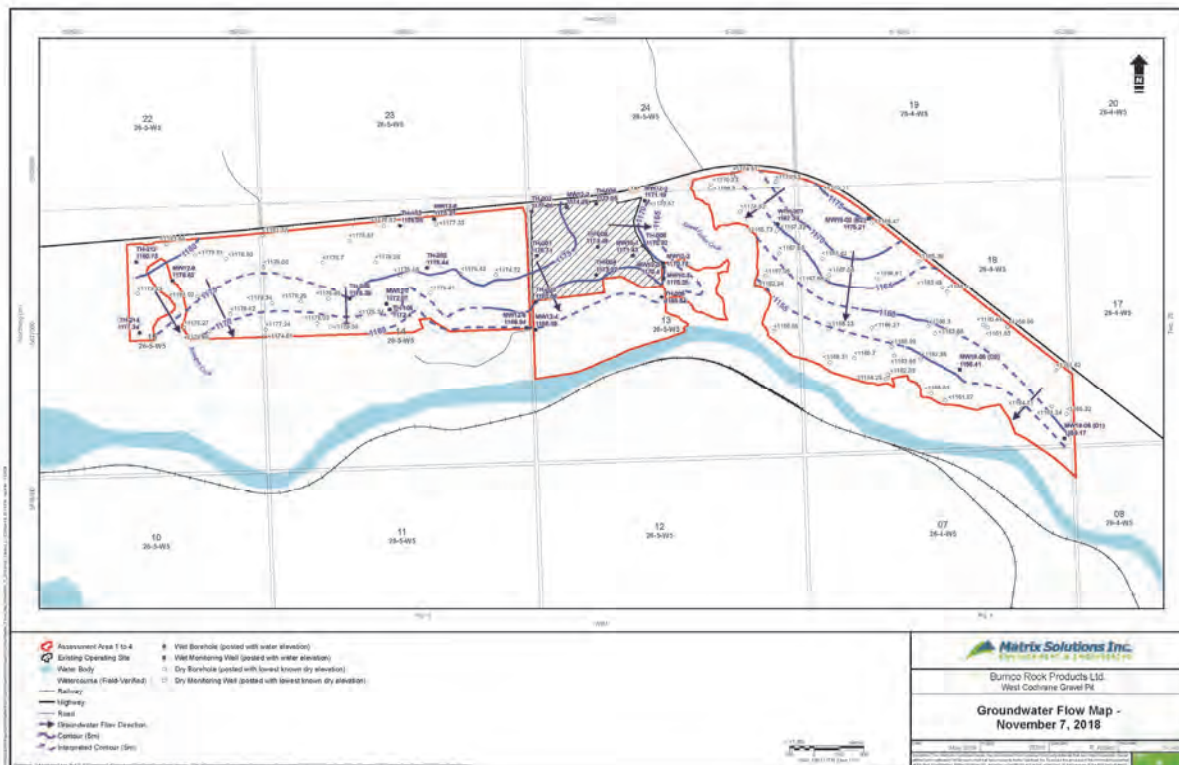
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Matrix manually measured depths to groundwater on November 7, 2018, and are included in Table A. Water levels recorded in pressure transducers installed in the monitoring wells were reviewed and compensated for atmospheric conditions. A total of 11 hydrographs were created based on available and usable data from August 28, 2015 to November 7, 2018 (Appendix D).

The groundwater levels varied across the study area. Generally, the wells displayed seasonal fluctuations ranging between 0.4 to 0.9 m and water levels were near the base of the gravel. MW12-1 had a sudden water level increase in April 2018, MW12-5 had a water sudden water level increase in July 2016 and May 2018. MW12-7 had a sudden water level increase in May 2017 and May 2018. The sudden increases of water suggest local rapid recharge likely from spring snow melt and runoff. Wells MW12-5 and MW12-7 have a veneer of top soil above the gravels, allowing for local recharge at the well.

The groundwater monitoring network encountered shallow groundwater at depths ranging from 0.83 to 15.74 m bgs at wells MW18-05 (D2) and MW18-01 (B1) on November 7, 2018. Groundwater elevations west of Grand Valley Creek, based upon groundwater monitoring well data and test hole data, suggests a groundwater flow to the south to southeast that generally follows topography. In the eastern portion of the site the flow varied from south to southwest with a western component in the northern portion (Figure 7).

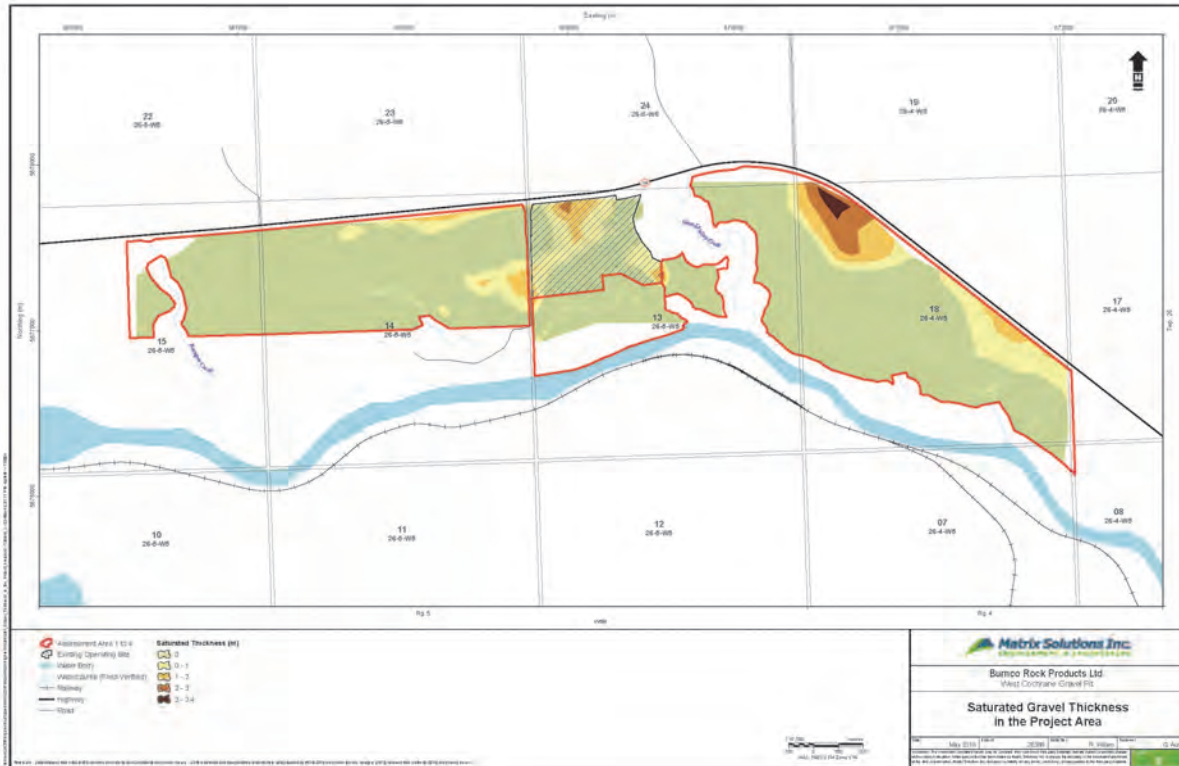
Figure 12: Groundwater Flow



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A saturated gravel thickness contour map was generated using water elevation data and the base of sand and gravel surface supplied by BURNCO. The gravels were fully saturated in the northeast portion of the study area near MW18-02 (B2) and were less saturated to the west, ranging from 0 to 3 m (Figure 8). Determining inflow in areas where mining will occur in the saturated thickness zones and estimations of water diversion based upon saturated thickness and mining area is included in Appendix E.

Figure 13: Saturated Gravel Thickness



Groundwater monitoring well MW18-02 (B2) was sampled on August 30, 2018 following purging after drilling. All other wells drilled in 2018 were dry following well installation. The remaining wells, including the existing well network, were sampled on November 7, 2018. Field-measured parameters (including temperature, pH, and electrical conductivity) were collected during sampling.

Groundwater samples were collected and submitted to AGAT Laboratories in Calgary, Alberta, for routine chemical parameter analyses. Dissolved petroleum hydrocarbons (benzene, toluene, ethylbenzene, and xylenes and dissolved metals parameters were obtained from MW18-02 (B2)).

The following groundwater monitoring wells were not sampled due to the wells being dry or having limited water: MW12 1, MW12 4, MW12 5, MW12 8, MW18 01 (B1), MW18 03 (B3), and MW18 04 (D3).

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Table 4: Groundwater Quality Results

Monitoring Well	Sample Date	MSI Sample Number	Lab pH	Lab EC µS/cm	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Cl mg/L	SO ₄ mg/L	NO ₂ -N mg/L	NO ₃ -N mg/L	NO ₂ -N+NO ₃ -N mg/L	T-Alkalinity mg/L	HCO ₃ mg/L	Hardness mg/L	TDS mg/L
MW10-1	28-Mar-12	862756-1	8.08	679	46.8	41.1	40.9	3.9	12.8	59.5	<0.005	1.22	1.22	305	372	286	388
MW10-1	07-Nov-18	26388181107005	8.03	752	51.8	39.8	43.7	3.5	16.7	54.8	<0.01	4.79	4.79	314	383	283	420
MW10-2	28-Mar-12	862756-5	7.96	922	92.5	49.4	31.2	4.1	60.6	193	<0.005	0.01	0.01	230	280	434	568
MW10-2	07-Nov-18	26388181107007	7.97	796	75.9	40.9	23.2	3.1	40.4	119	<0.01	<0.02	<0.02	256	312	358	456
MW10-3	07-Nov-18	26388181107008	8.07	545	61.9	28.4	18	1.5	8.2	35.6	<0.01	0.42	0.42	253	309	272	305
MW12-2	28-Mar-12	862756-3	8.08	784	39.8	9	126	3.2	10.4	89.4	0.045	0.33	0.375	322	393	140	471
MW12-2	13-May-13	935496-12	8.29	757	28.7	11.8	138	2.9	5.6	61.6	0.005	0.02	0.025	386	471	120	480
MW12-2	13-May-13	935496-13	8.29	753	27.8	11.6	134	2.8	5.3	64.3	<0.005	0.02	0.02	385	470	117	477
MW12-2	13-May-13	935496-14	8.31	758	27.6	11.4	140	2.8	5.2	61.8	<0.005	0.05	0.05	386	470	118	480
MW12-2	07-Nov-18	26388181107010	8.14	783	42.7	23.9	98.3	2.8	17.7	79.6	0.23	1.03	1.25	313	381	205	458
MW12-3	28-Mar-12	862756-4	7.95	926	91.2	49.1	30.3	4	59.4	196	<0.005	0.02	0.02	230	281	430	568
MW12-3	07-Nov-18	26388181107006	8.09	877	53.5	32	99.9	3	14.2	135	<0.01	0.03	0.03	325	397	285	593
MW12-6	02-Apr-12	863229-1	7.82	714	280	53	31	4.4	27	44	<0.005	0.66	0.66	336	410	917	641
MW12-6	13-May-13	935496-7	8.1	691	60.3	41	33.3	2.6	17.5	36.8	<0.005	0.68	0.68	375	457	319	416
MW12-6	13-May-13	935496-8	8.08	703	59.7	42.3	32.9	2.5	17.7	36.8	<0.005	0.72	0.72	356	435	323	406
MW12-6	07-Nov-18	26388181107009	7.95	688	61.2	38	36.8	2.4	10.9	31.9	<0.01	0.33	0.33	355	433	309	396
MW12-7	28-Mar-12	862756-2	7.88	643	61.2	14.9	56.7	5	23.7	85.6	<0.005	0.81	0.81	222	271	214	380
MW12-7	07-Nov-18	26388181107002	7.96	780	68.7	30.3	59.2	3.3	22.9	55.9	<0.01	0.27	0.27	337	411	296	444
MW12-9	02-Apr-12	863229-2	7.97	573	86	20.9	25.4	3.4	8.3	57.8	0.024	0.17	0.194	255	310	301	355
MW12-9	13-May-13	935496-10	8.16	543	60.7	24	25.3	3.1	6.1	39.2	<0.005	0.02	0.02	277	337	250	324
MW12-9	13-May-13	935496-11	8.18	544	59.8	23.6	25.7	3.2	6.7	40.5	<0.005	0.03	0.03	282	344	246	329
MW12-9	07-Nov-18	26388181107003	7.98	578	59.2	26.8	25.5	2.8	6.4	37.8	<0.01	<0.02	<0.02	271	330	258	321
MW18-02 (B2)	30-Aug-18	26388180830001	7.88	1880	161	96.6	111	4.6	140	326	<0.01	0.3	0.3	523	638	800	1150
MW18-02 (B2)	07-Nov-18	26388181107011	7.71	2010	140	128	101	3.8	195	228	<0.01	<0.02	<0.02	665	811	877	1190
MW18-05 (D2)	07-Nov-18	26388181107001	8.03	965	49.7	17.6	149	3.2	32.9	110	<0.01	0.03	0.03	359	438	197	578
MW18-06 (D1)	07-Nov-18	26388181107012	8.01	680	79.1	37	12.1	6.8	11.1	56.7	0.09	3.28	3.36	297	362	350	396
Alberta Tier 1 - Natural Areas*			6.5-8.5 ^B	NS	NS	NS	200 ^{AO}	NS	120 ^A	H ^{LAP}	Cl ^A	3 ^A	NS	NS	NS	NS	500 ^{AO}

Notes:

- NS - not specified
 A - indicates guideline for Aquatic Life exposure pathway
 AO - aesthetic objective from Guidelines for Canadian Drinking Water Quality-Summary Table (Health Canada 2017)
 Cl - dependent on chloride value
 H - dependent on hardness value
 LAP - lowest of Aquatic Life and Potable Groundwater exposure pathways
 B - indicates guideline for Potable Groundwater exposure pathway
 * - Alberta Tier 1 Soil and Groundwater Remediation Guidelines (AEP 2016)
 *** - Environmental Quality Guidelines for Alberta Surface Waters (AEP 2018)
Italics - indicates values do not meet applicable guidelines

2.7 Historical Resources

Lifeways of Canada Limited (Lifeways) was retained by BURNCO to conduct a historical resources assessment of the proposed development. In addition, a Stage 1 excavation was completed on the lands from the existing gravel pit in NW13 to evaluate the significance of resources previously identified within EhPp-75 and pursue full clearance from Alberta Culture. A complete copy of these reports can be found as part of BURNCO's Land Use Application.

2.7.1 Historical Resources – NW 13-26-05 W5M

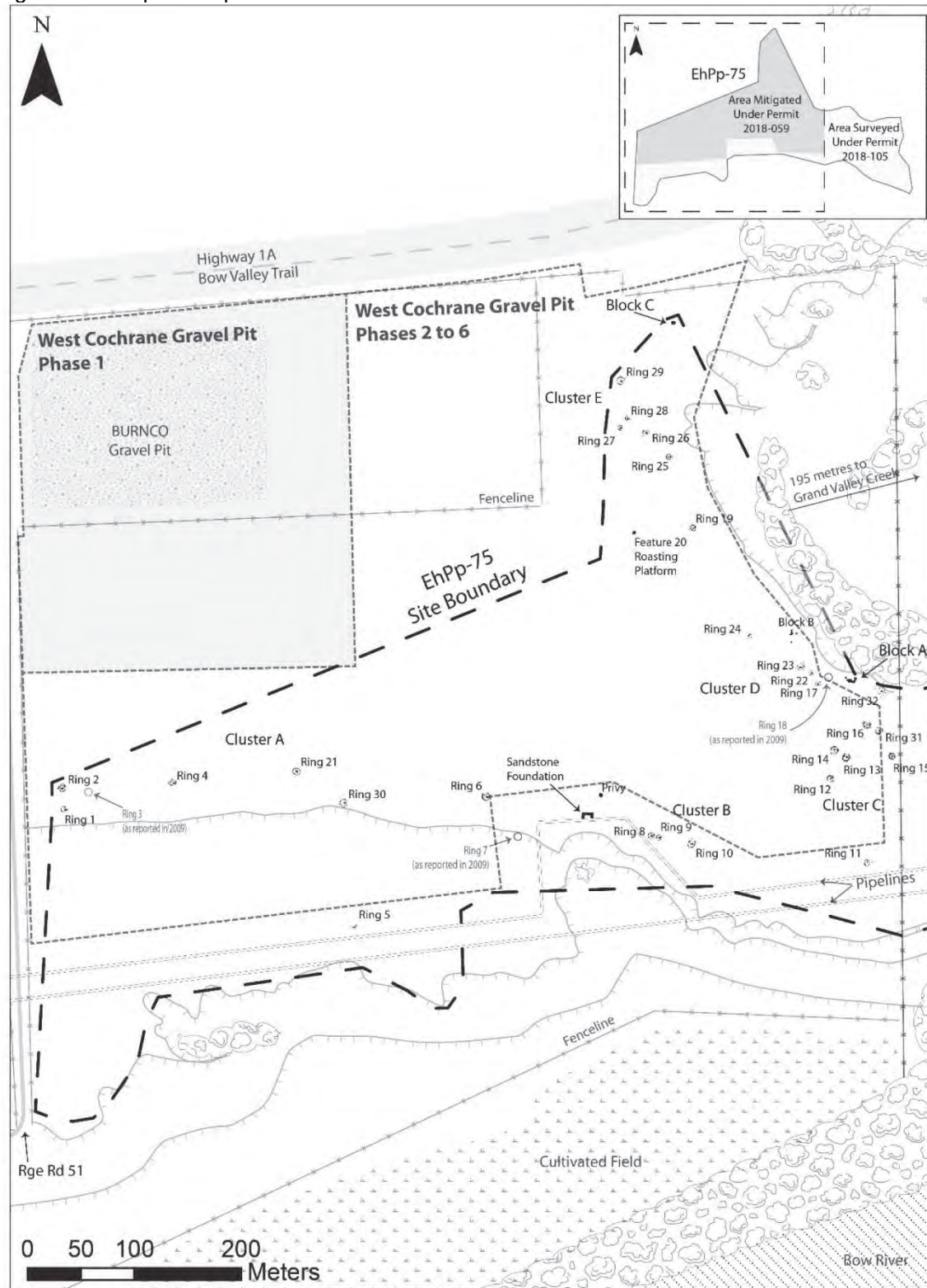
The existing gravel pit at NW 13-26-05 W5M has been in operation since 2016. As such, these lands had been previously evaluated for historical resources. In 2009, Bison Historical Service Ltd. completed an assessment for these lands. This assessment identified several stone features (EhPp-75) which had the potential for historical significance. Under project file #4650-09-002, Alberta Culture provided clearance to conduct mining activities on those areas of the site not covered by EhPp-75 while requiring further evaluation of the stone features.

Lifeways was retained by BURNCO to conduct a Stage 1 excavation of the EhPp-75 sites located within the development area. An overview of the results is as follows:

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Figure 14: EhPp-75 Map of 2018 Stone Feature and Block Excavations



Historical Resources Impact Mitigations (HRIMs) required at EhPp-75 were to include the following components:

- 1. Mapping of all 29 stone features; 28 tipi rings/stone circles and one hearth feature,*
- 2. 2 m² of excavation in each ring or arc (for a total of 56 m²),*
- 3. 1 m² and mapping of the single visible hearth,*
- 4. a total of 50 m² excavation spread over site Areas A, B, and C, and;*
- 5. radiocarbon dating if suitable samples were recovered.*

In three instances during the relocation and mapping of the 28 stone circles (tipi rings) and one other stone feature, we were unable to verify previously reported rings. Lifeways staff then identified three ring locations that do not appear to have been recorded in 2009. In discussion with Dr. Trevor Peck (Plains Archaeologist, Historical Resources Management Branch; HRMB), the newly recorded rings were substituted for those we were unable to relocate. As per the Schedule of Requirements, test excavations of 2 m² were undertaken in each ring, and 1 m² at Feature 20 (roasting platform). Following the stone feature test excavations, block excavations were undertaken in Areas A, B, and C as per the requirements (Appendix A). After the first 10 m² of excavation of the required 20 m² at Area B, results indicated that further work in this location was not warranted. However, we recommended that additional units be excavated at Feature 20 to capture a larger area, and at Area A to gather a larger sample of materials. After discussing this with Dr. Peck, he agreed that shifting the remaining 10 m² to more productive areas would be prudent. Ultimately, 2 m² were excavated in each of 28 tipi rings, 7 m² at Feature 20, 24 m² at Area A, 10 m² at Area B, and 10 m² at Area C for a total of 107 m² at EhPp-75.

The stone feature test excavations produced valuable information about EhPp-75, however in all cases neither diagnostic nor dateable materials were recovered, artifact density in almost all cases was low to very low, and only a single ring feature provided evidence of a central hearth.

Block excavations in Area A produced valuable information relative to the site's Precontact occupations. That being said, there is no stratigraphic separation of these near-surface materials, disturbance to site features in the area is clear, and overall artifact densities are considered to be moderate. The excavations to date have recovered an adequate sample of materials from Area A, and we conclude that additional investigations here have only a low probability of further contributing meaningfully to our knowledge of EhPp-75.

Block excavations as required in Areas B and C identified the areas as low to moderate density scatters of materials commonly found across the site. These areas lacked features, diagnostic artifacts, or artifacts in high amounts or of special interest. Further work in these areas has very low potential to contribute to our understanding of EhPp-75.

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

The Lifeways report concluded with a recommendation for full clearance related to the development phases in NW13. This recommendation was accepted by Alberta Culture and a Historical Resources Act Approval # 4650-18-0056-003 was received. A copy of this approval is provided as part of BURNCO's Land Use Application. This means that the development areas proposed by BURNCO in NW 13 can proceed with no further assessment related to historical resources.

West Cochrane Gravel Pit – Master Site Development Plan

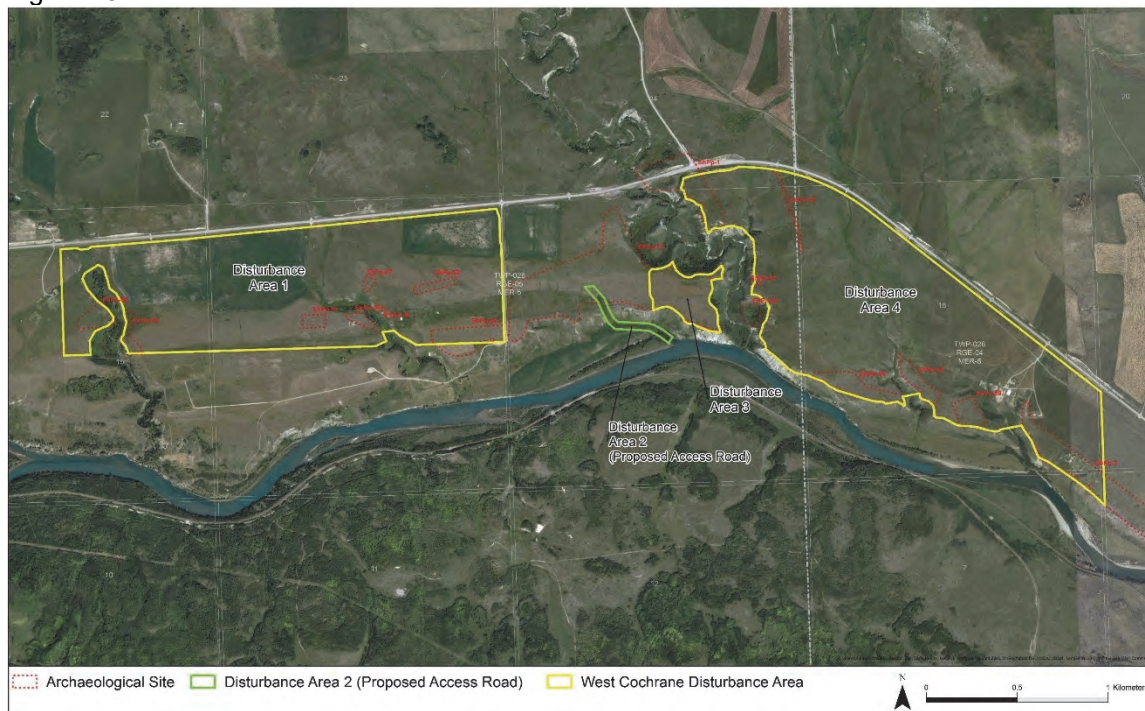
BURNCO**2.7.1 Historical Resources – Expansion Areas**

In 2018, Lifeways also conducted a Historical Resources Impact Assessment (HRIA) as well as a Historical Resources Impact Assessment for Palaeontology (pHRIA) for all lands beyond NW13.

The HRIA included work in four defined Disturbance Areas. Based on a Historic Resources Application filed on behalf of the proponent on April 30, 2018, the Historic Resources Management Branch (HRMB) issued a Schedule of Requirements for the Project on June 25, 2018. The Schedule specified that the HRIA address all areas of high archaeological potential within the Project area that had not been previously assessed, and that the relationship between the footprint and previously recorded sites EhPp-1, EhPp-3, EhPp-49, EhPp-65, and EhPp-75 be established (portions of EhPp-75 were subject to mitigative excavations in the context of the existing gravel pit operations under Permit 18-059 earlier in the season).

A separate palaeontological HRIA was required for a small subset of these lands. This work was undertaken under RTMP Permit 18-062 in August 2018.

Figure 15: HRIA – Areas for Assessment



Seventeen archaeological sites were recorded during the 2018 HRIA program, sixteen of which are directly associated with the Project area. Most are of at least high local archaeological significance and worthy of some level of mitigation prior to impact from the development of the BURNCO West Cochrane Expansion Project or any other proposed development. The HRIA resulted in the rerecording of previously recorded site EhPp-65, the relocation and reassessment of sites EhPp-1, EhPp-3, EhPp-49, EhPh-59, and EhPh-75, and the recording of 8 previously unrecorded Precontact sites with stone features, one Historic Period homestead site, and one site with both Precontact stone features and a Historic homestead. In addition, the historic Morley Trail crosses the Project area and was recorded.

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

Heritage Sites recorded within the Borden designations include HS 107372, 107373, 107374, 107375, and 107376.

EhPp-65 was found to be outside of the Project area, and no further work on the site is recommended in the context of BURNCO's West Cochrane Expansion Project. The remainder of the sites will be addressed in the Disturbance Area-specific summaries and recommendations below.

Disturbance Area 1

Eight archaeological sites were recorded in association with Disturbance Area 1: EhPp-49, EhPp-86, EhPp-87, EhPp-88, EhPp-89, EhPp-90 (HS 107373, 107374, and 107375), EhPp-91, and EhPp-92. We recommend that additional preimpact mitigation be required on all of these sites or any portions thereof to be impacted by the BURNCO West Cochrane Expansion Project. In addition, we recommend that Historical Resources Act clearance be granted to Project impacts associated with all non-site areas within Disturbance Area 1.

Figure 16: HRIA Work Undertaken in Disturbance Area 1

**Disturbance Area 2**

One archaeological site was recorded in association with Disturbance Area 2, EhPp-75 (HS 107372). Intensive HRIA work on the proposed Access Road and Water Diversion Point (Disturbance Area 2) found that it will not impact any significant features or activity areas at EhPp-75 and observed no other historical resources associated with the development. Therefore, we recommend that Historical Resources Act clearance be granted to BURNCO for the development of the access road (Disturbance Area 2) as illustrated in Figure 6. However, should development plans be altered to disturb deposits below the depth of 50 cmbs on the river bottom in Disturbance Area 2, we recommend that deep backhoe testing of the proposed access road right-of-way be required. Should proposed development extend outside of Disturbance Area 2, additional HRIA may be required.

Alberta Culture and Tourism, through the Royal Tyrrell Museum of Palaeontology and Royal Alberta Museum, had specified an Area of Concern (AoC) in 13-26-5 W5 on the north side of the Bow River valley, associated with the rim of the +30 m gravel-bearing surface and exposing not only the gravels but also outcrops of the underlying Cretaceous bedrock. A proposed Access Road and Water Diversion Point is to be constructed through a portion of the AoC from the high surface to the Bow River.

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

A field survey of the AoC was undertaken, supplemented by a detailed examination of exposed gravels at the small existing BURNCO gravel pit to the north of the AoC, just south of Highway 1A, associated with the same terrace-like surface.

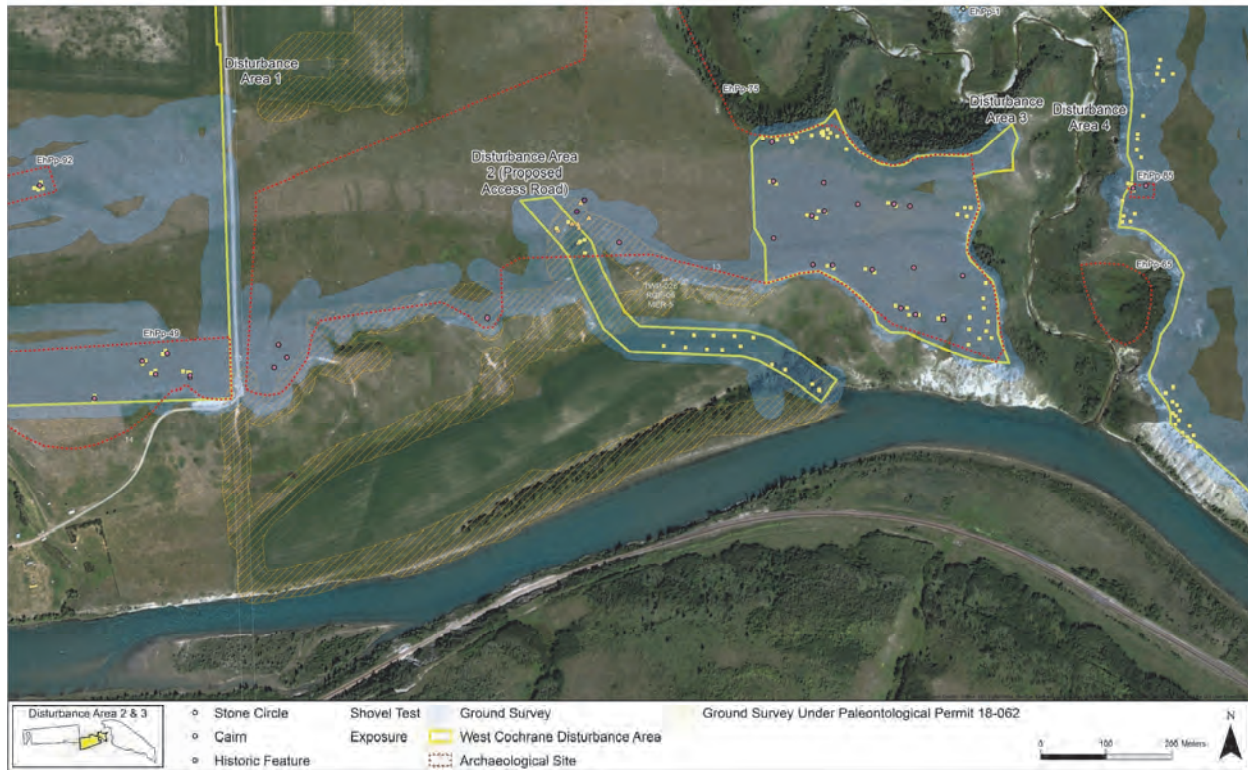
Bedrock in the AoC is of Late Cretaceous age and appears to be equivalent to the Maastrichtian Horseshoe Canyon Formation of the Edmonton Group in the Red Deer River valley to the east. Bedrock outcrops roughly on strike with these deposits to the south, across the Bow, and to the north along Grand Valley Creek have yielded fossils of dinosaurs (theropod and hadrosaur) as well as fresh-water molluscs, plant macrofossils, and palynomorphs. No animal remains were found during the survey of the AoC but a prominent indurated sideritic siltstone unit (Bedrock Exposure #1) immediately west of the proposed Access Road coulee was found to be rich in macerated leaf and twig fragments as well as large pieces of coalified wood. This significant occurrence has potential to be sampled in detail for identifiable plant fossils, which may be amenable to detailed study via cellulose acetate peels. This bedrock outcrop must be carefully protected from any impact during construction of the proposed Access Road. If the road impact involves only shallow blading, there would be no palaeontological concerns. However, if deeper cutting into bedrock in the coulee is needed for construction to grade, a palaeontologist should be on hand to monitor Access Road construction in that zone. A second sandstone outcrop (Bedrock Exposure #2) had poorly preserved macerated plant remains and should be protected to avoid impact. A third outcrop reveals bentonitic claystone that may have potential for radiometric dating.

**Disturbance Area 3**

A single significant archaeological site, EhPp-75, was found to cover most of Disturbance Area 3. We recommend that any portion of EhPp-75 to be impacted in Disturbance Area 3 be mitigated prior to development associated with the BURNCO West Cochrane Expansion Project.

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

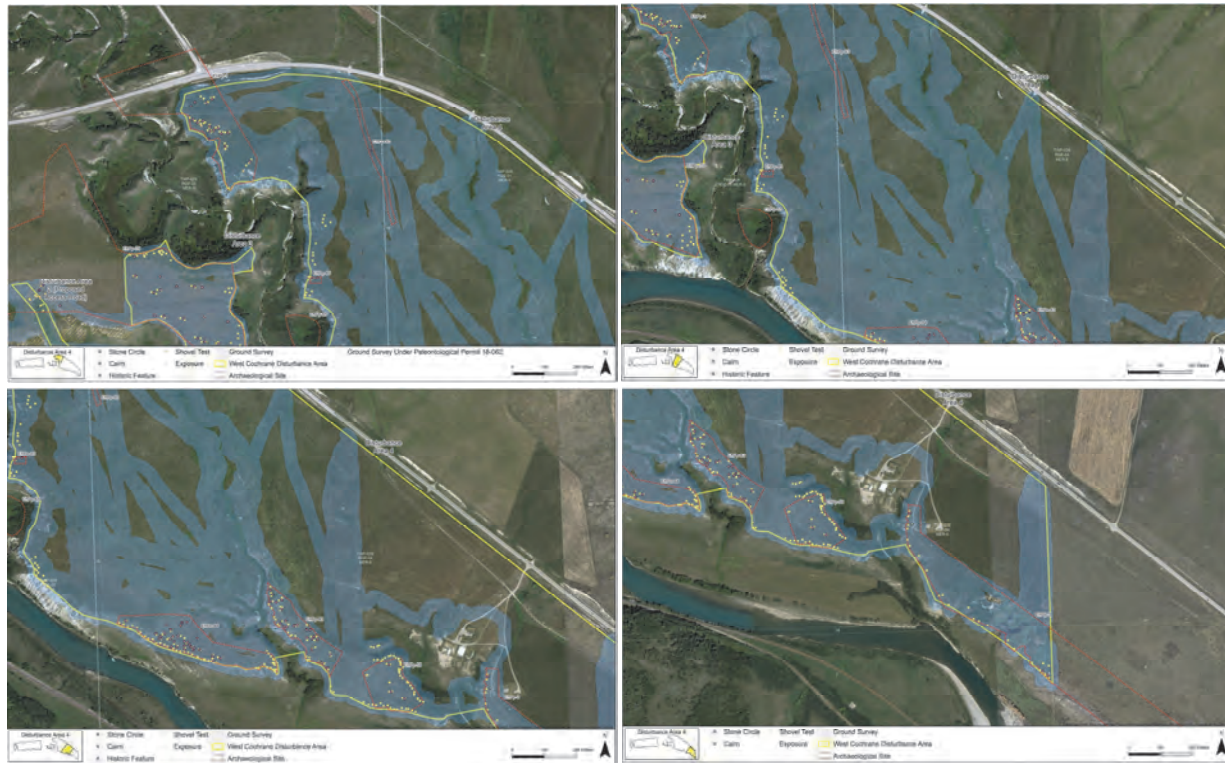
Figure 17: HRIA Work Undertaken in Disturbance Areas 2 and 3

**Disturbance Area 4**

Seven archaeological sites are associated with Disturbance Area 4: EhPp-1, EhPp-3, EhPp-59, EhPp-83, EhPp-84, EhPp-85, and EhPp-93 (HS 107376). No further work is recommended prior to any ground disturbance on archaeological site EhPp-93 (HS 107376). We recommend that additional pre-impact mitigation be required on any portions of EhPp-1, EhPp-3, EhPp-59, EhPp-83, EhPp-84, and EhPp-85 to be impacted by the BURNCO West Cochrane Expansion Project. In addition, we recommend that Historical Resources Act clearance be granted to Project impacts associated with all non-site areas within Disturbance Area 4.

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

Figure 18: HRIA Work Undertaken in Disturbance Area 4

**Closure**

Within Disturbance Areas 1, 3, and 4 there were 16 archaeological sites that were recorded during the 2018 field program. Historical Resources Act approval was provided on areas not containing these sites under project file #4650-18-0056-001. A copy of this approval is provided as part of BURNCO's Land Use Application. This means that development areas located outside of mapped archaeological sites can proceed with no further assessment related to historical resources. For those development areas located within mapped archaeological sites, additional studies and excavation is required prior to any excavation or disturbance.

The assessment completed in disturbance area 2 determined that the access road route avoids all precontact stone features and the historic sandstone foundation (HS 1073732) at EhPp-75. Development of the access road may proceed as per Historical Resources Act approval #4650-18-0056-001. A copy of this approval is provided as part of BURNCO's Land Use Application. This means that the development of this access road can proceed with no further assessment related to historical resources.

Policy #4

BURNCO will secure historical resource clearance from Alberta Culture & Tourism before commencing operations in uncleared areas of the project.

3.0 Development / Operating Plan

3.1 Overview

BURNCO currently operates a gravel pit at NW 13-26-05 W5M. This site is 61 hectares in size. It contains an estimated 2,500,000 tonnes of aggregates and is selling roughly 125,000 tonnes of material annually. This site was permitted in 2012 with a design capacity of 500,000 tonnes per year. It opened in 2016 after the completion of an intersection upgrade at Range Road 51 in support of the project.

BURNCO is proposing to increase the overall size of the pit to 452 hectares of contiguous lands through the inclusion of adjacent land parcels. In total, the Project Area contains an estimated 15,000,000 tonnes of aggregate and is expected to operate for 30 to 35 years. No change in annual design capacity is being proposed. Major activities at the pit will continue to include:

- aggregate crushing
- aggregate washing
- earthworks
- loading and scaling

Crushing

Crushing is completed with a portable crushing plant. This plant is comprised of a number of modular components on wheeled chassis. When assembled, the components work together to crush, screen, and convey aggregate materials in the production of construction materials. The plant is mobilized to the site as required and the length of stay is dependent on the type and amount of materials required for anticipated construction projects. It is expected that the use of a portable crushing plant will continue through all phases of the proposed project. This portable crushing plant will not be set up in a central location, but instead, will be set up in the active mining areas of the pit progresses over time.



West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**Washing

Washing is completed with a portable washing plant. Like the crusher, this plant is comprised of a number of modular components on wheeled chassis. When assembled, the components work together to wash, screen, and convey aggregate materials in the production of washed construction materials. The plant is mobilized to the site as required and the length of stay is dependent on the type and amount of materials required for anticipated construction projects. It is expected that the use of a portable washing plant will continue through all phases of the proposed project. This portable washing plant is not as easily moved and will be set up in a central location. The initial location will be in NW13. As operations progress west of Range Road 51, the location will be moved to NE 14. This is illustrated in Section 3.3.

Earthworks

To extract the gravel (pit-run), topsoil and subsoil must be salvaged, and overburden must be removed to expose the gravel beneath. This work is accomplished with heavy machinery such as scrapers, track hoes, articulating trucks, bulldozers, graders. This process is expected to continue as required through all phases of the proposed project.



West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**Loading and Scaling

Once aggregate materials have been processed by the portable crusher and portable wash plant, the final step is to load these materials into trucks for transport to construction projects. This work is accomplished with a loader. Trucks are then weighed and ticketed at a portable commercial truck scale and portable scale house. This process is expected to continue as required through all phases of the proposed project.



At present, operations include aggregate crushing, earthmoving necessary to expose aggregate and reclaim disturbed areas, and loading trucks with finished construction aggregates. Washing at the site is expected to commence within the next five years.

Over time, sales are expected to reach 500,000 tonnes per year. This annual volume is the original design capacity of the site and is already approved at the existing gravel pit in NW13. The volume currently being shipped from the site is roughly 125,000 tonnes per year. Thus, the target capacity would represent an increase of roughly four times the volumes currently being shipped from the site as it ramps up to full production. All studies and assessments have been completed based on this 500,000 tonne annual sales volume.

Aggregate from this site will be used to supply local projects in Rocky View County and in the Town of Cochrane. Washing capacity at this site will also allow BURNCO to supply premium aggregates to its network of asphalt and concrete plants in the Greater Calgary Area. BURNCO has a number of sites in Rocky View that currently serve this vital role as a supply of premium materials, however they are nearing depletion and BURNCO views the West Cochrane site as a replacement.

3.2 Hours of Operation

BURNCO's existing gravel pit is currently operated Monday through Saturday with no operations on Sundays or Statutory Holidays.

Going forward, BURNCO is not proposing any change to operating hours. The site would remain as a 24-hour operation for crushing, washing, and earthworks (as per the current Development Permit DP # PRDP20175123), while trucking would remain as a daytime operation.

- Hours for Operating:
 - 24 Hours a Day; Monday through Friday
 - 7am to 5pm on Saturday
 - No activities on Sundays or Statutory Holidays
- Hours for Hauling:
 - 6:00 am to 7:00 pm Monday through Saturday
 - No activities on Sundays or Statutory Holidays

Policy #5

BURNCO will follow the hours of operation as determined by Rocky View County as part of the Development Permit process.

3.3 Development Phasing

As there is an existing operation in NW 13-26-05 W5M, the infrastructure necessary for the operation of a gravel pit on these lands is already in place. This includes items such as a designated haul route and upgraded intersection, scale, water licenses to source water, and screening berms. Over time, and as the project develops, new infrastructure will be required and changes to existing infrastructure are also anticipated. A detailed phasing plan is provided in Appendix 3. The key development strategies associated with that phasing plan are as follows:

Policy #6

BURNCO will follow the development phasing plan as illustrated in the MSDP.

Phases A1 to A7:

- Screening berm already in place for this parcel with small extension to be completed as operations move further east,
- Haul route to remain unchanged (Range Road 51 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing,
- Washing to commence once sufficient space opened up by mining activities. Wash plant to be located in phases A1 and A2,
- Road to Bow River diversion point (in SE13) to be constructed.

"E" phases of site to commence during "B" phases of site. The two sides of the site will utilize independent highway access and due to the presence of the Grande Valley Creek (which BURNCO plans no activities within), the sides will operate largely independently. For the purposes of this report, they are represented below as parallel columns.

West Cochrane Gravel Pit – Master Site Development PlanPhases B8 – B11

- “B” portion of screening berm to be constructed upon commencement of activity in phase B8,
- Haul route to remain unchanged (Range Road 51 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing,
- Washing to commence once sufficient space opened up by mining activities. Wash plant to be located in phase B8.

Phases E22 – E24

- “E” portion of screening berm to be constructed upon commencement of activity in phase E22,
- Traffic Impact Assessment will be undertaken to determine required upgrades for eastern access (Range Road 45 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing.

Phases C12 – C15

- “C” portion of screening berm to be constructed upon commencement of activity in phase C12,
- Haul route to remain unchanged (Range Road 51 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing,
- Wash plant to remain in B8.

Phases F25 – F27

- “F” portion of screening berm to be constructed upon commencement of activity in phase F25,
- Haul route to remain unchanged (Range Road 45 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing.

Phases D16 – D21

- “D” portion of screening berm to be constructed upon commencement of activity in phase D16,
- Haul route to remain unchanged (Range Road 51 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing,
- Wash plant to remain in phase B8.

Phases G28 – G31 + H30

- “G” portion of screening berm to be constructed upon commencement of activity in phase G28,
- “H” portion of screening berm to be constructed upon commencement of activity in phase H30,
- Haul route to remain unchanged (Range Road 45 to Highway 1A),
- Crushing, Earthworks, Loading and Scaling to following mine phasing.

West Cochrane Gravel Pit – Master Site Development Plan

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Reclamation of depleted areas is guided by the available reclamation materials from new mining areas (cut) and the amount of material needed to achieve the final grading plan (fill). Figure 20 illustrates the mine phasing planned at the site based on BURNCO's analysis of the cut/fill balances. The maximum planned disturbance area on the west side as illustrated will be 70 acres at any single time. The maximum planned disturbance area on the east side as illustrated will be 51 acres. These areas were the ones used in analysis of project impacts such as air quality.

West Cochrane Gravel Pit – Master Site Development Plan

BURNCO**3.4 Site Securement, Signage, Buffers**

Project lands will continue to be secured on all property boundaries with farm fencing. All access points to the project lands such as farm approaches will be gated.

Upon issuance of a development permit for these lands, “Danger No Trespassing” signs will be posted every 200 meters along all property boundaries to inform the general public about the presence of open excavations and provide basic site information.



The primary access point to the project will have lockable steel gates comprised of two 16-foot gates hung on large steel corner posts. Signage will also be provided to identify the site and provide key information. Signs will be 4 feet by 8 feet and mounted on one or both sides of the approach.



West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

There will be a minimum three-meter buffer to adjacent property or road allowances. Given the high amount of overburden material available for back-sloping/reclamation purposes no additional extraction setbacks will be required.

Proximity setbacks were also reviewed in relation to utilities. In all cases, BURNCO will secure a proximity agreement with the applicable operators before any activities within 30m of any utility Right-Of-Way. TC Energy operates the east-west pipeline across the project (ROW 467JK), and based on consultation, BURNCO will ensure a 7m development setback from the edge of the Right-Of-Way as well as 3:1 reclamation back sloping for any excavations adjacent to the pipeline.

Policy #7

BURNCO will install site signage. This will include perimeter signage to discourage trespassing as well as entrance signage as necessary to identify the site and provide key information to the public.

Policy #8

Site signage shall include a 24-hour phone number for neighbors to call in the event of questions or concerns.

Policy #9

BURNCO will secure a proximity agreement with the applicable operator before any activities within 30m of any utility Right-Of-Way.

3.5 Noise Assessment and Control

BURNCO intends to minimize the noise of the operation through the following measures:

- The loader back-up alarm systems will be maintained at the minimum dBA levels allowable under Alberta Occupational Health and Safety guidelines. When the equipment is operating during darkness, the noise alarm system is turned off and a strobe light warning system is turned on as an alternative to the warning sounds,
- Access roads will be graded and regularly maintained to reduce traffic noise,
- Each separate main component of the crusher (i.e. the cone, jaw and screen deck) will be enclosed by a sound and dust retarder blanket system. Testing has shown that the sound levels drop significantly from 10-15 dBA with the installation of these blankets,
- Any electrical generating sets will have sound absorbing baffles installed,
- Where feasible highline power will be utilized instead of generators for powering the conveyors, crushers and wash-plant,
- Rubber liners will be used at all conveyor transfer points to reduce the impact noise,
- Where feasible, the use of poly screen decks vs. traditional steel screen decks on the wash-plant to reduce the sound level,
- All equipment associated with the crusher will be regularly maintained to ensure that it is working properly and that no noise other than normal operating noise is emanating from the equipment,
- Use of engine retarder brakes will not be allowed when trucks are in the stockpile area,
- Strategically place product piles to shield the neighboring areas from the operating equipment,
- Construction of screening berms in strategic locations as detailed in Section 3.14.

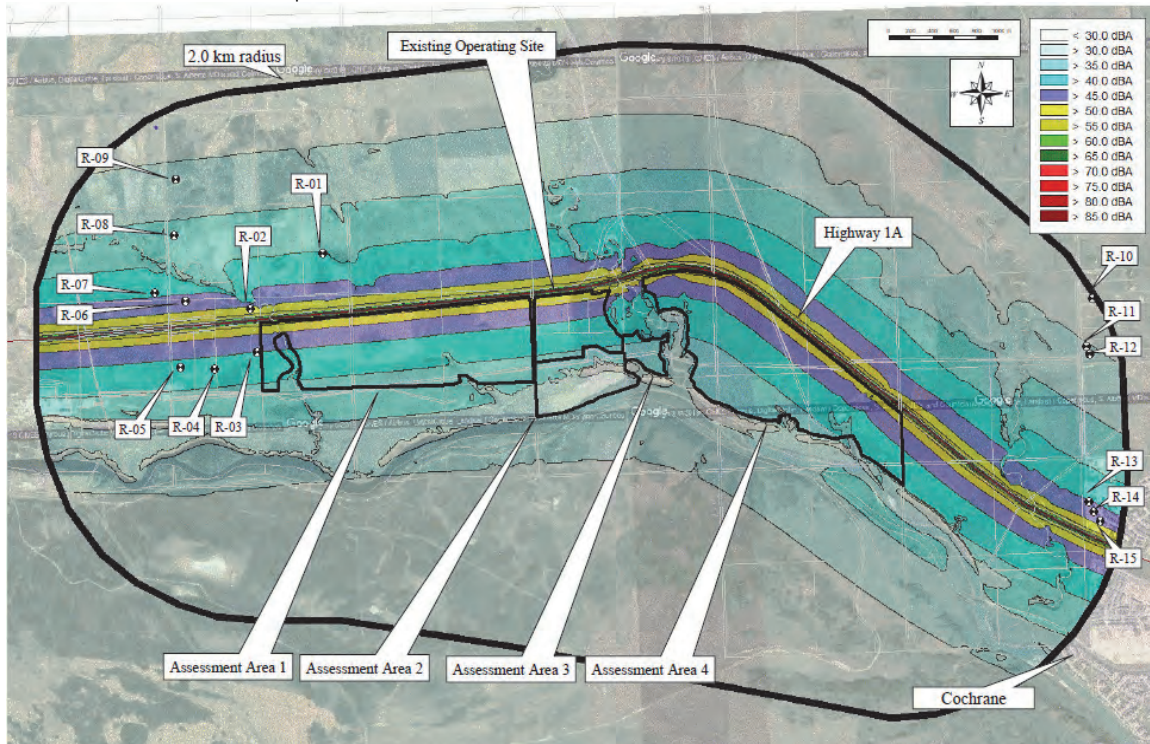
West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

In support of the Project, ACI Acoustical Consultants Inc. (ACI) was retained to complete an Environmental Noise Impact Assessment for the Project. A complete copy of the ACI report is provided as part of BURNCO's Land Use Application. The objectives of this assessment were to evaluate the potential noise impact of the project operations for residential receptors within 2.0km of the project boundaries. As part of the study, noise monitoring was conducted at a receptor location within the study area. In addition, detailed on-site measurements were conducted at an existing BURNCO aggregate site. The information from the noise monitoring, the on-site measurements and detailed operational information provided by BURNCO were used to generate a computer noise model of the study area under existing and future conditions (i.e. with the Project operating). An overview of the results is as follows:

Baseline

A long-term noise monitoring was conducted at two receptor locations within the study area to determine the existing noise climate. Site work was conducted for ACI on May 9, May 15 & May 24, 2018 by P. Froment, B.Sc., B.Ed., P.L.(Eng.). From this, a 24-hour review period (based on meteorological conditions) indicated that the noise climate of the area was dominated by traffic related noise sources (primarily Highway 1A to the north). Results from the long-term noise monitoring were used as a calibration tool to model the projected existing noise climate of the study area.

Figure 21: Baseline Case Leq24 Sound Levels

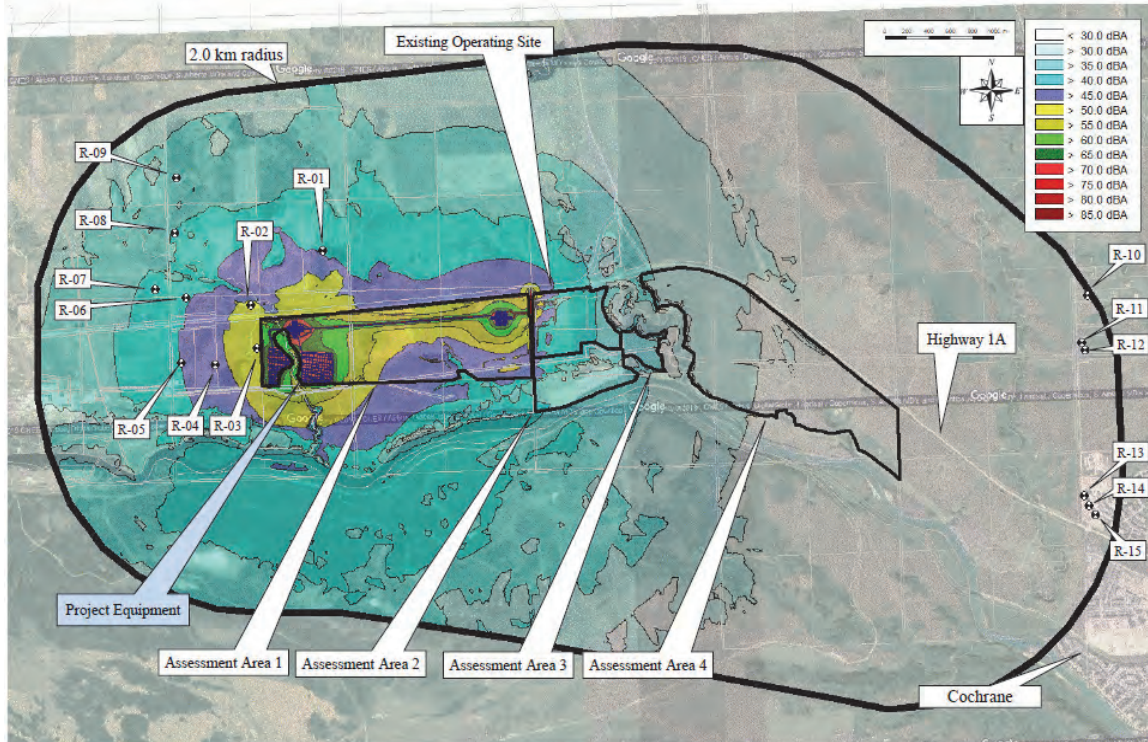
**West Site**

The results of the West Site noise modeling scenario indicated Leq24 sound levels ranging from 19.7 dBA to 51.5 dBA for modeled residential receptor locations within 2.0km of the Project boundaries. The impact of the Project relative to the existing noise climate for receptors within 5.0km of the active project operations ranged from -3.1 to 6.1 dBA. The variance in the impact of the Project was contributed to the relative distance of the receptors to the Project and to Highway 1A, respectively. The relative impact of the Project

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

for all receptor locations ranged from -3.1 to 6.1 dBA. The variance in the impact can be attributed to the relative distance of the receptors to the Project and to Highway 1A, respectively. Therefore, residents that were further from Highway 1A but within proximity to the West Site operations had the highest impact. Subsequently, the noise climate of receptors further than 600m from the active site and south of the project were determined to be minimally impacted by the contributions of the Project.

Figure 22: West Site Operations Leq24 Sound Levels



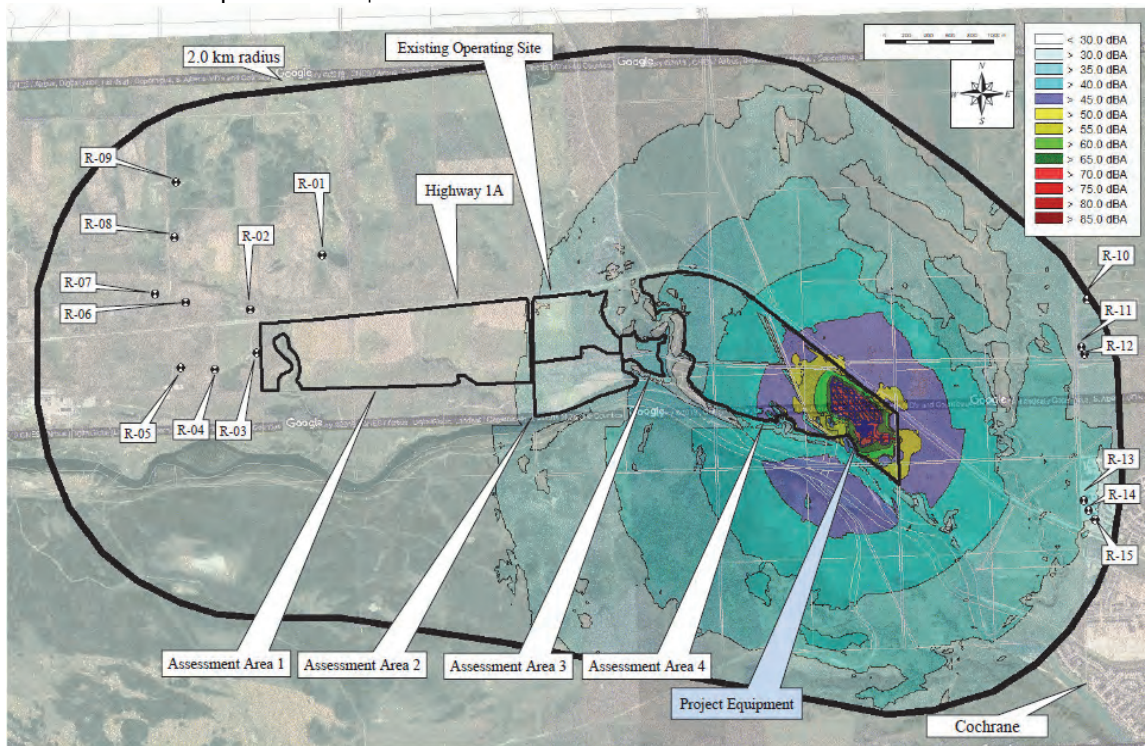
East Site

The results of the East Site noise modeling scenario indicated Leq24 sound levels ranging from 19.1 dBA to 35.9 dBA for modeled residential receptor locations within 2.0km of the Project boundaries. The impact of the Project relative to the existing noise climate for receptors within 5.0km of the active project operations ranged from -13.9 dBA to 6.0 dBA. The variance in the impact of the Project was again contributed to the relative distance of the receptors to the Project and to Highway 1A, respectively. However, it should be noted that the projected noise levels between residential locations within 5.0km of the active project operations had a relatively minimal difference (maximum of 2.8 dBA between the highest and lowest noise levels).

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BURNCO

Figure 23: East Site Operations Leq24 Sound Levels



Based on this modeling, it is BURNCO's belief that the Project will not create an adverse effect related to noise. The noise environment for the area is already heavily influenced by road traffic on Highway 1A. The projected noise increases related to the project are modest.

BURNCO is also committed to monitoring the site as necessary to ensure noise does not become an adverse effect for the area. As required, BURNCO will utilize enhanced mitigation measures. Such enhanced mitigations include:

- Additional noise control,
- Reducing site activities during periods of excessive noise.

With these options in place, BURNCO is confident that noise will not become a nuisance as a result of this development.

Policy #10

BURNCO will follow the noise control measures detailed in the MSDP. In addition, BURNCO will utilize enhanced mitigation measures if necessary, to ensure that noise is reasonably controlled and does not become a nuisance.

3.6 Air Quality Assessment and Control

BURNCO has implemented the following measures to reduce dust generated from the operations:

- A 30km/hour speed limit is enforced in the stockpile area,
- A water truck will be available to water the extraction and processing areas as a means of reducing dust,
- During overburden stripping operations, the dust will be controlled by watering the work area as needed,
- All soil stockpiles will be seeded as soon as possible following construction,
- The disturbance associated with the excavation area will be kept to a minimum by progressively reclaiming mined out cuts thereby reducing the amount of wind borne dust generated from exposed areas,
- Each separate major component of the crusher (i.e., the cone, jaw and screen deck) will be enclosed by a sound and dust retarder blanket system.

In support of the Project, Matrix Solutions Inc. (Matrix) was retained to complete an air quality assessment to identify the potential effects and changes to ambient air quality due to the proposed BURNCO expansion Project near Cochrane, Alberta. A complete copy of the report is provided as part of BURNCO's Land Use Application. An overview of the results is as follows:

The objective of this assessment is to assess the potential effects of the proposed Project on the ambient air quality in the region. The Project emissions interact with existing emissions from other sources in the region; therefore, the assessment considers the effect of nitrogen oxides (NOX), fine particulate matter less than 2.5 µm in diameter (PM2.5), total suspended particulates (TSP), and carbon monoxide (CO) emissions as a result of the Project, in combination with other regional sources.

The Alberta Ambient Air Quality Objectives (AAAQOs) were developed under the Environmental Protection and Enhancement Act (EPEA, R.S.A. 2000) to protect Alberta's air quality (AEP 2019a). The objectives refer specifically to ambient concentrations expressed in units of micrograms per cubic metre (µg/m³) and parts per billion (ppb). The objectives also represent a range of averaging periods that address potential short-term exposure responses (i.e., 1-hour or 24-hour) and/or long-term chronic exposures (i.e., 30-day or annual). The assessment considers both short- and long-term averaging objectives.

Table 5: Alberta Ambient Air Quality Objectives (AAAQOs)

Substances	Averaging Period	AAAQO ^(a) (µg/m ³)
Nitrogen Dioxide (NO ₂)	1-hour	300
	Annual	45
Fine Particulate Matter (PM _{2.5})	24-hour	29
Total Suspended Particulates (TSP)	24-hour	100
	Annual	60 ^(b)
Carbon Monoxide (CO)	1-hour	15,000
	8-hour	6,000

a. AAAQO (AEP 2019a)

b. Calculated using the geometric mean concentration.

Background concentrations represent contributions from sources not included in the modelling (such as naturally occurring sources, nearby non-industrial sources, and unidentified distant sources). Per the requirements of the AQMG, an ambient monitoring background value was determined based on a reduced dataset of the ambient monitoring data.

The background concentrations were estimated using the methodology outlined in the AQMG, using data from two air quality monitoring stations based on the availability of continuous data. The Caroline Station was considered the most representative station for the Project.

Since only NO₂ and PM_{2.5} are monitored at the Caroline Station, monitored CO data were used from the closest station to the Project, Calgary Northwest Station. A full year of data were not available at the Calgary Northwest Station for 2018, so 2017 data were used.

Recent data were not available in the CRAZ or PAMZ monitoring networks for TSP, so PM_{2.5} data were assumed to be representative of this particulate size fraction.

Air dispersion models provide a scientific means of relating air emissions to ground level pollutant concentrations at receptors by using complex mathematical equations that simulate transportation, dispersion, chemical transformation, and deposition processes.

The California Puff Dispersion Model (CALPUFF) is a non-steady-state puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation, and removal. The CALPUFF model is approved by the AQMG for refined assessments with potential long range (>200 km) impacts. For this assessment the CALPUFF model (version 7.2.1) was used in accordance with the AQMG to determine air quality changes for the Baseline Case, Project Case, and Application Case.

The assessment considers the contribution of existing and approved industrial sources within the Study Area (50 km × 50 km). These sources include major facilities in the Study Area, as well as smaller facilities and sand/gravel pits.

Emission information for existing and approved sources was obtained from an internal database of known emission sources including AEP and Alberta Energy Regulator licence information, approvals, and permits, and recent air quality assessments undertaken in the region. This database is routinely updated as new applications and licenses become available. Existing and approved sources included in the Study Area were identified by searching this database for facilities within the Study Area. In addition to the Matrix database, the IHS Markit database was also reviewed for additional facilities that are likely to have an impact on cumulative air quality in the Study Area (gas plants and processing facilities, sand/gravel pits, etc.).

The operation of the Project will result in emissions of NO_x, PM_{2.5}, TSP, and CO from electrical generators, dirt work, crush plant operations, wash plant operations, gravel mining, and sales activity.

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Project Emissions have been modelled to capture the anticipated worst-case subsection of proposed mining areas as well as the worst-case subsection of operation. The worst-case subsection of proposed mining areas placed crushing operations at the eastern and westernmost extents of the project area. These locations were chosen as they placed operations in the closest proximity to existing residents, the Air Assessment Boundary and the Town of Cochrane. The intent of this approach was to estimate the air quality experienced by those receptors during the worst-case of emissions from a location perspective. From an operations perspective, modelling assumes that all activity types from both Assessment Areas 1 and 4 are occurring simultaneously. This is not possible in practice and is, again, meant to model the worst-case emissions from this proposed development.

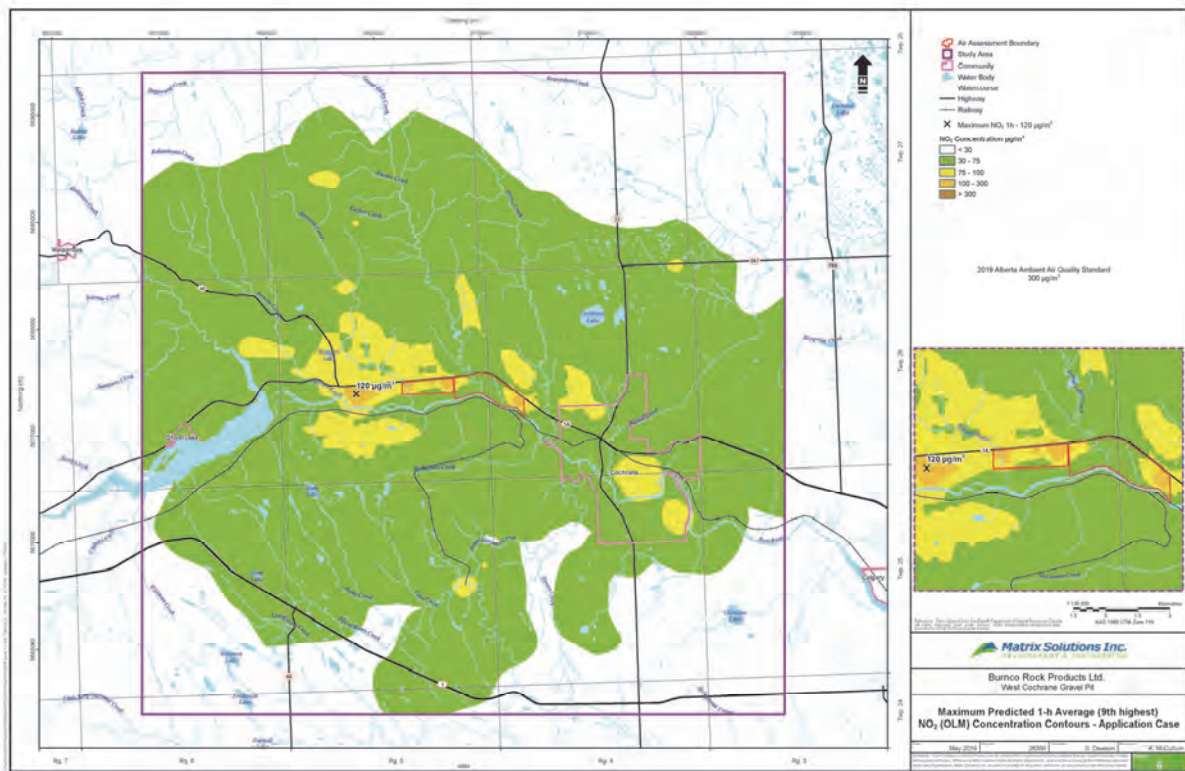
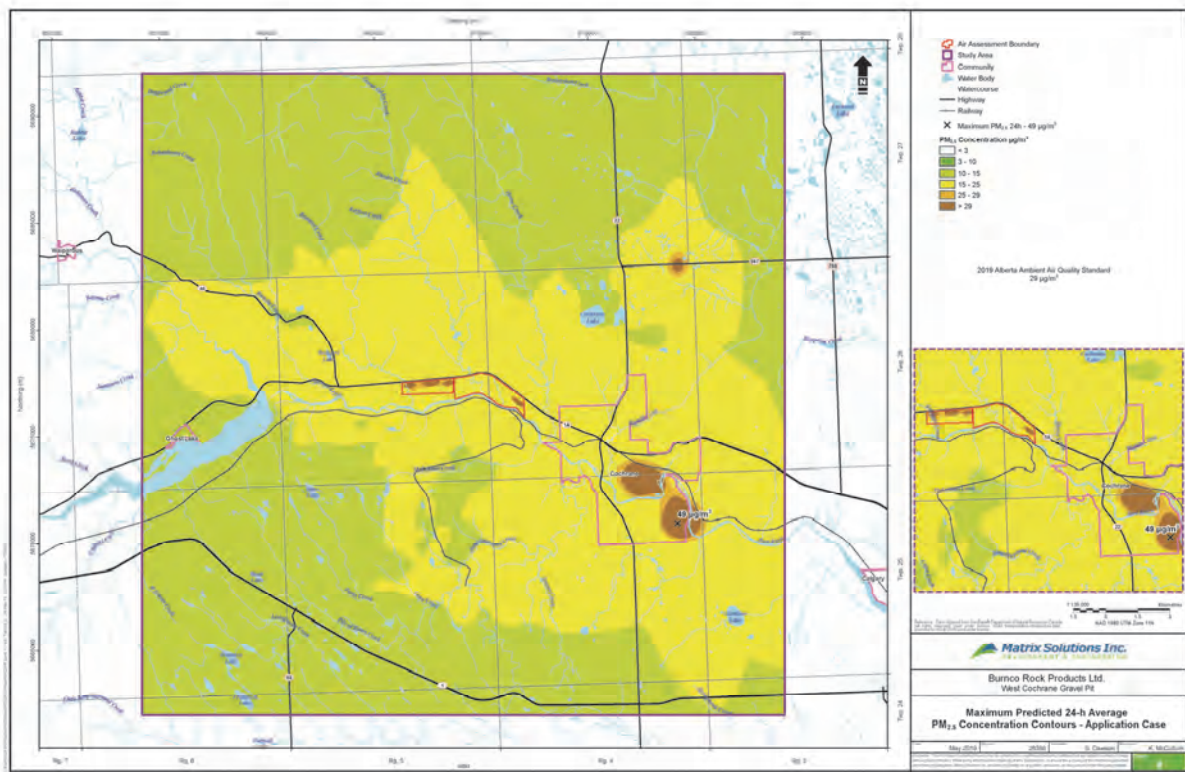
The facility was divided into the following general activities, with each activity having its own sources emitting the substances of concern:

- Crushing Plant,
- Wash Plant,
- Hauling Operations,
- Earthmoving.

The following standard BURNCO mitigations were then incorporated into the model:

- Crusher enclosures,
- Water spray bars,
- Dust control on haul roads and at Plant,
- Progressive reclamation,
- Berms and separation of operations from receptors.

The modeled concentrations provided in the report were as follows:

West Cochrane Gravel Pit – Master Site Development PlanFigure 24: Maximum Predicted 1-hr Average CO₂ ConcentrationFigure 25: Maximum Predicted 24-hr PM_{2.5} Concentration

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Figure 26: Maximum Predicted 24-hr TSP Concentration

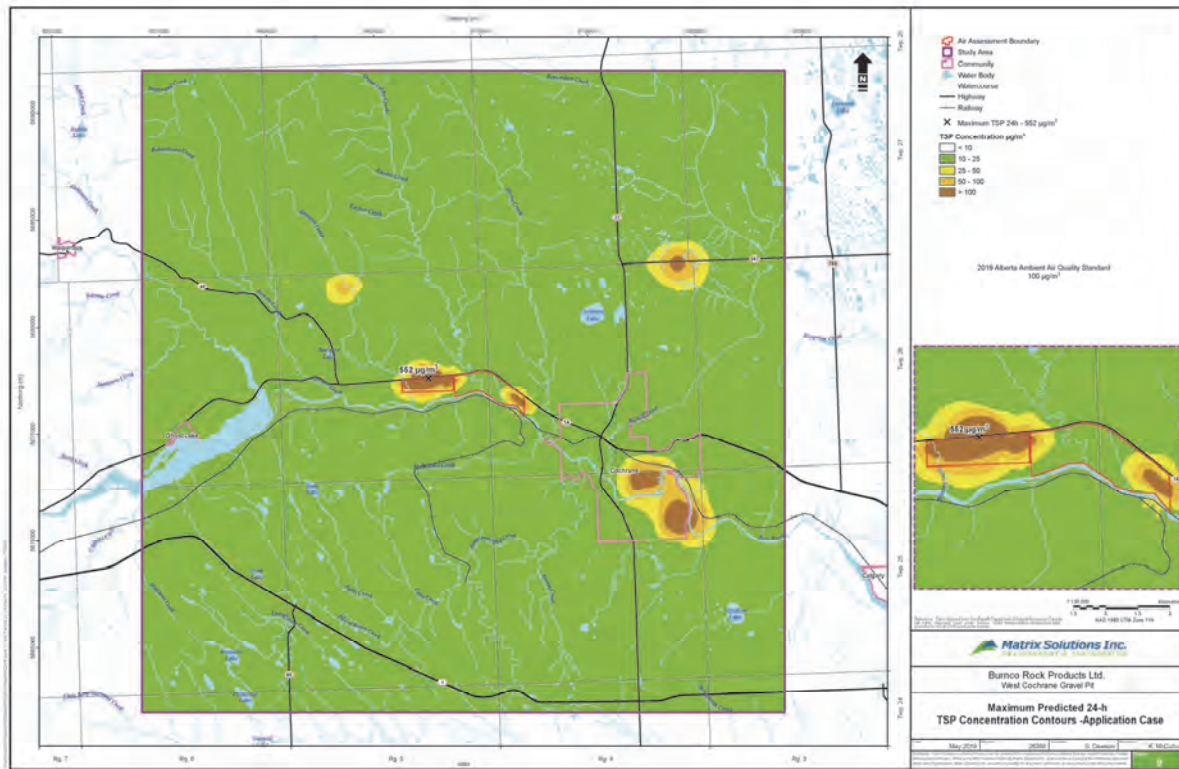
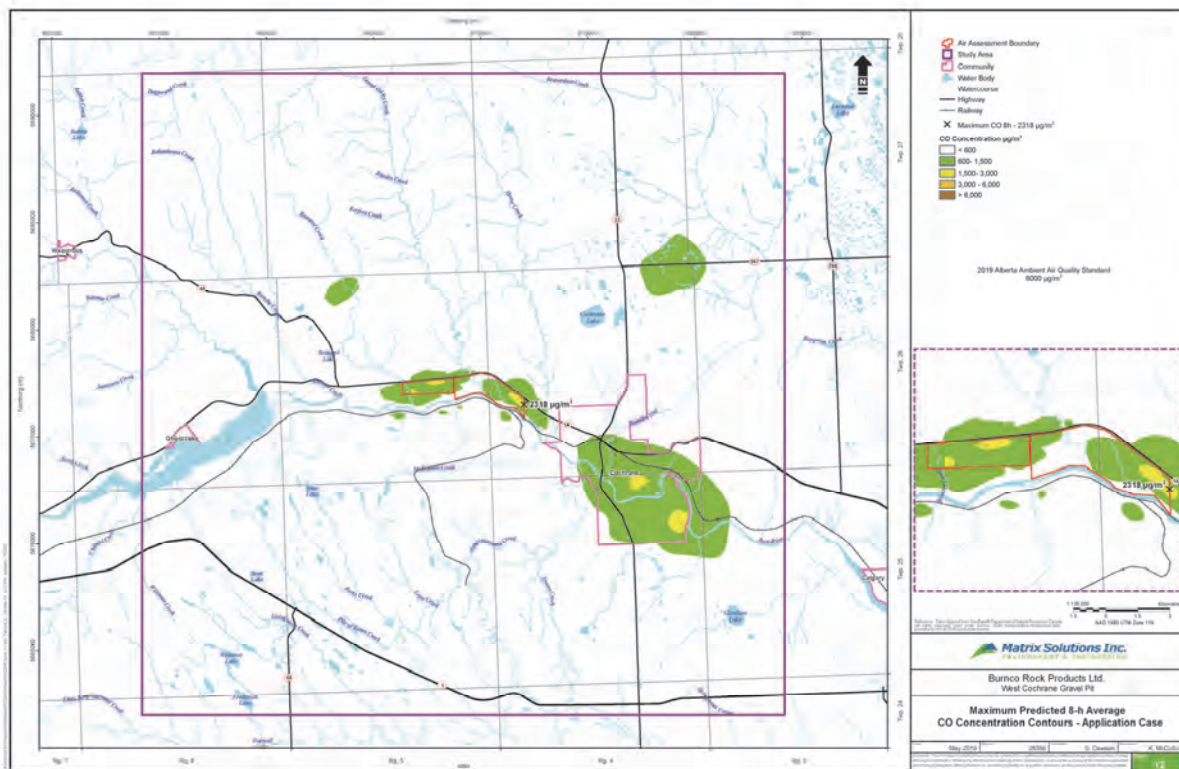


Figure 27: Maximum Predicted 8-hr Average CO Concentration



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The report concluded as follows:

The air assessment identified that emissions of NO₂, PM_{2.5}, TSP, and CO will be emitted from the Project site. Predicted results of the dispersion modelling show that maximum ground level NO₂, PM_{2.5}, and CO concentrations due to the Project Case will be below the applicable AAAQOs at the Air Assessment Boundary and beyond. In addition, the results from the Application Case and Baseline Case also show that the maximum ground level concentrations of NO₂ and CO will be below the applicable AAAQOs.

While the results predict exceedances of PM_{2.5} in the Application and Baseline Cases, the maximum values are 8.7 km from the Air Assessment Boundary and are attributed to existing emission sources and not the Project.

Predicted maximum ground level concentrations of TSP from the Project, Baseline, and Application Cases are above the applicable objectives (Figures 11 and 12). The actual impacts are expected to be below these predictions given the highly conservative assumptions used in the modelling, such as using 24 hours per day operations, simultaneously modelling Assessment Areas 1 and 4, and assuming the entire area of each Assessment Area will be excavated at one time. These conservative assumptions are primarily affecting emissions of particulate matter which have impacts to air quality that are local, short-term (will cease when operations are not occurring), and reversible when operations end. Impacts due to operations are considered very intermittent and conservative estimates were applied to operations and emissions which ultimately over-predicted worst-case potential of particulate impacts.

There is higher confidence in emissions estimated from combustion sources, such as the generators and vehicle emissions, as the combustion product emissions associated with fuel are well understood. There are higher uncertainties for emissions associated with dust generation such as earth movement, transport of materials, processing, and stock piling. As such, the probability of predictions at the boundary is higher for short-term durations, not as high for annual averages, and not for the entire duration of operations, whereas during most of the operations, mitigated measures will be monitored and used to reduce the surface dust generated.

Given the results of the modelling, and the conservative assumptions used, the operations for the BURNCO Assessment Area 4 operations and Assessment Area 1 operations are not expected to compromise the far field air quality in the area.

Based on this modeling, it is BURNCO's belief that the Project will not create an adverse effect related to air quality. While the air quality assessment does indicate the possibility of exceeding the Alberta ambient air quality objectives (AAQO's) for TPM, it is also important to note that this exceedance is predicted to extend no more than 100 meters beyond the property line. Additionally, the predicted concentrations are calculated using worst-case and highest intensity site operation conditions and are anticipated to only be encountered under extremely infrequent site operating conditions.

BURNCO is also committed to monitoring the site as necessary to ensure air for the area is not adversely affected. As required to meet Alberta ambient air quality objectives, BURNCO will utilize enhanced mitigation measures.

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Such enhanced mitigations include:

- Additional dust control (sprinklers, more frequent water truck use, and dust suppressants),
- Reducing site activities during periods of poor air quality,
- Paving of the access road up to and including the scale facility,
- Additional vegetation planting around receptors.

With these enhanced mitigation options in place and significant time to monitor impacts as the site develops over 30 to 35 years of operation, BURNCO is confident that this development can be successfully operated to ensure compliance with Alberta ambient air quality objectives.

Policy #11

BURNCO will follow the dust control measures detailed in the MSDP. In addition, BURNCO will utilize enhanced mitigation measure if necessary, to ensure that dust is reasonably controlled and does not become a nuisance.

Policy #12

Operations at the pit will be compliant with the Alberta Ambient Air Quality Objectives (AAAQO).

3.7 Environmental Monitoring & Complaint Resolution

At the present time, the existing gravel pit in NW13 is more than 1,700m from the nearest occupied residence. This will be the case for many years to come. As such, no permanent monitoring stations for either noise, dust, or other emissions are envisioned for the site at this time. Instead, monitoring will be conducted on an as-required basis.

In future, BURNCO will employee full time monitoring for noise when gravel pit operations during periods when both night time operations are occurring, and operations are within 400m of an occupied residence. Full time monitoring for dust will occur when gravel pit operations are within 400m of an occupied residence.

At all times, the following protocol shall be employed in the case of noise or dust complaints received by BURNCO from nearby residents:

- BURNCO will investigate the complaint,
- BURNCO will make reasonable steps to address the complaint if it is determined that the site is the source of the complaint,
- In all instances, BURNCO will respond to the complainant within 24 hrs. This response will include the results of BURNCO's investigation, and any actions taken. This response will be provided in writing.

Policy #13

BURNCO will provide full time noise monitoring during periods when both night time operations are occurring, and operations are within 400m of an occupied residence. Full time monitoring for dust will occur when gravel pit operations are within 400m of an occupied residence.

Policy #14

BURNCO will follow the complaint response protocol provided in the MSDP related to noise and dust complaints.

3.8 Groundwater Assessment and Security

3.8.1 Groundwater Assessment

As discussed in Section 2.6, Matrix Solutions Inc. (Matrix) was retained to complete a Groundwater Impact Assessment. The objectives for this assessment were to describe the hydrogeology and groundwater resources within the Project Area and to evaluate the potential effects on groundwater that may be caused by the proposed gravel pit. A complete copy of the report is provided as part of BURNCO's Land Use Application. An overview of the results is as follows:

To meet the hydrogeological requirements as outlined in the Code of Practice for Pits (AENV 2004). Matrix undertook the following tasks in this assessment:

- *reviewing geological and hydrogeological data to identify and characterize local and regional geology and develop a hydrogeological framework for the site*
- *reviewing all existing water wells data within a 5 km radius of the site*
- *reviewing all existing groundwater and surface water allocations within a 5 km radius of the site*
- *assessing the site hydrogeological conditions including hydraulic conductivity, recharge/discharge conditions, depth to water level, baseline groundwater conditions, and flow direction in the aggregates deposit*
- *assessing potential impact of the gravel mining operations on groundwater resources*
- *assess potential effects from dewatering during operations in accordance with the Alberta Environment Guide to Groundwater Authorization (AENV 2011)*

A search of well information from AEP water well database (AEP 2018a) was completed on October 18, 2018 and March 21, 2019. The search identified 203 records within a 5 km radius of 18-026-04 W5M and 1.6 km radius of N-15-026-05 W5M (Table 6a, Figure 6). These include 179 water wells, 4 flowing shot holes, and 2 springs. The wells ranged in depth from 6.10 to 260.00 m bgs and the majority of the wells are listed for domestic and stock use. Based on the listed completion information and associated depth to bedrock for the water wells, 166 out of the 179 wells are interpreted to be completed in the bedrock and 3 wells (GIC 2079054, 386523, and 386518; water well numbers 8, 11, and 144; Table 6a) are interpreted to be completed in sand and gravel. The groundwater wells interpreted to be completed in the sand and gravel are located greater than 735 m to the north and west of the west end of the site and are listed as domestic and stock use.

The records for the remaining 13 wells did not include adequate information to determine the depth to bedrock.

A field-verified survey (FVS) was conducted between June 18, 2018, and May 28 to September 16, 2019, to supplement the FVS that was conducted by Levelton in 2014 (Appendix A) and BURNCO in 2016. The FVS aimed to obtain baseline information about local water users and to establish their proximity to the site. A questionnaire modified from

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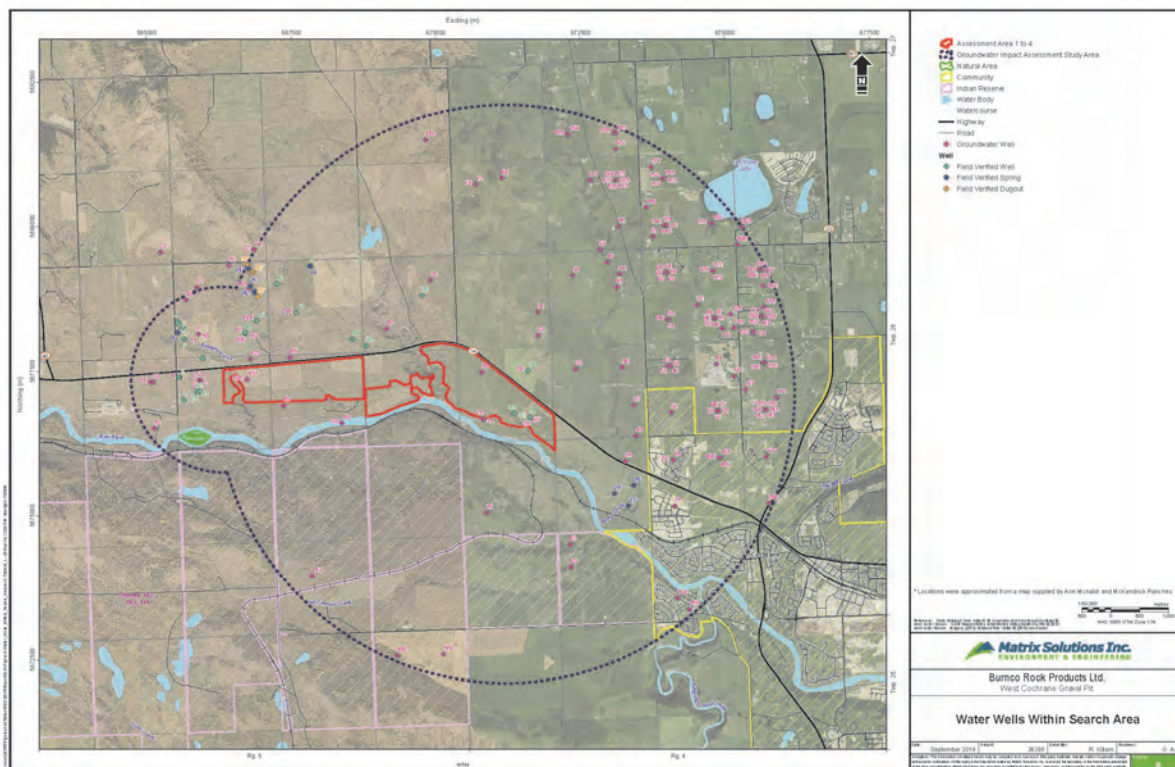
the Alberta Environment Guide to Groundwater Authorization (AENV 2011) was used to conduct an interview with the landowners.

A search of well and landowner information from Alberta Environment and Parks (AEP) and AbaData™ (Abacus 2018) within a 1.6 km radius of 18-026-04 W5M and N-15-026-05 W5M was conducted to identify residential wells. A review of the county maps and an open house meeting held by BURNCO was used to identify and contact landowners via telephone. At the discretion of the landowners, the surveys were conducted in person at the property, or over the telephone.

The field verification survey included the following:

- *contacting all well owners to arrange for access the wells*
- *collecting GPS coordinates of the wells*
- *leaving a site visit letter at the property if the landowner was not present at the residence*

Figure 28: Area Water Resources



Matrix installed six monitoring wells across the property between July 23 and August 30, 2018, with the existing 12 monitoring wells (Appendix A) west of Grand Valley Creek (Figure 5), resulting in an 18 monitoring well network to characterize site geology and hydrogeology.

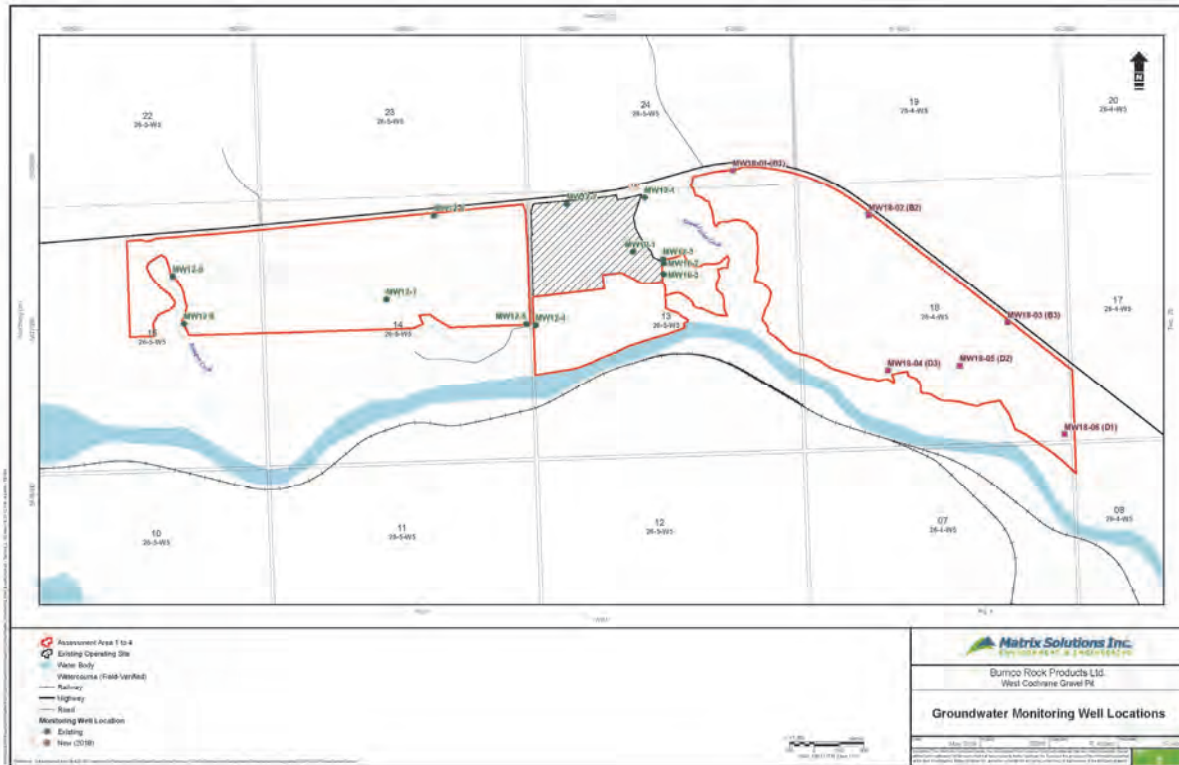
Matrix manually measured depths to groundwater on November 7, 2018 and are included in Table A. Water levels recorded in pressure transducers installed in the monitoring wells were reviewed and compensated for atmospheric conditions. A total of 11 hydrographs were created based on available and usable data from August 28, 2015 to November 7, 2018.

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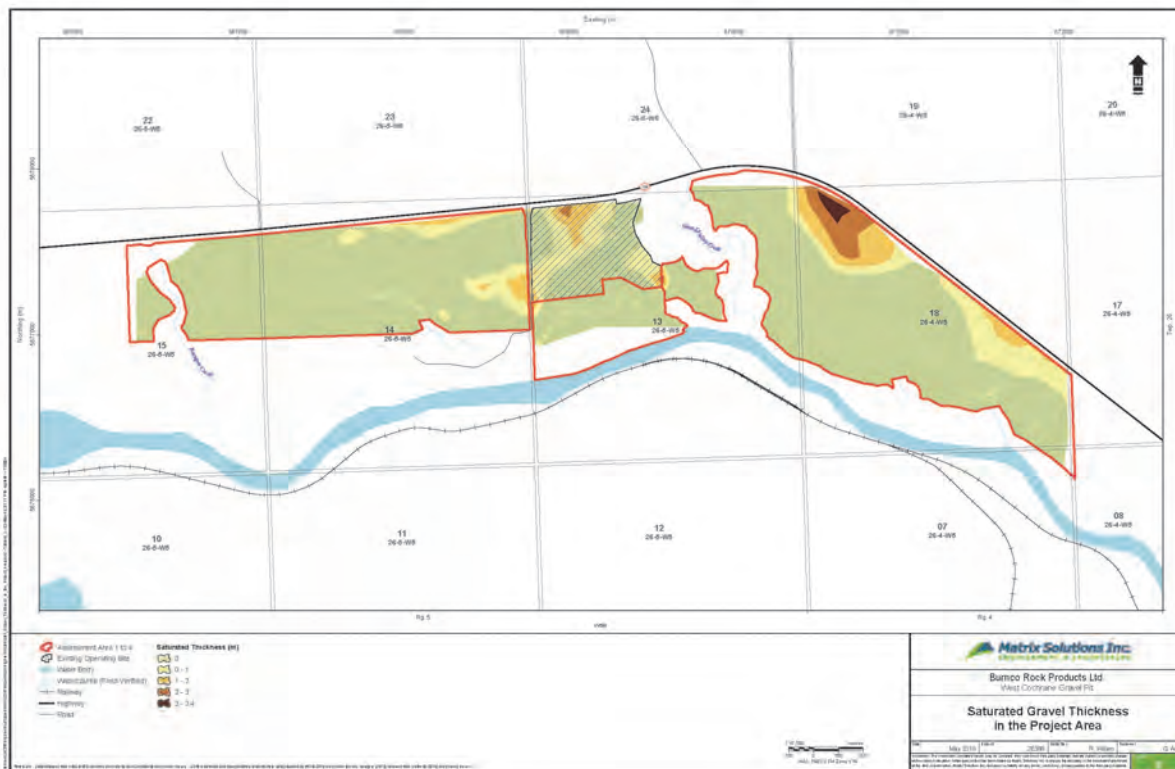
A saturated gravel thickness contour map was generated using water elevation data and the base of sand and gravel surface supplied by BURNCO. The gravels were fully saturated in the northeast portion of the study area near MW18-02 (B2) and were less saturated to the west, ranging from 0 to 3 m.

Figure 29: BURNCO Monitoring Well Locations



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Figure 30: Saturated Thickness Map

**Policy #15**

BURNCO will monitor water levels in the network of 18 monitoring wells spread across the project. Continuous monitoring will occur in no less than 6 wells. Continuous monitoring will be done in wells situated between active operations and adjacent landowners as well as in accordance with direction from Alberta Environment & Parks.

3.8.2 Dewatering Activities

This work determined that within the proposed gravel pit, some of the gravel is below the water table. In order to recover these resources, BURNCO will dewater these zones to allow for mining. In support of this requirement Matrix examined the volume of water necessary for dewatering the zones of saturated gravel. This volume was examined in combination with necessary stormwater handling on the site and is provided as part of the Stormwater and Drainage Management Plan found in BURNCO's Land Use Application.

The proposed stormwater drainage management plan for the project accounts for stormwater runoff from the mining areas as well as expected groundwater inflows to mining operations. This report provides sizing and location concepts based on current mine planning.

All stormwater runoff from mining areas will be collected in dewatering excavation pits located within the mining area and will be pumped to dedicated recharge ponds located a sufficient distance away to allow for groundwater infiltration. Groundwater inflows to mining areas will also be collected in the dewatering excavation pits and pumped to the recharge ponds. The recharge ponds will be sized to accommodate stormwater runoff

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volumes from a 1:10-year, 24-hour design storm event plus pit water that would be pumped from the dewatering excavation.

The mining scenario west of Grand Valley Creek assumes a contributing runoff area of 25 ha (equivalent to the size of the two largest two adjoining phases on the west side + 10%) and a maximum saturated depth of 2 m (equivalent to the highest saturated depth in any mine phase on the west side of Grand Valley Creek and therefore the highest possible groundwater inflow rate in the western portion of the site). This scenario was analyzed using PCSWMM with one 150-mm (6-inch) pump (maximum rate of 0.032 m³/s, giving a maximum daily diversion rate of 2,765 m³/day).

The mining scenario east of Grand Valley Creek assumes a contributing runoff area of 30 ha (equivalent to the size of the two largest two adjoining phases on the east side + 10%) and a maximum saturated depth of 3 m (equivalent to the highest saturated depth in any mine phase on the east side of Grand Valley Creek and therefore the highest possible groundwater inflow rate in the eastern portion of the site). This scenario was analyzed using PCSWMM with one 6" pump (maximum rate of 0.032 m³/s, giving a maximum daily diversion rate of 2,765 m³/day).

These results provide the expected maximum diversion rates assuming that the initial dewatering as well as six months of ongoing dewatering would occur in the same year, based on the expected maximum groundwater inflow rates.

Table 6: Maximum Annual Groundwater Diversion Volume

Pond	Maximum Annual Groundwater Diversion Volume (m ³)		
	During Initial Dewatering Phase	During Ongoing Mining (Assuming 6 months of dewatering)	Total
West Recharge Pond	164,900	123,100	288,000
East Recharge Pond	354,000	233,900	587,900

The model results indicate that the east recharge pond has sufficient capacity at 95 m x 95 m to handle these initial dewatering flows at a 1.0 m depth; however, the west recharge pond at 90 m x 90 m would require a design depth of 1.5 m to handle the initial dewatering flows from the pits.

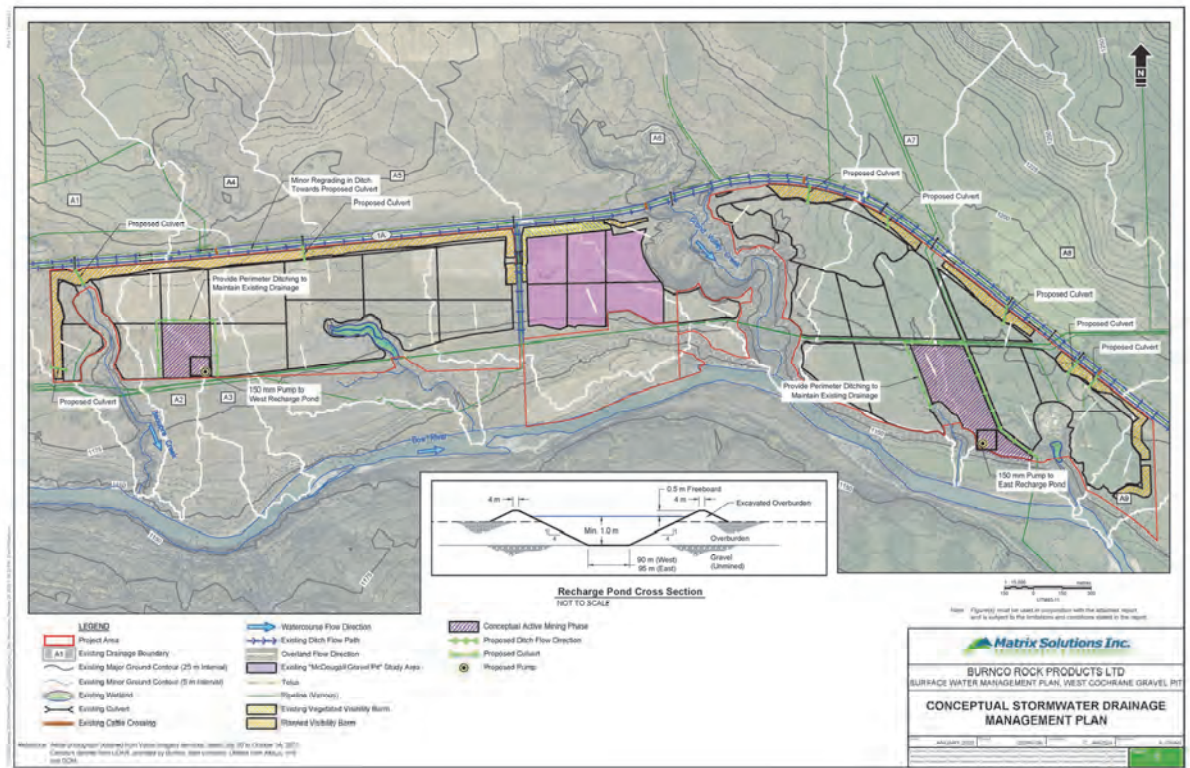
Table 7: Recharge Pond Design

Recharge Pond	Minimum Pond Base Area (m ²)	Minimum Base Width (Assuming Square Geometry) (m)	Pond Depth (m)
West Recharge Pond	8,100	90	1.5
East Recharge Pond	9,025	95	1.0

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Figure 31: Drainage Management Plan (Recharge Ponds Locations)

**3.8.3 Groundwater Conclusions**

The majority of the site is expected to have little or no groundwater. Many of the drill holes completed by BURNCO were dry. The saturated gravel thickness map shows that areas with groundwater are limited. Further, that these areas are expected to be a significant distance from nearby water users. The evaluations by Matrix concluded as follows:

Due to the generally low saturation and shallow water table (near the base of the gravel), dewatering at site may be limited. Water well records also indicate that the wells in the vicinity of the site are completed in bedrock aquifers at various depths. Dewatering of the saturated gravels at site is not expected to impact users in the area. A bailing strategy for resource removal will likely result in higher total suspended solids compared to dewatering. Potential environmental impacts can be eliminated or minimized with engineering controls implemented at construction and as part of ongoing operations.

Potential impacts of future aggregate operations on nearby groundwater and surface water diversions are expected to be minimal with best management practices.

Finally, hydraulic connectivity of the groundwater table present in the base of the gravel deposit will be maintained by providing layer of aggregate at the base of the excavation and above the bedrock. This layer is illustrated on the cross sections in Appendix 3.

3.8.4 Groundwater Security

Diverting groundwater may require a Water Act approval from Alberta Environment and Parks. BURNCO will secure any necessary authorizations prior to proceeding with this activity.

Should any nearby water well users indicate to BURNCO that they believe their water supply has been negatively impacted due to the gravel mining operation, BURNCO will do the following:

- Provide a temporary alternate water supply within 24 hours if a resident is without water,
- Hire an outside consultant within 14 days to determine the cause of the problem,
- Provide a permanent alternate water supply if the problem is at least partially due to BURNCO's mining operation.

Policy #16

BURNCO will secure Water Act approvals as necessary from Alberta Environment & Parks related to dewatering, bailing, or any other activities in the groundwater table before commencing such operations.

Policy #17

BURNCO will complete a baseline monitoring program for any residential water well located within 400m of the project boundary if requested by the owner.

Policy #18

BURNCO will follow the complaint protocol provided in the MSDP related to groundwater security.

3.8.5 Existing Water Licenses & Approvals

BURNCO currently has two water licenses for the diversion of water from the Bow River. The diversion for these licenses will be located in SE 13-26-5 W5M and will provide a source of water for gravel washing and dust control. BURNCO also holds a Water Act approval which allows for excavation of gravel from within the groundwater table in NW 13. Copies of these licenses are provided as part of BURNCO's Land Use Application.

- License No. 00396954-00-00 44 acre-feet (55,507 m³)
- License No. 00396952-00-00 67 acre-feet (83,260 m³)
- Approval No. 00430788-00-00 Aggregate Extraction Below Water Table

Policy #19

BURNCO will secure Water Act approvals as necessary from Alberta Environment & Parks related to gravel washing before commencing such operations.

3.9 Traffic Impact Assessment and Control

BURNCO expects to continue utilizing the current haul route out of NW 13-26-05 W5M (Range Road 51 to Highway 1A) for the duration of the site activities. This access will be utilized for all activities west of Grande Valley Creek. This includes phases A1-A7, B8-B11, C12-C15, and D16-D21.

Policy #20

BURNCO will continue to utilize the upgraded intersection at Range Road 51 and Highway 1A for all activities west of Grade Valley Creek (phases A1-A7, B8-B11, C12-C15, and D16-D21).

BURNCO is not proposing any activities within Grande Valley Creek. As a result, the operations east of Grande Valley Creek will be operated independently of those operations west of the Creek. A new access for these operations will be developed out of SE 18-26-04 W5M (Range Road 45 to Highway 1A). This access will be utilized for all activities east of Grande Valley Creek. This includes phases E22-E24, F25-F27, G28-G31, and H30.

Policy #21

In future, BURNCO will develop an upgraded intersection at Range Road 45 and Highway 1A for all activities east of Grade Valley Creek (phases E22-E24, F25-F27, G28-G31, and H30). This upgrade will be built to the standard required by Rocky View County and Alberta Transportation.

Policy #22

No aggregate operations shall occur within the MSDP area without approval of a Roadside Development Permit from Alberta Transportation.

Over time, sales are expected to reach 500,000 tonnes per year. This annual volume is the amount already approved at the existing gravel pit in NW13, but is an increase of roughly four times the volumes currently being shipped from the site as it ramps up to full production. This annual amount will utilize the existing access, or, will be split between the existing access and the future access at Range Road 45.

3.9.1 Traffic Impact Assessment

In 2013 a Traffic Impact Assessment (TIA) was submitted by Scheffer Andrew Ltd. on behalf of BURNCO Rock Products Ltd. This TIA was utilized to determine that an upgrade was required at the intersection of Range Road 51 and Highway 1A. The TIA determined that a Type IVb intersection was required to facilitate the development and any additional road usage. After acceptance from Rocky View County and Alberta Transportation (through a Roadside Development Permit), the intersection was upgraded in 2015. A Final Acceptance Certificate (FAC) for this intersection was received by BURNCO in January 2020. A copy of the TIA, FAC, and Roadside Development Permit and is provided as part of BURNCO's Land Use Application.

In support of this application, Scheffer Andrew Ltd. conducted a 2021 review of the 2013 TIA. This technical memo is provided as part of BURNCO's Land Use Application. It concludes:

We have reviewed our 2013 TIA for the site, and the current traffic volumes on Highway 1A as reported by Alberta Transportation. Our review shows that background traffic growth on Highway 1A has been slower than what was assumed in 2013. In addition, BURNCO has confirmed that the maximum number of trips assumed to be generated by the pit development in 2013 are still valid. For these two reasons, the intersection layout, intersection capacity, and intersection lighting warrant calculations from the 2013 TIA are still valid today.

As the development progresses, it is known that the construction of an intersection will be needed at the east side of the property at Range Road 45 to Highway 1A. It is anticipated that this access will be required in 10-15 years. Therefore, a TIA will be undertaken at that time to determine the appropriate upgrades.

3.9.2 Haul Safety

All drivers are required to follow the BURNCO trucking policy to ensure BURNCO safety standards as well as the public's expectations are met. Drivers must always practice responsible driving habits and maintain a good driving record. As with all BURNCO operations, company employees and independent truckers involved in the hauling of aggregate must meet three criteria:

- Safety – only the highest standard of safety is appropriate to safeguard the public, the driver's peers and the driver,
- Legality – all federal, provincial and municipal laws and regulations must be followed as well as BURNCO's own regulations,
- Efficiency – the least time-consuming, safe and legal haul route must be taken.

Each spring, independent truckers wishing to work for BURNCO must register themselves and their vehicles by providing, among other things, proof of proper insurance, registration, vehicle safety inspection, and coverage by the Workers Compensation Board.

Policy #23

BURNCO will follow the protocol provided in the MSDP related to haul safety.

3.9.3 Haul Monitoring

BURNCO participates in the Alberta Sand and Gravel Association (ASGA) truck registry program to help monitor trucks. The registry works in the following manner:

- The truck registry requires all gravel truck operators to display a four-digit number, and the phone number 1-866-901-ASGA (2742),
- If someone feels the truck is not operating in a safe and courteous manner, they can phone the complaint line and register a complaint,
- All complaints received via this number are documented and relayed to the producer (i.e. BURNCO) the truck is registered with.

The producer then follows up on the complaint to ensure it is resolved. With the truck registry, BURNCO is informed of any problems that are occurring on the haul route and can resolve them promptly.

Policy #24

BURNCO will follow the protocol provided in the MSDP related to haul monitoring.

3.10 Storm Water

As discussed in Section 2.5, Matrix Solutions Inc. (Matrix) was retained to complete a Stormwater Management Plan (SMP) for the Project. A complete copy of the Matrix report can be found in BURNCO's Land Use Application. Section 2.5 addressed existing site conditions. The Assessment also included a review of appropriate management measures. The following is the conclusion from the report:

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All stormwater runoff from mining areas will be collected in dewatering excavation pits located within the mining area and will be pumped to dedicated recharge ponds located a sufficient distance away to allow for groundwater infiltration.

Overland flows from upstream sources will be directed around active mining operations using interceptor ditches and/or berms. All flows generated in the upstream catchment areas of Grand Valley Creek and/or Beaupre Creek will continue to pass through the project area.

Adequate setback distances will be maintained from Grand Valley and Beaupre Creek as well as the three unnamed watercourses identified in the study area. Culverts of adequate capacity will be provided through the visibility berm in several locations, including at Beaupre Creek, to convey the 1:100-year design flows. These culverts should be designed to meet Alberta Transportation requirements for highway culvert crossings. The conceptual stormwater drainage management plan, including proposed culvert locations, is shown on Figure 5.

Policy #25

BURNCO will ensure that regional stormwater flows are not impacted. All flows generated in the upstream catchment areas of Grand Valley Creek and/or Beaupre Creek will continue to pass through the project area.

Policy #26

BURNCO will ensure that stormwater from the active mining area is collected and not discharged from the site.

In the final reclaimed condition, the drainage patterns are expected to have minimal impact on the surrounding area, provided the following recommendations are implemented:

- *Because visibility berms will remain in place, the proposed culverts must be adequately sized and adequately maintained to ensure upstream flows can continue to flow through the project area after mining is completed.*
- *To ensure that post-development runoff rates are equal to or less than pre-development runoff rates, bioretention and localized depression storage must be provided as follows:*
 - *The site will not be uniformly graded; local depressions and undulations will be provided to attenuate post-development flows and provide hydraulic grade control.*
 - *The local depressions and undulations are critical in areas A2 and A4, where the onsite drainage areas have increased. Specific volume targets have been provided for these areas in Table 20.*
 - *Bioretention areas will be provided in A6 (6 ha east of Grand Valley Creek and 4 ha west of Grand Valley Creek) to attenuate additional flows both from the project area and the upstream portion of drainage area A7.*
 - *Because of pipeline conflicts, the post-development drainage area A7 has been reduced significantly. There may be some impacts to the existing wetland in area A7 because of this reduction.*

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- Adequate erosion and sediment control measures must be implemented to minimize downstream impacts.

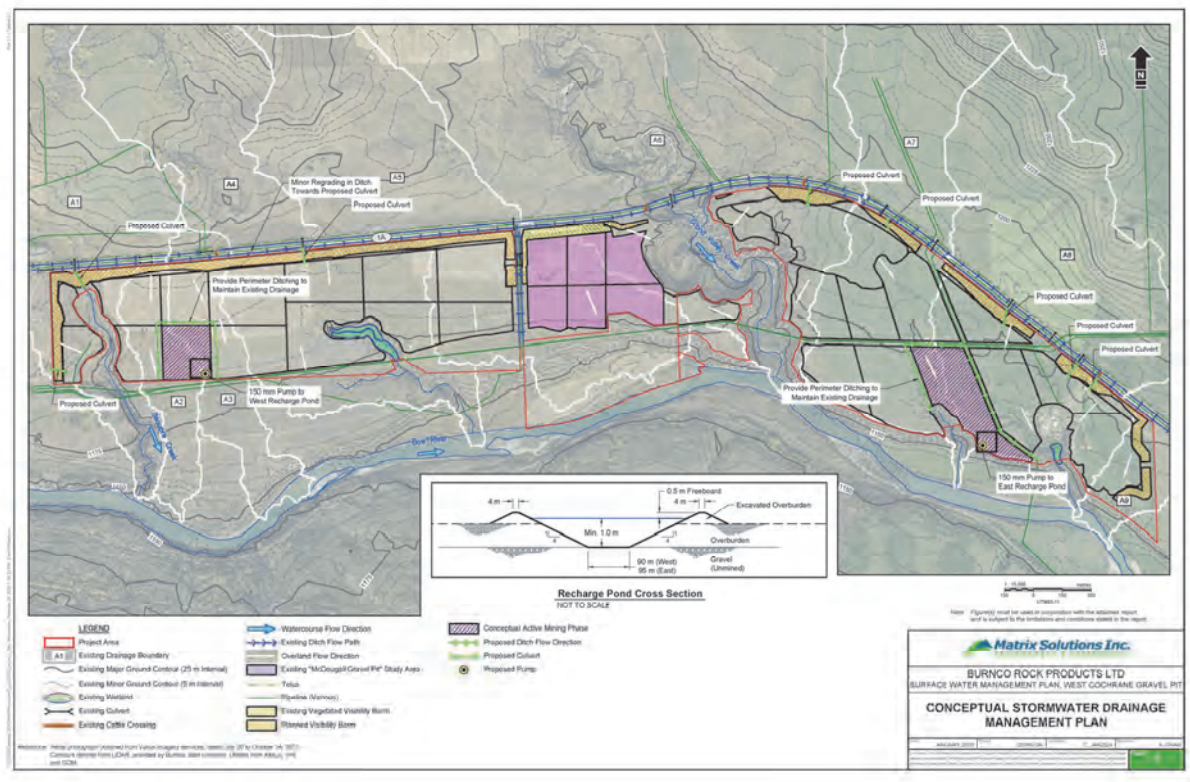
Policy #27

BURNCO will follow the reclamation recommendations in the MSDP related to drainage. This will ensure that the reclaimed site does impact local or regional drainage patterns.

Policy #28

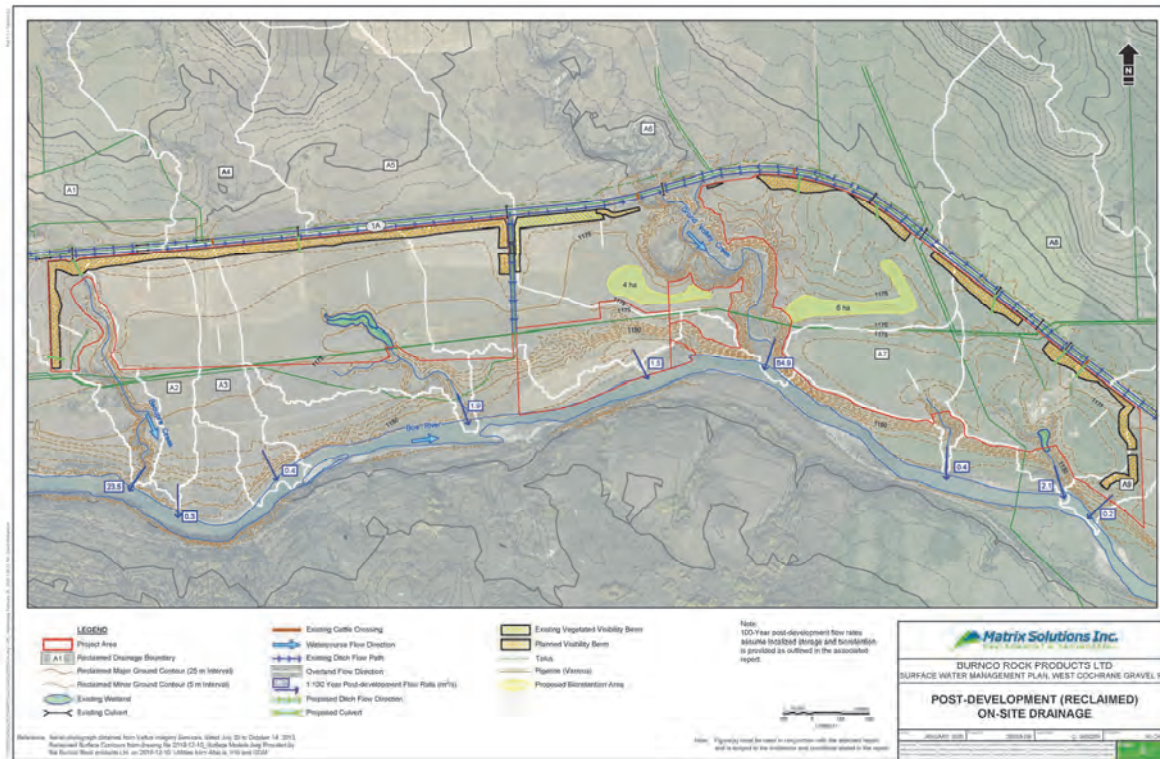
Stormwater will be managed in accordance with the submitted Conceptual Stormwater Management Plan.

Figure 32: Drainage Management Plan (Culvert Locations)



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Figure 33: Post Development Drainage

**3.11 Vegetation and Wildlife Controls**

As discussed in Section 2.2, Matrix Solutions Inc. (Matrix) was retained to complete a Biophysical Impact Assessment (BIA) for the Project area, to assess potential impacts to the biophysical resources and recommend mitigation measures to minimize potential impacts. Section 2.2 addressed existing site conditions. The Assessment also included a review of appropriate mitigation measures which shall be observed during site operations.

Setbacks and Restricted Activity Periods apply to environmentally sensitive resources identified during the field surveys. They are based on federal, provincial, and county regulatory requirements as well as professional judgement. Matrix developed the following in relation to this project:

Policy #29

BURNCO will follow the setback and restricted activity requirements identified in the MSDP in relation to wildlife, wetlands, riparian areas and watercourses.

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Table 8: Table of Setback and Restricted Activity Periods

Environmental Sensitivity	Setback and Restricted Activity Periods	Regulatory Requirement
Red-tailed Hawk Nest	<ul style="list-style-type: none"> 100 m setback (year-round) 	<ul style="list-style-type: none"> <i>Alberta Wildlife Act</i> (setback supports due diligence but is not specifically stated in the Act)
Bald Eagle Nest	<ul style="list-style-type: none"> 1,000 m setback (year-round) 	<ul style="list-style-type: none"> <i>Alberta Wildlife Act</i> (setback supports due diligence but is not specifically stated in the Act)
Amphibian Breeding Ponds ¹	<ul style="list-style-type: none"> 100 m setback from the edge of a breeding pond May require setbacks if activity is in the breeding period (April 1 to July 1) May require setbacks if young are present (setbacks in effect to October 1) 	<ul style="list-style-type: none"> <i>Alberta Wildlife Act</i> (setback supports due diligence but is not specifically stated in the Act) SARA - depending on species identified (setback supports due diligence but is not specifically stated in the Act)
Key Wildlife and Biodiversity Zone	<ul style="list-style-type: none"> RAP = December 15 to April 30 	<ul style="list-style-type: none"> <i>Wildlife Act</i> (RAP supports due diligence but is not specifically stated in the Act)
Migratory Bird	<ul style="list-style-type: none"> RAP = April 15 to August 31 	<ul style="list-style-type: none"> <i>Migratory Birds Convention Act</i> <i>Wildlife Act</i> (RAP supports due diligence but is not specifically stated in the Act)
Wetland Setbacks	<ul style="list-style-type: none"> 6 m (year-round) 	<ul style="list-style-type: none"> <i>Alberta Wetland Policy</i> (setback supports due diligence but is not specifically stated in the Policy) <i>Alberta Water Act</i> (setback supports due diligence but is not specifically stated in the Act)
Riparian Areas	<ul style="list-style-type: none"> 30 m setback 	<ul style="list-style-type: none"> <i>Rocky View Land Use Bylaw</i> <i>Policy 419: Riparian Protection Policy</i>
Watercourses	<ul style="list-style-type: none"> 60 m from Bow River and Grand Valley Creek 30 m from all other watercourses 	<ul style="list-style-type: none"> <i>Code of Practice for Pits</i> <i>Fisheries Act</i> (setback supports due diligence but is not specifically stated in the Act)
Fish and Fish Habitat Setbacks	<ul style="list-style-type: none"> RAP = September 16 to April 15 - within banks (to top of bank) of all watercourses except U-WC2 and U-WC3 (as they do not have defined bed and banks) For U-WC2 and U-WC3 drainage must be maintained and mitigation measures utilized to ensure no sedimentation of the watercourse 	<ul style="list-style-type: none"> <i>Fisheries Act</i> (RAP supports due diligence but is not specifically stated in the Act) <i>Water Act</i>- This RAP is specific to the Class C watercourses

These setbacks and restricted activity periods were applied to the project mapping and provided the following figures:

West Cochrane Gravel Pit – Master Site Development Plan

Figure 34: Applicable Riparian Setbacks

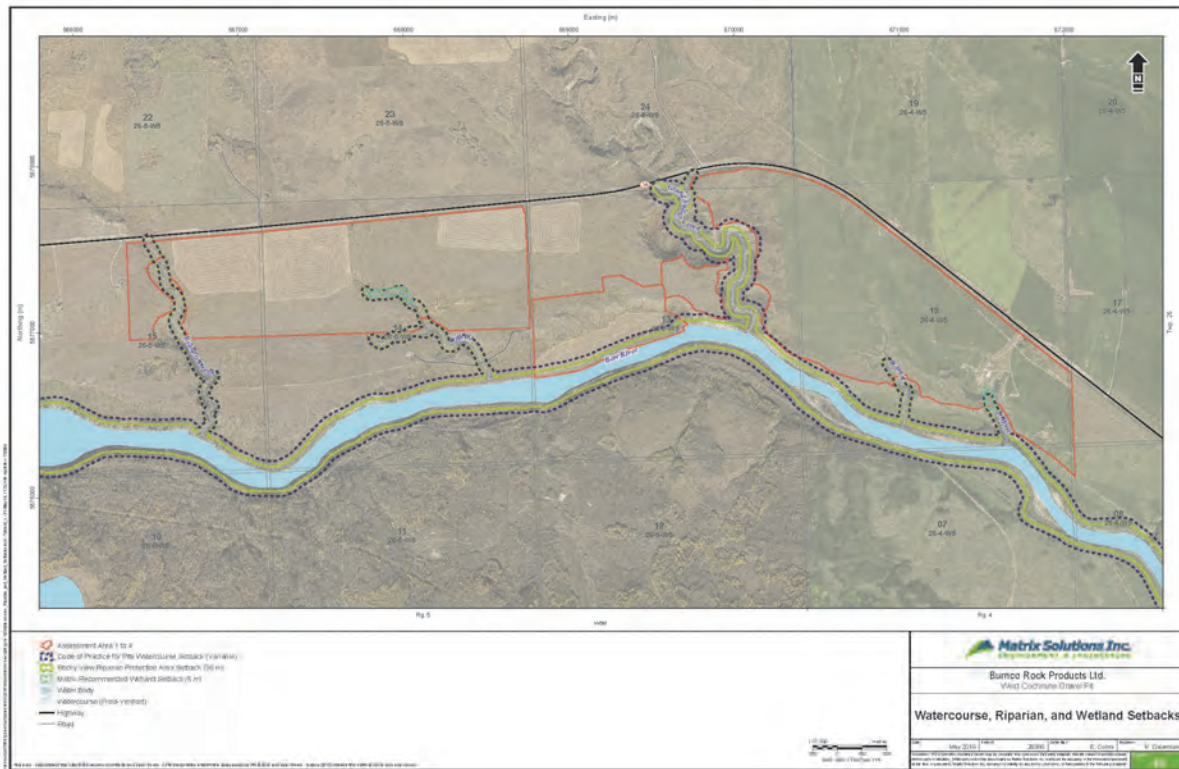
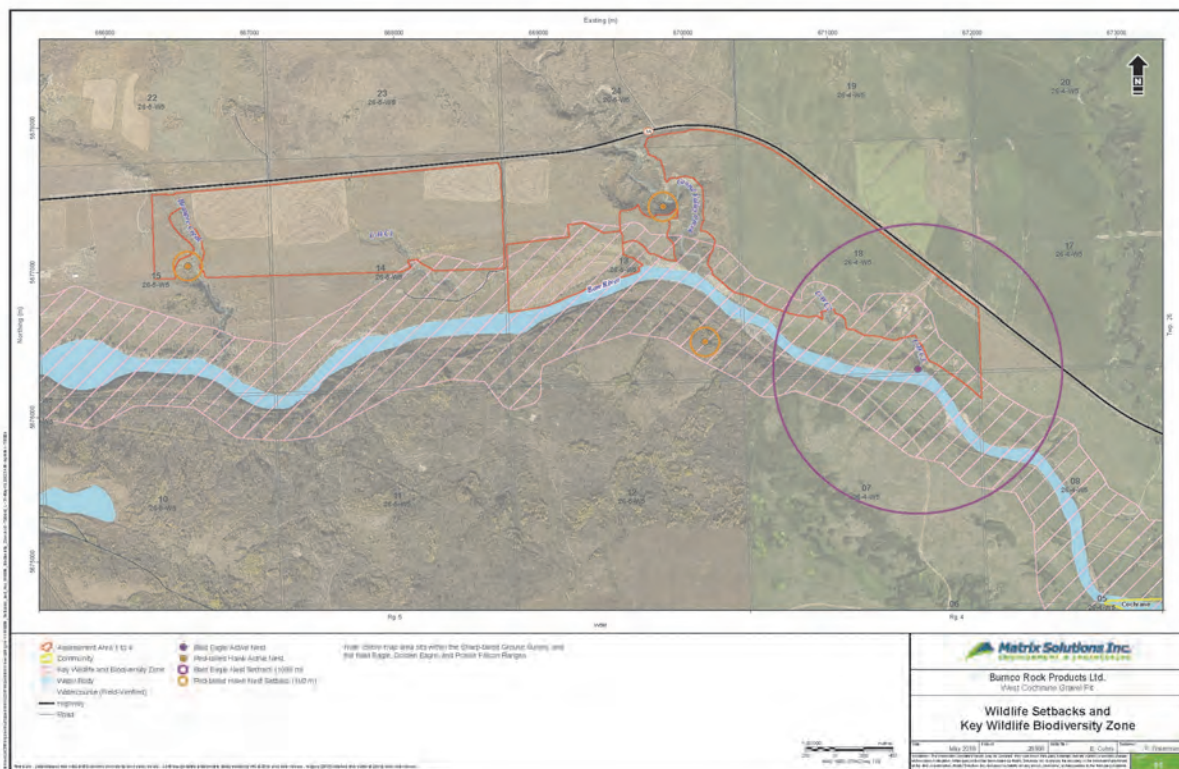


Figure 35: Applicable Wildlife Setbacks



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With the exception of the necessary crossing of Beaupre Creek, the watercourse, riparian, and wetland setbacks were permanently incorporated into the site planning. Disturbance limits were adjusted to ensure these setbacks were met.

A screening berm is planned to be constructed across Beaupre Creek at the northern property boundary. To maintain the existing drainage pattern a culvert will be constructed through the screening berm to convey 1:100-year flows in Beaupre Creek.

BURNCO will seek appropriate authorizations from Alberta Environment and Parks prior to construction of this screening berm to ensure that all necessary mitigations and controls are in place.

Policy #30
BURNCO will secure necessary authorizations from Alberta Environment & Parks related to the berm and vehicle crossing at Beaupre Creek before commencing these developments.

For the wildlife setbacks, the mapping only provides necessary setbacks while the wildlife is present and the noted nesting locations shall be monitored. In particular, the report noted:

The Project is located within the recommended regulatory setbacks for a bald eagle nest (1,000 m), as per the Master Schedule of Standards and Conditions (GoA 2018) and the Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta (ASRD 2011; Figure 11). Bald eagles and their nests are also covered under the Alberta Wildlife Act (Province of Alberta 2018) However, it is noted that due to topography, there is no line of site from the eagle nest to the portion of the Project Area located within 1,000 m of the nest. Additionally, BURNCO does not plan to begin mining on this portion of the site until approximately 2028. Therefore, Matrix recommends that the nest be monitored twice per breeding season to track activity and successful breeding within the nest. If the nest continues to be active and activity is planned to start within the buffer area, additional consultation will be required with AEP.

The Project Area is also located within the recommended setback of 100 m from two active red-tailed hawk nests identified during the 2018 raptor stick nest survey (Figure 11; GoA 2018). Depending on the timing of construction within the nest setbacks, it is recommended that these nests are surveyed for activity prior to construction. If the nests are noted to be active, initial construction of the phases within these setbacks should occur outside of the raptor breeding season (March 15 to August 30) to avoid impacts to breeding wildlife and birds (ESRD 2013).

The report went on to complete an impact assessment and cumulative effect review for the following items:

- Geology,
- Hydrology, Soils and Topography,
- Vegetation and Wetlands,
- Wildlife and Wildlife Habitat,
- Fish and Fish Habitat.

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Mitigation measures are the elimination, reduction or control of the adverse environmental effects of the Project and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means (Government of Alberta 2010).

The potential environmental effects of Project construction and operation were predicted, based on experience with previous gravel pits as well as experience gained through assessment of other Projects with similar environmental conditions.

Effects are considered to occur where anticipated future conditions resulting from the Project differ from the conditions otherwise expected from natural change, before mitigations are applied. Residual effects are those effects that remain after mitigation measures have been implemented.

A summary of the mitigation measures that will be implemented to minimize Project related impacts is provided below.

Table 9: Potential Vegetation and Wildlife Impacts, Mitigation Measures, and Residual Effects

Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
Vegetation and Wetlands	Rare Plants and Rare Communities	<ul style="list-style-type: none"> Based on the timing of future construction, additional rare plant surveys may be required. <u>In the event that</u> rare plants or rare ecological communities are discovered during construction, work will be stopped, and the Construction Supervisor Environmental Advisor will be contacted. Mitigation measures will be implemented as <u>required</u>, and may include avoidance or transplanting. 	Direction: Negative Magnitude: High Duration: Long-term Frequency: Isolated Extent: Project Area Reversibility: Irreversible Probability: Low Confidence: High Residual Effect: Not significant
Vegetation and Wetlands	Weeds	<ul style="list-style-type: none"> Access work areas from approved areas. Ensure vehicles and equipment are cleaned before being allowed onsite. Restrict vehicle access over newly seeded areas. Monitor the disturbed areas for weeds and work with landowners to apply control measures if required. Weed control and management will be performed during construction activities to prevent prohibited or noxious weeds from being introduced or spread. 	Direction: Negative Magnitude: Low Duration: Long-term Frequency: Isolated Extent: Project Area Reversibility: Reversible in the <u>short term</u> Probability: High Confidence: High Residual Effect: Not significant
Wildlife and Wildlife Habitat	Wildlife habitat loss/alteration	<ul style="list-style-type: none"> Construction of new phases will commence outside of the migratory bird RAP, between April 15 and August 31 (ECCC 2018) where possible. If construction must take place within the migratory bird RAP, a nest sweep will be completed prior to vegetation clearing to limit the risk of impacting nesting wildlife. In the event an active nest is found, site-specific mitigation measures should be developed (e.g., clearly marked species specific buffer around the nest or non-intrusive monitoring). Relocate nests following consultations with applicable regulators. <u>In the event that</u> wildlife and/or specific wildlife habitat features are identified during construction/operations, the 	Direction: Negative Magnitude: Low Duration: Long-term Frequency: Continuous Extent: Project Area Reversibility: Reversible in the medium to long-term Probability: High Confidence: High Residual Effect: Not significant

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Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
		<ul style="list-style-type: none"> Implement immediate action to control, contain, recover and clean up any release. 	
Vegetation and Wetlands	Vegetation	<ul style="list-style-type: none"> Follow existing roads and overlap cultivated land, minimizing the Project footprint where possible. Maintain compatible vegetation or vegetated ground mat, to the extent practical. Maintain native ground cover where possible. Implement progressive reclamation. During weed control, reduce uncontrolled overspray and unnecessary damage to native vegetation and/or cultivated land. 	<p>Direction: Negative Magnitude: High Duration: Long-term Frequency: Continuous Extent: Project Area Reversibility: Reversible in the medium to long-term Probability: High Confidence: High</p> <p>Residual Effect: Not significant</p>
Vegetation and Wetlands	Riparian Areas	<ul style="list-style-type: none"> No aggregate development shall be located within the County's Riparian Protection Areas (Rocky View County 2019). Riparian areas will include a 30 m buffer from the center of the watercourse (60 m from bank for Bow River). Demarcate the riparian area using flagging tape or other visual marker as a means to alert construction traffic to the presence of the <u>riparian</u> and identify a no driving zone. 	If setbacks are adhered to, there will be no residual effects.
Vegetation and Wetlands	Wetlands	<ul style="list-style-type: none"> Wetlands will be avoided. Maintain compatible vegetation or vegetated ground mat, to the extent practical, particularly within the wetland buffer. Install erosion control measures upslope of wetlands. Demarcate the wetland using flagging tape or other visual marker as a means to alert construction traffic to the presence of the <u>wetland</u> and identify a no driving zone. The recommended 5 m buffer around the wetlands will not be encroached upon. In the event that wetlands will be impacted, a Water Act application and associated wetland assessment will be completed. 	If setbacks are adhered to, there will be no residual effects.

Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
		<p>features should be <u>flagged</u> and the appropriate mitigation developed, which may require consultation with AEP.</p> <ul style="list-style-type: none"> Progressive reclamation will occur once phases are depleted and mining operations within that phase is no longer feasible. Footprint avoids of riparian areas. Mining activities will not take place along the areas immediately adjacent to the Bow River (Figure 1). Install erosion/sedimentation control along fences adjacent to riparian areas and wetlands. Based on the timing of future construction, follow-up surveys may be required. 	
Wildlife and Wildlife Habitat	Sensory Disturbance	<ul style="list-style-type: none"> Construction of new phases will commence outside of the migratory bird RAP, between April 15 and August 31 (ECCC 2018) where possible. If construction must take place within the migratory bird RAP, a nest sweep will be completed prior to vegetation clearing to limit the risk of impacting nesting wildlife. In the event an active nest is found, site-specific mitigation measures should be developed (e.g., clearly marked species specific buffer around the nest or non-intrusive monitoring). Relocate nests following consultations with applicable regulators. In the event that wildlife and/or specific wildlife habitat features are identified during construction/operations, the features should be <u>flagged</u> and the appropriate mitigation developed, which may require consultation with Rocky View County and AEP. Maintain a 1,000 m buffer from the bald eagle nest when active. Monitor the bald eagle nest twice per breeding season, until activity is scheduled to start within the 1,000 m buffer, to track activity of the nest, and note successful breeding within the nest. Construct additional nesting platforms further from the site to encourage use by the bald eagles. 	<p>Direction: Negative Magnitude: Low Duration: Long-term Frequency: Continuous Extent: Outside Project Area Reversibility: Reversible in the medium to long-term Probability: High Confidence: High</p> <p>Residual Effect: Not significant</p>

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Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
		<ul style="list-style-type: none"> Once activities commence within the 1,000 m buffer, monitor the nest for activity during construction and operations. If the nest continues to be active and activity is planned to start within the buffer area, additional consultation may be required with AEP. If construction occurs within the amphibian breeding season and within the 100 m of any riparian areas or wetlands amphibian surveys will be completed. If amphibians are identified, a setback from the breeding pond will be determined in discussion with BURNCO and AEP. Make efforts to conduct construction during daylight hours to minimize noise disturbance to wildlife during dawn and dusk. Reduce noise levels of activities, whenever possible, and ensure that noise abatement equipment is in good working order. Based on the timing of future construction, follow-up surveys may be required. 	
Wildlife and Wildlife Habitat	Barriers to movement	<ul style="list-style-type: none"> For work that is required in the KWZ, construction of new phases will not occur between December 15 to April 30. Footprint avoids of riparian areas. Mining activities will not take place along the areas immediately adjacent to the Bow River within the KWZ (Figure 11). 	Direction: Negative Magnitude: Low Duration: Long-term Frequency: Continuous Extent: Project Area Reversibility: Reversible in the long-term Probability: High Confidence: High Residual Effect: Not significant
Wildlife and Wildlife Habitat	Potential for direct mortality	<ul style="list-style-type: none"> If a SAR is encountered in the Project Area and there is potential for direct mortality, cease construction activities until consultation has occurred with AEP, and appropriate mitigation measures have been implemented (e.g., setbacks, timing restrictions). Construction of new phases will commence outside of the migratory bird RAP, between April 15 and August 31 (ECCC 2018), where possible. 	Direction: Negative Magnitude: Low Duration: Long-term Frequency: Continuous Extent: Outside Project Area Reversibility: Reversible in the medium to long-term Probability: Low

Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
		<ul style="list-style-type: none"> If construction must take place within the migratory bird RAP, a nest sweep will be completed prior to vegetation clearing to limit the risk of impacting nesting wildlife. In the event an active nest is found, site-specific mitigation measures should be developed (e.g., clearly marked species specific buffer around the nest or non-intrusive monitoring). Relocate nests following consultations with applicable regulators. In the event that wildlife and/or specific wildlife habitat features are identified during construction/operations, the features should be <u>flagged</u> and the appropriate mitigation developed, which may require consultation with AEP. If sensitive amphibians are identified within the construction area and work will occur when young are present, install silt fence around the wetland and salvage and move the amphibians that are in the construction area to a suitable habitat. Investigate the possibility of installing wildlife crossing signs at points along the highway where the east and west boundaries of the site are located. Advise personnel to follow speed limits to improve road safety and reduce risks of wildlife mortality. Lower speeds during periods of reduced visibility. Attempt to limit traffic during periods where wildlife <u>tend</u> to be most active (i.e., dawn and dusk) to reduce the risk of wildlife mortality. Do not harass, feed, or interact with wildlife. Ensure proper containers are provided for garbage and ensure regular facility maintenance to prevent accumulation of garbage on the ground. Carry a spill kit and report any vehicle or equipment leaks to the appropriate authority. Appropriate spill kits will be provided for any onsite fuel storage tanks. 	Confidence: High Residual Effect: Not significant

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Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
		<ul style="list-style-type: none"> Do not refuel vehicles or equipment within 100 m of a wetland or riparian area. If immobile machinery is required to be within 100 m of the riparian area (e.g., pumps), then they should be placed in an isolated area within secondary containment capable of containing all fluids in said machinery. 	
Fish and Fish Habitat	Use of industrial equipment near watercourse that could result in deleterious substances entering the watercourses	<ul style="list-style-type: none"> All machinery working near water will be cleaned and free of debris and organic matter before entering the construction site. All machinery and vehicles will be refuelled a minimum of 100 m away from the watercourse. If immobile machinery is required to be within 100 m of the watercourse (e.g., pumps), then they should be placed in an isolated area within secondary containment capable of containing all fluids in said machinery. Any equipment (personal protective equipment, fisheries equipment) used within Beaupre Creek, Grand Valley Creek or the three Unnamed Watercourses must be cleaned and disinfected according to the standards provided in the <i>Interim Guidelines for the Disinfection of Fisheries Equipment to Reduce the Spread of Whirling Disease in Southern Alberta</i> (AEP 2016). A site-specific spill response plan will be developed before construction occurs. 	Direction: Neutral Magnitude: Negligible Duration: Immediate Frequency: Incidental Extent: Outside Project Area Reversibility: Reversible immediately Probability: Low Confidence: High Residual Effect: None
Fish and Fish Habitat	Change in sediment concentrations resulting in poor visibility and altered food sources	<ul style="list-style-type: none"> Implement setbacks as specified in Table 12. Develop and implement an ESC Plan addressing each watercourse if activities occur within the setbacks. Maintain and inspect ESC measures frequently to ensure effectiveness. 	Direction: Neutral Magnitude: Negligible Duration: Immediate Frequency: Incidental Extent: Outside Project Area Reversibility: Reversible immediately Probability: Low Confidence: High Residual Effect: None

Valued Ecosystem Component	Potential Impact	Mitigation Measures	Residual Effects
Fish and Fish Habitat	Potential mortality of fish and eggs resulting from deposition of sediment	<ul style="list-style-type: none"> Implement setbacks as specified in Table 12. Develop and implement an ESC Plan addressing each watercourse if activities occur within the setbacks. Maintain and inspect ESC measures frequently to ensure effectiveness. 	Direction: Neutral Magnitude: Negligible Duration: Immediate Frequency: Incidental Extent: Outside Project Area Reversibility: Reversible immediately Probability: Low Confidence: High Residual Effect: None

The Report concluded as follows:

Valued Ecosystem Components (VECs) within the Project Area were identified during desktop and field assessments. Activities related to the Project were determined and potential impacts of those activities on VECs were identified.

Mitigation measures identified in this report are based on information collected during field surveys, best management practices, regulatory requirements for setbacks and RAPs and professional judgement.

The Project will have no residual impacts on geology, wetlands, riparian areas or fish and fish habitat if mitigation measures are implemented. The Project will have residual impacts to hydrology, soils, vegetation, rare plants, weeds, and wildlife. These impacts are considered not significant if mitigation measures are implemented. No cumulative impacts are expected for any of the VECs within the Project Area or within the VEC spatial boundary.

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BURNCO will be implementing progressive reclamation during the course of the Project, which will reduce the duration of an impact, as well as the amount of area being impacted. Progressive reclamation also contributes to reducing cumulative effects of the Project.

Policy #31

BURNCO will follow the recommendations in the MSDP related to impact assessment and managing cumulative effects for Vegetation and Wildlife. These measures will ensure limited impact on geology, hydrology, soils and topography, vegetation and wetlands, wildlife and wildlife habitat, fish and fish habitat.

Policy #32

BURNCO will control weeds during operations and reclamation. These efforts will be compliant with the Weed Control Act and the Rocky View County Land Use Bylaw.

3.12 Hazardous Waste Plan

All fuel storage sites will be constructed in a manner that follows the *Guidelines for Secondary Containment for Above Ground Storage Tanks*, Alberta Environmental Protection, May 1997, and comply with Part 4 of the *Alberta Fire Code 2006* for tank registrations. A bermed imperviously lined area, or other form of secondary containment, will surround fuel tanks with a minimum 110% holding capacity of the largest tank's capacity. Any spills within or beyond the bermed area of the above ground storage tanks will be controlled immediately using various techniques including diking and containing. Any spills will be collected using sorbent pads and vacuum trucks.

Materials such as oil, lubricants, glycols, etc. that are stored on-site will be labeled according to the Workplace Hazardous Materials Information System (WHMIS) regulations and will be suitably contained. No waste material will be imported into the pit. All waste material generated from pit operations will be collected and stored in approved containers. This waste material will then be hauled on a regular basis to an approved landfill for proper disposal. Burial of waste will be prohibited during all phases of the operation. Portable sanitary facilities will be located on site. All sanitary waste will be hauled to an approved waste management treatment facility.

Policy #33

BURNCO will follow the hazardous waste plan in the MSDP.

3.13 Erosion and Sediment Control

In support of the Project, Matrix Solutions Inc. (Matrix) was retained to complete an Erosion and Sediment Control Plan for the Project area. This assessment was completed in 2020 and is provided as part of BURNCO's Land Use Application. It includes the following components:

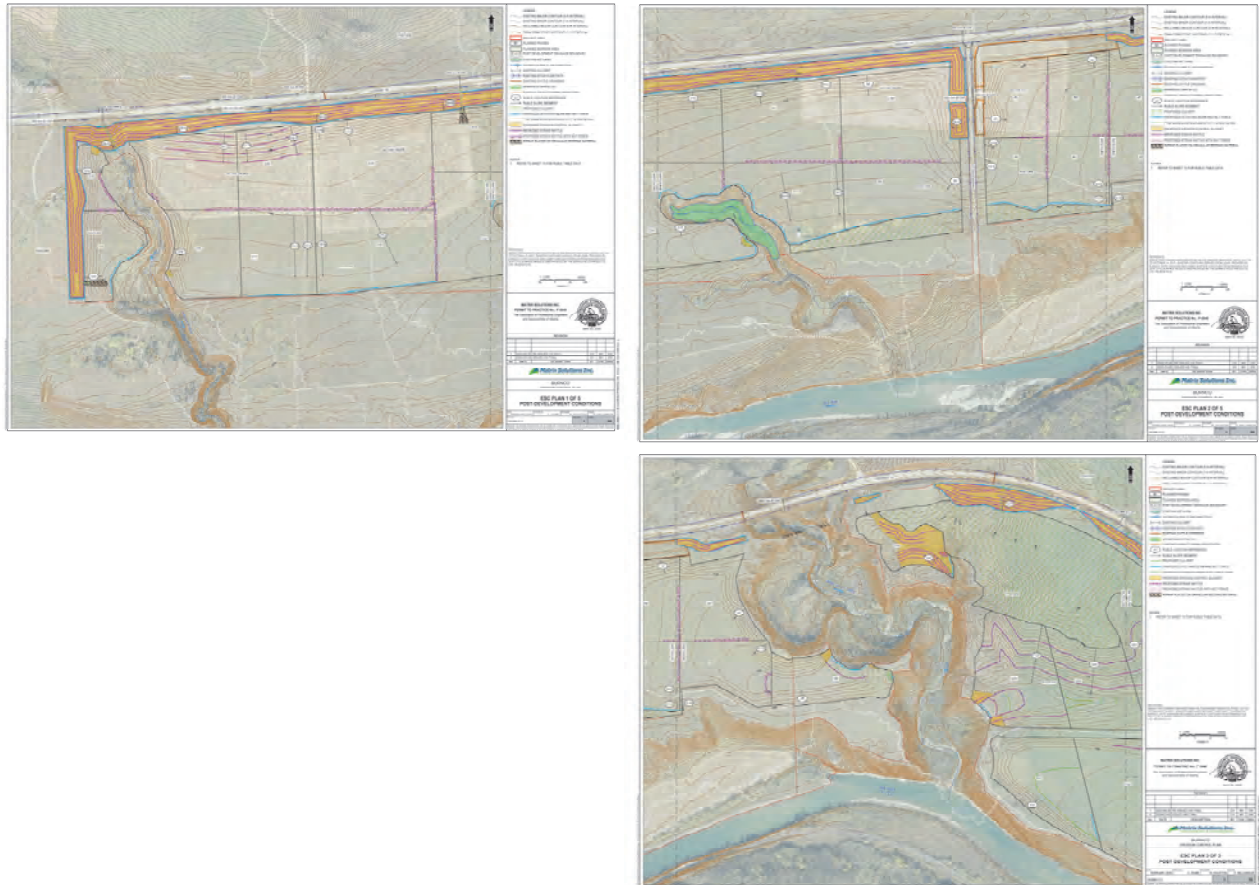
- A site description and identification of erosion and sediment control areas of concern,
- A description of erosion and sediment control measures to be implemented, and appropriate maintenance and repair requirements,
- Inspection, maintenance and record keeping procedures,
- Post-construction monitoring,
- A sample erosion and sediment control inspection form.

West Cochrane Gravel Pit – Master Site Development Plan**BURNCO**

A summary of the mitigation measures that will be implemented to minimize Project related impacts is provided below.

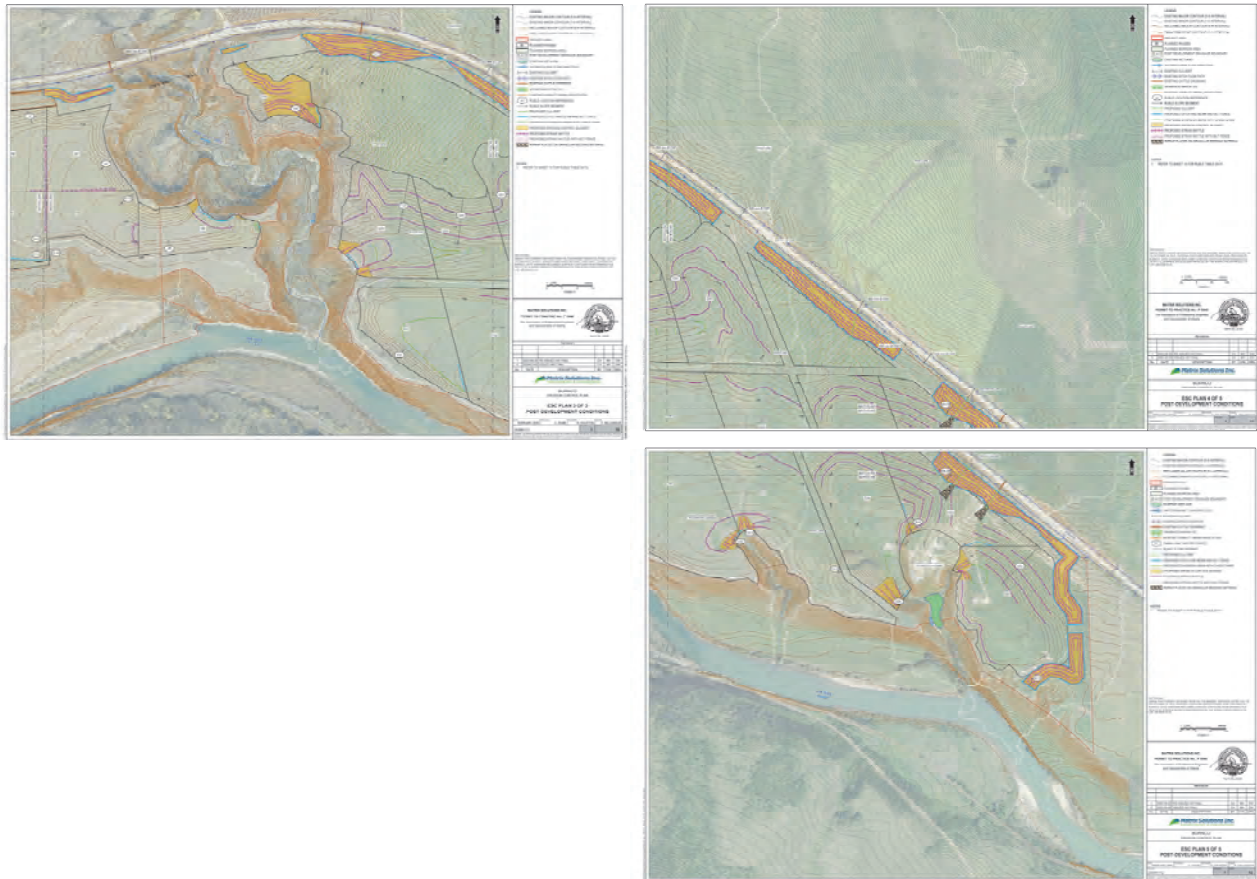
Policy #34**BURNCO will follow the erosion and sediment control measures in the MSDP.**

Figure 36: ESC Plan – West



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Figure 37: ESC Plan – East



This provides high level control measures for proposed project activities during active gravel pit operation (interim condition) and during site reclamation (final condition).

Drainage patterns must be reasonably returned to pre-development conditions to prevent problematic drainage issues when landscape alterations occur. Preferable drainage patterns include effective infiltration and temporary storage in small depressions, which is supported by proper ESC measures. The purpose of this ESC plan is to support proposed restored drainage patterns to ensure there is no risk of sediment laden drainage entering adjacent sensitive/protected watercourses.

3.14 Landscaping and Site Screening

As there is an existing operation in the NW 13-26-05 W5M, the infrastructure necessary for the operation of a gravel pit is already in place. This includes items such as a designated haul route, scale, screening berms. Over time, and as the project develops, new infrastructure will be required and changes to existing infrastructure are also anticipated. A detailed phasing plan is provided as part of BURNCO's Land Use Application. One of the key development strategies associated with that phasing plan is the development of a suitable screening berm along west, north, and east portions of the Project.

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In support of the Project, Matrix Solutions Inc. (Matrix) was retained to complete a Visual Impact Assessment. The assessment was conducted to identify the potential impact of the project development to the visual resources in the area.

Visual resources are defined as the landforms, vegetation, water surfaces, and cultural modifications (physical changes caused by human activities) that give the landscape its visual qualities. A visual resources assessment is the study of the perception of the landscape (both aesthetic and scenic qualities) by the users of the landscape and how this perception may change with new cultural modifications (USDI 1986 a,b).

In order to enhance the appearance of the facility and reduce the impact on neighboring tenants, Matrix created a planting and maintenance plan for a visual screen adjacent to the proposed gravel pit. Rocky View County advises that screening be considered for certain development activities to manage the aesthetics of the landscape.

This assessment was completed in 2019 and is provided as part of BURNCO's Land Use Application and includes the following components:

- Line-of-sight from the viewpoint location to the Project area,
- Documented and potential use of the viewpoint by stakeholders,
- Accessibility of the viewpoint locations to the public,
- Proximity to roads, trails, rivers, settlements locations,
- Locations accessed by recreational users,
- Potential for views over larger portions of the landscape.

Based on this analysis, a berm design and planting plan was developed to mitigate impacts on the visual resources of the area as much as feasible. The resulting designs are shown below.

Policy #35

BURNCO will follow the development and planting plan for the screening berm as provided in the MSDP.

West Cochrane Gravel Pit – Master Site Development Plan

Figure 38: Visual Impact Assessment – Receptor Locations

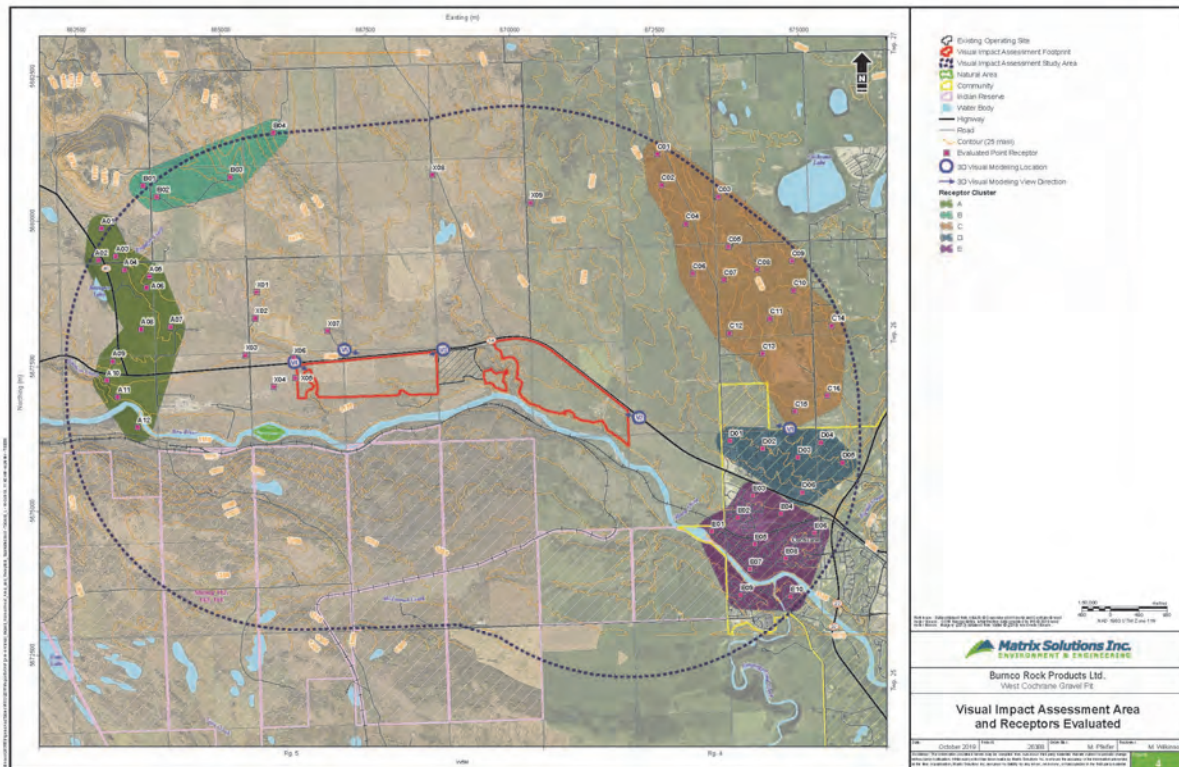
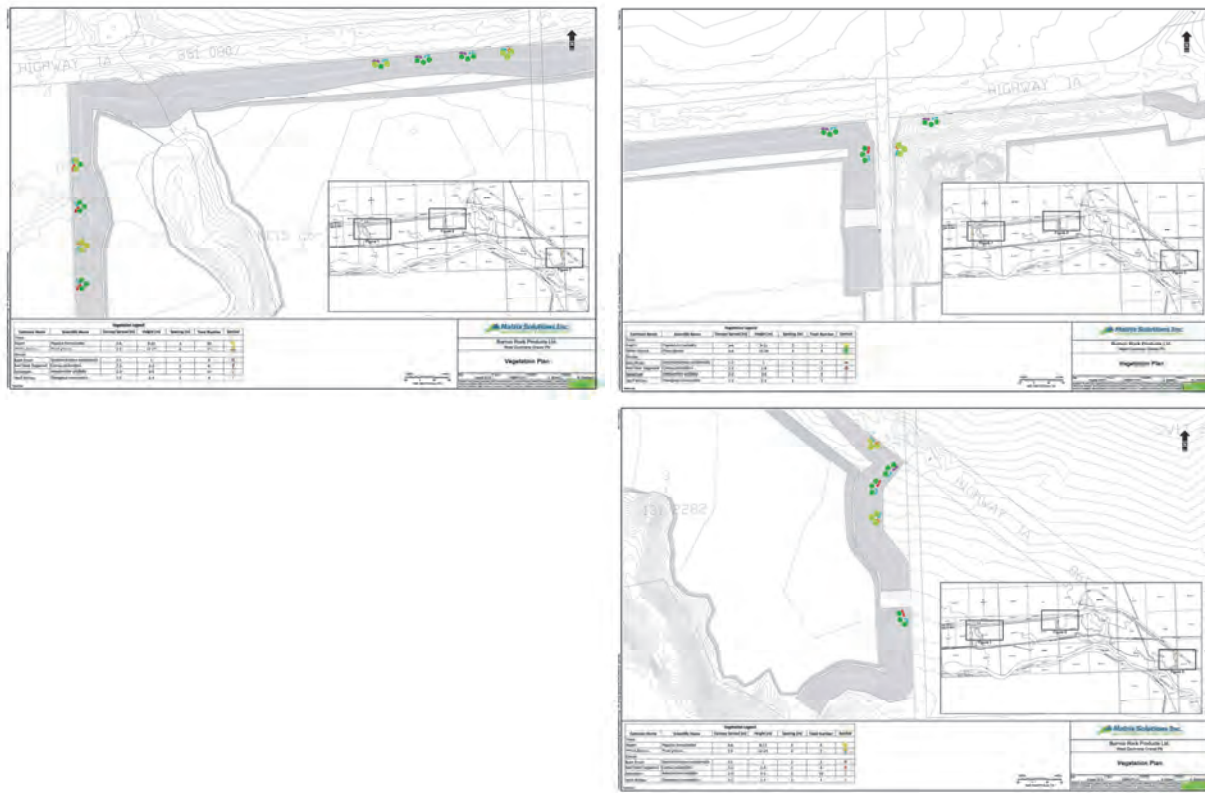


Figure 39: Visual Impact Assessment – Planting Plan



A total of 57 receptors were identified in the Study Area (Figure 4). These receptors have been grouped in five peripheral clusters (Clusters A to E) and a central “cluster” (“Cluster” X). There are apparent residences generally clustered in the western area (Clusters A and B). Cluster C represents a combination of individual acreages and points representing a grouping of acreages north of Cochrane.

Areas of Cochrane sit within the Study Area, so a number of point locations representing various neighborhoods and potential development areas were selected, split into two clusters: Cluster D, representing areas north of the Bow River, and Cluster E, representing areas south of the Bow River.

For all 57 point receptors, the visible area was quantified for both the existing conditions and full site mined models, calculating the total VIA Footprint and percentage of the VIA Footprint that is visible from that each receptor. Additionally, the total Study Area visible before and after mitigation and a percentage loss in total Study Area viewshed was calculated (Table 1).

Out of 57 total receptors, a total of 26 receptors did not have a view into the VIA Footprint in the Existing Conditions model case. One of these receptors (X01) sits within 1.6 km of the VIA Footprint.

Of the remaining 31 receptors:

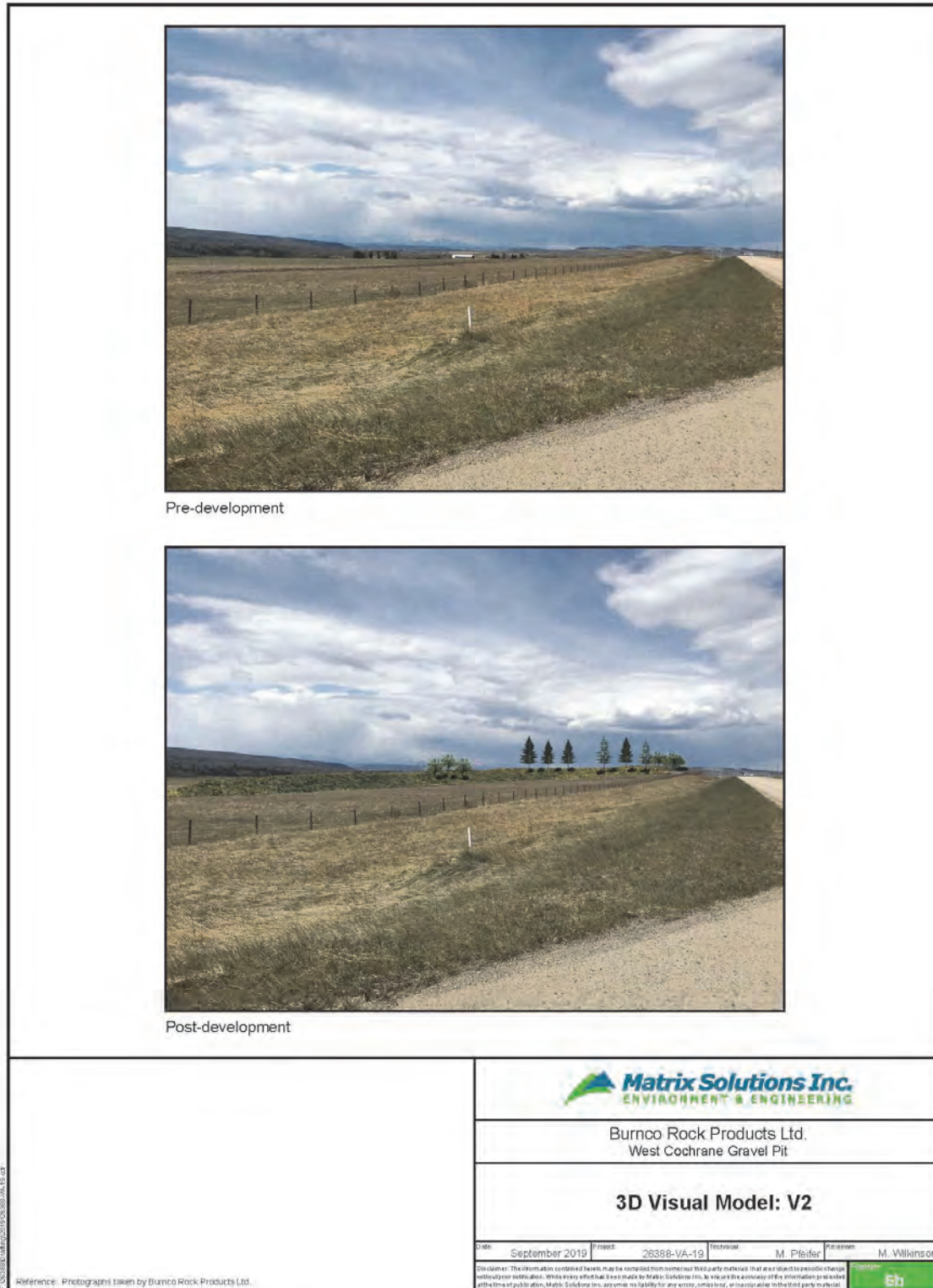
- 10 receptors currently have less than 10% of the VIA Footprint in view. Of these, only 1 receptor (X02) sits within 1.6 km of the VIA Footprint.*
- 11 receptors had greater than 10% of the VIA Footprint in view in Existing Conditions model, but proposed berms have reduced this to less than 10% of the VIA Footprint in view. Of these, 4 receptors (X03 to X06) sit within 1.6 km of the VIA Footprint.*
- 10 receptors had greater than 10% of the VIA Footprint in view and proposed berms have not reduced this to less than 10% of the VIA Footprint in view. Of these, only 1 receptor (X07) sits within 1.6 km of the VIA Footprint.*

For all receptors, an evaluation of the amount of reduction of Study Area viewable from the receptor was undertaken. In almost all cases, the total loss in viewshed is under 10%; the exceptions being the three nearest receptors (X04, X05, and X06) to the VIA Footprint.

The line of sight analysis helps to illustrate the mitigative value provide by the berm design and planting plan. These features should provide significant screening capability for public traveling at road level and to nearby residents. Due to topography, it is not possible to fully screen operations from some residential receptors located around the development due to their significantly higher elevation, but the berm and planting will still provide some level of visual mitigation to these locations.

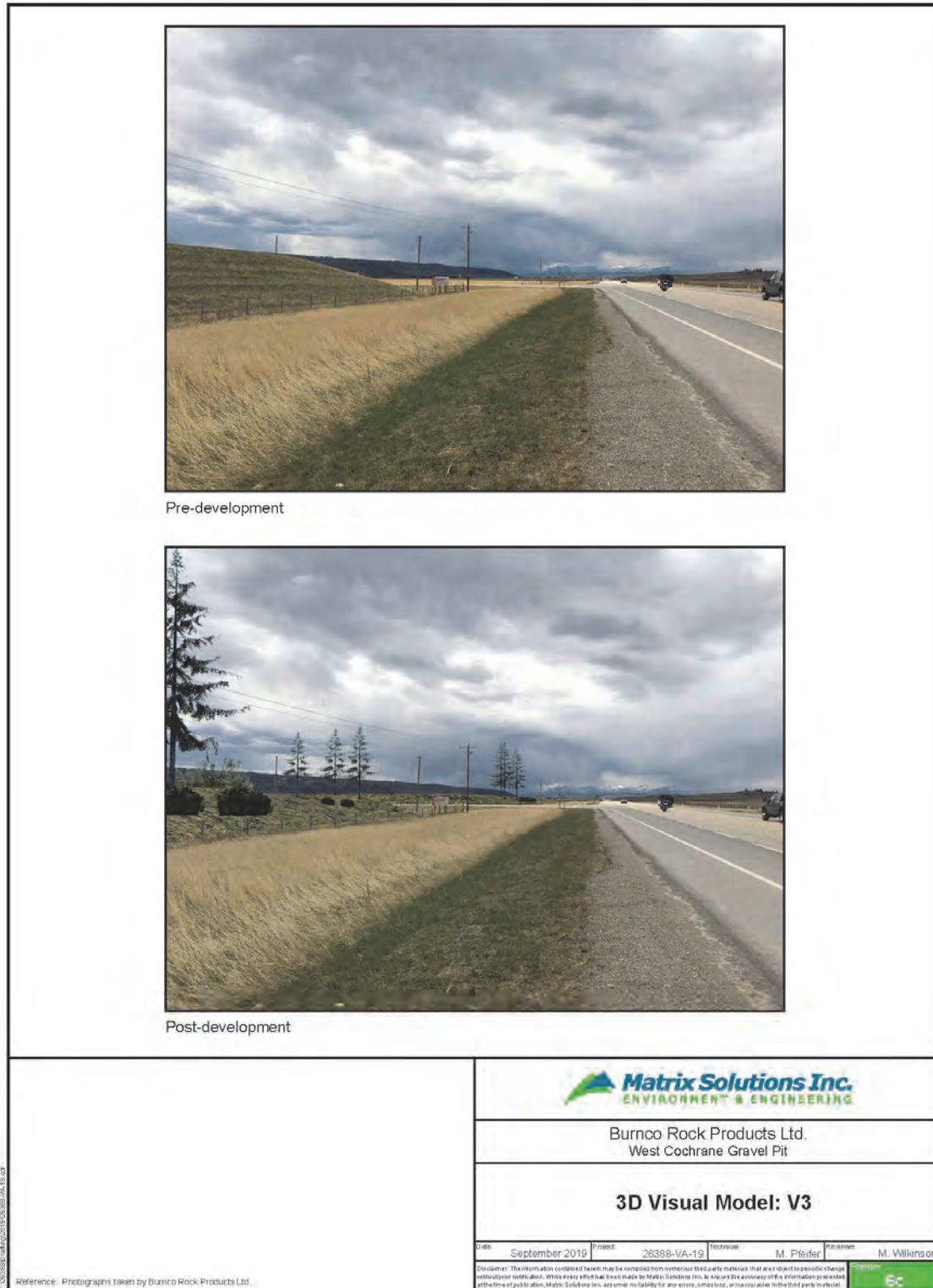
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Figure 40: View of Berm and Planting Plan (Location #2)



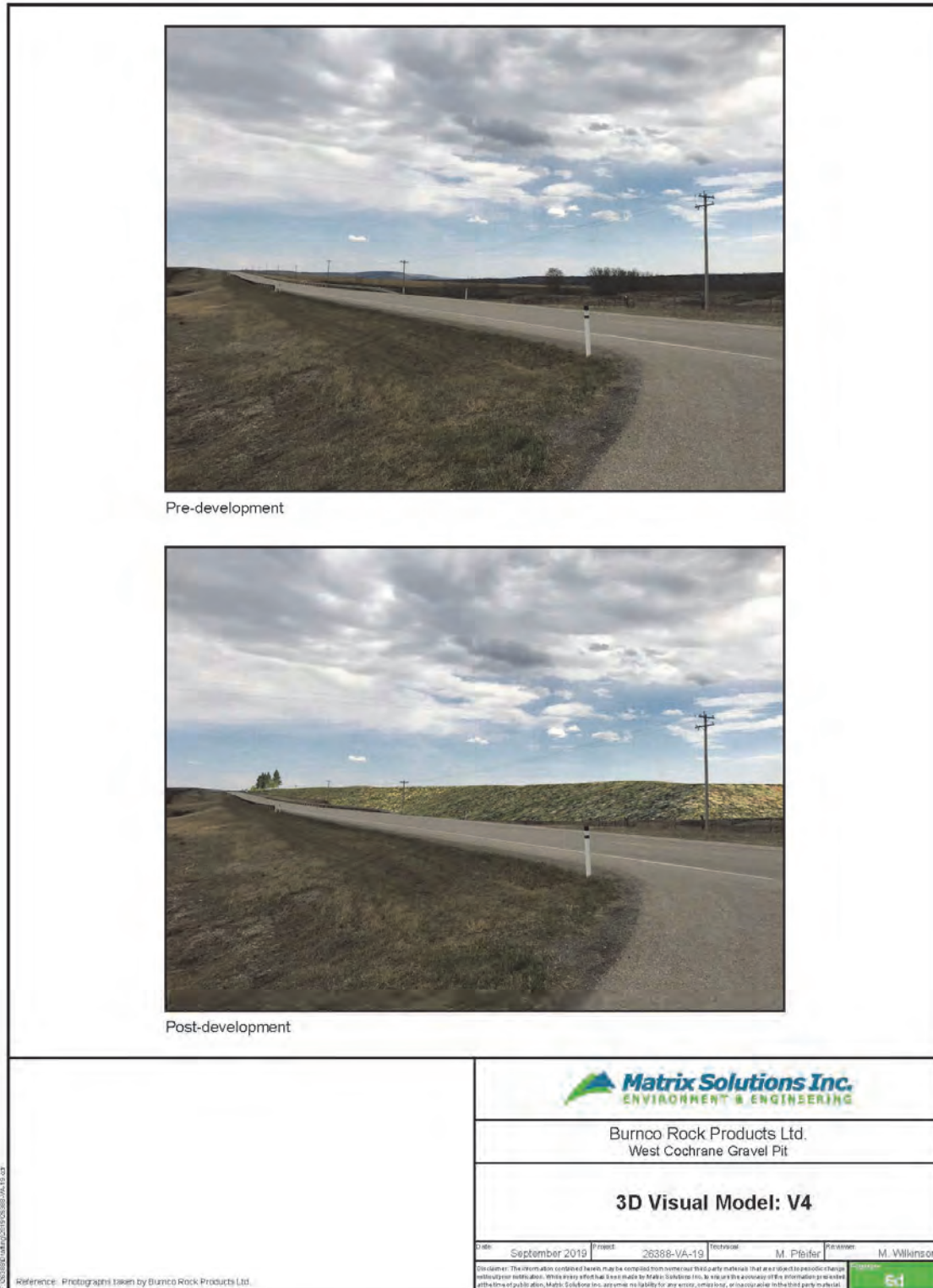
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Figure 41: View of Berm and Planting Plan (Location #3)



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Figure 42: View of Berm and Planting Plan (Location #4)



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As described in the Section 3.3, the site will be developed based on milestones related to the progress of the mining areas. Likewise, construction of the screening berm will also be built in phases and will be done so in accordance with the following:

Phase A:

- Screening berm already in place for this parcel with small extension to be completed as operations move further east.
- Vegetation planting on this section of berm will be completed upon receipt of municipal and provincial permits associated with this application.

Phase B:

- “B” portion of screening berm to be constructed upon commencement of activity in phase B8.
- Vegetation planting on this section of berm will be completed at the time of construction.

Phase C:

- “C” portion of screening berm to be constructed upon commencement of activity in phase C12.

Phase D:

- “D” portion of screening berm to be constructed upon commencement of activity in phase D16.
- Vegetation planting on this section of berm will be completed at the time of construction.

Phase E:

- “E” portion of screening berm to be constructed upon commencement of activity in phase E22.
- Vegetation planting on this section of berm will be completed at the time of construction.

Phase F:

- “F” portion of screening berm to be constructed upon commencement of activity in phase F25.

Phase G:

- “G” portion of screening berm to be constructed upon commencement of activity in phase G28.

Phase H:

- “H” portion of screening berm to be constructed upon commencement of activity in phase H30.

In all cases, these screening berms will be constructed with an overburden core as insufficient volumes of topsoil and subsoil would be available to construct such significant berms. It is also intended that these berms will remain as a permanent reclamation feature. As such, proper handling of topsoil and subsoil to avoid admixing will be followed:

- Prior to placement of overburden, topsoil and subsoil will be removed from the berm development area and temporarily stockpiled,
- Overburden will then be used to shape the berm,
- Subsoil and topsoil will then be replaced, and the screening berm will be seeded.

4.0 Cumulative Effects

The development planning process for the West Cochrane Gravel Pit included an assessment of the cumulative aspects of extraction activities in the area. A review of nearby gravel pits indicated that the closest gravel operations were a significant distance away:

- Big Hill Springs Pit (Registration #15240-00-00) – 8.5kms away,
- BURNCO Cochrane Pit (Registration #15944-00-00) – 6.0kms away,
- Robinson Pit (Registration #244731-00-00) – 8.0kms away,
- Cochrane Pit (Registration #15685-00-00) - 6.0kms away,
- Griffin Pit (Registration #15328-00-00) – 4.8kms away.

Due to these distances, and after reviewing their locations and likely scale of operations, no cumulative impact was predicted.

As described earlier, BURNCO has completed various impact assessments related to the West Cochrane Gravel Pit. These assessments included review of predevelopment conditions, operating conditions and post development conditions. Potential impacts have been identified and appropriate mitigations developed. It should also be noted that assessments were completed with both areas of the West Cochrane Gravel Pit assumed to be in operation (east side plus west side). With these mitigations in place, BURNCO is confident that impacts related to this development have been mitigated as much as reasonably possible, that the site will not have an undue impact, and that the West Cochrane Gravel Pit will be operated in a socially and environmentally responsible manner.

Policy #36

BURNCO will provide Annual Reporting to Rocky View County and in accordance with Development Permit requirements.

5.0 Reclamation Plan

BURNCO always strives to promptly reclaim their operations back to an equivalent land capability and to re-establish a similar grade and drainage patterns that existed prior to disturbance. The site will be predominantly reclaimed back to agricultural use as shown in the reclamation drawings provided in Appendix 3.

Policy #37

BURNCO will reclaim areas promptly wherever possible and in accordance with the reclamation contours and cross-sections in the MSDP. In addition, BURNCO will limit maximum disturbed area on the west side to 70 acres at any single time. The maximum planned disturbance area on the east side will be 51 acres. The total maximum disturbed area at any single time will be 121 acres.

5.1 Landscaping and Closure

As described in Section 3.14, the screening berms built adjacent to Highway 1A will be left as a permanent reclamation feature. These screening berms will have been constructed with an overburden core and should have mature landscaping at the time of final reclamation.

The contouring associated with this permanent feature is shown on the reclamation plan in DWG. NO. 6 in Appendix 3.

5.2 Soil Salvage

All topsoil and subsoil on site will be salvaged and used in the final reclamation. Topsoil and subsoil salvage will not occur under wet, frozen, adverse field conditions or high wind velocities that will result in mixing, loss, compaction or degradation of soil. Topsoil and subsoil will be salvaged a minimum of three meters ahead of pit faces.

In some instances, topsoil and subsoil will be placed along the west development boundary for use in creating screening berms. These stockpiles will be separated from each other with topsoil used to develop the south portion of the berm and browns used to develop the north portion of the berm. These screening berms will be vegetated as soon as possible and will be sloped 3:1 with a three-meter top. Stockpile site locations will be prepared so that:

- Stockpiles are placed on stable ground,
- Stockpiles are placed in locations unaffected by pit activities,
- Stockpiles are stabilized to minimize erosion.

As much as possible, topsoil and subsoil will be directly placed into areas of reclamation.

Policy #38

BURNCO will ensure proper soil salvage and will follow the protocols provided in the MSDP related to soil salvage.

5.3 Subgrade

Placement of fill and rough grading will follow the contour plan shown in Appendix 3 Drawing No. 5: Site Reclaimed Map. Once subgrades are established, areas will be ripped and cross ripped to a depth of 0.3 meters to ensure decompaction of the subgrade. Ripping can help improve soil conditions by breaking up the surface of the overburden, increasing infiltration of surface water, and creating a better root zone.

5.4 Soils Placement

Once subgrades are established and decompacted, subsoil and topsoil will be spread evenly. Target replacement depths will be based on parcel and will be 85% of the pre-disturbance soils depths as detailed in Section 2.4 of this report.

5.5 Vegetation

Once topsoil has been evenly placed, the reclaimed areas will be re-vegetated to hayland using drill seeding at a rate no less than 22 kg/acre. Grass seed mixture will be 30% wheatgrass, 40% smooth brome, 30% Kentucky bluegrass. Once seeding is complete, a program of cutting and fertilizing will take place as necessary to ensure the hayland becomes established.

5.6 Inactive Pit Conservation & Reclamation

At all time, the pit will be clearly identified by signs that indicate danger and discourage trespassing. Slopes around structures and equipment will be stabilized and sloped no steeper than 3:1. During periods of inactivity of over six months, pit faces will be sloped no steeper than

West Cochrane Gravel Pit – Master Site Development Plan

2:1. Stockpiles will be vegetated, and the weeds will be sprayed and mowed. The site will be monitored to ensure soil reclamation material is stable, weeds are controlled, and the site is secure.

Once the above items have been completed, the site will be monitored on a monthly basis to ensure soil reclamation material is stable, weeds are controlled, and the site is secure.

Policy #39

BURNCO will follow the protocols provided in the MSDP related to inactive pit conservation and reclamation.

6.0 Conclusion

The BURNCO West Cochrane Pit has been in successful operation since 2016. BURNCO would like to continue operating at this location and is seeking to increase the permitted area of the pit and secure the long-term future of the project. This report outlined how BURNCO would address the concerns that were expressed about the development of the project. It also presents the various studies that have been undertaken by independent professionals to look at the scientific data and determine the project impacts and prescribe mitigation measures.

This project presents a great opportunity for Rocky View County and the people of Alberta in continuing to meet the growing demand for aggregates. These aggregates are critical in building our communities and maintaining our quality of life.

BURNCO is committed to the highest level of care and compliance in all our developments. It is BURNCO's belief that by following the Project Activities Plan for the lands associated with the proposed development, that BURNCO's West Cochrane Pit can continue to operate in a socially and environmentally responsible manner for many years to come.

Appendix 1: Supporting Documents Submitted with Land Use Application

- 1: Drawings
- 2: Application for Amendment to Land Use Bylaw
- 3: Land Titles and Landowner Consents
- 4: Biophysical Impact Assessment
- 5: Stormwater Management Plan
- 6: Erosion and Sediment Control (ESC) Plan
- 7: Environmental Noise Impact Assessment
- 8: Air Quality Assessment
- 9: Groundwater Impact Assessment
- 10: Visual Resources Assessment
- 11: Traffic Impact Assessment
- 12: Historic Resources Impact Assessment
- 13: Open House #1 Summary
- 14: Open House #2 Summary
- 15: Existing Permits and Authorizations

Appendix 2: MSDP Policy Summary

Policy #1

BURNCO will secure appropriate approvals to excavate aggregate and develop within all onsite Road Allowances and will follow applicable terms and conditions as negotiated with the County and Alberta Transportation.

Policy #2

BURNCO will secure an approved Registration from Alberta Environment & Parks under the Code of Practice for Pits before commencing operations.

Policy #3

Aggregate development within the MSDP area shall comply with all relevant municipal, provincial and federal legislation, regulations and policies.

Policy #4

BURNCO will secure historical resource clearance from Alberta Culture & Tourism before commencing operations in uncleared areas of the project.

Policy #5

BURNCO will follow the hours of operation as determined by Rocky View County as part of the Development Permit process.

Policy #6

BURNCO will follow the development phasing plan as illustrated in the MSDP.

Policy #7

BURNCO will install site signage. This will include perimeter signage to discourage trespassing as well as entrance signage as necessary to identify the site and provide key information to the public.

Policy #8

Site signage shall include a 24-hour phone number for neighbors to call in the event of questions or concerns.

Policy #9

BURNCO will secure a proximity agreement with the applicable operator before any activities within 30m of any utility Right-Of-Way.

Policy #10

BURNCO will follow the noise control measures detailed in the MSDP. In addition, BURNCO will utilize enhanced mitigation measures if necessary, to ensure that noise is reasonably controlled and does not become a nuisance.

Policy #11

BURNCO will follow the dust control measures detailed in the MSDP. In addition, BURNCO will utilize enhanced mitigation measure if necessary, to ensure that dust is reasonably controlled and does not become a nuisance.

Policy #12

Operations at the pit will be compliant with the Alberta Ambient Air Quality Objectives (AAAQO).

Policy #13

BURNCO will provide full time noise monitoring during periods when both night time operations are occurring, and operations are within 400m of an occupied residence. Full time monitoring for dust will occur when gravel pit operations are within 400m of an occupied residence.

Policy #14

BURNCO will follow the complaint response protocol provided in the MSDP related to noise and dust complaints.

Policy #15

BURNCO will monitor water levels in the network of 18 monitoring wells spread across the project. Continuous monitoring will occur in no less than 6 wells. Continuous monitoring will be done in wells situated between active operations and adjacent landowners as well as in accordance with direction from Alberta Environment & Parks.

Policy #16

BURNCO will secure Water Act approvals as necessary from Alberta Environment & Parks related to dewatering, bailing, or any other activities in the groundwater table before commencing such operations.

Policy #17

BURNCO will complete a baseline monitoring program for any residential water well located within 400m of the project boundary if requested by the owner.

Policy #18

BURNCO will follow the complaint protocol provided in the MSDP related to groundwater security.

Policy #19

BURNCO will secure Water Act approvals as necessary from Alberta Environment & Parks related to gravel washing before commencing such operations.

Policy #20

BURNCO will continue to utilize the upgraded intersection at Range Road 51 and Highway 1A for all activities west of Grade Valley Creek (phases A1-A7, B8-B11, C12-C15, and D16-D21).

Policy #21

In future, BURNCO will develop an upgraded intersection at Range Road 45 and Highway 1A for all activities east of Grade Valley Creek (phases E22-E24, F25-F27, G28-G31, and H30). This upgrade will be built to the standard required by Rocky View County and Alberta Transportation.

Policy #22

No aggregate operations shall occur within the MSDP area without approval of a Roadside Development Permit from Alberta Transportation.

Policy #23

BURNCO will follow the protocol provided in the MSDP related to haul safety.

Policy #24

BURNCO will follow the protocol provided in the MSDP related to haul monitoring.

Policy #25

BURNCO will ensure that regional stormwater flows are not impacted. All flows generated in the upstream catchment areas of Grand Valley Creek and/or Beaupre Creek will continue to pass through the project area.

Policy #26

BURNCO will ensure that stormwater from the active mining area is collected and not discharged from the site.

Policy #27

BURNCO will follow the reclamation recommendations in the MSDP related to drainage. This will ensure that the reclaimed site does not impact local or regional drainage patterns.

Policy #28

Stormwater will be managed in accordance with the submitted Conceptual Stormwater Management Plan.

Policy #29

BURNCO will follow the setback and restricted activity requirements identified in the MSDP in relation to wildlife, wetlands, riparian areas and watercourses.

Policy #30

BURNCO will secure necessary authorizations from Alberta Environment & Parks related to the berm and vehicle crossing at Beaupre Creek before commencing these developments.

Policy #31

BURNCO will follow the recommendations in the MSDP related to impact assessment and managing cumulative effects for Vegetation and Wildlife. These measures will ensure limited impact on geology, hydrology, soils and topography, vegetation and wetlands, wildlife and wildlife habitat, fish and fish habitat.

Policy #32

BURNCO will control weeds during operations and reclamation. These efforts will be compliant with the Weed Control Act and the Rocky View County Land Use Bylaw.

Policy #33

BURNCO will follow the hazardous waste plan in the MSDP.

Policy #34

BURNCO will follow the erosion and sediment control measures in the MSDP.

Policy #35

BURNCO will follow the development and planting plan for the screening berm as provided in the MSDP.

Policy #36

BURNCO will provide Annual Reporting to Rocky View County and in accordance with Development Permit requirements.

Policy #37

BURNCO will reclaim areas promptly wherever possible and in accordance with the reclamation contours and cross-sections in the MSDP. In addition, BURNCO will limit maximum disturbed area on the west to 70 acres at any single time. The maximum planned disturbance area on the east side will be 51 acres. The total maximum disturbed area at any single time will be 121 acres.

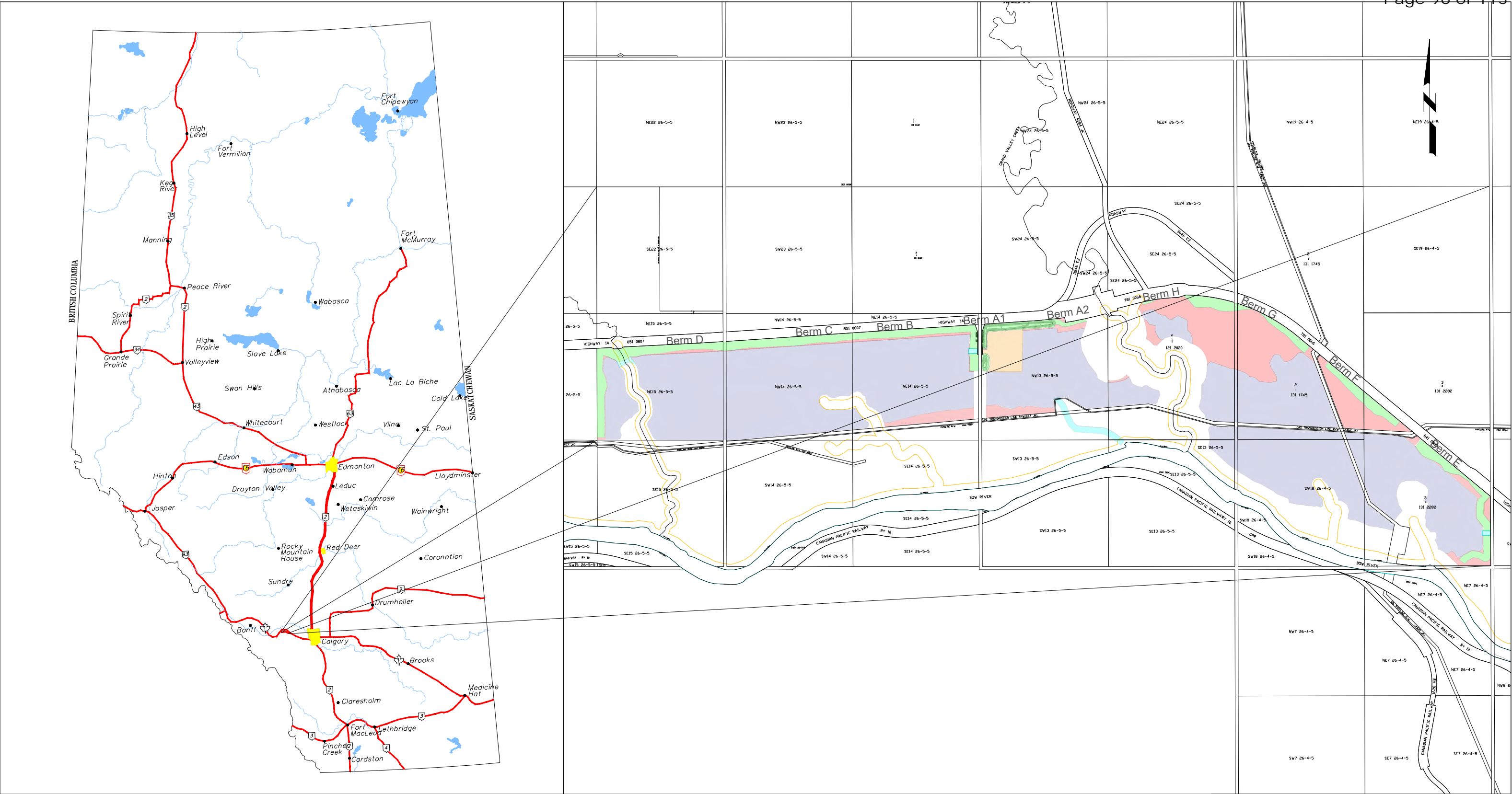
Policy #38

BURNCO will ensure proper soil salvage and will follow the protocols provided in the MSDP related to soil salvage.


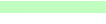

West Cochrane Gravel Pit – Master Site Development Plan**Policy #39**

BURNCO will follow the protocols provided in the MSDP related to inactive pit conservation and reclamation.

Appendix 3: Drawings



LEGEND:

- | | |
|---|---|
|  Mining Area |  Cadastral |
|  Existing Operating Area |  Contours Major |
|  Borrow Area |  Contours Minor |
|  Planned Access |  Surface Drainage Flow |
|  Visual Landscape Berm |  Cross Section Alignment |
|  Mine Phase |  Environmental Setback |

NOTES:

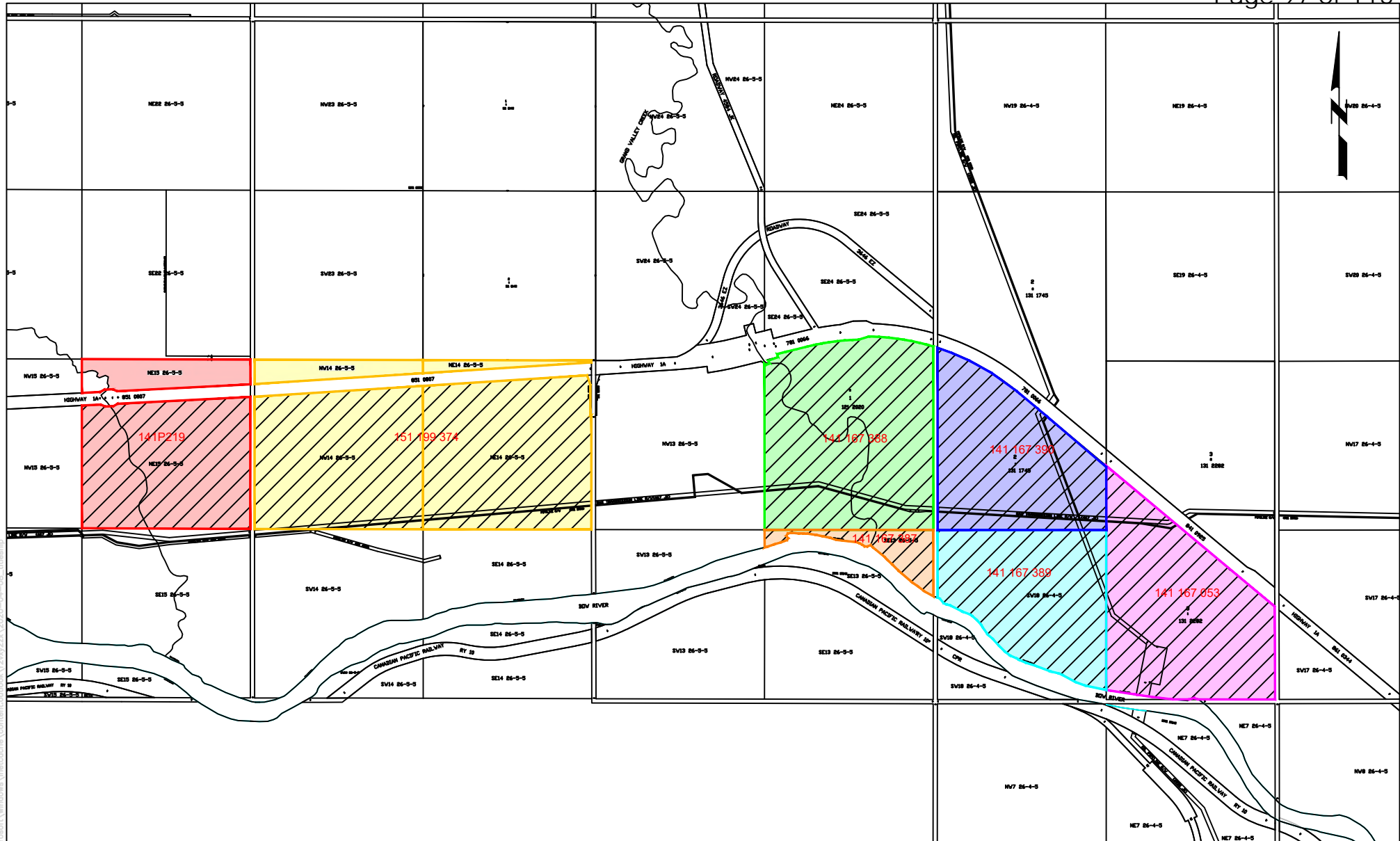
- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable



BURNCO Rock Products Ltd

West Cochrane
Location Map

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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DATE REVISED: MAY 2020		CHECKED BY: TC	

Legend

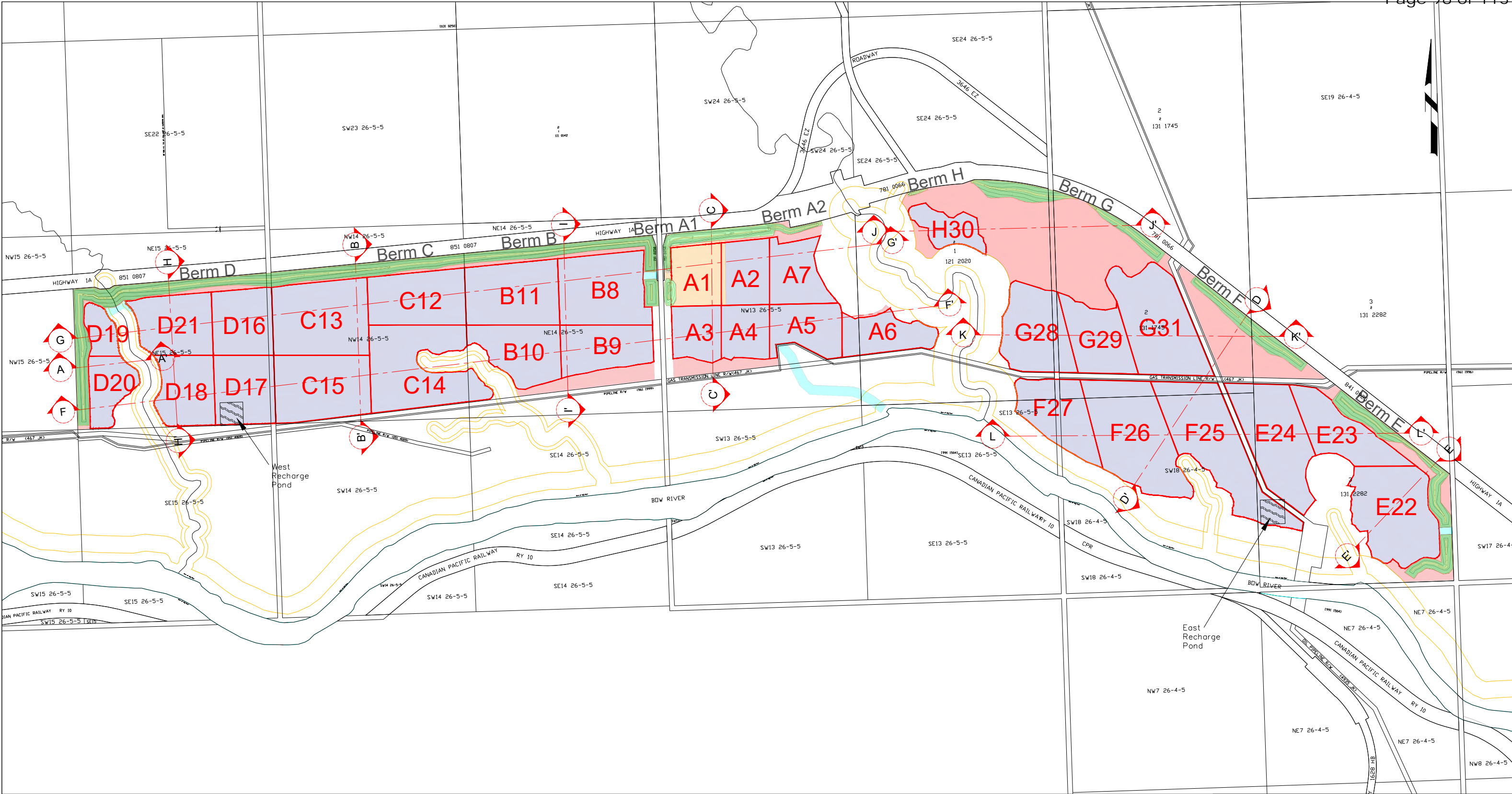
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-  TOTAL TITLE AREA
-  TOTAL RE-ZONING AREA

Title Number	Total Title Area (acres)	Total Re-zoning Area (acres)
141P219	147.82	119.62
151 199 374	295.88	269.48
141 167 388	175.52	175.52
141 167 387	15.20	15.20
141 167 390	123.28	123.28
141 167 389	112.00	112.00
141 167 053	151.33	151.33

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WEST COCHRANE
Land Titles Map

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DATE SUBMITTED: MAY 2020		CHECKED BY: TC	



LEGEND:

- Mining Area
Existing Operating Area
Borrow Area
Planned Access
Visual Landscape Berm
Mine Phase
- Cadastral
Contours Major
Contours Minor
Surface Drainage Flow
Cross Section Alignment
Environmental Setback

NOTES:

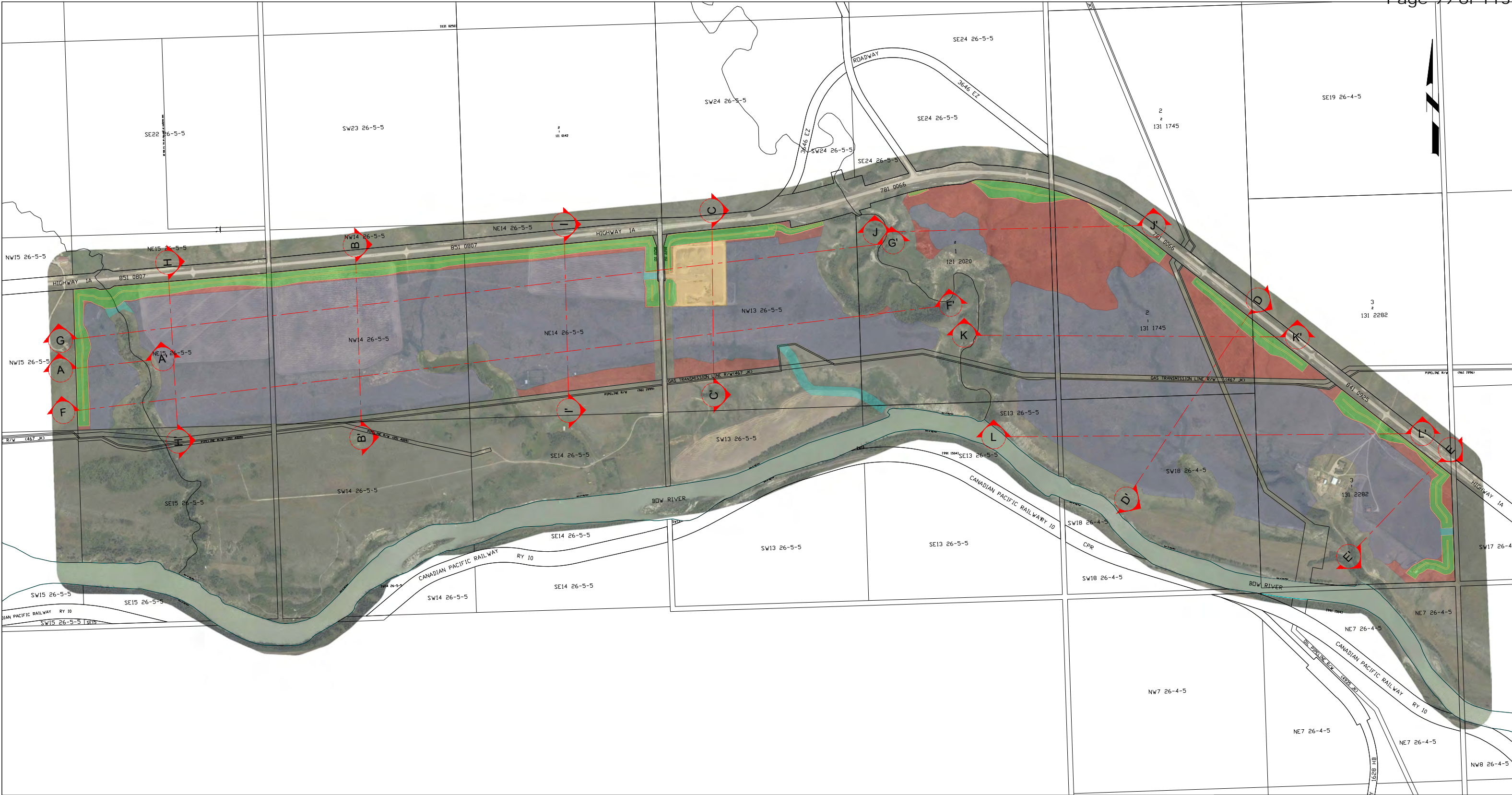
- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- West recharge pond dimensions (width/length/depth) - 90/90/1.5 (m)
- East recharge pond dimensions (width/length/depth) - 95/95/1.0 (m)

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West Cochrane
Mine Phase Plan

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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DATE REVISED: MAY 2020		CHECKED BY: TC	



LEGEND:

- Mining Area
- Existing Operating Area
- Borrow Area
- Planned Access
- Visual Landscape Berm
- Mine Phase

- Cadastral
- Contours Major
- Contours Minor
- Surface Drainage Flow
- Cross Section Alignment
- Environmental Setback

NOTES:

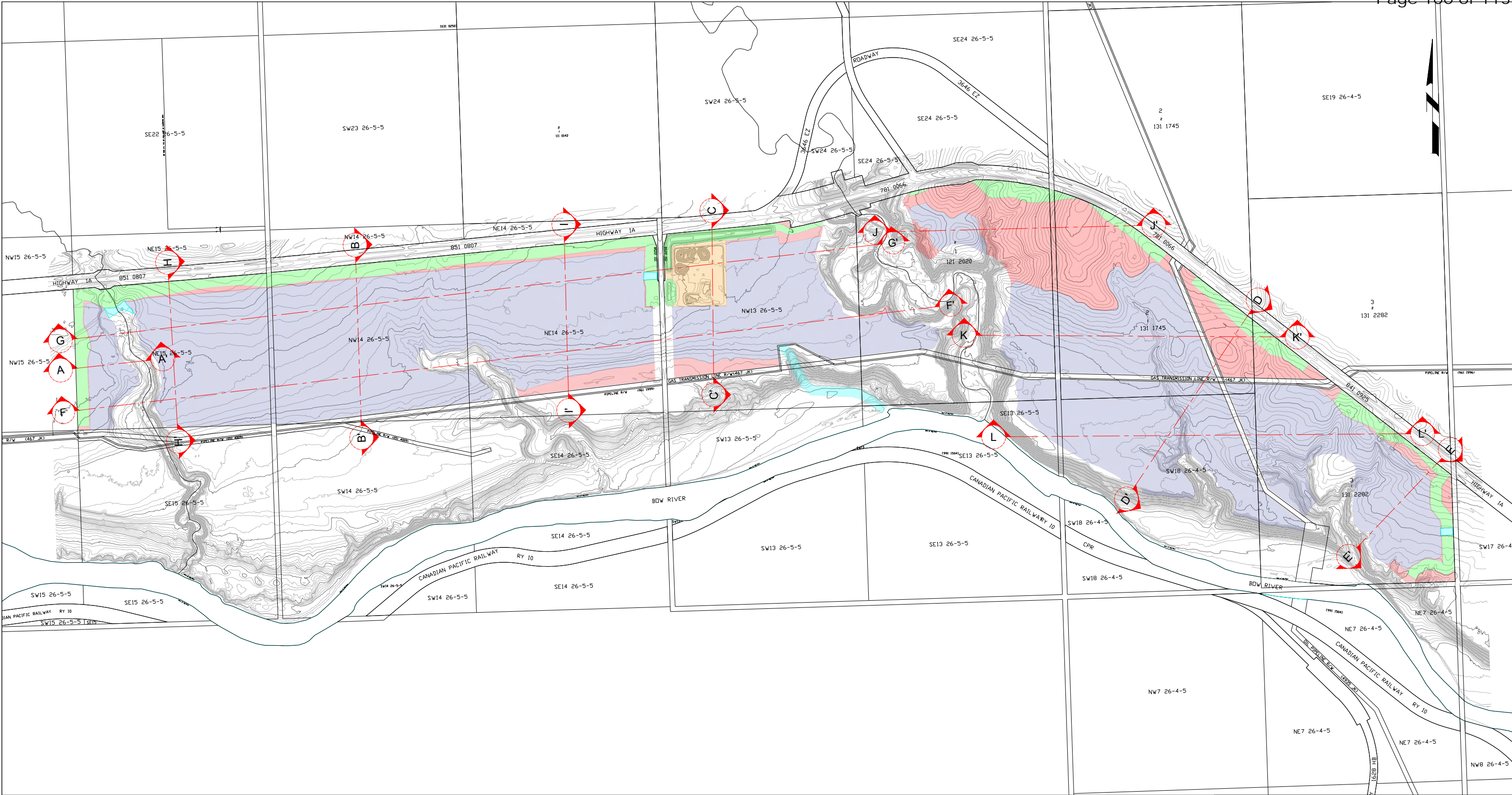
- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable

BURNCO Rock Products Ltd

West Cochrane
Site Map

NE 15-26-05 WSM; NW 14-26-05 WSM; NW 13-26-05 WSM; SW 13-26-05 WSM; SE 13-26-05 WSM;
NE 13-26-05 WSM; SW 18-26-04 WSM; SE 18-26-04 WSM; NE 7-26-04 WSM

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DATE REVISED: MAY 2020		CHECKED BY: TC	



LEGEND:

- Mining Area
- Existing Operating Area
- Borrow Area
- Planned Access
- Visual Landscape Berm
- Mine Phase

- Cadastral
- Contours Major
- Contours Minor
- Surface Drainage Flow
- Cross Section Alignment
- Environmental Setback

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable

BURNCO Rock Products Ltd

West Cochrane
Site Existing Contours Map

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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DATE REVISED: MAY 2020		CHECKED BY: TC	



Cadastral
 Contours Major
 Contours Minor
 Surface Drainage Flow
 Cross Section Alignment
 Environmental Setback

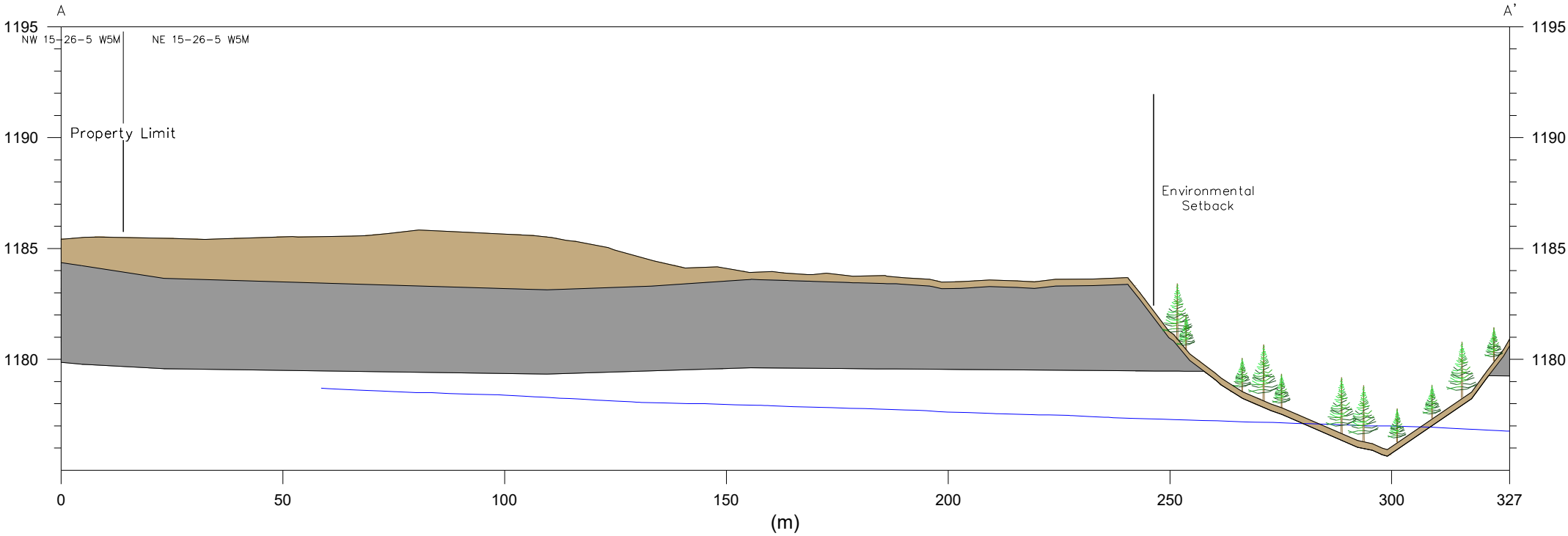
- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable

DWG. NO.

6

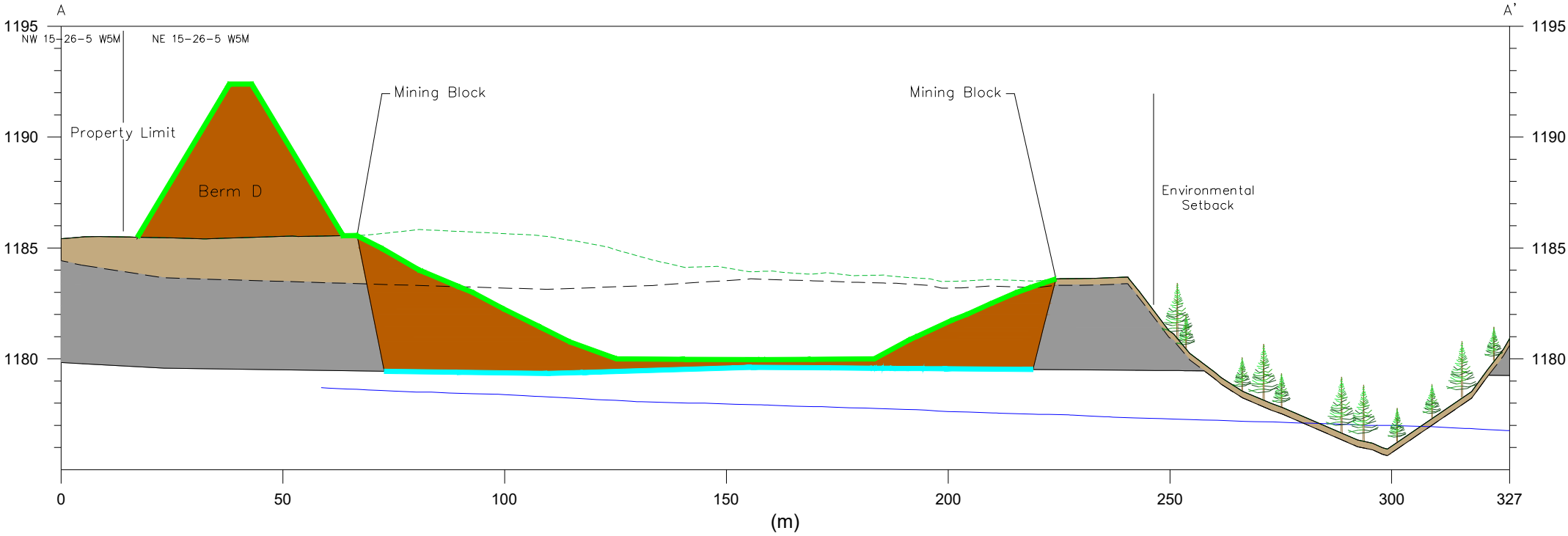
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EXISTING SITE CONDITIONS



A

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

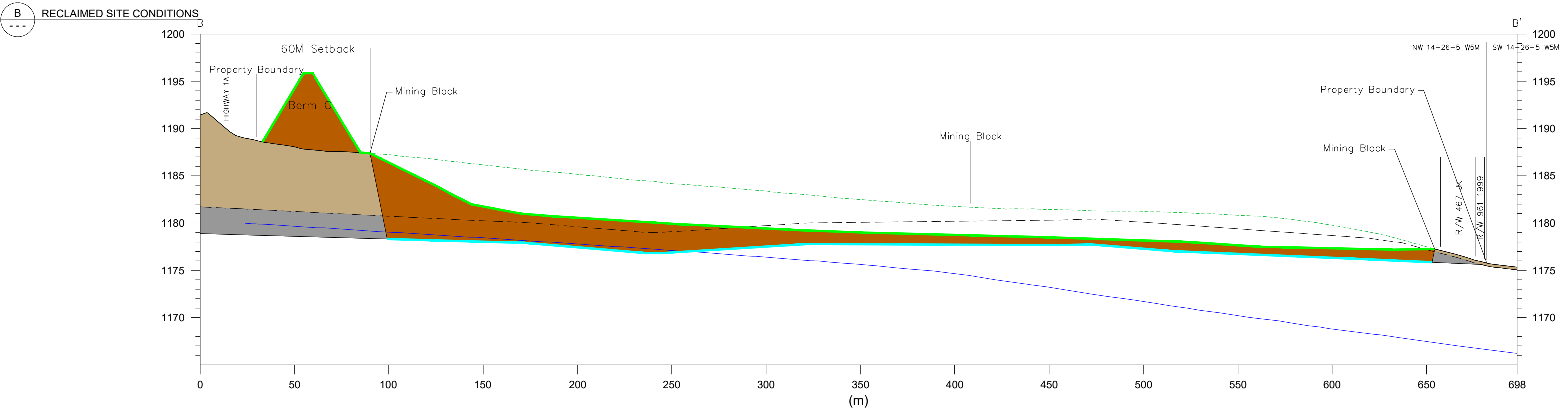
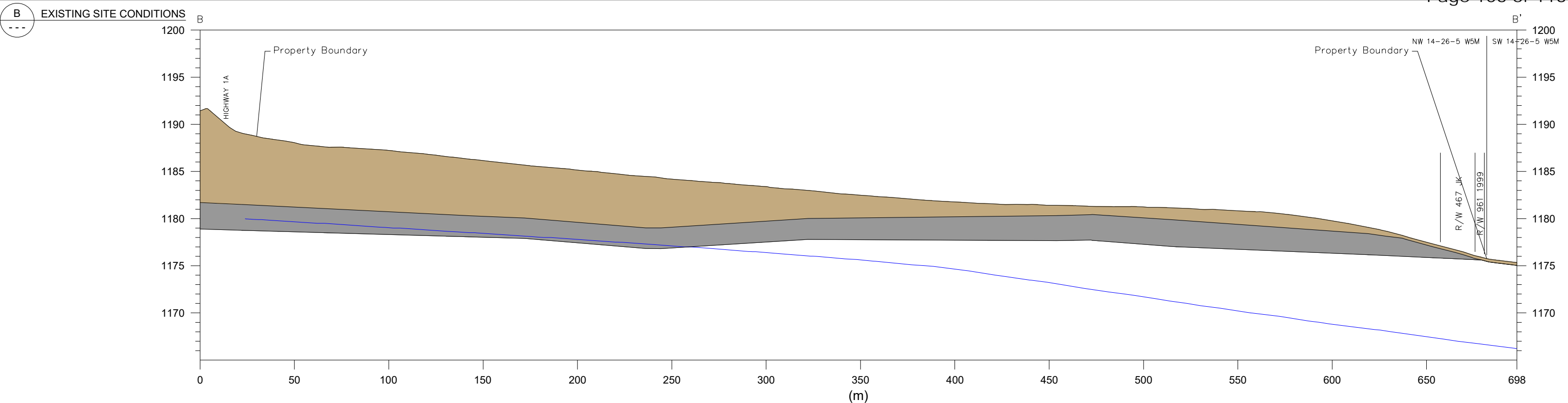
- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

West Cochrane
Cross Section A - A'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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- LEGEND:**
- Clay
 - Gravel
 - Backfilled Material (Clay)
 - Original Topsoil/Subsoil
 - Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
 - Original Ground Profile
 - Original Top of Gravel
 - Ground Water Table
 - Hydraulic Connectivity Layer (1 ft. / 0.3m.)

- NOTES:**
- All units are in meters
 - All berms are constructed to 3H:1V with 5m wide top
 - All reclaimed slopes are constructed to less than 10H:1V
 - All mine faces are mined to no more than 1H:1V
 - 3m property line setback utilized where applicable
 - For cross-section plans, 5:1 vertical exaggeration is exercised
 - For cross-section plans, elevations are provided in MASL
 - For cross-section plans, mapped gravel is underlain by bedrock
 - For cross-section plans, bedrock's type, depth and extend are unknown

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West Cochrane
Cross Section B - B'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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FEB. 2020

DATE SUBMITTED:
MAY 2020

SCALE:
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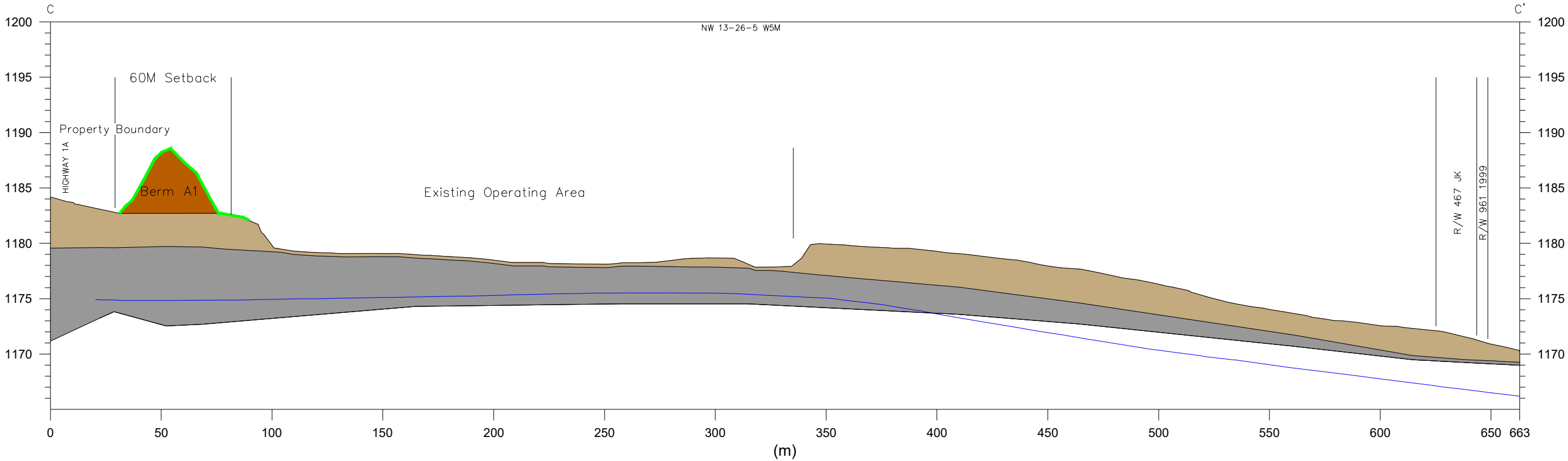
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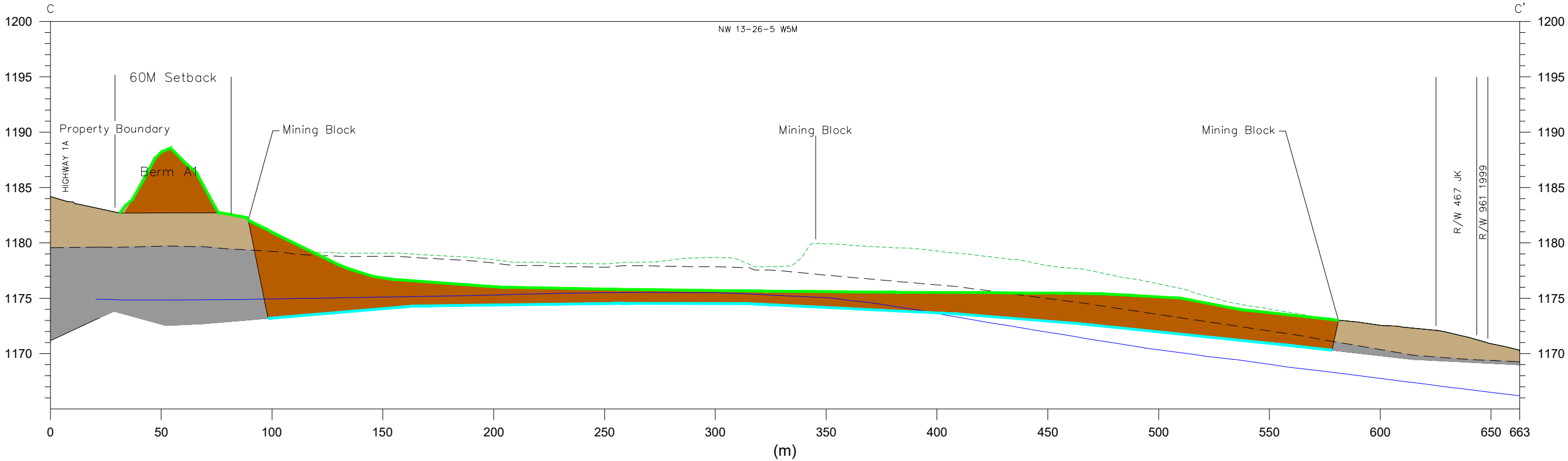
C

EXISTING SITE CONDITIONS



C

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

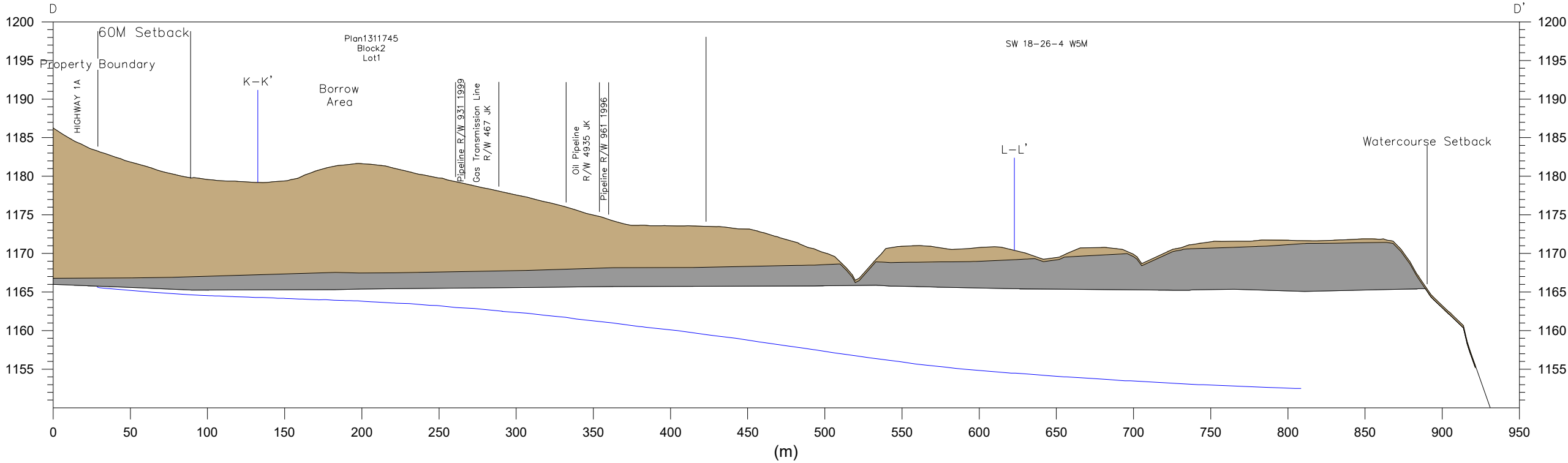
West Cochrane
Cross Section C - C'

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NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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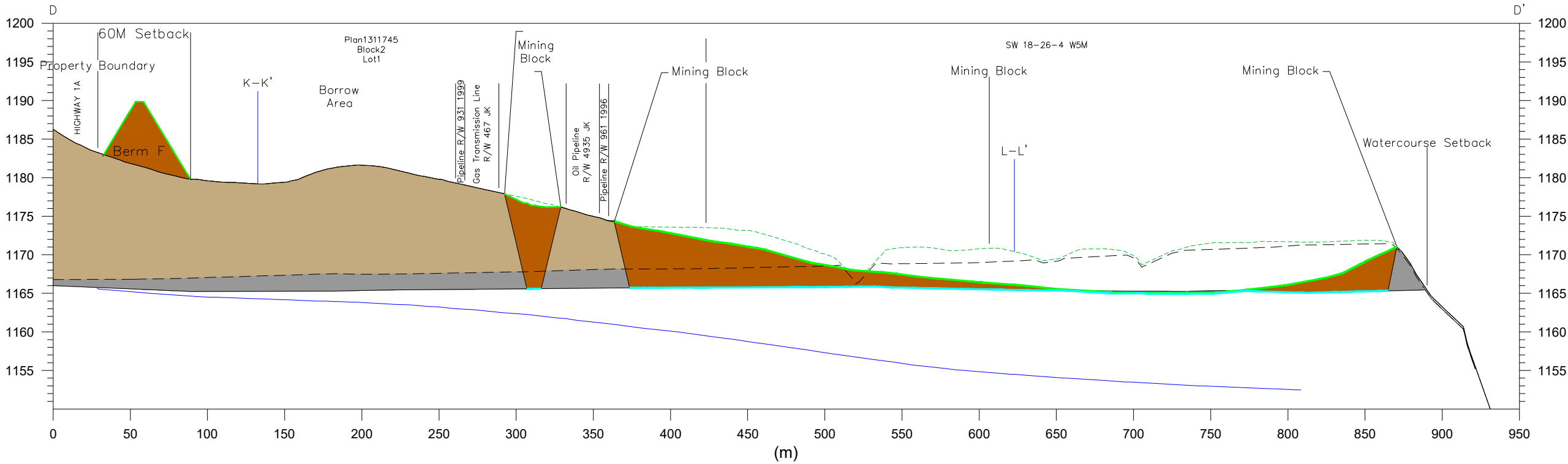
D

EXISTING SITE CONDITIONS



D

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

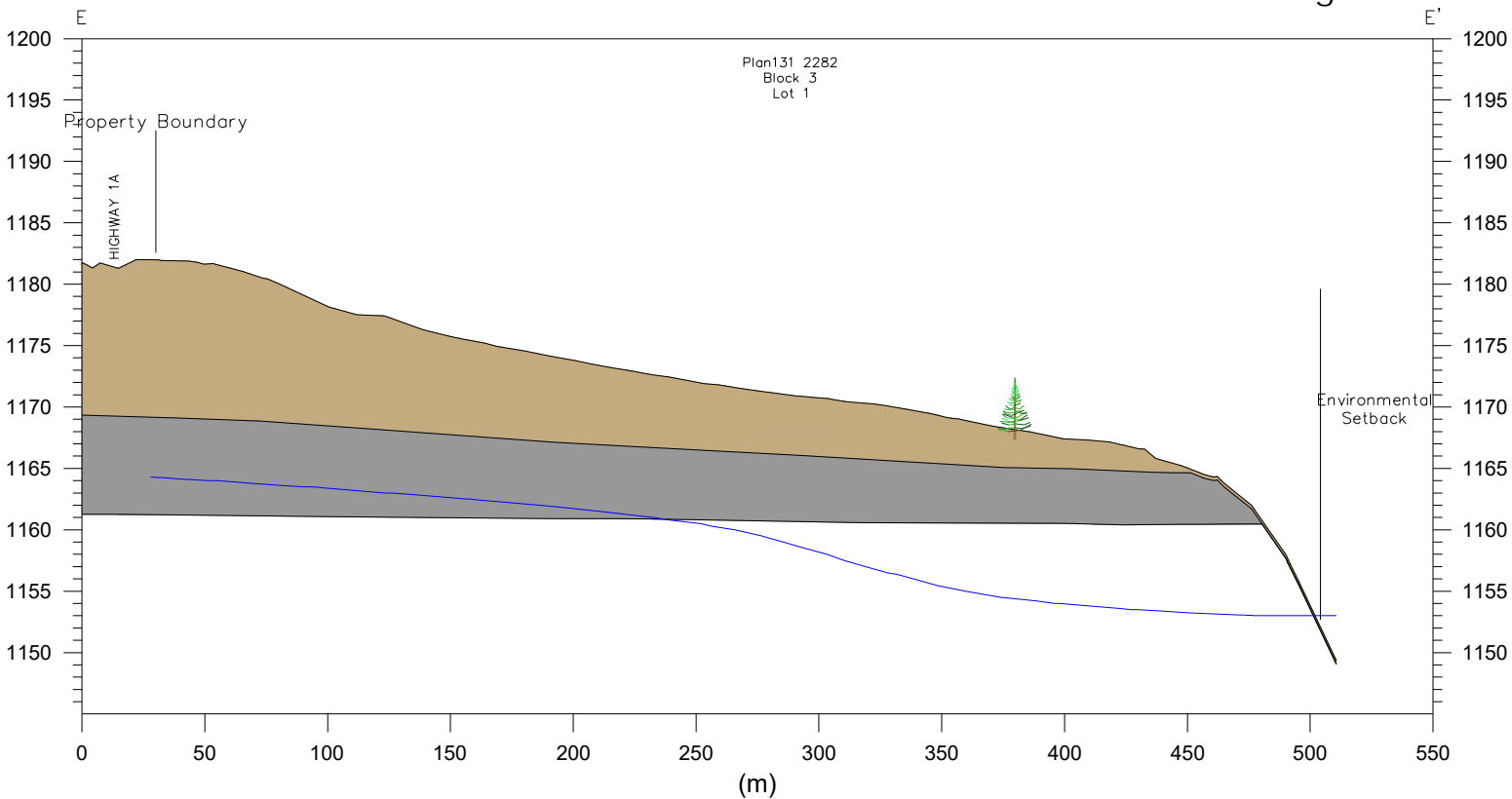
West Cochrane
Cross Section D - D'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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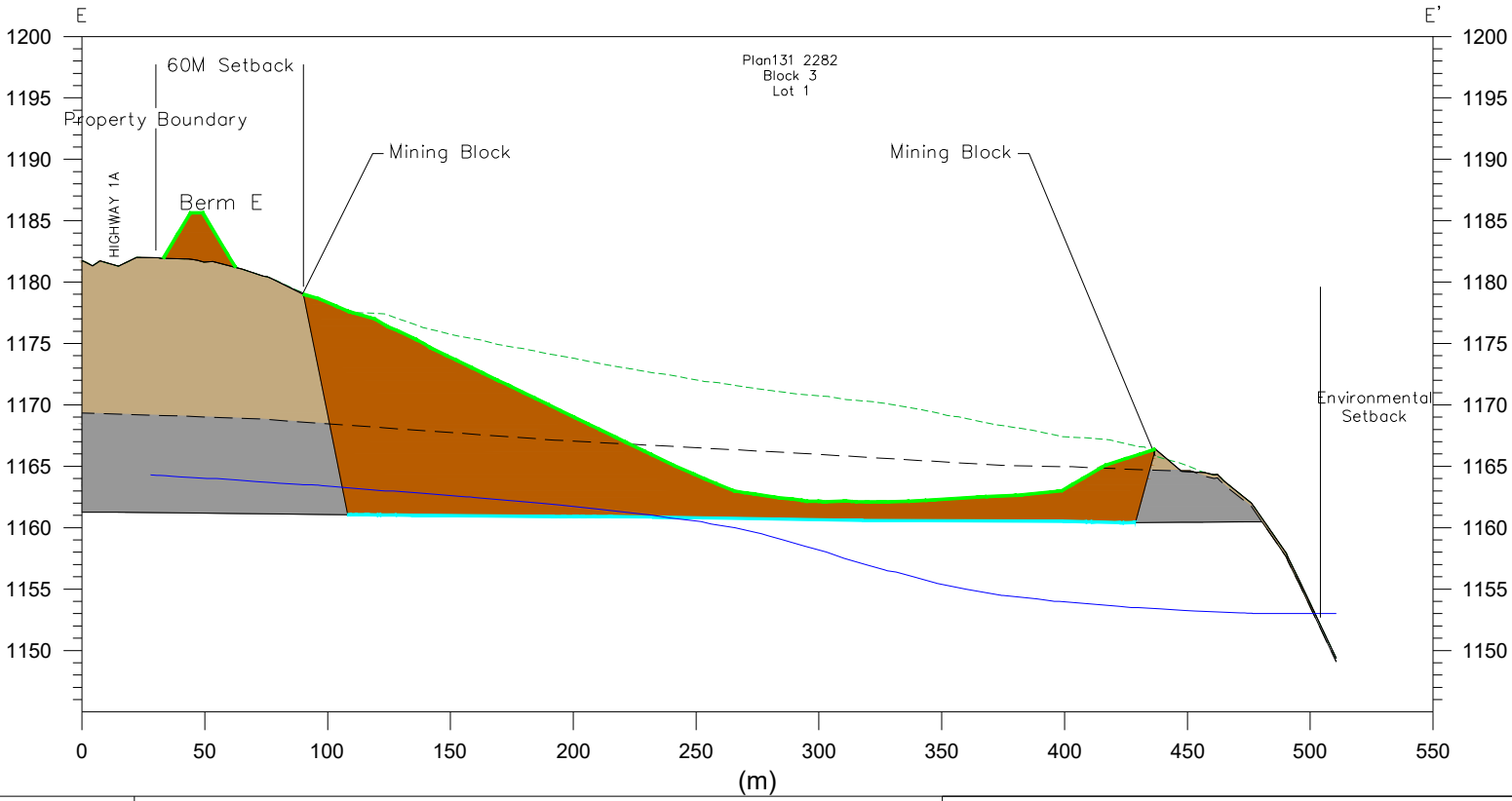
E

EXISTING SITE CONDITIONS



E

RECLAIMED SITE CONDITIONS



- LEGEND:**
- Clay
 - Gravel
 - Backfilled Material (Clay)
 - Original Topsoil/Subsoil
 - Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
 - Original Ground Profile
 - Original Top of Gravel
 - Ground Water Table
 - Hydraulic Connectivity Layer (1 ft. / 0.3m.)

- NOTES:**
- All units are in meters
 - All berms are constructed to 3H:1V with 5m wide top
 - All reclaimed slopes are constructed to less than 10H:1V
 - All mine faces are mined to no more than 1H:1V
 - 3m property line setback utilized where applicable
 - For cross-section plans, 5:1 vertical exaggeration is exercised
 - For cross-section plans, elevations are provided in MASL
 - For cross-section plans, mapped gravel is underlain by bedrock
 - For cross-section plans, bedrock's type, depth and extend are unknown

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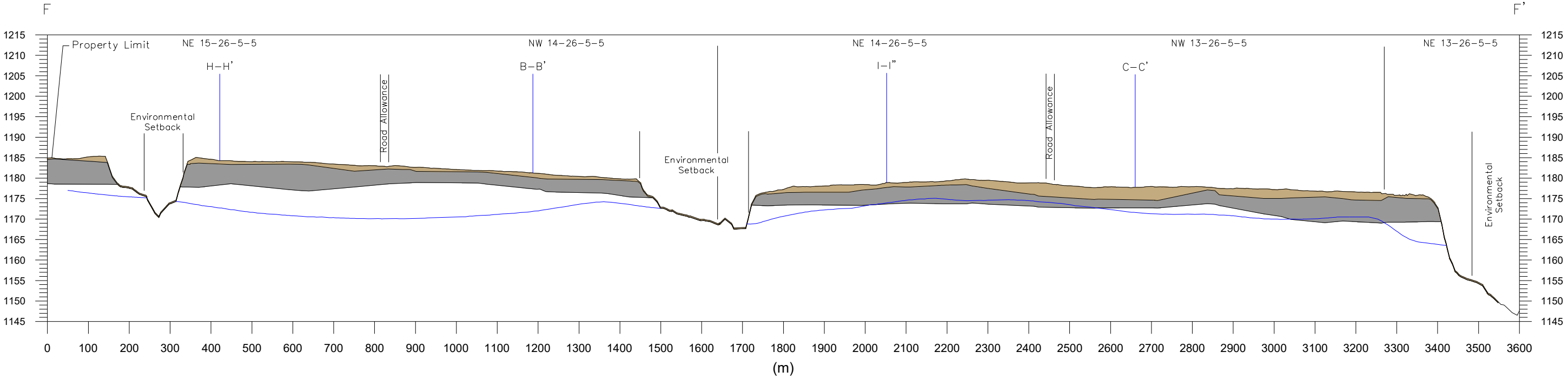
West Cochrane
Cross Section E - E'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 11
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	

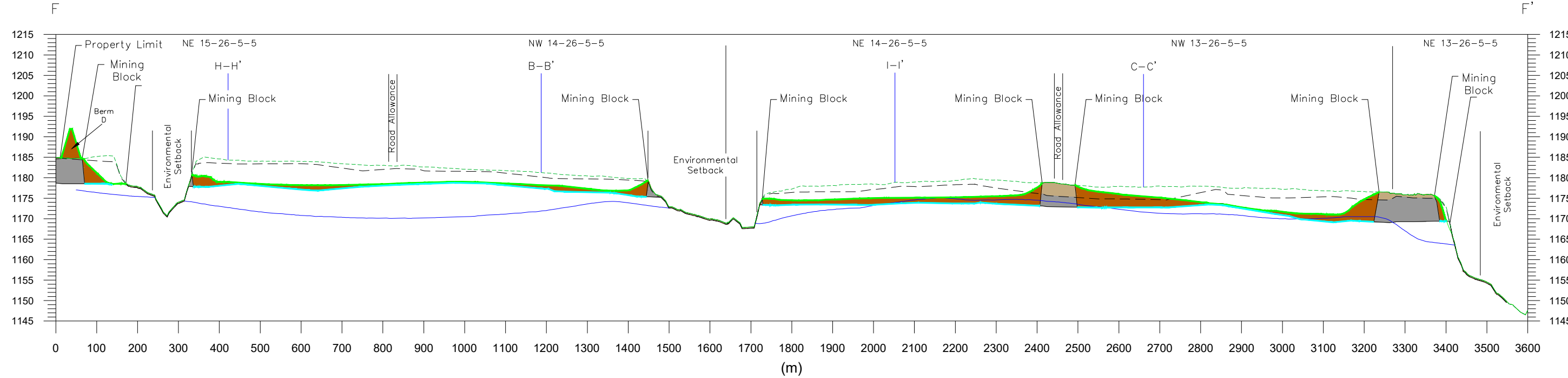
F

EXISTING SITE CONDITIONS



F

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 10:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

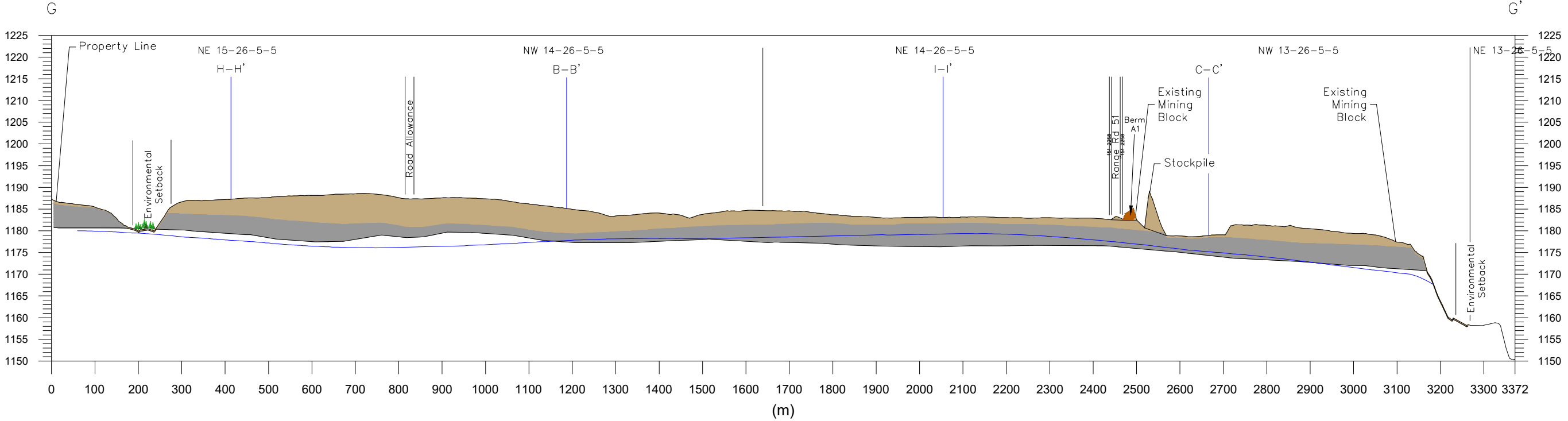
West Cochrane
Cross Section F - F'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 12
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	

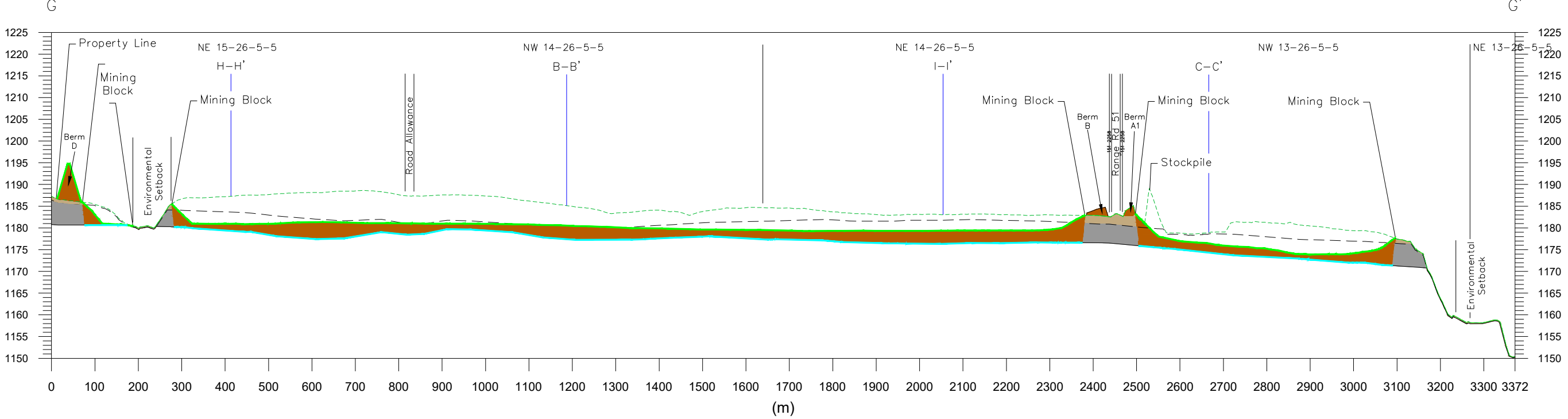
G

EXISTING SITE CONDITIONS



G

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 10:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

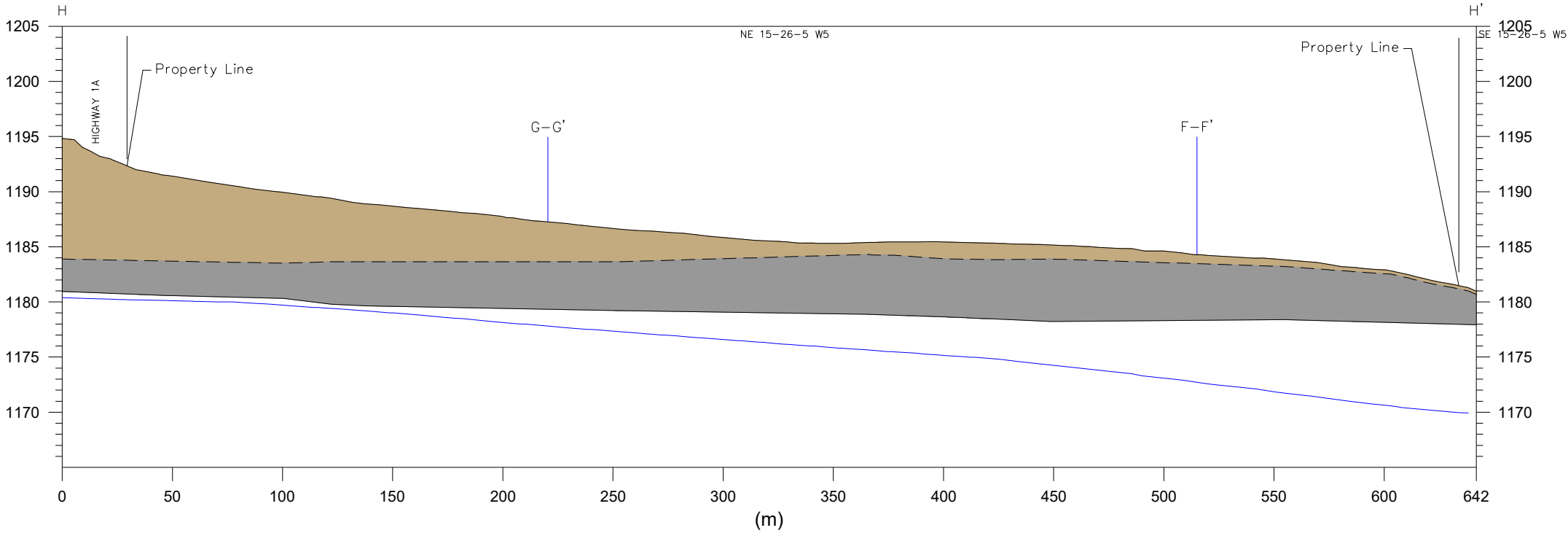
West Cochrane
Cross Section G - G'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 13
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	

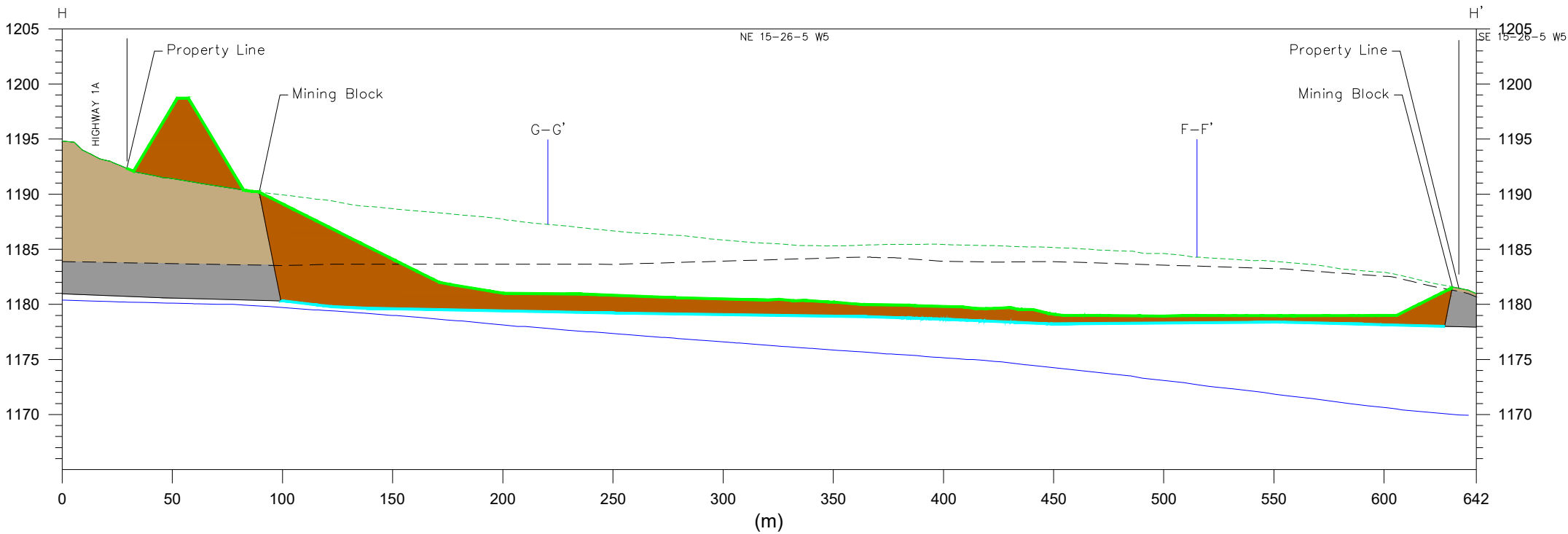
H

EXISTING SITE CONDITIONS



H

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

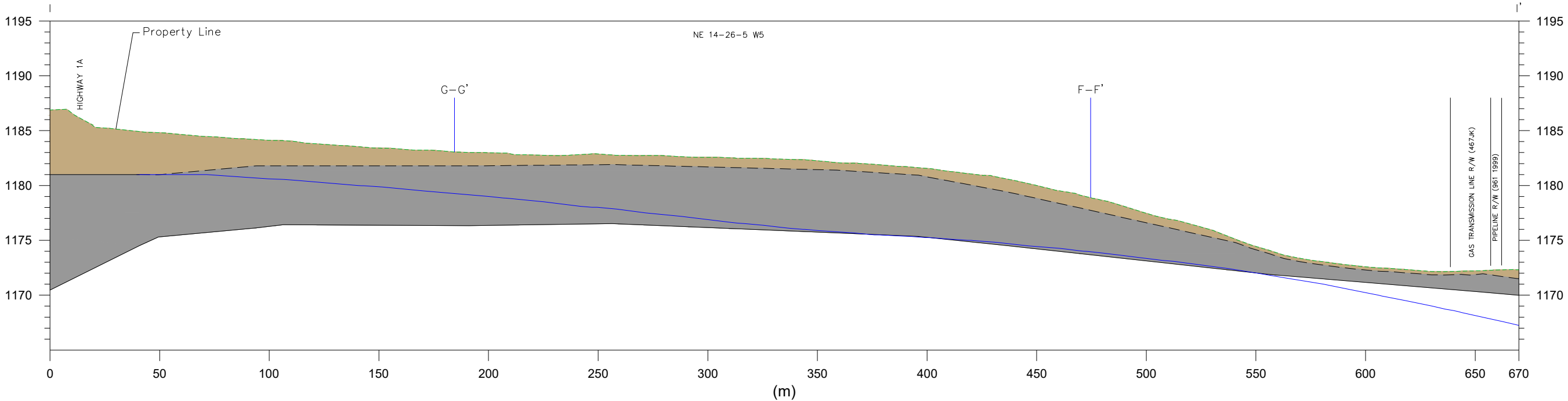
**West Cochrane
Cross Section H-H'**

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 14
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	

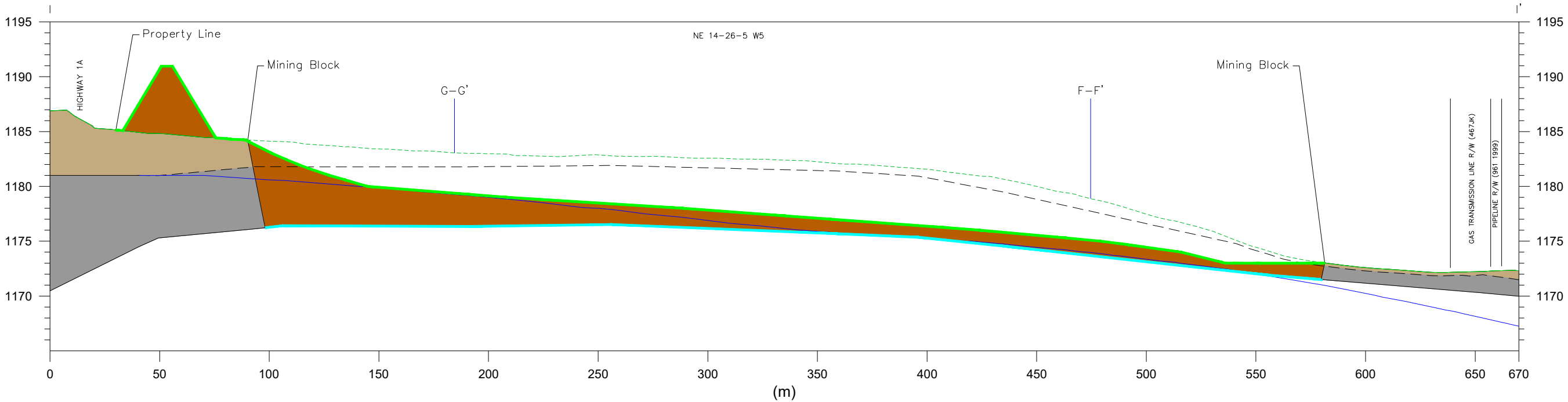
I

EXISTING SITE CONDITIONS



I

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

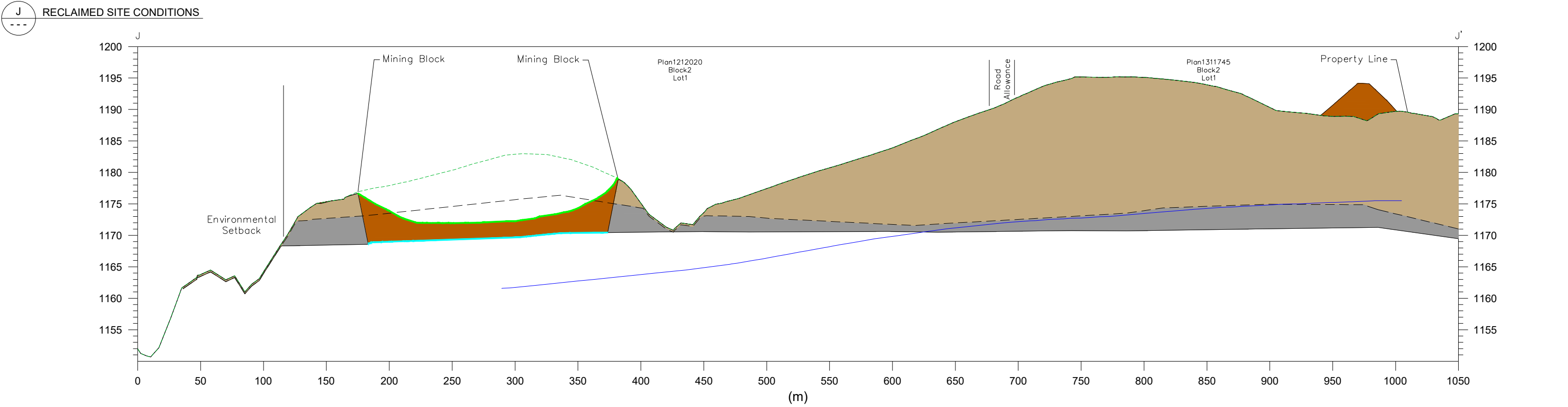
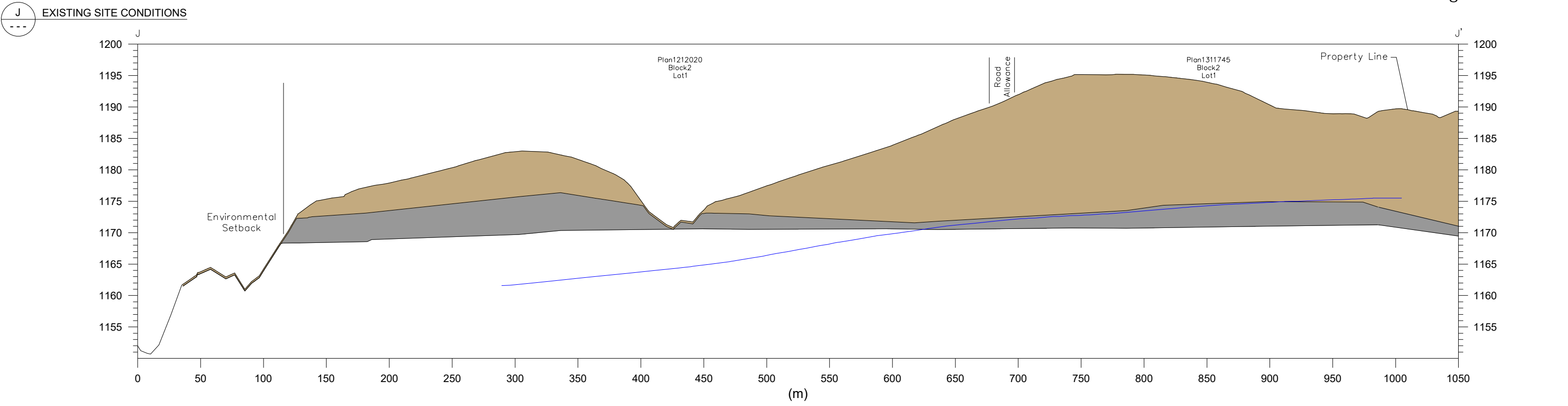
- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

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West Cochrane
Cross Section I-I'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

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DATE SUBMITTED: MAY 2020		CHECKED BY: TC	



- LEGEND:**
- Clay
 - Gravel
 - Backfilled Material (Clay)
 - Original Topsoil/Subsoil
 - Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
 - Original Ground Profile
 - Original Top of Gravel
 - Ground Water Table
 - Hydraulic Connectivity Layer (1 ft. / 0.3m.)

- NOTES:**
- All units are in meters
 - All berms are constructed to 3H:1V with 5m wide top
 - All reclaimed slopes are constructed to less than 10H:1V
 - All mine faces are mined to no more than 1H:1V
 - 3m property line setback utilized where applicable
 - For cross-section plans, 5:1 vertical exaggeration is exercised
 - For cross-section plans, elevations are provided in MASL
 - For cross-section plans, mapped gravel is underlain by bedrock
 - For cross-section plans, bedrock's type, depth and extend are unknown

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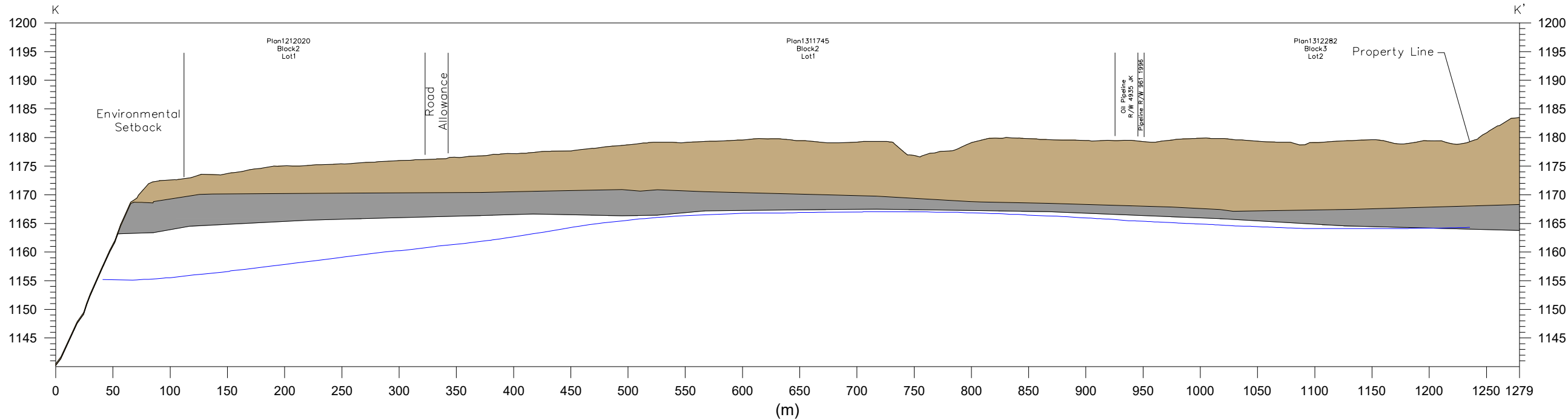
**West Cochrane
Cross Section J - J'**

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 16
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	

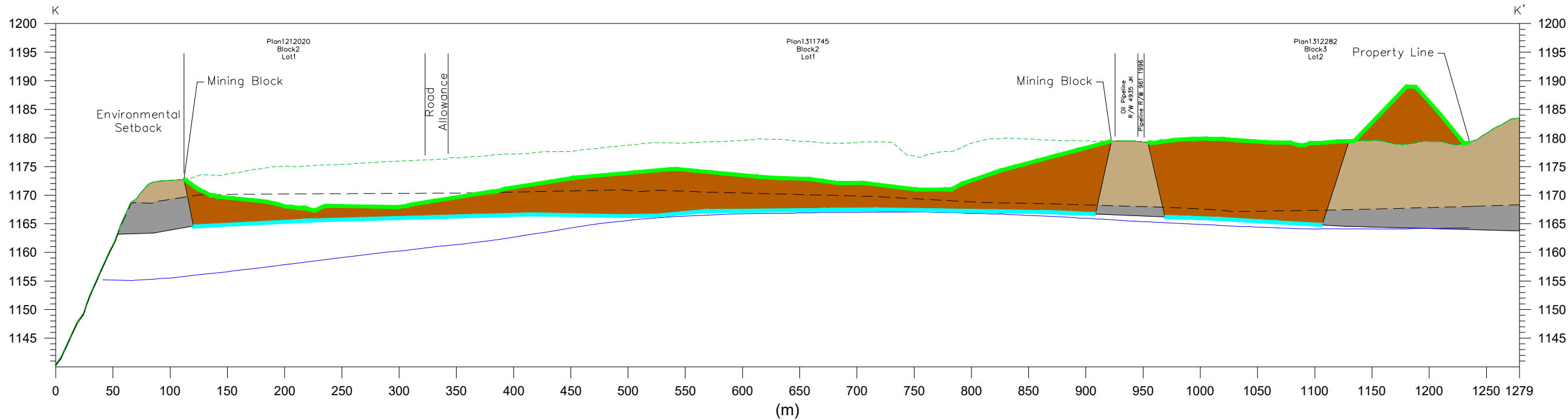
K

EXISTING SITE CONDITIONS



K

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

BURNCO Rock Products Ltd

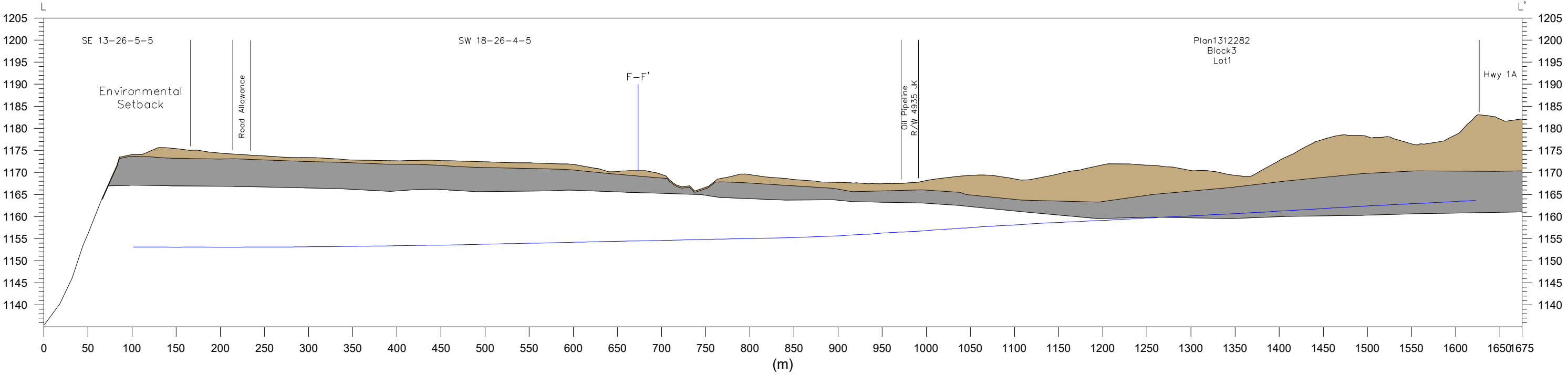
West Cochrane
Cross Section K - K'

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 17
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	

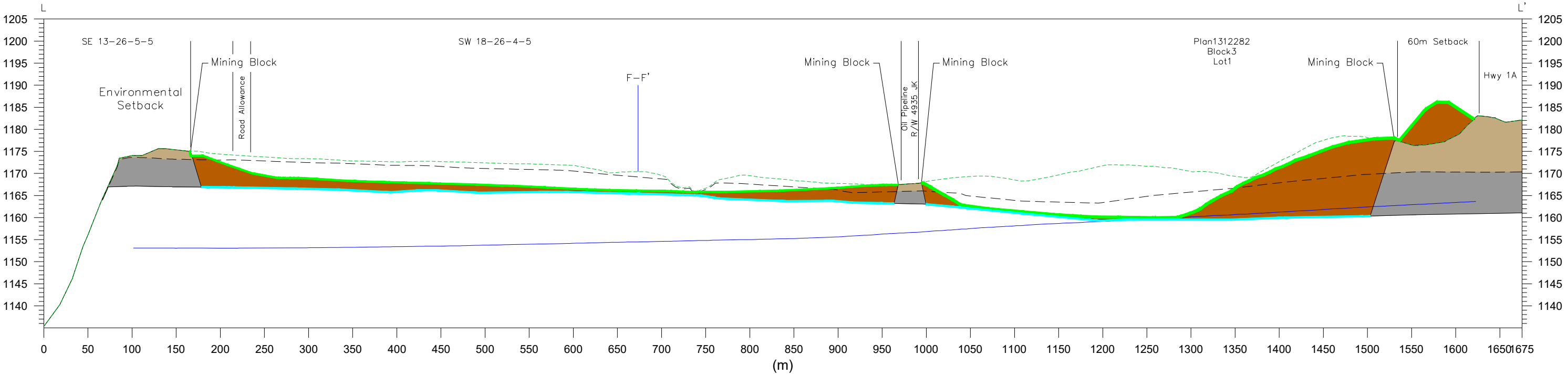
L

EXISTING SITE CONDITIONS



L

RECLAIMED SITE CONDITIONS



LEGEND:

- Clay
- Gravel
- Backfilled Material (Clay)
- Original Topsoil/Subsoil
- Replaced Topsoil/Subsoil (85% of pre-disturbed depths)
- Original Ground Profile
- Original Top of Gravel
- Ground Water Table
- Hydraulic Connectivity Layer (1 ft. / 0.3m.)

NOTES:

- All units are in meters
- All berms are constructed to 3H:1V with 5m wide top
- All reclaimed slopes are constructed to less than 10H:1V
- All mine faces are mined to no more than 1H:1V
- 3m property line setback utilized where applicable
- For cross-section plans, 5:1 vertical exaggeration is exercised
- For cross-section plans, elevations are provided in MASL
- For cross-section plans, mapped gravel is underlain by bedrock
- For cross-section plans, bedrock's type, depth and extend are unknown

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**West Cochrane
Cross Section L - L'**

NE 15-26-05 W5M; NW 14-26-05 W5M; NW 13-26-05 W5M; SW 13-26-05 W5M; SE 13-26-05 W5M;
NE 13-26-05 W5M; SW 18-26-04 W5M; SE 18-26-04 W5M; NE 7-26-04 W5M

DATE DRAWN: FEB. 2020	SCALE: N.T.S.	DRAWN BY: ML	DWG. NO. 18
DATE SUBMITTED: MAY 2020		CHECKED BY: TC	