Master Site Development Plan

HUGHES GRAVEL PIT

September 2017

Hughes Gravel Pit
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Prepared in support of a proposed amendment to re-designate:
NE-36-26-4-W5M

from
Ranch and Farm District

to
Natural Resource Industrial District

September 2017

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1.0 Introduction

1.1 Overview

Lafarge Canada Inc (Lafarge) is proposing to develop a sand and gravel pit, the Hughes Gravel Pit, located at NE 36-26-04-W5M within Rocky View County. Lafarge owns the lands which comprise 160 acres and are currently used for cattle grazing, hay crops, and a small acreage which Lafarge is presently renting out.

The intent is to mine the marketable gravel, process it on site, and then haul it to construction projects in the surrounding communities. The site is estimated to contain 12.5 million tonnes of marketable construction aggregates. It is anticipated to operate for 50 years and at the end of life will be restored to use as farmland.

Lafarge recognizes the impact that a sand and gravel development can have on surrounding neighbors. As such, considerable consultation and planning effort has been devoted to ensure that this development minimizes any such impacts and at the same time, lays out systems to ensure performance of the project through the use of ongoing monitoring. The goal is to deliver a development which can exist with minimal impact on its surroundings while still providing access to the sand and gravel resources at this site which are needed to build our communities.

This Master Site Development Plan (MSDP) was developed in support of Lafarge's application to affect a re-designation of the quarter section from Ranch and Farm (RF) to Natural Resource Industrial (NRI) as required under bylaw C-4841-97.

1.2 Purpose of this MSDP

The MSDP is the first step in the permitting process for a gravel pit in Rocky View County. The MSDP is a non-statutory plan that, once adopted by RVC Council, will set out the vision, methodology, and operational guidelines for the Hughes Gravel Pit.

Commitment #1: The commitments laid out in this MSDP shall guide the development, operation, and reclamation of the Hughes Gravel Pit.

2.0 Municipal and Provincial Approval Requirements

Commitment #2: Lafarge will ensure that all required municipal and provincial permits are received prior to the commencement of activities and that they are adhered to during the course of operations.

2.1 Municipal Requirements

In Rocky View County, gravel pit developments must pass a two stage permitting process. The Master Site Development Plan (MSDP) is the first step. The MSDP will allow the County to pass a bylaw re-designating the lands from Ranch and Farm (RF) to Natural Resource Industrial (NRI). Once this has happened, the second step will be the application for a development permit. The application for a development permit will provide additional details of Lafarge's proposals and provide an opportunity for Rocky View County to impose formal operating requirements and restrictions on the development.

The Transportation Offsite Levy will become payable after the issuance of a conditional Development Permit and the Community Aggregate Payment will be payable in accordance with the applicable Community Aggregate Payment Levy bylaw.

2.2 Environmental Protection and Enhancement Act

Sand and gravel pits are regulated by Alberta Environment and Parks (AEP) under the Code. The Code states that all pits that result in a disturbance of 5.0 ha or larger require a registration. Lafarge will be submitting an application to register this pit.

2.3 Water Act

Sand and gravel pits are regulated by AEP under the Water Act. This encompasses several areas of water use and disturbance.

A number of wetlands have been identified on this site. As such, an approval is required under the Water Act for the removal of these wetlands.

It is anticipated that all stormwater will be handled on site. The majority of stormwater will be allowed to dissipate naturally into the grade and sub-grade of the site. Should pumping be required, the affected stormwater will be directed to a recharge pond where the water will be dissipated into the sub-grade. This method of handling pit water is considered exempt under the *Water Act* and an approval will not be required.

Lafarge will not be mining within the groundwater table. In areas where groundwater is present, Lafarge will maintain a buffer of 1m. A *Water Act* approval is not required when utilizing this methodology.

2.4 Historical Resources Act

The Historical Resources Act serves to protect historic buildings and other structures, archeological sites (buried artifacts and other evidence that tell us about human life in the past), and paleontological sites (fossilized remains of plants and animals). If an activity is likely to result in the alteration of, damage to or destruction of a historic resource, the person or company undertaking the activity may be required to conduct a Historical Resources Impact Assessment (HRIA) among other requirements. Lafarge has completed a site review and received a clearance letter from Alberta Culture approving a gravel pit development.

2.5 Alberta Transportation Roadside Development Approvals

Alberta Transportation requires a roadside development permit for all proposed developments, including change in use of existing development or access, within 300 metres of the provincial highway right-of-way boundary or within 800 metres of the centre point of an intersection of the provincial highway with another public road. The development may not proceed until a permit has been issued by Alberta Transportation subject to the provisions of Section 11 – 19 inclusive of the Highways Development and Protection Act, Chapter H-8.5 2004, amendments thereto, and the Highways Development and Protection Regulation (Alberta Regulation 326/2009) and amendments thereto. As such, Lafarge has completed a Traffic Impact Assessment related to the Hughes Gravel Pit and has been in discussion with Alberta Transportation in order to ensure the development plans are in accordance with their requirements. Lafarge will be submitting an application to Alberta Transportation based on those reports and discussions.

2.6 Berms

Two berms are proposed, one adjacent to Hwy 567 for the full width of the quarter section and the second at the south east of the quarter section adjacent to RR40. These berms serve as visual, acoustic and fugitive dust barriers for the site. These berms will be located in accordance with Alberta Transportation and Rocky View County specification.

3.0 Existing Conditions

3.1 Location and Surrounding Land Use

The Hughes Gravel Pit is located on the south side of Provincial Highway 567 and the west side of range road 40. The quarter section is located ~30km west of Airdrie and ~10km North of Cochrane. A location map is provided in Appendix D.

A large portion of the project site is zoned by RVC as Ranch and Farm District (RF). According to Section 43.1 of the RVC County Bylaw, "*the purpose and intent of this District is to provide for agricultural activities as the primary land use on a quarter section of land or on large balance lands from a previous subdivision*." There is a small section at the northeast corner of the Project area, which is designated as Farmstead (F) land use. According to Section 47.1 of the Bylaw, "*the purpose of this District is to provide for a single parcel of land containing an existing Farmstead from an unsubdivided quarter section*."

The surrounding Land Use is predominantly Ranch and Farm District, with the main use being grazing. The area has a rolling landscape covered mainly by natural grasses with some hayland. There are 28 single family residences located within 2.4kms (1.5 miles) of the development. Please see the map provided in Appendix D.

In addition to the Ranch and Farm uses, it is important to note that Provincial Highway 567 is a major transportation corridor. A number of light industrial developments exist along this highway in the areas west of the pit. This includes the Shell gas station at the junction of Highway 567 and Highway 22. A light industrial complex is also 1.6kms (1 mile) away which houses a number of businesses including heavy equipment storage and a garden centre.

Hillstone Aggregates Gravel Pit is located on the quarter section immediately to the west of Hughes Gravel Pit. In addition, gravel pits are currently being proposed to the North (McNair Sand & Gravel) and the East (Mountain Ash Limited Partnership).

A final feature worth noting is the presence of the Big Hill Springs Provincial Park located approximately 3.2kms to the South East of Hughes Gravel pit.

3.2 Topography and Surface Drainage

Regional topography slopes gently to the northeast, southeast, and south towards Big Hill Creek, which is located a minimum of 2.2 km from the site. The site is located at an elevation approximately 90 m higher than Big Hill Creek, with the majority of elevation loss occurring within 300 m of the creek.

Topography at the site gently slopes to the southeast and south in the northern portion of the site, and slopes downwards more steeply in the southern portion of the site towards a

northwest-southeast trending local low lying area. Surface water was not present in this local low lying area based on available aerial photography from 2011 to 2013 (Google, 2014). The elevation difference between the site and the local low lying area is approximately 16 m. The closest regionally mapped drainage pathway is located approximately 1 km southeast and down-slope of the site and drains into Big Hill Creek.

Surface water drainage at the site is anticipated to follow local topography and drain towards the south and southeast. Several low lying areas that are not regionally mapped are present in the northern portion of the site and surface water flow at the site is anticipated to drain towards these features on a seasonal basis based.

3.3 Soils

Lafarge commissioned Ghostpine Environmental Services Ltd. (Ghostpine) to conduct a Biophysical Assessment as well as a Preconstruction Site Assessment for the proposed Hughes Gravel Pit. These assessments can be found in Appendix F and Appendix G.

The majority of the quarter section's topsoil is Class 4, characterized as having limited agricultural capabilities. The Temperature subclass (H) places further limitations on the land's crop yielding potential.

3.4 Vegetation

Lafarge commissioned Ghostpine Environmental Services Ltd. (Ghostpine) to conduct a Biophysical Assessment as well as a Preconstruction Site Assessment for the proposed Hughes Gravel Pit. These assessments can be found in Appendix F and Appendix G.

The vegetation within the Foothills Parkland Natural Subregion is characterized by the driest south and west-facing slopes vegetated by mountain rough fescue – bluebunch fescue – needle-and-thread communities on well to rapidly drained soils. Somewhat moister southerly slopes are typically vegetated by herb-rich mountain rough fescue – bluebunch fescue grasslands in the southern unit of the Natural Subregion, similarly diverse mountain rough fescue Parry oatgrass grasslands in the northern unit. The moist, moderately well-drained northerly slopes, seepage zones or low areas support aspen forests with understories of snowberry, silverberry, white meadowsweet, prickly rose, saskatoon and a diverse array of herbs. Balsam poplar also occurs on moister sites and white spruce or Douglas fir are occasional.

Vegetation species observed in the Project area include three-flowered avens, goldenbean, prairie crocus, American vetch, common yarrow, Kentucky bluegrass, purple oat-grass, star-flowered false Solomon's seal, northern bedstraw, graceful cinquefoil, saline shooting star, wild strawberry, everlasting (three species), early blue violet, veiny meadow rue, pasture sage, western wheatgrass, prickly rose, and Flodman's thistle. (Pre-Construction Site Assessment, Ghostpine 2014).

There are no *Species at Risk* based on a search done on June 9, 2014 of the Alberta Conservation Management Information System (ACIMS).

3.5 Wildlife

Lafarge commissioned Ghostpine Environmental Services Ltd. (Ghostpine) to conduct a Biophysical Assessment as well as a Preconstruction Site Assessment for the proposed Hughes Gravel Pit. These assessments can be found in Appendix F and Appendix G.

Based on these two reports:

1. The overall habitat quality for this area is low because it is a matrix of improved pasture and hayland, with very little structural diversity, such as tree patches. There are a few very small tree patches but no additional species were observed in them when compared to the surrounding pasture. The larger treed area surrounding the acreage provides suitable habitat for wildlife species that are not grassland-dependent, but this is an isolated habitat, with no connectivity to other forested areas.

2. The project area does not appear to be a wildlife corridor, because it lacks landscape features that would funnel species to utilize the quarter section, such as valleys, treed areas, and rivers. There were no game trails or abundant mammal sign observed during the field assessment.

3. The overall wildlife species diversity is low. A greater number of wildlife species were observed in vicinity of the acreage area, but overall biodiversity was observed to be low.

If clearing is to take place during the migratory bird breeding season (April 01, to August 01) the site will be inspected by a qualified professional to ensure that no active nests are present. If active nests are present, clearing will be delayed until all the young have fledged.

3.6 Geology

The underlying bedrock at the project area is the Paskaspoo Formation which is generally comprised of mudstone, siltstone, and sandstone.

Table 1 - Stratigraphy at the Pit

Soil Layer	Average Depth (m)	Minimum Depth (m)	Maximum Depth (m)
Topsoil	0.23	0.14	0.30
Overburden	3.22	0.30	5.49
Sand & Gravel	22.7	21.0	25.0

3.7 Stratigraphy

The stratigraphy of the pit is shown on Table 1. A total of 4 test holes were completed in the area intended to be mined to determine the extent of gravel. Surface soil stratigraphy is based on the field assessment conducted by Ghostpine Environmental in June of 2014. The

stratigraphy as outlined in Table 1 and is based on a combination of test hole data and the field soil assessment.

3.8 Groundwater

Waterline Resources Inc. (Waterline) was retained by Lafarge to conduct a hydrogeological investigation of the proposed Hughes Gravel Pit. This investigation can be found in Appendix H.

No significant differences were found between the samples taken from the boreholes and the general description of the area geology. Standard pumping tests were completed and logs of 28 surrounding wells examined.

The results yielded the existence of a localised perched water table which is within the proposed excavation. Removal of this material will have no impact on the performance of local wells.

The testing of water samples yielded no adverse issues from both health and aesthetic objectives.

All field investigation activities were supervised and/or conducted by Waterline staff. The full and detailed results of these investigations are included in Appendix H.

4.0 Project Description

4.1 Proposed Site Activities

It is envisioned that the Hughes Gravel Pit will process and ship approximately 250,000 tonnes of aggregate per year. With an estimated reserve of 12.5M tonnes, the development is expected to operate for approximately 50 years.

At this time, it is envisioned that four significant pit activities will occur in order to allow the processing and sale of aggregates from this site. They include:

- Soils Removal / Placement / Progressive Reclamation
- Aggregate Mining / Crushing
- Sales Loading (Loader, Trucks & Scale)
- Asphalt Production - Temporary Asphalt Plant

It is important to note that most of these activates do not occur year round. Soils removal, placement, and progressive reclamation are typically only done once per year. Aggregate mining and crushing are typically done only once per year whereby materials are processed using a portable processing plant and materials are stockpiled on site for use in sales long after the processing plant has moved to another site. The temporary asphalt plant is envisioned not as a permanent fixture, but simply as an activity which might occur should a local paving project warrant the placement of a mobile asphalt plant in this location on a temporary basis.

4.2 Transportation Access

Access to the site will be from Provincial Highway 567 and is expected to be located on the west side of the property. This location will provide a common access to Hillstone Aggregates (operating immediately West of the Hughes Gravel Pit and McNair Sand & Gravel (proposed on the North side of the Hughes Gravel Pit). Based on consultation with Alberta Transportation as well as local residents, this location is desirable as it will provide a dedicated intersection for gravel related traffic while minimizing the impact on residential traffic using north and south bound Range Road 40.

Watt Consulting Group was retained by Lafarge to conduct a Transportation Impact Assessment (TIA) for Hughes Gravel Pit**.** This assessment can be found in Appendix J. For the shared intersection, this analysis also included the traffic generation expected from the other two gravel pits that would potentially be utilizing the intersection.

The recommendation of the TIA is for the construction of the Type IV(c) access intersection. This intersection type has also been endorsed by Alberta Transportation.

Roadside Development Permits will be required from Alberta Transportation for the Hughes Gravel Pit access and sign.

Commitment #3: Access to the site will be achieved through the installation of a type IVc intersection to be located on Highway 567 (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

4.3 Haul Route

The aggregates produced and shipped from the Hughes Gravel Pit will service a number of surrounding communities. It is envisioned that truck traffic related to the gravel pit will follow three main haul routes.

- Route #1 -East on Highway 567 into Airdrie - ~30% of Truck Traffic
- Route #2 - East on Highway 567 then South on Highway 766 then East on Highway 1A into Calgary - ~55% of Truck Traffic
- Route #3 - West of Highway 567 then South on Highway 22 into Cochrane - ~15% of truck traffic

Watt Consulting Group was retained by Lafarge to conduct a Transportation Impact Assessment (TIA) for the intersections along these haul routes. The analysis can be found in Appendix J. The results of the analysis of the gravel haul route for the Hughes Gravel Pit operation lead to the following, required in part due to an increase in background traffic:

- Opening Day Operating Conditions: As per the recommendations outlined in MMM Group's Silverhorn Functional Planning Study, the intersection of Highway 1A / Highway 766 requires signalization and a 20 m left turn bay should be introduced at the southbound approach.

- A monitoring program is recommended for the intersection of Highway 567 / Highway22 to establish when the intersection will require improvements. This improvement will be required due to the growth in background traffic volumes; additional traffic generated by the operation of the Hughes gravel pit will have negligible impact on the existing operation of Highway 567 / Highway 22.

As Lafarge is not the sole user of these intersections, it would not be appropriate for Lafarge to undertake these recommendations in isolation. Lafarge commits to working with Rocky View County and with Alberta Transportation in order to address the concerns related to the above intersections.

Lafarge recognizes that, together with other aggregate operators in the locality, it will be required to gain the necessary approvals for, and/or contribute towards the cost of, implementing the above recommended improvements through future development permits and agreements.

Furthermore, Lafarge acknowledges that Rocky View County and Alberta Transportation may, in future, identify additional highway safety measures and improvements that are necessary to accommodate cumulative levels of gravel truck traffic along the haul routes. Such measures may include the construction of climbing/passing lanes on Highway 567.

Lafarge appreciates that in obtaining approval of any future development permits for its proposed development, it may be required to contribute towards the implementation of these potential highway improvements.

Commitment #4: Subject to approval by Alberta Transportation, Lafarge will undertake, or contribute to, appropriate upgrades to the intersection of Highway 1A/Highway 766 and shall support Alberta Transportation and Rocky View County in determining the appropriate timing for the upgrade of the intersection of Highway 567/Highway 22 (see Appendix B: Joint Community Commitments. Lafarge is also committed to supporting the implementation of any necessary highway safety improvements along its identified haul routes as may be identified by the County and Alberta Transportation in any future development permit applications.

4.4 Site Design Features

In addition to the Type IVc access intersection which will be built as described above, Lafarge is proposing a variety of key design features which will help to ensure that the Hughes Gravel Pit will create minimal impact on the surrounding community.

Berms

Lafarge is proposing to construct two earth berms which will serve to restrict visibility to pit operations by passing motorists on Highway 567 as well as providing a visual and acoustic barrier in order to mitigate impacts on nearby residents.

The first berm will be built along the north portion of the quarter section. This berm will be constructed to a set elevation of 1304m above sea level. As the topography in the area varies, this will mean that the berm is approximately 5m above the grade of provincial Highway 567 at the western most extent of the berm and approximately 8m above the grade of provincial Highway 567 at the eastern most extent of the berm. It will be constructed with 3:1 (H:V) side slopes and the material required to construct it will be overburden and topsoil sourced from the initial phases of the site. This berm will require approximately 181,000 m^3 of material.

The second berm will be built in the south east portion of the quarter section in order to protect residences located directly South East of the Hughes Gravel Pit. This berm will be approximately 5m above the grade of Range Road 40. It will be constructed with 3:1 (H:V) side slopes and the material required to construct it will be overburden and topsoil sourced from the initial cut blocks for the site. This berm will require approximately 36,000 m^3 of material.

All berms will be contoured and seeded to grass.

Commitment #5: Lafarge will construct visual and noise attenuation berms. These berms will range in size from 5 -8m above original ground level. They will be built using 3:1 slopes (3 horizontal: 1 vertical) and a 5m flat top (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Internal Roads and Scale

Lafarge is proposing to construct a scaling facility for use in weighing gravel trucks prior to departure from the site. This scaling facility will house a small site office for use in pit management. It will have washrooms for staff and truckers. This facility will be linked to the type IVc intersection along Highway 567 by internal roads. These roads will be paved. Paving this section of internal road will serve several purposes. First, the paving will assist in mitigating noise from trucks by providing a smooth driving surface. Second, pavement will also assist in dust mitigation by providing a clean dust free surface for driving on around the intense operations of the scales. Finally, the paved surface will help to minimize debris being

tracked out onto the highway as the paved surface will allow for minimal debris to lodge in the tires and chassis of the trucks just prior to them pulling out onto Highway 567.

Potable Water and Wastewater

Potable water will be supplied in personal consumption quantities located as required. Portable sanitary facilities will be established on site and regular maintenance contracts issued by Lafarge

Commitment #6: Lafarge will construct a scaling facility, truck staging area and office. Lafarge will pave the internal access road to this scale facility.

Truck Monitoring

A final but crucial site feature will be the use of the Alberta Sand and Gravel Association Truck Registry System. Lafarge continues to be a strong proponent of this system. The registry imparts minimum operating standards and establishes accountabilities for trucks operating outside of gravel pits or job sites. Decals are applied to each truck which have an easily remembered number and a centralized toll-free number to take public complaints. The ASGA then oversees an established complaint management protocol which allows companies to ensure that truckers are behaving in a safe and courteous manner while utilizing public roads.

Commitment #7: Lafarge hired haulers will utilize the Alberta Sand and Gravel Association Truck Registry System for identification of trucks and complaint management related to truck behaviour on public roads (see Section 8: Joint Operating Standards).

4.5 Phasing

Mapping related to pit phasing is provided in Appendix D.

Phase 1

Phase 1 will comprise land for the creation of the following pit elements:

- First cut of the excavation
- the north berm (built using materials from the first cut of the excavation)
- Highway 567 access intersection and semi-permanent internal roads (mostly paved)
- Scale and Site Office
- Fuel storage area for Sales Loader
- Pond in SE corner of quarter section for use in storm water management
- the South-East Berm (built using materials from the SE storm water management pit)
- Placement of monitoring stations for noise / dust.

Phase 1 will establish the various elements required to successfully operate the Hughes Gravel pit. Two cuts will be made in order to expose gravel. The soils from these cuts will be used in the creation of berms. The access intersection and internal haul roads will be built. These will tie into a scaling facility which will incorporate a scale and site office. A small fuel station will also be created in this area for use in refueling the sales loader and other on-site equipment.

The first cut is expected to yield some 1M tonnes of material based on the expected sales of 250,000 tonnes per year.

Subsequent Phases

Subsequent phases are shown in Appendix D. Extraction is intended to occur in four phases over the 160 acres. These phases involve mining activity progressing east and then working south across the site until all materials are successfully extracted.

Lafarge will work to ensure that progressive reclamation is completed. Phasing boundaries will be determined at the development permit stage and sized appropriately to meet operational needs.

It is important to note that at all times, the site will be required to meet noise and air quality requirements detailed later in this submission. Should the amount of open area have a deleterious effect on those results, Lafarge will re-examine the need to accelerate our progressive reclamation. At the same time, securities held by AESRD will ensure that at any given time, there are sufficient funds set aside to ensure the reclamation of all disturbed areas.

4.6 Air Quality

Millennium EMS Solutions Ltd. (MEMS) was retained by Lafarge to provide an air quality assessment of emissions associated with the activities and operations of Lafarge's proposed Hughes Gravel Pit. This assessment can be found in Appendix E.

Project operations will result in emissions to the atmosphere. These emissions are expected to be comfortably below the thresholds established by the Alberta Ambient Air Quality Objectives and the Canadian Ambient Air Quality Standards (for $PM_{2.5}$).

Four individual pit activities were defined for the Project:

- overburden removal
- aggregate mining/crushing
- sales (trucking)
- an asphalt plant

Two maximum daily emission cases were assessed:

- Normal Operations - overburden removal, aggregate mining/crushing, sales
- Normal Operations with Asphalt Plant - overburden removal, aggregate mining/crushing, sales, and an asphalt plant

To be conservative, precipitation was not considered to reduce annual emissions. In addition, U.S. EPA emission factors, especially for fugitive dust, are considered to be conservative and the regulatory model is designed to be conservative as well. It is also very unlikely that all four pit activities will occur concurrently with the worst case meteorological conditions for dispersion.

Operation of the Hughes Gravel Pit is thus not expected to adversely affect air quality beyond the property boundary, alone or in conjunction with emissions from other operating pits. Air quality monitoring will occur as detailed in the Joint Operating Standards (see Section 8).

Commitment #8: Lafarge will utilize dust control measures such as road sweeping and the application of calcium chloride or water to haul roads as required to control dust (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Commitment #9: Any temporary asphalt plant shall only utilize propane or natural gas as a fuel source.

Commitment #10: Lafarge will install monitors for $PM_{2.5}$ and PM_{10} in collaboration with adjacent operators. These readings will be taken on an hourly basis. Corrective action will be taken if readings are exceeding applicable Canadian or provincial standards as a result of activity at the Hughes Gravel Pit. Air quality monitoring details will be shared publicly through the Big Hill Springs Aggregate Producers Group joint website (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

4.7 Noise

Lafarge commissioned a comprehensive Noise Impact Assessment by Patching Associates Acoustical Engineering Ltd, which is included in Appendix I. This report concludes that the Hughes Gravel Pit contribution to noise in addition to the background noise will not exceed proposed limits.

The primary objectives of the study were to:

- Assess the sound data of typical equipment that is proposed for the facility,
- Predict the noise level at the receiver locations of concern near the proposed facility site during maximum disturbance scenario at the site, and
- Recommend noise control measures to minimize noise disturbance from the project operations.

As topsoil removal will occur starting at the surface of the ground, while gravel extraction operations will occur only once approximately 5 m of overburden are removed, the gravel extraction will take place at significantly depressed locations, where the noise-reduction berms will reduce the noise. Based on information provided by Lafarge, the study focuses on assessing the noise impacts from normal operation during a maximum disturbance scenario at the site. The maximum disturbance scenario would be expected to occur during the concurrent operations of all the equipment associated with stripping (includes topsoil and overburden removal and excavation), crushing, asphalt plant and sales activities.

It is also expected that short duration activities and one-time events like the construction of the berm required for noise control will generate noise. However, due to the short duration of these one-time events, the assessment focused on the long-term steady activities that would generate noise at the site during normal operations.

The sound power levels emitted from the facility were determined through the use of sound pressure level data from previous studies and field measurements of similar equipment operating at other facilities. These values were then used to model the proposed facility and the surrounding area to determine the expected noise level contributions at these residences from the normal operations of the facility during maximum disturbance. The modeling was performed using the CadnaA noise-modeling package. The results of the model are shown in Table 2 for the residences of concern during daytime maximum disturbance scenario and assuming downwind conditions.

Table 2 - Noise Impact Assessment

Residence (Approximate distance to the Mine Center)	Predicted Daytime Facility Sound Level* (dBA)	Measured Daytime Baseline Sound Level** (dBA L_{eq} Day)	Predicted Cumulative Sound Levels with Measured Daytime Baseline Sound Level (dBA)	Daytime Noise Limit (dBA)	Meets Daytime Noise Limit?
R01 - 600 m NE	56	57	60	60	Yes
R04 - 930 m SE	50	43	51	60	Yes
R03 - 1710 m W	48	45	50	60	Yes
R02 - 1720 m NW	48	57	58	60	Yes

Note: *Assumes all equipment associated with stripping, crushing, asphalt plant and sales are operating at the same time.
**The measured daytime baseline sound level is from the field survey completed between September 15, 2014 and September 18, 2014 (for details, see the Background Sound Survey report in Appendix B). R01 and R04 are the primary residences of concern and were measured. R02 and R03 located more than 1500 m from the facility were estimated to be in similar acoustic environment as R01 and the project site, respectively.

As Rocky View County has no stated noise limit guidelines in the County's Noise Bylaw No. C-5772-2003, the City of Calgary noise bylaw limits was used as a guidance document. The City of Calgary Bylaw (Bylaw 5M2004) stipulates the following:

- No person shall cause or permit to be caused a Continuous Sound that exceeds the greater of the following Sound Levels at any point of reception within a residential development:
  - 65 dBA Leq measured over a one (1) hour period during the daytime; or
  - 50 dBA Leq measured over a one (1) hour period during the nighttime;
- Notwithstanding above, where the Ambient Sound Level for an area is at or above the maximum allowable day-time or nighttime Sound Levels referred to above, measured over a one hour period, a Sound Level must exceed 5 dBA Leq over the Ambient Sound Level before it becomes an offence.

Within the submitted Noise Impact Assessment attached as Appendix I, some recognition of the suburban (semirural) nature of the immediate area near the proposed mining operation is given through a *5 dBA* reduction in the City of Calgary limit. The daytime noise limit adopted in this study for all the receivers was 60 dBA Leq (1 hour).

In order to determine the existing baseline or background sound levels in the area, PAAE conducted a continuous background sound level measurement at the proposed mine site and two closest receivers of interest. For more information on baseline sound measurement results, please refer to the report in Appendix I. In order to assess the noise impacts utilizing a cumulative effects assessment methodology, the measured background sound level at each receiver of interest was added to the predicted sound from the project, and the cumulative level was compared to the 60 dBA Leq daytime noise limit utilized for the study.

Notwithstanding the conclusions of the submitted Noise Impact Assessment, Lafarge commits to ensuring that noise levels generated by the operation will be maintained at or below Permissible Sound Levels calculated in accordance with the methodologies and guidelines of the Alberta Energy Regulator's (AER) 'Directive 038: Noise Control'. At development permit stage, a revised Noise Impact Assessment will be submitted to Rocky View County, demonstrating compliance with the Directive.

A representative selection of residences were monitored during the information (baseline) gathering process. Once site activity commences, two residences will be selected for monitoring as part of the joint monitoring initiative of Big Hill Springs Aggregate Producers Group. Over time it may be appropriate to change the location of one or both the noise monitoring devices. This will be done in consultation with the impacted land owners and Rocky View County. The monitors will be located inside the Lafarge property boundary closest to the agreed upon location. The residence on the subject quarter section will be abandoned prior to commencement of mining activity on this site. The buildings on the adjacent quarter section to the west are unoccupied and slated for demolition in the short term.

In order to ensure that the reality of this operation matches with the modeling and that the sound mitigation controls are performing as assumed, Lafarge will commit to installing noise monitor (in conjunction with air quality monitors) in collaboration with adjacent operators. These monitors will monitor noise levels on an hourly basis. The results will be compared to the joint standard at the project property line as determined by the Big Hill Springs Aggregate Producers Group, and reported to Rocky View County on a regular basis. This monitoring will ensure that there is a mechanism for identifying if the site is not performing as predicted. Lafarge, in collaboration with the Aggregate Producers Group, will commit to investigating any exceedances of determined standards and taking corrective action in order to achieve these standards at any residences being affected by the Hughes Gravel Pit.

Commitment #11: Lafarge will install a noise monitor in collaboration with adjacent operators to monitor dBA on an hourly basis. Corrective action will be taken if readings are exceeding the agreed sound level dBA limit at the project property line as a result of activity at the Hughes Gravel Pit. At development permit stage, a revised Noise Impact Assessment will be submitted demonstrating compliance with the Alberta Energy Regulator's 'Directive 038'. Noise monitoring details will be shared publicly through the Big Hill Springs Aggregate Producers Group joint website (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

4.8 Groundwater

Waterline Resources Inc. (Waterline) was retained by Lafarge to conduct a hydrogeological investigation of the proposed Hughes Gravel Pit. This investigation can be found in Appendix H. This investigation was completed for due diligence purposes and is not considered a regulatory requirement to support the development approval or operations.

The regional sand and gravel deposit, that is proposed to be developed at the site, accumulated within a glacial outwash channel. The channel trends north-south in the area north of the intersection of Highways 22 and 567, and extends to the east, parallel to Highway 567. The width of the channel as defined by the gravel deposit ranges from approximately 1.5 to 4.0 km. In the vicinity of the proposed development site, the channel width is estimated at 4 km. The maximum thickness of the sand and gravel deposit apparently occurs in the vicinity of the site, and the deposit appears to thin towards the channel margins where the gravel matrix is characterized by higher clay content.

The geology at the site is characterized by approximately 3 to 5 m of clay underlain by sand and gravel to depths between approximately 25 to 28 metres below ground level (mbgl). Sandstone and shale bedrock was identified as the subcrop beneath the sand and gravel deposit.

The regional water table across the site ranged between depths of approximately 20 to 23 mbgl. The sand and gravel unconfined aquifer within the channel was developed as a domestic water supply within the development site quarter section. Other domestic water wells located within approximately 1.6 km radius of the proposed development site appear to be completed in the deeper bedrock underlying the sand and gravel deposit. Localized, perched water table conditions appear to exist at one well located in the northwest area of the site at depths of 8.5 to 11.2 mbgl, but appear to be discontinuous both at the site and regionally.

Surface water accumulates in low lying areas at the site where it appears to be sustained seasonally before being lost to evaporation. Infiltration appears to be limited by the shallow low permeability clay soils that overlie the permeable gravel deposits. The closest regionally mapped drainage course is located approximately 1 km southeast, and downslope of the site, and permanent surface water bodies are not present within at least 1 km of the site. The regional water table appears to be hydraulically disconnected from the local ponded water and surface drainage courses.

Baseline groundwater quality was determined by analyzing groundwater samples collected from the site wells and water wells located at neighboring landowner properties. General chemistry parameters (e.g., major ions, nutrients, etc.), metals, and hydrocarbons generally met the Guidelines for Canadian Drinking Water Quality, aside from total aluminum at one on-site well and total iron at on-site wells and one domestic water supply. As appropriate, once sufficient area has been opened, Lafarge will review the groundwater elevations with respect to mining operations.

No gravel washing, dewatering, or other industrial uses of groundwater are currently proposed for the development. On-site water management above the water table may be completed to manage surface water runoff or horizons affected by perched water table conditions during aggregate extraction activities. Development of the site for aggregate extraction is not anticipated to unreasonably interfere with existing groundwater users, permanent surface water bodies, or groundwater resources in general if appropriately managed.

All mining will cease at least 1.0 m above the water table. This standard has been informed by Section 4.11.4 of Alberta Environment and Parks' *Guide to the Code of Practice for Pits,* which states that soil materials "should be placed at least 1 metre above the seasonally high water table" during reclamation.

Groundwater levels will be monitored in collaboration with adjacent operators to ensure this standard is achieved, as detailed in the Joint Operating Standards (Section 8).

Commitment #12: Lafarge will only operate 1.0m above the water table. Lafarge will not use groundwater for any industrial purpose. Operators will work with adjacent neighbours to share information from the ongoing groundwater monitoring process (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Commitment #13: Lafarge will utilize double walled fuel tanks in combination with collision protection for any onsite fuel storage. Lafarge will utilise secondary containment for any onsite oil or lubricant storage.

Commitment #14: Lafarge will have spill kits on site at all times. The site will utilize Lafarge procedures for spill response and employees will be trained in these procedures.

4.9 Biophysical Considerations

Lafarge commissioned Ghostpine Environmental Services Ltd. (Ghostpine) to conduct a Biophysical Assessment as well as a Preconstruction Site Assessment for the proposed Hughes Gravel Pit. These assessments can be found in Appendix F and Appendix G.

Based on that assessment it was determined that the project area contains limited biodiversity, in terms of wildlife and vegetation. Habitat for waterfowl, amphibians, and shorebirds is largely limited to the dugout. Grassland songbirds and small mammals are the groups most likely to be affected (by habitat loss) through the development of the gravel pit, raptors and carnivores may experience some loss of hunting territory/prey base.

The report identified the following areas of focus:

Vegetation

Mature trees and shrubs are utilized by various species for foraging, cover and breeding habitat. It is recommended that any clearing activities occur prior to April 15 or after August 20, outside of the main season of bird nesting activities in order to avoid potential issues with birds which are protected under the Alberta Wildlife Act and the federal Migratory Bird Convention Act (refer also to the Wildlife Recommendations). If activity is to occur between these dates, a supplemental wildlife survey is recommended.

Ensure that all construction equipment arrives on site in a clean condition to minimize the risk of the introduction of weeds or invasive species. All equipment that arrives in soiled condition or that has passed through areas that have been identified as having a weed problem, should

not be allowed on the site until it has been cleaned off at a suitable location. Record any sites where equipment was specifically cleaned due to concerns associated with weeds, and monitor those sites during the following growing season.

Hydrology and Water Bodies

Ten wetlands (four Class I and six Class III) were identified in the project area. An application under the Alberta Water Act (Alberta Environment 2007) is required for any wetland that will be disturbed through the construction/operation/reclamation of the gravel pit. Lafarge will ensure approvals are obtained prior to construction and that all mitigations presented in approved documentation are followed.

Where wetlands avoidance is not practical by proposed Project activities and operations, Lafarge will provide compensation for wetlands disturbance as per the current provincial wetlands policy for private land. Lafarge anticipates coordination with Ducks Unlimited Canada for the wetlands compensation program.

Wildlife

A supplemental wildlife survey is recommended, and will be completed, if construction and clearing is scheduled to occur during the bird breeding season (April 15 to August 20) to determine if active nest sites are present.

If migratory bird species protected under the federal Migratory Birds Convention Act (GC 1994) or species protected under the Alberta Wildlife Act (GOA 2013) or federal Species at Risk Act (GC 2002) are found, suspected or observed during clearing, construction and/or clean up, work should be postponed.

Workers found harassing or feeding wildlife or littering will be removed from the project.

Commitment #15: Wildlife Surveys will be completed in the proposed area of disturbance prior to any land clearing activities between April 15 and August 20. If protected or at risk bird species are found, work will be postponed or adjusted in order to avoid the bird habitat.

4.10 Stormwater Management

Stormwater Solutions Inc. was retained by Lafarge conduct a stormwater investigation of the proposed Hughes Gravel Pit. This report can be found in Appendix K. This investigation included a review of current storm water courses, development of a plan for stormwater management during operation of the site.

Current Conditions

The topography of the site was reviewed and current stormwater flows analyzed. This analysis identified the need for a culvert within the North Berm. The inclusion of this culvert will allow for stormwater in the local area surrounding the gravel pit to continue its natural course without the creation of the berm serving to create areas of ponding.

Stormwater Management

Stormwater management during the operations of the Hughes Gravel pit will be based on a two stage system.

Stage 1 - stormwater collection within the excavation area will be directed to a suitable area of the excavation where it will be allowed to naturally dissipate into the floor of the excavation. It is expected that these flows are directed into a gravel base, this methodology will provide sufficient stormwater capacity for the vast majority of storm events.

Stage 2 - In the rare event that stormwater does not dissipate in the excavation at a sufficient rate and there is a significant collection of water, Lafarge will enable a second stage of stormwater management. In this event, stormwater from the main excavation will be pumped to the dry pond located in the South-East corner of the pit that was cut in phase one of the pit development in order to create the South-East berm. Pumping water to this location will provide additional stormwater storage and will allow water to once again dissipate naturally back into the site stratigraphy.

Whatever configuration of phasing is adopted (number, sequence or size), no stormwater will leave the site. Interim ponds will be sited at the south of the current operating area. This is in preparation for a floor slope of ±-1.5% north to south. The full reclamation stage (Drawing 8 - Hughes Reclaimed Contours, Progression 1L) shows the final reclaimed elevation to be below existing ground elevations.

Commitment #16: In the rare event that discharging stormwater from the site becomes necessary, Lafarge will ensure it has approval from Alberta Environment to do so.

4.11 Erosion / Sediment and Weed Control

The following weed prevention and control measures will be undertaken to ensure weeds are properly managed:

- All construction equipment arriving on site is in a clean condition to minimize the risk of the introduction of weeds or invasive species
- All areas of the gravel pit will be inspected during the growing season, by a qualified individual for presence of prohibited noxious weeds
- Identified weeds will be controlled immediately either through the use of herbicide or by mowing as recommended by a qualified individual
- Only individuals holding a Pesticide Service Registration will be contracted to use herbicide

The following erosion and sediment prevention and control measures will be undertaken to ensure that erosion is properly managed:

- All stockpiles will be rough graded to reduce dust emissions
- All berms will be contoured and seeded to grass
- All topsoil stockpiles, if expected to sit for two years or more, will be seeded to grass

- All areas of the gravel pit will be inspected during each season by a qualified individual for presence of erosion which may have a deleterious effect on soil storage, stormwater, or offsite areas. Problem erosion and sediment areas will be controlled through the use of additional mitigation measures such as silt fencing, matting, or other.

Lafarge recognises and accepts the contents of Appendices 1200A and 1200B of the County Servicing Standards (2013). These will be completed in conjunction with Lafarge's Development Permit Application for the subject quarter section.

Commitment #17: The following actions will be undertaken in order to control weeds: all construction equipment arriving at the site will be clean, the gravel pit will be inspected during the growing season by a qualified individual for presence of prohibited noxious weeds, identified weeds will be controlled immediately either through the use of herbicide or by mowing, only individuals holding a Pesticide Service Registration will be contracted to use herbicide.

Commitment #18: Lafarge recognises and accepts the contents of Appendices 1200A and 1200B of the County Servicing Standards (2013). These will be completed in conjunction with Lafarge's Development Permit Application for the subject quarter section.

4.12 Soil Salvage and Handling

Industry best practices will be followed to ensure conservation of all soil materials. Topsoil stockpiles, sub-soil stockpiles, and overburden stockpiles will be kept separate to prevent admixing. All soils are to remain on site.

Where soil stockpiles are to be placed within the project area:

- If topsoil, it may be placed on top of existing ground after all scrub and brush have been cleared.
- If sub-soil, the ground beneath will be stripped of all brush and topsoil before any sub-soil is stockpiled thereon.
- If overburden, the ground beneath will be stripped of all brush, topsoil, and subsoil before any overburden is stockpiled thereon.

All stockpiles will be rough graded and contoured to reduce dust emissions. All topsoil stockpiles, if expected to sit for two years or more, shall be seeded to an appropriate crop or dry land grass.

Commitment #19: Soil salvage will be done according to industry best practice in order to ensure conservation of all soil materials.

4.13 Site Security and Signage

Lafarge shall provide sufficient warning to both trespassers and visitors and anyone else entering the site for whatever reason, of the potential hazards contained within the pit area.

"Danger: Open Pit" and “No Trespassing” signing shall be erected at strategic points along the perimeter fence and at all access points. Generally, these signs shall be erected at the four corners of the fenced area and at not more than 200 m intervals around the perimeter. If the placement of signs at these locations is not reasonable due to lack of visibility or some other reason that would make the signs ineffective, the signs shall be moved to areas where they are most effective.

Entrance signs will prominently contain the Lafarge's name and contact information.

Lafarge shall also erect signing within the pit area to warn of potential hazards from items such as pit faces, slopes, and ponds.

Commitment #20: The site will be fenced and signage will be installed at 200m intervals which state “DANGER: OPEN PIT" and “NO TRESPASSING". Entrance signs will prominently contain Lafarge's name and contact information, signage will be erected within the pit to warn of potential hazards.

4.14 Operating Hours & Reporting

It is expected that the Hughes gravel pit will operate during the daytime only. The expected hours of operation are as follows:

- Monday to Friday: 7:00am to 7:00pm
- Saturday: 7:00am to 5:00pm
- Closed on Sundays and Statutory Holidays

Lafarge will provide Rocky View County with an annual report related to activities at the Hughes Gravel Pit. This annual report will contain the following items:

- Summary of volumes shipped
- A site plan showing disturbed and reclaimed areas as well as site features (berms, scale, office, internal roads, etc.)
- Noise monitoring results
- Dust monitoring results

Commitment #21: The site will operate during the daytime only. Lafarge will provide annual reports to Rocky View County which will include key activities and results of ongoing performance measures (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

5.0 Final Reclamation

5.1 Proposed End Land Use

At the end of life of the Hughes Gravel Pit, the areas disturbed as a result of mining operations will have been progressively reclaimed for use as agricultural lands, following Part 5 of the Code of Practice for Pits. This will either be for use as cultivation, hayland, grazing, or some combination of the mentioned items.

5.2 Soil Replacement, Contouring and Re-vegetation

As the site is mined, the original topography will change significantly as the gravel is removed. Overburden and reject materials from aggregate processing will be used to construct major contours and features. This will entail moving overburden back into the pit and compacting it in predefined layers to create a stable sub-grade. These contours and features will then be evenly overlain with the salvaged subsoil and topsoil.

Reclamation contours are shown in Appendix D. They have been planned in a fashion that creates a gentle down-slope across the majority of the site moving from north to south. This will create a suitable area for use in agricultural purposes. It will also work to direct stormwater to a small dry pond planned at the south side of the reclaimed pit. This dry pond can serve as a dugout for use in watering livestock.

The grade of the floor of the pit is planned at an average of 1.5% which will create drainage and prevent unwanted ponding once the site has been reclaimed. All other slopes will be created at grades no steeper than 3 horizontal : 1 vertical.

Once the site has been graded according to the post reclamation contour plan, areas will be topsoiled, scarified if required and then seeded to grass.

The grass seed mix will include: purple oat-grass, western wheatgrass. Additionally, seed for the following items will be added to the seed mix in order to assist in restoring the site to the original vegetation identified as part of the Biophysical Assessment as being currently present on site: three-flowered avens, golden bean, prairie crocus, American vetch, common yarrow, star-flowered false Solomon's seal, northern bedstraw, graceful cinquefoil, saline shooting star, wild strawberry, everlasting (three species), early blue violet, veiny meadow rue, pasture sage, prickly rose, and Flodman's thistle.

Commitment #22: Lafarge will undertake progressive reclamation as extraction phases are completed. The seed mix used for permanent reclamation will include purple oat-grass, western wheatgrass. Additional seed will be added to the mix in order to assist in returning the site to the vegetation profile identified as part of the Biophysical Impact Assessment and Preconstruction Site Assessment.

6.0 Cumulative Effects Assessment

The Canadian Environmental Assessment Agency (CEAA) offers the following definition: *Cumulative effects are changes to the environment that are caused by an action in combination with other past, present, and future human actions.*

6.1 Past Effects

The past use of this site as ranch and farming land does not have impact on the proposed development of this site for operation as a gravel pit. There are no environmental contaminants or other considerations which should be considered as part of the planning.

6.2 Future Effects

It is proposed that at the end of life as a gravel pit, the site be reclaimed and returned to use as farm land. This end use does not create any known effects beyond the level of current planning. Contouring and vegetation planning has been completed in order to successfully achieve this desired outcome. Surrounding land uses or activities are not seen to impact this planned end use for the site. By the same token, the planned end use of this site as farm land would not have any impact on surrounding land uses.

6.3 Present Effects

Hillstone Aggregates Gravel Pit is located on the quarter section immediately to the west of Hughes Gravel Pit. In addition, gravel pits are currently proposed to the North (McNair Sand & Gravel) and to the East (Mountain Ash Limited Partnership).

In general, the surrounding area is predominately ranch and farming but it is important to note that Highway 567 is a major transportation corridor and that the area west of the gravel pit continues to industrialize with the presence of a major gas station and a growing light industrial area.

It is not easy to assess the impact of all future developments, but Lafarge has considered the impact of proposed gravel pits in its planning. Further discussion of cumulative effects and associated mitigation strategies that will be implemented by the Big Hills Springs Aggregate Producers Group can be found in the Joint Community Commitments (Appendix B).

<u>Traffic</u>

The proposed access onto Highway 567 is a type IVc intersection. It is planned that Lafarge, Hillstone Aggregates, and McNair Sand & Gravel will all have direct access to this intersection.

This joint type IVc intersection will serve to keep gravel pit truck traffic separated from local traffic as much as practical. The design and sizing of this intersection has considered its use by three gravel pits and has incorporated their estimated truck traffic in order to ensure that the intersection is of sufficient size and meets current design standards. Watt Consulting Group and Alberta Transportation has confirmed that a type IV intersection is appropriate to support the gravel pit operations (Appendix C).

Noise

Lafarge has made significant effort to understand and then mitigate the impact on local residents with respect to noise. That effort has resulted in significant commitments related to berming, paving, and operational mitigations. We expect that the commitments will successfully mitigate the noise impact on nearby residents. Additionally, minimum standards with regard to noise levels and monitoring have been jointly established by Lafarge and the adjacent operators of the existing and proposed pits as a measure to collectively mitigate impacts on overall noise levels in the area.

Lafarge, in collaboration with the other operators of Big Hill Springs Aggregate Producers Group, has committed to the installation of noise monitors. Lafarge believes that the presence of these monitors and the commitment of the Aggregate Producers Group to the reporting of the results on a joint website and at liaison meetings will provide a noise management system sufficient to protect local residents. The noise monitors will provide the means to detect exceedances, and will allow for analysis of source location and corrective actions.

Dust

Lafarge has made significant effort to understand and then mitigate the impact on local residences related to dust. Once again, that effort has resulted in significant commitments related to berming, paving, and operational mitigations. It is expected that those commitments will successfully mitigate the dust impact on nearby residents. Additionally, minimum standards with regard to dust levels and monitoring have been jointly established by Lafarge and the adjacent operators of the existing and proposed pits as a measure to collectively mitigate impacts on overall dust levels in the area.

Lafarge, in collaboration with the other operators of Big Hill Springs Aggregate Producers Group, has committed to the installation of dust monitors in conjunction with the noise monitors described above. Lafarge believes that the presence of these monitors and the commitment to the reporting of the results on a joint website and at liaison meetings will provide a dust management system sufficient to protect local residents. The dust

monitors will provide the means to detect exceedances, and will allow for analysis of source location and corrective actions.

Other Effects
Lafarge has established base line readings on groundwater in the area. The operation of Hughes gravel pit is not expected to have an impact as Lafarge is not proposing to work within the water table. Lafarge and the adjacent operators (current and proposed) have jointly committed to maintaining a minimum buffer of 1 m between extraction activities and the water table. The impacts on other items such as stormwater, biophysical considerations, erosion, weed control planning, etc. are viewed to be more local in nature and should be addressed and mitigated as part planning for individual developments.

7.0 Community Consultation and Relations

7.1 2014 Community Engagement Program

In 2014 Lafarge undertook a comprehensive Community Engagement Program, starting with a mail out to all addresses within 1.6 km of Hughes Gravel Pit and onsite visits to neighboring homeowners and businesses. Lafarge successfully made contact with over 28 area residents in the area in order to discuss their concerns. A map of local residences is provided in Appendix D.

This process was useful to guide the scope of work set out for the Consultants who prepared the reports and studies supporting this MSDP. At that time, concerns were focused in four main areas

- Noise
- Dust
- Traffic
- Groundwater

Based on these areas of concern, Lafarge made significant effort to provide enhanced focus on these areas when developing this MSDP.

7.2 2015 Open House

Lafarge held an Open House at Cochrane RancheHouse, Birch Room from 4:00 to 8:00 pm 08 April 2015. Details are attached as Appendix M. Approximately 30 adults attended and there was considerable discussion between Lafarge's team and members of the public.

7.3 2017 Stakeholder Committee and Landowner Meeting Invitations

As an extension of past engagement efforts, Lafarge continues to work collaboratively with the other operators of Big Hill Springs Aggregate Producers Group to ensure ongoing communication and engagement with neighbouring residents and businesses.

To this end, a Stakeholder Committee invitation letter was distributed in early August 2017 by the operators of the Aggregate Producers Group to residents and businesses within a 1.5 mile radius of the project sites. This letter provided an update on the status of the proposed operations and information on the planned Stakeholder Committee, which is intended to act as a forum for ongoing communication, complaint resolution and building trust. Neighbours were invited to join the Stakeholder Committee, whose meetings will commence in Fall 2017.

Adjacent neighbours were also invited to attend a landowner meeting held at Weedon Hall from 6:30 pm to 9:30 pm on 14 August 2017. The purpose of this meeting was to discuss the new joint MSDP process and key commitments surrounding cumulative impact mitigation, as well as tools for ongoing communication.

7.4 Lafarge in the Community

Lafarge has been operating in the Calgary area for well over 50 years. It operates ready mix plants, asphalt plants, a concrete pipe plant, a precast concrete plant, and runs paving and construction crews. In addition, Lafarge owns and operates the Exshaw Cement Plant which has been operating for over 100 years. Lafarge's Western Canada head office is located in Calgary's Quarry Park.

Lafarge follows "3 pillars" in relation to its community involvement

Education: Lafarge seeks to advance social and economic conditions in our communities. We believe education is at the root of success and will consider projects which enhance learning from elementary through post-secondary.

Environment: Lafarge's business relies on natural resources which makes us critical stewards of land and environment. We are particularly concerned about the lifecycle of our sites and assuring local biodiversity. To this end we are interested in supporting biodiversity and conservation projects.

Sustainable Construction: Energy used in building represents about 39 per cent of worldwide total energy consumption. To reduce this amount, the collective efforts of all building owners

and users is required. Lafarge is committed to sustainable construction and likes to support projects where there is a commitment to reduce the total energy balance of a project.

A few examples of these efforts include:

- Lafarge Meadows reclamation and land donation to Fish Creek Provincial Park
- 1101 documented volunteer hours from Lafarge employees in 2014 (Habitat for Humanity, Flood clean-up, Zoo clean up, etc.)
- Over $200,000 in 2014 company donations within the Calgary Area alone (SAIT, Habitat for Humanity, etc.)
- $1,000,000 in annual Community Aggregate Payment levy fees to City of Calgary
- $150,000 in annual Community Aggregate Payment levy fees to county of Rocky View

With our long history and Alberta's bright future, community involvement and the continued fostering of long term relationships remains a focus for Lafarge in order to support the communities we live and work in.

8.0 Joint Operating Standards

The Big Hill Springs Aggregate Producers Group (Lafarge, McNair Sand & Gravel, Mountain Ash Limited Partnership) have determined a set of operating standards as a measure to ensure consistency among operators and minimize impacts beyond the extraction sites. The establishment of consistent standards not only upholds best practices for aggregate extraction, but also helps to reduce cumulative impacts and ensures that the quality of life of adjacent neighbours is maintained.

8.1 Noise

Noise levels generated by the operation will be maintained at or below Permissible Sound Levels calculated in accordance with the methodologies and guidelines of the Alberta Energy Regulator's (AER) 'Directive 038: Noise Control'. At development permit stage, a revised Noise Impact Assessment will be submitted to Rocky View County, demonstrating compliance with the Directive.

Joint sound (and dust) monitoring stations will be installed to ensure the determined noise standard is being maintained. A Noise Mitigation Plan and Monitoring Program will be submitted at development permit stage outlining, at a minimum, noise mitigation practices and monitoring intervals and locations.

8.2 Air Quality

$PM_{2.5}$ and PM_{10} levels will be monitored to ensure compliance with Canadian Ambient Air Quality Standards (CAAQS) and Alberta Ambient Air Quality Objectives (AAAQO), respectively. In order to meet or exceed these standards, $PM_{2.5}$ levels will remain at or below a 24-hour average of 28 µg m-3 (CAAQS), while PM_{10} levels will remain at or below a 24-hour average of 100 µg m-3 (AAAQO).

The Big Hill Springs Aggregate Producers Group supports the involvement of the Alberta Sand and Gravel Association (ASGA) in any provincial policy forums on silica.

As detailed in the Joint Community Commitments (Appendix B), the operators will participate in joint dust mitigation efforts. In addition, joint dust (and sound) monitoring stations tracking wind patterns and rainfall will be operated to ensure the air quality standards are met. An Emissions Mitigation Plan and Monitoring Program will be submitted at development permit stage outlining, at a minimum, dust mitigation practices and monitoring intervals and locations.

8.3 Traffic

Participation in the ASGA Truck Registry program (or equivalent) will be required for all commercially licensed trucks directly controlled by the operator. A Traffic Management Plan will be submitted at development permit stage. At a minimum, the Plan will include:

1. Measures to control the driving behaviour of aggregate haulers accessing the site and providing discipline procedures for non-compliance;
    - The use of In-Vehicle Monitoring Systems shall be investigated and implemented,

unless it can be demonstrated that the use of IVMS would not have positive impacts on operations and traffic safety.

2. Proposals to reduce safety conflicts between site traffic and other road users; and
3. Measures to ensure that all vehicles leave the site in a state that will prevent aggregate materials and other detritus from being deposited on the road/highway network.
    - Measures shall include the paving of the internal driveway a minimum length of 100 metres from the highway right of way, with construction to appropriate road standards.

As discussed in the Joint Community Commitments (Appendix B), a joint intersection will be created for the sites to improve traffic safety where feasible. Additionally, the intersection upgrades completed for all three gravel pits will allow the gravel truck traffic to merge onto Hwy 567 safely. The Big Hill Springs Aggregate Producers Group is committed to constructing an auxiliary lane on Highway 567 connecting both intersections ~~is~~ as an additional safety enhancement, subject to review and approval by Alberta Transportation.

Also subject to Alberta Transportation approval, the auxiliary lane will be constructed to a length which allows loaded gravel trucks to reach 85% of the posted highway speed before the lane ends.

8.4 Visual and Landscape

Common berms will be constructed along Highway 567, both to provide a visual barrier and as a mitigation strategy for dust and noise. Appropriate setbacks from the highway will be determined based on the Alberta Transportation Roadside Development Permit process and Rocky View County standards. Berms will also be constructed as deemed appropriate to reduce visual impact and meet dust and noise commitments. Berms will be seeded to grass, following industry best practice.

Attractive site entrances and signage will also be provided to enhance the visual quality of the landscape.

8.5 Groundwater

As a measure to ensure protection of the groundwater, only dry extraction will be permitted and a minimum buffer of 1 m above the water table will be maintained. Groundwater levels will be monitored using piezometers to ensure compliance with the Water Act. Individual operators will work with adjacent neighbours to address any concerns that may arise, while the Stakeholder Committee will provide a venue to discuss ongoing groundwater monitoring.

A Groundwater Monitoring Plan will be submitted at Development Permit stage, which measures the impact of the development on groundwater quality and quantity. The submitted Groundwater Monitoring Plan will provide for remedial actions in the event that identified trigger levels are breached.

8.6 Hours of Operation

Activities will be restricted to the following hours of operation:

- Monday to Friday: 7am to 7pm
- Saturday: 7am to 5pm
- No activity on Sundays or statutory holidays

8.7 Reclamation

Reclamation will be completed in accordance with Part 5 of the Code of Practice for Pits, which sets requirements regarding the conservation of soil and subsoil and the characteristics of reclamation.

Progressive reclamation is strongly encouraged to ensure that the area of disturbance is minimized at any given time and post-extraction lands are returned to their former agricultural state.

8.8 Monitoring

As discussed in the Joint Community Commitments (Appendix B), Big Hill Springs Aggregate Producers Group will collectively monitor noise, dust and groundwater levels, with monitoring data published on a joint website. Investigation procedures will be determined for non-compliance and complaints, and a lead from the Group will be nominated to manage complaints on behalf of the sites. Regular liaison meetings will be held with appointed residents once a website has been established as a forum to provide operational updates and provide up-to-date information to residents.

8.9 Environmental

The requirements of relevant provincial legislation (Code of Practice for Pits, Water Act) and the requirements of the County Servicing Standards will be met to ensure that environmental impacts are minimized.

8.10 Erosion and Sediment Control & Stormwater

Erosion and sediment control and stormwater management will be addressed onsite by the individual operators to meet the requirements of the County Servicing Standards.

APPENDIX A
Summary of Commitments

Commitment #1: The commitments laid out in this MSDP shall guide the development, operation, and reclamation of the Hughes Gravel Pit.

Commitment #2: Lafarge will ensure that all required municipal and provincial permits are received prior to the commencement of activities and that they are adhered to during the course of operations.

Commitment #3: Access to the site will be achieved through the installation of a type IVc intersection to be located on Highway 567 (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Commitment #4: Subject to approval by Alberta Transportation, Lafarge will undertake, or contribute to, appropriate upgrades to the intersection of Highway 1A/Highway 766 and shall support Alberta Transportation and Rocky View County in determining the appropriate timing for the upgrade of the intersection of Highway 567/Highway 22 (see Appendix B: Joint Community Commitments. Lafarge is also committed to supporting the implementation of any necessary highway safety improvements along its identified haul routes as may be identified by the County and Alberta Transportation in any future development permit applications.

Commitment #5: Lafarge will construct visual and noise attenuation berms. These berms will range in size from 5 -8m above original ground level. They will be built using 3:1 slopes (3 horizontal : 1 vertical) and a 5m flat top (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Commitment #6: Lafarge will construct a scaling facility, truck staging area and office. Lafarge will pave the internal access road to this scale facility.

Commitment #7: Lafarge hired haulers will utilize the Alberta Sand and Gravel Association Truck Registry System for identification of trucks and complaint management related to truck behaviour on public roads (see Section 8: Joint Operating Standards).

Commitment #8: Lafarge will utilize dust control measures such as road sweeping and the application of calcium chloride or water to haul roads as required to control dust (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments) .

Commitment #9: Any temporary asphalt plant shall only utilize propane or natural gas as a fuel source.

Commitment #10: Lafarge will install a monitor for $PM_{2.}5$ and PM10 in collaboration with adjacent operators. These readings will be taken on an hourly basis. Corrective action will be taken if readings are exceeding applicable Canadian or provincial standards as a result of activity at the Hughes Gravel Pit. Air quality monitoring details will be shared publicly through the Big Hill Springs Aggregate Producers Group joint website (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Commitment #11: Lafarge will install a noise monitor in collaboration with adjacent operators to monitor dBA on an hourly basis. Corrective action will be taken if readings are exceeding the agreed sound level dBA limit at the project property line as a result of activity at the Hughes Gravel Pit. At development permit stage, a revised Noise Impact Assessment will be submitted demonstrating compliance with the Alberta Energy Regulator's 'Directive 038'. Noise monitoring details will be shared publicly through the Big Hill Springs Aggregate Producers Group joint website (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments)

Commitment #12: Lafarge will only operate 1.0m above the water table. Lafarge will not use groundwater for any industrial purpose. Operators will work with adjacent neighbours to share information from the ongoing groundwater monitoring process (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments).

Commitment #13: Lafarge will utilize double walled fuel tanks in combination with collision protection for any onsite fuel storage. Lafarge will utilise secondary containment for any onsite oil or lubricant storage.

Commitment #14: Lafarge will have spills kits on site at all times. The site will utilize Lafarge procedures for spill response and employees will be trained on these procedures.

Commitment #15: Wildlife Surveys will be completed in the proposed area of disturbance prior to any land clearing activities between April 15 and August 20. If protected or at risk bird species are found, work will be postponed or adjusted in order to avoid the bird habitat.

Commitment #16: In the rare event that discharging storm water from the site becomes necessary, Lafarge will ensure it has approval from Alberta Environment to do so.

Commitment #17: The following actions will be undertaken in order to control weeds: all construction equipment arriving at the site will be clean, the gravel pit will be inspected during the growing season by a qualified individual for presence of prohibited noxious weeds, identified weeds will be controlled immediately either through the use of herbicide or by mowing, only individuals holding a Pesticide Service Registration will be contracted to use herbicide.

Commitment #18: Lafarge recognises and accepts the contents of Appendices 1200A and 1200B of the County Servicing Standards (2013). These will be completed in conjunction with Lafarge's Development Permit Application for the subject quarter section.

Commitment #19: Soil salvage will be done according to industry best practice in order to ensure conservation of all soil materials.

Commitment #20: The site will be fenced and signage will be installed at 200m intervals which state "danger: open pit" and "no trespassing". Entrance signs will prominently contain Lafarge's name and contact information, signage will be erected within the pit to warn of potential hazards.

Commitment #21: The site will operate during the daytime only. Lafarge will provide annual reports to Rocky View County which will include key activities and results of ongoing performance measures (see Section 8: Joint Operating Standards and Appendix B: Joint Community Commitments) .

Commitment #22: The seed mix used for permanent reclaim areas will include purple oat-grass, western

wheatgrass. Additional seed will be added to the mix in order to assist in returning the site to the vegetation profile identified as part of the Biophysical Impact Assessment and Preconstruction Site Assessment.

APPENDIX B

Joint Community Commitments

Big Hill Springs Aggregate Producers Group is committed to continue to work with our local stakeholders. Based on previous engagement the group has identified joint measures to minimize and monitor cumulative impacts for the local area.

- The group commits to keeping noise from the on-site operation to levels at or below Permissible Sound Levels calculated in accordance with the methodologies and guidelines of the Alberta Energy Regulator's (AER) 'Directive 038: Noise Control' at the project property line. Notwithstanding the above, occasional exceedances of the agreed Permissible Sound Levels may occur. Notifications will be given to neighbours prior to loud work, volumes exceeding the agreed Permissible Sound Levels.
- The group will work to coordinate any loud decibel work, such as stripping and reclamation.
- Operators will work to reduce noises produced at site when possible while still ensuring the best occupational, health and safety practices.
- Start and stop times will be strictly adhered to:
    - Monday to Friday: 7am to 7pm
    - Saturday: 7am to 5pm
    - No activity on Sundays or statutory holidays
- Dust control measures will be used and will be based on industry best practices. The operators will participate in joint dust mitigation efforts. This may include, but is not limited to water spraying while crushing, landscaping barriers, calcium chloride, watering of gravel roads, lowering speed limits within project boundaries, and other appropriate methods.
- Queueing on a highway is a traffic safety violation. Each operator will work to educate truckers so there is an understanding that queueing will not be tolerated on the highway. Operators, where possible, will work with enforcement authorities to ensure queueing is not tolerated.
- Big Hill Springs Aggregate Producers Group will work with Alberta Transportation at the design phase to discuss relevant local impacts and safety measures for the joint intersection and traffic design on Highway 567. Mitigation strategies may include:
    - Area lighting
    - Signage and other roadside indicators
    - Appropriate speed limits
    - Improving sight lines
    - Climbing lane warrants
- The Big Hill Springs Aggregate Producers Group is committed to constructing an auxiliary lane on Highway 567 connecting both intersections ~~is~~ as an additional safety enhancement, subject to review and approval by Alberta Transportation. Also subject to Alberta Transportation approval, the auxiliary lane will be constructed to a length which allows loaded gravel trucks to reach 85% of the posted highway speed before the lane ends. This is an effort to mitigate the cumulative effects of traffic from the aggregate producers in the area and a commitment to ensure the safety of vehicles traveling on Highway 567.
- Each operator will install suitable berms and buffers surrounding the sites to minimize visual,

dust and noise nuisances to adjacent landowners.

- Noise and air quality monitoring details will be shared publicly through the Big Hill Springs Aggregate Producers Group joint website.
- Operators will work with adjacent neighbours to share information from the ongoing groundwater monitoring process.
- Big Hills Springs Aggregate Producers Group will adhere to a shared communication plan. The communications plan will support engagement with neighbouring resident and businesses.

Joint Communications Plan

Big Hill Springs Aggregate Producers Group will achieve active communication with surrounding residents and businesses, supporting open and ongoing dialogue with all producers and our neighbours.

LEVEL OF ENGAGEMENT

General Public *Goal: To provide balanced and objective information to a broad audience.*	**Residents & Businesses within 1.5 Mile Radius** *Goal: To gather input on the project, to establish ongoing communications.*	**Adjacent Neighbours** *Goal: To work directly with neighbours to ensure that concerns are understood and addressed.*
Engagement Tactics	**Engagement Tactics**	**Engagement Tactics**
Engagement Contact	Engagement Contact	Engagement Contact
Project Website	Project Website	Project Website
Yearly Public Event	Yearly Public Event	Yearly Public Event
	Stakeholder Committee	Stakeholder Committee
		Individual Meetings
		Special Mitigation Arrangements

I. BHSAPG will provide an **engagement contact number.** Residents will be able to report concerns or questions and expect a quick response from an operator on behalf of the Producers Group.

II. A **project website** will be maintained by BHSAPG to provide information to the community, including details on cumulative effects management and monitoring such as noise and dust. The website will also provide residents a feedback mechanism, where they can ask questions and leave feedback for BHSAPG.

III. A **yearly public event** will be hosted on project sites so the community is able to see the operations firsthand, meet their local business representatives and receive updates on the projects.

IV. A volunteer **Stakeholder Committee** will be formed, inviting residents within a 1.5 mile radius of the project sites to participate. The Stakeholder Committee will establish:

   a. How Committee members wish to be engaged and through what media (in person meetings, newsletters, email, etc);

b. How often the Committee wishes to meet or to be engaged;

c. What information the Committee wishes to discuss;

d. A means to resolve future complaints for residents in the 1.5 mile radius; and

e. Any other matter as determined by the Committee.

V. Regular **individual meetings** with adjacent neighbours and those most directly impacted by the operations will be held at Weedon Hall with representatives from each aggregate producer. These will be held as required either by the projects or the local residents. BHSAPG is committed to providing relevant project information at the meetings and responding to neighbour questions with appropriate subject matter experts and topics such as development permitting, Alberta Transportation, or groundwater monitoring information.

VI. **Special mitigation arrangements** for adjacent neighbours may be required from time to time over the life of the projects. As part of being a responsible neighbour, members of the BHSAPG are committed to responding to adjacent neighbour concerns quickly and appropriately.

APPENDIX C
Additional Transportation Considerations

The MSDPs for McNair, Lafarge and Mountain Ash gravel pit applications went before Council on July 11, 2017. Additional details were requested through a Motion Arising. Regarding Transportation, Administration was to work collaboratively with the MSDP Applicants noted above to:

> *Review and adapt transportation access and egress to HWY 567 that would maximize safety and result in a design that would allow loaded gravel trucks to maximize their speed to safely merge into highway 567's lanes as determined by RVC engineering and Alberta Transportation.*

The three Applicants, collectively known as the Big Hill Springs Aggregate Producers Group (the Aggregate Group), commissioned WATT Consulting Group (WATT) to review the adequacy of the Type IV intersection layout to service the gravel pit operations. This review included traffic from the existing gravel pit and the Aggregate Group's proposed gravel pits.

The WATT letter states:

> *From the traffic perspective, Type IV* [intersections] *provides for safe traffic operation since it ensures that the turns at the intersection are executed without or with minimal impact on the traffic along Highway 567. It will provide more than adequate capacity to accommodate expected turning movements.*

And further, the WATT letter concludes:

> *Type IV intersections will adequately support gravel extraction areas.*

Alberta Transportation has also provided a letter to Administration regarding the sufficiency of the proposed Type IV intersections for the proposed gravel pit operations. The Alberta Transportation letter states:

> *The location of the access to Highway 567 … [from the proposed Mountain Ash gravel pit] … is approved and is to be constructed to a "Type IVa" intersection treatment…*
>
> *The location of the new access to Highway 567 [for the proposed combined gravel operations intersection] that is 800 metres west of the … [proposed Mountain Ash gravel pit access] … is approved and is to be constructed to a "Type IVc" intersection treatment…*

These intersection treatments are considered suitable to provide access and egress from Highway 567 to the gravel operations, with minimal disruption to highway traffic.

The WATT letter and the Alberta Transportation letter are provided as supporting documents to the MSDP.

It is further noted that at a meeting between Administration, Alberta Transportation and the MSDP Applicants held on July 20, 2017, Administration confirmed that they have accepted the proposed intersection locations and Type in theory. Detailed design of the proposed intersection will be confirmed at the development permit stage. They mentioned that this was implicit in their recommendation for approval of the proposed Land Use and the related MSDPs.

The following discussion includes traffic associated with the three proposed gravel pits and the existing gravel pit.

Summary of existing traffic and proposed gravel pit traffic:

- Highway 567
  - 2 lane paved highway under Alberta Transportation jurisdiction
  - 4,670 vehicles per day (Average Annual Daily Traffic)
  - 8,500 vehicles per day (volume where highway is a candidate for twinning)
- Gravel Operations
  - Combined Pit Access (McNair BRADI, Lafarge, Existing pit)
    - 153 loaded trucks – expected average loaded trucks per day leaving pits
      - This includes 60 existing loaded trucks per day from existing pit
  - Mountain Ash Pit Access
    - 50 loaded trucks – expected average loaded trucks per day leaving pit
  - Totals from the Aggregate Group's proposed gravel pits
    - 143 additional loaded trucks added to Highway 567
    - 286 vehicles per day – the above number (146) expressed as average annual daily traffic which includes loaded trucks leaving and unloaded trucks entering the gravel pits.
    - 6.1% - traffic volume increase on Highway 567 due to the Aggregate Group's expected gravel truck traffic.

It is noted that loaded gravel trucks accelerate at a slower rate than passenger vehicles which can impact merging with highway traffic. While Type IV intersections have been deemed appropriate by Rocky View County Administration, Alberta Transportation and the Aggregate Group's Engineers, it is understood that the ultimate length of the acceleration lanes is determined through detailed design.

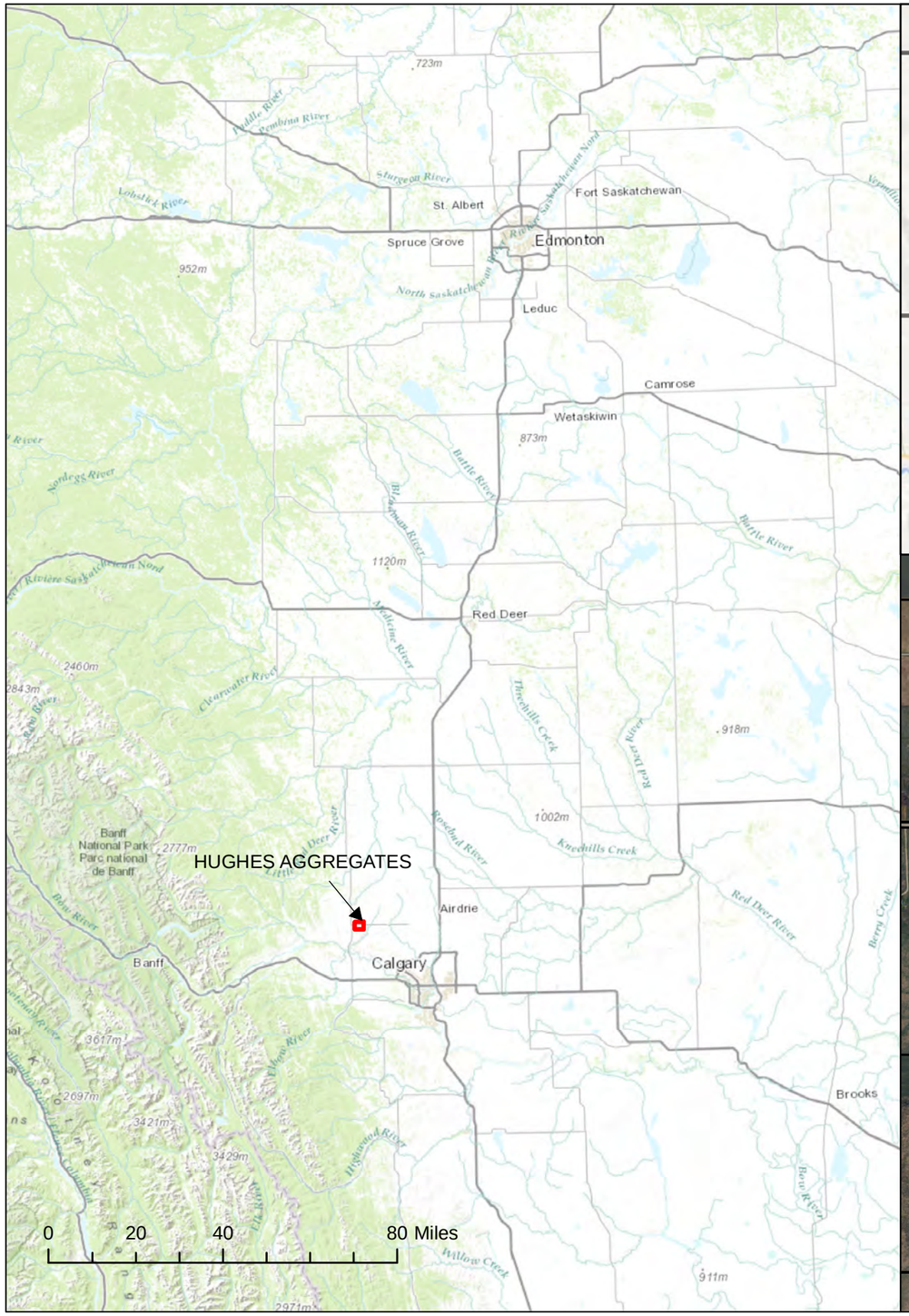
As noted in the WATT letter:

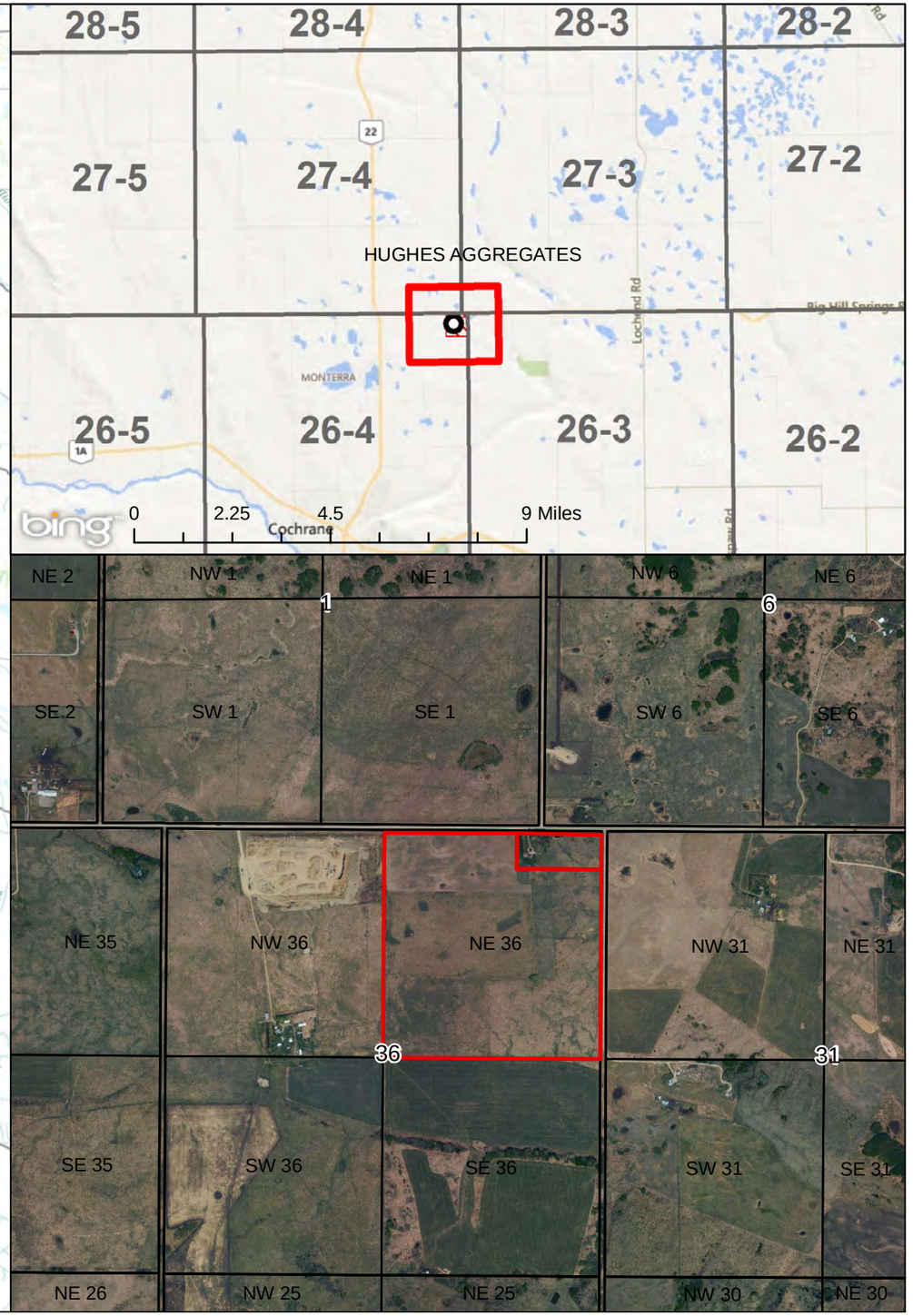
> *It should also be noted that an idea to construct an auxiliary lane on the south side of Highway 567 connecting both intersections has been discussed as an additional option to provide acceleration distance for loaded trucks on the predominant movement.*

The Big Hill Springs Aggregate Producers Group is committed to constructing an auxiliary lane on Highway 567 connecting both intersections ~~is~~ as an additional safety enhancement, subject to review and approval by Alberta Transportation. This is an effort to mitigate the cumulative effects of traffic from the aggregate producers in the area and a commitment to ensure the safety of vehicles traveling on Highway 567.

In summary, Rocky View County Administration and Alberta Transportation support the intersection Types and locations in theory. Detailed design of the proposed intersection will be confirmed at the development permit stage. Alberta Transportation has no issues with the additional traffic on Highway 567. The proposed gravel pit operations traffic can be accommodated through Type IV intersections and the detailed design through the Development Permit process will ensure the intersections are built with appropriate acceleration lanes.

APPENDIX D
Drawings





HUGHES
LOCATION PLAN
NE 36-26-4-W5M

Legend

PROPERTY LINE

QTR SEC LINES

REV.	DATE	NOTES

NAD 1983 3TM
114

0 400 800 1,600 Feet

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DESGNED BY	Eric Man	PROJECT DATE	February 26, 2015
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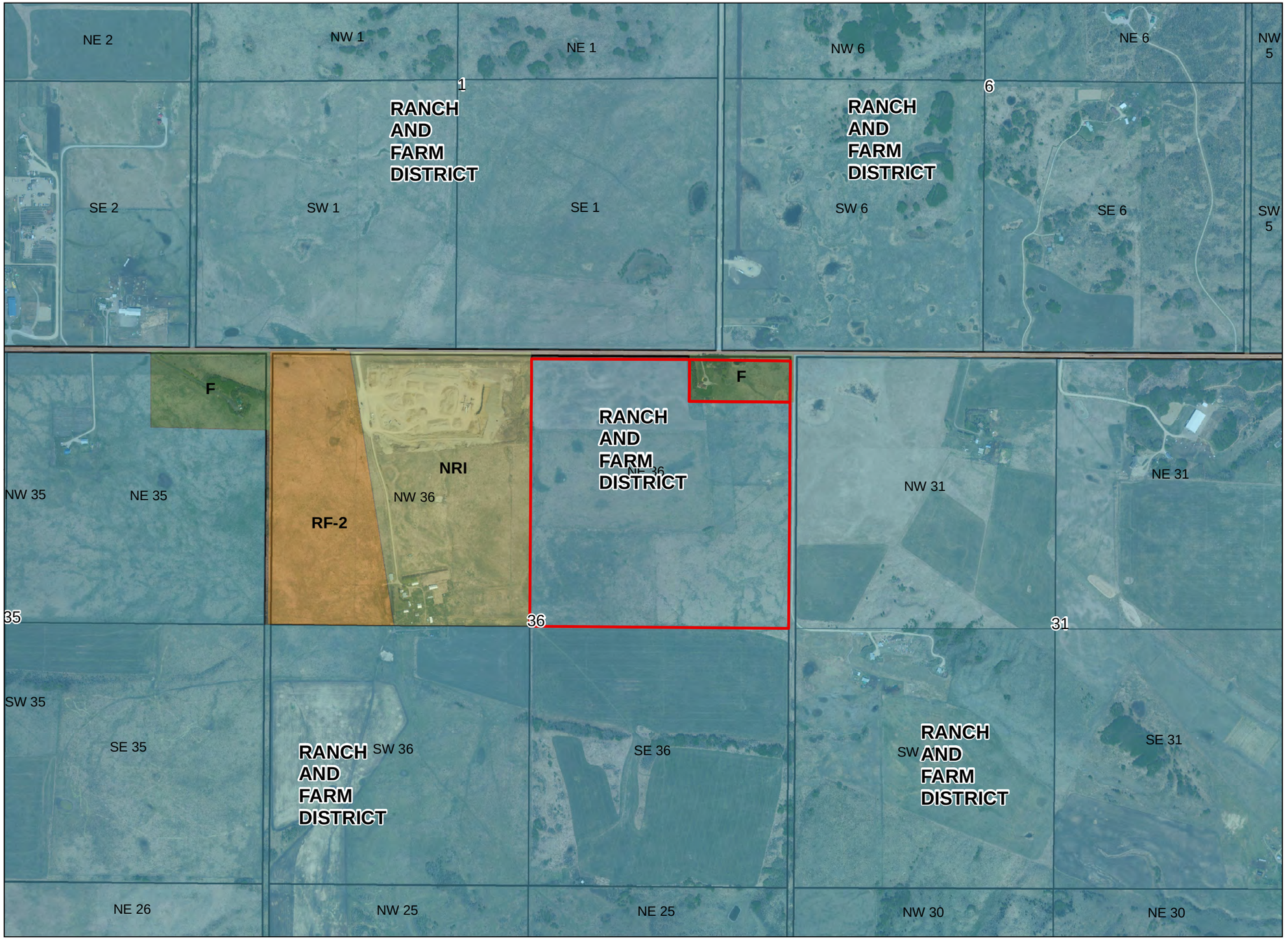

HUGHES
LAND USE MAP
NE 36-26-4-W5M

Legend

LAND USE

- FARMSTEAD DISTRICT
- NATURAL RESOURCE INDUSTRIAL DISTRICT
- RANCH AND FARM DISTRICT
- RANCH AND FARM TWO DISTRICT
- PROPERTY LINE
- QTR SEC LINES

NOTES:
RANCH AND FARM DISTRICT (RF) UNLESS INDICATED

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0 240 480 960 Feet

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Basemap data obtained from Rockey View County and Altalist Ltd..

DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
DRAWN BY	Eric Man	IMAGERY DATE	April 01, 2012
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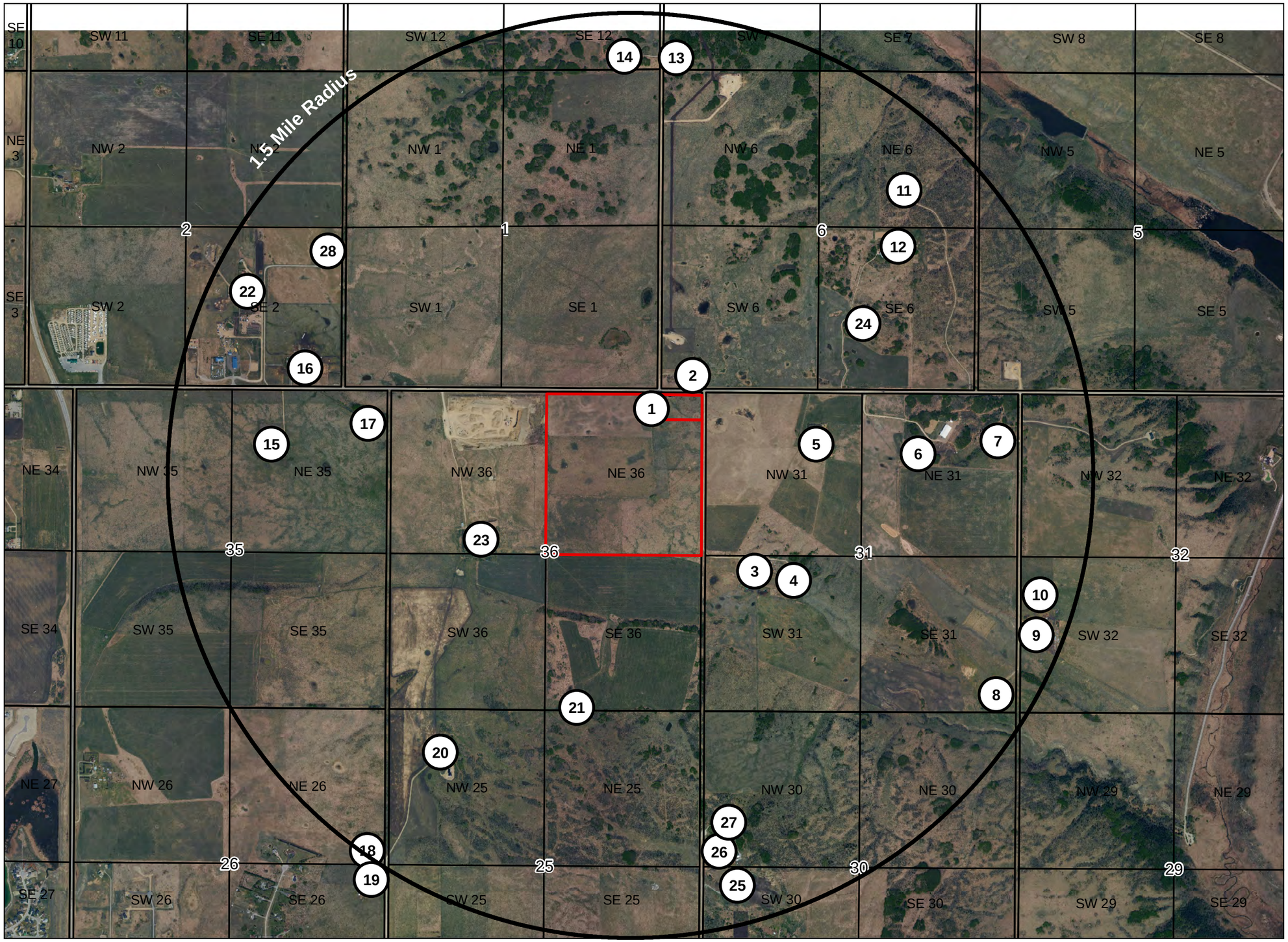
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"



HUGHES
STAKEHOLDER MAP
NE 36-26-4-W5M

Legend

1 STAKEHOLDERS

PROPERTY LINE

QTR SEC LINES

REV.	DATE	NOTES

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DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
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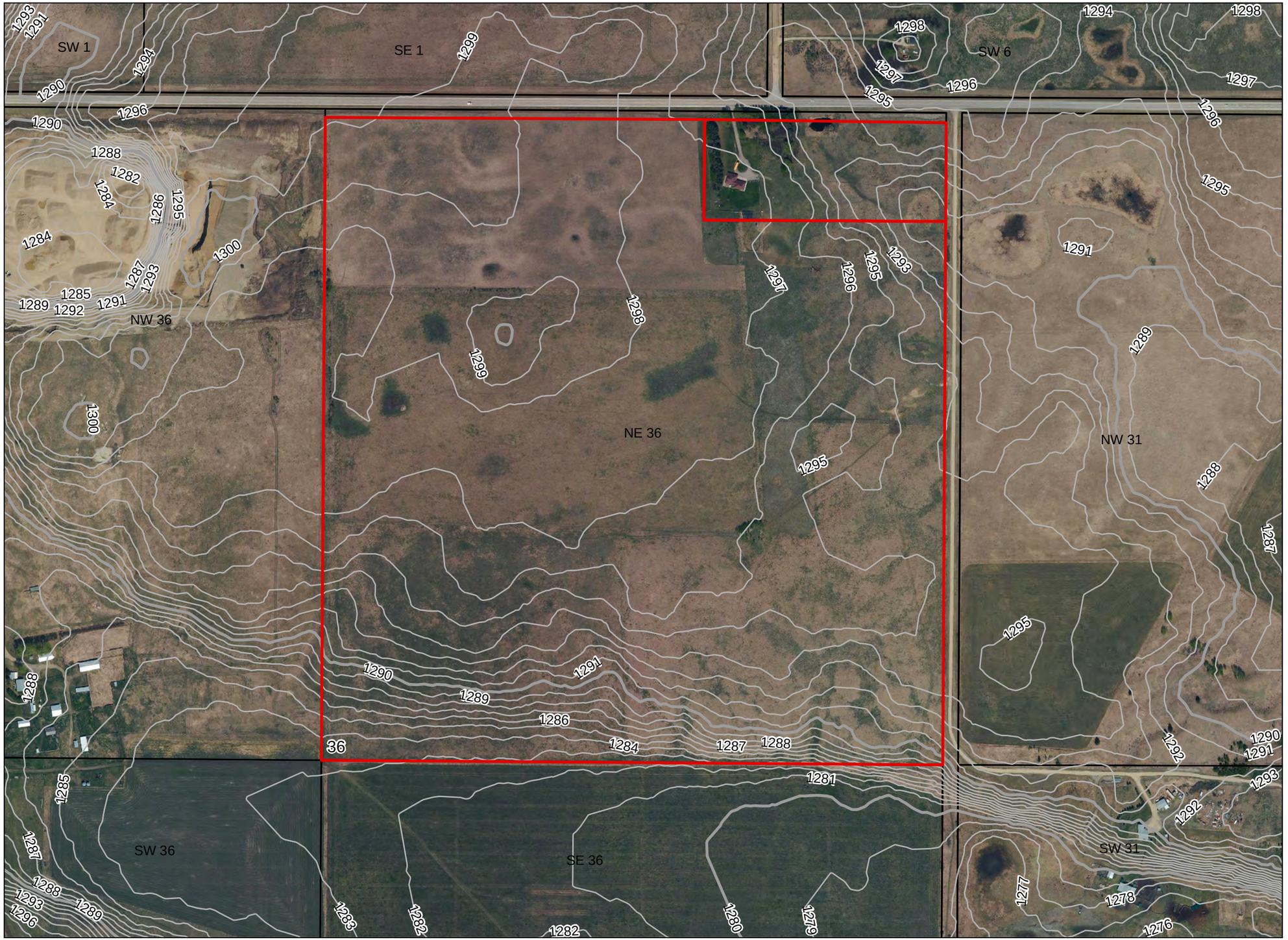
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"



HUGHES
CURRENT SITE CONDITIONS
NE 36-26-4-W5M

Legend

PROPERTY LINE

QTR SEC LINES

NOTES:
CONTOUR LINES IN METERS

REV.	DATE	NOTES

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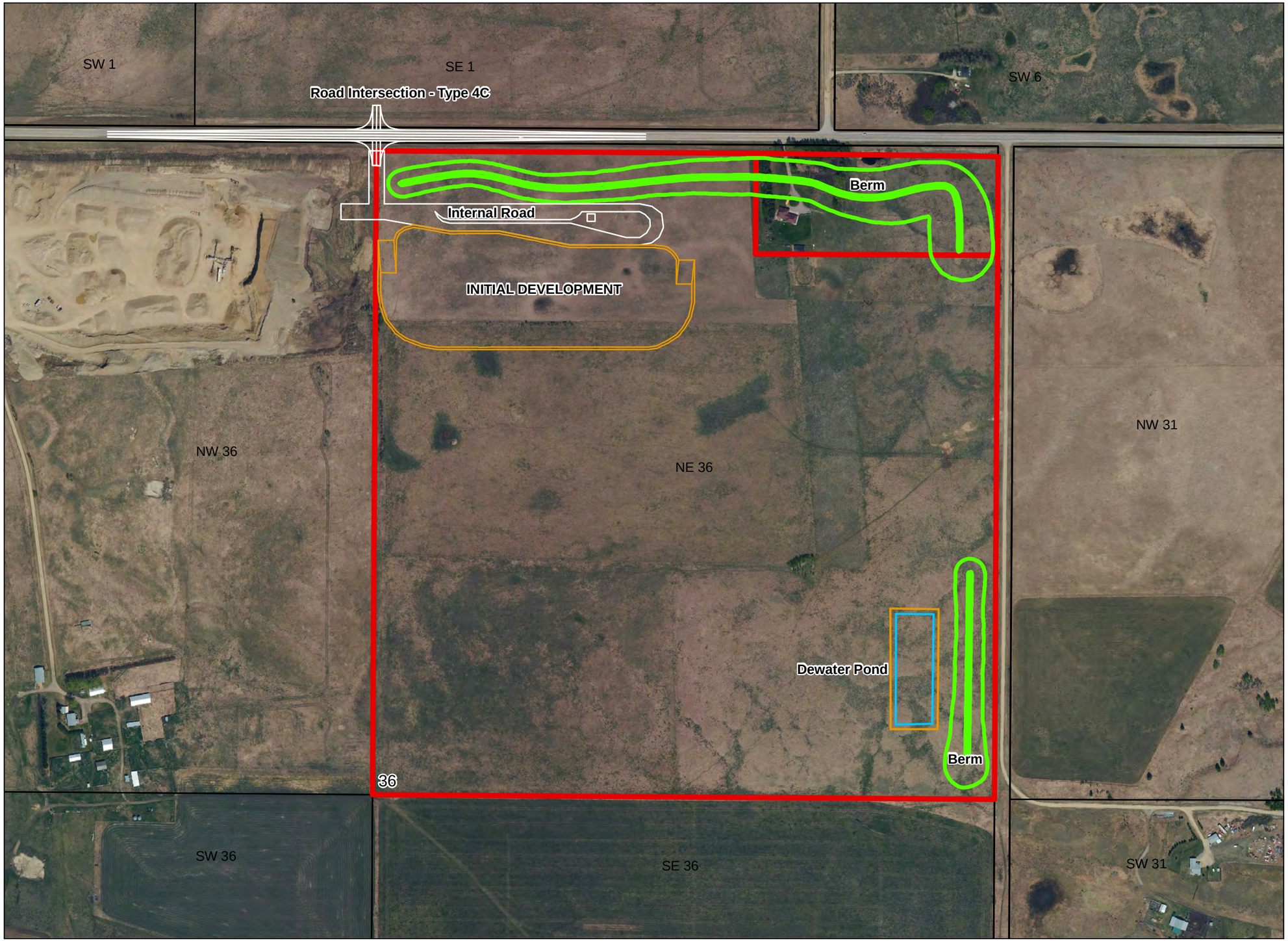

HUGHES
INITIAL DEVELOPMENT
NE 36-26-4-W5M

Legend

- PROPERTY LINE
- QTR SEC LINES

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CONTOUR LINES IN METERS

REV.	DATE	NOTES

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114

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DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
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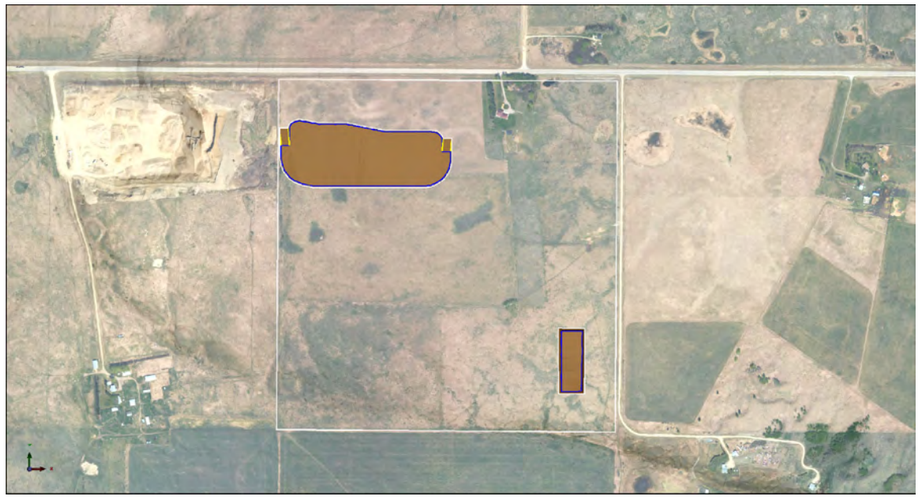
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"

PROGRESSION 1A

PROGRESSION 1B



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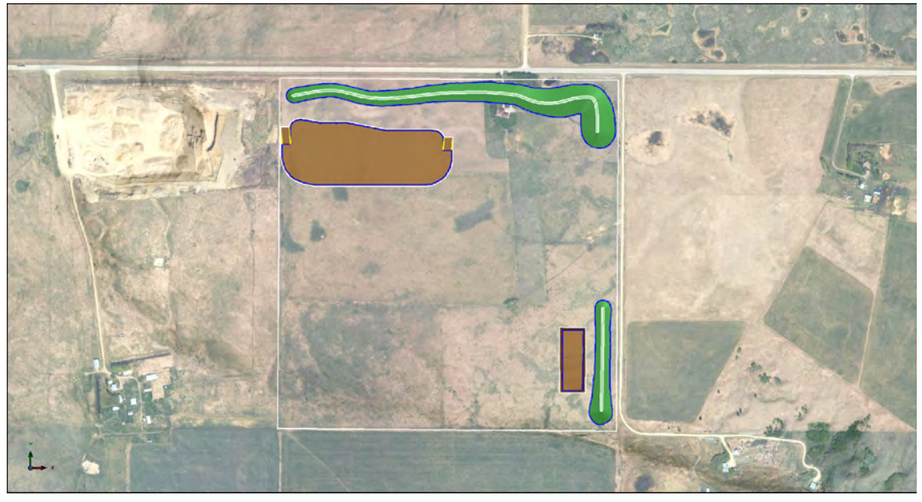

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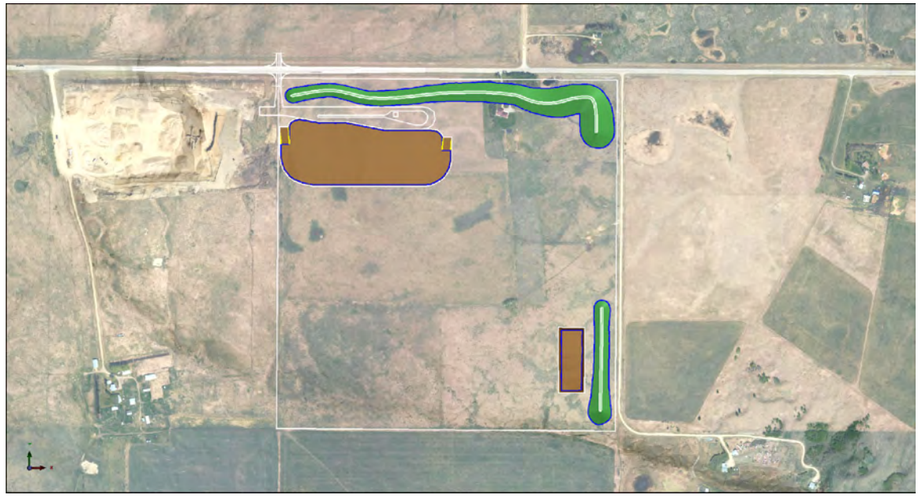

HUGHES
OPENING SITE SEQUENCE
PART 1
NE 36-26-4-W5M

REV.	DATE	NOTES

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LAFARGE

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Basemap data obtained from Rockey View County and Altalist Ltd..

DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
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PROJECT NO.	AB15007	PAPER SIZE	11" x 17"

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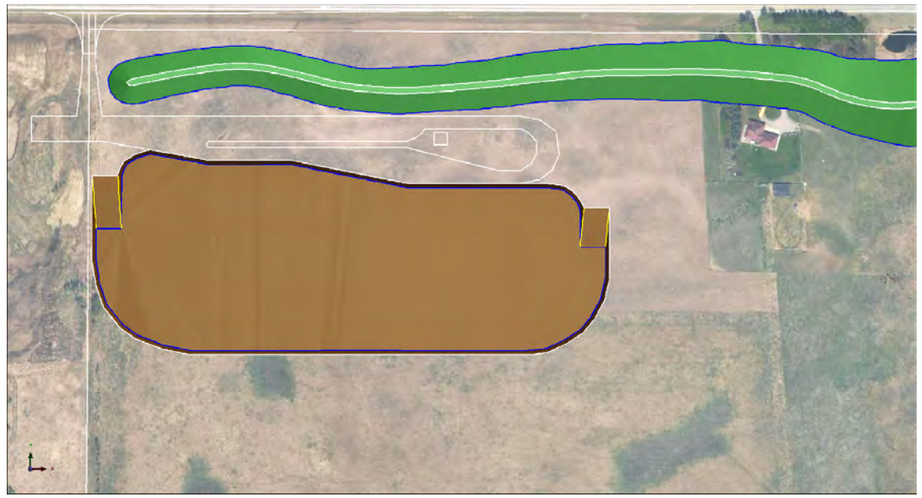

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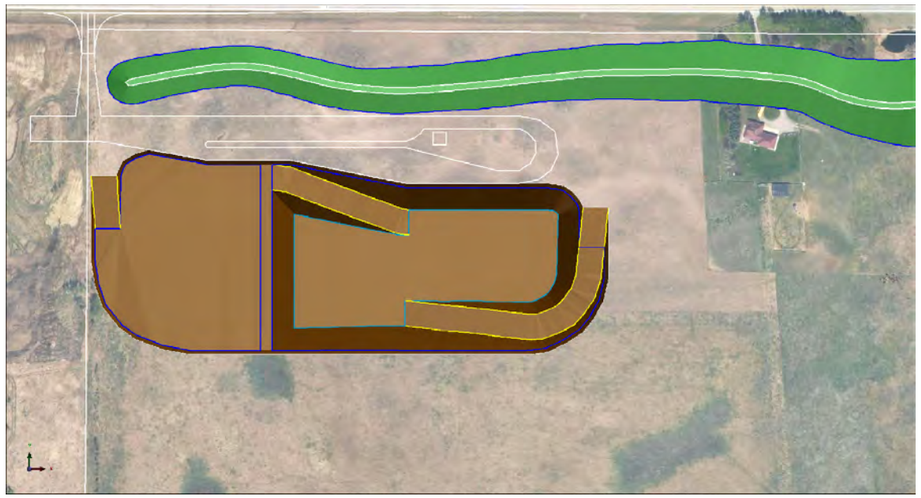

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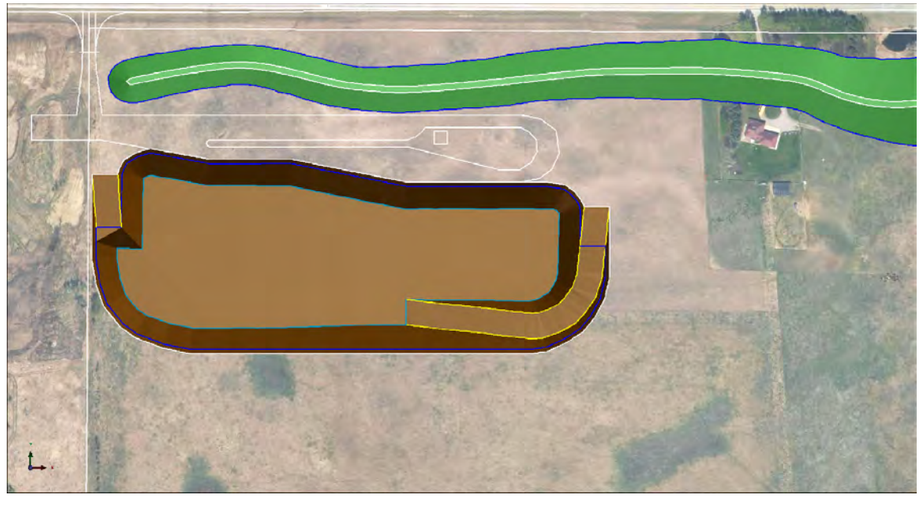

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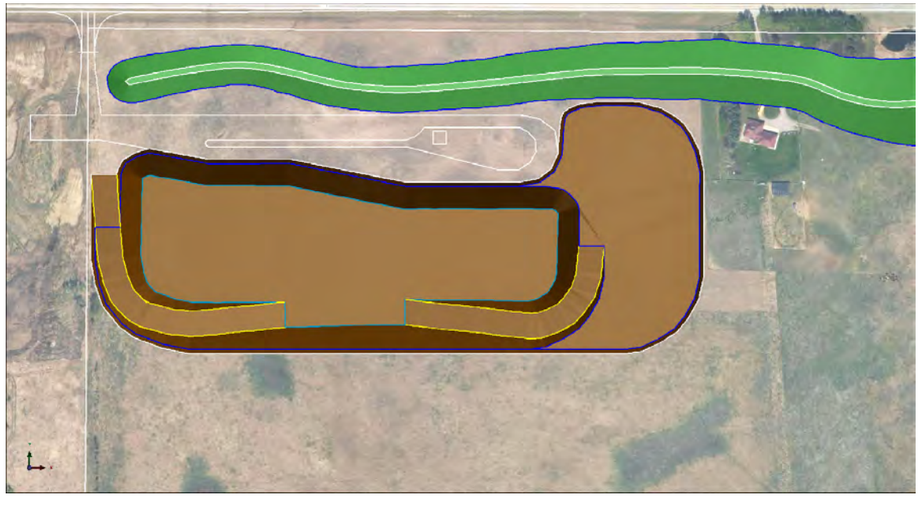

HUGHES
OPENING SITE SEQUENCE
PART 2
NE 36-26-4-W5M

REV.	DATE	NOTES

NAD 1983 3TM
114

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DRAWN BY	Eric Man	IMAGERY DATE	April 01, 2012
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PROJECT NO.	AB15007	PAPER SIZE	11" x 17"

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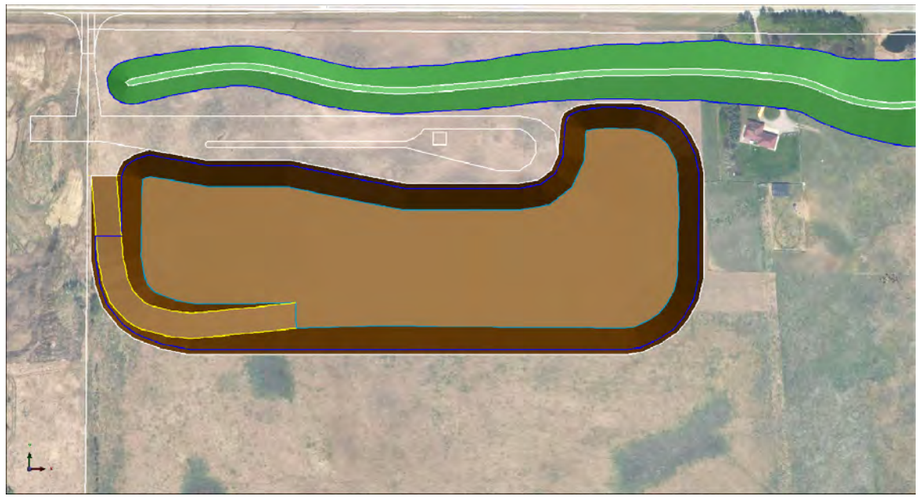

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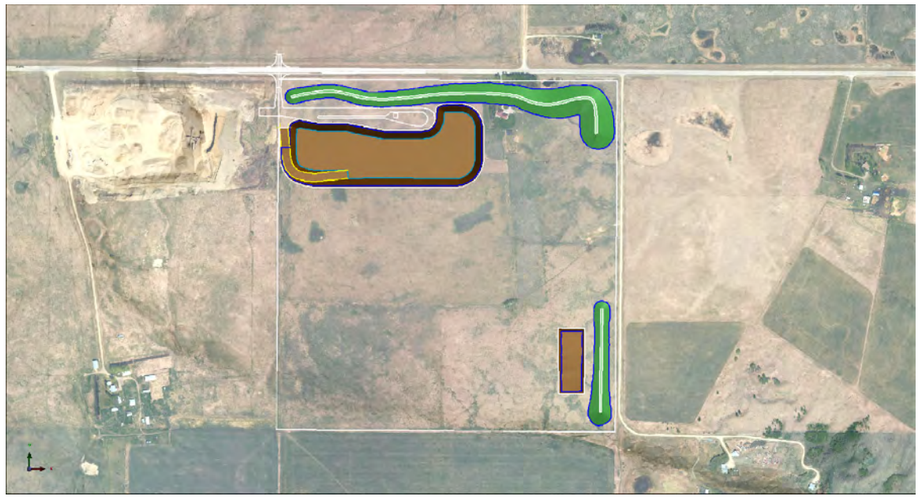

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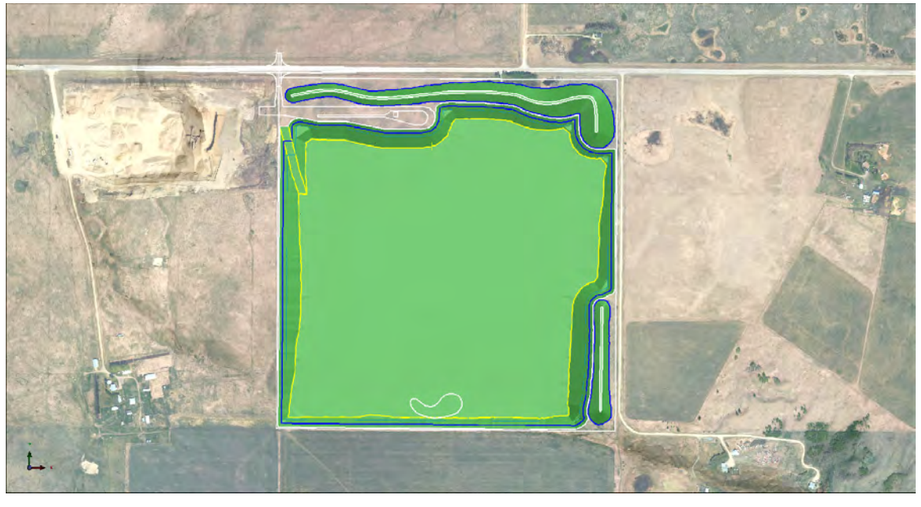

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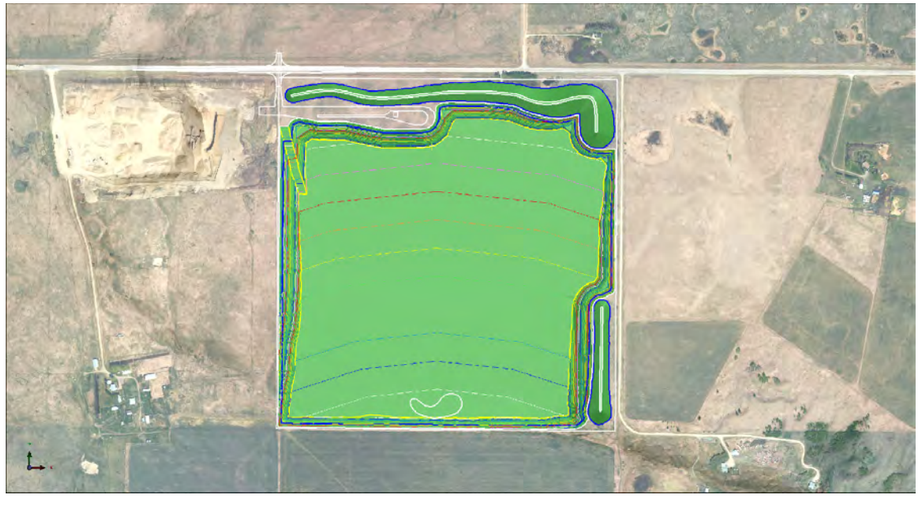

HUGHES
OPENING SITE SEQUENCE
PART 3
NE 36-26-4-W5M

REV.	DATE	NOTES

NAD 1983 3TM
114

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LAFARGE

LAFARGE CANADA INC.

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PROJECT NO.	AB15007	PAPER SIZE	11" x 17"

PROGRESSION 1M

HUGHES
OPENING SITE SEQUENCE
PART 4
NE 36-26-4-W5M

REV.	DATE	NOTES

NAD 1983 3TM
114

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DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
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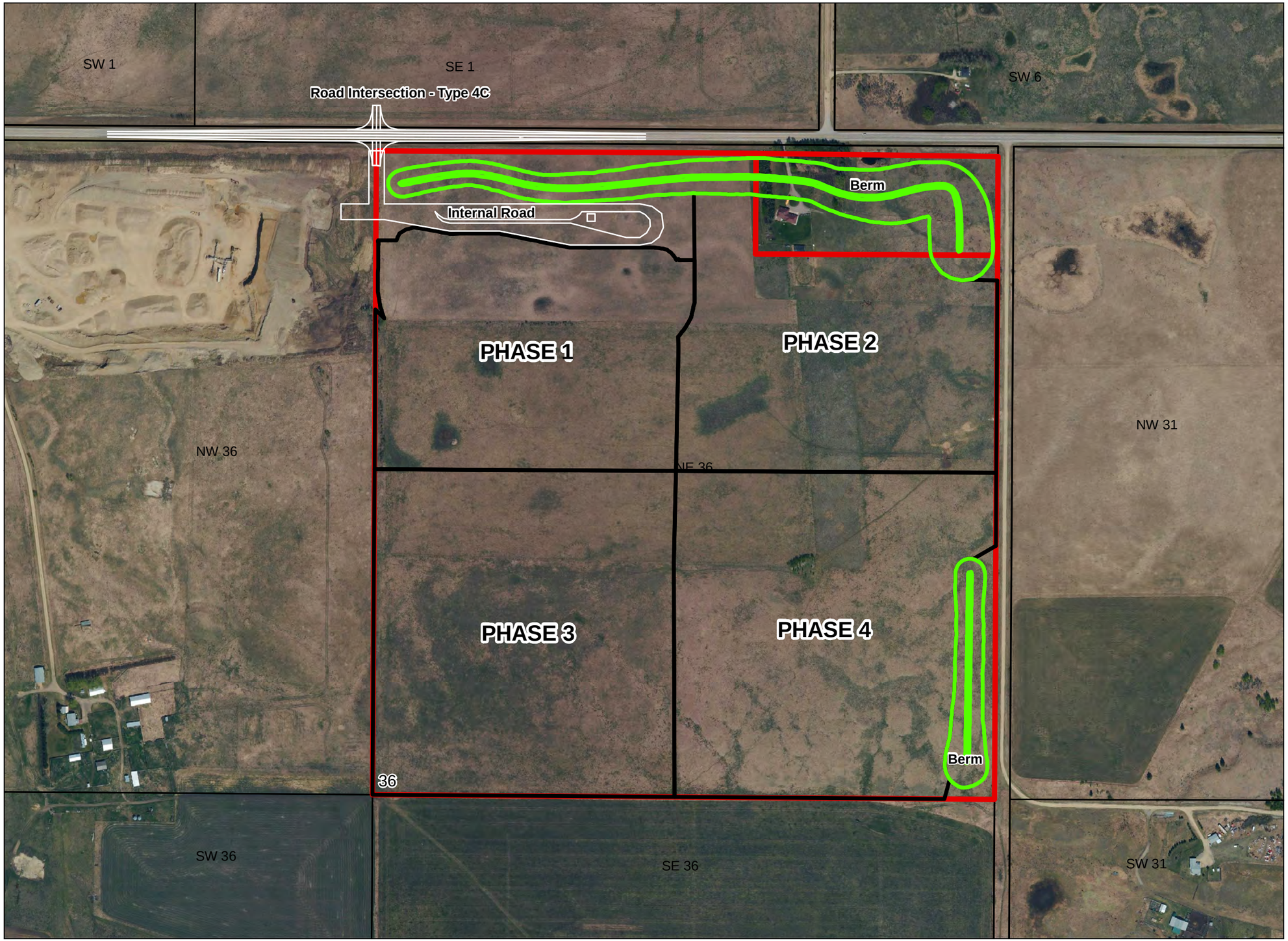
CHECKED BY	N/A	SHEET	9 of 12
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"



HUGHES
MINING SEQUENCE PHASE
NE 36-26-4-W5M

Legend

- PROPERTY LINE
- QTR SEC LINES

NOTES:
CONTOUR LINES IN METERS

REV.	DATE	NOTES

NAD 1983 3TM
114

0 100 200 400 Feet

0 25 50 100 Meters

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LAFARGE

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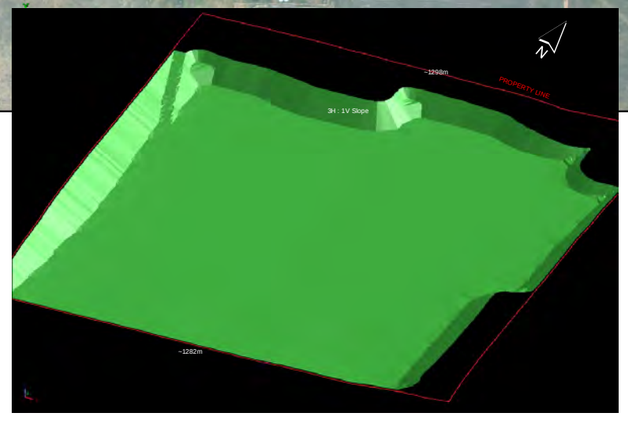
COMMENTS:

Although every effort is made to ensure that this map product is accurate and up to date, some discrepancies in the data may occur due to various data sources beyond our control. This map may be generalized and may not reflect current conditions. Uncharted hazards may exist. Do not use this map for navigational purposes. Any comments should be directed to the Land Management Group of Lafarge Western Canada.

Basemap data obtained from Rockey View County and Altalist Ltd..

DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
DRAWN BY	Eric Man	IMAGERY DATE	April 01, 2012
CHECKED BY	N/A	SHEET	10 of 12
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"



HUGHES
RECLAIMED CONDITIONS
NE 36-26-4-W5M

REV.	DATE	NOTES

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DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
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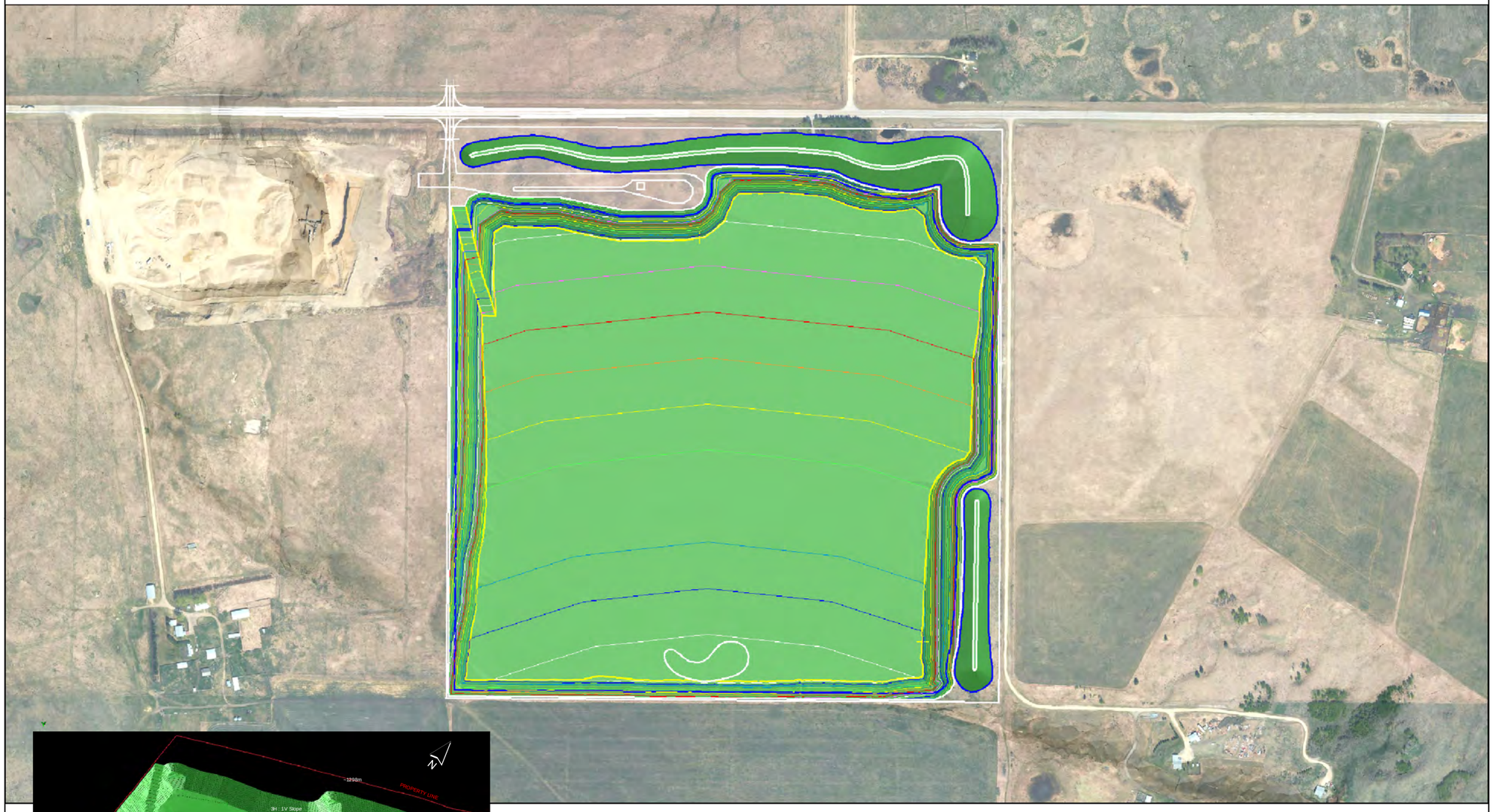
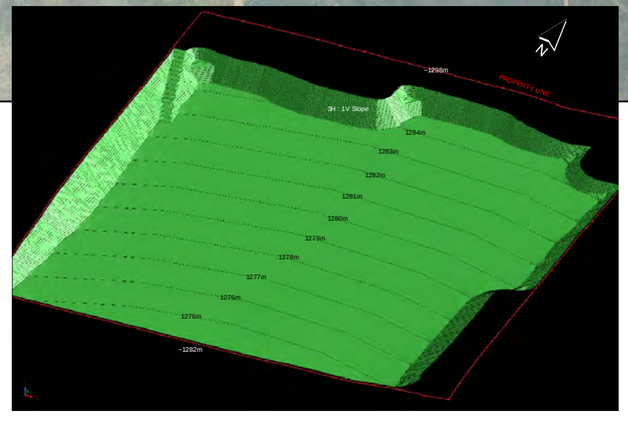
CHECKED BY	N/A	SHEET	11 of 12
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"





HUGHES
RECLAIMED CONDITIONS
CONTOURS
NE 36-26-4-W5M

REV.	DATE	NOTES

NAD 1983 3TM
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Basemap data obtained from Rockey View County and Altalist Ltd..

DESGNED BY	Eric Man	PROJECT DATE	January 14, 2015
DRAWN BY	Eric Man	IMAGERY DATE	April 01, 2012
CHECKED BY	N/A	SHEET	12 of 12
PROJECT NO.	AB15007	PAPER SIZE	11" x 17"

APPENDIX E
Air Quality Assessment

APPENDIX F
Biophysical Assessment

APPENDIX G
Preconstruction Site Assessment

APPENDIX H
Groundwater Investigation

APPENDIX I
Noise Impact Assessment

APPENDIX J
Traffic Impact Assessment

APPENDIX K
Stormwater Assessment

APPENDIX L
Alberta Culture Clearance Letter

APPENDIX M
Open House Report