## RIVERSDALE RESOURCES

# Supplemental Information Request Addendum \#7 

Benga Mining Limited<br>Grassy Mountain Coal Project<br>CCA Applications No. 1844520 and 1902073<br>EPEA Application No. 001-403427<br>WA Applications No. 001-00403428, 001-00403429, 001-00403430 and 00100403431<br>PLA Applications No. MSL160757, MSL160758, LOC160841, LOC160842 and LOC970943

May 2018

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## A. PUBLIC LANDS ACT

## 1. Environmental Field Reports

Submit the Environmental Field Report (EFR) forms.
The EFR's are part of the disposition approval and hence the EFR must be completed entirely and inclusively.

In the response Benga has made references to the Environmental Impact Assessment (EIA) and the PLA Application document instead of entering the required information in the EFR. All the relevant and application information need to be included in the EFR as the information in the EFR and the EFR documents will be included in the disposition approval.

## Response:

Refer to Appendix A-1 for the completed Environmental Field Reports (EFR) for LOC 160841, LOC 160842, MSL 160757, and MSL 160758.

## B. WATER ACT

## 80. Engineering Design Details of Sedimentation Ponds

In the response to SIR80, Benga has provided some engineering design details of their sedimentation ponds. Benga only provided portions of the information requested.
a) Provide the requested information on rainfall intensity distribution, rainfall runoff methodology (SIR80(a)).

## Response:

Sedimentation Ponds, including the West Sedimentation Pond, the East Sedimentation Pond and the NE Sedimentation Pond have been designed to reduce total suspended sediment (TSS) by sizing the ponds to accommodate a runoff volume equal to the 10 -year 24 -hour storm event.

A HEC-HMS model was developed to evaluate the required minimum sedimentation pond volume. The Huff distribution was used to distribute the design storm event, the SCS Curve Number method was used to estimate precipitation excess as a function of cumulative precipitation, soil cover and antecedent moisture and the SCS Unit Hydrograph method was used to transform precipitation excess into an outflow hydrograph.
b) Provide the the methodology used to derive pond surface area required for sediment control (SIR 80(b)).

## Response:

The sedimentation ponds were designed with the intent that they would operate as empty ponds post-storm events. Given that the design storage capacity is greater or equal to the 10 -year 24 hour storm results in sufficient storage to hold the storm event to promote settling. Once settling is achieved, the pond is dewatered to allow sufficient storage for the following storm. Without any discharge, sediment will settle within 24-hours given sufficient settling depth.

To settle 5 to 10-micron particle within 24-hours, the minimum required pond depth with zero discharge needs to be 1.75 m using the following equation (BC MOE 2015):
Minimum Pond Depth = Retention Time * Particle Settling Velocity.

Detail design of the pond dimension and outflow structure will include minimum length to width ratio to limit short-circuiting.

Minimum sedimentation pond volume to control TSS for these ponds are:

- West sedimentation pond $=54,700 \mathrm{~m}^{3}$
- East sedimentation pond $=14,400 \mathrm{~m}^{3}$
- Northeast sedimentation pond $=46,300 \mathrm{~m}^{3}$


## 84. Hydrological Data

a) Provide the requested hydrological data for SIR84(b)(ii) - the data used to produce EIA Figures 41 and 43 to 48

## Response:

The data used to produce EIA Figure 41, 43 to 48 are provided in Appendix B-1 excel file "IR84 Tables 20180501 SRJ". The data tables include total flow at each node as well as the "flow from site" reporting to each node, comprising seepage and discharge of treated water.
b) Provide the requested information for SIR 84 (c to e) based on the Blairmore Creek mean annual runoff depth instead of the regional analysis based watershed yield of 323 mm .

## Response:

We do not feel a reassessment is warranted based on the following rationale. The mean annual discharge (MAD) reported for Blairmore Creek of $154 \mathrm{~mm} /$ year refers to mean annual surface water flow measured at station BC-H01 in Blairmore Creek. The runoff estimate does not include interflow or shallow groundwater, which must be accounted for when evaluating the assimilative capacity of the creeks and potential effects on downstream water quality.

The varying stream-bed characteristics along Blairmore Creek and Gold Creek affect the proportion of the total flow that is measurable as surface channel flow (i.e. the interflow/groundwater flow ratio). Table 84-1 shows a summary of calculated MAD values (Consultant Report (CR) \#4, Table 3-1 and Table 3-4) and corresponding average annual unit runoff for stations along the two Creeks (MAD divided by catchment area). Location of the reaches are shown in Figure 84-1. The average unit surface runoff in Blairmore Creek ranges between approximately $200 \mathrm{~mm} /$ year and $300 \mathrm{~mm} /$ year for stations upstream of BC-H01 (BC-0/H01 on Figure 84-1) but is estimated at $154 \mathrm{~mm} /$ year at the station furthest downstream (Table 84-1). This suggests that shallow groundwater or interflow is considerable at that station.

Table 84-1 indicate that the observed variability in annual unit runoff at stations along Gold Creek is even greater than in Blairmore Creek. Surface flow in reaches 6, 8 and 9 appear to be a relatively small proportion of total flow when comparing to the unit flow in Reach 5, 7 and at the WSC gauge (Station GC-HWSC on Figure 84-1).

For both creeks, the variability in unit runoff is a direct result of the stream bed characteristics and in particular the hydraulic conductivity of the bed substrate. Figure $84-2$ (bottom) (previously presented as Figure 3-4 in CR\#4) shows surface flow completely infiltrating the creek bed in Gold Creek. Note that unit runoff differences may also be controlled by differences in watershed characteristics, such as the terrain (including associated effects on the climate forcing) and land-cover, which were discussed in the CR\#4 report (Section 3.1) and CR\#6 report (Section 3.3).

The water and load balance model must account for all water into which loadings from the project area are dispersed in the same way that total flow from the proposed mine area (both surface and groundwater flow) must be accounted for. Therefore, the direct use of a MAD value for channel flow at a single station is not a defensible input to the water and load balance model and will not produce a meaningful result.

## Table 84-1 Estimated Mean Annual Discharge and Unit Runoff for Blairmore Creek and Gold Creek

| Water course | Study <br> Reach/Station | $\mathbf{M A D}\left(\mathbf{m}^{3} / \mathbf{s}\right)$ | Drainage Area <br> $\left.\mathbf{( k m}^{2}\right)$ | Average <br> Annual Unit <br> Runoff <br> (mm/year) | Reference <br> Point $^{\mathbf{1}}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Blairmore | Reach 5 | 0.110 | 15 | 231 | BC-15/H03 |
|  | Reach 4 | 0.175 | 19.1 | 289 | BC-12 |
|  | Reach 3 | 0.208 | 32.7 | 203 | BC-2 |
|  | BC-H01 | 0.235 | 47.7 | 154 | n/a |
|  |  |  | 10.8 | 137 | GC-26 |
| Gold | Reach 9 | 0.047 | 14.9 | 144 | GC-22 |
|  | Reach 8 | 0.068 | 31.5 | 343 | GC-7/H01 |
|  | Reach 7 | 0.342 | 31.8 | 104 | GC-3 |
|  | Reach 6 | 0.105 | 44.8 | 276 | GC-1 |
|  | Reach 5 | 0.392 | 63.3 | 334 | WSC |

1 See table 3-6 of IFA for details
2 Includes a small amount ( $<10 \%$ ) for missing winter data

## 206. Contingency Periods

SIR 206 response uses the hydrological model's representation of overall impacts to stream baseflow as opposed to identifying and quantifying resutrn flow/volumes separately. The responses do not provide sufficient information on impacts ot streams during water quality contingency periods when retun flows will be lower than expected and during initial years when return flows to Gold Creek are not expected. Provide responses by quantifying the expected return flows.
a) SIR

## Response:

The assessment of potential impacts to flow in Gold Creek conservatively assumed that no flow would report from site to the creek during the operations phase, including water from the sedimentation ponds. This assumption was made in an effort to represent a reasonable worstcase scenario in the assessment. Tables supplied in the file "IR84 Tables 20180501 SRJ" (see response to SIR 84(b)(ii) above) list the assumed flows used in the model scenarios (see
worksheets "P10_GC", "P50_GC", and "P90_GC"). In other words, return flows are expected to be zero for the operations period and relatively minor in the post-closure period.

## 207. Water Conservation Objective

In response to SIR 207, Benga has not provided the requested analysis showing the impacts that the proposed transfers and new licence may have on the Crowsnest River Water Conservation Objective. This analysis is required for AER's consideration of the Matters and Factors listed in the Approved Water Management Plan for the South Saskatchewan River Basin.

## Response:

Benga requested and received information from AEP for naturalized flows at the Water Conservation Objective (WCO) station "Crowsnest River at Frank". The information received was in the form of two pieces of data and a formula. The data is a set of naturalized flows at the WSC station "Crowsnest River at Frank" for the years 1928 to 2009, and a set of weekly flows calculated in 1995 using the old and outdated modified Tennant/Tessman minimum flow methodology referred to as an "IO" or Instream Objective. The formula was represented as either $45 \%$ of the natural flow or the IO plus $10 \%$ whichever is greater. This data was used to compute the WCO on a weekly time step.

The IO is substantially greater than $45 \%$ so a comparison calculation was prepared for the provided naturalized river flow data set and the frequency that the IO plus $10 \%$ would equal the natural flow. Normally the second step would be to subtract the licenced diversions, in a reasonable proportion to their typical pattern of use, from the naturalized river flow to see how often the new licenced diversion would be restricted.

The analysis from the AEP supplied data showed the calculated WCO often exceeded the natural river flow for much of the year, for all of the modelled years without even considering any of the existing licenced diversions. A copy of the data calculations and associated graphs are provided in Appendix B-2. The data is also graphically shown on Figure 207-1.

The results show the WCO exceeded the naturalized flow data numerous times every week of the year, without any withdrawals occurring. For example, in the 81 years of flow data in week 9 , the WCO requirement exceeds the natural flow in all 81 years. This data wasn't presented in the response to SIR \#207a, as it was assumed there was an error in the data. The reason behind developing a WCO for a watercourse in Alberta was to identify a reasonable portion of a stream flow that must remain in the stream to protect the instream environment (Water Act Sec 1(1)(hhh)). A formula that frequently identifies more water than is naturally available in the stream most of the time suggests an error in either data or methodology. The issue was described to AEP, with a request for clarification of any potential data misalignment. No response was received on why the data produced a WCO requirement greater than the natural flow.

Benga investigated this further and found an updated method for calculating Instream Flow Needs, that was developed in 2011 and was available on the AEP website. The method commonly referred to as the "Alberta Method" was carefully constructed as a replacement for
the previously used "modified Tennant/Tessman method" and its variations adopted from the USA in the 1970 to 2010 period. For comparison, the AEP naturalized flow for "Crowsnest River at Frank" was applied according to the AEP website instructions for calculating an Instream Flow Need. The result is also provided in Appendix B-2 and shown on Figure 207-2. The analysis shows the minimum flow required for protecting the river environment (IFN) exceeds the natural flow in about 20 years out of the 81 years of data. During such occasions Benga would assume the risk to reduce production or to increase on-site water storage to use during these times.

The second step of subtracting the existing senior licence diversions from the naturalized flow data to predict the frequency that the new application may be restricted has not been attempted. Although there is a relatively small amount of licenced water use in the Crowsnest River basin, there is no reliable data on the frequency of water use by the existing small group of licencees. There is also the potential for compounding errors, since the naturalized flow data set provided by AEP was constructed also without actual water use reports to indicate the water use pattern and frequency of use of the existing licencees.

The impact on the three allocations that have been applied for is described below:

## York Creek temporary transfer:

- This licence has the highest priority (Priority \#1 - discussed in more detail in the response to SIR 208) of all water licences in the Crowsnest River System between Crowsnest Lake and the Oldman River Dam. The total volume requested for transfer is $250,400 \mathrm{~m}^{3}$ per year. This licence pre-dates any WCO objectives that were later adopted and is therefore, not subject to the WCO objective.
- The York Creek transfer will allow water to remain in the river for a longer time from the current location in York Creek (Addendum 2, Appendix 1E, Figure 1-1) to the confluence of Gold Creek with the Crowsnest River, an additional 7.4 km .


## Devon Licence transfer:

- This licence has a priority of \#3 in the Crowsnest River System between Crowsnest Lake and the Oldman River Dam. The total volume requested for transfer is $123,350 \mathrm{~m}^{3}$ per year. This licence also pre-dates any WCO objectives that were later adopted and is therefore, not subject to the WCO objective.
- The Devon transfer will allow water to remain in the river for a longer time from the current location on the Crowsnest River (Addendum 2, Appendix 1E, Figure 1-1) to the confluence of Gold Creek with the Crowsnest River, an additional 16.5 km .
- The impact of these transfers result in more water staying in the river longer, which is positive to the environment and downstream users.


## Industrial Reserve new allocation:

- This licence will be the newest allocation and will have the lowest priority (Priority \#16) in the Crowsnest River System between Crowsnest Lake and the Oldman River Dam. The total volume requested for allocation is $185,025 \mathrm{~m}^{3}$ per year. This licence will be subject to WCO objectives and will be the first licence to be shut down or restricted if the WCO objectives can't be met.
- This new licence can not have any impact on any new licensees or the WCO (either as the $45 \%$ of natural flow or as the IO plus $10 \%$ ).

Since the two transfers are senior priorities and pre-date the WCO objectives, the WCO does not apply to them in the current location and form and therefore will not have any different effect on the WCO at Frank. The new licence will be subject to the WCO and since it will be the most junior licence above the Oldman Dam, will be the first to be shut down to achieve the WCO.

Since new licences are all subject to WCO being met, the new licence applied for can not have any impact on the WCO being met, just risk to the licence holder of being shut down. None of the licenses will have any impact on the WCO at Frank being met by being transferred or by new operations at Grassy Mountain. The potential impacts to Gold Creek, Blairmore Creek and the Crowsnest River are discussed in Addendum 2, Appendix 1E, Section 3.

From the table of Matters and Factors in the Water Management Plan for the SSRB one of the items in the Matters column is:
"Existing, potential and cumulative effects on any applicable instream objective and/or WCO"
The way previous licence applications have been managed to meet the requirement above is a condition has been added to the new licence stating the licencee must cease diversions when the WCO is not being met. To be comparable to other licences issued Benga expects the same condition will be placed on the new licence thus preventing any effects on the WCO.

It is assumed the issue of the WCO being identified as the IO plus $10 \%$ where the data used forces a calculated value greater than the natural flow most of the time will be resolved. A WCO of $45 \%$ of natural flow, or a WCO equal to the IFN are more practical and acceptable values.

## Figures



Panel B
Adjacent to historical coal slack pile (just downstream of Panel A), May 18 2016, with surface flow present in both channels shown. Looking upstream.

Panel C

Same view/location as Panel B, September 14 2016, with intermittent flow in one channel only (tree in channel fell since May 18). Looking upstream.


Figure 84-2 Surface Flow Infiltration, Gold Creek


Disclaimer: This figure was derived from multiple data sources and while we make every effort to assure its accuracy, Millennium EMS Solutions Ltd. disclaims any representation or warranty and assumes no liability either for any errors, omission or inaccuracies that may occur.


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# Appendix A-1: Environmental Field Reports (EFR) for LOC 160841, LOC 160842, MSL 160757, and MSL 160758 

## Completion of EFR Cover Document <br> For all Dispositions 2.0 <br> Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or ' $N / A$ ' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

New
Revised

Date Submitted 28/05/2018
Department Number LOC 160841

## dd/mm/yyyy

Site/Project Name: Grassy Mountain Coal Mine

## A. Communications

1. Applicant: Benga Mining Limited
2. Company contact person for EFR: Alisdair Gibbons
Phone: <contact information
3. E-mail: <email address removed>

Cell Phone: $\qquad$
$\qquad$
4.
5. Company representative who conducted the onsite assessment for the EFR:

Tyler Riewe
6. Phone: <contact information

Cell Phone: (__ $\qquad$
7. Fax: ( $\quad$ )

E-mail: <email address removed>
8. Date of on-site assessment: $\underline{2014 \text { to } 2016 \text { m }}$
dd/mm/yyyy
a
Note: The Regulatory body reserves the option to audit individual EFR's to ensure field visits have been conducted and information supplied is accurate.


1. Construction is proposed under the following soil conditions (check the box that applies):
Frozen
v
X Non-Frozen
e
$\square$ Other (If "Other", explain) >
d
Construction will occur in both frozen and non-frozen ground conditions throughout the life of the Project.

Proposed construction date: $\frac{\text { Q1 } 2019 \text { to Q4 } 2020}{\text { dd/mm/yyyy }}$
dd/mm/yyyy
2. Specify associated developments/dispositions that may be required as a result of this disposition.
$\square$ Power line
$\square$ Pipeline
$\square$ Compressor
$\square$ Metering Station
$\square$ Access
Other An application for a MSL for the mining area and portions of the access/coal conveyor/powerline will be submitted to the AER. In addition, and application for a MLL for the construction camp will be submitted to Alberta Environment and Parks.

## Land Standing Review

3. A complete Land Standing Review check must be made on the proposed area.

Date Land Standing search was completed: 15/09/2016
dd/mm/yyyy

a. Within a Provincial Grazing Reserve? $\square$ Yes $\boxtimes$ No

If 'Yes', complete the Provincial Grazing Reserve template and attach to the Environmental Field Report. (Refer to Appendix I in the instruction document.)
b. Within the Chungo Access Management Area? $\square$ Yes $\quad$ No

If 'Yes', complete the Chungo Area template (located at the end of IL 2005-01 - Annex to Chungo Creek Industrial Access Management Area Information Letter
and attach it to the Environmental Field Report.
c. Within a FireSmart Community Zone? $\quad$ Yes $\square$ No

If 'Yes', contact Forest Protection Division for additional hazard reduction requirements.
d. Follow the "Bear Smart" program to reduce bear-human conflicts and increase public stewardship of black and grizzly bears in Alberta by providing strategies, information and education materials to its staff and contractors, see srd.alberta.ca and search for "Alberta BearSmart"
4. Are Permanent/Research Sample Plots/Rangeland Benchmarks located within 100 m of the boundary of the lands under application? $\square$ Yes $\boxtimes$ No
If 'Yes', indicate the legal land description and GPS coordinates for each plot/benchmark in relation to the disposition boundary (degree, decimal, minutes).

| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD __ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD $\qquad$ S | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD $\qquad$ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD __ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |

PSP's held by the Regulatory body appear as DRS or PNT reservations on the LSAS report. The forest industry also has sample plots, and if these are registered, they will appear as ISP's on the LSAS report. If the forest industry sample plots are not registered, they will not appear on the LSAS report. The proponent is responsible for determining if there are any PSP's or ISP's on the land under application. PSP's and ISP's must not be disturbed.

## Stakeholders, Other Land Users

5. Is there potential impact on or conflict with stakeholders and other land users? $\boxtimes$ Yes $\square$ No If "Yes" to either, please list and explain mitigation:
Benga has been undertaking an extensive public engagement and Aboriginal Consultation program for the Project, which was initiated in 2013 and is still ongoing as part of the regulatory process for applications and assessments required in accordance with the Environmental Protection and Enhancement Act and Coal Conservation Act. Benga has held three Public Forums and three Open Houses in the Crowsnest Pass to inform the public about the Project. Numerous meetings have also been held with the regional municipalities, local stakeholders, local residents and land
owners, special interest groups, provincial and federal government agencies, senior cabinet ministers and specific individuals with concerns.
Consents with holders of overlapping dispositions have been provided to the AER.
6. What actions have been taken to integrate this disposition with other existing/planned activities and resources to minimize the impacts on the land base? (Check appropriate boxes.)
```
\square \mp@code { N o t ~ a p p l i c a b l e }
\square \mp@code { U s e ~ c o m m o n ~ c o r r i d o r }
\square \text { Parallel existing clearing/right of way}
\ Use existing clearing/right of way
\square \text { Other}
```

Explain: The Project is located in an area with significant historic mining activity. Opportunities for use of existing clearings for the ancillary activities such as the rail loop, conveyor and construction camp were evaluated and facilities sited accordingly. The final location of the rail loop was determined based on discussions with various stakeholders.
7. Identify any aesthetic concerns related to the proposed activity (i.e., negative effects on the aesthetic/sensory aspects of the surrounding land including view, smell, noise, etc.).

```
\(\square\) Not applicable
\(\square\) From public access
\(\square\) From residence
\(\square\) From recreation facility
O Other Land Users
```

Explain: A majority of the concerns raised focussed on the visual impacts of the proposed rail load-out facility. Members of the community voiced concerns that the load-out facility would be too visible from Highway 3. Accordingly, Benga redesigned the location of the load-out infrastructure to the back side of the rail loop, thereby moving the infrastructure further away from Highway 3. The site preparation (i.e., grading) necessary to install load-out infrastructure in the proposed location will position the base of the load-out lower than the level of the highway, thereby reducing the relative height of the structure from Highway 3. To further obscure the view of the infrastructure from the highway and community, Benga will construct berms and plant vegetation around the perimeter of the railway. Benga will continue to engage in discussions with the community to address ideas for landscaping and other measures that would diminish concerns related to the visual impact of the load out infrastructure from the community's perspective. In addition, a visual assessment of lighting around the rail load-out was undertaken. Several options for mitigation were identified and with the implementation of these mitigation measures it was determined that the visibility of operations will be low and the overall impact will be insignificant.

Visual impacts on what the mountain will look like post mining has been raised by the Piikani Nation. Benga has developed a Conservation and Reclamation Plan for the Project. The reclaimed lands will feature regionally compatible landforms and vegetation patterns that are ecologically functional and successional. The goal of the reclamation plan is to develop lands that are maintenance-free and self-sustaining. The landscape will evolve through seral states of initial revegetation to self-sustaining ecosystems, consisting of mature vegetation communities typical of the Region. Although new landscapes will be created during development and reclamation of the Project, they will be integrated with the surrounding undisturbed lands.
8. Are there any conflicts with Access Management Plans, Integrated Resource Plans or policy documents for the area? $\square$ Yes $\boxtimes$ No
If 'Yes', explain mitigation strategy: $\qquad$
9. Was First Nations (Aboriginal) consultation required by the Regulatory body? $\boxtimes$ Yes $\square$ No

If "Yes", with whom: Groups included in the consultation program were identified by the Alberta Aboriginal Consultation Office (ACO) and the Canadian Environmental Assessment Agency. These groups are as follows:

- Blood Tribe (Kainai Nation);
- Piikani Nation;
- Siksika Nation;
- Stoney Nakoda Nation:
- Bearspaw;
- Chiniki;
- Wesley; and
- Tsuut'ina Nation.


## C. Wildlife/Environmental Concerns

1. Within a Key/Critical Wildlife Zone? $\quad$ Yes $\square$ No

If 'Yes', provide information on mitigation strategies that will be implemented: Portions of the propsed LOC are located in theKey Wildlife and Biodiversity Zone (KWBZ). The KWBZ is for winter ungulate habitiat and high potential for biodiversity. Key strategies for protection of these zones include minimizing vegetation clearing, activity in winter, not creating new access and adhering to timing restrictions. The LOC is located adjacent to areas of existing developments (e.g. golf course, Highway 3, the community of Blairmore), where only a minimal amount of new clearing will be required for development of the LOCs.
2. Wildlife Timing Constraint apply? $\boxtimes$ Yes $\square$ No

If 'Yes', provide dates of restricted period: From April 15 To August 31
To avoid disrupting nesting migratory and resident songbirds and raptors, in accordance with Alberta's Wildlife Act and Canada's Migratory Birds Convention Act (Regulation 12:1) and the Species at Risk Act, vegetation clearing will be scheduled outside April 15 to August 31. In the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines. Any active nest sites encountered will be buffered with the recommended setback distances based on specific species requirements. (See Provincial Timing Guidelines or FW referral maps.)
3. Fisheries Timing Constraint apply? $\square$ Yes $\boxtimes$ No

If 'Yes', provide dates of restricted period: From __ To
(See Provincial Watercourse Codes of Practice for restricted periods.)
4. Within a Caribou Area? $\square$ Yes $\boxtimes$ No. If 'Yes', specify the Caribou Protection Plan number and name.

## Species at Risk (Plant/Animals)

5. Is it likely that a species at risk (not including Woodland Caribou in number 4 above) will be found in the area of the proposed development? $\boxtimes$ Yes $\square$ No If 'Yes', specify the status and protective strategy for each species: See attached Species at Risk summary.

| Species $1 \_$Species $2 \ldots$ |  |
| :--- | :--- |
| $\square$ Endangered | $\square$ Endangered |
| $\square$ Threatened | $\square$ Threatened |
| $\square$ Special Concern | $\square$ Special Concern |
| $\square$ At Risk | $\square$ At Risk |
| $\square$ May Be At Risk | $\square$ May Be At Risk |
| Explain any conflict and proposed mitigation | Explain any conflict and proposed mitigation |
| $\square$ |  |


| Species $3 \ldots$ | Species 4 |
| :--- | :--- |
| $\square$ Endangered | $\square$ Endangered |
| $\square$ Threatened | $\square$ Threatened |
| $\square$ Special Concern | $\square$ Special Concern |
| $\square$ At Risk | $\square$ At Risk |
| $\square$ May Be At Risk | $\square$ May Be At Risk |
| Explain any conflict and proposed mitigation | Explain any conflict and proposed mitigation |
| $\square$ |  |

Alberta Fish and Wildlife Division recommends predevelopment inventory be conducted on all native grasslands habitats within the Grassland Natural Region due to high concentration of Species at Risk and limited site specific information on occurrences.
6. Has a pre-development Species at Risk inventory been completed to alert the applicant of any wildlife concerns related to this project? $\boxtimes$ Yes (copy of inventory attached) $\square$ No
If 'No', explain: See attached Species at Risk summary.

Has the activity been assessed to ensure it does not negatively affect any species at risk? $\boxtimes$ Yes $\square$ No
If 'No', explain: $\qquad$
8. If Access Restrictions apply, include legal land description and explain mitigation measures.

LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$
Explain mitigation strategy: $\qquad$
9. If within or adjacent (within 100 m ) to a Protected Area, indicate the type of protected area and explain what measures will be taken to avoid conflict with the protected area.
$\square$ Natural Area $\square$ Ecological Reserve $\quad \square$ Park $\quad$ Other It is located within a FireSmart Community Zone. Benga has had discussions with regulators and developed a fire control plan based on the FireSmart Wildfire Assessment System
Name of protected area: $\qquad$
Explain mitigation strategy: $\qquad$
10. Are there any environmentally sensitive areas in the vicinity (within 100 m ) of the proposed activity that will require special measures to protect?Yes Х No
If 'Yes', list and explain: $\qquad$
11. Is the proposed activity within a permafrost area? $\square$ Yes $\boxtimes$ No If 'Yes', specify the Permafrost Protection Plan number and name: $\qquad$

## D. Historical Resources

Date search completed A Historical Resource Impact Assessment was undertaken as part of the EIA and submitted to Alberta Culture. 05/08/16
dd/mm/yyyy
What is the Historical Resource Value (HRV) of the affected lands?
Not Listed1 இ 2】 3【 45

If HRV is 1-5, an 'Application for Historical Resources Act Clearance' must be submitted to the Cultural Facilities and Historical Resource Division (CFHRD) of Alberta Community Development.
Date submitted $\frac{05 / 08 / 16}{\mathrm{dd} / \mathrm{mm} / \mathbf{y y y y}}$
Note: Activities on land that has an HRV or 4 or 5 may require a Historical Resources Impact Assessment (HRIA).

## E. Vegetation and Timber Cover

Vegetation (check all that apply)

| $\square$ Native grassland | $\square$ Treed wetland | Deciduous-dominant forest: |
| :--- | :--- | :--- |
| $\square$ Tame pasture | $\square$ Shrubby wetland | $\square$ ("D" less than $\mathbf{3 0 \%}$ coniferous trees) |
| $\square$ Cropland | $\square$ Grass or grass-like wetland | Coniferous-dominant forest: |
| $\boxtimes$ Sparsely or non-vegetated | $\square$ Native aspen parkland | $\boxed{\text { ("C" more than } 70 \% \text { coniferous trees) }}$ |
| $\square$ Cutblock - planted | $\square$ Other (specify) | Mixedwood forest: |Natural regeneration >2 m

## Timber Salvage

1. Merchantable timber present? $\boxtimes$ Yes $\square$ No

Provide a volume inventory as follows:
Coniferous approx. volume $\underline{400} \mathrm{~m}^{3}$ or $\qquad$ number of loads

Spruce $\underline{37 \%} \quad$ Pine 27\% Other $\underline{37} \%$
Deciduous approximate volume $\underline{50} \mathrm{~m}^{3}$ or $\qquad$ number of loads

Aspen 100 \% Other 0 \%
2. Specify the timber disposition or FMA(s) shown on LSAS.
$\boxtimes$ No disposition (Contact the Regulatory body)
$\square$ Disposition number of FMA: $\qquad$ , holder name $\qquad$
3. Utilization standards:

Coniferous $\underline{15} \mathbf{~ c m}$ stump diameter to a $11 \mathbf{~ c m}$ top diameter.
Deciduous 15 cm stump diameter to a 11 cm top diameter.
4. Timber salvage waiver requested?Yes $\boxtimes$ No
If 'Yes', provide justification: $\qquad$
5. Provide the name of the salvage purchaser Timber volumes from crown land will be offered to the two main quota holders, Spray Lakes Sawmills (1980) Ltd. and Crowsnest Forest Products. Should these quota holders decline, the volumes will be made available to other interested parties., or check one of the following:Not known at this time
By $\square$ TM88 (or equivalent)
By Timber permit
6. When will the salvage be removed/hauled from the site to a wood processing plant?

Proposed date start: $\frac{01 / 01 / 2019}{\mathrm{dd} / \mathrm{mm} / \mathbf{y y y y}}$
$\boxtimes$ Proposed date complete: $01 / 12 / 2019$ dd/mm/yyyy

Notes: The operator is responsible for moving the salvage to a site that is accessible to ensure all the wood can be removed. This may require forwarding the wood to a site with all-weather access.

A copy of the TM88 or equivalent must be submitted to the the Regulatory body to ensure proper tracking of ownership, transport and manufacturing can occur.

## F. Soil and Vegetation Management

Soil salvage, storage, replacement, and handling procedures shall be in keeping with those outlined in Section 6 "Site Disturbance, Clearing and Soil Management," of the "Public Lands Operational Handbook".

Note: Projects on specific areas of public land may require a soil survey. The proponent is to identify such requirements during the planning process.

Are there soil sensitivities (i.e., shallow depth to water table; shallow depth to bedrock; soils are gravely or stony, etc.)? $\quad$ Yes $\square$ No
Explain: There are a few soil sensitivities within the area including, shallow depth to bedrock (bedrock at surface to depths $<100 \mathrm{~cm}$ ) and gravely and stony soils.

Surface expression (i.e., topography). The area has varying mountainous topography, with slopes ranging from Class 4 to Class 7 ( 5 to $>45$ degrees). Surface expression varies across the area and includes sections of level, hummocky, terraced and inclined expression. The proposed LOC is located in previously disturbed area with variable topography due to existing development
Site drainage (i.e., drainage is very poor, poor, imperfect, moderately well, well, rapid, or very rapid)
Drainage ranged from very poor to very rapid.
Are there problem vegetation/weeds/invasive species on or near site at time of assessment?
$\boxtimes$ Yes $\square$ No Explain No noxious or invasive species were identified within the proposd LOC areas, however, nine noxious weeds, and 20 invasive vegetation species were identified within the proposed Mine Permit boundary. The majority of the noxious and invasive species were observed in areas with existing disturbance (i.e., pipelines, well sites, clearings, pastures, cutblocks, and along roads).

Identification of species, degree of infestation and approximate amount of area infested per species.

|  | Species 1 | Species 2 | Species 3 |
| :--- | :--- | :--- | :--- |
| Trace (rare) | hound's-tongue |  |  |
| Low <br> (occasional) | downy brome, blueweed, <br> dalmatian toadflax |  |  |
| Moderate <br> (scattered plants) | ox-eye daisy, creeping thistle, <br> common toadflax |  |  |
| High <br> (fairly dense) | tall buttercup, common mullein |  |  |

Is there a risk of weed spread to the site if development proceeds?
$\square$ High
$\boxtimes$ Moderate
$\square$ Low
If any risk, provide details in reclamation and construction sections of supplements. If high or moderate, show location on the application plan.

## G. Incidental Activities

The applicant is to identify and outline on the application plan any incidental activities required for temporary use.

Note: No additional approval is required for incidental activities that are applied for with the disposition and included in the plan.

If the incidental activity is not approved under the disposition, a separate approval is required. Incidental activities approved in this manner are for temporary use only and are not part of the surface disposition.

1. According to field assessment, will additional incidental clearings be required? $\square$ Yes $\boxtimes$ No If 'Yes', indicate the purpose:CampsiteTemporary WorkspaceBorrow PitSalvage DeckOther $\qquad$
2. Are any additional clearings planned in reforested areas?Yes $\boxtimes$ No If 'Yes', explain

The Core Operating Conditions are standard practices that must be applied to all activities.

## H. Core Operating Conditions

## Prior to Entry - Confirmation Number

099 The holder shall contact and advise Regulatory body of its intentions:

- prior to entry upon the lands for a stated purpose,
- prior to any additional construction during the term of this authority,
- at the completion of operations or construction, and
- upon abandonment of this activity.

Upon contact prior to initial entry on the land, the Regulatory body shall issue a confirmation number that shall be maintained on file by the holder and be provided to the Regulatory body on request.
<Location \& Telephone No.> $\qquad$

## Adverse Ground Conditions

105 Any activity on the land during adverse ground conditions must be suspended if the activity is likely cause unacceptable damage to vegetation or soil, as may be determined by the holder or the Regulatory body.

## Sample Plots

108 No entry is allowed within the boundaries of any research or sample plot.
Reclamation - Interim
127 The holder shall reclaim all disturbed land surfaces within two growing seasons. Interim reclamation, including site and debris clean-up, slope stabilization, recontouring with subsoil, and spreading of topsoil shall be done progressively and concurrently with operations.

## Reclamation - Final

128 Final surface reclamation must meet the requirements for the specific activity in place at the time of abandonment.

## Noxious Weeds

131 The holder shall cut, keep down and destroy all noxious weeds and restricted weeds as per the Public Lands Act.

## Waste Material Disposal

135 The holder shall remove all garbage and waste material from this site to the satisfaction of the Regulatory body, in it s sole discretion.

Watercourse/Water Body - No Material to be Deposited
148 The holder shall not deposit or push debris, soil or other deleterious materials into or through any watercourse or water body or on the ice of any watercourse/water body.

## Erosion Prevention

158 The holder shall take all precautions and safeguards necessary to prevent soil and surface erosion to the satisfaction of the Regulatory body in its sole discretion.

## Natural Drainage - No Interruption

161 The holder shall not create any interruptions to natural drainage, including ephemeral draws that may result in blockage of water flow.

## Sites and Installations 3.0 Completion of Supplement A Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

New $\boxtimes$ Revised
Date Submitted: $\frac{28 / 05 / 2018}{\mathrm{dd} / \mathrm{mm} / \mathrm{yyyy}}$
MSL Number LOC 160841

PIL Number: $\qquad$
Site/Project Name: Grassy Mountain Coal Mine
Legal land description: LSD $\underline{03-06}$ Sec $0 \underline{\text { 02 }} \quad$ Twp 008 Rge $\underline{04}$ W $\underline{1}$

## A. Site Description

1. Stability concerns: $\square$ Yes $\boxtimes$ No If 'Yes', explain mitigation: $\qquad$

Questions 2, 3, 4 and 5 of section A apply to MSL only. The "Wellsite Spacing Recommendations" may be used as a guide, search for "Wellsite Spacing Recommendations" on srd.alberta.ca .
2. Well type:OilSweet GasSour Gas ( $\mathrm{H}^{2} \mathrm{~S}$ )Coalbed Methane
Single Well pad

## Multi-well

 pad$\boxtimes$ Other The LOC includes a portion of the rail loop that is approximately 200 m by 220 m
3. Well depth: N/Am
4. Flare requirements for drilling:50 m35 m25 mFlare pitFlare tank Flare stack
5. Number of zones to be completed/produced N/A Inter-well spacing N/A m.

## B. Vehicle/Equipment Access

How will the site be accessed? (Check boxes that apply)
$\boxtimes$ By an existing access held under disposition or jurisdiction (specify name, disposition number, and owner):
The proposed LOC will be accessed via an existing roadway on Freehold land.New application (LOC)New access included in this application.
Note: If access is part of the site and installation application, an access supplement must be submitted.

## C. Contamination Prevention

1. Is the boundary of the site located within 100 m of a watercourse? $\square$ Yes $\boxtimes$ No

If 'Yes', specify distance from edge of lease to top of breaks in meters $\qquad$ Explain mitigation strategy if within $\mathbf{1 0 0}$ meters $\qquad$ -
2. Will the site be diked during drilling? $\quad \square$ Yes $\quad$ No During production? $\square$ Yes $\boxtimes$ No If 'No', explain why not. N/A

Will other methods of on-site contamination prevention be required? Explain No.

## Applicable to MSL only

## D. Sump

Type of sump (check appropriate box):On-site pitAbove-ground tank on siteIn-ground tank on siteRemote sump

Remote sump location: LSD $\qquad$ Sec $\qquad$ Twp Rge $\qquad$ $\mathbf{W}^{-}$ Private landPublic land (if location known, indicate on the survey plan)

GPS coordinates: (deg/min/decimal) NAD83 Latitude $\qquad$ Longitude $\qquad$
Proposed mud type: $\qquad$ Hydrocarbon: $\qquad$Salt base: $\qquad$Gel chem: $\qquad$ $\square$ Other: $\qquad$

## Applicable to MSL only

Disposal
Estimate volumes to be disposed of: Solids $\qquad$ m $^{3}$ Liquids $\qquad$ $\mathrm{m}^{3}$

Proposed disposal method: $\square$ Mix/bury/cover $\quad \square$ Land spreading $\quad \square$ Land farming $\quad \square$ Pump-offDisposal on forested public landOther $\qquad$ Approximate date of disposal $\qquad$Private LandPublic Land
Indicate land farming or land spreading location if off site on public land.
LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

## Applicable to MSL only

## E. Source of Water

1. Water Required: $\square$ Yes $\square$ No $\square$ Water well on lease
2. Offsite source: $\square$ Offsite water well $\quad \square$ Lake $\square$ Stream $\square$ RiverOther (specify type) $\qquad$
Location: LSD ___ Sec ___ Twp ___ Rge ___
3. Access required to water source? $\square$ Yes $\square$ No If 'Yes' attach a sketch.

## F. Construction Strategy

## 1. Vegetation Removal

Explain: When encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan. Nonmerchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.

## 2. Brush Disposal <br> Explain: See Section F. 1

## 3. Topsoil handling: (Check appropriate boxes) $\square$ No stripping $\square$ Minimum surface disturbance $\square$ Stripping $\square$ Single Lift $\square$ Two Lift $\boxtimes$ Other (Explain) Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses. Soil salvage guidance by experienced professionals will result in minimal soil losses and will minimize impacts to soil quality.

Additional details: A significant portion of the proposed LOC areas to be developed for the rail loop is located on previously developed land. Existing golf course buildings and infrastructure will be removed. The soil salvage practices planned by Benga will provide a suitable quality reclamation material with sufficient volume for the soil replacement requirements of the reclamation plan while providing a suitable seed bed for the revegetation program.
4. Will padding of the wellsite be required? $\square$ Yes $\quad \boxtimes$ No,
If 'Yes' Explain: N/A - no wellsite is proposed

## G. Reclamation Strategy

Revegetation strategy: (Check appropriate boxes) $\square$ Natural Recovery $\square$ Native Seed
$\square$ Non-native Seed $\boxtimes$ Other
One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

Interim: Interim reclamation for the proposed LOC area will be limited to slope stabalization and errosion control measures
Production/Operation: The LOC area will be required throughtout the life of the mine. Areas not required for ongoing operation will be revegetated to control erosion. At mine closure the rail loop and supporting infrastructure will be fully reclaimed. The track will be dismantled and all associated infrastructure will be removed. The area will be recontoured to meet
the sloping requirements, compaction will be alleviated and conserved soil will be replaced. The area will be revegetated to integrate with adjacent lands. One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

## Applicable to MSL only

See Appendix III - Lease Description and Wellsite Sizing Information
Note: Complete and attach the lease description and wellsite sizing template (in the Appendix) if a nonstandard wellsite is required as per the lease description and wellsite sizing document (see instructions).

## Operating Condition

## Contamination Prevention

136 In addition to complying with Federal, provincial and local laws and regulations respecting the environment, including release of substances, the holder shall, to the regulatory body's satisfaction, take necessary precautions to prevent contamination of land, water bodies and the air with particulate and gaseous matter, which, in the opinion of the regulatory body in its sole discretion, is or may be harmful.

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable.
Failure to fill out the document and form(s) completely will result in the EFR being rejected.


Date Submitted 28/05/2018
LOC Number LOC 160841
dd/mm/yyyy

Legal land description: From: LSD SW
Sec 02
Twp 008
Rge 04
W 5 $\qquad$
To: LSD SW
Sec 02
Twp 008
Rge 04
W 5 $\qquad$

Note: The Pre-disturbance Planning and Surface Access Management sections of the Public Lands Operational Handbook should be consulted when dealing with new access development, extensions or upgrading existing access. Before a road is approved, the applicant may be requested to present the advantages and disadvantages on any alternate proposals, the rationale for selecting a particular route and the trade-offs made.

## A. Type of Access/Dimensions

1. Initial access width See below $m$ and type of access:undeveloped dryundeveloped frozendry weather
$\boxtimes$ all-weather (permanent)NA
Explain: The LOC includes a portion of the rail loop that is approximately 200 m by 220 m .
2. Final access width See below $\mathbf{m}$ as applied for and type of access:$\square$ undeveloped dryundeveloped frozendry weather
$\boxtimes$ all-weather (permanent)
Explain: The LOC includes a portion of the rail loop that is approximately 200 m by 220 m .

Notes: For winter access it is recommended that existing seismic lines be used for initial access to a location. Widening of these lines should be minimized. Minimal widths for initial access are to be used wherever possible. Once a well or development is considered viable, the applicant generally plans to move to a wider ROW (e.g. 20m) for development of a high grade road. In this case, the 20 m width can be applied for with the understanding there will be no additional clearing beyond the $8-10 \mathrm{~m}$ width indicated until the development is proven viable.

If the entire Row is cleared initially and then not required for the development, it will be treated as Unauthorized use of public land and appropriate enforcement action will be taken.

If electricity is required at a facility, the Row must be planned to ensure the power line is located on the downwind side. This is required to maximize the tree-free area adjacent to the power lines, thus reducing the potential of falling trees hitting the power line and possibly starting a wildfire, as well as, cutting off power to the facility.

Where a road, pipeline, and power line ROW are required, it is recommended the power line be located between the road and pipeline. This greatly reduces the clearing requirements and keeps the power line safe from falling trees.

## B. Topography

1. Mark more than one box to show range:
$\square$ Level (0-2\%)
$\boxtimes$ Gentle (3-10\%)
【 Moderate (11-15\%)
$\boxtimes$ Steep (16-30\%)
$\boxtimes$ Very steep (over 30\%)
Explain: The LOC is located within an area of topography that ranges from strong to extreme (Class 4 to 7 ).

## C. Watercourse Crossings

Avoidance, Minimizing and Mitigation/Compensation, in that order, are considerations for watercourse crossings. See the instructions for additional explanation.

1. Will watercourse crossings be installed? $\square$ Yes $\boxtimes$ No. (If 'No', go to next section). If 'Yes', number the watercourse crossings on the survey plan and complete the table below.

Note: All licences, authorizations and approvals issued by the Regulatory body under the Public Lands Act, Forests Act, Environmental Protection and Enhancement Act and Water Act, should not be taken to mean the proponent (applicant) has complied with federal legislation. Proponents should contact Fisheries and Oceans Canada in the location nearest to them (Peace River, Edmonton, Calgary, Lethbridge) in relation to the application of federal laws, including but not limited to the Navigable Water Protection Act and the Fisheries Act (Canada).

| Crossing Number | Crossing Method | Culvert/Bridge Size Diameter (mm) $x$ length (m) | Watercourse Size Class (1-4) | LSD | Sec | Twp | Rge | Mer | Specify if restricted activity period (dd/mm/yyyy) | Class of Waterbody from COP (A,B,C,D) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |
|  | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |
|  | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |

2. Temporary watercourse crossings will be removed by
dd/mm/yyyy

Note: Temporary crossings must not be installed or existing ones removed during restricted activity periods unless clean flow can be maintained. Crossings installed during winter work should be removed prior to spring break up.

## D. Construction Strategy

## Plan attached (include all areas of existing clearing(s) and new clearing(s) to be used, and their dimensions)

1. Vegetation removal: Explain: When encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan. Non-merchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.

## 2. Brush disposal: Explain: See Secton D. 1

3. Topsoil handling/Topsoil stripping width: (Check the appropriate boxes for initial and final access)

Minimal surface disturbance (no stripping)
Stripping $\square$ Single Lift $\square$ Two Lift $\boxtimes$ Other Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses. Soil salvage guidance by experienced professionals will result in minimal soil losses and will minimize impacts to soil quality.

Explain if more than one box has been checked.
Additional details: A significant portion of the proposed LOC areas to be developed for the rail loop is located on previously developed land. Existing golf course buildings and infrastructure will be removed. The soil salvage practices planned by Benga will provide a suitable quality reclamation material with sufficient volume for the soil replacement requirements of the reclamation plan while providing a suitable seed bed for the revegetation program.

## E. Reclamation Strategy

## Revegetation strategy: (Check appropriate boxes)

## Natural recovery $\square$ Native seed $\square$ Non-native seed $\boxtimes$ Other See Production/Operation Section

 Interim: Interim reclamation for the proposed LOC area will be limited to slope stabalization and errosion control measures.
## Production/Operation: .

The LOC area will be required throughtout the life of the mine. Areas not required for ongoing operation will be revegetated to control erosion.

At mine closure the rail loop and supporting infrastructure will be fully reclaimed. The track will be dismantled and all associated infrastructure will be removed. The area will be recontoured to meet the sloping requirements, compaction will be alleviated and conserved soil will be replaced. The area will be revegetated to integrate with adjacent lands. One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.



## Species at Risk Summary

# SPECIES AT RISK SUMMARY <br> LOC 160841 

## WILDLIFE SPECIES

The wildlife species at risk that were either recorded during field surveys undertaken for the Environmental Impact Assessment or reported in the Fish and Wildlife Management Information System within the boundary of the proposed LOC, and for which there is moderately to highly suitable habitat in the proposed LOC boundary, are outlined in Table 1.

| Table 1 | Species at Risk that may occur within the proposed LOC boundaries. |  |  |
| :---: | :---: | :---: | :---: |
| Common Name | Provincial Status $^{1}$ | Federal Status ${ }^{2}$ | Key Habitat Requirements |
| Birds |  |  |  |
| Common nighthawk | Sensitive | Threatened SARA Schedule 1 | Cutblocks, forest clearings, prairies, rock outcrops. Nests near logs, boulders, and shrubs. |
| Mammals |  |  |  |
| Little brown myotis | Secure | Endangered <br> - SARA <br> Schedule 1 | Roosts under loose bark on trees, tree cavities, buildings, bridges, caves. Forages near water. |

1 Alberta Wild Species General Status Listing (AEP 2010c)
2 COSEWIC/SARA status. Species with SARA status are indicated with SARA Schedule 1.

## MITIGATION MEASURES

Benga will be implementing a number of best management practices, Project design features, and other wildlife mitigation measures to avoid or minimize effects on wildlife. These best management practices, design features, and mitigation measures are presented below in relation to each of the expected Project-wildlife interactions that were assessed.

To prevent or minimize Project effects on federally-listed (SARA) species at risk, Benga will work in consultation with Environment Canada to develop species-specific mitigation and monitoring plans for species at risk known to occur in the WLSA. These species include the, common nighthawk and little brown myotis. Critical habitat has not yet been identified for these species by Environment Canada; should this happen, mitigation plans will be updated to include critical habitat. Over the duration of the Project, other species at risk may be found in the WLSA or added to the SARA list of protected species. If this occurs, Benga will contact Environment Canada to determine mitigation requirements for these additional species.

Project development has the potential to interact with wildlife in different ways. The Project may alter wildlife habitat availability, habitat connectivity/movement, and wildlife mortality risk
and health, all of which may affect the abundance of wildlife in the area. Benga will implement the mitigation measures outlined below to minimize potential impact to wildlife.

## HABITAT AVAILABILITY

Many of the Project effects associated with wildlife habitat loss will be minimized through implementation of the Project's reclamation plan. The summary of the reclamation plan mitigation recommendations for wildlife and wildlife habitat reclamation include:

- minimize the overall disturbance footprint through the mine planning process to avoid critical breeding habitats, nesting and denning sites, and movement corridors to the extent possible;
- preserve remnant forest patches within the development areas where feasible to provide habitat, habitat connectivity and hide cover for wildlife species;
- remnant patches should protect known essential raptor habitat features by incorporating these habitat features (i.e., mature balsam poplar and aspen) where possible;
- maximize the direct placement of salvaged soil to enhance native plant development;
- retain slash and large woody debris in the salvaged soil to provide microsites for native plant and hide cover for wildlife;
- establish a variety of vegetation species and communities suitable for wildlife, and encourage structural complexity within the forests;
- encourage understory complexity in reclaimed forests by planting native shrubs such as alder and willow;
- ensure that core security areas are provided for wildlife;
- provide water management program that ensures the surface water quality is maintained; and
- limit sight lines by maintaining mature forest stands as buffers between roads and reclamation areas.

To support the reclamation plan mitigation measures, the following will be implemented to mitigate potential direct and indirect Project effects on wildlife habitat availability:

- incorporate the existing legacy mining disturbances into the development and reclamation plans for the project, and other proposed land use activities to the best extent possible so that habitat loss, habitat fragmentation, linear disturbance features, and cumulative habitat loss are minimized;
- pre-disturbance surveys (wildlife sweeps) will be conducted in the development area prior to any construction activities during Project development to determine the occurrence of any important wildlife habitat features such as migratory bird nests, mineral licks, active dens, bat habitat and hibernacula, active raptor nest sites, and essential raptor habitat features (i.e., mature balsam poplar, platform/stick nests) that could indicate the presence of species at risk;
- protect all important wildlife habitat features in areas of suitable wildlife habitat (on the edge of the Project footprint boundary) appropriate setback distances (or buffer zones) will be considered;
- clearing and equipment use/storage/cleaning in undisturbed areas within and adjacent to the Project footprint will be avoided;
- vegetation adjacent to high-activity linear corridors (e.g., access roads, coal conveyor) will be retained to reduce the extent of noise and visual sensory disturbances to the extent possible;
- where appropriate, vegetated buffer zones (100 m or minimum of 30 m ; pending topography constraints) will be maintained between Project infrastructure and wetlands, creeks, and streams to the best extent possible;
- as required by the Weed Control Act and Regulations, all identified noxious and invasive weed species populations will be controlled prior to any site disturbance and mine operation to prevent the further spread of weeds. Noxious weed management will occur in compliance with R\&R/03-4 Weeds on Industrial Development Sites;
- as the presence of artificial lighting can potentially affect bird and bat use of nearby habitats, Benga has developed a visual impact mitigation plan that reduces stray and non-essential artificial lighting to minimize wildlife effects and that will comply with OH\&S safety requirements; and
- sensory disturbance from the active mine site will be further mitigated through the use of mufflers on all internal combustion engines, utilizing mine pit topography to shield noise generated from haul trucks, and conducting blasting during daylight hours.


## HABITAT CONNECTIVITY AND MOVEMENT

The following general wildlife mitigation measures will be implemented to minimize potential disruption to daily and seasonal wildlife movements:

- road plowing and grading will be conducted in a manner that does not restrict wildlife from crossing access roads or accessing wildlife crossings; and
- measures to control dust and other air emissions (e.g., watering of roads and use of dust suppressants, minimizing engine idling, etc.) within the Project footprint will be implemented to minimize effects on adjacent wildlife habitats.

For raptors, additional relevant mitigations include:

- retain residual patches of essential habitat and habitat features within and adjacent to the mine footprint (i.e., mature poplar trees, tall conifer trees) to provide perches, nest sites, and hide cover;
- minimize loss of mature and old-growth forest habitat and avoid complex, multi-story mixedwood forest where possible; and
- maintain a 100 m buffer of undisturbed forest around Blairmore Creek, Gold Creek and other riparian corridors.

Mitigation measures specific to bat species include:

- avoid direct and indirect impacts to known, primary maternity roosts should any such roosts be located/identified;
- prior to removal or alteration of historic mine shafts and infrastructure, conduct roost and hibernacula surveys within them, and consult with AEP should hibernacula or roosts be located; and
- where possible, tree clearing will be planned to avoid the May to August bat summer season.


## MORTALITY RISK

Wildlife mortality risk may increase as a result of increased traffic, wildlife encountering equipment, or elements of the Project footprint, and wildlife being attracted to Project facilities or humans. The Grassy Mountain area currently has a considerable network of trails and roads that are heavily used. Plans are already being implemented to reduce this level of access and with the approval of this Project, the levels will be reduced considerably more. Mitigation measures that will be implemented to reduce wildlife mortality risk include:

- all access to the Mine Permit will be controlled, no uncontrolled access will be permitted. Common operational practices will include:
- prohibiting use of snowmobiles and ATVs;
- prohibiting hunting, harassment, or feeding of wildlife; and
- implementing a strictly enforced zero tolerance policy on the use of firearms.
- timing vegetation site clearing activities to occur outside the April 15 to August 31 period to avoid disrupting nesting migratory and resident songbirds and raptors;
- in the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines. Establish speciesappropriate setback distances around confirmed active nest sites until fledging in consultation with Environment Canada and AEP. If the status of a nest cannot be confirmed, or if a nest is found outside of the breeding season, a setback distance will be implemented until such time as the nest status can be confirmed;
- confirm the presence/absence of bats in high quality habitats located within the Project footprint prior to the initiation of any clearing activities and develop a mitigation plan if bats are found;
- conducting pre-disturbance denning (bears, marten, etc.) and roosting (bats) surveys prior to vegetation clearing and other high-disturbance activities. Consult with AEP as needed to develop appropriate mitigation and management strategies;
- conducting pre-disturbance surveys (acoustic surveys and visual searches) to identify wetlands and watercourses used by breeding Columbia spotted frogs and western toads that feed into the protection plans;
- Benga commits to supporting active bear management plans associated with the Project. If a site specific plan is required, it will be developed in consultation with AEP personnel as part of the Wildlife Mitigation and Monitoring Plan. The plan is expected to be a comprehensive document that outlines operational strategies and best practices for addressing concerns related to not only bear-human conflicts but potential risks to ungulates and other wildlife resulting from attraction of bears to the area;
- developing a Beneficial Management Plan guide to minimize potential Projectspecific impacts on migratory birds and their habitat by identifying more site-specific mitigation and monitoring measures following Project approval and in consultation with federal and provincial regulators;
- a detailed Waste Management Plan will be developed and implemented prior to construction and operational activities to minimize the attraction of wildlife. Benga will follow the Best Management Practices for camps, fences, and barriers as described in Bear Smart: Best Management Practices for Camps, and ensure all waste is stored in wildlife-proof containers and disposed of properly. Some of the waste management and bear awareness/Bear Smart guidelines that will be implemented include:
- ensuring food waste, refuse, and other attractants are securely contained in enclosed and approved bear-proof containers and/or facilities (e.g., hard-sided buildings, fenced compounds, and bear-proof transfer station) prior to transportation to a disposal facility to prevent access by scavenging bears;
- providing adequate signage to inform employees of the location and proper use of bear-proof storage containers/facilities;
- ensuring waste storage containers/facilities are not filled beyond capacity;
- ensuring regular inspection and maintenance of waste storage containers/facilities is carried out;
- ensuring measures contained in the bear management plan are diligently followed by all employees and contractors;
- all on-site staff will receive Bear Awareness Training; and
- bear warning signs will be installed to advise staff of locations where problem bears have been reported.
- implementing an Emergency Spill Response Plan to limit the effect of accidental spills. Spills will be minimized by restricting fuel storage and filling to designated areas that are at least 100 m from wetlands and watercourses as well as Project drainage ditches, sediment control ponds, and pit lakes;
- storing all hazardous materials, including those used for blasting, in secure areas that are inaccessible to wildlife (e.g., buildings, storage areas surrounded by wildlife-proof
fencing). In addition, proper handling and storage of industrial materials and debris within the Project footprint will be maintained to minimize potential risks to wildlife;
- developing procedures to clear blasting areas of large mammals or birds prior to blasting;
- designing water management ponds and drainage ditches, and pit lakes to minimize potential entrapment of wildlife;
- developing a strategy to minimize changes in water quality upstream of the mine in conjunction with a water-quality monitoring program;
- enforcing speed limits ( $\leq 50 \mathrm{~km} / \mathrm{hr}$ ) along the main access road and utility corridors and placing signs at identified wildlife crossings to increase driver diligence to minimize wildlife-vehicle collisions. Vehicles will yield to all wildlife crossing the main access road;
- bird collisions with buildings will be mitigated by placing visual markers on windows, and collisions with the proposed power line will be mitigated by installing large 'floats' or other markers;


## PLANT SPECIES

Twenty-two vegetation species identified within the boundaries of the proposed surface dispositions at the time of the field assessment were on the Alberta Rare Plant Tracking and Watch Lists (ACIMS 2014) (Table 2). Two species identified are federally listed by COSEWIC and SARA: Pinus albicaulis (whitebark pine) and Pinus flexilis (limber pine). Whitebark pine is listed as Endangered in Alberta and British Columbia under SARA Schedule 1. Limber pine was designated as Endangered throughout its range in Alberta and British Columbia by COSEWIC in November 2014.

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Vascular plants |  |  |  |  |  |  |
| Angelica dawsonii | Yellow angelica | G4 | S3 | W | - | Sensitive |
| Carex petasata | Pasture sedge | G5 | S1S2 | Y | - | May be at risk |
| Eriogonum cernuum | Nodding umbrella-plant | G5 | S2 | Y | - | May be at risk |
| Eucephalus engelmannii | Elegant aster | G4G5 | S3S4 | W | - | May be at risk |
| Phacelia hastata | Silver-leaved scorpionweed | G5 | S3 | W | - | Sensitive |
| Pinus albicaulis | Whitebark pine | G3G4 | S2 | Y | Endangered | At risk (Endangered) |
| Pinus flexilis | Limber pine | G4 | S2 | Y | Endangered | At risk (Endangered) |
| Piperia unalascensis | Alaska bog orchid | G5 | S2? | Y | - | Sensitive |
| Mosses and liverworts |  |  |  |  |  |  |
| Conocephalum salebrosum | Liverwort | G5 | S2 | Y | - | May be at risk |
| Dicranum tauricum | Broken-leaf moss | G4 | S1S2 | Y | - | Sensitive |
| Lophozia ascendens | Liverwort | G4 | S1 | Y | - | May be at risk |
| Lophozia longidens | Liverwort | G5 | S1 | Y | - | May be at risk |
| Lophozia wenzelii | Liverwort | G4G5 | S1 | Y | - | May be at risk |
| Pellia neesiana | Liverwort | G5 | S2 | Y | - | - |
| Racomitrium aciculare | Moss | G5 | S1 | Y | - | Sensitive |
| Schistidium tenerum | Thread bloom moss | G5? | S2 | Y | - | Sensitive |
| Lichens |  |  |  |  |  |  |
| Cladonia umbricola | Shaded cladonia | G3G5 | S1 | Y | - | May be at risk |
| Nodobryoria abbreviata | Tufted foxtail lichen | G4? | S1 | Y | - | May be at risk |
| Peltigera cinnamomea | Cinnamon dog pelt lichen | GNR | S2 | Y | - | May be at risk |

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Umbilicaria americana | American rock tripe lichen | G5? | S2S3 | Y | - | May be at risk |
| Vulpicida canadensis | Brown-eyed sunshine lichen | G3G5 | S2 | Y | - | Sensitive |
| Xylographa parallela | Black woodscript lichen | G5 | S2S4 | Y | - | May be at risk |

${ }^{1}$ GRANK refers to global conservation rank and SRANK refers to subnational conservation rank). See EIA CR \#8, Section 1.6.3 for definitions of rankings.
${ }^{2} \mathrm{Y}$ - species is tracked, W - species is watched (ACIMS 2014).
${ }^{3}$ COSEWIC (2014), SARA (2014).
${ }^{4}$ General Status of Alberta Wild Species database (Government of Alberta 2010). (Endangered) refers to Endangered under Alberta’s Wildlife Act (Government of Alberta 2014).

## MITIGATION MEASURES

Rare plant species rankings in Alberta are largely determined by the number of observations of the species that are reported in the province. Based on this system, low profile, difficult to locate, and hard to identify species are more likely to be listed as rare. It is difficult to determine if some species are rare due to location at the edge of their natural range. Taxonomic uncertainty and misidentification may also result in the rare status of certain species. Avoidance of rare plant species provincially ranked between S1 and S3 is the most preferred mitigation option. Where avoidance is not an option, site-specific and species-specific mitigation planning may be possible. Based on a review of the species descriptions and habitat requirements of the rare plant species located in the Project Footprint, Benga has developed a rare plant species mitigation program.

Mitigation measures will include, but are not limited to, the following:

- a re-vegetation program which aims to establish diverse native vegetation communities (closed conifer forests, grassland open forests, mixed forests, and treed wetlands) with equivalent pre-disturbance capability;
- a C\&R Plan which aims to establish communities that are locally and regionally limited in distribution where conditions allow;
- preservation of adjacent vegetation communities by minimizing the area required for construction and operation of the Project;
- provision of appropriate soil substrate where re-vegetated areas can establish;
- seeding of stockpiled reclamation material with suitable vegetation species mix to ensure long term stability of the soil piles, which reduces erosion and the potential for weed establishment;
- use of coarse woody debris and direct soil placement techniques to augment mycorrhizal and microbial inoculums;
- use direct placement of soil for provision of propagules to enhance opportunity for re-establishment of native species composition and enhanced species richness;
- planting of multiple layers of native vegetation (e.g., trees, shrubs and graminoids) to provide initial structure for wildlife habitat and to enhance biodiversity;
- based on the described selection criteria implement the seed collection, propagation and/or relocation plan for rare species; and
- establish disease-resistant whitebark pine.

In addition to the strategies noted above, the preferred primary mitigation strategy for native foothills rough fescue grasslands is avoidance. Until disturbance is unavoidable, the following mitigation strategies will be implemented to preserve the resource:

- construct, or undertake assessments and surveys, during the dormant period for rough fescue (August to March); and
- avoid soil disturbance by:
- minimizing topsoil stripping and grading;
- utilizing existing trails; and
- potential implementation of seed collection and propagation plan and/or direct placement of sod.

Where disturbance is unavoidable, where feasible, mitigation strategies will include direct placement of reclamation material (including potential transplantation of rare plants or of foothills rough fescue sod), collection of native seed from areas with foothills rough fescue and rare plants that will be disturbed, seeding of wild harvest seed, as part of a certified, weed-free native seed mixes in re-vegetation plan, and the potential seeding and growing of plugs grown in a green house to be transplanted onto the site.

To preserve genetic diversity, clusters of whitebark pine will be investigated for suitability for cone/seed collection prior to disturbance and seed collection would include selection of trees showing evidence of white pine blister rust resistance. Conditions and strategies for establishing whitebark pine during reclamation include:

- identification of high light, low competition sites;
- planting in pure stands or patches to avoid competition from other trees;
- avoiding planting in swales and frost pockets;
- creation of microsites for seedling establishment (rocks, stumps or other coarse woody debris);
- use of recommended spacing to avoid interspecies competition; and
- planting seedlings in the fall to avoid hot dry summer conditions.

Given that various wetland classes are rare in the Project Footprint and in the region, added mitigation measures for wetland impacts should include the following:

- use of best practices to maintain the hydrologic regime of mineral soil wetlands;
- creation of transition areas between re-vegetated ELCs as outlined in the reclamation plan to the treed swamps, where it is possible and/or appropriate to do so; and
- placement of culverts within wetlands that will be divided by roads to ensure that water flow between wetlands will not be affected.

Wetland monitoring will include but not be limited to the following:

- monitoring and maintenance of drainage control structures should be conducted regularly to ensure water flow and flow patterns are maintained in wetlands adjacent to the Project Footprint;
- monitoring road removal at Project closure which may have had an effect on adjacent wetlands to ensure restoration of the hydrologic regime;
- monitoring of reclaimed wetlands should continue for a minimum of ten years to ensure the composition and structure, and key wetland functions are consistent with those in wetlands in the LSA prior to the Project disturbance; and
- monitoring of reclaimed wetlands should include the use of sub-emergent vegetation species as indicators of wetland health and integrity in the monitoring program.

Vegetation species that have current or historical uses and importance to First Nations groups are considered Traditional Ecological Knowledge (TEK) resources. Supplementary mitigation measures for TEK vegetation impacts include the following:

- consult with and involve First Nations Peoples in designing mitigation measures for sustainable management of TEK vegetation;
- implement a re-vegetation program which aims at the re-establishment of vegetation communities, such as those previously mentioned (closed conifer forests, mature mixed forests, native upland herbaceous grasslands and treed swamps) that are common to the pre-disturbed landscape and that will support TEK vegetation; and
- where practicable utilize locally collected seed to preserve the legacy of species and of place.


## Public Land Standing Report

| Req: 0000671394 <br> Report Date: $2016 / 09 / 30$ | Time: 18:24:18 |
| :--- | :--- |

## Selected Activities

| Surface Dispositions | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| :---: | :---: | :---: | :---: |
|  |  | Types: | All |
| Geophysical | NA | Status: | All |
|  |  | Types: | All |
| Reservations | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
|  |  | Types: | All |
| Encumbrances | Y | Status: | All |
|  |  | Types: | All |
| Land Postings | Y | Status: | Number Assigned, Open, Closed |
|  |  | Types: | All |

## Land Keys

W5-04-008-02-SW


| Geo Administrative Areas |  |  |  |
| :---: | :---: | :---: | :---: |
| ALBERTA ENERGY REGULATOR | SOUTH REGION |  | Code: AER-S |
| W5-04-008 COAL DEVELOPMENT REGION | SETTLED |  | Code: CDR-1 |
| W5-04-008-02 <br> ENVIRONMENT CORPORATE REGION | SOUTHERN |  | Code: ENV-1 |
| W5-04-008 <br> ENVIRONMENT CONS. \& RECL. DISTRICT | NO. 20 |  | Code: ERD-020 |
| W5-04-008 <br> EASTERN SLOPE ZONE W5-04-008 |  |  | Code: ESZ |
| FOREST MANAGEMENT UNIT W5-04-008-02-SW | SOUTHWEST | CO1 SOUTHERN ROCKIES | Code: FMU-C-51 |
| FOREST MANAGEMENT UNIT W5-04-008-02 | SOUTHWEST | CO2 SOUTHERN ROCKIES | Code: FMU-C-52 |
| FISH \& WILDLIFE ADMIN REGION | SOUTHERN REGION | BLAIRMORE | Code: FWA-1-02 |
| W5-04-008 |  |  |  |
| FISH AND WILDLIFE DISTRICT | SOUTHERN REGION | BLAIRMORE | Code: FWD-1-09 |


| Req: 0000671394 |  | Public Land Standing |  |
| :---: | :---: | :---: | :---: |
| Report Date: 2016/09/30 T | Time: 18:24:18 |  |  |
| FISH \& WILDLIFE REFERRAL LANDS |  |  | Code: FWR |
| W5-04-008-02 |  |  |  |
| GENERAL LANDS CLASSIFICATION | WHITE |  | Code: GLC-W |
| W5-04-008-02 |  |  |  |
| GRAZING ZONE | A2 |  | Code: GRZ-A2 |
| W5-04-008 |  |  |  |
| INTEGRATED RESOURCE PLAN | CROWSNEST CORRIDOR |  | Code: IRP-C4 |
| W5-04-008-02 |  |  |  |
| LAND USE AREA | SOUTHWEST 1 | BLAIRMORE | Code: LUA-SW1-2 |
| W5-04-008 |  |  |  |
| OPERATIONAL APPROVAL DISTRICTS | South Saskatchewan Region | South Saskatchewan District | Code: OPD-5-1 |
| W5-04-008 |  |  |  |
| RANGELAND DISTRICT | SOUTHWEST | PINCHER CREEK | Code: RLD-SW-6 |
| W5-04-008-02 |  |  |  |
| REGIONAL PLANNING COMMISSIONS | OLDMAN RIVER |  | Code: RPC-02 |
| W5-04-008 |  |  |  |
| URBAN MUNICIPALITY W5-04-008-02-SW | TOWN | BLAIRMORE | Code: UBM-T-009 |
|  |  |  |  |
| URBAN MUNICIPALITY | TOWN | MUNICIPALITY OF CROWSNEST PASS | Code: UBM-T-113 |
| W5-04-008-02 |  |  |  |

## Req: 0000671394

Report Date: 2016/09/30 Time: 18:24:18

LSRC550D
Public Land Standing
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Geographic Land Information Management and Planning System
Req: 0000671394

Report Date: 2016/09/30 Time: 18:24:18

ETS Request No.: R3540085
Public Land Standing
LSRC550D
Page 6 of 9

| Activities and Titles |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks | Total Area |  |
|  |  |  |  |  | Acres | Hectares |
| PNT090084 | Active/Disposed | 2011/10/20 | 2021/10/19 |  | 132,888.84 | 53,778.200 |

PINCHER CREEK OFFICE - RANGELAND DISTRICT-LANDS DIVISION DEPT. OF SUSTAINABLE RESOURCE DEV
0181 : MULTIPLE RESOURCE CONCERNS
5 : NO SURFACE SALE DISPOSITIONS
710 : SEE COMMENTS
THIS LOCATION MAY FALL WITHIN AN AREA OF FOOTHILLS FESCUE GRASSLAND, A VERY VALUABLE NATIVE GRASSLAND TYPE THAT IS LIMITED IN REMAINING AREA. ROUGH FESCUE GRASSLANDS ARE VERY SENSITIVE TO SURFACE DISTURBANCE AND DIFFICULT AND COSTLY TO RECLAIM. PROPONENTS MUST CONSULT INFORMATION LETTER (IL) 2010-02, FESCUE GRASSLANDS -- PRINCIPLES FOR MINIMIZING SURFACE DISTURBANCE AND MAKE EARLY CONTACT WITH ALBERTA ENVIRONMENT \& SUSTAINABLE RESOURCE DEVELOPMENT STAFF FOR THE AREA IN QUESTION. THE INFORMATION LETTER ADDRESSES OBLIGATIONS AND SPECIFIC DIRECTION REGARDING ALL POTENTIAL SURFACE DISTURBANCE RELATED ACTIVITY IN FOOTHILLS ROUGH FESCUE GRASSLAND PLANT COMMUNITIES. THIS DIRECTIVE SUPPLEMENTS THE ERCB'S IL 2002-01: PRINCIPLES FOR MINIMIZING SURFACE DISTURBANCE IN NATIVE PRAIRIE AND PARKLAND AREAS. IL 2010-02 MAY BE FOUND AT:
HTTP://WWW.SRD.ALBERTA.CA/FORMSONLINESERVICES/INFORMATIONLETTERS/LANDSINFO RMATIONLETTERS/DOCUMENTS/IL2010-02-
FOOTHILLSFESCUEGRASSLANDPRINCIPLESFORMINIMIZINGSURFACEDISTURBANCE-MAR232010.PDF IL 2002-01 MAY BE FOUND AT:

HTTP://WWW.ALBERTAPCF.ORG/RSU_DOCS/EUB_NATIVE_PRAIRIE.PDF
ACTIVITY DETAIL INFORMATION

| PLAN NO | LTO PLAN NO | ITEM |
| :--- | :--- | :--- |
| 7837 RN |  | VERSION DATE(S) |
| 7837 RN |  | $2011 / 09 / 09$ |

W5-04-008-02-SW

Geographic Land Information Management and Planning System

| Req: 0000671394 |  |
| :--- | :--- |
| Report Date: $2016 / 09 / 30$ | Time: 18:24:18 |

ETS Request No.: R3540085
Public Land Standing LSRC550D
Page 7 of 9

## Activities and Titles

| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks |  | Total Area |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | Acres | Hectares |
| TFA 103358 | Active/Disposed | 2010/07/14 | 2011/07/14 |  |  |  |  |
|  |  |  | MUNCIP | HE CROWS | PASS |  |  |
|  |  |  | A C T IVITY | IN F OR | ION |  |  |
|  | OPTION TO PURCHASE (Y/N): |  | WITHIN 100M OF | ODY (Y/N): | PURPO <br> RECRE |  |  |
|  | DIMENSION: |  | CLIENT FILE NO |  |  |  |  |
|  |  |  |  |  |  |  |  |


| Req: 0000671394 |  |  | Public Land Standing |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Report Date: 2016/09/30 Time: 18:24:18 |  |  |  |  |  |
| Client List |  |  |  |  |  |
| Activity | Client ID | Name / Address | Province | Country | Postal Code |
| CNT090027 | 8072051-001 | CALGARY OFFICE - FORESTRY AND EMERGENCY RESPONSE DIVISON OF ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPM |  |  |  |
|  |  | WILDFIRE MANAGEMENT BRANCH CALGARY WILDFIRE MANAGEMENT AREA 8660 BEARSPAW DAM RD NW |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T3L 1S4 |
| DRS890056 | 8000026-009 | ENVIRONMENT AND WATER, DEPARTMENT OF REGIONAL SERVICES 2005 AVE S FLOOR 2 |  |  |  |
|  |  |  |  |  |  |
|  |  | LETHBRIDGE | Alberta | CANADA | T1J 4L1 |
| PLA 000472 | 0000233-003 | ATCO GAS AND PIPELINES LTD. (SOUTH) 410 STAFFORD DR N |  |  |  |
|  |  |  |  |  |  |
|  |  | LETHBRIDGE | Alberta | CANADA | T1H 2A8 |
| PNT090084 | 8078165-001 | PINCHER CREEK OFFICE - RANGELAND DISTRICT-LANDS DIVISION DEPT. OF SUSTAINABLE RESOURCE DEV |  |  |  |
|  |  | 782 MAIN ST ROOM 242 PO BOX 1420 |  |  |  |
|  |  | PINCHER CREEK | Alberta | CANADA | T0K 1W0 |
| TFA 103358 |  | MUNCIPALITY OF THE CROWSNEST PASS P.O. Box 6000 |  |  |  |
|  |  |  |  |  |  |
|  |  | Crowsnest Pass | Alberta | Canada | T0K0E0 |
| Total Activities: 5 |  |  |  |  |  |

## DISCLAIMER

THIS STANDING REPORT IS PROVIDED SUBJECT TO THE CONDITION THAT HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF ALBERTA AND HER EMPLOYEES:
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(2) SHALL NOT BEAR ANY RESPONSIBILITY FOR ANY LOSS OR DAMAGE OF ANY KIND ARISING FROM OR IN RESPECT OF ANY ABSENCE OF INFORMATION OR ANY ERRORS OR OMISSIONS (WHETHER THE AFORESAID OCCASIONED BY NEGLIGENCE OR OTHERWISE) IN OR AFFECTING THIS REPORT OR THE INFORMATION THEREIN.

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[^0]
## Consents

June 22, 2016

Keith Bott
Riversdale Resources
PO Box 660
$1233120^{\text {th }}$ Ave
Blairmore, AB TOK OEO

## RE: LOC FOR RAIL LOOP NEAR BLAIRMORE, AB (SECTION 2/3, TOWNSHIP 8, RANGE 4, W5M)

ATCO Gas has facilities within the proposed LOC, under Pipeline Agreement Application (PLA) number 000472. A majority of the gas main within the proposed LOC has been abandoned.

If any portion of the gas main remains in the proposed LOC, ATCO Gas requires the remaining portion of the gas main to be abandoned. This abandonment is done at the developer's expense prior to any surface construction within the proposed LOC. Please contact the Lethbridge Engineering Department at (403) 380-5400 to arrange for a gas main abandonment.

Please contact Alberta One-Call Corporation at 1-800-242-3447 prior to any surface construction.
ATCO Gas has no objection to this proposal providing the above requirements are met.
If you require further information, please contact the undersigned at <contact information removed>
Sincerely,
ATCO Gas
<Original signed by>

Michael Leung


Distribution Design EIT, Lethbridge Region Operations
Email: <email address removed>
Phone: <contact information removed>

[^1]
## Completion of EFR Cover Document <br> For all Dispositions 2.0 <br> Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or ' $N / A$ ' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

New
Revised

Date Submitted 28/05/2018
Department Number LOC 160842

## dd/mm/yyyy

Site/Project Name: Grassy Mountain Coal Mine

## A. Communications

1. Applicant: Benga Mining Limited
2. Company contact person for EFR: Alisdair Gibbon Phone: <contact information
3. E-mail: <email address removed>

Cell Phone: $\qquad$
$\qquad$
4.
5. Company representative who conducted the onsite assessment for the EFR:

Tyler Riewe
6. Phone: <contact information
6. Phone: removed>

Cell Phone: (__ ) $\qquad$
7. Fax: (__ E-mail: <email address removed>
8. Date of on-site assessment: $\underline{2014 \text { to } 2016}$

$$
\overline{\mathrm{dd} / \mathrm{mm} / \mathrm{yyyy}}
$$

Note: The Regulatory body reserves the option to audit individual EFR's to ensure field visits have been conducted and information supplied is accurate.

## B. Surface Location

LSD $\underline{N E} \quad$ Sec $\underline{03} \quad$ Twp $\underline{008} \quad$ Rge $\underline{04} \quad$ W $\underline{5}$
To:
LSD $\underline{N E} \quad$ Sec $\underline{03} \quad$ Twp $008 \quad$ Rge $04 \quad$ W $\underline{5}$

1. Construction is proposed under the following soil conditions (check the box that applies):
```
    Frozen
    \Non-Frozen
    \square \mp@code { O t h e r ~ ( I f ~ " O t h e r " , ~ e x p l a i n ) }
```

Construction will occur in both frozen and non-frozen ground conditions throughout the life of the Project.

Proposed construction date: Q1 2019 to Q4 2020
dd $/ \mathrm{mm} / \mathbf{y y y y}$
2. Specify associated developments/dispositions that may be required as a result of this disposition.
$\square$ Power line
$\square$ Pipeline
$\square$ Compressor
$\square$ Metering Station
$\square$ Access
$\boxed{\text { Other An application for a MSL for the mining area and portions of the access/coal conveyor/powerline will be }}$ submitted to the AER. In addition, and application for a MLL for the construction camp will be submitted to Alberta Environment and Parks.

## Land Standing Review

3. A complete Land Standing Review check must be made on the proposed area.

Date Land Standing search was completed: 15/09/2016
dd/mm/yyyy

| Reservation/Activity Number | Action required/identify conflicts/contact name and or comments |
| :--- | :--- |
| CNT 090027 | Benga has prepared a fire control plan in accordance with the FireSmart <br> Wildfire Assessment System /FireSmart Community Zone/Forestry and <br> Emergency Response Division of Environment and Sustainable Resource <br> Development - Calgary Office |
| PNT 090084 | direct reclamation material placement from grassland areas, collect native <br> seeds for future reclamation, seeding of wild harvested weed-free native seek <br> mix. seeding and growing of foothills rough fescue plugs to be trasplated onto <br> recaimed sites/may fall within area of foothills fescue grassland/Lands <br> Division of Department of Sustainable Resource Development - Pincher <br> Creek Office - Rangeland District |
| PNT900426 | Historical Resource Impact Assessment has been undertaken/Registered <br> Historic Resource - Greenhill Mine Complex/ Not included in LSAS report, <br> but shown on AEPs Disposition Spatial Processing Tool |
|  |  |
|  |  |
|  |  |

a. Within a Provincial Grazing Reserve? $\square$ Yes $\boxtimes$ No

If 'Yes', complete the Provincial Grazing Reserve template and attach to the Environmental Field Report. (Refer to Appendix I in the instruction document.)
b. Within the Chungo Access Management Area? $\quad \square$ Yes $\quad$ No

If 'Yes', complete the Chungo Area template (located at the end of IL 2005-01 - Annex to Chungo Creek Industrial Access Management Area Information Letter
and attach it to the Environmental Field Report.
c. Within a FireSmart Community Zone? $\quad$ Yes $\square$ No

If 'Yes', contact Forest Protection Division for additional hazard reduction requirements.
d. Follow the "Bear Smart" program to reduce bear-human conflicts and increase public stewardship of black and grizzly bears in Alberta by providing strategies, information and education materials to its staff and contractors, see srd.alberta.ca and search for "Alberta BearSmart"
4. Are Permanent/Research Sample Plots/Rangeland Benchmarks located within 100 m of the boundary of the lands under application? $\square$ Yes $\boxtimes$ No
If 'Yes', indicate the legal land description and GPS coordinates for each plot/benchmark in relation to the disposition boundary (degree, decimal, minutes).

| Reservation No. | PSP/RSP No. | LSD $\qquad$ Sec | Twp | Rge | W |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD $\qquad$ S | _Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |

PSP's held by the Regulatory body appear as DRS or PNT reservations on the LSAS report. The forest industry also has sample plots, and if these are registered, they will appear as ISP's on the LSAS report. If the forest industry sample plots are not registered, they will not appear on the LSAS report. The proponent is responsible for determining if there are any PSP's or ISP's on the land under application. PSP's and ISP's must not be disturbed.

## Stakeholders, Other Land Users

5. Is there potential impact on or conflict with stakeholders and other land users? $\quad$ Yes $\quad \square$ No If "Yes" to either, please list and explain mitigation:
Benga has been undertaking an extensive public engagement and Aboriginal Consultation program for the Project, which was initiated in 2013 and is still ongoing as part of the regulatory process for applications and assessments required in accordance with the Environmental Protection and Enhancement Act and Coal Conservation Act. Benga has held three Public Forums and three Open Houses in the Crowsnest Pass to inform the public about the Project. Numerous meetings have also been held with the regional municipalities, local stakeholders, local residents and land
owners, special interest groups, provincial and federal government agencies, senior cabinet ministers and specific individuals with concerns.
Consents with holders of overlapping dispositions have been provided to the AER.
6. What actions have been taken to integrate this disposition with other existing/planned activities and resources to minimize the impacts on the land base? (Check appropriate boxes.)
```
\square \mp@code { N o t ~ a p p l i c a b l e }
\square \mp@code { U s e ~ c o m m o n ~ c o r r i d o r }
\square \text { Parallel existing clearing/right of way}
\ Use existing clearing/right of way
\square \text { Other}
```

Explain: The Project is located in an area with significant historic mining activity. Opportunities for use of existing clearings for the ancillary activities such as the rail loop, conveyor and construction camp were evaluated and facilities sited accordingly. The final location of the rail loop was determined based on discussions with various stakeholders.
7. Identify any aesthetic concerns related to the proposed activity (i.e., negative effects on the aesthetic/sensory aspects of the surrounding land including view, smell, noise, etc.).
$\square$ Not applicable
$\square$ From public access
$\square$ From residence
$\square$ From recreation facility
$\square$
$\square$

Explain: A majority of the concerns raised focussed on the visual impacts of the proposed rail load-out facility. Members of the community voiced concerns that the load-out facility would be too visible from Highway 3. Accordingly, Benga redesigned the location of the load-out infrastructure to the back side of the rail loop, thereby moving the infrastructure further away from Highway 3. The site preparation (i.e., grading) necessary to install load-out infrastructure in the proposed location will position the base of the load-out lower than the level of the highway, thereby reducing the relative height of the structure from Highway 3. To further obscure the view of the infrastructure from the highway and community, Benga will construct berms and plant vegetation around the perimeter of the railway. Benga will continue to engage in discussions with the community to address ideas for landscaping and other measures that would diminish concerns related to the visual impact of the load out infrastructure from the community's perspective. In addition, a visual assessment of lighting around the rail load-out was undertaken. Several options for mitigation were identified and with the implementation of these mitigation measures it was determined that the visibility of operations will be low and the overall impact will be insignificant.

Visual impacts on what the mountain will look like post mining has been raised by the Piikani Nation. Benga has developed a Conservation and Reclamation Plan for the Project. The reclaimed lands will feature regionally compatible landforms and vegetation patterns that are ecologically functional and successional. The goal of the reclamation plan is to develop lands that are maintenance-free and self-sustaining. The landscape will evolve through seral states of initial revegetation to self-sustaining ecosystems, consisting of mature vegetation communities typical of the Region. Although new landscapes will be created during development and reclamation of the Project, they will be integrated with the surrounding undisturbed lands.
8. Are there any conflicts with Access Management Plans, Integrated Resource Plans or policy documents for the area? $\square$ Yes $\boxtimes$ No
If 'Yes', explain mitigation strategy: $\qquad$
9. Was First Nations (Aboriginal) consultation required by the Regulatory body? $\boxtimes$ Yes $\square$ No

If "Yes", with whom: Groups included in the consultation program were identified by the Alberta Aboriginal Consultation Office (ACO) and the Canadian Environmental Assessment Agency. These groups are as follows:

- Blood Tribe (Kainai Nation);
- Piikani Nation;
- Siksika Nation;
- Stoney Nakoda Nation:
- Bearspaw;
- Chiniki;
- Wesley; and
- Tsuut'ina Nation.


## C. Wildlife/Environmental Concerns

1. Within a Key/Critical Wildlife Zone? $\boxtimes$ Yes $\square$ No

If 'Yes', provide information on mitigation strategies that will be implemented: Portions of the propsed LOC are located in the Mountain Goat and Sheep Rang, and Key Wildlife and Biodiversity Zone(KWBZ).
An assessment of the potential impacts to mountain goats has been undertaken. During the field assessments it was determined that there is no quality mountain goat habitat within the study area and no mountain goats were detected during the surveys conducted in 2014 or 2015. An assessment of the potential impacts to bighorn sheep was also undertaken. Bighorn sheep were not identified during any of the wildlife surveys undertaken for the Project but are known to occur along Highway 3. Bighorn sheep may move through the mine permit boundary while travelling between winter and summer ranges, and therefore movement could be altered by the development of the overland conveyor. The conveyor has been designed to include wildlife crossings, which will mitigate the impact to wildlife movement.
The KWBZ is for winter ungulate habitiat and high potential for biodiversity. Key strategies for protection of these zones include minimizing vegetation clearing activity in winter, not creating new access and adhering to timing restrictions. Both portions of the proposed LOCs are located adjacent to areas of existing developments (e.g. golf course, Highway 3, the community of Blairmore), where only a minimal amount of new clearing will be required for development of the LOCs.
2. Wildlife Timing Constraint apply? $\boxtimes$ Yes $\square$ No

If 'Yes', provide dates of restricted period: From April 15 To August 31
To avoid disrupting nesting migratory and resident songbirds and raptors, in accordance with Alberta's Wildife Act and Canada's Migratory Birds Convention Act (Regulation 12:1) and the Species at Risk Act, vegetation clearing will be scheduled outside April 15 to August 31. In the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines. Any active nest sites encountered will be buffered with the recommended setback distances based on specific species requirements. (See Provincial Timing Guidelines or FW referral maps.)
3. Fisheries Timing Constraint apply? $\boxtimes$ Yes $\square$ No

If 'Yes', provide dates of restricted period: From May 1 To August 15
(See Provincial Watercourse Codes of Practice for restricted periods.)
4. Within a Caribou Area? $\square$ Yes $\boxtimes$ No. If 'Yes', specify the Caribou Protection Plan number and name.

## Species at Risk (Plant/Animals)

5. Is it likely that a species at risk (not including Woodland Caribou in number 4 above) will be found in the area of the proposed development? $\boxtimes$ YesNo
If 'Yes', specify the status and protective strategy for each species: See attached Species at Risk summary.

| Species $1-$ | Species $2 \ldots$ |
| :--- | :--- |
| $\square$ Endangered | $\square$ Endangered |
| $\square$ Threatened | $\square$ Threatened |
| $\square$ Special Concern | $\square$ Special Concern |
| $\square$ At Risk | $\square$ At Risk |
| $\square$ May Be At Risk | $\square$ May Be At Risk |
| Explain any conflict and proposed mitigation | Explain any conflict and proposed mitigation |
| $\square$ |  |


| Species $3 \ldots$ | Species 4 |
| :--- | :--- |
| $\square$ Endangered | $\square$ Endangered |
| $\square$ Threatened | $\square$ Threatened |
| $\square$ Special Concern | $\square$ Special Concern |
| $\square$ At Risk | $\square$ At Risk |
| $\square$ May Be At Risk | $\square$ May Be At Risk |
| Explain any conflict and proposed mitigation | Explain any conflict and proposed mitigation |
| $\square$ |  |

Alberta Fish and Wildlife Division recommends predevelopment inventory be conducted on all native grasslands habitats within the Grassland Natural Region due to high concentration of Species at Risk and limited site specific information on occurrences.
6. Has a pre-development Species at Risk inventory been completed to alert the applicant of any wildlife concerns related to this project? $\boxtimes$ Yes (copy of inventory attached) $\square$ No
If 'No', explain: See attached Species at Risk summary.

Has the activity been assessed to ensure it does not negatively affect any species at risk? $\boxtimes$ Yes $\square \mathbf{N}$
If 'No', explain: $\qquad$
8. If Access Restrictions apply, include legal land description and explain mitigation measures.

LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$
Explain mitigation strategy: $\qquad$
9. If within or adjacent (within 100 m ) to a Protected Area, indicate the type of protected area and explain what measures will be taken to avoid conflict with the protected area.
$\square$ Natural Area $\square$ Ecological Reserve $\quad \square$ Park $\quad$ Other It is located within a FireSmart Community Zone. Benga has had discussions with regulators and developed a fire control plan based on the FireSmart Wildfire Assessment System
Name of protected area: $\qquad$
Explain mitigation strategy: $\qquad$
10. Are there any environmentally sensitive areas in the vicinity (within 100 m ) of the proposed activity that will require special measures to protect? $\square$ Yes $\boxtimes$ No
If 'Yes', list and explain: $\qquad$
11. Is the proposed activity within a permafrost area? $\square$ Yes $\boxtimes$ No If 'Yes', specify the Permafrost Protection Plan number and name: $\qquad$

## D. Historical Resources

Date search completed A Historical Resource Impact Assessment was undertaken as part of the EIA and submitted to Alberta Culture. 05/08/16
dd/mm/yyyy

What is the Historical Resource Value (HRV) of the affected lands?

If HRV is 1-5, an 'Application for Historical Resources Act Clearance' must be submitted to the Cultural Facilities and Historical Resource Division (CFHRD) of Alberta Community Development.
Date submitted 05/08/16
dd/mm/yyyy
Note: Activities on land that has an HRV or 4 or 5 may require a Historical Resources Impact Assessment (HRIA).

## E. vegetation and immor' Cover

Vegetation (check all that apply)Native grassland
Tame pastureTreed wetland

Cropland
【 Sparsely or non-vegetated
Cutblock - planted
Natural regeneration >2 m

Deciduous-dominant forest:("D" less than $\mathbf{3 0 \%}$ coniferous trees) Coniferous-dominant forest:区 ("C" more than $70 \%$ coniferous trees) Mixedwood forest:
("CD" 70\% to 50\% coniferous trees) ("DC" 50\% to 30\% coniferous trees)

Timber Salvage

1. Merchantable timber present? $\boxtimes$ Yes $\square$ No

Provide a volume inventory as follows:
Coniferous approx. volume $400 \mathrm{~m}^{3}$ or $\qquad$ number of loads

Spruce 37\% Pine 27\% Other $\underline{37}$ \%
Deciduous approximate volume $\underline{50} \mathrm{~m}^{3}$ or $\qquad$ number of loads

Aspen 100 \% Other 0 \%
2. Specify the timber disposition or FMA(s) shown on LSAS.
$\boxtimes$ No disposition (Contact the Regulatory body)Disposition number of FMA: $\qquad$ , holder name $\qquad$
3. Utilization standards:

Coniferous $\underline{15} \mathbf{~ c m}$ stump diameter to a $11 \mathbf{c m}$ top diameter.
Deciduous 15 cm stump diameter to a $\underline{11} \mathbf{~ c m}$ top diameter.
4. Timber salvage waiver requested?Yes $\boxtimes$ No

If 'Yes', provide justification: $\qquad$
5. Provide the name of the salvage purchaser Timber volumes from crown land will be offered to the two main quota holders, Spray Lakes Sawmills (1980) Ltd. and Crowsnest Forest Products. Should these quota holders decline, the volumes will be made available to other interested parties., or check one of the following:
$\square$ Not known at this time
ByTM88 (or equivalent)
By $\square$ Timber permit
6. When will the salvage be removed/hauled from the site to a wood processing plant?Proposed date start: $\frac{01 / 01 / 2019}{\mathrm{dd} / \mathrm{mm} / \mathbf{y y y y}}$
X Proposed date complete: $\underline{01 / 12 / 2019}$

## dd/mm/yyyy

Notes: The operator is responsible for moving the salvage to a site that is accessible to ensure all the wood can be removed. This may require forwarding the wood to a site with all-weather access.

A copy of the TM88 or equivalent must be submitted to the the Regulatory body to ensure proper tracking of ownership, transport and manufacturing can occur.

## F. Soil and Vegetation Management

Soil salvage, storage, replacement, and handling procedures shall be in keeping with those outlined in Section 6 "Site Disturbance, Clearing and Soil Management," of the "Public Lands Operational Handbook".

Note: Projects on specific areas of public land may require a soil survey. The proponent is to identify such requirements during the planning process.

Are there soil sensitivities (i.e., shallow depth to water table; shallow depth to bedrock; soils are gravely or stony, etc.)? $\boxtimes$ Yes $\square$ No

Explain: There are a few soil sensitivities within the mine area including, shallow depth to bedrock (bedrock at surface to depths $<100 \mathrm{~cm}$ ) and gravely and stony soils.

Surface expression (i.e., topography). The area has varying mountainous topography, with slopes ranging from Class 1 to Class 9 ( 0 to $>45$ degrees). Surface expression varies across the area and includes sections of level, hummocky, terraced and inclined expression. The proposed LOC is located in previously disturbed area with variable topography due to existing development
Site drainage (i.e., drainage is very poor, poor, imperfect, moderately well, well, rapid, or very rapid)
Drainage ranged from very poor to very rapid.
Are there problem vegetation/weeds/invasive species on or near site at time of assessment?
$\boxtimes$ Yes $\square$ No Explain No noxious or invasive species were identified within the proposd LOC areas, however, nine noxious weeds, and 20 invasive vegetation species were identified within the proposed Mine Permit boundary. The majority of the noxious and invasive species were observed in areas with existing disturbance (i.e., pipelines, well sites, clearings, pastures, cutblocks, and along roads).

Identification of species, degree of infestation and approximate amount of area infested per species.

|  | Species 1 | Species 2 | Species 3 |
| :--- | :--- | :--- | :--- |
| Trace (rare) | hound's-tongue |  |  |
| Low <br> (occasional) | downy brome, blueweed, <br> dalmatian toadflax |  |  |
| Moderate <br> (scattered plants) | ox-eye daisy, creeping thistle, <br> common toadflax |  |  |
| High <br> (fairly dense) | tall buttercup, common mullein |  |  |

Is there a risk of weed spread to the site if development proceeds?High
$\boxtimes$ Moderate
$\square$ Low
If any risk, provide details in reclamation and construction sections of supplements. If high or moderate, show location on the application plan.

## G. Incidental Activities

The applicant is to identify and outline on the application plan any incidental activities required for temporary use.
Note: No additional approval is required for incidental activities that are applied for with the disposition and included in the plan.

If the incidental activity is not approved under the disposition, a separate approval is required. Incidental activities approved in this manner are for temporary use only and are not part of the surface disposition.

1. According to field assessment, will additional incidental clearings be required? $\square$ Yes $\boxtimes$ No If 'Yes', indicate the purpose:
$\square$ CampsiteTemporary WorkspaceBorrow PitBackslopeSalvage DeckOther $\qquad$
2. Are any additional clearings planned in reforested areas?Yes $\boxtimes$ No If 'Yes', explain

The Core Operating Conditions are standard practices that must be applied to all activities.

## H. Core Operating Conditions

## Prior to Entry - Confirmation Number

099 The holder shall contact and advise Regulatory body of its intentions:

- prior to entry upon the lands for a stated purpose,
- prior to any additional construction during the term of this authority,
- at the completion of operations or construction, and
- upon abandonment of this activity.

Upon contact prior to initial entry on the land, the Regulatory body shall issue a confirmation number that shall be maintained on file by the holder and be provided to the Regulatory body on request.
<Location \& Telephone No.> $\qquad$

## Adverse Ground Conditions

105 Any activity on the land during adverse ground conditions must be suspended if the activity is likely cause unacceptable damage to vegetation or soil, as may be determined by the holder or the Regulatory body.

## Sample Plots

108 No entry is allowed within the boundaries of any research or sample plot.

## Reclamation - Interim

127 The holder shall reclaim all disturbed land surfaces within two growing seasons. Interim reclamation, including site and debris clean-up, slope stabilization, recontouring with subsoil, and spreading of topsoil shall be done progressively and concurrently with operations.

## Reclamation - Final

128 Final surface reclamation must meet the requirements for the specific activity in place at the time of abandonment.

## Noxious Weeds

131 The holder shall cut, keep down and destroy all noxious weeds and restricted weeds as per the Public Lands Act.

Waste Material Disposal
135 The holder shall remove all garbage and waste material from this site to the satisfaction of the Regulatory body, in it s sole discretion.

Watercourse/Water Body - No Material to be Deposited
148 The holder shall not deposit or push debris, soil or other deleterious materials into or through any watercourse or water body or on the ice of any watercourse/water body.

## Erosion Prevention

158 The holder shall take all precautions and safeguards necessary to prevent soil and surface erosion to the satisfaction of the Regulatory body in its sole discretion.

## Natural Drainage - No Interruption

161 The holder shall not create any interruptions to natural drainage, including ephemeral draws that may result in blockage of water flow.

## Sites and Installations 3.0 Completion of Supplement A Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

New $\boxtimes$ Revised
Date Submitted: $\frac{28 / 05 / 2018}{\mathrm{dd} / \mathrm{mm} / \text { yyyy }}$
MSL Number LOC 160842

PIL Number: $\qquad$
Site/Project Name: Grassy Mountain Coal Mine
Legal land description: LSD $\underline{09}$ Sec 03 Twp 008 Rge $\underline{04}$ W $\underline{1}$

## A. Site Description

1. Stability concerns: $\square$ Yes $\boxtimes$ No If 'Yes’, explain mitigation: $\qquad$

Questions 2, 3, 4 and 5 of section A apply to MSL only. The "Wellsite Spacing Recommendations" may be used as a guide, search for "Wellsite Spacing Recommendations" on srd.alberta.ca .

| 2. Well type: | $\square$ Oil $\quad \square$ Sweet Gas | Sour Gas ( $\mathrm{H}^{2} \mathrm{~S}$ ) | Coalbed Methane | Single Well pad |  | Multi-well pad |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |

Other The western LOC includes a portion of the rail loop that is approximately 150 m long with an irregular width due to the cut and fills required during construction. The eastern LOC includes a portion of the rail loop that is approximately 250 m long with an irregular width due to cut and fills and an access road that is 305 m long and 20 m wide
3. Well depth: N/Am
4. Flare requirements for drilling: $\quad \square 50 \mathrm{~m} \quad \square \mathbf{3 5} \mathbf{m} \quad \square \mathbf{2 5} \mathbf{m}$Flare stack
5. Number of zones to be completed/produced N/A Inter-well spacing N/A m.

## B. Vehicle/Equipment Access

How will the site be accessed? (Check boxes that apply)
$\boxtimes$ By an existing access held under disposition or jurisdiction (specify name, disposition number, and owner):
The proposed LOC will be accessed via Grassy Mountains main access road.New application (LOC)New access included in this application.

Note: If access is part of the site and installation application, an access supplement must be submitted.

## C. Contamination Prevention

1. Is the boundary of the site located within 100 m of a watercourse? $\quad$ Yes $\quad \square$ No

If 'Yes', specify distance from edge of lease to top of breaks in meters $\leq 100 \mathrm{~m}$
Explain mitigation strategy if within 100 meters in accordance with the Water Act Code of Practice for Watercourse Crossings.
2. Will the site be diked during drilling? $\quad \square$ Yes $\quad$ No During production? $\square$ Yes $\boxtimes$ No If 'No', explain why not. N/A

Will other methods of on-site contamination prevention be required? Explain No.

## Applicable to MSL only <br> D. Sump

Type of sump (check appropriate box):On-site pit Above-ground tank on siteIn-ground tank on siteRemote sump

Remote sump location: LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W
$\qquad$Private landPublic land (if location known, indicate on the survey plan)

GPS coordinates: (deg/min/decimal) NAD83 Latitude $\qquad$ Longitude $\qquad$ Proposed mud type: $\square$ Hydrocarbon: $\quad \square$ Salt base: $\quad \square$ Gel chem: $\qquad$
$\square$ Other: $\qquad$

## Applicable to MSL only

Disposal
Estimate volumes to be disposed of: Solids $\qquad$ m $^{3}$ Liquids $\qquad$ $\mathrm{m}^{3}$

Proposed disposal method: $\square$ Mix/bury/cover $\quad \square$ Land spreading $\square$ Land farming $\square$ Pump-offDisposal on forested public landOther $\qquad$ Approximate date of disposal $\qquad$Private Land
Public Land
Indicate land farming or land spreading location if off site on public land.
LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

## Applicable to MSL only

## E. Source of Water



Other (specify type) $\qquad$

Location: LSD ___ Sec ___ Twp ___ Rge ___
3. Access required to water source? $\square$ Yes $\square$ No If 'Yes' attach a sketch.

## F. Construction Strategy

## 1. Vegetation Removal

Explain: When encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan. Nonmerchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.

## 2. Brush Disposal

Explain: See Section F. 1

## 3. Topsoil handling: (Check appropriate boxes) $\square$ No stripping $\square$ Minimum surface disturbance

$\square$ Stripping $\square$ Single Lift $\square$ Two Lift $\boxtimes$ Other (Explain) Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses. Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses due to conventional salvage and handling methods and minimize impacts to soil quality.

Additional details: The soil salvage practices planned by Benga will provide a suitable quality reclamation material with sufficient volume for the soil replacement requirements of the reclamation plan while providing a suitable seed bed for the revegetation program. Reclamation material salvage operations will ensure the salvage of all available upland surface soil. Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses and will minimize impacts to soil quality.


## G. Reclamation Strategy

Revegetation strategy: (Check appropriate boxes) $\square$ Natural Recovery $\square$ Native Seed
$\square$ Non-native Seed $\boxtimes$ Other
One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

Interim: Interim reclamation for the proposed LOC area will be limited to slope stabalization and errosion control measures

Production/Operation: The LOC area will be required throughtout the life of the mine. Areas not required for ongoing operation will be revegetated to control erosion.

## Applicable to MSL only

See Appendix III - Lease Description and Wellsite Sizing Information
Note: Complete and attach the lease description and wellsite sizing template (in the Appendix) if a nonstandard wellsite is required as per the lease description and wellsite sizing document (see instructions).

## Operating Condition

## Contamination Prevention

136 In addition to complying with Federal, provincial and local laws and regulations respecting the environment, including release of substances, the holder shall, to the regulatory body's satisfaction, take necessary precautions to prevent contamination of land, water bodies and the air with particulate and gaseous matter, which, in the opinion of the regulatory body in its sole discretion, is or may be harmful.

### 4.0 Supplement B <br> Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable.
Failure to fill out the document and form(s) completely will result in the EFR being rejected.


Date Submitted 28/05/2018
LOC Number LOC 160842
dd/mm/yyyy

Legal land description: From: LSD NE
Sec 03
Twp 008
Rge 04
W 5 $\qquad$
To: LSD NE
Sec 03
Twp 008
Rge 04
W 5 $\qquad$

Note: The Pre-disturbance Planning and Surface Access Management sections of the Public Lands Operational Handbook should be consulted when dealing with new access development, extensions or upgrading existing access. Before a road is approved, the applicant may be requested to present the advantages and disadvantages on any alternate proposals, the rationale for selecting a particular route and the trade-offs made.

## A. Type of Access/Dimensions

1. Initial access width See below $m$ and type of access:undeveloped dryundeveloped frozendry weatherall-weather (permanent)
区 NA
Explain: The western LOC includes a portion of the rail loop that is approximately 150 m long with an irregular width due to the cut and fills required during construction.
2. Final access width See below $\mathbf{m}$ as applied for and type of access:undeveloped dryundeveloped frozendry weatherall-weather (permanent)

Explain: The LOC includes a portion of the rail loop that is approximately 150 m long with an irregular width due to the cut and fills required during construction.

Notes: For winter access it is recommended that existing seismic lines be used for initial access to a location. Widening of these lines should be minimized. Minimal widths for initial access are to be used wherever possible. Once a well or development is considered viable, the applicant generally plans to move to a wider ROW (e.g. 20 m ) for development of a high grade road. In this case, the 20 m width can be applied for with the understanding there will be no additional clearing beyond the $\mathbf{8 - 1 0 \mathrm { m }}$ width indicated until the development is proven viable.

If the entire Row is cleared initially and then not required for the development, it will be treated as Unauthorized use of public land and appropriate enforcement action will be taken.

If electricity is required at a facility, the Row must be planned to ensure the power line is located on the downwind side. This is required to maximize the tree-free area adjacent to the power lines, thus reducing the potential of falling trees hitting the power line and possibly starting a wildfire, as well as, cutting off power to the facility.

Where a road, pipeline, and power line ROW are required, it is recommended the power line be located between the road and pipeline. This greatly reduces the clearing requirements and keeps the power line safe from falling trees.

## B. Topography

1. Mark more than one box to show range:Level (0-2\%)
$\square$ Gentle (3-10\%)
$\square$ Moderate (11-15\%)
$\boxtimes$ Steep (16-30\%)
$\boxtimes$ Very steep (over 30\%)
Explain: The LOC is located within an area of topography that ranges from strong to extreme (Class 6 to 8).

## C. Watercourse Crossings

Avoidance, Minimizing and Mitigation/Compensation, in that order, are considerations for watercourse crossings. See the instructions for additional explanation.

1. Will watercourse crossings be installed? $\square$ Yes $\boxtimes$ No. (If 'No', go to next section). If 'Yes', number the watercourse crossings on the survey plan and complete the table below.

Note: All licences, authorizations and approvals issued by the Regulatory body under the Public Lands Act, Forests Act, Environmental Protection and Enhancement Act and Water Act, should not be taken to mean the proponent (applicant) has complied with federal legislation. Proponents should contact Fisheries and Oceans Canada in the location nearest to them (Peace River, Edmonton, Calgary, Lethbridge) in relation to the application of federal laws, including but not limited to the Navigable Water Protection Act and the Fisheries Act (Canada).

| Crossing Number | Crossing Method | Culvert/Bridge Size Diameter (mm) $x$ length (m) | Watercourse Size Class (1-4) | LSD | Sec | Twp | Rge | Mer | Specify if restricted activity period (dd/mm/yyyy) | Class of Waterbody from COP (A,B,C,D) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |
|  | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |
|  | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |

2. Temporary watercourse crossings will be removed by
dd/mm/yyyy
Note: Temporary crossings must not be installed or existing ones removed during restricted activity periods unless clean flow can be maintained. Crossings installed during winter work should be removed prior to spring break up.

## D. Construction Strategy

## Plan attached (include all areas of existing clearing(s) and new clearing(s) to be used, and their dimensions)

1. Vegetation removal: Explain: When encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan. Non-merchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.
2. Brush disposal: Explain: See Secton D. 1
3. Topsoil handling/Topsoil stripping width: (Check the appropriate boxes for initial and final access)

## Minimal surface disturbance (no stripping)

Stripping $\square$ Single Lift $\square$ Two Lift $\boxtimes$ Other Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses. Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses and will minimize impacts to soil quality.

Explain if more than one box has been checked.
Additional details: The soil salvage practices planned by Benga will provide a suitable quality reclamation material with sufficient volume for the soil replacement requirements of the reclamation plan while providing a suitable seed bed for the revegetation program. Some of the project area has lands without soil material present or the topography is too steep to allow soil to be salvaged safely. Soil salvage guidance by experienced professionals will result in minimal soil losses and will minimize impacts to soil quality.

## E. Reclamation Strategy

## Revegetation strategy: (Check appropriate boxes)

$\square$ Natural recovery $\square$ Native seed $\square$ Non-native seed $\boxtimes$ Other See Production/Operation Section
Interim: Interim reclamation will be undertaken in order to stabilize slopes and control erosion.
Production/Operation: Areas not required for ongoing operation will be revegetated to control erosion. At closure the proposed LOC will be revegetated to coniferous forest. One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grasslegume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.



## Species at Risk Summary

# SPECIES AT RISK SUMMARY <br> LOC 160842 

## WILDLIFE SPECIES

The wildlife species at risk that were either recorded during field surveys undertaken for the Environmental Impact Assessment or reported in the Fish and Wildlife Management Information System within the boundary of the proposed LOC, and for which there is moderately to highly suitable habitat in the proposed LOC boundary, are outlined in Table 1.

| Table 1 | Species at Risk that may occur within the proposed LOC boundaries. |  |  |
| :---: | :---: | :---: | :---: |
| Common <br> Name | Provincial <br> Status $^{\mathbf{1}}$ | Federal <br> Status $^{2}$ | Key Habitat Requirements |
| Birds | Sensitive | Threatened <br> SARA <br> Schedule 1 | Cutblocks, forest clearings, prairies, rock outcrops. Nests near <br> logs, boulders, and shrubs. |
| Common <br> nighthawk |  |  |  |
| Mammals |  |  |  |
| Little brown <br> myotis | Secure | Endangered <br> - SARA <br> Schedule 1 | Roosts under loose bark on trees, tree cavities, buildings, bridges, <br> caves. Forages near water. |

1 Alberta Wild Species General Status Listing (AEP 2010c)
2 COSEWIC/SARA status. Species with SARA status are indicated with SARA Schedule 1.

## MITIGATION MEASURES

Benga will be implementing a number of best management practices, Project design features, and other wildlife mitigation measures to avoid or minimize effects on wildlife. These best management practices, design features, and mitigation measures are presented below in relation to each of the expected Project-wildlife interactions that were assessed.

To prevent or minimize Project effects on federally-listed (SARA) species at risk, Benga will work in consultation with Environment Canada to develop species-specific mitigation and monitoring plans for species at risk known to occur in the WLSA. These species include the, common nighthawk and little brown myotis. Critical habitat has not yet been identified for these species by Environment Canada; should this happen, mitigation plans will be updated to include critical habitat. Over the duration of the Project, other species at risk may be found in the WLSA or added to the SARA list of protected species. If this occurs, Benga will contact Environment Canada to determine mitigation requirements for these additional species.

Project development has the potential to interact with wildlife in different ways. The Project may alter wildlife habitat availability, habitat connectivity/movement, and wildlife mortality risk
and health, all of which may affect the abundance of wildlife in the area. Benga will implement the mitigation measures outlined below to minimize potential impact to wildlife.

## HABITAT AVAILABILITY

Many of the Project effects associated with wildlife habitat loss will be minimized through implementation of the Project's reclamation plan. The summary of the reclamation plan mitigation recommendations for wildlife and wildlife habitat reclamation include:

- minimize the overall disturbance footprint through the mine planning process to avoid critical breeding habitats, nesting and denning sites, and movement corridors to the extent possible;
- preserve remnant forest patches within the development areas where feasible to provide habitat, habitat connectivity and hide cover for wildlife species;
- remnant patches should protect known essential raptor habitat features by incorporating these habitat features (i.e., mature balsam poplar and aspen) where possible;
- maximize the direct placement of salvaged soil to enhance native plant development;
- retain slash and large woody debris in the salvaged soil to provide microsites for native plant and hide cover for wildlife;
- establish a variety of vegetation species and communities suitable for wildlife, and encourage structural complexity within the forests;
- encourage understory complexity in reclaimed forests by planting native shrubs such as alder and willow;
- ensure that core security areas are provided for wildlife;
- provide water management program that ensures the surface water quality is maintained; and
- limit sight lines by maintaining mature forest stands as buffers between roads and reclamation areas.

To support the reclamation plan mitigation measures, the following will be implemented to mitigate potential direct and indirect Project effects on wildlife habitat availability:

- incorporate the existing legacy mining disturbances into the development and reclamation plans for the project, and other proposed land use activities to the best extent possible so that habitat loss, habitat fragmentation, linear disturbance features, and cumulative habitat loss are minimized;
- pre-disturbance surveys (wildlife sweeps) will be conducted in the development area prior to any construction activities during Project development to determine the occurrence of any important wildlife habitat features such as migratory bird nests, mineral licks, active dens, bat habitat and hibernacula, active raptor nest sites, and essential raptor habitat features (i.e., mature balsam poplar, platform/stick nests) that could indicate the presence of species at risk;
- protect all important wildlife habitat features in areas of suitable wildlife habitat (on the edge of the Project footprint boundary) appropriate setback distances (or buffer zones) will be considered;
- clearing and equipment use/storage/cleaning in undisturbed areas within and adjacent to the Project footprint will be avoided;
- vegetation adjacent to high-activity linear corridors (e.g., access roads, coal conveyor) will be retained to reduce the extent of noise and visual sensory disturbances to the extent possible;
- where appropriate, vegetated buffer zones ( 100 m or minimum of 30 m ; pending topography constraints) will be maintained between Project infrastructure and wetlands, creeks, and streams to the best extent possible;
- as required by the Weed Control Act and Regulations, all identified noxious and invasive weed species populations will be controlled prior to any site disturbance and mine operation to prevent the further spread of weeds. Noxious weed management will occur in compliance with R\&R/03-4 Weeds on Industrial Development Sites;
- as the presence of artificial lighting can potentially affect bird and bat use of nearby habitats, Benga has developed a visual impact mitigation plan that reduces stray and non-essential artificial lighting to minimize wildlife effects and that will comply with OH\&S safety requirements; and
- sensory disturbance from the active mine site will be further mitigated through the use of mufflers on all internal combustion engines, utilizing mine pit topography to shield noise generated from haul trucks, and conducting blasting during daylight hours.


## HABITAT CONNECTIVITY AND MOVEMENT

The following general wildlife mitigation measures will be implemented to minimize potential disruption to daily and seasonal wildlife movements:

- road plowing and grading will be conducted in a manner that does not restrict wildlife from crossing access roads or accessing wildlife crossings; and
- measures to control dust and other air emissions (e.g., watering of roads and use of dust suppressants, minimizing engine idling, etc.) within the Project footprint will be implemented to minimize effects on adjacent wildlife habitats.

For raptors, additional relevant mitigations include:

- retain residual patches of essential habitat and habitat features within and adjacent to the mine footprint (i.e., mature poplar trees, tall conifer trees) to provide perches, nest sites, and hide cover;
- minimize loss of mature and old-growth forest habitat and avoid complex, multi-story mixedwood forest where possible; and
- maintain a 100 m buffer of undisturbed forest around Blairmore Creek, Gold Creek and other riparian corridors.
Mitigation measures specific to bat species include:
- avoid direct and indirect impacts to known, primary maternity roosts should any such roosts be located/identified;
- prior to removal or alteration of historic mine shafts and infrastructure, conduct roost and hibernacula surveys within them, and consult with AEP should hibernacula or roosts be located; and
- where possible, tree clearing will be planned to avoid the May to August bat summer season.


## MORTALITY RISK

Wildlife mortality risk may increase as a result of increased traffic, wildlife encountering equipment, or elements of the Project footprint, and wildlife being attracted to Project facilities or humans. The Grassy Mountain area currently has a considerable network of trails and roads that are heavily used. Plans are already being implemented to reduce this level of access and with the approval of this Project, the levels will be reduced considerably more. Mitigation measures that will be implemented to reduce wildlife mortality risk include:

- all access to the Mine Permit will be controlled, no uncontrolled access will be permitted. Common operational practices will include:
- prohibiting use of snowmobiles and ATVs;
- prohibiting hunting, harassment, or feeding of wildlife; and
- implementing a strictly enforced zero tolerance policy on the use of firearms.
- timing vegetation site clearing activities to occur outside the April 15 to August 31 period to avoid disrupting nesting migratory and resident songbirds and raptors;
- in the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines. Establish speciesappropriate setback distances around confirmed active nest sites until fledging in consultation with Environment Canada and AEP. If the status of a nest cannot be confirmed, or if a nest is found outside of the breeding season, a setback distance will be implemented until such time as the nest status can be confirmed;
- confirm the presence/absence of bats in high quality habitats located within the Project footprint prior to the initiation of any clearing activities and develop a mitigation plan if bats are found;
- conducting pre-disturbance denning (bears, marten, etc.) and roosting (bats) surveys prior to vegetation clearing and other high-disturbance activities. Consult with AEP as needed to develop appropriate mitigation and management strategies;
- conducting pre-disturbance surveys (acoustic surveys and visual searches) to identify wetlands and watercourses used by breeding Columbia spotted frogs and western toads that feed into the protection plans;
- Benga commits to supporting active bear management plans associated with the Project. If a site specific plan is required, it will be developed in consultation with AEP personnel as part of the Wildlife Mitigation and Monitoring Plan. The plan is expected to be a comprehensive document that outlines operational strategies and best practices for addressing concerns related to not only bear-human conflicts but potential risks to ungulates and other wildlife resulting from attraction of bears to the area;
- developing a Beneficial Management Plan guide to minimize potential Projectspecific impacts on migratory birds and their habitat by identifying more site-specific mitigation and monitoring measures following Project approval and in consultation with federal and provincial regulators;
- a detailed Waste Management Plan will be developed and implemented prior to construction and operational activities to minimize the attraction of wildlife. Benga will follow the Best Management Practices for camps, fences, and barriers as described in Bear Smart: Best Management Practices for Camps, and ensure all waste is stored in wildlife-proof containers and disposed of properly. Some of the waste management and bear awareness/Bear Smart guidelines that will be implemented include:
- ensuring food waste, refuse, and other attractants are securely contained in enclosed and approved bear-proof containers and/or facilities (e.g., hard-sided buildings, fenced compounds, and bear-proof transfer station) prior to transportation to a disposal facility to prevent access by scavenging bears;
- providing adequate signage to inform employees of the location and proper use of bear-proof storage containers/facilities;
- ensuring waste storage containers/facilities are not filled beyond capacity;
- ensuring regular inspection and maintenance of waste storage containers/facilities is carried out;
- ensuring measures contained in the bear management plan are diligently followed by all employees and contractors;
- all on-site staff will receive Bear Awareness Training; and
- bear warning signs will be installed to advise staff of locations where problem bears have been reported.
- implementing an Emergency Spill Response Plan to limit the effect of accidental spills. Spills will be minimized by restricting fuel storage and filling to designated areas that are at least 100 m from wetlands and watercourses as well as Project drainage ditches, sediment control ponds, and pit lakes;
- storing all hazardous materials, including those used for blasting, in secure areas that are inaccessible to wildlife (e.g., buildings, storage areas surrounded by wildlife-proof
fencing). In addition, proper handling and storage of industrial materials and debris within the Project footprint will be maintained to minimize potential risks to wildlife;
- developing procedures to clear blasting areas of large mammals or birds prior to blasting;
- designing water management ponds and drainage ditches, and pit lakes to minimize potential entrapment of wildlife;
- developing a strategy to minimize changes in water quality upstream of the mine in conjunction with a water-quality monitoring program;
- enforcing speed limits ( $\leq 50 \mathrm{~km} / \mathrm{hr}$ ) along the main access road and utility corridors and placing signs at identified wildlife crossings to increase driver diligence to minimize wildlife-vehicle collisions. Vehicles will yield to all wildlife crossing the main access road;
- bird collisions with buildings will be mitigated by placing visual markers on windows, and collisions with the proposed power line will be mitigated by installing large 'floats' or other markers;


## PLANT SPECIES

Twenty-two vegetation species identified within the boundaries of the proposed surface dispositions at the time of the field assessment were on the Alberta Rare Plant Tracking and Watch Lists (ACIMS 2014) (Table 2). Two species identified are federally listed by COSEWIC and SARA: Pinus albicaulis (whitebark pine) and Pinus flexilis (limber pine). Whitebark pine is listed as Endangered in Alberta and British Columbia under SARA Schedule 1. Limber pine was designated as Endangered throughout its range in Alberta and British Columbia by COSEWIC in November 2014.

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Vascular plants |  |  |  |  |  |  |
| Angelica dawsonii | Yellow angelica | G4 | S3 | W | - | Sensitive |
| Carex petasata | Pasture sedge | G5 | S1S2 | Y | - | May be at risk |
| Eriogonum cernuum | Nodding umbrella-plant | G5 | S2 | Y | - | May be at risk |
| Eucephalus engelmannii | Elegant aster | G4G5 | S3S4 | W | - | May be at risk |
| Phacelia hastata | Silver-leaved scorpionweed | G5 | S3 | W | - | Sensitive |
| Pinus albicaulis | Whitebark pine | G3G4 | S2 | Y | Endangered | At risk (Endangered) |
| Pinus flexilis | Limber pine | G4 | S2 | Y | Endangered | At risk (Endangered) |
| Piperia unalascensis | Alaska bog orchid | G5 | S2? | Y | - | Sensitive |
| Mosses and liverworts |  |  |  |  |  |  |
| Conocephalum salebrosum | Liverwort | G5 | S2 | Y | - | May be at risk |
| Dicranum tauricum | Broken-leaf moss | G4 | S1S2 | Y | - | Sensitive |
| Lophozia ascendens | Liverwort | G4 | S1 | Y | - | May be at risk |
| Lophozia longidens | Liverwort | G5 | S1 | Y | - | May be at risk |
| Lophozia wenzelii | Liverwort | G4G5 | S1 | Y | - | May be at risk |
| Pellia neesiana | Liverwort | G5 | S2 | Y | - | - |
| Racomitrium aciculare | Moss | G5 | S1 | Y | - | Sensitive |
| Schistidium tenerum | Thread bloom moss | G5? | S2 | Y | - | Sensitive |
| Lichens |  |  |  |  |  |  |
| Cladonia umbricola | Shaded cladonia | G3G5 | S1 | Y | - | May be at risk |
| Nodobryoria abbreviata | Tufted foxtail lichen | G4? | S1 | Y | - | May be at risk |
| Peltigera cinnamomea | Cinnamon dog pelt lichen | GNR | S2 | Y | - | May be at risk |

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Umbilicaria americana | American rock tripe lichen | G5? | S2S3 | Y | - | May be at risk |
| Vulpicida canadensis | Brown-eyed sunshine lichen | G3G5 | S2 | Y | - | Sensitive |
| Xylographa parallela | Black woodscript lichen | G5 | S2S4 | Y | - | May be at risk |

${ }^{1}$ GRANK refers to global conservation rank and SRANK refers to subnational conservation rank). See EIA CR \#8, Section 1.6.3 for definitions of rankings.
${ }^{2} \mathrm{Y}$ - species is tracked, W - species is watched (ACIMS 2014).
${ }^{3}$ COSEWIC (2014), SARA (2014).
${ }^{4}$ General Status of Alberta Wild Species database (Government of Alberta 2010). (Endangered) refers to Endangered under Alberta’s Wildlife Act (Government of Alberta 2014).

## MITIGATION MEASURES

Rare plant species rankings in Alberta are largely determined by the number of observations of the species that are reported in the province. Based on this system, low profile, difficult to locate, and hard to identify species are more likely to be listed as rare. It is difficult to determine if some species are rare due to location at the edge of their natural range. Taxonomic uncertainty and misidentification may also result in the rare status of certain species. Avoidance of rare plant species provincially ranked between S1 and S3 is the most preferred mitigation option. Where avoidance is not an option, site-specific and species-specific mitigation planning may be possible. Based on a review of the species descriptions and habitat requirements of the rare plant species located in the Project Footprint, Benga has developed a rare plant species mitigation program.

Mitigation measures will include, but are not limited to, the following:

- a re-vegetation program which aims to establish diverse native vegetation communities (closed conifer forests, grassland open forests, mixed forests, and treed wetlands) with equivalent pre-disturbance capability;
- a C\&R Plan which aims to establish communities that are locally and regionally limited in distribution where conditions allow;
- preservation of adjacent vegetation communities by minimizing the area required for construction and operation of the Project;
- provision of appropriate soil substrate where re-vegetated areas can establish;
- seeding of stockpiled reclamation material with suitable vegetation species mix to ensure long term stability of the soil piles, which reduces erosion and the potential for weed establishment;
- use of coarse woody debris and direct soil placement techniques to augment mycorrhizal and microbial inoculums;
- use direct placement of soil for provision of propagules to enhance opportunity for re-establishment of native species composition and enhanced species richness;
- planting of multiple layers of native vegetation (e.g., trees, shrubs and graminoids) to provide initial structure for wildlife habitat and to enhance biodiversity;
- based on the described selection criteria implement the seed collection, propagation and/or relocation plan for rare species; and
- establish disease-resistant whitebark pine.

In addition to the strategies noted above, the preferred primary mitigation strategy for native foothills rough fescue grasslands is avoidance. Until disturbance is unavoidable, the following mitigation strategies will be implemented to preserve the resource:

- construct, or undertake assessments and surveys, during the dormant period for rough fescue (August to March); and
- avoid soil disturbance by:
- minimizing topsoil stripping and grading;
- utilizing existing trails; and
- potential implementation of seed collection and propagation plan and/or direct placement of sod.

Where disturbance is unavoidable, where feasible, mitigation strategies will include direct placement of reclamation material (including potential transplantation of rare plants or of foothills rough fescue sod), collection of native seed from areas with foothills rough fescue and rare plants that will be disturbed, seeding of wild harvest seed, as part of a certified, weed-free native seed mixes in re-vegetation plan, and the potential seeding and growing of plugs grown in a green house to be transplanted onto the site.

To preserve genetic diversity, clusters of whitebark pine will be investigated for suitability for cone/seed collection prior to disturbance and seed collection would include selection of trees showing evidence of white pine blister rust resistance. Conditions and strategies for establishing whitebark pine during reclamation include:

- identification of high light, low competition sites;
- planting in pure stands or patches to avoid competition from other trees;
- avoiding planting in swales and frost pockets;
- creation of microsites for seedling establishment (rocks, stumps or other coarse woody debris);
- use of recommended spacing to avoid interspecies competition; and
- planting seedlings in the fall to avoid hot dry summer conditions.

Given that various wetland classes are rare in the Project Footprint and in the region, added mitigation measures for wetland impacts should include the following:

- use of best practices to maintain the hydrologic regime of mineral soil wetlands;
- creation of transition areas between re-vegetated ELCs as outlined in the reclamation plan to the treed swamps, where it is possible and/or appropriate to do so; and
- placement of culverts within wetlands that will be divided by roads to ensure that water flow between wetlands will not be affected.

Wetland monitoring will include but not be limited to the following:

- monitoring and maintenance of drainage control structures should be conducted regularly to ensure water flow and flow patterns are maintained in wetlands adjacent to the Project Footprint;
- monitoring road removal at Project closure which may have had an effect on adjacent wetlands to ensure restoration of the hydrologic regime;
- monitoring of reclaimed wetlands should continue for a minimum of ten years to ensure the composition and structure, and key wetland functions are consistent with those in wetlands in the LSA prior to the Project disturbance; and
- monitoring of reclaimed wetlands should include the use of sub-emergent vegetation species as indicators of wetland health and integrity in the monitoring program.

Vegetation species that have current or historical uses and importance to First Nations groups are considered Traditional Ecological Knowledge (TEK) resources. Supplementary mitigation measures for TEK vegetation impacts include the following:

- consult with and involve First Nations Peoples in designing mitigation measures for sustainable management of TEK vegetation;
- implement a re-vegetation program which aims at the re-establishment of vegetation communities, such as those previously mentioned (closed conifer forests, mature mixed forests, native upland herbaceous grasslands and treed swamps) that are common to the pre-disturbed landscape and that will support TEK vegetation; and
- where practicable utilize locally collected seed to preserve the legacy of species and of place.


## Public Land Standing Report

| Req: 0000671393 <br> Report Date: $2016 / 09 / 30$ | Time: 17:52:15 |
| :--- | :--- |

## Selected Activities

| Surface Dispositions | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| :---: | :---: | :---: | :---: |
|  |  | Types: | All |
| Geophysical | NA | Status: | All |
|  |  | Types: | All |
| Reservations | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
|  |  | Types: | All |
| Encumbrances | Y | Status: | All |
|  |  | Types: | All |
| Land Postings | Y | Status: | Number Assigned, Open, Closed |
|  |  | Types: | All |

## Land Keys

W5-04-008-03-NE


| Req: 0000671393 |  | Public Land Standing |  |
| :---: | :---: | :---: | :---: |
| Report Date: 2016/09/30 Ti | Time: 17:52:15 |  |  |
| FISH \& WILDLIFE REFERRAL LANDS |  |  | Code: FWR |
| W5-04-008-03 |  |  |  |
| GENERAL LANDS CLASSIFICATION | WHITE |  | Code: GLC-W |
| W5-04-008-03 |  |  |  |
| GRAZING ZONE | A2 |  | Code: GRZ-A2 |
| W5-04-008 |  |  |  |
| INTEGRATED RESOURCE PLAN | CROWSNEST CORRIDOR |  | Code: IRP-C4 |
| W5-04-008-03 |  |  |  |
| LAND USE AREA | SOUTHWEST 1 | BLAIRMORE | Code: LUA-SW1-2 |
| W5-04-008 |  |  |  |
| OPERATIONAL APPROVAL DISTRICTS | South Saskatchewan Region | South Saskatchewan District | Code: OPD-5-1 |
| W5-04-008 |  |  |  |
| RANGELAND DISTRICT | SOUTHWEST | PINCHER CREEK | Code: RLD-SW-6 |
| W5-04-008-03 |  |  |  |
| REGIONAL PLANNING COMMISSIONS | OLDMAN RIVER |  | Code: RPC-02 |
| W5-04-008 |  |  |  |
| URBAN MUNICIPALITY | TOWN | MUNICIPALITY OF CROWSNEST PASS | Code: UBM-T-113 |
| W5-04-008-03 |  |  |  |

Req: 0000671393

Report Date: 2016/09/30 Time: 17:52:15

LSRC550D
Public Land Standing
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|  |  |  |
| :--- | :--- | :---: |
| Activity | Status/Type | Date |
| Land | Active/Disposed | $2009 / 03 / 10$ |
| CNT090027 |  |  |

## Activities and Titles

| Activity | Status/Type | Date | Expiry | Client |  |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Land |  |  |  | Metes and Bounds Remarks | Total Area |
| CNT090027 | Active/Disposed | $2009 / 03 / 10$ | $2034 / 03 / 31$ |  | Hectares |

CALGARY OFFICE - FORESTRY AND EMERGENCY RESPONSE DIVISON OF ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPM
0510 : BUFFER
1 : NO RESTRICTON
710 : SEE COMMENTS
Agency CommentsFOR EAP APPLICATIONS, SEND EMAIL TO BELOW ADDRESS BASED ON CRITERIA. A TEN DAY REFERRAL WINDOW WILL APPLY AND NOTE OF RECIEPT WILL BE PROVIDED BY EMAIL. IF NO REPLY IS RECEIVED THEN PROCEED WITH APPLICATION. NONEAP APPLICANTS FOLLOW NORMAL REFERRAL PROTOCOLS. ALL PROPONENTS ARE TO REFER TO THE FIRESMART GUIDEBOOK FOR THE OIL AND GAS INDUSTRY, BEST MANAGEMENT PRACTICES FOR WILDFIRE PREVENTION AND FIRESMART FIELD GUIDE FOR WILDFIRE RISK AND MITIGATION STRATEGIES; LINK TO E-DOCUMENTS HTTP://WILDFIRE.ALBERTA.CA/FIRE-SMART-INDUSTRY/DEFAULT.ASPX FIRESMART CONSULATATIVE NOTATION COMMENTS: TYPES OF ACTIVITES AND DISPOSITIONS THAT REQUIRE REFERRAL; *RECREATION LEASE (REC) *DISPOSTION RESERVATION (DRS)-USE CRITERIA FOR MLL*,SML AND LOC AS DEFINED BELOW *EASEMENT (EZE) *VEGETATION CONTROL EASEMENT (VCE) *LICENSE OF OCCUPATION (LOC)-HIGH GRADE ROAD OR ACCESS ROAD 20M + WIDE *MINERAL SURFACE LEASE (MSL), *MISCELLANEOUS LEASE (MLL) *MISCELLANEOUS PERMIT (MLP) *PIPELINE AGREEMENT (PLA)-IF 20M+WIDE *PIPELINE INSTALLATION LEASE (PIL)- IF OVER 5 HECTARES *RURAL ELECTRIC ASSOCIATION EASEMENT (REA) *SURFACE MATERIAL LEASE (SML)- ONLY IF PEATMOSS *ALL AGRICULTURAL DISPOSITIONS REQUIRING FENCE LINE CLEARING/FIELD CLEARING AND DEBRIS DISPOSAL *REGIONAL GRAZING/TIMBER INTRGRATION PLANS . ALL APPLICATIONS MUST BE REFERRED VIA EMAIL TO THE "WILDFIRE PREVENTION OFFICER" AT THE CALGARY FORESTRY OFFICE: ESRD.EDS-CLGR-FIRESMART@GOV.AB.CA TYPES OF ACTIVITES AND DISPOSITIONS NOT REQUIRING REFERRAL *GEOPHYSICAL ACTIVITIES. *AGRICULTURAL DISPOSITIONS WHERE CLEARING IS NOT REQUIRED E.G. HAY PERMIT *HAP), FOREST GRAZING LICENSE (FGL) WITH NO FENCE LINES *TIMBER DISPOSITIONS
ACTIVITY DETAIL INFORMATION

| PLAN NO | LTO PLAN NO | ITEM |
| :--- | :--- | :--- |
| 5999 RN |  | VERSION DATE(S) |

Geographic Land Information Management and Planning System
Req: 0000671393
Report Date: 2016/09/30

Report Date: 2016/09/30 Time: 17:52:15


Geographic Land Information Management and Planning System
Req: 0000671393

Report Date: 2016/09/30 Time: 17:52:15

ETS Request No.: R3540084
Public Land Standing LSRC550D
Page 6 of 9

|  | Activities and Titles |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks | Total Area |  |
|  |  |  |  |  | Acres | Hectares |
| PNT090084 | Active/Disposed | 2011/10/20 | 2021/10/19 |  | 132,888.84 | 53,778.200 |

PINCHER CREEK OFFICE - RANGELAND DISTRICT-LANDS DIVISION DEPT. OF SUSTAINABLE RESOURCE DEV
0181 : MULTIPLE RESOURCE CONCERNS
5 : NO SURFACE SALE DISPOSITIONS
710 : SEE COMMENTS
THIS LOCATION MAY FALL WITHIN AN AREA OF FOOTHILLS FESCUE GRASSLAND, A VERY VALUABLE NATIVE GRASSLAND TYPE THAT IS LIMITED IN REMAINING AREA. ROUGH FESCUE GRASSLANDS ARE VERY SENSITIVE TO SURFACE DISTURBANCE AND DIFFICULT AND COSTLY TO RECLAIM. PROPONENTS MUST CONSULT INFORMATION LETTER (IL) 2010-02, FESCUE GRASSLANDS -- PRINCIPLES FOR MINIMIZING SURFACE DISTURBANCE AND MAKE EARLY CONTACT WITH ALBERTA ENVIRONMENT \& SUSTAINABLE RESOURCE DEVELOPMENT STAFF FOR THE AREA IN QUESTION. THE INFORMATION LETTER ADDRESSES OBLIGATIONS AND SPECIFIC DIRECTION REGARDING ALL POTENTIAL SURFACE DISTURBANCE RELATED ACTIVITY IN FOOTHILLS ROUGH FESCUE GRASSLAND PLANT COMMUNITIES. THIS DIRECTIVE SUPPLEMENTS THE ERCB'S IL 2002-01: PRINCIPLES FOR MINIMIZING SURFACE DISTURBANCE IN NATIVE PRAIRIE AND PARKLAND AREAS. IL 2010-02 MAY BE FOUND AT:
HTTP://WWW.SRD.ALBERTA.CA/FORMSONLINESERVICES/INFORMATIONLETTERS/LANDSINFO RMATIONLETTERS/DOCUMENTS/IL2010-02-
FOOTHILLSFESCUEGRASSLANDPRINCIPLESFORMINIMIZINGSURFACEDISTURBANCE-MAR232010.PDF IL 2002-01 MAY BE FOUND AT:

HTTP://WWW.ALBERTAPCF.ORG/RSU_DOCS/EUB_NATIVE_PRAIRIE.PDF
ACTIVITY DETAIL INFORMATION

| PLAN NO | LTO PLAN NO | ITEM |
| :--- | :--- | :--- |
| 7837 RN |  | VERSION DATE(S) |
| 7837 RN |  | $2011 / 09 / 09$ |

W5-04-008-03-NE



## DISCLAIMER

THIS STANDING REPORT IS PROVIDED SUBJECT TO THE CONDITION THAT HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF ALBERTA AND HER EMPLOYEES:
(1) HEREBY DISCLAIM AND ARE RELEASED FROM ANY AND ALL RESPONSIBILITY FOR THE INFORMATION IN, AND ANY OMISSION OF THE INFORMATION FROM, THIS REPORT;
(2) SHALL NOT BEAR ANY RESPONSIBILITY FOR ANY LOSS OR DAMAGE OF ANY KIND ARISING FROM OR IN RESPECT OF ANY ABSENCE OF INFORMATION OR ANY ERRORS OR OMISSIONS (WHETHER THE AFORESAID OCCASIONED BY NEGLIGENCE OR OTHERWISE) IN OR AFFECTING THIS REPORT OR THE INFORMATION THEREIN.

THIS REPORT DOES NOT SHOW CAVEATS, BUILDERS' LIENS, OR OTHER INSTRUMENTS, IF ANY, REGISTERED AT LAND TITLES OFFICE IN RESPECT OF ANY LANDS OR INTERESTS THEREIN. PERSONS ARE ADVISED TO ALSO EXAMINE RECORDS AT LAND TITLES OFFICE TO ASCERTAIN WHETHER OTHER INSTRUMENTS THAT MAY CONCERN THE LANDS OR INTERESTS THEREIN HAVE BEEN REGISTERED.

[^2]
## Completion of EFR Cover Document <br> For all Dispositions 2.0 <br> Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or ' $N / A$ ' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

New
Revised

Date Submitted 28/05/2018
Department Number MSL 160758

## dd/mm/yyyy

Site/Project Name: Grassy Mountain Coal Mine

## A. Communications

1. Applicant: Benga Mining Limited
2. Company contact person for EFR: Alisdair Gibbons Phone:
<contact information removed>
3. 
4. E-mail: <email address removed>

Cell Phone: $\qquad$
$\qquad$
5. Company representative who conducted the onsite assessment for the EFR:

Tyler Riewe
6. Phone:

Cell Phone: $\qquad$ ) $\qquad$
7. Fax: $\qquad$ )

E-mail: <email address removed>
8. Date of on-site assessment: 2014 to 2016

$$
\overline{\text { dd/mm/yyyy }}
$$

Note: The Regulatory body reserves the option to audit individual EFR's to ensure field visits have been conducted and information supplied is accurate.

## B. Surface Location

LSD $\underline{04}$ Sec $\underline{14}$ Twp $\underline{008} \quad$ Rge $\underline{04} \quad$ W $\underline{5}$
To:
LSD 04 Sec 14 Twp 008 Rge $04 \quad$ W $\underline{5}$

1. Construction is proposed under the following soil conditions (check the box that applies):
```
    Frozen
    \Non-Frozen
    \square \mp@code { O t h e r ~ ( I f ~ " O t h e r " , ~ e x p l a i n ) }
```

Construction will occur in both frozen and non-frozen ground conditions throughout the life of the Project.

Proposed construction date: Q2 2019 to Q2 2020
dd $/ \mathrm{mm} / \mathbf{y y y}$
2. Specify associated developments/dispositions that may be required as a result of this disposition.
$\square$ Power line
$\square$ Pipeline
$\square$ Compressor
$\square$ Metering Station
$\square$ Access
$\boxtimes$ Other LOC for the rail line/load-out and MSL for the mining area

## Land Standing Review

3. A complete Land Standing Review check must be made on the proposed area.

Date Land Standing search was completed: 15/09/2016
dd/mm/yyyy

| Reservation/Activity Number | Action required/identify conflicts/contact name and or comments |
| :--- | :--- |
| PNT 900430 | Waste Disposal/Reclamation Site. Benga has committed to reclaiming <br> affected lands to equivalent capability. Benga will utilize waste storage and <br> spill response procedures that will reduce potential for contamination to enter <br> the adjacent drainage |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

a. Within a Provincial Grazing Reserve? $\square$ Yes $\boxtimes$ No

If 'Yes', complete the Provincial Grazing Reserve template and attach to the Environmental Field Report. (Refer to Appendix I in the instruction document.)
b. Within the Chungo Access Management Area? $\square$ Yes $\boxtimes$ No

If 'Yes', complete the Chungo Area template (located at the end of IL 2005-01 - Annex to Chungo Creek Industrial Access Management Area Information Letter
and attach it to the Environmental Field Report.
c. Within a FireSmart Community Zone? $\quad$ Yes $\square$ No

If 'Yes', contact Forest Protection Division for additional hazard reduction requirements.
d. Follow the "Bear Smart" program to reduce bear-human conflicts and increase public stewardship of black and grizzly bears in Alberta by providing strategies, information and education materials to its staff and contractors, see srd.alberta.ca and search for "Alberta BearSmart"
4. Are Permanent/Research Sample Plots/Rangeland Benchmarks located within 100 m of the boundary of the lands under application? $\square$ Yes $\boxtimes$ No

If 'Yes', indicate the legal land description and GPS coordinates for each plot/benchmark in relation to the disposition boundary (degree, decimal, minutes).

| Reservation No. | PSP/RSP No. | LSD __ Sec | Twp | Rge | W |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Latitude | Longitude | Distance away |  |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Se | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Se | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | _ Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD __ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |

PSP's held by the Regulatory body appear as DRS or PNT reservations on the LSAS report. The forest industry also has sample plots, and if these are registered, they will appear as ISP's on the LSAS report. If the forest industry sample plots are not registered, they will not appear on the LSAS report. The proponent is responsible for determining if there are any PSP's or ISP's on the land under application. PSP's and ISP's must not be disturbed.

## Stakeholders, Other Land Users

5. Is there potential impact on or conflict with stakeholders and other land users? $\boxtimes$ Yes $\square$ No If "Yes" to either, please list and explain mitigation:
Benga has been undertaking an extensive public engagement and Aboriginal Consultation program for the Project, which was initiated in 2013 and is still ongoing as part of the regulatory process for applications and assessments required in accordance with the Environmental Protection and Enhancement Act and Coal Conservation Act. Benga has held three Public Forums and three Open Houses in the Crowsnest Pass to inform the public about the Project. Numerous meetings have also been held with the regional municipalities, local stakeholders, local residents and land owners, special interest groups, provincial and federal government agencies, senior cabinet ministers and specific individuals with concerns.
Consents with holders of overlapping dispositions have been provided to the AER.
6. What actions have been taken to integrate this disposition with other existing/planned activities and resources to minimize the impacts on the land base? (Check appropriate boxes.)Not applicable
$\square$ Use common corridor
$\square$ Parallel existing clearing/right of way
$\boxtimes$ Use existing clearing/right of wayOther
Explain: A majority of the MSL is located on an existing clearing.
7. Identify any aesthetic concerns related to the proposed activity (i.e., negative effects on the aesthetic/sensory aspects of the surrounding land including view, smell, noise, etc.).
இNot applicable
$\square$ From public access
$\square$ From residence
$\square$ From recreation facility
$\square$ Other $\qquad$
Explain: No aesthectic concerns have been raised related to the access corridor in this area.
8. Are there any conflicts with Access Management Plans, Integrated Resource Plans or policy documents for the area? $\square$ Yes $\boxtimes$ No
If 'Yes', explain mitigation strategy: $\qquad$
9. Was First Nations (Aboriginal) consultation required by the Regulatory body? $\boxtimes$ YesNo
If "Yes", with whom: Groups included in the consultation program were identified by the Alberta Aboriginal Consultation Office (ACO) and the Canadian Environmental Assessment Agency. These groups are as follows:

- Blood Tribe (Kainai Nation);
- Piikani Nation;
- Siksika Nation;
- Stoney Nakoda Nation:
- Bearspaw;
- Chiniki;
- Wesley; and
- Tsuut'ina Nation.


## C. Wildlife/Environmental Concerns

1. Within a Key/Critical Wildlife Zone? $\boxtimes$ Yes $\square$ No If 'Yes', provide information on mitigation strategies that will be implemented: The proposed MSL is located within a Mountain Goat and Sheep Range. An assessment of the potential impacts to mountain goats has been undertaken through the Mines Environmental Impact Assessment (EIA) process. During the field assessments it was determined that there is no quality mountain goat habitat within the study area and no mountain goats were detected during the surveys conducted in 2014 or 2015.
2. Wildlife Timing Constraint apply? $\boxtimes$ Yes $\square$ No

If 'Yes', provide dates of restricted period: From April 15 To August 31

To avoid disrupting nesting migratory and resident songbirds and raptors, in accordance with Alberta's Wildlife Act and Canada's Migratory Birds Convention Act (Regulation 12:1) and the Species at Risk Act, Benga will schedule vegetation clearing activities outside the April 15 to August 31 period. In the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines. Any active nest sites encountered will be buffered with the recommended setback distances based on specific species requirements. (See Provincial Timing Guidelines or FW referral maps.)
3. Fisheries Timing Constraint apply?Yes $\boxtimes$ No
If 'Yes', provide dates of restricted period: From $\qquad$ To
There are no aquatic resource timing restrictions associated with the proposed access corridor MSL. Desktop review indicates that the access corridor encroaches upon an existing tributary to Blairmore Creek. The portion of tributary associated with this location has been substantially altered due to historical mining activities (i.e., this area was once a drainage valley; however, was filled with legacy waste rock, with the surface reclaimed with vegetation). Currently, Alberta Environment and Parks holds a Protective Notation (PNT) for this drainage management system

- (See Provincial Watercourse Codes of Practice for restricted periods.)

4. Within a Caribou Area? $\square$ Yes $\boxtimes$ No. If 'Yes', specify the Caribou Protection Plan number and name.

## Species at Risk (Plant/Animals)

5. Is it likely that a species at risk (not including Woodland Caribou in number 4 above) will be found in the area of the proposed development?Yes $\square$ No
If 'Yes', specify the status and protective strategy for each species: For further details on species at risk within the proposed activity, see attached Species at Risk summary.


Alberta Fish and Wildlife Division recommends predevelopment inventory be conducted on all native grasslands habitats within the Grassland Natural Region due to high concentration of Species at Risk and limited site specific information on occurrences.
6. Has a pre-development Species at Risk inventory been completed to alert the applicant of any wildlife concerns related to this project? $\boxtimes$ Yes (copy of inventory attached) $\square$ No
If 'No', explain: See attached Species at Risk summary.

Has the activity been assessed to ensure it does not negatively affect any species at risk? $\boxtimes$ Yes $\square$ No
If 'No', explain: $\qquad$
8. If Access Restrictions apply, include legal land description and explain mitigation measures.
LSD
Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$
LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

Explain mitigation strategy: $\qquad$
9. If within or adjacent (within 100 m ) to a Protected Area, indicate the type of protected area and explain what measures will be taken to avoid conflict with the protected area.
Natural AreaEcological ReservePark
Other Crown reservations as discussed in Section B. 3.

Name of protected area: $\qquad$
Explain mitigation strategy: $\qquad$
10. Are there any environmentally sensitive areas in the vicinity (within 100 m ) of the proposed activity that will require special measures to protect? $\square$ Yes $\quad$ No
If 'Yes', list and explain: $\qquad$
11. Is the proposed activity within a permafrost area? $\square$ Yes $\boxtimes$ No If 'Yes', specify the Permafrost Protection Plan number and name: $\qquad$

## D. Historical Resources

Date search completed A Historical Resources Impact Assessment (HRIA) was undertaken and submitted to Alberta Culture. The HRIA is currently under review and Alberta Culture has indicated that clearance for the Project will not be granted until the Environmental Protection and Enhancement Act and Coal Conservation Act approvals have been issued.
dd/mm/yyyy
What is the Historical Resource Value (HRV) of the affected lands?
Not Listed 1 $\square$ 3 【 4

If HRV is 1-5, an 'Application for Historical Resources Act Clearance’ must be submitted to the Cultural Facilities and Historical Resource Division (CFHRD) of Alberta Community Development.
Date submitted 05/08/2016
dd/mm/yyyy
Note: Activities on land that has an HRV or 4 or 5 may require a Historical Resources Impact Assessment (HRIA).

## E. Vegetation and Timber Cover

## Vegetation (check all that apply)

| $\square$ Native grassland | $\square$ Treed wetland |
| :--- | :--- |
| $\square$ Tame pasture | $\square$ Shrubby wetland |
| $\square$ Cropland | $\square$ Grass or grass-like wetland |
| $\square$ Sparsely or non-vegetated | $\square$ Native aspen parkland |
| $\square$ Cutblock - planted | $\square$ Other (specify) $\underline{\text { Grass Meadow. }}$ |
| $\square$ Natural regeneration $\mathbf{~} \mathbf{2 ~ m}$ |  |

Deciduous-dominant forest:("D" less than 30\% coniferous trees) Coniferous-dominant forest: இ ("C" more than 70\% coniferous trees) Mixedwood forest:Natural regeneration $>2 \mathbf{m}$("CD" 70\% to 50\% coniferous trees) ("DC" 50\% to 30\% coniferous trees)

Timber Salvage

1. Merchantable timber present? $\boxtimes$ Yes $\square$ No

Provide a volume inventory as follows:

Coniferous approx. volume $\mathbf{m}^{\mathbf{3}}$ or $\leq 1$ number of loads
Spruce 10\% $\quad$ Pine $\underline{87} \% \quad$ Other $\underline{3} \%$
Deciduous approximate volume $\qquad$ $\mathrm{m}^{3}$ or $\leq 1$ number of loads
Aspen 100 \% Other 0 \%
2. Specify the timber disposition or FMA(s) shown on LSAS.
$\boxtimes$ No disposition (Contact the Regulatory body)Disposition number of FMA: $\qquad$ , holder name $\qquad$
3. Utilization standards:

Coniferous $\underline{15} \mathbf{~ c m}$ stump diameter to a 11 cm top diameter.
Deciduous $\underline{15} \mathbf{~ c m}$ stump diameter to a $11 \mathbf{~ c m}$ top diameter.
4. Timber salvage waiver requested? $\square$ Yes $\boxtimes$ No

If 'Yes', provide justification: $\qquad$
5. Provide the name of the salvage purchaser timber volumes from crown land will be offered to the two main quota holders, Spray Lakes Sawmills (1980) Ltd. and Crowsnest Forest Products. Should these quota holders decline, the volumes will be made available to other interested parties., or check one of the following:
$\square$ Not known at this time
ByTM88 (or equivalent)
By $\square$ Timber permit
6. When will the salvage be removed/hauled from the site to a wood processing plant?Proposed date start: $\frac{01 / 07 / 2019}{\mathrm{dd} / \mathrm{mm} / \mathbf{y y y y}}$
$\boxtimes$ Proposed date complete: $\underline{01 / 12 / 2020}$
dd/mm/yyyy

Notes: The operator is responsible for moving the salvage to a site that is accessible to ensure all the wood can be removed.
This may require forwarding the wood to a site with all-weather access.

A copy of the TM88 or equivalent must be submitted to the the Regulatory body to ensure proper tracking of ownership, transport and manufacturing can occur.

## F. Soil and Vegetation Management

Soil salvage, storage, replacement, and handling procedures shall be in keeping with those outlined in Section 6 "Site Disturbance, Clearing and Soil Management," of the "Public Lands Operational Handbook".

Note: Projects on specific areas of public land may require a soil survey. The proponent is to identify such requirements during the planning process.

Are there soil sensitivities (i.e., shallow depth to water table; shallow depth to bedrock; soils are gravely or stony, etc.)? $\boxtimes$ YesNo

Explain: There are a few soil sensitivities within the area including, shallow depth to bedrock (bedrock at surface to depths $<100 \mathrm{~cm}$ ) and gravely and stony soils.

Surface expression (i.e., topography). The proposed MSL is located within a previously disturbed area with variable topography due to existing development. The surrounding area has varying mountainous topography, with slopes ranging from Class 1 to Class 9 ( 0 to $>45$ degrees).
Site drainage (i.e., drainage is very poor, poor, imperfect, moderately well, well, rapid, or very rapid)
Site Drainage ranged from very poor to very rapid.
Are there problem vegetation/weeds/invasive species on or near site at time of assessment?
$\boxtimes$ Yes $\square$ No Explain No noxious or invasive spcies were identified within the proposed area however, during the vegetation survey undertaken as part of the EIA, nine noxious weeds, and 20 invasive vegetation species were identified within the surrounding proposed mine area. The majority of the noxious and invasive species were observed in areas with existing disturbance (i.e., pipelines, well sites, clearings, pastures, cutblocks, and along roads)..

Identification of species, degree of infestation and approximate amount of area infested per species.

|  | Species 1 | Species 2 | Species 3 |
| :--- | :--- | :--- | :--- |
| Trace (rare) |  |  |  |
| Low <br> (occasional) | downy brome, blueweed, <br> dalmatian toadflax |  |  |
| Moderate <br> (scattered plants) | ox-eye daisy, creeping thistle, <br> common toadflax |  |  |
| High <br> (fairly dense) | tall buttercup, common mullein |  |  |

Is there a risk of weed spread to the site if development proceeds?
$\square$ High $\quad \boxtimes$ Moderate $\square$ Low
If any risk, provide details in reclamation and construction sections of supplements. If high or moderate, show location on the application plan.

## G. Incidental Activities

The applicant is to identify and outline on the application plan any incidental activities required for temporary use.
Note: No additional approval is required for incidental activities that are applied for with the disposition and included in the plan.

If the incidental activity is not approved under the disposition, a separate approval is required. Incidental activities approved in this manner are for temporary use only and are not part of the surface disposition.

1. According to field assessment, will additional incidental clearings be required? $\square$ Yes $\boxtimes$ No If 'Yes', indicate the purpose:
$\square$ CampsiteTemporary WorkspaceOther $\qquad$Borrow PitBackslope
Salvage DeckTemporary Access
2. Are any additional clearings planned in reforested areas? $\square$ Yes $\boxtimes$ No If 'Yes', explain

The Core Operating Conditions are standard practices that must be applied to all activities.

## H. Core Operating Conditions

## Prior to Entry - Confirmation Number

099 The holder shall contact and advise Regulatory body of its intentions:

- prior to entry upon the lands for a stated purpose,
- prior to any additional construction during the term of this authority,
- at the completion of operations or construction, and
- upon abandonment of this activity.

Upon contact prior to initial entry on the land, the Regulatory body shall issue a confirmation number that shall be maintained on file by the holder and be provided to the Regulatory body on request.
<Location \& Telephone No.> $\qquad$

## Adverse Ground Conditions

105 Any activity on the land during adverse ground conditions must be suspended if the activity is likely cause unacceptable damage to vegetation or soil, as may be determined by the holder or the Regulatory body.

## Sample Plots

108 No entry is allowed within the boundaries of any research or sample plot.

## Reclamation - Interim

127 The holder shall reclaim all disturbed land surfaces within two growing seasons. Interim reclamation, including site and debris clean-up, slope stabilization, recontouring with subsoil, and spreading of topsoil shall be done progressively and concurrently with operations.

## Reclamation - Final

128 Final surface reclamation must meet the requirements for the specific activity in place at the time of

## Noxious Weeds

131 The holder shall cut, keep down and destroy all noxious weeds and restricted weeds as per the Public Lands Act.

## Waste Material Disposal

135 The holder shall remove all garbage and waste material from this site to the satisfaction of the Regulatory body, in it s sole discretion.

## Watercourse/Water Body - No Material to be Deposited

148 The holder shall not deposit or push debris, soil or other deleterious materials into or through any watercourse or water body or on the ice of any watercourse/water body.

## Erosion Prevention

158 The holder shall take all precautions and safeguards necessary to prevent soil and surface erosion to the satisfaction of the Regulatory body in its sole discretion.

Natural Drainage - No Interruption
161 The holder shall not create any interruptions to natural drainage, including ephemeral draws that may result in blockage of water flow.

## Sites and Installations 3.0 Completion of Supplement A Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

New $\boxtimes$ Revised
Date Submitted: 28/05/2018
MSL Number MSL 160758
dd/mm/yyyy
PIL Number: $\qquad$
Site/Project Name: Grassy Mountain Coal Mine
Legal land description: LSD $\underline{04}$ Sec $\underline{14} \quad$ Twp 008 Rge $\underline{04} \quad$ W $\underline{1}$

## A. Site Description

1. Stability concerns: $\square$ Yes $\boxtimes$ No If 'Yes', explain mitigation: $\qquad$

Questions 2, 3, 4 and 5 of section A apply to MSL only. The "Wellsite Spacing Recommendations" may be used as a guide, search for "Wellsite Spacing Recommendations" on srd.alberta.ca .
2. Well type:OilSweet GasSour Gas ( $\mathrm{H}^{2} \mathrm{~S}$ )Coalbed Methane
Single Well pad
Multi-well pad
$\boxtimes$ Other An access corridor including a 10 m wide access road, a 3 m wide covered conveyor and a powerline right-of-way.
3. Well depth: N/Am
4. Flare requirements for drilling:50 m35 m25 m

Flare pitFlare tankFlare stack
5. Number of zones to be completed/produced N/A

Inter-well spacing N/A m.

## B. Vehicle/Equipment Access

How will the site be accessed? (Check boxes that apply)
$\boxtimes$ By an existing access held under disposition or jurisdiction (specify name, disposition number, and owner): During construction this area will be accessed via an existing access road, a majority of which is through Freehold land owned by Benga. Benga will also be constructing a new mine access from Highway 3 to the mine infrastructure area. A small portion of this new access road is located on Crown land, and will be part of a separate LOC application.New application (LOC)
X New access included in this application.

Note: If access is part of the site and installation application, an access supplement must be submitted.

## C. Contamination Prevention

> 1. Is the boundary of the site located within 100 m of a watercourse? $\boxtimes$ Yes $\square$ No
> If 'Yes', specify distance from edge of lease to top of breaks in meters See below
> Explain mitigation strategy if within 100 meters No activities will occur within the bed and bank of the watercourse. The overland conveyor is covered and the access road will be constructed in accordance with the Water Act Code of Practice for Watercourse Crossings
2. Will the site be diked during drilling? $\quad \square$ Yes $\quad$ No During production? $\square$ Yes $\boxtimes$ No If 'No', explain why not. N/A - no drilling is proposed

Will other methods of on-site contamination prevention be required? Explain No. The overland conveyor is covered and the access road will be constructed in accordance with the Water Act Code of Practice for Watercourse Crossings.

## Applicable to MSL only <br> D. Sump

$\begin{array}{lll}\text { Type of sump (check appropriate box): } & \square \text { On-site pit } & \square \text { Above-ground tank on site } \\ & \square \text { In-ground tank on site } \quad \square \text { Remote sump }\end{array}$

Remote sump location: LSD__ Sec ___ Twp__ Rge__ W__Private landPublic land (if location known, indicate on the survey plan)

GPS coordinates: (deg/min/decimal) NAD83 Latitude $\qquad$ Longitude $\qquad$
Proposed mud type: $\square$ Hydrocarbon: $\qquad$Salt base: $\qquad$ Gel chem: $\qquad$
Q Other: N/A

## Applicable to MSL only

## Disposal

Estimate volumes to be disposed of: Solids $\qquad$ m $^{3}$ Liquids $\qquad$ $\mathbf{m}^{3}$

Proposed disposal method: $\square$ Mix/bury/cover $\quad \square$ Land spreading $\square$ Land farming $\square$ Pump-offDisposal on forested public land
Other N/A Approximate date of disposal $\qquad$Private Land
Public Land
Indicate land farming or land spreading location if off site on public land.
LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

## Applicable to MSL only

## E. Source of Water

\author{

1. Water Required: $\square$ Yes $\quad$ No $\square$ Water well on lease <br> 2. Offsite source: $\square$ Offsite water well $\square$ Lake $\square$ Stream $\square$ River
}

## Other (specify type) <br> $\qquad$

Location: LSD ___ Sec __ Twp ___ Rge ___ W__
3. Access required to water source? $\square$ Yes $\square$ No If 'Yes' attach a sketch.

## F. Construction Strategy

1. Vegetation Removal

Explain: A majority of the access corridor MSL area is on a previously cleared area. If encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan.

Non-merchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.

## 2. Brush Disposal <br> Explain: See Section F. 1

## 3. Topsoil handling: (Check appropriate boxes) $\square$ No stripping $\square$ Minimum surface disturbance

$\square$ Stripping $\square$ Single Lift $\square$ Two Lift $\boxtimes$ Other (Explain) Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses. Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses and will minimize impacts to soil quality.

Additional details: The soil salvage practices planned by Benga will provide a suitable quality reclamation material with sufficient volume for the soil replacement requirements of the reclamation plan while providing a suitable seed bed for the revegetation program.
4. Will padding of the wellsite be required?
Yes
No,
If 'Yes' Explain: N/A - no wellsite is proposed

## G. Reclamation Strategy

Revegetation strategy: (Check appropriate boxes) $\square$ Natural Recovery $\square$ Native Seed
$\square$ Non-native Seed $\boxtimes$ Other The proposed MSL will be revegetated to coniferous forest after mine closure. One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

Interim: Lands will be progressively reclaimed and adaptive management techniques will be incorporated when selecting
the appropriate revegetation techniques. Interim reclamation for the proposed MSL area will be limited to errosion control measures.

Production/Operation: Areas not required for ongoing operation will be revegetated to control erosion.

## Applicable to MSL only

See Appendix III - Lease Description and Wellsite Sizing Information
Note: Complete and attach the lease description and wellsite sizing template (in the Appendix) if a nonstandard wellsite is required as per the lease description and wellsite sizing document (see instructions).

## Operating Condition

## Contamination Prevention

136 In addition to complying with Federal, provincial and local laws and regulations respecting the environment, including release of substances, the holder shall, to the regulatory body's satisfaction, take necessary precautions to prevent contamination of land, water bodies and the air with particulate and gaseous matter, which, in the opinion of the regulatory body in its sole discretion, is or may be harmful.

### 4.0 Supplement B <br> Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable.
Failure to fill out the document and form(s) completely will result in the EFR being rejected.


Date Submitted 28/05/2018
LOC Number MSL 160758
dd/mm/yyyy

Legal land description: From: LSD 04
Sec 14
Twp 008
Rge 04
W 5 $\qquad$
To: LSD $\underline{04}$
Sec 14
Twp 008
Rge 04
W 5 $\qquad$

Note: The Pre-disturbance Planning and Surface Access Management sections of the Public Lands Operational Handbook should be consulted when dealing with new access development, extensions or upgrading existing access. Before a road is approved, the applicant may be requested to present the advantages and disadvantages on any alternate proposals, the rationale for selecting a particular route and the trade-offs made.

## A. Type of Access/Dimensions

1. Initial access width 15 $\qquad$ $m$ and type of access:undeveloped dryundeveloped frozendry weather
区 all-weather (permanent)NA
Explain: The access corridor includes a 10 m wide access road, a 3 m wide covered conveyor and a powerline right-of-way. The powerline will be located a minimum of 10 m from the tree line. The total right-of-way width will be 35
m. Only 0.15 ha of new clearing is required for construction of the access corridor in this area.
2. Final access width $\underline{10} \mathbf{m}$ as applied for and type of access:undeveloped dryundeveloped frozendry weather
$\boxtimes$ all-weather (permanent)
Explain: AThe access corridor includes a 10 m wide access road, a 3 m wide covered conveyor and a powerline right-of-way. The powerline will be located a minimum of 10 m from the tree line. The total right-of-way width will be 35 m . Only 0.15 ha of new clearing is required for construction of the access corridor in this area.

Notes: For winter access it is recommended that existing seismic lines be used for initial access to a location. Widening of these lines should be minimized. Minimal widths for initial access are to be used wherever possible. Once a well or development is considered viable, the applicant generally plans to move to a wider ROW (e.g. 20 m ) for development of a high grade road. In this case, the 20 m width can be applied
for with the understanding there will be no additional clearing beyond the $\mathbf{8 - 1 0 \mathrm { m }}$ width indicated until the development is proven viable.

If the entire Row is cleared initially and then not required for the development, it will be treated as Unauthorized use of public land and appropriate enforcement action will be taken.

If electricity is required at a facility, the Row must be planned to ensure the power line is located on the downwind side. This is required to maximize the tree-free area adjacent to the power lines, thus reducing the potential of falling trees hitting the power line and possibly starting a wildfire, as well as, cutting off power to the facility.

Where a road, pipeline, and power line ROW are required, it is recommended the power line be located between the road and pipeline. This greatly reduces the clearing requirements and keeps the power line safe from falling trees.

## B. Topography

1. Mark more than one box to show range:Level (0-2\%)Gentle (3-10\%)Moderate (11-15\%)Steep (16-30\%)Very steep (over 30\%)
Explain: The majority of the access corridor is located in a previously disturbed area with variable topography. Topography within the area ranges from strong to very strong (Class 6 to 7).

## C. Watercourse Crossings

Avoidance, Minimizing and Mitigation/Compensation, in that order, are considerations for watercourse crossings. See the instructions for additional explanation.

1. Will watercourse crossings be installed? $\boxtimes$ Yes $\square$ No. (If 'No', go to next section). If 'Yes', number the watercourse crossings on the survey plan and complete the table below.

Note: All licences, authorizations and approvals issued by the Regulatory body under the Public Lands Act, Forests Act, Environmental Protection and Enhancement Act and Water Act, should not be taken to mean the proponent (applicant) has complied with federal legislation. Proponents should contact Fisheries and Oceans Canada in the location nearest to them (Peace River, Edmonton, Calgary, Lethbridge) in relation to the application of federal laws, including but not limited to the Navigable Water Protection Act and the Fisheries Act (Canada).

2. Temporary watercourse crossings will be removed by
dd/mm/yyyy
Note: Temporary crossings must not be installed or existing ones removed during restricted activity periods unless clean flow can be maintained. Crossings installed during winter work should be removed prior to spring break up.

## D. Construction Strategy

Plan attached (include all areas of existing clearing(s) and new clearing(s) to be used, and their dimensions)

1. Vegetation removal: Explain: A majority of the access corridor MSL area is on a previously cleared area. If encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan.
Non-merchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.

## 2. Brush disposal: Explain: See Section D. 1

3. Topsoil handling/Topsoil stripping width: (Check the appropriate boxes for initial and final access)

Minimal surface disturbance (no stripping)
$\square$ Stripping $\square$ Single Lift $\square$ Two Lift Other Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses. Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses and will minimize impacts to soil quality.

Explain if more than one box has been checked. $\qquad$
Additional details: $\qquad$

## E. Reclamation Strategy

Revegetation strategy: (Check appropriate boxes)
$\square$ Natural recovery $\square$ Native seed $\square$ Non-native seed $\boxtimes$ Other See below
Interim: Interim revegetation will be undertaken for erosion control.

## Production/Operation:

Areas not required for ongoing operation will be revegetated to control erosion. At closure the proposed MSL will be revegetated to coniferous forest. One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

# Easement <br> 6．0 Supplement D <br> Environmental Field Report（EFR） 

The cover document and the appropriate supplement form must be submitted for each surface disposition application．All blanks must either be filled in or＇$N$／A＇noted where applicable． Failure to fill out the document and form（s）completely will result in the EFR being rejected．

Date Submitted 28／05／2018
EZE／VCE Number MSL 160758 dd／mm／yyyy
VCE Application－provide related disposition（EZE）number $\qquad$
Legal land description：From：LSD $\underline{04} \quad$ Sec $\underline{14} \quad$ Twp $008 \quad$ Rge $\underline{04} \quad$ W $\underline{5}$
To：LSD $\underline{04} \quad$ Sec $\underline{14} \quad$ Twp $\underline{008} \quad$ Rge $\underline{04} \quad$ W $\underline{5}$

## A．Right－of－Way：

Will vegetation control be required beyond the right－of－way indicated？Yes $\boxtimes$ No．If＇Yes＇，Explain $\qquad$

## B．Wildfire Prevention Strategy

1．Type of power line：
【 Above－ground lineBuried cable（Powerline Hazard Assessment Plan［PHAP］is not required．）

2．Is the proposed line located within the Forest Protection Area？$\boxtimes$ Yes $\square$ No． If＇Yes＇，a PHAP must be attached（see Appendix IV in the instruction manual）．

3．Will the power line be within 10 km of a community within the Forest Protection Area？$\boxtimes$ YesNo If＇Yes＇，identify the community Blairmore Alberta

Note：Proposed power lines located within 10 km of a community will generally require a more comprehensive hazard assessment plan than power lines located in other areas within the Forest Protection Area．

## C．Method of Vehicle／Equipment Watercourse Crossings

1．Type of access（check the appropriate boxes）Undeveloped dryUndeveloped frozen
$\square$ Dry weather
】 N／A
Will watercourses be crossed by vehicle／equipment？Yes】No．

Avoidance, Minimizing and Mitigation/Compensation, in that order, are considerations for watercourse crossings. See the instructions for additional explanation. Watercourse/water body crossings must meet the requirements of the Water Act Codes of Practice.
2. Will watercourse crossings be installed? $\boxtimes$ Yes $\square$ No. If 'No', go to next section.

If 'Yes', number the watercourse crossings on the survey plan and complete the table below.

| Crossing Number | Crossing Method | Culvert/Bridge Size Diameter (mm) $x$ length (m) | Watercourse Size Class (1-4) | LSD | Sec | Twp | Rge | Mer | Specify if restricted activity period (dd/mm/yyyy) | Class of Waterbody from COP (A,B,C,D) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Initial CU | clear span X unknown | 2 | 04 | 14 | 008 | 04 | 5 | From May 1 | B |
|  | Final CU |  |  |  |  |  |  |  | To August 15 |  |
|  | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |
|  | Initial | X |  |  |  |  |  |  | From |  |
|  | Final |  |  |  |  |  |  |  | To |  |

3. Temporary watercourse crossings will be removed by NA
dd/mm/yyyy
During restricted activity periods, temporary crossings must not be installed or existing ones removed unless clean flow and fish passage can be maintained. Additional approvals will be required from the federal Fisheries and Oceans Canada if in-stream work is proposed during the restricted activity period. Crossings installed during winter work should be removed prior to spring break up.

Note: All licences, authorizations and approvals issued by the Regulatory body under the Public Lands Act, Forests Act, Environmental Protection and Enhancement Act and Water Act, should not be taken to mean the proponent (applicant) has complied with federal legislation. Proponents should contact Fisheries and Oceans Canada in the location nearest to them (Peace River, Edmonton, Calgary, Lethbridge) in relation to the application of federal laws, including but not limited to the Navigable Water Protection Act and the Fisheries Act (Canada).

## D. Construction Strategy

1. Vegetation removal: Explain A majority of the access corridor MSL area is on a previously cleared area . If encountered, merchantable timber will be salvaged as per the Mines Timber Management Plan. Non-merchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.
2. Brush disposal: Explain See Section D. 1
3. Topsoil handling/Topsoil stripping width: (Check the appropriate boxes for initial and final access)
$\square$ Minimal surface disturbance (no stripping)
$\square$ Stripping
$\square$ Single Lift
$\square$ Two Lift
$\boxtimes$ Other Explain Soil conservation will be undertaken to ensure there will be sufficient volumes of suitable reclamation material to support the self-sustaining vegetation communities required to achieve the planned end land uses.

Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses and will minimize impacts to soil quality.

Explain if more than one box has been checked: $\qquad$
Additional details: Reclamation material salvage operations will ensure the salvage of all available upland surface soil.

## E. Reclamation Strategy

## Revegetation strategy: (Check appropriate boxes)

Natural recoveryNative seedNon-native seedOther The proposed MSL will be revegetated to coniferous forest after mine closure. One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

Note: It is recommended the proponent consult with the local Land Manager/Officer and/or affected disposition holders, where relevant (e.g. existence of FMA's), to assist in determining the appropriate revegetation strategy.

Interim: Interim reclamation for the proposed MSL area will be limited to errosion control measures.
Production/Operation: Areas not required for ongoing operation will be revegetated for erosion control.



## Species at Risk Summary

# SPECIES AT RISK SUMMARY <br> MSL 160758 

## WILDLIFE SPECIES

The wildlife species at risk that were either recorded during field surveys undertaken for the Environmental Impact Assessment or reported in the Fish and Wildlife Management Information System within the boundary of the proposed access corridor MSL, and for which there is moderately to highly suitable habitat in the proposed MSL boundary, are outlined in Table 1. Incidental flyovers of birds (e.g., golden eagles) are not included, unless accompanied by a sign of habitat usage (e.g., breeding calls, confirmed nest).

| Table 1 | Species at Risk that may occur within the proposed access corridor MSL boundary. |  |  |
| :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { Common } \\ & \text { Name } \end{aligned}$ | Provincial Status ${ }^{1}$ | Federal Status ${ }^{2}$ | Key Habitat Requirements |
| Amphibians and Reptiles |  |  |  |
| Long-toed Salamander | Sensitive | Not At Risk | Under rocks, rotting logs, debris; near ponds, lakes, streams. |
| Western toad | Sensitive | Special Concern | Ponds, streams, rivers, lakes; overwinter in sandy upland forest. |
| Birds |  |  |  |
| Common nighthawk | Sensitive | Threatened SARA Schedule 1 | Cutblocks, forest clearings, prairies, rock outcrops. Nests near logs, boulders, and shrubs. |
| Western wood pewee | Sensitive | - | Mature deciduous and mixed forests, forest edges, and riparian zones. Absent from dense forest. |
| Mammals |  |  |  |
| Hoary bat | Sensitive | - | Open grassy areas in coniferous and deciduous forests. Forages near farmlands. Roosts in trees. |
| Grizzly bear | Threatened | Special Concern | Open slopes, alpine meadows, cutblocks, burns, riparian areas, mature forest, and disturbed sites. |

1 Alberta Wild Species General Status Listing (AEP 2010c)
2 COSEWIC/SARA status. Species with SARA status are indicated with SARA Schedule 1.

## MITIGATION MEASURES

Benga will be implementing a number of best management practices, Project design features, and other wildlife mitigation measures to avoid or minimize effects on wildlife. These best management practices, design features, and mitigation measures are presented below in relation to each of the expected Project-wildlife interactions that were assessed.

To prevent or minimize Project effects on federally-listed (SARA) species at risk, Benga will work in consultation with Environment Canada to develop species-specific mitigation and monitoring plans for species at risk known to occur in the WLSA. Over the duration of the Project, other species at risk may be found in the WLSA or added to the SARA list of protected species. If this occurs, Benga will contact Environment Canada to determine mitigation requirements for these additional species.

Project development has the potential to interact with wildlife in different ways. The Project may alter wildlife habitat availability, habitat connectivity/movement, and wildlife mortality risk and health, all of which may affect the abundance of wildlife in the area. Benga will implement the mitigation measures outlined below to minimize potential impact to wildlife.

## HABITAT AVAILABILITY

Many of the Project effects associated with wildlife habitat loss will be minimized through implementation of the Project's reclamation plan. The summary of the reclamation plan mitigation recommendations for wildlife and wildlife habitat reclamation include:

- minimize the overall disturbance footprint through the mine planning process to avoid critical breeding habitats, nesting and denning sites, and movement corridors to the extent possible;
- preserve remnant forest patches within the development areas where feasible to provide habitat, habitat connectivity and hide cover for wildlife species;
- remnant patches should protect known essential raptor habitat features by incorporating these habitat features (i.e., mature balsam poplar and aspen) where possible;
- maximize the direct placement of salvaged soil to enhance native plant development;
- retain slash and large woody debris in the salvaged soil to provide microsites for native plant and hide cover for wildlife;
- establish a variety of vegetation species and communities suitable for wildlife, and encourage structural complexity within the forests;
- encourage understory complexity in reclaimed forests by planting native shrubs such as alder and willow;
- ensure that core security areas are provided for wildlife;
- provide water management program that ensures the surface water quality is maintained; and
- limit sight lines by maintaining mature forest stands as buffers between roads and reclamation areas.

To support the reclamation plan mitigation measures, the following will be implemented to mitigate potential direct and indirect Project effects on wildlife habitat availability:

- pre-disturbance surveys (wildlife sweeps) will be conducted in the development area prior to any construction activities during Project development to determine the occurrence of any important wildlife habitat features such as migratory bird nests, mineral licks, active dens, bat habitat and hibernacula, active raptor nest sites, and essential raptor habitat features (i.e., mature balsam poplar, platform/stick nests) that could indicate the presence of species at risk;
- protect all important wildlife habitat features in areas of suitable wildlife habitat (on the edge of the Project footprint boundary) appropriate setback distances (or buffer zones) will be considered;
- clearing and equipment use/storage/cleaning in undisturbed areas within and adjacent to the Project footprint will be avoided;
- vegetation adjacent to high-activity linear corridors (e.g., access roads, coal conveyor) will be retained to reduce the extent of noise and visual sensory disturbances to the extent possible;
- the overland coal conveyor system was designed in such a manner to prevent any deposition of coal product along the route from the CHPP to the rail load-out area. This includes a cover for the length of the conveyor to reduce dust, and motor specifications to reduce industrial noise levels;
- as required by the Weed Control Act and Regulations, all identified noxious and invasive weed species populations will be controlled prior to any site disturbance and mine operation to prevent the further spread of weeds. Noxious weed management will occur in compliance with R\&R/03-4 Weeds on Industrial Development Sites ; and
- as the presence of artificial lighting can potentially affect bird and bat use of nearby habitats, Benga has developed a visual impact mitigation plan that reduces stray and non-essential artificial lighting to minimize wildlife effects and that will comply with OH\&S safety requirements.


## HABITAT CONNECTIVITY AND MOVEMENT

The following general wildlife mitigation measures will be implemented to minimize potential disruption to daily and seasonal wildlife movements:

- a minimum of six wildlife crossings (underpasses and overpasses) will be incorporated into the design of the coal conveyor (the conveyor route is approximately 5.4 km in length)
- road plowing and grading will be conducted in a manner that does not restrict wildlife from crossing access roads or accessing wildlife crossings; and
- measures to control dust and other air emissions (e.g., watering of roads and use of dust suppressants, minimizing engine idling, etc.) within the Project footprint will be implemented to minimize effects on adjacent wildlife habitats .

Project-specific mitigations targeted to carnivore species have been incorporated into the reclamation planning. Many of these will also support habitat connectivity for migratory birds, raptors, and species at risk, and include:

- minimize the overall disturbance footprint through the mine planning process;
- preserve remnant forest patches in the development areas to provide essential habitat, habitat connectivity, and hide cover for wildlife species;
- retain slash and large woody debris in the replaced soil landscape;
- plant native shrubs early in the reclamation process to initiate hiding cover;
- establish mixed wood forest stands and high density coniferous tree stands;
- provide understory complexity in the reclaimed forests by planting native shrubs such as alder and willow to provide security cover for the carnivores and their prey;
- maximize the amount of ungulate habitat;
- prior to final reclamation, disrupt linear disturbances and sight lines by mounding surface soils, piling brush; and
- limit sight lines by maintaining mature forest stands or by planting high density coniferous stands to act as buffers between roads, project disturbance boundaries and the reclaimed mine areas.

Additional mitigations that are specifically targeted to grizzly bears and grizzly bear habitat will also support other carnivores and migratory birds, and include:

- leave patches of residual forest within and adjacent to the mine footprint; and
- commence reclamation early on in mine operations by seeding reclaimable areas with plant species favourable to grizzly bear forage, and by planting shrub and tree species that provide suitable cover (e.g., willow, alder, coniferous trees).

For migratory birds, additional relevant mitigations include:

- retain slash and large woody debris in the salvaged soil to provide microsites for native plant and hide cover and perches for wildlife; and
- ensure reclaimed areas promote the re-establishment of woody species and are on a trajectory for reforestation.

For raptors, additional relevant mitigations include:

- retain residual patches of essential habitat and habitat features within and adjacent to the mine footprint (i.e., mature poplar trees, tall conifer trees) to provide perches, nest sites, and hide cover; and
- minimize loss of mature and old-growth forest habitat and avoid complex, multi-story mixedwood forest where possible.


## MORTALITY RISK

Wildlife mortality risk may increase as a result of increased traffic, wildlife encountering equipment, or elements of the Project footprint, and wildlife being attracted to Project facilities or humans. The Grassy Mountain area currently has a considerable network of trails and roads that are heavily used. Plans are already being implemented to reduce this level of access and with the approval of this Project, the levels will be reduced considerably more. Mitigation measures that will be implemented to reduce wildlife mortality risk include:

- all access to the Mine Permit will be controlled, no uncontrolled access will be permitted. Common operational practices will include:
- prohibiting use of snowmobiles and ATVs;
- prohibiting hunting, harassment, or feeding of wildlife; and
- implementing a strictly enforced zero tolerance policy on the use of firearms.
- timing vegetation site clearing activities to occur outside the April 15 to August 31 period to avoid disrupting nesting migratory and resident songbirds and raptors;
- in the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines. Establish speciesappropriate setback distances around confirmed active nest sites until fledging in consultation with Environment Canada and AEP. If the status of a nest cannot be confirmed, or if a nest is found outside of the breeding season, a setback distance will be implemented until such time as the nest status can be confirmed.
- confirm the presence/absence of bats in high quality habitats located within the Project footprint prior to the initiation of any clearing activities and develop a mitigation plan if bats are found;
- conducting pre-disturbance denning (bears, marten, etc.) and roosting (bats) surveys prior to vegetation clearing and other high-disturbance activities. Consult with AEP as needed to develop appropriate mitigation and management strategies;
- Benga commits to supporting active bear management plans associated with the Project. If a site specific plan is required, it will be developed in consultation with AEP personnel as part of the Wildlife Mitigation and Monitoring Plan. The plan is expected to be a comprehensive document that outlines operational strategies and best practices for addressing concerns related to not only bear-human conflicts but potential risks to ungulates and other wildlife resulting from attraction of bears to the area;
- developing a Beneficial Management Plan guide to minimize potential Projectspecific impacts on migratory birds and their habitat by identifying more site-specific mitigation and monitoring measures following Project approval and in consultation with federal and provincial regulators;
- a detailed Waste Management Plan will be developed and implemented prior to construction and operational activities to minimize the attraction of wildlife. Benga
will follow the Best Management Practices for camps, fences, and barriers as described in Bear Smart: Best Management Practices for Camps, and ensure all waste is stored in wildlife-proof containers and disposed of properly. Some of the waste management and bear awareness/Bear Smart guidelines that will be implemented include:
- ensuring food waste, refuse, and other attractants are securely contained in enclosed and approved bear-proof containers and/or facilities (e.g., hard-sided buildings, fenced compounds, and bear-proof transfer station) prior to transportation to a disposal facility to prevent access by scavenging bears;
- providing adequate signage to inform employees of the location and proper use of bear-proof storage containers/facilities;
- ensuring waste storage containers/facilities are not filled beyond capacity;
- ensuring regular inspection and maintenance of waste storage containers/facilities is carried out;
- ensuring measures contained in the bear management plan are diligently followed by all employees and contractors;
- all on-site staff will receive Bear Awareness Training; and
- bear warning signs will be installed to advise staff of locations where problem bears have been reported.
- implementing an Emergency Spill Response Plan to limit the effect of accidental spills. Spills will be minimized by restricting fuel storage and filling to designated areas that are at least 100 m from wetlands and watercourses as well as Project drainage ditches, sediment control ponds, and pit lakes;
- storing all hazardous materials, including those used for blasting, in secure areas that are inaccessible to wildlife (e.g., buildings, storage areas surrounded by wildlife-proof fencing). In addition, proper handling and storage of industrial materials and debris within the Project footprint will be maintained to minimize potential risks to wildlife;
- developing procedures to clear blasting areas of large mammals or birds prior to blasting;
- designing water management ponds and drainage ditches, and pit lakes to minimize potential entrapment of wildlife;
- developing a strategy to minimize changes in water quality upstream of the mine in conjunction with a water-quality monitoring program;
- enforcing speed limits ( $\leq 50 \mathrm{~km} / \mathrm{hr}$ ) along the main access road and utility corridors and placing signs at identified wildlife crossings to increase driver diligence to minimize wildlife-vehicle collisions. Vehicles will yield to all wildlife crossing the main access road; and
- bird collisions with buildings will be mitigated by placing visual markers on windows, and collisions with the proposed power line will be mitigated by installing large 'floats' or other markers.


## PLANT SPECIES

Twenty-two vegetation species identified within the boundaries of the proposed surface dispositions at the time of the field assessment were on the Alberta Rare Plant Tracking and Watch Lists (Table 2). Two species identified are federally listed by COSEWIC and SARA: Pinus albicaulis (whitebark pine) and Pinus flexilis (limber pine). Whitebark pine is listed as Endangered in Alberta and British Columbia under SARA Schedule 1. Limber pine was designated as Endangered throughout its range in Alberta and British Columbia by COSEWIC in November 2014.

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Vascular plants |  |  |  |  |  |  |
| Angelica dawsonii | Yellow angelica | G4 | S3 | W | - | Sensitive |
| Carex petasata | Pasture sedge | G5 | S1S2 | Y | - | May be at risk |
| Eriogonum cernuum | Nodding umbrella-plant | G5 | S2 | Y | - | May be at risk |
| Eucephalus engelmannii | Elegant aster | G4G5 | S3S4 | W | - | May be at risk |
| Phacelia hastata | Silver-leaved scorpionweed | G5 | S3 | W | - | Sensitive |
| Pinus albicaulis | Whitebark pine | G3G4 | S2 | Y | Endangered | At risk (Endangered) |
| Pinus flexilis | Limber pine | G4 | S2 | Y | Endangered | At risk (Endangered) |
| Piperia unalascensis | Alaska bog orchid | G5 | S2? | Y | - | Sensitive |
| Mosses and liverworts |  |  |  |  |  |  |
| Conocephalum salebrosum | Liverwort | G5 | S2 | Y | - | May be at risk |
| Dicranum tauricum | Broken-leaf moss | G4 | S1S2 | Y | - | Sensitive |
| Lophozia ascendens | Liverwort | G4 | S1 | Y | - | May be at risk |
| Lophozia longidens | Liverwort | G5 | S1 | Y | - | May be at risk |
| Lophozia wenzelii | Liverwort | G4G5 | S1 | Y | - | May be at risk |
| Pellia neesiana | Liverwort | G5 | S2 | Y | - | - |
| Racomitrium aciculare | Moss | G5 | S1 | Y | - | Sensitive |
| Schistidium tenerum | Thread bloom moss | G5? | S2 | Y | - | Sensitive |
| Lichens |  |  |  |  |  |  |
| Cladonia umbricola | Shaded cladonia | G3G5 | S1 | Y | - | May be at risk |
| Nodobryoria abbreviata | Tufted foxtail lichen | G4? | S1 | Y | - | May be at risk |
| Peltigera cinnamomea | Cinnamon dog pelt lichen | GNR | S2 | Y | - | May be at risk |

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Umbilicaria americana | American rock tripe lichen | G5? | S2S3 | Y | - | May be at risk |
| Vulpicida canadensis | Brown-eyed sunshine lichen | G3G5 | S2 | Y | - | Sensitive |
| Xylographa parallela | Black woodscript lichen | G5 | S2S4 | Y | - | May be at risk |

${ }^{1}$ GRANK refers to global conservation rank and SRANK refers to subnational conservation rank).
${ }^{2} \mathrm{Y}$ - species is tracked, W - species is watched (ACIMS 2014).
${ }^{3}$ COSEWIC (2014), SARA (2014).
${ }^{4}$ General Status of Alberta Wild Species database (Government of Alberta 2010). (Endangered) refers to Endangered under Alberta’s Wildlife Act (Government of Alberta 2014).

## MITIGATION MEASURES

Rare plant species rankings in Alberta are largely determined by the number of observations of the species that are reported in the province. Based on this system, low profile, difficult to locate, and hard to identify species are more likely to be listed as rare. It is difficult to determine if some species are rare due to location at the edge of their natural range. Taxonomic uncertainty and misidentification may also result in the rare status of certain species. Avoidance of rare plant species provincially ranked between S1 and S3 is the most preferred mitigation option. Where avoidance is not an option, site-specific and species-specific mitigation planning may be possible. Based on a review of the species descriptions and habitat requirements of the rare plant species located in the Project Footprint, Benga has developed a rare plant species mitigation program.

Mitigation measures will include, but are not limited to, the following:

- a re-vegetation program which aims to establish diverse native vegetation communities (closed conifer forests, grassland open forests, mixed forests, and treed wetlands) with equivalent pre-disturbance capability;
- a C\&R Plan which aims to establish communities that are locally and regionally limited in distribution where conditions allow;
- preservation of adjacent vegetation communities by minimizing the area required for construction and operation of the Project;
- provision of appropriate soil substrate where re-vegetated areas can establish;
- seeding of stockpiled reclamation material with suitable vegetation species mix to ensure long term stability of the soil piles, which reduces erosion and the potential for weed establishment;
- use of coarse woody debris and direct soil placement techniques to augment mycorrhizal and microbial inoculums;
- use direct placement of soil for provision of propagules to enhance opportunity for re-establishment of native species composition and enhanced species richness;
- planting of multiple layers of native vegetation (e.g., trees, shrubs and graminoids) to provide initial structure for wildlife habitat and to enhance biodiversity;
- based on the described selection criteria implement the seed collection, propagation and/or relocation plan for rare species; and
- establish disease-resistant whitebark pine.

To preserve genetic diversity, clusters of whitebark pine will be investigated for suitability for cone/seed collection prior to disturbance and seed collection would include selection of trees showing evidence of white pine blister rust resistance. Conditions and strategies for establishing whitebark pine during reclamation include:

- identification of high light, low competition sites;
- planting in pure stands or patches to avoid competition from other trees;
- avoiding planting in swales and frost pockets;
- creation of microsites for seedling establishment (rocks, stumps or other coarse woody debris);
- use of recommended spacing to avoid interspecies competition; and
- planting seedlings in the fall to avoid hot dry summer conditions.

Vegetation species that have current or historical uses and importance to First Nations groups are considered Traditional Ecological Knowledge (TEK) resources. Supplementary mitigation measures for TEK vegetation impacts include the following:

- consult with and involve First Nations Peoples in designing mitigation measures for sustainable management of TEK vegetation;
- implement a re-vegetation program which aims at the re-establishment of vegetation communities, such as those previously mentioned (closed conifer forests, mature mixed forests, native upland herbaceous grasslands and treed swamps) that are common to the pre-disturbed landscape and that will support TEK vegetation; and,
- where practicable utilize locally collected seed to preserve the legacy of species and of place.


## Public Land Standing Report

| Req: 0000666549 <br> Report Date: 2016/09/15 | Time: 10:24:03 |
| :--- | :--- |

## Selected Activities

| Surface Dispositions | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of <br> Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| :--- | :--- | :--- | :--- |
| Geophysical | Types: | All |  |
| Reservations | Status: <br> Types: | All <br> All |  |
|  | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of <br> Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| Encumbrances |  | Types: | All |
|  |  | Status: <br> Types: | All <br> All |
| Land Postings | Y |  | Status: |

## Land Keys

W5-04-008-14-SW


| ALBERTA ENERGY REGULATOR | SOUTH REGION |  | Code: AER-S |
| :---: | :---: | :---: | :---: |
| W5-04-008 |  |  |  |
| COAL DEVELOPMENT REGION | SETTLED |  | Code: CDR-1 |
| W5-04-008-14 |  |  |  |
| ENVIRONMENT CORPORATE REGION | SOUTHERN |  | Code: ENV-1 |
| W5-04-008 |  |  |  |
| ENVIRONMENT CONS. \& RECL. DISTRICT | NO. 20 |  | Code: ERD-020 |
| W5-04-008 |  |  |  |
| EASTERN SLOPE ZONE |  |  | Code: ESZ |
| W5-04-008 |  |  |  |
| FOREST MANAGEMENT UNIT W5-04-008-14 | SOUTHWEST | CO2 SOUTHERN ROCKIES | Code: FMU-C-52 |
| FISH \& WILDLIFE ADMIN REGION | SOUTHERN REGION | BLAIRMORE | Code: FWA-1-02 |
| W5-04-008 |  |  |  |
| FISH AND WILDLIFE DISTRICT | SOUTHERN REGION | BLAIRMORE | Code: FWD-1-09 |
| W5-04-008 |  |  |  |
| FISH \& WILDLIFE REFERRAL LANDS |  |  | Code: FWR |
| W5-04-008-14 |  |  |  |
| GENERAL LANDS CLASSIFICATION | WHITE |  | Code: GLC-W |
| W5-04-008-14 |  |  |  |


| Req: 0000666549 |  | Public Land Standing |  |
| :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 | Time: 10:24:03 |  |  |
| GRAZING ZONE | A2 |  | Code: GRZ-A2 |
| W5-04-008 |  |  |  |
| INTEGRATED RESOURCE PLAN | LIVINGSTONE-PORCUPINE HILLS |  | Code: IRP-L2 |
| W5-04-008-14 |  |  |  |
| LAND USE AREA | SOUTHWEST 1 | BLAIRMORE | Code: LUA-SW1-2 |
| W5-04-008 |  |  |  |
| MUNICIPAL DISTRICT | RANCHLAND NO. 66 |  | Code: MD-066 |
| W5-04-008-14 |  |  |  |
| OPERATIONAL APPROVAL DISTRICTS | South Saskatchewan Region | South Saskatchewan District | Code: OPD-5-1 |
| W5-04-008 |  |  |  |
| RANGELAND DISTRICT | SOUTHWEST | PINCHER CREEK | Code: RLD-SW-6 |
| W5-04-008-14 |  |  |  |
| REGIONAL PLANNING COMMISSIONS | OLDMAN RIVER |  | Code: RPC-02 |
| W5-04-008 |  |  |  |




## DISCLAIMER

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THIS REPORT DOES NOT SHOW CAVEATS, BUILDERS' LIENS, OR OTHER INSTRUMENTS, IF ANY, REGISTERED AT LAND TITLES OFFICE IN RESPECT OF ANY LANDS OR INTERESTS THEREIN. PERSONS ARE ADVISED TO ALSO EXAMINE RECORDS AT LAND TITLES OFFICE TO ASCERTAIN WHETHER OTHER INSTRUMENTS THAT MAY CONCERN THE LANDS OR INTERESTS THEREIN HAVE BEEN REGISTERED.

[^3]
## Completion of EFR Cover Document <br> For all Dispositions 2.0 <br> Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or ' $N / A$ ' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.

NewRevised

Date Submitted 28/05/2018
Department Number MSL 160757

## dd/mm/yyyy

Site/Project Name: Grassy Mountain Coal Mine

## A. Communications

1. Applicant: Benga Mining Limited
2. Company contact person for EFR: Alisdair Gibbons Phone:
3. E-mail: <email address removed>

Cell Phone: $\qquad$
$\qquad$
4.
5. Company representative who conducted the onsite assessment for the EFR:

Tyler Riewe
6. Phone: <contact information removed> Cell Phone: $\left(\begin{array}{l}\text { ___ }) \\ \text { 7. Fax: }(\square)\end{array}\right.$
8. Date of on-site assessment: $\underline{2014 \text { to } 2016}$

$$
\overline{\text { dd/mm/yyyy }}
$$

Note: The Regulatory body reserves the option to audit individual EFR's to ensure field visits have been conducted and information supplied is accurate.

## B. Surface Location

LSD $\underline{03}$ Sec $\underline{11}$ Twp $\underline{009} \quad$ Rge $\underline{04} \quad$ W $\underline{5}$
To:
LSD $\underline{07}$ Sec 18 Twp $008 \quad$ Rge $03 \quad$ W $\underline{5}$

1. Construction is proposed under the following soil conditions (check the box that applies):
```
    Frozen
    \Non-Frozen
    \square Other (If "Other", explain)
```

Construction will occur in both frozen and non-frozen ground conditions throughout the life of the Project.

Proposed construction date: $\frac{2019 \text { to } 2045}{\text { dd/mm/yyyy }}$
dd $/ \mathrm{mm} / \mathbf{y y y y}$
2. Specify associated developments/dispositions that may be required as a result of this disposition.
$\square$ Power line
$\square$ Pipeline
$\square$ Compressor
$\square$ Metering Station
$\square$ Access
Other separate disposition applications will be submitted to the AER for a LOC for portions of the rail line and adjacent access and MSL for portions of the conveyor/powerline/access road right of way. In addition, a disposition application for the construction camp will be submitted to Alberta Environment and Parks

## Land Standing Review

3. A complete Land Standing Review check must be made on the proposed area.

Date Land Standing search was completed: 15/09/2016
dd/mm/yyyy

| Reservation/Activity Number | Action required/identify conflicts/contact name and or comments |
| :--- | :--- |
| Please see attached reservation <br> summary table |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

a. Within a Provincial Grazing Reserve? $\quad \square$ Yes $\boxtimes$ No

If 'Yes', complete the Provincial Grazing Reserve template and attach to the Environmental Field Report. (Refer to Appendix I in the instruction document.)
b. Within the Chungo Access Management Area? $\quad \square$ Yes $\quad$ No

If 'Yes', complete the Chungo Area template (located at the end of IL 2005-01 - Annex to Chungo Creek Industrial Access Management Area Information Letter
and attach it to the Environmental Field Report.
c. Within a FireSmart Community Zone? $\quad$ Yes $\square$ No

If 'Yes', contact Forest Protection Division for additional hazard reduction requirements.
d. Follow the "Bear Smart" program to reduce bear-human conflicts and increase public stewardship of black and grizzly bears in Alberta by providing strategies, information and education materials to its staff and contractors, see srd.alberta.ca and search for "Alberta BearSmart"
4. Are Permanent/Research Sample Plots/Rangeland Benchmarks located within 100 m of the boundary of the lands under application? $\square$ Yes $\boxtimes$ No

If 'Yes', indicate the legal land description and GPS coordinates for each plot/benchmark in relation to the disposition boundary (degree, decimal, minutes).

| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Se | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Se | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD $\qquad$ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD __ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |
| Reservation No. | PSP/RSP No. | LSD ___ Sec | Twp | Rge | W |
| Latitude | Longitude | Distance away | m |  |  |

PSP's held by the Regulatory body appear as DRS or PNT reservations on the LSAS report. The forest industry also has sample plots, and if these are registered, they will appear as ISP's on the LSAS report. If the forest industry sample plots are not registered, they will not appear on the LSAS report. The proponent is responsible for determining if there are any PSP's or ISP's on the land under application. PSP's and ISP's must not be disturbed.

## Stakeholders, Other Land Users

5. Is there potential impact on or conflict with stakeholders and other land users? $\boxtimes$ Yes $\square$ No If "Yes" to either, please list and explain mitigation:
Benga has been undertaking an extensive public engagement and Aboriginal Consultation program for the Project, which was initiated in 2013 and is still ongoing as part of the regulatory process for applications and assessments required in accordance with the Environmental Protection and Enhancement Act and Coal Conservation Act. Benga has held three Public Forums and three Open Houses in the Crowsnest Pass to inform the public about the Project. Numerous meetings have also been held with the regional municipalities, local stakeholders, local residents and land owners, special interest groups, provincial and federal government agencies, senior cabinet ministers and specific individuals with concerns.
Consents with holders of overlapping dispositions have been provided to the AER.
6. What actions have been taken to integrate this disposition with other existing/planned activities and resources to minimize the impacts on the land base? (Check appropriate boxes.)Not applicable
$\square$ Use common corridor
$\square$ Parallel existing clearing/right of way
$\boxtimes$ Use existing clearing/right of way
$\square$ Other $\qquad$
Explain: The Project is located in an area with significant historic mining activity. The proposed MSL boundary is located with consideration for the location of the coal resource and design requirements. Opportunities for use of existing clearings for the ancillary activities such as the rail loop, conveyor and construction camp were evaluated and facilities sited accordingly.
7. Identify any aesthetic concerns related to the proposed activity (i.e., negative effects on the aesthetic/sensory aspects of the surrounding land including view, smell, noise, etc.).
$\square$ Not applicable
From public accessFrom residence
$\square$ From recreation facility
$\boxtimes$ Other Land Users
Explain: Visual impacts on what the mountain will look like post mining has been raised by the Piikani Nation. Benga has developed a Conservation \& Reclamation Plan for the Project. The reclaimed lands will feature regionally compatible landforms and vegetation patterns that are ecologically functional and successional. The goal of the reclamation plan is to develop lands that are maintenance-free and self-sustaining. The landscape will evolve through seral states of initial revegetation to self-sustaining ecosystems, consisting of mature vegetation communities typical of the Subalpine or Montane Sub Regions of the Rocky Mountain Natural Region. Although new landscapes will be created during development and reclamation of the Project, they will be integrated with the surrounding undisturbed lands.
8. Are there any conflicts with Access Management Plans, Integrated Resource Plans or policy documents for the area? $\square$ Yes $\boxtimes$ No
If 'Yes', explain mitigation strategy: $\qquad$
9. Was First Nations (Aboriginal) consultation required by the Regulatory body? $\boxtimes$ Yes $\square$ No

If "Yes", with whom: Groups included in the consultation program were identified by the Alberta Aboriginal Consultation Office (ACO) and the Canadian Environmental Assessment Agency. These groups are as follows:

- Blood Tribe (Kainai Nation);
- Piikani Nation;
- Siksika Nation;
- Stoney Nakoda Nation:
- Bearspaw;
- Chiniki;
- Wesley; and
- Tsuut'ina Nation.


## C. Wildlife/Environmental Concerns

1. Within a Key/Critical Wildlife Zone? $\quad \square$ Yes $\square$ No

If 'Yes', provide information on mitigation strategies that will be implemented: The northern most portion of the proposed MSL for the mining area is located in a Grizzly Bear Zone and the southern portion is located within a Mountain Goat and Sheep Range. An assessment of the potential impacts to grizzly bears was undertaken as part of the Environmental Impact Assessment. It was predicted that with implementation of the proposed mitigation measures (see attached Species at Risk Summary), the impacts on grizzly bears would be insignificant.
An assessment of the potential impacts to mountain goats and bighorn sheep has also been undertaken. During the field assessments it was determined that there is no quality mountain goat habitat within the study area and no mountain goats were detected during the surveys conducted in 2014 or 2015. Bighorn sheep were not identified during any of the wildlife surveys undertaken for the Project but are known to occur along Highway 3. Bighorn sheep may move through the mine permit boundary while travelling between winter and summer ranges, and therefore movement could be altered by the development of the overland conveyor. The conveyor has been designed to include wildlife crossings, which will mitigate the impact to wildlife movement.
2. Wildlife Timing Constraint apply? $\quad$ Yes $\square$ No

If 'Yes', provide dates of restricted period: From April 15 To August 31
To avoid disrupting nesting migratory and resident songbirds and raptors, in accordance with Alberta's Wildlife Act and Canada's Migratory Birds Convention Act (Regulation 12:1) and the Species at Risk Act, Benga will schedule vegetation clearing activities outside the April 15 to August 31 period. In the event that vegetation clearing must occur within the restricted activity period, pre-disturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines_ (See Provincial Timing Guidelines or FW referral maps.)
3. Fisheries Timing Constraint apply? $\boxtimes$ Yes $\square$ No

If 'Yes', provide dates of restricted period: From May 1 to August 15 and September 16 to April 5 To
The proposed mining area MSL is located between Blairmore Creek and Gold Creek. The timing constraints for Gold Creek and associated tributaries are May 1 to August 15 and September 16 to April 5. The timing constraint for Blairmore Creek and its associated tributaries is May 1 to August 15. Neither of the mainstems of Blairmore Creek or Gold Creek will be directly impacted by development of the Project; however, mine pit and waste rock disposal area development will encroach upon some tributaries of both watercourses. (See Provincial Watercourse Codes of Practice for restricted periods.)
4. Within a Caribou Area? $\square$ Yes $\boxtimes$ No. If 'Yes', specify the Caribou Protection Plan number and name.

## Species at Risk (Plant/Animals)

5. Is it likely that a species at risk (not including Woodland Caribou in number 4 above) will be found in the area of the proposed development?
$\boxtimes$ Yes

If 'Yes', specify the status and protective strategy for each species: For further details on species at risk within the proposed activity, see attached Species at Risk summary.

| Species $1 \_$Species 2 |  |
| :--- | :--- |
| $\square$ Endangered | $\square$ Endangered |
| $\square$ Threatened | $\square$ Threatened |
| $\square$ Special Concern | $\square$ Special Concern |
| $\square$ At Risk | $\square$ At Risk |
| $\square$ May Be At Risk |  |
| Explain any conflict and proposed mitigation | $\square$ May Be At Risk |
| $\square$ |  |


| Species $3 \ldots-$ Species $4 \ldots$ |  |
| :--- | :--- |
| $\square$ Endangered | $\square$ Endangered |
| $\square$ Threatened | $\square$ Threatened |
| $\square$ Special Concern | $\square$ Special Concern |
| $\square$ At Risk | $\square$ At Risk |
| $\square$ May Be At Risk | $\square$ May Be At Risk |
| Explain any conflict and proposed mitigation | Explain any conflict and proposed mitigation |
| $\square$ | $\square$ |

Alberta Fish and Wildlife Division recommends predevelopment inventory be conducted on all native grasslands habitats within the Grassland Natural Region due to high concentration of Species at Risk and limited site specific information on occurrences.
6. Has a pre-development Species at Risk inventory been completed to alert the applicant of any wildlife concerns related to this project? $\boxtimes$ Yes (copy of inventory attached) $\square$ No
If 'No', explain: See attached Species at Risk summary.

Has the activity been assessed to ensure it does not negatively affect any species at risk? $\boxtimes$ Yes $\quad \square$ No If 'No’, explain: $\qquad$
8. If Access Restrictions apply, include legal land description and explain mitigation measures.
LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$
LSD $\qquad$ Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

Explain mitigation strategy: $\qquad$
9. If within or adjacent (within 100 m ) to a Protected Area, indicate the type of protected area and explain what measures will be taken to avoid conflict with the protected area.Natural Area $\square$ Ecological ReservePark

Other Located within Crown Protective Notations as discussed in Section B．3．
Name of protected area： $\qquad$
Explain mitigation strategy： $\qquad$

10．Are there any environmentally sensitive areas in the vicinity（within 100 m ）of the proposed activity that will require special measures to protect？$\square$ Yes $\boxtimes$ No
If＇Yes＇，list and explain： $\qquad$

11．Is the proposed activity within a permafrost area？$\square$ Yes $\boxtimes$ No If＇Yes＇，specify the Permafrost Protection Plan number and name： $\qquad$

## D．Historical Resources

Date search completed A Historical Resources Impact Assessment（HRIA）was undertaken and submitted to Alberta Culture．The HRIA is currently under review and Alberta Culture has indicated that clearance for the Project will not be granted until the Environmental Protection and Enhancement Act and Coal Conservation Act approvals have been issued．
dd／mm／yyyy
What is the Historical Resource Value（HRV）of the affected lands？
$\square$ Not Listed1 $\square$ $\square$【 3 $\square$ 4 【 5

If HRV is 1－5，an＇Application for Historical Resources Act Clearance＇must be submitted to the Cultural Facilities and Historical Resource Division（CFHRD）of Alberta Community Development．
Date submitted $\frac{05 / 08 / 2016}{\mathrm{dd} / \mathrm{mm} / \mathrm{yyyy}}$
Note：Activities on land that has an HRV or 4 or 5 may require a Historical Resources Impact Assessment（HRIA）．

## E．Vegetation and Timber Cover

Vegetation（check all that apply）

| $\square$ Native grassland | $\boxed{\text { Treed wetland }}$ |
| :--- | :--- |
| $\square$ Tame pasture | $\square$ Shrubby wetland |
| $\square$ Cropland | $\square$ Grass or grass－like wetland |
| $\square$ Sparsely or non－vegetated | $\square$ Native aspen parkland |
| $\square$ Cutblock－planted | $\boxed{\text { Other（specify）Grass Meadow．}}$ |

Deciduous－dominant forest：
区（＂D＂less than $30 \%$ coniferous trees）
Coniferous－dominant forest：
$\boxtimes$（＂C＂more than $70 \%$ coniferous trees） Mixedwood forest：
$\square$ Natural regeneration＞2 m
$\boxtimes$（＂CD＂70\％to $50 \%$ coniferous trees）
$\boxtimes$（＂DC＂ $\mathbf{5 0 \%}$ to $\mathbf{3 0 \%}$ coniferous trees）

## Timber Salvage

1. Merchantable timber present? $\boxtimes$ Yes $\square$ No

Provide a volume inventory as follows:
Coniferous approx. volume $1,316 \mathrm{~m}^{3}$ or $\qquad$ number of loads

Spruce 14\% Pine 80\% Other 6 \%
Deciduous approximate volume $114,550 \mathrm{~m}^{3}$
or $\qquad$ number of loads

Aspen 98 \% Other $\underline{2}$ \%
2. Specify the timber disposition or FMA(s) shown on LSAS.
$\boxtimes$ No disposition (Contact the Regulatory body)
$\square$ Disposition number of FMA: _,
holder name $\qquad$
3. Utilization standards:

Coniferous $\underline{15} \mathbf{c m}$ stump diameter to a $11 \mathbf{c m}$ top diameter.
Deciduous $\underline{15} \mathbf{c m}$ stump diameter to a $11 \mathbf{c m}$ top diameter.
4. Timber salvage waiver requested?Yes $\boxtimes$ No

If 'Yes', provide justification: $\qquad$
5. Provide the name of the salvage purchaser Timber volumes from crown land will be offered to the two main quota holders, Spray Lakes Sawmills (1980) Ltd. and Crowsnest Forest Products. Should these quota holders decline, the volumes will be made available to other interested parties., or check one of the following:
$\boxtimes$ Not known at this time $\quad$ By $\square$ TM88 (or equivalent) By $\square$ Timber permit
6. When will the salvage be removed/hauled from the site to a wood processing plant?
$\boxtimes$ Proposed date start: $\frac{01 / 07 / 2019}{\mathrm{dd} / \mathrm{mm} / \mathbf{y y y y}}$
$\boxtimes$ Proposed date complete: $\frac{\text { Ongoing through life of the mine. }}{\mathbf{d d} / \mathbf{m m} / \mathbf{y y y y}}$

Notes: The operator is responsible for moving the salvage to a site that is accessible to ensure all the wood can be removed.
This may require forwarding the wood to a site with all-weather access.

A copy of the TM88 or equivalent must be submitted to the the Regulatory body to ensure proper tracking of ownership, transport and manufacturing can occur.

## F. Soil and Vegetation Management

Soil salvage, storage, replacement, and handling procedures shall be in keeping with those outlined in Section 6 "Site Disturbance, Clearing and Soil Management," of the "Public Lands Operational Handbook".

Note: Projects on specific areas of public land may require a soil survey. The proponent is to identify such requirements during the planning process.

Are there soil sensitivities (i.e., shallow depth to water table; shallow depth to bedrock; soils are gravely or stony, etc.)? $\boxtimes$ Yes $\square$ No
Explain: There are a few soil sensitivities within the mine area including, shallow depth to bedrock (bedrock at surface to depths $<100 \mathrm{~cm}$ ) and gravely and stony soils.

Surface expression (i.e., topography). The area has varying mountainous topography, with slopes ranging from Class 1 to Class 9 ( 0 to $>45$ degrees). Steeper slopes Classes between 7 and 9 (16.5- 45 degrees) are most prevalent in the northern portion of the proposed mining area MSL boundary areas of the proposed disposition boundary. The southern portion of the proposed mining area MSL boundary has slopes primarily between Class 6 and 7 ( 8 to 24 degrees). Surface expression varies across the area and includes sections of level, hummocky, terraced and inclined expression.
Site drainage (i.e., drainage is very poor, poor, imperfect, moderately well, well, rapid, or very rapid)
Site Drainage ranged from very poor to very rapid. Very poor and well drained soils are located at the lower and mid slopes in the most southern portion of the proposed disposition area. Rapid to very rapidly drained areas are located throughout the area
Are there problem vegetation/weeds/invasive species on or near site at time of assessment?
Yes $\square$ No Explain During the vegetation survey undertaken as part of the EIA, nine noxious weeds, and 20 invasive vegetation species were identified within and surrounding the proposed surface disposition boundary. The majority of the noxious and invasive species were observed in areas with existing disturbance (i.e., pipelines, well sites, clearings, pastures, cutblocks, and along roads).

Identification of species, degree of infestation and approximate amount of area infested per species.

|  | Species 1 | Species 2 | Species 3 |
| :--- | :--- | :--- | :--- |
| Trace (rare) |  |  |  |
| Low <br> (occasional) | downy brome, blueweed, <br> dalmatian toadflax |  |  |
| Moderate <br> (scattered plants) | ox-eye daisy, creeping thistle, <br> common toadflax |  |  |
| High <br> (fairly dense) | tall buttercup, common mullein |  |  |

Is there a risk of weed spread to the site if development proceeds?
$\square$ High $\quad \boxtimes$ Moderate $\square$ Low
If any risk, provide details in reclamation and construction sections of supplements.
If high or moderate, show location on the application plan.

## G. Incidental Activities

The applicant is to identify and outline on the application plan any incidental activities required for temporary use.
Note: No additional approval is required for incidental activities that are applied for with the disposition and included in the plan.

If the incidental activity is not approved under the disposition, a separate approval is required. Incidental activities approved in this manner are for temporary use only and are not part of the surface disposition.

1. According to field assessment, will additional incidental clearings be required? $\square$ Yes $\boxtimes$ No If 'Yes', indicate the purpose:
$\square$ CampsiteTemporary WorkspaceOther $\qquad$
2. Are any additional clearings planned in reforested areas?Yes $\boxtimes$ No If 'Yes', explain $\qquad$
The Core Operating Conditions are standard practices that must be applied to all activities.

## H. Core Operating Conditions

## Prior to Entry - Confirmation Number

099 The holder shall contact and advise Regulatory body of its intentions:

- prior to entry upon the lands for a stated purpose,
- prior to any additional construction during the term of this authority,
- at the completion of operations or construction, and
- upon abandonment of this activity.

Upon contact prior to initial entry on the land, the Regulatory body shall issue a confirmation number that shall be maintained on file by the holder and be provided to the Regulatory body on request.
<Location \& Telephone No.> $\qquad$

## Adverse Ground Conditions

105 Any activity on the land during adverse ground conditions must be suspended if the activity is likely cause unacceptable damage to vegetation or soil, as may be determined by the holder or the Regulatory body.

## Sample Plots

108 No entry is allowed within the boundaries of any research or sample plot.

## Reclamation - Interim

127 The holder shall reclaim all disturbed land surfaces within two growing seasons. Interim reclamation, including site and debris clean-up, slope stabilization, recontouring with subsoil, and spreading of topsoil shall be done progressively and concurrently with operations.

## Reclamation - Final

128 Final surface reclamation must meet the requirements for the specific activity in place at the time of abandonment.

## Noxious Weeds

131 The holder shall cut, keep down and destroy all noxious weeds and restricted weeds as per the Public Lands Act.

## Waste Material Disposal

135 The holder shall remove all garbage and waste material from this site to the satisfaction of the Regulatory body, in it s sole discretion.

Watercourse/Water Body - No Material to be Deposited
148 The holder shall not deposit or push debris, soil or other deleterious materials into or through any watercourse or water body or on the ice of any watercourse/water body.

## Erosion Prevention

158 The holder shall take all precautions and safeguards necessary to prevent soil and surface erosion to the satisfaction of the Regulatory body in its sole discretion.

## Natural Drainage - No Interruption

161 The holder shall not create any interruptions to natural drainage, including ephemeral draws that may result in blockage of water flow.

## Sites and Installations 3.0 Completion of Supplement A Environmental Field Report (EFR)

The cover document and the appropriate supplement form must be submitted for each surface disposition application. All blanks must either be filled in or 'N/A' noted where applicable. Failure to fill out the document and form(s) completely will result in the EFR being rejected.New $\triangle$ Revised

Date Submitted: 28/05/2018
MSL Number MSL 160757
dd/mm/yyyy
PIL Number: $\qquad$
Site/Project Name: Grassy Mountain Coal Mine
Legal land description: LSD $\qquad$ Sec $\qquad$ Twp 8/9 Rge $\underline{3 / 4}$ W $\underline{5}$

## A. Site Description

1. Stability concerns: $\boxtimes$ Yes $\square$ No If 'Yes', explain mitigation: In order to mitigate the concern associated with potential instability, Benga has developed mine design criteria based on the results of the geotechnical investigation and geological modelling that has been undertaken for the project.

Questions 2, 3, 4 and 5 of section A apply to MSL only. The "Wellsite Spacing Recommendations" may be used as a guide, search for "Wellsite Spacing Recommendations" on srd.alberta.ca .
2. Well type: $\square$OilSweet GasCoalbed
Single Well pad

Multi-well
( $\mathrm{H}^{2} \mathrm{~S}$ ) Methane pad
$\boxtimes$ Other A coal mine including •

- open pit truck and shovel mining operations area;
- waste rock disposal areas (north and south of the pit area, in addition to in-pit);
- internal haul roads;
- topsoil storage area; and
- water management structures.

3. Well depth: N/Am
4. Flare requirements for drilling:50 m35 m25 m
Flare pitFlare tankFlare stack
5. Number of zones to be completed/produced N/A Inter-well spacing $\mathrm{N} / \mathrm{A} \mathrm{m}$.

## B. Vehicle/Equipment Access

How will the site be accessed? (Check boxes that apply)
By an existing access held under disposition or jurisdiction (specify name, disposition number, and owner):

The mining area MSL will be accessed from a road that parallels the overland conveyor. A majority of this access is through land owned by Benga. There are two small portions of the road that are located on Crown land, and will be included in separate disposition applications for the MSL for the access corridor and the eastern LOC for the rail loop and access.

New application (LOC)New access included in this application.
Note: If access is part of the site and installation application, an access supplement must be submitted.

## C. Contamination Prevention

1. Is the boundary of the site located within 100 m of a watercourse? $\quad$ Yes $\quad \square$ No

If 'Yes', specify distance from edge of lease to top of breaks in meters variable
Explain mitigation strategy if within 100 meters Blairmore Creek and Gold Creek are located to the west and east of the Project, respectively. Although Benga will maintain a 100 m vegetated buffer between mine development and these watercourses, the mine will encroach on tributaries to both Blairmore and Gold creeks. The proposed MSL boundary will encompass the entire mining area that is located on Crown land but will not include the bed and bank of either Blairmore or Gold creek.
The main potential mechanism for transport of deleterious materials from the site will be from surface runoff mobilizing the deleterious materials and transporting them to adjacent watercourses. Benga has included a comprehensive water management system in the mine design to reduce the potential for deleterious material to leave the site. These water management facilities include:

- maintaining a 100 m vegetated buffer between mine development and Blairmore Creek and Gold Creek;
- the development of a series of collection ditches and sedimentation settling ponds (which release to either Gold Creek or Blairmore Creek);
- the development of a series of collection ditches and surge ponds (three ponds which are part of Selenium Management Plan that will not release to Gold Creek or Blairmore Creek); and
- the development of site wide drainage civil works.

In addition, Benga will develop an Environmental Protection Program for the Project based on the Project design, potential environmental risk and outcomes of the environmental assessment and regulatory review process. The goal for the Environmental Protection Program is to first prevent and second to minimize adverse environmental impacts resulting from mine related operations.
2. Will the site be diked during drilling? $\quad \square$ Yes $\quad \boxtimes$ No During production? $\square$ Yes $\boxtimes$ No

If 'No', explain why not. N/A

Will other methods of on-site contamination prevention be required? Explain .

## Applicable to MSL only <br> D. Sump

Type of sump (check appropriate box): $\square$ On-site pit $\square$ Above-ground tank on site

Remote sump location: LSD___ Sec __ Twp__ Rge___ W_

## Applicable to MSL only

## Disposal

Estimate volumes to be disposed of: Solids $\qquad$ m $^{3}$ Liquids $\qquad$ $\mathbf{m}^{3}$
Proposed disposal method: $\square$ Mix/bury/cover $\quad \square$ Land spreading $\quad \square$ Land farming $\quad \square$ Pump-off <br> Disposal on forested public land}
$\boxtimes$ Other N/A Approximate date of disposal $\qquad$
$\square$ Private LandPublic Land
Indicate land farming or land spreading location if off site on public land.
LSD
Sec $\qquad$ Twp $\qquad$ Rge $\qquad$ W $\qquad$

## Applicable to MSL only

## E. Source of Water

1. Water Required: $\boxtimes$ Yes $\quad \square$ No $\quad \square$ Water well on lease
2. Offsite source: $\square$ Offsite water well $\square$ Lake $\square$ Stream $\square$ River

Other (specify type) onsite raw water pond developed as part of project

## Location: LSD 4 Sec $\underline{24}$ Twp $\underline{8}$ Rge 4 W $\underline{5}$ <br> $\qquad$ <br> 3. Access required to water source? $\square$ Yes $\boxtimes$ No If 'Yes' attach a sketch.

## F. Construction Strategy

## 1. Vegetation Removal

Explain: Development of the mine will require clearing existing vegetation from the Project Footprint. The Project Footprint has been developed recognizing Benga's commitment to minimizing the amount of disturbance that is required for Project development.

All merchantable timber will be salvaged as per the Benga's Timber Salvage Plan. The disposition of timber removed from crown land will be made available to the local timber rights holders. The timber from private land will be made available to Aboriginal groups, to local timber rights holders, or disposed by some other process.

Non-merchantable timber and slash materials will be disposed of, incorporated with soil, or will be stored for use during reclamation. The placement of coarse woody debris on reclaimed landscapes will provide value for the establishment of native plant species as well as providing wildlife habitat values such as perching and hiding cover.

## 2. Brush Disposal <br> Explain: See Section F. 1 above.

# 3. Topsoil handling: (Check appropriate boxes) $\square$ No stripping $\square$ Minimum surface disturbance <br> $\square$ Stripping $\square$ Single Lift $\square$ Two Lift $\boxtimes$ Other (Explain) See below 

Additional details: The soil salvage practices planned by Benga will provide a suitable quality reclamation material with sufficient volume for the soil replacement requirements of the reclamation plan while providing a suitable seed bed for the revegetation program. Reclamation material salvage operations will ensure the salvage of all available upland surface soil. Terrain features indicate that 1,102 ha of land has salvageable upland surface soil and salvageable organic soil present. Some of the project area has lands without soil material present or the topography is too steep to allow soil to be salvaged safely. Soil salvage guidance by experienced professionals and pre-disturbance soil survey information will result in minimal soil losses and minimize impacts to soil quality.

## 4. Will padding of the wellsite be required? $\quad \square$ Yes $\boxtimes$ No, <br> If 'Yes' Explain: N/A

## G. Reclamation Strategy

Revegetation strategy: (Check appropriate boxes) $\square$ Natural Recovery $\square$ Native Seed
$\square$ Non-native Seed $\boxtimes$ Other Benga has identified six ecological units occurring over the minesite, based on ecosite phases present in the Montane and Subalpine Natural Subregions. End land use and revegetation goals were then chosen for each area.

Revegetation techniques and equipment typically include:

- broadcast seeding and fertilizing using a range of equipment from hand-held seeders to aerial means;
- the direct placement of salvaged reclamation material on recontoured areas, where possible;
- collection of local tree/shrub seed and cuttings;
- contracted greenhouse production of quality tree and shrub seedlings, produced from seed or cuttings which are collected from native (genetically local) plants;
- individual tree and shrub fertilization at the time of planting; and
- rough soil surface and incorporating LFH and woody debris during the final stages of spoil dump construction to create microsites.

The advantages of the direct placement of reclamation material are well documented including utilizing the plant propagules contained in the soil to aid the establishment of native vegetation. To enhance ecosite development, Benga will identify opportunities for direct placement of salvaged reclamation material. The scheduling of direct placement opportunities is limited to having recontoured lands available in proximity to reclamation material salvage areas.

One of the goals of the revegetation program is to reduce erosion and sedimentation in the watershed. Typically, in moderate to high erosion risk areas, a grass-legume cover is established immediately after soil placement to control erosion. One to four years after the grass-legume mix is seeded, woody species establishment commences with the planting of tree and shrub seedlings. Fertilizer is applied at the time of seeding to increase vegetative growth.

In low erosion risk areas, seed application (grass-legume) will be reduced or eliminated and the planting of shrub and trees and transplantation of plant and plant materials will be done concurrently. Benga will reduce fertilizer application rates and usage.

Interim: Lands will be progressively reclaimed and adaptive management techniques will be incorporated when selecting the appropriate revegetation techniques.

Production/Operation: As mining operations on certain areas of the mine are finalized, the mining areas will be graded and contoured in preparation for reclamation material placement as part of final reclamation. Reclamation material will be sourced from active mining areas if direct placement opportunities exist or will be hauled from stockpile locations on the mine. Replaced reclamation material will be revegetated through a combination of seeding, planting and natural regeneration, depending on the type and extent of the reclamation area, to ensure soils are stabilized and that the species selection promotes the intended final ecological end point.

## Applicable to MSL only

See Appendix III - Lease Description and Wellsite Sizing Information

Note: Complete and attach the lease description and wellsite sizing template (in the Appendix) if a nonstandard wellsite is required as per the lease description and wellsite sizing document (see instructions).

## Operating Condition

Contamination Prevention
136 In addition to complying with Federal, provincial and local laws and regulations respecting the environment, including release of substances, the holder shall, to the regulatory body's satisfaction, take necessary precautions to prevent contamination of land, water bodies and the air with particulate and gaseous matter, which, in the opinion of the regulatory body in its sole discretion, is or may be harmful.



# RESERVATION SUMMARY <br> MSL 160757 

| Reservation/Activity Number | Action required/ Identify conflicts/contact name or comments |
| :---: | :---: |
| CNT 090027 | Benga has prepared a fire control plan in accordance with the FireSmart Wildfire Assessment System /FireSmart Community Zone /Forestry and Emergency Response Division of Environment and Sustainable Resource Development - Calgary Office |
| CNT 860041 | Reclaim the area to equivalent capability/Potential Timber Disposal /Lands Division of Department of Sustainable Resource Development - Blairmore Office - Land Use Area |
| CNT 980012 | consultation with local trail users such as the Crow Snow Riders Snowmobile Club /Snowmobile Trails /Lands Division of Department of Sustainable Resource Development - Blairmore Office - Land Use Area |
| PNT 090084 | /may fall within an area of foothills fescue grassland /Lands Division of Department of Sustainable Resource Development - Pincher Creek Office - Rangeland District |
| PNT 090087 | /may fall within an area of foothills fescue grassland /Lands Division of Department of Sustainable Resource Development - Pincher Creek Office - Rangeland District |
| PNT 880617 | Mine design criteria based on the results of the geotechnical investigation and geological modelling and reclamation measures to return the land to equivalent capability /Steep rolling topography. No agricultural dispositions are permitted with the exception of unimproved grazing. /Disposition held by the Lands Division of Department of Sustainable Resource Development - Pincher Creek Office - Rangeland District |
| PNT 880618 | Mine design criteria based on the results of the geotechnical investigation and geological modelling and reclamation measures to return the land to equivalent capability /Steep rolling topography. No agricultural dispositions are permitted with the exception of unimproved grazing. /Disposition held by the Lands Division of Department of Sustainable Resource Development - Pincher Creek Office - Rangeland District |
| PNT 880619 | Reclamation measures to return the land to equivalent capability /Steep rolling topography. No agricultural dispositions are permitted with the exception of unimproved grazing. /Disposition held by the Lands Division of Department of Sustainable Resource Development - Pincher Creek Office - Rangeland District |
| PNT 930299 | Consultation has been undertaken with grazing lease holders, and reclamation measures to return the land to equivalent capability / Grazing allotment area, no agricultural dispositions, grazing permits only. Gap Range Allotment. /Disposition held by the Department of Sustainable Resource Development - Rocky Mountain Forest Reserve South Office - Rangeland District |
| PNT 940130 | Consultation has been undertaken with grazing lease holders, and reclamation measures to return the land to equivalent capability /Grazing allotment area, no agricultural dispositions, grazing permits only. Blairmore Gold Range Allotment. /Disposition held by the Department of Sustainable Resource Development - Rocky Mountain Forest Reserve South Office - Rangeland District |
| PNT 960092 | Mine design criteria based on the results of the geotechnical investigation and geological modelling and reclamation measures to return the land to equivalent capability /Steep rolling topography. No agricultural dispositions are permitted with the exception of "Grazing Haying "/Disposition held by the Department of Sustainable Resource Development - Pincher Creek Office - Rangeland District |
| PNT 900430 (Not included in LSAS Report but shown on AEP's Disposition Spatial Processing Tool) | Construction and Reclamation to return the land to equivalent capability. Utilization of waste storage and spill response procedures that will reduce potential for contamination to enter the adjacent drainage. /Waste Disposal/Reclamation Site /Disposition held by the Department of Environment and Water |

## Species at Risk Summary

# SPECIES AT RISK SUMMARY <br> MSL 160757 

## WILDLIFE SPECIES

The wildlife species at risk that were either recorded during field surveys undertaken for the Environmental Impact Assessment or reported in the Fish and Wildlife Management Information System within the boundary of the proposed mining area MSL, and for which there is moderately to highly suitable habitat in the proposed MSL boundary, are outlined in Table 1. Incidental flyovers of birds (e.g., golden eagles) are not included, unless accompanied by a sign of habitat usage (e.g., breeding calls, confirmed nest).

| Table 1 | Species at Risk that may occur in the proposed mining area MSL boundary. |  |  |
| :---: | :---: | :---: | :---: |
| Common Name | Provincial Status ${ }^{1}$ | Federal Status ${ }^{2}$ | Key Habitat Requirements |
| Amphibians and Reptiles |  |  |  |
| Columbia spotted frog | Sensitive | Not At Risk | Permanent water bodies in mixed coniferous/ subalpine forests; $995->2,150 \mathrm{~m}$ in elevation. |
| Long-toed <br> Salamander | Sensitive | Not At Risk | Under rocks, rotting logs, debris; near ponds, lakes, streams. |
| Western toad | Sensitive | Special Concern | Ponds, streams, rivers, lakes; overwinter in sandy upland forest. |
| Birds |  |  |  |
| Bald eagle | Sensitive | Not At Risk | Forages in lakes and rivers with treed shorelines. Nests in mature trees along the edges of forests. |
| Barred owl | Sensitive | - | Mature and old mixedwood forests, with large trees containing large cavities for nesting. |
| Common nighthawk | Sensitive | Threatened SARA Schedule 1 | Cutblocks, forest clearings, prairies, rock outcrops. Nests near logs, boulders, and shrubs. |
| Olive-sided flycatcher | May Be At Risk | Threatened SARA Schedule 1 | Semi-open coniferous/mixedwood forests along edges/openings, near water with tall trees/snags. |
| Sora | Sensitive | - | Shallow and moderately deep water (marshes, ponds) with emergent vegetation. |
| Western wood pewee | Sensitive | - | Mature deciduous and mixed forests, forest edges, and riparian zones. Absent from dense forest. |
| Mammals |  |  |  |
| American badger | Sensitive | - | Open spaces, grasslands, prairies, treeless slopes, riparian meadows. |
| Little brown myotis | Secure | Endangered SARA Schedule 1 | Roosts under loose bark on trees, tree cavities, buildings, bridges, caves. Forages near water. |


| Table 1 | Species at Risk that may occur in the proposed mining area MSL <br> boundary. |  |  |
| :---: | :---: | :---: | :---: |
| Common <br> Name | Provincial <br> Status $^{1}$ | Federal Status ${ }^{2}$ | Key Habitat Requirements |
| Hoary bat | Sensitive | - | Open grassy areas in coniferous and deciduous forests. <br> Forages near farmlands. Roosts in trees. |
| Bobcat | Sensitive | - | Coniferous/deciduous forests, brushy areas in coulees. Dens <br> in rocky crevices, hollow logs. |
| Canada lynx | Sensitive | Not At Risk | Coniferous forest with downed woody debris and dense <br> understory. |
| Wolverine | May Be At <br> Risk | Special Concern | Large areas of remote wilderness in the foothills and <br> mountains. Avoids human development. |
| Grizzly bear | Threatened | Special Concern | Open slopes, alpine meadows, cutblocks, burns, riparian <br> areas, mature forest, and disturbed sites. |

1 Alberta Wild Species General Status Listing (AEP 2010c)
2 COSEWIC/SARA status. Species with SARA status are indicated with SARA Schedule 1.

## WILDLIFE MITIGATION

Benga will be implementing a number of best management practices, Project design features, and other wildlife mitigation measures to avoid or minimize effects on wildlife. These best management practices, design features, and mitigation measures are presented below in relation to each of the expected Project-wildlife interactions that were assessed.

To prevent or minimize Project effects on federally-listed (SARA) species at risk, Benga will work in consultation with Environment Canada to develop species-specific mitigation and monitoring plans for species at risk known to occur in the MSL area. These species include olive-sided flycatcher, common nighthawk, short-eared owl, and little brown myotis. Critical habitat has not yet been identified for these species by Environment Canada; should this happen, mitigation plans will be updated to include critical habitat.

Project development has the potential to interact with wildlife in different ways. The Project may alter wildlife habitat availability, habitat connectivity/movement, and wildlife mortality risk and health, all of which may affect the abundance of wildlife in the area. Benga will implement the mitigation measures outlined below to minimize potential impact to wildlife.

## HABITAT AVAILABILITY

Many of the Project effects associated with wildlife habitat loss will be minimized through implementation of the Project's reclamation plan. The summary of the reclamation plan mitigation recommendations for wildlife and wildlife habitat reclamation include:

- minimize the overall disturbance footprint through the mine planning process to avoid critical breeding habitats, nesting and denning sites, and movement corridors to the extent possible;
- preserve remnant forest patches within the development areas where feasible to provide habitat, habitat connectivity and hide cover for wildlife species;
- remnant patches should protect known essential raptor habitat features by incorporating these habitat features (i.e., mature balsam poplar and aspen) where possible;
- maximize the direct placement of salvaged soil to enhance native plant development;
- retain slash and large woody debris in the salvaged soil to provide microsites for native plant and hide cover for wildlife;
- establish a variety of vegetation species and communities suitable for wildlife, and encourage structural complexity within the forests;
- encourage understory complexity in reclaimed forests by planting native shrubs such as alder and willow;
- ensure that core security areas are provided for wildlife;
- provide water management program that ensures the surface water quality is maintained; and
- limit sight lines by maintaining mature forest stands as buffers between roads and reclamation areas.

To support the reclamation plan mitigation measures, the following will be implemented to mitigate potential direct and indirect Project effects on wildlife habitat availability:

- incorporate the existing legacy mining disturbances into the development and reclamation plans for the project, and other proposed land use activities to the best extent possible so that habitat loss, habitat fragmentation, linear disturbance features, and cumulative habitat loss are minimized;
- pre-disturbance surveys (wildlife sweeps) will be conducted in the development area prior to any construction activities during Project development to determine the occurrence of any important wildlife habitat features such as migratory bird nests, mineral licks, active dens, bat habitat and hibernacula, active raptor nest sites, and essential raptor habitat features (i.e., mature balsam poplar, platform/stick nests) that could indicate the presence of species at risk;
- protect all important wildlife habitat features in areas of suitable wildlife habitat (on the edge of the Project footprint boundary) appropriate setback distances (or buffer zones) will be considered;
- clearing and equipment use/storage/cleaning in undisturbed areas within and adjacent to the Project footprint will be avoided;
- vegetation adjacent to high-activity linear corridors (e.g., access roads, coal conveyor) will be retained to reduce the extent of noise and visual sensory disturbances to the extent possible;
- the overland coal conveyor system was designed in such a manner to prevent any deposition of coal product along the route from the CHPP to the rail load-out area. This includes a cover for the length of the conveyor to reduce dust, and motor specifications to reduce industrial noise levels;
- where appropriate, vegetated buffer zones (100 m or minimum of 30 m ; pending topography constraints) will be maintained between Project infrastructure and wetlands, creeks, and streams to the best extent possible;
- as required by the Weed Control Act and Regulations, all identified noxious and invasive weed species populations will be controlled prior to any site disturbance and mine operation to prevent the further spread of weeds. Noxious weed management will occur in compliance with R\&R/03-4 Weeds on Industrial Development Sites;
- as the presence of artificial lighting can potentially affect bird and bat use of nearby habitats, Benga has developed a visual impact mitigation plan that reduces stray and non-essential artificial lighting to minimize wildlife effects and that will comply with OH\&S safety requirements;
- to mitigate the potential effects of sensory disturbance (acoustic and visual) on effective habitat availability in the southeast portion of the Gold Creek valley, Benga will install and maintain a $15-\mathrm{m}$ tall earth berm along the eastern edge of the south disposal area. The earth berm will be constructed/maintained during the day-time when required and will grow in elevation as the height of the disposal area increases; and
- sensory disturbance from the active mine site will be further mitigated through the use of mufflers on all internal combustion engines, utilizing mine pit topography to shield noise generated from haul trucks, and conducting blasting during daylight hours.


## HABITAT CONNECTIVITY AND MOVEMENT

The following general wildlife mitigation measures will be implemented to minimize potential disruption to daily and seasonal wildlife movements:

- a minimum of six wildlife crossings (underpasses and overpasses) will be incorporated into the design of the coal conveyor;
- surface water management ponds and ditches located in undisturbed areas of the Project footprint will be designed to allow wildlife to move around or cross safely;
- road plowing and grading will be conducted in a manner that does not restrict wildlife from crossing access roads or accessing wildlife crossings; and
- measures to control dust and other air emissions (e.g., watering of roads and use of dust suppressants, minimizing engine idling, etc.) within the Project footprint will be implemented to minimize effects on adjacent wildlife habitats.

Project-specific mitigations targeted to carnivore species have been incorporated into the reclamation planning. Many of these will also support habitat connectivity for migratory birds, raptors, and species at risk, and include:

- minimize the overall disturbance footprint through the mine planning process;
- preserve remnant forest patches in the development areas to provide essential habitat, habitat connectivity, and hide cover for wildlife species;
- retain slash and large woody debris in the replaced soil landscape;
- plant native shrubs early in the reclamation process to initiate hiding cover;
- establish mixed wood forest stands and high density coniferous tree stands;
- provide understory complexity in the reclaimed forests by planting native shrubs such as alder and willow to provide security cover for the carnivores and their prey;
- maximize the amount of ungulate habitat;
- prior to final reclamation, disrupt linear disturbances and sight lines by mounding surface soils, piling brush; and
- limit sight lines by maintaining mature forest stands or by planting high density coniferous stands to act as buffers between roads, project disturbance boundaries and the reclaimed mine areas.

Additional mitigations that are specifically targeted to grizzly bears and grizzly bear habitat will also support other carnivores and migratory birds, and include:

- maintain a 100 m undisturbed forested buffer around Blairmore Creek and other riparian corridors;
- leave patches of residual forest within and adjacent to the mine footprint; and
- commence reclamation early on in mine operations by seeding reclaimable areas with plant species favourable to grizzly bear forage, and by planting shrub and tree species that provide suitable cover (e.g., willow, alder, coniferous trees).

For migratory birds, additional relevant mitigations include:

- retain slash and large woody debris in the salvaged soil to provide microsites for native plant and hide cover and perches for wildlife; and
- ensure reclaimed areas promote the re-establishment of woody species and are on a trajectory for reforestation.

For raptors, additional relevant mitigations include:

- retain residual patches of essential habitat and habitat features within and adjacent to the mine footprint (i.e., mature poplar trees, tall conifer trees) to provide perches, nest sites, and hide cover;
- minimize loss of mature and old-growth forest habitat and avoid complex, multi-story mixedwood forest where possible; and
- maintain a 100 m buffer of undisturbed forest around Blairmore Creek, Gold Creek and other riparian corridors.

Targeted mitigation measures involving amphibians and amphibian habitat include:

- conduct monitoring to identify other habitable ponds and to identify habitat requirements and constraints;
- construct trial breeding ponds;
- reclaim upland habitat adjacent to reconstructed breeding ponds; and
- avoid habitat destruction and alteration outside of the defined Project footprint to the best extent possible.

Mitigation measures specific to bat species include:

- avoid direct and indirect impacts to known, primary maternity roosts should any such roosts be located/identified;
- prior to removal or alteration of historic mine shafts and infrastructure, conduct roost and hibernacula surveys within them, and consult with AEP should hibernacula or roosts be located; and
- where possible, tree clearing will be planned to avoid the May to August bat summer season.


## MORTALITY RISK

Wildlife mortality risk may increase as a result of increased traffic, wildlife encountering equipment, or elements of the Project footprint, and wildlife being attracted to Project facilities or humans. The Grassy Mountain area currently has a considerable network of trails and roads that are heavily used. Plans are already being implemented to reduce this level of access and with the approval of this Project, the levels will be reduced considerably more. Mitigation measures that will be implemented to reduce wildlife mortality risk include:

- all access to the Mine Permit will be controlled, no uncontrolled access will be permitted;
- timing vegetation site clearing activities to occur outside the April 15 to August 31 period to avoid disrupting nesting migratory and resident songbirds and raptors. In the event that vegetation clearing must occur within the restricted activity period, predisturbance nesting surveys will be conducted by experienced avian biologists according to established sensitive species inventory guidelines;
- confirm the presence/absence of bats in high quality habitats located within the Project footprint prior to the initiation of any clearing activities and develop a mitigation plan if bats are found;
- conducting pre-disturbance denning (bears, marten, etc.) and roosting (bats) surveys prior to vegetation clearing and other high-disturbance activities. Consult with AEP as needed to develop appropriate mitigation and management strategies;
- conducting pre-disturbance surveys (acoustic surveys and visual searches) to identify wetlands and watercourses used by breeding Columbia spotted frogs and western toads that feed into the protection plans;
- Benga commits to supporting active bear management plans associated with the Project. If a site specific plan is required, it will be developed in consultation with AEP personnel as part of the Wildlife Mitigation and Monitoring Plan. The plan is expected to be a comprehensive document that outlines operational strategies and best practices for addressing concerns related to not only bear-human conflicts but potential risks to ungulates and other wildlife resulting from attraction of bears to the area;
- developing a Beneficial Management Plan guide to minimize potential Projectspecific impacts on migratory birds and their habitat by identifying more site-specific mitigation and monitoring measures following Project approval and in consultation with federal and provincial regulators;
- a detailed Waste Management Plan will be developed and implemented prior to construction and operational activities to minimize the attraction of wildlife. Benga will follow the Best Management Practices for camps, fences, and barriers as described in Bear Smart: Best Management Practices for Camps, and ensure all waste is stored in wildlife-proof containers and disposed of properly;
- implementing an Emergency Spill Response Plan to limit the effect of accidental spills. Spills will be minimized by restricting fuel storage and filling to designated areas that are at least 100 m from wetlands and watercourses as well as Project drainage ditches, sediment control ponds, and pit lakes;
- storing all hazardous materials, including those used for blasting, in secure areas that are inaccessible to wildlife (e.g., buildings, storage areas surrounded by wildlife-proof fencing). In addition, proper handling and storage of industrial materials and debris within the Project footprint will be maintained to minimize potential risks to wildlife;
- developing procedures to clear blasting areas of large mammals or birds prior to blasting;
- designing water management ponds and drainage ditches, and pit lakes to minimize potential entrapment of wildlife;
- developing a strategy to minimize changes in water quality upstream of the mine in conjunction with a water-quality monitoring program;
- enforcing speed limits ( $\leq 50 \mathrm{~km} / \mathrm{hr}$ ) along the main access road and utility corridors and placing signs at identified wildlife crossings to increase driver diligence to minimize wildlife-vehicle collisions. Vehicles will yield to all wildlife crossing the main access road; and
- bird collisions with buildings will be mitigated by placing visual markers on windows, and collisions with the proposed power line will be mitigated by installing large 'floats' or other markers.


## PLANT SPECIES

Twenty-two vegetation species identified within the boundaries of the proposed surface dispositions at the time of the field assessment were on the Alberta Rare Plant Tracking and Watch Lists (ACIMS 2014) (Table 2). Two species identified are federally listed by COSEWIC and SARA: Pinus albicaulis (whitebark pine) and Pinus flexilis (limber pine). Whitebark pine is listed as Endangered in Alberta and British Columbia under SARA Schedule 1. Limber pine was designated as Endangered throughout its range in Alberta and British Columbia by COSEWIC in November 2014.

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Vascular plants |  |  |  |  |  |  |
| Angelica dawsonii | Yellow angelica | G4 | S3 | W | - | Sensitive |
| Carex petasata | Pasture sedge | G5 | S1S2 | Y | - | May be at risk |
| Eriogonum cernuum | Nodding umbrella-plant | G5 | S2 | Y | - | May be at risk |
| Eucephalus engelmannii | Elegant aster | G4G5 | S3S4 | W | - | May be at risk |
| Phacelia hastata | Silver-leaved scorpionweed | G5 | S3 | W | - | Sensitive |
| Pinus albicaulis | Whitebark pine | G3G4 | S2 | Y | Endangered | At risk (Endangered) |
| Pinus flexilis | Limber pine | G4 | S2 | Y | Endangered | At risk (Endangered) |
| Piperia unalascensis | Alaska bog orchid | G5 | S2? | Y | - | Sensitive |
| Mosses and liverworts |  |  |  |  |  |  |
| Conocephalum salebrosum | Liverwort | G5 | S2 | Y | - | May be at risk |
| Dicranum tauricum | Broken-leaf moss | G4 | S1S2 | Y | - | Sensitive |
| Lophozia ascendens | Liverwort | G4 | S1 | Y | - | May be at risk |
| Lophozia longidens | Liverwort | G5 | S1 | Y | - | May be at risk |
| Lophozia wenzelii | Liverwort | G4G5 | S1 | Y | - | May be at risk |
| Pellia neesiana | Liverwort | G5 | S2 | Y | - | - |
| Racomitrium aciculare | Moss | G5 | S1 | Y | - | Sensitive |
| Schistidium tenerum | Thread bloom moss | G5? | S2 | Y | - | Sensitive |
| Lichens |  |  |  |  |  |  |
| Cladonia umbricola | Shaded cladonia | G3G5 | S1 | Y | - | May be at risk |
| Nodobryoria abbreviata | Tufted foxtail lichen | G4? | S1 | Y | - | May be at risk |
| Peltigera cinnamomea | Cinnamon dog pelt lichen | GNR | S2 | Y | - | May be at risk |

## Table 2 Rare Plants Occurrences within the Proposed Mine Area

| Scientific Name | Common Name | Rank or Conservation Status |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | GRANK ${ }^{1}$ | SRANK ${ }^{1}$ | Tracked ${ }^{2}$ | $\begin{gathered} \text { COSEWIC / } \\ \text { SARA }^{3} \end{gathered}$ | Provincial ${ }^{4}$ |
| Umbilicaria americana | American rock tripe lichen | G5? | S2S3 | Y | - | May be at risk |
| Vulpicida canadensis | Brown-eyed sunshine lichen | G3G5 | S2 | Y | - | Sensitive |
| Xylographa parallela | Black woodscript lichen | G5 | S2S4 | Y | - | May be at risk |

${ }^{1}$ GRANK refers to global conservation rank and SRANK refers to subnational conservation rank).
${ }^{2} \mathrm{Y}$ - species is tracked, W - species is watched (ACIMS 2014).
${ }^{3}$ COSEWIC (2014), SARA (2014).
${ }^{4}$ General Status of Alberta Wild Species database (Government of Alberta 2010). (Endangered) refers to Endangered under Alberta’s Wildlife Act (Government of Alberta 2014).

## MITIGATION MEASURES

Rare plant species rankings in Alberta are largely determined by the number of observations of the species that are reported in the province. Based on this system, low profile, difficult to locate, and hard to identify species are more likely to be listed as rare. It is difficult to determine if some species are rare due to location at the edge of their natural range. Taxonomic uncertainty and misidentification may also result in the rare status of certain species. Avoidance of rare plant species provincially ranked between S1 and S3 is the most preferred mitigation option. Where avoidance is not an option, site-specific and species-specific mitigation planning may be possible. Based on a review of the species descriptions and habitat requirements of the rare plant species located in the Project Footprint, Benga has developed a rare plant species mitigation program.

Mitigation measures will include, but are not limited to, the following:

- a re-vegetation program which aims to establish diverse native vegetation communities (closed conifer forests, grassland open forests, mixed forests, and treed wetlands) with equivalent pre-disturbance capability;
- a C\&R Plan which aims to establish communities that are locally and regionally limited in distribution where conditions allow;
- preservation of adjacent vegetation communities by minimizing the area required for construction and operation of the Project;
- provision of appropriate soil substrate where re-vegetated areas can establish;
- seeding of stockpiled reclamation material with suitable vegetation species mix to ensure long term stability of the soil piles, which reduces erosion and the potential for weed establishment;
- use of coarse woody debris and direct soil placement techniques to augment mycorrhizal and microbial inoculums;
- use direct placement of soil for provision of propagules to enhance opportunity for re-establishment of native species composition and enhanced species richness;
- planting of multiple layers of native vegetation (e.g., trees, shrubs and graminoids) to provide initial structure for wildlife habitat and to enhance biodiversity;
- based on the described selection criteria implement the seed collection, propagation and/or relocation plan for rare species; and
- establish disease-resistant whitebark pine.

In addition to the strategies noted above, the preferred primary mitigation strategy for native foothills rough fescue grasslands is avoidance. Until disturbance is unavoidable, the following mitigation strategies will be implemented to preserve the resource:

- construct, or undertake assessments and surveys, during the dormant period for rough fescue (August to March); and
- avoid soil disturbance by:
- minimizing topsoil stripping and grading;
- utilizing existing trails; and
- potential implementation of seed collection and propagation plan and/or direct placement of sod.

Where disturbance is unavoidable, where feasible, mitigation strategies will include direct placement of reclamation material (including potential transplantation of rare plants or of foothills rough fescue sod), collection of native seed from areas with foothills rough fescue and rare plants that will be disturbed, seeding of wild harvest seed, as part of a certified, weed-free native seed mixes in re-vegetation plan, and the potential seeding and growing of plugs grown in a green house to be transplanted onto the site.

To preserve genetic diversity, clusters of whitebark pine will be investigated for suitability for cone/seed collection prior to disturbance and seed collection would include selection of trees showing evidence of white pine blister rust resistance. Conditions and strategies for establishing whitebark pine during reclamation include:

- identification of high light, low competition sites;
- planting in pure stands or patches to avoid competition from other trees;
- avoiding planting in swales and frost pockets;
- creation of microsites for seedling establishment (rocks, stumps or other coarse woody debris);
- use of recommended spacing to avoid interspecies competition; and
- planting seedlings in the fall to avoid hot dry summer conditions.

Given that various wetland classes are rare in the Project Footprint and in the region, added mitigation measures for wetland impacts should include the following:

- use of best practices to maintain the hydrologic regime of mineral soil wetlands;
- creation of transition areas between re-vegetated ELCs as outlined in the reclamation plan to the treed swamps, where it is possible and/or appropriate to do so; and
- placement of culverts within wetlands that will be divided by roads to ensure that water flow between wetlands will not be affected.

Wetland monitoring will include but not be limited to the following:

- monitoring and maintenance of drainage control structures should be conducted regularly to ensure water flow and flow patterns are maintained in wetlands adjacent to the Project Footprint;
- monitoring road removal at Project closure which may have had an effect on adjacent wetlands to ensure restoration of the hydrologic regime;
- monitoring of reclaimed wetlands should continue for a minimum of ten years to ensure the composition and structure, and key wetland functions are consistent with those in wetlands in the LSA prior to the Project disturbance; and
- monitoring of reclaimed wetlands should include the use of sub-emergent vegetation species as indicators of wetland health and integrity in the monitoring program.

Vegetation species that have current or historical uses and importance to First Nations groups are considered Traditional Ecological Knowledge (TEK) resources. Supplementary mitigation measures for TEK vegetation impacts include the following:

- consult with and involve First Nations Peoples in designing mitigation measures for sustainable management of TEK vegetation;
- implement a re-vegetation program which aims at the re-establishment of vegetation communities, such as those previously mentioned (closed conifer forests, mature mixed forests, native upland herbaceous grasslands and treed swamps) that are common to the pre-disturbed landscape and that will support TEK vegetation; and,
- where practicable utilize locally collected seed to preserve the legacy of species and of place.


## Public Land Standing Report

| Req:0000666556 <br> Report Date: $2016 / 09 / 15$ <br>  Time: 10:36:01 |
| :--- |
| Selected Sections |
| Geo-Administrative Area: |
| Requested Lands: |
| Title Information: |
| Activity Details: |
| Subdivisions: |

## Selected Activities

| Surface Dispositions | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of <br> Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| :--- | :---: | :--- | :--- |
| Geophysical | NA | Types: <br> Status: <br> Types: | All <br> All |
| Reservations | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of <br> Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| Encumbrances | Y | Types: | All |
| Land Postings |  | Status: <br> Types: | All <br> All |
|  |  | Status: | Number Assigned, Open, Closed |
| Types: | All |  |  |

## Land Keys

W5-03-008-31-NE
W5-03-008-31-NW
W5-03-009-06-NW

```
W5-03-009-06-SE
W5-03-009-06-SW
W5-04-008-25-NE
W5-04-008-26-NE
W5-04-008-26-SE
W5-04-008-35-NE
W5-04-008-35-NW
W5-04-008-35-SE
W5-04-008-36-NE
W5-04-008-36-SE
W5-04-009-01
W5-04-009-02-NE
W5-04-009-02-SE
W5-04-009-11-SE
W5-04-009-12-SW
```

Report Date: 2016/09/15 Time: 10:36:01

| Requested Land |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Requested Land W5-03-008-31-NW | OwnershipStatus | $\begin{gathered} \text { Administered } \\ \text { By } \end{gathered}$ | Titled Status | Survey Status | Area in Hectares |  | Area in Acres |  | Water |
|  |  |  |  |  | Land | Title | Land | Title |  |
|  | Crown | FLW | Titled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-03-008-31-NE | Crown | FLW | Untitled | Surveyed | 64.345 | 0.000 | 159.00 | 0.00 | No Water Coverage |
| W5-03-009-06-SE | Crown | FLW | Untitled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-03-009-06-SW | Crown | FLW | Untitled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-03-009-06-NW | Crown | FLW | Untitled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-008-25-NE | Mixed | FLW-FRH | Mixed | Surveyed | 0.000 | 32.415 | 0.00 | 80.10 | No Water Coverage |
| Remarks: FRHOLD 80.10 LS 9\&16 |  |  |  |  |  |  |  |  |  |
| ENR 79.90 LS 10\&15 |  |  |  |  |  |  |  |  |  |
| W5-04-008-26-SE | Crown | FLW | Titled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-008-26-NE | Crown | FLW | Untitled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-008-35-SE | Crown | FLW | Untitled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-008-35-NW | Crown | FLW | Untitled | Surveyed | 66.368 | 0.000 | 164.00 | 0.00 | No Water Coverage |
| W5-04-008-35-NE | Crown | FLW | Untitled | Surveyed | 65.559 | 0.000 | 162.00 | 0.00 | No Water Coverage |
| W5-04-008-36-SE | Mixed | FLW-FRH | Mixed | Surveyed | 0.000 | 32.415 | 0.00 | 80.10 | No Water Coverage |
| Remarks: FRH <br> ENR 79.10 LS $1 \& 8$ |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| W5-04-008-36-NE | Mixed | FLW-FRH | Mixed | Surveyed | 0.000 | 32.375 | 0.00 | 80.00 | No Water Coverage |
| Remarks: FRHOLD 80.00 LS 9\&16 |  |  |  |  |  |  |  |  |  |
| ENR 80.00 LS 10\&15 |  |  |  |  |  |  |  |  |  |
| W5-04-009-01 | Crown | FLW | Untitled | Partly Surveyed | 259.000 | 0.000 | 640.00 | 0.00 | No Water Coverage |
| W5-04-009-02-SE | Crown | FLW | Untitled | Surveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-009-02-NE | Crown | FLW | Untitled | Unsurveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-009-11-SE | Crown | FLW | Titled | Unsurveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| W5-04-009-12-SW | Crown | FLW | Untitled | Unsurveyed | 64.750 | 0.000 | 160.00 | 0.00 | No Water Coverage |
| TOTAL |  |  |  |  | 1,167.522 | 97.205 | 2,885.01 | 240.20 |  |

## Geo Administrative Areas

SOUTH REGION
Code: AER-S
REGULATOR

$$
\begin{aligned}
& \text { W5-03-008 } \\
& \text { W5-03-009 }
\end{aligned}
$$

| ALBERTA ENERGY REGULATOR | SOUTH REGION |  | Code: AER-S |
| :---: | :---: | :---: | :---: |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| COAL DEVELOPMENT REGION | SETTLED |  | Code: CDR-1 |
| W5-03-008-31 |  |  |  |
| W5-04-008-25 |  |  |  |
| W5-04-008-26 |  |  |  |
| W5-04-008-36 |  |  |  |
| COAL DEVELOPMENT REGION | EASTERN SLOPES |  | Code: CDR-3 |
| W5-03-009-06 |  |  |  |
| W5-04-008-35 |  |  |  |
| W5-04-009 |  |  |  |
| ENVIRONMENT CORPORATE REGION | SOUTHERN |  | Code: ENV-1 |
| W5-03-008 |  |  |  |
| W5-03-009 |  |  |  |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| ENVIRONMENT CONS. \& RECL. DISTRICT | NO. 20 |  | Code: ERD-020 |
| W5-03-008 |  |  |  |
| W5-03-009 |  |  |  |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| EASTERN SLOPE ZONE |  |  | Code: ESZ |
| W5-03-008 |  |  |  |
| W5-03-009 |  |  |  |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| FOREST MANAGEMENT UNIT | SOUTHWEST | C5 SOUTHERN ROCKIES | Code: FMU-C-05 |
| W5-03-009-06 |  |  |  |
| W5-04-008-35 |  |  |  |
| W5-04-009 |  |  |  |
| FOREST MANAGEMENT UNIT | SOUTHWEST | CO2 SOUTHERN ROCKIES | Code: FMU-C-52 |


| Req: 0000666556 |  | Public Land Standing |  |
| :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 Time: 10:36:01 |  |  |  |
| FOREST MANAGEMENT UNIT | SOUTHWEST | CO2 SOUTHERN ROCKIES | Code: FMU-C-52 |
| W5-04-008-25 |  |  |  |
| W5-04-008-26 |  |  |  |
| W5-04-008-36 |  |  |  |
| FOREST RESERVE | ROCKY MOUNTAINS |  | Code: FR-001 |
| W5-03-009-06 |  |  |  |
| W5-04-008-35 |  |  |  |
| W5-04-009 |  |  |  |
| FISH \& WILDLIFE ADMIN REGION | SOUTHERN REGION | BLAIRMORE | Code: FWA-1-02 |
| W5-03-008 |  |  |  |
| W5-03-009 |  |  |  |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| FISH AND WILDLIFE DISTRICT | SOUTHERN REGION | BLAIRMORE | Code: FWD-1-09 |
| W5-03-008 |  |  |  |
| W5-03-009 |  |  |  |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| GENERAL LANDS | GREEN |  | Code: GLC-G |
| CLASSIFICATION |  |  |  |
| W5-03-009-06 |  |  |  |
| W5-04-008-35 |  |  |  |
| W5-04-009 |  |  |  |
| GENERAL LANDS | WHITE |  | Code: GLC-W |
| CLASSIFICATION |  |  |  |
| W5-03-008-31 |  |  |  |
| W5-04-008-25 |  |  |  |
| W5-04-008-26 |  |  |  |
| W5-04-008-36 |  |  |  |
| GRAZING ZONE | A2 |  | Code: GRZ-A2 |
| W5-03-008 |  |  |  |
| W5-03-009 |  |  |  |
| W5-04-008 |  |  |  |
| W5-04-009 |  |  |  |
| INTEGRATED RESOURCE | LIVINGSTONE-PORCU |  | Code: IRP-L2 |

INTEGRATED RESOURCE LIVINGSTONE-PORCUPINE HILLS
PLAN
W5-03-008-31
W5-03-009
W5-04-008-25
W5-04-008-26
W5-04-008-35
W5-04-008-36
W5-04-009
LAND USE AREA
W5-03-008 W5-03-009 W5-04-008 W5-04-009

## MUNICIPAL DISTRICT

W5-03-008-31 W5-03-009-06 W5-04-008-25 W5-04-008-26 W5-04-008-35 W5-04-008-36 W5-04-009

W5-03-008
W5-03-009
W5-04-008
W5-04-009
RANGELAND DISTRICT
SOUTHWEST

W5-03-009-06 W5-04-008-35 W5-04-009
RANGELAND DISTRICT W5-03-008-31 W5-04-008-25 W5-04-008-26 W5-04-008-36

Geographic Land Information Management and Planning System
REGIONAL PLANNING OLDMAN RIVER Code: RPC-02 COMMISSIONS

OLDMAN RIVER
Code: RPC-02

W5-03-008
W5-03-009
W5-04-008
W5-04-009

## Req: 0000666556

Report Date: 2016/09/15 Time: 10:36:01

Public Land Standing
LSRC550D
Page 8 of 39

| Activities and Titles |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks |  | Total Area |
|  |  |  |  |  |  | Hectares |
| CNT090027 | Active/Disposed | 2009/03/10 | 2034/03/31 |  | 175,167.31 | 70,887.690 |
|  |  |  | CALGAR ENVIRON 0510 : BU 1 : NO RE 710 : SEE | FICE - <br> T AND <br> CTON MENT | Y RESPONSE DIVISON OF DEVELOPM |  |
|  |  | Agency CommentsFOR EAP APPLICATIONS, SEND EMAIL TO BELOW ADDRESS BASED ON CRITERIA. A TEN DAY REFERRAL WINDOW WILL APPLY AND NOTE OF RECIEPT WILL BE PROVIDED BY EMAIL. IF NO REPLY IS RECEIVED THEN PROCEED WITH APPLICATION. NONEAP APPLICANTS FOLLOW NORMAL REFERRAL PROTOCOLS. ALL PROPONENTS ARE TO REFER TO THE FIRESMART GUIDEBOOK FOR THE OIL AND GAS INDUSTRY, BEST MANAGEMENT PRACTICES FOR WILDFIRE PREVENTION AND FIRESMART FIELD GUIDE FOR WILDFIRE RISK AND MITIGATION STRATEGIES; LINK TO E-DOCUMENTS HTTP://WILDFIRE.ALBERTA.CA/FIRE-SMART-INDUSTRY/DEFAULT.ASPX FIRESMART CONSULATATIVE NOTATION COMMENTS: TYPES OF ACTIVITES AND DISPOSITIONS THAT REQUIRE REFERRAL; *RECREATION LEASE (REC) *DISPOSTION RESERVATION (DRS)-USE CRITERIA FOR MLL*,SML AND LOC AS DEFINED BELOW *EASEMENT (EZE) *VEGETATION CONTROL EASEMENT (VCE) *LICENSE OF OCCUPATION (LOC)-HIGH GRADE ROAD OR ACCESS ROAD 20M+ WIDE *MINERAL SURFACE LEASE (MSL), *MISCELLANEOUS LEASE (MLL) *MISCELLANEOUS PERMIT (MLP) *PIPELINE AGREEMENT (PLA)-IF 20M+WIDE *PIPELINE INSTALLATION LEASE (PIL)- IF OVER 5 HECTARES *RURAL ELECTRIC ASSOCIATION EASEMENT (REA) *SURFACE MATERIAL LEASE (SML)- ONLY IF PEATMOSS *ALL AGRICULTURAL DISPOSITIONS REQUIRING FENCE LINE CLEARING/FIELD CLEARING AND DEBRIS DISPOSAL *REGIONAL GRAZING/TIMBER INTRGRATION PLANS . ALL APPLICATIONS MUST BE REFERRED VIA EMAIL TO THE "WILDFIRE PREVENTION OFFICER" AT THE CALGARY FORESTRY OFFICE: ESRD.EDS-CLGR-FIRESMART@GOV.AB.CA TYPES OF ACTIVITES AND DISPOSITIONS NOT REQUIRING REFERRAL *GEOPHYSICAL ACTIVITIES. *AGRICULTURAL DISPOSITIONS WHERE CLEARING IS NOT REQUIRED E.G. HAY PERMIT *HAP), FOREST GRAZING LICENSE (FGL) WITH NO FENCE LINES *TIMBER DISPOSITIONS |  |  |  |  |
|  |  | ACTIVITY DETAIL INFORMATION |  |  |  |  |
|  | PLAN NO | LTO PLA |  | ITEM | VERSION DATE(S) |  |
|  | 5999 RN |  |  |  | 2009/02/24 |  |
| W5-03-008-31-NE |  |  |  |  | (0.00) | (0.000) |
| W5-03-008-31-NW |  |  |  |  | (0.00) | (0.000) |
| W5-03-009-06 |  |  |  |  | (640.00) | (259.000) |
| W5-04-008-25-NE |  |  |  |  | (0.00) | (0.000) |

Geographic Land Information Management and Planning System


TO DETERMINE VOLUMES AND ESTABLISH AU A.A.CC. WITHIN THE MCCRILLIVARY CREEK MISC. TIMBER USE AREA OF THE CS M.U.

## ACTIVITY DETAIL INFORMATION

## NO PLANS

| W5-04-009-01 | (640.00) | (259.000) |
| :---: | :---: | :---: |
| W5-04-009-02 | (640.00) | (259.000) |
| W5-04-009-11 | (640.00) | (259.000) |
| W5-04-009-12 | (640.00) | (259.000) |

Geographic Land Information Management and Planning System
Req: 0000666556

Report Date: 2016/09/15 Time: 10:36:01

ETS Request No.: R3534550

## Public Land Standing

LSRC550D
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W5-04-009-01-NW
W5-04-009-02-09
W5-04-009-02-16
W5-04-009-11-01
W5-04-009-12-04



Geographic Land Information Management and Planning System
Req: 0000666556

Report Date: 2016/09/15 Time: 10:36:01

ACTIVITY DETAIL INFORMATION

OPTION TO PURCHASE (Y/N): N WITHIN 100M OF WATERBODY (Y/N): N PURPOSE: WELLSITE AND ACCESS ROAD DIMENSION: W/S - IRREGULAR; A/R - 20.117 CLIENT FILE NO:S001374 M

| PLAN NO | LTO PLAN NO | ITEM | VERSION DATE(S) |
| :--- | :--- | :--- | :--- |
| 13785 MS |  |  | $1858 / 11 / 17$ |
| 13785 MS | A | $1997 / 06 / 18$ |  |
| 13785 MS |  | $1997 / 06 / 18$ |  |

Geographic Land Information Management and Planning System



Public Land Standing
ETS Request No.: R3534550


| Req: 0000666556 |  |  | Public Land Standing |  |  | LSRC550D |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 | Time: 10:36:01 |  |  |  |  | Page 16 of 39 |
| Activities and Titles |  |  |  |  |  |  |
| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks | Total Area |  |
|  |  |  |  |  | Acres | Hectares |
| MSL 801502 | Active/Disposed | 1980/08/29 | 2030/08/28 |  | 8.33 | 3.371 |
|  |  |  | DEVON C | ORPORATION |  |  |

A C TIVITY DETAIL INFORMATION

| ACTIVITY DETAIL INFORMATION |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| OPTION TO PURCHASE (Y/N): N DIMENSION: | WITHIN 100M OF WATERBODY (Y/N): CLIENT FILE NO: |  | PURPOSE: WELLSITE |  |  |
| PLAN NO | LTO PLAN NO | NO ITEM | VERSION DATE(S) |  |  |
| 21117 MS |  |  | 1858/11/17 |  |  |
| W5-04-009-01-NW |  |  |  | (0.00) | (0.000) |
| W5-04-009-02-NE |  |  |  | (0.00) | (0.000) |
| W5-04-009-11-SE |  |  |  | (0.00) | (0.000) |
| W5-04-009-12-SW |  |  |  | (0.00) | (0.000) |
| MSL 890948 Active/Disposed | 1989/10/06 | 2014/10/05 |  | 2.29 | 0.925 |
|  |  | TAQA NORTH LTD. |  |  |  |
|  |  | ACTIVITY DETAIL INFOR | I O N |  |  |
| OPTION TO PURCHASE (Y/N): DIMENSION: IRREGULAR |  | WITHIN 100M OF WATERBODY (Y/N): CLIENT FILE NO: | PURPOSE: WELLSITE |  |  |
| PLAN NO | LTO PLAN NO | NO ITEM | VERSION DATE(S) |  |  |
| 36298 MS |  |  | 1989/09/07 |  |  |
| W5-04-008-35-SE |  |  |  | (2.29) | (0.925) |

Geographic Land Information Management and Planning System
Req: 0000666556

Report Date: 2016/09/15 Time: 10:36:01
Report Date: 2016/09/15 Time: 10:36:01 Page 17 of 39


| Req: 0000666556 |  | Public Land Standing | LSRC550 |
| :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 | Time: 10:36:01 |  | Page 18 of 3 |



Req: 0000666556
Report Date: $2016 / 09 / 15 \quad$ Time: 10:36:01

Req: 0000666556

Public Land Standing
LSRC550D
Report Date: 2016/09/15 Time: 10:36:01
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W5-04-008-26-NE
W5-04-008-26-SE
Req: 0000666556



Geographic Land Information Management and Planning System
Req: 0000666556
Report Date: $2016 / 09 / 15 \quad$ Time: 10:36:01

ETS Request No.: R3534550
Report Date: 2016/09/15 Time: 10:36:01 Page 24 of 39

| Activities and Titles |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Activity <br> Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks | Total Area |  |
|  |  |  |  |  | Acres | Hectares |
| PNT930299 | Active/Disposed | 1993/08/23 | 2018/08/31 |  | 122,762.00 | 49,680.015 |
|  |  |  | ROCKY M DEPT. OF 0165 : GR 3 : NO AG 130 : GRA 710 : SEE | T RESERVE SOUTH OFFI BLE RESOURCE DEV OTMENT AREA AL DISPOSITION MIT ONLY S | RICT |  |
|  |  | \#14 GAP R | LOTMEN | RESERVE HEAD TAX PER | FILE. |  |
|  |  |  | IVITY | INFORMATION |  |  |
|  | NO PLANS |  |  |  |  |  |
| W5-04-009-01-NE |  |  |  |  | (20.00) | (8.094) |
| W5-04-009-01-NW |  |  |  |  | (5.00) | (2.023) |
| W5-04-009-11-SE |  |  |  |  | (75.00) | (30.351) |
| W5-04-009-12 |  |  |  |  | (640.00) | (259.000) |
| PNT940130 | Active/Disposed | 1994/04/14 | 2019/04/30 |  | 18,469.06 | 7,474.163 |

ROCKY MTN FOREST RESERVE SOUTH OFFICE - RANGELAND DISTRICT DEPT. OF SUSTAINABLE RESOURCE DEV
0165 : GRAZING ALLOTMENT AREA
3 : NO AGRICULTURAL DISPOSITION
130 : GRAZING PERMIT ONLY
710 : SEE COMMENTS
\#3 BLAIRMORE - GOLD RANGE ALLOTMENT - FOREST RESERVE. HEAD TAX PERMITS ONLY

## ACTIVITY DETAIL INFORMATION



Geographic Land Information Management and Planning System
Req: 0000666556
Report Date: $2016 / 09 / 15 \quad$ Time: 10:36:01

ETS Request No.: R3534550
Public Land Standing LSRC550D


THESE LANDS BEST SUITED FOR GRAZING DUE TO STEEP SLOPES RANGING FROM 15\% TO > $30 \%$. LANDS WERE ACQUIRED THROUGH LAND EXCHANGE IN 1993. PRIME WATERHSED PROTECTION ALONG GOLD CREEK AND FISH HABITAT; POTENTIALLY VALUABLE FOR UNGULATE HABITAT AND POTENTIAL FOR REFORESTATION UNDER A MULTIPLE USE PLAN.
ACTIVITY DETAIL INFORMATION

NO PLANS


Geographic Land Information Management and Planning System





| Req: 0000666556 | Public Land Standing |  |
| :--- | :--- | :--- |
| Report Date: $2016 / 09 / 15$ | Time: 10:36:01 |  |



| Req: 0000666556 |  |  | Public Land Standing |  |  | LSRC550D |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 | Time: 10:36:01 |  |  |  |  | Page 31 of 39 |
| Activities and Titles |  |  |  |  |  |  |
| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks | Total Area |  |
|  |  |  |  |  | Acres | Hectares |
| TPA 1677 | Active/Disposed | 1986/08/29 | 2017/06/30 |  | 0.00 | 0.000 |
|  |  |  | TERRY D |  |  |  |

OPTION TO PURCHASE (Y/N): DIMENSION:

ACTIVITY DETAIL INFORMATION
WITHIN 100M OF WATERBODY (Y/N): PURPOSE
CLIENT FILE NO:
NO PLANS


ACTIVITY DETAIL INFORMATION
OPTION TO PURCHASE (Y/N): DIMENSION:

WITHIN 100M OF WATERBODY (Y/N): PURPOSE: CLIENT FILE NO:

## NO PLANS

| W5-04-009-11-01 | N/DAISY-GOLD CR DIV | $(0.00)$ |
| :--- | :--- | :--- |
| W5-04-009-11-02 | N/DAISY-GOLD CR DIV \& E/DAISY-VICEROY CR DIV |  |
| W5-04-009-11-07 |  | $(0.00)$ |
| W5-04-009-11-08 |  | $(0.00)$ |
| $(0.000)$ |  |  |
| $(0.000)$ |  |  |
| $(0.000)$ |  |  |

Geographic Land Information Management and Planning System

| Req: 0000666556 |  |
| :--- | :--- |
| Report Date: $2016 / 09 / 15$ | Time: 10:36:01 |

ETS Request No.: R3534550
Public Land Standing LSRC550D

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## Activities and Titles

| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks | Total Area |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | Acres | Hectares |
| W5-04-009-12-03 |  | N/DAISY-GOLD CR DIV |  |  | (0.00) | (0.000) |
| W5-04-009-12-04 |  | N/DAISY-GOLD CR DIV |  |  | (0.00) | (0.000) |
| W5-04-009-12-05 |  |  |  |  | (0.00) | (0.000) |
| W5-04-009-12-06 |  |  |  |  | (0.00) | (0.000) |




| Req: 0000666556 |  |  | Public Land Standing |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 T |  | Time: 10:36:01 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| PLA 5009 | 8006366-002 | LONLIFE RESOURCES LTD |  |  |  |
|  |  | C/O CANADIAN NATURAL RESOURCES LIMI 8552 ST SW SUITE 2500 |  |  |  |
|  |  | CALGARY | AB | CANADA | T2P 4J8 |
| PLA 5009 | 8006368-003 | NORCO RESOURCES LIMITED |  |  |  |
|  |  | 52815 AVE SW SUITE 404 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2R 0R2 |
| PLA 5009 | 8012211-001 | CANADIAN NATURAL RESOURCES LIMITED |  |  |  |
|  |  | 8552 ST SW SUITE 2100 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4J8 |
| PLA 5009 | 8014043-001 | OPINAC EXPLORATION LIMITED |  |  |  |
|  |  | KEN RUTH CAPTIVA R 7366 AVE SW | ITION |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 3T7 |
| PLA 5796 | 8062617-001 | DEVON CANADA CORPORATION |  |  |  |
|  |  | 4003 AVE SW SUITE 2000 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| PLA 052764 | 8062617-001 | DEVON CANADA CORPORATION |  |  |  |
|  |  | 4003 AVE SW SUITE 2000 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| PLA 800692 | 8006366-001 | LONLIFE RESOURCES LTD |  |  |  |
|  |  | 5213 AVE SW FLOOR 12 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 3T3 |
| PLA 800692 | 8006368-003 | NORCO RESOURCES LIMITED |  |  |  |
|  |  | 52815 AVE SW SUITE 404 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2R 0R2 |
| PLA 800692 | 8012211-001 | CANADIAN NATURAL RESOURCES LIMITED |  |  |  |
|  |  | 8552 ST SW SUITE 2100 |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4J8 |
| PLA 800692 | 8014043-001 | OPINAC EX |  |  |  |



| Req: 0000666556 |  |  | Public Land Standing |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 Time: 10:36:01 |  |  |  |  |  |
|  |  | PINCHER CREEK | Alberta | CANADA | T0K 1W0 |
| PNT880618 | 8078165-001 | PINCHER CREEK OFFICE - RANGELAND DISTRICT-LANDS DIVISION DEPT. OF SUSTAINABLE RESOURCE DEV |  |  |  |
|  |  | 782 MAIN ST ROOM 242 <br> PO BOX 1420 |  |  |  |
|  |  | PINCHER CREEK | Alberta | CANADA | T0K 1 W0 |
| PNT930299 | 8079006-001 | ROCKY MTN FOREST RESERVE SOUTH OFFICE - RANGELAND DISTRICT DEPT. OF SUSTAINABLE RESOURCE DEV |  |  |  |
|  |  | 782 MAIN ST ROOM 242 PO BOX 1420 |  |  |  |
|  |  | PINCHER CREEK | Alberta | CANADA | T0K 1W0 |
| PNT940130 | 8079006-001 | ROCKY MTN FOREST RESERVE SOUTH OFFICE - RANGELAND DISTRICT DEPT. OF SUSTAINABLE RESOURCE DEV |  |  |  |
|  |  | $\begin{aligned} & \text { 782 MAIN ST ROOM } 242 \\ & \text { PO BOX } 1420 \end{aligned}$ |  |  |  |
|  |  | PINCHER CREEK | Alberta | CANADA | T0K 1W0 |
| PNT960092 | 8078165-001 | PINCHER CREEK OFFICE - RANGELAND DISTRICT-LANDS DIVISION DEPT. OF SUSTAINABLE RESOURCE DEV |  |  |  |
|  |  | 782 MAIN ST ROOM 242 <br> PO BOX 1420 |  |  |  |
|  |  | PINCHER CREEK | Alberta | CANADA | T0K 1W0 |
| ROE 156 | 8062617-001 | DEVON CANADA CORPORATION |  |  |  |
|  |  |  |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| ROE 324 | 8062617-001 | DEVON CANADA CORPORATION |  |  |  |
|  |  |  |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| ROE 1169 | 8062617-001 | DEVON CANADA CORPORATION 4003 AVE SW SUITE 2000 |  |  |  |
|  |  |  |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| ROE 8751 | 8062617-001 | DEVON CANADA CORPORATION 4003 AVE SW SUITE 2000 |  |  |  |
|  |  |  |  |  |  |
|  |  | CALGARY | Alberta | CANADA | T2P 4H2 |
| TFA 134555 | 1008823-002 | BENGA MINING L |  |  |  |


| Geographic Land Information Management and Planning System  <br> Req: 000066556  <br> Report Date: 2016/09/15 Time: 10:36:01 | Public Land Standing |  |  |
| :--- | :--- | :--- | :--- |
|  |  |  |  |

Req: 0000666556
Report Date: $2016 / 09 / 15 \quad$ Time: 10:36:01

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[^4]| Req: 0000666558 <br> Report Date: $2016 / 09 / 15$ |
| :--- |
|  | Time: 10:38:01 | Selected Sections |
| :--- |
| Geo-Administrative Area: |
| Requested Lands: |
| Title Information: |
| Activity Details: |
| Subdivisions: |

## Selected Activities

| Surface Dispositions | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of <br> Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| :--- | :---: | :--- | :--- |
| Geophysical | NA | Types: <br> Status: <br> Types: | All <br> All |
| Reservations | Y | Status: | Number Assigned, Application, Letter of Authority, Land Amendment Application, Letter of <br> Authority for Amendment, Active/Disposed, Cancelled - Outstanding Obligation |
| Encumbrances | Y | Types: | All |
| Land Postings |  | Status: <br> Types: | All <br> All |
|  |  | Status: | Number Assigned, Open, Closed |
| Types: | All |  |  |

## Land Keys

W5-04-008-13-NE
W5-04-008-13-NW
W5-04-008-13-SW


| Req: 0000666558 |  | Public Land Standing |  |
| :---: | :---: | :---: | :---: |
| Report Date: 2016/09/15 T | Time: 10:38:01 |  |  |
| FISH \& WILDLIFE REFERRAL LANDS |  |  | Code: FWR |
| W5-04-008-13 |  |  |  |
| CLASSIFICATION |  |  |  |
| W5-04-008-13 |  |  |  |
| GRAZING ZONE | A2 |  | Code: GRZ-A2 |
| W5-04-008 |  |  |  |
| INTEGRATED RESOURCE PLAN | LIVINGSTONE-PORCUPINE HILLS |  | Code: IRP-L2 |
| W5-04-008-13 |  |  |  |
| W5-04-008-14 |  |  |  |
| LAND USE AREA | SOUTHWEST 1 | BLAIRMORE | Code: LUA-SW1-2 |
| W5-04-008 |  |  |  |
| MUNICIPAL DISTRICT | RANCHLAND NO. 66 |  | Code: MD-066 |
| W5-04-008-13 |  |  |  |
| OPERATIONAL APPROVAL DISTRICTS | South Saskatchewan Region | South Saskatchewan District | Code: OPD-5-1 |
| W5-04-008 |  |  |  |
| RANGELAND DISTRICT | SOUTHWEST | PINCHER CREEK | Code: RLD-SW-6 |
| W5-04-008-13 |  |  |  |
| W5-04-008-14 |  |  |  |
| REGIONAL PLANNING COMMISSIONS | OLDMAN RIVER |  | Code: RPC-02 |
| W5-04-008 |  |  |  |

## Req: 0000666558

Report Date: 2016/09/15 Time: 10:38:01

Public Land Standing
LSRC550D
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| Activities and Titles |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Activity Land | Status/Type | Date | Expiry | Client <br> Metes and Bounds Remarks |  | Total Area |
|  |  |  |  |  |  | Hectares |
| CNT090027 | Active/Disposed | 2009/03/10 | 2034/03/31 | 175,167.31 |  | 70,887.690 |
|  |  |  | CALGARY OFFICE - FORESTRY AND EMERGENCY RESPONSE DIVISON OF ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPM <br> 0510 : BUFFER <br> 1 : NO RESTRICTON <br> 710 : SEE COMMENTS |  |  |  |
|  |  | Agency CommentsFOR EAP APPLICATIONS, SEND EMAIL TO BELOW ADDRESS BASED ON CRITERIA. A TEN DAY REFERRAL WINDOW WILL APPLY AND NOTE OF RECIEPT WILL BE PROVIDED BY EMAIL. IF NO REPLY IS RECEIVED THEN PROCEED WITH APPLICATION. NONEAP APPLICANTS FOLLOW NORMAL REFERRAL PROTOCOLS. ALL PROPONENTS ARE TO REFER TO THE FIRESMART GUIDEBOOK FOR THE OIL AND GAS INDUSTRY, BEST MANAGEMENT PRACTICES FOR WILDFIRE PREVENTION AND FIRESMART FIELD GUIDE FOR WILDFIRE RISK AND MITIGATION STRATEGIES; LINK TO E-DOCUMENTS HTTP://WILDFIRE.ALBERTA.CA/FIRE-SMART-INDUSTRY/DEFAULT.ASPX FIRESMART CONSULATATIVE NOTATION COMMENTS: TYPES OF ACTIVITES AND DISPOSITIONS THAT REQUIRE REFERRAL; *RECREATION LEASE (REC) *DISPOSTION RESERVATION (DRS)-USE CRITERIA FOR MLL*,SML AND LOC AS DEFINED BELOW *EASEMENT (EZE) *VEGETATION CONTROL EASEMENT (VCE) *LICENSE OF OCCUPATION (LOC)-HIGH GRADE ROAD OR ACCESS ROAD 20M + WIDE *MINERAL SURFACE LEASE (MSL), *MISCELLANEOUS LEASE (MLL) *MISCELLANEOUS PERMIT (MLP) *PIPELINE AGREEMENT (PLA)-IF 20M+WIDE *PIPELINE INSTALLATION LEASE (PIL)- IF OVER 5 HECTARES *RURAL ELECTRIC ASSOCIATION EASEMENT (REA) *SURFACE MATERIAL LEASE (SML)- ONLY IF PEATMOSS *ALL AGRICULTURAL DISPOSITIONS REQUIRING FENCE LINE CLEARING/FIELD CLEARING AND DEBRIS DISPOSAL *REGIONAL GRAZING/TIMBER INTRGRATION PLANS . ALL APPLICATIONS MUST BE REFERRED VIA EMAIL TO THE "WILDFIRE PREVENTION OFFICER" AT THE CALGARY FORESTRY OFFICE: ESRD.EDS-CLGR-FIRESMART@GOV.AB.CA TYPES OF ACTIVITES AND DISPOSITIONS NOT REQUIRING REFERRAL *GEOPHYSICAL ACTIVITIES. <br> *AGRICULTURAL DISPOSITIONS WHERE CLEARING IS NOT REQUIRED E.G. HAY PERMIT *HAP), FOREST GRAZING LICENSE (FGL) WITH NO FENCE LINES *TIMBER DISPOSITIONS |  |  |  |  |
|  |  | ACTIVITY DETAIL INFORMATION |  |  |  |  |
|  | PLAN NO | LTO PLAN |  | ITEM | VERSION DATE(S) |  |
|  | 5999 RN |  |  |  | 2009/02/24 |  |
| W5-04-008-13 |  |  |  |  | (640.00) | (259.000) |
| W5-04-008-14-NE |  |  |  |  | (0.00) | (0.000) |
| W5-04-008-14-SE |  |  |  |  | (0.00) | (0.000) |



Geographic Land Information Management and Planning System


ACTIVITY DETAIL INFORMATION
OPTION TO PURCHASE (Y/N):
DIMENSION: 15 M

| PLAN NO | LTO PLAN NO | ITEM |
| :--- | :--- | :--- |

45069 MS

2000/02/04
(4.84)
(1.960)

Geographic Land Information Management and Planning System


ACTIVITY DETAIL INFORMATION
OPTION TO PURCHASE (Y/N): DIMENSION: IRREGULAR ; $15 \mathrm{M} \quad$ CLIENT FILE NO:1788

| PLAN NO | LTO PLAN NO | ITEM |  | VERSION DATE(S) |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 45069 MS |  |  |  | 2000/02/04 |  |
|  |  | Reclamations |  |  |  |
| RECLAMATION CERTIFICATE NUMBER: | SR0-00-169 | ISSUE DATE: | 2000/10/11 | TYPE: | Unknown |
| RECLAMATION CERTIFICATE NUMBER: | SR0-00-169 | ISSUE DATE: | 2000/10/11 | TYPE: | Unknown |

TYPE: Unknown
Req: 0000666558
Report Date: 2016/09/15 Time: 10.38.01


Geographic Land Information Management and Planning System



Geographic Land Information Management and Planning System

| Req: 0000666558 |  |
| :--- | :--- |
| Report Date: 2016/09/15 | Time: 10:38:01 |

ETS Request No.: R3534552


| Req: 000066558 |  |  |
| :--- | :--- | :--- | :--- | :--- |
| Report Date: $2016 / 09 / 15$ |  | Public Land Standing |

Geographic Land Information Management and Planning System

| Req: 0000666558 |  |
| :--- | :--- |
| Report Date: 2016/09/15 | Time: 10:38:0 |



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[^5]
## Consents

## Egbert Veldman

<personal information removed>

July 29, 2016
Keith Bott
Benga Mining Ltd
PO Box 660
Blairmore, Alberta
TOK OEO

RE: Timber Disposition CTPC050124
Dated: 10 day of July, 2016

I have a Timber Disposition within the MSL applied for by Benga Mining within sections 1, 2, 11 \& 12 of Township 9 Range 4 W5M. Benga Mining is to allow me access to the proposed MSL for the purpose of Timber Permit CTPC050124 and other future permits applied for within the MSL.

I have no objection to their proposed MSL providing the above requirement is met.

Sincerely,
<Original signed by>

Egbert Veldman

July 21, 2016
Sent via email: <email address removed>

Benga Mining Limited
PO Box 660
12331 20 ${ }^{\text {th }}$ Ave
Blairmore, AB TOKOEO

## ATTENTION: KEITH BOTT

RE: Proposed Coal Mine in Proximity to AltaLink 1201 Transmission Line in 23-8-4-W5M, 24-8-4-W5M, and 21-8-4-W5M

AltaLink has been notified of the proposed coal mine at the above mentioned location, in proximity to AltaLink's 500 Kilovolt, 1201 transmission line.

AltaLink has no objections to the proposed facility in proximity to AltaLink's Right of Way/Easement provided that the following conditions are met:

- Benga Mining must apply for, receive, and approve facility crossing, encroachment, or proximity agreements from AltaLink for any access routes or new facilities which cross over, encroach within, or are within less than thirty metres from the edge of AltaLink's transmission line right of way
- Benga Mining is responsible for mitigating any hazards to AltaLink's transmission line which are created or exacerbated by the presence or operation of the mine or associated facilities; including, but not limited to, falling debris, clearance beneath and around the lines, and drainage
- AltaLink must be permitted to access its transmission lines to perform routine or emergency maintenance as needed; and, Benga Mining must coordinate with AltaLink to ensure that the line and its components may be accessed safely by AltaLink personell

If you have any questions or concerns, please do not hesitate to contact the undersigned.

Respectfully,
<Original signed by>

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Drew Cunningham, C.E.T.
Transmission Lines Encroachment Technologist
Ph: <contact information removed>
        <email address removed>
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## Via Courier

July 15, 2016

## Benga Mining Limited

P.O. Box 660
$12331-20^{\text {th }}$ Ave.
Blairmore, AB TOK OEO

## ATTENTION: Anthony Martin Director

## RE: Letter of non-Objection - Coleman Area

Further to our communications on the subject, Devon Canada, on behalf of itself and its affiliates, hereby confirms that it has reviewed the materials forwarded to Devon by Benga Mining Limited ("Benga") on June 20, 2016 and June 27, 2016 relating to Benga's application to the Canadian Environmental Assessment Agency and the Alberta Energy Regulator for a mine permit at its proposed Grassy Mountain site and Devon has no objections to the materials and information presented in such materials.

To the extent there are any material changes to the proposed mining operations and plans, kindly advise us so we may review the same.

If you require further information or wish to discuss, please feel free to contact the writer at
<contact information removed>
or via email at <email address removed>

Devon Canada, by its
Managing Partner, Devon Canada Corporation
<Original signed by>
Vince Boden
Sr. Supervisor, Surface Land and
Survey

## Consent of Occupant

We Gold Creek Grazing Co-operative of Fort Macleod in the province of Alberta. IN CONSIDERATION of the sum of $\$ 1.00$ and other good and valuable consideration paid to us by the mineral producer (Benga Mining Ltd.), receipt of which is hereby acknowledged, and in consideration of the covenants and agreements hereinafter mentioned and on the part of Benga Mining Ltd. to be kept, observed and performed;

We, Gold Creek Grazing Cooperative DO HEREBY CONSENT to Benga Mining Ltd., its successors and assigns, its contactors, subcontractors, servants and agents the right, license, liberty, privilege and easement to enter upon, over, under and through all those portions of:

Grazing Permit GRP870052
E $1 / 2$ 14-008-04 W5M; E $1 / 2$ 26-008-04 W5M
Grazing Permits PNT930299 and PNT940130
E 1/2 35-008-04 W5M; NW35-008-04 W5M; 1-009-04 W5M; E½ 2-009-04 W5M; SW2-009-04
W5M; SE11-009-04 W5M; SW12-009-04 W5M; W1/2 6-009-03 W5M; E1/2 14-008-04; N1/2 13-008-04; SW 13-008-04

And made between Her Majesty the Queen in right of the Province as represented by the Regulatory body (Minister of Environment and Sustainable Resource Development or the Alberta Energy Regulator) as Lessor/Grantor and me (us) as Lessee/Grantee at any time and from time to time with vehicles and equipment for the purpose permitted by the Public Lands Administration Regulation and any regulations passed in substitution therefor.

Benga Mining Ltd. HEREBY COVENANTS AND AGREES to compensate me (us) for damage done to my (our) buildings, growing crops, fences and livestock on the said land by reason of the exercise of the rights hereby granted; and Benga Mining Ltd HEREBY COVENANTS AND AGREES to pay (us), in addition to the consideration and compensation hereinbefore mentioned the annual rent of $\$ 1.00$ dollar, such rent being payable annually in advance on the $1^{\text {st }}$ day of January in each year or portion thereof that the rights hereby granted are exercised, the first of which payments to be made on the $\underline{1}^{\text {st }}$ day of January 2017.

If my (our) right to occupy the said land terminates for any reason, this consent and covenants and agreements herein contained shall then and in that event cease and determine.

This consent is given under my (our) hand expressly for the purpose of satisfying the requirements of Section 12 of the Surface Rights Act or any other relevant or applicable legislation.

This consent shall be binding upon and shall enure all the benefit of my (our) heirs, executors, administrators and assigns.
IN WITNESS WHEREOF I/WE, have executed this consent at Blair none in the province of Alberta, this_ $9 / \hbar$ day of Aregust_, 2016. SIGNED AND DELIVERED By


Occupant Signature
This Consent is hereby acknowledged and accepted by Benga Mining Ltd.
<Original signed by>
Per.
Stwe "mukyn.

I/We, Don Driver of Fort Macleod in the Province of Alberta, IN CONSIDERATION of the sum of $\$ 1.00$ and other good and valuable consideration paid to me (us) by the mineral producer (Beng Mining Ltd), receipt of which is hereby acknowledged, and in consideration of the covenants and agreements hereinafter mentioned and on the part of Benga Mining Ltd. to be kept, observed and performed:

I/We, Don Driver DO HEREBY CONSENT to Beng Mining Ltd., its successors and assigns, its contractors, subcontractors, servants and agents the right, license, liberty, privilege and easement to enter upon, over, under and through all those portions of: L15, L14, L13-31-008-03 W5M (the lands described in the lease, license, permit) numbered GRL960066 dated the 19 day of June, 1996 (expired), and GRL36801 dated the $\underline{1}^{\text {st }}$ day of June, 1962, and made between Her Majesty the Queen in right of the Province as represented by the Regulatory body (Minister of Environment and Sustainable Resource Development or the Alberta Energy Regulator) as Lessor/Grantor and me (us) as Lessee/Grantee at any time and from time to time with vehicles and equipment for the purposes permitted by the Public Lands Administration Regulation and any regulations passed in substitution therefor.

Benga Mining Ltd. HEREBY COVENANTS AND AGREES to compensate me (us) for damage done to my (our) buildings, growing crops, fences and livestock on the said land by reason of the exercise of the rights hereby granted; and Benga Mining Ltd. HEREBY COVENANTS AND AGREES to pay us, in addition to the consideration and compensation hereinbefore mentioned the annual rent of \$1.00 dollars, such rent being payable annually in advance on the $1^{\text {st }}$ day of January in each year or portion thereof that the rights hereby granted are exercised, the first of which payments to be made on the $\underline{1}^{\text {st }}$ day of January, 2017.

If my (our) right to occupy the said land terminates for any reason, this consent and covenants and agreements herein contained shall then and in that event cease and determine.

This consent is given under my (our) hand expressly for the purpose of satisfying the requirements of Section 12 of the Surface Rights Act or any other relevant or applicable legislation.

This consent shall be binding upon and shall enure to the benefit of my (our) heirs, executors, administrators and assigns.

IN WITNESS WHEREOF I/WE, have executed this consent at
 IN WITNESS WHEREOF IMNE, have


Per:

## Appendix B-1: Hydrology Raw Data


2026 Jun 2,102,000 $\begin{array}{ll}2026 \text { Aug } & 452,109 \\ 2026 \text { Sep } & 389,316\end{array}$ 2026 Sep $\quad 389,316$ $\begin{array}{ll}2026 \text { Oct } & 301,406 \\ 2026 \text { Nov } & 311,453\end{array}$ $\begin{array}{ll}2026 \text { Nov } & 311,453 \\ 2026 \text { Dec } & 226,054\end{array}$ $\begin{array}{ll}2027 \mathrm{Jan} & 2260,703\end{array}$ $\begin{array}{ll}2027 \text { Feb } & 166,850 \\ 2027 \text { Mar } & 226,054\end{array}$ 2027 Apr 545,042 2027 May $1,884,000$ 2027 Jun $2,102,000$ $\begin{array}{ll}2027 \text { Jul } & 979,569 \\ 2027 \text { Aug } & 452,109\end{array}$ 2027 Sep $\quad 389,316$ 2027 Nov 311,453 2027 Dec 226,054 2028 Jan
2028 Feb $\begin{array}{ll}2028 \mathrm{Mar} & 226,054 \\ 2028 \text { Apr } & 545,042\end{array}$ $\begin{array}{ll}2028 \text { Apr } & 545,042 \\ 2028 \text { May } & 1,884,000\end{array}$ $\begin{array}{ll}2028 \text { May } & 1,884,000 \\ 2028 \text { Jun } & 2,102,000\end{array}$ 2028 Jul $\quad 979,569$ 2028 Aug 452,109 2028 Sep $\quad 389,316$ $\begin{array}{ll}2028 \text { Oct } & 301,406 \\ 2028 \text { Nov } & 311,453\end{array}$ 2028 Dec 2029 150,703 $\begin{array}{ll}2029 \text { Feb } & 166,850 \\ 2029 \mathrm{Mar} & 26,854\end{array}$ $2029 \mathrm{Apr} \quad 545,042$ $\begin{array}{ll}2029 \text { Apr } & 545,042 \\ 2029 \text { May } & 1,884,000\end{array}$ 2029 Jun $\quad$ 2,102,000 2029 Jul $\quad 979,569$ 2029 Aug 452,109 $\begin{array}{ll}2029 \text { Sep } & 389,316 \\ 2029 \text { oct } & 301,406\end{array}$ 2029 Nov 311,453 2029 Dec 226,054 $2030 \mathrm{Jan} \quad 150,703$ $\begin{array}{ll}2030 \text { Feb } & 166,850 \\ 2030 \text { Mar } & 226,054\end{array}$ 2030 Apr 545,042 2030 May $1,884,000$ 2030 Jul 979,569 2030 Aug
2030 Sep 2030 ct 2030 Nov 311,453 $\begin{array}{ll}2030 \text { Dec } & 226,054 \\ 2031 \text { Jan } & 150,703\end{array}$ $\begin{array}{ll}2031 \mathrm{Jan} & 150,703 \\ 2031 \mathrm{Feb} & 166,850\end{array}$ 2031 Mar 226,054 $\begin{array}{lr}2031 \text { Apr } & 545,042 \\ \text { 2031 May } & 1,884,000\end{array}$ 2031 Jun 2,102,000 $\begin{array}{ll}2031 \text { Jul } \\ \text { 2031 } & \text { 979,569 }\end{array}$ 2031 Sep 452,109 2031 Oct $\quad 301,316$ 2031 Nov 311,453 2031 Dec 226,054 ${ }_{2032 \mathrm{Feb}}^{203 \mathrm{Jan}}$
$\begin{array}{ll}2032 \mathrm{Feb} & 161,096 \\ 2032 \mathrm{Mar} & 226,054\end{array}$
2032 Apr 545,042
2032 May $1,884,000$ 2032 Jul 2,102,000 2032 Jul $\quad 979,569$ $\begin{array}{ll}2032 \mathrm{Aug} & 452,109 \\ 2032 \mathrm{Sep} & 389,316\end{array}$ $\begin{array}{ll}2032 \text { Sep } & 389,316 \\ 2032 \text { oct } & 301,406\end{array}$ $\begin{array}{ll}2032 \text { Oct } & 301,406 \\ 2032 \text { Nov } & 311,453\end{array}$ $\begin{array}{ll}2032 \text { Dec } & 226,054\end{array}$ $\begin{array}{ll}2033 \mathrm{Jan} & 150,703\end{array}$ 2033 Feb 166,850 $\begin{array}{ll}2033 \mathrm{Mar} & 226,054 \\ 2033\end{array}$ $\begin{array}{lr}2033 \text { Apr } & 545,042 \\ 2033 \text { May } & 1884,000\end{array}$ 2033 May $1,884,000$ 2033 Jun $2,102,000$ $\begin{array}{ll}2033 \text { Jul } & 979,569 \\ 2033 \text { Aug } & 452,109\end{array}$

$\begin{array}{ll}2033 \text { Oct } & 301,406 \\ 2033 \text { Nov } & 311,453\end{array}$
2033 Dec 226,054
2034 Jan 150,703
2034 Feb 166,850
2034 Apr 226,054
2034 May 1884,000
$\begin{array}{ll}2034 \text { May } \\ 2034 \text { Jun } & 2,102,0000\end{array}$
2034 Jul 979,569
$\begin{array}{ll}2034 \text { Aug } & 452,109\end{array}$
2034 Sep 389,316
2034 Oct $\quad 301,406$
2034 Dec 226,054
2035 Jan 150,703
2035 Feb $\quad 166,850$
$\begin{array}{ll}2035 \mathrm{Mar} & 226,054 \\ 2035 \mathrm{Apr} & 545,042\end{array}$
$\begin{array}{lr}2035 \text { Apr } & 545,042 \\ 2035 \text { May } & 1,884,000\end{array}$
2035 Jun $2,102,000$
979,569
2035 Aug 452,109
$\begin{array}{ll}2035 \text { Sep } & 389,316 \\ 2035 \text { oct } & 301,406\end{array}$
2035 Nov 311,453
2035 Dec 226,054
2036 Jan 150,703
$\begin{array}{ll}2036 \text { Feb } & 161,095 \\ 2036 \text { Mar } & 226,054\end{array}$
2036 Apr 545,042
$\begin{array}{ll}2036 \text { May } & 1,884,000 \\ 2036 \text { Jun } & 2,102,000\end{array}$




| 766，000 | 461，968 | 112，000 | 58，061 | 327，000 | 335，241 | 3，973，000 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 792，976 | 204，713 | 857，423 | 25，898 | 1，997，000 |  |  |
| 692，558 | 180，752 | 749，311 | 22，800 | 1，306，000 | 131，573 | 1，564，000 |
| 551，635 | 147，710 | 597，587 | 18，585 | 1，040，861 | 107，502 | 1，23，000 |
| 569，045 | 152，270 | 616，3 |  |  |  |  |
| 430，064 | 119，035 | 466，763 | 14，963 | 811，925 | 86，813 | 960，754 |
| 308，729 | 90，616 | 335，634 | 11，423 | 583，379 |  |  |
| 331，577 | 95，211 | 360，165 | 12，024 | 626，994 | 70，026 | 736，845 |
| 424，870 | 117，028 | 460，609 | 14，836 | 803，551 | 86，045 | 952，382 |
| 945，899 | 240，63 | 1，021，624 | 30，446 | 1，784，000 | 175，299 | 2，14，000 |
| 3，278，000 | 784，485 | 3，538，000 | 98，633 | 6，172，000 | 567，087 | 7，411，000 |
| 3，898，000 | 1．053，000 | 4，22，000 | 132，702 | 7，344，000 | 769，542 | 8，729，000 |
| 1．782，000 | ， | 1，28，000 | 5，698 | 3，361，00 | 345，12 | 4，00，000 |
| 797，014 | 203，223 | 862，437 | 25，940 | 1，507，000 | 199，551 | 1，806，000 |
| 693，278 | 180，571 | 750，509 | 22，975 | 1，310，000 | 132，630 | 1，568，000 |
| 550，927 | 147，345 | 597，099 | 18，693 | 1，041，705 | 108，150 | 1，241，000 |
| 566，967 | 152，076 | 614，386 | 19，245 | 1，071，492 | 111，330 | 1，277，000 |
| 428，870 | 118，504 | 465，659 | 15，012 | 811，363 | 87，103 | 960，192 |
| 222，919 | 26，615 | 239，427 | 3，381 | 420，478 | 18，057 | 520，681 |
| 244，125 | 27，442 | 262，121 | 3，511 | 460，650 | 18，619 |  |
| 333，678 | 39，794 | 358，464 | 5，154 | 630，122 | 27，578 | 780，442 |
| 802，205 | 93，757 | 861，642 | 12，108 | 1，514，835 | 64，564 | 1．876，594 |
| 0 2，787，899 | 337，283 | 2，93，688 | 42，951 | 5，259，410 | 230，8 |  |
| 0 3，406，070 | 613，697 | 3，669，718 | 78，093 | 6，429，660 | 439，78 | 7，816，5 |
| 0 1，793，255 | 484，974 | 40，007 | 61,953 | 3，391，039 | 358，74 | 4，028，319 |
| 823，126 | 217，986 | 0，603 | 8，022 | 1，557 | 162， | 1，852，479 |
| 714，560 | 194，833 | 773，244 | 24，962 | 1，351，493 | 144，626 | 1，604，7 |
| 564，507 | 161，624 | 611，167 | 20，637 | 1.667 | 119，889 | 1，263，851 |
| 582，178 | 166，011 | 630，212 | 21，151 | 1，100，524 | 122，839 | $1,303,312$ |
| 436，443 | 132，937 | 472，897 | 16，937 | 825 | 8，728 |  |
| 305，125 | 104，374 | 331，46 | 13，29 |  |  |  |
| 332，140 | 110，405 | 360，618 | 14，088 | 628，047 | 82，493 | 737，035 |
| 431，309 | 132，617 | 467，812 | 16，997 | 815，820 | 99，095 |  |
| 968，606 | 255，012 | 1，048，379 | 2，722 | 1．831，371 |  |  |
| 3，366，501 | 852，155 | 3，643，352 | 108，744 | 6，361，140 | 628，13 | 7，602， |
| 3，822，565 | 1，063，000 | 4，139，232 | 135，605 | 7，223，743 |  | 8，607，844 |
| 1，772，480 | 483，374 | 1，919，217 | 61,980 | 3，399，773 | 358，90 | 3，995，606 |
| 813，706 | 217，400 | 881，217 | 28，033 | 1，539，414 | 162，190 | 1，837，935 |
| 706，283 | 194，246 | 764，964 | 24，945 | 1，35，928 | 144，525 | 1，592，152 |
| 557，953 | 161，294 | 604，590 | 20,627 | 1，054，732 | 119，828 | 1，252，841 |
| 575，319 | 165，554 | 623，304 | 21，113 | 1，087，088 | 122，607 |  |
| 431，421 | 132，735 | 467，837 | 16，915 | 815，311 | 98，600 | 963，564 |
| 304，482 | 103，718 | 330，691 | 13，216 | 575，657 | 77，443 |  |
| 321，735 | 107，472 | 349，340 | 13，714 | 608，414 | 80，320 | 713，586 |
| 430，310 | 131，611 | 466，687 | 16，871 | 813，975 | 98，329 | 962，218 |
| 966，177 | 252，584 | 1，045，644 | 32，416 | 1，826，419 | 187，195 |  |
| 3，358，729 | 844，142 | 3，634，555 | 107，73 | 6，345，4 | 622，01 |  |
| 3，813，832 | 1，054，000 | 4，129，482 | 134，457 | 7，207，218 | 780，144 | $8,591,323$ |
| 0 1，767，520 | 479，284 |  | 61，465 | 3，343，087 | 355，794 | 3，987，819 |
| 811，966 | 215，386 | 879，255 | 27，780 | 1，536，581 | 160，658 | 1，834 |
| 704，864 | 192，513 | 763，363 | 24,726 | 1，333，031 | 143，20 | 1，589，253 |
| 556，617 | 159，951 | 603，084 | 20，457 | 1，052，260 | 118， |  |
| 573，936 | 164，165 | 621，748 | 20，938 | 1，084，533 | 121，551 | 1，289，025 |
| 430，423 | 131，728 | 466，712 | 16，789 | 813，466 | 97，833 | 961，718 |
| 303，764 | 103，0 | 329， | 13，130 | 574，328 | 76，927 | 672，601 |
| 330，599 | 108，897 | 358，88 | 13，8 | 625，192 | 81，346 |  |
| 429，188 | 130，555 | 465，435 | 16，738 | 811，894 | 97，525 | 960，135 |
| 963，404 | 249，987 | 1，042，553 | 32，088 | 1，821，163 | 185，218 | 2，181，201 |
| 3，355，923 | 842，177 | 3，631，784 | 107，490 | 6，340，878 | 620，51 | 83，616 |
| 803，379 | 1．045，000 | 4，118，057 | 133，264 | 7，188，394 | 772， |  |
| 1，763，375 | 475，292 | 1，909，12 | 60，962 | 3，344，742 | 352，758 | 3，980， |
| 810，576 | 213，063 | 877，705 | 27，487 | 1，533，495 | 158，889 | 1，831，991 |
| 703，771 | 190，475 | 762，145 | 24，469 | 1，331，020 | 141，654 | 1,58 |
| 554，900 | 158，346 | 601，171 | 20，255 | 1，049，066 | 117，583 |  |
| 572，130 | 162，477 | 619，734 | 20，725 | 1，081，171 | 120，265 | 1，285，875 |
| 429，091 | 130，481 | 465，226 | 16，631 | 810，985 | 96，884 | 959，242 |
| 332，863 | 102，167 | 362，816 | 13，020 | 628，961 | 76，262 | 728，181 |
| 358，025 | 107，863 | 389，93 | 13，768 | 676，8 | 80，557 |  |
| 450，912 | 129，060 | 490，005 | 16，549 | 853，207 | 96，385 | 1，002，036 |
| 957，145 | 246，151 | 1，034，966 | 31，604 | 1，810，000 | 182，29 | 2，170，000 |
| 0 3，360，000 | 833，045 | 3，634，000 | 106，337 | 6，348，000 | 613，61 | 7，589，00 |
| 3，846，000 | 1，028，000 | 4，166，000 | 131，161 | 7，270，000 | 760，2 | 8，655，000 |
| 1，776，000 | 467，120 | 1，924，000 | 59，928 | 3，361，000 | 346，5 | 4005 |
| 813，156 | 209，107 | 880，965 | 26，986 | 1，541，000 | 155，867 | 1，838，000 |
| 710，368 | 186，903 | 769，983 | 24，017 | 1，344，000 | 138，925 | 1，600，000 |
| 567，957 | 155，451 | 616，345 | 19，889 | 1，074，329 | 115，371 | 1，273，000 |
| 544，331 | 159，354 | 633，980 | 20，330 | 1，104，5 | 117，878 |  |
| 499，028 | 128，118 | 488，281 | 16，332 | 848，867 | 95，077 | 997，696 |
| 273，497 | 83，075 | 295，191 | 10，493 | 519，080 | 62，573 | 617，316 |
| － | 354 | 316，599 | 10，52 | 557，181 | 62，685 | 666，176 |
| 367，296 | 84，377 | 395，100 | 10，645 | 696，8 | 63，095 | 845，330 |
| 764，383 | 89，887 | 818，050 | 11，289 | 1，449，03 | 65，308 | 1，810，150 |
| 0 2，430，510 | 113，014 | 2，593，994 | 13，992 | 4，608，298 | 74，596 | 5，861，793 |
| 3，054，949 | 462，450 | 3，272，664 | 58，199 | 5，793，136 | 340，398 | 7，183，372 |
| 1，639，553 | 418，215 | 1．765，198 | 52，787 | 3，111，9 | 313，617 | 3，753，837 |
| 750，267 | 186，864 | 807，603 | 23，584 | 1，423，309 | 140，037 | 1，720， |
| 649，900 | 164，504 | 699，696 | 20，763 | 1，233，176 | 123，336 | 1，487，969 |
| 506，118 | 130，141 | 544，998 | 16，427 | 960，368 | 97，613 | 1，158，369 |
| 525，640 | 136，962 | 566，108 | 17，289 | 997，426 | 102，766 | 1，201，821 |
| 381，546 | 99，440 | 410，922 | 12，552 | 724，02 | 74，612 | 872，087 |
| 252，210 | 65，829 | 271，956 | 8，310 | 478，270 | 49，387 | 577，682 |
| 268，600 | 69，423 | 289，596 | 8，763 | 509，346 | 52，069 | 615，634 |
| 374，760 | 95，392 | 403，983 | 12，040 | 710，644 | 71，518 | 859，838 |
| 906，406 | 232，659 | 977，180 | 29，366 | 1，719，180 | 174，469 | 2，078，877 |
| 0 3，152，685 | 823，183 | 3，39， 8 ，88 | 103，910 | 5，978，738 | 617，578 | 7，221，750 |
| 3，517，477 | 917，339 | 3，792，214 | 115，795 | 6，699，823 | 688，198 | 8，057，097 |
| 1，628，834 | 418，215 | 1．75，887 | 52，787 | 089，61 | 313，617 | 3，735，861 |
| 745，363 | 186，864 | 803，343 | 23，584 | 1，413，098 | 140，037 | 1，711，830 |
| 645，652 | 164，504 | 696，005 | 20，763 | 1，224，330 | 123，336 | $1,48,844$ |
| 502，809 | 130，141 | 542，123 | 16，427 | 953，479 | 97，613 | 1，152，822 |
| 522，204 | 136，962 | 563，122 | 17，289 | 990，270 | 102，766 | 1，19，066 |
| 379，052 | 99，440 | 408，754 | 12，552 | 718，808 | 74，612 | 867，910 |
| 252，199 | 65，829 | 271，947 | 8,310 | 478，248 | 49，387 | 577，660 |
| 278，181 | 71，902 | 299，929 | 9，076 | 527，511 | 53，929 | 637，597 |
| 374，744 | 95，392 | 403，969 | 12，040 | 710，611 | 71，518 | 859，804 |
| 906，368 | 232，659 | 977，148 | 29，366 | 1，79，101 | 174，469 | 2，078，796 |
| 3，152，552 | 823，183 | 3，39，696 | 103，910 | 5，978，461 | 617，578 | 7，221，471 |
| 3，517，328 | 917，339 | 3，792，089 | 115，795 | 6，669，514 | 688，198 | 8，056，787 |
| 0 1，628，765 | 418，215 | 1，75，829 | 52,787 | 3，089，476 | 313，617 | 3，735，716 |
| 745，331 | 186，864 | 803，317 | 23，584 | 1，413，033 | 140，037 | 1，711，764 |
| 645，624 | 164，504 | 695，982 | 20，763 | 1，224，273 | 123，336 | 1，480，787 |
| 502，788 | 130，141 | 542，105 | 16，427 | 953，434 | 97，613 | 1，152，778 |
| 522，182 | 136，962 | 563，103 | 17，289 | 990，224 | 102，766 | 1，196，020 |
| 379，036 | 99，440 | 408，741 | 12，552 | 718，775 | 74，612 | 867，877 |
| 252，199 | 65，829 | 271，947 | 8，310 | 478，248 | 49，387 | 577，660 |
| 278，181 | 71，902 | 299，929 | 9，076 | 527，511 | 53，299 | 637，597 |
| 374，74 | 95，392 | 403，969 | 12，040 | 710，611 | 71，518 | 859，804 |
| 906，368 | 232，659 | 977，148 | 29，366 | 1，719，101 | 174，469 | 2，078，796 |
| 3，152，552 | 823，183 | 3，39，696 | 103，910 | 5，978，461 | 617，578 | 7，221，471 |
| 3，517，328 | 917339 | 3，792，089 |  | 6，669，514 |  | 8，056， |

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|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2056 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2056 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 |  | 1,225,000 |
| 2056 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2057 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2057 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 |  |
| 2057 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2057 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2057 May 1 | 1,884,0010 | 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,00 | 617,578 | 7,383,000 |
| 2057 Jun | 2,122,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2057 Jul | 979,59 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2057 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,54 | 1,433,000 | 140,037 | 1,732,000 |
| 2057 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2057 ctt | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2057 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2057 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2058 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2058 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2058 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2058 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2058 May | 1,884,000 | 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2058 Jun | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2058 Jul | 979,569 | 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2058 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2058 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2058 oct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2058 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2058 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2059 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,3 | 590,349 |
| 2059 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2059 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2059 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2059 May | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2059 un | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2059 ul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2059 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2059 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2059 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2059 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2059 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2060 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2060 Feb | 161,095 | 275,035 | 69,423 | 296,635 | 8,763 | 521,311 | 52,069 | 627,529 |
| 2060 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | ${ }^{723,925}$ | 71,518 | 872,974 |
| 2060 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,11,000 |
| 2060 May 1 | 1,884,000 | 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,38,000 |
| 2060 Jun | 2,102,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2060 Jul | 979,569 | 1,664,000 | 418,21 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2060 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2060 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2060 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2060 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2060 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2061 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2061 eb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2061 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2061 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2061 May 1 | 1,884,000 | 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,38,000 |
| 2061 Jun | 2,102,000 | 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2061 Jul | 979,569 | 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,00 |
| 2061 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2061 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2061 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2061 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2061 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2062 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,3 | 590,349 |
| 2062 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2062 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2062 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,11,000 |
| 2062 May 1 | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2062 Jun | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2062 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2062 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2062 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2062 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2062 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,22,000 |
| 2062 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2063 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2063 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2063 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2063 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,11,000 |
| 2063 May 1 | 1,884,000 | 0 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,38,000 |
| 2063 Jun | 2,102,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2063 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2063 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2063 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2063 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2063 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2063 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2064 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2064 Feb | 161,095 | 275,035 | 69,423 | 296,635 | 8,763 | 521,311 | 52,069 | 627,529 |
| 2064 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2064 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2064 May 1 | 1,884,000 | 0 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2064 Jun | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2064 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,00 |
| 2064 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2064 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2064 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2064 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2064 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2065 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2065 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2065 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | ${ }^{723,925}$ | 71,518 | 872,974 |
| 2065 Apr | 545,042 | - 926,089 | ${ }^{2322,659}$ | 998,920 $3,496,000$ | 29,366 103910 1 | $1,756,000$ $6,140,00$ | 174,469 617578 | $2,111,000$ $7,383,000$ |
| 2065 May | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2065 Jun | 2,122,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2065 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2065 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2065 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2065 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2065 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2065 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2066 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2066 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2066 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2066 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2066 May 1 | 1,884,000 | 0 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2066 Jun | 2,102,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2066 Jul | 979,569 | 1,664,000 | 418,215 | 1796,000 |  | 157,0 | 313,6 | 03,000 |
| 2066 Aug | 452,109 | 5,933 | 6,864 | 15,3 |  | 1,433,000 | 140,03 |  |


|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2066 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2066 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2067 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2067 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2067 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2067 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2067 May | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2067 Jun | 2,102,000 | 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,488,000 | 688,198 |  |
| 2067 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2067 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2067 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2067 Oct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2067 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,76 |  |
| 2067 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2068 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2068 feb | 161,095 | 275,035 | 69,423 | 296,635 | 8,763 | 521,311 | 52,069 | 627,529 |
| 2068 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2068 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2068 May | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2068 Jun | 2,102,000 | 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2068 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2068 Aug | 452,109 | 755,934 | 186,864 | 815,32 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2068 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2068 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2068 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2068 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2069 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 599,349 |
| 2069 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,229 | 649,941 |
| 2069 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2069 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2069 May | 1,884,000 | 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2069 un | 2,102,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2069 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2069 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2069 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2069 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2069 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,76 | 1,225,000 |
| 2069 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2070 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2070 Feb | 166,850 | 284,857 | 71,902 | 307,29 | 9,076 | 539,928 | 53,9 | 649,941 |
| 2070 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2070 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2070 May | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,883,000 |
| 2070 Jun | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2070 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,00 |
| 2070 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2070 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2070 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2070 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2070 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2071 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 |  | 590,349 |
| 2071 eb | 166,850 | 284,857 | 71,902 | 307,29 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2071 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2071 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2071 May | 1,884,000 | $03,238,000$ | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2071 Jun | 2,102,000 | $03,612,000$ | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2071 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2071 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2071 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2071 ctt | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2071 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2071 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2072 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2072 Feb | 161,095 | 275,035 | 69,423 | 296,635 | 8,763 | 521,311 | 52,069 | 627,529 |
| 2072 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2072 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2072 May | 1,884,000 | 0 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,14,000 | 617,578 | 7,383,000 |
| 2072 Jun | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,235,000 |
| 2072 Jul | 979,569 | 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2072 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2072 sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2072 Oct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2072 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2072 dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2073 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2073 feb | 166,850 | 284,857 | 71,902 | 307,29 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2073 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2073 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2073 May | 1,884,000 | 0 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2073 Jun | 2,102,00 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,48,000 | 688,198 | 8,23,000 |
| 2073 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2073 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,43,000 | 140,037 | 1,732,000 |
| 2073 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2073 Oct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2073 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2073 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2074 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2074 feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,229 | 649,941 |
| 2074 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2074 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2074 May | 1,884,000 | 0 3,238,000 | 823,183 | 3,496,000 | 103,910 | 6,140,000 | 617,578 | 7,383,000 |
| 2074 Jun | 2,102,000 | 0 3,612,000 | 917,339 | 3,898,000 | 115,795 | 6,848,000 | 688,198 | 8,23,000 |
| 2074 Jul | 979,569 | 0 1,664,000 | 418,215 | 1,796,000 | 52,787 | 3,157,000 | 313,617 | 3,803,000 |
| 2074 Aug | 452,109 | 755,934 | 186,864 | 815,325 | 23,584 | 1,433,000 | 140,037 | 1,732,000 |
| 2074 Sep | 389,316 | 658,132 | 164,504 | 710,297 | 20,763 | 1,248,000 | 123,336 | 1,504,000 |
| 2074 ct | 301,406 | 515,085 | 130,141 | 556,265 | 16,427 | 977,013 | 97,613 | 1,177,000 |
| 2074 Nov | 311,453 | 537,223 | 136,962 | 580,494 | 17,289 | 1,019,064 | 102,766 | 1,225,000 |
| 2074 Dec | 226,054 | 389,982 | 99,440 | 421,463 | 12,552 | 739,829 | 74,612 | 888,876 |
| 2075 Jan | 150,703 | 259,061 | 65,829 | 279,450 | 8,310 | 490,985 | 49,387 | 590,349 |
| 2075 Feb | 166,850 | 284,857 | 71,902 | 307,229 | 9,076 | 539,928 | 53,929 | 649,941 |
| 2075 Mar | 226,054 | 381,888 | 95,392 | 411,749 | 12,040 | 723,925 | 71,518 | 872,974 |
| 2075 Apr | 545,042 | 926,089 | 232,659 | 998,920 | 29,366 | 1,756,000 | 174,469 | 2,116,000 |
| 2075 May | 1,884,000 | $03,248,000$ | 823,183 | 3,508,000 | 103,910 | 6,160,000 | 617,578 | 7,401,000 |
| 2075 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2075 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2075 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2075 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2075 ct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2075 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2075 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2076 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 4, 5 ,387 | 612,443 645323 |
| 2076 Feb | 161,095 | 284,443 | 69,423 | 307,235 | 8,763 | 539,105 | 52,069 | 645,323 |
| 2076 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2076 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2076 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2076 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2076 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 76 Aug | 2,109 | 0,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 10123 | 1,740,000 |
| 2076 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,00 | 123,3 | 1,534,000 |


|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2076 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2077 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2077 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2077 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2077 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2077 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2077 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 3,615,000 |
| 2077 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2077 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,54 | 1,441,000 | 140,037 | 1,740,000 |
| 2077 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2077 ct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2077 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2077 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2078 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2078 feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2078 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2078 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2078 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2078 Jun | 2,102,000 | $03,812,000$ | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2078 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2078 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2078 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2078 ct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2078 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2078 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2079 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2079 Feb | 166,850 | 294,717 | 71,902 | 318,37 | 9,076 | 558,576 | 53,929 | ${ }^{668,587}$ |
| 2079 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2079 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2079 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2079 Jun | 2,102,000 | $03,812,000$ | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2079 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2079 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2079 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2079 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2079 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2079 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2080 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2080 Feb | 161,095 | 284,443 | 69,423 | 307,235 | 8,763 | 539,105 | 52,069 | 645,323 |
| 2080 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2080 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2080 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2080 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| $2080 . \mathrm{Jul}$ | 979,569 | 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2080 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,54 | 1,441,000 | 140,037 | 1,740,000 |
| 2080 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2080 ct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2080 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2080 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2081 an | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2081 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | ${ }^{668,587}$ |
| 2081 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2081 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2081 May | 1,884,000 | 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2081 Jun | 2,102,000 | $03,812,000$ | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2081 Jul | 979,569 | 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2081 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2081 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2081 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2081 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2081 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2082 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2082 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | ${ }^{668,587}$ |
| 2082 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2082 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2082 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2082 Jun | 2,102,000 | $03,812,000$ | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2082 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2082 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2082 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2082 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2082 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2082 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2083 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2083 feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,229 | 668,587 |
| 2083 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2083 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2083 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2083 Jun | 2,122,000 | $03,812,000$ | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2083 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2083 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,54 | 1,441,000 | 140,037 | 1,740,000 |
| 2083 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2083 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,0177,275 | 97,613 | 1,217,000 |
| 2083 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2083 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2084 Jan | 150,703 | 270,74 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2084 Feb | 161,095 | 284,443 | 69,423 | 307,235 | 8,763 | 539,105 | 52,069 | 645,323 |
| 2084 Mar | 226,054 | 389,330 | -95,392 | ${ }^{420,133}$ | 12,040 | 737,999 | 71,518 | 887,046 |
| 2084 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2084 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2084 Jun | 2,122,000 | $03,812,000$ | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2084 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2084 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2084 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 20840 ct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2084 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2084 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2085 Jan | 150,703 | 270,743 | ${ }^{65,829}$ | 292,612 | 8,310 | 513,079 58579 | 49,387 | ${ }^{612,443}$ |
| 2085 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,229 | 668,587 |
| 2085 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2085 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2085 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2085 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2085 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2085 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2085 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2085 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2085 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2085 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2086 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2086 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2086 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2086 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2086 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2086 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2086 Jul | 979,569 | 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2086 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 865 ep | 389,316 | 674,032 | 164,504 | 28,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2086 Oct | 301,406 | 536,375 | 130,141 | 80,249 |  | 1,01 |  | 1,217,000 |


|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2087 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2087 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2087 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2087 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2087 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2087 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2087 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2087 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2087 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2087 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2087 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,2891 | 1,077,252 | 102,766 | 1,283,000 |
| 2087 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2088 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2088 feb | 161,095 | 284,443 | 69,423 | 307,235 | 8,763 | 539,105 | 52,069 | 645,323 |
| 2088 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2088 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2088 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2088 Jun | 2,102,000 | 0 0,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2088 Jul | 979,56 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2088 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2088 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2088 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2088 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,28 | 1,077,252 | 102,7 | 1,283,000 |
| 2088 Dec | 226,054 | 411,542 | 99,40 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2089 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2089 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2089 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2089 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2089 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2089 Jun | 2,102,000 | 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2089 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2089 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2089 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2089 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2089 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2089 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2090 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,453 |
| 2090 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2090 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2090 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2090 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 | 6,488,000 | 617,578 | 7,731,000 |
| 2090 Jun | 2,102,000 | 0 O,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2090 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2090 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,74,000 |
| 2090 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2090 oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2090 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2090 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2091 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2091 feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2091 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2091 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,17,000 |
| 2091 May | 1,884,000 | 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,73,000 |
| 2091 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,61,000 |
| 2091 Jul | 979,569 | 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2091 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,74,000 |
| 2091 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2091 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2091 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2091 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2092 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2092 Feb | 161,095 | 284,443 | 69,423 | 307,235 | 8,763 | 539,105 | 52,069 | 645,323 |
| 2092 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2092 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2092 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2092 Jun | 2,102,000 | 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2092 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,00 |
| 2092 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2092 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2092 ct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2092 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2092 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2093 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2093 feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2093 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2093 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2093 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2093 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2093 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2093 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2093 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2093 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2093 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2093 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2094 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2094 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2094 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2094 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2094 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2094 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2094 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2094 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,54 | 1,441,000 | 140,037 | 1,740,000 |
| 2094 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2094 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2094 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2094 Dec | 226,054 | 411,542 | 99,40 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2095 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2095 Feb | 166,850 | 294,717 | 71,902 | 318,337 | 9,076 | 558,576 | 53,929 | 668,587 |
| 2095 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2095 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2095 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2095 Jun | 2,102,000 | 0 3,812,000 | 917,339 | 4,126,000 | 115,795 7 | 7,228,000 | 688,198 | 8,615,000 |
| 2095 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2095 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2095 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 2095 Oct | 301,406 | 536,375 | 130,141 | 580,249 | 16,427 | 1,017,275 | 97,613 | 1,217,000 |
| 2095 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,289 | 1,077,252 | 102,766 | 1,283,000 |
| 2095 Dec | 226,054 | 411,542 | 99,440 | 445,753 | 12,552 | 780,603 | 74,612 | 929,650 |
| 2096 Jan | 150,703 | 270,743 | 65,829 | 292,612 | 8,310 | 513,079 | 49,387 | 612,443 |
| 2096 Feb | 161,095 | 284,433 | 69,423 | 307,235 | 8,763 | 539,105 | 52,069 | 645,323 |
| 2096 Mar | 226,054 | 389,330 | 95,392 | 420,133 | 12,040 | 737,999 | 71,518 | 887,046 |
| 2096 Apr | 545,042 | 957,843 | 232,659 | 1,034,696 | 29,366 | 1,816,000 | 174,469 | 2,176,000 |
| 2096 May | 1,884,000 | 0 3,422,000 | 823,183 | 3,704,000 | 103,910 6 | 6,488,000 | 617,578 | 7,731,000 |
| 2096 Jun | 2,102,000 | O 3,812,000 | 917,399 | 4,126,000 | 115,795 | 7,228,000 | 688,198 | 8,615,000 |
| 2096 Jul | 979,569 | 0 1,724,000 | 418,215 | 1,864,000 | 52,787 | 3,269,000 | 313,617 | 3,915,000 |
| 2096 Aug | 452,109 | 760,358 | 186,864 | 820,311 | 23,584 | 1,441,000 | 140,037 | 1,740,000 |
| 2096 Sep | 389,316 | 674,032 | 164,504 | 728,211 | 20,763 | 1,278,000 | 123,336 | 1,534,000 |
| 960 ct | 301,406 | 536,375 | 130,141 | 0,24 | 16,427 | 1,017,275 |  | 1,217,000 |
| 96 Nov | 311,453 | 567,991 | 136,962 | 615,158 | 17,28 | 1,077,252 |  |  |

$\mathrm{m} 3 / \mathrm{yr}$
Annual Flow Annual Flows

 $\begin{array}{lll}2018 & 7734556 & 11117937 \\ 2019 & 1295378 \\ 207934447 & 258882841\end{array}$ $\begin{array}{llllll}2019 & 7734556 & 11788692 & 13025939 & 21708402 & 26795514 \\ 2020 & 7728802 & 11529999 & 12737413 & 21624454 & 26709870\end{array}$ 2021773455611719722127966172155216626640662 2022773455612168085131672622154434226634900 2023773455612209447131781202149119426582586 2024772880212508396135036922206867827155807 \begin{tabular}{llllll}
2025 \& 7734556 \& 12520951 \& 13529383 \& 22274968 \& 27363868 <br>
\hline

 2026773455612429629134395562228189427372079 $\begin{array}{llllll}2027 & 7734556 & 11840234 & 12791086 & 21315948 & 26406596 \\ 2028 & 7728802 & 12403536 & 13443114 & 22496791 & 27583988\end{array}$ $\begin{array}{lllllll}2028 & 7728802 & 12403536 & 13443114 & 22496791 & 27583988 \\ 2029 & 7734556 & 12473629 & 13538356 & 22738528 & 27829868\end{array}$ 

20 \& 7734556 \& 12473629 \& 13538356 \& 22738528 \& 27829468 <br>
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 $\begin{array}{lllllll} & 031 & 7734556 & 12244451 & 13319582 & 22578710 & 27668647\end{array}$ 2032772880210704284116036281980553824893639 2033773455612364914134963022308675528174363 2034773455612602471137751612361320128704651 2035773455612603478137793292364350228732956 2036772880212527137136986702352854628614798 $\begin{array}{llllll}2037 & 7734556 & 12562034 & 13739573 & 23619873 & 28712270 \\ 2038 & 7734556 & 11412017 & 12445842 & 21459243 & 26548945\end{array}$ 0387734556111412017124458422145924326545945 039773455612784461139945932407016529158970 20417734556127271152139243552395328229044460 2042773455612661861138571522384201228931567 $\begin{array}{llllll}2042 & 7734556 & 12661861 & 13857152 & 23842012 & 28931567 \\ 2043 & 7734556 & 10902254 & 11888475 & 20549233 & 25644561\end{array}$ 772880212161048132872242293094728022485 2045773455612170094132971082294800328043331 2046773455612170094132971082294800328043331 2047773455612170094132971082294800328043331 2048772880212161048132872242293094728022485 $\begin{array}{llllll}2049 & 7734556 & 12170094 & 13297108 & 22948003 & 28043331\end{array}$ 2051773455612170094132971082294800328043331 2052772880212161048132872242293094728022485 $\begin{array}{llllll}2052 & 7728802 & 12161048 & 13287224 & 22930947 & 28022485 \\ 2053 & 7734556 & 12170094 & 13297108 & 22948003 & 28043331\end{array}$ $2054 \quad 773455612170094132971082294800328043331$ 2055773455612170094132971082294800328043331 2056772880212161048132872242293094728022485 2057773455612170094132971082294800328043331 20587734556112170094132971082294800328043331 

2059 \& 7734556 \& 12170094 \& 13297108 \& 22948003 <br>
28043333 <br>
\hline

 

\& 061 \& 77385556 \& 12170094 \& 1329727108 \& 22948003 <br>
2800432435 <br>
\hline

 2062773455612170094132971082294800328043331 2063773455612170094132971082294800328043331 2064772880212161048132872242293094728022485 2065773455612170094132971082294800328043331 2066773455612170094132971082294800328043331 2067773455612170094132971082294800328043331 7772880212161048132872242293094728022485 069773455612170094132971082294800328043331 

\& 770 \& 7734556 \& 12170094 \& 13297108 \& 22948003 <br>
2804333 <br>
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 $\begin{array}{llllll} & 072 & 7728802 & 12161048 & 13287224 & 22930947 \\ 280224885\end{array}$ $2073 \quad 773455612170094132971082294800328043331$ 2074773455612170094132971082294800328043331 2075773455612352065135040272329261528386718 2076772880212460162136261042349654028587852 2077773455612469434136362422351402328609124 $\begin{array}{llllll}2078 & 7734556 & 12469434 & 13636242 & 23514023 & 28609124 \\ 2079 & 7734556 & 12469434 & 13636242 & 23514023 & 28609124\end{array}$ 2079773455612469434136362422351402328609124 080772880212460162136261042349654028587852 2082773455612469434136362422351402328609124 $2083 \quad 773455612469434136362422351402328609124$ $2084 \quad 772880212460162136261042349654028587852$ 20857734556124699434136362422351402328609124 77345561246933413636242235140232860912 773455612469434136362422351402328609124 2088772880212460162136261042349654028587852 7773455612469434136362422351402328609124 09077345561246943413636242235140232860912 

2092 \& 7728802 \& 1246016213626104 \& 23496540 \& 2858785 <br>
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\end{tabular} 773455612469434136362422351402328609124 $2094 \quad 77345561246943413636242235140232860912$ 2095-7734556 1246943413636242235140232860912 2096772880212460162136261042349654028587852 $2097 \quad 773455612469434136362422351402328609124$ 773455612469434136362422351402328609124 2099773455612469434136362422351402328609124










2026 Jun 1,536,000 6 Jul 715,537 2026 Aug 330,248 $\begin{array}{ll}2026 \text { Sep } & 284,380 \\ 2026 \text { Oct } & 220,165\end{array}$ $\begin{array}{ll}2026 \text { Oct } & 220,165 \\ 2026 \text { Nov } & 227,504\end{array}$ $\begin{array}{ll}2026 \text { Nov } & 227,504 \\ 2026 \text { Dec } & 165,124\end{array}$ $\begin{array}{ll}2026 \text { Dec } & 165,124 \\ 2027 \text { Jan } & 110,083\end{array}$ $\begin{array}{ll}2027 \text { Feb } & 121,877 \\ 2027 \text { Mar } & 165,124\end{array}$ $\begin{array}{ll}2027 \text { Apr } & \text { 395,124 }\end{array}$ 2027 May $1,376,000$ 2027 Jun $1,536,000$ $\begin{array}{ll}2027 \text { Jul } & 715,537 \\ 2027 \text { Aug } & 330,248\end{array}$ $\begin{array}{ll}2027 \mathrm{Aug} & 330,248 \\ 2027 \mathrm{Sep} & 284,380 \\ 2027\end{array}$ $\begin{array}{ll}2027 \text { Sep } & 284,380 \\ 2027 \text { Oct } & 220,165\end{array}$
2027 Nov 227,504 $\begin{array}{ll}2027 \text { Dec } & 165,124 \\ 2028 \text { Jan } & 110,083\end{array}$ 2028 Feb 1117,675 2028 Mar
$\begin{array}{ll}2028 \text { Apr } & 398,132 \\ 2028 \text { May } & 1,376000\end{array}$ 2028 May $1,376,000$ 2028 Jul
2028 Aug
2028 sep
2028 oct
2028 Nov
$\begin{array}{ll}2029 \mathrm{Jan} & 110,083 \\ 2029 \mathrm{Feb} & 121,877\end{array}$
$2029 \mathrm{Feb} \quad 121,877$
$\begin{array}{ll}2029 \text { Mar } & 165,124 \\ 2029 \text { Apr } & 398,132\end{array}$
$\begin{array}{ll}2029 \text { Apr } & 398,132 \\ 2029 \text { May } & 1,376,000\end{array}$ 2029 Jun $1,536,000$ $\begin{array}{ll}2029 \mathrm{Jul} & 715,537 \\ 2029\end{array}$ $\begin{array}{ll}2029 \mathrm{Aug} & 330,248 \\ 2029 \mathrm{Sep} & 284,38\end{array}$ 2029 oct 2220,165 2029 Nov 227,504 $\begin{array}{ll}2030 \text { Jan } & 110,083\end{array}$ $\begin{array}{ll}2030 \text { Feb } & 121,877 \\ 2030 \text { Mar } & 165,124\end{array}$ $\begin{array}{lr}2030 \text { Apr } & 398,132 \\ 2030 \text { May } & 1376000\end{array}$ 2030 Jun $1,536,000$ 2030 Jul $\quad 715,537$ $\begin{array}{ll}2030 \text { Aug } & 330,248 \\ 2030 \text { Sep } & 284,380\end{array}$ 2030 Oct 2030 Nov 227,504 $\begin{array}{ll}2030 \text { Dec } & 165,124 \\ 2031 \text { Jan } & 110,083\end{array}$ 2031 Jan
2031 Mar $\quad 165,124$
2031 May $1,376,000$
2031 Jun 1,536,000
2031 Jul
2031
715,537
$\begin{array}{ll}2031 \text { Aug } & 330,248 \\ 2031 \text { Sep } & 284,380\end{array}$
$\begin{array}{ll}\text { 2031 Sep } & 284,380 \\ \text { 2031 Oct } & 220165\end{array}$
2031 Nov
2031 Dec
2032 Jan
${ }_{2032 \mathrm{Feb}}^{203 \mathrm{Jan}}$
$\begin{array}{ll}2032 \text { Feb } & 117,675 \\ 2032 \text { Mar } & 165,124\end{array}$
2032 Apr 398,132
2032 May $1,376,000$ 2032 Jul
2032 Aug 330,248 2032 Sep 284,380 $\begin{array}{ll}2032 \text { Oct } & 220,165 \\ 2032 \text { Nov } & 227,504\end{array}$ $\begin{array}{ll}2032 \text { Nov } & 227,504 \\ 2035,124\end{array}$ 2033 Jan 110,083
2033 Feb 121,877
$\begin{array}{ll}2033 \text { Mar } & 165,124 \\ 2033 \text { Apr } & 398,132\end{array}$
2033 May $1,376,000$
2033 Jun $1,536,000$ 2033 Jul
$\begin{array}{ll}\text { 2033 Aug } & 350,248 \\ 2033 \text { Sep } & 284,380\end{array}$
2033 oct 220,165
2033 Nov 227,504
$\begin{array}{ll}2033 \text { Dec } & 165,124 \\ 2034 \text { Jan } & 110,083\end{array}$
$2034 \mathrm{Feb} \quad 121,877$
2034 Mar $\quad 165,124$
2034 Apr $\quad 398,132$
2034 May $1,376,000$
2034 Jun
2034 Aug
2034 sep
2034 Oct
2034 Nov
2034 Dec
2035 Jan
2035 Feb 121,877
$\begin{array}{ll}2035 \mathrm{Mar} & 165,124 \\ 2035 \mathrm{Apr} & 398\end{array}$
2035 Apr $\quad 398,132$
$\begin{array}{ll}2035 \text { May } & 1,376,000 \\ 2035 \text { Jun } & 1,536,000\end{array}$
$\begin{array}{ll}2035 \text { Jul } & 715,537\end{array}$
2035 Aug 330,248
2035 Sep 284,380
2035 Oct 220,165
$\begin{array}{ll}2035 \text { Nov } & 227,504 \\ 2035 \text { Dec } & 165,124\end{array}$
$\begin{array}{ll}2035 \text { Dec } & 165,124 \\ 2036 \text { Jan } & 110,083\end{array}$
$\begin{array}{ll}2036 \mathrm{Jan} & 110,083 \\ 2036 \mathrm{Feb} & 117,676\end{array}$
2036 Mar $\quad 165,124$
$\begin{array}{lr}2036 \text { Apr } & \text { 398, } \\ 2036 \text { May } \\ 1,376,000\end{array}$
2036 Jun 1,536,000

|  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1,214,000 | 303,940 | 1,282,000 | 23,279 | 2,092,000 | 129,351 | 2,563,000 |
| 606,092 | 163,351 | 644,054 | 13,917 | 1,056,123 | 78,857 |  |
| 535,529 | 147,472 | 569,926 | 12,847 | 935,133 | 73,115 | 1,121,597 |
| 436,063 | 124,901 | 465,397 | 11,305 | 764,504 | 64,811 | 909,457 |
| 447,990 | 127,761 | 477,981 | 11,527 | 785,148 | 66,036 | 934,934 |
| 345,799 | 103,052 | 370,270 | 9,723 | 609,562 | 56,123 | 718,278 |
| 159,461 | 21,214 | 167,610 | 509 | 276,541 | 1,329 | 349,431 |
| 6,134 | 23,106 | 185,163 | 564 | 305,768 | 1,473 | 386,471 |
| 237,930 | 30,658 | 250,178 | 764 | 413,651 | 2,003 | 522,997 |
| 573,516 | 73,772 | 603,048 | 1,842 | 997,474 | 4,860 | 1,260,750 |
| $02,109,276$ | 372,099 | 2,224,430 | 21,024 | 3,680,776 | 105,351 | 4,589,966 |
| $02,540,250$ | 586,880 | 2,688,251 | 45,544 | 4,453,729 | 250,920 | 5,463,598 |
| , | 295,633 | 1,23,765 | 24,400 | 12, | 136,100 |  |
| 582,705 | 159,738 | 618,79 | 14,429 | 1,027,448 | 81,930 | 1,244,010 |
| 509,368 | 144,548 | 541,192 | 13,283 | 898,461 |  |  |
| 406,154 | 122,782 | 431,997 | 11,639 | 717,099 | 66,813 | 861,151 |
| 418,440 | 125,721 | 445,001 | 11,869 | 738,583 | 68,084 | 887,462 |
| 317,330 | 103,799 | 338,060 | 10,237 | 561,340 |  |  |
| 227,208 | 84,406 | 242,893 | 8,785 | 403,683 | 51,307 | 475,491 |
| 239,132 | 86,763 | 255,555 | 8,999 | 424,956 | 52,482 | 501,779 |
| 314,842 | 102,596 | 335,805 | 10,285 | 558,774 | 59,504 | 666,931 |
| 689,031 | 182,564 | 732,248 | 16,611 | 1,218,677 | 94,050 | 1,480,663 |
| 0 2,262,532 | 520,844 | 2,399,013 | 43,292 | 3,990,219 | 239,8 |  |
| 0 2,517,770 | 574,594 | 2,669,459 | 47,822 | 4,442,479 | 264,686 | 5,454,853 |
| 0 1,197,238 | 289,904 | 1,270,565 | 25,462 | 2,116,872 | 142,521 | 2,588,549 |
| 577,666 | 157,094 | 614,605 | 14,8 | 1,024,885 | 84,89 |  |
| 505,002 | 142,272 | 537,573 | 13,705 | 896,234 | 78,290 | 1,082,826 |
| 402,730 | 121,020 | 429,156 | 11,966 | 715,328 | 68,794 | 859,819 |
| 414,906 | 123,901 | 442,070 | 12,207 | 736,761 | 70,131 | 886,092 |
| 314,714 | 102,477 | 335,886 | 10,482 | 559,962 | 60,696 | 668,108 |
| 226,290 | 83,525 | 242,140 | 8,948 | 403,476 | 52,2 | 475,297 |
| 244,873 | 87,240 | 261,880 | 9,292 | 436,660 | 54,160 | 516,270 |
| 313,465 | 101,278 | 334,676 | 10,529 | 558,625 | 60,953 | 666,796 |
| 685,700 | 179,387 | , 52 | 17,2 | 1,218,4 | 97,581 |  |
| 0 2,250,982 | 509,860 | 2,389,560 | 45,329 | 3,990,632 | 252,108 | 4,898,782 |
| $02,505,177$ | 562,338 | 2,658,956 | 50,095 | 4,442,819 | 278,386 | 5,456,316 |
| 1,192,014 | 284,916 | 1,267,432 | 26,611 | 2,118,640 | 149,436 | 2,590,34 |
| 584,532 | 162,995 | 622,871 | 16,478 | 1,041,850 | 94,28 | 1,259,150 |
| 509,257 | 145,922 | 542,881 | 14,869 | 907,885 | 85,28 |  |
| 403,318 | 121,563 | 430,304 | 12,580 | 719,514 | 72,478 | 863,983 |
| 415,600 | 124,227 | 443,350 | 12,812 | 741,230 | 73,758 | 890,535 |
| 3,338 | 101,160 | 334,758 | 10,726 | 559,809 | 62,145 | 667,970 |
| 225,132 | 82,646 | 241,187 | 9,111 | 403,658 | 53,2 | 475,551 |
| 243,597 | 86,267 | 260,829 | 72 | 436,840 |  |  |
| 311,751 | 99,960 | 333,270 | 10,773 | 558,745 | 62,468 | 667,013 |
| 681,632 | 176,209 | 726,193 | 17,789 | 1,218,416 | 101,180 | 1,480,626 |
| 2,293,210 | 548,882 | 2,439,586 | 53,636 | 4,089,118 | 302,318 | 4,995,991 |
| $02,586,075$ | 636,128 | 2,752,218 | 63,160 | 4,612,500 | 357,324 | 5,62,085 |
| $01,216,849$ | 308,772 | 1,296,096 | 31,378 | 2,175,668 | 178,264 | 2,647,181 |
| 575,730 | 154,905 | 614,175 | 16,283 | 1,033,206 | 93,150 | 1,250,02 |
| 500,131 | 138,190 | 533,700 | 14,604 | 896,905 | 83,732 | 1,084,123 |
| 398,622 | 117,506 | 425,789 | 12,618 | 715,276 | 72,742 | 859,905 |
| 410,663 | 120,270 | 438,591 | 12,880 | 736,705 | 74,210 | 886,178 |
| 311,624 | 99,842 | 333,351 | 10,971 | 559,930 | 63,60 | 668,188 |
| 256,653 | 81,762 | 278,166 | 9,274 | 470,414 | 54,276 | 542,891 |
| 273,659 | 85,275 | 296,281 | 9,653 | 501,710 | 56,3 | 581,951 |
| 336,893 | 98,599 | 363,471 | 11,019 | 616,918 | 63,953 | 725,632 |
| 682,588 | 172,884 | 730,420 | 18,384 | 1,242,000 | 104,771 | 1,54,000 |
| $02,152,000$ | 493,781 | 2,291,000 | 50,245 | 3,901,000 | 281,837 | 4,806,000 |
| $02,555,000$ | 624,171 | 2,72, 7000 | 65,615 | 4,634,000 | 372,147 | 5,46, 000 |
| 1,202,000 | 297,425 | 1,286,000 | 31,810 | 2,190,000 | 180,872 | 2,661,000 |
| 577,254 | 148,932 | 619,608 | 16,396 | 1,058,323 | 93,830 | 1,276,000 |
| 511,029 | 135,222 | 549,304 | 14,979 | 937,477 | 85,994 | 1,125,597 |
| 417,351 | 115,545 | 449,761 | 12,954 | 766,674 | 74,773 | 911,627 |
| 428,920 | 118,226 | 462,165 | 13,229 | 787,746 | 76,319 | 937,530 |
| 336,389 | 98,347 | 363,814 | 11,225 | 619,730 | 65,198 | 728,444 |
| 219,619 | 80,763 | 236,427 | 9,444 | 407,271 | 55,305 | 478,360 |
| 231,070 | 82,860 | 248,691 | 9,705 | 428,752 | 56,759 | 504,822 |
| 303,855 | 97,107 | 326,475 | 11,277 | 563,797 | 65,508 | 67,995 |
| 663,653 | 169,299 | 710,790 | 19,007 | 1,299,284 | 108,531 | 1,489,299 |
| 0 2,164,900 | 464,125 | 2,313,716 | 50,218 | 4,005,258 | 281,668 | 4,906,295 |
| 0 2,011,708 | 129,374 | 2,133,807 | 7,106 | 3,700,591 | 18,828 | 4,71,413 |
| 932,866 | 57,124 | 989,673 | 3,311 | 1,799,724 | 8,773 | 2,193,023 |
| 427,333 | 24,469 | 453,606 | 1,528 | 790,486 | 4,049 | 1,008,934 |
| 367,983 | 21,237 | 390,607 | 1,316 | 680,696 | 3,486 | 868,804 |
| 285,036 | 16,579 | 302,50 | 1,019 | 527,135 | 2,699 | 672,765 |
| 294,609 | 17,198 | 312,704 | 1,053 | 544,776 | 2,789 | 695,259 |
| 213,523 | 12,195 | 226,662 | 764 | 395,095 | 2,024 | 504,321 |
| 140,986 | 7,842 | 149,948 | 509 | 261,083 | 1,349 | 334,235 |
| 155,673 | 8,286 | 165,601 | 564 | 288,638 | 1,994 | 369,632 |
| 210,205 | 10,557 | 223,667 | 764 | 390,351 | 2,024 | 500,091 |
| 641,791 | 159,329 | 689,078 | 18,819 | 1,195,675 | 107,394 | 1,457,863 |
| $02,219,541$ | 528,795 | 2,382,700 | 62,043 | 4,129,555 | 353,073 | 5,036,255 |
| 0 2,517,310 | 626,072 | 2,703,028 | 74,120 | 4,683,674 | 423,497 | 5,693,703 |
| 0 1,184,741 | 303,768 | 1,272,992 | 36,457 | 2,209,101 | 208,930 | 2,679,881 |
| 560,344 | 152,800 | 602,976 | 18,658 | 1,047,292 | 107,491 | 1,263,760 |
| 486,299 | 135,980 | 523,440 | 16,605 | 909,085 | 95,808 | 1,095,74 |
| 3,414 | 111,750 | 412,961 | 13,663 | 717,107 | 79,051 | 861,581 |
| 395,830 | 115,662 | 426,305 | 14,132 | 740,190 | 81,769 | 889,487 |
| 299,803 | 95,410 | 323,338 | 11,746 | 561,159 | 68,339 | 669,295 |
| 215,524 | 78,832 | 233,077 | 9,784 | 403,802 | 57,366 | 475,777 |
| 233,148 | 82,089 | 252,010 | 10,204 | 436,962 | 59,707 | 516,736 |
| 298,114 | 94,362 | 321,770 | 11,746 | 558,911 | 68,341 | 667,281 |
| 667,793 | 177,959 | 718,967 | 21,982 | 1,249,998 | 126,495 | 1,512,125 |
| 0 0,258,426 | 567,732 | 2,429,003 | 69,506 | 4,217, 824 | 398,138 | $5,125,178$ |
| $02,516,622$ | 629,220 | 2,706,277 | 77,112 | 4,699,321 | 441,560 | 5,71,853 |
| 0 1,188,756 | 308,624 | 1,278,368 | 38,146 | 2,222,453 | 219,126 | 2,993,897 |
| 565,098 | 158,605 | 608,938 | 19,824 | 1,058,661 | 114,528 | 1,275,563 |
| 492,911 | 141,971 | 531,295 | 17,681 | 923,192 | 102,308 | 1,109,865 |
| 389,288 | 118,000 | 419,835 | 14,658 | 729,107 | 85,062 | 873,741 |
| 401,724 | 121,469 | 433,170 | 15,037 | 751,975 | 87,236 | 901,444 |
| 301,094 | 97,050 | 325,016 | 12,050 | 564,101 | 70,176 | 672,427 |
| 215,366 | 78,684 | 232,958 | 9,821 | 403,895 | 57,581 | 475,873 |
| 233,002 | 81,953 | 251,009 | 10,249 | 437,119 | 59,977 | 51,896 |
| 297,956 | 94,214 | 321,677 | 11,812 | 559,201 | ${ }^{68,735}$ | ${ }^{667,573}$ |
| 673,297 | 183,208 | 725,215 | 22,842 | 1,261,478 | 131,692 | 1,523,516 |
| O 2,257,352 | 566,968 | 2,428,956 | 70,110 | 4,220,695 | 401,780 | 5,128,060 |
| $\begin{aligned} & 02,515,546 \\ & 0 \\ & 0\end{aligned} 1,187,992$ | 628,560 | 2,705,187 | 77,809 | 4,703,211 | 445,769 | 5,744,749 |
| ,187,692 | 308,309 | 1,278,343 | 38,470 | 2,223,355 | 221,081 | 2,994,811 |
| 565,722 | 158,385 | 609,791 | 19,964 | 1,060,693 | 115,374 | 1,278,628 |
| 492,267 | 142,268 117577 | 530,730 | 17,873 | 923,030 | 103,405 88417 | 1,109,812 |
| 389,061 | 117,577 | 419,696 | 14,717 | 729,472 | 85,417 | 874,110 |
| 401,979 | 121,178 | 433,566 | 15,116 | 753,239 | 87,714 | 902,702 |
| 300,829 | 97,178 | 324,808 | 12,150 | 564,203 | 70,780 | 672,532 |
| 250,375 | 78,622 | 273,080 | 9,870 | 472,468 | 57,872 | 544,945 |
| 260,858 327,939 | 80,652 | 284,358 | 10,149 | 492,645 | 59,437 | 570,118 |
| 327,939 | 94,122 | 356,247 | 11,884 | 620,060 | 69,173 |  |
| 690,770 | 176,276 | 746,060 | 22,176 | 1,304,000 | 127,666 | 1,566,000 |
| $0 \text { 2,302,000 }$ | $564,406$ | 2,481,000 | 70,489 | 4,327,000 | 404,071 | 5,232,000 |




[^7]| ${ }^{2036 \mathrm{Ju}}$ | 715,537 | 0 1,222,000 | 306,252 | 1,32000 | 38,576 | 2,304,000 | 221,724 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2036 Aug | 330,248 | 594,562 | 157,007 | 643,852 | 19,959 | 1,125,139 | 115,346 | 1,342,000 |
| 2036 Sep | 284,380 | 521,043 | 139,725 | 564,628 | 17,689 | 984,755 | 102,354 |  |
| 2036 ct | 220,165 | 419,911 | 116,123 | 455,759 | 14,647 | 793,336 | 84,993 | 938,287 |
| 2036 Nov | 227,504 | 432,020 | 119,525 | 468,787 | 15,025 | 815,558 | 87,161 | 965,344 |
| 2036 dec | 165,124 | 329,549 | 95,421 | 358,428 | 12,014 | 623,058 | 69,957 | 731,774 |
| 2037 Jan | 110,083 | 250,251 | 78,561 | 273,054 | 9,918 | 473,026 | 58,165 | 545,503 |
| 2037 Feb | 121,877 | 266,743 | 81,817 | 290,771 | 10,356 | 504,622 | 60,623 | 584,863 |
| 2037 Mar | 165,124 | 327,755 | 94,030 | 356,209 | 11,956 | 620,894 | 69,610 | 729,610 |
| 2037 Apr | 398,132 | 688,248 | 175,365 | 743,648 | 22,264 | 1,302,000 | 128,196 | 1,564,000 |
| 2037 May 1 | 1,376,000 | 2,300,000 | 562,952 | 2,479,000 | 71,006 | , 331,000 | 407,190 | 5,23,000 |
| 2037 Jun | 1,536,000 | 0 2,561,000 | 624,831 | 2,759,000 | 78,903 | 4,824,000 | 452,377 | 5,836,000 |
| 2037 Jul | 715,537 | 0 1,220,000 | 305,622 | 1,318,000 | 38,861 | 2,304,000 | 223,441 | 2,775,000 |
| 2037 Aug | 330,248 | 593,324 | 156,354 | 642,804 | 20,045 | 1,125,139 | 115,863 | 1,342,000 |
| 2037 Sep | 284,380 | 520,863 | 139,695 | 564,712 | 17,829 | 986,437 | 103,203 | 1,173,597 |
| 2037 ct | 220,165 | 418,115 | 115,721 | 453,977 | 14,708 | 791,638 | 85,364 |  |
| 2037 Nov | 227,504 | 431,084 | 119,075 | 467,973 | 15,084 | 815,470 | 87,518 | 965,256 |
| 2037 Dec | 165,124 | 329,499 | 95,331 | 358,536 | 12,086 | 624,134 | 70,395 | 732,848 |
| 2038 Jan | 110,083 | 165,186 | 24,823 | 177,336 | 3,160 | 311,920 | 17,354 | 384,430 |
| 2038 feb | 121,877 | 181,009 | 25,721 | 194,275 | 3,303 | 341,944 | 18,032 | 422,285 |
| 2038 Mar | 165,124 | 248,215 | 37,552 | 266,578 | 4,872 | 469,343 | 26,831 | 578,083 |
| 2038 Apr | 398,132 | 596,237 | 88,401 | 640,195 | 11,428 | 1,127,066 | 62,763 | 1,389,314 |
| 2038 May | 1,376,000 | 0 2,073,749 | 317,438 | 2,227,282 | 40,602 | 3,916,747 | 223,593 | 4,823,258 |
| 2038 Jun | 1,536,000 | - $2,303,074$ | 343,759 | 2,472,962 | 44,079 | 4,350,234 | 242,088 | 5,361,92 |
| 2038 Jul | 715,537 | 1,075,819 | 162,712 | 1,155,126 | 21,113 | 2,033,548 | 116,268 | 2,504,861 |
| 2038 Aug | 330,248 | 495,091 | 73,810 | 531,832 | 9,744 | 937,338 | 53,662 | 1,154,348 |
| 2038 Sep | 284,380 | 424,989 | 62,343 | 456,399 | 8,163 | 804,044 | 44,831 | 991,393 |
| 2038 ctt | 220,165 | 331,028 | 50,115 | 355,510 | 6,496 | 625,864 | 35,775 | 770,849 |
| 2038 Nov | 227,504 | 340,923 | 50,739 | 366,038 | 6,530 | 644,170 | 35,865 | 794,034 |
| 2038 dec | 165,124 | 298,828 | 106,107 | 322,806 | 13,518 | 565,273 | 79,040 | 672,299 |
| 2039 Jan | 110,083 | 231,497 | 88,616 | 251,555 | 11,289 | 437,923 | 66,441 | 509,411 |
| 2039 feb | 121,877 | 250,712 | 92,915 | 272,311 | 11,864 | 474,413 | 69,729 | 553,700 |
| 2039 Mar | 165,124 | 321,482 | 109,015 | 348,735 | 13,986 | 608,578 | 81,868 | 716,459 |
| 2039 Apr | 398,132 | 705,371 | 198,159 | 763,108 | 25,468 | 1,333,976 | 147,547 | 1,595,870 |
| 2039 May 1 | 1,376,000 | 2,319,412 | 575,146 | 2,505,270 | 73,671 | 4,384,147 | 423,285 | 5,291,94 |
| 2039 Jun | 1,536,000 | 0 2,581,437 | 635,652 | 2,788,725 | 81,463 | 4,880,057 | 467,833 | 5,893,183 |
| 2039 Jul | 715,537 | 1,227,099 | 318,568 | 1,326,695 | 41,014 | 2,321,465 | 236,444 | 2,793,307 |
| 2039 Aug | 330,248 | 591,615 | 170,423 | 640,407 | 22,040 | 1,120,670 | 127,909 | 1,37, 369 |
| 2039 Sep | 284,380 | 517,079 | 153,833 | 559,868 | 19,789 | 978,621 | 115,035 | 1,165,391 |
| 2039 ct | 220,165 | 412,112 | 130,036 | 446,506 | 16,638 | 779,533 | 97,019 | 923,804 |
| 2039 Nov | 227,504 | 424,677 | 133,284 | 460,020 | 16,996 | 802,837 | 99,062 | 951,955 |
| 2039 dec | 165,124 | 321,816 | 109,337 | 349,008 | 13,930 | 608,497 | 81,527 | 716,379 |
| 2040 Jan | 110,083 | 231,034 | 88,131 | 251,036 | 11,227 | 437,073 | 66,071 | 508,552 |
| 2040 Feb | 117,675 | 243,267 | 90,779 | 264,254 | 11,590 | 460,365 | 68,143 | 536,866 |
| 2040 Mar | 165,124 | 320,752 | 108,279 | 347,917 | 13,894 | 607,236 | 81,308 | 715,110 |
| 2040 Apr | 398,132 | 703,596 | 196,385 | 761,116 | 25,245 | 1,331,081 | 146,198 | 1,592,963 |
| 2040 May 1 | 1,376,000 | 2,31, | 569,016 | 2,498,368 | 72,899 | 4,372,315 | 418,620 | 5,28,030 |
| 2040 Jun | 1,536,000 | 0 0,574,534 | 628,810 | 2,780,820 | 80,601 | 4,867,274 | 462,627 | 5,88,394 |
| 2040 Jul | 715,537 | 0 1,224,171 | 315,379 | 1,322,728 | 40,612 | 2,315,583 | 234,018 | 2,78,418 |
| 2040 Aug | 330,248 | 590,144 | 168,951 | 638,756 | 21,854 | 1,117,718 | 126,789 | 1,334,414 |
| 2040 Sep | 284,380 | 515,813 | 152,566 | 558,47 | 19,629 | 976,290 | 114,070 | 1,163,472 |
| 2040 oct | 220,165 | 411,137 | 129,055 | 445,410 | 16,515 | 777,735 | 96,273 | 922,000 |
| 2040 Nov | 227,504 | 423,669 | 132,271 | 458,887 | 16,868 | 800,980 | 98,291 | 950,090 |
| 2040 dec | 165,124 | 321,088 | 108,601 | 348,190 | 13,837 | 607,155 | 80,968 | 715,030 |
| 2041 Jan | 110,083 | 230,409 | 87,635 | 250,357 | 11,165 | 435,902 | 65,694 | 507,423 |
| 2041 Feb | 121,877 | 249,477 | 91,814 | 270,951 | 11,725 | 472,117 | 68,892 | 551,442 |
| 2041 Mar | 165,124 | 319,793 | 107,508 | 346,875 | 13,796 | 605,441 | 80,721 | 713,373 |
| 2041 Apr | 398,132 | 701,267 | 194,488 | 758,582 | 25,006 | 1,366,270 | 144,753 | 1,588,283 |
| 2041 May | 1,376,000 | 0 0,305,168 | 562,330 | 2,889,102 | 72,056 | 4,356,662 | 413,530 | 5,265,793 |
| 2041 Jun | 1,536,000 | 0 0,599,514 | 621,205 | 2,807,699 | 79,642 | 4,913,154 | 456,837 | 5,92,886 |
| 2041 Jul | 715,537 | 0 1,257,168 | 311,770 | 1,359,629 | 40,157 | 2,377,542 | 231,269 | 2,848,655 |
| 2041 Aug | 330,248 | 588,077 | 167,254 | 636,503 | 21,640 | 1,114,067 | 125,497 | $1,330,868$ |
| 2041 Sep | 284,380 | 514,002 | 151,078 | 556,473 | 19,441 | 972,896 | 112,937 | 1,159,970 |
| 20410 ct | 220,165 | 409,707 | 127,882 | 443,852 | 16,367 | 775,057 | 95,379 | ${ }^{919,398}$ |
| 2041 Nov | 227,504 | 422,168 | 131,037 | 457,253 | 16,712 | 798,169 | 97,351 | 947,359 |
| 2041 dec | 165,124 | 319,977 | 107,690 | 346,980 | 13,722 | 605,075 | 80,274 | 713,011 |
| 2042 Jan | 110,083 | 267,881 | 86,998 | 292,908 | 11,085 | 506,322 | 65,209 | 578,797 |
| 2042 Feb | 121,877 | 286,061 | 91,059 | 312,519 | 11,630 | 541,038 | 68,316 | 621,279 |
| 2042 Mar | 165,124 | 353,661 | 106,416 | 385,357 | 13,659 | 669,626 | 79,889 | 778,340 |
| 2042 Apr | 398,132 | 722,922 | 191,686 | 782,900 | 24,652 | 1,368,000 | 142,616 | 1,630,000 |
| 2042 May 1 | 1,376,000 | 0 2,278,000 | 552,059 | 2,457,000 | 70,758 | 4,35,000 | 405,692 | 5,212,000 |
| 2042 Jun | 1,536,000 | 0 2,777,000 | 609,089 | 3,055,000 | 78,110 | 5,25,000 | 447,587 | 6,260,000 |
| 2042 Jul | 715,537 | 0 1,292,000 | 305,819 | 1,388,000 | 39,405 | 2,444,000 | 226,725 | 2,915,000 |
| 2042 Aug | 330,248 | 610,382 | 164,365 | 662,174 | 21,275 | 1,157,139 | 123,290 | 1,376,000 |
| 2042 Sep | 284,380 | 539,471 | 148,468 | 585,734 | 19,111 | 1,022,027 | 110,944 | 1,209,597 |
| 2042 ct | 220,165 | 439,305 | 125,768 | 477,793 | 16,099 | 831,310 | 93,764 | 976,263 |
| 2042 Nov | 227,504 | 451,540 | 128,756 | 490,951 | 16,424 | 853,690 | 95,607 | 1,003,476 |
| 2042 dec | 165,124 | 352,755 | 105,964 | 384,576 | 13,504 | 666,978 | 78,954 | 775,692 |
| 2043 Jan | 110,083 | 220,904 | 82,373 | 238,830 | 10,411 | 419,467 | 62,291 | 490,584 |
| 2043 Feb | 121,877 | 235,453 | 82,577 | 254,306 | 10,435 | 447,050 | 62,373 | 525,999 |
| 2043 Mar | 165,124 | 288,799 | 83,324 | 311,054 | 10,522 | 548,189 | 62,673 | 655,854 |
| 2043 Apr | 398,132 | 576,217 | 87,349 | 616,800 | 10,993 | 1,093,386 | 64,289 | 1,355,551 |
| 2043 May | 1,376,000 | 0 1,788,244 | 104,243 | 1,899,938 | 12,967 | 3,380,234 | 71,074 | 4,291,702 |
| 2043 Jun | 1,536,000 | 0 0,978,979 | 107,000 | 2,199,192 | 13,289 | 3,752,858 | 72,181 | 4,771,245 |
| 2043 uul | 715,537 | 985,504 | 92,832 | 1,052,514 | 11,633 | 1,869,509 | 66,491 | 2,341,980 |
| 2043 Aug | 330,248 | 539,055 | 131,764 | 579,370 | 16,628 | 1,023,011 | 98,674 | $1,238,820$ |
| 2043 Sep | 284,380 | 467,988 | 117,874 | 503,117 | 14,877 | 888,163 | 88,341 | 1,074,766 |
| 2043 ct | 220,165 | 365,256 | 94,040 | 392,774 | 11,870 | 693,212 | 70,521 | 837,227 |
| 2043 Nov | 227,504 | 380,058 | 99,658 | 408,779 | 12,580 | 721,320 | 74,70 | 870,073 |
| 2043 dec | 165,124 | 275,882 | 72,364 | 296,732 | 9,135 | 523,602 | 54,293 | 631,568 |
| 2044 Jan | 110,083 | 182,071 | 47,779 | 196,187 | 6,031 | 345,256 | 35,841 | 417,829 |
| 2044 Feb | 117,675 | 193,634 | 50,128 | 208,613 | ${ }_{6}^{6,327}$ | 367,178 | 37,589 | 444,772 |
| 2044 Mar | 165,124 | 269,588 | 68,317 | 290,371 | 8,622 | 511,191 | 51,198 | 620,113 |
| 2044 Apr | 398,132 | 652,796 | 167,377 | 703,216 | 21,125 | 1,237,443 | 125,476 | 1,500,848 |
| 2044 May | 1,376,000 | 0 2,276,121 | 597,553 | 2,452,648 | 75,427 | 4,316,270 | 448,249 | 5,22,160 |
| 2044 Jun | 1,536,000 | $02,538,588$ | 665,536 | 2,735,288 | 84,008 | 4,814,626 | 499,227 | 5,826,637 |
| 2044 Jul | 715,537 | 0 0,173,756 | 300,887 | 1,264,113 | 37,976 | 2,224,653 | 225,566 | 2,696,297 |
| 2044 Aug | 330,248 | 535,059 | 132,712 | 576,168 | 16,748 | 1,014,554 | 99,398 | 1,232,055 |
| 2044 Sep | 284,380 | 464,519 | 117,874 | 500,337 | 14,877 | 880,820 | 88,341 | 1,068,897 |
| 2044 ct | 220,165 | 362,549 | 94,040 | 390,604 | 11,870 | 687,481 | 70,521 | ${ }^{832,655}$ |
| 2044 Nov | 227,504 | 377,241 | 99,658 | 406,520 | 12,580 | 715,356 | 74,770 | 865,322 |
| 2044 dec | 165,124 | 273,837 | 72,364 | 295,092 | 9,135 | 519,273 | 54,293 | 628,119 |
| 2045 Jan | 110,083 | 182,064 | 47,779 | 196,182 | 6,031 | 345,243 | 35,841 | 417,815 |
| 2045 Feb | 121,877 | 200,542 | 51,918 | 216,058 | 6,553 | 380,275 | 38,931 | 460,642 |
| 2045 Mar | 165,124 <br> 98823 | 269,578 | 68,317 | 290,364 | 8,622 | 511,171 | 51,198 <br> 125476 | ${ }^{620,092}$ |
| 2045 Apr | 398,132 | 652,773 | 167,377 | 703,199 | 21,125 | 1,237,395 | 125,476 | 1,500,799 |
| 2045 May 1 | 1,376,000 | $02,276,040$ | 597,553 | 2,452,586 | 75,427 | 4,316,100 | 448,249 | 5,22,990 |
| 2045 Jun | 1,536,000 | 0 0 2,538,499 | 665,536 | 2,735,218 | 84,008 | 4,814,437 | 499,227 | 5,826,447 |
| 2045 Jul | 715,537 | 0 0,173,715 | 300,887 | 1,264,081 | 37,976 | 2,224,565 | 225,566 | 2,996,209 |
| 2045 Aug | 330,248 | 535,041 | 132,712 | 576,154 | 16,748 | 1,014,514 | 99,398 | 1,232,015 |
| 2045 Sep | 284,380 | 464,502 | 117,874 | 500,324 | 14,877 | 880,785 | 88,341 | 1,068,862 |
| 2045 ct | 220,165 | 362,536 | 94,040 | 390,594 | 11,870 | 687,454 | 70,521 | 832,628 |
| 2045 Nov | 227,504 | 377,227 | 99,658 | 406,510 | 12,580 | 715,328 | 74,770 | 865,294 |
| 2045 dec | 165,124 | 273,827 | 72,364 | 295,085 | 9,135 | 519,253 | 54,293 | 628,098 |
| 2046 Jan | 110,083 | 182,064 | 47,779 | 196,182 | 6,031 | 345,243 | 35,84 | 417,815 |
| 2046 Feb | 121,877 | 200,542 | 51,918 | 216,058 | 6,553 | 380,275 | 38,931 | 460,642 |
| 2046 Mar | 165,124 | 269,578 | 68,317 | 290,364 | 8,622 | 511,171 | 51,198 | 620,092 |
| 2046 Apr | 398,132 | 652,773 | 167,377 | 703,199 | 21,125 | 1,237,395 | 125,476 | 1,500,799 |
| 2046 May 1 | 1,376,000 | $02,276,040$ | 597,553 | 2,452,586 | 75,427 | 4,316,100 | 448,249 | 5,222,990 |
| 2046 Jun | $1.536,000$ 715,537 | $02,538,499$ | 665,536 | 2,735,218 |  | 4,814,43 | 499,227 | 5,826,447 |


|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2046 Sep | 284,380 | 464,502 | 117,874 | 500,324 | 14,877 | 880,785 | 88,341 | 1,068,862 |
| 2046 ct | 220,165 | 362,536 | 94,040 | 390,594 | 11,870 | 687,454 | 70,521 | 832,628 |
| 2046 Nov | 227,504 | 377,227 | 99,658 | 406,510 | 12,580 | 715,328 | 74,770 | 865,294 |
| 2046 dec | 165,124 | 273,827 | 72,364 | 295,085 | 9,135 | 519,253 | 54,293 | 628,098 |
| 2047 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2047 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2047 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8.622 | 523,640 | 51,198 | 632,514 |
| 2047 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2047 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2047 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2047 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,28,000 | 225,566 | 2,759,000 |
| 2047 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2047 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2047 ctt | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2047 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 |  |
| 2047 dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2048 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2048 feb | 117,676 | 199,736 | 50,128 | 215,366 | 6,327 | 378,593 | 37,589 | 456,178 |
| 2048 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2048 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2048 May 1 | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2048 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2048 Jul | 715,537 | 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 259,000 |
| 2048 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2048 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,3 | 1,091,597 |
| 2048 ctt | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2048 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2048 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2049 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2049 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2049 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2049 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2049 May 1 | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2049 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2049 Jul | 715,537 | 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2049 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2049 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,34 | 1,091,597 |
| 2049 oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2049 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2049 dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2050 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2050 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2050 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2050 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2050 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2050 Jun | 1,536,000 | - 2,629,000 | 665,53 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| $2050 . \mathrm{Jul}$ | 715,537 | 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2050 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2050 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2050 ct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2050 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2050 dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2051 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2051 feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2051 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2051 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2051 May 1 | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2051 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2051 Jul | 715,537 | - 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2051 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2051 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2051 Oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2051 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2051 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2052 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2052 eb | 117,676 | 199,736 | 50,128 | 215,366 | 6,327 | 378,593 | 37,589 | 45,178 |
| 2052 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2052 Apr | 398,132 | 671,328 | 167,377 | 223,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2052 May 1 | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2052 Jun | 1,536,000 | O 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2052 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2052 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2052 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2052 ct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2052 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2052 dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2053 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2053 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2053 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8.622 | 523,640 | 51,198 | 632,514 |
| 2053 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2053 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2053 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2053 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2053 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2053 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2053 ctt | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2053 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,70 | 892,924 |
| 2053 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2054 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2054 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2054 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2054 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2054 May 1 | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2054 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2054 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2054 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2054 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2054 ct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2054 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2054 dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2055 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2055 feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2055 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2055 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2055 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2055 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2055 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2055 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2055 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2055 oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2055 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2055 dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2056 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2056 Feb | ${ }^{117,676}$ | 199,736 | 50,128 | 215,366 | ${ }_{6}^{6,327}$ | 378,593 | 37,589 | 456,178 |
| 2056 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2056 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2056 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2056 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2056 Jul | 715,537 330248 | 0 1,20 | 300,887 | 22,000 | 37,9 | 2,288,000 | 225,566 |  |


| 2056 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,001,597 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2056 ctt | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2056 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2056 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2057 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2057 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2057 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8.622 | 523,640 | 51,198 | 632,514 |
| 2057 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2057 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2057 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,98,000 |
| 2057 Jul | 715,537 | 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2057 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2057 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2057 ct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2057 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2057 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 |  | 648,258 |
| 2058 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2058 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2058 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2058 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2058 May | 1,376,000 | 2,358,000 | 597,553 | 2,545,000 | 75,421 | 4,471,000 | 448,249 | 5,378,000 |
| 2058 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2058 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,00 |
| 2058 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2058 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2058 oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2058 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2058 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2059 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2059 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2059 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2059 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2059 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2059 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2059 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,28,000 | 225,566 | 2,759,000 |
| 2059 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2059 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2059 Oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | ${ }^{854,965}$ |
| 2059 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2059 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2060 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2060 Feb | 117,676 | 199,736 | 50,128 | 215,366 | 6,327 | 378,593 | 37,589 | 456,178 |
| 2060 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2060 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2060 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2060 Jun | 1,536,000 | $\bigcirc 2,629,000$ | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2060 Jul | 715,537 | 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2060 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2060 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2060 ct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | ${ }^{85,965}$ |
| 2060 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2060 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2061 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2061 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2061 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2061 Apr | 398, 132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2061 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2061 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,98,000 |
| 2061 Jul | 715,537 | 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2061 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2061 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2061 ct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2061 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2061 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2062 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2062 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2062 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2062 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2062 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2062 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2062 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,32,000 | 37,976 | 2,288,000 | 225,566 | 2,759,00 |
| 2062 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | $1,250,000$ |
| 2062 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2062 Oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 85,965 |
| 2062 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,70 | 892,924 |
| 2062 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2063 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2063 feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2063 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2063 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2063 May | 1,376,000 | - 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2063 Jun | 1,536,000 | - 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2063 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2063 Aug | 330,248 | - 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | $1,250,000$ |
| 2063 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2063 ctt | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2063 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2063 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2064 Jan | 110,083 | 188,619 | 47,79 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2064 Feb | 117,676 | 199,736 | 50,128 | 215,366 | 6,327 | 378,593 | 37,589 | 456,178 |
| 2064 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2064 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2064 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2064 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,98,000 |
| 2064 Jul | 715,537 | $\bigcirc 1,208,000$ | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,759,000 |
| 2064 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2064 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2064 Oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2064 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,770 | 892,924 |
| 2064 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2065 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2065 Feb | 121,877 | 206,869 | 51,918 | 223,59 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2065 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2065 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2065 May | 1,376,000 | O 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2065 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,98,000 |
| 2065 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,28,000 | 225,566 | 2,759,00 |
| 2065 Aug | 330,248 | 544,612 | 132,712 | 587,036 | 16,748 | 1,032,935 | 99,398 | 1,250,000 |
| 2065 Sep | 284,380 | 476,159 | 117,874 | 513,684 | 14,877 | 903,149 | 88,341 | 1,091,597 |
| 2065 Oct | 220,165 | 374,205 | 94,040 | 404,025 | 11,870 | 709,800 | 70,521 | 854,965 |
| 2065 Nov | 227,504 | 391,644 | 99,658 | 423,155 | 12,580 | 742,920 | 74,70 | 892,924 |
| 2065 Dec | 165,124 | 284,321 | 72,364 | 307,248 | 9,135 | 539,384 | 54,293 | 648,258 |
| 2066 Jan | 110,083 | 188,619 | 47,779 | 203,436 | 6,031 | 357,484 | 35,841 | 430,067 |
| 2066 Feb | 121,877 | 206,869 | 51,918 | 223,059 | 6,553 | 392,112 | 38,931 | 472,471 |
| 2066 Mar | 165,124 | 276,227 | 68,317 | 297,695 | 8,622 | 523,640 | 51,198 | 632,514 |
| 2066 Apr | 398,132 | 671,328 | 167,377 | 723,878 | 21,125 | 1,272,000 | 125,476 | 1,536,000 |
| 2066 May | 1,376,000 | 0 2,358,000 | 597,553 | 2,545,000 | 75,427 | 4,471,000 | 448,249 | 5,378,000 |
| 2066 Jun | 1,536,000 | 0 2,629,000 | 665,536 | 2,837,000 | 84,008 | 4,986,000 | 499,227 | 5,998,000 |
| 2066 Jul | 715,537 | 0 1,208,000 | 300,887 | 1,302,000 | 37,976 | 2,288,000 | 225,566 | 2,75,000 |
| 2066 Aug | 0,24 | 44,612 | 2,712 | 87,036 | 16,748 | 1,032,935 |  | 1,250,000 |















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| 2023 Dec | 120,729 | 261,398 | 93,273 | 278,543 | 8,067 | 444,032 | ,800 | 522,576 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2024 Jan | 80,486 | 138,533 | 33,336 | 146,312 | 1,753 | 231,528 | ¢,276 | 284,783 |
| 2024 Feb | 86,036 | 200,121 | 80,416 | 213,944 | 7,592 | 341,878 | 44,448 | 377,674 |
| 2024 Mar | 120,729 | 259,304 | 93,641 | 276,510 | 8,308 | 441,461 | 48,205 | 520,214 |
| 2024 Apr | 291,090 | 552,478 | 160,851 | 586,287 | 11,836 | 933,168 | 66,749 | 1,124,513 |
| 2024 May | 1,006,000 | 0 1,785,663 | 445,381 | 1,889,005 | 26,759 | 3,005,500 | 145,743 | 3,699,742 |
| 2024 Jun | 1,123,000 | 1,985,066 | 489,916 | 2,099,994 | 29,337 | 3,341,705 | 159,483 | 4,083,368 |
| 2024 Jul | 523,157 | 949,406 | 250,234 | 1,005,819 | 16,833 | 1,603,933 | 93,366 | 1,948,992 |
| 2024 Aug | 241,457 | 464,167 | 138,684 | 493,134 | 10,929 | 788,318 | 62,129 | 946,960 |
| 2024 Sep | 207,921 | 407,440 | 126,332 | 433,134 | 10,263 | 692,487 | 58,634 | 828,931 |
| 2024 ctt | 160,971 | 327,545 | 108,613 | 348,659 | 9,296 | 557,624 | 53,532 | 662,999 |
| 2024 Nov | 166,337 | 337,095 | 111,012 | 358,726 | 9,443 | 573,654 | 54,332 | 682,573 |
| 2024 Dec | 120,729 | 258,668 | 93,072 | 275,857 | 8,473 | 441,797 | 49,200 | 520,546 |
| 2025 Jan | 80,486 | 189,484 | 77,221 | 202,738 | 7,606 | 325,619 | 44,643 | 37,768 |
| 2025 feb | 89,109 | 203,881 | 80,224 | 217,973 | 7,804 | 350,374 | 45,716 | 408,232 |
| 2025 Mar | 120,729 | 257,216 | 91,725 | 274,382 | 8,509 | 441,003 | 49,481 | 519,791 |
| 2025 Apr | 291,090 | 547,428 | 156,233 | 581,144 | 12,321 | 932,155 | 69,829 | 1,124,191 |
| 2025 May | 1,006,000 | 0 1,768,137 | 429,419 | 1,871,649 | 28,436 | 2,996,781 | 155,934 | 3,661,289 |
| 2025 Jun | 1,123,000 | 0 0,966,343 | 472,102 | 2,079,365 | 31,208 | 3,332,848 | 170,848 | 4,074,997 |
| 2025 Jul | 523,157 | 940,320 | 241,934 | 996,571 | 17,704 | 1,600,067 | 98,700 | 1,94, 862 |
| 2025 Aug | 241,457 | 459,980 | 134,853 | 488,870 | 11,331 | 786,926 | 64,630 | 945,631 |
| 2025 Sep | 207,921 | 403,837 | 123,034 | 429,461 | 10,610 | 691,372 | 60,798 | 827,872 |
| 2025 Oct | 160,971 | 324,757 | 106,059 | 345,818 | 9,565 | 556,925 | 55,225 | 662,345 |
| 2025 Nov | 166,337 | 334,213 | 108,373 | 355,790 | 9,720 | 572,911 | 56,079 | ${ }^{681,875}$ |
| 2025 Dec | 120,729 | 256,579 | 91,157 | 273,728 | 8,674 | 441,335 | 50,475 | 520,119 |
| 2026 Jan | 80,486 | 219,980 | 75,944 | 237,960 | 7,740 | 390,964 | 45,475 | 443,955 |
| 2026 Feb | 89,109 | 233,009 | 78,811 | 251,677 | 7,952 | 413,614 | 46,620 | 472,282 |
| 2026 Mar | 120,729 | 281,758 | 89,811 | 302,916 | 8,710 | 497,387 | 50,703 | 576,873 |
| 2026 Apr | 291,090 | 549,493 | 151,617 | 584,100 | 12,806 | 954,023 | 72,764 | 1,144,701 |
| 2026 May | 1,006,000 | 1,678,000 | 413,464 | 1,769,000 | 30,112 | 2,877,000 | 166,055 | 3,53,000 |
| 2026 Jun | 1,123,000 | 1,858,000 | 454,297 | 1,959,000 | 33,079 | 3,189,000 | 182,142 | 3,929,00 |
| 2026 Jul | 523,157 | 909,865 | 233,637 | 963,091 | 18,576 | 1,574,000 | 103,967 | 1,918,000 |
| 2026 Aug | 241,457 | 466,320 | 131,023 | 497,191 | 11,734 | 817,284 | 67,066 | 976,254 |
| 2026 Sep | 207,921 | 415,373 | 119,736 | 443,647 | 10,956 | 729,535 | 62,897 | 866,427 |
| 2026 ct | 160,971 | 343,194 | 103,506 | 367,778 | 9,833 | 605,386 | 56,851 | 711,366 |
| 2026 Nov | 166,337 | 352,189 | 105,734 | 377,255 | 9,997 | 620,784 | 57,759 | 730,296 |
| 2026 Dec | 120,729 | 276,804 | 87,333 | 297,743 | 8,633 | 491,098 | 50,238 | 570,584 |
| 2027 Jan | 80,486 | 117,782 | 15,452 | 123,948 | 372 | 204,573 | 966 | 257,948 |
| 2027 Feb | 89,109 | 130,042 | 16,780 | 136,875 | 412 | 226,151 | 1,072 | 285,248 |
| 2027 Mar | 120,729 | 175,553 | 22,157 | 184,822 | 559 | 305,848 | 1,459 | 385,922 |
| 2027 Apr | 291,090 | 423,309 | 53,449 | 445,656 | 1,347 | 737,738 | 3,547 | 930,803 |
| 2027 May | 1,006,000 | O 1,486,829 | 206,292 | 1,566,344 | 7,134 | 2,591,648 | 27,281 | 3,258,273 |
| 2027 Jun | 1,123,000 | 0 1,889,535 | 440,517 | 2,003,414 | 34,856 | 3,320,649 | 192,848 | 4,059,366 |
| 2027 Jul | 523,157 | 905,077 | 227,560 | 960,781 | 19,396 | 1,595,025 | 108,899 | 1,938,266 |
| 2027 Aug | 241,457 | 443,354 | 128,381 | 471,976 | 12,108 | 784,599 | ${ }^{69,308}$ | ${ }^{942,546}$ |
| 2027 Sep | 207,921 | 389,509 | 117,597 | 414,923 | 11,275 | 689,510 | 64,806 | 825,342 |
| 2027 ct | 160,971 | 313,531 | 101,957 | 334,431 | 10,078 | 555,592 | 58,310 | 660,476 |
| 2027 Nov | 166,337 | 322,762 | 104,243 | 344,202 | 10,247 | 571,648 | 59,251 | 680,059 |
| 2027 Dec | 120,729 | 248,065 | 88,239 | 265,106 | 9,055 | 440,492 | 52,764 | 518,852 |
| 2028 Jan | 80,486 | 181,029 | 74,053 | 194,274 | 7,993 | 323,125 | 46,990 | 375,327 |
| 2028 feb | 86,036 | 189,757 | 75,717 | 203,559 | 8,148 | 338,776 | 47,842 | 394,653 |
| 2028 Mar | 120,729 | 245,411 | 87,124 | 262,639 | 9,086 | 437,445 | 52,961 | 516,275 |
| 2028 Apr | 291,090 | 521,091 | 145,332 | 555,122 | 13,707 | 924,440 | 78,196 | 1,115,585 |
| 2028 May | 1,006,000 | O 1,681,121 | 392,407 | 1,785,729 | 33,211 | 2,972,157 | 184,760 | 3,636,448 |
| 2028 Jun | 1,123,000 | 0 1,868,760 | 431,537 | 1,984,976 | 36,521 | 3,305,593 | 202,914 | 4,047,287 |
| 2028 Jul | 523,157 | 895,264 | 223,375 | 952,388 | 20,172 | 1,587,281 | 113,593 | 1,93,048 |
| 2028 Aug | 241,457 | 438,675 | 126,449 | 467,961 | 12,466 | 781,198 | 71,480 | 939,900 |
| 2028 Sep | 207,921 | 385,436 | 115,934 | 411,424 | 11,584 | 686,529 | 66,677 | 823,034 |
| 2028 Oct | 160,971 | 310,308 | 100,669 | 331,657 | 10,316 | 553,191 | 59, | 658,632 |
| 2028 Nov | 166,337 | 319,438 | 102,912 | 341,342 | 10,494 | 569,193 | 60,750 | 678,175 |
| 2028 dec | 120,729 | 245,572 | 87,273 | 262,955 | 9,234 | 438,598 | 53,854 | 517,414 |
| 2029 Jan | 80,486 | 180,390 | 73,409 | 193,750 | 8,112 | 322,942 | 47,684 | 375,148 |
| 2029 Feb | 89,109 | 194,029 | 76,060 | 208,259 | 8,363 | 347,359 | 49,063 | 405,273 |
| 2029 Mar | 120,729 | 244,446 | 86,161 | 261,850 | 9,265 | 437,296 | 54,013 | 516,130 |
| 2029 Apr | 291,090 | 518,741 | 143,009 | 553,202 | 14,138 | 924,503 | 80,771 | 1,115,541 |
| 2029 May | 1,006,000 | 0 1,672,989 | 384,379 | 1,778,593 | 34,700 | 2,973,062 | 193,725 | 3,63, 357 |
| 2029 Jun | 1,123,000 | 0 1,859,605 | 422,574 | 1,977,881 | 38,182 | 3,36,480 | 212,922 | 4,048,180 |
| 2029 Jul | 523,157 | 891,027 | 219,200 | 948,928 | 20,946 | 1,588,261 | 118,242 | 1,932,972 |
| 2029 Aug | 241,457 | 436,729 | 124,522 | 466,369 | 12,824 | 781,201 | 73,612 | 939,907 |
| 2029 Sep | 207,921 | 383,762 | 114,274 | 410,056 | 11,891 | 686,480 | 68,508 | 822,991 |
| 2029 Oct | 160,971 | 309,016 | 99,384 | 330,600 | 10,555 | 553,094 | 61,173 | 658,539 |
| 2029 Nov | 166,337 | 318,103 | 101,584 | 340,250 | 10,740 | 569,096 | 62,210 | 678,083 |
| 2029 Dec | 120,729 | 244,609 | 86,309 | 262,166 | 9,412 | 438,449 | 54,905 | 517,271 |
| 2030 Jan | 80,486 | 179,765 | 72,767 | 193,235 | 8,231 | 323,426 | 48,442 | 375,631 |
| 2030 Feb | 89,109 | 193,334 | 75,350 | 207,688 | 8,494 | 347,897 | 49,897 | 405,808 |
| 2030 Mar | 120,729 | 243,497 | 85,198 | 261,069 | 9,443 | 437,858 | 55,131 | 51,689 |
| 2030 Apr | 291,090 | 516,422 | 140,685 | 551,303 | 14,569 | 925,261 | 83,412 | 1,116,553 |
| 2030 May | 1,006,000 | 0 0,664,953 | 376,349 | 1,772,592 | 36,189 | 2,975,036 | 202,757 | 3,639,332 |
| 2030 Jun | 1,123,000 | 0 1,850,554 | 413,616 | 1,970,857 | 39,843 | 3,308,436 | 222,996 | 4,050,139 |
| 2030 Jul | 523,157 | 886,840 | 215,025 | 945,503 | 21,720 | 1,589,242 | 122,958 | 1,933,955 |
| 2030 Aug | 241,457 | 434,807 | 122,595 | 464,795 | 13,181 | ${ }^{781,897}$ | 75,809 | 940,601 82358 |
| 2030 Sep | 207,921 | 382,111 | 112,615 | 408,702 | 12,199 | 687,149 | 70,407 | 823,658 |
| 2030 ct | 160,971 | 307,743 | 98,100 | 329,555 | 10,793 | 553,704 | 62,650 | 659,147 |
| 2030 Nov | 166,337 | 316,787 | 100,257 | 339,171 | 10,986 | 569,714 | 63,736 | 678,698 |
| 2030 Dec | 120,729 | 243,659 | 85,346 | 261,386 | 9,591 | 439,011 | 56,025 | 517,830 |
| 2031 Jan | ${ }^{80,486}$ | 212,330 | 72,120 | 231,200 | 8,350 | 390,718 | 49,163 | 443,709 |
| 2031 Feb | 89,109 | 224,635 | 74,625 | 244,315 | 8.627 | 413,456 | 50,697 | 472,124 |
| 2031 Mar | 120,729 | 270,542 | 84,203 | 293,108 | 9,623 | 497,327 | 56,217 | 57,813 |
| 2031 Apr | 291,090 | 522,711 | 138,254 | ${ }^{560,866}$ | 15,004 | 954,247 | 86,038 | 1,146,701 |
| 2031 May | 1,006,000 | 0 1,586,000 | 367,839 | 1,691,000 | 37,695 | 2,879,000 | 211,855 | 3,541,000 |
| 2031 Jun | 1,123,000 | 0 1,758,000 | 404,000 | 1,873,000 | 41,529 | 3,193,000 | 233,175 | 3,933,000 |
| 2031 Jul | 523,157 | 863,569 | 210,489 | 923,579 | 22,508 | 1,576,000 | 127,713 | 1,922,000 |
| 2031 Aug | 241,457 | 445,234 | 120,481 | 479,317 | 13,546 | 818,904 | 78,014 | 977,874 |
| 2031 Sep | 207,921 | 397,457 | 110,778 | 428,569 | 12,515 | 731,261 | 72,315 | 868,151 |
| 2031 Oct | 160,971 | 329,514 | 96,667 | 356,348 | 11,039 | 606,982 | 64,134 | 712,964 |
| 2031 Nov | 166,337 | 338,249 | 98,764 | 365,695 | 11,242 | 622,692 | 65,277 | 732,206 |
| 2031 Dec | 120,729 | 270,644 | 84,253 | 293,835 | 9,777 | 499,904 | 57,149 | 579,390 |
| 2032 Jan | 80,486 | 170,935 | 71,390 | 184,372 | 8,475 | 317,782 | 4,915 | 369,846 |
| 2032 Feb | 86,036 | 179,112 | 72,863 | 193,131 | 8.665 | 333,184 | 50,973 | ${ }^{388,896}$ |
| 2032 Mar | 120,729 | 231,306 | 83,111 | 248,904 | 9,811 | 430,251 | 57,355 | 508,761 |
| 2032 Apr | 291,090 | 0 489,908 | 135,634 | 525,062 | 15,459 | 909,327 | 88,786 | 1,099,601 |
| 2032 May | 1,006,000 | 0 1,569,305 | 350,737 | 1,677,305 | 38,251 | 2,906,001 | 215,209 | 3,566,191 |
| 2032 Jun | 1,123,000 | 0 1,433,489 | 93,037 | 1,527,067 | 5,195 | 2,657,124 | 13,766 | 3,39, 333 |
| 2032 Jul | 523,157 | 667,849 | 40,660 | 708,561 | 2,421 | 1,234,972 | 6,414 | 1,581,519 |
| 2032 Aug | 241,457 | 306,560 | 17,163 | 325,379 | 1,117 | 568,414 | 2,960 | 728,038 |
| 2032 Sep | 207,921 | 264,310 | 15,093 | 280,510 | 962 | 489,794 | 2,549 | 627,244 |
| 2032 Oct | 160,971 | 204,881 | 11,927 | 217,419 | 745 | 379,448 | 1,973 | 485,859 |
| 2032 Nov | 166,337 | 211,895 | 12,501 | 224,847 | 770 | 392,280 | 2,039 | 502,235 |
| 2032 Dec | 120,729 | 153,576 | 8,864 | 162,980 | 559 | 284,499 | 1,480 | 364,308 |
| 2033 Jan | 80,486 | 101,913 | 5,676 | 108,252 | 372 | 188,949 | 987 | 242,239 |
| 2033 Feb | 89,109 | 112,477 | 5,944 | 119,501 | 412 | 208,838 | 1,092 | 267,840 |
| 2033 Mar | 120,729 | 151,770 | 7,460 | 161,296 | 559 | 282,322 | 1,480 | 362,265 |
| 2033 Apr | 291,090 | 365,920 | 17,974 | 388,888 | 1,347 | 680,696 | 3,568 | 873,447 |
| 2033 May | 1,006,000 | 0 1,286,936 | 83,039 | 1,368,623 | 7,072 | 2,393,895 | 26,923 | 3,059,644 |
| 2033 Jun | 1,123,000 | 0 1,740,288 | 383,984 | 1,863,875 | 45,062 | 3,246,101 | 254,500 | 3,984,677 |
| 2033 Jul | 523,157 | 834,053 | 201,181 | 894,776 | 24,155 | 1,559,422 | 137,659 | 1,902,836 |
| 2033 Aug | 241,457 | 409,323 | 116,187 | 440,195 | 14,307 | 767,103 | 82,606 | 925,363 |
| 2033 Sep | 207,921 | 359,817 | 107,081 | 387,155 | 13,170 | 674,139 | 76,269 | 810,309 |
| 20330 ct | 0,971 | \%,955 | 803 | 312,321 | 11,546 | 543,193 | 67,197 | 444 |
| 2033 Nov | 166,337 | 298,446 | 95,805 | 321,406 | 11,766 | 558,916 | 68,442 | 667,69 |



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| 4 May | 1,006,000 |
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| 2045 Apr | 291,090 |
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| 2045 Sep | 207,921 |
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| 2046 Mar | 120,729 |
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| 2046 May | 1,006,000 |
| 2046 Jun | 1,123,000 |
| 2046 Jul | 523,157 |
| 2046 Aug | 241,457 |
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| 2047 Mar | 120,729 |
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| 2053 Nov | 166,337 |
| 2053 Dec | 120,729 |
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2084 Aug 241,457 2084 Sep 207,921 $\begin{array}{ll}2084 \text { Oct } & 160,971 \\ 2084 \text { Nov } & 166,337\end{array}$ $\begin{array}{ll}2084 \text { Nov } & 166,337 \\ 2084 \text { Dec } & 120,729\end{array}$ $\begin{array}{lr}2084 \mathrm{Dec} & 120,729 \\ 2085 \mathrm{Jan} & 80,486\end{array}$ $\begin{array}{lr}2085 \text { Feb } & 89,109 \\ 2085 \text { Mar } & 120,729\end{array}$ 2085 Apr 2085 May $1,006,000$ | 2085 Jun | $1,123,000$ |
| :--- | ---: |
| 2085 Jul | 523,157 | $\begin{array}{ll}2085 \text { Aug } & 241,457 \\ 23,157\end{array}$ 2085 Sep 207,921 $\begin{array}{ll}2085 \text { Oct } & 160,971 \\ 2085 \text { Nov } & 166337\end{array}$ $\begin{array}{ll}2085 \text { Nov } & 166,337 \\ 2085 \text { Dec } & 120,729\end{array}$ $\begin{array}{ll}2086 \mathrm{Jan} & 80,486 \\ 2086 \text { Feb } & 89,109\end{array}$ 2086 Feb

$\begin{array}{lr}2086 \text { Apr } & 291,090 \\ 2086 \text { May } \\ 1,006 & \end{array}$ $\begin{array}{ll}2086 \text { May } & 1,006,000 \\ 2086 \text { Jun } \\ 1,123,000\end{array}$ 2086 Jul 2086 Aus 2086 Oct 160,971 $\begin{array}{ll}2086 \text { Nov } & 166,337 \\ 2086 \text { Dec } & 120,729\end{array}$ 2087 Jan
$\begin{array}{lr}2087 \mathrm{Feb} & 89,109 \\ 2087 \mathrm{Mar} & 120,729\end{array}$ $\begin{array}{ll}2087 \text { Apr } & \text { 2010,729 }\end{array}$ 2087 May $1,006,000$ 2087 Jul 2087 Aug 241,457 $\begin{array}{ll}2087 \text { Sep } & 207,921 \\ 2087 \text { Oct } & 160,971\end{array}$ $\begin{array}{ll}2087 \text { Nov } & 166,337\end{array}$ $\begin{array}{ll}2087 \text { Dec } & 120,729 \\ 2088 \text { lan } & 80,496\end{array}$ $\begin{array}{ll}2088 \mathrm{Jan} & \begin{array}{l}80,486 \\ 2088 \mathrm{Feb} \\ 86036\end{array}\end{array}$ $\begin{array}{lr}2088 \text { Feb } & 86,036 \\ 2088 \text { Mar } & 120,729\end{array}$ $\begin{array}{lr}2088 \text { Apr } & 291,090 \\ 2088 \text { May } 1,006,000\end{array}$ 2088 Jun $1,123,000$ 2088 Jul $\quad 523,157$ 2088 Aug 241,457 2088 Sep 207,921 2088 oct 160,971 $\begin{array}{ll}2088 \text { Nov } & 166,337 \\ 2088 \text { Dec } & 120,729\end{array}$ $\begin{array}{ll}2088 \text { Dec } & 120,729 \\ 2089 & \end{array}$ 2089 Jan
$\begin{array}{ll}2089 \text { Mar } & 120,729\end{array}$

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| 3,067 | 15,399 | 941,427 | 27,185 |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| 285,57 | 72,47 | 308,51 |  |  |  |  |
|  |  |  |  |  | 39,488 |  |
| 137,296 |  | 148,05 |  |  |  |  |
|  |  | 161,72 |  |  |  |  |
| 199,24 |  | 214,5 | 6,132 | 377,7 | 6,393 |  |
| 485,70 | 119,810 | 53, | 15,121 | 920 | 89,779 |  |
| 1.716, | 153 | 1,853 |  | 3,255,000 | 324,8 |  |
| 1,914,00 |  |  |  |  |  |  |
| 873,06 | 215 | 941,427 |  | 1,556,00 | 161,4 |  |
|  | 93,256 | 420,6 | 11,767 | 740,942 | 69,788 |  |
| 343,5 |  |  |  |  |  |  |
| 271,55 | 67,736 | 293,20 | 8,549 | 515 | 0,780 |  |
| 285,573 |  | 308.51 |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  | 148,0 | 371 | 260,2 |  |  |
|  |  |  |  |  |  |  |
| 199,24 |  | 214,5 | 132 | 377, | 6,393 |  |
| 485,70 | 119,810 | 523,47 | 15,121 | 920,837 |  |  |
| .716,0 | 433,153 | 矿 |  | 3,255,0 |  |  |
| , 1914,000 | 482,06 | 2,065,00 |  | .627,0 |  |  |
| 87306 | 215,39 |  |  |  |  |  |
| 390,6 |  | 420,6 | 11,767 | 740,9 | 69,7 |  |
| 343,56 |  | 370,427 |  |  |  |  |
| 271,55 |  | 293,1 |  | 515, |  |  |
| 28,573 |  | 308,513 |  | 541,76 |  |  |
|  |  |  |  |  |  |  |
| 137,29 |  | 148,0 |  | 260,2 |  |  |
| 150,045 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| 485,70 |  | 523,47 | 5,121 | 920,83 | 89,779 |  |
| 1,716,000 | 433 | 1,85 |  | 3,255, |  |  |
| 1,914,00 | 482 |  | 60,848 |  |  |  |
| 3,067 | 215,399 | 941,42 |  |  |  |  |
|  |  | 420,69 |  |  |  |  |
|  |  | 370,47 |  |  |  |  |
|  |  | 293,1 |  |  |  |  |
| 285,57 |  |  |  |  |  |  |
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|  |  | 156,15 |  |  |  |  |
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|  |  | 523,4 |  |  |  |  |
| .716,00 | 433 | 1,833,0 |  | 3,255,000 | 324,8 |  |
| 1,914,00 |  |  |  | 3,627,000 |  |  |
|  | 215 | 941,42 |  | 1,656 |  |  |
|  |  | 420,6 |  |  |  |  |
|  |  |  |  |  |  |  |
| 271,55 |  | 293,10 |  |  |  |  |
|  |  | 308,5 |  |  |  |  |
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|  |  |  |  |  |  |  |
|  |  | 214, |  | 377, | 6,393 |  |
| 485,70 | 119 | 523,47 |  | 920 |  |  |
| 1,716,00 |  | 1.853, |  | 3,255 |  |  |
| 1.914,0 | 482 | 065 |  | 3,627 |  |  |
| - 873,067 | 215 |  |  |  |  |  |
|  |  | 420,6 |  | 740, |  |  |
|  |  | 370,427 |  |  |  |  |
|  |  | 293,10 |  |  |  |  |
| 285,5 |  | 308,5 |  |  |  |  |
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| , | 119 | 523,47 |  | 920,8 |  |  |
|  | 433,1 |  |  |  |  |  |
| 1,914,00 | 482,0 | 2,065 |  |  | 361,5 |  |
| 873,067 |  | 941,42 |  |  |  |  |
|  |  | 420,6 |  |  |  |  |
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| 199,24 |  | 21,3 |  |  |  |  |
| 485,70 |  | 523,4 | 15,121 |  |  |  |
| , |  | 1,853,00 |  | ,227, |  |  |
|  | 482,06 | , |  | 627,0 | 361,5 |  |
| 873,067 | 215, | 420 |  | 1.656,00 | 161,410 |  |
| ( 390,638 |  | 420,6 |  | 740,9 |  |  |
| 1 343,5 <br>   <br> 271,5  |  |  |  |  |  |  |
| 285,5 |  | 20, |  |  |  |  |
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| 137,29 |  | 148,0 |  | 260, |  |  |
|  |  | 156,12 |  | 274,6 |  |  |
| 199,240 485,703 |  | 214,59 |  |  | 36,393 |  |
| 485,70 | 119,810 | 523,4 | 5,121 | 920,8 | 89,79 |  |
| ,716,0 | 433,15 | 1,853,00 |  | 3,255,0 | 324,872 |  |
| 1,914,00 | 8, 6,2 |  | 60,848 |  | 361, |  |
| 873,06 | 15,39 | 941,42 | 27,185 | 1.656,00 | 161,4 | 2,002,00 |
| 390,638 |  | 42,697 | 11, | 740,9 |  |  |
| 343,56 | 83,898 | 370,427 | 10,588 | 651,6 | 62,843 |  |
| 271,55 | 67,736 | 293,1 |  | 515,1 |  |  |
| 285,573 | 72,477 | 308, | 149 | 54, |  |  |
| 207,33 | 52,636 | 224,0 | 6,644 |  | 39,488 |  |
| 137,296 |  | 148,0 | 4,371 | 260, |  |  |
| 5,045 | 37,357 | 161, | 4,715 | 284,4 | 28,00 |  |
| 9,24 | 48,589 | 214,5 |  | 377, | 36,393 |  |
| 485,703 | 119,810 | 523,47 | 5,127 | 920,837 | \%24 |  |
| 1,716,000 | 433,153 | 853,00 | 4,674 | ,255,000 | 324,87 |  |
| 1,914,000 | 482,066 | 2065,0 | 50,848 | 3,627,000 | 361, |  |
| 873,06 | 215,399 | 941,427 | 2,185 | 1.656,00 | 161,410 |  |
| 0,63 |  | 420,69 | 1,76 | 740,94 | 69,788 |  |
| 3,569 |  | 370,27 | 10,588 | 651,6 |  |  |
| 1,556 | 736 | 293,10 | 549 | 515,1 | 5,180 |  |
| 56,573 | 72,477 | 308,51 | ,149 | 541 | 54,372 |  |
| 7,334 | , 636 | 224,0 | 6,644 |  |  |  |
| 7,296 | 627 | 148,0 | 4,371 | 260,21 | 25,970 |  |
| 150,045 | 37,357 | 121,2 | 4,715 |  |  |  |
| 199,240 | 48,589 | 214 | 132 | 377,709 | 36,39 |  |
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$\begin{array}{llll}\text { GC13.Ove } & \text { GC10.Ove } & \text { GC04.Over } & \text { GCO2.Over } \\ \text { GCO1.Over }\end{array}$

| 2017 | 1451247 | 5914325 | 12829819 | 14207260 | 24517250 |
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|  | 1451247 | 5914325 | 12829819 | 14207260 | 24517250 |
|  | 1451247 | 5914325 | 12829819 | 1389019 | 241993 |
|  | 1450167 | 5909926 | 12820276 | 13532158 | 23834556 |
|  | 1451247 | 5909913 | 12811761 | 13525175 | 23833568 |
|  | 14512 | 59004 | 12776 | 1348929 | 237 |
|  | 1451247 | 5891072 | 1274000 | 1345441 | 23762706 |
|  | 1450167 | 5878102 | 126844 | 133973 | 23698 |
|  | 1451247 | 5872761 | 12636520 | 13349932 | 236588 |
|  | 1451247 | 5863044 | 12580104 | 13292516 | 23601680 |
|  | 1450663 | 585025 | 12537639 | 1325105 | 235616 |
|  | 1448365 | 5833225 | 12501751 | 13213633 | 23514339 |
| 2029 | 1448227 | 5823899 | 12483510 | 13196921 | 23507079 |
|  | 1447010 | 5809232 | 12456958 | 13170370 | 23479 |
|  | 1442304 | 5777191 | 12414661 | 13127072 | 23435977 |
|  | 1432727 | 5720218 | 12343569 | 13056448 | 23358650 |
|  | 1425312 | 5671848 | 12290923 | 130053 | 23314141 |
|  | 1418202 | 5619743 | 12235068 | 12949479 | 23258283 |
|  | 1412583 | 5569098 | 12184861 | 12898274 | 23207196 |
|  | 1405903 | 5513267 | 12124568 | 12837450 | 23137845 |
|  | 1401334 | 5466743 | 12082403 | 12796980 | 23106157 |
|  | 1395715 | 5415086 | 12032191 | 12767338 | 23075759 |
|  | 1392793 | 5389754 | 12004859 | 12740976 | 23048873 |
|  | 1391757 | 5384473 | 11995727 | 12730299 | 23031627 |
|  | 1392793 | 5386863 | 12004200 | 12738315 | 23046535 |
|  | 1392793 | 5386450 | 12001896 | 12737011 | 23046393 |
|  | 1392793 | 5525855 | 12142788 | 128768 | 23184846 |
|  | 1391757 | 5634286 | 12247296 | 12981862 | 23281421 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 23298724 |
|  | 1392793 | 5638452 | 12256384 | 129914 | 23298724 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 23298724 |
|  | 1391757 | 5634286 | 12247296 | 12981862 | 23281421 |
|  | 1392793 | 5638452 | 12256384 | 129914 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
| 2051 | 1392793 | 563845 | 12256384 | 12991496 | 2329872 |
|  | 1391757 | 5634286 | 12247296 | 129818 | 2328 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 23298 |
|  | 1391757 | 5634286 | 12247296 | 1298186 | 2328142 |
|  | 1392793 | 5638452 | 12256384 | 1299149 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 232987 |
|  | 1391757 | 5634286 | 12247296 | 1298186 | 232814 |
|  | 1392793 | 5638452 | 12256384 | 129914 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1391757 | 5634286 | 12247296 | 1298186 | 23281 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
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|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
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|  | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
| 2073 | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
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| 2076 | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
| 2079 | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
| 2082 | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
| 2085 | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
| 2088 | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
| 2089 | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
| 2091 | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
|  | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
|  | 1392793 | 5638452 | 12256384 | 12991496 | 2329872 |
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|  | 1391757 | 5634286 | 12247296 | 12981862 | 2328142 |
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& 128,968 \\
& 59,524 \\
& 51,256
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GC13．Ove GC10．Ove GC04．Ove GC02．Over GC01．Over
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|  | 1061065 | 681 | 87 | 10388917 | 1792528 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2018 | 106 | 4323681 | 9378987 |  |  |
| 2019 | 106 | 432368 | 937898 | 10154 |  |
|  |  | 4320 | 9372 |  |  |
|  | 1061065 | 43209 | 366 |  |  |
| 2022 | 1061065 | 4314686 | 9341413 | 98315 | 173981 |
|  | 1061065 | 4307455 | 9313993 | 9836735 |  |
| 2024 | 106027 | 4297895 | 927360 | 枹9 |  |
| 2025 | 1061065 | 4293646 | 923958 | 9760329 | 172 |
|  | 106106 | 42861 | 919766 | 9719403 | 1725 |
| 2027 | 1060635 | 427796 | 916 | 9687828 | 1722 |
|  | 1058957 | 426490 | 913 | 9660630 |  |
| 2029 | 1058854 | 4257201 | 912710 | 96498 | 1718 |
|  | 1057963 | 4248325 | 9108 |  |  |
|  | 105452 | 42238 | 9076 | 9597946 |  |
| 2032 | 104 | 41 |  |  | 17 |
|  | 1042103 | 41463 | 89872 |  |  |
|  | 1036902 | 410897 | 89467 | 946844 | 1700 |
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|  | 1027911 | 403134 | 886544 | 3857 | 1691 |
|  | 1024570 | 399727 | 88347 | 356 |  |
|  | 1020465 | 395919 | 879742 | 9319167 | 1685516 |
|  | 1018325 | 3940 | 87783 |  | 168 |
|  | 1017568 | 393693 | 877165 |  |  |
|  | 101832 | 393925 | 877584 | 29 | 168 |
|  | 1018325 | 39377 | 87746 | 9296367 | 16834 |
|  | 1018325 | 40140 | 88508 | 93790 | 1691 |
|  | 101756 | 4125 | 89 | 94959 | 1702 |
|  | 101 | 41281 | 896 | 9503 |  |
|  | 10183 | 41281 | 896 | 9503 | 170 |
|  | 101832 | 41281 | 89656 | 5030 | 170405 |
|  | 1017568 | 412513 | 89589 | 4959 | 17027 |
|  | 1018325 | 412817 | 8965 | 9503010 | 1704 |
|  | 1018325 | 412817 | 896 | 9503 | 1704 |
|  | 101832 | 412817 |  | 9503010 | 1704 |
|  | 101756 | 412 | 895899 | 位 | 17027 |
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|  | 1018325 | 41281 | 89656 | 9503010 | 170 |
|  | 1018325 | 412817 | 896563 | 503 | 17040 |
|  | 101756 | 4125 | 895 | 9495969 | 1702 |
|  | 1018325 | 412 | 896 | 9503010 | 170 |
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|  | 101832 | 41281 | 89656 | 030 | 1704 |
|  | 1017568 | 412513 | 89589 | 495 | 17027 |
|  | 1018325 | 41281 | 89656 | 5030 | 17040 |
|  | 1018325 | 41281 | 896563 | 95030 | 1704 |
|  |  | 41281 |  |  |  |
|  | 101 | 41251 | 895 | 9495969 | 170 |
|  | 1018325 | 412817 |  | 9503010 | 1704 |
|  | 1018325 | 412817 | 89656 | 03 | 1704 |
|  | 1018325 | 412817 | 89656 | 95030 | 170405 |
|  | 1017568 | 412513 | 89589 | 9495969 |  |
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|  | 1017568 | 412513 | 895899 | 94959 | 170279 |
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|  | 1018325 | 412817 | 896563 | 95030 | 17040 |
| 2075 | 101832 | 41281 | 896563 | 95030 | 170 |
|  | 101756 | 41251 | 89589 | 495 | 1702 |
| 2077 | 1018325 | 412817 | 8965 | 95030 | 17040 |
|  | 1018325 | 412817 | 8965639 | 95030 | 17040 |
|  | 1018325 | 412817 | 896563 | 95030 | 170405 |
|  | 1017568 | 412513 | 895899 | 4959 | 1702 |
|  | 1018325 | 4128177 | 896563 | 95030 | 17040 |
|  | 101832 | 4128177 | 89656 | 95030 | 17040 |
|  | 1018325 | 4128177 | 896563 | 950301 | 17040579 |
|  | 1017568 | 412513 | 89589 | 94959 | 17027 |
|  | 1018325 | 412817 | 8965639 | 5030 | 170405 |
|  | 101832 | 412817 | 896563 | 95030 | 17040 |
|  | 101832 | 412817 | 896563 | 95030 | 170405 |
|  | 1017568 | 4125134 | 8958998 | 949596 | 17027 |
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| 2090 | 1018325 | 412817 | 8965639 | 95030 | 17040579 |
| 2091 | 101832 | 41281 | 89656 | 迷 | 1704 |
|  | 1017568 | 412513 | 895899 | 4959 | 1702793 |
| 2093 | 1018325 | 412 | 89656 | 95030 | 170405 |
|  | 101832 | 412817 | 896563 | 95030 | 170405 |
| 2095 | 1018325 | 412817 | 89656 | 950301 | 17040 |
|  | 101756 | 41251 | 89 | 9495969 | 1702793 |
| 2097 | 1018325 | 4128177 | 896563 | 950301 | 1704057 |
| 2098 | 1018325 | 4128177 | 896 |  |  |
|  | 1018325 | 412817 | 896 | 9503010 | 1704 |


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# Appendix B-2: Alberta Method: Instream Flow Need Calculation 

Provided Electronically


[^0]:    *** END OF REPORT ***

[^1]:    410 Slathord Drve North Lethbroge. Alberta, Canada T1H 2 A9
    Tel 403-380-5400 Fax 403-380 5428
    www atcogas com

[^2]:    *** END OF REPORT ***

[^3]:    *** END OF REPORT ***

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