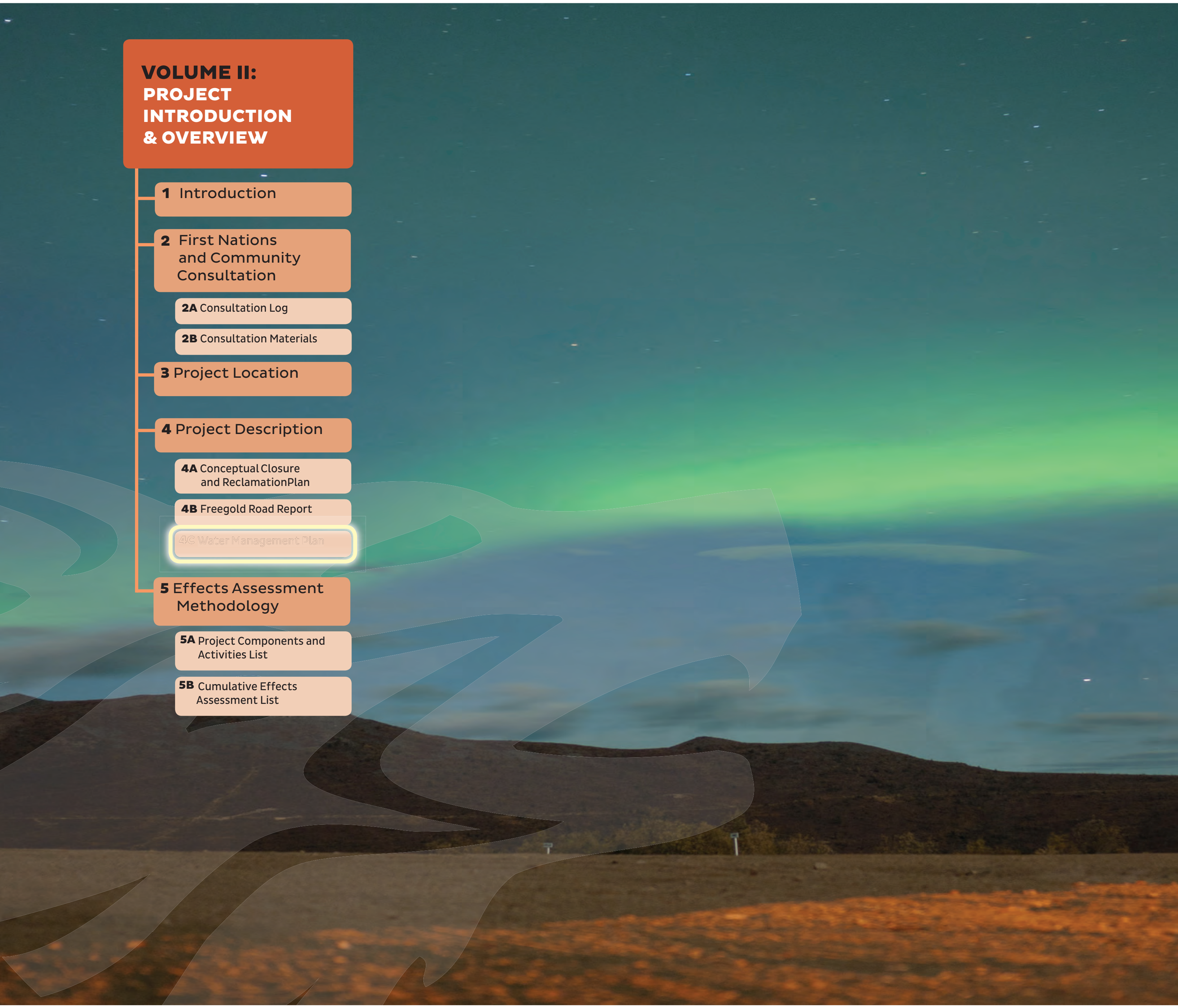
APPENDIX 4C: WATER MANAGEMENT PLAN



CASINO MINING CORPORATION
CASINO PROJECT

WATER MANAGEMENT PLAN

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CASINO MINING CORPORATION
CASINO PROJECT

WATER MANAGEMENT PLAN
VA101-325/14-2

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0	Issued in Final	December 12, 2013	KJB

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EXECUTIVE SUMMARY

The water management plan (WMP) covers the project mine life from construction through to post-closure, which corresponds to the water management phases: construction, operations and closure (phases I, II and III). The objectives of the plan are to manage water in a manner that provides sufficient water to support ore processing, while minimizing the potential for storm flows to cause damage to mine structures and for mining operations to cause adverse effects to downstream water quality. This includes:

- Minimizing erosion in disturbed areas
- Preventing the release of sediment laden water to receiving environments
- Maintaining existing aquatic habitat downstream of the project footprint for as long as practicable, and
- Providing sufficient flows to maintain compensatory aquatic habitat.

The strategies used in the water management plan are:

- Operational water management strategy:
  - Keep non-contact water clean by diverting it around Project areas wherever possible.
  - Use the water within the project area to the maximum practical extent by collecting and managing site runoff and seepage from disturbed areas (contact water), maximizing the recycle of water from the Heap Leach Facility (HLF) and Tailings Management Facility (TMF), collecting and reusing water collected in the Open Pit, and storing surplus water for future use where possible.
- Sediment and erosion control strategies:
  - Manage sediment mobilization and erosion by installing sediment controls prior to land disturbance, limiting land disturbance as much as practicable, reducing water velocities across the ground, progressively rehabilitating disturbed land, ripping areas to promote infiltration, and restricting access to rehabilitated areas.
  - Install appropriate temporary erosion and sediment control measures or Best Management Practices (BMP) before and during construction activities.

The WMP is presented according to facility for the construction through to closure water management phases.

<u>Heap Leach Facility</u>

Construction (Years -4 to -3) - the construction phase of the HLF WMP will commence prior to HLF ore stacking in Year -3 and is characterized by:

- Extensive site clearing, grubbing and stripping.
- Establishing HLF water management structures including the HLF events ponds, HLF in-heap storage behind the confining embankment, cofferdams, pumping systems, runoff collection ditches and clean water diversion ditches. Water will be controlled in a manner that will minimize erosion in areas disturbed by construction activities and will be treated prior to release from a single point of discharge.

Operations (Years -3 to 18):

- 5-staged expansion of the HLF footprint over the 18 year ore stacking operation (Years -3 to 15).

- The heap will be actively irrigated with cyanide solution via the irrigation pumping systems, with pregnant solution being routed through the Carbon ADR Plant/SART for metals recovery. Clean water diversion ditches will divert runoff from the upslope catchment area around the HLF.
- Makeup water required to bring stacked ore up to the leaching moisture content will be sourced from a fresh water supply pond and events pond temporary storage in Years -3 to -1, and the fresh water pipeline from the Yukon River and/or TMF pond for the remainder of HLF operations until the end of Year 18.
- From Year 16 through Year 18, ore stacking will cease and ore will continue to be irrigated with cyanide solution until supplemental gold recovery is no longer profitable.
- Any excess water that exceeds the operating capacity of the in-heap pond during operations will be recycled back to areas of the heap that are not being irrigated.

HLF Closure Phase I (Years 19 to 28):

- Irrigation of ore with cyanide solution ceases and detoxification (rinsing) of the HLF will commence in Years 19 to 23, with the detoxified water being recirculated back onto the heap via the irrigation pumping system in order to remove cyanide and reduce the pH of the stacked ore. During this time, any excess water accumulated in the in-heap storage will be treated for cyanide and pumped to the Open Pit to aid in pit filling.
- Once rinsing stops, the HLF will be allowed to drain down over 5 years (Years 24 to 28) to release the remaining water stored in the heap until all the stacked ore reaches the long-term residual moisture content.
- The draindown water released from the heap will be treated for cyanide (if required) and pumped to the Open Pit.

HLF Closure Phase II (Year 29+):

- Once the heap draindown flow has reduced to manageable levels (Year 29), the heap will be reclaimed and all pumping systems will be decommissioned.
- All upstream diversion ditches will be decommissioned and any excess runoff from the HLF will discharge naturally to the TMF pond.
- The surface of the heap will be re-graded to remove any flat areas that would favour infiltration, and a low permeability cover will be placed over the heap.

<u>Tailings Management Facility and Open Pit</u>

Construction (Years -4 to -1) – the construction phase will commence approximately 42 months prior to mill start and is characterized by:

- Extensive site clearing, grubbing and stripping.
- Establishment of water management structures including cofferdams, pumping systems, and temporary runoff collection ditches to route sediment laden water to sediment control measures for discharge to Casino Creek.
- Construction of the Main TMF starter embankment, which will be used to store water prior to mill start up.

Operations (Years 1 to 22):

- Staged expansion of the TMF embankments over the 22 year mine life (Year 1 to 22).
- Construction of a water management pond downstream of the TMF embankment, for the collection and recycle of TMF seepage and embankment runoff.

- Active discharge of tailings to the TMF, with reclaim water being pumped from the TMF pond to the mill via the reclaim system.
- Fresh water and additional makeup water required to support mill operations will be sourced from the Yukon River and delivered through a fresh water pipeline.
- The Open Pit dewatering will be sent directly to the mill for use in the process until Year 19, when open pit mining ceases and pit filling begins.
- Runoff collection ditches downstream of the final footprints of the ore and waste rock stockpiles will route water to local collection ponds, from where it will be routed to the TMF pond.

Closure Water Management Phase I and II (Years 23 to 114):

- End of tailings deposition to the TMF and beginning of site reclamation. The water management activities associated with TMF reclamation will last approximately 10 years.
- For the first 5 years following the end of tailings deposition (Year 23 to 27), the TMF pond water will be pumped to the Open Pit while maintaining a minimum pond volume to provide water cover over the waste rock stored in the facility. This will facilitate the ongoing improvement of pond water quality by progressively increasing the proportion of natural runoff in the pond, and allow for construction of the passive treatment closure wetlands within the TMF.
- Starting in Year 28, the TMF pond will be allowed to fill naturally to the closure spillway elevation and then discharge to Casino Creek. Pumping of seepage from the TMF to the TMF pond will continue until the TMF pond discharges down the spillway, which will occur in approximately Year 30.

Closure Water Management Phase III (Year 114+):

- The Open Pit will have completely flooded and begun discharging to the TMF pond via a gravity decant system during the summer months of June through September. This runoff will be routed through a wetland constructed at the north end of the TMF.

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Appendix A Stage Layouts

ABBREVIATIONS

BMP .... best management practices
HLF .... heap leach facility
NAG .... non-acid generating
PAG .... potentially acid generating
PMP ....probable maximum precipitation
TMF.. tailings management facility
WMP ....water management plan
WRMF.. waste rock management facility
WSMP……………………………………………………………....winter seepage mitigation pond

1 – INTRODUCTION

1.1 PROJECT DESCRIPTION

The Casino Project is a venture by Casino Mining Corporation (CMC) to develop an open pit copper-gold-molybdenum mine in the Yukon. The project is located in the Dawson Range Mountains of the Klondike Plateau approximately 300 km northwest of Whitehorse, Yukon, Canada, as shown on Figure 1.1. This area is somewhat unique geologically in that it was not glaciated during the Wisconsin Advance. The deposit is hosted by the Prospector Mountain Suite, a suite of igneous intrusive rocks with an intense hydrothermal alteration overprint. The deposit will be mined using open pit methods with a nominal mill throughput of approximately 120,000 tonnes/day of ore over a 22 year operating life.

A general layout of the project site is shown on Figure 1.2. The proposed project facilities include ore stockpiles, a Plant Site, a Heap Leach Facility (HLF), an Open Pit, and a Tailings Management Facility (TMF). The Open Pit will be up to 600 meters deep and contain a mineable reserve of approximately 965 million tonnes of mill ore. The TMF has been sized to provide sufficient capacity to store approximately 956 million tonnes of tailings (including cyclone sand tailings used as embankment fill) and co-disposal of up to 649 million tonnes of potentially reactive waste rock and overburden materials.

Approximately 157.5 million tonnes of additional mined ore will be processed at the HLF located south of the Open Pit. HLF operations will commence in Year -3 during pre-production stripping of the Open Pit.

1.2 SCOPE OF REPORT

This report outlines the water management plan (WMP) for the Casino Project in support of environmental permitting. The water management plan covers the project mine life from construction through to post-closure.

LEGEND

- PROJECT LOCATION
- CITY / TOWN
- EXISTING ROAD
- PROPOSED ACCESS ROAD

NOTES:

1. BASE MAP: (C) MICROSOFT BING MAPS AND NATIONAL ROAD MAPS.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: WGS 1984 WEB MERCATOR AUXILIARY SPHERE.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:12,000,000 FOR 8.5x11 (LETTER) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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CASINO MINING CORPORATION

CASINO PROJECT

PROJECT LOCATION MAP

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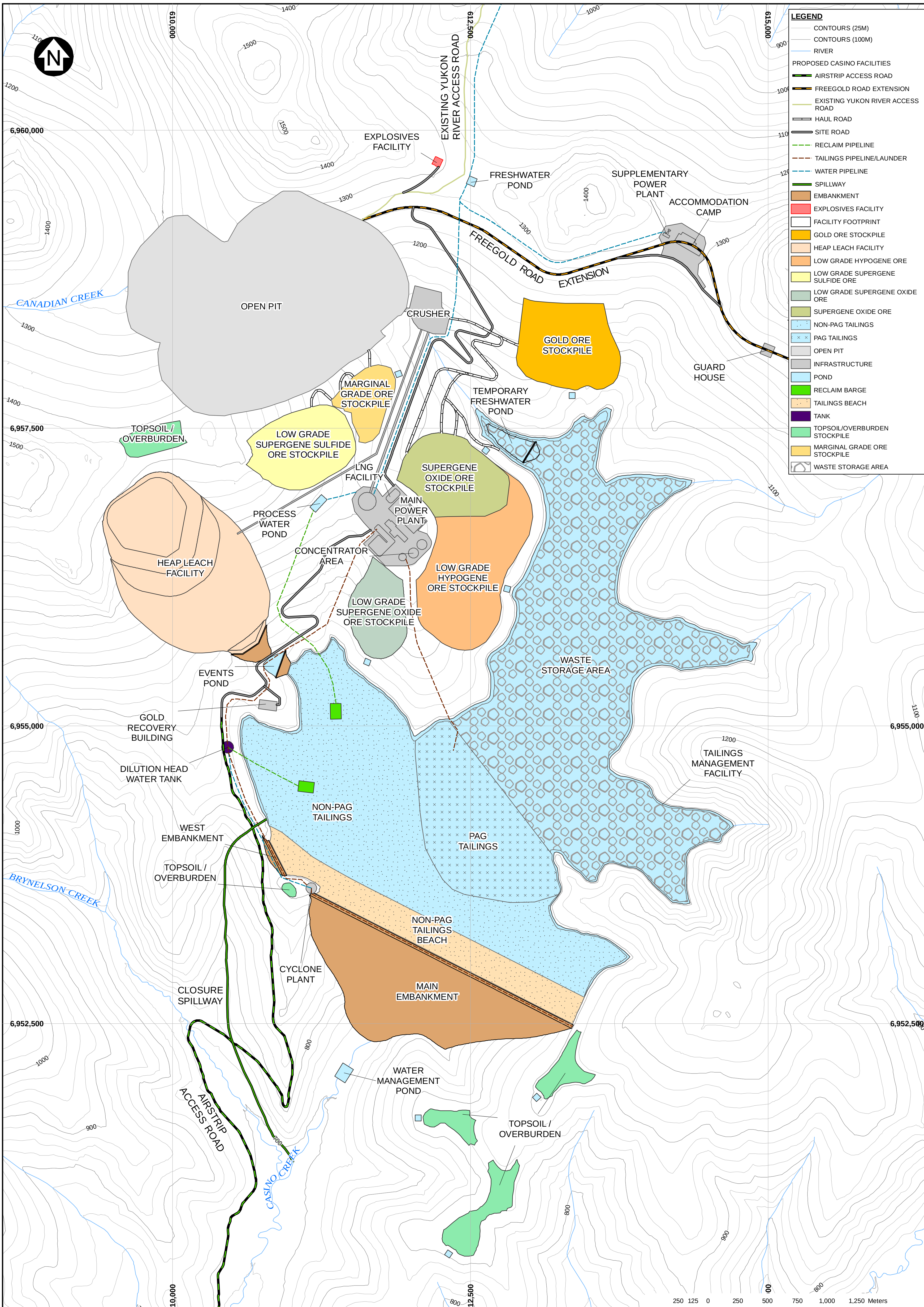
P/A NO.	REF NO.	REV
VA101-325/14	2	0

FIGURE 1.1



NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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GENERAL ARRANGEMENT
MAXIMUM FOOTPRINT

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P/A NO.	REF NO.
VA101-325/14	2

FIGURE 1.2 REV 0

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2 – SITE CHARACTERISTICS

2.1 HYDROMETEOROLOGY

The climate at the Casino Project area is characterized by long, cold, dry winters and short, warm, wet summers, with conditions varying according to altitude and aspect. The mean annual temperature for the Casino Project area is approximately -3 °C, with minimum and maximum mean monthly temperatures of -18 °C and 11 °C occurring in January and July, respectively. The mean annual precipitation (MAP) for the Casino Project area (elevation 1200 m) is estimated to be 460 mm, with approximately 66% falling as rain and the remainder falling as snow. The annual potential evapotranspiration (PET) value for the Casino Project area is estimated to be 300 mm.

Streamflow in the region is highest during the summer months of May through August due to a combination of melting of the winter snowpack, melting of the active permafrost layer, and rainfall events. Annual peak instantaneous flows commonly occur during the freshet period on larger rivers, but on smaller streams like those around the Project they typically occur due to intense rain or rain on snow events. Flows decrease steadily throughout the fall and winter and minimum flows typically occur in March.

The climate and hydrology at the Casino Project site have been assessed based on both short-term site data and longer-term regional data. Climate data were collected on-site at the Project climate station located in the upper Casino Creek sub-watershed at an elevation of 1200 m. The period of site record extends from 1993 to 1994 and from 2008 to 2012. Preliminary streamflow data were collected by Hallam Knight Piésold in 1993 and 1994. A new data streamflow collection program was initiated by AECOM in 2008, with the installation of ten streamflow monitoring stations. As of 2012, nine stations are considered to be in active operation and continue to be operated at present by Knight Piésold Ltd. (KP). A summary of the climate and hydrologic parameters are presented in detail in the KP reports "Baseline Climate Report" (Knight Piésold, 2013a) and "Baseline Hydrology Report" (Knight Piésold, 2013b).

Extreme precipitation estimates suitable for design purposes were estimated for the site on the basis of return period rainfall values for Pelly Ranch, which is the closest long-term regional climate station to the site. The return period 24-hour extreme rainfall values were transferred to the Casino climate station using an orographic factor of 1.07 per 100 m, resulting in 24-hour rainfall depths ranging from 32 mm for a 2-year return period to 71 mm for a 100-year return period, as summarized in Table 2.1. Details of the derivation of the 24-hr design values are included in the "Baseline Climate Report" (Knight Piésold, 2013a).

Table 2.1 Extreme 24-Hour Rainfall at the Project Site Climate Station

Climate Station	Elevation (m)	Return Period (years)	24-Hr Rainfall (mm)
Casino Project Site	1200	2	32
		5	42
		10	49
		25	58
		50	64
		100	71

NOTE:

1. 24-HOUR RAINFALL DEPTHS ESTIMATED USING RETURN PERIOD RAINFALL AMOUNTS PRESENTED FOR PELLY RANCH BY ENVIRONMENT CANADA AND TRANSLATED TO SITE USING AN OROGRAPHIC FACTOR OF 1.07/100 m.

3 – WATER MANAGEMENT APPROACH

3.1 OVERVIEW

The WMP describes how water will be controlled and managed in and around the project area during construction, operations, and closure. The objectives of the plan are to manage water in a manner that provides sufficient water to support ore processing while minimizing the potential for storm flows to cause damage to mine structures and minimizing the potential for mining operations to cause adverse effects to downstream water quality. Water will be controlled in a manner that minimizes erosion in areas disturbed by construction activities and prevents the release of sediment laden water to the receiving environment. This includes diverting and/or collecting surface water runoff, constructing sediment control ponds, and managing pump back systems. The key facilities identified in the WMP are the:

- Open Pit
- Tailings Management Facility (TMF) –West Saddle and Main Embankments
- Heap Leach Facility (HLF)
- Gold, Supergene Oxide, and Low Grade Ore Stockpiles
- Topsoil Stockpiles
- Collection ditches and other water management structures, and
- Sediment and erosion control measures during construction and operations for the facilities listed above.

The following sections describe the objectives, design elements and facilities included in the WMP, for the full life of the mine, from construction (pre-production) and operations through to post-closure.

3.2 CONSTRUCTION WATER MANAGEMENT OBJECTIVES

3.2.1 Erosion Management and Sediment Control Strategies

This section of the WMP describes the construction phase objectives and provides guidance for the control of all water originating from, or brought into, the mine site during construction. The design criteria for the various sediment control elements required during construction will be primarily based on the document titled “Guidance for Assessing the Design, Size and Operation of Sediment Ponds used in Mining,” as issued by the BC Ministry of Environment, Land and Parks (BC MELP, 2001), and on the document titled “Guidelines for Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia,” as issued by the Ministry of Energy, Mines and Natural Gas (1998).

Water will be controlled in a manner that will minimize erosion in areas disturbed by construction activities, and will be treated as required prior to release from a single point of discharge. Construction water management includes the collection and diversion of surface water runoff, temporary groundwater dewatering, and the use of cofferdams and pumping systems.

The construction water management strategy is to minimize disturbance areas and implement Best Management Practices as work progresses. The sources of water during construction are as follows:

- Precipitation runoff from disturbed areas
- Groundwater from dewatering construction activities and pit depressurizing wells, and
- Treated septic and grey water from the camp (small quantities).

Activities that may require sediment and erosion control include clearing vegetation, stripping topsoil, stockpiling topsoil, and constructing roads and infrastructure. Potential hazards from these activities, in the absence of planned mitigation measures, include increased surface erosion from disturbed areas, increased sediment load to downstream receiving environments, and siltation or erosion of downstream watercourses or water bodies.

Sediment mobilization and erosion will be managed throughout the site by:

- Installing sediment controls prior to construction activities
- Limiting the disturbance as much as possible, and
- Reducing water velocity across the ground, particularly on exposed surfaces and in areas where flow tends to concentrate.

Installation of temporary erosion and sediment control features or Best Management Practices (BMPs) will be the first step towards controlling sediment and erosion during construction. All temporary sediment and erosion control features will require regular maintenance. The temporary erosion and sediment control features associated with BMPs will be reclaimed after achieving soil and sediment stabilization.

3.2.2 Best Management Practices (BMPs)

Erosion control BMPs reduce erosion potential by stabilizing exposed soil or reducing surface runoff flow velocities. There are generally two types of erosion control BMPs that are used:

- Source control BMPs for protection of exposed surfaces, and
- Conveyance BMPs for control of runoff.

Experience and adaptive management are integral to the successful selection of the appropriate BMPs and the design and implementation of an overall erosion and sediment control plan. Erosion control BMPs will be implemented prior to and during construction to minimize erosion and sediment discharge into surrounding areas. Typical BMPs that will be used at the project are:

- Runoff collection ditches
- Energy dissipaters
- Sediment traps
- Slope drains
- Surface roughening
- Filter bags
- Water bars
- Diversion structures
- Silt fences
- Sediment basins
- Temporary seeding, and
- Mulching.

3.2.2.1 Collection Ditches (CD)

A runoff collection ditch intercepts construction water runoff and diverts it to a stabilized area where it can be effectively managed. Collection ditches are used within construction areas to collect runoff and convey it to appropriate sediment control measures. General locations and conditions may include:

- Below disturbed slopes to divert sediment-laden water to control facilities
- At or near the perimeter of the construction area to prevent sediment-laden runoff from leaving the site, and
- Below disturbed areas to prevent erosion before stabilization is achieved.

Collection ditches may be either temporary or permanent structures. Temporary collection ditches for construction will be sized to convey the runoff from a 10 year return period 24-hour storm event assuming that the entire footprint area has been disturbed and contributes sediment laden runoff to the sediment control and water management ponds. Collection ditches will be inspected and maintained regularly to remove any blockages to flow (accumulated sediment, debris, etc.) that may occur.

3.2.2.2 Energy Dissipators (ED)

Energy dissipators are typically riprap lined plunge pools used to dissipate the energy of fast flowing water and prevent erosion of natural stream channels downstream. These structures are used in conjunction with diversion and collection ditches, and are typically located upstream of the receiving waterbody (e.g. stream, pond, lake, etc.). Energy dissipators will be inspected and maintained regularly to remove any blockages to flow (accumulated sediment, debris, etc.) that may occur.

3.2.2.3 Sediment Traps (ST)

Sediment traps are typically constructed within collection ditches to detain sediment-laden runoff long enough to allow the majority of the sediment to settle out. The exact locations and final geometry of each trap will be field fitted to integrate with the terrain to minimize disturbance. Water from sediment traps will flow to holding ponds, sediment basins or other BMP structures. The sediment traps will be inspected regularly for sediment accumulation. Maintenance will include the removal of sediment if the sediment trap has accumulated sediment to one half of the wet storage. If the sediment trap is clogged by sediment and/or debris, the trap will be removed and cleaned, or replaced.

3.2.2.4 Slope Drains (SD)

Slope drains consist of flexible tubing or conduit and are required to convey concentrated runoff into the appropriate BMP structure when ditches are deemed impractical. Slope drains shall be sized according to estimates of peak flows, which are dependent on contributing drainage area. Slope drains will be inspected and maintained regularly and any blocked or damaged parts will be cleaned, repaired, or removed and replaced.

3.2.2.5 Surface Roughening (SR)

Cut and fill slopes will be roughened with tracked machinery where appropriate to reduce runoff velocity and erosion, increase infiltration, and aid in the establishment of vegetative cover with seeding. The roughening will be carried out by a tracked machine moving up and down the slope surfaces, creating undulations on the soil surface. This procedure is simple and inexpensive, and it provides immediate short-term erosion control for bare soil where vegetative cover is not yet established. A rough soil surface provides favorable moisture conditions that will aid in seed germination.

3.2.2.6 Filter Bags (FB)

Filter bags are generally constructed from a sturdy non-woven geotextile capable of filtering particles larger than 150 microns. Filter bags are to be installed at the discharge end of pumped diversion pipelines, via fabric flange fittings, to remove fine grained materials such as silt before discharging water to the environment.

Filter bags should be installed on flat, stable, non-erodible foundations, or in well vegetated areas. The pumping rate shall be no greater than specified by the manufacturer. Discharge from filter bags will be routed to minimize erosion.

A smaller variety of filter bags, referred to as filter socks, can be installed on the discharge ends of gravity flow pipes, such as slope drains, to filter silt particles before discharging water to the environment.

3.2.2.7 Waterbars (WB)

Waterbars serve to reduce sheet flow and surface erosion of areas of exposed soil and/or roads by diverting runoff towards a stable vegetated area or collection ditch. Spacing of waterbars will be field fitted based on the slope grade and general erodibility of the surface. Waterbars must not direct runoff into a ditch that will channel water toward the watercourse unless the ditch is adequately prepared with check dams and armouring, where appropriate. Waterbars may require regular maintenance when subjected to frequent traffic crossings.

3.2.2.8 Diversion Structures (DS)

A temporary diversion structure consists of sandbags stacked in a pyramid formation with a polyethylene sheet placed diagonally in between the bags. Temporary diversion structures are useful for diverting concentrated overland flows to an appropriate sediment basin or other BMP structure where it can be effectively managed.

3.2.2.9 Silt Fences (SF)

Silt fences are typically sheets of geotextile material installed downslope of erosion-susceptible terrain to prevent sediment-laden sheet flow from entering receiving waters. Drainage pools that form along the uphill side of the fence promote sediment settling. Drainage in contact with the fence is filtered through the geotextile. The small pores of the silt fence will filter coarse particles and restrict water exfiltration rates. Barrier locations are informally chosen based on site features and conditions (e.g. soil types, climate, terrain features, sensitive areas, etc.), design plans, existing and anticipated drainage courses, and other available erosion and sediment controls. Typical barrier sites are catch points beyond the toe of fill material, or on side slopes above waterways or drainage channels. Silt fences are not recommended for wide low-flow, low-velocity drainage ways, for concentrated flows, in continuous flow streams, for flow diversion, or as check dams. Silt fences should be inspected for damage, tears, clogging, or erosion of the surrounding areas. Damaged sections will be repaired or replaced to maintain functionality.

3.2.2.10 Sediment Basins (SB)

A sediment basin is a temporary structure that is used to detain runoff from small drainage areas so that sediment can settle out. Sediment basins are generally located in areas where access can be maintained for sediment removal and proper disposal. Sediment basins are typically constructed at the end of collection ditches to detain sediment-laden runoff long enough to allow the majority of the sediment to settle out. A sediment basin can be created by excavating a basin, utilizing an existing depression, or constructing a dam on a slight slope downward from the work area. Sediment-laden runoff from the disturbed site is conveyed to the basin via ditches, slope drains, or diversion structures. The basin is a temporary measure, with a nominal design life of approximately six months, and is to be maintained until the site is permanently protected against erosion by vegetation and/or structures. The size of the temporary sediment basin is dependent on the size of the drainage area. The exact location and final geometry of each basin should be field fitted to integrate with the terrain to minimize disturbance.

3.2.2.11 Temporary Seeding (TS)

Exposed slopes and other disturbed areas will be seeded to establish vegetative cover utilising native grass species. The purpose of temporary seeding is to stabilize the soil and reduce damage from wind and/or water until permanent stabilization is accomplished. Seeding is applicable to areas that are exposed and subject to erosion for more than 30 days, and is usually accompanied by surface preparation, fertilizer, and mulch; however, the timing of seeding is weather and season dependent and consequently this method is not applicable at all times. Temporary seeding may be accomplished by hand or mechanical methods, or by hydraulic application (hydroseeding), which incorporates seed, water, fertilizer, and mulch into a homogeneous mixture (slurry) that is sprayed onto the soil.

3.2.2.12 Mulching (MU)

Mulching is the application of a uniform protective layer of straw, wood fiber, wood chips, or other acceptable material on or incorporated into the soil surface of a seeded area to allow for the immediate protection of the seed bed. The purpose of mulching is to protect the soil surface from the forces of raindrop impact and overland flow, foster the growth of vegetation, increase infiltration, reduce evaporation, insulate the soil, and suppress weed growth. Mulching helps to hold fertilizer, seed, and topsoil in place in the presence of wind, rain, and runoff, and reduces the need for watering. Mulching may be utilized in areas that have been seeded either for temporary or permanent cover.

There are two basic types of mulches: organic mulches and chemical mulches. Organic mulches likely to be used include straw, hay, wood fiber, wood chips, and bark chips. This type of mulch is usually spread by hand or by machine (mulch blower) after seed, water, and fertilizer have been applied. Chemical mulches, also known as soil binders or tackifiers, are composed of a variety of synthetic materials, including emulsions or dispersions of vinyl compounds, rubber, asphalt, or plastics mixed with water. Chemical mulches are usually mixed with organic mulches as a tacking agent to aid in the stabilization process, and are not used as mulch alone, except in cases where temporary dust and erosion control is required. The choice of materials for mulching should be based on soil conditions, season, type of vegetation, and the size of the area. One example is rolled erosion control blankets woven with degradable or poly netting with straw or coconut mulch, which can be used on steep slopes to provide a permanent or semi-permanent cover.

3.3 OPERATIONAL AND CLOSURE WATER MANAGEMENT OBJECTIVES

The goals of the WMP during the operations and closure phases are to keep non-contact water clean and to minimize water withdrawals or discharges outside of the project footprint. Using water from within the project area to the maximum practical extent and constructing clean water diversion ditches are vital to achieving these goals.

Non-contact water from catchments outside of the project footprint will be diverted to the extent possible. Site runoff from disturbed areas will be collected and managed; surplus water will be stored within the TMF and used at the mill. Water recycled from the TMF to the mill and cyclone plant will be maximized to the extent possible. The water supply sources for the project will include:

- Runoff from the mine site facilities
- Runoff from the undisturbed catchment around the project site
- Water recycled from the TMF supernatant pond
- Water recycled from HLF operations
- Fresh water from the Yukon River
- Groundwater from the Open Pit dewatering, and
- Treated septic and grey water, in small quantities, from the camp and other facilities.

Sediment and erosion control strategies will include establishing diversion ditches and stabilizing disturbed land surfaces to minimize erosion. Sediment mobilization and erosion will be managed throughout the site during operations by:

- Progressively rehabilitating disturbed land and constructing drainage controls to improve the stability of rehabilitated land
- Ripping of rehabilitation areas to promote infiltration
- Protecting natural drainages and watercourses by constructing appropriate sediment control devices such as collection and diversion ditches, sediment traps, and sediment ponds, and
- Restricting access to rehabilitated areas.

3.4 SURFACE DRAINAGE CONTROLS

3.4.1 General

This section describes specific water management elements that will be used where required throughout the site. The location and sequencing of water management facilities and BMPs during construction, operations and closure are described in Section 4 and Section 5, respectively.

3.4.2 TMF Water Management Pond

3.4.2.1 Construction

A water management pond will be situated in the valley bottom downstream of the TMF Main embankment footprint. During early construction (Years -4 and -3), the pond will function as a sediment control pond to detain runoff from disturbed areas and allow sediment to settle out. Starting in Year -2, water in the pond will be pumped back to the TMF pond upstream of the starter embankment. The water management pond will be designed according to guidelines developed by the British Columbia Ministry of Environment (BC MELP, 2001). The pond will be designed to settle sediment during peak flood events, up to and including the 10 year peak flow (the inflow hydrograph resulting from a 10 year, 24-hr rainfall event plus snowmelt). Furthermore, the pond will be designed with an overflow spillway sized to safely pass large flood flows, up to and including the 200 year flood.

3.4.2.2 Operations

During operations, the water management pond will collect surface runoff and seepage from the TMF embankments (Main and West), and the collected water will be pumped back to the TMF. The pond storage volumes will be sized based on the maximum estimated seepage inflows from the embankment and foundation drainage systems over the life of the facility. The pond will be constructed of rockfill and will be lined with a low permeability geomembrane, as required by site conditions.

3.4.2.3 Closure

In closure, the TMF water management pond will be replaced by a larger pond designed to collect and store seepage from the TMF during the winter months. This pond will function as a mitigation measure in order to prevent the discharge of seepage from the Project when there is little to no dilution available from surface water runoff. This ‘Winter Seepage Mitigation Pond’ (WSMP) will consist of the following three main components:

- An upstream cut-off wall keyed into bedrock to intercept all seepage from the dam and force it to surface where it will drain by gravity into the storage pond.
- A storage pond lined with LLDPE or HDPE membrane.
- An earth dam approximately 10 m high. This dam will incorporate a gravity decant pipe system which will be closed for the winter months and opened during the spring freshet.

The pond will collect seepage from December through April and then discharge at a rate of approximately 130 L/s beginning in May after the onset of the spring freshet. The pond will then empty during September, and discharge will occur based on natural runoff rates during October and November. The pond has a total capacity of approximately 600,000 m^3, which assumes the collection of the maximum embankment winter seepage for 5 months (approx. 450,000 m^3), plus freeboard. More details on the WSMP can found in the “Casino Project - Conceptual Closure and Reclamation Plan” (Brodie, 2013).

3.4.3 Coffer Dams

A coffer dam will be constructed within the TMF starter footprint to capture all runoff from the upstream areas and route it to the sediment pond downstream. The coffer dam will be designed to manage runoff from the 10 year, 24-hr rainfall event for the construction period. Pumping will be provided to restore the coffer dam water levels to normal operating conditions within seven days of the design event.

Freeboard on the coffer dam will be routinely monitored to ensure that sufficient storage capacity for collected water is available. In the event that the water levels encroach on the design freeboard allowance, contingency options include raising the coffer dam to provide additional water storage and/or lowering the water level by pumping.

3.4.4 Sediment Settling Ponds

Temporary sediment settling ponds will be constructed downstream of all construction activities, which includes the water management pond downstream of the TMF starter embankment (as described in Section 3.4.2). The ponds will be designed in accordance with the Guidelines (BC MELP, 2001) outlined above. General considerations are that the pond be constructed with a long and narrow shape (5L:1W), and with sufficient depth to provide a minimum 1.5 m of water cover above accumulated sediment. The temporary ponds will be decommissioned when the runoff from the source area meets discharge requirements, with the exception of the water management pond that will function as the seepage pond during operations. Water treated in the sediment settling ponds will be discharged to existing channels via energy dissipating structures. All sediment ponds will require inspection and maintenance on a scheduled basis, as well as after all substantial storm events.

3.4.5 Construction Dewatering

Dewatering of the proposed excavation areas will be accomplished by the use of sump pits, wells, wellpoints and/or removable pumping stations. Runoff and seepage collected from construction dewatering will be collected and discharged after treatment using the most appropriate BMP methods, depending on the site specific conditions and requirements. The treated water will be discharged to the environment via energy dissipating structures.

3.4.6 Heap Leach Facility

3.4.6.1 HLF In-Heap Storage

The HLF embankment constructed at the toe of the heap pad will provide in-heap storage for excess runoff and/or leachate solution during normal operations, and also in the event of a storm event or emergency shutdown. The in-heap pond has a total capacity of 172,600 m^3, which consists of the following:

- 90,000 m^3 for normal operating capacity, which is based on 20 m of operational head for the in-heap pond pumping system, and
- 82,600 m^3 of storm storage capacity based on the rainfall generated from a 25 year 24-hr storm event.

In the event that the storage requirement is greater than this, the excess runoff/solution will spill to the events pond downstream of the heap via the embankment spillway. The HLF embankment spillway is designed to convey the peak flow generated from the 200 year storm event.

3.4.6.2 HLF Events Pond

The HLF events pond is designed to provide storm storage for the portion of the total runoff (rainfall and snowmelt) generated by the 100 year storm that exceeds the in-heap storage capacity of the HLF. The pond is situated immediately down gradient of the HLF embankment and the pond inflow is conveyed via the HLF embankment spillway. The HLF events pond will be designed to meet the following design criteria:

- 74,000 m^3 of storm storage capacity based on the runoff volume generated from the 100 year storm event (100 year 24-hr rainfall plus snowmelt), assuming runoff from the contributing HLF footprint of 1.5 km^2, which includes the maximum HLF footprint of 1.3 km^2 and 0.2 km^2 of HLF embankment area.
- The spillway shall convey the peak outflow discharge generated from the inflow of the 200 year storm hydrograph (200 year 24-hr rainfall + snowmelt), while maintaining a minimum embankment crest freeboard of 0.3 metres.

The events pond total capacity takes into account that the in-heap pond already provides storage for the 25 year 24-hr rainfall volume; therefore the events pond volume is based on the total runoff generated by the 100 year 24-hr event (rainfall + snowmelt) minus the 25 year 24-hr rainfall event.

The events pond will be constructed to full size prior to HLF operations in Year -3. Under typical operating conditions, the events pond will be operated as a dry pond to ensure that the maximum pond capacity is available for short duration storm events, with the exception of Years -3 to -1, when approximately 50,000 m^3 of runoff will be stored in the pond to supply the process water needs for the HLF. As of Year 1, makeup water for HLF operations will be supplied by the Yukon River pipeline and/or the TMF pond.

3.4.6.3 HLF Diversion Ditches

Diversion ditches will typically be lined with vegetation, riprap, or other stable material, and are designed to divert non-contact surface runoff around mine facilities to downstream areas. A series of diversion ditches will be constructed around the perimeter of the staged HLF to intercept overland surface runoff and convey flows to the TMF. Intermediate ditches within the HLF footprint will be constructed and decommissioned as necessary. Diversion ditches will be sized to convey the 100 year peak flow.

3.4.6.4 HLF Fresh Water Supply Pond

A fresh water supply pond will be constructed in the northern upper reach of the final TMF footprint in order to supply fresh water to the HLF prior to construction and commissioning of the TMF embankment and Yukon River water supply pipeline. The fresh water supply pond will have a storage capacity of approximately 460,000 m^3 (equal to approximately 8.5 months of fresh water requirement for the HLF in Years -3 to -1). The pond will be developed through the construction of an embankment, which will be designed with an overflow spillway sized to safely pass the design storm event commensurate with the dam safety rating.

3.4.7 Tailings Management Facility

3.4.7.1 TMF Collection Ditches

Permanent collection ditches during operations will typically be lined with vegetation, riprap, or other stable material, and will be designed to convey contact surface runoff from disturbed areas to a water management pond.

The WMP includes constructing collection ditches to either route water to areas within the mine site where it is required, or to divert contact surface runoff to a downstream water management pond. Major diversions include the West Saddle and Main Embankment collection ditches. These ditches will divert runoff from the embankments and downslope catchments to the TMF water management pond located at a low point downstream of the Main Embankment. Collection ditches will be sized to convey the 10 year peak flow.

3.4.7.2 TMF Closure Spillway

A spillway and downstream channel are required to convey excess water in the TMF to prevent overtopping of the embankments in closure and post-closure. The closure spillway will be constructed in the west abutment of the West embankment and a constructed channel and plunge pool will convey the spillway flow to the Casino Creek channel downstream of the TMF and upstream of Brynelson Creek.

The spillway is designed to convey the probable maximum flood (PMF) generated from the 24-hr PMP plus snowmelt, assuming that all upstream diversion channels have failed during such an event. The crest elevation of the closure spillway will be a minimum of 3 m below the final crest of the embankment.

Additional information regarding the TMF closure spillway can be found in the TMF Feasibility Design Report (Knight Piésold, 2012).

3.4.8 Stockpile Collection Ditches and Ponds

Collection ditches will typically be lined with vegetation, riprap, or other stable material, and are designed to convey contact surface runoff from disturbed areas to water management ponds.

The WMP includes constructing collection ditches to either route water to areas within the mine site where it is required, or to divert contact surface runoff to downstream water management ponds. Collection ditches will be constructed around the downstream footprint edge of the Gold, Supergene Oxide, Low Grade Ore and Topsoil Stockpiles. These ditches will collect and convey runoff from the stockpiles to ponds in topographic low points downstream of each stockpile. Spillways in the ponds will be sized to convey peak flows resulting from the 100 year runoff event.

4 – CONSTRUCTION WATER MANAGEMENT PLAN

4.1 GENERAL

This section provides an overview of the construction activities for each year during the construction phase of the project, followed by the sequence of construction.

4.2 YEAR -4

Construction in Year -4 will be primarily site establishment and mobilization efforts and will also include establishing the Heap Leach Facility. Construction activities will focus on the following work areas:

- Establish the construction accommodation camp
- Strip and begin construction of the crusher
- Strip and begin construction of the mill site
- Strip and line the HLF, stage 1 footprint, and
- Construct the fresh water supply pond embankment prior to freshet.

Site establishment in Year -4 is shown on Figure A.1 and will follow the general sequence below:

- Upgrade existing roads and establish new construction roads, and upgrade or establish road side ditches and water management BMPs. Establish or upgrade discharge points for road runoff. Locally stockpile strippings and unsuitables, then seed, and reclaim.
- Pioneer access to the accommodation camp pad. Construct the camp pad sediment control pond and establish any necessary temporary water management BMPs. Strip the camp pad and construct the camp. Stockpile topsoil and strippings adjacent to the camp pad, then seed and reclaim.
- Pioneer access to contractor laydowns and the equipment assembly pad, establish sediment control ponds and install temporary BMPs, strip and cap laydowns and the assembly pad. Continue road construction and upgrades. Establish a topsoil stockpile, and construct a sediment settling pond and collection and diversion ditches.
- Pioneer access to the crusher and mill pad, establish sediment settling ponds, and install temporary BMPs. Clear and strip the crusher and mill pads and begin collecting crusher and mill topsoil, to be stockpiled for later use.
- Construct diversion ditches above the HLF, and clear strip and line the HLF stage 1 footprint. Construct the events pond prior to October Year -4. The HLF water management is detailed in Section 5.1.
- Pioneer access to the freshwater supply pond and install temporary sediment control measures. Construct the fresh water supply pond embankment prior to freshet Year -4.

4.3 YEAR -3

Construction in Year -3 will continue site establishment and mobilization efforts, and will initiate mining in the Open Pit. Over burden will be stockpiled and waste rock deposition will begin in the TMF. Construction activities will focus on the following work areas:

- Construct the TMF Coffer Dam, and
- Strip and begin mining the Open Pit.

The general arrangement in Year -3 is shown on Figure A.2 and construction will follow the general sequence below:

- Pioneer access to the TMF coffer dam, construct the Water Management Pond below the coffer dam, and install temporary sediment control measures. Construct the coffer dam prior to freshet Year -3. Establish topsoil stock piles adjacent to the coffer dam.
- Release water stored behind the TMF cofferdam to the Water Management Pond, where it will be treated for sediment and released to Casino Creek.
- Begin stripping topsoil from the Open Pit, and stockpile the topsoil for later use.
- Ongoing works in Year -3 will be mill construction, camp pad expansion, and laydown expansion.

4.4 YEAR -2

Construction of the mill and TMF embankment will continue into Year -2. Mining operations will continue in the Open Pit with ore being either stockpiled or sent to the Heap Leach. Over burden will be stockpiled in topsoil stockpiles or in the waste storage area of the TMF. New construction activities will focus on the following work areas:

- Construct the TMF starter embankment, and
- Establish ore stockpiles.

The general arrangement in Year -2 is shown on Figure A.3 and construction will follow the general sequence below:

- Construct the starter and west embankments, and accumulate runoff behind the starter embankment for the start-up pond.
- Begin to pump water back to the TMF pond from the water management pond downstream of the TMF embankment.
- Establish ore stockpiles, and use collection ditches to collect runoff and direct it to the TMF pond.
- Commence construction of the Yukon River water supply pipeline including the water supply pond and the process water pond. Minimize disturbance areas, and locally stockpile and seed topsoil and unsuitables.
- Ongoing construction activities will include expansion of the Open Pit, expansion of the topsoil stockpiles, road upgrades and construction, and mill construction.

4.5 YEAR -1

Construction in Year -1 will be comprised of finishing tasks started earlier. New works will be inside the TMF footprint. New construction activities will include:

- Tailings and reclaim pipelines.

The general arrangement in Year -1 is shown on Figure A.4 and construction will follow the general sequence below:

- Construction of the tailings and reclaim pipes, and the reclaim barge. All runoff from these activities will be contained in the TMF.
- Ongoing construction activities will include expansion of the Open Pit, expansion of the ore stock piles, expansion of the topsoil stockpiles, road upgrades and construction, and Mill completion.

5 – OPERATIONAL AND CLOSURE WATER MANAGEMENT PLAN

5.1 HEAP LEACH FACILITY

5.1.1 General

The following sub-sections outline the WMP for the HLF. The heap leach pad will be stacked with ore approximately 300 days per year at a nominal rate of 9.1 million tonnes per year, and will be irrigated at a rate of 1312 m^3/hr all year round from Year -3 through Year 18 of mine operations. Ore produced from the Open Pit during the non-stacking periods will be stored in the gold ore stockpile located in the upper reaches of the TMF catchment.

5.1.2 Construction

The proposed heap leach pad will be developed in five stages, with water management measures beginning in Year -4 (Figure A.1):

- Install cofferdam and construct the HLF events pond and HLF confining embankment.
- Construct the events pond at the foot of the HLF downstream confining embankment to the full capacity of 74,000 m^3.
- Construct the HLF embankment and events pond spillways.
- Construct interim diversion ditches around the perimeter of the stage 1 heap pad to intercept overland surface runoff and convey flows downstream of the HLF. Diversion ditches will include lining and protection from erosion and scouring.

5.1.3 Operations

Precipitation falling directly on the heap is considered contact water and will be collected and used for process makeup requirements. Additional water sources and key timelines are outlined below and on Figures A.2 to A.4:

<u>Years -3 to -1:</u>

- Stage 1 HLF development commences with ore stacking and active irrigation.
- Pregnant leach solution from the heap will be routed through Carbon ADR Plant/SART for metals recovery. Barren solution will then be discharged to the barren solution tank before cyanide is added and the solution is recirculated back onto the heap through the irrigation system. The only loss considered in the metals recovery and irrigation circuit is evaporative loss from the irrigation emitters, otherwise the system is treated as a closed loop.
- HLF diversion ditches will divert runoff from upslope catchment areas around the HLF.
- HLF makeup water required to bring incoming ore from the Open Pit and/or the ore stockpile up to the required leaching moisture content is sourced from the water accumulated in the in-heap pond, fresh water supply pond located upstream of the TMF embankment and/or the events pond temporary makeup water storage of 50,000 m^3.
- The TMF starter embankment will begin storing water as of Year -2 and can also be used as a makeup source for the HLF (if necessary).

<u>Years 1 to 15 (Figures A.5 to A.7):</u>

- Stages 2 to 5 HLF development and active irrigation and metals recovery circuit will be continued.

- The TMF embankment and Yukon River water pipeline will be constructed and commissioned and HLF makeup water will be sourced from in-heap pond and these two water sources.
- The fresh water supply pond will be decommissioned and the events pond will be kept dry.
- Intermediate diversion ditches will be decommissioned as the footprint develops.
- Any excess water above the normal operating capacity of the in-heap pond will be recycled back onto inactive areas of the heap (not under active irrigation).

Years 16 to 18:

- Ore stacking to heap will have ceased but ore will continue to be irrigated with leachate solution 365 days a year to extract all remaining gold until it is deemed no longer profitable.
- Any excess water above the normal operating capacity of the in-heap pond will be recycled back onto inactive areas of the heap (not under active irrigation).

5.1.4 HLF Closure Phase I

The HLF closure and reclamation will begin when ore stacking ceases and irrigation with cyanide ends after Year 18 and continues until HLF draindown flows are reduced to a manageable volume (approximately 10 years). Closure will commence and continue with the following procedures:

Years 19 to 23 (Figures A.8 to A.9):

- Detoxification (rinsing) of the HLF will commence to reduce pH and remove cyanide from the heap.
- The barren solution will be recirculated through the detoxification system back onto the heap.
- The pregnant solution recovery system will be decommissioned.
- Any excess water accumulated in the in-heap storage will be pumped to the Open Pit to aid in pit filling.

Years 24 to 28 (Figure A.10):

- Rinsing of the heap will cease, which will initiate the draindown of the water stored in the heap.
- Non-contact surface runoff from the cover will be directed away from the events pond and towards the TMF pond.
- HLF draindown water (contact infiltration) will be pumped to the Open Pit to aid in pit filling.

5.1.5 HLF Closure Phase II & Phase III

Once draindown flow from the heap has reduced to manageable levels, the final heap closure activities will be completed as follows. Remaining active HLF closure activities will be completed in Year 29.

Years 29 to perpetuity (Figures A.11 to A.12):

- Removal of geosynthetic liners from the overflow spillway and the events pond, as required.
- Removal of pregnant solution and events pond pumps and pipeworks.
- Decommissioning of the events pond. Heap infiltration and runoff flows will be discharged to the TMF pond.
- Decommissioning of all upstream diversion ditches.
- Grading, covering and revegetation of final heap slopes will be completed to reduce infiltration and increase evapotranspiration from the vegetated cover. The closure cover will also provide

erosion protection from surface runoff. The closure cover will be designed to reduce overall infiltration into the HLF to 20% of net precipitation.

5.2 TAILINGS MANAGEMENT FACILITY

5.2.1 General

The following sections outline the WMP for the TMF from pre-production (Year -3) through to the end of operations (Year 22) and into closure.

5.2.2 Construction

The construction phase of the TMF will commence approximately 36 months prior to mill start-up. This phase is characterized by extensive clearing, grubbing and stripping, and the development of access roads and haul roads. The water management features established during this period will include sediment control structures, coffer dams, pumping systems, runoff collection ditches, and diversion channels.

Water management during construction of the TMF will consist of the following sequential activities and milestones:

Pre-Production (Year -3 to -2) (Figure A.2 to A.3):

- Construct collection ditches to divert runoff from upstream and downstream of the West and Main starter embankments.
- Install coffer dam and begin construction of Main starter embankment.
- The water management pond downstream of the starter Main embankment will function as a sediment control pond during TMF embankment construction in Year -3. During Year -2, water in this pond will be pumped back to the TMF pond once the Main starter embankment begins storing water.
- Implement sediment control downstream of the Main starter embankment to collect sediment laden water during construction and to discharge clean water back into Casino Creek.
- The TMF pond will begin to store water in Year -2 that will be used as a make-up source for the HLF operation (if required).

Immediately prior to mill start-up (Year -1) (Figure A.4):

- Complete construction of TMF embankment collection ditches.
- Prior to mill start up in Year 1, approximately 11 Mm^3 of water from the Yukon River pipeline will be pumped to the TMF to supplement the accumulated 4 Mm^3 pond in order to establish a minimum start up pond of 15 Mm^3 (3 months of mill requirement).

5.2.3 Operations

Mill start-up defines the start of operations and is assumed to be in January of Year 1. The WMP for the TMF and associated facilities during operations is outlined below and illustrated on Figures A.5 to A.9 in Appendix A:

Years 1 to 22:

- Ore will be processed through the mill and tailings will be discharged to the TMF.

- Staged expansions of the Main embankment will be on-going annually to maintain TMF storage requirements.
- All runoff from undisturbed areas within the TMF catchment will be directed to and collected in the TMF pond.
- Fresh water will be pumped from the Yukon River to the plant site for mill use.
- Process water will be discharged into the TMF with the tailings slurry at a rate of approximately 1180 L/s for a tailings production rate of 120,000 tonnes/day.
- Tailings supernatant water will be reclaimed and either pumped back to the mill via the mill head pond or to the cyclone sand dilution water head tank for process water requirements.
- A cyclone sand deposition strategy will be implemented to selectively develop the tailings beach along the south embankment.
- Embankment seepage and runoff collected in the downstream water management pond will be pumped back to the TMF during operations.

5.2.4 Closure Water Management Phases I, II and III

The closure water management plan for the TMF was developed to ensure that the obligations for care and maintenance during closure and post-closure are minimized. The WMP for TMF closure is outlined below and is illustrated on Figures A.10 to A.11 in Appendix A.

Closure Water Management Phase I will commence at the end of mill operations, Phase II will commence once the TMF pond discharges down the spillway, and Phase III will commence when the Open Pit has filled with water and begins discharging to the TMF pond.

<u>Closure Water Management Phase I (Years 23 to 30):</u>

- Reclamation of the TMF beaches and embankments, plant and infrastructure sites, conveyor route, cyclone sand plant and pipelines, and any access roads not required for long term monitoring.
- Passive treatment systems in the form of wetlands will be constructed in the northern reaches of the TMF pond (North TMF Wetland) and adjacent to the TMF Main embankment (South TMF Wetland), as shown on Figure A.10.
- Construction of the closure TMF spillway.
- The Winter Seepage Mitigation Pond will be constructed and will continue to recycle seepage and embankment runoff to the TMF pond during this phase.
- The TMF pond level will be managed to maintain a water cover over the saturated waste rock stored in the facility, with all excess pond water to be pumped to the Open Pit to facilitate the ongoing improvement of pond water quality by progressively increasing the proportion of natural runoff in the pond, and to allow for wetland construction during the first five years of this phase (until end of Year 27). The TMF pond is then expected to take 3 years to fill to the closure spillway elevation (end of Year 30).
- Runoff/infiltration from the reclaimed HLF will discharge naturally to the TMF pond as of Year 29 (Figure A.11).

Closure Water Management Phases II and III (Years 31 to 114+):

- Decommissioning of the TMF embankment collection ditches and seepage collection system.
- The Winter Seepage Mitigation Pond downstream of the Main embankment will cease pump-back to the TMF pond, and will begin storing winter seepage and discharging during the summer.
- Runoff/infiltration from the reclaimed HLF will continue to discharge naturally to the TMF pond.
- The TMF pond will be routed through the South TMF Wetland before discharging naturally downstream via the closure spillway.

5.3 OPEN PIT AND ASSOCIATED FACILITIES

5.3.1 General

The following sections outline the WMP for the Open Pit, ore stockpiles, and topsoil stockpiles from pre-production (Year -3) through to the end of operations (Year 22) and into closure.

5.3.2 Construction

The construction phase of the Open Pit WMP will commence approximately 36 months prior to mill start-up, while the stockpiles WMP will commence approximately 24 months prior to mill start-up. Implementation of the plan during the staged development will consist of the following:

Years -3 to -1 (Figures A.2 to A.4):

- Construct access roads to the Open Pit, ore stockpiles and topsoil stockpiles. Establish sediment and erosion control measures along the access and haul roads, as necessary.
- Preparation of stockpile foundations, and construction and commissioning of associated runoff collection systems.
- Implement appropriate pumping systems near the Open Pit to manage pit dewatering requirements.
- The upper Canadian Creek catchment is not diverted into the Open Pit but continues to flow naturally northwards to the Yukon River.

5.3.3 Operations

All contact water in the Open Pit will be collected and directed to the mill, while contact water from the Ore Stockpiles will be directed to the TMF pond. The WMP for the facilities and the key timelines for operations are outlined below for Years 1 to 22 (Figures A.5 to A.7):

Open Pit:

- Pit dewatering systems will be established to collect the dewatering flows from the pit sump. All collected water will be pumped to the mill for use in the process.
- Upslope catchment areas will be allowed to flow naturally into the Open Pit.
- Canadian Creek will be diverted around the Open Pit when the pit footprint intercepts the creek, as shown on Figure A.8.

Ore Stockpiles:

- Undisturbed runoff will be directed around the various stockpiles and will be allowed to drain naturally to the TMF pond.

- Contact runoff from the Ore Stockpiles will be collected in local water management ponds and will be pumped to the TMF pond.
- An infiltration suppression system and/or groundwater collection system will be established beneath the Low Grade Supergene Sulfide Ore Stockpile to minimize infiltration to groundwater. The system will be designed to be 90% effective.

<u>Topsoil Stockpiles:</u>

- Runoff from the stockpiles will be allowed to flow back to the natural down-gradient drainages and to the TMF.
- Sediment and erosion control measures will be implemented along the haul roads during construction and operations.

5.3.4 Closure Water Management Phases I and II

Open Pit mining will cease mid-Year 19 and the low grade ore stockpiles will be processed through the mill until the end of Year 22. Pit dewatering will cease and the closure phase for the Open Pit will begin in Year 19. The closure phase for the ore/topsoil stockpiles will begin in Year 23 after mill operations have ceased. The WMP for the Open Pit and stockpiles is outlined below and is illustrated on Figures A.8 to A.11 in Appendix A.

<u>Open Pit:</u>

- The Open Pit dewatering system will be decommissioned in Closure Water Management Phase I.
- The Open Pit will be allowed to fill naturally by runoff from the upstream catchments, including Canadian Creek, as of Year 19. This will continue into perpetuity.
- The Open Pit will also receive water pumped from the Heap Leach Facility and TMF pond early in Closure Water Management Phase I.

<u>Ore/Topsoil Stockpiles:</u>

- As of Year 23, the stockpiles will be reclaimed and vegetated to stabilize the slopes, and all runoff from the various upslope stockpile footprints will flow naturally into the TMF pond.

5.3.5 Closure Water Management Phase III

Closure Water Management Phase III will commence when the Open Pit lake begins to overflow towards the TMF in approximately Year 114. The WMP for the Open Pit in Phase III is outlined below and is illustrated on Figure A.12 in Appendix A.

<u>Open Pit:</u>

- The Open Pit is full and overflows are routed through the North TMF Wetland before being discharged into the TMF pond. Discharge will occur during the months of June through September via a controlled gravity discharge structure at the outlet of the Open Pit.

6 – REFERENCES

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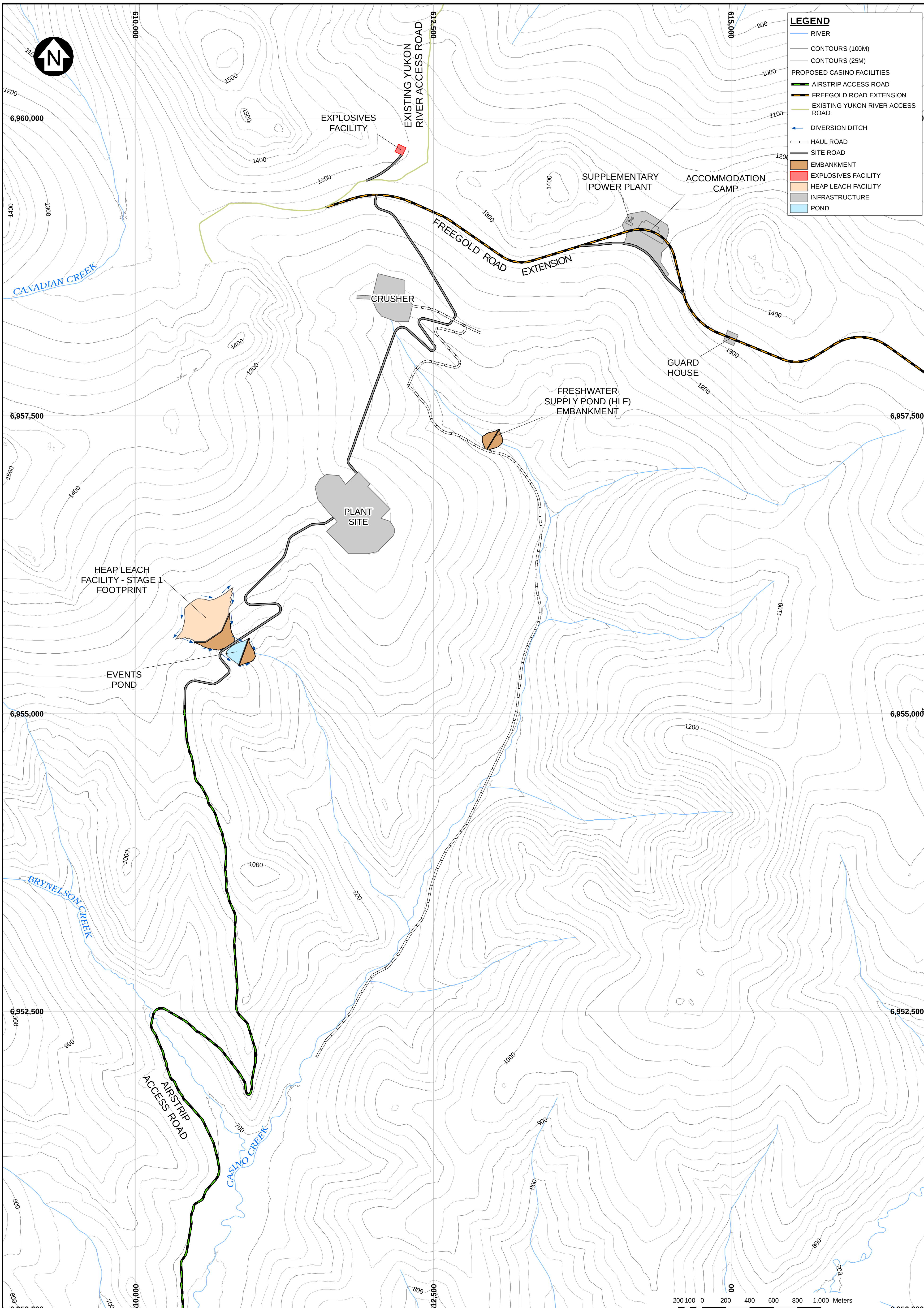
APPENDIX A

STAGE LAYOUTS

(Figures A.1 to A.12)



NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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CASINO PROJECT

WATER MANAGEMENT
YEAR -4

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FIGURE A.1 | REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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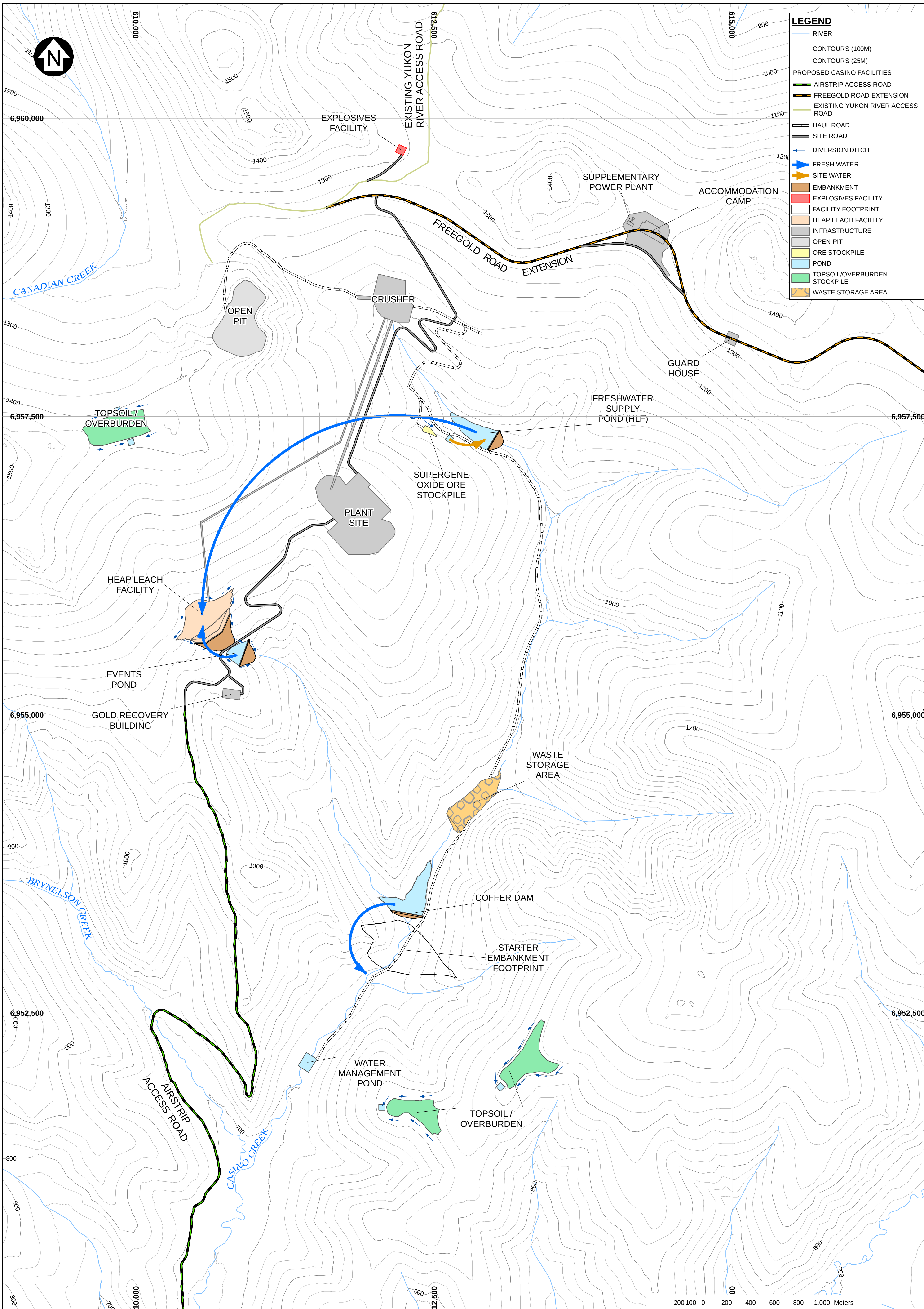

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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FIGURE A.2 | REV 0

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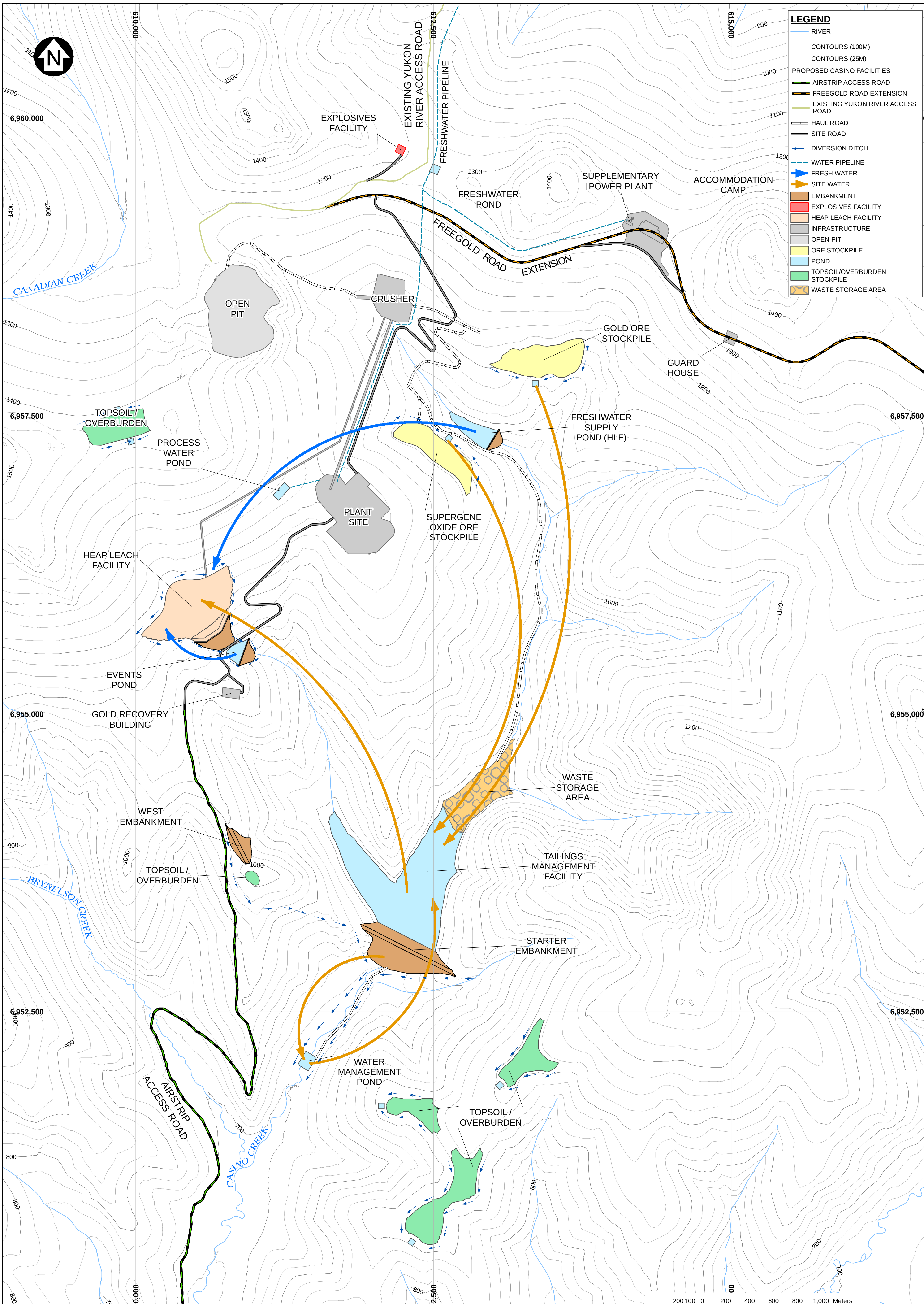

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NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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CASINO PROJECT

WATER MANAGEMENT YEAR -2

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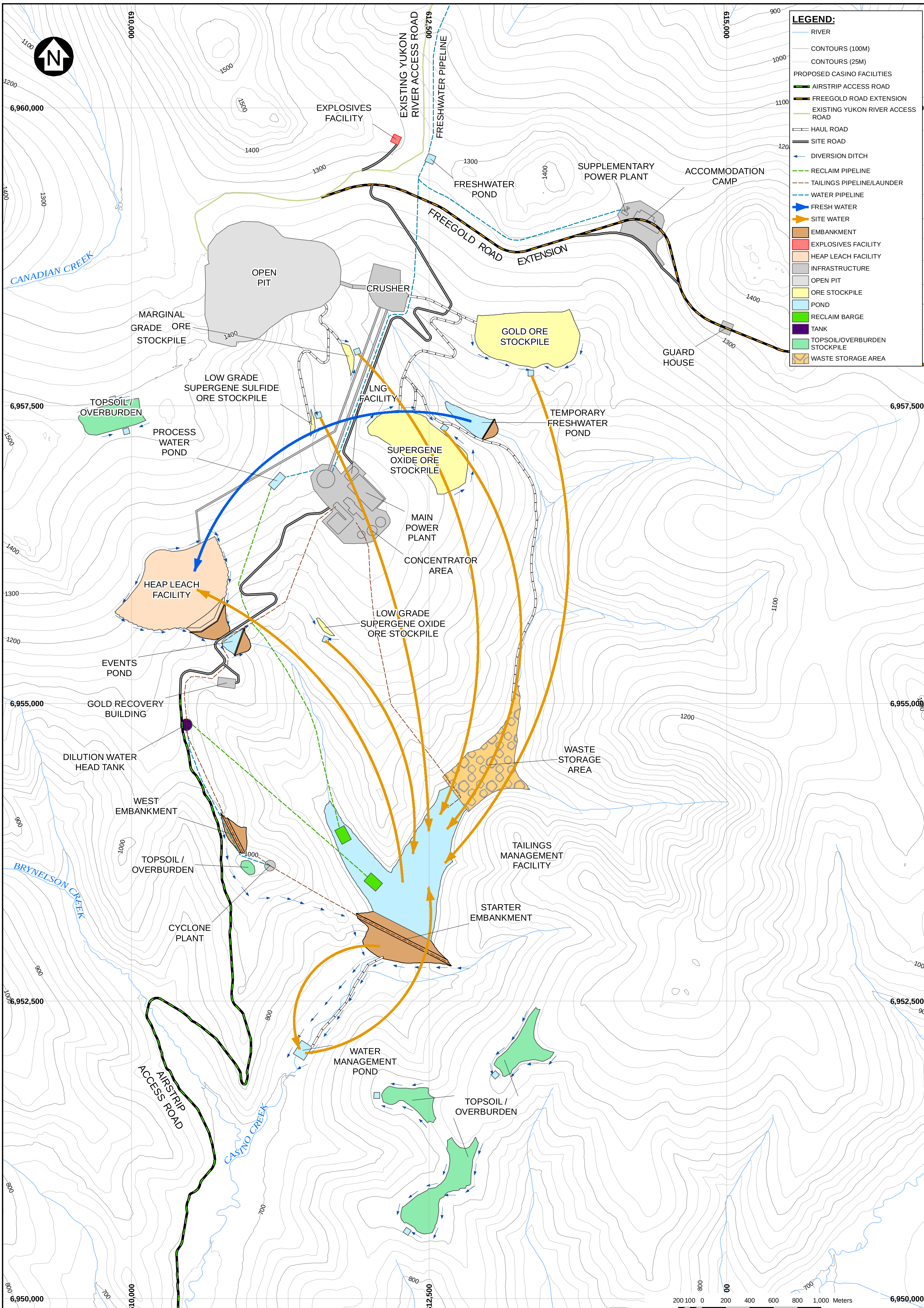
FIGURE A.3 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB



NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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CASINO PROJECT

WATER MANAGEMENT YEAR -1

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VA101-325/14	2

FIGURE A.4 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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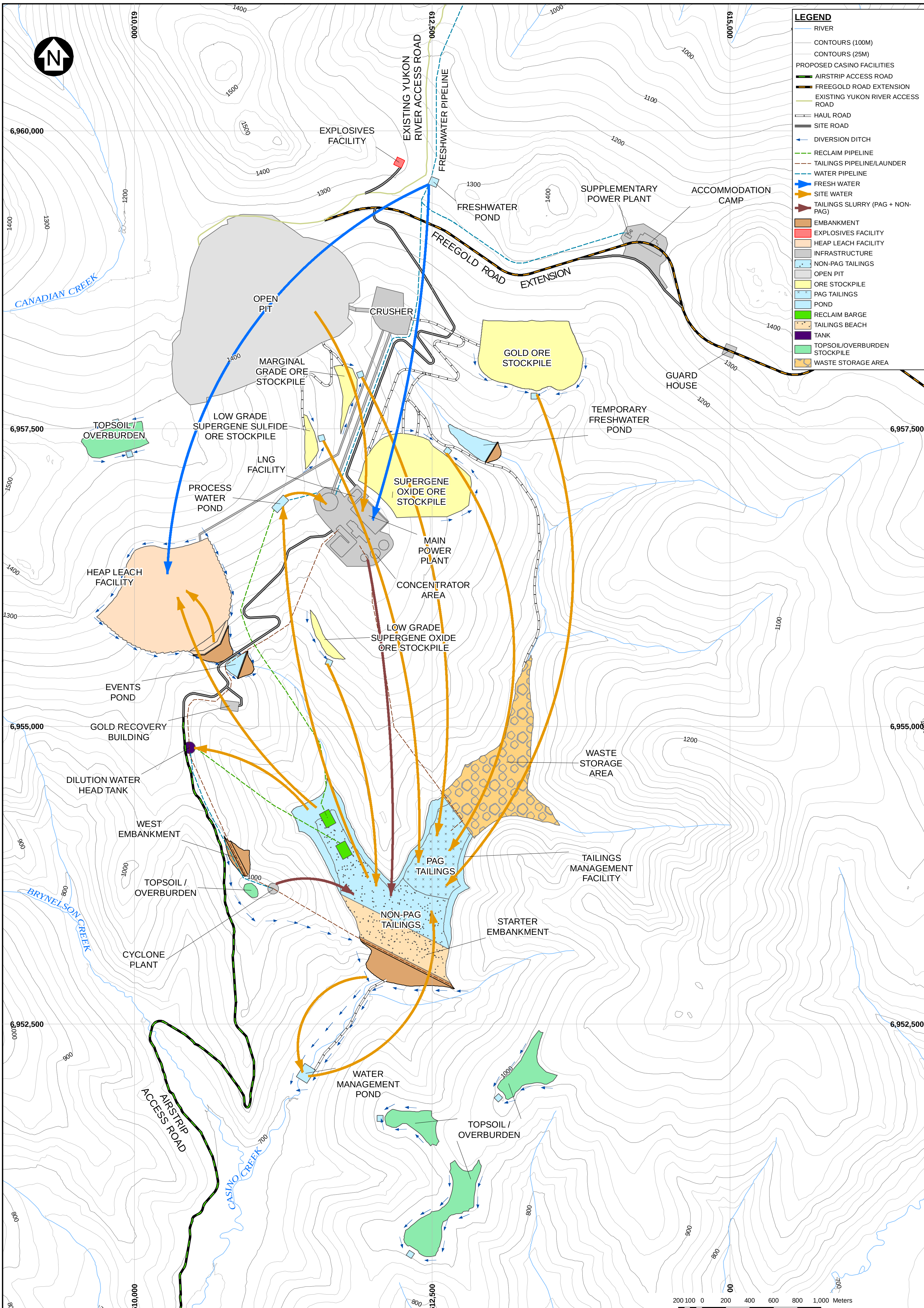

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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CASINO PROJECT

WATER MANAGEMENT
YEAR 1

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VA101-325/14	2

FIGURE A.5 REV 0

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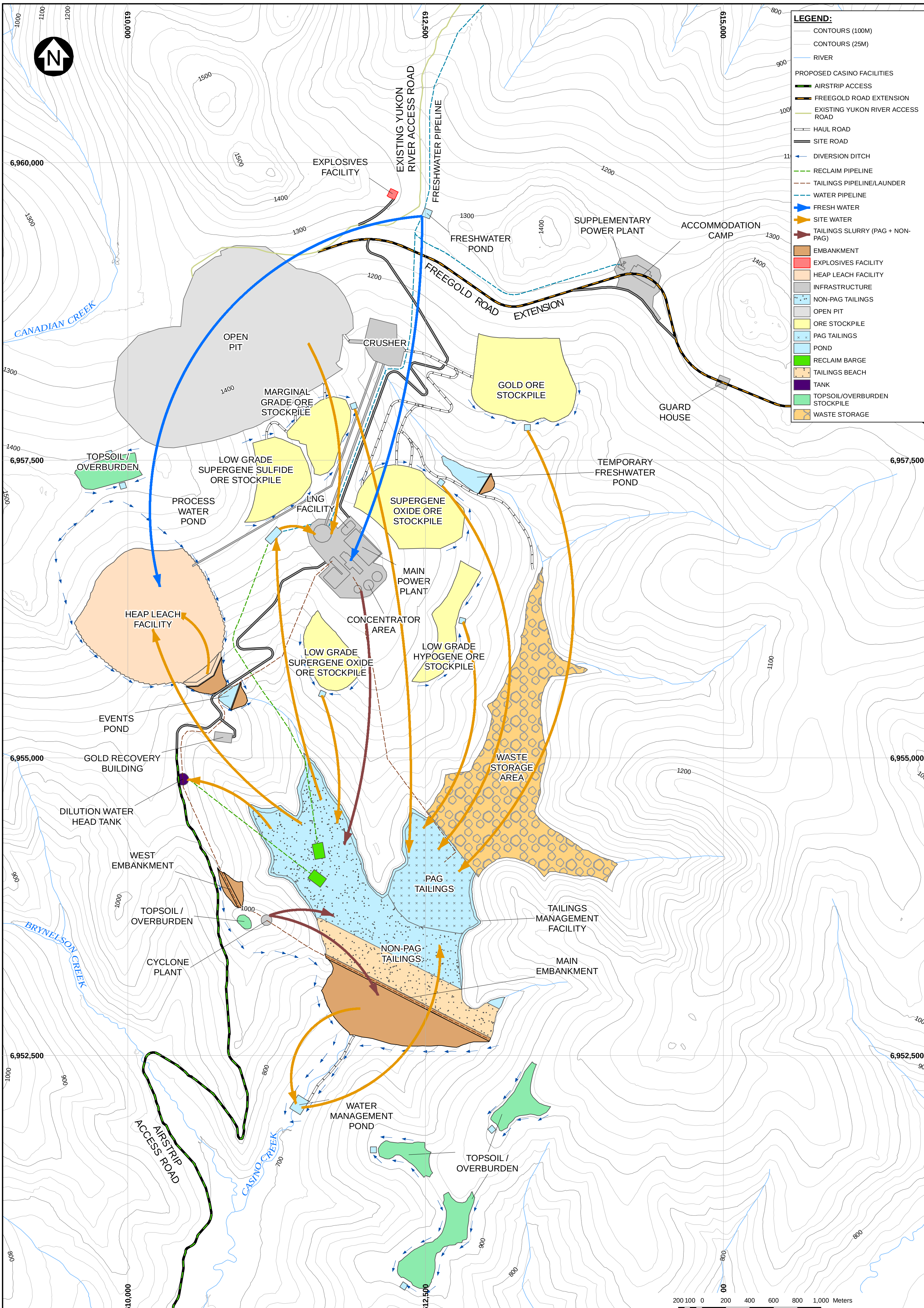

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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CASINO PROJECT

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P/A NO. VA101-325/14 | REF NO. 2

FIGURE A.6 | REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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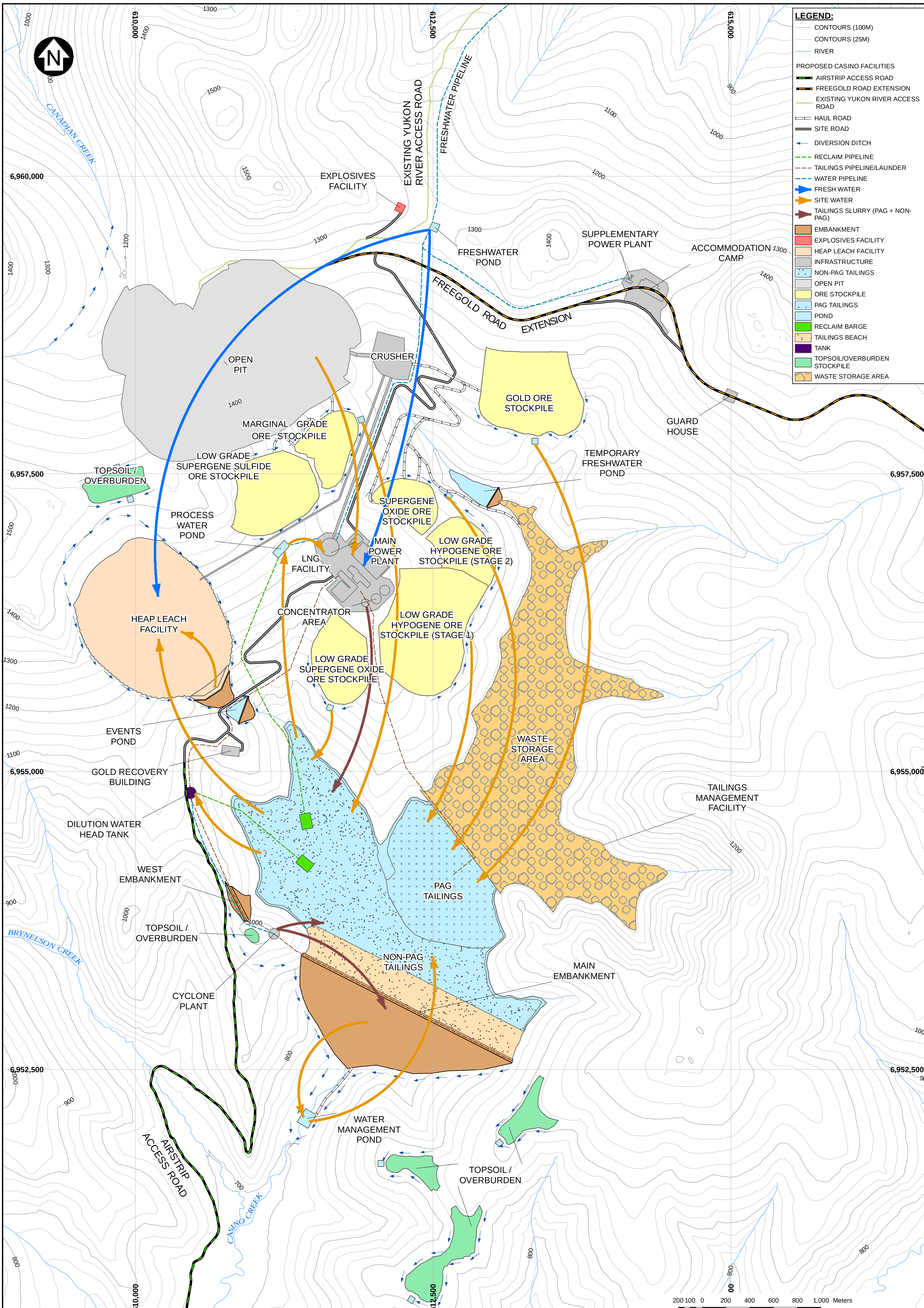

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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CASINO PROJECT

WATER MANAGEMENT YEAR 10

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VA101-325/14	2

FIGURE A.7 — REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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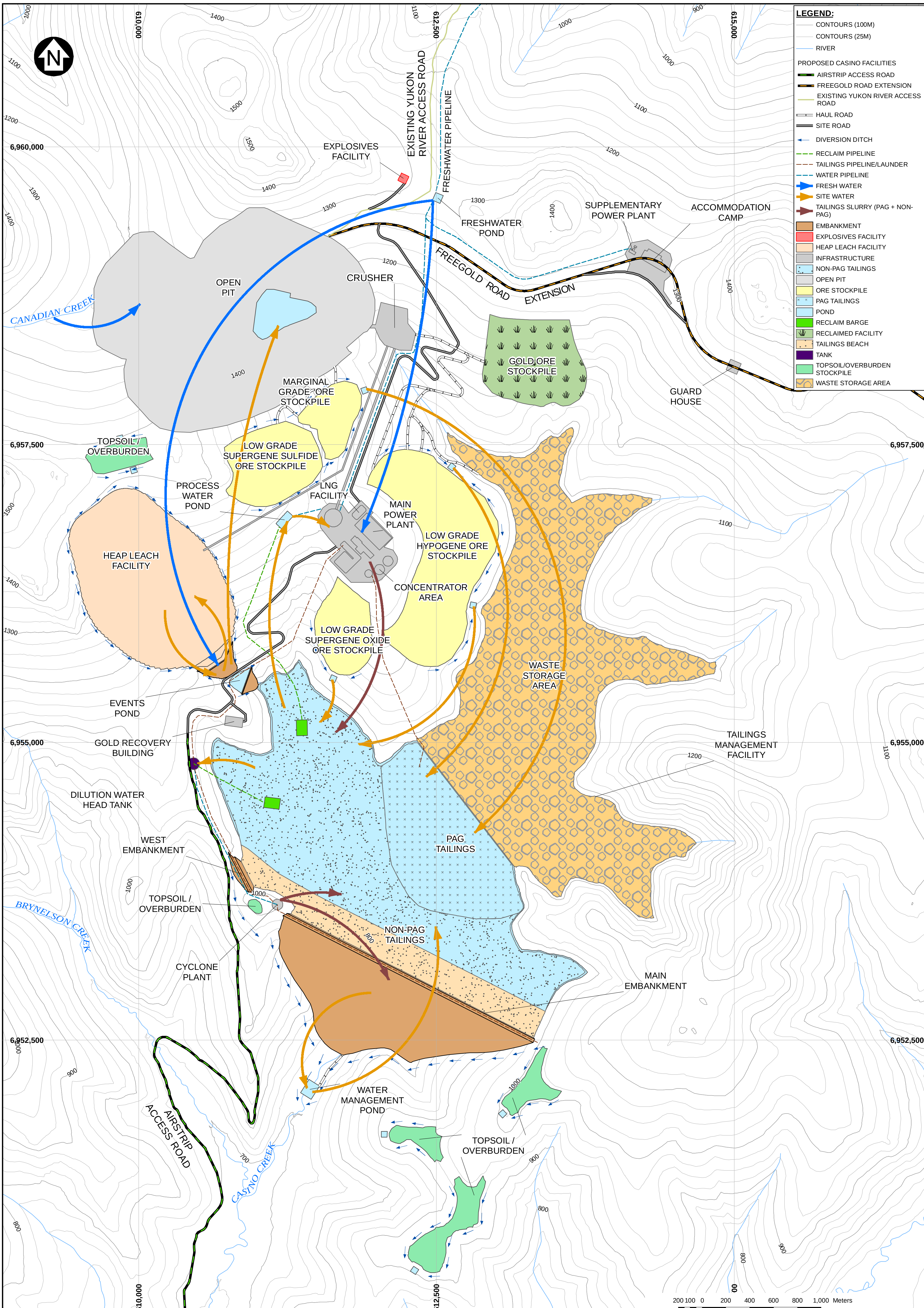

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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CASINO PROJECT

WATER MANAGEMENT
YEAR 19

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FIGURE A.8 | REV 0

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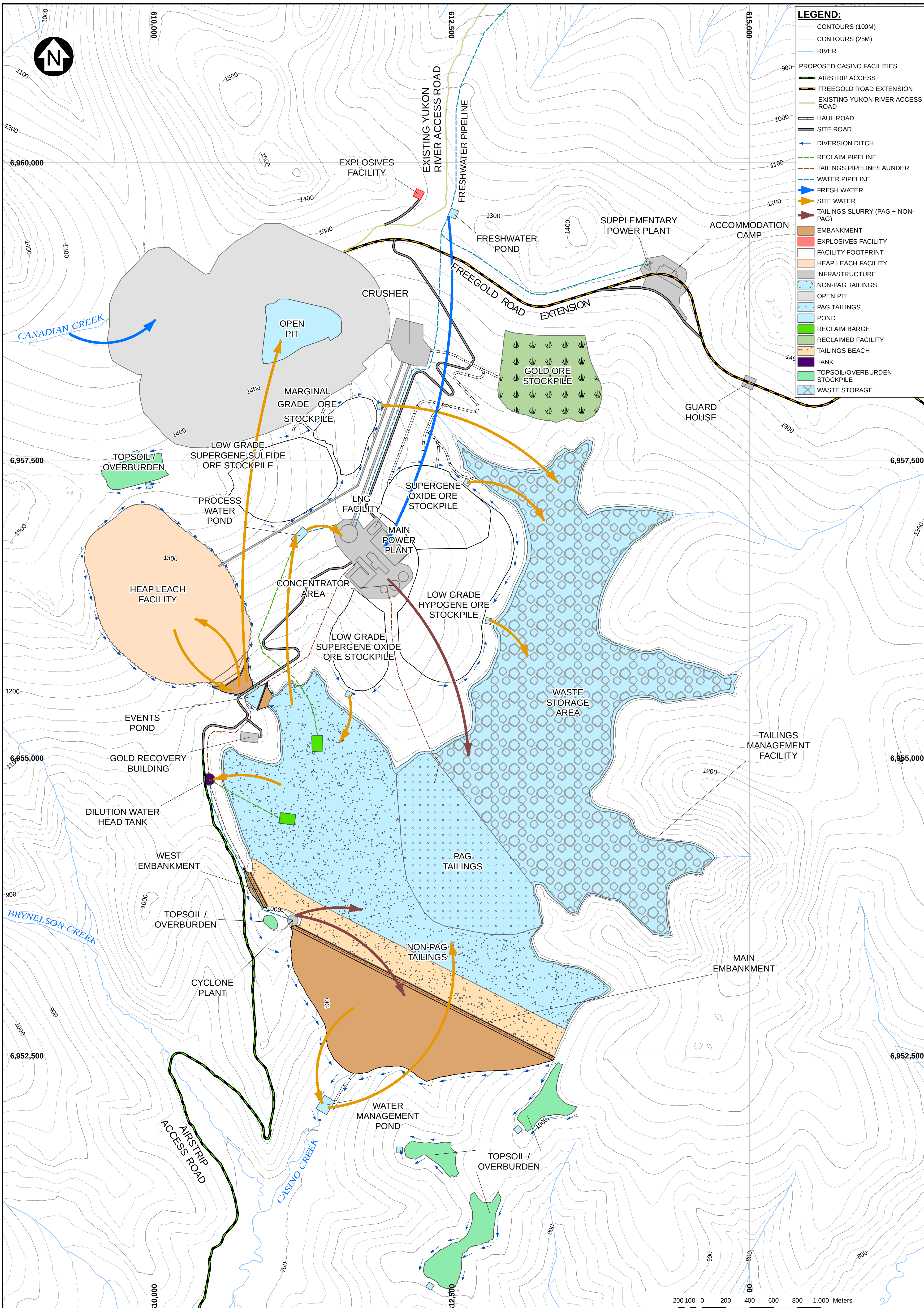

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CASINO PROJECT

WATER MANAGEMENT
YEAR 22

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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VA101-325/14	2

FIGURE A.9 — REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30OCT'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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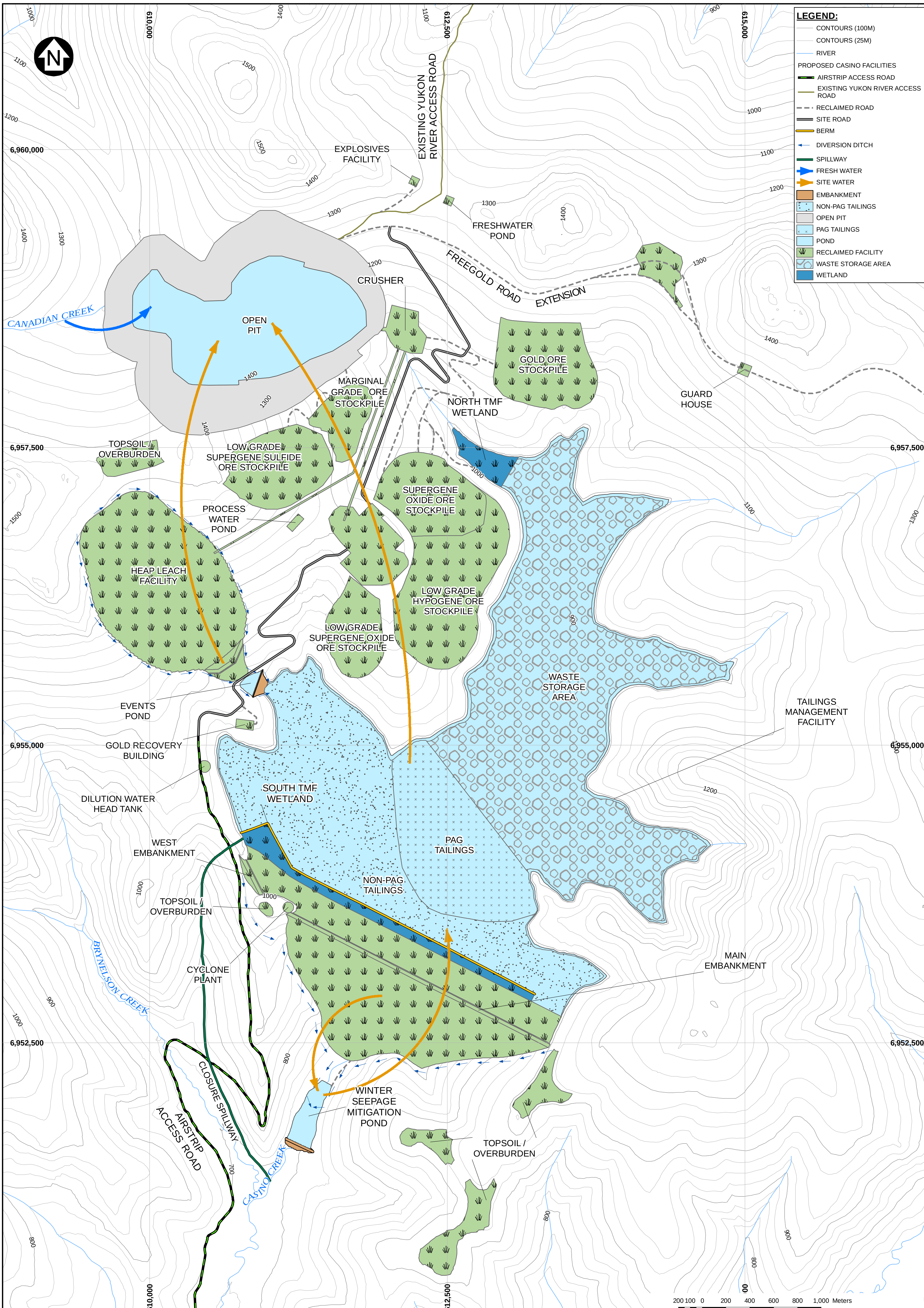

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. PHASE 1: ACTIVE WATER MANAGEMENT PRIOR TO THE DISCHARGE OF THE TMF POND.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	2DEC'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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CASINO PROJECT

CLOSURE WATER MANAGEMENT PHASE I

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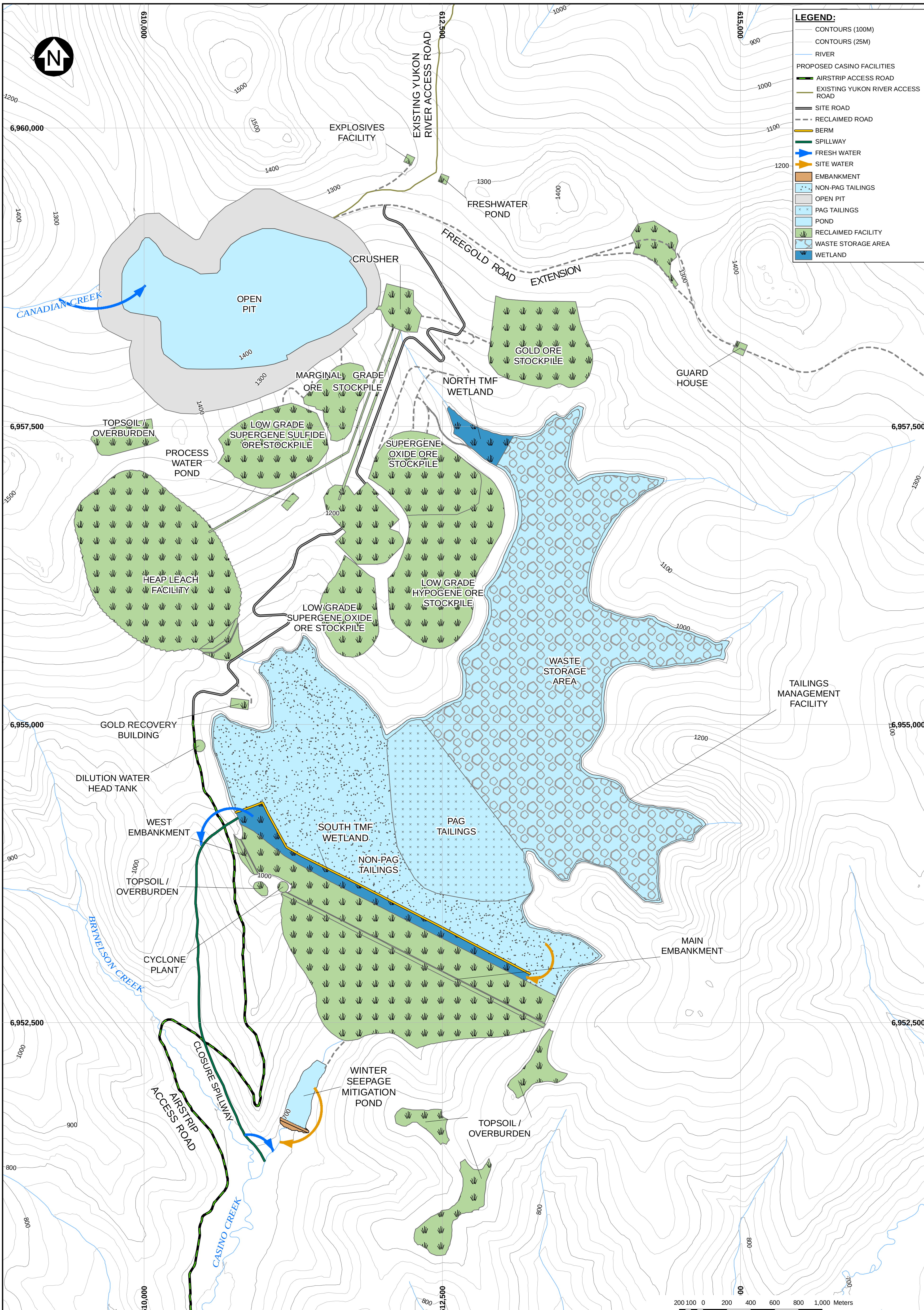
P/A NO. VA101-325/14

REF NO. 2

FIGURE A.10

REV 0



NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. PHASE II: PASSIVE WATER MANAGEMENT AFTER DISCHARGE OF THE TMF POND BUT PRIOR TO DISCHARGE OF THE OPEN PIT LAKE.

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CASINO PROJECT

CLOSURE WATER MANAGEMENT PHASE II

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P/A NO.	REF NO.
VA101-325/14	2

FIGURE A.11 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	2DEC'13	ISSUED WITH REPORT	CC	CC	EER	KJB

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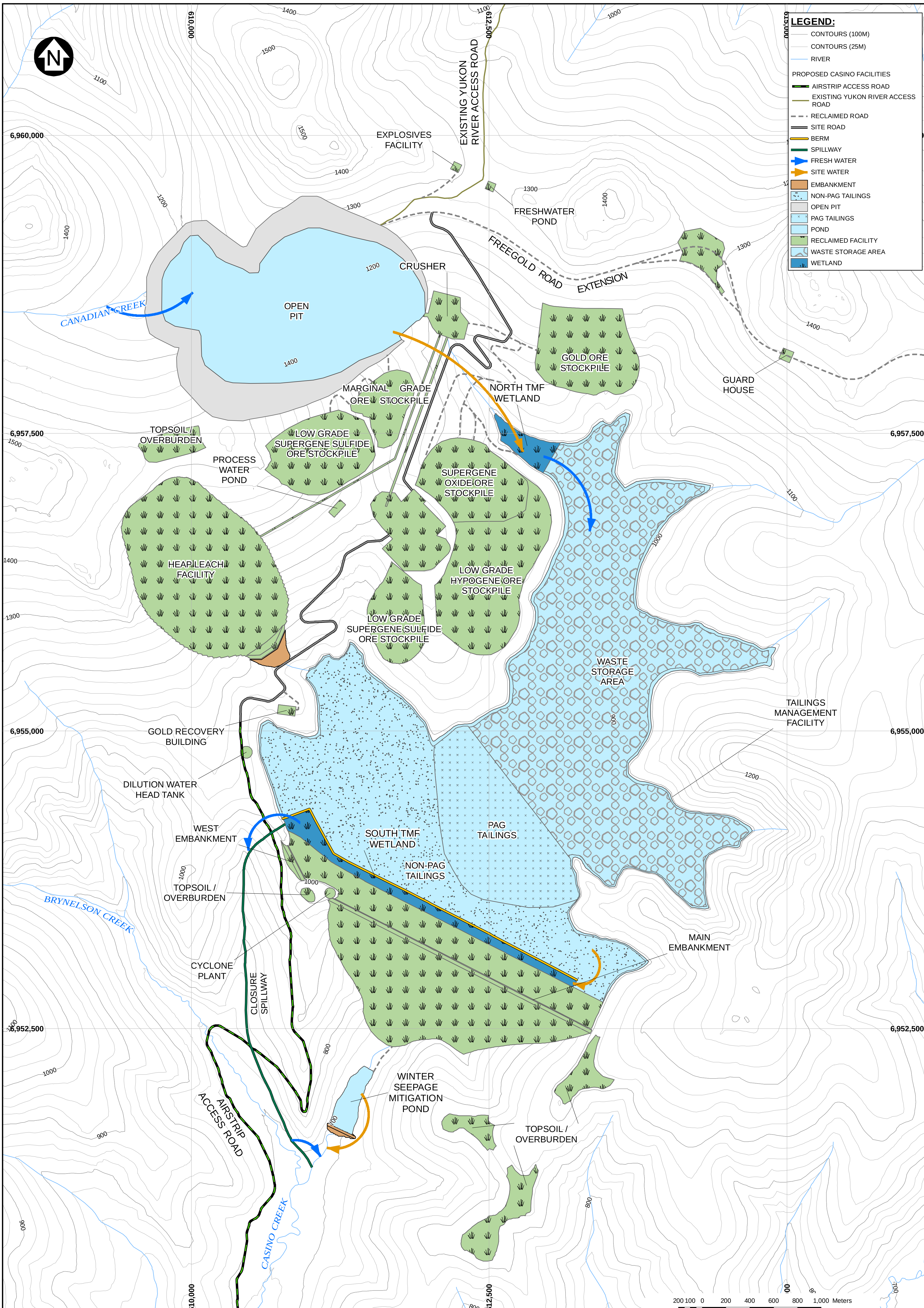

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REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	2DEC'13	ISSUED WITH REPORT	CC	CC	EER	KJB

NOTES:

1. BASE MAP: LAKES FROM NTS, RIVERS FROM CANVEC, CONTOURS FROM EAGLE MAPPING.

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3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:30,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. PHASE III: PASSIVE WATER MANAGEMENT AFTER DISCHARGE OF THE OPEN PIT LAKE.

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CLOSURE WATER MANAGEMENT PHASE III

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FIGURE A.12 | REV 0