Section C
Project Description

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C PROJECT DESCRIPTION

Coal Valley Resources Inc. (CVRI) is proposing to continue operations of the Coal Valley Mine (CVM) by developing coal resources in the Robb Trend Project (Project) (Figure A.1-2). The Project is not a new mining development but is rather an extension to the existing mining and coal processing activities at the CVM. The considerable operations and reclamation expertise of CVRI from the existing mining areas will be important to the success of the Project.

Section C of the Application provides an overview of existing operations at the CVM, an overview and discussion of the Project conceptual mining operations, infrastructure and services and the environmental management systems.

The existing infrastructure, expertise and resources currently in place for the operation of the CVM will be extended to the Project.

C.1 OVERVIEW OF EXISTING OPERATIONS

CVRI owns and operates the CVM which is located approximately 100 km south of Edson in the Coal Branch area of Alberta (Figure A.1-1). This area has an extensive coal mining history dating back to the early 20th century when coal extraction was carried out using underground mining methods. Modern surface mining was introduced into the Coal Branch Area during the 1960's.

The CVM has been in operation since 1978 employing both truck/shovel and dragline mining methods. The mine has established a reputation as a dependable supplier of high quality thermal coal for overseas and domestic markets. Depleting coal reserves within the existing CVM permit area require further mine development to allow CVRI to maintain its workforce and to continue to supply thermal coal to its customers. At current forecasted rates of coal production, CVRI will require additional mining areas by mid-2014. Over the life of the mine development, operation and reclamation procedures have been adapted to evolving regulatory requirements and mining best practices.

C.1.1 PRODUCTION HISTORY

Table C.1-1 illustrates the historic record for production from the mine. During 2005, the Coal Valley Mine Coal Processing Plant (Plant) at CVM was modernized and expanded to an annual production capacity of 4.0 million tonnes. Additional mining equipment and manpower have been added since 2005 as production levels have increased. Life of mine production from the current mine area has reached over 70 million tonnes over 34 years of operation. Wide variations in annual production have been encountered during the years of operation as market demand and coal prices have fluctuated (Chart C.1-1).

These tabulations illustrate that CVM is a mature mine with an established workforce and stable market. While production levels have fluctuated a base market has been maintained and has grown over time. The current production capacity and market has been increased into the order of 4 million tons per year. However, the long life of the property has drawn down the reserves available and new mining areas must be brought into production.

Table C.1-1 Annual Production Statistics							
Year	**Waste (BCM)**	**Coal (CMT)**	**Overall Ratio (BCM/CMT)**	**Year**	**Waste (BCM)**	**Coal (CMT)**	**Overall Ratio (BCM/CMT)**
1978	2,960,703	663,729	4.46	1995	10,356,123	1,711,611	6.05
1979	5,982,276	1,953,190	3.06	1996	11,881,603	1,779,430	6.68
1980	10,415,544	2,401,317	4.34	1997	11,626,084	1,677,430	6.93
1981	12,417,449	2,736,463	4.54	1998	12,315,681	1,876,478	6.56
1982	13,818,532	2,685,206	5.15	1999	11,185,751	1,604,404	6.97
1983	12,820,596	2,040,498	6.28	2000	6,375,780	1,088,389	5.86
1984	12,906,920	2,102,337	6.14	2001	7,192,559	1,514,412	4.75
1985	8,414,767	1,702,497	4.94	2002	8,261,889	1,788,800	4.62
1986	7,632,468	1,569,500	4.86	2003	10,113,802	1,800,000	5.62
1987	9,334,255	1,724,480	5.41	2004	9,862,884	1,650,749	5.97
1988	11,738,338	2,014,392	5.83	2005	8,761,002	1,418,120	6.18
1989	11,502,506	1,982,187	5.8	2006	9,474,273	3,596,261	2.63
1990	11,008,098	1,950,057	5.65	2007	12,570,973	3,723,000	3.38
1991	9,114,498	1,854,344	4.92	2008	15,938,759	3,674,275	4.34
1992	10,344,270	1,902,017	5.44	2009	18,806,093	3,601,861	5.22
1993	8,688,332	1,528,480	5.68	2010	20,403,089	3,408,555	5.99
1994	8,860,741	1,475,285	6.01	2011	21,522,987	3,375,645	6.37
Total					**374,609,625**	**71,575,399**	**5.37**

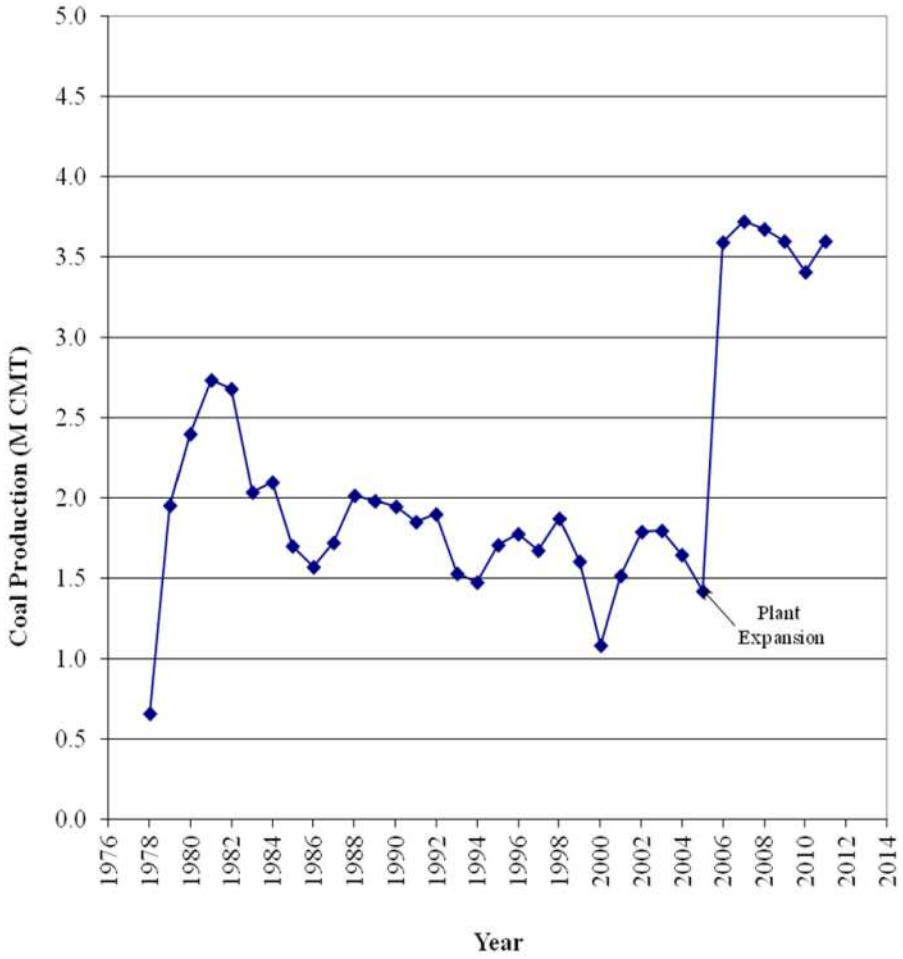


Chart C.1-1 Annual Sales Production

C.1.2 EXISTING MINE AREAS

An overview of the existing mine development at CVM is provided in Figure C.1-1. The original mine development began in what is now known as the Base Mine area which also includes the Plant and office/maintenance shop complex. Over the years CVRI applied to the necessary regulatory bodies for approval to develop, operate and reclaim additional individual pit and dump areas. In 1999, as the original mine area reached completion, CVRI submitted a mine permit application and EIA for the West Extension and South Block areas. By 2004 mining began in the Mercoal East area and in 2008 CVRI submitted a mine permit application and EIA for the Mercoal West and Yellowhead Tower areas. This expansion of the mining region has allowed CVM to continue production to date.

CVRI wishes to continue mining to levels near the maximum Plant production. Mine production can be balanced to match Plant capacity as the reserve base and equipment is available. The reserve base remaining at the current CVM operation is very limited. The pit areas available within the current mine permit and at the current mine economics, are illustrated within

Table C.1-2. With this dwindling coal reserve base the remaining life of the mine is limited to only a few years. The Project is essential for continued production from CVM.

Table C.1-2 Available Mining Areas in Permit Area[(1)]

Mine Area	Coal Reserve (RMT)
Main Property (Base Mine, West Extension, Mercoal East, South Block)	
Pit 26/21	3,628,000
Pit 27	385,000
Pit 29	3,243,000
Pit 143/144	918,000
Pit 132	273,000
Mercoal West	
MW	3,724,000
Yellowhead Tower	
Pit 152/162	12,190,000
YH	14,468,000
Total	**38,829,000**

(1) Projected to December 31, 2011

C.1.3 MINING OVERVIEW

CVRI utilizes a variety of mining methods within the open pit mining operation. The occurrence of multiple coal seams within the foothills terrain adds complexity to the mining layout. Seams which are faulted folded and situated as steeply dipping strata add further limitations and challenges to mine design and operations. Factors such as coal quality, proximity to the Plant, infrastructure requirements and ratio of overburden to recovered coal have an impact on the economics of pit development.

C.1.3.1 Pit Design

The spatial limits of individual pits are determined by geologic, economic, topographic and operational boundaries. Variables which determine this are steeply dipping coal seams, lack of availability of spoiling room and amount of rehandle. The pit areas are designed on geologic cross-sections with pit limits determined by applying a break even strip ratio (BESR) on each of the cross-sections. From these cross-sections the overall pit limits can be determined and the average strip ratio realized. The mineable areas are then divided into workable pieces to meet coal scheduling and waste dump development sequences.

Typically, 90% of in-place tonnage is assumed to be recoverable. This loss (10%) is discounted due to mining inefficiencies to remove partings or recover smaller seams. Efforts are directed at maximizing in-pit recovery of in-place tonnage and values greater than 90% are often achieved. Dilution from waste rock into the coal may also occur during mining. Dipping seams are often

more difficult to clean effectively so that both loss and dilution occur at the top and bottom of the seam during loading.

Final pit design is provided in the applications submitted to the ERCB at the mine licencing stage of development. During this licencing stage the detailed pit and dump designs are reviewed for safety, stability and maximizing coal recovery. Detailed operating and reclamation procedures and plans provided with the applications are reviewed for approval. This process is repeated for each individual pit and dump over the life of the mine.

C.1.3.2 Dragline Operation

Since inception CVM has utilized a large walking dragline (Page 752LR) for overburden stripping (Photo C.1-1). This dragline is well suited to moving large volumes of overburden from shallow coal seams at an economical cost. A limitation of the machine is the depth of digging and the operating radius which can move the overburden only within the distance of the swing radius. Figure C.1-2 illustrates the typical dragline mining method. The low operating cost of this unit makes this a favored mining method but it is suitable only in specific mining circumstances. Photo C.1-2 captures the dragline crossing Highway 40.

The dragline (Page 752LR) is used only in the part of the mine where the terrain is suitable for dragline operations. The dragline removes the overburden above the coal and places it on un-mined land adjacent (on both sides) to the initial cut. The exposed coal is loaded with backhoes haul trucks and delivered to the Plant.

A smaller walking dragline (Marion 7450) works in advance (approximately three months) of the Page 752 dragline in order to build walk roads and pre-build drilling benches. Both draglines will be supported by a dozer.

Two months in advance of the dragline a blast hole drill will be used to drill overburden rock in order to allow for blasting. The overburden will be drilled and blasted in one bench. The depth of the pit commonly ranges from 20 m to the full dragline mining depth of 37 m.

The broken rock is then excavated with the Page 752LR and sidecast into overburden piles on both sides of the pit. A RH-120 backhoe will ‘enter’ the pit to load the coal onto haul trucks which deliver it to the Plant. The coal is dug in benches progressing from the top to the pit bottom. The coal recovery advances in segments behind the dragline. A grader will maintain the haulroad on a continuous basis.

Photo C.1-1 Typical Dragline Pit

Photo C.1-2 Dragline Crossing HWY 40

C.1.3.3 Truck/Shovel Operation

The traditional mining method for deep stripping operations is a 'truck /shovel' method which utilizes multiple benches to progressively dig deeper to recover the resource of interest. Figure C.1-3 provides a typical view of this method.

The mining layout depends on various types of excavators to dig the overburden and load large capacity trucks which move the overburden out of the pit to dump beyond the resource area. The operation relies on numerous pieces of equipment and a large workforce for operations and maintenance of the equipment. Recent efficiency has been gained by increased size of equipment leading to lower manpower costs.

Truck/shovel or open pit mining methods are best suited for mining irregularly shaped coal structures that are not flat lying and are located deeper in the ground. The overburden is drilled, blasted and subsequently removed in successive layers which are commonly referred to as benches. Bench height is determined by the size of the mining equipment but typical bench heights range from 10 to 20 m. Several benches may be in operation simultaneously in different parts and at different elevations in the open pit mine.

Large mining shovels or backhoes are utilized to excavate the overburden and load it onto haul trucks to be hauled to external waste dumps or to backfill mined out areas. The excavators will then load coal into haul trucks for delivery to the Plant for processing.

CVRI will use dozer‘s to strip soil and to prepare the initial drill benches approximately three months in advance of mining. Two months in advance of mining an blast hole drill will be used to drill overburden rock for blasting.

A typical ‘bench setup’ will involve two large backhoes (RH-170 or RH-120) used to excavate waste and coal with a D10R dozer supporting their operations. One backhoe will be used to excavate and load waste rock. The other backhoe will alternate between excavating rock and coal. The overburden and coal will be removed in 14 m high benches. Waste rock will be hauled to external dumps or if scheduling will allow to an in-pit backfill area. When excavating rock a backhoe will utilize only two to four trucks while the backhoe loading coal will utilize 10 to 12 trucks for the long coal haul cycle.

As with dragline mining drilling will typically be conducted on day shift only with blasting occurring two or three times per month in a given pit.

C.1.3.4 Pre-Mining Activities

Areas that have merchantable timber will be logged prior to mining. Timber is currently salvaged by a private contractor and as directed by Alberta Sustainable Resource Development (ASRD). Non-merchantable timber and residual material, such as tops and limbs, are left in place and incorporated with the soil salvage operations.

When timber salvage activities are complete, soil salvage operations can commence. CVRI currently salvages sufficient topsoil volumes to satisfy reclamation requirements. Soil will be salvaged using a variety of mining equipment. Salvaged soil is either hauled to a stockpile location, direct placed to an adjacent area that has been contoured and is ready for soil placement or dozed into a stockpile. All stockpile locations are located on stable ground outside of the active mining areas.

Support infrastructure such as access corridors, haul roads, power lines and drainage ditches will be constructed during the pre-mining stage of the Project after merchantable timber and soil salvage operations are complete.

C.1.3.5 Drilling and Blasting

All overburden materials excavated at the CVM require blasting in order to achieve suitable digging conditions. Bulk explosives are utilized to fragment the rock to the point where the dragline or excavators can dig and load the material.

Large diameter drills are utilized throughout the various pits to drill through ‘benches’ above the coal. Drill holes sizes are generally 9-12 inch in diameter. Specific drill ‘patterns’ are used for differing circumstances and rock types. Typically a ‘staggered pattern’ with drillholes on 8m x 8m spacing is applied. Drillholes are typically 20 m in depth for a truck/shovel bench.

ANFO is the common bulk explosive used throughout the mine. Modified 'slurry' is used when wet conditions are encountered. An on-site contractor supplies and loads the bulk explosives as directed by CVRI. The top of the blast holes are 'stemmed' with drill cuttings or crushed gravel to hold the explosive force within the hole.

Safety around the blasting area is of prime importance and strict procedures are followed to clear and secure the area. Operational practices includes those listed below.

- *Use of delays and vary type of delay* - Increased use of delays and/or different delays can be used to reduce ground vibration, minimize fly rock and noise (especially in areas of potential public exposure) and improve the efficiency of blasts. This special consideration may be necessary in parts of the mining in the Project area.
- *Clearance of Blast Areas* – The blast area is visually inspected by the blaster in charge in advance of the blast. Guards then secure the area at all access points. A radio call is made and radio silence called on all mine frequencies as a final warning. This procedure provides a warning of an impending blast.
- *Routine blasting time frame* - CVRI routinely blasts during specific times. Blasting is limited to daylight hours, and is usually scheduled between 12:00 PM and 5:00 PM.
- *Security around mine and blast areas* - CVRI maintains general security perimeter around the active mining areas to keep the public out of potentially dangerous areas. The security perimeter is normally marked with signs and any access roads or trails are blocked or gated. A more intensive security perimeter is established around blasting areas by visual inspection of the surrounding area, access roads and viewpoints. Guards are posted at all access points with visual view of the blasting area.

C.1.3.6 Overburden Handling

Overburden can be placed in external dumps or within pit areas that have been mined and are no longer required. In either case careful consideration of dump design and long term stability must be addressed. Reclamation objectives for the area must be accommodated in the plan.

Dump designs are subject to government approval and regulation. CVRI will submit detailed design for proposed dumps with the mine licence application. Licence applications will include details of the proposed dump site, progressive development plans and a reclamation plan showing how the area will be reclaimed.

As part of the licence application, an evaluation of dumping requirements, potential dump configurations and capacity is undertaken. These designs are then reviewed by qualified geotechnical engineers to address foundation and dump stability issues. The geotechnical review involves field investigations to determine foundation conditions from test pits and soil classification tests. This field testing usually provides sufficient information for a stability calculation, by computer modeling, to ensure that required safety factors are met with the dump configuration. The proposed dump design may need to be modified to achieve these required standards.

Partings are the non-coal materials located within or between the coal seams and are excavated by the backhoes during mining and are generally hauled to the external dumps.

Rock removed during the excavation of the various pits is disposed of within large overburden dumps. These are often constructed near the pits or as backfill into previous pits. Backfill has the advantage of refilling mine areas thus reducing disturbance of additional land.

Large capacity haul trucks move the waste rock material out of the pit to the disposal dumps. The rear dump trucks build various levels of 'lifts' on the dumps, often dumping from significant heights to fill over a lower area. Specific operating and safety procedures are followed in dump development including overall geotechnical stability of the constructed pile.

Upon completion of construction the dumps are sloped by dozers to reduce the side slopes. This then permits salvaged soil to be brought in to spread over the dump surface as part of the reclamation effort.

C.1.3.7 Decommissioning & Reclamation

Prior to closure of pits CVRI applies to the ERCB for approval to abandon dumps and pits.

During decommissioning the following will take place:

- equipment removed;
- facilities demolished;
- power lines removed;
- crossings removed;
- water management ponds removed; and
- reclaim Plant coal tailings.

The reclamation plan recognizes the importance of minimizing disturbance, and integrating reclaimed lands with adjacent undisturbed landscapes. The plan utilizes the most effective methods and prescriptions available, to keeping with the concepts of ecosystem management. A key aspect of the reclamation plan is to recognize that environmental integrity is a progression, which occurs over time. CVRI will reclaim lands to conditions which will advance this progression, realizing that time is also required for all of the ecosystem processes to become re-established. Objectives of the reclamation plan are found in Section F.

C.1.4 COAL PROCESSING PLANT

The existing Plant (Photo C.1-3) at the CVM will continue to be utilized into the future, processing the coal mined in the Project area. The Plant is located within the existing Mine Permit and is licenced by ERCB with operating approvals under EPEA. In 2005 CVRI invested significant capital funds to modernize and expand the Plant capacity in order to meet expected increased foreign market demand. The approved production level for the Plant is 4.4 million tonnes per year.

Photo C.1-3 Coal Processing Plant and Office/Shop Complex

C.1.4.1 Coal Processing

The processing or cleaning of the coal involves removing impurities to achieve a desired coal quality. Typical clean coal quality will result in 11% ash and 10% moisture content. The resulting coal product is shipped via rail for domestic use or to ocean ports for export overseas. A simplified block flow diagram of the Plant process is included as Figure C.1-4 with the location of individual coal processing and materials handling facilities shown in Figure C.1-5.

The raw coal hauled from the pits is processed at the Plant which removes partings and inherent waste material. In general, approximately 50% of the raw material haul is removed by the Plant to produce the final 'clean coal' product. If during the initial mining the pits provide higher yield coal (higher recovery from the Plant), pit limits can be re-examined.

Material cleaned from the raw coal at the Plant is also hauled by truck to nearby waste dumps. A slurry 'tailings' produced from the Plant is also disposed of near the Plant into a tailings pond.

C.1.4.2 Plant Refuse Management

During 2005, CVRI submitted an application to AEW and the ERCB regarding the proposed Plant expansion. The application identified capacity for 27 Mm^3 of tailings and 36 Mm^3 of coarse rejects near the Plant site, sufficient for many years of future production.

Ash Disposal

CVRI utilizes a coal fired dryer at the CVM for the drying the processed coal to desired moisture level. The dryer is supplemented with natural gas. The small volumes of ash produced from the coal burning is discarded with the Plant reject.

Rejects Handling

The Plant cleans the raw coal to a desired quality specification by removing rock, partings and fine sediments. The coal recovery in the Plant is approximately 50% which means that for every 100 tonnes that is run through the Plant there are approximately 50 tonnes of waste material generated. This discard material must be accommodated in the disposal plans. The Plant discard material is produced as coarse and fine reject material.

Coarse reject is primarily rock removed during early stages of the coal cleaning process. While some of this material is used for road construction or the majority is discarded as waste material. Fine reject is finer rock material (middlings) that is removed in subsequent processing stages. The coarse and fine rejects are combined and directed to a bin where it can be loaded to haul trucks. These trucks haul to the reject dump. The reject dumps(s) are established as backfill in nearby older pits thus aiding in ultimate reclamation of the pits. The reject is also being dumped on older tailings ponds thus aiding in reclamation of these features.

Tailings Disposal

The finer Plant waste material (Plant tailings) is pumped as a slurry into the nearby Mynheer A pits at CVM. A buried tailings line leads from the Plant's thickener to the tailings area. The slurry is gravity fed into the pond for disposal. Water from the opposite end of the pond is recirculated into the Plant process water system. Long term storage capacity in the pond is available.

Process Water

The water utilized in the Plant is pumped to the tailings pond from which a re-circulation system returns a portion of the water back to the Plant. Make-up water supply is from licenced wells adjacent to the Plant.

C.1.5 SUPPORTING INFRASTRUCTURE AND SERVICES

Current supporting infrastructure is shown on Figure C.1-5.

C.1.5.1 Mine Access

The main entrance to the facility area is from Highway 40. Multiple access points to various points of the operation are available. CVRI also utilizes remote maintenance and shift change facilities throughout the operation to assist in operational efficiency. For example, shift buses report to several locations at shift change. Fuel and materials are also delivered to various locations. As part of general security public access is controlled at many of these entrances.

C.1.5.2 Haulroad Design and Maintenance

Large capacity haul trucks are utilized to move the recovered 'raw coal' from the various pits to the Plant. As coal seams are uncovered within various parts of the mine the coal haul will be concentrated on specific production areas. Therefore the major coal haul routes vary throughout time.

Road design standards are followed to ensure operating safety. Dragline access roads are constructed to a running surface width of 40 m and a maximum grade of 5% to allow the dragline to move from one pit area to another. This width is required for vehicles to pass and for the electrical power cables required during dragline moves.

Roads constructed for truck and shovel/backhoe operations require a running surface of 30 m at maximum grades up to 5% (Figure C.1-6). This will allow for equipment moves, waste, coal and partings haulage. Safety berms are constructed on sections of road that are elevated and exposed. Short in-pit ramps are built at 20 to 25 m widths with grades up to 10%.

All roadways are crowned to direct water off the surface to collection areas or water management facilities. Effective drainage keeps haulroads dry and useable by the haul trucks. Dragline access roads are constructed without a crown to facilitate the initial movement of the dragline. After the dragline has passed, a crown is established on the haulroad.

Haul roads and general mine infrastructure are constructed using competent sandstone rock from the pit areas as the road base. A layer of crushed rock is used for final surfacing. Coarse reject produced as a by-product from the Plant can also be used as an alternative to crushed rock. No significant sources of aggregate are required for haul road design, construction or maintenance. If a specialized aggregate product is required, CVRI will continue to use local licenced aggregate sources for small projects. As continual maintenance of the roadways is required, graders are extensively used to maintain the road surface, remove mud or snow and remove rock debris spilled by the haul trucks. Water trucks are used to control dust on the haulroads.

C.1.5.3 Coal Transport

A CN rail line from the Edson area serves the Coal Branch area. The CNR Foothills Sub from Parkhill Junction directly services Coal Valley. Unit trains are utilized for transport of coal from the site. Such trains can contain 100 to 115 rail cars. Typically, one unit trains arrives and departs each day of year. The rail system and trains are operated by CN.

C.1.5.4 Process Water

Large volumes of water are utilized in the Plant. The majority is recirculated through the tailings pond. Make-up water is obtained from deep wells on the site. This water supply system is approved by AEW and usage is reported annually.

C.1.5.5 Explosives

The supply and preparation of explosives is provided by a contractor. Currently Bulk Explosives Ltd. (BXL) provides the facilities, manpower and equipment for this capacity. BXL has an excellent production and safety record. Since all rock material requires blasting prior to mining this is an important component of the mining operation.

The blasting compound currently used at CVM is a blend of ammonium nitrate and fuel oil (ANFO). Various forms of ANFO are utilized in different situations depending upon the blast hole conditions (wet or dry) and the specific blasting requirements.

The contractor operates the processing facilities (Photo C.1-4) and provides the workforce to supply the full range of bulk explosives services including; bulk material storage, transportation and delivery to the pit. The contractor's staff loads the open holes as directed by CVRI employees. All equipment and operating procedures associated with the handling, transport and storage of explosives are carefully regulated and monitored.

The manufacturing of bulk ANFO explosives involves creating a simple mixture of ammonium nitrate prills and diesel fuel. The mixing of the ingredients occurs within a bulk loading truck at the actual blast pattern site. These ingredients are delivered separately to the mine site and placed in bulk storage facilities. The loading truck hauls the separate ingredients to the blast holes to be loaded and then mixes to the required specifications. Other ingredients such as emulsifiers and additives are delivered separately in smaller quantities in tanks or drums. A slurry or emulsion form of ANFO is required for use in wet blast hole conditions.

Ancillary items for blasting are secured on site within an approved and secured 'magazine'. A separate and secure storage area for packaged products such as primers, detonating cord, and cartridge explosives is maintained. Additional separate and secure locations are provided in remote areas of the mine for the storage of detonators and blasting caps where CVRI employees are responsible for these products. The qualified CVRI blasting crew and blasting supervisor will be responsible for connecting and firing all blasts.

Existing on-site communications infrastructure and facilities will be used to service the Project development. Radio communications are an important link in ensuring that blasting operations are conducted safely.

Photo C.1-4 Existing Explosives Manufacturing Plant

C.1.5.6 Power

A major 138 kv power supply line currently supplies electrical power to the Plant and shop area. On site distribution lines constructed and operated by CVRI carry power to various pit areas and supplies power to the walking dragline.

Power supply lines in the minesite are typically 25 kv transmission lines carrying power to various distribution points near active pit areas. The two draglines are electrically powered so that lines are needed to follow the pit development sequence for these units. Power is utilized in the backhoe pits for lighting and pumping. Some blast drills are electrically powered.

Currently, the CVM uses approximately 65,000 MWh annually for all activities. Power consumption will not increase as a result of the Project.

C.1.5.7 Mine Equipment

The major equipment currently employed at the CVM is listed in Table C.1-3. As mining areas are depleted this equipment is located into new development areas. In the long term many of these units can be expected to be retired and replaced, likely with similar or larger units.

Table C.1-3 Mine Equipment		
Type	**Make/Model**	**Number**
Dragline	Page 752LR	1
	Marion 7450	1
Drill	GD45	1
	SKS	1
	DR460	1
Excavators	RH-90	1
	RH-120	5
	RH-170	1
	EX-1800	1
	EX-750	1
	Cat 420	2
	Cat 366	2
	Cat 330	2
Grader	Cat 16	4
	Cat 24	2
Haul Trucks	Wabco 190	1
	Haulpak 630	5
	Haulpak 190	4
	Cat 789	30
	Cat 777	3
Water Trucks	Wabco 170	2
Dozers	Cat 834	1
	Cat D6	1
	Cat D7	1
	Cat D10	9
	Cat D11	2
Scrapers	Cat 637	2
Low Boy	M100	1

C.1.5.8 Service Bays (Fuel/Lube)

Fuel and lube facilities are located at various points throughout the mine area. A number of these are relocated as operations advance to new areas. These ‘service islands’ assist operational

efficiency by keeping fuel and lube available to the large mobile equipment and readily accessible to haul trucks routes.

At these sites mobile equipment are provided with diesel fuel, engine coolants and lubricants. The satellite stations reduce the need to send equipment all the way to the main filling depot, resulting in time and energy savings. All fuel depots have secondary containment berms around the storage tanks and site drainage is managed. Regular use and maintenance of these depots ensures that spillage and leakage is minimized. Depots are located close to active mining areas along the main haulroads and mainly service haul trucks. Most mobile equipment (*i.e.,* dozers) is serviced from fuel/lube trucks.

C.1.5.9 Office/Shop Complex

The administration offices, equipment maintenance shop, welding and light vehicle repair shop are located near the existing Plant. The facilities provide a centralized planning and business administration area. The main shop provides facilities for major heavy equipment repair. Equipment can be placed indoors for longer repair jobs where overhead cranes are available. A parts warehouse is maintained at the shop.

C.1.6 WATER MANAGEMENT

Water management is required for all components of the Project from the initial site disturbance through to final reclamation. Therefore, water management is a priority consideration throughout the mine planning and development. Minimizing surface disturbance and completing timely reclamation are essential considerations that can affect water management.

The collection of surface runoff water and the management of pit water are required primarily for the removal of total suspended solids (TSS). The main objective is to control TSS levels to meet wastewater guidelines and objectives.

Pit dewatering operations involve the disposal of surface water (from rainfall and snow melt) and groundwater that enter the pits. The groundwater level is typically close to surface in the mining area and as mining operations drop below this level, continual dewatering of pit areas will be required. Pit dewatering is conducted by directing all water to containment sumps within the pit and using pumps to transfer the water to a settling pond for treatment and release. Water is often transferred to mined out pit areas where it is stored and not released.

Operationally, CVRI installs a series of collection ditches, sumps, pumps and settling ponds to manage all surface water on the mine site. Surface runoff from mining areas, haul roads, overburden dumps and any other disturbed areas is collected and directed to settling ponds for treatment or to mined out pits for temporary storage. The water from the settling ponds is discharged to natural streams in the area. Potential water quality impacts, primarily elevated levels of TSS, can occur during the operation period with discharges of water from settling ponds or breaches in the surface water management system. CVRI controls all surface runoff from disturbed areas.

Activities that result in the removal of surface vegetation have the potential to cause erosion and sedimentation. Soil erosion is reduced by minimizing the time that disturbed surfaces are left

without vegetation. Temporary measures to control erosion before a vegetation cover is established include:

- diversion ditches;
- drainage control;
- check dams;
- sediment ponds;
- sumps; and
- mulch.

Construction activities related to the major stream crossings are carried out during periods lowest impact, typically during the winter months. Where possible, a 30 m buffer of undisturbed vegetation is retained between development activities and watercourses. Construction techniques will be employed that protect the integrity of the streams as well as the quality of water.

Impoundment designs incorporate features that contribute to the effectiveness of TSS removal:

- large pre-settling sumps are constructed upstream of the impoundment's to allow for natural sediment removal;
- settling ponds are located at the top of drainage sheds where possible to minimize non-target water influent;
- a cellular design is incorporated to aid in settling and dredging; and
- use of a cationic flocculant to treat wastewater for sediment removal. The primary flocculant, Alcomer 7198, is used extensively at the CVM. This (or a similar product) will be used to treat settling pond influent in the Project area. The use of LT7990 flocculant has been approved by Alberta Environment but due to a change in flocculant suppliers (BASF), Alcomer 7198, an equivalent, is now being used.

C.1.6.1 Surface Water Collection System

CVRI has successfully utilized a number of water collection systems within the existing mine permit to aid in water management. One of the objectives of the water collection systems is to intercept surface flows above the mining area and to divert the flows around the disturbance. This reduces the quantity of water that is impacted by the mining operations and would therefore have to be handled and treated within the mining area. A network of drainage ditches and containment areas are developed along the edge of disturbance areas to accomplish this objective.

An objective of the water management plan is to collect and contain all water that has been affected by mining and to ensure that it meets water quality objectives prior to release to the receiving environment. This is done by establishing a network of settling ponds (Photo C.1-5) to remove sediment from the water either by gravity or by artificially enhancing the removal of sediment with the use of coagulants and flocculants. The settling ponds are typically located within natural drainage, down gradient from potential mine disturbance areas. This arrangement permits water to flow into collection systems and be directed to the settling pond. Outflow from

settling ponds into receiving waters is monitored and controlled to meet the water quality criteria contained the EPEA approval.

Photo C.1-5 Typical Settling Pond

C.1.6.2 Pit Dewatering

All surface runoff and groundwater is collected within the pit area using a system of drainage ditches and sumps, where the water is pumped to a licenced settling pond for treatment and release. The pit water is pumped from the pit areas in a controlled manner to keep the "floor" of the pit dry and operable. Controlled pumping allows for constant flows to be effectively handled through the impoundment(s) into the receiving stream(s).

C.1.6.3 Stream Diversions

Throughout the life of the CVM, a number of watercourses have been intercepted and required either permanent or temporary diversions around the pits. As mine design details are finalized CVRI has applied to the appropriate regulatory bodies for approval to divert each watercourse prior to mining.

The technique used for a watercourse diversion depends on the characteristics of the watercourse and pit development plans. A typical diversion plan of a fish bearing watercourse is shown on Figure C.1-7. As mining progresses, the watercourse is diverted away from the active pit. Mining continues through the original watercourse alignment then the watercourse diversion is moved behind the active mining area. Once mining and backfilling is completed the watercourse is then re-established. In this example the diversion consists of a lined open ditch. Other small diversions may use gravity piping or pumping depending on the timing of the diversion and flows anticipated.

C.1.6.4 Watercourse Crossings

All watercourse crossings are constructed to comply with the "Code of Practice for Watercourse Crossings" (AENV 2000). All watercourse crossing installations are supervised by a qualified aquatic environment specialist. When the crossings are appropriately designed and constructed, they have a have a negligible effect on the watercourses.

C.1.6.5 Lake Development

Dependent on the pit characteristics some of the pits are reclaimed as end pit lakes. The mine pit is contoured to produce shorelines that provide wildlife and recreation values. Some of the lakes are backfilled to create shallow (littoral) areas. Surface inflow and outflow channels are developed where practical. The filling of the lakes and wetlands is completed with both surface runoff and groundwater infiltration.

As required in the EPEA approval prior to the completion of mining and the development of an approved end-pit lake CVRI submits detailed lake development plans to AEW. These plans provide the following detailed information:

- general lake configuration;
- surface area;
- depth;
- area and distribution of littoral zones;
- location and design parameters of inlet and outlet channels;
- outlet barrier plans to prevent the entrance of fish into the end-pit lake;
- lake bottom substrate and configuration;
- shoreline slopes;
- revegetation of shoreline areas;
- function of the lake and shorelines in relation to the proposed end land uses;
- information on water monitoring program or water quality information;
- information on fisheries monitoring program and methods to handle coarse/unwanted fish, until certification; and
- other habitat enhancement.

C.1.7 WASTE MANAGEMENT

Domestic Wastewater

Treated domestic wastewater is discharged once per year to the Coal Creek Settling Pond System for a maximum period of three weeks.

Domestic Solid Wastes

Domestic wastes generated at the mine site include items such as tires, batteries, oil filters, used oil and grease, miscellaneous office refuse etc. Where practical, recyclable items are sent to an appropriate recycling facility. Non-recycled waste is stored and removed off-site to an approved waste management facility.

C.2 PROJECT OVERVIEW

CVRI is proposing to continue operations of the CVM by developing coal resources in the Project area (Figure A.1-2). The Project is not a new mining development but is rather an extension to the existing mining and coal processing activities at the CVM. The same equipment, techniques and labour force currently employed at the existing CVM operation will be progressively shifted into the Project area. This will extend the productive life of the CVM for an additional +25 years.

The Project will be developed using a combination of dragline and truck/shovel operations with a projected raw coal production of approximately 180 million tonnes for processing yielding approximately 90 million clean metric tonnes of coal (CMT). The overall objectives of the mine plan are to maximize the economic recovery of coal, minimize disturbance, provide a uniform coal flow to the Plant, and operate in a safe and efficient manner. Production from the Project is expected to be approximately 8.0 M RMT per year to match the maximum Plant production capacity (see Chart C.2-1). The result, based upon a coal yield of 50%, will provide a sales volume of 4.0 M CMT per year. Chart C.2-1 illustrates that production from the Project will begin slowly and build over a few years as production from the CVM pits are completed. Full production can be maintained for several years but will eventually begin to decline as the last pits reach completion. The chart also illustrates a coal haulage trend showing that the mine sequence is based on entering the pits closest to the Plant first. Over the life of the Project pits furthest from the Plant will mined last.

Production will be from numerous pits developed throughout the full length of the Project.

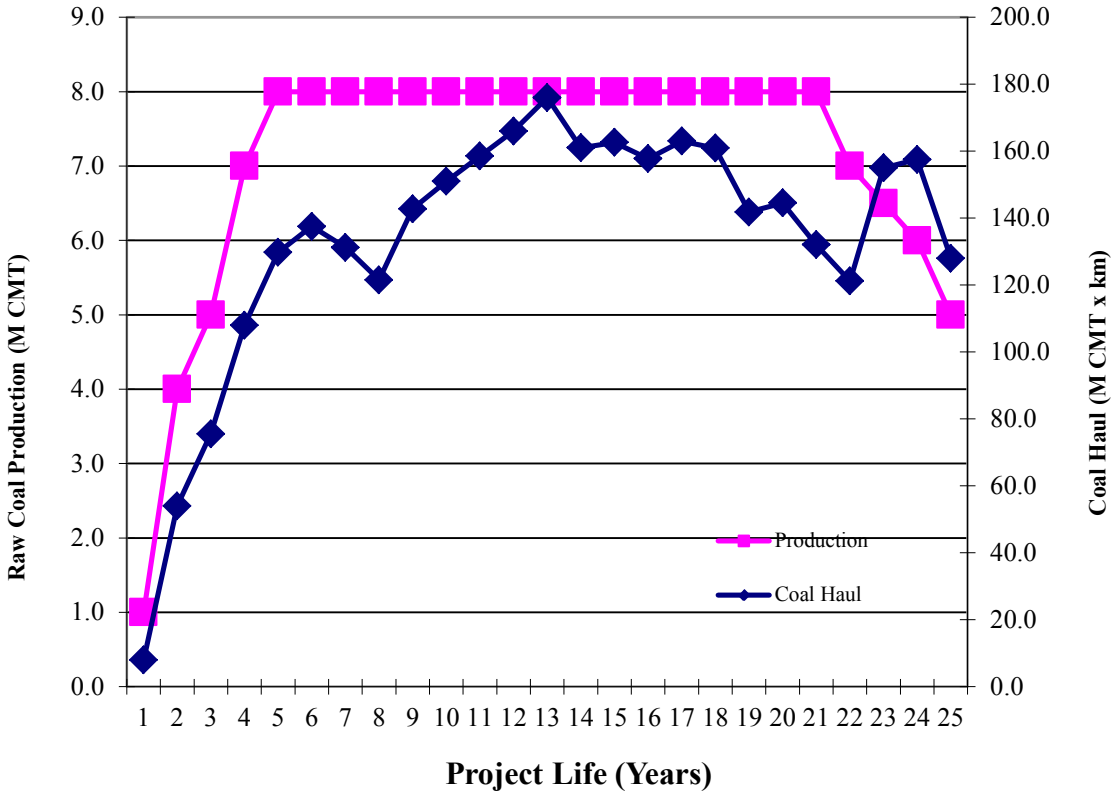


Chart C.2-1 Project Production Schedule

C.2.1 DEVELOPMENT OVERVIEW

Development plans for the Project are shown in Figure C.2-1. The overall mine plan considers both individual pit designs and overall mine sequencing. While the pit designs and mine sequencing will be subject to continual revision during the life of the operation, the scenario presented provides the general methods and approach that will be followed. Conceptual development procedures, environmental controls, drainage control plans and reclamation plans have also been developed.

Key features of the Project area are shown on Figure A.1-2 and include:

- the Project area is approximately 50 km long and approximately 2 km wide;
- the Project has been divided into four generalized mining areas; Robb West, Robb Main, Robb Center and Robb East;
- the community of Robb is located between Robb Main and Robb West;
- numerous watercourses occur within the development area including Bryan Creek, Hay Creek, Erith River, Bacon Creek, Halpenny Creek, Lendrum Creek, Lund Creek and tributaries to the Pembina River;
- oil and gas activity includes several pipelines crossing the Project area;

- mining will start in the center and over time more to the western and eastern extremes; and
- the existing Plant, office and shop will continue to be utilized.

The Project is located north of the existing mine, oriented parallel to the current operation. Multiple coal seams are present within the Project area. These seams are situated with a north-west and south-east strike direction. The seams dip to the north-east. Terrain is characterized as foothills with high ridges and distinct valleys. Ridges are oriented as the coal seam, running the length of the Project. The coal measures are within a valley formed by ridges on both sides.

C.2.1.1 Project Areas

The Project has been segmented in four primary zones based on quantity of reserves and the proposed mine plan; Robb West, Robb Main, Robb Center and Robb East. First production is expected to be centered in the Robb Main area. Over time the large dragline is expected to progress toward the east primarily in the Mynheer Seam pits (Table C.2-1). Additional excavators will follow with development of adjacent pits.

Over the life of the Project the majority of production is expected from Robb Main and Robb West with backhoe/truck operations. Initial pits in the Erith valley will advance eastward north of the Erith River and westward toward Robb. Once these pits reach completion production will be switched to Robb West.

Robb West is located west of the community of Robb and west of Highway 47. The zone has a strike length of approximately 7,000 m. The western limit of the zone is defined by the coal lease held by CVRI. Coal leases along this trend to the west of this area are held by others and covered by a previously approved Mine Permit. The eastern limit of this zone has been defined in order to provide a buffer between the proposed pit development and the community of Robb. The proposed buffer takes advantage of both distance and existing terrain features to provide a visual barrier. A small open pit mine and abandoned underground mining have been previously located in Robb West area. These operations have long been abandoned.

A break within the Project is evident as the community of Robb. The community is comprised of three distinct areas; the “Hill”, the “Valley” and “Mile 34”. A strike length of approximately three kilometres is occupied by the residential areas of Robb. No development is proposed in this area and coal reserves will be left in place. Underground mining early in the 1900’s were operated under and around the community. The tipple areas, power houses and mine entrances have been long abandoned. The community is bounded on the west by Highway 47, high voltage transmission lines and a gas pipeline. The Embarras River to the east represents a boundary to a “Hill” portion of the residential area. The “Valley” district in located on the river floodplain bounded by the river embankment on both sides. The “Mile 34” district is located somewhat further south, again in the river floodplain area.

The Robb Main zone is located east of the community of Robb and includes the Erith River valley to the east. The majority of the coal reserve for the Project is contained in this zone. Robb Main is approximately 15,000 m in strike length. The western limit of the Robb Main zone has been defined to provide a buffer between the proposed mining area and the community

of Robb. The proposed buffer takes advantage of both distance and existing terrain features to provide an appropriate spacing between the proposed operation and the residential area. Hay Creek is an obvious feature which is located at the proposed boundary of disturbance. Additional underground workings are present within this western end of this Robb Main. These workings have been long abandoned. The eastern limit of Robb Main is located near the drainage divide between Erith River and Halpenny Creek.

The Robb Center area is located within the Halpenny and Drummond Creek drainage areas. The zone has a strike length of approximately ten kilometres. Coal seams here are less extensive and resulting pits smaller. Many of the pits are targeted for dragline mining.

The Robb East portion of the Project is located within the headwaters of Lund Creek. The zone has a strike length of approximately 15 kilometres. The eastern limit of the zone is defined by the Pembina River valley. Coal seams continue to be thinner in this region and the dip of the seams steepens dramatically at the east end. A complex of thrust faults at the east end produces a thickened coal sequence in the Val d'Or seam which affords a large, deep backhoe pit development.

Table C.2-1 Run of Mine Coal (ktonne)

Seam	Robb West	Robb Main	Robb Center	Robb East	Total	
Upper Val d'Or	3,397	7,555	803	3,823	15,578	76,635
Val d'Or	8,462	27,910	5,873	18,812	61,057	
Arbour	13,678	36,725	6,512	2,877	59,792	59,792
McLeod	359	2,322	-	-	2,681	2,681
Upper McPherson	2,108	1,430	-	-	3,538	20,724
Main McPherson	10,246	3,323	16	689	14,274	
Lower McPherson	-	2,833	53	26	2,912	
Wee (Silkstone)	-	518	185	977	1,680	1,740
Bourne (Silkstone)	-	-	-	60	60	
Upper Mynheer	2,562	7,348	1,788	3,305	15,003	16,232
Lower Mynheer	-	778	-	451	1,229	
Total	**40,812**	**90,742**	**15,230**	**31,020**	**177,804**	**177,804**
Waste (kbcm)	145,622	291,087	55,708	98,947	**591,362**	
Ratio (bcm/tonne)	3.57	3.21	3.66	3.19	**3.41**	

C.2.1.2 Mine Plan

The proposed mine plan and ultimate pit limits are determined by various factors which include geology, engineering, environmental, regulatory, marketing and economics. Regardless of these variables the overall approach and strategy presented by the mine plan will not change. As part

of the ongoing and progressive nature of the mine licencing process, individual pit designs and mining plans will be submitted at a later date for review and approval. A conceptual overview of the mine plan is included as Figure C.2-1.

Preliminary mine planning for the Project focuses on two centers of production:

- The walking dragline is the most efficient and lowest cost mining unit at the CVM. Therefore its production capability must be prioritized and maximized. The long, narrow shallow cuts associated with the Mynheer and some Val d'Or pits within Robb Center and East are suited to the large dragline. This machine will be able to excavate the full depth of the pit in a single pass and place spoil to both sides of the cut. Hydraulic excavators can follow behind the dragline and recover the coal uncovered in the dragline cut. With this strategy all cuts suited to dragline mining would be set aside and designated for dragline mining. With the striping ratios identified in the Project area the dragline operation would then be able to produce 1/3 of the annual production by itself.
- The larger portion of the Project reserve involves mining of large, multi-bench 'truck/shovel' style pits. These are primarily in the Val d'Or/Arbour seam located on the south facing slopes throughout the Project area. The size and depth of these pits are suited to placement of multiple excavators which can provide flexibility in sequencing multiple bench development. Overburden excavated from these pits will be trucked to a combination of external dumps or placed as 'in-pit' backfill. The strategy of prioritizing pits with the shortest coal haul would result in Robb Main and Robb Center pits being mined first. The eastern end of Robb East and Robb West would then be sequenced last. During mining throughout the Project a buffer surrounding the hamlet of Robb (Figure C.2-2) will be maintained. Approximately 2/3 of the annual production would be sourced from these truck/shovel pits. Multiple pits would be developed simultaneously in order to accommodate the many machines and provide a consistent coal release.

Mining from the two production areas will occur simultaneously. Support equipment, such as drills, dozers and trucks, can be relocated as necessary between the two areas.

Overall proposed development footprint for the Project is approximately 5728 ha (Table C.2-2). The Project pits will be sequenced to meet production, backfill and reclamation objectives. For this application, pits have been designed to generic parameters. Future refinements of these designs will occur at the mine licencing stage.

Table C.2-2 Project Development Features		
Development Type	**Disturbance Footprint**	
	Area (ha)	**Proportion (%)**
Pits	1778.7	31.0
Soil Piles	491.6	8.6
Spoil Piles	1897.7	33.1
Ponds & Access	33.6	0.6
Haulroad	75.9	1.3
Peripheral Area[(1)]	1451.1	25.3
Total	**5728.6**	**100**

(1) Area within Project Footprint boundary needed for operations but with no mining development

C.2.1.3 Mine Schedule

CVRI is anticipating integration of production from the existing operation and the new Project area in order to achieve a consistent and even coal supply to the Plant and customers. Mine equipment will be moved into the Project in a phased sequence as pits in CVM are completed. Mining in the Project area will begin with pre-development activities in 2013.

For mine planning and scheduling purposes CVRI has identified a critical construction components that needs to be started early in the schedule followed by a start-up phase when coal haul from the Project is occurring but not at full production and then a full production phase when all coal supplied to the Plant site is being provided by the Project.

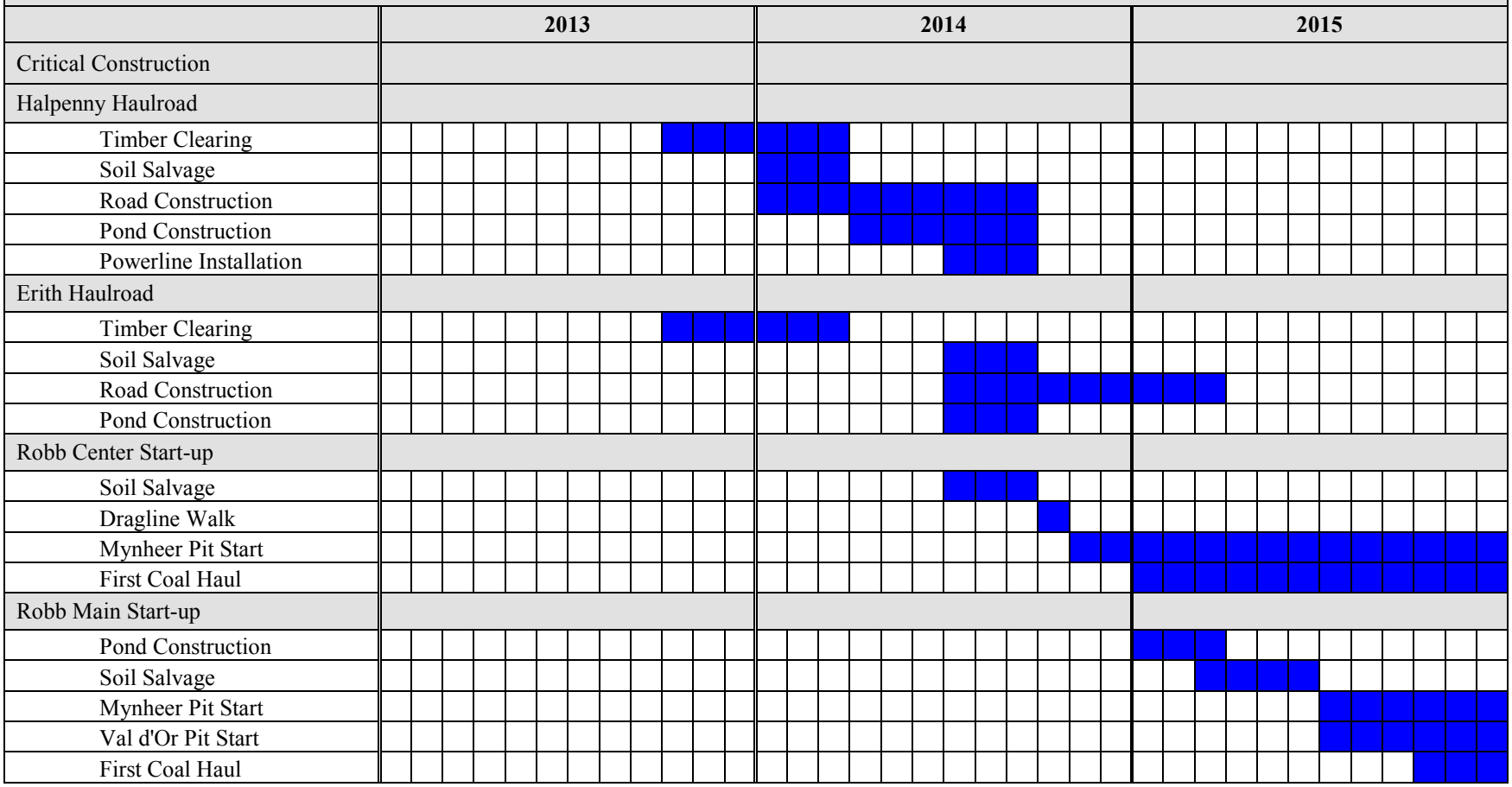
Start-up activities for the Project must be initiated during 2013 in order to meet the required production schedule. Equipment from the CVM will begin to be relocated by mid-2014. Table C.2-3 provides an illustration of the 'start-up' phase of the Project highlighting several critical construction activities which are planned to initiate the Project construction and accommodate commencement of mining. These activities are focused on early stages of access construction between the existing operation and the initial Project pits.

Construction of the Halpenny and Erith haulroads need to be started in fall 2013. Timber clearing of the haulroad routes is scheduled for fall/winter of 2013/2014. These winter months are preferred for timber harvesting for the improved ground conditions.

The Halpenny haulroad is to be constructed first since the walking dragline is the first mining unit to be moved into the Project. The first earthwork will include soil salvage from the haulroad footprint. Again, the winter months are a preferred window for soil salvage on sloped landscape due to the improved ground conditions. Soil salvage operations can be staged with the road construction. Earthwork for the haulroad will start as soon as initial areas are available. This activity will involve cut and fill earthwork to construct a wide haulroad through the Halpenny valley. This road will connect the existing Plant site area to the first pit area in the Project. The haulroad will also act as the 'walk road' for relocating the dragline to the Project. An integral

part of the road construction is the simultaneous construction of water management facilities throughout the road route. Ditches and sumps are constructed as part of the road. Additional waste water treatment ponds will be constructed at strategic locations along the route in order to manage road runoff. Such work will continue throughout most of 2014. The road is to be ready by fall, 2014 to accommodate relocation of the dragline.

Table C.2-3 Start Up Schedule



The first pit will be developed in Robb Center to accommodate dragline mining in the Mynheer Seam. The dragline is scheduled to start mining November 1, 2014. Coal will begin to be hauled from the pit by January, 2015.

The second development area in the Project will be located in Robb Main. Construction of the Erith haulroad will be started after general completion of the Halpenny road. This is scheduled from mid-2014 to mid-2015. Mining equipment is scheduled to be moved into the Erith pits in mid-2015. Pits in the Val d'Or and Mynheer seams will be started together. Coal haul from the Erith valley pits is scheduled to start by October 1, 2015. Additional equipment will be relocated into the Erith valley area in 2016/2017 in order to enlarge pits and increase production from this area. Within a few years the majority of the mine production will be sourced from this portion of the Project.

Table C.2-4 provides an illustration of the current mine progress plan. Full production is expected to be reached by 2018 with all mine equipment relocated into the Project area. Pits within the CVM operation will all be completed by this time. Full production is expected to continue until 2034 when annual production rates will slowly decline as the remaining reserve area is completed. The life of the mine is shown as 2038, an operating life of 25 years.

Table C.2-4 Development Schedule

Year	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38
Corridor Construction																									
Halpenny Corridor	■																								
Erith Corridor	■																								
Bryan Corridor													■												
Mine Development																									
Robb East								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Robb Center	■	■	■	■	■	■	■	■																	
Robb Main		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Robb West														■	■	■	■	■	■	■	■	■	■	■	■
Coal Haul																									
Halpenny Corridor	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Erith Corridor		■	■	■	■	■	■	■	■	■	■	■													
Bryan Corridor														■	■	■	■	■	■	■	■	■	■	■	■

C.2.2 PIT DESIGN CRITERIA

As stated in Section C.1.3.1 the spatial limits of the pit are determined by geologic, economic, topographic and operational boundaries. As is current practice at CVM, the pit areas for the Project were designed on geologic cross-sections where pit limits are determined by applying a BESR on each of the cross-sections. From these cross-sections the overall pit limits were determined and the average strip ratio realized.

For the purpose of the mine permit application conceptual pit and dump plans were developed following rudimentary but typical design parameters. Parameters utilized for these preliminary pit designs include:

- highwalls will be excavated at an overall angle of 45 degrees with bench faces at 60 degrees (pits with steep seam dips would need to be modified to accommodate jointing planes);
- footwall slopes will follow bedding (pits with steep seam dips would have to be modified for possible slab failure mechanism);
- a BESR of 6:1 BCM/CMT was used (see Section B) (Strip ratio cut-off should vary throughout the Project area to account for variations in haul distant and cost);
- adequate room must be provided for operating machines working near the pit bottom. The minimum width of the final bench is designed to be 15 m; and
- as discussed in Section B, the rock units that will be exposed in the Project development area are identical with those found at the CVM. Consequently, the geotechnical assessment involved comparing the local geology of the Project to a similar area at the CVM. Geotechnical work at the CVM has shown that a predictable relationship exists between bedding and the main joint sets which dominate the rock mass. Intact bedrock and rock mass strength have been sampled from the CVM and evaluated at through laboratory testing and highwall back analyses and are expected to be directly applicable to the Project area. The stability information (Section B) is based on this information and the experience of mining similar slopes at the CVM over a 35 year period.

As part of future pit licence applications, CVRI will complete further geotechnical analysis of pit designs. These evaluations will consider the following conditions as part of the design:

- **Rock Conditions -** All rock types present in the highwalls will be evaluated for jointing and bedding characteristics. If necessary, an evaluation of specific rock types, including near footwall material, will be conducted to determine their strength.
- **Groundwater -** The groundwater program has been started through installation of several piezometers. Ongoing groundwater measurements will continue; and evaluated for potential design implications.
- **Presence of Fault Zones -** Ground disturbed by thrust faults may impact the overall stability of pit walls. Continued exploration results will be evaluated to determine structural integrity throughout the Project for evaluation for highwall and footwall stability.

The results of such analysis would be utilized to develop specific design parameters for each individual pit. Likewise, individual dump designs would be evaluated to identify foundation and slope stability.

C.2.3 PIT RESERVES

In the Project area, the major coal seams of interest are the Val d'Or/Arbour and the Upper Mynheer. Smaller seams include McLeod, McPherson, and Silkstone. The general structure dips to the northeast. Steeper dips (+45 degrees) are present at the extreme eastern end of the property. No major faulting or folding is evident except for complex repeated seams in the extreme eastern end of the Project. Pits will be developed in these dipping monocline seams. Pit depth is controlled by strip ratio. Geology and geotechnical characteristics for the Project area are described in Section B.

As stated in Section C.1.3 the spatial limits of the pits are determined by geologic, economic, topographic and operational boundaries. Variables which determine this are steeply dipping coal seams, lack of overburden spoiling room and amount of rehandle. The pit areas are designed on geologic cross-sections. A selection of the geological cross-sections used for pit design are included as follows:

- Figure C.2-3 Development and Reclamation Section -2,800E
- Figure C.2-4 Development and Reclamation Section -100E
- Figure C.2-5 Development and Reclamation Section 1,900E
- Figure C.2-6 Development and Reclamation Section 6,000E
- Figure C.2-7 Development and Reclamation Section 9,500E
- Figure C.2-8 Development and Reclamation Section 13,360E
- Figure C.2-9 Development and Reclamation Section 15,900E
- Figure C.2-10 Development and Reclamation Section 20,500E
- Figure C.2-11 Development and Reclamation Section 26,000E
- Figure C.2-12 Development and Reclamation Section 30,400E
- Figure C.2-13 Development and Reclamation Section 33,000E
- Figure C.2-14 Development and Reclamation Section 33,860E
- Figure C.2-15 Development and Reclamation Section 42,000E

The pit limits are determined by applying a BESR on each of the cross-sections for the proposed pit areas. From these cross-sections the overall pit limits are determined and the average strip ratio realized. Table C.2-5 indicates the proposed coal release rates for the Project mine plan.

Table C.2-5 Raw Coal Production (RMT)						
Year	**Robb Center/East**		**Robb Main**		**Robb West**	**Total**
	Dragline(s)	**Backhoe(s)**	**Dragline(s)**	**Backhoe(s)**	**Backhoe(s)**	
2011	-	-	-	-	-	-
2012	-	-	-	-	-	-
2013	-	-		-	-	-
2014	-	-	1.0	-	-	1.0
2015	-	-	2.0	2.0	-	4.0
2016	-	-	2.0	3.0	-	5.0
2017	-	1.0	2.0	4.0	-	7.0
2018	-	2.0	1.5	4.5	-	8.0
2019	-	2.0	1.5	4.5	-	8.0
2020	1.0	2.0	0.5	4.5	-	8.0
2021	2.0	1.5	-	4.5	-	8.0
2022	2.0	1.5	-	4.5	-	8.0
2023	2.0	1.0	-	5.0	-	8.0
2024	2.0	1.0	-	5.0	-	8.0
2025	2.0	1.0	-	5.0	-	8.0
2026	2.0	1.0	-	5.0	-	8.0
2027	2.0	1.0	-	4.0	1.0	8.0
2028	2.0	0.5	-	3.5	2.0	8.0
2029	2.0	-	-	3.5	2.5	8.0
2030	2.0	-	-	3.0	3.0	8.0
2031	2.0	-	-	3.0	3.0	8.0
2032	1.0	-	-	3.0	4.0	8.0
2033	1.0	-	-	3.0	4.0	8.0
2034	1.0	0.5	-	3.0	3.5	8.0
2035	0.5	0.5	-	2.5	3.5	7.0
2036	-	1.0	-	0.5	5.0	6.5
2037	-	1.0	-	-	5.0	6.0
2038	-	1.0	-	-	4.0	5.0
2039	-	-	-	-	-	-
2040	-	-	-	-	-	-
Sub-Total	**26.5**	**19.5**	**10.5**	**80.5**	**40.5**	**177.5**
Total	**46.0**		**91.0**		**218.0**	

C.2.4 DRILLING AND BLASTING

CVRI will continue to use the equipment and procedures currently being utilized on the existing mine areas (Section C.1.5). These procedures include use of rotary drill rigs to drill the overburden.

For blasting being conducted in the vicinity of the community of Robb, blasting practices will be modified, if required, to reduce the amount of explosives detonated per delay, reducing the impacts of noise and vibration.

C.2.5 OVERBURDEN HANDLING

Overburden handling will be conducted using the same general procedures currently in place at the existing mine areas (Section C.1.3.6). Detailed overburden handling plans will be provided in the subsequent mine licence and EPEA applications that will be submitted to AEW and the ERCB for each individual pit as development of the Project progresses.

C.3 PROJECT DEVELOPMENT PLAN

The Project area will be developed sequentially over the mine life. To illustrate this progression eleven development stages have been detailed showing the mine sequence over time. Development will utilize a combination of dragline and truck/shovel mining methods with multiple pits active simultaneously. The active pit development for each stage of mining are listed in Table C.3-1 and shown on the following figures:

- Figure C.3-1 - Stage 1A
- Figure C.3-2 - Stage 1B
- Figure C.3-3 - Stage 2A
- Figure C.3-4 - Stage 2B
- Figure C.3-5 - Stage 3
- Figure C.3-6 - Stage 4
- Figure C.3-7 - Stage 5
- Figure C.3-8 - Stage 6
- Figure C.3-9 - Stage 7
- Figure C.3-10 - Stage 8
- Figure C.3-11 - Stage 9

At any one time there will be several pits (Figure C.3-12) under various stages of development. This phasing of the development allows the rock removal and coal recovery to be scheduled allowing sufficient coal release to provide a steady feed of raw coal to the Plant and ensuring rail and port delivery schedules to customers.

The strategy for development follows a number of basic principles:

- certain pits are applicable to dragline mining methods only;
- pits with shortest coal haul will be developed first;

- mining will not occur immediately adjacent to both sides of the community of Robb at the same time;
- mining nearest the community of Robb will be sequenced to minimize noise and air impacts;
- backfill of pits should be maximized;
- pits should be completed and reclaimed as soon as possible;
- disruption of water courses must be minimized; and
- overall active disturbance is to be minimized.

Table C.3-1 Mine Development and Schedule

Mine Area	Pit	Mining Methods	Date
Stage 1A & 1B			
Robb Main	M6-12	Truck/Shovel	**2014 - 2017 (Figures C.3-1 & C.3-2)**
	MC11-16	Truck/Shovel	
	V10-16	Truck/Shovel	
Robb Center	V20-25	Truck/Shovel	
	M20-23	Dragline	
Stage 2A & 2B			
Robb Main	V10-16	Truck/Shovel	**2016 to 2021 (Figure C.3-3 & C.3-4)**
	V16-20	Truck/Shovel	
	M17-20	Dragline	
	M12-17	Truck/Shovel	
	M6-12	Truck/Shovel	
Robb Center	V20-25	Truck/Shovel	
Stage 3			
Robb Main	V10-16	Truck/Shovel	**2021 to 2022 (Figure C.3-5)**
Robb Center	V20-25	Truck/Shovel	
	M20-23	Dragline	
Stage 4			
Robb Main	V10-16	Truck/Shovel	**2023 to 2025 (Figure C.3-6)**
Robb Center	V20-25	Truck/Shovel	
	V25-30	Truck/Shovel	
	M24-30	Dragline	
Robb East	V30-40	Truck/Shovel	
	M30-40	Truck/Shovel	
Stage 5			
Robb Main	V6-10	Truck/Shovel	**2025 to 2027 (Figure C.3-7)**
	M6-12	Truck/Shovel	

Table C.3-1 Mine Development and Schedule			
Mine Area	**Pit**	**Mining Methods**	**Date**
	V16-20	Truck/Shovel	
Robb Centre	V25-30	Truck/Shovel	
Robb East	V40-45	Truck/Shovel	
	V30-40	Truck/Shovel	
	M30-40	Dragline	
Stage 6			
Robb East	M30-40	Dragline	**2027 to 2029 (Figure C.3-8)**
Stage 7			
Robb West	V4-3	Truck/Shovel	**2030 to 2033 (Figure C.3-9)**
	M4-3	Truck/Shovel	
Robb East	M40-45	Dragline	
Stage 8			
Robb West	V4-3	Truck/Shovel	**2034 to 2037 (Figure C.3-10)**
	M4-3	Truck/Shovel	
Robb East	M40-45	Dragline	
	V40-45	Truck/Shovel	
Stage 9			
Robb West	V4-3	Truck/Shovel	**2038 (Figure C.3-11)**
	M4-3	Truck/Shovel	
Robb East	M40-45	Dragline	
	V40-45	Truck/Shovel	

C.3.1 PRE-MINING PHASE

Timber and soil salvage activities will be carried out using the procedures currently in place at the CVM (Section C.1.3.5).

The Project is within the West Fraser FMA. A master agreement between CVRI and Hinton Wood Products is in place governing operation and compensation for mining within the FMA. There are numerous permanent sample plots (PGS) located within the Project area and CVRI will work with the FMA holder to determine appropriate compensation. CVRI is also working with West Fraser to progressively withdraw the lands required for the Project from their FMA and provide compensation. As the Project area is within the Hinton Wood Products FMA all timber harvest will be to their standards and wood delivered to the Hinton mill. It is expected that the harvest operations will be done by contractors.

CVRI anticipates that production from the Project will be required in late 2014 in order to meet supply demands, therefore pre-production activities will commence in 2013. Much of the work anticipated can be done with the fall and winter months. This early work will involve:

- timber clearing of the Halpenny Corridor;
- construction of several of the water management ponds needed within the Halpenny Corridor;
- soil salvage within portions of the Halpenny Corridor; and
- installations of culverts and watercourse crossings.

The 'walking dragline' is expected to be the first mining equipment moved into the Project area. This unit is expected to be 'walked' into the new area in mid-2014. This would make it available to start the first pit and uncover coal for the first coal haul late that year.

In preparation for the dragline to be moved into the Project area the following construction and pre-production activity would be required:

- A 'walkroad' from the Halpenny Corridor and to the first pit would have to be constructed to permit movement of the machine into the Project. The 'Halpenny' haulroad also serves as the 'walkroad'. Additional work after the dragline passes would be required to complete the haulroad for routine coal haul. It is expected that the dragline would require 15 to 20 days to move into position.
- A powerline within the Halpenny Corridor and to the first pit would have to be constructed. The powerline is required to provide power to the dragline.
- The initial mining area would have to be prepared by timber clearing, soil salvage and blasting prior to the dragline starting operation. By doing this work in advance the dragline will be able to start mining immediately upon reaching the pit.

C.3.2 START-UP PRODUCTION PHASE - STAGE 1A & 1B (2014-2017)

Figure C.3-1 and C.3-2 illustrates the initial steps of development in the Project area. Within the earliest stages of development the initial mining areas will begin to be opened and established. Production will begin slowly with a few smaller excavators and a few haul trucks. The early pits will have small benches and the working area will be limited. The first competent rock will be utilized to build haul roads between pits and external dump areas. The objective of this 'pioneering' stage is to establish larger working space and the first road network so that additional equipment can be accommodated for increased productivity.

C.3.2.1 Access

Both the Halpenny and Erith haul corridors need to be constructed at an early stage. This work will involve timber clearing, soil salvage, construction of water management facilities and early haul road development. Pre-development work within these corridors is expected to be started in 2013 with road construction starting in 2014 (see Table C.2-3).

The Halpenny corridor involves approximately 8 km of new road and 8 settling ponds. A power line will also be built along the same corridor. Multiple small culverts will be installed at various water crossings of Halpenny tributaries.

The Erith corridor includes approximately 8 km of new road and 9 settling ponds. Multiple small culverts will be installed at Erith tributaries. A large arch culvert is required at the main Erith River crossing.

C.3.2.2 Robb Center Mining Activity

The first equipment into the Project will be a small backhoe to open Pit M21 in the Mynheer Seam at approximately 21,000E position. Soil will be salvaged and stockpiled from the initial pit area in anticipation of the dragline arrival. Once the soil is removed a drill bench can be established for the initial drill and blast patterns. Overburden to the coal depth must be blasted prior to excavation by the dragline.

The small backhoe will also start the small Pit V21 in the Val d'Or Seam at approximately 21,000E position. Soil will be salvaged and the first overburden excavated. This first competent rock will be used to build haul roads between the two pits and for the dragline walk road into the Mynheer Seam pit.

Within the first few months of operation the backhoe will move between the two pits, excavating overburden to uncover coal and excavating coal in the Mynheer Seam as the dragline begins to advance westward.

The large walking dragline will enter the Mynheer Seam pit once the walkroad is available and sufficient overburden is blasted in advance of the dragline working area. The dragline will excavate overburden and spoil to the north and south on both sides of the pit. The machine will begin to advance to the west thus leaving uncovered coal in the pit which can be dug and hauled eastward out of the pit mouth.

This will begin two Robb Center pits; V20-22 and M20-22. Over time the Mynheer Seam will expand westward as Pit M17-22. The Val d'Or Seam will expand east and west as additional equipment is added as it becomes available from CVM.

C.3.2.3 Robb Main Mining Activity

Two backhoe pits will be started in Robb Main commencing in 2015. Pit M11-12 and Pit V10-11 (Mynheer and Val d'Or Seams) will be started to provide early coal production from the area. Both will involve development of external rock dumps. The 'good' rock available from each pit will be utilized to expand the initial haul road routes.

Preparations for the early diversion stage of the Erith River will also be started. This work will include preparation for the narrow Pit MC11-16 in the McPherson Seam. Figure C.3-2 illustrates the extension of this pit into 2017.

C.3.2.4 Mine Facilities

Figure C.3-2 also illustrates the establishment of early facilities within the Project area. Within the first two year's CVRI plans to establish a 'temporary dry' to accommodate mine workers. Once this is established a number of mine operators will be bused directly to the Project site for shift changes.

To gain operational efficiencies it is expected that facilities for field maintenance of equipment will be established and improvements for the supply chain of parts, operating supplies and consumables will result in addition of storage and handling capacity in the area. Therefore, fuel and lube stations will be located close to active mining area. Storage or supplies and consumables are also likely to be setup near operational centers.

CVRI expects that the explosives facility current located near the Plant site will be relocated to be closer to the mine activity. Likewise some form of field maintenance shop is expected to be constructed in the Project area. Sites for these facilities will be established in these initial years. Such facilities are all expected to be temporary in nature making use of modular buildings and skid structures.

C.3.2.5 Ponds

Three additional ponds will be constructed in the Robb Main area to accommodate water management around Pit MC11-16 (McPherson Pit).

C.3.2.6 Diversions

Pit MC11-16 in Robb Main will require minor diversions of the Erith River to accommodate the mining. These diversions will simply 'short-cut' some small meanders of the river.

C.3.3 FULL PRODUCTION PHASE - STAGE 2A & 2B (2016 - 2021)

Stage 2 constitutes the beginning of full production of the Project when all coal production for the mine is being provided from the Project with mining in all other areas of CVM exhausted. Stage 2 mining activities are shown on Figures C.3-3 and C.3-4.

C.3.3.1 Robb Center

During this period the Pit V19-22 (Val d'Or Seam) will be expanded and deepened with the development of Pit V20-25. Additional external dumps will be added. Ponds will be constructed to cover runoff from the pit and dump areas.

The dragline operation will continue to extend to the west within the Mynheer Seam. Pit M16-21 will be spoiled to the north and south. Coal will be hauled along the Halpenny route. Ponds will be constructed along the pit length.

C.3.3.2 Robb Main

The early pits in Robb Main will continue to be expanded and deepened. Additional mining equipment will be added as it becomes available from the CVM operation. All mining equipment is expected to be positioned in the Project by approximately 2017. The majority of full coal production will be from the Robb Main area.

Pit MC11-16 will have been completed previously and the Erith River temporarily diverted through the pit. This will permit the portion of Pit M13-16 in the Mynheer Seam to be mined beneath the original river channel. This pit, once reclaimed, will become the final route for the Erith River flow.

C.3.3.3 Facilities

It is expected that a remote maintenance facility will be in place during this stage of development. The majority of the mobile mining equipment will active in the Project area by this time. The explosives site will also be relocated by this stage in order to serve the nearby mining operation. Numerous minor storage areas are also expected to be in place and remote fuel/lube islands will be available in active mining areas.

C.3.3.4 Ponds

Additional ponds will be constructed as necessary to accommodate pit and dump runoff. Two ponds are planned downslope near the Erith River and one pond is planned below the external dump in Robb Center.

C.3.3.5 Diversions

The first stage of the Erith River diversion will be installed during this period. Once Pit MC11-16 in Robb Main is completed it will be reclaimed to form a temporary diversion channel for Erith River. This will remove the river from a portion of its original channel so that the Mynheer Seam can be mined and recovered.

Once Pit M12-17 (Mynheer Seam) is completed it can be reclaimed and Erith River returned to flow through the reclaimed pit. By moving the river back to the south it will then be out of the way for future mining of the Val d'Or Seam located to the north.

C.3.4 FULL PRODUCTION PHASE - STAGE 3 (2021 – 2022)

Stage 3 (Figure C.3-5) development begins in approximately 2021 and will involve the following:

- continued mining of Pit V10-16 and Pit V20-25;
- dragline moved to west end of Pit M20-23; and
- construction of Diversion 4, 5 & 6.

C.3.4.1 Robb Main

Truck/shovel mining in Pit V10-16 will continue to expand in size and depth. The pit will tend to expand eastward. Some work will continue in nearby Mynheer Seam pits and backfill in the early Mynheer Seam pits will begin from the Val d'Or Seam pit.

C.3.4.2 Robb Center

Truck shovel mining in Pit 20-25 will continue to expand in size particularly towards the east across Halpenny Creek (Diversion 5). Waste rock will continue to external dumps to the north. Waste from the lower benches will be hauled for disposal in-between Val d'Or and Mynheer.

The dragline will be moved to the west end to begin Pit M20-23 and advances to the east across Halpenny Creek (Diversion 5), and tributaries to Halpenny Creek (Diversion 4 and 6). The Mynheer pits east of this point will have been completed and reclamation started.

C.3.4.3 Ponds

Two additional ponds will be constructed in Robb Center. One will be located north and below the external dump. The other will be constructed near the Halpenny Creek to cover for mine development in the Mynheer Seam.

C.3.4.4 Diversions

Diversions within Halpenny Creek will be installed at this point to accommodate mining to begin expansion toward the east in Robb Center.

C.3.5 FULL PRODUCTION PHASE - STAGE 4 (2023-2025)

Key elements in the subsequent development stage are illustrated in Figure C.3-6 and include:

- continued mining in Pits V10-16 and V20-25;
- commencement of mining in Pit V25-31; and
- construction of Diversions 7, 8 & 9.

C.3.5.1 Robb Main

Mining of Pit V10-16 continues east towards the Erith River and create large external dumps to the north. The western end of this pit will be reaching pit bottom benches. Some minor work will continue in nearby Mynheer pits.

C.3.5.2 Robb Center

Mining in Pit V20-25 continues to expand rapidly and large external dumps will be created to the north.

The dragline is moved from the completed Pit M20-23 area to the west end of Pit M24-30 where the dragline advances to the east across tributaries to Lendrum Creek (Diversions 7 & 8) into Pit M30-40.

Mining will begin in Pit V25-30 and involve crossing Lendrum Creek and its tributaries (Diversions 7, 8 and 9). Portions of this Val d'Or Seam pit will be accomplished with the dragline with the majority with backhoes. Pits are narrow and shallow so advance through the region will be relatively quick.

C.3.5.3 Facilities

Haulroads and powerlines will be extended eastward as the pits advance.

C.3.5.4 Ponds

Another pond will be required to the north of Val d'Or Seam pit in Robb Main. This will be located below the external dump and next to a tributary of Erith River.

A similar situation in Robb Center will require a pond to the north below an external dump. Two additional ponds in Robb Center will be located near Val d'Or Seam pits next to Lendrum Creek.

C.3.5.5 Diversions

Diversions in Lendrum Creek will be established for pits advancing to the east in Robb Center.

C.3.6 FULL PRODUCTION PHASE - STAGE 5 (2025-2027)

Figure C.3-7 illustrates continued spread of mining in the Project area. The Robb Main operation will continue to advance eastward in the Val d'Or Seam but new pits in the Mynheer Seam will work toward the west on the south side of the valley. Robb Center advances into Robb East as the dragline and smaller backhoe pits continue progression eastward. Key elements of this stage of development include:

- mining begins in Pit M6-12 and advances to the west toward Hay Creek (Diversion 10);
- mining in Pit V16-20 continues to the east across Bacon Creek (Diversion 3);
- mining continues in Pit V25-30 and advancement to the west across tributaries to Lendrum Creek (Diversion 7 & 8);
- mining continues in Pit V30-40 and advances to the east across Diversions 11, 12 and 14; and
- mining continues in pit M30-37 advancing to the east across Diversions 9 and 11.

C.3.6.1 Robb Main

The Val d'Or Seam pit in Robb Main will be advancing to the east so as to intersect with the downstream segment of Erith River. This will require a diversion of the river around the mining area.

C.3.6.2 Robb Center

At this phase of development much of the Robb Center mining will be nearing completion.

C.3.6.3 Robb East

Dragline mining will be well advanced into Robb East in both the Mynheer and Val d'Or seams.

C.3.6.4 Ponds

Additional ponds will be developed in the Lund Creek area, north of the proposed mining areas. A pond will also be required in the Hay Creek valley at the western end of Robb Main.

C.3.6.5 Diversion

A major diversion of the Erith River will be required to accommodate the Val d'Or pit in Robb Main. The upper portion of Hay Creek will be impacted by Mynheer seam mining. Diversions of Lund Creek tributaries will be started.

C.3.7 FULL PRODUCTION PHASE - STAGE 6 (2027-2029)

Stage 6 is intended to illustrate the progression of mining toward the east side of the hamlet of Robb. Figure C.3-8 tracks the mining areas from 2027 to approximately 2029. During the period 2017 to 2029 much of the production will be from pits already active. Mining will be progressing into lower benches to recover much of the coal.

C.3.7.1 Robb Main

Mining will have been completed in Pit M6-10 (Mynheer Seam) by this period. This pit is a narrow shallow pit on the south valley floor developed by backhoe/truck methods. Rock will have been placed into external dumps on the south side of the pit with some hauled to the east for backfill. The strategy is to complete this pit in advance of work in the parallel Val d'Or Seam so that Val d'Or rock can be backfilled into the Mynheer cut. This reduces any need for external rock dumps on the northern ridge which would be exposed to the community of Robb.

Pit V6-12 (Val d'Or Seam) will be advanced from the east side. Upper benches will be mined first. These are high on the valley slope and most exposed toward the community. By moving from the east these benches can be better kept from view and equipment hidden by the advancing face. Trucks will be hauling eastward, away from the community. As the pit advances to lower benches the west end wall will perform as a sight and sound barrier. At lower benches the entire equipment production area is below ground grade. Rock will be hauled to the east as backfill in Mynheer pits and Val d'Or pits to the east. This creates an 'end-pit' configuration which would be reclaimed as a lake.

C.3.7.2 Robb Center

All mining in the Robb center area will have been completed. A road will be maintained between the Erith and Halpenny corridors to accommodate equipment movement and personnel access between Robb Main and Robb East. Otherwise the mine area in the central portion will be well within reclamation stages.

C.3.7.3 Robb East

Mining will be continuing in the eastern end of Robb East with pits in both Mynheer and Val d'Or Seams. Haulroad and powerlines from the Halpenny corridor will continue to be extend eastward to accommodate progression of these pits.

C.3.7.4 Robb West

Early development will be starting in Robb West in anticipation of mining start-up. The work will include construction of the access road and ponds needed for water management. Timber clearing will be started in the central portion of Robb West where the first mining is planned.

A diversion of the logging road "Robb Road" will be constructed to bypass the Robb West mine area.

C.3.7.5 Facilities

Construction of the Bryan haulroad will be undertaken during this stage. The bypass road for the logging road to the north of Robb West will also be put in place.

C.3.7.6 Ponds

The ponds associated with the Bryan corridor will be constructed.

C.3.8 FULL PRODUCTION PHASE - STAGE 7 (2030-2033)

This next phase of development is illustrated by Figure C.3-9. By this period of the mine mining will be complete in Robb Center, drawing to a close in Robb West and at the extreme eastern end of Robb East. Much of the production will be switching into Robb West. Key elements of this stage include:

- mining in Pit M40-45 commences and progresses to the east across Diversion 14 and 15; and
- mining begins in central portion of Robb West across a portion of Bryan Creek (Diversion 13).

C.3.8.1 Robb Main

Mine operations in Robb Main will be ramping down as Robb West activity is ramped up. Pit activity in Robb Main will be focused on the deeper benches of Pit V6-10 (Val d'Or Seam) in order to finish the pit. This is the last mining in Robb Main.

C.3.8.2 Robb Center

There is no activity in Robb Center

C.3.8.3 Robb East

Activity in Robb East is at the extreme eastern end. All dragline cuts are nearing completion. The large Pit V40-44 (Val d'Or Seam) will be starting.

C.3.8.4 Robb West

Construction of the Bryan Corridor will be completed in advance of start-up of mining in Robb West. This work involves construction of the haulroad and water management ponds associated with the road and the initial pit areas. No powerline is required in this corridor.

Mine equipment will be relocated from the Robb Main area into Robb West to start-up new pits. As pits are enlarged more equipment will be moved in to expand production. Over a period of one to two years all the equipment from Robb Main will be moved be moved into Robb West.

Mining in Robb West will begin in the central part of the area. In order to accommodate all the equipment multiple pits and benches will need to be developed simultaneously. A key element of the mine sequence is to complete the western 'leg' of the Mynheer Seam relatively quickly. Once this portion of the seam has been completed the pit will be available for in-pit backfill. Until that point all overburden will have to be placed into external dumps.

By concentrating on the central and western portion of the Project a favorable sequence can be developed to maximize in-pit backfill. Overburden from the eastern portions of development will be able to be placed into the earlier areas as in-pit backfill. This sequence also minimizes the timeframe for disturbance to Bryan Creek.

Coal will be hauled to the Plant via the Bryan Creek haulroad corridor.

C.3.8.5 Facilities

Facilities in Robb Main will begin to be shut-down as mining draws to a close.

Some remote facilities in Robb West will be established to aid the operation. A remote dry for shift change will be considered. Fuel/lube islands will be moved into the area to supply mobile equipment. Temporary storage and maintenance capability will also be considered.

C.3.8.6 Ponds

A pond will be required near Bryan Creek in Robb West. Additional ponds in the Lund Creek area of Robb East will also be established.

C.3.8.7 Diversion

Diversion of Bryan Creek in Robb West will have been established by this period. Likewise the remainder of the diversions in the extreme end of Robb East will have been put into place.

C.3.9 FULL PRODUCTION PHASE - STAGE 8 (2034-2037)

This next phase of development, Figure C.3-10, illustrates the progression of mining in Robb West and the final pits in Robb East. Activities included in this period will involve:

- final of dragline mining in Pit M40-45;
- mining of Pit M4-3 as it extends to the east across Diversion 13; and
- extension of Pit V4-3 to the east and west.

C.3.9.1 Robb Main

Mining is complete and reclamation is at full rate. The Erith corridor will be in the midst of reclamation.

C.3.9.2 Robb Center

Mining is complete and reclamation is complete.

C.3.9.3 Robb East

Mining will be concentrated at the east end. Reclamation of previous pits would be nearing completion.

C.3.9.4 Robb West

The strategy for mining Robb West is to mine the western end of both seams first. Once the Mynheer portion is completed then it can be backfilled from deeper benches of the pits in the Val d'Or Seam. Likewise, once the west end of Val d'Or Seam is completed it can be backfilled from the east end.

Bryan Creek will be initially handle to the north until the Mynheer Seam eastern pit is mined and completed. This will then allow the creek flow to be directed through the old pit while the deeper and larger Val d'Or Seam pit is mined.

The majority of production equipment is within the Robb West area. Mining in the Mynheer Seam has progressed from the west end into the east end, under Bryan Creek. Mining in the Val d'Or Seam is progressing into the lower benches in the west end and beginning in upper benches in the east end, nearest the community of Robb. Waste rock is being placed into dumps on the north side of the Val d'Or Seam pits with the majority as backfill into the western Mynheer Seam pits.

C.3.10 FULL PRODUCTION PHASE - STAGE 9 (2038)

The mine plan shown as Stage 9 (Figure C.3-11) illustrates the full, completed mine development. The last development will complete the large Pit V40-44 in Robb East (Val d'Or Seam) and the last Val d'Or Seam pit in Robb West. Both will be left as end pit cuts to be developed as lakes.

Upon completion the final haulroads can closed and reclaimed.

C.3.11 DECOMMISSIONING PHASE

Decommissioning of the pits, dumps and associated facilities for the Project will be conducted utilizing the procedures currently in place at the existing CVM. Details of the plan are contained within the application (Section C.1.3.7). The primary principles of the Decommissioning Plan are to ensure that infrastructure and associated facilities are operated to ensure the minimum disturbance footprint and that these facilities are removed as soon as possible following in the completion of mining.

C.3.12 RECLAMATION PHASE

CVM has developed a conceptual Conservation and Reclamation Plan for the Project. Details of the Plan are contained within the application (Section F). The primary principle of the Conservation and Reclamation Plan is to ensure that adequate resources are conserved allowing for the return of all disturbed lands to an equivalent land capability designed to support the end land use objectives.

C.4 WATER MANAGEMENT PLAN

A conceptual Water Management Plan has been developed for the entire Project area. Detailed surface water management plans will be developed for the licensing stages.

The surface water management program at the CVM contains the following elements:

- initial planning and placement of mine operating facilities reducing the need for drainage and sediment controls;
- locating haul roads along drainage divides to minimize effects to watercourses;

- maintenance of natural vegetated buffers between mine areas and watercourses where possible;
- design of water management facilities by qualified personnel;
- construction of water management facilities as per the approved designs;
- regular inspection and maintenance of the water management facilities;
- operation of the water management system by qualified personnel that are knowledgeable of the mining process; and
- participation of mine operations personnel in surface water management.

The Project will require the construction of temporary and permanent diversions of watercourses within the Project area. A number of construction techniques will be used to maintain the water quality during the construction and operation of the diversions. Additional details are provided in CR# 6.

C.4.1 SURFACE WATER COLLECTION SYSTEM

There are a total of 44 settling ponds planned within the Project area for water management. The ponds have been designed by a qualified hydrologist to collect local runoff from the strategically located sumps, mining areas, reclamation areas and pumped mine pit dewatering. The settling ponds will be sized and have pre-settling areas and flocculant treatment similar to those in use at the existing CVM. The settling ponds will be excavated into natural ground with minimal berm height and water backup above ground level. Typical cobble armoured overflow channels will be provided to control local erosion and contain the maximum expected outflow from each settling pond.

In areas with steeper gradients exfiltration ditches may be utilized to control runoff from soil and spoil stockpiles.

Location of the proposed ponds and sumps are shown on Figure C.4-1.

Table C.4-1 Summary of Project Settling Ponds

Pond	Watershed	Active Period (Yr # - #)	Purpose			Minimum Pond Size (m²)
			Haulroad	Mining	Dump	
W1	Jackson Creek	13-26	×			1,000
W2	Embarras River	13-26	×			1,020
W3	Embarras River	13-26	×			750
W4	Embarras River	13-26	×			1,500
W5	Bryan Creek	13-26	×			2,000
W6	Bryan Creek	13-26	×	×	×	3,200
W7	Bryan Creek	13-26		×		2,000
W8	Bryan Creek	15-26		×		2,000

Table C.4-1 Summary of Project Settling Ponds

Pond	Watershed	Active Period (Yr # - #)	Purpose			Minimum Pond Size (m²)
			Haulroad	Mining	Dump	
H1	Hay Creek	12-17		×		3,000
E1	Erith River	1-17	×			1,150
E2	Erith River	1-17	×			2,100
E3	Erith River	1-17	×			1,400
E4	Erith River	1-17	×			1,800
E5	Erith River	1-17	×			960
E6	Erith River	1-17	×			650
E7	Erith River	1-17	×			930
E8	Erith River	1-17	×			1,240
E9	Erith River	1-17	×			1,040
E10	Erith River	1-17	×	×		2,350
E11	Erith River	3-15		×		1,800
E12	Erith River	4-14		×		5,000
E13	Erith River	5-13		×		2,000
E14	Erith River	6-13		×		9,000
B1	Bacon Creek	3-13		×	×	2,000
P1	Halpenny Creek	1-26	×			1,250
P2	Halpenny Creek	1-26	×			1,400
P3	Halpenny Creek	1-26	×			600
P4	Halpenny Creek	1-26	×			1,400
P5	Halpenny Creek	1-26	×			810
P6	Halpenny Creek	1-26	×			1,760
P7	Halpenny Creek	1-26	×			640
P8	Halpenny Creek	8-26		×		2,000
P9	Halpenny Creek	8-26		×		2,000
P10	Halpenny Creek	8-26		×	×	2,000
P11	Halpenny Creek	10-26			×	2,000
P12	Halpenny Creek	10-26		×		2,000
D1	Lendrum Creek	10-26		×		2,000
D2	Lendrum Creek	10-26		×		2,000
L1	Lund Creek	12-26			×	2,000

Table C.4-1 Summary of Project Settling Ponds						
Pond	Watershed	Active Period (Yr # - #)	Purpose			Minimum Pond Size (m²)
			Haulroad	Mining	Dump	
L2	Lund Creek	12-26		×	×	2,000
L3	Lund Creek	12-26			×	2,000
L4	Lund Creek	12-26		×	×	2,000
L5	Lund Creek	17-26			×	2,000
N1	Pembina Trib.	17-26		×	×	2,000

C.4.2 PIT DEWATERING

All surface runoff and groundwater will be collected within the pit area using a system of drainage ditches and sumps, where the water to licenced impoundments for treatment and release. The pit water is pumped from the pit areas in a controlled manner to keep the "floor" of the pit dry and operable. Controlled pumping allows for constant flows to be effectively handled through the impoundment(s) into the receiving stream(s).

The mining of the Robb West and Robb Center development areas is expected to intersect abandoned underground mining areas in the vicinity of the Robb townsite. The underground workings are known to contain an unknown volume of water. Mine wastewater handling facilities and practices in place at the CVM are expected to be able to adequately accommodate these volumes once intercepted.

C.4.3 STREAM DIVERSIONS

The development of the Project will require approximately 15 watercourse diversions (Table C.4-2) around the active mining areas. A typical watercourse diversion is depicted in Figure C.1-7. The environmental impacts of these diversions are discussed in Section E and CR# 6.

In the design and execution of the diversions the following design concepts or a combination of the concepts will be employed:

- excavated and lined diversion channels;
- mining up to the creek, backfilling the pit and running the diversion over the backfilled pit then continuing on with the mining of the pit; and
- pumped diversions where the watercourse will be dammed and the water would be pumped around the development.

The majority of the diversions will involve fish bearing streams where natural bypass flows will have to be maintained at all times. Smaller intermittent or ephemeral drainages having drainage areas less than 1 km² may have flows temporarily or permanently blocked by waste rock piles or

pits. Runoff may be re-directed to adjacent streams or allowed to seep to pits through the waste rock piles.

Many of the diversion systems are temporary and may only be in place for about one year until backfilling and reclamation can take place. Some of the diversions will be permanent installations that will be integrated with the end pit lake development. Refer to CR#6 for details.

The design and construction of all stream crossings will be completed in compliance with the *Alberta Code of Practice for Watercourse Crossings* and associated guidelines. Habitat compensation measures may be required depending on construction plans (developed at a later date) and specific site conditions. Fisheries and Oceans Canada (DFO), ASRD and stakeholders will be consulted with to ensure habitat quality is protected. Standard practices that are proven to be effective to mitigate potential adverse effects during instream works, associated with watercourse diversions, will be implemented. These practices are listed in CR #2.

CVRI will use the skills and knowledge gained from stream diversion and watercourse reclamation work at current mine projects as a starting point for the reclamation of stream habitats in the Project. All stream reconstruction work will be supervised by a Qualified Aquatic Environment Specialist.

Table C.4-2 Main Watercourse Diversions

No.	Watercourse	Active Period Year	Diversion Method	Description
1	Erith River	1-13	in pit	Multi-staged, see CR #6, Figure 26
2	Erith East Trib (ERT1)	2-13	in pit	To Erith via McPherson then Mynheer Pits
3	Bacon Creek	3-13	in pit	To Erith tributary in McPherson then Mynheer pit
4	Halpenny West Trib (HLT1)	8-9	in pit	Temporary pump then in Mynheer pit to main
5	Halpenny Creek	3-6	cutoff	Temporary cutoff around Val d'Or Pit
5	Halpenny Above Trib	8-9	cutoff	Temporary cutoff around Mynheer Pit
5	Halpenny Creek	10-13	over pit	Across backfilled Val d'Or pit
6	Halpenny East Trib (HLT2)	10-12	in pit	Temporary pump around, then in Mynheer pit
7	Lendrum West Trib (LET1)	10-12	in pit	Temporary pump then in Mynheer pit east to main
8	Lendrum Trib (LET3)	10-12		Temporary pump or flume across 3 pits, then in-pit
9	Lendrum Creek (Main East)	10-12	in pit	Upper 2.78 km² pump around, then in pit
10	Hay Creek	12-17	in pit	Creek removed, pump around or to ponds
11	Lund West 1 Trib (LDT1)	12-14	over pits	Pump across 2 pits then into pits (2 end pit lakes)

Table C.4-2 Main Watercourse Diversions				
No.	**Watercourse**	**Active Period Year**	**Diversion Method**	**Description**
12	Lund West 2 Trib (LDT3)	12-15	over pit	Temporary pump across narrow pit
12	Lund West 2 Trib (LDT3)	14-16	over pit	Join 3 channels above and pump across
12	Lund West 2 Trib (LDT3)	17-20	in pit	2-3 branches, final thru 3 pits, 2 end pit lakes
13	Bryan Creek	17-20	cutoff	Ditch cut around pit
13	Bryan Creek	17-20	cutoff	Second lower cutoff around pit
13	Bryan Creek	21-24	in pit	Collect in pit and ponds and pump to lower creek
14	Upper Lund Creek	17-20	over pits	Pump around, then over backfilled pit and in pit
14	Upper Lund Creek	21-24	in pit	Collect in pit and ponds and pump to lower creek
15	Pembina Trib (PET1)	17-20	around pit	Temporary pump or ditch around, then in pit yr 21

A long section of the Erith River is currently located over a mineable portion of the Mynheer Seam. In addition, the current river course inhibits mining of a portion of the McPherson Seam and utilizes space that could be utilized for overburden dumps from the larger nearby Val d'Or pits.

CVRI is proposing temporary relocation of a portion of the Erith River in order to accommodate mining of these three seams. The first stage of this relocation process is mining of a long, narrow cut following the McPherson Seam and thus providing a temporary channel for re-routing the river.

This 'McPherson Pit' (MC11-16) must be developed and completed quickly within the first years of mining in order to accomplish the proper sequence for the ultimate permanent river channel.

Figure C.3-12 illustrates the 'McPherson Pit' (MC11-16) located parallel to and north of the current Erith River channel. The smaller 'walking dragline' is expected to mine this pit as a single 'cut' following the subcrop of the seam. Overburden will be spoiled to the south side of the pit. A backhoe will follow the dragline in order to excavate and load the uncovered coal. Once the full pit has been developed and the coal removed a temporary channel will be accommodated within the pit for short term relocation of the Erith River.

By moving the Erith River into this 'new channel' CVRI will be able to mine the Mynheer Seam, reclaim the pit and re-establish the river into a permanent route through the reclaimed pits of the Mynheer Seam.

Once the river is relocated south into the reclaimed pit then mining of the Val d'Or pit to the north can be scheduled. Overburden from the pit will be placed into and over the McPherson Pit.

C.4.4 WATERCOURSE CROSSINGS

In order to access the Project area numerous watercourse crossings will be required (Table C.4-3, Figure C.4-1). All crossings will be constructed in accordance with the "Code of Practice for Watercourse Crossings" (AENV 2000). Habitat compensation measures may be required depending on construction plans (developed at a later date) and specific site conditions. Fisheries and Oceans Canada (DFO), ASRD and stakeholders will be consulted with to ensure habitat quality is protected. Standard practices that are proven to be effective to mitigate potential adverse effects during instream construction, associated with watercourse crossings, will be implemented. These practices are listed in CR #2.

All watercourse crossing installations will be supervised by a Qualified Aquatic Environmental Specialist.

Applications under the *Navigable Waters Protection Act* will be made at a later date.

The main crossings required are listed in Table C.4-3. Other draws will have minimum 0.6 m diameter culverts or drain to ponds.

Table C.4-3 Main Corridor Haulroad Crossings

Crossing Number	Watercourse	Typical Culvert Diameter (m)	Crossing Type
Erith Corridor			
E1	ERT10	2.6	Fish Passage Required
E2	ERT8	2.2	Fish Passage Required
E3	Erith River	3.6	No Instream Disturbance
E4	Ephemeral draw	0.6	No Fish Passage Required
E5	ERT6	1.4	TBD
E6	ERT5	3	Fish Passage Required
E7	ERT4	2.2	No Fish Passage Required
Halpenny Corridor			
H1	HLT9A	2.2	Fish Passage Required
H2	HLT9	2.2	Fish Passage Required
H3	HLT8	2.2	Fish Passage Required
H4	HLT1- TL Draw	0.6	No Fish Passage Required
H5	HLT1- TL1	0.9	No Fish Passage Required
H6	HLT1	3	Fish Passage Required
Bryan Corridor			
B1	Jackson Creek	2	Fish Passage Required

Table C.4-3 Main Corridor Haulroad Crossings			
Crossing Number	**Watercourse**	**Typical Culvert Diameter (m)**	**Crossing Type**
B2	Embarras Trib 1 (EMT3)	1	TBD
B3	Embarras Trib 2	0.6	No Fish Passage Required
B4	Bryan East (BRT2)	1	No Fish Passage Required
B5	Bryan East Trib (BRT2B)	1.2	No Fish Passage Required
B6	Bryan East Trib (to BRT2-T)	2.4	TBD
B7	Bryan East Trib (to BRT2)	0.6	No Fish Passage Required
B8	Bryan East Trib (to BRT2)	0.6	No Fish Passage Required
B9	Bryan Middle Trib(BRT2A)	2	TBD
B10	Bryan Creek	3	Fish Passage Required

C.4.5 LAKE DEVELOPMENT

Twelve lakes are planned as part of the reclamation plan for the Project area. The final physical characteristics of the lakes are sensitive to changes in mine plans, so detailed planning will be provided at the mine licencing stage.

The conceptual physical characteristics of the proposed lakes are provided in Table C.4-4.

The environmental impacts associated with creation of the end pit lakes are discussed in Section E.

Table C.4-4 Conceptual Characteristics of Reclaimed Lakes in the Project Area								
Lake	**Pit**	**Creek Influence**	**Water Level (m)**	**Surface Area (ha)**	**Max. Depth (m)**	**Volume (m^3.)**	**Littoral Zone**	
							Area (ha)	**Ratio (%)**
Robb West								
Lake 1	V4-3	Bryan Creek	1125	63.5	75	21,717,500	5.0	7.9%
Lake 2	V4-3	Bryan Creek	1110	93.0	65	23,305,900	17.6	18.9%
Robb Main								
Lake 3	M4-3	Hay Creek	1130	60.3	55	12,689,600	8.3	13.8%
Lake 4	M12-17, M17-20	Erith River	1130	71.1	45	8,131,400	17.8	25.0%
Lake 5	V10-16, V16-20	Erith River	1120	131.8	45	22,150,300	33.8	25.6%
Robb Center								
Lake 6	V20-25	Halpenny Creek	1120	28.9	50	4,379,900	4.9	17.0%
Lake 7	V25-30	Lendrum Creek	1150	16.4	25	1,756,000	3.7	22.6%

Table C.4-4 Conceptual Characteristics of Reclaimed Lakes in the Project Area								
Lake	Pit	Creek Influence	Water Level (m)	Surface Area (ha)	Max. Depth (m)	Volume (m^3.)	Littoral Zone	
							Area (ha)	Ratio (%)
Robb East								
Lake 8	V25-30	Lund Creek	1190	20.1	40	2,009,700	5.9	29.4%
Lake 9	V24-30	Lund Creek	1195	21.0	35	2,751,300	4.1	19.5%
Lake 10	V30-40	Lund Creek	1200	5.5	15	164,200	2.3	41.8%
Lake 11	M24-30	Lund Creek	1230	17.7	35	1,983,600	4.0	22.6%
Lake 12	V30-40, V40-45	Lund Creek	1230	96.0	55	25,401,900	9.1	9.5%
Totals				**625.3**		**126,441,300**	**116.5**	

Note: * - Assuming downstream instream flows are maintained (*i.e.,* 15% of runoff used with no filling when flows are below 80% exceedances level) with average groundwater inflow contribution at 30mm/year from total basin on lakes > 10m deep

C.5 SUPPORTING INFRASTRUCTURE & SERVICES

C.5.1 COAL PROCESSING

The Project allows CVRI to continue to supply a constant rate of coal to the Plant. There are no changes to the Plant processes or materials handling required with the addition of the Project mining area.

The Plant was expanded in 2005 under approval from AEW and the ERCB. Operation of the Plant, including tailings and reject management, will continue under the existing operating approvals. Water supply for the Plant will continue to utilize re-circulation of water from the tailings pond with make-up water provided by deep wells.

Table C.5-1 indicates the long term disposal capacity at the CVM to accommodate processing of coal from the Project. Since the completion of the Plant expansion, CVRI has followed the tailings and reject disposal plans provided in the most recent Plant operating plan. Both reject and tailings have continued to be placed into old pits near the Plant. These "Mynheer A" pits were mined decades ago and intentionally left for Plant discard. The Mynheer A pits have sufficient capacity for disposal of tailings and Plant reject for many more years. Should additional space be required the current Pit 26 area would be available for added capacity.

Table C.5-1 Long Term Tailings and Reject Disposal								
Year	Coal Production		Yield	Tailings Disposal			Reject Disposal	
	M RMT	M CMT	%	M MT	Mm^3	Location	Mm^3	Location
2012	6.5	3.6	55%	1.6	1.3	Mynheer A	2.0	Mynheer A
2013	6.5	3.6	55%	1.6	1.3	Mynheer A	2.0	Mynheer A
2014	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2015	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A

Table C.5-1 Long Term Tailings and Reject Disposal

Year	Coal Production		Yield	Tailings Disposal			Reject Disposal	
	M RMT	M CMT	%	M MT	Mm^3	Location	Mm^3	Location
2016	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2017	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2018	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2019	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2020	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2021	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2022	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2023	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2024	7.3	4.0	55%	1.8	1.5	Mynheer A	2.2	Mynheer A
2025	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2026	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2027	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2028	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2029	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2030	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2031	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2032	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2033	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2034	7.3	4.0	55%	1.8	1.5	Pit 26	2.2	Mynheer A
2035	6.4	3.5	55%	1.6	1.3	Pit 26	1.9	Mynheer A
2036	5.9	3.3	55%	1.4	1.2	Pit 26	1.8	Mynheer A
2037	5.5	3.0	55%	1.3	1.1	Pit 26	1.6	Mynheer A
2038	4.5	2.5	55%	1.1	0.9	Pit 26	1.4	Mynheer A
Total Available >2011					**38.6**		**56.9**	

C.5.2 ACCESS ROADS

The Project mining area straddles the community of Robb, which runs along Highway 47. The Project will utilize existing corridors to connect to the existing CVM which includes the Plant. Approximately 6 km of the "Robb Road", a West Fraser logging road, will need to be relocated in order to accommodate mining of the Robb West portion of the Project. The relocation is required in 2028 as the initial mining stages of Robb West are scheduled. A new route is proposed to bypass north of the mining areas. This route would be a permanent relocation for the road, constructed to the equivalent of the existing design standard. No additional crossings over Highway 47 are required. Dust suppression methods will continue to be instituted and lighting and warning signs will be maintained on Highway 47.

As stated above, the Project will utilize existing corridors to connect to the existing CVM and this eliminates the need for any new railway crossings. CVRI will continue to utilize two level crossings over the rail line on the existing mine.

Manpower for the Plant, heavy equipment repair and staff positions will continue to be bused to the central office/shop area. Dry facilities for these employees will remain at the site. Ancillary functions such as safety, training, mine dispatch, electrical repair and major welding will remain in the same facility.

Traffic patterns can be expected to change only marginally as mining areas vary over time. The Pit 123 dry is expected to be closed in 2012 as mining in the area is completed. The Pit 29 dry is expected to become more heavily utilized as mining begins in the Yellowhead Tower area. It could be expected that the full utilization of both current drys would shift to the single Yellowhead Tower operational area. This can be expected to occur in 2012 to 2014/2015. Traffic to the office/shop and Plant area is expected to remain unchanged.

Mining operations are expected to transition into the Project area as current mine areas are completed. Project mine activity is expected to start in 2014 and ramp up to the full production by 2016/2017. Therefore, the traffic to the current dry facilities can be expected to shift totally to Project locations between 2014 and 2017. The office/shop and coal processing traffic will remain unchanged.

A satellite dry facility is expected to be located in the Project area by 2014 and increase to maximum use by 2017. The site will be located off the Robb Road accessed by a local service road. CVRI bus service and personal vehicles, currently servicing the two satellite dry facilities, will be switched to the new Project site. Therefore, this traffic would exit Highway 47 at the north Robb access junction, travel eastward toward the Hanlan-Robb gas plant until reaching the local service road leading to the Project. This would result in a minor shift in the local traffic patterns where south of Robb, on Highway 47, traffic would be reduced and east of Robb there would be a corresponding increase in traffic.

C.5.3 COAL TRANSPORT

The plans for transporting coal to market will be the same as currently undertaken at the mine (Section C.1.5.3). As this Project is required in order to maintain production at the Plant, there are no changes to the number or frequency of trains required to transport coal to market.

C.5.4 WATER SOURCE

There will be no changes to the existing water source facilities or volume of water required at the mine. The existing water source facilities (Section C.1.5.4) will continue operating throughout the life of the Project.

C.5.5 BLASTING STORAGE AND MANUFACTURING

The blasting procedures utilized at the existing development (Section C.1.3.5) will be utilized at the Project. The annual quantity of ANFO used throughout the life of the Project will be approximately 10,000 tonnes.

It is anticipated that once all mining activities are moved into the Project area that the storage facilities (explosives manufacturing plant) will be relocated to the Project for efficiency purposes. A suitable site will be established and licenced through regulatory agencies.

Ancillary items for blasting are secured on site within an approved and secured 'magazine'. All existing facilities that are associated with blasting activities will remain on the existing CVM where a separate and secure storage area for packaged products such as primers, detonating cord, and cartridge explosives is maintained. Additional separate and secure locations are provided in remote areas of the mine for the storage of detonators and blasting caps where the employees at the CVM are responsible for these products. The qualified CVRI blasting crew and blasting supervisor will be responsible for connecting and firing all blasts.

C.5.6 POWER

The total power consumption of the CVM will not change with the addition of the Project. Since the dragline, drills and pumping equipment are electrically powered, powerlines will be required throughout the Project area. Existing clearings and right of ways will be used where possible which is similar to practices employed at the CVM. The construction of the new powerlines will be completed by a contractor.

C.5.7 SERVICE BAYS (FUEL/LUBE)

The main fuelling depot at the existing mine (Base Mine) (Figure C.5-1A and C.5-1B) will remain in use for the Project. The haul trucks and other mobile equipment in the Plant and shop area will utilize this station.

It is anticipated that due to the distance from the main depot to the Project area smaller satellite service facilities will be established. These satellite facilities will be established in a similar manner to other satellite facilities found throughout the CVM.

C.5.8 OFFICE/SHOP COMPLEX

The office/shop complex will not be altered from what is currently in place at the mine (Section C.1.5.9).

C.6 ENVIRONMENTAL MANAGEMENT

CVRI's goal is to foster the safe, orderly and efficient development of its coal resources. This is done in a manner to achieve and maintain a balance between meeting the needs of its customers and protecting the environment. As part of conducting its mining operations in a safe and efficient manner, the company strongly endorses initiatives which protect and enhance environmental quality. These initiatives illustrate the company's proactive commitment towards carrying out mining operations in an environmentally responsible manner. CVRI will adopt the same environmental and operating practices championed at the existing mine to the Project area.

Details on the specific programs and procedures that reflect CVRI's commitments towards environmental protection within the Project area are identified and discussed in the following sections.

C.6.1 RESPONSIBLE MANAGEMENT

CVRI is committed to providing responsible management for its operations:

- mine development is carried out in a professional and environmentally responsible manner;
- impacts on the biophysical environment are mitigated;
- human health, well-being and safety of its employees are safeguarded; and
- all management level staff are familiar with the company's policies regarding operating practices and environmental protection and that employees under their supervision receive proper instruction with respect to policy and procedures through on-site job and safety, health and environmental training programs.

C.6.2 ENVIRONMENTAL PROTECTION MEASURES

CVRI will ensure that environmental factors and protection measures are taken into consideration during all phases, from planning to reclamation, of mine development. Technically proven and economically feasible measures will be taken which protect environmental quality for air, water, vegetation, wildlife and land resources.

CVRI undertakes as a priority "pollution prevention" in preference to "pollution cleanup".

Pollution prevention measures in place at CRVI include:

- reuse and recycling of products;
- substitution of products purchased with more "environmentally friendly" materials;
- equipment modifications and improved operating efficiencies; and
- conservation of materials and resources.

C.6.3 PARTICIPANT IN ENVIRONMENTAL AND REGULATORY INITIATIVES

CVRI is an active participant in many environmental and regulatory initiatives and will continue to be an active member of these programs during the operating life of the Project. Programs range from participation in regional programs such as the West Central Airshed Society (WCAS) and West Fraser's Forest Resources Advisory Group (FRAG), to provincial and national initiatives.

C.6.4 REGULATORY COMPLIANCE AND ADAPTIVE MANAGEMENT

CVRI is committed to ensuring that its operations comply with all relevant laws and regulations. This commitment is attained in many ways:

- key CVRI employees be keep informed of relevant laws, regulations and operating guidelines through training programs;
- continual review and updating of emergency preparedness procedures; and
- continual review and updating of operating procedures including responsible handling, use and disposal of products and materials.

Environmental and Occupational Health and Safety Inspectors routinely monitor CVRI's site operations and regulatory compliance. CVRI will continue carrying out its environmental and operating programs in the Project area using an adaptive management approach.

C.6.5 RESPECT THE INTERESTS OF THE PUBLIC

CVRI is committed to respect the interests of all interested publics in the Project development. CVRI believes that the information provided, and commitments made in this application demonstrate its recognition of public participation towards this Project. Please refer to Section G for details on the public consultation program.

C.6.6 ENVIRONMENTAL PROTECTION PROGRAM

The purpose of the Environmental Protection Program at the CVM is to first prevent and second to minimize adverse environmental impacts resulting from mine related operations. The program will be implemented in the Project area through the following on-site mechanisms:

- adaptive management approach to environmental risk assessment;
- Safety, Health and Environment Committee (SHE) comprised of key CVRI employees;
- emergency response and wildfire control and prevention;
- waste management program;
- spill response and clean up procedures;
- operating policy commitments; and
- site reclamation.

A brief discussion illustrating how environmental impacts are prevented and/or minimized through each of these mechanisms is provided in the following sections:

C.6.6.1 Adaptive Management to Environmental Risk Assessment

CVRI recognizes and performs three stages of environmental risk assessment. Throughout these stages of risk assessment, CVRI adapts operating practices to ensure that environmental impacts are eliminated or minimized. Government regulation and public involvement ensure successful implementation of environmental programs.

The first stage of adaptive management is carried out prior to mine development. At this stage, baseline environmental conditions are documented and potential environmental risks and impacts are assessed. Mine plans are developed to ensure that the risks and impacts are prevented or mitigated.

The second stage is carried out during mine operations. The potential risks and impacts that were identified prior to mine development are monitored to ensure that control and mitigation measures are effective or if adaptive measures are required. The purpose of monitoring is to determine if changes in the natural environment (*i.e.,* background conditions) have occurred after mining has commenced.

Potentially adverse environmental effects can be halted or mitigated prior to becoming a concern.

This is achieved by the following methods:

- continually updating relevant environmental baseline information throughout the life of the operation;
- determining whether the impacts and risks identified prior to development were correct, or whether all impacts and risks had been identified; and
- assessing whether existing mine plans and operations can be modified to further reduce environmental risk and impact.

The final stage is carried out following the completion of mine development. A post reclamation assessment is carried out to demonstrate that all environmental encumbrances and liabilities associated with mine development operations have been removed.

C.6.6.2 Safety, Health and Environment Committee

Part of CVRI's Environmental Protection Program is the Safety, Health and Environment (S.H.E.) Committee. The purpose of the S.H.E. Committee is to act as a site custodian to ensure that the operation regularly evaluates, and if necessary, mitigates or eliminates adverse impacts on the environment.

The S.H.E. Committee consists of senior personnel from each of the following functional areas: Materials Management, Maintenance, Engineering, Pit Operations, Plant Processing, Safety, and Environment. The S.H.E. Committee has various responsibilities that include:

- Initiating and recommending health, safety and environmental improvements to Site Management which mitigate adverse impacts as a result of mining operations or enhance baseline health, safety and environmental conditions.
- Developing materials and programs that communicate to the employees, government and public, CVRI's commitment, efforts and accomplishments in environmental management.

C.6.6.3 Emergency Response and Wildfire Control and Prevention

CVRI has an Emergency Response Plan in place for various emergency situations. As part of the Emergency Response Plan an Emergency Response Team (ERT) exists who are trained to assist in:

- fires
- extrication of trapped persons;
- care of injured persons;
- chemical spills; and
- other emergencies.

Detailed emergency response plans which are specifically designed for various sites at the CVM are present in areas such as the Plant, office complex, maintenance and light duty machine shops, fuelling stations and pit operations are in place. These specific plans rely on personnel training, leadership and communication amongst all involved parties.

CVRI also has a Wildfire Control and Prevention Plan which is updated annually for each wildfire season. This plan includes on-site fire prevention and control equipment, communication procedures as well as off-site communication with the public and firefighting authorities (ASRD) and cooperative efforts in regional fire prevention and control. Fire prevention, detection, reporting, and suppression measures are the basis of this plan. The FireSmart Wildfire Assessment System is also referred to by CVRI when developing new mining areas in further effort to decrease the chance of a wildfire caused by industrial activities.

C.6.6.4 Waste Management Program

Waste is defined as any unwanted non-recyclable solid or liquid material that is intended to be treated or disposed of. Waste also includes refuse and garbage (Section 2(1) (t) of the Activities Designation Regulation of AEPEA). As outlined in the Alberta User Guide for Waste Managers (AEP, 1994) the generator is responsible for classifying their waste and determining the proper disposal procedure for each waste product. CVRI is continuously investigating and evaluating waste disposal activities.

C.6.6.5 Spill Response and Clean Up Procedures

Materials and products currently used at CVM will also be utilized during development of the Project area. CVRI's team of environmental consultants has evaluated the various products to be used in the Project area and the potential risk of exposure to the general public and biota. Based on this review, three purchased products (diesel fuel, ammonium nitrate, and flocculants) and two mining by-products (coal dust/PM_{10} and suspended sediment) were identified and have been evaluated for impact assessment. The results of the evaluations concluded that the products used in the mining of the Project area would not impact the general public or biota. Their assessment evaluated current operating practices. Spill conditions were not assessed since the incidence of spills occurring at the CVM is low. A comprehensive spill response program is in place to prevent any adverse effects on the environment.

C.6.6.6 Spill Prevention and Detection Monitoring Procedures

All employees are accountable for ensuring that a high level of spill prevention is maintained by following good housekeeping and maintenance practices. For example, programs are in place which include product inventory monitoring, inspections of containment and transfer facilities and leak detection monitoring. Records of these practices are also kept. Facilities requiring repair are brought to the attention of the Maintenance Department for follow up action.

C.6.6.7 Spill Containment Responsibilities

In the event of a spill, the effectiveness of response operations are influenced by the time in which the spill is detected, controlled and contained. The initial spill response is designed to address the issues of paramount concern such as safety, environmental and property protection. After a spill is detected, the following actions are taken:

- ensure that the source(s) of the spill has been shut-off;
- determine the level of hazard to personnel, property and the environment. If necessary, the Senior Foreman is called for assistance. The Senior Foreman may elect to handle cleanup operations with departmental personnel. If it appears that the spill could result in

damage or harm to personnel, the environment or property, CVRI's Emergency Response Team will be called and respond for cleanup. If additional manpower and spill response expertise is required, it will be obtained through mutual aid support groups, spill cleanup contractors and/or consulting services;

- start spill containment, recovery and cleanup operations with equipment on hand; and
- initiate spill notification procedures.

C.6.6.8 Spill Clean Up Procedures

Initial cleanup operations focus on containing the spilled product to prevent further contamination. The spill is contained to the smallest manageable area possible, to channel flow to containment areas, and to keep the spill out of water courses.

The immediate area around a product spill will be secured and kept clear of nonessential personnel. Reference will be made to the product Material Safety Data Sheet for proper treatment and cleanup procedures. If practical and feasible, spilled material will be recovered and returned to a storage area for reuse or recycle. Spilled material which cannot be recovered will be picked up and stored for proper disposal. Procedures followed in the onsite disposal or short term storage of contaminated material will comply with regulatory requirements for disposal/storage.

C.6.6.9 Spill Training

Employees receive instruction through safety, health and environment training programs to ensure they understand spill notification and clean up procedures. In addition, each departmental Senior Foreman and all Emergency Response Team Members receive spill prevention training (supplemented by appropriate training manuals) and "hands on" field training sessions. CVRI has provided on site Spill Containment and Clean up workshops for all Emergency Response Teams within the organization.

C.6.6.10 Site Reclamation

Another key component in CVRI's Environmental Protection Program is the site reclamation program carried out following mine operations. Site reclamation activities for the Project area are discussed in detail in Section F of this application.

C.7 ENVIRONMENTAL RESEARCH

History of Innovation

CVRI has operated the CVM successfully for +35 years. Over that period many economic, technological and regulatory changes have evolved to which CVRI has had to react. Many innovations have been implemented in order to improve the operation and maintain an economically viable and environmentally responsible mining operation. Numerous safety, processing, mining, and environmental ideas have been researched and evaluated through on-site testing.

The following list provides a sample of the variety of ideas which CVRI has considered at the CVM operation:

- Mining
  - CVRI was one of the first coal operations to implement the utilization of large scale hydraulic backhoes to gain efficiency in mobility in the pits. The operation now uses a wide variety of hydraulic excavators including front shovel models.
  - Updating production equipment with larger scale units has been a constant over the mine life. Larger equipment, such as Cat 789 trucks, Cat 24 graders, Cat 993 loaders and D11 dozers have added efficiency and cost competitiveness.
  - A truck dispatch system has been implemented throughout the mine site. This involves GPS equipment trucks and excavators, a mine wide radio communication system and a computerized data management capability which tracks equipment utilization and permits computer dispatch of equipment.
  - CVRI has considered underground mining methods for the CVM area. A small underground test mine was operated to gain operating experience and observe mining conditions. The test program was short lived due to poor mining conditions.
  - Likewise, the company has experimented with or evaluated numerous other types, models and makes of mining equipment.

- Processing
  - CVRI was the first coal process plant in Canada to implement a 'filter press' for plant tailings management. The filter plant operated for several years but was eventually found to be too costly due to operating and maintenance costs. The operation reverted to use of a tailings pond.
  - CVRI tested the concept of 'injecting' tailings into old underground workings as a method of minimizing tailings pond size. This was not successful.
  - Implementation of a 'fines recovery' circuit has been evaluated numerous times to gauge the opportunity of recovering the very fine coal currently lost into the tailings. At one time flotation cells had been part of the process but have since been taken out of the plant. Spirals have been part of the circuit for many years. The recent Plant expansion (2005) has resulted in a full modernization of the plant process equipment. The original equipment has been replaced with larger and more effective equipment.

- Safety
  - As the operation has expanded in size the company has responded with additional fire, mine rescue and first aid equipment, facilities and training.
  - CVRI continues to expect and obtain outstanding records for safety.
  - Safe working procedures continue to be updated and enhanced.

- Management of Mine Waste Water
  - CVRI was an early industry leader in evaluating and implementing flocculation systems for waste water ponds.

- The use of ponds has increased over time as a primary control technique for runoff from disturbed mine areas. More pumps, pump lines, sumps and 'pump crew' have been added over time. A culture toward water control has been established.
- Hazardous waste containment and management has been improved throughout the site. A 'hazardous waste storage yard' has been established and is now well managed. Double walled 'enviro' tanks for fuel is now the norm. Spill response capacity and implementation is much improved.
- CVRI has evaluated and is now implementing utilization of 'floc logs' as a remedial technique in treating ditch water with heavy erosional sediment.

- Soil Salvage
  - CVRI was involved in some of the early research into evaluating soil salvage depth required for suitable reclamation. Various test plots were established to evaluate soil and overburden interaction.
  - CVRI received the first reclamation certificate for reclaimed mine lands.

- Vegetation
  - CVRI was an early pioneer in developing appropriate seed mixes for the foothills application. The initial focus was on establishment of a vegetated surface to control erosion. CVRI found a species mix that provided quickly growing cover which would subsequently yield to other species for wildlife forage.
  - CVRI has used a variety of seed mixes over time leading to the current seed mix variations. Monitoring of old and new seeding applications continue.
  - CVRI has established a local tree seedling supply chain. Cone harvesting is accomplished from the mine area. A commercial nursery grows and supplies the required seedlings. Tree planting crews used by the local forestry company are contracted to plant the seedlings. CVRI has determined the optimum time window for planting through monitoring of past plantings.
- Aquatic Environment
  - CVRI has successfully diverted local creeks, constructed lake outfall structures, reclaimed 'end pit lakes', developed small scale wetlands on reclaimed landscape and reconstructed creek channels.
  - A 'stocking program' within 'end pit lakes' has been accomplished in conjunction with SRD with great success.

- Other
  - CVRI has field tested various 'dust suppression' agents focused on reducing haul road dust. Results have not been as successful as the current suppression method (water). CVRI continues to use water application for road dust control.

Research and Reclamation Monitoring

CVRI has long been active in ongoing environmental research and monitoring of reclamation. The topics which CVRI has invested in have been focused on the Upper Foothills area with

priority to environmental management and reclamation techniques. Some of the work which CVRI has partnered in is listed:

- Characteristics and Quality of Minesoil Profiles and Minesoil Landscapes at the Coal Valley Mine, March 1999.
- Vegetation Survey of Reclaimed Lands within the Luscar Sterco Coal Valley Mine, June 1998.
- Water Quality of Two End Pit Lakes in Relation to Fishery Sustainability.
- Nitrate in Surface Runoff from Coal Mines in the Coal Brach: A Review of Existing Information, March 1999.
- Characterization and Reclamation of Coal Tailings Materials, September 1997.

Recent Research & Results Monitoring

CVRI has undertaken a variety of studies and audits for determining innovation implementation or adaptation. Some of the more recent studies conducted to date include:

- CVRI has sponsored a series of monitoring program related to 'end pit lakes'. An early report was "*An Evaluation of Existing End Pit Lakes*", February 2008. The most recent covered was "*Evaluation of Water Quality in Existing End-Pit Lakes in the Coal Valley Mine Area*", Hatfield. Further monitoring and design evaluation work regarding 'end pit lakes' is planned.
    - As reclamation focus on 'wetlands' has recently increased CVRI sponsored a field reconnaissance of wetlands already in place on reclaimed landscape throughout the minesite: "Evaluation of Reclaimed Wetland and Riparian Resources in the Coal Valley Mine, January 2008", Hatfield. Further field trails and evaluation work regarding 'wetland development' is planned.
    - CVRI has participated with academic institutions in sponsoring research work in areas of reclamation. For example "Vegetation Development on Reclaimed Lands" was a thesis topic which evaluated a wide variety of reclaimed sites at the mine. Further evaluation of various aspects of vegetation for reclamation is planned.
    - A new initiative by the company is focusing on establishment of native plants on reclaimed profiles. An early program has started to consider transplanting huckleberry into reforested lands. A report was produced to evaluate early results: "*Huckleberry Transplantation Trials*", Navus. An expansion of this program is planned.
    - As part of the reclamation of Pit 122 CVRI is re-establishing flow of Embarras River through an end pit lake. A 'fish barrier' has been constructed downstream of the lake. The DFO compensation program associated with the lake includes ongoing monitoring of the lake and fisheries. The program has just recently started as the river has been rerouted.

Affiliations with Local Initiatives

CVRI has established and maintained active participation in various local and provincial forums and technical associations related to mining, reclamation and environmental management. Such organizations include:

- *Foothills Recreation Management Association*

  Local resource companies have joined West Fraser to maintain and operate a number of regional campsites and recreation areas. CVRI has most recently assisted funding of campsite improvements at Fairfax Lake. The company participates in the organization and provides an annual contribution for the operating budget.

- *Forest Resources Advisory Group*

  CVRI participates in the local FRAG associated with West Fraser as a Coal Association representative.

- *West Central Airshed Society*

  CVRI participates in WCAS as an industrial member.

- *Yellowhead Synergy Group*

  CVRI participates in the local Synergy group which brings a wide variety of resource company representatives together to monitor regional issues.

- *Foothills Research Institute*

  CVRI is a member of the Grizzly Bear Program and the Stream Crossing Program operating out of the FRI offices in Hinton.

- *End Pit Lake Committee*

  CVRI is a founding member and active participant in the joint industry and Government working group established to build the draft end pit lake development guideline.

- *Alberta Selenium Working Group Committee*

  An Alberta Selenium Working Group (SWG) was established in October 1999 to produce an adaptive framework and approach for the evaluation and management of Se at the mountain mines. Membership of the SWG includes representatives from provincial and federal governments and from the coal industry. CVRI has been an active, participating member of the SWG since its inception.

  A technical workshop on Selenium (Se) was held in Hinton, Alberta in September 2000. A goal of the workshop was to propose and develop a Work Plan to address data and knowledge gaps. Based on the workshop and subsequent discussions between governmental agencies and industry, biological sampling, off-mine site water quality sampling, on-site water quality monitoring, and investigations of potential sources of Se were undertaken to address components of the Work Plan with review and direction from the SWG

- *Canadian Land Reclamation Association (CLRA)*

  CVRI is a long standing member within the CLRA. The CLRA is a non-profit organization incorporated in Canada with corresponding members throughout North America and other countries. The main objectives of CLRA are:

- to further knowledge and encourage investigation of problems and solutions in land reclamation;
- to provide opportunities for those interested in and concerned with land reclamation to meet and exchange information, ideas and experience;
- to incorporate the advances from research and practical experience into land reclamation planning and practice;
- to collect information relating to land reclamation and publish periodicals, books and leaflets which the Association may think desirable;
- to encourage education in the field of land reclamation; and
- to provide awards for noteworthy achievements in the field of land reclamation.

- *Coal Association of Canada*

  CVRI is a long standing, active member of the Coal Association of Canada. Headquartered in Calgary, Alberta, The Coal Association of Canada represents companies engaged in the exploration, development, use and transportation of coal. Its members include major coal producers and coal-using utilities, the railroads and ports that ship coal, industry suppliers of goods and services, and municipalities that have an interest in furthering the objectives of the Coal Association.

- *Mine Financial Security Program (MFSP) Committee*

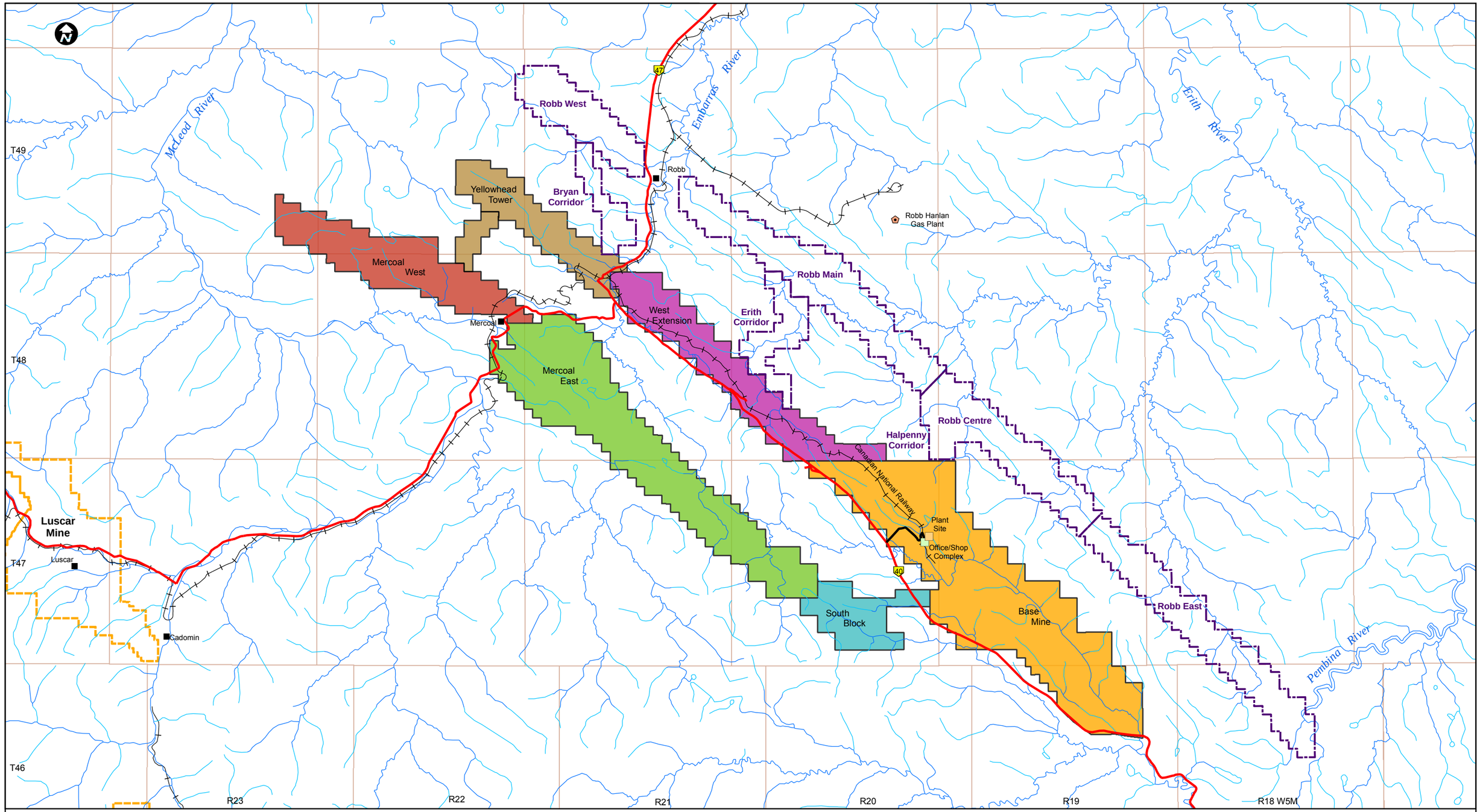
  CVRI has worked with the Alberta Government MFSP Committee and predecessor initiatives to assist in the development of an updated program for the determination of appropriate financial reclamation liability and the mechanisms for providing sufficient security of that liability.

- *Alberta Chamber of Resources (ACR)*

  CVRI is a long standing and active member of the ACR and is a featured corporation of 2012. ACR's overarching vision is "Orderly and Responsible Development", which embodies the principles of prosperity and quality of life for present plus future generations of Albertans and Canadians. ACR and its Members envision a future, a few decades hence, in which Albertans enjoy a high quality of life, sustainable environment, economic prosperity and pride in a heritage of responsible development of our rich endowment of natural resources. Facets of this future can be envisioned as:

  - Alberta has a positive global reputation for sustainable development of both renewable and non-renewable resources, earned through consistently effective and efficient regulation, responsible corporate leadership and results-driven innovation.
  - Our natural landscape, clean water and fresh air are enjoyed by Albertans and visitors, and will be for generations to come.
  - The resource sectors are recognized for our leadership in striking a positive balance between the social/economic benefits and the impacts of resource development. The balance point is well understood, resulting from an evolving consensus between industry, government and society.
  - Albertans, particularly resource workers, are proud of our contribution to the sustainable quality of life in Alberta and Canada.

- Powered by responsible development of our natural resources, the Alberta economy continues to generate career opportunities and stable employment, plus wealth at personal, corporate and government levels.
- Exports of natural resources include a high proportion of added value through refining, processing or bundling with made-in-Alberta technologies.
- Alberta has a distinctive innovation culture, powered by highly skilled people within learning companies.
- Exploration, discovery and development continue to energize and renew the Alberta resource sectors.



Legend

Existing Mine Permit Boundary

- Base Mine
- Mercoal East
- Mercoal West
- South Block
- West Extension
- Yellowhead Tower

- Proposed Robb Trend Mine Permit Boundary
- Other Mines
- Main Access Road

0 1.5 3 6

Kilometres

PROJECT:

Coal Valley Mine
Robb Trend Project

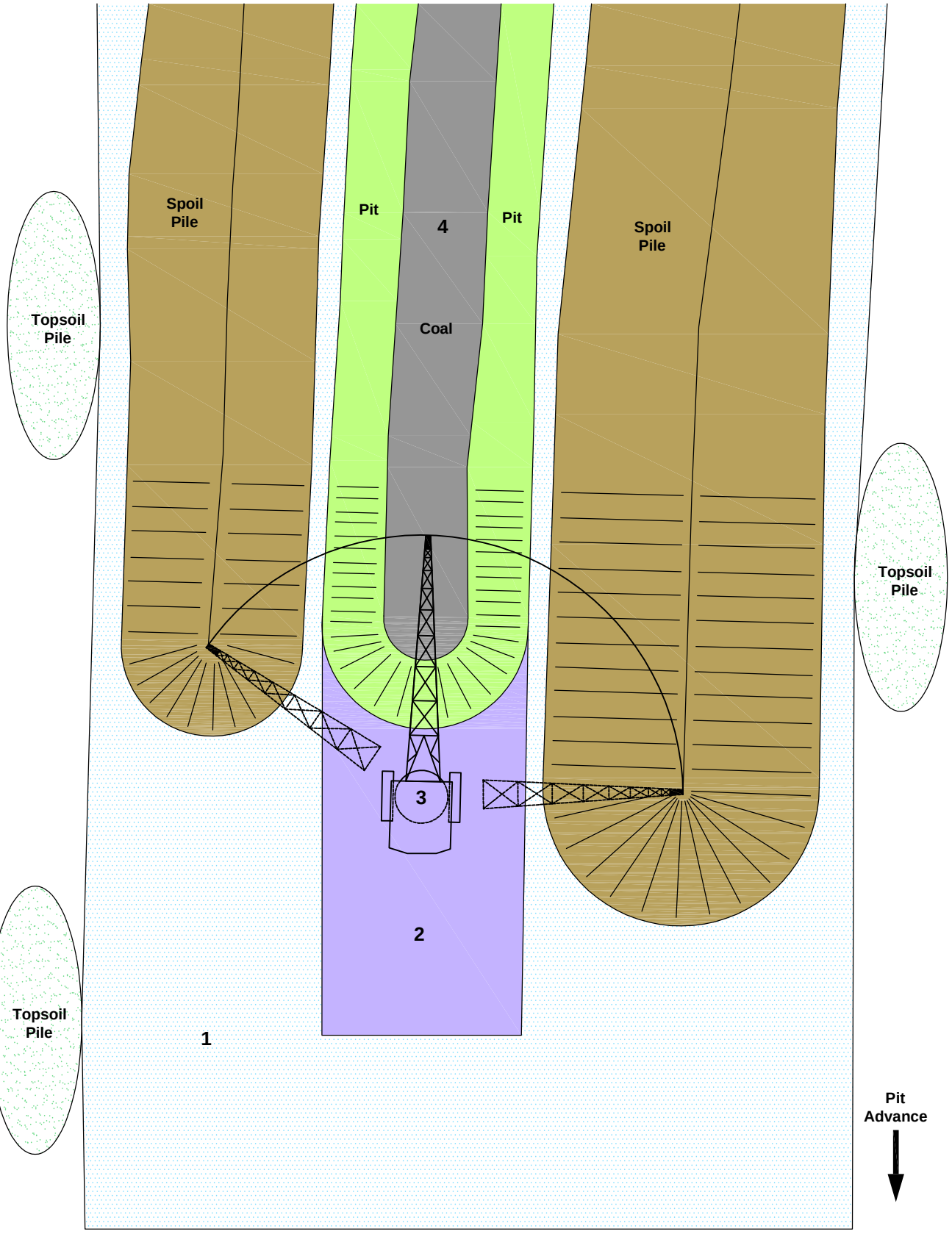
TITLE:

Existing Mine Development

DRAWN: PS/JG
CHECKED: KY
DATE: Mar 9/12
PROJECT: 08-041

FIGURE:

C.1-1



1. Trees are cleared and soil salvaged.
2. Dozer prepares the dragline pad.
3. Dragline excavates pit to expose coal. Overburden is placed in spoil piles on either side of the pit.
4. Backhoe loads coal onto trucks for haul to processing plant.

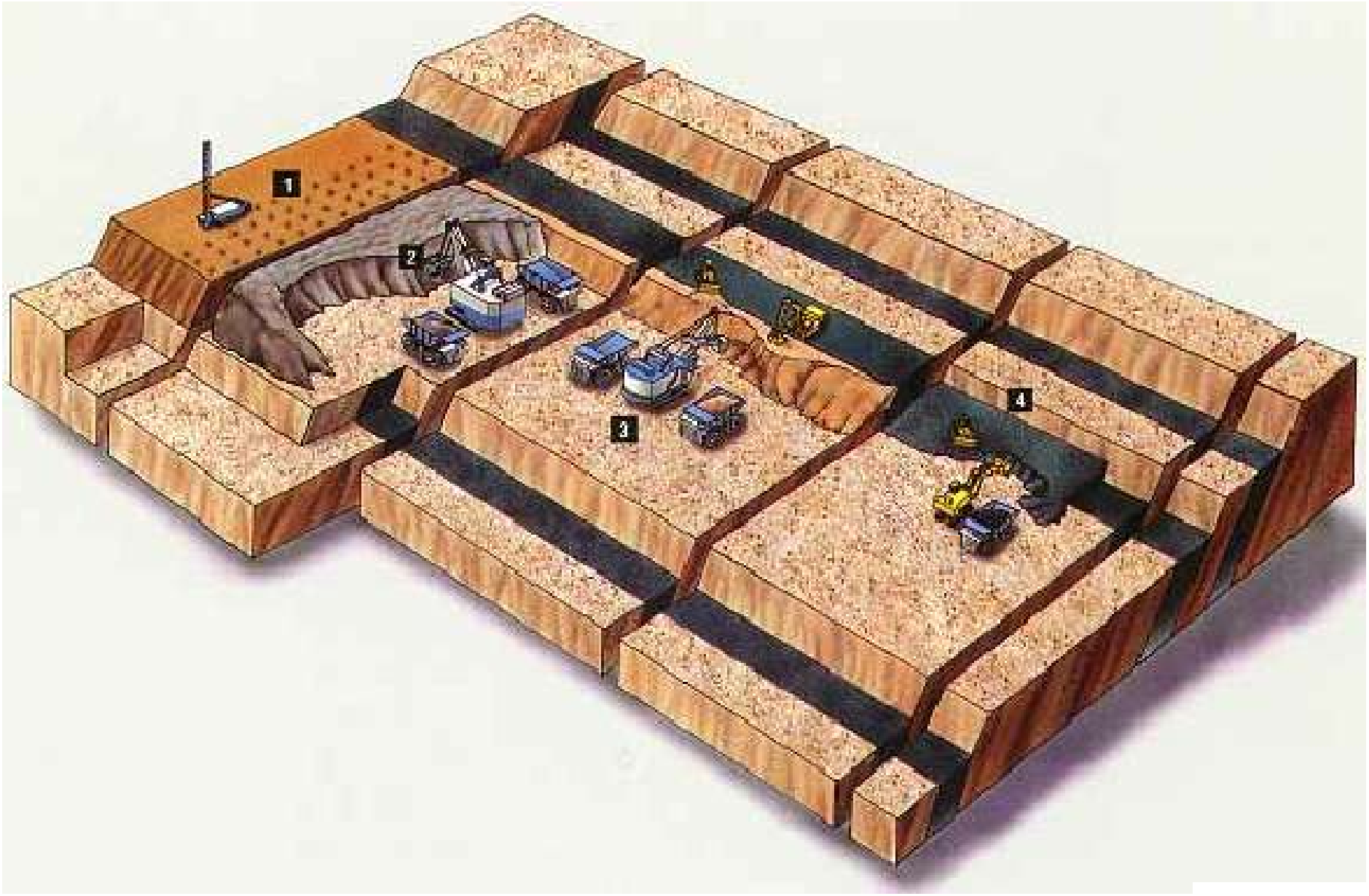
REF: CVRI, 2012.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Typical Dragline Mining Method

DRAWN:	JG
CHECKED:	KY
DATE:	Mar 25/12
PROJECT:	08-041

FIGURE:
C.1-2



1. Once trees and soil are salvaged, drilling and blasting takes place.
2. An excavator loads overburden rock into trucks which then haul the overburden to spoil piles outside the pit or to mined out pits.
3. An excavator and dozer work on uncovering the coal seam. Waste overburden is loaded onto trucks and hauled to external dumps.
4. An excavator loads coal into haul trucks for transport to the processing plant.

REF: CVRI, 2012.

PROJECT:
Coal Valley Mine
Robb Trend Project

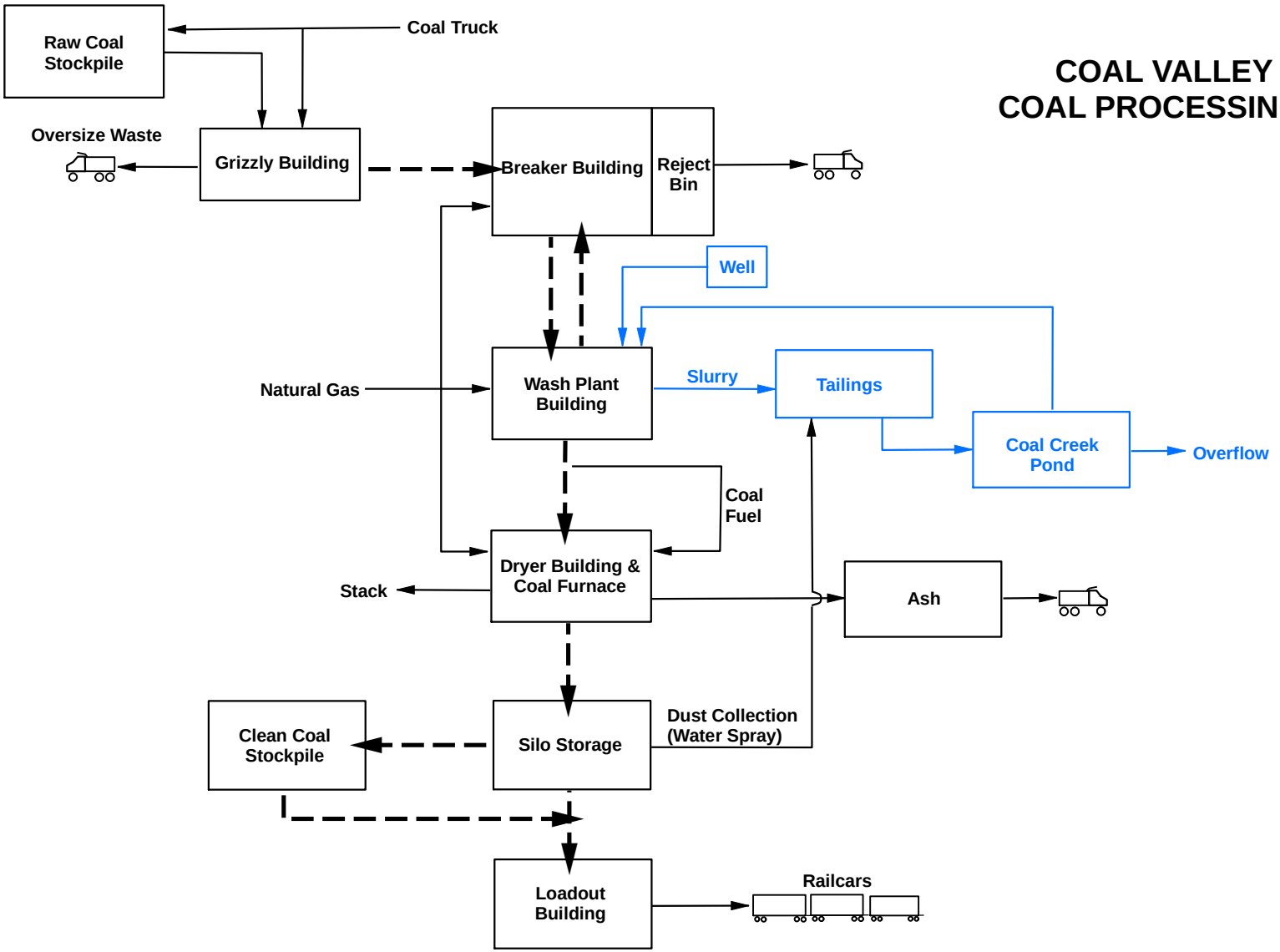
TITLE:
Typical Truck/Shovel Mining Method

FILE: ...Final Docs/Application/Typical_Mining.dwg

DRAWN:	JG
CHECKED:	KY
DATE:	Mar 29/12
PROJECT:	08-041

FIGURE:
C.1-3

COAL VALLEY MINE
COAL PROCESSING PLANT



REF: CVRI, 2010

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Simplified Coal Handling Diagram

DRAWN:	PS/JG
CHECKED:	KY
DATE:	Mar 25/12
PROJECT:	08-041

FIGURE: **C.1-4**

Legend

Highway

Railway

0 0.25 0.5 1

Kilometres

PROJECT:

Coal Valley Mine
Robb Trend Project

TITLE:

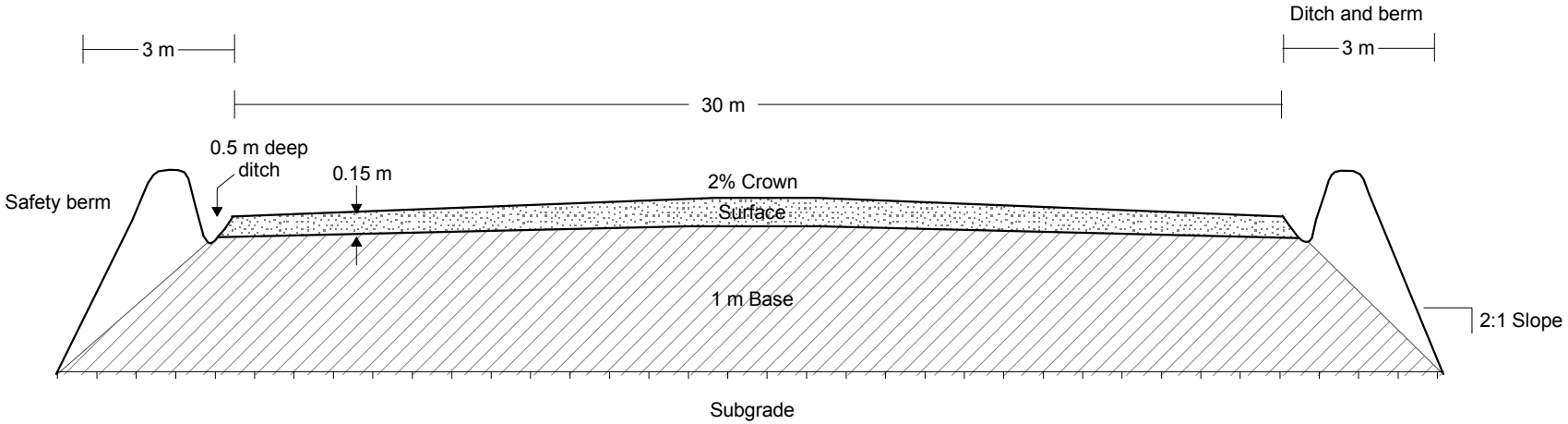
Coal Processing Facilities

DRAWN:	PS/JG
CHECKED:	KY
DATE:	Mar 25/12
PROJECT:	08-041

FIGURE:

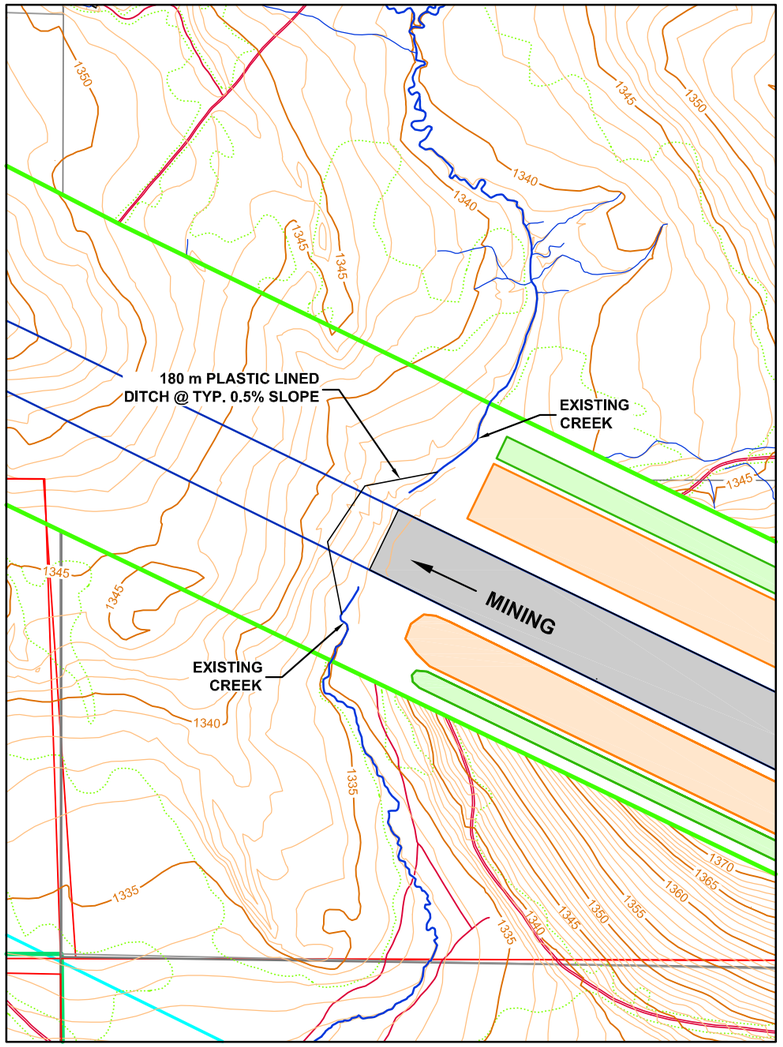
C.1-5

REF: Orthophoto Date: 2010.



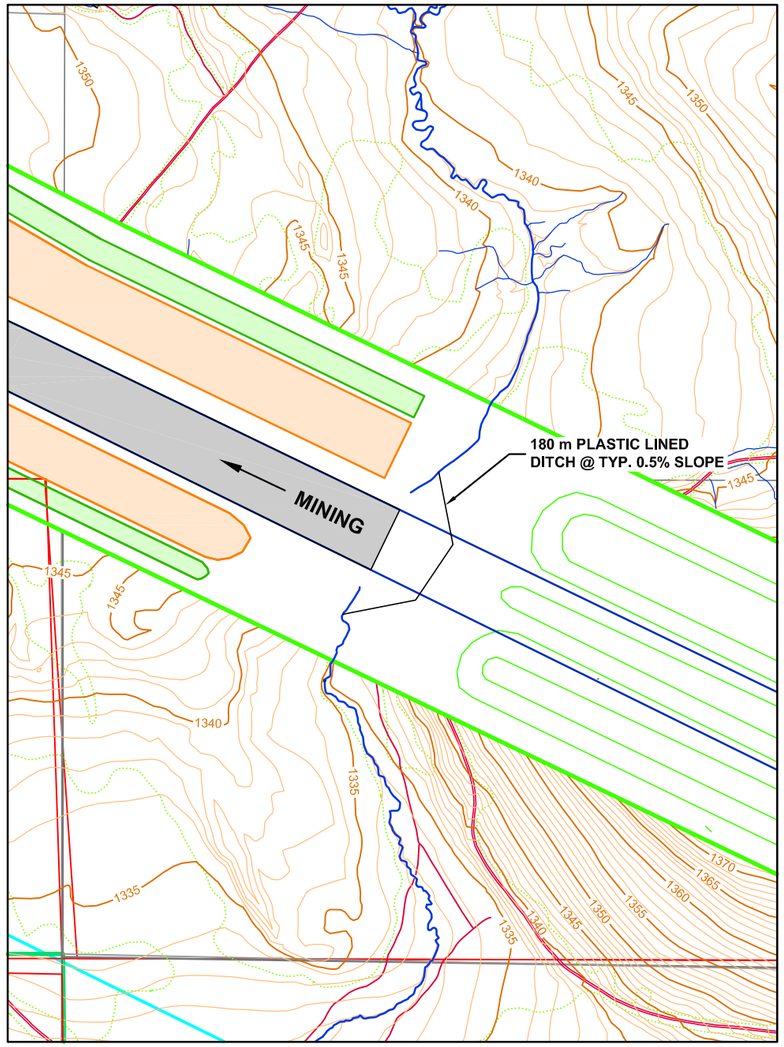
NOT TO SCALE

	PROJECT: **Coal Valley Mine Robb Trend Project**	cvri
	TITLE: **Typical Haulroad Profile**	DRAWN: SL/JG CHECKED: KY DATE: Mar 25/12 PROJECT: 08-041
		FIGURE: **C.1-6**



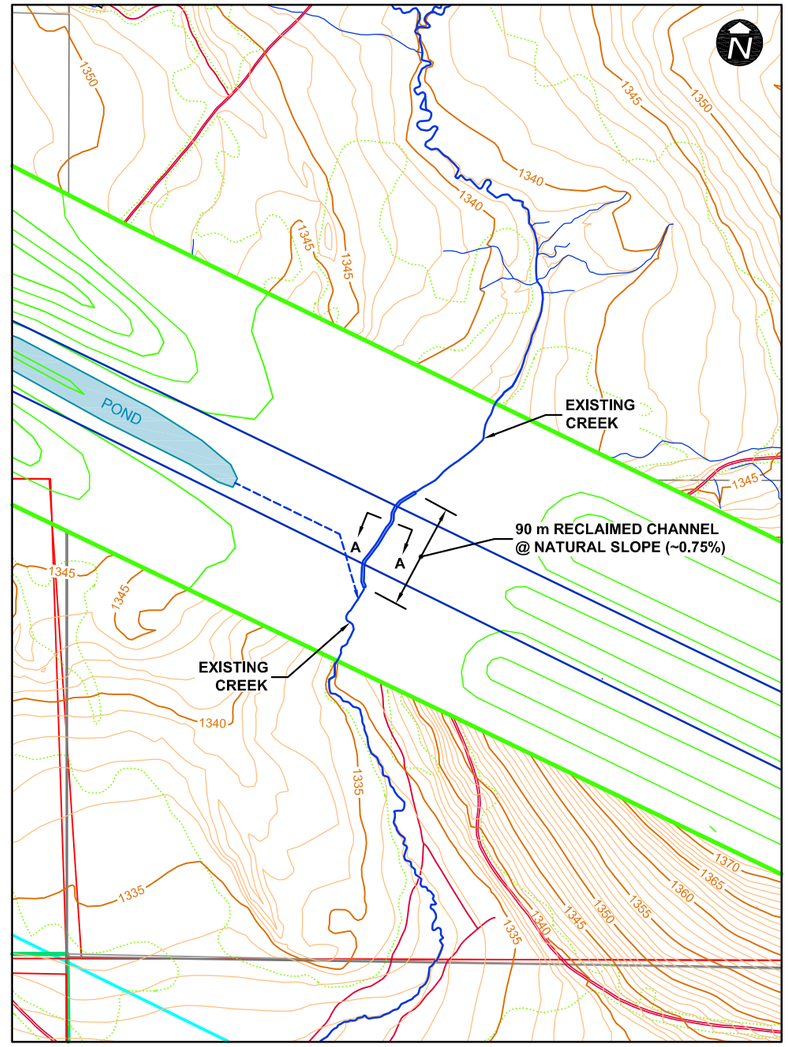
STAGE 1 DIVERSION

Scale 1 : 5000



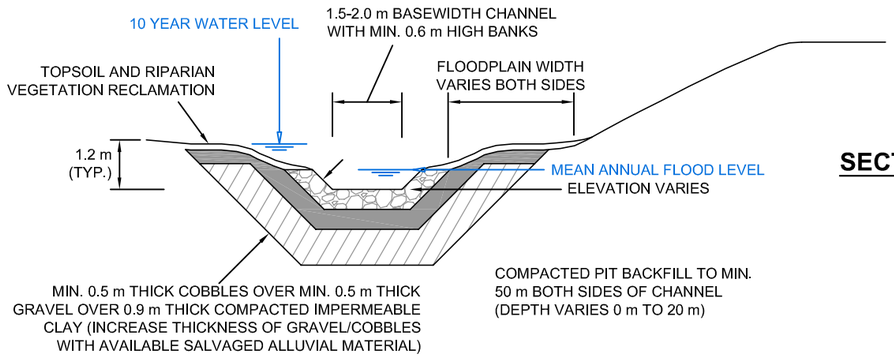
STAGE 2 DIVERSION

Scale 1 : 5000



STAGE 3 RECLAMATION

Scale 1 : 5000



SECTION A-A

LEGEND

- Dragline and Backhoe Pits
- Spoilpiles
- Topsoil Stockpiles

Source: From Matrix 2008.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Typical Watercourse Diversion Plan

FILE: ...Final Docs\Application\Diversion Plan.dwg

DRAWN:	Matrix/JG
CHECKED:	KY
DATE:	Mar 27/12
PROJECT:	08-041

FIGURE: **C.1-7**

Robb West
Robb Main
Robb Center
Robb East
Bryan Corridor
Erith Corridor
Halpenny Corridor
Robb
Sterco
Lovettville
Fig C.2-3
Fig C.2-4
Fig C.2-5
Fig C.2-6
Fig C.2-7
Fig C.2-8
Fig C.2-9
Fig C.2-10
Fig C.2-11
Fig C.2-12
Fig C.2-13
Fig C.2-14
Fig C.2-15
Twp 50
Twp 49
Twp 48
Twp 47
Twp 46
Rge 21
Rge 20
Rge 19
Rge 18
18,000 N
16,000 N
14,000 N
12,000 N
10,000 N
Halpenny Creek
Lendrum Creek
Erith River
Lovett River
Fairfax Lake
White Creek
Main Creek

Legend

- Proposed Robb Trend Mine Permit Boundary
- Proposed Footprint
- Existing Mine Permit Boundary
- Cross-section Location
- Pit
- Overburden Dump
- Soil Pile
- Haul Road
- Pond
- Pond Access
- Permanent Watercourse
- Intermittent Watercourse
- Ephemeral Watercourse
- Waterbody

0 0.75 1.5 3
Kilometres

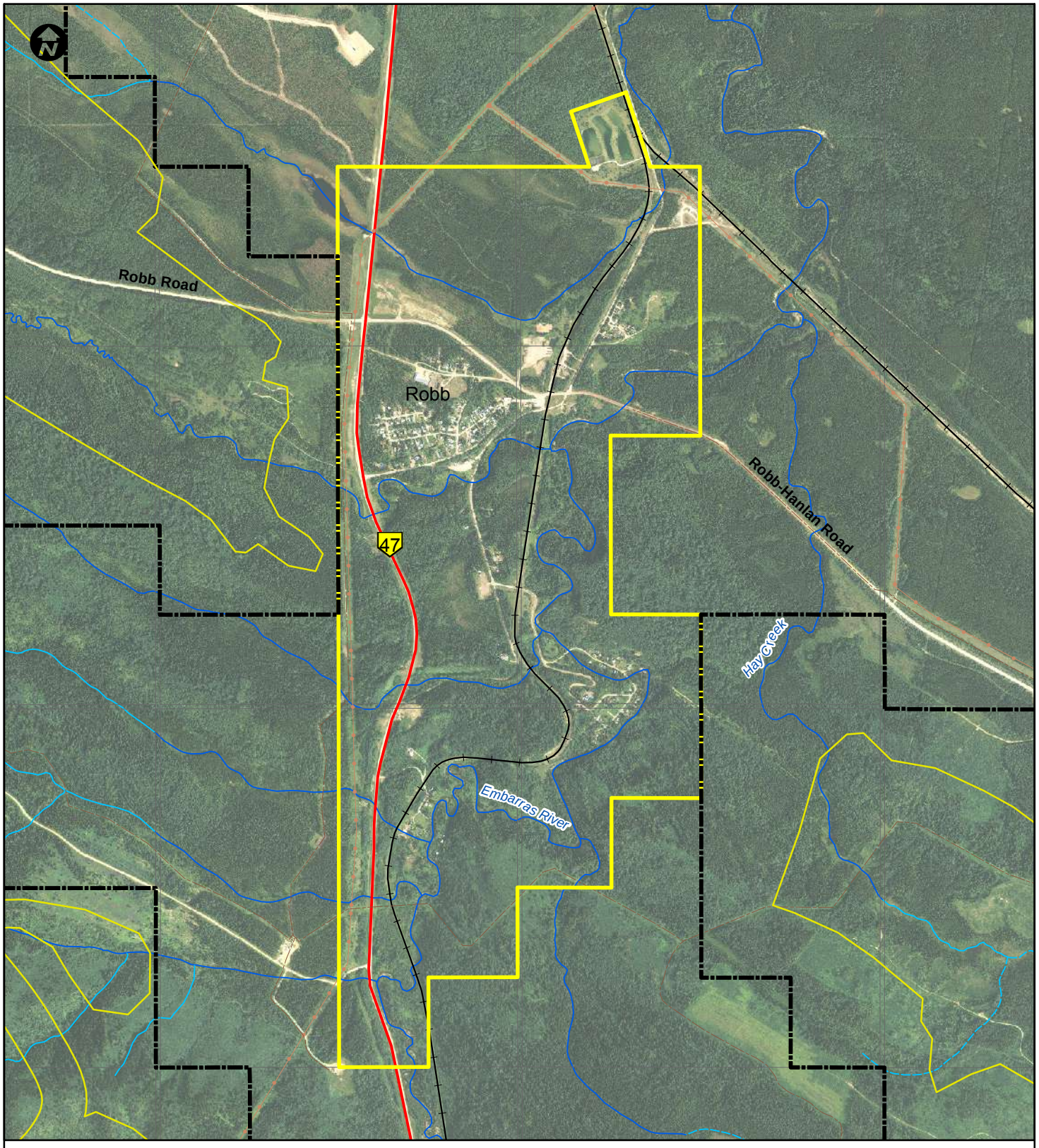
REF: CVRI, Robb Trend Project Extents 2B.dwg, Feb 7, 2011.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Development Plan

DRAWN: PS/JG
CHECKED: KY
DATE: Mar 29/12
PROJECT: 08-041

FIGURE:
C.2-1



Legend

- Proposed Mine Permit Boundary
- Proposed Footprint
- Robb Townsite Boundary
- Highway
- Powerline
- Railway

0 125 250 500 750
Metres

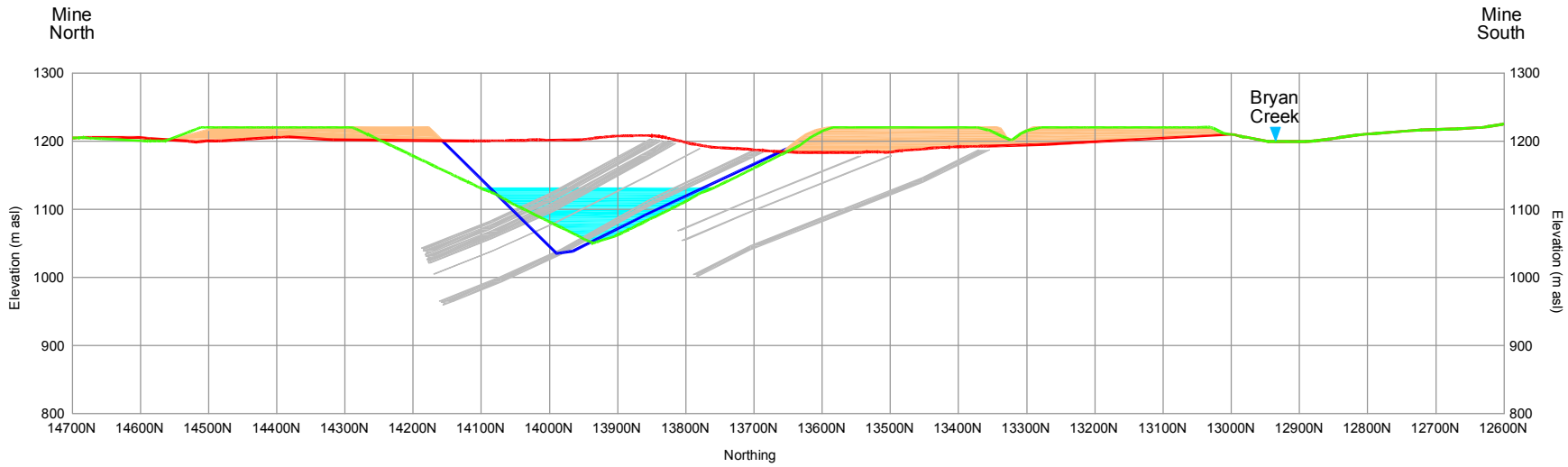
REF: Date of Orthophoto: 2010

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Mining in the Vicinity of the Community of Robb

DRAWN:	PS/JG
CHECKED:	KY
DATE:	Mar 25/12
PROJECT:	08-041

FIGURE:
C.2-2



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

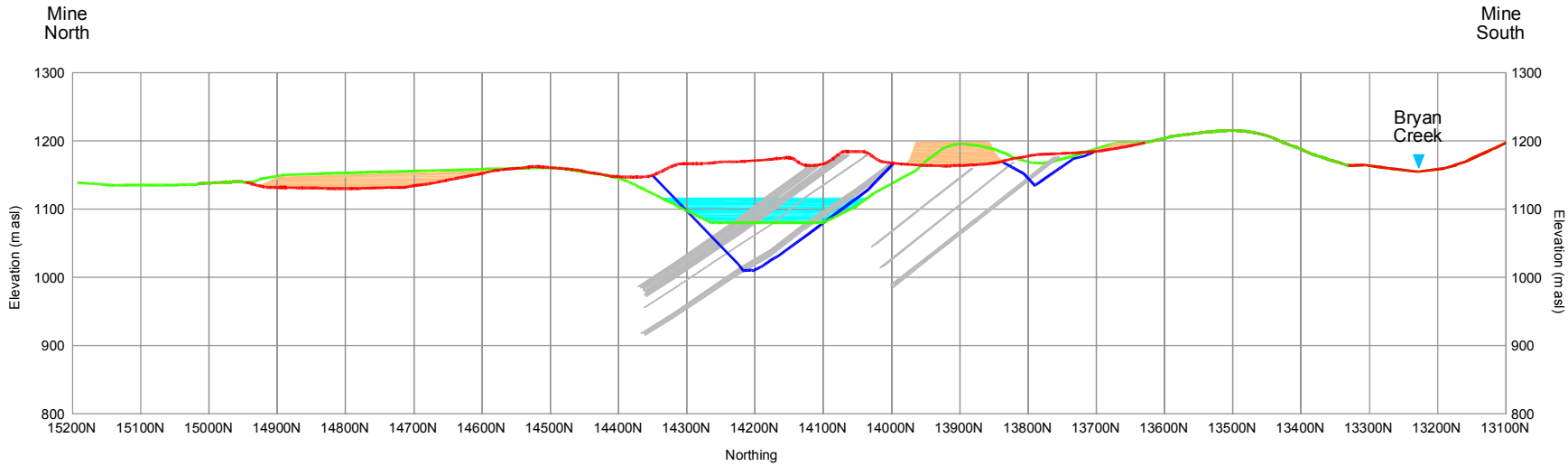
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Development and Reclamation Section -2,800E During Stage 9

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-3**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

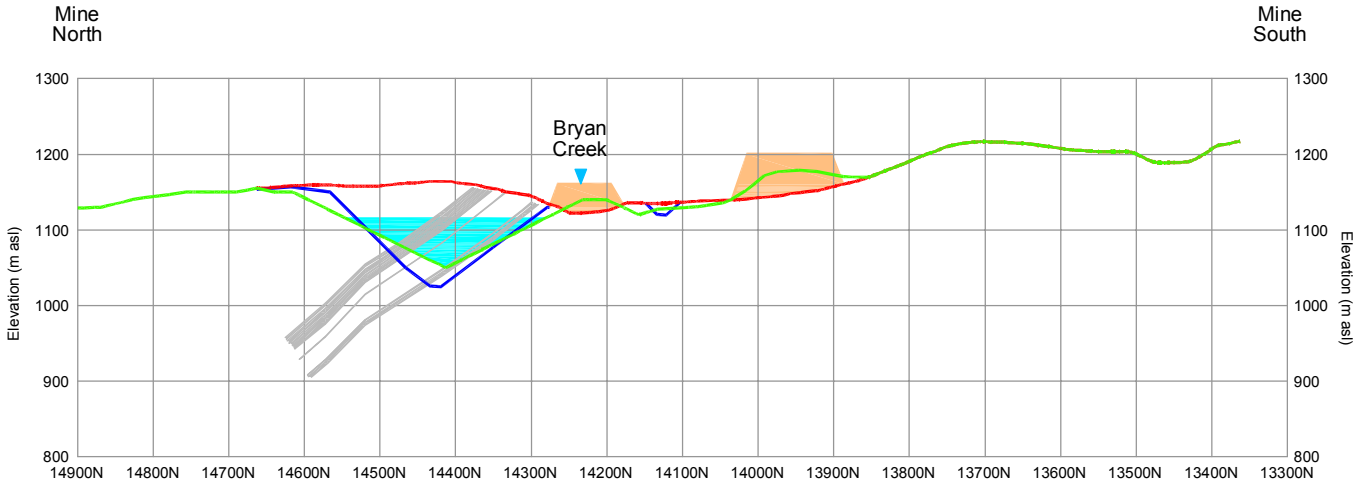
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Development and Reclamation Section -100E During Stage 7

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-4**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

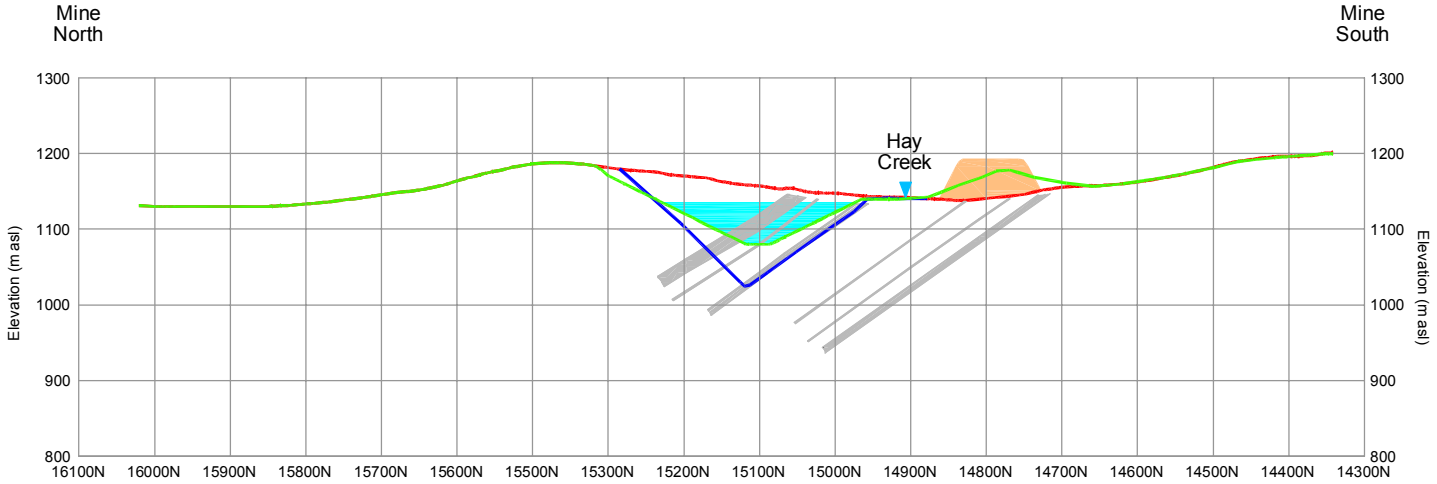
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Development and Reclamation Section 1,900E During Stage 9

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-5**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

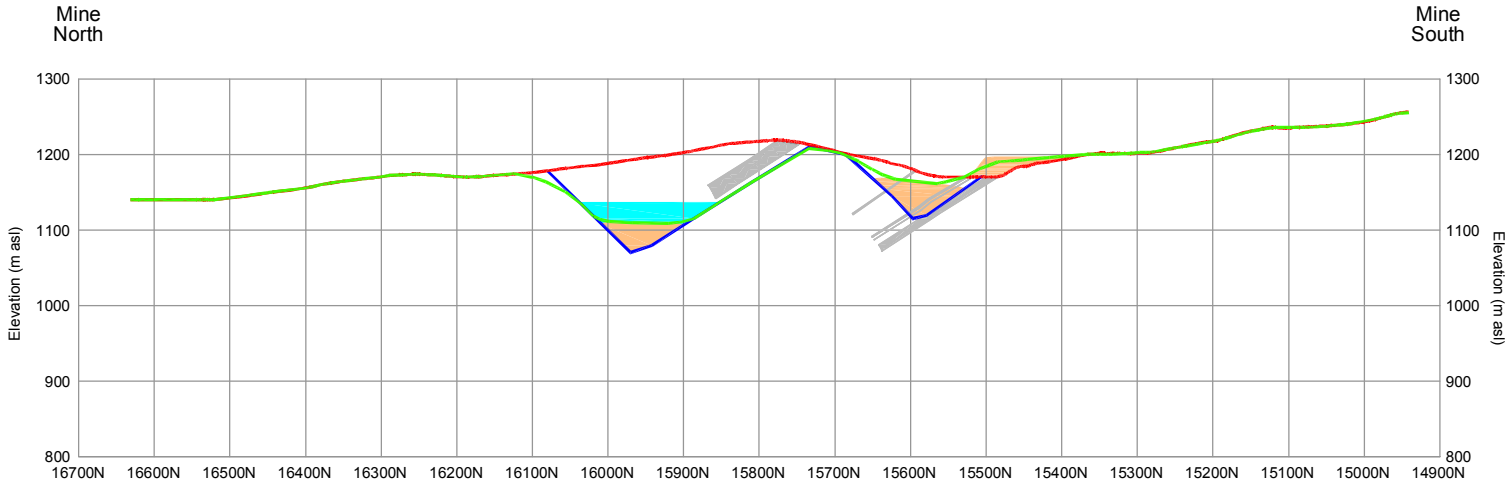
TITLE:

Development and Reclamation
Section 6,000E During Stage 9

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-6**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

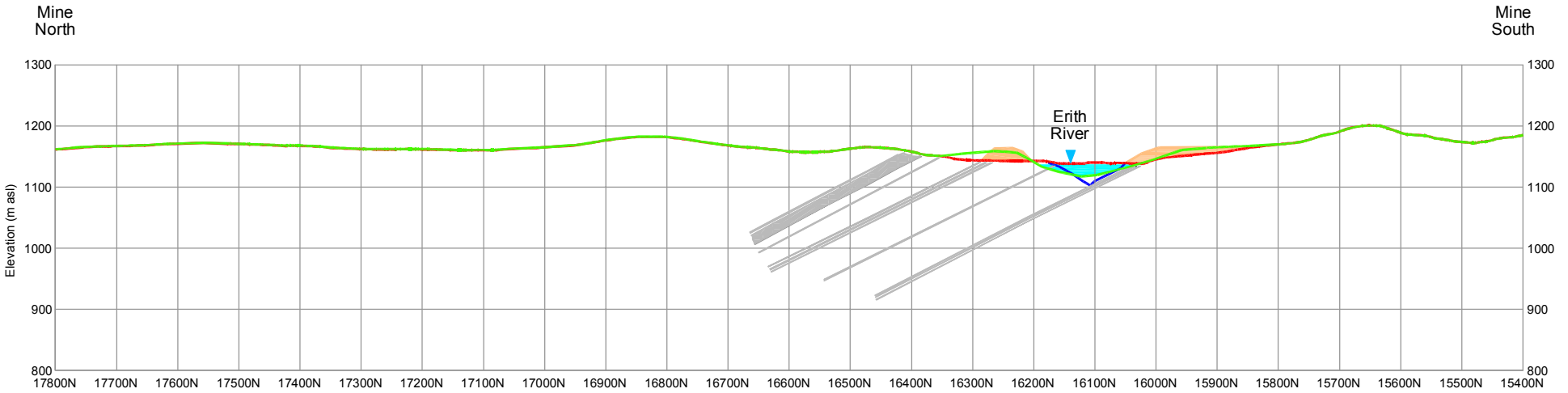
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Development and Reclamation
Section 9,500E During Stage 6

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-7**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

TITLE:

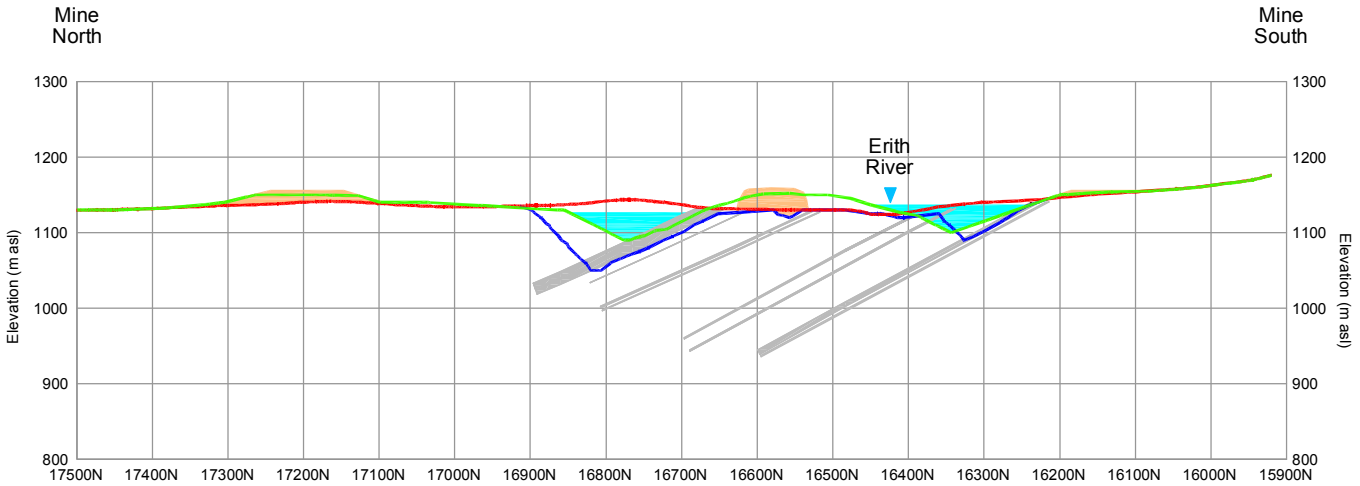
Development and Reclamation
Section 13,360E During Stage 3

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE:

C.2-8



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

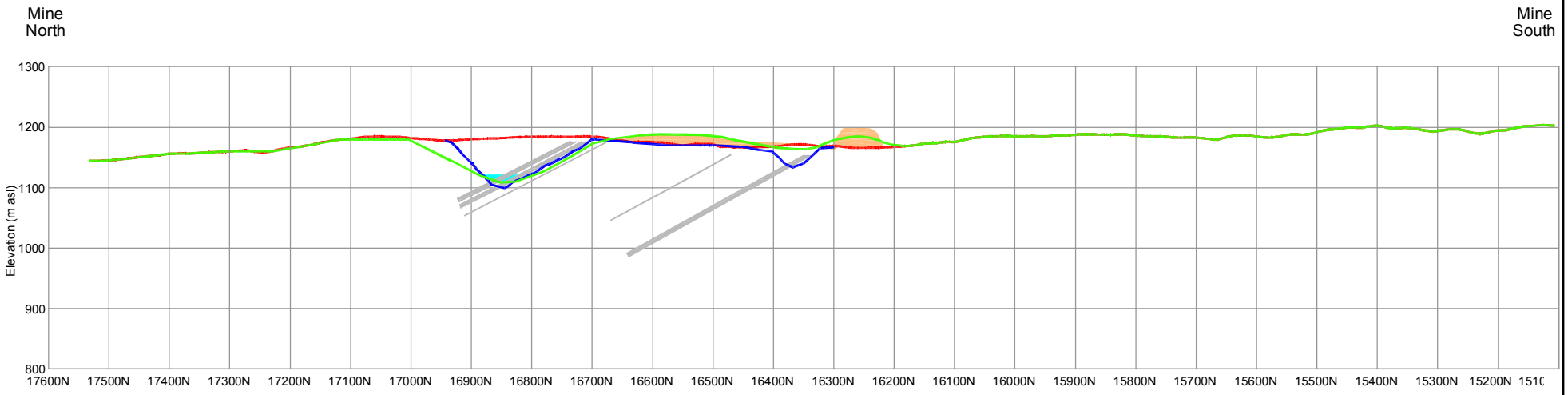
TITLE:

Development and Reclamation
Section 15,900E During Stage 5

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-9**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

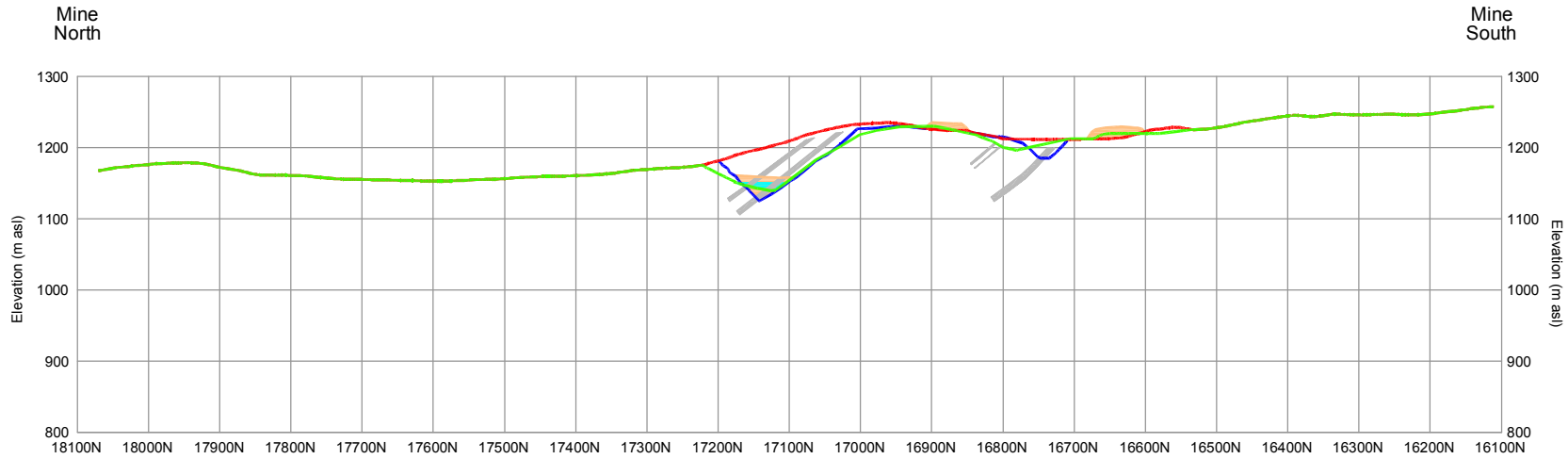
TITLE:

Development and Reclamation
Section 20,500E During Stage 5

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-10**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

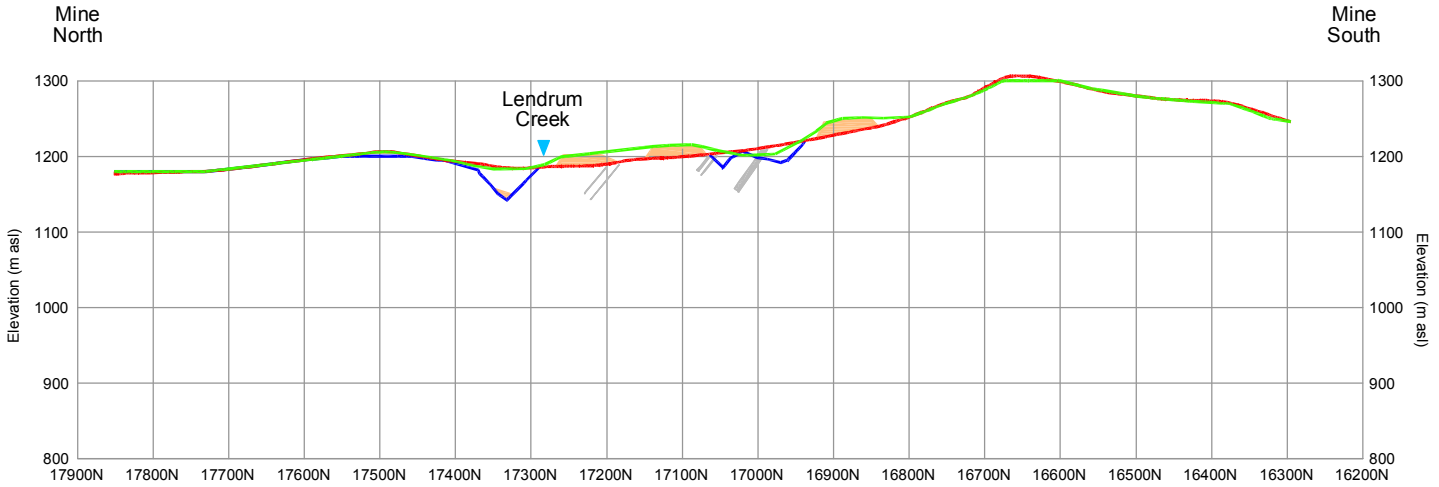
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Development and Reclamation
Section 26,000E During Stage 5

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 3/12
PROJECT:	08-041

FIGURE: **C.2-11**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

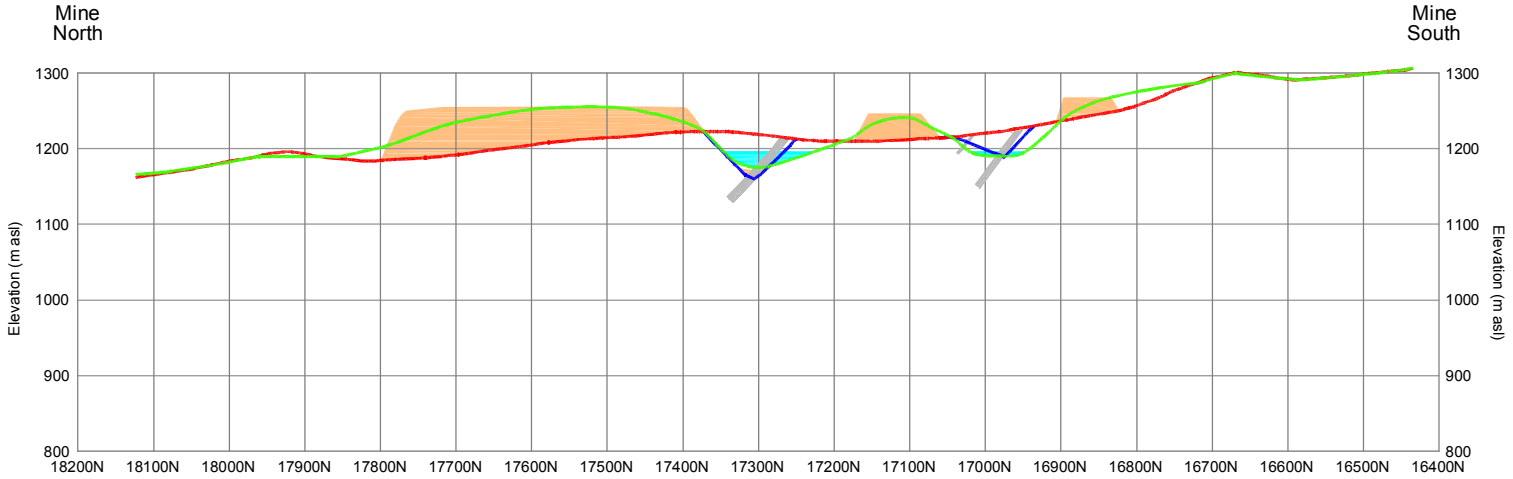
TITLE:

Development and Reclamation
Section 30,400E During Stage 5

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-12**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

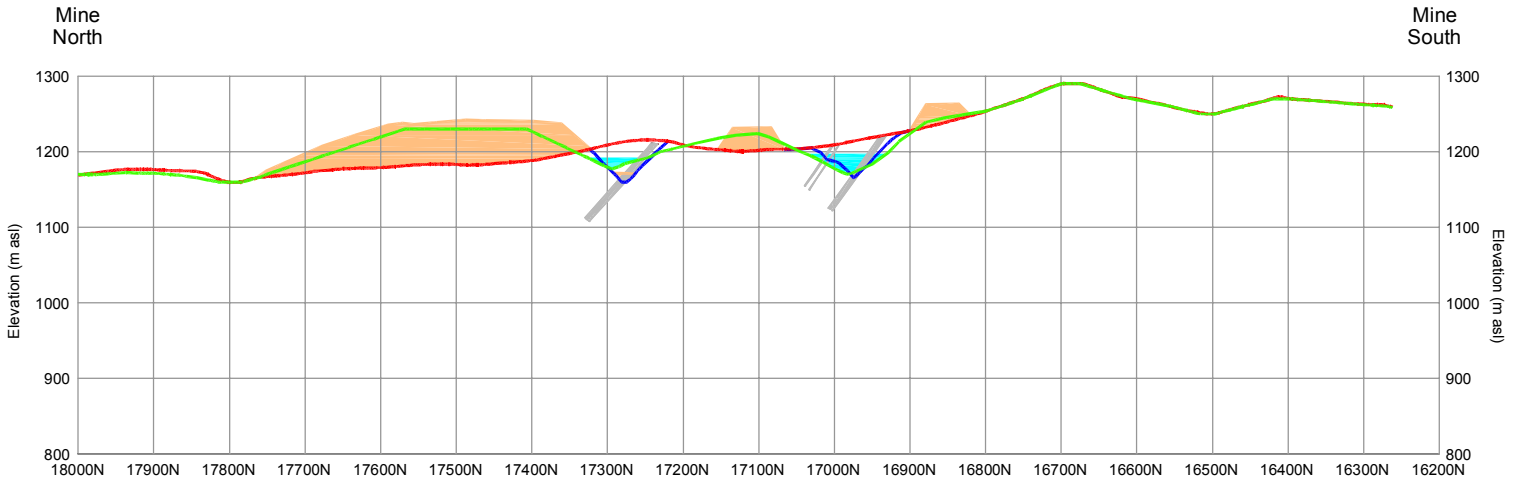
TITLE:

Development and Reclamation
Section 33,000E During Stage 7

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-13**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

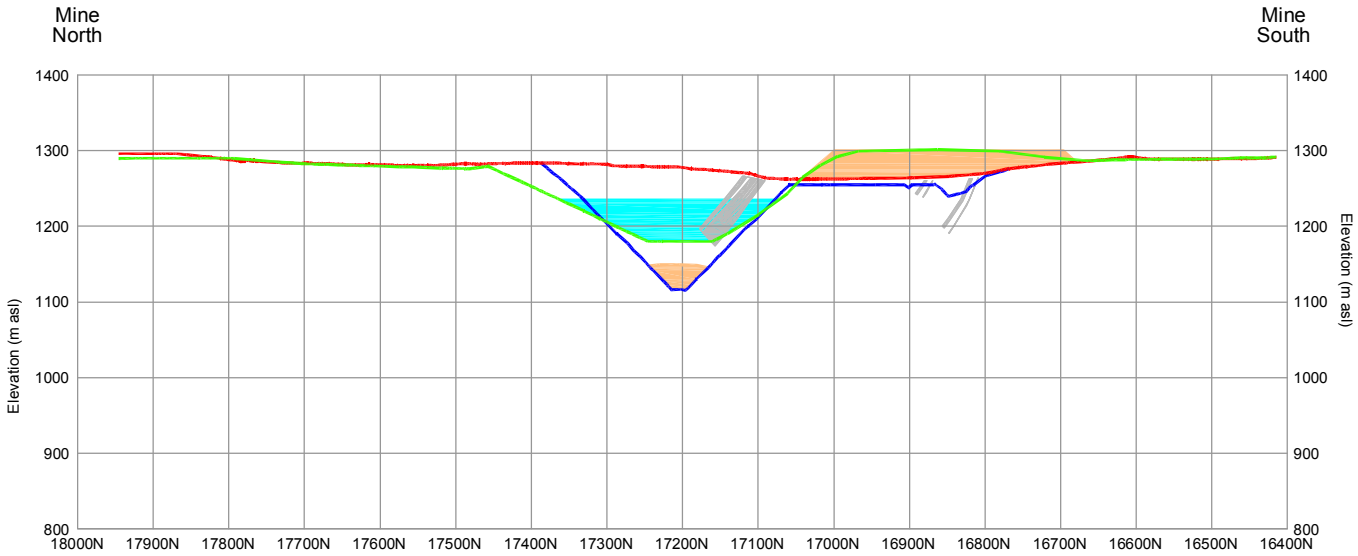
TITLE:

Development and Reclamation
Section 33,860E During Stage 7

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE: **C.2-14**



Legend

- Original Topography
- Reclaimed Topography
- Pit Limits
- Overburden Pile
- Water Level
- Coal Seam

0 100 200 400m

Scale 1 : 10 000

PROJECT:

Coal Valley Mine
Robb Trend Project

TITLE:

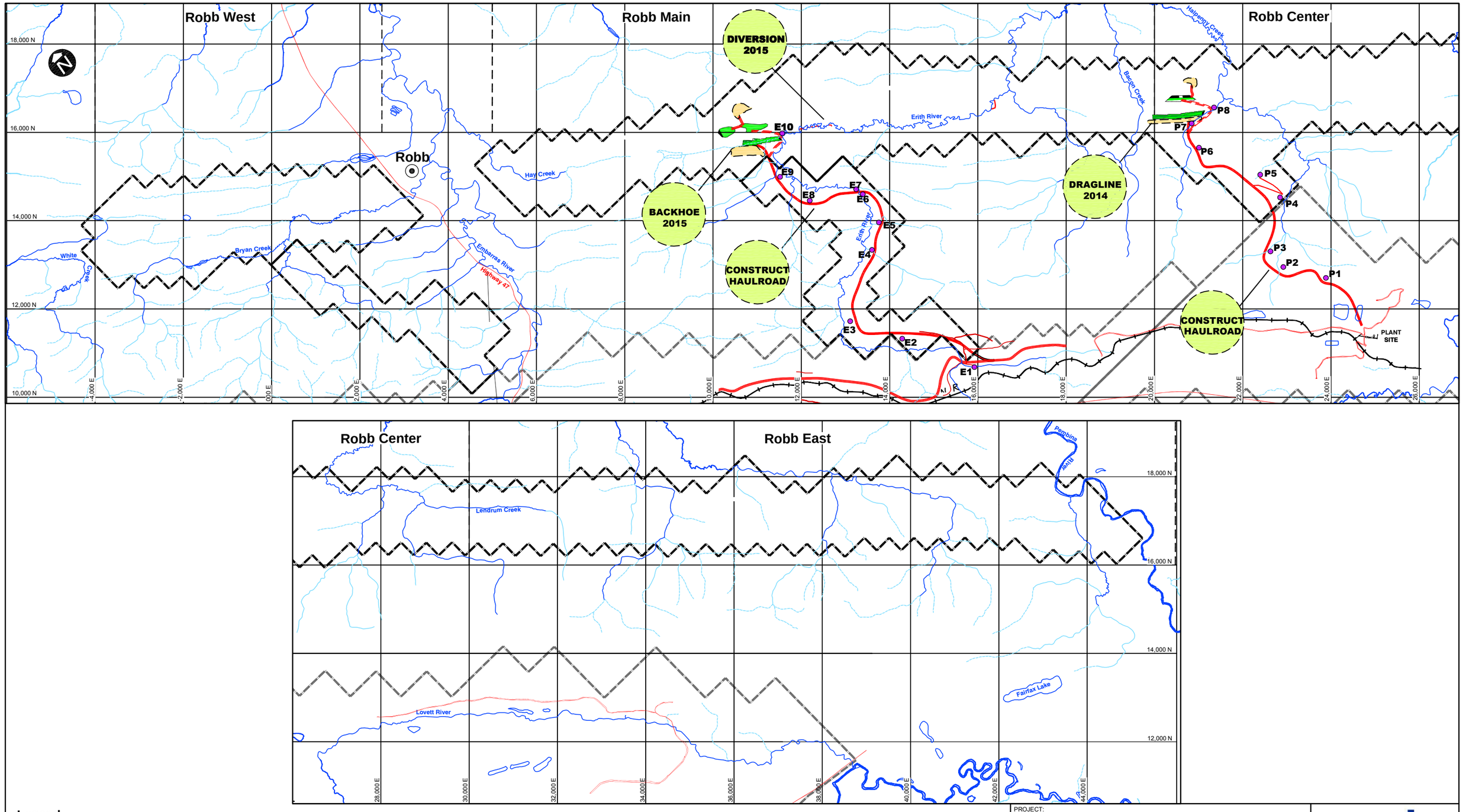
Development and Reclamation
Section 42,000E During Stage 8

FILE: Final Docs\Application\Cross-Sections.dwg

DRAWN:	AD/JG
CHECKED:	KY
DATE:	Apr 5/12
PROJECT:	08-041

FIGURE:

C.2-15



Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

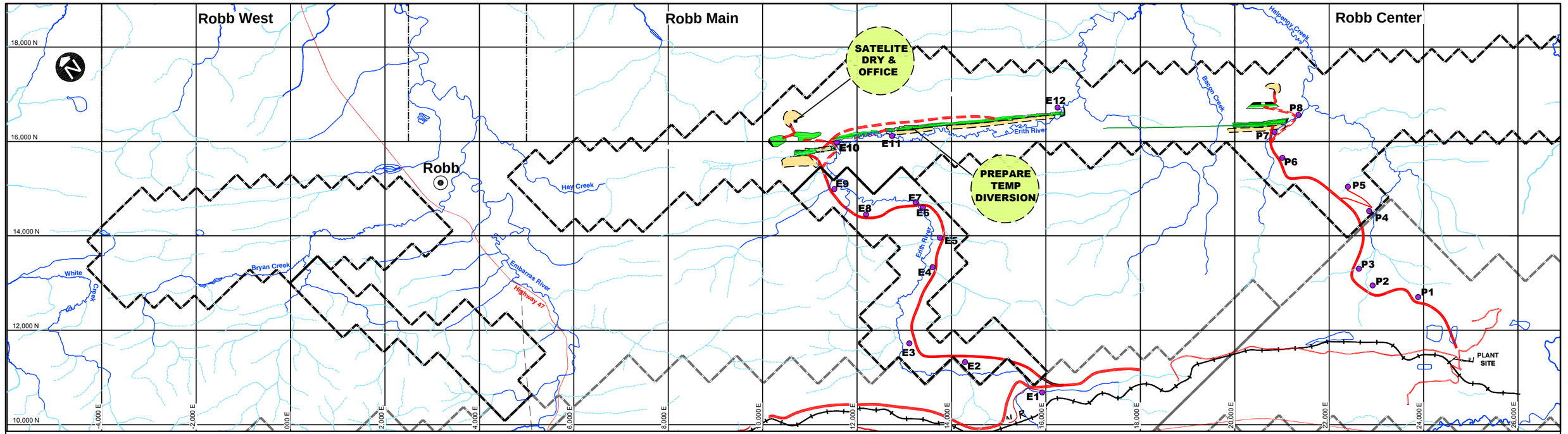
SCALE 1 : 80 000

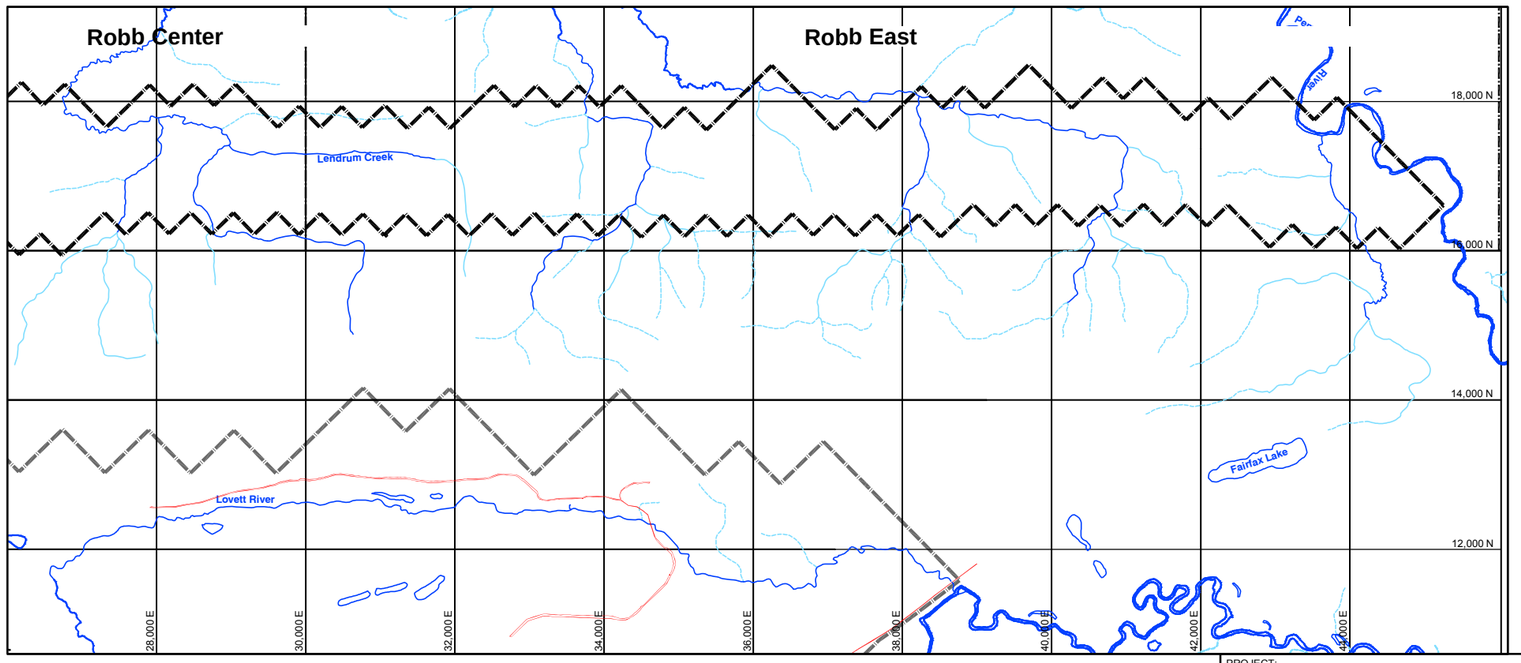
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 1A Development (2014 - 2017)

FILE: C.3-1 Mining Stage 1.dwg

DRAWN: JG	FIGURE:
CHECKED: KY	C.3-1
DATE: Mar 29/12	
PROJECT: 08-041	





Legend

- Settling Pond
- Haul Road
- Spoil Pile
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

0 1 2 3 4 km

SCALE 1 : 80 000

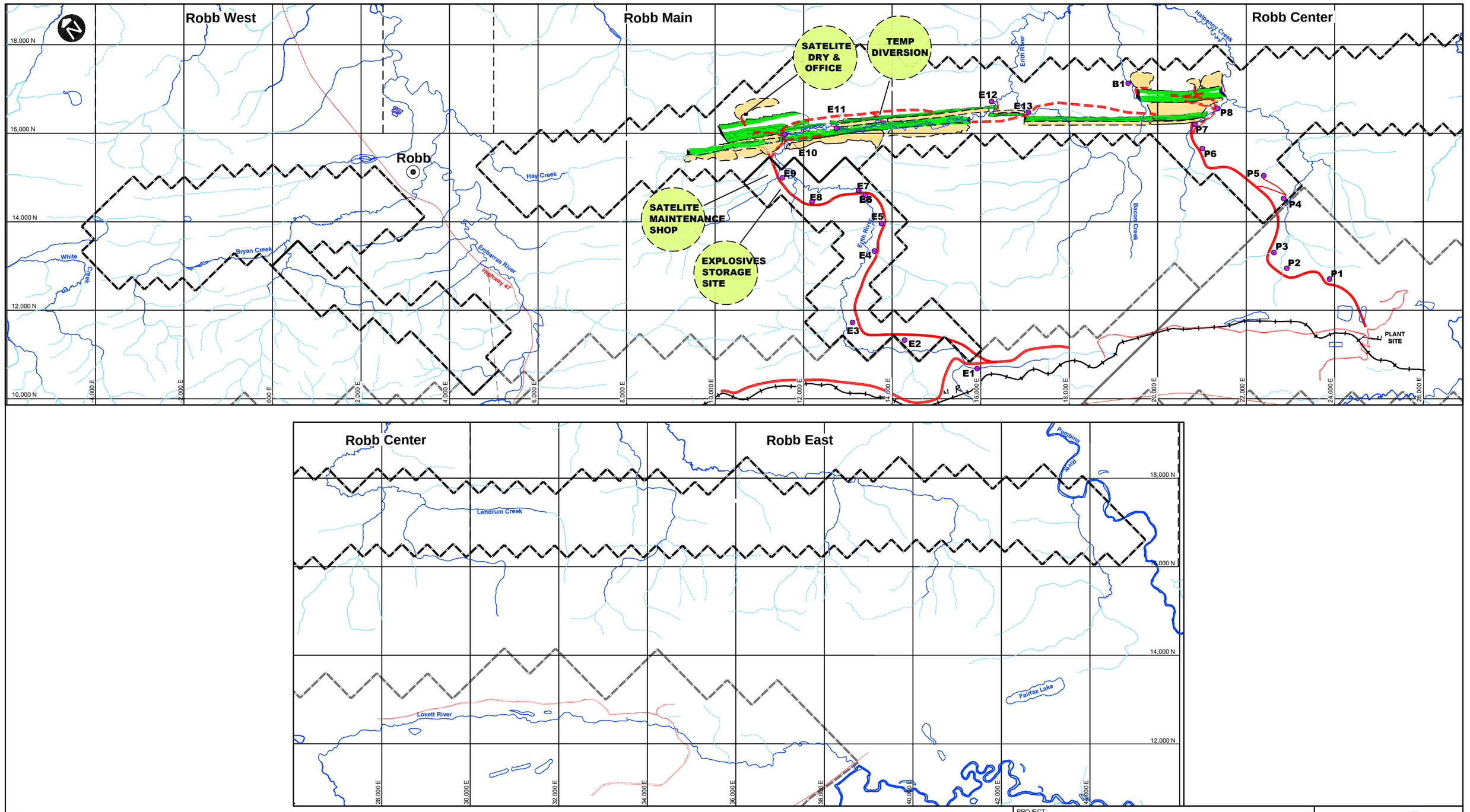
REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 1B Development (2014 - 2017)

FILE: C.3-2 Mining Stage 1-5.dwg

DRAWN: JG	FIGURE:
CHECKED: KY	**C.3-2**
DATE: Mar 29/12	
PROJECT: 08-041	



Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 2A Development (2016 - 2021)

FILE: C.3-3 Mining Stage 2.dwg

DRAWN: JG	FIGURE: C.3-3
CHECKED: KY	
DATE: Mar 29/12	
PROJECT: 08-041	

Robb West

Robb Main

Robb Center

Robb

TEMP DIVERSION

PREPARE FINAL CHANNEL

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13

P1 P2 P3 P4 P5 P6 P7 P8 B1

PLANT SITE

Hay Creek

Bryan Creek

White Creek

Embarras River

Highway 47

Erin River

Halpenny Creek

Blazey Creek

18,000 N

16,000 N

14,000 N

12,000 N

10,000 N

-4,000 E

-2,000 E

000 E

2,000 E

4,000 E

6,000 E

8,000 E

10,000 E

12,000 E

14,000 E

16,000 E

18,000 E

20,000 E

22,000 E

24,000 E

26,000 E

Robb Center

Robb East

Lendrum Creek

Lovett River

Fairfax Lake

18,000 N

16,000 N

14,000 N

12,000 N

28,000 E

30,000 E

32,000 E

34,000 E

36,000 E

38,000 E

40,000 E

42,000 E

44,000 E

Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

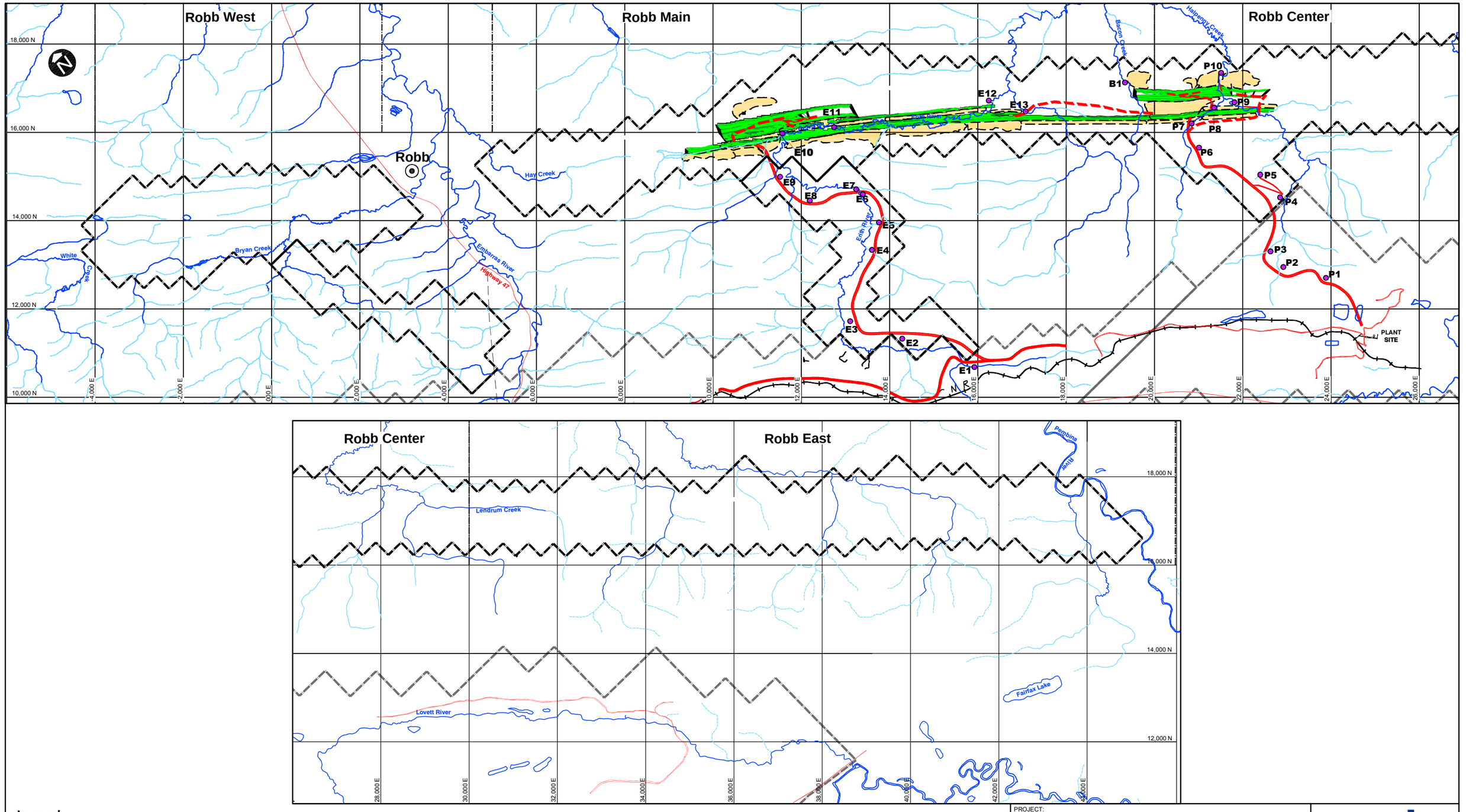
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 2B Development (2016 - 2026)

FILE: C.3-4 Mining Stage 2-5.dwg

DRAWN: JG
CHECKED: KY
DATE: Mar 29/12
PROJECT: 08-041

FIGURE:
C.3-4



Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 3 Development (2021 - 2022)

FILE: C.3-5 Mining Stage 3.dwg

DRAWN: JG	FIGURE:
CHECKED: KY	**C.3-5**
DATE: Mar 30/12	
PROJECT: 08-041	

Robb West

Robb Main

Robb Center

Robb

Hay Creek

White Creek

Bryan Creek

Embarras River

Highway 47

Halpenny Creek

Bacon Creek

Erith River

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12

B1

PLANT SITE

18,000 N

16,000 N

14,000 N

12,000 N

10,000 N

-4,000 E -2,000 E 000 E 2,000 E 4,000 E 6,000 E 8,000 E 10,000 E 12,000 E 14,000 E 16,000 E 18,000 E 20,000 E 22,000 E 24,000 E 26,000 E

Robb Center

Robb East

D1 D2

Pembina River

Lovett River

Fairfax Lake

18,000 N

16,000 N

14,000 N

12,000 N

28,000 E 30,000 E 32,000 E 34,000 E 36,000 E 38,000 E 40,000 E 42,000 E 44,000 E

Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

PROJECT:

Coal Valley Mine
Robb Trend Project

TITLE:

Stage 4 Development (2023 - 2025)

cvri

FILE: C.3-6 Mining Stage 4.dwg

DRAWN: JG	FIGURE:
CHECKED: KY	C.3-6
DATE: Mar 30/12	
PROJECT: 08-041	

Robb West

Robb Main

Robb Center

Robb Center

Robb East

Robb

Hay Creek

Bryan Creek

White Creek

Embarras River

Highway 47

Bacon Creek

Halpenny Creek

Erith River

Lendrum Creek

Lovett River

Fairfax Lake

Pembina River

PLANT SITE

H1

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12

B1

D1 D2

L1 L2 L3 L4

18,000 N

16,000 N

14,000 N

12,000 N

10,000 N

-4,000 E -2,000 E 000 E 2,000 E 4,000 E 6,000 E 8,000 E 10,000 E 12,000 E 14,000 E 16,000 E 18,000 E 20,000 E 22,000 E 24,000 E 26,000 E

28,000 E 30,000 E 32,000 E 34,000 E 36,000 E 38,000 E 40,000 E 42,000 E 44,000 E

Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 5 Development (2025 - 2027)

cvri

FILE: C.3-7 Mining Stage 5.dwg

DRAWN: JG
CHECKED: KY
DATE: Mar 30/12
PROJECT: 08-041

FIGURE:
C.3-7

Robb West

Robb Main

Robb Center

Robb Center

Robb East

Robb

Hay Creek

Bryan Creek

White Creek

Embarras River

Highway 47

Erith River

Bacon Creek

Halpenny Creek

Pembina River

Lendrum Creek

Lovett River

Fairfax Lake

PLANT SITE

W1 W2 W3 W4 W5 W6 W7

H1

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14

B1

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12

D1 D2

L1 L2 L3 L4

18,000 N

16,000 N

14,000 N

12,000 N

10,000 N

4,000 E 2,000 E 000 E 2,000 E 4,000 E 6,000 E 8,000 E 10,000 E 12,000 E 14,000 E 16,000 E 18,000 E 20,000 E 22,000 E 24,000 E 26,000 E

28,000 E 30,000 E 32,000 E 34,000 E 36,000 E 38,000 E 40,000 E 42,000 E 44,000 E

Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 6 Development (2027 - 2029)

cvri

FILE: C.3-8 Mining Stage 6.dwg

DRAWN: JG
CHECKED: KY
DATE: Mar 29/12
PROJECT: 08-041

FIGURE:
C.3-8

Robb West

Robb Main

Robb Center

Robb

Robb Center

Robb East

Hay Creek

White Creek

Bryan Creek

Embarras River

Highway 47

Erith River

Halpenny Creek

Pembina River

Lendrum Creek

Lovett River

Fairfax Lake

PLANT SITE

W1 W2 W3 W4 W5 W6 W7

H1

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14

B1

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12

D1 D2

L1 L2 L3 L4 L5

N1

18,000 N

16,000 N

14,000 N

12,000 N

10,000 N

4,000 E 2,000 E 000 E 2,000 E 4,000 E 6,000 E 8,000 E 10,000 E 12,000 E 14,000 E 16,000 E 18,000 E 20,000 E 22,000 E 24,000 E 26,000 E

28,000 E 30,000 E 32,000 E 34,000 E 36,000 E 38,000 E 40,000 E 42,000 E 44,000 E

Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 7 Development (2030 - 2033)

cvri

FILE: C.3-9 Mining Stage 7.dwg

DRAWN: JG
CHECKED: KY
DATE: Mar 29/12
PROJECT: 08-041

FIGURE:
C.3-9

Robb West

Robb Main

Robb Center

Robb

Hay Creek

Bacon Creek

Halpenny Creek

Erith River

Embarras River

Highway 47

Bryan Creek

White Creek

H1

W1 W2 W3 W4 W5 W6 W7 W8

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14

B1

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12

PLANT SITE

18,000 N

16,000 N

14,000 N

12,000 N

10,000 N

4,000 E 2,000 E 000 E 2,000 E 4,000 E 6,000 E 8,000 E 10,000 E 12,000 E 14,000 E 16,000 E 18,000 E 20,000 E 22,000 E 24,000 E 26,000 E

Robb Center

Robb East

Pembina River

Lendrum Creek

D1 D2

L1 L2 L3 L4 L5

N1

Lovett River

Fairfax Lake

18,000 N

16,000 N

14,000 N

12,000 N

28,000 E 30,000 E 32,000 E 34,000 E 36,000 E 38,000 E 40,000 E 42,000 E 44,000 E

Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

SCALE 1 : 80 000

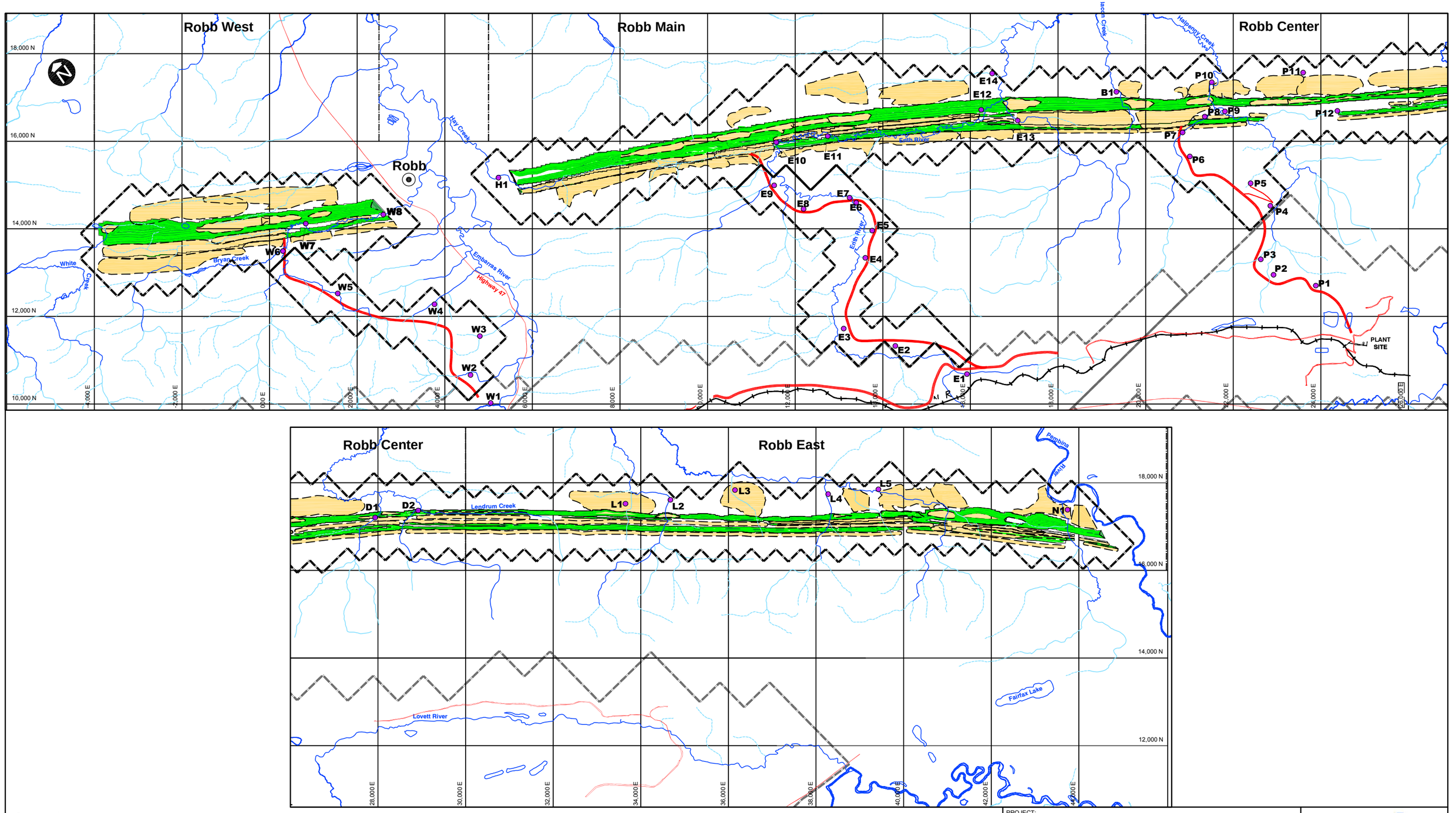
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 8 Development (2034 - 2037)

cvri

FILE: C.3-10 Mining Stage 8.dwg

DRAWN: JG	FIGURE: C.3-10
CHECKED: KY	
DATE: Mar 29/12	
PROJECT: 08-041	



Legend

- Pond
- Haul Road
- Spoil Pile
- Pit Limit
- Active Pit
- Proposed Robb Trend Mine Permit Boundary
- Existing Mine Permit Boundary

REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

0 1 2 3 4 km

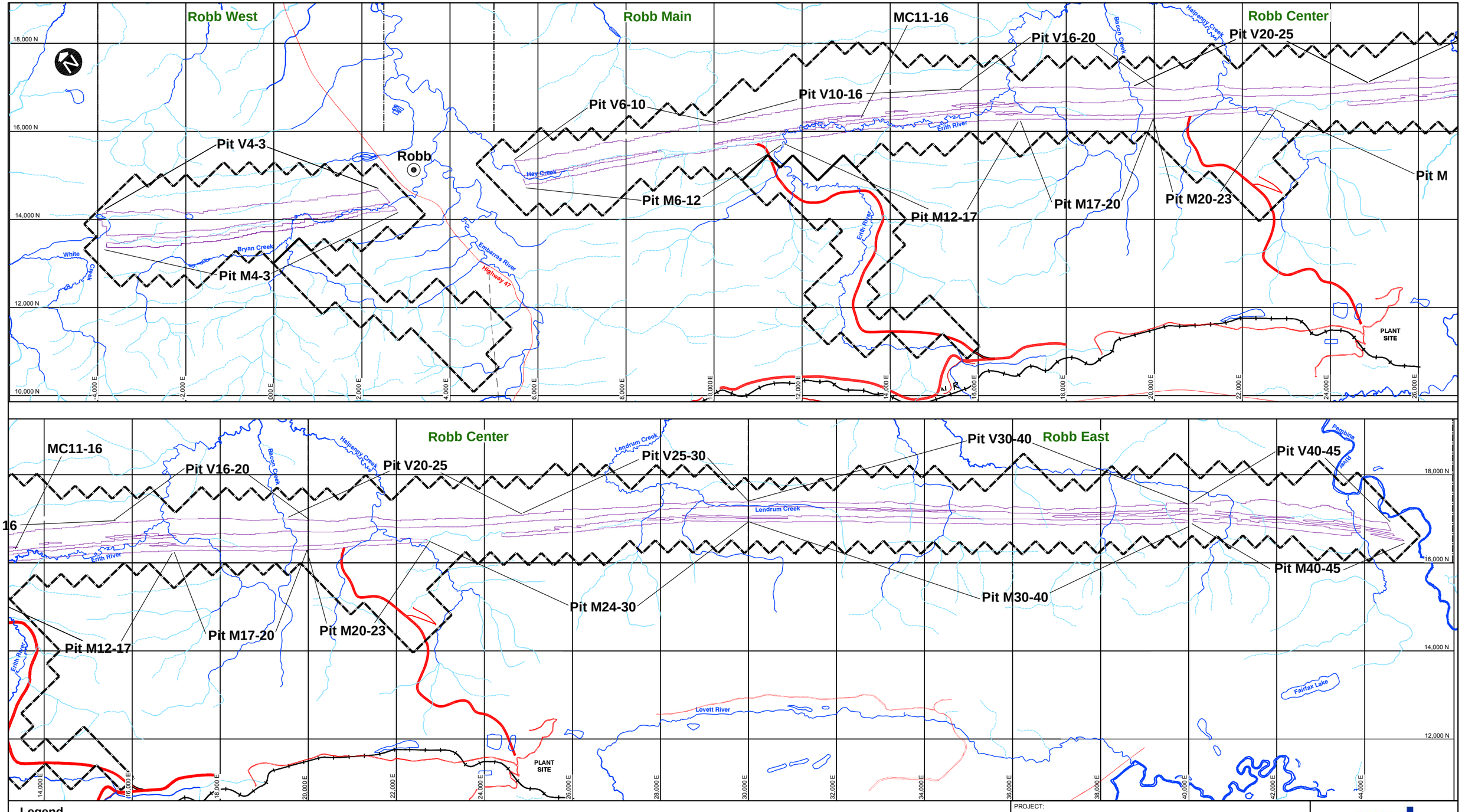
SCALE 1 : 80 000

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Stage 9 Development (2038)

FILE: C.3-11 Mining Stage 9.dwg

DRAWN: JG	FIGURE: C.3-11
CHECKED: KY	
DATE: Mar 29/12	
PROJECT: 08-041	



Legend

- Haul Road
- Pit Limit

0 1 2 3 4 km

SCALE 1 : 80 000

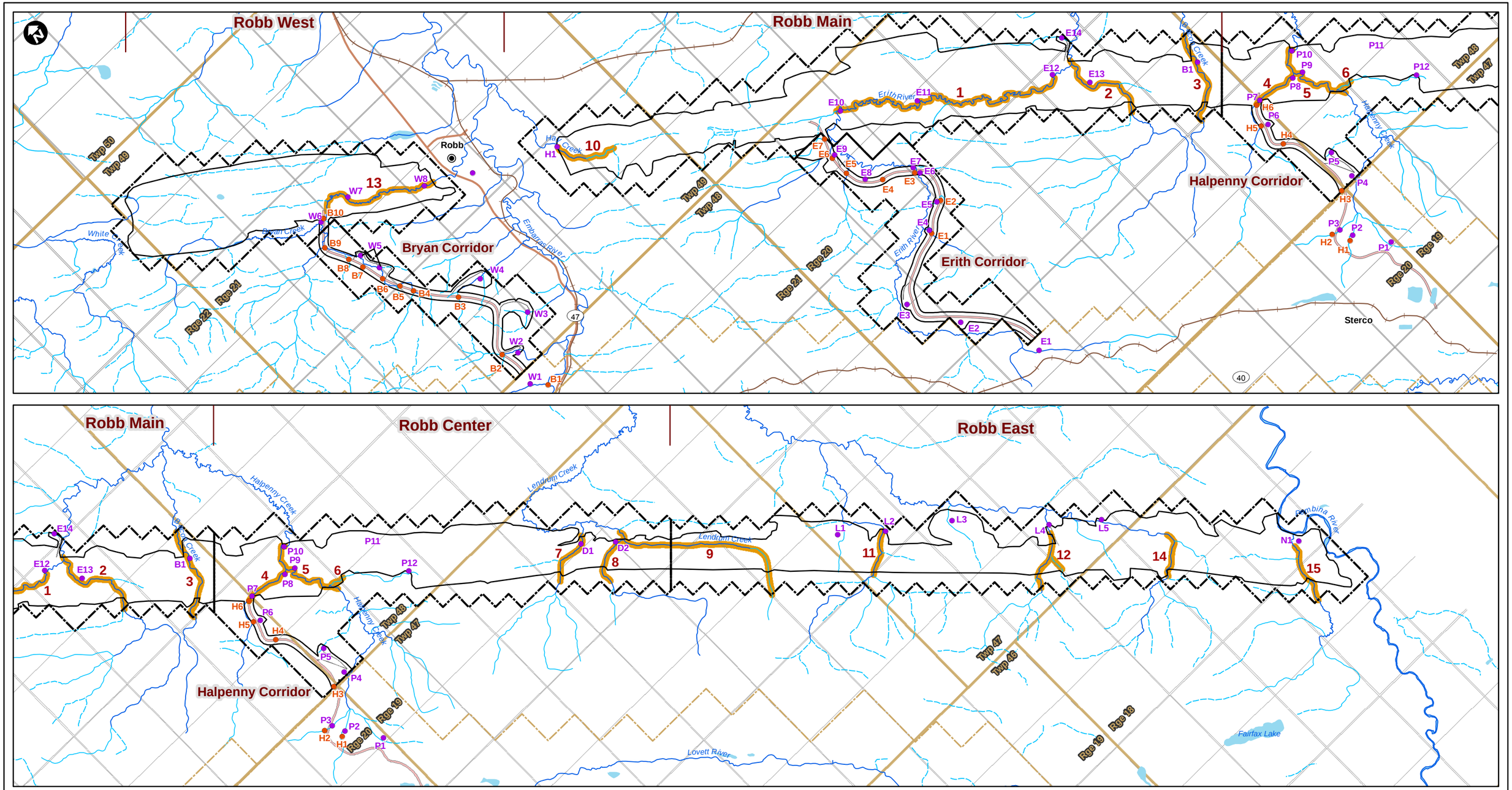
REF: CVRI, Rob Trend Project Extents 2B.dwg, Feb 7, 2011.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Pit Outlines

FILE: Fig C.3-12 Pit Outlines.dwg

DRAWN: JG	FIGURE:
CHECKED: KP	**C.3-12**
DATE: Mar 28/12	
PROJECT: 08-041	



Legend

- Proposed Robb Trend Mine Permit Boundary
- Proposed Footprint
- Existing Mine Permit Boundary
- Settling Pond
- Watercourse Crossing
- Haul Road
- Pond Access
- Permanent Watercourse
- Intermittent Watercourse
- Ephemeral Watercourse
- Watercourse Diversions
- Waterbody

0 0.75 1.5 3
Kilometres

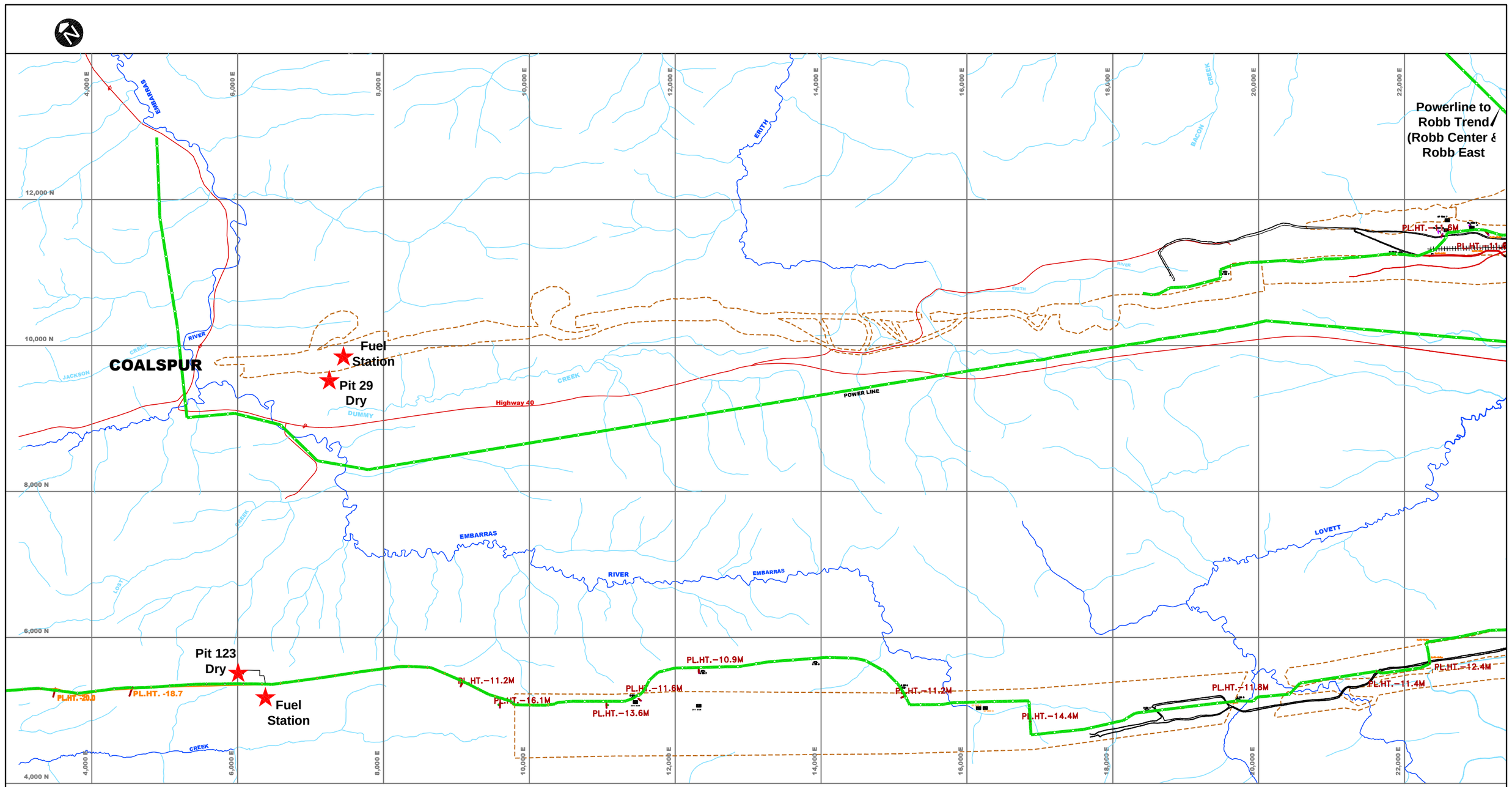
REF: CVRI, Robb Trend Project Extents 2B.dwg, Feb 7, 2011.

PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Water Management Plan

DRAWN: PS/JG
CHECKED: KY
DATE: Mar 30/12
PROJECT: 08-041

FIGURE:
C.4-1



Legend

- Substation
- Transformer
- Fused Disconnect
- Lightning Arrestor
- Isolation Switch
- Powerline
- Pit Outline

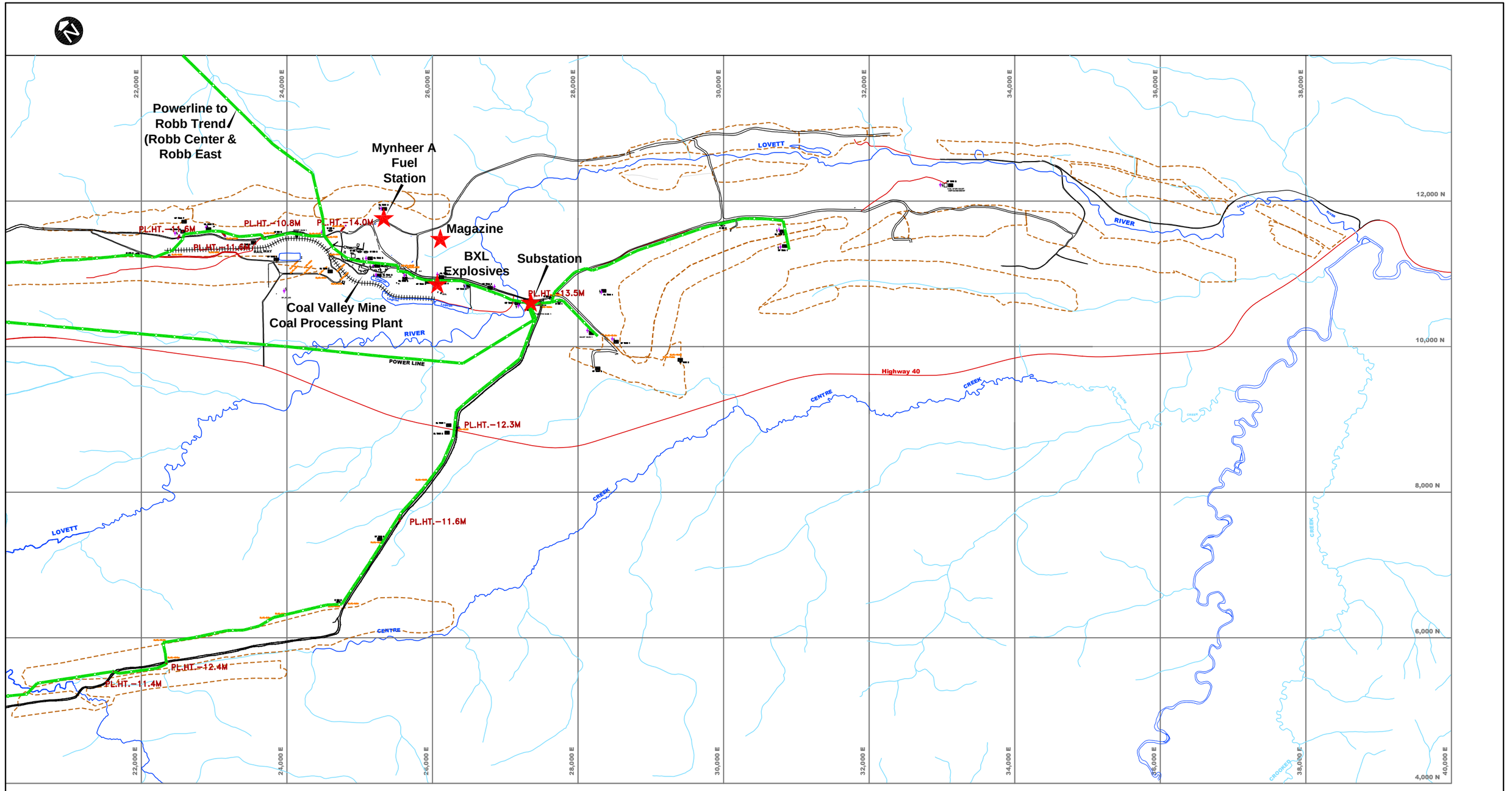
PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Existing Infrastructure - West

FILE: Fig C.5-1 Existing Infrastructure.dwg

DRAWN:	JG
CHECKED:	KP
DATE:	Mar 29/12
PROJECT:	08-041

FIGURE:
C.5-1a



Legend

- Substation
- Transformer
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- Isolation Switch
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PROJECT:
Coal Valley Mine
Robb Trend Project

TITLE:
Existing Infrastructure - East

FILE: Fig C.5-1 Existing Infrastructure.dwg

DRAWN: JG	FIGURE:
CHECKED: KP	**C.5-1b**
DATE: Mar 29/12	
PROJECT: 08-041	