Section C – Project Description

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C PROJECT DESCRIPTION

C.1 PROJECT OVERVIEW

The Mercoal West (MW) and Yellowhead Tower (YT) Mine Extension Project are two separate mining areas. The MW development is located immediately west of the Community of Mercoal and is a continuation of Mercoal East which is currently being mined (Figure A.1.0-2). YT is located immediately west of the community of Coalspur and is a continuation of the Pit 29 mining activities (Figure A.1.0-3). Both proposed development areas will be extended to the west away from the communities. Mining and reclamation activities in the MW are currently scheduled to begin in early 2009 and continue until 2012. Mining in YT will begin in 2009 with final reclamation completed by 2015.

The MW and YT mine development are a combination dragline and truck/shovel operation with a projected coal production of 3.6 million CMT for MW and 13.3 million CMT for YT. The overall objectives of the mine plan are to maximize the economic recovery of coal, minimize disturbance, provide a uniform coal flow to the wash plant, and operate in a safe and efficient manner. In order to balance waste removal, optimize equipment use, and minimize the disturbance to the land base being utilized it is more effective to operate in the two proposed mine developments at the same time. The workforce and mining equipment used at the existing mine will be used in the MW and YT areas. The experience that CVM and its employees have gained in open pit mining will be directly transferable to the proposed mine extensions.

Development plans for MW and YT are shown on Figures C.1.0-1 and C.1.0-2. The overall mine plans consider 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. Development procedures, environmental impacts, drainage control plans and reclamation plans have also been developed.

C.1.1 Mining Equipment

The proposed development areas will use a combination of truck/shovel and dragline mining methods. The equipment currently being utilized at the existing Coal Valley Mine (Table C.1.1-1) will be utilized for the proposed development. This includes electric draglines, backhoes, off-highway haulage trucks, front end loaders, rotary drills, dozers, graders and scrapers.

Table C.1.1-1 CVM Equipment List

Unit	Model	Use
Dragline		
145201	752 Page*	Overburden an interburden removal (shoes=21 psi), (42 c.y.)
145205	7450 Mar*	Coal and interburden removal (shoes=23 psi), (10 c.y.)
Drill		
145104	45R BE	Drilling overburden rock, interburden rock and coal for blasting
145108	45G DE	Drilling overburden rock for blasting
145110	SKS TR	
145111		To be purchased in 2008
Loader		
145312	WA800	Plant Loader
145315	992G*	
145316	992G	
Truck		
145425	M100 Water truck	Water Truck
145440	170D Wabco Hauler Water truck	Water Truck
145441	170D Wabco Hauler	Hauling coal and rock
145442	170D Wabco Hauler	Hauling coal and rock
145443	630E Haulpac	Hauling coal and rock
145448	170D Haulpac	Hauling coal and rock
145449	170D Haulpac	Hauling coal and rock
145451	630E Haulpac	Hauling coal and rock
145452	630E Haulpac	Hauling coal and rock
145453	630E Haulpac	Hauling coal and rock
145454	685E Haulpac	Hauling coal and rock
145455	685E Haulpac	Hauling coal and rock
145456	685E Haulpac	Hauling coal and rock
145457	685E Haulpac	Hauling coal and rock
145462	789C Hauler	Hauling coal and rock
145463	789C Hauler	Hauling coal and rock
145464	789C Hauler	Hauling coal and rock
145465	789C Hauler	Hauling coal and rock
145466	789C Hauler	Hauling coal and rock
145467	789C Hauler	Hauling coal and rock
145468	789C Hauler	Hauling coal and rock
145469	789C Hauler	Hauling coal and rock
145470	789C Hauler	Hauling coal and rock
145471	789C Hauler	Hauling coal and rock
145472	789C Hauler	Hauling coal and rock
145473	789C Hauler	Hauling coal and rock
145474	789C Hauler	Hauling coal and rock
145475	789C Hauler	Hauling coal and rock
145476	789C Hauler	Hauling coal and rock
145477	789C Hauler	Hauling coal and rock
145478	789C Hauler	Hauling coal and rock
145479	789C Hauler	Hauling coal and rock
145480	789C Hauler	Hauling coal and rock
145481	789C Hauler	Hauling coal and rock

Table C.1.1-1 CVM Equipment List

Unit	Model	Use
145482	789C Hauler	Hauling coal and rock
145483	789C Hauler	Hauling coal and rock
Backhoe		
145554	Hitachi EX700	Coal loading, utility work (5.5 cu. yd.)
145559	O&K 90C	
145561	EX 1800	
145564	5130 CAT	
145565	RH120C	
145566	RH120C	
145567	330 CAT	
145568	EX750	
145569	420 D CAT	
145570	330 CAT	
145571	RH120C	
145573	RH120C	
145575	RH120C	
145576	RH120C	
Grader		
145709	16G CAT	Road Maintenance
145710	16H CAT*	
145711	16H CAT	
145712	16H CAT	
Dozer		
145810	D3B CAT Tractor	
145816	D10R CAT	
145828	D10R CAT	Reclamation/Pit preparation/Overburden dumps/Pad work
145834	D85 KOM	
145835	D10R CAT	
145836	D10R CAT	
145837	D10R CAT*	
145838	D11R CAT*	
145839	D11R CAT	
145840	D10T CAT	
145841	D10T CAT	
145848	D11R CAT	
145850	D6R-LPG	
Support		
145958	637E CAT Scraper	Topsoil removal/replacement and road maintenance
145988	637E CAT Scraper	
146912	40T Grove Crane	
146914	980G CAT Cable Reeler	

C.1.2 Haul Road Design

Road design standards are followed to ensure operating safety. Dragline access roads are constructed to a running surface width of 40 m 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.1.2-1). 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.

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 are generally constructed using sandstone rock from the pit areas as the road base. A layer of crushed rock is used for final surfacing. This crushed rock is often produced as a by product from the coal preparation plant. 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.1.3 Mine Pre Development

C.1.3.1 Timber Salvage and Clearing

Areas that have merchantable timber will require pre-logging and salvage prior to other activities occurring. Timber will be salvaged by the FMA holder (West Fraser Mills Ltd.) or a private contractor as is current practice at CVM and will be conducted as directed by Sustainable Resource Development. Unmerchantable timber and residual material, such as tops and limbs, will be left in place and incorporated with the soil salvage operations.

CVM has a "no burn" policy which prohibits the burning of slash. This policy will also be in place for the MW and YT developments.

There are numerous permanent sample plots located within the MW and YT area and CVM is working with the FMA holder to determine appropriate compensation. CVM is also working with West Fraser to withdraw the lands required for the Project from their FMA.

C.1.3.2 Soil Salvage

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

A soil survey of the proposed MW and YT areas has been completed. The details of the soil survey are provided in Section E.10 and Consultant Report #10. The reclamation plan is included in Section F.

C.1.4 Description of Mining

Factors such as coal quality, proximity to the processing plant, infrastructure requirements and ratio of overburden to recovered coal have an impact on the economics of pit development. 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 9% moisture content. The resulting coal product is shipped via rail for domestic use or to ocean ports for export overseas.

Due to the geologic and topographic features of the MW and YT development, these areas will involve both truck/shovel (open pit) and dragline (strip) mining methods.

C.1.4.1 Dragline Mining Method

The coal beds at CVM are not lying flat but are steeply dipping therefore, a modified method of strip mining will be employed. The dragline (Page 752) will be used to mine portions of the areas of MW and YT 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 on haul trucks and delivered to the plant. The mining areas are not commonly backfilled and are reclaimed as end pit lakes.

The smaller Marion 7450 dragline will work in advance (approximately three months) of the Page 752 dragline in order to strip soil, build walk roads and, pre-build drilling benches. The dragline will be supported by a dozer.

Two months in advance of the Page 752 dragline an electric drill will be used to drill and blast overburden rock. 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. Drilling will be conducted on day shifts only with blasting occurring two or three times per month.

The broken rock is then excavated with the Page 752 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. Ten haul trucks will be used to haul coal and will have cycle times (return trip) being approximately 1.5 hours. A grader will maintain the haulroad on a continuous basis.

C.1.4.2 Truck and Shovel Mining Method

Truck and 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.

In these areas, CVM 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 electric drill will be used to blast overburden rock.

Two RH-120 backhoes will be used to excavate waste and coal with a D10R dozer supporting their operations. One backhoe will be used to excavate and load waste rock. Another backhoe will alternate between excavating rock and coal. The overburden and coal will be removed in 14 m benches. Waste rock will be hauled to external dumps or if scheduling will allow to an in-pit backfill area. When excavating rock, two trucks will be used but when excavating coal, 10 trucks will be required.

During the development of the MW and YT area, CVM will have three truck/shovel operations underway at the same time.

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

C.1.5 Pit Design Criteria

The spatial limits of the pit 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. The pit limits are determined by applying an incremental cut-off strip ratio (ICSR) on each of the cross-sections for the proposed pit areas. From these cross-sections the overall pit limits can be determined and the average strip ratio realized.

Parameters utilized for the pit design include:

- highwalls will be excavated at 55 degrees;
- footwall slopes in all the pits will follow bedding. This is proposed for areas of both shallow and steeply dipping strata because of the limited pit depths (0 to 50 m) and the flexibility afforded by single pass dragline mining;
- an Incremental Cutoff Strip Ratio (ICSR) of approximately 10:1 BCM/CMT or less was used to determine the positioning of the highwall versus the depth of the seam;
- 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. The maximum digging depth for the backhoe is approximately 6 m. The pit bottom width is generally not of concern for the MW and YT area; and
- as discussed in Section B, the rock units that will be exposed in the MW and YT development area are stratigraphically identical with those found at the CVM. Consequently, the geotechnical assessment involved comparing the local geology of the MW and YT to similar areas at the CVM. Geotechnical work at 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 evaluated at Coal Valley through laboratory testing and highwall back analyses and are expected to be directly applicable to the MW and YT areas. The stability information (Section B) is based on

this information and the experience of mining geotechnically similar slopes at CVM over a 20 year period.

As part of future pit licence applications, CVM 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 bedding characteristics. If necessary, an evaluation of specific rock types 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
- **Presence of Fault Zones -** Ground disturbed by thrust faults may impact the overall stability of pit walls. Conditions exist where fault zones will be exposed as part of the pit highwall or footwall. Berms will be placed if required in the pit walls.

Typically, 90% of in-place tonnage is assumed to be recoverable. This loss (10%) is discounted due to mining inefficiencies. Efforts are directed at maximizing in-pit recovery of in-place tonnage and values greater than 90% are often achieved. If during the initial mining the pits provide higher yield coal (higher recovery from the plant), pit limits can be re-examined.

C.1.6 Materials Handling

C.1.6.1 Overburden Disposal

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. CVM 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 often 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.

CVM has significant experience in designing, constructing and reclaiming overburden dumps in terrain similar to what is found in the MW and YT development area. Overburden materials and foundation conditions are comparable to those found on the existing Coal Valley Mine. This experience will be utilized in the design and geotechnical analysis.

The preference for overburden discard is as in-pit backfill where possible and practical. Backfill of pits reduces land disturbance, improves reclamation of pits and can often aid in the sequencing of mining. In the MW area, the single pass dragline mining has limited options for in-pit dumping as overburden materials are deposited on both sides of the pit. Some of this material is pushed back into the pit when reclamation is being completed.

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.

C.1.6.2 Reject Materials

The coal preparation plant cleans the raw coal to a desired quality specification by removing rock, partings and fine sediments. The coal recovery in the plant ranges from 50 - 55% which means that for every 100 tonnes that is run through the plant there are 45 – 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. The material is used for road construction or it is hauled back to the active pits or dumps. This can aid in reclamation as the material helps backfill mined out pit areas.

The fine reject material (plant tailings) is discarded in mined out pits at the CVM. CVM has long term capacity for disposal of plant reject material into mined out pits near the plantsite.

C.1.7 Drilling and Blasting

CVM will continue to use the equipment and procedures currently being utilized on the existing mine areas. These procedures include use of rotary drill rigs to drill the overburden. Drilling is completed in one pass in the dragline pits with some drillholes being up to 40 m deep. Drilling of the overburden at the truck/shovel operations will be accomplished on 14 m benches.

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

- *Potential to expand 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 will be necessary for the mining in the MW and YT areas;
- *Use of siren in advance of blasts* - A siren will sound in advance of the blast as a final warning and provides a final opportunity to check the security of the area. This procedure provides a warning of an impending blast;
- *Routine blasting time frame* - CVM routinely blasts during specific times. Blasting is generally completed in daylight hours, and is usually scheduled between 12:00 PM and 5:00 PM; and
- *Security around mine and blast areas* - CVM maintains general security in the mining areas to keep all employees and the public out of potentially dangerous areas. The security perimeter is normally marked with signs and any access roads or trails are

controlled with guards. Prior to blasting all immediate areas are checked to ensure they are clear and safe.

C.1.8 Explosives and Communications

The preparation and supply of explosives will be provided by a contractor who is currently Bulk Explosives Ltd. (BXL), who 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). This is the product that will be used for the proposed development. It is anticipated that the annual quantity of ANFO used will be approximately 3,500 tonnes. 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 and provides the workforce to supply the full range of bulk explosives services including; manufacturing, storage, transportation and delivery to the pit. The contractor's staff loads the open holes as directed by CVM 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. These ingredients are delivered separately to the mine site and placed in bulk storage facilities. 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.

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 CVM employees are responsible for these products. The qualified CVM 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 MW and YT development. Radio communications are an important link in ensuring that blasting operations are conducted safely.

For blasting being conducted in the vicinity of the communities of Mercoal and Coalspur, blasting practices can be modified if required, to reduce the amount of explosives detonated per delay, reducing the impacts of noise and vibration.

C.1.9 Service Bays (Fuel/Lube)

The main fuelling depot at the existing mine (Mynheer A Lube Station) will remain in use for the MW and YT operations. The haul trucks and other mobile equipment will utilize this station. It is anticipated that due to the distance from the main depot to the MW and YT developments

smaller satellite service facilities will be established. 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 remote mobile equipment (i.e. dozers) is serviced from fuel/lube trucks.

C.1.10 Water Management

Water management is a priority consideration throughout mine planning and development. Minimizing surface disturbance and completing timely reclamation are essential considerations that can affect water management. Operationally, CVM will install a series of collection ditches, sumps, pumps and settling ponds to manage all water on the mine site.

A conceptual water management plan has been developed for the entire MW and YT area. Based on experience at the CVM, the collection of surface runoff water and management of pit water is required primarily for the removal of total suspended solids (TSS). The main objective is to control TSS levels so they 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 MW and YT 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 large pumps to transfer the water to a settling pond where treatment and release can occur. Water is often transferred to mined out pit areas where it is stored and not released.

Surface runoff from mining areas, haul roads, overburden dumps and any other disturbed areas will be collected and directed to settling ponds or mined out pits for treatment. The water from the settling ponds will be 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. CVM plans to control all surface runoff from disturbed areas.

Water management is required for all components of the Project from the initial site disturbance through to final reclamation. Activities that result in the removal of surface vegetation have the potential to cause erosion and sedimentation. Soil erosion will be reduced by minimizing the time that disturbed surfaces are left without vegetation. Temporary measures to control erosion before a vegetation cover is established may include:

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

Construction activities related to the major stream crossings will be 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 (i.e. Mercoal and Chance Creeks). Construction techniques will be employed that protect the integrity of the streams as well as the quality of water.

An assessment of potential impacts to water resources in the Project area was conducted in the hydrogeology (CR# 3), hydrology (CR# 6) and water quality (CR# 11) reports within this application. These Consultant Reports (CR#) provide descriptions of the baseline conditions, precipitation data, estimated flows and predicted impacts of the proposed mine development plan. The information provided in these reports has been used extensively in development of water management plans for the Project. The detailed water management plans for MW and YT are provided in Section C.2.3 and Section C.3.3.

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, LT7990, is used extensively at the CVM. This (or a similar product) will be used to treat settling pond influent in the extension areas. The use of LT7990 has been approved by Alberta Environment. The product line “LT” indicates low toxicity and is approved for use in potable water treatment.

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

C.2 MERCOAL WEST DEVELOPMENT PLAN

The MW mine extension is located west of the community of Mercoal and west of Highway 40 (Figure C.1.0-1). CVM proposes to develop MW with a combination dragline and truck/shovel mining methods with a total projected coal production of 3 million CMT. Both mining methods have been used extensively over the past 30 years at the Coal Valley Mine.

In the MW area most of the terrain and geology is suitable for the dragline to be employed. CVM is planning on using truck/shovel mining methods for the remaining area and those areas with complex mining conditions.

The MW development is approximately 15 km long and 250 m wide excluding haul roads. The community of Mercoal is located at the east end of the development area with the nearest resident located approximately 0.5 km from the nearest development (Figure C.2.0-1). The community of Mercoal is located on Highway 40 that runs between Coalspur and Cadomin. The

rail line passes through Mercoal as it serves Inland Cement and the Elk Valley Coal Corporation (EVCC) Cardinal River, Cheviot Operations near Cadomin.

The proposed MW mine extension will involve development of two pits. Pit 124 will utilize dragline mining methods while Pit 125 will be mined with truck/shovel. The pits will be sequenced to meet production objectives.

In MW the major seam of interest is the Val d'Or which is located near to the surface and dips to the northeast. The geologic structure is generally a moderate to steeply dipping monocline and is described in detail in Section B. The coal is uncovered to an economic depth and recovered for processing.

The MW area will be developed with a single pass or strip from the coal subcrop to lower elevations (downdip) until the final pit depth is reached. Overburden will be placed in two linear waste dumps in parallel to the pit. As a result of the single pass mining method there will be very few opportunities for in-pit backfill. Coal removal will be completed using backhoes and haul trucks once the overburden removal is complete. In some areas the dragline may be employed to lift the coal from the pit to facilitate coal loading. The haul trucks will transport the coal to the plant for cleaning.

Mining in the MW area will begin with pre-development activities in early 2009 and final recontouring and soil placement in early 2011. The development area includes mine pits, topsoil and overburden piles, ponds/sumps and haulroads. Buffer areas will remain between development features. These areas are not directly disturbed by mining activities but are included in the overall footprint due to their proximity to development. Overall, proposed development footprint for MW is approximately 522 ha (Table C.2.0-1).

Table C.2.0-1 Mercoal West Areas

Development Type	Disturbance Footprint	
	Area (ha)	Proportion (%)
Pits	93	18
Topsoil Piles	54	10
Spoil Piles	172	33
Ponds/Sumps	2	1
Haulroad	107	20
Buffer Area	94	18
Total	**522**	**100**

C.2.1 Pit Reserves

As stated in Section C.1.5 the spatial limits of the pit 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. A selection of geological cross-sections used for pit design are included as Figures C.2.2-1 to Figure C.2.2-8. The pit limits are determined by applying an incremental cut-off strip ratio (ICSR) on each of the cross-sections for the proposed pit areas. From these cross-sections the overall pit limits can be determined and the average strip ratio realized (Table C.2.1-1).

Table C.2.1-1 Mercoal West Material Handling

Pit	Waste (BCM)	Coal (RMT)	Ratio (BCM/RMT)	Yield (%)	Coal (CMT)	Ratio (BCM/CMT)
124 - Dragline	5,670,317	3,043,753	1.86	52.5	1,597,970	3.55
125 - Backhoe	9,643,215	3,898,164	2.47	52.5	2,046,536	4.71
Total	15,313,532	6,941,917	2.21	52.5	3,644,506	4.20

For the MW pit areas, the geologic structure of the coal seams occur as a steeply dipping monocline. In these pits the coal footwall forms the pit floor (bottom). The resulting highwall forms the other pit limit. The dragline can mine to a maximum effective depth of 37 m from ground level. Anything beyond this depth is not considered economical for dragline operations. The dragline pits are designed based upon the geometry of the Page 752 dragline and its capability to mine a steeply dipping seam. Spoiling capacity and configuration is also controlled by the dragline swing radius and dumping height.

The truck/shovel pits are designed as multiple benched pits with the bench development staged in phases to improve coal flow from the pit.

C.2.2 Mining Sequence

The proposed mine plan is subject to changes due to various factors such as geology, engineering, regulatory, marketing and economic factors. 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 licensing process, individual pit designs and mining plans will be submitted, as required, to the province for review and approval.

Development of the MW area involves a combination of dragline and truck/shovel mining methods. The general dragline and truck/shovel mining methods described in Section C.1.4 will be utilized for the MW development. Locations of the different mining methods are shown on Figure C.1.0-1 and listed in Table C.2.2-1.

Table C.2.2-1 Mercoal West Development Locations and Schedule

Pit - Section	Mining Methods	Dates
Pit 124 – 2350E to 900E	Dragline	January to March 2009
Pit 125 – 900E to 130W	Truck/Shovel	2009
Pit 124 – 130W to 2400W	Dragline	March to July 2009
Pit 125 – 2400W to 5200W*	Truck Shovel	2009 - 2010
Pit 124 – 5200W to 7700W**	Dragline	2009 - 2010
Pit 125 – 7700W to 12500W**	Truck/Shovel	2009 - 2010

* Burnt area additional exploration required
** Potential area. Additional Exploration required

C.2.2.1 Mine Pre-Development

It is anticipated that pre-development work for the MW area will be started in early 2009. Pre-development will include the construction of the haulroad, Highway 40 crossing, rail line crossing, installation of the power line, site clearing and soil salvage. Water management features including ditches and impoundments will also be established. Drainage control structures will be constructed in advance of development to control sedimentation. Pre-development activities are discussed in detail in Section C.1.3.

C.2.2.2 Dragline Mining

Mining will begin with dragline operations starting at the south-east end of the proposed pit. Dragline mining operations will extend to the west from approximately 2350E to 900E. The dragline will then be "walked" around the first area proposed for truck/shovel mining (900E to 130W). The dragline will be used to mine from approximately 130W to 2400W then once again "walked" around the next section of truck/shovel pit (2400W to 5200W). The final dragline mining will start at approximately 5200W and extend to 7700W. All dragline mining will be completed by late 2009.

C.2.2.3 Truck and Shovel Mining

Truck and shovel mining is scheduled to be completed on three areas of the MW development (Pit 125). In the central part of the underground mined area (900E to 130W) the conditions are not favourable for dragline operations as there are concerns about the stability of the ground surface resulting from the underground workings. CVM is planning on employing truck/shovel mining methods for this area. The use of the shovels will give the flexibility required to allow subsurface investigation to be completed as the overburden removal is undertaken. In this case trucks and backhoes will be used to remove the overburden and to recover the coal. The second area is where the coal seam has been burned (2400W to 5200W). Again the mining method will give the flexibility required to mine the burned coal zone. The truck/shovel method will be used to complete the mining of the west end of the development area.

C.2.3 Water Management Plan

C.2.3.1 Surface Water Collection System

Coal Valley has successfully utilized a number of water collection systems within the existing mine to aid in water management. One of the objectives of the water collection systems is to intercept surface flows above the mining area and simply 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. This strategy will be employed in the MW area. A network of drainage ditches and containment areas will be developed along the edge of disturbance to accomplish this objective.

Another objective is to collect and contain all water that has been affected by mining (i.e. sedimentation) and ensuring that it is clean when released from the site. This is done by establishing a network of sedimentation ponds or impoundments that naturally remove sediment or artificially enhanced settling using coagulants and flocculants. Also, once areas have been mined out, they become potential storage areas for wastewater from active mining areas. These areas are utilized wherever possible. Water from these areas is generally pumped through a licenced impoundment prior to release to the environment.

C.2.3.2 Impoundments

Impoundments are utilized to remove suspended sediment for wastewater. Impoundments are typically located within natural drainages, down gradient from potential mine disturbance areas. This arrangement permits water to flow into collection systems and be directed to the impoundment. Outflow from impoundment's into receiving waters are monitored and controlled to meet EPEA standards.

There are currently seven settling ponds and ten sumps planned for the MW area (Figure C.2.3-1). These ponds will be designed to collect local runoff from the spoil pile areas, strategically located sumps 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 mine. 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 impoundment.

C.2.3.3 Pit Dewatering

At MW, CVM is not planning on installing dewatering wells and have elected to handle the water in-pit. All pit water will be collected by a system of drainage ditches and sumps which will direct the water to licensed impoundments for treatment. 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.2.3.4 Stream Diversions

As MW development progresses from the south-east end near Highway 40 to the north-west, tributary streams of Mercoal Creek, Unnamed Creek and McCardell Creek are intercepted and will require temporary diversions around the pits. A total of nine tributary diversions are currently planned for MW with drainage areas ranging from less than 0.2 km² to 6 km². Other than the largest drainage (Diversion 2) whose channel is approximately 2 m wide, these are small ephemeral to intermittent creeks typically less than 1 m wide. The typical diversion length across the pit and spoil pile areas is approximately 350 m with grades ranging from 0.3% to 3.7%.

A typical diversion plan using the fish bearing tributary of Mercoal Creek as an example, is shown on Figure C.2.3-2. As mining progresses, the watercourse will be diverted away from the active pit. Mining will continue through the original watercourse alignment then the watercourse diversion will be moved behind the active mining area. Once mining and backfilling is completed the watercourse will be re-established.

For the fish bearing tributary the diversion will consist of a lined open ditch. The other small diversions may use gravity piping or pumping depending on the timing of the diversion and flows anticipated. All diversions will be moved around mining as the pits progress using a similar sequencing as shown in Figure C.2.3-2. Where practical, the spoil piles will be split in the area of the diversions to provide space for the diversion installation and to minimize the recontouring that will be required to re-establish the drainage system after mining.

C.2.3.5 Lake Development

Four lakes (>10 m deep) and five wetland areas (<3m deep) are proposed for MW as part of the reclamation plan. These will be developed within completed pits. The filling of the lakes and wetland will be accomplished with surface runoff and groundwater.

Development plans will include placement of backfill to create shallow (littoral) areas. Shore line areas will be resloped. Surface inflow and outflow channels will be developed where practical. Table C.2.3-1 includes details on the lake and wetland developments. Final reclamation and drainage plans are discussed further in Section F.

Table C.2.3-1 Proposed End Pit Lakes and Wetlands - Mercoal West

Lake/Pond	Pit	Creek Influence	Water Elevation (m)	Surface Area (m^2)	Maximum Depth (m)	Volume (m^3)	Littoral Area (m^2)	Littoral Area (%)
A	124	Tributary of Mercoal	1335	67,789	10	338,945	22,596	33%
B	125	Tributary of Mercoal	1338	9,448	3	14,172	9,448	100%
C	124	Tributary of Mercoal	1370	14,840	3	22,260	14,840	100%
D	125	Tributary of Mercoal	1375	18,045	10	90,225	6,015	33%
E	124	Tributary of McLeod	1352	16,734	10	83,670	5,578	33%
F	125	Tributary of McCardell	1305	28,218	3	42,327	28,218	100%
G	125	Tributary of McCardell	1271	12,992	10	64,960	4,331	33%
H	125	Tributary of McCardell	1230	4,108	3	6,162	4,108	100%
I	125	None	1230	2,216	3	3,324	2,216	100%
Total				174,390			97,350	56%

C.2.4 Associated Development

C.2.4.1 Highway 40 Crossing

The MW development is a continuation of mining from the Mercoal East area. To accommodate mining, Highway 40 must be crossed to allow mining equipment access to the area (Figure C.2.4-1). An at-grade or level crossing has been proposed and will be submitted to Alberta Infrastructure and Transportation for review. The crossing will be designed to ensure safe operation of mine vehicles and management of traffic along Highway 40. The crossing will also be designed to allow the dragline to access the development area. Dust suppression methods will be instituted and lighting and warning signs will be installed on Highway 40. Mine truck driver training programs will emphasize safe operation where the two roadways cross. CVM has safely operated a similar crossing for many years. The proposed crossing will be used for approximately 2 years.

C.2.4.2 CN Railway Crossing

CVM will also require a level crossing over the railway. CVM has two similar level crossings over the rail line on the existing mine. A typical railway crossing plan is included as Figure C.2.4-2.

C.2.4.3 Powerlines

Presently a 138 kV power line serves the CVM's main substation. Construction of a 138 kV powerline from the mine site's main substation will occur in 2009. Its alignment will follow the main haulroad access into the MW. At this point, a substation will be required to reduce the voltage to 7.2 kV for the mining operations. Since the dragline, drills and pumping equipment are electrically powered, powerlines will be required throughout the MW 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.2.4.4 Watercourse Crossings

Current haulroad alignment will require three to four crossings of defined tributary channels of the McCardell and Mercoal Creek. Of these only one tributary has been identified as having fish habitat. The culvert for this crossing will be sized to permit fish passage in accordance with standard guidelines. The other watercourse crossings are of ephemeral draws and will be maintained by a minimum 0.5 m culvert.

All of the watercourse crossings will be constructed in accordance with the "Code of Practice for Watercourse Crossings" (AENV 2000).

C.3 YELLOWHEAD TOWER DEVELOPMENT PLAN

The YT development area is located immediately to the west of the community of Coalspur. In the YT area, a series of faults has over thickened the coal seams by squeezing the coal along strike into pods and by duplex faulting that has stacked the seam multiple times. Due to the complex geology and steep terrain in some of the YT area CVM is planning on using both dragline and truck/shovel mining methods. Both mining methods have been used extensively over the 30 year of operation at the Coal Valley Mine. General mining methods have been described in Section C.1.4. The estimated production from the YT area is 13.3 million clean metric tonnes (CMT).

Figure A.1.0-2 provides a photomosaic of the proposed development area. Some of the key features include:

- the project area is approximately 8 km long and 1 km wide;
- the community of Coalspur is located at the east end of the development area and located along Highway 47. Mining activities will occur in close proximity to seasonal cottages located on the west side of the highway (Figure C.3.0-1);
- Chance Creek flows from north-west to south-east through the development area until it joins with the Embarras River;
- Jackson Creek flows through the south-eastern portion of the development.
- the CNR rail runs along Highway 47 and at Coalspur one branch of the line heads south-east to the Coal Valley Mine load out facility and the other branch heads to the south-west to Inland Cement and the Elk Valley Coal Corporation, Cardinal River Operations;
- oil and gas activity is extensive with several pipelines located in the development area; and
- the proposed YT area will involve ten distinct pits;
    - three pits (Pit 165, 161 and 160) will be mined using dragline methods;
    - four pits (Pit 154, 153, 152, and 150) will be mined with truck/shovel mining methods;
    - the remaining three pits (Pit 163, 162, and 151) will be mined with a combination of dragline and truck/shovel methods.

The YT pits will be sequenced to meet production, backfill and reclamation objectives. For this application, pits have been designed to specific parameters. Future refinements of these designs may occur at the Mine Licencing stage.

Mining in the MW area will begin with pre-development activities in early 2009 and final recontouring and soil placement in early 2015. Overall proposed development footprint for YT is approximately 822 ha (Table C.3.0-1).

Table C.3.0-1 Yellowhead Tower Areas		
Development Type	**Disturbance Footprint**	
	Area (ha)	**Proportion (%)**
Pits	150	18
Topsoil Piles	77	9
Subsoil Piles	281	34
Ponds/Sumps	3	0
Haulroad	40	5
Dragline Walkroad	18	2
Buffer Area	253	31
Total	822	100

In the YT area, the major coal seams of interest are the Val d'Or and the Upper Mynheer. The Val D'Or is located near to the surface and dips to the northeast and is generally a moderate to steeply dipping monocline while the Mynheer is defined as steeply dipping. The coal seams are described in more detail in Section B.

C.3.1 Pit Reserves

As stated in Section C.1.5 the spatial limits of the pit 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 Figures C.3.1-1 to Figure C.3.1-7. The pit limits are determined by applying an incremental cut-off strip ratio (ICSR) 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.3.1-1 indicates the proposed coal release rates and corresponding overburden stripping requirements for the MW and YT mine plan.

Table C.3.1-1 Yellowhead Tower Mining Plan

Pit	Mine Method	Seam	Waste (BCM)	Coal (RMT)	Ratio (BCM/ RMT)	Yield (%)	Coal (CMT)	Ratio (BCM/ CMT)
150	Backhoe	Mynheer	1,592,290	586,296	2.72	52.5	307,805	5.17
151	Backhoe Dragline	Mynheer	1,235,585	496,479	2.49	52.5	260,651	4.74
152	Backhoe	Mynheer	11,062,034	4,817,174	2.30	52.5	2,529,017	4.37
153	Backhoe	Mynheer	1,249,392	645,997	1.93	52.5	339,148	3.68
154	Backhoe	Mynheer	9,684,219	3,389,990	2.86	52.5	1,779,745	5.44
160	Dragline	Val D'Or	7,031,722	2,744,986	2.56	52.5	1,441,117	4.88
161	Dragline	Val D'Or	1,583,642	704,362	2.25	52.5	369,790	4.28
162	Backhoe Dragline	Val D'Or	8,492,958	4,988,606	1.70	52.5	2,619,018	3.24
163	Backhoe Dragline	Val D'Or	1,414,937	2,090,974	0.68	52.5	1,097,761	1.29
164	Backhoe Dragline	Val D'Or	9,081,067	3,923,806	2.31	52.5	2,059,998	4.41
165	Dragline	Val D'Or	1,629,941	1,027,505	1.59	52.5	539,440	3.02
Total			**54,057,787**	**25,416,175**	**2.13**	**52.5**	**13,343,490**	**4.05**

For the pits where a combination of dragline and truck/shovel mining methods will be employed, the dragline will complete the initial pit development and will excavate the upper levels of the overburden with the truck/shovel mining method completing the pit.

The volume of overburden and coal has been calculated for each pit allowing a mine sequence and schedule to be calculated. This schedule illustrates the approximate time frame for each development. The resulting life of mine development plan described in this report illustrates not only potential pit areas but corresponding spoil development, drainage plan, and ultimate reclaimed profiles.

C.3.2 Mining Sequence

The proposed mine plan and ultimate pit limits are determined by various factors which include geology, engineering, 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 YT mine plan is included as Figure C.1.0-2.

The YT area will be developed in four stages utilizing a combination of dragline and truck/shovel mining methods. The active pit development for each stage of mining are listed in Table C.3.2-1 and shown on the following figures:

- Figure C.3.2-1 - Stage 1;
- Figure C.3.2-2 - Stage 2;
- Figure C.3.2-3 - Stage 3; and
- Figure C.3.2-4 - Stage 4.

The four stages of development are also listed in Table C.3.2-1. At any one time there are several pits under various stages of development. This phasing of the development allows the rock removal and coal recovery to be scheduled to allow sufficient coal release that will provide a steady feed of raw coal to the plant to ensure contract demands are met.

Table C.3.2-1 Yellowhead Tower Pit Development and Schedule

Pit	Mining Methods	Dates
Stage 1		
Pit 164	Dragline & Truck/Shovel	**May 2009 to April 2010 (Figure C.3.2-1)**
Pit 165	Dragline	
Pit 153	Truck/Shovel	
Pit 163	Dragline & Truck/Shovel	
Pit 152	Truck/Shovel	
Stage 2		
Pit 164	Dragline & Truck/Shovel	**May 2010 to July 2010 (Figure C.3.2-2)**
Pit 153	Truck/Shovel	
Pit 152	Truck/Shovel	
Pit 162	Dragline & Truck/Shovel	
Stage 3		
Pit 164	Dragline & Truck/Shovel	**August 2010 to July 2012 (Figure C.3.2-3)**
Pit 153	Truck/Shovel	
Pit 152	Truck/Shovel	
Pit 162	Dragline & Truck/Shovel	
Pit 151	Dragline & Truck/Shovel	
Pit 161	Dragline	
Pit 150	Truck/Shovel	
Pit 160	Dragline	
Stage 4		
Pit 164	Dragline & Truck/Shovel	**August 2012 to end of January 2015 (Figure C.3.2-4)**
Pit 154	Truck/Shovel	

C.3.2.1 Mine Pre-Development

It is anticipated that pre-development work for the YT area will be started in early 2009. Pre-development will include the construction of the haulroad, construction of the dragline walk road, Highway 47 crossing, rail line crossings, installation of the power line, site clearing and soil salvage. Water management features including ditches and impoundment's will also be established. Drainage control structures will be constructed in advance of development to control sedimentation. Pre-development activities are discussed in more detail in Section C.1.3.

C.3.2.2 Stage 1 Development

Stage 1 development is scheduled to occur from May 2009 until April 2010. Initially, the Marion (7450) dragline will be moved to the west end of the YT area via the dragline walk road. At the same time construction will begin on the haulroad linking the Pit 29 activities with the YT development. This will include the installation of the level crossing on Highway 47 and two level crossings on the CN Railway, and several watercourse crossings. Watercourse crossing details are discussed further in Section C.3.3.

The Marion dragline will begin stripping soil from the Pit 163, 164, 165, 152 and 153 pits. When the Page 752 dragline has finished at MW it will move to YT via the dragline walk road. There is currently a pipeline, owned and operated by Petro-Canada, located in the Pit 153 and 165 development area. Prior to any surface disturbance CVRI will discuss the relocation of this line with Petro-Canada.

Prior to any activities occurring in Pit 152 and 153, two small diversions of Chance Creek and a tributary will need to be constructed. These diversions are discussed further in Section C.3.3.

C.3.2.3 Stage 2 Development

Stage 2 mining is scheduled to occur from May 2010 to July 2010 and is associated with the diversion of Chance Creek and mining in Pit 162. Mining will be completed in Pits 163 and 165 so reclamation activities including recontouring, coversoil placement and seeding will occur during this time.

Chance Creek will be diverted through Pit 152 to one of the tributaries of Chance Creek. A temporary lined channel will be constructed along one of the benches of the mined out Pit 152. Once Chance Creek has been diverted, mining of the Pit 162 will begin and completed as part of stage 3 development.

C.3.2.4 Stage 3 Development

Stage 3 mining is scheduled to occur from August 2010 to July 2012. Active mining will occur in the existing Pits 152, 153 and 164 and will commence in new Pits 162 (east end), 150, 151, 160 and 161. Mining will be completed in all these pit areas with the exception of Pits 154 and 164 which will continue into stage 4.

There are two pipelines located within the stage 3 development area. A pipeline owned and operated by Petro-Canada that crosses the Pit 151 development area and a line owned by

Talisman crosses the pit 161 development area. Prior to any surface disturbance CVRI will discuss the relocation of these lines with Petro-Canada and Talisman.

During this time, Pit 153 is completed and will be reclaimed. Chance Creek will then be routed through the end pit lake back into the main channel. Mining in the main portion of Pit 162 will be completed. Pit 162 will be reclaimed and the main stem of Chance Creek will be reconstructed and diverted through the reclaimed Pit 162 to near its original alignment. Pit 152 mining and reclamation will be completed and the small diversion of the tributary will then be routed through the Pit 152 end pit lake. To accommodate mining the eastern portion of Pit 162, the tributary will be diverted along the western edge of the pit (likely through a large culvert) back to the main channel of Chance Creek.

Settling ponds along Jackson Creek will be constructed prior to soil salvage and mining of the Pit 150 and 160 areas or development of the spoil piles.

C.3.2.5 Stage 4 Development

Stage 4 development is scheduled from August 2012 to January 2015 and includes completion of mining and reclamation in Pits 154 and 164. The end pit lake in Pit 153 will serve as the main sediment control facility during this time.

The diversion of the Chance Creek tributary around the south-east end of Pit 162 will be removed and the tributary channel re-established.

Reclamation and recontouring will occur in Pits 150, 151 and 160. End pit lakes will be established in Pits 150 and 160.

All access roads and facilities will be removed unless they are required for general maintenance and reclamation activities.

C.3.3 Water Management Plan

C.3.3.1 Surface Water Collection System

Coal Valley has successfully utilized a number of water collection systems within the existing mine to aid in water management. One of the objectives of the water collection systems is to intercept surface flows above the mining area and simply 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. This same strategy as discussed for the MW area. A network of drainage ditches and containment areas will be developed along the edge of disturbance to accomplish this objective.

Another objective is to collect and contain all water that has been affected by mining (i.e. sedimentation) and ensuring that it is clean when released from the site. This is done by establishing a network of sedimentation ponds or impoundments that naturally remove sediment or artificially enhanced settling using coagulants and flocculants. Also, once areas have been mined out, they become potential storage areas for wastewater from active mining areas. These areas are utilized wherever possible. Water from these areas is generally pumped through a licensed impoundment prior to release to the environment.

C.3.3.2 Impoundments

There are currently eight settling ponds and ten sumps planned for the YT area. The ponds are designed to collect local runoff from the strategically located sumps, spoil pile 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 mine. 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 impoundment.

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.1.0-2.

C.3.3.3 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).

C.3.3.4 Stream Diversions

During the development of the YT two tributaries to Chance Creek and two separate locations along the main stem of Chance Creek are intercepted and will require temporary diversions around the active mining areas. The environmental impacts of these diversions are discussed in Section E.

With the first stage of mining (Section C.3.2.2) the diversion of two intermittent streams will be required. The first diversion, located on upper Chance Creek, is approximately 200 m in length and is required to move water around Pit 153. This diversion will involve the construction of a 1 m deep ditch around the active pit area. This ditch may be poly-lined to minimize seepage into the adjacent pit. The second diversion, is located on a tributary of Chance Creek, is approximately 100 m long and is required to move water around Pit 152. This diversion is steeper and will consist of a 1 m deep ditch either cut into bedrock or armoured with rock. Both diversions (Figure C.3.2.1) will be approximately 1-2 m wide. After mining of Pit 152 and 153 is completed these diversions will be rerouted through the mined out pits into the planned end pit lakes. Depending on the hydrological conditions at the time the flow from the diversions may be gradually directed to the end pit lake area in order for minimum downstream flows to be maintained.

During the second stage of mining (Section C.3.2.3) the diversion of the main stem of Chance Creek will be required so that Pit 162 can be mined. Chance Creek will be diverted along a lined channel constructed along a bench of Pit 152 (Figure C.3.2.2) and into the tributary to the south of the pit. Approximately 1.5 km of the Chance Creek channel will be inactive with approximately 900 m being mined through.

Mining and reclamation of Pit 162 will be completed in Stage 3 (Section C.3.2.4). Pit 162 will be reclaimed and the main stem of Chance Creek will be reconstructed and diverted through the reclaimed Pit 162 to near its original alignment (Figure C.3.2.3). To accommodate mining the eastern portion of Pit 162, the tributary will be diverted along the western edge of the pit (likely through a large culvert) back to the main channel of Chance Creek (Figure C.3.2.3).

C.3.3.5 Lake Development

Five lakes are planned as part of the reclamation plan for the YT area. The physical characteristics of the proposed lakes are listed in Table C.3.3-1.

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

Table C.3.3-1 Proposed End Pit Lakes - Yellowhead Tower

Pond	Pit	Creek Influence	Water Elevation (m)	Surface Area (m^2)	Maximum Depth (m)	Volume (m^3.)	Littoral	
							Area (m^2)	Portion
A	150	Jackson	1180	18,276	10	91,380	4,627	25%
B	160	Chance	1210	60,629	10	303,145	5,283	9%
C	152	Chance	1260	145,427	50	3,635,675	4,976	3%
E	153	Chance	1270	21,167	20	211,670	4,648	22%
F	154	Chance	1300	127,894	50	3,197,350	14,479	11%
Total				**464,802**			**54,094**	**12%**

C.3.4 Associated Development

C.3.4.1 Dragline Walk Road

CVM plans to build a 40 m wide dragline walk road to move the dragline from MW to the YT development area. The road location has been chosen to avoid major creek crossings. Surface water management controls will be installed. These controls will consist of collection ditches, sumps and pumps which will collect and transfer haulroad runoff to a licenced impoundment for treatment.

The dragline will move to YT as mining in MW is completed using the truck/shovel operation. This road will be used as required to shuttle personnel and equipment between the two development areas until the mining and reclamation of MW has been completed. At that time CVM will close and reclaim the road.

CVM plans to discuss the future use of the haulroad with West Fraser Forest Products.

C.3.4.2 Highway 47 Crossing

The YT mining area, located west of the community of Coalspur, is a continuation of mining from the Pit 28/29 area. A crossing will be constructed across Highway 47 to allow mining equipment access to the area (Figure C.3.0-1) and to haul coal to the processing plant. An at

grade or level crossing has been proposed and will be submitted to Alberta Infrastructure and Transportation for review. The crossing will be designed to ensure safe operation of mine vehicles and management of traffic along Highway 47. Typical highway crossing plan is included as Figure C.2.4-1.

Dust suppression methods will be instituted and lighting and warning signs will be installed on Highway 47. Mine truck driver training programs will emphasize safe operation where the two roadways cross. CVM has operated other similar crossings for many years. The proposed crossing will be used for coal haulage for a very short duration.

C.3.4.3 CN Railway Crossing

CVM will also require two level crossings over the railway. One of the crossings will be on the line that is currently utilized to haul coal from the Elk Valley Coals Cardinal River operation. The second crossing will be on the railway line that services the CVM. CVM has two similar level crossings over the rail line on the existing mine. A typical railway crossing plan is included as Figure C.2.4-2.

C.3.4.4 Powerlines

Construction of a 138 kV powerline from the substation at Coalspur will occur in 2009. Its alignment will follow the main haulroad access into the YT area. At this point, a substation will be required to reduce the voltage to 7.2 kV for the mining operations. Since the dragline, drills and pumping equipment are electrically powered, powerlines will be required throughout the YT 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.3.4.5 Watercourse Crossings

In order to access the YT area numerous watercourse crossings will be required (Figure C.3.3-1). These include:

- the Embarras River;
- the main stem of Chance creek; and
- numerous crossings on tributaries to Chance Creek.

The Embarras River crossing will be a clear span open bottom arch type culvert with no instream work. It is anticipated that the Embarras River is navigable and therefore the crossing will be constructed with 1.5 m clearance above the mean annual flood level. Vertical wall end treatments will be provided to minimize the length of the structure to about 42 m long. The structure will have a clear span of approximately 11 m with a minimum height of 3 m.

For the Chance Creek crossing, CVM plans to use a 4 m diameter structural plate culvert that is 86 m long. This is slightly larger than the existing crossing located downstream at Highway 47. The proposed structure will be buried 2 m deep to allow establishment of fish habitat maintaining the natural channel width. The average channel is approximately 3 m wide.

Eight other defined watercourse crossings of upper Chance Creek and its tributaries will be required. These are all small channels <1 m wide and will have 1-2 m diameter culverts installed.

All crossings will be constructed in accordance with the "Code of Practice for Watercourse Crossings" (AENV 2000).

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

C.3.4.6 Coalspur Provincial Recreation Area

The Coalspur Provincial Recreation Area (PRA) is located approximately 200 m from the proposed haulroad. There is also an existing road that joins the PRA with the community of Coalspur (Figure C.3.0-1).

Given the proximity of the PRA to the proposed haulroad, CVM is proposing to relocate the PRA south along the Embarras River. Details concerning the exact location of the PRA have not been finalized. This relocation has been discussed with West Fraser who currently operates the PRA, and further discussions need to be held with Alberta Tourism, Parks, Recreation and Culture.

C.4 ENVIRONMENTAL MANAGEMENT

CVM'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. CVM will adopt the same environmental and operating practices championed at the existing mine to the MW and YT development areas.

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

C.4.1 Responsible Management

CVM 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.4.2 Environmental Protection Measures

CVM 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 and land resources.

CVM undertakes as a priority "pollution prevention" in preference to "pollution clean up".

Pollution prevention measures in place at Coal Valley 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.4.3 Participant in Environmental and Regulatory Initiatives

CVM 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 MW and YT areas. 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.4.4 Regulatory Compliance and Adaptive Management

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

- key CVM 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 CVM's site operations and regulatory compliance. The company will continue carrying out its environmental and operating programs in the MW and YT areas using an adaptive management approach.

C.4.5 Respect the Interests of Publics

CVM is committed to respect the interests of all interested publics in the MW and YT development. The company believes that the information provided, and commitments made in this application demonstrate the company's recognition of public participation towards this mine development project. Please refer to Section G for details on the public consultation program.

C.4.6 Environmental Protection Program

The purpose of Coal Valley's Environmental Protection Program is to first prevent and second to minimize adverse environmental impacts resulting from the company's operations. The program will be implemented in the extension area through the following on-site mechanisms:

- adaptive management approach to environmental risk assessment;
- Safety, Health and Environment Committee (SHE) comprised of key CVM employees;
- 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.4.6.1 Adaptive Management to Environmental Risk Assessment

Coal Valley recognizes and performs three stages of environmental risk assessment. Throughout these stages of risk assessment, CVM 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.4.6.2 Safety, Health and Environment Committee

Part of Coal Valley'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, Coal Valley's commitment, efforts and accomplishments in environmental management.

C.4.6.3 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. CVM is continuously investigating and evaluating waste disposal activities.

C.4.6.4 Spill Response and Clean Up Procedures

Materials and products currently used at CVM will also be utilized during development of the extension area. CVM's team of environmental consultants has evaluated the various products to be used in the MW and YT 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 extension 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.4.6.5 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.4.6.6 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, Coal Valley'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.4.6.7 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.

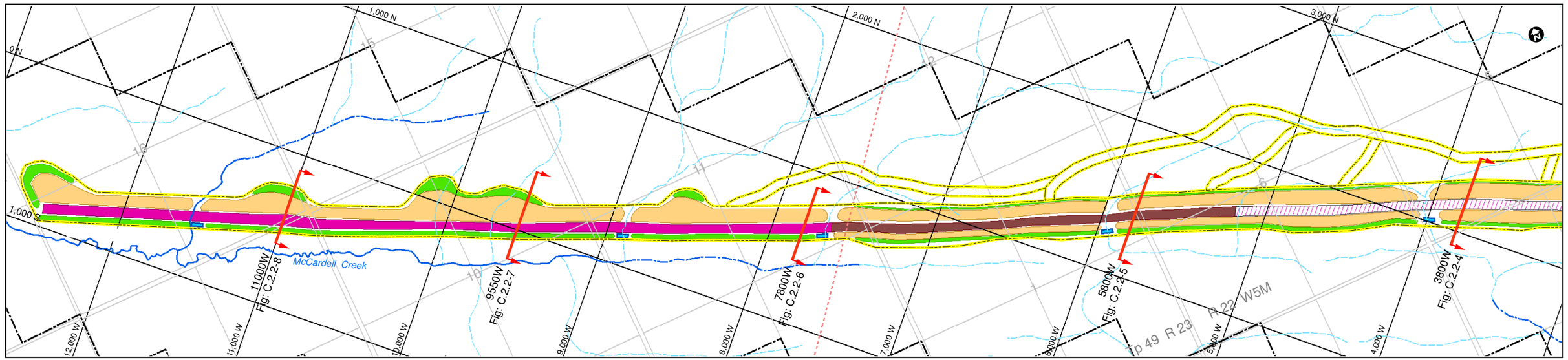
The immediate area around a product spill will be secured and kept clear of nonessential personnel. Reference will be made to the product Material Safety Data Sheet for proper treatment and cleanup procedures. If practical and feasible, spilled material will be recovered and returned to a storage area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

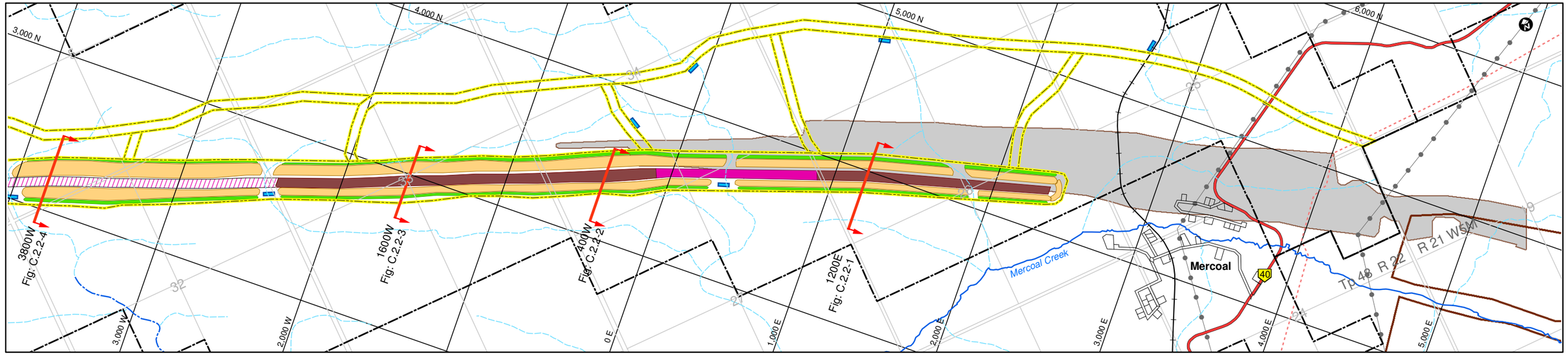
C.4.6.8 Spill Training

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. CVM has provided on site Spill Containment and Clean up workshops for all Emergency Response Teams within the organization.

C.4.6.9 Site Reclamation

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





Legend

- Disturbance Footprint
- Mine Permit Boundary
- 1000m Mine Grid
- Backhoe (Pit 125)
- Backhoe - Burnt Area (Pit 125)
- Dragline (Pit 124)
- Mercoal East Pit
- Underground Mine Limits
- Topsoil
- Spoil
- Ponds and Sumps
- Stream - Perennial
- Stream - Recurring
- Stream - Indefinite
- Highway
- Railway
- Powerline
- Pipeline
- Cross Section Location

0 0.25 0.5 1
Kilometres

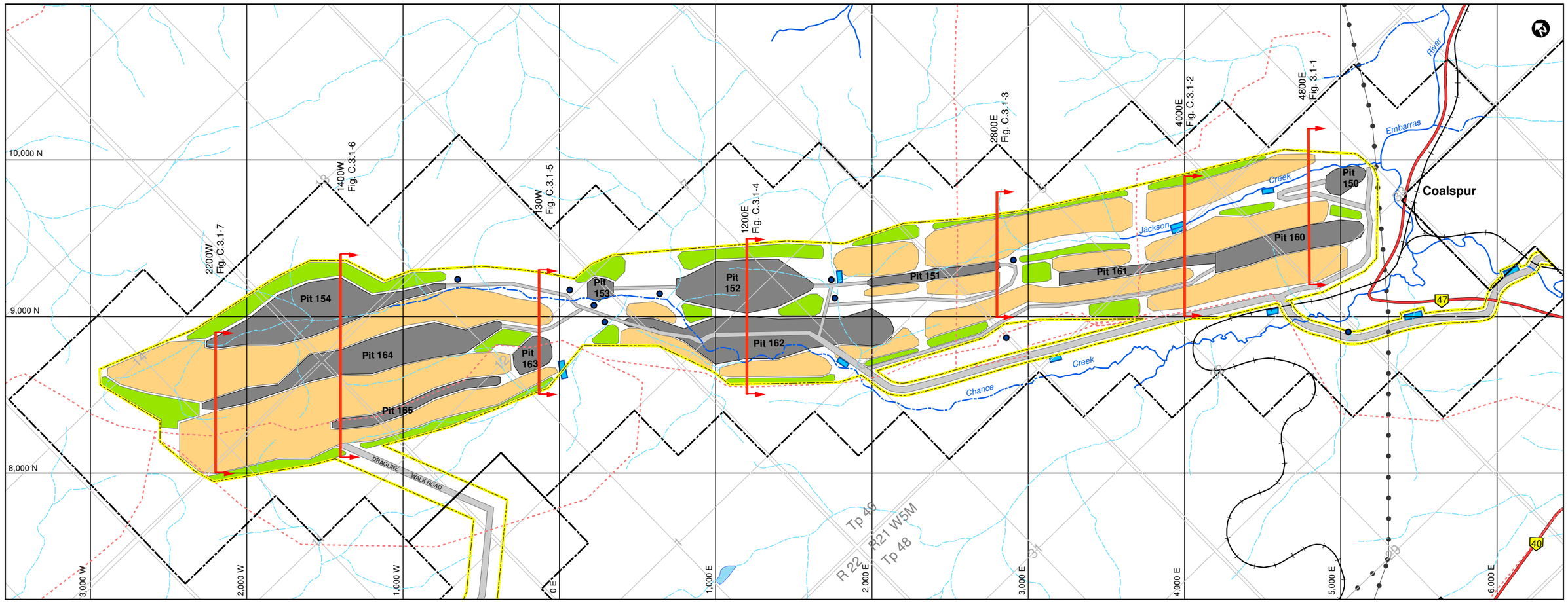
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Mine Plan Overview

DRAWN: PS
CHECKED: KY
DATE: Feb 8/08
PROJECT: 05-171

FIGURE:
C.1.0-1

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.1.0-1 Mercoal West Mine Plan Overview.mxd) 04/02/2008 -- 10:16:27 AM



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil
- Spoil
- Pit
- 1000m Mine Grid
- Stream - Perennial
- Stream - Recurring
- Stream - Indefinite
- Pond
- Sump
- Cross Section Location
- Haul Road
- Highway
- Railway
- Pipeline
- Powerline

0 0.25 0.5 1

Kilometres

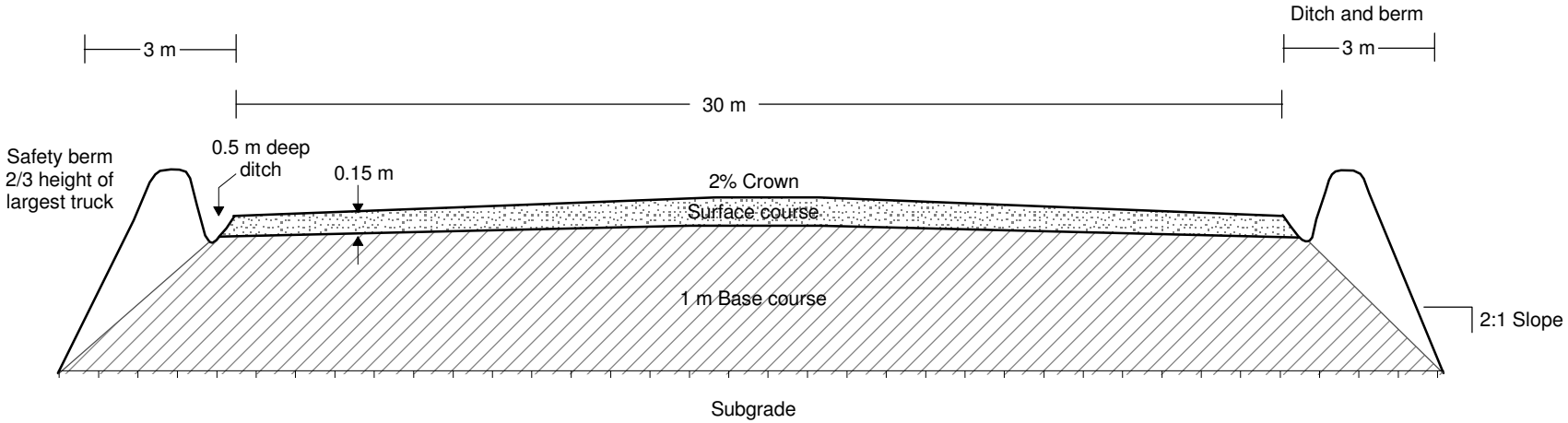
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Yellowhead Tower Mine Plan Overview

DRAWN: PS
CHECKED: KY
DATE: Feb 8/08
PROJECT: 05-171

FIGURE:
C.1.0-2

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.1.0-2 Yellowhead Tower Mine Plan Overview.mxd) 04/02/2008 -- 10:00:10 AM



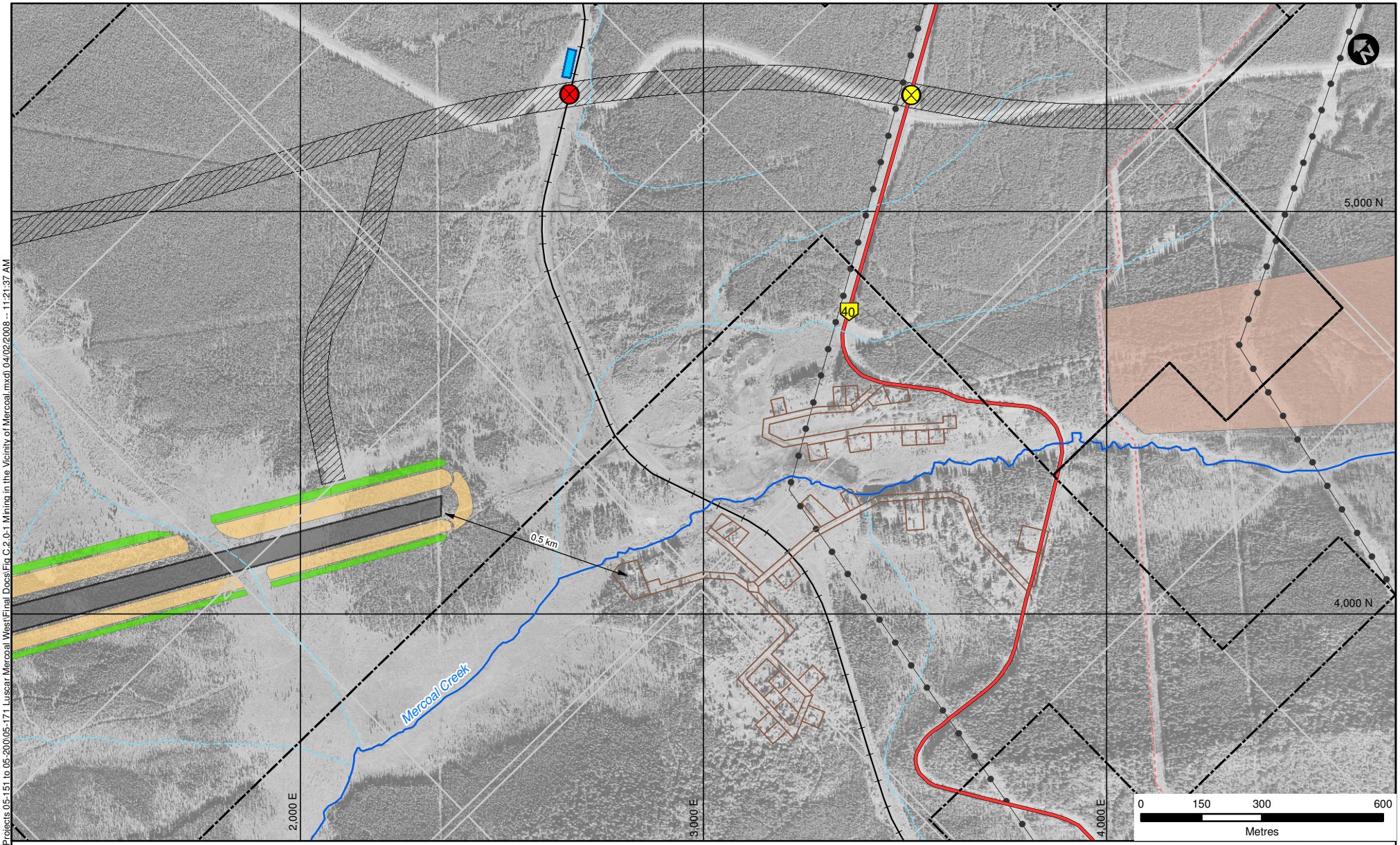
NOT TO SCALE

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Typical Haulroad Profile

DRAWN:	SL
CHECKED:	KY
DATE:	Jan 21/08
PROJECT:	05-171

FIGURE:
C.1.2-1



Legend

- Mine Permit Boundary
- Rail Crossing
- Road Crossing
- Topsoil Pile
- Spoil Pile
- Pit
- Mercoal East
- 1000m Mine Grid
- Pond
- Haul Road
- Lot or Access Road
- Highway
- Railway
- Powerline
- Pipeline

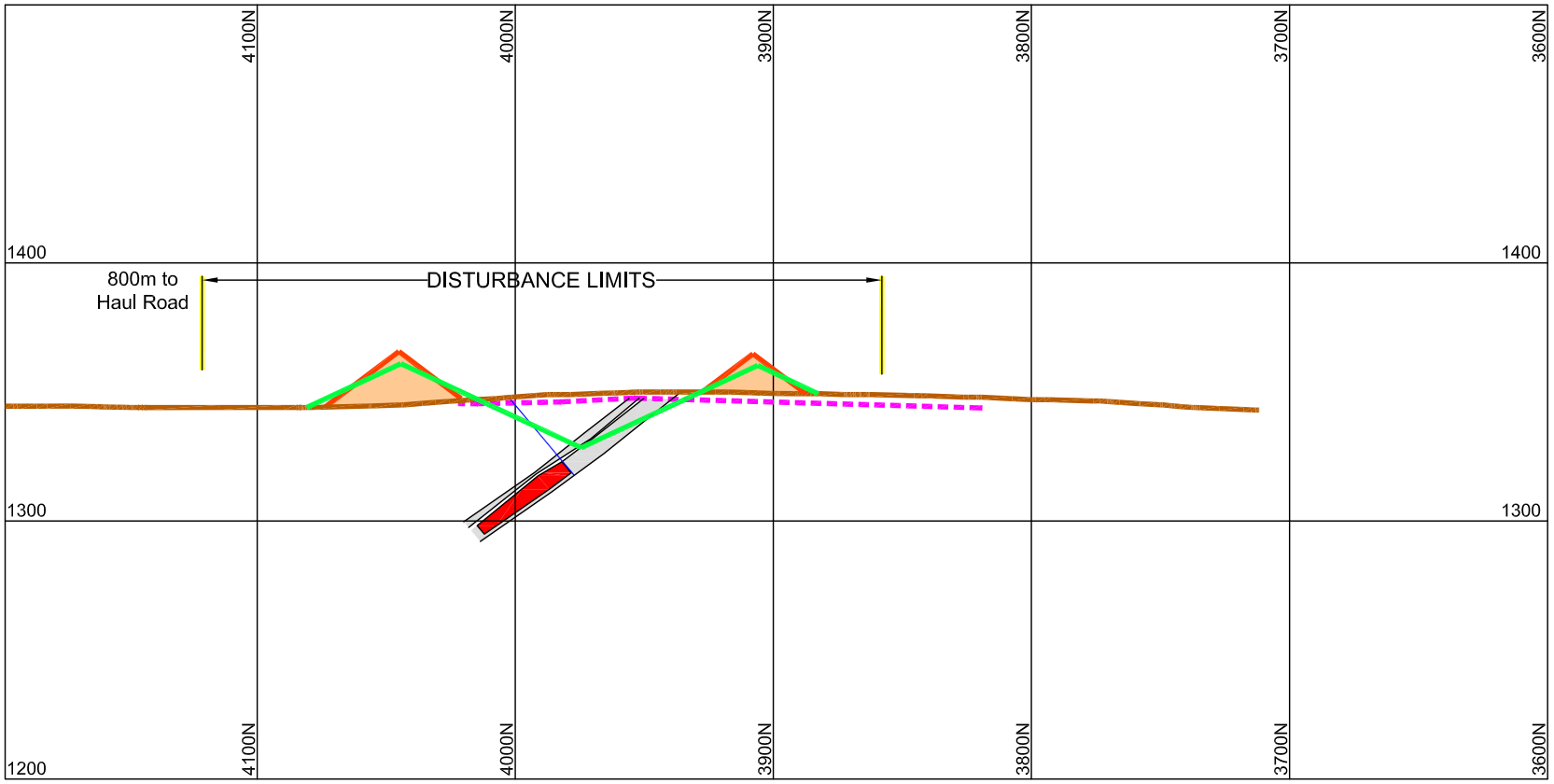
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mining Activities in Vicinity of Mercoal

DRAWN:	PS
CHECKED:	KY
DATE:	Feb 4/08
PROJECT:	05-171

FIGURE:
C.2.0-1

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.2.0-1 Mining in the Vicinity of Mercoal.mxd) 04/02/2008 -- 11:21:37 AM



Legend

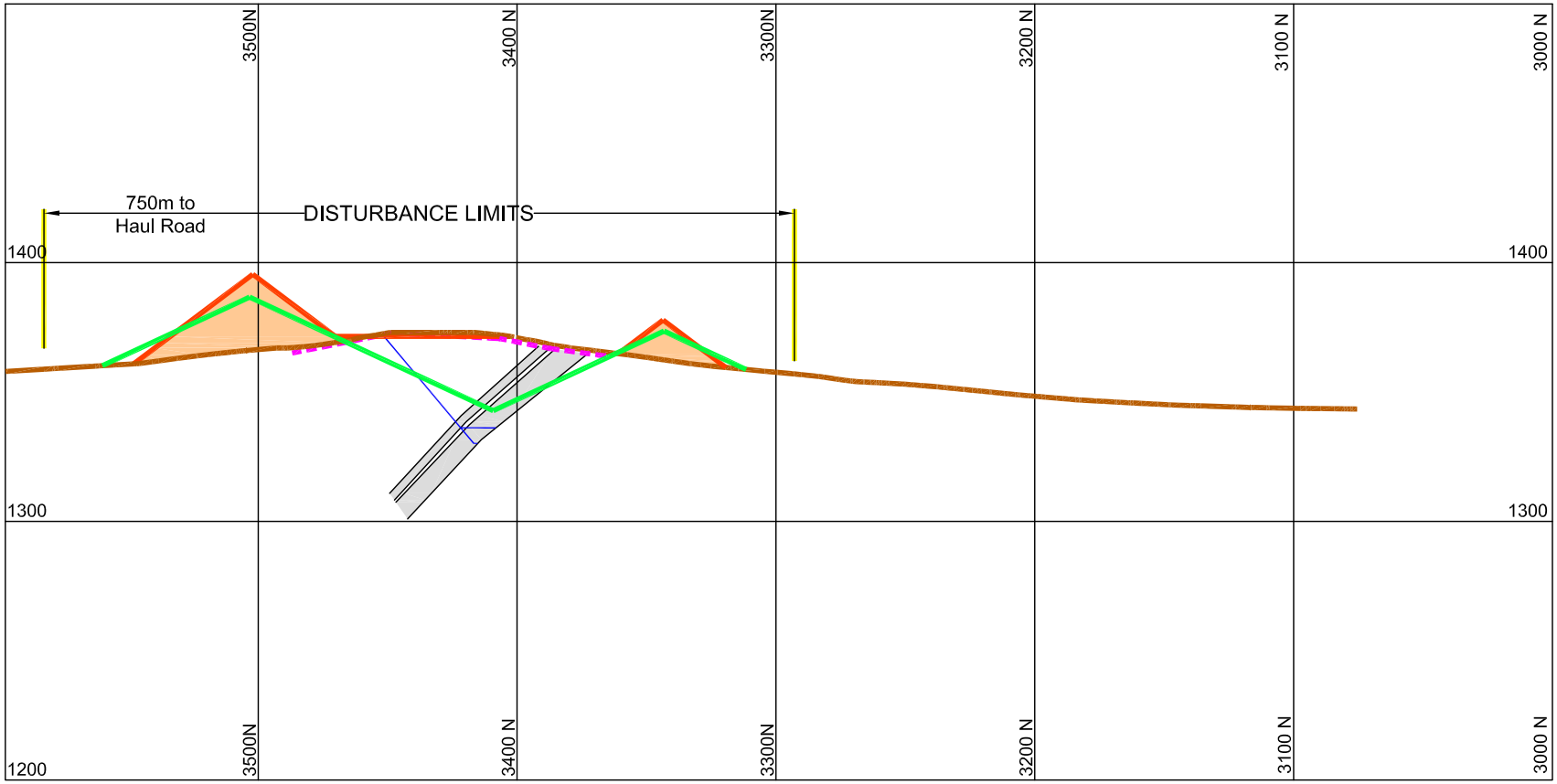
- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 1200 E

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	**C.2.2-1**
DATE: JAN 6/07	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

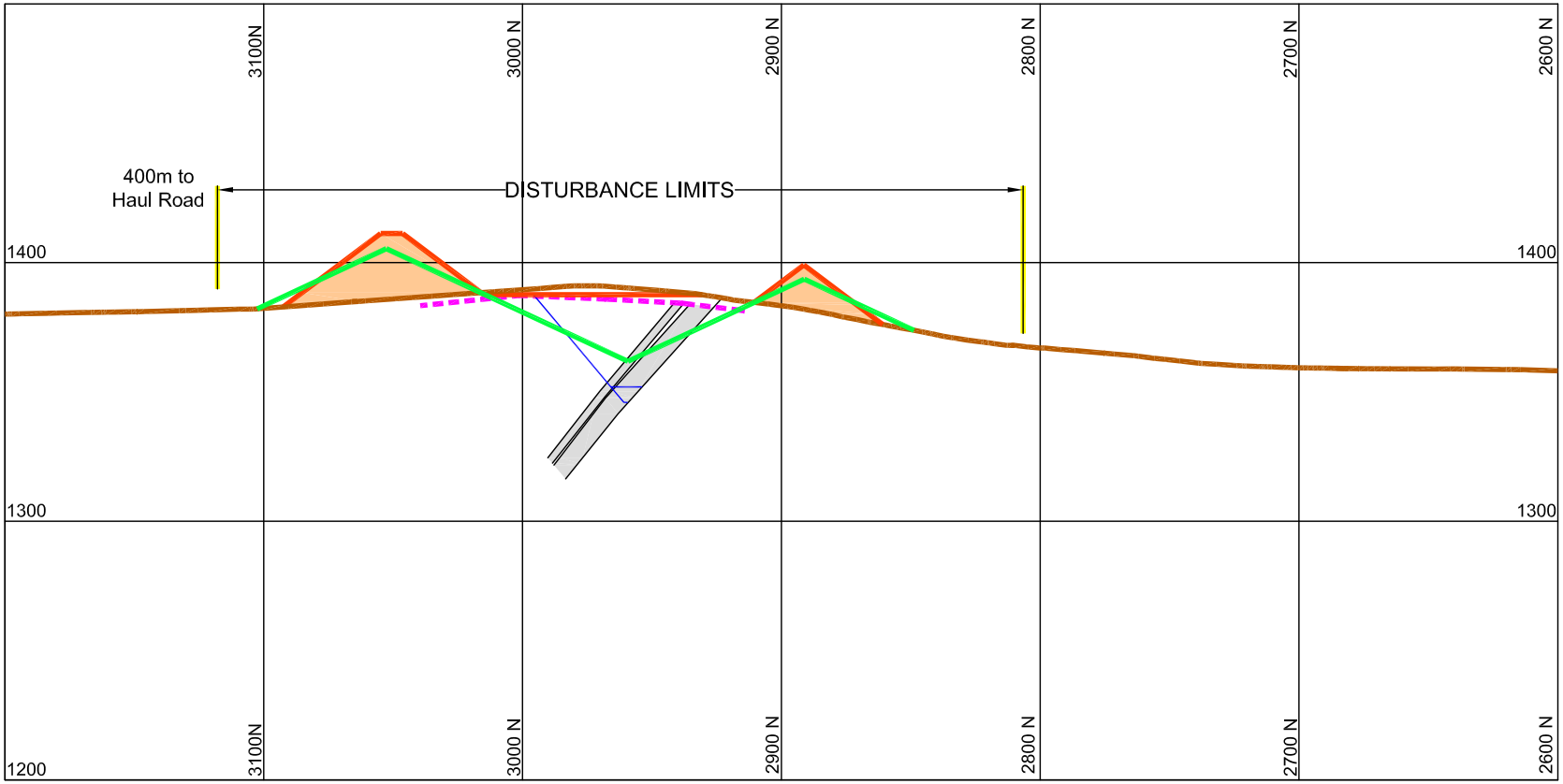
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 400 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN:	OTHERS
CHECKED:	KY
DATE:	JAN 6/07
PROJECT:	05-171

FIGURE: **C.2.2-2**



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 1600 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

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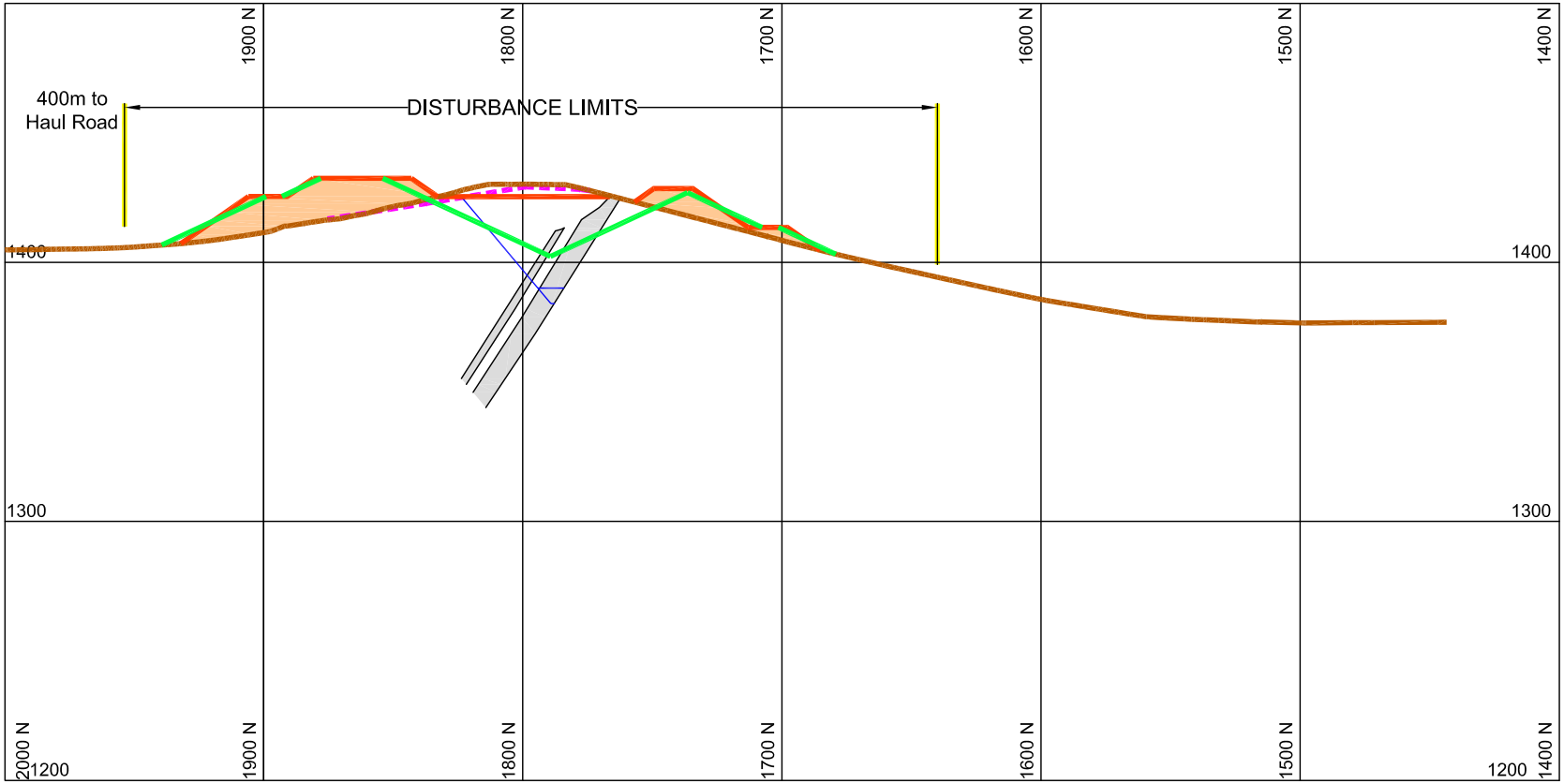
DATE: JAN 6/07	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

cvri

TITLE:
Mercoal West Development and Reclamation Section 3800 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

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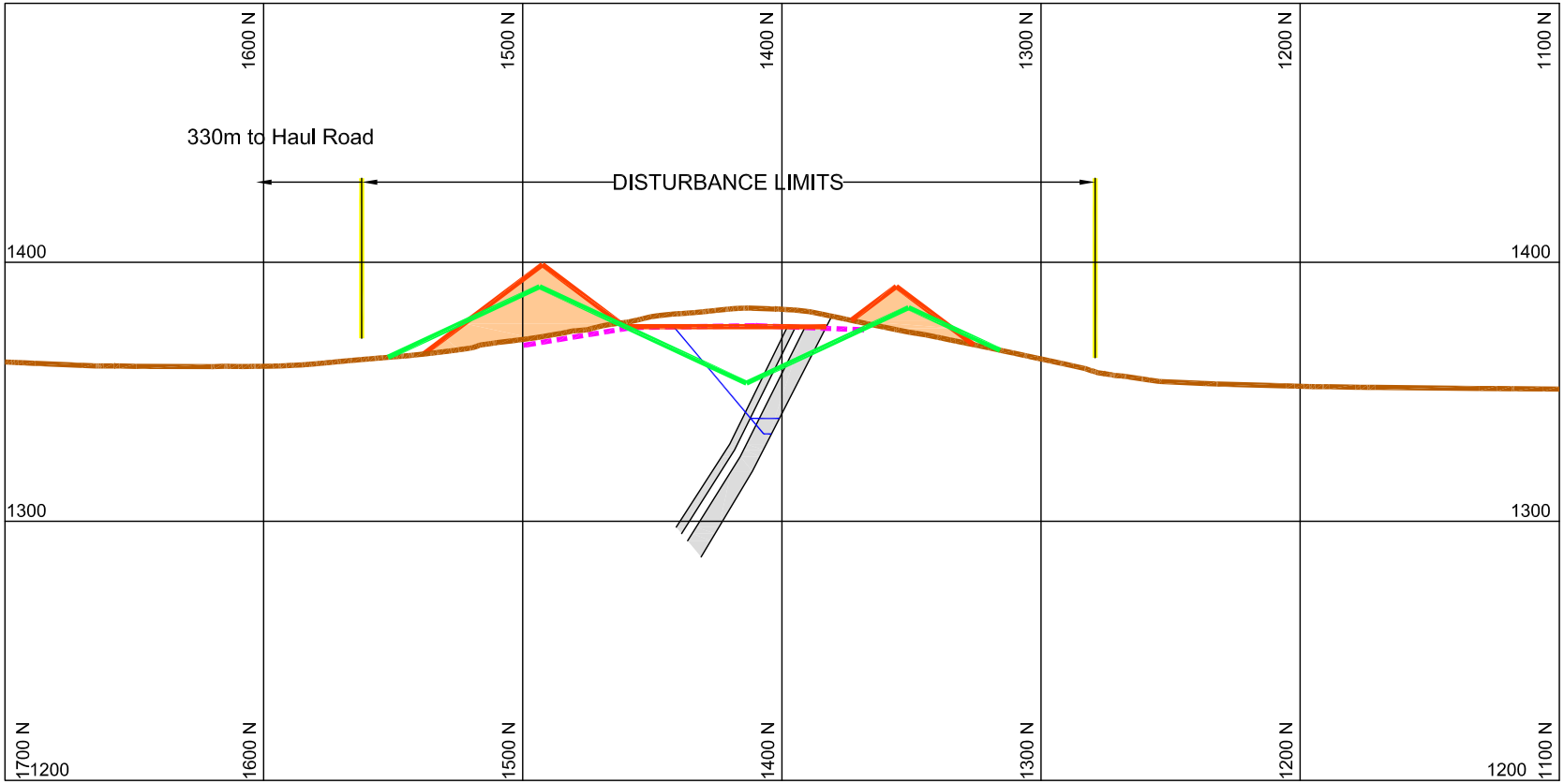
DATE: JAN 6/07	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 5800 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

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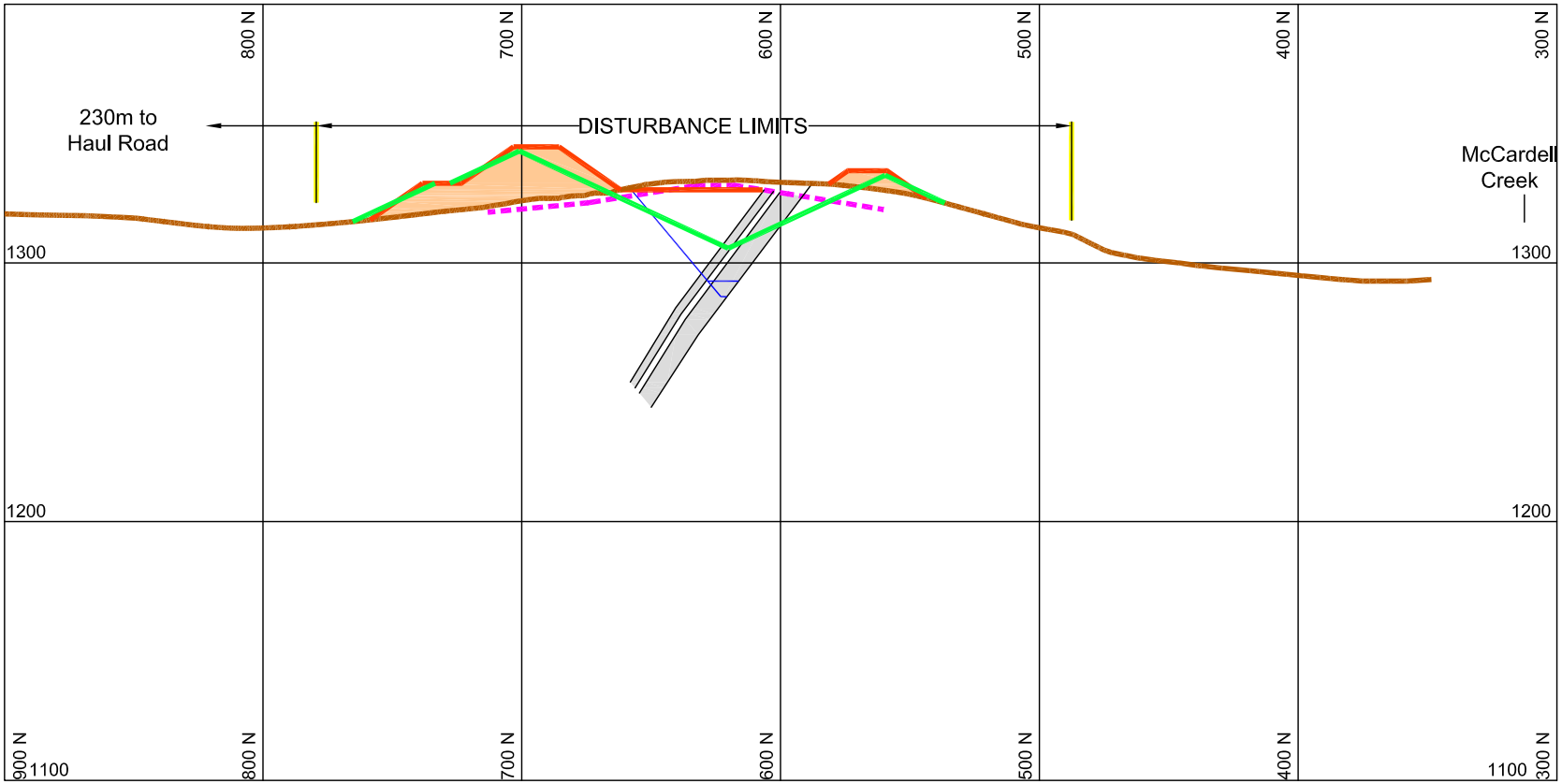
DATE: JAN 6/07	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 7800 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

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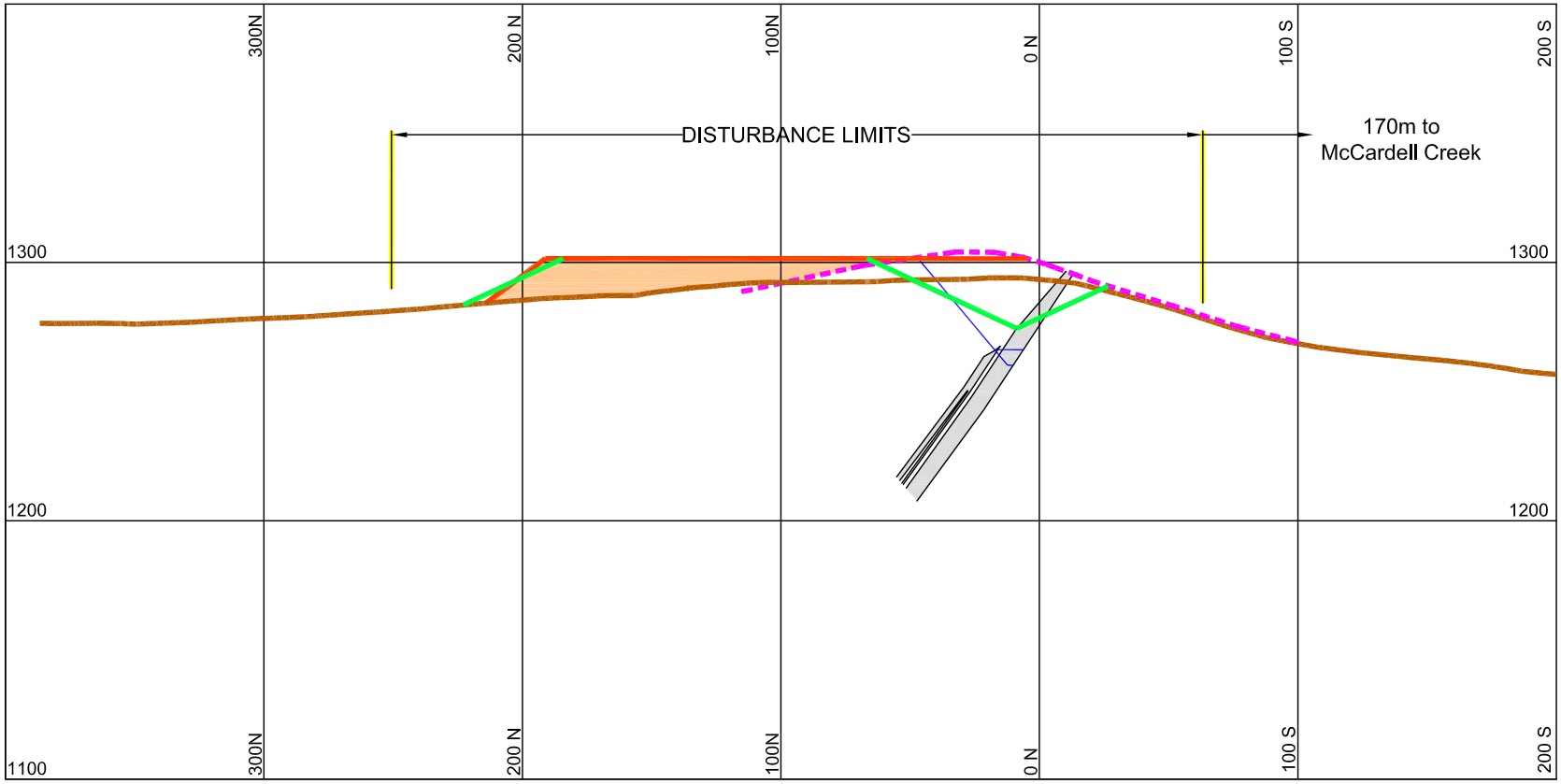
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 9550 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

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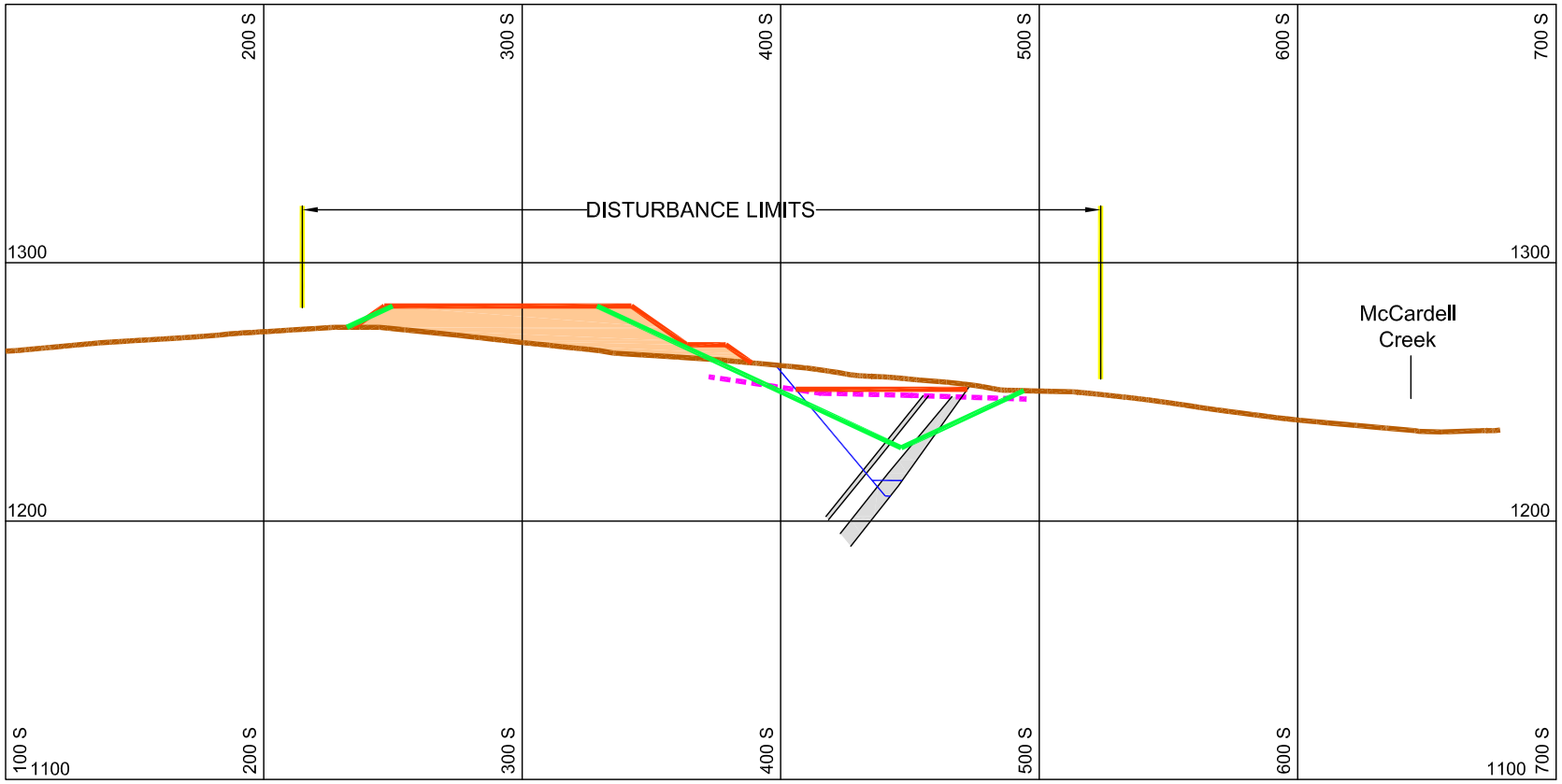
DATE: JAN 6/07	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mercoal West Development and Reclamation Section 11000 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

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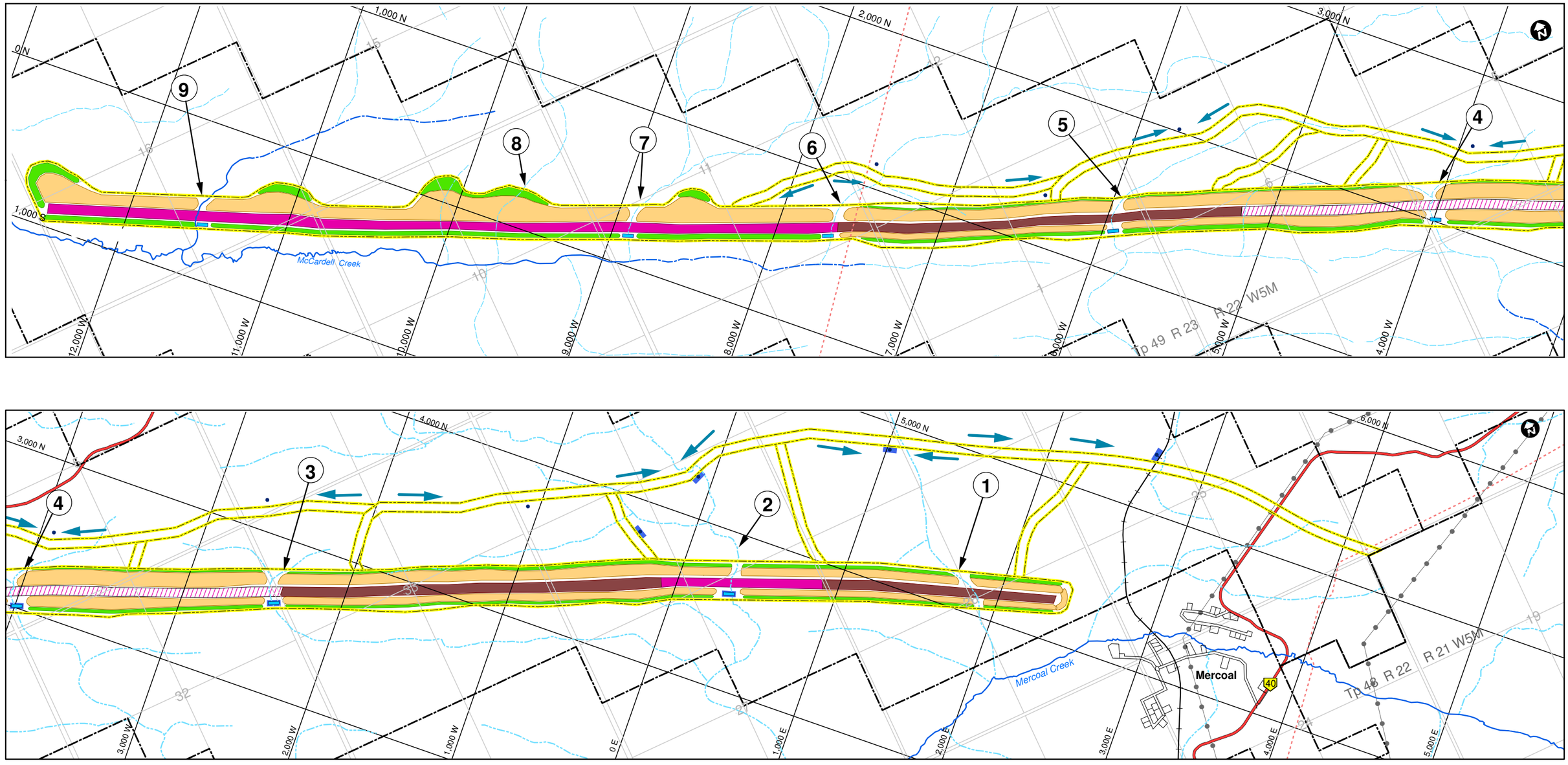
DATE: JAN 6/07	
PROJECT: 05-171	



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil Stockpile
- Spoil Stockpile
- Backhoe (Pit 125)
- Backhoe - Burnt Area (Pit 125)
- Dragline (Pit 124)
- Stream - Perennial
- Stream - Recurring
- Stream - Indefinite
- Pond
- Sump
- Drainage Flow
- 9 Diversion
- Highway
- Railway
- Powerline
- Pipeline
- 1000m Mine Grid

0 0.25 0.5 1
Kilometres

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

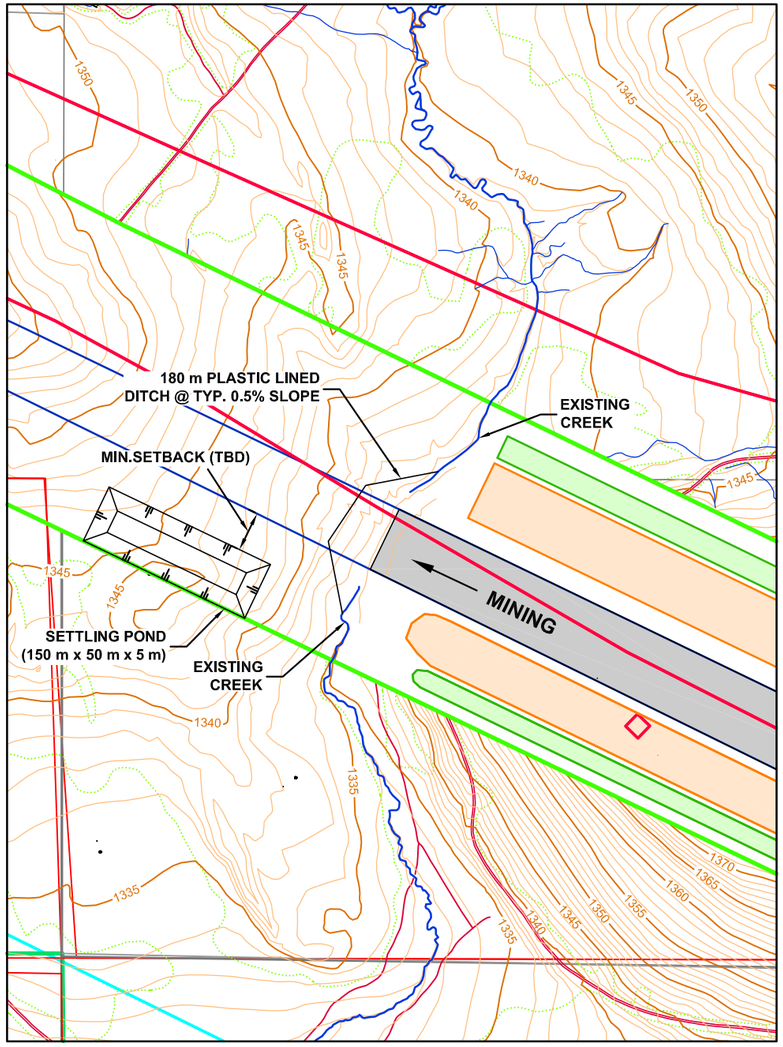
TITLE:
Mercoal West Water Management Plan

cvri

DRAWN: PS
CHECKED: KY
DATE: Feb 4/08
PROJECT: 05-171

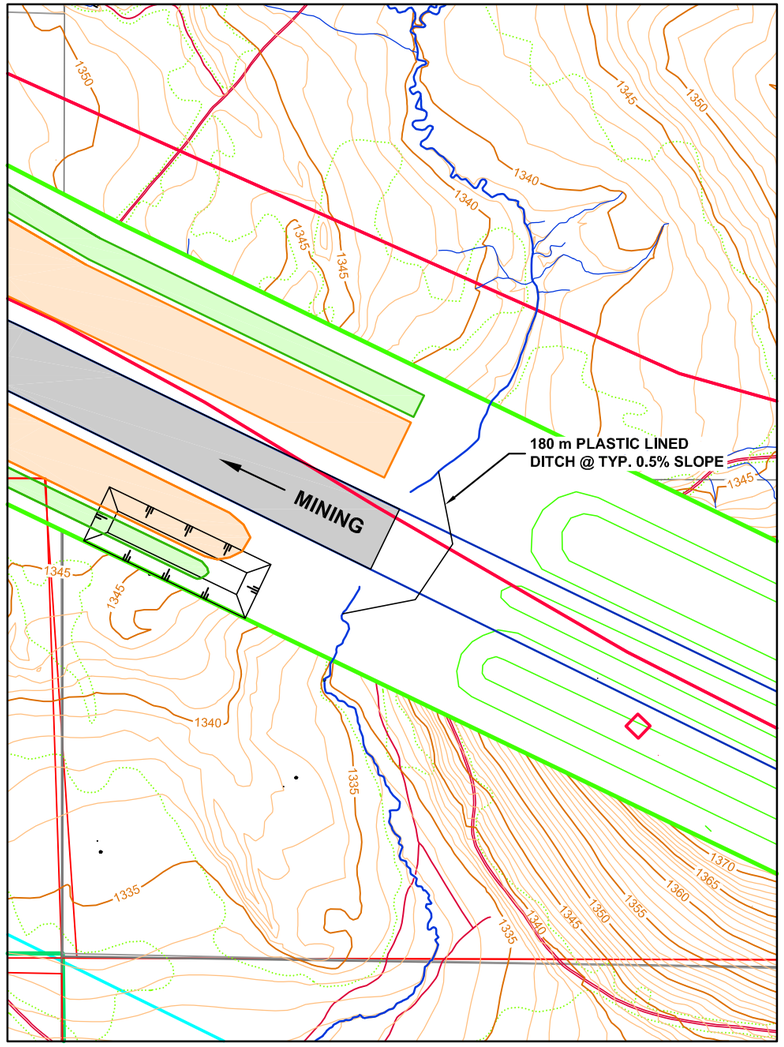
FIGURE:
C.2.3-1

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.2.3-1 Mercoal West Water Management Plan.mxd) 04/02/2008 -- 11:40:31 AM



STAGE 1 DIVERSION

Scale 1 : 5000



STAGE 2 DIVERSION

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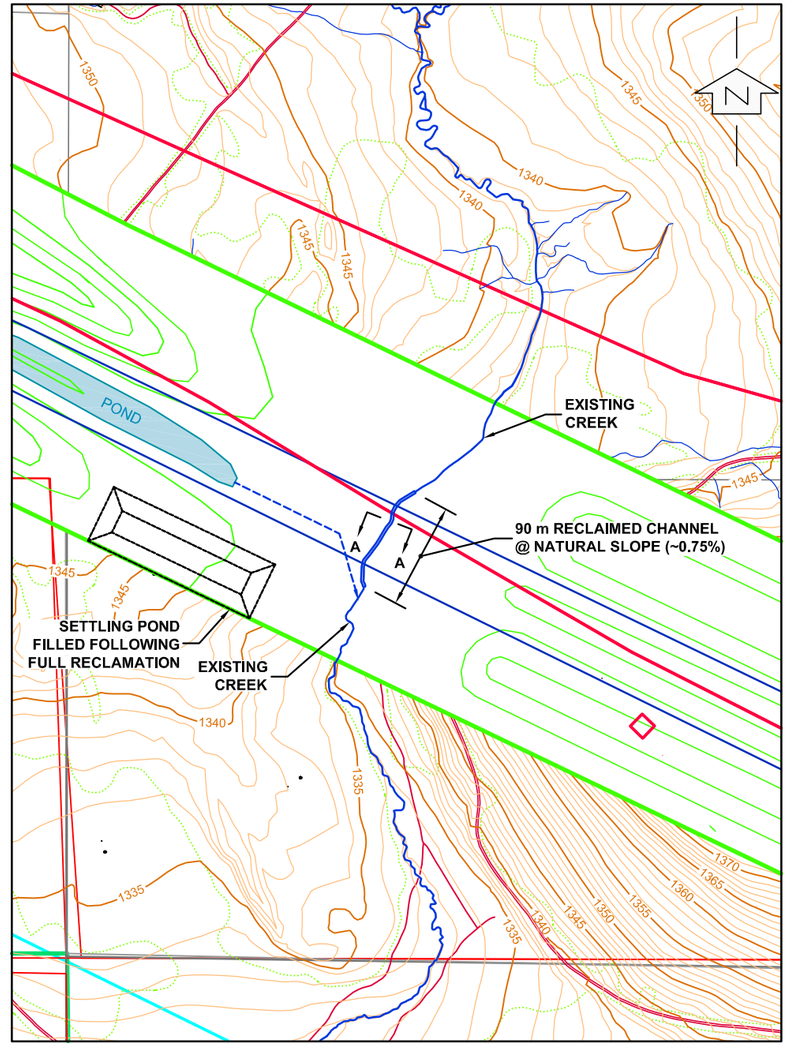
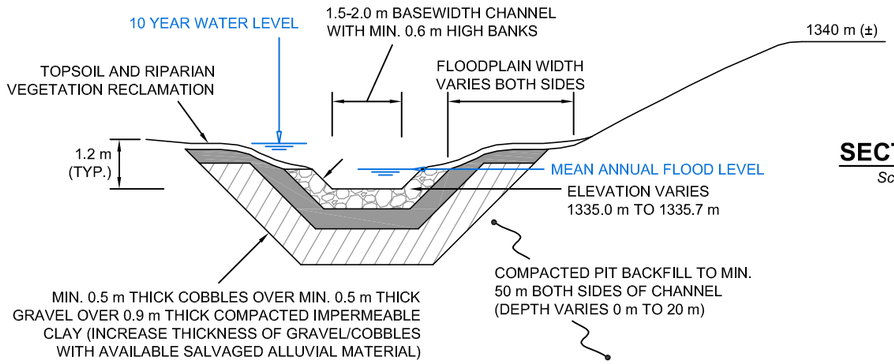


STAGE 3 RECLAMATION

Scale 1 : 5000



SECTION A-A

Scale 1 : 150

SCALE

SCALE

NOTE:

Diversion No. 2 shown as example. This is the largest creek. Culvert/flow will be smaller for other diversions.

LEGEND

- Dragline and Backhoe Pits
- Spoilpiles
- Topsoil Stockpiles

Source: From Matix 2008

PROJECT:

Mercoal West and Yellowhead Tower Mine Extension Project

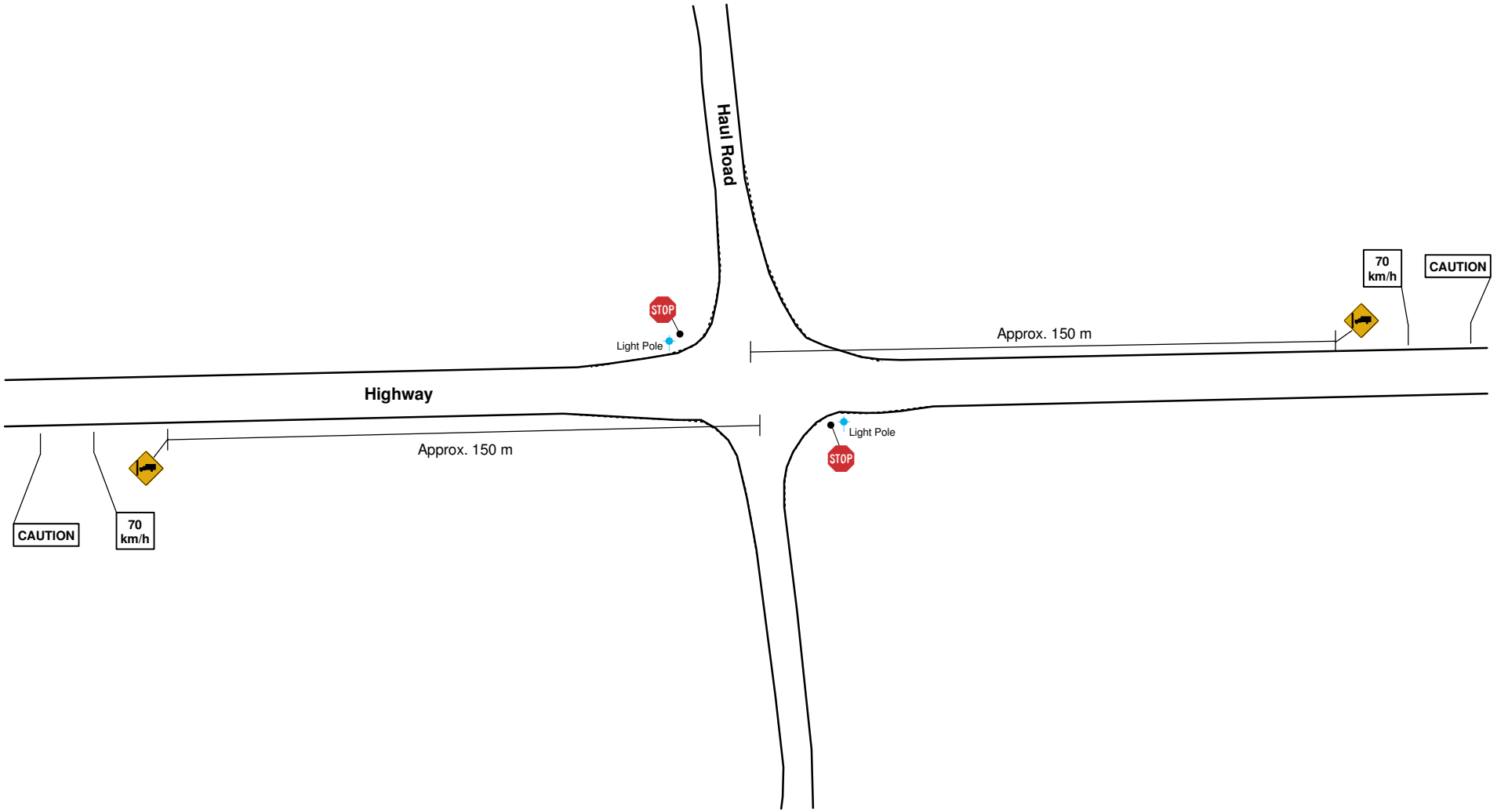
Millennium EMS Solutions Ltd.

TITLE:

Typical Watercourse Diversion Plan

FILE: 05-171 TYP DIVERSION PLAN.DWG

DRAWN: MATRIX	FIGURE:
CHECKED: KY	C.2.3-2
DATE: FEB 6/08	
PROJECT: 05-171	



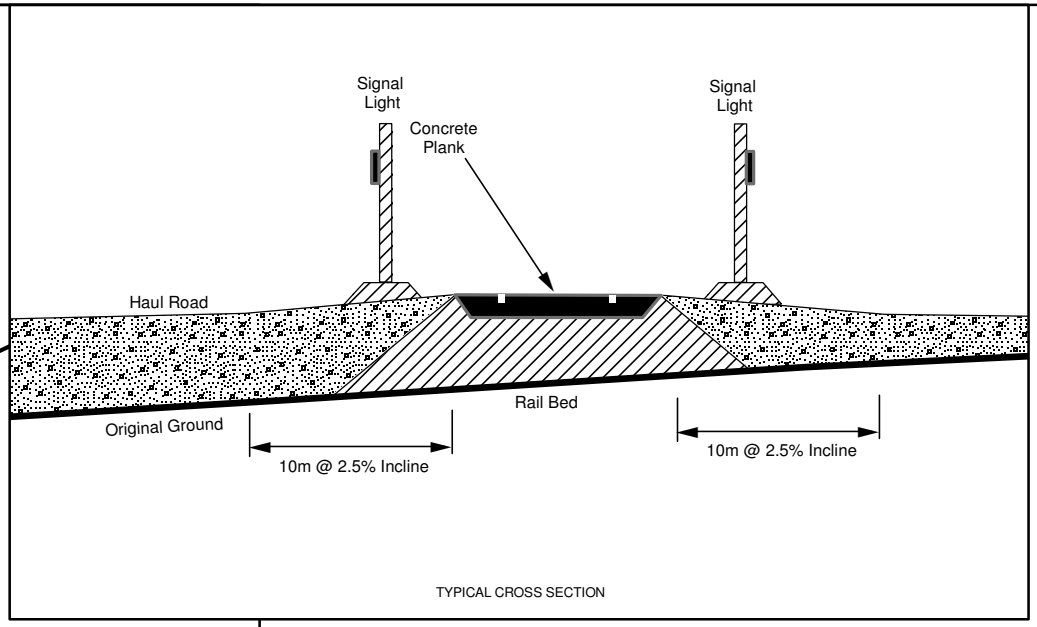
NOT TO SCALE

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

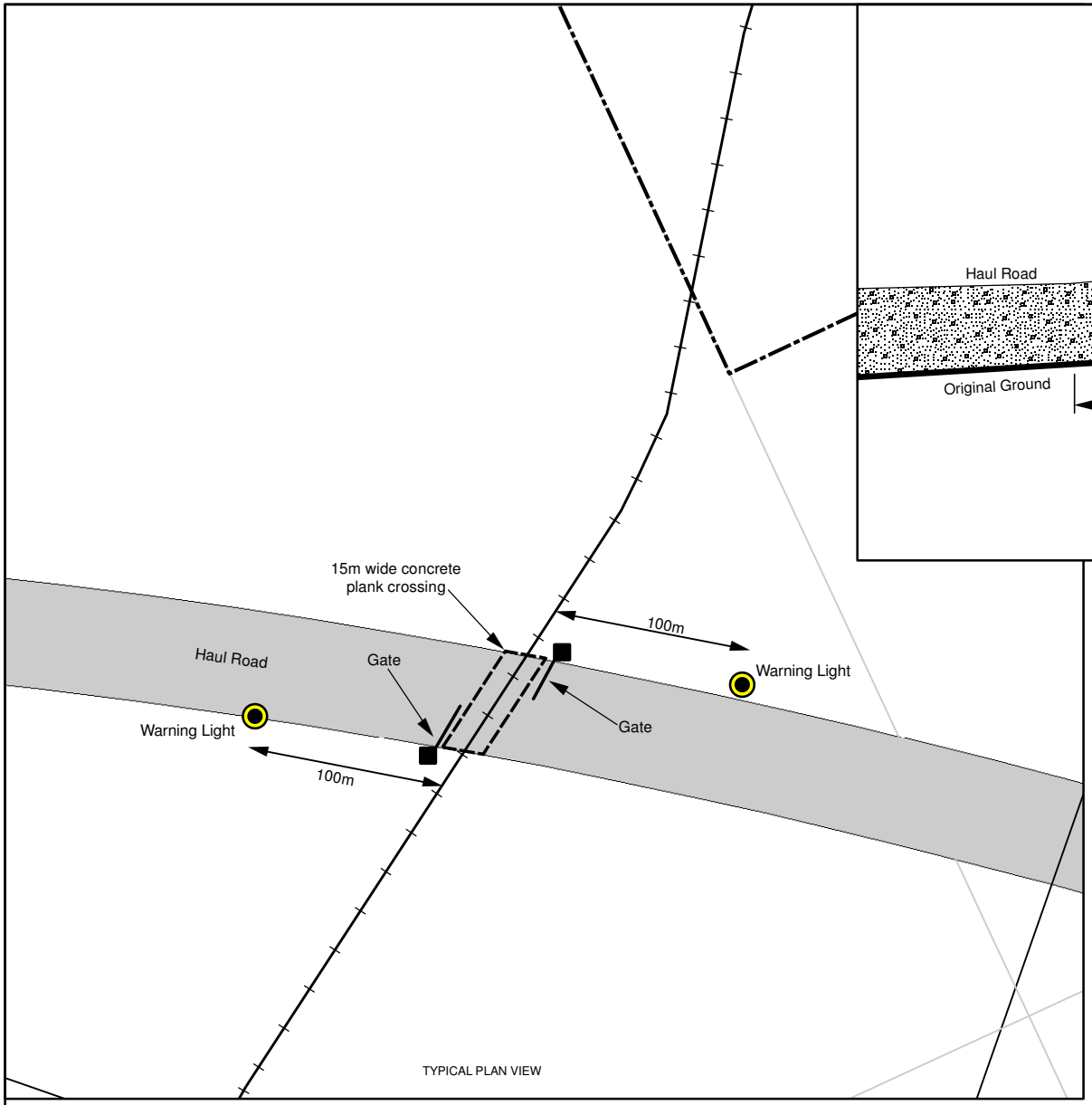
TITLE:
Typical Highway Crossing

DRAWN:	SL
CHECKED:	KY
DATE:	Jan 21/08
PROJECT:	05-171

FIGURE:
C.2.4-1



TYPICAL CROSS SECTION



TYPICAL PLAN VIEW

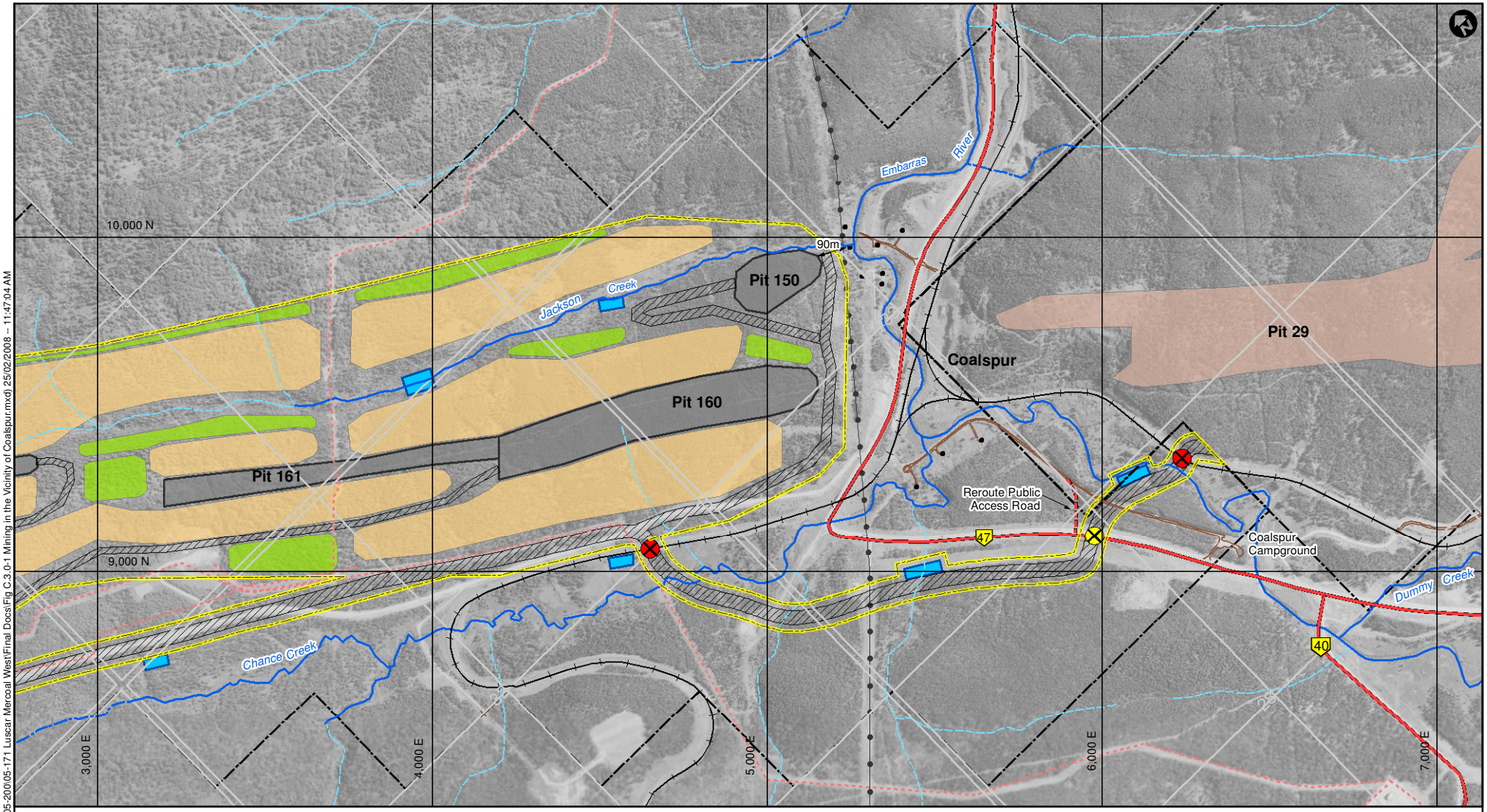
NOT TO SCALE

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Typical Railway Crossing

DRAWN:	PS
CHECKED:	KY
DATE:	Feb 4/08
PROJECT:	05-171

FIGURE:
C.2.4-2



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Cottage
- Rail Crossing
- Road Crossing
- Topsoil Pile
- Spoil Pile
- Pit
- Existing Pit
- 1000m Mine Grid
- Pond
- Haul Road
- Proposed New Access Road
- Access Road
- Highway
- Railway
- Powerline
- Pipeline

0 200 400 800
Metres

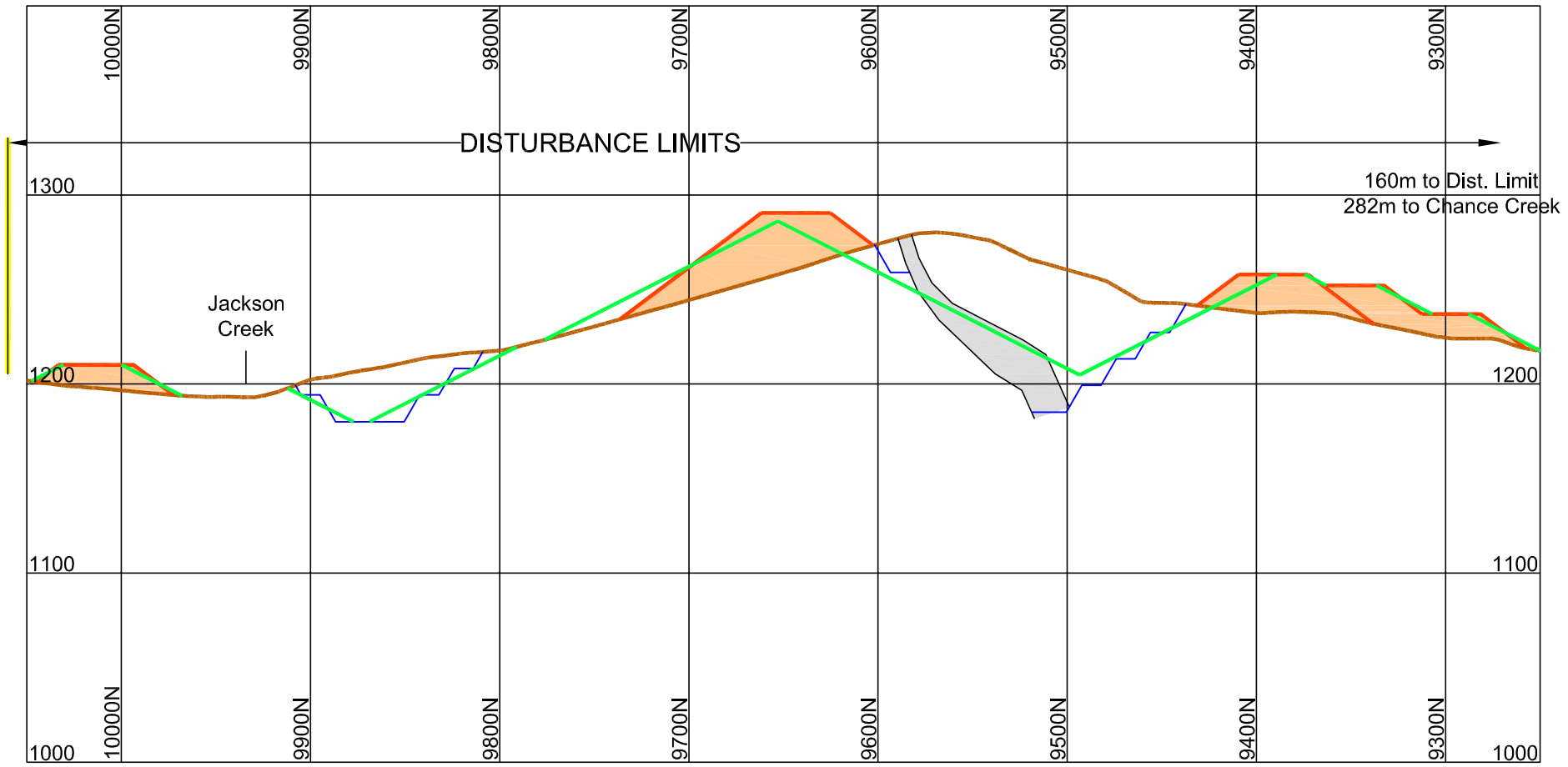
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mining Activities in Vicinity of Coalspur

DRAWN:	PS
CHECKED:	KY
DATE:	Feb 25/08
PROJECT:	05-171

FIGURE: **C.3.0-1**

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.3.0-1 Mining in the Vicinity of Coalspur.mxd) 25/02/2008 – 11:47:04 AM



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

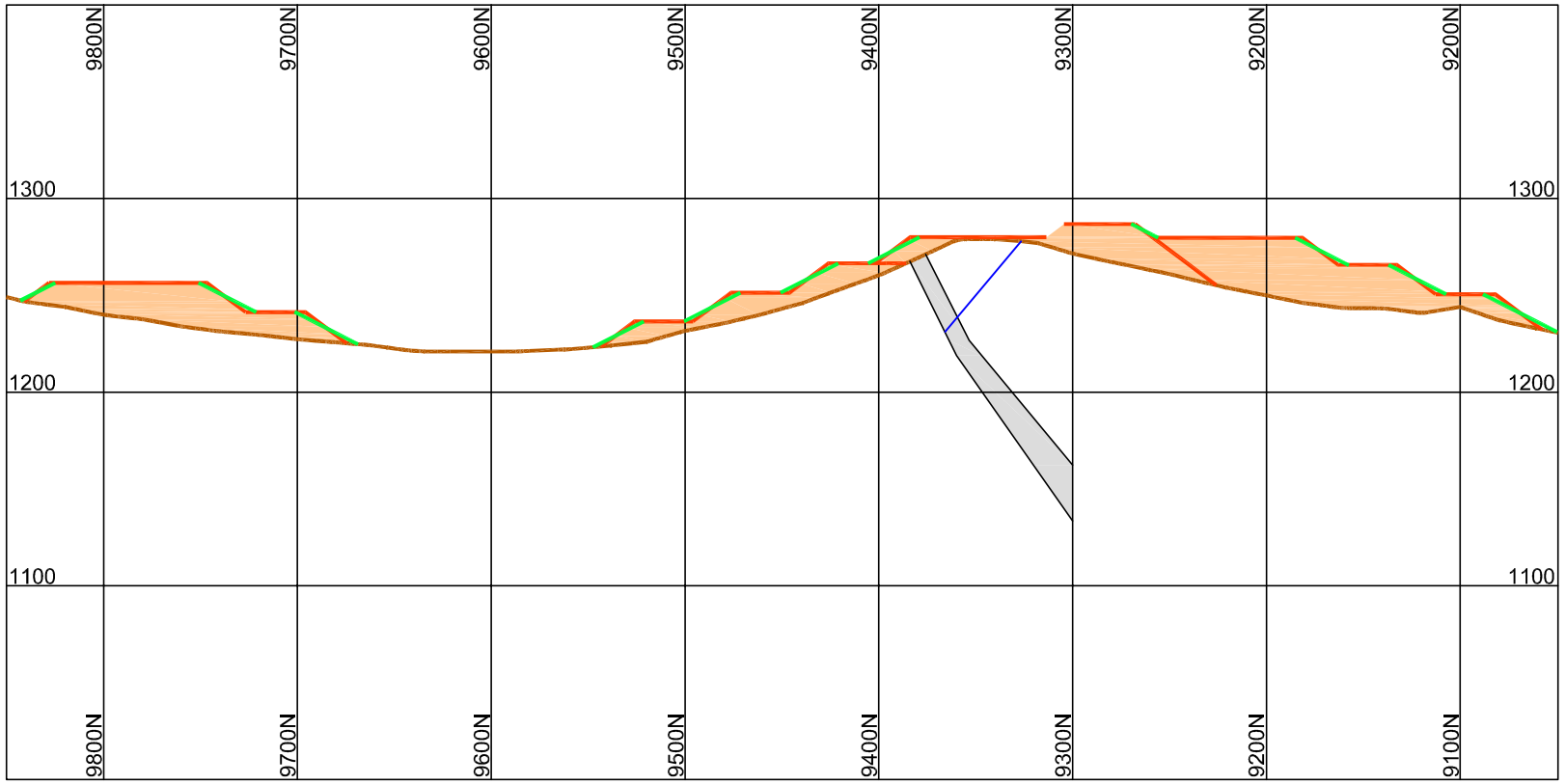
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Yellowhead Tower Development and Reclamation Section 4800 E

cvri

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	C.3.1-1
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

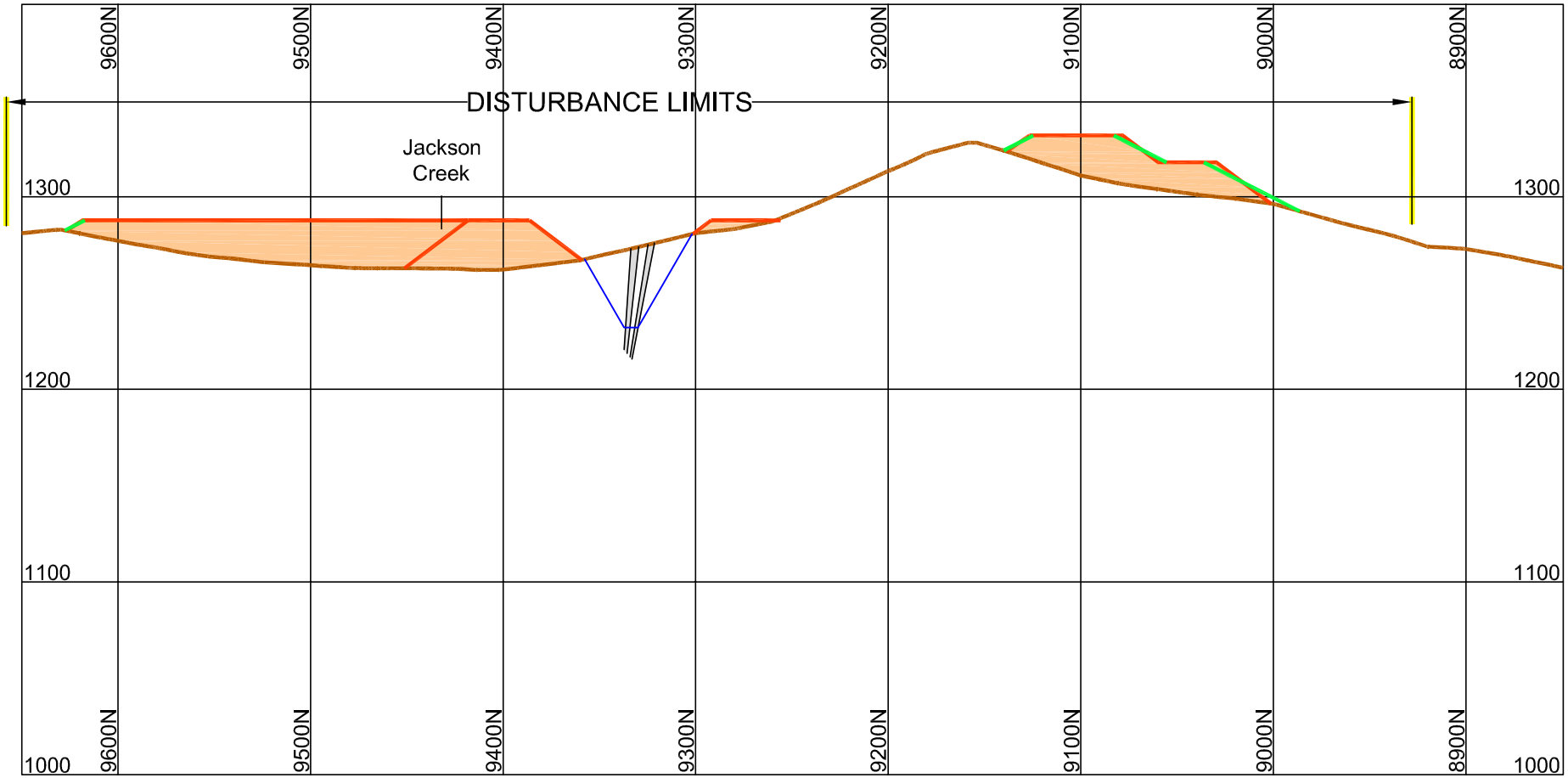
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

cvri

TITLE:
Yellowhead Tower Development and Reclamation Section 4000 E

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	C.3.1-2
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

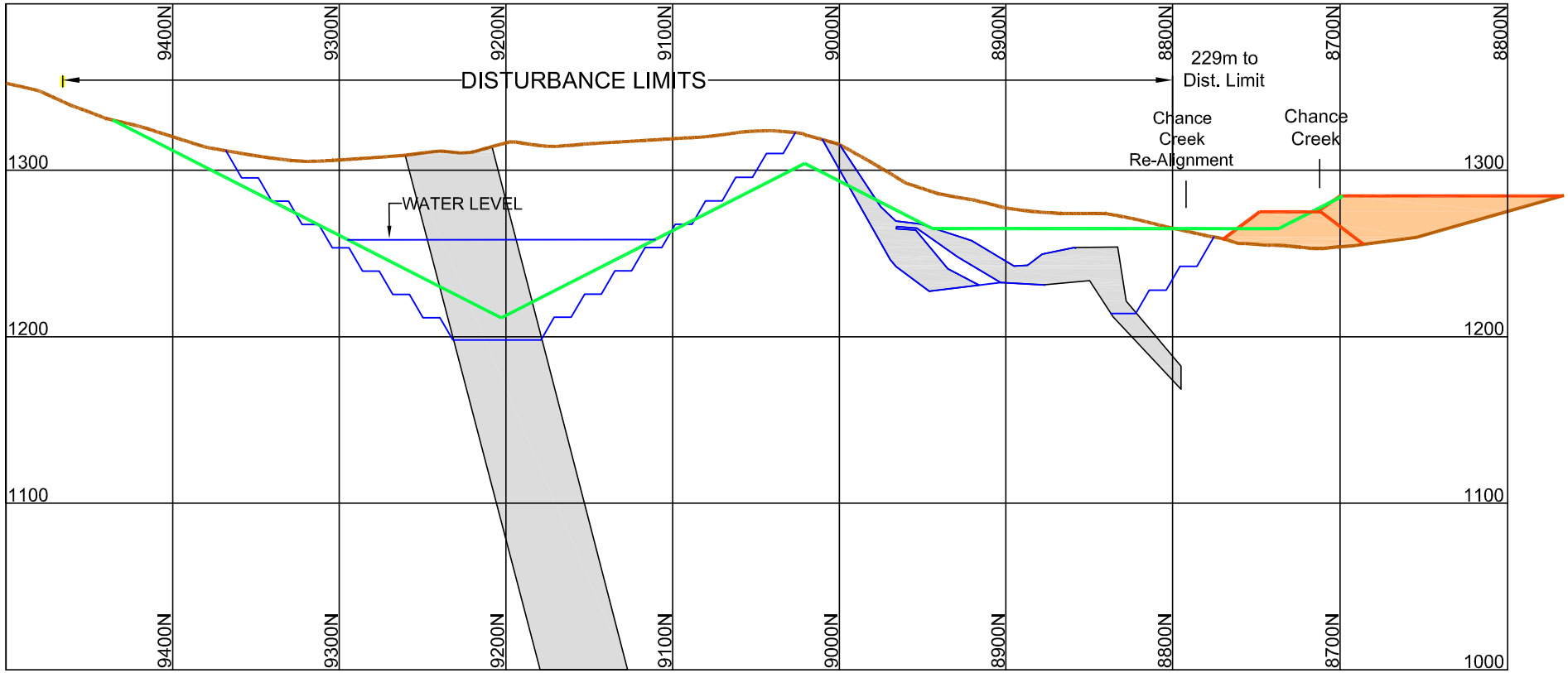
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

cvri

TITLE:
Yellowhead Tower Development and Reclamation Section 2800 E

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	C.3.1-3
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

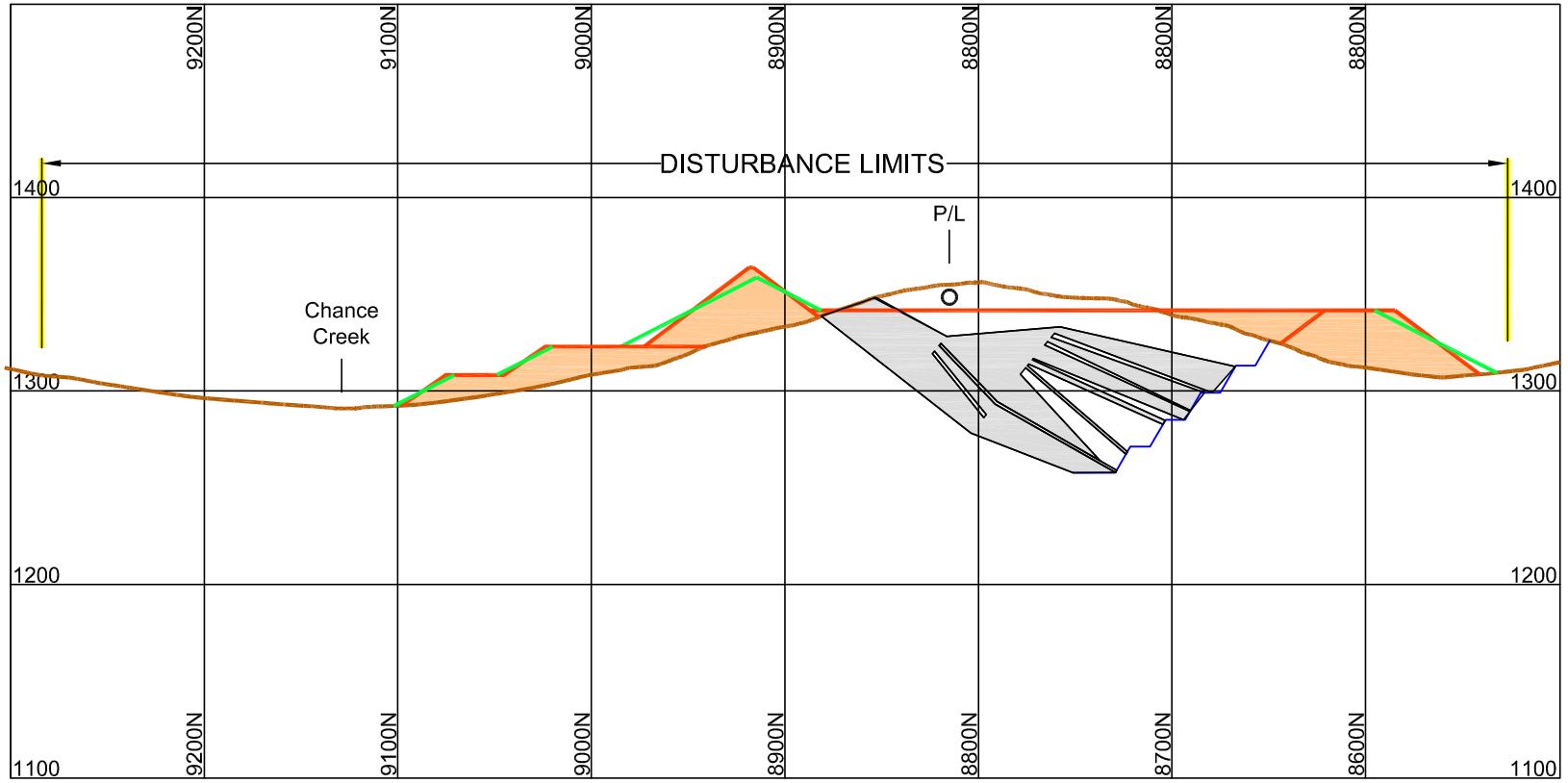
- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Limit
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Yellowhead Tower Development and Reclamation Section 1200 E

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	C.3.1-4
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

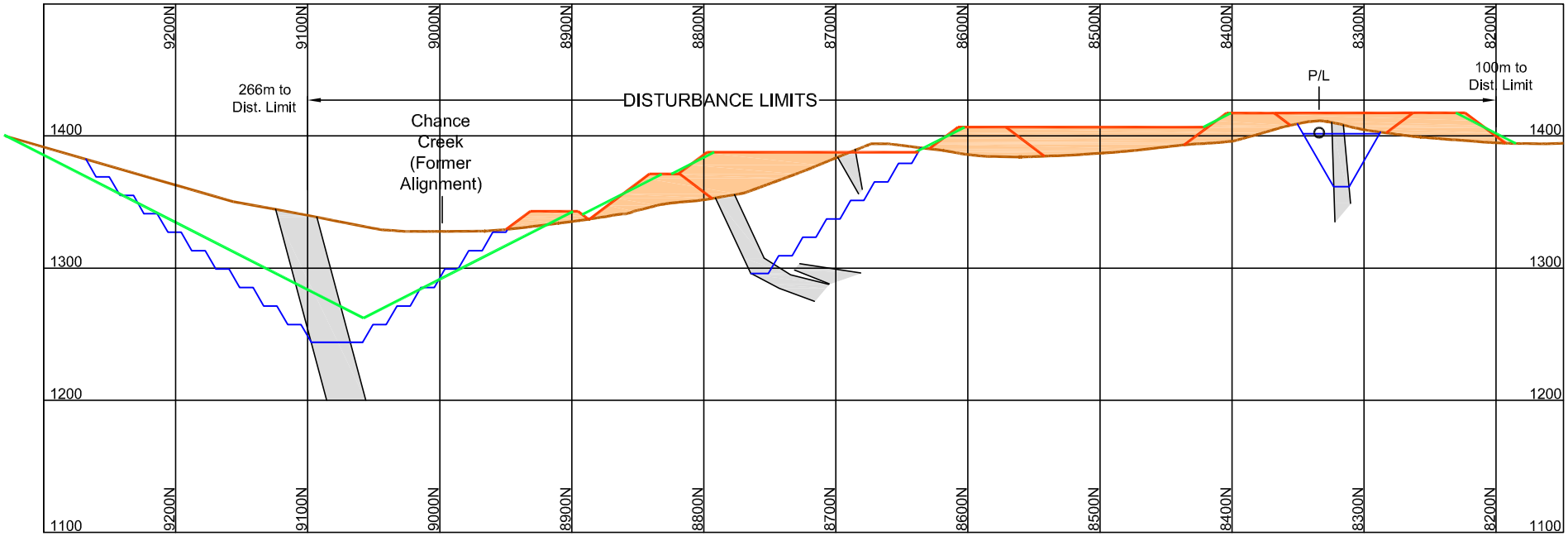
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

cvri

TITLE:
Yellowhead Tower Development and Reclamation Section 130 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	C.3.1-5
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

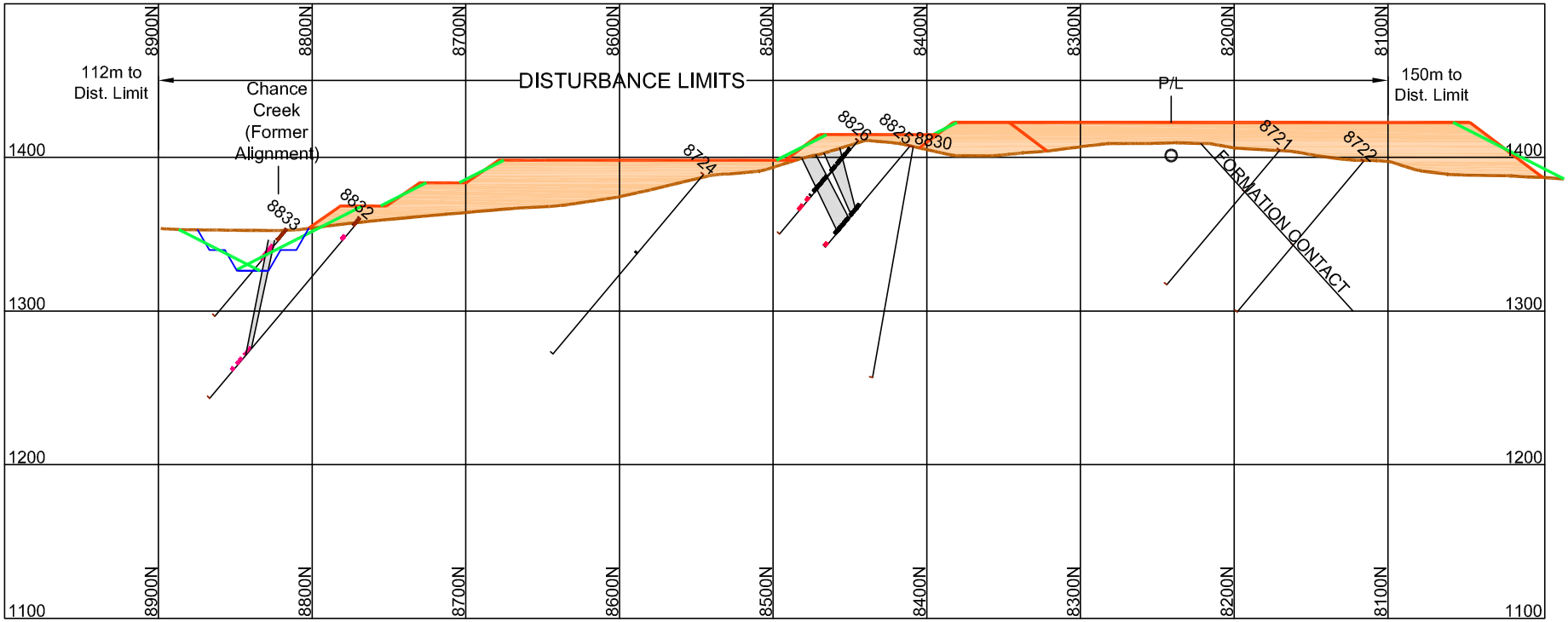
- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Yellowhead Tower Development and Reclamation Section 1400 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE:
CHECKED: KY	C.3.1-6
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

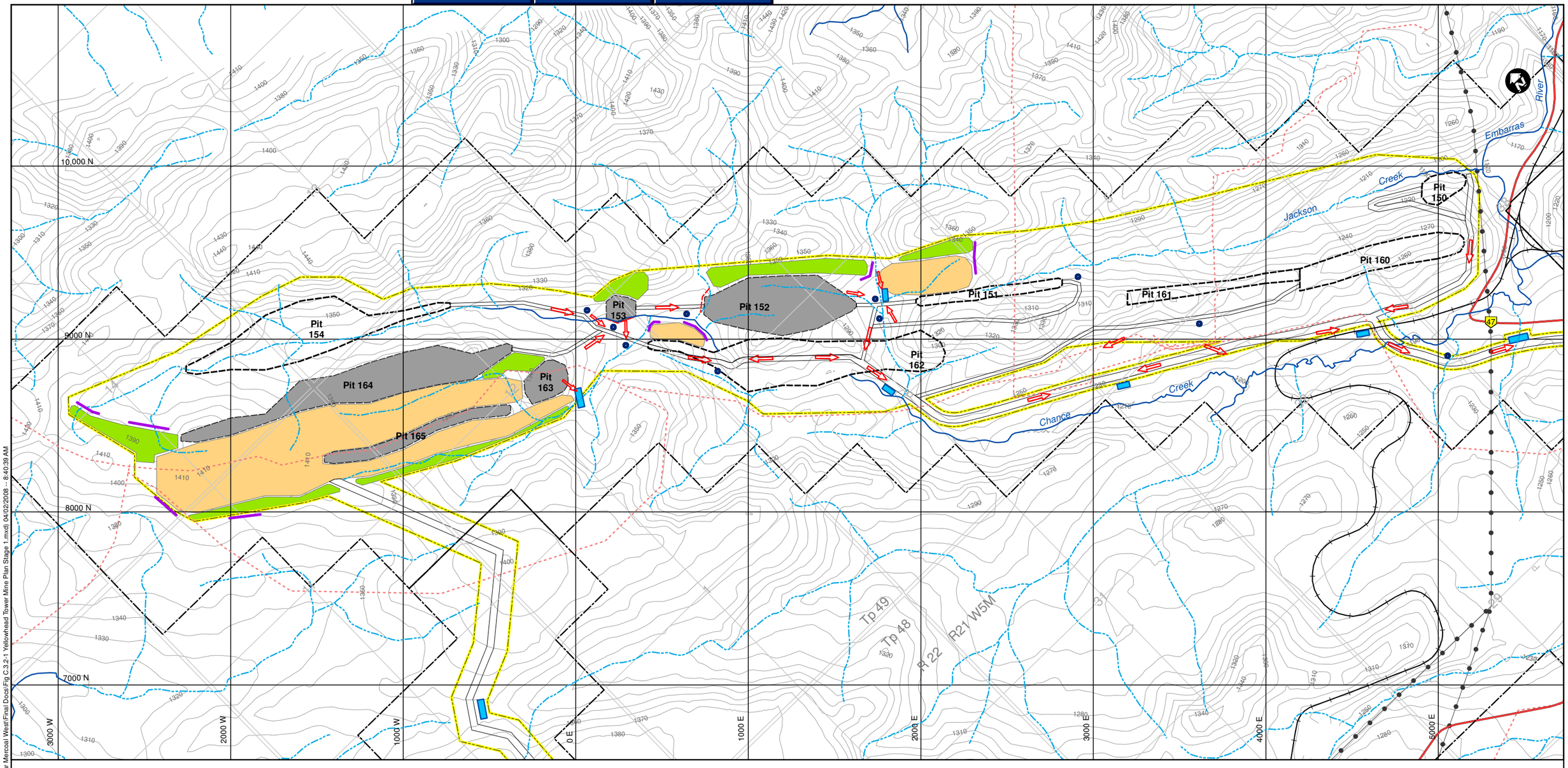
- Original Ground
- Reclaimed Ground
- Spoil Surface
- Till
- Pit Highwall
- Underground Mining
- Coal Seam

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Yellowhead Tower Development and Reclamation Section 2200 W

FILE: 05-171 MERCOAL SECTIONS-JAN6.DWG

DRAWN: OTHERS	FIGURE: C.3.1-7
CHECKED: KY	
DATE: FEB 25/08	
PROJECT: 05-171	



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil
- Spoil
- Pit
- Inactive Pit
- 1000m Mine Grid
- Stream
- Ephemeral/Intermittent Stream
- Pond
- Diversion
- Exfiltration Ditch
- Drainage Direction
- Sump
- Haul Road
- Highway
- Railway
- Powerline
- Pipeline
- Contour (10m interval)

0 0.25 0.5 1
Kilometres

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

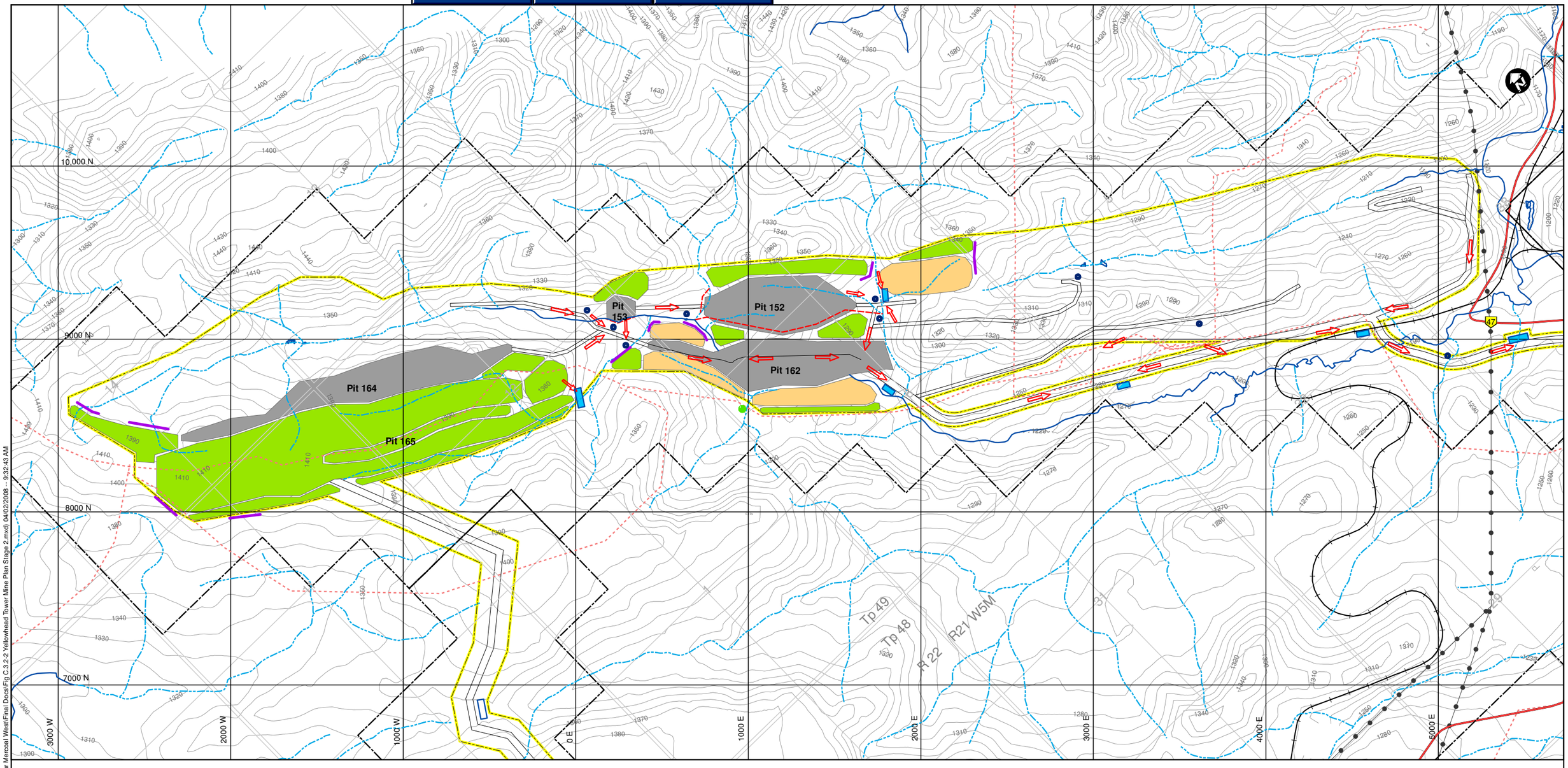
TITLE:
Mine Plan - Stage 1

cvri

DRAWN: PS
CHECKED: KY
DATE: Feb 4/08
PROJECT: 05-171

FIGURE:
C.3.2-1

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.3.2-1 Yellowhead Tower Mine Plan Stage 1.mxd) 04/02/2008 - 8:40:39 AM



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil
- Spoil
- Pit
- Inactive Pit
- 1000m Mine Grid
- Stream
- Ephemeral/Intermittent Stream
- Pond
- Diversion
- Exfiltration Ditch
- Drainage Direction
- Sump
- Clean Water Sump
- Haul Road
- Highway
- Railway
- Powerline
- Pipeline
- Contour (10m interval)

0 0.25 0.5 1

Kilometres

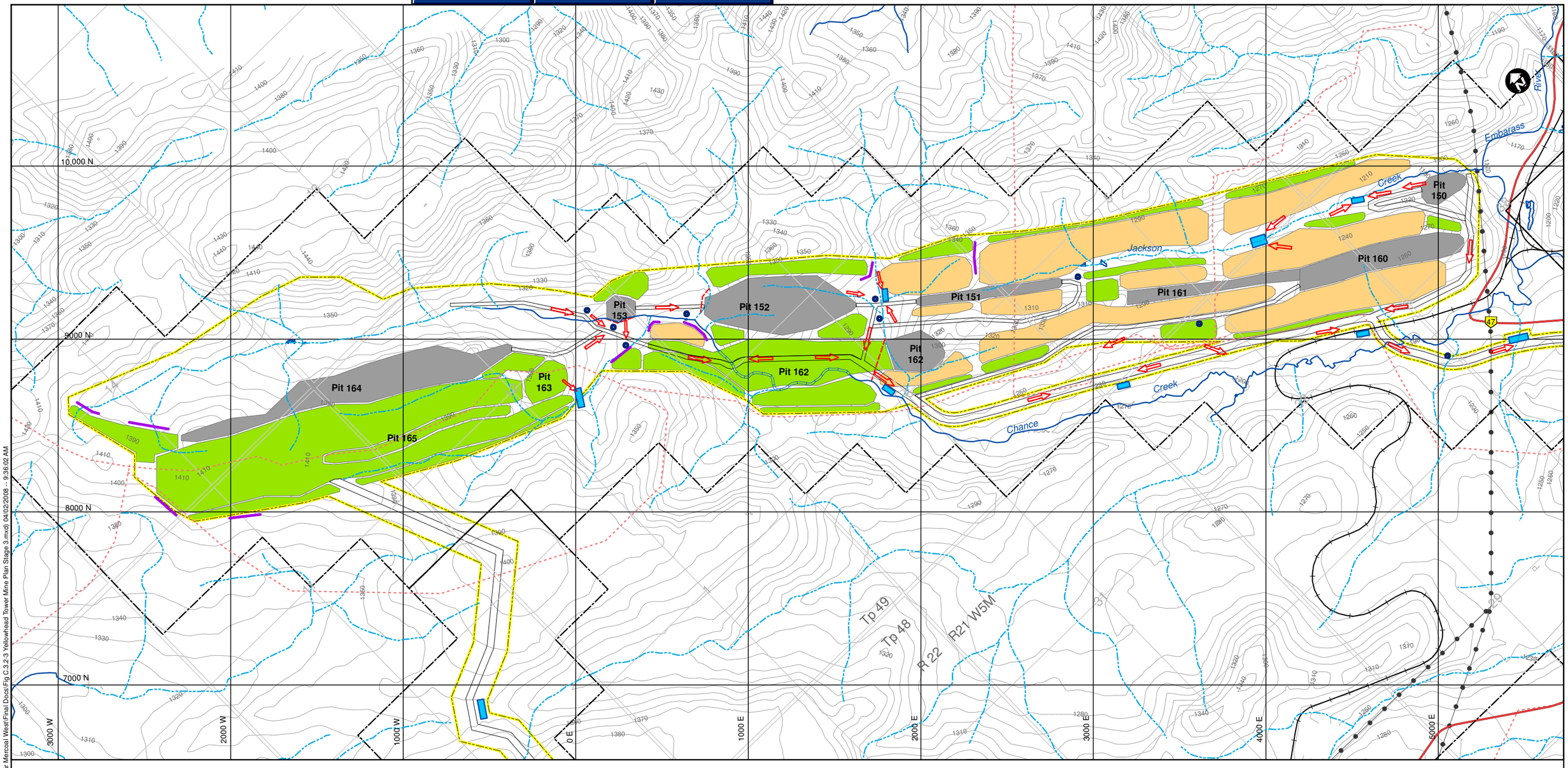
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mine Plan - Stage 2

DRAWN: PS
CHECKED: KY
DATE: Feb 4/08
PROJECT: 05-171

FIGURE:
C.3.2-2

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.3.2-2 Yellowhead Tower Mine Plan Stage 2.mxd) 04/02/2008 - 9:32:43 AM



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil
- Spoil
- Pit
- Inactive Pit
- 1000m Mine Grid
- Stream
- Ephemeral/Intermittent Stream
- Pond
- Diversion
- Exfiltration Ditch
- Drainage Direction
- Sump
- Clean Water Sump
- Haul Road
- Highway
- Railway
- Powerline
- Pipeline
- Contour (10m interval)
- Restored Creek

0 0.25 0.5 1
Kilometres

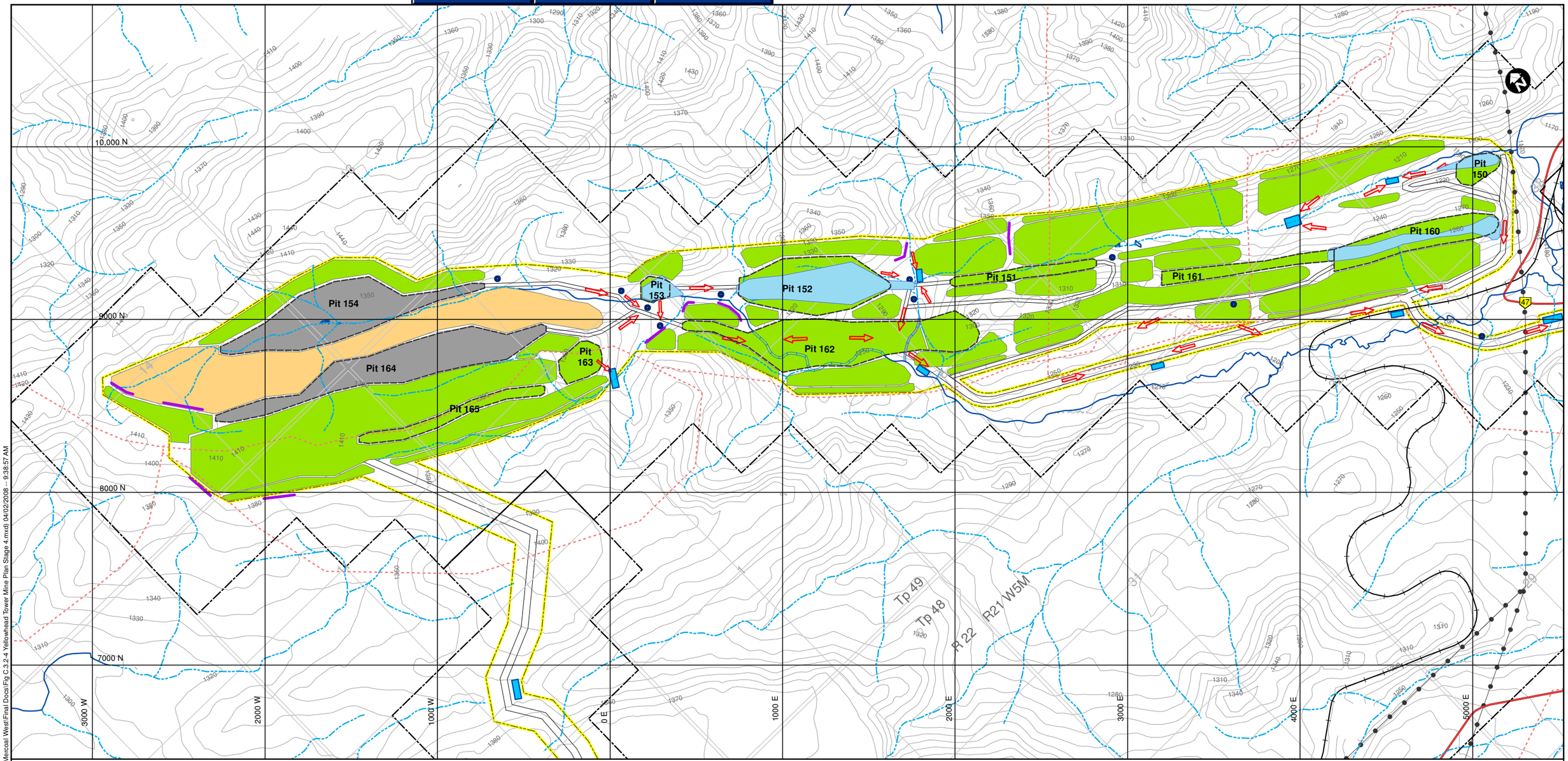
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mine Plan - Stage 3

DRAWN: PS
CHECKED: KY
DATE: Feb 4/08
PROJECT: 05-171

FIGURE:
C.3.2-3

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.3.2-3 Yellowhead Tower Mine Plan Stage 3.mxd) 04/02/2008 - 9:36:02 AM



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil
- Spoil
- Pit
- Inactive Pit
- 1000m Mine Grid
- Stream
- Ephemeral/Intermittent Stream
- Pond
- Diversion
- Exfiltration Ditch
- Drainage Direction
- Sump
- Clean Water Sump
- Haul Road
- Highway
- Railway
- Powerline
- Pipeline
- Contour (10m interval)
- Restored Creek

0 0.25 0.5 1
Kilometres

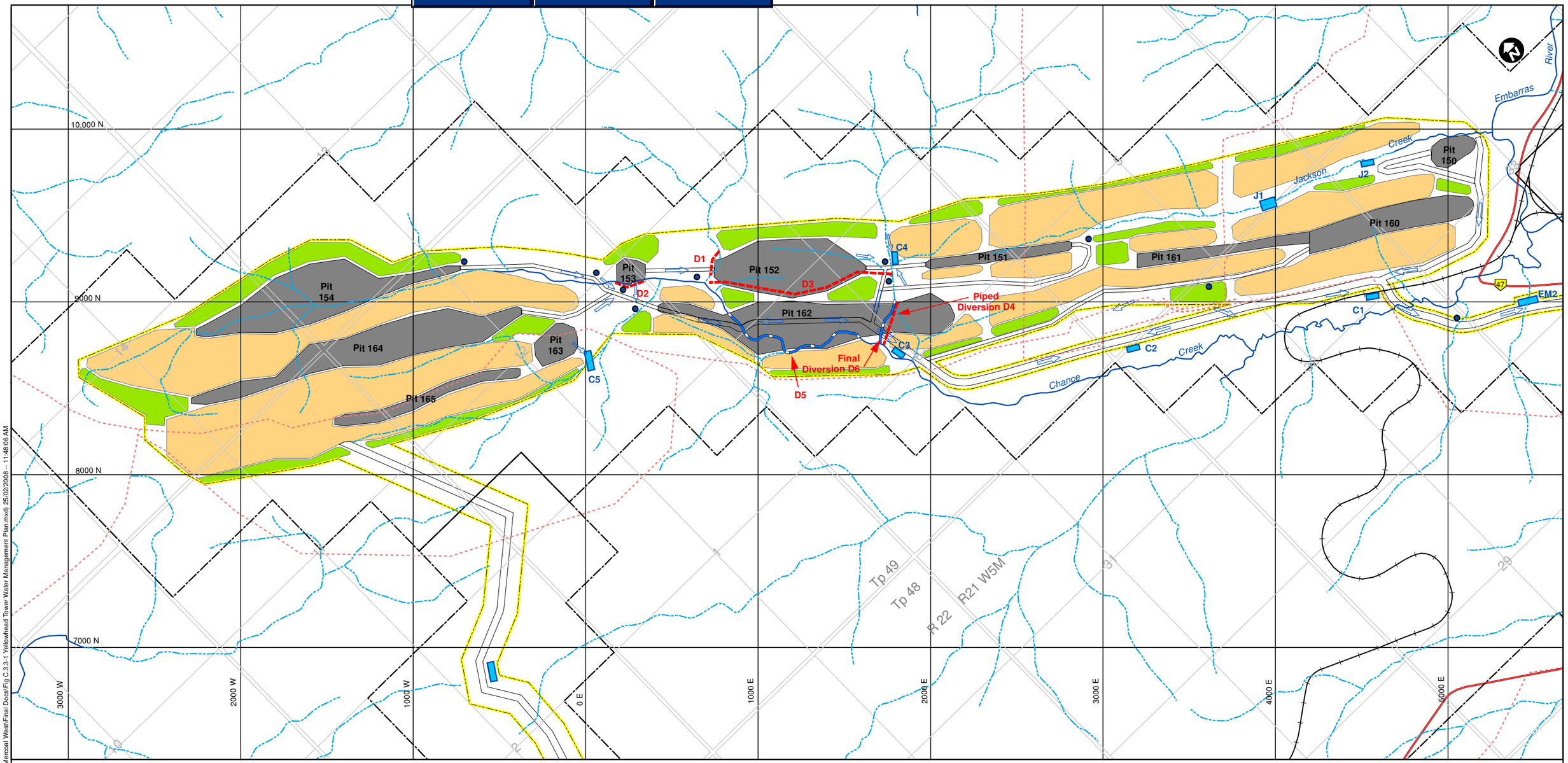
PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Mine Plan - Stage 4

DRAWN: PS
CHECKED: KY
DATE: Feb 4/08
PROJECT: 05-171

FIGURE:
C.3.2-4

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.3.2-4 Yellowhead Tower Mine Plan Stage 4.mxd) 04/02/2008 - 9:38:57 AM



Legend

- Disturbance Footprint
- Mine Permit Boundary
- Topsoil Stockpile
- Spoil Stockpile
- Pit
- Haul Road
- Stream
- Ephemeral/Intermittent Stream
- Pond
- Diversion D1
- Restored Channel
- Sump
- Flow Direction
- Highway
- Railway
- Powerline
- Pipeline
- 1000m Mine Grid

0 0.25 0.5 1
Kilometres

PROJECT:
Mercoal West and Yellowhead Tower Mine Extension Project

TITLE:
Yellowhead Tower Water Management Plan

DRAWN: PS
CHECKED: KY
DATE: Feb 25/08
PROJECT: 05-171

FIGURE:
C.3.3-1

Map Document: (K:\Active Projects 2005\Projects 05-151 to 05-200\05-171 Luscar Mercoal West\Final Docs\Fig C.3.3-1 Yellowhead Tower Water Management Plan.mxd) 25/02/2008 - - 11:48:06 AM