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3.0 OPERATION PLANS

3.1 Operation Plan - General

In accordance with:

- Section 38-14.1-14, North Dakota Century Code (NDCC);
- Section 38-14.1-15, NDCC;
- Section 69-05.2-09-1, North Dakota Administrative Code (NDAC);
- Section 38-14.1-24(19), NDCC;
- Section 69-05.2-09-14, NDAC; and
- Section 69-05.2-18, NDAC.

This section addresses the North Dakota requirements for Operation Plans to engage in surface coal mining operations. Plans for mining operations, construction and use of mine support facilities, removal of existing structures, blasting, air pollution control, transportation facilities, and surface water management have been developed by Norwest Corporation (Norwest) and are included in this section. In addition, an application for an Air Quality Permit to Construct for the South Heart Lignite Mine (SHLM) is being developed and will be filed at the North Dakota Department of Health (NDDH). The application package will include a description of the wind erosion mitigation measures and air pollution control plan developed for the proposed mine.

3.1.1 Operation Description Narrative

3.1.1.1 Introduction

South Heart Coal LLC (SHC) is planning to develop and operate a surface-lignite mining operation located southwest of the town of South Heart in Stark County, North Dakota. Production is scheduled at a rate of 2.4 Million tons per year (Mtpy) over the 30-year life of the mine. Production for the first year of operation, 2014, is scheduled for 130,600 tons (t) and 931,900 t for the second year. Production for years 2016 through 2043 are scheduled at 2.4 Mtpy production.

Overburden/topsoil will be removed using a combination of 44-cubic yard (cy) tractor-scrapers, 20-cy hydraulic excavators, D11 class dozers, and 150-t rear dump trucks. Lignite will be removed using 150-t rear dump trucks and 15-cy hydraulic excavators.

The productivities of the 44-cy scrapers, D11 class dozers, 150-t class trucks and the 15-cy and 20-cy hydraulic excavators are based on standard operating parameters common within the mining industry or based on actual operating experience. The overburden fleet consisting of scrapers/dozers/trucks/loaders is projected to remove up to a maximum of approximately 11.5 million (M) cy of overburden material per year. The lignite fleet consisting of trucks/hydraulic excavators is projected to mine 2.4 Mt of lignite per year.

Figure 3.1-1 presents the location of topsoil/subsoil storage facilities, haul roads, sediment control structures, and a general pit layout for the life of the mine.

Carlson Mining 2009 mining software was used to develop both overburden and lignite production schedules for the life of the mine. The SHLM has an approximate life of 30 years. Mine timing and sequencing for overburden and lignite can be seen on Figure 3.1-2.

From 2014 through early 2043, overburden and lignite removal is scheduled for a maximum of five shifts per week, 52 weeks per year. Several other activities will occur prior to the removal of lignite from the Permit Area. These activities include, but are not limited to, removal and stockpiling of topsoil and subsoil, construction of haul roads and lignite access ramps, and the construction of sediment control structures. The work associated with these activities will continue during the normal mining activities within the Permit Area.

If required, explosives will be used to fracture and fragment the lignite coal seams to facilitate loading and haulage of the lignite. Blasting will occur between sunrise and sunset Monday through Friday. Blast holes will be drilled using a 6-inch (in) to 9-in diameter rotary drill.

SHC anticipates dewatering of the pits will be necessary due to ground water infiltration and surface water run-off into the pit. Water will be collected in ditches and routed to central sump locations where it will be pumped to the sedimentation pond adjacent to the active mining area (Figure 3.1-1 and Figure 3.6-1). In the pond, the suspended solids will be allowed to settle out before the water is

discharged into natural drainages. Water from the sedimentation pond may be used for haul road dust suppression as required.

Table 3.1-1 shows the projected annual disturbed acres per year within the Permit Area. Table 3.1-2 includes the estimated annual lignite production from the two recoverable lignite seams over the life of the mine and within the Permit Area. In addition, Table 3.1-3 lists the equipment that will be used for overburden, topsoil and lignite removal, rough and final grading, topsoil and subsoil replacement, revegetation, and support of other ancillary mining activities.

3.1.1.2 Safety

SHC will develop a plan for compliance with the health and safety standards of the Federal Mine Health and Safety Administration (MSHA). SHC will develop a program to ensure compliance with all applicable SHC and MSHA safety policies. All access to the SHLM site will be controlled and access to the Permit Area will be allowed only under controlled circumstances. Persons entering the SHLM site will be required to undergo hazard training as prescribed by MSHA.

3.1.1.3 Abandoned Underground Mines

No abandoned underground mines have been identified within the Permit Area or the areas adjacent to the Permit Area.

3.1.1.4 Waste Disposal

Disposal of waste within the Permit Area will be limited to that non-coal waste for which a solid waste disposal permit is not required. Those non-coal wastes include wood materials, certain plastic materials, concrete materials, and other mining-related, non-hazardous materials specifically exempted from the requirement to obtain a solid waste disposal permit under the provisions of NDAC 33-20-02.1-01. Those non-coal wastes will be placed and stored in a controlled manner in designated areas within the Permit Boundary in accordance with all applicable regulations including NDAC 69-05.2-19-04. No other waste disposal activities are planned within the Permit Area.

3.1.1.5 Relocation and Re-Route of Utilities

The Southwest Water Authority water line, the West Plains Electric underground power line, and the Consolidated Telecom copper phone line located in the northern portion of Sections 20, 21, and 22, Township 139 North, Range 98 West will be relocated to the right-of-way (ROW) corridor located between Pit 1 and Pit 2, as shown on Figure 3.1-5a, Figure 3.1-5b, Figure 3.1-5c, and Figure 3.1-5d. Portions of the Montana-Dakota Utilities Company (MDU) underground gas line which are connected to the Williston Basin Interstate Pipeline Company (WBI) underground gas line will be disconnected from the WBI gas line in the NW1/4 corner of Section 21, Township 139 North, Range 98 West and the NE1/4 corner of Section 22, Township 139 North, Range 98 West. The utilities disconnected during the mining phase of SHC will be re-connected prior to reclamation of the disturbed mining area.

The Southwest Water Authority water line and West Plains Electric underground power line located in the N1/4 of Section 34, Township 139 North, Range 98 West will be disconnected and re-routed to the south of their current location, placing the utilities further from the mining activities of Pit 4.

The timing for the relocation of the affected utilities can be seen on Figure 3.1-5a, Figure 3.1-5b, Figure 3.1-5c, and Figure 3.1-5d. The figures show the approximate timing and location of all relocated utilities. The actual timing of these relocations may vary due to conditions encountered during mining or changes to the mining plan and/or mining sequence.

After completion of mining in the Permit Area and once reclamation has begun, SHC will ensure that the existing and pre-existing utilities affected (relocated) by the mining activities will be re-connected if desired by the owner. All final location of utilities will be subject to approval from the appropriate utility company.

3.1.2 Mining Method Narrative

SHLM will be a surface lignite mining operation located just southwest of South Heart, North Dakota. The SHLM is scheduled to produce 2.4 Mt of lignite for the approximately 30 years of operation (from 2014 through early 2043). The lignite will be hauled using 150-t rear dump trucks to the coal crushing facility which will be located in Section 34, Township 139 North, Range 98 West.

Figure 3.1-1 shows the general mine layout, proposed mining areas, topsoil/subsoil storage areas, haul road locations, and facility locations. Figure 3.1-2 shows the proposed overburden removal sequence by year within the mining Permit Area.

Within the Permit Boundary, there are a total of four lignite seams. The seams in top down order are the E Seam, the E1 Seam, the D Seam, and the HT Butte Seam. Within the proposed Permit Area, mining of the HT Butte Seam has not been scheduled because it lies an average of 143 feet (ft) below the D Seam and has a stripping ratio greater than 10 to 1, which is uneconomic to mine (more information on this can be found in Section 2.3). The D Seam is the primary seam scheduled for mining because it averages 17.1 ft in thickness and has an overall average stripping ratio of less than 5 to 1. The average lignite seam and overburden thickness for the individual lignite seams are summarized in Table 3.1-4.

3.1.2.1 Mine Development

After SHLM permit approval, the pre-mining development work will begin with construction of the sedimentation control structures, mine access and haulage roads, mine support facilities area, office, power lines, and various other related facilities. These facilities will be used for a period of approximately 30 years. All facilities will be located outside a 100 foot setback from all county roads except for the mine access road which connects to the county road to allow access to the mine site. To ensure that no facilities are constructed or no area is disturbed within this 100 foot county road right-of-way setback line, a series of boundary stakes will be set by the surveyor along the setback line to clearly delineate this boundary during facilities construction and early mining activities. Prior to construction of any facilities, the topsoil/subsoil will be removed and stockpiled adjacent to these facilities. Topsoil/subsoil stockpiles will remain through the life of the mine. The mine access road and sedimentation control structures must be constructed and in-place before any additional facility construction work can start. Once the sedimentation control structures are in place, all other facility construction can be completed. Upon mine closure, all facilities will be removed except for those required during the final reclamation phase. After the facilities are removed, the topsoil/subsoil will be replaced and the sites revegetated.

3.1.2.2 Haul Roads

Haul roads will be constructed on both undisturbed land (no mining) and reclaimed spoil (mined land). A typical haul road cross-section is included on Figure 3.5-2.

Haul road construction on undisturbed lands will consist of removing and storing the topsoil in areas adjacent to the proposed haul road alignment and any proposed borrow areas. SHC plans on using the subsoil along the haul road alignment as material for the road sub-base. If, during construction, the subsoil found along the haulage route or borrow areas consists of weathered bedrock or other material it will be tested for toxicity. Rotary hole cutting samples will be collected and analyzed for electrical conductivity (EC), sodium adsorption ratio (SAR), and texture. A report summarizing the results of these samples will be submitted to the North Dakota Public Service Commission (PSC). If the analyses show the materials meet subsoil quality standards, SHC proposes to use these materials, along with the subsoil, for the sub-base during road construction. If these samples do not meet subsoil standards, then additional borrow areas will be used to recover sufficient subsoil to complete the road construction. Cuts in the borrow areas will be limited to a maximum of 5 ft in depth. Once the sub-base is completed, a top dressing of compacted aggregate or gravel will be added as the final running surface. During construction, culverts will be installed at the proper locations and ditches will be constructed in all road cut sections. Visual monitoring of the cut materials removed for construction will ensure that no poor quality (reduced, gray, or sodic) materials are removed and used.

Haul roads in disturbed mining areas will be constructed using borrow materials located along the haul road alignment. The sub-base will be constructed of compacted overburden waste found at the surface. A top dressing of 6 in of compacted aggregate or gravel will be added to the top of the compacted sub-base to provide the final running surface. During construction, culverts will be installed at the proper locations and ditches will be constructed in all road cut sections.

Upon completion of mining, all haul roads not scheduled to remain after mining will be reclaimed. All aggregate or gravel will be removed from the road and will be hauled into the final pit for disposal. All culverts will be removed and disposed either by placement in the final pit where they will be covered with spoil material or they will be salvaged and sold as scrap. The sub-base material will be spread to conform to the proposed final contour. Then all topsoil and any stockpiled subsoil in the disturbed mining areas will be respread over the haul road alignment and revegetated.

Some subsoil required for use in SHLM subsoil respread plans may be removed during the construction of haul roads or sediment control structures footprint areas in areas scheduled for mining. The subsoil will be removed from these areas during the haul road construction or prior to the overburden removal operation. Any topsoil removed will be handled in accordance with the reclamation procedures outlined in Section 4.1.1.

The general mining sequence will consist of:

- Land clearing (if any);
- Topsoil/subsoil removal;
- Pre-stripping of overburden (when required);
- Primary overburden removal;
- Lignite drilling, blasting (when required);
- Lignite loading. hauling and crushing;
- Backfilling;
- Final grading;
- Replace topsoil/subsoil; and
- Replace vegetative cover.

3.1.2.3 Topsoil Removal

Topsoil and subsoil removal will precede the pre-stripping of the overburden from the areas to be disturbed by mining, roads, and facilities. The topsoil lift will be removed using 44-cy tractor-scrapers to the depths indicated on the soil survey maps Figure 2.4-2A, Figure 2.4-2B, and Figure 2.4-2C. The subsoil material will be removed after the topsoil using the same scraper fleet to the depths indicated on the soil survey maps Figure 2.4-2A, Figure 2.4-2B, and Figure 2.4-2C.

Topsoil/Subsoil volumes required for replacement were estimated using two methods. Method 1 used a gridded model to estimate the total thickness of Suitable Growth Material (SPGM) required. A SPGM thickness replacement grid was developed using the overburden quality drill hole data and the respread depth criteria outlined in NDAC 69-05.2-15-04-4 of the regulations. Table 3.1-5 shows the required average replacement depth is 3.5 feet while the average in-place topsoil/subsoil thickness

is 2.4 feet. This results in a deficit of 1.1 feet or approximately 6.15M bank cubic meters (bcy) of SPGM which will be obtained from within the disturbed pit area.

Method 2 outlined in Policy Memorandum No. 17 was the second method used to estimate the required SPGM respread depths for the Permit Area. One hundred-one (101) ~~Ninety-nine (99)~~ overburden sample holes are located within the proposed Permit Boundary (See Figure 4.1-10a). Using these ~~99~~ 101 holes, Table 4.1-1 was developed to estimate the total depth of SPGM required to meet the cover standards for sodic spoil found in Policy Memorandum No.3, Part l-A(l). The proposed SPGM respread depths range from 24 to 48 inches with 29 holes showing 24 inches, 4 holes showing 36 inches, 12 holes showing 42 inches and ~~54~~ 56 holes showing 48 inches. The average respread depth for this Permit Area using these ~~99~~ 101 sample holes is 39 inches or 3.25 feet. This would result in a deficit of 0.28 feet or 2.2 Million bank cubic yards (Mbcy). Therefore during reclamation, SHLM will recover and store approximately 2.2 Mbcy of suitable overburden from the proposed pit area as a subsoil supplement. This is discussed in Section 4.1.1.1.

The topsoil/subsoil and the suitable overburden removed will be placed in topsoil/subsoil and suitable overburden stockpiles when it cannot be directly hauled and placed as final respread on final graded areas. When requested by the property owner, the topsoil/subsoil will be stockpiled according to surface ownership to prevent mixing of topsoil from one ownership parcel with another. Areas where the topsoil will be stockpiled include the box cuts and areas where mining advances from one surface ownership parcel to another. Figure 1.3-2 shows the surface land ownership parcels as listed in Table 3.1-5. The tractor-scrapers will place the topsoil/subsoil on the stockpiles in compliance with NDAC 69-05-2-18.01(5). A dozer will create a diversion ditch around the topsoil stockpile to help prevent erosion. Ramps from one lift to another will be constructed at grades not to exceed eight percent (8%). At all other times, topsoil will be direct hauled from the future mining area to the regrade area as described in Section 4.1.1.

In order to assure that sufficient SPGM will be available for respread, additional suitable soil will be available in the same area for salvage as indicated on the soil survey maps (Figure 2.4-2A, Figure 2.4-2B, and Figure 2.4-2C). However, in cases where sufficient topsoil/subsoil is not available, suitable overburden material will be used to make-up the deficit of suitable topsoil. Table 3.1-5 shows the volume of suitable topsoil/subsoil available for removal/respread for each landowner within the Permit Boundary. In addition, the table shows the total volume of suitable topsoil/subsoil and suitable overburden required to meet the final reclamation requirements for each landowner. Based on SHC overburden geochemical model, there appears to be sufficient additional

suitable overburden available within the disturbance area to satisfy any potential suitable SPGM shortfall of any landowner (See Section 4.1.1.1). In general, the topsoil/subsoil removal and respread or stockpiling operation will occur during the summer and fall seasons (April – October) of the year preceding mining. Because the initial overburden mining operation is starting in mid year 2013, the topsoil for the remaining 6 months of 2013 and for the first 4 months of 2014 must be removed between the beginning of July and the end of October, 2013. The contractor will attempt to schedule topsoil and subsoil removal operations during the approximately 8 frost free months. Normally, the fall topsoil removal operations are scheduled to remove sufficient SPGM to allow mining operations to continue until spring of the following year. Such stockpile locations and the other affected areas are shown on Figure 3.1-1. The actual locations of topsoil/subsoil stockpiles may vary slightly from those shown on the figure due to actual field conditions. SHC will directly respread as much SPGM, without stockpiling, as is legally and logistically possible. The stockpiling will be in accordance with methods approved by the PSC. Volumes will be measured by load count or topographical survey. The stockpiles will be seeded as soon as possible with an approved mixture of grasses to help control weed infestation and water and wind erosion (Section 4.3). Each topsoil stockpile will be identified by a sign post bearing a name or number specific to that stockpile.

3.1.2.4 Overburden Removal

The overburden depths within the Permit Area range from 13 to 105 ft in thickness. After the topsoil and suitable subsoil material have been removed and stockpiled, the initial box cut overburden material (a minimum width of 3 mining cuts or 450 ft) will be removed and hauled to an out-of-pit stockpile (Figure 3.1-1). The overburden stockpile will be located north of the initial box cut. The overburden stockpile will be built in a maximum of 4-ft lifts to comply with NDAC 69-05-2-18.01(5). The overburden material will remain stockpiled until it can be respread back on the regrade area.

The overburden material will be removed using the contractor's truck/shovel/scraper fleet. When a sufficiently large regrade area is completed, the stockpiled box cut overburden material will be removed from the stockpiles and respread equally over this large area.

Final grading of the area will be achieved using dozers and motor graders as required. The location of the out-of-pit overburden stockpiles can be seen on Figure 3.1-1. The actual locations of the out-of-pit overburden stockpiles may vary slightly from those shown on the figure due to actual field

conditions. This determination will be made in the field and dictated by the amount of material needed to regrade the existing pit.

Beginning in mid-2014, the overburden truck/loader/dozer fleet is scheduled to work five shifts per week, up to 52 weeks per year. Dozer assistance for the overburden removal operation may be required in areas where harder material is encountered. Portions of the overburden material that are classified as suitable overburden may be used as SPGM in areas where there is not sufficient SPGM material to meet reclamation requirements. Stockpiling of SPGM may be required due to mine sequencing constraints. The SPGM stockpile locations are shown on Figure 3.1-1. The actual locations of SPGM stockpiles may vary slightly from those shown on the map due to actual field conditions. When overburden/interburden stockpiling is necessary, the overburden truck/loader/scraper fleet will haul the SPGM from the pre-stripping area to the stockpile locations. A dozer will then be used to push the SPGM into 4-ft lifts to comply with NDAC 69-05-2-18.01(5). Ramps from one lift to another will be constructed at grades not to exceed 8%. Final grading of the area will be achieved by the dozer fleet as required.

3.1.2.5 Lignite Removal

The truck/loader/dozer fleet will remove the overburden above the E seam (where present) by loading and hauling this overburden into the adjacent mined-out pit area. If any recoverable E seam is encountered, the top of the E lignite seam will be cleaned using track dozers, motor graders, or rubber-tired dozers, ripped, and then hauled to the coal crushing facility located at the Plant Facility. The truck/loader/dozer fleet will then remove the overburden above the E1 seam (where present) by loading and hauling this overburden into the adjacent mined-out pit area. If any recoverable E1 seam is encountered, the top of the E1 lignite seam will be cleaned using track dozers, motor graders, or rubber-tired dozers, ripped and hauled to the coal crushing facility located at the Plant Facility. The overburden/interburden above the D seam, which includes the unrecoverable E and E1 seams, will then be loaded and hauled by the truck/loader/dozer fleet into the same adjacent mined-out pit area using the same method described for removal of the E seam overburden/interburden. Once the D seam is exposed, track dozers, motor graders, or rubber-tired dozers will clean the top of the lignite. The lignite will be prepared for loading by either blasting the lignite or ripping the lignite with a D11 class dozer. When the D seam is ready for loading, a 15-cy front hydraulic excavator will load the lignite into 150-t rear dump trucks for direct transport to the coal crushing facility located at the Plant Facility. If the coal crushing facility is unable to accept the lignite, it will be stockpiled adjacent to

the truck dump hopper located at the Plant Facility. This lignite stockpile will be able to store approximately 100,000 t of lignite.

Lignite loading operations are scheduled to work one eight-hour shift, five days a week, 52 weeks per year. Any production shortfall will be made up by either working overtime or additional loading shifts.

3.1.2.6 Design Parameters

Face angles for benches are designed at 50 degrees (from horizontal), pit widths are designed at 150 ft wide, and the angle of repose for the spoil material is designed at 37 degrees. An overall pit slope angle of 43 degrees (from horizontal) was used for planning purposes. The above design parameters are based on a geotechnical investigation performed by Norwest (Ennis et. al. 2007).

SHC does not plan to blast the overburden material, but if blasting of the lignite is needed it will be drilled on a 16 ft by 16 ft pattern using between 6- to 9-in holes. The designed powder factor used for lignite blasting is 0.25 pounds (lbs)/t.

During development of the mine plan, significant consideration was giving to maximizing the utilization and conservation of the lignite being recovered in the Permit Area so that re-affecting the land in the future can be minimized. The same consideration was given to maximizing the recovery of the lignite in the Permit Area in order to minimize total land disturbance. To ensure that lignite recovery will be maximized, the following procedures will be followed:

- Lignite will be prepared for loading using a combination of rubber-tired dozers, motor graders, or tractor scrapers. Cleaning will remove extraneous material on top of the lignite seam and minimize the lignite loss by removing only the small amounts of remaining overburden material or any oxidized lignite.

- The contract miner will monitor the loading of the lignite to ensure that the operators are taking the maximum amount of lignite from the floor and ribs while maintaining the lignite quality at contract compliance levels.

- Lignite haul trucks will not be overloaded to ensure that lignite spillage is minimized.

3.1.2.7 Haul Road Maintenance

The lignite will be hauled from the mine area to the coal crushing facility located within the northern portion of Section 34, Township 139 North, Range 98 West, from 2014 through mid-2043. During non-freezing conditions, fugitive dust from the haul roads will be controlled using a 20,000 gallon (gal) water truck to water the haul roads. Agglomerating agents may be added to the water to minimize the amount of water needed on the haul road to control the dust.

3.1.2.8 Regrading and Reclamation

Following the removal of all recoverable coal, rough grading of the overburden spoils will begin. A more detailed description of the rough grading can be found in Section 4.1.

Projected respread depths for topsoil/subsoil will be determined based on overburden soil characteristics described in Section 2.3. The texture, SAR, and saturation percentage of the final graded spoil will be determined by a PSC evaluation of the pre-mine overburden data, sample analyses of the graded spoil on an approved grid collected by SHC or by a combination of both. Once the PSC and SHC have established a satisfactory baseline of regraded spoil characteristics, the topsoil/subsoil replacement can begin.

Once the final grading and sampling is completed and approved by the PSC, the topsoil/subsoil or suitable overburden material will be respread in 24-, 36-, 42- or 48-in lifts using tractor scrapers or end dump trucks. With the assistance of grade stakes placed on 100-ft centers or GPS machine guidance systems, the topsoil/subsoil or suitable overburden will be spread on the regarded spoil and with the aid of additional equipment (motor graders, tractors, discs, etc.). The topsoil/subsoil or suitable overburden will be spread to a required depth. When the topsoil/subsoil or suitable overburden areas are approved by the PSC, the area will be revegetated as described in Section 4.3. Table 3.1-5 shows the volume of suitable topsoil/subsoil available for removal/respread for each landowner within the Permit Area. In addition, the table shows the total volume of suitable topsoil/subsoil and overburden required to meet the final reclamation requirements for each landowner. Based on SHC overburden geochemical model, there appears to be sufficient additional suitable overburden available within the disturbance area to satisfy any potential suitable SPGM shortfall of any landowner.

3.1.3 Mine Support Facilities

Mine operations require facilities to:

- Maintain equipment;
- Wash mobile equipment;
- Store parts and supplies;
- Provide offices for professional and administrative staff;
- Provide safety/training facilities;
- Store explosive supplies; and
- Process waste water from mine office and shop facilities.

Figure 3.1-3a and Figure 3.1-3b are conceptual drawings showing the mine support facilities for the operation. Figure 3.1-4 is a conceptual drawing of the refueling equipment proposed for the mine site. These structures will be constructed using conventional methods that may include buried footings, slabs on grade, basic steel frame structure with insulation, and siding. The support buildings total approximately 27,500 square feet (ft^2). The buildings will be temperature controlled (heated and air conditioned). Activities performed in these facilities will include administrative and management, mine planning, other engineering services, warehousing, and equipment maintenance. Materials that will be used during maintenance of equipment include replacement parts, welding supplies, steel, oils, lubricants, ethylene glycol, and various other supplies. These materials will be stored, handled, and disposed of in manners necessary to ensure the safety of operating personnel, the protection of the environment, and compliance with all applicable laws and regulations.

3.1.3.1 Wash Bay

The mine facilities include a wash bay to clean mobile equipment prior to performing preventative maintenance (PMs) and major repairs. Mud, grease, and oils dislodged from the equipment during washing will form a slurry which will be directed into a concrete sump where the majority of the solids will settle out. Oil and grease washed from the equipment will rise to the top of the water in

the sump and will be removed using an oil-grease trap and/or an oil-water separator. The oil free water will be discharged into a wash water settling pond located near the wash bay.

The wash water settling pond provides additional capacity to settle out fine silts and clays from the wash water. It also will be equipped with an oil-water separator to capture oil that is not captured in the concrete sump. The cleaned water may be released into natural drainages under a National Pollutant Discharge Elimination System (NPDES) permit, or pumped back to the wash bay for re-use.

Both the sump and wash water storage pond will require periodic cleaning to remove buildup of mud. This mud will be loaded into haulage trucks and deposited in designated areas in mined-out areas inside the pit.

The oil that is skimmed off the wash water will be collected in 55-gal drums or larger storage bins and sent to an off-site licensed recycler.

3.1.3.2 Fuel Depot

The haul truck fueling depot will consist of one steel 9,500 gal double wall diesel storage tank built for use in transportation of fuel. A fabric spill liner will be provided 20 ft beyond the extent of the fuel trailer and an additional 20 ft x 20 ft area where the trucks will be refueled. Haul trucks and other mine vehicles will be refueled while on the 20 ft square apron. The liner will collect spill that occur during fueling operations. Operators will be trained in fueling procedures. The fueling training will include discussion of how to safely handle the fuel as a potential environmental and fire hazard. Figure 3.1-4 contains an illustration of the planned installation. This sketch shows that the impervious liner is planned to extend 20 ft beyond the area under the trailer and that it will be installed under 12-in of fill material to assure that the liner stays in place and to assure that any spill is contained in this area. Emergency shut offs will be located near the pumps mounted on the trailer. Also, fire extinguisher and/or fire hydrants will be placed nearby to fight fuel fires.

3.1.3.3 Disposal Procedures

After mining activities are completed, any soils or construction materials contaminated with fuel or oils will be collected and disposed of off-site in landfills licensed to handle these materials or treated and disposed of on-site in accordance with all applicable laws and regulations. Other facilities or

structures will be dismantled and sold as scrap, or buried on-site with sufficient cover to allow vegetation growth.

3.1.3.4 Explosive Storage Area

The explosive storage area located at SHC will be used to store adequate blasting materials. The storage area will consist of two separate magazine buildings and an explosive storage bin. One storage magazine will store detonators, blasting caps, delays, and other initiating devices. The other storage magazine will store detonating cord, boosters, and other explosive devices and products. The blasting storage bin will have the capacity of storing 25 t of explosives. All explosive materials will be stored in accordance with Federal, State, and local laws.

3.1.3.5 Septic System

The septic system will be located near the mine office and shop facilities. The system will be designed and sized to process water from mine office and maintenance shop showers, sinks, and toilets. The system will include a septic tank and leach field located adjacent to the mine office and warehouse facilities. Prior to installation of the septic system, the area will be tested to ensure that a septic system and leach field will function properly. If testing indicates that a septic system would not operate properly, there are two options for waste water treatment. Option 1 is to install a waste water vault or tank to store the sewage on-site until it can be transported off-site to a proper waste water treatment facility. Option 2 is to install a package waste water treatment that will process all the wastes and allow discharge of the treated water. All facilities will be designed to meet all county and state laws.

3.2 Existing Structures

In accordance with:

- Section 38-14.1-14, NDCC; and
- Section 69-05.2-09-3, NDAC.

3.2.1 Existing Structures Narrative

Based on the definitions in NDAC 69-05.2-09-03, there are no existing mining-related structures in the Permit Area. There are, however, a number of existing non-mining structures (e.g., utilities) within and near the Permit Area including:

- Southwest Water Authority water line (1.5 in to 12 in);
- AT&T fiber optics line;
- Consolidated Telecom copper line and fiber optic line;
- Sprint-Nextel fiber optics line;
- ELM Locating and Utilities Services telephone line;
- West Plains Electric 345-kilovolt (kV) and 230-kV transmission lines, and underground power line;
- Montana-Dakota Utilities underground 12-in gas line and 41.6-kV transmission line;
- Williston Basin Interstate Pipeline Company 2-in and 16-in natural gas pipeline;
- Plains All American 4-in and 6-in crude oil pipeline; and
- Stark County and Section Line roads (un-paved).

Figure 3.2-1a, Figure 3.2-1b and Figure 3.2-1c show the proposed mining pit layout and the location of the utility structures. Figure 3.1-5a, Figure 3.1-5b, Figure 3.1-5c, and Figure 3.1-5d show the re-route locations for all the utility lines within the SHC Permit Area. West Plains Electric's underground power transmission line, Williston Basin Interstate Pipe Line Company's natural gas line, Consolidated Telecom's copper line, and South West Water Authority's water line will be re-routed to the ROW area as shown on Figure 3.1-5a, Figure 3.1-5b, Figure 3.1-5c, and Figure 3.1-5d in order to avoid damaging these utilities during mining. If required, the West Plains Electric overhead power lines will be raised to gain clearance sufficient to allow mining and support equipment to pass under.

SHC will obtain the necessary license(s) or permits required to conduct coal mining activities near, adjacent, or under the utility structures in the Permit Area.

3.2.1.1 Farmsteads

Refer to Section 1.5.5 for a description of existing farmstead locations, road closures, and operations within one hundred feet of a road ROW.

3.2.1.2 Mine Facilities

Refer to Section 3.1 for a description of all the mine facilities to be constructed within the Permit Area.

3.2.1.3 Surface Water Management Structures

Refer to Section 3.6 for a description of the surface water structures.

3.2.2 Farm Building/Structure Removal Narrative

In certain portions of the SHC Permit Area where mining activities will occur, existing structures including but not limited to residential homes, farm structures, farm buildings, storage containers, and barns may need to be removed prior to any nearby mining activity. Figure 3.2-1a shows the areas where the farm structures may be removed.

Prior to mining through any area containing the various farm structures, SHC will establish a construction zone perimeter around the area to be affected. SHC will then place geo-textile fences around the construction perimeter to help minimize the disturbance of the topsoil and subsoil within this area. Then a combination of equipment, tractor-scrapers, dozers, and motor graders will pre-strip the topsoil/subsoil within the construction area and haul it to topsoil/subsoil stockpiles as described in Section 3.1.2. The existing structures within the construction zone will then be demolished. To the extent that it can be done without adverse impact to the environment and is allowed by applicable laws and regulations, the wood and other construction debris will be buried in the mined-out pits. Any of this material classified as hazardous waste or determined to be otherwise unsuitable for disposal on-site will be stored and handled accordingly and disposed of at an off-site waste disposal facility permitted to receive those types of waste.

Any fluids, chemicals, sewage, oil, fuel, or liquid storage containers located in the construction area will be removed prior to demolition. The fuel, liquids, or oils collected will be disposed of off-site at facilities permitted to handle those types of wastes.

3.3 Blasting Plan

In accordance with:

- Section 38-14.1-14, NDCC;
- Section 38-14-1-24, NDCC;
- Section 69-05.2-09-04, NDAC; and
- Section 69-05.2-17, NDAC.

3.3.1 Procedures

SHC will follow and comply with all applicable Federal, State, and local laws, regulations, and requirements pertaining to the use, handling, preparation, and storage of explosives.

When loosening the coal cannot be accomplished efficiently by ripping with dozers, SHC will use explosives to fracture and fragment the lignite seams to facilitate the loading and preparation of the lignite. Blast holes will be drilled using a rotary drill capable of drilling 6- to 9-in diameter holes. The size of a blasting shot will depend on the area available for drilling, the wetness of the holes, and/or the location of the nearest occupied dwelling. A blasting shot could range from a single hole to a maximum of three hundred holes.

Prior to blasting, all the mine access roads within the vicinity of the blast area will be posted with blast warning signs. Within the pit area where blasting will occur, all mining activities will cease, all mobile equipment will be removed to a safe distance from the blasting area, and access ramps to the area being blasted will be blocked until the blast area has been cleared. Prior to detonating the blast, audible warning signals will be sounded. The sound is a follows:

- Pre-Blast Warning: A 1-minute (60 seconds) steady siren warning 5 min prior to the blast;

- Blast Warning: A 1-minute (60 seconds) wailing siren will sound prior to final detonation to notify all personal of the pending blast; and

- All Clear Signal: Following the blast, the blast site will be inspected for misfires and once the blast site is cleared, a steady siren signal for 1 minute (60 seconds) will sound after the blast area has been cleared.

Blasting within the Permit Area will comply with the requirements outlined in NDAC 69-05.2-17-05. No blasting will take place within 500 ft of any gas or oil collection lines, fluid transmission pipelines, sewer lines, disposal wells, petroleum or gas storage facilities, municipal water storage facilities, occupied dwelling, or farm buildings. No blasting will take place within 150 ft of any electric transmission lines. There will be no blasting within 1,000 ft of an occupied dwelling, public building, school, church, or community or institutional building outside the Permit Area. Within the proposed Permit Area, there are no public buildings within 300 ft of the planned pit areas.

SHC will ensure that the maximum amount of explosives initiated in an eight-millisecond (ms) period does not exceed the blasting standards required to control ground vibrations. Table 3.3-1 shows the maximum weight of explosives that can be detonated within an 8-ms delay period based on the scaled distances to an existing structure within or outside the Permit Area. For the Permit Area, the weight of explosives for each drill hole will range from a minimum of 22 lbs to a maximum of 55 lbs with the average drill hole containing 45 lbs. Figure 3.3-1 shows the distances to farm and other building structures within one mile of the Permit Area. The map also includes a table showing the scaled distances, at 400-ft intervals, and the maximum weight of explosives that can be detonated within an 8 ms delay period.

A cross-section and plan view of a typical blast pattern showing the burden and spacing of drill holes and delays are shown on Figure 3.3-2 (a non-electric system (nonel) and Figure 3.3-3 (detonating cord system). Blast holes will be completed as shown in the drawings with the primers, explosives (ammonium nitrate/fuel oil (ANFO)), and stemming placed in the holes as shown. The primers/boosters may be placed at the bottom of the hole, decked (two primers separated by some distance) or collar loaded, depending on drill hole conditions. A non-electric ignition system will be used to ignite the non-electric trunk line delays or detonating cord used for blast initiation. Bulk ANFO will be used in dry holes while pre-bagged ANFO will be used in wet holes. Information for each blast will be recorded using the blast record shown in Appendix 3.3-1.

In addition, all blasting activities will be conducted by trained, experienced, and competent persons who understand the hazards involved in a blasting operation.

All blasts will be conducted under the supervision of a certified blaster as required by Federal law and MSHA.

All drilling and blasting activities will be conducted by SHC employees or contractors. The drilling and blasting plan for each blast will be approved by a certified blaster and be implemented by SHC employees or contractors working under the guidance of the certified blaster.

3.3.2 Schedule

SHC will publish a blasting schedule in the Dickinson Press or another newspaper that is generally circulated in the area where blasting will occur at least ten days but not more than twenty days prior to beginning the blasting program. That schedule will be republished annually or more frequently as necessary. Copies of the blasting schedule will be distributed to all local governments and utilities that might be affected by the blasting and to all residents within one-half mile of the blasting area as required by law. If a significant change in the blasting schedule and/or location becomes necessary after publication and distribution of the notices described above, a revised blasting schedule will be published as described above and also sent to residents living within one-half mile of the blasting site at least ten days, but not more than twenty days prior to implementation of the new blasting schedule or blasting at the new location. An example of the blasting notice can be found in Appendix 3.3-2.

Blasting may occur at other times than specified in the blasting schedule due to emergency situations. These situations may include rain, lightning, atmospheric conditions, or operator or public safety issues. If a blast is delayed due to hazardous weather, such as a thunder storm, such that detonation would occur other than during the time frame listed in the blast schedule, notice will be given to all residents within one-half mile of the blasting site and a complete written report will be filed with the PSC no later than three days following the blast. Such report will include a description of the delay, when the actual blast occurred, what warning notices were given, and a copy of the blasting report.

3.3.3 Monitoring

Thirty days prior to any blasting, SHC will notify in writing all residents and landowners of man-made dwellings or structures located within one mile of the Permit Area with instructions on how to request a pre-blast survey. An example of this pre-blast survey is found in Appendix 3.3-3. If a pre-blast survey is requested by any landowners, SHC will hire an independent contractor to conduct a pre-blast survey. The contractor will supply three copies of the pre-blast survey. All requested pre-blast surveys by land owners located within one mile of the permit boundary will be performed and completed prior to any blasting. One copy will be kept at the SHLM site, one copy will sent to the PSC, and one copy sent to the landowner.

Records of all blasting conducted at the SHLM site will be kept on file for a period of three years. Appendix 3.3-1 contains a typical page of the recorded blast information.

SHC may conduct seismic monitoring at the nearest dwelling if access is granted, or seismic monitoring will be situated such that the monitoring devices are on a straight line between the mine Permit Boundary and the structure being monitored. The blasting and measuring systems of the seismic monitoring systems will follow the guidelines as outlined in NDAC 69-05.2-17-05. An example specification sheet that details the types, capacities, and sensitivities of monitoring equipment can be found in Appendix 3.3-5. This example is provided through PreSeisTek and is found in Appendix 3.3-5. If the monitoring data clearly shows that SHC is in compliance, seismic monitoring may be discontinued.

3.3.4 Notices

The following is a list of government agencies and the newspaper that will receive a blasting schedule notice:

- North Dakota Public Service Commission
  600 E. Boulevard, Dept 408
  Bismark, ND 58505-0480

- Stark County Commissioners
  County Courthouse
  51 3rd St. E
  Dickinson, ND 58601

- Stark County Sheriff

66 Museum Dr.
Dickinson, ND 58602

- Dickinson Press
  1815 1st St. W
  Dickinson, ND 58602

Appendix 3.3-4 provides a list of landowners, residents, and building owners that are located within one mile of the Permit Area and who must be notified at least 30 days prior to any blasting of their right to request a pre-blast survey for their properties. With this notification, SHC will include a copy of the blasting schedule notice as required.

3.4 Air Quality Control Plan

Sections 38-14.1-14(2)(j) NDCC and 69-05.2-09-05 NDAC require that SHC specify the measures it will employ to comply with the air pollution control requirements of the NDDH and any other measures necessary to effectively control wind erosion and resulting air pollution.

Mining involves the movement of soil, overburden and coal, and generates fugitive dust, all of which are considered in the emission inventory for the proposed mine. The operations associated with the SHLM that may result in particulate matter emissions include the following:

- Topsoil removal, loading and unloading, and transport;
- Overburden removal, loading and unloading, and transport;
- Coal drilling, blasting, removal, loading, unloading, transport and storage; and
- Reclamation.

The surface mine operations described above can generate fugitive dust due to handling, hauling and storage of topsoil, overburden, and coal. SHC will implement the appropriate best management practices to minimize the fugitive dust emissions. The proposed control measures will include:

- Minimizing drop heights associated with material loading and unloading;
- Application of water and/or other dust suppressants on mine haul roads;
- Vehicle speed limits on mine haul roads;

- Use of best management practices (BMPs) to reduce potential emission from storage piles; and

- Concurrent reclamation of areas disturbed by mining in order to reduce the overall size of the disturbed surface area that would be vulnerable to wind erosion.

Particulate emissions from material handling (e.g., loading haul trucks, unloading haul trucks, etc.) are a source of fugitive dust emissions. Those emissions will be controlled by minimizing the drop height (e.g., from the loader bucket to the haul truck bed). This measure will serve to minimize the amount of material exposed at any one time to the potential for wind entrainment of fine particles in the material.

Particulate emissions from unpaved haul roads will be controlled using a combination of wet suppression sprays and speed limits. Wet suppression is the preferred control option and will reduce potential emissions by approximately 90%.

Fugitive dust emissions from traffic on unpaved roads are partly a function of vehicle speed, with slower speeds generating less dust. SHC will control speeds of the mine haul trucks to minimize fugitive dust entrainment and resulting emissions.

SHC will use compaction and, as necessary, dust suppression sprays to minimize fugitive emission from the material storage piles. Compaction and application of dust suppression sprays represent the most stringent technically and economically feasible particulate control system available for material handling storage piles.

As described in other areas of this application document, SHC is committed to undertaking reclamation of disturbed surface as soon as practical after mining is completed in the area and as allowed by the regulatory authorities. Concurrent reclamation will serve to minimize the amount of surface vulnerable to wind erosion and thereby reduce resulting fugitive dust emissions.

NDAC 69-05.2-09-02(10) requires that an application for a permit to open and operate a surface coal mine include maps showing specific features of the mine including each air pollution collection and control facility. SHC understands the term "air pollution collection and control facility" to refer to a stationary air pollution control device such as a baghouse or scrubber. As required by NDAC 69-05.2-09-02(10), the locations of such stationary pollution control devices could readily be reflected on a map.

However, as described above, no discrete air pollution collection and control facilities are proposed for the SHLM. That is because the mining activities proposed in this permit application are conducted with mobile equipment ill suited to the application of stationary air pollution collection and control facilities as SHC understands that term. Instead, as described above, SHC proposes air pollution control measures (e.g., minimization of material drop heights) and practices (e.g., application of water) to reduce emissions to the atmosphere from the proposed mining activities.

Therefore, because SHC proposes no air pollution control and collection facilities none are reflected on the maps provided as part of this application.

SHC will apply to the North Dakota Department of Health for the required air quality-related permit-to-construct in which SHC will propose the air pollution control measures and practices described here.

SHC has applied to the NDDH for an air quality permit-to-construct for the SHLM.

3.5 Transportation Facilities

In accordance with:

- Section 38-14.1-07, NDCC;
- Section 38-14.1-24(15), NDCC;
- Section 69-05.2-09-06, NDAC;
- Section 69-05.2-04-01.3, NDAC;
- Section 69-05.2-24, NDAC; and
- Section 69-05.2-09-07, NDAC.

A description of the transportation facilities to be constructed, used, and maintained for the mine is provided in this section. In addition, a letter certifying that the plans and drawings pertaining to the primary roads have been prepared by or under the direction of a certified registered professional engineer with experience in the design and construction of roads is provided in Appendix 3.5-1 and a discussion of this letter is location in Section 3.5.2. This section will also include a plan to relocate or use any existing county and section line roads.

3.5.1 Transportation Narrative

3.5.1.1 Haul Road Construction

The development of haul roads at the SHLM site will require the construction of a portion of the main haul road through undisturbed areas to facilitate mining equipment mobilization and coal haulage to the coal crushing facility. The proposed haul roads and pit access ramps are shown on Figure 3.5-1. The haul roads and ramps may or may not be constructed in the exact locations shown due to unforeseen changes in mining conditions or other factors. The intent of illustrating the haul roads and ramps is to show the method that will be used in the coal haulage process. The actual locations will be based on the conditions encountered in the field, pit placement, and advancement of the pits.

Typical haul road cross-sections constructed in undisturbed areas and regrade areas are illustrated on Figure 3.5-2. The typical main haul road will be designed using the following parameters:

- Road Travel Width (Minimum): 60 ft;
- Road Bed Slope: 1% to ditches;
- Road Embankment Slopes: 4H to 1V for trapezoid ditches;
3H to 1V for triangular ditches;
- Ditch Bottom Width: 4 ft for trapezoid ditches
- Ditch Backslope: 3H to 1V or Less unless otherwise specified;
- Culvert Design: 10-year/24-hour precipitation event; and
- Arch Bridge Design 100-year flood flow on South Branch Heart River

Compacted cover over culverts will be sufficient to withstand vertical soil pressures along with loads from mining equipment. Berms will be installed between the road drainage and the pits.

~~A typical profile of the mine support facilities site access road is illustrated in Figure 3.5-4.~~ Figure 3.5-5 and Figure 3.5-6 illustrate~~s a~~ typical profiles of the access road for the explosive materials storage area. ~~Figure 3.5-6 illustrates a typical profile of the pit access road which will be~~

~~used to transport employees and equipment from the mine support facilitates to the active working areas within the mine.~~

Typical haul road profiles are illustrated on Figure 3.5-7, Figure 3.5-8, Figure 3.5-9 and Figure 3.5-10.

The haul road will be constructed using either overburden material, subsoil material, or a mixture of overburden and subsoil depending on the road cut and fill material quality. For roads constructed across regraded spoil, each new haul road segment will be designed using the final regrade contours of the regraded area. The road will be constructed such that the final road elevation will be approximately 2 ft above the final spoil regrade contour elevation. The haul road construction methods will be documented to develop the necessary material handling procedures during the reclamation of each haul road segment.

Haul roads that are constructed on undisturbed land may require subsoil borrow areas to facilitate initial haul road construction. Locations of subsoil borrow areas are conceptual and will vary depending on the quality testing performed prior to road construction. Final locations, however, will be on “knobs” or “ridges” of hills near the initial haul road alignment and will not be located across drainages. Each borrow area will be a self-contained non-contributing feature or structure which will trap all precipitation. Borrow areas will be located within the Permit Boundary and the proposed Disturbance Boundary. If the runoff from these borrow areas cannot be routed through a sedimentation impoundment, then runoff from these areas will be controlled by Best Management Practices (BMPs) in order to prevent additional contribution of sediment to streams (Section 3.6.1). Topsoil removed will be placed adjacent to the haul road or on the nearest topsoil stockpile according to surface ownership, if requested. Size of borrow areas will be dictated by the above constraints and will also be dependent upon actual weather and soil moisture conditions at the time of construction. Subsoil unsuitable for road construction (i.e., supersaturated) will be removed from the road sub-grade and placed on the elevated portion of each borrow area. Subsoil removed from the borrow areas will be limited to oxidized and other materials that visually appear to be of subsoil quality (i.e., not gray, reduced, or very coarse material). Upon reclamation, fill from the roads will be returned to the borrow areas to restore them to the approved post-mining topography (PMT), and topsoil will be respread on both the reclaimed borrow areas and road areas as outlined in the reclamation plan.

3.5.1.2 Haul Road and Coal Ramp Plan

The Main Haul Road (MHR) segment 1 begins at the planned coal crushing facility and heads north following the west side of Pit 3. It crosses the South Branch Heart River at approximately station 40+00 and continues northeast until reaching the boundary of Pit 1; at which point the haul road parallels Pit 1 until station 112+50. Where MHR segment 1 crosses the South Branch Heart River, approximately station 40+00 to 41+00, a concrete arch bridge will be engineered and constructed to support the loads of the mining equipment. ~~Prior to design and construction of the bridge a survey and soil samples of the area will be conducted.~~ A ~~conceptual~~ design of the concrete arch bridge has been prepared~~bridge~~, which demonstrates that the structure can safely accommodate the peak flow from a 100-year event. The design includes an ~~and~~ HEC-RAS hydraulic analysis of the~~and~~ cross-sections developed from the available 2-foot contour map for the location. Designs for the concrete arch bridge are provided~~can be seen in~~ on Figure 3.5-13 and Figure 3.5-14.~~;~~ The hydraulic analysis ~~these drawings are conceptual and~~ based on the two foot topographic map is believed to provide upper bound estimates of water surface elevations because the topographic surface does not delineate the full extent of channel incision in the vicinity of the structure. Geotechnical investigations of foundation materials will be completed to prepare the construction designs. A detailed survey of the area will also be performed to support the construction designs. These construction designs will be submitted for approval prior to construction of the concrete arch~~available topography and soil information. A detailed survey of the area and soil sampling will need to be completed prior to actual design and construction of the~~ bridge. Coal ramps for the Pit 1 area will branch off from this main haul road to provide access into the active mining areas. Haul road segment MHR 1 and coal ramps will be used for coal haulage from Pit 1 to the coal crushing facilities and will remain in place until mining begins in Pit 2. Prior to completion of mining in Pit 1, the MHR segment 2 will be constructed to facilitate the mining of Pit 2.

A portion of the MHR segment 2 will be constructed during the initial phase of mining of Pit 1. The segment of MHR 2 will begin at the intersection of MHR 1 and MHR 2, approximately station 112+12 on MHR 1, and MHR 2 will extend to approximately station 56+13 where it will connect to the pit access road. This segment of the haul road will serve as access to Pit 1 and the haul route for overburden being placed on the out-of-pit overburden stockpile 1 located in Section 21 of Township 139 North, Range 98 West.

The other MHR segments (the remainder of 2, and all of MRH 3, and 4) will be constructed as needed as mining advances within the SHC Permit Area.

Pit ramps will branch off the MHRs at 1,000- to 3,000-ft intervals. Individual ramp lengths will vary depending on the mining conditions encountered and pit depths. Pit ramps will slope down through the mine spoils at grades between two to eight percent until they reach the approximate pit bottom. As mining progresses further from the main haul road, older portions of the pit ramp will be backfilled and reclaimed to the approximate final spoil regrade elevation. A new ramp will then be constructed at grades discussed previously which will allow a more efficient and economical haul truck operation. Figure 3.5-1 shows the general layout of the coal access ramps to be constructed at SHC. These ramp locations are approximate and may change based on material conditions encountered in the field.

3.5.1.3 SHLM Access Road

Access to SHC mine will start from the South Heart Exit from Interstate Highway 94 and will follow this route (Figure 3.5-11a):

- Take South Heart Road (121st Avenue, SW) south from I-94 approximately 0.75 miles to the intersection of old Highway 10;
- Turn right and travel 1 mile west on Highway 10 to the intersection of 122nd Avenue SW;
- Turn left and travel ~~1~~ 2 1/3 miles south on 122nd Avenue SW ~~to the intersection of 38th Street SW~~; and
- Turn right ~~onto SHC Access Road and travel approximately 1 mile west~~ into the SHC Support Facilities.

The SHLM access road will require upgrading and paving as described below:

- Segment 1 – Interstate 94 to Highway 10 – Improvements as agreed-upon with Stark County;
- Segment 2 – Highway 10 to 122nd Avenue SW – Improvements as agreed-upon with Stark County; and
- Segment 3 – 122nd Avenue SW to 38th Street SW – Improvements as agreed-upon with Stark County.

Upon approval for road construction from the Stark County Board of County Commissioners, 1 mile of Highway 10 will be improved as necessary to support anticipated mine traffic, approximately

2 miles of existing county road will be upgraded and paved. This work will occur prior to the opening of the SHLM.

3.5.1.4 Removed, Re-Routed, Temporarily Closed, and Reclaimed Roads

During the course of mining it will be necessary to temporarily close certain section line rights-of-way and the trails that occupy them. It will also be necessary to temporarily close and/~~-~~or relocate certain county-maintained roads. SHC will work closely with the Stark County Board of Commissioners on road closure/re-route plans and will obtain the Commissioners' approval of all changes to county-maintained roads prior to implementing those changes.

Figure 3.5-11B shows the schedule and location for the proposed road closures/re-routes within the ~~p~~Permit ~~a~~Area. All road closures will be approved by the Stark County Board of Commissioners prior to their closure for mining. SHC will petition the County to close trails and roads only when necessary, allowing time for any required County administrative process. Reclamation and reopening plans for the closed roads will also be subject to the approval of the Stark County Commissioners. All relocated and rebuilt roads and trails will be constructed to a condition equal to or better than their pre-mining condition and will comply with applicable County road construction guidelines.

~~In Section 16 and 15 of Township 139 North, Range 98 West there is one unpaved road that will be closed during mining and is listed below:~~

- ~~East-west road located along the south section line.~~

~~In Section 22 of Township 139 North, Range 98 West there is one unpaved road that will be closed during mining and is listed below:~~

- ~~North-south road located along the west section line.~~

~~In Section 20 of Township 139 North, Range 98 West there is one unpaved road that will be closed during mining and is listed below:~~

- ~~East-west road located along the north section line; and~~

~~In Section 27 of Township 139 North, Range 98 West there are three unpaved roads that will be closed during mining and are listed below:~~

- ~~East-west road located along portions of the north section line;~~

- ~~North-South road located along the southern portion of the west section line;~~
- ~~North-South road located along the northern portion of the west section line.~~

~~In Section 33 of Township 139 North, Range 98 West there are two unpaved roads that will be closed during mining and are listed below:~~

- ~~East-west road located along the north section line;~~
- ~~North-South road located along the east section line.~~

~~These roads will be closed and relocated as shown on Figure 3.5-11b and Figure 3.5-11c.~~

An overpass ~~will be constructed~~is planned for construction on 122nd Avenue ~~prior to~~in 2038. The overpass will run north to south along 122nd Avenue in the SW1/4 of Section 23 and SE1/4 of Section 22 of Township 139 North, Range 98 West as shown on Figure 3.5-11~~c~~b. The overpass is being constructed to allow safe access for mine traffic to portions of the mine on the both sides of 122nd Avenue. The overpass will allow mine traffic (haul trucks, mine vehicles, mobile equipment, etc.) to pass under 122nd Avenue. Detailed design and construction plans for the planned overpass will be provided to the Stark County Road Superintendent and to the PSC as a permit revision prior to any construction. SHC will conduct detailed soil, traffic, and geotechnical studies to support design of the overpass and the detailed design plans will be certified by a professional engineer prior to submission to the Stark County Highway Superintendent and the PSC for approval. ~~The overpass will stay in place and not be removed post-mining.~~

~~The existing unpaved section line road (41st Street SW) running east to west along the north section line of Sections 33 and 34 of Township 139 North, Range 98 West will be closed as shown on Figure 3.5-11b. The section line public right-of-way (ROW) that runs north to south along the west section line of Section 34 of Township 139 North, Range 98 West will also be closed. Prior to the closure of these existing section line roads and public ROW, new section line roads will be constructed that run east to west along the south section lines of Sections 33 and 34 of Township 139 North, Range 98 West and then north-south along the west section line ROW of Section 33 to intersect with existing 41st Street at the northwest corner of Section 33. Figure 3.5-11c shows the preliminary proposed road relocations that SHC has designed that will have minimal or no travel affects on residents who use these roads. Once the Stark County Board of County Commissioners has approved the SHC proposed road relocations and re-alignments, the 10,600 ft of the new section~~

~~line road that will run east to west along the southern section line of Section 33 and 34 of Township 139 North, Range 98 West will be built. Also, approximately 5,300 feet of road will be constructed along the west boundary of section 33 to tie the newly constructed portion of 42nd Street to existing 41st Street.~~

~~Prior to the beginning of mine construction, the following roads will be closed throughout the entire mine life:~~

- ~~The unpaved section line ROW along the western boundary of Section 21 of Township 139 North, Range 98 West;~~
- ~~The eastern 1/3 of the unpaved road lying along the northern section line road in Section 27 of Township 139 North, Range 98 West;~~
- ~~The northern and eastern unpaved section line road in Section 33 of Township 139 North, Range 98 West;~~
- ~~The southern 1/2 of the unpaved road lying along the western section line road in Section 27 of Township 139 North, Range 98 West; and~~
- ~~All other unpaved roads in Section 27 of Township 139 North, Range 98 West.~~

~~Once mining is complete within the Permit Area and reclamation has begun, all the section line and county roads affected during the mining activities will be reclaimed to a condition equal to or better than their pre-mining conditions or as stipulated with the Stark County Board of Commissioners. All final road designs and construction will be subject to approval from the Stark County Board of Commissioners and will comply with all county road construction guidelines.~~

3.5.1.5 Culvert and Arch Bridge Design

This section presents the design characteristics and location of the culverts that will be installed for the Permit Area.

Haul Road Culvert Installation Designs:

Culvert CC#1 through Haul Road

Drainage Area = 178.3 acres (includes drainage contained by berm and facilities area at the north side of the mine)
Estimated 10-year peak flow (Q_{10}) = 61.15 cubic feet per second (cfs)

Estimated 100-year peak flow (Q_{100}) = 155.53 cfs

Use one (1) 60-in diameter corrugated metal pipe (CMP) or two (2) 44" x 72" arched culverts
Projecting inlet
Minimum slope = 1%

Passes: Q_{10} with Headwater (HW) depth of 3.75 ft
Q_{100} with HW depth of 6.5 ft

Culvert CC#2 through Haul Road

Drainage Area = 98.16 acres
Q_{10} = 80.19 cfs
Q_{100} = 188.92 cfs

Use one 60-in diameter CMP or one 36" x 58" arched culvert
Projecting inlet
Minimum slope = 2.00%

Passes: Q_{10} with HW depth of 4 ft
Q_{100} with HW depth of 7.8 ft

Culvert CC#3 through Haul Road

Drainage Area = 33.16 acres
Q_{10} = 24.42 cfs
Q_{100} = 67.13 cfs

Use one 36-in diameter CMP
Projecting inlet
Minimum slope = 1%

Passes: Q_{10} with HW depth of 3 ft
Q_{100} with HW depth of 7.5 ft

Culvert CC#4 through Haul Road

Drainage Area = 67.43 acres
Q_{10} = 42.96 cfs
Q_{100} = 120.65 cfs

Use one 48–in diameter CMP
Projecting inlet
Minimum slope 1%

Passes: Q_{10} with HW depth of 3.4 ft
Q_{100} with HW depth of 9.6 ft

Culvert CC#5 through Haul Road

Drainage Area = 472.16 acres
Q_{10} = 181.9 cfs
Q_{100} = 465.35 cfs

Use one 96-in diameter CMP or one 87” x 137” arched culvert or two 69” x 98” arched culverts
Projecting inlet
Minimum slope 1.5%

Passes: Q_{10} with HW depth of 5 ft
Q_{100} with HW depth of 9.69 ft

Culverts CC#6 and CC#7 are located on the site access road. CC#6 transfers water from the haul road and the facilities area under the road to Pond 3. During the permit term, culvert CC#7 transfers undisturbed area runoff under the site access road. For life of mine water management plans, culvert CC#7 will become the outlet structure for Pond 5. A design section for CC#7 is included in Figure 3.5-12 to ensure that the Con/Span concrete arch culvert can also function as the spillway for Pond 5. A 14-foot wide Con/Span concrete arch culvert with a 4-foot rise and wingwalls set within an angle ranging from 30o to 75o can safely accommodate peak flows from a 100-year, 6-hour event for conditions prior to pond construction and following pond construction. The invert elevation at the inlet to the Con/Span concrete arch culvert is at 2,497.6 feet and the access road elevation at Station 5+00 is at an elevation of 2,502 feet.

Culvert CC#6 ~~site~~ facility ~~access~~ area road (W)

Drainage Area = ~~150.67~~8.743 acres
Q_{10} = 11.63 cfs
Q_{100} = 197.36 cfs

Use one ~~60~~36 in diameter CMP
Projecting inlet
Minimum slope 1.5%

Passes: Q_{10} with HW depth of ~~4.5~~2.0 ft
Q_{100} with HW depth of ~~10~~ 2.8 ft

Culvert CC#7 ~~site~~ facility area ~~access~~ road (E)

Drainage Area = ~~202.22~~4.31 acres
Q_{10} = ~~194~~ 8.6 cfs ~~undisturbed~~

Q_{100} = ~~264~~ 14.48 cfs disturbed

Use one 24-in diameter CMP
Projecting inlet
Minimum slope 2%
~~14-foot by 4-foot Con/Span concrete arched culvert with wing walls~~
~~Minimum slope 1.0%~~

~~Passes: Q_{100} with HW depth of 2.8 ft (undisturbed) and 3.36 (disturbed)24-in diameter CMP~~
~~Projecting inlet~~
~~Minimum slope 2%~~

Passes: Q_{10} with HW depth of 1.75 ft
Q_{100} with HW depth of 2.7 ft

Culverts CC#8 and CC#9 route water across small drainages traversed by the Explosives Storage access road.

Culvert CC#8 Explosive storage access road

Drainage Area = 40.6 acres
Q_{10} = 56.3 cfs

Use one 48–in diameter CMP
Projecting inlet
Minimum slope 1%

Passes: Q_{10} with HW depth of 3.6 ft

Culvert CC#9 Explosive storage access road

Drainage Area = 113.4 acres
Q_{10} = 148.5 cfs

Use one 66–in diameter CMP
Minimum slope 1.0%

Passes: Q_{10} with HW depth of 5.5 ft

Culvert CC# 10 routes water across a small swale crossed by the access road to SOVB-10.

Culvert CC#10 SOVB-10 access road

Drainage Area = 36.14 acres
Q_{10} = 52 cfs

Use one 45–in diameter CMP
Projecting inlet
Minimum slope 1%

Passes: Q_{10} with HW depth of 3.75 ft

Culverts will be installed on MHR segment 1 at the stations shown on Figure 3.5-3. The culverts are designed for the peak flow from a 100-year, 24-hour storm event based on the higher of the peak flows from the drainage under initial mining conditions versus the drainage following reclamation.

MRH 1 culvert design information is summarized in Table 3.5.1. Additional information on the locations of other culverts are displayed on Figure 3.5-12, and the design of culverts shown in Table 3.5-1 can be found in Appendix 3.6.2 – Surface Water Management SEDCAD Reports.

Haul Road Crossing, South Branch Heart River

A bridge structure consisting of three 48-foot Con/Span concrete arch culverts will be installed where the Main Haul road Segment 1 (MHR1) crosses the South Branch Heart River at MHR1 Station 40+00 as shown on Figure 3.5-14. The drainage area of the South Branch Heart River at the haul road crossing is approximately 115.2 square miles. Peak flows at this location were estimated using the USGS method for estimating the magnitude and frequency of peak discharge on ungaged streams in North Dakota (Williams-Sether, 1992). The estimated 10-year and 100-year design flows used in this section are:

- Q_{10} = 1,859 cfs
- Q_{100} = 5,932cfs

The design for the haul road crossing of the South Branch Heart River included a HEC-RAS analysis of the changes in the floodplain elevations for the design flows at the location of the bridge structure and upstream of the structure. Three 48-foot Con/Span concrete arch culverts have been specified for the design to keep the increase in the floodplain elevations to within approximately 2.2 feet at cross section 18+400 located approximately 2000 feet upstream of the bridge structure and haul road crossing as shown in Figure 3.5-13. The Cons/Span bridge structure will safely pass the peak flow from a 100-year event of 5,932 cfs. The flood elevation for a 100-year event at the bridge structure is estimated to be at 2519.07 feet as shown in Figure 3.5-14. The minimum elevation of the Haul Road crossing the flood plain will be 2520.5 to ensure that the haul Road is not breached during the 100-year flood.

3.5.2 Professional Engineer Certification

As required by NDAC 69-05.2-09-06(2), the plans and drawings pertaining to the primary roads submitted for permit have been prepared by, or under the direction of a certified registered professional engineer with experience in the design and construction of roads. The plans and drawings for the primary roads are contained in Section 3.5.1. Appendix 3.5-1 contains a certification letter, affixed with the stamp and signature of the professional engineer, for the plans and drawings of

primary roads and culverts included in this permit application. The original certification letter is on file at Golder Associates Inc., 44 Union Boulevard, Suite 300, Lakewood, Colorado 80228.

3.6 Surface Water Management

In accordance with:

- Section 38-14.1-14(1)(o), NDCC;
- Section 38-14.1-14(2)(h), NDCC;
- Section 69-05.2-09-09, NDAC; and
- Section 69-05.2-16, NDAC.

3.6.1 Surface Water Management Plan

A water management plan, presented on Figure 3.6.1, has been developed to address the regulatory requirements for water management for the proposed surface coal mine operations over the life-of-mine period. The water management plan for mine operations addresses the design, construction, and operation of a network of structures which will collect and treat surface runoff from areas disturbed by surface mining operations, thereby preventing any additional contribution of suspended solids to waters downstream of the impacted area. These will minimize erosion and prevent additional contributions of sediment on undisturbed areas or to stream flow or runoff outside the Permit Area to the extent possible. The structures that comprise this network include ~~a~~ sedimentation ponds, ~~sediment sump,~~ collection ditches, and temporary diversions. The water management plan also addresses pit water pumping and treatment. Other objectives of the water management plan are to reduce potential operational delays that result from inflows of surface water runoff into the active mining areas and to provide a source of water supply for dust suppression and mine use. The following sections of the surface water management plan include a description of design procedures and criteria, a plan for water management and detailed designs for all structures to be constructed during the permit term. Appendix 3.6-1 presents a letter certifying that the plans and drawings pertaining to the water management structures have been prepared by, or under the direction of a certified registered professional engineer with experience in the design and construction of surface water management structures.

The watersheds associated with the water management plan and the locations of major operational water management structures that have been developed for the proposed operations are shown on Figure 3.6-2 and Figure 3.6-3. Upgradient diversion structures, highwall berms, and impoundments may also used to minimize the surface runoff entering the active mine area. These measures serve to reduce the volume of disturbed area runoff that will need to pass through sediment control structures. It also serves to reduce potential operational delays that result from frequent inflows of surface water runoff into the active mining areas.

Figure 3.6.4 and Figure 3.6-5 include the layouts of the collection ditches (CD1A, and CD2A) and the sedimentation ponds that will be utilized to control and treat drainage from areas disturbed by mining activities, including disturbed areas that have been graded, seeded, or planted prior to discharge to streams and effect compliance with applicable Federal and State water quality requirements. Runoff from disturbed areas that cannot be treated in the sedimentation pond is either contained by berms or treated using BMPs in order to prevent additional contribution of sediment to streams. These may include the use of sumps, check dams, berms, silt fences, bale dikes, rock or grass sediment filters, riprap, mulches, and other measures independently or in combination to reduce runoff, trap sediment, or treat runoff water.

The sediment ponds are temporary impoundments that have been engineered to meet the requirements of the North Dakota State Engineer and the appropriate Water Resource District, as well as the performance standards for the PSC. The impoundments are designed to contain, at a minimum, the runoff resulting from a 10-year, 24-hour storm event plus an estimated sediment storage capacity for at least 3 years of expected sediment yield. The structures are partially excavated ponds with low-height embankments. The design height for the embankment includes a five percent allowance for settling and no side slopes are steeper than 3H:1V. The pond design includes an emergency spillway capable of passing the peak discharge resulting from a 100-year, 6-hour precipitation event with a minimum of one-foot of freeboard with the spillway flowing at design depth. The designs for the pond and ditches were developed using the hydrologic parameters and design procedures presented in Section 3.6.2.

There are ~~three~~ two ponds and one sump proposed for the initial permit term. Pond 1 handles flow from the northern portion of the pit area and a plan view, embankment and emergency spillway cross section are shown on Figure 3.6-6, along with graphs showing stage-area-capacity and stage-discharge. A sump located on the southeast corner of the facilities area will contain storm runoff.

Water will be pumped from the sump to Pond 1 for treatment, prior to discharge. Pond 2 treats the drainage from the southern half of Pit 1, and designs are shown on Figure 3.6-7. ~~Pond 3 treats the watershed associated with the facilities area, and points south.~~ The engineered drawings for Ponds 1 and 2 are displayed in Figure~~s~~ 3.6-~~8~~6 and Figure 3.6-7, respectively~~.~~. Design calculations for the Ponds 1, 2 and the sump are included in Appendix 3.6.2. Detailed water plans associated with later permit terms, including water structures associated with Pits 2 through 5 and Ponds ~~4~~3 through 11 will be submitted through the permit revision or permit renewal process at least six months prior to the desired construction date. Construction will not begin until detailed design plans for the structures are approved by the PSC.

Sedimentation control structures will be installed before any major mining activities commence in the contributing watershed. Prior to the construction of these structures, the topsoil will be removed and stockpiled from the construction site and the surface scarified. Suitable overburden removed from the excavated portion of the pond basin is used for embankment construction. Material used in the embankment construction will be free of sod, large rocks, and other large pieces of vegetated matter. The embankment material is then used to reclaim the pond basin. Excess overburden excavated from pond sites and not otherwise used to construct embankments or haul roads will be disposed of as spoil or stockpiled for pond reclamation.

The sedimentation pond and associated control structures are temporary and will be removed and the affected area reclaimed when sediment control is no longer required to treat disturbed area runoff. It is assumed that the sedimentation pond will remain in service for a period of up to 10 years following topsoil placement and seeding of all disturbed areas draining to the pond.

Storm water and ground water pumped from the mining pits will be stored and treated in the sedimentation pond. Pit water will typically be collected at in-pit sumps where it will be pumped into ditches that drain to the sedimentation pond.

During life of mine operations, the operator will employ temporary stream channel diversions on the West Tributary of the South Branch Heart River during operations in Pit 2, and temporary diversion of the South Tributary to the South Branch Heart River during operations in Pit 4A as shown on Figure 3.6-1. These diversions will be installed to prevent additional contributions of suspended solids to stream flow and runoff outside the Permit Area, and engineered to maximize stability. They will be designed to handle the 100-year 6-hour storm. Design calculations for the diversion

segments DD-1, DD-2 and DD-3 for the West Tributary are included in Appendix 3.6.2. Detailed designs associated with the construction of these temporary diversions will be submitted through the permit revision or permit renewal process at least six months prior to the desired construction date. Construction will not begin until detailed design plans for the structures are approved by the PSC. Following mining, the West Tributary and the South Tributary will be reconstructed in a geomorphically stable configuration per designs in Section 4-1.

3.6.2 Hydrologic Parameters, Design Procedures and Design Concepts

The procedures utilized in determining the required capacity for the proposed sedimentation ponds include the determination of curve numbers (CN) for hydrologic soil cover complexes for sub-watersheds draining to the ponds in order to estimate the runoff volumes for the 10-year, 24-hour design rainfall magnitudes. The curve number estimates for B, C and D hydrologic soil groups under different levels of disturbance and reclamation cover at the mine are provided in Table 3.6-1. Procedures for determining these values were developed and published in Barfield et al. 1983. The 3-year sediment storage volume was calculated using the Revised Universal Soil Loss Equation (RUSLE) method within the Civil Software Sediment, Erosion, Discharge by Computer Aided Design (SEDCAD). A Rainfall value of 50 was acquired from the Isoerodent Map of the Eastern US. Most of the soils were silt loams, and an erodible particle size distribution for silt loams were entered into the model. Thus, a K of 0.37 was used for the soil erodibility factor, unless sandier, B soils were present, in which case a K of 0.24 was utilized. Representative slope lengths and slopes were entered for each subwatershed. Table 3.6-4, summarizes the Cover factor values, which varied based on reclamation success. Shows the factors used in calculating the 3 year sediment storage volume for the sedimentation pond along with the results. The Pond Structure Detail in the SEDCAD modeling in Appendix 3.6.2 for each pond identifies the three-year sediment storage volume and elevation, and it is also displayed on Figure 3.6-6 and Figure 3.6-7.

The SEDCAD software from Civil Software Design was utilized in developing the detailed designs for collection ditches, sedimentation pond, culverts, and BMPs for the Permit Area disturbance. SEDCAD includes routines for estimating runoff volumes using the Natural Resources Conservation Service (NRCS) CN procedure, calculating time of concentrations, estimating storm erosion, and performing flood flow and sediment routing. The time of concentration (Tc) is the duration of time for water to travel from the most remote portion of the subwatershed to the outlet. SEDCAD also includes routines for designing ditches, diversion channels, and sedimentation ponds. Sedimentation

pond design features include the generation of area-elevation-capacity relationships for impoundments, alternative design options for primary and emergency spillways and calculation of impoundment freeboard levels and sediment capture results. All of the design specifications for the surface water management structures can be found in Appendix 3.6.2, Surface Water Management SEDCAD Reports.

Collection ditches will be engineered as earthen channels, sized to safely pass design velocities or protect vulnerable transition zones. Collection ditch freeboard will be at least 0.3 ft deep for a 10-year, 24-hour storm event. Temporary diversions are designed for estimated peak flow from the 10-year event or larger. The peak flows for these designs are determined using SEDCAD.

Culvert installations for the haul roads have been designed to pass the 10-year 24-hour event with a headwater diameter ratio of 1. They will safely pass the peak flow from a 100-year, 6-hour precipitation event as described in Section 3.5. Either the SEDCAD software or the SurvCADD Software, distributed by Carlson Software, has been utilized to size culvert installations. Culvert installations for small access roads are sized for the 10-year 24-hour storm.

The Rainfall Frequency Atlas of the United States, U.S. Weather Bureau Technical Paper No. 40 (TP-40), was used to obtain precipitation data for the region. The design rainfall events from TP-40 are currently used and accepted by the PSC, the North Dakota State Water Commission (SWC), the NRCS (formerly called SCS), and other State and Federal agencies dealing with water management. The design precipitation events used to determine watershed runoff volumes and peak flows are summarized in Table 3.6-2.

For design of the drainage density and slopes for the PMT, the design engineers have relied on a geomorphic-based design approach which uses information from pre-mine channel and floodplain characteristics to establish design configurations for the reclaimed channels that incorporate appropriate gradients, channel lining, revegetation, and roughness features as appropriate, and minimize the potential for landslides. The pre-mining channel and floodplain characteristics of the South Branch Heart River within the Permit Area are summarized in the Draft Report on South Heart Geomorphic Field Work prepared by Golder (Golder 2007). The PMT and hydrologic reclamation plans, including plans for stream channel reclamation ~~permanent diversions~~ and wetland restoration are presented in Section 4.1.

3.6.3 Water Management Plan for the Mine Plan

Figure 3.6-2 and Figure 3.6-3 include the layout of the collection ditches, culverts, and sedimentation ponds sediment that will be utilized from 2014 through 2019 to treat drainage from areas disturbed by mining activities prior to discharge to streams. The sedimentation ponds are utilized to control runoff and sediment from the disturbed areas. The sedimentation ponds are designed and constructed to meet applicable effluent limitation requirements and design standards. The pond is designed to have sufficient storage capacity to store and treat sediment and runoff from a 10-year, 24-hour precipitation event.

The disturbed area runoff north and east of Pit 1 will be collected by either the road drainage ditches or Ditch CD-1A and routed to sedimentation pond 1. Ditch designs are summarized in Table 3.6-3. Ditch CD-1A includes three haul road culverts (CC#1-CC#3). The haul road culvert designs are provided in Section 3.5. The profile and typical cross section for CD-1A are provided on Figure 3.6-4. The profile and typical cross section for CD-2A are provided on Figure 3.6-5. Ditch CD-2A includes one culvert, CC#5. Another culvert, CC#4, routes haul road drainage under the road to the north side of sediment pond 2. Culverts CC#6 and CC#7 are located on the site access road; CC#6 transfers water from the haul road and the facilities area under the road to Pond 3. Culverts CC#8 and CC#9 route water across small drainages traversed by the Explosives Storage access road. Culvert CC# 10 routes water across a small swale crossed by the access road to SOVB-10.

Several stockpiles are located where collection ditches could not be installed to direct runoff from these stockpiles to the sedimentation ponds. Sediment control from these isolated locations will be maintained by the use of BMPs including berms and grass filters to treat runoff from these topsoil stockpiles. Also, mulch, grass filters and straw wattles are utilized as BMPs to treat any haul road drainage that may reach surface drainages. These stormwater BMPs are identified on ~~Figure 3.6-9~~ Figure 3.6-8 along with the location and typical design for containment berms for stockpiles identified for small area exemptions.

3.6.4 Designs for Water Management Structures

Figure 3.6-1 shows the layout of the water management plan, including the sedimentation pond and the sediment sump, which are utilized to control runoff and sediment from the disturbed areas.

The sedimentation ponds are designed and constructed to meet applicable effluent limitation requirements and design standards. The ponds are designed to have sufficient storage capacity to store and treat sediment and runoff from a 10-year, 24-hour precipitation event. The design plans for the sedimentation ponds are included on Figure 3.6-6, and Figure 3.6-7~~,~~. ~~and Figure 3.6-8.~~

The disturbed area runoff will be collected by the haul road ditches and by ditches CD-1A and CD-2A, which will route flows to the sedimentation ponds. The plan includes five haul road culverts. The haul road culvert designs are provided in Section 3.5. The profiles and typical cross sections for CD-1A and CD-2A are provided on Figure 3.6-~~3~~4 and Figure 3.6-~~4~~5. Table 3.6.3, Main Haul Road Ditch Design Summary, shows the ditch design parameters along with the size of the watershed, 10 Yr. – 24 hr. peak flows, and the flow velocity within these ditches. The other design parameters can be found in Appendix 3.6.2.

3.6.5 Water Management Plan Construction and Operations

Runoff from disturbed areas that cannot be treated in the sedimentation ponds is either contained by berms or treated using BMPs in order to prevent additional contribution of sediment to streams. These may include the use of sumps, check dams, berms, silt fences, bale dikes, sediment filters, riprap, mulches, and other measures independently or in combination to reduce runoff, trap sediment, or treat runoff water.

The sediment pond shall be constructed according to plans approved by the PSC. Prior to the construction of the sedimentation pond, BMPs will be employed to limit stormwater runoff from the pond construction area. This may include the establishment of a downgradient barrier between the construction area and the drainage if vegetative filters are inadequate to protect the waterway. Staking may occur to identify the maximum limits of disturbance associated with the pond and safe construction travelways. Culverts should be installed across drainages to minimize off-site sedimentation.

The topsoil will be removed and stockpiled from the construction site and the surface may be scarified. The sedimentation pond will then be constructed using appropriately textured materials from the excavation; supplemental materials will be placed in waste piles or back into mined pits. The outlet works will be built as designed, ensuring that there are energy dissipaters at the discharge points where diversions intersect with natural streams and the exit velocity is greater than the

receiving stream using energy dissipaters, riprap channels, surge ponds, and other devices to reduce erosion, prevent deepening or enlargement of stream channels and minimize disturbances to the hydrologic balance. The embankment fill outslopes, the emergency spillway, and the surrounding disturbed area above the high water line will be re-seeded as soon as practical during the subsequent seeding period. Mulch may be applied to facilitate revegetation success. The active upstream face of the sedimentation pond near the active high water lines may be rip-rapped or similarly armored to ensure stabilization of the embankment from erosion and sudden drawdown.

Following construction of the sedimentation pond, BMPs will be undertaken where needed to minimize disturbance of existing runoff and associated surface water. Ditches will be installed at appropriate gradients and protections shall be used in critical zones such as curves or transitions from gradually sloping segments to steeply sloping segments. Roughening the surface, use of terraces or installation of sediment barriers such as earthen berms, silt fences, straw bale dikes and brush windrows may be performed to minimize erosion by retaining sediment within disturbed areas. Straw wattles or grass filters will be utilized as BMPs to treat any haul road drainage that may reach surface drainages.

Pumping of pit water to the sediment ponds will be performed on an as needed basis. Pit sumps will be maintained within the active mine pits to allow for pit water to be managed and minimize the need to pump pit water during storm runoff events.

Road construction operations will employ one or more BMPs to minimize off-site siltation and runoff. These may include one or more of the following techniques. The operator may try to schedule road construction during seasons of low precipitation probability. Construction may be preceded by staking of the outer limits of disturbance and employing sediment barriers such as berms, silt fences, straw bales, brush windrows, and rock check dams between the disturbance and the downgradient drainage if vegetative filters are inadequate to minimize off-site sedimentation. Culverts will be constructed to minimize siltation in the culvert through the use of sumps upstream of the inlet and use of an adequate slope (equal or greater than two percent) for drainage through the pipe(s). Downgradient erosion will be minimized through the use of energy dispersal materials such as rocks at the pipe outlet. Ditches will be surveyed to ensure that engineered gradients are achieved. Road fill outslopes and cuts will be re-seeded and mulched at the first possible revegetation season following construction.

Sediment will be removed periodically to maintain an adequate storage volume for the design event. An as-built survey shall be performed immediately following construction and a staff gage or other measuring device will be installed to establish the design sediment level and the design pump-out level. It is anticipated that sediment may need to be removed every other year, except at times when much of the design watershed is below grade in the pit. Seasonal monitoring of sediment levels within the pond is proposed to allow adequate planning for sediment pond maintenance.

The sedimentation ponds and the sediment sump will be dewatered to levels specified in the design as soon as possible following a storm event. The water will be removed from the sedimentation pond as soon as water quality appears to be within acceptable limits for discharge. Also, pond level may be drawn down to the actual sediment level in the pond if water is needed for dust suppression or other mine water uses.

Pond inspections will be conducted regularly during constructions by a registered professional engineer or specialist under the direction of a registered professional engineer experienced in the construction of impoundments. Written reports shall be prepared and maintained near the SHLM site. Following completion of construction, the registered professional engineer shall promptly provide the SWC with a certified report documenting the periodic inspection during construction and general compliance with the engineered plans, including a determination of the pond volume. Any deviations from the approved plans will be discussed and ramifications of the differences summarized. Once the impoundments are operating, they will be inspected at least annually until the removal of the structure or release of the performance bond. Annual reports should address stability of the structure, other hazardous conditions, depth and elevation of any impounded water, existing storage capacity, any existing or required monitoring, and instrumentation. A copy of all inspection reports will be maintained at or near the SHLM site.

Water quality monitoring will be performed in compliance with applicable governmental permits resulting in periodic reports to the SWC. Monitoring will be adequate to accurately record both the quantity and quality of water leaving the Permit Area and be conducted using reliable test data. Monitoring for point source discharges will be conducted according to NDDH standards and result in notification to the SWC within five days of receipt of the analytical results that indicated non-compliance with permit conditions or applicable standard. If a North Dakota pollutant discharge elimination system effluent limit non-compliance situation does occur, the analytical reports will accompany the notice of non-compliance. Water quality reporting to the SWC will include

completed North Dakota pollutant discharge elimination system reporting and associated analytical data. In the event that flocculants are needed to effect compliance for any of the surface water management structures, appropriate documentation of the product and protocol for use will be submitted to both the NDDH and the SWC for approval prior to use.

3.7 Protection of Public Parks

In accordance with:

- Section 69-05.2-04-01, NDAC; and
- Section 69-05.2-09-08, NDAC.

There are no places listed on the National Register of historic places that may be adversely affected by the proposed mining operations within the Permit Boundary.

3.8 Surface Mining Near Underground Mine

In accordance with:

- Section 69-05.2-09-10, NDAC; and
- Section 69-05.2-13-06, NDAC.

There are no mining activities within 500 ft (152.04 meters) of an underground mine.

3.9 Auger Mining Plan

In accordance with:

- Section 69-05.2-09-18, NDAC.

There will no be auger mining at the SHLM site.

TABLES

FIGURES

APPENDIX 3.3-1

BLAST RECORD

APPENDIX 3.3-2

NOTICE OF BLASTING SCHEDULE

APPENDIX 3.3-3

PRE-BLAST SURVEY REQUEST

APPENDIX 3.3-4

SURFACE OWNERS WITHIN ONE MILE OF THE PERMIT BOUNDARY

APPENDIX 3.3-5

MONITORING EQUIPMENT SPECIFICATION SHEET

APPENDIX 3.5-1

CERTIFICATION LETTER - PRIMARY ROADS

APPENDIX 3.6-1

CERTIFICATION LETTER – SURFACE WATER MANAGEMENT OPERATIONS PLANS

APPENDIX 3.6-2

SURFACE WATER MANAGEMENT SEDCAD REPORTS
SOUTH HEART LIGNITE MINE