

# PLAN OF OPERATIONS

*VALLEY CITY INERT WASTE LANDFILL – PERMIT 0176  
VALLEY CITY, NORTH DAKOTA*

**PREPARED FOR:**  
CITY OF VALLEY CITY

*Updated April 2018*



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## Exhibits

- Exhibit 1: Location Map
- Exhibit 2: USGS Quad Map
- Exhibit 3: Contour Map of Site
- Exhibit 4: Aerial Photograph of Site
- Exhibit 5: County Road Map
- Exhibit 6: Land Ownership Map
- Exhibit 7: Inert Landfill Expansion Plans

## List of Appendices

- Appendix A: North Dakota Department of Health Guidelines
- Appendix B: North Dakota Pollution Discharge Elimination System Permit
- Appendix C: Geotechnical Evaluation Report (January 2008)
- Appendix D: Soil Survey Report (Revised May 2018)
- Appendix E: Slug Test (May 2010)
- Appendix F: Compliance History
- Appendix G: Insurance Coverage
- Appendix H: Property Ownership - Deeds

# 1 EMERGENCY INFORMATION

## 1.1 EMERGENCY PHONE NUMBERS

Fire, Police, Sheriff, Ambulance – Emergency Only	911
Valley City Fire Department	845-3351
Valley City Police Department	845-3110
Barnes County Sheriff Department	845-8530
County-City Ambulance Service	845-2220
Mercy Hospital	845-6400
Valley City Clinic – Sanford	845-6000
North Dakota Emergency Assistance	1-800-472-2121
North Dakota Poison Information	1-800-732-2200
North Dakota Dept. of Health Division of Waste Management	701-328-5166
North Dakota Dept. of Health Division of Water Quality	701-328-5210

## 1.2 OTHER PHONE NUMBERS

Valley City City Hall	845-1700
Valley City Public Works	Office 845-0380
	Service Center 845-4255
	Transfer Station 845-0314
Barnes County Highway Department	845-8508
City-County Health Department	845-8518
Barnes County Rural Water Users	845-1117
Cass County Electric Cooperative	845-2251
	Or 1-800-248-3292
Kadmas, Lee & Jackson, Inc. – Engineers	845-4980

## 1.3 911 ADDRESS

11490 35<sup>TH</sup> Street Southeast

## 1.4 LOCATION

The Northeast Quarter of Section 31, Township 140 North, Range 58 West, Valley Township, Barnes County, North Dakota

## 1.5 DIRECTIONS

From Interstate 94 Exit 288 (Oakes Interchange), South one-half mile, East one and three-fourths miles  
From Interstate 94 Exit 290 (West Valley City Interchange) South one-half mile, West one-fourth mile.



## **2 GENERAL INFORMATION**

### **2.1 PURPOSE**

This Operation Plan is being provided to address maintenance on the previously closed sanitary landfill and operating the inert landfill.

### **2.2 INTRODUCTION**

A basic need of civilized society is a method by which waste materials can be disposed of safely and economically. The methods of disposal used over the years are as varied as the materials themselves, but generally speaking, the method chosen has been the cheapest and most convenient with little concern for the long term effects.

In recent years it has become apparent that this approach has caused irreparable damage to the environment. Among the effects are air and water pollution, destruction of wildlife and habitat, cancer epidemics from contaminated soils, blights on the landscape, and potentially dangerous situations that require great expense to rectify.

Because of this, there has been a movement in society and in government at all levels to more closely control and regulate the various means of waste disposal. The purpose of the Plan of Operation is to set guidelines and standards, and to delineate procedures that facilitate a safe, economical and environmentally sound manner of disposing of waste materials.

The operation of solid waste management facilities in the state is subject to the review and approval of the North Dakota Department of Health, Division of Waste Management. Permits are required for the construction and operation of the facilities, and non-compliance with the permit conditions or applicable regulations may result in fines, restrictions and other legal action.

The Waste Management Division of the Department of Health has published regulations and guidelines concerning the operation and management of solid waste facilities, some of which are included in the Appendix. In addition, they have access to the latest research and literature on the subject, and have considerable knowledge and experience relating to the solid waste industry. It is part of their mission to provide information and advice to owners and operators of solid waste facilities and they should be among the first consulted when questions arise.

The service provided by a solid waste management facility is substantial when considering the alternative of having each individual, business and institution dispose of their own garbage and refuse. Similarly, the responsibility incurred by those who operate the facility is also substantial. It is a responsibility to protect the health and safety of the public and the future environment.

### **2.3 SITE DESCRIPTION AND HISTORY**

The City of Valley City sanitary landfill is located in the Northwest corner of the Northeast Quarter of Section 31, Township 140 North, Range 58 West. The City's present holdings encompasses a total area of 87.22 contiguous acres. This area includes 21 acres of the previously closed sanitary landfill, the current inert landfill site, a transfer station and a yard waste debris drop-off.

The site is located approximately one mile Southwest of the City Limits and about two and one-half miles from the center of town. The City's sewage treatment lagoons are about three-fourths of a mile to the Southeast.

Land use surrounding the site is predominantly agricultural. Tillable land is used for small grains and alfalfa, with pivot irrigation systems installed on those tracts near the lagoon. Hay land and pasture line the creek which passes through Section 31 from the Southeast to the Northwest and then continues North to the North side of Interstate 94, then Easterly along the Interstate to the Sheyenne River.

### *2.3.1 SANITARY LANDFILL*

Operation of the landfill began with the construction of a berm about 20 feet high upslope from the East edge of the creek channel. Waste was placed behind this berm and covered with material excavated from the side of the hill. Limits of the West side of the landfill were controlled by the location of the creek and the North-South property line fence. Generally, the most westerly area of the landfill was used for the disposal of demolished houses.

Cells were excavated into the side of the hill and were constructed on top of the filled areas. Each cell typically was 75 to 100 feet wide, 200 to 500 feet long, with depths of 10 to 20 feet, and generally ran East-West perpendicular to the hillside. Cover material was excavated from the hillside ahead of the filling operations.

Slopes along the North face and along the creek were built to approximately 2 to 1 (horizontal to vertical), rising about 35 feet above the creek before leveling off into a terrace. About 100 feet back from the crest, another steep embankment was constructed. The highest elevations of the sanitary landfill were filled in 1991. An expansion on the Northeast corner was filled during 1992, and an expansion on the Southeast corner was the last to be developed and closed in 1994.

In the fall of 1990, the City began preparations for the staged closure of what by then had become the largest open landfill in the state. Several feet of garbage at the South end of the site was excavated and relocated within the site to allow for the diversion of a drainageway which previously ran through the filled area.

The first phase of the construction of the clay cap began in 1992 with the relocation of the creek along the Northwest face of the landfill. Slopes adjacent to the creek were too steep to stabilize. Property was acquired West of the creek, and material excavated for the rerouting of the creek was used for the clay cap. A 6" perforated drain pipe was installed beneath the original creek bed. The crest of the first terrace and other high spots of garbage were excavated and moved upslope to fill in low areas.

While a slope of 8 to 1 (horizontal to vertical) is desirable, steeper slopes were used because of the limitations imposed by the topography of the site. Slopes were constructed at 6 to 1 or flatter with the exception of the Northwest corner, which is almost 4 to 1. The steepness of these slopes will require extra attention to maintain the cover of vegetation, especially during drought or after major storm events.

The 1992 phase of the closure project covered about 14.5 acres of the sanitary landfill with an eighteen-inch clay cap, six inches of topsoil and seeding in accordance with the regulations in effect at the time.

The subsequent closures of 3.5 acres in 1993 and 3.0 acres in 1994 included an eighteen-inch clay cap, a twelve-inch protection layer, six inches of topsoil and seeding.

Erosion control berms were constructed across the face of the landfill cap to intercept sheet water coming down the slope and direct it at reduced velocities towards the Southwest corner of the site. There a series of sedimentation ponds was built to further slow the water and allow particles of soil to drop out before the run-off enters the natural drainage system.

Currently the Sanitary landfill is closed and all waste not designated as Inert is processed at the waste transfer facility located onsite.

### 2.3.2 INERT LANDFILL

The original inert landfill pit was excavated during the 1993 and 1994 closure projects with most of the material going for clay cap and the rest stockpiled for cover material. The depth of the inert pit at the north end was controlled by a layer of rocks and boulders in the floor of the excavation. The initial pit reached its capacity and in 2004 a new tract of land totaling 31.45 acres was added to the South. Here, a new pit was originally set up as a composting site, but was transitioned to a sand bag disposal area following the 2009 flood and again after the 2011 flood for additional sand bag disposal. Currently this area is being used as the inert waste disposal pit.

### 2.3.3 SOILS

For the most part, soils encountered in the various excavations consisted of yellow and brown clays interspersed with rocks and boulders. Thin layers of gravel or sandy clays showed up in scattered areas, and the escarpment at the Southwest corner of the sanitary landfill is predominately gravelly clay. The entire area is underlain by the Pierre Shale Formation, locally referred to as blue clay.

The sanitary landfill cap was constructed of the yellow and brown clays at the upper elevations with blue clay (soft shale) being used at the lower elevations along the West side.

The last municipal waste was placed in the sanitary landfill in March of 1994 when the Transfer Station went into operation. Inert materials continued to be placed there until the summer of 1994 and the completion of the Inert Landfill Pit.

### 2.3.4 CLAY STORAGE

During the 2009 flood of the Sheyenne River, the city purchased a large volume of clay for temporary dike construction. The dikes clay material was removed in the fall of 2009 and stockpiled over the closed municipal landfill. During the 2011 flood, the clay was utilized for construction of temporary dikes and again removed after the flood and returned to the site.

The intent of the clay stockpile is to use it to fill in basements being purchased by the City over a period of several years in conjunction with the permanent flood protection phased buyouts.

Below is the schedule for Clay Requirements as they relate to the remaining clay stockpiles.

Phase I	Summer 2015 thru 2016	10% used, filled in demolished flood buyout property
Phase II	Summer 2017 thru 2018	75% used, filled in demolished flood buyout property
Phase III	Summer 2019 thru 2020	(usage of remaining 25%)

With the funding and construction of Phase III, the City is confident the remaining clay will be utilized and completely gone by 2023.

Post clay removal areas in conjunction with Phase I and the 2017 portion of Phase II areas have been capped and seeded with spring plant cover crop. As Clay is removed in current and future phases, the disturbed areas will be properly capped and seeded as well.

#### 2.3.5 GRASS CLIPPING DUMP SITE

The city's grass clipping collection site at the old mill sat within the footprint of the city's permanent flood protection plan. In the summer of 2017, the city constructed a new drop off site to the north west of the transfer station. The new site is located outside of the fence for the landfill, has lighting and security cameras allowing it to be open 24 hours.

### 3 OPERATION PLAN

#### 3.1 SITE LAYOUT AND SECURITY

Entrance to the Valley City Solid Waste Facilities is through a gate at the Northeast corner of the site. The gate is locked during non-business hours. A sign at the entrance identifies the facility, states the hours of operation, and lists options for certain unaccepted wastes. Additional signage directs traffic to the scale or to the office at the Transfer Station.

A woven wire fence borders the North, East and South sides of the original 46.59 acre tract with barbed wire on the West. A single row shelter belt runs along the East and South fence lines.

The closed sanitary landfill occupies approximately the Westerly two-thirds of the original site. The inert landfill pit is in the Southeast corner, the Transfer Station in the Northeast corner, and the composting and stockpile areas in between.

An access road leads from the gate to the scale in front of the transfer station. Roads and vehicle maneuvering areas surround the Transfer Station, and another road runs past the composting area to the inert pit. These roads are drained and graveled, with ditches and culverts installed as required for surface drainage.

A new City resident yard waste drop-off site (24-hour access with video surveillance and yard lighting), was established in 2017. This facility is located at the center north end of the property and has its own dedicated access off of County Road 35<sup>th</sup> Street SE.

#### 3.2 SANITARY LANDFILL CAP

##### 3.2.1 SANITARY LANDFILL CAP MAINTENANCE

The landfill cap forms a relatively thin protective shield over the accumulated and compacted refuse beneath. The layer of topsoil and vegetation that protects the clay cap, and the clay cap itself can be measured in inches. Yet, it must withstand the forces of climate above and settlement below, and must perform for decades, even centuries. The City of Valley City will be responsible for the maintenance and

protection of the cap in perpetuity. Efforts expended early in the life of the cap will pay dividends in the long term.

The cover of a sanitary landfill serves three general purposes. Besides excluding human and animal contact with the contained wastes and preventing the release of gaseous vapors to the environment, the cap's primary function is to shed water. Moisture in the landfill pack tends to seep downward, absorbing soluble organic and inorganic compounds from the waste. This "leachate" will collect at the bottom and may migrate to the surface or into the ground water, providing a source of contamination.

The landfill cap can be divided into three layers. The bottom layer is a relatively impermeable clay which provides a hydraulic barrier. The middle layer is the protection layer or root zone. The upper layer consists of the topsoil and vegetative cover.

Maintaining a healthy cover of vegetation is critical to the long term life of the landfill cap. An overhead leaf and stem structure above the soil breaks the impact of falling rain and wind, and the root structure binds and protects the soil from being dislodged by wind and moving water. Vegetation also minimizes soil crusting, decreases freezing depths and protects the cap from the impacts of machinery or other vehicles.

The entire cap should be thoroughly inspected a minimum of twice a year, spring and fall, and after any major storm event. Areas where vegetation is sparse or where erosion is taking place should be repaired with topsoil and reseeded with a suitable grass mixture. Mulching will provide protection for seed and new vegetation. Deep rooted plants such as alfalfa should be avoided. The seed mixture used on the existing cap is as follows:

Percent By Weight	Kind	Percent Live Seed
50%	Fairway Crested Wheat Grass	80%
25%	Slender Wheat Grass	75%
25%	Western Wheat Grass	75%

Cultivated crops or grazing is prohibited on the landfill cap. Harvesting of hay is permissible, however the removal of plant material which would otherwise protect and supplement the topsoil may be detrimental, especially during the first years of vegetation development. Also, the use of any type of motorized vehicles on the cap should be avoided.

To maintain a healthy growth of vegetation, it may be necessary to fertilize. Spreading compost, especially in the more sparsely vegetated areas, would be very beneficial in supplying nutrients and organic material to the soil.

Small mammals, such as mice, shrews, pocket gophers and badgers can cause extensive damage to a landfill cap by burrowing into the clay layers, allowing the infiltration of water or oxygen. Even earthworms and other invertebrates may have a long term effect on the integrity of the cap, as their tunnels allow water infiltration and provide pathways for root penetration.

### 3.2.2 GAS VENTS

As organic material decomposes in the landfill, bacterial action produces methane, carbon dioxide and other organic gases including hydrogen sulfide. The odor of hydrogen sulfide is easily detected, however, methane and carbon dioxide are odorless and colorless. Methane is flammable and concentrations between five and fifteen percent in the atmosphere are explosive. These gases can cause dizziness, unconsciousness, even death, if confined in a closed or sheltered area.

If contained under the clay cap, these gases can migrate to the surface through cracks or fissures, and may kill the vegetation on the surface. Six gas vents, consisting of PVC pipes extending from above the ground to several feet into the landfill pack, allow the gases to escape to the atmosphere.

Pockets of gas may collect in isolated areas of the landfill, causing damage to the cap. These may be dissipated with the installation of additional gas vents as required.

During inspections of the landfill cap, particular attention should be given to the edge of the clay cap where settlement of the landfill pack adjacent to the original escarpment of the pit can cause a separation in the clay layer. Areas where this has occurred should be repaired by subcutting along the escarpment and installing a minimum of two feet of compacted clay, topsoil and seeding. Additional repairs may be required as settlement continues over the years.

Also, future cells, mainly the inert waste pits as they reach capacity will require capping, seeding and maintenance with the same criteria as the closed site areas just discussed.

## 3.3 DRAINAGE

### 3.3.1 SUBSURFACE DRAINAGE SYSTEM

A six-inch corrugated polyethylene perforated drain tile was installed beneath the original creek bed to intercept and relieve any underground water flows. An eight-inch perforated PVC drain tile is located along the North face of the sanitary landfill beneath the roadway ditch. These pipelines drain into a manhole at the Northwest corner of the landfill, and then through an 18" concrete pipe North across the road to an outlet just East of the 72" concrete culvert.

If required to check for possible leachate contamination, samples of the effluent of either of these pipelines may be obtained from the manhole. Sampling procedures will be outlined by the Department of Health.

The outlet of the 18" concrete pipe has a tendency to silt in and should be cleaned or flushed as required. The outlet and the manhole should be checked during each landfill cap inspection.

### 3.3.2 GROUND WATER MONITORING

As water percolates through the landfill pack, it picks up pollutants in the form of organic and inorganic compounds, including various chemicals and heavy metals that can be toxic or detrimental to plants, animals and the environment in general. This leachate can migrate through the soil and contaminate the underground water.

The Valley City sanitary and inert landfills have been constructed in and covered with clay rich soil, which limits the movement of water and confines the leachate. In addition, the waste deposited in the

inert site, for the most part, does not contain the harmful components found in the closed sanitary landfill.

The sanitary landfill was excavated into the side of the valley formed by a tributary to the Sheyenne River. A clay barrier was constructed along the East side of the creek, and mostly inert material (demolished buildings) were buried there. During the closure project, the creek was moved to the Northwest and a perforated drain surrounded by coarse aggregate and filter fabric was installed beneath the old channel, and the channel was filled with clay. Another drain tile was installed along the North face of the landfill in the ditch of the township road. These two pipelines meet in a manhole at the Northwest corner of the landfill, where they could be sampled. The effluent is piped across the road and outfalls into the creek.

In 1992, the North Dakota State Water Commission drilled seven test holes around the sanitary landfill and installed monitoring wells in five of the test holes. The depth and intake interval of each well was selected to monitor the water level and allow sampling at the upper levels of the Pierre Shale Formation, the bottom of the Glacial Till.

Although high levels of strontium and nitrates were evident in the sodium-chloride type water, it was concluded by the analysis of the major ions and trace elements that leachate migration into the ground water was not occurring. It was suggested that the elevated nitrate levels could be the result of irrigating with water from the sewage lagoons.

According to the State Water Commission report, the ground water under the landfill flows to the West, and then to the North under the creek. The movement of water is primarily through cracks and fissures in the shale and is very slow.

An artesian well is located in the old farmstead Southwest of the landfill. This well is probably over 800 feet deep, penetrating the Dakota Sandstone Formation. Other wells may be located on nearby farmsteads, although most or all are on the rural water system for domestic use.

If ground water contamination becomes a concern, the first step would be to sample the effluent in the drain tiles. Beyond that, the Department of Health and the State Water Commission will provide guidance.

### *3.3.3 SURFACE DRAINAGE AND STORM WATER MANAGEMENT*

The creek that crosses the Northwest corner of the landfill site drains approximately 6,000 acres. As part of the 1992 closure project, the culvert in the roadway was replaced and the creek was relocated about 175 feet Northwest to its present location. Originally, the creek ran at the base of a steep clay embankment, behind which was located the oldest portion of the landfill. A drain tile was installed beneath the original creek bed, and after the removal of topsoil, the area was filled, and the slopes were flattened with compacted clay.

The drainageway that enters the original landfill property from the South drains approximately 120 acres within the East half of Section 31. This water has been diverted from its natural course to flow along the South edge of the site in a rock lined ditch to a series of sediment basins, and then into the creek just upstream from the point where the creek was diverted.

Ponds which were dug in to the channel of the relocated creek in 1992 filled with sediment during heavy rains in 1993. The sediment basin on the drainageway uphill from its juncture with the creek also filled but was dredged later that fall.

Run-off from the landfill cap is intercepted by three erosion control berms running from Northeast to Southwest across the face of the embankment. These berms catch the water running downslope at a grade of 15% to 25% and divert it cross slope at a grade of about 1%, slowing its velocity and its erosive force. Sediment basins at the end of the berms further slow the water, allowing soil particles to drop out before reaching the creek.

These sediment basins should be inspected at the same time as the landfill cap and will probably require periodic clean out to remain functional.

Diversion dikes around the inert landfill pit and access to the pit should be maintained to prevent run-off from entering the pit. Precipitation which falls within the inert landfill will drain to the sump hole in the Southwest corner of the pit, where it will be evaporated. In the spring or during periods of heavy precipitation it may be necessary to pump water from the sump hole into the drainageway.

The discharge from the sump pit is regulated by a North Dakota Pollution Discharge Elimination System (NDPDES) Permit, which is included in the Appendix. The effluent must be tested prior to discharge in accordance with the parameters and requirements set forth in the permit. During discharge, the downstream drainageways should be monitored for signs of erosion. The volume of discharge must be determined, either by pump run times or some other method. The NDPDES permit is administered by the North Dakota Department of Health, Division of Water Quality.

Diversion dikes should be maintained on the uphill sides of the composting area, diverting run-off around the site. Containment dikes on the downhill sides will collect and hold precipitation from within the site for evaporation.

Heavy rains could cause erosion of the diversion and containment dikes. They should be repaired as soon as possible with dirt on hand. Sediment ponds may fill in and/or drainageways may erode. All drainage control facilities, as well as the cap, should be inspected after each major storm event.

### 3.4 SAFETY

#### 3.4.1 *GENERAL SAFETY*

The operation of heavy equipment, danger of fire, and the possibility of contact with noxious materials are three of the more common hazards at a solid waste facility. These dangers are present for the general public as well as the operator, transport drivers and other workers. The goal is to minimize exposure to hazards by utilizing proper management practices.

Solid waste processing operations fall under the Occupational Health and Safety Act (OSHA) administered and enforced by the U.S. Department of Labor. Inspectors from OSHA, Worker's Compensation and other agencies will visit the site periodically and un-announced to review safety procedures and identify potentially dangerous situations. These inspectors have the mandate and legal authority to enforce their directives. Of course, safe operations are in the best interests of the owner, operator and the public.



The Public Works Department of the City of Valley City has in place a Safety Policy which addresses issues of on the job safety. Regularly scheduled safety meetings are held, and a safety officer is responsible for implementing the policy.

Equipment used at the site should be maintained in top working condition. Poorly running equipment is not only inefficient and uneconomical, it is unsafe. Engines should be serviced and tuned at regularly scheduled intervals. Broken or missing parts should be replaced promptly. Records should be kept of all maintenance and repairs.

All trucks and loaders should be equipped with back up alarms audible above the engine noise when the unit is being operated in reverse. Exhaust systems should vent to the top above the machine and should be checked periodically for leaks which may allow sparks to escape. Excessive exhaust noise can damage hearing and cause fatigue in addition to interfering with verbal communication. All moving parts should be shielded. Paper and other debris, as well as clothing, may become entangled in moving parts or lodged in front of radiators causing mechanical problems or overheating. Equipment should be shut down before any work is performed.

Washing facilities with a shower are in the Transfer Station in case of accidental contact with noxious materials and for cleanup at the end of the work shift. Employees should keep a change of clothing available.

All workers at the site should be familiar with basic First Aid procedures, and formal First Aid training is advisable. A First Aid kit should be maintained at the Transfer Station and on all equipment.

Telephones are in the Transfer Station, and emergency phone numbers and directions to the site should be posted at each phone. Each person working at the site should have a contact person who will initiate an investigation if the worker fails to check in at pre-arranged times.

Scavenging at a solid waste facility is prohibited by law. Besides being an unhealthy, aesthetically objectionable practice that interferes with the orderly and efficient operation of the facility, allowing scavengers on the site exposes the owner and operator to legal liabilities in the event of injury or death due to accident or disease.

Ponded water provides breeding habitat for mosquitoes and other insects. Care should be taken during maintenance operations that no depressions are left undrained, except those required for the containment and evaporation of run-off in the composting area and the sediment basins.

Fire extinguishers are located on both levels of the Transfer Station and should be mounted in each motorized piece of equipment. Water is available through spigots in the Transfer Station. The Valley City Fire Department will conduct yearly inspections at the facility.

Small fires may be contained with on-site extinguishers. If there is any question about controlling the fire, the fire department should be notified immediately. Equipment should be moved to a safe location and efforts made to contain the blaze.

Open burning at the site is prohibited except by permit from the Department of Health. Any flammable materials, including fuels for pumps or lawn mower, cleaning solvents and degreasers, hydraulic oil or other such materials should be properly stored in a secure area away from the work area. Grass and weeds should be kept short, especially if conditions are dry.

Occasionally, smoldering materials are picked up inadvertently in a transport, or combustion may begin spontaneously because of heat generated by chemical action. Each load should be visually inspected prior to and during unloading for signs of combustion. "Hot" loads should be kept away from the work area and the combustion extinguished as quickly as possible.

Some discarded items may become explosive when subjected to heat or compaction. Empty containers of volatile liquids may contain enough vapors to explode. Any discarded container is potentially hazardous as its contents are unknown.

Dust can present two hazards. Health problems can result from the inhalation of dirt particles and eyes may be affected. Also, visibility can be restricted by clouds of dust raised by vehicles and equipment. The application of water can control dust as required. Do not use oil.

This facility is not designed or permitted to accept hazardous wastes except in quantities normally found in household waste. If a noticeable amount of material suspected of being hazardous is observed, it shall be rejected and returned to the generator. If that is not practical, it shall be prudently separated and removed to a secure area, and its origin determined. Do not open closed containers. The Department of Health should be contacted for further guidance.

The costs associated with the disposal of wastes can encourage deception and illegal dumping. The operator of a solid waste facility should be alert to any suspicious activities and notify the proper authorities. Any such incidents should be noted in detail in the operator's daily log.

Because of the hazards associated with the operation of a solid waste facility, safety should be stressed continuously. Workers must always be alert to dangerous situations.

#### *3.4.2 LANDFILL FIRES*

There are several different scenarios that could result in fires or explosions.

A hot load arriving in a garbage truck should be off loaded, if possible, away from buildings, grass and flammable materials and extinguished with fire extinguishers and/or water or smothered with dirt. Pay attention to wind direction and speed.

A fire in a roll off container could be handled in a similar fashion if the container is outside and can be raised with a loader and dumped. However, suddenly exposing smoldering material to the open air could result in a much larger fire. Depending on the contents of the containers, it may be prudent to drag the container to a safe location and either attempt to extinguish the fire with water or let it burn out.

Stockpiles of trees, demolished buildings and other flammable materials should be located away from buildings and vegetated areas. Earthen berms should be placed around the perimeter of the pile, and an adequate stockpile of dirt should be available nearby should it become necessary to smother a fire.

Flammable materials placed in the inert landfill pit should be covered as soon as practical. No more than 10,000 square feet (100 x 100 feet) should be exposed at any given time. A stockpile of dirt large enough to cover the exposed face two feet deep (2,650 cubic yards of dirt for 10,000 square feet of exposed material) should be located nearby.

The Valley City Solid Waste Facility has two landfills, the operating inert landfill and the closed sanitary landfill.

Landfill fires fall into two general categories, surface fires involving recently buried or uncompacted refuse close to the surface, and underground fires which are well below the surface and involve materials that are months or years old.

Surface fires can be ignited in several ways, including careless smoking, improperly shielded exhaust, smoldering materials in incoming loads, deliberate fires, arson, and spontaneous combustion. Surface fires, if discovered soon enough, are best handled by separating the burning material from the rest of the fill, dousing with water and/or smothering with dirt. Larger blazes may require different tactics depending on the type of material that is burning and the location of the fire in relation to the rest of the landfill pack.

Underground fires are often the result of spontaneous combustion, which can be triggered by an increase in the oxygen content of the landfill.

Three ingredients are necessary to initiate and sustain a fire, a fuel supply, oxygen and a source of heat or ignition. As the contents of a landfill decompose, heat is generated and methane gas is produced. The heat will accumulate and build to temperatures of about 150° Fahrenheit. If the heat continues to build and oxygen is present, a chemical oxidation of wood and similar material will begin at about 200° F and can become self-sustaining at about 300° F. Wood will ignite spontaneously at about 600°F.

Methane gas is highly flammable in concentrations of 5 to 15 percent or more. Vents in the landfill cap will allow some gas to escape into the atmosphere. However, pockets of methane are likely dispersed throughout the landfill pack.

If the landfill is properly constructed and maintained, the existing oxygen will be used up by the decomposition process, and atmospheric oxygen will be excluded by the cover material and cap. A breach in the protective covering, whether it be cracks caused by settlement, animal burrows or even earthworm tunnels, can allow oxygen to reach the decomposing material, and initiate or accelerate the process of spontaneous combustion. Most fires start on the windward side of the landfill.

Underground fires in landfills can burn for weeks or months without being discovered. Often the first indication is smoke emanating from some part of the site. The presence of abnormally high levels of carbon monoxide gas is another indicator, as is a substantial settlement of an area over a short period of time.

Besides carbon monoxide, smoke from landfill fires can contain particles of unburned fuel, toxic gasses, and dioxins. The danger and level of toxicity of the smoke and gasses depends on the length of exposure and the types of materials that are burning.

Extinguishing an underground landfill fire can be very difficult, and tactics used for structural or grass fires may not work. It is necessary to remove one or more of the three ingredients of a fire, fuel, oxygen, or heat.

Burning or smoldering material may be excavated and moved to another area where it is extinguished with water or smothered with dirt. However, excavations into the landfill pack may allow more oxygen to reach burning areas, intensifying, or spreading the fire.

Using water to suppress or extinguish the landfill fire in place also may have drawbacks. Water can contribute to the decomposition process, thus generating additional heat. Water will also percolate through the landfill pack, leaching pollutants which could contaminate ground and surface waters. Depending on the location, massive amounts of water could also destabilize slopes.

Some water may be available in the sump pit of the inert landfill. The closest major source of impounded water would be the tertiary cell (south cell) of the city's sewage lagoons, located about a mile to the Southeast. A pipeline runs from the lagoon to the pivot irrigation near the southeast corner of the inert pit. Also, a fire hydrant on the municipal water system is located near City Lights Supper Club, about a mile to the Northeast.

Class A foam added to the water reduces the surface tension of the water and provides for better penetration and increased effectiveness. Of course, there are also disadvantages to the use of foam on landfill fires as with other types of fires.

If the source of oxygen can be determined, closing that off will deprive the fire of one of the three necessary ingredients. Placing a minimum of two feet of dirt over the burn area, adjacent areas, and any suspected faults may shut off the oxygen supply and cause the fire to burn out.

The combustion of materials in the landfill will reduce their volume and may create voids underground. These voids may collapse under the weight of firefighting equipment, earth moving equipment, or even people.

Because of the potential toxicity of the smoke and gasses, evacuation of nearby farmsteads may be prudent. Specialized personal protective equipment may be required for firefighters and equipment operators.

A major landfill fire will likely attract the expertise of personnel from several local, state and federal agencies. Control of the site and the firefighting plan will have to be established and communicated to all parties. Commercial firms specializing and experienced in landfill fires are available. A major landfill fire can take months to extinguish and the expense can be staggering.

### *3.4.3 LEAKS AND EMISSIONS*

Materials arriving at the Valley City Solid Waste Facility are screened as free liquids are not accepted. However, situations may arise where liquids such as fuel, lubricants, coolants, solvents, herbicides or

other chemicals or substances, either used at the facility or on vehicles passing through the facility, may escape into the environment. This could result from a blown hydraulic hose, overheated motor, ruptured fiberglass tank, or numerous other scenarios.

The first step, of course, is to assess the situation in terms of flammability and toxicity and move people and equipment as necessary. The liquid should be contained as quickly as possible, with temporary berms if necessary. An absorbent may be used to soak up free liquid. All materials, including contaminated soil, shall be disposed of properly, depending on the nature of the material. If there are questions regarding the disposal of contaminated material, the Department of Health can advise.

Dust can be controlled by the application of water or a commercial dust suppressant. Oil should not be used because of the damage it can cause to the environment

Blowing debris can be an issue if not handled promptly and properly. Materials unloaded in the transfer station will usually not be a problem, although with overhead doors open, wind may blow through the building, picking up plastic bags, papers, or other similar debris. Scraps of tarpaper, styrofoam and other waste at the inert site may also become windborne. These materials should be picked up promptly and at regular intervals. Cover material will hold down the debris at the inert site. Keeping windblown debris to an absolute minimum is a prerequisite to being a good neighbor.

Objectionable odors, although present in the transfer station and sometimes in the compost area, are not usually a problem as they are quickly dissipated into the air, and there are no nearby neighbors. Intense or persistent odors should be investigated to locate the source. Hydrogen Sulfide, sometimes called sewer gas, is one of the byproducts of decomposition, and its presence could indicate a problem in the sanitary landfill cap.

### 3.5 FACILITY OPERATION

#### 3.5.1 *EMPLOYEE CERTIFICATIONS & TRAINING*

All landfill operators are certified through the North Dakota Department of Health. All Valley City landfill operators attend the training which takes place yearly.

#### 3.5.2 *SOLID WASTE DISPOSAL*

Three general categories of solid waste are accepted for processing or disposal at the Valley City Solid Waste Facility:

1. Inert solid waste, which is comprised of materials which do not rot and will not contaminate water, is placed in the Inert Landfill, and periodically buried.
2. Municipal solid waste consists of garbage, trash, and refuse, and is compacted into containers at the Transfer Station and then transported to a municipal solid waste landfill.
3. Yard wastes include grass clippings, leaves, wood chips and other plant wastes which are suitable for composting.

The Valley City Solid Waste Facility does not accept any wastes that are hazardous, infectious, radioactive, liquid, sewage, or of unknown composition and/or origin, except in amounts normally in household waste. Specifically excluded are asbestos, large animals, contaminated soils, lead-acid storage batteries, insecticides, pesticides, barrels, and major appliances (white goods).

Concrete, asphalt, rock, and clean dirt in large quantities are directed to other area sites to be used as fill material. Customers with storage batteries, barrels, major appliances, metals, and other recyclable materials are directed to local recycling centers.

Tires are accepted from city residents only and are stockpiled to be either buried or picked up by a recycler.

With the exception of yard wastes, all solid waste entering and leaving the facility will be weighed, documented by load regarding origin and hauler, and tabulated daily. An annual report will be filed with the Department of Health. In addition, the operator should keep a daily log of the activities taking place, the weather, equipment breakdowns, visitors, and any unusual occurrences.

The operation of the Transfer Station, because of the constant and/or unpredictable arrival of customers, requires that the operator on duty be in the building or nearby. During the yard waste season and when activities such as compost processing, inert processing, burning, or other work is being done, it will be necessary to have additional help.

Personnel at the solid waste facility shall be trained to operate the necessary equipment and shall be instructed in the operations of the facility and the basics of solid waste screening and handling. It is highly desirable that personnel attend training courses provided by the Department of Health. Although not presently required by regulations, the operator should be certified.

### *3.5.3 WASTE ACCEPTANCE AND REJECTION PROCEDURES*

Waste acceptance or rejection is determined in accordance with the guidelines set forth in the "ND MSW Landfill Operator's Training Manual", EPA publication "Waste Screening at MSW Management Facilities" and the categories of accepted wastes as identified herein and by the Permit To Operate. All waste delivered to the solid waste facility for processing, storage or disposal must be identified prior to acceptance. Haulers should be questioned randomly regarding the contents and origin of the load, and random visual inspections should be performed as required for confirmation. Only wastes as described herein are accepted. Wastes not identified as acceptable, or not specifically excluded must be verified with the Department of Health or the District Health Unit.

### *3.5.4 INERT LANDFILL OPERATION*

The Inert Landfill will accept only non-putrescible solid waste which will not contaminate water or form a contaminated leachate. Inert waste can include cementitious concrete, asphalt concrete, metal, wood, masonry and construction and demolition materials that do not undergo rapid decomposition or contain water soluble contaminants.

Prohibited wastes include municipal wastes and household garbage, asbestos, infectious waste, radioactive waste, waste grain, elevator screenings, treated grain, animal wastes, carcasses, sewage wastes, pesticide cans, batteries, hazardous wastes, oils, greases, oil filters, solvents, and any liquids.

Any such wastes arriving at the site shall be processed through the Transfer Station, if acceptable, or sent back to the generator for proper disposal.

Trees, demolition lumber, un-upholstered wood furniture and other clean burning wastes may be stockpiled and periodically burned. A burn variance from the Department of Health must be obtained for each event and the burn shall be coordinated with the Valley City Fire Department. Burning should take place only under favorable weather conditions and forecasts, and with appropriate precautions and contingencies. The ash from burning will be placed in the inert pit and covered.

Scrap tires may be accepted for disposal at the Inert Landfill, either for burial, or stockpiled for pick up by a recycler. If buried, tires should be placed in layers at the bottom of the pit and covered with dense materials such as concrete, as tires are somewhat buoyant and tend to float to the surface over time. Tire stockpiles should not exceed 1,300 tires (approximately twenty feet by twenty feet by four feet high). Tire piles provide habitat for rats, mosquitoes and other vectors. Under combustion, tires release contaminants into the atmosphere and possibly into surface and groundwater.

Ash from the coal fired boilers at Valley City State University will be accepted for disposal in the Inert Landfill. Analysis of the material indicates that it is not inert, however, it may be placed in the inert pit under the following conditions:

1. The transporting and burial of the ash will be coordinated to limit the exposure of the ash to the environment as much as possible.
2. The operation shall take place during calm, dry weather.
3. The material shall not be placed in the bottom of the inert pit where it could come in contact with impounded water.
4. A hole shall be excavated and/or clay dikes built to contain the expected quantity of ash.
5. A minimum of one foot of cover material shall be placed immediately over the ash.

The embankment of waste materials in the inert pit has begun at the Northeast corner of the pit and shall move vertically and Southwesterly in layers. The intent is to bring the North end of the landfill to the proposed finish grades before filling on the South and Southwest side. Expansion of the inert pit shall take place to the south. The existing sump hole shall remain in use as long as practical.

Wastes in the Inert Landfill shall be covered at least two times a year with a minimum of six inches of cover material. More frequent applications may be necessary to control materials susceptible to becoming windborne and to discourage rodents, snakes, insects and other vectors from using the landfill as habitat. The working face of the landfill shall be kept as small as possible.

The proposed finish grades for the existing Inert Landfill shall be computed on an 8 to 1 (horizontal to vertical) slope from the existing ground at the edge of the pit up towards the center. The embankment shall be rounded at the peak. The surface shall be shaped and graded to drain, capped with clay, top soiled and seeded in accordance with Department of Health guidelines.

As portions of the Inert Landfill are brought to final grade, they will be capped and seeded, reducing the area of the open landfill.

Topsoil for the closure of the Inert Landfill will come from existing stockpiles, composting operations, and from excavations for the expansion of the inert pit. Additional topsoil is available from the vacant farmstead area. The cap will be seeded and maintained in accordance with Section 33-20-0.5.1 of the North Dakota Solid Waste Management Rules.

Cover material and topsoil will be imported to the site from other locations as the opportunity or need arises.

### *3.5.5 COMPOSTING*

The Valley City Public Works Department maintains one facility for the City residents to disposal of; leaves, grass clippings, yard waste and tree branches. This facility is located at the landfill site and consists of a 24-hour, 7-day facility where residents are directed by signs to dispose of composting vegetation in one pile and tree and branches in another. separate pile. City crews then transport the debris to either the composting site or in the case of the woody products to the chipper to make mulch. A dumpster for plastic bags, boxes and inappropriate materials, and a sign will encourage people to separate these items from the yard wastes.

Composting is a controlled decomposition process whereby leaves and grass clippings are processed over a period of time, resulting in a product that can be used as a soil supplement, topsoil extender, or as topsoil. The mulch product is reused for placement around trees in greenspace plantings throughout the City.

Diversion dikes are located on the upslope sides of the composting area to prevent surface run-off from entering the site. Precipitation which falls on the site will be retained by containment dikes built on the downslope sides, and an area in the lowest part of the site will be used to evaporate the collected water.

Pads for the compost windrows are graded to allow drainage away from the windrows towards the evaporation area.

When windrows are placed they should be 8 to 10 feet wide and 4 to 6 feet high to generate and maintain the heat necessary for decomposition. The windrows should also be turned to aerate and mix the materials. Water may be added during dry periods to maintain the proper moisture levels. Moist windrows should be peaked in the center to shed water. Dry windrows should have a concave top to absorb any precipitation.

Grass clippings are rich in Nitrogen, while leaves, straw and wood chips are rich in Carbon. Mixing the two types of materials will produce a better balance of nutrients in the final product.

Insufficiently aerated windrows may generate odors and will require additional aeration by turning. Odors may be caused by excessive moisture, improper carbon to nitrogen ratio, or by excessive temperatures in oversized windrows. The recommended Carbon to Nitrogen ratio is about 20-30 to 1 by



weight or 4 to 1 by volume (leaves to grass). Temperatures in the windrow should be checked periodically and should range from 120° to 145° F.

Under optimum conditions, yard wastes can be processed into compost in about six weeks. However, it will probably be more economical to operate on a seasonal basis, constructing the windrows from leaves and dead vegetation in the fall, adding grass clippings to the windrows and turning them through the spring and summer, and stockpiling the finished product in the fall, in preparation for the next batch.

The compost may be used for fertilizing and for repairs on the sanitary landfill cap and stockpiled for use on the closure of the inert landfill. Surplus material can be made available to the public.

### 3.5.6 EMERGENCY WASTE MANAGEMENT

Natural disasters, large-scale accidents and other emergencies may result in large amounts of waste that will need to be disposed of safely and quickly. While tornadoes, severe storms, or fires are possible, the most prevalent disaster in Valley City is flooding.

Wind generated waste will include trees and branches, shingles, and even whole buildings. Power outages may cause large quantities of food and other perishables to spoil or be unfit for use. Flooding may result in sewage soaked furnishings, carpet and personal belongings. Any disaster, natural or otherwise, will likely have an impact on the waste stream.

“Guideline 1 – Emergency Waste Management and Disposal” developed by the Department of Health, is found in the Appendix and contains very useful and perceptive insights into emergency waste management. It should be noted that the inert landfill pit is excavated in relatively good quality clay, and could be used for emergency disposal of non hazardous putrescible wastes with Department of Health approval.

### 3.5.7 INDUSTRIAL/SPECIAL WASTE MANAGEMENT

1. Generator/Hauler Notification: Operating requirements and restrictions are posted on facility signage at the transfer station site. Supplementary requirements or restrictions will be mailed out to generators and haulers prior to their implementation (as required). Haulers will be made aware of forthcoming changes by direct notification as they come to the facility to dispose of wastes.
2. Waste Evaluation: Only wastes as described herein are accepted. All other wastes considered for acceptance shall be evaluated by the Department of Health prior to acceptance at the facility. Therefore, the analysis, criteria, testing and analytical methods used are determined by the Department.
3. Inspection/Management: Wastes are inspected in accordance with the procedures set forth in EPA publication “Waste Screening at MSW Management Facilities” and the “ND MSW Landfill Operators Training Manual”. Acceptance or rejection is contingent upon whether

the waste in question is described herein as accepted, not specifically prohibited and is approved by the Department.

4. Specific Wastes:

- a. Bulk chemical containers with free product or residue: Not Accepted.
- b. Asbestos: Not Accepted.
- c. Wastes containing PCB's: Not Accepted.
- d. Radioactive Wastes: Not Accepted.
- e. Rendering/slaughterhouse wastes: Not Accepted.
- f. Combustible/ignitable wastes due to high temperatures: "Hot" loads are taken to a designated area within the inert landfill and spread/mixed with daily cover to extinguish and cool.
- g. Foundry Wastes: Not Accepted.
- h. Power Plant Incinerator Ash: Accepted from Valley City State University. See Inert Landfill Operation (Page 19).
- i. Paint residues, filters and dust: Accepted in dry form only.
- j. Ink sludge, lime sludge, wood sludge, paper sludge: Accepted in dry form only with Department of Health approval.
- k. Fiberglass, urethane, polyurethane and epoxy resin waste: Accepted in dry form only with Department of Health approval.
- l. Spent activated carbon filters: Not Accepted.
- m. Oil/gas exploration and production wastes: Not Accepted.
- n. Wastes containing free liquids: Not Accepted.
- o. Contaminated Soils: Not Accepted.
- p. Other accepted wastes:  
Tires: Accepted from city residents only, stored in designated area at landfill.

Wood Wastes: Stored in designated area to be chipped and hauled out

by recycler. Upon Department approval of burn variance, materials may be burned.

Yard Wastes: brought in by residents and composted in dedicated area.

### 3.5.8 WASTES PROHIBITED FROM DISPOSAL

Except as noted in Industrial/Special Waste Management Section.

1. Liquids
2. Unrinsed Pesticide Containers
3. Lead-Acid Batteries
4. Waste Oil
5. PCB Wastes
6. Hazardous Wastes (Other than normal household quantities)
7. Ignitable Wastes
8. Solvents, Paints and Fuels
9. Corrosives: Acids and Alkalies
  
10. Reactive and Listed Wastes
11. Sludges
12. Manures
13. Septic Tank Pumpings
14. Infectious Wastes

## 4 INERT LANDFILL EXPANSION

### 4.1 GENERAL INFORMATION

In the fall of 2011 the original inert landfill pit reached capacity and work began to expanded to the area just to the south as shown on the Site Plan. This expansion covers approximately 2 acres of the new property to the south. Given the rate that the first inert landfill took to reach capacity it is anticipated that the proposed expansion will last approximately 16 years. In the unforeseen chance a significant natural disasters (floods) cause an influx of demolition debris this timeframe could be shorter.

## 4.2 EXPANSION PLAN

Included in Exhibit 7 are the plans for the inert landfill expansion. These plans delineate the site boundaries in relation to the existing inert pit. The full buildout expansion will be able to utilize the existing sump pit and drainage system.

Also included in the Appendix are a geotechnical report, soil survey, and slug test for the proposed site. The geotechnical report and slug test show that perched water is located on the proposed site within a sandy layer. To mitigate the perched water drainage tile will be installed at a depth which is 2-feet lower than the proposed floor elevation of the inert pit. The drainage tiles will outlet to the existing sump pit. Discharges from the sump will comply with the existing North Dakota Pollution Discharge Elimination System permit which is on file with the North Dakota Department of Health.

Fencing shall be added to enclose the new expanded area to limit access to the existing entrance to the landfill property. In addition interior access roads will be constructed to allow for traffic circulation within the site. These access roads will be modified as needed for operation of the facility.

Closure of the expansion shall be in accordance with the plan and shall include a minimum of 18-inches of suitable clay cap and 6-inches of topsoil. The slopes of the cap shall not exceed 7:1 and all topsoil shall be seeded and maintained as stated in the previous sections of this Plan of Operation.

## **EXHIBIT 1: LOCATION MAP**



*Valley City Inert Landfill  
Barnes County, North Dakota*



## **EXHIBIT 2: USGS QUAD MAP**

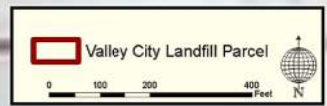


*Valley City Inert Landfill  
USGS Quad*

35th St SE

**Valley City West  
46098-H1**

31



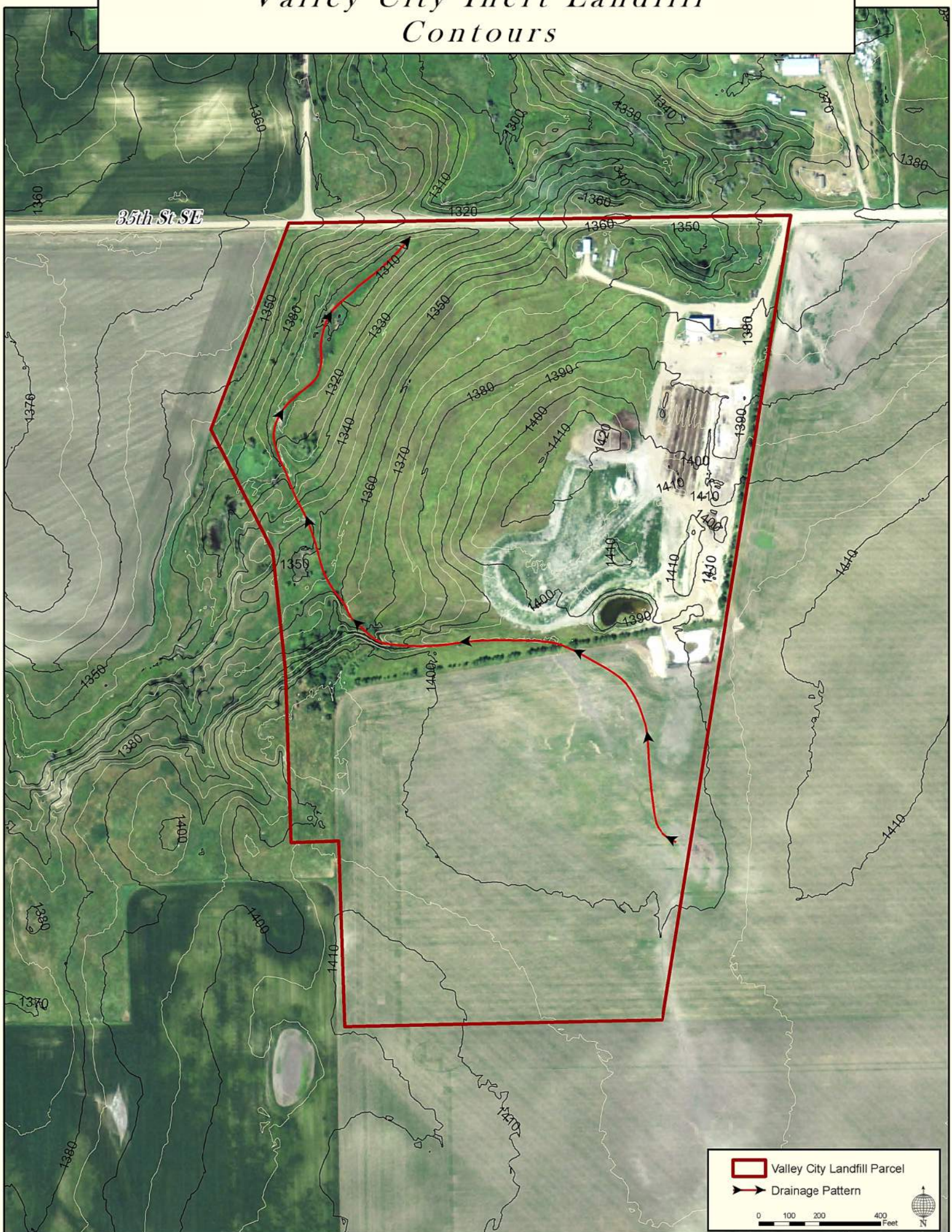


### **EXHIBIT 3: CONTOUR MAP OF SITE**



# Valley City Inert Landfill Contours

35th St SE



Valley City Landfill Parcel

Drainage Pattern

0 100 200 400 Feet





**EXHIBIT 4: AERIAL PHOTOGRAPH OF SITE**

# Inert Waste Landfill - 2018

Valley City, ND

YARD WASTE  
DROP OFF SITE

35<sup>TH</sup> ST SE

SANITARY LANDFILL  
(CLOSED)

TRANSFER STATION

COMPOSTING

CLAY STOCKPILE  
(SEE REMOVAL SCHEDULE)

INERT LANDFILL  
PIT - CELL 2

## Legend

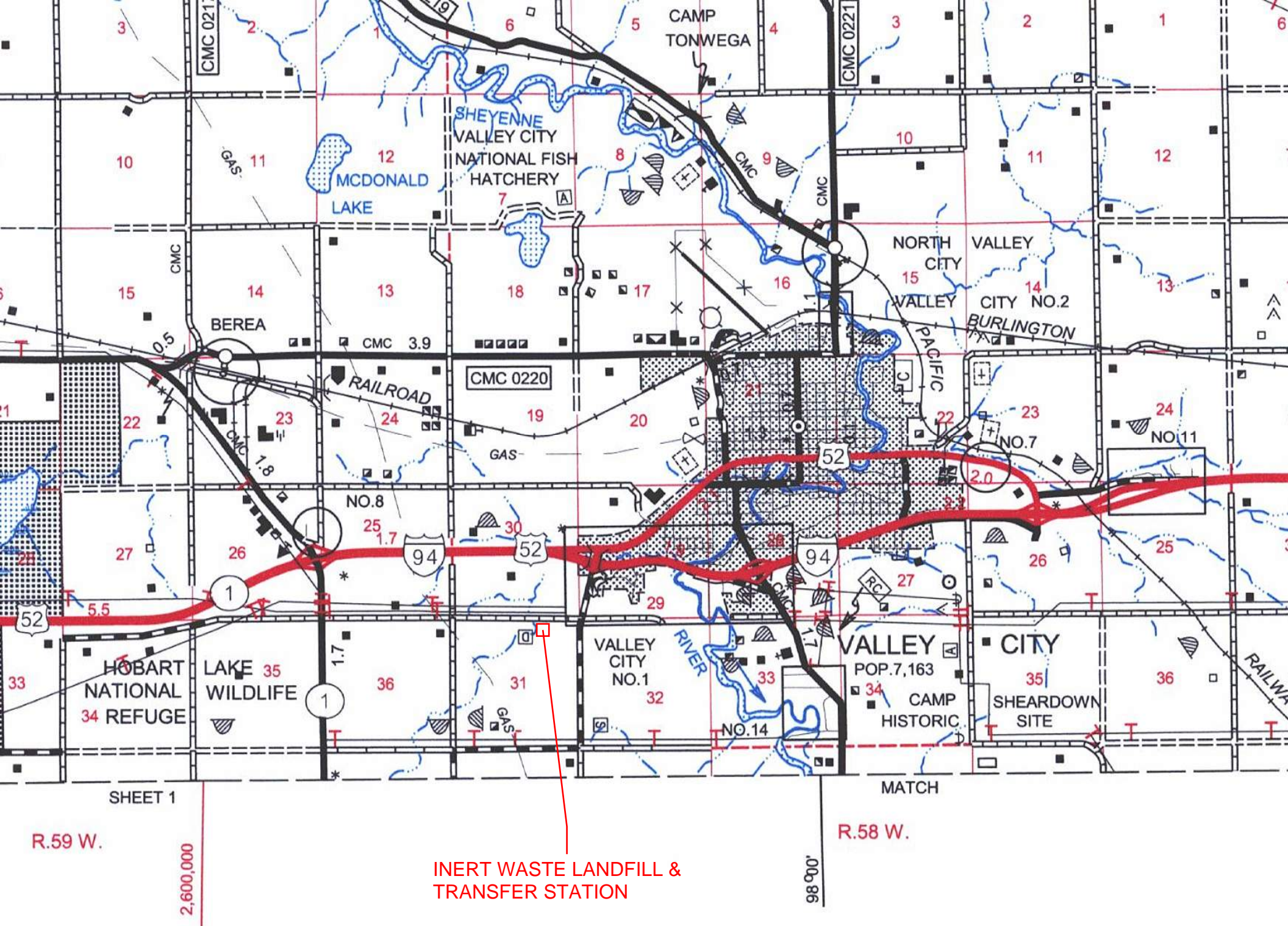
 Landfill Parcel



1000 ft

## **EXHIBIT 5: COUNTY ROAD MAP**





INERT WASTE LANDFILL & TRANSFER STATION

R.59 W.

R.58 W.

SHEET 1

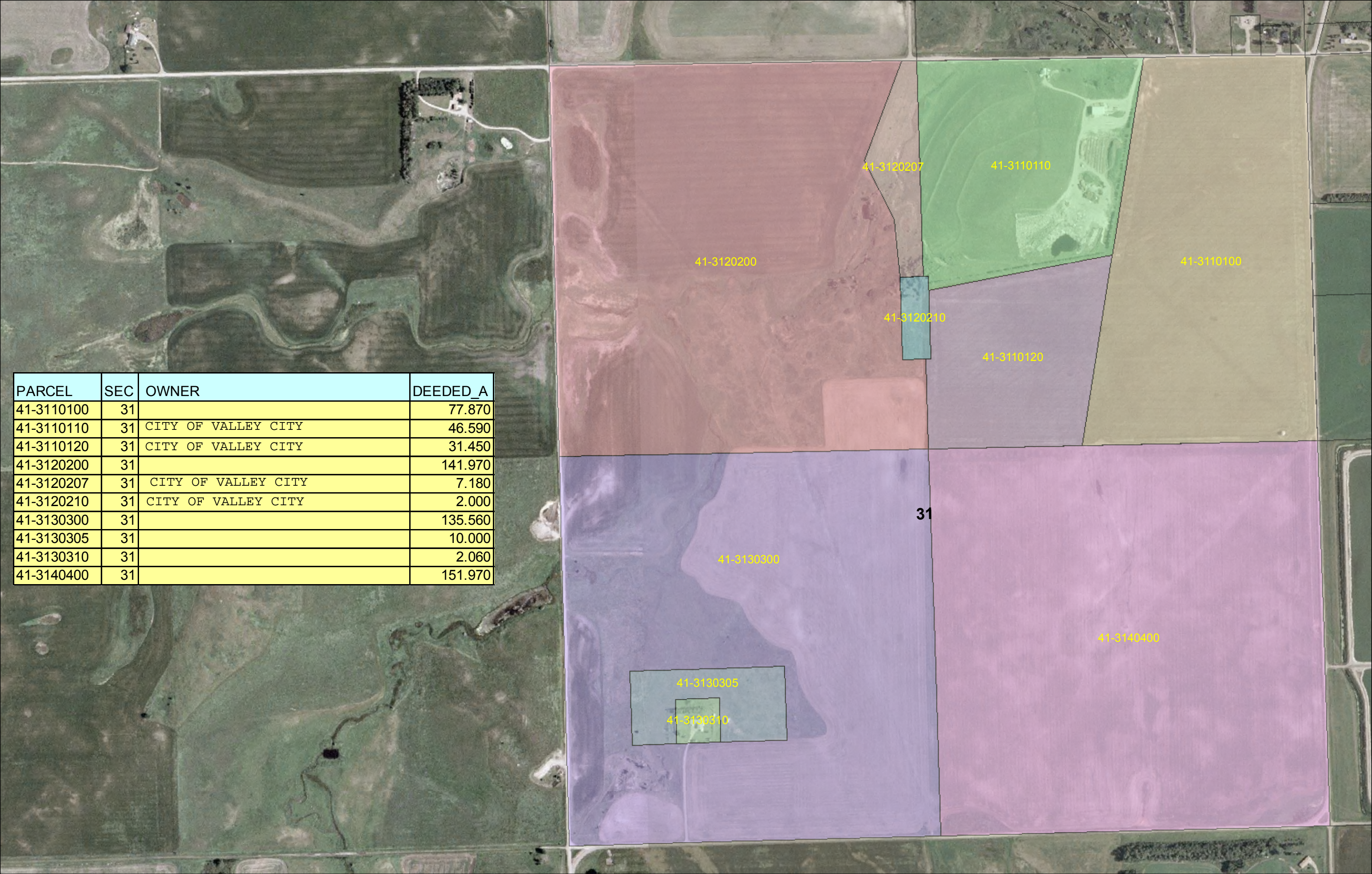
MATCH

2,600,000

98 000

**EXHIBIT 6: LAND OWNERSHIP MAP  
(PARCEL MAP)**





PARCEL	SEC	OWNER	DEEDED_A
41-3110100	31		77.870
41-3110110	31	CITY OF VALLEY CITY	46.590
41-3110120	31	CITY OF VALLEY CITY	31.450
41-3120200	31		141.970
41-3120207	31	CITY OF VALLEY CITY	7.180
41-3120210	31	CITY OF VALLEY CITY	2.000
41-3130300	31		135.560
41-3130305	31		10.000
41-3130310	31		2.060
41-3140400	31		151.970

41-3120200

41-3120207

41-3110110

41-3110100

41-3120210

41-3110120

31

41-3130300

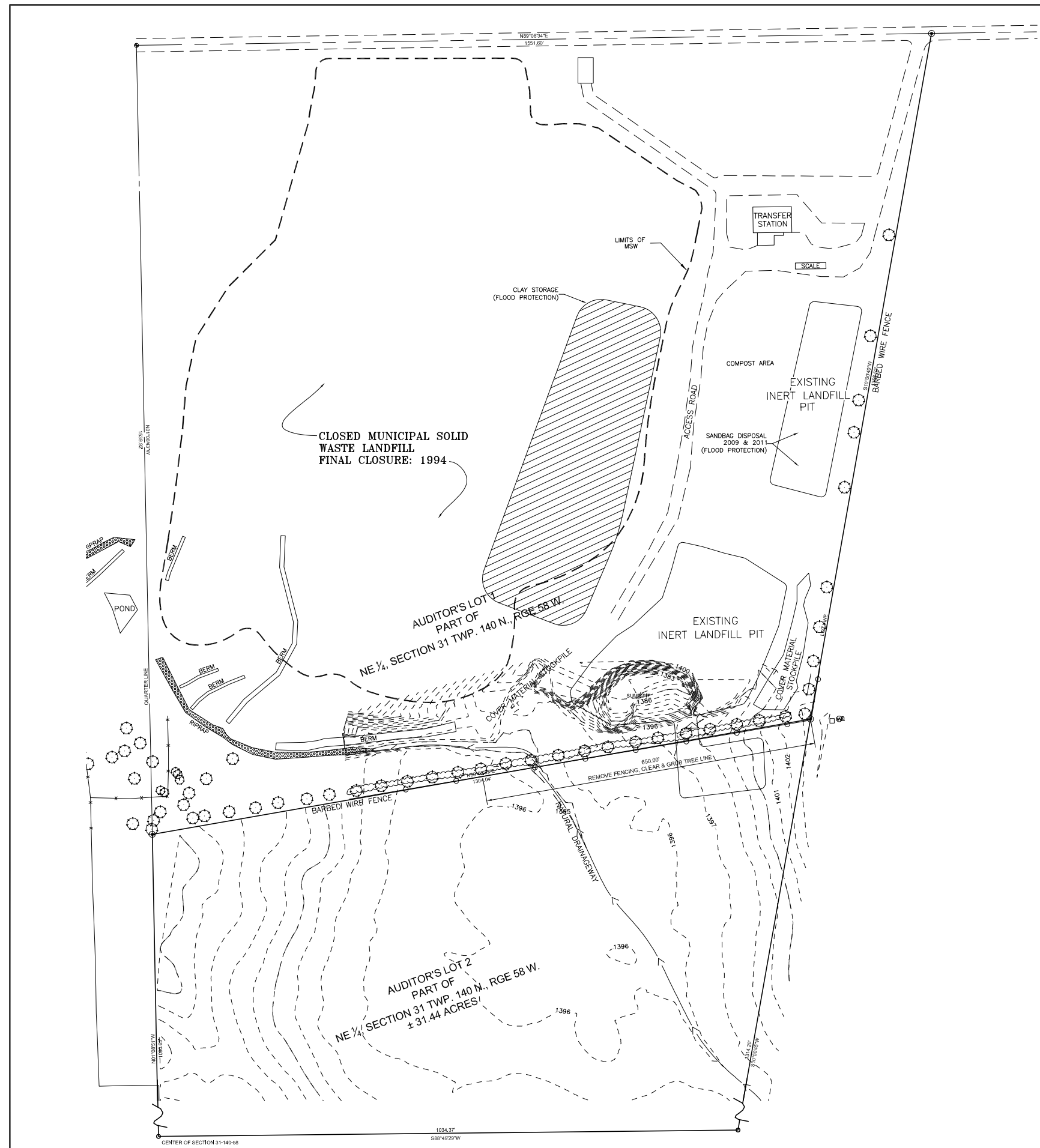
41-3140400

41-3130305

41-3130310



## **EXHIBIT 7: INERT LANDFILL EXPANSION PLANS**



**LEGAL DESCRIPTION**

**AUDITOR'S LOT 1**

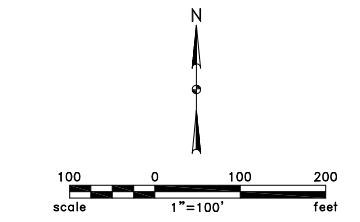
A tract of land situated in the Northeast Quarter (NE 1/4) of Section 31, Township 140 North, Range 58 West of the Fifth Principal Meridian, Barnes County North Dakota, more particularly described as follows:

Commencing at the Northeast corner of the Northeast Quarter (NE 1/4) of said Section 31; thence S60°00'00"W along the Section line a distance of 1,064.79 feet to an iron pin, the Point of Beginning; thence S10°51'55"W a distance of 1,358.59 feet to an iron pin; thence S83°55'22"W a distance of 1,304.20 feet to an iron pin on the West line of said Northeast Quarter (NE 1/4); thence N30°17'28"W along the Quarter line a distance of 1,540.00 feet to an iron pin at Northwest corner of said Northeast Quarter; thence N80°00'00"E along the Section line a distance of 1,551.79 feet to the Point of Beginning. Said tract of land contains 46.59 acres more or less, including that portion of the 2.0 acre parcel described in Document Number 207950 at the office of the Barnes County Recorder that lies within said Northeast Quarter (NE 1/4).

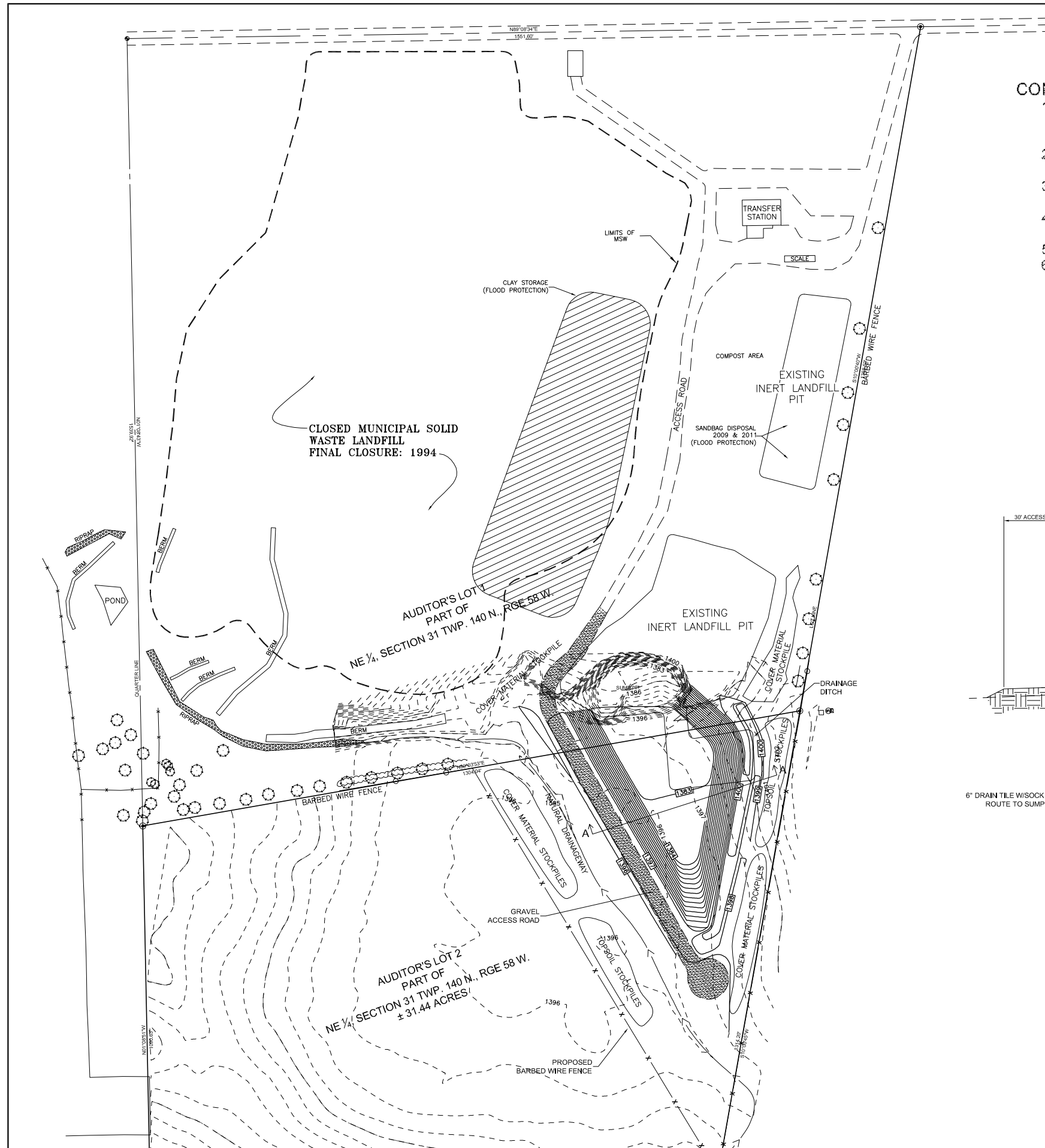
**AUDITOR'S LOT 2**

A tract of land situated in the Northeast Quarter (NE 1/4) of Section 31, Township 140 North, Range 58 West of the Fifth Principal Meridian, Barnes County, North Dakota, more particularly described as follows:

Commencing at the Northeast corner of the Northeast Quarter (NE 1/4) of said Section 31; thence S60°00'00"W along the Section line a distance of 1,064.79 feet to an iron pin; thence S10°51'55"W a distance of 1,358.59 feet to an iron pin, the Point of Beginning; thence continuing S10°51'55"W a distance of 1,314.30 feet to an iron pin on the South line of said Northeast Quarter; thence S83°40'38"W along the Quarter line a distance of 1,034.60 feet to an iron pin at the center of said Section 31; thence N30°17'28"W along the Quarter line a distance of 1,090.82 feet to an iron pin; thence N83°55'22"E a distance of 1,304.20 feet to the Point of Beginning. Said tract of land contains 31.45 acres more or less, including that portion of the 2.0 acre parcel described in Document Number 207950 at the office of the Barnes County Recorder that lies within said Northeast Quarter (NE 1/4).

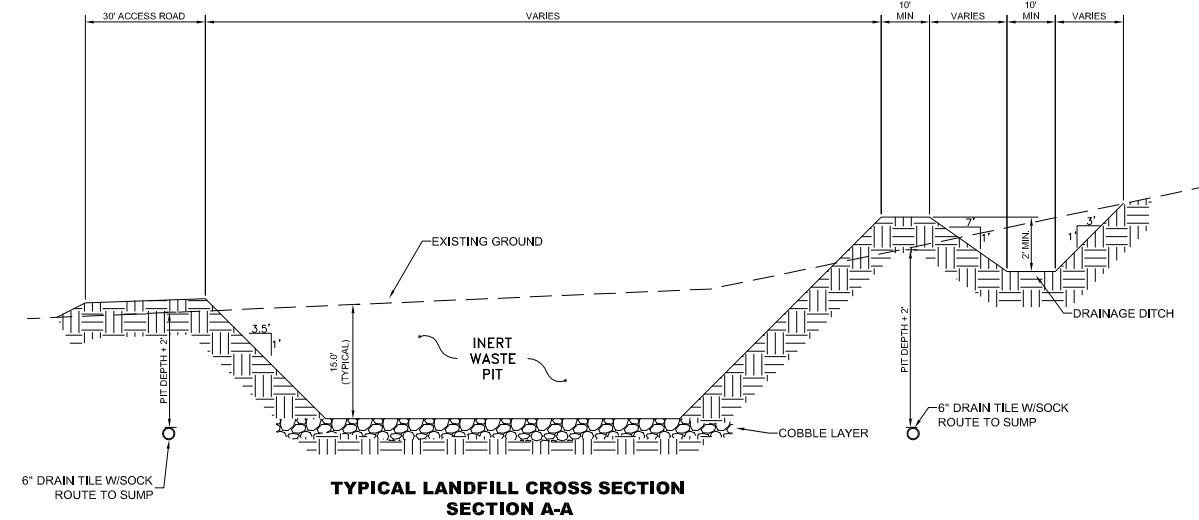


Rev'd. 00/00/0000		SHEET NO.	
<b>VALLEY CITY INERT LANDFILL</b> VALLEY CITY, NORTH DAKOTA		<b>1</b>	
<b>Kadmas Lee &amp; Jackson</b> Engineers Surveyors Planners		<b>EXISTING CONDITIONS</b>	
		DRWN BY EAG	CHD BY EAG
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© Kadmas, Lee & Jackson 2009			

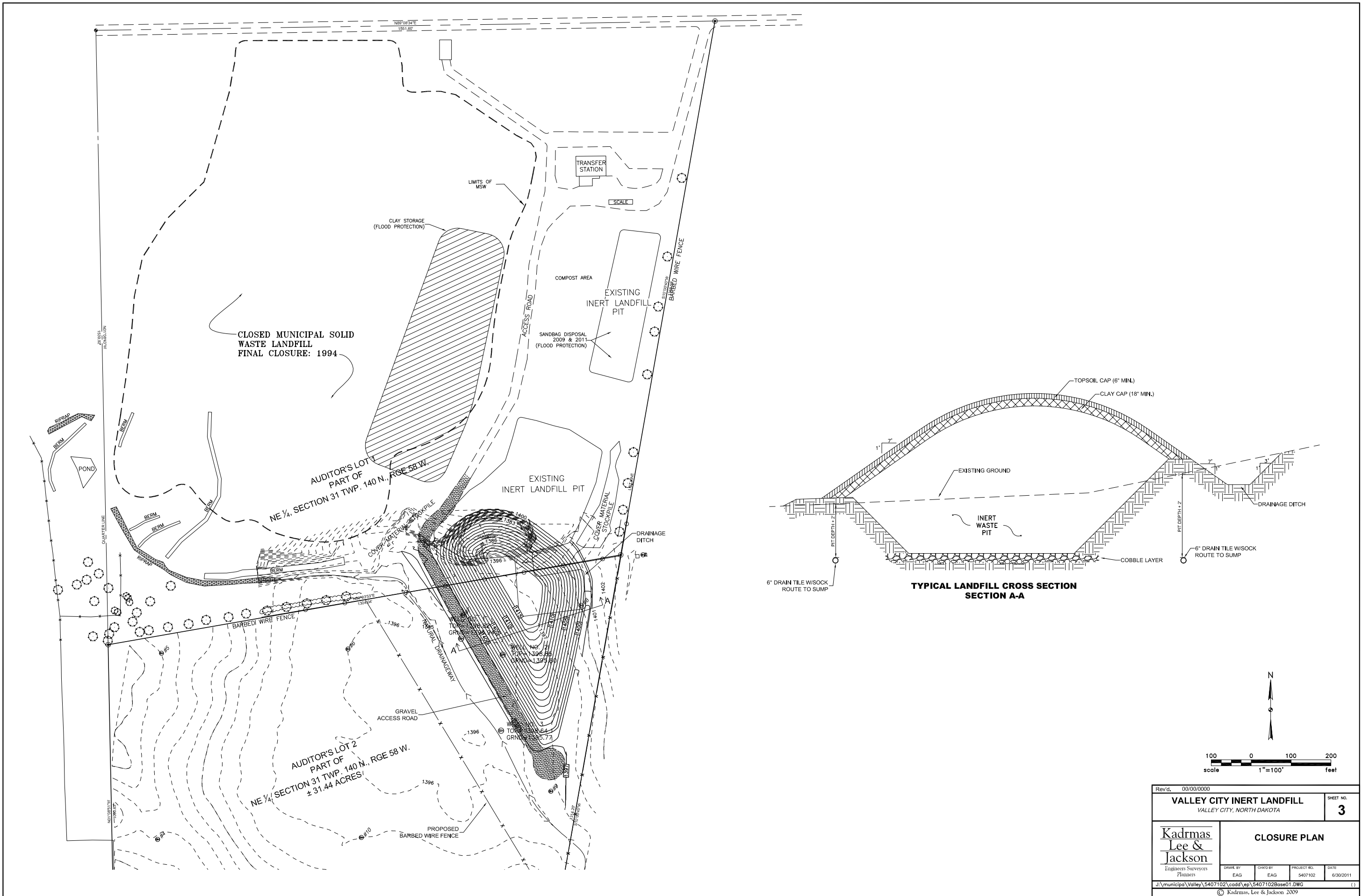


**CONSTRUCTION NOTES**

1. ALL WORK SHALL BE IN ACCORDANCE WITH GUIDELINE 16, OPERATION OF INERT WASTE LANDFILLS, DEVELOPED BY THE DIVISION OF WASTE MANAGEMENT OF THE NORTH DAKOTA DEPARTMENT OF HEALTH.
2. ALL TOPSOIL SHALL BE STRIPPED AND STOCKPILED FOR USE IN FINAL CLOSURE OF THE LANDFILL.
3. COVER MATERIAL SHALL BE STOCKPILED FOR USE AS DAILY COVER AND FINAL COVER.
4. DRAINAGE DITCHES SHALL BE CONSTRUCTED PRIOR TO EXCAVATION OF THE DISPOSAL PIT
5. AREAS TO BE SEEDED SHALL HAVE A MINIMUM OF 6" OF TOPSOIL RESPREAD.
6. DRAINAGE TILE SHALL BE ROUTED TO THE SUMP PIT.



Rev'd.	00/00/0000	SHEET NO.	2
<b>VALLEY CITY INERT LANDFILL</b> VALLEY CITY, NORTH DAKOTA			
<b>Kadmas Lee &amp; Jackson</b> Engineers Surveyors Planners		<b>EXPANSION PLAN</b>	
DRWN BY EAG	CHD BY EAG	PROJECT NO. 5407102	DATE 6/30/2011
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© Kadmas, Lee & Jackson 2009			

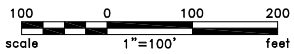


CLOSED MUNICIPAL SOLID WASTE LANDFILL  
FINAL CLOSURE: 1994

AUDITOR'S LOT 1  
PART OF  
NE 1/4 SECTION 31 TWP. 140 N., RGE 58 W.

AUDITOR'S LOT 2  
PART OF  
NE 1/4 SECTION 31 TWP. 140 N., RGE 58 W.  
± 31.44 ACRES

TYPICAL LANDFILL CROSS SECTION  
SECTION A-A



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**APPENDIX A: NORTH DAKOTA DEPARTMENT OF HEALTH GUIDELINES**



## **GUIDELINE 1 - EMERGENCY WASTE MANAGEMENT AND DISPOSAL**

North Dakota Department of Health - Division of Waste Management

918 E. Divide Ave., 3rd Fl., Bismarck, ND 58501-1947

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### **I. Introduction**

The collection, management and disposal of large amounts of waste resulting from emergencies such as natural disasters and large-scale accidents, may overwhelm local waste management programs. Local officials, emergency management professionals and solid waste managers are advised to evaluate and plan for emergency waste cleanup procedures. Planning for emergency waste cleanup will help protect public health and safety, control cost and stress of the situation, and minimize impact on local communities and the environment. This guideline and attachments address emergency waste management and provide information for efficient and cost-effective waste collection, recycling and disposal.

Local officials are familiar with neighborhoods, businesses and industries in their community which may generate large amounts of waste during emergency situations. These officials should apply knowledge of their community to effectively use equipment, contractors and solid waste disposal facilities during the emergency. Local officials and emergency personnel should have plans to reach the public with waste management information through newspapers, electronic media announcements or through pamphlets.

Additional information is available upon request, or online at [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm).

### **II. Priorities in Waste Identification, Segregation and Management**

Wastes generated in an emergency may pose health and environmental risks, depending on their nature and if the emergency has created a waste exposure pathway (such as damage to containers, spills, etc.). Advance removal of waste or materials from potential natural disaster areas is an effective preventive measure. For example, the public should be encouraged to remove paints, household chemicals, pesticides, oil, lead-acid batteries and appliances from a basement or a structure if a flood is forecast. Once a disaster has struck, prioritizing the early cleanup of waste materials which pose the most risk will protect the public and help avoid contamination of high-volume, low-toxicity inert (demolition) waste materials. Following is a prioritized description of potential emergency waste, from highest to lowest priority.

#### **A. Hazardous Materials and Hazardous Waste**

Hazardous materials and hazardous waste pose environmental and health risks if their containers are disrupted and the material is exposed. Waste materials of concern include solvents, paints, pesticides (insecticides, herbicides, fungicides, etc.), fertilizers, oil, lead-acid batteries, acids and bases (such as drain cleaners), and even explosive materials (such as ammunition). If these types of materials have not been removed from property prior to the emergency, an evaluation should be made to look for any leaking or damaged containers. If the property owner or the emergency coordinators know that materials within the property pose the danger of exposure, they should ensure that the area is cordoned off until

emergency personnel can remediate the site. Emergency coordinators can use their discretion for what types of leaks or spills require cleanup assistance. For example, in most cases, property owners should be able to cleanup paint spills or leaks on their property.

Leaking containers of hazardous materials or chemicals can be placed in more secure labeled containers; however, mixing chemicals or products should be avoided. Leaking containers of oil-based paints can be consolidated into labeled five-gallon containers or larger drums for later reuse. Spilled materials can be absorbed with cat litter and then placed in a plastic bag or durable container. Damaged or saturated bags of yard chemicals, pesticides, fertilizers, etc., should be placed in plastic bags or other containers, labeled and placed in a secure location. Avoid mixing incompatible materials such as acids and bases or chlorine and ammonia-based compounds, as injurious reactions may result. Labels placed on the new containers should contain the following information: (a) container contents, (b) container owner, and (c) condition of the contents.

If at all possible, usable materials should be segregated and conserved for eventual reuse. Exposing usable contents of containers during demolition of a structure may result in managing the material as a hazardous waste. Usable materials that are properly labeled, placed in a secure location and segregated by waste type can be evaluated later for proper reuse. If materials are stored outside, they should be placed in segregated locations, surrounded with a small earthen dike or berm to control surface water runoff and run-on and covered to keep out moisture.

#### B. Municipal Solid Waste/Putrescible Waste

Municipal solid waste or putrescible waste includes food waste, household garbage, small pet carcasses and other waste which may undergo microbiological decomposition. Physical damage to food stocks and disruption of power to refrigeration equipment could result in large amounts of putrescible waste which should be promptly removed for burial at a Municipal Solid Waste (MSW) landfill. The community could probably contract with its municipal waste hauler to remove the putrescible waste. If the hauler does not have adequate equipment or is otherwise unable to handle the waste. Reference is suggested to list of waste haulers to find a company with adequate resources to handle the putrescible waste.

Collection efficiency of putrescible waste is maximized by keeping putrescible waste separate from other waste. The public should be advised to avoid mixing hazardous waste and hazardous materials with putrescible waste. Similarly, if faced with a large amount of putrescible waste for cleanup, the public could be directed not to mix demolition materials, clothing, furniture and other bulky materials with the putrescible waste, as these materials could be later disposed with inert waste. Putrescible waste should be contained in plastic bags and/or secure garbage cans for ease of handling. Containment prevents release of putrescible waste to the environment and exposure to vectors (insects, rodents, etc.).

Putrescible waste should be hauled to an approved MSW landfill. In cases of emergencies, putrescible waste may be hauled, with Departmental coordination, to a secured emergency waste disposal site **if the waste does not contain hazardous materials**. Putrescible waste should be promptly covered with soil at the site. An existing inert waste landfill may function as an emergency putrescible waste site. It is usually easier to expand existing inert waste landfill sites for emergency purposes than to develop a new disposal site. If a site does

not exist, however, an emergency site may be developed with Departmental coordination. Emergency coordinators should refer to Part **IV.B.** of this document for guidance on selecting an emergency disposal site. The Department's emergency response coordinator will forward technical assistance requests for site selection to the Division of Waste Management. An emergency putrescible waste site should be operated and closed in accordance with procedures described in **Part IV. C, D, and E.**

If streets or roads are blocked in the emergency area or if adequate collection equipment is not available, community drop-off points may be developed for handling putrescible waste. Roll-off containers placed in strategic locations can accept putrescible waste if they are covered and promptly serviced to avoid nuisances of flies and odors. Emergency coordinators should contact municipal waste landfills in the emergency area for names of waste hauling companies that may provide roll-off containers.

#### C. Livestock and Large Animals

Dead or diseased livestock and large animals should be managed with direction from the North Dakota Board of Animal Health. If possible, accumulations of livestock can be rendered by a rendering company or they can be stockpiled at an emergency disposal area to be burned or buried (refer to Grease Renderers List).

#### D. Agricultural Commodities

Damaged and potentially-rotting grain, potatoes and other agricultural commodities or food stuffs should be managed to minimize extreme odors, airborne spores, gasses and harborage of vectors. Vector harborage may lead to secondary health concerns such as spread of the Hantavirus. Damaged grain, if handled promptly, can often be salvaged by various salvage companies. If beyond salvage, however, the grain can be disposed at a MSW landfill or if necessary, at an approved emergency waste disposal site. Molding grain can generate nitrogen dioxide which can have adverse health effects in closed environments. Molding grain can also release spores which may result in an allergic reaction (coughing, mucous secretions, fever, chills, heavy breathing, etc.) to persons in the area.

Agricultural commodity waste should be handled in a manner that prevents its introduction into the environment. Avoid spillage when loading trucks and contain the load to prevent wind dispersal. If the material is to be buried at a landfill or emergency waste disposal site, it should be placed in a trench and covered with soil as soon as possible.

#### E. Inert Waste

Emergencies may result in widespread damage to a community's physical structure, including buildings, utilities and trees. The waste or debris, resulting from damaged structures or utilities is usually considered inert waste. **By definition, inert waste** does not form contaminated leachate which can pollute surface or groundwater or serve as food for vectors. **Inert waste examples include metal, wood (from structures, utilities or trees), bricks, asphalt or cement concrete, plaster, drywall, siding, asphalt or wood shingles, insulation, ceramics, plastic and glass.** A natural disaster, however, may also result in generation of large quantities of household inert waste, including carpet, draperies, upholstered and wooden furniture, mattresses, clothing, bedding, paper, plastic and



cardboard. Demolition waste refers to waste generated from building or structure demolition. Demolition waste includes materials used in building or structure construction described as inert waste.

Inert waste is usually the most visible waste resulting from an emergency. It is also usually the largest volume of waste that public officials and private property owners will have to manage. Buildings, structures or trees damaged in a severe storm or accident may present a personal safety concern. Inert waste from buildings, structures or trees, however, is the lowest priority waste in an emergency in terms of public health or environmental concerns. Nevertheless, inert waste must be quickly removed from an impacted area to make streets and roads negotiable and to restore utility service. Emergency coordinators, therefore, should instruct community residents in techniques that will allow them to quickly cleanup their property, yet also simplify inert waste management.

### III. Inert Waste Management

Although inert waste can be landfilled, communities can control emergency waste disposal costs by recycling, reusing or possibly burning some of the inert waste. Emergency coordinators should therefore manage inert waste with one goal in mind: *volume reduction*. Reducing inert waste volume by recycling, reusing, shredding, compacting or burning will likely reduce inert waste disposal cost for the affected community.

#### A. Segregation

The first and most important step in an inert waste cleanup involves waste segregation. Owners of damaged property should segregate their inert waste into three piles placed near the street for collection: wood, metal (including major appliances) and nonburnables. Nonburnables include: plastic, vinyl and rubber waste, asphalt shingles, carpet, draperies, upholstered furniture, mattresses, clothing and bedding, paper and cardboard and other nonburnable construction materials (see **Part IV. Inert Waste Disposal**).

#### B. Collection and Storage

As time permits, inert waste can be collected and transported to storage or disposal facilities. Although inert waste piles are unsightly, the inert waste usually poses little threat to public health or the environment. Provided the inert waste is not impeding traffic flow or hindering utility restoration, inert waste collection is usually a lower priority during the emergency.

Woodpiles should be transported to the community landfill or other location suitable for shredding or burning wood. No approval from the Division is required for a wood storage location. The wood storage location, however, should be carefully selected so that shredding or burning the wood will not create a nuisance for residential areas.

Metal piles should be transported to the community landfill or other location suitable for stockpiling and recycling metal. No approval from the Division is required for a metal storage location. The metal storage location, however, should be carefully selected so that noise from crushing and baling the metal will not create a nuisance for residential areas. Major appliances (refrigerators, freezers, washers, dryers, etc.) should be stockpiled

separately from other scrap metal. In addition, refrigerant-containing appliances should be stockpiled separately from other appliances so Freon may be captured.

Nonburnable inert waste should be transported to the community landfill or other approved emergency disposal site. Refer to Part **IV.** for inert waste disposal information.

#### C. Recycling and Reuse

Scrap metal, including major appliances and automobiles, are routinely recycled in North Dakota by scrap metal recyclers. Metal and appliances generated as a result of the emergency should therefore be recycled. A list of scrap iron processors who may recycle the metal is available from this Division.

Buildings or structures sustaining severe damage in a storm or accident may be condemned for demolition. A portion of the materials in these structures or buildings, however, may be recoverable and recyclable. For example, road construction contractors may be interested in crushing a large concrete or brick structure into road base material. Metal recyclers may be interested in recovering steel structural members or special metals such as copper from structures. Dimension lumber may be reused as construction material. Hardwood flooring or woodwork in some structures may be of use to commercial or hobby woodworkers.

Wood chipping is another effective waste volume reduction technique. Wood waste from trees and branches may be processed into wood chips usable for mulching material in community tree replanting programs. Emergency coordinators should contact local tree service firms, rental companies or implement dealers for information on tree chipping services or chipping equipment rental. Chipping wood during cleanup greatly reduces the volume of materials and thus, the hauling requirements.

#### D. Open Burning

Open burning, as opposed to recycling, reuse or burial, may be a management option for trees or nonsalvageable wood resulting from the emergency. Open burning trees and wood is an option under the following conditions:

1. The wood must be clean burning, for example, it must be free of materials that will produce unreasonable smoke (asphalt shingles, rubber, etc.) or will smolder for extended periods; and
2. A *burn variance* form must be received from the Division of Air Quality (refer to SFN-8509). All portions of the application must be completed, including the local fire department coordination approval and district health unit coordination approval if the county belongs to a district health unit (refer to District Health Unit List). Upon receipt of a burn variance, open burning may proceed after notifying the local fire department. Please contact the Division of Air Quality at 701.328.5188 with questions about open burning.

### **IV. Inert Waste Disposal**

Regardless of waste volume reduction efforts, some inert waste generated during the emergency will require landfill disposal. Some inert waste can be managed in no other manner, especially if waste normally considered recyclable (paper and cardboard) has been damaged by water. Inert waste requiring landfill disposal usually involves waste from buildings or households that is not recyclable, reusable or burnable, including: plastic, vinyl and rubber waste, asphalt shingles, carpet, draperies, upholstered furniture, mattresses, clothing and bedding, paper and cardboard and other nonburnable construction materials.

Existing inert waste disposal sites in the emergency area are acceptable for inert waste disposal (refer to lists of Inert Waste Landfills including Permit-By-Rule Landfills). These sites, however, may require expansion of the disposal area to accommodate large amounts of waste. Access roads and entrance gates of existing sites may require widening or improvement to accommodate increased vehicular traffic.

It is generally easier to expand existing inert waste disposal sites than to develop a new disposal site. Some communities impacted by an emergency, however, may not have an existing inert waste landfill. In response to an emergency, a community may need to develop an inert waste disposal area. See Part **IV.B.** of this guideline for information on selecting an inert waste disposal site.

#### A. Prohibited Waste Disposal

Inert waste to be disposed should be carefully inspected to ensure it contains no wastes which may form contaminated leachate, pollute surface water or groundwater, or attract vectors. Buildings or structures condemned and scheduled for demolition should be inspected if the structure is safe for entry. Prohibited waste identified during the inspection should be removed from the structure prior to demolition.

The following wastes are prohibited from disposal at inert waste disposal sites:

1. Household garbage, food, animal carcasses and other putrescible wastes, unless the site has been designated an emergency putrescible waste disposal site;
2. Liquids, solvents, paint;
3. Maintenance and cleaning chemicals or products;
4. Pesticides, fertilizers and other yard, garden or agricultural chemicals;
5. Oil and oil containers, lead-acid batteries and all appliances;
6. Fluorescent light fixtures and bulbs, mercury-containing electrical switches and thermostats and electrical transformers;
7. Regulated asbestos-containing materials in buildings; and
8. Other waste which may form contaminated leachate, pollute surface water or groundwater, pollute the air or attract vectors, unless specific approval has been granted.

- a. **Liquids, used oil, lead-acid batteries and major appliances** (white goods) are prohibited from landfill disposal. Established recycling markets exist for used oil, lead-acid batteries and major appliances. See Division management outlines, pamphlets and guidelines on used oil and major appliances documents/lists.
- b. **Solvents, paints, chemicals or pesticides** should be removed from structures scheduled for demolition (if safe for entry) or segregated from inert waste. If not usable, very small quantities (household quantities) of these wastes may be disposed with municipal waste. Large quantities of these wastes may require handling by a hazardous waste management firm. See the Division's management outlines on disposal of pesticides and their containers and paint wastes.
- c. **Mercury-containing fluorescent light bulbs, thermostats and electrical switches and fluorescent light bulb fixtures and electrical transformers which may contain Polychlorinated Biphenyls (PCBs)** should be removed from structures scheduled for demolition (if safe for entry). Depending on the quantities of these items and the concentration of mercury or PCBs, disposal may be allowed in permitted municipal waste landfills. See Division's management outlines on universal waste or PCB-containing waste.
- d. **Regulated asbestos-containing material** should be properly removed from structures scheduled for demolition (if safe for entry). Asbestos is a known carcinogen and proper handling is critical to protect public health and safety. Depending on what type of structure is being demolished, an inspection for regulated asbestos-containing material may be required. The Division of Air Quality regulates asbestos inspection, removal and transportation to a disposal facility. An "Asbestos Notification of Demolition and Renovation" SFN-17987 is often required for structure demolition projects and must be submitted to the Division of Air Quality at least ten (10) days before beginning demolition. Regulated asbestos-containing material must be disposed at permitted landfills approved for asbestos disposal (see the Division of Air Quality's SFN-17987 Asbestos Notification of Demolition/Renovation form and summary for asbestos handling). Depending on the extent of the emergency, however, the Department may waive established asbestos handling requirements. For example, wetting suspected asbestos material prior to structure demolition may be sufficient if the structure is unsafe for entry and poses a safety concern in its present condition. In addition, the ten-day advance notification period may be waived if notification is made by telephone and a ten-day delay would pose an undue hardship.

## B. Disposal Site Selection

The inert waste disposal site must be carefully selected. Avoid environmentally sensitive or unstable areas that will not provide safe, long-term waste disposal. For example, wetlands, gravel pits, floodplains and shallow water table areas are environmentally sensitive because of surface and groundwater pollution concerns. Ravines, woody draws and steeply sloping terrains are unstable areas subject to accelerated erosion which may expose the waste.

To assure safe, long-term inert waste disposal, the site should be nearly level to moderately sloping, well drained and meet the following criteria:

1. Maximum site slope of nine (9) percent;
2. Minimum distance of two hundred (200) feet to nearest surface water;
3. Minimum depth of three (3) feet to seasonal high water table (waste disposal in the water table is prohibited); and
4. Underlain by loamy, silty or clayey soils (sandy or gravelly soils are unacceptable).

Soil survey maps, available through local Natural Resources Conservation Service (NRCS) offices (formerly the Soil Conservation Service), provide the necessary information for disposal site selection. Soil survey maps depict soil types on an aerial photobase. The maps are very useful because they show not only soil types, but also drainage and cultural features, such as streams, wetlands, roads, field boundaries and building sites. Soil types depicted on published soil survey maps are described in the survey report. The survey report includes soil descriptions and tables which describe soil slope, texture, depth to seasonal high water table and other soil properties.

Most North Dakota counties have a published soil survey. Contact the local NRCS office to ask if published soil survey information is available and to receive assistance for soil map interpretation. Some North Dakota counties, however, do not have published soil survey information. In these counties, the survey may be completed but not published, or the survey is in progress. To obtain soil survey information in these counties, you must request a preliminary soil survey of a specific area from the county NRCS office. Preliminary soil survey maps usually produce poor quality photocopies. Request the NRCS staff to produce the best possible photocopy of the specific area. In very few cases, soil survey information may not be available for a specific area. If soil survey information is not available, the Department may have other information sources to assess site suitability or an onsite Departmental inspection may be necessary.

The site proposed for inert waste disposal must be accurately depicted on a legible map. Legible photocopies of published soil survey maps are acceptable for this purpose; however, photocopies of unpublished soil survey maps are unacceptable because of poor reproduction. Where published soil survey information is unavailable, an aerial photograph photocopy from the Consolidated Farm Services Agency (CFSA) can be used to depict the proposed disposal area. These photocopies cover one section of land and are available for a nominal fee for all areas of the state. Contact the county CFSA to request a photocopy for a particular section of interest.

#### C. Disposal Site Operation

1. Disposal Site Control and Access

Disposal operations must be tightly controlled and completed as soon as possible to avoid potential problems. Access control through fencing, barriers, gates or supervision as necessary will help avoid open dumping, prohibited waste disposal, scavenging, vandalism and possible injury. Site access should be available through an improved two-lane access road. A narrow entrance gate and narrow or muddy access road will hinder disposal site access and slow the waste cleanup process. Discrete areas may be

designated for stockpiling recyclables (metal, appliances, etc.), burnable wood materials and compostable materials (grass and leaves).

## 2. Stormwater Control

Stormwater control measures should be implemented at the inert waste disposal site. Stormwater is simply precipitation or snowmelt. The concern with stormwater is not the water itself. Rather, the concern is the soil or other pollutants which may be carried in stormwater off the disposal site and deposited in drainage ways, stormwater sewers or surface water.

Effective stormwater control involves methods or materials to prevent pollutants, mainly soil, from leaving the disposal site. Methods and materials for stormwater control include:

- a. Careful site selection and development, and diversion of upslope surface water run-on;
- b. Minimizing the area disturbed for waste disposal, especially if the disposal area has existing vegetative cover;
- c. Maintaining a "buffer" of undisturbed vegetative cover around the disposal area to trap soil before it leaves the site; and
- d. Placing straw bales, silt fences or similar material where concentrated surface water runs off the disposal site. Straw bales or silt fences must be anchored in the ground to be effective in trapping soil before it leaves the site.

If the inert waste disposal area exceeds five (5) acres, a permit for stormwater discharge may be required by the Division of Water Quality. Please contact the Division of Water Quality's Wastewater Facility/Permits Program at 701.328.5210 with questions about stormwater discharge permits.

## 3. Stripping Topsoil

Topsoil is the dark colored surface layer of soil that is rich in organic matter and nutrients. Topsoil is critically important to establishing vegetation for reclamation of disturbed areas. It is important, therefore, to strip topsoil from the inert waste disposal area before excavating the disposal trench. Depending on the disposal site's geographic location and landscape position, topsoil may be as little as three inches or more than 15 inches thick. Topsoil must be stripped from the excavation area and saved at the site for reclaiming the disposal area.

## 4. Trench Excavation and Debris Compaction

The disposal trench may be excavated after stripping and stockpiling disposal site topsoil. Depending on the site selected, disposal trench depth may be limited by soil conditions or by the seasonal high water table depth. Remember, inert waste disposal in the water table is prohibited. Depth of the seasonal high water table in glaciated

portions of North Dakota is usually indicated by a change in subsoil color from brown or tan to gray with increasing depth.

Inert waste disposal should be restricted to as small an area as possible and waste should be compacted with heavy equipment as it is placed in the disposal trench. Waste compaction serves two purposes: (1) it reduces the size of excavation required for waste disposal by maximizing use of disposal trenches; and (2) it reduces potential problems of soil settling (subsidence) after the disposal area is reclaimed. Other forms of waste volume reduction, besides compaction, may serve to reduce required size of the disposal excavation. For example, wood or trees can be shredded to reduce disposal volume.

#### D. Disposal Site Closure

Disposal trenches should not be filled to excavation capacity. Instead, maintain at least two (2) feet between the inert waste and original ground elevation (before stripping topsoil). The entire site should be cleaned and all waste, including burned debris ash, must be consolidated in the trench. Stockpiles of recyclable materials should be removed. The disposal area must receive at least two and one-half (2½) feet of soil cover, including reapplied topsoil. The soil cover should be carefully graded to form a slightly convex or domed surface that will promote surface water runoff. If the disposal area will be used for pastureland, hayland or wildlife habitat, the disturbed area should be seeded to climatically adapted grasses or legumes. Erosion control measures, such as incorporating straw or planting a cover crop, may be necessary if permanent cover planting is delayed. Maintain stormwater control measures for at least one (1) year after the site is closed.

#### E. Notification of Waste Disposal Activity

The Department requires that a “Notice of Waste Disposal” activity be filed with the County Register of Deeds office for permitted landfills or emergency disposal sites. The notice informs anyone conducting a title search of the disposal site property that a specific area of land was used for waste disposal. Maintaining an orderly operation and careful site closure will help minimize future landowner concerns on the site and may help ensure future saleability of the property.

A Notice of Waste Disposal form/affidavit which may be used for filing. Describe the disposal location and type of waste. The affidavit must be signed by the property owner and notarized. Use the partial section notation, for example: NE ¼ of the NW ¼ of Section 14, to describe the disposal area as accurately as possible. In the example given, the disposal area is described as ten (10) acres. The partial section notation can describe very small disposal areas, provided they are in corners of quarter sections where landmarks (fence lines, tree rows) can be used to identify the area on a map.

To print out form see our Division’s website at: [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm)

The original Notice of Waste Disposal form should be filed with the County Register of Deeds office. A nominal fee is usually required for filing. When filing the notice, the property owner should ask the Register to forward a certified copy of the notice to the Department.



## **GUIDELINE 16 – OPERATION OF INERT WASTE LANDFILLS**

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### **I. Introduction**

Many communities in North Dakota may wish to develop sites for disposing inert wastes routinely generated by their citizens and businesses. The purpose of this guideline is to illustrate the requirements of state rules and describe the proper operation and maintenance of inert waste landfills. The North Dakota Department of Health, Division of Waste Management (telephone: 701.328.5166) administers the North Dakota Solid Waste Management Rules, which regulate such facilities.

Inert waste includes construction and demolition material such as metal, wood, bricks, masonry and cement concrete; asphalt concrete; tires; metal; tree branches; bottom ash from coal fired boilers; and waste coal fines from air pollution control equipment. Metal wastes such as washers, dryers, and other scrap metal may be stockpiled at an inert waste landfill for recycling. Inert wastes are those types of bulky wastes that normally do not pose significant hazards of environmental degradation. Inert waste will not generally contaminate water or form a contaminated leachate and does not serve as food for vectors.

The Department has established two categories for operation of inert waste landfills. Inert waste landfills operated for municipalities servicing populations of less than 1,000 people are eligible to operate under the Permit-By-Rule provision. These communities need only submit a notifying form and adhere to the applicable rules. Communities of more than 1,000 people or commercial entities are required to obtain an inert waste landfill permit.

The first seven sections (I through VII) of this guidance document apply to all inert waste landfills. Sections VIII and IX apply to permitted landfills, but "Permit-By-Rule" landfills may consider following these sections as well. Section XII describes permit application procedures for operators of inert waste landfills requiring a permit.

### **II. Site Selection**

An inert waste disposal site must be carefully selected so that it is relatively high (ravines, potholes, and sloughs are not suited for landfills), well drained, and dry. The site should be underlain with clay-rich soil to help reduce any hazard of groundwater contamination. The following characteristics define a suitable site:

- A. Site slope: 6 percent maximum.
- B. Minimum distance to surface water: 200 feet.
- C. Minimum distance to residences or buildings: site-specific; in general, 200 feet.
- D. Minimum depth of 15 or more feet to seasonal high water table for most soils.



- E. Soil characteristics: Slow to moderate permeability, less than 2 inches per hour.  
Areas underlain by highly permeable soils or sodium affected soils should be avoided.

Published soil survey information available through local Natural Resource Conservation Service (NRCS) offices (formerly the Soil Conservation Service) provides an excellent reference for some of the necessary site characteristics such as site slope, depth to groundwater, and soil type for most locations in North Dakota. If specific soil information is not available or if more detailed soil information is required, a Professional Soil Classifier can be used to determine site-specific soil conditions.

NDAC section 33-20-04.1-01 states that landfills may not be located in areas which are unsuitable because of topographic, geologic, hydrologic, or soil conditions. The Department considers the following locations unsuitable, in most cases, for development of inert waste landfills:

- A. Where waste is disposed within an aquifer;
- B. Within a public water supply designated wellhead protection area;
- C. Within a one-hundred-year flood plain;
- D. Where geologic or manmade features, including underground mines, may result in differential settlement or failure of the structural integrity of the facility;
- E. On the edge of or within channels, ravines, or steep topography whose slope is unstable due to erosion or mass movement;
- F. Within woody draws;
- G. In areas designated as critical habitats for endangered or threatened species of plant, fish, or wildlife;
- H. Over or immediately adjacent to principal glacial drift aquifers identified by the state engineer;
- I. Closer than 1000 feet [304.8 meters] to a down-gradient drinking water supply well;
- J. Closer than 200 feet [60.69 meters] horizontally from the ordinary high water elevation of any surface water or wetland;
- K. Within final cuts of surface mines; or
- L. Closer than 1000 feet [304.8 meters] to any state or national park.

### **III. Site Construction/Development**

Disposal sites must be properly constructed and must provide for adequate cover of disposed wastes. As necessary, the following must be addressed:

- A. Topsoil and subsoil must be carefully removed from disposal areas, properly segregated and stockpiled for final reclamation. Cover material should also be stockpiled in strategic areas for eventual use during site operations. All earthen material must be maintained on site unless removal from the site is authorized by the Department.

- B. Careful consideration should be given to site drainage so as to preclude surface water run-on or runoff from creating any problems. All surface water resulting from run-on, runoff, snowmelt, or direct precipitation should be controlled to avoid any concentration of water on or in the waste and to minimize infiltration of water into the waste material.
- C. Trenches should be planned and excavated for disposal of appropriate wastes.
- D. Provisions must be made for proper re-vegetation of the site with suitable grass and plant seed mixtures as portions of the site are reclaimed.
- E. Tree planting and windbreak planting are desirable to prevent the site from becoming a blight of the landscape.

See an example of a [Typical Landfill Layout](#).

Access to the disposal site must be controlled with a fence and a lockable gate. The site must be locked when it is not open for use and the responsible parties should not loan out the keys or have duplicate keys made for any persons other than the landfill operators or supervisors.

A road leading to the site should be established such that it is adequate for all weather conditions. Provisions should be made so that access to the disposal site cannot be gained by driving around the gate or through the fence.

A permanent sign must be posted at the entrance of the facility, which indicates the following:

- A. The name of the facility's owner;
- B. The name and telephone number of a person responsible for the facility;
- C. The wastes accepted at the facility; and
- D. The days and hours the facility is open for access.

Signs are available through Roughrider Industries in Bismarck or you may wish to make your own. See an example of an [Inert Waste Landfill Sign](#).

#### **IV. Waste Acceptance and Disposal Practices**

Disposal at the inert waste landfill must be limited to inert wastes only. Some guidelines on waste acceptance and management include:

- A. Clean-burning wastes such as trees and branches generated by a small community can be stockpiled in one or more separate aboveground piles. Clean, non-diseased wood can be made available to the public for firewood. Similarly, lumber, doors, windows, and reusable materials may be segregated for reuse. The Department promotes responsible reuse and recycling of materials.

Acceptance of pallets and other "trade waste" should be avoided as these materials should be properly managed by the company generating such materials. Such materials should be reused or recycled ([see list of Wood Processing/Recycling Facilities and Equipment Vendors](#)). The Department may deny burn variances for woodpiles that have large amounts of "trade waste."

If wood cannot reasonably be used as described above and/or if it is diseased wood that cannot be reasonably processed (shredded), the Department may consider an application for a one-time burn variance conditioned upon demonstration of the unusual or exceptional circumstance combined with reasonable efforts by the facility to promote waste reduction and reuse. Thus, a modest amount of clean, unusable lumber, demolition lumber, and wooden furniture may also be burned, but if quantities of "wood waste" become excessive, the Department may deny a variance. Do not mix other materials such as plastic, shingles, tires, grass, leaves, garbage and other waste that may generate toxic emissions or excessive smoke; rather, limit the piles to clean-burning (non-treated) wood only.

The landfill owner/operator should coordinate with the local fire department to ensure protection should their services be needed. The burn variance application should have coordination approval of the local fire chief and the District Health Unit if the county is a member of a district.

- B. Concrete, bricks, mortar, plaster, asphalt roofing, tires, shingles, upholstered furniture, and other inert wastes which cannot be burned can be disposed in a disposal trench.
- C. Metal wastes such as automobiles, major appliances, demolition metals, etc., may be stockpiled in a separate area for eventual recycling. Major appliances and scrap metal are prohibited from disposal and must be stockpiled for recycling. Please note that any refrigerant must be appropriately removed and collected. Intentionally venting refrigerants (such as Freon®) to the open air is prohibited under [Section 608 of the Clean Air Act of 1990](#).
- D. Yard waste (grass and leaves). Yard waste collection or composting sites may be established at inert waste landfills. Do not mix grass and leaves with clean wood. See Section VIII for additional information.
- E. Scrap tires. Recycling markets are developing for scrap tires, but land filling is still an approved disposal practice. See Section IX for additional information.
- F. The facility shall not be used for the disposal of household garbage or putrescible waste; liquids of any type; asbestos; soluble wastes (fly ash, salt, etc.); animal carcasses; waste grain, seed and elevator screenings; treated grain; pesticide containers; lead-acid batteries; used oil; greases; oil filters; PCB waste/oils; hazardous wastes [i.e., ignitable (solvents, paints and fuels), corrosives (acids and alkalis), reactive, toxicity characteristic and listed wastes]; electronic waste (televisions, computers, monitors, printers, copiers, materials containing circuit boards, ballasts, capacitors, etc.); mercury-containing devices (fluorescent lighting, switches, thermometers, thermostats, etc.); hazardous materials; sludge; manure; septic tank pumping; special waste (oilfield and/or coal combustion waste); industrial waste; radioactive waste; or infectious wastes. Any such wastes arriving at the site for disposal must be sent back with the generator of the waste for proper disposal. If appreciable problems arise in such wastes arriving at the site, the site operator or responsible party should contact the Division of Waste Management, North Dakota Department of Health (telephone: 701.328.5166) for further guidance. Local law enforcement officials should also be contacted regarding such problems. It is sometimes beneficial to provide a separate roll-off container or dumpster for putrescible wastes (garbage) brought to the site so these wastes can be routinely transported to a permitted municipal waste landfill.

The site supervisor should ensure that citizens dispose various wastes in the appropriate areas. Signs erected within the site guiding the disposal of different wastes are beneficial. In addition, the sign at the gate should stipulate the proper disposal of the different waste types.

## **V. Site Operation and Maintenance**

A community or business establishing the disposal site should have adequate equipment available for excavating disposal trenches and for routine compaction and covering of disposed waste as needed. In addition, inert waste landfill operators should have access to a 2-inch or larger water pump. Any liquid in the disposal trench should be pumped out into a separate holding pond. The pumping will reduce the amount of water in contact with wastes in the trench. Under no circumstances may pit water be discharged into ditches, wetlands, or other drainage ways, or off landfill property.

The site supervisor must ensure that all persons involved in the disposal operation are knowledgeable of state waste management rules and regulations, the contents of this guideline, and any specific issues concerning facility compliance.

The disposal site should be open only during specific days and times of the week. During these times a site supervisor or operator must be present to supervise disposal and they should ensure that spilled debris is properly cleaned up. The site must be locked at all other times so as to prevent unauthorized access and unauthorized disposal. It is suggested that a notice in the local newspaper be published at regular intervals stating the times the landfill is open, specifying the types of waste accepted, and other appropriate rules for the site.

The working face or open area of a landfill must be limited in size to as small an area as practicable. Spread the waste in layers not to exceed two feet in thickness and compact the waste by running over the layers four to five times with heavy equipment to reduce the volume. Sequential partial closure must be implemented as necessary to keep the disposal area as small as practicable and to close filled areas in a timely manner. See an example of a [Landfill Development Sequence](#). "Closing as you fill" will invariably save money in the long run.

All loads brought to the site must be properly contained and covered so as to prevent any spillage or windblown debris leaving the transport vehicle. The cooperation of local law enforcement officials and the landfill supervisor in monitoring loads of waste hauled to the site is essential to prevent any littering, unauthorized disposal, or the disposal of wastes that are not allowed to be disposed at the site.

The community, township, or county in which the disposal site is located may choose to have appropriate ordinances and fines enacted for nonconforming disposal, unauthorized disposal, or littering at the site. Such information should be posted at the gate to the facility.

Inert waste disposal sites require regular care and maintenance. Wastes must be covered at minimum every six months, but more often if necessary. Proper precautions should be taken for final site drainage. Closed areas should be properly sloped so as to promote surface water drainage.

Vector control measures, in addition to the application of cover material, must be instituted whenever necessary to prevent the transmission of disease, prevent bird hazards to

aircraft, and otherwise prevent and reduce hazards created by rats, flies, snakes, insects, birds, cats, dogs, and skunks.

## **VI. Site Closure and Post closure Care**

Prior to the application of final cover, the site should be graded to minimize erosion and optimize drainage of precipitation falling on the landfill. The slopes may not be less than 3 percent, or more than 15 percent. The landfill must be closed with a final cover designed to minimize precipitation run-on from adjacent areas while providing a surface drainage system which does not adversely affect drainage from adjacent lands.

The owner/operators of inert waste landfills have two cover system options for final closure. The owner/operators may choose: a 2-foot thick (or thicker) cover consisting of at least 12 inches of compacted clay-rich soil, at least 6 inches of uncompacted clay-rich soil, and at least 6 inches of topsoil; or a 4-foot thick (or thicker) cover consisting of at least 3½ feet of uncompacted clay-rich soil and at least 6 inches of topsoil. See an example of [Suitable Cover Systems for Inert Waste Landfills](#).

After the site is covered and graded to promote runoff, it must be seeded with shallow rooted native grasses. Deep-rooted vegetation such as alfalfa and trees should not be planted on filled areas. Your local NRCS office can assist you in selecting an appropriate seed mix.

Closed solid waste management units may not be used for cultivated crops, heavy grazing, buildings, or any other use which might disturb the protective vegetative and soil cover.

Owners/operators of inert waste landfills must conduct post closure care for a period of five years after closure. Post closure care consists of performing at minimum, annual inspections to ensure the integrity and effectiveness of the final cover, and making repairs to the cover to correct effects of settlement, subsidence, and other events, and preventing run-on and runoff from eroding or otherwise damaging the final cover.

## **VII. Record of Notice**

At the start of landfill operation, the owner or operator shall record a notarized affidavit with the county recorder. The affidavit must specify that this facility, as noted in the legal description, is permitted to accept solid waste for disposal. This affidavit must specify that another affidavit must be recorded upon the facility's final closure. See an example of an [Affidavit of Solid Waste Disposal Facility](#).

Within sixty days of completion of final closure and prior to sale or lease of the property on which the facility is located, the owner shall comply with North Dakota Century Code section 23-29-13. The record or plat shall, in perpetuity, notify any person conducting a title search that the land has been used as a solid waste disposal facility. The record or plat must indicate the types and quantities of solid waste placed in the site and details on the site's construction, operation, or closure (including precautions against any building, earth moving, or tillage on the closed site) that are necessary to ensure the long-term maintenance and integrity of the closed facility. The Department must be provided a certified copy of any affidavit or plat within sixty days of recording. See an example of an [Affidavit and Notice of Disposal Facility](#).

## VIII. Yard Waste

Many communities provide collection or compost locations for grass clippings and leaves at their inert waste landfills. These communities have realized that disposal of yard waste in municipal waste a landfill is expensive and consumes valuable landfill space. The Department encourages the separation of yard waste from the municipal waste stream and the establishment of yard waste collection/compost sites if the yard waste is appropriately managed. Yard waste should not be buried at inert waste sites since landfill space-saving advantages would be defeated. Additionally, yard waste usually may not be effectively burned at the landfill because of moisture and aeration problems in yard waste piles. Burn variances prohibit the burning of materials which will smolder. Inert landfill operators are then left with at least two methods to properly manage yard waste: composting and land incorporation.

Composting yard waste is a controlled decomposition process requiring active management and resulting in a useful end product (compost). A proper composting operation requires development of a suitable area for composting and active management of the composting pile. The landfill operator should develop a composting area by:

- A. Selecting a nearly level, easily accessible area;
- B. Constructing a berm or ditch around the composting area to divert surface water run-on and control surface runoff from the composting pile;
- C. Constructing a composting “pad” in the shape of an inverted “V” where yard waste will be “windrowed” on one ramp for composting and then placed on the other ramp when turned. The ramps allow surface water to be drained from the composting pile. See an example of [Composting](#) and a [Compost Area Layout](#).
- D. If the composting area is also a yard waste collection point, provide guidance signs instructing residents to keep plastic bags out of the yard waste and provide trash receptacles for bag disposal.

Proper management of the yard waste involves these fundamental steps by the landfill operator:

- A. Maintain a nutrient balance in the composting pile by mixing nitrogen-rich (grass) and carbon-rich (leaves, straw) material. Leaves collected in the fall may be saved for incorporation with grass the following summer. If leaves are not available, straw may be mixed with grass during the summer months. Wood chips may also be used if leaves are not available.
- B. Maintain sufficient oxygen in the pile by turning the windrows on a regular basis (monthly during the growing season) and preventing accumulation of surface water near the piles (purpose of the ramps). The main complaint registered with composting piles arises from odors generated by oxygen-poor conditions in the pile. When turning the pile, the material should be lifted and allowed to “cascade” down, allowing the material to be properly aerated.
- C. Maintain moisture balance in the pile by adding water during dry periods of the year. If necessary, water should be added during the turning process. The material should be moist but it should not be possible to squeeze free water from a handful of yard waste.

- D. Maintain temperature of the pile by constructing windrows of sufficient size. Adequate heat is required in the pile for efficient yard waste decomposition. Piles 8 to 10 feet wide and 4 to 6 feet tall should be large enough to generate necessary heat. Piles should be peaked in the center to shed water.

Land incorporation is an alternative yard waste management method if a community determines composting is not feasible. Land incorporation of yard waste involves the cooperation of a local farmer and is simply the incorporation of yard waste into the soil surface of crop production fields.

The yard waste is usually collected at the landfill, cleaned of plastic bags, and loaded onto a truck for delivery to a field at the farmer's convenience. During the summer months, yard waste is usually incorporated into Agricultural Stabilization and Conservation Service (ASCS) "set aside" acreage. The yard waste eventually decomposes in the soil and provides the benefits of added nutrients and organic matter to the soil.

The Department's main concern with the land application method is the potential problem of litter if yard waste is not properly cleaned prior to land incorporation.

## **IX. Scrap Tires**

Scrap tires continue to be a problem waste for many landfills in North Dakota. Besides being a waste that is difficult to landfill, tire piles may pose a health threat by providing vector (mosquito, rat) breeding habitat. Tire piles may also pose an environmental hazard in the event they become ignited, releasing contaminants to the atmosphere, and possibly to surface and groundwater.

Scrap tire recycling is developing in North Dakota, but is not established throughout the state (contact the Department for information on scrap tire haulers and tire recyclers). Land-filling tires, therefore, remains a viable and approved method of scrap tire disposal.

The North Dakota Solid Waste Management Rules describe strict management requirements for tire piles exceeding 1,300 tires. Landfill operators are therefore advised to maintain their scrap tire piles at less than 1,300 tires to be exempt from these requirements. The Department roughly estimates that a tire pile of 400 square feet with an average height of 4 feet will contain 1,300 tires.

The Department recommends that landfill disposal of tires be coordinated with a time when a new trench is excavated. The basis for this recommendation lies with the fact that tires do not compact well and create a buoyant or "springy" surface when buried near the surface. The problem of buoyancy can be reduced if tires are shredded prior to burial. If tires are not shredded, they should be placed in layers at the bottom of a trench and covered with denser material such as concrete debris. Tires should be buried beneath the frost line (about 4 feet) to prevent them from being heaved to the surface. Land-filled tires should be completely covered with soil to eliminate a mosquito breeding habitat and the potential for fires.

## **X. Plan of Operation**

The owner/operator of a permitted inert waste landfill must prepare and implement a written plan of operation. The plan of operation is similar to an owner's manual for a vehicle or appliance; the plan should describe the facility's operation to facility personnel and the facility must be operated in accordance with the plan.



The Plan of Operation must include, at minimum:

- A. A waste acceptance plan detailing the categories of wastes acceptable for disposal and the types of wastes that will not be accepted at the site;
- B. A description of facility inspection activities as required for proper record keeping and reporting. The owner/operator should keep an inspection log that includes, at minimum, the date of the inspection, the name of the inspector, observations made, and the date and type of any repairs or corrective action taken, if necessary. Inspections should be conducted at least monthly. See a sample [Inert Waste Landfill Inspection Checklist](#).
- C. A contingency plan describing what actions will be taken for unusual events such as fire, excessive dust, excessive precipitation, or any other potential emergencies at the facility; and
- D. A discussion of how partial closure will occur at the landfill.

## **XI. Recordkeeping and Reporting**

The owner/operator of a permitted landfill must keep records of the types and weights or volumes of wastes accepted at the facility. Inert waste landfills generally receive only a limited number of waste types. Categories might include wood, metal, concrete, compost, tires, and others. See a sample [Inert Waste Landfill Monthly Landfill Waste Receipt Log](#). Do not submit this with the annual reports.

The owner/operators must also prepare and submit an annual report to the Department by March first of each year. See a sample [Inert Waste Landfill Annual Report](#). The report must cover facility activities during the previous calendar year. The report must include the following: (1) name and address of the facility; (2) calendar period covered by the report; (3) annual quantity for each category of solid waste in tons or volume; (4) identification of occurrences and condition that prevented the compliance with the permit and North Dakota Solid Waste Management Rules; and (5) other items identified in the facility plans and permit.

## **XII. Permit Application Procedures**

### **A. Site Selection**

The first step in the permit application process for a new inert waste landfill involves selecting a site that is suitable for a landfill and that is acceptable to local zoning entities. NDAC subsection 1 of section 33-20-04.1-01 states:

“No solid waste management facility may be located in areas which result in impacts to human health or environmental resources or in an area which is unsuitable because of reasons of topography, geology, hydrology, or soils.”

Before proceeding with extensive plans, it is suggested that an applicant provide the Department with a facility description describing the proposed landfill location and projected size of the operation, in addition to providing a statement of approval from the local zoning authority. The site assessment should describe the natural features of the proposed site. The applicant can use soil survey, topographic, and geologic maps to characterize the site and illustrate the relationship of the site location to surrounding



features such as wetlands, gravel pits, woody draws, etc., which may prevent the site from becoming permitted.

## B. Permit Application

Applications for permits or permit renewals for inert waste landfills must be submitted on Departmental forms and signed by the owner/operator.

Applications for new inert waste landfills must publish a public notice in the official county newspaper that an application has been submitted to the Department. Applications for new inert waste landfills completed after July 1, 1994, may be subject to approval by a county-wide vote if the Board of County Commissioners calls a special election.

The application for an inert waste landfill, in addition to the application form, must include the following supplementary information:

1. Description of types of waste accepted;
2. Description of soils and geology at the site;
3. Site development plans (layout);
4. Plan of operation;
5. Open burning and dust control methods;
6. Plans for separation of topsoil and subsoil;
7. Inspection and reporting methods;
8. Description of access control and facility signs; and
9. Written closure plan.

Routine permit renewals for inert waste landfills do not require publication of a public notice and only need address supplementary information requirements if the facility operation has significantly changed.



## GUIDELINE 17 - WASTES EXCLUDED FROM ACCEPTANCE AT LANDFILLS

North Dakota Department of Health - Division of Waste Management

918 E. Divide Ave., 3rd Fl., Bismarck, ND 58501-1947

Telephone: 701.328-5166 • Fax: 701.328.5200 • Website: [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm)

Updated 04-2009

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Article 33-20 of the North Dakota Administrative Code regulates the collection and transportation of waste and the operation and construction of Municipal Solid Waste (MSW) landfills, inert waste landfills, transfer stations, and industrial waste landfills. Some wastes are specifically excluded from acceptance at different types of landfills in quantities other than found in normal household wastes. Some wastes are often more appropriately handled by recycling and others may have to be treated in some manner (e.g., solidified). Many wastes are carefully monitored by the Department so as to prohibit unauthorized disposal of excessive quantities which may lead to environmental degradation. A landfill owner/operator has the right to refuse other wastes he may not wish to manage. **Generators, haulers, transfer stations, and landfill operators are required to inspect waste loads to ensure compliance.**

The wastes listed in these guidelines are not all inclusive and the Department may, on a case-by-case basis and upon written request, provide variances for acceptance of some wastes which are generally prohibited. Those wastes which are specifically prohibited by rule, Department policy, or Departmental practice from disposal into municipal waste and inert waste landfills and which should be controlled at transfer stations and by waste collectors are as follows:

- A. Prohibited or restricted in MSW and Inert Waste Landfills:
1. Hazardous waste (other than normal household quantities in MSW landfills) including:
    - a. Ignitables (e.g., solvents, fuels, paints, etc.).
    - b. Corrosives (e.g., acids and alkalis).
    - c. Reactives (e.g., hypochlorite - swimming pool chemicals, cyanides).
    - d. Toxicity characteristic wastes.
    - e. Other listed hazardous wastes.
  2. Industrial waste, which is nonhazardous waste generated by industrial or manufacturing processes. Municipal waste landfills may accept an amount of industrial waste of up to 10 percent of the weight of municipal waste received per month **if the industrial waste is identified in the industrial waste management procedures contained in the operating plan approved by the Department.**
  3. Lead-acid batteries (these must be recycled).
  4. Liquids (other than household quantities in MSW landfills).
  5. Scrap metal and major appliances (refrigerators, washers, etc.) which may be carefully stockpiled for recycling. (Refrigerators must have Freon removed prior to processing.)
  6. Municipal waste incinerator ash.
  7. Pesticide containers (including insecticides, herbicides, and fungicides) except that MSW landfills may accept containers normally in household waste and larger containers that are empty and have been triple rinsed or power rinsed and punctured.

8. Polychlorinated biphenyl (PCB) wastes and PCB oils, (typically in transformers and capacitors) which are regulated by the federal EPA Toxic Substances Control Act (TSCA) regulations.
  9. Raw or digested sewage sludges, lime sludges, grit chamber cleanings, animal manure (should be used as fertilizer), septic tank pumpings, bar screens, oil sludges and other sludges unless approved by the Department.
  10. Regulated infectious wastes except in amounts normally in household waste. Regulated infectious waste from hospitals, nursing homes, etc., must be incinerated or autoclaved and sharps rendered "nonsharp" if disposed at a MSW landfill. Departmental guidance is available for handling infectious wastes.
  11. Special wastes which are nonhazardous solid wastes generated by energy conversion facilities; crude oil and natural gas exploration and production; mineral and ore mining, beneficiation, and extraction; and surface coal mine operations.
  12. Used oil (this is generally a liquid and may also be hazardous) which should be recycled.
  13. Other waste, if the Department determines that such waste has toxic or adverse characteristics which can impact public health or environmental resources.
- B. Asbestos Waste: Asbestos waste disposal is generally carefully controlled in municipal, industrial, and special waste landfills and is regulated under the Air Pollution Rules (Article 33-15). Departmental guidance is available for disposal of asbestos into selected landfills that are operated in compliance with the North Dakota Solid Waste Management Rules.
- C. Additional Restrictions for Inert Waste Landfills: In addition to the wastes listed above, the following wastes shall not be disposed into inert waste landfills without Departmental authorization:
1. Putrescible wastes (household garbage and food wastes);
  2. Animal carcasses; and
  3. Waste grain, seed, or elevator screens.

Disposal of wastes into inert waste landfills is restricted to wood, concrete, metal, bricks, and other wastes that do not readily degrade and do not generally pose an environmental hazard (see the Department's "Guideline 16 - Operation of Inert Waste Landfills"). Disposal of oil filters, spray cans, paint cans, caulk tubes, liquids, PCB wastes, municipal solid waste, and other similar wastes, which may pose a hazard to ground water, surface water, or air quality are not allowed.

It is beneficial to keep the public informed as to the types of wastes allowed to be disposed in specific landfills. Waste collectors can help by communicating with generators, tagging unacceptable waste materials to inform generators why they were not accepted, etc. A copy of this document should be reviewed by haulers and should be available in haulers' trucks for reference. It is suggested this information be posted in public places within a community, at the entrance to landfill facilities, and periodically published in the local newspaper. The Department has further information on signs required for landfill and transfer stations. Visit our website at [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm) for information and solid waste guidelines.



## **GUIDELINE 27 - IMPLEMENTING A RECYCLING PROGRAM**

North Dakota Department of Health - Division of Waste Management

918 E. Divide Ave., 3rd Fl., Bismarck, ND 58501-1947

Telephone: 701.328.5166 • Fax: 701.328.5200 • Website: [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm)

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Recycling is a fundamental part of any communities integrated waste management scheme. While recycling is not a complete answer to solving a municipal waste problem, a well-developed waste reduction and recycling program with a well operating inert waste landfill can save many North Dakota communities 25-50 percent of the increased costs of waste disposal. Many different recycling options are available, but to succeed some strategic planning is essential.

### **1. Establishing a Municipal Waste Task Force and Developing Local Expertise**

Local citizens and decision makers are often unfamiliar with the details of integrated waste management, including waste reduction and recycling. In order to build local expertise and to form a consensus on what needs to be done to better manage municipal solid wastes, many communities are organizing local task forces to study and make decisions regarding municipal solid wastes. Included on such a task force would be local officials, community groups, citizens, employees, collection and disposal system representatives, businesses interested in recycling and resource recovery, environmental groups, and any other parties interested in the solid waste management system. The task force should gain a background in solid waste issues and study the local political, institution, and economic realities for their community, county, and regional political jurisdictions.

The task force can identify waste management issues including the current and future waste streams, waste management practices, disposal needs, and determine goals and objectives. A study of various waste management alternatives and integration of alternatives, along with fostering public education and involvement, is necessary. A basic understanding of project financing is necessary before the development, implementation, and monitoring of an integrated waste management program. Once programs are put into practice, the task force can be invaluable in evaluating the new system and make recommendations on any further changes or additions. Involvement of a local solid waste task force is essential in ensuring local agreement in solid waste management alternatives and to build a common understanding and consensus on local options. Further information is available in the EPA publication "Decision Makers Guide to Solid Waste Management."

### **2. Understand and Identify Markets**

Finding an outlet or market for the recyclable materials is one of the first and most important tasks in starting a recycling program. Markets must be secured before collection of recyclables should begin. Programs should decide if they want to end market their collected materials or work with an existing recycling center within their region or the state.

To directly sell end market materials, a program should be fairly large. The program would need to identify the markets (often out-of-state), secure marketing agreements, have processing facilities (such as crushers, magnetic separators, sort lines, balers, etc.), have adequate storage to hold truckload or railcar load quantities of materials, have transportation arrangements worked out, and have adequate staffing. Because of the difficulties associated with direct marketing, most community programs may find it easier to market their materials with an existing regional recycling center. A listing of existing recycling operations in the state is available from the Department upon request.

Whichever way your program decides to market it is important to discuss with your processor or end market what materials will be accepted, and how materials are to be prepared or separated at your collection program to make them most marketable. It's important to decide where your recyclable materials will go and how they should be separated, processed, and transported prior to starting your collection program or you may simply end up with a large supply of segregated trash which may have to be disposed in a landfill.

### **3. Evaluate Recycling Program Management**

Recycling program management can be accomplished by a variety of entities including municipal government operation, private for profit entities or civic or local non profit organizations. In many instances, some sort of marriage between several entities works well. There is no magic method for developing a recycling program in any community. A variety of programs have proven successful. A local recycling program must be crafted to the needs of the community. One thing most successful programs have in common is a dynamic individual or group who can act as the force to foster the cooperation and coordination of the various entities which can be involved.

### **4. Evaluate Recycling Program Options**

Just as there is no magic method to manage a recycling program there is likewise no magic method that works best in all communities. A number of types of collection methods can be employed such as curbside collection, remote drop-off centers, or staffed multi-material collection centers. Several things should be kept in mind while evaluating options:

- Start small and build expertise and community support. Initially mistakes are bound to be made. Start recycling those materials which are most marketable and coincidentally make up a large part of the waste stream. Yard waste compost is easily marketed to area farmers, gardeners, or parks. There are currently good markets for most paper products and aluminum cans. As your program develops additional commodities can be added. Be sure to have storage space and a market for everything you collect.
- To encourage participation, make your program as convenient as possible. For example, drop-off locations should be at easily accessible, convenient locations.

Studies have shown that curbside collection of recyclables on the same day as regular garbage collection provides for higher participation but is more expensive.

- The storage and collection system should keep recyclables separated and contamination-free to the best extent possible.

For most smaller communities, a drop-off center, conveniently located and open one or two days a week and staffed by a volunteer group, will be most cost-effective and manageable. Also, smaller communities will find it beneficial to work together to get their recyclables centrally located. This can make transportation to or pickup from a regional processing center much more economical.

## **5. Foster Public Education and Participation**

Communication with the public and promotion of the program should be ongoing. Education and promotion programs should be planned with the community's needs in mind. Building successful participation requires explanation to the public of where, when, who, and how the program was decided upon. The public has a right and responsibility to understand the full costs and liabilities associated with the waste they generate.

Several steps should be taken in developing an education program. First, understand the different audiences you are trying to reach. What types of educational materials will get the most exposure and be most effective? Second, prepare a plan. The plan should include manageable goals. It should discuss main issues to be addressed, goals, activities or events to accomplish each goal, resources available (funding, volunteers, community support) for activities or events and a time line to coordinate the efforts with other programs, seasonal activities or events. Your plan should focus on delivering the educational message, encouraging program participation, and funding the activities for the program. A wide variety of educational materials are available from the Department upon request.

Keep in mind that each community's needs are different and what may be successful in one case may not be what is needed in another. It's critical to involve your citizens and businesses in your program development. Ongoing evaluation of the system is important to adapt to new situations, evaluate new markets, and maximize efficiency of the system.

The Division of Waste Management's *Solid Waste Program*, of the North Dakota Department of Health has a wide range of information and expertise to help your community. The ND Solid Waste Recycling Association (NDSWRA) and local solid waste districts also play a key role in implementing changes in the system. Visit the NDSWRA website at <http://www.ndswra.org>



## **GUIDELINE 34 - COMPOST FACILITY GUIDELINES**

North Dakota Department of Health - Division of Waste Management

918 E. Divide Ave., 3rd Fl., Bismarck, ND 58501-1947

Telephone: 701.328.5166 • Fax: 701.328.5200 • Website: [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm)

Revised 3-2010

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### **I. Introduction**

This guideline is intended to help applicants considering a waste composting facility in North Dakota. The North Dakota Department of Health (NDDH) has other additional information for yard waste composting facilities serving communities of less than 10,000 people who qualify for a permit by rule and for applicants considering the composting of dead animals.

The North Dakota Department of Health generally regulates composting of solid waste, as specified in North Dakota Century Code (NDCC) Chapter 23-29 and North Dakota Administrative Code (NDAC) Article 33-20. Under the definitions included in Section 33-20-01.1-03 NDAC, composting is defined as “the controlled biological decomposition of organic solid wastes under aerobic conditions.” Additional information on the regulation of solid waste, including composting activities, as well as water protection under the North Dakota Solid Waste Management Rules, includes the following:

- ▶ Chapter 33-20-02.1 Permit Provisions and Procedures;
- ▶ Chapter 33-20-03.1 Permit Application Provisions;
- ▶ Chapter 33-20-04.1 General Performance Standards; and
- ▶ Chapter 33-20-13 Water Protection Provisions.

To meet the requirements for the NDDH’s compost standards, a compost pile must be carefully managed to maintain proper nutrient balance, oxygen content, temperature, and moisture. Since some concern may arise due to leachate (water contaminated by waste products) migration as well as by odors and vectors, the Department generally requires that someone proposing a waste management facility, other than those qualifying for a permit by rule, submit a preapplication to determine the general suitability of the site for the proposed facility.

### **II. Section 33-20-03.1-01: Preapplication Procedures**

A preapplication, submitted to the Department for review before the onset of any extensive facility design, normally consists of a preliminary facility description and a site assessment as follows:

1. The preliminary facility description must include, at a minimum, the location of the facility, a projection of capacity, size, daily waste receipts, type of waste accepted, years of operation, description of operation and costs, and a discussion of the proposed facility’s compliance with local zoning requirements; and
2. The preliminary site assessment must include available information about the site’s geology, hydrogeology, topography, soils, and hydrology, based on existing information.

The information provided in the preapplication should evaluate the appropriateness of the site, in view of the general location standards detailed in Section 33-20-04.1-01 of the Solid Waste Management Rules. In addition, the preapplication submitted to the Department should be aware of the requirements of Chapter 33-20-13 "Water Protection Provisions," however, exact details on the measures necessary for water protection would be discussed as part of the facility's preapplication review. The preapplication procedure allows the Department to interact with the proposed facility's owner/operator to provide guidance on site selection, facility construction, operation, etc., before extensive amounts of time and money are expended in the facility's planning.

### **III. Section 33-20-04.1-01: General Location Standards**

Discuss site selection for solid waste facilities. Site selection for a composting facility should be carefully considered to prevent or reduce potential contamination of surface water or groundwater resources. Leachate (contaminated water) generated from the waste decomposition process may be impacted by excessive amounts of nitrogen, phosphorous, microorganisms, volatile organic compounds, or metals. Leachate may contaminate surface or groundwater resources. Site selection should involve an assessment of the proposed site's soil types, depth to groundwater, and distance to surface water. Compost facility site selection usually dictates the facility design necessary to protect surface water and groundwater from potential contamination. The Department may restrict establishment of composting facilities at some sites, based on potential impact of water resources. Approval of the site will help ensure that the composting facility operation maintains compliance with water protection provisions. Overall, the Department recommends the following criteria for siting a composting facility:

1. Avoid sites underlain by sandy or gravelly (coarse textured) soils. These soils possess relatively large pore spaces that allow rapid water infiltration and movement. In the event that contaminated leachate is released during the composting operation, coarse textured soils may not prevent transport of contaminants to groundwater resources. In many locations of the state, coarse textured soils are underlain by a water table or near-surface groundwater aquifer. These aquifers are particularly vulnerable to contamination from surface or near-surface activities because the aquifer is "exposed" to the surface via coarse textured soils.
2. Avoid sites within a 100-year floodplain, within 200 feet of any surface water or wetland, or sites that are near or in ravines, channels, or woody draws.

Once a preapplication has been approved, the proposed facility's owner/operator may submit the additional details necessary to address any concerns arising due to the State Solid Waste Management Rules and the concerns expressed in the preapplication review.

In addition to the general location standards detailed above, Chapter 33-20-04.1 includes the general performance standards for solid waste management facilities. These additional sections in this chapter that are pertinent to composting activities include:

- ▶ Section 33-20-04.1-02 General Facility Standards;
- ▶ Section 33-20-04.1-03 Plan of Operation;
- ▶ Section 33-20-04.1-04 Recordkeeping and Reporting;
- ▶ Section 33-20-04.1-05 General Closure Standards; and
- ▶ Section 33-20-04.1-07 Piles Used for Storage and Treatment - Standards.



These sections should be reviewed in detail by any proposer wishing to develop a waste composting facility. Some requirements may need more explanation than others. Some of the specific requirements may be applicable to other types of facilities such as a landfill (not applicable or NA) or may be simply answered in a one or two sentence statements. Some requirements will need careful explanation. To help the proposer for a facility, the following discussion is intended to help guide them through the various sections and requirements. Any proposer is also advised to work closely with the North Dakota Department of Agriculture, the National Resources Conservation Service (formerly the Soil Conservation Service) who has publications pertinent to waste composting and other technical resources.

#### **IV. Section 33-20-04.1-07: Piles Used for Storage and Treatment**

Detail some specific design and operating standards for compost systems. Design of the composting facility will depend on the facility's size and method of operation. Issues to be considered include:

1. Vector control.
2. Comply with the general facility standards of Section 33-20-04.1-02 (partially discussed below).
3. Maintain the site including the removal of all solid waste, as necessary, and at closure to a permitted facility, or otherwise manage the waste that is in keeping with the purpose of this article. This part of the application should detail what will be done with the end product (compost) and what will be done in the event of system disruption and at closure.
4. Requirements for waste piles likely to produce a leachate include:
  - a. Depending on the site and the facility design and operation, the base of the compost operating area must be adequately lined with concrete, asphalt, specification-compacted clay, or an artificial liner to control or restrict downward migration of leachate. A liner thickness may be reduced if moisture can be carefully controlled and at sites that are underlain by thick deposits of clay-rich soil and a relatively deep water table. The liner or pad must be durable and large enough to allow the equipment to maneuver.
  - b. Waste piles likely to produce a leachate must establish structures adequate to control run-on and runoff from a 24-hour, 25-year storm to prevent potential surface water or groundwater contamination. Permanently constructed and well maintained earthen berms of adequate design should be sufficient to control surface water run-on and runoff. The Department also recommends that the composting facility describe methods to manage contaminated runoff ponded within berms.

Based on site and waste characteristics, the Department may require other environmental measures as listed.

## **V. Section 33-20-04.1-02: General Facility Standards**

Requires a facility owner/operator to provide for the training of facility personnel in procedures necessary for the specific facility and to provide for routine inspections of the facility.

In addition, the standards stipulate that all facilities shall comply with the water protection provisions, not cause a discharge of pollutants into the waters of the state, and not cause a violation of the ambient air quality standards or odor rules, Article 33-15, at the facility boundary.

A description of the equipment necessary for composting operations to meet the environmental standards described in subsections 2 through 5 may vary with the method used. For any system other than an in-vessel system, a loader, compost turner or similar equipment will be necessary to create and turn the pile and to remove finished compost. Systems using active ventilation or piping in the pile will need piping and probably a blower. To monitor temperature, a compost thermometer with a long probe is necessary. Systems may need a meter to monitor pH levels. If large particles are a problem, compost grinding or classification may be necessary. Spreading equipment may also be necessary.

Some specific requirements such as for a sign at the facility can be adapted, as necessary, for a composting facility. A facility not taking a wide variety of wastes, and not open for public use, would only need to indicate the name of the facility, the name and telephone number of the owner and operator, and have a statement restricting trespassing.

The general facility standards provide general requirements for routine inspection (subsection 8) and (subsection 9) control of spillage and windblown waste materials, rubbish, trash or garbage. If waste is spilled or scattered, cleanup must be undertaken promptly.

## **VI. 33-20-04.1-03: Plan of Operation**

All facilities shall have a plan of operation specific to their facility as follows:

1. The owner or operator must prepare and implement a plan of operation approved by the Department that describes the facility's operation to operating personnel, and the facility must be operated in accordance with the plan. The operation plan should address the rule requirements and the items generally discussed in this guide for the operation of a nuisance-free composting facility. It is advised that the operation of a composting facility will need to be monitored and records kept (see subsection 2 of Section 33-20-04.1-04) on a daily or weekly basis to ensure the following:
  - a. A description of waste acceptance procedures, including categories of solid waste to be accepted and waste rejection procedures.
  - b. A description of waste handling procedures such as:
  - c. The facility must be inspected as required by subsection 2 of Section 33-20-04.1-03. It is advised that the facility be inspected daily when it is in active use.
  - d. Contingencies must be addressed in the event of a fire, leaks, groundwater

contamination, other releases (odors, dust, vectors, surface water releases, etc.) or other issues pertinent to the facility. The contingency action procedures should provide details (names, addresses, phone numbers) as to who will respond and what timely measures will be undertaken to address noncompliant conditions. For example, if vectors are noted on a daily inspection, the contingency action identified in the plan might be to call an exterminator that day and have him eradicate the vector problem. During successive days, remedial measures such as turning the compost and installing a screen over and around the pile could be completed. The problem and corrective measures will need to be described in the daily log will be described in the annual report to the Department.

- e. Leachate removal and management must be addressed. If the system is covered with a roof and no run-on or runoff is feasible, no leachate should migrate from the pile. If a system is to be open to the air, liners, berms, lined ponds, leachate testing, and leachate transport to a disposal facility (such as a nearby Publicly Owned Treatment Works (POTW) should be addressed.
- f. Safety procedures and health considerations should be addressed. Composting may promote the growth of pathogens or produce volatiles which can potentially affect the health of compost workers.

The following personal protective measures are appropriate:

- (1) Workers should be aware that disease-producing microorganisms or potentially toxic chemicals may be in the work environment. Protective clothing or coveralls should be worn, and employees should wash up before breaks and lunch and at the end of the work period. Contaminated clothing should not be worn home by employees;
  - (2) Workers must maintain high standards of hygiene such as washing hands before meals, breaks, and before going home;
  - (3) During dry weather the composting area should be sprinkled with water to prevent dust;
  - (4) To reduce inhalation problems, workers should wear adequate respirators;
  - (5) Safety shoes and glasses should be worn where necessary; and
  - (6) The compost facility should not be located near any residences, businesses, or public facilities.
- g. Sequential partial closure for landfills - Not Applicable (NA) for compost facilities.
  - h. Industrial waste procedures for on-site compost facilities should provide assurances that people handling, transporting, and managing the waste will be trained to ensure that unallowed waste will not be managed by the compost facility. A list of unallowed waste might be helpful for training and operation.

2. The owner or operator shall inspect the facility to ensure compliance with the rules and shall keep an inspection log including information such as the date of inspection, the name of the inspector, a notation of observations made, and the date and nature of any repairs or corrective action taken.

#### **VII. Section 33-20-04.1-04: Recordkeeping and Reporting**

This section states:

1. The facility may not receive waste until the construction has been approved;
2. The owner or operator must keep appropriate records at or near the facility that are available for inspection; and
3. The owner or operator must submit an annual report by March 1 of each year.

#### **VIII. Section 33-20-04.1-05: General Closure Standards**

A compost facility that is well operated will only need to complete the compost operation. The owner/operator should detail what will be done in the eventuality that the facility goes out of business or the process is disrupted. In such a case, the owner/operator should describe how he will remove the waste, transport it, and what facility will handle the waste (such as a local municipal solid waste landfill). As part of the contingency plan, the owner/operator must state what arrangements are made for this eventuality (what landfill, equipment, etc.). A written closure plan and closure documentation is required (see rules).

#### **IX. Chapter 33-20-13: Water Protection Provisions**

This Chapter describes the site characterization procedures and, if necessary, the groundwater monitoring provisions. Well sited, designed and operated facilities probably do not need groundwater monitoring. A site with coarse, sandy soils and a high water table might need monitoring. The water quality standards referenced in this Chapter refer to NDCC Chapter 61-28. State law does not allow pollution of waters of the state.

Available from the Department's website is the North Dakota Solid Waste Management Rules, Chapter 33-20-04.1, General Performance Standards.

**APPENDIX B: NORTH DAKOTA POLLUTION DISCHARGE ELIMINATION  
SYSTEM PERMIT**



December 27, 2017

Valley City Landfill  
Jeff Differding  
136 4th Ave SE  
Valley City, ND 58072

**Issuance of an NDPDES Permit**

**NDPDES Permit No: ND0026140 Name: Valley City Landfill**

Enclosed is your North Dakota Pollutant Discharge Elimination System (NDPDES) wastewater discharge permit which has been issued to your facility. This letter serves as notice that your facility is covered by and is authorized to discharge wastewater under the conditions as described in the above-referenced permit.

Should you have any questions, please contact Sarah Starr at 701.328.5215 or the Division of Water Quality-NDPDES Permits Program at 701.328.5210. Note that enclosures are not being sent to carbon copy recipients.

Sincerely,

Marty Haroldson  
NDPDES Program Manager  
Division of Water Quality

Enc.

CC: Kerwin Kostad, City Auditor





**NDPDES Permits Program-Division of Water Quality**

**Receipt of an NDPDES Permit**

**NDPDES Permit No: ND0026140 Name: Valley City Landfill**

Your North Dakota Pollutant Discharge Elimination System (NDPDES) wastewater discharge permit will be in effect on January 01 2018. Please complete this form, make a copy for your records, and return it to us at the address below by January 26 2018

**Receipt of an NDPDES Permit**

Valley City Landfill has received a copy of its NDPDES Permit ND0026140. We are aware that the permit is effective on January 01 2018 and expires on December 31 2022.

Date Received: \_\_\_\_\_

Received By: \_\_\_\_\_

Title: \_\_\_\_\_

Telephone: \_\_\_\_\_

Comments:

Please return the completed form to:

North Dakota Dept of Health  
Div of Water Quality Permits Program  
918 East Divide Ave  
Bismarck ND 58501-1947

<b>For Office Use Only</b>
Route to: Sarah Starr

Permit No: ND0026140  
Effective Date: January 1, 2018  
Expiration Date: December 31, 2022

AUTHORIZATION TO DISCHARGE UNDER THE  
NORTH DAKOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with Chapter 33-16-01 of the North Dakota Department of Health rules as promulgated under Chapter 61-28 (North Dakota Water Pollution Control Act) of the North Dakota Century Code,

the City of Valley City Public Works

is authorized to discharge from the sump at their inert landfill

to an unnamed tributary of the Sheyenne River

provided all the conditions of this permit are met.

This permit and the authorization to discharge shall expire at midnight,

December 31, 2022.

Signed this 20 day of December, 2017.



Karl H. Rockeman, P.E.  
Director  
Division of Water Quality

Permit No: ND0026140  
Effective Date: January 1, 2018  
Expiration Date: December 31, 2022

AUTHORIZATION TO DISCHARGE UNDER THE  
NORTH DAKOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM

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provided all the conditions of this permit are met.

This permit and the authorization to discharge shall expire at midnight,  
December 31, 2022.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Karl H. Rockeman, P.E.  
Director  
Division of Water Quality

BP 2014.06.12

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## DEFINITIONS Standard Permit BP 2013.12.31

1. “**Act**” means the Clean Water Act.
2. “**Average monthly discharge limitation**” means the highest allowable average of “daily discharges” over a calendar month, calculated as the sum of all “daily discharges” measured during a calendar month divided by the number of “daily discharges” measured during that month.
3. “**Average weekly discharge limitation**” means the highest allowable average of “daily discharges” over a calendar week, calculated as the sum of all “daily discharges” measured during a calendar week divided by the number of “daily discharges” measured during that week.
4. “**Best management practices**” (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage areas.
5. “**Bypass**” means the intentional diversion of waste streams from any portion of a treatment facility.
6. “**Composite**” sample means a combination of at least 4 discrete sample aliquots, collected over periodic intervals from the same location, during the operating hours of a facility not to exceed a 24 hour period. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of Standard Methods for the Examination of Water and Wastewater.
7. “**Daily discharge**” means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the “daily discharge” is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the “daily discharge” is calculated as the average measurement of the pollutant over the day.
8. “**Department**” means the North Dakota Department of Health, Division of Water Quality.
9. “**DMR**” means discharge monitoring report.
10. “**EPA**” means the United States Environmental Protection Agency.
11. “**Geometric mean**” means the  $n^{\text{th}}$  root of a product of  $n$  factors, or the antilogarithm of the arithmetic mean of the logarithms of the individual sample values.
12. “**Grab**” for monitoring requirements, means a single "dip and take" sample collected at a representative point in the discharge stream.
13. “**Instantaneous**” for monitoring requirements, means a single reading, observation, or measurement. If more than one sample is taken during any calendar day, each result obtained shall be considered.
14. “**Maximum daily discharge limitation**” means the highest allowable “daily discharge.”
15. “**Salmonid**” means of, belonging to, or characteristic of the family Salmonidae, which includes the salmon, trout, and whitefish.

16. "**Sanitary Sewer Overflows (SSO)**" means untreated or partially treated sewage overflows from a sanitary sewer collection system.
17. "**Severe property damage**" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
18. "**Total drain**" means the total volume of effluent discharged.
19. "**Upset**" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.



**FACILITY DESCRIPTION**

The inert landfill is located southwest of Valley City in Barnes County approximately one-half mile south and one-quarter mile west of Interstate 94, exit 290. The land description is the NE1/4, Section 31, Township 140N, Range 58W. The total area of the landfill is seventy-eight acres. Thirty-six of those acres are open.

**OUTFALL DESCRIPTION**

**Outfall 001** – Active. Final Outfall. Sump. The location of this outfall is Latitude 46.90255, Longitude -98.04607. Any discharge from the facility would be to an unnamed, unclassified tributary of the Sheyenne River. Tributaries not specifically mentioned or classified in the North Dakota State Water Quality Standards (NDAC Chapter 33-16-02.1) are considered Class III streams.

**PERMIT SUBMITTALS SUMMARY**

Coverage Point	Submittal	Monitoring Period	Submittal Frequency	First Submittal Date
001A	Discharge Monitoring Report (DMR)	Semiannually	Semiannually	July 31, 2018
Application Renewal	NPDES Application Renewal	None	1/permit cycle	June 30, 2022

**SPECIAL CONDITIONS**

No special conditions have been determined at this time.

**I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

**A. Discharge Authorization**

During the effective period of this permit, the permittee is authorized to discharge pollutants from the outfall as specified to the following: **Unnamed Tributary of the Sheyenne River.**

This permit authorizes the discharge of only those pollutants resulting from facility processes, waste streams, and operations that have been clearly identified in the permit application process.

**B. Effluent Limitations and Monitoring**

The permittee must limit and monitor all discharges as specified below:

Table 1: Effluent Limitations and Monitoring Requirements 001			
Parameter	Effluent Limitations	Monitoring Requirements	
	Daily Max.	Sample Frequency	Sample Type
Five-Day Biochemical Oxygen Demand (BOD <sub>5</sub> ) – mg/l	25	Weekly	Grab
Total Suspended Solids (TSS) – mg/l	100	Weekly	Grab
Oil & Grease – Visual <sup>a</sup>	N/A	Daily	Visual
Oil & Grease – mg/l <sup>a</sup>	10	Weekly	Conditional/ Grab
pH – S.U.	within the range 6.0 to 9.0	Weekly	Grab
Phosphorus, Total – mg/l	*	Quarterly	Grab
Total Kjeldahl Nitrogen – mg/l	*	Quarterly	Grab
Ammonia as Nitrogen – mg/l	*	Quarterly	Grab
Hardness, Total – mg/l <sup>b</sup>	*	Annual	Grab
Lead – µg/l <sup>b</sup>	*	Annual	Grab
Iron – µg/l <sup>b</sup>	*	Annual	Grab
Magnesium – µg/l <sup>b</sup>	*	Annual	Grab
Arsenic – µg/l <sup>b</sup>	*	Annual	Grab
Silver – µg/l <sup>b</sup>	*	Annual	Grab
Chromium – µg/l <sup>b</sup>	*	Annual	Grab
Cyanide – µg/l <sup>b</sup>	*	Annual	Grab
Mercury – µg/l <sup>b</sup>	*	Annual	Grab
Selenium – µg/l <sup>b</sup>	*	Annual	Grab
Cadmium – µg/l <sup>b</sup>	*	Annual	Grab
Flow Effluent – gpd	*	Daily	Instantaneous
Drain Total – Mgal	*	Quarterly	Calculated
Notes:			
*. This parameter is not limited. However, the department may impose limitations based on sample history and to protect the receiving waters.			

Table 1: Effluent Limitations and Monitoring Requirements <b>001</b>			
Parameter	Effluent Limitations	Monitoring Requirements	
	Daily Max.	Sample Frequency	Sample Type
a.	There shall be no floating oil or visible sheen present in the discharge. If floating oil or a visible sheen is detected in the discharge, the department shall be contacted and a grab sample analyzed to ensure compliance with the concentration limitation. Any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.		
b.	An analysis for this parameter shall occur during the first discharge of each year. If a discharge does not occur during the year, an analysis is not required.		
N/A Not Applicable			
Stipulations:			
The discharge shall not include wastewater from other processing sources or sanitary facilities.			
There shall be no direct discharge of solid and/or sludges generated by the treatment facility.			
The permittee shall take the necessary preventative measures to ensure that the discharge does not cause erosion in the area of operation or the bank of the receiving waters and prevent any nuisance conditions from occurring in the receiving waters.			
The discharge shall not contain any floating solids, visible foam in other than trace amounts, or oily wastes that produce sheen on the surface of the receiving water.			
Samples taken in compliance with the monitoring requirements specified in this permit shall be taken prior leaving outfall 001 and prior to entering the receiving stream.			
The dates of discharge, frequency of analysis, and number of exceedences shall be included on the DMR.			

## II. MONITORING, RECORDING, AND REPORTING REQUIREMENTS BP 2017.08.21

### A. Representative Sampling (Routine and Non-Routine Discharges)

All samples and measurements taken shall be representative of the monitored discharge.

In order to ensure that the effluent limits set forth in this permit are not violated at times other than when routine samples are taken, the permittee must collect additional samples at the appropriate outfall whenever any discharge occurs that may reasonably be expected to cause or contribute to a violation that is unlikely to be detected by a routine sample. The permittee must analyze the additional samples for those parameters limited under **Part I Effluent Limitations and Monitoring** requirements of this permit that are likely to be affected by the discharge.

The permittee must collect such additional samples as soon as the spill, discharge, or bypassed effluent reaches the outfall. The samples must be analyzed in accordance with **B. Test Procedures**. The permittee must report all additional monitoring in accordance with **D. Additional Monitoring**.

### B. Test Procedures

The collection and transportation of all samples shall conform with EPA preservation techniques and holding times found in 40 CFR 136. All laboratory tests shall be performed by a North Dakota certified laboratory in conformance with test procedures pursuant to 40 CFR 136, unless other test procedures have been specified in this permit or approved by EPA as an alternate test procedure under 40 CFR 136.5. The method of determining the total amount of water discharged shall provide results within 10 percent of the actual amount.

### C. Recording of Results

Records of monitoring information shall include:

1. the date, exact place and time of sampling or measurements;
2. the name(s) of the individual(s) who performed the sampling or measurements;
3. the name of the laboratory;
4. the date(s) and time(s) analyses were performed;
5. the name(s) of the individual(s) who performed the analyses;
6. the analytical techniques or methods used; and
7. the results of such analyses.

### D. Additional Monitoring

If the discharge is monitored more frequently than this permit requires, all additional results, if in compliance with **B. Test Procedures**, shall be included in the summary on the Discharge Monitoring Report.

## **E. Reporting of Monitoring Results**

1. Monitoring results shall be summarized and reported to the department using Discharge Monitoring Reports (DMRs). If no discharge occurs during a reporting period, "No Discharge" shall be reported. The permittee must submit DMRs electronically using the electronic information reporting system unless requirements in subsection 3 are met.
2. Prior to December 21, 2020, the permittee may elect to electronically submit the following compliance monitoring data and reports instead of mailing paper forms. Beginning December 21, 2020, the permittee must report the following using the electronic reporting system:
  - a. General permit reports [e.g., notices of intent (NOI); notices of termination (NOT); no exposure certifications (NOE)];
  - b. Municipal separate storm sewer system program reports;
  - c. Pretreatment program reports;
  - d. Sewer overflow/bypass event reports; and
  - e. Clean Water Act 316(b) annual reports
3. The permittee may seek a waiver from electronic reporting. To obtain a waiver, the permittee must complete and submit an Application for Temporary Electronic Reporting Waiver form (SFN 60992) to the department. The department will have 120 days to approve or deny the waiver request. Once the waiver is approved, the permittee may submit paper versions of monitoring data and reports to the department.
  - a. One of the following criteria must be met in order to obtain a waiver. The department reserves the right to deny any waiver request, even if they meet one of the criteria below.
    1. No internet access,
    2. No computer access,
    3. Annual DMRs (upon approval of the department),
    4. Employee turnover (3 month periods only), or
    5. Short duration permits (upon approval of the department)

All reports must be postmarked by the last day of the month following the end of each reporting period. All original documents and reports required herein shall be signed and submitted to the department at the following address:

ND Department of Health  
Division of Water Quality  
918 East Divide Ave  
Bismarck ND 58501-1947

## **F. Records Retention**

All records and information (including calibration and maintenance) required by this permit shall be kept for at least three years or longer if requested by the department or EPA.

### III. COMPLIANCE RESPONSIBILITIES

#### A. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

#### B. Proper Operation and Maintenance

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. If necessary to achieve compliance with the conditions of this permit, this shall include the operation and maintenance of backup or auxiliary systems.

#### C. Planned Changes

The department shall be given advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance. Any anticipated facility expansions, production increase, or process modifications which might result in new, different, or increased discharges of pollutants shall be reported to the department as soon as possible. Changes which may result in a facility being designated a "new source" as determined in 40 CFR 122.29(b) shall also be reported.

#### D. Duty to Provide Information

The permittee shall furnish to the department, within a reasonable time, any information which the department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the department, upon request, copies of records required to be kept by this permit. When a permittee becomes aware that it failed to submit any relevant facts or submitted incorrect information in a permit application or any report, it shall promptly submit such facts or information.

#### E. Signatory Requirements

All applications, reports, or information submitted to the department shall be signed and certified.

All permit applications shall be signed by a responsible corporate officer, a general partner, or a principal executive officer or ranking elected official.

All reports required by the permit and other information requested by the department shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

The authorization is made in writing by a person described above and submitted to the department;  
and

The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

If an authorization under E. Signatory Requirements is no longer accurate for any reason, a new authorization satisfying the above requirements must be submitted to the department prior to or together with any reports, information, or applications to be signed by an authorized representative.

Any person signing a document under this section shall make the following certification:



"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

**F. Twenty-four Hour Notice of Noncompliance Reporting**

1. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The following occurrences of noncompliance shall be included in the oral report to the department at 701.328.5210:
  - a. Any lagoon cell overflow or any unanticipated bypass which exceeds any effluent limitation in the permit under G. Bypass of Treatment Facilities;
  - b. Any upset which exceeds any effluent limitation in the permit under H. Upset Conditions; or
  - c. Violation of any daily maximum effluent or instantaneous discharge limitation for any of the pollutants listed in the permit.
2. A written submission shall also be provided within five days of the time that the permittee became aware of the circumstances. The written submission shall contain:
  - a. A description of the noncompliance and its cause;
  - b. The period of noncompliance, including exact dates and times;
  - c. The estimated time noncompliance is expected to continue if it has not been corrected; and
  - d. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

Reports shall be submitted to the address in Part II.E. Reporting of Monitoring Results. The department may waive the written report on a case by case basis if the oral report has been received within 24 hours by the department at 701.328.5210 as identified above.

All other instances of noncompliance shall be reported no later than at the time of the next Discharge Monitoring Report submittal. The report shall include the four items listed in this subsection.

**G. Bypass of Treatment Facilities**

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to any of the following provisions in this section.
2. Bypass exceeding limitations-notification requirements.
  - a. Anticipated Bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten (10) days before the date of bypass.
  - b. Unanticipated Bypass. The permittee shall submit notice of an unanticipated bypass as required under F. Twenty-four Hour Notice of Noncompliance Reporting.

3. Prohibition of Bypass. Bypass is prohibited, and the department may take enforcement action against a permittee for bypass, unless:
  - a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
  - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
  - c. The permittee submitted notices as required under the 1. Anticipated Bypass subsection of this section.

The department may approve an anticipated bypass, after considering its adverse effects, if the department determines that it will meet the three (3) conditions listed above.

#### **H. Upset Conditions**

An upset constitutes an affirmative defense to an action brought for noncompliance with technology-based permit effluent limitations if the requirements of the following paragraph are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and the permittee can identify its cause(s);
2. The permitted facility was, at the time being, properly operated;
3. The permittee submitted notice of the upset as required under F. Twenty-four Hour Notice of Noncompliance Reporting and
4. The permittee complied with any remedial measures required under I. Duty to Mitigate.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

#### **I. Duty to Mitigate**

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. The permittee, at the department's request, shall provide accelerated or additional monitoring as necessary to determine the nature and impact of any discharge.

#### **J. Removed Materials**

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be buried or disposed of in such a manner to prevent any pollutant from entering any waters of the state or creating a health hazard. Sludge/digester supernatant and filter backwash shall not be directly blended with or enter either the final plant discharge and/or waters of the state. The permit issuing authority shall be contacted prior to the disposal of any sewage sludges. At that time, concentration limitations and/or self-monitoring requirements may be established.

#### **K. Duty to Reapply**

Any request to have this permit renewed should be made six months prior to its expiration date.

#### **IV. GENERAL PROVISIONS**

##### **A. Inspection and Entry**

The permittee shall allow department and EPA representatives, at reasonable times and upon the presentation of credentials if requested, to enter the permittee's premises to inspect the wastewater treatment facilities and monitoring equipment, to sample any discharges, and to have access to and copy any records required to be kept by this permit.

##### **B. Availability of Reports**

Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the department and EPA. As required by the Act, permit applications, permits, and effluent data shall not be considered confidential.

##### **C. Transfers**

This permit is not transferable except upon the filing of a Statement of Acceptance by the new party and subsequent department approval. The current permit holder should inform the new controller, operator, or owner of the existence of this permit and also notify the department of the possible change.

##### **D. New Limitations or Prohibitions**

The permittee shall comply with any effluent standards or prohibitions established under Section 306(a), Section 307(a), or Section 405 of the Act for any pollutant (toxic or conventional) present in the discharge or removed substances within the time identified in the regulations even if the permit has not yet been modified to incorporate the requirements.

##### **E. Permit Actions**

This permit may be modified, revoked and reissued, or terminated for cause. This includes the establishment of limitations or prohibitions based on changes to Water Quality Standards, the development and approval of waste load allocation plans, the development or revision to water quality management plans, changes in sewage sludge practices, or the establishment of prohibitions or more stringent limitations for toxic or conventional pollutants and/or sewage sludges. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

##### **F. Need to Halt or Reduce Activity Not a Defense**

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

##### **G. State Laws**

Nothing in this permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation preserved under Section 510 of the Act.

##### **H. Oil and Hazardous Substance Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

##### **I. Property Rights**

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

**J. Severability**

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

**FACT SHEET FOR NDPDES PERMIT  
ND-0026140**

**PERMIT REISSUANCE**

**CITY OF VALLEY CITY PUBLIC WORKS**

**FACT SHEET DATE – AUGUST 2017**

**INTRODUCTION**

The Federal Clean Water Act (CWA, 1972, and later amendments in 1977, 1981, and 1987, etc.) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the CWA is the National Pollutant Discharge Elimination System (NPDES), which the U.S. Environmental Protection Agency (EPA) has oversight authority. In 1975, the State of North Dakota was delegated primacy of the NPDES program by EPA. The North Dakota Department of Health (NDDoH) has been designated the state water pollution control agency for all purposes of the Federal Water Pollution Control Act, as amended [33 U.S.C. 1251, et seq.], and is hereby authorized to take all action necessary or appropriate to secure to this state the benefits of the act and similar federal acts. The department's authority and obligations for the wastewater discharge permit program is in North Dakota Administrative Code 33-16 (NDAC), promulgated pursuant to North Dakota Century Code Chapter 61-28 (NDCC). The department uses North Dakota Pollutant Discharge Elimination System (NDPDES) as its permitting title.

The following rules or regulations apply to NDPDES permits:

- Procedures the department follows for issuing NDPDES permits (NDAC Chapter 33-16-01),
- Standards of Quality for Waters of the State (NDAC Chapter 33-16-02.1).

These rules require any treatment facility operator to obtain an NDPDES permit before discharging wastewater to state waters. They also define the basis for limits on each discharge and for other requirements imposed by the permit.

According to NDAC Section 33-16-01-08, the department must prepare a draft permit and accompanying fact sheet, and make them available for public review. The department must also publish an announcement (public notice) during a period of thirty days, informing the public where a draft permit may be obtained and where comments regarding the draft permit may be sent (NDAC Section 33-16-01-07). For more information regarding preparing and submitting comments about the fact sheet and permit, please see **Appendix A - Public Involvement**. Following the public comment period, the department may make changes to the draft NDPDES permit. The department will summarize the responses to comments and changes to the permit in **Appendix D - Response to Comments**.

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**BACKGROUND INFORMATION**

**Table 1. General Facility Information**

Applicant:	City of Valley City Public Works
Facility Name and Address:	Valley City Landfill 11490 35 <sup>th</sup> St. SE, Valley City, ND 58072
Permit Number:	ND0026140
Permit Type:	Minor, Permit Renewal
Type of Treatment:	Sump
SIC Code:	4953
Discharge Location:	Unnamed Tributary to the Sheyenne River, Class IA water body 001: T140N, R58W, S31, NE1/4 Latitude: 46.90255 Longitude: -98.04607
Hydrologic Code:	09020204 – Lower Sheyenne

**Figure 1. Aerial Photograph of Valley City Landfill, Valley City, ND (Google Earth 5/16/2016)**





## **FACILITY DESCRIPTION**

The reapplication is for an inert landfill which services the city of Valley City and the surrounding area. The plans submitted to the Waste Management Division in July of 1996 show the disposal pit to be roughly circular, with a circumference of about 300 feet. The base of the cell slopes to the south to promote drainage of the water into a sump located at the south end of the cell.

This landfill is in the process of adding thirty three acres. The drainage from this expansion will be directed to the present collection basin. The landfill does not intend to include new services with this expansion and so changing the requirements of this permit is not needed at this time.

The type of material deemed acceptable for disposal in an inert landfill is regulated under the North Dakota's Solid Waste Rules. The Department's Division of Waste Management is responsible for enforcing and administering the Solid Waste Rules. It is required in the permit issued by the Waste Management Division (permit number: 0176) that the inert landfill be used for disposal of "Inert Waste" which is defined as non-putrescible, non-water soluble solid waste that will not in any way form a contaminated leachate. Inert waste includes but is not limited to: (1) construction and demolition material (such as wood, bricks, masonry, concrete (cured) and metal) resulting from the demolition or razing of buildings, roads, and other structures; (2) trees and tree branches; (3) metal wastes that do not contain oils, solvents, PCBs, or other similar materials; (4) bottom ash from coal-fired boilers; and (5) waste coal fines from air pollution equipment.

## **Outfall Description**

The discharge facility is located in the NE 1/4, Section 31, Township 140 North, Range 58 West. The location of the outfall is at Latitude: 46.90255; Longitude: -98.04607, in Barnes County. Any discharge would consist of precipitation and/or shallow ground water that may accumulate in the landfill cells during operation. Water from the sump is pumped out of the cell and flows to an unnamed, unclassified tributary west of the old municipal solid waste fill area when a discharge is necessary. The tributary eventually flows to the Sheyenne River, a class IA stream.

## **PERMIT STATUS**

The department issued the previous permit for this facility on January 1, 2013. The previous permit placed effluent limits on Biochemical Oxygen Demand (BOD<sub>5</sub>), pH, Total Suspended Solids (TSS), Oil & Grease. Monitoring requirements were placed on conventional pollutants, phosphorus, Total Kjeldahl Nitrogen, ammonia and trace elements.

## **SUMMARY OF COMPLIANCE WITH PREVIOUS PERMIT ISSUED**

Department staff last conducted a non-sampling compliance inspection on June 8, 2016. The department's assessment of the compliance is based on review of the facility's Discharge Monitoring Reports (DMRs) and inspections conducted by department staff.

### Past Discharge Data

There have been no reported discharges from the facility since May 2011. This has been substantiated during an inspection by department personnel and from the facility's Discharge Monitoring Reports (DMRs).

## PROPOSED PERMIT LIMITS

### EFFLUENT LIMITATIONS and MONITORING REQUIREMENTS

The following limitations are based on promulgated guidelines as outlined in section 40 of the Code of Federal Regulations (CFR), the North Dakota Administrative Code (NDAC), the North Dakota Standards of Quality for Waters of the State (WQS) and Best Professional Judgment (BPJ), as determined by the North Dakota Department of Health.

The discharge of wastewater from inert landfills is not regulated by national effluent guidelines, which establish technology-based effluent limitations for various industries. In the absence of a federal standard, limitations may be generated using Best Professional Judgment (BPJ) to ensure reasonable control technologies are used to prevent potential harmful effects of the discharge. In addition, the department must consider and include limitations necessary to protect water quality standards applicable to the receiving waters. The proposed effluent limitations shall take effect once the permit becomes active. The effluent limitations and the basis for the limitations are provided in the table below. These limitations are similar to other industrial discharges that are treated with settling facilities such as low volume waste at steam/electric facilities and surface runoff from coal mining operations. The proposed limitations will become effective once the permit becomes active.

**Table 3: Effluent Limitations and Monitoring Requirements for Outfall 001**

Effluent Parameter	Daily Maximum	Basis <sup>a</sup>
BOD <sub>5</sub>	25 mg/l	BPJ
TSS	100 mg/l	BPJ
Oil and Grease – Visual <sup>b</sup>	N/A	BPJ
Oil and Grease <sup>b</sup>	10 mg/l	BPJ
pH	Between 6.0 and 9.0 s.u.	BPJ
Total Phosphorus	*	BPJ
Total Kjeldahl Nitrogen	*	BPJ
Ammonia as Nitrogen	*	BPJ
Total Hardness	*	BPJ
Lead	*	BPJ

**Table 3: Effluent Limitations and Monitoring Requirements for Outfall 001**

Effluent Parameter	Daily Maximum	Basis <sup>a</sup>
Iron	*	BPJ
Magnesium	*	BPJ
Arsenic	*	BPJ
Silver	*	BPJ
Chromium	*	BPJ
Cyanide	*	BPJ
Mercury	*	BPJ
Selenium	*	BPJ
Cadmium	*	BPJ
Flow Rate	*	BPJ
Total Flow	*	BPJ
The discharge shall not include wastewater from other processing sources or sanitary facilities.		Previous Permit
There shall be no direct discharge of solid and/or sludges generated by the treatment facility.		Previous Permit
The permittee shall take the necessary preventative measures to ensure that the discharge does not cause erosion in the area of operation or the bank of the receiving waters and prevent any nuisance conditions from occurring in the receiving waters.		Previous Permit
There shall be no discharge of floating solids or visible foam in other than trace amounts.		Previous Permit
Notes:		
* . This parameter is not limited. However, the department may impose limitations based on sample history and to protect the receiving waters.		
a. The basis of the effluent limitations is given below:		
<p>“Previous Permit” refers to limitations in the previous permit. The NPDES regulations <b>40 CFR Part 122.44(1)(1) Reissued permits</b> require that when a permit is renewed or reissued, interim limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit unless the circumstances on which the previous permit was issued have materially and substantially changed since the previous permit was issued and would constitute cause for permit modification or revocation and reissuance under <b>40 CFR Part 122.62</b>.</p>		
b. There shall be no floating oil or visible sheen present in the discharge. If floating oil or a visible sheen is detected in the discharge, the department shall be contacted and a grab sample analyzed to ensure compliance with the concentration limitation. Any single		

**Table 3: Effluent Limitations and Monitoring Requirements for Outfall 001**

Effluent Parameter	Daily Maximum	Basis <sup>a</sup>
analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.		
N/A	Not Applicable	

**SELF-MONITORING REQUIREMENTS**

All effluent shall be sampled at a point leaving outfall 001 but prior to entering waters of the state.

**Table 4: Self-Monitoring Requirements**

Effluent Parameter	Frequency	Sample Type <sup>a</sup>
BOD <sub>5</sub> , mg/l	1/Week	Grab
TSS, mg/l	1/Week	Grab
Oil and Grease – Visual	Daily	Visual
Oil and Grease, mg/l	1/Week	Conditional/Grab
pH, S.U.	1/Week	Grab
Total Phosphorus, mg/l	Quarterly	Grab
Total Kjeldahl Nitrogen, mg/l	Quarterly	Grab
Ammonia as Nitrogen, mg/l	Quarterly	Grab
Total Hardness, mg/l	Annually	Grab
Lead, ug/l	Annually	Grab
Iron, ug/l	Annually	Grab
Magnesium, ug/l	Annually	Grab
Arsenic, ug/l	Annually	Grab
Silver, ug/l	Annually	Grab
Chromium, ug/l	Annually	Grab
Cyanide, ug/l	Annually	Grab
Mercury, ug/l	Annually	Grab
Selenium, ug/l	Annually	Grab
Cadmium, ug/l	Annually	Grab
Flow Rate, gpd	Daily	Instantaneous
Total Flow, Mgal	Quarterly	Calculated
<b>Notes:</b>		
a. Refer to Appendix B for definitions.		
The beginning and ending dates of the discharge shall be recorded.		

**SURFACE WATER QUALITY-BASED EFFLUENT LIMITS**

The *Standards of Water Quality for Waters of the State* (NDAC Chapter 33-16-02.1) are designed to protect existing water quality and preserve the beneficial uses of North Dakota's surface waters. Wastewater discharge permits must include conditions that ensure the discharge will meet the surface water quality standards. Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin-wide total maximum daily load (TMDL) study. TMDLs result from a scientific study of the water body and are developed in order to reduce pollution from all sources.

This section of the Sheyenne River that the facility discharge reaches is listed in the North Dakota 2016 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads (TMDL). The section is listed as impaired based on benthic-macroinvertebrate bioassessments and sedimentation/siltation. The affected use (fish and other aquatic biota) is listed as fully supporting but threatened. The TMDL development status is "low." This means TMDL development activities (e.g., monitoring and modeling) are scheduled for completion within 8 years of the approved date of the list.

The department reviewed the facility's discharge history over the past 15 years. Discharges are infrequent and of good quality. The department does not feel the permitted activity will be a significant contributor to the impairment.

### **Numerical Criteria for the Protection of Aquatic Life and Recreation**

Numerical water quality criteria are listed in the water quality standards for surface waters (NDAC Chapter 33-16-02.1). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. The department uses numerical criteria along with chemical and physical data for the wastewater and receiving water, to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

### **Numerical Criteria for the Protection of Human Health**

The U.S. EPA has published numeric water quality criteria for the protection of human health that are applicable to dischargers. These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The state water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

### **Narrative Criteria**

Narrative water quality criteria (NDAC Chapter 33-16-02.1-08) limit concentrations of pollutants from exceeding applicable standards of the receiving waters. The department adopted a narrative biological goal solely to provide an additional assessment method that can be used to identify impaired surface waters.

### **Antidegradation**

The purpose of North Dakota's Antidegradation Policy (NDAC Chapter 33-16-02.1 - Appendix IV) is to:

- Provide all waters of the state one of three levels of antidegradation protection.
- Determine whether authorizing the proposed regulated activity is consistent with antidegradation requirements.

This fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit.

### **Mixing Zones**

The department's water quality standards contain a Mixing Zone and Dilution Policy and Implementation Procedure, NDAC Chapter 33-16-02.1 (Appendix III). This policy addresses how mixing and dilution of point source discharges with receiving waters will be addressed in developing chemical-specific and whole effluent toxicity discharge limitations for point source discharges. Depending upon site-specific mixing patterns and environmental concerns, some pollutants/criteria may be allowed a mixing zone or dilution while others may not. In all cases, mixing zone and dilution allowances shall be limited, as necessary, to protect the integrity of the receiving water's ecosystem and designated uses.

## **EVALUATION OF SURFACE WATER QUALITY-BASED EFFLUENT LIMITS FOR NUMERIC CRITERIA**

### **HUMAN HEALTH**

North Dakota's water quality standards include numeric, human health-based criteria that the department must consider when writing NDPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria. The department determined the applicant's discharge is unlikely to contain chemicals regulated to protect human health. The department will re-evaluate this discharge for impacts to human health at the next permit reissuance.

## **MONITORING REQUIREMENTS**

The department requires monitoring, recording, and reporting (NDAC Chapter 33-16-01; 21 through 23) and 40 CFR 122.41 to verify that the treatment process is functioning correctly and that the discharge complies with the permit's limits.

### **TEST PROCEDURES**

The collection and transportation of all samples shall conform to EPA preservation techniques and holding times. All laboratory tests shall be performed by a North Dakota certified laboratory in conformance with test procedures pursuant to 40 CFR 136, unless other test procedures have been specified or approved by EPA as an alternate test procedure under 40 CFR 136.5.

The method of determining the total amount of water discharged shall provide results within 10 percent of the actual amount.

### **OTHER PERMIT CONDITIONS**

No other permit conditions are proposed for the facility.

### **PERMIT ISSUANCE PROCEDURES**

#### **PERMIT ACTIONS**

This permit may be modified, revoked and reissued, or terminated for cause. This includes the establishment of limitations or prohibitions based on changes to water quality standards, the development and approval of waste load allocation plans, the development or revision to water quality management plans, changes in sewage sludge practices, or the establishment of prohibitions or more stringent limitations for toxic or conventional pollutants and/or sewage sludges. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

The department must be notified, in advance, of any facility expansions, additions, or modifications to increase the amount of discharge. The increase in any effluent limitation is considered a major permit modification. Major modifications require the issuance of a public notice inviting public comment.

#### **PROPOSED PERMIT ISSUANCE**

This proposed permit meets all statutory requirements for the department to authorize a wastewater discharge. The permit includes limits and conditions to protect human health, aquatic life, and the beneficial uses of waters of the State of North Dakota. The department proposes to issue this permit for a term of five (5) years.



## **APPENDIX A – PUBLIC INVOLVEMENT INFORMATION**

The department proposes to reissue a permit to the **City of Valley City Public Works** for its inert landfill operations. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and the department's reasons for requiring permit conditions.

The department will place a Public Notice of the Draft on **October 11, 2017** in the **Valley City Times Record** to inform the public and to invite comment on the proposed draft North Dakota Pollutant Discharge Elimination System permit and fact sheet.

The Notice –

- Indicates where copies of the draft Permit and Fact Sheet are available for public evaluation.
- Offers to provide assistance to accommodate special needs.
- Urges individuals to submit their comments before the end of the comment period.
- Informs the public that if there is significant interest, a public hearing will be scheduled.

You may obtain further information from the department by telephone, 701.328.5210, or by writing to the address listed below.

North Dakota Department of Health  
Division of Water Quality  
918 East Divide Avenue, 4<sup>th</sup> Floor  
Bismarck, ND 58501

The primary author of this permit and fact sheet is Sarah Starr.

**North Dakota Department of Health Public Notice  
Reissue of an NDPDES Permit**

Public Notice Date: 10/11/2017

Public Notice Number: ND-2017-029

**Purpose of Public Notice**

The Department intends to reissue the following North Dakota Pollutant Discharge Elimination System (NDPDES) Discharge Permit under the authority of Section 61-28-04 of the North Dakota Century Code.

**Permit Information**

Application Date: 4/26/2017

Application Number: ND0026140

Applicant Name: Valley City Landfill

Mailing Address: 136 4th Ave SE, Valley City, ND 58072

Telephone Number: 701.845.0380

Proposed Permit Expiration Date: 12/31/2022

**Facility Description**

The reapplication is for a sump at the Valley City inert landfill. The discharge consists of precipitation and/or shallow groundwater that may accumulate in the landfill cells during operation. The discharge facility is located in the NE1/4, Section 31, Township 140 North, Range 58 West, and would be to an unnamed tributary of the Sheyenne River.

**Tentative Determinations**

Proposed effluent limitations and other permit conditions have been made by the Department. They assure that State Water Quality Standards and applicable provisions of the FWPCAA will be protected.

**Information Requests and Public Comments**

Copies of the application, draft permit, and related documents are available for review. Comments or requests should be directed to the ND Dept of Health, Div of Water Quality, 918 East Divide Ave, Bismarck ND 58501-1947 or by calling 701.328.5210.

All comments received by November 11, 2017 will be considered prior to finalizing the permit. If there is significant interest, a public hearing will be scheduled. Otherwise, the Department will issue the final permit within sixty (60) days of this notice. If you require special facilities or assistance relating to a disability, call TDD at 1.800.366.6868.

## APPENDIX B – DEFINITIONS

### DEFINITIONS Standard Permit BP 2013.12.31

1. “**Act**” means the Clean Water Act.
2. “**Average monthly discharge limitation**” means the highest allowable average of “daily discharges” over a calendar month, calculated as the sum of all “daily discharges” measured during a calendar month divided by the number of “daily discharges” measured during that month.
3. “**Average weekly discharge limitation**” means the highest allowable average of “daily discharges” over a calendar week, calculated as the sum of all “daily discharges” measured during a calendar week divided by the number of “daily discharges” measured during that week.
4. “**Best management practices**” (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage areas.
5. “**Bypass**” means the intentional diversion of waste streams from any portion of a treatment facility.
6. “**Composite**” sample means a combination of at least 4 discrete sample aliquots, collected over periodic intervals from the same location, during the operating hours of a facility not to exceed a 24 hour period. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of Standard Methods for the Examination of Water and Wastewater.
7. “**Daily discharge**” means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the “daily discharge” is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the “daily discharge” is calculated as the average measurement of the pollutant over the day.
8. “**Department**” means the North Dakota Department of Health, Division of Water Quality.
9. “**DMR**” means discharge monitoring report.
10. “**EPA**” means the United States Environmental Protection Agency.
11. “**Geometric mean**” means the  $n^{\text{th}}$  root of a product of  $n$  factors, or the antilogarithm of the arithmetic mean of the logarithms of the individual sample values.
12. “**Grab**” for monitoring requirements, means a single "dip and take" sample collected at a

representative point in the discharge stream.

13. **"Instantaneous"** for monitoring requirements, means a single reading, observation, or measurement. If more than one sample is taken during any calendar day, each result obtained shall be considered.
14. **"Maximum daily discharge limitation"** means the highest allowable "daily discharge."
15. **"Salmonid"** means of, belonging to, or characteristic of the family Salmonidae, which includes the salmon, trout, and whitefish.
16. **"Sanitary Sewer Overflows (SSO)"** means untreated or partially treated sewage overflows from a sanitary sewer collection system.
17. **"Severe property damage"** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
18. **"Total drain"** means the total volume of effluent discharged.
19. **"Upset"** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

**APPENDIX C – DATA AND TECHNICAL CALCULATIONS**

**DFLOW**

Critical low flow limitations were not utilized in this permit renewal.

DFLOW 1B3 (ACUTE)	0 CFS	DFLOW 1Q10 (ACUTE)	0 CFS
DFLOW 4B3 (CHRONIC)	0 CFS	DFLOW 7Q10 (CHRONIC)	0 CFS
DFLOW 30B10 (AMMONIA)	0 CFS		

FACT SHEET FOR NDPDES PERMIT ND-0026140

City of Valley City Public Works

**EXPIRATION DATE: December 31, 2022**

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#### **APPENDIX D – RESPONSE TO COMMENTS**

No comments were received by the department during the public Comment period.

## **APPENDIX C: GEOTECHNICAL EVALUATION REPORT (JANUARY 2008)**



## **A Geotechnical Evaluation Report**

Proposed Inert Landfill  
County Highway 17  
Valley City, North Dakota

*Prepared for*

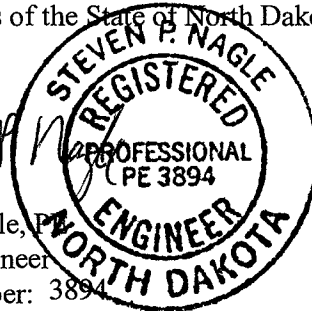
**The City of Valley City**

### **Professional Certification**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of North Dakota.



Steven P. Nagle, PE  
Principal Engineer  
License Number: 3894  
January 4, 2008



Project FA-07-04918

Braun Intertec Corporation



**Braun Intertec Corporation**  
526 10th Street NE  
West Fargo, ND 58078

Phone: 701.232.8701  
Fax: 701.232.7817  
Web: braunintertec.com

January 4, 2008

Project FA-07-04918

City of Valley City  
c/o Erik Gilbertson, PE, LSIT  
Kadmas Lee & Jackson, Inc.  
1010 4th Avenue SW  
P.O. Box 937  
Valley City, ND 58072-0937

Dear Mr. Gilbertson:

Re: Geotechnical Evaluation  
Inert Landfill Site Selection  
West of County Highway 17  
T140N, R58W, S31-NE1/4  
Valley City, North Dakota

We have completed the geotechnical evaluation authorized by Mr. David Johnson, City Administrator for the City of Valley City, on October 25, 2007. The purpose of the evaluation was to provide subsurface soil and groundwater data to assist the City of Valley City and Kadmas Lee & Jackson, Inc., in designing the proposed inert landfill. The evaluation was completed in general accordance with our proposal dated October 22, 2007.

### Summary of Results

Ten penetration test borings were advanced for this project. Three (3) of the borings (Borings ST-7, ST-8, and ST-9) were performed within the proposed landfill area (Phase I) and seven (7) of the borings (Boring ST-1 through ST-6 and ST-10) were performed within the proposed landfill expansion area (Phase II).

**Phase I Borings.** The borings generally encountered approximately 1 foot of topsoil underlain by sandy lean clay glacial till to depths ranging from 30 to 43 feet. Below the glacial till the borings encountered fat clay weathered bedrock to the borings' termination depths. One boring encountered a layer of bentonite from approximately 30 to 33 feet.

**Phase II Borings.** The borings generally encountered approximately 1 foot of topsoil. Below the topsoil the borings encountered sandy lean clay glacial till deposits to their termination depths. Two of the borings encountered fat clay weathered bedrock at depths of 23 and 45 feet. One boring encountered a silty sand layer from 7 to 12 1/2 feet.

**Groundwater.** Groundwater was observed in two of the borings at depths ranging from about 7 to 14 1/2 feet, corresponding to elevations ranging from 1397 to 1389, during or immediately following drilling. Five of the borings were allowed to remain open for a period of time ranging from 5 hours to 7 days. After the wait period, groundwater was observed at depths ranging from 5 to 33 feet, corresponding to elevations ranging from 1369 1/2 to 1394 1/2. Seasonal and annual fluctuations of the groundwater levels should be anticipated.

### **Summary of Recommendations**

Based on the soils and groundwater levels encountered in the borings, and the guidelines set by the NDDH in Guideline 16, it appears that a permanent dewatering will be necessary for this site. With the landfill's bottom elevation near 1370, groundwater will need to be lowered as much as 35 feet to meet the NDDH required 15-foot separation. Laboratory tests indicate that if the on-site clays are reworked, moisture conditioned and compacted, they will have permeabilities less than 2 inches per hour.

### **General**

Please refer to the attached report for a more detailed summary of our analyses and recommendations. If we can provide further assistance, or observation and testing services during construction, please contact us at 701.232.8701.

Sincerely,

BRAUN INTERTEC CORPORATION



Mark Kvas, EIT  
Staff Engineer



Steven P. Nagle, PE  
Principal Engineer

Attachment: Geotechnical Evaluation

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## **A. Introduction**

### **A.1. Project**

The City of Valley City is planning to construct a new inert landfill in the northeast quarter of the southwest quarter of the northeast quarter of Section 31, Township 140N, and Range 58W (Phase I). It is also our understanding the City would like to characterize the remainder of the southwest quarter of the northeast quarter of Section 31 for future expansion of the landfill (Phase II). The proposed landfill site is located approximately 1/4 mile west of County Highway 17 and approximately 1/4 mile south of 35th Street Southeast in Valley City, North Dakota.

### **A.2. Purpose of This Evaluation**

The purpose of our geotechnical evaluation was to provide subsurface soil and groundwater information to assist Kadrmas Lee & Jackson, Inc. (KL&J), in the preparation of plans and specifications for construction of the proposed landfill.

### **A.3. Scope**

On behalf of the City of Valley City, Mr. Erik Gilbertson, PE, LSIT of KL&J, requested a proposal to conduct the required geotechnical evaluation at the location of the proposed landfill and its future expansion area. We submitted our proposal to Mr. Gilbertson on October 22, 2007, which was authorized on October 25, 2007 by Mr. David Johnson, City Administrator for the City of Valley City. Our services were provided under the terms of our General Conditions dated June 15, 2006.

Our scope of services was limited to:

- conducting three (3) penetration test borings to a depth of 50 feet within the Phase I area, and three (3) penetration test borings to a depth of 50 feet and four (4) penetration test borings to a depth of 30 feet within the Phase II area,
- classifying the soil and preparing boring logs,
- providing laboratory testing in accordance with the requirements of the North Dakota Department of Health,
- analyzing the results of the field and laboratory tests,
- formulating recommendations for construction of the landfill and discussing them with KL&J, and
- submitting a geotechnical evaluation report containing logs of the borings, analysis of the field and laboratory tests, and recommendations for the construction of the landfill.

#### **A.4. Documents Provided**

Mr. Gilbertson provided us with a site plan indicating the proposed Phase I and II areas. The site plan was titled "Inert Landfill Expansion Concept", was prepared by KL&J, and was dated January 4, 2004. An AutoCAD drawing of the site is included in the Appendix as our Soil Boring Location Sketch.

In preparation of this report, we referenced a copy of *Guideline 16 – Operation of Inert Waste Landfills* prepared by the North Dakota Department of Health NDDH and dated November 2002.

#### **A.5. Locations and Elevations**

KL&J staked the borings at the locations we chose. The approximate locations of the borings are indicated on the attached Soil Boring Location Sketch. KL&J provided us with the ground surface elevations at the boring locations.

### **B. Results**

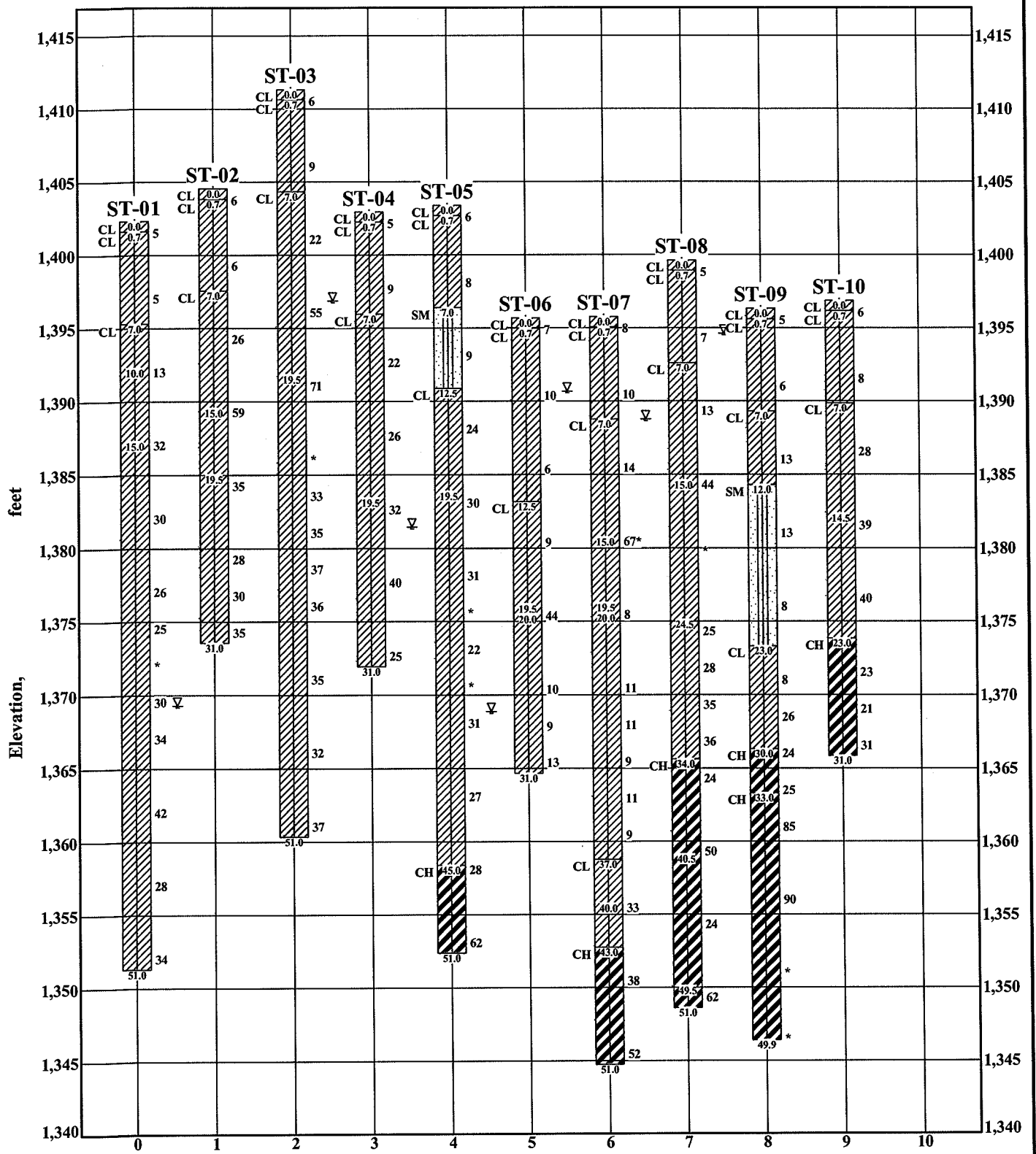
#### **B.1. Logs**

Log of Boring sheets indicating the depths and identifications of the various soil strata, and groundwater observations are attached. The strata changes were inferred from the changes in soils encountered with the borings. A fence diagram is attached following this page, which summarizes the borings and the strata encountered. It should be noted that the depths shown as changes between the strata are only approximate. The changes are likely transitions and the depths of the changes vary between the borings.

Geologic origins presented for each stratum on the Log of Boring sheets are based on the soil types, and available common knowledge of the depositional history of the site. Because of the complex glacial and post-glacial depositional environments, geologic origins are frequently difficult to ascertain. A detailed investigation of the geologic history of the site was not performed.

#### **B.2. Site Condition**

During our fieldwork the site was a plowed farm field. The existing inert landfill is just to the north of the proposed Phase I site. The ground surface elevations at the borings ranged from 1396 (at Borings ST-6 and ST-7) to 1411 1/2 (at Boring ST-3). The ground surface generally slopes down towards the drainage swale that crosses the eastern portion of the site.



Fence Diagram

Braun Project FA-07-04918  
 Geotechnical Evaluation  
 Inert Landfill Site Selection  
 County Highway 17  
 Valley City, North Dakota

**BRAUN**<sup>SM</sup>  
 INTERTEC

ELEVATION & DISTANCE SCALES: 04918.GPI BRAUN.GDT 12/17/07 12:01

### **B.3. Soils**

Ten penetration test borings were advanced for this project. Three (3) of the borings (Borings ST-7, ST-8, and ST-9) were performed within the proposed landfill area (Phase I) and seven (7) of the borings (Boring ST-1 through ST-6 and ST-10) were performed within the proposed landfill expansion area (Phase II).

**B.3.a. Phase I Borings.** The borings generally encountered approximately 1 foot of topsoil underlain by sandy lean clay glacial till to depth ranging from 30 to 43 feet. Below the glacial till the borings encountered fat clay weathered bedrock to the borings' termination depths. Boring ST-9 encountered a layer of bentonite from approximately 30 to 33 feet.

**B.3.b. Phase II Borings.** The borings generally encountered approximately 1 foot of topsoil. Below the topsoil the borings encountered sandy lean clay glacial till deposits to their termination depths. Borings ST-5 and ST-10 encountered fat clay weathered bedrock at depths of 23 and 45 feet. Borings ST-5 and ST-9 encountered a silty sand layer from 7 to 12 1/2 feet and from 12 to 23 feet, respectively.

**B.3.c. Penetration Resistances.** Penetration resistances in the glacial till soils ranged from 5 to more than 50 blows per foot (BPF), indicating their consistencies/relative densities ranged from rather soft/loose to hard. Penetration resistances in the fat clay weathered bedrock ranged from 21 to more than 50 BPF, indicating they were very stiff to hard.

### **B.4. Groundwater**

Groundwater was observed in Borings ST-3 and ST-7 at depths ranging from about 7 to 14 1/2 feet, corresponding to elevations ranging from 1397 to 1389, during or immediately following drilling. Five of the borings were allowed to remain open for a period of time ranging from 5 hours to 7 days. After the wait period, groundwater was observed at depths ranging from 5 to 33 feet, corresponding to elevations ranging from 1369 1/2 to 1394 1/2. Seasonal and annual fluctuations of the groundwater level should be anticipated.

Mr. Gilbertson indicated the groundwater levels in the existing landfill are near 1380. The drainage swale likely influenced the measured groundwater levels. Thus, the water levels measured in the borings likely represent the local (around the drainage swale) groundwater levels, but may not represent the regional groundwater level. Consideration may be given to installing a series of nested piezometers in the project area to evaluate the regional groundwater level. Seasonal and annual fluctuations in groundwater levels should be anticipated.



## **B.5. Laboratory Tests**

**B.5.a. Moisture Content Tests.** We performed 30 moisture content tests on samples collected from varying depths. The tests were performed to aid us in classification of the soils as well as evaluation of their engineering properties. The moisture contents of the samples tested ranged from about 15 to 28 percent. The moisture contents indicated the materials tested were near to above their optimum moisture contents.

**B.5.b. Atterberg Limits Tests.** Four Atterberg limits tests were performed on samples collected from the near-surface borings to aid us in classifying the soils. The Atterberg limits test measures the soil's range of moisture content that the soil behaves plastically; the upper limit being the liquid limit (LL) and the lower limit being the plastic limit (PL). Lean clays have liquid limits less than 50 percent and fat clays have liquid limits equal to or greater than 50 percent.

The Atterberg limits tests indicated the soils tested had liquid limits ranging from 35 to 48 and plastic limits ranging from 15 to 22, indicating they are moderately plastic.

**B.5.c. Grain Size Analysis.** Four sieve analyses tests were performed on samples collected from the near-surface borings to aid us in correctly classifying the soil, determining their grain size distributions, and predicting their permeabilities. The Grain Size Accumulation Curves follow the logs in the Appendix.

The results indicated the clays near the bottom of the landfill were sandy lean clay.

## **C. Analyses and Recommendations**

### **C.1. Proposed Construction**

It is our understanding that the inert landfill will be constructed in two phases. Phase I will be constructed just to the south of the existing inert landfill. Phase II is planned for the future expansion of the landfill. Phase I will have a depth of approximately 25 feet below the surface (near elevation 1370).

We understand that the landfill will be constructed in accordance with North Dakota Department of Health (NDDH) requirements; in particular the *Operation of Inert Waste Landfills* prepared by the NDDH and dated November 2002. If the landfill location changes significantly from our

understanding, we should be informed, since a review and revision to our recommendations may be required.

## **C.2. Discussion**

The soils encountered in the borings from both of the Phases are very similar; therefore the recommendations in the following sections are for both Phases.

**C.2.a. Site Selection Considerations.** Based on the soils encountered in the borings and the guidelines set by the NDDH, it appears that the construction of a permanent dewatering system will be necessary for this site.

Based on the soil borings and laboratory test results, it appears that the on-site clays encountered in the borings are acceptable for the landfill's bottom.

**C.2.b. Groundwater Considerations.** The NDDH requires a minimum depth of 15 or more feet to the seasonal high water table. During our drilling, we observed groundwater levels ranging from 5 to 34 1/2 feet. Based on the soils coloration and moisture contents, we anticipate the groundwater levels will range from 15 to 25 feet corresponding to elevations ranging from near 1390 to 1370. With the landfill's bottom planned near elevation 1370, the groundwater would need to be lowered as much as 35 feet to meet the NDDH requirement. To better predict the groundwater levels, a series of nested piezometers should be installed at the site. The nested piezometers would allow us to better predict the seasonally high groundwater level and would allow us to indicate any perched groundwater conditions.

## **C.3. Site Preparation**

We recommend that vegetation, topsoils and any organic materials be removed and stockpiled for later use. The site should then be excavated down to the desired bottom depth. Sands were encountered in two of the borings. If sand is encountered at the base of the excavation, we recommend that it be overexcavated an additional 2 feet and replaced with moisture-conditioned and compacted, on-site clay. The excavated material should also be stockpiled for uses as cover material.

## **C.4. Landfill Bottom**

**C.4.a. Excavations.** The soils anticipated at the bottom-of-landfill elevation (1370) are sandy lean clay. It is our opinion that the anticipated soils can be excavated with bulldozers, loaders and/or backhoes. Several of the borings encountered cobbles and boulders. When wet, the

anticipated clay bottom will be very susceptible to disturbance (weakening) under repetitive equipment traffic.

As indicated in Section C.3 above, we recommend any sand layers be overexcavated a minimum of two feet. Based on the anticipated bottom elevation and the soils in our borings, we anticipate the sand layers soils will be encountered above the excavation base.

**C.4.b. Dewatering.** As indicated in the borings, groundwater was encountered from 5 to 34 1/2 feet. It is likely that the water observed was perched in the overlying softer soils. Once the excavation extends below the perched groundwater level, dewatering of the excavation will be necessary.

With the anticipated soil types, we anticipate dewatering will have to be performed by pumping from sumps or shallow trenches excavated around the perimeter of the landfill's bottom. Based on the landfill's bottom elevation near 1370 and our groundwater observations ranging from 1390 to 1370, the groundwater level would need to be lowered as much as 35 feet to meet the NDDH requirements. A permanent dewatering system would need to be installed to maintain the required 15 feet of separation.

**C.4.c. Backfill and Fill.** The soils encountered in borings, that are free of organic or foreign materials can be used as cover material.

**C.4.d. Permeabilities.** The potential infiltration rates depend on the permeabilities of the natural clay soils. Based on the laboratory tests and our past experience with these types of soils, it is our opinion that the if properly moisture-conditioned and recompacted, the on-site clays will have a permeability that will allow less than 2 inches of infiltration per hour.

## **C.5. General**

We recommend the statements in Guideline 16 of the NDDH be adhered to in preparing the inert landfill design and performing its construction.

## **D. Construction**

### **D. 1. Excavation**

It is our opinion that the soils encountered by the borings can be excavated with a backhoe, front-end loader, or dozer. Based on the soils encountered by the borings, we anticipate the natural clays

will be Type B soils under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines. Where groundwater is observed freely seeping from the excavation sidewalls, they will be Type C soils.

#### **D.2. Observations**

We recommend that all excavations for the pond be observed by a geotechnical engineer or a geotechnical engineering technician working under the direction of a geotechnical engineer. These observations are recommended to evaluate if the subgrade soils are similar to those encountered by the borings and to verify that all topsoils have been removed. These observations should be conducted prior to scarifying the base soils and placing fill for the embankments.

#### **D.3. Testing**

We recommend testing be performed in accordance with the recommendations from the North Dakota Health Department.

#### **D.4. Cold Weather Considerations**

If site grading and construction is anticipated during cold weather, we recommend that good winter construction practices be observed. All snow and ice should be removed from cut and fill areas prior to additional grading. No fill should be placed on soils which have frozen or contain frozen material. No frozen soils should be used as fill.

### **E. Procedures**

#### **E.1. Sampling**

We performed the penetration test borings on November 19, 20, and 26, 2007, with a truck-mounted core and auger drill rig equipped with 3 1/4-inch inside diameter hollow-stem auger. We sampled the borings in general accordance with ASTM D 1586, "Penetration Test and Split-Barrel Sampling of Soils." We advanced the boreholes with the hollow-stem auger to the desired test depths. A 140-pound hammer falling 30 inches was then used to drive the standard 2-inch split-barrel sampler a total penetration of 1 1/2 feet below the tip of the hollow-stem auger. The blows for the last foot of penetration were recorded and are an index of soil strength characteristics. Samples were taken at 2 1/2-foot vertical intervals to a depth of 20 feet, then at 5-foot intervals. A portion of each sample was sealed in a glass jar.

## **E.2. Soil Classifications**

The drill crew visually and manually classified the soils encountered in the field in accordance with ASTM D 2488, "Description and Identification of Soils (Visual-Manual Procedures)." A summary of the ASTM classification system is included in the Appendix. All samples were then returned to our laboratory for review of the field classifications by a geotechnical engineer. Samples will remain in our Fargo office for a period of 60 days to be available for your examination.

## **E.3. Groundwater Observations**

During the drilling operations, the drill crew probed the holes through the auger to check for the presence of groundwater. Immediately after withdrawal of the auger, the holes were again probed and the depths of the water or cave-ins were noted. Several of the borings were allowed to remain open for a period of time ranging from 5 hours to 7 days. The borings were then backfilled with grout.

## **F. General Recommendations**

### **F.1. Basis of Recommendations**

The analyses and recommendations submitted in this report are based upon the data obtained from the borings performed at the locations indicated on the attached sketch. Often, variations occur between these locations, the nature and extent of which do not become evident until additional exploration or construction is conducted. A re-evaluation of the recommendations of this report should be made after performing on-site observations during construction to note the characteristics of any variations. The variations may result in additional costs, and it is suggested that a contingency be provided for this purpose.

It is recommended that we be retained to perform the observation and testing program for the construction at this site. This will allow correlation of the soil conditions encountered during construction to the test pits, and will provide continuity of professional responsibility.

### **F.2. Review of Design**

This report is based on the design of the proposed inert landfill as related to us for preparation of this report. It is recommended that we be retained to review the geotechnical aspects of the designs and specifications. With the review, we will evaluate whether any changes in design have affected the validity of the recommendations, and whether our recommendations have been correctly interpreted and implemented in the design and specifications.

### **F.3. Groundwater Fluctuations**

We made water level observations in the borings at the times and under the conditions stated on the boring logs. These data were interpreted in the text of this report. The period of observation was relatively short, and fluctuation in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw, drainage, and other seasonal and annual factors not evident at the time the observations were made. Design drawings and specifications and construction planning should recognize the possibility of fluctuations.

### **F.4. Use of Report**

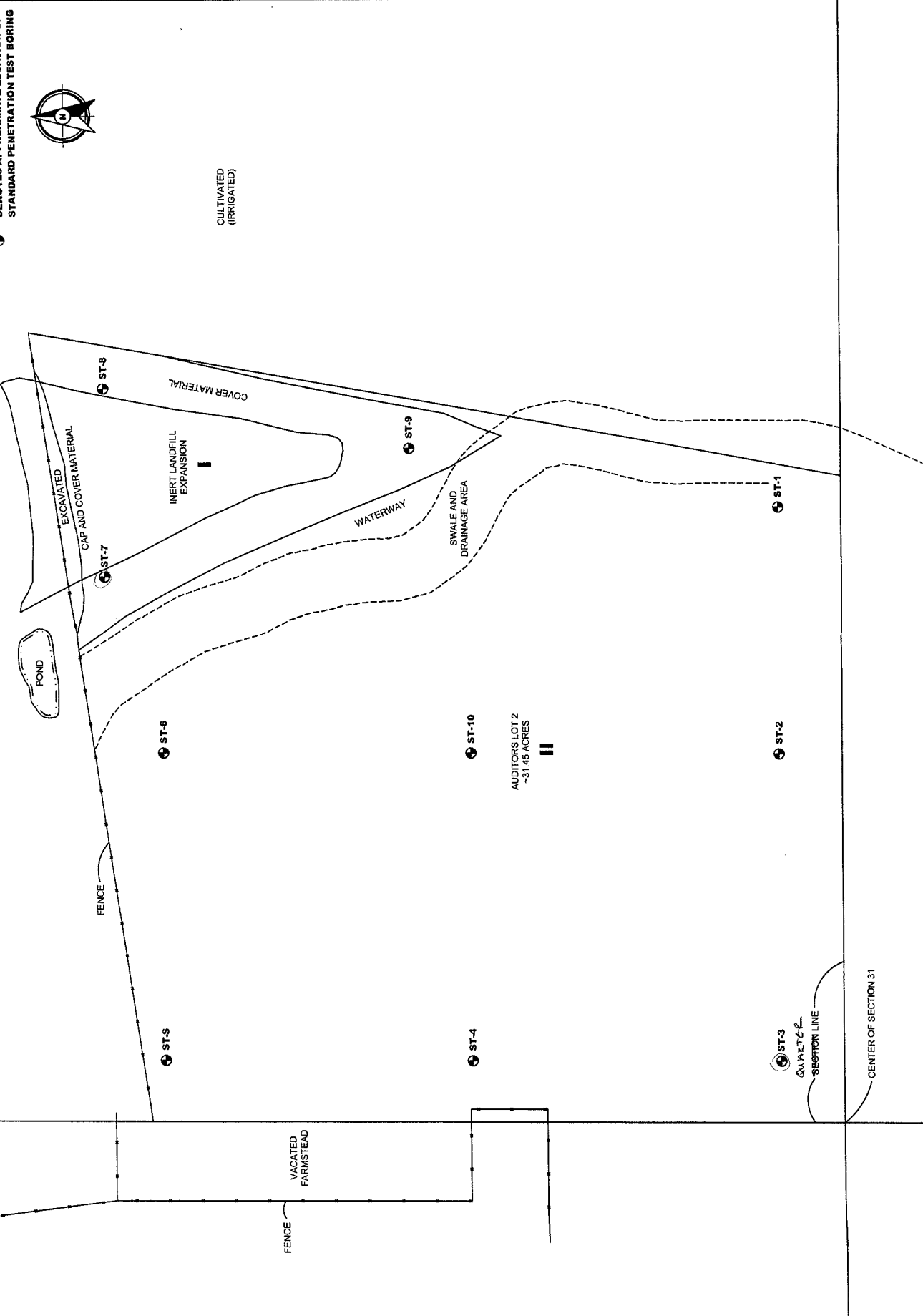
This report is for the exclusive use of the City of Valley City and their design consultant, Kadrmas Lee & Jackson, Inc., to use to design the pond and prepare construction documents. In the absence of our written approval, we make no representation and assume no responsibility to other parties regarding this report. The data, analyses and recommendations may not be appropriate for other structures or purposes. We recommend that parties contemplating other structures or purposes contact us.

### **F.5. Level of Care**

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

## **Appendix**

☛ DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING





# Descriptive Terminology



## Standard D 2487 - 00 Classification of Soils for Engineering Purposes (Unified Soil Classification System)

### Particle Size Identification

Boulders	.....	over 12"
Cobbles	.....	3" to 12"
Gravel	.....	
Coarse	.....	3/4" to 3"
Fine	.....	No. 4 to 3/4"
Sand	.....	
Coarse	.....	No. 4 to No. 10
Medium	.....	No. 10 to No. 40
Fine	.....	No. 40 to No. 200
Silt	.....	< No. 200, PI < 4 or below "A" line
Clay	.....	< No. 200, PI ≥ 4 and on or above "A" line

### Relative Density of Cohesionless Soils

Very loose	.....	0 to 4 BPF
Loose	.....	5 to 10 BPF
Medium dense	.....	11 to 30 BPF
Dense	.....	31 to 50 BPF
Very dense	.....	over 50 BPF

### Consistency of Cohesive Soils

Very soft	.....	0 to 1 BPF
Soft	.....	2 to 3 BPF
Rather soft	.....	4 to 5 BPF
Medium	.....	6 to 8 BPF
Rather stiff	.....	9 to 12 BPF
Stiff	.....	13 to 16 BPF
Very stiff	.....	17 to 30 BPF
Hard	.....	over 30 BPF

### Drilling Notes

Standard penetration test borings were advanced by 3" or 6" ID hollow-stem augers unless noted otherwise. Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous-flight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the prefix "B."

Hand auger borings were advanced manually with a 1" or 3" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix "H."

**BPF:** Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

**WH:** WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

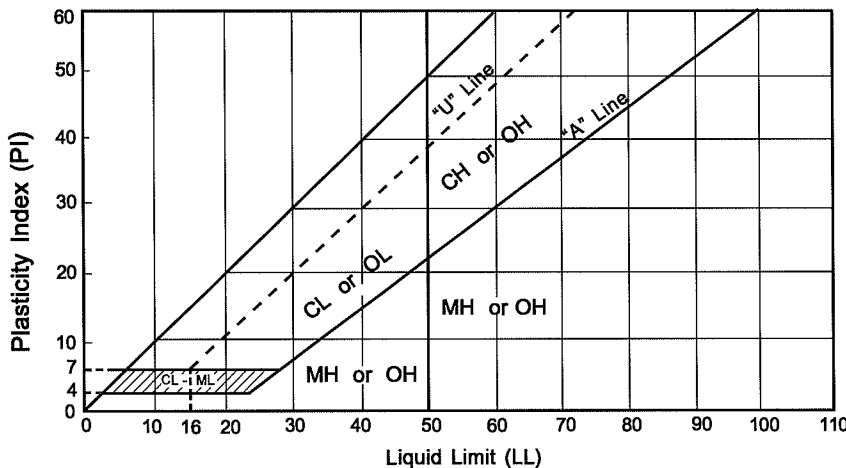
**WR:** WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

**TW** indicates thin-walled (undisturbed) tube sample.

**Note:** All tests were run in general accordance with applicable ASTM standards.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>a</sup>				Soils Classification		
				Group Symbol	Group Name <sup>b</sup>	
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines <sup>e</sup>	$C_u \geq 4$ and $1 \leq C_c \leq 3$ <sup>c</sup>	GW	Well-graded gravel <sup>d</sup>	
		Gravels with Fines More than 12% fines <sup>e</sup>	$C_u < 4$ and/or $1 > C_c > 3$ <sup>c</sup>	GP	Poorly graded gravel <sup>d</sup>	
			Fines classify as ML or MH	GM	Silty gravel <sup>d fg</sup>	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines <sup>i</sup>	$C_u \geq 6$ and $1 \leq C_c \leq 3$ <sup>c</sup>	SW	Well-graded sand <sup>h</sup>	
		Sands with Fines More than 12% <sup>i</sup>	$C_u < 6$ and/or $1 > C_c > 3$ <sup>c</sup>	SP	Poorly graded sand <sup>h</sup>	
			Fines classify as CL or CH	SM	Silty sand <sup>fg h</sup>	
Fine-grained Soils 50% or more passed the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line <sup>j</sup>	CL	Lean clay <sup>k l m</sup>	
			PI < 4 or plots below "A" line <sup>j</sup>	ML	Silt <sup>k l m</sup>	
		Organic	Liquid limit - oven dried < 0.75	OL	Organic clay <sup>k l m n</sup>	
			Liquid limit - not dried < 0.75	OH	Organic silt <sup>k l m o</sup>	
	Silts and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay <sup>k l m</sup>	
			PI plots below "A" line	MH	Elastic silt <sup>k l m</sup>	
		Organic	Liquid limit - oven dried < 0.75	OH	Organic clay <sup>k l m p</sup>	
			Liquid limit - not dried < 0.75	OH	Organic silt <sup>k l m q</sup>	
	Highly Organic Soils	Primarily organic matter, dark in color and organic odor			PT	Peat

- a. Based on the material passing the 3-in (75mm) sieve.
- b. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
- c.  $C_u = D_{60} / D_{10}$   $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
- d. If soil contains ≥15% sand, add "with sand" to group name.
- e. Gravels with 5 to 12% fines require dual symbols:  
GW-GM well-graded gravel with silt  
GW-GC well-graded gravel with clay  
GP-GM poorly graded gravel with silt  
GP-GC poorly graded gravel with clay
- f. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
- g. If fines are organic, add "with organic lines" to group name.
- h. If soil contains ≥15% gravel, add "with gravel" to group name.
- i. Sands with 5 to 12% fines require dual symbols:  
SW-SM well-graded sand with silt  
SW-SC well-graded sand with clay  
SP-SM poorly graded sand with silt  
SP-SC poorly graded sand with clay
- j. If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- k. If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
- l. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
- m. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
- n. PI ≥ 4 and plots on or above "A" line.
- o. PI < 4 or plots below "A" line.
- p. PI plots on or above "A" line.
- q. PI plots below "A" line.



### Laboratory Tests

DD	Dry density, pcf	OC	Organic content, %
WD	Wet density, pcf	S	Percent of saturation, %
MC	Natural moisture content, %	SG	Specific gravity
LL	Liquid limit, %	C	Cohesion, psf
PL	Plastic limit, %	φ	Angle of internal friction
PI	Plasticity index, %	qu	Unconfined compressive strength, psf
P2000	% passing 200 sieve	qp	Pocket penetrometer strength, tsf

<b>Braun Project FA-07-04918</b> Geotechnial Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Daktoa	BORING: <b>ST-01</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/26/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1402.3	0.0						
1401.6	0.7	CL	LEAN CLAY, black, moist. (Topsoil)	5			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, rather soft. (Glacial Till)	5			
1395.3	7.0	CL	SANDY LEAN CLAY, a little Gravel, brown to gray, moist, stiff to hard. (Glacial Till)	13			
			-with COBBLES below 10 feet.	32			
			-gray below 15 feet.	30		20	
				26			
				25		19	
				*			
				30	▽	14	*50 blows for 4 inches (high penetration likely caused by Gravel and Cobbles). LL=35, PL=15, PI=20
				34			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.CPJ BRAUN.GDT 11/26/07 15:17

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	<b>BORING: ST-01 (cont.)</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/26/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1362.3	40.0	[Hatched Box]	SANDY LEAN CLAY, a little Gravel, brown to gray, moist, stiff to hard. (Glacial Till) <i>(continued)</i>	42			
				28		13	
1351.3	51.0	[Hatched Box]	END OF BORING.  Water observed at a depth of 33 feet to a cave-in depth of 35 feet when rechecked 5 hours after withdrawal of the auger.  Boring then backfilled with Grout.	34			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	<b>BORING: ST-02</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/26/07	SCALE: 1" = 5'
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BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47 (See Descriptive Terminology sheet for explanation of abbreviations)

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1404.6	0.0						
1403.9	0.7	CL	LEAN CLAY, black to dark brown, moist. (Topsoil)	6			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium. (Glacial Till)	6			
1397.6	7.0	CL	SANDY LEAN CLAY, with GRAVEL, brown to gray, moist, very stiff to hard. (Glacial Till)	26			
			-with COBBLES at 15 feet.	59			
			-gray below 19 1/2 feet.	35		21	
				28			
				30		18	
1373.6	31.0		END OF BORING.	35			
			Water not observed with 29 1/2 feet of hollow stem auger in the ground.				
			Boring then backfilled with Grout.				

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-03</b>
	LOCATION: See Sketch.

DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/26/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
1411.4	0.0					
1410.7	0.7	CL	LEAN CLAY, black to dark brown, moist. (Topsoil)	6		
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, rather stiff. (Glacial Till)	9		
1404.4	7.0	CL	SANDY LEAN CLAY, with GRAVEL, brown to gray, moist, very stiff to hard. (Glacial Till)	22		
					▽	
				55		
			-gray below 19 1/2 feet.	71		
				*		*50 blows for 6 inches.
				33		
				35		
				37		
				36		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	<b>BORING: ST-03 (cont.)</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/26/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
1371.4	40.0	[Hatched Box]	SANDY LEAN CLAY, with GRAVEL, brown to gray, moist, very stiff to hard. (Glacial Till) <i>(continued)</i>	35		
				32		
1360.4	51.0	[Hatched Box]	END OF BORING.  Water observed at a depth of 14 1/2 feet while drilling.  Boring then backfilled with Grout.	37		

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	<b>BORING: ST-04</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/20/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1402.9	0.0						
1402.2	0.7	CL CL	LEAN CLAY, black to dark brown, moist. (Topsoil)	5			
			SANDY LEAN CLAY, trace Gravel, brown, moist, rather stiff. (Glacial Till)	9			
1395.9	7.0	CL	SANDY LEAN CLAY, with GRAVEL, brown to gray, moist, very stiff to hard. (Glacial Till)	22			
			-gray below 19 1/2 feet.	26		19	
				32	▽	20	
				40		19	
1371.9	31.0		END OF BORING.	25		19	
			Water observed at a depth of 21 1/2 feet to a cave-in depth of 22 feet when rechecked 6 days after withdrawal of the auger.  Boring then backfilled with Grout.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-05</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/20/07	SCALE: 1" = 5'
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(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1403.4	0.0						
1402.7	0.7	CL	LEAN CLAY, black to dark brown, moist. (Topsoil)	6			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium. (Glacial Till)	8			
1396.4	7.0	SM	SILTY SAND, fine- to medium- to coarse-grained, with GRAVEL, brown, moist, loose. (Glacial Till)	9			
1390.9	12.5	CL	SANDY LEAN CLAY, trace Gravel, brown to gray, moist, very stiff to hard. (Glacial Till)	24			
			-gray below 19 1/2 feet.	30		20	
				31			
				*			*50 blows for 5 inches (set). No recovery.
				22		23	LL=48, PL=22, PI=26
				*			*50 blows for 5 inches (set). No recovery.
				31	▽	19	



**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-05 (cont.)</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/20/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1363.4	40.0		SANDY LEAN CLAY, trace Gravel, brown to gray, moist, very stiff to hard. (Glacial Till) <i>(continued)</i>	27		21	
1358.4	45.0	CH	FAT CLAY, (SHALE), gray, moist, very stiff to hard. (Weathered Bedrock)	28			
1352.4	51.0		END OF BORING.  Water observed at a depth of 34 1/2 feet to a cave-in depth of 35 feet when rechecked 6 days after withdrawal of the auger.  Boring then backfilled with Grout.	62			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-06</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/20/07	SCALE: 1" = 5'
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(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.CPJ BRAUN.GDT 1/2/08 14:47

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1395.7	0.0						
1395.0	0.7	CL	LEAN CLAY, black to dark brown, moist. (Topsoil)	7			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	10	▽		
				6			
1383.2	12.5	CL	SANDY LEAN CLAY, a little Gravel, brown to gray, moist, rather stiff to stiff. (Glacial Till)	9		23	
				44			
			-gray below 19 1/2 feet. -with COBBLES from 20 to 22 feet.	10		21	
				9			
1364.7	31.0		END OF BORING.	13			
			Water observed at a depth of 5 feet to a cave-in depth of 14 feet when rechecked 6 days after withdrawal of the auger.  Boring then backfilled with Grout.				

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-07</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/20/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1395.8	0.0						
1395.1	0.7	CL	LEAN CLAY, black, moist. (Topsoil)	8			
		CL	SANDY LEAN CLAY, with lenses of Sand, trace Gravel, brown, wet, rather stiff. (Glacial Till)	10			
1388.8	7.0	CL	SANDY LEAN CLAY, a little Gravel, brown to gray, moist to wet, medium to rather stiff. (Glacial Till)	14	▽		
			-with COBBLES at 15 feet.	67*			*High penetration resistance likely caused by Cobbles.
			-wet at 19 1/2 feet. -with COBBLES from 20 to 22 feet.	8		27	
				11		21	
				11			
				9		18	LL=37, PL=20, PI=17
				11			
				9		28	
1358.8	37.0	CL	SANDY LEAN CLAY, with GRAVEL, gray, moist, hard. (Glacial Till)				

(See Descriptive Terminology sheet for explanation of abbreviations)  
 BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnial Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Daktoa	BORING: <b>ST-07 (cont.)</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/20/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1355.8	40.0		SANDY LEAN CLAY, with GRAVEL, gray, moist, hard. (Glacial Till) <i>(continued)</i> -with Sand lenses at 40 feet.	33		17	
1352.8	43.0	CH	FAT CLAY, (SHALE), gray, moist, hard. (Weathered Bedrock)	38			
1344.8	51.0		END OF BORING.  Water observed at a depth of 7 feet to a cave-in depth of 19 1/2 feet immediately after withdrawal of the auger.  Boring then backfilled with Grout.	52			

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17

<b>Braun Project FA-07-04918</b> <b>Geotechnical Evaluation</b> <b>Inert Landfill Site Selection</b> <b>County Highway 17</b> <b>Valley City, North Dakota</b>	<b>BORING: ST-08</b>
	<b>LOCATION: See Sketch.</b>

<b>DRILLER: I.D.S.</b>	<b>METHOD: 3 1/4" HSA (Auto Hmr)</b>	<b>DATE: 11/19/07</b>	<b>SCALE: 1" = 5'</b>
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BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17  
 (See Descriptive Terminology sheet for explanation of abbreviations)

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1399.6	0.0						
1398.9	0.7	CL	LEAN CLAY, black, moist. (Topsoil)	5			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium. (Glacial Till)		▽		
				7			
1392.6	7.0	CL	SANDY LEAN CLAY, trace Gravel, brown to gray, moist, stiff to hard. (Glacial Till)	13		23	
				44		17	
			-with COBBLES at 15 feet.	*			*50 blows for 4 inches (set). No recovery.
				25			
			-gray below 24 1/2 feet.	28		18	LL=45, PL=20, PI=25
				35		19	
				36			
1365.6	34.0	CH	FAT CLAY, (SHALE), gray, moist. (Weathered Bedrock)	24		25	

<b>Braun Project FA-07-04918</b> Geotechnial Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Daktoa	BORING: <b>ST-08 (cont.)</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/19/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1359.6	40.0		FAT CLAY, (SHALE), gray, moist. (Weathered Bedrock) <i>(continued)</i> -wet at 40 1/2 feet.	50			
				24			
1348.6	51.0		-wet at 49 1/2 feet.	62			
			END OF BORING.  Water observed at a depth of 5 feet to a cave-in depth of 17 1/2 feet when rechecked 7 days after withdrawal of the auger.  Boring then backfilled with Grout.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 15:17

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-09</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/19/07	SCALE: 1" = 5'
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(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1396.3	0.0						
1395.6	0.7	CL	LEAN CLAY, black to dark brown, moist. (Topsoil)	5			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium. (Glacial Till)	6			
1389.3	7.0	CL	SANDY LEAN CLAY, with GRAVEL, brown, moist, stiff. (Glacial Till)	13			
1384.3	12.0	SM	SILTY SAND, fine- to medium-grained, a little Gravel, gray and brown, moist, medium dense to loose. (Glacial Till)	13			
1373.3	23.0	CL	SANDY LEAN CLAY, with GRAVEL, gray, wet, medium to very stiff. (Glacial Till)	8		18	
				26		15	
1366.3	30.0	CH	BENTONITE, grayish white, moist. (Glacial Till)	24			
1363.3	33.0	CH	FAT CLAY, (SHALE), gray, moist, hard. (Weathered Bedrock)	25			
				85			

**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	BORING: <b>ST-09 (cont.)</b> LOCATION: See Sketch.
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DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/19/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1356.3	40.0	[Hatched Box]	FAT CLAY, (SHALE), gray, moist, hard. (Weathered Bedrock) (continued)	90			
		[Hatched Box]		*			*50 blows for 5 inches.
1346.4	49.9	[Hatched Box]	END OF BORING.  Water not observed with 49 1/2 feet of hollow stem auger in the ground.  Boring then backfilled with Grout.	*			*50 blows for 5 inches (set).

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47



**INTERTEC**

<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota	<b>BORING: ST-10</b> LOCATION: See Sketch.
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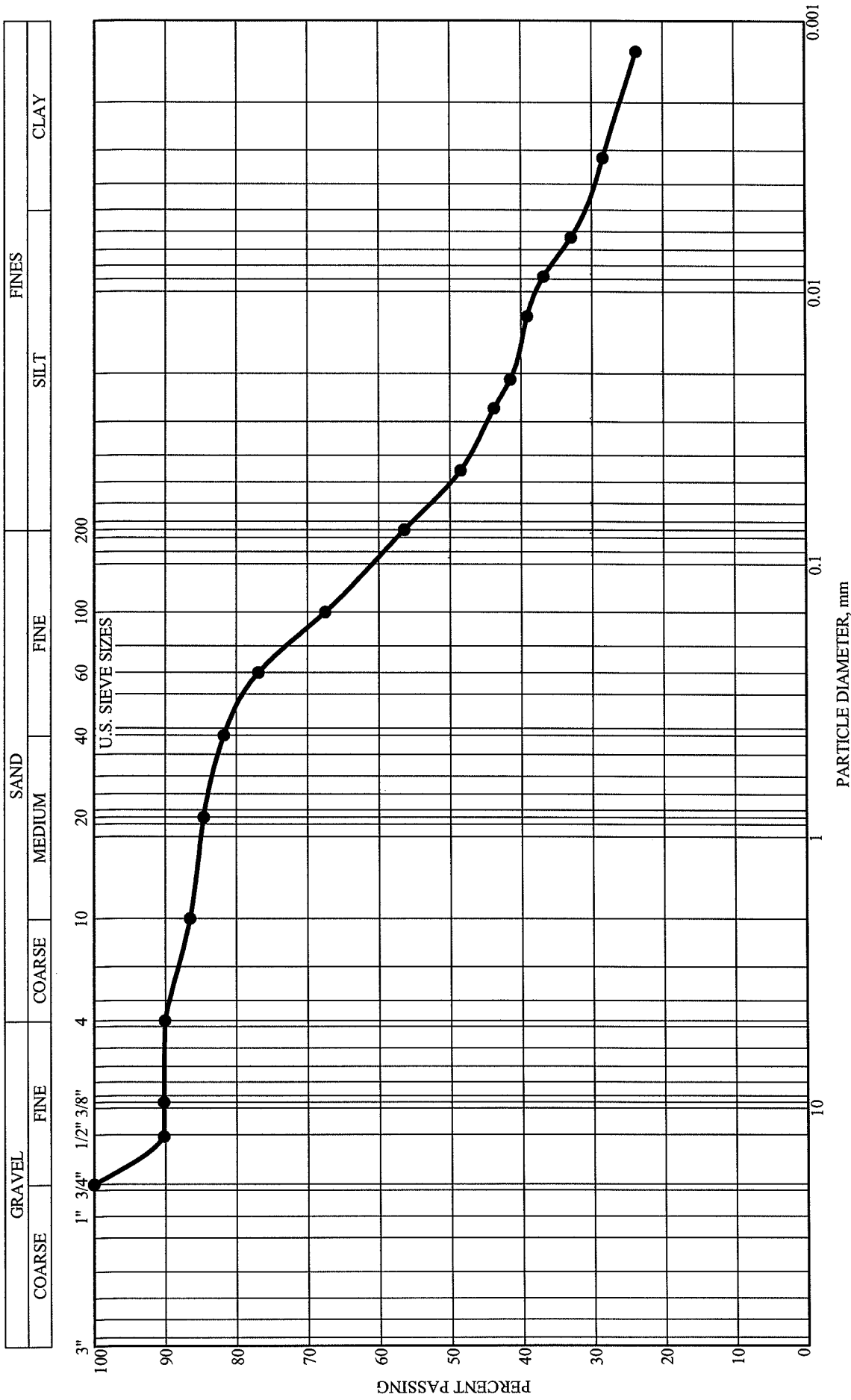
DRILLER: I.D.S.	METHOD: 3 1/4" HSA (Auto Hmr)	DATE: 11/26/07	SCALE: 1" = 5'
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Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1396.9	0.0						
1396.2	0.7	CL	LEAN CLAY, black, moist. (Topsoil)	6			
		CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium. (Glacial Till)	8			
1389.9	7.0	CL	SANDY LEAN CLAY, with GRAVEL, brown to gray, moist, very stiff to hard. (Glacial Till)	28			
			-gray below 14 1/2 feet.	39		18	
				40			
1373.9	23.0	CH	FAT CLAY, (SHALE), gray, moist, very stiff. (Weathered Bedrock)	23		26	
				21			
1365.9	31.0		END OF BORING.	31			
			Water not observed with 29 1/2 feet of hollow stem auger in the ground.				
			Boring then backfilled with Grout.				

(See Descriptive Terminology sheet for explanation of abbreviations)

BRAUN BASIC LOG 04918.GPJ BRAUN.GDT 1/2/08 14:47

# GRAIN SIZE ACCUMULATION CURVE (ASTM)



**CLASSIFICATION:**  
 SANDY LEAN CLAY (CL)  
 LL=35, PL=15, PI=20

GRAVEL	SAND	SILT	CLAY
10.0%	33.6%	25.0%	31.4%

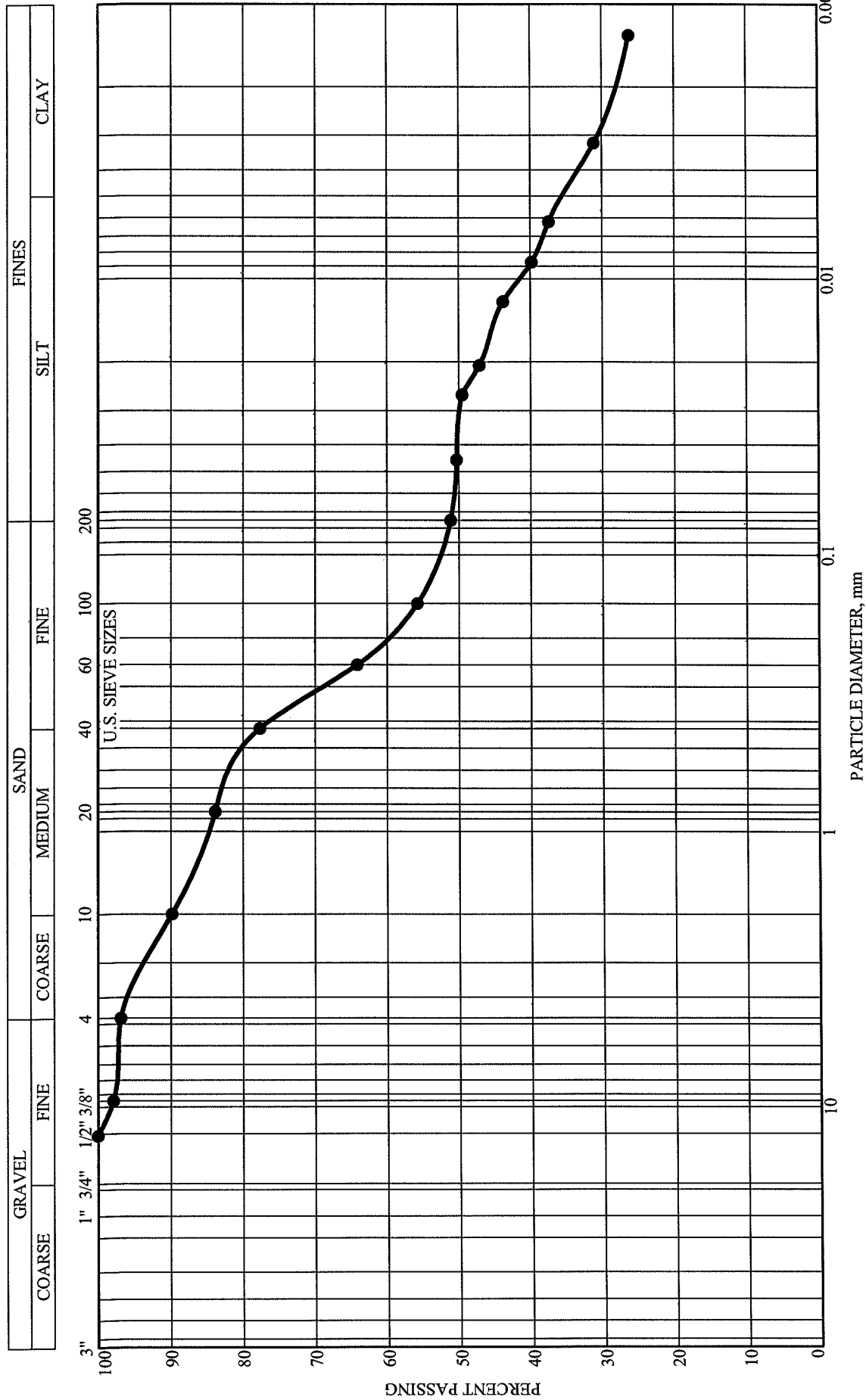
**Braun Project FA-07-04918**  
 Geotechnical Evaluation  
 Inert Landfill Site Selection  
 County Highway 17  
 Valley City, North Dakota  
 BORING: ST-01 DEPTH: 32.0'-33.5'



Braun Intertec Corporation

FA-07-04918

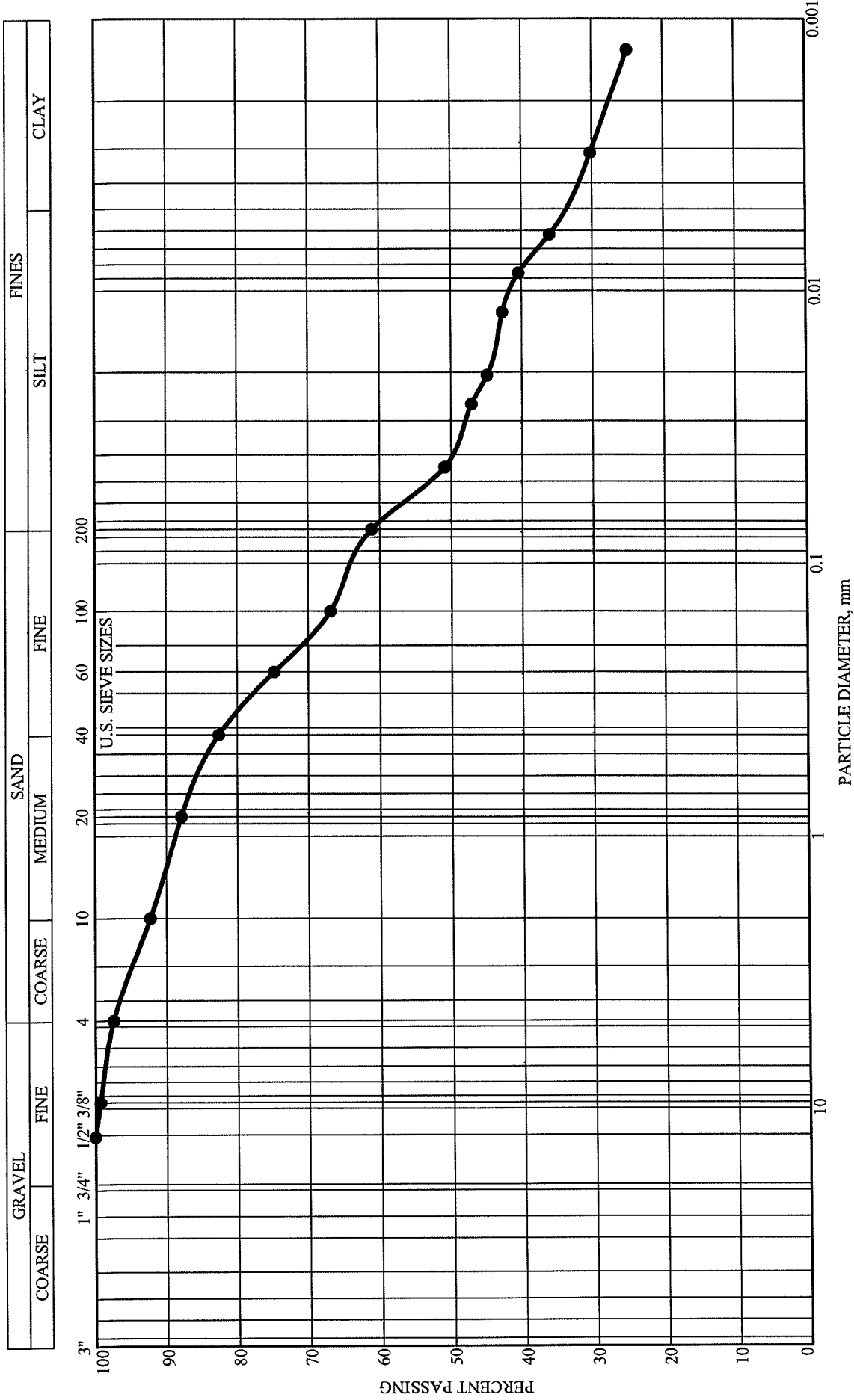
# GRAIN SIZE ACCUMULATION CURVE (ASTM)



<b>BRAUN</b> <sup>SM</sup> <b>INTERTEC</b>	<b>Braun Project FA-07-04918</b> Geotechnical Evaluation Inert Landfill Site Selection County Highway 17 Valley City, North Dakota BORING: ST-05 DEPTH: 29.5'-31.0' Braun Intertec Corporation	<b>CLASSIFICATION:</b> SANDY LEAN CLAY (CL) LL=48, PL=22, PI=26
GRAVEL SAND SILT CLAY	3.1% 45.7% 15.8% 35.4%	FINES SILT CLAY



# GRAIN SIZE ACCUMULATION CURVE (ASTM)



**CLASSIFICATION:**  
 SANDY LEAN CLAY (CL)  
 LL=45, PL=20, PI=25

GRAVEL 2.6%  
 SAND 36.3%  
 SILT 26.9%  
 CLAY 34.2%

**Braun Project FA-07-04918**  
 Geotechnical Evaluation  
 Inert Landfill Site Selection  
 County Highway 17  
 Valley City, North Dakota  
 BORING: ST-08 DEPTH: 27'-0"-28.5'



Braun Intertec Corporation

FA-07-04918

## **APPENDIX D: SOIL SURVEY REPORT (REVISED MAY 2018)**

# **Soil Survey Report**

**of**

**Portions of the Northeast 1/4 of Section 31,  
Township 140 N., Range 58 W.  
in Barnes County, North Dakota**

**Prepared for**

**City of Valley City, ND  
254 2<sup>nd</sup> Avenue NE  
Valley City, ND 58072**

**and**

**Kadrmass, Lee, and Jackson  
P. O. Box 937  
Valley City, North Dakota 58072-0937**

**Prepared by**

**Prairie Soil Consulting, LLC**

**CJ Heidt and Mike Ulmer  
Registered Professional Soil Classifiers  
Bismarck, North Dakota**

**Revised - May 2018  
Original - January 2008**

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## **I. Introduction**

### **Scope of Project**

The City of Valley City, North Dakota contracted with Prairie Soil Consulting, LLC of Bismarck, North Dakota to conduct a soil resource evaluation and prepare a high intensity soil survey for a parcel of land in Barnes County, North Dakota. The company of Kadrmas, Lee, and Jackson of Valley City, North Dakota facilitated the project. The purpose of the evaluation was partial fulfillment of licensing requirements for obtaining a permit to develop a Solid Waste Landfill from the North Dakota State Health Department.

The area of consideration consisted of approximately 31 acres in the southwest ¼ of the northeast ¼ of Sec. 31, T. 140 N., R. 58 W. in Barnes County, North Dakota. The area is approximately 2 miles southwest of Valley City, North Dakota. The evaluation included the preparation or collection of:

1. High intensity soil survey
2. Map unit legend and map unit and taxonomic unit descriptions
3. Appropriate sample collection and laboratory analyses
4. Classification of the soils
5. Pertinent interpretations.

In the area, the land use was harvested annual crop. Fieldwork was completed in October of 2007, laboratory analyses in December of 2007, and report writing in January of 2008.

### **Soils and Natural Setting**

The project area is on an undulating late Wisconsin-aged till plain. This area occurs in the Northern Glaciated Plains Level III Ecoregion and the Drift Plains Level IV Ecoregion (Bryce et. al., 1996). Bryce states “The Northern Glaciated Plains Ecoregion is characterized by a flat to gently rolling landscape composed of glacial drift. The subhumid conditions foster a grassland transitional between the tall and shortgrass prairie. High concentrations of temporary and seasonal wetlands create favorable conditions for duck nesting and migration. Though the till soil is very fertile, agricultural success is subject to annual climatic fluctuations.”

The Drift Plains consists of a subtle undulating topography and a thick mantle of glacial till. Because of the productive soil and level topography, this ecoregion is almost entirely cultivated, with many wetlands drained or simply tilled and planted. Elevation in the area ranges from 1080 to 2000 feet; local relief ranges from nearly level to 200 feet. Average precipitation is approximately 18 inches and the frost-free period is 95 to 125 days (USDA-SCS, 1981). Native vegetation consisted of western wheatgrass, big and little bluestem, switchgrass, and indiangrass.

The major soils in the area are Mollisols (Calcudolls, Calciaquolls, Hapludolls, Natrudolls). They are deep and mostly well drained. Soils on summit or convex landscape positions have thinner mollic epipedons while backslopes through toeslopes have thicker mollic

epipedons. Glacial erratics, consisting of large stones, commonly occur. An Order Two-soil survey has been completed by the USDA-NRCS (Attachment 1a; Opdahl et. al., 1990).

## **II. Methods**

### **Soil Survey**

The soil survey was conducted under the standards and guidelines of the National Cooperative Soil Survey (USDA-SCS, 1982) with modifications to these procedures to allow the development of a High Intensity Soil Survey. Field mapping was done on a paper reproduction at a scale of approximately 1:4,800. The scale was adequate for the complexity of the landscape and soil variability. The overriding influence on the design of map units was an accurate estimation of soil and landscape properties affecting suitable plant growth materials (SPGM) and crop production. Soil morphology; including depth to lime, depth of argillic horizon, natural soil drainage, depth to unweathered till; and depth of mollic epipedon were evaluated. Soil chemistry, parent material, vegetation and slope and landform characteristics were all additional map unit design parameters. All map units were designed as consociations. An attempt was made to limit inclusions in map unit delineations that would affect estimations of SPGM. No spot symbols were used in the mapping legend because of the difficulty in interpreting and determining acreage.

The area was mapped utilizing a close order traverse. Continuous landscape observations along the transverse were made. Soils at over 50 sites were observed and evaluated using a Giddings hydraulic soil probe and spade and auger. Eight sites were selected to represent the major taxonomic units that occurred in the project area. Soils at these sites were described in detail according to Schoeneberger et. al. (2002) and classified based on Soil Taxonomy (USDA-NRCS, 2006). Soils at seven sites were selected to represent the chemical and physical properties of soils in the project and were sampled for characterization analyses. Field textures were used to determine the particle-size family. Soils were described to 60 inches.

A draft survey plan was submitted to and approved by Steve Tillison, Assistant Director, Solid Waste Division, North Dakota State Health Department, prior to initiating the project.

### **Laboratory Analyses**

Selected horizons from seven soils representing the major taxonomic units in the area were sampled for laboratory characterization of the major properties affecting SPGM. Key horizons were selected from these soils to represent important soil horizons. By extrapolating between these horizons, the entire range and variability in selected soil properties in the project area could be obtained. This approach to sampling is valid because of the uniformity in the soil's parent material in the project area. Laboratory analyses were conducted by the Minnesota Valley Testing Laboratory in Bismarck, North Dakota using standard soil analytical procedures. Analyses included:

- Sodium adsorption ratio (SAR);
- pH
- Electric conductivity (EC)
- Major cations

Organic matter (OM)  
Particle size analyses

**Interpretations**

Suitable Plant Growth Material (SPGM or topsoil and associated soil horizons) and subsoil can be determined using depths from representative taxonomic units, results from laboratory analyses, and map unit acreage. The high intensity soil survey of the project area (See Appendix 2) can be used to determine acreage of the various soil components. It is recommended that calculations of SPGM be made to 60 inches and reported to the nearest cubic yard for each map unit and the total project area.

The criteria and procedures for determining SPGM as defined by the North Dakota State Health Department can be found in Guideline #26 – *Soil Surveys and Management of Suitable Plant Growth Material (SPGM) and Plant Rooting Soil For North Dakota Solid Waste Disposal Facilities* (see Health Dept. web site for details). Criteria for SPGM is summarize in Table 1.

**Table 1. SPGM and Subsoil criteria**

Parameter	SPGM	Subsoil
Presence of lime	Noncalcareous	Not specified
Soil color	Dark	Not specified
Electrical conductivity	<2 mmhos/cm	<4 mmhos/cm
Sodium adsorption ratio	<4	<10
Organic matter	≥ 1.0 percent	Not specified
Texture	Moderately-coarse or finer	Moderately-coarse or finer

Prime farmland was determined from the high intensity soil survey and from USDA-NRCS Web soil survey map at 1:20,000 (Soil Survey Staff 2008).

Hydric soils were identified in the field using procedures outlined in *Field Indicators of Hydric Soils in the United States* (USDA-NRCS, 2006). However, formal wetland delineation was not part of this project.

Soil productivity indexes for the High Intensity Soil Survey were derived from the Soil Survey of Barnes County, North Dakota (Opdahl et. al., 1990). Adjustments were made to these figures to obtain ratings for soils or soil phases not identified in the published soil survey by considering similar soils and soil properties such as depth to saturation, natural drainage, and landscape position material. Soil productivity indexes are shown for drained phases of the soils.

CJ Heidt and Mike Ulmer, Registered Professional Soil Classifiers in North Dakota, conducted all work.

### III. Results and Discussion

#### Soil Survey

A high intensity soil survey at a scale of approximately 1:4,800 for the project area can be found in Appendix 2. The area generally consisted of level to gently undulating till, with areas of local alluvium. The most extensive soils on the level and gently undulating areas were phases of the Svea, Barnes, and Wyard soils. A concave phase of the Darnen soil was found in a swale along the western edge of the project area. These soils consisted of a fine-loamy glacial till. The small, steeper area in the southwest portion of the project consisted of the relatively thin Buse soil. A lacustrine area occurred in the northcentral portion of the project area. The Badger, Colvin and Parnell soils were found associated with this landform. The Parnell soils are very poorly drained; however, artificial drainage has occurred in this area.

Eight taxonomic units and 10 map units were recognized in the project area. A numerical legend is shown in Table 2.

**Table 2. Numerical Legend**

Symbol	Map Unit Name
1A	Parnell silty clay, 0 to 1 percent slopes
2A	Badger silty clay, 0 to 1 percent slopes
3A	Colvin silty clay loam, 0 to 1 percent slopes
4A	Hamerly loam, 0 to 3 percent slopes
5B	Darnen loam, 3 to 6 percent slopes
6A	Wyard loam, 0 to 3 percent slopes
7A	Svea loam, 1 to 3 percent slopes
7B	Svea loam, 3 to 6 percent slopes
8B	Barnes loam, 3 to 6 percent slopes
10B	Buse loam, 3 to 6 percent slopes

#### Map Unit Descriptions

##### **1A – Parnell silty clay, 0 to 1 percent slopes**

These level, deep, very-poorly soils occurred in a shallow depression along the north boundary of the project area. Slopes were generally plane to slightly concave. These soils formed in fine-textured alluvium. Included with these soils are small areas of Badger and Colvin soils. The inclusions were of minor extent. For a detailed soil profile description of Parnell silty clay, see Taxonomic Unit Descriptions, Appendix 3.

Generally, the soil material to 60 inches in the Parnell silty clay qualifies as either SPGM or subsoil material. The two materials are separated by the presence of lime. The subsoil of the Parnell soil (generally the 11 to 39 inch depth) has a clay increase and is fine textured. This material qualifies as SPGM but, depending on the amount of SPGM in the project area, may be better suited as subsoil material.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively.

### **2A – Badger silty clay, 0 to 1 percent slopes**

These level, deep, somewhat poorly soils were associated with a shallow depression found along the north boundary of the project area. Slopes were generally plane to slightly concave. These soils formed in fine-textured alluvium. Included with these soils are small areas of Colvin, Parnell, and Wyard soils. The inclusions were of minor extent. For a detailed soil profile description of Badger silty clay, see Taxonomic Unit Descriptions, Appendix 3.

Generally, the soil material to 60 inches in the Badger silty clay qualifies as either SPGM or subsoil material. The two materials are separated by the presence of lime. The subsoil of the Badger soil (generally the 8 to 31 inch depth) has a clay increase and is fine textured. This material qualifies as SPGM but, depending on the amount of SPGM in the project area, may be better suited as subsoil material.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively.

### **3A – Colvin silty clay loam, 0 to 1 percent slopes**

These level, deep, poorly drained soils occurred on slight rises surrounding depressions. Slopes were generally slightly convex to linear. These soils are formed in moderately fine textured lacustrine or alluvium deposits. Included with these soils are small areas of Badger and Parnell soils. The inclusions were of minor extent. For a detailed soil profile description of Colvin silty clay loams, see the Taxonomic Unit Descriptions, Appendix 3.

Carbonates (lime) were typically found at the surface of the Colvin soils. However, because the amount of lime was low and the amount of organic matter was high, the surface layer was considered appropriate as SPGM. Below the surface, to a depth of 60 inches, qualifies as subsoil material. The subsoil material is generally too high in carbonates to qualify as SPGM

Table 5 is provided as a template to calculate estimates of SPGM volumes. For selected agronomic and landfill interpretations see Table 6 and 7, respectively.

### **4A – Hamerly loam, 0 to 3 percent slopes**

These level, deep, somewhat-poorly drained soils occurred on slight rises or intermingled with wetter soils. Slopes were generally slightly convex to linear. These soils are formed in medium glacial till. Included with these soils are small areas of Svea and Wyard soils. The inclusions were of minor extent. For a detailed soil profile description of Hamerly loams, see the Taxonomic Unit Descriptions, Appendix 3.

Carbonates (lime) were typically found at the surface of the Hamerly soils. However, because the amount of lime was low and the amount of organic matter was high, the surface

layer was considered appropriate as SPGM. Below the surface, to a depth of 60 inches, qualifies as subsoil material. The subsoil material is generally too high in carbonates to qualify as SPGM material.

Table 5 is provided as a template to calculate estimates of SPGM volumes. For selected agronomic and landfill interpretations see Table 6 and 7, respectively.

### **5B – Darnen loam, 3 to 6 percent slopes**

These gently undulating, deep, well drained soils occurred in swales. Slopes were generally concave. These soils are formed in local colluvium and alluvium over medium textured glacial till. Included with these soils are small areas of Barnes and Svea soils. The inclusions were of minor extent. For a detailed soil profile description of Darnen loam, see the Taxonomic Unit Descriptions, Appendix 3.

The A and Bw horizons of the Darnen soils qualify as SPGM and coincide with the depth of carbonates. The rest of the 60-inch profile qualifies as subsoil material. The thickness of the SPGM material averages about 37 inches but ranges from 32 to 40 inches. The subsoil material is generally too high in carbonates to qualify as SPGM material. It is visually differentiated from the SPGM material by the lighter color and higher carbonate content.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively

### **6A - Wyard loam, 0 to 3 percent slopes**

These nearly level, deep, somewhat-poorly drained soils occurred on lower sideslopes and flats. Slopes were generally linear. These soils are formed in medium textured glacial till with a mantle of alluvium. Included with these soils are small areas of Svea and Badger soils. The inclusions were of minor extent. For a detailed soil profile description of Wyard loam, see the Taxonomic Unit Descriptions, Appendix 3.

The A and Bw horizons of the Wyard soil qualify as SPGM and coincide with the depth of carbonates. The rest of the 60-inch profile qualifies as subsoil material. The thickness of the SPGM material averages about 21 inches, but ranges from about 18 to 25 inches. The subsoil material is generally too high in carbonates to qualify as SPGM material. It is visually differentiated from the SPGM material by the lighter color and higher carbonate content.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively.

### **7A - Svea loam, 1 to 3 percent slopes**

These nearly level, deep, moderately well drained soils occurred on flats. Slopes were generally linear. These soils are formed in medium textured glacial till. Included with these soils are small areas of Barnes, Hamerly, and Wyard soils. The inclusions were of minor extent. For a detailed soil profile description of Svea loam, see the Taxonomic Unit Descriptions, Appendix 3.

The A and Bw horizons of the Svea soils qualify as SPGM and coincide with the depth of carbonates. The rest of the 60-inch profile qualifies as subsoil material. The thickness of the SPGM material averages about 28 inches, but ranges from about 24 to 30 inches. The subsoil material is generally too high in carbonates to qualify as SGPM material. It is visually differentiated from the SPGM material by the lighter color and higher carbonate content.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively.

### **7B- Svea loam, 3 to 6 percent slopes**

These gently undulating, deep, well-drained soils occurred in swales. Slopes were generally linear or slightly convex. These soils are formed in medium textured glacial till. Included with these soils are small areas of Barnes soils. The inclusions were of minor extent. For a detailed soil profile description of Svea loam, see the Taxonomic Unit Descriptions, Appendix 3.

The A and Bw horizons of the Svea soils qualify as SPGM and coincide with the depth of carbonates. The rest of the 60-inch profile qualifies as subsoil material. The thickness of the SPGM material averages about 28 inches, but ranges from about 24 to 30 inches. The subsoil material is generally too high in carbonates to qualify as SGPM material. It is visually differentiated from the SPGM material by the lighter color and higher carbonate content.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively

### **8B – Barnes loam, 3 to 6 percent slopes**

These gently sloping, deep, well drained soils occurred on sideslopes. Slopes were generally linear. These soils are formed in medium textured glacial till. Included with these soils are small areas of Svea and Buse soils. The inclusions were of minor extent. . For a detailed soil profile description of Barnes loam, see the Taxonomic Unit Descriptions, Appendix 3.

The A and Bw horizons of the Barnes soils qualify as SPGM and coincide with the depth of carbonates. The rest of the 60-inch profile qualifies as subsoil material. The thickness of the SPGM material averages about 15 inches, but ranges from about 14 to 18 inches. The subsoil material is generally too high in carbonates to qualify as SGPM material. It is visually differentiated from the SPGM material by the lighter color and higher carbonate content.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively.

### **10B – Buse loams, 3 to 6 percent slopes**

These gently undulating, deep, well drained soils occurred on slope shoulders. Slopes were generally convex. These soils are formed in medium textured glacial till. Included with these soils are small areas of Svea and Buse soils. The inclusions were of minor extent. For a detailed soil profile description of Barnes loam, see the Taxonomic Unit Descriptions, Appendix 3.

Carbonates (lime) were typically found at the surface of the Buse soils. However, because the amount of lime was low and the amount of organic matter was high, the surface layer was considered appropriate as SPGM. Below the surface, to a depth of 60 inches, qualifies as subsoil material. The subsoil material is generally too high in carbonates to qualify as SPGM material.

Estimated volumes of SPGM and subsoil are shown in Table 4. Selected agronomic and landfill interpretations are shown in Table 5 and 6, respectively.

### **Soil Taxonomic Units**

The soils in the study are Mollisols that have a Typic-Udic or Aquic soil moisture regime and a frigid soil temperature regime. Soil taxonomic unit descriptions can be found in Appendix 3. Soil classification is shown in Table 3.

**Table 3. Soil Classification.**

<b>Taxonomic Unit</b>	<b>Classification</b>
Badger	Fine, smectitic, frigid Vertic Argiaquolls
Barnes	Fine-loamy, mixed, superactive, frigid Calcic Hapludolls
Buse	Fine-loamy, mixed, superactive, frigid Typic Calciudolls
Colvin	Fine-silty, mixed, superactive, frigid Typic Calciaquolls
Hamerly	Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls
Parnell	Fine, smectitic, frigid Vertic Argiaquolls
Svea	Fine-loamy, mixed, superactive, frigid Pachic Hapludolls
Wyand	Fine-loamy, mixed, superactive, frigid Typic Endoaquolls

### **Laboratory Analyses**

Laboratory analyses are shown in Appendix 4 (original data sheets available upon request). Seven taxonomic units were selected for characterization. These included: Badger silty clay, Barnes loam, Buse loam, Colvin silty clay loam, Hamerly loam, Parnell silty clay,



Svea loam, and Wyard loam. A total of 23 samples were submitted for analyses. In many cases the entire soil profile was not sampled but significant horizons were selected from the soil profile to represent the soil material throughout the project area. For example, if two Bk horizons were similar only one was selected for characterization. This sampling design eliminated redundancy in the analyses. Because of the uniformity in the soil parent material and the limited size of the project area, this approach adequately represented the soils in the project area as outlined in Guideline #26 – *Soil Surveys and Management of Suitable Plant Growth Material (SPGM) and Plant Rooting Soil For North Dakota Solid Waste Disposal Facilities* (see Health Dept. web site for details).

The soils all had high levels of organic matter (OM) in the surface and medium levels in the subsurface horizons. Organic matter would not limit this material for SPGM or subsoil material.

Electrical conductivity (EC) generally was low in both the surface and subsoils. The Parnell surface had a EC above 4 dS/m but the subsoil horizon directly below the surface had a EC below 1 dS/m. Likely the surface reading is either an anomaly or an error. The ECs of the substratums of the Badger and Hamerly soils were around 6 dS/m, much less than the limiting EC for subsoil (10 dS/m).

The Sodium Absorption Ratio (SAR) was also generally low in the surface and subsoils. Only the substratum of the Badger and Svea soils had SARs above the threshold value to qualify for SPGM.

The presence of lime is the soil characteristic that limits these soils qualifying as SPGM. Generally, the lower subsoils were calcareous and had enough carbonates to restrict their use as topsoil. The surfaces of the Typic Calcudolls (Buse soils) and the Calciaquolls (Colvin and Hamerly soils) had low levels of free carbonates. However, since the amount of lime was low and amount of organic matter was high, it was decided to include the surface horizons of these soils in SPGM. The presence of lime is not a limitation for subsoil materials.

## **Interpretations**

### Suitable Plant Growth Materials

Soil morphology and laboratory analyses were used to determine SPGM and subsoil thickness to a depth of 60 inches. For some soil layers, field observations were used to determine in the material would be best suited for SPGM or subsoil. Table 4 is a template for estimating volumes of SPGM and subsoil to 60 inches.

**Table 4. Volume of Suitable Plant Growth Material and Subsoil Material**

<b>Map Unit Symbol</b>	<b>Map Unit Name</b>	<b>Acres</b>	<b>SGPM Depth (inches)</b>	<b>SGPM Volume (cubic yards)<sup>1</sup></b>	<b>Subsoil Thickness (inches)</b>	<b>Subsoil Volume (cubic yards)<sup>1</sup></b>	<b>Total Volume (cubic yards)<sup>1</sup></b>
1A	Parnell silty clay, 0 to 1 percent slopes	1.3	39	6816	21	3670	10486
2A	Badger silty clay, 0 to 1 percent slopes	9.4	18	22748	42	53078	75826
3A	Colvin silty clay loam, 0 to 1 percent slopes	1.6	6	1291	54	11616	12907
4A	Hamerly loam, 0 to 3 percent slopes	2.5	7	2353	53	17814	20167
5B	Darnen loam, 3 to 6 percent slopes	0.6	37	2985	23	1855	4840
6A	Wyard loam, 0 to 3 percent slopes	2.5	21	7058	39	13108	20166
7A	Svea loam, 1 to 3 percent slopes	6.7	28	25222	32	28825	54047
7B	Svea loam, 3 to 6 percent slopes	5.0	28	18822	32	21511	40333
8B	Barnes loam, 3 to 6 percent slopes	1.2	15	2420	45	7260	9680
10B	Buse loam, 3 to 6 percent slopes	0.2	7	188	53	1425	1613
<b>TOTAL</b>		<b>31.0</b>		<b>89903</b>		<b>160162</b>	<b>250065</b>

<sup>1</sup> Rounded to the nearest cubic yard.

#### Prime Farmlands

High intensity soil survey map units qualifying as prime farmland are shown in Table 5. Prime farmlands delineated in the Order 2 soil survey (Soil Survey Staff, 2008) is shown in Appendix 1b.

#### Hydric Soils

Map units 1A; Parnell silty clay, 0 to 1 percent slopes and 3A; Colvin, silty clay loam, 0 to 1 percent slopes are dominated by hydric soils. Formal wetland delineation was not made.

#### Agronomic Ratings

Selected agronomic ratings for map units can be found in Table 5. Data for this table, for the most part, can be found in the USDA-NRCS Field Office Technical Guide for Barnes County. Values were extrapolated from similar soils for series and series phases not mapped in the progressive survey (Opdahl et. al., 1990).

**Table 5. Agronomic Ratings (drained interpretations, where applicable)**

Map Unit	Land Capability Class	Productivity Index	Wind Erodibility Group	K Factor	Runoff	Ecological Site	Important Farmland <sup>1</sup>
1A	3w	85	4	0.28	Medium	Wetland	Other
2A	2e	90	4	0.28	Medium	Clayey	Prime
3C	2w	70	4L	0.28	Medium	Wet meadow	Prime
4A	2e	85	4L	0.24	Medium	Subirrigated	Prime
5B	2e	95	6	0.24	Medium	Loamy overflow	Prime
6A	2c	90	6	0.24	Medium	Loamy	Prime
7A	2c	100	6	0.24	Medium	Loamy	Prime
7B	2e	95	6	0.24	Medium	Loamy	Prime
8B	2e	80	6	0.24	Medium	Loamy	Prime
10B	3e	57	4L	0.28	Medium	Thin upland	Prime

<sup>1</sup>Other land as defined in the USDA-NRCS Technical Guide

#### Sanitary Landfill

Selected ratings for map units used for sanitary landfills can be found in Table 6. Data for this table, for the most part, can be found in the USDA-NRCS Field Office Technical Guide for Barnes County. Values were extrapolated from similar soils for series and series phases not mapped in the progressive survey (Opdahl et. al., 1990).

**Table 6. Sanitary Ratings**

Map Unit	Sanitary Landfill (Trench)	Sanitary Landfill (Area)	Daily Cover for Landfill
1A	Very limited (depth to saturation)	Very limited (depth to saturation)	Very limited (depth to saturation)
2A	Very limited (depth to saturation)	Very limited (depth to saturation)	Very limited (too clayey)
3A	Very limited (depth to saturation)	Very limited (depth to saturation)	Very limited (depth to saturation)
4A	Very limited (depth to saturation)	Very limited (depth to saturation)	Somewhat limited (depth to saturation)
5B	Very limited (depth to saturation)	Very limited (depth to saturation)	Not limited
6A	Very limited (depth to saturation)	Very limited (depth to saturation)	Very limited (depth to saturation)
7A	Very limited (depth to saturation)	Very limited (depth to saturation)	Not limited
7B	Very limited (depth to saturation)	Very limited (depth to saturation)	Not limited

8B	Very limited (depth to saturation)	Very limited (depth to saturation)	Not limited
10B	Not limited	Not limited	Not limited

#### IV. Citations

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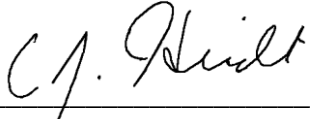
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## Signatures

This soil survey report was completed by Registered Professional Soil Classifiers:

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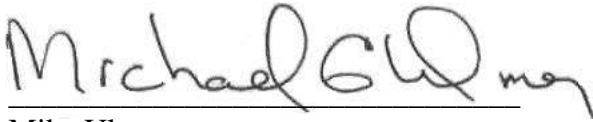
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C. J. Heidt

Registered Professional Soil Classifier ND (No. 36)

Certified Professional Soil Scientist/Soil Classifier ARCPACS (No. 0879)

Certified Professional Wetland Scientist - SWS (No. 1577)



---

Mike Ulmer

Registered Professional Soil Classifier (58)

Certified Professional Soil Scientists/Soil Classifier ARCPACS (NO. 02255)

## V. Appendixes

### Appendix 1a. Order 2 Soil Survey (Soil Survey Staff, 2008)



**Barnes County, North Dakota USDA-NRCW Web Soil Survey Legend (Soil Survey Staff, 2008)**

<b>Map Unit</b>	<b>Map Unit Name</b>
<b>3</b>	<b>Parnell silty clay loam, 0 to 1 percent slopes</b>
<b>14C</b>	<b>Barnes-Buse loams, 6 to 9 percent slopes</b>
<b>17B</b>	<b>Barnes-Svea loams, 3 to 6 percent slopes</b>
<b>65</b>	<b>Svea-Barnes loams, 0 to 3 percent slopes</b>
<b>66</b>	<b>Hamerly-Wyard loams, 0 to 3 percent slopes</b>
<b>100</b>	<b>Pits, dumps</b>

# Appendix 1b. Order 2 Prime farmland





## Farmland Classification

Farmland Classification— Summary by Map Unit — Barnes County, North Dakota				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Parnell silty clay loam, 0 to 1 percent slopes	Not prime farmland	6.3	19.8%
14C	Barnes-Buse loams, 6 to 9 percent slopes	Not prime farmland	0.2	0.7%
17B	Barnes-Svea loams, 3 to 6 percent slopes	All areas are prime farmland	14.8	46.3%
65	Svea-Barnes loams, 0 to 3 percent slopes	All areas are prime farmland	3.5	10.8%
66	Hamerly-Wyard loams, 0 to 3 percent slopes	Prime farmland if drained	7.1	22.1%
100	Pits, dump	Not prime farmland	0.1	0.3%
Totals for Area of Interest (AOI)			32.0	100.0%

### Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

### Rating Options

*Aggregation Method:* No Aggregation Necessary

*Tie-break Rule:* Lower

## Appendix 2. High Intensity Soil Survey



### High Intensity Soil Survey Numerical Legend

<b>Symbol</b>	<b>Map Unit Name</b>
1A	Parnell silty clay, 0 to 1 percent slopes
2A	Badger silty clay, 0 to 1 percent slopes
3A	Colvin silty clay loam, 0 to 1 percent slopes
4A	Hamerly loam, 0 to 3 percent slopes
5B	Darnen loam, 3 to 6 percent slopes
6A	Wyard loam, 0 to 3 percent slopes
7A	Svea loam, 1 to 3 percent slopes
7B	Svea loam, 3 to 6 percent slopes
8B	Barnes loam, 3 to 6 percent slopes
10B	Buse loam, 3 to 6 percent slopes

### Appendix 3. Taxonomic Unit Descriptions

#### **SERIES: Badger**

#### **TAXONOMIC CLASS: Fine, smectitic, frigid Vertic Argiaquolls**

(Colors are for moist soil)

**Ap**--0 to 8 inches; black (10YR 2/1) silty clay; moderate fine and medium cloddy structure; firm; common very roots.

**Bt**--8 to 18 inches; very dark gray (10YR 3/1) silty clay; moderate fine and medium prismatic structure parting to moderate fine and medium angular blocky; firm; common very fine roots.

**Bk**--18 to 31 inches; dark grayish brown (2.5Y 4/2) silty clay; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; firm; common very fine roots; violent effervescence.

**2C1**--31 to 41 inches; brown (10YR 4/3) coarse sandy loam; many fine and medium yellowish brown (10YR 5/6) redoximorphic concentrations; massive; loose; about 5 percent rock fragments; strong effervescence.

**3C2**--41 to 60 inches; olive brown (2.5Y 4/3) clay loam; many fine and medium yellowish brown (10YR 5/6) and few medium strong brown (7.5YR 5/6) redoximorphic concentrations; massive; friable; about 2 percent rock fragments; common fine and medium masses of gypsum in upper part; slight effervescence.

#### **SERIES: Barnes**

#### **TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Calcic Hapludolls**

(Colors are for moist soil)

**Ap**--0 to 6 inches; black (10YR 2/1) loam; moderate fine and medium subangular blocky structure; friable; common very roots; about 1 percent rock fragments.

**Bw**--6 to 15 inches; dark brown (10YR 3/3) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky structure; friable; common very fine roots; about 1 percent rock fragments.

**Bk**-- 15 to 29 inches; dark grayish brown (2.5Y 4/2) clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 3 percent rock fragments; common medium and coarse masses of carbonate; violent effervescence.

**Bck**--29 to 40 inches; olive brown (2.5Y 4/3) clay loam; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; about 3 percent rock fragments; common fine and medium masses of carbonates; strong effervescence.

**C**--40 to 60 inches; olive brown (2.5Y 4/3) clay loam; massive; firm; about 3 percent rock fragments; slight effervescence.

**SERIES: Buse**

**TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Typic Calcudolls**

(Colors are for moist soil)

**Ap**--0 to 7 inches; very dark grayish brown (10YR 3/2) loam; moderate fine and medium granular structure; friable; common very roots; about 3 percent rock fragments: slight effervescence.

**Bk1**--7 to 20 inches; olive brown (2.5Y 4/3) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 3 percent rock fragments; common fine and medium masses of carbonate; violent effervescence.

**Bk2**--20 to 31 inches; dark grayish brown (2.5Y 4/2) clay loam; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 5 percent rock fragments; thin sand lens at the base; common medium and coarse masses of carbonates; violent effervescence.

**C**--31 to 60 inches; olive brown (2.5Y 4/3) clay loam; massive; friable; about 3 percent rock fragments; slight effervescence.

**SERIES: Colvin**

**TAXONOMIC CLASS: Fine-silty, mixed, superactive, frigid Typic Calciaquolls**

(Colors are for moist soil)

**Ap**--0 to 6 inches; black (10YR 2/1) silty clay loam; moderate medium cloddy structure; friable; common very roots; slight effervescence.

**Bk1**--6 to 16 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many fine yellowish brown (10YR 5/6) redoximorphic concentrations; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few fine masses of carbonates; strong effervescence.

**Bk2**--16 to 30 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine yellowish brown (10YR 5/6) redoximorphic concentrations; moderate coarse prismatic

structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; few fine masses of carbonates; strong effervescence.

**Bck**--30 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine yellowish brown (10YR 5/6) redoximorphic concentrations; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; few fine masses of carbonates; strong effervescence.

**C**--38 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine yellowish brown (10YR 5/6) redoximorphic concentrations; massive; friable; strong effervescence.

**SERIES: Darnen**

**TAXONOMIC CLASS:** Fine-loamy, mixed, superactive, frigid Cumulic Hapludolls  
(Colors are for moist soil)

**Ap/A**--0 to 20 inches; black (10YR 2/1) loam; weak fine granular structure in the upper part and moderate fine and medium subangular blocky in the lower part; very friable; common very fine roots.

**Bw**--20 to 37 inches; very dark grayish brown (10YR 3/2) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; very friable; common very fine roots.

**Bk**--37 to 52 inches; dark grayish brown (2.5Y 4/2) loam; weak coarse prismatic structure parting to weak medium subangular blocky; very friable; violent effervescence.

**2C**—52 to 60 inches; olive brown (2.5Y 4/3) clay loam; massive; friable; about 2 percent rock fragments; strong effervescence.

**SERIES: Hamerly**

**TAXONOMIC CLASS:** Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls

(Colors are for moist soil)

**Ap**--0 to 7 inches; black (10YR 2/1) loam; weak fine cloddy structure; friable; common very roots; about 1 percent rock fragments; slight effervescence.

**Bk1**--7 to 15 inches; brown (10YR 4/3) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 10 percent rock fragments; few shale fragments; violent effervescence.

**Bk2**--15 to 24 inches; olive brown (2.5Y 4/3) loam; few fine light olive brown (2.5Y 5/6) redoximorphic concentrations; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 2 percent rock fragments; few shale fragments; few fine masses of carbonates; violent effervescence.

**Bck**--24 to 35 inches; olive brown (2.5Y 4/3) clay loam; common fine yellowish brown (10YR 5/6) redoximorphic concentrations; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; few very fine roots; about 3 percent rock fragments; few shale fragments; strong effervescence.

**C**--35 to 60 inches; olive brown (2.5Y 4/3) clay loam; common fine yellowish brown (10YR 5/6) and few fine strong brown (7.5YR 5/6) redoximorphic concentrations; massive; friable; about 3 percent rock fragments; slight effervescence.

**SERIES: Parnell**

**TAXONOMIC CLASS: Fine, smectitic, frigid Vertic Argiaquolls**

(Colors are for moist soil)

**Ap/A**--0 to 11 inches; black (10YR 2/1) silty clay; moderate fine and medium cloddy structure; firm; common very roots.

**Bt1**--11 to 22 inches; very dark grayish brown (10YR 3/2) silty clay; weak medium prismatic structure parting to moderate fine angular blocky and subangular blocky; firm; common very fine roots; tongues of A material extends to 30 inches.

**Bt2**--22 to 39 inches; very dark gray (10YR 3/1) silty clay; weak medium prismatic structure parting to moderate fine and medium angular blocky and subangular blocky; firm; few very fine roots.

**Bk**--39 to 47 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine light olive brown (2.5Y 5/6) redoximorphic concentrations; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; strong effervescence.

**Bck**--47 to 56 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine light olive brown (2.5Y 5/6) redoximorphic concentrations; massive; friable; strong effervescence.

**C**--56 to 60 inches; olive brown (2.5Y 4/3) silty clay loam; common fine and medium light olive brown (2.5Y 5/6) redoximorphic concentrations; massive; friable; slight effervescence.

**SERIES: Svea**

**TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Pachic Hapludolls**

(Colors are for moist soil)

**Ap/A**--0 to 12 inches; black (10YR 2/1) loam; weak fine and medium subangular blocky structure in the upper part and moderate fine and medium subangular blocky in the lower part; very friable; common very roots; about 1 percent rock fragments.

**Bw**--12 to 28 inches; very dark grayish brown (10YR 3/2) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky structure; very friable; common very fine roots; about 1 percent rock fragments.

**Bk**-- 28 to 41 inches; olive brown (2.5Y 4/3) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 2 percent rock fragments; many fine and medium masses of carbonate; violent effervescence.

**Bck**--41 to 46 inches; dark grayish brown (2.5Y 4/2) clay loam; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; about 2 percent rock fragments; common fine and medium masses of carbonates; strong effervescence.

**C**--46 to 60 inches; olive brown (2.5Y 4/4) clay loam; massive; friable; about 2 percent rock fragments; sand layer at 49 to 53 inches; strong effervescence.

**SERIES: Wyard**

**TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Typic Endoaquolls**

(Colors are for moist soil)

**Ap**--0 to 7 inches; black (10YR 2/1) loam; moderate fine and medium granular structure; very friable; common very roots; about 1 percent rock fragments.

**A**--7 to 15 inches; black (10YR 2/1) loam; moderate fine and medium subangular blocky structure; very friable; common very roots; about 1 percent rock fragments.

**Bw**--15 to 21 inches; dark brown (10YR 3/3) loam; moderate medium prismatic structure parting to weak fine and medium platy structure; very friable; common very fine roots; about 1 percent rock fragments.

**Bk**-- 21 to 28 inches; dark grayish brown (2.5Y 4/2) loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 2 percent rock fragments; many fine and medium masses of carbonate; violent effervescence.

**Bck**--28 to 45 inches; dark grayish brown (2.5Y 4/2) clay loam; common fine yellowish brown (10YR 5/6) redoximorphic concentrations; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; about 2 percent rock fragments; strong effervescence.

**C**--45 to 60 inches; olive brown (2.5Y 4/3) clay loam; common fine yellowish brown (10YR 5/6) redoximorphic concentrations; massive; friable; about 2 percent rock fragments; slight effervescence.



## Appendix 4. Laboratory Analyses

Laboratory Characterization Analyses <sup>1</sup>														
Soil Series	Soil Horizon <sup>2</sup>	Depth (inches)	pH	Organic Matter %	EC Ds/m	Particle Size Analyses				Ca meq/l	Mg meq/l	Na meq/l	Cation/EC Ratio	SAR
						Sand %	Silt %	Clay %	Texture					
Badger	Bk	22-31	6.6	0.8	0.5	11	23	67	c	2	1	2	9.6	2.2
Badger	3C2	41-60	7.6	0.3	5.6	51	23	27	scl	27	24	27	14.0	5.3
Barnes	Ap	0-6	7.4	3.6	0.6	46	25	29	scl	4	2	2	12.5	1.3
Barnes	Bw	6-15	7.0	1.4	0.9	44	30	27	cl	4	2	2	9.4	1.2
Barnes	Bk	15-29	7.8	0.6	0.8	44	23	34	cl	3	3	2	9.7	1.5
Barnes	BCK	29-40	7.9	0.3	1.6	46	28	27	scl	4	10	3	10.4	1.1
Barnes	C	40-60	8.0	0.2	1.6	49	28	24	scl	4	10	3	10.4	1.1
Buse	Ap	0-7	7.5	2.8	0.7	46	25	29	scl	6	2	2	13.4	0.9
Buse	Bk2	20-31	7.9	0.6	0.5	56	20	24	scl	2	2	2	12	1.7
Buse	C	31-60	8.1	0.3	0.9	54	18	29	scl	2	5	4	12	2.3
Colvin	Ap	0-6	7.3	3.3	0.8	6	43	52	sic	3	1	4	9.9	2.4
Colvin	Bk2	16-30	7.8	0.8	1.3	11	30	59	c	4	4	6	10.0	2.9
Colvin	C	38-60	7.9	0.6	0.9	6	28	67	c	3	3	3	9.8	1.7
Hamerly	Ap	0-7	7.3	4.2	0.8	34	33	34	cl	4	2	3	10.1	1.8
Hamerly	Bk2	15-24	7.7	0.7	2.0	31	23	47	c	11	8	6	12.1	2.0
Hamerly	C	35-60	7.8	0.6	5.6	54	23	24	scl	13	48	22	14.8	3.9
Parnell	Ap	0-11	7.5	1.5	4.2	9	43	49	sic	26	26	12	15.0	2.4
Parnell	Bt1	11-22	7.2	1.0	0.7	14	38	49	c	3	1	3	10.0	2.3
Svea	Ap/A	0-12	7.0	2.7	0.4	26	38	37	cl	1	1	2	9.5	1.8
Svea	Bw	12-28	7.3	0.6	0.5	39	28	34	cl	1	1	2	9.6	2.2
Svea	Bk	28-41	8.0	0.3	1.1	59	8	34	scl	2	4	5	10.0	3.2
Svea	C	46-60	8.1	0.2	1.0	51	20	29	scl	1	2	6	9.4	4.4
Wyrd	Bw	15-21	7.6	5.1	2.6	31	28	42	c	15	9	11	13.4	3.1

<sup>1</sup> Data from Minnesota Valley Testing Laboratory, Bismarck, ND. Original data sheets available upon request. Data rounded to significant figures.

<sup>2</sup> Not all horizons samples for each soil. If similar horizons existed (e.g. Bk1 and Bk2) only one selected for characterization

## **APPENDIX E: SLUG TEST (MAY 2010)**

**Date:** May 14, 2010

**To:** Jon Cameron  
City of Valley City  
c/o Erik Gilbertson, PE  
Kadmas, Lee & Jackson, Inc.  
1010 4th Avenue Southwest  
P.O. Box 937  
Valley City, ND 58072-0937

**From:** Kelton Barr/Braun Intertec  
Brad Schneider/Braun Intertec

**Subject:** **Results of Slug Tests, Valley City Landfill, Valley City, ND**

---

In order to determine the hydraulic characteristics of the shallow groundwater system at the Valley City Landfill, a series of slug tests were conducted at three piezometers installed at the landfill. The location of the piezometers, named P1, P2, and P3, are shown on Figure 1, and their boring logs are in Appendix A. This memorandum describes the methods and results of these slug tests.

A slug test uses an instantaneous addition or withdrawal of a known volume from the standing water column in a well or piezometer. This initiates an interaction of the water column with the groundwater in the formation to eliminate the sudden increase or decrease in static water level in the well. By measuring the changes in water level with time in the well, data can be collected that can be analyzed by a method such as Bouwer and Rice (1976) and Bouwer (1989) to determine the hydraulic conductivity of the formations into which the well or piezometer has been installed.

On April 19, 2010 a series of slug tests were carried out in the landfill piezometers. For each piezometer measurements of depth to water and depth to bottom of piezometer were made with a Solinst 10443 water level reader. Using this information a Solinst Model 3001 Levelogger was then installed in the piezometer, suspended on a rigid cable near the bottom of the piezometer. This datalogger was programmed to record submergence depth at intervals of one second in P1 and P2 and intervals of 4 seconds in P3. Then a "slug" consisting of a solid PVC rod 5 feet 3 inches in length and 1 3/4 inches in diameter attached to a rigid cable was dropped into the piezometer, initiating a slug-in test. After ten to thirty minutes the slug and datalogger were removed. The data were downloaded to a laptop and reviewed to ensure that viable data were collected.

The data were then analyzed using the Bouwer and Rice method. The slug test data are in Appendix B. The water column displacement with time for the three piezometers are summarized on Figures 2 through 4. The summary information for the analysis are summarized on Table 1, along with the operative equation for the Bouwer and Rice method. A diagram showing the different construction parameters used in the Bouwer and Rice equation is shown in Figure 5.

Table 1 also contains the hydraulic conductivities determined from the slug tests. As can be seen, P1 had the highest hydraulic conductivity of  $7.9 \times 10^{-4}$  cm/sec. This piezometer also intersected a three-foot layer of silty sand. P2 had a hydraulic conductivity of  $1.5 \times 10^{-4}$  cm/sec. The silty sand layer intersected by this piezometer was thinner at 2.5 feet thick with an underlying clayey sand layer 1.5 feet thick. P3

had a hydraulic conductivity of  $1.4 \times 10^{-5}$  cm/sec. The silty sand layer was absent at this piezometer, and the clayey sand layer was two feet thick. These hydraulic conductivities are consistent with the strata encountered and are considered to be viable, representative values.

The analyses and conclusions submitted in this report are based on our field observations completed for this project. In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, expressed or implied, is made.

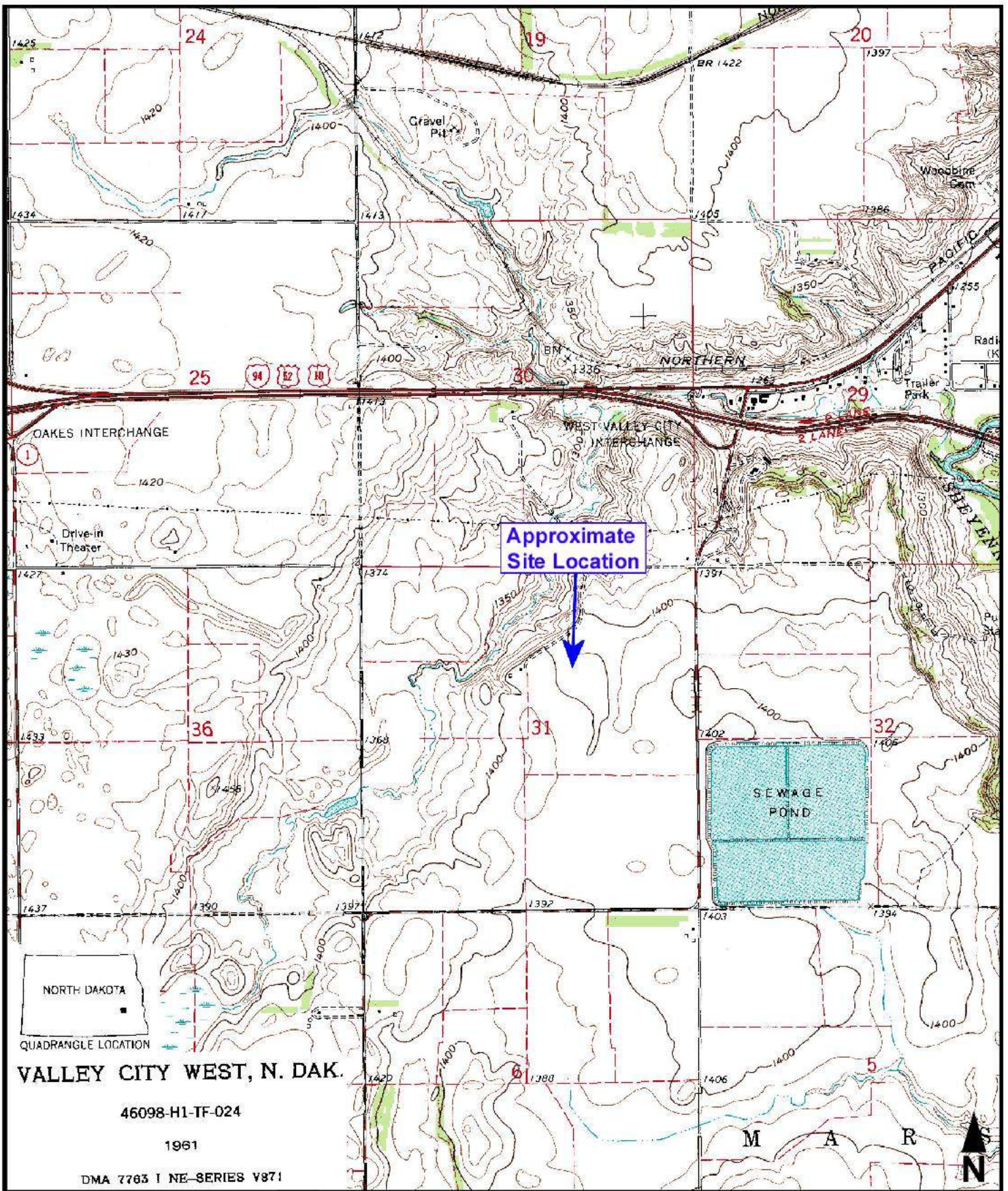
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Bouwer, Herman (May-June, 1989) The Bouwer and Rice slug test – an update: *Ground Water*, v. 27, no. 3, p. 304-309.

## **Appendix A**



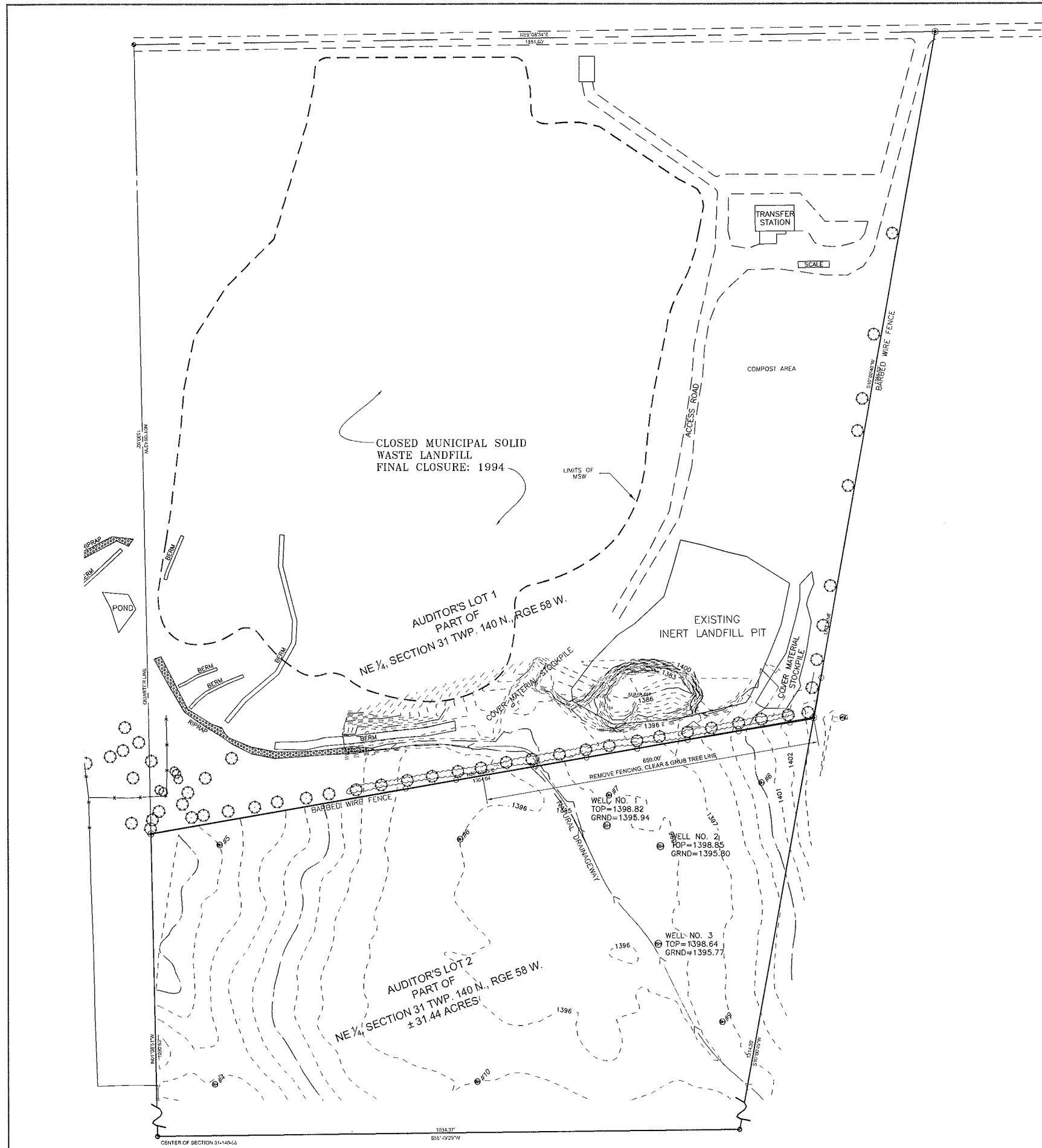


**BRAUN**<sup>SM</sup>  
**INTERTEC**

Site Location Map  
 Valley City Inert Landfill  
 County Highway 17  
 Valley City, North Dakota

USGS TOPOGRAPHIC MAP	
Valley City West, ND	
DATE:	5/14/2010
JOB NO:	FA-09-04678
SCALE:	1 : 24,000
DRAWN BY:	FER
FIGURE NO:	1

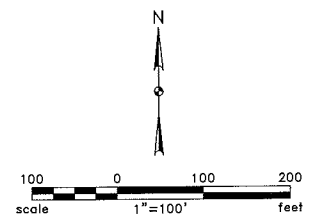




**LEGAL DESCRIPTION**

**AUDITOR'S LOT 1**  
 A tract of land situated in the Northeast Quarter (NE 1/4) of Section 31, Township 140 North, Range 58 West of the Fifth Principal Meridian, Barnes County North Dakota, more particularly described as follows:  
 Commencing at the Northeast corner of the Northeast Quarter (NE 1/4) of said Section 31; thence S90°00'00"W along the Section line a distance of 1,084.79 feet to an iron pin, the Point of Beginning; thence S10°51'55"W a distance of 1,358.59 feet to an iron pin; thence S80°55'22"W a distance of 1,304.20 feet to an iron pin on the West line of said Northeast Quarter (NE 1/4); thence N00°17'28"W along the Quarter line a distance of 1,546.00 feet to an iron pin at Northwest corner of said Northeast Quarter; thence N90°00'00"E along the Section line a distance of 1,551.79 feet to the Point of Beginning. Said tract of land contains 46.59 acres more or less, including that portion of the 2.8 acre parcel described in Document Number 207950 at the office of the Barnes County Recorder that lies within said Northeast Quarter (NE 1/4).

**AUDITOR'S LOT 2**  
 A tract of land situated in the Northeast Quarter (NE 1/4) of Section 31, Township 140 North, Range 58 West of the Fifth Principal Meridian, Barnes County, North Dakota, more particularly described as follows:  
 Commencing at the Northeast corner of the Northeast Quarter (NE 1/4) of said Section 31; thence S90°00'00"W along the Section line a distance of 1,084.79 feet to an iron pin; thence S10°51'55"W a distance of 1,358.59 feet to an iron pin, the Point of Beginning; thence continuing S10°51'55"W a distance of 1,314.30 feet to an iron pin on the South line of said Northeast Quarter; thence S89°40'38"W along the Quarter line a distance of 1,054.60 feet to an iron pin at the center of said Section 31; thence N00°17'28"W along the Quarter line a distance of 1,090.82 feet to an iron pin; thence N80°55'22"E a distance of 1,304.20 feet to the Point of Beginning. Said tract of land contains 31.45 acres more or less, including that portion of the 2.8 acre parcel described in Document Number 207950 at the office of the Barnes County Recorder that lies within said Northeast Quarter (NE 1/4).



Rev'd. 00/00/0000	SHEET NO
<b>VALLEY CITY INERT LANDFILL</b> VALLEY CITY, NORTH DAKOTA	<b>1</b>
<b>Kadmas Lee &amp; Jackson</b> Engineers Surveyors Planners	<b>EXISTING CONDITIONS</b>
DRAWN BY EAG	CHECKED BY EAG
PROJECT NO 5407102	DATE 01/14/2008
J:\municipal\Valley\5407102\cadd\ep\5407102Base01.DWG (1)	
© Kadmas, Lee & Jackson 2009	

<b>Braun Project FA-09-04678</b> <b>Slug Test</b> <b>Valley City Inert Landfill</b> <b>County Hwy 17, T140N, R58W, S31-NE1/4</b> <b>Valley City, North Dakota</b>	<b>BORING: P-1</b> LOCATION: See Sketch.
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DRILLER: K. Miller	METHOD: 3 1/4" HSA, Autohammer	DATE: <b>12/4/09</b>	SCALE: <b>1" = 4'</b>
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Elev. feet	Depth feet	Symbol	Description of Materials (Soil- ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
1395.9	0.0					
1394.9	1.0	CL	LEAN CLAY, black and gray, moist. (Topsoil)	5		
—	—	CL	LEAN CLAY, with Silt lenses and laminations, gray and brown, moist, medium. (Glacial Till)	7	▽	
—	—			6		
1389.9	6.0	CL	LEAN CLAY with SAND, gray and brown, moist, rather soft. (Glacial Till)	4		
—	—			8		
1386.9	9.0	SM	SILTY SAND, fine- to coarse-grained, brown, moist, loose to very loose. (Glacial Outwash)	4		
—	—			12		
1383.9	12.0	CL	LEAN CLAY with SAND, brown and gray, moist, rather stiff. (Glacial Till)	10		
1379.9	16.0		END OF BORING.			
—	—		Water not observed with 14 1/2 feet of hollow stem auger in the ground.			
—	—		A piezometer with a screen depth interval of 2 1/2 to 12 1/2 feet was set in the borehole.			

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING 04678.GPJ BRAUN.GDT 5/14/10 10:47



<b>Braun Project FA-09-04678</b> <b>Slug Test</b> <b>Valley City Inert Landfill</b> <b>County Hwy 17, T140N, R58W, S31-NE1/4</b> <b>Valley City, North Dakota</b>	<b>BORING: P-2</b> LOCATION: See Sketch.
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DRILLER: K. Miller	METHOD: 3 1/4" HSA, Autohammer	DATE: <b>12/4/09</b>	SCALE: <b>1" = 4'</b>
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Elev. feet	Depth feet	Symbol	Description of Materials (Soil- ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
1395.8	0.0					
1392.8	3.0	FILL	POSSIBLE FILL: Lean Clay, black, moist.	5	▽	
1388.8	7.0	FILL	POSSIBLE FILL: Lean Clay with Sand, gray and brown, moist.	5		
1386.3	9.5	SM	SILTY SAND, fine-grained, brown, moist, loose. (Glacial Outwash)	8		
1384.8	11.0	SC	CLAYEY SAND, brown, waterbearing, loose. (Glacial Outwash)	5		
1381.8	14.0	CL	SANDY LEAN CLAY, brown, moist, stiff. (Glacial Till)  -gray below 12 1/2 feet.	14		
			END OF BORING.  Water not observed with 12 1/2 feet of hollow stem auger in the ground.  A piezometer with a screen depth interval of 3 to 13 feet was set in the borehole.			

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING 04678.GPJ BRAUN.GDT 5/14/10 10:47

<b>Braun Project FA-09-04678</b> <b>Slug Test</b> <b>Valley City Inert Landfill</b> <b>County Hwy 17, T140N, R58W, S31-NE1/4</b> <b>Valley City, North Dakota</b>	<b>BORING: P-3</b> LOCATION: See Sketch.
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DRILLER: K. Miller	METHOD: 3 1/4" HSA, Autohammer	DATE: <b>12/4/09</b>	SCALE: <b>1" = 4'</b>
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Elev. feet	Depth feet	Symbol	Description of Materials (Soil- ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
1395.8	0.0					
1395.4	0.4	CL	LEAN CLAY, black, moist. (Topsoil)	6		
		CL	LEAN CLAY with SAND, gray and brown, moist, medium to soft. (Glacial Till)	6	▽	
				3		
1389.8	6.0	SC	CLAYEY SAND, brown, wet, medium. (Glacial Outwash)	8		
1387.8	8.0	CL	LEAN CLAY with SAND, gray and brown, moist, medium to rather stiff. (Glacial Till)	7		
			-with Silt lenses and laminations below 10 feet.	9		
			-gray below 12 feet, trace Gravel.	7		
				6		
1379.8	16.0		END OF BORING.			
			Water not observed with 14 1/2 feet of hollow stem auger in the ground.			
			A piezometer with a screen depth interval of 3 1/2 to 13 1/2 feet was set in the borehole.			

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING 04678.GPJ BRAUN.GDT 5/14/10 10:47

## **Appendix B**

Figure 2. P1 slug-in head vs. time

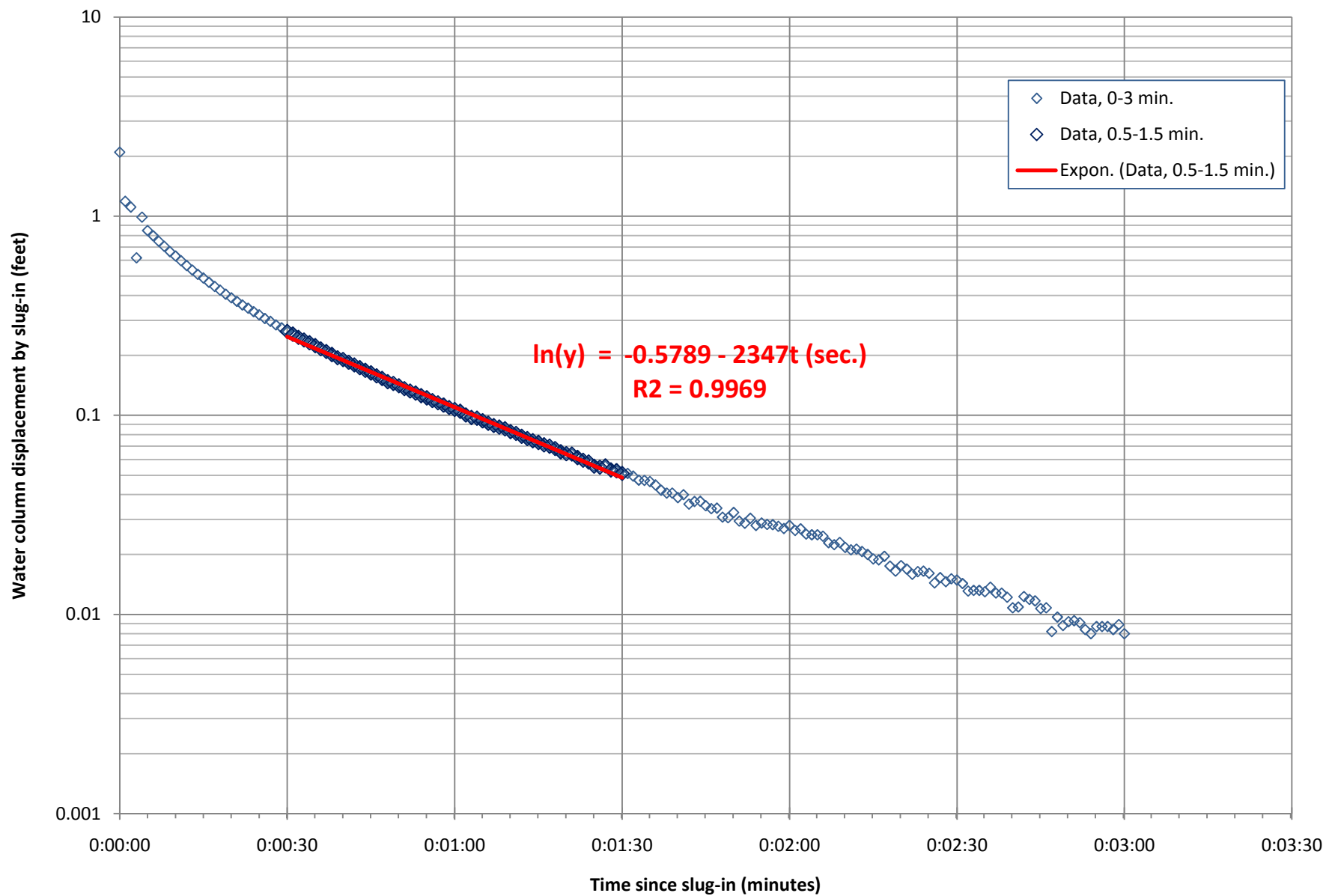


Figure 3. P2 slug-in head vs. time

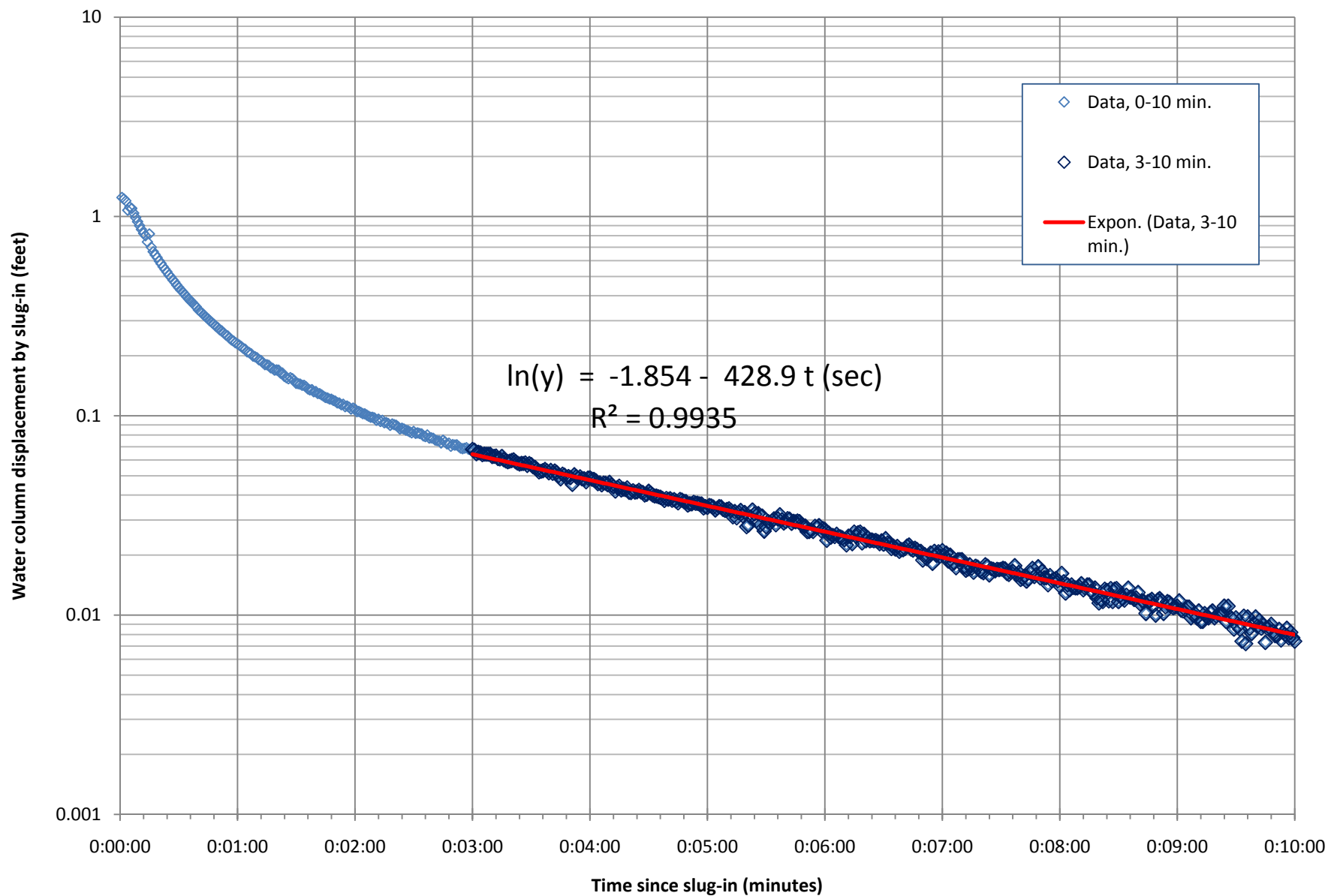
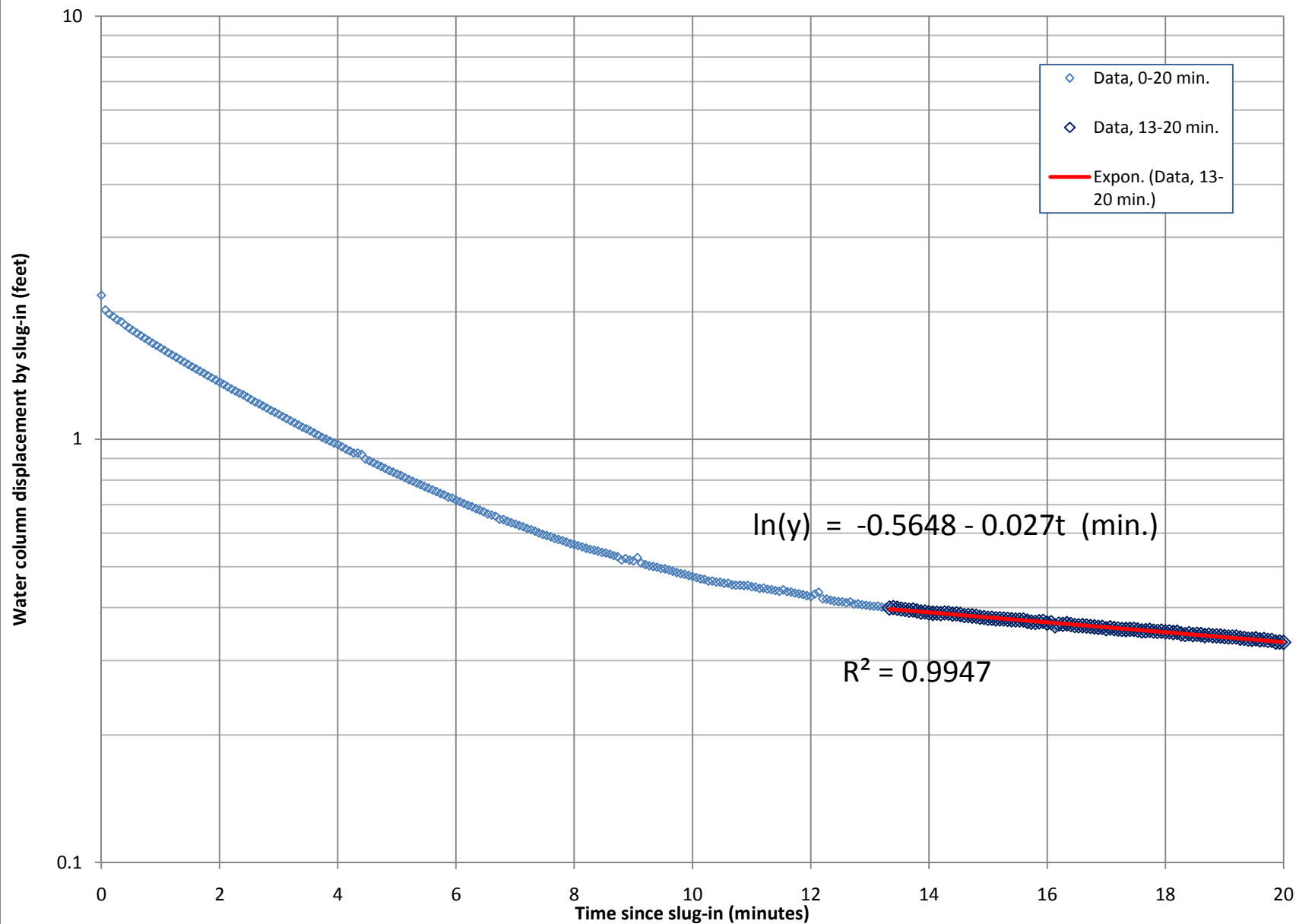


Figure 4. P3 Slug-in head vs. time



**Table 1. Summary of Slug test analyses**

	<b>P2</b>	<b>P3</b>	<b>P1</b>
$r_c$	0.083 feet	0.083 feet	0.083 feet
$r_w$	0.27 feet	0.27 feet	0.27 feet
<b>L</b>	10 feet	10 feet	10 feet
<b>H</b>	11.33 feet	11.93 feet	10.6 feet
<b>C</b>	2.2	2.2	2.2
$C/(L/r_w)$	0.0594	0.0594	0.0594
$1.1/\ln(H/r_w)$	0.294370507	0.290361	0.299712
$\ln(R_e/r_w)$	2.82669126	2.859096	2.784645
$(1/t)*\ln(y_0/y_t)$	0.298 min <sup>-1</sup>	0.027 min <sup>-1</sup>	1.6298 min <sup>-1</sup>
<b>K</b>	<b>2.901E-04 ft/min</b> <b>4.836E-06 ft/sec</b> <b>1.474E-04 cm/sec</b>	<b>2.659E-05 ft/min</b> <b>4.432E-07 ft/sec</b> <b>1.351E-05 cm/sec</b>	<b>1.563E-03 ft/min</b> <b>2.605E-05 ft/sec</b> <b>7.941E-04 cm/sec</b>

For the equation from Bouwer and Rice (1976):

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2Lt} \ln(y_0/y_t)$$

where  $\ln(R_e/r_w) = \left[ \frac{1.1}{\ln(H/r_w)} + \frac{C}{(L/r_w)} \right]^{-1}$

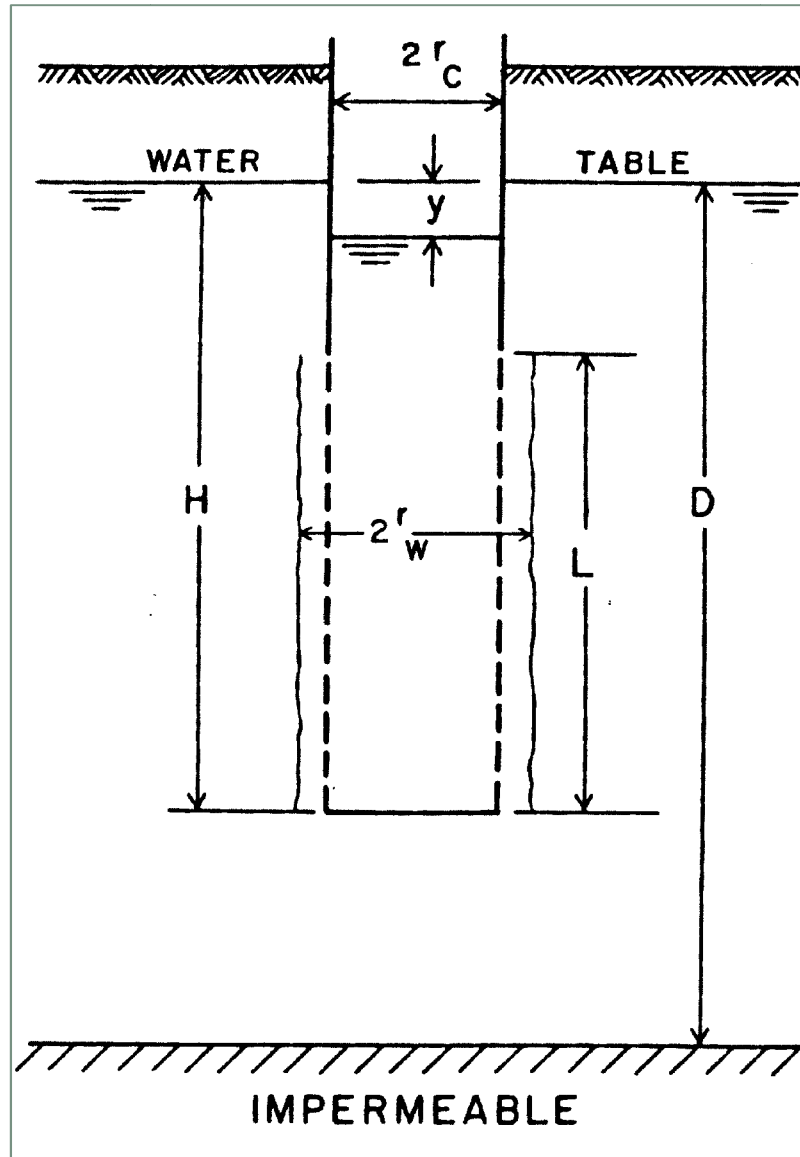


Figure 5. Geometry and symbols for slug test on partially penetrating, partially screened well in unconfined aquifer with gravel pack and/or developed zone around screen. (from Bouwer and Rice, 1976)



## **APPENDIX F: COMPLIANCE HISTORY**



**NORTH DAKOTA**  
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION  
Gold Seal Center, 918 E. Divide Ave.  
Bismarck, ND 58501-1947  
701.328.5200 (fax)  
www.ndhealth.gov



FILE: Valley City Inert Waste Landfill – Permit 0176

March 26, 2012

Mayor & City Commission  
City of Valley City  
PO Box 390  
Valley City, ND 58072

Dear Mayor & Commission Members:

Enclosed is a Permit for a Solid Waste Management Facility. It lists the conditions under which the permit is issued. The operation of this disposal facility must adhere to these permit provisions; therefore, we would advise that you read them carefully.

If you have any questions regarding this permit, please contact the Department at 701-328-5166.

Sincerely,

Scott A. Radig, P.E., Director  
Division of Waste Management

SAR:JKK:DAT:lj

Enc.

CERTIFIED

cc/enc: Jon Cameron, City Administrator  
Jeff Differding, Public Works Department  
Erik Gilbertson, Kadrmass, Lee & Jackson



**PERMIT FOR A SOLID WASTE MANAGEMENT FACILITY**  
NORTH DAKOTA DEPARTMENT OF HEALTH — DIVISION OF WASTE MANAGEMENT  
TELEPHONE: 701-328-5166 • REV. 02/12

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Pursuant to Chapter 23-29 of the North Dakota Century Code (NDCC), (Solid Waste Management and Land Protection Act), and Article 33-20 of the North Dakota Administrative Code (NDAC), (Solid Waste Management Rules), and in reliance on statements and representations heretofore made by the owner or owner's representative designated below, a permit is hereby issued authorizing such owner/operator to construct and operate a solid waste management facility at the designated location under any and all conditions.

**A. Owner/Operator:**

1. **Name:** Valley City Inert Waste Landfill
2. **Mailing Address:** PO Box 390, Valley City, ND 58072
3. **Location Address:** 11474 35th Street SE, Valley City, ND 58072

**B. Permit Number:** 0176

**C. Solid Waste Management Units:**

1. Inert Waste Landfill
2. Clean Wood Stockpile
3. Yard Waste Compost
4. Scrap Metal and Appliance Pile and Recycling
5. Clean Concrete and Asphalt
6. Closed Municipal Solid Waste (MSW) Landfill

**D. Location Information:**

1. Forty (40) acres of the approximately seventy-eight (78) acres in the NE1/4 of Sec 31, TWP 140N, R 58W of Barnes County
2. **Permit Area:** As described in referenced documents and facility files.

**E. General Conditions:**

- E.1. The owner/operator of the facility is subject to the Solid Waste Management and Land Protection Act (Chapter 23-29 NDCC), the Solid Waste Management Rules (Article 33-20 NDAC), all other North Dakota and federal laws, rules or regulations and orders now or hereafter effected by the North Dakota Department of Health (hereinafter the Department), and to any and all conditions of this permit.
- E.2. Compliance with terms of this permit does not constitute a defense to any order issued or any action brought under NDCC 23-29, NDAC 33-20, NDCC 23-20.3, NDAC 33-

24, Sections 3013, 7003, or 3008(a) of RCRA, Sections 106(a), 104 or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. et. seq.) or any other law providing for protection of public health or the environment.

- E.3. Issuance of this permit does not convey property rights of any sort or any exclusive privilege, nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local law or regulations.
- E.4. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- E.5. This permit is based on the premise that the information submitted by the owner/operator is accurate and that the facility will be or has been constructed and will be operated as specified in the application and all related documents. Any inaccuracies or misrepresentations found in the application may be grounds for the termination or modification of this permit. The Permittee must inform the Department of any deviation from, or changes in, the information in the application which would affect the Permittee's ability to comply with the applicable rules or permit conditions.
- E.6. The Permittee shall at all times properly operate and maintain the facility and systems of disposal, storage and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.
- E.7. The Permittee shall give notice to the Department of any planned physical alterations or additions to permitted waste management units. Any physical change in or change in the method of the operation of a treatment or disposal operation shall be considered to be construction, installation or establishment of a new operation. No construction, installation or establishment of a new operation shall be commenced unless the owner/operator thereof shall file an application for, and receive, a permit to construct and operate from the Department.
  - a. The Permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
  - b. Any significant change in or use of contract operators in the routine operation of the facility shall be deemed a significant change in the operation and shall be subject to Departmental review of the operator's qualifications, background,

experience, equipment and other pertinent issues. Such change may necessitate modification of the permit and the facility's plan of operation.

- c. Whenever the Permittee becomes aware that the Permittee failed to submit any relevant facts in the permit application or submitted incorrect information in the permit application or in any report to the Department, the Permittee shall promptly submit such facts or information.
- E.8.** The owner/operator shall construct, operate, maintain and close the waste management units and the facility according to the criteria of law and rule, conditions of this permit, and other reasonable precautions to prevent or minimize, if applicable, any environmental impacts including, but not limited to, fugitive dust emissions, objectionable odors, air toxics and gas emissions, spills, litter and contamination of surface water and groundwater.
- E.9.** The Permittee shall furnish to the Department, within a reasonable time, any relevant information which the Department may request to determine whether cause exists for modifying, reissuing or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.
- E.10.** This permit may be modified, revoked and reissued, or terminated for cause as specified in Section 33-20-02.1-06 NDAC. The filing of a request for permit modification, revocation and reissuance, termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

This permit may be renewed as specified in Section 33-20-02.1-07 NDAC. Review of any application for a permit renewal shall consider improvements in the state of control and measurement technology, compliance with state rules and permit, as well as changes in applicable regulations.
- E.11.** This permit does not supersede local zoning authority or any other requirements of any political subdivision of the state.
- E.12.** Within sixty (60) days of the issuance of this permit, if not already completed, the owner/operator shall record a notarized affidavit with the County Recorder. The affidavit shall specify that this facility, as noted in the legal description, is permitted to accept solid wastes for disposal. This affidavit shall specify that another affidavit must be recorded upon the facility's final closure.

  - a. Upon closure, a second affidavit shall be recorded specifying any final details regarding the types of waste disposed at the facility, as well as any final details regarding the facility's location, construction, management, etc.
  - b. The Department must be provided a copy of both affidavits, certified by the

County Recorder of the county in which the facility is located. The copies must be forwarded to the Department within thirty (30) days of recorded dates, or if notification has already been completed, within thirty (30) days of the permit issuance date.

- E.13.** Any entity that controls the permit holder (Permittee) agrees to accept responsibility for any remedial measures, closure and postclosure care or penalties incurred by the permit holder (Permittee).
- E.14. Waste Reduction and Recycling:** The owner/operator shall continue programs to educate waste generators and haulers on appropriate measures to reduce, reuse and recycle wood, yard waste, concrete, asphalt, metals, paper, paperboard and other materials as practicable and shall help facilitate, implement or provide appropriate procedures and services to reduce waste disposed in landfills by at least 40% as described in NDCC 23-29-02. A description of recycling and waste reduction activities and an estimate of the volume and percentage of waste which has been diverted shall be included in the annual report to the Department.
- E.15.** Except as modified by conditions of this permit, this facility and related waste management units and structures shall be designed, constructed, operated and closed in accordance with previous correspondence and documents contained in Departmental files pertaining to this facility and as described in the documents enumerated below, which are hereby incorporated by reference in this permit.
- a. Application for a Solid Waste Management Facility Permit - North Dakota Department of Health - Division of Management SFN 19269 (03/07), submitted by the Valley City Public Works Department, Valley City, ND and received by the Department on July 5, 2011.
  - b. Plan of Operations (Updated June 2011) - Valley City Municipal Solid Waste Facility, prepared for the Valley City Public Works Department, City of Valley City, ND and submitted by Kadrmas, Lee & Jackson, Valley City, ND on July 5, 2011.
  - c. A Geotechnical Evaluation Report, dated January 4, 2008 and prepared by Braun Intertec Corporation for the City of Valley City.
  - d. Soil Survey Report of Portions of the Northeast 1/4 of Section 31, Township 140 N., Range 80 W. in Barnes County, ND, dated January 2008 and prepared by Prairie Soil Consulting, LLC for the City of Valley City, ND and Kadrmas, Lee, and Jackson.

- e. Attachment to Permit IT-176 - Specific Condition F.3.a. - History of Valley City Inert Waste Landfill IT-176, dated June 14, 2005 and prepared by the North Dakota Department of Health - Division of Waste Management.
- f. Application for a Solid Waste Management Facility Permit - North Dakota Department of Health - Division of Waste Management SFN 19269 (05/02), dated September 20, 2004 and submitted by the Valley City Public Works Department, Valley City, ND.
- g. Revised Plan of Operations - Valley City Municipal Solid Waste Facility, prepared for the Valley City Public Works Department, City of Valley City, ND, (revised September 14, 2004) and submitted by Kadrmas, Lee & Jackson, Valley City, ND.
- h. Future submittals approved by the Department may supersede or supplement items listed above.

### Specific Conditions

#### **F. Inert Waste Landfill:**

- F.1.** The inert waste landfill shall not be used for the disposal of household garbage and putrescible waste; asbestos; soluble wastes (fly ash, salt, etc.); animal carcasses; waste grain, seed and elevator screenings; liquids; unrinsed pesticide containers; lead-acid batteries; used oil; scrap metal; metal appliances; PCB waste/oils; hazardous wastes [i.e., ignitables (solvents, paints and fuels), corrosives (acids and alkalies), reactives, toxicity characteristic and listed wastes]; electronic waste (televisions, computers, monitors, printers, copiers, materials containing circuit boards, ballasts, capacitors, etc.); mercury-containing devices (fluorescent lighting, switches, thermometers, thermostats, etc.); hazardous materials; sludges; manure; septic tank pumping; and infectious wastes. Grass and leaves may not be placed in any disposal unit; however, clean materials free of plastics, trash and garbage may be stockpiled for composting if approved in this permit.
- F.2.** The facility is authorized for disposal of inert wastes unless otherwise approved by the Department. "Inert waste" means nonputrescible, non-water-soluble solid waste that will not in any way form a contaminated leachate. Inert waste includes but is not limited to: (1) construction and demolition material such as wood, bricks, masonry, concrete (cured) and incidental metal resulting from the demolition or razing of buildings, roads and other structures; (2) trees and tree branches; (3) incidental metal wastes that do not contain oils, solvents, PCBs, or other similar materials; (4) bottom ash from coal-fired boilers; and (5) waste coal fines from air pollution equipment.
- F.3.** Metal items, including, but not limited to, major appliances, metal furniture, scrap metal, etc., may not be collected or transported for disposal to any solid waste disposal unit or facility unless such unit or facility has provision for intermediate storage and recycling of these materials and all such materials are appropriately segregated for

recycling. Any metal items that may contain oils, fuels, antifreeze, solvents, PCBs, refrigerants or other similar materials shall be drained before stockpiling or provisions shall be made to properly remove and recycle such materials before they leak or spill.

- F.4. The owner or operator shall design, construct, maintain and operate the facility in a manner to minimize the possibility of a fire, explosion or any unplanned sudden or nonsudden release of solid waste or solid waste constituents to air, soil, groundwater or surface water which could threaten human health or the environment.
- F.5. All waste operations shall be properly maintained to minimize the potential for fire. The working area of the disposal operation shall be maintained in as small an area as practicable, not to exceed 10,000 square feet before cover is applied. Adequate cover shall be stockpiled near the operating area to cover the waste to a depth of two (2) feet in the event of a fire.
- F.6. The facility shall be operated in full accordance with the approved plan of operation and the waste screening provisions. All activities at the site will be conducted in a manner that will minimize the risk of fire. No open flames or smoldering material will be allowed near the fill area.
- F.7. Operations and sequential partial closure shall be implemented such that the working face or open area (the area that has not been covered or closed) of the landfill must be limited in size to as small an area as practicable. The open area of the inert waste landfill shall not exceed 10,000 square feet before cover is applied. Heavy equipment shall routinely run over the lifts of waste material (one foot to two feet maximum) at least four to five times or more as necessary to adequately break up and compact the waste material. At maximum, areas that have not been formally closed with the required two (2) feet of final cover shall be no larger than 40,000 square feet. All wastes, including, but not limited to, the working face must be covered at least two times per year with a minimum of six (6) inches of suitable earthen material. Grade stakes shall be placed as necessary to ensure filling activities follow the approved closure grades.
- F.8. Adequate emergency cover soil (in addition to the dirt needed for normal fill and cover activities) shall be stockpiled in close proximity to the disposal area to be used in the event of a fire or other emergency. These stockpiles shall, at minimum, be equivalent to two (2) cubic feet per square foot of open area plus enough dirt to cover unclosed areas of the landfill with at least two (2) feet of dirt.
- F.9. Within six (6) months, and prior to accepting waste from any industry, including, but not limited to, contractors (construction, demolition, etc.), manufacturers, maintenance companies, auto and truck maintenance (transportation) companies, etc., or waste hauler, the owner/operator shall provide to appropriate representatives of the company a copy of the approved waste acceptance procedures as well as copies of the waste evaluation form. The company must agree to the waste screening and inspection procedures. The owner/operator shall maintain a list of industrial sources of inert waste



in the facility's operating record. The training and educational material shall be repeated and/or amended as necessary to ensure compliance with the waste acceptance procedures and the permit.

- F.10.** All earthen material must be maintained on-site (to be used for all construction, cover, closure and revegetation activities) unless removal from the site is authorized by the Department.
- F.11.** All personnel involved in solid waste handling and in the facility operation or monitoring must be provided a copy of this permit and shall be instructed in specific procedures to ensure compliance with the permit, the facility plans and the state rules as necessary to prevent accidents and environmental impacts. Documentation of training such as names, dates, description of instruction methods and copies of certificates awarded must be placed in the facility's operating record. In addition, a copy of this permit, pertinent rules, guidelines and forms shall be posted at a prominent location within the facility.
- F.12.** Disturbed areas shall be planted with a cover crop to control erosion, weeds and windblown dust. Upon placement of final cover on any portion of the landfill and upon construction of facility berms, ditches, etc., revegetation practices, procedures and erosion control measures shall be provided to address the issues identified in the attached guidelines on revegetation and native grass planting procedures for solid waste landfills (Attachments 1 and 2); however, the final seed mix may be adjusted based on consultation with local soils and native grass experts, subject to Departmental approval. Placement of final cover shall include placement of erosion control measures such as straw or mulch incorporation, erosion control matting, etc. The area shall also be promptly planted with a cover crop so as to provide near-term protection of the soil and seed bed.
- F.13.** Based on the Natural Resources Conservation Service Soil Survey or an on-site survey completed by a Registered Professional Soil Classifier, at least seventeen (17) inches of suitable plant growth material (SPGM Topsoil) and SPGM subsoil shall be removed from areas to be disturbed for disposal, including access roads, soil stockpile areas, metal and wood stockpiling/storage, etc. SPGM Topsoil and SPGM subsoil shall be stored in approved areas for use in site closure. The operator shall leave at least three (3) "monuments" of undisturbed soil for each phase or area disturbed to document the depth of SPGM removed. Upon Departmental approval, these monuments may also be removed for stockpiling in the approved locations. All SPGM shall be replaced upon site or area reclamation. SPGM Topsoil and subsoil stockpiles shall be marked with signs stating "SPGM Topsoil – Do not disturb or remove without authorization."
- F.14.** Facility operations, construction and ancillary activities shall avoid disturbance of environmentally-sensitive or erosion-prone areas characterized by strong slopes, thin soil conditions or sensitive vegetation. Steep, erosion-prone or unstable areas outside of the approved plans are not suited for use, storage, soil borrow activities or development unless formally approved as a modification of this permit subject to

Chapter 33-20-02.1 NDAC. Development of any area that exceeds a six percent (6%) percent slope shall not be undertaken without formal Departmental approval and incorporation of appropriate erosion control and revegetation provisions.

- F.15.** Disposal of scrap tires as a layer in the bottom of a disposal trench is allowed so long as bulkier or heavier waste is placed over the tires and the waste is well-compacted and covered. No stockpiling of tires, rubber, etc., is approved unless the owner/operator notifies the Department of a Permit-by-Rule tire pile facility and manages all tires in accordance with state rules. Adequate fire lanes shall be provided around any tire stockpile, and the tire area shall have adequate runoff and fire control provisions to manage the facility in the event a fire should start.
- F.16.** The applicant is required to send the landfill operator(s) to an inert waste operations and screening workshop given by the North Dakota Department of Health. The operator(s) must attend one (1) workshop within two (2) years of the permit issuance date.
- F.17.** The facility's annual report shall include a summary of educational and outreach efforts to reduce, reuse and recycle materials including scrap metal, appliances, wood materials, concrete aggregate, asphalt, compost and all other materials recycled. The report shall include the amounts and types of materials received, the amounts in any stockpile, the amounts marketed or given away, the amounts and types of material processed, and any other information needed to accurately document the facility or community waste reduction and recycling efforts.
- F.18.** Any landfill trench excavation shall watch for sand or gravel materials or layers and/or water-bearing zones. Should sand or gravel materials be encountered, the owner/operator and facility engineer shall contact the Department. Any such zones or layers shall be over-excavated and sealed with at least two (2) feet of compacted clay-rich soil placed in 6-inch layers and run over to ensure adequate compaction. Any water in the landfill excavation shall be properly managed. Water that has contacted waste may be transported to the city lagoons or other approved facility or management option.
- F.19.** The plans for the inert waste landfill expansion shall be altered such that the drain tile or pipe installed in the area of the inert waste landfill expansion shall be placed in a bed of appropriately sized gravel material. To reduce the potential for plugging, a filter fabric or "sock" shall not be placed immediately around the pipe. Filter fabric shall be placed around the gravel bed surrounding the drainage pipe.
- F.20. Scrap Tire Management:**
- a.** No stockpiling of tires, rubber, etc., is approved unless the owner/operator obtains a permit for a scrap tire stockpile unit. All tires must be managed in accordance with state rules and any solid waste permit.

- b. Disposal of scrap tires in the inert waste landfill is allowed so long as they are carefully layered in the bottom of a disposal trench or working area, six (6) inches of soil or approved cover material covers the tires and then covered with no more than 24 inches of bulkier or heavier waste placed over the tires area. This layer of bulkier waste must be well-compacted by running over the material with heavy equipment at least five times in all of the operating area. The well-compacted waste must then be covered with at least 12 inches of interim cover.

**F.21. Surface Water Sump:** The old surface water sump located on the south end of the old fill area shall be restored in a Departmentally-approved manner. Water in the sump shall either be applied to adjacent fields, removed to the city publicly owned treatment works (POTW), or tested and properly managed. All waste shall be removed or covered and the excavation shall then be promptly filled. The area shall then be properly sloped and reclaimed by August 30, 2012. The Department reserves the right to require alterations in stormwater/contact water management as deemed necessary. The owner/operator may supply plans for an upgraded stormwater pond, subject to Departmental review and approval.

**F.22. Clay-rich Soil Stockpiles (Flood Dike Soils):** When utilized in the future, clay-rich soil materials stored on-site for flood diking or other purposes shall be as far away from the old sanitary landfill and the steep slopes so as to minimize the potential for excessive weight, slumping and erosion. This material shall be stored in a location identified as acceptable by the Valley City engineering consultants, subject to Departmental oversight. Erosion control measures shall be instituted as necessary to maintain compliance with the facility stormwater plan and permit.

**G. Yard Waste Compost Unit:**

**G.1.** The owner/operator may maintain a yard waste compost unit on the permit area, subject to approval by the Department. The compostable material shall be restricted to leaves, grass clippings and similar yard waste material, straw, produce from supermarkets and other materials approved by the Department. No plastic, garbage, debris or trash shall be commingled in the compost pile. A summary of the operation, turning, moisture levels, temperature levels, odors, training of operators and other issues shall be included in the facility's operating record and shall be summarized in the owner/operators routine annual report. Operation of the compost unit shall promote timely and orderly aerobic breakdown of compostable materials. The owner/operator shall make provisions to educate and promote use of compost materials for landscaping, land recovery, gardening, etc.

**H. Waste Woodpile/Processing Unit:**

**H.1.** The owner/operator may stockpile reasonable amounts of wood and wood products in the area so long as efficient and safe operation is afforded and may operate wood processing equipment in accordance with all Departmental permits. The owner/operator is encouraged to promote and support measures to minimize wood waste in the area

served and promote utilization of wood and wood-derived materials for appropriate uses. The facility's annual report shall include a summary of educational and outreach efforts to reduce, reuse and recycle wood; the amounts and types of wood materials received (tree branches, pallets, lumber, construction/demolition, etc.); the amounts in each wood stockpile; the amounts marketed or given away (firewood, pallet recycling, construction lumber, etc.); the amounts and types of processed wood materials stockpiled; the amounts of wood processed; and the amounts of wood products used or marketed for mulch, fuel or other appropriate uses.

**H.2.** Any wood stockpile shall be free of oil, rubber, asphalt, asphalt shingles, tar paper, upholstered furniture, household waste, plaster, non-wood siding, asbestos, insulation, grass, leaves and other potential contaminants.

**I. Metal and Appliance Stockpile/Recycling Unit:**

**I.1.** The owner/operator may stockpile segregated amounts of scrap metal and appliances for recycling. The owner/operator is encouraged to promote and support measures to recycle metal and segregate it from the waste stream. Appliances containing Freon, including, but not limited to, refrigerators, freezers, air conditioners and dehumidifiers, shall be carefully lined up so as to allow removal of refrigerants. Electronic waste or other unallowed materials shall not be commingled in the recycling pile. Metal items containing oils, greases, etc., shall be properly drained prior to delivery to the site. The facility's annual report shall include a summary of educational and outreach efforts to reduce, reuse and recycle metal, the amounts and types of metal materials received and the amount removed for recycling.

**J. Clean Concrete and Asphalt Concrete:**

**J.1.** The owner/operator may stockpile reasonable amounts of concrete and/or asphalt in an approved area so long as efficient and safe operation is afforded and provisions are made to have the materials processed for aggregate. The owner/operator is encouraged to promote and support measures to minimize concrete waste in the area served and promote utilization of processed aggregate materials for appropriate uses. The owner/operator shall undertake a program to educate waste generators and haulers on appropriate measures to reduce, reuse and recycle concrete materials, and shall help facilitate, implement or provide appropriate procedures and services to reduce waste disposal as described in NDCC 23-29-02.

**K. Closed Solid Waste Landfill Units:**

**K.1.** All closed areas must be managed and maintained in accordance with the closure and postclosure requirements of NDAC 33-20-04.1-09, an approved closure plan, an approved postclosure plan and this permit. Closed solid waste management units may not be used for cultivated crops, heavy grazing, buildings, or any other use which might disturb the protective vegetative and soil cover.

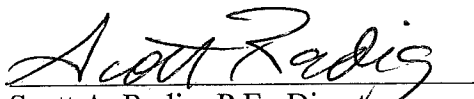
- K.2.** The owner/operator shall conduct annual postclosure evaluations and investigations of the closed landfill units including:
- a. The final cover and vegetation at all closed disposal units or sites in the area, including, but not limited to, closed areas of the municipal solid waste and inert waste landfills in accordance with the postclosure standards and guidelines for closed solid waste facilities. At minimum, these fill areas and structures as shall be evaluated as specified in Guideline 28, "Evaluating Final Vegetative Cover of Closed Landfill Areas" which is attached to this permit.
  - b. All drainage and leachate management structures as described in the June 2011 "Plan of Operations, Valley City Inert Waste Landfill 0176" shall be evaluated annually. The subsurface drainage system shall be evaluated annually, sampled, and analyzed.
  - c. Additional attention may be necessary if there are areas of dead vegetation, bare soil, erosion, ponding of surface water, seepage, landfill gas, leachate generation, surface water ponding, slumping or if other significant issues arise. An evaluation of site drainage, erosion, cover thickness, suitable plant growth thickness and quality, and any other environmental issues shall be provided.

- K.3.** A summary of inspections, evaluation and repair of closed landfill areas shall be included in the owner/operators routine annual report.

Should questions or issues arise, the owner or operator shall contact the North Dakota Department of Health at 701-328-5166.

In consideration of information provided regarding the facility and its operation and in consideration of the conditions above, the North Dakota Department of Health hereby issues a permit to the Valley City Inert Waste Landfill.

This permit is effective as of March 26, 2012 and shall remain in effect until March 26, 2017, unless modified, superseded, or revoked under Section 33-20-02.1-06 NDAC or continued in accordance with Section 33-20-02.1-07 NDAC.

  
\_\_\_\_\_  
Scott A. Radig, P.E., Director  
Division of Waste Management

3-27-2012  
Date

**Attachments:**

- 1. Guideline 28: Evaluating Final Vegetative Cover of Closed Landfill Areas
- 2. Guideline 24: General Native Grass Seeding



## **GUIDELINE 28 - EVALUATING FINAL VEGETATIVE COVER OF CLOSED LANDFILL AREAS**

North Dakota Department of Health - Division of Waste Management

918 E. Divide Ave., 3rd Fl., Bismarck, ND 58501-1947

Telephone: 701.328.5166 • Fax: 701.328.5200 • Website: [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm)

Revised 03-2010

### **I. Introduction**

Revegetating a closed landfill or portion of a landfill is one of the most important steps in a facility's design, operation and maintenance, to control water infiltration, reduce erosion, minimize leachate generation, limit long-term liability for the owner/operator, and protect the environment. Once a landfill area has been covered, the timely establishment of erosion control measures, cover crop seeding, and establishment of native grass is essential to stabilize and reclaim the site. This guideline is intended to help guide facility owners/operators reclaim facilities and assess whether the vegetative cover is effective. Design, slope and soil features common to landfills may make revegetation difficult.

For at least two to three years after site closure, the landfill facility should be checked monthly (except when frozen) to ensure vegetation reestablishment and to monitor any erosion or settling of the final cover. The closed landfill should continue to be monitored on a less frequent basis for up to 30 years after site closure, particularly after significant rainfall events. These inspections also are needed to check for dead or stressed vegetation due to landfill gas, leachate seepage, significant erosion, etc.

### **II. Evaluating the Final Vegetative Cover**

Following the second growing season, use the following guidelines to determine adequacy of stands and if reseeding or reinforcement seeding is required:

- A. It should be recognized that environmental factors such as climate, insects, soils, and fertility affect time required for establishment of stands. Timeliness of precipitation, drought, extreme temperatures, severe winds, or late soil thaw can delay seedling (young grass grown from seed) emergence and/or development.
- B. Areas heavily vegetated with weeds may exhibit erosion and channelization. Native grasses and grasses in general have a much more fibrous root system than most weeds. Weeds are generally considered to have a taproot system. Fibrous root systems hold the soil in place much better than a taproot system. Erosion damage may not be easy to see in areas of weedy growth unless the site is walked.
- C. Rhizomatous (sod forming) grass species have roots that will spread and will continue to fill in the open spaces; whereas native bunchgrasses grow upright with spaces between each bunch. Bunchgrass stands may develop gaps if the initial establishment is sparse, but can help stabilize erosion prone areas.
- D. Native grass seedling emergence should be relatively uniform over the area. The

density of established plants should be effective in minimizing soil loss due to erosion. Stand counts should indicate a density of at least 70 percent cover per square foot of area. If at least three rhizomatous species are present, the lower limit of 70 percent cover per square foot is adequate. Ninety percent cover per square foot is necessary when all are bunchgrass species or a mixture of rhizomatous and bunchgrass species.

- E. The adequacy of a stand (a group of several grass plants growing together in one place) will be based on density of established plants and stage of morphological development needed to ensure perenniality (lasting more than two growing seasons). To be considered established, a grass plant must have a well-developed root system and should exhibit signs of tillering (shoot growing from the base of a stem, especially the stem of a grass) or rhizome (thick underground horizontal stem that produces roots and has shoots that develop into new plants) development.
- F. Preliminary stand evaluation can be made four to eight weeks after germination; evaluate for progress and management problems (i.e., weeds, insects, etc.) – not for final establishment.
- G. Stands resulting from late fall (dormant) or spring seeding must go through the first growing season and subsequent winter; evaluation for establishment can be made any time during the second growing season.
- H. Stands resulting from late summer seeding cannot be evaluated for establishment until the end of the subsequent, full growing season.
- I. Most stands will require two growing seasons to become established; warm-season species may require three growing seasons for establishment.
- J. Stand counts may be done, using either a square foot frame or the row count method:
  - 1. **If a frame count is used**, all plants rooted within the frame should be counted. A predetermined number of steps should be taken diagonal or perpendicular to the drill rows and the frame dropped at the toe of the foot on the final step. The frame should be dropped in a consistent alignment to the drill rows. (See description of how to do a frame count below.)
  - 2. **If the row count method is used**, two side-by-side rows should be counted, the length to be determined by the row spacing. A 6-inch row spacing would require the observer to count all plants in two rows for a length of 12 inches; a 7-inch row spacing would require a 10.3-inch length of two rows; and an 8-inch row spacing would require a 9-inch length. The same procedure would be used for a row count as for a frame count. However, instead of dropping the frame at the toe of the foot, this point would then mark the beginning of the row count.
- K. The number of samples required depends on factors such as stand uniformity and the number of species to be counted. Generally, a minimum of 10 counts (or frames) per 10 acres or less of the field size would result in a representative sample. End rows, turn around areas or other areas that may have been double seeded should be avoided. Ten counts per 10 acres of field size should be used only as a starting point.

For example, a 70- to 80-acre pasture planting with a uniform stand may be sampled accurately using 40 counts or less. Whatever the situation, enough counts must be taken so that a representative sample is obtained.

(From USDA-NRCS, North Dakota, May 2008, FOTG, Section I, Plant Materials, Herbaceous Vegetation Establishment Guide.)

**Frame Count Measurement of Groundcover:** Use a folding rule to create a 12- x 12-inch square. Stand over this area, look directly down, and estimate the amount of ground that is covered by plants. Take a photo of the square for documentation. For each square, record groundcover at about 30 random locations, look at the variation (highest and lowest values) and calculate the average. Also, look for more visual signs of erosion and soil loss such as gullies, rills and tunneling; washing of soil; litter along fence lines and around plants; muddy and silted dams; and muddy streams with high sediment loads. Monitor groundcover regularly to assess progress. *Source: Greg Lodge, NSW DPI*

**At 20% groundcover**

Runoff water loss = 160mm per year  
Soil loss = 8.5mm per year  
Poor plant production and sustainability  
Low green leaf and plant vigor  
Low water infiltration  
Plants exposed to temperature extremes  
Low litter  
Low microbial activity  
Poor organic matter content  
Poor soil structure and surface sealing of soil

**At 70% groundcover**

Runoff water loss = 10mm per year  
Soil loss = 0.3mm per year  
Good plant production and sustainability  
High green leaf and plant vigor  
High water infiltration  
Plant bases protected from temperature extremes  
High litter levels  
Good microbial activity  
High organic matter content  
Good soil structure and soil surface

**At 40% groundcover**

Still too low  
Runoff water loss = 90mm per year  
Soil loss = 4mm per year  
Poor pasture and soil health

**At 90% groundcover**

Reduced runoff water and soil loss  
On slopes, groundcover should target 100% to retain top soil nutrients and to promote stable pasture conditions  
Weed colonization will be reduced when bare ground is removed

(From a Joint Initiative of Australian Wool Innovation and Meat & Livestock Australia; *Making More from Sheep*, Copyright 2008; [www.makingmorefromsheep.com.au/healthy-soils/tool\\_6.2.htm](http://www.makingmorefromsheep.com.au/healthy-soils/tool_6.2.htm).)

**III. Maintaining Final Cover**

The closed landfill site would benefit from mowing, haying or light grazing, depending on the post-closure use that has been approved. Grazing would be limited to an approved NRCS grazing plan.

1. **Weed Control** - During the establishment period, excessive amounts of competitive weeds must be controlled. Control weeds that compete with seedlings for sunlight



- and/or moisture during the growing season of the species planted. The first weed control operation will be needed as recommended or prior to weed seed maturity. Repeated weed control operations may be needed. Competitive weeds can be controlled either mechanically or chemically, or by a combination of these methods.
2. **Mechanical** - When controlling competitive weeds by clipping or mowing, adjust the equipment to cut above the new seedlings, and clip before the weeds set seed or mature. If the clippings are dense enough to smother the new seedlings, promptly remove clippings from the field.
- a. **Mowing Height.** Eight to 10 inches is the preferred stubble height. This will be over the top of most 1- to 2-year-old forb and legume species in early summer. Certain species are especially sensitive to clipping height, and removal of the basal leaves may result in death of the plant. Some grass species such as switchgrass have high growing points, and once established should not be mowed at a height less than 10 inches until after the growing season.
- b. **Equipment.** Swathers generally work best because of operator visibility, maneuverability and ease of height adjustment. The operator can quickly raise or lower the platform. If the windrows are heavy enough to smother new seedlings, they should be promptly removed. Sickle bar mowers are good if an adequate, consistent stubble height can be maintained. Rotary mowers can work well if they are set at the highest wheel setting. This will usually result in about an 8-inch clipping height. A level mowing height should be maintained and travel speed as appropriate to disperse the clippings. A sharp blade is essential.
- c. **Timing.** Mowing must be done early enough in the season before most of the weed seed becomes viable and so the seeded species can still benefit from the "opened canopy" and put on new growth before fall. Multiple mowings in a season may be necessary with high density/biomass weed competition. Mowing in late summer or early fall provides little benefit to the seeded species and probably causes more harm than good. Check local/state regulations of individual conservation practices for the earliest allowable mowing dates. Whenever a new seeding is mowed, some injury occurs to the seeded species. Young forb and legume seedlings are especially vulnerable and may be killed by driving over them. If weeds are a competition problem to the new seeding, then mowing is probably justified. Spot mowing is encouraged whenever possible. This eliminates damage to the seeded species in areas where you don't have to mow, and maintains the taller wildlife cover. Spot mowing also creates "edge" structure which enhances landscape diversity within the field and may provide additional wildlife benefits.
3. **Chemical** -To control competitive weeds with herbicides, use the appropriate herbicide(s) applied according to the manufacturer's label. The best control will generally be obtained when weeds are in the early stages of growth. Precautions should be taken to ensure that grass or legume seedlings are not injured by the selected herbicide(s). Refer to North Dakota State University, Agricultural Weed Control Guide (Cir. W-253 Rev.) for specific herbicide recommendations on forage crops in North Dakota.

4. **Noxious weeds** must be controlled in accordance with state law.
  - a. **Insect Control.** Insects can be a threat to seedlings. Contact the County Extension Service for recommendations on control of specific insects affecting seeded species.

**CAUTION:** When using any pesticides (herbicides or insecticides), read and follow the manufacturer's label recommendations. Read and follow all directions and precautions on the label. Use of pesticides must be consistent with the label and in accordance with state and federal laws and regulations.

*(From USDA-NRCS, North Dakota, May 2008, FOTG, Section I, Plant Materials, Herbaceous Vegetation Establishment Guide.)*

#### IV. **Repairing Final Cover**

As appropriate, the landfill site may need additional covering applied, additional erosion control structures or measures installed, and/or reseeded of the vegetative cover. See the North Dakota Department of Health's "General Native Grass Seeding" guideline for recommendations.

1. If evaluation reveals a marginal stand, consideration should be given to allowing a second growing season for establishment. Seedings that contain a high percentage of "hard seed" are more likely to produce new seedlings during the second growing season.
2. The alternative of a partial reinforcement seeding, in lieu of the full seeding rate, should be considered during the evaluations.
3. "Spot" seeding weak areas may be a logical alternative in the case of spotty or intermittent stands, in lieu of whole field reseeded.

*(From USDA-NRCS, North Dakota, May 2008, FOTG, Section I, Plant Materials, Herbaceous Vegetation Establishment Guide.)*

#### **References:**

1. A Joint Initiative of Australian Wool Innovation and Meat & Livestock Australia - Making More from Sheep, Copyright 2008.
2. North Dakota Department of Health, Division of Waste Management, General Native Grass Seeding.
3. North Dakota State University, Agricultural Weed Control Guide (Cir. W-253 Rev.).
4. USDA-NRCS, North Dakota, May 2008, FOTG, Section I, Plant Materials, Herbaceous Vegetation Establishment Guide.
5. USDA-NRCS - North Dakota, August 2002, FOTG, Section IV, Conservation Practices, Conservation Practice Standard 342, Critical Area Planting.

Attachment 2



**GUIDELINE 24 - GENERAL NATIVE GRASS SEEDING**

North Dakota Department of Health – Division of Waste Management

918 E. Divide Ave., Bismarck, ND 58501-1947

Telephone: 701.328.5166 • Fax: 701.328.5200 • Website: [www.ndhealth.gov/wm](http://www.ndhealth.gov/wm)

Updated 04-2009

Native grass plantings on solid waste facilities help control erosion and minimize longer term closure costs. Most native grass species develop a strong root system that helps control erosion and contributes to an increase in soil fertility by recycling nutrients while alive and returning vital nutrients to the soil as the roots decompose. Because many native grasses are adapted to survive in almost any soil conditions, they require no fertilizer or irrigation after planting. Thus, over the long-term, planting native grasses (and wildflowers) can reduce maintenance costs. The North Dakota Department of Health recommends facility owners review their reclamation plans with staff and consult with local Natural Resources Conservation Service (NRCS) offices. Because of the specialties of landfill closure and the need to have long-term durable plantings, seeding rates are recommended to be higher than native grassland not impacted by waste management activities. The Department of Health's guideline on "Evaluating Final Vegetative Cover of Closed Landfill Areas" also can help guide facility owner/operators in this essential element of facility closure.

**Suggested Native Grass Mixture**

Species	PLS* Pounds/Acre	Percent of Mixture**	Warm or Cool Season	Bunchgrass or Rhizomatous	Minimum Root Depth
Western Wheatgrass ( <i>Pascopyrum smithii</i> )	4	21%	Cool	Rhizomatous	20" +
Green Needlegrass*** ( <i>Nassella viridula</i> )	4	21%	Cool	Bunchgrass	14" +
Slender Wheatgrass ( <i>Elymus trachycaulus</i> ) or Canada Wildrye ( <i>Elymus Canadensis</i> )	2 2	10.5% 10.5%	Cool Cool	Bunchgrass Bunchgrass	16" + 16" +
Sideoats Grama*** ( <i>Bouteloua curtipendula</i> )	2	10.5%	Warm	Rhizomatous	12" +
Switchgrass ( <i>Panicum virgatum</i> )	2	10.5%	Warm	Rhizomatous	12" +
Big Bluestem*** ( <i>Andropogon gerardii</i> )	2	10.5%	Warm	Bunchgrass, sometimes with short rhizomes	20" +
Little Bluestem*** ( <i>Schizachyrium scoparium</i> )	1.5	8	Warm	Bunchgrass, sometimes with short rhizomes	14" +
Blue Grama*** ( <i>Bouteloua gracilis</i> )	1.5	8	Warm	Bunchgrass, forming short rhizomes	16" +
<b>Total Seed (min)</b>	<b>19 pounds</b>	<b>100%</b>			

\*PLS - Pure Live Seed (based on 50 PLS/sq feet)

\*\*Percent Mixture – Contingent upon soil requirements. Adjust mixture based on NRCS map.

\*\*\*Chaffy or awned seeds (i.e., bluestems, indiagrass and blue grama) are extremely difficult to plant with a grain drill. It is recommended that a grass drill be used for these types of grasses. Proper agitation is needed to prevent "bridging" of seed in the seedbox, and the feeder mechanism must be capable of metering a uniform flow of seed at the desired rate. Very few grain drills have this capability. Use of debarbed seeds is strongly recommended when considering seeding chaffy or awned seeds in a grain drill.

1. The seedbed should be firmly packed (footprints left in the soil should be less than 1/2-inch deep).
2. Erosion control and establishing a cover crop.

**Upon soil placement on landfill areas, erosion control measures must be incorporated immediately to minimize erosion of soil layers. Applying and incorporating wheat straw at a rate of at least 2,000 pounds per acre is a common practice. Other measures are appropriate, especially in erosion prone areas.** Straw mulch should be free of noxious weeds. Bromegrass is not an advisable mulch. Approximately 10 percent of the soil surface should be visible through the mulch. Excessive cover which will smother seedlings should be avoided.

**In spring:** A cover crop of oats or barley at 10 PLS pounds/acre is recommended for seeding the disturbed area prior to native grass seeding. It is ideal to mow the cover crop to a height of 8 inches when the grain in the head is forming but still immature to produce standing stubble.

**In fall:** The recommendation would be to seed a cover crop of winter wheat in September/October for an immediate cover crop. In the spring, the cover crop should be chemically killed with Roundup, and then the native grass seeded into the residual cover crop material. Winter wheat is aggressive and will make a good cover; however, because it is so successful in beating back the invasives, it will also tend to out-compete the native grass they try to seed later (hence the Roundup before seeding in the spring).

3. An early spring seeding (before May 24) is preferred, and should not extend past June 15 at the latest. A dormant fall seeding (after October 20) is acceptable; however, the mixture should be dominated heavily with cool-season species. If moisture levels and weather conditions are optimal, planting at other times may be considered. At anytime, if the planting is not successful, reseeding must be addressed when appropriate.
4. The native grass seed should be planted through the standing cover stubble during the following growing season at a soil depth of 1/2 inch, depending on site conditions. Precautions must be taken not to plant the seed too deeply in the soil or poor germination will result. A drill designed specifically for grass seeding will give the best results.
5. Fertilizer should not be applied before the native grass has established.
6. **Use North Dakota certified seed, northern origin cultivars, northern-adapted cultivars, or approved varieties by the NRCS.** Refer to Table 2 of the USDA-NRCS - North Dakota, May 2008, FOTG.

**Note:** This native grass mixture is a suggestion for general purposes (such as the closure of small inert waste landfills, disturbed waste sites, etc.), where there are not significant soil problems (salinity, wetness, high sand content, etc.) and where climactic factors or slope factors are not significant. Sites that have other factors affecting plant selection, especially in eastern or western North Dakota, steeper slopes, or where alternative covers are used, should consult the Department of Health and the local NRCS office to tailor the native seed selection. Sites with slopes exceeding 15 percent should plant at a heavier rate, such as 25-30 PLS pounds/acre. Alternative covers also should ensure a mixture of cool and warm season grasses, with both shallow and deep roots. Larger landfills also should have a seed selection tailored to their facility while addressing the principles outlined in this guideline.

**References:**

USDA-NRCS - North Dakota, May 2008, FOTG - Section I - Reference Subject - Plant Materials, Herbaceous Vegetation Establishment Guide.

USDA-NRCS - North Dakota, August 2002, FOTG - Section IV - Conservation Practices, Conservation Practice Standard - 342, Critical Area Planting.



**NORTH DAKOTA**  
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION  
Gold Seal Center, 918 E. Divide Ave.  
Bismarck, ND 58501-1947  
701.328.5200 (fax)  
www.ndhealth.gov



REF FILE: Valley City Inert Waste Landfill – Permit 0176

February 9, 2012

Mayor & City Commission  
City of Valley City  
PO Box 390  
Valley City, ND 58072

Dear Mayor & Commission Members:

The North Dakota Department of Health (Department), Division of Waste Management, is proposing approval of the renewal of a permit for a solid waste management facility located near Valley City, ND. A copy of the Permit Review, Draft Permit and Public Notice describing the proposed permit are enclosed for your review.

As required by Section 33-20-03.1-03 of the North Dakota Administrative Code, the Draft Permit will be available for public review and comment for thirty (30) days following publication of the Public Notice. The public comment period begins February 21, 2012 and ends March 21, 2012. During that period any interested person may submit written comments and request a public hearing by stating the nature of the specific issues to be raised. A 15-day notice will be provided before any hearing is scheduled. The Department will consider all comments prior to taking any action on the permit. Comments, questions, and written communication should be directed to:

Scott A. Radig, P.E., Director  
North Dakota Department of Health  
Division of Waste Management  
918 East Divide Avenue, 3rd Floor  
Bismarck, ND 58501-1947

Should you have any comments on the proposed permit, please provide them to the Department, in writing, prior to the expiration date of the public comment period.

Sincerely,

Steven J. Tillotson, Asst. Director  
Division of Waste Management

SJT:JK:DAT:ljl

Enc.

CERTIFIED

cc/enc: City-County Health District  
Jon Cameron, Valley City Administrator  
Jeff Differding, Public Works Department  
Erik Gilbertson, Kadrmas, Lee & Jackson

Environmental Health  
Section Chief's Office  
701.328.5150

Division of  
Air Quality  
701.328.5188

Division of  
Municipal Facilities  
701.328.5211

Division of  
Waste Management  
701.328.5166

Division of  
Water Quality  
701.328.5210

NORTH DAKOTA DEPARTMENT OF HEALTH

INTRADEPARTMENTAL MEMORANDUM

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REF FILE: Valley City Inert Waste Landfill – Permit 0176

TO: Scott A. Radig, P.E., Director *SAR*  
Division of Waste Management

FROM: Steven J. Tillotson, Asst. Director *Steven J. Tillotson*  
Division of Waste Management

Jane K. Kangas, Env. Scientist *Jane K. Kangas*  
Solid Waste Program  
Division of Waste Management

Diana A. Trussell, Env. Engineer *Diana A. Trussell*  
Solid Waste Program  
Division of Waste Management

SUBJECT: Permit Renewal Application

DATE: February 9, 2012

**Introduction**

On July 5, 2011, the city of Valley City submitted an application, prepared by Kadrmas, Lee & Jackson, Inc., for renewal of their solid waste permit and expansion of an inert waste landfill. The site is located within approximately 40 acres in the NE1/4 of Section 31, TWP 140N, R 58W in Barnes County southeast of Valley City, ND. The Solid Waste Management Units include an Inert Waste Landfill, a Clean Wood Stockpile, Yard Waste Composting, Scrap Metal and Appliance Recycling Piles, Clean Concrete and Asphalt stockpiles, and a closed Municipal Solid Waste (MSW) landfill. The facility applied to continue accepting inert waste (construction and demolition materials such as wood, metal, bricks, masonry, concrete and asphalt pavement, and yard wastes). The proposed expansion area is to the south of the existing inert waste landfill.

The western two-thirds, strongly sloping areas of the original site are occupied by a closed sanitary landfill. The inert waste landfill pit occupies the southeast corner, the transfer station occupies the northeast corner, and the composting and stockpile areas are in between. The proposed expansion area is to the south of the existing inert waste landfill.

**Site Characteristics**

According to the Soil Survey Report prepared by Prairie Soil Consulting, LLC for Valley City and dated January 2008, the area is on an undulating late Wisconsin-aged till plain. This area occurs in the Northern Glaciated Plains Level III Ecoregion and the Drift Plains Level IV

Ecoregion. The Northern Glaciated Plains Ecoregion is characterized by a flat to gently rolling landscape composed of glacial drift. The Drift Plains consist of a subtle undulating topography and a thick mantle of glacial till. The major soils in the area are Mollisols (Calciudolls, Calciaquolls, Hapludolls, and Natrudolls). They are deep and mostly well-drained. Glacial erratic, consisting of large stones, commonly occur.

The soils encountered in the various excavations consisted of yellow and brown clays interspersed with rocks and boulders. Thin layers of gravel or sandy clays showed up in scattered areas, and the escarpment at the southwest corner of the sanitary landfill is predominately gravelly clay. The entire area is underlain by the Pierre Shale Formation, locally referred to as "blue clay."

### Operation

The operating plans for the facility address waste acceptance procedures and security. According to the application, the site is accessible through a gate at the northeast corner which is locked during non-business hours. A woven wire fence borders the north, east and south sides of the site and barbed wire is on the west. There is also a single-row shelter belt which runs along the east and south fence lines.

The site also includes a closed MSW landfill which lies on the steep west-facing slopes above a creek that crosses the northwest corner of the closed MSW landfill site and drains approximately 6,000 acres. This old landfill was quite difficult to close and it has a number of surface water diversions to slow runoff and control erosion off the property. A drain tile was installed beneath the original creek bed, and after the removal of topsoil, the area was filled and the slopes were flattened with compacted clay. There is some drain tile leading to a culvert with water which should be inspected and the water sampled. In addition, the owner/operator should be required to do routine inspection and any maintenance of the closed landfill units, drainage structures and the leachate control system.

There is also an intermittent drainage way that enters the upland landfill property from the south that drains approximately 120 acres within the east half of Section 31. The water has been diverted from its natural course to flow along the south edge of the site in a rock-lined ditch to a series of sediment basins, and then into the creek just upstream from the point where the creek was diverted. The sediment basin abuts the landfill unit and waste has been observed in contact with the water. The water may also tend to de-stabilize the fragile slopes (Pierre Shale) which typically can fail and slump in the Valley City area. It is recommended that this pond be evaluated, closed, and the drainage system on the upland revised. The owner/operator should provide plans for better surface water management on the uplands of the site.

There are diversion dikes around the inert waste landfill pit and access to the pit will be maintained to prevent runoff from entering the pit. Precipitation which falls within the inert waste landfill will drain to the sump hole in the southwest corner of the pit where it will be evaporated. During periods of heavy precipitation and in the spring, it may become necessary to

pump water from the sump hole into the drainage way. The discharge from the sump pit is regulated by a North Dakota Pollution Discharge Elimination System (NDPDES) permit and Valley City has an approved NDPDES permit. There are diversion dikes on the uphill sides of the composting area diverting runoff around the site and there are also containment dikes on the downhill sides which will collect and hold precipitation from within the site for evaporation.

The landfill plan of operation also includes plans for safety, landfill fires, and waste acceptance and rejection procedures. The safety plan covers safety meetings, training and systems that are in place to prevent accidents. Landfill fires are discussed in the plan. The plan states that flammable materials placed in the inert waste landfill pit will be covered as soon as practicable and that no more than 10,000 square feet will be exposed at any given time. A stockpile of dirt will be located nearby with enough material to cover 10,000 square feet of open area with two feet of dirt. The waste acceptance and rejection procedures cover what the landfill will accept and what they won't accept. The plan also covers waste screening procedures.

The city of Valley City is also planning to expand the inert waste landfill to the south of the existing pit. A geotechnical report, soil survey and slug test results were submitted for the proposed site. The geotechnical report and slug test show that perched water is located on the proposed site within a sandy layer. In order to mitigate the perched water, drainage tile will be installed at a depth that is two feet lower than the proposed floor elevation of the inert waste pit. The drain tile or pipe should be placed in a bed of appropriately sized gravel material. To reduce the potential for plugging, a filter fabric or "sock" should not be placed immediately around the pipe (as specified in the plans). Rather, filter fabric should be placed around the gravel bed surrounding the drainage pipe.

The tiles will outlet to the existing sump pit and the discharges will comply with the existing NDPDES permit. Fencing will be added to enclose the proposed area and to limit access. Also, additional interior access roads will be constructed and modified as needed. The closure of the proposed site will be in accordance with the approved closure plan. The cap will be at least 18 inches of suitable clay cap and 6 inches of topsoil.

The proposed new inert waste landfill cells could encounter shallow sand units (discontinuous) and shallow groundwater. Any sand units should be over-excavated and filled or sealed with at least two feet of compacted clay. Any shallow groundwater or surface water could be hauled to the nearby city publicly owned treatment works (POTW) ponds or managed in a manner approved by the Department.

The city of Valley City anticipates the proposed expansion of the inert waste landfill site to be operational for approximately 15 years.



NORTH DAKOTA DEPARTMENT OF HEALTH  
PUBLIC NOTICE OF OPPORTUNITY TO COMMENT ON DRAFT PERMIT  
FOR A SOLID WASTE MANAGEMENT FACILITY UNDER  
THE NORTH DAKOTA SOLID WASTE MANAGEMENT RULES

FACILITY NAME: Valley City Inert Waste Landfill – Permit 0176

APPLICANT: City of Valley City, PO Box 390, Valley City, ND 58072

BACKGROUND:

On July 5, 2011, the City of Valley City submitted an application, prepared by Kadrmas, Lee and Jackson Inc., for renewal of their solid waste permit and expansion of an inert waste landfill. The site is located within approximately 40 acres in the NE1/4 of Section 31, Township 140N, Range 58W in Barnes County southeast of Valley City, ND. The Solid Waste Management Units include an Inert Waste Landfill, a Clean Wood Stockpile, Yard Waste Composting Pile, Scrap Metal and Appliance Recycling Piles, Clean Concrete and Asphalt stockpiles, and a closed Municipal Solid Waste landfill. The facility applied to continue accepting inert waste (construction and demolition materials such as wood, metal, bricks, masonry, concrete and asphalt pavement, and yard wastes). The proposed expansion area is to the south of the existing inert waste landfill.

The Department believes that a permit which meets the requirements of the North Dakota Solid Waste Management Rules and is protective of human health and the environment can be issued to the Valley City Inert Waste Landfill and has prepared a Draft Permit for public review and comment.

PUBLIC COMMENTS AND HEARING

As required by Section 33-20-03.1-03 of the North Dakota Administrative Code, the Draft Permit will be available for public review and comment for thirty (30) days following publication of the Public Notice. The public comment period begins February 21, 2012 and ends March 21, 2012. During that period any interested person may submit written comments and request a public hearing by stating the nature of the specific issues to be raised. A fifteen (15) day notice will be provided before any hearing is scheduled. The North Dakota Department of Health will consider all comments prior to taking any action on the permit. Comments, questions and written communication should be directed to:

Scott A. Radig, P.E., Director  
North Dakota Department of Health  
Division of Waste Management  
918 East Divide Avenue, 3rd Floor  
Bismarck, ND 58501-1947

The Draft Permit and Permit Application are available for review during the hours of 8:30 a.m. to 4:00 p.m., Monday through Friday, at the North Dakota Department of Health, Division of Waste Management, 918 East Divide Avenue, 3rd Floor, Bismarck, ND. A copy of this Public Notice is also on the Department's website at: <http://www.ndhealth.gov>

Anyone requiring special access or accommodations to review the Draft Permit may contact the Department at 701-328-5166.



REF FILE: Valley City Inert Waste Landfill IT-176

July 25, 2005



MAYOR & CITY COUNCIL  
C/O CITY AUDITOR  
PO BOX 390  
VALLEY CITY ND 58072

Dear Mayor & Council Members:

Enclosed is a Permit for a Solid Waste Management Facility. It lists the conditions under which the permit is issued. The operation of this disposal facility must adhere to these permit provisions; therefore, we would advise that you read them carefully.

If you have any questions regarding this permit, please contact the Department at 701-328-5166.

Sincerely,

Steven J. Tillotson, Acting Director  
Division of Waste Management

SJT:ljl

Enc.

CERTIFIED

cc: Mel Olstad, Valley City Public Works Dept.  
Chuck Luessen, Kadrmass, Lee & Jackson

ValleyCity IT-176 Ltr 20050725.wpd



**PERMIT FOR A SOLID WASTE MANAGEMENT FACILITY**  
**NORTH DAKOTA DEPARTMENT OF HEALTH — DIVISION OF WASTE MANAGEMENT**  
**TELEPHONE: 701-328-5166 • REV. 01/05**

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Pursuant to Chapter 23-29 of the North Dakota Century Code (NDCC), (Solid Waste Management and Land Protection Act), and Article 33-20 of the North Dakota Administrative Code (NDAC), (Solid Waste Management Rules), and in reliance on statements and representations heretofore made by the owner or owner's representative designated below, a permit is hereby issued authorizing such owner/operator to construct and operate a solid waste management facility at the designated location under any and all conditions.

**A. Owner/Operator:**

- Name:** Valley City Inert Waste Landfill
- Mailing Address:** 254 2nd Avenue NE, Valley City, ND 58072
- Location Address:** 11474 35th Street SE, Valley City, ND 58072

**B. Permit Number:** IT-176

**C. Solid Waste Management Units:**

- Primary:** Inert Waste Landfill
- Other(s):** Not applicable

**D. Location Information:**

**General:** NE1/4 of Sec 31 TWP 140N R 58W of Barnes County

**E. General Conditions:**

- E.1.** The owner/operator of the facility is subject to the Solid Waste Management and Land Protection Act (Chapter 23-29 NDCC), the Solid Waste Management Rules (Article 33-20 NDAC), all other North Dakota and federal laws, rules or regulations and orders now or hereafter effected by the North Dakota Department of Health (hereinafter the Department), and to any and all conditions of this permit.
- E.2.** Compliance with terms of this permit does not constitute a defense to any order issued or any action brought under NDCC 23-29, NDAC 33-20, NDCC 23-20.3, NDAC 33-24, Sections 3013, 7003, or 3008(a) of RCRA, Sections 106(a), 104 or 107 of the Comprehensive Environmental Response,





Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et. seq.) or any other law providing for protection of public health or the environment.

- E.3. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local law or regulations.
- E.4. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- E.5. This permit is based on the premise that the information submitted by the owner/operator is accurate and that the facility will be or has been constructed and will be operated as specified in the application and all related documents. Any inaccuracies or misrepresentations found in the application may be grounds for the termination or modification of this permit. The Permittee must inform the Department of any deviation from, or changes in, the information in the application which would affect the Permittee's ability to comply with the applicable rules or permit conditions.
- E.6. The Permittee shall at all times properly operate and maintain the facility and systems of disposal, storage, and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.
- E.7. The Permittee shall give notice to the Department of any planned physical alterations or additions to permitted waste management units. Any physical change in, or change in the method of operation of, a treatment or disposal operation shall be considered to be construction, installation, or establishment of a new operation. No construction, installation, or establishment of a new operation shall be commenced unless the owner/operator thereof shall file an application for, and receive, a permit to construct and operate from the Department.
- a. The Permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
  - b. Whenever the Permittee becomes aware that the Permittee failed to submit any relevant facts in the permit application, or submitted

incorrect information in the permit application or in any report to the Department, the Permittee shall promptly submit such facts or information.

- E.8.** The owner/operator shall construct, operate, maintain, and close the waste management units and the facility according to the criteria of law and rule, conditions of this permit, and other reasonable precautions to prevent or minimize, if applicable, any environmental impacts including, but not limited to, fugitive dust emissions, objectionable odors, air toxics and gas emissions, spills, litter, and contamination of surface water and groundwater.
- E.9.** The Permittee shall furnish to the Department within a reasonable time, any relevant information which the Department may request to determine whether cause exists for modifying, reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.
- E.10.** This permit may be modified during its term through mutual agreement or by Department Order for the purpose of preventing or abating adverse impact to the environment.
- E.11.** This permit does not supersede local zoning authority or any other requirements of any political subdivision of the state.
- E.12.** Within sixty (60) days of the issuance of this permit, if not already completed, the owner/operator shall record a notarized affidavit with the County Register of Deeds. The affidavit shall specify that this facility, as noted in the legal description, is permitted to accept solid wastes for disposal. This affidavit shall specify that another affidavit must be recorded upon the facility's final closure.

  - a.** Upon closure, a second affidavit shall be recorded specifying any final details regarding the types of waste disposed of at the facility, as well as any final details regarding the facility's location, construction, management, etc.
  - b.** The Department must be provided a copy of both affidavits, certified by the County Register of Deeds in which the facility is located. The copies must be forwarded to the Department within thirty (30) days of recorded dates, or if notification has already been completed, within thirty (30) days of the permit issuance date.
- E.13.** Any entity that controls the permit holder (Permittee) agrees to accept responsibility for any remedial measures, closure and post-closure care, or penalties incurred by the permit holder (Permittee).



**E.14.** The owner/operator shall construct, operate, maintain, and close the waste management units and the facility according to the criteria of law and rule, conditions of this permit, and other reasonable precautions to prevent or minimize, if applicable, any environmental impacts including, but not limited to, fugitive dust emissions, objectionable odors, air toxics and gas emissions, spills, litter, and contamination of surface water and groundwater.

**F. Specific Conditions:**

**F.1.** The facility shall not be used for the disposal of household garbage and putrescible waste; asbestos; soluble wastes (fly ash, salt, etc.); animal carcasses; waste grain, seed, and elevator screenings; liquids; unrinsed pesticide containers; lead-acid batteries; used oil; PCB waste/oils; hazardous wastes [i.e., ignitables (solvents, paints, and fuels), corrosives (acids and alkalis), reactives, toxicity characteristic and listed wastes]; hazardous materials; sludges; manure; septic tank pumpings or infectious wastes.

**F.2.** The facility is authorized for disposal of inert wastes. "Inert waste" means nonputrescible, nonwater soluble solid waste that will not in any way form a contaminated leachate. Inert waste includes but is not limited to: (1) construction and demolition material (such as wood, bricks, masonry, concrete (cured) and metal) resulting from the demolition or razing of buildings, roads, and other structures; (2) trees and tree branches; (3) metal wastes that do not contain oils, solvents, PCBs, or other similar materials; (4) bottom ash from coal-fired boilers; and (5) waste coal fines from air pollution equipment.

**F.3.** Except as modified by conditions of this permit, this facility and related waste management units and structures shall be designed, constructed, operated, and closed in accordance with previous correspondence and documents contained in Departmental files pertaining to this facility and as described in the documents enumerated below, which are hereby incorporated by reference in this permit.

**a.** Attachment to Permit IT-176 - Specific Condition F.3.a. - History of Valley City Inert Waste Landfill IT-176, dated July 25, 2005 and prepared by the North Dakota Department of Health - Division of Waste Management.

**b.** Application for a Solid Waste Management Facility Permit - North Dakota Department of Health - Division of Management SFN 19269 (05/02), dated September 20, 2004 and submitted by the Valley City Public Works Department, Valley City, ND.

- c. Revised Plan of Operations - Valley City Municipal Solid Waste Facility, prepared for the Valley City Public Works Department, City of Valley City, ND (revised September 14, 2004) and submitted by Kadrmass, Lee & Jackson, Valley City, ND.
  - d. Plan of Operations - Valley City Municipal Solid Waste Facility, prepared for the Valley City Public Works Department, City of Valley City, ND and submitted by Kadrmass, Lee & Jackson, Valley City, ND on September 20, 2003.
  - e. Application for a Solid Waste Management Facility Permit - North Dakota Department of Health - Division of Waste Management SFN 19269 (08/00), received from the Valley City Public Works Department, Valley City, ND, on June 20, 2001.
  - f. Application for a Solid Waste Management Facility Permit - North Dakota Department of Health & Consolidated Laboratories - Division of Waste Management SFN 19269 (11/94), received from the Valley City Public Works Department, Valley City, ND on June 6, 1996.
  - g. Plan of Operations - Valley City Municipal Solid Waste Facility, dated June 6, 1996 and prepared by Kadrmass, Lee & Jackson, Valley City, ND.
  - h. Site Suitability Review of the Valley City Landfill (1993), submitted by Jeffrey Olson, North Dakota State Water Commission and Phillip L. Greer, North Dakota Geological Survey.
  - i. Future submittals approved by the Department may supersede or supplement items listed above.
- F.4.** Within eighteen (18) months of the permit issuance date, and prior to expansion into any previously unfilled areas, the owner/operator shall complete a soil survey for the facility and identify any additional sources of Suitable Plant Growth Material (SPGM). All SPGM must be segregated and stockpiled for use in closure of the facility.
- F.5.** Within eighteen (18) months of the permit issuance date, and prior to any expansion into any unfilled areas, the owner/operator shall submit to the Department, for approval, a detailed closure plan, including fill progression plans, for the new facility. No expansion shall be initiated until this plan has been approved by the Department.
- F.6.** The owner or operator shall design, construct, maintain and operate the facility in a manner to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden release of solid waste or solid waste



constituents to air, soil, groundwater or surface water which could threaten human health or the environment.

- F.7. All waste operations shall be properly maintained to minimize the potential for fire. The working area of the disposal operation shall be maintained in as small an area as practicable, not to exceed 10,000 square feet before cover is applied. Adequate cover shall be stockpiled near the operating area to cover the waste to a depth of two (2) feet in the event of a fire.
- F.8. The facility shall be operated in full accordance with the approved Plan of Operation and the Waste Screening provisions. All activities at the site will be conducted in a manner that will minimize the risk of fire. No open flames or smoldering material will be allowed near the fill area.
- F.9. Operations and Sequential Partial Closure shall be implemented such that the working face or open area (the area that has not been covered or closed) of the landfill must be limited in size to as small an area as practicable. The open area of the inert waste landfill shall not exceed 10,000 square feet before cover is applied. Heavy equipment shall routinely run over the lifts of waste material (one foot to two feet maximum) at least four to five times or more as necessary to adequately break up and compact the waste material. At maximum, areas that have not been formally closed with the required two feet of final cover shall be no larger than 40,000 square feet. All wastes, including but not limited to the working face, must be covered at least two times per year with a minimum of six inches of suitable earthen material. Grade stakes shall be placed as necessary to ensure filling activities follow the approved closure grades.
- F.10. Adequate emergency cover soil (in addition to the dirt needed for normal fill and cover activities) shall be stockpiled in close proximity to the disposal area to be used in the event of a fire or other emergency. These stockpiles shall, at minimum, be equivalent to two cubic feet per square foot of open area plus enough dirt to cover unclosed areas of the landfill with at least two feet of dirt.
- F.11. Prior to accepting waste from any industry (including, but not limited to contractors (construction, demolition, etc.), manufacturers, maintenance companies, auto and truck maintenance (transportation) companies, etc.) or waste hauler, the owner/operator shall provide to appropriate representatives of the company a copy of the approved Waste Acceptance Procedures as well as copies of the Waste Evaluation Form. The company must agree to the waste screening and inspection procedures. The owner/operator shall maintain a list of Industrial Sources of Inert Waste in the facility's operating record. The training and educational material shall be repeated and/or amended as necessary to ensure compliance with the Waste Acceptance Procedures and the permit.



Inert Solid Waste Management Permit  
Permit No. IT-176  
Page 7 of 7

- F.12.** Cover material shall be maintained as necessary and as identified in the Plan of Operation to ensure adequate amounts for all cover and closure activities. All cover material stockpiles, both on the permit site and that identified off-site, shall be maintained solely for use in the landfill unless removal is authorized by the Department.

In consideration of information provided regarding the facility and its operation and in consideration of the conditions above, the North Dakota Department of Health hereby issues a permit to the Valley City Inert Waste Landfill.

This permit is effective as of July 25, 2005 and shall remain in effect until July 25, 2007, unless modified, superseded, or revoked under Section 33-20-02.1-06 NDAC or continued in accordance with Section 33-20-02.1-07 NDAC.



Steven J. Tillotson, Acting Director  
Division of Waste Management



Date

**Attachment to Permit IT-176 - Specific Condition F.3.a.**

**History of Valley City Inert Waste Landfill IT-176**

**July 25, 2005**

**January 26, 2004:** Corrected Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 2003, submitted by the Valley City Public Works Department, PO Box 240, Valley City, ND.

**January 19, 2004:** Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 2003, submitted by the Valley City Public Works Department, Valley City, ND.

**January 6, 2003:** Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 2002, submitted by the Valley City Public Works Department, Valley City, ND.

**March 12, 2002:** Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 2001, submitted by the Valley City Public Works Department, Valley City, ND.

**March 16, 2001:** Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 2000, submitted by the Valley City Public Works Department, Valley City, ND.

**March 13, 2000:** Revised Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 1999, submitted by the Valley City Public Works Department, Valley City, ND.

**April 13, 1999:** Annual Report for the Valley City Transfer Station and Inert Site, Calendar Year 1998, submitted by the Valley City Public Works Department, Valley City, ND.

## **APPENDIX G: INSURANCE COVERAGE**



# NORTH DAKOTA INSURANCE RESERVE FUND

PO BOX 2258  
BISMARCK, ND 58502

INSURED COPY

Named Member	Memorandum Number	Coverage Period	
		From	To
	GL 0000414 33	01/01/2018	01/01/2019
	Agent 8452712	0.1250	
VALLEY CITY, CITY OF AVIS RICHTER, AUDITOR PO BOX 390 VALLEY CITY ND 58072-0390	DACOTAH INSURANCE PO BOX 997 VALLEY CITY ND 58072  Telephone: 701-845-6870		

## MEMORANDUM OF COVERAGE LIABILITY COVERAGE DECLARATIONS

The Named Member is a member of the North Dakota Insurance Reserve Fund (NDIRF) with all rights and responsibilities set forth in the by-laws.

Coverage does not apply to loss under a coverage part which occurs prior to the Retroactive Date, if any, shown below. Coverage is provided only for those coverage parts indicated by a contribution in the contribution section below.

This Memorandum of Coverage does not constitute an insurance policy or insurance contract within the meaning of Chapter 32-12.1 of the North Dakota Century Code. The limit of liability afforded the Named Member under this Memorandum is that specified by Chapter 32-12.1-03(2) of the North Dakota Century Code, two hundred fifty thousand dollars per person and one million dollars for any number of claims arising from any single occurrence regardless of the number of political subdivisions, or employees of such political subdivisions, which are involved in that occurrence. A political subdivision may not be held liable, or be ordered to indemnify an employee held liable, for punitive or exemplary damages. The limit of coverage shown below applies in the event of a judicial determination that the statutory limit of liability is not applicable to a specific occurrence. The NDIRF is a self-insurance pool within the meaning of Chapter 26.1-23.1-02 of the North Dakota Century Code. Membership in the NDIRF does not constitute any form of waiver, modification or limitation of any immunity or limitation of liability that is available with respect to a particular claim or "suit".

COVERAGES	RETROACTIVE DATE	LIMIT OF LIABILITY PER OCCURRENCE	CONTRIBUTION
A) Personal Injury and Property Damage Liability		\$2,000,000	\$39,546
B) Medical Payments	Not Applicable	\$2,500	Included
C) Governance Liability		\$2,000,000	\$3,818
<b>CONTRIBUTION</b>			<b>\$ 43,364</b>

Forms and Endorsements contained in this Memorandum of Coverage at inception:

GL 10 01 (08/15)	GL 20 02 (01/12)	GL 20 30 (08/16)	GL 30 01 (01/91)	GL 30 03 (09/11)
GL 30 20 (04/08)	GL 40 30 (08/16)	IL 80 01 (01/91)		

Authorized Representative



**NAMED MEMBER** VALLEY CITY, CITY OF  
**MEMORANDUM NUMBER** GL 0000414 33  
**EFFECTIVE DATE** 01/01/2018 **TO** 01/01/2019

### SCHEDULE OF COVERED PROFESSIONAL SERVICES

Coverage is provided only for those professional services, furnished by a "Covered Party," indicated by an "X" below.

If coverage is required for additional professional services, contact your agent listed in the declarations.

- Attorneys
- Coroners
- Emergency Medical Technicians
- Engineers
- Firefighters
- Judges
- Law Enforcement Officers
- Nurses (CRNA, RN, LPN, & FPN)
- Paramedics
- Physicians
- Physicians - Acting as volunteers in accordance with North Dakota Century Code Chapter 23-27-04.1.
- Physicians - Acting in accordance with duties under North Dakota Century Code Chapter 23-35-12 Local Health Officers.
- Psychologists
- Sanitarians
- Social Workers
- Surveyors
- Therapists (OT, PT, RT, & RC)
- Teachers



**NAMED MEMBER** VALLEY CITY, CITY OF  
**MEMORANDUM NUMBER** GL 0000414 33  
**EFFECTIVE DATE** 01/01/2018 **TO** 01/01/2019

**ADDITIONAL COVERED PARTY**

The individual(s), organization(s), or corporation(s) listed below, including their employees, are a "covered party" for the coverages and operations shown.

**ADDITIONAL COVERED PARTY:** CITY/COUNTY LIBRARY BOARD  
VALLEY CITY ND ND 58072

**COVERAGES:** A, B & C

**OPERATIONS:**  
ALL OPERATIONS

**ADDITIONAL COVERED PARTY:** VALLEY CITY-BARNES COUNTY  
DEVELOPMENT CORPORATION  
VALLEY CITY ND ND 58072

**COVERAGES:** A, B & C

**OPERATIONS:**  
ALL OPERATIONS



**NAMED MEMBER** VALLEY CITY, CITY OF  
**MEMORANDUM NUMBER** GL 0000414 33  
**EFFECTIVE DATE** 01/01/2018 **TO** 01/01/2019

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**ADDITIONAL COVERED PARTY**

**WHO IS A COVERED PARTY (Section III)** is amended to include as a covered party the individual(s) or entity(s) shown in the schedule to the extent indemnification is provided under VI. **SUPPLEMENTARY PAYMENTS - COVERAGE A. AND C.**

**SCHEDULE**

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JOHN DEERE FINANCIAL PO BOX 6600 JOHNSTON IA 50131-6600	<b>COVERAGES: A ONLY</b>
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JONES LANG LASALLE BROKERAGE, INC. 4300 AMON CARTER BLVD, STE 100 FORT WORTH TX 76155	<b>COVERAGES: A ONLY</b>
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BNSF RAILWAY COMPANY 2500 LOU MENK DR - AOB3 FORT WORTH TX 76131	<b>COVERAGES: A ONLY</b>
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**NAMED MEMBER** VALLEY CITY, CITY OF  
**MEMORANDUM NUMBER** GL 0000414 33  
**EFFECTIVE DATE** 01/01/2018 **TO** 01/01/2019

**NDIRF**

**ADDITIONAL COVERED PARTY  
 GENERAL LIABILITY ENDORSEMENT  
 STATE OF NORTH DAKOTA**

The State of North Dakota is a "covered party" but only with respect to liability incurred for "personal injury" or "property damage" caused in whole or part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

In the performance of your on going operations in completion of Lease Agreement between the State of North Dakota, Information Technology Department and Valley City-Barnes County Development Corporation. This lease terminates on March 31, 2017.

In addition:

1. Any attorney who represents the State must be appointed by the North Dakota Attorney General as a Special Assistant Attorney General as required under N.D.C.C. 54-12-08.
2. The coverage afforded the State is primary as respects any insurance or self-retention maintained by the State and shall be noncontributory.
3. The State will be defended as an added covered party in accordance with the terms and conditions of this Memorandum of Coverage.
4. Any right of recovery we may have against the State because of payments we make on behalf of the State for "personal injury" or "property damage" arising out of this endorsement is waived.

Exclusion:

With respect to the coverage afforded to the State of North dakota, the following exclusion applies:

Coverage does not apply to "personal injury" or "property damage" occurring:

1. After work to be performed as part of your responsibilities has been completed; or
2. After that portion of work to be performed as part of your responsibilities has been put to its intended use.





# NORTH DAKOTA INSURANCE RESERVE FUND

PO BOX 2258  
BISMARCK, ND 58502

<b>Named Member</b>	<b>Agent</b> 8452712
VALLEY CITY, CITY OF AVIS RICHTER, AUDITOR PO BOX 390 VALLEY CITY ND 58072-0390	DACOTAH INSURANCE PO BOX 997 VALLEY CITY ND 58072  Telephone: 701-845-6870

## CONFIRMATION OF COVERAGE

This confirmation of coverage is issued as a matter of information only and confers no rights upon the confirmation of coverage holder.

This confirmation of coverage does not amend, extend, or alter the coverage afforded the named member.

This is to certify that the memorandum of coverage listed below has been issued to the named member shown above.

If any memorandum of coverage listed below is cancelled during the coverage period, the North Dakota Insurance Reserve Fund will provide the confirmation of coverage holder a thirty (30) day notice of cancellation.

<i>Memorandum Number</i>	<i>Coverage Period</i>	<i>Limit of Liability</i>
GL 0000414 33	01/01/2018 to 01/01/2019	\$2,000,000

### Coverage

Premises/Operations

*The Confirmation of Coverage Holder is an added covered party under Additional Covered Party Endorsement GL 30 03 (09/11).*

### *Descriptions of operations, locations, autos, or special items:*

### *Confirmation of Coverage Holder*

BNSF RAILWAY COMPANY - JLL  
C/O CERTFOCUS  
PO BOX 140528  
KANSAS CITY, MO 64114

### *Authorized Signature*

*Elaine Markwart*

### *Issue Date*

12/19/2017



**NAMED MEMBER** VALLEY CITY, CITY OF  
**MEMORANDUM NUMBER** GL 0000414 33  
**EFFECTIVE DATE** 01/01/2018 **TO** 01/01/2019

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## DATA BREACH EXCLUSION

This endorsement modifies the following:

### LIABILITY MEMORANDUM OF COVERAGE

With respect to this endorsement, the provisions of the LIABILITY MEMORANDUM OF COVERAGE apply unless modified by the endorsement.

**SECTION V. EXCLUSIONS** is amended to include the following exclusion:

Our duty to pay for or defend does not apply to:

Liability, regulatory proceedings, fines, penalties, or any other obligations or expenses arising out of a "data breach".

**SECTION VIII. DEFINITIONS** is amended to include the following definitions:

"Data Breach" means the loss, theft, release, or publication of "personally identifiable information" and/or "protected health information" if that information was, or is reasonably believed to have been, accessed or acquired by an unauthorized person.

"Personally Identifiable Information" means Personal Information as defined in applicable North Dakota Statutes or any other state or federal law pertaining to the specific "data breach".

"Protected Health Information" means the definition provided by the Health Information Portability and Accountability Act (HIPAA) and includes individually identifiable health information (excluding the individually identifiable health information of non-U.S. citizens), held or maintained by a "covered party".

## **APPENDIX H: PROPERTY OWNERSHIP - DEEDS**

251737

Fee: \$13.00

OFFICE OF COUNTY RECORDER County of Barnes, North Dakota  
I hereby certify that the within instrument was filed in this office  
on 03/15/2004 at 11:20 AM, and was duly recorded.

By *[Signature]* Deputy  
County Recorder

DOCUMENT NUMBER 251737

### WARRANTY DEED

THIS INDENTURE, Made this 11<sup>th</sup> day of March, 2004, between **KAREN MONSON and RICHARD MONSON, her husband**, grantor, whether one or more, and **CITY OF VALLEY CITY, a municipal corporation of Barnes County, North Dakota**, whose post office address is P.O. Box 390, Valley City, North Dakota 58072, grantee.

WITNESSETH, for and in consideration of the sum of One and No/100 (\$1.00) Dollar and other valuable consideration, grantor does hereby GRANT to the grantee, all of the following real property lying and being in the County of Barnes, State of North Dakota, and described as follows, to-wit:

Auditors Lot Number Two (2) of the Northeast Quarter (NE¼) of Section Thirty-one (31), in Township One Hundred Forty (140) North, of Range Fifty-eight (58) West of the Fifth Principal Meridian, Barnes County, North Dakota, according to the Plat of Auditors Lot Number 2 of NE¼, Section 31, Township 140 N., Range 58 W., Barnes County, North Dakota, recorded on February 23, 2004, in the office of the County Recorder, Barnes County, North Dakota, in Book "B" of Auditors Plat, Page 99, as Document Number 251585, said Lot 2 containing 31.45 acres, more or less, as described and shown on said plat, subject to any conveyance or reservation of oil or mineral rights heretofore made, and of record, and further subject to any easements or conveyances of record in the office of the County Recorder in and for Barnes County, North Dakota, for roadways, highways, transmission lines, utility services, or any other purposes.

"The legal description was obtained from a previously recorded instrument."

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantee that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are

251737

free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, and no other exceptions, whatsoever; and the above granted lands and premises in the quiet and peaceable possession of said grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision "e" of subsection 6 of Section 11-18-02.2, N.D.C.C.

[Signature] Date 3-11-04  
(Grantee or Agent)

WITNESS, The hand of the grantor:

Karen Monson  
Karen Monson

Richard E Monson  
Richard Monson

STATE OF NORTH DAKOTA,  
SS.  
COUNTY OF BARNES.

On this 11<sup>th</sup> day of March, 2004, before me, personally appeared Karen Monson and Richard Monson, her husband, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and acknowledged that they executed the same.

[Signature]

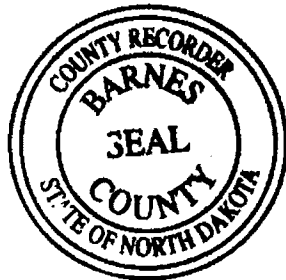
Taxes and Special Assessments paid and transferred, entered this 13<sup>th</sup> day of March 2004

Edward K. McLaugh  
County Auditor  
By Boh M. Sakka  
Deputy

R JON FITZNER  
Notary Public  
State of North Dakota  
My Commission Expires Oct. 13, 2009

DOCUMENT NUMBER 251737

Grantor K  
Grantee R  
Indexed eR  
Checked 33



SURVEY RECORD  
PLAT OF  
AUDITOR'S LOT NO. 1  
OF NORTHEAST QUARTER (NE 1/4), SECTION 31,  
TOWNSHIP 140 NORTH, RANGE 58 WEST  
BARNES COUNTY, NORTH DAKOTA

Present Owner City of Valley City, a municipal corporation of Barnes County, ND

OWNER'S CERTIFICATE

THE UNDERSIGNED, Owners of the within described property in accordance with the provisions of Section 57-02-39 of the North Dakota Century Code as Rev. 1943, and upon demand of the County Auditor of Barnes County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as therein described, and have caused the same to be placed on record, as provided by law.

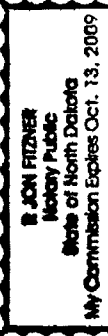
Witness our hands this 17th day of February, 2004.

In the presence of:

R. Jon Fitzner City of Valley City  
R. Jon Fitzner Riley H. Rogers, President  
STATE OF NORTH DAKOTA Board of City Commissioners  
COUNTY OF BARNES Attest: Kerwin Kostad  
Kerwin Kostad, City Auditor

On this 17th day of February, 2004 A.D., before me a Notary Public, personally appeared Riley H. Rogers and Kerwin Kostad, known to me to be the same person/s described herein and who executed the within and foregoing Owner's Certificate and acknowledged before me that they executed the same in behalf of the City of Valley City.

R. Jon Fitzner  
Notary Public R. Jon Fitzner  
State of NORTH DAKOTA  
My commission expires October 13, 2009

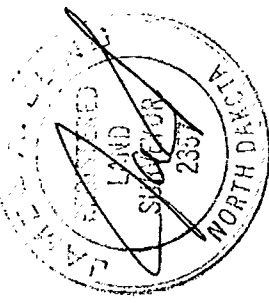


(SEAL)

SURVEYOR'S CERTIFICATE

I, James A. Jung, Valley City, North Dakota, a Registered Land Surveyor in the State of North Dakota, do hereby certify that at the request of Valley City Public Works, I made the within and foregoing plat and description of the land as herein described and that the lots, distances, area and location as indicated on said plat and contained in said description are true and correct to the best of my knowledge and belief.

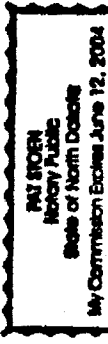
James A. Jung  
Registration No. 2357



STATE OF NORTH DAKOTA )  
COUNTY OF BARNES )

Subscribed and sworn to before me this 17th day of February, 2004 A.D.

Rat Stoen  
Notary Public  
State of NORTH DAKOTA  
My commission expires June 12, 2004

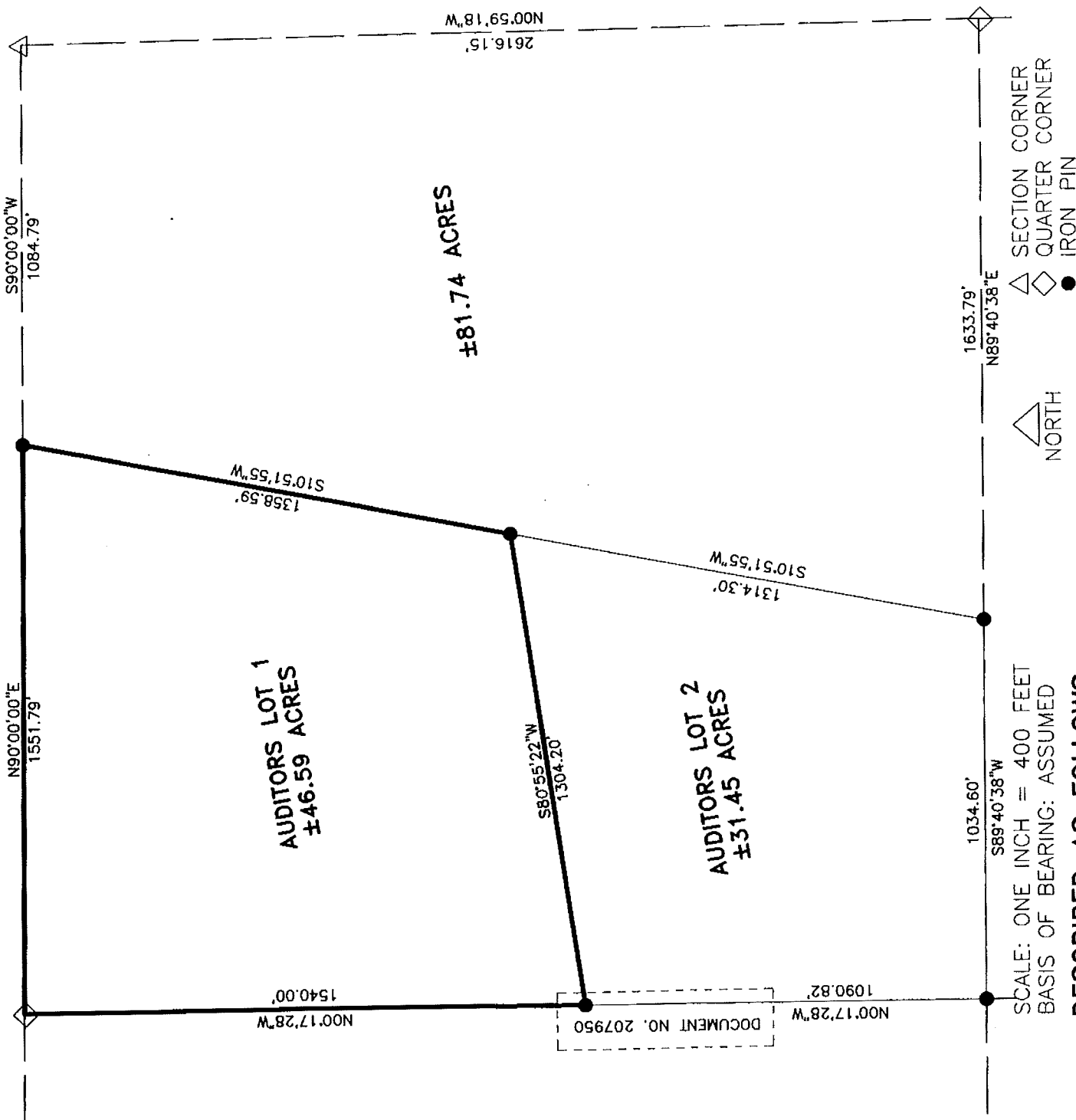


OFFICE OF THE REGISTER OF DEEDS  
BARNES COUNTY, NORTH DAKOTA

I hereby certify that the within instrument was filed for record in this office on the 23rd day of February, 2004, at 12:15 o'clock P. M., and was duly recorded on Page 96 of Book B of Plat Auditors.

Taxes and Special Assessments paid and transfer entered this 23rd day of February, 2004  
Edulink & McLaugh County Auditor  
By Beth M. DeWine Deputy

PLAT OF AUDITORS LOT NUMBER 1  
OF NE 1/4 SECTION 31, TOWNSHIP 140 N., RANGE 58 W.  
BARNES COUNTY, NORTH DAKOTA



SCALE: ONE INCH = 400 FEET  
BASIS OF BEARING: ASSUMED

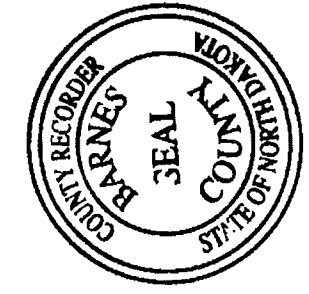
AUDITOR'S LOT 1



SECTION CORNER  
QUARTER CORNER  
IRON PIN

A tract of land situated in the Northeast Quarter (NE 1/4) of Section 31, Township 140 North, Range 58 West of the Fifth Principal Meridian, Barnes County, North Dakota, more particularly described as follows:

Commencing at the Northeast corner of the Northeast Quarter (NE 1/4) of said Section 31; thence S90°00'00"W along the Section line a distance of 1,084.79 feet to an iron pin, the Point of Beginning; thence S10°51'55"W a distance of 1,358.59 feet to an iron pin; thence S80°55'22"W a distance of 1,304.20 feet to an iron pin on the West line of said Northeast Quarter (NE 1/4); thence N00°17'28"W along the Quarter line a distance of 1,540.00 feet to an iron pin at Northwest corner of said Northeast Quarter; thence N90°00'00"E along the Section line a distance of 1,551.79 feet to the Point of Beginning. Said tract of land contains 46.59 acres more or less, including that portion of the 2.0 acre parcel described in Document Number 207950 at the office of the Barnes County Recorder that lies within said Northeast Quarter (NE 1/4).



Creditor	K
Creditor	K
Debtor	K
Contract	251582

DOCUMENT NUMBER 251582

Fee: \$7.00  
OFFICE OF COUNTY RECORDER County of Barnes, North Dakota  
I hereby certify that the within instrument was filed in this office  
on 02/23/2004 at 12:15 PM, and was duly recorded.

By Janna R. Bauer County Recorder  
Kristin Estelt Deputy

Returned To: LENABURG, ETAL Page 2 of 2  
Box 330  
Valley City, ND 58072