ENGINEERING

Cost Estimate
Facilities Plan

Revised Project Costs

Phase 1 – Lagoon
$820,052.20 (original contract amount)
$24,420.00 (CCO #1)
$451,970.00 (CCO #2)
$1,296,442.20 – total

Phase 2 – Storm Sewer
223,426.00 (original contract amount)
-$2,025.00 (CCO #1)
$9,121.00 (CCO #2)
$230,522.00 – total

Phase 3 – Sanitary Sewer
$227,208.00 (original contract amount)
$49,795.00 (**PROPOSED** CCO #1)
$277,003.00 (PROPOSED) total

Combined Construction costs -	$1,803,967.20
Brosz Design & Bid -	$429,389.28
Brosz Construction Admin -	$325,000.00
Bond Council -	$25,000.00
TOTAL -	**$2,583356.48**

Funding sources:
$548,000 grant
$1,666,000 SRF
TOTAL $2,214,000

Additional funding needed - $369,356.48

Additional funding is needed to address an infiltration issue that was discovered at the wastewater treatment facility. During restoration of Cell 5 of the lagoon, an infiltration problem was discovered in the northeast corner of the berm. The infiltration is coming from a sand/bentonite layer which appears to be the original stream bed of the waterway that the lagoons were built in. Due to this sand/bentonite layer, water is infiltrating past the berms. To remedy this, the berm to the west will be moved necessitating the installation of a keyway that will be dug below the sand/bentonite layer to seal the berm. It is estimated that an additional 650 cubic yards of material will be needed to install the keyway, build the new berm, and backfill. Approximately 120 linear feet of perforated pipe, 1,525 linear feet of solid drain pipe, and seven cleanouts will be installed to address the infiltration and better manage storm water flows. Additional grading, topsoil, gravel surfacing, and rip rap will also be required.

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DETENTION POND
BISON, SD
TOPSOIL FILL & GRADING

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CELL 5
BISON, SD
DRAIN TILE

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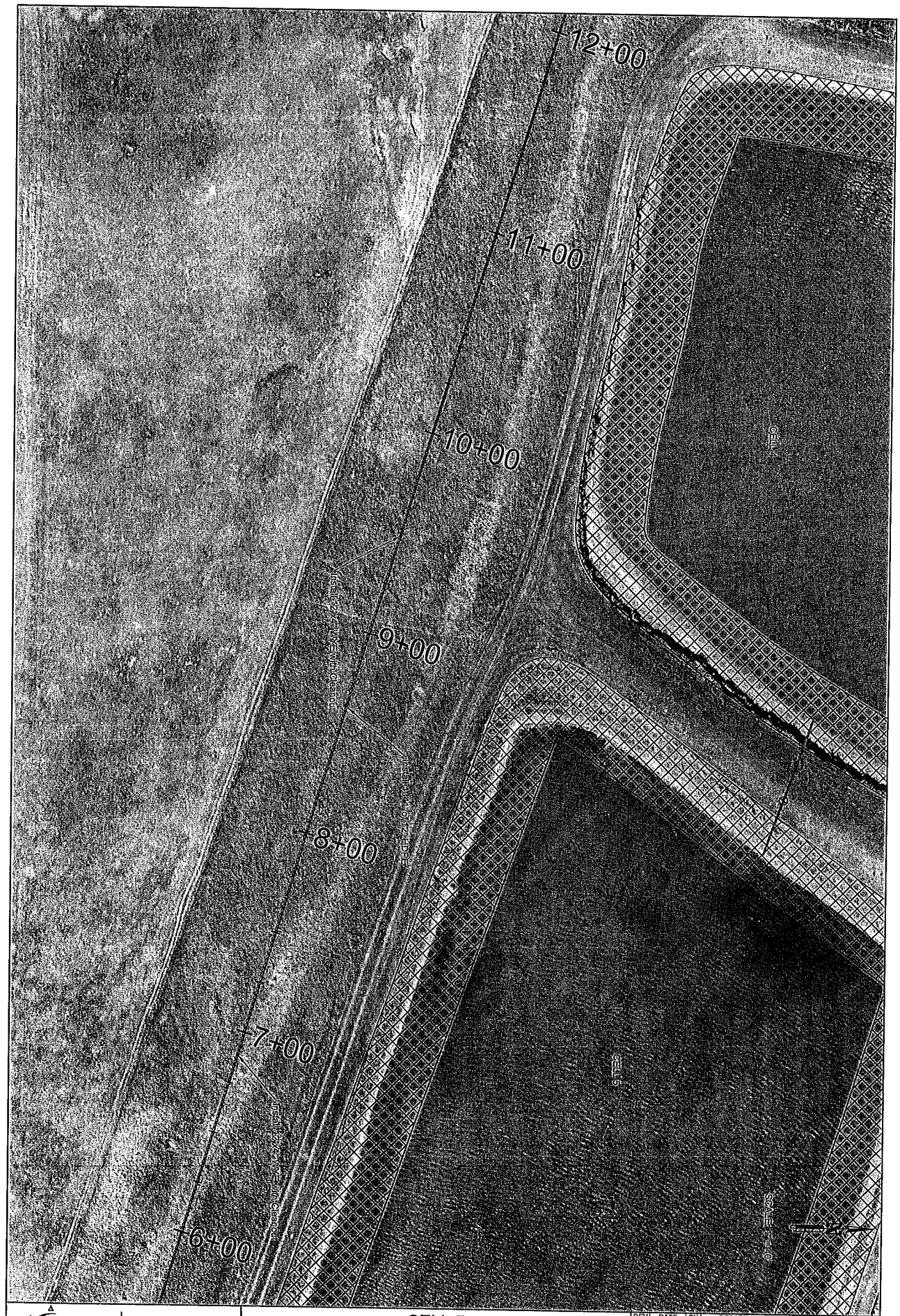

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CELL 5
BISON, SD
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CELL 5
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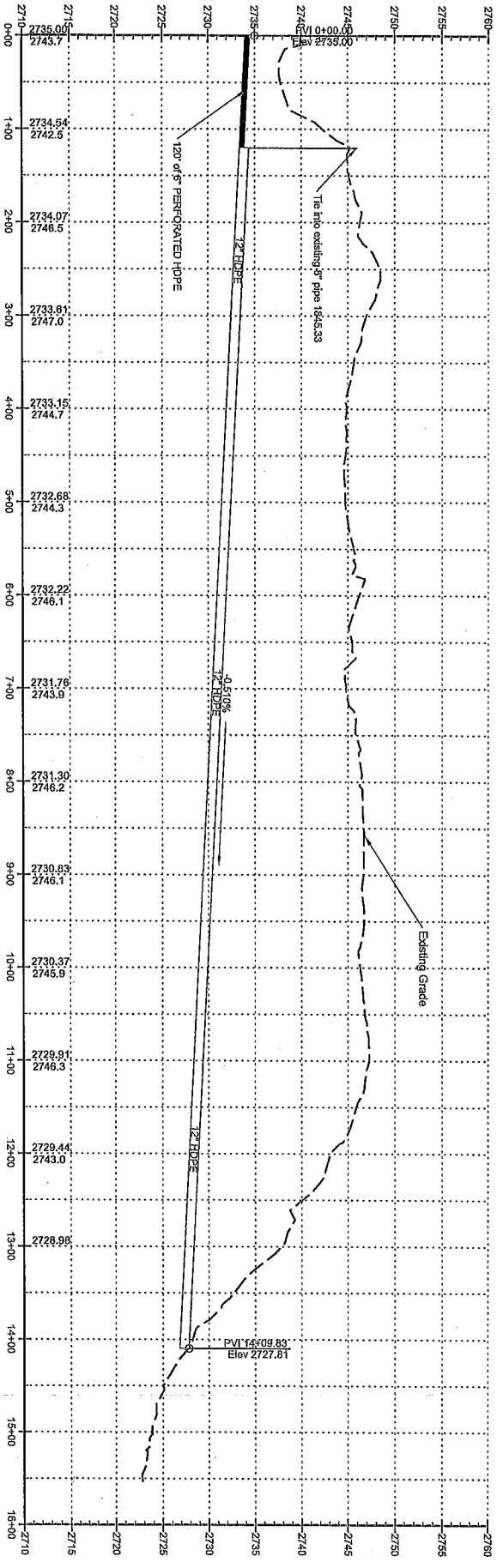

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CELL 5
BISON, SD
DRAIN TILE PROFILE

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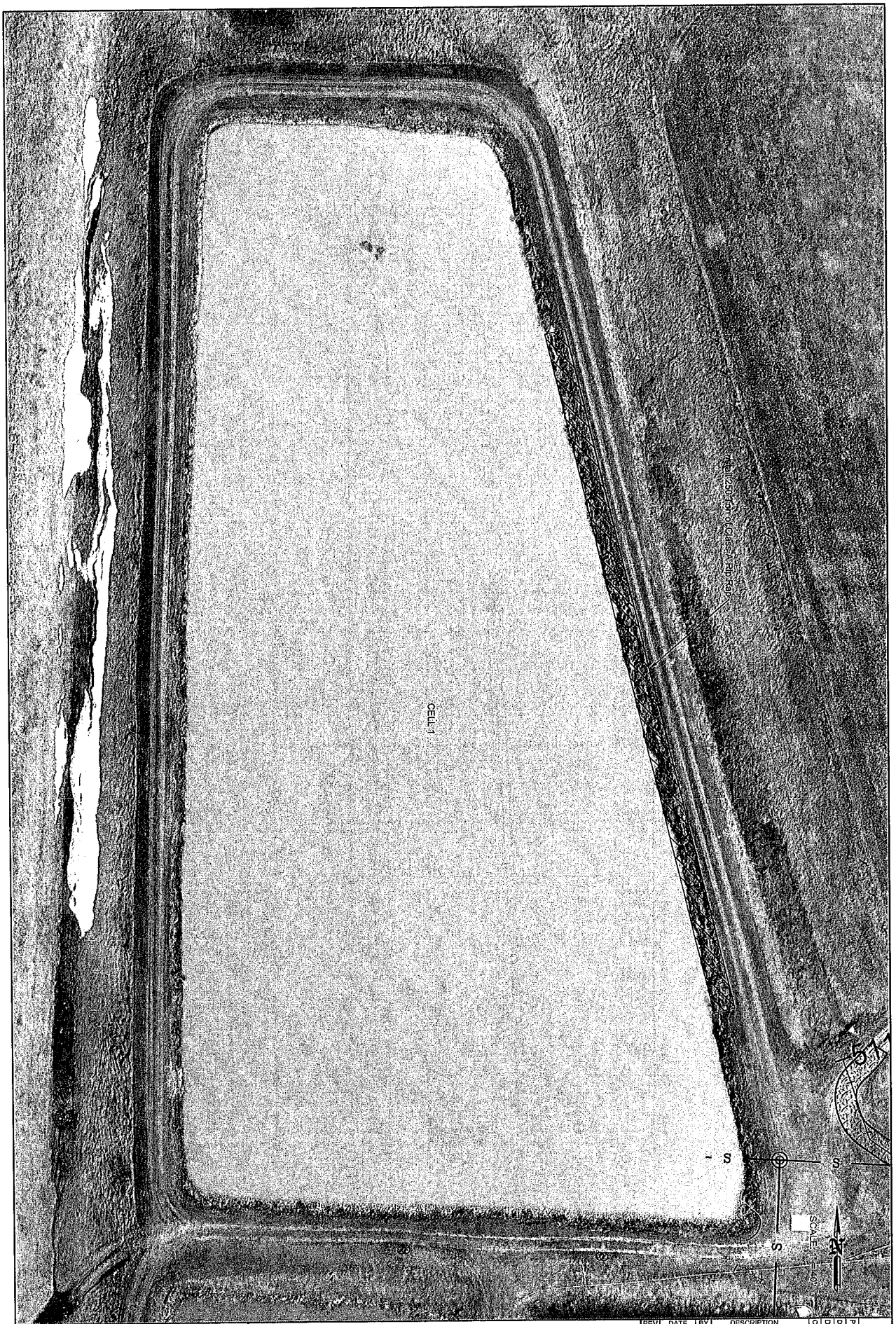

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CELL 1
BISON, SD
RIP RAP

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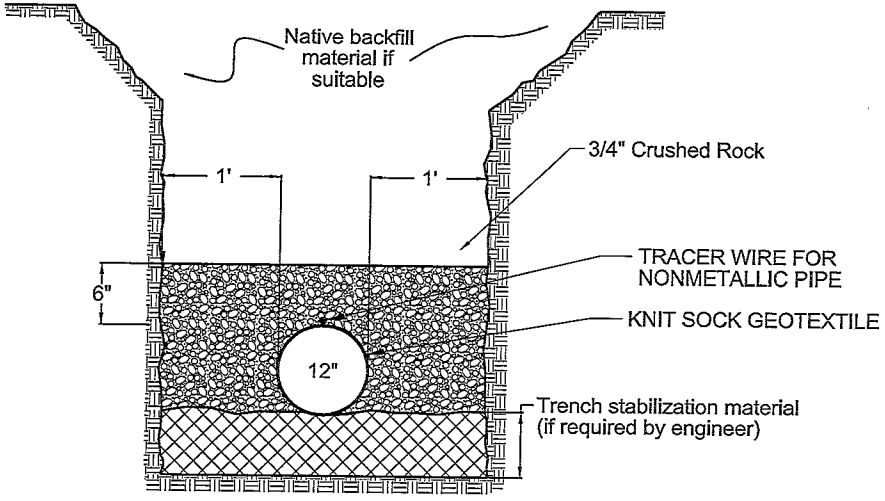
Perforated HDPE Bedding



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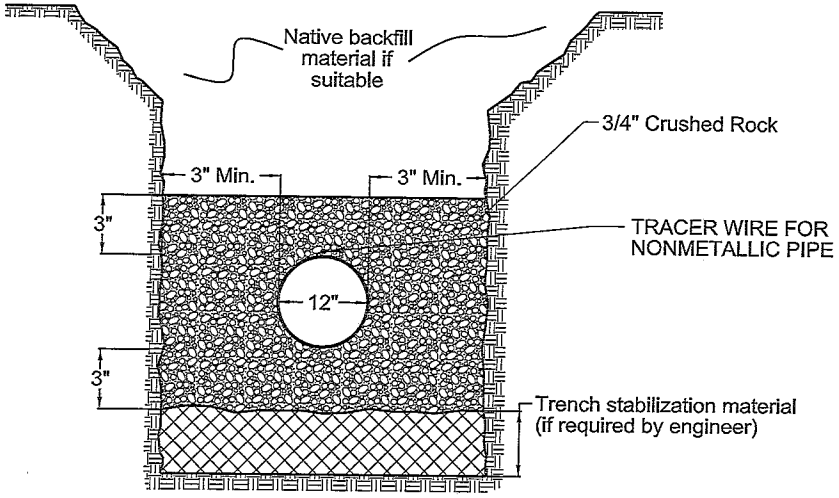
PERFORATED HDPE BEDDING

SCALE: NTS

HDPE Bedding



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HDPE BEDDING

SCALE: NTS

NOTE: Pipe Bedding will be incidential to pipe bid items.

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CELL 5
BISON, SD
DRAIN TILE DETAIL

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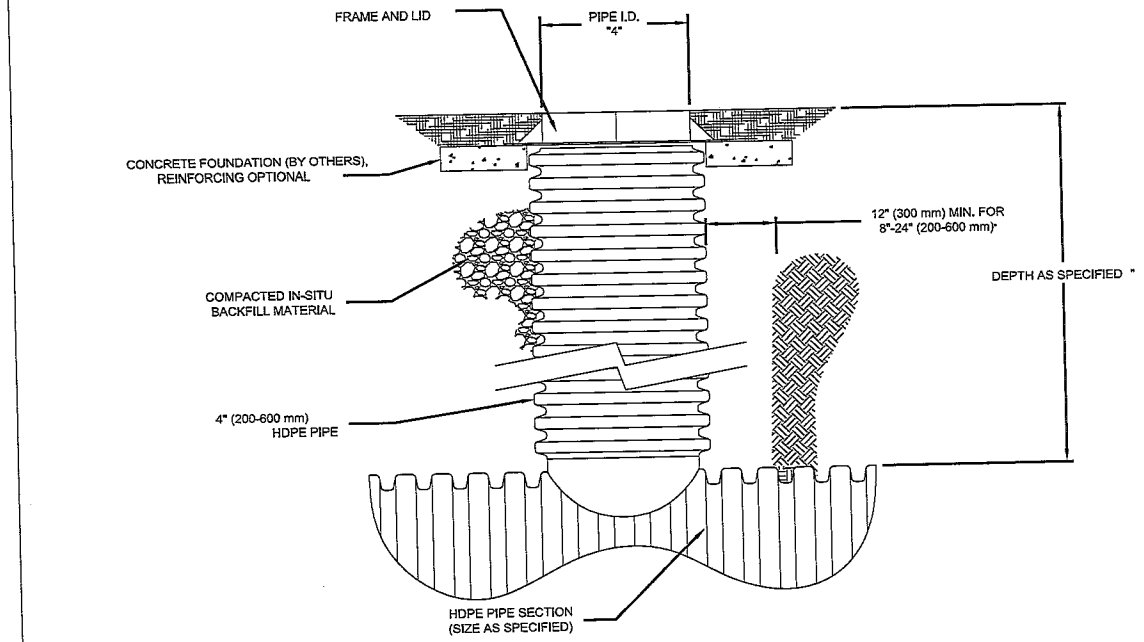

NOTES:
PLEASE REFERENCE TO PRINSCO'S
INSTALLATION GUIDE FOR PROPER
TRENCH AND BACKFILL INSTRUCTIONS.

PRINSCO
WATER MANAGEMENT SOLUTIONS
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WILLMAR, MN 56201
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NTS

$(EDTIME,??)

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CELL 5
BISON, SD
DRAIN TILE DETAIL

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PRINSCO
WATER MANAGEMENT SOLUTIONS

Specification / **Knit Sock Geotextile**

Scope

This specification designates the requirements for knitted sleeves of polyester geotextile which can be used as "sock" over Prinsco pipe.

Characteristics

The knitting process produces uniformly sized drainage openings, permitting exceptionally high water flow rates. Since sock is seamless, it does not require edge-joining by gluing or ultrasonic welding. The polyester is resistant to environmental degradation in service by rot, mildew, chemical attack, and insects.

The pre-installed filter fabric shall be a circular-knit geotextile fabric and meets or exceeds the following properties in accordance with ASTM D6707 – *Standard specification for Circular Knit Geotextile Fabrics for Use in Sub-surface Drainage Applications.*

"Type A" sock is all white and most commonly used for agricultural and residential applications. "Type H" sock is white with red stripes and most commonly used for highway or DOT applications when necessary.

Table 1: ASTM D6707 Knitted Sock Characteristics

Characteristic	Units	ASTM Test Method	Value	
			Type A	Type H
Water Permittivity	sec^{-1} (min.)	D4491	2.4	2.75
AOS	US Sieve (max.)	D4751	30	40
	mm (max.)		0.600	0.425
Puncture Strength	lbs (min.)	D6241	180	215
	N (min.)		800	950
Appearance	–	–	All White	White w/ Red Stripes

Method of Application to Pipe

Sock is applied around the corrugated plastic pipe as the final step in the pipe production process. A specified sock diameter is used for each pipe diameter. Bulk sock is also available for installation in the field.

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CELL 5
BISON, SD
DRAIN TILE DETAIL

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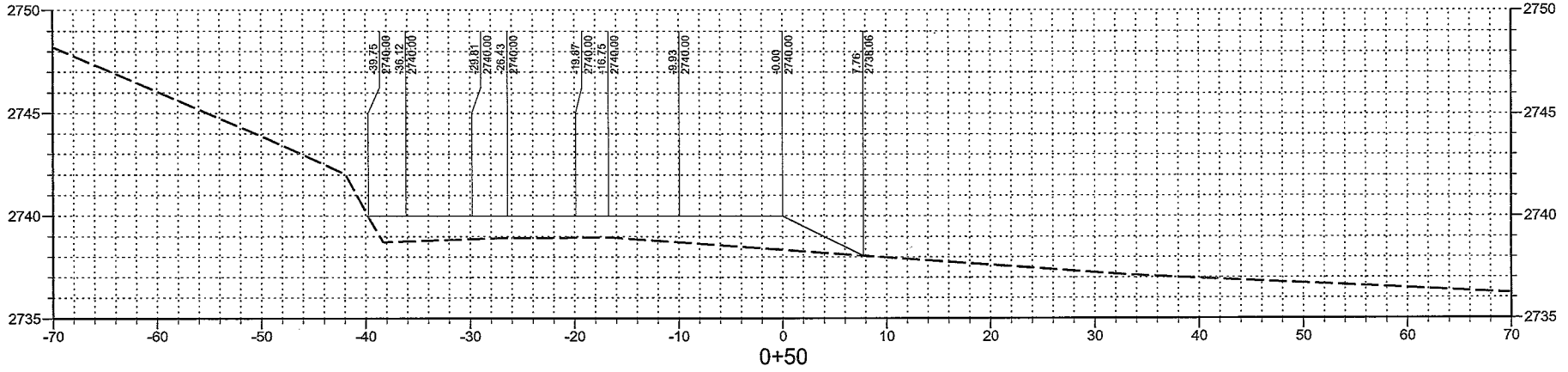

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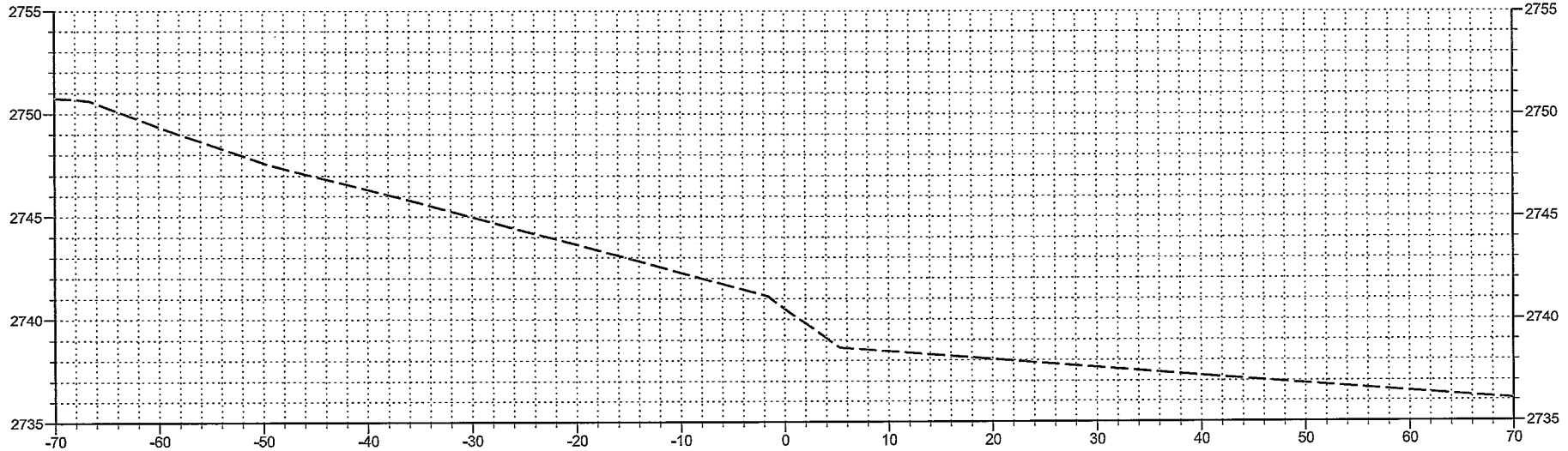

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LAGOON CELL 5
BISON, SD
CROSS SECTION

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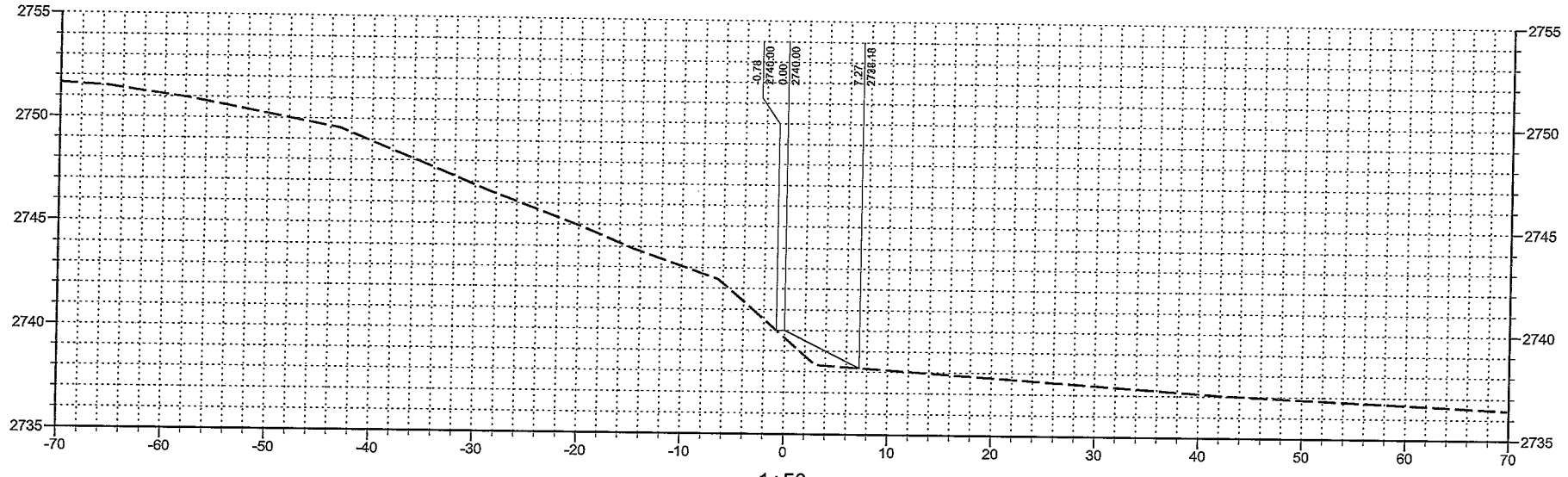

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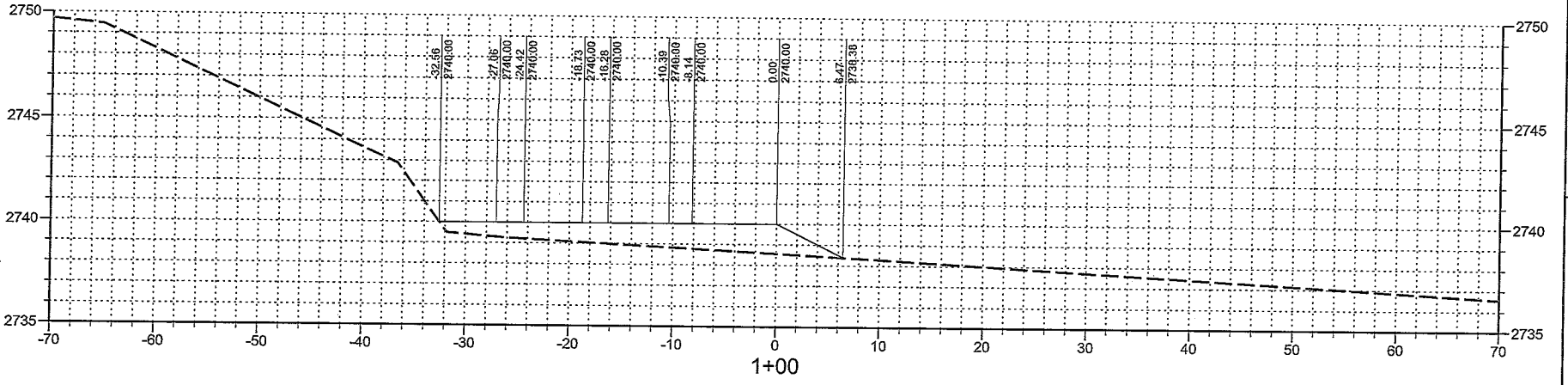

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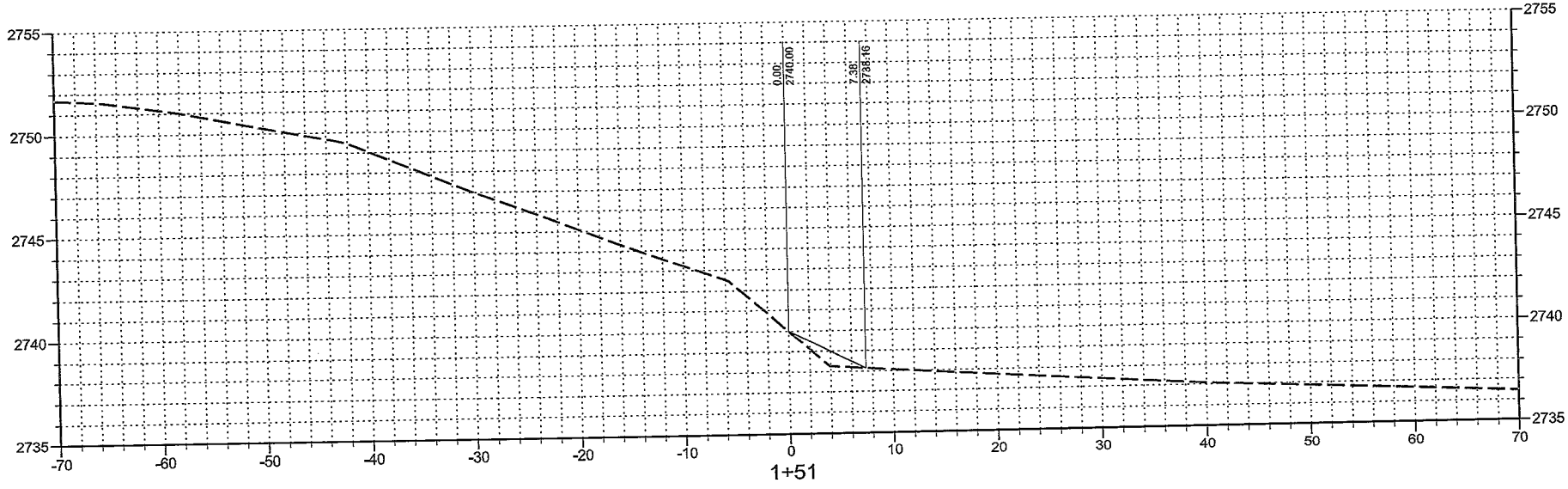

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BROSZ ENGINEERING, INC.

Environmental

CREAS
Agency Correspondence

Environmental Comment

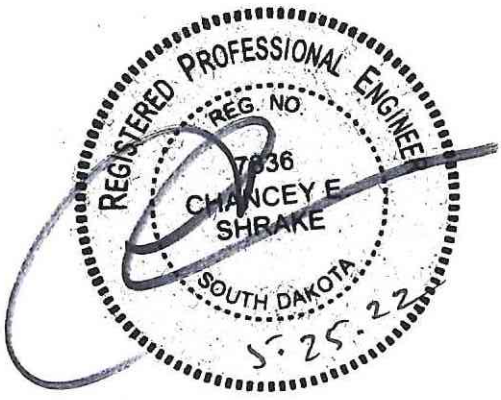
This project was reviewed at the time of original application, the area of the project hasn't changed. This application is for additional funding for the same project. A revised CATEX/FONSI may be needed if the additional funding application is awarded.

Facility Plan

Wastewater Collection and Treatment System Improvements

Prepared for

Town of Bison, SD



May 2022

3030 Airport Road, Suite A, Pierre, SD 57501
Phone:(605) 224-1123; Fax (605) 224-0659

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TOWN OF BISON
WASTEWATER COLLECTION AND TREATMENT SYSTEM IMPROVEMENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TOWN OF BISON
WASTEWATER COLLECTION AND TREATMENT SYSTEM IMPROVEMENTS

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1.0
INTRODUCTION

This chapter presents the need for this report and the objectives of the study. A list of abbreviations is also included to assist the reader in understanding the information provided.

1.1 PURPOSE

The Town of Bison (Town) (Figure 1.1) operates its own wastewater infrastructure facilities, and services customers within the Town limits and just outside Town limits. The Town wishes to perform an extensive evaluation of its facilities to determine the current status of the system and any upgrades or improvements that are needed for its system, both short and long term.

The community of Bison has authorized Brosz Engineering, Inc. (BEI), to prepare a report, which will provide inventory and condition of the current wastewater system. Based on these assessments, alternatives and recommendations will be proposed for updating the current wastewater system.

The recommended plan presented herein addresses the planning, design, construction, and financing of alternatives to meet anticipated regulatory requirements, residential and commercial growth, and system reliability needs for the Town of Bison. Implementation of the recommended improvements will provide adequate and dependable wastewater services for existing and future customers. This report will serve as a tool in order for the Town to make effective decisions, now and into the future.

1.2 SCOPE

The principal elements of this report include the following:

1. Inventory and assess current wastewater collection and treatment systems. Deficiencies, as well as satisfactory elements within the system, will be annotated within the report.
2. Analyze current and future treatment system capacities, organic and hydraulic, respectively.
3. Address concerns of previous SD DENR inspections.
4. Investigate possible alternatives for wastewater system improvements.
5. Issue formal recommendations based on alternative analysis.

1.3 ACKNOWLEDGEMENTS

Brosz Engineering wishes to acknowledge and thank Beth Hulm, Luke Clements, and Earl Siefken for their assistance and cooperation. Their cooperation and courtesy in obtaining a variety of necessary information was extremely valuable in completing and producing this report.

1.4 ABBREVIATIONS

AC	asbestos cement
ADD	average day demand
BEI	Brosz Engineering, Inc.
CDBG	community development block grant
cfs	cubic feet per second
CI	cast iron
CIP	capital improvement program
CWFCP	consolidated water facilities construction program
CY	cubic yard
EDA	Economic Development Administration
EPA	U.S. Environmental Protection Agency
EUAC	Equivalent Uniform Annual Cost
F	Farenheit
FEMA	Federal Emergency Management Agency
ft	feet
ft^3/day	cubic feet per day
fps	feet per second
gal	gallons
GO	general assessment
GOED	Governor's Office of Economic Development
gpm	gallons per minute
gpd	gallons per day
gpcd	gallons per day per capita
HDPE	high-density polyethylene
hp	horsepower
HUD	Housing and Urban Development
IFC	International Fire Code
In	inches
IPS	iron pipe size
K	1000 of a unit
kWh	kilowatt-hour
LF	linear feet
LS	lump sum
MDD	maximum day demand
MG	million gallons
MMD	maximum month demand
mgd	million gallons per day
mg/L	milligrams per liter
mL	milliliter
NA	Not Applicable; Not Available
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
PHD	peak hour demand
psi	pounds per square inch
PVC	polyvinyl chloride
Qs	normal supply capacity
RD	Rural Development
RUS	Rural Utility Service

SD DENR	South Dakota Dep. of Environment and Natural Resources
sf	square feet
Town	Town of Bison
UPC	Uniform Plumbing Code
USDA	United States Department of Agriculture

1.5 REFERENCES

Preliminary Engineering Report for Wastewater Treatment & Sanitary Sewer Collection System, Interstate Engineering, 2012

Infiltration and Inflow Analysis, KBM, Inc., 2013

CIPP Project Proposal, HydroKlean, 2014

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Chapter 2.0
PLANNING AREA CHARACTERISTICS

This chapter presents introductory information regarding the community of Bison, future population estimates, and all necessary environmental review information required to complete funding considerations by SD DENR and any other applicable funding agencies.

2.1 STUDY AREA

The Town of Bison is located in Perkins County, approximately 40 miles southwest of the City of Lemmon. South Dakota Highway 20 (SD-20) runs through the northern part of the community.

A Town location map is shown on Figure 1.1. The wastewater infrastructure necessary to service the entire community lies within Town boundaries and is located in Section 13 of T18N, R13E, in Perkins County. The area to be served by the proposed improvements include current Town limits and areas estimated to be developed within the next twenty (20) years. All other areas are currently intended to remain rural and unincorporated.

2.2 BISON POPULATION STATISTICS

Bison is a community with a population of 340, based on the 2010 US Census. The Town's median age is 44.2, while the SD median age is 36.8. Data from the 2010 census states that Bison has an average household size of 2.11 with a median household income of $39,688, which is higher than the poverty threshold income level of $33,710.

The percentage of people within Bison that fall below the poverty level is 9.0%. Comparatively, the state average household size is 2.42 with a median income of $50,338. Approximately 98% of the community is Caucasian and the remaining 2% is two or more races.

2.3 HISTORICAL POPULATION AND FUTURE GROWTH

Population statistics shown in Table 2.1 were obtained from the US Census Bureau. The population of Bison has steadily decreased since 1950. The population of Bison is influenced greatly by local businesses and the surrounding agricultural community, which in turn, drive the local economy.

The status of these variables, in addition to the growth of industry and business opportunities in neighboring communities will be the primary factor(s) in the population forecast of the Town. It is anticipated that the Town will see periods of population flux during the design life of the proposed improvements detailed in Chapter 4.0. Although the population will likely not significantly change every year, the historical population has been extrapolated to develop a conservative estimate of future population for the Town.

Table 2.1 – Bison Historical and Projected Populations

Year	Population
1950	457
1960	457
1970	406
1980	457
1990	451
2000	373
2010	333
2018	365
2020	357*
2030	344*
2040	340*

***Denotes population forecast estimate**

Table 2.1 shows slight downward population trends in upcoming years. This is based on several factors. The number of students in the school system has remained stable and even slightly increased in the last several years. This means that the average age of the community is becoming slightly younger, as opposed to getting older which is indicative of many declining communities. It is our professional opinion that this community will not see significant increase or decrease in population in the upcoming years. Therefore, a design population of 340 will be used throughout the remainder of the report.

2.4 SOIL / GEOLOGY / TOPOGRAPHY / CLIMATE

There are two main classifications of soil types within the Town and the proposed improvement project area(s). These series, as determined by the Natural Resources Conservation Service Soil Survey of Perkins County are the Morton loam complex (57%) and Morton-Lantry loam complex (25%). Detailed descriptions of the soil classifications are shown within Appendix C.

Morton loam and Morton-Lantry loam are very similar. Both have loamy till parent material. They are characterized as well drained, non-saline to slightly saline soil, with stratified loam to silty clay loam.

The remainder of the soil types for the study area are composed of various silty clay loams, clay loams, and silty clay soils.

These types of soils are suitable for engineered uses as proposed within this report. However, it is recommended that a Geotechnical Engineering firm be employed to determine the appropriateness and any limitations of the in-situ soils.

The topography of Perkins County and the Town of Bison is rolling, with slopes ranging from 0 to 15 percent. The approximate elevation within the Town is 2,800 feet above sea level.

The climate of Bison is characterized as semi-arid. The spring weather usually is cool and windy; summer usually has moderate precipitation, hot days, and cool nights; autumn months generally are mild; and the winter is characterized by low temperatures accompanied by wind and snow. The mean annual precipitation is about 17 inches. Average temperatures for the Town range between 8 F in the winter to 86 F in the summer.

2.5 ENVIRONMENTAL REVIEW INFORMATION

As part of the environmental assessment requirement for the facility planning process, the project sponsor is required to contact various state and federal agencies in regard to possible adverse environmental impact(s) from the proposed infrastructure improvements. Environmental assessment letters have been sent to the following agencies:

- *U.S. Fish and Wildlife Service*
- *U.S. Army Corps of Engineers (District and Area Offices)*
- *South Dakota Department of Environment and Natural Resources*
- *Natural Resources Conservation Service*
- *South Dakota Department of Game, Fish, and Parks*
- *South Dakota Division of Emergency Management*

All agencies responded to the assessment letters. Their response letters are included in Appendix A. It is expected that no negative environmental impacts will occur from construction taking place on previously disturbed land.

2.5.1 FLOODPLAINS, WETLANDS, AND AQUIFERS

Agencies were contacted about possible impacts upon floodplains, wetlands, and aquifers. Possible impacts include: 1) Flood Hazards; 2) Floodplain Construction; and 3) Impacts to Wetland(s). Return correspondence from the US Corps of Engineers stated that no impacts were expected. If impacts are projected throughout the course of construction, the agency needs to be contacted and any necessary information and/or permits (i.e. 404 Permit) obtained for regulatory approval.

2.5.1.1 FLOODPLAINS

A FEMA floodplain map for the Town of Bison is currently not available. After a thorough evaluation of the existing FEMA floodplain data, it has been determined that there are not any floodplain areas within the community. Therefore, the proposed improvements in the community are not expected to encroach in any dedicated floodplain.

2.5.1.2 WETLANDS

The proposed improvements are not anticipated to impact areas considered as natural wetlands defined by the US Fish and Wildlife Service. Appendix A contains the National Wetlands Inventory map for the areas included in the proposed improvements.

2.5.1.3 AQUIFERS

Perkins County overlies several aquifers, including the Ludlow, Hell Creek, and Fox Hills Formations. Most of the groundwater used by the Town of Bison is obtained from the Fox Hills Formation. Obtaining groundwater from these aquifers in the service area typically produce water quality that is typically of suitable quality for drinking, livestock watering, or irrigation purposes. The water quality from wells in these shallower formations is generally good, although it is quite variable and can be highly mineralized.

Shallow wells finished in these aquifers yield a combined total of approximately 50 gpm. Water quality is generally consistent throughout the formation.

The proposed improvements to the existing wastewater system are not anticipated to impact any of the underlying aquifers.

2.5.2 AGRICULTURAL LANDS

The Natural Resources Conservation Service was contacted about possible impacts to prime or important farmland. Return correspondence stated that no impacts were expected, due to the fact that all construction will take place on previously disturbed land.

2.5.3 WILD AND SCENIC RIVERS

There are no “Wild and Scenic Rivers” within the proposed construction area. Therefore, no impacts of this resource will occur.

An unnamed tributary of Thunder Butte Creek is the nearest body of water and is free flowing upstream and downstream until it reaches Thunder Butte Creek. Potential impacts to the waterbody would be inadvertent discharge of wastewater from a sanitary sewer overflow. This creek is identified on Figure 1.1.

2.5.4 FISH AND WILDLIFE

Proposed improvements are in an urbanized setting not suitable for fish and wildlife. Therefore, no impact is expected. The U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish, and Parks were contacted in regard to the impacts of fish and wildlife. Both agencies reported that no impact would occur to fish or wildlife during the course of construction.

2.5.4.1 THREATENED & ENDANGERED SPECIES / CRITICAL HABITAT

The U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish, and Parks were contacted in regard to the impacts of critical habitat for fish and wildlife. Both agencies reported that no impact would occur to critical habitat during the course of construction. Table 2.2 lists the threatened and endangered species known to exist within Perkins County.

Table 2.2 – Threatened and Endangered Species (Perkins County)

County	Group	Species	Certainty of Occurrence	Status
Perkins	Bird	Whooping crane	Known	E
	Bird	Piping Plover	Known	T
	Bird	Red Knot	Possible	T
	Mammal	Northern Long-eared Bat	Known	T
E = Endangered; T = Threatened; C = Candidate; XN = Experimental/Non-essential population				

2.5.5 AIR QUALITY

The proposed project area and Perkins County do not have air quality problems. Local air quality problems occur due to odors from different sources such as livestock feeding operations, as well as, other sources.

Dust storms can also occur on occasion; particularly in dry years when lack of moisture reduces the vegetative cover on the land surface.

The proposed project is not expected to have long term adverse impacts on air quality. Short term impacts include fugitive dust from construction. This will be minimized by incorporation of a SWPPP, as well as, BMP's.

2.5.6 WATER QUALITY AND QUANTITY

The major surface water source near the proposed improvements is an unnamed tributary of Thunder Butte Creek. The beneficial uses for the tributary of Thunder Butte Creek are:

- Fish and wildlife propagation, recreation and stock watering waters; and
- Irrigation waters

The tributary flows approximately 2.5 miles to Thunder Butte Creek. Beneficial uses for Thunder Butte Creek include:

- Fish and wildlife propagation, recreation, and stock watering waters
- Irrigation waters
- Limited contact recreation; and
- Warmwater marginal fish life propagation

Potential impacts to water quality include the release of untreated wastewater to the tributary of Thunder Butte Creek and eventually to Thunder Butte Creek.

The South Dakota Department of Environment and Natural Resources was contacted in regard to possible impacts of surface water quality or quantity. All applicable departments within SDDENR reported that no potential impacts are expected due to this project.

2.6 HISTORICAL, CULTURAL, AND ARCHEOLOGICAL

The Town of Bison has four locations listed in the Federal Register of Historic Places, with only one currently in Town limits. This location is a homestead located off SD-20 (NRIS ID#78002566). This proposed project is not anticipated to have any impact upon this location.

Verification of historic sites will be requested from the State Historical Preservation Office (SHPO). An archeological review is not expected to be required in the location of the proposed improvements. All proposed work areas have been previously disturbed during the initial placement of the wastewater facilities.

2.7 DIRECT AND INDIRECT IMPACTS

Previous portions of this section have addressed the impact of the proposed improvements on water quality, fish and wildlife, and cultural resources. The remainder of this section addresses other potential impacts and mitigation measures that may be necessary to implement.

2.7.1 WATER AND AIR RESOURCES

Construction of the proposed improvements will require excavation and site grading. Potential impacts include short term localized erosion and fugitive dust. Erosion and sediment control best management practices will be implemented to negate any potential for impact.

2.7.2 WILDLIFE

The proposed project is in both urbanized and rural areas. Wildlife will be prevented from occupying the areas immediately adjacent to the construction sites. No long-term effects on wildlife are expected as a result of this project.

2.7.3 CULTURAL RESOURCES

Construction of the proposed improvements is not expected to have any impact upon cultural resources in the area. There is a potential for unearthing or covering up historic or archeological resources during construction.

In the event that these resources are compromised during construction, the immediate stoppage of work is dictated by a required condition in the contract specifications. Additionally, the Town of Bison will employ a full-time engineer who will monitor construction activities and observe for any cultural resource impacts.

2.8 MITIGATION OF ADVERSE IMPACTS

Adverse impacts will be minimized to the greatest extent possible by the implementation of accepted cautionary measures. Temporary and permanent erosion control will be included in the construction process. Appropriate permits will be secured prior to the discharge of any trench dewatering or storm waters. Protection of human health, safety, and welfare will be incorporated into the contract documents. If permanent adverse

impacts result from the project, mitigating measures will be followed to the satisfaction of the appropriate oversight agencies.

Positive impacts include improved human health and safety, as well as, improved wastewater distribution service for the Town of Bison. This impact is of long-term value to the residents of Bison and Perkins County.

2.9 NO ACTION TAKEN ENVIRONMENTAL IMPACT

If no action is taken by the Town, the current wastewater distribution infrastructure will further degrade and will increase the cost to operate and maintain their system.

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Chapter 3.0
WASTEWATER COLLECTION AND TREATMENT SYSTEMS

This chapter describes the Town's existing wastewater collection and treatment facilities. In addition, results from a comprehensive assessment and analysis are also included.

3.1 WASTEWATER COLLECTION SYSTEM

Bison currently provides sanitary sewer service to 234 service connections. The collection system for the Town is made up of approximately 14,995 feet of VCP and 14,840 feet of PVC. Additionally, there are approximately seventy-two (72) manholes within the collection system. The layout of the collection system can be seen in Figure 3.1.

Installation of the original sewer system occurred in the 1950's. The majority of the collection system is of original construction and almost 70 years old. The majority of the existing collection system flows via gravity and there is one lift station that services three houses in the northeast corner of town.

3.2 SEWER MAIN AND MANHOLES

Construction of the original system occurred in 1950's. Additional expansions to the infrastructure have been constructed over the years. The wastewater collection system for the Town is made up of approximately 14,995 feet of VCP and 14,840 feet of PVC. Approximately 88% of collection piping is 8-inch in diameter. There are approximately seventy-two (72) manholes within the collection system, primarily consisting of 48-inch diameter precast manholes.

Almost all of the manholes are located in a hard-surfaced street and are accessible for O&M activities. Manholes are typically flush with the road surface, however, in some cases, they are located beneath the road surface. PVC piping has been installed as needed for repairs and new installations from 1990 onward. The collection system is cleaned on an "as-needed" basis.

The Town had previously contracted with *HydroKlean* to clean, televise, and line a portion of the wastewater system. In 2015, *HydroKlean* cleaned and lined approximately 3,800 feet of pipe in the South and North portions of Town. The reports and photos provided were reviewed and indicate that the wastewater pipes have numerous issues including roots, fractures, and improperly installed taps. It was expected that these issues persist throughout the remainder of the Town. Therefore, Brosz conducted further investigation into the entire collection system including 14,840 feet of PVC; 3,800 feet of previously lined pipe; and 11,195 feet of unlined clay pipe.

Brosz Engineering conducted a collection system inventory including evaluating the piping using a sewer zoom camera. This evaluation indicated that issues noted in previous evaluations still persist and that there are significant signs of I/I. The overall condition of the evaluated section of the collection system leaves questions as to the condition of the remainder of the system that was not accessible. Therefore, it is recommended that the Town continue a formal inspection program and implement an

improvement program to recondition the portions of the system that have not been improved in order to prevent any loss of infrastructure.

3.2.1 LIFT STATION

The Town currently maintains one lift station located in the northeast corner of town. This lift station services three houses north of the baseball field. The lift station consists of one pump which serves to lift wastewater approximately 8 feet vertically to the adjacent gravity sewer piping. During inspection, the lift station was in good condition with no issues.

3.3 WASTEWATER FLOWRATES

Sanitary sewer flow in a collection system is composed of wastewater from residences and businesses, as well as, clear water that is referred to as infiltration and inflow (I/I).

Water that enters the wastewater collection system through cracked pipes, poor joints, and the walls of manholes is referred to as infiltration. Infiltration occurs when the groundwater table is at or above the level of sanitary sewer piping. Inflow is generally described as the clear water that enters the wastewater collection system from storm sewer connections, perforated manhole covers, improperly abandoned lines, roof drains, basement sump pumps, and other drainage systems. Inflow generally occurs during or shortly after periods of snowmelt and precipitation events. A typical wastewater collection system is conservatively designed so that it can carry a nominal amount of I/I. However, when I/I becomes excessive, the system can easily become hydraulically overloaded.

Since half (50%) of the collection system is original VCP construction, the need to investigate for I/I is desired. Reduction of unwanted water coming into the system will prolong the life of the collection and treatment systems. Therefore, it is in the best interest of the Town to fully evaluate the collection system for I/I. Typically, this includes the use of smoke testing, flow monitoring, and televising, or a combination thereof.

3.3.1 BASELINE FLOWRATE

Before a determination of I/I within the collection system can be made, a baseline flowrate must be calculated. A baseline flowrate is the approximate wastewater flows a community produces solely based on their potable water use. A baseline wastewater flowrate for the Town of Bison was determined by using the winter-time water use records to determine the daily water use of the residents. Typically, I/I is at a minimum during November through February due to frost conditions within the subsoil.

Water use data was provided by the Town and is shown in Table 3.1. Water use data indicates that the average daily demand (ADD) was approximately 26,194 gpd (77 gpcd). During the winter months the ADD was equal to approximately 20,878 gpd (61.4 gpcd).

Table 3.1
Potable Water Use

Date	Monthly Use (gal)	Daily Use (gpd)	Daily Use (gpcd)
2018			
Jan	708,500	22,855	67.2
Feb	654,100	22,555	66.3
Mar	728,600	23,503	69.1
Apr	707,400	23,580	69.4
May	1,211,100	39,068	114.9
Jun	1,355,500	45,183	132.9
Jul	1,476,500	47,629	140.1
Aug	1,195,600	38,568	113.4
Sep	672,300	22,410	65.9
Oct	494,000	15,935	46.9
Nov	644,600	21,487	63.2
Dec	756,700	24,410	71.8
Total	**10,604,900**	**29,055**	**85.5**
Winter	**2,763,900**	**22,842**	**67.2**
2019			
Jan	537,400	17,335	51.0
Feb	558,000	19,241	56.6
Mar	650,800	20,994	61.7
Apr	692,900	23,097	67.9
May	973,200	31,394	92.3
Jun	902,951	30,098	88.5
Jul	1,101,900	35,545	104.5
Aug	743,000	23,968	70.5
Sep	665,600	22,187	65.3
Oct	528,800	17,058	50.2
Nov	557,200	18,573	54.6
Dec	635,900	20,513	60.3
Total	**8,547,651**	**23,334**	**68.6**
Winter	**2,288,500**	**18,913**	**55.6**
18-19 Avg	**798,023**	**26,133**	**76.9**

It is a widely accepted assumption that approximately 80% of the metered potable water usage reaches the collection system. Therefore, it is concluded that the average daily volume of water that reaches the sanitary sewer is 80% of the average daily water use (61.4 gpcd), which was calculated to be 49.1 gpcd or 16,694 gpd.

Chapter 1.C.2 of the *Recommended Design Criteria for Wastewater Collection and Treatment Facilities*, published by the SDDENR suggests the use of typical wastewater flows between 60 to 75 gpcd with 60 gpcd, as a minimum. The calculated value of 60 gpcd will be used for this report.

3.4 Infiltration and Inflow Analysis

The Town of Bison is unsure how much the collection system is being affected by infiltration or inflow. Therefore, in order to determine the amount of unwanted water coming into the sanitary sewer system, the following analyses were conducted to determine the location, amount, and severity of any intrusion.

Unwanted water uses up the reserve capacity of a community's wastewater collection, pumping, and treatment facilities. I/I results in a decreased capacity for growth and an increased need for larger infrastructure.

SDDENR has established a maximum acceptable allowance for infiltration. The standard is 200 gallons per day per inch of diameter per mile of pipe for VCP and 50 gallons per day per inch of diameter per mile of PVC pipe. The Town sewer collection system is made up of portions of PVC and VCP. Based upon the lengths and diameter of sewer pipe within the community, an infiltration flowrate of 5,668 gpd is considered acceptable.

The Environmental Protection Agency (EPA) has also established a threshold above which infiltration, domestic wastewater flow, industrial flow and commercial flow is considered to be excessive. This threshold is 120 gal per capita per day (gpcpd). Based upon this threshold value and a current population of 357, the maximum allowable flow should not exceed 42,840 gpd.

In order to gain a perspective into the condition of the collection system and to determine the amount of unwanted water coming into the sanitary sewer system, the following analyses were conducted to determine the location, amount, and severity of any potential intrusion.

3.4.1 FLOW MONITORING

Flow monitoring was conducted for the Town of Bison in April of 2013 by *KBM, Inc*. as a portion of an Infiltration and Inflow analysis. Flow monitoring equipment was installed at the inlet manhole to the treatment system. The data from the KBM study indicated that the sewer pipe to the lagoon, sampled at 3:00 am in a period with no precipitation was flowing at 8.1 gpm. This calculates out to be 34.3 gpcd of I/I. The total flow of the system using this value would be 94.3 gpcd (normal flow rate of 60 gpcd + I/I flow rate of 34.3 gpcd.) This equates to a daily volume to the lagoons of 32,062 gpd during dry conditions.

During the KBM inspection, observations were also taken during a rain event. During the rain event, the manholes to the lagoon were surcharged indicating that the pipes would be in full flow conditions. KBM calculates this to be between 164 and 243 gpm during the rainfall events observed. This equates to a daily volume to the lagoons of 236,160 gpd to 349,920 gpd.

This study clearly demonstrates that during rain events, the system is experiencing a large volume of water entering the collection system from infiltration and inflow.

3.4.2 SMOKE TESTING

Smoke testing has not been conducted on the Bison wastewater collection system yet. It is highly recommended that the Town continue to coordinate with South Dakota Rural Water Association in order to perform smoke testing of the wastewater collection system.

3.4.3 CLEANING AND TELEVISING

Approximately 3,800 feet of the collection system was cleaned and televised prior to lining by *HydroKlean* in 2015. Brosz Engineering conducted a preliminary analysis with the usage of a pole camera. However, it is highly recommended that a more detailed evaluation be conducted on the entire collection system in order to ascertain the condition of the system, as well as, identify any problem areas in need of replacement and/or emergency repair.

During the pole camera evaluation, it was noted that there were substantial issues in the collection system. The entire system had solids accumulations and requires cleaning. The unlined portions of the clay system have substantial water infiltrating through joints and large numbers of roots. A number of clay pipes throughout the system are holding water and have restricted flow.

The pole camera review indicated that the unlined clay pipes are the largest contributor to I/I and issues in the collection system. These pipes are distributed between the older portions of town in the southeast corner and the north areas as show in Figure 3.1. A comprehensive televising will certainly show additional issues of a similar nature.

The issues that were encountered during the partial cleaning and televising of sewer lines that will likely be encountered in the remainder of the system are as follows:

1. ***Root intrusion***
2. ***Mineral deposits***
3. ***Heavy sediment accumulation***
4. ***Pipe cracking and deterioration***
5. ***Pipeline sagging***
6. ***Manhole deterioration***

Root intrusion is common among aging service and collection lines through cracks and other openings within the collection system. Mineral deposits indicate that during times of wet weather, groundwater has seeped into the collection system, causing increased flows to the treatment system.

Heavy sediment accumulation in collection systems are typically indicative or are contributed to by openings in the system which allow dirt and sediment in. Manhole lids not properly seated or those with perforations can also be the cause, especially when located in non-vegetated areas or gravel surfaced roadways.

All VCP pipe eventually cracks which accelerates deterioration of the collection system piping. The collection system consists of portions of VCP pipe that was installed in the 1950's. Pipe manufactured and installed during this time period is experiencing significant defects and deterioration in many communities across the country.

Sags in the pipeline cause the accumulation of solids in the depression, reduce flow velocities, and eventually can cause plugging within the collection system. Pipe and manhole cracking and deterioration are prone to further decay and increase opportunities for groundwater infiltration.

Several original manholes are constructed of outdated materials such as brick or corrugated metal pipe. These manholes typically are significant sources of I/I which further accelerates the deterioration of the collection system.
Therefore, based on the age of the collection system and the presence of unwanted water in the system due to I/I, it is imperative that the entire system be cleaned and televised in order to ascertain the condition of the system.

3.5 WASTEWATER COLLECTION SUMMARY

After performing visual inspections and reviewing previous flow monitoring studies of the Bison wastewater collection system, it is apparent that significant improvements to the system are needed to prevent any further deterioration and sustain the wastewater collection system well into the future.

Several recommendations listed below do not require significant capital to accomplish and will provide benefit to the collection system.

- ***Obtain short and long term goals for the Bison wastewater system.***
- ***Review sewer rates on a more frequent basis (every 1 to 2 years).***
- ***Continue disconnecting storm sewer connections and sump pumps from the sanitary sewer.***

Several things can be done which will help prolong the life of the current system. These recommendations will also increase the knowledge of decision makers as to the necessity of replacement or refurbishment of components within the system. Cost estimates for these recommendations are presented in Chapter 4.0.

- **Complete video inspection of the collection system.**
- **Smoke testing of the entire collection system.**
- **Town survey of sump pumps and foundation drains**
- **Replacement or refurbishment of sewer main.**

3.6 WASTEWATER TREATMENT SYSTEM

The wastewater treatment facility, originally constructed in 1983, with upgrades constructed in 2001, collects wastewater from the sanitary sewer system through gravity piping.

The wastewater treatment system was originally designed to operate as a combined sewer system, containing the sanitary and stormwater flows. Over the last several years, the Town has separated the majority of the stormwater system from the sanitary storm system.

The treatment system consists of five cells: a primary cell of 2.55 acres (Cell 1), two secondary cells of 1.03 acres and 0.96 acres (Cells 2 and 3), and two evaporation cells of 2.08 acres and 3.42 acres (Cells 4 and 5). The layout of the lagoon system can be seen in Figure 3.2.

The normal operation of the facility involves Cells 1, 2, and 3 operating in series. When flows are high, wastewater is transferred from Cells 2 or 3 into Cells 4 and 5.

The facility is currently permitted and operated as a No Discharge facility. However, with recent wet years, the Town has been forced to emergency land apply wastewater to prevent failure of the system.

An inspection of the treatment facility was conducted by Brosz Engineering on January 31, 2020. The overall condition of the treatment facility is of average condition compared to facilities of similar size and age. Several items were noted during the inspection of the treatment facility. These included: erosion to pond berms, excess water levels, and stormwater infiltration.

3.6.1 TREATMENT SYSTEM ORGANIC LOADING

Section B.1.a of Chapter IV of the SDDENR Design Criteria Manual states that the maximum design loading of the primary lagoon cell shall not exceed 30 pounds of BOD_5 per acre per day. Section B.1.d states that the maximum organic loading for the entire system shall not exceed 20 pounds of BOD_5 per acre per day. Average contribution rates of BOD_5 is 0.2 lbs./cap/day. The acreage of the evaporation ponds has been excluded for these calculations.

Therefore, based on the Town's treatment facility size, overall loading should not exceed 90.8 lbs./day. As seen in Table 3.2, the current loading estimated at the treatment facility is 71.4 lbs./day. The Town is currently using approximately 79% of their organic loading capacity within the treatment system. Based upon future population projects, the Bison WWTF will be able to handle the organic loading contributed by the community.

Table 3.2 - Organic Capacity Summary

Pond Sizes	
	(acres)
Primary	2.55
Secondary	1.99
Evaporation	5.5
Total Treatment Pond Area	4.54
Population	
Current	357
Future (2040)	340
Organic Loadings (BOD_5)	
	(lbs/day)
Current	71.4
Future (2040)	68
Loading Rate (lbs/cap/d)	**0.2**
Primary Cell Loading	
	(lbs/ac)
Current	28.0
Future (2040)	26.7
SDDENR Design Max	**30.0**
Total Facility Loading	
	(lbs/ac)
Current	15.7
Future (2040)	15.0
SDDENR Design Max	**20.0**
Final Determination: This facility has enough organic capacity now and into the future	

3.6.2 TREATMENT SYSTEM ORGANIC LEVELS (SLUDGE DEPTHS)

As part of this report, the sludge and water depths in the lagoon cells were measured. The results of the inspection are included in Appendix F. The assessment of the sludge depth in the lagoons does not indicate that there are significant levels of sludge that would require remediation or removal in the pond system at this time.

Over the life of the system, sludge and solids may build up at the bottom of the lagoons as a result of system operation. As the volume of sludge and solids increases, there is correspondingly less volume for wastewater which subsequently requires more frequent releases from the system. Sludge and water depths in the lagoon indicate the available storage volume in the lagoons. It is highly recommended that the Town continue monitoring the sludge depth of the wastewater system.

3.6.3 TREATMENT SYSTEM HYDRAULIC CAPACITY

In addition to the organic capacity, the hydraulic capacity of the treatment facility was evaluated. A water mass balance was conducted on the Bison wastewater treatment facility. In the absence of I/I, the overall system is able to operate as a total containment system now and into the future, as shown in Table 3.3. However, with the levels of I/I entering the system, the Town is having to discharge multiple times per year. The amount of water entering the treatment system causes significant concerns as the amount of I/I vastly outweighs the typical wastewater inflow.

Table 3.3 - Hydraulic Capacity Summary

Pond Sizes		
	(acres)	**(sq. ft)**
Primary	2.55	111,078.0
Secondary	1.99	86,684.4
Evaporation	5.5	239,580.0
Total Pond Area	**10.04**	**437,342.4**
Population		
Current	357	
Inflow		
	(gpcd)	**(gpd)**
Avg Daily Inflow	60	21,420.0
Precipitation		
	(in/yr)	**(gal/day)**
Yearly Precip	15	11,203.2
Evaporation		
	(in/yr)	**(gal/day)**
Yearly Evap	38	28,381.3
Seepage		
	(in/day)	**(gal/day)**
Primary	0.0625	4,327.4
Secondary	0.125	6,754.2
Evaporation	0.125	18,667.3
Inflow < ***21420***	**Seepage + Evaporation - Precipitation** ***46927***	
This facility has enough capacity to be run as a total retention facility		

Therefore, it is strongly recommended that the collection system be further evaluated for I/I via smoke testing and also cleaned and televised to ascertain the current condition of the piping in the collection system. By determining the current condition of the system and identifying locations of I/I, the Town can make improvements to eliminate unwanted water from entering the collection and subsequently, the treatment system.

3.7 WASTEWATER TREATMENT SUMMARY

The population of Bison is expected to be stable over the next 20 years. Current and future organic loadings will still be able to be effectively treated at the facility. Hydraulic loading into the treatment facility is unable to be effectively handled with the current facilities, as excess water loading is the leading cause of previous discharge violations.

Excess I/I prevents an accurate determination of how the system should ideally operate and causes additional wear on an already aging system. Repairing the manholes and piping in the sanitary sewer collection system will prevent the need for costly replacements requiring the excavation of paved streets and replacement of street surfacing. Therefore, it is recommended that the Town work to reduce I/I and begin repairs on the wastewater infrastructure.

The treatment system has several issues that must be addressed to allow for continued operation, including erosion on the pond berms, storm water infiltration, and excessive water levels. These issues must be addressed by repairing the pond berms to preserve the integrity of the treatment system, removing the sources of the stormwater that is impacting the lagoons, and rerouting the system to allow for optimal operation.

3.8 NEED FOR IMPROVEMENT PROJECT

As shown in the previous televising reports, pole camera videos, and treatment system evaluation, it is apparent that there is immediate need for the proposed improvement project. If left unattended operation and maintenance difficulties, as well as, excessive repairs will inundate any sewer funds necessary for general upkeep and maintenance.

Operation and maintenance of the proposed improvements will be in line with current staffing and resource capabilities or may even reduce the demands of staff. Discussions with the utility manager has provided necessary guidance and direction of possible design alternatives for the Town.

3.8.1 HEALTH, SANITATION, AND SECURITY

The proposed improvement project will have a direct positive effect on the health and sanitation of the surrounding community. Current collection system lines lend themselves to compromise and possible failure and subsequent overflows and backups.

Areas to be replaced serve buildings such as the school, and the clinic, therefore, safe and reliable sewer service is paramount.

3.8.2 FUTURE GROWTH

As seen in Section 2.3, the population of the Town is projected to stay relatively constant in future years. However, the northeast portion of the Town is the most capable of growth. all design parameters of the proposed improvements will take into account possible growth potential of the service area.

3.9 WASTEWATER COLLECTION AND TREATMENT GOALS

It is imperative that a community have a well-defined plan, as well as, short and long-term goals for the successful operation of their infrastructure systems.

Therefore, based on our review of the current facilities and discussions with the Town, we believe the short and long-term goals for the wastewater system should include:

Short Term Goals (3 mo. to 12 mo.):

1. **Perform cleaning and televising of remaining portion of the collection system.**
2. **Conduct smoke testing to identify other sources of I/I not yet documented.**
3. **Determine method of treatment system operation to satisfy current permit conditions.**
4. **Update monthly sewer rates to minimum required for funding eligibility.**

Long Term Goals (1 yr. to 5 yr.):

1. **Review sewer rates on an annual basis.**
2. **Refurbish sanitary sewer manholes.**
3. **Refurbish collection system, as necessary.**

These goals will serve the Town in the short term by enabling them to fully evaluate the wastewater systems and allow for the ability to apply for state and federal funding for improvements. Long term goals will allow for improved O&M, increased ability to sustain and fund improvements, as well as, upgrade those portions of the system that are in need of refurbishment or replacement.

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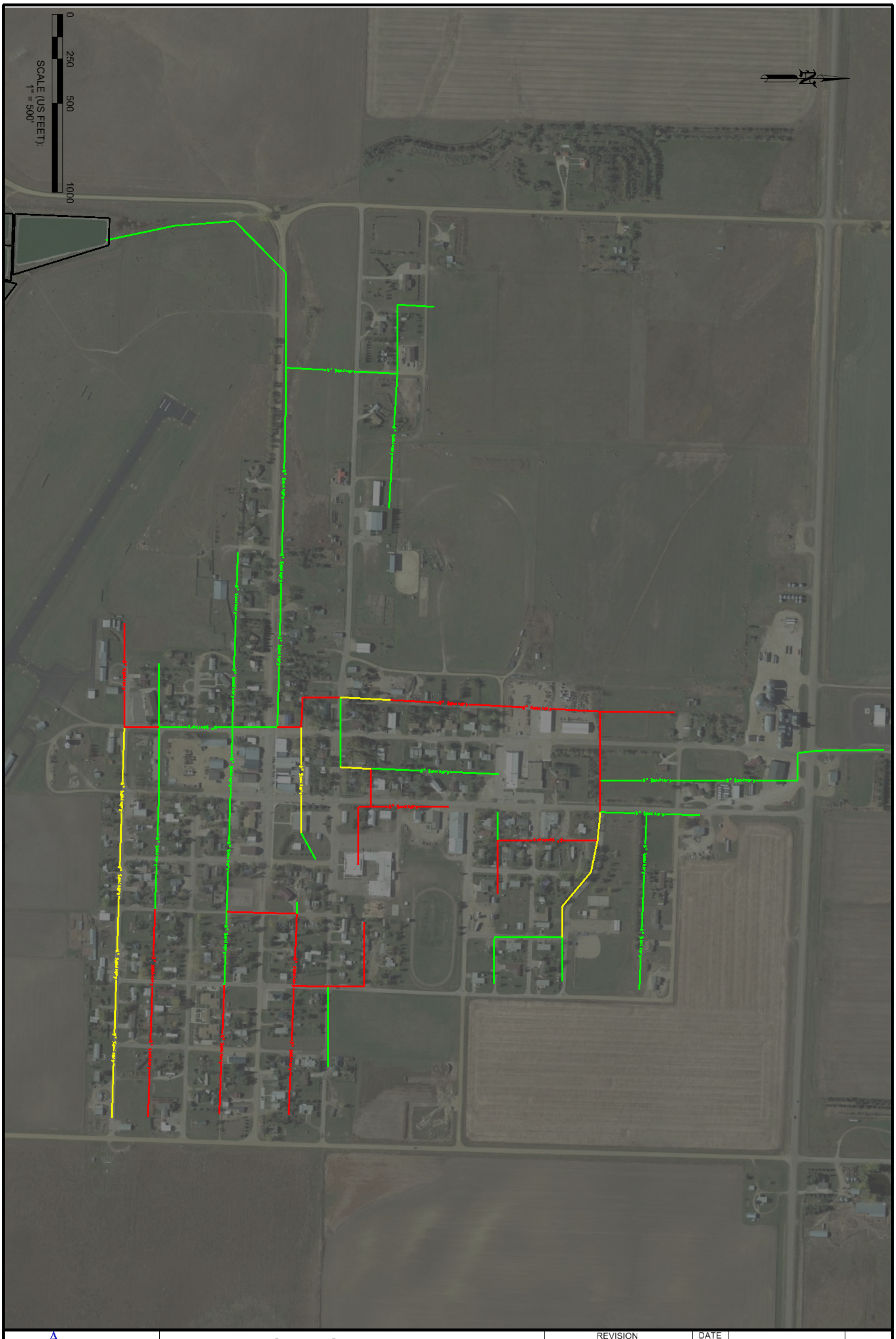

3030 Airport Rd. Box 23 Pierre, SD 57501 PH: 605.224.1123 Brosz ENGINEERING, INC. ARCHITECTURE ENGINEERING SURVEYING	SHEET DESCRIPTION: Collection System - Figure 3.1 PROJECT NAME: Bison Wastewater Treatment System PROJECT NO.: S19-P567	REVISION / DATE 1 — xx/xx/xx 2 3 4	DESIGNED BY: PIA DRAWN BY: PIA DATE PRINTED: 07/01/20	01 OF 01

01 OF 01

DESIGNED BY: PIA

DRAWN BY: PIA

DATE PRINTED: 07/01/20

REVISION	DATE
1	xx/xx/xx
2	
3	
4	

SHEET DESCRIPTION: Treatment System - Figure 3.2

PROJECT NAME: Bison Wastewater Treatment System

PROJECT NO.: S19-P567

3030 Airport Rd, Box 23
Pierre, SD 57501
PH: 605.224.1123

BROSZ ENGINEERING, INC.
ARCHITECTURE ENGINEERING SURVEYING

Chapter 4.0
PROPOSED WASTEWATER SYSTEM ALTERNATIVES

This chapter proposes improvement alternatives to the wastewater collection and treatment facilities. These improvements will be evaluated based on the system's technical requirements, cost effectiveness, and operational reliability. In addition, cost estimating and life cycle analysis are presented herein.

4.1 Cost Estimating Criteria

The cost estimates presented in this study are opinions developed from prior bid tabulations, cost curves, information obtained from previous studies, and Brosz Engineering's experience on previous projects. The costs estimated for each alternative are intended to be used to facilitate revisions to the Town's CIP and ultimately to support determination of user rates and connection (tap) fees.

4.1.1 Period of Analysis

A planning period is selected to approximate the life of the capital facilities to be compared in the economic analysis, as well as to capture the influence of significant factors on economic decisions. A planning period of 40 years was selected for this project, encompassing the design period from 2025 through 2065. This represents the typical period for facilities planning and approximates the life of major equipment in wastewater facilities. In addition, 20 years is the minimum planning period required for EPA Facilities Planning, although USDA-RD loans typically are for 40 years in duration.

4.1.2 Operations Labor Rate

The operations labor rate is estimated to be $45 per hour, including fringe benefit costs, based on the 2020 average rates for the Town's operations and maintenance personnel. A crew equaling one-eighth (1/8) full-time employee equivalent will be tasked with routine preventive maintenance tasks, as well as, normal operation of the facility.

4.1.3 Power Costs

The Town is currently serviced with power by Grand Electric Cooperative. Electric rates are shown below in Table 4.1.

Table 4.1 – Town of Bison Electricity Usage Rates

Fees	Rate
Meter Fee (Min Use)	1 phase - $35/mo 3 phase - $60/mo
Kwh Usage	$0.09/Kwh

Alternatives that contain mechanical equipment will take into account the life cycle costs of electricity usage.

4.1.4 MAINTENANCE COSTS

To estimate the cost of maintaining new facilities, an allowance is made based on the original construction cost of the facility. Unless explicitly delineated by the manufacturer, an allowance for mechanical equipment maintenance was selected to be three percent (3%), based on previous engineering experience.

4.1.5 COST ESTIMATING ACCURACY

The cost estimates presented in the report have been prepared for predesign study purposes and for guidance in project evaluation and implementation. Final costs of a project will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors such as: preliminary alignment generation, investigation of alternative routings, and detailed utility and topography surveys.

The American Association of Cost Engineers defines three types of cost estimates:

• An Order of Magnitude Estimate for Master Plan Studies. This is an approximate estimate made without detailed engineering data. It is normally expected that an estimate of this type would be accurate within +50 percent to -30 percent.

• A Budget Estimate for Predesign Study. A budget estimate is prepared with the use of flow sheets, layouts, and equipment details. It is normally expected that an estimate of this type would be accurate within +30 percent to -15 percent.

• A Definite Estimate (Engineer's Estimate) for Time of Contract Bidding. This estimate is prepared from very defined engineering data. The data includes fairly complete plot plans and elevations, soil data, and a complete set of specs. It is expected that a definite estimate would be accurate within +15 to -5 percent.

Costs developed for this study should be considered a "budget estimate" and have an expected accuracy range of +30 percent to -15 percent.

4.2 Equivalent Uniform Annual Cost(s)

All alternatives presented within the chapter are compared using the Equivalent Uniform Annual Cost(s) or EUAC. EUAC focuses on the annual cost of owning and operating equipment or systems. It is a cash flow analysis approach, where cash flows are converted to their respective design lives. Comparing alternatives using the EUAC method takes into account the design life of each alternative, operational costs, maintenance activities, and any salvage value of equipment and materials at the end of the useful life.

The EUAC method expresses life cycle costs as an annualized estimate of cash flow instead of a lump-sum estimate of present value. Since life cycle costs are calculated as an annualized amount, engineering professionals use this method to compare the economic value of systems with different service lives. Therefore, the alternative that has the lowest upfront capital cost may not always be the lowest cost alternative. Below in Table 4.2 show the different values and terms used within the EUAC comparison.

Table 4.2 – Equivalent Uniform Annual Cost(s)

Variable	Definition	Value
Design Life = n	*Length of Time Facility is Expected to Operate at Design Conditions*	*Varies, but for this report a value of 20 years is used*
Interest = i	*Annual interest rate*	*4.50%*
Present Worth = PW	*Upfront cost of an item*	*Varies*
Salvage Value = SV	*Value of equipment or material at end of design life*	*Varies*
Net Present Worth of Salvage Value = PWSV	*Present Worth of Salvage Value*	
Net Present Worth of Capital Costs = NPW	*Present Worth less the Present Worth of Salvage Value (PW – PWSV)*	*Varies*
Net Present Worth of Annual Costs	*Present worth of annual O&M costs over the design life*	
Equivalent Uniform Annual Cost(s)	*Annual cost of present worth of capital, salvage, and O&M costs*	

4.3 WASTEWATER SYSTEM ALTERNATIVES

The following describes improvement alternatives that have been developed for the Bison wastewater system. The alternatives are separated between collection system alternatives and treatment facility alternatives.

Design of all alternatives shall be in accordance with SDDENR recommended design criteria, Ten States Standards, County ordinances, and all other applicable standards. In addition, all comments and concerns of review agencies would be addressed and/or implemented prior to bidding of the construction project.

Brosz Engineering and the Town of Bison collaboratively identified several potential alternatives to address the current issues facing their wastewater infrastructure.

These alternatives were refined and the alternatives selected for further evaluation are discussed in detail in the remainder of this chapter.

4.4 WASTEWATER COLLECTION SYSTEM - ALTERNATIVE 1 DO NOTHING

A “Do Nothing” alterative would consist of keeping the collection system as it is currently operating. No improvements would be made to the collection system. This alternative is not recommended for the fact that the design life of the collection system is nearing its end and there are several indications that the Town may have a severe I/I problem, and the potential for major repairs and replacement is becoming greater every year. Therefore, this alternative will not be discussed any further in the report.

4.5 WASTEWATER COLLECTION SYSTEM - ALTERNATIVE 2 CLEANING AND TELEVISING OF COLLECTION SYSTEM

Alternative 2 consists of cleaning and televising the entire collection system. Since televising has only been done on an “as needed” basis during the life of the system, it is necessary to determine the condition of the aging infrastructure in order to prioritize replacement or refurbishment activities.

Also, it is necessary to identify potential locations where I/I may be entering the collection system. The estimated cost to clean and televise the collection system is shown below in Table 4.3.

Table 4.3 - Opinion of Probable Construction Costs
Wastewater Collection Alternative 2 - Clean and Televise Collection System

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	$ 10,500.00	$ 10,500.00
2	Clean Sewer	29,835	LF	$ 1.25	$ 37,293.75
3	Televise Sewer	29,835	LF	$ 1.40	$ 41,769.00
4	Inspect Manholes	72	EA	$ 100.00	$ 7,200.00
5	Clear Sewer Obstructions	25	EA	$ 125.00	$ 3,125.00
6	Remove Protruding Services	20	EA	$ 250.00	$ 5,000.00
				Total Construction Costs	**$ 104,887.75**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 10,488.78
	6% Admin / Legal				$ 6,293.27
				Subtotal	**$ 16,782.04**
	Design and Construction Management Services				
	Proposal Assistance & Inspection Review				$ 15,000.00
				Subtotal	**$ 15,000.00**
				TOTAL PROJECT COST	**$ 136,669.79**

4.6 WASTEWATER COLLECTION SYSTEM - ALTERNATIVE 3 MANHOLE AND COLLECTION SYSTEM REFURBISHMENT

Due to the age of the existing sanitary sewer infrastructure, it is prudent to discuss improvements that will sustain the collection system in future years. Typically, collection systems can be refurbished in place, replaced by conventional methods, or a combination of both. The method of repair depends on the current condition of the system.

Cured In Place Pipe (CIPP) is a method which a resin impregnated felt liner is inserted into the existing pipe and heated where it cures and adheres to the existing pipe, giving it a design strength and life equal to or greater than the original piping system. Select portions of the existing pipe may need to be replaced or repaired in order to accomplish the lining of a segment of pipeline.

Manhole refurbishment typically consists of application of mortar or grout to seal existing manholes from I/I, as well as, regain its full structural integrity. A corrosion protective coating is then applied over the grout to seal the grout from any hydrogen sulfide gases. Hydrogen sulfide gases typically induce a corrosive environment inside the collection system and lead to premature failure of collection system components.

Refurbishment of the existing infrastructure in place is considerably cheaper than conventional replacement. The Town has previously worked with *HydroKlean* to line a portion of the Town and has been replacing aging pipe with PVC. This study assumes that the remaining clay sewer pipe in the Town will need to be refurbished as the piping is reaching the end of its design life but the system will need to be fully inspected to get exact pipe lengths. As Town Ordinance requires landowners to independently maintain their service lines from the residence entirely to the sewer main, these lengths will not be included. Costs to refurbish the original collection system components are shown in Table 4.4 and 4.5.

4.6.1 DESIGN CRITERIA

Design of the replacement collection system will be in accordance with SD DENR Recommended design criteria and Ten States Standards. In addition, all comments and concerns of RD/RUS would be addressed and/or implemented prior to bidding of the construction project.

4.6.2 SCHEMATIC OF COLLECTION SYSTEM ALTERNATIVE 3

A schematic layout of the existing collection system to be refurbished under the proposed alternative is shown in Figures 3.1 and 3.2.

4.6.3 ENVIRONMENTAL IMPACTS

No environmental impacts are foreseen with this alternative. All disturbance will occur within the Town roadway and original sanitary sewer location.

4.6.4 LAND REQUIREMENTS

Additional land is not required for this alternative. All necessary land is currently owned and maintained by the Town.

4.6.5 CONSTRUCTION PROBLEMS

Problems that may be encountered during construction include bypassing wastewater and alternative hours of construction during late evening or early morning.

4.6.6 COST ESTIMATES

A detailed cost estimate and EUAC has been performed for this alternative and are shown below in Tables 4.4 and 4.5.

4.6.7 ADVANTAGES & DISADVANTAGES OF COLLECTION SYSTEM ALTERNATIVE 3

Advantages associated with the alternative include total refurbishment of the existing wastewater collection system throughout the community. Some disadvantages include significant capital cost.

Table 4.4 - Opinion of Probable Construction Costs
Alternative 3 - Manhole and Collection System Refurbishment

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	$ 250,000.00	$ 250,000.00
2	Traffic Control	1	LS	$ 27,000.00	$ 27,000.00
3	Sanitary Sewer Temporary Bypass	1	LS	$ 40,000.00	$ 40,000.00
4	Remove Manhole Casting	15	EA	$ 400.00	$ 6,000.00
5	Sawcut Asphalt Paving	1,000	LF	$ 4.50	$ 4,500.00
6	Point Repair - 8"	150	LF	$ 300.00	$ 45,000.00
7	Preinstall Cleaning & CCTV Inspection - 8" Sewer	11,195	LF	$ 1.00	$ 11,195.00
8	Heavy Cleaning - All Sizes	250	LF	$ 2.50	$ 625.00
9	Grind Protruding Service Tap	30	EA	$ 150.00	$ 4,500.00
10	CIPP Lining - 8" Sewer Main	11,195	LF	$ 32.00	$ 358,240.00
11	CIPP End Seals - 8"	8	EA	$ 1,000.00	$ 8,000.00
12	Post Installation CCTV Inspection	11,195	LF	$ 1.00	$ 11,195.00
13	Reinstate Active Service Connections	117	EA	$ 125.00	$ 14,625.00
14	Minor Manhole Bench Repair	15	EA	$ 1,400.00	$ 21,000.00
15	Major Manhole Bench Repair	7	EA	$ 2,000.00	$ 14,000.00
16	Manhole Corrosion Protective Coating	300	VF	$ 600.00	$ 180,000.00
17	Adjust Manhole	5	EA	$ 2,500.00	$ 12,500.00
18	Asphalt Patching	350	Ton	$ 300.00	$ 105,000.00
19	Base Course	150	Ton	$ 50.00	$ 7,500.00
				Total Construction Costs	**$1,120,880.00**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 112,088.00
	6% Admin / Legal				$ 67,252.80
				Subtotal	**$ 179,340.80**
	Design and Construction Management Services				
	Design Engineering & Bid Letting				$ 112,088.00
	Construction Inspection, Testing, and Management				$ 112,088.00
				Subtotal	**$ 224,176.00**
				TOTAL PROJECT COST	**$1,524,396.80**

Table 4.5 - Equivalent Uniform Annual Costs Analysis
Alternative 3 - Manhole and Collection System Refurbishment

Initial Capital Costs				
Item	**Capital Cost**	**Salvage Value**	**Salvage Present Worth**	**Net Present Worth**
Mobilization	$ 250,000.00			$ 250,000.00
Traffic Control	$ 27,000.00			$ 27,000.00
Sanitary Sewer Temporary Bypass	$ 40,000.00			$ 40,000.00
Remove Manhole Casting	$ 6,000.00			$ 6,000.00
Sawcut Asphalt Paving	$ 4,500.00			$ 4,500.00
Point Repair - 8"	$ 45,000.00	$ 18,000.00	$ 7,463.57	$ 37,536.43
Preinstall Cleaning & CCTV Inspection - 8" Sewer	$ 11,195.00			$ 11,195.00
Heavy Cleaning - All Sizes	$ 625.00			$ 625.00
Grind Protruding Service Tap	$ 4,500.00			$ 4,500.00
CIPP Lining - 8" Sewer Main	$ 358,240.00	$ 143,296.00	$ 59,416.66	$ 298,823.34
CIPP End Seals - 8"	$ 8,000.00	$ 3,200.00	$ 1,326.86	$ 6,673.14
Post Installation CCTV Inspection	$ 11,195.00			$ 11,195.00
Reinstate Active Service Connections	$ 14,625.00			$ 14,625.00
Minor Manhole Bench Repair	$ 21,000.00	$ 8,400.00	$ 3,483.00	$ 17,517.00
Major Manhole Bench Repair	$ 14,000.00	$ 5,600.00	$ 2,322.00	$ 11,678.00
Manhole Corrosion Protective Coating	$ 180,000.00	$ 72,000.00	$ 29,854.29	$ 150,145.71
Adjust Manhole	$ 12,500.00			$ 12,500.00
Asphalt Patching	$ 105,000.00	$ 42,000.00	$ 17,415.00	$ 87,585.00
Base Course	$ 7,500.00	$ 3,000.00	$ 1,243.93	$ 6,256.07
				$ 998,354.69

Annual O&M Costs		
Item	**Capital Cost**	**Net Present Worth**
Energy	$ -	$ -
Maintenance	$ 750.00	$ 9,755.95
Labor	$ 500.00	$ 6,503.97
Miscellaneous	$ 250.00	$ 3,251.98
		$ 19,511.90
Total Net Present Worth		$1,017,866.60
Equivalent Uniform Annual Cost (20 yrs @ 4.5%)		**$ 45,803.00**

4.7 WASTEWATER COLLECTION SYSTEM - ALTERNATIVE 4 CONVENTIONAL MANHOLE AND COLLECTION SYSTEM REPLACEMENT

As a comparison to in place refurbishment of the collection system, Alternative 4 is the complete replacement of manholes and sanitary sewer main that is of original construction. If left too long, refurbishment of the existing infrastructure may not be a viable option and the Town will be left with the only option of conventional replacement. Due to the replacement of the sewer main, the cost to replace the portion of the service line in the right of way is included in this option. Costs to replace the original collection system components are shown in Table 4.6 and 4.7.

4.7.1 DESIGN CRITERIA

Design of the replacement collection system will be in accordance with SD DENR Recommended design criteria and Ten States Standards. In addition, all comments and concerns of RD/RUS would be addressed and/or implemented prior to bidding of the construction project.

4.7.2 SCHEMATIC OF COLLECTION SYSTEM ALTERNATIVE 4

A schematic layout of the existing collection system to be replaced under the proposed alternative is shown in Figures 3.1 and 3.2.

4.7.3 ENVIRONMENTAL IMPACTS

No environmental impacts are foreseen with this alternative. All disturbance will occur within the Town roadway and original sanitary sewer location.

4.7.4 LAND REQUIREMENTS

Additional land is not required for this alternative. All necessary land is currently owned and maintained by the Town.

4.7.5 CONSTRUCTION PROBLEMS

Problems that may be encountered during construction include bypassing wastewater and alternative hours of construction during late evening or early morning.

4.7.6 COST ESTIMATES

A detailed cost estimate and EUAC has been performed for this alternative and are shown below in Tables 4.6 and 4.7.

4.7.7 ADVANTAGES & DISADVANTAGES OF COLLECTION SYSTEM ALTERNATIVE 4

Advantages associated with the alternative include totally new sanitary sewer pipe and manholes throughout the community. Some disadvantages include significant capital cost.

Table 4.6 - Opinion of Probable Construction Costs
Alternative 4 - Conventional Replacement of Wastewater Collection System

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	$ 400,000.00	$ 400,000.00
2	Traffic Control	1	LS	$ 25,000.00	$ 25,000.00
3	Salvage & Stockpile Granular Base	20,000	SY	$ 6.00	$ 120,000.00
4	Remove PCC Concrete Surfacing	711	SY	$ 30.00	$ 21,330.00
5	Remove Bituminous Surfacing	1,326	SY	$ 22.00	$ 29,172.00
6	Unclassified Excavation	70,720	CY	$ 4.50	$ 318,240.00
7	8 inch SDR 35 Sewer Pipe	11,195	LF	$ 60.00	$ 671,700.00
8	48 inch Manhole Replacement	36	EA	$ 4,500.00	$ 162,000.00
9	Type A-7 Manhole Frame and Lid	36	EA	$ 600.00	$ 21,600.00
10	4 x 8 Wye Service Connection	115	EA	$ 250.00	$ 28,750.00
11	4 inch 45 degree Fitting	115	EA	$ 50.00	$ 5,750.00
12	4 inch Sewer Service Pipe	4,050	EA	$ 30.00	$ 121,500.00
13	4 inch Sewer Service Coupling	115	EA	$ 115.00	$ 13,225.00
14	Bypass Pumping	1	LS	$ 35,000.00	$ 35,000.00
15	Place Granular Base Material	6,000	TON	$ 6.00	$ 36,000.00
16	Base Course	1,500	TON	$ 35.00	$ 52,500.00
17	Asphalt Surfacing	2,000	TON	$ 300.00	$ 600,000.00
18	PCC Concrete Patching	711	SY	$ 150.00	$ 106,650.00
19	Replacement of Topsoil	3,000	CY	$ 12.00	$ 36,000.00
20	Seeding, Fertilizing, and Mulching	9,500	SY	$ 9.50	$ 90,250.00
				Total Construction Costs	**$ 2,894,667.00**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 289,466.70
	6% Admin / Legal				$ 173,680.02
				Subtotal	**$ 463,146.72**
	Design and Construction Management Services				
	Design Engineering & Bid Letting				$ 289,466.70
	Construction Inspection, Testing, and Management				$ 289,466.70
				Subtotal	**$ 578,933.40**
				TOTAL PROJECT COST	**$ 3,936,747.12**

Table 4.7 - Equivalent Uniform Annual Costs Analysis
Alternative 4 - Conventional Replacement of Wastewater Collection System

Initial Capital Costs				
Item	**Capital Cost**	**Salvage Value**	**Salvage Present Worth**	**Net Present Worth**
Mobilization	$ 400,000.00			$ 400,000.00
Traffic Control	$ 25,000.00			$ 25,000.00
Salvage & Stockpile Granular Base	$ 120,000.00			$ 120,000.00
Remove PCC Concrete Surfacing	$ 21,330.00			$ 21,330.00
Remove Bituminous Surfacing	$ 29,172.00			$ 29,172.00
Unclassified Excavation	$ 318,240.00			$ 318,240.00
8 inch SDR 35 Sewer Pipe	$ 671,700.00	$ 268,680.00	$ 111,406.24	$ 560,293.76
48 inch Manhole Replacement	$ 162,000.00	$ 64,800.00	$ 26,868.86	$ 135,131.14
Type A-7 Manhole Frame and Lid	$ 21,600.00	$ 8,640.00	$ 3,582.51	$ 18,017.49
4 x 8 Wye Service Connection	$ 28,750.00	$ 11,500.00	$ 4,768.39	$ 23,981.61
4 inch 45 degree Fitting	$ 5,750.00	$ 2,300.00	$ 953.68	$ 4,796.32
4 inch Sewer Service Pipe	$ 121,500.00	$ 48,600.00	$ 20,151.64	$ 101,348.36
4 inch Sewer Service Coupling	$ 13,225.00	$ 5,290.00	$ 2,193.46	$ 11,031.54
Bypass Pumping	$ 35,000.00	$ 14,000.00	$ 5,805.00	$ 29,195.00
Place Granular Base Material	$ 36,000.00			$ 36,000.00
Base Course	$ 52,500.00	$ 21,000.00	$ 8,707.50	$ 43,792.50
Asphalt Surfacing	$ 600,000.00	$ 240,000.00	$ 99,514.29	$ 500,485.71
PCC Concrete Patching	$ 106,650.00	$ 42,660.00	$ 17,688.66	$ 88,961.34
Replacement of Topsoil	$ 36,000.00	$ 14,400.00	$ 5,970.86	$ 30,029.14
Seeding, Fertilizing, and Mulching	$ 90,250.00	$ 36,100.00	$ 14,968.61	$ 75,281.39
				$2,572,087.29

Annual O&M Costs		
Item	**Capital Cost**	**Net Present Worth**
Energy	$ -	$ -
Maintenance	$ 750.00	$ 9,755.95
Labor	$ 500.00	$ 6,503.97
Miscellaneous	$ 250.00	$ 3,251.98
		$ 19,511.90
Total Net Present Worth		$2,591,599.20
Equivalent Uniform Annual Cost (20 yrs @ 4.5%)		**$ 116,620.96**

4.8 WASTEWATER COLLECTION SYSTEM - ALTERNATIVE 5 COMBINATION MANHOLE AND COLLECTION SYSTEM REFURBISHMENT/REPLACEMENT

This alternative uses both conventional replacement techniques as well as refurbishing existing pipe. It is assumed that approximately 15% of the unlined clay sewer pipe in the system is degraded sufficiently to require conventional replacement and the remaining 85% can be CIPP lined. Costs to repair the collection system components are shown in Table 4.8 and 4.9.

4.8.1 DESIGN CRITERIA

Design of the replacement collection system will be in accordance with SD DENR Recommended design criteria and Ten States Standards. In addition, all comments and

concerns of RD/RUS would be addressed and/or implemented prior to bidding of the construction project.

4.8.2 SCHEMATIC OF COLLECTION SYSTEM ALTERNATIVE 5

A schematic layout of the existing collection system to be replaced under the proposed alternative is shown in Figures 3.1 and 3.2.

4.8.3 ENVIRONMENTAL IMPACTS

No environmental impacts are foreseen with this alternative. All disturbance will occur within the Town roadway and original sanitary sewer location.

4.8.4 LAND REQUIREMENTS

Additional land is not required for this alternative. All necessary land is currently owned and maintained by the Town.

4.8.5 CONSTRUCTION PROBLEMS

Problems that may be encountered during construction include bypassing wastewater and alternative hours of construction during late evening or early morning.

4.8.6 COST ESTIMATES

A detailed cost estimate and EUAC has been performed for this alternative and are shown below in Tables 4.8 and 4.9.

4.8.7 ADVANTAGES & DISADVANTAGES OF COLLECTION SYSTEM ALTERNATIVE 5

Advantages associated with the alternative include a refurbished collection system throughout the community. Some disadvantages include significant capital cost.

Table 4.8 - Opinion of Probable Construction Costs

Alternative 5- Combination Replacement/Refurbishment of Wastewater Collection System

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	$ 250,000.00	$ 250,000.00
2	Traffic Control	1	LS	$ 27,000.00	$ 27,000.00
3	Sanitary Sewer Temporary Bypass	1	LS	$ 40,000.00	$ 40,000.00
4	Salvage & Stockpile Granular Base	3,000	SY	$ 6.00	$ 18,000.00
5	Remove Bituminous Surfacing	200	SY	$ 22.00	$ 4,400.00
6	Sawcut Asphalt Paving	1,000	LF	$ 4.50	$ 4,500.00
7	Remove Manhole Casting	15	EA	$ 400.00	$ 6,000.00
8	Unclassified Excavation	3,980	CY	$ 4.50	$ 17,910.00
9	8 inch SDR 35 Sewer Pipe	1,679	LF	$ 60.00	$ 100,740.00
10	48 inch Manhole Replacement	11	EA	$ 4,500.00	$ 49,500.00
11	Type A-7 Manhole Frame and Lid	11	EA	$ 600.00	$ 6,600.00
12	4 x 8 Wye Service Connection	17	EA	$ 250.00	$ 4,250.00
13	4 inch 45 degree Fitting	17	EA	$ 50.00	$ 850.00
14	4 inch Sewer Service Pipe	170	LF	$ 30.00	$ 5,100.00
15	4 inch Sewer Service Coupling	17	EA	$ 115.00	$ 1,955.00
16	Point Repair - 8"	150	LF	$ 300.00	$ 45,000.00
17	Preinstall Cleaning & CCTV Inspection - 8" Sewer	9,516	LF	$ 1.00	$ 9,516.00
18	Heavy Cleaning - All Sizes	250	LF	$ 2.50	$ 625.00
19	Grind Protruding Service Tap	30	EA	$ 150.00	$ 4,500.00
20	CIPP Lining - 8" Sewer Main	9,516	LF	$ 32.00	$ 304,512.00
21	CIPP End Seals - 8"	8	EA	$ 1,000.00	$ 8,000.00
22	Post Installation CCTV Inspection	9,516	LF	$ 1.00	$ 9,516.00
23	Reinstate Active Service Connections	100	EA	$ 125.00	$ 12,500.00
24	Minor Manhole Bench Repair	15	EA	$ 1,400.00	$ 21,000.00
25	Major Manhole Bench Repair	7	EA	$ 2,000.00	$ 14,000.00
26	Manhole Corrosion Protective Coating	300	VF	$ 600.00	$ 180,000.00
27	Adjust Manhole	5	EA	$ 2,500.00	$ 12,500.00
28	Asphalt Patching	350	Ton	$ 300.00	$ 105,000.00
29	Base Course	220	Ton	$ 50.00	$ 11,000.00
				Total Construction Costs	**$ 1,274,474.00**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 127,447.40
	6% Admin / Legal				$ 76,468.44
				Subtotal	**$ 203,915.84**
	Design and Construction Management Services				
	Design Engineering & Bid Letting				$ 159,309.25
	Construction Inspection, Testing, and Management				$ 159,309.25
				Subtotal	**$ 318,618.50**
				TOTAL PROJECT COST	**$ 1,797,008.34**

Table 4.9 - Equivalent Uniform Annual Costs Analysis
Alternative 5- Combination Replacement/Refurbishment of Wastewater Collection System

Initial Capital Costs				
Item	**Capital Cost**	**Salvage Value**	**Salvage Present Worth**	**Net Present Worth**
Mobilization	$ 250,000.00			$ 250,000.00
Traffic Control	$ 27,000.00			$ 27,000.00
Sanitary Sewer Temporary Bypass	$ 40,000.00			$ 40,000.00
Salvage & Stockpile Granular Base	$ 18,000.00			$ 18,000.00
Remove Bituminous Surfacing	$ 4,400.00			$ 4,400.00
Sawcut Asphalt Paving	$ 4,500.00			$ 4,500.00
Remove Manhole Casting	$ 6,000.00			$ 6,000.00
Unclassified Excavation	$ 17,910.00			$ 17,910.00
8 inch SDR 35 Sewer Pipe	$ 100,740.00	$ 40,296.00	$ 16,708.45	$ 84,031.55
48 inch Manhole Replacement	$ 49,500.00	$ 19,800.00	$ 8,209.93	$ 41,290.07
Type A-7 Manhole Frame and Lid	$ 6,600.00	$ 2,640.00	$ 1,094.66	$ 5,505.34
4 x 8 Wye Service Connection	$ 4,250.00	$ 1,700.00	$ 704.89	$ 3,545.11
4 inch 45 degree Fitting	$ 850.00	$ 340.00	$ 140.98	$ 709.02
4 inch Sewer Service Pipe	$ 5,100.00	$ 2,040.00	$ 845.87	$ 4,254.13
4 inch Sewer Service Coupling	$ 1,955.00	$ 782.00	$ 324.25	$ 1,630.75
Point Repair - 8"	$ 45,000.00	$ 18,000.00	$ 7,463.57	$ 37,536.43
Preinstall Cleaning & CCTV Inspection - 8" Sewer	$ 9,516.00			$ 9,516.00
Heavy Cleaning - All Sizes	$ 625.00			$ 625.00
Grind Protruding Service Tap	$ 4,500.00			$ 4,500.00
CIPP Lining - 8" Sewer Main	$ 304,512.00	$ 121,804.80	$ 50,505.49	$ 254,006.51
CIPP End Seals - 8"	$ 8,000.00	$ 3,200.00	$ 1,326.86	$ 6,673.14
Post Installation CCTV Inspection	$ 9,516.00			$ 9,516.00
Reinstate Active Service Connections	$ 12,500.00			$ 12,500.00
Minor Manhole Bench Repair	$ 21,000.00	$ 8,400.00	$ 3,483.00	$ 17,517.00
Major Manhole Bench Repair	$ 14,000.00	$ 5,600.00	$ 2,322.00	$ 11,678.00
Manhole Corrosion Protective Coating	$ 180,000.00	$ 72,000.00	$ 29,854.29	$ 150,145.71
Adjust Manhole	$ 12,500.00			$ 12,500.00
Asphalt Patching	$ 105,000.00			$ 105,000.00
Base Course	$ 11,000.00	$ 4,400.00	$ 1,824.43	$ 9,175.57
				$1,149,665.34

Annual O&M Costs				
Item	**Capital Cost**			**Net Present Worth**
Energy	$ -			$ -
Maintenance	$ 750.00			$ 9,755.95
Labor	$ 500.00			$ 6,503.97
Miscellaneous	$ 250.00			$ 3,251.98
				$ 19,511.90
Total Net Present Worth				$1,169,177.24
Equivalent Uniform Annual Cost (20 yrs @ 4.5%)				**$ 52,611.98**

4.9 WASTEWATER TREATMENT SYSTEM - ALTERNATIVE 1 DO NOTHING

A “Do Nothing” alternative would consist of keeping the treatment system as it is currently operating. No improvements would be made to the system. This alternative is not recommended at this time due to the requirements that the SD DENR has imposed on the Town.

4.10 WASTEWATER TREATMENT SYSTEM - ALTERNATIVE 2 WASTEWATER TREATMENT FACILITY REFURBISHMENT

Treatment Alternative 2 consists of the refurbishment of Treatment Cells #4 and #5. Proposed improvements include fixing the pond berms, installation of riprap/geotextile and additional repairs to the pond system. The proposed improvements will bring current system back into the status as it was originally built to and will meet the SD DENR required corrections.

4.10.1 DESIGN CRITERIA

Design of the refurbished treatment system will be in accordance with SD DENR Recommended design criteria and Ten States Standards. In addition, all comments and concerns of RD/RUS would be addressed and/or implemented prior to bidding of the construction project.

4.10.2 SCHEMATIC OF TREATMENT SYSTEM ALTERNATIVE 2

A schematic layout of the existing treatment system to be refurbished under the proposed alternative is shown in Figures 3.1 and 3.2.

4.10.3 ENVIRONMENTAL IMPACTS

No environmental impacts are foreseen with this alternative. All disturbance will occur within the existing footprint of the treatment system.

4.10.4 LAND REQUIREMENTS

Additional land is not required for this alternative. All necessary land is currently owned and maintained by the Town.

4.10.5 CONSTRUCTION PROBLEMS

Problems that may be encountered during construction include transfer of wastewater to allow for construction, and unforeseen subsurface conditions including elevated groundwater tables.

4.10.6 COST ESTIMATES

A detailed cost estimate and EUAC has been performed for this alternative and are shown below in Tables 4.10 and 4.11.

4.10.7 ADVANTAGES & DISADVANTAGES OF TREATMENT SYSTEM ALTERNATIVE 2

Advantages associated with the alternative include increased lifespan of the treatment system and additional resilience to erosion. Some disadvantages include significant capital cost.

Table 4.10 - Opinion of Probable Construction Costs
Treatment Alternative 2 - WWTF Refurbishment

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	$ 140,000.00	$ 140,000.00
2	Transfer Pumping	1	LS	$ 30,000.00	$ 30,000.00
3	Contractor Provided Liner Material	11,252	CY	$ 12.00	$ 135,024.00
4	Shaping and Compaction of Lagoon Berms	9,644	SY	$ 6.00	$ 57,864.00
5	Removing Existing Riprap	1	LS	$ 25,000.00	$ 25,000.00
6	8 inch SDR 35 Sewer Pipe	225	LF	$ 65.00	$ 14,625.00
7	Intermediate Control Manhole	1	EA	$ 18,500.00	$ 18,500.00
8	Geotextile Liner	89,900	SF	$ 3.50	$ 314,650.00
9	Lagoon Depth Indicators	2	EA	$ 3,500.00	$ 7,000.00
10	Piping Splash Pads	2	EA	$ 2,500.00	$ 5,000.00
11	Piping Supports	2	EA	$ 1,200.00	$ 2,400.00
12	Seeding, Fertilizing, and Mulch	3.0	AC	$ 10,000.00	$ 30,000.00
				Total Construction Costs	**$ 780,063.00**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 78,006.30
	6% Admin / Legal				$ 46,803.78
				Subtotal	**$ 124,810.08**
	Design and Construction Management Services				
	Geotechnical Engineering				$ 7,500.00
	Design Engineering & Bid Letting				$ 97,507.88
	Construction Inspection, Testing, and Management				$ 97,507.88
				Subtotal	**$ 202,515.75**
				TOTAL PROJECT COST	**$1,107,388.83**

Table 4.11 - Equivalent Uniform Annual Costs Analysis
Treatment Alternative 2 - WWTF Refurbishment

Initial Capital Costs				
Item	**Capital Cost**	**Salvage Value**	**Salvage Present Worth**	**Net Present Worth**
Mobilization	$ 140,000.00			$ 140,000.00
Transfer Pumping	$ 30,000.00			$ 30,000.00
Contractor Provided Liner Material	$ 135,024.00	$ 54,009.60	$ 22,394.69	$ 112,629.31
Shaping and Compaction of Lagoon Berms	$ 57,864.00			$ 57,864.00
Removing Existing Riprap	$ 25,000.00			$ 25,000.00
8 inch SDR 35 Sewer Pipe	$ 14,625.00	$ 5,850.00	$ 2,425.66	$ 12,199.34
Intermediate Control Manhole	$ 18,500.00	$ 7,400.00	$ 3,068.36	$ 15,431.64
Geotextile Liner	$ 314,650.00	$ 125,860.00	$ 52,186.95	$ 262,463.05
Lagoon Depth Indicators	$ 7,000.00	$ 2,800.00	$ 1,161.00	$ 5,839.00
Piping Splash Pads	$ 5,000.00	$ 2,000.00	$ 829.29	$ 4,170.71
Piping Supports	$ 2,400.00	$ 960.00	$ 398.06	$ 2,001.94
Seeding, Fertilizing, and Mulch	$ 30,000.00	$ 12,000.00	$ 4,975.71	$ 25,024.29
				$ 692,623.28

Annual O&M Costs		
Item	**Capital Cost**	**Net Present Worth**
Energy	$ -	$ -
Maintenance	$ 1,200.00	$ 15,609.52
Labor	$ 600.00	$ 7,804.76
Miscellaneous	$ 300.00	$ 3,902.38
		$ 27,316.67
Total Net Present Worth		$ 719,939.95
Equivalent Uniform Annual Cost (20 yrs @ 4.5%)		**$ 32,396.30**

4.11 WASTEWATER TREATMENT SYSTEM - ALTERNATIVE 3 WASTEWATER SYSTEM EXPANSION

This alternative consists of expanding the wastewater system to address the additional inflow in the system including the possibility of operating as a discharge facility. With the proposed changes to the wastewater collection system, we believe that adding additional storage is unnecessary because, with improvements, the facility should be able to operate as a No-Discharge facility. This option is also cost prohibitive compared to the other options available and thus will not be discussed further.

4.12 WASTEWATER TREATMENT SYSTEM – ALTERNATIVE 4 MECHANICAL TREATMENT SYSTEM

The Town has requested evaluating the possibility of using a mechanical treatment system including sequential batch reactors (SBR) or submerged aerated growth reactor (SAGR) systems. While these systems are more than capable of providing high quality water to discharge, these processes are often too elaborate for the discharge requirements currently imposed upon small communities in South Dakota. Mechanical systems require significant capital to procure and install, as well as, provide O&M on an annual basis. These systems are ultimately more costly than any proposed alternatives to the existing WWTF. Therefore, this alternative will not be discussed further.

4.13 WASTEWATER TREATMENT SYSTEM – ALTERNATIVE 5 REROUTE LAGOON SYSTEM

One of the primary issues in the Town's operation of the lagoon system is the system operates in a distinct way which involves manually transferring wastewater from Cells #1-3, to Cells #4 or #5 via a diesel-powered trash pump. The system would be better operated as a traditional gravity system, thus removing the need for personnel on-site multiple times a day to transfer wastewater and ensuring the pump has adequate fuel. This alternative includes rerouting the inlet piping to Cell #5 and installing a lift station to allow for flow into Cell #5. Additional piping will be installed between the cells to allow for gravity flow and manual operation of the system rather than the operation of a diesel pump on the pond berm.

4.13.1 DESIGN CRITERIA

Design of the replacement collection system will be in accordance with SD DENR Recommended design criteria and Ten States Standards. In addition, all comments and concerns of RD/RUS would be addressed and/or implemented prior to bidding of the construction project.

4.13.2 SCHEMATIC OF TREATMENT SYSTEM ALTERNATIVE 5

A schematic layout of the existing treatment system which will be rerouted in the alternative is shown in Figures 3.1 and 3.2.

4.13.3 ENVIRONMENTAL IMPACTS

No environmental impacts are foreseen with this alternative. All disturbance will occur within the treatment system footprint and original sanitary sewer location.

4.13.4 LAND REQUIREMENTS

Additional land is not required for this alternative. All necessary land is currently owned and maintained by the Town.

4.13.5 CONSTRUCTION PROBLEMS

Problems that maybe encountered during construction include bypassing wastewater and alternative hours of construction during late evening or early morning.

4.13.6 COST ESTIMATES

A detailed cost estimate and EUAC has been performed for this alternative and are shown below in Tables 4.12 and 4.13.

4.13.7 ADVANTAGES & DISADVANTAGES OF TREATMENT SYSTEM ALTERNATIVE 5

Advantages associated with the alternative include reduced operation and maintenance requirements, better lagoon operation and treatment, reduced costs due to elimination of the diesel pump. Some disadvantages include significant capital cost and maintenance of a new lift station which staff are unfamiliar with.

Table 4.12 - Opinion of Probable Construction Costs
Treatment Alternative 5 - Reroute Lagoon System

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
Transfer Pipe/Lift Station					
1	Mobilization	1	LS	$ 65,000.00	$ 65,000.00
2	Package Lift Station	1	LS	$ 150,000.00	$ 150,000.00
3	Unclassified Excavation	2,037	CY	$ 10.00	$ 20,370.37
4	10 inch SDR 35 Sewer Pipe	1,900	LF	$ 75.00	$ 142,500.00
5	6" HDPE Forcemain	300	LF	$ 35.00	$ 10,500.00
6	Connnect to Manhole	1	LS	$ 2,000.00	$ 2,000.00
7	Gravel Cushion	764	Ton	$ 35.00	$ 26,740.00
8	48" Inlet Manhole	1	LS	$ 6,000.00	$ 6,000.00
9	Traffic Control, Miscellaneous	1	LS	$ 5,500.00	$ 5,500.00
10	Clearing	1	LS	$ 25,000.00	$ 25,000.00
11	Remove and Replace Topsoil	1	LS	$ 10,000.00	$ 10,000.00
12	Seeding, Fertilizing, and Mulch	0.7	AC	$ 20,000.00	$ 14,000.00
				Total Construction Costs	**$ 477,610.37**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 47,761.04
	6% Admin / Legal				$ 28,656.62
				Subtotal	**$ 76,417.66**
	Design and Construction Management Services				
	Geotechnial Engineering				$ 5,000.00
	Design Engineering & Bid Letting				$ 57,313.24
	Construction Inspection, Testing, and Management				$ 47,761.04
				Subtotal	**$ 110,074.28**
				TOTAL PROJECT COST	**$ 664,102.31**

Table 4.13 - Equivalent Uniform Annual Costs Analysis
Treatment Alternative 5 - Reroute Lagoon System

Initial Capital Costs				
Item	**Capital Cost**	**Salvage Value**	**Salvage Present Worth**	**Net Present Worth**
Mobilization	$ 65,000.00			$ 65,000.00
Package Lift Station	$ 150,000.00	$ 60,000.00	$ 24,878.57	$ 125,121.43
Unclassified Excavation	$ 20,370.37			$ 20,370.37
10" PVC	$ 142,500.00	$ 57,000.00	$ 23,634.64	$ 118,865.36
6" HDPE Forcemain	$ 10,500.00	$ 4,200.00	$ 1,741.50	$ 8,758.50
Connnect to Manhole	$ 2,000.00			$ 2,000.00
Gravel Cushion	$ 26,740.00	$ 10,696.00	$ 4,435.02	$ 22,304.98
48" Inlet Manhole	$ 6,000.00	$ 2,400.00	$ 995.14	$ 5,004.86
Traffic Control, Miscellaneous	$ 5,500.00			$ 5,500.00
Clearing	$ 25,000.00			$ 25,000.00
Remove and Replace Topsoil	$ 10,000.00			$ 10,000.00
Seeding, Fertilizing, and Mulch	$ 14,000.00			$ 14,000.00
				$ 421,925.49
Annual O&M Costs				
Item	**Capital Cost**			**Net Present Worth**
Energy	$ 5,000.00			$ 65,039.68
Maintenance	$ 1,500.00			$ 19,511.90
Labor	$ 1,200.00			$ 15,609.52
Miscellaneous	$ 400.00			$ 5,203.17
				$ 105,364.29
Total Net Present Worth				$ 527,289.78
Equivalent Uniform Annual Cost (20 yrs @ 4.5%)				**$ 23,727.04**

4.14 WASTEWATER TREATMENT SYSTEM – ALTERNATIVE 6 STORM SEWER DIVERSION

During site inspections, it is apparent that the Town's stormwater system discharges into the drainage ditch that surrounds the facility. There is evidence that stormwater has infiltrated or overflowed into the lagoon systems in the past. Stormwater ponds in this drainage ditch cause operational difficulties for the lagoon systems and possibly compromise the integrity of the system. There is a drop inlet at the northeast corner of the intersection of Rogers and 1st which routes storm water beneath the airport to a stormwater pond. This alternative includes grading and rerouting of the stormwater channel to divert it away from the wastewater lagoon as well as rerouting and connecting the drop inlet to the existing storm sewer infrastructure.

4.14.1 DESIGN CRITERIA

Design of the storm sewer infrastructure will be in accordance with SD DENR Recommended design criteria and Ten States Standards. In addition, all comments and concerns of RD/RUS would be addressed and/or implemented prior to bidding of the construction project.

4.14.2 SCHEMATIC OF TREATMENT SYSTEM ALTERNATIVE 6

A schematic layout of the existing treatment system with the storm sewer drainage noted in the alternative is shown in Figures 3.1 and 3.2.

4.14.3 ENVIRONMENTAL IMPACTS

No environmental impacts are foreseen with this alternative. All disturbance will occur within the Town roadway, original sanitary sewer location, and the existing treatment system footprint.

4.14.4 LAND REQUIREMENTS

Additional land is not required for this alternative. All necessary land is currently owned and maintained by the Town.

4.14.5 CONSTRUCTION PROBLEMS

Problems that may be encountered during construction include unforeseen subsurface conditions.

4.14.6 COST ESTIMATES

A detailed cost estimate and EUAC has been performed for this alternative and are shown below in Tables 4.14 and 4.15.

4.14.7 ADVANTAGES & DISADVANTAGES OF TREATMENT SYSTEM ALTERNATIVE 6

Advantages associated with the alternative include reducing damage to the lagoons by diverting storm water, reduced infiltration and loading of the treatment system, and improved drainage. Some disadvantages include capital cost.

Table 4.14 - Opinion of Probable Construction Costs
Treatment Alternative 6- Storm Sewer Diversion

ITEM	BID ITEM DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
Pond Construction					
1	Mobilization	1	LS	$ 30,000.00	$ 30,000.00
2	Shaping of Berms/Drainage	14,333	SY	$ 4.00	$ 57,333.33
3	Turf Reinforcement Mats	7,167	SY	$ 10.00	$ 71,666.67
4	Seeding, Fertilizing, and Mulch	3	AC	$ 10,000.00	$ 29,614.33
5	24" RCP Class 3	770	LF	$ 100.00	$ 77,000.00
6	Storm Sewer Bedding Material	770	LF	$ 7.00	$ 5,390.00
7	4'x6' Concrete Type S Drop Inlet Base	4	EA	$ 4,500.00	$ 18,000.00
8	4'x6' Concrete Type S Drop Inlet Lid	4	EA	$ 2,500.00	$ 10,000.00
9	Connect to Existing Storm Sewer Pipe	1	LS	$ 2,000.00	$ 2,000.00
				Total Construction Costs	**$ 301,004.33**
	Contingency / Admin & Legal Fees				
	10% Contingency				$ 30,100.43
	6% Admin / Legal				$ 18,060.26
				Subtotal	**$ 48,160.69**
	Design and Construction Management Services				
	Design Engineering & Bid Letting				$ 37,625.54
	Construction Inspection, Testing, and Management				$ 37,625.54
				Subtotal	**$ 75,251.08**
				TOTAL PROJECT COST	**$ 424,416.10**

Table 4.15 - Equivalent Uniform Annual Costs Analysis
Treatment Alternative 6- Storm Sewer Diversion

Initial Capital Costs				
Item	**Capital Cost**	**Salvage Value**	**Salvage Present Worth**	**Net Present Worth**
Mobilization	$ 30,000.00			$ 30,000.00
Shaping of Berms/Drainage	$ 57,333.33			$ 57,333.33
Turf Reinforcement Mats	$ 71,666.67	$ 28,666.67	$ 11,886.43	$ 59,780.24
Seeding, Fertilizing, and Mulch	$ 29,614.33			$ 29,614.33
24" RCP Class 3	$ 77,000.00	$ 30,800.00	$ 12,771.00	$ 64,229.00
Storm Sewer Bedding Material	$ 5,390.00	$ 2,156.00	$ 893.97	$ 4,496.03
4'x6' Concrete Type S Drop Inlet Base	$ 18,000.00	$ 7,200.00	$ 2,985.43	$ 15,014.57
4'x6' Concrete Type S Drop Inlet Lid	$ 10,000.00	$ 4,000.00	$ 1,658.57	$ 8,341.43
Connect to Existing Storm Sewer Pipe	$ 2,000.00			$ 2,000.00
				$ 270,808.93

Annual O&M Costs		
Item	**Capital Cost**	**Net Present Worth**
Energy	$ -	$ -
Maintenance	$ 600.00	$ 7,804.76
Labor	$ 300.00	$ 3,902.38
Miscellaneous	$ 200.00	$ 2,601.59
		$ 14,308.73
Total Net Present Worth		$ 285,117.66
Equivalent Uniform Annual Cost (20 yrs @ 4.5%)		**$ 12,829.29**

4.15 FACILITY OPERATION

Improvements were made to the wastewater treatment facility in the 1990's including the construction of additional lagoons. The system was originally designed for total retention, requiring no discharges and minimal operation.

During the review of the system, it appears that the facility could be operated again this way in the future if excessive I/I is eliminated from the system. No alternatives to the operation of the ponds are recommended at this time. It is believed that, with the proposed alternatives completed and a substantial reduction of I/I, hydraulic loading issues could be eliminated.

4.16 SUMMARY

The Town of Bison wastewater collection and treatment facilities are in need of significant improvements in the upcoming years. Collection system, as well as, treatment system improvements are needed to keep the Town is compliance with current permit conditions, as set forth by the SDDENR and USEPA. Once these improvements have been made, continual upkeep will keep it in good working order for many years to come.

The proposed alternatives will improve the existing system to provide safe and reliable sewer service to the residents of Bison. However, the alternatives come with a great financial responsibility to its citizens.

Therefore, it is imperative that these recommendations be thoroughly discussed amongst the council in order to make informed decisions as to the priorities of improvements, as well as, means to finance these improvements.

Chapter 5.0
SELECTION OF ALTERNATIVES

This chapter further compares the proposed infrastructure improvements in Chapters 4.0. Formal recommendations are made based upon further comparison based on the system's technical requirements, cost effectiveness, and operational reliability.

5.1 SELECTION METHODOLOGY

A decision matrix was developed for the comparison of the wastewater alternatives that were selected in Chapter 4.0. Alternatives were evaluated further, based on the following criteria:

- *Need*
- *Risk*
- *Capital cost*
- *O&M cost*
- *Footprint*
- *Energy consumption*
- *Reliability*
- *Operations staff familiarity*
- *Maintenance needs*

Since the Town does not have significant capital generation capability, it is critical that the alternatives be analyzed in a cost-effective manner that is also sensitive to community needs. As a result, the philosophy for the analysis is to incorporate conservative provisions to effectively resolve the current issues while producing a minimum amount of debt. The selected alternatives must also be reliable and require a minimal level of operation and maintenance demands.

Table 5.1 - Wastewater Alternative Decision Matrix

Decision Variables	*Collection Alt #2*	*Collection Alt #3*	*Collection Alt #4*	*Collection Alt #5*	*Treatment Alt #2*	*Treatment Alt #3*	*Treatment Alt #4*	*Treatment Alt #5*	*Treatment Alt #6*
Need	Immediate	3-5 yrs	5-10 yrs	3-5 yrs	3-5 yrs	3-5 yrs	3-5 yrs	1-3 yrs	1-3 yrs
Risk	1	2	2	2	2	3	3	2	2
Capital Cost	1	2	3	2	2	3	3	2	2
O&M Costs	1	1	2	1	1	2	3	2	2
Footprint	1	1	3	1	2	3	2	1	1
Energy Consumption	1	1	1	1	1	1	2	2	1
Reliability	1	1	1	1	1	1	3	1	1
Staff Familiarity	1	1	1	1	1	2	3	1	1
Maintenance Needs	1	1	2	1	2	2	3	2	2
Total	***8***	***10***	***15***	***10***	***12***	***17***	***22***	***13***	***12***

Rating Legend
1 = Excellent
2 = Average
3 = Poor

It is recommended that Collection Alternative #2 (Cleaning and Televising) be implemented as soon as possible. Due to the age of the collection system and the indication that there is significant I/I entering the system, it is imperative that the Town have a full understanding of the current condition of the system. ***It is also recommended that Collection Alternative #5 (Combination of Conventional replacement and CIPP) be implemented***. Collection Alternative #5 was chosen over Collection Alternative #3 and #4 due to the fact that the Town may have the ability to refurbish the vast majority of the existing collection system in lieu of conventional replacement, saving the Town significant money. However, depending on the condition of the existing collection system, a combination of Collection Alternatives #3 and #4 may be required. After Collection Alternative #2 is complete, the televising reports can be reviewed, and final determination can be made as to the condition of the collection system.

Treatment alternatives necessary depend on refurbishment of the collection system. The Town is currently under a compliance schedule with SD DENR (detailed in Appendix B) which requires corrective action be taken on Cells 4 and 5. ***It is our recommendation to construct Treatment Alternative #2.*** However, with mobilization of a crew to place riprap on Cells #4 and #5, a substantial mobilization savings could be seen by also completing Treatment Alternatives #5 and #6 together if the Town wishes to pursue these alternatives at the same time.

Therefore, it is the recommendation of this report that the Town of Bison implement the following alternatives in the immediate future:

1. ***Collection Alternative #2 (Cleaning and Televising)***
2. ***Collection Alternative #5 (Combination of Conventional replacement and CIPP)***
3. ***Treatment Alternative #2 (Refurbish Cells #4 & #5)***

5.2 USER FEE IMPACTS

As part of the cost analysis for the recommended improvements, the estimated impact on user fees has been calculated. Financial data supplied by the Town was used to determine the current operational status of the funds.

Current sewer rates are a monthly rate of $5/1,000 gal with a $10 service charge per service connection. Although there is not a minimum sewer rate to obtain funding, there is a minimum rate needed to become eligible for state and federal funding subsidies, which are primarily grants and principal loan forgiveness. Currently, this minimum subsidy rate is $30 per month. However, most communities that have received significant subsidies in the most recent funding rounds have established monthly sewer rates between $40 to $50 per month after funding packages had been put in place.

It should be noted that subsidies in any form are not guaranteed. The Town should be prepared for the possibility of obtaining all loan funding in order to finance the recommended infrastructure improvements.

If the Town choose to raise their rates to qualify for subsidy funding, several funding scenarios are possible. Tables 5.2, 5.3, and 5.4 detail several grant/loan funding packages that the community could receive.

5.3 CAPITAL FINANCE PLAN

In order to improve the existing infrastructure, funding must be obtained whether it be loans, subsidy, or a combination thereof. The Town of Bison will work closely with Black Hills Council of Local Governments or Midwest Assistance Program (MAP) to develop a financing plan for the proposed improvements.

The plan will address the Town's needs while at the same time providing the least burden onto the existing customers.

5.4 ENVIRONMENTAL EVALUATION

Comments from state and federal resource agencies have been obtained concerning any possible environmental impacts from the proposed improvement projects. All correspondence pertaining to this is located in Appendix A.

5.5 VIEW OF THE PUBLIC AND CONCERNED INTEREST GROUPS

The Town of Bison will conduct a public hearing on the proposed project improvements. Information regarding this will be submitted after it has been conducted.

5.6 FINAL SELECTION OF ALTERNATIVES

The alternatives recommended for implementation in the immediate future include:

1. ***Collection Alternative #2 (Cleaning and Televising)***
2. ***Collection Alternative #5 (Combination of Conventional replacement and CIPP)***
3. ***Treatment Alternative #2 (Refurbish Cells #4 & #5)***

These improvements will aid the Town in their ability to adequately operate and maintain their wastewater system without expending significant labor and materials towards a failing system that is difficult to maintain compliance with state and federal standards.

After televising of the collection system is complete, a schedule of improvements can be made for the replacement and/or refurbishment of the sewer mains.

5.6.1 DESIGN OF PROPOSED IMPROVEMENTS

Design of the proposed improvements will provide satisfactory operation and maintenance of the wastewater infrastructure. Improvements will be designed in accordance with all applicable design criteria including AWWA and Ten States Standards. All industry principals and standards for the design of these systems will be strictly adhered to.

5.6.2 *IMPLEMENTATION OF IMPROVEMENTS*

Based upon the recommendations within this report, detailed design of the proposed improvements will be completed by the Town's consultant and approved by SD DENR, since this is a work of "sanitary significance." Cost estimates have been prepared and are located in Chapter 4.0. The projects will be bid in accordance with state statues, which govern municipal corporations and will be constructed by the lowest responsive bidder.

An implementation schedule for the proposed improvements is shown below in Table 5.5. Several of the tasks listed in the schedule are sequential in nature and failure to maintain the dates for earlier tasks may result in pushing back later tasks. Tasks are recommended to be completed in order to progress the project forward through design and construction include:

Table 5.5 - Implementation Schedule

	Task	Date
1	*Submittal of Facility Plan*	December-20
2	*Approval of Facility Plan*	January-21
3	*Notice To Proceed for Design*	March-21
4	*State Water Plan Application*	February-21
5	*Funding Application Submittal*	March-21
6	*Project Funding Package Approval*	June-21
7	*Submittal of Plans and Specifications*	July-21
8	*Approval of Plans and Specifications*	September-21
9	*Solicitation of Bids*	October-21
10	*Opening of Bids*	October-21
11	*Award of Bid*	November-21
12	*Start of Construction*	November-21
13	*End of Construction*	November-22
14	*Project Closeout*	December-22

5.6.3 *LAND ACQUISITION*

No land is needed for the proposed improvements. All work will be completed in existing right-of-way, Town owned property, or in easements that have already been obtained. If additional land is needed, the Town will work in good faith to purchase the wanted parcel or obtain all necessary leases and/or easements required to perform construction.

5.6.4 INTERAGENCY AGREEMENTS

No cooperative agreements are needed with other agencies. Bison solely owns, operates, and maintains its wastewater system. Loan documents will be executed with the appropriate lenders, but as Bison is a municipal corporation, it has the legal authority to enter into such agreements. The Town legal advisor will provide counsel on any matters regarding this issue.

Table 5.2 - Funding and Financing of Proposed Alternative(s) - 20yr @ 2.25%

	90/10 Grant/Loan	80/20 Grant/Loan	70/30 Grant/Loan	60/40 Grant/Loan	50/50 Grant/Loan	40/60 Grant/Loan	30/70 Grant/Loan	20/80 Grant/Loan	10/90 Grant/Loan	0/100 Grant/Loan
Annual O&M Costs	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864
Amount Amortized	$ 304,107	$ 608,213	$ 912,320	$ 1,216,427	$ 1,520,533	$ 1,824,640	$ 2,128,747	$ 2,432,854	$ 2,736,960	$ 3,041,067
Grant Amount	$ 2,736,960	$ 2,432,854	$ 2,128,747	$ 1,824,640	$ 1,520,533	$ 1,216,427	$ 912,320	$ 608,213	$ 304,107	$ -
Multiplication Factor	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063
Annual Payment	$ 19,049.87	$ 38,099.75	$ 57,149.62	$ 76,199.49	$ 95,249.37	$ 114,299.24	$ 133,349.11	$ 152,398.99	$ 171,448.86	$190,498.73
Debt Reserve (10%)	$ 1,905	$ 3,810	$ 5,715	$ 7,620	$ 9,525	$ 11,430	$ 13,335	$ 15,240	$ 17,145	$ 19,050
Assets / Other Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	$ 69,819	$ 90,774	$ 111,729	$ 132,683	$ 153,638	$ 174,593	$ 195,548	$ 216,503	$ 237,458	$ 258,413
Annual Revenue	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280
Surplus / Deficit	$ 28,461	$ 7,506	$ (13,449)	$ (34,403)	$ (55,358)	$ (76,313)	$ (97,268)	$ (118,223)	$ (139,178)	$ (160,133)
Minimum Monthly Rate Increase	$0.00	$0.00	$4.79	$12.25	$19.71	$27.18	$34.64	$42.10	$49.56	$57.03

Assumptions:

Number of Connections	234	
Number of Years	20	years
Interest Rate	0.0225	or 2.25%
Total Project Costs	$ 3,041,066.96	* Project Cost is for ALL Recommended Alternatives

Table 5.3 - Funding and Financing of Proposed Alternative(s) - 30yr @ 2.75%

	90/10 Grant/Loan	80/20 Grant/Loan	70/30 Grant/Loan	60/40 Grant/Loan	50/50 Grant/Loan	40/60 Grant/Loan	30/70 Grant/Loan	20/80 Grant/Loan	10/90 Grant/Loan	0/100 Grant/Loan
Annual O&M Costs	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864
Amount Amortized	$ 304,107	$ 608,213	$ 912,320	$ 1,216,427	$ 1,520,533	$ 1,824,640	$ 2,128,747	$ 2,432,854	$ 2,736,960	$ 3,041,067
Grant Amount	$ 2,736,960	$ 2,432,854	$ 2,128,747	$ 1,824,640	$ 1,520,533	$ 1,216,427	$ 912,320	$ 608,213	$ 304,107	$ -
Multiplication Factor	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049
Annual Payment	$ 15,018.13	$ 30,036.27	$ 45,054.40	$ 60,072.53	$ 75,090.66	$ 90,108.80	$ 105,126.93	$ 120,145.06	$ 135,163.20	$150,181.33
Debt Reserve (10%)	$ 1,502	$ 3,004	$ 4,505	$ 6,007	$ 7,509	$ 9,011	$ 10,513	$ 12,015	$ 13,516	$ 15,018
Assets / Other Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	$ 65,384	$ 81,904	$ 98,424	$ 114,944	$ 131,464	$ 147,984	$ 164,504	$ 181,024	$ 197,544	$ 214,063
Annual Revenue	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280
Surplus / Deficit	$ 32,896	$ 16,376	$ (144)	$ (16,664)	$ (33,184)	$ (49,704)	$ (66,224)	$ (82,744)	$ (99,264)	$ (115,783)
Minimum Monthly Rate Increase	$0.00	$0.00	$0.05	$5.93	$11.82	$17.70	$23.58	$29.47	$35.35	$41.23

Assumptions:

Number of Connections	234
Number of Years	30 years
Interest Rate	0.0275 or 2.75%
Total Project Costs	$ 3,041,066.96

* Project Cost is for ALL Recommended Alternatives

Table 5.4 - Funding and Financing of Proposed Alternative(s) - 40yr @ 2.25%

	90/10 Grant/Loan	80/20 Grant/Loan	70/30 Grant/Loan	60/40 Grant/Loan	50/50 Grant/Loan	40/60 Grant/Loan	30/70 Grant/Loan	20/80 Grant/Loan	10/90 Grant/Loan	0/100 Grant/Loan
Annual O&M Costs	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864	$ 48,864
Amount Amortized	$ 304,107	$ 608,213	$ 912,320	$ 1,216,427	$ 1,520,533	$ 1,824,640	$ 2,128,747	$ 2,432,854	$ 2,736,960	$ 3,041,067
Grant Amount	$ 2,736,960	$ 2,432,854	$ 2,128,747	$ 1,824,640	$ 1,520,533	$ 1,216,427	$ 912,320	$ 608,213	$ 304,107	$ -
Multiplication Factor	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Annual Payment	$ 11,610.00	$ 23,219.99	$ 34,829.99	$ 46,439.99	$ 58,049.98	$ 69,659.98	$ 81,269.97	$ 92,879.97	$ 104,489.97	$116,099.96
Debt Reserve (10%)	$ 1,161	$ 2,322	$ 3,483	$ 4,644	$ 5,805	$ 6,966	$ 8,127	$ 9,288	$ 10,449	$ 11,610
Assets / Other Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Annual Costs	$ 61,635	$ 74,406	$ 87,177	$ 99,948	$ 112,719	$ 125,490	$ 138,261	$ 151,032	$ 163,803	$ 176,574
Annual Revenue	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280	$ 98,280
Surplus / Deficit	$ 36,645	$ 23,874	$ 11,103	$ (1,668)	$ (14,439)	$ (27,210)	$ (39,981)	$ (52,752)	$ (65,523)	$ (78,294)
Minimum Monthly Rate Increase	$0.00	$0.00	$0.00	$0.59	$5.14	$9.69	$14.24	$18.79	$23.33	$27.88

Assumptions:

Number of Connections	234
Number of Years	40 years
Interest Rate	0.0225 or 2.25%
Total Project Costs	$ 3,041,066.96

* Project Cost is for ALL Recommended Alternatives

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Chapter 6.0
CAPITAL IMPROVEMENT PROGRAM

This final chapter describes revenue and budget projections that would be available for repayment. In addition, various financing options are presented, and recommendations are made in regard to possible funding options and sources.

6.1 CAPITAL IMPROVEMENT REVENUE

The Town wastewater rate schedule is presented below in Table 6.1. As of 2020, Bison uses a scaling wastewater rate with $10.00 for residential and commercial with an additional usage fee of $5 per 1,000 gallons of water usage. The current average monthly rate of $35.00 which is above the minimum recommended of $30.00 per month. This recommended minimum rate is a prerequisite for state and federal funding subsidies eligibility.

Table 6.1 - Town of Bison Wastewater Rates and Revenue

Usage Group	Wastewater Rate (Monthly)				
All	Service fee of $10/month and $5/1,000 gallons				
# of Connections	Annual Revenue				
234	**2020**	**2021**	**2022**	**2023**	**2024**
Current Rate	$ 98,280.00	$ 98,280.00	$ 98,280.00	$ 98,280.00	$ 98,280.00
SDDENR Min ($30)	$ 84,240.00	$ 84,240.00	$ 84,240.00	$ 84,240.00	$ 84,240.00

6.2 CAPITAL IMPROVEMENT O&M COSTS

The average annual costs for wastewater operation and maintenance (O&M) is $48,864. As seen on Table 6.2 the annual O&M cost associated with wastewater operations ranged from $38,981 to $79,990. Annual O&M costs for the proposed improvements are expected to remain relatively constant after year 2022. With appropriate reserves in place, the O&M for the proposed improvements should only be affected by yearly inflation rates.

Table 6.2 - Capital Improvement O&M Cost Summary

	2020	2021	2022	2023	2024
Direct Benefits					
Salaries	$ 12,500.00	$ 12,937.50	$ 13,390.31	$ 13,858.97	$ 14,344.04
Benefits	$ 3,050.00	$ 3,156.75	$ 3,267.24	$ 3,381.59	$ 3,499.95
Insurance	$ 4,570.00	$ 4,729.95	$ 4,895.50	$ 5,066.84	$ 5,244.18
Office Related					
Admin / Office	$ 2,500.00	$ 2,587.50	$ 2,678.06	$ 2,771.79	$ 2,868.81
Office Supplies	$ 150.00	$ 155.25	$ 160.68	$ 166.31	$ 172.13
Copying	$ 50.00	$ 51.75	$ 53.56	$ 55.44	$ 57.38
Computer Equipment	$ 300.00	$ 310.50	$ 321.37	$ 332.62	$ 344.26
O&M					
Motor Vehicle	$ 1,500.00	$ 1,552.50	$ 1,606.84	$ 1,663.08	$ 1,721.28
Fuel and Oil	$ 550.00	$ 569.25	$ 589.17	$ 609.79	$ 631.14
Pump Fuel/Maintenance	$ 5,000.00	$ 5,175.00	$ 5,356.13	$ 5,543.59	$ 5,737.62
Maint & Repairs	$ 4,000.00	$ 4,140.00	$ 4,284.90	$ 4,434.87	$ 4,590.09
Jetting & Jet Water	$ 1,200.00	$ 1,242.00	$ 1,285.47	$ 1,330.46	$ 1,377.03
Supplies/Sampling	$ 1,000.00	$ 1,035.00	$ 1,071.23	$ 1,108.72	$ 1,147.52
Minor Equipment	$ 400.00	$ 414.00	$ 428.49	$ 443.49	$ 459.01
Miscellaneous					
Professional Services	$ 42,320.00	$ -	$ -	$ -	$ -
Conferences	$ 700.00	$ 724.50	$ 749.86	$ 776.10	$ 803.27
Operator Certifications	$ 200.00	$ 200.00	$ 200.00	$ 225.00	$ 250.00
Annual Totals	**$ 79,990.00**	**$ 38,981.45**	**$ 40,338.80**	**$ 41,768.66**	**$ 43,247.69**

6.3 DEBT AND RESERVES

Currently, the Town of Bison does not have any existing debt load on the wastewater infrastructure but does have an outstanding loan balance for the stormwater system. Table 6.3 shows reserves for debt and reserves for short-lived wastewater assets. However, there has been no reserve fund kept at this time.

Table 6.3 - Wastewater Capital Improvement Program Reserves

	2020	2021	2022	2023	2024
Debt Reserves					
Existing Debt	$ -	$ -	$ -	$ -	$ -
Proposed Debt	$ 190,498.73	$ 190,498.73	$ 190,498.73	$ 190,498.73	$ 190,498.73
Short Lived Asset Reserves					
Pickup Truck	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
Computer Equipment	$ 500.00	$ 500.00	$ 500.00	$ 500.00	$ 500.00
Annual Totals	**$ 193,498.73**	**$ 193,498.73**	**$ 193,498.73**	**$ 193,498.73**	**$ 193,498.73**

Short-lived asset reserves for replacement of the City maintenance vehicle will be on a seven-year rotation. Additionally, reserves for computer equipment are needed to assist the wastewater department in providing sustainment to their aging wastewater infrastructure.

6.4 Funding and Financing Options

Financing infrastructure projects is difficult for a community that has limited resources. As shown in Tables 5.2, 5.3, and 5.4, if the recommended alternatives were attempted to be financed with no subsidies, the City would be faced to increase their wastewater rates by $75.72, $55.97, $39.28 and per service per month, respectively. Projects such as these frequently consume a significant percentage of community financial resources. Consequently, to finance major capital improvement projects, other methods of obtaining capital must be investigated.

6.5 Federal Loans / Grants

Federal agencies such as the US Department of Agriculture's Rural Development/Rural Utility Service (RD/RUS) have both grant and loan funds available for financing improvements. A preliminary engineering report and pre-application, along with certain other information, is required before a community can submit a full application for project funding.

RD/RUS is the primary federal agency that funds local infrastructure projects. There are other federal agencies that do assist local communities under "special" circumstances. Some of these agencies include the Federal Emergency Management Agency (FEMA), the Economic Development Administration (EDA) and the US Department of Housing and Urban Development (HUD). However, these agencies typically do not become involved in funding projects unless there has been a disaster, or a major economic development activity is forthcoming.

6.6 State Loans / Grants

The State of South Dakota has several programs that can provide financial assistance for community improvements. The programs are operated through various departments of state government. Some are financed with 100% state resources; some use a combination of state and federal funds, while others are federal "pass-through" funds.

6.7 SD DENR PROGRAMS

SD DENR has a low interest loan and grant program called the Consolidated Water Facilities Construction Program (CWFCP). This program was established in 1986 by combining several existing grant and loan programs. It is funded entirely with state monies and is designed to provide financial assistance through grants and loans for water and wastewater projects throughout the state.

Additionally, the state administers the State Revolving Loan (SRF) fund. The SRF program was established to provide low interest loans to governmental entities for drinking water, clean water, and non-point source pollution control projects. The amount of funds available is dependent upon the annual appropriations from the US Congress and the amount of funds previously distributed from the beginning of the year.

6.8 GOED PROGRAM

The Governor's Office of Economic Development (GOED) administers the Community Development Block Grant (CDBG) program. This program utilizes the US Department of Housing and Urban Development (HUD) small cities program funding. CDBG funds may be used for a variety of community development activities, including water and sewer system renovations and rehabilitation. Emphasis of this program is to provide benefits for low and moderate-income people. Several communities qualify for funds from this program; however, an income survey may be necessary to verify eligibility.

6.9 OTHER SOURCES FOR FINANCING

The predominant method to finance capital improvement projects is through state and federal funding agencies, such as SDDENR and USDA-RD. However, there are other resources and programs available that can be used to assist communities in financing projects such as the one being considered by the community. It is in the best interests of the community to explore as many funding sources as possible to maximize grant dollar possibilities.

6.9.1 PAY AS YOU GO

For small communities, the most common method of financing needed improvements is the "pay-as-you-go" method. This method obtains revenue from general taxation, fees, service charges, special funds and/or special assessments. The advantages of this method are:

1. No interest payments; and
2. Greater budget flexibility.

Disadvantages of this method are:

1. Inequities between age groups (older citizens pay for a share of the project and younger citizens who may not have paid any of the costs realize greater benefits simply because of greater life spans);

2. Difficulty in generating large amounts of capital that is often required for large scale capital improvements; and

3. Large-scale capital improvements often cannot be constructed efficiently by phased construction.

6.9.2 RESERVE FUNDS

A variation of the “pay-as-you-go” method is using reserve fund financing. Communities using this method accumulate funds in advance for construction of needed capital improvements. This accumulation may be the result of surplus operating funds that are allowed to remain in the operating budget from year to year. These funds are often “earmarked” for a specific purpose. It may also be revenues from a certain percentage of the water or sewer rate that are specifically placed in a depreciation account. Financing projects in this manner is often attractive to communities.

This method has disadvantages. The most obvious drawback is that the fund has to be established for a length of time to allow it to generate sufficient capital for a substantial project. Also, good management is required to ensure that the investment pays an adequate return. If the interest generated on the investment is not greater than the inflation rate, then gains in the accumulation of the fund may be lost to inflation.

6.9.3 SALES TAX

Sales taxes can also be used to finance capital improvements. State statues allow a city to dedicate sales tax revenues to capital improvement construction. A long-range plan can be developed to allow capital improvements to be constructed in phases. As revenue is generated each year, a segment of the overall plan is constructed. Many communities are currently using this method of constructing improvements.

6.9.4 BONDS

Another method of generating revenue for improvements is through the sale of bonds on the private bond market. Three different types of bonds are frequently used to finance capital improvement projects. Each has different requirements and will need the involvement of legal counsel. The three types are General Obligation (GO), Revenue, and Special Assessment bonds.

6.9.5 GO BONDS

GO bonds always require a bond election, with a 60% majority vote needed, because these bonds pledge the taxing authority of the community to repay the bond. GO bonds typically have lower interest rates than Revenue bonds, due to the fact that they are backed by the taxing authority of the community.

6.9.6 REVENUE BONDS

Revenue bonds, which pledge revenue generated from the project, are often sold to finance capital improvements. These bonds do not require a bond election, but as with

any action of a governmental body, the enabling ordinance must be approved by the board.

6.9.7 SPECIAL ASSESSMENT BONDS

The final type of bond typically used is the Special Assessment bond. These bonds have a limited payback period. Assessment for principal and interest repayment is levied against adjacent owners over a given period of years. These special assessments are collected with property tax payments. Street improvements are frequently financed through the use of special assessment bonds.

6.10 SUMMARY OF FINANCING OPTIONS

Typically, no single funding program provides 100% of funding to finance a project. In most cases, a combination of various low interest loans and grant offers are frequently "packaged" together to satisfactorily finance capital improvements.

6.11 FUNDING RECOMMENDATIONS

Due to the cost of the proposed improvements and the limited amount of local finances available, this report recommends that the Town of Bison should:

1. Develop a capital finance plan with the aid of Black Hills Council of Local Governments or Midwest Assistance Program. Evaluate Town financial resources, rate structure and various funding sources available to construct capital improvement projects. Investigate if rate increases, debt restructuring, or other funding options may be used to finance all or part of the proposed project.

2. Complete funding applications for financial assistance to SRF and Clean Water Funding Programs within SD DENR, as well as, USDA's Rural Development / Rural Utility Service Water and Sewer Program, and the SD GOED Community Development Block Grant Program.

Appendix A
Environmental Assessment Letters and Maps

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DENR
SOUTH DAKOTA

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

June 19, 2020

Marcella Reece
Brosz Engineering
3030 Airport Road, Suite A, PO Box 23
Pierre, SD, 57501

Re: Environmental Review – Town of Bison Wastewater Improvements, Perkins County, SD

Dear Ms. Reece:

The South Dakota Department of Environment and Natural Resources' (DENR) Ground Water Quality Program has reviewed the above-referenced project for potential impacts to ground water quality. Based on the information submitted in your letter, dated June 11, 2020, DENR does not anticipate adverse impacts to ground water quality by this project.

If construction for this project disturbs one or more acre(s) of soil, a storm water permit may be required. For more information or to obtain a storm water permit, please contact the Department at 1-800-SD-Storm or visit: http://denr.sd.gov/des/sw/StormWaterandConstruction.aspx.

There have been numerous petroleum and other chemical releases throughout the state. Of the releases reported to DENR, we have identified fifteen release cases in the vicinity of your project. All these cases are within the project area. A table with the release information is enclosed. However, the locational information provided to us regarding releases is sometimes inaccurate or incomplete. If you would like to do more research, additional information on reported releases in South Dakota may be obtained at the following website: https://apps.sd.gov/NR42InteractiveMap

In the event that contamination is encountered during construction activities or is caused by the construction activity, Town of Bison, or its designated representative, must report the contamination to DENR at 605-773-3296. Any contaminated soil encountered or caused by the construction must be temporarily stockpiled and sampled to determine disposal requirements, and the construction materials used in the contaminated area should be evaluated for chemical compatibility and adjusted accordingly.

Finally, the site lies within a Zone A Source Water Protection Area. DENR recommends contacting local county and government officials regarding potential requirements and restriction that may apply to development within the source water area

Thank you for providing DENR the opportunity to comment on this project. If you have any questions regarding the information provided, please contact me at 605-773-3296.

Sincerely,

Andrew Fox
Environmental Scientist I
Ground Water Quality Program

Enclosure

c: Kelly Serr, Perkins Emergency Manager, Bison, SD

Table 1 - Known releases that may impact the Town of Bison Watewater Improvements, as of June 19, 2020.

DENR ID	Site Name	City	County	Street	Material	Status	R1	Latitude	Longitude
2001413	Clean ATP - Bison Airport	Bison	Perkins	Southwest Corner of Town		C	KM	45.519456	-102.466273
2002.196	ATP - Perkins County Highway Department	Bison	Perkins	305 Coleman Avenue	Petroleum	C	KM	45.521478	-102.465584
2001412	Clean ATP - Starr Property	Bison	Perkins	308 Rand		C	KM	45.5218	-102.464384
2013.187	LUST Trusy - Bison	Bison	Perkins	West at Colman and Main St	Petroleum	C	ZB	45.522592	-102.465148
96.212	Bison Implement - Tank Removals	Bison	Perkins	201 Main Street	Petroleum	NFA	KH	45.522867	-102.465131
91.188	Bison Implement (also 96.212)	Bison	Perkins	Main Street	Petroleum	C	KM	45.522899	-102.465252
90.407	Perkins County Weed Board	Bison	Perkins	Chem storaage Bldg. Near 101 Main Street	Pesticide 2, 4-D	C	TK	45.522804	-102.466008
2016.008	Clean ATP - Perkins County Courthouse	Bison	Perkins	100 East Main Street		C	TF	45.523022	-102.464327
2001.534	ATP - Penor Texaco	Bison	Perkins	2nd Avenue	Petroleum	NFA	KM	45.524031	-102.465219
2007.099	ATP Gene Smith Property	Bison	Perkins	509 3rd Avenie East	Gasoline	NFA	TF	45.524237	-102.461573
2001415	Clean ATP - Prezler Property	Bison	Perkins	Baird Street and 1st Avenue		C	KM	45.525833	-102.463907
90.235	Grand Electric - REA - Tank Removal	Bison	Perkins	801 Colman Avenue	Gasoline	NFA	TF	45.526098	-102.46538
92954	United Parcel Service	Bison	Perkins	2nd Avenue		C	JA	45.52799	-102.465056
93.52	Lila White LUST Trust Project	Bison	Perkins	Hwy 20, N end of town	Petroleum	NFA	DM	45.531014	-102.465852
2009017	Clean ATP - SDDOT, Bison	Bison	Perkins	17854 SD Hwy 20		C	TF	45.531564	-102.467343

Status: C = Closed, NFA = No Further Action, O/M = Open/Monitoring, I=Inactive, T=Tracking

R1 = DENR reviewer's initials

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

June 16, 2020

Marcella Reese
Brosx Engineering Inc.
3030 Airport Road
Suite A
PO Box 23
Pierre, SD 57501

RE: Town of Bison Wastewater Improvement Project(s) Environmental Assessment
BEI Job No. S19-P567

Dear Marcella,

The Department of Game, Fish and Parks has reviewed the above project involving wastewater improvements in Bison, South Dakota.

Based on the information provided, there is no anticipated significant impact to fish and wildlife resources.

If you have any questions, please feel free to contact me at 605-773-6208.

Sincerely,

Hilary Morey
Environmental Review Senior Biologist
523 East Capitol Avenue
Pierre, SD 57501
hilary.morey@state.sd.us

Waste Management Determination
Hazardous Waste/Solid Waste/Asbestos
It appears, based on the information provided, that this project will have little or no impact on the waste management in this area.
Approved By: James L. Wendte
Date: June 19, 2020
South Dakota Department of Environment & Natural Resources
Phone: (605) 773-3153 Fax: (605) 773-6035

Brosz ENGINEERING, INC.

RECEIVED
JUN 15 2020
Dept. of Environment and Natural Resources Waste Management

June 11, 2020

Jim Wendte - Administrator
Waste Management Program
SD DENR
523 E. Capitol Avenue
Pierre, SD 57501

RE: Town of Bison Wastewater Improvement Project(s) Environmental Assessment; Request for Comments
BEI Job No. S19-P567

Dear Mr. Wendte:

Brosz Engineering is assisting the Town of Bison in gathering information for an environmental assessment on a proposed wastewater improvement project. Although no funding applications have been completed at this stage of the planning process, the community is anticipating applying for loans and grants funded by various state and federal agencies. These agencies include, but are not limited to, the United States Department of Agriculture Rural Development – Rural Utilities Water and Waste program, South Dakota State Revolving Loan Program, and Community Development Block Grant (CDBG) funding that is available through the Small Cities Program, administered by the State of South Dakota.

The proposed wastewater system improvements could include the replacement of sanitary sewer collection piping, improvements to the wastewater treatment facility, or a combination thereof.

As part of the planning process, it must be determined if the proposed construction will have any significant environmental impact. The project would be located within the community limits of Bison, in Sections 13 Township 18N, Range 13E of Perkins County. All construction activities will take place in previously disturbed areas. Therefore, it is believed that there will be no significant impact on the environment. Please find enclosed a site map, which indicates the location of Bison, the town seeking the proposed improvements.

If your agency has any concern with environmental or permitting issues that may impact the proposed construction, or if you have any technical questions or concerns about the project, do not hesitate to contact me.

A written response is requested within 30 days. If comments are not received by July 16, 2020, the Town will assume that your agency will accept a determination of no significant impact and will proceed with the remainder of the environmental assessment process at the appropriate stage of project development. No environmental impact statement will be prepared.

The Town anticipates completing the construction of the project sometime in 2021 or 2022. Thank you for your prompt attention and cooperation in this matter.

Sincerely,
Brosz Engineering, Inc.

Marcella Reese

Marcella Reese
Engineering Intern
Brosz Engineering, Inc.
(605) 224-1123
marcellar@broszengineering.com

Enclosure

Brosz ENGINEERING, INC.

RECEIVED
JUN 15 2020
AIR QUALITY PROGRAM

June 11, 2020

AIR QUALITY DETERMINATION
It appears, based on the information, that the project will have little or no impact on the air quality in this area. This project is approved.
Approved By: Anthony Rueb
Date: 6/15/2020
(605) 773-3151
South Dakota Department of Environment
And Natural Resources

Rick Boddicker
Air Quality Program
SD DENR
523 E. Capitol Avenue.
Pierre, SD 57501

RE: Town of Bison Wastewater Improvement Project(s) Environmental Assessment; Request for Comments
BEI Job No. S19-P567

Dear Mr. Boddicker:

Brosz Engineering is assisting the Town of Bison in gathering information for an environmental assessment on a proposed wastewater improvement project. Although no funding applications have been completed at this stage of the planning process, the community is anticipating applying for loans and grants funded by various state and federal agencies. These agencies include, but are not limited to, the United States Department of Agriculture Rural Development – Rural Utilities Water and Waste program, South Dakota State Revolving Loan Program, and Community Development Block Grant (CDBG) funding that is available through the Small Cities Program, administered by the State of South Dakota.

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The Town anticipates completing the construction of the project sometime in 2021 or 2022. Thank you for your prompt attention and cooperation in this matter.

Sincerely,
Brosz Engineering, Inc.

Marcella Reese

Marcella Reese
Engineering Intern
Brosz Engineering, Inc.
(605) 224-1123
marcellar@broszengineering.com

Enclosure

Brosz ENGINEERING, INC.

June 11, 2020

Mark Mayer - Administrator
Drinking Water Program
SD DENR
523 E. Capitol Avenue
Pierre, SD 57501

RE: Town of Bison Wastewater Improvement Project(s) Environmental Assessment; Request for Comments
BEI Job No. S19-P567

Dear Mr. Mayer:

Brosz Engineering is assisting the Town of Bison in gathering information for an environmental assessment on a proposed wastewater improvement project. Although no funding applications have been completed at this stage of the planning process, the community is anticipating applying for loans and grants funded by various state and federal agencies. These agencies include, but are not limited to, the United States Department of Agriculture Rural Development – Rural Utilities Water and Waste program, South Dakota State Revolving Loan Program, and Community Development Block Grant (CDBG) funding that is available through the Small Cities Program, administered by the State of South Dakota.

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Brosz ENGINEERING, INC.

June 11, 2020

Patrick Snyder
Surface Water Quality Program
SD DENR
523 E. Capitol Avenue
Pierre, SD 57501

RE: Town of Bison Wastewater Improvement Project(s) Environmental Assessment; Request for Comments
BEI Job No. S19-P567

Dear Mr. Snyder:

Brosz Engineering is assisting the Town of Bison in gathering information for an environmental assessment on a proposed wastewater improvement project. Although no funding applications have been completed at this stage of the planning process, the community is anticipating applying for loans and grants funded by various state and federal agencies. These agencies include, but are not limited to, the United States Department of Agriculture Rural Development – Rural Utilities Water and Waste program, South Dakota State Revolving Loan Program, and Community Development Block Grant (CDBG) funding that is available through the Small Cities Program, administered by the State of South Dakota.

The proposed wastewater system improvements could include the replacement of sanitary sewer collection piping, improvements to the wastewater treatment facility, or a combination thereof.

As part of the planning process, it must be determined if the proposed construction will have any significant environmental impact. The project would be located within the community limits of Bison, in Sections 13 Township 18N, Range 13E of Perkins County. All construction activities will take place in previously disturbed areas. Therefore, it is believed that there will be no significant impact on the environment. Please find enclosed a site map, which indicates the location of Bison, the town seeking the proposed improvements.

SCANNED

If your agency has any concern with environmental or permitting issues that may impact the proposed construction, or if you have any technical questions or concerns about the project, do not hesitate to contact me.

A written response is requested within 30 days. If comments are not received by July 16, 2020, the Town will assume that your agency will accept a determination of no significant impact and will proceed with the remainder of the environmental assessment process at the appropriate stage of project development. No environmental impact statement will be prepared.

The Town anticipates completing the construction of the project sometime in 2021 or 2022. Thank you for your prompt attention and cooperation in this matter.

Sincerely,
Brosz Engineering, Inc.

Marcella Reese

Marcella Reese
Engineering Intern
Brosz Engineering, Inc.
(605) 224-1123
marcellar@broszengineering.com

Enclosure

SURFACE WATER QUALITY DETERMINATION
It appears, based on the information provided, that this project will have little or no impact on the surface water quality in this area. This project is approved.
Approved By: Shannon Minerich
Date: 7/09/2020
(605) 773-3351 FAX (605) 773-5286
SOUTH DAKOTA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

SOUTH DAKOTA
DEPARTMENT
OF PUBLIC SAFETY
prevention ~ protection ~ enforcement
EMERGENCY MANAGEMENT

118 WEST CAPITOL AVENUE • PIERRE, SOUTH DAKOTA 57501
P: 605.773.3231
F: 605.773.3580

July 16, 2020

Marcella Reese
Engineering Intern
Brosz Engineering
3030 Airport Road, Suite A
Pierre, SD 57501

RE: Town of Bison Wastewater Environmental Review

Ms. Reese:

Thank you for advising the South Dakota Office of Emergency Management of the proposed wastewater improvements in the Town of Bison, South Dakota. The State of South Dakota promotes proper floodplain management guidance and works with communities to ensure that local officials are providing the most accurate information for development to residents and businesses. This means ensuring that local communities are reviewing proposed development projects for compliance with their adopted floodplain management ordinance and the Code of Federal Regulations 44 Part 60.3.

In reviewing the Federal Emergency Management Agency's National Flood Insurance Program (NFIP) database, it was determined there are no designated Special Flood Hazard Areas (SFHA) in the Town of Bison. Therefore, National Flood Insurance Program building and SFHA construction requirements are not applicable to the project.

Should you have any additional questions regarding this information or need further guidance on floodplain management regulations, please feel free to contact me at (605) 773-3231.

Sincerely,

Marc Macy, CFM
South Dakota Office of Emergency Management

USDA
United States Department of Agriculture

July 15, 2020

Ms. Marcella Reese
Engineering Intern
Brosz Engineering, Inc.
PO Box 23
Pierre, South Dakota 57501

RE: Environmental Review for:
Bison Wasterwater Improvement Project_BEI No. S19-P567

Dear Ms. Reese:

Thank you for the opportunity to provide a Farmland Protection Policy Act (FPPA) review on this project. The project as outlined will have **no impact** on prime or important farmland.

If you have any questions, please contact me at (605) 858-6670.

Sincerely,

Tim Nordquist

TIM NORDQUIST
Conservationist Agronomist

cc:
Nathan Jones, State Soil Scientist, NRCS, Huron SO
Jessica Michalski, State Resource Conservationist, NRCS, Huron SO

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Appendix B

SDDENR SWD Permit, SOB, Inspection Reports

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Permit No.: SD0022411

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Surface Water Discharge Permit
Under The South Dakota Surface Water Discharge System

In compliance with the provisions of the South Dakota Water Pollution Control Act and the Administrative Rules of South Dakota, Article 74:52,

The town of Bison

is directed by the South Dakota Department of Environment and Natural Resources to have **no discharge** from its wastewater treatment facility located in the Southwest ¼ of Section 13, Township 18 North, Range 13 East, in Perkins County, South Dakota (Latitude 45.518528°, Longitude -102.476472°), in accordance with the requirements as contained in the provisions of this permit. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the South Dakota Water Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

This permit shall become effective September 1, 2019.

This permit and the authorization to discharge shall expire at midnight, June 30, 2024.

Signed this 13 day of August, 2019.

Authorized Permitting Official

Hunter Roberts
Secretary
Department of Environment and Natural Resources

TABLE OF CONTENTS

1.0 DEFINITIONS

"30-day (and monthly) Average" means the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

"7-day (and weekly) Average" means the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. The calendar week that begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.

"Acute Toxicity" occurs when in the LC_{50} test when 50 percent or more mortality is observed for either species at any effluent concentration. Mortality in the control must simultaneously be 10 percent or less for the effluent results to be considered valid.

The "**Approval Authority"** is the Secretary of the South Dakota Department of Environment and Natural Resources.

"ARSD" means the Administrative Rules of South Dakota. These often referred to as "Standards".

An **"Authorized Release"** is a discharge from a permitted outfall that meets all permit conditions and effluent limits.

"Biosolids" means any sewage sludge or material derived from sludge that can be beneficially used. Beneficial use includes, but is not limited to, land application to agricultural land, forest land, a reclamation site or sale or give away to the public for home lawn and garden use.

"BOD_5" means Five-Day Biochemical Oxygen Demand. BOD is a measurement of the amount of oxygen utilized by the decomposition of organic material, over a specified time period (usually 5 days) in a sample.

A **"Bypass"** is the intentional diversion of waste streams from any portion of a collection system or treatment facility other than the permitted outfall(s). Bypasses may result in releases from the sanitary sewer collection system (see **"Sanitary Sewer Overflow"**) or emergency releases from the treatment facility (see **"Emergency Discharge"**). If a bypass results in a release of wastewater, it shall be sampled and reported as either a sanitary sewer overflow from the collection system or an emergency discharge from the treatment facility.

"Chronic Toxicity" occurs when in the IC_{25} test when the survival, growth, or reproduction, as applicable, for either test species, at the effluent dilution(s) designated in this permit, is significantly less (at the 95 percent confidence level) than that observed for the control specimens.

"Composite Samples" shall be flow proportioned. The composite sample shall contain at least four samples collected over the compositing period. Unless otherwise specified, the time between

the collection of the first sample and the last sample shall not be less than six hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

1. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

2. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

3. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

4. Continuous collection of sample, with sample collection rate proportional to flow rate.

"Daily Maximum (Daily Max.)" is the maximum value allowable in any single sample or instantaneous measurement.

"DMR" means Discharge Monitoring Report, EPA Form 3320-1, or a report filed electronically by an EPA-approved electronic system, or other forms provided by the Department which are used to report sampling data.

An **"Emergency Discharge"** is a discharge from the treatment or containment system through a release structure or over or through retention dikes or walls. An emergency discharge is distinguished from a sanitary sewer overflow in that a sanitary sewer overflow discharges wastewater prior to reaching the treatment or containment system. An emergency discharge is an enforceable violation of the permit unless it is an allowable bypass that does not cause effluent limitations to be exceeded, an anticipated bypass approved by the Secretary, or an unanticipated bypass allowed under Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.

"EPA" or **"US EPA"** means United States Environmental Protection Agency.

A **"Grab Sample**,**"** for monitoring requirements, is a single "dip and take" sample collected at a representative point in the discharge stream.

Inhibition Concentration, 25 Percent (IC_{25}) is a point estimate of the toxicant concentration that would cause a 25-percent reduction in a non-lethal biological measurement (e.g., reproduction or growth), calculated from a continuous model (i.e., Interpolation Method).

An **"Industrial User"** is a non-domestic source of pollutants discharged into a publicly owned treatment works.

An **"Instantaneous Measurement**,**"** for monitoring requirements, is a single reading, observation, or measurement either taken at the facility or within 15 minutes of the sample.

"Instream Waste Concentration (IWC)" is the concentration of a toxicant in the receiving water after mixing. It is also referred to as the receiving water concentration (RWC).

"Lethal Concentration, 50 Percent (LC_{50})" is the toxic or effluent concentration that would cause death in 50 percent of the test organisms over a specified period of time.

"MGD" is the measure of flow rate meaning million gallons per day.

"Mixing Zone (Zone of mixing)" is an area in a stream where an effluent or discharge mixes with the upstream water under ARSD 74:51:01:01. A mixing zone for wastewater discharges to flowing waters is allowed under ARSD 74:51:01:26. Lakes are not allowed a mixing zone under ARSD 74:51:01:27.

"No Observed Effect Concentration (NOEC)" is the highest tested concentration of an effluent or a toxicant that causes no observable adverse effect on the test species (i.e., the highest concentration of toxicant at which the values for the observed responses are not statistically different from the controls). NOEC is determined using hypothesis testing.

"pH" is the measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.

"PTI" means Preliminary Toxicity Investigation. Up to a 30-day period where the permittee investigates the cause(s) of a whole effluent toxicity exceedance and if the toxicity is known, includes a proposal for its elimination.

A **"Publicly-Owned Treatment Works"** or **"POTW"** is any device or system used in the treatment, including recycling and reclamation, of municipal sewage or industrial waste of a liquid nature that is owned by the state or a municipality. This term includes sewers, pipes, or other conveyances only if they convey wastewater to a publicly owned treatment works providing treatment.

"Reasonable Potential (RP)" is the likelihood that an effluent will cause or contribute to an excursion above a water quality standard based on a number of factors, including the use of data (e.g. whole effluent toxicity test data). In the context of this document, references to RP and WET limits include both lethal and sub-lethal effects.

A **"Sanitary Sewer Overflow"** or **"SSO"** is the intentional or unintentional discharge of untreated sewage from the sanitary sewer collection system, including sewer lines, manholes, lift stations, etc. An SSO is an enforceable violation of the permit unless it is an allowable bypass that does not cause effluent limitations to be exceeded, an anticipated bypass approved by the Secretary, or an unanticipated bypass allowed under Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.

"SDDENR" means the South Dakota Department of Environment and Natural Resources.

"Secretary" means the Secretary of the South Dakota Department of Environment and Natural Resources, or authorized representative.

"Severe Property Damage" is substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural

resources that 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.

"Sewage Sludge" is any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes but is not limited to solids removed during primary, secondary or advanced wastewater treatment, scum, septage, portable toilet pumpings, and sewage sludge products. Sewage sludge does not include grit, screenings, or ash generated during the incineration of sewage sludge.

A **"Significant Industrial User"** is defined as an industrial user discharging to a publicly-owned treatment works (POTW) that satisfies any of the following:

1. Is subject to Categorical Pretreatment Standards under ARSD Chapter 74:52:10 (a.b.r. 40 CFR 403.6 and 40 CFR chapter I, subchapter N);

2. Discharges an average of 25,000 gallons per day or more of process wastewater to the publicly owned treatment works (excluding sanitary, non-contact cooling water, and boiler blowdown wastewater);

3. Contributes a process wastewater that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the publicly owned treatment works; or,

4. Is designated as such by the Secretary on the basis that the Industrial User has a reasonable potential for adversely affecting the publicly owned treatment works or for violating any pretreatment standard or requirement.

"Surface Water Discharge (SWD) Permitting Program" is the state program that regulates the discharge of pollutants into the state's waters. This is the state's implementation of the federal NPDES program.

"Test Acceptability Criteria (TAC)" are specific criteria for determining whether toxicity test results are acceptable, pursuant to EPA's WET test methods in 40 CFR 136 (additional TAC may be established by the Department). The effluent and reference toxicant must meet specific criteria as defined in the test method.

"Toxic Unit - Acute (TU_a)" is 100 times the reciprocal of the effluent concentration that causes 50 percent of the organisms to die in an acute toxicity test ($TUa = 100/LC_{50}$) (see LC_{50}).

"Toxic Unit - Chronic (TU_c)" is 100 times the reciprocal of the effluent concentration that causes no observable effect on the test organisms in a chronic toxicity test ($TUc = 100/IC_{25}$).

"Toxicity Identification Evaluation (TIE)" is a set of site-specific procedures used to identify the specific chemical(s) causing effluent toxicity.

"Toxicity Reduction Evaluation (TRE)" is a site-specific study conducted in a step-wise process to identify the causative agents of effluent toxicity, isolate the source of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity after the control measures are put in place.

"TSS" means Total Suspended Solids. TSS is a measure of the filterable solids present in a sample.

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits 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.

"Water Quality-based Effluent Limit (WQBEL)" is a NPDES permit limit that is developed to assure protection of aquatic life or human health consistent with applicable State water quality standards.

"Whole Effluent Toxicity (WET)" is the total toxic effect of an effluent measured directly with a toxicity test.

"Whole Effluent Toxicity (WET) Test" is a procedure using living organisms to determine whether a chemical or an effluent is toxic. A toxicity test measures the degree of the effect of a specific chemical or effluent on exposed test organisms.

2.0 PERMIT COVERAGE

2.1 Permit Transfers

1. Coverage under this permit may be transferred to a new permittee if:

    a. The signatory authority notifies the Secretary at least 30 days in advance of the proposed transfer date;

    b. The notice includes a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

    c. The new permittee submits a Certification of Applicant form certifying the new permittee is qualified to perform the obligations of a permit holder in accordance with South Dakota Codified Law 1-40-27.

2. The Secretary will notify the existing and new permittee of his or her intent to transfer, modify, or revoke and reissue the permit based on the information received and other permit information.

2.2 Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limits (and compliance schedules, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving waters applicable to this permit are modified in such a manner as to require different effluent limits than contained in this permit;

2. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted that calls for different effluent limits than contained in this permit;

3. Effluent Guidelines: Effluent limit guidelines are promulgated or revised for point sources covered by this permit;

4. Total Maximum Daily Load: Additional controls in the permit are necessary to implement a total maximum daily load approved by the Secretary and/or EPA;

5. Noncompliance: The discharger is a significant contributor of pollution to waters of the state, presents a health hazard, or is in noncompliance with the conditions of the permit;

6. Whole Effluent Toxicity: Whole effluent toxicity is detected in the discharge; this permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity (WET) testing, a WET limit, a compliance date, additional or modified numerical limits, or any other conditions related to the control of toxicants if toxicity is detected during the life of this permit; or

7. Other Changes: Other conditions or standards change so that the discharge no longer qualifies for this permit, such as the permittee being designated as a major discharger, changes in necessary influent or effluent pollutant monitoring, additional industrial pretreatment requirements become applicable to the permittee, or other items.

2.3 Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain coverage under a new permit. The permit application must be submitted at least 180 days before the expiration date of this permit. Periodically during the term of this permit and at the time of reissuance, the permittee may be requested to reaffirm its eligibility to discharge under this permit.

2.4 Continuation of the Expired Permit

An expired permit continues in full force and effect until a new permit is issued. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must submit an application at least 180 days before the expiration date of the permit.

2.5 Property Rights

1. The Secretary's issuance of this permit, adoption of design criteria, and approval of plans and specifications, does not convey any property rights of any sort, any exclusive privileges, any authorization to damage, injure or use any private property, any authority to invade personal rights, any authority to violate federal, state, or local laws or regulations, or any taking, condemnation or use of eminent domain against any property owned by third parties.

2. The State does not warrant that the permittee's compliance with this permit, design criteria, approved plans and specifications, and operation under this permit, will not cause damage, injury or use of private property, an invasion of personal rights, or violation of federal, state or local laws or regulations. The permittee is solely and severably liable for all damage, injury or use of private property, invasion of personal rights, infringement of federal, state or local laws and regulations, or taking or condemnation of property owned by third parties, that may result from actions taken under the permit.

2.6 Permit Actions

The Secretary may modify, revoke and reissue, or terminate coverage under this permit for cause, including failure to comply with any provision of this permit or any condition imposed by the Secretary upon granting coverage under this permit. 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.

2.7 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.

3.0 EFFLUENT LIMITS

3.1 Prohibition of Bypass, Emergency Discharges, and SSOs

1. The permittee may allow bypasses to occur that do not result in a discharge and will not result in a violation of the effluent limits, but only if for essential maintenance to ensure efficient operation.

2. An emergency discharge, sanitary sewer overflow, or bypass is prohibited and the Secretary may take enforcement action against a permittee, unless:

   a. The emergency discharge, SSO, or bypass was unavoidable to prevent loss of life, threat to public health, personal injury, or severe property damage;

   b. There were no feasible alternatives to the emergency discharge, SSO, or 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 an emergency discharge, SSO, or bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

c. The permittee submitted notices as required in **Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.**

3. The permittee shall sample an emergency discharge or SSO for the parameters and at the frequencies listed in **Section 3.5 – Self-Monitoring Requirements - *Sanitary Sewer Overflows and Emergency Discharges***. The sample results shall be reported in accordance with the reporting requirements listed in **Section 4.1 – Reporting of Monitoring Results**.

4. The Secretary may approve an emergency discharge, SSO, or bypass, after considering its adverse effects, if the Secretary determines that it will meet the three conditions listed above in Paragraph 2.

5. If a bypass, emergency discharge, or sanitary sewer overflow occurs or is expected to occur, the permittee shall take the appropriate measures to minimize the discharge of pollutants. Such measures may include the closing of facilities that contribute wastewater to the sewer system until the discharge is terminated.

3.2 Proper Operation and Maintenance

1. The permittee shall at all times properly operate and maintain all facilities and treatment and control systems that are installed or used by the permittee to achieve compliance with the conditions of this permit or other conditions required by the Secretary upon issuance.

2. Proper operation and maintenance may include adequate laboratory controls and appropriate quality assurance procedures.

3. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

4. This may include the maintenance of freeboard levels of lagoons or holding ponds.

3.3 Inspection Requirements

The permittee shall inspect its wastewater treatment facility, outfall structures, and lift stations regularly as outlined below. The inspections shall be conducted to determine if a discharge is occurring, has occurred since the previous inspection, and/or if a discharge is likely to occur before the next inspection. In addition, the inspections shall be performed to determine if proper operation and maintenance procedures are being undertaken at the wastewater treatment facility and lift stations. The permittee shall maintain a notebook recording information obtained during the inspection.

1. **Facility Inspections.** The permittee shall inspect the facility and discharge location on at least a **monthly** basis. During a discharge, the permittee shall inspect the facility and discharge location on at least a **daily** basis. At a minimum, the notebook shall include the following:

a. Date and time of the inspection;

b. Name of the inspector(s);

c. The facility's discharge status;

d. The measured amount of freeboard or water depth in each pond;

e. Identification of operational problems and/or maintenance problems;

f. Recommendations, as appropriate, to remedy identified problems;

g. A brief description of any actions taken with regard to problems identified; and,

h. Other information, as appropriate.

2. The permittee shall maintain the notebook(s) for the facility and each lift station in accordance with proper record-keeping procedures and shall make the notebook(s) available for inspection, upon request, by the Secretary or the US EPA.

3.4 Compliance Schedule

The permittee shall achieve compliance with the effluent limits specified for discharges in accordance with the following schedule:

1. Submit a facility plan to SDDENR, identifying the steps the town will take to address pond repairs or alternatives:……..…….……..**June 1, 2020**
2. Submit quarterly progress reports on repairs, process modifications, equipment acquisition, other items specified in the Facility Plan beginning:…….....**October 1, 2020**
3. Submit plans and specifications for system upgrades and modifications to SDDENR for review and approval by:.……..……..**June 1, 2021**
4. Start construction of system upgrades, process modifications, or equipment acquisition by:……..……...…..**June 1, 2022**
5. Complete construction and startup of treatment system, process modifications, or equipment installation by:…….……..**March 31, 2023**

1. The milestones must be completed by the date specified. The permittee shall submit to the SDDENR a written notice of compliance or noncompliance with each milestone by the date specified above. If the permittee is not in compliance with the milestone, the notice shall include the cause of any noncompliance, any

remedial actions taken, and the probability of meeting the next scheduled requirement.

3.5 Self-Monitoring Requirements – *Sanitary Sewer Overflows and Emergency Discharges*

All sanitary sewer overflows and emergency discharges shall be monitored for the following parameters at the frequency and with the type of measurement indicated. Promptly upon discovery of an emergency discharge or sanitary sewer overflow, the discharge shall be monitored as shown below. Knowingly discharging or failing to report a discharge within a reasonable time from the permittee first learning of a discharge could subject the permittee to penalties as provided under the South Dakota Water Pollution Control Act. The permittee shall report the monitoring results in accordance with **Section 4.1 – Reporting of Monitoring Results.**

Effluent Parameter	Frequency	Reporting Values [1]	Sample Type [1]
Duration of Discharge, days	Monthly	Monthly Total [2]	Calculate
Total Flow, million gallons	Monthly	Monthly Total	Calculate
Flow Rate, MGD	Daily	Actual Value	Instantaneous
pH, standard units	Daily	Actual Value	Instantaneous [3, 4]
Water Temperature, °C	Daily	Actual Value	Instantaneous [4, 5]
Five-Day Biochemical Oxygen Demand (BOD_5), mg/L	Daily	Actual Value	Grab
Total Suspended Solids (TSS), mg/L	Daily	Actual Value	Grab
Ammonia-Nitrogen (as N), mg/L	Daily	Actual Value	Grab [4]
E. coli, no./100 mL	Daily	Actual Value	Grab

[1] See **Section 1.0 - Definitions**.

[2] The date and time of the start and termination of each discharge shall also be reported in the comment section of the DMR.

[3] The pH shall be taken within 15 minutes of sample collection with a pH meter. The pH meter must be capable of simultaneous calibration to two points on the pH scale that bracket the expected pH and are approximately three standard units apart. The pH meter must read to 0.01 standard units and be equipped with temperature compensation adjustment. Readings shall be reported to the nearest 0.1 standard units.

[4] The pH and temperature of the effluent shall be determined when ammonia-nitrogen (as N) samples are collected.

[5] The water temperature of the effluent shall be taken as a field measurement. Measurement shall be made with a mercury-filled, or dial type thermometer, or a thermistor. Readings shall be reported to the nearest whole degree Celsius.

3.6 Monitoring Procedures

1. Effluent samples taken in compliance with the monitoring requirements established under this permit shall be collected prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

2. Monitoring shall be conducted according to test procedures approved under ARSD Section 74:52:03:06 (a.b.r. 40 CFR, Part 136), unless other test procedures have been specified in this permit or approved by the Secretary. Analysis methods shall be sufficiently sensitive to ensure the minimum detection level for a pollutant is below the permit limit. If no sufficiently sensitive method is available, the method with the lowest minimum detection level shall be used.

3.7 Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit at the designated points, using test procedures approved under ARSD Section 74:52:03:06 (a.b.r. 40 CFR 136) or as specified in this permit, the results of this monitoring shall be used in determining compliance with this permit and reported to SDDENR.

3.8 Capacity, Management, Operation, and Maintenance Program

In the event that the Secretary notifies the permittee of the need to develop a capacity, management, operation, and maintenance program in order to address, reduce, or eliminate the frequency of sanitary sewer overflows or emergency discharges, the permittee shall develop and submit the program to the Secretary. The program shall, at a minimum, address the following areas:

1. Sewer management program: This program includes personnel organizational structure, training, communication information systems, noncompliance notification program, and other appropriate items;

2. Collection system operation program: This program includes operational budgeting, monitoring, safety, emergency preparedness and response, pump stations, operational recordkeeping, and other appropriate items;

3. Collection system maintenance program: This program includes maintenance budgeting, planned and unplanned maintenance; sewer cleaning; maintenance recordkeeping, parts and equipment inventory, and other appropriate items; and

4. Sewer system capacity evaluation: The capacity evaluation includes the following:

    a. System inventory (sewer locations, sizes, slopes, materials, age, condition, etc.);

b. Identification of problem areas (overflows, surcharged lines, basement backups, etc.);

c. Capacity evaluation of problem areas (utilizing flow and precipitation records, infiltration and inflow investigation, manhole and pipe inspections and televising, smoke and dye testing, and building inspections); and

d. Sewer rehabilitation recommendations.

5. Timelines: This program shall identify timelines and specific dates for completing any identified changes or improvements.

6. SDDENR Approval: The permittee shall submit the program to SDDENR for approval. Upon approval, the permittee shall implement the program.

4.0 REPORTING & RECORD KEEPING REQUIREMENTS

4.1 Reporting of Monitoring Results

1. Effluent results shall be reported on Emergency Discharge and SSO Reporting Summary Forms in Appendix A.

2. All reports must be submitted **no later than the 28th day of the month** following the completed reporting period.

3. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with **Section 4.5 – Signatory Requirements** and submitted to the Secretary at the following address:

South Dakota Department of Environment and Natural Resources
Surface Water Quality Program
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3182

In accordance with 40 CFR, Part 122, all permit reports shall be submitted electronically starting no later than **December 21, 2020.**

4. In accordance with SDCL 1-40-39, the Secretary is authorized to accept a document with an electronic signature. SDDENR shall provide for the authenticity of each electronic signature by adhering to any standards established by the South Dakota Bureau of Information and Telecommunications pursuant to SDCL 53-12-47 and 53-12-50 or any other standards established by rules promulgated pursuant to SDCL Chapter 1-26.

4.2 Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements

1. Any possible or actual endangerment to health or the environment attributed to an effluent violation, bypass, emergency discharge, or sanitary sewer overflow shall be reported as soon as possible, but no later than 24 hours after becoming aware of the circumstances as follows:

    a. During regular business hours (8:00 a.m. - 5:00 p.m. Central Time), the report shall be made at (605) 773-3351.

    b. Outside of normal business hours, the permittee shall contact the South Dakota Emergency Management at (605) 773-3231.

2. Effluent violations, bypass, sanitary sewer overflows, and emergency discharges that do not meet the conditions above shall be reported to the Secretary within 24 hours from the time the permittee becomes aware of the circumstances as follows:

    a. During regular business hours (8:00 a.m. - 5:00 p.m. Central Time), the report shall be made at (605) 773-3351.

    b. Outside of normal business hours, the permittee shall leave a message at 1-800-GET-DENR (1-800-438-3367).

3. The permittee shall submit notice of bypass as follows:

    a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Secretary at least 10 days before the date of the bypass.

    b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass to the secretary at (605) 773-3351 by the first workday (8:00 a.m. – 5:00 p.m. Central Time) following the day the permittee became aware of the circumstances.

4. The Secretary may require the permittee to notify the general public or downstream users that could be or will be impacted by the effluent violation, bypass, emergency discharge, or SSO.

    a. In making the decision to require public notification, the Secretary will consider the potential impacts as a result of the effluent violation, bypass, emergency discharge, or SSO, the downstream beneficial uses (such as drinking water or recreation), and the potential for public contact.

    b. If required by the Secretary, the permittee shall notify the public and/or downstream users as soon as possible, but in no case more than 24 hours after the effluent violation, bypass, emergency discharge, or SSO begins.

5. In addition to verbal notification, the permittee shall submit a written report of the circumstances regarding the effluent violation, bypass, sanitary sewer overflow, or emergency discharge to the Secretary. The permittee shall use the Emergency

Discharge and SSO Reporting Summary Form in Appendix A to report an emergency discharge or SSO. Effluent violations shall be reported on the Discharge Monitoring Report forms required in **Section 4.1 – Reporting of Monitoring Results**.

a. Reports shall be submitted in accordance with **Section 4.1 – Reporting of Monitoring Results**.

b. The written submission shall contain:

i. A description of the event and its cause;
ii. The period of the event, including exact dates and times;
iii. Where the wastewater was discharged;
iv. The estimated time the event is expected to continue if it has not been corrected;
v. Any adverse effects, such as fish kills;
vi. If public notification was required, describe how the public was notified of the discharge; and
vii. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the event.

6. The written report shall be submitted by t**he 28th day of the following month**. The Secretary may require a written report to be submitted sooner or may require additional information if the discharge has the potential to impact human health or the environment.

4.3 Other Noncompliance Reporting Requirements

1. The permittee shall submit a written report of all instances of permit noncompliance not reported under **Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements.**

a. Reports shall be submitted in accordance with **Section 4.1 – Reporting of Monitoring Results**.

b. The written submission shall contain:

i. A description of the event and its cause;
ii. The period of the event, including exact dates and times;
iii. Where the wastewater was discharged;
iv. The estimated time the event is expected to continue if it has not been corrected;
v. Any adverse effects, such as fish kills;
vi. If public notification was required, describe how the public was notified of the discharge; and
vii. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the event.

2. The written report shall be submitted by the 28th day of the following month. The Secretary may require a written report to be submitted sooner or may require

additional information if the discharge has the potential to impact human health or the environment.

4.4 Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or names of the individuals who performed the sampling or measurements;

3. The dates analyses were performed;

4. The time analyses were initiated;

5. The initials or names of individuals who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and,

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

4.5 Signatory Requirements

1. All permit applications, reports or information submitted to the Secretary shall be signed and certified by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Secretary shall be signed by a person described in Paragraph 1 of this section or by a duly authorized representative of that person. A person is a duly authorized representative only if:

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

    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of superintendent or equivalent responsibility, or an individual or position having overall responsibility for environmental matters. A duly authorized representative may be either a named individual or any individual occupying a named position.

3. If an authorization under Paragraph 2 a. above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the Secretary.

4. Any person signing a document under this section shall include 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.

4.6 Retention of Records

1. The permittee shall retain records of all monitoring information and other data required by this permit. This includes:

   a. Data collected on site;

   b. Copies of all Discharge Monitoring Report Forms;

   c. A copy of the permit;

   d. All calibration and maintenance records;

   e. All original strip chart recordings for continuous monitoring instrumentation;

   f. Copies of all other reports required by this permit; and

   g. Records of all data used to complete the application for this permit.

2. This information must be retained for a period of at least **three years** from the date of the sample, measurement, report, or application. This period may be extended by request of the Secretary at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this permit must be maintained on site during the duration of the permitted activity.

4.7 Availability of Reports

Except for data determined to be confidential under ARSD Section 74:52:02:17, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of SDDENR. The name and address of the permittee, permit applications, permits, and effluent data shall not be considered confidential.

4.8 Duty to Provide Information

1. The permittee shall furnish to the Secretary, within a reasonable time, any information the Secretary 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 Secretary, upon request, copies of records required to be kept by this permit.

2. If the permittee becomes aware that it failed to submit any relevant facts in a permit application form, or submitted incorrect information in a permit application form or any report to the Secretary, it shall promptly submit such facts or information.

4.9 Planned Changes

The permittee shall give notice to the Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutant discharged, or could result in noncompliance with permit conditions. This notification also applies to pollutants that are not subject to effluent limits or other notification requirements in this permit.

5.0 COMPLIANCE REQUIREMENTS

5.1 Duty to Comply

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the South Dakota Water Pollution Control Act and the federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application (a violation of a condition of this permit is subject to SDCL Section 34A-2-75).

5.2 Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any wastewater discharge and/or sludge disposal or reuse in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

5.3 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.

5.4 Upset Conditions

1. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limits if the requirements of Paragraph 2 of this section 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 (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limits).

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and the permittee can identify the cause(s) of the upset;

b. The permitted facility was at the time being properly operated;

c. The permittee submitted notice of the upset as required under **Section 4.2 – Effluent Violation, Bypass, Emergency Discharge, and SSO Reporting Requirements**; and,

d. The permittee complied with mitigation measures required under **Section 5.2 – Duty to Mitigate.**

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

5.5 Penalties for Violations of Permit Conditions

Any person who violates a permit condition is in violation of the provisions of SDCL 34A-2-36, and is subject to penalties under SDCL 34A-2-75. In addition to a jail sentence authorized by SDCL 22-6-2, such violators are subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, or for damages to the environment of this state. Except as provided in **Section 5.4 – Upset Conditions**, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

5.6 Penalties for Falsification of Reports

1. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is in violation of the provisions of SDCL 34A-2-77, and is subject to penalties under SDCL 34A-2-75.

2. Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit is in violation of the provisions of SDCL 34A-2-77, and is subject to penalties under SDCL 34A-2-75.

3. In addition to a jail sentence authorized by SDCL 22-6-2, such violators are subject to a criminal fine not to exceed ten thousand dollars per day of violation. The violator is also subject to a civil penalty not to exceed ten thousand dollars per day of violation, or for damages to the environment of this state.

5.7 Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude SDDENR from taking any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to that the permittee is or may be subject under Section 311 of the Federal Clean Water Act.

6.0 INDUSTRIAL WASTES

6.1 Industrial Users

1. The Permittee has the responsibility to protect the Publicly-Owned Treatment Works (POTW) from pollutants which would inhibit, interfere, or otherwise be incompatible with operation of the treatment works including interference with the use or disposal of municipal sludge.

2. During the life of the permit, the permittee shall conduct an industrial waste survey to identify the character and volume of pollutants from each significant industrial user, as well as documenting production data. The permittee shall notify the Secretary of any new introductions by new or existing industrial users or any substantial change in pollutants from any industrial user. Such notice must contain the information described in Paragraph 3 below and be submitted to the Secretary no later than 60 days following the introduction or change.

3. The permittee shall provide adequate notice to the Secretary of any substantial change in the volume or character of pollutants being introduced into the POTW by any other industrial users. For the purposes of this section, adequate notice shall include information on:

    a. The quality and quantity of effluent to be introduced into the POTW; and,

    b. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

6.2 Prohibited Discharges

Under no circumstances shall the permittee allow the introduction of the following pollutants to the POTW from any source of nondomestic discharge:

1. Pollutants that create a fire or explosion hazard in the publicly owned treatment works, including but not limited to waste streams with a closed cup flashpoint of less than 60 degrees Celsius (140 degrees Fahrenheit) using the test methods specified in ARSD Section 74:28:22:01 (a.b.r. 40 CFR 261.21);

2. Pollutants that will cause corrosive structural damage to the Publicly owned treatment works (POTW), but in no case discharges with pH lower than 5.0 standard units nor greater than 12.5 standard units;

3. Solid or viscous pollutants in amounts that will cause obstruction to the flow in the POTW, or other interference with the operation of the POTW;

4. Any pollutant, including oxygen demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW;

5. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees Celsius (104 degrees Fahrenheit);

6. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

7. Pollutants that result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

8. Any trucked or hauled pollutants, except at discharge points designated by the POTW; and

9. Any pollutant that causes pass through or interference.

6.3 Categorical Standards

In addition to the general limits expressed above, more specific pretreatment limits have been promulgated for specific industrial categories under Section 307 of the Act (see ARSD, Chapter 74:52:10, a.b.r. 40 CFR Subchapter N, Parts 405 through 471, for specific information).

6.4 Legal Action

The Secretary retains the right to take legal action against the industrial user and/or the permittee, in those cases where a permit violation has occurred because of the failure of an industrial user to discharge at an acceptable level.

7.0 ADDITIONAL PERMIT CONDITIONS

7.1 Inspection and Entry

The permittee shall allow the Secretary or EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the South Dakota Water Pollution Control Act, any substances or parameters at any location.

7.2 Removed Substances

1. Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard in accordance with applicable requirements of SDCL 34A-2, -6, and -11.

2. If sludge disposal is necessary, the permittee shall submit to the Secretary a sludge disposal plan for review and approval prior to the removal and disposal of sludge. The permittee shall not dispose of sludge without the Secretary's approval.

APPENDIX A

Emergency Discharge and SSO Reporting Form

EMERGENCY DISCHARGE and SSO REPORTING FORM

This form is to be used to summarize the reporting requirements for any emergency discharge or sanitary sewer overflow.

Address:			
Facility Contact:		**Phone:**	

Description of Event *(Attach additional sheets if necessary)*

Please check the boxes below, as appropriate, to indicate the type of release being reported (See* Definitions *for an explanation of each term).

☐ **Emergency Discharge** ☐ **Sanitary Sewer Overflow**

Date and Time the discharge began or was discovered:	
Date and Time the discharge was stopped:	

Describe the events resulting in the discharge and its cause(s):

Where did the event occur and where was the wastewater released to:

Describe the steps taken or planned to reduce, eliminate, and prevent reoccurrence:

Time and Date 24-Hour Notice of Noncompliance given to SDDENR:	
Describe any adverse effects, such as fish kills, etc.:	
Duration of discharge (include dates and times):	
Total flow, million gallons:	

ANALYTICAL RESULTS

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7
Date and time of sample							
Water Temperature, °C							
Flow Rate, million gallons per day							
pH, standard units							
Five-Day Biochemical Oxygen Demand (BOD_5), mg/L							
Total Suspended Solids (TSS), mg/L							
Ammonia-Nitrogen (as N), mg/L							
E. coli, no./100 mL							

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.

Name (print): _____ Title: _____

Signature: _____ Date: _____

STATEMENT OF BASIS

Applicant:	Town of Bison
Permit Number:	SD0022411
Contact Person:	Luke Clements, President Sion Hanson, Maintenance Supervisor PO Box 910 Bison, SD 57620
Phone:	(605) 244-5677 (City hall) (605) 244-5678 (City shop)
Permit Type:	Minor Municipal - Renewal

This document is intended to explain the basis for the requirements contained in the draft Surface Water Discharge Permit. This document provides guidance to aid in complying with the permit requirements. This guidance is not a substitute for reading the draft permit and understanding its requirements.

DESCRIPTION

The town of Bison operates a wastewater treatment facility located in the Southwest ¼ of Section 13, Township 18 North, Range 13 East, in Perkins County, South Dakota (Latitude 45.518528°, Longitude -102.476472°, Navigational Quality GPS)

Wastewater flows by gravity to a 5-cell stabilization pond system. Cells 1, 2 and 3 (2.55 acres, 1.03 acres, and 0.96 acres in surface area, respectively) are operated in series. The city can then transfer wastewater from Cell 3 to either Cell 4 or Cell 5, which are considered evaporation ponds and are 2.08 and 3.42 acres in surface area, respectively.

This wastewater treatment facility serves a population of 333 persons (2010 census), with no known industrial users contributing flow to the system. The WWTF began operation in 1983 and was upgraded in 2001, and is designed for total retention.

The town of Bison needs to repair riprap to ponds and replace the liner in Cell 1; however, the location of the town makes transport of materials cost-intensive. The town has currently hired an engineer to explore construction options. A mechanical treatment plant has been mentioned as a possible alternative. Until upgrades to the current system are completed or an alternative has been decided upon, a no discharge permit will be reissued and all previous provisions will continue.

RECEIVING WATERS

Any discharge from this facility will enter a tributary of Thunder Butte Creek which is classified by the South Dakota Surface Water Quality Standards (SDSWQS), Administrative Rules of South Dakota (ARSD), Section 74:51:03:01 for the following beneficial uses:

(9) Fish and wildlife propagation, recreation, and stock watering waters; and
(10) Irrigation waters.

The unnamed tributary flows 2.6 miles to before it enters Thunder Butte Creek, which is classified by the SDSWQS, ARSD Section 74:51:03:01 and 74:51:03:22 for the following beneficial uses:

(6) Warmwater marginal fish life propagation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters; and
(10) Irrigation waters.

TOTAL MAXIMUM DAILY LOAD

Section 303(d) of the federal Clean Water Act requires states to develop Total Maximum Daily Loads (TMDLs) for waters at levels necessary to achieve and maintain water quality standards. TMDLs are calculations of the amount of pollution a waterbody can receive and still maintain applicable water quality standards. TMDLs are necessary for waters that do not meet or are not expected to meet water quality standards with the application of technology-based controls for point sources. TMDLs address specific waterbodies, segments of waterbodies, or even entire watersheds, and are pollutant specific. TMDLs must allow for seasonal variations and a margin of safety, which accounts for any lack of knowledge concerning the relationship between pollutant loads and water quality.

This segment of the receiving waterbody has not been identified as being impaired; therefore, a TMDL is not needed.

ANTIDEGRADATION

The South Dakota Department of Environment and Natural Resources (SDDENR) has fulfilled the antidegradation review requirements for this permit. In accordance with South Dakota's Antidegradation Implementation Procedure and the SDSWQS, no further review is required. The results of SDDENR's review are included in Attachment 1.

INSPECTIONS

Personnel from SDDENR conducted a Compliance Inspection of the town of Bison wastewater treatment facility on April 16, 2019. The following comments and corrective actions were required in order to come into compliance with the town's Surface Water Discharge (SWD) permit:

COMMENTS	REQUIRED CORRECTIVE ACTIONS
The operator stated he is inspecting the pond site monthly as required by the permit. However, he is not keeping an inspection notebook documenting these inspections of the wastewater treatment facility as required by the permit.	All pond site inspections conducted by town personnel **must be documented** in a notebook to be reviewed by SDDENR personnel when an inspection occurs. At a minimum, the notebook shall include the following: 1. Date and time of the inspection; 2. Name of the inspector(s); 3. The facility's discharge status; 4. The measured water depth in all cells and the artificial wetlands; 5. Identification of operational problems and/or maintenance problems; 6. Recommendations, as appropriate, to remedy identified problems; 7. A brief description of any actions taken with regard to problems identified; and 8. Other information, as appropriate. The inspection notebook is a condition of the SWD permit.
The operator reported that sewer has backed up into a couple of homes.	All discharge and/or overflows, including sewer back-ups must be monitored, reported, and sampled according to the requirements in your SWD permit.

EFFLUENT LIMITS

The town of Bison shall have **no discharge** from its wastewater treatment facility except in accordance with the bypass or emergency release provisions of the permit. A no discharge permit is issued to facilities that are not expected to discharge under normal conditions. The no discharge requirement is based on past facility performance and permit writer's judgement.

Outfall 001N Any discharge from the wastewater treatment facility to unnamed tributary of Thunder Butte Creek (Latitude 45.518528°, Longitude -102.476472°, Navigational Quality GPS) No discharge is permitted form **outfall 001**.

SELF MONITORING REQUIREMENTS

The draft permit requires the permittee to monitor all sanitary sewer overflows (SSO's) and emergency discharges for BOD_5 (mg/L), TSS (mg/L), pH (s.u.), ammonia-nitrogen (as N, mg/L), and *E. coli* (#/100mL). Effluent water temperature (°C), total flow (million gallons), flow rate (MGD), and duration of discharge (days) shall be monitored, but will not have a limit. These monitoring requirements are based on the need to fully characterize the discharge.

Discharge samples will be taken daily. All of the samples collected during the 7-day or 30-day period are to be used in determining the averages. The permittee always has the option of collecting additional samples if appropriate.

Monitoring shall consist of **monthly** inspections of the facility and the outfall to verify that proper operation and maintenance procedures are being practiced and whether or not there is a discharge occurring from this facility. **Daily** inspections are required during a discharge. Documentation of each of these visits shall be kept in a notebook to be reviewed by SDDENR or EPA personnel when an inspection occurs.

On October 22, 2015, the Environmental Protection Agency (EPA) published in the federal register a rule that makes electronic reporting of permit reporting requirements mandatory for all SWD permits. EPA's rule will require all permit reporting requirements (such as permit applications and violation reports) to be submitted electronically. SDDENR is working on programs to meet this requirement and will notify facilities as they become available.

WHOLE EFFLUENT TOXICITY

The SDDENR *Reasonable Potential Implementation Procedure for SWD Permits* was reviewed to determine if Whole Effluent Toxicity (WET) testing is applicable to the town of Bison. Following the guidance document, the town of Bison is not believed to have reasonable potential to cause or contribute to an exceedance of the SDSWQS for toxicity.

The draft permit will not include WET monitoring or limits. SDDENR has determined that due to the facility's no discharge status and the lack of significant industrial contributions to the wastewater treatment facility, there is no reasonable potential for WET. SDDENR has the authority to reopen the permit to add WET effluent limits, compliance schedules, monitoring, or other appropriate requirements.

PRETREATMENT

Publicly Owned Treatment Works (POTWs) with a 5 MGD or greater design flow which receive wastewater from a significant industrial user are required under 40 CFR 403.8 to develop a pretreatment program. The state may also require a POTW with a lower design flow to develop a program to prevent Pass Through or Interference with the POTW, including biosolids.

The town of Bison has a design flow of less than 5.0 MGD, and no industries who are likely to cause pass through or interference with the POTW. Therefore, the draft permit will not require the

town of Bison to develop an industrial pretreatment program. Any categorical industrial user (CIU) or significant industrial user (SIU) that discharges to the POTW will be permitted by the state. However, the city must still meet the requirements for regulating nondomestic sources of wastewater entering its system in accordance with the requirements of section 6.0 of the draft permit.

COMPLIANCE SCHEDULE

The facility is in need of repair to ponds and looking for the most cost effective approach to fixing the problem or finding an alternative to treat their wastewater. In accordance with SDSWQS, ARSD Section 74:52:03:22, a compliance schedule shall be incorporated into this permit. The permittee shall achieve compliance with the following schedule:

1. Submit a facility plan to SDDENR, identifying the steps the town will take to address pond repairs or alternatives:……..……..**June 1, 2020**
2. Submit quarterly progress reports on repairs, process modifications, equipment acquisition, other items specified in the Facility Plan beginning: …….…….....…**October 1, 2020**
3. Submit plans and specifications for system upgrades and modifications to SDDENR for review and approval by:.…….……..**June 1, 2021**
4. Start construction of system upgrades, process modifications, or equipment acquisition by:…….……...…..**June 1, 2022**
5. Complete construction and startup of treatment system, process modifications, or equipment installation by:……..……..**March 31, 2023**

SLUDGE

Based on the town of Bison's permit application, SDDENR does not anticipate sludge will be removed or disposed of during the life of the permit. Therefore, the draft Surface Water Discharge permit shall not contain sludge disposal requirements. However, if sludge disposal is necessary, the city of Bison is required to submit to SDDENR a sludge disposal plan for review and approval **prior** to the removal and disposal of sludge.

DRAINAGE ISSUES

Perkins County has the authority to regulate drainage. The town of Bison is responsible for getting any necessary drainage permits from the county **prior** to discharging.

ENDANGERED SPECIES

This is a renewal of an existing permit. No listed endangered species are expected to be impacted by activities related to this permit. However, the table below shows the species that may be present in the town of Bison's geographic area.

COUNTY	GROUP	SPECIES	CERTAINTY OF OCCURRENCE
PERKINS	BIRD	CRANE, WHOOPING	POSSIBLE

This information was accessible at the following US Fish and Wildlife Service website as of May 2, 2019, and was last updated by the US Fish and Wildlife Service January 11, 2017: https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_Jan2017.pdf.

PERMIT EXPIRATION

A five-year permit is recommended.

PERMIT CONTACT

This statement of basis and the draft permit were developed by Raul Vasquez, Engineer I for the Surface Water Quality Program. Any questions pertaining to this statement of basis or the draft permit can be directed to the Surface Water Quality Program, at (605) 773-3351.

June 2, 2019

ATTACHMENT 1

Antidegradation Review

Permit Type:	**Minor Municipal - Renewal**	Applicant:	**Town of Bison**
Date Received:	**08/24/2015**	Permit #:	**SD0022411**
County:	**Perkins**	Legal Description:	**SW ¼ Sec. 13, T18N, R13E**
Receiving Stream:	**Unnamed tributary of Thunder Butte Creek**	Classification:	**9,10**

If the discharge affects a downstream waterbody with a higher use classification, list its name and uses: **Thunder Butte Creek 6, 8, 9, 10**

APPLICABILITY

1. Is the permit or the stream segment exempt from the antidegradation review process under ARSD 74:51:01? Yes ☒ No ☐ If no, go to question #2. If yes, check those reasons why the review is not required:

- ☐ Existing facility covered under a surface water discharge permit is operating at or below design flows and pollutant loadings;
- ☐ *Existing effluent quality from a surface water discharge permitted facility is in compliance with all discharge permit limits;
- ☐ *Existing surface water discharge permittee was discharging to the current stream segment prior to March 27, 1973, and the quality and quantity of the discharge has not degraded the water quality of that segment as it existed on March 27, 1973;
- ☐ *The existing surface water discharge permittee, with DENR approval, has upgraded or built new wastewater treatment facilities between March 27, 1973, and July 1, 1988;
- ☐ The existing surface water discharge permittee discharges to a receiving water assigned only the beneficial uses of (9) and (10); the discharge is not expected to contain toxic pollutants in concentrations that may cause an impact to the receiving stream; and DENR has documented that the stream cannot attain a higher use classification. This exemption does not apply to discharges that may cause impacts to downstream segments that are of higher quality;
- ☐ Receiving water meets Tier 1 waters criteria. Any permitted discharge must meet water quality standards;
- ☐ The permitted discharge will be authorized by a Section 404 Corps of Engineers Permit, will undergo a similar review process in the issuance of that permit, and will be issued a 401 certification by the department, indicating compliance with the state's antidegradation provisions; or
- ☒ Other: This permit does not allow a discharge, except in accordance with the emergency release, bypass, or sanitary sewer overflow provisions of the draft permit.

*An antidegradation review is not required where the proposal is to maintain or improve the existing effluent levels and conditions. Proposals for increased effluent levels, in these categories of activities are subject to review.

No further review required.

ANTIDEGRADATION REVIEW SUMMARY

2. The outcome of the review is:

- ☒ A formal antidegradation review was not required for reasons stated in this worksheet. Any permitted discharge must ensure water quality standards will not be violated.
- ☐ The review has determined that degradation of water quality should not be allowed. Any permitted discharge would have to meet effluent limits or conditions that would not result in any degradation estimated through appropriate modeling techniques based on ambient water quality in the receiving stream, or pursue an alternative to discharging to the waterbody.
- ☐ The review has determined that the discharge will cause an insignificant change in water quality in the receiving stream. The appropriate agency may proceed with permit issuance with the appropriate conditions to ensure water quality standards are met.
- ☐ The review has determined, with public input, that the permitted discharge is allowed to discharge effluent at concentrations determined through a total maximum daily load (TMDL). The TMDL will determine the appropriate effluent limits based on the upstream ambient water quality and the water quality standard(s) of the receiving stream.
- ☐ The review has determined that the discharge is allowed. However, the full assimilative capacity of the receiving stream cannot be used in developing the permit effluent limits or conditions. In this case, a TMDL must be completed based on the upstream ambient water quality and the assimilative capacity allowed by the antidegradation review.
- ☐ Other: _____

3. Describe any other requirements to implement antidegradation or any special conditions That are required as a result of this antidegradation review: _____

Raul Vasquez — Reviewer
June 2, 2019 — Date

Albert Spangler, P.E. — Team Leader
June 2, 2019 — Date

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

May 24, 2019

The Honorable Luke Clements
Mayor, City of Bison
PO Box 910
Bison, SD 57620

RE: Surface Water Discharge Compliance Inspection SWD Permit Number: SD0022411

Dear Mayor Clements:

The South Dakota Department of Environment and Natural Resources conducted a Surface Water Discharge Compliance Inspection of the city's wastewater treatment facility on April 16, 2019. I appreciate Sion Hanson and Earl Siefken's time and cooperation in supplying the requested information.

I have enclosed an inspection summary and a copy of the inspection report. Please pay special attention to the Inspection Summary tables and implement the required corrective actions as soon as possible. All corrective actions taken will be reviewed during our next inspection at your facility.

Please continue to keep the Department informed on the progress of upgrading the system.

Thank you for your continued efforts to protect the environment and natural resources of South Dakota. Please review this report for accuracy, and respond within thirty days with any needed corrections. If you have any questions about this letter or the inspection reports, please contact me at (605) 773-3351.

Sincerely,

Kyle Doerr
Engineer I
Surface Water Quality Program
Enclosures

cc: Sion Hanson, Utilities Manager, City of Bison
SWD File - Pierre

INSPECTION SUMMARY

Facility: City of Bison

SWD Permit: SD0022411

Inspection Date: April 16, 2019

The following comments and corrective actions are ***required*** in order to come into compliance with the city's surface water discharge permit.

COMMENTS	REQUIRED CORRECTIVE ACTIONS
A copy of the SWD permit is not kept on-site.	In accordance with **Section 2.11** *Records Retention*, a copy of the SWD permit must be kept on-site so that the operator is aware of permit conditions. I have enclosed a copy with this report. Please keep this permit on-site and available.
The operator stated he is inspecting the pond site monthly as required by the permit. However, he is not keeping an inspection notebook documenting these inspections of the wastewater treatment facility as required by the permit.	All pond site inspections conducted by town personnel **must be documented** in a notebook to be reviewed by SDDENR personnel when an inspection occurs. At a minimum, the notebook shall include the following: 1. Date and time of the inspection; 2. Name of the inspector(s); 3. The facility's discharge status; 4. The measured water depth in all cells and the artificial wetlands; 5. Identification of operational problems and/or maintenance problems; 6. Recommendations, as appropriate, to remedy identified problems; 7. A brief description of any actions taken with regard to problems identified; and 8. Other information, as appropriate. The inspection notebook is a condition of the SWD permit.

COMMENTS	REQUIRED CORRECTIVE ACTIONS
The city is not maintaining the records required by the SWD permit for a minimum of three years.	**Section 2.11** of your permit states you shall retain records of all monitoring information, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report, or application.
The operator reported that sewer has backed up into a couple of homes.	All discharge and/or overflows, including sewer back-ups must be monitored, reported, and sampled according to the requirements in your SWD permit.

The following comments and corrective actions are ***recommended*** and are items that will improve the operation of your facility.

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
The dikes are showing major signs of erosion.	The ponds should be riprapped to stop the erosion caused by high water and wind/wave action. If not corrected, this erosion may cause operation and maintenance problems and result in major repair expenses. Please see enclosed sheet on riprapping.
Emergency procedures have not been established in the case of a major storm event, a sewer main break, or a chemical release into the sewer system.	The city may wish to consider establishing written emergency procedures to ensure city staff is prepared to address emergencies that may arise during the operation of the wastewater collection and treatment system.
The fence on the west side of the wastewater treatment facility is down.	The fence should be repaired to prevent the entrance of unauthorized persons into the wastewater treatment facility.
There are no pond depth indicators in cells.	Pond depth indicators should be installed in each cell, with readings recorded during each inspection. These records will be helpful in determining flow to the ponds and aid in maintaining the proper operating depths in the ponds at all times.

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
Cattails and reeds are growing in Cell #3. There are not many currently but these should be removed so they do not spread	In order for your treatment pond(s) to operate properly, the rush and cattail growth in the ponds should be eliminated by spraying and/or cutting to prevent erosion/seepage damage to the dikes and attracting rodents.
The city has not implemented a regular sewer line cleaning schedule.	The department recommends that the city develop a regular sewer line cleaning schedule. Regular cleaning will prevent sewer back-ups and will help identify problems in the collection system.

MUNICIPAL INSPECTION CHECKLIST

I. GENERAL FACILITY INFORMATION

Name	**Town of Bison Wastewater Treatment Facility**		
Location	**2/3 miles southwest of town in the Southwest ¼ of Sec 13, R18N, R13E**		
SWD Permit Number	**SD0022411**		
Mailing Address	**PO Box 910, Bison SD 57620**		
Facility Street Address	**¼ mile south of Main St & 7th Ave W intersection on 7th Ave**		
Contact Person / Title	**Sion Hanson/ Utilities Manager**	Phone Number	**605-244-5677**
Responsible Party / Title	**Luke Clements/ President**	Phone Number	**605-244-5677**
Facility Email address	**bison@sdplains.com**		

Persons present during the inspection:

Name / Title	Phone Number / Email Address	Affiliation
Earl Siefken/ Operator	**605-244-5678**	**Town of Bison**
Sion Hanson/ Utility Manager	**605-244-5678**	**Town of Bison**
Kyle Doerr/ Engineer I	**(605) 773-3351 / kyle.doerr@state.sd.us**	**SDDENR**
Raul Vasquez/ Engineer I	**(605) 773-3351 / raul.vasquez@state.sd.us**	**SDDENR**

Inspection Date	**04/16/2019**	Last Inspection Date	**Onsite:7/23/15**
Entrance Time	**8:30 AM**	Exit Time	**10:30 AM**
Permit Effective Date	**4/1/2011**	Permit Expiration Date	**3/31/2016**
Avg. Reported Flow Rate	**Unknown**	Avg. Design Flow Rate	**Unknown**
Population Served	**333 (2010 Census)**	Design Population Equivalent	**Same**
Date Facility Began Operation	**1983**		
Dates of Facility Upgrades	**2001, 2014- relined pipes**		
Receiving Water and Classification	**Unnamed tributary of Thunder Butte Creek to Thunder Butte Creek (9,10)**		**(6,8,9,10)**

List any deficiencies the previous inspection identified which the facility was required to correct:

Sewer backups, gate unlocked, erosion, riprap, no depth indicators, cattails, grazing animals, surcharge

Were the deficiencies corrected: ☐ Yes ☒ No

Comments: No backups, no grazing animals corrected. Other deficiencies not corrected

Type of Discharge:

☒ No Discharge ☐ Intermittent with PTD ☐ Intermittent without PTD ☐ Continuous

Type of Facility:

☒ Stabilization Ponds only ☐ Stabilization Ponds/Artificial Wetlands ☐ Mechanical

☐ Hybrid: Mechanical and Stabilization Ponds ☐ Land Application ☐ I/P Basins

Facility Description from the Statement of Basis and Flow Diagram
Wastewater flows by gravity to a 5-cell stabilization pond system. Cells 1,2 and 3 (2.55 acres, 1.03 acres, and 0.96 acres in surface area, respectively) are operated in series. The city can then transfer wastewater from Cell 3 to either Cell 4 or Cell 5, which are considered evaporation ponds and are 2.08 and 3.42 acres in surface area, respectively. A land application outfall (Outfall 002) is being added to the proposed permit.

This wastewater treatment facility serves a population of 377 persons (2000 census), with no known industrial users contributing flow to the system. The WWTF began operation in 1983, was upgraded in 2001, and is designed for total retention.

Does the facility match the above description? ☒ Yes ☐ No

Does the statement of basis match the permit? ☒ Yes ☐ No

Are the number and discharge locations described in the permit correct? ☒ Yes ☐ No

If any questions are “No” above, please describe modifications or changes.

II. Personnel and Budget Review

Personnel:

Does the facility have separate departments for WW Collection and WW Treatment? ☐ Yes ☒ No

Does the state require certification for WW Collection or WW Treatment? ☐ Yes ☒ No

Does the facility have operators certified for WW Collection and/or WW Treatment? ☐ Yes ☒ No

WW Collections:

Number of WW Collection Personnel: **2**

State Required WW Collection Certification: ☐ Class I ☐ Class II ☐ Class III ☐Class IV

Number of Certified Operators and Classification			
Class I	Class II	Class III	Class IV

WW Treatment:

Number of WW Treatment Personnel: **2**

State Required WW Treatment Certification: ☐ Class I ☐ Class II ☐ Class III ☐Class IV

Number of Certified Operators and Classification			
Class I or Stabilization Pond	Class II	Class III	Class IV

Budget: Fiscal Year 2018

Annual wastewater expenses ***$20,329.52*** Monthly residential sewer use fees ***$12 flat+ $10***

Annual wastewater revenues ***$28,565.59*** Monthly commercial sewer use fees ***same***

Does the facility apply wastewater surcharges? ☒ Yes ☐ No

Describe any wastewater projects proposed during the next three years. **Riprap, reline, or build new treatment system and remove storm sewer settling pond that is above wastewater lagoons**

Describe measures to raise funds for the project(s). ***Surcharge***

Any current funding through DENR? ☐ Yes ☒ No

Personnel and budget comments:

The revenue was $28.417.27 off user fees plus $425.25 interest put into account.
The city also has a 1050 account (Super Sewer depreciation account) with $23, 417.27 currently.
The surcharge of $10 goes into the 1050 account to build up finances for sewer projects.

III. Required Recordkeeping

PERMIT VERIFICATION

Yes	No	N/A		
☐	☒	☐	1.	Is a current copy of the permit onsite?
☐	☒	☐	2.	Is operator aware of main permit conditions?
☐	☒	☐	3.	Facility, address and contact information is correct in the SWD Database (Fees, SSO's PTD's, Inspections, PDF's, Flooding, etc.)? If not, list correct information in comments.
☐	☒	☐	4.	Facility, address and contact and permit information is correct in the ICIS Database, (Monitoring, Limits, Inspections, Schedules, Limit Summary, etc.)? If not, list correct information in comments.
☐	☒	☐	5.	Are there any missing fees?
	1/2/19		6.	Date the last fee was received by DENR:
☐	☒	☐	7.	Have there been any new, different, or increase loadings to the POTW? If yes, describe in comments.
☐	☒	☐	8.	Have there been any changes in influent flow rate to the POTW? If yes, describe in comments.

Permit Verification Comments:
The facility did not have a copy of permit during inspection. One will be mailed with inspection report.
Updated President (Luke Clements) and Maintenance Supervisor (Sion Hanson) in SWD database.
Updated Cognizant official to Sion Hanson in ICIS.

INSPECTION RECORDS

Yes	No	N/A		
☐	☒	☐	1.	Is an inspection notebook maintained for the facility and outfall(s)?
☒	☐	☐	2.	Are inspections of the facility and outfall(s) conducted as frequently as required by the permit? Frequency Required: **Monthly**
☐	☒	☐	3.	Is all required information recorded?
☐	☒	☐		a. Date and time of the inspection.
☐	☒	☐		b. Name of the inspector(s).
☐	☒	☐		c. Facility's discharge status.
☐	☒	☐		d. Amount of freeboard or water depth in stabilization ponds and artificial wetlands.
☐	☒	☐		e. Identification of operational problems and/or maintenance problems.
☐	☒	☐		f. Recommendations, as appropriate, to remedy identified problems.
☐	☒	☐		g. A brief description of any actions taken with regard to problems identified.
☐	☒	☐		h. Other information, as appropriate.
☐	☒	☐	4.	Is an inspection notebook maintained for the lift station(s)?
☐	☐	☒	5.	Are inspections of the lift station(s) conducted as frequently as required by the permit? Frequency Required: **Weekly**
☐	☐	☒	6.	Is all required information recorded?
☐	☐	☒		a. Date and time of the inspection.
☐	☐	☒		b. Name of the inspector(s).

Yes	No	N/A	
☐	☐	☒	c. Whether an SSO is occurring or has occurred.
☐	☐	☒	d. Identification of operational problems and/or maintenance problems.
☐	☐	☒	e. Cleaning of screenings.
☐	☐	☒	f. Testing of alarms.
☐	☐	☒	g. Hour meter readings
☐	☐	☒	h. Recommendations, as appropriate, to remedy identified problems.
☐	☐	☒	i. A brief description of any actions taken with regard to problems identified.
☐	☐	☒	j. Other information, as appropriate.

Inspection Records Comments:
The facility does not have required records. A DENR Inspection Notebook was left with the operators.

MAINTENANCE RECORDS

Yes	No	N/A	
☐	☒	☐	1. Does the facility have a system for addressing maintenance activities?
☐	☒	☐	2. Are records maintained documenting maintenance activities? If yes, describe in comments,

Maintenance Records Comments:
The facility does not have maintenance records.

DISCHARGE MONITORING REPORTS

Yes	No	N/A	
☐	☒	☐	1. Is the facility approved for NetDMR? **Approval Date:**

Discharge Monitoring Report Comments:
The facility is a no discharge facility so is not required to submit DMRs.

RECORDS RETENTION

Yes	No	N/A	
☐	☒	☐	1. Are the following records kept onsite for a minimum of 3 years?
☐	☒	☐	a. Inspection Records
☐	☐	☒	b. Calibration Records
☐	☐	☒	c. DMRs
☐	☐	☒	d. Emergency Discharge/SSO Reporting Forms
☐	☐	☒	e. Sample Results
☐	☐	☒	f. WET Lab Data
☐	☐	☒	g. Chain of Custody Forms
☐	☐	☒	h. PTD Records
☐	☐	☒	2. Is the facility keeping sludge/biosolids records for a minimum of 5 years?

Records Retention Comments:
The facility does not have records.

IV. Self-Monitoring / Sampling Evaluation

Self-Monitoring Table

Insert Sampling Frequency Below			
Parameter	**Required Effluent**	**Actual Effluent**	**Onsite/Lab**
Ammonia	***Daily***	***Daily***	***Lab***
BOD_5	***Daily***	***Daily***	***Lab***
E. coli	***Daily***	***Daily***	***Lab***
pH	***Daily***	***Daily***	***Lab***
Total Suspended Solids	***Daily***	***Daily***	***Lab***
Water Temperature	***Daily***	***Daily***	***Lab***

Yes	No	N/A		
☐	☒	☐	1.	Does the permit require permission to discharge (PTD)?
☐	☐	☒		a. Is the permittee monitoring for all PTD parameters prior to discharge?
☐	☐	☒		b. Is the permittee requesting PTD?
☐	☐	☒		c. Has the permittee had problems meeting PTD requirements?
☐	☐	☒	2.	Are the minimum self-monitoring requirements of the permit met? If no, explain in comments
☐	☐	☒	3.	Are they sampling more than required and submitting all sample data?
☐	☐	☒	4.	Are samples collected at the location(s) described in the SWD permit?
☐	☐	☒	5.	Is the permittee using the method of sample collection specified in the permit?
☐	☐	☒	6.	If composite sampling is conducted, is the facility using flow proportioned sampling?
☐	☐	☒	7.	Do the methods used for collection, preservation, and analysis conform to 40 CFR 136*?*
☐	☐	☒		a. If composite sampling is conducted, is the sample refrigerated during sampling?
☐	☐	☒		b. Are the proper containers used for sample collection (see 40 CFR 136.3)?
☐	☐	☒		c. Are the samples shipped on ice (if needed)?
☐	☐	☒		d. Are the proper preservatives added to samples?
☐	☐	☒		e. Are the samples analyzed with in the proper holding time?
☒	☐	☐	8.	Does the facility have extra sample bottles/kits in case of an emergency discharge?
☐	☐	☒	9.	Is a written laboratory quality assurance manual available, if the facility conducts its own testing? When was the QA manual last updated:
☐	☐	☒	10.	Is the pH meter properly calibrated? How often?
☐	☐	☒	11.	Is a pH calibration log maintained?
☐	☐	☒	12.	Does the pH calibration log contain all of the following information?
☐	☐	☒		a. Date and Time
☐	☐	☒		b. Initials or signature of person calibrating the meter
☐	☐	☒		c. 7 buffer reading
☐	☐	☒		d. 10 buffer reading
☐	☐	☒		e. Temperature of buffer
☐	☐	☒		f. Buffer expiration date
☒	☐	☐	13.	Is pH analyzed within 15 minutes of sample collection?
☐	☐	☒	14.	Does the pH meter meet DENR specifications?

Yes	No	N/A		
☐	☐	☒		a. Two point calibration?
☐	☐	☒		b. Temperature compensation?
☐	☐	☒		c. Does it read to two decimal places?
☐	☒	☐	15.	Are other laboratory instruments and equipment calibrated and maintained?
☒	☐	☐	16.	Is an off-site lab used for analysis of some or all sampling required? If so, indicate parameters and the laboratory in the table below.
☒	☐	☐	17.	Does the permittee follow appropriate chain of custody?
☐	☒	☐	18.	Is the permittee required to participate in a DMR QA study?
☐	☐	☒		a. Has the permittee met the DMR QA study deadlines?
☐	☐	☒		b. Has the permittee had a parameter not pass? If yes, provide details in the comment section.

Parameters	***Emergency Discharge Parameters***
Laboratory Name	***Midcontinent Labs***
Address	***2381 S Plaza Dr, Rapid City, SD 57702***
Phone	***605-348-0111***

Self-Monitoring/Sampling Evaluation Comments:

Facility is not required to have pH meter as it is a no discharge facility but does have access to one if needed.

V. Whole Effluent Toxicity

Yes	No	N/A		
☐	☒	☐	1.	Is the permittee required to conduct Whole Effluent Toxicity testing as a requirement of the permit? ☐ **Acute** ☐ **Chronic**

Whole Effluent Toxicity Comments:

WET testing not required

VI. Flow Measurement

Primary Influent Flow Measurement

A. General

Yes	No	N/A		
			1.	Type of primary flow measurement device: ***None***
☐	☐	☒	2.	Is the influent flow measured before all return lines?
☐	☐	☒	3.	Are the proper flow tables used by facility personnel?
☐	☐	☒	4.	Is the flow measurement equipment adequate to handle expected ranges of flow rate?

Influent Flow Measurement Comments:

No influent flow measurement

Primary Effluent Flow Measurement

A. General

Yes	No	N/A		
			1.	Type of primary flow measurement device: ***Pump Hours***
☒	☐	☐	2.	Is the effluent flow measured after all return lines?
☒	☐	☐	3.	Are the proper flow tables used by facility personnel?
☒	☐	☐	4.	Is the flow measurement equipment adequate to handle expected ranges of flow rate?

Effluent Flow Measurement Comments:
The facility could use the hours on pump to calculate the effluent flow rate.

VII. Sludge/Biosolids

Yes	No	N/A	
☐	☒	☐	Does the facility regularly (at least once every 5 years) dispose of sludge/biosolids?

For Facilities that Do Not Regularly Dispose of Biosolids:

Yes	No	N/A		
☐	☒	☐	1.	Has the facility removed/disposed of sludge since the last inspection?
☐	☐	☒		a. If the facility has disposed of sludge, did the facility receive one-time approval?
☐	☐	☒		b. If the facility has disposed of sludge, did the facility submit the required follow-up report?
☐	☒	☐	2.	Has the facility observed sludge accumulation?
☐	☒	☐	3.	Does the facility have future sludge disposal plans? If yes, detail in comments.
			4.	Where is sludge stored at the facility?

Sludge/Biosolids Comments:
Biosolids is not expected to be removed in this permit cycle.

VIII. Facility Compliance Review

Yes	No	N/A		
☐	☒	☐	1.	Has the facility discharged since the last inspection? If yes, list how many.
☐	☐	☒	2.	Is the facility in compliance with all effluent limits since the last inspection?
☐	☐	☒		a. Effluent BOD_5 violations. If yes, how many?
☐	☐	☒		b. Effluent TSS violations. If yes, how many?
☐	☐	☒		c. Effluent pH violations. If yes, how many?
☐	☐	☒		d. Effluent conductivity violations. If yes, how many?
☐	☐	☒		e. Effluent temperature violations. If yes, how many?
☐	☐	☒		f. Effluent TRC violations. If yes, how many?
☐	☐	☒		g. Effluent WET violations. If yes, how many?
☐	☐	☒		h. Other violations. If yes, list parameter and number of occurrences in comments.
☐	☐	☒	3.	Has the permittee monitored as required since the last inspection?
☐	☐	☒	4.	Has the permittee notified SDDENR of maximum and minimum permit violations within 24 hours of becoming aware of the violation?
☐	☐	☒	5.	Has the permittee submitted a written report of the violation as required by the department?
☐	☐	☒	6.	Has the permittee received warning letters or notices of violation since the last inspection?

Facility Compliance Review Comments:

The facility has not discharged since the last inspection.

IX. Compliance Schedule

Yes	No	N/A		
☒	☐	☐	1.	Is the facility subject to a compliance schedule either in its permit or in an enforcement action? If yes, note date and type of action in comments.
			2.	In the comments, list milestones that remain in the schedule.
☒	☐	☐	3.	Has facility missed milestone dates?
☒	☐	☐	4.	Has the Surface Water Quality Program received all of the required compliance schedule reports?
☐	☒	☐	5.	Will the facility meet the final schedule date?
☒	☐	☐	6.	Is a modification to the compliance schedule necessary?

Compliance schedule Comments:

1. **Hire professional engineer to identify I/I……October 1, 2011**
2. **Complete I/I Study……..….September 1, 2012**
3. **Submit Facility Plan to SDDENR…….…….July 1, 2013**
4. **Submit Quarterly Updates Beginning……....July 1, 2013**
5. **Submit Plans and Specs to SDDENR……....June 1, 2014**
6. **Start Construction if Necessary……..June 1, 2015**
7. **Complete Construction if Necessary……..…….March 31, 2016**

The facility did miss deadlines but the city has been in constant contact with the Department and has been trying to find a solution that is affordable and are still making progress to fix the system's issues. A new construction schedule is being added to permit renewal.

X. Industrial Wastes/Pretreatment

Yes	No	N/A		
☒	☐	☐	1.	Does the facility accept hauled septage wastes? If yes, list hauler contact information:
☐	☒	☐	2.	Does the facility accept hauled industrial/commercial wastes? If yes, list the hauler and types of industrial wastes accepted at the facility in the comments section.
☐	☒	☐	3.	If accepted at the facility, is any hauled wastes visually inspected or sampled?
☐	☒	☐	3.	Does the facility receive industrial or other wastes? If yes, list sources.
☐	☒	☐	4.	Have any new industries been identified since the last inspection? If yes, provide name and type of industry.
☐	☐	☒	5.	Are industries regulated by ordinance? If yes, attach relevant ordinance.
☐	☐	☒	6.	Does the facility have an approved pretreatment program?
☐	☐	☒	7.	Does the facility have an industry that is permitted through SDDENR?
☐	☐	☒		a. Has the industry been submitting data to the city?
☐	☐	☒		b. Has the industry notified the city of any violations, bypasses, or slug loads?
☐	☒	☐	8.	Does the community have dental offices? If so, how many?
☐	☐	☒	9.	What is the average daily flow rate of industrial sources? % hydraulic and organic loading?

Industrial Wastes/Pretreatment Comments:

The facility has a camper dump station that could contribute waste to system.

XI. Collection System and Lift Stations

Type of Collection System:

☒ Separate ☐ Combined (San + Storm)
☐ Both ☐ Other

If other, please explain. _____

Yes	No	N/A		
☐	☒	☐	1.	Is a routine sewer-cleaning schedule maintained? Describe in comments.
☒	☐	☐	2.	Have sewer backups occurred in basements since the last inspection?
☐	☒	☐	3.	Have any sanitary sewer overflows occurred since the last inspection?
☐	☒	☐	4.	Have bypasses occurred from the collection system (including lift stations) since the last inspection?
☐	☒	☐	5.	Were all SSOs and bypasses reported to DENR as required?
☐	☒	☐	6.	Were all SSOs sampled as required by the permit?
☒	☐	☐	7.	Does the permittee have a sump pump ordinance?
☐	☒	☐	8.	Does the permittee have an ordinance regulating grease and/or requiring grease traps?
☒	☐	☐	9.	Has testing for inflow/infiltration sources been conducted since the last inspection?
☒	☐	☐	10.	Have sources of inflow/infiltration been identified?
			11.	What measures have been taken to correct inflow/infiltration problems?
☒	☐	☐	12.	Has the collection system been upgraded since the last inspection? If yes, describe:
			13.	Miles of collection system, if known: **Unknown**
			14.	Number of Lift Stations:0
☐	☒	☐	15.	Are there any privately owned lift stations? **None**
☐	☒	☐	16.	Are there any collection systems not owned by the permittee that contribute to the POTW? If yes list contact information below.

Collection System and Lift Station Comments:

The city reported that they had sewage backup into a house but it was found to be an issue with the private connection and not the city's system.
The city must report all backups to the Department even if it is deemed to be the private connection and not the city's responsibility. The city also must sample the backup and send to lab to confirm it is sewage.
The city had the lines inspected when collection system was relined.

XII. Storm Water

Industrial

Yes	No	N/A		
☐	☒	☐	1.	Is storm water permit coverage required for the facility (>1.0 MGD design flow)?

Industrial Storm Water Comments: **None**

Construction

Yes	No	N/A		
☐	☒	☐	1.	Is the facility upgrading?
☐	☒	☐	2.	Is more than 1 acre of land disturbed?

Construction Storm Water Comments:
None

XIII. Plant Operations

Yes	No	N/A		
☐	☐	☒	1.	Is standby power or equivalent provisions provided for the treatment facility?
☐	☐	☒	2.	Does the facility have an alarm system for power or equipment failures?
☐	☒	☐	3.	Have emergency procedures been established?
☐	☒	☐	4.	Is the facility adding chemicals during the treatment process?
☐	☒	☐	5.	Can the facility be bypassed (internal, total, etc.)? If yes, describe bypass procedures.
☐	☐	☒	6.	Has DENR has been notified of previous bypasses? List bypasses reported since last inspection.
☒	☐	☐	7.	Does the treatment facility have adequate capacity to protect against hydraulic overload?
☒	☐	☐	8.	Does the treatment facility have adequate capacity to protect against organic overloads?
			9.	How does the facility evaluate capacity?

Plant Operation Comments:
It is recommended the facility come up with written emergency procedures in case of emergency and someone needs to know what to do in regards to wastewater system.

XIV. Site Visual Inspection / Treatment Processes

Provide a general description of applicable treatment processes, along with comments relating to the operation, condition of equipment, observations, and any changes made since the last inspection.

A. General Appearance

The facility dikes show a lot of erosion from a lack of riprap. That is why the construction schedule was included in permit. The facility is struggling to find an affordable option as the correct riprap cannot be found locally. The dikes are mowed but the fence could use repair as the facility removed a section to clean out the storm water channel with heavy equipment.

B. Safety Features

Yes	No	N/A		
☐	☐	☒	1.	Are procedures established for identifying out-of-service equipment? What are they?
☐	☐	☒	2.	Is personal protective equipment provided for employees (safety helmets, hearing protection, eye protection, gloves, rubber boots with steel toes)?

Yes	No	N/A		
☐	☐	☒	3.	Are laboratory safety devices (eyewash and shower, fume hood, proper labeling and storage) available?
☐	☐	☒	4.	Does the plant have general safety features such as rails around or covers over tanks, pits, and wells?
☐	☐	☒	5.	Are portable hoists available for equipment removal?
☐	☐	☒	6.	Are warning signs (no smoking, high voltage, watch-your-step, and exit) posted?
☒	☐	☐	7.	Are emergency phone numbers listed?
☒	☐	☐	8.	Is the plant generally clean and free from open trash areas?
☐	☐	☒	9.	Are SDS (MSDS), as applicable, accessible by employees?
☐	☒	☐	10.	Is there a fence or other barrier to prevent non-wastewater personnel from accessing the facility?
☒	☐	☐	11.	Do non-wastewater personnel have access to the facility?
☐	☒	☐	12.	Is there wastewater personnel onsite 24-hours a day; 7-days a week?
☐	☒	☐	13.	Are gates locked?
☒	☐	☐	14.	Are wastewater warning signs located at the facility?

Safety Features Comments:

The fence is in need of repair. The fence was removed to get access for heavy equipment to clean out the storm water channel that runs around the wastewater system. The system is not currently able to restrict access to the public. The fence needs to be repaired and the gate needs to be locked to prevent non-wastewater personnel from accessing facility.

C. Treatment Units

Stabilization Ponds

Item	Comments
Inspection frequency	**Weekly during summer, less frequent in winter**
Weeds and/or trees growing on the dikes	**Some cattails in Cell #3**
Vegetation growing in the ponds	**None**
Pond dikes protected from erosion with riprap	**None and sever erosion has occurred**
Dike structure failure (sloughing and/or sagging)	**Yes**
Evidence of erosion	**Yes**
Pond seepage surfacing reported	**There is seepage from Storm Water Retention Basin into Cell #5**
Fencing in good condition	**No**
Signs legible and properly located	**Yes**
Facility accessible in all weather conditions	**Yes**
Evidence of burrowing animals	**None observed**
Evidence of grazing animals	**None observed**
Odor problem (except seasonal turnover)	**None observed**
Are there aerators? (indicate type)	**No**
Number of aerators per cell	**N/A**
Inter-pond piping valves are working and used	**Yes**
Depth indicator(s)	**No**
Discharge structure (valve control, overflow, etc.)	**Valve Controlled**
Which ponds are drawn down during a discharge?	**Cell #5**
Cells operated in series or parallel	**Series**

Cell information (stabilization pond)

	Cell #1	Cell #2	Cell #3	Cell #4	Cell #5
Maximum operation depth	**8'**	**6'**	**6'**	**3'**	**3'**
Current operating depth	**7'**	**5'**	**5'**	**2'**	**3'**
Minimum operating depth	**2'**	**2'**	**2'**	**2'**	**2'**
Surface area at maximum depth	**2.55 A**	**1.03 A**	**0.96 A**	**2.08 A**	**3.42 A**

Stabilization Pond Comments:

The ponds show severe signs of erosion due to lack of riprap. The construction schedule in permit has been added to address this issue.

Photo Log

Location:	City of Bison
Date:	April 16, 2019
Staff Member:	Kyle Doerr, Raul Vasquez

Figure 1: Cell #1 Facing North

Figure 3: Cell #3 Facing Southwest

Figure 2: Cell #2 Facing South

Figure 4: Stormwater Canal

Figure 5: Storm Water Canal Facing East

Figure 8: Depth Indicator with no markings

Figure 6: Transfer Pipe to Cell #4

Figure 9: Erosion on Cell #4

Figure 7: Transfer Pipe

Figure 10: Erosion on Cell #4

Figure 11: Erosion on Cell #5 Facing East

Figure 12: Cell #5 Facing West

Figure 13: Stormwater Detention Pond

Figure 14: Seepage from Stormwater Pond to Cell #5

Figure 15: Cell #5 Facing Southwest

Figure 16: Erosion on Cell #4

Figure 17: Erosion on Cell #4

Figure 18: Erosion on Cell #4

Figure 19: South Side of Cell #4

Figure 20: Cattails in Cell #3

Figure 21: Depth Indicator in Cell #3 without markings

For Office Use Only			
Rating: ☐S ☒M ☐U	**Other: MOD ☐ ASSIST ☐ SEV ☐ ENF ☐**		
Name of Inspector	**Signature**	**Affiliation / Phone**	**Date**
Kyle Doerr		***SDDENR / (605) 773-3351***	**5/15/19**
Name of Reviewer	**Signature**	**Affiliation / Phone**	**Date**
Albert Spangler, P.E.		***SDDENR / (605) 773-3351***	**5/22/19**

PO Box 910
Bison, SD 57620
Phone: 605-244-5677
Fax: 650-244-7173

ATTN:JESSIE ALLARD

RECEIVED
SEP 29 2015
DEPT OF ENVIRONMENT & NATURAL RESOURCES - RAPID CITY

Corrective measures taken by the city of bison in regards to our lagoon inspection done on july, 23,2015:

1.- the city will fix and lock all gates going into our lagoons

2.-the city is currently re-engineering our lagoon system to get rip-rap done on the cells, we are in the process of having soil samples taken for the possible cónstruction of another cell also.

3.- after rip-rap is done pond depth indicators will be installed.

4.-cattails are scheduled to be sprayed when weather allows

5.- the city is aerating cells 4&5 to drop water levels before winter

6.- the city is in the process of of camera work on our sanitary sewer lines. We are replacing problem areas,(sags & cracked clay tile pipe) to prepare for relining problem areas. The re-lining is scheduled to be done in October 2015 by Hydro Klean, located in watertown,s.d.

I hope this summary will answer all questions in regards to our lagoon inspection

If there are any other questions I can be reached at (605) 244-5678

Heath Mckinstry Maint. Supervisor

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
2050 West Main Street, Suite #1
Rapid City, SD 57702-2493
Telephone: 605-394-2229
Fax: 605-394-5317

August 24, 2015

The Honorable David Kopren
President, Town of Bison
PO Box 910
Bison, SD 57620

RE: Surface Water Discharge Compliance Inspection (SWD Permit Number: SD0022411)

Dear President Kopren:

The South Dakota Department of Environment and Natural Resources conducted a Surface Water Discharge Compliance Inspection of the town's wastewater treatment facility on July 23, 2015. I appreciate Heath McKinstry's time and cooperation in supplying the requested information.

I have attached an inspection summary and a copy of the inspection report. Please pay special attention to the inspection summary tables and implement the required corrective actions as soon as possible. All corrective actions taken will be reviewed during our next inspection at your facility.

By September 30, 2015, please submit a summary of the corrective actions taken to the department at the address listed in the letterhead.

Thank you for your continued efforts to protect the environment and natural resources of South Dakota. Please review this report for accuracy, and respond within thirty days with any needed corrections. If you have any questions about this letter or the inspection reports, please contact me at (605) 773-3351.

Sincerely,

Jessie L. Allard
Engineer I
Surface Water Quality Program

Enclosures

cc w/enc: Keith McKinstry, Operator - Town of Bison
SWD File - Pierre

INSPECTION SUMMARY

Facility: Town of Bison
SWD Permit: SD0022411
Inspection Date: July 23, 2015

The following comments and corrective actions are ***required*** in order to come into compliance with the town's surface water discharge permit.

COMMENTS	REQUIRED CORRECTIVE ACTIONS
The operator reported that the sewer backed up into a home.	All discharge and/or overflows, including sewer back-ups must be monitored, reported, and sampled according to the requirements in your SWD permit.

The following comments and corrective actions are ***recommended*** and are items that will improve the operation of your facility.

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
The gate in the fence around the wastewater treatment facility was unlocked. **This was noted in previous inspections.**	The gate should remain locked to prevent the entrance of unauthorized persons into the wastewater treatment facility.
The dikes are showing signs of erosion.	The ponds should be riprapped to stop the erosion caused by high water and wind/wave action. If not corrected, this erosion may cause operation and maintenance problems and result in major repair expenses. **The town is aware of this problem and is working to address it.**
There is not enough riprap in cells A, B, and C of the wastewater treatment facility. **The town is aware of this problem and is working to address it.**	Cells A, B, and C need more riprap to stop the erosion caused by high water and wind/wave action. If not corrected, this erosion may cause operation and maintenance problems and result in major repair expenses. Please see enclosed sheet on riprapping

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
There are no pond depth indicators in cells 3, 4, or 5. **This was noted in previous inspections.**	Pond depth indicators should be installed in each cell, with readings recorded during each inspection. These records will be helpful in determining flow to the ponds and aid in maintaining the proper operating depths in the ponds at all times.
Cattails and reeds are growing in cell #3. **The cattails were scheduled to be sprayed after the inspection.**	In order for your treatment ponds to operate properly, the rush and cattail growth in the ponds should be eliminated by spraying and/or cutting to prevent erosion/seepage damage to the dikes and attracting rodents.
The stabilization pond area should be free of grazing animals.	Grazing animals can do extensive damage in just a short period of time resulting in both operation and maintenance problems, and a major expense to the city for repairs.
The stabilization ponds were extremely full during the inspection. The ponds have been continuously run under surcharge conditions and now the dikes are showing evidence of damage due to sloughing and erosion. When water levels exceed the maximum depth in any of the ponds, surcharge conditions exist. Prolonged surcharges lead to dike erosion, seepage or slumping of the surrounding dikes.	The water in the stabilization ponds needs to be lowered as soon as possible. If the problem is not corrected soon, the surcharge conditions may cause an unauthorized discharge from your facility.

NO DISCHARGE INSPECTION CHECKLIST

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

I. GENERAL INFORMATION

Name	Town of Bison		
Location	SW ¼ Sec. 13 T18N R13E, Perkins County		
SWD Permit No.	SD0022411		
Contact Person / Title	Heath McKinstry / Operator	**Phone Number**	605-244-5678 (shop) 605-484-8160
Responsible Party/Title	David Kopren / President	**Phone Number**	605-244-5677

Persons present during the inspection:

Name	Title / Phone Number	Affiliation
Heath McKinstry	Operator / 605-484-8160	Bison
Earl Siefken	Operator / 605-244-5677	Bison
Jessie Allard	Engineer I / 605-394-6866	SDDENR

Mailing Address	PO Box 910, Bison, SD 57620		
Inspection Date	7/23/2015	**Last Inspection Date**	10/19/2011
Entrance Time	10:00 AM	**Exit Time**	12:30 PM
Permit Effective Date	4/1/2011	**Permit Expiration Date**	3/31/2016

Type of "No Discharge" Facility:

☒ Stabilization Ponds Only ☐ Other:

Design Population Equivalent	Unknown	**Average Design Flow**	Unknown
Present Population Served	333 (2010 Census)		
Date Facility Began Operation	1983	**Dates of Facility Upgrades**	2001
Industries Served by Facility (list names of industries)	None		

Facility Description:
Wastewater flows by gravity to a 5-cell stabilization pond system. Cells 1, 2, 3 (2.55 acres, 1.03 acres, and 0.96 acres in surface area, respectively) are operated in series. The city can then transfer wastewater from Cell 3 to either Cell 4 or Cell 5, which are considered evaporation ponds and are 2.08 and 3.42 acres in surface area, respectively.

Does the facility match the above description? Yes or No. If not, describe facility modifications or changes.
Yes

Is a permit modification needed?
No

II. PERSONNEL AND BUDGET REVIEW

Number of Personnel: **2**

Certification	Class I	Class II	Class III	Class IV
Treatment				
Collection				
State certification requirements (if required)	**None**			

Budget:

Yearly expenditures for the facility. **$40,453.49** Residential Sewer Use Fee **$22/month**

Yearly revenue for the facility. **$52,976.47** Commercial Sewer Use Fee **$22/month**

Describe any wastewater projects planned during the next three years. **The city plans to have sewer and manholes relined.**

Describe measures taken to raise funds for the project(s). **Sewer fund**

Comments: The Town of Bison has planned a project to rip-rap their ponds; however, they received no bids after letting their project.

III. PERMIT VERIFICATION

		Yes	No	N/A
1.	A current copy of the permit is on site.	X		
2.	Operator is aware of permit conditions (especially unauthorized release procedures).	X		
3.	O&M manuals for the treatment facility and the lift stations are available.	X		
4.	Facility is as described in permit. If no, what is different?	X		
5.	Facility, address and contact information is correct in the SWD Database? (Including: Fees, SSO's, PTD's, Inspections, PDF's, Flooding Reports, etc.)	X		
6.	Facility, address and contact and permit information is correct in the ICIS Database? (Including: Monitoring and Limits, Inspections, Construction Schedules, etc.)	X		
7.	Have there been any new, different, or increased loadings to the WWTF since the last inspection? If yes, describe. **Increased groundwater infiltration**	X		

Comments:

IV. RECORDKEEPING AND REPORTING EVALUATION

	Yes	No	N/A
1. An inspection notebook is maintained for the treatment facility.	X		
2. A notebook is maintained for lift station inspections, and/or hour meter readings?			X
3. Discharge Monitoring Reports have been submitted as required (for land application facilities only).			X
4. Information is maintained for the required 3-year period.	X		

If overflows occurred from this facility, the information from questions 5-7 should be entered in the SSO Database.

	Yes	No	N/A
5. Facility has experienced an emergency release, such as overflows (pond or sanitary sewer) or bypasses (internal, collection system, total). If yes, describe the release (dates, total volumes, receiving waters, etc.): Facility discharged on November 4, 2013 for about 2 weeks. The stormwater detention pond overflowed into cell #5 and a discharge was necessary to prevent cell #5 from overflowing.	X		
6. DENR was notified of any emergency releases (treated and/or untreated). If no, why not?	X		
7. Samples were collected for all emergency releases/bypasses. If yes, list sampling results in the following table. If no, why not?	X		

Comments: The operator has been keeping inspection records, but nothing was available for the month of July. Their inspection notebooks run from July-June and he did not have a new notebook to keep records in. A new notebook will be sent to the facility.

V. FACILITY PROCEDURES REVIEW

	Yes	No	N/A
1. A water balance has been done for the facility. Describe the results. **I/I was identified to be a major source of inflow.**	X		
2. Written emergency procedures are established (in the event of a major storm event, a chemical release into the sewer system, a sewer main break, etc.)	X		
3. A vulnerability assessment has been performed.		X	
4. Modifications to the facility have been made since the last inspection. Describe the modifications:		X	
5. Facility can be bypassed (internal, collection system, total). Describe bypass procedures:		X	
6. Sludge has been disposed of at this facility. If yes, describe disposal procedures:		X	

7. Hauled waste (septage) or industrial waste is accepted at this facility. If yes, list contact information:		X	
8. Chemicals or enzymes are added to the wastewater. If yes, list products:		X	
9. The facility has experienced problems with industrial or hauled wastes. If yes, explain:		X	
10. Does the facility have sampling kits in case of a discharge or SSO?	X		

Comments:

VI. COMPLIANCE SCHEDULE STATUS REVIEW

	Yes	No	N/A
1. Is the facility subject to a compliance schedule either in its permit or in an enforcement action? If yes, note date and type of enforcement action. **The city is on a construction schedule to address emergency discharges they've had.**	X		
2. List milestones that remain in the schedule: **See comments**			
3. Has facility has missed milestone dates? If yes explain:	X		
4. Will the facility meet or do they plan to meet final compliance schedule date?		X	

Comments: The permit was modified on 12/2/2013 to incorporate a new compliance schedule.

- Hire engineer to review sanitary sewer system and identify I/I sources: 10/1/2011
- Complete and submit I/I study to SDDENR: 9/1/2012
- Submit facility plan to address excess flow and noncompliance: 7/1/2013
- Submit quarterly progress reports: 7/1/2013
- Submit plans & specifications and modifications to SDDENR: 6/1/2014
- Start construction: 6/1/15
- Complete construction and startup: 3/31/2016

In the quarterly progress report submitted by Beth Hulm, the city finance officer, the plans and specifications were approved on 4/27/15 and the addendum was approved on 6/4/15. Bid letting commenced on 6/9/15 for the lagoon project; however, no bids were received. Contractors were concerned about the lack of nearby rock and clay sources as well as a possible change order due to a nearby spring leaking into one of the cells. The scope of the project has changed and a new environmental review may need to be done. The plans and specifications may need to be modified along with their loan documents. The town will not be able to complete the lagoon project during this calendar year. They do plan to reline large sections of the sewer throughout the town this fall.

VII. COLLECTION SYSTEM REVIEW

Piping and Manholes

Type of Collection System: [ ] Combined [X] Separate [ ] Both

[ ] Other (explain): _____

		Yes	No	N/A
1.	A routine sewer-cleaning schedule is maintained. If yes, what is the schedule and what type of equipment is used? **Jetted every three years.**	X		
2.	Sewer backups into basements occur during high flows. If yes, explain: **One this spring due to tree roots in the pipe.**	X		
3.	The community has a sump pump ordinance. If yes, how is it enforced? **The city attorney is drafting the ordinance and it will be approved in their August city meeting.**		X	
4.	Testing for inflow/infiltration sources has been conducted since the last inspection. If yes, describe testing and corrective actions taken to fix problems: **Sewer was smoked four years ago and the last manhole on the line was manually checked. Half of their system is clay tile which is cracked and causing high I/I.**	X		
5.	Miles of collection system, if known: **Unknown**			

Comments: The operator was unaware of the requirements to report backups into homes. Proper reporting procedures were discussed.

VIII. TREATMENT PROCESS REVIEW

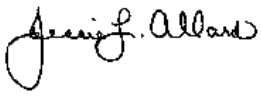
Stabilization Ponds

Item	Comments
Inspection frequency	**Monthly**
Weeds and/or trees growing on the dikes	**Some weeds and small brush**
Vegetation growing in the ponds	**Some cattails in cell 3**
Pond dikes protected from erosion with riprap	**Some rip-rap – improperly sized and installed**
Pond seepage surfacing reported	**None**
Dike structure failure (sloughing and/or sagging)	**Some erosion in cells 4 and 5**
If aerators are used, number per cell	**N/A**
Aerator information and comments	**N/A**
Condition of fencing	**Good**
All access gates are kept locked	**No**
Signs legible and properly located	**Yes**
Facility accessible in all weather conditions	**Yes**
Evidence of burrowing animals	**No**
Evidence of grazing animals	**Yes – cattle graze in the storm ditch along cells**
Odor problem (except seasonal turnover)	**No**
Inter-pond piping valves are working and used	**Yes**
Flow measurement (weir, flume, etc.)	**None**
Depth indicator(s)	**Depth indicators in cell 1 & 2**
Effluent destination	**Unnamed tributary of Thunder Butte**
Discharge structure (valve control, overflow, etc.)	**None**
Latest discharge (date)	**2013**
Duration of discharge	
Cells operated in series or parallel	**Series**

Cell information

	Cell #1	Cell #2	Cell #3	Evaporation Cell #4	Evaporation Cell #5
Maximum operation depth (feet)	**8**	**6**	**6**	**3**	**3**
Current operating depth (feet)	**8**	**6**	**6**	**3**	**3**
Minimum operating depth (feet)	**2**	**2**	**2**	**2**	**2**
Surface area at maximum depth (acres)	**2.55**	**1.03**	**0.96**	**2.08**	**3.42**

Comments: All cells are at or over capacity. The depth indicators in Cell 1 & 2 were underwater.

For Office Use Only			
Rating: ☐ S ☒ M ☐ U	**Other:** MOD ☐ ASSIST ☐ SEV ☐ ENF ☐		
Name of Inspector	**Signature**	**Affiliation / Phone**	**Date**
Jessie L. Allard		**SDDENR / (605) 773-3351**	**8/24/2015**
Name of Reviewer	**Signature**	**Affiliation / Phone**	**Date**
Albert Spangler, P.E.		**SDDENR / (605) 773-3351**	**8/14/2015**


Cell #1
07 23 2015 11:25


Cell #2
07 23 2015 11:30

Cell #3

Cell #4

Cell #5

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

November 15, 2011

The Honorable Juell Chapman
President, City of Bison
PO Box 910
Bison, SD 57620

RE: Surface Water Discharge Compliance Inspection (SWD Permit Number: SD0022411)

Dear President Chapman:

The South Dakota Department of Environment and Natural Resources conducted a Surface Water Discharge Compliance Inspection at the city's wastewater treatment facility on October 19, 2011. I appreciate Heath McKinstry's time and cooperation in supplying the requested information.

I have attached an inspection summary and a copy of the inspection report. Please pay special attention to the Inspection Summary tables and implement the required corrective actions as soon as possible. All corrective actions taken will be reviewed during our next inspection at your facility. **By December 19, 2011, please submit a summary of the corrective actions taken to the department at the address listed in the letterhead.**

Thank you for your continued efforts to protect the environment and natural resources of South Dakota. Please review this report for accuracy, and respond within thirty days with any needed corrections. If you have any questions about this letter or the inspection reports, please contact me at (605) 773-3351.

Sincerely,

Jonathan Hill
Natural Resources Project Engineer
Surface Water Quality Program
Enclosures

cc: Heath McKinstry, Operator, Bison
Seth Draper, EPA Region 8, 8ENF-W-NP
SWD File - Pierre

INSPECTION SUMMARY

Facility: Bison WWTF

SWD Permit: SD0022411

Inspection Date: October 19, 2011

The following comments detail violations of the permit that were identified during the inspection. Corrective actions for each violation are ***required*** for the town to come into compliance with its surface water discharge permit.

COMMENTS	REQUIRED CORRECTIVE ACTIONS
As per the town's request, the town's permit allows for the land application of wastewater. Because land applying wastewater is part of the town's permit, the town is required to submit a Best Management Practices Plan for land application of wastewater to SDDENR within 90 days of the permit effective date. SDDENR has not received this plan at the time of the inspection.	Section 1.7 of your permit states: "*A Best Management Practices Plan for land application of treated wastewater shall be developed and implemented. The goal of the plan shall be to protect surface and ground water supplies, and public health. The plan shall be prepared in accordance with the* South Dakota Recommended Design Criteria Manual for Wastewater Collection and Treatment Facilities, *1991. The plan shall be submitted to the department for review and approval within 90 days of the permit effective date. No land application shall occur prior to the plan being reviewed and approved by the department.*" **The town must submit this plan by December 19, 2011.**

COMMENTS	REQUIRED CORRECTIVE ACTIONS
The operator is not keeping adequate records of his inspections of the wastewater treatment facility in an inspection notebook. ***This comment was made during previous inspections.***	All pond site inspections conducted by town personnel must be documented in a notebook to be reviewed by SDDENR personnel when an inspection occurs. **At a minimum,** the notebook shall include the following: 1. Date and time of the inspection; 2. Name of the inspector(s); 3. The facility's discharge status; 4. The measured water depth in all cells and the artificial wetlands; 5. Identification of operational problems and/or maintenance problems; 6. Recommendations, as appropriate, to remedy identified problems; 7. A brief description of any actions taken with regard to problems identified; and 8. Other information, as appropriate. The inspection notebook is a condition of the SWD permit and must be kept for all future site inspections.

The following comments and corrective actions are ***recommended*** and are items that will improve the operation of your facility.

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
The dikes are showing signs of erosion from wind/wave action. Cell #4 is also showing signs of erosion from storm water flowing into the treatment cell from the adjoining hillside.	The ponds should be riprapped to stop the erosion caused by high water and wind/wave action. The town should consider redirecting storm water flow around the treatment cells to stop erosion from storm water flowing into the cell minimize the need for emergency discharges. If not corrected, this erosion may cause operation and maintenance problems and result in major repair expenses. Please see enclosed sheet on riprapping.

COMMENTS	RECOMMENDED CORRECTIVE ACTIONS
There is weed growth on the pond dikes.	This unwanted vegetation needs to be eliminated to prevent dike damage from erosion and the root systems of these plants. This vegetation also tends to inhibit the air action on the ponds, which in turn inhibits the biological action necessary to treat the wastes and keep odors to a minimum. Once the weeds are eliminated, the pond site should be reseeded with an appropriate grass.
The operator would benefit from more training.	We would like to encourage you to give Mr. McKinstry or another representative of Bison the opportunity to attend the wastewater training courses sponsored by the state to upgrade skills and share knowledge concerning the operation and maintenance of municipal wastewater systems. For more information as to dates and locations of upcoming courses in your area, contact South Dakota Association of Rural Water Systems, under contract with DENR, at 203 Center Street W., Madison, SD 57042. Phone: (605) 556-7219. Website: http://www.sdarws.com.
The current sewer use fees are $14.62/month.	The town should continue its efforts to increase the sewer use fees. Several communities are facing upgrades, rehabilitation, or new construction. If your community is confronting a large project, you may wish to contact your local planning district to discuss appropriate rates and the available funding sources for your project.
The gate in the fence around the wastewater treatment facility was unlocked.	The gate should remain locked to prevent the entrance of unauthorized persons into the wastewater treatment facility.
There are no pond depth indicators in cells #3, #4, or #5	Pond depth indicators should be installed in each cell, with readings recorded during each inspection. These records will be helpful in determining flow to the ponds and aid in maintaining the proper operating depths in the ponds at all times.

Riprap

Riprap is recommended to protect the slopes of wastewater pond dikes if the ponds are 5 acres or more in size or if the pond dikes show significant erosion. Riprap will prevent the erosion of the pond dikes from wave action due to high winds.

Riprap is usually done by engineering firms but can be done by individual facilities if the proper procedure is followed.

The following steps are found in Chapter IV – Recommended Design Criteria for Wastewater Stabilization and Pollution Control Ponds. This document can be found on SDDENR's website at http://denr.sd.gov/documents/designnumber.pdf. The information on riprap begins on page 46 of 139 of the Design Criteria.

Riprap and Bank Stabilization Requirements

1. The riprap or bank stabilization shall be provided on the interior slopes from the toe to the top of the freeboard. It shall be hard and durable and be stable after placement.

2. The riprap should be approximately **6 to 18 inches** in diameter.

3. The riprap shall be placed in depths of 8-18 inches depending upon size, location and configuration of cells.

4. Since riprap is usually placed against fine material, a filter of sand with gravel or spalls should be placed on the embankment slopes prior to riprapping. The depth of the filter material should be at least 4 inches. Another alternative available is synthetic filter blankets which shall be securely anchored and shall have been satisfactorily demonstrated by prior use to be suitable and durable for such purposes.

Adequate justification is required for not following the foregoing criteria.

NO DISCHARGE INSPECTION CHECKLIST

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

I. GENERAL INFORMATION

Name Town of Bison

Location Southwest ¼ of Section 13, Township 18 North, Range 13 East, in Perkins County, South Dakota (Latitude 45.518528°, Longitude -102.476472°)

SWD Permit No. SD0022411

Contact Person / Title Heath McKinstry / Water Superintendent **Phone Number** (605) 244-5678

Responsible Party/Title Juell Chapman / President **Phone Number** (605) 244-5677

Persons present during the inspection:

Name	Title / Phone Number	Affiliation
Heath McKinstry	Water Superintendent / (605) 224-5678	Bison
Jonathan Hill	Natural Resources Project Engineer / (605) 773-3351	SDDENR

Mailing Address PO Box 910 Bison, SD 57620

Inspection Date 10/19/2011 **Last Inspection Date** July 15, 2010

Entrance Time 9:45 AM **Exit Time** 11:15 AM

Permit Effective Date April 1, 2011 **Permit Expiration Date** March 31, 2016

Type of "No Discharge" Facility:

☐ Stabilization Ponds Only ☒ Other: stabilization, evaporation ponds, and land application

Design Population Equivalent Unknown **Average Design Flow** Unknown

Present Population Served 333

Date Facility Began Operation 1983, **Dates of Facility Upgrades** 2001

Industries Served by Facility (list names of industries) None

For office use only: *OMA* Yes ☐ No ☒ *OME* Yes ☐ No ☒ *SEV* Yes ☐ No ☒ *ENF* Yes ☐ No ☒

II. PERMIT VERIFICATION

	Yes	No	N/A
1. A current copy of the permit is on site.	X		
2. Operator is aware of permit conditions (especially unauthorized release procedures).	X		
3. O&M manuals for the treatment facility and the lift stations are available.			X
4. Facility is as described in permit. If no, what is different?	X		
5. Facility, address and contact information is correct in the SWD Database?	X		
6. Facility, address and contact information is correct in the ICIS Database?	X		
5. Have there been any new, different, or increased loadings to the WWTF since the last inspection? If yes, describe.		X	

Comments: ***Flow has decreased. The operator believes this is a result of sump pumps being disconnected from the collection system.***

III. RECORDKEEPING AND REPORTING EVALUATION

	Yes	No	N/A
1. An inspection notebook is maintained for the treatment facility.		X	
2. A notebook is maintained for lift station inspections, and/or hour meter readings?			X
3. Discharge Monitoring Reports have been submitted as required (for irrigation facilities only).			X
4. Information is maintained for the required 3-year period.	X		

If overflows occurred from this facility, the information from questions 5-7 should be entered in the SSO Database.

	Yes	No	N/A
5. Facility has experienced an emergency release, such as overflows (pond or sanitary sewer) or bypasses (internal, collection system, total). If yes, describe the release, including dates, total volumes, and receiving waters: ***No emergency discharges since spring of 2010.***		X	
6. DENR was notified of any emergency releases (treated and/or untreated). If no, why not?		X	
7. Samples were collected for all emergency releases/bypasses. If yes, list sampling results in the following table. If no, why not?		X	

Comments: ***The operator records dates of maintenance activities on a calendar in the city shop. The operator has calendars going back for more than 3 years with this information.***

IV. FACILITY PROCEDURES REVIEW

	Yes	No	N/A
1. A water balance has been done for the facility. Describe the results. ***I/I has been a significant problem for the city. A construction schedule has been added to the permit requiring the city to address I/I. So far, the city has requested residents to voluntarily remove sump pumps from the waste water collection system. The residents have been cooperating with this request.***	X		
2. Written emergency procedures are established (in the event of a major storm event, a chemical release into the sewer system, a sewer main break, etc.)	X		
3. A vulnerability assessment has been performed.		X	
4. Modifications to the facility have been made since the last inspection. Describe the modifications:		X	
5. Facility can be bypassed (internal, collection system, total). Describe bypass procedures:		X	
6. Sludge has been disposed of at this facility. If yes, describe disposal procedures:		X	
7. Hauled waste (septage) or industrial waste is accepted at this facility. If yes, list contact information:		X	
8. Chemicals or enzymes are added to the wastewater. If yes, list products:		X	
9. The facility has experienced problems with industrial or hauled wastes. If yes, explain:		X	
10 Does the facility have sampling kits in case of a discharge or SSO?	X		

Comments: ***From Cell #3, water can be pumped to either of the two evaporation cells.***

V. COMPLIANCE SCHEDULE STATUS REVIEW

	Yes	No	N/A
1. Is the facility subject to a compliance schedule either in its permit or in an enforcement action? If yes, note date and type of enforcement action. ***Construction schedule in permit to address excess flow into system***	X		
2. List milestones that remain in the schedule: *2. Complete and submit an inflow/infiltration study to SDDENR by:* ***September 1,2012*** *3. Submit a facility plan to SDDENR, identifying the steps the town will take to address sources of excess flow into the system and correct other identified causes of noncompliance by:* ***January 1, 2013*** *4. Submit plans and specifications for system upgrades and modifications to SDDENR for review and approval by:* ***March 1, 2013***			

5. Start construction of system upgrades, process modifications, or equipment acquisition, if necessary, by: ***July 1, 2013***			
6. Submit quarterly progress reports on construction of treatment systems, process modifications, equipment acquisition, or other items specified in the Facility Plan beginning: ***July 1, 2013***			
7. Complete construction and startup of treatment system, process modifications, or equipment installation by: ***October 1, 2014***			
3. Facility will meet the final compliance date.	X		

Comments: ***The inspector mentioned to the operator that the city should consider doing repairs to the dikes and add more riprap as part of the upgrades to the system.***

VI. PERSONNEL AND BUDGET REVIEW

Number of Personnel: ***1***

Certification	Class I	Class II	Class III	Class IV
Treatment	***0***			
Collection	***0***			
State certification requirements	***None***			

Budget:

Yearly expenditures for the facility. ***$70,274.00***

Residential Sewer Use Fee ***$10.77 / month + 3.85 / month project fee***

Yearly revenue for the facility. ***$109,484.97***

Commercial Sewer Use Fee ***$***

Describe any wastewater projects planned during the next three years. ***Projects will depend on what the engineering study finds.***

Describe measures taken to raise funds for the project(s). ***The town puts the 3.85 / month fee into a fund exclusively for wastewater projects.***

Comments: ***The town increases the fees by 3% each January.***

VII. COLLECTION SYSTEM REVIEW

Piping and Manholes

Type of Collection System: [ ] Combined [X] Separate [ ] Both [ ] Other (explain):

	Yes	No	N/A
1. A routine sewer-cleaning schedule is maintained. If yes, what is the schedule and what type of equipment is used? ***The entire system is jetted yearly.***	X		
2. Sewer backups into basements occur during high flows. If yes, explain:		X	

	X*	
X		

3. The community has a sump pump ordinance. If yes, how is it enforced?
The city does not have an official sump pump ordinance, however, noticed were posted around town asking residents to disconnect any sump pumps connected to the collection system.

4. Testing for inflow/infiltration sources has been conducted since the last inspection. If yes, describe testing and corrective actions taken to fix problems: ***The collection system was smoke tested in 2009. The collection system was inspected with a camera in 2011. A flow study is being conducted by the city's engineer.***

Comments: ***The operator has not received the results of the flow study. The camera showed some sagging areas of the collection system and leaking manholes. The city has relined many any of the manholes in 2010 and 2011.***

Within the past year, the operator has noticed a large number of homes disconnecting the sump pumps from the wastewater collection system since the city asked residents to voluntarily disconnect sump pumps from the collection system.

VIII. TREATMENT PROCESS REVIEW

Land Application:

Comments: ***The town has decided that land application of wastewater is not an option that they will pursue at this time. The town has not land applied wastewater. A land application plan has not been developed at this time. The plan must be developed and submitted whether or not the town currently plans to land apply wastewater in the near future.***

Stabilization Ponds:

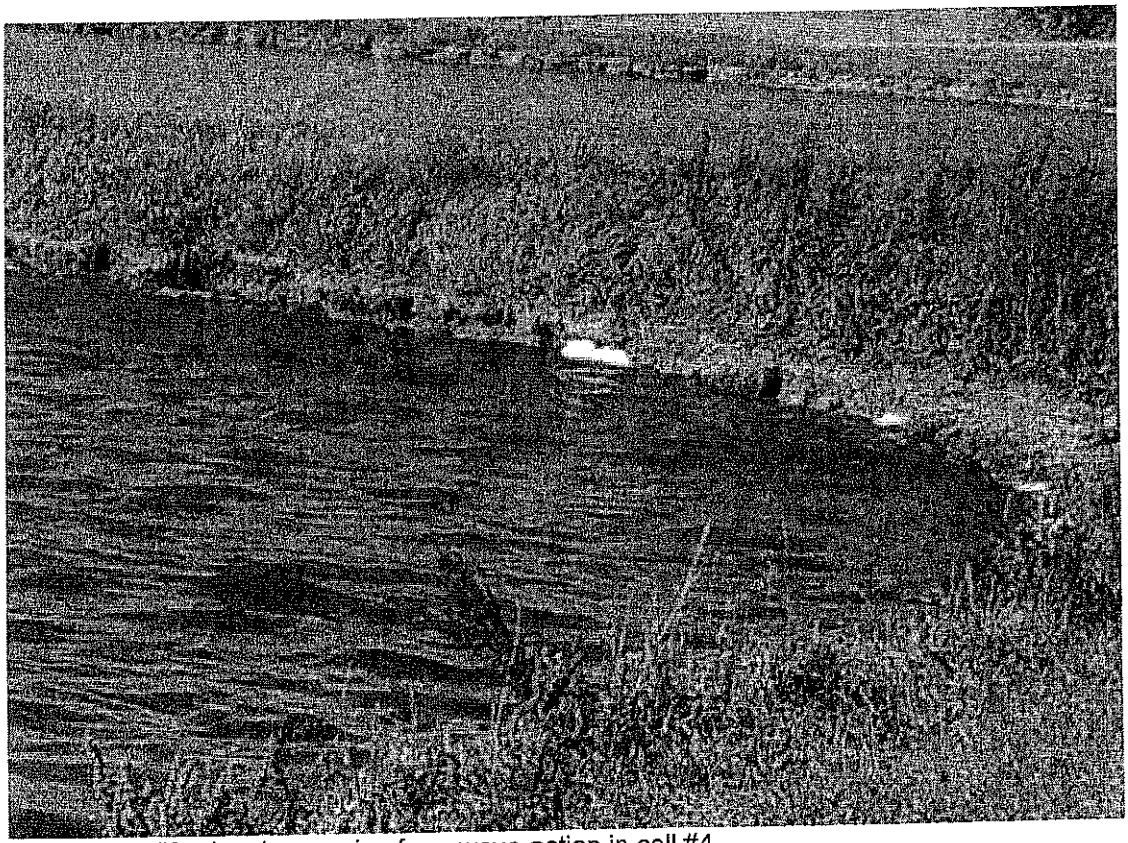
Item	Comments
Inspection frequency	*Weekly*
Weeds and/or trees growing on the dikes	*Some weeds on the dikes*
Vegetation growing in the ponds	*None*
Pond dikes protected from erosion with riprap	*Riprap is present in some areas, but is not properly sized or installed to protect against erosion.*
Pond seepage surfacing reported	*None*
Dike structure failure (sloughing and/or sagging)	*Erosion noted in cells #4 and #5 from wave action. Cell #4 has slight erosion due to run off from adjoining hillside.*
If aerators are used, number per cell	*NA*
Aerator information and comments	*NA*
Condition of fencing	*Good*
All access gates are kept locked	*No*
Signs legible and properly located	*Yes*
Facility accessible in all weather conditions	*Yes*
Evidence of burrowing animals	*Yes*
Evidence of grazing animals	*None*
Odor problem (except seasonal turnover)	*None*
Inter-pond piping valves are working and used	*Yes*
Flow measurement (weir, flume, etc.)	*None*
Depth indicator(s)	*Depth indicators are in cells #1 and 2 only.*
Effluent destination	*Unnamed tributary of Thunder Butte*
Discharge structure (valve control, overflow, etc.)	*None*
Latest discharge (date)	*June 2010 emergency discharge*
Duration of discharge	*16 days*
Cells operated in series or parallel	*Series*

Cell information

	Cell #1	Cell #2	Cell #3	evaporation cell #4	evaporation cell #5
Maximum operation depth (feet)	*8*	*6*	*6*	*3*	*3*
Current operating depth (feet)	*4.5*	*5*	*5*	*3*	*3*
Minimum operating depth (feet)	*2*	*2*	*2*	*2*	*2*
Surface area at maximum depth (acres)	*2.55*	*1.03*	*0.96*	*2.08*	*3.42*

Comments: ***Cell #4 is showing signs of erosion from runoff from the adjoining hillside. Erosion from caused by overland flow and from wave action are shown in the photographs on the next page. The town should consider redirecting storm water flow around the treatment cells to prevent erosion and minimize emergency discharges.***

Photograph #1, erosion from overland flow into cell #4 is circled.


Photograph #2, showing erosion from wave action in cell #4.

Surface Water Discharge Compliance Inspection Report

Section A: National Data System Coding

Transaction Code	Permit No.	mm/dd/yy	Insp. Type	Inspector	Fac. Type
N 5	SD0022411	10/19/2011	C	S	1

Remarks:

Inspection Work Days	Facility Evaluation Rating	BI	QA	Reserved	Reserved
0.8	3	N	N		

Section B: Facility Data

Name and Location of Facility (*For Industrial Users include POTW name and SWD permit number*)	Entry Time:	Permit Eff. Date:
Bison Wastewater Treatment Facility	9:45 AM	04/01/2011
Name of On-Site Representative(s)/ Title/ Phone and Fax Number	**Exit Time:**	**Permit Exp. Date**
Heath McKinstry / Water Superintendent / (605) 244-5678	11:15 AM	03/31/2016
Name and Address of Responsible Official/Title/Phone and Fax Number	**Other Facility Data**	
Juell Champman / President / PO Box 910, Bison SD, 57620 / (605) 244-5677		
Contacted?		

Section C: Areas Evaluated During Inspection
(S=Satisfactory, M=Marginal, U=Unsatisfactory, N=Not Evaluated)

S	Permit	N	Flow Measurement	M	O & M	S	CSO/SSO
U	Records/Reports	S	Self-Monitoring	S	Sludge Disposal	N	PP
M	Facility Site Review	S	Compliance Schedule	S	Industrial Users	N	Multimedia
M	Effluent/Receiving Waters	S	Laboratory	N	Storm Water	N	Other

Section D: Summary of Findings/Comments (*Attach additional sheets if necessary*)

1. Best Management Plans for land application have not been developed.
2. Operator is not keeping an inspection notebook with required information.
3. Dikes are showing signs of erosion.
4. Dikes have weed growth.
5. Monthly fee is $14.62.
6. Gate to the WWTF is not kept locked.
7. Depth indicators should be installed in cells #3, #4, and #5.

Name of Inspector(s)	Signature	Affiliation / Phone	Date
Jonathan Hill	Jonathan Hill	*SDDENR / (605) 773-3351*	11-3-2011

Name of Reviewer	Signature	Affiliation / Phone	Date
Kelli D. Buscher, P.E.	Kelli D. Buscher	*SDDENR / (605) 773-3351*	11/14/11

INSTRUCTIONS FOR SURFACE WATER DISCHARGE COMPLIANCE INSPECTION REPORT

SECTION A: NATIONAL DATA SYSTEM CODING

Transaction Code: Use N, C or D for New, Change or Delete. All inspections will be New (N) unless there is an error in the data entered.

Permit No.: SWD Permit Number.

Inspection Date: Use month/day/year format.

Inspection Type: Uses the following codes to describe the type of inspection:

A-Performance Audit
B-Biomonitoring
C-Compliance Evaluation
D-Diagnostic
E-Corps of Engrs Inspection
F-Pretreatment Follow-up
G-Pretreatment Audit
I-Industrial User (IU)
L-Enforcement Case Support
M-Multimedia
P-Pretreatment Compliance Inspection
R-Reconnaissance Inspection
S-Compliance Sampling
U-IU Inspection with Pretreatment Audit
X-Toxics Inspection
Z-Biosolids
2 IU Sampling Inspection
3 IU Non-Sampling Insp
4 IU Toxics Inspection
5 IU Sampling Insp w/Prt
6 IU Non-Samp Insp w/Prt
7 IU Toxics w/Prt
%-SSO Sampling Insp
& -SSO Non-Sampling Insp
# -CSO Sampling Insp
$ - CSO Non-Sampling Insp

Inspector Code: Use following codes to describe the lead agency:

C-Contractor or Other (specify)
E-Corps of Engineers
J-Joint EPA/State - EPA Lead
N-NEIC Inspectors
R-EPA Regional inspector
S-State Inspector
T-Joint State/EPA - State Lead

Facility Type: Use following codes to describe the facility:

1-Municipal - Publicly Owned Treatment Works (POTW) with SIC code 4952.
2-Industrial - Other than municipal, agricultural and Federal facilities.
3-Agricultural - Facilities with SIC 0111 to 0971.
4-Federal - Facilities identified as Federal by the EPA Regional Office.

Remarks: Columns for remarks at discretion of the Inspector.

Inspection Work Days: Estimate the total work effort (to the nearest 0.1 work day), up to 99.9 days, that were used to complete the inspection and submit a QA reviewed report of findings. This estimate includes the accumulative effort of all participating inspectors; any effort for laboratory analyses, testing, and remote sensing; and the billed payroll time for travel and pre and post inspection preparation. This estimate does not require detailed documentation.

Facility Evaluation Rating: Evaluate the quality of the facility self monitoring program using scale of 1 to 5, with a 5 being a very reliable program, a 3 being satisfactory and a 1 being a very unreliable program.

Biomonitoring Information: Enter D for static testing; F for flow through testing; or N for no biomonitoring.

Quality Assurance Data Inspection: Enter Q if inspection was a follow-up on QA sample results. Enter N otherwise.

SECTION B: FACILITY DATA

This section is self-explanatory, except for *Other Facility Data*, which may include new information not in the permit or PCS (e.g., new outfalls, names of receiving waters, new ownership, and other updates to the record).

SECTION C: AREAS EVALUATED DURING INSPECTION

Indicate findings (S, M, U or N) in the appropriate line. Use section D and additional sheets as need to explain findings in a brief narrative when appropriate. The heading marked *Multimedia* may indicate medias such as CAA, RCRA, and TSCA. The heading marked "Other" may be used to note any additional concerns, such as SPCC, BMPs, and concerns that are not covered elsewhere.

SECTION D: SUMMARY OF FINDINGS/COMMENTS

Briefly summarize the inspection findings along with referencing any attachments such as checklists from NPDES inspection manuals, pretreatment guidance documents and monitoring results.

Operation and Maintenance Award Summary Form

am.
8-27-10

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

~~AT~~ Tim
Dale
Jonathan
~~Bret~~
Tina
~~Anthony~~ File

August 25, 2010

Eric Kahler
President, Town of Bison
PO Box 910
Bison, SD 57620

RE: Offsite Evaluation (SWD Permit SDG822411)

Dear Mr. Kahler:

The South Dakota Department of Environment and Natural Resources (SDDENR) has recently conducted an offsite file review of the wastewater treatment facility for the town of Bison, permit number SDG822411. The following observations were discovered during the evaluation:

- The town has had several emergency discharges in the past two years. Your permit does not authorize discharges except in accordance with emergency provisions. The number of discharges that have occurred at the facility is unacceptable and the facility needs to take measures to stop discharging.

- All discharges were verbally reported to SDDENR; however, the written reporting requirements were not followed. An "Unauthorized Discharge Monitoring Summary Form", found in the Appendix of your SWD permit, must be filled out and submitted to SDDENR by the 28th day of the month following the emergency discharge.

- The Unauthorized Discharge Monitoring Summary Form stated the discharge lasted from June 7th to June 19th of 2010; however SDDENR was notified on June 2nd that the discharge had started June 1st. The monitoring form also stated that the samples were taken June 7th, June 8th, and June 9th, but State Health Lab data indicated the samples were taken June 1st, June 2nd, and June 17th. Please make sure that unauthorized discharge information is accurately reported. The Unauthorized Discharge Monitoring Summary form is being returned to be corrected and resubmitted to SDDENR.

- Not enough samples are being taken during the emergency discharges. According to your permit, 3 samples must be taken the first week of the discharge and 1 sample per week each week after that.

- Total Coliforms are not being analyzed in emergency discharge samples. Your SWD permit requires that all samples of an unauthorized discharge shall be analyzed for total coliforms.

- The pH is being analyzed at the State Health Lab. EPA methods dictate that the pH must be taken within 15 minutes of sample collection. Therefore the city must have access to a pH meter and analyze samples in the field.

- The samples have been received at the State Health Lab at too high of temperature. The maximum allowable received temperature for a sample is 4 °C. Please make sure proper preservation techniques are being followed.

- The June 2010 Unauthorized Discharge Monitoring Summary Form and State Health Lab result forms were reviewed and it was found that the Total Suspended Solids (TSS) results were reported as the Five-day Biochemical Oxygen Demand (BOD_5) results and the fecal coliform results were reported as the total coliform results. If you need assistance in filling out these forms, please contact SDDENR at (605) 773-3351. The Unauthorized Discharge Monitoring Summary form is being returned to be corrected and resubmitted to SDDENR.

- Mr. McKinstry has not been authorized to sign the "Unauthorized Discharge Monitoring Summary Form" Please have the town president sign the forms or send a letter to SDDENR authorizing Mr. McKinstry to sign the forms.

If you have any questions or concerns regarding this evaluation, please feel free to contact me at (605) 773-3351 or Tina.Piroutek@state.sd.us.

Sincerely,

Tina Piroutek
Natural Resources Engineer
Surface Water Quality Program

cc: SWQ file

SWD PERMIT OFF-SITE EVALUATION CHECKLIST

South Dakota Department of Environment and Natural Resources

I. GENERAL INFORMATION

Facility Name	Town of Bison		
SWD Permit No.	SDG822411		
Reviewer / Title	Tina Piroutek/Natural Resources Engineer		
Review Date	July 15, 2010	**Last Inspection Date**	August 27, 2007
Permit Effective Date	April 1, 2008	**Expiration Date**	March 31, 2011
Industries Potentially Served by the Facility (Review Phone Book, Internet, Industrial Guide, etc.)	None		
Population Served	373 (2000 census)		
Date Facility Began Operation	1983	**Date of Facility Upgrade(s)**	2001

II. PERMIT VERIFICATION

		Yes	No	N/A
1.	DENR has been notified of any new, different, or increased loading to the WWTF.		X	
2.	Name of receiving water(s) and classification. **Unnamed tributary of Thunder Butte Creek (9,10), Thunder Butte Creek (6,8,9,10)**			
3.	Names, address, location, and phone number are correct in the database and ICIS. If not, indicate correct information below.	X		
4.	Are any changes to the permit necessary?	X		
5.	Is the permit properly coded (Review Limit Summary in ICIS)?	X		
6.	Is a follow-up letter to the facility required?	X		

Comments: *The town has requested to add land application of wastewater to their permit.*

For office use only: ***OMA*** Yes ☐ No ☒ ***OME*** Yes ☐ No ☒ ***SEV*** Yes ☐ No ☒ ***ENF*** Yes ☐ No ☒

III. RECORDKEEPING AND REPORTING EVALUATION

1. The following information shall be reviewed where reasonably available:
   a. Lab results (Review Health Lab results, if applicable)
   b. Discharge Monitoring Reports (DMRs – Review last 2 years of DMRs)
   c. Emergency Discharge Forms
   d. Compliance Schedule Reports
   e. Other: _____
   f. Other: _____

	Yes	No	N/A
2. The facility is required to obtain permission from the department before discharging.			X
a. If yes, has the facility requested permission for discharges			X
b. If yes, has the facility received permission for discharges			X
3. The DMRs and/or Emergency Release Forms have been submitted on time		X	
4. The DMRs and/or Emergency Release Forms have been completed properly		X	
a. Monitoring for required parameters is performed at least as frequently as required by the permit		X	
b. Monitoring is performed for all required parameters		X	
c. Minimum, maximum, and average columns are properly completed			X
d. The number of exceedances column (NO. EX) is completed properly			X
e. The permit signatory or authorized representative is signing the DMRs		X	
f. Each page of the DMRs is signed and dated	X		

Comments: *The facility did not send in an Unauthorized Discharge Monitoring Summary form for the March 2009 and July 2009 unauthorized discharges. Not enough samples were taken for the June 2010 discharge. According to the June 2010 monitoring form, the discharge lasted from June 7- June 19th, however SDDENR was notified of the discharge on June 2nd and the State Health Lab has results from June 1st, June 2nd, and June 17th. According to State Health Lab results, the facility is not sampling for total coliform, as required by the permit. The State Health Lab pH values were reported on the monitoring form. The TSS results were reported on the monitoring summary for the BOD_5 results and the fecal coliform results were reported as total coliform results. The fecal coliform was not analyzed for the June 1, 2010 sample because it reached the lab past the 24 hour holding time. Heath McKinstry signed the June 2010 Unauthorized Discharge Monitoring Summary but has not been authorized to do so.*

IV. COMPLIANCE EVALUATION

Facility Performance

		Yes	No	N/A
1.	Facility has reported a discharge since last inspection. If yes, how many? _____		X	
2.	Facility is in compliance with all effluent limits since last inspection.			X
a.	Effluent BOD_5 violations? If yes, how many? _____			X
b.	Effluent TSS violations? If yes, how many? _____			X
c.	Effluent pH violations? If yes, how many? _____			X
d.	Effluent ammonia violations? If yes, how many? _____			X
e.	Effluent fecal coliform violations? If yes, how many? _____			X
f.	Effluent total coliform violations? If yes, how many? _____			X
g.	Effluent temperature violations? If yes, how many? _____			X
h.	Effluent TRC violations? If yes, how many? _____			X
i.	Other effluent violations? _____			X
3.	Department has received complaints (Describe below)		X	

Comments: *Facility is a no discharge facility. There have been four unauthorized discharges since the last inspection.*

Enforcement/Compliance Schedule Evaluation

Yes	No	N/A
	X	
		X
		X
		X
	X	
		X

1. Has the facility received an enforcement action in the last 5 years?
   a. Has the facility complied with the Order for Compliance?
   b. Have similar violations occurred?
   c. Were facility modifications or construction necessary to meet the Order?
2. Is the facility subject to a compliance schedule either in its permit or in an enforcement action? If yes, note date and type of schedule.

3. List milestones that remain in the schedule:

4. Facility has missed milestone dates, but will still meet the final compliance date.

Comments: *Facility has not received an enforcement action and does not have a compliance schedule.*

Sanitary Sewer Overflow Evaluation

Review file and SSO database for the following questions

Yes	No	N/A
X		
	X	
	X	

1. Facility has reported sanitary sewer overflows or bypasses (internal, collection system, total). Describe in detail, including dates, total volumes, receiving waters:

2. DENR was properly notified of any bypasses/overflows (24-hr verbal notice plus a letter in 5 days) or unauthorized releases (treated and/or untreated). If no, why not?
   DENR received an Unauthorized Discharge Monitoring Summary Form for the June 2010 emergency discharge. A form was not received for any of the other discharges

3. Samples were collected for all bypasses and/or overflows. If yes, summarize sampling results. If no, why not?
   Samples were taken of all discharges; however the samples were not analyzed for total coliform, as required by the permit. Also the facility is having the State Health Lab analyze the pH. See attachment 1 for sample results.

Comments: *The city sewer superintendent, Heath McKinstry, stated that he did not know he was required to send in the Unauthorized Discharge Monitoring Summary Form, until June 2010. Mr. McKinstry indicated that he has kept sample records for all of the discharges. Two unauthorized discharges occurred March of 2009. 3/17/2009: One cell overflowed about 100 gallons into the ditch next to the ponds. 3/20/2009: All of the cells were overflowing into cell 5 and cell 5 was overflowing to the unnamed tributary of Thunder Butte Creek. An emergency discharge occurred in July 2009. The cells were full and the facility was forced to discharge. It is unknown, how long the discharge occurred and how much wastewater was released. DENR was notified in April 2010 that the city will need to discharge, however the city postponed the discharge until June 2010. The June 2010 discharge was caused by a large amount of flow into the ponds, believed to be from sump pumps. The discharge lasted from June 1-June 17th and approximately 1,152,000 gallons were discharged to the unnamed tributary of Thunder Butte Creek.*

Land Application Evaluation

Yes	No	N/A
	X	
	X	
		X

1. Is the facility approved to land apply wastewater?
2. Has land application of wastewater occurred?
3. Has the facility followed the sampling and reporting requirements for land application

Comments: *The town has submitted an application to allow for land application of wastewater.*

Attachment 1-Emergency Discharge/SSO Sample Results

Sample Date	Sample Time	BOD_5 (mg/L)	TSS (mg/L)	Ammonia (mg/L)	Fecal Coliform (#/100mL)	Lab pH (s.u.)
March 2009						
03/17/2009	09:00	30	24	1.94	1100	7.45
03/17/2009	09:00	58	31	12.6	12000	7.49
03/23/2009	13:00	8	29	1.47	330	7.55
03/23/2009	13:00	7	18	0.7	<10	7.44
April 2009						
04/15/2009	12:38	4	20	1.33	100	7.76
04/15/2009	13:38	3	29	0.21	<10	7.42
04/16/2009	12:45	5	12	1.19	70	7.71
04/16/2009	13:30	8	21	1.17	<10	9.11
04/23/2009	12:35	12	126	6.06	90	8.77
July 2009						
07/20/2009	13:37	19	164	0.9	20	8.96
June 2010						
06/01/2010	15:06	22	56	0.32	**NA**	9.23
06/02/2010	11:45	21	59	0.55	10	9.3
06/17/2010		40	111	0.1	100	9.2

*All samples were received at the State Health Lab above the maximum acceptable temperature.

NA=The sample was not analyzed for fecal coliform because the holding time was exceeded.

GREAT FACES. GREAT PLACES.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
2050 West Main, Suite #1
Rapid City, SD 57702
Telephone 605-394-2229
FAX Number 605-394-5317

am 10/30/07 Stacy ~~Sarah~~ ~~Anthony~~ ~~Al~~ ~~Tim~~ ~~Jill~~ ~~Pete~~ File ~~Ready~~

October 1, 2007

The Honorable Jeff Van Vactor
President, Town of Bison
PO Box 910
Bison, SD 57620-0910

RE: Bison Wastewater Treatment Facility No-Discharge Inspection (Permit Number SD0022411)

Dear President Van Vactor:

We appreciate the assistance of Doug Lewton and Heath McKinstry in conducting the No-Discharge inspection of the Bison wastewater treatment facility by South Dakota Department of Environment and Natural Resources' (SDDENR) personnel on August 27, 2007. Enclosed are the results of the inspection in the "No Discharge Inspection Checklist" and the "Surface Water Discharge (SWD) Compliance Inspection Report."

The purpose of the inspection was to review wastewater facility operation and maintenance practices, along with determining compliance with the town's SWD permit. Please review the entire report for accuracy. The following recommendations and comments are items which will improve the operation of your facility. These items should be addressed as part of an ongoing maintenance program.

Recommendations and Comments

1. The town of Bison had two emergency releases from its wastewater system in 2006. The releases were reported to the department and sampled as required by the Surface Water Discharge permit. Please continue to follow permit requirements for any future emergency releases.

2. In order to have an adequate source of funds for repairs and replacement of the town's wastewater collection and treatment system, we recommend that the town review its wastewater rates and give serious consideration to raising them. Several communities are facing upgrades, rehabilitation, or new construction. These construction costs are typically very large and cannot be accomplished without the community leaders having the foresight to set appropriate wastewater rates to cover these costs as well as the cost of operation and maintenance. Many communities facing construction projects are finding that an appropriate rate is approximately $17 per household per month. The town may want to consider

annual increases to the sewer use rates over a period of several years to reach a more appropriate level.

3. Emergency procedures have not been established for major storm events, chemical releases to the sewer system, sewer main breaks, etc. The town of Bison should consider developing an emergency response plan and/or a priority call list in the event of a sewer line break, severe storm, or natural disaster. An emergency response plan and a priority call list will aid the town in handling these events. For further information or assistance in preparing an emergency response plan, please contact the South Dakota Association of Rural Water Systems at (605) 336-7219.

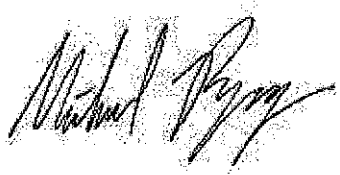
4. The town shall continue its efforts in controlling weed and tree growth in the stabilization pond area. This unwanted vegetation needs to be eliminated to prevent dike damage from erosion and break up of the dikes from the root systems of these plants.

5. The gate to the wastewater treatment facility should be secured at all times to deter unauthorized entry.

6. We would like to encourage you to give Doug Lewton or another representative of Bison the opportunity to attend some of the various wastewater training courses sponsored by the state to upgrade their skills and share knowledge concerning the operation and maintenance of municipal wastewater systems. For more information as to dates and locations of upcoming courses in your area, contact South Dakota Association of Rural Water Systems, under contract with DENR, at 5009 W 12th Street, Suite 5, Sioux Falls, SD 57106. Phone: (605) 336-7219.

Thank you for protecting the natural resources of South Dakota. If you have any questions concerning this report, please contact this office.

Sincerely,



Michael Pogany, E.I.T.
Natural Resources Project Engineer
Surface Water Quality Program

Enclosure

cc: Doug Lewton, Superintendent, Town of Bison
Bison SWD File - RCRO
Bison SWD File – DENR Pierre
USEPA Region VIII

NO DISCHARGE INSPECTION CHECKLIST

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

I. GENERAL INFORMATION

Name	Bison Wastewater Treatment Facility		
Location	one mile west of Bison, SW ¼ of Section 13, Township 18 North Range 13 East		
SWD Permit No.	SD0022411		
Contact Person / Title	Doug Lewton / Superintendent	**Phone Number**	(605) 244-5677
Responsible Party/Title	Jeff Van Vactor / President	**Phone Number**	(605) 244-5677
Mailing Address	PO Box 910, Bison, SD 57620		
Inspection Date	8/27/07	**Last Inspection Date**	9/9/02
Entrance Time	1300	**Exit Time**	1400
Permit Effective Date	4/1/03	**Permit Expiration Date**	3/31/08

Type of "No Discharge" Facility:

☒ Stabilization Ponds Only ☐ Other: _____

Design Population Equivalent	Unknown	**Average Design Flow**	Unknown
Present Population Served	387		
Date Facility Began Operation	1983	**Dates of Facility Upgrades**	2001
Industries Served by Facility (list names of industries)	Bison Foods (butchering)		

For office use only:	***OMA***	***OME***	***SEV***	***ENF***
	Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒

II. PERMIT VERIFICATION

	Yes	No	N/A
1. A current copy of the permit is on site.	X		
2. Operator is aware of permit conditions, especially unauthorized release procedures.	X		
3. A copy of the O&M manuals for the treatment facility and the lift stations are available.		X	
4. Facility is as described in permit. If no, what is different? _____	X		
5. Have there been any new, different, or increased loadings to the WWTF since the last inspection? If yes, describe. _____		X	

Comments:

III. RECORDKEEPING AND REPORTING EVALUATION

	Yes	No	N/A
1. An inspection notebook is maintained for the treatment facility.	X		
2. A notebook is maintained for inspections of the lift stations, and/or hour meter readings.			X
3. Discharge Monitoring Reports have been submitted as required (for irrigation facilities only).			X
4. Information is maintained for the required 3-year period.	X		

If overflows occurred from this facility, the information from questions 5-7 should be entered in the SSO Database.

	Yes	No	N/A
5. Facility has experienced an emergency release, such as overflows (pond or sanitary sewer) or bypasses (internal, collection system, total). If yes, describe the release, including dates, total volumes, and receiving waters: ***Two emergency discharges in 2006 due to excessive precipitation. Feb-March 2006, April – May 2006. See sample summary below for results.***	X		
6. DENR was notified of any emergency releases (treated and/or untreated). If no, why not? _____	X		
7. Samples were collected for all emergency releases/bypasses. If yes, list sampling results in the following table. If no, why not? _____	X		

Comments:

	Sample 1	Sample 2	Sample 3
Date of sample	*2/28/06*	*3/1/06*	*3/2/06*
Time of sample	*1340*	*1410*	*1405*
Flow while sampling, gpm	*600*	*600*	*600*
BOD_5, mg/L	*23*	*22*	*21*
TSS, mg/L	*78*	*74*	*78*
Fecal Coliforms, no/100 mL (May 1 - September 30)	*< 10*	*< 10*	*< 10*
Ammonia as N, mg/L	*0.35*	*0.53*	*0.59*
pH, standard units (LAB pH)	*9.41*	*9.43*	*9.42*
Water Temperature, °C	*3.6*	*2.5*	*3.0*

	Sample 1	Sample 2	Sample 3
Date of sample	*4/25/06*	*4/27/06*	*5/1/06*
Time of sample	*1346*	*1348*	*1355*
Flow while sampling, gpm	*600*	*600*	*600*
BOD_5, mg/L	*40*	*29*	*26*
TSS, mg/L	*176*	*172*	*450*
Fecal Coliforms, no/100 mL (May 1 - September 30)	*< 10*	*< 10*	*10*
Ammonia as N, mg/L	*0.13*	*0.06*	*0.12*
pH, standard units (LAB pH)	*9.40*	*9.40*	*9.37*
Water Temperature, °C	*8.0*	*14.3*	*15.1*

IV. FACILITY PROCEDURES REVIEW

	Yes	No	N/A
1. A water balance has been done for the facility. Describe the results. ***Water balance shows total retention.***	X		
2. Written emergency procedures are established (in the event of a major storm event, a chemical release into the sewer system, a sewer main break, etc.)		X	
3. A vulnerability assessment has been performed.		X	
4. Modifications to the facility have been made since the last inspection. Describe the modifications: _____		X	

	Yes	No	N/A
5. Facility can be bypassed (internal, collection system, total). Describe bypass procedures: ***Valve allows water from cell #1 to enter cell #3, but is not used. Cells #4 and #5 are used depending on water levels.***	X		
6. Sludge has been disposed of at this facility. If yes, describe disposal procedures:		X	
7. Hauled waste (septage) or industrial waste is accepted at this facility. If yes, list contact information:		X	
8. Chemicals or enzymes are added to the wastewater. If yes, list products:		X	
9. The facility has experienced problems with industrial or hauled wastes. If yes, explain:			X

Comments:

V. COMPLIANCE SCHEDULE STATUS REVIEW

	Yes	No	N/A
1. Is the facility subject to a compliance schedule either in its permit or in an enforcement action? If yes, note date and type of enforcement action.		X	
2. List milestones that remain in the schedule:			
3. Facility has missed milestone dates, but will still meet the final compliance date.			X

Comments:

VI. PERSONNEL AND BUDGET REVIEW

Number of Personnel: ***2***

Certification	Class I	Class II	Class III	Class IV
Treatment				
Collection				
State certification requirements (if required)	***None required***			

Budget:

Yearly expenditures for the facility. ***$25,194*** Residential Sewer Use Fee ***$13.03/mo***

Yearly revenue for the facility. ***$30,564*** Commercial Sewer Use Fee ***$13.03/mo***

Describe any wastewater projects planned during the next three years. ***None planned***

Describe measures taken to raise funds for the project(s). ***NA***

Comments: *Sewer use fee includes a depreciation reserve charge of $3.48 and base fee of $9.55.*

VII. COLLECTION SYSTEM REVIEW

Piping and Manholes

Type of Collection System: ☐ Combined ☒ Separate ☐ Both

☐ Other (explain): _____

	Yes	No	N/A
1. A routine sewer-cleaning schedule is maintained. If yes, what is the schedule and what type of equipment is used? ***The whole town is jetted 2 times per year.***	X		
2. Sewer backups into basements occur during high flows. If yes, explain:		X	
3. The community has a sump pump ordinance. If yes, how is it enforced? ***Visual inspections during building inspections or reading water meters.***	X		
4. Testing for inflow/infiltration sources has been conducted since the last inspection. If yes, describe testing and corrective actions taken to fix problems: ***Smoke testing in spring 2007. Problems identified in private residences. Homeowners instructed to remedy problems.***	X		

Comments:

VIII. TREATMENT PROCESS REVIEW

Stabilization Ponds

Item	Comments
Inspection frequency	*2-3 time per week, documented once per month*
Weeds and/or trees growing on the dikes	*Yes weed growth on dikes. One small tree noted. Small area of bull rushes.*
Vegetation growing in the ponds	*No*
Pond dikes protected from erosion with riprap	*Cell #1-3 have riprap. Evaporation cells #4 and #5 do not. Minor erosion noted on cells #4 and #5.*
Pond seepage surfacing reported	*No*
Dike structure failure (sloughing and/or sagging)	*No*
If aerators are used, number per cell	*NA*
Aerator information and comments	*NA*
Condition of fencing	*Good*
All access gates are kept locked	*No*
Signs legible and properly located	*Yes*
Facility accessible in all weather conditions	*Yes*
Evidence of burrowing animals	*No*
Evidence of grazing animals	*No*
Odor problem (except seasonal turnover)	*No*
Inter-pond piping valves are working and used	*Yes*
Flow measurement (weir, flume, etc.)	*NA*
Depth indicator(s)	*Cells 3-5.*
Effluent destination	*Emergency releases enter unnamed trib. of Thunder Butte Creek.*
Discharge structure (valve control, overflow, etc.)	*None*
Latest discharge (date)	*May 2006*
Duration of discharge	*6 days*
Cells operated in series or parallel	*Series 1-3, Cells #4 or #5 dosed as water levels allow.*

Cell information

	Cell #1	Cell #2	Cell #3	Cell #4	Cell #5
Maximum operation depth	*5′*	*5′*	*5′*	*3′*	*3′*
Current operating depth	*4.5′*	*5′*	*4′*	*2′*	*2′*
Minimum operating depth	*2′*	*2′*	*2′*	*1′*	*1′*
Surface area at maximum depth	*2.55 ac*	*1.03*	*0.96*	*2.08*	*3.42*

Comments:

Surface Water Discharge Compliance Inspection Report

Section A: National Data System Coding

Transaction Code		Permit No.	mm/dd/yy	Insp. Type	Inspector	Fac. Type
N	5	SD0022411	08/27/07	C	S	1

Remarks:

Inspection Work Days	Facility Evaluation Rating	BI	QA	Reserved	Reserved
0.6	3	N	N		

Section B: Facility Data

Name and Location of Facility (For Industrial Users include POTW name and SWD permit number)	Entry Time:	Permit Eff. Date:
Bison Wastewater Treatment Facility	1300	04/01/03
Name of On-Site Representative(s)/ Title/ Phone and Fax Number	**Exit Time:**	**Permit Exp. Date**
Doug Lewton / Superintendent / (605) 244-5677	1400	03/31/08
Name and Address of Responsible Official/Title/Phone and Fax Number	**Other Facility Data**	
Jeff Van Vactor, PO Box 910, Bison, SD 57620		
Contacted? No		

Section C: Areas Evaluated During Inspection
(S=Satisfactory, M=Marginal, U=Unsatisfactory, N=Not Evaluated)

S	Permit	N	Flow Measurement	S	O & M	S	CSO/SSO
S	Records/Reports	S	Self-Monitoring	N	Sludge Disposal	N	PP
S	Facility Site Review	N	Compliance Schedule	N	Industrial Users	N	Multimedia
S	Effluent/Receiving Waters	N	Laboratory	N	Storm Water	N	Other

Section D: Summary of Findings/Comments (Attach additional sheets if necessary)

1. Continue to follow reporting and sampling requirements for emergency releases.
2. Recommend raising sewer rates.
3. Recommend developing written emergency procedures.
4. Continue efforts to remove weed and tree growth on pond dikes.
5. Recommend locking gates to facility to prevent unauthorized access.
6. Encourage additional operator training.

Name of Inspector(s)	Signature	Affiliation / Phone	Date
Michael Pogany, E.I.T.		SDDENR / (605) 394-2229	10/1/07

Name of Reviewer	Signature	Affiliation / Phone	Date
Kelli D. Buscher, P.E.		SDDENR / (605) 773-3351	10/1/07

INSTRUCTIONS FOR SURFACE WATER DISCHARGE COMPLIANCE INSPECTION REPORT

SECTION A: NATIONAL DATA SYSTEM CODING

Transaction Code: Use N, C or D for New, Change or Delete. All inspections will be New (N) unless there is an error in the data entered.

Permit No.: SWD Permit Number.

Inspection Date: Use month/day/year format.

Inspection Type: Uses the following codes to describe the type of inspection:

A-Performance Audit
B-Biomonitoring
C-Compliance Evaluation
D-Diagnostic
E-Corps of Engrs Inspection
F-Pretreatment Follow-up
G-Pretreatment Audit
I-Industrial User (IU)
L-Enforcement Case Support
M-Multimedia
P-Pretreatment Compliance Inspection
R-Reconnaissance Inspection
S-Compliance Sampling
U-IU Inspection with Pretreatment Audit
X-Toxics Inspection
Z-Biosolids
2 IU Sampling Inspection
3 IU Non-Sampling Insp
4 IU Toxics Inspection
5 IU Sampling Insp w/Prt
6 IU Non-Samp Insp w/Prt
7 IU Toxics w/Prt
%-SSO Sampling Insp
& -SSO Non-Sampling Insp
# -CSO Sampling Insp
$ - CSO Non-Sampling Insp

Inspector Code: Use following codes to describe the lead agency:

C-Contractor or Other (specify)
E-Corps of Engineers
J-Joint EPA/State - EPA Lead
N-NEIC Inspectors
R-EPA Regional inspector
S-State Inspector
T-Joint State/EPA - State Lead

Facility Type: Use following codes to describe the facility:

1-Municipal - Publicly Owned Treatment Works (POTW) with SIC code 4952.
2-Industrial - Other than municipal, agricultural and Federal facilities.
3-Agricultural - Facilities with SIC 0111 to 0971.
4-Federal - Facilities identified as Federal by the EPA Regional Office.

Remarks: Columns for remarks at discretion of the Inspector.

Inspection Work Days: Estimate the total work effort (to the nearest 0.1 work day), up to 99.9 days, that were used to complete the inspection and submit a QA reviewed report of findings. This estimate includes the accumulative effort of all participating inspectors; any effort for laboratory analyses, testing, and remote sensing; and the billed payroll time for travel and pre and post inspection preparation. This estimate does not require detailed documentation.

Facility Evaluation Rating: Evaluate the quality of the facility self monitoring program using scale of 1 to 5, with a 5 being a very reliable program, a 3 being satisfactory and a 1 being a very unreliable program.

Biomonitoring Information: Enter D for static testing; F for flow through testing; or N for no biomonitoring.

Quality Assurance Data Inspection: Enter Q if inspection was a follow-up on QA sample results. Enter N otherwise.

SECTION B: FACILITY DATA

This section is self-explanatory, except for *Other Facility Data*, which may include new information not in the permit or PCS (e.g., new outfalls, names of receiving waters, new ownership, and other updates to the record).

SECTION C: AREAS EVALUATED DURING INSPECTION

Indicate findings (S, M, U or N) in the appropriate line. Use section D and additional sheets as need to explain findings in a brief narrative when appropriate. The heading marked *Multimedia* may indicate medias such as CAA, RCRA, and TSCA. The heading marked "Other" may be used to note any additional concerns, such as SPCC, BMPs, and concerns that are not covered elsewhere.

SECTION D: SUMMARY OF FINDINGS/COMMENTS

Briefly summarize the inspection findings along with referencing any attachments such as checklists from NPDES inspection manuals, pretreatment guidance documents and monitoring results.

Appendix C
Town Soil Map and Data

This sheet intentionally left blank

U.S. Fish and Wildlife Service
National Wetlands Inventory

Bison

June 5, 2020

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Perkins County, South Dakota

June 5, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Perkins County, South Dakota
Survey Area Data: Version 19, Sep 17, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 9, 2015—Sep 10, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BcA	Belfield-Grail clay loams, 0 to 2 percent slopes	22.3	3.1%
Db	Dimmick and Heil soils	74.5	10.5%
McA	Morton loam, 0 to 2 percent slopes	75.8	10.6%
McB	Morton loam, 2 to 6 percent slopes	330.4	46.4%
MdC	Morton-Lantry loams, 2 to 9 percent slopes	118.5	16.6%
MdD	Morton-Lantry loams, 6 to 15 percent slopes	77.0	10.8%
RfB	Regent-Savage silty clay loams, 3 to 6 percent slopes	5.6	0.8%
W	Water	8.5	1.2%
Totals for Area of Interest		**712.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Perkins County, South Dakota

BcA—Belfield-Grail clay loams, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2r4h0
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Belfield and similar soils: 50 percent
Grail and similar soils: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belfield

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Slope alluvium derived from shale and siltstone

Typical profile

Ap - 0 to 6 inches: clay loam
A - 6 to 10 inches: clay loam
E/B - 10 to 13 inches: clay loam
Btn1 - 13 to 19 inches: clay
Btn2 - 19 to 26 inches: clay loam
Bk - 26 to 45 inches: clay loam
C - 45 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Forage suitability group: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Grail

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Slope alluvium derived from shale and siltstone

Typical profile

Ap - 0 to 6 inches: clay loam
A - 6 to 10 inches: clay loam
Bt - 10 to 33 inches: clay
Bk - 33 to 52 inches: clay loam
C - 52 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 8.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Forage suitability group: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Savage

Percent of map unit: 10 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope

Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Grail, overflow

Percent of map unit: 10 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Daglum

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Hydric soil rating: No

Db—Dimmick and Heil soils

Map Unit Setting

National map unit symbol: cx0h
Elevation: 1,660 to 3,610 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Dimmick and similar soils: 50 percent
Heil and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dimmick

Setting

Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey slope alluvium

Typical profile

H1 - 0 to 6 inches: silty clay
H2 - 6 to 60 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 5 percent
Gypsum, maximum in profile: 2 percent
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: Wet Land (R054XY036ND)
Forage suitability group: Not suited (G054XY000ND)
Hydric soil rating: Yes

Description of Heil

Setting

Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey slope alluvium

Typical profile

H1 - 0 to 3 inches: silty clay loam
H2 - 3 to 48 inches: silty clay
H3 - 48 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 1 to 4 inches to natric
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: Closed Depression (R054XY022ND)
Forage suitability group: Not suited (G054XY000ND)
Hydric soil rating: Yes

Minor Components

Belfield

Percent of map unit: 4 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Rhoades

Percent of map unit: 3 percent
Landform: Plains
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Thin Claypan (R054XY033ND)
Hydric soil rating: No

Daglum

Percent of map unit: 3 percent
Landform: Plains
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Hydric soil rating: No

McA—Morton loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: cx0y
Elevation: 1,660 to 3,610 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Morton and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morton

Setting

Landform: Plains
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 18 inches: silty clay loam
H3 - 18 to 32 inches: silty clay loam
Cr - 32 to 60 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Minor Components

Belfield

Percent of map unit: 4 percent
Landform: Drainageways, swales
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 4 percent
Landform: Drainageways, swales
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear, concave

Across-slope shape: Concave, linear
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Vebar

Percent of map unit: 3 percent
Landform: Plains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear, convex
Ecological site: Sandy (R054XY026ND)
Hydric soil rating: No

Rhoades

Percent of map unit: 3 percent
Landform: Drainageways, swales
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: Thin Claypan (R054XY033ND)
Hydric soil rating: No

Heil

Percent of map unit: 1 percent
Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Closed Depression (R054XY022ND)
Hydric soil rating: Yes

McB—Morton loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: cx0z
Elevation: 1,660 to 3,610 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Morton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morton

Setting

Landform: Plains
Landform position (two-dimensional): Backslope, summit

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 18 inches: silty clay loam
H3 - 18 to 32 inches: silty clay loam
Cr - 32 to 60 inches: weathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Minor Components

Belfield

Percent of map unit: 4 percent
Landform: Plains, swales
Landform position (two-dimensional): Footslope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 4 percent
Landform: Swales
Landform position (two-dimensional): Footslope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Lantry

Percent of map unit: 3 percent
Landform: Knolls
Landform position (two-dimensional): Shoulder, summit

Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: Thin Loamy (R054XY038ND)
Hydric soil rating: No

Vebar

Percent of map unit: 3 percent
Landform: Plains
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Linear
Across-slope shape: Linear, convex
Ecological site: Sandy (R054XY026ND)
Hydric soil rating: No

Heil

Percent of map unit: 1 percent
Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Closed Depression (R054XY022ND)
Hydric soil rating: Yes

MdC—Morton-Lantry loams, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: cx11
Elevation: 1,660 to 3,610 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Morton and similar soils: 55 percent
Lantry and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morton

Setting

Landform: Plains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 18 inches: silty clay loam

H3 - 18 to 32 inches: silty clay loam
Cr - 32 to 60 inches: weathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Description of Lantry

Setting

Landform: Knolls, ridges
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 26 inches: silt loam
Cr - 26 to 60 inches: weathered bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 45 percent
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)

Forage suitability group: Limy Upland (G054XY400ND)
Hydric soil rating: No

Minor Components

Grail

Percent of map unit: 4 percent
Landform: Swales
Landform position (two-dimensional): Toeslope, footslope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 3 percent
Landform: Swales
Landform position (two-dimensional): Footslope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Vebar

Percent of map unit: 3 percent
Landform: Plains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear, convex
Ecological site: Sandy (R054XY026ND)
Hydric soil rating: No

Tally

Percent of map unit: 3 percent
Landform: Swales
Landform position (two-dimensional): Footslope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: Sandy (R054XY026ND)
Hydric soil rating: No

Cabba

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: SHALLOW (054XY024SD_1)
Hydric soil rating: No

Belfield

Percent of map unit: 3 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear
Across-slope shape: Concave

Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Heil

Percent of map unit: 1 percent
Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Closed Depression (R054XY022ND)
Hydric soil rating: Yes

MdD—Morton-Lantry loams, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: cx12
Elevation: 1,660 to 3,610 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Morton and similar soils: 40 percent
Lantry and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Morton

Setting

Landform: Plains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 13 inches: silty clay loam
H3 - 13 to 32 inches: silty clay loam
Cr - 32 to 60 inches: weathered bedrock

Properties and qualities

Slope: 6 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Loamy (R054XY031ND)
Forage suitability group: Droughty Loam (G054XY120ND)
Hydric soil rating: No

Description of Lantry

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 26 inches: silt loam
Cr - 26 to 60 inches: weathered bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 45 percent
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Thin Loamy (R054XY038ND)
Forage suitability group: Limy Upland (G054XY400ND)
Hydric soil rating: No

Minor Components

Cabba

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex

Across-slope shape: Linear, convex
Ecological site: Shallow Loamy (R054XY030ND)
Other vegetative classification: SHALLOW (054XY024SD_1)
Hydric soil rating: No

Daglum

Percent of map unit: 6 percent
Landform: Plains, drainageways
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: Claypan (R054XY021ND)
Hydric soil rating: No

Belfield

Percent of map unit: 6 percent
Landform: Drainageways, plains
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Arnegard

Percent of map unit: 3 percent
Landform: Swales
Landform position (two-dimensional): Footslope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Vebar

Percent of map unit: 2 percent
Landform: Plains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear, convex
Ecological site: Sandy (R054XY026ND)
Hydric soil rating: No

Heil

Percent of map unit: 1 percent
Landform: Closed depressions
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Closed Depression (R054XY022ND)
Hydric soil rating: Yes

RfB—Regent-Savage silty clay loams, 3 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vzsn
Elevation: 1,650 to 3,600 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Regent and similar soils: 68 percent
Savage and similar soils: 17 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Regent

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt1 - 7 to 12 inches: silty clay
Bt2 - 12 to 22 inches: silty clay
Bk - 22 to 36 inches: silty clay
Cr - 36 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Forage suitability group: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Description of Savage

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from shale and siltstone

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bt1 - 7 to 14 inches: silty clay
Bt2 - 14 to 21 inches: silty clay loam
Bk - 21 to 46 inches: silty clay loam
C - 46 to 67 inches: silty clay loam
Cr - 67 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 6 percent
Depth to restrictive feature: 60 to 79 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 3.0
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Clayey (R054XY020ND)
Forage suitability group: Clayey Subsoil (G054XY210ND)
Hydric soil rating: No

Minor Components

Grail, overflow

Percent of map unit: 6 percent
Landform: Swales
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Loamy Overflow (R054XY023ND)
Hydric soil rating: No

Moreau

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Clayey (R054XY020ND)
Hydric soil rating: No

Daglum

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (R054XY021ND)
Hydric soil rating: No

Cabba

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Shallow Loamy (R054XY030ND)
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 2wx3y
Elevation: 970 to 3,940 feet
Mean annual precipitation: 13 to 31 inches
Mean annual air temperature: 39 to 50 degrees F
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Unranked

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Appendix D
Manhole Evaluation Sheets

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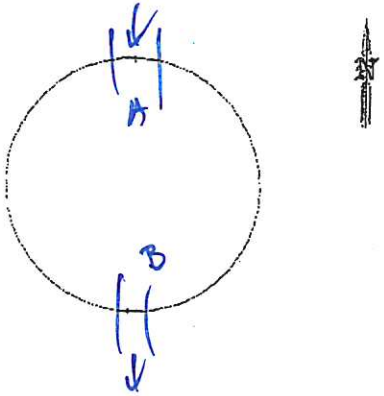
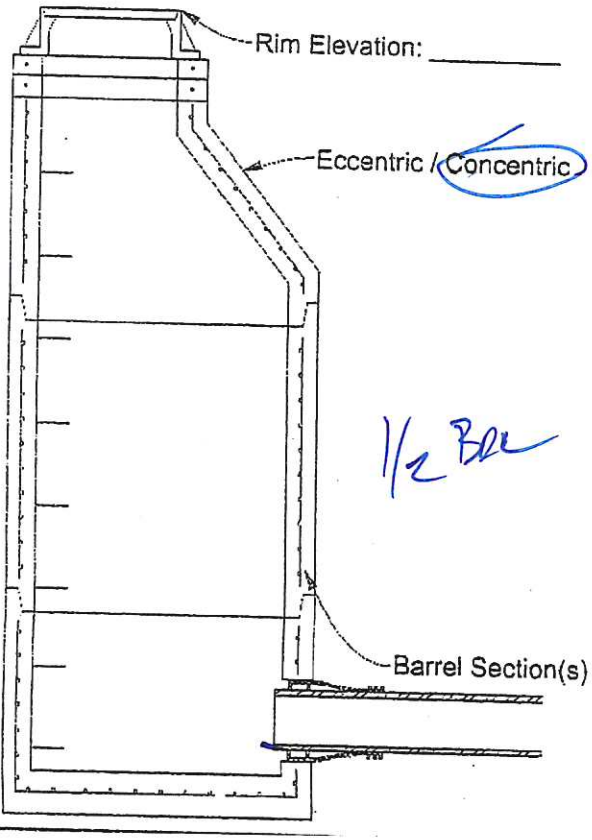
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location 1

MH ID 1 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above 3"

Cover Diameter 25.5

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type Good ~~Fair~~ Poor None

Bench Condition Good ~~Fair~~ Poor

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

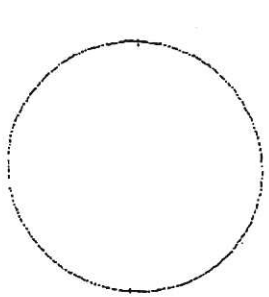
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	N	8.05
B	12	PVC	S	
C				
D				
E				
F				

MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____



Location _____

MH ID 2 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 26.5

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 2 Alignment: _____ Type: conc

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

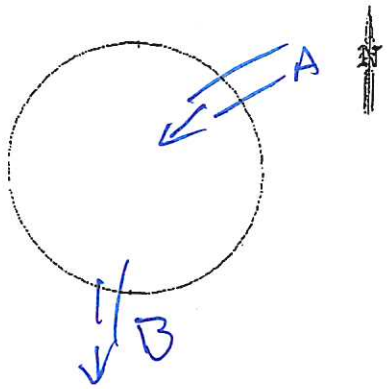
Pipe	Size	Type	Card. Dir.	Cut
A	12	N	PVC	
B	12	S		8.25
C				
D				
E				
F				

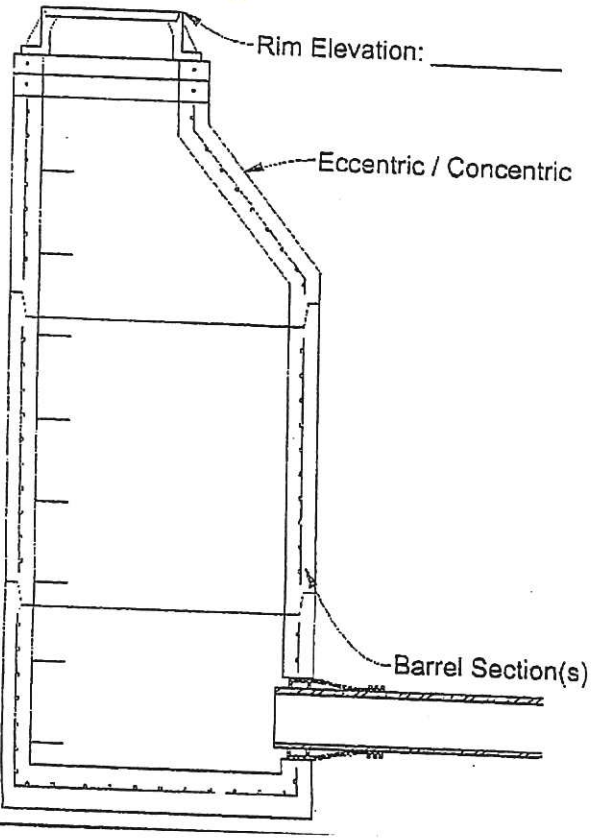
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 3 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above 2"

Cover Diameter _____

Cover Condition (Good) Fair Poor

Casting Condition (Good) Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type (Precast) Brick Block Combination

Manhole Condition (Good) Fair Poor

Step Condition Re-Rod Cast (Reinf. Plastic) Other: _____

Step Type (Good) Fair Poor None

Bench Condition (Good) Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No Minor

Infiltration Location Pipe Invert (Casting) Walls

Inverts:

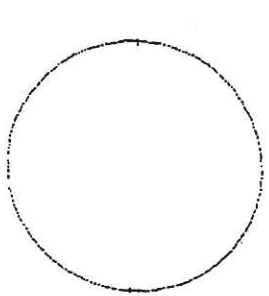
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	NNE	
B	12	PVC	S	6.60
C				
D				
E				
F				

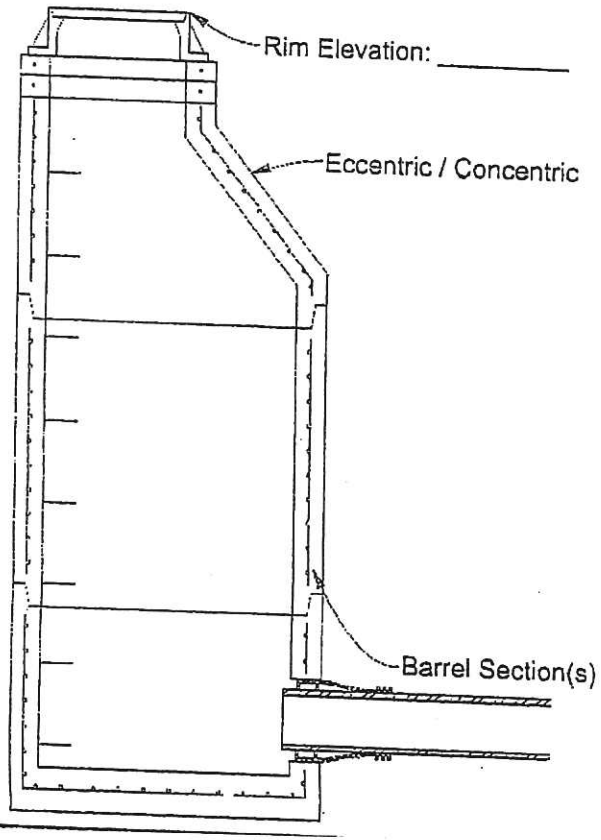
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 4 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS - DITCH

Grade to Manhole Cover Diameter Flush Below _____ Above _____

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: _____

Riser Rings Qty: 3 Alignment: 2" Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type Good ~~Fair~~ Poor None

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

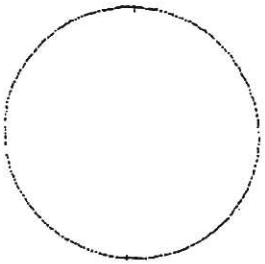
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	E	
B	12		~~S~~E	
C				
D				
E				
F				

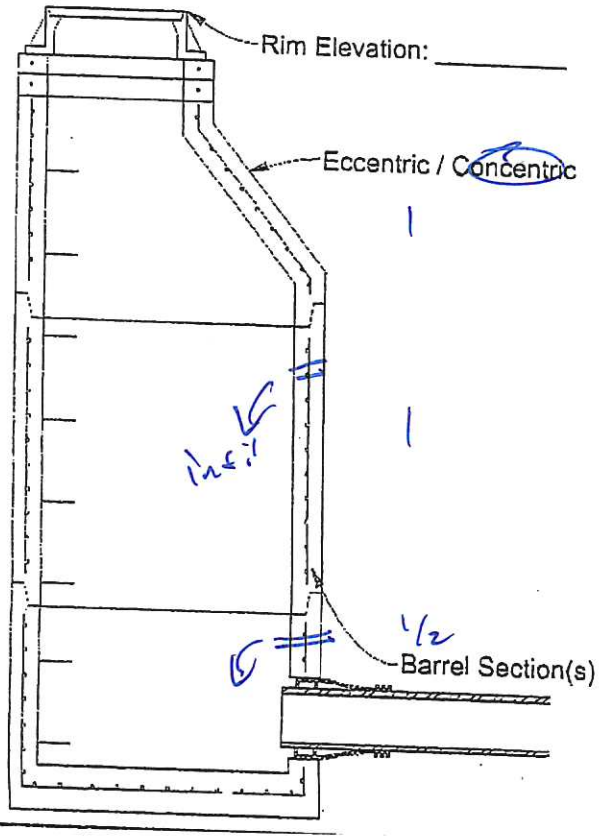
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 6 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above 4"

Cover Diameter 25.8

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: _____

Riser Rings Qty: 1 Alignment: 6" Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type ~~Good~~ Fair Poor None

Bench Condition Good ~~Fair~~ Poor

Drop Manhole Type Outside Inside (None)

Infiltration ~~Yes~~ No

Infiltration Location ~~Pipe~~ Invert Casting ~~Walls~~

OAKKy holes?

Inverts:

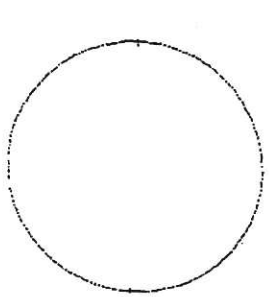
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	E	
B	8	PVC	N	
C	12	PVC	W	12.5
D				
E				
F				

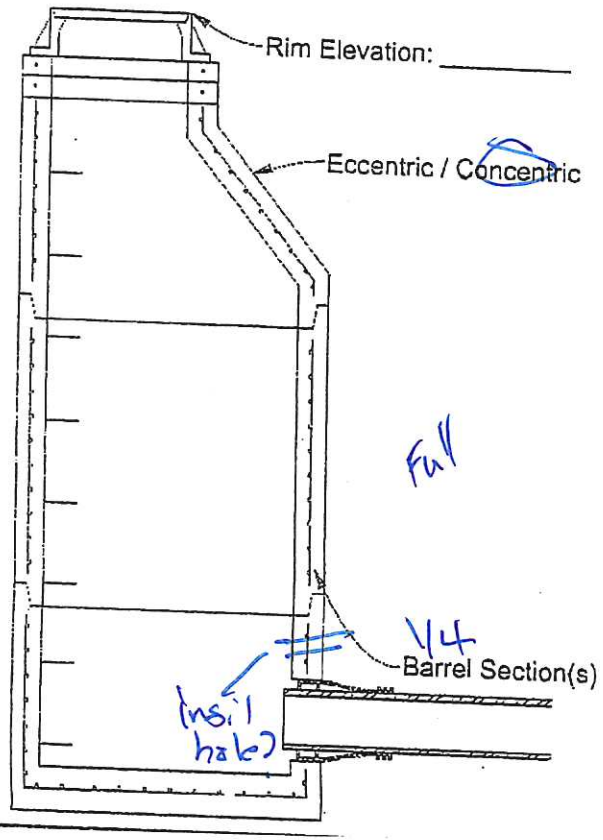
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID S Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS

Grade to Manhole Flush Below _____ Above 5"

Cover Diameter 26.5

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: _____

Riser Rings Qty: 1 Alignment: C" Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type ~~Good~~ Fair Poor None

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration ~~Yes~~ No

Infiltration Location Pipe Invert Casting Walls 3-stream

Inverts:

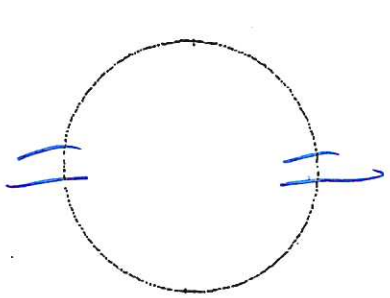
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	E	12.2
B	12		W	
C				
D				
E				
F				

MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____



Location _____

MH ID 7 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS DITCH

Grade to Manhole Flush Below _____ Above 4"

Cover Diameter _____

Cover Condition ~~Good~~ ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: _____

Riser Rings Qty: 2 Alignment: 6" Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type ~~Good~~ Fair Poor None

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration ~~Yes~~ No

Infiltration Location Pipe Invert Casting ~~Walls~~

Inverts:

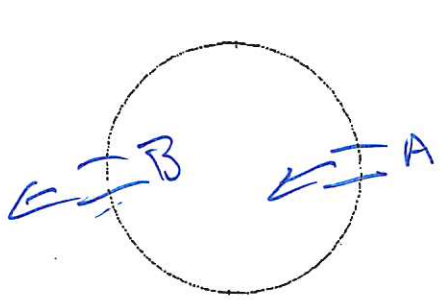
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	E	1.2
B	12		W	
C				
D				
E				
F				

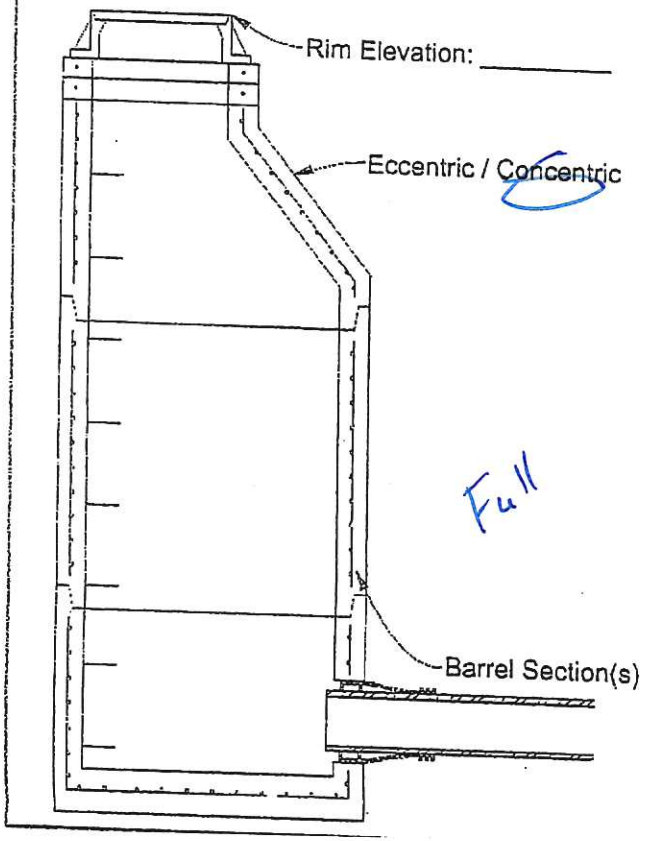
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Full

Location _____

MH ID 8 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ROAD Ditch

Grade to Manhole Flush Below _____ Above 4'

Cover Diameter 25.5

Cover Condition Good Fair ~~Poor~~

Casting Condition Good Fair ~~Poor~~ Height: _____

Riser Rings Qty: _____ Alignment: 2' Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good Fair ~~Poor~~ corrosion MAJOR

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair ~~Poor~~ None RUSTED OFF

Bench Condition Good ~~Fair~~ Poor

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

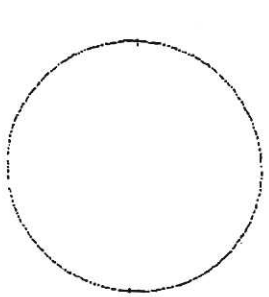
Pipe	Size	Type	Card. Dir.	Cut
A	12	PVC	E	
B	12	PVC	W	9.8
C				
D				
E				
F				

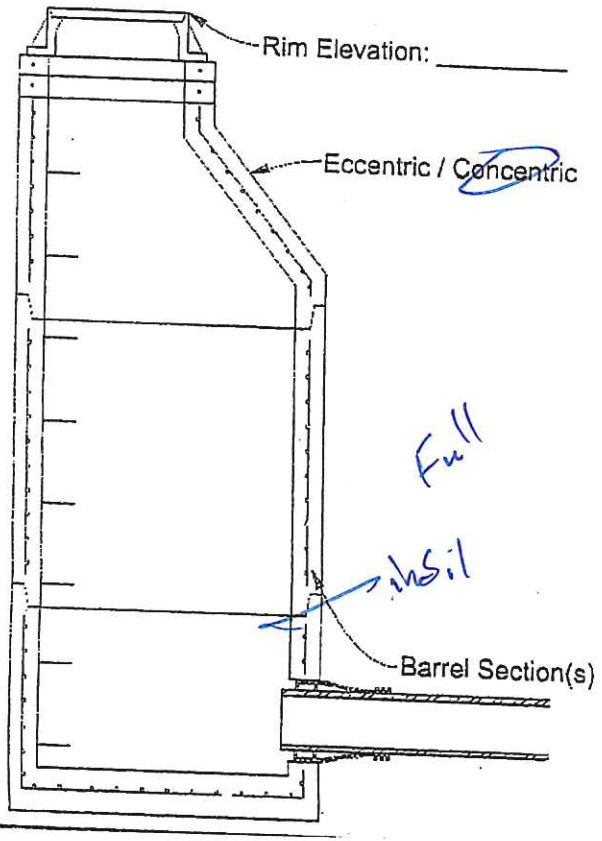
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 9 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above 5"

Cover Diameter 25.5

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor CORR: MAJOR

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

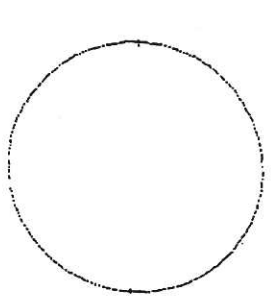
Pipe	Size	Type	Card. Dir.	Cut
A	12		E	
B	12		W	11.2
C				
D				
E				
F				

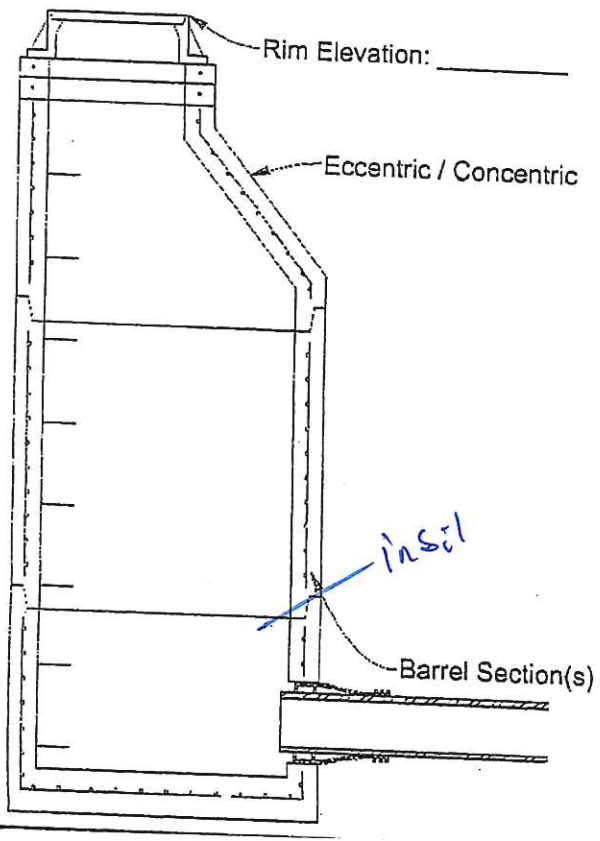
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 10 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover 28.5

Grade to Manhole Cover Diameter Flush Below _____ Above 2'1

Cover Condition Good Fair ~~Poor~~

Casting Condition Good Fair (Poor) Height: _____

Riser Rings Qty: _____ Alignment: 1' Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair ~~Poor~~ conc: maj r

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor (None)

Bench Condition Good (Fair) ~~Poor~~

Drop Manhole Type Outside Inside (None)

Infiltration (Yes) No

Infiltration Location Pipe Invert Casting (Walls)

Inverts:

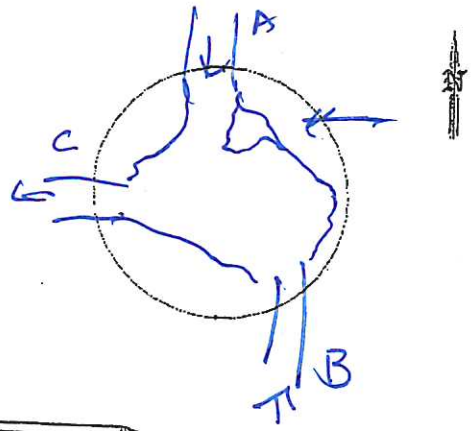
Pipe	Size	Type	Card. Dir.	Cut
A	12		E	11.7
B	12		W	
C				
D				
E				
F				

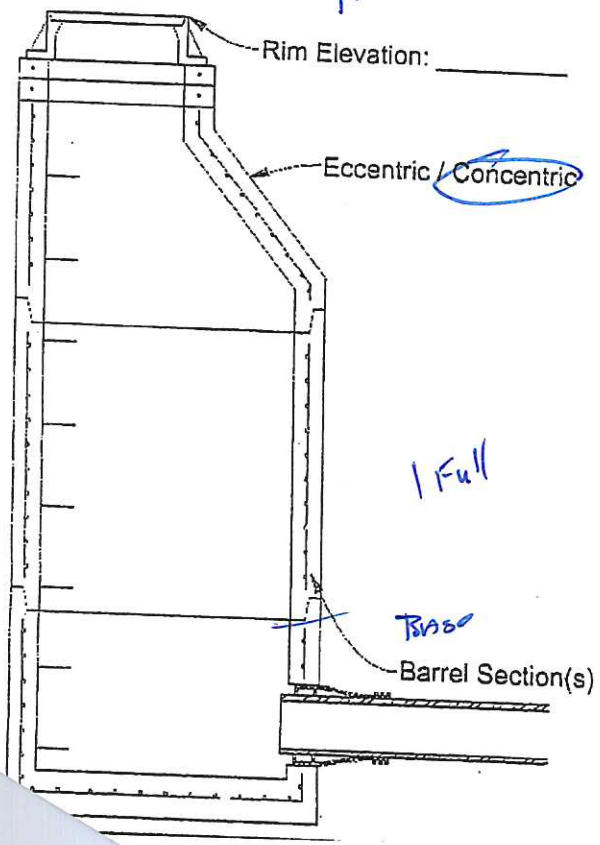
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 11 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover street

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good Fair ~~Poor~~

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

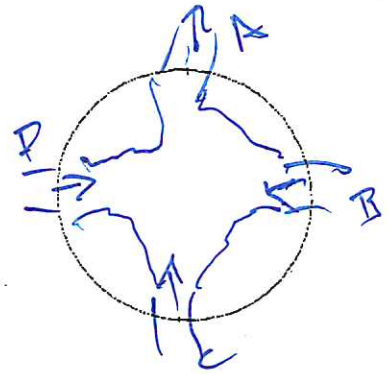
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	W	14.9
B	8	PVC	S	
C	12	PVC	W	15.05
D				
E				
F				

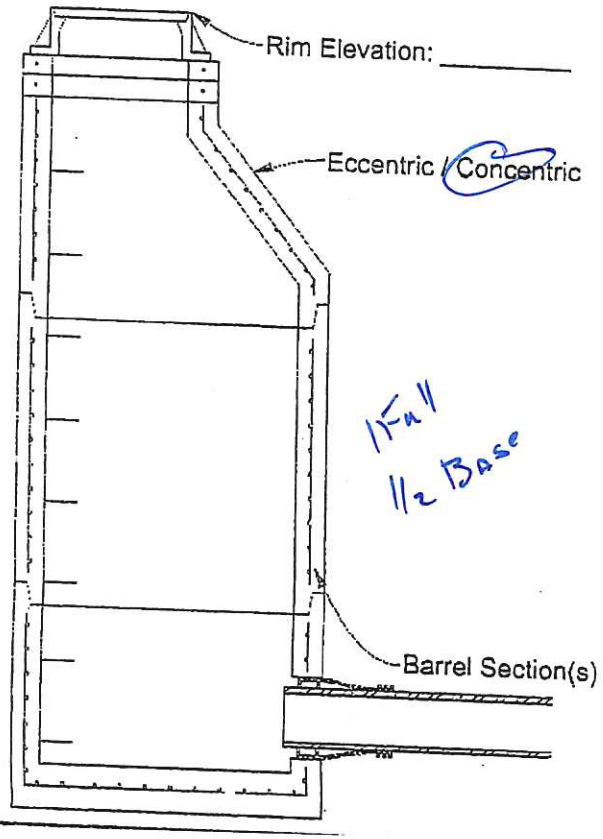
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 12 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover 123.5 Street

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 1 Alignment: 4" Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor cover: minor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

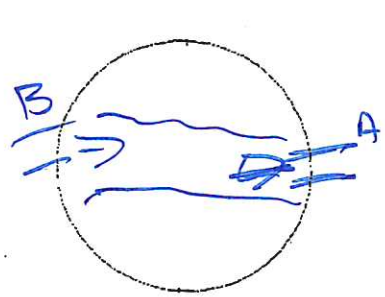
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	14.33
B	8	PVC	E	
C	8	11	S	
D	8	11	W	11.9
E				
F				

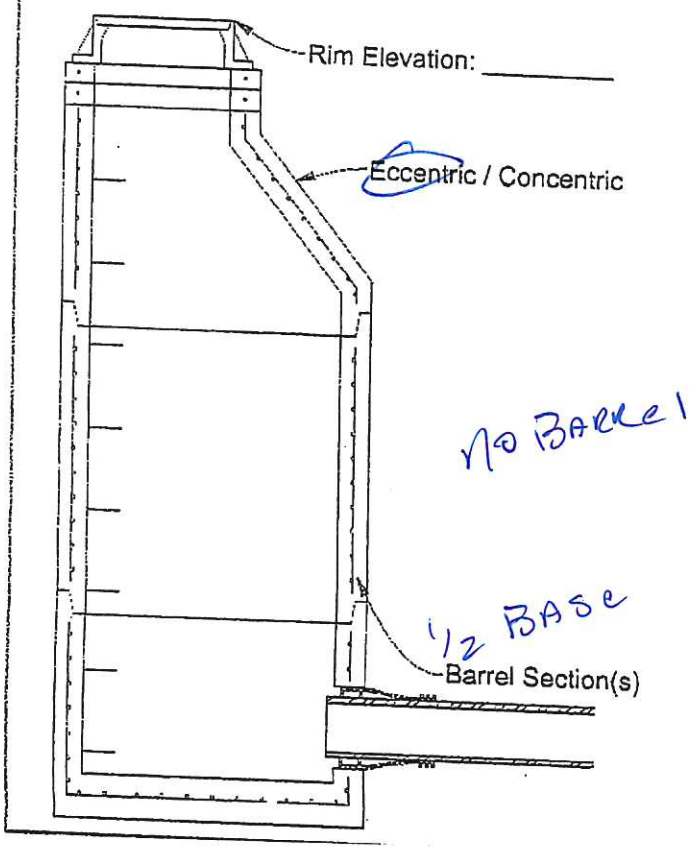
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 13 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Alley DIRT

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No ROOTS

Infiltration Location Pipe Invert Casting Walls

Inverts:

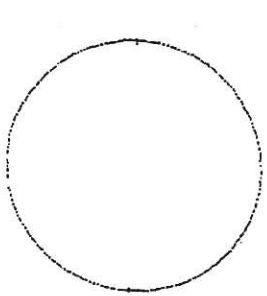
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	E	8.2
B	8	PVC	W	7.6
C				
D				
E				
F				

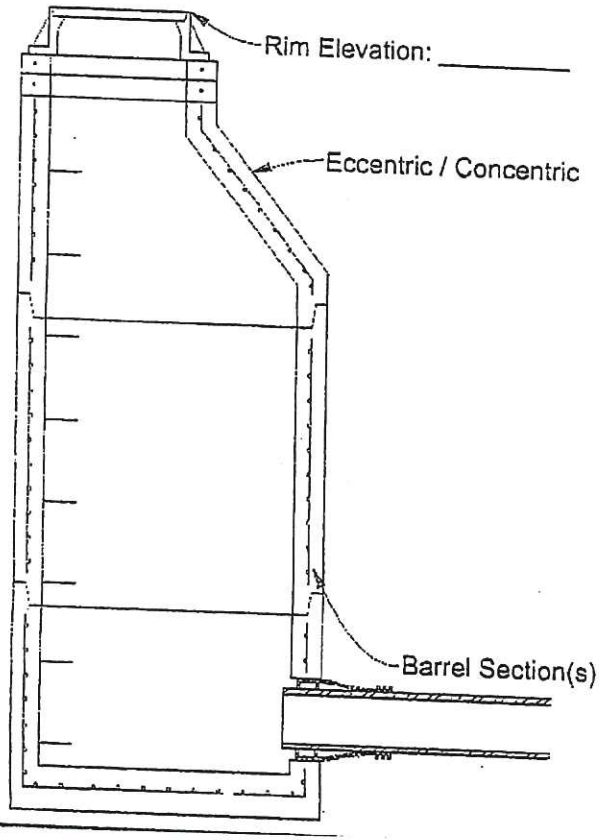
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 14 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Street

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

1 Inaccessible

Inverts:

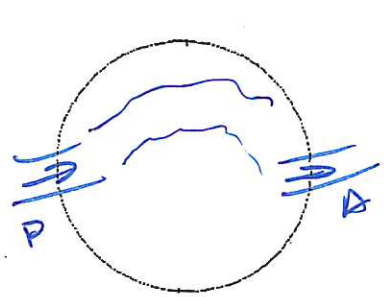
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

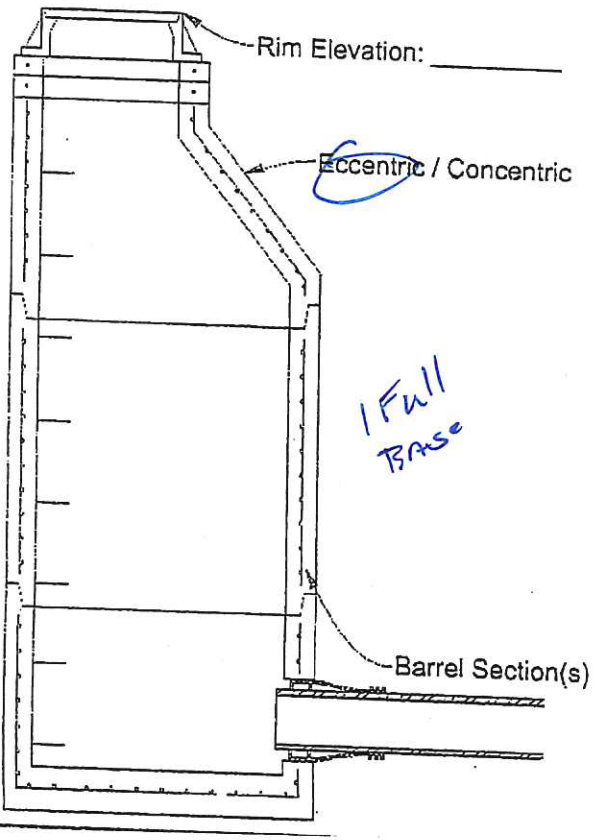
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 18 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 26

Cover Condition ~~Good~~ ~~Fair~~ Poor

Casting Condition ~~Good~~ ~~Fair~~ Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair ~~Poor~~ No bench

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location ~~Pipe~~ Invert Casting Walls

Inverts: Pipe not grouted?

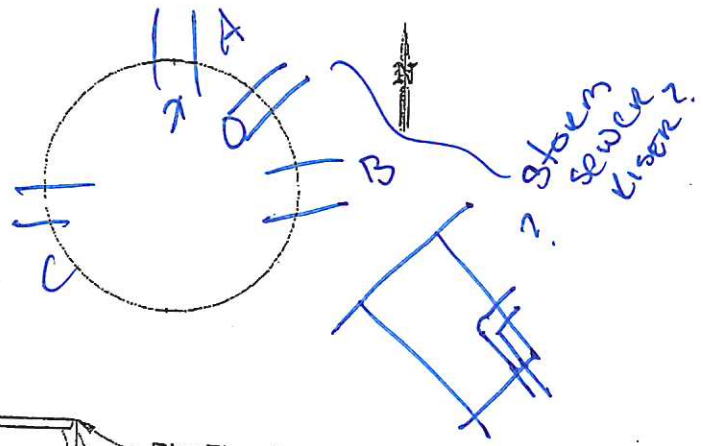
Pipe	Size	Type	Card. Dir.	Cut
A	8"	PVC	E	10.5
B	8"	PVC	W	10.4
C				
D				
E				
F				

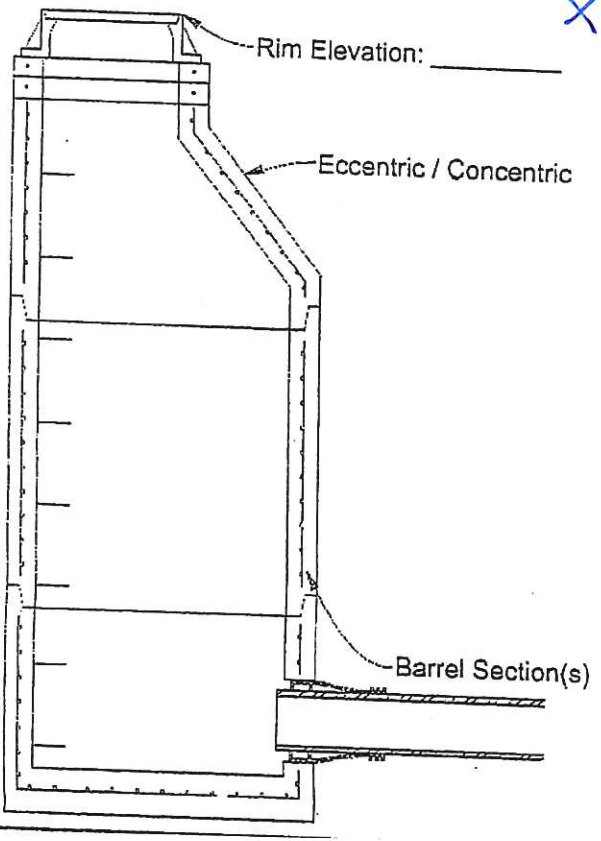
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 16 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Cover Diameter Flush Below _____ Above _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor minor ?

Drop Manhole Type Outside Inside (None) ?

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

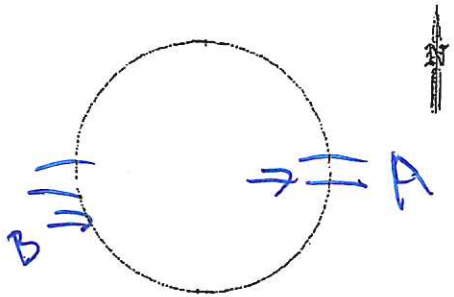
Pipe	Size	Type	Card. Dir.	Cut
A	8		N	10.8
B	8		E	
C	12		W	10.0
D				
E				
F				

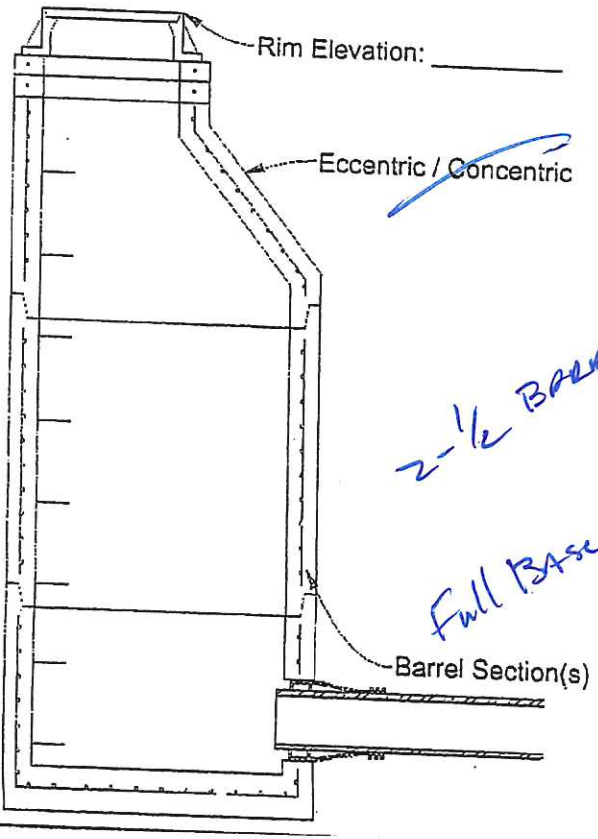
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





STARTS ON BARREL

2-½ BARREL

FULL BASE

Location _____

MH ID 67 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

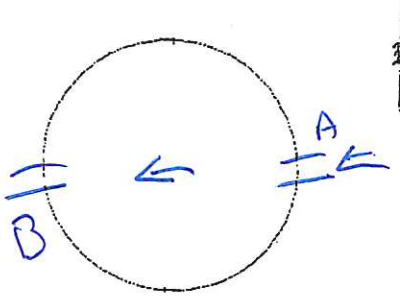
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	E	11.8
B	8	VCP	W	
C				
D				
E				
F				

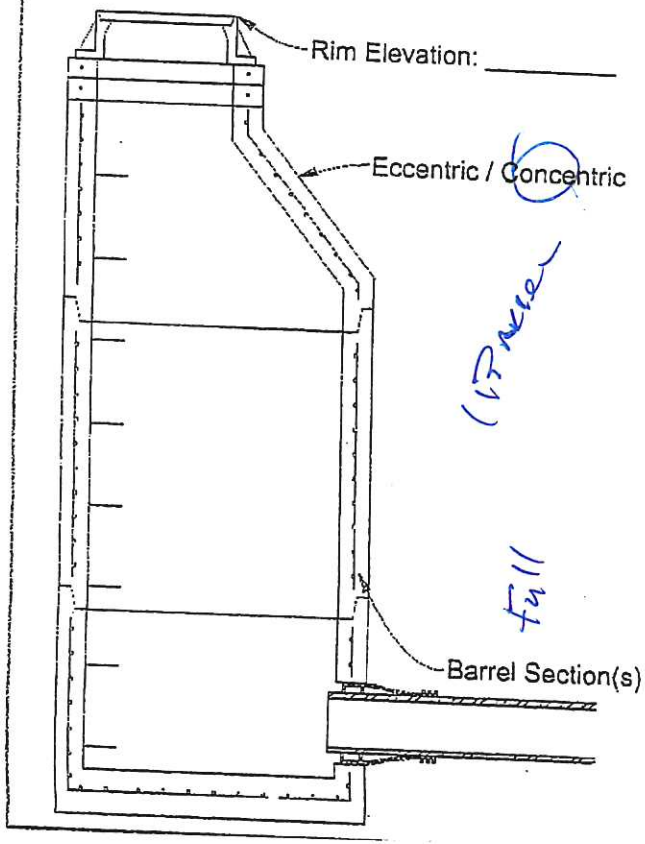
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 1B Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover grass - ditch S-side

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration ~~Yes~~ No

Infiltration Location Pipe Invert Casting ~~Walls~~

Inverts:

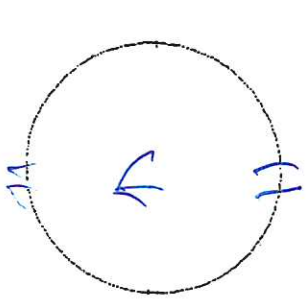
Pipe	Size	Type	Card. Dir.	Cut
A	6"	VCP	E	10.30
B	6"		W	
C				
D				
E				
F				

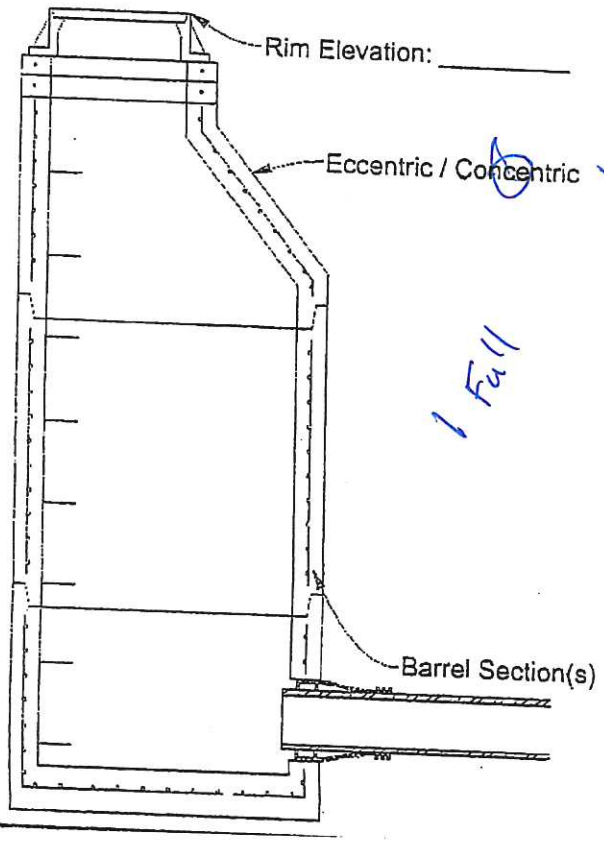
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 19 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

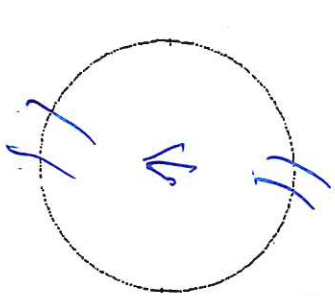
Pipe	Size	Type	Card. Dir.	Cut
A	8	RC	E	9.65
B	8	PVC	W	9.65
C				
D				
E				
F				

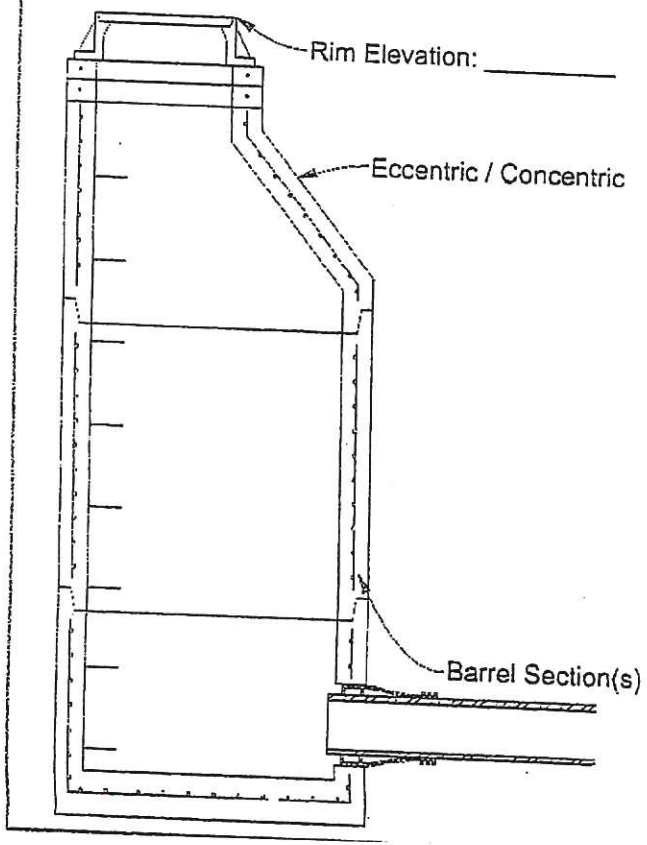
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location 20

MH ID _____ Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover 2 concrete collars

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 25

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

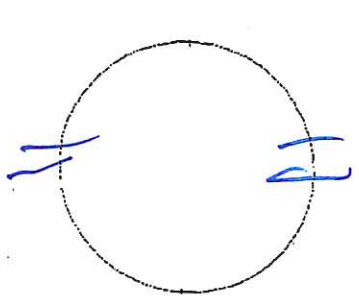
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	E	
B	8	VCP	W	12.3
C				
D				
E				
F				

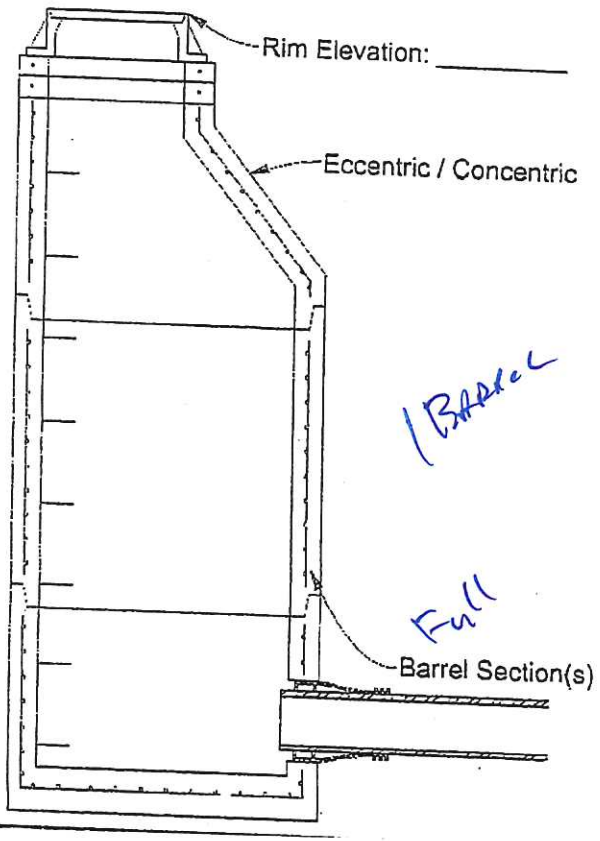
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 21 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____ concrete collar

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 26

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls Base

Inverts:

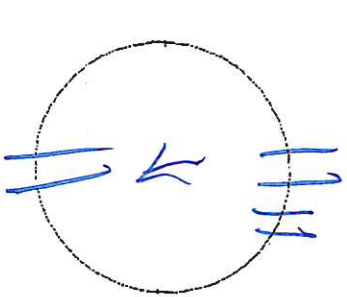
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	E	
B	8	PVC	W	9,35
C				
D				
E				
F				

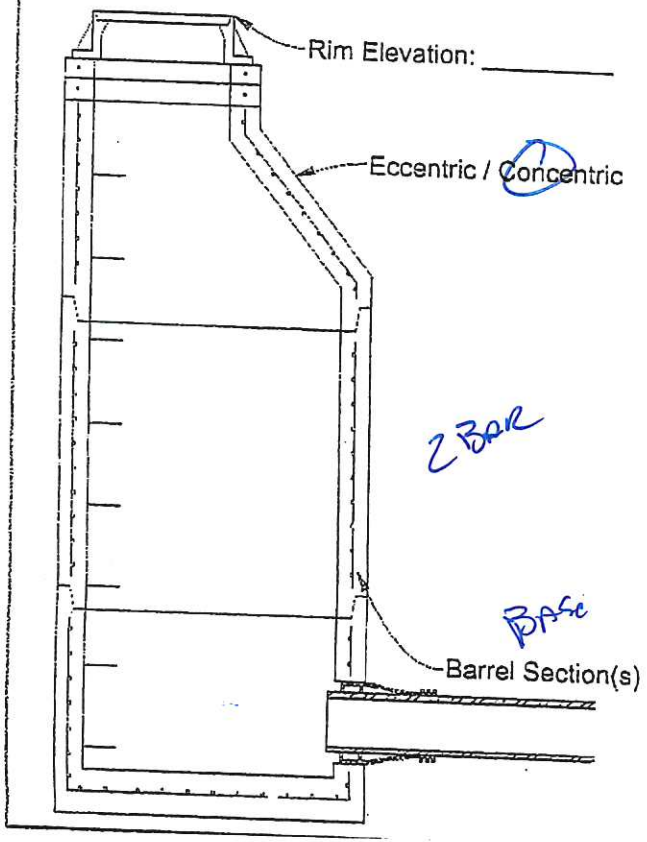
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location 22

MH ID _____ Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Dirt Alley

Grade to Manhole Flush Below 2' Above _____

Cover Diameter 25

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls Base

Inverts:

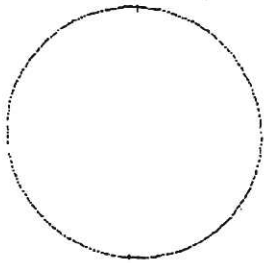
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	E	
B	8	PVC	W	16.1
C	4	PVC		11.2
D				
E				
F				

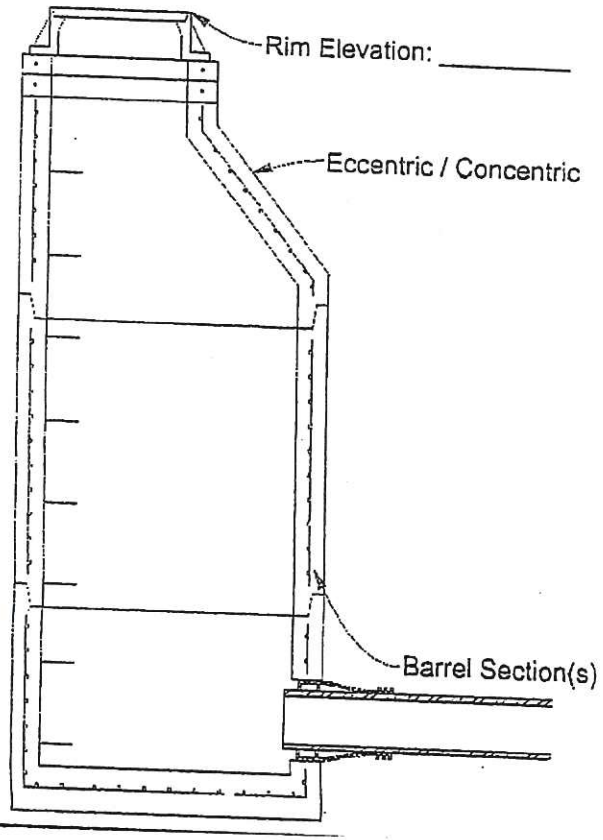
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location 23

MH ID _____ Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Street

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 6" Alignment: CMP Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor Minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

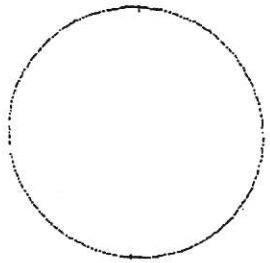
Pipe	Size	Type	Card. Dir.	Cut
A	8	N	VCP	
B	8	E	PVC	10.7
C	8	W	PVC	
D				
E				
F				

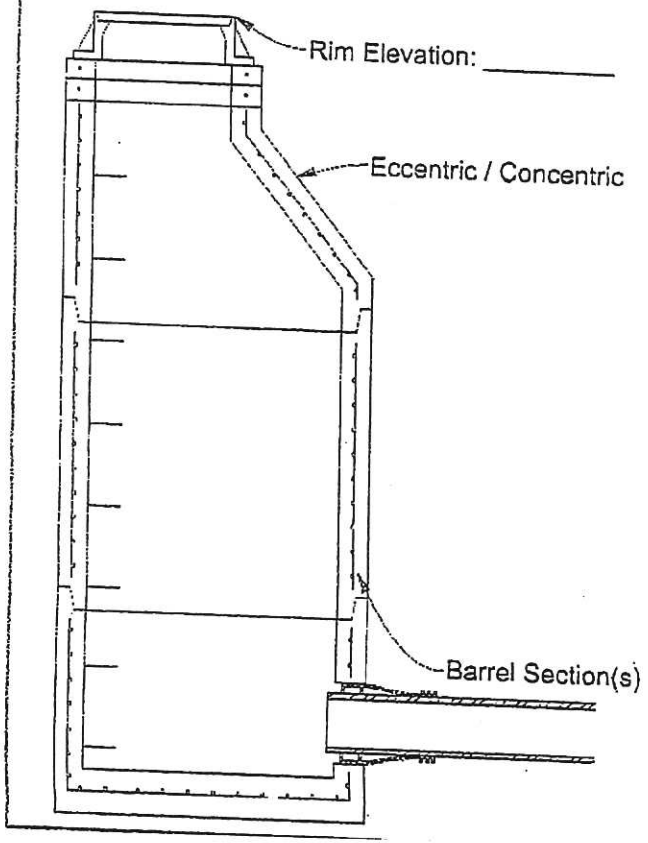
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





INACCESSIBLE

Location _____

MH ID 24 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

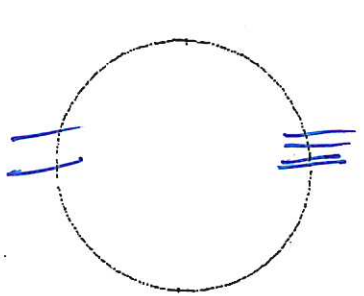
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

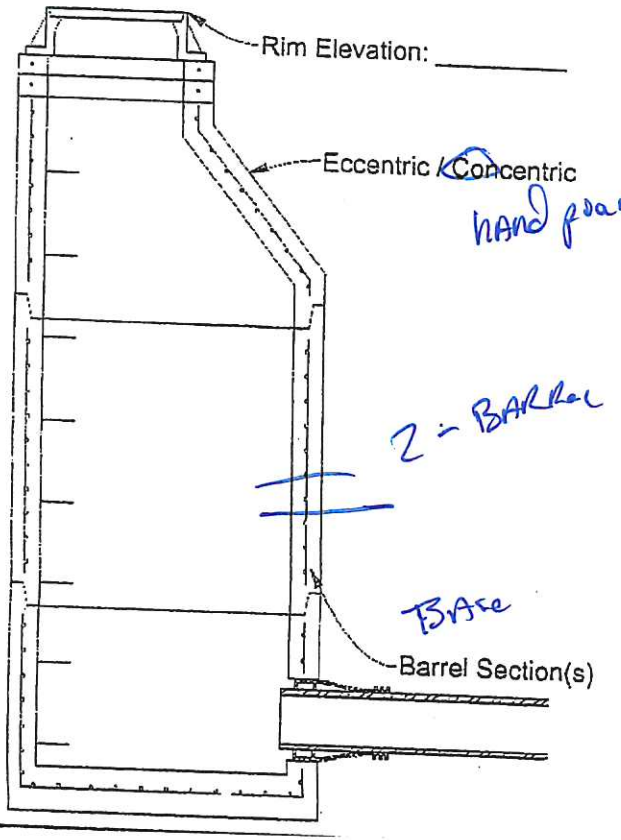
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 25 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ASPHALT

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ ~~Fair~~ Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type ~~Outside~~ Inside (None)

Infiltration ~~Yes~~ No

Infiltration Location Pipe Invert Casting ~~Walls~~ BASE

Inverts:

Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	E	12.8
B	8	VCP	[illegible]	10.8
C	8	VCP	W	12.8
D				
E				
F				

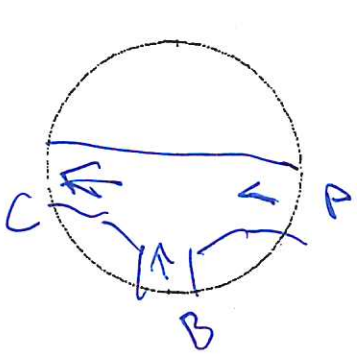
pool

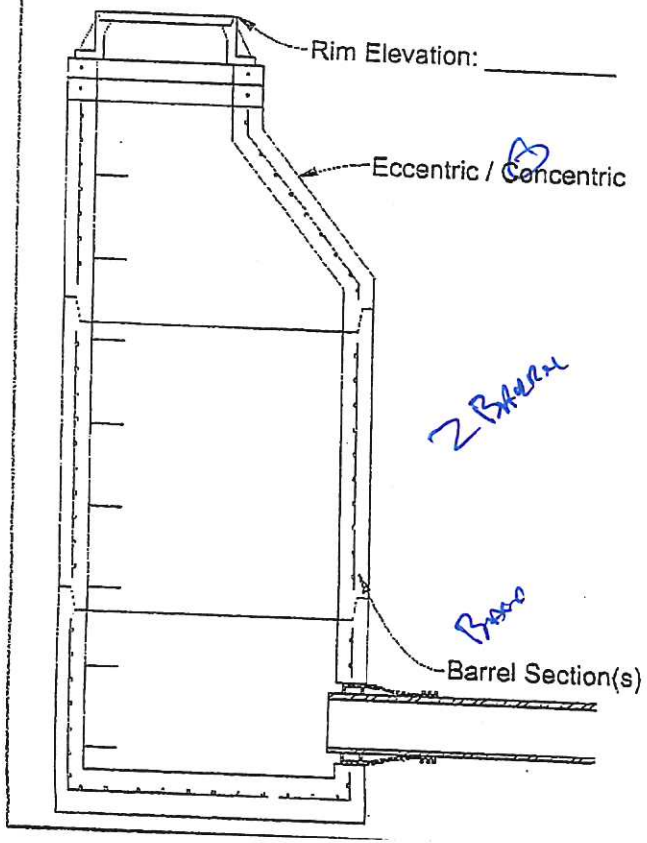
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 26 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Asphalt

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls BASE

Inverts:

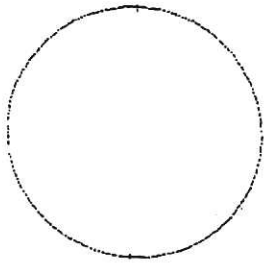
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	E	
B	8	VCP	S	
C	8	VCP	W	10.3
D				
E				
F				

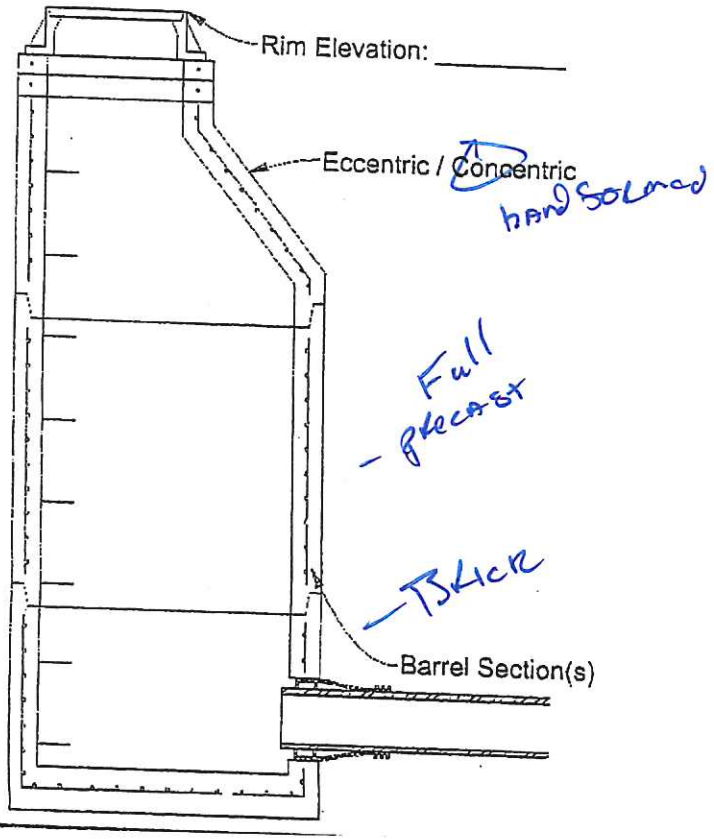
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 27 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition (Good) Fair Poor

Casting Condition (Good) Fair Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type (Precast) (Brick) Block Combination

Manhole Condition Good Fair (Poor)

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair (Poor) MAJOR

Drop Manhole Type Outside Inside (None)

Infiltration (Yes) No

Infiltration Location Pipe Invert Casting (Walls)

Bricks

Inverts:

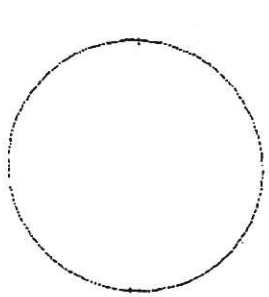
Pipe	Size	Type	Card. Dir.	Cut
A	12		N	
B	12		E	
C	~~8~~ 10		W	9.8
D				
E				
F				

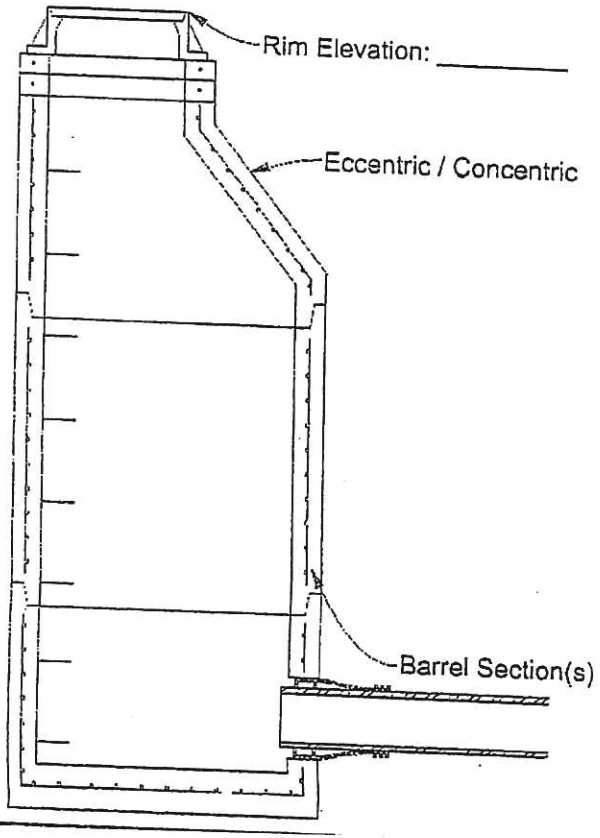
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 28 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above 2"

Cover Diameter _____

Cover Condition Good Fair ~~Poor~~ – Decent Sit

Casting Condition Good Fair ~~Poor~~ Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type (CMP) Precast Brick Block Combination

Manhole Condition Good Fair ~~Poor~~

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good Fair ~~Poor~~

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

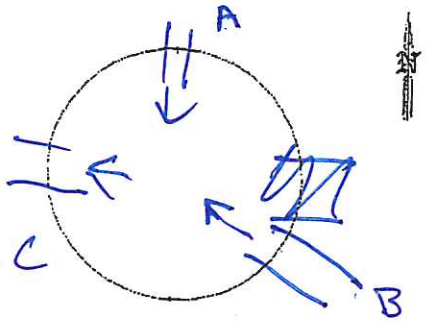
Pipe	Size	Type	Card. Dir.	Cut
A	12	VCP	E	
B	12	VCP	W	7.3
C				
D				
E				
F				

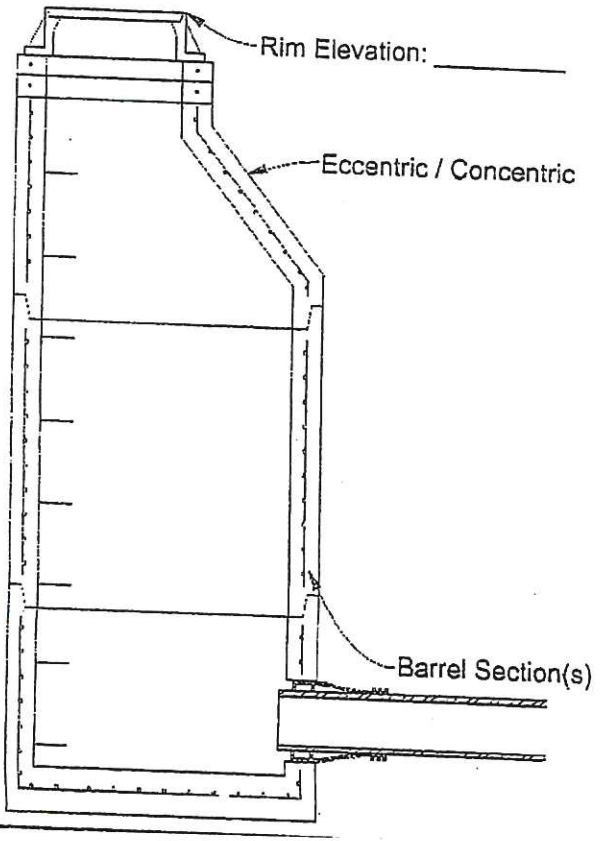
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 29 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ~~GRASS~~ - Good planting

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair ~~Poor~~

Casting Condition Good Fair ~~Poor~~ Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

CMP Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair ~~Poor~~

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good Fair ~~Poor~~

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

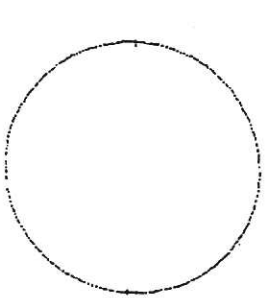
Pipe	Size	Type	Card. Dir.	Cut
A	2	PVC	N	
B	8	VCP	SE	
C	8	VCP	W	7.40
D				
E				
F				

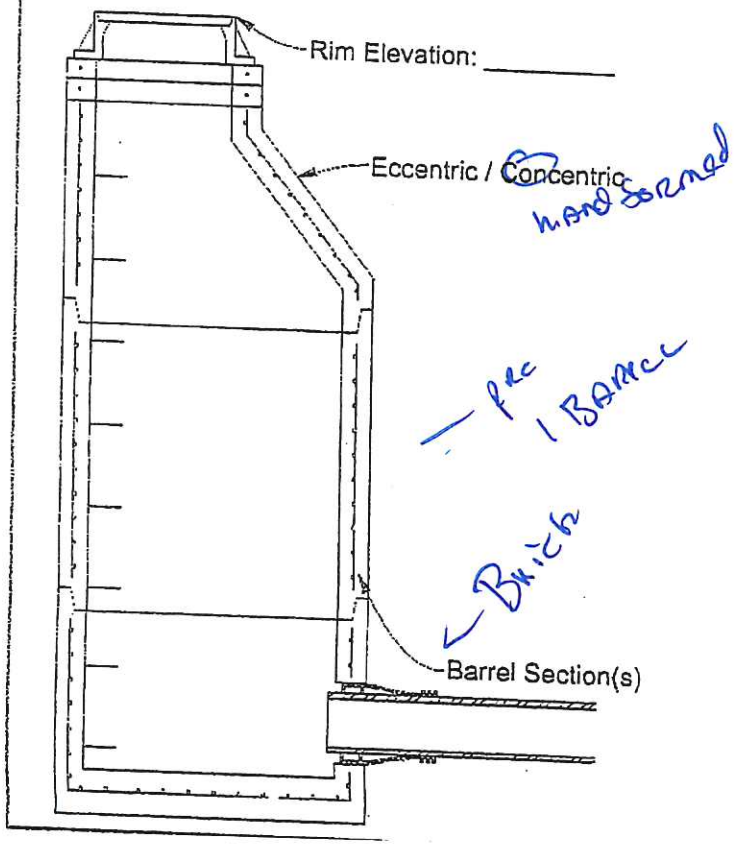
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 30 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Asphalt

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings (Needs Casting) Qty: 0 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

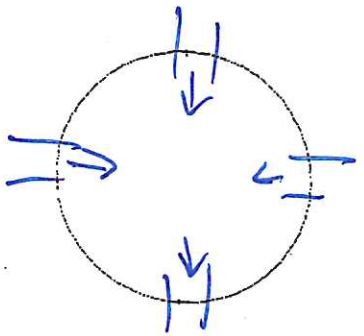
Pipe	Size	Type	Card. Dir.	Cut
A	12	VCP	S	7.5
B	12	VCP	U	
C				
D				
E				
F				

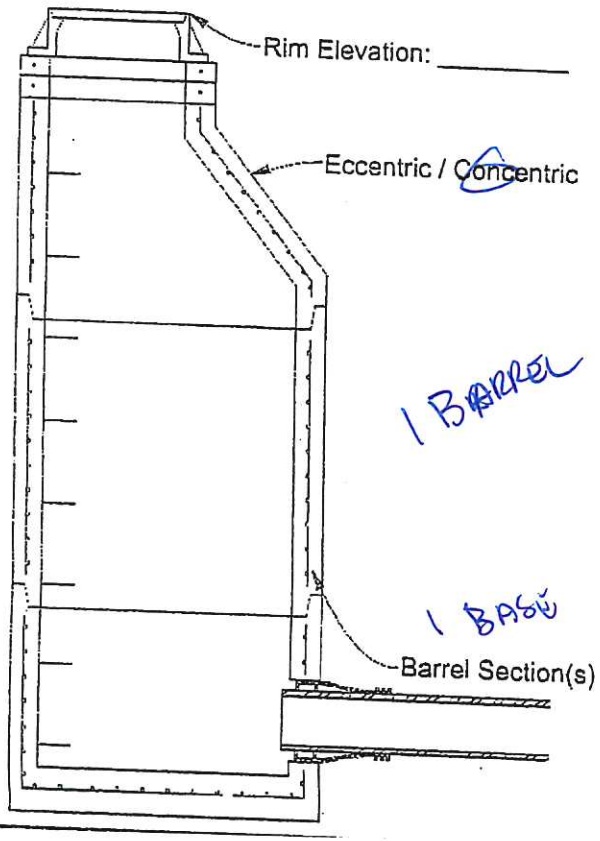
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 31 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Asphalt

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 1 Alignment: 2" Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

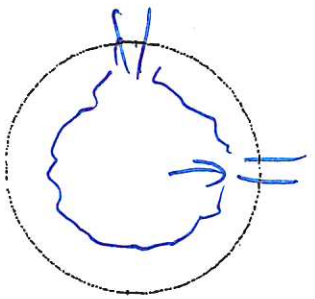
Pipe	Size	Type	Card. Dir.	Cut
A	8		N	
B	8	VCP	E	
C	12	VCP	S	13.8
D	8	VCP	W	
E				
F				

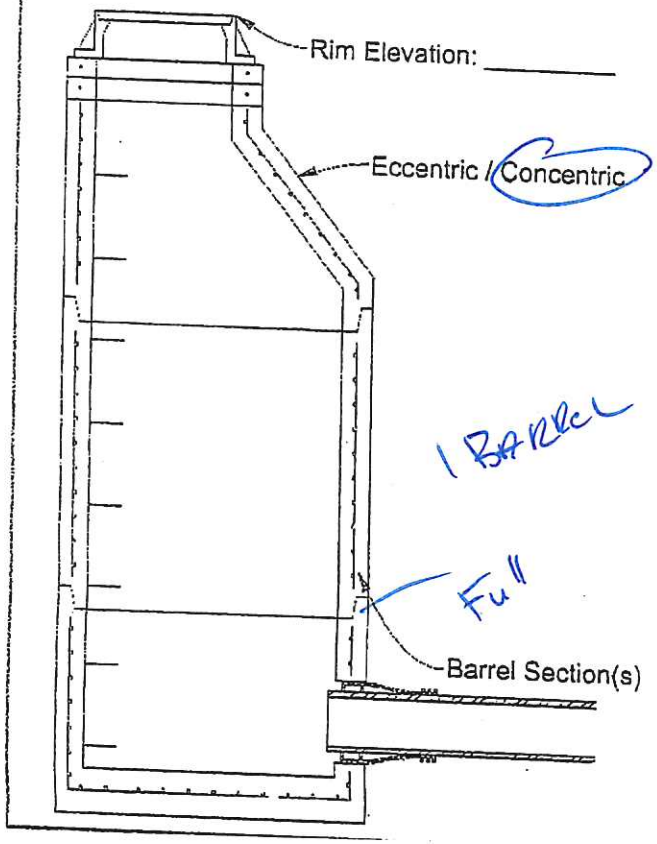
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 26 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Cover Diameter Flush Below 1" Above _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 2 Alignment: 2" Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor MAJOR

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls BASE

Inverts:

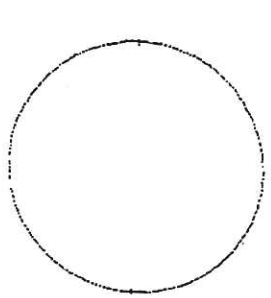
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	E	12.3
C				
D				
E				
F				

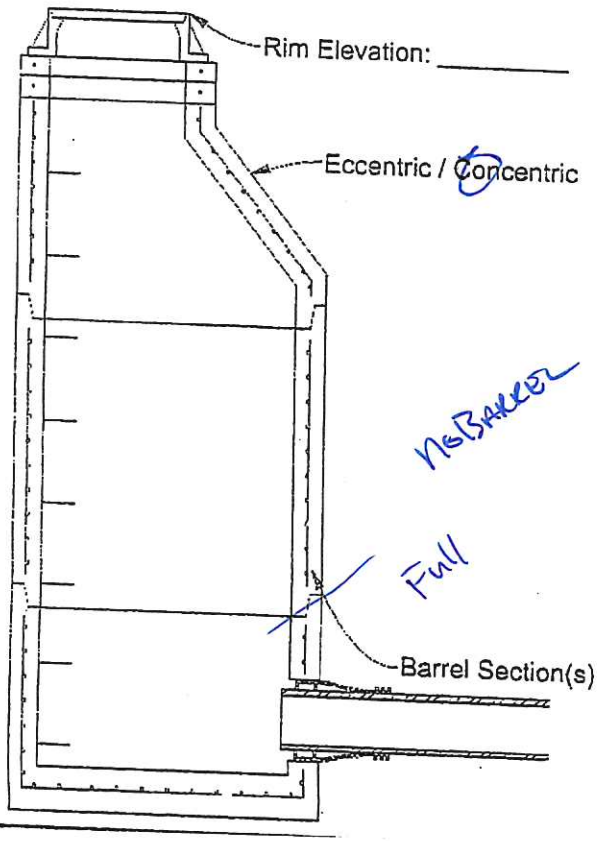
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 35 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: 1 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

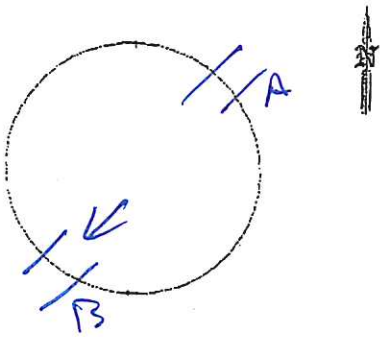
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8 6	PVC	S	8.7
C				
D				
E				
F				

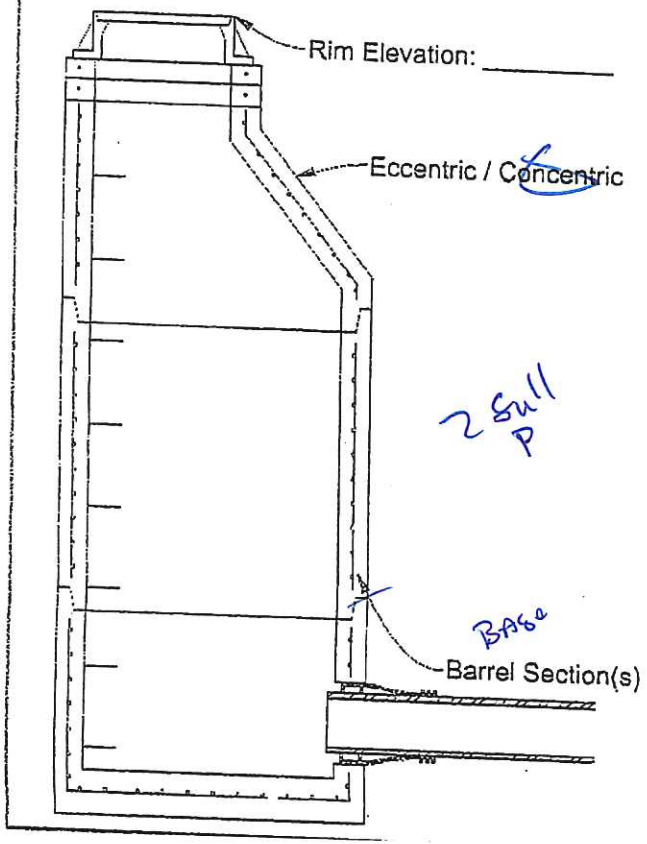
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 34 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ~~Grass~~

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition ~~Good~~ Fair Poor

Casting Condition Good ~~Fair~~ Poor Height: _____

Riser Rings Qty: 2 Alignment: 4"-2" Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration ~~Yes~~ No

Infiltration Location Pipe Invert Casting Walls

Barrel Joint

Inverts:

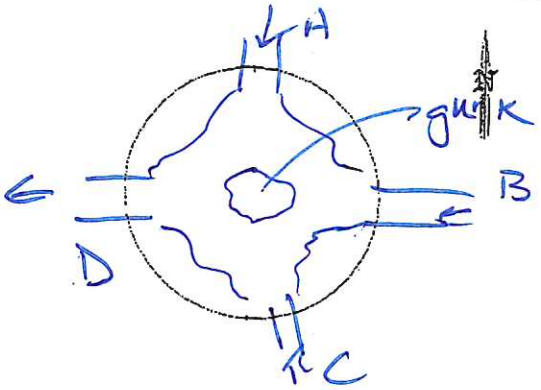
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC FKP	NE	
B	8	PVC	SW	16.8
C				
D				
E				
F				

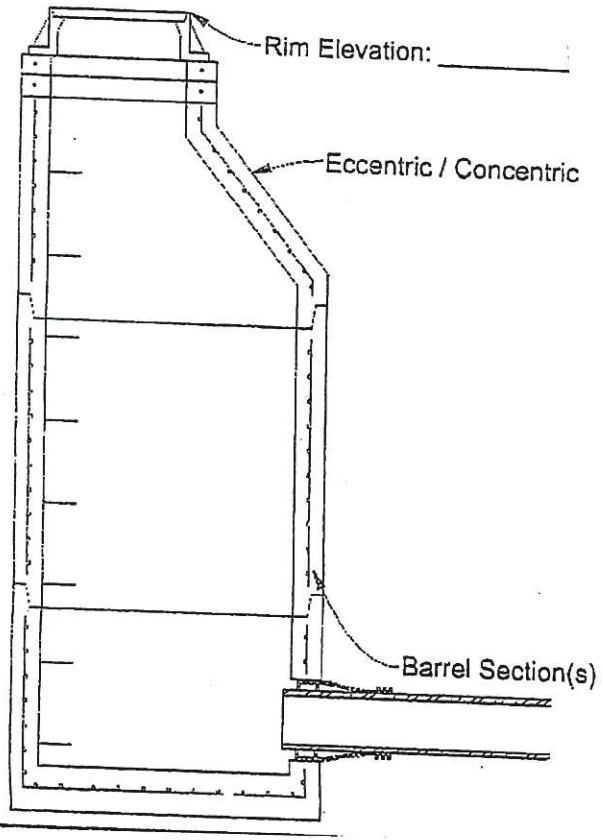
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 35 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Dirt Alley

Grade to Manhole Flush ~~Below~~ 1" Above _____

Cover Diameter 25.5

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good Fair ~~Poor~~ Height: 8"

CMP Riser Rings Qty: 1 Alignment: ~~8~~ 6" Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition ~~Re-Rod~~ Cast Reinf. Plastic Other: _____

Step Type Good Fair ~~Poor~~ None

Bench Condition Good Fair ~~Poor~~

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

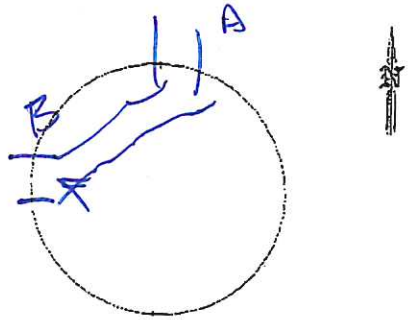
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	N	
B	8	VCP	E	
C	4	VCP	S	
D	8	VCP	W	12.6
E				
F				

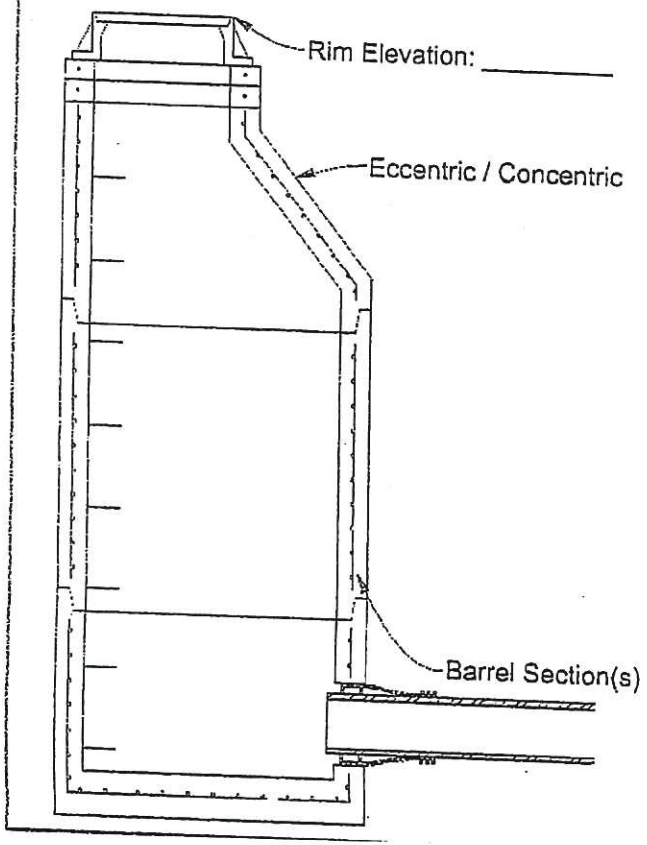
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 36 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ~~gravel~~ alley

Grade to Manhole Flush ~~Below~~ 2" Above _____

Cover Diameter ~~24~~ 23

Cover Condition Good (Fair) Poor

Casting Condition Good ~~Fair~~ Poor Height: _____

Riser Rings Qty: 72" Alignment: concentr Type: _____

Manhole Type (Precast) Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor (None)

Bench Condition Good Fair ~~Poor~~

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

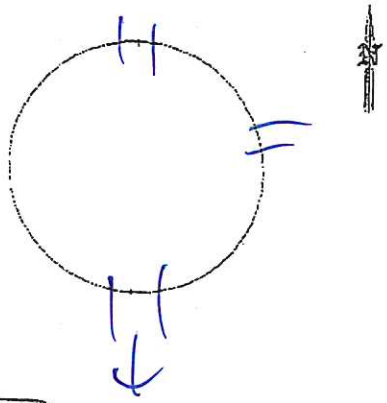
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	N	
B	~~8~~ 6	PVC	W	9.4
C				
D				
E				
F				

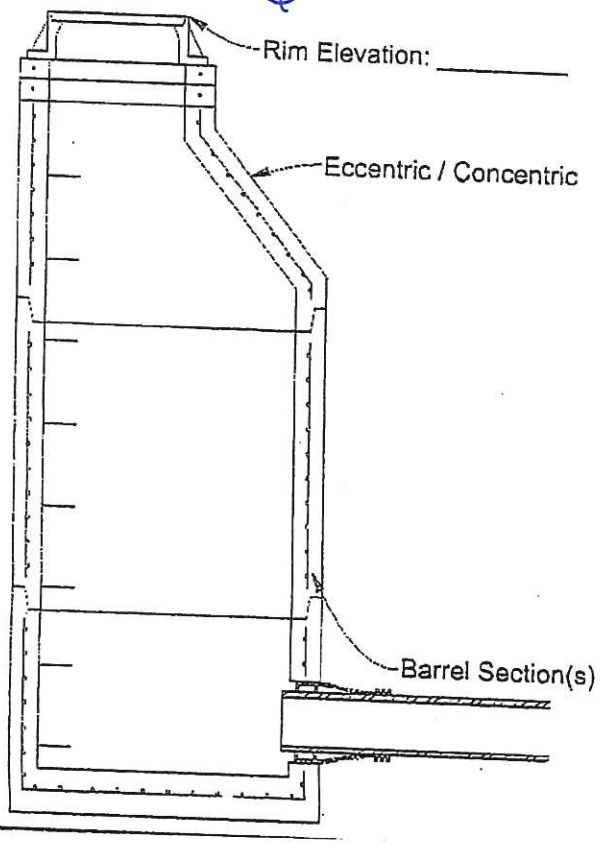
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 37 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover gravel

Grade to Manhole Flush ~~Below~~ 1'1 Above _____

Cover Diameter 23

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: _____

Riser Rings Qty: 4" Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type Good ~~Fair~~ Poor None

Bench Condition Good Fair ~~Poor~~ minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Hole Holes

Inverts:

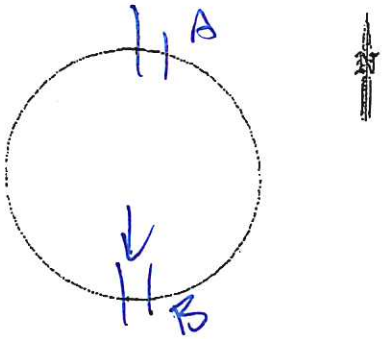
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	E	
C	6	VCP	S	
D				
E				
F				

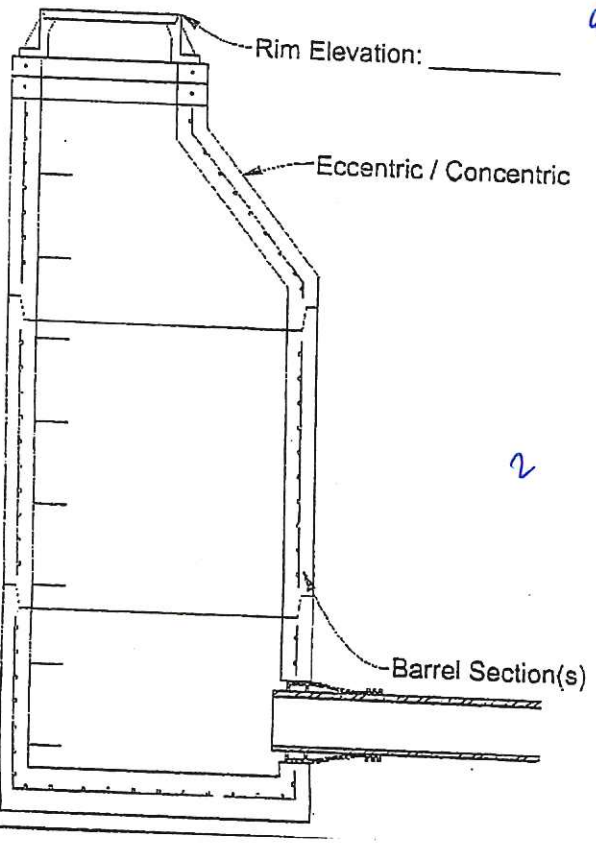
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





SLAB on BARREL MISSING chunk exposed rebar

Replace top BARREL

2

Location _____

MH ID 38 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Dirt Alley

Grade to Manhole Flush ~~Below~~ 1" Above _____

Cover Diameter 24

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: 5

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good ~~Fair~~ ~~Poor~~

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition ~~Good~~ ~~Fair~~ Poor

Drop Manhole Type Outside Inside ~~None~~

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

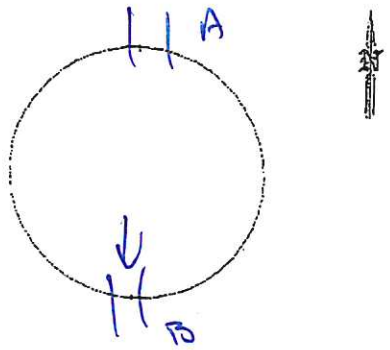
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	N	
B	8	VCP	S	9.5
C				
D				
E				
F				

MANHOLE INSPECTION FORM

Project _____

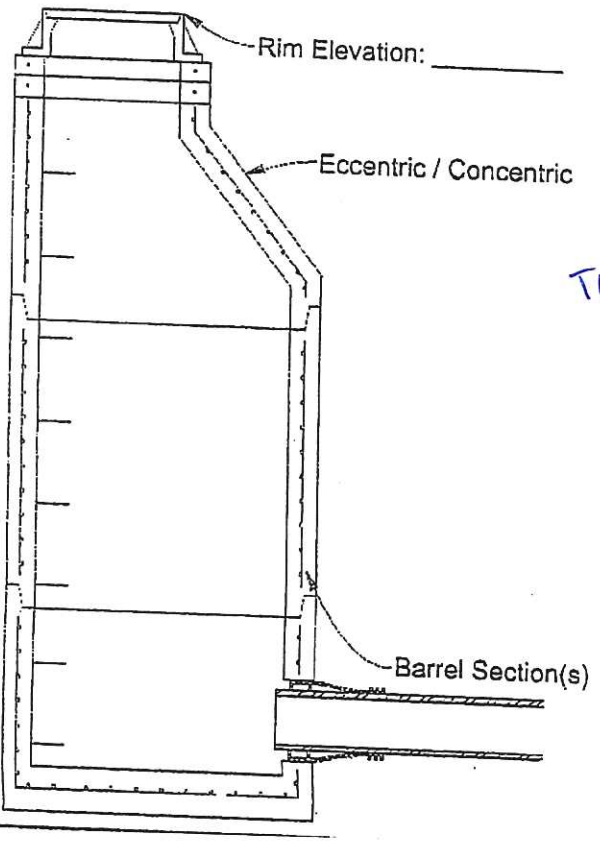
Date _____

Inspector _____



SLAB on BARREL

minor LOOSE



MISSING large chunk

TOP BARREL REPLACE w/ CONE

Location _____

MH ID 39 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRAVEL Alley

Grade to Manhole Flush ~~Below~~ 11 Above _____

Cover Diameter 24

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: 5

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ ~~Fair~~ Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition ~~Good~~ Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

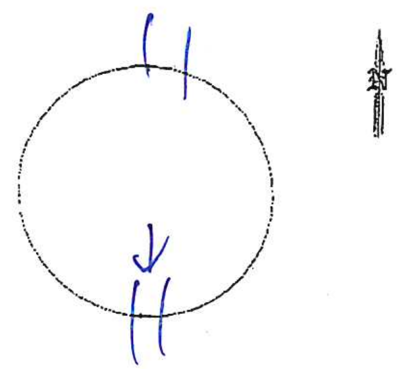
Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	N	
B	8	VCP	S	9.5
C				
D				
E				
F				

MANHOLE INSPECTION FORM

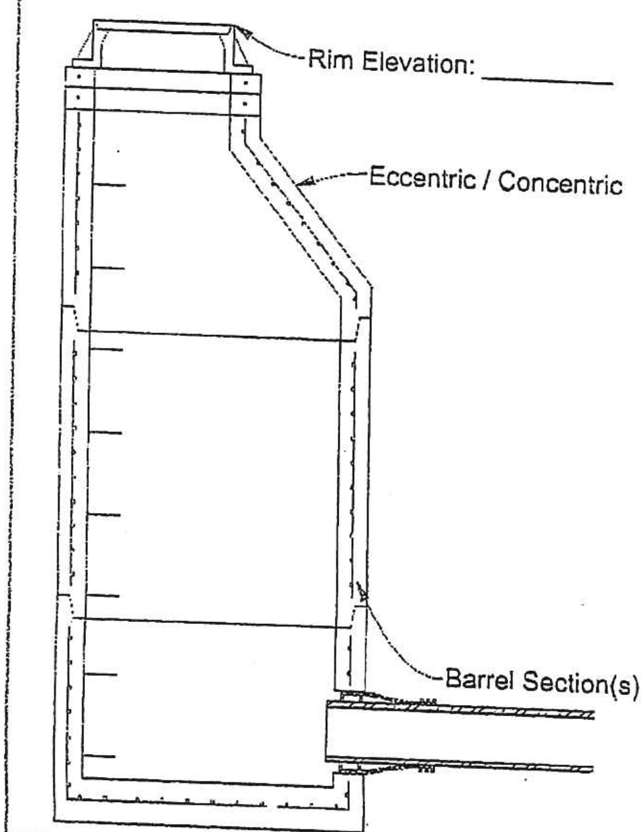
Project ______

Date ______

Inspector ______



SBAB on Robarrel



Location	______
MH ID	40 Point # ______
Present Use	Storm Sanitary Other: ______
Surface Cover	Land street / Alley
Grade to Manhole	Flush ~~Below~~ (circled) 1" Above ______
Cover Diameter	24
Cover Condition	Good ~~Fair~~ Poor
Casting Condition	Good Fair (circled) Poor Height: 5
Riser Rings	Qty: ______ Alignment: ______ Type: ______
Manhole Type	Precast (circled) Brick Block Combination
Manhole Condition	Good Fair (circled) Poor
Step Condition	Re-Rod Cast. Reinf. Plastic Other: ______
Step Type	Good Fair Poor None (circled)
Bench Condition	Good Fair Poor (circled) minor
Drop Manhole Type	Outside Inside (None)
Infiltration	~~Yes~~ No
Infiltration Location	Pipe Invert Casting (circled) Walls

Inverts:

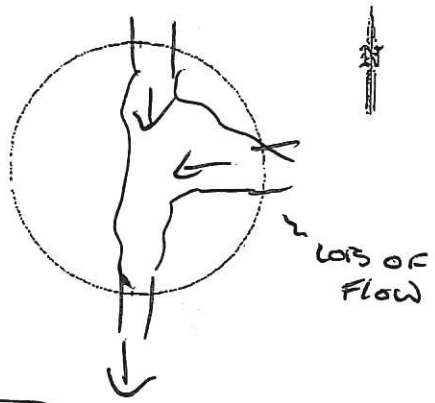
Pipe	Size	Type	Card. Dir.	Cut
A	10	VCP	N	
B	10	VCP	S	8.5
C				
D				
E				
F				

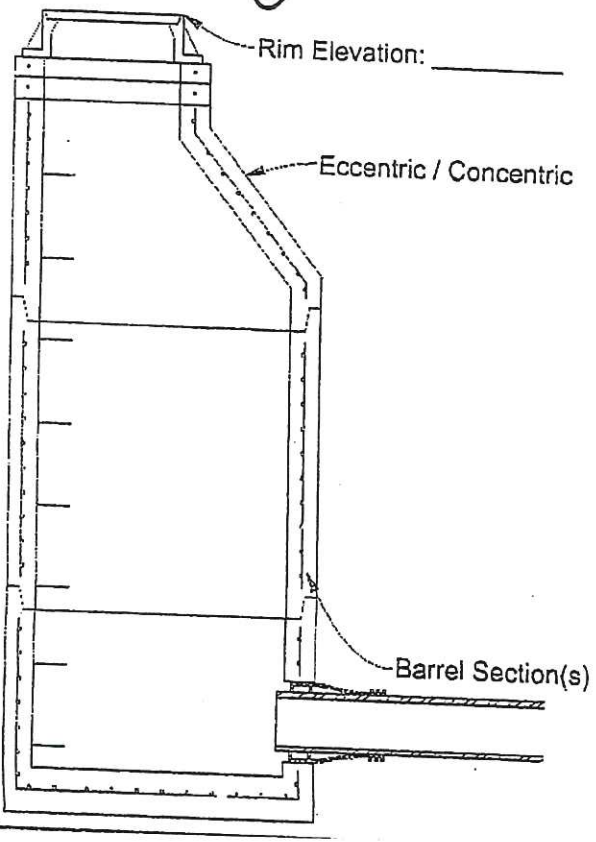
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 41 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover concrete collars

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: 9"

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good (Fair) Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good (Fair) Poor

Drop Manhole Type Outside Inside (None)

Infiltration ~~Yes~~ ~~No~~ minor

Infiltration Location Pipe Invert ~~Casting~~ Walls

SLAB on BARREL

Clean TRASH

Inverts:

Pipe	Size	Type	Card. Dir.	Cut
A	8	VCP	~~A~~ N	
B	8	VCP	E	
C	8	VCP	S	5.4
D				
E				
F				

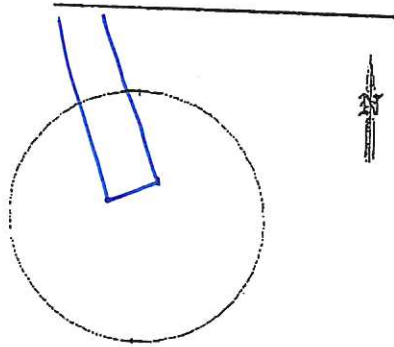
MANHOLE INSPECTION FORM

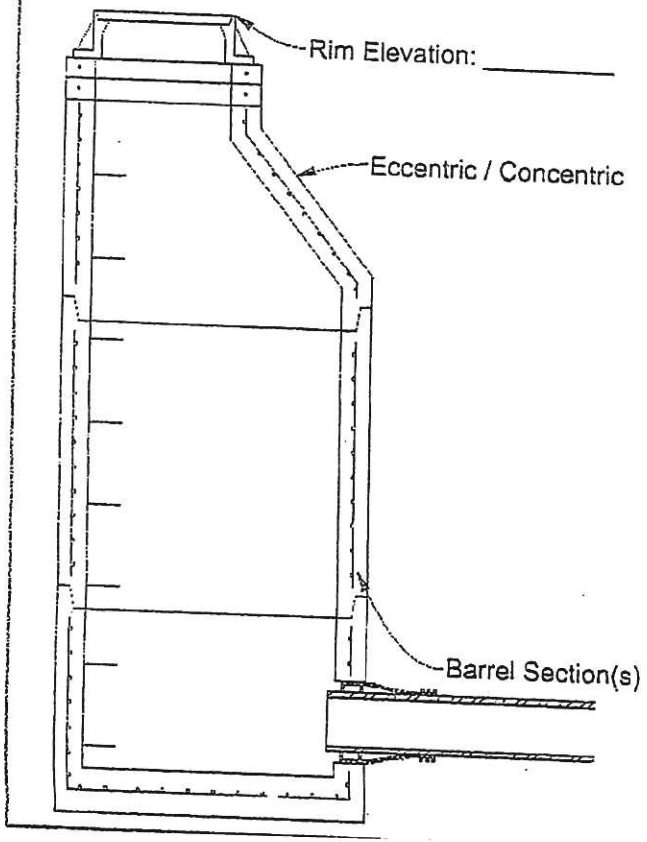
Not Connected to Sanitary

Project _____

Date _____

Inspector _____





Location _____

MH ID 42 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Cover Diameter Flush Below _____ Above _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

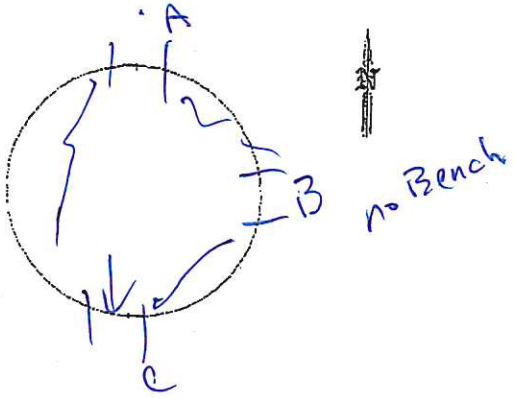
Pipe	Size	Type	Card. Dir.	Cut
A	10	VCP	NNW	~~12~~ 8' ?
B				12.7 Bottom
C				
D				
E				
F				

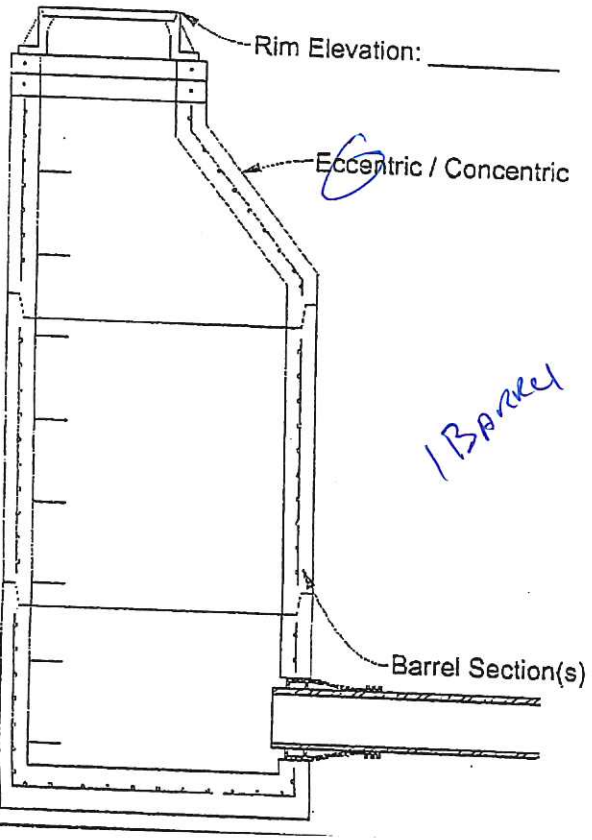
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 43 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover 23

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter _____

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: 8

Riser Rings Qty: 2" 4" 6" Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor major

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Roots

Inverts:

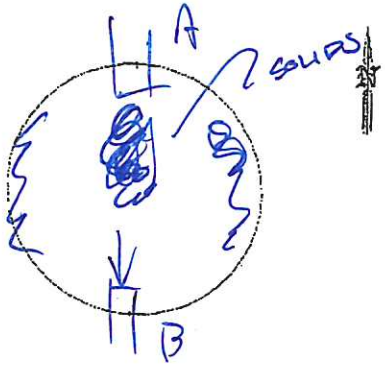
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	E	
C	8	PVC	S	8.4
D				
E				
F				

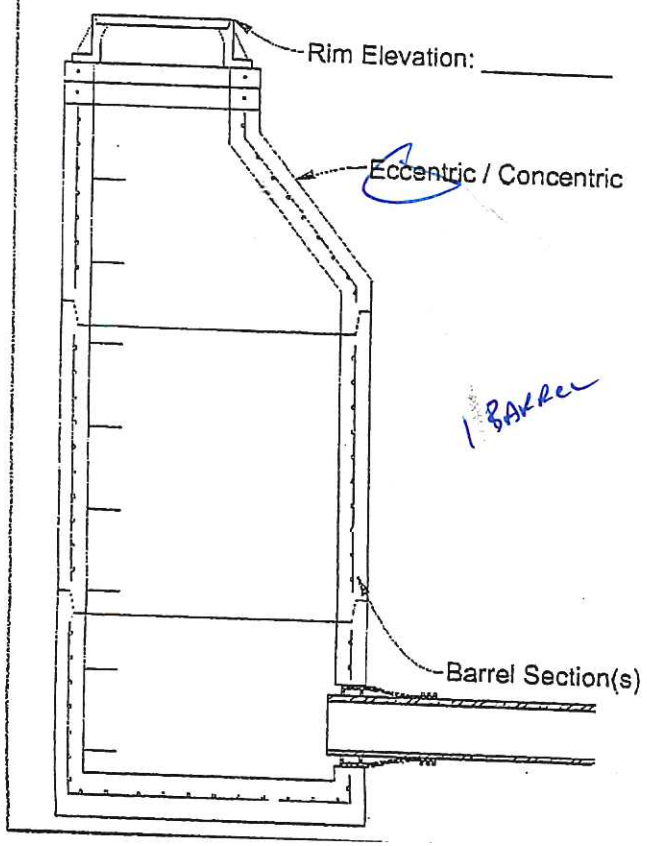
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 44 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover RR GRASS ALLEY

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 23

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: 7

Riser Rings Qty: 2" Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

no bench

Bench Condition Good Fair Poor MAJOR

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

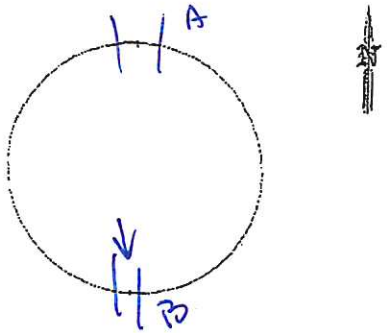
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	S	10.5
C				
D				
E				
F				

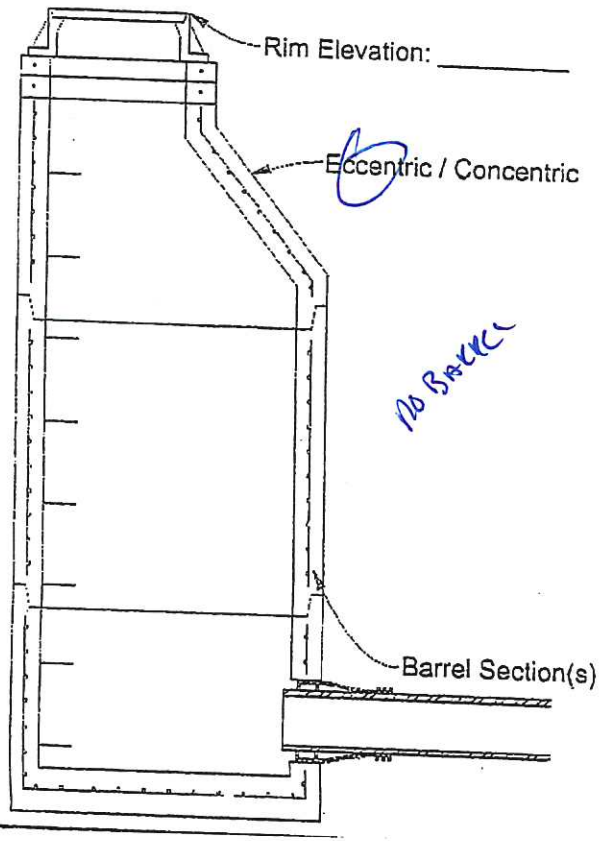
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 45 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover street

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter 23

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: 2

Riser Rings Qty: 2-21" Alignment: ok Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast Reinf. ~~Plastic~~ Other: _____

Step Type ~~Good~~ Fair Poor None

Bench Condition ~~Good~~ ~~Fair~~ Poor

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

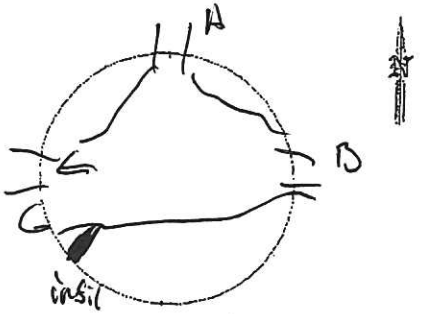
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	S	7.4
C				
D				
E				
F				

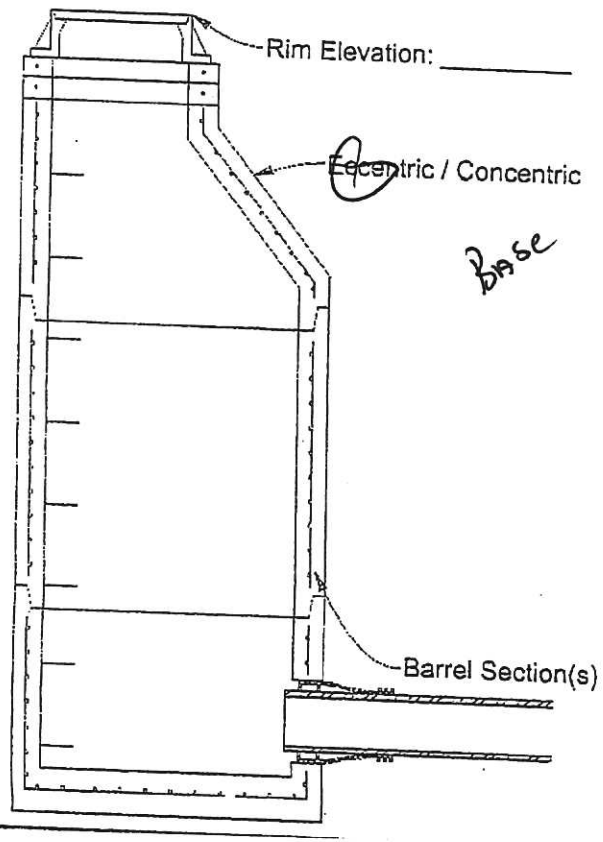
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 46 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ~~grass~~

Grade to Manhole Flush Below _____ Above 2"

Cover Diameter 24

Cover Condition Good ~~Fair~~ Poor

Casting Condition Good ~~Fair~~ Poor Height: 5

Riser Rings Qty: 2-2" 4" Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ ~~Fair~~ Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type ~~Good~~ Fair Poor None

Bench Condition Good ~~Fair~~ Poor minor

Drop Manhole Type Outside Inside (None)

Infiltration ~~Yes~~ No

Infiltration Location Pipe Invert Casting ~~Walls~~ severe

Inverts:

Pipe	Size	Type	Card. Dir.	Cut
A	8	YCP	N	
B	6 8	YCP	E	
C	8	YCP	W	8.5
D				
E				
F				

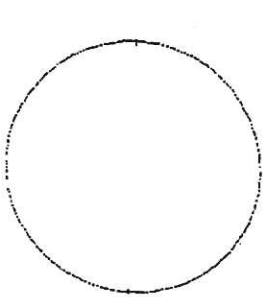
MANHOLE INSPECTION FORM

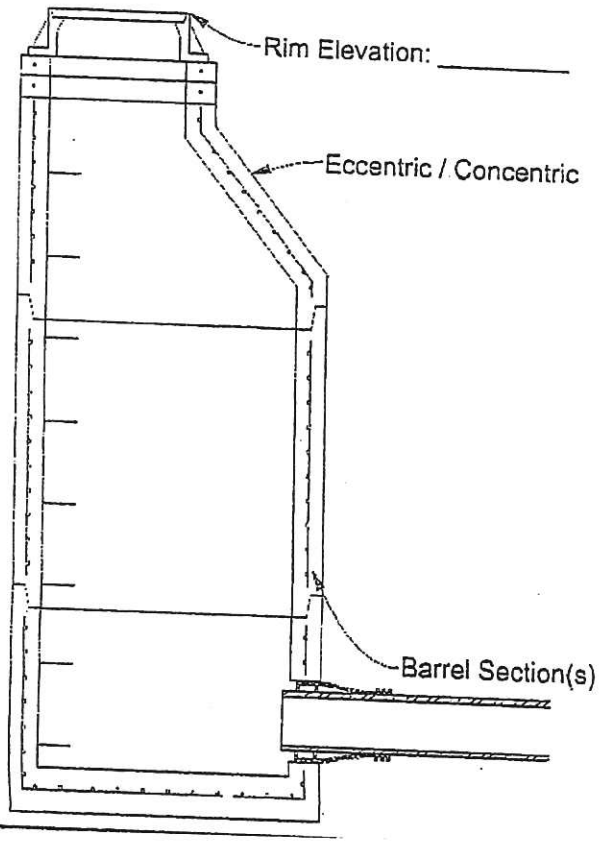
Project _____

Date _____

Inspector _____

Inaccessible under Asphalt





Location _____

MH ID 47 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

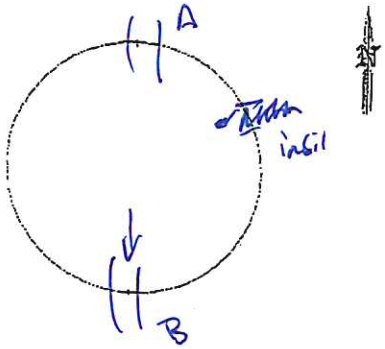
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

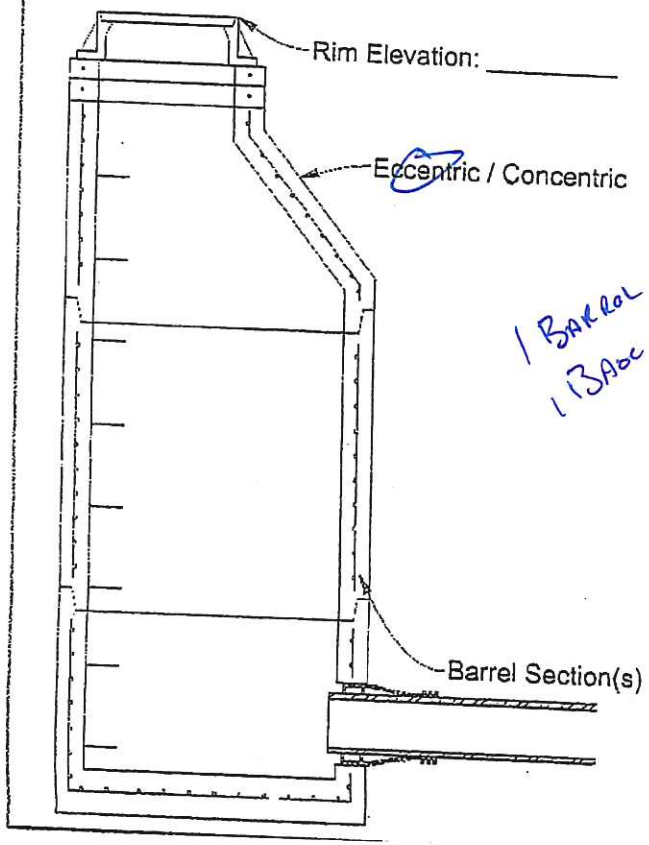
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





1 BARREL
1 BASE

Location _____

MH ID 48 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover 23 GRASS

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 23

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: 8

Riser Rings Qty: 2" 6" Alignment: OK Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

MODERATE

Inverts:

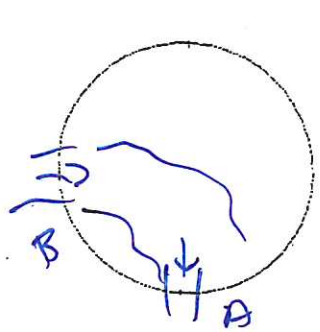
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	S	12.7
C				
D				
E				
F				

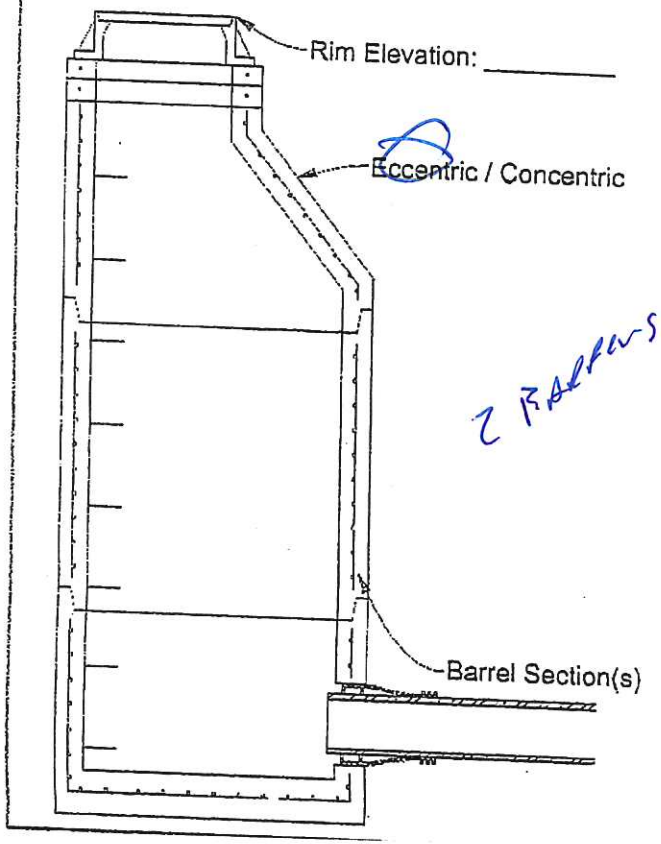
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location 49

MH ID _____ Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover PAVEMENT

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 27

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: 7

Riser Rings Qty: 2 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor MINOR

Drop Manhole Type Outside Inside (None)

Infiltration Yes No MODERATE

Infiltration Location Pipe Invert Casting Walls

Inverts:

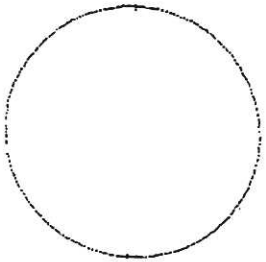
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	S	
B	8	PVC	W	15.5
C				
D				
E				
F				

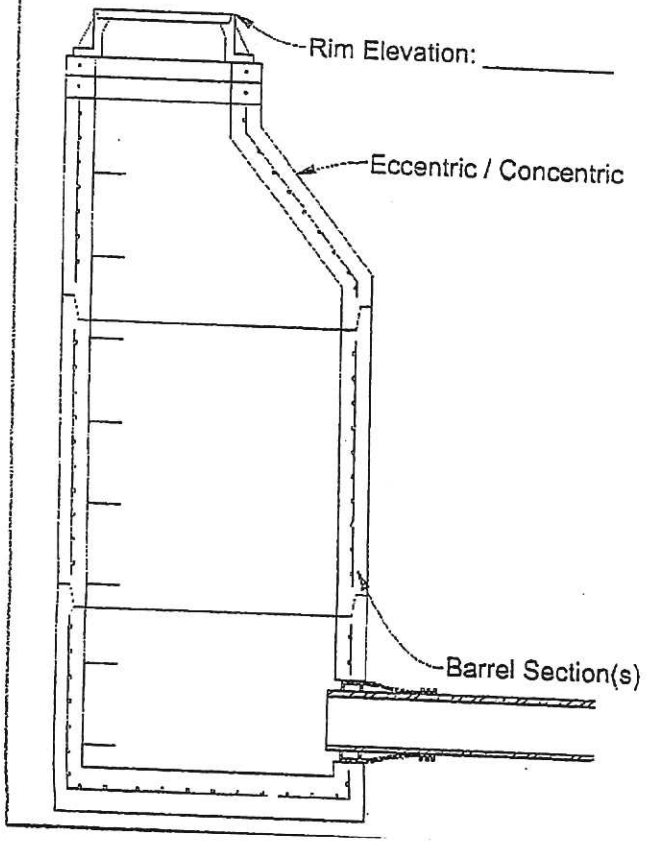
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Inaccessible

Location _____

MH ID 60 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Asphalt

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

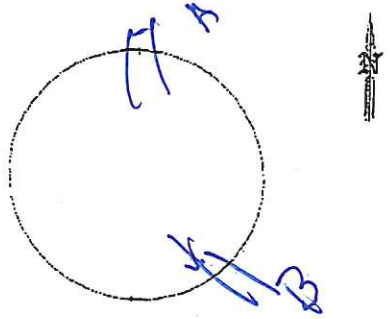
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

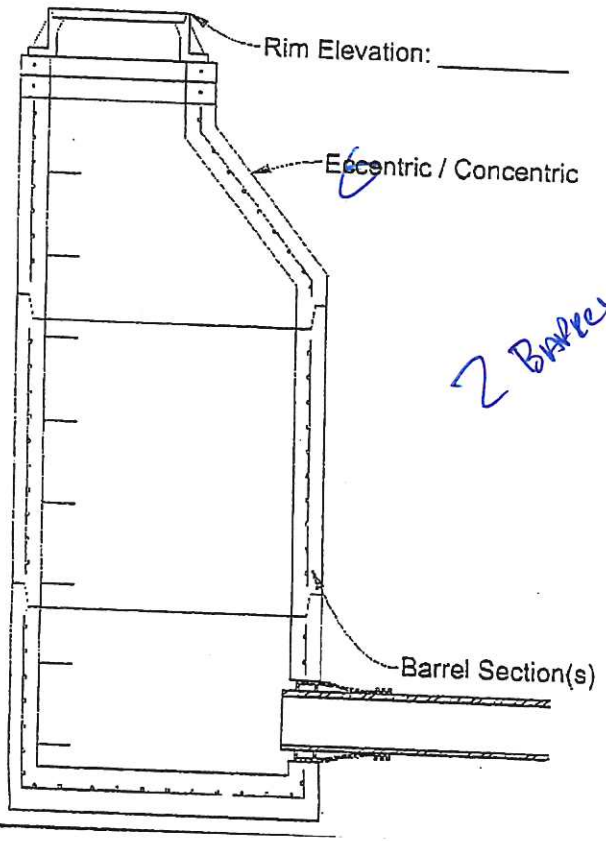
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID S1 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover Asphalt

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 23

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: 7"

Riser Rings Qty: 0 Alignment: FAIR Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No minor

Infiltration Location Pipe Invert Casting Walls

Inverts:

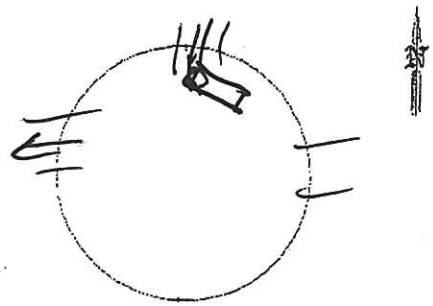
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	PVC	SSE	15.5
C				
D				
E				
F				

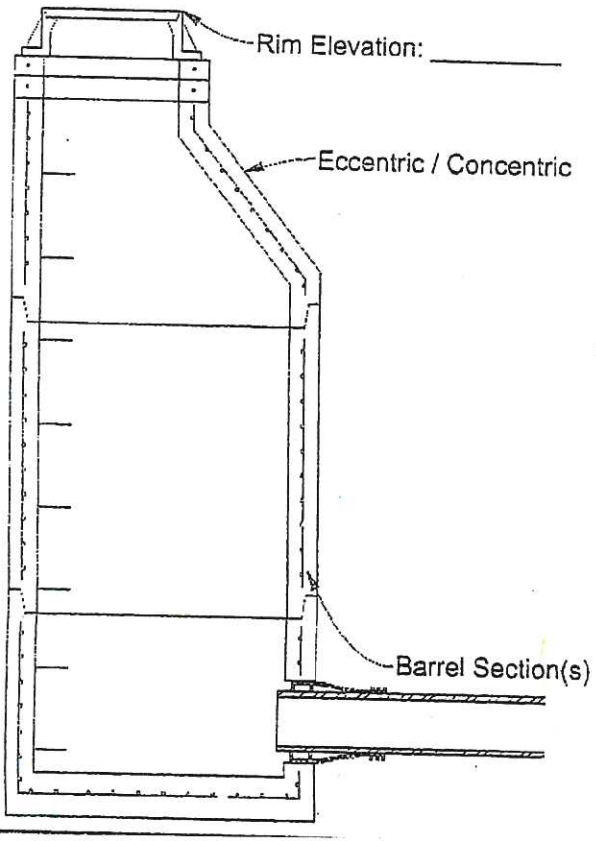
MANHOLE INSPECTION FORM

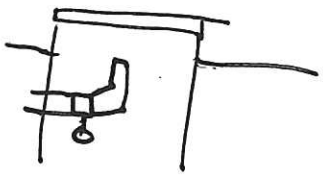
Project _____

Date _____

Inspector _____







Location _____

MH ID 53 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover ~~Pvmt~~ ROAD DITCH

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 24

Cover Condition ~~Good~~ Fair Poor

23" / Casting Condition ~~Good~~ Fair Poor Height: 7

Riser Rings Qty: _____ Alignment: _____ Type: _____

CMP — Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair ~~Poor~~

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good Fair ~~Poor~~ MAJOR

Drop Manhole Type Outside Inside ~~(None)~~

Infiltration ~~Yes~~ No

Infiltration Location Pipe ~~Invert~~ Casting Walls

Inverts:

Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	N	
B	8	RCP	E	
C	8	RCP	W	9.5
D	2	PVC	N	5.0
E				
F				

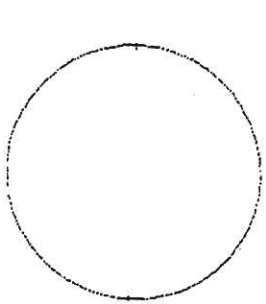
GATE VALVE

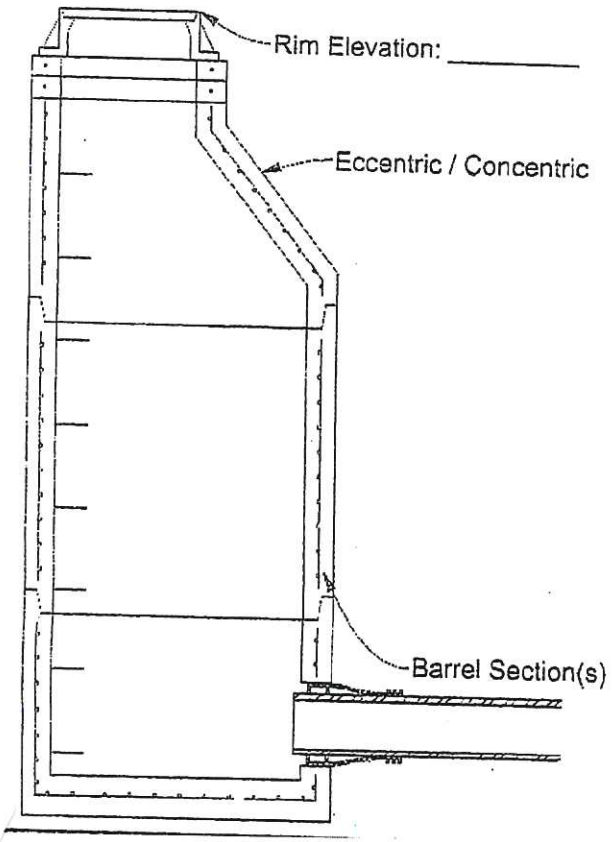
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 54 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

INACCESSIBLE

Inverts:

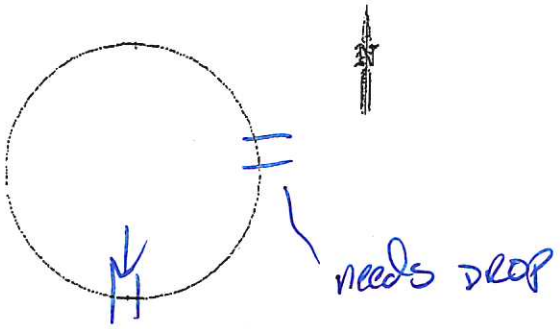
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

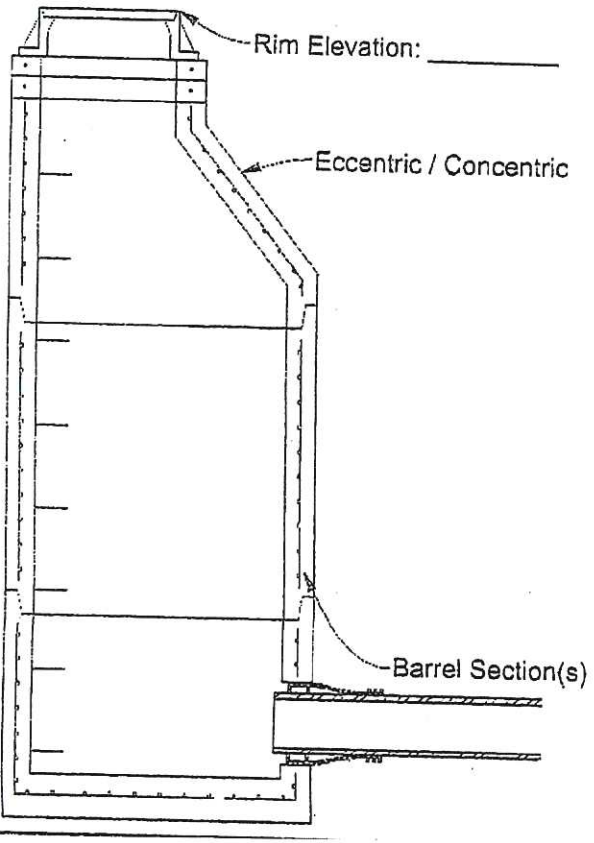
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





SLAB on BARREL

5-2' BARREL SECTION

Location _____

MH ID 55 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below 1" Above _____

Cover Diameter 33

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: 7

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor none major

Drop Manhole Type Outside Inside (None)

Infiltration Yes No MODERATE

Infiltration Location Pipe Invert Casting Walls

Inverts:

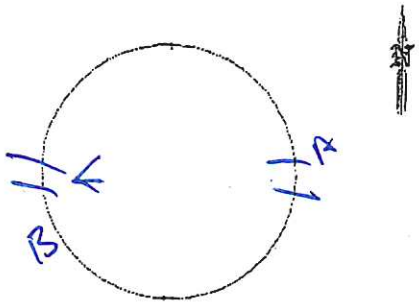
Pipe	Size	Type	Card. Dir.	Cut
A	4		E	7.0
B	8		S	13.4
C				
D				
E				
F				

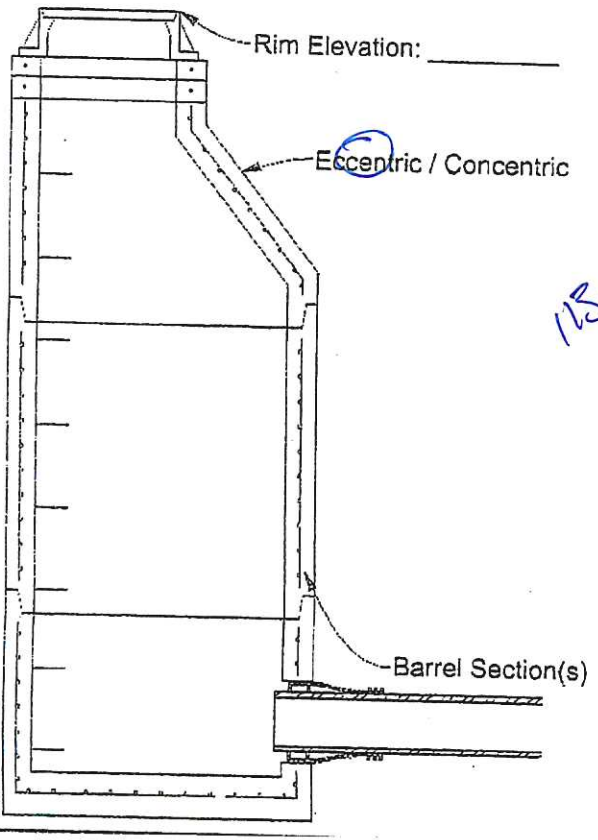
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





ISBARRA

Location _____

MH ID SG Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above 1 8 11

Cover Diameter 2 3

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition ~~Good~~ Fair Poor

Step Condition Re-Rod Cast ~~Reinf. Plastic~~ Other: _____

Step Type ~~Good~~ Fair Poor None

Bench Condition Good ~~Fair~~ Poor minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

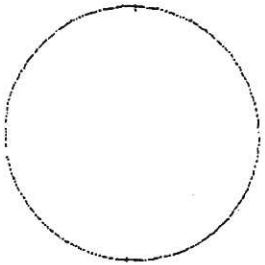
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	E	
B	8	PVC	W	9.2
C				
D				
E				
F				

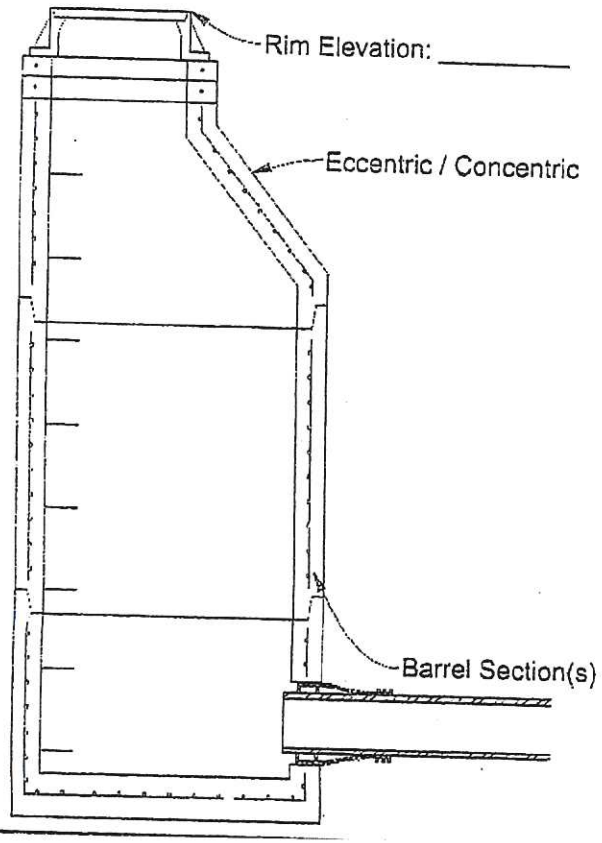
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 57 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover GRASS

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 24

Cover Condition ~~Good~~ Fair Poor

Casting Condition Good ~~Fair~~ Poor Height: 7

Riser Rings Qty: 4" Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good ~~Fair~~ Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good Fair Poor none?

Drop Manhole Type Outside Inside (~~None~~)

Infiltration ~~Yes~~ No minor

Infiltration Location Pipe Invert Casting ~~Walls~~

MODERATE CORROSION

NEEDS DROP

Inverts:

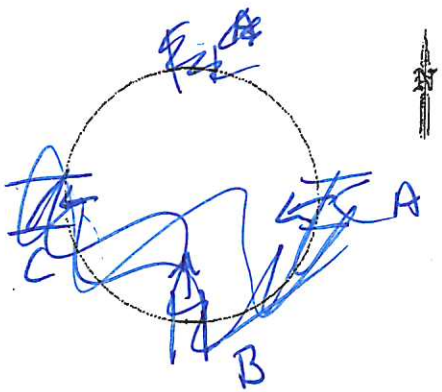
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	E	8.2
B	2		W	3.2
C				14.2
D				
E				
F				

MANHOLE INSPECTION FORM

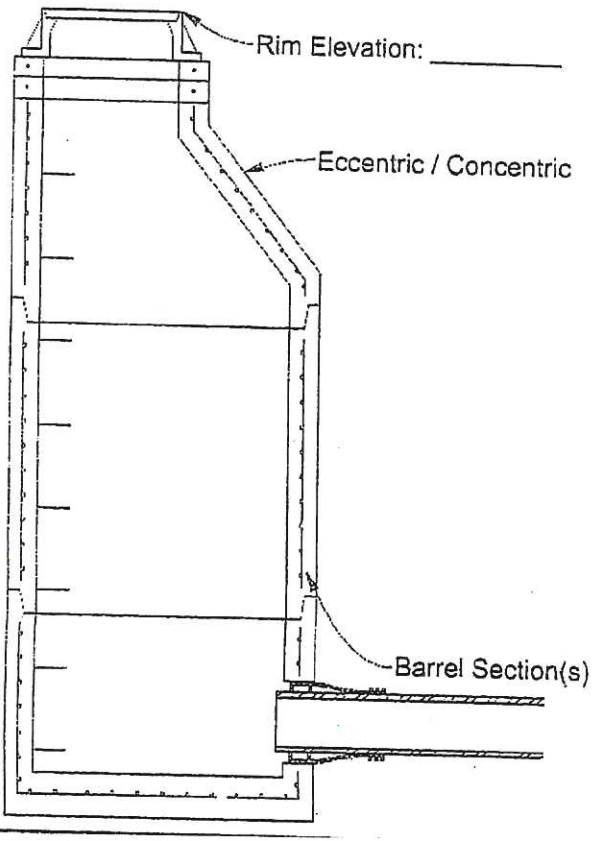
Project _____

Date _____

Inspector _____



MANHOLE COVER O/ NO MH



Location _____

MH ID SB Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

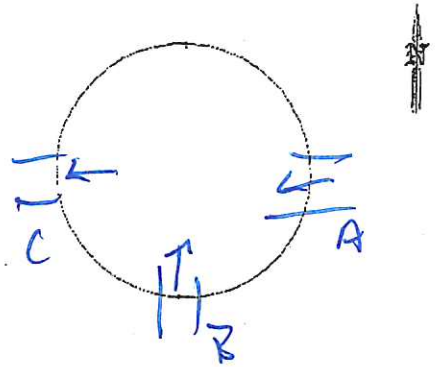
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

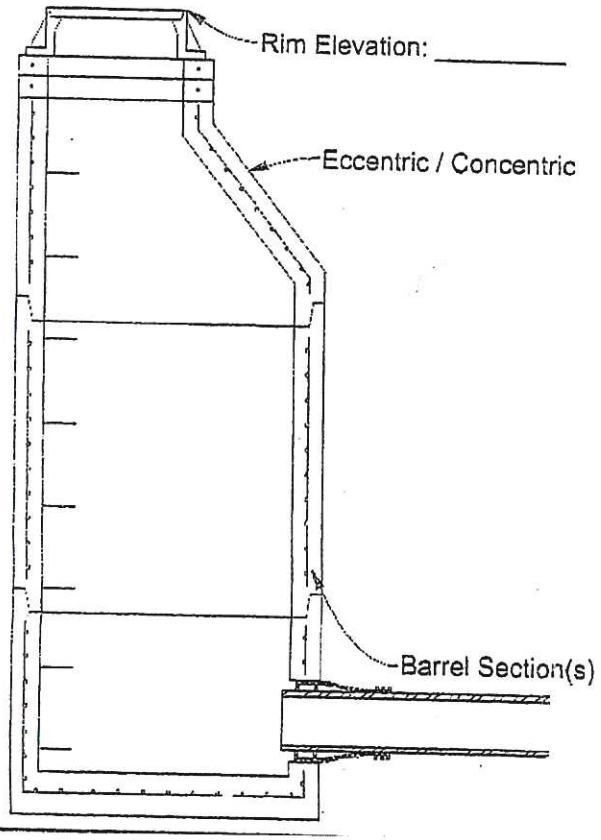
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 59 Point # _____

Present Use Storm ~~Sanitary~~ Other: _____

Surface Cover gravel

Grade to Manhole ~~Flush~~ Below _____ Above _____

Cover Diameter 23.5

Cover Condition ~~Good~~ Fair Poor

Casting Condition ~~Good~~ Fair Poor Height: _____

Riser Rings Qty: 1 2" Alignment: _____ Type: _____

Manhole Type ~~Precast~~ Brick Block Combination

Manhole Condition Good Fair ~~Poor~~

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor ~~None~~

Bench Condition Good Fair ~~Poor~~ minor

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts: Lined

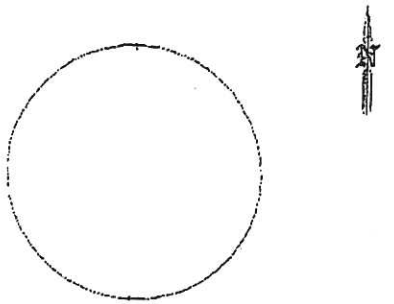
Pipe	Size	Type	Card. Dir.	Cut
A	8	PVC	E	
B	8	PVC	S	
C	8	PVC	W	9.2
D				
E				
F				

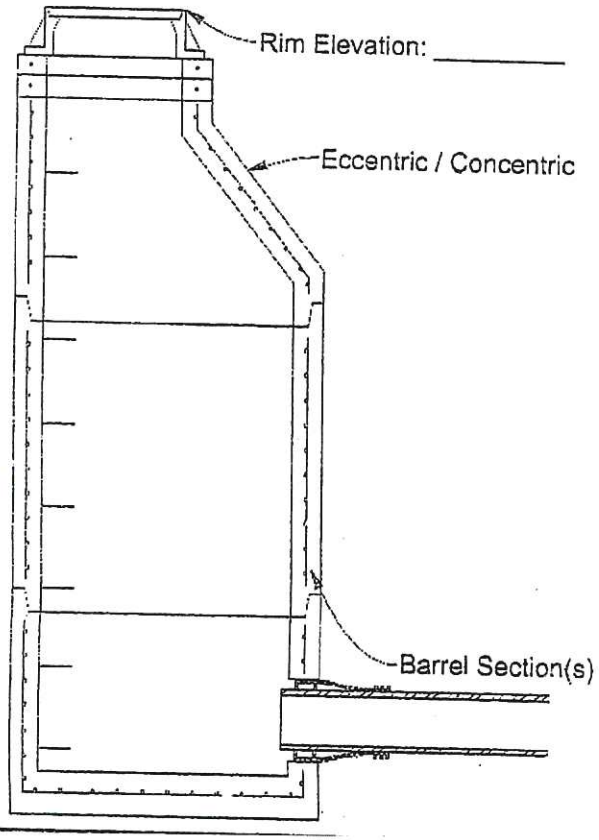
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Under ROADS INACCESSIBLE

Location _____

MH ID 60 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover _____

Grade to Manhole Flush Below _____ Above _____

Cover Diameter _____

Cover Condition Good Fair Poor

Casting Condition Good Fair Poor Height: _____

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor None

Bench Condition Good Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes No

Infiltration Location Pipe Invert Casting Walls

Inverts:

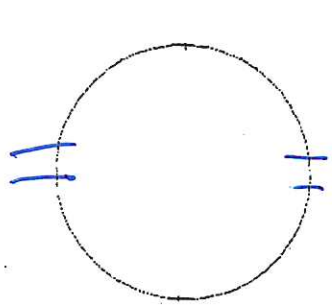
Pipe	Size	Type	Card. Dir.	Cut
A				
B				
C				
D				
E				
F				

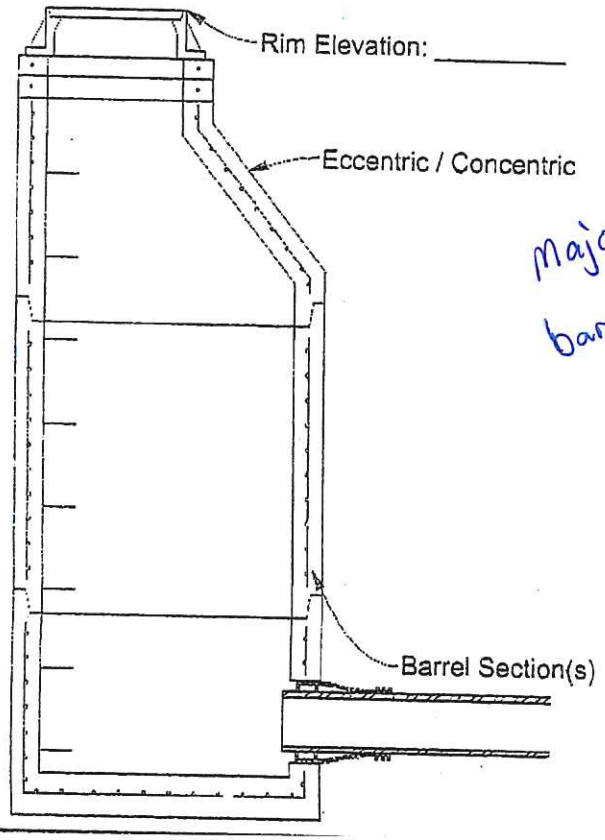
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Major gap between barrels

Location _____

MH ID 61 Point # _____

Present Use Storm Sanitary Other: _____

Surface Cover concrete collars

Grade to Manhole Flush Below _____ Above _____

Cover Diameter 24

Cover Condition ~~Good~~ Fair Poor

Casting Condition Good Fair Poor Height: ~~7~~ 11

Riser Rings Qty: _____ Alignment: _____ Type: _____

Manhole Type Precast Brick Block Combination

Manhole Condition Good Fair Poor steel showing

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good ~~Fair~~ Poor ~~None~~

Bench Condition Good ~~Fair~~ Poor

Drop Manhole Type Outside Inside (None)

Infiltration Yes ~~No~~

Infiltration Location Pipe Invert Casting Walls

Inverts:

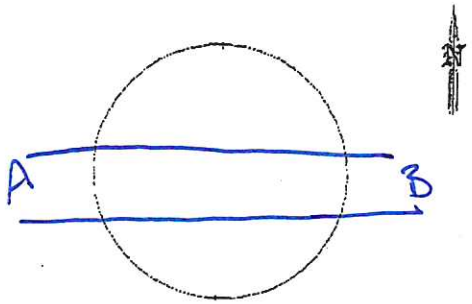
Pipe	Size	Type	Card. Dir.	Cut
A	8	lined PVC	E	
B	8	lined PVC	W	7.4
C				
D				
E				
F				

MANHOLE INSPECTION FORM

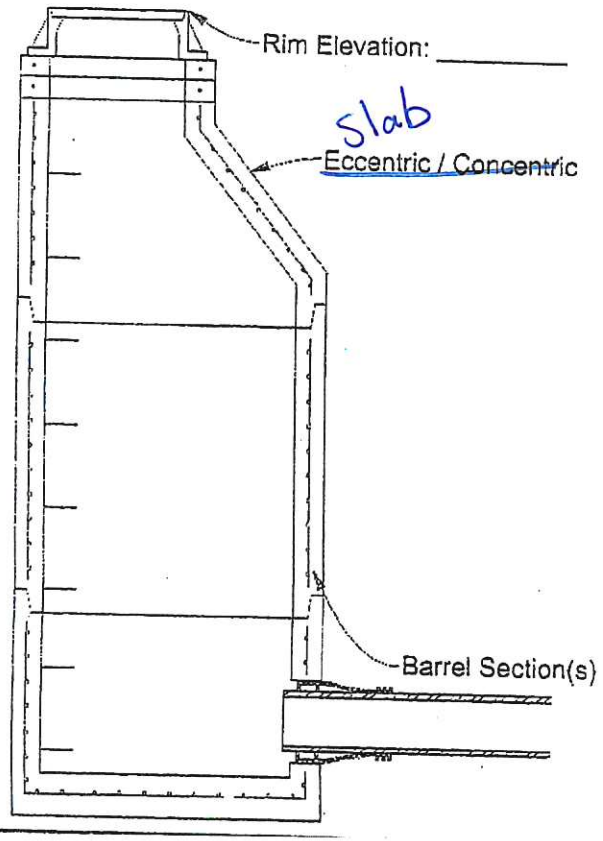
Project _____

Date _____

Inspector _____



minor Bench repair



Location _____

MH ID 03 Point # _____

Present Use Storm (Sanitary) Other: _____

Surface Cover Gravel

Grade to Manhole Flush Below _____ Above 1"

Cover Diameter 24

Cover Condition (Good) Fair Poor

Casting Condition (Good) Fair Poor Height: 7

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type (Precast) Brick Block Combination

Manhole Condition Good (Fair) Poor

Step Condition Re-Rod Cast. Reinf. Plastic Other: NO

Step Type Good Fair Poor None

Bench Condition Good (Fair) (Poor)

Drop Manhole Type Outside Inside (None)

Infiltration Yes (No)

Infiltration Location Pipe Invert Casting Walls

Inverts:

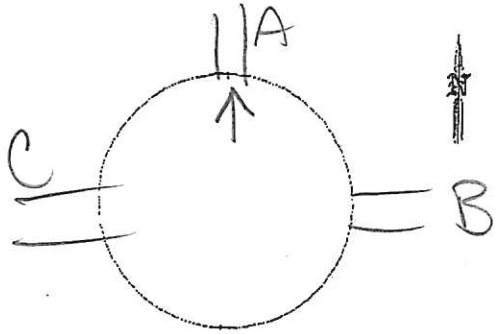
Pipe	Size	Type	Card. Dir.	Cut
A	8	Lined	W	7.7
B	8	Clay	E	
C				
D				
E				
F				

MANHOLE INSPECTION FORM

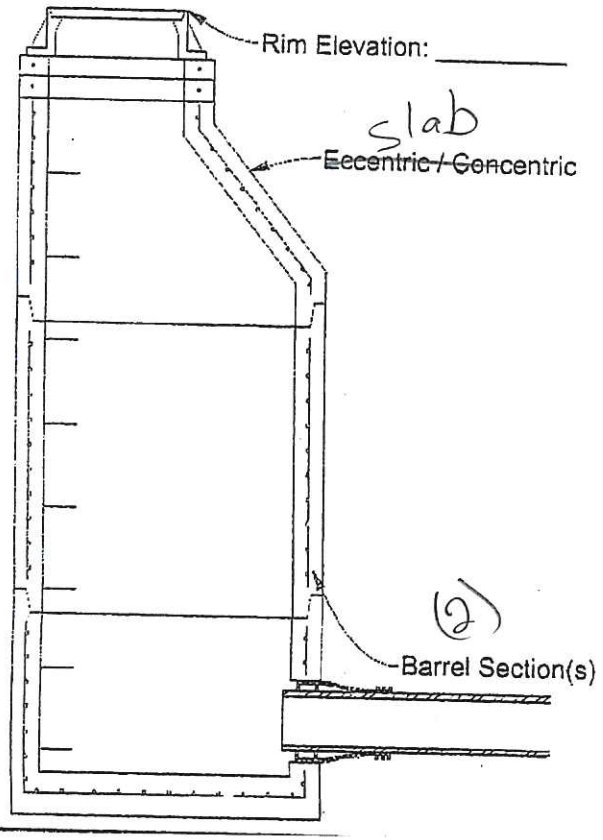
Project _____

Date _____

Inspector _____



minor Bench repair



Location _____

MH ID 64 Point # _____

Present Use Storm (Sanitary) Other: _____

Surface Cover Gravel

Grade to Manhole (Flush) Below _____ Above _____

Cover Diameter 24

Cover Condition Good (Fair) Poor

Casting Condition Good (Fair) Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type (Precast) Brick Block Combination

Manhole Condition Good Fair (Poor)

Step Condition Re-Rod Cast. Reinf. Plastic Other: NO

Step Type Good Fair Poor (None)

Bench Condition Good Fair (Poor)

Drop Manhole Type Outside Inside (None)

Infiltration (Yes) No minor

Infiltration Location Pipe Invert (Casting) Walls

Inverts:

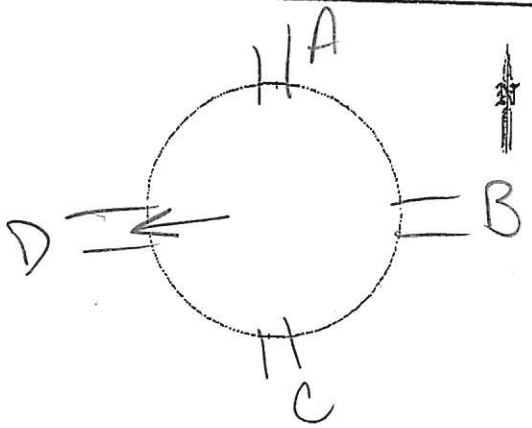
Pipe	Size	Type	Card. Dir.	Cut
A	8	Clay	N	10.8
B	8	Clay	E	
C	8	Clay	W	
D				
E				
F				

MANHOLE INSPECTION FORM

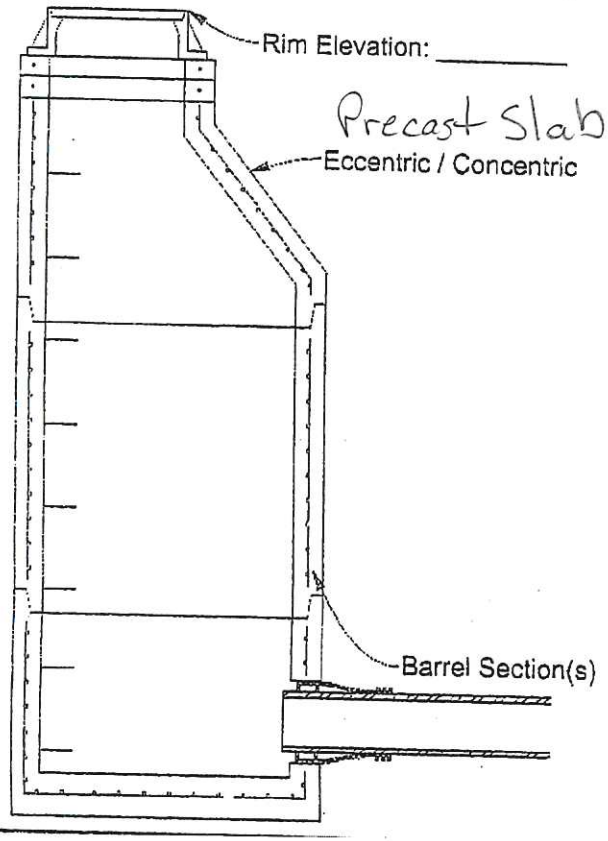
Project _____

Date _____

Inspector _____



Replace MH
Major Bench



Location _____

MH ID 65 Point # _____

Present Use Storm (Sanitary) Other: _____

Surface Cover Grass

Grade to Manhole: Flush Below _____ Above 2"

Cover Diameter 26

Cover Condition Good (Fair) Poor

Casting Condition Good (Fair) Poor Height: _____

Riser Rings Qty: 1 Alignment: Good Type: 4/Conc

Manhole Type Precast (Brick) Block Combination

Manhole Condition Good Fair (Poor)

Step Condition Re-Rod Cast. Reinf. Plastic Other: _____

Step Type Good Fair Poor (None)

Bench Condition Good Fair (Poor)

Drop Manhole Type Outside Inside (None)

Infiltration Yes (No) maybe @ Base

Infiltration Location Pipe Invert Casting Walls

Inverts:

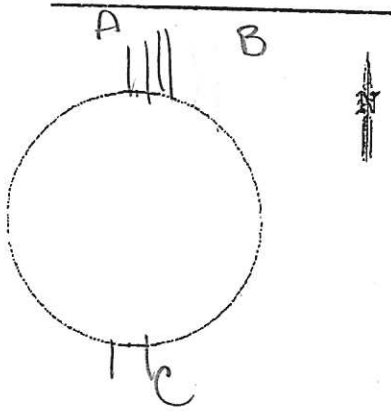
Pipe	Size	Type	Card. Dir.	Cut
A	6	PVC	N	8.9
B	8	clay	E	
C	4	Iron	S	Vacated ? 7.3
D	8	Clay	W	10.1
E				
F				

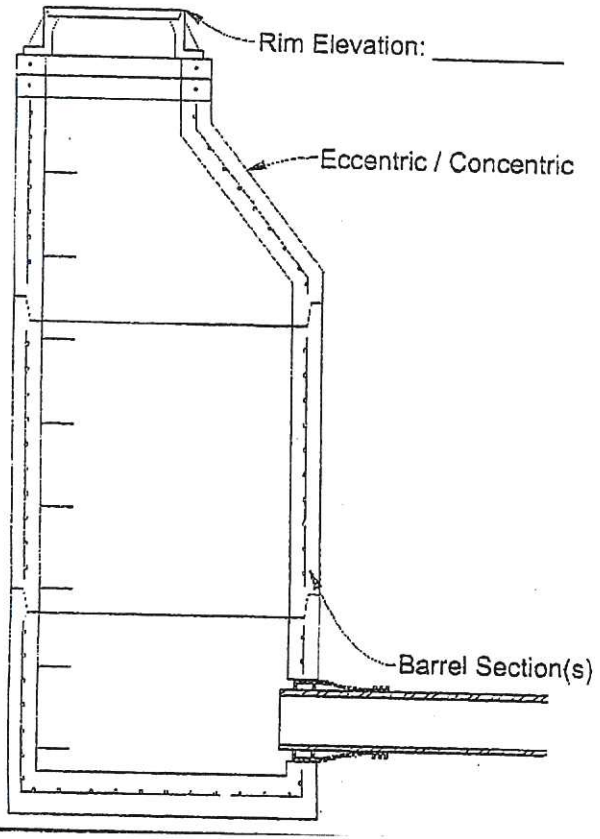
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 66 Point # _____

Present Use Storm (Sanitary) Other: _____

Surface Cover Grass

Grade to Manhole (Flush) Below _____ Above _____

Cover Diameter 23

Cover Condition Good (Fair) Poor

Casting Condition Good (Fair) Poor Height: 7

minor Bench Repair

Riser Rings Qty: 2 Alignment: Fair Type: Conc 2"/6"

Manhole Type Precast (Brick) Block Combination

Manhole Condition Good (Fair) Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor (None)

Bench Condition Good (Fair) Poor

Drop Manhole Type Outside Inside (None)

Infiltration (Yes) No

Infiltration Location Pipe Invert Casting (Walls) + Base

Inverts:

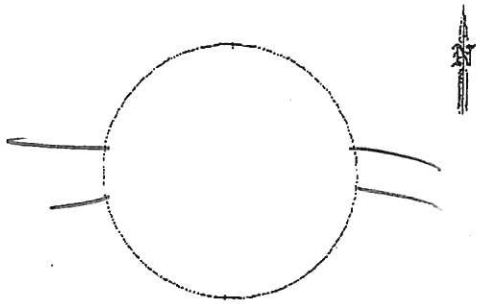
Pipe	Size	Type	Card. Dir.	Cut
A	8	Clay	N	
B	6	Clay	N	7.1
C	8	Clay	S	8.4
D				
E				
F				

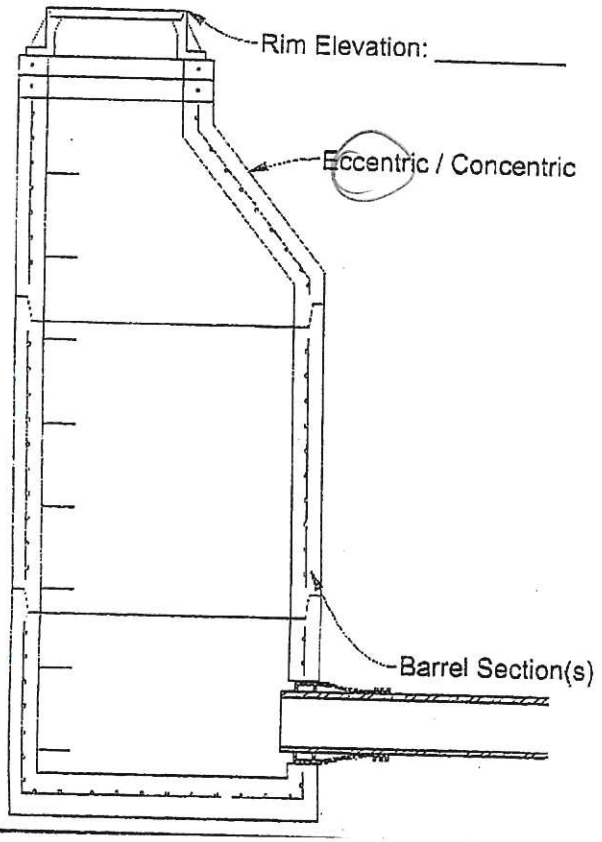
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 68 Point # _____

Present Use Storm (Sanitary) Other: _____

Surface Cover Asphalt

Grade to Manhole Flush Below 1" Above _____

Cover Diameter 23

Cover Condition Good (Fair) Poor

Casting Condition Good (Fair) Poor Height: 7

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type (Precast) Brick Block Combination

Manhole Condition (Good) (Fair) Poor

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor (None)

Bench Condition (Good) Fair Poor

Drop Manhole Type Outside Inside (None)

Infiltration (Yes) No

Infiltration Location Pipe Invert Casting (Walls)

Double Casting
No Rings

Inverts:

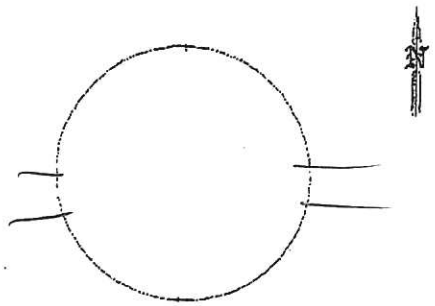
Pipe	Size	Type	Card. Dir.	Cut
A	8	clay	E	
B	8	clay	W	11.0
C				
D				
E				
F				

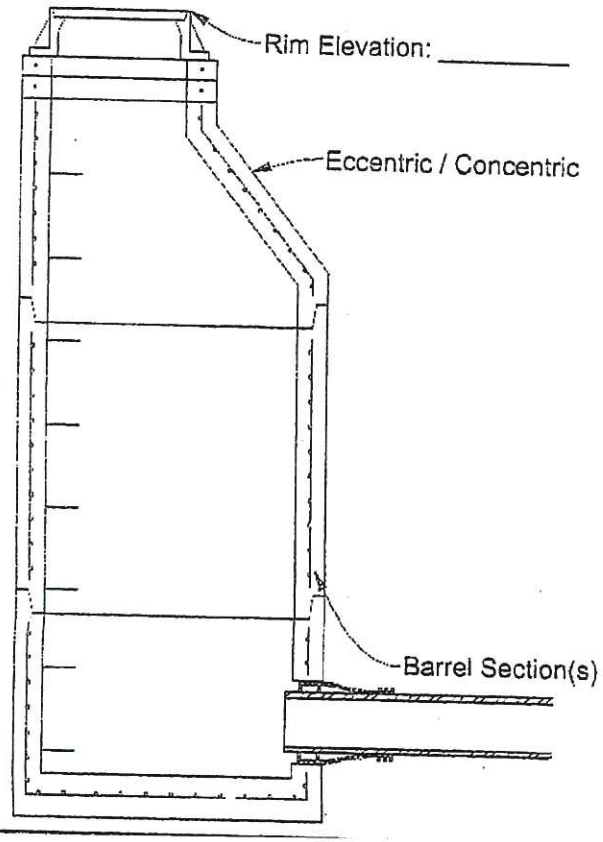
MANHOLE INSPECTION FORM

Project _____

Date _____

Inspector _____





Location _____

MH ID 69 Point # _____

Present Use Storm (Sanitary) Other: _____

Surface Cover Asphalt

Grade to Manhole (Flush) Below _____ Above _____

Cover Diameter 24

Cover Condition Good (Fair) Poor

Casting Condition Good (Fair) Poor Height: _____

Riser Rings Qty: 0 Alignment: _____ Type: _____

Manhole Type (Precast) Brick Block Combination

Manhole Condition Good Fair (Poor)

Step Condition Re-Rod Cast Reinf. Plastic Other: _____

Step Type Good Fair Poor (None)

Bench Condition Good (Fair) Poor

Drop Manhole Type Outside Inside (None)

Infiltration (Yes) No

Infiltration Location Pipe Invert Casting (Walls)

Double Casting Welded to fit?

Pipes misaligned in manhole

Inverts:

Pipe	Size	Type	Card. Dir.	Cut
A	8	Clay	E	
B	8	Clay	W	13.0
C				
D				
E				
F				

Appendix E
Sanitary Sewer Pipeline Evaluation

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Structure ID		Cleaning		Roots		Cracks		Sags		Intruding Services		Additional Comments
Upstream	Downstream	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	
1	2u	1										Slow moving water
1	Cell 1d	1										
2	1d	1										
2	3u	1										
3	2d											
4	3d	1										
4	3u											
4	5u							1				Slowing moving water
5	4d	1										
5	6u	1										Side build up
6	5d											
6	7u											
6	33u	1							2			Slopes down into sag
7	6d	1										
7	6d	1										
7	8u	1										
7	8u	1										
8	7d	1										
8	9u	1										Side build up
9	8d	1										
9	10u	1										
11	10d	1										
11	12u	1										Side build up
11	31u	1		1								Slight roots intruding on each segment, crooked pipes
12	11d	1										
12	13u	1						1				
12	14u	1						1				Water standing still, nearly half full
12	22u		2									Clumps
13	12d	1										
13	Wu	1			2							Roots blocking almost across, pipes misaligned
14	13d											
14	15u			1				1				Water not moving
14	Eu											Not straight pipes
16	14d	1		1								Little plants growing
16	17u			1				1				Puddles/not moving
17	16d	1										
17	Eu	1										
18	19u							1				Water flowing over entrance
18	Wd											
19	18d	1										
19	20u		2									Water not moving, clumps
20	19d											
20	21u	1						1				Infiltration from top, pipes aren't aligned
22	12d	1										
22	23u	1								1		

23	22d	1						1				Water not moving
23	24u	1										
23	26u	1										
24	23d	1						1				Water not moving
24	25u		2									Buildup at bottom
26	23d	1										
26	Eu				2			1				Big roots at top, sag near bottom, pipes aren't aligned
26	Wu		2									The back is completely filled, needs cleaning
27	26d	1		1								Pipes aren't lined up
27	28u							1				
27	30u	1						1				
28	27d	1										
28	29u											
29	28d	1						1				Water not moving
29	Eu	1		1								
30	27d	1						1				Water not moving
30	Wu	1										
31	11d	1										
31	35u	1										Water filled halfway
31	37Nu			1								Discoloration
31	Wu											Hole
33	6d											
33	Nu	1										
34	35d	1										Pipes aren't straight
34	Nwu	1										Jagged opening
35	31d	1								1		
35	31u	1		1								
35	34u	1		1								
35	Nu	1										
36	37d	1		1								
36	43u	1										
37	31d			1								
37	36u											
37	38u			1						1		Major infiltration!
38	37d			1								
38	39u											
39	38d	1		1								
39	40u			1								
40	39d	1		1					2			Buildup at top of pipe
40	41u	1										
41	40d	1							2			
41	46u	1						1				Half full with water
41	Nu	1						1				Water not moving
43	44u	1										
43	46d	1										Infiltration near back
43	65u		2		2							Almost completely clogged near back
45	44d			1								

45	Nu							1				Water not moving
46	41d	1		1								Sitting water
46	47u	1										
46	53u	1		1								Sitting water, slight infiltration
48	47d											
48	49u	1										Standing water
49	48d	1						1				
49	50u	1										
51	50d								2			Water is not moving
51	52u	1										Sitting water
53	46d	1										Slight infiltration
53	54u	1						1				
53	59u	1										
53	59u	1										
54	56u	1										
56	Eu	1						1				Water puddles not moving

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Appendix F
Sludge Depth Evaluation

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Lagoon Sample Depth		
Location:		Town of Bison Lagoons
Pond 1		**Sludge Depth**
	Sample 1	10"
	Sample 2	14"
	Sample 3	12"
	Sample 4	10"
Pond 2		
	Sample 1	8"
	Sample 2	8"
Pond 3		
	Sample 1	8"
	Sample 2	10"
Pond 4		
	Sample 1	8"
	Sample 2	8"
	Sample 3	6"
	Sample 4	6"
Pond 5		
	Sample 1	3"
	Sample 2	3"
	Sample 3	6"
	Sample 4	3"
	Sample 5	6"
	Sample 6	12"
	Sample 7	12"
	Sample 8	8"
	Sample 9	6"

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Legend

Sample Locations ⊕

0 100 200 400

SCALE (US FEET):
1" = 200'

N

Pond #1
Pond #2
Pond #3
Pond #4
Pond #5
Storm Water Pond

01 OF 01

DESIGNED BY: PIA

DRAWN BY: PIA

DATE PRINTED: 02/26/21

REVISION	DATE
1	xx/xx/xx
2	
3	
4	

SHEET DESCRIPTION: Sludge Depth Testing

PROJECT NAME: Bison Wastewater Treatment System

PROJECT NO.: S19-P567

3030 Airport Rd, Box 23
Pierre, SD 57501
PH: 605.224.1123

BROSZ ENGINEERING, INC.
ARCHITECTURE ENGINEERING SURVEYING