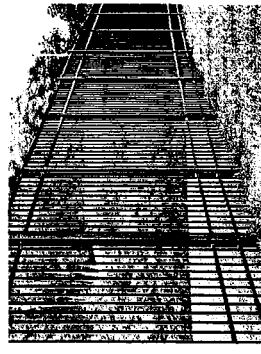
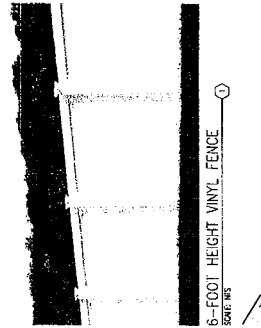


**APPENDIX C**  
**FENCING MAP**



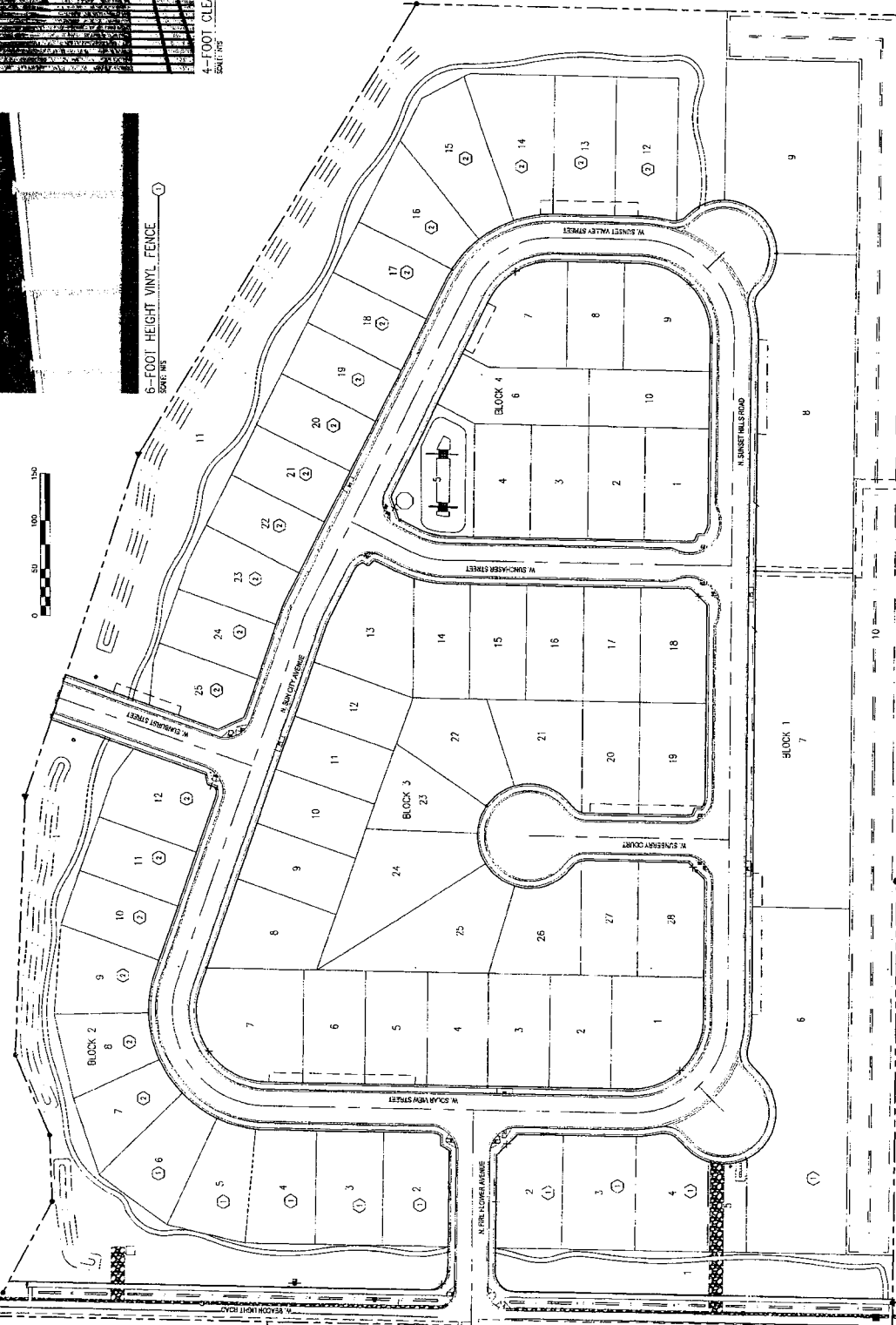
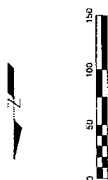
4-FOOT CLEAR VIEW FENCE  
SCALE: 1/8" = 1'-0"



6-FOOT HEIGHT VINYL FENCE  
SCALE: 1/8" = 1'-0"

**KEYNOTES**

1. MATERIAL SHALL BE WHITE POLYETHYLENE GLASS REINFORCED FIBER CONCRETE (WPC).
2. MATERIAL SHALL BE CLEAR VINYL FIBER REINFORCED CONCRETE (FRC).



<p><b>811</b> Know what's below. Call before you dig.</p>	<p>UNLESS OTHERWISE NOTED, THESE PLANS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CITY, STATE AND FEDERAL REQUIREMENTS. A GRADING PERMIT HAS BEEN ISSUED.</p> <p>DRAWING STATUS:</p>	<p>DATE: _____ BY: _____ CHECKED BY: _____ SCALE: _____</p>	<p>SEAL - ENGINEER</p> <p><b>B</b> BLAINE A. WOMER A W CIVIL ENGINEERING 1000 W. SUNSET HILLS ROAD, SUITE 100 DALLAS, TEXAS 75242</p> <p>PLANNING ENGINEERING SURVEYING UTILITY WORKS</p>	<p>CITY OF STAR, ID SUNFIELD ESTATES SUBDIVISION FENCE EXHIBIT</p>	<p>SHEET NO. 1 OF 1 PLOT NO. M1420003</p>
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**APPENDIX D**  
**SEWAGE GRINDER PUMP MAP**



**APPENDIX E**  
**SEWER SYSTEM O&M MANUAL**

Prepared For:

-IDEQ

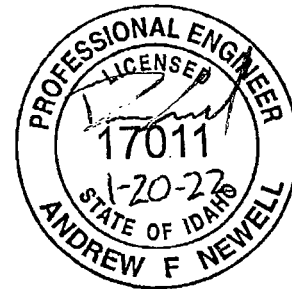
Sunfield Estates Subdivision  
Star, Idaho

Low Pressure Sewer Operation and  
Maintenance Manual

**APPROVED**

By: Tom Burnham, PE  
State of Idaho  
Department of Environmental Quality

Date: January 21, 2022



Prepared By:

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4355 W. Emerald Street, Suite 145  
Boise, ID 83706  
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*Revised January 20, 2022*  
November 4, 2021



Project No: N1420003

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## APPENDICES

### Appendix A - Figures

Vicinity Map  
Site Map  
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## **PURPOSE AND SCOPE**

The purpose of the low-pressure sewer Operations and Maintenance (O&M) Program is to provide reliable low pressure sewage pumping service by inspecting, operating and maintaining valves, force mains and other equipment associated with the system.

## **OVERVIEW**

The Homeowners Association (HOA) is responsible for operating and maintaining a network of low-pressure sewer system, encompassing roughly 3,900 linear feet of low-pressure force mains ranging in size from 1.5 to 2 inches, connected to the Star Sewer and Water District (SSWD) wastewater collection system. The HOA provides O&M necessary to operate these low-pressure sewers and low-pressure force mains optimally while minimizing SSOs, odors, costly repairs, and unnecessary outages. The HOA conducts inspections and performs preventative and reactive maintenance as required.

## **SEWER SYSTEM OPERATION**

There are three basic components to this system: the service lines, the grinder pump, and the main lines. The service lines receive the effluent from all the buildings and discharge it to the grinder pumps wet well by way of gravity flow. When the effluent level in the wet well reaches a predetermined level, the sensors activate the pump and effluent is pumped into the pressurized main line to be discharged into the SSWD owned and operated sewer system.

The grinder pump is equipped with a submersible pump, wet well, tank lid, wet well vent, discharge valve, ball valve, flow meters and an alarm device. A large wet well provides backup capacity during power outages, estimated to withstand two days of power outage.

The HOA must place the direct supervision of the low-pressure sewer system under the responsible charge of a wastewater operator who holds a valid Idaho license equal to or greater than the classification of the wastewater system. Only qualified personnel who have obtained a Wastewater Operator Certification shall operate the sewer system.

When operating the sewer system, ensure compliance with all applicable local, state, and OSHA regulations.

## **SYSTEM STARTUP**

Do not attempt to start the system if the wet well is empty. For first startup it may be necessary to fill the wet well with water to the level that will trigger the pump to start. Turn on the pump controls and when the pump has built pressure in the line slowly open the common force main isolation valve until pressure is equalized. The system is ready for normal operation.



The wet well was designed to deal with either initial lower flow rate or design peak flow rate. However, when the discharge sewer is less than estimated initial flow rate, some issues, such as odor and grit settling in the wet well may occur due to the retention time increased in both wet well and main pipes. The odor could be minimized with increase of the pump start frequency through filling the water to the level that will trigger the pump to start. Chemical feed addition at the wet well can help control odor problems, if necessary. Before addition, the chemicals used must be approved by SSWD.

The grinder pumps are equipped with an alarm system that will notify the operator when any failure occurs. There is a high-water level alarm and a pump failure alarm that will notify the operator when a problem arises.

### **SYSTEM SHUTDOWN**

Once the system is in operation, it should not need to be shut down except for major repair and maintenance. When shutting down the system, close the isolation valve on the discharge pipe, turn the pump control off, and shut off the power at the main breaker box. The grinder pump is equipped with isolation valves that will allow routine maintenance to be performed on the pumps and valves while maintaining normal operation and not requiring the entire system to be shut down.

### **GRINDER PUMPS**

The grinder pumps are equipped with an alarm system. When a pump fails, an alarm will notify the system operator of the failure and the pump should be replaced immediately by a qualified service technician. If there is a sudden power outage, a large wet well provides backup capacity.

### **ISOLATION VALVES**

The low-pressure system is equipped with multiple isolation valves on each pump discharge line and the common force main to aid in operation and maintenance of the system. The locations of all valves are indicated on the record drawings.

### **PUMP CONTROLS**

The Grinder Pump will be equipped with a control system that will monitor pump status and critical information; run/fail, low/high level, fail and high level. When the control system monitors a failure, an alarm is activated, and the system operator is notified.

### **CHECK VALVES**

The Lift Station is equipped with three check valves: two for each pump discharge line and one on the main line. The check valves are necessary to keep the pressurized line from filling the wet well and will not allow the pumps to cycle the waste back into the

wet well. Each check valve can be isolated from the system using isolation valves during routine maintenance.

#### **TANK LID**

The grinder pumps are equipped with a accessible tank lid that shall remained locked except during inspection and maintenance.

#### **PRESSURE CLEANOUT**

Pressure cleanouts have been installed for ease of cleaning. The cleanouts are designed to allow a 400 ft jet pipe to perform maintenance activities.

#### **EMERGENCY STORAGE**

The grinder pump is designed with emergency storage capacity in the wet well. At peak hour flows, the wet well will provide an additional 20 minutes of storage. Under lower flows this time could be significantly increased. A septic pumper could be utilized to empty the wet well if all alarms and pump controls fail.

#### **ROUTINE MONITORING & MAINTENANCE**

Routine monitoring and preventive maintenance of the low-pressure sewer system is a necessary task which will ensure continued, reliable operation and increase the life of the system. All equipment in the sewer system shall be backed up by manufactures' service manuals. This material should be carefully read, filed, and consulted when servicing is required. In conducting routine inspections and preventative maintenance be sure to follow the manufacturers' recommendations (pump, control panels, valves, etc.) as well as appropriate safety precautions. The grinders, pumps, and operating equipment should be inspected routinely. More frequent inspection should be conducted under severe operating conditions. The following is a list of recommended tasks that should be completed to improve the operation of the system.

##### **Weekly:**

Inspect the grinder pumps and force main for signs of overflow and leaks. Repair any problems as required.

##### **Monthly:**

Check all equipment in the sewer system for any sign of wear or damage. Correct any problems that are found.

Check control panel switches for proper position. Visually inspect the control panel wiring for obvious signs of electrical problems, such as burned wiring, wire

off terminal, and burn spots on the panel. If this is observed, contact a qualified electrician to correct the problem.

Verify the area around the grinder pump is clear of any obstructions and clutter and clean as necessary.

Yearly:

Inspect all pumps and electrical controls. The inspection should be conducted by a qualified technician. It should include, but not be limited to: pump performance and the condition of the electrical controls and panels.

Operate pump in manual mode. Check wet well for grease, debris, and unusual noise. Inspect the discharge lines in both wet well and valve pit for leakage and valve arrangement. Monitor the pump discharge pressure. After the pump has been tested, turn the pump off and place back in AUTO mode.

Monitor an entire pump cycle and record the cycle time. Compare the cycle time with previous recordings to judge performance. Verify that the flow meter is functional.

Inspect sewer manholes, cleanouts and valves. Use sewer hook to remove the manhole cover. Pressure wash manhole walls to clean interior surfaces of manhole of debris, dirt, oil, grease, remains of old coating materials, and any other extraneous materials. Examine manhole, cleanout and valves visually for damage. Repair damage and leakage in manholes, cleanouts and air release valves. Trim and grout as necessary. Reset/replace frame and cover as necessary.

#### **WET WELL AND CHECK VALVES MAINTENANCE**

Wet wells shall be pumped out and cleaned at least twice a year to prevent solids and grease build-up. Flushing of the sewer line may occasionally be required by turning on the submersible pump manually after filling up the wet well with water. Check valves shall be maintained after shutting off the isolation valve and the pump. The locations of all valves are indicated on the record drawings.

#### **MISCELLANEOUS MAINTENANCE**

All system components should be properly maintained and kept in good working condition at all times. Any broken, damaged or worn components should be replaced immediately by a trained professional.

## **SYSTEM TROUBLE SHOOTING**

The low-pressure sewer system has been designed to provide redundancy and backup power in the case of emergencies or problems. Some of the more common problems that maybe encountered are discussed in the following sections.

### **ODORS**

Odors in the sewer system will be displaced to the atmosphere by vent tubes installed on the well. If odors develop and accumulate, they can be reduced by adding hydrogen peroxide, chlorine, ferric chloride, or sodium nitrate, etc.

### **CLOGGED MAIN LINE**

While the system has been designed to reduce clogging, it may occur occasionally. If a line line clogs it would most likely be revealed by a backed-up sewer at a building or an overflowing manhole. If either case is observed, a qualified technician should be called immediately to clear the problem.

### **HIGH EFFLUENT LEVEL IN THE WET WELL**

High effluent level in the wet well may occur for different reasons. As flow levels increase, the pump may not be able to keep up with the increased flows. If this is the case, the pumps capacity may be insufficient and need replaced. The high effluent levels may be caused by a tripped breaker, unplugged pump or pump failure. Check the circuit breaker and reset it if tripped. Check the pumps outlet and make sure it is connected. Check the pump controls and make sure they are working. If this does not solve the problem, have a qualified technician fix the problem by replacing the pump.

### **EQUIPMENT AND SPARE PARTS**

The HOA keeps an inventory of spare pipe, replacement grinder pump, valves, and fittings along with other components that are needed at overnight hours, weekends, and holidays when supply houses are closed.

### **OUTSOURCING**

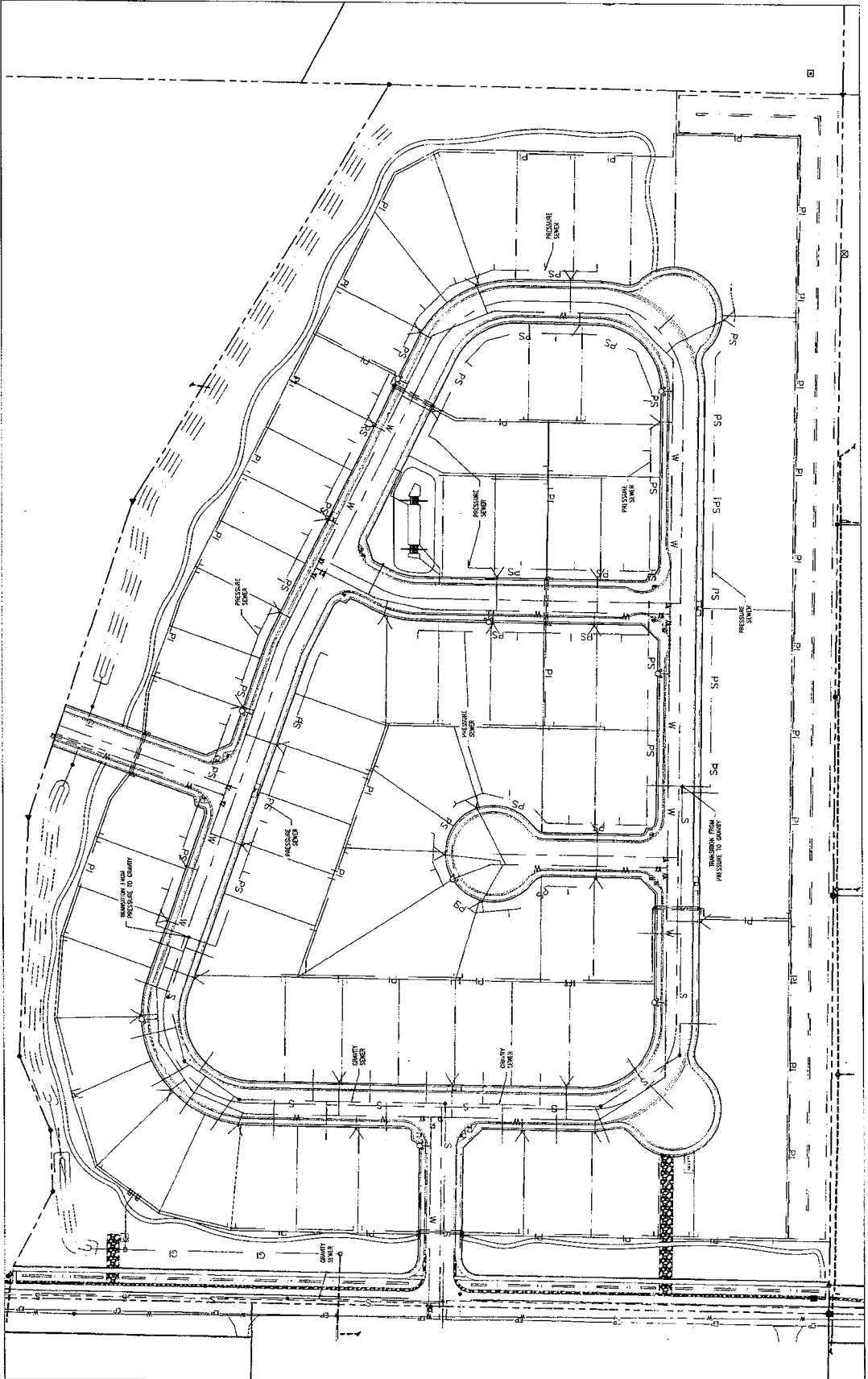
The HOA outsources O&M services, major equipment repairs and rebuilds.

### **CONCLUSION**

The design, construction and management of the low-pressure system will be able to meet all technical, financial and management responsibilities. The HOA will be able to meet these requirements with adequate CC&R's, HOA fees and proper education of the homeowners.

## APPENDIX A - FIGURES





811  
Know what's below.  
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NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT CONSTITUTE AN ENDORSEMENT OR WARRANTY BY THE ENGINEER. THE ENGINEER'S LIABILITY IS LIMITED TO THE SCOPE OF THE SERVICES PROVIDED. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE OR INJURY TO PERSONS OR PROPERTY RESULTING FROM THE CONSTRUCTION OF THE WORK SHOWN ON THESE PLANS.

DRAWING STATUS: FOR AGENCY REVIEW

SCALE: ENGINEER

**B** BLAINE A. WOMER  
CIVIL ENGINEERING  
1111 11th St., Suite 100, Rapid City, SD 57701

CITY OF STAR, ID  
SUNFIELD ESTATES SUBDIVISION  
SITE MAP

DATE: \_\_\_\_\_

REV: \_\_\_\_\_

REVISIONS:

NO.	DATE	DESCRIPTION

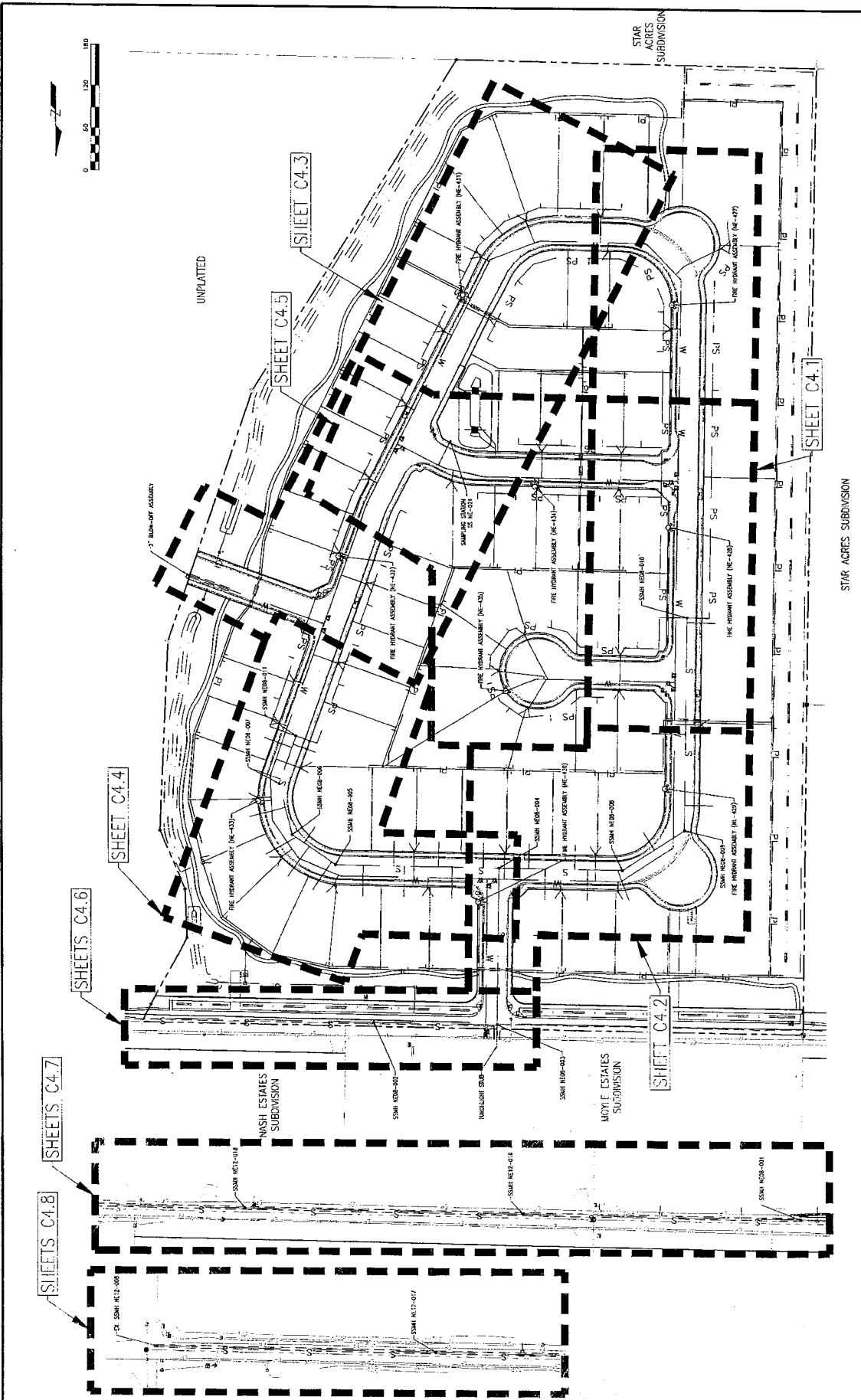
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REV: \_\_\_\_\_

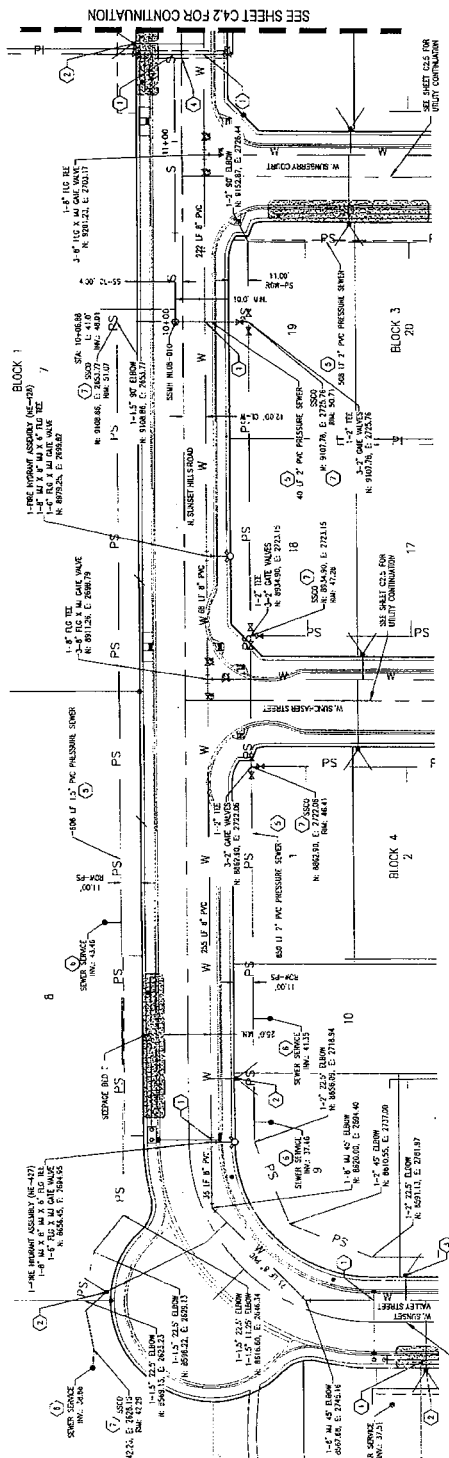
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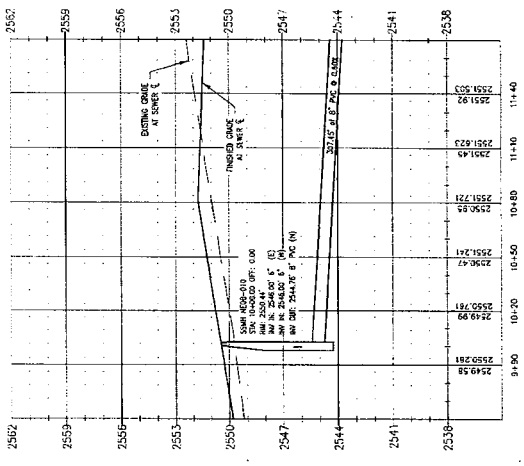


<b>811</b> Know what's below. Call before you dig.		<p>NOTE: WORK CONTAINED WITHIN THESE PLANS IS SUBJECT TO THE CITY OF STAR, ID ENFORCEMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.</p>	
<p>SEAL - ENGINEER</p>		<p>BLAINE A. WOMER CIVIL ENGINEERING</p> <p>100 W. STAR, BOX 9, STAR, IDAHO 83203</p>	
<p>BENCHMARK SEE SHEET C1.0</p> <p>SCALE: 1" = 40'</p>		<p>CITY OF STAR, ID SUNFIELD ESTATES SUBDIVISION SEWER AND WATER IMPROVEMENT PLANS UTILITY INDEX MAP</p>	
<p>STAR ACRES SUBDIVISION</p>		<p>STAR ACRES SUBDIVISION</p>	
<p>SHEET NO. C4.0</p>		<p>FILE NO. N1430003</p>	





SEWER ALIGNMENT B (STA. 10+00.00 TO 11+70.00)



**KEYNOTES**

1. MANHOLE, PRESSURE SEWER, AND STRUCTURE DIMENSIONS SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS SHALL BE IN FEET AND INCHES UNLESS OTHERWISE SPECIFIED.
3. SPECIAL NOTES APPLY TO THE SEWER ALIGNMENT.
4. PRESSURE SEWER SHALL BE AS SHOWN.
5. PRESSURE SEWER SHALL BE 12\"/>

**SHEET NOTES**

1. SEE SHEET C-1 FOR GENERAL NOTES AND SHEET NOTES.
2. SEE SHEET C-2 FOR GENERAL NOTES AND SHEET NOTES.
3. SPECIAL NOTES APPLY TO THE SEWER ALIGNMENT.
4. PRESSURE SEWER SHALL BE AS SHOWN.
5. PRESSURE SEWER SHALL BE 12\"/>

6. SPECIAL NOTES APPLY TO THE SEWER ALIGNMENT.
7. PRESSURE SEWER SHALL BE AS SHOWN.
8. PRESSURE SEWER SHALL BE 12\"/>

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**BLAINE A. WOMER**  
CIVIL ENGINEERING

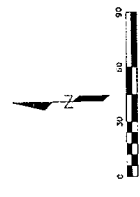
PLANNING  
SURVEYING  
ENGINEERING  
PUBLIC WORKS

SCALE: 1" = 40'

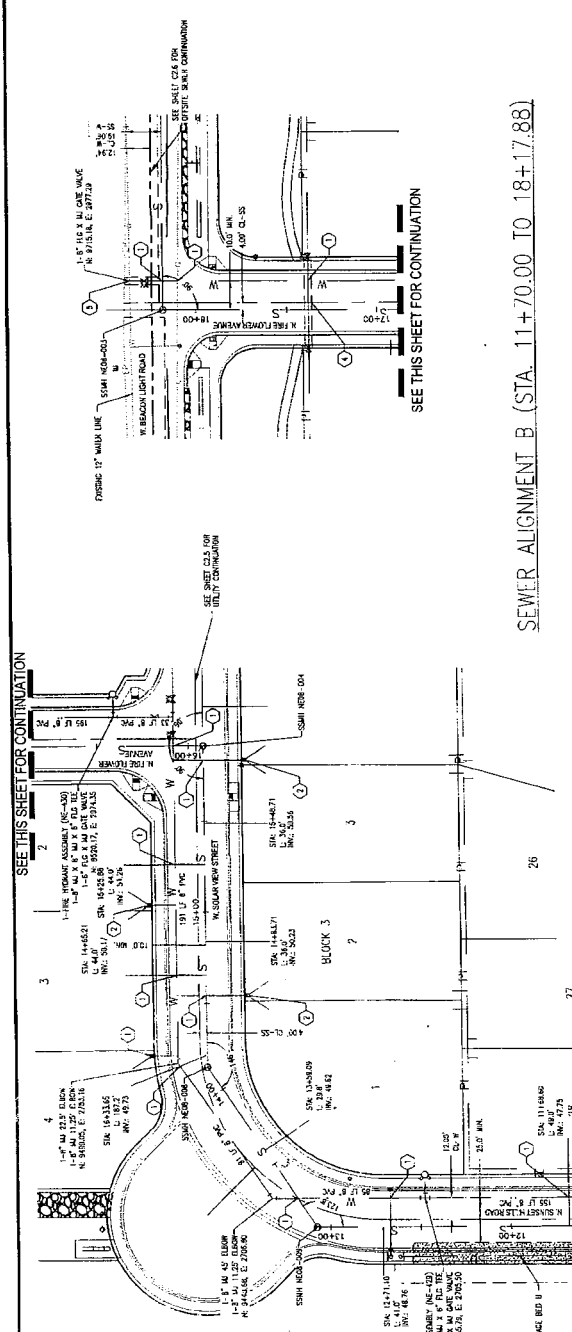
BENCHMARK: SEE SHEET C-1.0

CITY OF STAR, ID  
SUNFIELD ESTATES SUBDIVISION  
SEWER AND WATER IMPROVEMENT PLANS  
PRESSURE SEWER AND SEWER ALIGNMENT B PLAN AND PROFILE  
STA. 10+00.00 TO 11+70.00

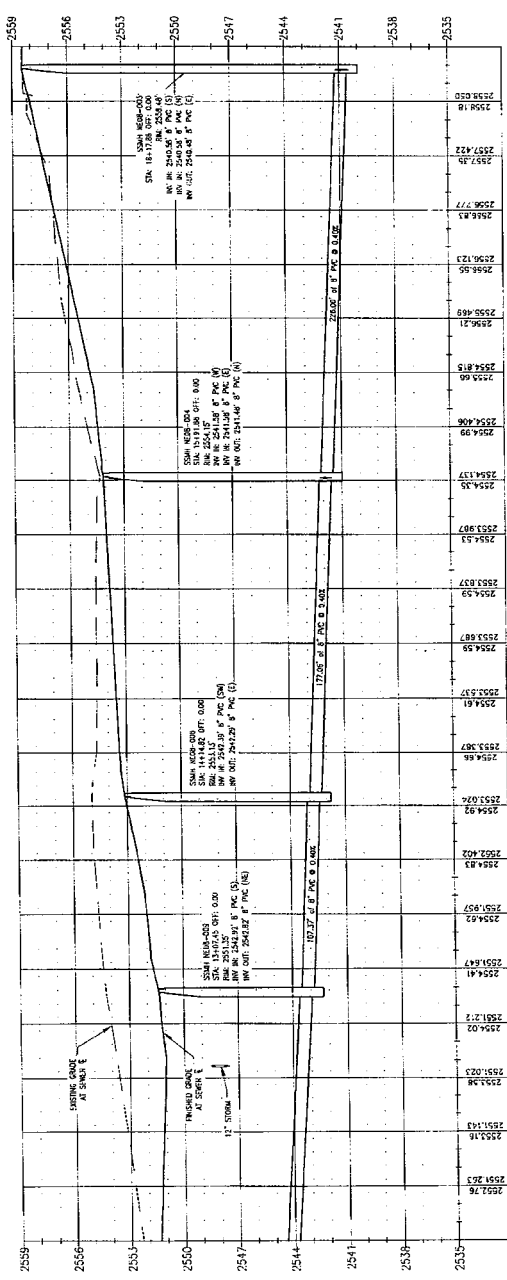
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FILE NO. N1420003



- KEYNOTES**
1. ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN FEET AND INCHES.
  2. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
  3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
  4. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
  5. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
  6. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.



SEWER ALIGNMENT B (STA. 11+70.00 TO 18+17.88)



STATION	ELEVATION
12+00	2551.76
12+10	2551.20
12+20	2551.03
12+30	2551.02
12+40	2551.02
12+50	2551.02
12+60	2551.02
12+70	2551.02
12+80	2551.02
12+90	2551.02
13+00	2551.02
13+10	2551.02
13+20	2551.02
13+30	2551.02
13+40	2551.02
13+50	2551.02
13+60	2551.02
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13+80	2551.02
13+90	2551.02
14+00	2551.02
14+10	2551.02
14+20	2551.02
14+30	2551.02
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18+00	2551.02

SHEET NO. C4.2  
PLAN NO. 11420003

CITY OF STAR, ID  
SUNFIELD ESTATES SUBDIVISION  
SEWER AND WATER IMPROVEMENT PLANS  
SEWER ALIGNMENT B PLAN AND PROFILE  
STA. 11+70.00 TO 18+17.88

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SEE SHEET  
C1.0

SCALE: \_\_\_\_\_

**BLAINE A. WOMER**  
CIVIL ENGINEERING

REGISTERED PROFESSIONAL ENGINEER  
NO. 17911  
STATE OF IDAHO

**BLAINE A. WOMER**  
CIVIL ENGINEERING

REGISTERED PROFESSIONAL ENGINEER  
NO. 17911  
STATE OF IDAHO

SEWER

PIPE

DIAMETER

FEET

ROCK

NOTE: WORK CONTAINED WITHIN THESE PLANS IS SUBJECT TO THE PERMITS AND REGULATIONS OF THE LOCAL AND STATE GOVERNMENTS. THE ENGINEER'S RESPONSIBILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE WORK SHOWN HEREON. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND REGULATIONS. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE WORK SHOWN HEREON.

**811** Know what's below. Call before you dig.

- SHEET NOTES**
1. SEE SHEET C4.1 FOR CONTINUATION.
  2. SEE SHEET C4.2 FOR CONTINUATION.
  3. SEE SHEET C4.3 FOR CONTINUATION.
  4. SEE SHEET C4.4 FOR CONTINUATION.
  5. SEE SHEET C4.5 FOR CONTINUATION.
  6. SEE SHEET C4.6 FOR CONTINUATION.
  7. SEE SHEET C4.7 FOR CONTINUATION.
  8. SEE SHEET C4.8 FOR CONTINUATION.
  9. SEE SHEET C4.9 FOR CONTINUATION.
  10. SEE SHEET C4.10 FOR CONTINUATION.
  11. SEE SHEET C4.11 FOR CONTINUATION.
  12. SEE SHEET C4.12 FOR CONTINUATION.
  13. SEE SHEET C4.13 FOR CONTINUATION.
  14. SEE SHEET C4.14 FOR CONTINUATION.
  15. SEE SHEET C4.15 FOR CONTINUATION.
  16. SEE SHEET C4.16 FOR CONTINUATION.
  17. SEE SHEET C4.17 FOR CONTINUATION.
  18. SEE SHEET C4.18 FOR CONTINUATION.
  19. SEE SHEET C4.19 FOR CONTINUATION.
  20. SEE SHEET C4.20 FOR CONTINUATION.

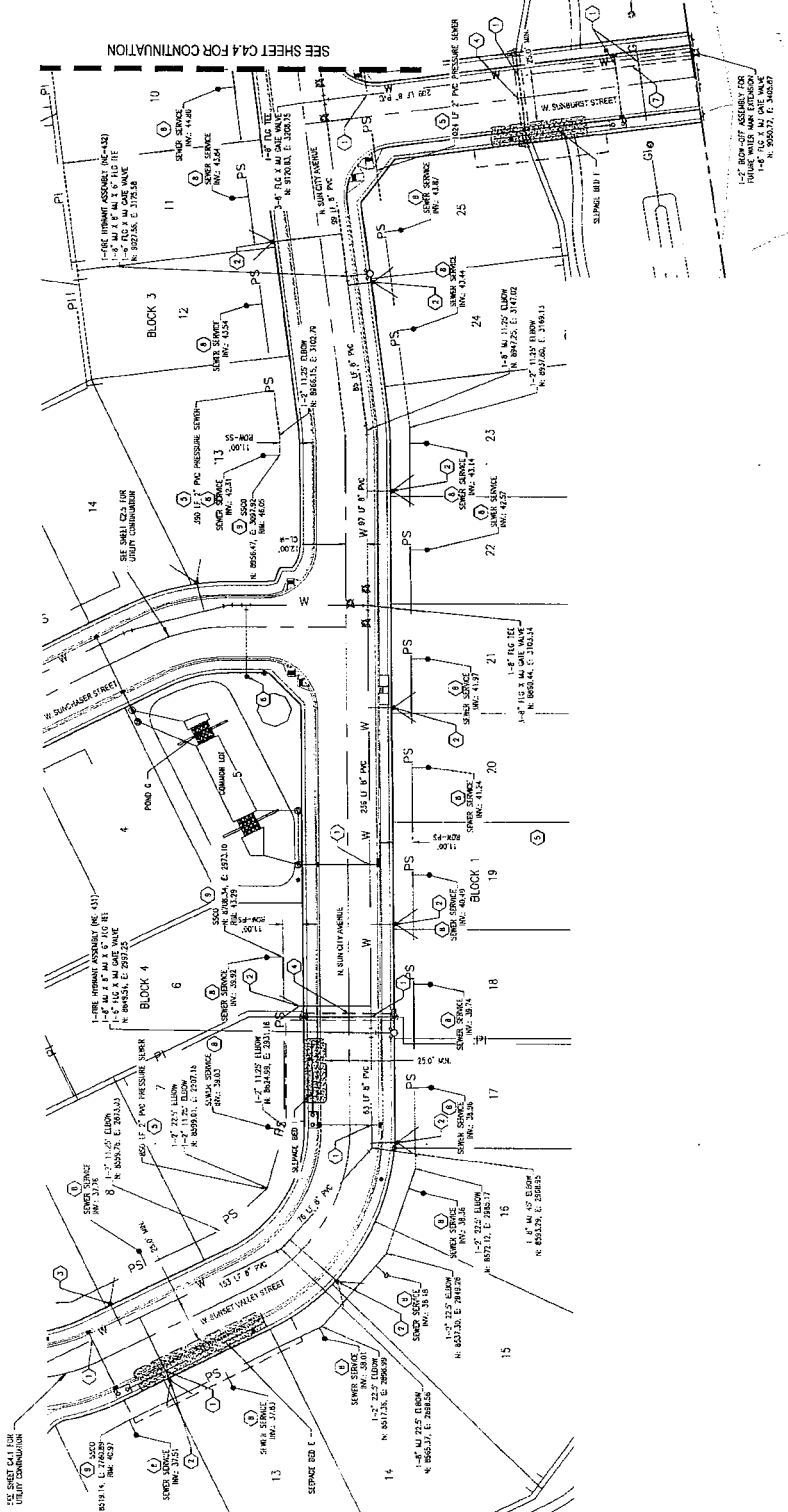


**KEYNOTES**

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND STRUCTURES, AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) STANDARD SPECIFICATIONS FOR SEWERAGE AND WATER SUPPLY SYSTEMS.
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	<p><b>BLAINE A. WOMER</b> CIVIL ENGINEERING</p>	<p>PLANNING SURVEYING ENGINEERING PUBLIC WORKS</p>	<p><b>CITY OF STAR, ID</b> SUNFIELD-ESTATES SUBDIVISION SEWER AND WATER IMPROVEMENT PLANS PRESSURE SEWER AND WATER LAYOUT</p>
<p>SCALE: 1" = 40'</p>	<p>SEE SHEET C1.0</p>	<p>BENCHMARK</p>	<p>SHEET NO. <b>C4.3</b> FILE NO. <b>N1420003</b></p>
<p>DATE: 12/15/2010</p>	<p>PROJECT: SUNFIELD-ESTATES SUBDIVISION</p>	<p>BY: [Signature]</p>	<p>DATE: 12/15/2010</p>
<p>DATE: 12/15/2010</p>	<p>PROJECT: SUNFIELD-ESTATES SUBDIVISION</p>	<p>BY: [Signature]</p>	<p>DATE: 12/15/2010</p>

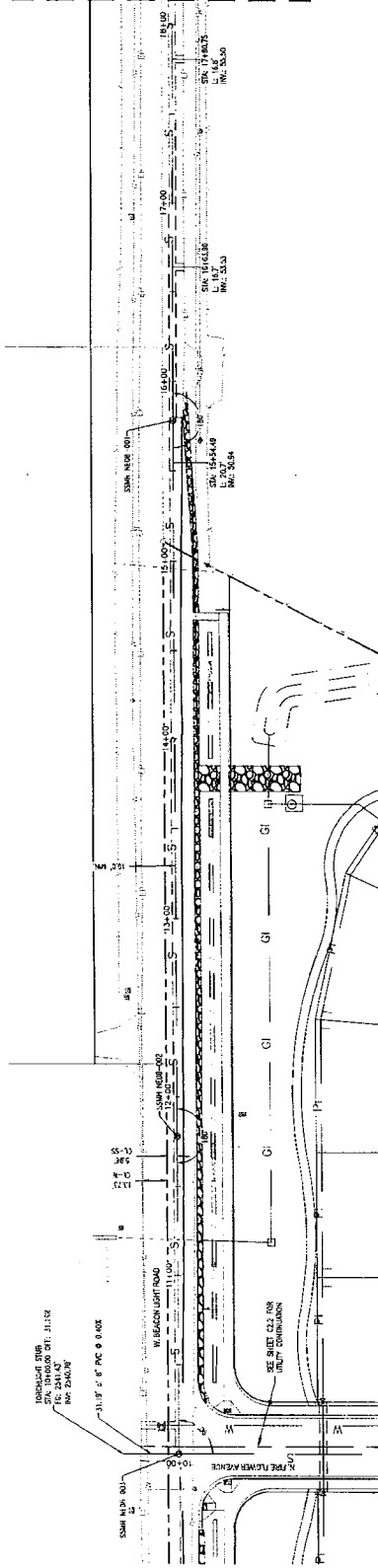
**811**  
Know what's below.  
Call before you dig.



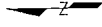




SEE SHEET C.7 FOR CONTINUATION



OFFSITE SEWER ALIGNMENT A (STA. 10+00.00 TO 18+00.00)

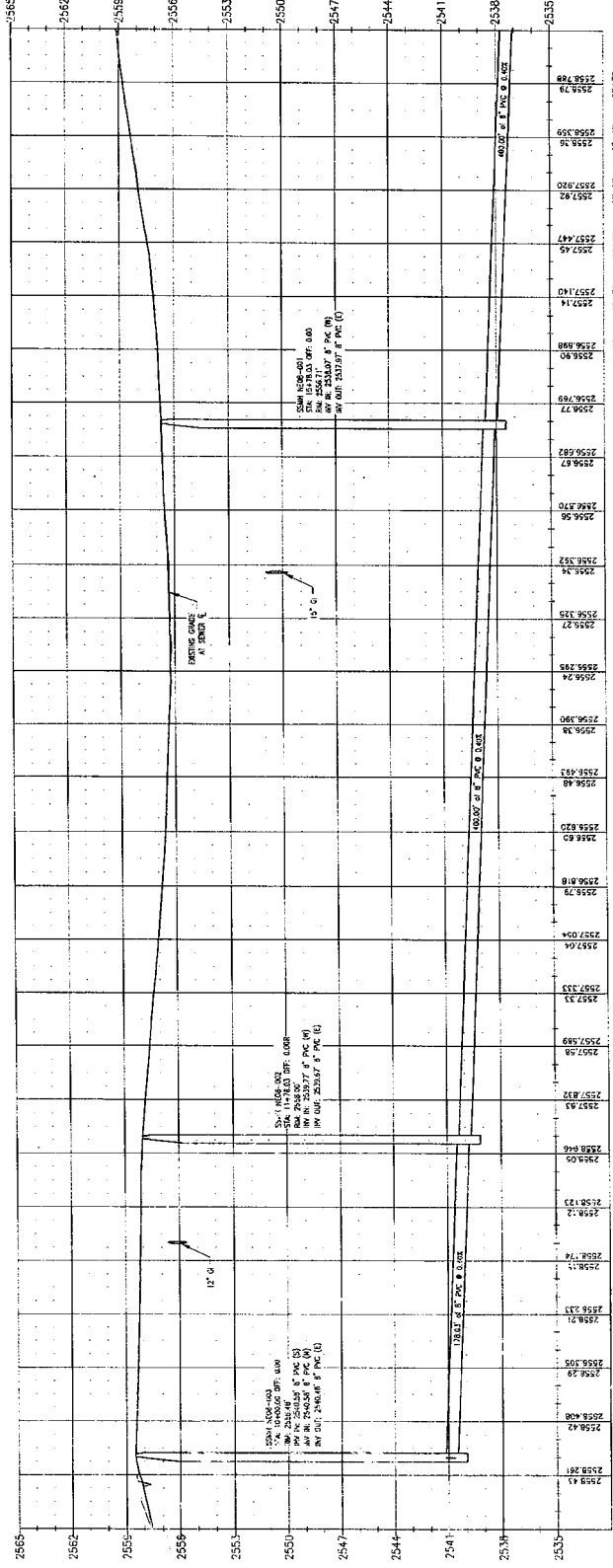


KEYNOTES

1. VERIFY ALL DIMENSIONS, SPACING, AND MATERIALS WITH THE CONTRACTOR.
2. VERIFY ALL DIMENSIONS, SPACING, AND MATERIALS WITH THE CONTRACTOR.
3. VERIFY ALL DIMENSIONS, SPACING, AND MATERIALS WITH THE CONTRACTOR.

SHEET NOTES

- A. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- B. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- C. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- D. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- E. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- F. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- G. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- H. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- I. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- J. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- K. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- L. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- M. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- N. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- O. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- P. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- Q. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- R. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- S. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- T. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- U. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- V. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- W. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- X. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- Y. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.
- Z. SEE SHEET C.1 FOR DETAILS OF THE SEWER MAIN.



CITY OF STAR, ID  
 SUNFIELD ESTATES SUBDIVISION  
 SEWER AND WATER IMPROVEMENT PLANS  
 OFFSITE SEWER ALIGNMENT A PLAN AND PROFILE  
 STA. 10+00.00 TO 18+00.00

SEE SHEET  
 C.1.0

B LAINE A. WOMER  
 CIVIL ENGINEERING

SEAL-ENGINEER

BENCHMARK  
 SEE SHEET  
 C.1.0

PLANING  
 SURVEYING  
 ENGINEERING  
 PUBLIC WORKS

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NOTE:  
 WORK CONTAINED WITHIN THESE PLANS  
 SHALL NOT CONSTITUTE AN ENDORSEMENT  
 OR GUARANTEE BY THE CITY OF STAR.  
 THE CITY OF STAR HAS BEEN ISSUED.

SHEET NO.  
 C.4.6  
 FILE NO.  
 N1420003

SCALE: 1" = 40'

DATE: 10/11/11

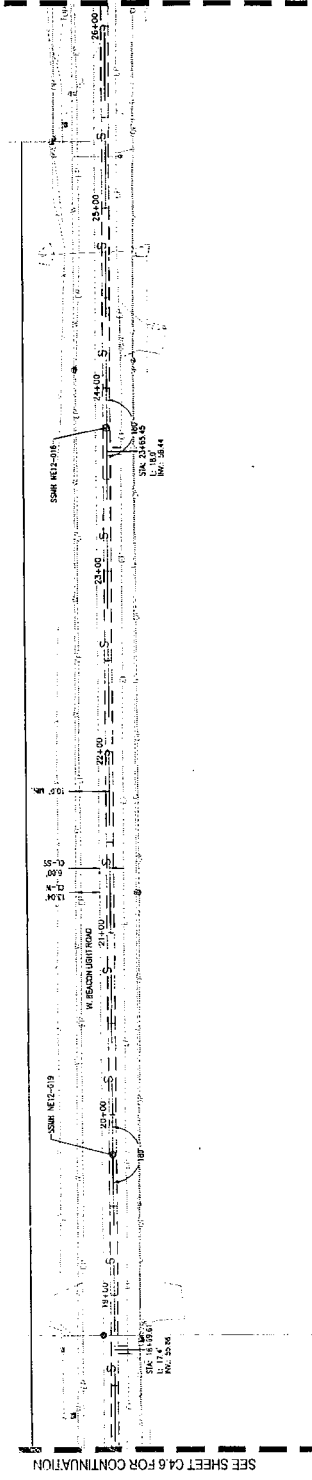
DRAWN BY: J. W. W.

CHECKED BY: J. W. W.

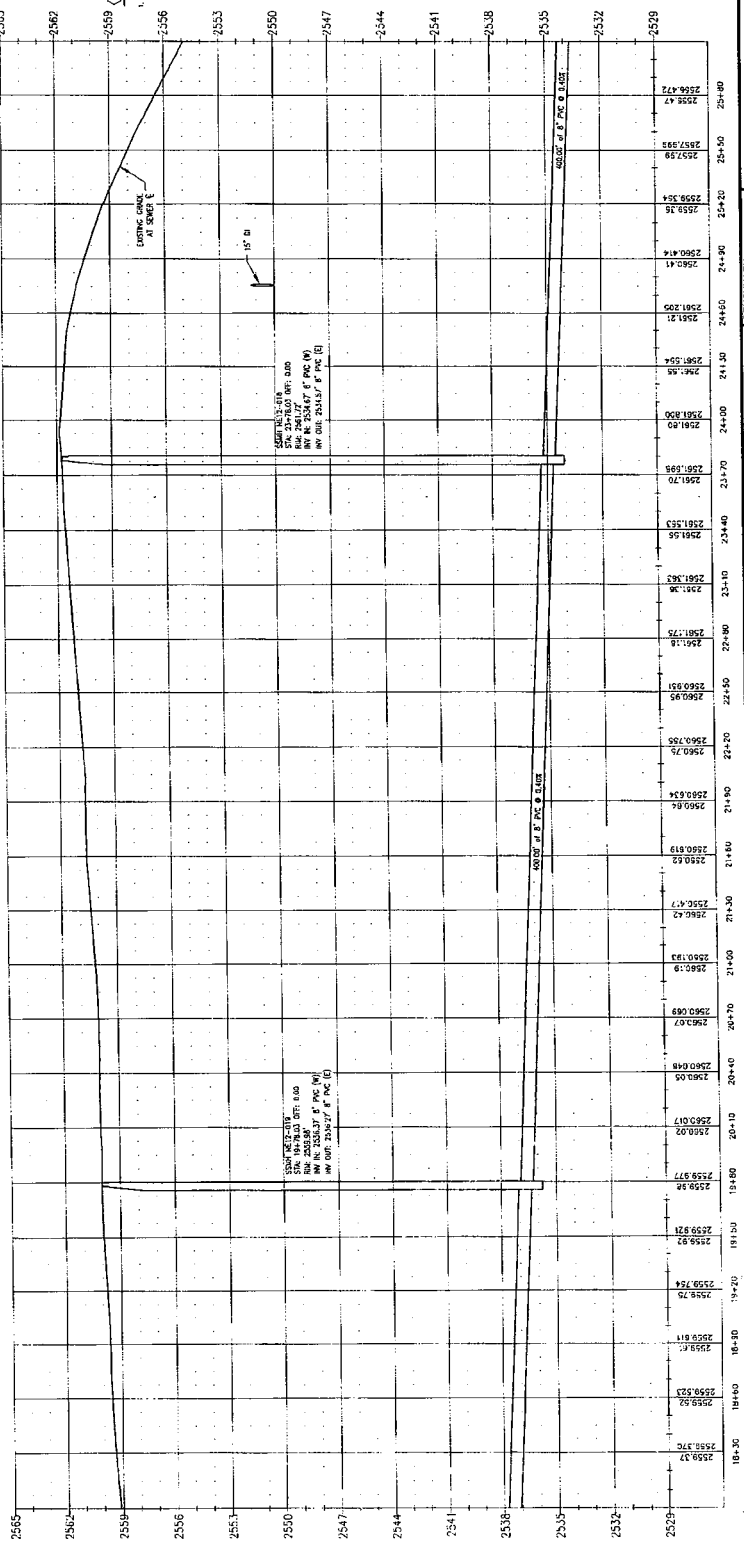
APPROVED BY: J. W. W.

SEE SHEET C4.6 FOR CONTINUATION

SEE SHEET C4.6 FOR CONTINUATION



OFFSITE SEWER ALIGNMENT A (STA. 18+00.00 TO 26+10.00)



**KEYNOTES**

1. VERTICAL CURVES SHALL BE DESIGNED TO PROTECT THE PROFILES OF ALL ADJACENT SEWER LINES TO BE MAINTAINED.
2. SEE SHEET C4.6 FOR CONTINUATION.
3. SEE SHEET C4.6 FOR CONTINUATION.
4. SEE SHEET C4.6 FOR CONTINUATION.
5. SEE SHEET C4.6 FOR CONTINUATION.
6. SEE SHEET C4.6 FOR CONTINUATION.
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8. SEE SHEET C4.6 FOR CONTINUATION.
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18. SEE SHEET C4.6 FOR CONTINUATION.
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21. SEE SHEET C4.6 FOR CONTINUATION.
22. SEE SHEET C4.6 FOR CONTINUATION.
23. SEE SHEET C4.6 FOR CONTINUATION.
24. SEE SHEET C4.6 FOR CONTINUATION.
25. SEE SHEET C4.6 FOR CONTINUATION.
26. SEE SHEET C4.6 FOR CONTINUATION.
27. SEE SHEET C4.6 FOR CONTINUATION.
28. SEE SHEET C4.6 FOR CONTINUATION.
29. SEE SHEET C4.6 FOR CONTINUATION.
30. SEE SHEET C4.6 FOR CONTINUATION.

**811**  
**Know what's below.**  
**Call before you dig.**

UNITS:  
 ALL DIMENSIONS UNLESS OTHERWISE SHOWN ARE IN FEET AND INCHES.  
 ALL ANGLES UNLESS OTHERWISE SHOWN ARE IN DEGREES.  
 ALL TOLERANCES UNLESS OTHERWISE SHOWN ARE AS FOLLOWS:  
 ±.01 FOR DIMENSIONS IN FEET AND INCHES.  
 ±.005 FOR DIMENSIONS IN MILLIMETERS.  
 ±.030 FOR DIMENSIONS IN METERS.  
 ±.010 FOR DIMENSIONS IN DEGREES.

**PLAN**  
 SEE SHEET C4.6 FOR CONTINUATION

**PROFILE**  
 SEE SHEET C4.6 FOR CONTINUATION

**DATE:** \_\_\_\_\_

**DRAWN BY:** \_\_\_\_\_

**CHECKED BY:** \_\_\_\_\_

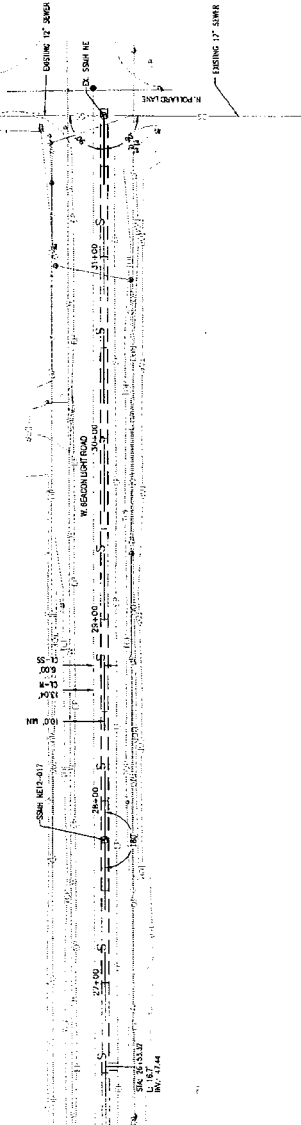
**SCALE-ENGINEER**

**B**  
**BLAINE A. WOMER**  
 CIVIL ENGINEERING  
 14000 RICHMOND AVE., SUITE 200  
 GREENVILLE, SC 29615  
 803-733-2222  
 REG. NO. 4701

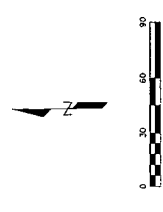
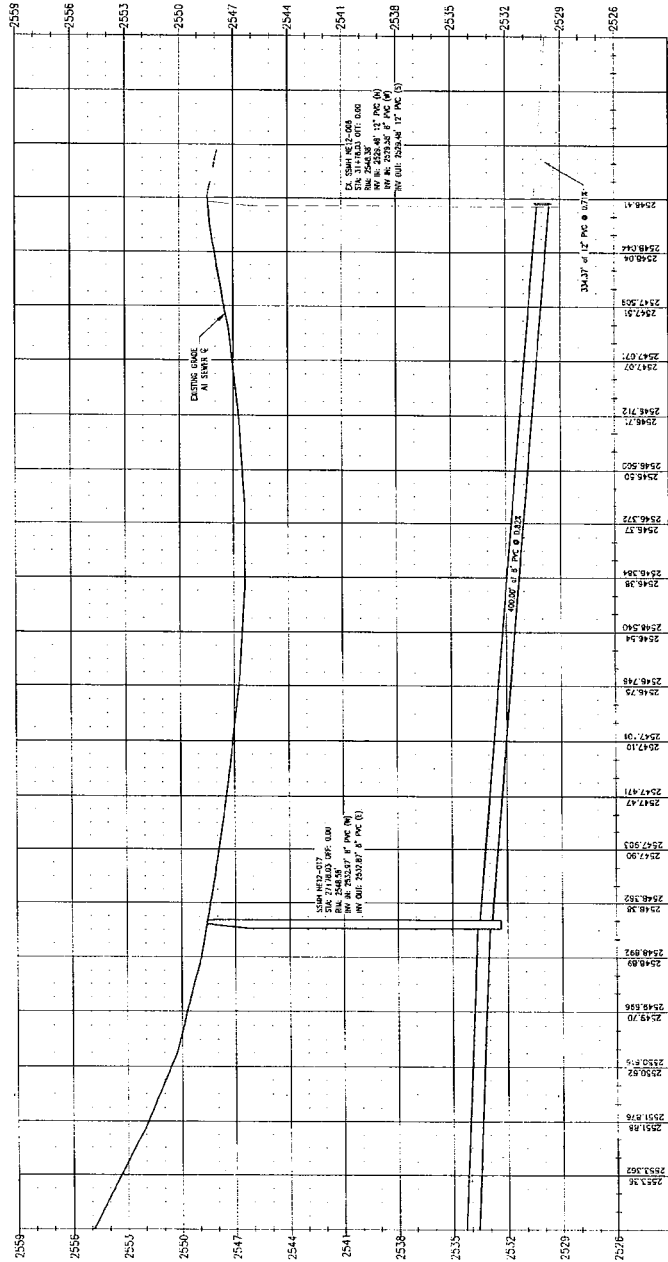
**CITY OF STAR, ID**  
**SUNFIELD ESTATES SUBDIVISION**  
**SEWER AND WATER IMPROVEMENT PLANS**  
**OFFSITE SEWER ALIGNMENT A PLAN AND PROFILE**  
**STA. 18+00.00 TO 26+10.00**

**SHEET NO.** C4.7  
**TITLE NO.** N1420003

SEE SHEET CA-7 FOR CONTINUATION



OFFSITE SEWER ALIGNMENT A (STA. 26+10.00 TO 31+78.03)



KEYNOTES

- 1. ALL EXISTING UTILITIES SHOWN ARE BASED ON RECORD DRAWINGS AND FIELD SURVEY.
- 2. SEE SHEET CA-8 AND CA-9 FOR THE WATER MAIN AND SANITARY MAINS.
- 3. EXISTING SEWER AND WATER MAINS ARE SHOWN FOR INFORMATION ONLY. THE LOCATION AND DEPTH OF EXISTING UTILITIES SHOULD BE VERIFIED BY FIELD SURVEY.
- 4. THE PROPOSED SEWER AND WATER MAINS ARE SHOWN FOR INFORMATION ONLY. THE LOCATION AND DEPTH OF EXISTING UTILITIES SHOULD BE VERIFIED BY FIELD SURVEY.
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SHEET NOTES

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811 Know what's below. Call before you dig.

BLAINE A. WOMER CIVIL ENGINEERING

CITY OF STAR, ID  
SUNFIELD ESTATES SUBDIVISION  
SEWER AND WATER IMPROVEMENT PLANS  
OFF-SITE SEWER ALIGNMENT A PLAN AND PROFILE  
STA. 26+10.00 TO 31+78.03

SEE SHEET C1.0

SCALE: 1" = 40'

DATE: 11/11/10

DR: JAW

CHK: JAW

APP: JAW

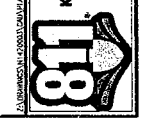
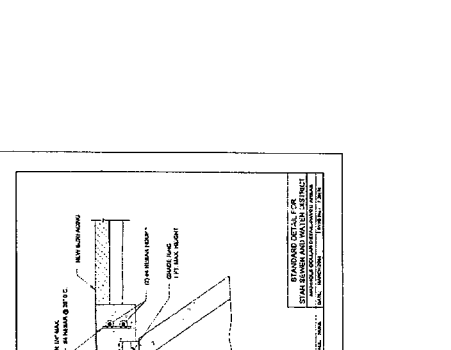
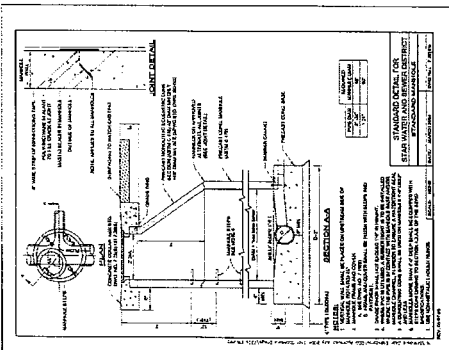
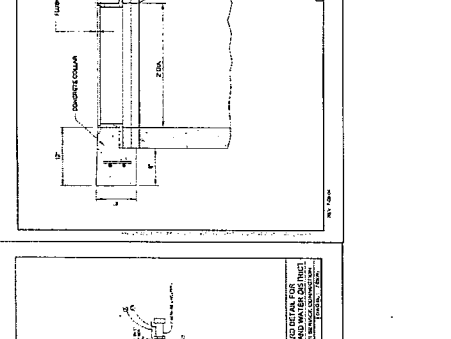
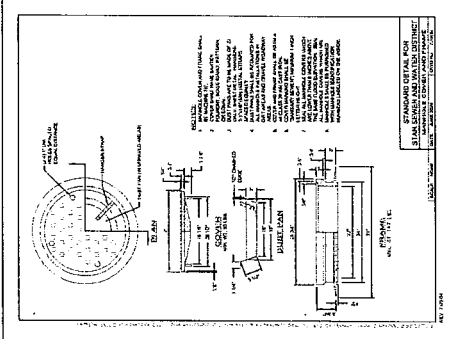
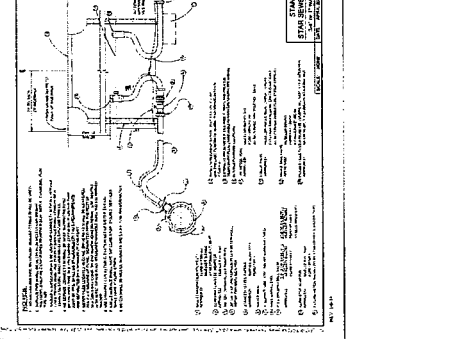
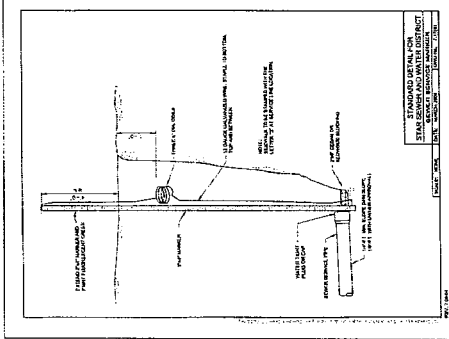
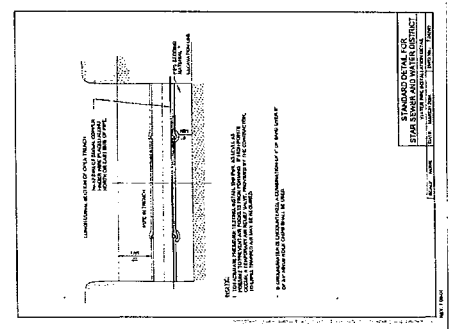
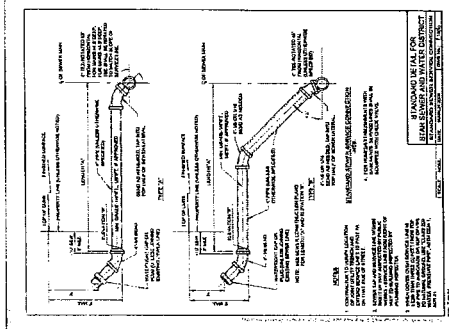
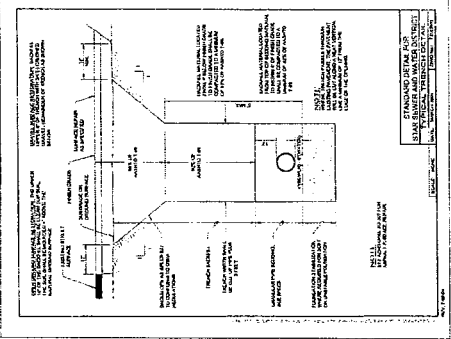
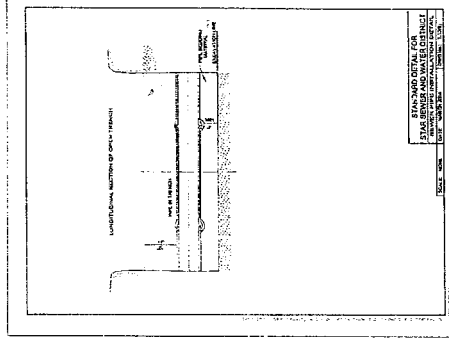
SEAL - ENGINEER

REGISTERED PROFESSIONAL ENGINEER  
STATE OF IDAHO  
No. 21900  
EXPIRES 12/31/11

PLANNING  
SURVEYING  
ENGINEERING  
CONSULTING  
PRACTICE

SHEET NO. C4.8  
FILE NO. N1420003





Know what's below.  
Call before you dig.

MULL, BERKMAN, WILSON, FLECK, PANG  
ENGINEERING FERTILIZERS UNIT, A  
DIVISION OF WILSON ENGINEERS AND ARCHITECTS  
GRADING PERMIT HAS BEEN ISSUED

DATE	DESCRIPTION	BY	CHECKED

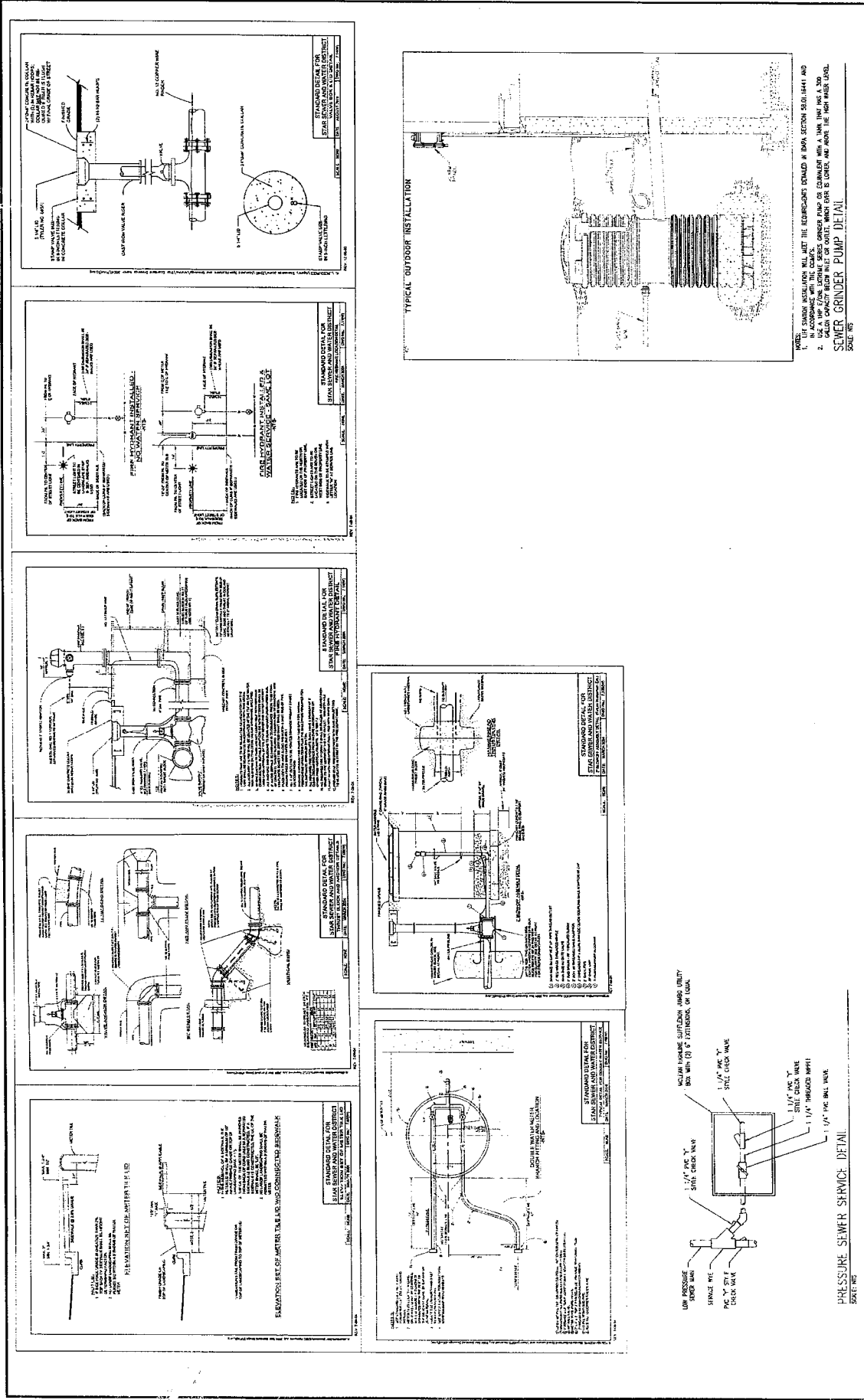


**B** BLAINE A. WOMER  
CIVIL ENGINEERING  
150 N. ROYAL ST. CHICAGO, ILL. 60601

SEE SHEET  
C1.0

BENCHMARK  
CITY OF STAR, IJ  
SUNFIELD ESTATES SUBDIVISION  
SEWER AND WATER IMPROVEMENT PLANS  
SEWER AND WATER DETAILS

SHEET NO. 049  
FILE NO. NH420003



**811**  
Know what's below. Call before you dig.

**NOTE:** WORK CONTAINED WITHIN THESE PLANS IS THE PROPERTY OF THE ENGINEER. NO PART OF THIS WORK SHALL BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER. GRADING PERMIT HAS BEEN ISSUED.

**SEAL-ENGINEER**  
  
**BLAINE A. WOMER**  
 CIVIL ENGINEERING  
 1000 W. 10th St., Boise, Idaho 83702

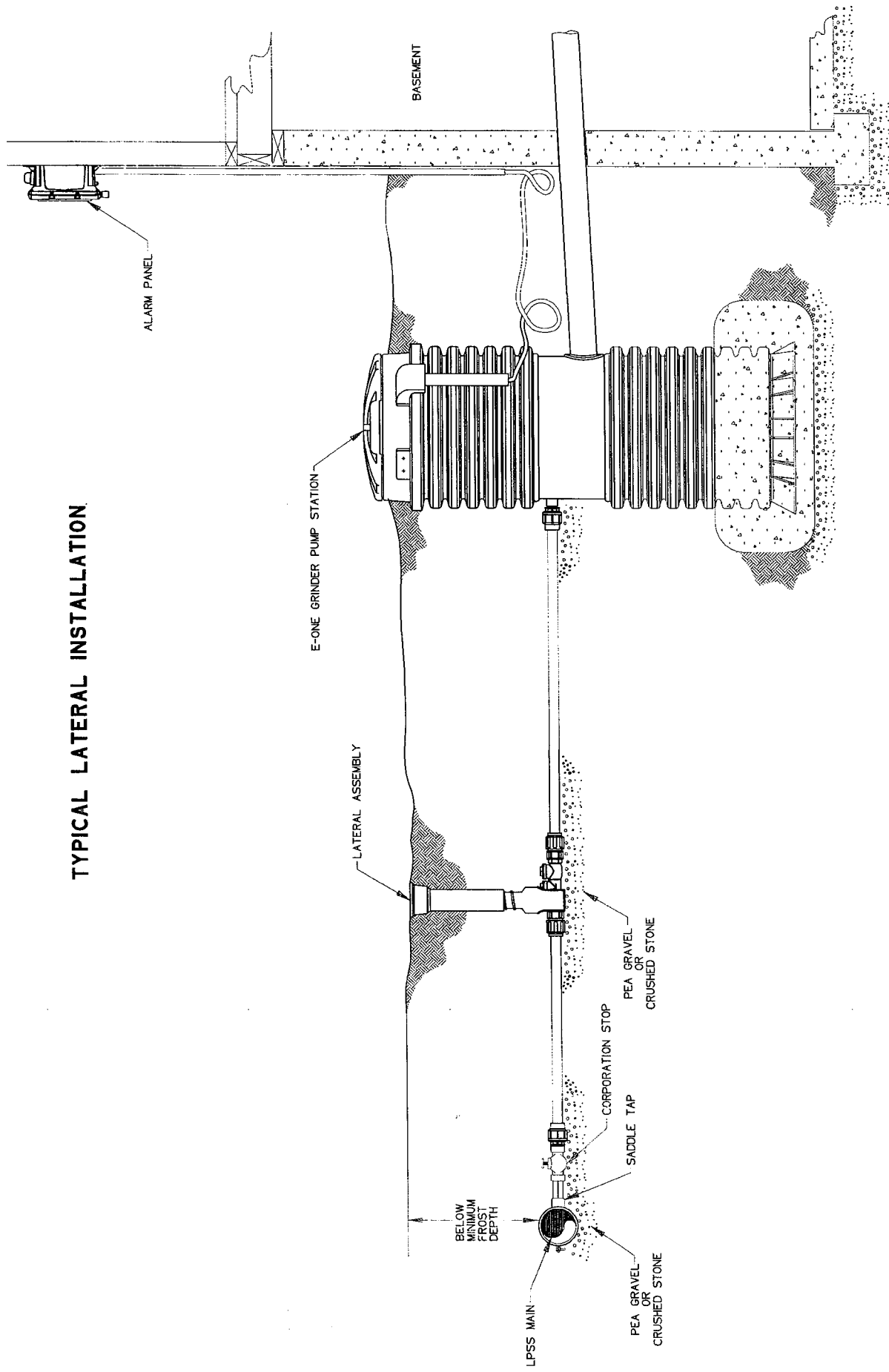
**PLANNING**  
 4 PLANNING  
 4 PRELIMINARY  
 4 FINAL

**BENCHMARK:**  
 SEE SHEET C1.0

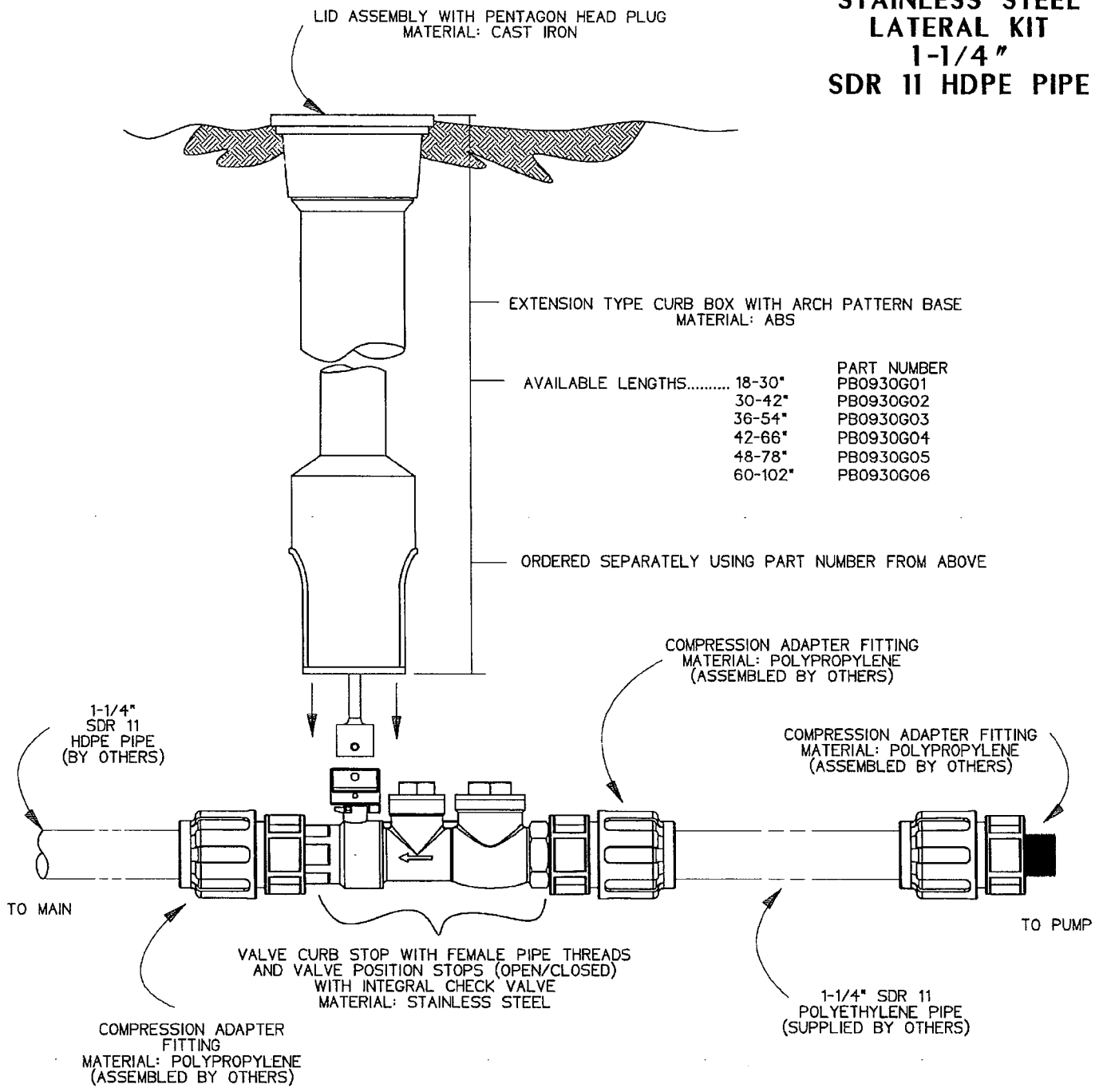
**CITY OF STAR, ID**  
**SUNFIELD ESTATES SUBDIVISION**  
**SEWER AND WATER IMPROVEMENT PLANS**  
**SEWER AND WATER DETAILS**

**SHEET NO:** C4.10  
**DATE:** 01/14/2003  
**PROJECT NO:** 11420003

# TYPICAL LATERAL INSTALLATION



**STAINLESS STEEL  
LATERAL KIT  
1-1/4"  
SDR 11 HDPE PIPE**



**NOTES:**

1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS  
\*FOR SS FITTING INTO SS THREAD, USE PIPE DOPE OR TEFLON TAPE, NOT BOTH
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NCO193G01
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

KIT PARTS ARE NOT ASSEMBLED

SGS	DN	11/02/11	B	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE



STAINLESS STEEL LATERAL KIT  
1-1/4" SDR 11 HDPE PIPE

NA0330P02

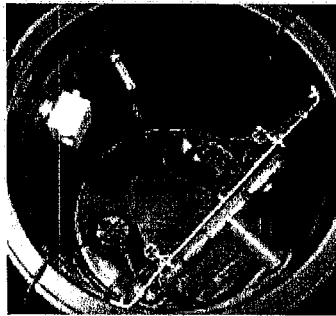
## **APPENDIX B - ADDITIONAL INFORMATION**

## CC&R Addendum

Private Residential Pressure Sewer System: The system for removing sewage from the Residential Lot that runs from the point where the primary pressure sewer line exits the Residential Building to the point where such system connects to the gravity sewer main maintained by the Star Sewer and Water District, including any services lines, discharge lines, grinder pump and cover, control panel, valves, or their appurtenant facilities located on or under each Residential Lot and the public right of way from the Residential Lot line to the point of connection with the gravity sewer main maintained by the Star Sewer and Water District and servicing only the Building thereon. The Residential Sewer System is subject to a License Agreement for Private Operation of Low-Pressure Sewer System, which among other things, authorizes the placement and operation of the Residential Sewer System in the public right of way located within the Sunfield Estates Subdivision, namely that area from the edge of the Residential Lot to the connection point to the Star Sewer and Water District gravity sewer main, and includes running the system under public sidewalks, curbs, and roads. Each builder shall bear the cost of design, installation, and permitting of the individual Residential Sewer Systems, but shall receive a credit from Developer for some of those costs. Builders are required to provide all HOA and individual homeowners with an operation and maintenance manual for the Residential Sewer System. At closing, the HOA will provide all homeowners with the contact information for sewer representative and a number for emergency services. The Association shall bear the maintenance, repair, upgrade, and replacement of individual Residential Sewer Systems, which serve the individual Residential Lots. All construction and maintenance to this system shall follow the rules, regulations and requirements set forth in the IDAPA Section 58.01.16.441.

# Liberty Pumps®

## D3600-Series



4" inlet  
(unmounted)

**3**  
Year Warranty

Available  
Heights

48"  
60"  
72"  
84"  
96"

### Duplex Grinder Package

**Factory Assembled  
2 hp Grinder Pumps  
36" Diameter System**

*Features:*

- Integral check valves
- QuickTree® pre-mounted float system for pump control and alarm
- 4" inlet hub with rubber pipe seal
  - 2" discharge
- Factory pre-assembled guide rail system
- Galvanized guide rail piping (stainless optional)
- Factory pre-assembled schedule 80 PVC discharge piping with ball valves
- Fiberglass basin with anti-flotation collar
  - Standard green fiberglass cover, solid (optional black steel, solid)
  - All stainless steel supports and brackets pre-mounted
  - NEMA 4X junction box for electrical connections, pre-mounted
  - Stainless steel chain for pump lift-out

\*Other custom basin sizes available consult factory



Available with  
LSG or LSGX-Series  
(2-Stage) Grinders



evolve.

# D3600-Series Specifications

## Features:

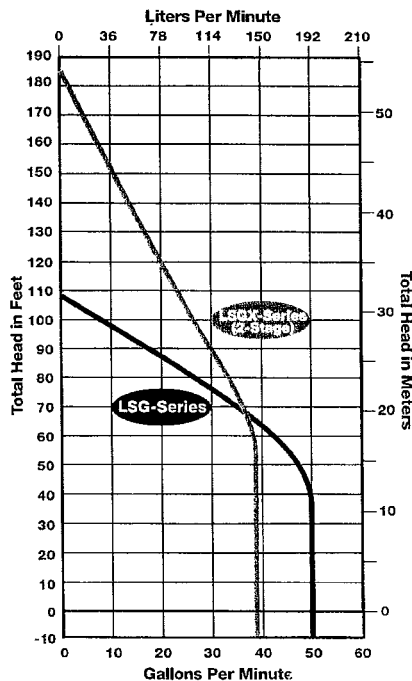
2 hp. Grinder Pump  
Choose from single stage LSG or two stage LSGX-Series pumps



- Available in a wide range of voltages
- 2" discharge (exiting basin)
- 25' power cable length

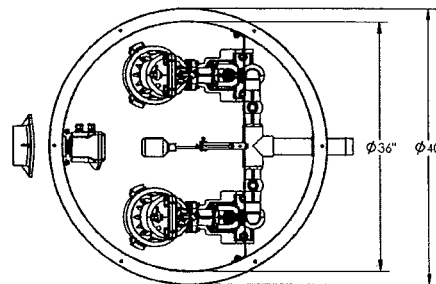
(See LSG or LSGX-Series literature for complete pump specifications.)

## Performance Curves:

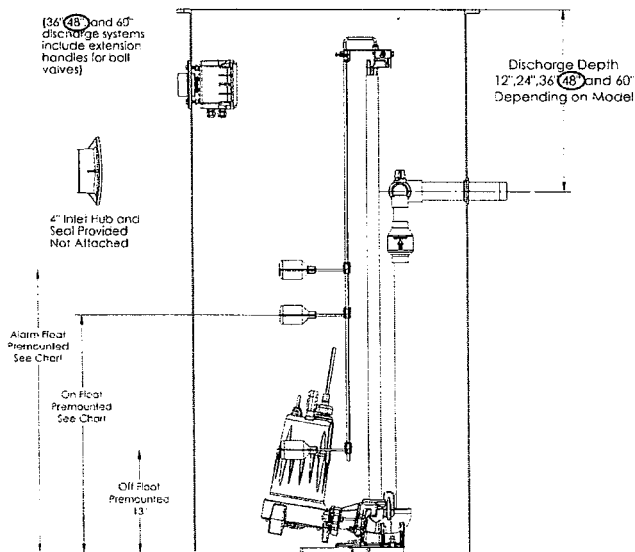


## Dimensional Data

Top View



Side View



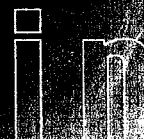
Galvanized guide rails standard. For stainless steel rails add "S" to model number.  
Example: (galvanized) D3672LSG202-24-C

For steel cover option add "-SC" suffix to model number.  
Example: (steel) D3672LSG202-24-SC

## Factory set control levels 3600-Series

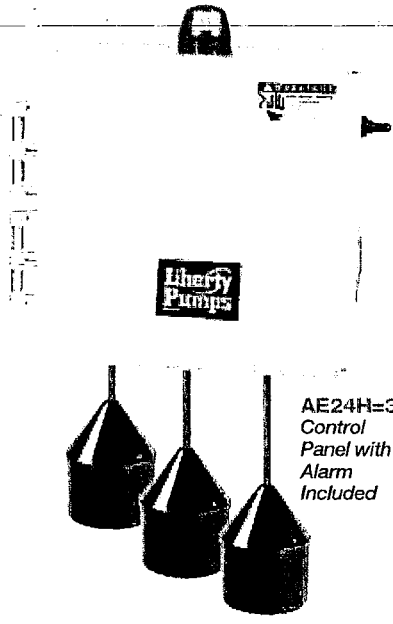
Model	Off level	On Level	Alarm Level	Volume per Pump Cycle	Total Basin Capacity
D3648	13" (33 cm)	25" (64 cm)	31" (79 cm)	62 gal. (235 liters)	211 gal. (799 liters)
D3660	13" (33 cm)	28" (71 cm)	34" (86 cm)	75 gal. (284 liters)	264 gal. (999 liters)
D3672	13" (33 cm)	31" (79 cm)	37" (94 cm)	88 gal. (333 liters)	317 gal. (1200 liters)
D3684	13" (33 cm)	34" (86 cm)	40" (102 cm)	101 gal. (382 liters)	370 gal. (1400 liters)
D3696	13" (33 cm)	37" (94 cm)	43" (109 cm)	115 gal. (435 liters)	423 gal. (1601 liters)

Specifications are subject to change without notice.





# Choice of Panels: AE-Series or IP-Series



## AE-Series Panels - (Standard)

Provide reliable alternating operation with standard features that include:

- HOA Switch
- NEMA 4X enclosure
- Circuit Breakers
- Visual and Audible alarm
- Pump run indicator lights
- Auxiliary contacts
- Three level control floats

For the complete AE-Series specifications, See AE-Series literature sheet.



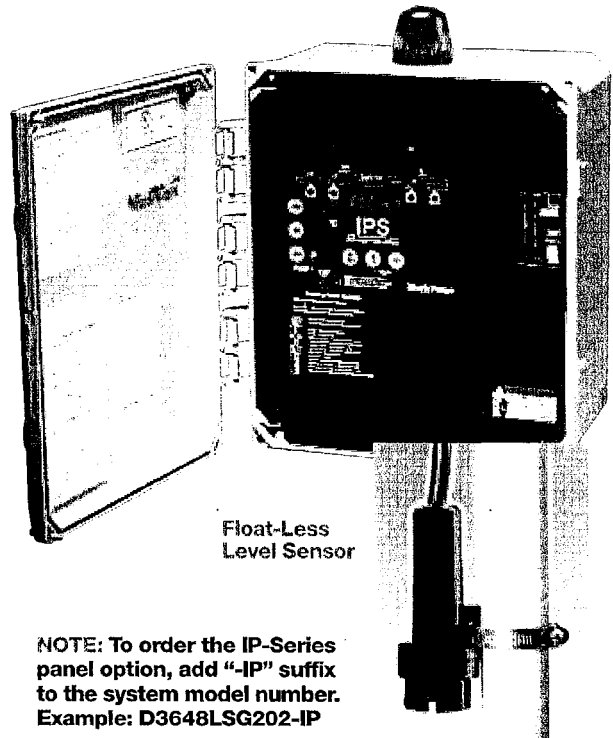
## IP-Series™ Panels - (Optional)

IP control panels incorporate the latest programmable pump features through a simple, easy-to-use touch pad on the inner door. Now pump programming and system monitoring is easier than ever.

### Features:

- NEMA 4X weatherproof enclosure for indoor/outdoor mounting
- Float-less level sensor is compact and eliminates multiple wide-angle floats for controlling pumps
- Redundant "ALARM" float included for added security
- Inner panel door provides increased safety
- Easy-to-use touch pad for programming pump on/off levels and alarm level in inches or centimeters
- Separate control and alarm fuses
- Digital display board for system monitoring
- Alarm beacon and horn provide audio/visual warning of alarm condition
- Test/Normal/Silence switch
- Auxiliary contacts
- Panel is field convertible for either demand dose or timed dose applications

For the complete IP-Series specifications, See IP-Series literature sheet.



Float-Less Level Sensor

**NOTE: To order the IP-Series panel option, add "-IP" suffix to the system model number. Example: D3648LSG202-IP**

# Time. evolve.

# D3600- Series Duplex Model

36" diameter  
fiberglass basin  
available in heights  
of 48", 60", 72",  
84" and 96".

Available with  
standard AE-Series  
control panel or  
upgraded to the  
new IP-Series  
Intelligent Panel.

Systems listed  
to the right are  
shipped with a  
standard AE-Series  
control panel.  
To upgrade to an  
IP-Series panel  
add "-IP" suffix to  
the above model  
number. Example:  
D3672LSG202-24-IP  
See AE-Series or  
IP-Series literature  
for complete  
specifications.

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Models	Volts	Phase	Wgt.	Standard Panel AE-Series	(Optional) Panel IP-Series
D3648 - 36" x 48" basin (Discharge depth is 12" from top of basin)					
D3648LSG202	208/230	1	470 lbs.	AE24H=3	IPD-24H
D3648LSG202-C	208/230	1	470 lbs.	AE24HC=3	IPD-24HC
D3648LSG203	208/230	3	479 lbs.	AE34=3-511	IPD-34-511
D3648LSG204	440-480	3	479 lbs.	AE34=3-171	IPD-34-171
D3648LSG205	575	3	479 lbs.	AE54=3-161	IPD-34-161
D3648LSGX202	208-230	1	482 lbs.	AE24H=3	IPD-24H
D3648LSGX202-C	208-230	1	482 lbs.	AE24HC=3	IPD-24HC
D3648LSGX203	208/230	3	491 lbs.	AE34=3-511	IPD-34-511
D3648LSGX204	440-480	3	491 lbs.	AE34=3-171	IPD-34-171
D3648LSGX205	575	3	491 lbs.	AE54=3-161	IPD-34-161
D3660 - 36" x 60" basin (Discharge depth is available in 24" or 36" from top of basin. Add -24 or -36 to model when ordering)					
D3660LSG202 (-24 or -36)	208/230	1	490 lbs.	AE24H=3	IPD-24H
D3660LSG202-C (-24 or -36)	208/230	1	490 lbs.	AE24HC=3	IPD-24HC
D3660LSG203 (-24, or -36)	208/230	3	499 lbs.	AE34=3-511	IPD-34-511
D3660LSG204 (-24 or -36)	440-480	3	499 lbs.	AE34=3-171	IPD-34-171
D3660LSG205 (-24 or -36)	575	3	499 lbs.	AE54=3-161	IPD-34-161
D3660LSGX202 (-24 or -36)	208-230	1	502 lbs.	AE24H=3	IPD-24H
D3660LSGX202-C (-24 or -36)	208-230	1	502 lbs.	AE24HC=3	IPD-24HC
D3660LSGX203 (-24 or -36)	208/230	3	511 lbs.	AE34=3-511	IPD-34-511
D3660LSGX204 (-24 or -36)	440-480	3	511 lbs.	AE34=3-171	IPD-34-171
D3660LSGX205 (-24 or -36)	575	3	511 lbs.	AE54=3-161	IPD-34-161
D3672 - 36" x 72" basin (Discharge depth is available in 24", 36" or 48" from top of basin. Add -24, -36 or -48 to model when ordering)					
D3672LSG202 (-24, -36 or -48)	208/230	1	515 lbs.	AE24H=3	IPD-24H
D3672LSG202-C (-24, -36 or -48)	208/230	1	515 lbs.	AE24HC=3	IPD-24HC
D3672LSG203 (-24, -36 or -48)	208/230	3	524 lbs.	AE34=3-511	IPD-34-511
D3672LSG204 (-24, -36 or -48)	440-480	3	524 lbs.	AE34=3-171	IPD-34-171
D3672LSG205 (-24, -36 or -48)	575	3	524 lbs.	AE54=3-161	IPD-34-161
D3672LSGX202 (-24, -36 or -48)	208-230	1	527 lbs.	AE24H=3	IPD-24H
D3672LSGX202-C (-24, -36 or -48)	208-230	1	527 lbs.	AE24HC=3	IPD-24HC
D3672LSGX203 (-24, -36 or -48)	208/230	3	536 lbs.	AE34=3-511	IPD-34-511
D3672LSGX204 (-24, -36 or -48)	440-480	3	536 lbs.	AE34=3-171	IPD-34-171
D3672LSGX205 (-24, -36 or -48)	575	3	536 lbs.	AE54=3-161	IPD-34-161
D3684 - 36" x 84" basin (Discharge depth is available in 24", 36", 48" or 60" from top of basin. Add -24, -36, -48 or -60 to model when ordering)					
D3684LSG202 (-24, -36, -48 or -60)	208/230	1	540 lbs.	AE24H=3	IPD-24H
D3684LSG202-C (-24, -36, -48 or -60)	208/230	1	540 lbs.	AE24HC=3	IPD-24HC
D3684LSG203 (-24, -36, -48 or -60)	208/230	3	549 lbs.	AE34=3-511	IPD-34-511
D3684LSG204 (-24, -36, -48 or -60)	440-480	3	549 lbs.	AE34=3-171	IPD-34-171
D3684LSG205 (-24, -36, -48 or -60)	575	3	549 lbs.	AE54=3-161	IPD-34-161
D3684LSGX202 (-24, -36, -48 or -60)	208-230	1	552 lbs.	AE24H=3	IPD-24H
D3684LSGX202-C (-24, -36, -48 or -60)	208-230	1	552 lbs.	AE24HC=3	IPD-24HC
D3684LSGX203 (-24, -36, -48 or -60)	208/230	3	561 lbs.	AE34=3-511	IPD-34-511
D3684LSGX204 (-24, -36, -48 or -60)	440-480	3	561 lbs.	AE34=3-171	IPD-34-171
D3684LSGX205 (-24, -36, -48 or -60)	575	3	561 lbs.	AE54=3-161	IPD-34-161
D3696 - 36" x 96" basin (Discharge depth is available in 24", 36", 48" or 60" from top of basin. Add -24, -36, -48 or -60 to model when ordering)					
D3696LSG202 (-24, -36, -48 or -60)	208/230	1	565 lbs.	AE24H=3	IPD-24H
D3696LSG202-C (-24, -36, -48 or -60)	208/230	1	565 lbs.	AE24HC=3	IPD-24HC
D3696LSG203 (-24, -36, -48 or -60)	208/230	3	574 lbs.	AE34=3-511	IPD-34-511
D3696LSG204 (-24, -36, -48 or -60)	440-480	3	574 lbs.	AE34=3-171	IPD-34-171
D3696LSG205 (-24, -36, -48 or -60)	575	3	574 lbs.	AE54=3-161	IPD-34-161
D3696LSGX202 (-24, -36, -48 or -60)	208-230	1	577 lbs.	AE24H=3	IPD-24H
D3696LSGX202-C (-24, -36, -48 or -60)	208-230	1	577 lbs.	AE24HC=3	IPD-24HC
D3696LSGX203 (-24, -36, -48 or -60)	208/230	3	586 lbs.	AE34=3-511	IPD-34-511
D3696LSGX204 (-24, -36, -48 or -60)	440-480	3	586 lbs.	AE34=3-171	IPD-34-171
D3696LSGX205 (-24, -36, -48 or -60)	575	3	586 lbs.	AE54=3-161	IPD-34-161

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Phone 800-543-2550 Fax (585) 494-1839

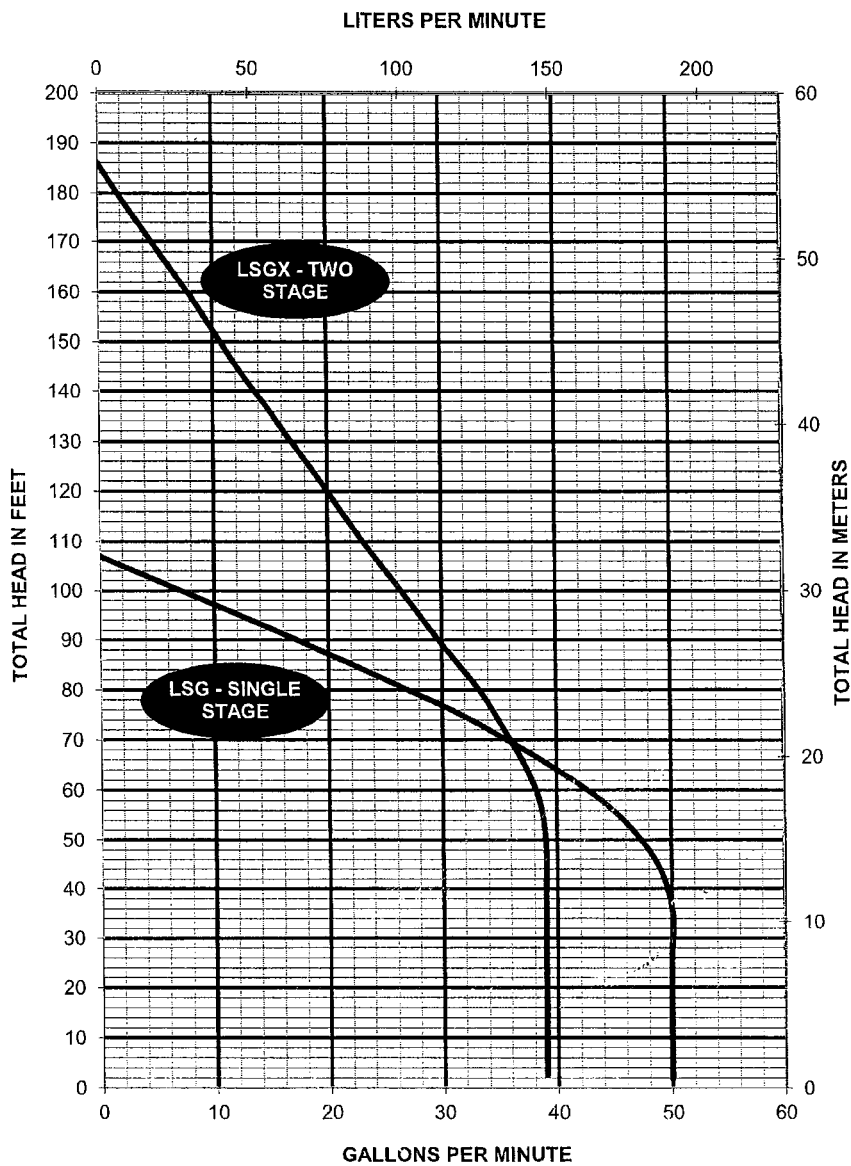
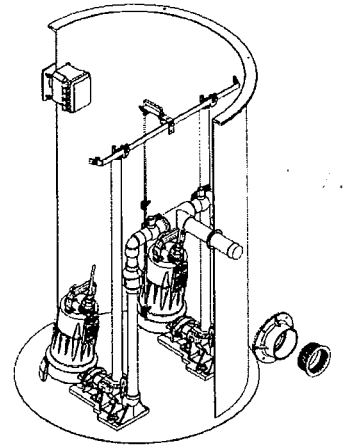
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# Liberty Pumps®

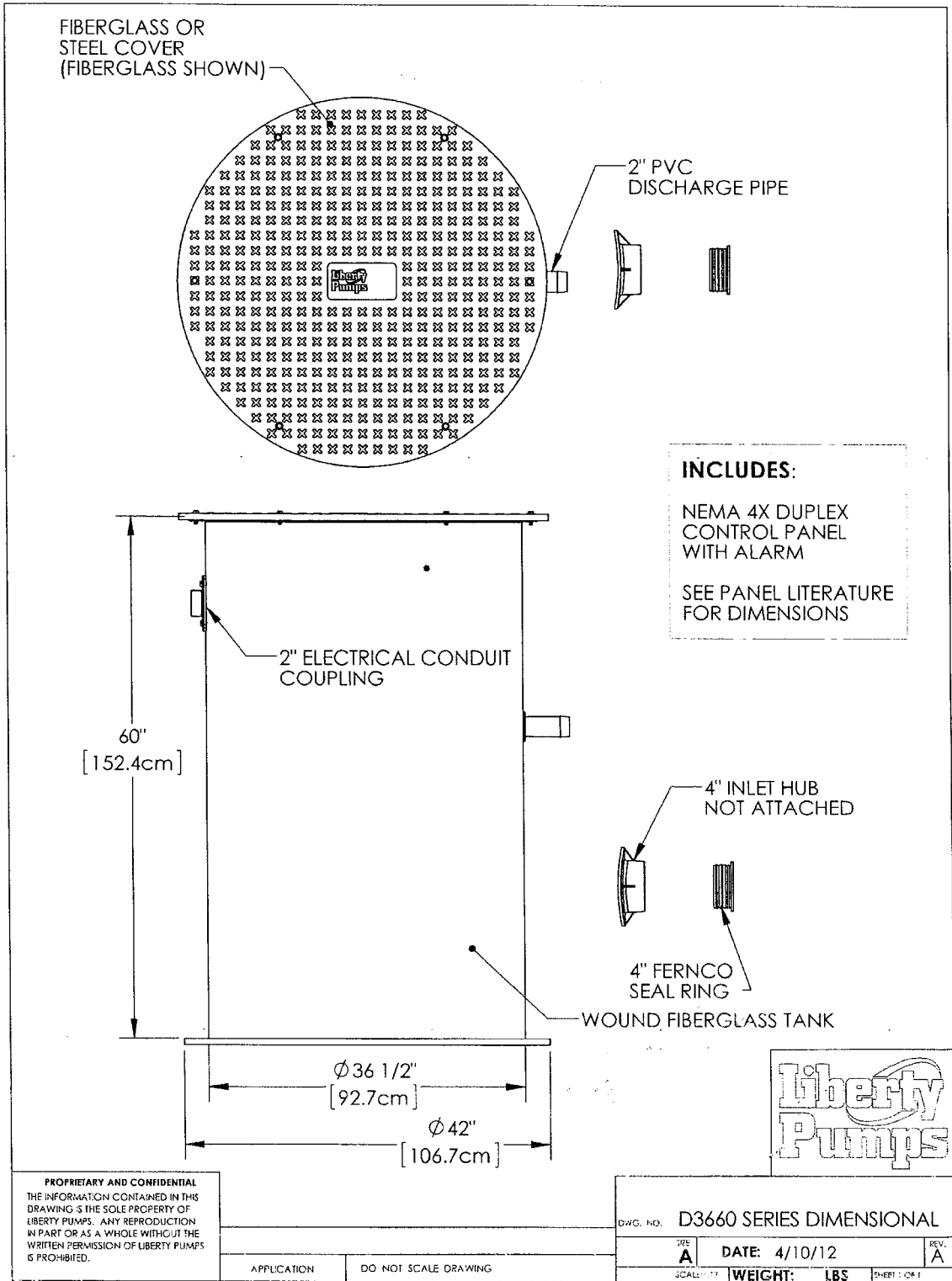


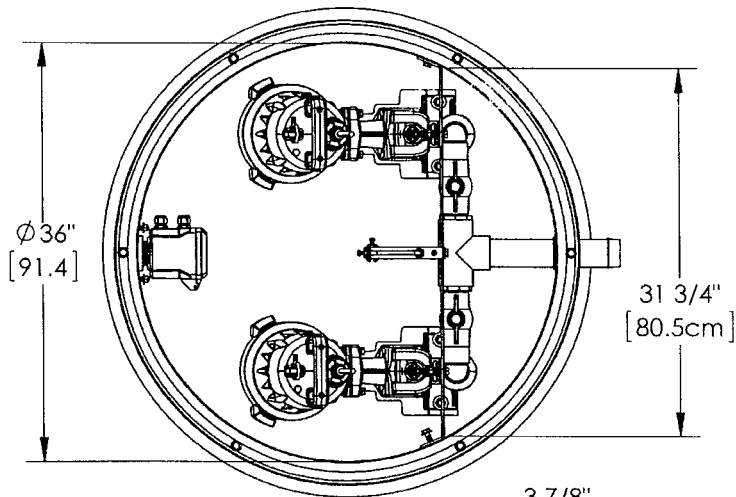
## Pump Specifications

### D3660LSG, D3660LSGX Omnivore® 2HP Duplex Grinder Packages

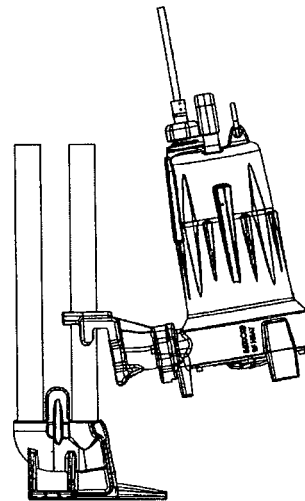
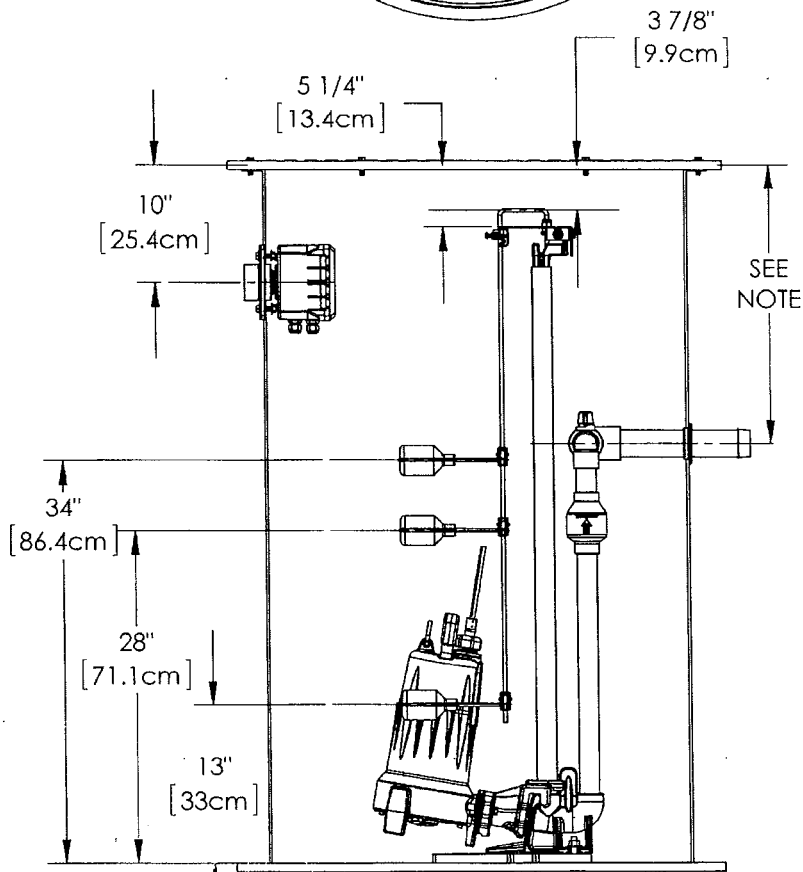


**D3660LSG/LSGX - Series Dimensional Data**

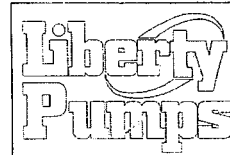




**NOTE:**  
DISCHARGE  
HEIGHT  
OPTIONS:  
24", 36" & 48"



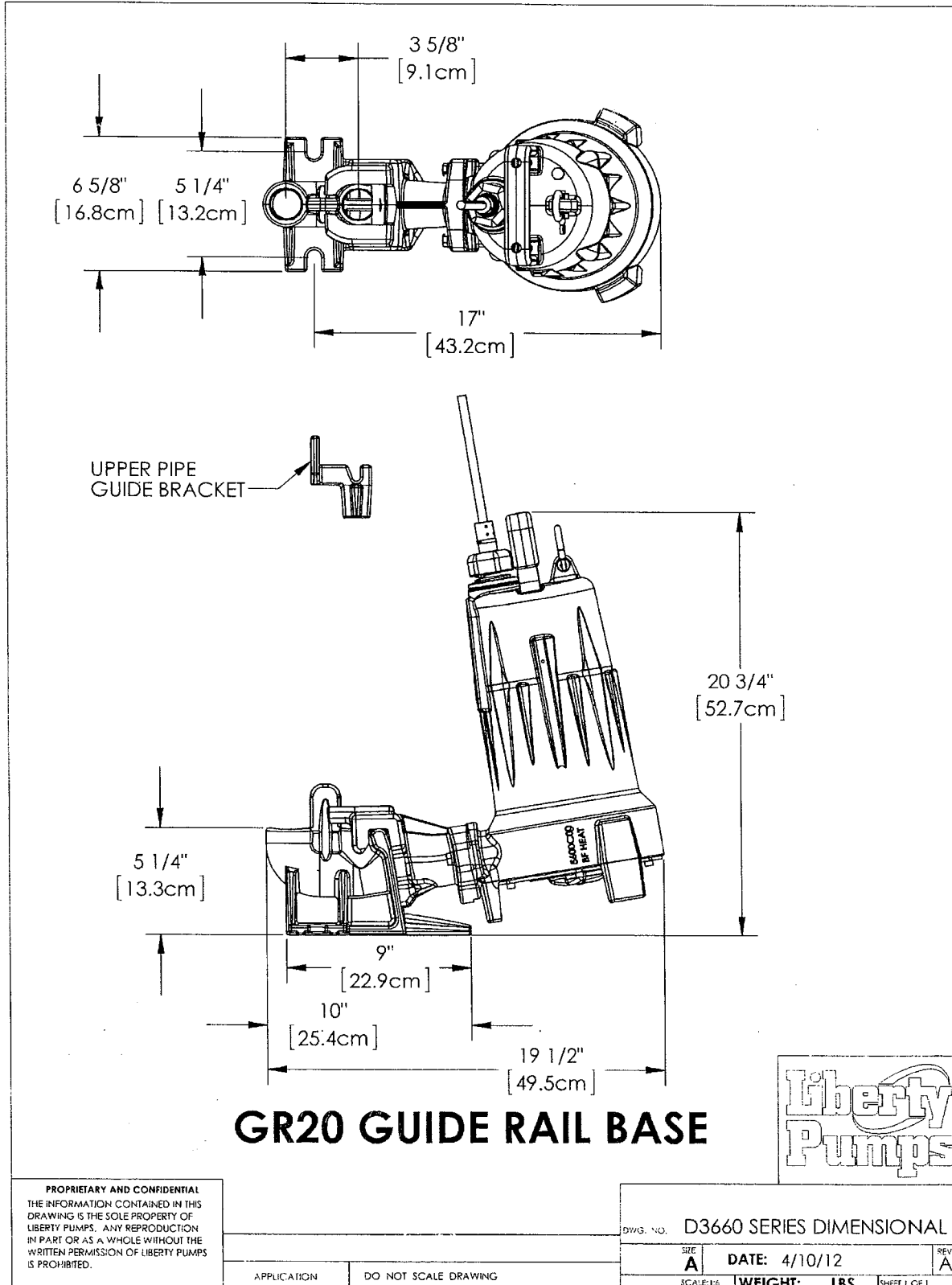
GR20 GUIDE RAIL  
DISCONNECTED VIEW  
SEE DETAIL NEXT PAGE  
SCALE: 1:10



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APPLICATION	DO NOT SCALE DRAWING
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DWG. NO. D3660 SERIES DIMENSIONAL	
SIZE A	DATE: 4/10/12
SCALE: 1:2	WEIGHT: 1BS
REV. A	SHEET 1 OF 1



## D3660LSG/LSGX - Series Electrical data

MODEL	H P	VOLTAGE	PHASE	SF	FULL LOAD AMPS	LOCKED ROTOR AMPS	THERMAL OVERLOAD TEMP	STATOR WINDING CLASS.	CORD LENGTH FT	DISCHARGE	STANDARD CONTROL PANEL *
D3660LSG202	2	208/230	1	1.0	15	53	135°C	B	25	1-1/4" NPT	AE24H=3
D3660LSG202-C	2	208/230	1	1.0	15	53	135°C	B	35	1-1/4" NPT	AE24HC=3
D3660LSG203	2	208/230	3	1.0	10.6	61	N/A	B	25	1-1/4" NPT	AE34=3-511
D3660LSG204	2	440-480	3	1.0	5.3	31	N/A	B	25	1-1/4" NPT	AE34=3-171
D3660LSG205	2	575	3	1.0	4.9	31	N/A	B	25	1-1/4" NPT	AE54=3-161
D3660LSGX202	2	208-230	1	1.0	15	53	135°C	B	25	1-1/4" NPT	AE24H=3
D3660LSGX202-C	2	208-230	1	1.0	15	53	135°C	B	35	1-1/4" NPT	AE24HC=3
D3660LSGX203	2	208/230	3	1.0	10.6	61	N/A	B	25	1-1/4" NPT	AE34=3-511
D3660LSGX204	2	440-480	3	1.0	5.3	31	N/A	B	25	1-1/4" NPT	AE34=3-171
D3660LSGX205	2	575	3	1.0	4.9	31	N/A	B	25	1-1/4" NPT	AE54=3-161

## D3660LSG/LSGX - Series Technical Data

TANK	WOUND FIBERGLASS WITH ANTI FLOATATION FLANGE FIBERGLASS COVER STANDARD STEEL COVER OPTIONAL
CAPACITY	264 GALLON TOTAL BASIN VOLUME (PUMP CYCLE = 75 GALLONS)
GUIDE RAIL	STANDARD -SCHEDULE 40 GALVANIZED OPTIONAL SCHEDULE 40 STAINLESS STEEL
GUIDE RAIL BASE / DISCONNECT (GR20)	CAST IRON
INLET HUB	4" WITH FLANGE GASKET AND PIPE SEAL
DISCHARGE PIPING	2" SCHEDULE 80 PVC
CONTROL PANEL	AE-SERIES NEMA 4X DUPLEX OUTDOOR ALTERNATING PANEL, WITH AUDIBLE (80 DBI) AND VISUAL HIGH WATER ALARM.
IMPELLER	300 SERIES S.S.
PAINT	POWDERCOATING
MAX LIQUID TEMP	140°F / 60°C
MAX STATOR TEMP	275°F / 135°C
THERMAL OVERLOAD	275°F / 135°C (single phase only)
POWER CORD TYPE	SJOOW (1-phase) / SEOOW (3-phase) SOOW (external capacitor models)
MOTOR HOUSING	CLASS 25 CAST IRON
VOLUTE	CLASS 25 CAST IRON
SHAFT	300 SERIES S.S.
HARDWARE	STAINLESS
ORINGS	BUNA N
MECHANICAL SEAL	UNITIZED SILICON CARBIDE
MIN BEARING LIFE	50,000 HRS
WEIGHT	490 LBS / 222 kg

\* ADD -IP TO THE MODEL NUMBER FOR IP-SERIES PANEL UPGRADE.

## **D3660LSG/LSGX - Series Specifications**

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### **1.01 GENERAL**


The contractor shall provide labor, material, equipment, and incidentals required to provide \_\_\_\_\_ (QTY) centrifugal grinder pumps as specified herein. The pump models covered in this specification are Series LSG/LSGX200 single phase grinder pumps. The pump furnished for this application shall be model \_\_\_\_\_ as manufactured by Liberty pumps.

### **2.01 OPERATING CONDITIONS**

Each submersible pump shall be rated at 2 hp \_\_\_\_\_ volts \_\_\_\_\_ phase 60 Hz. 3450 RPM. The unit shall produce \_\_\_\_\_ G.P.M. at \_\_\_\_\_ feet of total dynamic head.

The submersible pump shall be capable of handling residential and commercial sewage and grinding it to a fine slurry enabling it to be pumped over long distances in pipelines as small as 1.25" in diameter. The LSG series single stage submersible pump shall have a shut-off head of 110 feet and a maximum flow of 50 GPM @ 10 feet of total dynamic head. The LSGX series two stage submersible pump shall have a shut-off head of 185 feet and a maximum flow of 38 GPM @ 10 feet of total dynamic head.

### **3.01 CONSTRUCTION**

Each centrifugal grinder pump shall be equal to the  certified Series LSG/LSGX Grinder pumps as manufactured by Liberty Pumps, Bergen NY. The castings shall be constructed of class 25 cast iron. The motor housing shall be oil filled to dissipate heat. Air filled motors shall not be considered equal since they do not properly dissipate heat from the motor. All mating parts shall be machined and sealed with a Buna-N o-ring. All fasteners exposed to the liquid shall be stainless steel. The motor shall be protected on the top side with sealed cord entry plate with molded pins to conduct electricity eliminating the ability of water to enter internally through the cord. The motor shall be protected on the lower side with a dual seal arrangement. The first seal is a double lip seal molded in FKM fluoroelastomer or Buna N.

The second / main seal shall be a unitized hard face silicon carbide seal with stainless steel housings and spring.

The upper and lower bearing shall be capable of handling all radial thrust loads. The lower bearing shall have the additional ability to handle the downward axial thrust produced by the impeller and cutters by design of angular contact roller races. The pump housing shall be of the concentric design thereby equalizing the pressure forces inside the housing which will extend the service life of the seals and bearings. Additionally there shall be no cutwater in the housing volute in order to discourage the entrapment of flowing debris. The pump shall be furnished with stainless steel handle having a nitrile grip.

### **4.01 ELECTRICAL POWER CORD**

The submersible pump shall be supplied with 25 feet of multiconductor power cord. It shall be cord type SJOOW (1-phase), SEOOW (3-phase), or SOOW (external capacitor models), capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity. This will eliminate the ability of water to enter internally through the cord, by means of a damaged or wicking cord.

### **5.01 MOTORS**

All motors shall be oil filled and class B insulated NEMA B design, rated for continuous duty. Since air filled motors are not capable of dissipating heat as effectively, they shall not be considered equal. At maximum load, the winding temperature shall not exceed 135 degrees C un-submerged. Single phase motors shall be capacitor start / capacitor run and have an integral thermal overload switch in the windings for protecting the motor.

### **6.01 BEARINGS AND SHAFT**

An upper radial and lower thrust bearing shall be required. The upper bearing shall be a single ball / race type bearing. The lower bearing shall be an angular contact heavy duty ball / race type bearing, designed to handle axial grinder pump thrust loads. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The bearing system shall be designed to enable proper cutter alignment from shut off head to maximum load at 10' of TDH. The motor shaft shall be made of 300 or 400 series stainless steel and have a minimum diameter of .670".



## **7.01 SEALS**

The pump shall have a dual seal arrangement consisting of a lower and upper seal to protect the motor from the pumping liquid. The lower seal shall be a FKM fluoroelastomer OR Buna N molded double lip seal, designed to exclude foreign material away from the main upper seal. The upper seal shall be a unitized silicon carbide hard face seal with stainless steel housings and spring equal to Crane Type T-6a. The motor plate / housing interface shall be sealed with a Buna-N o-ring.

## **8.01 IMPELLER**

The impeller shall be a investment cast stainless steel impeller, with pump out vanes on the back shroud to keep debris away from the seal area. it shall be keyed and bolted to the motor shaft.

## **9.01 CUTTER MECHANISM**

The cutter and plate shall consist of 440 stainless steel with a Rockwell C hardness of 55-60. The stationary cutter plate shall have specially designed orifices through it, which enable the slurry to flow through the pump housing at an equalized pressure and velocity. The stationary cutter shall consist of V shapes to maximize cutting action and arc shape exclusion slots to outwardly eject debris from under the rotary cutter. The rotary cutter shall have (4) blades and be designed with a recessed area behind the cutting edge to prevent the accumulation and binding of any material between rotary cutter and the stationary cutter. The cutting system must incorporate close tolerances for optimum performance. Ring or radial cutters, or those that grind on the outside circumference of shall not be considered equal.

## **10.01 CONTROLS**

The pumps shall be controlled with a NEMA 4X outdoor duplex control panel with three float switches and a high water alarm or with optional IP Series NEMA 4X outdoor duplex control panel with transducer, adjustable set-points, data logging, and a high water alarm.

## **11.01 PAINT**

The exterior of the casting shall be protected with Powder Coat paint.

## **12.01 SUPPORT**

The pump shall have cast iron support legs, enabling it to be a free standing unit. The legs will be high enough to allow solids and long stringy debris to enter the cutter assembly.

## **13.01 SERVICEABILITY**

Components required for the repair of the pump shall be shipped within a period of 24 hours.

## **14.01 FACTORY ASSEMBLED TANK SYSTEMS WITH GUIDE RAIL AND QUICK DISCONNECT DISCHARGE**

Factory mounted guide rail system with pump suspended by means of bolt-on quick disconnect which is sealed by means of nitrile grommets. The discharge piping shall be schedule 80 PVC and furnished with a check valve and PVC shut-off ball valve. The tank shall be wound fiberglass, and an inlet hub shall be provided with the system.

## **15.01 TESTING**

The pump shall have a ground continuity check and the motor chamber shall be Hi-potted to test for electrical integrity, moisture content and insulation defects. The motor and volute housing shall be pressurized, and an air leak decay test is performed to ensure integrity of the motor housing. The pump shall be run, voltage current monitored, and the tester checks for noise or other malfunction.

## **16.01 QUALITY CONTROL**

The pump shall be manufactured in an ISO 9001 certified Facility.

## **17.01 WARRANTY**

Standard limited warranty shall be 3 years.

# Liberty Pumps®

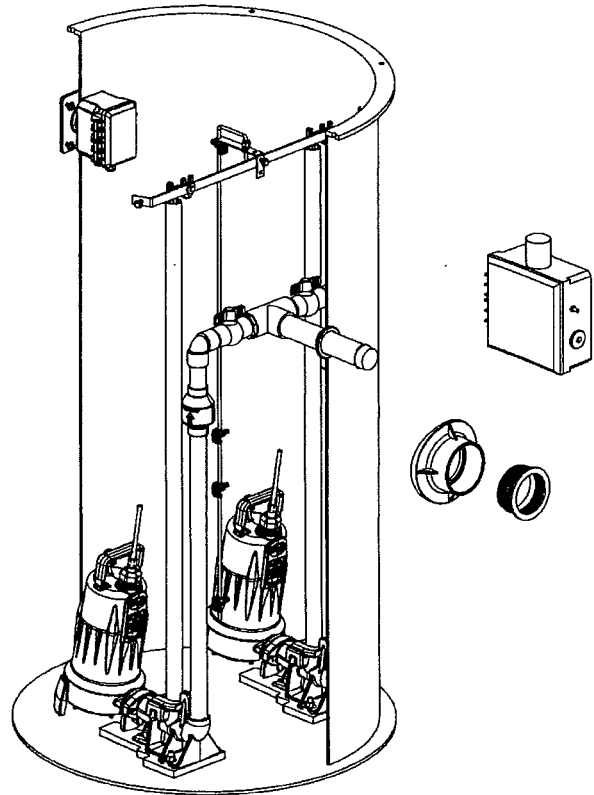
## Installation Manual

7353000E

## D3600- Series Duplex Grinder Systems

### Features:

- 36" Diameter Fiberglass Tank
- Available in 48", 60", 72", 84", and 96" heights
- LSG Single or LSGX 2 Stage 2HP Grinder Pumps
- Factory Installed Guide Rail System
- Quick Tree™ pre-mounted float system
- NEMA 4X Junction Box
- NEMA 4X Duplex Alternating Control Panel



### Contents

1. General Information
2. Precautions / Pre-Installation
3. Installation Instructions
4. Maintenance & Troubleshooting
5. GR20 Assembly

**Liberty Pumps®**

7000 Apple Tree Avenue  
Bergen, NY 14416  
Phone: (800) 543-2550  
Fax: (585) 494-1839  
www.libertypumps.com

#### IMPORTANT:

Prior to installation, record Model, Serial Number, and Code Number from pump nameplate for future reference.

MODEL \_\_\_\_\_

SERIAL \_\_\_\_\_

CODE \_\_\_\_\_

INSTALLATION  
DATE \_\_\_\_\_

# 1 General Information

## GRINDER PUMP SPECIFICATIONS

MODEL	H P	VOLTAGE	PHASE	FULL LOAD AMPS	LOCKED ROTOR AMPS	THERMAL OVERLOAD TEMP	STATOR WINDING CLASS	SHUT-OFF HEAD	CORD LENGTH FT	DISCHARGE
LSG202A	2	208/230	1	15	53	135°C 275°F	B	108'	25	1-1/4"
LSG202M	2	208/230	1	15	53	135°C 275°F	B	108'	25	1-1/4"
LSG202M-C*	2	208/230	1	15	53	135°C 275°F	B	108'	35	1-1/4"
LSG203M	2	208/230	3	10.6	61	N/A	B	108'	25	1-1/4"
LSG204M	2	440/460	3	5.3	31	N/A	B	108'	25	1-1/4"
LSG205M	2	575	3	4.9	31	N/A	B	108'	25	1-1/4"
LSGX202A	2	208-230	1	15	53	135°C 275°F	B	185'	25	1-1/4"
LSGX202M	2	208-230	1	15	53	135°C 275°F	B	185'	25	1-1/4"
LSGX202M-C*	2	208-230	1	15	53	135°C 275°F	B	185'	35	1-1/4"
LSGX203M	2	208/230	3	10.6	61	N/A	B	185'	25	1-1/4"
LSGX204M	2	440/460	3	5.3	31	N/A	B	185'	25	1-1/4"
LSGX205M	2	575	3	4.9	31	N/A	B	185'	25	1-1/4"

\***Note:** LSG202M-C & LSGX202M-C are for external capacitor applications and require the use of control panels fitted with properly matched capacitors and start relays.

**Maximum fluid temperature: 140°F (60°C)**

**⚠ CAUTION** The grinder pump and the control panel are supplied with their own separate Installation/Operation/Maintenance manuals. Ensure that you have received these manuals, and that you read and understand them prior to installing this unit. Your familiarity with the grinder pump manual and the control panel manual is critical. This installation manual gives a brief overview of the system, and deals mainly with inspection and installation of the basin, but it does not cover the specifics of the pump operation or the control panel operation. If you have any questions, call customer service at (800) 543-2550.

## 2 Precautions / Pre-Installation

### ⚠ WARNING

- **Risk of electric shock.** Always disconnect the pump from the power source before handling or making adjustments.
- These pumps are not to be installed in locations classified as hazardous in accordance with the National Electric Code, ANSI/NFPA 70.
- The electrical connections and wiring for a pump installation should only be made by qualified personnel.
- This pump is supplied with a grounding conductor or a grounding-type attachment plug. To reduce the risk of electric shock, be certain that the grounding conductor is connected only to a properly grounded control panel or, if equipped with a grounding-type plug, that it is connected to a properly grounded, grounding-type receptacle.
- Do not bypass grounding wires or remove ground prong from attachment plugs.
- Do not remove cord and strain relief, and do not connect conduit to pump.
- Do not use an extension cord.
- This system requires separate, properly fused and grounded branch circuit. Make sure the power source is properly sized for the voltage and amperage requirements of the system, as noted on the nameplate.
- The installation must be in accordance with the National Electric Code and all applicable local codes and ordinances.
- Sump and sewage pumps often handle materials which could cause illness or disease. Wear adequate protective clothing when working on a used pump or piping.
- Never enter a pump basin after it has been used. Sewage and effluent can emit several gases which are poisonous.

### Pre-installation checklist:

1. Inspect the unit upon arrival to ensure that there is no shipping damage. Pay careful attention to the condition of the fiberglass basin, control floats, pump guide rail brackets, and control panel. Notify the carrier immediately if there is any damage.
2. Read all instructions and familiarize yourself with the unit's operation prior to proceeding with the installation.
3. A qualified licensed electrician should install and test all electrical circuits.
4. Check to ensure that your power source is adequate to handle the pump amperage as noted above and on the pump nameplate. Ensure that the electrical supply circuit is equipped with fuses or breakers of the proper capacity.
5. A separate 115V branch circuit should be installed for the control circuit. We do not recommend splitting the incoming pump power circuit to power the control circuit.
6. All electrical connections should be tested to ensure that a proper ground has been established

## 3 Installation Instructions

1. **Excavation:** Excavate the hole for the basin as small as possible, with a minimum base diameter of 50". Never place the basin in direct contact with rocks or other sharp objects. Place enough fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone at the bottom of the excavation to create a minimum of 12 inches stone or gravel after compaction. Do not use sand or native soil as backfill\*. Properly compact underneath the basin to provide a solid, level base that can support the weight of the filled basin. If a concrete pad will be used under the basin, the compacted stone sub-base can be reduced to 6 inches.
2. **Connections & Backfill:** Pour enough concrete over and around the anti-floatation flange to anchor the basin and prevent upward movement. Connect 2" schedule 80 PVC pipe to the pump discharge. Do not reduce the size of the discharge piping, and do not increase the discharge piping to larger than 3". The remainder of the discharge line should be as short as possible with a minimum number of turns. Connect the inlet line to the 4" inlet hub with a rubber donut (Liberty #6112000). Connect the electrical coupling to 2" electrical conduit and run the power and float cords through the conduit to the control panel. The remaining backfill should be only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone. Do not use sand or native soil as backfill\*. **Do Not** exert heavy pressure or run heavy equipment over the backfill material, as it may cause tank collapse.

\*Other backfill options may be available – consult the factory for special instructions relative to your situation.

3. **Venting:** The fiberglass basin provided with the system must be completely sealed and properly vented in order to meet health and plumbing code requirements. The system is designed to be vented through the inlet to an existing building vent stack. In order to accomplish this, there must be no traps between the system inlet and the nearest building vent stack connection. See Figure A for an example. If this is not possible or desirable in your application, a vent flange or grommet can be installed in a hole cut into the solid fiberglass cover.

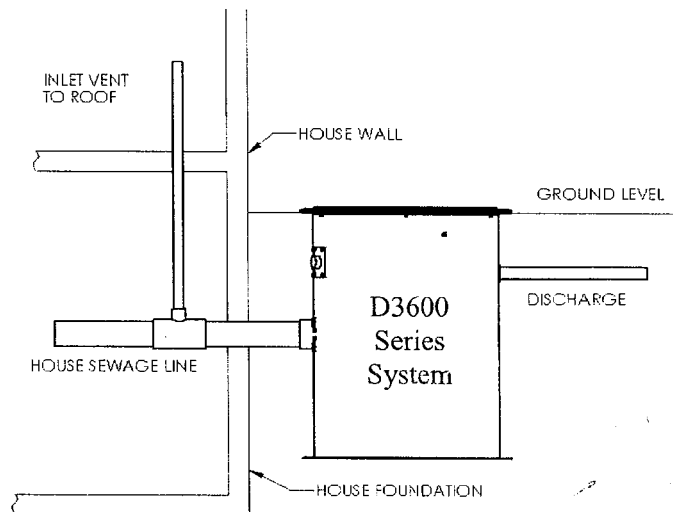


Figure A – Inlet Venting

#### 4. Control Panel:

**⚠ WARNING** **Risk of Electric shock:** This pump is supplied with a grounding conductor. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded earth wire. All electrical circuitry should be installed in accordance with the National Electric Code (NEC) and all applicable local codes or ordinances.

**⚠ CAUTION** The control panel that is an integral part of this complete unit is supplied with its own separate Installation/Operation/Maintenance manual. Ensure that you have received this manual, and that you read and understand it prior to installing this unit. Your familiarity with the control panel manual is critical.

A separate 115V branch circuit should be installed for the control circuit. We do not recommend splitting the incoming pump power circuit to power the control circuit. Connect the grinder pump leads and the float switch leads to the control panel in accordance with the instructions included with those units.

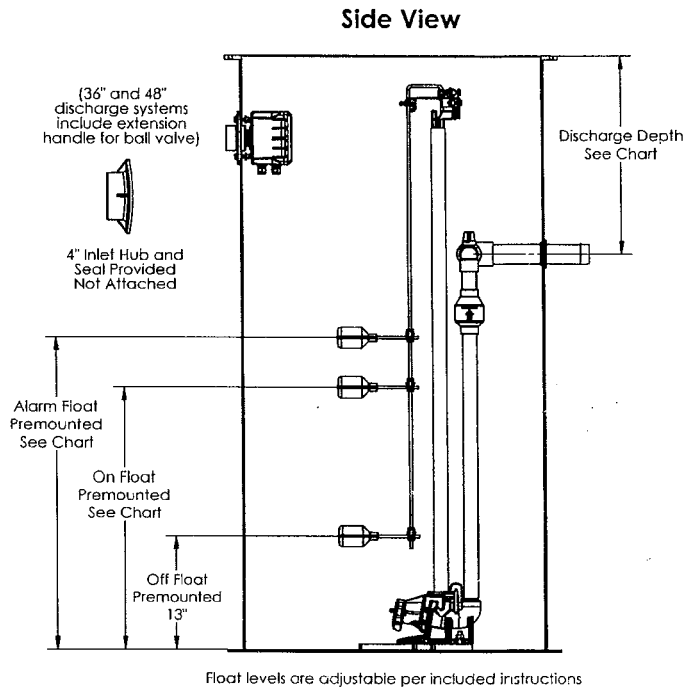
**5. Float Switches:** The float switches are pre-mounted on a quick tree. For quick tree removal, loosen the cord nut and pull the tree straight out of the tank. The pump cycle is pre-set at the factory at 12" for D3648 (approximately 53 gallons) and 18" for D3672 (approximately 79 gallons). The pump cycle can be adjusted by loosening the cord clamp and moving the "on" float up or down. We do not recommend adjustments of more than 3" in either direction – please call the factory if you need to adjust the pump cycle beyond this recommended level.

**6. Testing and Startup:** Follow the testing and startup procedures found in the grinder pump and control panel manual.

## 4 Maintenance and Troubleshooting

**⚠ CAUTION** The grinder pump and control panel are supplied with their own separate Installation/Operation/Maintenance manuals. Ensure that you have received these manuals, and that you read and understand them prior to installing this unit. Your familiarity with the grinder pump manual and the control panel manual is critical. Please follow the Maintenance and Troubleshooting procedures provided in those manuals.

Model	Off Level	On Level	Alarm level	Volume/cycle
D3648	13" (33 cm)	25" (64 cm)	31" (79 cm)	62 gal. (235 liters)
D3660	13" (33 cm)	28" (71 cm)	34" (86 cm)	75 gal. (284 liters)
D3672	13" (33 cm)	31" (79 cm)	37" (94 cm)	88 gal. (333 liters)
D3684	13" (33 cm)	34" (86 cm)	40" (102 cm)	101 gal. (382 liters)
D3696	13" (33 cm)	37" (94 cm)	43" (109 cm)	115 gal. (435 liters)

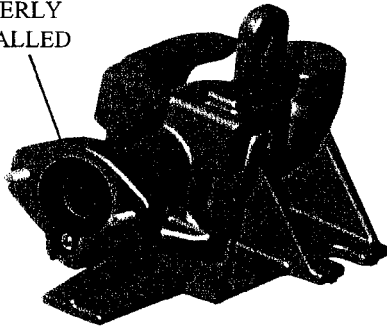


# 5 GR20 Quick Disconnect Assembly

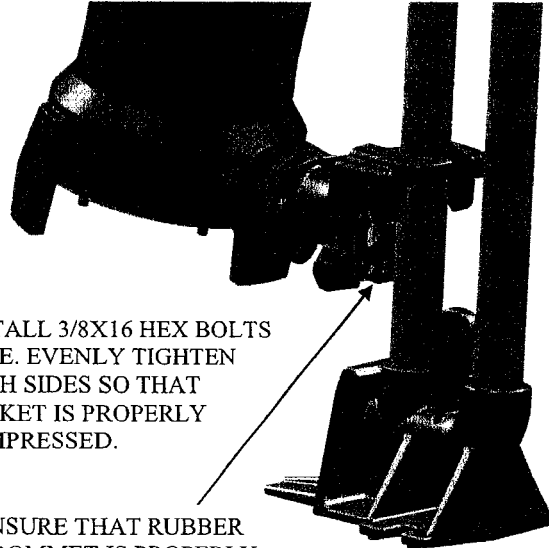
## GR20 Assembly

The GR20 quick disconnect assembly provided with your grinder package system is designed to allow easy installation and removal of the pump. When installed correctly it will seal and provide a means to lift the pump without disconnecting any of the discharge piping. Please ensure that installation is done as per the diagrams below.

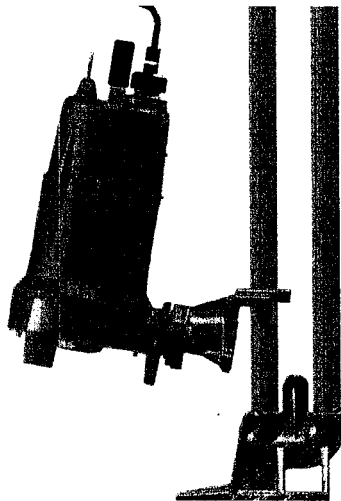
ENSURE THAT GROMMET IS PROPERLY INSTALLED



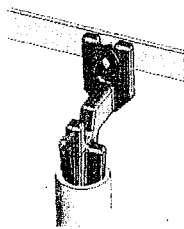
INSTALL 3/8X16 HEX BOLTS HERE. EVENLY TIGHTEN BOTH SIDES SO THAT GASKET IS PROPERLY COMPRESSED.



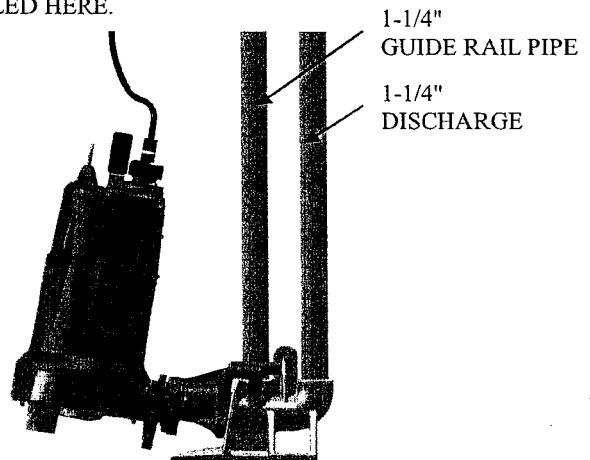
ENSURE THAT RUBBER GROMMET IS PROPERLY INSTALLED HERE.



**DISCONNECTED POSITION**



**PIPE GUIDE ASSEMBLY**



**OPERATING POSITION**

### **3 Year Limited Warranty**

Liberty Pumps, Inc. warrants that pumps of its manufacture are free from all factory defects in material and workmanship for a period of 3 years from the date of purchase. The date of purchase shall be determined by a dated sales receipt noting the model and serial number of the pump. The dated sales receipt must accompany the returned pump if the date of return is more than 3 years from the "CODE" (date of manufacture) number noted on the pump nameplate.

The manufacturer's obligation under this Warranty shall be limited to the repair or replacement of any parts found by the manufacturer to be defective, provided the part or assembly is returned freight prepaid to the manufacturer or its authorized service center, and provided that none of the following warranty-voiding characteristics are evident:

The manufacturer shall not be liable under this Warranty if the product has not been properly installed; if it has been disassembled, modified, abused or tampered with; if the electrical cord has been cut, damaged or spliced; if the pump discharge has been reduced in size; if the pump has been used in water containing sand, lime, cement, gravel or other abrasives; if the pump has been used in water above the advertised temperature rating; if the product has been used to pump chemicals or hydrocarbons; if a non-submersible motor has been subjected to excessive moisture; or if the label bearing the serial, model and code number has been removed.

Liberty Pumps, Inc. shall not be liable for any loss, damage or expenses resulting from installation or use of its products, or for consequential damages, including costs of removal, reinstallation or transportation.

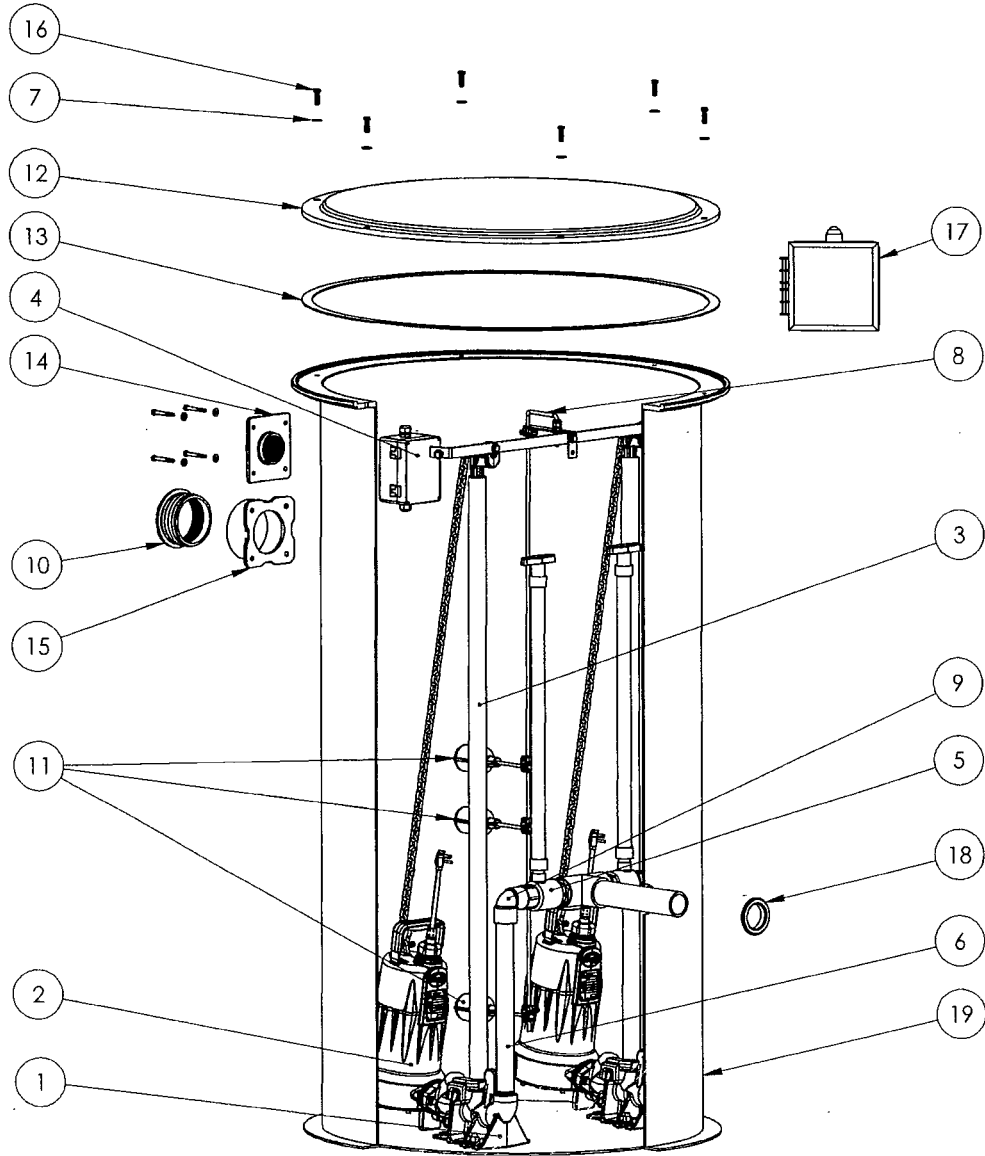
**There is no other express warranty. All implied warranties, including those of merchantability and fitness for a particular purpose, are limited to three years from the date of purchase.**

**This Warranty contains the exclusive remedy of the purchaser, and, where permitted, liability for consequential or incidental damages under any and all warranties are excluded.**



7000 Apple Tree Avenue  
Bergen, NY 14416  
Phone: (800) 543-2550  
Fax: (585) 494-1839  
[www.libertypumps.com](http://www.libertypumps.com)

D3672LSG202-48 (B10)



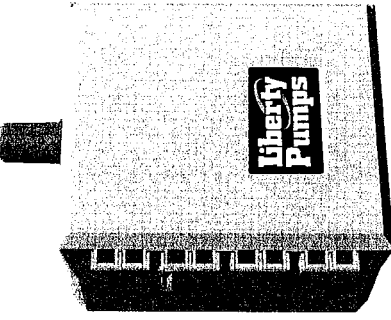


## D3672LSG202-48 (B10)

#	PART #	DESCRIPTION	QTY	Note
1	GR20BC	GR20 GUIDE RAIL, BALL/CHECK STYLE	2	
2	5650E00	OMNIVORE PUMP	2	
3	4750R00	1-1/4" GALVANIZED PIPE 1-1/4" GUIDERAIL, GALVANIZED	58	
4	6620000	JUNCTION BOX	1	
5	47450A0	BALL VALVE 1-1/4" PVC 2122-012	2	
6	4001000	1-1/4" TOE NIPPLE, PVC	2	
7	8107000	3/8-16 WASHER, FLAT FLAT WASHER, 3/8" 316 SS	28	
8	K001562	KIT, 50430C0 QUICK TREE WITH CLAMPS, L. BRKTFLOAT SUPPORT, STAINLESS STEEL	1	
9	4706000	1-1/4" SCH80 PVC ELBOW 90 DEGREE ELBOW 90, 1-1/4" SXS PVC	2	
10	K001141	4" FERNCO SEALING DONUT	1	
11	FLOAT SWITCH KIT	FLOAT SWITCH KIT 6005000 SWITCH, NON-MERCURY, QTY (1)	3	
12	4650000	36" FIBERGLASS COVER	1	
13	45220C0	GASKET TAPE	1	
14	K001352	BULKHEAD FITTING 2" NPS, INCLUDES MOUNTING HARDWARE	1	
15	4784000	4" HUB, INCLUDES HARDWARE 4" FIBERGLASS HUB, INCLUDES HARDWARE	1	
16	8128000	3/8-16" X 1-1/4" BOLT	6	
17	AE24H=3	GRINDER ALTERNATOR NEMA 4X	1	
18	4768000	PIPE SEAL GROMMET, 2"	1	[1]
19	4651000	36X72" FIBERGLASS TANK	1	

**PART NOTES:**

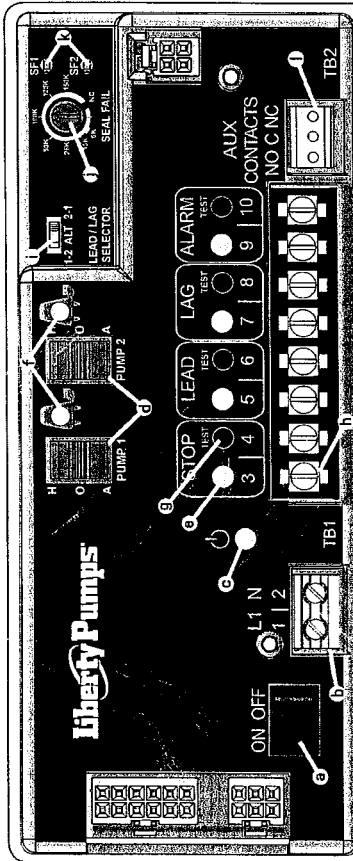
- [1] - Part requires factory authorized service. Contact Liberty Pumps at 1-800-543-2550



# Three Phase Duplex

AE34=3-131, AE34=3-141, AE34=3-171,  
AE34=3-191, AE34=3-511, AE34=4-131,  
AE34=4-141, AE34=4-171, AE34=4-191,  
AE34=4-511, AE54=3-121, and AE54=4-121

Manufactured by SJE Rhombus®  
**Installation and Operation Manual**



Model shown contains optional Seal Fail circuitry.

### COMPONENTS

- a. ON/OFF Switch - Control/Alarm Power
- b. 120V Incoming Power Terminals
- c. Power LED - (Green)
- d. Pump HOA Switches
- e. Float LEDs - (Red) x4
- f. Pump LEDs  
Pump Run - (Green)  
Pump Fail - (Red)
- g. Simulate Float Buttons x4
- h. Float Terminals x8
- i. Lead/Lag Selector Switch
- j. Dual Seal Fail Pot - (Optional)
- k. Dual Seal Fail LEDs - (Red) - (Optional)
- l. Auxiliary Alarm Terminals

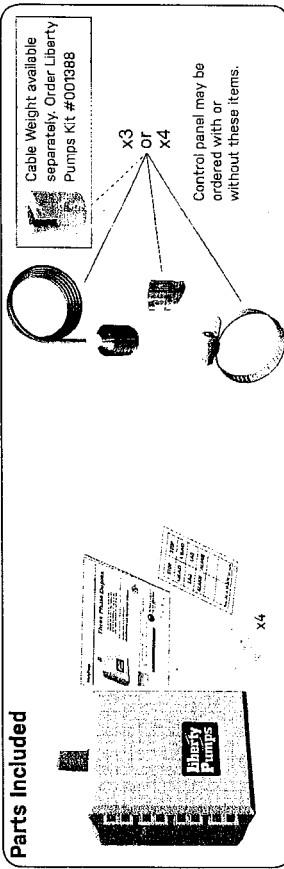
### PROGRAMMING INSTRUCTIONS

WITH POWER ON HOAS OFF FLOATS OFF-DISCONNECTED. PRESS DESIRED FLOAT BUTTON RAPIDLY 4 TIMES AND HOLD

\*\*PUMP LEDs WILL FLASH UPON SUCCESSFUL PROGRAMMING\*\*

OPTIONS	DEFAULT	OPERATION
FLIGHT BUTTON	ON	ACTIVATES IF A PUMP CAUSES 'LAG' 3 CYCLES IN A ROW
PUMP FAIL ALARM	OFF	LATCHES HIGH ALARM CLEAR WITH EXTERNAL TEST SWITCH
MANUAL ALARM RESET	OFF	ACTIVATES HORN UPON SEAL FAIL
SEAL FAIL HORN	OFF	FLASHES BEACON UPON HIGH ALARM
ALARM FLASHER	OFF	FLASHES BEACON UPON HIGH ALARM

ALARM	BEACON	CONTROLLER LED	HORN
PUMP FAIL	FLASHING	RED PUMP LIGHT	NO
SEAL FAIL	FLASHING	SFL SF2	PRG
FLOAT FAIL	FLASHING	BAO FLOAT NOT LIT	NO
HIGH ALARM	SOLID	ALARM FLOAT	YES



**WARNING!**  
ELECTRICAL SHOCK HAZARD  
Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

**Warranty void if panel is modified.**

Call factory with servicing questions:  
**1-800-543-2550**

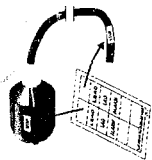
Liberty Pumps offers a three-year limited warranty. For complete terms and conditions, please visit [www.libertypumps.com](http://www.libertypumps.com).

Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.

### Installing the Float Switches

The Three Phase Duplex control panel operates with float switches to activate pump STOP, LEAD, pump START, LAG pump START and highlevel ALARM functions.

- 1 WARNING!** Ensure all power is turned OFF before installing floats in tank. Failure to do so could result in serious or fatal shock.
- Label each float and cord end with the provided pairs of STOP, LEAD, LAG, and ALARM stickers.

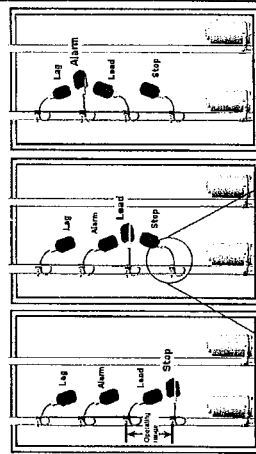


### 3 CAUTION!

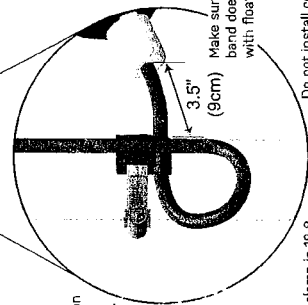
If the floats are not properly mounted and connected in the correct order, the pumps will not function properly.

Floats require free range of motion. They must not touch each other or any equipment in the pump chamber.

#### Pipe Clamp Mounting



Tighten the clamp.



Make sure hose clamp band does not interfere with float operation.

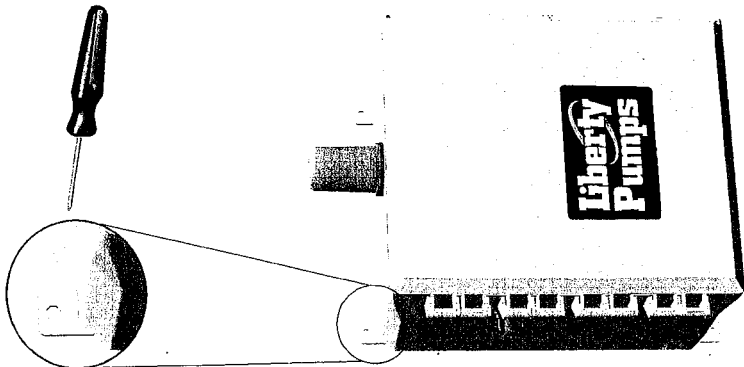
Hose clamp is 18-8 stainless steel.

Do not install cord under hose clamp.

### Mounting the Control Panel

#### NOTE

If the distance to the control panel exceeds the length of the float switch cords or the pump power cord, splicing in a liquid-tight junction box will be required. For outdoor or wet installation, we recommend a Liberty Pumps UL Type 4X junction box.



### Wiring the Control Panel

Determine conduit entrance locations on control panel as shown. Check local codes and schematic on the inside cover of the panel for the number of power circuits required.

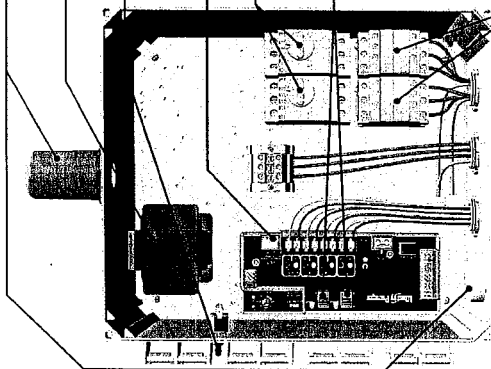
#### CAUTION!

Be sure the pump power voltage and phase are the same as the pump motor being installed.

2 Connect the following wires to the proper terminal positions:

- incoming power
- pump 1
- pump 2
- float switches

See schematic on inside cover of the control panel for details.



Typical Layout (May vary with options ordered).

#### CAUTION!

You must use conduit sealant to prevent moisture or gases from entering the panel.

Type 4X conduit must be used to maintain a Type 4X rating of the control panel.

3 Verify correct operation of control panel after installation is complete.

### Operation

Liberty Pumps Three Phase Duplex control panel operates with float switches. When all floats are in the open or OFF position, the panel is inactive. As the liquid level rises and closes the STOP float, the panel remains inactive until the LEAD float closes. At this point the LEAD pump will turn ON (if the Hand/Off/Auto switch is in the AUTO mode and the power is ON). The pump will remain ON until both the STOP and LEAD floats return to their OFF positions. If the liquid level rises beyond both the STOP and LEAD floats to reach the LAG float, the lag pump will turn ON (if the Hand/Off/Auto switch is in the AUTO mode and the power is ON). Both pumps will remain ON until the STOP, LEAD, and LAG floats return to their OFF positions. If the liquid level rises to reach the ALARM float, the alarm will be activated.

#### Alarm System (Indicator Light and Horn)

When an alarm condition occurs, the red light and horn will be activated.

#### Transformer

The transformer converts incoming three phase power to 120V to be used for control and alarm.

If the TEST/NORMAL/SILENCE switch is moved to the SILENCE position and released, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset.

#### Auxiliary Contact

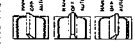
Form C. Can be wired normally open or normally closed.

#### Motor Protective Switches

Each pump circuit has motor protective switches that provides pump disconnect, overload, and branch circuit protection. Adjust overload to pump FLA.

#### Hand-Off-Auto (HOA) Switches

The HOA 3-way switches control pump functions.



In HAND mode, the pump will turn ON.

OFF turns the pump OFF.

In AUTO mode, commands from the float switches turn each pump ON and OFF.

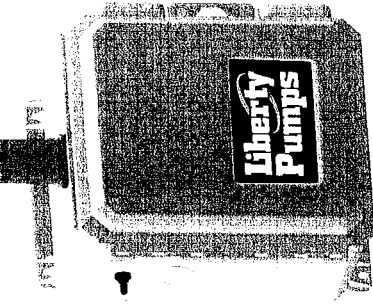
#### Motor Contactors

Motor contactors control pumps by switching electrical lines.



**Technical support, service questions:**  
1-800-543-2550

Monday - Friday  
7:00 AM to 6:00 PM Eastern Time



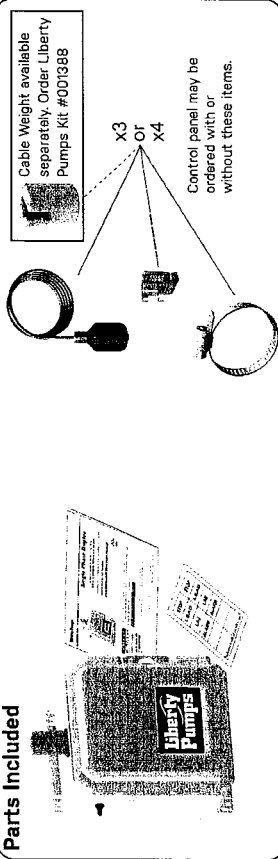
# Single Phase Duplex

AE21IL=3, AE21IH=3, AE21IL=4, AE21IH=4  
AE24L=3, AE24H=3, AE24L=4, and AE24H=4

Manufactured by SJE Rhombus®  
**Installation and Operation Manual**



### Parts Included



### WARNING!

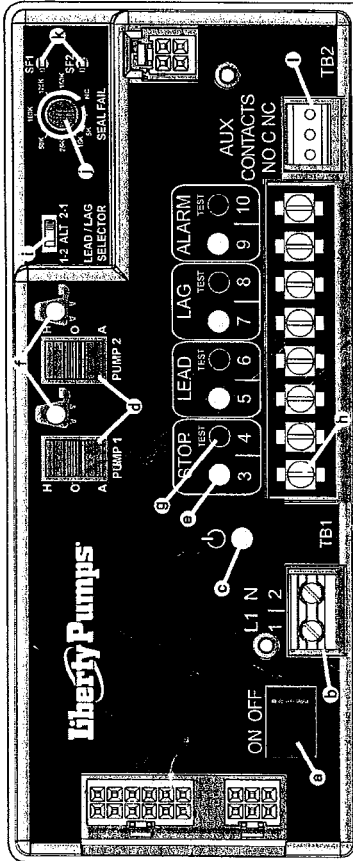
**ELECTRICAL SHOCK HAZARD**  
Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes. UL Type 4X enclosures are for indoor or outdoor use.

**Warranty void if panel is modified.**

Call factory with servicing questions:  
**1-800-543-2550**

Liberty Pumps offers a three-year limited warranty. For complete terms and conditions, please visit [www.libertypumps.com](http://www.libertypumps.com). Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.



Model shown contains optional Seal Fail circuitry.

### COMPONENTS

- a. ON/OFF Switch - Control/Alarm Power
- b. 120V Incoming Power Terminals
- c. Power LED - (Green)
- d. Pump HOA Switches
- e. Float LEDs - (Red) x4
- f. Pump LEDs  
Pump Run - (Green)  
Pump Fail - (Red)
- g. Simulate Float Buttons x4
- h. Float Terminals x8
- i. Lead/Lag Selector Switch
- j. Dual Seal Fail Pot - (Optional)
- k. Dual Seal Fail LEDs - (Red) - (Optional)
- l. Auxiliary Alarm Terminals

### PROGRAMMING INSTRUCTIONS

WITH POWER ON, HOAs OFF, FLOATS OFF OR DISCONNECTED, PRESS DESIRED FLOAT BUTTON RAPIDLY 4 TIMES AND HOLD.

\*\*PUMP LEADS WILL FLASH UPON SUCCESSFUL PROGRAMMING\*\*

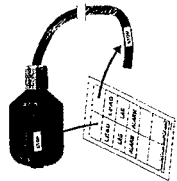
OPTIONS	DEFAULT	OPERATION
PUMP FAIL ALARM	STOP	ON
MANUAL ALARM RESET	LEAD	OFF
SEAL FAIL HORN	LAG	OFF
ALARM FLASHER	ALARM	OFF

ALARM	BEACON	CONTROLLER LED	HORN
PUMP FAIL	FLASHING	RED PUMP LIGHT	NO
SEAL FAIL	FLASHING	SF1, SF2	PROG
FLOAT FAIL	FLASHING	BAD FLOAT NOT LIT	NO
HIGH ALARM	SOLID	ALARM FLOAT	YES

### Installing the Float Switches

The Single Phase Duplex control panel operates with float switches to activate pump STOP, LEAD pump START, LAG pump START and high-level ALARM functions.

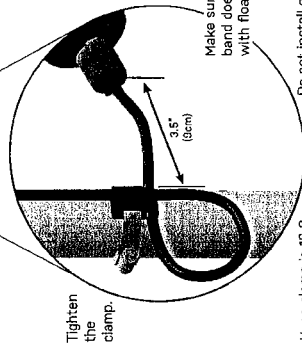
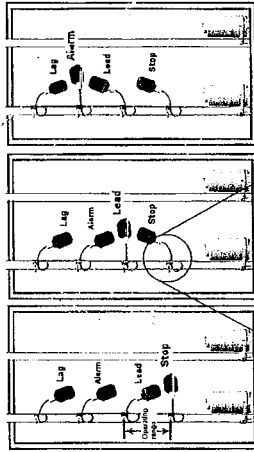
- 1** **WARNING!** Ensure all power is turned OFF before installing floats in tank. Failure to do so could result in serious or fatal shock.
- 2** Label each float and cord end with the provided pairs of STOP, LEAD, LAG, and ALARM stickers.



- 3** **CAUTION!** If the floats are not properly mounted and connected in the correct order, the pumps will not function properly.

Floats require free range of motion. They must not touch each other or any equipment in the pump chamber.

#### Pipe Clamp Mounting



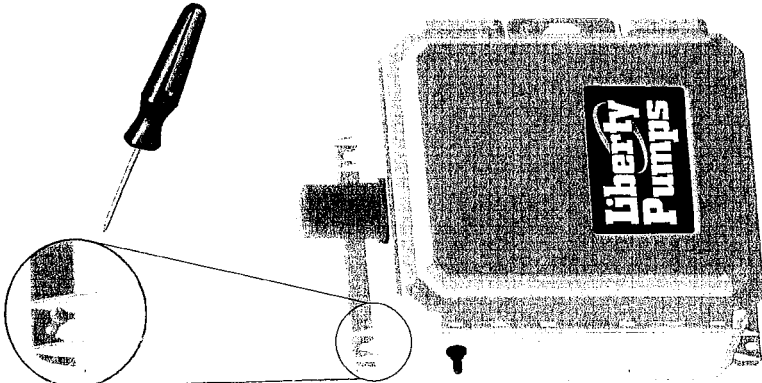
Make sure hose clamp band does not interfere with float operation.

Do not install cord under hose clamp.

### Mounting the Control Panel

#### NOTE

If the distance to the control panel exceeds the length of the float switch cords or the pump power cord, splicing in a liquid-tight junction box will be required. For outdoor or wet installation, we recommend a Liberty Pumps UL Type 4X junction box.



### Wiring the Control Panel

- Determine conduit entrance locations on control panel as shown. Check local codes and schematic inside the panel for the number of power circuits required.

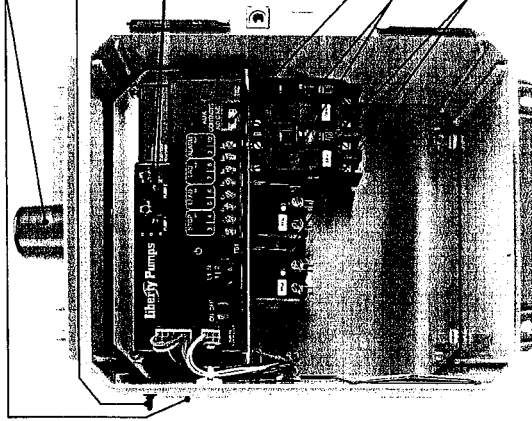
#### CAUTION!

Be sure the pump power voltage and phases are the same as the pump motor being installed.

- Connect the following wires to the proper terminal positions:

- Incoming power
- pump 1
- pump 2
- float switches

See schematic inside control panel for details.



Typical Layout (May vary with options ordered).

#### CAUTION!

You must use conduit sealant to prevent moisture or gases from entering the panel. Type 4X conduit must be used to maintain a Type 4X rating of the control panel.

- Verify correct operation of control panel after installation is complete.

### Operation

Liberty Pumps Single Phase Duplex control panel operates with float switches. When all floats are in the open or OFF position, the panel is inactive. As the liquid level rises and closes the STOP float, the panel remains inactive until the LEAD float closes. At this point the LEAD pump will turn ON (if the Hand-Off-Auto switch is in the AUTO mode and the power is ON). The pump will remain ON until both the STOP and LEAD floats return to their OFF positions. If the liquid level rises beyond both the STOP and LEAD floats to reach the LAG float, the lag pump will turn ON (if the Hand-Off-Auto switch is in the AUTO mode and the power is ON). Both pumps will remain ON until the STOP, LEAD, and LAG floats return to their OFF positions. If the liquid level rises to reach the ALARM float, the alarm will be activated.

#### Alarm System (Indicator Light and Horn)

When an alarm condition occurs, the red light and horn will be activated.

If the TEST/NORMAL/SILENCE switch is moved to the SILENCE position and released, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset.

#### Hand-Off-Auto (HOA) Switches

The HOA 3-way switches control pump functions.

In HAND mode, the pump will turn ON.

OFF turns the pump OFF.

In AUTO mode, commands from the float switches turn each pump ON and OFF.

#### Auxiliary Contact

Form C - Can be wired normally open or normally closed.

#### Circuit Breakers (optional)

Circuit Breakers provide pump disconnect and branch circuit protection.

#### Motor Contactors

Motor contactors control pumps by switching electrical lines.

**?** **Technical support, service questions:**  
1-800-543-2550

Monday - Friday  
7:00 AM to 6:00 PM Eastern Time

# AE-SERIES

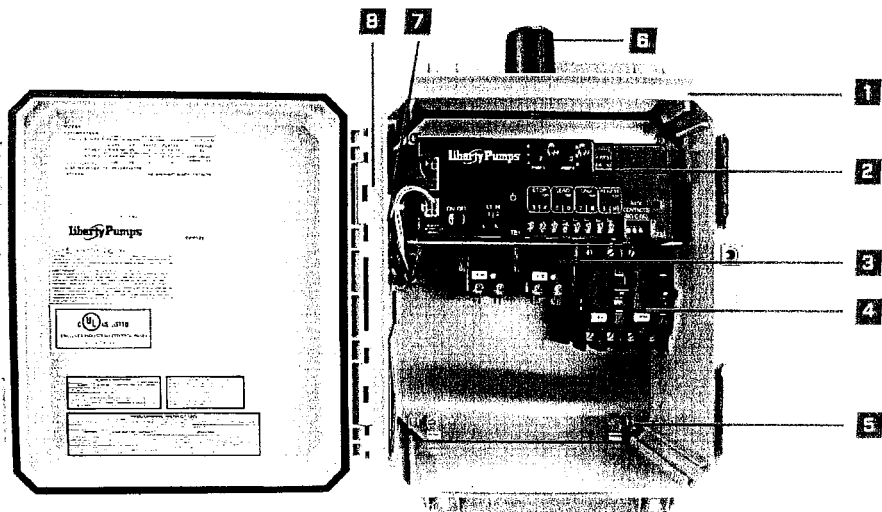
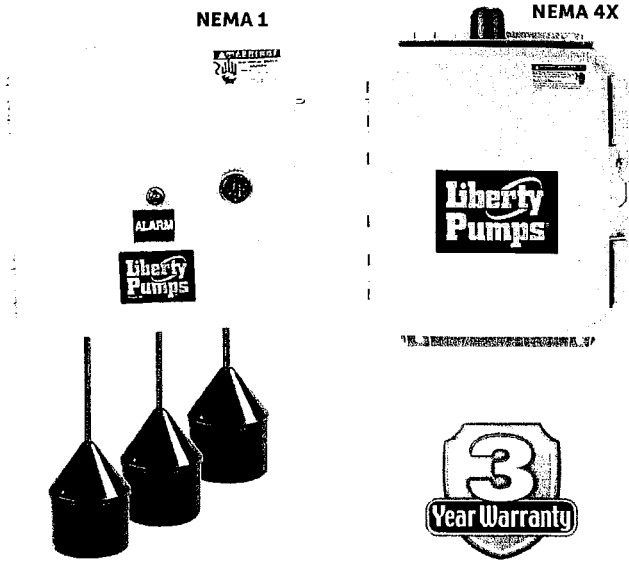
## Duplex Pump Controls

# Liberty Pumps®

A Family and Employee Owned Company

AE-Series duplex panels control two 1-phase or 3-phase pumps in water and sewage installations. This panel includes a new **innovative duplex controller** for pump control, alternation and alarm; including float switch status LEDs, control/alarm power ON/OFF switch with LED indicator, pump run LEDs, HOA switches, pump lead/lag selector switch, auxiliary contacts and more.

The control panel features built-in lag pump delay time, pump failure detection, and float switch out-of-sequence notification. In addition, there are user-selectable field programmable operations: alarm steady-state or flashing; alarm auto reset or manual reset; pump failure notification.



1-phase NEMA 4X shown

## Components

1. Newly designed larger NEMA 4X enclosure for indoor/outdoor use
  - a. Drip shield
  - b. Heavy-duty wide clamping securable latches (2)
  - c. Stainless steel 1/4 turn cover set screw
  - d. Low profile hinged lockable cover
  - e. Integral mounting flanges
2. Duplex Controller
  - a. Pump HOA switches with green/red LED indicators
  - b. Control power ON/OFF switch
  - c. Power ON green LED indicator
  - d. Float switch status red LED indicators
  - e. Float switch push-to-test buttons
  - f. Pump selector switch
  - g. Auxiliary alarm contacts
  - h. Terminal blocks for incoming power and float switches
3. Magnetic motor contactors control pumps by switching electrical lines.
4. Circuit breakers provides pump disconnect and branch circuit protection
5. Ground lugs
6. Red LED alarm beacon
7. Alarm horn
8. Exterior alarm test/normal/silence switch



# AE-Series Duplex Pump Controls

## Standard Features

**Enclosure\*:** 12" x 10" x 6"; NEMA 4X – ultraviolet stabilized thermoplastic for outdoor use; NEMA 1 – metal for indoor use. Certain options may increase enclosure size.

**Magnetic Motor Contactor:** Controls pump by switching hot electrical lines.

**HDA Switches:** Offer manual operation of pumps (on circuit board).

**Green Pump Run Indicators:** On circuit board

**Control ON/OFF Switch:** On circuit board

**Float Switch Terminal Block:** On circuit board

**Control/Alarm Auto Reset Fuses**

\* 3-phase panels measure 14" x 12" x 6". Multi-tap transformer (208/240/480 VAC primary) provides 120V control voltage. Motor protective switch provides adjustable overload, branch circuit protection and pump disconnect.

**Control/Alarm Power ON Indicator:** On circuit board.

**Float Switch Status Indicators:** Stop, lead, lag/alarm, alarm mounted on circuit board. Float switch push-to-test buttons.

**Circuit Breakers:** Provide pump disconnect and branch circuit protection.

**Connection Terminal Block**

**Auxiliary Contacts**

**Ground Lug**

**Alarm Package:** NEMA 4X = red beacon and horn (83 to 85 dB), exterior test/normal/silence switch.

**NEMA 1:** Door mounted red indicator and buzzer mounted internally (83 to 85 dB), exterior test/normal/silence switch.

MODEL	VOLTS	PHASE	FULL LOAD AMPS (Must match pumps)	ENCLOSURE TYPE	FLOAT SWITCHES
<b>1-Phase</b>					
AE21L=3	120/208/240	1	0 - 14.9A	NEMA 1	3
AE21H=3	120/208/240	1	15 - 20A	NEMA 1	3
AE21L=4	120/208/240	1	0 - 14.9A	NEMA 1	4
AE21H=4	120/208/240	1	15 - 20A	NEMA 1	4
AE24L=3	120/208/240	1	0 - 14.9A	NEMA 4X	3
AE24H=3	120/208/240	1	15 - 20A	NEMA 4X	3
***AE24HC=3-3	120/208/240	1	15 - 20A	NEMA 4X	3
AE24L=4	120/208/240	1	0 - 14.9A	NEMA 4X	4
AE24H=4	120/208/240	1	15 - 20A	NEMA 4X	4
<b>3-Phase**</b>					
AE34=3-131	208/240/480	3	1.6 - 2.5A	NEMA 4X	3
AE34=3-141	208/240/480	3	2.5 - 4.0A	NEMA 4X	3
AE34=3-171	208/240/480	3	4.0 - 6.3A	NEMA 4X	3
AE34=3-191	208/240/480	3	6 - 10A	NEMA 4X	3
AE34=3-511	208/240/480	3	9 - 14A	NEMA 4X	3
AE34=4-131	208/240/480	3	1.6 - 2.5A	NEMA 4X	4
AE34=4-141	208/240/480	3	2.5 - 4.0A	NEMA 4X	4
AE34=4-171	208/240/480	3	4.0 - 6.3A	NEMA 4X	4
AE34=4-191	208/240/480	3	6 - 10A	NEMA 4X	4
AE34=4-511	208/240/480	3	9 - 14A	NEMA 4X	4
AE54=3-121	575	3	1.6 - 2.5A	NEMA 4X	3
AE54=4-121	575	3	1.6 - 2.5A	NEMA 4X	4
AE54=3-151	575	3	2.5 - 4.0A	NEMA 4X	3
AE54=3-161	575	3	4.0 - 6.3A	NEMA 4X	3
AE54=4-151	575	3	2.5 - 4.0A	NEMA 4X	4
AE54=4-161	575	3	4.0 - 6.3A	NEMA 4X	4

35' and 50' cord lengths available. Add "-3" or "-5" suffix to model number. Example: AE21L=3-3 for 35' cord.

**NOTE:** AE-Series panels come with variable amp ranges and must be ordered with the correct matching full load amp to that of the pump(s) being used. Use the chart above to select the proper amp range or consult the factory for technical assistance.

\*\* 3-phase panels come equipped with thermal overload protection that must be properly sized to the pump's full load run amps. Please consult factory for proper panel selection. All 3-phase "standard" panels come with NEMA 4X enclosure.

\*\*\* AE24HC=3-3 includes start/run capacitors and start relay for use with LSG202M-C and LSGX202M-C models.

## Float Switch Specifications

All standard duplex panels come equipped with (3) or (4) mercury-free pilot-duty float switches (depending on model). 20' cord standard. Optional lengths available. External weights or pipe clamp mounts required.

**Cable:** Flexible 18 gauge, 2 conductor

**Electrical:** 5A, 120/230 VAC, 50/60 Hz

**Float Switch:** High impact PVC

**Maximum fluid temperature:** 140°F

Liberty Pumps can customize a panel to your specific pump needs. Please contact us for available options and ordering information. 800-543-2550

Specifications subject to change without notice.

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# Panel Selection Guide

Guide for selecting correct simplex or duplex panels for sewage, grinder and large effluent pumps based on voltage, amps and phase.

## Panel to Pump

### Simplex - Single Phase

SXL21=3	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
SXL24=3	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
SXH21=3	FL152	FL202	LEH152	LEH202	LSG202	LSGX202				
SXH24=3	FL152	FL202	LEH152	LEH202	LSG202	LSGX202				
SXHC24=3-3	LSG202M-C	LSGX202M-C								

### Simplex - Three Phase

SX34=3-131	LE74									
SX34=3-141	FL64	FL74	LE104							
SX34=3-171	FL63	FL104	FL154	FL204	LE73	LE103	LEH104	LEH154	LSG204	LSGX204
SX34=3-191	FL73	FL103	LEH103	LEH204						
SX34=3-511	FL153	FL203	LEH153	LEH203	LSG203	LSGX203				
SX54=3-121	LE105									
SX54=3-151	FL105	LEH105								
SX54=3-161	FL155	FL205	LEH155	LEH205	LSG205	LSGX205				

### Duplex - Single Phase

AE21L=3	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
AE21L=4	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
AE24L=3	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
AE24L=4	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
AE21H=3	FL152	FL202	LEH152	LEH202	LSG202	LSGX202				
AE21H=4	FL152	FL202	LEH152	LEH202	LSG202	LSGX202				
AE24H=3	FL152	FL202	LEH152	LEH202	LSG202	LSGX202				
AE24H=4	FL152	FL202	LEH152	LEH202	LSG202	LSGX202				
AE24HC=3-3	LSG202M-C	LSGX202M-C								

### Duplex - Three Phase

AE34=3-131	LE74									
AE34=4-131	LE74									
AE34=3-141	FL64	FL74	LE104							
AE34=4-141	FL64	FL74	LE104							
AE34=3-171	FL63	FL104	FL154	FL204	LE73	LE103	LEH104	LEH154	LSG204	LSGX204
AE34=4-171	FL63	FL104	FL154	FL204	LE73	LE103	LEH104	LEH154	LSG204	LSGX204
AE34=3-191	FL73	FL103	LEH103	LEH204						
AE34=4-191	FL73	FL103	LEH103	LEH204						
AE34=3-511	FL153	FL203	LEH153	LEH203	LSG203	LSGX203				
AE34=4-511	FL153	FL203	LEH153	LEH203	LSG203	LSGX203				
AE54=3-121	LE105									
AE54=4-121	LE105									
AE54=3-151	FL105	LEH105								
AE54=4-151	FL105	LEH105								
AE54=3-161	FL155	FL205	LEH155	LEH205	LSG205	LSGX205				
AE54=4-161	FL155	FL205	LEH155	LEH205	LSG205	LSGX205				





## Panel to Pump Continued

### Intelligent Panel ▪ Simplex ▪ Single Phase

IPS-24L	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
IPS-24H	FL152	FL202	LEH152	LEH202	LSG202	LSGX202	LEH202			
IPS-24HC	LSG202M-C	LSGX202M-C								

### Intelligent Panel ▪ Simplex ▪ Three Phase

IPS-34-131	LE74									
IPS-34-141	FL64	FL74	LE104							
IPS-34-171	FL63	FL104	FL154	FL204	LE73	LE103	LEH104	LEH154	LSG204	LSGX204
IPS-34-191	FL73	FL103	LEH103	LEH204						
IPS-34-511	FL153	FL203	LEH153	LEH203	LSG203	LSGX203				
IPS-54-121	LE105									
IPS-54-151	FL105	LEH105								
IPS-54-161	FL155	FL205	LEH155	LEH205	LSG205	LSGX205				

### Intelligent Panel ▪ Duplex ▪ Single Phase

IPD-24L	FL102	LE41	LE51	LE52	LE71	LE72	LE102	LEH102	PRG101	PRG102
IPD-24H	FL152	FL202	LEH152	LEH202	LSG202	LSGX202	LEH202			
IPD-24HC	LSG202M-C	LSGX202M-C								

### Intelligent Panel ▪ Duplex ▪ Three Phase

IPD-34-131	LE74									
IPD-34-141	FL64	FL74	LE104							
IPD-34-171	FL63	FL104	FL154	FL204	LE73	LE103	LEH104	LEH154	LSG204	LSGX204
IPD-34-191	FL73	FL103	LEH103	LEH204						
IPD-34-511	FL153	FL203	LEH153	LEH203	LSG203	LSGX203				
IPD-54-121	LE105									
IPD-54-151	FL105	LEH105								
IPD-54-161	FL155	FL205	LEH155	LEH205	LSG205	LSGX205				

### Intrinsically Safe ▪ Simplex (Explosion Proof)

Requires cap kit (Sold separately) See pages 4-5

ISS24HS1=3-5	XLSG202	XLSG208	XLSGX202	XLSGX208								
ISS24LC1=3-5	XFL51	XFL52	XFL71	XFL72	XLE51	XLE52	XLE71	XLE72	XLE102	XLE152	XFL102	XFL152
ISS34=3-131-5	XLE54	XLE74										
ISS34=3-141-5	XFL54	XFL74	XLE53									
ISS34=3-171-5	XFL53	XFL73	XLE73	XLE104	XLE154	XFL104	XFL154					
ISS34=3-191-5	XLE103	XLE153	XFL103	XFL153	XLSG204	XLSGX204						
ISS34=3-511-5	XLSG203	XLSGX203										
ISS54=3-121-5	XFL55	XLE55	XLE75	XFL105	XFL155							
ISS54=3-151-5	XFL75	XLE105	XLE155									
ISS54=3-161-5	XLSG205	XLSGX205										

### Intrinsically Safe ▪ Duplex (Explosion Proof)

Requires cap kit (Sold separately) See pages 4-5

ISD24HS2=3-5	XLSG202	XLSG208	XLSGX202	XLSGX208								
ISD24LC2=3-5	XFL51	XFL52	XFL71	XFL72	XLE51	XLE52	XLE71	XLE72	XLE102	XLE152	XFL102	XFL152
ISD34=3-131-5	XLE54	XLE74										
ISD34=3-141-5	XFL54	XFL74	XLE53									
ISD34=3-171-5	XFL53	XFL73	XLE73	XLE104	XLE154	XFL104	XFL154					
ISD34=3-191-5	XLE103	XLE153	XFL103	XFL153	XLSG204	XLSGX204						
ISD34=3-511-5	XLSG203	XLSGX203										
ISD54=3-121-5	XFL55	XLE55	XLE75	XFL105	XFL155							
ISD54=3-151-5	XFL75	XLE105	XLE155									
ISD54=3-161-5	XLSG205	XLSGX205										



# Pump to Panel

Model	Simplex		Duplex		IP Simplex	IP Duplex
	NEMA 1	NEMA 4X	NEMA 1	NEMA 4X		
<b>LE-Series - Single Phase</b>						
LE41	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LE51	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LE52	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LE71	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LE72	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LE102	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LEH102	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
LEH152	SXH21=3	SXH24=3	AE21H=3 or 4	AE24H=3 or 4	IPS-24H	IPD-24H
LEH202	SXH21=3	SXH24=3	AE21H=3 or 4	AE24H=3 or 4	IPS-24H	IPD-24H

<b>LE-Series - Three Phase</b>						
LE73		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
LE74		SX34=3-131		AE34=3-131 (or =4-)	IPS-34-131	IPD-34-131
LE103		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
LE104		SX34=3-141		AE34=3-141 (or =4-)	IPS-34-141	IPD-34-141
LE105		SX54=3-121		AE54=3-121 (or =4-)	IPS-54-121	IPD-54-121
LEH103		SX34=3-191		AE34=3-191 (or =4-)	IPS-34-191	IPD-34-191
LEH104		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
LEH105		SX54=3-151		AE54=3-151 (or =4-)	IPS-54-151	IPD-54-151
LEH153		SX34=3-511		AE34=3-511 (or =4-)	IPS-34-511	IPD-34-511
LEH154		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
LEH155		SX54=3-161		AE54=3-161 (or =4-)	IPS-54-161	IPD-54-161
LEH203		SX34=3-511		AE34=3-511 (or =4-)	IPS-34-511	IPD-34-511
LEH204		SX34=3-191		AE34=3-191 (or =4-)	IPS-34-191	IPD-34-191
LEH205		SX54=3-161		AE54=3-161 (or =4-)	IPS-54-161	IPD-54-161

<b>FL-Series - Single Phase</b>						
FL51	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
FL52	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
FL62	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
FLH61	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
FL72	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
FL102	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
FL152	SXH21=3	SXH24=3	AE21H=3 or 4	AE24H=3 or 4	IPS-24H	IPD-24H
FL202	SXH21=3	SXH24=3	AE21H=3 or 4	AE24H=3 or 4	IPS-24H	IPD-24H

<b>FL-Series - Three Phase</b>						
FL63		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
FL64		SX34=3-141		AE34=3-141 (or =4-)	IPS-34-141	IPD-34-141
FL73		SX34=3-191		AE34=3-191 (or =4-)	IPS-34-191	IPD-34-191
FL74		SX34=3-141		AE34=3-141 (or =4-)	IPS-34-141	IPD-34-141
FL103		SX34=3-191		AE34=3-191 (or =4-)	IPS-34-191	IPD-34-191
FL104		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
FL105		SX54=3-151		AE54=3-151 (or =4-)	IPS-54-151	IPD-54-151
FL153		SX34=3-511		AE34=3-511 (or =4-)	IPS-34-511	IPD-34-511
FL154		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
FL155		SX54=3-161		AE54=3-161 (or =4-)	IPS-54-161	IPD-54-161
FL203		SX34=3-511		AE34=3-511 (or =4-)	IPS-34-511	IPD-34-511
FL204		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
FL205		SX54=3-161		AE54=3-161 (or =4-)	IPS-54-161	IPD-54-161

## Pump to Panel Continued

Model	Simplex		Duplex		IP Simplex	IP Duplex
	NEMA 1	NEMA 4X	NEMA 1	NEMA 4X		
<b>Grinder Pump - Single Phase</b>						
LSG202	SXH21=3	SXH24=3	AE21H=3 or 4	AE24H=3 or 4	IPS-24H	IPD-24H
LSGX202	SXH21=3	SXH24=3	AE21H=3 or 4	AE24H=3 or 4	IPS-24H	IPD-24H
LSG202M-C		SXHC24=3-3		AE24HC=3-3	IPS-24HC	IPD-24HC
LSGX202M-C		SXHC24=3-3		AE24HC=3-3	IPS-24HC	IPD-24HC
PRG101	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L
PRG102	SXL21=3	SXL24=3	AE21L=3 or 4	AE24L=3 or 4	IPS-24L	IPD-24L

<b>Grinder Pump - Three Phase</b>						
LSG203		SX34=3-511		AE34=3-511 (or =4-)	IPS-34-511	IPD-34-511
LSGX203		SX34=3-511		AE34=3-511 (or =4-)	IPS-34-511	IPD-34-511
LSG204		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
LSG205		SX54=3-161		AE54=3-161 (or =4-)	IPS-54-161	IPD-54-161
LSGX204		SX34=3-171		AE34=3-171 (or =4-)	IPS-34-171	IPD-34-171
LSGX205		SX54=3-161		AE54=3-161 (or =4-)	IPS-54-161	IPD-54-161

<b>Intrinsically Safe - FL-Series (Explosion Proof)</b>				Capacitor Kit
XFL51		ISS24LC1=3-5	ISD24LC2=3-5	K001515
XFL52		ISS24LC1=3-5	ISD24LC2=3-5	K001514
XFL53		ISS34=3-171-5	ISD34=3-171-5	
XFL54		ISS34=3-141-5	ISD34=3-141-5	
XFL55		ISS54=3-151-5	ISD54=3-151-5	
XFL71		ISS24LC1=3-5	ISD24LC2=3-5	K001515
XFL72		ISS24LC1=3-5	ISD24LC2=3-5	K001514
XFL73		ISS34=3-171-5	ISD34=3-171-5	
XFL74		ISS34=3-141-5	ISD34=3-141-5	
XFL75		ISS54=3-151-5	ISD54=3-151-5	
XFL102		ISS24LC1=3-5	ISD24LC2=3-5	K001585
XFL103		ISS34=3-191-5	ISD34=3-191-5	
XFL104		ISS34=3-171-5	ISD34=3-171-5	
XFL105		ISS54=3-151-5	ISD54=3-151-5	
XFL152		ISS24LC1=3-5	ISD24LC2=3-5	K001585
XFL153		ISS34=3-191-5	ISD34=3-191-5	
XFL154		ISS34=3-171-5	ISD34=3-171-5	
XFL155		ISS54=3-151-5	ISD54=3-151-5	

<b>Intrinsically Safe - LE-Series (Explosion Proof)</b>				
XLE51		ISS24LC1=3-5	ISD24LC2=3-5	K001514
XLE52		ISS24LC1=3-5	ISD24LC2=3-5	K001513
XLE53		ISS34=3-141-5	ISD34=3-141-5	
XLE54		ISS34=3-131-5	ISD34=3-131-5	
XLE55		ISS54=3-121-5	ISD54=3-121-5	
XLE71		ISS24LC1=3-5	ISD24LC2=3-5	K001514
XLE72		ISS24LC1=3-5	ISD24LC2=3-5	K001513
XLE73		ISS34=3-171-5	ISD34=3-171-5	
XLE74		ISS34=3-131-5	ISD34=3-131-5	
XLE75		ISS54=3-121-5	ISD54=3-121-5	
XLE102		ISS24LC1=3-5	ISD24LC2=3-5	K001585
XLE103		ISS34=3-191-5	ISD34=3-191-5	
XLE104		ISS34=3-171-5	ISD34=3-171-5	
XLE105		ISS54=3-151-5	ISD54=3-151-5	
XLE152		ISS24LC1=3-5	ISD24LC2=3-5	K001585
XLE153		ISS34=3-191-5	ISD34=3-191-5	
XLE154		ISS34=3-171-5	ISD34=3-171-5	
XLE155		ISS54=3-151-5	ISD54=3-151-5	

## Pump to Panel Continued

<i>Model</i>	<i>Simplex</i>		<i>Duplex</i>		<i>Capacitor Kit</i>
	<i>NEMA 1</i>	<i>NEMA 4X</i>	<i>NEMA 1</i>	<i>NEMA 4X</i>	
<b>Intrinsically Safe - LSG-Series (Explosion Proof)</b>					
XLSG208		ISS24HS1=3-5		ISD24HS2=3-5	K001640
XLSGX208		ISS24HS1=3-5		ISD24HS2=3-5	K001640
XLSG202		ISS24HS1=3-5		ISD24HS2=3-5	K001641
XLSGX202		ISS24HS1=3-5		ISD24HS2=3-5	K001641
XLSG203		ISS34=3-511-5		ISD34=3-511-5	
XLSGX203		ISS34=3-511-5		ISD34=3-511-5	
XLSG204		ISS34=3-191-5		ISD34=3-191-5	
XLSGX204		ISS34=3-191-5		ISD34=3-191-5	
XLSG205		ISS54=3-161-5		ISD54=3-161-5	
XLSGX205		ISS54=3-161-5		ISD54=3-161-5	

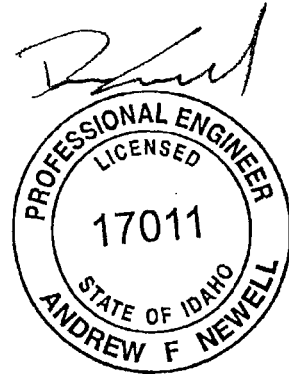
**APPENDIX F**  
**STORM DRAINAGE O&M MANUAL**

Prepared For:

- Sunfield, LLC
- City of Star
- ACHD

Sunfield Estates Subdivision  
Star, Idaho

Storm Drainage Facility  
Operations And  
Maintenance Manual



9-16-21

Prepared By:

Andrew Newell, P.E.  
Blaine A. Womer Civil Engineering  
4355 W. Emerald Street, Suite 145  
Boise, ID 83706  
(208) 593-7555  
andrew@bawce.com

September 16, 2021

Project No: N1420005



**BLAINE A. WOMER**  
CIVIL ENGINEERING

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Introduction .....	1
System Description .....	1
O&M Responsibility .....	1
Component Maintenance .....	2

## APPENDICES

### **Appendix A - Figures**

Vicinity Map

Roadway and Storm Drainage Plans

Final Plat

### **Appendix B - Checklists**

Inspection Checklist

## **INTRODUCTION**

The purpose of this manual is to assure the continued, successful operation of the storm drainage system that collects, transports, and disposes storm water run-off for this development. The primary purpose of the storm water facility is for storm water remediation. Any additions to the facility (such as trail pathways or additional landscaping) should be considered temporary and may be removed when heavy maintenance of the facility is needed. Replacement of these items will be the responsibility of the Sunfield Estates Subdivision Homeowners Association (HOA).

This development of the residential subdivision includes 75 lots: 69 single-family residential lots and 6 common lots. The proposed improvements to the site include roadways, sidewalks, lot grading, and site utilities.

## **SYSTEM DESCRIPTION**

The site's proposed storm drain system consists of curb and gutter, inlets, storm drain manholes, pipes and sand and grease traps. The storm water within the project site sheet flows into the curb and gutter, where it is channeled to the inlets. For the retention pond, storm water is conveyed through a manhole and pipes, sending the water quality event flow through a storm drain manhole and then the forebay, and the remaining flow to the primary pond. For the seepage bed, storm water is conveyed through a sand and grease trap, used for pretreatment, and then sending the water to an underground retention facility. Like most systems, the storm drainage facilities at this site require periodic maintenance to assure continued performance of the system components.

### System Failure

A storm water infiltration system will be considered failing when the storm water runoff remains in the facility for more than 48 hours after the conclusion of a storm or if sediment loading within the chambers exceeds 6" in depth.

### Inspection Records

Inspection records shall be kept five years following the date of inspection.

## **O&M RESPONSIBILITY**

The maintenance duties for the storm water system exist under two categories: heavy duty maintenance and light duty maintenance. The heavy duty maintenance will be the responsibility of the Ada County Highway District (ACHD). The light duty maintenance will be conducted by the HOA.

### Heavy Duty Maintenance



It will be the responsibility of the ACHD to maintain and repair the storm drainage system components within the public right-of-way and easements shown on the Sunfield Estates Subdivision - Final Plat. AHCD shall have the right to maintain and repair the storm water drainage system including, but not limited to, the curb and gutter, inlets, retention pond, storm drain manholes and pipes.

#### Light Duty Maintenance

It will be the responsibility of the HOA to maintain landscape areas within the public right-of-way and easements including:

- Care for grass within the public right-of-way and storm drainage easements during the growing season. Grass should be cut per the landscaper's recommendation to provide adequate cover of the roots and reduce the effects of evaporation.
- Keep shrubs and trees pruned or trimmed as needed to reduce overgrowth.
- Maintain and repair the pressurized irrigation system on an annual basis to ensure the proper irrigation of vegetation in planted areas. The irrigation system shall be drained prior to the winter months to reduce damage caused by freezing.
- Clean trash and debris within the subdivision as needed.
- Inspect pond banks on monthly basis for erosion and rodent holes and repair as necessary.
- Inspect pond for standing water or wet spots that may result from clogged orifices and remove debris as necessary.
- Provide weed control within the detention pond to prevent overgrowth.
- Remove sediment accumulation from pond infiltration area and rake/till sand for positive drainage.

At a minimum, storm water facilities should be monitored according to the checklist found in the Appendix. Any maintenance activities should be recorded on the checklist including who performed the activity and an approximate amount of materials removed. More frequent maintenance may be necessary, so periodic inspections should be performed to monitor the level of trapped debris or nonfunctioning storm drainage systems. The HOA should contact the ACHD if it has determined that a storm drainage component has failed or is not functioning properly.

#### **COMPONENT MAINTENANCE**

Operation and maintenance of the storm water facilities at Sunfield Estates Subdivision - No. 1 shall be governed by this Manual for the storm drainage system, which may only be modified at the direction of the Board of the HOA, **with written approval by ACHD.**

#### Drainage

There shall be no interference with the established drainage pattern over any portion of the property unless an adequate alternative provision is made for proper drainage and is first approved in writing by the City of Star. For the purposes hereof, "established" drainage is defined as the system of drainage, whether natural or otherwise, which exists at the time the overall grading of any portion of the property is completed, or that drainage which is shown on any plans approved by the City of Star, which may include drainage from common areas or any building lot in the property.

#### ACHD Storm Water Drainage System

All of Lot 5, Block 4 are servient to and contain the ACHD storm water drainage system. This lot is encumbered by that certain first amended master perpetual storm water drainage easement recorded on November 10, 2015, as instrument No. 2015-103256, official records of Ada County, and incorporated herein by this reference as if set forth in full (the "master easement"). The master easement and the storm water drainage system are dedicated to ACHD pursuant to section 40-2302 Idaho code. The master easement is for the operation and maintenance of the storm water drainage system. Said easement shall remain free of all encroachments and obstructions (including fences and trees) which may adversely affect the operation and maintenance of the storm drainage facilities.

#### ACHD Right to Inspect and Maintain

ACHD shall have the right at all times to inspect the storm water drainage system and perform any required maintenance and repairs.

#### ACHD Approval of Amendments

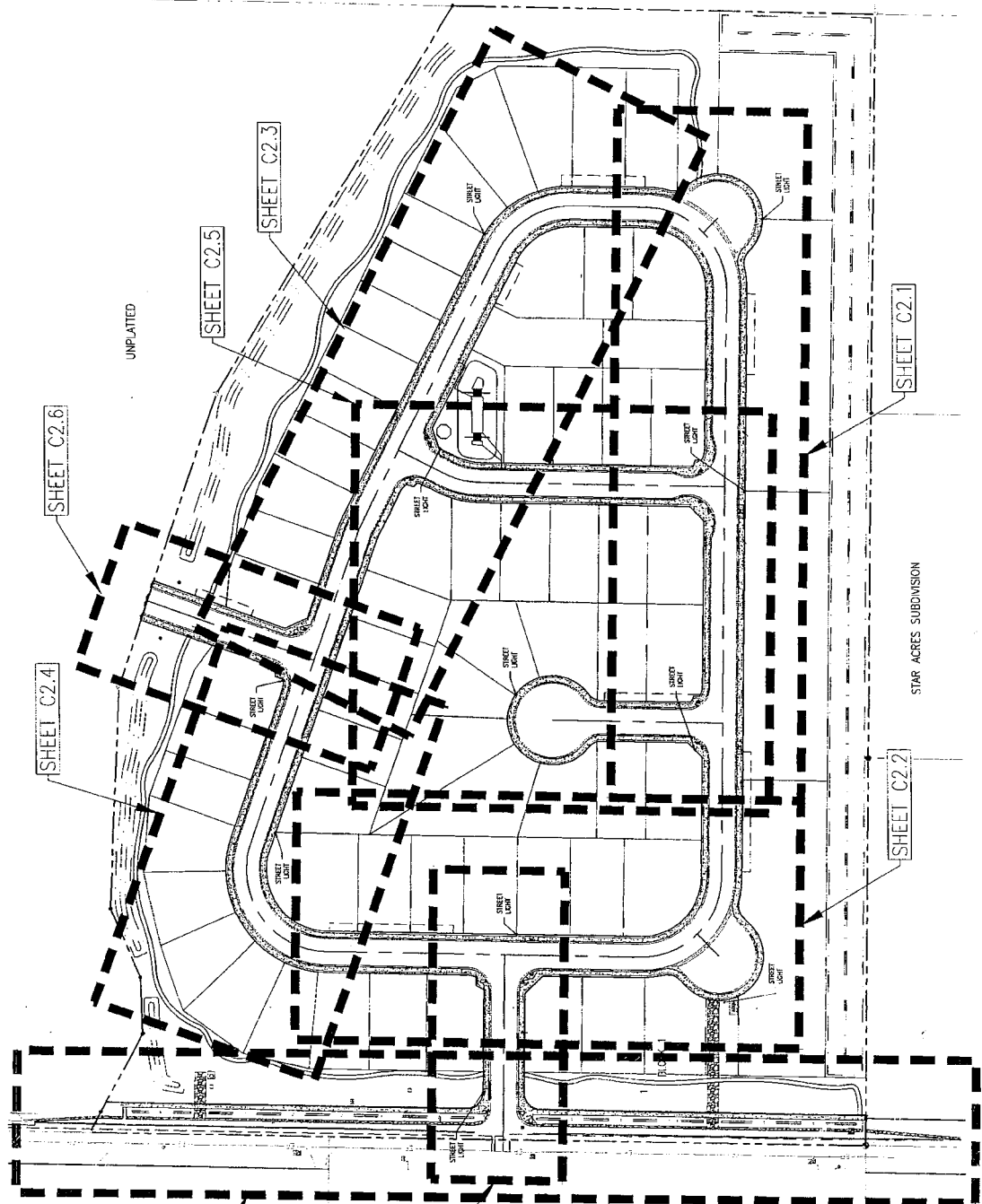
Any amendment of this Manual for Storm Water Facilities having any direct impact or effect on the ACHD storm water drainage system shall be subject to prior review and approval by ACHD.

#### Grading

The owner of any building lot within the property on which grading or other work has been performed pursuant to a grading plan approved under applicable provisions of the City of Star Code or by the HOA, shall maintain and repair all graded surfaces and erosion prevention devices, retaining walls, drainage structures, means or devices which are not the responsibility of ACHD, or other public agency, and plantings and ground cover installed or completed thereon.

**APPENDIX A - FIGURES**





MSJ  
ESTATES  
SUBDIVISION

SHEET C2.7

MOYLE ESTATES  
SUBDIVISION

SHEET C2.6

STAR ACRES SUBDIVISION

SHEET C2.2

SHEET C2.1

UNPLATTED

SHEET C2.6

SHEET C2.5

SHEET C2.3

STAR ACRES SUBDIVISION

Please refer to the following sheet for Public Street Construction:  
 1. Street C2.1  
 2. Street C2.2  
 3. Street C2.3  
 4. Street C2.4  
 5. Street C2.5  
 6. Street C2.6  
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 99. Street C2.99  
 100. Street C2.100



Know what's below.  
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NOTE: CONTRACTORS MUST VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO ANY EXCAVATION WORK. THE CITY OF STAR, ID IS NOT RESPONSIBLE FOR DAMAGES TO UTILITIES OR PERSONS OR PROPERTY CAUSED BY EXCAVATION WORK.

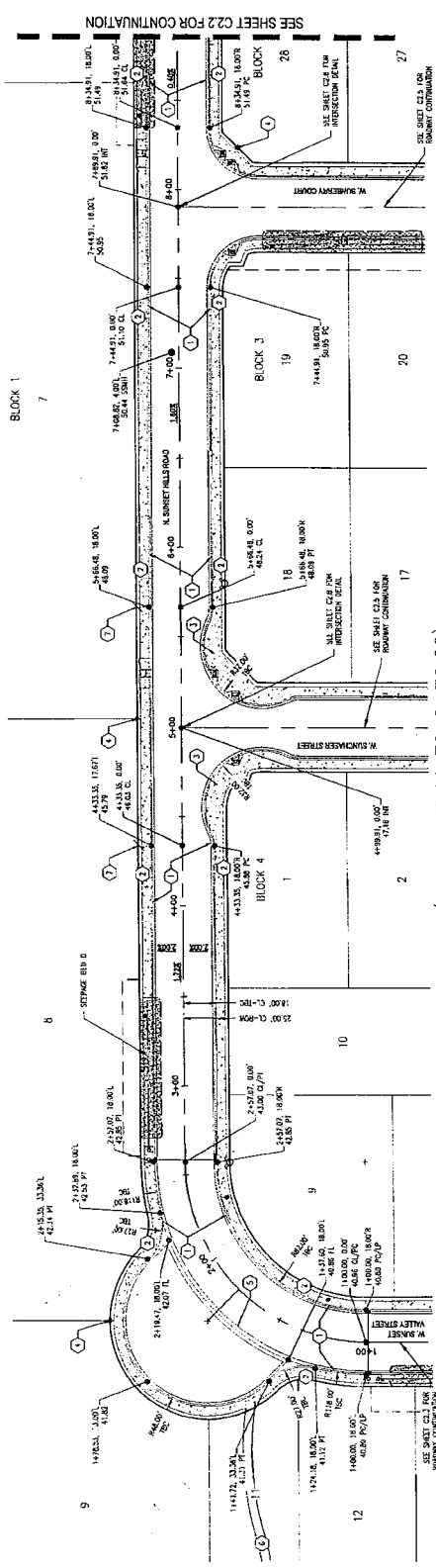


**B** **BLAINE A. WOMER**  
 CIVIL ENGINEERING  
 100 N. PARKWAY, SUITE 100, BOISE, IDAHO 83726  
 (208) 333-1111  
 REGISTERED PROFESSIONAL ENGINEER  
 STATE OF IDAHO  
 NO. 1701  
 EXPIRES 12/31/2024

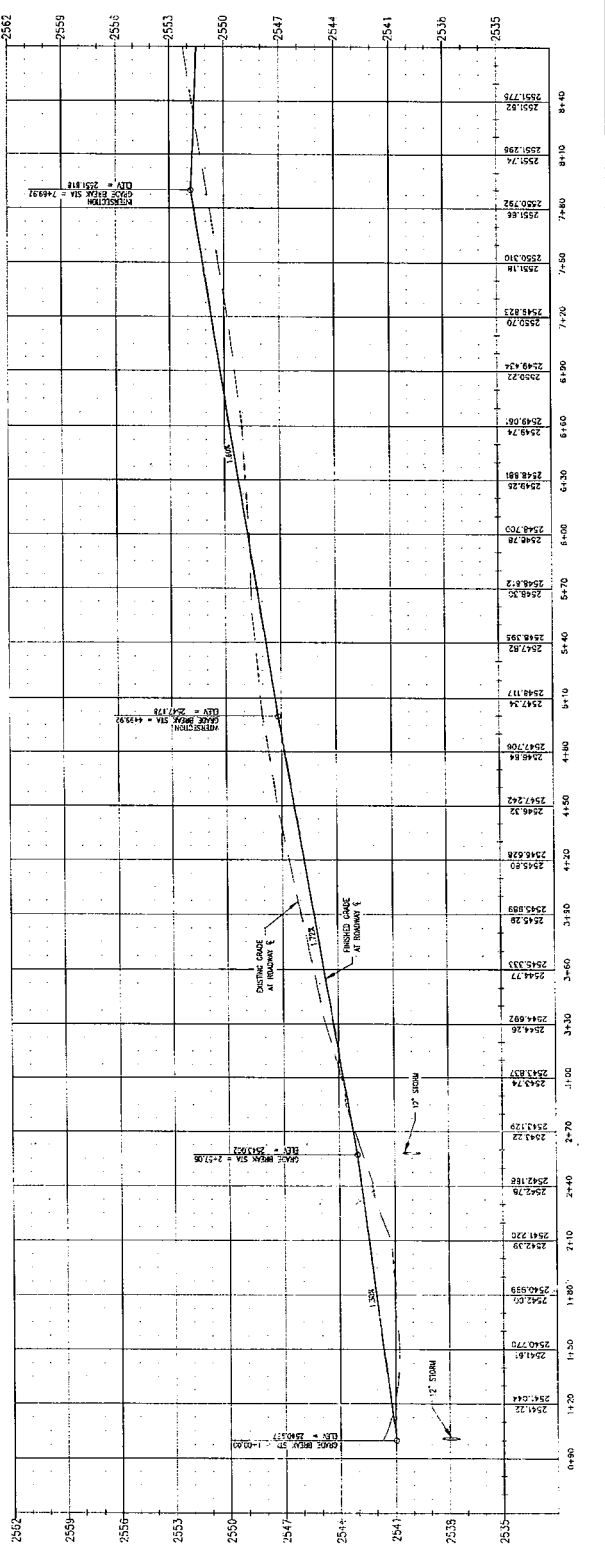
BENCHMARK  
 SEE SHEET  
 C1.0  
 SCALE: 1" = 60'

CITY OF STAR, ID  
 SUNFIELD ESTATES SUBDIVISION  
 ROADWAY IMPROVEMENT PLANS  
 ROADWAY INDEX MAP

SHEET NO.  
 C2.0  
 TITLE NO.  
 N1420003



N. SUNSET HILLS ROAD (STA. 1+00.00 TO 8+70.00)



Plans Are Accepted For Public Street Construction

KEYNOTES

1. SHALL BE SHOWN ON ALL SHEETS AND DRAWINGS.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARD PRACTICES OF THE PROFESSION.
3. ALL MATERIALS SHALL BE OF THE BEST QUALITY AVAILABLE.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARD PRACTICES OF THE PROFESSION.
5. ALL MATERIALS SHALL BE OF THE BEST QUALITY AVAILABLE.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARD PRACTICES OF THE PROFESSION.
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9. ALL MATERIALS SHALL BE OF THE BEST QUALITY AVAILABLE.
10. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARD PRACTICES OF THE PROFESSION.

SHEET NOTES

1. ALL SHEETS SHALL BE DRAWN AND NUMBERED.
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10. ALL SHEETS SHALL BE DRAWN AND NUMBERED.

Know what's below. Call before you dig.

811

BLAINE A. WOMER CIVIL ENGINEERING

CITY OF STAR, ID SUNFIELD ESTATES SUBDIVISION ROADWAY IMPROVEMENT PLANS N. SUNSET HILLS ROAD PLAN AND PROFILE STA. 1+00.00 TO 8+70.00

SEE SHEET C1.0

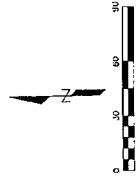
SCALE: HORIZONTAL 1"=40' VERTICAL 1"=4'

DATE: 11/11/11

BY: [Signature]

FOR: [Signature]

PROJECT NO: 11-00003



Plans Are Accepted For Public Street Construction

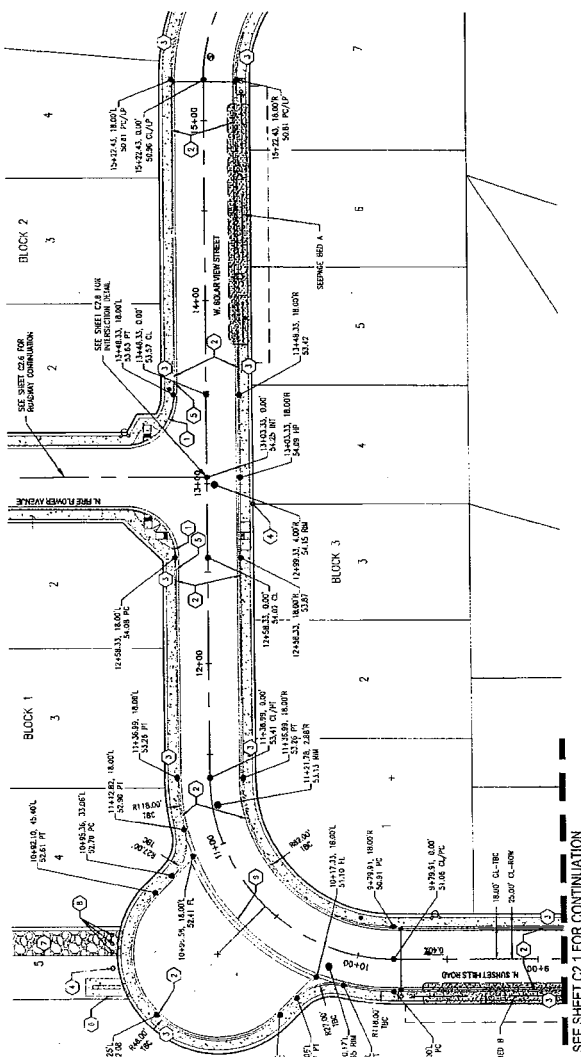
1. THESE PLANS SHOW THE PROPOSED IMPROVEMENTS TO THE EXISTING PAVED SIDEWALKS AND DRIVEWAYS ALONG THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 8+70.00 TO STA. 15+22.43. THE PROPOSED IMPROVEMENTS INCLUDE THE INSTALLATION OF 18\"/>

**KEYNOTES**

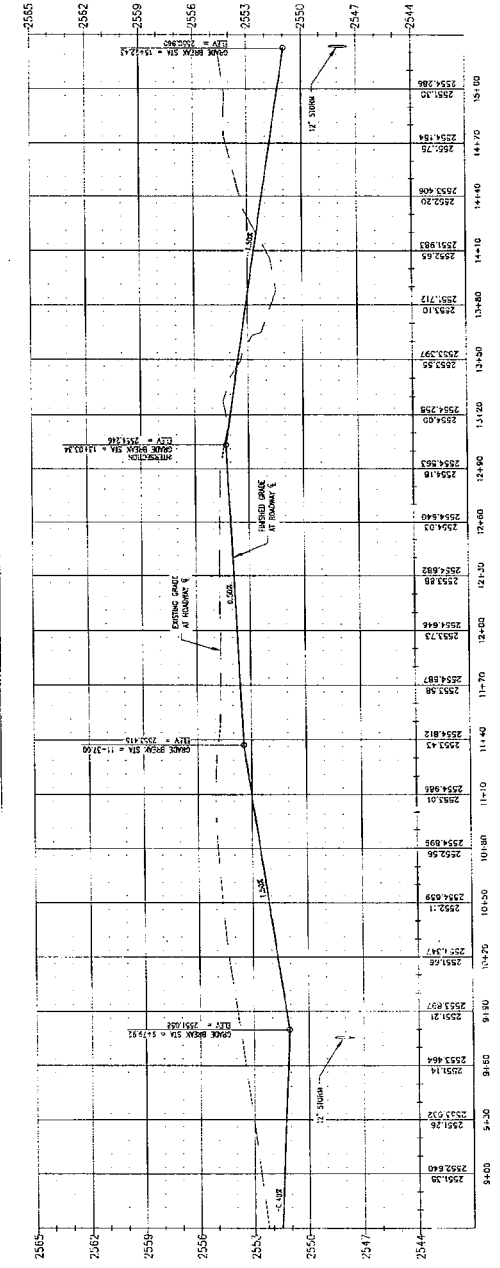
1. THESE PLANS SHOW THE PROPOSED IMPROVEMENTS TO THE EXISTING PAVED SIDEWALKS AND DRIVEWAYS ALONG THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 8+70.00 TO STA. 15+22.43.
2. THE PROPOSED IMPROVEMENTS INCLUDE THE INSTALLATION OF 18\"/>

**SHEET NOTES**

1. SEE SHEET C2.1 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 0+00 TO STA. 8+70.00.
2. SEE SHEET C2.3 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 15+22.43 TO STA. 22+00.00.
3. SEE SHEET C2.4 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 22+00.00 TO STA. 28+00.00.
4. SEE SHEET C2.5 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 28+00.00 TO STA. 34+00.00.
5. SEE SHEET C2.6 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 34+00.00 TO STA. 40+00.00.
6. SEE SHEET C2.7 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 40+00.00 TO STA. 46+00.00.
7. SEE SHEET C2.8 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 46+00.00 TO STA. 52+00.00.
8. SEE SHEET C2.9 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 52+00.00 TO STA. 58+00.00.
9. SEE SHEET C2.10 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 58+00.00 TO STA. 64+00.00.
10. SEE SHEET C2.11 FOR THE WEST SIDE OF SUNSET HILLS ROAD FROM STA. 64+00.00 TO STA. 70+00.00.



N. SUNSET HILLS ROAD/W. SOLAR VIEW STREET (STA. 8+70.00 TO 15+22.43)



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NOTE: CONTRACTOR SHALL VERIFY THESE PLANS SHALL BE CONFORMANT WITH ALL APPLICABLE REGULATIONS AND ORDINANCES.

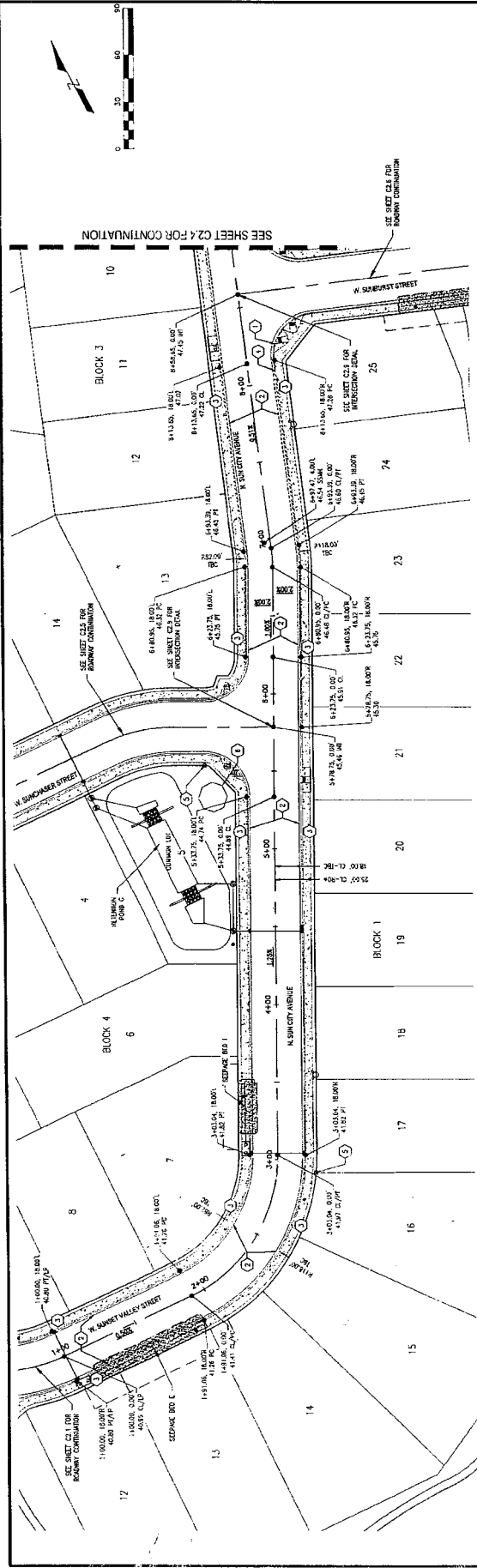
**BLAINE A. WOMER CIVIL ENGINEERING**  
 B.A. WOMER & ASSOCIATES, INC. 1717 S. 20th St., Suite 200, Phoenix, AZ 85024  
 P: 602.243.1100 F: 602.243.1101  
 www.bawom.com

**BLAINE A. WOMER CIVIL ENGINEERING**  
 PLANNING  
 SURVEYING  
 ENGINEERING  
 PUBLIC WORKS

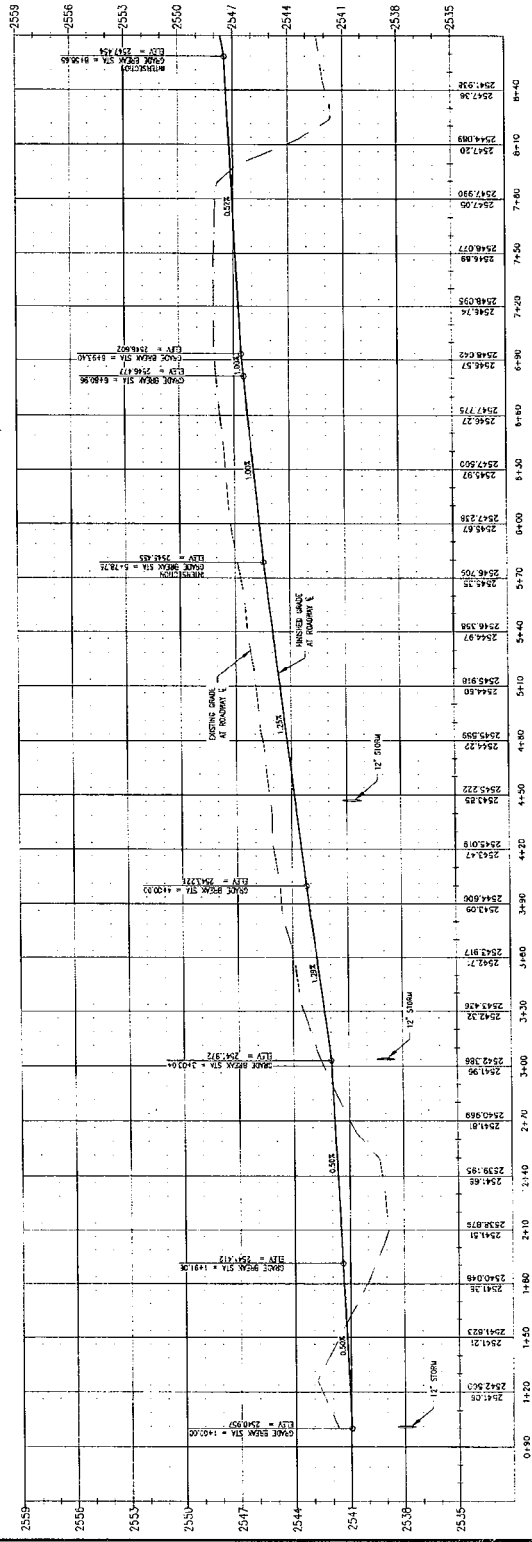
SEE SHEET C1.0

CITY OF STAR, ID  
 SUNFELD ESTATES SUBDIVISION  
 ROADWAY IMPROVEMENT PLANS  
 N. SUNSET HILLS ROAD/W. SOLAR VIEW STREET PLAN AND PROFILE  
 STA. 8+70.00 TO 15+22.43

SHEET NO. C2.2  
 FILE NO. N1420003  
 SCALE: 1" = 10'-0"



W. SUNSET VALLEY STREET/N. SUN CITY AVENUE (STA. 1+00.00 TO 8+70.00)



Plans Are Accepted For Public Street Construction

1. OWNER'S RECORD, ONE AND A HALF INCH FOR THE PROPOSED ROADWAY, SHALL BE USED FOR ALL DIMENSIONS.

2. ALL DIMENSIONS SHALL BE GIVEN IN FEET AND INCHES.

3. ALL DIMENSIONS SHALL BE GIVEN TO THE CENTERLINE OF THE ROADWAY UNLESS OTHERWISE NOTED.

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KEYNOTES

1. SEE SHEET C2.1 FOR ROADWAY CONTINUATION.
2. SEE SHEET C2.4 FOR ROADWAY CONTINUATION.
3. SEE SHEET C2.5 FOR INTERSECTION DETAIL.
4. SEE SHEET C2.6 FOR INTERSECTION DETAIL.
5. SEE SHEET C2.7 FOR INTERSECTION DETAIL.
6. SEE SHEET C2.8 FOR INTERSECTION DETAIL.
7. SEE SHEET C2.9 FOR INTERSECTION DETAIL.
8. SEE SHEET C2.10 FOR INTERSECTION DETAIL.
9. SEE SHEET C2.11 FOR INTERSECTION DETAIL.
10. SEE SHEET C2.12 FOR INTERSECTION DETAIL.

SHEET NOTES

1. ALL DIMENSIONS SHALL BE GIVEN TO THE CENTERLINE OF THE ROADWAY UNLESS OTHERWISE NOTED.
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10. ALL DIMENSIONS SHALL BE GIVEN TO THE CENTERLINE OF THE ROADWAY UNLESS OTHERWISE NOTED.

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PLANNING ENGINEERING SURVEYING CIVIL ENGINEERING

SEAL-ENGINEER

CITY OF STAR, ID SUNFIELD ESTATES SUBDIVISION ROADWAY IMPROVEMENT PLANS W. SUNSET VALLEY STREET/N. SUN CITY AVENUE P/4H AND PROFILE STA. 1+00.00 TO 8+70.00

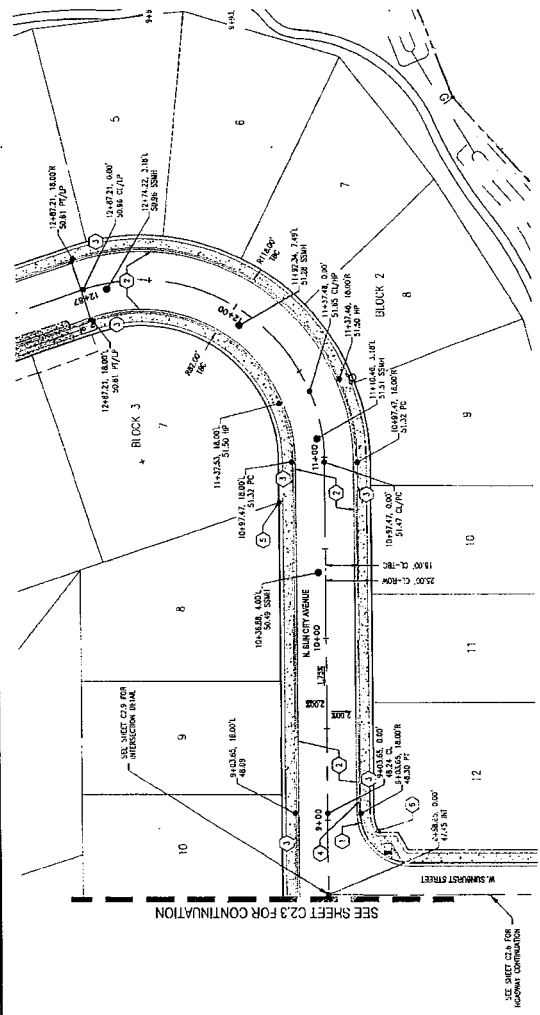
SHEET NO. C2.3

DATE: 11/17/11

SCALE: AS SHOWN

PROJECT NO. 1420003





N. SUN CITY AVENUE (STA. 8+70.00 TO 12+87.22)

**Plans Are Accepted For Public Street Construction**

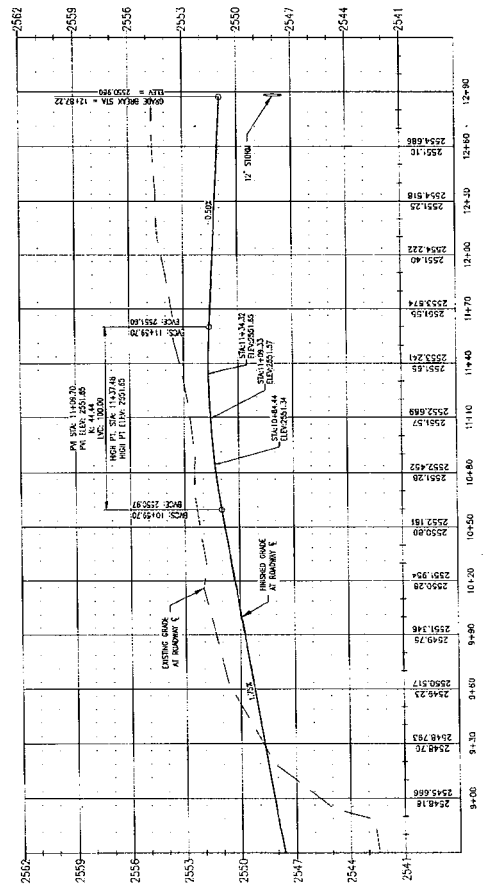
By the acceptance of these plans, the City of Star, ID, and the State of Idaho, are accepting the proposed street construction shown on these plans. The City of Star, ID, and the State of Idaho, are not responsible for the accuracy of the information shown on these plans. The City of Star, ID, and the State of Idaho, are not responsible for the accuracy of the information shown on these plans. The City of Star, ID, and the State of Idaho, are not responsible for the accuracy of the information shown on these plans.

**KEYNOTES**

1. SHALL BE MAINTAINED AND KEPT OPEN FOR PUBLIC TRAFFIC.
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20. SHALL BE MAINTAINED AND KEPT OPEN FOR PUBLIC TRAFFIC.

**SHEET NOTES**

- A. SEE SHEET C1.0 FOR STATION AND ELEVATION DATA.
- B. SEE SHEET C1.0 FOR TYPICAL ROADWAY SECTION.
- C. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- D. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- E. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- F. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- G. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- H. SEE SHEET C1.0 FOR LOT DIMENSIONS.
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- S. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- T. SEE SHEET C1.0 FOR LOT DIMENSIONS.
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- X. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- Y. SEE SHEET C1.0 FOR LOT DIMENSIONS.
- Z. SEE SHEET C1.0 FOR LOT DIMENSIONS.



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**BLAINE A. WOMER**  
CIVIL ENGINEERING

SEAL - ENGINEER

DATE: 12/11/22

**NOTE:** THESE PLANS CONTAIN INFORMATION THAT IS THE PROPERTY OF BLAINE A. WOMER CIVIL ENGINEERING. NO PART OF THESE PLANS SHALL BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, WITHOUT THE WRITTEN PERMISSION OF BLAINE A. WOMER CIVIL ENGINEERING.

**BENCHMARK**

SEE SHEET C1.0

**SCALE:** 1" = 40'

**CITY OF STAR, ID**

**SUNBEID ESIMES SUBDIVISION**

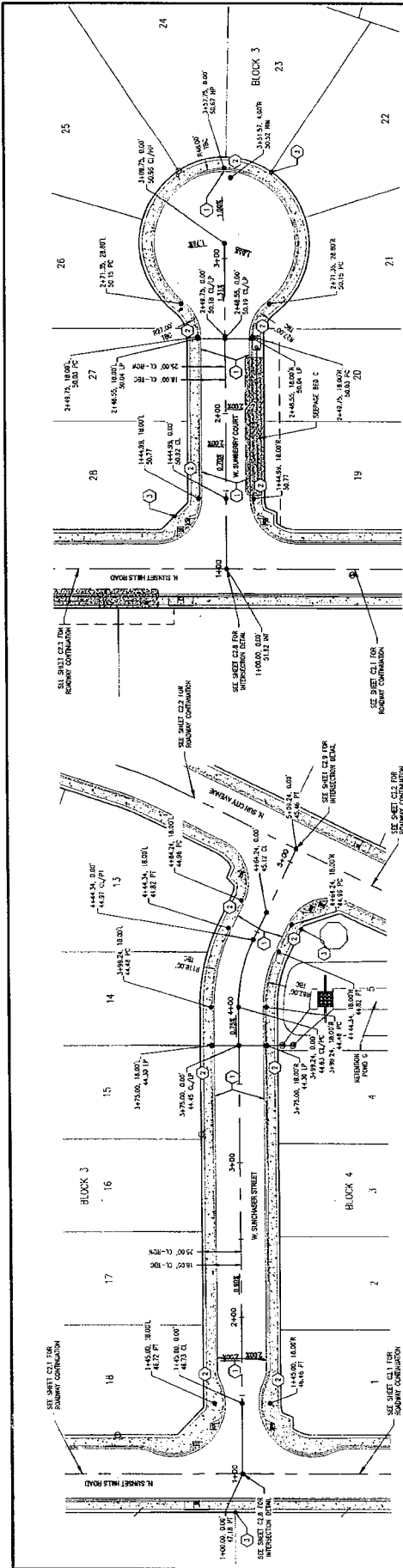
**ROADWAY IMPROVEMENT PLANS**

**N. SUN CITY AVENUE PLAN AND PROFILE**

**STA. 8+70.00 TO 12+87.22**

**SHEET NO.** C2.4

**PRT. NO.** N1420003



**N. SUNCHASER STREET (STA. 1+00.00 TO 5+09.25)**

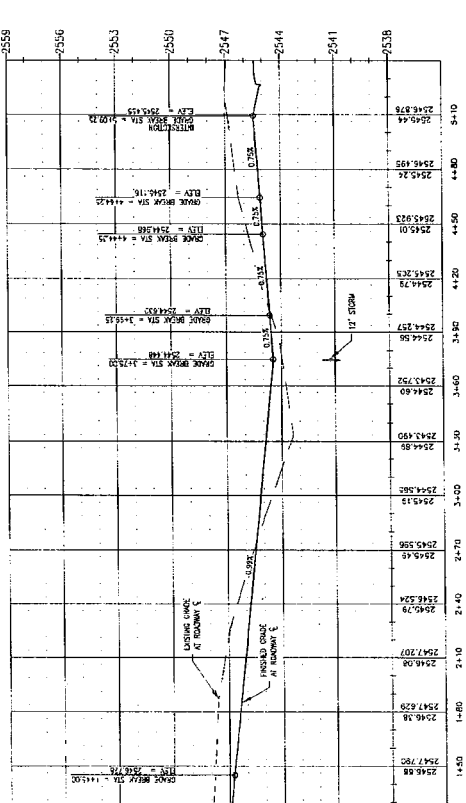
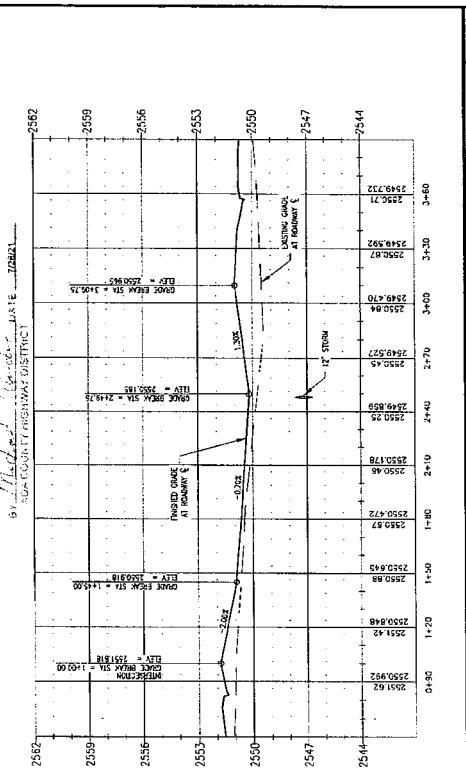
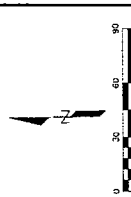
**SHEET NOTES**

- SEE SHEET C11 FOR CENTER AND SIDEWALKS.
- SEE SHEET C12 FOR TRUNK, SANITARY, VENTILATION, AND SEWER LINES.
- SEE SHEET C13 FOR UTILITY LINES.
- SEE SHEET C14 FOR INTERSECTION DETAILS.
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- SEE SHEET C100 FOR INTERSECTION DETAILS.

**W. SUNBERRY COURT (STA. 1+00.00 TO 3+09.75)**

**Plans Are Accepted For Public Sheet Construction**

- SEE SHEET C11 FOR CENTER AND SIDEWALKS.
- SEE SHEET C12 FOR TRUNK, SANITARY, VENTILATION, AND SEWER LINES.
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**811**  
Know what's below. Call before you dig.

**BLAINE A. WOMER**  
CIVIL ENGINEERING  
PLANNING  
SURVEYING  
ENGINEERING  
PUBLIC WORKS

**SEAL - ENGINEER**  
STATE OF TEXAS  
EXPIRES 12/31/2011

**REVENUE**

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**CITY OF STAR, ID**  
**SUNFIELD ESTATES SUBDIVISION**  
**ROADWAY IMPROVEMENT PLANS**  
N. SUNCHASER STREET & W. SUNBERRY COURT PLAN AND PROFILE  
STA. 1+00.00 TO 5+09.25 & STA. 1+00.00 TO 3+09.75

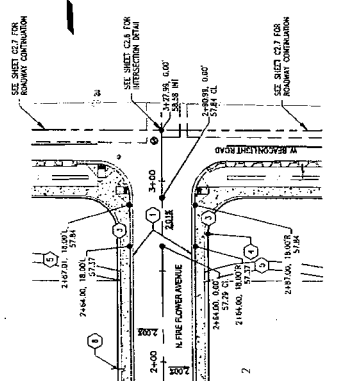
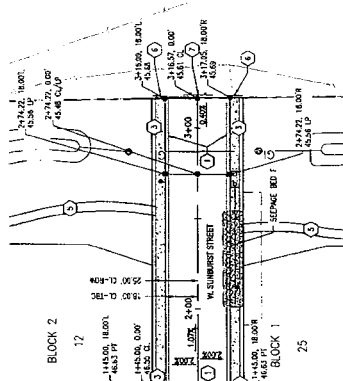
**REVENUE**

**SCALE:** 1" = 40'

**SEE SHEET C10**

**REVENUE**

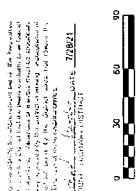
**SHEET NO. C29**  
**FILE NO. N1420003**



W. SUNBURST STREET (STA. 1+00.00 TO 3+16.57)

N. FIRE FLOWER AVENUE (STA. 1+00.00 TO 3+28.00)

Plans Are Accepted For Public Street Construction

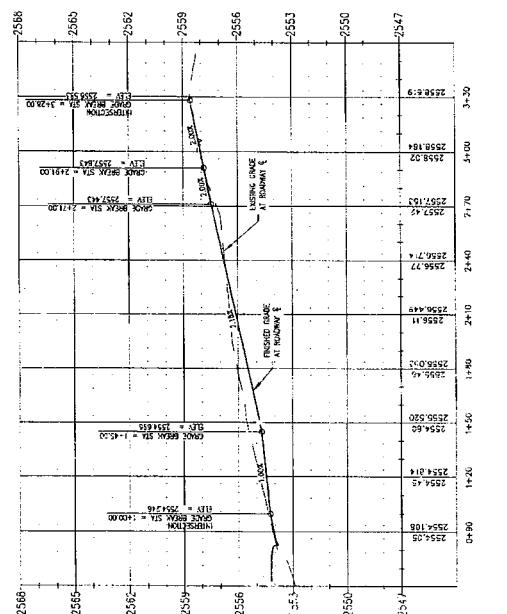
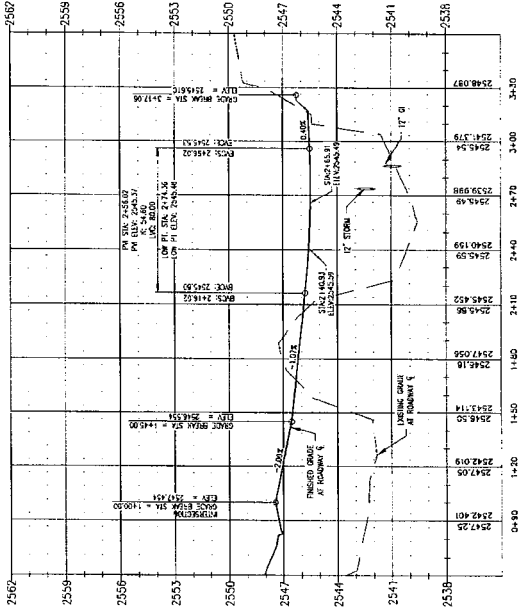


KEYNOTES

1. SHALL BE APPROVED AND STAMPED BY THE CITY ENGINEER.
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SHEET NOTES

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CITY OF STAR, ID  
 SUNFIELD ESTATES SUBDIVISION  
 ROADWAY IMPROVEMENT PLANS  
 N. SUNBURST STREET & W. SUNBURST COURT PLAN AND PROFILE  
 STA. 1+00.00 TO 3+09.75

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B. W. BLAINE A. WOMER  
 CIVIL ENGINEERING  
 1111 W. MAIN ST. SUITE 100  
 IDAHO FALLS, IDAHO 83402

SEAL-ENGINEER  
 (Professional Seal)

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BENCHMARK  
 SEE SHEET C1.0

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PLANING  
 SURVEYING  
 CIVIL ENGINEERING  
 PUBLIC WORKS

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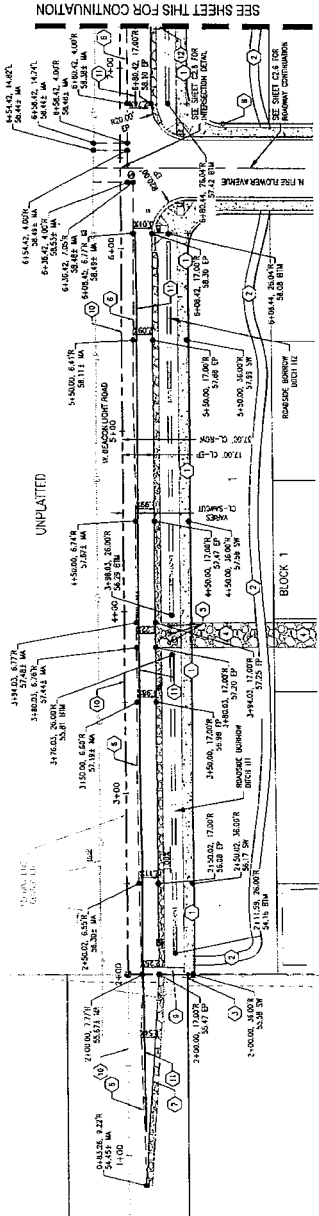
KNOW WHATS BELOW.  
 Call before you dig.  
 811

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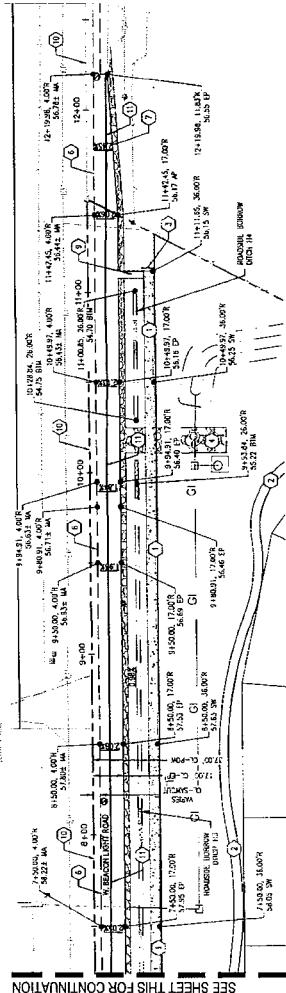
MOUNTAIN STATE UTILITIES THESE PLANS SHALL BE OPENED UP UNTIL AN ENCROACHMENT PERMIT UNDER A GRADING PERMIT THIS BEEN ISSUED.

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SHEET NO. C2.6  
 TITLE NO. N1470003



SEE SHEET THIS FOR CONTINUATION



SEE SHEET THIS FOR CONTINUATION

W. BEACON LIGHT ROAD (S.T.A. 0+83.26 TO 12+19.98)

**(K) KEYNOTES**

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**SHEET NOTES**

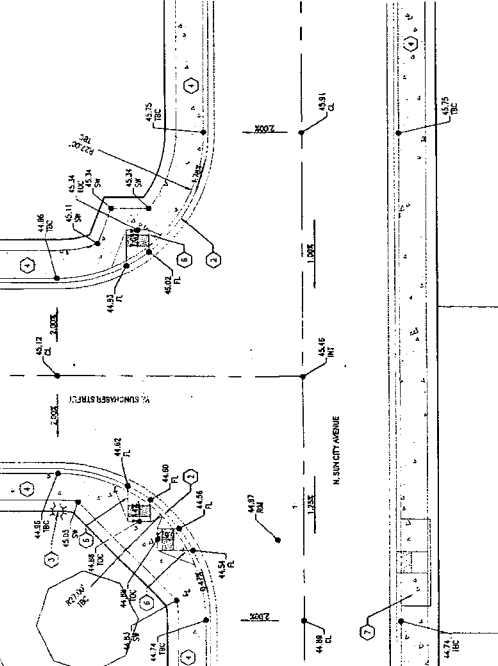
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Plans Are Accepted For Public Street Construction

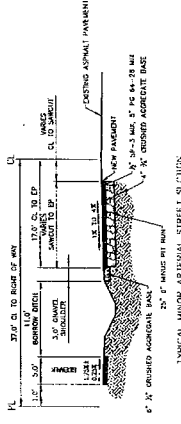
City of Star, ID  
 SUNFIELD ESTATES SUBDIVISION  
 ROADWAY IMPROVEMENT PLANS  
 W. BEACON LIGHT ROAD PLAN  
 SIA 0183.26 TO 12+19.98

	<b>BLAINE A. WOMER</b> CIVIL ENGINEERING	SEE SHEET <b>C-1.0</b>	BENCHMARK SEE SHEET <b>C-1.0</b>	CITY OF STAR, ID SUNFIELD ESTATES SUBDIVISION ROADWAY IMPROVEMENT PLANS W. BEACON LIGHT ROAD PLAN SIA 0183.26 TO 12+19.98	SHEET NO. <b>C-2.7</b> FILE NO. <b>N1420003</b>
SEAL - ENGINEER REGISTERED PROFESSIONAL ENGINEER No. 17011 STATE OF IDAHO		BENCHMARK SEE SHEET <b>C-1.0</b>		CITY OF STAR, ID SUNFIELD ESTATES SUBDIVISION ROADWAY IMPROVEMENT PLANS W. BEACON LIGHT ROAD PLAN SIA 0183.26 TO 12+19.98	
NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL BE COMPLETED AND OPEN GRADING PERMIT HAS BEEN ISSUED.		PLANING SURVEYING ENGINEERING PUBLIC WORKS		SCALE:	
<b>811</b> Know what's below. Call before you dig.		PLANING SURVEYING ENGINEERING PUBLIC WORKS		SCALE:	

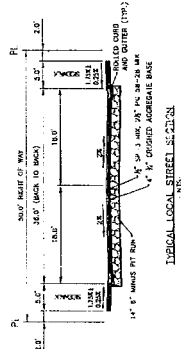




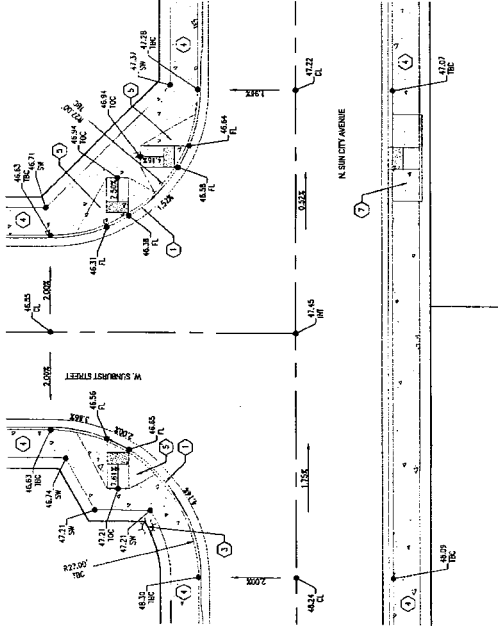
N. SUNSET CITY AVENUE/W. SUNCHASER STREET INTERSECTION DETAIL



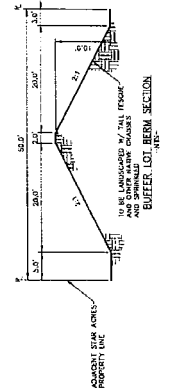
TYPICAL MINOR ARTERIAL STREET SECTION



TYPICAL LOCAL STREET SECTION



N. SUNSET CITY AVENUE/W. SUNBURST STREET INTERSECTION DETAIL



ASPHALT PATHWAY SECTION

- KEYNOTES**
1. SHALL BE FORWARDED FOR PUBLIC REVIEW AND APPROVAL.
  2. SHALL BE FORWARDED FOR PUBLIC REVIEW AND APPROVAL.
  3. SHALL BE FORWARDED FOR PUBLIC REVIEW AND APPROVAL.
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Plains Area Engineering For Public  
Sheet Labels/Details



SHEET NO. C2.9  
FILE NO. M1420030

CITY OF STAR, ID  
SUNFIELD ESTATES SUBMISSION  
ROADWAY IMPROVEMENT PLANS  
INTERSECTION DETAILS  
ROADWAY SECTIONS & DETAILS

BENCHMARK  
SEE SHEET  
C1.0

BLAINE A. WOMER  
CIVIL ENGINEERING  
PLANNING  
SURVEYING  
ENGINEERING  
PUBLIC WORKS

REGISTERED PROFESSIONAL ENGINEER  
NO. 17781  
STATE OF IDAHO

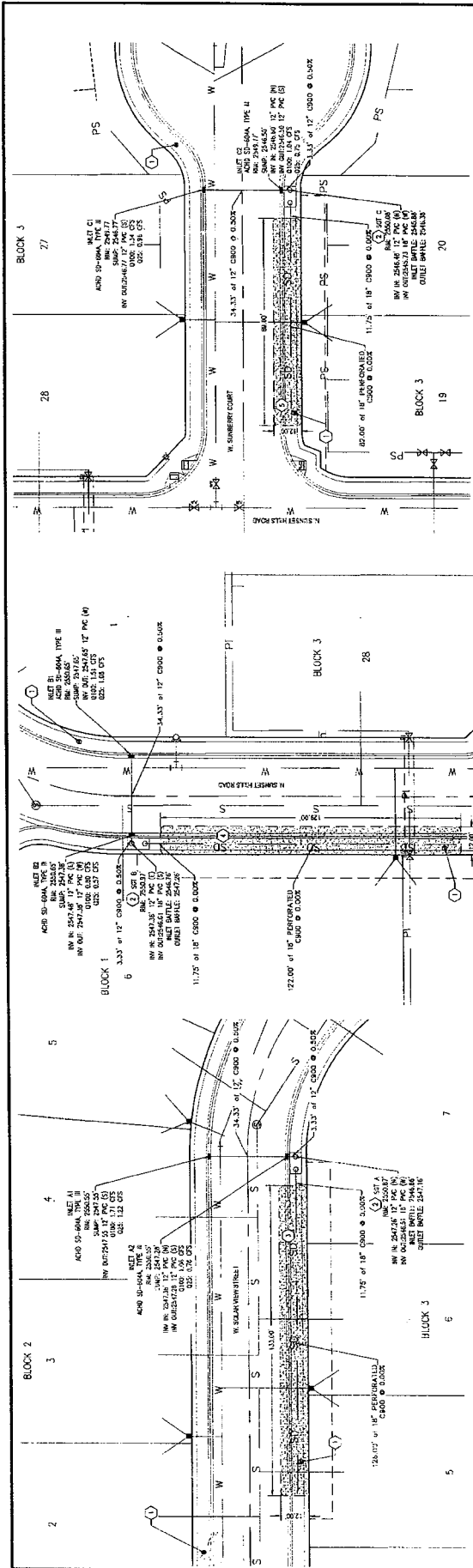
1010 N. 12TH ST., STE. 200  
BOISE, IDAHO 83702

NO.	DATE	REVISION

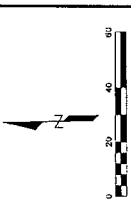
NOTE: WHEN COMPARED WITH THESE PLANS, SHALL NOT BE CONSIDERED VALID FOR GRADING PERMIT HAS BEEN ISSUED.

Know what's below.  
Call before you dig.

811  
Call before you dig.



SEEPAGE BED C

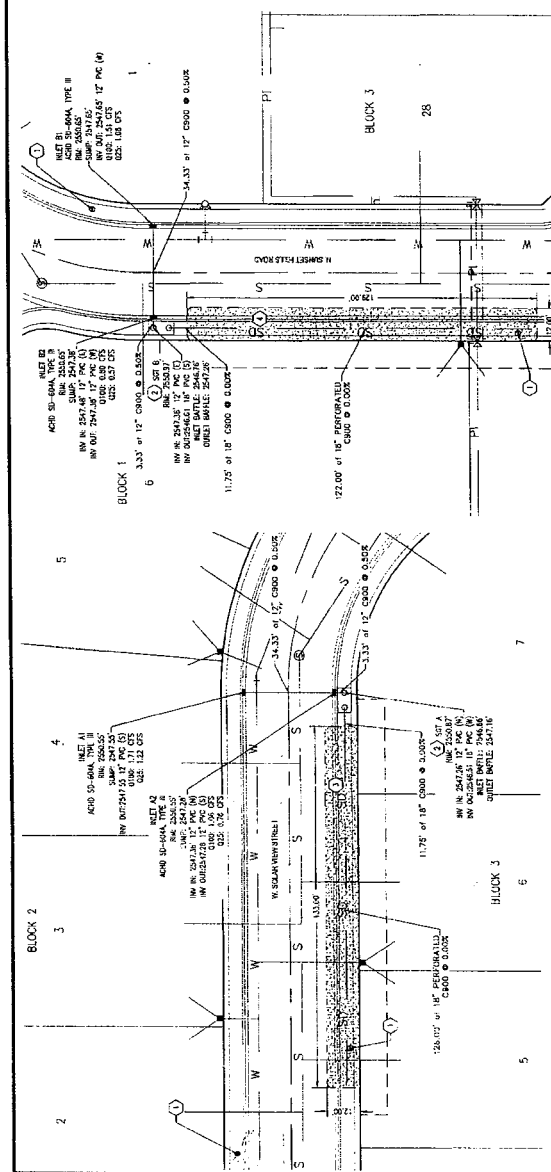


KEYNOTES

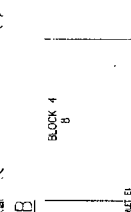
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SHEET NOTES

1. SEE SHEET 10 FOR NOTES AND EXISTING UTILITIES.
2. SEE SHEET 11 FOR NOTES AND EXISTING UTILITIES.
3. SEE SHEET 12 FOR NOTES AND EXISTING UTILITIES.
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10. SEE SHEET 19 FOR NOTES AND EXISTING UTILITIES.



SEEPAGE BED B

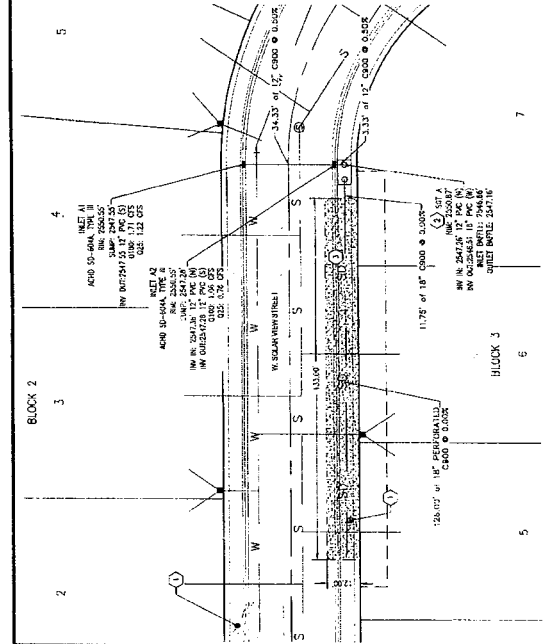


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SEEPAGE BED A



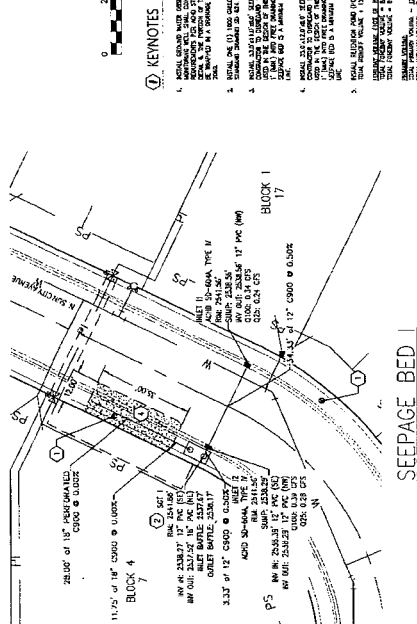
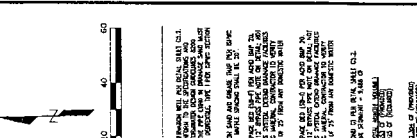
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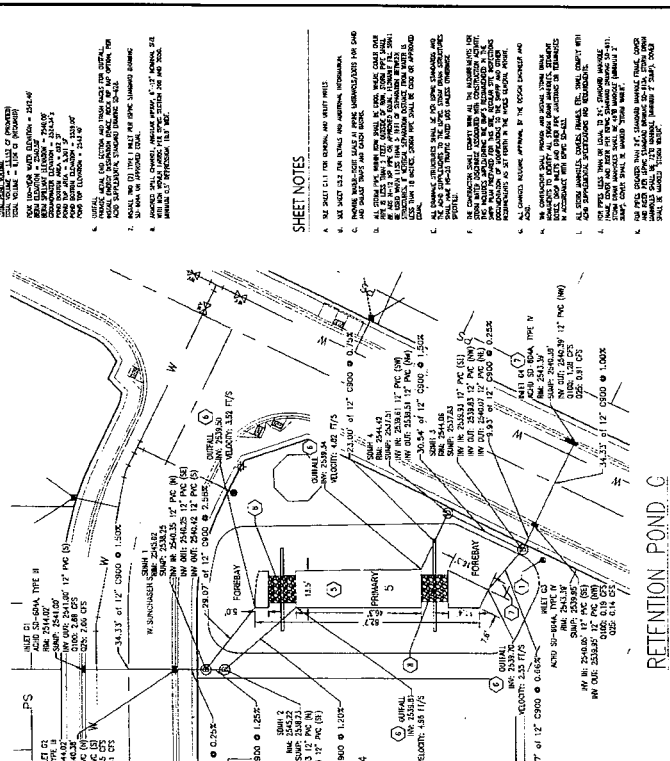
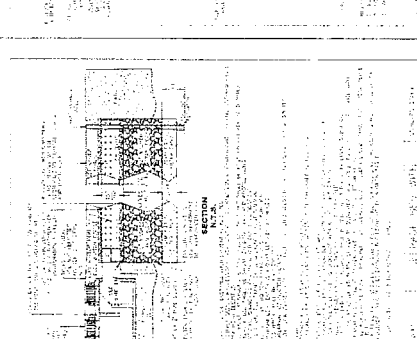
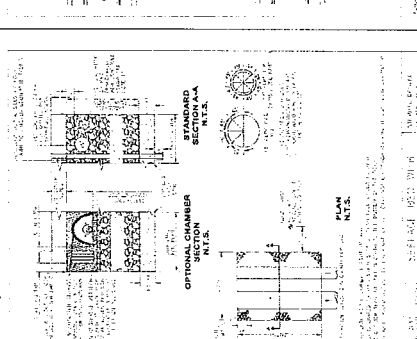
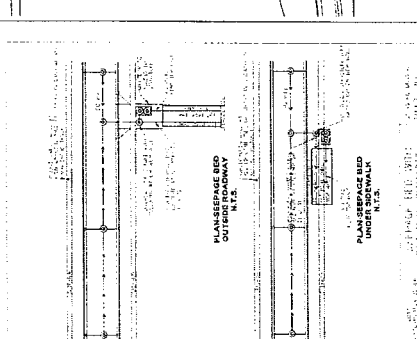
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<p>811 Know what's below. Call before you dig.</p>		<p>UNLICENSED PROFESSIONAL ENGINEERING DESIGNER UNDER SUPERVISION</p>	
<p>MULTI-USE COMPANIES WITHIN THESE PLANS SHALL NOT BE CONSIDERED UNLESS AN EXISTING PERMIT HAS BEEN ISSUED.</p>		<p>DATE: 11/11/2003</p>	
<p>BLAINE A. WOMER CIVIL ENGINEERING</p>		<p>SEAL - ENGINEER</p>	
<p>PLANNING SURVEYING ENGINEERING PUBLIC WORKS</p>		<p>SEE SHEET C1.0</p>	
<p>BEAUCHAMK</p>		<p>CITY OF STAR, ID</p>	
<p>SUNFELD ESTATES SUBDIVISION</p>		<p>STORM WATER IMPROVEMENT PLANS</p>	
<p>SEEPAGE BEDS</p>		<p>SHEET NO. 11/20003</p>	



SEEPAGE BED 1



GEOTEXTILE REQUIREMENTS

NOTE: REMOVAL OF MATERIALS WITH GEOTEXTILES ARE REQUIRED, SUM APPLICATIONS.

Material	Property	Requirement
Nonwoven Geotextile Fabric	Permeability	≥ 100 cm/s
	Tensile Strength	≥ 20 kN/m
	Compression	≥ 200 kPa
	UV Resistance	70% (30 Days)
	Fire Resistance	Class B
Woven Geotextile Fabric	Tensile Strength (Crack)	≥ 20 kN/m
	Tensile Strength (Rupture)	≥ 40 kN/m
	Compression	≥ 200 kPa
	UV Resistance	70% (30 Days)
	Fire Resistance	Class B

SEAL-ENGINEER

REGISTERED PROFESSIONAL ENGINEER

BLAINE A. WOMER

CIVIL ENGINEERING

STATE OF TEXAS

EXPIRES 09/01/2013

NO. 17031

MAILED 08/14/2012

PLANS FOR INSPECTION WITH CORRECTIVES ARE REQUIRED, SUM APPLICATIONS.

Sheet Construction:

Retention Pond Details

Scale: 1" = 10'-0"

North Arrow

Graphic Scale: 0 10 20 30

CITY OF STAR, ID

SUNFIELD ESTATES SUBDIVISION

STORM WATER IMPROVEMENT PLANS

SEEPAGE BEDS AND RETENTION POND AND STORM WATER DETAILS

SHEET NO. CS-1

FILE NO. MT120003

SCALE: 1" = 10'-0"

SIT SHEET C10

BENCHMARK

STANDARD

TRAINING

DESIGN

CONSTRUCTION

PHASE REVIEWS

BLAINE A. WOMER

CIVIL ENGINEERING

REGISTERED PROFESSIONAL ENGINEER

STATE OF TEXAS

EXPIRES 09/01/2013

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Sheet Construction:

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North Arrow

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## **APPENDIX B - CHECKLISTS**

**Sunfield Estates Subdivision  
OPERATION & MAINTANENCE MANUAL  
INSPECTION LIST**

<b>Location</b>				
	<b>Inspection 1</b>	<b>Inspection 2</b>	<b>Inspection 3</b>	<b>Inspection 4</b>
<b>Date:</b>				
<b>Time:</b>				
<b>Approx. Date &amp; Amount of Last Rainfall:</b>				
<b>Inspector:</b>				

Maintenance Item	Pass/Fail				Comments
	1	2	3	4	
<b>1. Irrigation (Monthly, during Irrigation season)</b>					
1. Control of nuisance water from lots and common areas to streets					
2. Control of watering within pond landscape					
<b>2. Retention Pond (Annual, After Major Storms)</b>					
1. Vegetation and ground cover adequate					
2. Weed control					
3. Unauthorized planting					
4. Slope protection/erosion					
5. Animal burrows					
6. Inlet/Outlet pipe trash rack					
a. Debris removal necessary					
b. Corrosion control					
7. Flow spreader					
8. Energy dissipation at inlet (riprap)					
9. Removal of litter and debris					
10. Standing water or wet spots, source of water?					
<b>3. Other (Monthly)</b>					
1. Encroachment of pond or easement area					
2. Complaints from residents					
3. Aesthetics					
a. Care for grass within the public right-of-way and storm drainage easements during the growing season. Grass should be cut per the landscaper's recommendation to provide adequate cover of the roots and reduce the effects of evaporation.					
b. Other (specify)					
4. Clean trash and debris within the subdivision as needed.					
5. Note forebay sildimentation depth, remove when depth exceed > 50% design.					
6. Remove cobble and sediment accumulation from sand infiltration areas, rake/till sand for positive drainage.					
7. Any public hazards (specify)					
<b>4. Other (Annual)</b>					
1. Pressure Irrigation - Maintain and repair to ensure the proper irrigation of vegetation in planted areas. The irrigation system shall be drained prior to the winter months to reduce damage caused by freezing.					
2. Outlet Control Structure					
a. Low flow orifice obstructed					
b. excessive sediment aculmulation in or around structure					
c. Condition of Structure					
i. Minor spalling (<1")					
ii. Major spalling (rebar exposed)					
iii. Joint failure					
iv. Water tightness					
d. outfall pipe functioning					
3. Other (specify)					

**Comments:**
