

May 12, 2024

Project No. 245589-13A

PR No. 8922

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Subject: Feasibility Report for Seepage Pits Testing and Design, Proposed Commercial Development, Assessor's Parcel Number 282-121-011, Located on Temescal Canyon Road, City of Corona, Riverside County, California

References: County of Riverside, Community Health Agency, Department of Environmental Health, *Onsite Wastewater Treatment Systems, Technical Guidance Manual*, Version A, undated.

County of Riverside, Community Health Agency, Department of Environmental Health, *Local Agency Management Program for Onsite Wastewater Treatment Systems*, 2022.

Earth Strata Geotechnical Services, Inc. is pleased to present this sewage disposal feasibility report for the proposed commercial development consisting of a multistory office building, located on Temescal Canyon Road, Assessor's Parcel Number 282-121-011, in the City of Corona, Riverside County, California. The purpose of our feasibility study was to determine the seepage pit percolation rates, physical characteristics of the subsurface earth materials within the vicinity of the proposed disposal area. We will then provide guidelines and the design of onsite sewage disposal systems for the utilizing seepage pits. This study is intended to provide adequate data to satisfy the County of Riverside, Community Health Agency, Department of Environmental Health Local Area Management Plan (LAMP) guidelines for commercial development.

PROPERTY DESCRIPTION AND LOCATION

The subject property is located on Temescal Canyon Road in the City of Corona, Riverside County, California (see Figure 1). The subject property consists of a developed 1.09 -acre parcel of land with relatively flat to hilly terrain. The subject property is underlain by old alluvial deposits and artificial fill. The seepage pits are proposed in native soils. The parcel is bordered by the I-15 off ramp to the west, single family residences to the north and south and by Temescal Canyon Road to the east.

Sewer is not available within 200 feet of the property. There are no water wells observed at this time on this or adjacent properties. Water drainage flows across the property from the southwest to the northeast.

PROPOSED CONSTRUCTION

Based on information provided by you, the proposed commercial development includes a multistory office building with an on-site sewage disposal system. The septic system design is based on the estimated waste flows included in

Appendix C and the approved development plans. The seepage pit testing results are included in Appendix B – Percolation Test Results.

SUBSURFACE EXPLORATION AND PERCOLATION TESTING PROCEDURE

SITE SOIL CHARACTERISTICS

The onsite soils were found to be favorable and ideal for onsite wastewater system. This is based on flat topography in the western portion of the property. Bedrock was not encountered in our exploration and test boring. Minor oversized cobbles were encountered, and drilling was performed with relative ease.

SUBSURFACE EXPLORATION

Subsurface exploration of the subject site consisted of three (3) seepage pit percolation test holes (30- foot deep) and two (2) monitoring well (40-foot deep), excavated on March 28, 2022. The deeper monitoring well test hole was left open to check for groundwater after testing was completed. The deep exploratory boring was excavated to interpret whether groundwater or impermeable soil layers were present. A drill rig with an 8-inch hollow-stem-auger was utilized to drill the exploratory and percolation test holes. Selective sampling was done on an as-needed basis in general accordance with the guidelines of Riverside County LAMP. Earth materials encountered within the deep exploratory boring were classified and logged using the guidelines of ASTM 2487. The approximate location of the deep exploratory boring is shown on the attached Exploratory Boring and Percolation Test Map, Plate 1. In addition, the deep exploratory test hole was excavated and logged, and has been included within Appendix A. Please see Appendix I with photos of the drilling, site and soils profiles.

PERCOLATION TESTING PROCEDURE

Falling-head percolation test method was utilized to perform percolation testing on three (3) test holes (30-feet) on July 8, 2024 in accordance with the procedures described in the referenced Riverside County LAMP. After drilling, 4-inch diameter perforated pipe was inserted into the percolation test holes to help prevent cave-ins. Pre-saturation of the test holes occurred on July 7, 2023. From a fixed reference point, the drop-in water level was measured and recorded for two twenty-five (25) minute intervals and then every 30 minutes for a total of 6 hours. The percolation test holes were filled with clear water to the ground surface and to four feet below the soil surface (the assumed inlet depth) for the last two readings. After each measurement, water was refilled to the ground surface with the exception of the last two readings. The Percolation Test Results are included in Appendix B

FINDINGS

EARTH MATERIALS

A general description of the earth materials observed on site is provided below:

- Quaternary Alluvial Fan Deposits (map symbol Qa): Quaternary alluvial fan deposits were encountered to the full depth of our exploration. These alluvial fan deposits consist predominately of olive brown to yellowish brown fine to coarse grained poorly-graded gravel with varying amounts of sand and silt. These deposits were generally noted to be in a dry medium dense to very dense state.

GROUNDWATER

Groundwater was not observed within the deep exploratory boring excavated to a depth of 40 feet. However, groundwater was observed in a previous deep bore located at the lowest elevation of the property at 28 feet below grade. It should be noted that the groundwater encountered is approximately 10 feet below our proposed seepage pit location.

PERCOLATION TEST RESULTS

The measured percolation test rates (Q) varied from 1.44 to 3.42 gallons per square foot per day (gal/ft²/day). An additional Factor of Safety of F.S. = 1.2 is applied to the slowest rate (Q) of 1.44. the Design rate of Q=1.2 gal/ft²/day will to be used for the design of the seepage pits length. The factor of safety is added due to the variation in the boring results between the test holes.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Our conclusion is that the subject property has sufficient area to support sewage disposal systems in those areas with test results exceeding the minimum LAMP based on the data presented in this report and the recommendations set forth herein. Additionally, it is our conclusion that the groundwater table will not encroach within the current allowable limit set forth by County of Riverside and the State of California requirements. The designed system shall be located in natural undisturbed soil at the depth of the tests performed.

SEWAGE DISPOSAL DESIGN RECOMMENDATIONS

The existing sewage disposal system consists of a 6 seepage pits system and a 3,500 septic tank. Calculations and sizing of the seepage pits are included in Appendix G.

Septic Tank Capacity: Waste flow calculations are based on Appendix H 201.1 of the Uniform Plumbing Code (UPC) and are presented in Appendix C of this report. The septic tank will have a minimum 3,500-gallon capacity.

Allowable Design Percolation Rate: Percolation testing yielded a Q of 1.44, however, A design factor of safety of 1.2 is applied to the required seepage pits depth. The following table shows the calculation of the minimum seepage pit capacity for the proposed residential development. The calculation steps are included in Appendix G.

Primary System: The primary system will consist of a 3,500-gallon septic tank and seepage pit disposal areas for the proposed development. The seepage pits will be constructed into the native materials as tested.

100 Percent Expansion System: The area for the expansion system is identified to the primary and is shown on the OWTS plans.

PUMP CHAMBER DESIGN AND TOTAL DYNAMIC HEAD (TDH) CALCULATIONS

The proposed system will require a pump chamber due to topographic elevation differences and the multi-level design of the proposed building.

The pump chamber is sized per the UPC to have a minimum volume holding capacity for 24 hours over the alarm level with duplex pumps. The 24 holding capacity is based on the estimated waste flow which is equal to 2/3 of the septic tank capacity. All conventional systems requiring a pump chamber will utilize a 2,500-gallon pump chamber with Duplex Pumps and a control panel. The pump chamber capacity and details are included in Appendix H of this report.

The proposed septic system will require a 2" force main and a distribution box with a velocity reducer / dissipater.

PERCOLATION RATE CALCULATION

Riverside County LAMP Guidelines

$$1. \quad Q = \frac{9 \text{ F/T D}}{L \text{ (avg)}}$$

$$2. \quad \frac{\text{Septic Tank Capacity}}{Q \cdot (15.7 \text{ or } 18.8)}$$

Q = Rate in gallons per square foot of sidewall per day

F = Drop during time interval in feet

T = Time interval in hours

D = Diameter of hole in feet

L (avg) = Average wetted depth during time interval in feet

15.7 for 5-foot diameter seepage pits

18.8 for 6-foot diameter seepage pits

Percolation Design Rate = Q (Gal/ft²/day)	Calculated Minimum Seepage Pit Depth Below Septic Tank Inlet¹ (minimum 3 feet) 6-foot Diameter Seepage Pit	Recommended Number of Seepage Pits and Total Depth for 6-foot Diameter Seepage Pit
	<i>3,500 gallons Septic Tank</i>	<i>3,500 gallons Septic Tank</i>
1.2	162 feet	6 @ 30

ADDITIONAL DESIGN CONSIDERATIONS AND RECOMMENDATIONS

The County of Riverside LAMP minimum setbacks are included in Appendix E. All the required setbacks must be observed during the installation of the system.

A minimum horizontal clearance of 8 feet is required between the seepage pits, proposed structures, and property lines. A minimum horizontal clearance of 5 feet is also required between the septic tank and proposed structures, and a minimum horizontal clearance of 18 feet on-center (12 feet from sidewalls) between seepage pits.

The seepage pits should be observed by the geotechnical consultant during and after excavation. The site observations are to verify the suitability of the exposed earth materials. Necessary revisions or modifications may be needed if unforeseen conditions exposed during construction, such as hard impermeable rock. Revisions could include adding additional lines or a redesign of the system that conforms to the site conditions.

The disposal field areas should not be used for recreation, horse corrals or other uses that would compact the earth materials at the surface. The ground surface over the disposal areas should be seeded or sodded to mitigate erosion.

The property owners should take note that proper use and maintenance are crucial to extending the effective design life of the sewage disposal system. The use of excessive water, introduction of detergents or chemicals, and solid food waste from garbage disposals can cause premature system failures. Properly maintained sewage disposal systems can function for many years. However, a rest period of roughly 10 to 15 years is generally needed to promote bacterial decay and a chance to dry up. After this resting period, the primary system can often be reactivated and alternated with the 100 percent expansion system.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of Mr. John Soldat, and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth Strata Geotechnical Services, Inc. should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth Strata Geotechnical Services, Inc. not be accorded the opportunity to review the project plans and specifications, we are not responsible for misinterpretation of our recommendations.

Earth Strata Geotechnical Services, Inc. should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth Strata Geotechnical Services, Inc. should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth Strata Geotechnical Services, Inc. during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

EARTH STRATA GEOTECHNICAL SERVICES, INC.



Stephen M. Poole, PE 40219
President
Principal Engineer



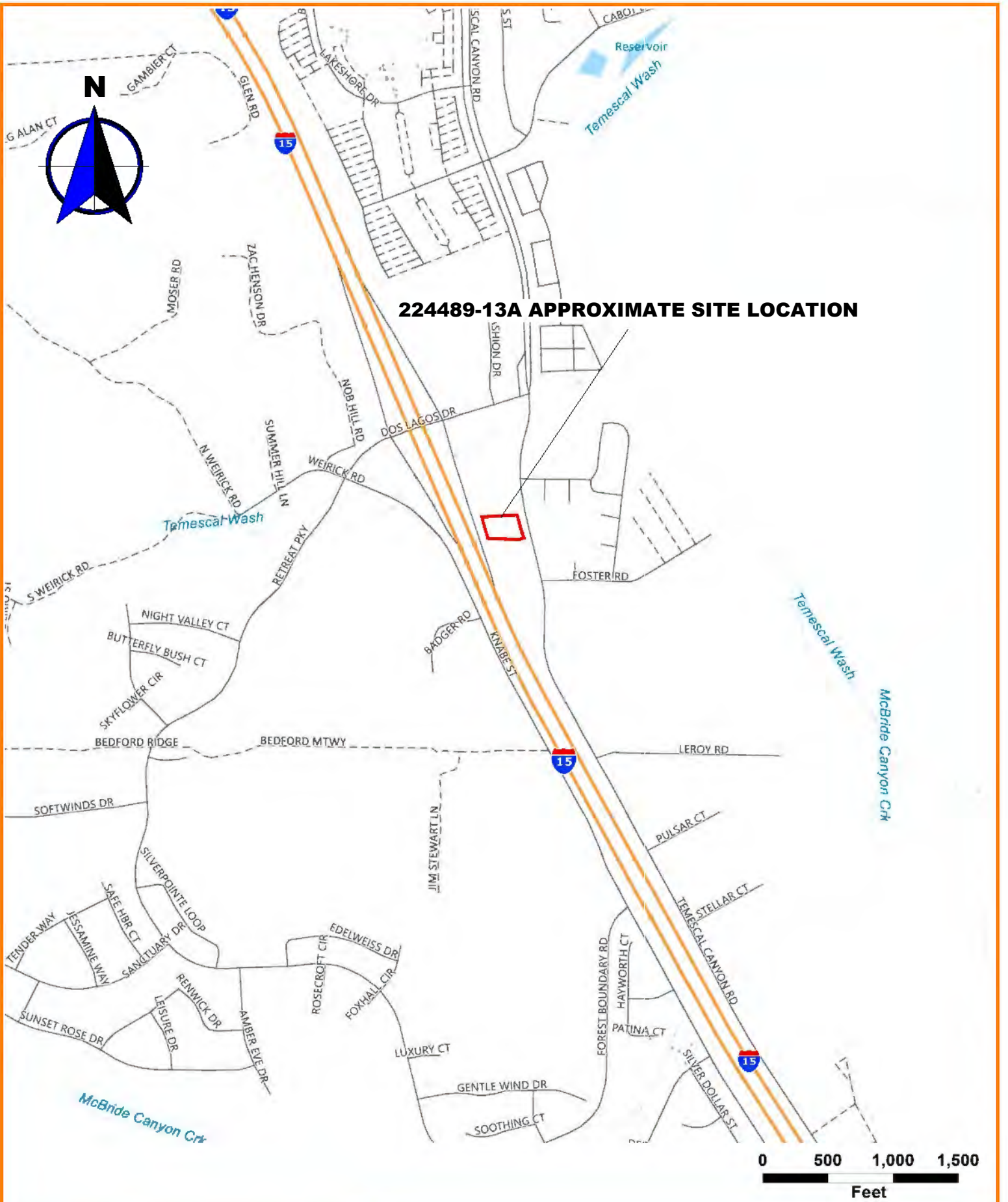
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Gadalla W. Gadalla
Vice President of Operations

Attachments: Figure 1 – Vicinity Map (*Rear of Text*)
Appendix A – Exploratory Logs (*Rear of Text*)
Appendix B – Percolation Test Results (*Rear of Text*)
Appendix C – Waste Flow Calculation - (*Rear of Text*)
Appendix D – NOT USED (*Rear of Text*)
Appendix E – County Required Setbacks (*Rear of Text*)
Appendix F – Project Plans (*Rear of Text*)
Appendix G – Seepage Pit Percolation Rate Calculation (*Rear of Text*)
Appendix H – Pump Chamber Design Details (*Rear of Text*)
Appendix I – Site Photos (*Rear of Text*)
Plate 1 – Seepage Pits / OWTS plan (*Rear of Text*)

FIGURE 1
VICINITY MAP



224489-13A APPROXIMATE SITE LOCATION

Earth Strata Geotechnical Services, Inc.

Geotechnical, Environmental and Materials Testing Consultants

www.ESGSINC.com (951) 397-8315

SOLDAT OFFICE BUILDING

224489-13A

VICINITY MAP

SEE BAR SCALE

JUNE 2024

FIGURE 1

APPENDIX A

EXPLORATORY LOGS

APPENDIX B
PERCOLATION TEST RESULTS

PERCOLATION SHEET

Job Number: 245589-13A

Tested By: JMR

Job Name: Temescal Canyon

Test Hole Number: SP-1

Test Hole Diameter (inches): 8

Soil Classification: Silty SAND

Date Excavated:

Depth of Test Hole Tested(ft): 30

Date Tested:

Actual Depth of Boring	30
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Date / Time

Presoak Period

Amount of Water Used / Comments

Start

Time Interval of Presoak

Stop

Measured Units

Feet

Reference Point

[top](#)

[illegible]

PERCOLATION SHEET

Job Number: 245589-13A

Tested By: JMR

Job Name: Temescal Canyon

Test Hole Number: SP-2

Test Hole Diameter (inches): 8

Soil Classification: Silty SAND

Date Excavated: 12/6/2023

Depth of Test Hole Tested(ft): 20

Date Tested: 12/6/2023

Actual Depth of Boring	30
------------------------	----

Date / Time

Presoak Period

Amount of Water Used / Comments

Start	Time Interval of Presoak
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	10
12	11
13	12
14	13
15	14
16	15
17	16
18	17
19	18
20	19
21	20
22	21
23	22
24	23
25	24
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45	44
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57	56
58	57
59	58
60	59
61	60
62	61
63	62
64	63
65	64
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67	66
68	67
69	68
70	69
71	70
72	71
73	72
74	73
75	74
76	75
77	76
78	77
79	78
80	79
81	80
82	81
83	82
84	83
85	84
86	85
87	86
88	87
89	88
90	89
91	90
92	91
93	92
94	93
95	94
96	95
97	96
98	97
99	98
100	99

Stop	Measured Units
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Feet

Reference Point top

[illegible]

PERCOLATION SHEET

Job Number: 245589-13A

Tested By: JMR

Job Name: Temescal Canyon

Test Hole Number: SP-3

Test Hole Diameter (inches): 8

Soil Classification: Silty SAND

Date Excavated: _____

Depth of Test Hole Tested(ft): 20

Date Tested: _____

Actual Depth of Boring	30
------------------------	----

Date / Time

Presoak Period

Amount of Water Used / Comments

Start

Time Interval of Presoak

Stop

Measured Units	Feet
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Feet

Reference Point top

[illegible]

Job Number:	245589-13A	Tested By:	JMR
Job Name:	Temescal Canyon		
Test Hole Number:	MW-1	Test Hole Diameter (inches):	8
Soil Classification:	Silty SAND	Date Excavated:	12/6/2023
Depth of Test Hole Tested(ft):	20	Date Tested:	12/6/2023
Actual Depth of Boring	30		

[illegible]

Job Number:	<u>245589-13A</u>	Tested By:	<u>JMR</u>
Job Name:	<u>Temescal Canyon</u>		
Test Hole Number:	<u>MW-2</u>	Test Hole Diameter (inches):	<u>8</u>
Soil Classification:	<u>Silty SAND</u>	Date Excavated:	<u> </u>
Depth of Test Hole Tested(ft):	<u>40</u>	Date Tested:	<u> </u>
Actual Depth of Boring	<u>40</u>		

[illegible]

APPENDIX C

WASTE FLOW CALCULATION

702.0 Fixture Unit Equivalents
702.1 Trap Size Diagram

The unit equivalent of plumbing fixtures shown in Table 702.1 shall be based on the size of the trap required, and the unit equivalent of fixtures and devices not shown in Table 702.1 shall be based on the size of trap or trap arm.

Maximum drainage fixture units for a fixture trap and trap arm loadings for sizes up to 4 inches (100 mm) shall be in accordance with Table 702.2(1).

TABLE 702.1
PLUMBING CODE VALUES
DRAINAGE FIXTURE UNIT VALUES (DFU) PROJECT SPECIFICS

PLUMBING APPLIANCES, APPURTENANCES, OR FIXTURES	MINIMUM SIZE TRAP AND TRAP ARM7	PRIVATE	PUBLIC	ASSEMBLY8		NO ON PLANS		Units		TOTAL FOR FIXTURE TYPE
	(inches)									
Bathtub or Combination Bath/Shower	1 1/2	2	2	-		0		-		0
Bidet	1 1/4	1	-	-		0		-		0
Bidet	1 1/2	2	-	-		0		-		0
Clothes Washer, domestic, standpipe5	2	3	3	3		0		-		0
Dental Unit, cuspidor	1 1/4	-	1	1		0		-		0
Dishwasher, domestic, with independent drain2	1 1/2	2	2	2		0		-		0
Drinking Fountain or Water Cooler	1 1/4	0.5	0.5	1		0		-		0
Food Waste Disposer, commercial	2	-	3	3		0		-		0
Floor Drain, emergency	2	-	0	0		0		-		0
Floor Drain (for additional sizes see Section 702.0)	2	2	2	2		0		-		0
Shower, single-head trap	2	2	2	2		0		-		0
Multi-head, each additional	2	1	1	1		0		-		0
Lavatory	1 1/4	1	1	1		21		1		21
Lavatories in sets	1 1/2	2	2	2		0		-		0
Wash fountain	1 1/2	-	2	2		0		-		0
Wash fountain	2	-	3	3		0		-		0
Mobile home or Manufactured Home, trap9	3	6	-	-		0		-		0
Receptor, indirect waste1,3	1 1/2	See footnote1,3	-	-		0		-		0
Receptor, indirect waste1,4	2	See footnote1,4	-	-		0		-		0
Receptor, indirect waste1	3	See footnote1	-	-		0		-		0
Sinks	-	-	-	-		0		-		0
Bar	1 1/2	1	-	-		0		-		0
Bar2	1 1/2	-	2	2		0		-		0
Clinical	3	-	6	6		0		-		0
Commercial with food waste2	1 1/2	-	3	3		0		-		0
Exam Room	1 1/2	-	1	-		0		-		0
Special Purpose2	1 1/2	2	3	3		0		-		0
Special Purpose	2	3	4	4		0		-		0
Special Purpose	3	-	6	6		0		-		0
Kitchen, domestic2 (with or without food waste disposer, dishwasher, or both)	1 1/2	2	2	-		0		-		0
Laundry2 (with or without discharge from a clothes washer)	1 1/2	2	2	2		0		-		0
Service or Mop Basin	2	-	3	3		3		3		9
Service or Mop Basin	3	-	3	3		0		-		0
Service, flushing rim	3	-	6	6		0		-		0
Wash, each set of faucets	-	-	2	2		0		-		0
Urinal, Hybrid	2	1	1	1		0		-		0
Urinal, integral trap 1.0 GPF2	2	2	2	5		0		-		0
Urinal, integral trap greater than 1.0 GPF	2	2	2	6		0		-		0
Urinal, exposed trap2	1 1/2	2	2	5		0		-		0
Water Closet, 1.6 GPF Gravity Tank6	3	3	4	6		8		6		48
Water Closet, 1.6 GPF Flushometer Tank6	3	3	4	6		0		-		0
Water Closet, 1.6 GPF Flushometer Valve6	3	3	4	6		0		-		0
Water Closet, greater than 1.6 GPF Gravity Tank6	3	4	6	8		0		-		0
Water Closet, greater than 1.6 GPF Flushometer Valve6	3	4	6	8		0		-		0

For SI units: 1 inch = 25 mm

Total Fixture Counts78

For SI units: 1 inch = 25 mm

Notes:

- 1 Indirect waste receptors shall be sized based on the total drainage capacity of the fixtures that drain there into, in accordance with Table 702.2(2).
- 2 Provide a 2 inch (50 mm) minimum drain.
- 3 For refrigerators, coffee urns, water stations, and similar low demands.
- 4 For commercial sinks, dishwashers, and similar moderate or heavy demands.
- 5 Buildings having a clothes-washing area with clothes washers in a battery of three or more clothes washers shall be rated at 6 fixture units each for purposes of sizing common horizontal and vertical drainage piping.
- 6 Water closets shall be computed as 6 fixture units where determining septic tank sizes based on Appendix H of this code.
- 7 Trap sizes shall not be increased to the point where the fixture discharge is capable of being inadequate to maintain their self-scouring properties.
- 8 Assembly [Public Use (see Table 422.1)].
- 9 For drainage fixture unit values related to lots within mobile home parks in all parts of the State of California, see California Code of Regulations, Title 25, Division 1, Chapter 2, Article 5, Section 1268. For drainage fixture unit values related to lots within special occupancy parks in all parts of the State of

	150 females.							
E Educational occupancy-private or public schools	Male 1 per 50	Female 1 per 30	Male 1 per 100	Male 1 per 40	Female 1 per 40	-	1 per 150	1 service sink or laundry tray
	Male					1 shower for each		

702.0 Fixture Unit Equivalents
702.1 Trap Size Diagram

The unit equivalent of plumbing fixtures shown in Table 702.1 shall be based on the size of the trap required, and the unit equivalent of fixtures and devices not shown in Table 702.1 shall be based on the size of trap or trap arm.

Maximum drainage fixture units for a fixture trap and trap arm loadings for sizes up to 4 inches (100 mm) shall be in accordance with Table 702.2(1).

TABLE 702.1
PLUMBING CODE VALUES
DRAINAGE FIXTURE UNIT VALUES (DFU)PROJECT SPECIFICS

PLUMBING APPLIANCES, APPURTENANCES, OR FIXTURES	MINIMUM SIZE TRAP AND TRAP ARM ⁷	PRIVATE	PUBLIC	ASSEMBLY ⁸		NO ON PLANS		Units		TOTAL FOR FIXTURE TYPE
	(inches)									
Bathtub or Combination Bath/Shower	1 1/2	2	2	-		0		-		0
Bidet	1 1/4	1	-	-		0		-		0
Bidet	1 1/2	2	-	-		0		-		0
Clothes Washer, domestic, standpipe ⁵	2	3	3	3		0		-		0
Dental Unit, cuspidor	1 1/4	-	1	1		0		-		0
Dishwasher, domestic, with independent drain ²	1 1/2	2	2	2		0		-		0
Drinking Fountain or Water Cooler	1 1/4	0.5	0.5	1		0		-		0
Food Waste Disposer, commercial	2	-	3	3		0		-		0
Floor Drain, emergency	2	-	0	0		0		-		0
Floor Drain (for additional sizes see Section 702.0)	2	2	2	2		0		-		0
Shower, single-head trap	2	2	2	2		0		-		0
Multi-head, each additional	2	1	1	1		0		-		0
Lavatory	1 1/4	1	1	1		21		1		21
Lavatories in sets	1 1/2	2	2	2		0		-		0
Wash fountain	1 1/2	-	2	2		0		-		0
Wash fountain	2	-	3	3		0		-		0
Mobile home or Manufactured Home, trap ⁹	3	6	-	-		0		-		0
Receptor, indirect waste ^{1,3}	1 1/2	See footnote1,3	-	-		0		-		0
Receptor, indirect waste ^{1,4}	2	See footnote1,4	-	-		0		-		0
Receptor, indirect waste ¹	3	See footnote1	-	-		0		-		0
Sinks	-	-	-	-		0		-		0
Bar	1 1/2	1	-	-		0		-		0
Bar ²	1 1/2	-	2	2		0		-		0
Clinical	3	-	6	6		0		-		0
Commercial with food waste ²	1 1/2	-	3	3		0		-		0
Exam Room	1 1/2	-	1	-		0		-		0
Special Purpose ²	1 1/2	2	3	3		0		-		0
Special Purpose	2	3	4	4		0		-		0
Special Purpose	3	-	6	6		0		-		0
Kitchen, domestic ² (with or without food waste disposer, dishwasher, or both)	1 1/2	2	2	-		0		-		0
Laundry ² (with or without discharge from a clothes washer)	1 1/2	2	2	2		0		-		0
Service or Mop Basin	2	-	3	3		3		3		9
Service or Mop Basin	3	-	3	3		0		-		0
Service, flushing rim	3	-	6	6		0		-		0
Wash, each set of faucets	-	-	2	2		0		-		0
Urinal, Hybrid	2	1	1	1		0		-		0
Urinal, integral trap 1.0 GPF ²	2	2	2	5		0		-		0
Urinal, integral trap greater than 1.0 GPF	2	2	2	6		0		-		0
Urinal, exposed trap ²	1 1/2	2	2	5		0		-		0
Water Closet, 1.6 GPF Gravity Tank ⁶	3	3	4	6		8		6		48
Water Closet, 1.6 GPF Flushometer Tank ⁶	3	3	4	6		0		-		0
Water Closet, 1.6 GPF Flushometer Valve ⁶	3	3	4	6		0		-		0
Water Closet, greater than 1.6 GPF Gravity Tank ⁶	3	4	6	8		0		-		0
Water Closet, greater than 1.6 GPF Flushometer Valve ⁶	3	4	6	8		0		-		0

For SI units: 1 inch = 25 mm

Total Fixture Counts78

For SI units: 1 inch = 25 mm

Notes:

- 1 Indirect waste receptors shall be sized based on the total drainage capacity of the fixtures that drain there into, in accordance with Table 702.2(2).
- 2 Provide a 2 inch (50 mm) minimum drain.
- 3 For refrigerators, coffee urns, water stations, and similar low demands.
- 4 For commercial sinks, dishwashers, and similar moderate or heavy demands.
- 5 Buildings having a clothes-washing area with clothes washers in a battery of three or more clothes washers shall be rated at 6 fixture units each for purposes of sizing common horizontal and vertical drainage piping.
- 6 Water closets shall be computed as 6 fixture units where determining septic tank sizes based on Appendix H of this code.
- 7 Trap sizes shall not be increased to the point where the fixture discharge is capable of being inadequate to maintain their self-scouring properties.
- 8 Assembly [Public Use (see Table 422.1)].
- 9 For drainage fixture unit values related to lots within mobile home parks in all parts of the State of California, see California Code of Regulations, Title 25, Division 1, Chapter 2, Article 5, Section 1268. For drainage fixture unit values related to lots within special occupancy parks in all parts of the State of

	150 females.								
E Educational occupancy-private or public schools	Male 1 per 50	Female 1 per 30	Male 1 per 100	Male 1 per 40	Female 1 per 40	-	1 per 150	1 service sink or laundry tray	
	Male					1 shower for each			

APPENDIX D
SIEVE ANALYSIS WORKSHEET
NOT USED

APPENDIX E
COUNTY REQUIRED SETBACKS

SETBACKS AS DEFINED PER RIVERSIDE COUNTY HEALTH DEPARTMENT TECHNICAL GUIDANCE MANUAL FOR ONSITE WASTEWATER TREATMENT SYSTEMS

Table 5.4
Minimum Horizontal Separations for Subsurface Sewage Disposal

Minimum Horizontal Distance From:	Septic Tank	Disposal Field	Seepage Pit
Building or Structure ¹	5 feet	8 feet	8 feet
Property Line Adjoining Private Property ²	5 feet	5 feet	8 feet
Water Supply Wells ^{3,4}	100 feet	100 feet	150 feet
Trees (greater than 10 inches in diameter)	10 feet	---	10 feet
Seepage Pits	5 feet	5 feet	12 feet
Disposal Field	5 feet	4 feet	5 feet
On Site Domestic Water Service Line ⁵	5 feet	5 feet	5 feet
Distribution Box	---	5 feet	5 feet
Pressure Public Water Main Line	10 feet	10 feet	10 feet
Flood Plain / 100 Year Flood Zone	Refer to Current UPC	Refer to Current UPC	Refer to Current UPC

1. Building or Structure includes porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways and similar structures or appurtenances.
2. System may go up to the edge of the property line adjoining public property if no public water mains are within or anticipated within 25 feet of the property line. A statement from the water district is required.
3. These water supply well minimum setbacks listed in Ordinance 682 must be maintained. However, per Ordinance 682, any surface sewage disposal system discharging 2,000 gal/day or more will require a 200 feet minimum setback.
4. All drainage piping shall clear domestic water supply wells by at least 50 feet. This distance may be reduced to not less than 25 feet when the drainage piping is constructed of materials approved for use within a building.
5. Water pipes crossing sewer piping shall be laid a minimum of 12 inches above that sewer pipe

Watercourses:

Watercourses, for purposes of determining setbacks from OWTS, have been separated into three main categories which are defined as follows:

- 1) **Major Streams.** This category includes watercourses such as the Santa Ana River, Strawberry Creek, San Jacinto River, Murrieta Creek, etc. Major streams have surface flows year round during most years.

Table 5.5

Septic tank	50 feet
Leach line	100 feet
Leach bed	100 feet
Seepage Pit	150 feet

- 2) **Ephemeral Streams.** These watercourses lose their surface flows at times during most years, but may still have significant cfs underflows. Significant underflow is usually evidenced by lush vegetative growth at the streambed during the dryer

Table 5.6

Septic tank	25 feet
Leach line	50 feet
Leach bed	50 feet
Seepage Pit	100 feet

- 3) **Drainage Courses.** These water courses include: ephemeral streams with little or no underflow during dry periods, eroded channels, unlined drainage channels, swales, gullies, ravines, dry creek beds, etc.

Table 5.7

Septic tank	15 feet
Leach line	15 feet
Leach bed	15 feet
Seepage Pit	15 feet

SETBACKS AS DEFINED PER RIVERSIDE COUNTY HEALTH DEPARTMENT
TECHNICAL GUIDANCE MANUAL FOR ONSITE WASTEWATER TREATMENT
SYSTEMS

Leach Line Installation on or Near Slopes:

Any portion of the disposal field shall maintain a 15 foot horizontal distance from daylight (or side of slope) to any portion of the leach line or leach bed. Table 5.3 gives the minimum cover allowed and depth of testing versus the percent of slope in the area of the disposal field to meet the 15 foot requirement. This Table also gives a factor by which to increase the square foot of bottom area due to the loss in transpiration caused by the added cover overburden.

Note: No system shall be installed in slopes greater than 45%. Regional Water Quality Control Board (RWQCB) approval may be required to address steep slopes. Contact the Department for specific requirements.

Note: The minimum depth of test required due to (%) percent slope of natural ground does not take into account leach line designs utilizing 2 feet or 3 feet of rock underneath leach line pipe. The Professional of Record must increase the required test depth to accommodate for the use of 2 feet or 3 feet of rock.

Table 5.3

(%) Slope of natural ground in area of disposal system	Minimum cover over lines / bed (ft.)	Minimum depth of test required (ft.)	Overburden Factor
5%	1	3	1.0
10%	1.5	3	1.0
15%	2.25	4	1.0
20%	3	4	1.0
25%	3.75	5	1.1
30%	4.5	6	1.2
35%	5.25	7	1.3
40%	6	8	1.4
45%	7.0	9	1.5

APPENDIX F

PROJECT PLANS

LEGAL DESCRIPTION

PARCEL A, AS SHOWN ON LOT LINE ADJUSTMENT NO. 2928, AS EVIDENCED BY DOCUMENT RECORDED JANUARY 26, 1990 AS INSTRUMENT NO. 1990-32933 OF OFFICIAL RECORDS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: THAT PORTION OF GOVERNMENT LOT 9 IN SECTION 21, TOWNSHIP 4 SOUTH, RANGE 6 WEST, SAN BERNARDINO BASE AND MERIDIAN, ACCORDING TO UNITED STATES GOVERNMENT SURVEY THEREOF, DESCRIBED AS FOLLOWS: COMMENCING AT A POINT ON THE SOUTHERLY LINE OF PARCEL 2 AS SHOWN BY MAP ON RECORD OF SURVEY ON FILE IN BOOK 42, PAGE(S) 68 THEREOF, OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, SAID POINT IS NORTH 87° 35' 10" WEST; ALONG SAID SOUTHERLY LINE, A DISTANCE OF 113.91 FEET FROM THE SOUTHEAST CORNER OF PARCEL 1 OF SAID RECORD OF SURVEY, SAID POINT BEING THE NORTHEAST CORNER OF THE LAND DESCRIBED AS PARCEL 40 IN FINAL ORDER OF CONDEMNATION, SUPERIOR CASE NO. 84056 RECORDED SEPTEMBER 23, 1965 AS INSTRUMENT NO. 109366 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH 15° 37' 07" EAST, ALONG THE EASTERLY LINE OF SAID PARCEL 40, A DISTANCE OF 100.00 FEET TO THE SOUTHEAST CORNER OF THE PARCEL LAND AS DESCRIBED IN DEED TO DOYLE V. HILL AND ELIZABETH L. HILL, RECORDED AUGUST 20, 1969 AS INSTRUMENT NO. 85326 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, SAID SOUTHWEST CORNER BEING THE **TRUE POINT OF BEGINNING** OF THE PARCEL TO BE DESCRIBED; THENCE CONTINUING SOUTH 15° 37' 07" EAST, ALONG SAID EASTERLY LINE OF PARCEL 40, A DISTANCE OF 170.49 FEET (FORMERLY RECORDED 170.52 FEET), TO THE SOUTHERLY LINE OF THE PARCEL OF LAND AS DESCRIBED IN DEED TO EULA G. CROSBIE, RECORDED JANUARY 29, 1942, IN BOOK 531, PAGE(S) 224 THEREOF, OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE SOUTH 88° 26' 54" EAST, ALONG SAID SOUTHERLY LINE, A DISTANCE OF 238.07 FEET TO A POINT THAT BEARS NORTH 88° 26' 54" WEST, ALONG SAID SOUTHERLY LINE, A DISTANCE OF 59.42 FEET FROM THE SOUTHEAST CORNER OF SAID PARCEL OF LAND DESCRIBED IN DEED TO EULA G. CROSBIE; THENCE NORTH 61° 06' 51" EAST, A DISTANCE OF 48.05 FEET TO THE WESTERLY LINE OF STATE HIGHWAY NUMBER 71, 80.00 FEET IN WIDTH, AS DESCRIBED IN DEED TO THE COUNTY OF RIVERSIDE, RECORDED JULY 22, 1930 IN BOOK 867, PAGE(S) 45 THEREOF, OF DEEDS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 13° 11' 55" WEST ALONG SAID WESTERLY LINE, A DISTANCE OF 104.06 FEET; THENCE NORTHWESTERLY ALONG SAID WESTERLY LINE ON A CURVE CONCAVE, HAVING A RADIUS OF 1540.00 FEET THROUGH AN ANGLE OF 02° 18' 16", AN ARC LENGTH OF 61.94 FEET TO THE SOUTHEAST CORNER OF SAID PARCEL OF LAND DESCRIBED IN DEED TO DOYLE V. HILL AND ELIZABETH L. HILL; THENCE SOUTH 87° 08' 22" WEST, ALONG THE SOUTHERLY LINE OF SAID PARCEL OF LAND, DESCRIBED IN DEED TO DOYLE V. HILL AND ELIZABETH L. HILL, A DISTANCE OF 289.64 FEET TO THE **TRUE POINT OF BEGINNING**.

BUILDING AREA ANALYSIS: (AS DEFINED BY CBC SECTION 202)	
2ND FLOOR CONDITIONED SPACE:	13,076 SF
3RD FLOOR CONDITIONED SPACE:	8,730 SF
4TH FLOOR CONDITIONED SPACE:	2,906 SF
TOTAL GROSS CONDITIONED SPACE:	24,712 SF

ADDITIONAL NON CONDITIONED BUILDING AREAS	
1ST FLOOR PARKING GARAGE:	17,100 SF
2ND FLOOR COURTYARD:	2,200 SF
3RD FLOOR COVERED ENTRY:	804 SF
4TH FLOOR UNCOVERED DECK:	500 SF

PARKING ANALYSIS:	
PER COUNTY OF RIVERSIDE PARKING REQUIRED:	
1 SPACE / 200 S.F. OF NET LEASABLE FLOOR AREA FOR MEDICAL AND DENTAL OFFICES, CLINICS, MEDICAL AND PROFESSIONAL BUSINESS OFFICES	
NET LEASABLE AREAS	
2ND FLOOR NET LEASABLE AREA:	10,300 SF
3RD FLOOR NET LEASABLE AREA:	6,400 SF
4TH FLOOR NET LEASABLE AREA:	1,900 SF
TOTAL NET LEASABLE AREA:	18,600 SF

18,600 S.F. / 200 = 93 PARKING SPACES REQUIRED	
PARKING SPACES REQUIRED:	93
PARKING SPACES PROVIDED:	93
PARKING BREAKDOWN:	
UPPER PARKING AREA:	40 SPACES (11 COMPACT SPACES)
LOWER PARKING AREA:	53 SPACES (5 COMPACT SPACES)
(20% COMPACT PARKING ALLOWED)	
ACCESSIBLE PARKING REQUIRED:	4
ACCESSIBLE PARKING PROVIDED:	4

PRELIMINARY GRADING PLAN
POR. SE ¼ SEC. 21, T.4S., R.6 W., SBBM.
TEMESCAL CANYON ROAD
RIVERSIDE COUNTY, CA
APN: 282-121-011
PPT 230008

- DRAIN NOTE:**
- (B) USE NDS DRAIN DURA SLOPE OR PRO SERIES CHANNEL OR EQUAL
- (C) PROVIDE 24"x24" CATCH BASIN NDS MODEL # 2415 OR EQUAL
- BOTH TRAFFIC RATED
- PAVING NOTE:**
- PROPOSED CONCRETE PAVING
- PROPOSED PARKING STRUCTURE
- EXISTING PAVEMENT REMOVE AND REPLACE AS SHOWN
PROTECT OFF-SITE CONCRETE

EARTHWORK QUANTITIES

CUT 11,000 CUBIC YARDS EXPORT 11,000 C.Y.
FILL 0 CUBIC YARDS IMPORT 0 C.Y.
TO BE EXPORTED TO THE LOCAT DUMP VIA TEMESCAL CANYON ROAD.

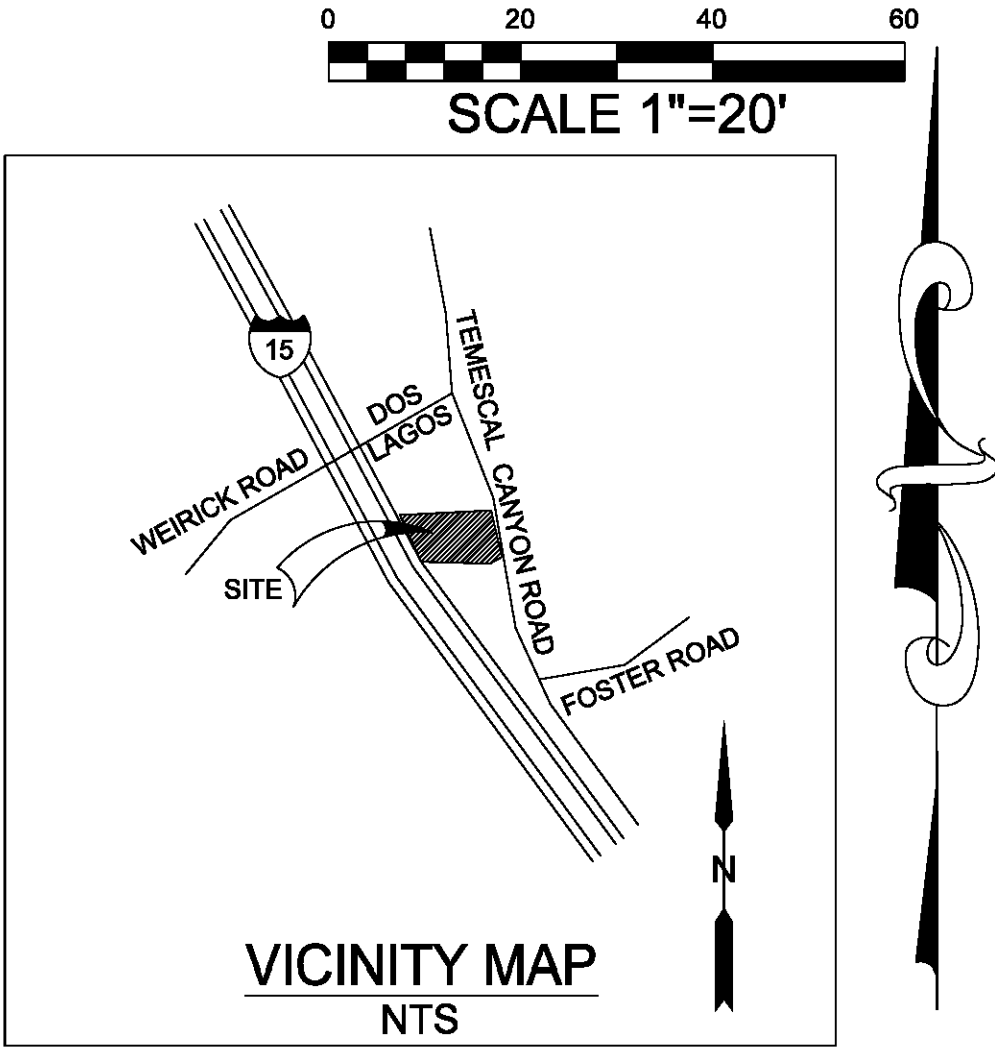
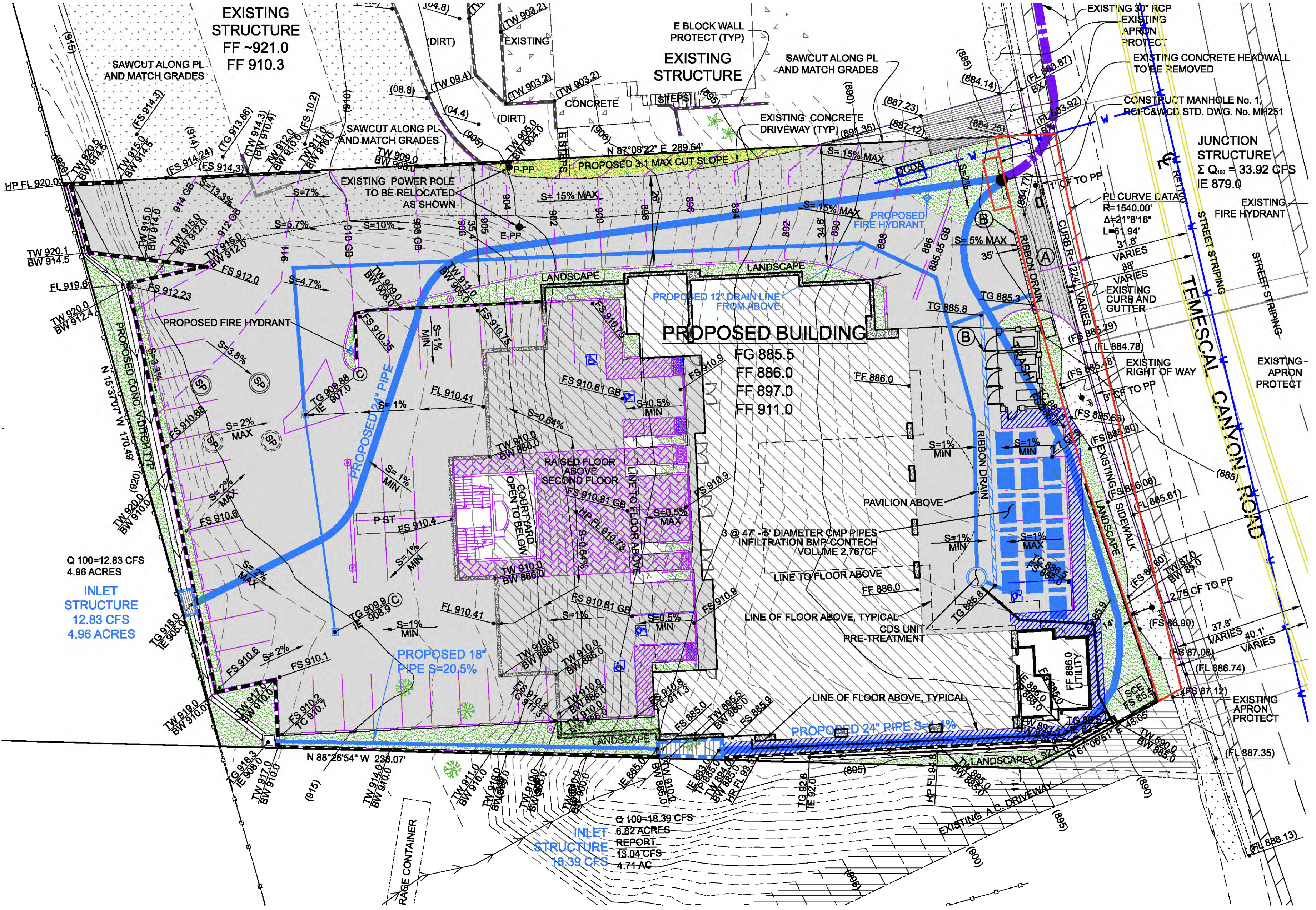
NOTE: EARTHWORK QUANTITIES ARE ESTIMATES ONLY AND DO INCLUDE SHRINKAGE OR SUBSIDENCE. THEY ARE ESSENTIALLY FOR PERMIT PURPOSES ONLY AND NOT INTENDED FOR BIDDING.

IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE EXACT QUANTITIES FOR THE PURPOSES OF PAYMENT AND CONTRACT DOCUMENTS. THE UNDERSIGNED ENGINEER ACCEPTS NO RESPONSIBILITY FOR DESCREPCENCIES IN THE EARTHWORK QUANTITIES.



AREA MAP
RCFC&WCD ORTHOPHOTO TOPO
PHOTO DATED 5-9-2007
1"=100'

APRON NOTE:
DRIVEWAY APRON PER RIVERSIDE COUNTY STANDARD No. 207
COMMERCIAL APRON



UTILITY PURVEYORS

ELECTRIC SCE 800 655-4555
GAS SO CAL GAS 909 307-7070
WATER T. V. W. D 951 277-1414
SEWER SEPTIC
PHONE VARIOUS
CABLE VARIOUS

LOT SIZE
47,592 SF NET & GROSS
1.09 ACRE NET & GROSS

FEMA ZONE X

PLANNING
ZONING CR
LAND USE C-P-S CZ 5845
NOT IN SPECIFIC PLAN

GEOLOGIC HAZARDS
VERY LOW LIQUEFACTION POTENTIAL
SUSCEPTIBLE TO SUBSIDENCE
NOT IN FAULT ZONE
PER COUNTY GIS SHEET

SOURCE OF TOPOGRAPHY
FIELD SURVEY DATED 8-10-19, 8-20-22 & 10-6-22

LEGEND

E EXISTING
FF FINISHED FLOOR
FG FINISHED GRADE
FS FINISHED SURFACE
IE INVERT ELEVATION
P PROPOSED
SP SEEPAGE PIT
ST xxxx GALLON SEPTIC TANK
TG TOP OF GRATE
TF TOP OF FOOTING
TW TOP OF WALL
TYP TYPICAL
USP UNDER SEPARATE PERMIT

APPLICANT
MARS HILL STUDIO, INC.
TONY MASSARO
2533 GREENBRIAR LANE
COSTA MESA, CA 92626
714 556-8299

tony@marshillstudio.com

OWNER/CLIENT
JOHN SOLDAT
1902 FULLERTON AVE
CORONA, CA 92881
951 737-7047
john@soldatcpa.onmicrosoft.com

CIVIL CONSULTING
2621 GREEN RIVER RD #105-209
CORONA, CA 92882
714 392-1219
wave@wwdb.org

Call: TOLL FREE
1-800
422-4133

TWO WORKING DAYS BEFORE YOU DIG

CONSTRUCTION RECORD	DATE	BY	REVISIONS / AMENDMENTS	ACC'D	BENCH MARK	SCALE	SEAL	Designed By	Drawn By	Checked By	RECOMMENDED BY:	DATE:	COUNTY OF RIVERSIDE	Drawing No.
Contractor						Horizontal	1"=20'	BV	BV	WCH	ACCEPTED BY:	DATE:	PRELIMINARY GRADING PLAN	PGP-1
Inspector						Vertical	1"=20'	WILLIAM C. HOBBS					POR. SE ¼ SEC. 21, T.4S., R.6W., SBBM	
Date Completed								R.C.E. No. 42265	Date 1-17-2024				TEMESCAL CANYON ROAD	Sheet 1 of 3

APPENDIX G

**SEEPAGE PIT PERCOLATION RATE
CALCULATIONS**

PERCOLATION RATE CALCULATION AND SEEPAGE PIT STEPS

1. $Q = \frac{9 F/T D}{L (avg)}$

2. $\frac{\text{Septic Tank Capacity}}{Q \cdot (15.7 \text{ or } 18.8)}$

Q = Rate in gallons per square foot of sidewall per day

F = Drop during time interval in feet

T = Time interval in hours

D = Diameter of hole in feet

L (avg) = Average wetted depth during time interval in feet

15.7 for 5-foot diameter seepage pits

18.8 for 6-foot diameter seepage pits

RATE (Q) CALCULATION BASED ON LAST READING

F = Drop during time interval in feet = 4.40

T = Time interval in hours = 0.5

D = Diameter of hole in feet (8/12) = 0.67

L (avg) = Average wetted depth during time interval in feet = 21.8

L Average = (initial Reading + Final Reading) / 2

Initial = 30 - 6 = 24

Final = 30 - 10.40 = 19.6

L (avg) = 21.8

$$Q = \frac{9 \times (4.40/0.5) \times 0.67}{21.8}$$

$$\underline{\underline{Q = 1.44}}$$

Factor of safety of 1.2 applied, Q=1.2 will be used for the design.

SEPPAGE PIT REQUIRED DEPTH (6 FOOT DIAMETER)

Total depth required for a 6 ft. diameter pit below the inlet = Septic Tank Capacity. /Q x 18.8
(where 18.8 is the circumference in feet of a 6 foot diameter pit).

$$\frac{\text{Septic Tank Capacity}}{Q \cdot (18.8)}$$

$$\frac{3500}{1.2 \times 18.8}$$

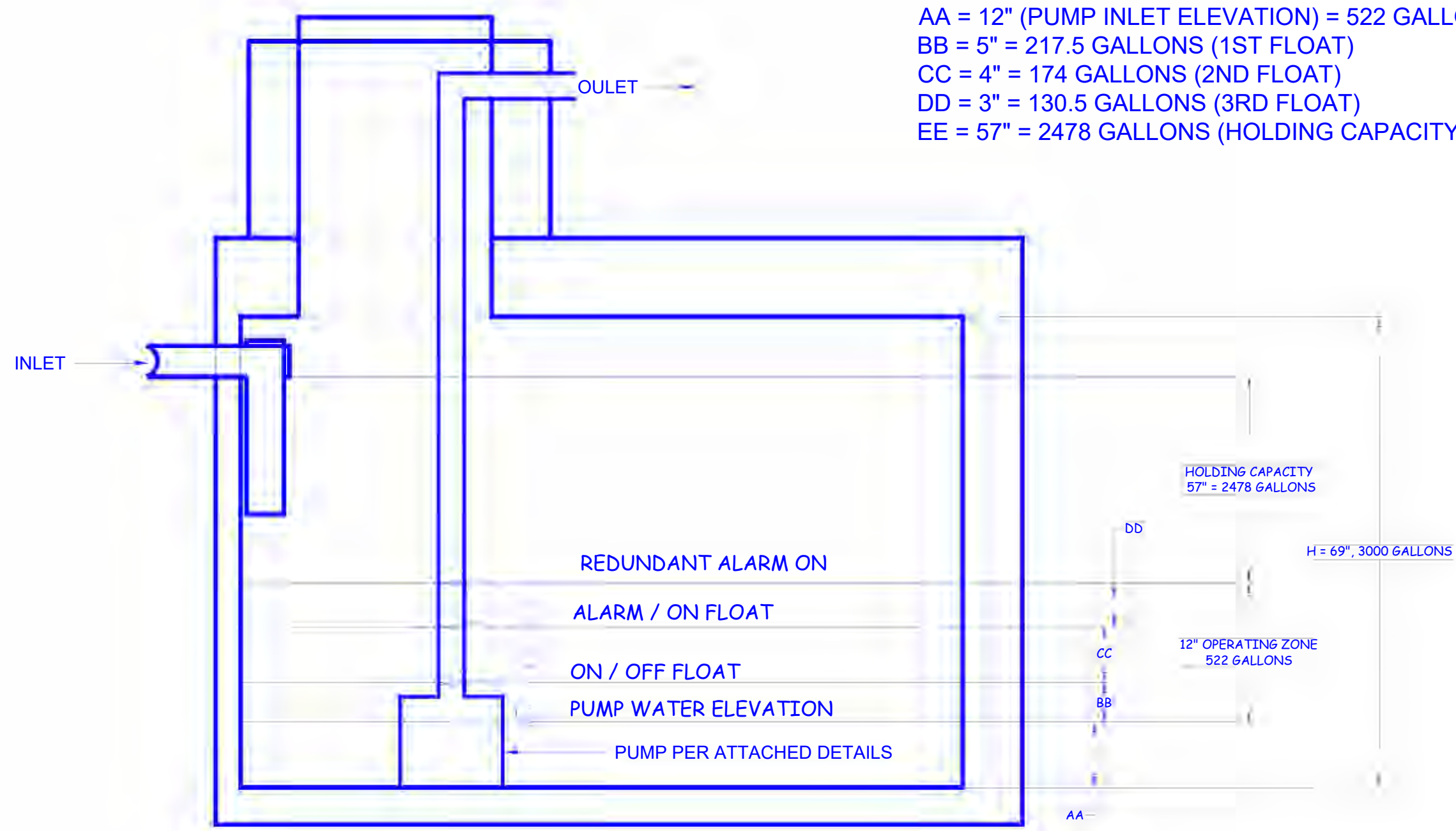
TOTAL SEEPAGE PITS DEPTH REQUIRED BELOW INLET = 162 FEET

APPENDIX H

PUMP CHAMBER DESIGN DETAILS

REQUIRED HOLDING CAPACITY = $\frac{2}{3}$ DAILY FLOW = 2333 GALLONS.
PROPOSED PUMP CHAMBER 2500
2500 GALLON CAPACITY
JENSEN PRECAST MODEL JZ 2500
RATED AT 43.5 GALLONS PER VERTICAL INCH

FLOAT ELEVATIONS / DISTANCES
AA = 12" (PUMP INLET ELEVATION) = 522 GALLONS
BB = 5" = 217.5 GALLONS (1ST FLOAT)
CC = 4" = 174 GALLONS (2ND FLOAT)
DD = 3" = 130.5 GALLONS (3RD FLOAT)
EE = 57" = 2478 GALLONS (HOLDING CAPACITY AFTER ALARM)



PUMP CHAMBER DETAILS	
LOCATED AT 15135 WOODS VALLEY ROAD	
CITY OF VALLEY CENTER, SAN DIEGO COUNTY, CALIFORNIA	
APN189-162-16	
NAME	OHMAN 2ND DWELLING
CLIENT	MR. PAUL OHMAN
PROJECT NO.	182348-11A
DATE	AUGUST2018
SCALE	
REFERENCES	
PLATE NO.	
REFERENCES	

Earth Strata Geotechnical Services, Inc.

Geotechnical, Environmental and Materials Testing Consultants

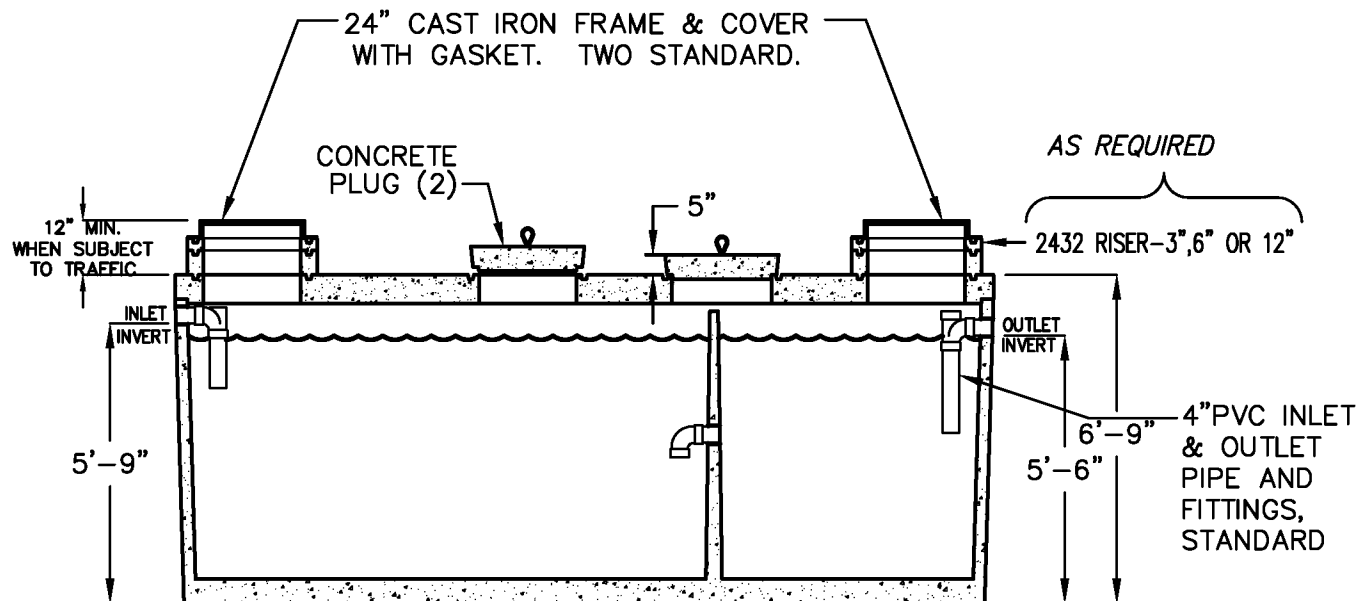
www.ESGSINC.com (951) 397-8315

3000 GALLON COMMERCIAL SEPTIC TANK

MODEL JZ3000

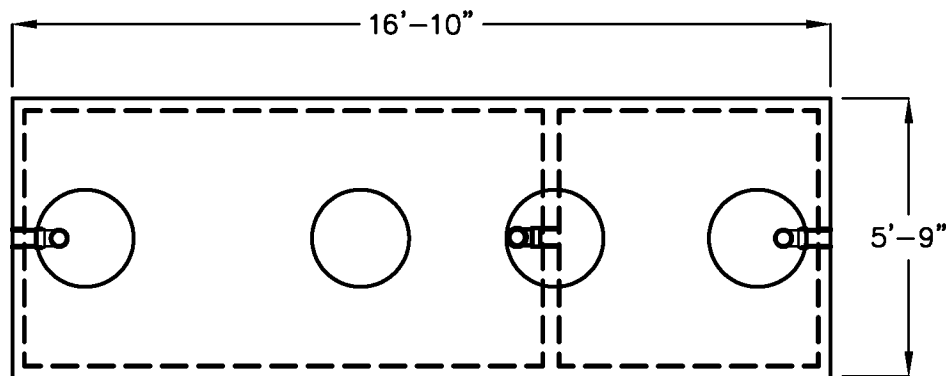
TRAFFIC RATED

ACCEPTED BY **UPC**®



**SIDE VIEW
CUTAWAY**

**TOP VIEW
(COVERS REMOVED)**

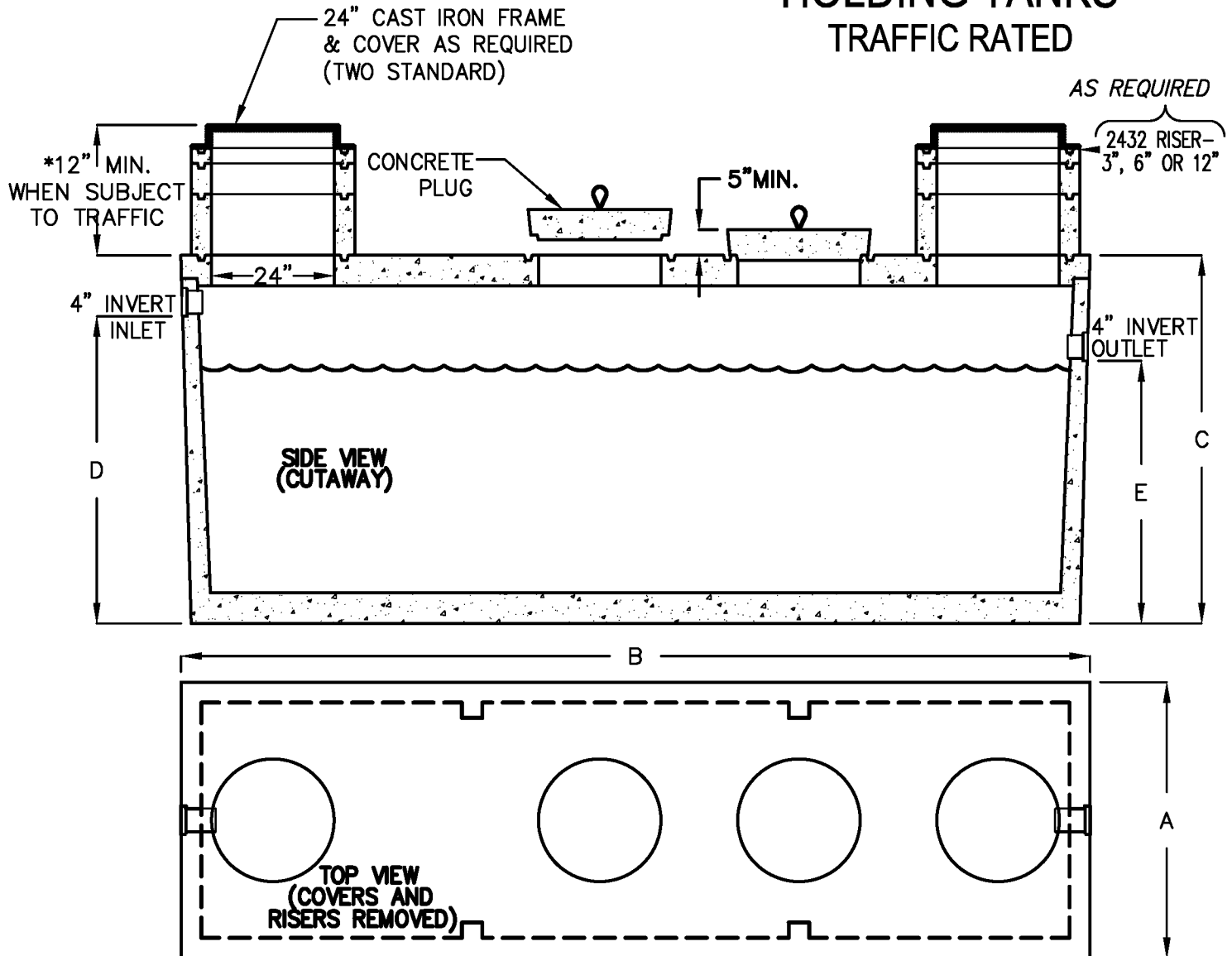


- LIQUID CAPACITY: 3000 GALLONS
- TANK DESIGNED FOR H-20 TRAFFIC WHEEL LOAD WITH DRY SOIL CONDITIONS (WATER TABLE BELOW TANK) EARTH COVER OVER TANK NOT TO EXCEED 5 FT.
- SUITABLE NATIVE OR SUB-BASE SHALL BE PREPARED TO HANDLE ANTICIPATED LOADS. THE EXCAVATION SHALL BE BEDDED WITH SUITABLE GRANULAR MATERIAL AND SHALL BE COMPACTED TO 90% MAXIMUM DRY DENSITY, OR TO REQUIREMENTS OF THE PROJECT GEOTECHNICAL ENGINEER.
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT JENSEN PRECAST.

MINIMUM EXCAVATION SIZE:
6'-9" X 17'-10" X DEPTH REQ'D.

THE DESIGN AND DETAIL OF THIS DRAWING ARE THE PROPERTY OF JENSEN PRECAST AND NOT TO BE USED EXCEPT IN CONNECTION WITH ITS OWN WORK. DESIGN AND INVENTION RIGHTS ARE RESERVED.

2,000 - 5,000 GALLON HOLDING TANKS TRAFFIC RATED



NOTE: NOT RECOMMENDED FOR POTABLE WATER OR ABOVE GROUND USE.
NO WARRANTIES EXPRESSED OR IMPLIED FOR MERCHANTABILITY OR
FITNESS FOR ANY PARTICULAR PURPOSE.

MODEL NUMBER	LIQUID CAPACITY GALLONS	TOTAL TANK VOLUME	WIDTH "A"	OVERALL LENGTH "B"	TANK HEIGHT "C"	INLET "D"	OUTLET "E"	MINIMUM EXCAVATION WIDTH	MINIMUM EXCAVATION LENGTH	* DEPTH OF BURY	MAX. LIFT WEIGHT
HP-2000	2000	2424	4'-11"	15'-11"	6'-0"	5'-0"	4'-9"	5'-11"	16'-11"	6' MAX.	19,100
HZ-2500	2500	3066	5'-9"	16'-10"	6'-0"	5'-0"	4'-9"	6'-9"	17'-10"	5' MAX.	22,700
HZ-3000	3000	3526	5'-9"	16'-10"	6'-9"	5'-9"	5'-6"	6'-9"	17'-10"	5' MAX.	24,000
HZ-4000	4000	4851	7'-8"	16'-7"	6'-9"	5'-6"	5'-3"	8'-8"	17'-7"	5' MAX.	22,100
HZ-5000	5000	5750	7'-8"	16'-7"	7'-11"	6'-9"	6'-6"	8'-8"	17'-7"	4' MAX.	24,100

LARGER SIZES AVAILABLE UPON REQUEST, CONTACT JENSEN PRECAST FOR DETAILS.

- TANK DESIGNED FOR H-20 TRAFFIC WHEEL LOAD WITH DRY SOIL CONDITIONS (WATER TABLE BELOW TANK).
- SUITABLE NATIVE OR SUB-BASE SHALL BE PREPARED TO HANDLE ANTICIPATED LOADS. THE EXCAVATION SHALL BE BEDDED WITH SUITABLE GRANULAR MATERIAL AND SHALL BE COMPACTED TO 90% MAXIMUM DRY DENSITY, OR TO REQUIREMENTS OF THE PROJECT GEOTECHNICAL ENGINEER.
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT JENSEN PRECAST.

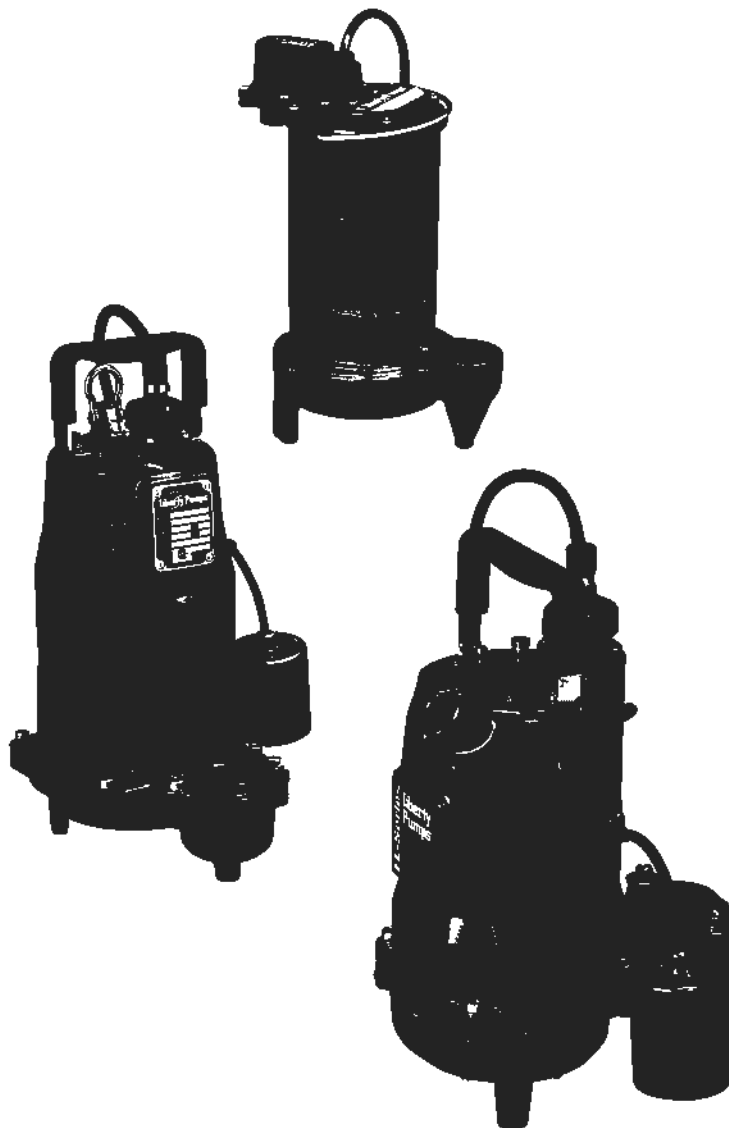
Installation Manual

7035000P

Submersible Dewatering/Effluent Pumps

Models

250-Series	1/3 hp
280-Series	1/2 hp
290-Series	3/4 hp
FL30-Series	1/3 hp
FL40-Series	1/2 hp
FL60-Series	6/10 hp
FLH60-Series	6/10 hp
FL70-Series	3/4 hp
FL100-Series	1 hp
FL150-Series	1-1/2 hp
FL200-Series	2 hp



Contents

<i>Safety Precautions</i>	3 EN
<i>General Information</i>	4 EN
<i>Operating Constraints</i>	4 EN
<i>Model Specifications</i>	4 EN
<i>Inspection and Storage</i>	4 EN
<i>Pump Design</i>	5 EN
<i>Pump System Components</i>	5 EN
<i>Preparation</i>	6 EN
<i>Installation</i>	7 EN
<i>Operation</i>	9 EN
<i>Maintenance and Troubleshooting</i>	10 EN
<i>Warranty</i>	12 EN

Safety Guidelines

	This safety alert symbol is used in the manual and on the pump to alert of potential risk for serious injury or death.
	This safety alert symbol identifies risk of electric shock . It is accompanied with an instruction intended to minimize potential risk of electric shock.
	This safety alert symbol identifies risk of fire . It is accompanied with an instruction intended to minimize potential risk of fire.
	This safety alert symbol identifies risk of serious injury or death . It is accompanied with an instruction intended to minimize potential risk of injury or death.
⚠ DANGER	Warns of hazards which, if not avoided, will result in serious injury or death.
⚠ WARNING	Warns of hazards which, if not avoided, could result in serious injury or death.
⚠ CAUTION	Warns of hazards which, if not avoided, could result in minor or moderate injury.
NOTICE	Signals an important instruction related to the pump. Failure to follow these instructions could result in pump failure or property damage.

⚠ WARNING	Read every supplied manual before using pump system. Follow all the safety instructions in manual(s) and on the pump. Failure to do so could result in serious injury or death.	
NOTICE	Installer: manual must remain with owner or system operator/maintainer.	
Record information from pump nameplate: Keep this manual handy for future reference. Pump Model #: _____ For replacement manual, visit LibertyPumps.com, or contact Liberty Pumps at 1-800-543-2550. Pump Serial #: _____ Manufacture Date: _____ Retain dated sales receipt for warranty. Install Date: _____		

Safety Precautions

WARNING **RISK OF ELECTRIC SHOCK**

- Accidental contact with electrically live parts, items, fluid, or water can cause serious injury or death.
- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.
- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code[®], the Occupational Safety and Health Administration, or applicable local codes and ordinances.
- Do not remove cord and strain relief, and do not connect conduit to pump.
- Pump shall be properly grounded using its supplied grounding conductor. Do not bypass grounding wires or remove ground prong from attachment plugs. Failure to properly ground the pump system can cause all metal portions of the pump and its surroundings to become energized.
- Do not handle or unplug the pump with wet hands, when standing on damp surface, or in water unless wearing Personal Protective Equipment.
- Always wear dielectric rubber boots and other applicable Personal Protective Equipment (PPE) when water is on the floor and an energized pump system must be serviced, as submerged electrical connections can energize the water. Do not enter the water if the water level is higher than the PPE protection or if the PPE is not watertight.
- Do not lift or carry a pump or a float assembly by its power cord. This will damage the power cord, and could expose the electrically live wires inside the power cord.
- The electrical power supply shall be located within the length limitations of the pump power cord, and for below grade installations it shall be at least 4 ft (1.22 m) above floor level.
- Do not use this product in applications where human contact with the pumped fluid is common (such as swimming pools, fountains, marine areas, etc.).
- Protect the power and control cords from the environment. Unprotected power and control (switch) cords can allow water to wick through ends into pump or switch housings, causing surroundings to become energized.
- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.

WARNING **RISK OF FIRE**

- Do not use an extension cord to power the product. Extension cords can overload both the product and extension cord supply wires. Overloaded wires will get very hot and can catch on fire.

- This product requires a separate, properly fused and grounded branch circuit, sized for the voltage and amperage requirements of the pump, as noted on the nameplate. Overloaded branch circuit wires will get very hot and can catch on fire. When used, electrical outlets shall be simplex of the appropriate rating.
- For cord replacement: power cord must be of the same length and type as originally installed on the Liberty Pumps product. Use of incorrect cord may lead to exceeding the electrical rating of the cord and could result in death, serious injury, or other significant failure.
- Do not use this product with or near flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. If rotating elements inside pump strike any foreign object, sparks may occur. Sparks could ignite flammable liquids.
- Sewage and effluent systems produce and may contain flammable and explosive gases. Prevent introduction of foreign objects into basin as sparks could ignite these gases. Exercise caution using tools and do not use electronic devices or have live, exposed electrical circuits in or around basins, open covers and vents.
- Manual pumps that have been factory constructed with a power cord with no male attachment plug must use an approved motor control panel. Do not wire a switch in series with the pump power cord as this can overload the wires. Overloaded wires get very hot and can catch on fire.
- These pumps are not to be installed in locations classified as hazardous in accordance with the National Electric Code[®], ANSI/NFPA 70.

WARNING **RISK OF SERIOUS INJURY OR DEATH**

- Do not modify the pump/pump system in any way. Modifications may affect seals, change the electrical loading of the pump, or damage the pump and its components.
- All pump/pump system installations shall be in compliance with all applicable Federal, State, and Local codes and ordinances.
- Do not allow children to play with the pump system.
- Do not allow any person who is unqualified to have contact with this pump system. Any person who is unaware of the dangers of this pump system, or has not read this manual, can easily be injured by the pump system.
- In 208/230V installations, one side of the line going to the pump is always "hot", whether the float switch is on or off. To avoid hazards, install a double pole disconnect near the pump installation.
- Vent basin in accordance with local code. Proper venting of sewer and effluent gases alleviates poisonous gas buildup and reduces the risk of explosion and fire from these flammable gases.
- Wear adequate Personal Protective Equipment when working on pumps or piping that have been exposed to wastewater. Sump and sewage pumps often handle materials that can transmit illness or disease upon contact with skin and other tissues.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.

- Do not remove any tags or labels from the pump or its cord.
- Keep clear of suction and discharge openings. To prevent injury, never insert fingers into pump while it is connected to a power source.
- Do not use this product with flammable, explosive, or corrosive fluids. Do not use in a flammable and/or explosive atmosphere as serious injury or death could result.
- This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. www.p65warnings.ca.gov.

NOTICE

- ◆ Verify 3-phase pumps for correct rotation prior to installing pump(s) in basin. To change rotation, reverse any two of the three power leads to the pump (not the ground). Code the wires for reconnection after installation.
- ◆ Do not dispose of materials such as paint thinner or other chemicals down drains. Doing so could chemically attack and damage pump system components and cause product malfunction or failure.
- ◆ Do not use pumps with fluid over 140°F (60°C). Operating the pump in fluid above this temperature can overheat the pump, resulting in pump failure.
- ◆ Do not use pump system with mud, sand, cement, hydrocarbons, grease, or chemicals. Pump and system components can be damaged from these items causing product malfunction or failure. Additionally, flooding can occur if these items jam the impeller or piping.
- ◆ Do not introduce any consumer item that is not toilet paper into a non-grinder (dewatering/effluent or sewage) pump/pump system. This includes, but is not limited to the following: feminine products, wipes, towels, towelettes, dental floss, swabs, pads, etc. Items such as these put the pump under undue strain and can result in pump/pump system failure. Additionally, it creates conditions for discharge line blockage.
- ◆ Do not run dry.
- ◆ Do not exert heavy pressure or run heavy equipment on the backfill material as this could cause the tank to collapse.
- ◆ Do not position the pump float directly under the inlet from drain tile or in the direct path of any incoming water.
- ◆ Keep pump upright.
- ◆ Do not allow pump to freeze.
- ◆ At no time shall the pump be stored within an incomplete wet basin. The pump shall not be placed into the basin until it can be fully operational.
- ◆ Effluent pumps need to be totally submerged below the water line to prevent pump corrosion.

General Information

Before installation, read these instructions carefully. Each pump is individually factory tested to ensure proper performance. Closely following these instructions will eliminate potential operating problems, assuring years of trouble-free service.

These pumps are to be used for handling septic tank effluent and drain (storm) water.

Provide pump serial number in all correspondence.

Pumps are certified to CSA® and UL® standards.

Pumps must be serviced at a qualified repair facility approved by Liberty Pumps. No repair work should be carried out during the warranty period without prior factory approval. Any unauthorized field repairs void warranty. Contact Liberty Pumps at 1-800-543-2550 to locate the closest authorized service center.

Operating Constraints

It is extremely important to verify that the pump has been sized correctly for the intended installation. The operating point of the pump must lie within the acceptable range as outlined by the applicable Liberty Pumps performance chart. Operating the pump outside of the recommended range can invalidate the CSA Certification of the pump and can also cause damage and premature failure. Operating outside of the recommended range can cause the pump to exceed its rated nameplate amp draw, which will void the pump certification. It can also cause motor overheating, cavitation, excessive vibration, clogging, and poor energy efficiency.

Model Specifications

For complete listing of pump models and their specifications, refer to <http://www.LibertyPumps.com/About/Engineering-Specs>. Pump nameplate provides a record of specific pump information.

Inspection and Storage

Initial Inspection

Inspect pump immediately for damage that may have occurred in shipment.

1. Visually check the pump and any spare parts for damage.
2. Check for damaged electrical wires, especially where they exit the motor housing.

Contact Liberty Pumps customer service to report any damage or shortage of parts.

Storage Before Use

WARNING **RISK OF ELECTRIC SHOCK**

- Protect the power and control cords from the environment. Unprotected power and control (switch) cords can allow water to wick through ends into pump or switch housings, causing surroundings to become energized.

NOTICE

- ◆ At no time shall the pump be stored within an incomplete wet basin. The pump shall not be placed into the basin until it can be fully operational.
- ◆ Do not allow the pump to freeze.

Pumps are shipped from the factory ready for installation and use. Hold the pump in storage if the pump station is not complete.

If storage is necessary, the pump should remain in its shipping container. It should be stored in a warehouse or storage shed that has a clean, dry temperature-stable environment where the pump and its container are covered to protect it from water, dirt, vibration, etc. The cord ends must be protected against moisture.

Uninstalled pumps that are idle for greater than three months should have impellers manually rotated once a month to lubricate the seals.

Installed pumps that are idle for greater than one month should have impellers manually operated through the breaker panel once a month to lubricate the seals. For **automatic models**, turn off the breaker, unplug the piggyback switch, and plug the pump directly into the wall socket. Turn the breaker on for 30 seconds, then turn the breaker off. Plug the piggyback switch back in. Refer to *Piggyback Switch Operation* on page 7.

Pump Design

All Liberty Pumps dewatering/effluent pumps come equipped with an air bleed hole in the base of the pump to help prevent airlock. A small spray of water from this hole is normal while pump is running.

For added protection, consider the addition of a back-up pump, as well as an alarm in applications where loss of pump function could result in property damage. If an alarm is used, it must be connected to a separate electrical circuit.

Pump System Components

Control Panel

Manual models ("**M**" suffix) and 3-phase models require a separate, approved pump control device or panel for automatic operation. Operation will be according to the control panel selected. Refer to separate manufacturer's instructions supplied with the unit. Verify the electrical specifications for the control panel properly match those of the pump. 3-phase models require overload elements selected or adjusted in accordance with the control or panel instructions.

Mounting, installation, and wiring connections are specific to the control panel used. Refer to the manufacturer's instructions supplied with the unit.

IMPORTANT: When connecting a new pump to an existing control panel, verify the panel is correctly sized and equipped for the pump.

Control panels designed for use with specific pumps available from Liberty Pumps can be found at http://www.LibertyPumps.com/Portals/0/Files/panel_selection_guide.pdf or contact Liberty Pumps.

Float Switches

WARNING **RISK OF ELECTRIC SHOCK**

- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.

Automatic Models

All FL-Series automatic models ("**A**" suffix) and Models 253, 283 and 293 come factory-equipped with a float switch mounted to the pump. These models come with two cords—one to the float switch and the other to the pump motor. The switch cord has a series (piggyback) plug enabling the pump motor cord to be plugged into the back of it. The purpose of this design is to allow temporary manual operation of the pump.

For manual operation, or in the event of float switch failure, the pump cord can be separated and plugged into the electrical outlet, directly bypassing the switch. Refer to *Piggyback Switch Operation* on page 7.

If using a differential other than the factory setting, verify that when the pump turns off, the minimum fluid level left in the basin is per Table 1 so the impeller remains submerged. A minimum cord length of 3-1/2" from the tether point to the top surface of the float is required for proper switch operation.

Models 251, 257, 281, 287, 291, and 297 have factory-preset float switches that are not adjustable. Other pumping differentials may be obtained by tethering the switch cord to the discharge pipe.

Switchless (Manual) Models

Manual pumps with no float switch are intended to be run using an approved liquid level control or approved motor control with correct rating that matches motor input in full load amperes. Regardless of the control type, verify that when the pump shuts off, the minimum fluid level left in the basin is per Table 1 so the impeller remains submerged.

IMPORTANT: Manual pumps factory constructed with a power cord with no male attachment plug must use an approved motor control panel. **Do not wire a switch in series with the pump power cord.**

Automatic operation with optional control devices: if the pump(s) are to be operated by either a simplex or duplex control panel or other optional control device, follow the manufacturer's instructions provided with the control panel for power connections.

Float Switch Settings

Table 1 includes factory set float levels for automatic models. The turn OFF level must be maintained as it is the **minimum** water depth to ensure proper cooling. Manual pumps have user-set turn ON levels.

Table 1. Factory Set Float Switch Settings

Model	Turn OFF Level	Turn ON Level
250	4"	user-set
251, 253	4"	11"
257	4"	7"
280	4"	user-set
281, 283	7"	13"
287	4"	9.5"
290	4"	user-set
291, 293	7"	13"
297	4"	9.5"
FL30	5"	12"
		
FL60	6"	13"
FL70	6"	13"
FLH60	6"	13"
FL100	8"	15"
FL150	8"	15"
FL200	8"	15"

Preparation

WARNING **RISK OF ELECTRIC SHOCK**

- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.

The basin required for effluent applications must be sealed and vented to meet health and plumbing code requirements. Proper basin size and materials for effluent applications vary depending on the type of effluent system and local codes. Check local codes prior to purchasing and installing the basin. Follow the manufacturer's recommended guidelines for installation of the basin. A minimum diameter of 18" and depth of 24" is required for proper pump operation, but larger basins are preferred for longer pump cycles and increased float switch life. Installation should be at a sufficient depth to ensure that all plumbing is below the frost line. If this is not feasible, size the basin and/or adjust the pump differential to accommodate the additional backflow.

For ordinary ground water pumping applications, it is recommended that the sump basin diameter be a **minimum** of 14". Vertical Magnetic Float (VMF) models 257, 287, and 297 may be used in a **minimum** 10" diameter sump; however, a larger diameter basin is preferred as it allows for a longer pump cycle and reduced float switch cycling. The depth of the basin should be a **minimum** of 18".

Prepare Existing Sump [Basin]

If replacing a previously installed pump, prepare the basin by removing the old pump and cleaning any debris from the basin. Inspect all remaining equipment in the basin including piping, valves, and electrical junction boxes (if present) and repair or replace as appropriate.

If the basin is not already enclosed on the bottom, provide a hard level bottom of bricks or concrete. Do not place the pump directly on earth, gravel, or debris since this can cause excessive wear of the impeller and possible jamming.

"The Brick" (Liberty Pumps #4445000) is a pre-molded stable platform designed to fit the 250, 280, and 290-Series submersible pumps. It raises the pump 2-1/2" off the bottom of the basin, reducing the potential for jamming from rocks and debris. Contact a local distributor to order.

Prepare New Sump [Basin]

Excavation

WARNING **RISK OF SERIOUS INJURY OR DEATH**

- Locate all overhead and underground utilities before excavating.

Excavate the hole as small as possible, with a minimum recommended 8" diametrical clearance around the tank. Never place the basin directly in contact with rocks or other sharp objects. Place only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone as bedding between the basin and the hole walls. 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.

Inlet Connection & Initial Backfill

Use only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone around the bottom of the basin to hold it in place. Do not use sand or native soil as backfill.

Make the inlet connection as required per basin.

Final Backfill

NOTICE

- Do not exert heavy pressure or run heavy equipment on the backfill material as this could cause the tank to collapse.

Keep large rocks, clods, and foreign objects out of the backfill material. Only fine, 1/4" to 3/4" pea gravel, or 1/8" to 1/2" washed, crushed stone is recommended. Do not use sand or native soil as backfill. Mound the backfill slightly and allow for natural settling. Provide access to the basin cover for maintenance and service.

Compaction of backfill materials must be adequate to ensure the support of the tank, and to prevent movement or settlement.

Installation

⚠️ WARNING ⚡ RISK OF ELECTRIC SHOCK

- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code®, the Occupational Safety and Health Administration, or applicable local codes and ordinances.

Electrical Connections

With main power disconnected, complete pump and control wiring connections per manufacturer's wiring diagrams included with the control panel as applicable. Once connections are made, all wires should be checked for unintentional grounds.

3-Phase Pump Rotation Verification

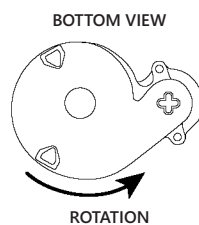
NOTICE

- ◆ Check 3-phase pumps for correct rotation prior to installing pump(s) in basin. To change rotation, reverse any two of the three power leads to the pump (not the ground). Code the wires for reconnection after installation.

3-phase power uses three separate alternating currents that peak at different intervals. With pumps that are powered by three phase electric, the phase sequence of the motor must match the phase sequence of the power source. When the phase sequences match, the pump operates properly.

However, when the phases are out of order, the pump runs backward (i.e., the impeller rotates in the wrong direction). This causes an extreme loss of performance and could raise the current draw, which could result in tripping an overload or circuit breaker.

To ensure that the power to the pump is installed correctly, always verify proper rotation **before** lowering it into the basin. If the pump is rotating in the wrong direction, turn off the power and reverse any two leads to the pump (not ground). This reverses the phase sequence and corrects the pump rotation. For 3-phase pumps, rotation must be counterclockwise when looking from the bottom of the pump. Label the wires for reconnection after installation.



Guide Rail System

If guide rails are used, refer to the separate instructions supplied with the unit for proper installation and operation, making sure all gaskets and components are present. Liberty Pumps Guide Rail System features a self-aligning mounting bracket. Contact Liberty Pumps for available models, such as GR22 and GR30 for FL-Series models.

If guide rails are not used, complete all pump-mounted plumbing at this time, being sure all gaskets and components are present.

Pump

Record information from pump nameplate onto inside cover of these instructions. Complete a visual inspection before lowering into basin.

Discharge

A check valve is required to prevent the backflow of liquid after each pumping cycle. A gate valve should follow the check valve to allow periodic cleaning of the check valve or removal of the pump. The remainder of the discharge line should be as short as possible with a minimum number of turns to minimize friction head loss.

Do not reduce the discharge to below that which is provided on the pump. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if questions arise regarding proper pipe size and flow rates.

Vent

Vent basin in accordance with applicable plumbing codes.

Piggyback Switch Operation

⚠️ WARNING ⚡ RISK OF ELECTRIC SHOCK

- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.

IMPORTANT: Verify breaker is turned off before plugging in the switch.

Plug the piggyback switch into the receptacle. The receptacle must be wired to an appropriately sized breaker. Plug the pump into the piggyback receptacle. Install the cable clamp (if supplied) for strain relief.

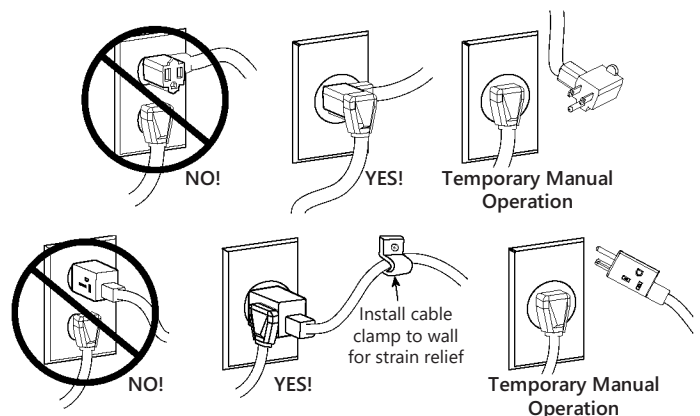


Figure 1. Piggyback Switch Operation

Automatic Pump Direct Wiring

WARNING **RISK OF SERIOUS INJURY OR DEATH**

- In 208/230V installations, one side of the line going to the pump is always “hot”, whether the float switch is on or off. To avoid hazards, install a double pole disconnect near the pump installation.

If a 1-phase pump will be wired directly into a junction box, and it is necessary to remove the plug, a certified electrician shall complete the wiring in accordance with the National Electric Code and applicable local codes. A disconnecting means for the pump shall be located in sight from the pump/basin location. See Figure 2 for direct wire installation of 1-phase, automatic pumps.

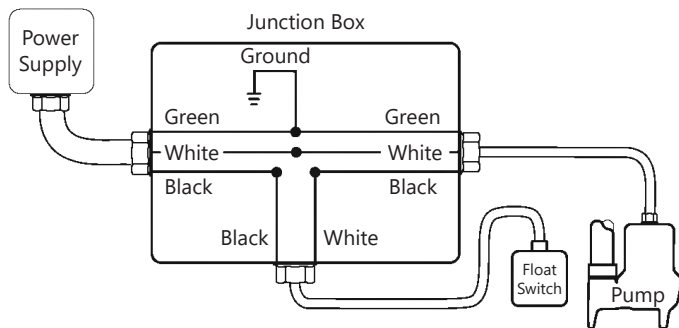


Figure 2. Direct Wiring of 115 V or 208/230 V, 1-Phase, Automatic

Dewatering/Sump System Application

A securable sump basin cover is required for safety and to prevent foreign objects from entering the basin.

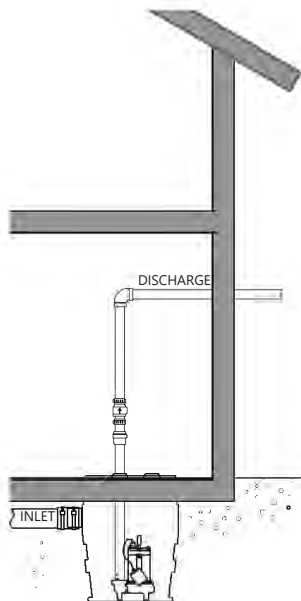
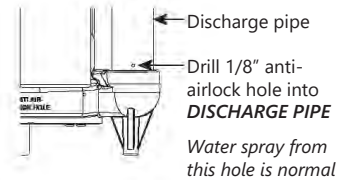


Figure 3. Typical Sump Installation (variations may apply)

1. Place pump in basin making certain the mounting interface (i.e., guide rail, torque stop) is engaged correctly. Float switch must have adequate clearance to side wall of basin and free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects.

A 1-1/2" threaded discharge is provided for connection of the discharge pipe. **Do not restrict the discharge to below that which is provided on the pump.** Schedule 40 PVC pressure pipe is recommended.

2. Connect discharge pipe to the discharge of the pump. Hand-tighten only. Over-tightening may cause the pump housing to crack.
3. Install a union or other means of separating the discharge line just above the floor to facilitate removal of the pump when necessary. A check valve is **required** just above or in place of the union to prevent the backflow of water after each pump cycle.
4. Connect additional piping as needed to direct the discharge to the desired location. Discharge should be kept as short as possible with a minimum number of turns.
5. Check all connections.
6. Check valve usage requires drilling an 1/8" anti-airlock hole in the discharge pipe just above the pump's discharge outlet to prevent pump airlock.



Effluent System Application

VMF models (257, 287, and 297) are **not** recommended for effluent applications due to their short ON/OFF cycle. Wide-angle float models are better suited for effluent applications and are easily adjustable for different ON/OFF levels.

A securable basin cover is required for safety and to prevent foreign objects from entering the basin.

Simplex (One Pump) Systems

NOTICE

- ◆ Effluent pumps need to be totally submerged below the water line to prevent pump corrosion.

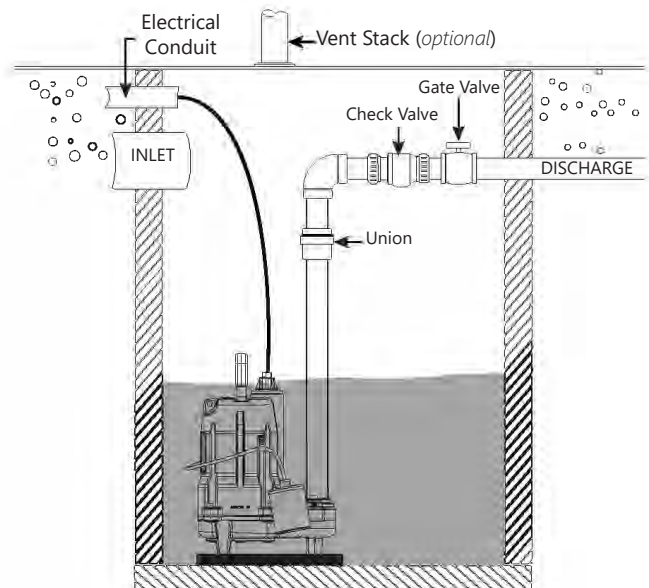


Figure 4. Typical Simplex System Installation (variations may apply)

1. Place pump in basin making certain the mounting interface (i.e., guide rail, torque stop) is engaged correctly. Float switch must have adequate clearance to side wall of basin and free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects.
2. If an optional control device or float is used, follow the separate manufacturer's directions for mounting. Minimum pump turn OFF level must not be set below Table 1 values.
3. Connect the discharge pipe to the pump's threaded discharge. **Do not reduce the discharge pipe size below that which is provided on the pump.**
4. Install the remaining discharge line.
5. Install a union to facilitate pump removal when necessary.
6. Install a check valve after the union to prevent the backflow of liquid after each pumping cycle.
7. Install a gate valve after the check valve to allow periodic cleaning of the check valve or removal of the pump.
8. Install the remainder of the discharge line as short as possible with a minimum number of turns to minimize friction head loss. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.
9. Mount and properly seal the basin cover.
10. Vent basin in accordance with applicable plumbing codes.

Duplex (Two Pump) Systems

NOTICE

- ◆ Effluent pumps need to be totally submerged below the water line to prevent pump corrosion.

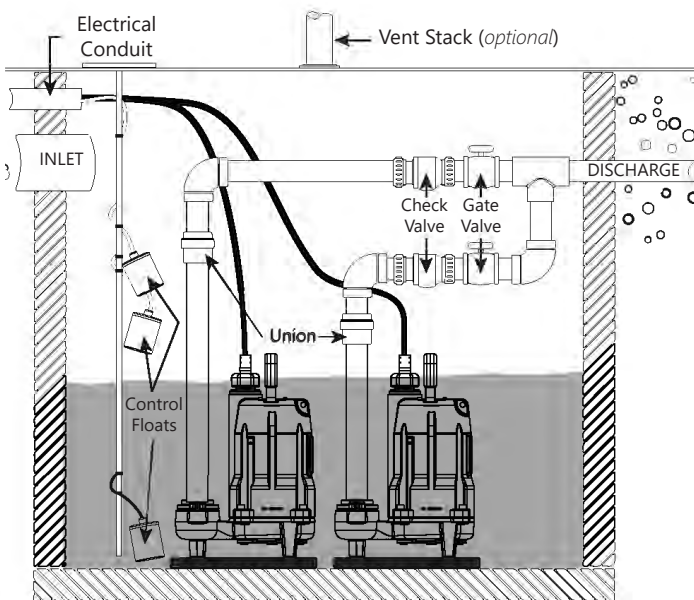


Figure 5. Typical Duplex System Installation (variations may apply)

1. Place both pumps in basin, making certain the mounting interface (i.e., guide rail, torque stop) is engaged correctly. The duplex control used will include 3 or 4 floats that will either be tethered to one of the discharge pipes or to an independent rod or bracket. Follow the duplex control manufacturer's instructions provided with the device. Each float switch must have adequate clearance to side wall of basin and free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects. Minimum pump turn OFF level must not be set below Table 1 values.
2. Connect an individual discharge pipe to each pump. **Do not reduce the discharge pipe size below that which is provided on the pump.** Larger pipe sizes may be required in some applications to reduce friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.
3. Install unions or flexible connectors to facilitate removal of the pump if necessary.
4. Install check valves on each discharge after the union and prior to the gate valve to prevent the back flow of liquid or gas. **A check valve on each discharge line, prior to tying into one common line, is necessary to prevent the recycling of fluid from one pump to the other.** A gate valve is recommended after the check valve to allow for periodic cleaning of the check valve or removal of the pump. Depending on the height of the basin, the check valves may either be installed inside the basin or outside the basin.
5. Install the remainder of the discharge line as short as possible with a minimum number of turns to minimize friction head loss. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.
6. Mount and properly seal the basin cover.
7. Vent basin in accordance with applicable plumbing codes.

Operation

Starting System

1. Verify all plumbing components are installed correctly and functional. Verify all valves are open and ready for pump use.
2. Double check all wire connections. Re-tighten all factory and field connections.
3. Ensure pump has no obstructions.
4. With all electrical and mechanical connections complete and secure, turn on power to pump and control panel, if applicable.
5. Verify operation of the pump, floats, and alarm circuits.
6. Run several cycles of water through the system to verify correct control operation for the installation.

Be certain to complete adequate testing, especially on systems with multiple pumps or custom control configurations.

Maintenance and Troubleshooting

⚠ WARNING **RISK OF ELECTRIC SHOCK**

- Accidental contact with electrically live parts, items, fluid, or water can cause serious injury or death.
- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.

⚠ WARNING **RISK OF SERIOUS INJURY OR DEATH**

- Wear adequate Personal Protective Equipment when working on pumps or piping that have been exposed to wastewater. Sump and sewage pumps often handle materials that can transmit illness or disease upon contact with skin and other tissues.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.

NOTICE

- ◆ Verify correct 3-phase pump rotation before retuning to service.

Maintenance

Check pump frequently for debris and/or build up that may interfere with pump or float switch operation. As the motor is oil-filled, no lubrication or other maintenance is required.

In the event the pump becomes clogged, the inlet screen can be removed to gain access to the pump impeller. Once the obstruction is removed, the anti-airlock hole should be cleaned.

Troubleshooting

No repair work shall be carried out during the warranty period without prior factory approval. To do so may void the warranty.

Liberty Pumps, Inc. assumes no responsibility for damage or injury due to disassembly in the field. Disassembly, other than an authorized repair facility approved by Liberty Pumps or its authorized service centers, automatically voids warranty.

Table 2. Troubleshooting Matrix

Problem	Possible Cause	Corrective Action
Pump does not start.	Damaged power or control cord.	Replace as needed.
	Control panel selector switch in OFF position.	Set selector switch to Hand or Auto position.
	Blown control circuit transformer fuse.	Replace fuse.
	Tripped circuit breaker, tripped GFCI, blown fuse, or other interruption of power.	Reset tripped circuit breaker, reset GFCI, replace blown fuse with properly sized fuse, check that the unit is securely plugged in, investigate power interruption.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Float switch unable to move to PUMP ON position due to interference in basin or other obstruction.	Position pump or float switch so that it has adequate clearance for free movement.
	Insufficient liquid level.	Verify liquid level is allowed to rise enough to activate float switch.
	Defective float switch.	Replace float switch.
	Obstructed impeller or volute.	Remove obstruction.
Pump runs, but does not turn off.	Loose wiring connections.	Check and tighten all connections.
	Pump is airlocked.	Turn pump off and let set for several minutes, then restart.
	Control panel selector switch in Hand position.	Set selector switch to Auto position.
	Float switch unable to move to PUMP OFF position due to interference with the side of basin or other obstruction.	Position pump or float switch so that it has adequate clearance for free movement.
	Control panel failure.	Check control panel.
	Defective float switch.	Replace float switch.

Table 2. Troubleshooting Matrix (continued)

Problem	Possible Cause	Corrective Action
Pump runs or hums, but does not pump.	Discharge line blocked or restricted.	Check discharge line for foreign material, including ice if discharge line passes through or into cold areas.
	Check valve is stuck closed or installed backward.	Remove check valve(s) and examine for freedom of operation and proper installation.
	Gate or ball valve is closed.	Open gate or ball valve.
	Total head (lift height) is beyond pump's capability.	Route piping to a lower level. If not possible, a larger pump may be required. Consult Liberty Pumps.
	Obstructed impeller or volute.	Remove obstruction.
	Pump is airlocked.	Turn pump off and let set for several minutes, then restart.
		Add baffle to reduce trapped air bubbles.
Pump cycles too frequently.	Improper float switch setting.	Adjust float switch setting.
	Check valve not installed, stuck open, or leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.
Pump runs periodically when fixtures are not in use.	Check valve not installed, stuck open, or leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.
	Fixtures are leaking.	Repair fixtures as required to eliminate leakage.
Pump does not deliver proper capacity.	Discharge valve(s) partially closed or clogged.	Check the discharge line for foreign material, including ice if the discharge line passes through or into cold areas.
	Check valve partially clogged.	Raise liquid level up and down to clear; remove check valve to remove obstruction.
	Incorrect 3-phase motor rotation.	Correct 3-phase pump rotation direction.
	Total head (lift height) is beyond pump's capability.	Route discharge piping to a lower level. If not possible, a larger pump may be required. Consult Liberty Pumps.
	Low liquid level.	Check liquid level.
	Obstruction in pump or piping.	Remove obstruction.
Pump operates noisily.	Piping attachments to building are too rigid.	Replace a portion of the discharge line with rubber hose or connector.
	Incorrect 3-phase motor rotation.	Correct 3-phase pump rotation direction.
	Foreign objects in the impeller cavity.	Clean the impeller cavity.
	Broken impeller.	Consult Liberty Pumps for information regarding impeller replacement.
Repeated tripping.	Circuit protection underrated.	Check rating and replace with proper size.
	Other appliance on same circuit.	Pump requires separate circuit.
	Pump is connected to an extension cord or wiring is inadequate or compromised.	Have an electrician check for proper wiring.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Obstruction in pump.	Remove obstruction.
	Incorrect 3-phase motor rotation.	Correct 3-phase pump rotation direction.
	Foreign matter buildup.	Clean motor housing.

Warranty

Liberty Pumps Wholesale Products Limited Warranty

Liberty Pumps, Inc. warrants that Liberty Pumps wholesale products are free from all factory defects in material and workmanship for a period of three (3) years from the date of purchase (excluding batteries). 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 three years from the date of manufacture noted on the pump nameplate.

The manufacturer's sole 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, operated, or maintained per manufacturer instructions; 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 temperatures above the advertised rating; if the pump has been used in water containing sand, lime, cement, gravel, or other abrasives; if the product has been used to pump chemicals, grease, or hydrocarbons; if a non-submersible motor has been subjected to moisture; or if the label bearing the model and serial 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 indirect, incidental, and 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
ph: 800-543-2550
fax: 585-494-1839
www.LibertyPumps.com

TOTAL DYNAMIC HEAD CALCULATION SHEET



JOB #: 245589-11A
 CLIENT: JOHN SALDAT
 PROJECT: SOLDAT OFFICE BUILDING
 DATE: 7/1/2024

CALCULATION SHEET #: 1

PROJECT APN
 TRACT:
 PROJECT ADDRESS

282-121-001
 TEMESCAL CANYON ROAD, CORONA CA

MINIMUM PUMP CAPACITY	25 GPM
PIPE SIZE	2 INCH
FRICTION HEAD LOSS/100 FEET OF PIPE	ACTUAL IS 1.2 FEET / 100 FOOT FT.
PIPE TYPE	PVC SCH. 40 2.4

HEAD LOSS DUE TO FRICTION

DISTANCES	
DISTANCE FROM PUMP TANK TO FIELD	ACTUAL IS 300 FEET 300 FT.
FITTINGS EQUIVALENT LENGTH	100 FT.
TOTAL EQUIVALENT PIPE LENGTH	400 FT.
HEAD LOSS DUE TO FRICTION	9.6 FT.
	USE 5 FEET MINIMUM

STATIC HEAD

ELEVATIONS	
DEPTH OF PUMP IN TANK	6 FT.
TOTAL ELEVATION INCREASE OR DECREASE	
ELEVATIONS ARE 885 AND 912	ACTUAL IS 20 FEET 26 FT.
TOTAL STATIC HEAD	32 FT.

TOTAL DYNAMIC HEAD = TOTAL STATIC HEAD + HEAD LOSS DUE TO FRICTION
TOTAL DYNAMIC HEAD = 41.60 FT. ROUNDED TO 42 FEET
PUMP CAPACITY 25 GPM

PUMP

LIBERTY PUMP, SUBMERSIBLE EFFLUENT PUMP OR APPROVED EQUIVALENT
 MODEL: FL50 SERIES 1/2 HP
 GPM 25
 HP 1/2
 PHASE 1
 HZ 60
 VOLTAGE 115



A Family and Employee Owned Company

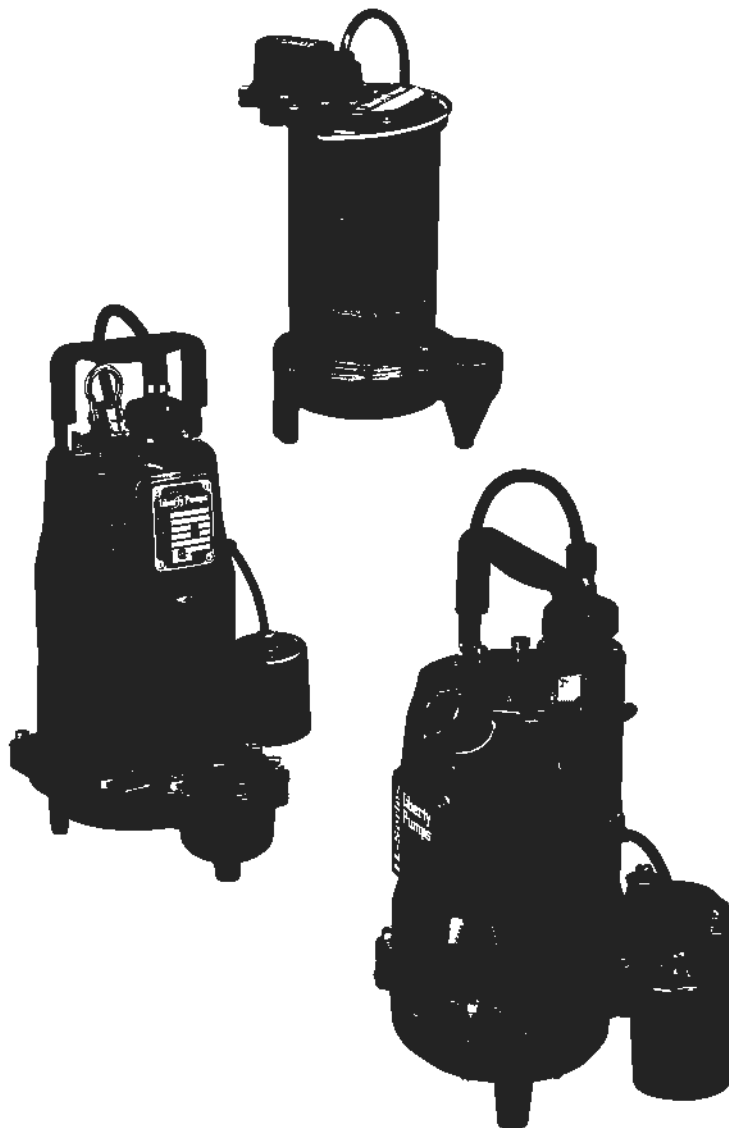
Installation Manual

7035000P

Submersible Dewatering/Effluent Pumps

Models

250-Series	<i>1/3 hp</i>
280-Series	<i>1/2 hp</i>
290-Series	<i>3/4 hp</i>
FL30-Series	<i>1/3 hp</i>
FL50-Series	<i>1/2 hp</i>
FL60-Series	<i>6/10 hp</i>
FLH60-Series	<i>6/10 hp</i>
FL70-Series	<i>3/4 hp</i>
FL100-Series	<i>1 hp</i>
FL150-Series	<i>1-1/2 hp</i>
FL200-Series	<i>2 hp</i>



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Safety Guidelines

	This safety alert symbol is used in the manual and on the pump to alert of potential risk for serious injury or death.
	This safety alert symbol identifies risk of electric shock . It is accompanied with an instruction intended to minimize potential risk of electric shock.
	This safety alert symbol identifies risk of fire . It is accompanied with an instruction intended to minimize potential risk of fire.
	This safety alert symbol identifies risk of serious injury or death . It is accompanied with an instruction intended to minimize potential risk of injury or death.
⚠ DANGER	Warns of hazards which, if not avoided, will result in serious injury or death.
⚠ WARNING	Warns of hazards which, if not avoided, could result in serious injury or death.
⚠ CAUTION	Warns of hazards which, if not avoided, could result in minor or moderate injury.
NOTICE	Signals an important instruction related to the pump. Failure to follow these instructions could result in pump failure or property damage.

⚠ WARNING	Read every supplied manual before using pump system. Follow all the safety instructions in manual(s) and on the pump. Failure to do so could result in serious injury or death.	
NOTICE	Installer: manual must remain with owner or system operator/maintainer.	
Record information from pump nameplate: Keep this manual handy for future reference. Pump Model #: _____ For replacement manual, visit LibertyPumps.com, or contact Liberty Pumps at 1-800-543-2550. Pump Serial #: _____ Manufacture Date: _____ Retain dated sales receipt for warranty. Install Date: _____		

Safety Precautions

WARNING **RISK OF ELECTRIC SHOCK**

- Accidental contact with electrically live parts, items, fluid, or water can cause serious injury or death.
- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.
- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code[®], the Occupational Safety and Health Administration, or applicable local codes and ordinances.
- Do not remove cord and strain relief, and do not connect conduit to pump.
- Pump shall be properly grounded using its supplied grounding conductor. Do not bypass grounding wires or remove ground prong from attachment plugs. Failure to properly ground the pump system can cause all metal portions of the pump and its surroundings to become energized.
- Do not handle or unplug the pump with wet hands, when standing on damp surface, or in water unless wearing Personal Protective Equipment.
- Always wear dielectric rubber boots and other applicable Personal Protective Equipment (PPE) when water is on the floor and an energized pump system must be serviced, as submerged electrical connections can energize the water. Do not enter the water if the water level is higher than the PPE protection or if the PPE is not watertight.
- Do not lift or carry a pump or a float assembly by its power cord. This will damage the power cord, and could expose the electrically live wires inside the power cord.
- The electrical power supply shall be located within the length limitations of the pump power cord, and for below grade installations it shall be at least 4 ft (1.22 m) above floor level.
- Do not use this product in applications where human contact with the pumped fluid is common (such as swimming pools, fountains, marine areas, etc.).
- Protect the power and control cords from the environment. Unprotected power and control (switch) cords can allow water to wick through ends into pump or switch housings, causing surroundings to become energized.
- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.

WARNING **RISK OF FIRE**

- Do not use an extension cord to power the product. Extension cords can overload both the product and extension cord supply wires. Overloaded wires will get very hot and can catch on fire.

- This product requires a separate, properly fused and grounded branch circuit, sized for the voltage and amperage requirements of the pump, as noted on the nameplate. Overloaded branch circuit wires will get very hot and can catch on fire. When used, electrical outlets shall be simplex of the appropriate rating.
- For cord replacement: power cord must be of the same length and type as originally installed on the Liberty Pumps product. Use of incorrect cord may lead to exceeding the electrical rating of the cord and could result in death, serious injury, or other significant failure.
- Do not use this product with or near flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. If rotating elements inside pump strike any foreign object, sparks may occur. Sparks could ignite flammable liquids.
- Sewage and effluent systems produce and may contain flammable and explosive gases. Prevent introduction of foreign objects into basin as sparks could ignite these gases. Exercise caution using tools and do not use electronic devices or have live, exposed electrical circuits in or around basins, open covers and vents.
- Manual pumps that have been factory constructed with a power cord with no male attachment plug must use an approved motor control panel. Do not wire a switch in series with the pump power cord as this can overload the wires. Overloaded wires get very hot and can catch on fire.
- These pumps are not to be installed in locations classified as hazardous in accordance with the National Electric Code[®], ANSI/NFPA 70.

WARNING **RISK OF SERIOUS INJURY OR DEATH**

- Do not modify the pump/pump system in any way. Modifications may affect seals, change the electrical loading of the pump, or damage the pump and its components.
- All pump/pump system installations shall be in compliance with all applicable Federal, State, and Local codes and ordinances.
- Do not allow children to play with the pump system.
- Do not allow any person who is unqualified to have contact with this pump system. Any person who is unaware of the dangers of this pump system, or has not read this manual, can easily be injured by the pump system.
- In 208/230V installations, one side of the line going to the pump is always "hot", whether the float switch is on or off. To avoid hazards, install a double pole disconnect near the pump installation.
- Vent basin in accordance with local code. Proper venting of sewer and effluent gases alleviates poisonous gas buildup and reduces the risk of explosion and fire from these flammable gases.
- Wear adequate Personal Protective Equipment when working on pumps or piping that have been exposed to wastewater. Sump and sewage pumps often handle materials that can transmit illness or disease upon contact with skin and other tissues.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.

- Do not remove any tags or labels from the pump or its cord.
- Keep clear of suction and discharge openings. To prevent injury, never insert fingers into pump while it is connected to a power source.
- Do not use this product with flammable, explosive, or corrosive fluids. Do not use in a flammable and/or explosive atmosphere as serious injury or death could result.
- This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. www.p65warnings.ca.gov.

NOTICE

- ◆ Verify 3-phase pumps for correct rotation prior to installing pump(s) in basin. To change rotation, reverse any two of the three power leads to the pump (not the ground). Code the wires for reconnection after installation.
- ◆ Do not dispose of materials such as paint thinner or other chemicals down drains. Doing so could chemically attack and damage pump system components and cause product malfunction or failure.
- ◆ Do not use pumps with fluid over 140°F (60°C). Operating the pump in fluid above this temperature can overheat the pump, resulting in pump failure.
- ◆ Do not use pump system with mud, sand, cement, hydrocarbons, grease, or chemicals. Pump and system components can be damaged from these items causing product malfunction or failure. Additionally, flooding can occur if these items jam the impeller or piping.
- ◆ Do not introduce any consumer item that is not toilet paper into a non-grinder (dewatering/effluent or sewage) pump/pump system. This includes, but is not limited to the following: feminine products, wipes, towels, towelettes, dental floss, swabs, pads, etc. Items such as these put the pump under undue strain and can result in pump/pump system failure. Additionally, it creates conditions for discharge line blockage.
- ◆ Do not run dry.
- ◆ Do not exert heavy pressure or run heavy equipment on the backfill material as this could cause the tank to collapse.
- ◆ Do not position the pump float directly under the inlet from drain tile or in the direct path of any incoming water.
- ◆ Keep pump upright.
- ◆ Do not allow pump to freeze.
- ◆ At no time shall the pump be stored within an incomplete wet basin. The pump shall not be placed into the basin until it can be fully operational.
- ◆ Effluent pumps need to be totally submerged below the water line to prevent pump corrosion.

General Information

Before installation, read these instructions carefully. Each pump is individually factory tested to ensure proper performance. Closely following these instructions will eliminate potential operating problems, assuring years of trouble-free service.

These pumps are to be used for handling septic tank effluent and drain (storm) water.

Provide pump serial number in all correspondence.

Pumps are certified to CSA® and UL® standards.

Pumps must be serviced at a qualified repair facility approved by Liberty Pumps. No repair work should be carried out during the warranty period without prior factory approval. Any unauthorized field repairs void warranty. Contact Liberty Pumps at 1-800-543-2550 to locate the closest authorized service center.

Operating Constraints

It is extremely important to verify that the pump has been sized correctly for the intended installation. The operating point of the pump must lie within the acceptable range as outlined by the applicable Liberty Pumps performance chart. Operating the pump outside of the recommended range can invalidate the CSA Certification of the pump and can also cause damage and premature failure. Operating outside of the recommended range can cause the pump to exceed its rated nameplate amp draw, which will void the pump certification. It can also cause motor overheating, cavitation, excessive vibration, clogging, and poor energy efficiency.

Model Specifications

For complete listing of pump models and their specifications, refer to <http://www.LibertyPumps.com/About/Engineering-Specs>. Pump nameplate provides a record of specific pump information.

Inspection and Storage

Initial Inspection

Inspect pump immediately for damage that may have occurred in shipment.

1. Visually check the pump and any spare parts for damage.
2. Check for damaged electrical wires, especially where they exit the motor housing.

Contact Liberty Pumps customer service to report any damage or shortage of parts.

Storage Before Use

WARNING **RISK OF ELECTRIC SHOCK**

- Protect the power and control cords from the environment. Unprotected power and control (switch) cords can allow water to wick through ends into pump or switch housings, causing surroundings to become energized.

NOTICE

- ◆ At no time shall the pump be stored within an incomplete wet basin. The pump shall not be placed into the basin until it can be fully operational.
- ◆ Do not allow the pump to freeze.

Pumps are shipped from the factory ready for installation and use. Hold the pump in storage if the pump station is not complete.

If storage is necessary, the pump should remain in its shipping container. It should be stored in a warehouse or storage shed that has a clean, dry temperature-stable environment where the pump and its container are covered to protect it from water, dirt, vibration, etc. The cord ends must be protected against moisture.

Uninstalled pumps that are idle for greater than three months should have impellers manually rotated once a month to lubricate the seals.

Installed pumps that are idle for greater than one month should have impellers manually operated through the breaker panel once a month to lubricate the seals. For **automatic models**, turn off the breaker, unplug the piggyback switch, and plug the pump directly into the wall socket. Turn the breaker on for 30 seconds, then turn the breaker off. Plug the piggyback switch back in. Refer to *Piggyback Switch Operation* on page 7.

Pump Design

All Liberty Pumps dewatering/effluent pumps come equipped with an air bleed hole in the base of the pump to help prevent airlock. A small spray of water from this hole is normal while pump is running.

For added protection, consider the addition of a back-up pump, as well as an alarm in applications where loss of pump function could result in property damage. If an alarm is used, it must be connected to a separate electrical circuit.

Pump System Components

Control Panel

Manual models ("**M**" suffix) and 3-phase models require a separate, approved pump control device or panel for automatic operation. Operation will be according to the control panel selected. Refer to separate manufacturer's instructions supplied with the unit. Verify the electrical specifications for the control panel properly match those of the pump. 3-phase models require overload elements selected or adjusted in accordance with the control or panel instructions.

Mounting, installation, and wiring connections are specific to the control panel used. Refer to the manufacturer's instructions supplied with the unit.

IMPORTANT: When connecting a new pump to an existing control panel, verify the panel is correctly sized and equipped for the pump.

Control panels designed for use with specific pumps available from Liberty Pumps can be found at http://www.LibertyPumps.com/Portals/0/Files/panel_selection_guide.pdf or contact Liberty Pumps.

Float Switches

WARNING **RISK OF ELECTRIC SHOCK**

- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.

Automatic Models

All FL-Series automatic models ("**A**" suffix) and Models 253, 283 and 293 come factory-equipped with a float switch mounted to the pump. These models come with two cords—one to the float switch and the other to the pump motor. The switch cord has a series (piggyback) plug enabling the pump motor cord to be plugged into the back of it. The purpose of this design is to allow temporary manual operation of the pump.

For manual operation, or in the event of float switch failure, the pump cord can be separated and plugged into the electrical outlet, directly bypassing the switch. Refer to *Piggyback Switch Operation* on page 7.

If using a differential other than the factory setting, verify that when the pump turns off, the minimum fluid level left in the basin is per Table 1 so the impeller remains submerged. A minimum cord length of 3-1/2" from the tether point to the top surface of the float is required for proper switch operation.

Models 251, 257, 281, 287, 291, and 297 have factory-preset float switches that are not adjustable. Other pumping differentials may be obtained by tethering the switch cord to the discharge pipe.

Switchless (Manual) Models

Manual pumps with no float switch are intended to be run using an approved liquid level control or approved motor control with correct rating that matches motor input in full load amperes. Regardless of the control type, verify that when the pump shuts off, the minimum fluid level left in the basin is per Table 1 so the impeller remains submerged.

IMPORTANT: Manual pumps factory constructed with a power cord with no male attachment plug must use an approved motor control panel. **Do not wire a switch in series with the pump power cord.**

Automatic operation with optional control devices: if the pump(s) are to be operated by either a simplex or duplex control panel or other optional control device, follow the manufacturer's instructions provided with the control panel for power connections.

Float Switch Settings

Table 1 includes factory set float levels for automatic models. The turn OFF level must be maintained as it is the **minimum** water depth to ensure proper cooling. Manual pumps have user-set turn ON levels.

Table 1. Factory Set Float Switch Settings

Model	Turn OFF Level	Turn ON Level
250	4"	user-set
251, 253	4"	11"
257	4"	7"
280	4"	user-set
281, 283	7"	13"
287	4"	9.5"
290	4"	user-set
291, 293	7"	13"
297	4"	9.5"
FL30	5"	12"
FL50	6"	13"
FL60	6"	13"
FL70	6"	13"
FLH60	6"	13"
FL100	8"	15"
FL150	8"	15"
FL200	8"	15"

Preparation

WARNING **RISK OF ELECTRIC SHOCK**

- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.

The basin required for effluent applications must be sealed and vented to meet health and plumbing code requirements. Proper basin size and materials for effluent applications vary depending on the type of effluent system and local codes. Check local codes prior to purchasing and installing the basin. Follow the manufacturer's recommended guidelines for installation of the basin. A minimum diameter of 18" and depth of 24" is required for proper pump operation, but larger basins are preferred for longer pump cycles and increased float switch life. Installation should be at a sufficient depth to ensure that all plumbing is below the frost line. If this is not feasible, size the basin and/or adjust the pump differential to accommodate the additional backflow.

For ordinary ground water pumping applications, it is recommended that the sump basin diameter be a **minimum** of 14". Vertical Magnetic Float (VMF) models 257, 287, and 297 may be used in a **minimum** 10" diameter sump; however, a larger diameter basin is preferred as it allows for a longer pump cycle and reduced float switch cycling. The depth of the basin should be a **minimum** of 18".

Prepare Existing Sump [Basin]

If replacing a previously installed pump, prepare the basin by removing the old pump and cleaning any debris from the basin. Inspect all remaining equipment in the basin including piping, valves, and electrical junction boxes (if present) and repair or replace as appropriate.

If the basin is not already enclosed on the bottom, provide a hard level bottom of bricks or concrete. Do not place the pump directly on earth, gravel, or debris since this can cause excessive wear of the impeller and possible jamming.

"The Brick" (Liberty Pumps #4445000) is a pre-molded stable platform designed to fit the 250, 280, and 290-Series submersible pumps. It raises the pump 2-1/2" off the bottom of the basin, reducing the potential for jamming from rocks and debris. Contact a local distributor to order.

Prepare New Sump [Basin]

Excavation

WARNING **RISK OF SERIOUS INJURY OR DEATH**

- Locate all overhead and underground utilities before excavating.

Excavate the hole as small as possible, with a minimum recommended 8" diametrical clearance around the tank. Never place the basin directly in contact with rocks or other sharp objects. Place only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone as bedding between the basin and the hole walls. 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.

Inlet Connection & Initial Backfill

Use only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone around the bottom of the basin to hold it in place. Do not use sand or native soil as backfill.

Make the inlet connection as required per basin.

Final Backfill

NOTICE

- Do not exert heavy pressure or run heavy equipment on the backfill material as this could cause the tank to collapse.

Keep large rocks, clods, and foreign objects out of the backfill material. Only fine, 1/4" to 3/4" pea gravel, or 1/8" to 1/2" washed, crushed stone is recommended. Do not use sand or native soil as backfill. Mound the backfill slightly and allow for natural settling. Provide access to the basin cover for maintenance and service.

Compaction of backfill materials must be adequate to ensure the support of the tank, and to prevent movement or settlement.

Installation

⚠ WARNING ⚡ **RISK OF ELECTRIC SHOCK**

- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code®, the Occupational Safety and Health Administration, or applicable local codes and ordinances.

Electrical Connections

With main power disconnected, complete pump and control wiring connections per manufacturer's wiring diagrams included with the control panel as applicable. Once connections are made, all wires should be checked for unintentional grounds.

3-Phase Pump Rotation Verification

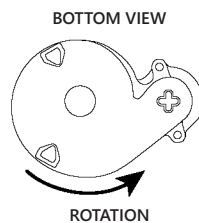
NOTICE

- ◆ Check 3-phase pumps for correct rotation prior to installing pump(s) in basin. To change rotation, reverse any two of the three power leads to the pump (not the ground). Code the wires for reconnection after installation.

3-phase power uses three separate alternating currents that peak at different intervals. With pumps that are powered by three phase electric, the phase sequence of the motor must match the phase sequence of the power source. When the phase sequences match, the pump operates properly.

However, when the phases are out of order, the pump runs backward (i.e., the impeller rotates in the wrong direction). This causes an extreme loss of performance and could raise the current draw, which could result in tripping an overload or circuit breaker.

To ensure that the power to the pump is installed correctly, always verify proper rotation **before** lowering it into the basin. If the pump is rotating in the wrong direction, turn off the power and reverse any two leads to the pump (not ground). This reverses the phase sequence and corrects the pump rotation. For 3-phase pumps, rotation must be counterclockwise when looking from the bottom of the pump. Label the wires for reconnection after installation.



Guide Rail System

If guide rails are used, refer to the separate instructions supplied with the unit for proper installation and operation, making sure all gaskets and components are present. Liberty Pumps Guide Rail System features a self-aligning mounting bracket. Contact Liberty Pumps for available models, such as GR22 and GR30 for FL-Series models.

If guide rails are not used, complete all pump-mounted plumbing at this time, being sure all gaskets and components are present.

Pump

Record information from pump nameplate onto inside cover of these instructions. Complete a visual inspection before lowering into basin.

Discharge

A check valve is required to prevent the backflow of liquid after each pumping cycle. A gate valve should follow the check valve to allow periodic cleaning of the check valve or removal of the pump. The remainder of the discharge line should be as short as possible with a minimum number of turns to minimize friction head loss.

Do not reduce the discharge to below that which is provided on the pump. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if questions arise regarding proper pipe size and flow rates.

Vent

Vent basin in accordance with applicable plumbing codes.

Piggyback Switch Operation

⚠ WARNING ⚡ **RISK OF ELECTRIC SHOCK**

- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.

IMPORTANT: Verify breaker is turned off before plugging in the switch.

Plug the piggyback switch into the receptacle. The receptacle must be wired to an appropriately sized breaker. Plug the pump into the piggyback receptacle. Install the cable clamp (if supplied) for strain relief.

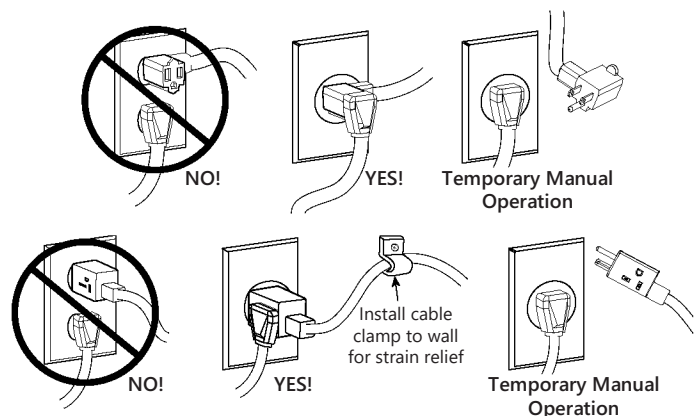


Figure 1. Piggyback Switch Operation

Automatic Pump Direct Wiring

WARNING **RISK OF SERIOUS INJURY OR DEATH**

- In 208/230V installations, one side of the line going to the pump is always “hot”, whether the float switch is on or off. To avoid hazards, install a double pole disconnect near the pump installation.

If a 1-phase pump will be wired directly into a junction box, and it is necessary to remove the plug, a certified electrician shall complete the wiring in accordance with the National Electric Code and applicable local codes. A disconnecting means for the pump shall be located in sight from the pump/basin location. See Figure 2 for direct wire installation of 1-phase, automatic pumps.

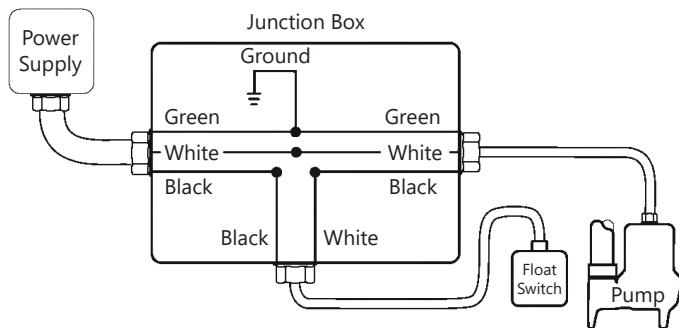


Figure 2. Direct Wiring of 115 V or 208/230 V, 1-Phase, Automatic

Dewatering/Sump System Application

A securable sump basin cover is required for safety and to prevent foreign objects from entering the basin.

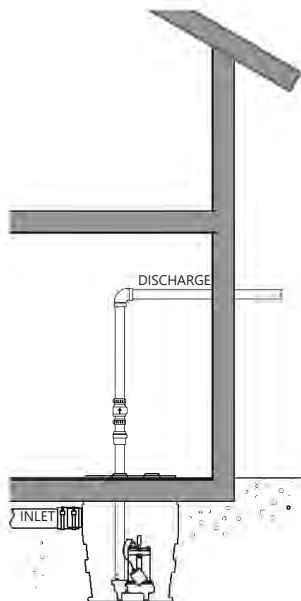
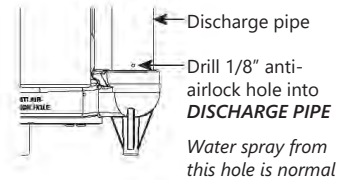


Figure 3. Typical Sump Installation (variations may apply)

1. Place pump in basin making certain the mounting interface (i.e., guide rail, torque stop) is engaged correctly. Float switch must have adequate clearance to side wall of basin and free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects.

A 1-1/2" threaded discharge is provided for connection of the discharge pipe. **Do not restrict the discharge to below that which is provided on the pump.** Schedule 40 PVC pressure pipe is recommended.

2. Connect discharge pipe to the discharge of the pump. Hand-tighten only. Over-tightening may cause the pump housing to crack.
3. Install a union or other means of separating the discharge line just above the floor to facilitate removal of the pump when necessary. A check valve is **required** just above or in place of the union to prevent the backflow of water after each pump cycle.
4. Connect additional piping as needed to direct the discharge to the desired location. Discharge should be kept as short as possible with a minimum number of turns.
5. Check all connections.
6. Check valve usage requires drilling an 1/8" anti-airlock hole in the discharge pipe just above the pump's discharge outlet to prevent pump airlock.



Effluent System Application

VMF models (257, 287, and 297) are **not** recommended for effluent applications due to their short ON/OFF cycle. Wide-angle float models are better suited for effluent applications and are easily adjustable for different ON/OFF levels.

A securable basin cover is required for safety and to prevent foreign objects from entering the basin.

Simplex (One Pump) Systems

NOTICE

- ◆ Effluent pumps need to be totally submerged below the water line to prevent pump corrosion.

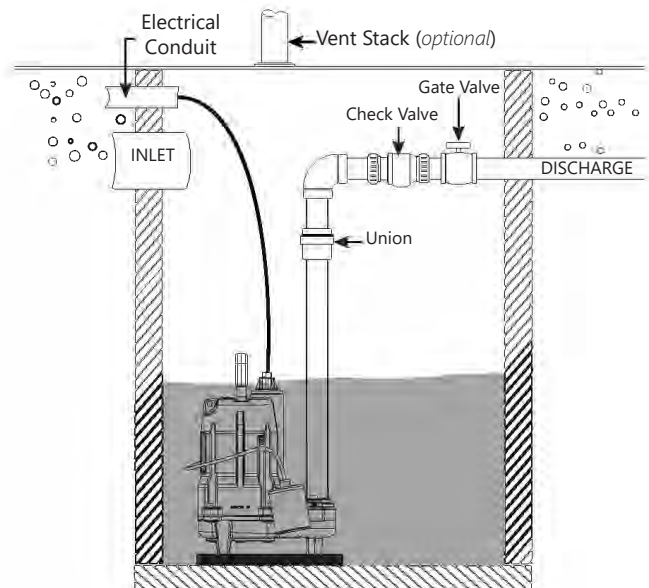


Figure 4. Typical Simplex System Installation (variations may apply)

1. Place pump in basin making certain the mounting interface (i.e., guide rail, torque stop) is engaged correctly. Float switch must have adequate clearance to side wall of basin and free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects.
2. If an optional control device or float is used, follow the separate manufacturer's directions for mounting. Minimum pump turn OFF level must not be set below Table 1 values.
3. Connect the discharge pipe to the pump's threaded discharge. **Do not reduce the discharge pipe size below that which is provided on the pump.**
4. Install the remaining discharge line.
5. Install a union to facilitate pump removal when necessary.
6. Install a check valve after the union to prevent the backflow of liquid after each pumping cycle.
7. Install a gate valve after the check valve to allow periodic cleaning of the check valve or removal of the pump.
8. Install the remainder of the discharge line as short as possible with a minimum number of turns to minimize friction head loss. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.
9. Mount and properly seal the basin cover.
10. Vent basin in accordance with applicable plumbing codes.

Duplex (Two Pump) Systems

NOTICE

- ◆ Effluent pumps need to be totally submerged below the water line to prevent pump corrosion.

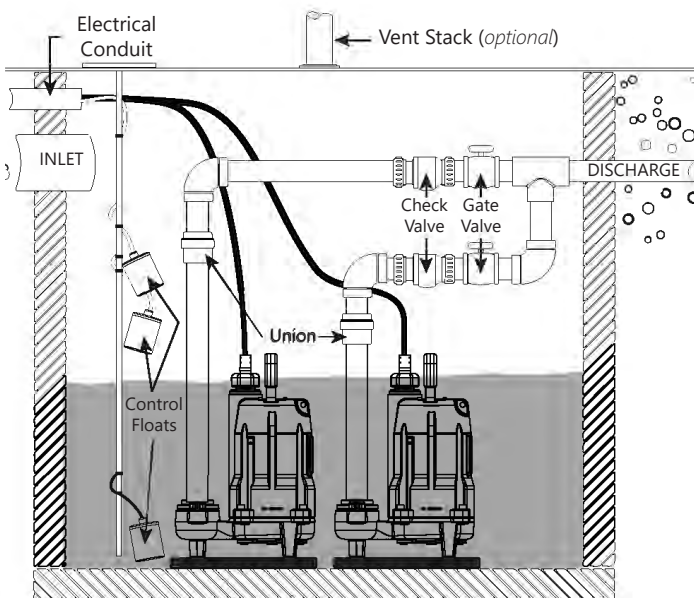


Figure 5. Typical Duplex System Installation (variations may apply)

1. Place both pumps in basin, making certain the mounting interface (i.e., guide rail, torque stop) is engaged correctly. The duplex control used will include 3 or 4 floats that will either be tethered to one of the discharge pipes or to an independent rod or bracket. Follow the duplex control manufacturer's instructions provided with the device. Each float switch must have adequate clearance to side wall of basin and free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects. Minimum pump turn OFF level must not be set below Table 1 values.
2. Connect an individual discharge pipe to each pump. **Do not reduce the discharge pipe size below that which is provided on the pump.** Larger pipe sizes may be required in some applications to reduce friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.
3. Install unions or flexible connectors to facilitate removal of the pump if necessary.
4. Install check valves on each discharge after the union and prior to the gate valve to prevent the back flow of liquid or gas. **A check valve on each discharge line, prior to tying into one common line, is necessary to prevent the recycling of fluid from one pump to the other.** A gate valve is recommended after the check valve to allow for periodic cleaning of the check valve or removal of the pump. Depending on the height of the basin, the check valves may either be installed inside the basin or outside the basin.
5. Install the remainder of the discharge line as short as possible with a minimum number of turns to minimize friction head loss. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.
6. Mount and properly seal the basin cover.
7. Vent basin in accordance with applicable plumbing codes.

Operation

Starting System

1. Verify all plumbing components are installed correctly and functional. Verify all valves are open and ready for pump use.
2. Double check all wire connections. Re-tighten all factory and field connections.
3. Ensure pump has no obstructions.
4. With all electrical and mechanical connections complete and secure, turn on power to pump and control panel, if applicable.
5. Verify operation of the pump, floats, and alarm circuits.
6. Run several cycles of water through the system to verify correct control operation for the installation.

Be certain to complete adequate testing, especially on systems with multiple pumps or custom control configurations.

Maintenance and Troubleshooting

⚠ WARNING **RISK OF ELECTRIC SHOCK**

- Accidental contact with electrically live parts, items, fluid, or water can cause serious injury or death.
- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.

⚠ WARNING **RISK OF SERIOUS INJURY OR DEATH**

- Wear adequate Personal Protective Equipment when working on pumps or piping that have been exposed to wastewater. Sump and sewage pumps often handle materials that can transmit illness or disease upon contact with skin and other tissues.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.

NOTICE

- ◆ Verify correct 3-phase pump rotation before retuning to service.

Maintenance

Check pump frequently for debris and/or build up that may interfere with pump or float switch operation. As the motor is oil-filled, no lubrication or other maintenance is required.

In the event the pump becomes clogged, the inlet screen can be removed to gain access to the pump impeller. Once the obstruction is removed, the anti-airlock hole should be cleaned.

Troubleshooting

No repair work shall be carried out during the warranty period without prior factory approval. To do so may void the warranty.

Liberty Pumps, Inc. assumes no responsibility for damage or injury due to disassembly in the field. Disassembly, other than an authorized repair facility approved by Liberty Pumps or its authorized service centers, automatically voids warranty.

Table 2. Troubleshooting Matrix

Problem	Possible Cause	Corrective Action
Pump does not start.	Damaged power or control cord.	Replace as needed.
	Control panel selector switch in OFF position.	Set selector switch to Hand or Auto position.
	Blown control circuit transformer fuse.	Replace fuse.
	Tripped circuit breaker, tripped GFCI, blown fuse, or other interruption of power.	Reset tripped circuit breaker, reset GFCI, replace blown fuse with properly sized fuse, check that the unit is securely plugged in, investigate power interruption.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Float switch unable to move to PUMP ON position due to interference in basin or other obstruction.	Position pump or float switch so that it has adequate clearance for free movement.
	Insufficient liquid level.	Verify liquid level is allowed to rise enough to activate float switch.
	Defective float switch.	Replace float switch.
	Obstructed impeller or volute.	Remove obstruction.
Pump runs, but does not turn off.	Loose wiring connections.	Check and tighten all connections.
	Pump is airlocked.	Turn pump off and let set for several minutes, then restart.
	Control panel selector switch in Hand position.	Set selector switch to Auto position.
	Float switch unable to move to PUMP OFF position due to interference with the side of basin or other obstruction.	Position pump or float switch so that it has adequate clearance for free movement.
	Control panel failure.	Check control panel.
	Defective float switch.	Replace float switch.

Table 2. Troubleshooting Matrix (continued)

Problem	Possible Cause	Corrective Action
Pump runs or hums, but does not pump.	Discharge line blocked or restricted.	Check discharge line for foreign material, including ice if discharge line passes through or into cold areas.
	Check valve is stuck closed or installed backward.	Remove check valve(s) and examine for freedom of operation and proper installation.
	Gate or ball valve is closed.	Open gate or ball valve.
	Total head (lift height) is beyond pump's capability.	Route piping to a lower level. If not possible, a larger pump may be required. Consult Liberty Pumps.
	Obstructed impeller or volute.	Remove obstruction.
	Pump is airlocked.	Turn pump off and let set for several minutes, then restart.
		Add baffle to reduce trapped air bubbles.
Pump cycles too frequently.	Improper float switch setting.	Adjust float switch setting.
	Check valve not installed, stuck open, or leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.
Pump runs periodically when fixtures are not in use.	Check valve not installed, stuck open, or leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.
	Fixtures are leaking.	Repair fixtures as required to eliminate leakage.
Pump does not deliver proper capacity.	Discharge valve(s) partially closed or clogged.	Check the discharge line for foreign material, including ice if the discharge line passes through or into cold areas.
	Check valve partially clogged.	Raise liquid level up and down to clear; remove check valve to remove obstruction.
	Incorrect 3-phase motor rotation.	Correct 3-phase pump rotation direction.
	Total head (lift height) is beyond pump's capability.	Route discharge piping to a lower level. If not possible, a larger pump may be required. Consult Liberty Pumps.
	Low liquid level.	Check liquid level.
	Obstruction in pump or piping.	Remove obstruction.
Pump operates noisily.	Piping attachments to building are too rigid.	Replace a portion of the discharge line with rubber hose or connector.
	Incorrect 3-phase motor rotation.	Correct 3-phase pump rotation direction.
	Foreign objects in the impeller cavity.	Clean the impeller cavity.
	Broken impeller.	Consult Liberty Pumps for information regarding impeller replacement.
Repeated tripping.	Circuit protection underrated.	Check rating and replace with proper size.
	Other appliance on same circuit.	Pump requires separate circuit.
	Pump is connected to an extension cord or wiring is inadequate or compromised.	Have an electrician check for proper wiring.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Obstruction in pump.	Remove obstruction.
	Incorrect 3-phase motor rotation.	Correct 3-phase pump rotation direction.
	Foreign matter buildup.	Clean motor housing.

Warranty

Liberty Pumps Wholesale Products Limited Warranty

Liberty Pumps, Inc. warrants that Liberty Pumps wholesale products are free from all factory defects in material and workmanship for a period of three (3) years from the date of purchase (excluding batteries). 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 three years from the date of manufacture noted on the pump nameplate.

The manufacturer's sole 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, operated, or maintained per manufacturer instructions; 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 temperatures above the advertised rating; if the pump has been used in water containing sand, lime, cement, gravel, or other abrasives; if the product has been used to pump chemicals, grease, or hydrocarbons; if a non-submersible motor has been subjected to moisture; or if the label bearing the model and serial 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 indirect, incidental, and 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.



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Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

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visit our web site:
www.zoeller.com

ELECTRICAL ALTERNATOR CONTROL PANEL - FOR DUPLEX INSTALLATIONS

An Electrical Alternator is used on a Duplex pump application where automatic alternation of the pumps is desired for added protection in residential or commercial applications. With one pump operating to handle normal flow, a second pump becomes operational in the event the water level continues to rise. The built-in alarm system, a standard feature, can be connected to sound when the second pump becomes operational (3-float switch system) or independently (4-float switch system). All electrical systems must be installed by a qualified electrician and according to the National Electrical Code. (See Section 430-71 through 430-113, plus any others that apply.)

Control Panel Features:

- Hand-Off-Auto Toggle Switch for each pump.
- Green pump run pilot light for each pump.
- Alarm test and silence switches.
- Red pilot light (Nema 1 Only) and audible alarm with 83 to 85 decibel rating for a high water condition.
- Red Alarm Beacon included with Nema 4X enclosure.
- Auxiliary Dry Contact.
- High Water Alarm.
- On Single Phase - Circuit breaker for each pump.
- On Three Phase - Motor protective switch with overload protection.
- Magnetic starter for each pump.
- Alternating mechanism.
- Numbered terminal strip for connecting pumps and variable level float switches.
- Nema 1 - general purpose or Nema 4X - Watertight enclosures available.
- Integral auxiliary terminal board connections (dry contact) for remote alarm devices.
- 3 or 4 variable level float switch control operation.
- Three 20' float switches included with single phase panels.
- UL Listed.
- 2 Year Warranty
- The use of off-the-shelf components provide for relatively easy field maintenance and repair.
- Float switches not included with three phase panels (See FM0526).

CONTROL PANEL USED WITH SINGLE PHASE PUMPS

NEMA 1 ENCLOSURE WITH 20' FLOAT SWITCH

Order No.	Dimensions H x W x D	Volts	Amp Range
10-1039	12" x 10" x 6"	115	7-15
10-1040	12" x 10" x 6"	115	15-20
10-0092*	12" x 10" x 6"	115/200/230	0-20

NEMA 4X ENCLOSURE WITH 20' FLOAT SWITCH

Order No.	Dimensions H x W x D	Volts	Amp Range
10-1041	12" x 10" x 6"	115	7-15
10-1042	12" x 10" x 6"	115	15-20
10-1043	12" x 10" x 6"	115/200/230	0-7
10-1044	12" x 10" x 6"	115/200/230	7-15
10-1045	12" x 10" x 6"	115/200/230	15-20
10-1046	12" x 10" x 6"	115/200/230	20-30
10-0093*	12" x 10" x 6"	115/200/230	0-20

* Branch circuit protection provided by installing electrician.

NEMA 1 ENCLOSURE



10-0092

NEMA 4X ENCLOSURE



10-0093

Products may not be exactly as illustrated

NOTE: 600 and X600 Series single phase pumps require special panels that include start components. See Selection Guide FM0712 for correct panel selection.

NOTE: All variable level float switches in this section are mechanically activated and do not contain mercury.

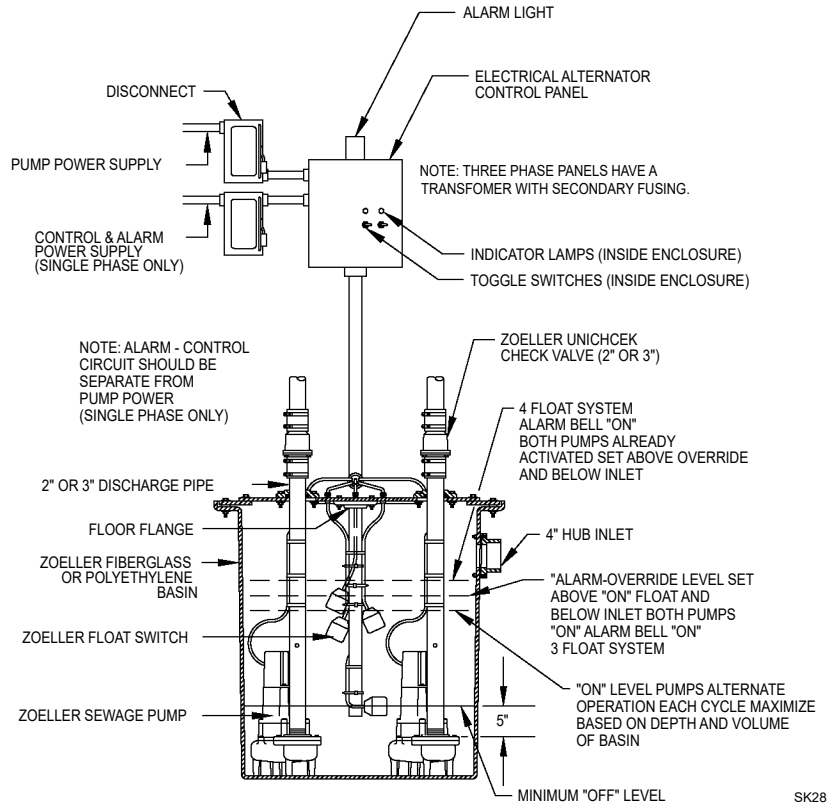
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CONTROL PANEL USED WITH THREE PHASE PUMPS

NEMA 4X ENCLOSURE (Float Switches not included)			
Order No.	Dimensions H x W x D	Volts*	Amp Range
10-1102	14" x 12" x 6"	200/230/460	1.0 - 1.6
10-1104	14" x 12" x 6"	200/230/460	1.6 - 2.5
10-1106	14" x 12" x 6"	200/230/460	2.5 - 4.0
10-1108	14" x 12" x 6"	200/230/460	4.0 - 6.3
10-1110	14" x 12" x 6"	200/230/460	6.0 - 10.0
10-1111	14" x 12" x 6"	200/230/460	9.0 - 14.0
10-1112	14" x 12" x 9"	200/230/460	13.0 - 18.0
10-1114	14" x 12" x 6"	200/230/460	17.0 - 23.0
10-1115	14" x 12" x 6"	200/230/460	20.0 - 25.0
10-1183	14" x 12" x 6"	200/208	23.0 - 32.0
10-1154	14" x 12" x 6"	575	1.6 - 2.5
10-1156	14" x 12" x 6"	575	2.5 - 4.0
10-1158	14" x 12" x 6"	575	4.0 - 6.3

*Three phase panel has multi-tap transformer with secondary fusing.

DUPLEX ELECTRICAL ALTERNATING SYSTEM



SK289

Sequence of Operation for Duplex Panel

- Operation can begin after the following:
 - Correct voltage is supplied to Panel
 - Panel is properly grounded
 - Pumps are connected correctly to Panel
 - Panel Circuit Breakers are closed
 - Floats are installed properly
 - Overload Protection is adjusted to Pump nameplate amps
 - Pump HOA Switches are set to "Auto"
 - Control On/Off Switch is set to "On"
- When the "Stop" and "Lead" floats are closed Pump 1 will energize and the Pump 1 Pump Run Light will illuminate. Pump 1 will remain operational until the "Stop" float opens.
- The next time the "Stop" and "Lead" floats are closed the Alternating Circuit will energize Pump 2 and the Pump 2 Pump Run Light will illuminate. Pump 2 will remain operational until the "Stop" float opens. This cycle will repeat each time the fluid level rises and falls.
- If the fluid level continues to rise after the first pump has been energized the "Lag" float will close. When the "Lag" float has closed the second Pump will Energize. Both Pumps will remain operational until the "Stop" float opens.
- In a three float system when the "Lag" float is closed the following will also occur:
 - The External High Water Light will illuminate
 - The Audible High Water Horn will sound
 - The Auxiliary Dry Contacts will close
- In a four float system, the alarm float should be the third float causing an alarm to sound when the lead pump fails to operate or the rate of in flow into the basin exceeds the capacity of one pump. When the alarm float is closed the following will occur:
 - The External High Water Light will illuminate
 - The Audible High Water Alarm will sound
 - The Auxiliary Dry Contacts will close

As the liquid level continues to rise the fourth float will close, energizing the lag pump. The lag pump and the lead pump will remain energized until the "Stop" float opens.

NOTE: In Duplex systems where it is considered normal for two pumps to operate in tandem during peak flow conditions, the third and fourth float may be reversed.
- The Audible High Water Horn can be silenced by pressing the Alarm Silence Button. When the "Alarm" float opens the External High Water Light, Audible High Water Horn and Dry Auxiliary Contacts will be reset.



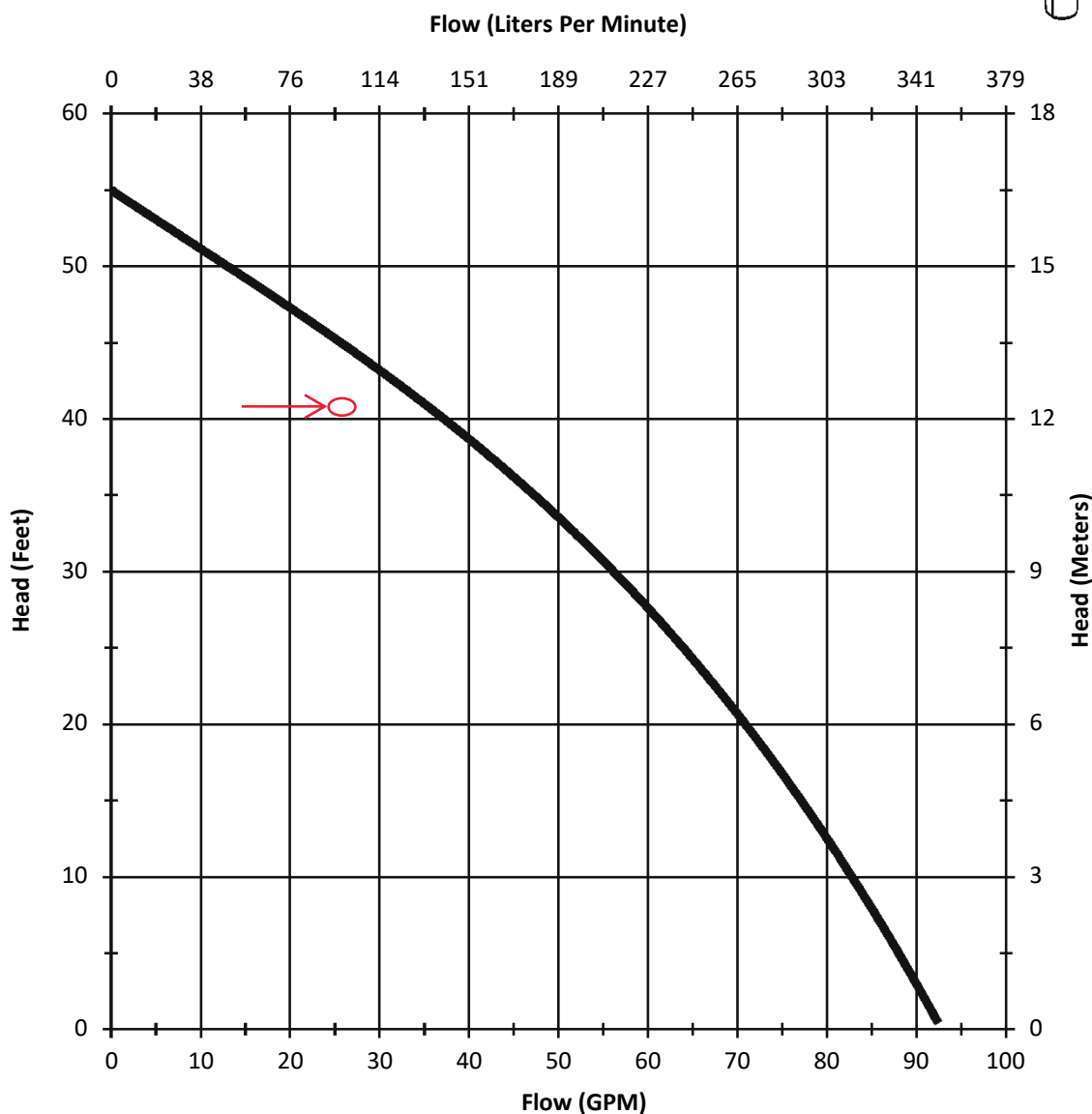
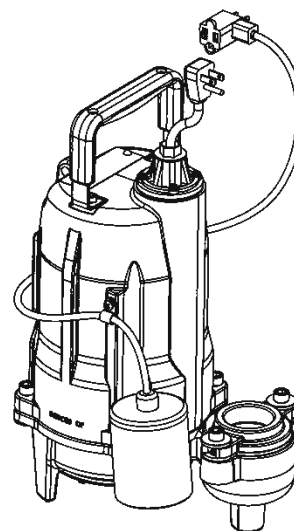
WARNING All electrical systems must be installed by a qualified licensed electrician and according to the National Electrical Code. (See section 430-71 through 430-113 plus any others that apply)

Refer to FM0712 for correct selection of Electrical Alternator.

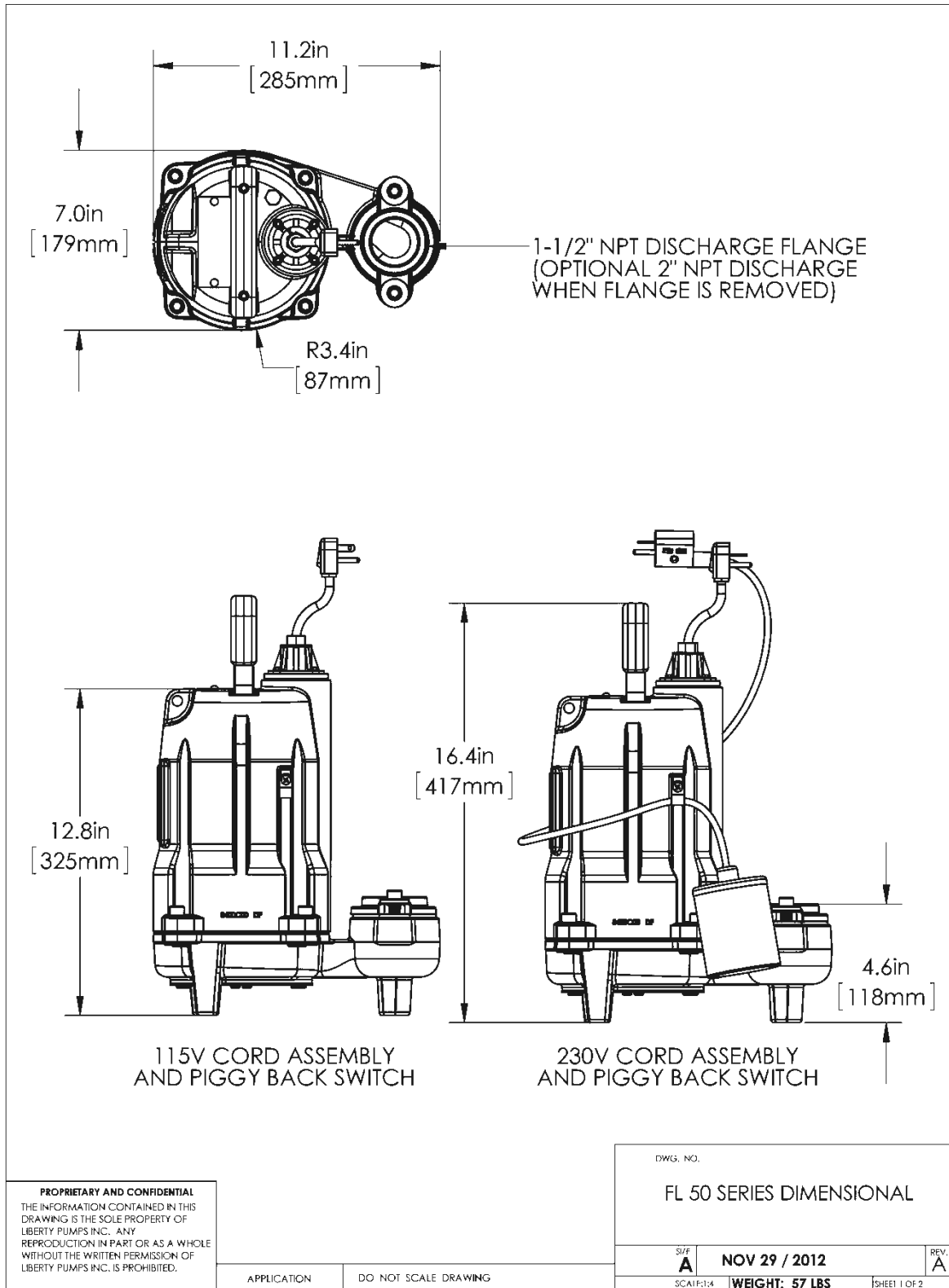


Pump Specifications

FL50 Series 1/2 hp Submersible Effluent Pump



FL50-Series Dimensional Data



FL50-Series Electrical Data

MODEL	HP	VOLTAGE	PHASE	FULL LOAD AMPS	LOCKED ROTOR AMPS	THERMAL OVERLOAD TEMP	STATOR WINDING CLASS	CORD LENGTH FT	DISCHARGE	AUTOMATIC	WGT.
FL51A	1/2	115	1	12	48.6	120°C 248°F	B	10	1 ½ OR 2"	YES	62 lbs.
FL51A-2	1/2	115	1	12	48.6	120°C 248°F	B	25	1 ½ OR 2"	YES	64 lbs.
FL51A-3	1/2	115	1	12	48.6	120°C 248°F	B	35	1 ½ OR 2"	YES	66 lbs.
FL51M	1/2	115	1	12	48.6	120°C 248°F	B	10	1 ½ OR 2"	NO	61 lbs.
FL51M-2	1/2	115	1	12	48.6	120°C 248°F	B	25	1 ½ OR 2"	NO	62 lbs.
FL51M-3	1/2	115	1	12	48.6	120°C 248°F	B	35	1 ½ OR 2"	NO	63 lbs.
FL51M-5	1/2	115	1	12	48.6	120°C 248°F	B	50	1 ½ OR 2"	NO	65 lbs.
FL52A	1/2	208-230	1	6.5	24.1	120°C 248°F	B	10	1 ½ OR 2"	YES	62 lbs.
FL52A-2	1/2	208-230	1	6.5	24.1	120°C 248°F	B	25	1 ½ OR 2"	YES	64 lbs.
FL52A-3	1/2	208-230	1	6.5	24.1	120°C 248°F	B	35	1 ½ OR 2"	YES	66 lbs.
FL52M	1/2	208-230	1	6.5	24.1	120°C 248°F	B	10	1 ½ OR 2"	NO	61 lbs.
FL52M-2	1/2	208-230	1	6.5	24.1	120°C 248°F	B	25	1 ½ OR 2"	NO	62 lbs.
FL52M-3	1/2	208-230	1	6.5	24.1	120°C 248°F	B	35	1 ½ OR 2"	NO	63 lbs.
FL52M-5	1/2	208-230	1	6.5	24.1	120°C 248°F	B	50	1 ½ OR 2"	NO	65 lbs.

FL50-Series Technical Data

IMPELLER	MULTI-VANE CAST IRON
PAINT	POWDER COAT
SOLIDS HANDLING CAPABILITY	¾"
MAX LIQUID TEMP	40°C 100°F CONTINUOUS DUTY 60°C 140°F INTERMITENT
MAX STATOR TEMP	130°C 266°F
THERMAL OVERLOAD	120°C 248°F
POWER CORD TYPE	SJTW (1-PH) or SEOOW (3-PH), or SJOOW (35', AND 50' – 1PH)
MOTOR HOUSING	CLASS 25 CAST IRON
VOLUTE	CLASS 25 CAST IRON
IMPELLER	CLASS 25 CAST IRON
SHAFT	STAINLESS
HARDWARE	STAINLESS
ORINGS	BUNA N
MECHANICAL SEAL	UNITIZED CERAMIC CARBON

FL50-Series Specifications

1.01 GENERAL:

The contractor shall provide labor, material, equipment, and incidentals required to provide _____ (QTY) centrifugal pumps as specified herein. The pump models covered in this specification are Series FL50 single phase pumps. The pump furnished for this application shall be model FL 51A as manufactured by Liberty pumps.

2.01 OPERATING CONDITIONS:

Each submersible pump shall be rated at 1/2 hp 115 volts single phase 60 Hz. 3450 RPM. The unit shall produce 10 G.P.M. at 60 feet of total dynamic head.

The submersible pump shall be capable of handling sewage effluent with 3/4" solid handling capability. The submersible pump shall have a shut-off head of 55 feet and a maximum flow of 76 GPM @ 15 feet of total dynamic head.

The pump shall be controlled with:

_____ A piggy back style on/off float switch.

_____ A NEMA 4X simplex control panel with three float switches and a high water alarm.

_____ A NEMA 4X duplex control panel with three float switches and a high water alarm.

3.01 CONSTRUCTION:



Each centrifugal sewage pump shall be equal to the c^{us} certified Series FL50 SERIES 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 unitized ceramic/carbon seal with stainless steel housings and spring. The pump shall be furnished with stainless steel handle.

4.01 ELECTRICAL POWER CORD

The submersible pump shall be supplied with a 10, 25, 35 or 50 feet of multiconductor power cord. It shall be cord type SJTW (1-PH), SEOOW (3-PH), SJOOW (35' – 1PH), or SJOOW (50' – 1PH), 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

Single phase motors shall be oil filled, permanent split capacitor, class B insulated NEMA B design, rated for continuous duty. At maximum load the winding temperature shall not exceed 130 degrees C unsumerged. Since air filled motors are not capable of dissipating heat they shall not be considered equal. The pump motor shall have an integral thermal overload switch in the windings for protecting the motor. The capacitor circuit shall be mounted internally in the pump.

6.01 BEARINGS AND SHAFT

Upper and lower ball bearings shall be required. The bearings shall be a single ball / race type bearing. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The motor shaft shall be made of 17-4 PH stainless steel and have a minimum diameter of .625".

7.01 SEALS

The pump shall have a unitized carbon / ceramic seal with stainless steel housings and spring equal to Crane Type 6A. The motor plate / housing interface shall be sealed with a Buna-N o-ring.

8.01 IMPELLER

The impeller shall be a class 25 iron. It shall be threaded to the motor shaft.

9.01 CONTROLS

All units can be supplied with CSA and UL approved automatic wide angle tilt float switches. The switches shall be equipped with piggy back style plug that allows the pump to be operated manually without the removal of the pump in the event that a switch becomes inoperable. Manual Pumps are operable by means of a pump control panel.

10.01 PAINT

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

11.01 SUPPORT

The pump shall have cast iron support legs, enabling it to be a free standing unit.

12.01 SERVICEABILITY

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

13.01 FACTORY ASSEMBLED TANK SYSTEMS WITH GUIDE RAIL AND QUICK DISCONNECT DISCHARGE

_____ Guide factory mounted rail system with pump suspended by means of bolt on quick disconnect which is sealed by means of nitrile grommets or o-rings. The Discharge piping shall be schedule 80 PVC and furnished with a PVC check valve and shut-off ball valve. The Tank shall be wound fiberglass or roto-molded plastic. An inlet hub shall be provided with the fiberglass systems.

_____ Stainless steel Guide Rail

_____ Zinc plated steel Guide Rail

_____ "diameter of basin size

_____ "height of basin size

_____ "distance from top of tank to discharge pipe outlet

_____ Fiberglass cover

_____ Structural foam polymer cover

_____ Steel cover

_____ Simplex System with Outdoor panel and alarm

_____ Duplex System with Outdoor panel and alarm

_____ Separate Outdoor Alarm

_____ Remote Outdoor Alarm

14.01 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.

15.01 QUALITY CONTROL

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

16.01 WARRANTY

Standard limited warranty shall be 3 years.

Liberty Pumps®

FL50-Series

1/2 hp

**Submersible
Effluent
Pumps**

3/4" Solids Handling

**1-1/2" or 2"
Discharge**



Features:

- Semi-open impeller permits passage of solids without clogging
- Heavy cast iron construction
- Stainless steel fasteners
- 416 stainless steel rotor shaft
- Permanently lubricated upper and lower ball bearings
- Oil-filled hermetically sealed motor with thermal overload protection
- Unitized carbon and ceramic shaft seal
- Dual-sized discharge flange: 1-1/2" or 2"
- Quick-disconnect power cord in 10' standard length (25', 35' and 50' optional lengths available on some models)

innovate. evolve.

FL50-SERIES

TECHNICAL SPECIFICATIONS

EXTERNAL CONSTRUCTION:

Pump Volute and legs – Gray iron casting class 25

Motor Cover – Gray iron casting class 25. All castings shall be powder coated for corrosion resistance prior to assembly.

Fasteners – all fasteners shall be 300-series stainless steel.

MOTOR

Submersible 3450 RPM, oil filled and hermetically sealed. Class B insulation rating. 17-4 PH stainless steel rotor shaft. Thermally protected on single phase models. Three phase models shall have overloads incorporated into the control panel, properly sized for the horsepower and amperage of pump.

IMPELLER

Cast iron – class 25, semi-open design capable of passing a minimum 3/4" solids.

SHAFT SEAL

Carbon/ceramic unitized design with BUNA N elastomers and stainless steel housing.

POWER CORD

10' cord length – Standard. Quick-disconnect design allows for easy field replacement. Optional lengths available per chart.

LEVEL CONTROL

Automatic models shall be controlled by an adjustable wide-angle style switch sealed in a polymeric float. A series piggy-back style plug shall be provided to allow for manual bypass operation. Not available on 50' models and 3-Phase.

DISCHARGE

2" FNPT with a 1-1/2" FNPT threaded cast iron flange provided.

DIMENSIONAL DATA:

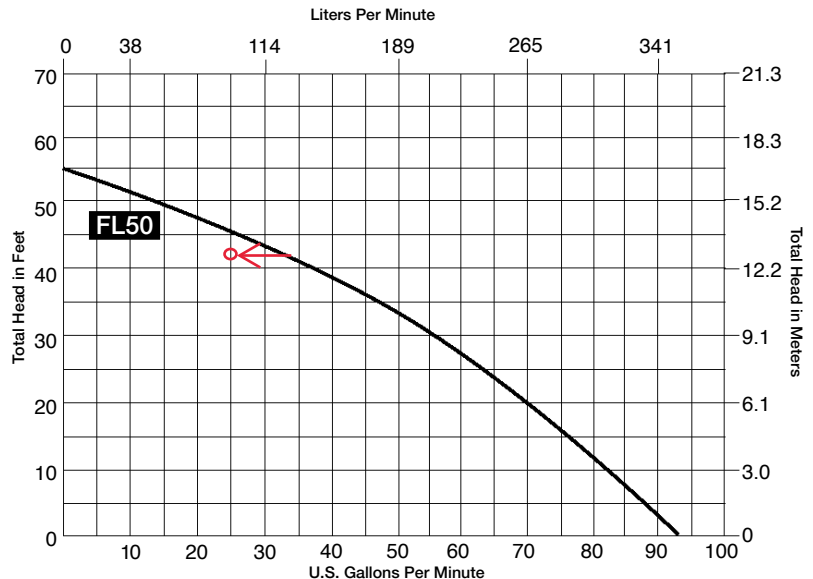
Height: 16.4" **Width:** 11.2"
(manual models)

Maximum Fluid Temperature:

100° F, 40° C Continuous Duty
140° F, 60° C Intermittent

FL50-Series

PERFORMANCE CURVE 60 Hz.



FL50-Series

Model	HP	Volts	Ph	Amps	Cord	Switch	Plug-End	Wgt
FL51A	1/2	115	1	12	10'	Automatic	Series Plug	62
FL51A-2	1/2	115	1	12	25'	Automatic	Series Plug	64
FL51A-3	1/2	115	1	12	35'	Automatic	Series Plug	66
FL51M	1/2	115	1	12	10'	Manual	Plug	61
FL51M-2	1/2	115	1	12	25'	Manual	Plug	62
FL51M-3	1/2	115	1	12	35'	Manual	Plug	63
FL51M-5	1/2	115	1	12	50'	Manual	Bare Lead	65
FL52A	1/2	208-230	1	6.5	10'	Automatic	Series Plug	62
FL52A-2	1/2	208-230	1	6.5	25'	Automatic	Series Plug	64
FL52A-3	1/2	208-230	1	6.5	35'	Automatic	Series Plug	66
FL52M	1/2	208-230	1	6.5	10'	Manual	Plug	61
FL52M-2	1/2	208-230	1	6.5	25'	Manual	Plug	62
FL52M-3	1/2	208-230	1	6.5	35'	Manual	Plug	63
FL52M-5	1/2	208-230	1	6.5	50'	Manual	Bare Lead	65



Specifications are subject to change without notice.

APPENDIX I

PHOTOS



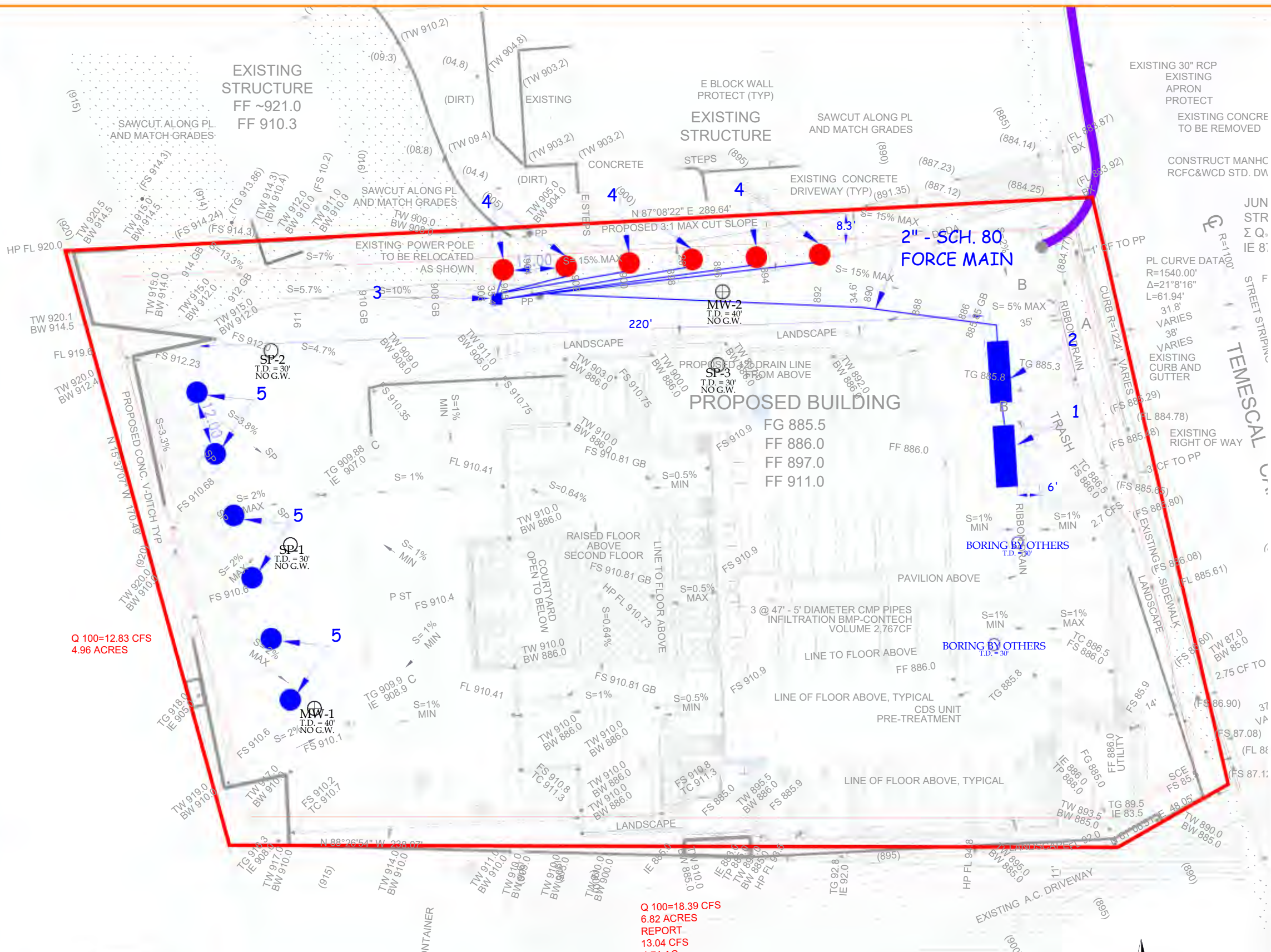












LEGEND

Locations are Approximate

Symbols

- Limits of Report
- SP-3
T.D. = 30'
NO.G.W.
- MW-2
T.D. = 30'
NO.G.W.
- Primary Seepage Pit
- 100% Expansion Seepage Pit

NOTES:

- PROPOSED OFFICE BUILDING
- 78 DRAINAGE FIXTURE UNITS
- 3500 GALLON SEPTIC TANK
- DESIGN RATE = 1.2 GALLONS/ SQFT/ DAY
- TOTAL DEPTH = 162 FEET
- PRIMARY: 6 - 6' DIAMETER SEEPAGE PIT @ 30 FEET DEEP (INLET DEPTH IS 3 FEET BELOW EXISTING GRADE)
- 100% EXPANSION: 6 - 6' DIAMETER SEEPAGE PIT @ 30 FEET DEEP (INLET DEPTH IS 3 FEET BELOW EXISTING GRADE)

- 3500 GALLON SEPTIC TANK (TRAFFIC RATED)
- 2500 GALLON PUMP CHAMBER (TRAFFIC RATED)
- DISTRIBUTION BOX WITH BAFFLE
- PRIMARY SEEPAGE PIT
- 100% EXPANSION SEEPAGE PIT

SEEPAGE PIT MAP

LOCATED ON TEMESCAL CANYON ROAD
CITY OF CORONA, RIVERSIDE COUNTY, CALIFORNIA
APN 282-121-011

SOLDAT OFFICE BUILDING

PROJECT	MR. JOHN SOLDAT
CLIENT	245589-13A
PROJECT NO.	JUNE 2024
DATE	1:30
SCALE	
DWG XREFS	
REVISION	JDG
DRAWN BY	PLATE

1 OF 1

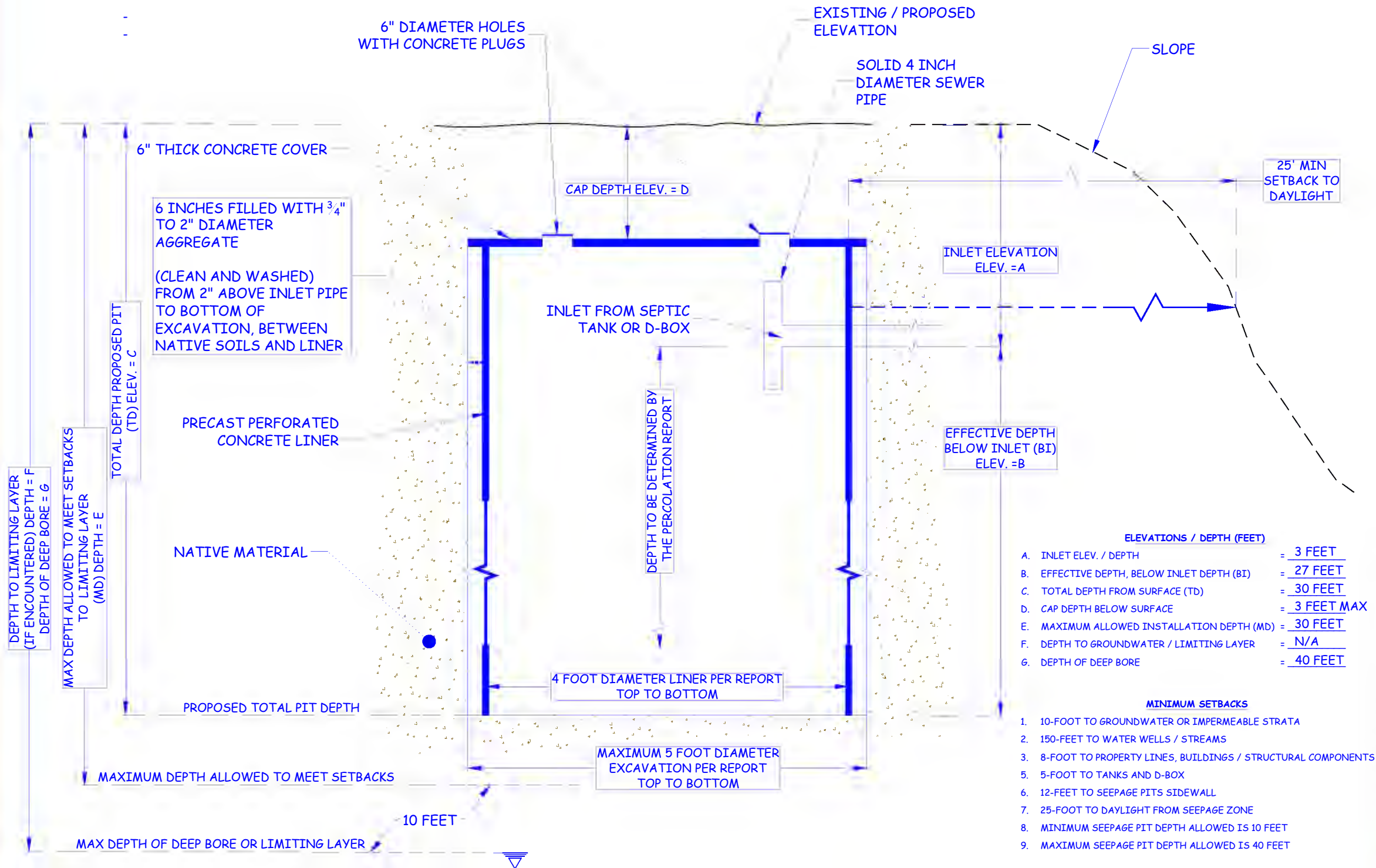
Stephen M. Pole

Erinella Gradella

NORTH

SCALE: 1" = 40'

TYPICAL SEEPAGE PIT DETAIL
NOT TO SCALE



ELEVATIONS / DEPTH (FEET)	
A. INLET ELEV. / DEPTH	= 3 FEET
B. EFFECTIVE DEPTH, BELOW INLET DEPTH (BI)	= 27 FEET
C. TOTAL DEPTH FROM SURFACE (TD)	= 30 FEET
D. CAP DEPTH BELOW SURFACE	= 3 FEET MAX
E. MAXIMUM ALLOWED INSTALLATION DEPTH (MD)	= 30 FEET
F. DEPTH TO GROUNDWATER / LIMITING LAYER	= N/A
G. DEPTH OF DEEP BORE	= 40 FEET

- MINIMUM SETBACKS
- 10-FOOT TO GROUNDWATER OR IMPERMEABLE STRATA
 - 150-FOOT TO WATER WELLS / STREAMS
 - 8-FOOT TO PROPERTY LINES, BUILDINGS / STRUCTURAL COMPONENTS
 - 5-FOOT TO TANKS AND D-BOX
 - 12-FOOT TO SEEPAGE PITS SIDEWALL
 - 25-FOOT TO DAYLIGHT FROM SEEPAGE ZONE
 - MINIMUM SEEPAGE PIT DEPTH ALLOWED IS 10 FEET
 - MAXIMUM SEEPAGE PIT DEPTH ALLOWED IS 40 FEET

TYPICAL SEEPAGE PIT DETAILS

LOCATED ON TEMESCAL CANYON ROAD
CITY OF CORONA, RIVERSIDE COUNTY, CALIFORNIA
APN 282-121-011

PROJECT	SOLDAT OFFICE BUILDING		
CLIENT	MR. JOHN SOLDAT		
PROJECT NO.	245589-13A		
DATE	JUNE 2024		
SCALE			
DWG XREFS			
REVISION			
DRAWN BY	JDG	PLATE	1 OF 1

Earth Strata Geotechnical Services, Inc.

Geotechnical, Environmental and Materials Testing Consultants

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