

APPLICATION - PERMIT
ON-SITE WASTEWATER SYSTEM



(Please Type or Print Legibly)

OWNER'S NAME: Midwick Jubilee, LLC PHONE:
ADDRESS: 366 Warwick Road Middletown, DE 19709
PROJECT LOCATION: 366 Warwick Road Middletown, DE 19709 TAX/MAP #: 13-026.00-025
APPLICATION DNREC
PREPARER: Kimberly A. Yanaitis, P.E.-Septic Solutions, LLC LICENSE #: 4195
PREPARER'S ADDRESS: 13 Charles Pointe Newark, DE 19702
PHONE: (302) 438-7498

I hereby affirm that the information provided on this document is accurate and complete.

Preparer's Signature: Kimberly A. Yanaitis Date: 6/11/24



(Please check all boxes that apply)

System Type: (CF = Cap & Fill / FD = Full Depth)

- Low Pressure Pipe (FD)
Elevated Sand Mound
Pressure Dose (FD)
Holding Tank
Gravity (FD)
Std. Pressure Dose (FD)
Std. Pressure Dose (CF)
Low Pressure Pipe (CF)
Wisconsin At-Grade
Pressure Dose (CF)
Subsurface Micro Irrigation
Gravity (CF)
Other

Type of Construction:

- Replacement
New Construction
Component Replacement
Repair to Existing System
Authorization to Use Existing System

- Bed or Trench
Gravelless Chamber or Stone/Gravel
Sand-lined Yes/No

Existing System Malfunctioning Yes No N/A

Pre-Treatment Units

- Septic Tank
Recirculating Sand Filter
Other

See Attached Calculations

Avg. Percolation Rate: 45
Gallons Per Day Flow: 3330
Minimum Sq. Ft.:
Required: 0.33\*sqrt(45)\*3330 gpd = 7372 sf
Proposed: 36 Trenches \* 3' \* 74 lf = 7992 sf

Central Water Available Yes No
(If yes, please state Utility Name: )





**VETERINARIAN FLOW RATES  
INCLUDES FUTURE DEVELOPMENT**

3 vets work per day (2 for office visits, 1 for surgery)  
 10 Hour work days  
 Office visits are scheduled every 20 mins (3 patients per hour)  
 Surgery = 1 patient per hour  
 2 vet techs and 2 office staff per vet

*EXISTING BUILDING "A"*

1 vet	70 gpd	70
2 techs	70 gpd	140
2 staff	20 gpd	40
10 patients	10 gpd	100
21 kennels	10 gpd	210
		<hr/>
		560

*EXISTING BUILDING "B"*

2 vets	70 gpd	140
4 techs	70 gpd	280
4 staff	20 gpd	80
60 patients	10 gpd	600
57 kennels	10 gpd	570
		<hr/>
		1670

= 2 vets per day  
 3 patients per hour per vet = 6 patients per hour  
 60 patients per day \* 10 gpd = 600 gpd

*PROPOSED BUILDING "F" - Future Office*

Assume 10 employees	20 gpd	200
		<hr/>
		200

*DOGGIE DAYCARE*

90 kennels	10 gpd	900
		<hr/>
		900

**TOTAL FLOW 3330 GPD**



TYPE OF ESTABLISHMENT	UNIT	GALLONS/UNIT/DAY
Airport	Person	5
Assembly Hall, Auditoriums, Indoor Theaters	Seat	3
Banquet Halls/Fire Halls/Community Centers	Seat	15
With bar & food	Seat	30
Barber Shop	Chair	50
Bar with minimum food prep	Seat	20
Bath House	Person	10
Beauty Shop	Chair	125
Boarding or rooming houses	Person	50
Staff	Person	15
Bowling Alley with no bar or restaurant	Lane	100
With bar or restaurant	Lane	200
Camps		
Work	Person	40
Summer	Person	40
Trailer without sewer hook-up	Site	50
Trailer with sewer hook-up	Site	75
Churches	Seat	5
Country Clubs	Person	100
Day Care	Child	10
Day Care Staff add	Person	15
Dentist Office	Chair	100
Office Staff add	Person	20
Dog Kennel	Dog	10
Factories	Person	25
with shower	Person	35
Hospitals	Bed	250+
Hotels	Room	120



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES  
AND ENVIRONMENTAL CONTROL

WASTEWATER DESIGN FLOW RATES

ISSUED: JANUARY 1985  
REVISED: JANUARY 2014

EXHIBIT - D  
(Sheet 1 of 3)

TYPE OF ESTABLISHMENT	UNIT	GALLONS/UNIT/DAY
Laundromat	Machine	500
Marinas	Boat Slip	10
Marinas with restrooms	Boat Slip	30
Motels	Room	100
with kitchen	Room	150
Medical office buildings and clinics	Persons	
Doctors, nurses and medical staff		70
Office staff		20
Patients		7
Offices	Employee	20
Outdoor sporting facilities	Persons per day	5
Parks with beaches		
Lavatory waste only	Person	5
Bath house, showers, lavatories	Person	13
Picnic Grounds, Public Swimming Pools		
Picnic with toilets only	Person	5
Picnic with lavatories and showers	Person	11
Swimming Pools and Beaches with lavatories and showers	Person	13
Residential Dwellings	Bedroom	120
Restaurants	Seat	
24 hour service		40
18 hour service		30
12 hour service		20
Add for bars & cocktail lounges		5
Rest/Nursing/Assisted Living Homes	Bed	100



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WASTEWATER DESIGN FLOW RATES

ISSUED: JANUARY 1985

REVISED: JANUARY 2014

EXHIBIT - D  
(Sheet 2 of 3)

TYPE OF ESTABLISHMENT	UNIT	GALLONS/UNIT/DAY
Schools	Student	10
with gym, showers, cafeteria	Student	25
with cafeteria	Student	15
Boarding	Student	75
Non-resident staff	Staff	15
Service Station	Pump	50
with convenience store	Sq. ft.	0.1
Stores (Retail)	Sq. ft.	0.1
Theaters		
Drive-in	Space	10
Movie Theaters	Seat	4
Veterinarian	Patient	10



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WASTEWATER DESIGN FLOW RATES

ISSUED: JANUARY 1985  
REVISED: JANUARY 2014

EXHIBIT - D  
(Sheet 3 of 3)

## GENERAL NOTES

1. The septic design is based on conditions stated in the Site Evaluation report. No liability will be assumed for malfunctioning septic system components due to a variation in the water table, unapproved field changes, faulty installation, lack of maintenance or failure to comply with conditions in the approved permit. It shall be the responsibility of the installer to notify the designer of field conditions that require changes to the individual septic system design.
2. This septic design does not constitute a formal survey.
3. The Hydrogeologic Suitability and Surface Water Assessment Report (HSR) is an integral part of this design. It shall be the responsibility of the installer to obtain and familiarize himself with the specific requirements. The HSR was prepared by Duffield Associates, Inc.
4. Topography, boundary and existing and proposed features are based on information provided in the HSR and per a plan entitled "Exploratory Major Land Development Plan of Middletown Veterinary Hospital" prepared by Clifton L. Bakhsh, Jr., Inc., dated 6/28/17 and last revised 4/11/18.
5. The septic disposal area(s) shall be fenced off prior to any activity on the lot to preserve the integrity of subsurface soil conditions and shall not be used for storage of any materials, stockpiling of topsoil, parking of any vehicles, etc.
6. The sides and bottom of the trenches shall be thoroughly scarified prior to the installation of the stone.
7. ***Final Inspection:*** One (1) inspection is required for this site. A minimum 48 hour notice shall be provided to the designer, prior to calling for the required engineer's inspection. Contact Kimberly A. Yanaitis, PE at 302-438-7498. It shall be the responsibility of the contractor to ensure that electric is available for the pump and that water is available for the pressure test, if required by the DNREC permit conditions. It shall also be the responsibility of the contractor to ensure that all interested parties are scheduled for the inspection. "All interested parties" include, but is not limited to, the engineer and DNREC (302-739-9948).
8. The installer shall be on-site during all final inspections and to set the head pressure for the engineer's approval. Any equipment necessary including, but not limited to, electrical generator, hoses, pressure gages and water, shall be provided by the contractor.
9. The replacement disposal system shall be the same as the initial system.
10. The septic disposal field shall be required to maintain a minimum of 100 feet from all adjacent domestic wells and 150 feet from all public wells.

The transmission line and manifold shall be buried to maintain a minimum of 30" of cover. At a driveway crossing (if applicable), the depth of the

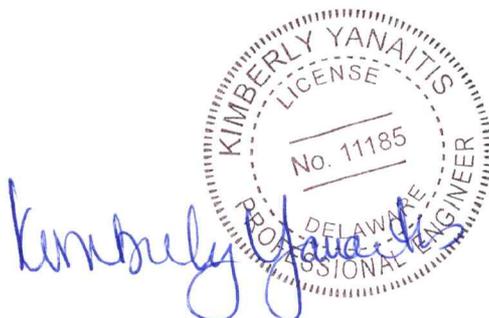


transmission line must be 36" or the pipe must be encased in six (6) inches of concrete or sleeved within a larger sized Schd 40 or Schd 80 pipe. The sleeving or encasement shall extend a minimum of two (2) feet beyond the edge of the driveway.

12. All trees and shrubs within 10' of the tanks and disposal fields shall be removed prior to installation unless a Tree Waiver is signed by the applicant and submitted to DNREC.
13. It shall be the responsibility of the builder to insure that the dwelling elevation is set properly for adequate fall from the sewer outfall to the septic tank. Coordinate with septic installer as required.
14. Property owner shall be responsible for establishing exact property corners.
15. The installer shall not encroach any more than 10 feet from any property line.
16. All piping shall be pressure rated Sch 40 PVC, properly fitted and welded.
17. The contractor is responsible for field verifying all isolation distances prior to initiating construction of system. If discrepancies are noted, the contractor shall contact engineer prior to commencing construction.
18. Any changes in specified equipment, including but not limited to, pumps, alarms, timers, etc., shall be approved by the engineer prior to initiating construction.
19. Any changes made to the system location, tank placement, etc. deemed necessary by the installer or the owner, shall be first noted to the engineer for approval prior to initiating the changes.
20. Any change requiring "As-Built" drawings shall be submitted to DNREC within ten (10) days of the system completion.
21. The system shall not be installed during inclement weather conditions (saturated, frozen and/or dessicated soil conditions, etc.) that would create compaction, smearing or destruction of the soil structure in the disposal area.
22. Allow 2' of excavation clearance around tanks for settling and backfilling. Fill and hand tamp in 8" lifts.
23. All dosing chamber components shall be field tested to insure accuracy, watertightness and proper operation of pumps and alarm controls prior to being placed in service.
24. All electrical connections on the interior of any septic tank, dosing tank and/or pretreatment unit shall be waterproof, corrosion resistant and explosion proof. The exterior connections on any septic tank, dosing tank and/or pretreatment unit shall be waterproof and corrosion resistant.

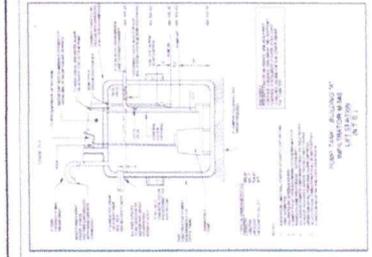
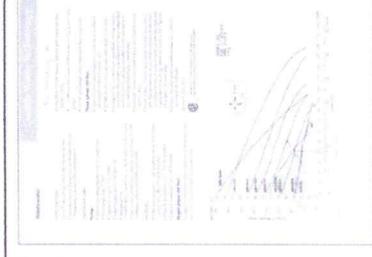
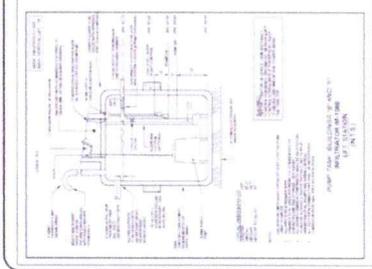
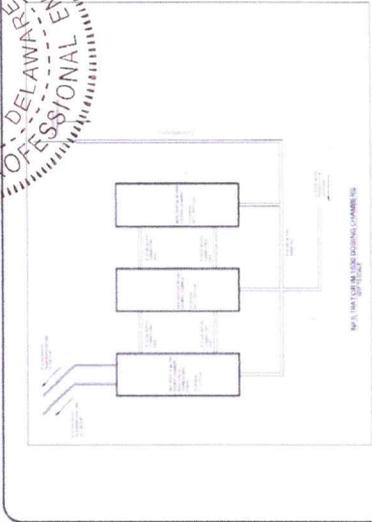
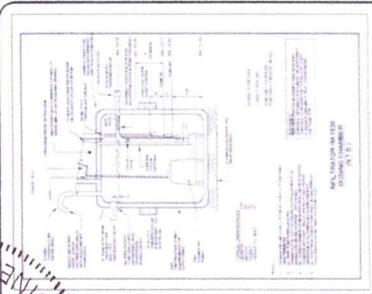


25. The installing contractor shall be responsible for insuring electrical connections and power and control wiring conform to all state, local and NEC codes.
26. The installing contractor shall be responsible to fill and grade over septic tanks, dosing tanks, transmission line, lateral trenches and any other below grade fixtures installed as part of this project.
27. The installing contractor shall verify the location of all wells within 150' of the disposal area.
28. The installing contractor shall provide the owner with all operating and maintenance manuals for all equipment installed as part of this project and advise the owner of proper care and operation of same.
29. The control panel shall be as specified in the permit. The bottom of the panel shall be a minimum of 24 inches above finished grade within direct line of sight of the pump or treatment device being operated.
30. The high water level alarm panel shall be powered from a separate circuit from the dosing pump.
31. The interior and exterior of the tanks shall be free of cracks, voids and other defects. Two piece tanks shall have the joint properly sealed before joining.
32. The building sewer line to all septic tanks shall be 4" Schd 40 PVC pipe.
33. All tank accessways shall have appropriate extensions installed to facilitate access to finished grade.
34. Laterals are to be placed along the contour.
35. Lawn sprinkler systems shall not be installed in the vicinity of the septic disposal field.
36. Water softeners are not permitted to be connected to the proposed septic system. Water softener brine shall be discharged in a manner that does not allow surface discharge (curtain drain).





*Kristy Yarnall*  
 Kristy Yarnall  
 License No. 11185  
 DELAWARE PROFESSIONAL ENGINEER



**INSTALLATION PRELIMINARY - 805 High-Pressure Details**

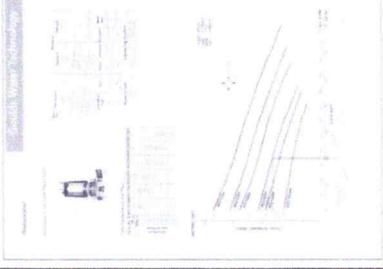
**GENERAL NOTES:**

1. All materials shall be as specified in the schedule.
2. All work shall be in accordance with the approved plans and specifications.
3. The contractor shall be responsible for obtaining all necessary permits.
4. The contractor shall be responsible for protecting existing utilities.
5. The contractor shall be responsible for the accuracy of the field data.
6. The contractor shall be responsible for the quality of the work.
7. The contractor shall be responsible for the safety of the work.
8. The contractor shall be responsible for the cleanup of the work.
9. The contractor shall be responsible for the disposal of the waste.
10. The contractor shall be responsible for the maintenance of the system.

**General Notes - Technology**

**General Notes - Technology**

**General Notes - Technology**



**TANK ALERT™ XI Alarm System**

Y  
 INFILTRATOR IM-1530 DOSING CHAMBERS

S  
 INFILTRATOR IM-1060 LIFT STATION BUILDINGS B AND F

E  
 INFILTRATOR IM-540 LIFT STATION BUILDING A

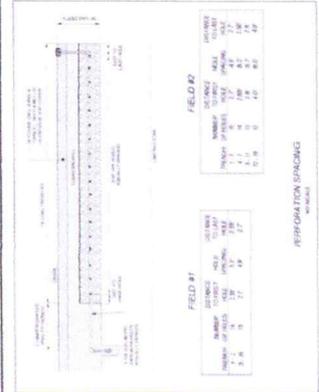
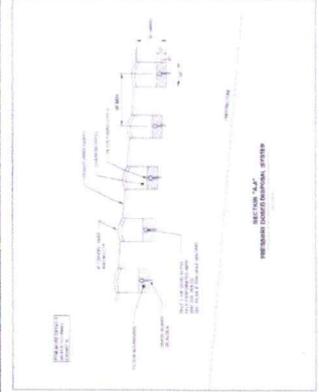
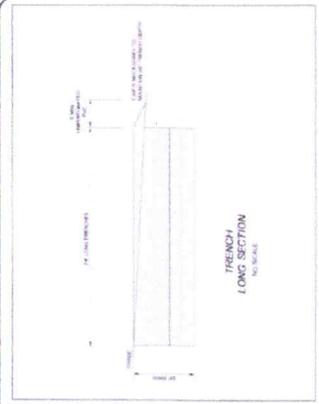
SEPTIC SYSTEM DETAILS

FOR  
 MIDDLETOWN VETERINARY HOSPITAL  
 ST GEORGES/APOQUINWINK HUNDRED  
 NEWCASTLE COUNTY DELAWARE

TP # 13-026-00-025  
 MIDWICK JUBILEE, LLC  
 366 WARRICK ROAD  
 MIDDLETOWN, DE 19709

SEPTIC SOLUTIONS, LLC  
 13 CHARLES POINTE  
 NEWARK, DE 19702  
 302-438-7498  
 kyanalis@sepsol.com

DATE	REVISION	CHKD.	DATE	Drawn By	CHKD.
02/02/2019	1	KAY	01/02/2019	KAY	2
	2	KAY		KAY	2
	3	KAY		KAY	2



DISPOSAL FIELD DETAILS

WARWICK ROAD  
(ROUTE 299)

PLAN 2

PLAN 1

WRPA



WRPA

APPROVED SOILS  
AREA (NOT SUBJECT  
OF THIS PERMIT)

PLAN 3

300' WIDE DP&L  
EASEMENT

EX. TOWER

EX. STABLE

APPROVED  
SOILS  
AREA

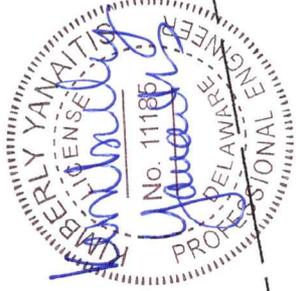
PLAN 4

DOGGIE  
DAY CARE

MIDDLETOWN WARWICK ROAD  
(ROUTE 301)

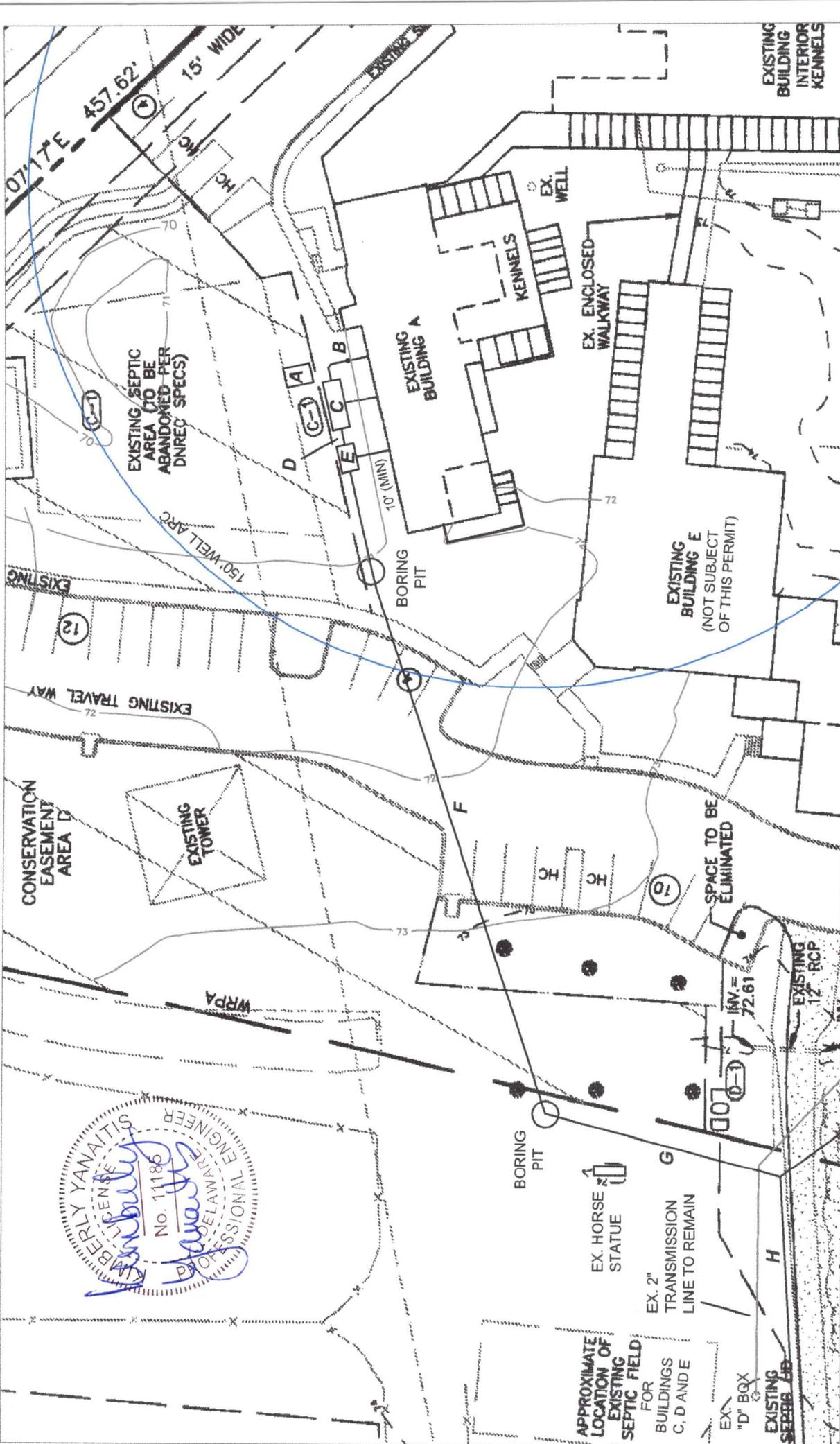
OVERALL  
PLAN

NO SCALE



OWNER OR AUTHORIZED AGENT SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

\* A COPY OF THIS PAGE MUST BE SUBMITTED WITH BOTH THE SEPTIC SYSTEM AND WELL CONSTRUCTION REPORT(S).

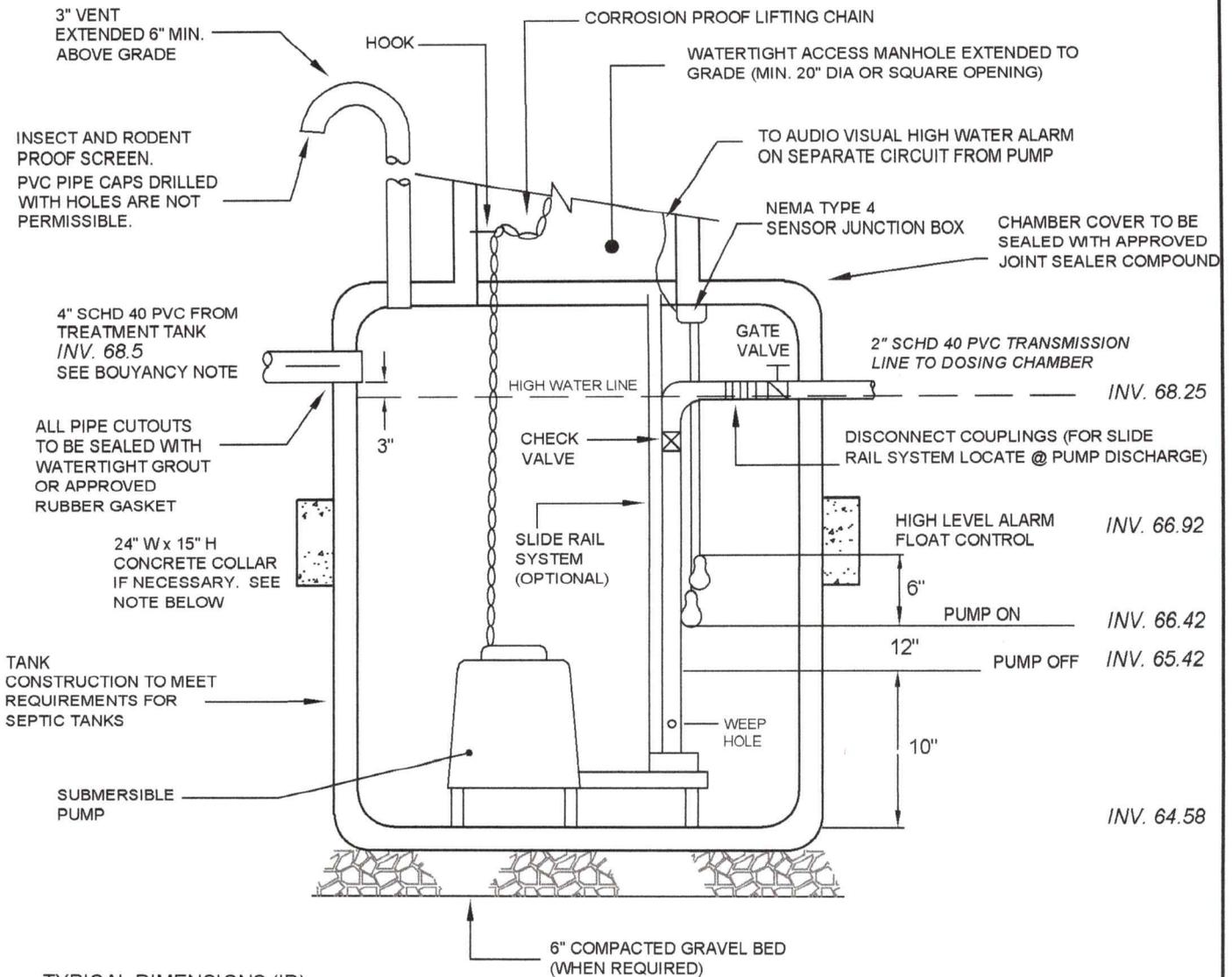


**PLAN 1**  
**SCALE: 1" = 40'**

- A. EX. SEPTIC TANK TO BE ABANDONED
- B. 15 LF 4" SCHD 40 PVC WITH CLEANOUT
- C. 1,500 GAL SEPTIC TANK WITH DNREC APPROVED FILTER AND RISERS TO GRADE
- D. 4" SCHD 40 PVC
- E. INFILTRATOR IM-540 LIFT PUMP TANK WITH VENT AND RISER TO GRADE
- F. 202 LF 2" SCHD 40 PVC TRANSMISSION LINE (167 LF TO BE BORED UNDER PARKING LOT)
- G. 73 LF 2" SCHD 40 PVC TRANSMISSION LINE
- H. 2" SCHD 40 PVC TRANSMISSION LINE TO DOSING CHAMBER

AMBERLY YANAITIS  
 LICENSE No. 11186  
 STATE OF DELAWARE  
 PROFESSIONAL ENGINEER

GRADE 71.0



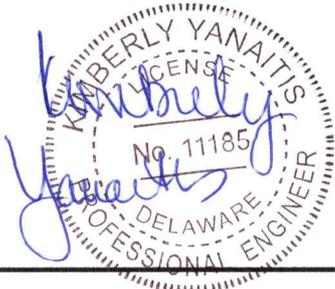
**TYPICAL DIMENSIONS (ID):**

LENGTH:	64.9"
WIDTH:	61.7"
HEIGHT:	54.6"
HEIGHT TO INLET:	47"

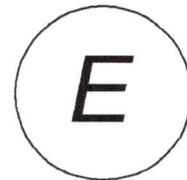
**NOTES:**

1. EXCAVATION LIMITS SHALL EXTEND AT LEAST 2 FEET BEYOND TANK PERIMETER.
2. ALL PIPE TO BE SCHEDULE 40 PVC.
3. CHAMBER TO BE SIZED ACCORDING TO REQUIREMENTS OF DOSING VOLUME AND STORAGE. SEE EXHIBIT I.
4. ALL DOSING CHAMBER COMPONENTS SHALL BE FIELD TESTED TO INSURE ACCURACY, WATER TIGHTNESS AND PROPER OPERATION OF ALL PUMPS AND ALARM CONTROLS.
5. ALL ELECTRICAL CONNECTIONS SHALL BE WATERPROOF, CORROSION RESISTANT AND EXPLOSION PROOF.

**BUOYANCY**  
 PER INFILTRATOR IM-SERIES TANK BUOYANCY CONTROL GUIDANCE DOCUMENT, NO BUOYANCY CONTROL IS REQUIRED IF THERE IS AT LEAST 12 INCHES (300 MM) OF SOIL COVER ABOVE THE TANK TOP.



**PUMP TANK - BUILDING "A"  
 INFILTRATOR IM-540  
 LIFT STATION  
 (N.T.S.)**



## Wastewater

### APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

### SPECIFICATIONS

#### Pump

- Solids handling capabilities: 3/4" maximum
- Discharge size: 2" NPT
- Capacities: up to 140 GPM
- Total heads: up to 128 feet TDH
- Temperature: 104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

#### MOTORS

- Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- Class B insulation on 1/2 - 1 1/2 HP models.
- Class F insulation on 2 HP models.

#### Single phase (60 Hz):

- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.

*Ex. Building "A"*

- SJTOW or STOW severe duty oil and water resistant power cords.
- 1/2 - 1 HP models have NEMA three prong grounding plugs.
- 1 1/2 HP and larger units have bare lead cord ends.

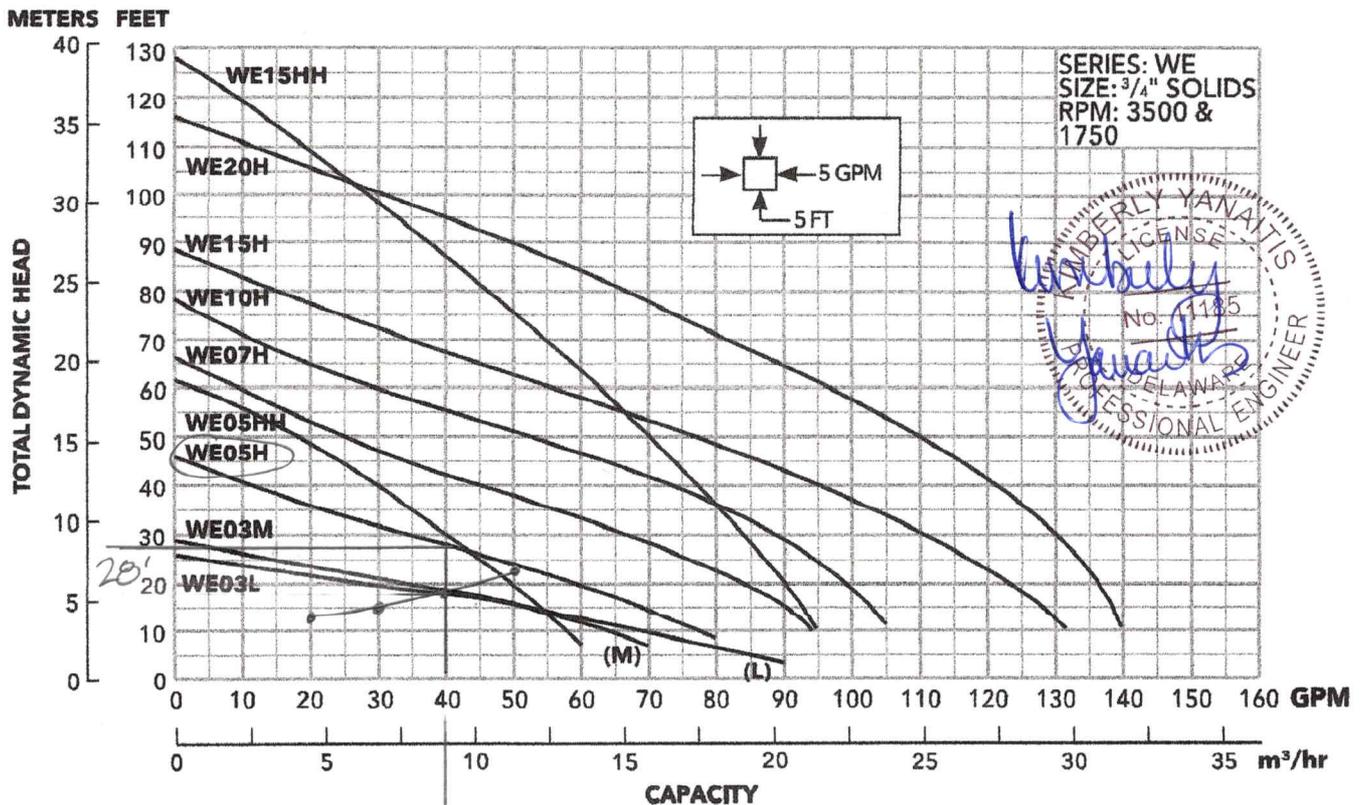
#### Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

#### AGENCY LISTINGS



Tested to UL 778 and CSA 22.2 108 Standards  
By Canadian Standards Association File #LR38549



## Wastewater

### MODELS

Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance		Power Cable Size	Weight (lbs.)			
										Start	Line-Line					
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56			
WE0318L			208			6.8	19.5	K	51	9.1	4.2					
WE0312L			230			4.9	14.1	L	53	14.5	8.0					
WE0311M			115			10.7	30.0	M	54	11.9	1.7					
WE0318M			208			6.8	19.5	K	51	9.1	4.2					
WE0312M			230			4.9	14.1	L	53	14.5	8.0					
WE0511H	0.5	1	115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60			
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3	60			
WE0512H			230			7.3	34.5	M	53	9.6	4.0	16/3	60			
WE0538H			3			200	4.9	22.6	R	68	NA	3.8	14/4	60		
WE0532H						230	3.3	18.8	R	70	NA	5.8				
WE0534H						460	1.7	9.4	R	70	NA	23.2				
WE0537H		575	1.4		7.5	R	62	NA	35.3	14/3	60					
WE0511HH		1	115		3.88	14.5	46.0	M	54	7.5	1.0	14/3	60			
WE0518HH			208			8.1	31.0	K	68	9.7	2.4	16/3	60			
WE0512HH			230			7.3	34.5	M	53	9.6	4.0	16/3	60			
WE0538HH			3			200	4.9	22.6	R	68	NA	3.8	14/4	60		
WE0532HH						230	3.6	18.8	R	70	NA	5.8				
WE0534HH						460	1.8	9.4	R	70	NA	23.2				
WE0537HH		575	1.5		7.5	R	62	NA	35.3	14/4	60					
WE0718H		0.75	1		208	4.06	4.06	11.0	31.0	K	68	9.7	2.4	14/3	70	
WE0712H					230			10.0	27.5	J	65	12.2	2.7	14/3	70	
WE0738H			3		200			6.2	20.6	L	64	NA	5.7	14/4	70	
WE0732H					230			5.4	15.7	K	68	NA	8.6			
WE0734H	460			2.7	7.9			K	68	NA	34.2					
WE0737H	575			2.2	9.9			L	78	NA	26.5					
WE1018H	1	1	208	4.44	4.44	14.0	59.0	K	68	9.3	1.1	14/3	70			
WE1012H			230			12.5	36.2	J	69	10.3	2.1	14/3	70			
WE1038H		3	200			8.1	37.6	M	77	NA	2.7	14/4	70			
WE1032H			230			7.0	24.1	L	79	NA	4.1					
WE1034H			460			3.5	12.1	L	79	NA	16.2					
WE1037H			575			2.8	9.9	L	78	NA	26.5					
WE1518H	1.5	1	208	4.56	4.56	17.5	59.0	K	68	9.3	1.1	14/3	80			
WE1512H			230			15.7	50.0	H	68	11.3	1.6	14/3	80			
WE1538H			3			200	10.6	40.6	K	79	NA	1.9	14/4	80		
WE1532H		230				9.2	31.7	K	78	NA	2.9					
WE1534H		460				4.6	15.9	K	78	NA	11.4					
WE1537H		575	3.7			13.1	K	75	NA	16.9	14/3	80				
WE1518HH		1	1			208	5.50	5.50	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512HH						230			15.7	50.0	H	68	11.3	1.6	14/3	80
WE1538HH			3			200			10.6	40.6	K	79	NA	1.9	14/4	80
WE1532HH						230			9.2	31.7	K	78	NA	2.9		
WE1534HH						460			4.6	15.9	K	78	NA	11.4		
WE1537HH						575			3.7	13.1	K	75	NA	16.9		
WE2012H	2	3	230	5.38	5.38	18.0	49.6	F	78	3.2	1.2	14/3	83			
WE2038H			200			12.0	42.4	K	78	NA	1.7	14/4	83			
WE2032H			230			11.6	42.4	K	78	NA	1.7					
WE2034H			460			5.8	21.2	K	78	NA	6.6					
WE2037H			575			4.7	16.3	L	78	NA	10.5					

# TANK ALERT® XT Alarm System

## Versatile, indoor or outdoor liquid level alarm system.

This alarm system monitors liquid levels in lift pump chambers, sump pump basins, holding tanks, sewage, agricultural, and other water applications.

The Tank Alert® XT indoor/outdoor alarm can serve as a high or low level alarm depending on the float switch model used.

The alarm horn sounds and the red beacon illuminates when a potentially threatening liquid level condition occurs. The horn can be silenced, but the alarm light remains on until the condition is remedied. Once the condition is cleared, the alarm will automatically reset.

A "power on" light on the switch indicates power to the alarm panel.



## FEATURES

- Enclosure meets Type 3R water-tight standard.
- Automatic alarm reset, horn silence switch, and alarm test switch.
- Alarm horn sounds at 85 decibels at 10 feet (3 meters).
- Alarm system (when installed on separate circuit) operates even if pump circuit fails.
- Complete package includes standard SJE SignalMaster® control switch with 15 feet (4.57 meters) of cable (other lengths available) and mounting clamp.
- UL Listed for indoor or outdoor use.
- CSA Certified.
- Five-year limited warranty.



## OPTIONS

When ordered with the alarm, the system is available with:

- alternate float switch models for high or low liquid level warning.
- auxiliary dry normally open contacts for easy attachment of remote devices.
- premounted terminal block so enclosure can also be used as a junction box for splicing pump, pump switch, and pump power. Meets NEC standard for junction boxes.
- 6 foot (1.8 meter) power cord and liquid-tight connectors.

## SPECIFICATIONS

**VOLTAGE:** 120 VAC, 50/60 Hz

**ALARM ENCLOSURE:** 6.5 x 4.5 x 3.0 inch (16.51 x 11.43 x 7.62 cm), indoor-outdoor, weatherproof, thermoplastic meets Type 3R water-tight standard

**ALARM HORN:** 85 decibels at 10 feet (3 meters), meets Type 3R water-tight standard as installed by factory

**ALARM BEACON:** UL Listed, Type 4x beacon assembly

**TEST/SILENCE SWITCH:** certified to IP66 and IP68 standards

**AUXILIARY ALARM CONTACTS (OPTIONAL):** 120 VAC, 5 amps max., 50/60 Hz

**PRE-MOUNTED TERMINAL BLOCK (OPTIONAL):** 20 amps, 120/230 VAC

**POWER CORD (OPTIONAL):** 6 foot (1.8 meter) cord with 120 VAC plug

**FLOAT SWITCH:** SJE SignalMaster® control switch with mounting clamp

**Cable:** 15 feet (4.57 meters), flexible 18 gauge, 2 conductor (UL) SJOW, water-resistant (CPE)

**Float:** 2.74 inch diameter x 4.83 inch long (7 cm x 12.3 cm), high impact, corrosion resistant polypropylene housing for use in sewage and non-potable water up to 140°F (60°C)

SEE BACKSIDE FOR ORDERING INFORMATION.

# SJE Rhombus.

PO Box 1708, Detroit Lakes, MN 56502

1-888-DIAL-SJE • 1-218-847-1317

1-218-847-4617 Fax

email: [customer.service@sjerhombus.com](mailto:customer.service@sjerhombus.com)

[www.sjerhombus.com](http://www.sjerhombus.com)

101

PROJECT NAME:

MIDDLETOWN VETERINARY HOSPITAL  
EX. BUILDING "A"  
LIFT PUMP #1

Date: 1/23/2019  
Design: KAY

AVERAGE FLOW:

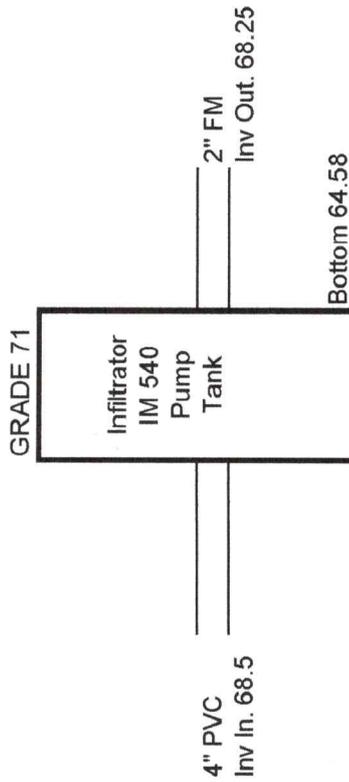
1 Vet * 70 GPD =	70 GPD
2 Techs * 70 GPD =	140 GPD
2 Staff * 20 GPD =	40 GPD
10 Patients * 10 GPD =	100 GPD
21 Kennels * 10 GPD =	210 GPD

Ex. Building A      560 GPD (0.4 GPM)

FORCE MAIN SIZE:

$D_{max} = 0.404 * \sqrt{Q \text{ (peak)}}$   
 $D_{max} = 0.404 * \sqrt{Q \text{ (0.4 GPM)}}$   
 $D_{max} = 0.25"$

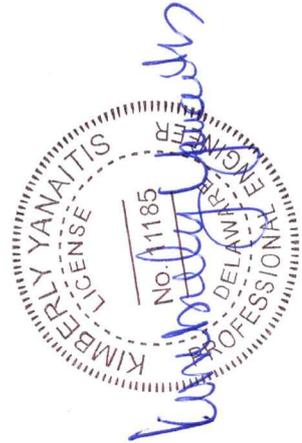
Use 2" SCHD 40 PVC



H.W.L.	66.92
PUMP ON	66.42
PUMP OFF	65.42
BOTTOM	64.58

STATIC HEAD:

SH = HIGH POINT - PUMP OFF  
SH = 75.0 - 65.42  
SH = 9.6      FT



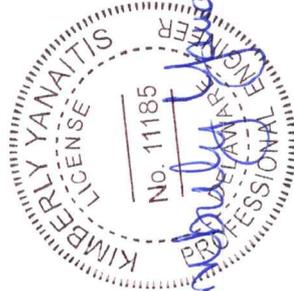
## PIPE AND FITTING SCHEDULE

Q (GPM)	2" STEEL		2" PVC (SDR-21)		3" PVC (SDR-21)		FITTING	K-VALUE
	V <sup>2</sup> / 2G	Hf (ft/100 ft)	V <sup>2</sup> / 2G	Hf (ft/100 ft)	V <sup>2</sup> / 2G	Hf (ft/100 ft)		
20	0.0568	0.868	0.05031	0.63	0.01054	0.112	2" CHECK VALVE	0.04
30	0.128	1.82	0.1132	1.34	0.02388	0.2	2" GATE VALVE	0.16
40	0.227	3.1	0.20236	2.28	0.04227	0.34	2" 90 BEND	1.00
50	0.355	4.67	0.31584	3.45	0.06589	0.52	2" 45 BEND	0.32
							3" 90 BEND	0.63
							3" 45 BEND	0.35
							3" TEE	1.2

Note: K-values per Supplement to NCC Std. Specifications for Construction Section 35.16, Part 5  
Sample Designs for Sewage Pumping Stations

## LOSSES

<b>20 GPM</b>								
	2" CHECK VALVE (STEEL)	1	*	0.0568	*	0.04	=	0.00227
	2" GATE VALVE (STEEL)	1	*	0.0568	*	0.16	=	0.00909
	2" 90 BEND (STEEL)	1	*	0.0568	*	1.00	=	0.05680
	2" 45 BEND (PVC)	2	*	0.05031	*	0.32	=	0.03220
	3" 90 BEND	2	*	0.01054	*	0.63	=	0.01328
	3" 45 BEND (PVC)	2	*	0.01054	*	0.35	=	0.00738
	3" TEE	2	*	0.01054	*	1.2	=	0.02530
	2" STEEL FM	4	*	0.868	(/100)		=	0.03472
	2" PVC FM	281	*	0.63	(/100)		=	1.77030
	3" PVC FM	502	*	0.112	(/100)		=	0.56224
	STATIC HEAD						=	9.60
	<b>TOTAL</b>						=	<b>12.11</b>



*Kimberly Yanaitis*

**30 GPM**

2" CHECK VALVE (STEEL)	1	*	0.128	*	0.04	=	0.00512
2" GATE VALVE (STEEL)	1	*	0.128	*	0.16	=	0.02048
2" 90 BEND (STEEL)	1	*	0.128	*	1.00	=	0.12800
2" 45 BEND (PVC)	2	*	0.1132	*	0.32	=	0.07245
3" 90 BEND	2	*	0.02388	*	0.63	=	0.03009
3" 45 BEND (PVC)	2	*	0.02388	*	0.35	=	0.01672
3" TEE	2	*	0.02388	*	1.2	=	0.05731
2" STEEL FM	4	*	1.82	(/100)	0.0728	=	0.0728
2" PVC FM	281	*	1.34	(/100)	3.76540	=	3.76540
3" PVC FM	502	*	0.2	(/100)	1.00400	=	1.00400
STATIC HEAD					9.60	=	9.60
<b>TOTAL</b>							<b>14.77</b>

**40 GPM**

2" CHECK VALVE (STEEL)	1	*	0.227	*	0.04	=	0.00908
2" GATE VALVE (STEEL)	1	*	0.227	*	0.16	=	0.03632
2" 90 BEND (STEEL)	1	*	0.227	*	1.00	=	0.22700
2" 45 BEND (PVC)	2	*	0.20236	*	0.32	=	0.12951
3" 90 BEND	2	*	0.04227	*	0.63	=	0.05326
3" 45 BEND (PVC)	2	*	0.04227	*	0.35	=	0.02959
3" TEE	2	*	0.04227	*	1.2	=	0.10145
2" STEEL FM	4	*	3.1	(/100)	0.124	=	0.124
2" PVC FM	281	*	2.28	(/100)	6.40680	=	6.40680
3" PVC FM	502	*	0.34	(/100)	1.70680	=	1.70680
STATIC HEAD					9.60	=	9.60
<b>TOTAL</b>							<b>18.42</b>

**50 GPM**

2" CHECK VALVE (STEEL)	1	*	0.355	*	0.04	=	0.01420
2" GATE VALVE (STEEL)	1	*	0.355	*	0.16	=	0.05680
2" 90 BEND (STEEL)	1	*	0.355	*	1.00	=	0.35500
2" 45 BEND (PVC)	2	*	0.31584	*	0.32	=	0.20214
3" 90 BEND	2	*	0.06589	*	0.63	=	0.08302
3" 45 BEND (PVC)	2	*	0.06589	*	0.35	=	0.04612
3" TEE	2	*	0.06589	*	1.2	=	0.15814
2" STEEL FM	4	*	4.67	(/100)	0.1868	=	0.1868
2" PVC FM	281	*	3.45	(/100)	9.69450	=	9.69450
3" PVC FM	502	*	0.52	(/100)	2.61040	=	2.61040
STATIC HEAD					9.60	=	9.60
<b>TOTAL</b>							<b>23.01</b>



**WET WELL VOLUME - INFILTRATOR IM-540**

PUMP ON TO PUMP OFF = 12"  
VOLUME = 136 GAL

**AVERAGE FLOW**

INFLOW = 0.4 GPM  
PUMP RATE = 40 GPM FROM PUMP CURVE  
DRAWDOWN = VOL / (Qpump - Qinflow) = 136 / (40 GPM - 0.4 GPM) =  
FILL TIME = VOL / Qinflow = 136 / 0.4 GPM =  
CYCLE TIME = DRAWDOWN + FILL TIME = 3.4 + 340.0 =  
STARTS PER DAY = 4.2 STARTS PER DAY

VELOCITY = PUMP RATE \* 0.00228 / [3.14 \* (DIA^2/4)] = 40 GPM \* 0.00228 / [3.14 \* (2"/12")^2 / 4] = 4.2 FPS



Ex. Building "A"

Table 2: Nominal Volume Chart

Height <sup>1</sup>		Total liquid volume in tank at indicated height					
in	cm	IM-540		IM-1060		IM-1530	
		U.S. Gal	Liters	U.S. Gal	Liters	U.S. Gal	Liters
1	3	3	11	3	11	17	64
2	5	8	30	13	49	34	128
3	8	14	53	28	106	51	192
4	10	21	80	46	174	68	256
5	13	29	109	65	246	94	357
6	15	37	141	86	326	122	463
7	18	46	173	107	405	152	573
8	20	55	207	129	488	180	681
9	23	64	243	152	575	212	802
10	25	74	279	176	666	245	928
11	28	84	317	200	757	280	1,061
12	30	94	356	225	852	312	1,182
13	33	105	396	251	950	351	1,328
14	36	116	437	277	1,049	387	1,463
15	38	127	480	303	1,147	422	1,597
16	40	138	523	330	1,249	464	1,756
17	43	150	566	357	1,351	500	1,892
18	46	161	611	384	1,454	537	2,034
19	48	173	656	411	1,556	575	2,177
20	50	186	702	438	1,658	614	2,322
21	53	198	749	465	1,760	652	2,468
22	56	210	796	493	1,866	690	2,612
23	58	223	843	521	1,972	729	2,758
24	61	235	891	549	2,078	770	2,914
25	64	248	940	577	2,184	808	3,058
26	66	261	988	605	2,290	847	3,208
27	69	274	1,038	633	2,396	887	3,356
28	71	287	1,088	662	2,506	928	3,513
29	74	300	1,137	691	2,616	968	3,665
30	76	313	1,185	719	2,722	1,007	3,814
31	79	326	1,233	747	2,828	1,048	3,966
32	81	338	1,281	775	2,934	1,087	4,113
33	84	351	1,328	802	3,036	1,126	4,262
34	86	363	1,375	830	3,142	1,165	4,410
35	89	375	1,421	857	3,244	1,204	4,557
36	91	387	1,466	884	3,346	1,242	4,701
37	94	399	1,511	911	3,449	1,280	4,846
38	97	411	1,555	938	3,551	1,318	4,988
39	99	422	1,598	965	3,653	1,355	5,131
40	102	433	1,640	992	3,755	1,393	5,272
41	104	444	1,681	1,018	3,854	1,430	5,412
42	107	455	1,722	1,044	3,952	1,466	5,550
43	109	465	1,761	1,069	4,047	1,502	5,685
44	112	475	1,799	1,094	4,141	1,537	5,817
45	114	485	1,836	1,118	4,232	1,572	5,950
46	117	494	1,871	1,142	4,323	1,604	6,070
47	119	503	1,905	1,165	4,410	1,638	6,201
48	122	512	1,938	1,187	4,493	1,667	6,310
49	124	520	1,970	1,208	4,573	1,697	6,422
50	127	528	1,999	1,228	4,648	1,724	6,527
51	130	535	2,027	1,247	4,720	1,749	6,621
52	132	542	2,050	1,265	4,789	1,766	6,684
53	135	547	2,071	1,278	4,838	1,777	6,726
54	137	551 <sup>2</sup>	2,087	1,287	4,872	1,785 <sup>2</sup>	6,758

Pump Off

12"

Pump On

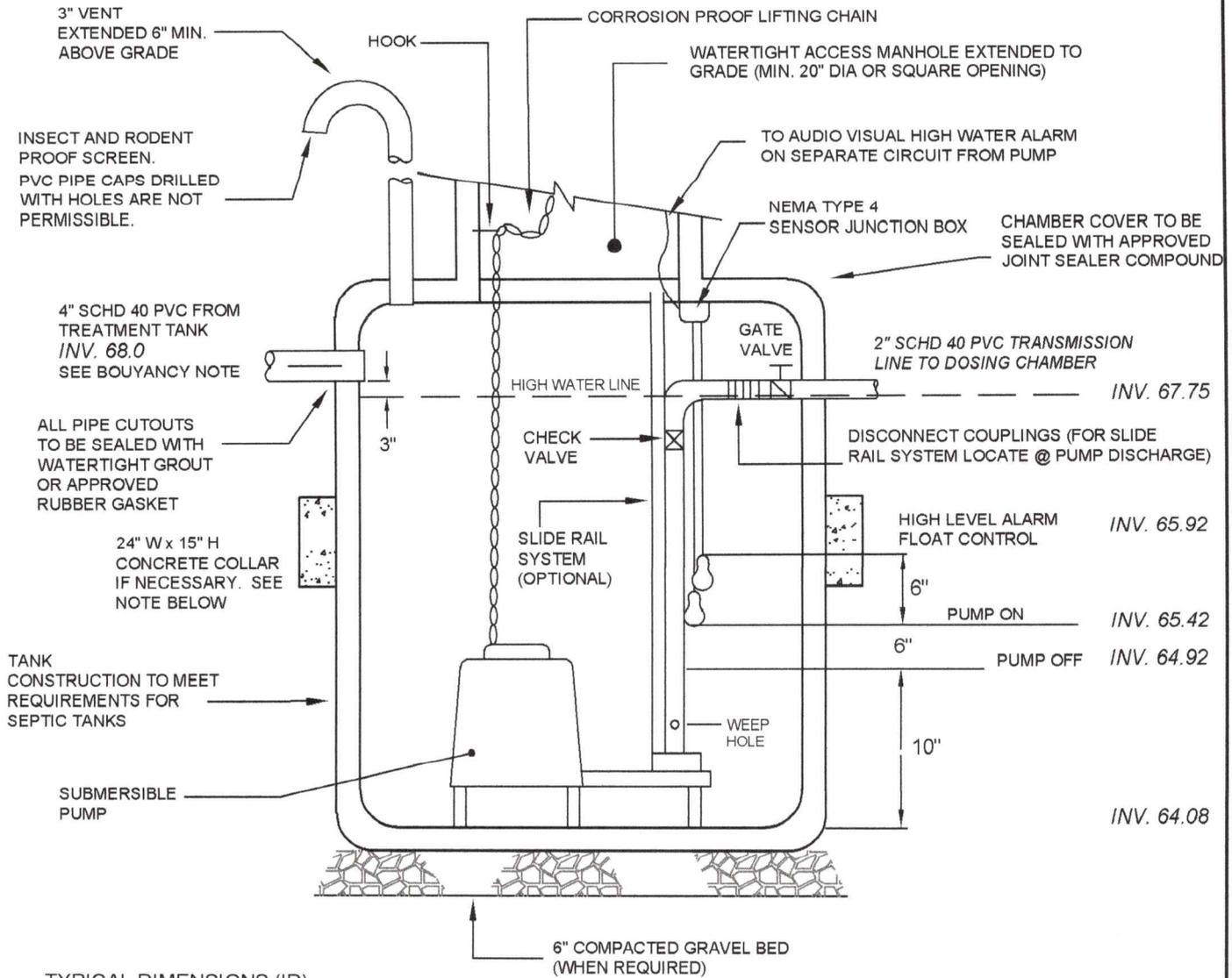
136 Gal

1. Height measured from lowermost inside surface at bottom of corrugation in tank.  
 2. The total capacity of the IM-540 tank is 552 gallons; the total capacity of the IM-1530 tank is 1,787 gallons.



GRADE 70.5

MAX. FM LENGTH = 300'  
MAX. VERTICAL LIFT = 18'



**TYPICAL DIMENSIONS (ID):**

LENGTH:	127"
WIDTH:	62.2"
HEIGHT:	54.7"
HEIGHT TO INLET:	47"

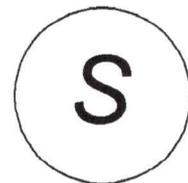
**NOTES:**

1. EXCAVATION LIMITS SHALL EXTEND AT LEAST 2 FEET BEYOND TANK PERIMETER.
2. ALL PIPE TO BE SCHEDULE 40 PVC.
3. CHAMBER TO BE SIZED ACCORDING TO REQUIREMENTS OF DOSING VOLUME AND STORAGE. SEE EXHIBIT I.
4. ALL DOSING CHAMBER COMPONENTS SHALL BE FIELD TESTED TO INSURE ACCURACY, WATER TIGHTNESS AND PROPER OPERATION OF ALL PUMPS AND ALARM CONTROLS.
5. ALL ELECTRICAL CONNECTIONS SHALL BE WATERPROOF, CORROSION RESISTANT AND EXPLOSION PROOF.

**BUOYANCY**  
PER INFILTRATOR IM-SERIES TANK BUOYANCY CONTROL GUIDANCE DOCUMENT, NO BUOYANCY CONTROL IS REQUIRED IF THERE IS AT LEAST 12 INCHES (300 MM) OF SOIL COVER ABOVE THE TANK TOP.



**PUMP TANK - BUILDINGS "B" AND "F"**  
**INFILTRATOR IM-1060**  
**LIFT STATION**  
**(N.T.S.)**



## Wastewater

Ex. Bldg "B" and Prop. Bldg "F"

### APPLICATIONS

Specifically designed for the following uses:

- Homes, Farms, Trailer Courts, Motels, Schools, Hospitals, Industry, Effluent Systems

### SPECIFICATIONS

#### Pump

- Solids handling capabilities: 3/4" maximum.
- Discharge size: 2" NPT.
- Capacities: up to 140 GPM.
- Total heads: up to 128 feet TDH.
- Temperature: 104°F (40°C) continuous, 140°F (60°C) intermittent.
- See order numbers on reverse side for specific HP, voltage, phase and RPM's available.

#### MOTORS

- Fully submerged in high-grade turbine oil for lubrication and efficient heat transfer.
- Class B insulation on 1/2 - 1 1/2 HP models.
- Class F insulation on 2 HP models.

#### Single phase (60 Hz):

- Capacitor start motors for maximum starting torque.
- Built-in overload with automatic reset.

- SJTOW or STOW severe duty oil and water resistant power cords.
- 1/2 - 1 HP models have NEMA three prong grounding plugs.
- 1 1/2 HP and larger units have bare lead cord ends.

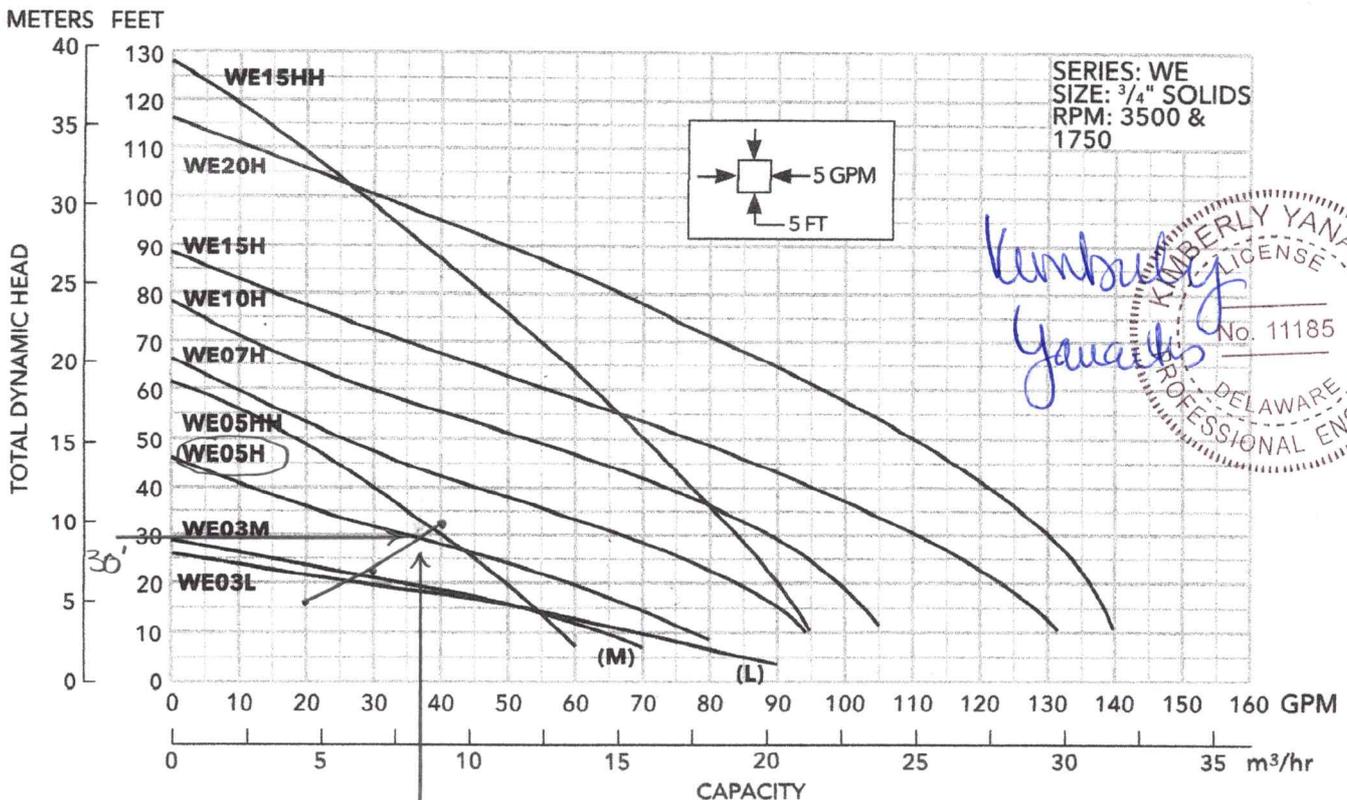
#### Three phase (60 Hz):

- Class 10 overload protection must be provided in separately ordered starter unit.
- STOW power cords all have bare lead cord ends.
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits, can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. Standard cord is 20'. Optional lengths are available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

#### AGENCY LISTINGS



Tested to UL 778 and CSA 22.2 108 Standards  
By Canadian Standards Association File #LR38549



*Kimberly Yanaitis*  
KIMBERLY YANAITIS  
LICENSE  
No. 11185  
PROFESSIONAL ENGINEER  
DELAWARE

## Wastewater

### MODELS

Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor Amps	KVA Code	Full Load Efficiency %	Resistance		Power Cable Size	Weight (lbs.)			
										Start	Line-Line					
WE0311L	0.33	1	115	1750	5.38	10.7	30.0	M	54	11.9	1.7	16/3	56			
WE0318L			208			6.8	19.5	K	51	9.1	4.2					
WE0312L			230			4.9	14.1	L	53	14.5	8.0					
WE0311M			115			10.7	30.0	M	54	11.9	1.7					
WE0318M			208			6.8	19.5	K	51	9.1	4.2					
WE0312M			230			4.9	14.1	L	53	14.5	8.0					
WE0511H	0.5	1	115	3450	3.56	14.5	46.0	M	54	7.5	1.0	14/3	60			
WE0518H			208			8.1	31.0	K	68	9.7	2.4	16/3	60			
WE0512H			230			7.3	34.5	M	53	9.6	4.0	16/3	60			
WE0538H			3			200	4.9	22.6	R	68	NA	3.8	14/4	60		
WE0532H						230	3.3	18.8	R	70	NA	5.8				
WE0534H						460	1.7	9.4	R	70	NA	23.2				
WE0537H		575	1.4		7.5	R	62	NA	35.3	14/4	60					
WE0511HH		1	115		3.88	14.5	46.0	M	54	7.5	1.0	14/3	60			
WE0518HH			208			8.1	31.0	K	68	9.7	2.4	16/3	60			
WE0512HH			230			7.3	34.5	M	53	9.6	4.0	16/3	60			
WE0538HH			3			200	4.9	22.6	R	68	NA	3.8	14/4	60		
WE0532HH						230	3.6	18.8	R	70	NA	5.8				
WE0534HH						460	1.8	9.4	R	70	NA	23.2				
WE0537HH		575	1.5		7.5	R	62	NA	35.3	14/4	60					
WE0718H		0.75	1		208	4.06	4.06	11.0	31.0	K	68	9.7	2.4	14/3	70	
WE0712H					230			10.0	27.5	J	65	12.2	2.7	14/3	70	
WE0738H			3		200			6.2	20.6	L	64	NA	5.7	14/4	70	
WE0732H					230			5.4	15.7	K	68	NA	8.6			
WE0734H	460			2.7	7.9			K	68	NA	34.2					
WE0737H	575			2.2	9.9			L	78	NA	26.5					
WE1018H	1	1	208	4.44	4.44	14.0	59.0	K	68	9.3	1.1	14/3	70			
WE1012H			230			12.5	36.2	J	69	10.3	2.1	14/3	70			
WE1038H		3	200			8.1	37.6	M	77	NA	2.7	14/4	70			
WE1032H			230			7.0	24.1	L	79	NA	4.1					
WE1034H			460			3.5	12.1	L	79	NA	16.2					
WE1037H			575			2.8	9.9	L	78	NA	26.5					
WE1518H	1.5	1	208	4.56	4.56	17.5	59.0	K	68	9.3	1.1	14/3	80			
WE1512H			230			15.7	50.0	H	68	11.3	1.6	14/3	80			
WE1538H		3	200			10.6	40.6	K	79	NA	1.9	14/4	80			
WE1532H			230			9.2	31.7	K	78	NA	2.9					
WE1534H			460			4.6	15.9	K	78	NA	11.4					
WE1537H			575			3.7	13.1	K	75	NA	16.9					
WE1518HH		1	1			208	5.50	5.50	17.5	59.0	K	68	9.3	1.1	14/3	80
WE1512HH						230			15.7	50.0	H	68	11.3	1.6	14/3	80
WE1538HH			3			200			10.6	40.6	K	79	NA	1.9	14/4	80
WE1532HH						230			9.2	31.7	K	78	NA	2.9		
WE1534HH						460			4.6	15.9	K	78	NA	11.4		
WE1537HH						575			3.7	13.1	K	75	NA	16.9		
WE2012H	2	1	230	5.38	5.38	18.0	49.6	F	78	3.2	1.2	14/3	83			
WE2038H			3			200	12.0	42.4	K	78	NA	1.7	14/4	83		
WE2032H		230				11.6	42.4	K	78	NA	1.7					
WE2034H		460				5.8	21.2	K	78	NA	6.6					
WE2037H		575				4.7	16.3	L	78	NA	10.5					

# TANK ALERT® XT Alarm System

## Versatile, indoor or outdoor liquid level alarm system.

This alarm system monitors liquid levels in lift pump chambers, sump pump basins, holding tanks, sewage, agricultural, and other water applications.

The Tank Alert® XT indoor/outdoor alarm can serve as a high or low level alarm depending on the float switch model used.

The alarm horn sounds and the red beacon illuminates when a potentially threatening liquid level condition occurs. The horn can be silenced, but the alarm light remains on until the condition is remedied. Once the condition is cleared, the alarm will automatically reset.

A "power on" light on the switch indicates power to the alarm panel.



## FEATURES

- Enclosure meets Type 3R water-tight standard.
- Automatic alarm reset, horn silence switch, and alarm test switch.
- Alarm horn sounds at 85 decibels at 10 feet (3 meters).
- Alarm system (when installed on separate circuit) operates even if pump circuit fails.
- Complete package includes standard SJE SignalMaster® control switch with 15 feet (4.57 meters) of cable (other lengths available) and mounting clamp.
- UL Listed for indoor or outdoor use.
- CSA Certified.
- Five-year limited warranty.



## OPTIONS

When ordered with the alarm, the system is available with:

- alternate float switch models for high or low liquid level warning.
- auxiliary dry normally open contacts for easy attachment of remote devices.
- premounted terminal block so enclosure can also be used as a junction box for splicing pump, pump switch, and pump power. Meets NEC standard for junction boxes.
- 6 foot (1.8 meter) power cord and liquid-tight connectors.

## SPECIFICATIONS

**VOLTAGE:** 120 VAC, 50/60 Hz

**ALARM ENCLOSURE:** 6.5 x 4.5 x 3.0 inch (16.51 x 11.43 x 7.62 cm), indoor-outdoor, weatherproof, thermoplastic meets Type 3R water-tight standard

**ALARM HORN:** 85 decibels at 10 feet (3 meters), meets Type 3R water-tight standard as installed by factory

**ALARM BEACON:** UL Listed, Type 4x beacon assembly

**TEST/SILENCE SWITCH:** certified to IP66 and IP68 standards

**AUXILIARY ALARM CONTACTS (OPTIONAL):** 120 VAC, 5 amps max., 50/60 Hz

**PRE-MOUNTED TERMINAL BLOCK (OPTIONAL):** 20 amps, 120/230 VAC

**POWER CORD (OPTIONAL):** 6 foot (1.8 meter) cord with 120 VAC plug

**FLOAT SWITCH: SJE SignalMaster® control switch with mounting clamp**  
**Cable:** 15 feet (4.57 meters), flexible 18 gauge, 2 conductor (UL) SJOW, water-resistant (CPE)  
**Float:** 2.74 inch diameter x 4.83 inch long (7 cm x 12.3 cm), high impact, corrosion resistant polypropylene housing for use in sewage and non-potable water up to 140°F (60°C)

SEE BACKSIDE FOR ORDERING INFORMATION.

# SJE Rhombus

PO Box 1708, Detroit Lakes, MN 56502

1-888-DIAL-SJE • 1-218-847-1317

1-218-847-4617 Fax

email: [customer.service@sjerhombus.com](mailto:customer.service@sjerhombus.com)

[www.sjerhombus.com](http://www.sjerhombus.com) 101

PROJECT NAME:

MIDDLETOWN VETERINARY HOSPITAL  
EX. BUILDING "B" AND PROP. BUILDING "F"

Date: 1/23/2019  
Design: KAY

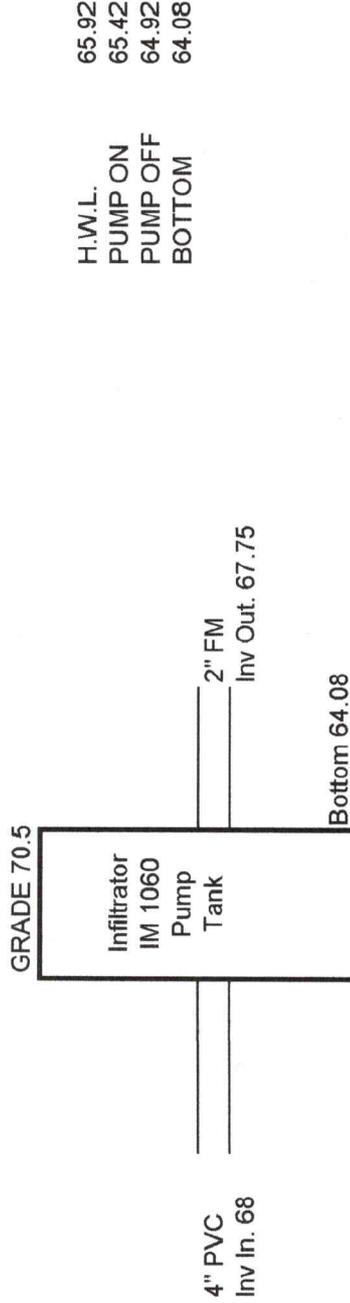
AVERAGE FLOW:

Ex. Building B	2 Vets * 70 GPD =	140 GPD
	4 Techs * 70 GPD =	280 GPD
	4 Staff * 20 GPD =	80 GPD
	60 Patients * 10 GPD =	600 GPD
	57 Kennels * 10 GPD =	570 GPD
	<u>Ex. Building B</u>	<u>1670 GPD</u>
Prop. Building F (Office)	10 Employees * 20 GPD	200 GPD
Total		<u>1870 GPD (1.3 GPM)</u>

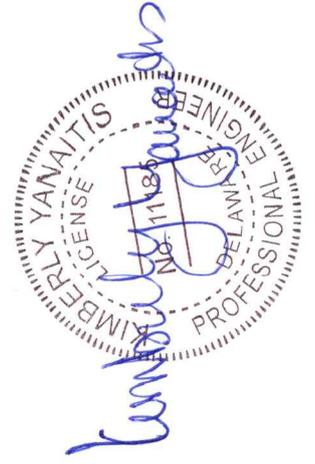
FORCE MAIN SIZE:

$D_{max} = 0.404 * \sqrt{Q}$  (Q peak)  
 $D_{max} = 0.404 * \sqrt{Q}$  (1.3 GPM)  
 $D_{max} = 0.46"$

Use 2" SCHD 40 PVC



STATIC HEAD: SH = HIGH POINT - PUMP OFF  
 SH = 75.0 - 64.92  
 SH = 10.1 FT



**PIPE AND FITTING SCHEDULE**

Q (GPM)	2" STEEL		2" PVC (SDR-21)		FITTING	K-VALUE
	V <sup>2</sup> / 2G	Hf (ft/100 ft)	V <sup>2</sup> / 2G	Hf (ft/100 ft)		
20	0.0568	0.868	0.05031	0.63	2" CHECK VALVE	0.04
30	0.128	1.82	0.1132	1.34	2" GATE VALVE	0.16
40	0.227	3.1	0.20236	2.28	2" 90 BEND	1.00
					2" 45 BEND	0.32

Note: K-values per Supplement to NCC Std. Spec  
 Construction Section 35.16, Part 5  
 Sample Designs for Sewage Pumping Stations



**LOSSES**

**20 GPM**

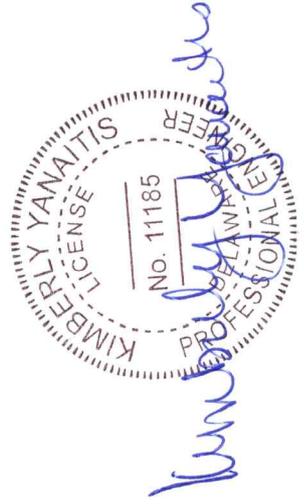
2" CHECK VALVE (STEEL)	1	*	0.0568	*	0.04	=	0.00227
2" GATE VALVE (STEEL)	1	*	0.0568	*	0.16	=	0.00909
2" 90 BEND (STEEL)	1	*	0.0568	*	1.00	=	0.05680
2" 45 BEND (PVC)	5	*	0.05031	*	0.32	=	0.08050
2" STEEL FM	4	*	0.868	(/100)		=	0.03472
2" PVC FM	950	*	0.63	(/100)		=	5.98500
STATIC HEAD						=	10.10
<b>TOTAL</b>							<b>16.27</b>

**30 GPM**

2" CHECK VALVE (STEEL)	1	*	0.128	*	0.04	=	0.00512
2" GATE VALVE (STEEL)	1	*	0.128	*	0.16	=	0.02048
2" 90 BEND (STEEL)	1	*	0.128	*	1.00	=	0.12800
2" 45 BEND (PVC)	5	*	0.1132	*	0.32	=	0.18112
2" STEEL FM	4	*	1.82	(/100)		=	0.0728
2" PVC FM	950	*	1.34	(/100)		=	12.73000
STATIC HEAD						=	10.10
<b>TOTAL</b>							<b>23.24</b>

**40 GPM**

2" CHECK VALVE (STEEL)	1	*	0.227	*	0.04	=	0.00908
2" GATE VALVE (STEEL)	1	*	0.227	*	0.16	=	0.03632
2" 90 BEND (STEEL)	1	*	0.227	*	1.00	=	0.22700
2" 45 BEND (PVC)	5	*	0.20236	*	0.32	=	0.32378
2" STEEL FM	4	*	3.1	(/100)		=	0.124
2" PVC FM	950	*	2.28	(/100)		=	21.66000
STATIC HEAD						=	10.10
<b>TOTAL</b>							<b>32.48</b>

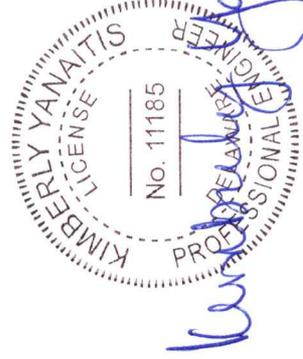


**WET WELL VOLUME - INFILTRATOR IM-1060**

PUMP ON TO PUMP OFF = 6"  
VOLUME = 154 GAL

AVERAGE FLOW  
INFLOW = 1.3 GPM  
PUMP RATE = 37 GPM FROM PUMP CURVE  
DRAWDOWN = VOL / (Qpump - Qinflow) = 154 / (37 GPM - 1.3 GPM) =  
FILL TIME = VOL / Qinflow = 154 / 1.3 GPM =  
CYCLE TIME = DRAWDOWN + FILL TIME = 4.3 + 118.5 =  
STARTS PER DAY = 12 STARTS PER DAY

VELOCITY = PUMP RATE \* 0.00228 / [3.14 \* (DIA<sup>2</sup>/4)] = 37 GPM \* 0.00228 / [3.14 \* (2"/12")<sup>2</sup> / 4] = 3.9 FPS

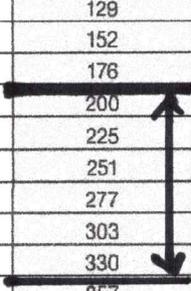


Ex. Bldg "B" and Prop. Bldg "F"

Table 2: Nominal Volume Chart

Height <sup>1</sup>		Total liquid volume in tank at indicated height					
in	cm	IM-540		IM-1060		IM-1530	
		U.S. Gal	Liters	U.S. Gal	Liters	U.S. Gal	Liters
1	3	3	11	3	11	17	64
2	5	8	30	13	49	34	128
3	8	14	53	28	106	51	192
4	10	21	80	46	174	68	256
5	13	29	109	65	246	94	357
6	15	37	141	86	326	122	463
7	18	46	173	107	405	152	573
8	20	55	207	129	488	180	681
9	23	64	243	152	575	212	802
10	25	74	279	176	666	245	928
11	28	84	317	200	757	280	1,061
12	30	94	356	225	852	312	1,182
13	33	105	396	251	950	351	1,328
14	36	116	437	277	1,049	387	1,463
15	38	127	480	303	1,147	422	1,597
16	40	138	523	330	1,249	464	1,756
17	43	150	566	357	1,351	500	1,892
18	46	161	611	384	1,454	537	2,034
19	48	173	656	411	1,556	575	2,177
20	50	186	702	438	1,658	614	2,322
21	53	198	749	465	1,760	652	2,468
22	56	210	796	493	1,866	690	2,612
23	58	223	843	521	1,972	729	2,758
24	61	235	891	549	2,078	770	2,914
25	64	248	940	577	2,184	808	3,058
26	66	261	988	605	2,290	847	3,208
27	69	274	1,038	633	2,396	887	3,356
28	71	287	1,088	662	2,506	928	3,513
29	74	300	1,137	691	2,616	968	3,665
30	76	313	1,185	719	2,722	1,007	3,814
31	79	326	1,233	747	2,828	1,048	3,966
32	81	338	1,281	775	2,934	1,087	4,113
33	84	351	1,328	802	3,036	1,126	4,262
34	86	363	1,375	830	3,142	1,165	4,410
35	89	375	1,421	857	3,244	1,204	4,557
36	91	387	1,466	884	3,346	1,242	4,701
37	94	399	1,511	911	3,449	1,280	4,846
38	97	411	1,555	938	3,551	1,318	4,988
39	99	422	1,598	965	3,653	1,355	5,131
40	102	433	1,640	992	3,755	1,393	5,272
41	104	444	1,681	1,018	3,854	1,430	5,412
42	107	455	1,722	1,044	3,952	1,466	5,550
43	109	465	1,761	1,069	4,047	1,502	5,685
44	112	475	1,799	1,094	4,141	1,537	5,817
45	114	485	1,836	1,118	4,232	1,572	5,950
46	117	494	1,871	1,142	4,323	1,604	6,070
47	119	503	1,905	1,165	4,410	1,638	6,201
48	122	512	1,938	1,187	4,493	1,667	6,310
49	124	520	1,970	1,208	4,573	1,697	6,422
50	127	528	1,999	1,228	4,648	1,724	6,527
51	130	535	2,027	1,247	4,720	1,749	6,621
52	132	542	2,050	1,265	4,789	1,766	6,684
53	135	547	2,071	1,278	4,838	1,777	6,726
54	137	551 <sup>2</sup>	2,087	1,287	4,872	1,785 <sup>2</sup>	6,758

Pump  
off  
6"  
Pump  
on



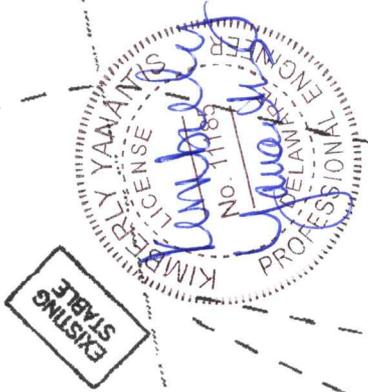
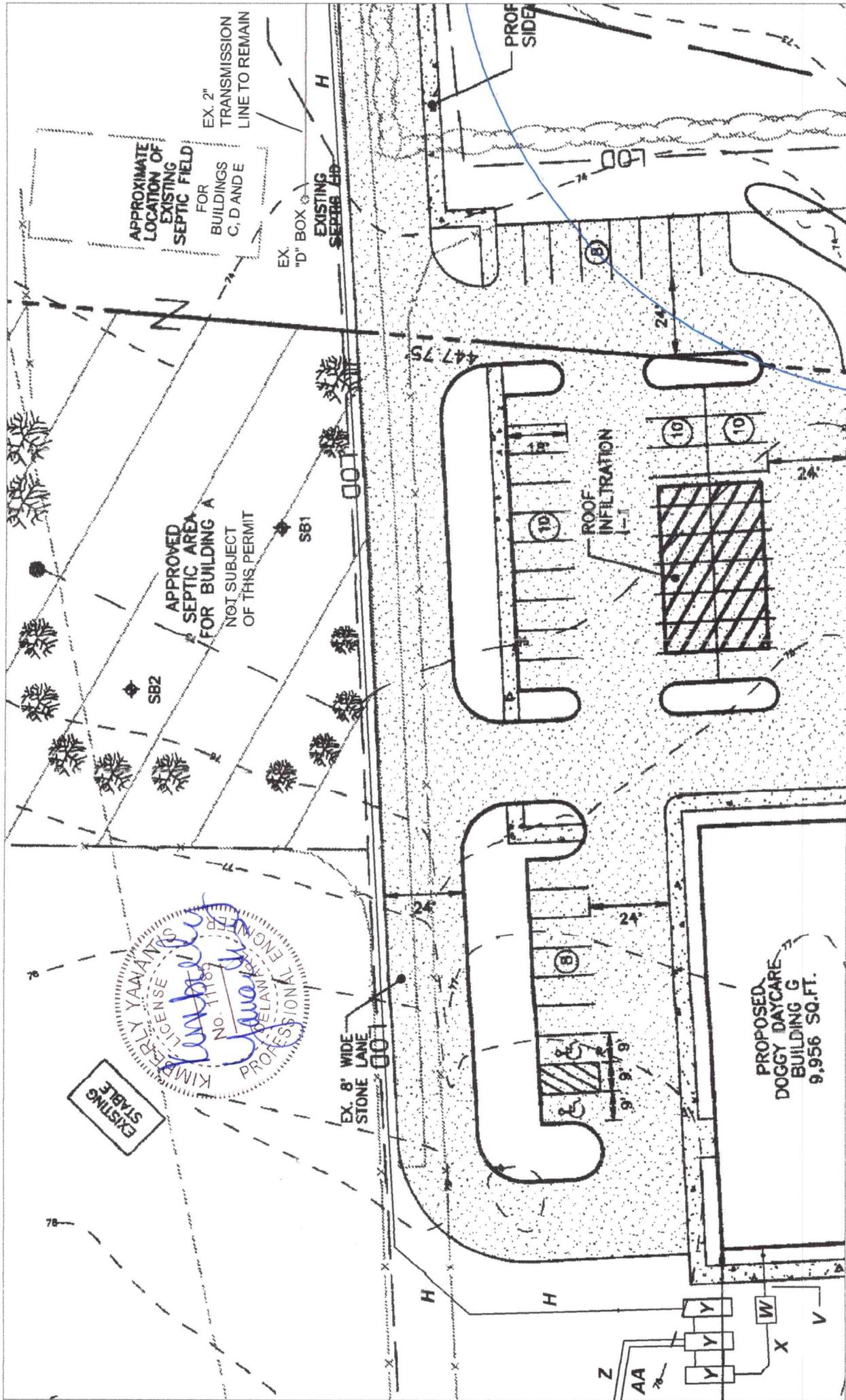
154 Gal

1. Height measured from lowermost inside surface at bottom of corrugation in tank.  
 2. The total capacity of the IM-540 tank is 552 gallons; the total capacity of the IM-1530 tank is 1,787 gallons.

- H. 502 LF 2" SCHD 40 PVC TRANSMISSION LINE TO DOSING CHAMBER
- V. 10 LF (MIN) 4" SCHD 40 PVC WITH CLEANOUT
- W. 1,500 GAL SEPTIC TANK WITH DNREC APPROVED FILTER AND RISERS TO GRADE
- X. 12 LF 4" SCHD 40 PVC
- Y. INFILTRATOR IM-1530 DOSING CHAMBER WITH VENT AND RISER TO GRADE
- Z. 137 LF 4" SCHD 40 PVC TRANSMISSION LINE (FIELD #1)
- AA. 134 LF 4" SCHD 40 PVC TRANSMISSION LINE (FIELD #2)

**PLAN 3**

**SCALE:  
1" = 40'**

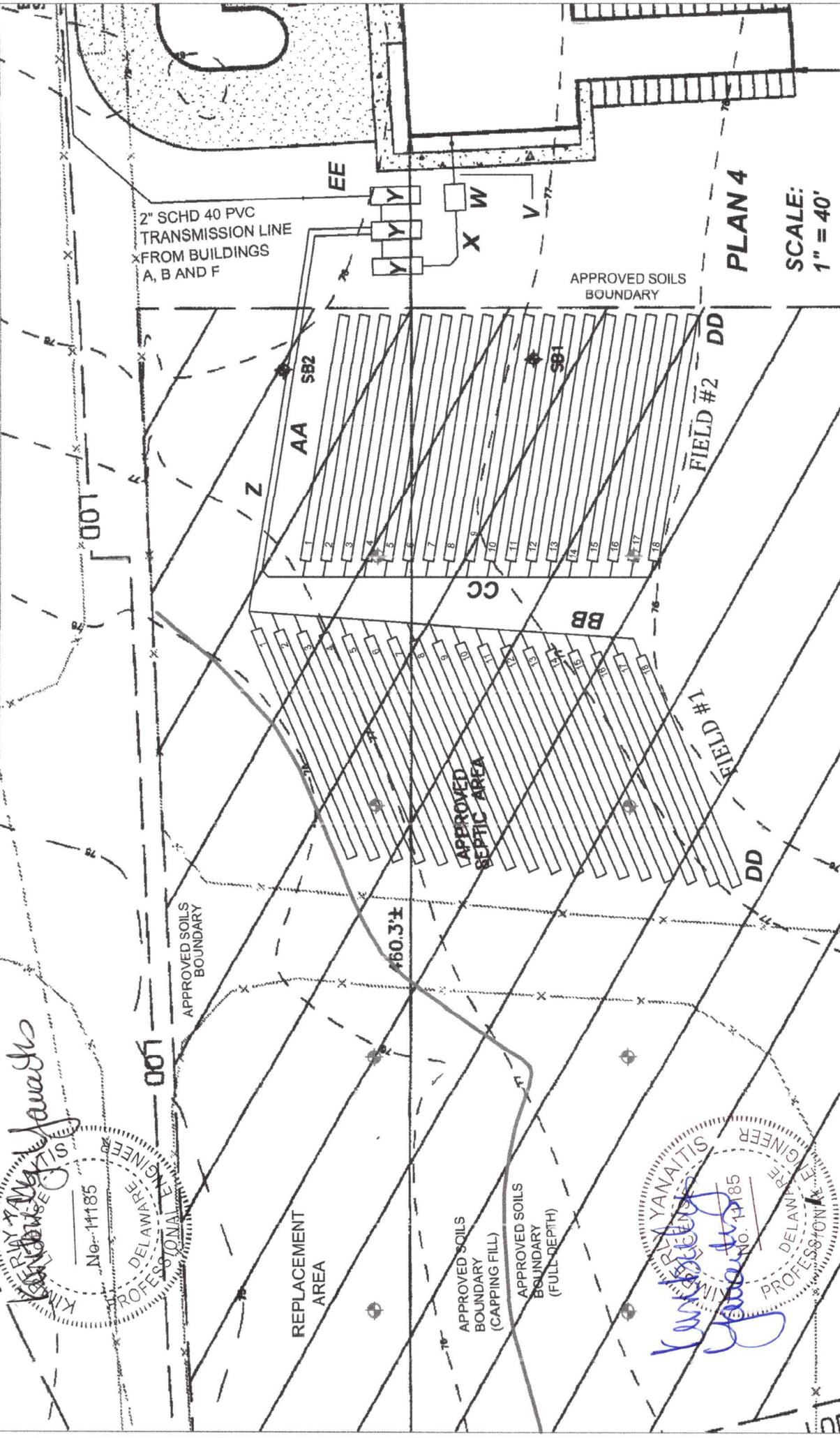


**PROPOSED DOGGY DAYCARE BUILDING G  
9,956 SQ.FT.**

**APPROVED SEPTIC AREA FOR BUILDING A  
NOT SUBJECT OF THIS PERMIT**

**APPROXIMATE LOCATION OF EXISTING SEPTIC FIELD FOR BUILDINGS C, D AND E**

**PROPOSED DOGGY DAYCARE BUILDING G  
9,956 SQ.FT.**



- V. 10 LF (MIN) 4" SCHD 40 PVC WITH CLEANOUT
- W. 1,500 GAL SEPTIC TANK WITH DNREC APPROVED FILTER AND RISERS TO GRADE
- X. 25 LF 4" SCHD 40 PVC
- Y. INFILTRATOR IM-1530 DOSING CHAMBER WITH VENT AND RISER TO GRADE
- Z. 137 LF 4" SCHD 40 PVC TRANSMISSION LINE (FIELD #1)
- AA. 134 LF 4" SCHD 40 PVC TRANSMISSION LINE (FIELD #2)
- BB. 108 LF 4" SCHD 40 PVC MANIFOLD (FIELD #1)
- CC. 103 LF 4" SCHD 40 PVC MANIFOLD (FIELD #2)
- DD. PRESSURE PORT. SET HEAD AT 2.31'
- EE. 20 LF 4" SCHD 40 PVC

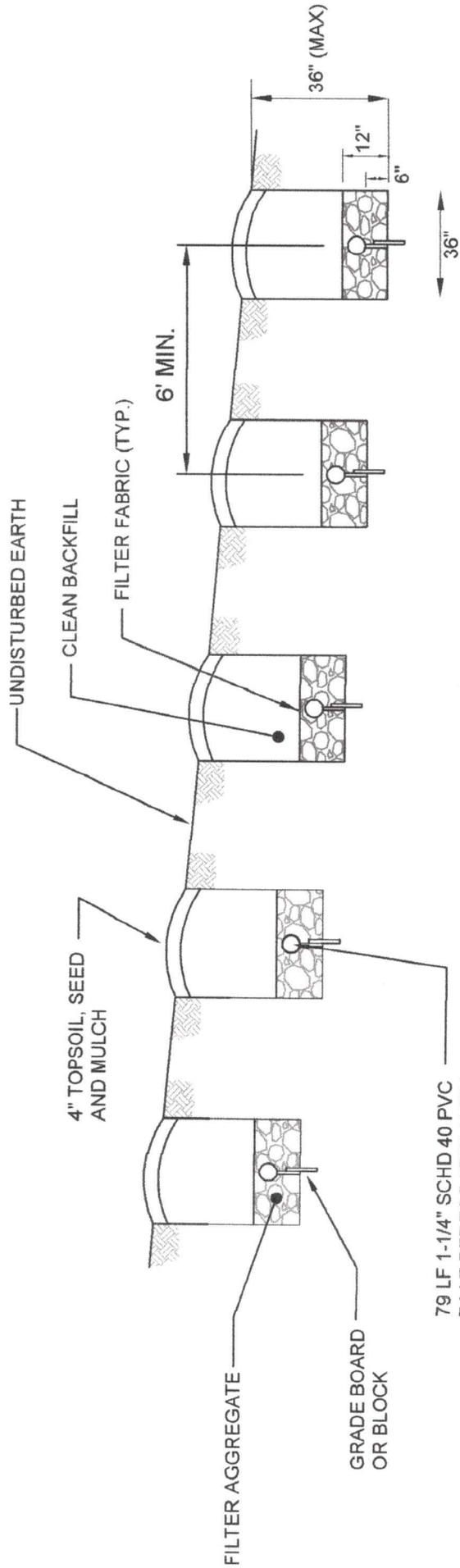
- PROPOSED PRESSURE DISPOSAL FIELD #2
- 18 TRENCHES
  - 36" WIDE, 6' OC (MIN), 24"-36" DEEP
  - 79 LF 1-1/4" SCHD 40 PVC LATERAL
  - 74 LF PERFORATED WITH 3/16" DIA. HOLES
  - TRENCHES 1 THRU 3: 15 HOLES @ 4.9' OC
  - TRENCHES 4 THRU 7: 14 HOLES @ 5.3' OC
  - TRENCHES 8 THRU 11: 13 HOLES @ 5.7' OC
  - TRENCHES 12 THRU 18: 12 HOLES @ 6' OC

- PROPOSED PRESSURE DISPOSAL FIELD #1
- 18 TRENCHES
  - 36" WIDE, 6' OC (MIN), 24"-36" DEEP
  - 79 LF 1-1/4" SCHD 40 PVC LATERAL
  - 74 LF PERFORATED WITH 3/16" DIA. HOLES
  - TRENCHES 1 AND 2: 14 HOLES @ 5.3' OC
  - TRENCHES 3 THRU 18: 15 HOLES @ 4.9' OC

*Kimberly Yanaitis*  
KIMBERLY YANAITIS  
No. 14185  
PROFESSIONAL ENGINEER  
DELAWARE

*Kimberly Yanaitis*  
KIMBERLY YANAITIS  
No. 14185  
PROFESSIONAL ENGINEER  
DELAWARE

FOR MORE DETAILS  
REFER TO DNREC  
EXHIBIT K

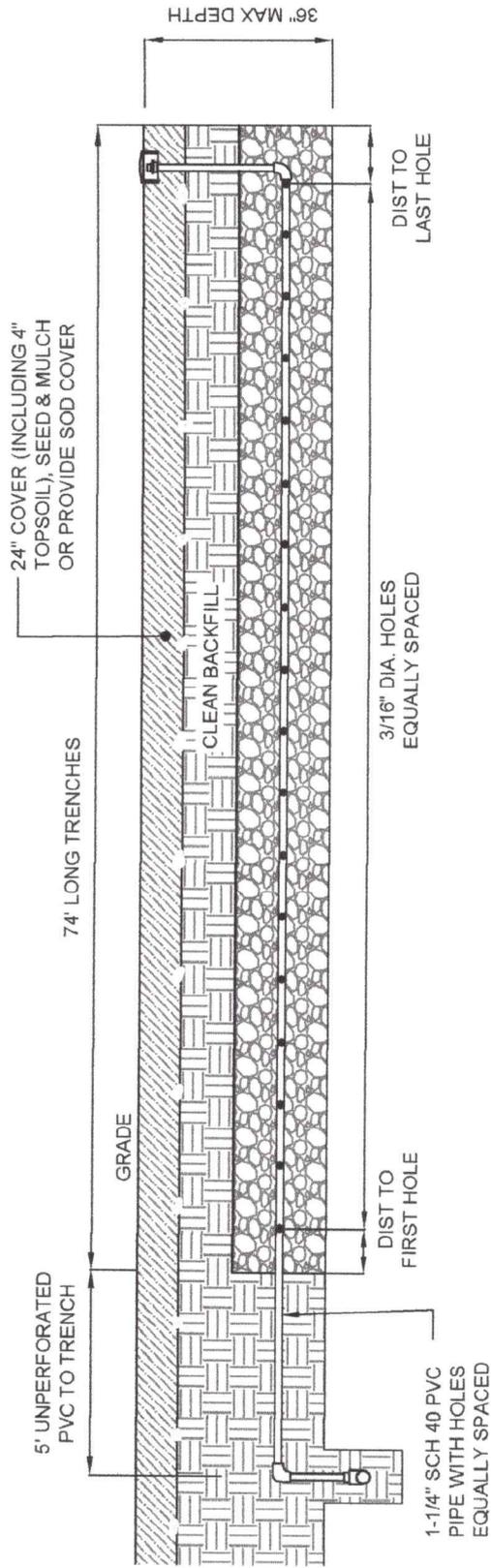


LIMITING ZONE

**SECTION "A-A"**  
**PRESSURE DOSED DISPOSAL SYSTEM**

(NO SCALE)





LIMITING ZONE

### FIELD #1

TRENCH	NUMBER OF HOLES	DISTANCE TO FIRST HOLE	HOLE SPACING	DISTANCE TO LAST HOLE
1-2	14	2.55'	5.3'	2.55'
3-18	15	2.7'	4.9'	2.7'

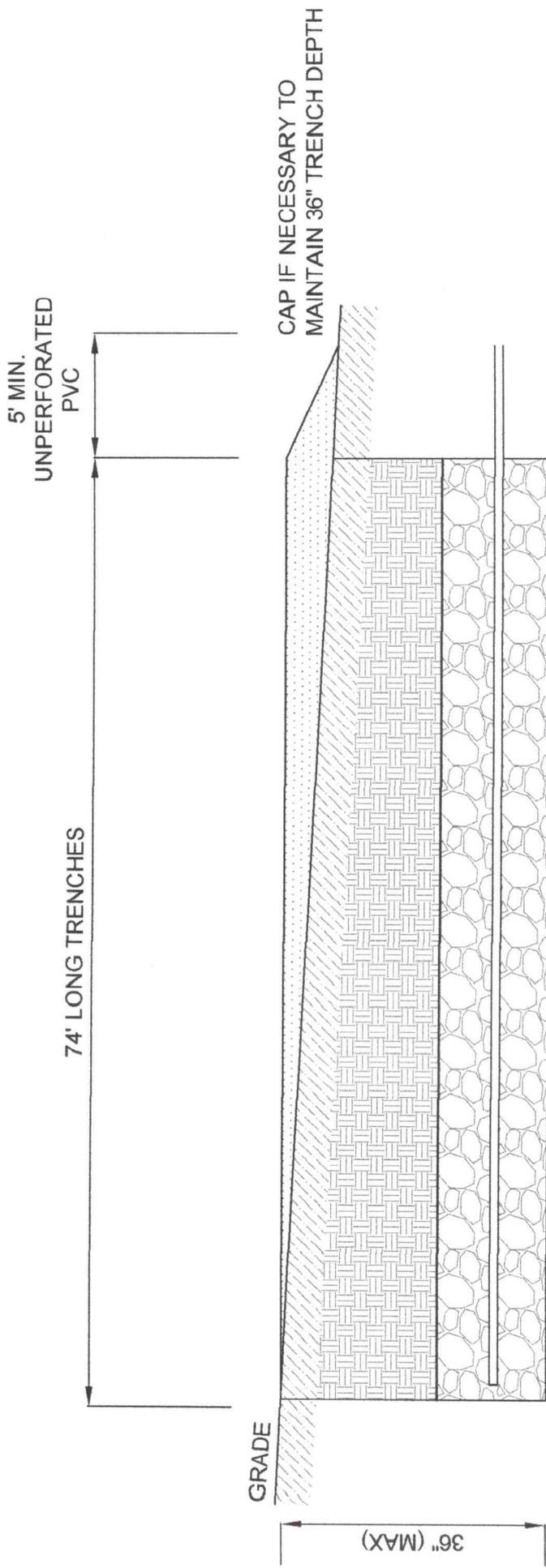
### FIELD #2

TRENCH	NUMBER OF HOLES	DISTANCE TO FIRST HOLE	HOLE SPACING	DISTANCE TO LAST HOLE
1-3	15	2.7'	4.9'	2.7'
4-7	14	2.55'	5.3'	2.55'
8-11	13	2.8'	5.7'	2.8'
12-18	12	4.0'	6.0'	4.0'



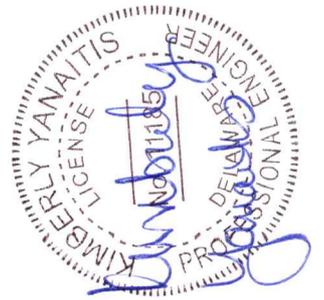
## PERFORATION SPACING

NO SCALE

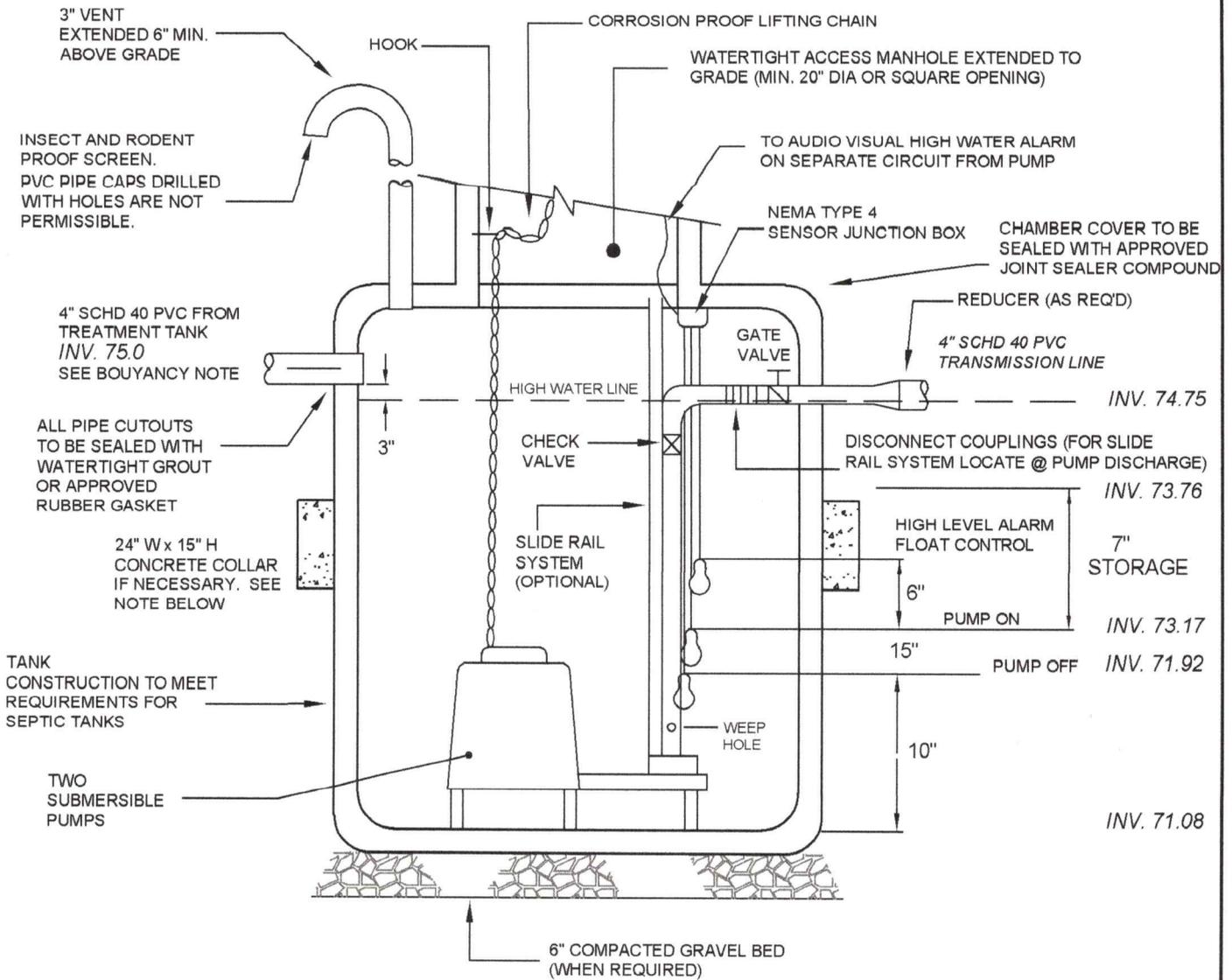


TRENCH  
LONG SECTION

NO SCALE



GRADE 78.0



TYPICAL DIMENSIONS (ID):

LENGTH:	176"
WIDTH:	62"
HEIGHT:	55"
HEIGHT TO INLET:	47"

DOSING SCHEDULE

3 DOSES PER DAY

PUMP OFF = 8 HOURS

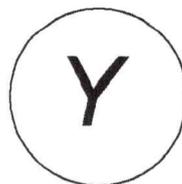
PUMP ON = 1 MINUTE, 40 SEC

NOTES:

1. EXCAVATION LIMITS SHALL EXTEND AT LEAST 2 FEET BEYOND TANK PERIMETER.
2. ALL PIPE TO BE SCHEDULE 40 PVC.
3. CHAMBER TO BE SIZED ACCORDING TO REQUIREMENTS OF DOSING VOLUME AND STORAGE. SEE EXHIBIT 1.
4. ALL DOSING CHAMBER COMPONENTS SHALL BE FIELD TESTED TO INSURE ACCURACY, WATER TIGHTNESS AND PROPER OPERATION OF ALL PUMPS AND ALARM CONTROLS.
5. ALL ELECTRICAL CONNECTIONS SHALL BE WATERPROOF, CORROSION RESISTANT AND EXPLOSION PROOF.

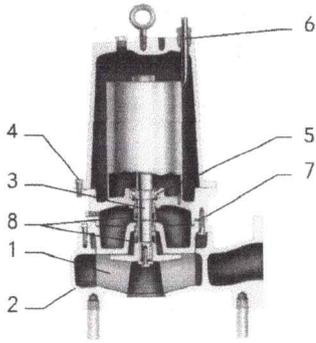
BUOYANCY  
 PER INFILTRATOR IM-SERIES TANK BUOYANCY CONTROL GUIDANCE DOCUMENT, NO BUOYANCY CONTROL IS REQUIRED IF THERE IS AT LEAST 12 INCHES (300 MM) OF SOIL COVER ABOVE THE TANK TOP.

**INFILTRATOR IM-1530  
 DOSING CHAMBER  
 (N.T.S.)**





### MATERIALS OF CONSTRUCTION

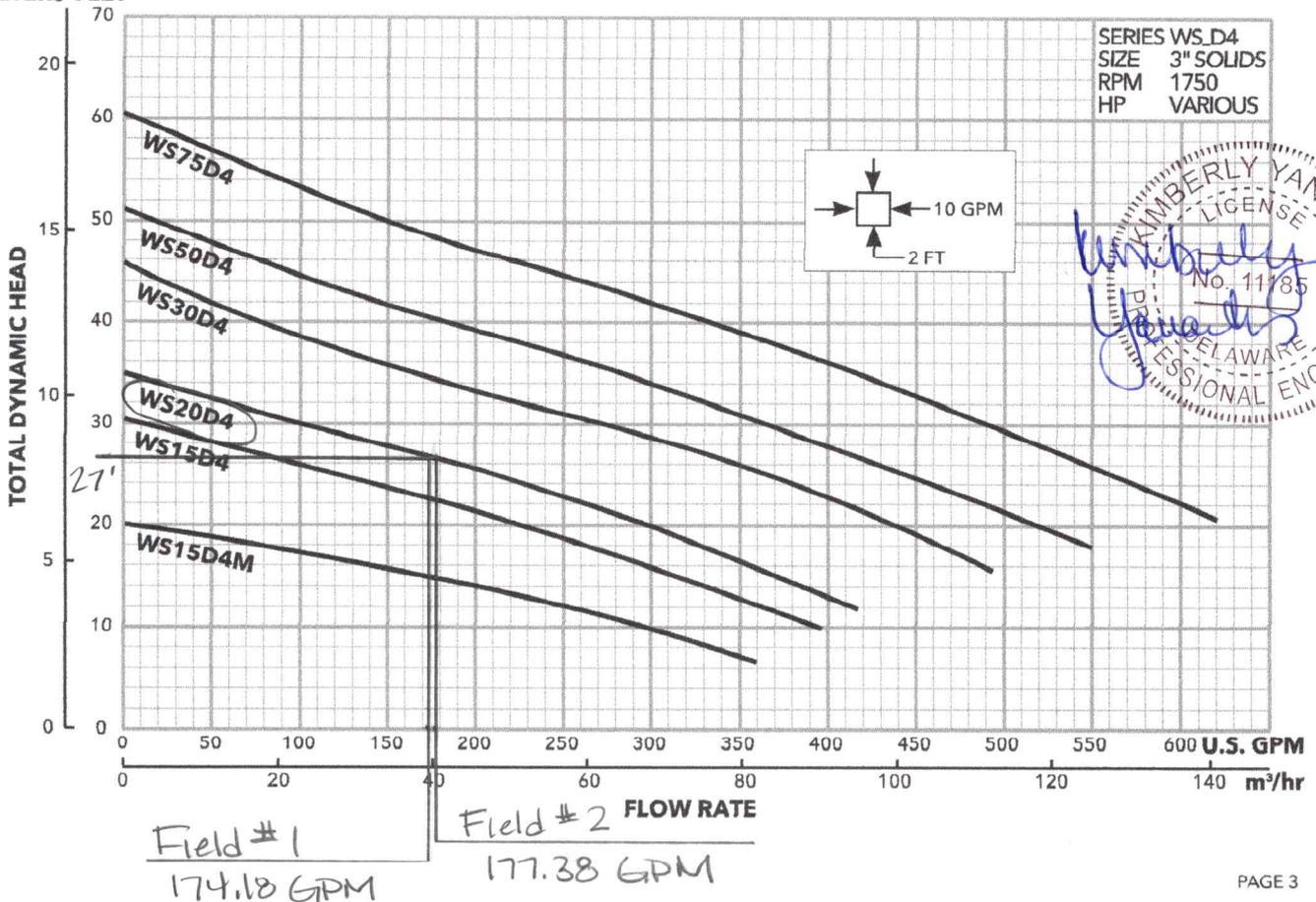


Item No.	Part Name	Material				
		Standard		Optional		
1	Impeller, non-clog	1003		1179		
2	Casing	1003				
3	Shaft-keyed	300 Series SS				
4	Fasteners	300 Series SS				
5	Ball bearings	Steel				
6	Power cable	STOW, 20 feet		Additional lengths		
7	O-ring	BUNA-N				
8	<b>Outer Mech. Seal</b>	<b>Service</b>	<b>Rotary</b>	<b>Stationary</b>	<b>Elastomers</b>	<b>Metal Parts</b>
	OPT	Heavy duty	Silicon Carbide	Tungsten Carbide	BUNA-N	300 Series SS
	STD	Mild abrasives	Silicon carbide		BUNA-N	300 Series SS
<b>Material Code</b>		<b>Engineering Standard</b>				
1003		Cast iron – ASTM A48 Class 30				
1179		Silicon bronze – ASTM C87600				

### PERFORMANCE RATINGS (gallons per minute)

Series No.	WS15D4M	WS15D4	WS20D4	WS30D4	WS50D4	WS75D4	
HP	1½	1½	2	3	5	7½	
RPM	1750						
Total Head Feet of Water	10	300	395				
	15	170	320	370			
	20		230	300	440	520	
	25		120	205	365	440	
	30			100	270	360	510
	35				160	275	440
	40				80	175	355
	45					85	260
	50						155
	55						80

### METERS FEET



## Wastewater

### APPLICATIONS

Used in a variety of residential, commercial and industrial applications such as:

- Sewage systems, Flood and Pollution Control, Dewatering/Effluent, Farms, Hospitals, Trailer Courts, Motels

### SPECIFICATIONS

#### Pump:

- Maximum solid size: 3"
- Discharge size: 4", 125 # ANSI flange
- Maximum capacity: 620 GPM
- Maximum total head: 60 feet
- 300 Series stainless steel fasteners
- 20' Power cord
- Standard silicon carbide/silicon carbide outer seal

#### Motor:

- Maximum ambient temperature: 104° F (40° C) continuous duty, 140° F (60° C) intermittent duty
- Rated for continuous duty when fully submerged
- Insulation: Class F
- 60 Hertz
- Single row ball bearings
- 300 Series stainless steel keyed shaft

#### Single Phase:

- 1.5 - 5 HP; 208 and 230 volts
- Built-in thermal overloads with automatic reset
- Built-in capacitors

#### Three Phase:

- 1.5 - 7.5 HP; 200, 230, 460 and 575 volts
- Class 10 overload protection must be provided in control panel

### MOTORS

- Fully submerged in oil-filled chamber: High grade turbine oil surrounds motor for more efficient heat dissipation, permanent lubrication of bearings and mechanical seal for complete protection against outside environment.
- Class F insulation
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits and can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction for precision positioning of parts and to carry thrust loads.
- Power Cable: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. 20 foot standard with optional lengths available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

### AGENCY LISTINGS



Tested to UL 778 and CSA 22.2 108 Standards  
By Canadian Standards Association  
File #LR38549

### MODEL AND MOTOR INFORMATION

Order Number	HP	Phase	Volts	RPM	Impeller Dia. (in.)	Maximum Amps	L.R. Amps	KVA Code	Power Cable	F.L. Motor Efficiency %	Resistance		Wt. (lbs.)	
											Start	Line-Line		
WS1518D4M	1.5	1	208	1750	5.63	17.2	50.8	B	14/3	80	1.1	0.9	195	
WS1512D4M			230			14.7	29.5	E		70	1.4	1.8		
WS1538D4M		3	200			11.5	40.9	H	14/4	81	NA	1.7		2.3
WS1532D4M			230			10.0	40.0	F		83		9.3		
WS1534D4M			460			5.0	20.0	F		83		14.8		
WS1537D4M			575			4.0	14.4	H		74				
WS1518D4		1	208		17.2	50.8	B	14/3	80	1.1	0.9	195		
WS1512D4			230		14.7	29.5	E		70	1.4	1.8			
WS1538D4		3	200		11.5	40.9	H	14/4	81	NA	1.7		2.3	
WS1532D4			230		10.0	40.0	F		83		9.3			
WS1534D4	460		5.0	20.0	F	83	14.8							
WS1537D4	575		4.0	14.4	H	74								
WS2018D4	2	1	208	1750	6.63	20.3	50.8	B	14/3	80	1.1	0.9	200	
WS2012D4			230			17.3	36.9	D		75	1.4	1.5		
WS2038D4		3	200			13.3	40.9	H	14/4	81	NA	1.7		2.3
WS2032D4			230			11.6	40.0	F		83		9.3		
WS2034D4			460			5.8	20.0	F		83		14.8		
WS2037D4			575			4.6	14.4	H		74				
WS3018D4	3	1	208	1750	7.00	25.5	50.8	B	10/3	80	1.1	0.9	208	
WS3012D4			230			21.5	46.4	C		79	1.0	1.0		
WS3038D4		3	200			16.6	53.8	G	14/4	85	NA	1.3		1.9
WS3032D4			230			14.4	49.5	H		83		7.5		
WS3034D4			460			7.2	24.8	H		83		11.6		
WS3037D4			575			5.8	17.3	G		78				
WS5012D4	5	1	230	1750	7.25	26.5	57.7	A	10/3	80	1.0	0.8	213	
WS5038D4			200			19.1	73.9	F		84	0.9			
WS5032D4		3	230			16.6	63.6	E	14/4	85	NA	1.2		4.8
WS5034D4			460			8.3	31.8	E		85		7.4		
WS5037D4			575			6.6	22.8	E		80				
WS7532D4			7.5			3	230	1750		7.69		23.0		105.0
WS7534D4	460	11.5		52.5	G		83		4.4					
WS7537D4	575	9.2		42.0	E		84							

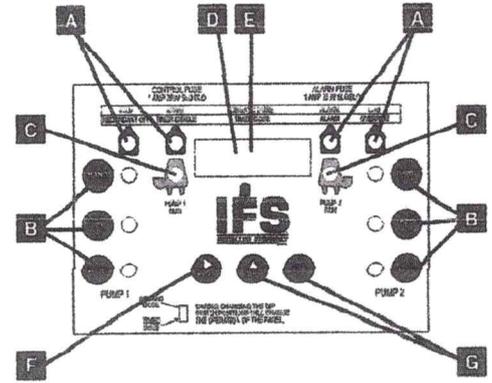
# INSTALLER FRIENDLY SERIES® - IFS Single Phase Duplex

Single phase, duplex demand dose or timed dose, float or C-Level™ sensor controlled system for pump control and system monitoring.

The IFS duplex control panel is designed to control two (alternating) 120, 208, 240 VAC single phase pumps in water and sewage installations. The panel features an easy-to-use touch pad with display on the inner door for programming and system monitoring. The alternating action equalizes pump wear. In addition to the alternating pump control, this system provides override control should either pump fail.

The panel configuration can be easily converted in the field to either a timed dose or demand dose.

The optional C-Level™ sensor is a pressure transducer that senses the liquid level in the tank and sends a signal to the IFS panel. Pump activation levels can be adjusted by using the panel touch pad. C-Level™ CL40 sensor operating range is 3-39.9 inches (7.6-101.3 cm), C-Level™ CL100 operating range is 3-99.5 inches (7.6-252.7 cm).



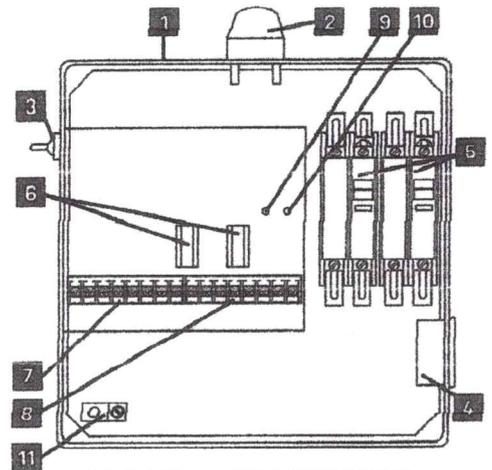
## TOUCH PAD FEATURES

- A. **Level Status Indicators** illuminate when floats or set points are activated. Alarm will activate if a float operates out of sequence.
- B. **HOA (Hand-Off-Automatic) Buttons** control pump mode with indication. Hand mode defaults to Automatic when stop level or redundant off level is reached.
- C. **Pump Run Indicators** will illuminate when pumps are called to run.
- D. **Lead/Lag Selector** toggles pump operation (alternate 1-2 and 2-1).
- E. **LED Display** shows system information including: level in inches or centimeters (C-Level™ only), mode, pumps elapsed time (hh:mm), events (cycles), alarm counter, float error count, timed dose override counter (timed dose only), and ON/OFF times (timed dose only).
- F. **NEXT Push Button** toggles display.
- G. **UP and SET Push Buttons** set pump ON/OFF times (timed dose only) and activation levels (C-Level™ only).

## PANEL COMPONENTS

1. **Enclosure base** measures 12 X 10 X 6 inches (30.48 X 25.4 X 15.24 cm). NEMA 4X (ultraviolet stabilized thermoplastic with removable mounting feet for outdoor or indoor use). **Note:** Options, voltage, and amp range selected may change enclosure size and component layout.
2. **Red Alarm Beacon** provides 360° visual check of alarm condition.
3. **Exterior Alarm Test/Normal/Silence Switch** allows horn and light to be tested and horn to be silenced in an alarm condition. Alarm automatically resets once alarm condition is cleared.
4. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating).
5. **Circuit Breakers** (optional) provide pump disconnect and branch circuit protection.
6. **Power Relays** control pump by switching electrical lines. Definite purpose contactors used when pump full load amps are above 15.
7. **Float Connection Terminal Block**
8. **Incoming Control/Alarm Power & Pump Terminal Block**
9. **Control Power Indicator/Fuse** indicator light illuminates if control power is present in panel. Alarm activates if control fuse is blown.
10. **Alarm Power Indicator/Fuse** indicator light illuminates if alarm power is present in panel.
11. **Ground Lug**

**NOTE:** Schematic/Wiring Diagram and Pump Specification Label are located inside the panel on enclosure cover



Model Shown IFS31W114X8AC

Reg. Cdn Pat. & TM Off  
C-Level™ Sensor US Patent No. 8,336,385; 8,587,242; 8,650,949

## FEATURES

- Entire control system is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes:  
**Demand Dose** - three 20' control switches  
**Timed Dose** - two 20' control switches
- Available with EZconnex® float system
- Complete with step-by-step installation instructions
- Five-year limited warranty



**SJE RHOMBUS.**

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B.13

California Prop 65 requires the following: WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

SEE REVERSE SIDE FOR ORDERING INFORMATION.

MIDDLETOWN VETERINARIAN HOSPITAL

Date: 12/17/2018

Design: KAY

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Field #1

PRESSURE DOSED DISPOSAL SYSTEM - FIELD #1

TOTAL DESIGN FLOW [A]	Ex. Building A	1 Vet * 70 GPD = 2 Techs * 70 GPD = 2 Staff * 20 GPD = 10 Patients * 10 GPD = 21 Kennels * 10 GPD =	70 GPD 140 GPD 40 GPD 100 GPD 210 GPD
	Ex. Building B	2 Vets * 70 GPD = 4 Techs * 70 GPD = 4 Staff * 20 GPD = 60 Patients * 10 GPD = 57 Kennels * 10 GPD =	140 GPD 280 GPD 80 GPD 600 GPD 570 GPD
	Prop. Building F (Office)	10 Employees * 20 GPD =	200 GPD
	Prop. Doggy Daycare	90 Kennels * 10 GPD =	900 GPD
			3330 GPD

TOTAL DESIGN FLOW [A]	3330	GPD		
1/2 DESIGN FLOW TO EACH SIDE OF FIELD	1665	GPD		
SEPTIC TANK VOLUME	VARIES	GAL		
TRENCH WIDTH	3	FEET		
HEAD TO BE MAINTAINED	2.31	FEET		
AVG. PERCOLATION RATE	45	MPI		
MIN. DISPOSAL AREA REQUIRED [B]	3686	SF		(1/2 PROPOSED DISPOSAL FIELD)
NO. OF LATERALS [C]	18	(2 MINIMUM)		(1/2 PROPOSED DISPOSAL FIELD)
TOTAL LATERAL LENGTH	79	LF		
PERFORATED LATERAL LENGTH	74	LF		
DISPOSAL AREA PROVIDED	3996	SF		(1/2 PROPOSED DISPOSAL FIELD)
LATERAL DIAMETER	1.25	INCH		

THE TOTAL FLOW WILL BE DIVIDED IN HALF, AND WILL BE ALTERNATED BETWEEN THE TWO SIDES OF THE DISPOSAL FIELD.



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 Field #1

LATERAL NO.	INV. ELEV (FT)	TOTAL LATERAL LENGTH (FT)	PERFORATED LATERAL LENGTH (FT)	TRENCH WIDTH (FT)	VOLUME PER TRENCH (GPD)	VOLUME PER SF OF TRENCH (GPD/SF)	LOADING PER TRENCH (%)
					[D]	[E]	[F]
1	73.90	79.00	74.00	3.0	92.50	0.417	5.56
2	74.10	79.00	74.00	3.0	92.50	0.417	5.56
3	74.30	79.00	74.00	3.0	92.50	0.417	5.56
4	74.50	79.00	74.00	3.0	92.50	0.417	5.56
5	74.50	79.00	74.00	3.0	92.50	0.417	5.56
6	74.50	79.00	74.00	3.0	92.50	0.417	5.56
7	74.50	79.00	74.00	3.0	92.50	0.417	5.56
8	74.50	79.00	74.00	3.0	92.50	0.417	5.56
9	74.50	79.00	74.00	3.0	92.50	0.417	5.56
10	74.50	79.00	74.00	3.0	92.50	0.417	5.56
11	74.50	79.00	74.00	3.0	92.50	0.417	5.56
12	74.50	79.00	74.00	3.0	92.50	0.417	5.56
13	74.50	79.00	74.00	3.0	92.50	0.417	5.56
14	74.50	79.00	74.00	3.0	92.50	0.417	5.56
15	74.50	79.00	74.00	3.0	92.50	0.417	5.56
16	74.50	79.00	74.00	3.0	92.50	0.417	5.56
17	74.50	79.00	74.00	3.0	92.50	0.417	5.56
18	74.30	79.00	74.00	3.0	92.50	0.417	5.56
<b>TOTAL</b>		<b>1422.00</b>	<b>1332.00</b>		<b>1665.00</b>		<b>100.0</b>



LATERAL NO.	IN-LINE PRESSURE (FT)	PERFORATION DISCHARGE RATE (GPM)	LATERAL DISCHARGE RATE (GPM)	PERFORATION DIAMETER (IN)	PERFORATION AREA (SF)	NO. OF PERFOR.	PERF. SPACING (6' MAX)
	[G]	[H]	[I]	(3/16")		[J]	[K]
1	2.91	0.72	10.06	0.1875	0.00019	14	5.3'
2	2.71	0.69	9.71	0.1875	0.00019	14	5.3'
3	2.51	0.67	10.01	0.1875	0.00019	15	4.9'
4	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
5	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
6	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
7	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
8	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
9	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
10	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
11	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
12	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
13	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
14	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
15	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
16	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
17	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
18	2.51	0.67	10.01	0.1875	0.00019	15	4.9'
TOTAL			174.18				



**FRICION LOSS IN 4" TRANSMISSION LINE (INSIDE TANK)**

REQUIRED PARAMETERS:

SCHEDULE 40 PVC  
 MINIMUM FLOW RATE = 2 FPS  
 4 INCHES (2" - 4" REQUIRED)  
 5 FEET  
 C = 150

DIAMETER  
 LENGTH  
 C =

SEGMENT	LENGTH (FT)	PIPE DIA. (IN)	FLOW (GPM) [L]	FLOW RATE (FPS) [M]	HL / 100 (FT) [N]	HL / SEGMENT (FT) [O]
1	5	4	174.18	4.55	1.765	0.088
TOTAL	(PLUS 20% FOR FITTING LOSSES)					0.106

**FRICION LOSS IN TRANSMISSION LINE**

REQUIRED PARAMETERS:

SCHEDULE 40 PVC  
 MINIMUM FLOW RATE = 2 FPS  
 4 INCHES  
 137 FEET  
 C = 150

DIAMETER  
 LENGTH  
 C =

SEGMENT	LENGTH (FT)	PIPE DIA. (IN)	FLOW (GPM) [L]	FLOW RATE (FPS) [M]	HL / 100 (FT) [N]	HL / SEGMENT (FT) [O]
1	137	4	174.18	4.55	1.765	2.418
TOTAL	(PLUS 20% FOR FITTING LOSSES)					2.902



*Kimberly Yanaitis*  
*Yanaitis*

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 Field #1

**FRICTION LOSS IN MANIFOLD LINE**

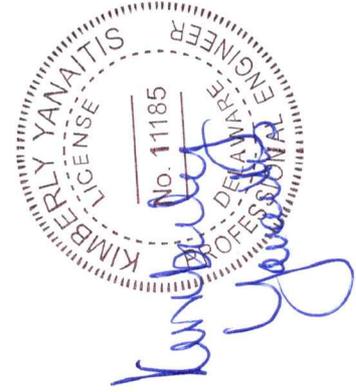
DIAMETER 4 INCHES  
 MANIFOLD LENGTH 108 FEET  
 NUMBER OF MANIFOLD SEGMENTS 1  
 C = 150

MANIFOLD SEGMENT	SEGMENT LENGTH (FT)	PIPE DIA. (IN)	FLOW (GPM) [P]	FLOW RATE (FPS)	HL / 100 (FT) [C]	HL / SEGMENT (FT) [R]
1	108.0	4	174.18	4.55	1.765	1.906
<b>TOTAL</b>	<b>108.0</b>	<b>(PLUS 20% FOR FITTING LOSSES)</b>				<b>2.287</b>

**FRICTION LOSS IN LATERALS 1, 2**

LATERAL DIAMETER 1.25 INCHES (1" - 3" REQUIRED)  
 TOTAL LATERAL LENGTH 79 FEET  
 HEAD TO BE MAINTAINED 2.31 FEET  
 HOLE DIAMETER 0.1875 3/16" (5/32" - 1/2" REQUIRED)  
 C = 150

TRENCH SEGMENT [S]	LENGTH (FT) [T]	PIPE DIA. (IN)	FLOW (GPM) [U]	HL / 100		HL / SEGMENT (FT) [W]
				(FT) [M]	(FPS) [V]	
1	7.55	1.25	0.72	0.1	0.1	0.008
2	5.30	1.25	1.44	0.1	0.1	0.005
3	5.30	1.25	2.16	0.118	0.118	0.006
4	5.30	1.25	2.87	0.196	0.196	0.010
5	5.30	1.25	3.59	0.293	0.293	0.016
6	5.30	1.25	4.31	0.402	0.402	0.021
7	5.30	1.25	5.03	0.516	0.516	0.027
8	5.30	1.25	5.75	0.660	0.660	0.035
9	5.30	1.25	6.47	0.823	0.823	0.044
10	5.30	1.25	7.18	0.994	0.994	0.053
11	5.30	1.25	7.90	1.166	1.166	0.062
12	5.30	1.25	8.62	1.373	1.373	0.073
13	5.30	1.25	9.34	1.585	1.585	0.084
14	5.30	1.25	10.06	1.804	1.804	0.096
15	2.55	1.25	10.78	2.088	2.088	0.053
<b>TOTAL PER LATERAL</b>	<b>79.00</b>	<b>(Plus 20% for Fitting Losses)</b>				<b>0.711</b>
<b>TOTAL 2 LATERALS</b>						<b>1.422</b>



**FRICTION LOSS IN LATERALS 3 - 18**

LATERAL DIAMETER 1.25 INCHES (1" - 3" REQUIRED)  
 TOTAL LATERAL LENGTH 79 FEET  
 HEAD TO BE MAINTAINED 2.31 FEET  
 HOLE DIAMETER 0.1875 (5/32" - 1/2" REQUIRED)  
 C = 150  
 NUMBER OF SEGMENTS PER TRENCH [S] 16

TRENCH SEGMENT [S]	LENGTH (FT) [L]	PIPE DIA. (IN)	FLOW (GPM) [U]	INCHES		H L / SEGMENT (FT) [W]
				HL / 100 (FT) [V]		
1	7.70	1.25	0.67	0.1		0.008
2	4.90	1.25	1.33	0.1		0.005
3	4.90	1.25	2.00	0.1		0.005
4	4.90	1.25	2.67	0.174		0.009
5	4.90	1.25	3.34	0.258		0.013
6	4.90	1.25	4.00	0.350		0.017
7	4.90	1.25	4.67	0.457		0.022
8	4.90	1.25	5.34	0.578		0.028
9	4.90	1.25	6.00	0.710		0.035
10	4.90	1.25	6.67	0.871		0.043
11	4.90	1.25	7.34	1.032		0.051
12	4.90	1.25	8.01	1.193		0.058
13	4.90	1.25	8.67	1.388		0.068
14	4.90	1.25	9.34	1.585		0.078
15	4.90	1.25	10.01	1.784		0.087
16	2.70	1.25	10.67	2.044		0.055
TOTAL PER LATERAL	79.00		(Plus 20% for Fitting Losses)			0.698
TOTAL 16 LATERALS						11.161



**THREE (3) INFILTRATOR IM-1530 DOSING CHAMBERS**

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 Revised: 5/24/2019  
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 Field #1

SEE NOMINAL VOLUME CHART

**STORAGE VOLUME CALCULATION**

STORAGE = AVERAGE FLOW VOLUME 3330 GPD

MINIMUM STORAGE VOLUME DEPTH = AVERAGE FLOW / AREA OF CHAMBER

MINIMUM STORAGE VOLUME DEPTH = 95.0 INCHES (COMBINED IN 3 TANKS)  
 (44" + 44" + 7")

**DOSING VOLUME CALCULATION**

PIPE DIA. (IN)	AREA (SF)	LENGTH (FT)	VOLUME (GAL)
4	0.0873	5	3.26
4	0.0873	137	89.43
4	0.0873	108	70.50
1.25	0.0085	1422.00	90.65
TOTAL VOLUME			253.85

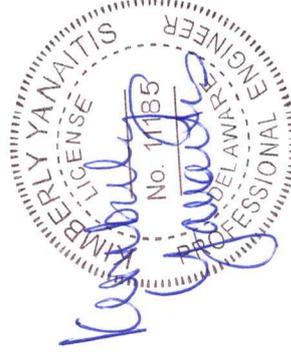
MINIMUM DOSING VOLUME = 5 \* INTERNAL (LIQUID) CAPACITY OF THE LATERALS  
 MINIMUM DOSING VOLUME = 453.26 GAL

MINIMUM VOLUME OF DOSING CHAMBER = DESIGNED DOSE VOLUME + DESIGN DAILY FLOW  
 MINIMUM VOLUME OF DOSING CHAMBER = 2118.26 GAL

MINIMUM DOSING VOLUME DEPTH = MINIMUM DOSING VOLUME / AREA OF CHAMBER  
 MINIMUM DOSING VOLUME DEPTH = 12.2 INCHES

DOSE VOLUME = Per Volume Chart = 808 Gal (25") - 245 gal (10") = 563.00 GAL

DOSE CYCLE = DESIGN FLOW / DOSE VOLUME 3.0  
 DOSE CYCLE = (3 MINIMUM)



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**STATIC HEAD CALCULATION**

INVERT AT CHAMBER 74.75  
 INVERT AT LATERAL 74.50  
 PUMP "OFF" INVERT 71.92

STATIC HEAD = HIGH POINT - PUMP "OFF"  
 STATIC HEAD = 2.83 FEET

**TOTAL DYNAMIC HEAD CALCULATION**

FLOW (GPM)	ORIFICE HEAD (FT)	STATIC HEAD (FT)	FRICIONAL HEAD (ft) TRANS PIPE (FT)	MANIFOLD (FT)	LATERAL (FT)	TOTAL FRICTION HEAD (FT)	TDH (FT)
174.18	2.31	2.83	3.008	2.287	12.583	17.88	23.02

**PUMP**

GOULDS MODEL #3888D4 SERIAL NO. WS2012D4 2 HP  
 TDH FROM PUMP CURVE 27 FEET

**TIMER SETTING**

STORAGE VOLUME = AVERAGE FLOW / STORAGE VOLUME  
 1665 GPD / 95 INCHES = 17.5 GAL/INCH

DOSING VOLUME \* STORAGE VOLUME = 15.0" \* 17.5 = 262.9 GAL

PUMP RUN TIME = 262.9 GAL / 174.18 GPM = 1.51 MIN

USE 1 MIN, 40 SEC



**MIDDLETOWN VETERINARIAN HOSPITAL**

Date: 12/17/2018  
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 FIELD #2

**PRESSURE DOSED DISPOSAL SYSTEM - FIELD #2**

TOTAL DESIGN FLOW [A]	Ex. Building A	1 Vet * 70 GPD = 2 Techs * 70 GPD = 2 Staff * 20 GPD = 10 Patients * 10 GPD = 21 Kennels * 10 GPD =	70 GPD 140 GPD 40 GPD 100 GPD 210 GPD
	Ex. Building B	2 Vets * 70 GPD = 4 Techs * 70 GPD = 4 Staff * 20 GPD = 60 Patients * 10 GPD = 57 Kennels * 10 GPD =	140 GPD 280 GPD 80 GPD 600 GPD 570 GPD
	Prop. Building F (Office)	10 Employees * 20 GPD =	200 GPD
	Prop. Doggy Daycare	90 Kennels * 10 GPD =	900 GPD
			<hr/> 3330 GPD

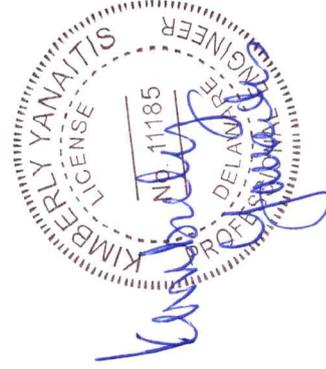
TOTAL DESIGN FLOW [A]	3330	GPD	
1/2 DESIGN FLOW TO EACH SIDE OF FIELD	1665	GPD	
SEPTIC TANK VOLUME	1,500	GAL	
TRENCH WIDTH	3	FEET	
HEAD TO BE MAINTAINED	2.31	FEET	
AVG. PERCOLATION RATE	45	MPI	
MIN. DISPOSAL AREA REQUIRED [B]	3686	SF	(1/2 PROPOSED DISPOSAL FIELD)
NO. OF LATERALS [C]	18	(2 MINIMUM)	(1/2 PROPOSED DISPOSAL FIELD)
TOTAL LATERAL LENGTH	79	LF	
PERFORATED LATERAL LENGTH	74	LF	
DISPOSAL AREA PROVIDED	3996	SF	(1/2 PROPOSED DISPOSAL FIELD)
LATERAL DIAMETER	1.25	INCH	

THE TOTAL FLOW WILL BE DIVIDED IN HALF, AND WILL BE ALTERNATED BETWEEN THE TWO SIDES OF THE DISPOSAL FIELD.



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 FIELD #2

LATERAL NO.	INV. ELEV (FT)	TOTAL LATERAL LENGTH (FT)	PERFORATED LATERAL LENGTH (FT)	TRENCH WIDTH (FT)	VOLUME PER TRENCH (GPD)	VOLUME PER SF OF TRENCH (GPD/SF)	LOADING PER TRENCH (%)
		[F]	[E]	[D]	[E]	[F]	
1	75.40	79.00	74.00	3.0	92.50	0.417	5.56
2	75.30	79.00	74.00	3.0	92.50	0.417	5.56
3	75.20	79.00	74.00	3.0	92.50	0.417	5.56
4	75.10	79.00	74.00	3.0	92.50	0.417	5.56
5	75.00	79.00	74.00	3.0	92.50	0.417	5.56
6	74.90	79.00	74.00	3.0	92.50	0.417	5.56
7	74.80	79.00	74.00	3.0	92.50	0.417	5.56
8	74.60	79.00	74.00	3.0	92.50	0.417	5.56
9	74.50	79.00	74.00	3.0	92.50	0.417	5.56
10	74.40	79.00	74.00	3.0	92.50	0.417	5.56
11	74.30	79.00	74.00	3.0	92.50	0.417	5.56
12	74.20	79.00	74.00	3.0	92.50	0.417	5.56
13	74.10	79.00	74.00	3.0	92.50	0.417	5.56
14	74.00	79.00	74.00	3.0	92.50	0.417	5.56
15	73.90	79.00	74.00	3.0	92.50	0.417	5.56
16	73.80	79.00	74.00	3.0	92.50	0.417	5.56
17	73.60	79.00	74.00	3.0	92.50	0.417	5.56
18	73.50	79.00	74.00	3.0	92.50	0.417	5.56
<b>TOTAL</b>		<b>1422.00</b>	<b>1332.00</b>		<b>1665.00</b>		<b>100.0</b>



LATERAL NO.	IN-LINE PRESSURE (FT) [G]	PERFORATION DISCHARGE RATE (GPM) [H]	LATERAL DISCHARGE RATE (GPM) [I]	PERFORATION DIAMETER (IN) (3/16")	PERFORATION AREA (SF)	NO. OF PERFOR.	PERF. SPACING (6' MAX) [K]
1	2.31	0.64	9.60	0.1875	0.00019	15	4.9'
2	2.41	0.65	9.81	0.1875	0.00019	15	4.9'
3	2.51	0.67	10.01	0.1875	0.00019	15	4.9'
4	2.61	0.68	9.52	0.1875	0.00019	14	5.3'
5	2.71	0.69	9.71	0.1875	0.00019	14	5.3'
6	2.81	0.71	9.88	0.1875	0.00019	14	5.3'
7	2.91	0.72	10.06	0.1875	0.00019	14	5.3'
8	3.11	0.74	9.65	0.1875	0.00019	13	5.7'
9	3.21	0.75	9.81	0.1875	0.00019	13	5.7'
10	3.31	0.77	9.96	0.1875	0.00019	13	5.7'
11	3.41	0.78	10.11	0.1875	0.00019	13	5.7'
12	3.51	0.79	9.47	0.1875	0.00019	12	6'
13	3.61	0.80	9.60	0.1875	0.00019	12	6'
14	3.71	0.81	9.73	0.1875	0.00019	12	6'
15	3.81	0.82	9.86	0.1875	0.00019	12	6'
16	3.91	0.83	9.99	0.1875	0.00019	12	6'
17	4.11	0.85	10.24	0.1875	0.00019	12	6'
18	4.21	0.86	10.37	0.1875	0.00019	12	6'
TOTAL			177.38				



**FRICTION LOSS IN 4" TRANSMISSION LINE (INSIDE TANK)**

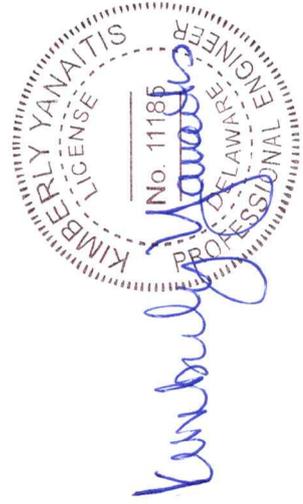
REQUIRED PARAMETERS:  
 SCHEDULE 40 PVC  
 MINIMUM FLOW RATE = 2 FPS  
 DIAMETER 4 INCHES (2" - 4" REQUIRED)  
 LENGTH 5 FEET  
 C = 150

SEGMENT	LENGTH (FT)	PIPE DIA. (IN)	FLOW (GPM) [L]	FLOW RATE (FPS) [M]	HL / 100 (FT) [N]	H L / SEGMENT (FT) [O]
1	5	4	177.38	4.63	1.827	0.091
TOTAL (PLUS 20% FOR FITTING LOSSES)						0.110

**FRICTION LOSS IN TRANSMISSION LINE**

REQUIRED PARAMETERS:  
 SCHEDULE 40 PVC  
 MINIMUM FLOW RATE = 2 FPS  
 DIAMETER 4 INCHES  
 LENGTH 134 FEET  
 C = 150

SEGMENT	LENGTH (FT)	PIPE DIA. (IN)	FLOW (GPM) [L]	FLOW RATE (FPS) [M]	HL / 100 (FT) [N]	H L / SEGMENT (FT) [O]
1	134	4	177.38	4.63	1.827	2.448
TOTAL (PLUS 20% FOR FITTING LOSSES)						2.938



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**FRICION LOSS IN MANIFOLD LINE**

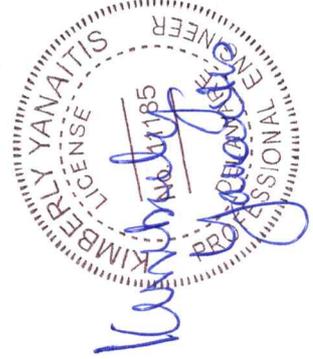
DIAMETER 4 INCHES  
 MANIFOLD LENGTH 103 FEET  
 NUMBER OF MANIFOLD SEGMENTS 1  
 C = 150

MANIFOLD SEGMENT	SEGMENT LENGTH (FT)	PIPE DIA. (IN)	FLOW (GPM) [F]	FLOW RATE (FPS)	HL./100 (FT) [Q]	HL./SEGMENT (FT) [R]
1	103.0	4	177.38	4.63	1.827	1.882
<b>TOTAL</b>	<b>103.0</b>	<b>(PLUS 20% FOR FITTING LOSSES)</b>				<b>2.258</b>

**FRICION LOSS IN LATERALS 1, 2, 3**

LATERAL DIAMETER 1.25 INCHES (1" - 3" REQUIRED)  
 TOTAL LATERAL LENGTH 79 FEET  
 HEAD TO BE MAINTAINED 2.31 FEET  
 HOLE DIAMETER 0.1875 3/16" (5/32" - 1/2" REQUIRED)  
 C = 150

TRENCH SEGMENT [S]	LENGTH (FT) [T]	PIPE DIA. (IN)	FLOW (GPM) [U]	HL./100 (FT)		HL./SEGMENT (FT) [W]
				[M]	[N]	
1	7.70	1.25	0.67	0.1	0.1	0.008
2	4.90	1.25	1.33	0.1	0.1	0.005
3	4.90	1.25	2.00	0.1	0.1	0.005
4	4.90	1.25	2.67	0.174	0.174	0.009
5	4.90	1.25	3.34	0.258	0.258	0.013
6	4.90	1.25	4.00	0.350	0.350	0.017
7	4.90	1.25	4.67	0.457	0.457	0.022
8	4.90	1.25	5.34	0.578	0.578	0.028
9	4.90	1.25	6.00	0.710	0.710	0.035
10	4.90	1.25	6.67	0.871	0.871	0.043
11	4.90	1.25	7.34	1.032	1.032	0.051
12	4.90	1.25	8.01	1.193	1.193	0.058
13	4.90	1.25	8.67	1.388	1.388	0.068
14	4.90	1.25	9.34	1.585	1.585	0.078
15	4.90	1.25	10.01	1.784	1.784	0.087
16	2.70	1.25	10.67	2.044	2.044	0.055
<b>TOTAL PER LATERAL</b>	<b>79.00</b>	<b>(Plus 20% for Fitting Losses)</b>				<b>0.698</b>
<b>TOTAL 3 LATERALS</b>						<b>2.093</b>



**FRICTION LOSS IN LATERALS 4, 5, 6, 7**

LATERAL DIAMETER 1.25 INCHES (1" - 3" REQUIRED)  
 TOTAL LATERAL LENGTH 79 FEET  
 HEAD TO BE MAINTAINED 2.31 FEET  
 HOLE DIAMETER 0.1875 3/16" (5/32" - 1/2" REQUIRED)  
 C = 150  
 NUMBER OF SEGMENTS PER TRENCH [S] 15

SEGMENT	TRENCH LENGTH (FT) [T]	PIPE DIA. (IN)	FLOW (GPM) [U]	HL / 100 (FT) [V]	HL / SEGMENT (FT) [W]
1	7.55	1.25	0.72	0.1	0.008
2	5.30	1.25	1.44	0.1	0.005
3	5.30	1.25	2.16	0.118	0.006
4	5.30	1.25	2.87	0.196	0.010
5	5.30	1.25	3.59	0.293	0.016
6	5.30	1.25	4.31	0.402	0.021
7	5.30	1.25	5.03	0.516	0.027
8	5.30	1.25	5.75	0.660	0.035
9	5.30	1.25	6.47	0.823	0.044
10	5.30	1.25	7.18	0.994	0.053
11	5.30	1.25	7.90	1.166	0.062
12	5.30	1.25	8.62	1.373	0.073
13	5.30	1.25	9.34	1.585	0.084
14	5.30	1.25	10.06	1.804	0.096
15	2.55	1.25	10.78	2.088	0.053
TOTAL PER LATERAL	79.00		(Plus 20% for Fitting Losses)		0.711
TOTAL 4 LATERALS					2.843

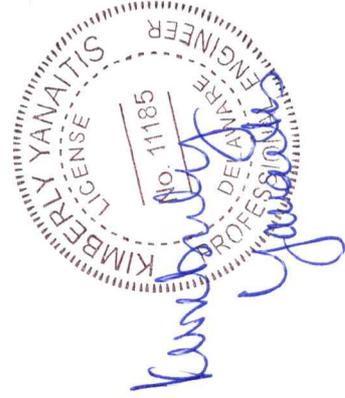


**FRICION LOSS IN LATERALS 8, 9, 10, 11**

LATERAL DIAMETER 1.25 INCHES (1" - 3" REQUIRED)  
 TOTAL LATERAL LENGTH 79 FEET  
 HEAD TO BE MAINTAINED 2.31 FEET  
 HOLE DIAMETER 0.1875 3/16"  
 C = 150 (5/32" - 1/2" REQUIRED)  
 NUMBER OF SEGMENTS PER TRENCH [S] 14

TRENCH SEGMENT [S]	LENGTH (FT) [L]	PIPE DIA. (IN)	FLOW (GPM) [U]	HL / 100 (FT) [V]	HL / SEGMENT (FT) [W]
1	7.80	1.25	0.78	0.1	0.008
2	5.70	1.25	1.56	0.1	0.006
3	5.70	1.25	2.33	0.136	0.008
4	5.70	1.25	3.11	0.225	0.013
5	5.70	1.25	3.89	0.335	0.019
6	5.70	1.25	4.67	0.457	0.026
7	5.70	1.25	5.44	0.598	0.034
8	5.70	1.25	6.22	0.763	0.043
9	5.70	1.25	7.00	0.950	0.054
10	5.70	1.25	7.78	1.137	0.065
11	5.70	1.25	8.55	1.352	0.077
12	5.70	1.25	9.33	1.582	0.090
13	5.70	1.25	10.11	1.823	0.104
14	2.80	1.25	10.89	2.131	0.060
TOTAL PER LATERAL	79.00		(Plus 20% for Fitting Losses)		0.728
TOTAL 4 LATERALS					2.912

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**FRICTION LOSS IN LATERALS 12, 13, 14, 15, 16, 17, 18**

LATERAL DIAMETER 1.25 INCHES (1" - 3" REQUIRED)  
 TOTAL LATERAL LENGTH 79 FEET  
 HEAD TO BE MAINTAINED 0.1875 FEET  
 HOLE DIAMETER 3/16"  
 C = 150  
 NUMBER OF SEGMENTS PER TRENCH [S] 13

TRENCH SEGMENT [S]	LENGTH (FT) [L]	PIPE DIA. (IN)	FLOW (GPM) [U]	HL / 100 (FT) [M]	HL / SEGMENT (FT) [W]
1	9.00	1.25	0.86	0.1	0.009
2	6.00	1.25	1.73	0.1	0.006
3	6.00	1.25	2.59	0.165	0.010
4	6.00	1.25	3.46	0.274	0.016
5	6.00	1.25	4.32	0.403	0.024
6	6.00	1.25	5.18	0.546	0.033
7	6.00	1.25	6.05	0.722	0.043
8	6.00	1.25	6.91	0.929	0.056
9	6.00	1.25	7.78	1.137	0.068
10	6.00	1.25	8.64	1.379	0.083
11	6.00	1.25	9.50	1.633	0.098
12	6.00	1.25	10.37	1.926	0.116
13	4.00	1.25	11.23	2.265	0.091
TOTAL PER LATERAL	79.00		(Plus 20% for Fitting Losses)		0.783
TOTAL 7 LATERALS					5.480



**THREE (3) IM-1530 DOSING CHAMBERS**

SEE NOMINAL VOLUME CHART

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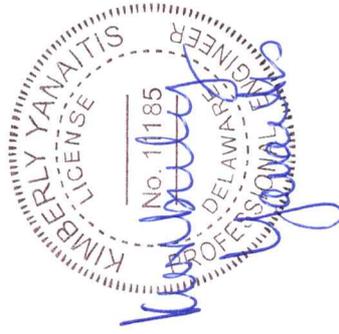
**STORAGE VOLUME CALCULATION**

STORAGE = AVERAGE FLOW VOLUME 3330 GPD  
 MINIMUM STORAGE VOLUME DEPTH = AVERAGE FLOW / AREA OF CHAMBER  
 MINIMUM STORAGE VOLUME DEPTH = 95.0 INCHES (COMBINED IN THREE TANKS)  
 (44" + 44" + 7")

**DOSING VOLUME CALCULATION**

PIPE DIA. (IN)	AREA (SF)	LENGTH (FT)	VOLUME (GAL)
TRANS LINE IN TANK	4	5	3.26
TRANSMISSION LINE	4	134	87.47
MANIFOLD	4	103	67.24
LATERALS	1.25	1422.00	90.65
<b>TOTAL VOLUME</b>			<b>248.63</b>

MINIMUM DOSING VOLUME = 5 \* INTERNAL (LIQUID) CAPACITY OF THE LATERALS 453.26 GAL  
 MINIMUM DOSING VOLUME =  
 MINIMUM VOLUME OF DOSING CHAMBER = DESIGNED DOSE VOLUME + DESIGN DAILY FLOW 2118.26 GAL  
 MINIMUM VOLUME OF DOSING CHAMBER =  
 MINIMUM DOSING VOLUME DEPTH = MINIMUM DOSING VOLUME / AREA OF CHAMBER 12.2 INCHES  
 MINIMUM DOSING VOLUME DEPTH =  
 DOSE VOLUME = Per Volume Chart = 808 Gal (25") - 245 gal (10") = 563.00 GAL  
 DOSE CYCLE = DESIGN FLOW / DOSE VOLUME 3.0 (3 MINIMUM)  
 DOSE CYCLE =



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**STATIC HEAD CALCULATION**

INVERT AT CHAMBER 74.75  
 INVERT AT LATERAL 75.40  
 PUMP "OFF" INVERT 71.92  
 STATIC HEAD = HIGH POINT - PUMP "OFF"  
 STATIC HEAD = 3.48 FEET

**TOTAL DYNAMIC HEAD CALCULATION**

FLOW (GPM)	ORIFICE HEAD (FT)	STATIC HEAD (FT)	FRICIONAL HEAD (ft) TRANS PIPE (FT)	MANIFOLD (FT)	LATERAL (FT)	TOTAL FRICTION HEAD (FT)	TDH (FT)
177.38	2.31	3.48	3.047	2.258	13.328	18.63	24.42

**PUMP**

GOULDS MODEL #3888D4 SERIAL NO. WS2012D4 2 HP  
 TDH FROM PUMP CURVE 27 FEET

**TIMER SETTING**

STORAGE VOLUME = AVERAGE FLOW / STORAGE VOLUME  
 1665 GPD / 95 INCHES = 17.5 GAL/INCH  
 DOSING VOLUME \* STORAGE VOLUME = 15.0" \* 17.5 = 262.9 GAL  
 PUMP RUN TIME = 262.9 GAL / 177.38 GPM = 1.48 MIN  
 USE 1 MIN, 40 SEC



**Table 2: Nominal Volume Chart**

Height <sup>1</sup>		Total liquid volume in tank at indicated height					
in	cm	IM-540		IM-1060		IM-1530	
		U.S. Gal	Liters	U.S. Gal	Liters	U.S. Gal	Liters
1	3	3	11	3	11	17	64
2	5	8	30	13	49	34	128
3	8	14	53	28	106	51	192
4	10	21	80	46	174	68	256
5	13	29	109	65	246	94	357
6	15	37	141	86	326	122	463
7	18	46	173	107	405	152	573
8	20	55	207	129	488	180	681
9	23	64	243	152	575	212	802
10	25	74	279	176	666	245	928
11	28	84	317	200	757	280	1,061
12	30	94	356	225	852	312	1,182
13	33	105	396	251	950	351	1,328
14	36	116	437	277	1,049	387	1,463
15	38	127	480	303	1,147	422	1,597
16	40	138	523	330	1,249	464	1,756
17	43	150	566	357	1,351	500	1,892
18	46	161	611	384	1,454	537	2,034
19	48	173	656	411	1,556	575	2,177
20	50	186	702	438	1,658	614	2,322
21	53	198	749	465	1,760	652	2,468
22	56	210	796	493	1,866	690	2,612
23	58	223	843	521	1,972	729	2,758
24	61	235	891	549	2,078	770	2,914
25	64	248	940	577	2,184	808	3,058
26	66	261	988	605	2,290	847	3,208
27	69	274	1,038	633	2,396	887	3,356
28	71	287	1,088	662	2,506	928	3,513
29	74	300	1,137	691	2,616	968	3,655
30	76	313	1,185	719	2,722	1,007	3,805
31	79	326	1,233	747	2,828	1,048	3,966
32	81	338	1,281	775	2,934	1,087	4,113
33	84	351	1,328	802	3,036	1,126	4,262
34	86	363	1,375	830	3,142	1,165	4,410
35	89	375	1,421	857	3,244	1,204	4,557
36	91	387	1,466	884	3,346	1,242	4,701
37	94	399	1,511	911	3,449	1,280	4,846
38	97	411	1,555	938	3,551	1,318	4,988
39	99	422	1,598	965	3,653	1,355	5,131
40	102	433	1,640	992	3,755	1,393	5,272
41	104	444	1,681	1,018	3,854	1,430	5,412
42	107	455	1,722	1,044	3,952	1,466	5,550
43	109	465	1,761	1,069	4,047	1,502	5,685
44	112	475	1,799	1,094	4,141	1,537	5,817
45	114	485	1,836	1,118	4,232	1,572	5,950
46	117	494	1,871	1,142	4,323	1,604	6,070
47	119	503	1,905	1,165	4,410	1,638	6,201
48	122	512	1,938	1,187	4,493	1,667	6,310
49	124	520	1,970	1,208	4,573	1,697	6,422
50	127	528	1,999	1,228	4,648	1,724	6,527
51	130	535	2,027	1,247	4,720	1,749	6,621
52	132	542	2,050	1,265	4,789	1,766	6,684
53	135	547	2,071	1,278	4,838	1,777	6,726
54	137	551 <sup>2</sup>	2,087	1,287	4,872	1,785 <sup>2</sup>	6,758

Pump off  
15"  
Pump on  
7"  
Storage  
44"

563 gal  
279 gal  
1537 gal

1. Height measured from lowermost inside surface at bottom of corrugation in tank.  
 2. The total capacity of the IM-540 tank is 552 gallons; the total capacity of the IM-1530 tank is 1,787 gallons.