THE STATE OF NEW HAMPSHIRE

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NHPUC 14DEC'16AM11:29

December 14, 2016

Debra A. Howland, Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, NH 03301

Re: DW 16-825, Hampstead Area Water Company, Inc.
Request for Franchise Expansion, Acquisition, and Rate Approval
Wells Village, Sandown NH
Staff Recommendation for Approval

Dear Ms. Howland:

The purpose of this letter is to offer Staff's recommendation with respect to the petition of Hampstead Area Water Company, Inc. (HAWC or the Company) in the above-referenced docket. HAWC seeks permission to establish a new franchise in the Town of Sandown to serve a proposed 40.83 acre development consisting of a fifty (50) unit condominium development known as "Wells Village." HAWC also seeks franchise authority for additional parcels of land surrounding the Wells Village development, as illustrated on Exhibit 4 to the Company's petition. Altogether the proposed new franchise area would compose about 265 acres. In addition, HAWC requests authority to acquire the associated water utility assets of Wells Village, for approval of a financing associated with HAWC's obligation to pay the developer $1,000 per connection, and authority to charge its current consolidated tariff rates in this new franchise area. Staff has reviewed the filing and conducted discovery, which is attached to this letter. Because the owners of the parcels other than Wells Village have not been noticed of this request and have not provided their assent, Staff recommends that the Commission restrict the new franchise area requested by HAWC to the 40.83 acre Wells Village development. Staff recommends approval for the associated financing and the application of HAWC's consolidated tariff rates.

HAWC provides water service to approximately 3,480 customers in twelve towns in southern New Hampshire, including Sandown. On October 11, 2016, HAWC filed its petition along with the prefiled testimony of Harold Morse, president of HAWC, and John Sullivan, controller for HAWC affiliate, Lewis Builders, Inc. The Wells Village project, developed by Kasher Corporation (Kasher), PO Box 626, Billerica, Massachusetts 01821, is located within Tax Map 13, Lot 1, west of Wells Village Road and just south of the Exeter River in Sandown, New Hampshire. The project is an adult housing community and will consist of fifty (50) two and

three bedroom condominium units. With the assistance of HAWC, Kasher has obtained the necessary water system and well approvals for Wells Village from the Department of Environmental Services (DES). As detailed in Exhibit 1 to the petition, Kasher, with Lewis Builders Development, Inc. (Lewis) as a subcontractor, will install the water system and convey it to HAWC.

Exhibit 3 provides a detailed map of the easement for the community well for Wells Village. The development will not be connected to HAWC's core system and HAWC will not provide fire protection service to Wells Village. Fire protection services will be provided by fire sprinklers located within the residences with no costs to HAWC.

The proposed franchise area with a metes and bounds description containing Two Hundred and Sixty Five (265.00) acres, more or less, is shown as Exhibit 4 and is considerably larger than the proposed Wells Village development known as Map 13, Lot 1 containing Forty and 83/100 (40.83) acres, more or less. Staff notes that the Commission received a letter from the Town of Sandown, dated October 16, 2016, confirming notification of HAWC's petition to acquire and operate a water system within the Wells Village development. The remaining acreage is undeveloped at this time, and the company has not provided notice to the other property owners in the proposed franchise area[1].

HAWC provided a copy of the DES approvals for two new wells and a water system for the proposed Townhouses at Wells Village project as Exhibit 12 to its petition. On June 30, 2016, the DES permitted the use of two bedrock wells to supply water for domestic use only. The permitted production volume/yield for well #1 is 26,208 gallons and well #2 is 27,244 gallons. The system is permitted for in-ground irrigation systems but strongly encouraged to put in place a program to control and limit irrigation use and to closely track production volumes and water levels in the wells. The water system must implement the approved Water Conservation Plan, signed January 22, 2016, in accordance with Env-Wq 2101, *Water Conservation* and NHDES' approval dated February 12, 2016. Two water quality issues were addressed by requiring the company to submit to the Drinking Water and Groundwater Bureau a schematic of the proposed system for approval. This approval letter was dated September 28, 2016. Once the water system becomes active, DES will require HAWC to report the usage through DES's Water Use Registration and Reporting Program. HAWC will also be required to contact the DES' chemical-monitoring staff to set up a Master Sampling schedule. Because the wells to be used by this development have been approved by the DES, Staff believes HAWC satisfies the requirements of RSA 374:22, III, regarding the suitability and availability of water for the Wells Village development.

[1] In response to Staff discovery request 1-4, HAWC indicates that the owner of tax map lot 9-15 has expressed interest in utilizing HAWC for water service in the future.

Exhibit 1 is a contract between Kasher, Lewis and HAWC to install the Wells Village water system assets. Kasher will be installing the water distribution system and Lewis will be paid by Kasher to install the pumping and treatment station, generator, controls and treatment system. Exhibit 6 is a schedule of costs of acquisition and Exhibit 7 is a bill of sale listing the specific assets included within the acquisition. The sales agreement provides for a sale price of $50,000, to be paid by HAWC in $1,000 per-hookup installments. According to the bill of sale, Kasher's cost of construction is estimated to total $462,305. Because HAWC is only paying $1,000 per hookup, with a cap of $50,000, a sizable amount of the assets will be booked as Contribution in Aid of Construction (CIAC) from the developer and will not be included in rate base.

Kasher executed a Water Rights Deed and Easement for Wells Village known as Map 13, Lot 1 on September 14, 2016. See Exhibit 3. This easement secures HAWC's access to the Wells Village water system and right to enforce the protective well radius easement.

The Pro-forma Continuing Property Records (CPR), Exhibit 13, do not contain the detail kept by HAWC in the ordinary course of its business. More detailed CPRs, however, will be obtained by HAWC during the acquisition. Staff is comfortable with recommending approval of the Wells Village franchise and other relief associated with the Wells Village request at this time because HAWC proposes no change to its existing rates and HAWC expects to have more detailed CPRs soon. Also, when HAWC seeks to place the plant associated with this system into rate base, presumably in its next general rate case, Staff will have an opportunity to confirm the adequacy of the CPRs at that time.

According to Mr. Morse's testimony, HAWC's existing consolidated metered rate is comprised of a $10.00 base charge per month and a consumption charge of $5.02 per 100 cubic feet of water consumed. The Commission found this rate to be just and reasonable pursuant to RSA 378:28 in Docket No. DW 12-170. Order No. 25,519 (June 7, 2013). There will be no fire protection charges since the fire sprinklers will be located within the residences and no costs associated with the systems were borne by the company.

HAWC has been providing water service as a regulated public utility since the late 1970s. Since that time, the company has grown to serve approximately 3,480 customers in twelve towns in southern New Hampshire, including Sandown. Based on this experience and the information provided in HAWC's petition, Staff views HAWC as having the technical, managerial, financial, legal, and other capabilities necessary to serve the proposed Wells Village subdivision. Staff concurs with HAWC's proposal to provide service to and charge its existing rates in the proposed Wells Village development. However, Staff recommends that the Commission restrict the franchise area requested by HAWC to the 40.83 acre development known as "Wells Village". If the company wishes to extend its franchise to include the remaining acreage in Sandown, it should file a petition with the consents of all identified property owners.

Because payment of the $50,000 sale price is being paid in installments, rather than at the time HAWC acquires the assets, HAWC and Kasher propose a promissory note for $50,000 with no interest. See Exhibit 5. The promissory note contains no specific repayment dates due to installments being payable upon hookup of water service and installation of a meter for said service for each of the fifty units. Staff has reviewed the terms of the promissory note and believes they are reasonable. Staff believes the use of the proceeds to acquire the water system is reasonable and Staff recommends the Commission approve HAWC's financing request.

If you have any questions regarding this matter, please contact me.

Sincerely,

Robyn J. Descoteau

Robyn J. Descoteau
Utility Analyst III

cc: Service list
Attachments

SERVICE LIST - EMAIL ADDRESSES - DOCKET RELATED

Pursuant to N.H. Admin Rule Puc 203.11 (a) (1): Serve an electronic copy on each person identified on the service list.

Executive.Director@puc.nh.gov
amanda.noonan@puc.nh.gov
bob@lewisbuilders.com
john.clifford@puc.nh.gov
mark.naylor@puc.nh.gov
ocalitigation@oca.nh.gov
robyn.descoteau@puc.nh.gov
steve.frink@puc.nh.gov

Docket #: 16-825-1 Printed: December 14, 2016

FILING INSTRUCTIONS:

a) **Pursuant to N.H. Admin Rule Puc 203.02 (a), with the exception of Discovery, file 7 copies, as well as an electronic copy, of all documents including cover letter with:**

DEBRA A HOWLAND
EXECUTIVE DIRECTOR
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

b) **Serve an electronic copy with each person identified on the Commission's service list and with the Office of Consumer Advocate.**

c) **Serve a written copy on each person on the service list not able to receive electronic mail.**

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-1 **Witness: Charles Lanza**

Please indicate the time frame anticipated for each of the following:

a) First water service to customer.
b) Completion of water system if different than above.
c) Completion of development, including any phasing.

Response:

a) Water service is anticipated to be provided to the first customer in spring of 2017.
b) The water system will be completed prior to the spring of 2017.
c) There is no proposed phasing and completion is estimated at the end of 2018.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-2 **Witness: Charles Lanza**

Re: Exhibit 2: Please identify which items are being installed by Kasher Corporation and which items are being installed by Lewis Builders Development, Inc.

Response:

Lewis Builders Development, Inc. is installing the pumping and treatment station, generator, controls, treatment and Kasher Corp. is installing the water distribution system.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-3 **Witness: John Sullivan**

Re: Exhibit 1, 2& 5: Please provide the date on which you expect these documents to be signed.

Response:

The documents are signed but are all contingent upon PUC approval. The Bill of Sale is pro forma and may change depending on what is actually installed at the time construction is completed.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-4 **Witness: Charles Lanza**

Re: Exhibits 3 & 4: Exhibit 3, page 5 details a tract of land known as "Tax map 13, Lot 1" containing 40.83 acres, more or less. This tract of land is known as the Senior Housing Development to be known as Town Houses at Well Village. Exhibit 4 details a tract of land which is 265.00 acres, more or less. Tax map 13, Lot 1 is contained within the described 265.00 acres.

a. Please explain why the Company has proposed a franchisearea larger than the proposed satellite system.
b. Have the owners of the lots other than Wells Village been notified that Hampstead Area Water Company, Inc. is seeking the franchise rights to the remaining lots included in the proposed franchise area? Please explain.
c. Please detail the development status of the remaining lots in the proposed franchise area.

Response:

a. The Company has proposed a larger franchise area than the proposed satellite system for two reasons. The first is the large undeveloped lot (Tax Map 9-15) is owned by a local developer who has expressed interest in utilizing the Company for water service for future development(s). Secondly, the area was chosen based on major physical boundaries and the proximity of undeveloped lands near to these boundaries.
b. They have not.
c. To the extent the Company has this knowledge, please see response 1-4(a).

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-5 **Witness: Charles Lanza**

Re: Exhibit 7: Please explain why there are no costs for fire protection in the proposed development. If fire protection is not required, please provide documentation of such.

Response:

The only fire protection being proposed at the Wells Village project is fire sprinklers located within the residences. The costs associated with installing these sprinklers include plumbing within the residences and will not be owned by the Company. There are no on-site hydrants.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-6 **Witness: Harold J. Morse**

Re: Exhibit 11: The acknowledgement letter sent to the Town of Sandown does not indicate that the proposed franchise area is much larger than the Wells Village project. Please explain.

Response:

The Company has sent a copy of the franchise plan and description to the Town of Sandown.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-7 **Witness: Charles Lanza**

Re: Exhibit 12: Please provide a copy of the water system site plan provided to Mr. Fran McCarthy showing proposed pump house and well locations.

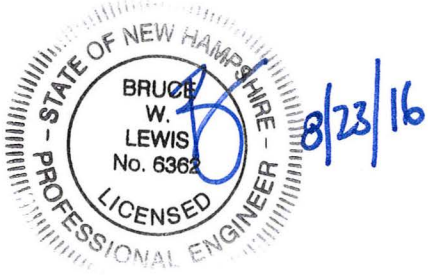
Response:

See attached.

Design Package
for
Town Houses at Wells Village
Community Water System
Sandown, New Hampshire

Prepared for:
Mr. Fran McCarthy
Kasher Corp.
Billerica, MA

Submitted to:
DGWGB
Mr. Tom Willis, P.E.
Concord, NH



Lewis Engineering, PLLC
Litchfield, NH
August 16, 2016

Lewis Engineering, PLLC
Specializing in Water System Designs & Approvals

44 Stark Lane Litchfield, NH 03052

August 16, 2016

Mr. Tom Willis, P .E.
NH Drinking Water and Groundwater Bureau
6 Hazen Drive
P.O. Box 95
Concord, NH 03302-0095

Re: Proposed Community Water System for Town Houses at Wells Village in Sandown, New Hampshire

Dear Tom,

Lewis Engineering, PLLC, has been retained by Mr. Fran McCarthy of Kasher Corporation, to assist in the layout and design of a new public water supply system for the proposed Town Houses at Wells Village in Sandown, NH.

The project is to be an adult housing community, consisting of 50, two and three bedroom units. The proposed project site is located generally west of Wells Village Road and just south of the Exeter River in Sandown, NH. The site will be provided water from an on site community water system that will run on 2 bedrock wells each with a 200' protective radius. Water booster pumps, metering, electrical controls and other necessary equipment will be housed in a pump station to be located generally west of the development. A buried atmospheric water storage tank will be installed just south the station

All system components have been reviewed and will be installed in accordance with DWGB rules. The water system will be owned and operated by the Hampstead Area Water Company (HAWC).

Your timely review and approval of the proposed Town Houses at Wells Village Community Water System would be greatly appreciated. Please contact the office if there are any questions, or if additional information is required. Also a review fee check in the amount of $2,250.

Respectfully,
LEWIS ENGINEERING, PLLC

Bruce Lewis, P.E.

Cc: Mr. Fran McCarthy - Kasher Corporation

Tel (603) 886-4985 Fax (603) 886-5149 Lewis.h2o@comcast.net

Exhibits

I. General Locus Plan

II. Pumps Station Site and Building Plan

III. System Design Summary

IV. Engineering Design and Operational Summary

V. Well Profiles, Pump Data, and Metering

VI. Water Treatment

VII. Water Storage Tanks

VIII. System Hydraulic Calculations

IX. Booster Pump Data

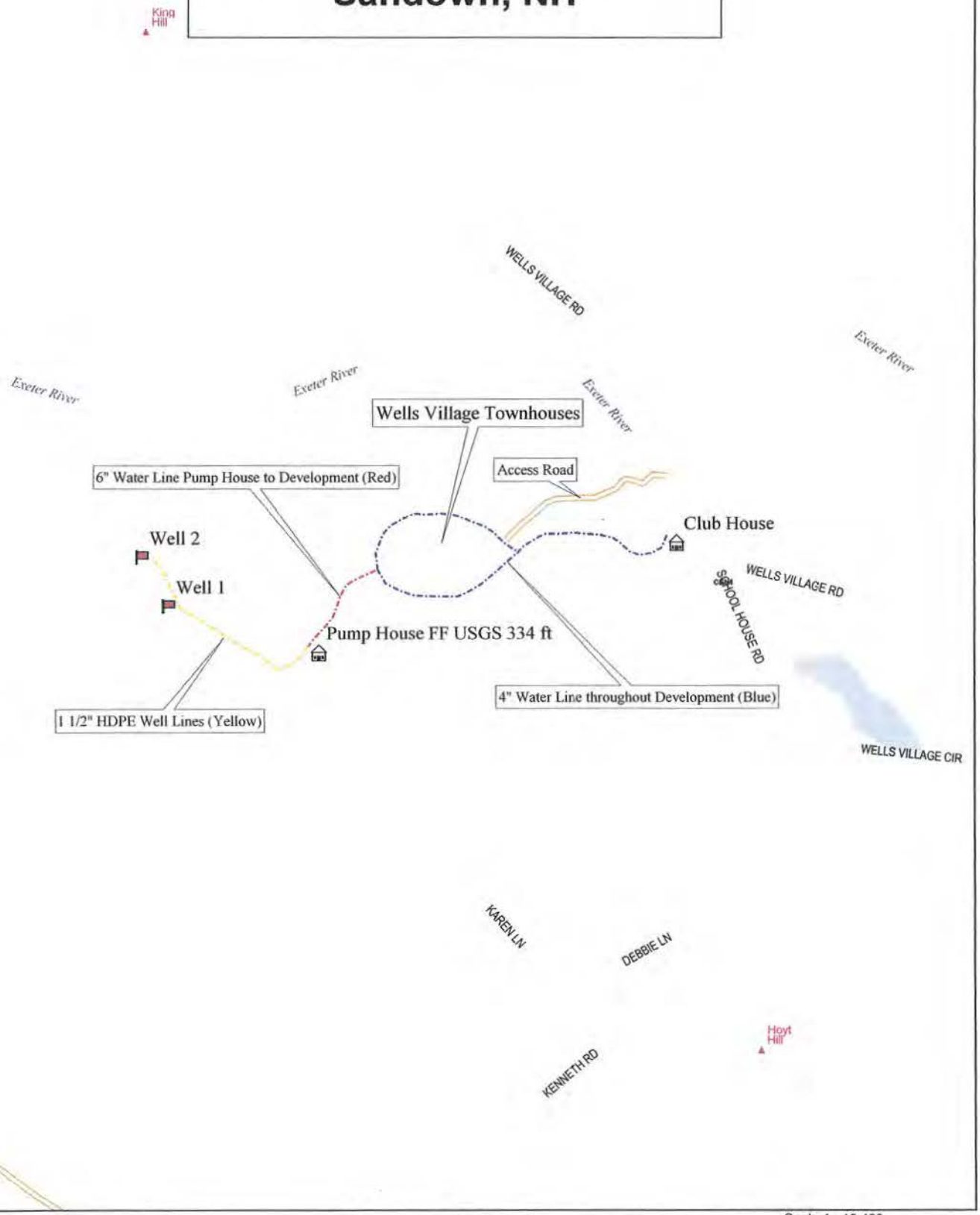
X. Water Distribution System Notes

XI. Electrical Components & Controls

XII. Miscellaneous Equipment

General Locus Plan

Wells Village Town Houses
Community Water System
Sandown, NH



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TN
MN (15.4°W)

Scale 1 : 10,400
1" = 866.7 ft
Data Zoom 14-3

Pump Station Site and Building Plan

WELLS VILLAGE TOWN HOUSES

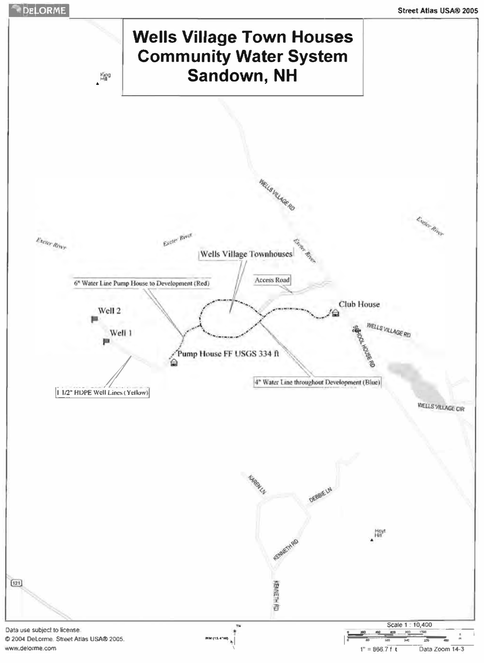
COMMUNITY WATER SYSTEM

SANDOWN, NEW HAMPSHIRE

AUGUST 2016

HAMPSTEAD AREA WATER COMPANY OF

ATKINSON, NEW HAMPSHIRE



SITE LOCUS

NTS

N

LEWIS ENGINEERING, PLLC

44 STARK LANE
LITCHFIELD, NH
lewis.h2o@comcast.net

Summary of Water Works Design Criteria
Town Houses at Wells Village
Wells Village Road, Sandown, NH
August 2016

Summary of Water Works Design Criteria
Town Houses at Wells Village
Wells Village Road, Sandown, NH
August 2016

1. Project Name ..... Town Houses at Wells Village
2. Service Area, City ..... off Wells Village Rd., Sandown, NH
3. Total Number of Senior Town House Units 50
4. Total Number of Bedrooms (2 & 3 per unit) 125
5. Ave. Gallons per Day per NHDES (150gal/br/day) 18,750
6. Ave. Gallons per Minute ..... 13 gpm
7. Approved Permitted Production Volume (2- Wells)..... 37.12 gpm
7. Peaking Factor based on Average Day usage and 50 Units 4.0
8. Projected Peak Hourly Demand (gpm) ..... 52 gpm
9. Size of well line to pump station ..... 1 ½"
10. Size of discharge piping ..... 6"
11. Size of Water Main through Project (with Flushing Points)..... 4"
12. Atmospheric Storage Tank Buried (8' 0" x 26'8")..... 10,000 gal
13. Total Number of Domestic Service Pumps 2 @ 5 h.p. 1 @ 2 h.p..... 3
14. Cap. and TDH of Typ. 5.0 h.p. Domestic Booster Pumps (VFD's) ..... 75 gpm @ 150 ft
15. Total Number of Low Flow Domestic Service Pump 1 @ 2 h.p. 1
16. Cap. and TDH of Typ. 2 h.p. Low Flow Booster Pump (VFD's)..... 32 gpm @ 150 ft
17. Domestic Booster Pumps Maintain Minimum (psi) at USGS 334'..... 55-60 psi
18. Minimum Domestic Pressure (psi) at Highest Elev. (USGS 349') ..... 50 psi
19. Normal Max. Anticipated System Pressure (psi) at lowest elev. (USGS 292') ..... 75 psi
20. Size of Station Water Meter (gal)(H.P. Turbine with Tri-Con E) ..... 3"
21. Public Utility Power Supply into Station (200 Amp) ..... 240V - 1Ø
22. Station Lighting ..... Dust / Moisture Resistant Fluorescent
23. Station Heat – Electric Heater with Fan & Thermostat..... 5 KW
24. General ventilation fan ..... 16"
25. Booster pump controls ..... VFD's with PLC based panel
26. Water Alarms ..... SCADA

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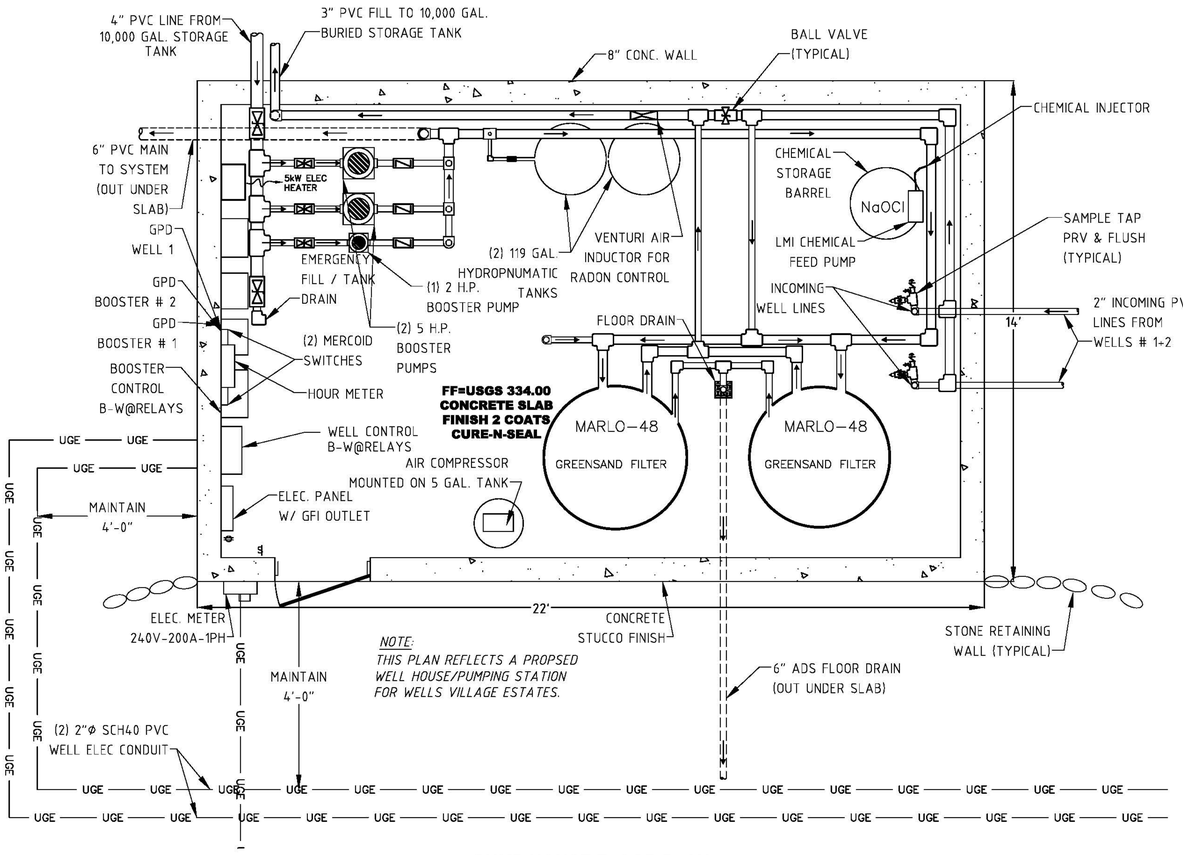
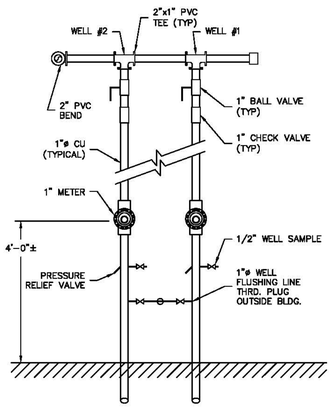
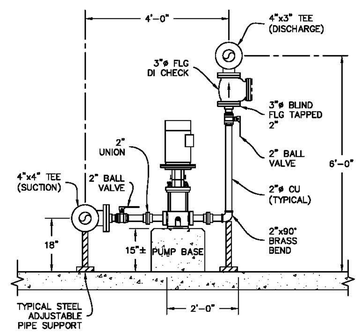


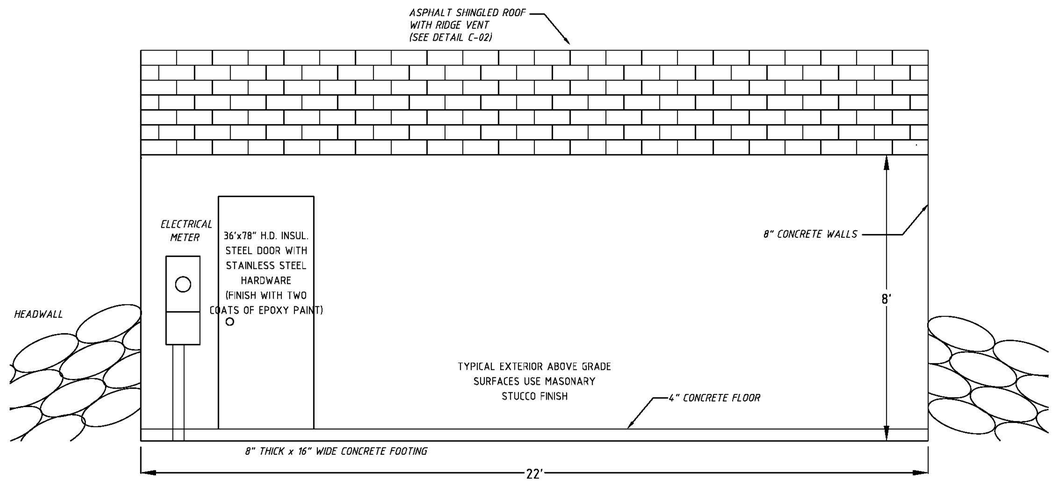
PUMP HOUSE FLOOR PLAN
PLAN VIEW
1/2" = 1'-0"



TYPICAL METER DETAIL
NTS



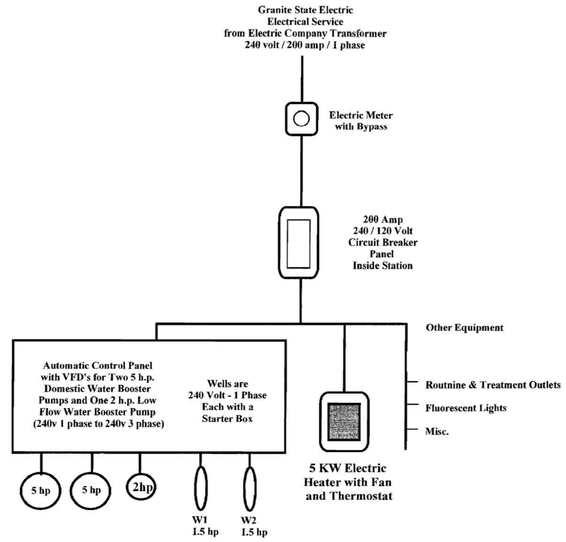
TYPICAL PUMP DETAIL
SECTION VIEW
1/2" = 1'-0"



EXTERIOR
FRONT ELEVATION VIEW
1/2" = 1'-0"

TOWN HOUSES AT WELLS VILLAGE COMMUNITY WATER SYSTEM
SANDOWN, NEW HAMPSHIRE
WATER DISTRIBUTION SYSTEM NOTES
Current Revision: September 2006

1. All distribution material including; mains, fittings, and valves to meet applicable New Hampshire Dept. of Environmental Services - Bureau of Water Supply Engineering, (NHDES-WSEB) and American Water Works Association (AWWA) standards.
2. All installation of material to conform to applicable NHDES-WSEB and AWWA standards and specifications for public water supply systems.
3. All valves, tees, bends, and their related joints to be properly restrained using approved "Grip-Ring", "Mega-Lug" or equal, retainer kits.
4. All water main and appurtenances to be an approved manufactured in accordance with current AWWA standards. All water main and appurtenances to be an approved AWWA C-900, 150 psi (min.) PVC water main. Pipe sizing shall be 6", 4", and 2" well lines as shown on plans approved by the Town Planning Board and NHDES-WSEB. All water main and service lines to be installed with a minimum of 60" of cover, and shall be properly sand bedded and backfilled with suitable material.
5. Gate valves shall be installed at locations shown on the Utility Plans. All gate valves shall be AWWA approved, epoxy coated, resilient wedge type, being OPEN LEFT (counter clockwise). Valve boxes shall be AWWA approved, slip type with 36" base, 36" top, and cover shall be a one-piece cast cover labeled "WATER".
6. Flushing Points and/or hydrants for flushing shall be installed at locations shown on the Project Plans. All flushing points shall be 2" connections and shall meet specifications for water distribution system flushing purposes, using approved flushing hydrants. Domestic services shall have service line sizing being 1" diameter, CTS, 200 psi, polyethylene tubing, with brass packed joint (PJ) service fittings, ball valve shut offs, adjustable Erie type curb boxes, and with corporation stops and saddles, as shown on Utility Plans into each of the buildings from the water main.
7. Separation of water mains and sewer shall be in accordance with WSEB standards. On parallel installation, water mains shall be laid at least ten feet horizontally from any existing or proposed sewer. If less than ten feet, water main shall be laid in a separate trench, or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer with at least three feet horizontal separation. At crossings there shall be a minimum vertical distance of 18 inches between the water main and sewer. Ductile iron pipe with a minimal laying length of 18 feet shall be used at all crossings, with both joints being located as far from the sewer as possible.
8. All water main to be, flushed, pressure tested, and disinfected, in accordance with the latest provisions of AWWA C-600 and C-651, prior to acceptance. Written certification of testing and bacteriological test results shall be provided.
9. A Record Drawing shall be provided following installation, in accordance with NHWSEB standards.



Note: All wiring to meet National and Local Electrical Code. All wire to be run in PVC or EMT conduit. Liquid tight allowed between motors and conduit. All enclosures minimum NEMA I Fluorescent lighting to each be 4' as needed, twin tube, moisture resistant.

ONE LINE SCHEMATIC
ELECTRIC DIAGRAM
(N.T.S.)

NOTES:

1. ALL WIRE TO BE RUN IN EMT W/LIQUID TIGHT BETWEEN CONDUIT AND MOTORS.
2. ALL ENCLOSURES TO BE MIN. NEMA I.
3. FLUORESCENT LTS. (4' TWINTUBE) TO BE VAPOR RESISTENT.
4. ALL WIRING TO MEET OR EXCEED ALL PROVISIONS OF NH BUILDING CODE AND NATIONAL ELECTRICAL CODE.
5. MCC'S PLC SHALL BE PROGRAMMED FOR AUTOMATIC STATION OPERATION BASED ON FLOW AND PRESSURE.

PLEASE SEE PROJECT WATER WORKS DESIGN BOOK FOR ADDITIONAL DETAILS, AS APPROVED BY NHWSEB

NOTES

1. STATION DESIGN PER HAMPSTEAD AREA WATER CO. (HAWC) STANDARD CWS PUMP STATION.
2. PRIME AND FINISH COAT LINTEL PRIOR TO INSTALLATION.
3. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO SPECIFIED INSTALLATION DETAILS.
4. ALL REBAR TO BE DEFORMED GRADE 40.
5. ALL INTERIOR WALLS TO BE PRIMED AND FINISHED WITH TWO COATS OF APPROVED PAINT.
6. PRIME AND PAINT (2 COATS) PLYWOOD CEILING WITH APPROVED PAINT.
7. ALL ELECTRICAL WORK TO COMPLY WITH NATIONAL ELECTRICAL CODE AND TOWN OF SANDOWN STANDARDS.
8. 5KW ELECTRIC HEATER TO BE ON A SEPARATE CIRCUIT BREAKER.

LEWIS ENGINEERING, PLLC
44 Stark Lane
Litchfield, NH 03052
lewis.h2o@worldnet.att.net

SHEET 1 OF 2
STRUCTURAL PLANS
TOWN HOUSES AT WELLS VILLAGE
WELLS VILLAGE ROAD
CWS PUMP STATION
SANDOWN, NEW HAMPSHIRE

DRAWN BY	DRAWING DATE	CONSTRUCTION DATE	INSTALLED BY	
SWIERZ CONSULTING, LLC	OCTOBER 2006	-	-	
ENGINEER	INSPECTOR	ASBUILT NO.	APPROX SCALE	SHEET NO.
B. LEWIS	-	-	AS NOTED	1

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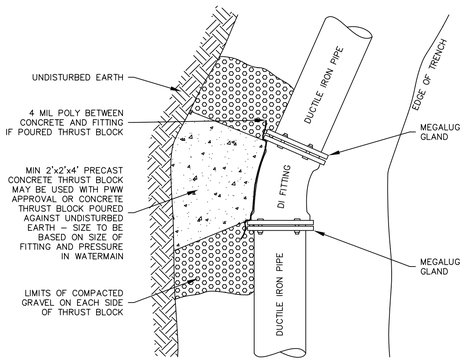
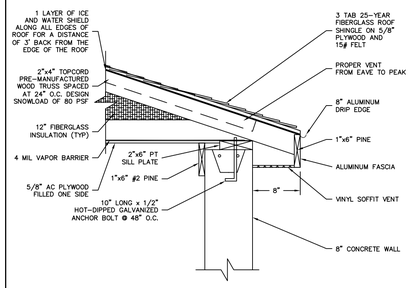


NOTES:
1. ALL MATERIAL AND INSTALLATION PROCEDURES WILL CONFORM TO TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.

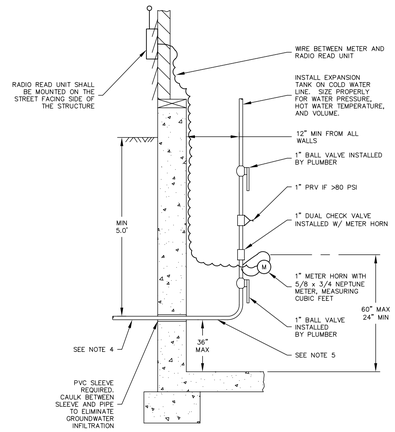
TYPICAL THRUST BLOCK DETAIL
NTS

B–02



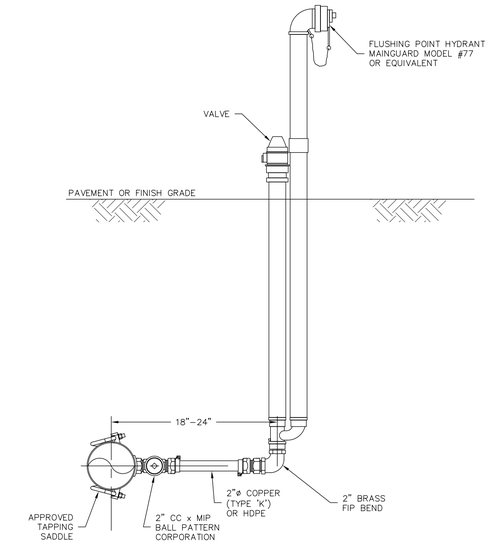
TYPICAL ROOF EAVE DETAIL
NTS

C–02



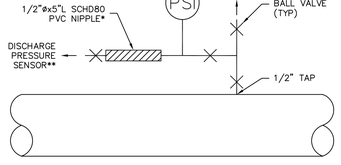
NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO STATE WATER WORKS REGULATORY AGENCY TECHNICAL SPECIFICATIONS.
2. INSTALLATION UNDER FOOTING OR THROUGH FOUNDATION WALL.
3. OWNER MUST PROVIDE A CLEAN, DRY ACCESSIBLE AND WARM (CONTINUALLY ABOVE 45°F) LOCATION FOR THE SERVICE ENTRANCE WATER METER AND DOUBLE CHECK VALVE.
4. 1" SERVICE LINE FROM STREET, SIZE & MATERIALS TO BE TYPE 'K' COPPER TUBING OR 200 PSIG RATED CTS POLYETHYLENE TUBING. SAND TO BE USED FOR BACK FILL FOR A MINIMUM OF 6" ABOVE AND BELOW THE SERVICE LINE.
5. PROVIDE A MINIMUM OF 24" OF STRAIGHT COPPER AT SERVICE ENTRANCE INSIDE OF BUILDING TO ALLOW FOR INSTALLATION OF ISOLATION VALVES, METER HORN AND METER, DUAL CHECK VALVE AND PRV (IF REQ'D).
6. WATER METER SHALL BE A 5/8 x 3/4 NEPTUNE METER, MEASURING CUBIC FEET, WITH A 2 BAND RADIO PRO–READ HEAD. THE RADIO READ SHALL BE MOUNTED ON THE STREET FACING SIDE OF THE STRUCTURE WITH WIRING BETWEEN THE UNIT AND THE METER.

DETAIL A–14
TYPICAL SERVICE WATER METER INSTALLATION
LEWIS ENGINEERING, PLLC
REV: 4–06 SCALE: NTS



NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO N.H.W.S.E.B. TECHNICAL SPECIFICATIONS.
2. SEE DETAILS A–3 AND A–4 FOR INSTALLATION ON DUCTILE IRON WATER MAINS.

DETAIL A–5
FLUSHING POINT DETAIL
LEWIS ENGINEERING, PLLC
REV: 6–05 SCALE: NTS

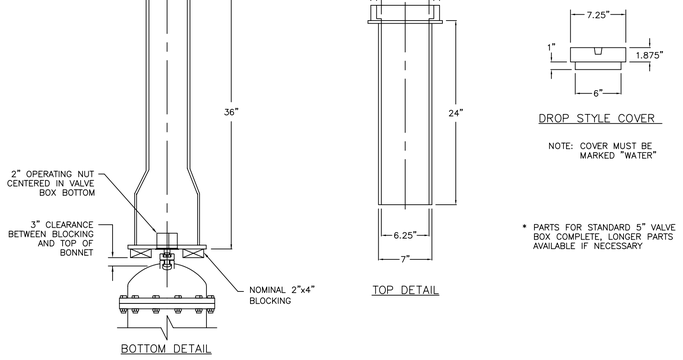


*NOTE:
USE SCHD80 PVC NIPPLE

**NOTE:
USE ASHCROFT 4–20 mA PRESSURE TRANSDUCER
McMASTER CARR
PART #31685k7

PSI SENSOR TAP DETAIL
NTS

D–02

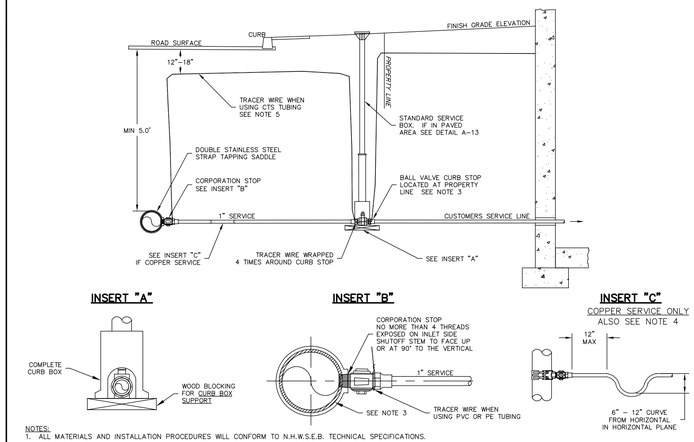


NOTE: COVER MUST BE MARKED "WATER"

* PARTS FOR STANDARD 5" VALVE BOX COMPLETE, LONGER PARTS AVAILABLE IF NECESSARY

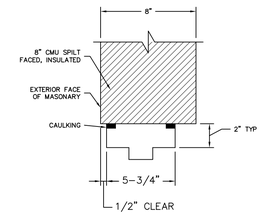
TYPICAL VALVE BOX DETAIL
NTS

E–02



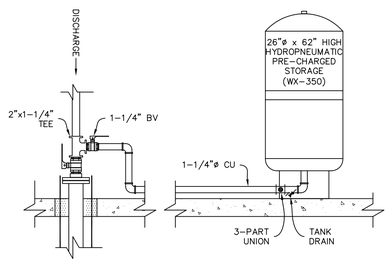
NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO N.H.W.S.E.B. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. IF WATER MAIN IS PVC, A DOUBLE STAINLESS STEEL STRAP TAPPING SADDLE MUST BE USED TO CONNECT THE CORPORATION TO THE WATER MAIN.
4. IF WATER MAIN IS PVC, AND THE NEW WATER SERVICE IS COPPER THEN SEE DETAIL A–19.
5. 10 GAUGE TRACER WIRE AS MANUFACTURED BY BMS, DIVISION OF ALBESTAR CORP., AVON, MA OR EQUIVALENT.

DETAIL A–20
TYPICAL 1" SERVICE AND VALVE BOX INSTALLATION DETAIL
LEWIS ENGINEERING, PLLC
REV: 4–04 SCALE: NTS



TYPICAL EXTERIOR DOOR JAMB DETAIL
NTS

F–02



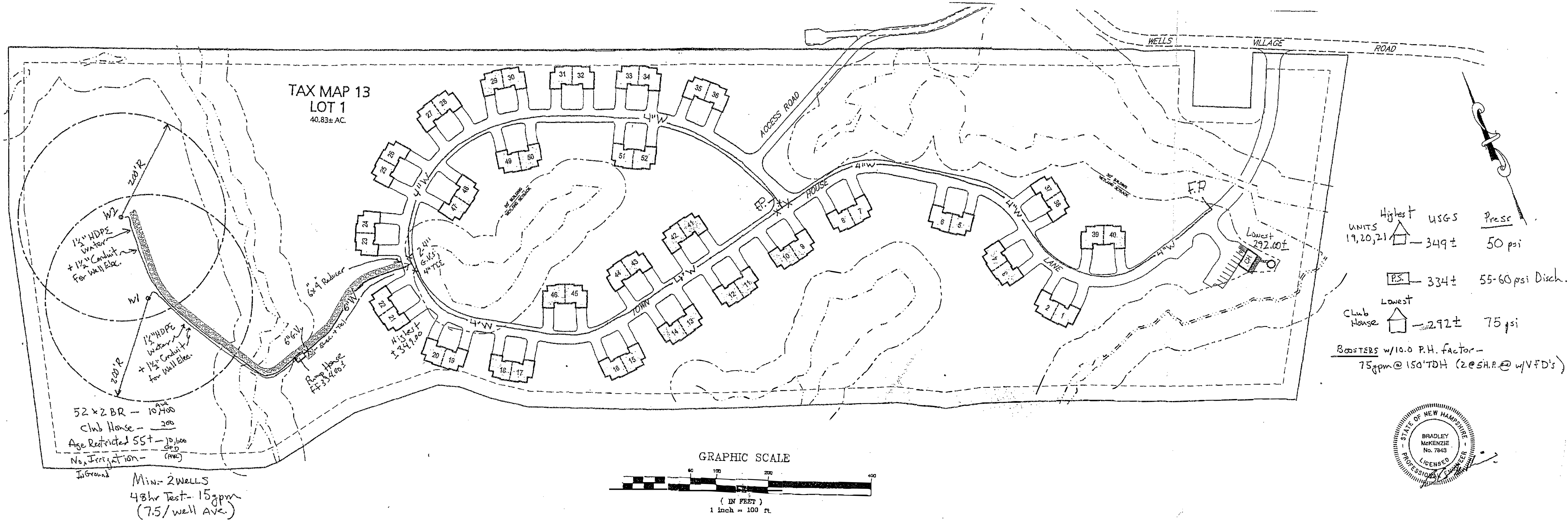
TYPICAL HYDRONEUMATIC CONNECTION DETAIL
NTS

G–02

LEWIS ENGINEERING, PLLC 44 Stark Lane Litchfield, NH 03052 lewis.h2o@worldnet.att.net	SHEET 2 OF 2 STANDARD DETAILS TOWN HOUSES AT WELLS VILLAGE WELLS VILLAGE ROAD CWS PUMP STATION SANDOWN, NEW HAMPSHIRE

DRAWN BY	DRAWING DATE	CONSTRUCTION DATE	INSTALLED BY	
SWIERZ CONSULTING, LLC	OCTOBER 2006	-	-	
ENGINEER	INSPECTOR	ASBUILT NO.	APPROX SCALE	SHEET NO.
B. LEWIS	-	-	AS NOTED	2

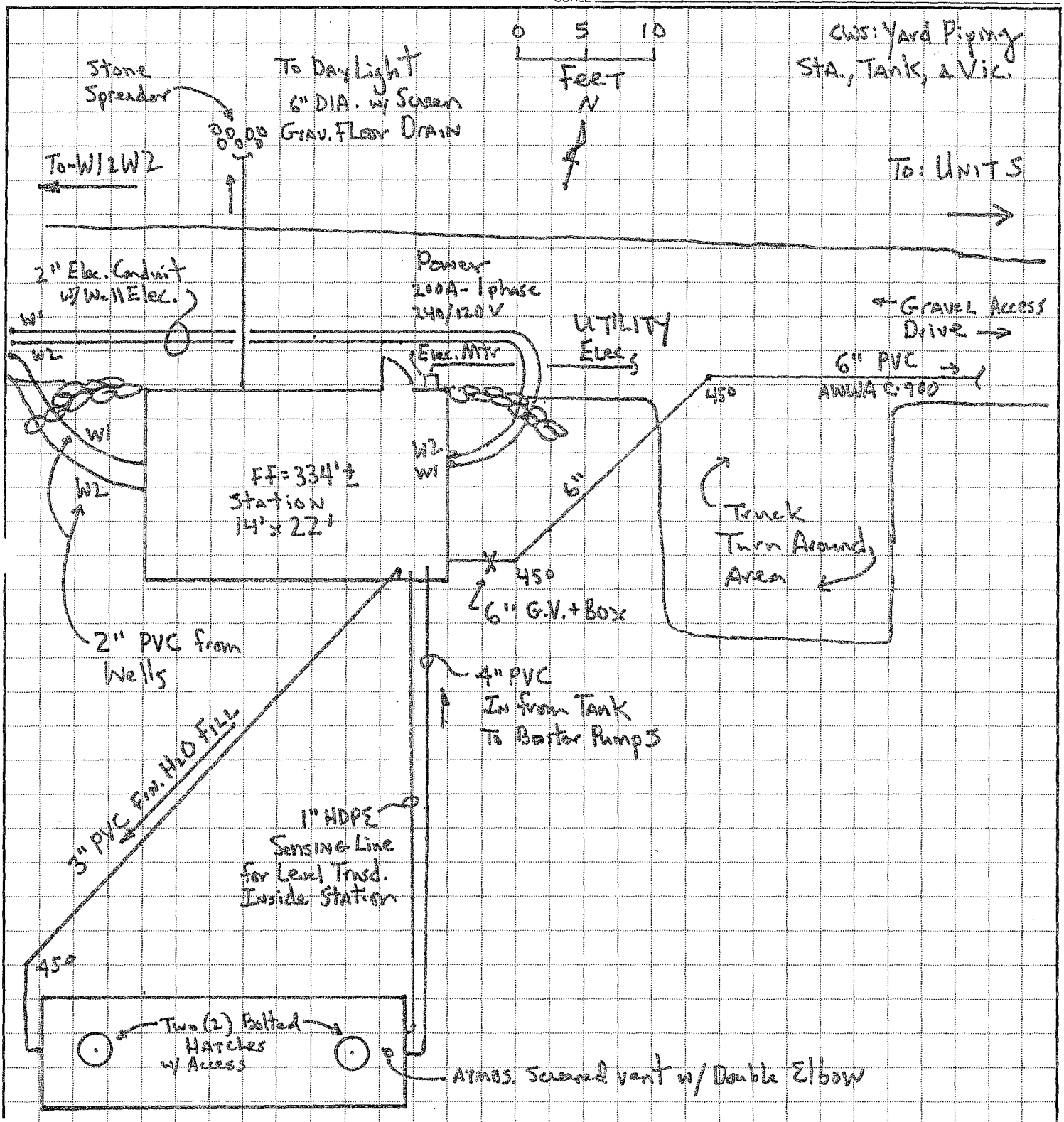
cut here for 22x34



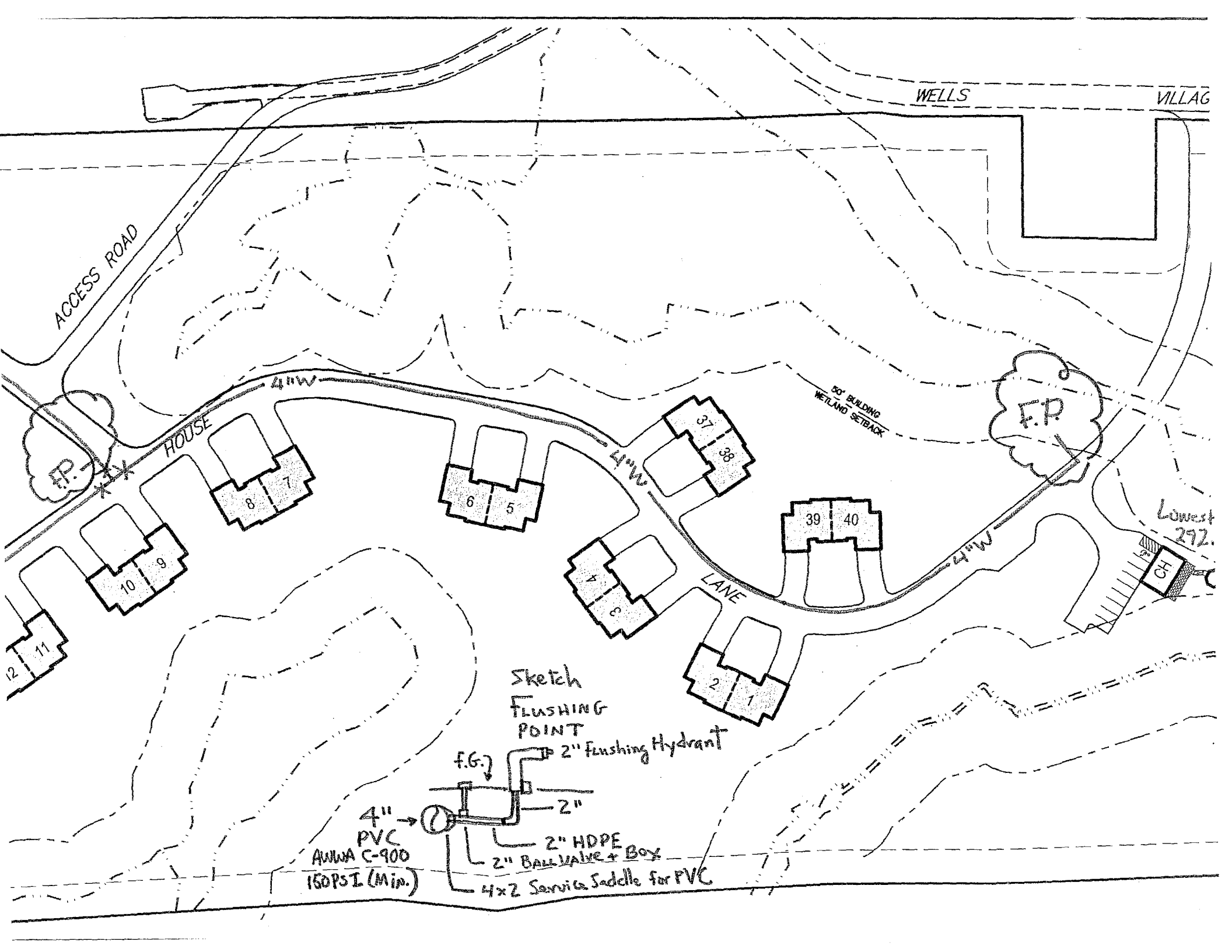
TAX MAP 13
LOT 1
40.83± AC.
WELLS VILLAGE ROAD
ACCESS ROAD
TOWN HOUSE LANE
W1
W2
200'R
200'R
1½" HDPE Water + 1½" Conduit for Well Elec.
6"x4" Reducer
6"G.V.
6"W
Pump House FF 334.00±
Highest ±349.00
2" G.V.S. 4" TCE
4"W
F.P.
Lowest 292.00±
52 x 2 BR — 10,400 Ave
Club House — 200
Age Restricted 55+ — 10,600 GPD (Ave)
No Irrigation — In Ground
Min: 2 WELLS
48hr Test – 15gpm
(7.5/well Ave.)
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
UNITS 19,20,21
Highest
USGS
Press
— 349±
50 psi
P.S. — 334±
55-60 psi Disch.
Club House
Lowest
— 292±
75 psi
BOOSTERS w/10.0 P.H. factor —
75gpm @ 150'TDH (2@5H.P. ea w/VFD's)
STATE OF NEW HAMPSHIRE
BRADLEY McKENZIE
No. 7843
LICENSED
PROFESSIONAL ENGINEER

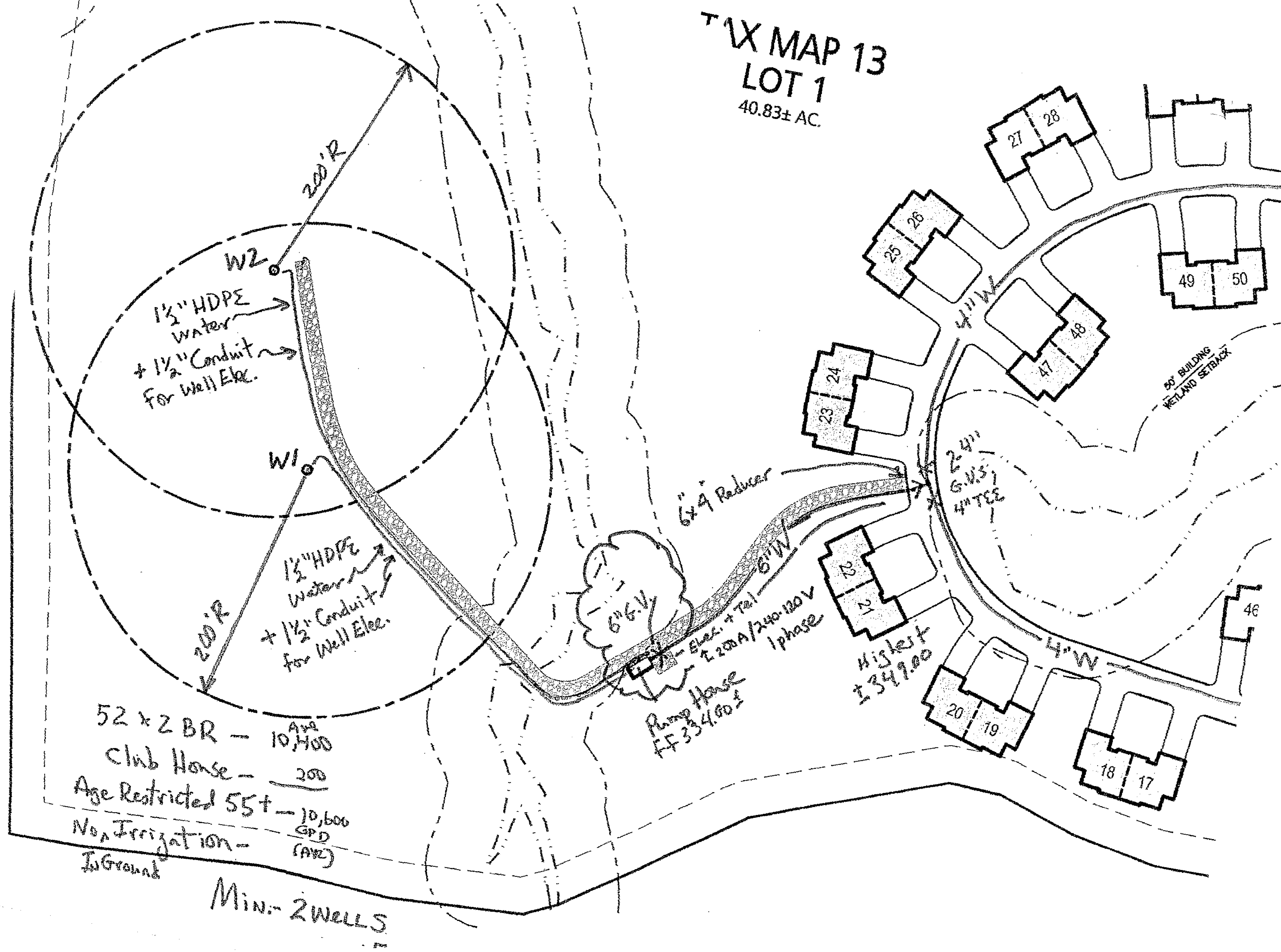
Lewis Engineering, PLLC
& LEWIS WATER SERVICES, LLC
44 Stark Lane
Litchfield, NH 03052
(603) 886-4985

JOB Well Village CWS 2006.008
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE OCT. '06
SCALE 1" = 10' ±



Direct Bury: Min 10,000 GAL - 8' DIA. x 26'8" L
ATMOS. Tank
Bottom of Tank @ 335' ± Min. 24" Cover over Top of Tank - Loam + Seed


WELLS
VILLAG
ACCESS ROAD
4"W
HOUSE
F.P.
50' BUILDING
WETLAND SETBACK
F.P.
4"W
4"W
LANE
37
38
39
40
8
7
6
5
10
9
4
3
2
1
11
CH
Lowest
292.
Sketch
FLUSHING
POINT
2" Flushing Hydrant
f.G.
2"
4"
PVC
AWWA C-900
150PSI (Min.)
2" HDPE
2" Ball Valve + Box
4x2 Service Saddle for PVC


TAX MAP 13
LOT 1
40.83± AC.
50' BUILDING
WETLAND SETBACK
27
28
25
26
49
50
47
48
23
24
21
22
46
19
20
17
18
W2
W1
200'R
200'R
1½" HDPE
Water
+ 1½" Conduit
For Well Elec.
1½" HDPE
Water
+ 1½" Conduit
for Well Elec.
6"x4" Reducer
2-4" G.V.'s
4" TEE
4"W
4"W
6"W
6" G.V.
Elec. + Tel
± 200A/240-120V
1 phase
Pump House
FF 334.00±
Highest
± 349.00
52 x 2 BR — 10,400 GPD
Club House — 200
Age Restricted 55+ — 10,600 GPD (AVE)
No Irrigation - InGround
Min:- 2 Wells

System Design Summary

Summary of Water Works Design Criteria
Town Houses at Wells Village
Wells Village Road, Sandown, NH
August 2016

1. Project Name ..... Town Houses at Wells Village
2. Service Area, City ..... off Wells Village Rd., Sandown, NH
3. Total Number of Senior Town House Units 50
4. Total Number of Bedrooms (2 & 3 per unit) 125
5. Ave. Gallons per Day per NHDES (150gal/br/day) 18,750
6. Ave. Gallons per Minute ..... 13 gpm
7. Approved Permitted Production Volume (2- Wells) ..... 37.12 gpm
7. Peaking Factor based on Average Day usage and 50 Units 4.0
8. Projected Peak Hourly Demand (gpm) ..... 52 gpm
9. Size of well line to pump station ..... 1 ½"
10. Size of discharge piping ..... 6"
11. Size of Water Main through Project (with Flushing Points) ..... 4"
12. Atmospheric Storage Tank Buried (8' 0" x 26'8") ..... 10,000 gal
13. Total Number of Domestic Service Pumps 2 @ 5 h.p. 1 @ 2 h.p. 3
14. Cap. and TDH of Typ. 5.0 h.p. Domestic Booster Pumps (VFD's) ..... 75 gpm @ 150 ft
15. Total Number of Low Flow Domestic Service Pump 1 @ 2 h.p. 1
16. Cap. and TDH of Typ. 2 h.p. Low Flow Booster Pump (VFD's) ..... 32 gpm @ 150 ft
17. Domestic Booster Pumps Maintain Minimum (psi) at USGS 334' ..... 55-60 psi
18. Minimum Domestic Pressure (psi) at Highest Elev. (USGS 349') ..... 50 psi
19. Normal Max. Anticipated System Pressure (psi) at lowest elev. (USGS 292') ..... 75 psi
20. Size of Station Water Meter (gal)(H.P. Turbine with Tri-Con E) ..... 3"
21. Public Utility Power Supply into Station (200 Amp) ..... 240V - 1Ø
22. Station Lighting ..... Dust / Moisture Resistant Fluorescent
23. Station Heat – Electric Heater with Fan & Thermostat ..... 5 KW
24. General ventilation fan ..... 16"
25. Booster pump controls ..... VFD's with PLC based panel
26. Water Alarms ..... SCADA

Engineering Design and Operational Summary

ENGINEERING OPERATION AND DESIGN SUMMARY
TOWN HOUSES AT WELLS VILLAGE
COMMUNITY WATER SYSTEM
SANDOWN, NEW HAMPSHIRE
August 2016

The proposed Town Houses at Wells Village development in Sandown, NH is to be a housing community consisting of 50, two and three bedroom units. There is no municipal water available in Sandown to provide water service to the new development. The Wells Village project will be served by an on-site community water system consisting of two bedrock wells, two domestic booster pumps, and one buried 10,000 gallon water storage tank. The Hampstead Area Water Company (HAWC) of Atkinson will own and operate this community water system. Based on NHDES criteria of 1 50 gpd per bedroom, this CWS is designed to provide an average of 22,500 gpd to the area.

Major Components at the Proposed Wells Village Pump Station

1. The 22 ft. x 14 ft. HAWC pump station building will be a poured in place concrete structure. There will be full coverage aluminum on the soffits and trim, and a common wood framed roof. The structure will be set on a frost wall and concrete slab. The building will have one 30" wide insulated metal door. The plywood ceiling and concrete walls in the pump room area will be painted. The structure will have a fram ed roof, plywood sheathing, with metal rood. The roof will be insulated with closed cell foam and/or standard fiberglass insulation, depending on the location over and/or within the structure. Heat and ventilation will be provided. Electrical backboards will be painted with two coats of acrylic latex paint. The proposed buried water storage tank will have a capacity of 10,000 gallons. The tank shall be coated with black asphaltum for direct bury service, with a NSF-61 EPA approved interior coating.

2. The wells will be metered with 1" Neptune meters, measuring in gallons. Each well will have a pressure relief valve, sample tap, and check valve. A well line flushing assembly, allowing the flushing of the well lines, will be installed inside the pump house with discharge to outside the building. A typical data sheet for the water meters is provided. Well Pumps #1 and #2 will both provide 20 gpm @ 210' TDH. The well pumps are designed to be A.Y. McDonald brand models or equal with 1.5 h.p., single phase motors, 230-volt, and each will require a starter box. Starter boxes may be mounted separately, adjacent to the automatic control panel.

3. Domestic service booster pumps will be Grundfos brand or equal centrifugal type models. There will be two 5 h.p. domestic pumps (Grundfos model # CR(E)15-3) that will each provide 75 gpm @ 150' TDH. There will also be one 2 h.p. low flow booster pump (Grundfos model # CR(E)5-7) that will provide 32 gpm @ 150' TDH. Cut sheets and pump curves have been provided.

4. Interior station piping will be PVC. Valves 3" and above will be resilient wedge gate valves and less than 3" will be PVC ball valves. All small fittings will be PVC or brass. Check valves on booster pumps will be full flow style. Wells will be fit up for water treatment provision as shown on plan set (greensand filtration), and will discharge into the buried water storage tank. Wells will be automatically controlled and alarmed based on tank level using a 4-20a. transducer based control system.

5. A greensand filtration system with chlorine feed shall be installed. Typical cut-sheets are included.

6. The control panel in the station will be a REPCO brand custom panel with PLC based automatic controls. VFD's will be installed for lead and lag domestic pumps. A 4½" liquid filled, 0 - 160 psi, discharge pressure gauge will be mounted adjacent to the discharge pressure transducer. The control panel will also have individual H-O-A switches and time clocks for wells and booster pumps being a screen on the Operator Interface Unit (OIU). The PLC program will allow boosters to shut down during low flow conditions. Dual pre-charged pressure tanks shall be installed as shown on the plan set. Boosters will be normally running to maintain a constant discharge pressure over a wide range of flows.

7. SCADA will incorporate Alarm closures for illegal entry, smoke, low pressure, low and high atmospheric tank level warnings, and low building temperature, will be connected with the alarm panel. There will also be a low water cut off for booster pump operation to prevent pumps from running dry.

8. Primary heat in the station will be provided by a 5 KW electric heater, with built in thermostat and fan. A typical cut sheet is included.

9. Lighting in the station will be with 4' long twin tube moisture resistant fluorescent lights, with dust covers. Typical cut sheets are included.

10. A station floor drain shall be installed, directing flow to daylight with a rodent screen. The drain will discharge to a stone swale area and shall be registered due to backwash water from the greensand filtration system.

11. A station wash-down hose bib will be available, along with water sampling taps.

12. Duplex courtesy outlets with GFI will be inside station.

13. Following construction and start- up, as-Built Drawings will be provided.

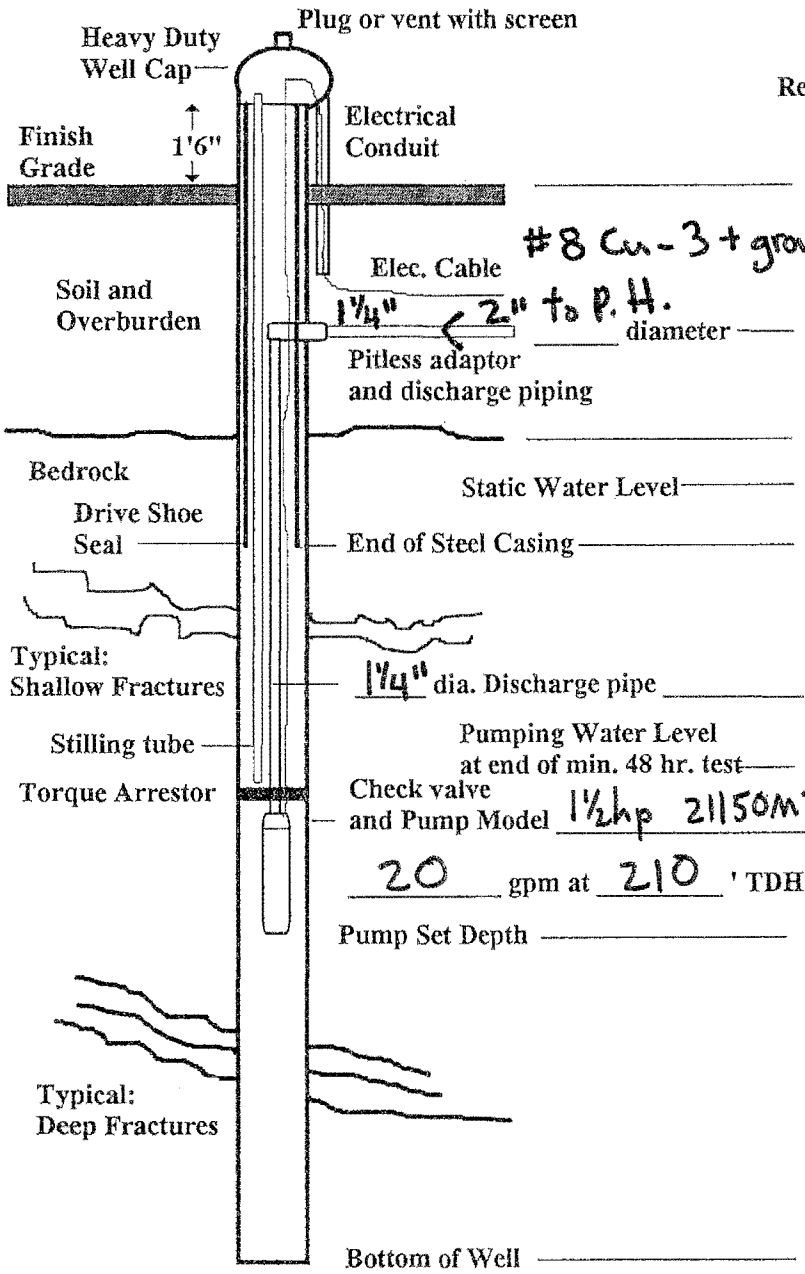
Well Profiles, Pump Data, and Metering

Well Profile Exhibit ____

Location: Wells Village Town Houses

Driller & Lic. #: Faxon Well & Pump

Date: Sept. '06



Reference Elevations Relative to Finish Grade	Well # 1	Well# 2
Finish Grade	0	0
Pitless adaptor and discharge piping diameter	5'0"	5'0"
Bedrock	5 ft	15 ft
Static Water Level	83'9" ft	80'1" ft
End of Steel Casing	20 ft	40 ft
Pumping Water Level at end of min. 48 hr. test	140'	114'
Pump Set Depth	300 ft	300 ft
Bottom of Well	475 ft	560 ft

Fracture Summary/Depths:

Notes for Reference:

Schematic Only - Not to Scale

Lewis Companies
Litchfield, N.H. 03052
Reference No.: 2006.108
\Well0498

Typical Well
Pump W1+W2
1½H.P. —
230V-1Ø
Set 300'

4" Submersible Pumps
M Series • 25 GPM

- Sizes from 1 to 5 HP
- One piece replacement cartridge - easier to service for minimal down-time
- Powered by NEMA approved stainless steel motors with built-in lightning protection
- 2 wire models up to 1 1/2 HP
- 3 wire models up to 5 HP

A.Y. McDonald offers a full line of four inch submersibles ranging from 1/3 horsepower through 15 horsepower. Our submersibles offer peak capacity performance in 5, 7, 10, 13, 18, 25, 35, 50, 75 and 90 GPM throughout the range of low to high heads.

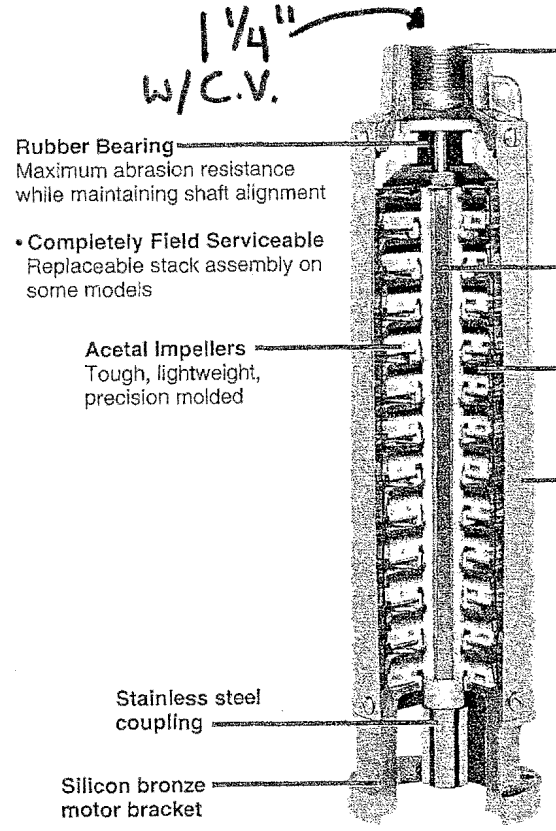
All four inch submersibles are supplied with grounded leads meeting the National Electrical Code (N.E.C.) specifications.

3 Wire single phase models include pump, motor, 48" leads, control box and check valve.

2 Wire single phase models include pump, motor, 48" leads and check valve.

3 Wire three phase models include pump, motor 48" leads, magnetic starter, heaters and check valve.

The charts on the following page will assist you in choosing the pump that meets your needs.



Available in 50 Hz. or 60 Hz.

Cutaway illustrates features and is not indicative of specific model performance.

NRTL/C
Certified per CSA C22.2 No. 108 and ANSI/UL 778

QUALITY • SERVICE • SINCE 1856

A.Y. McDONALD MFG. CO.
P.O. BOX 508 • DUBUQUE, IA 52004-0508 • 800-292-2737 • FAX 800-832-9296
E-MAIL sales@aymcdonaldmfg.com • WEB www.aymcdonaldmfg.com

MODELS AVAILABLE

2 Wire

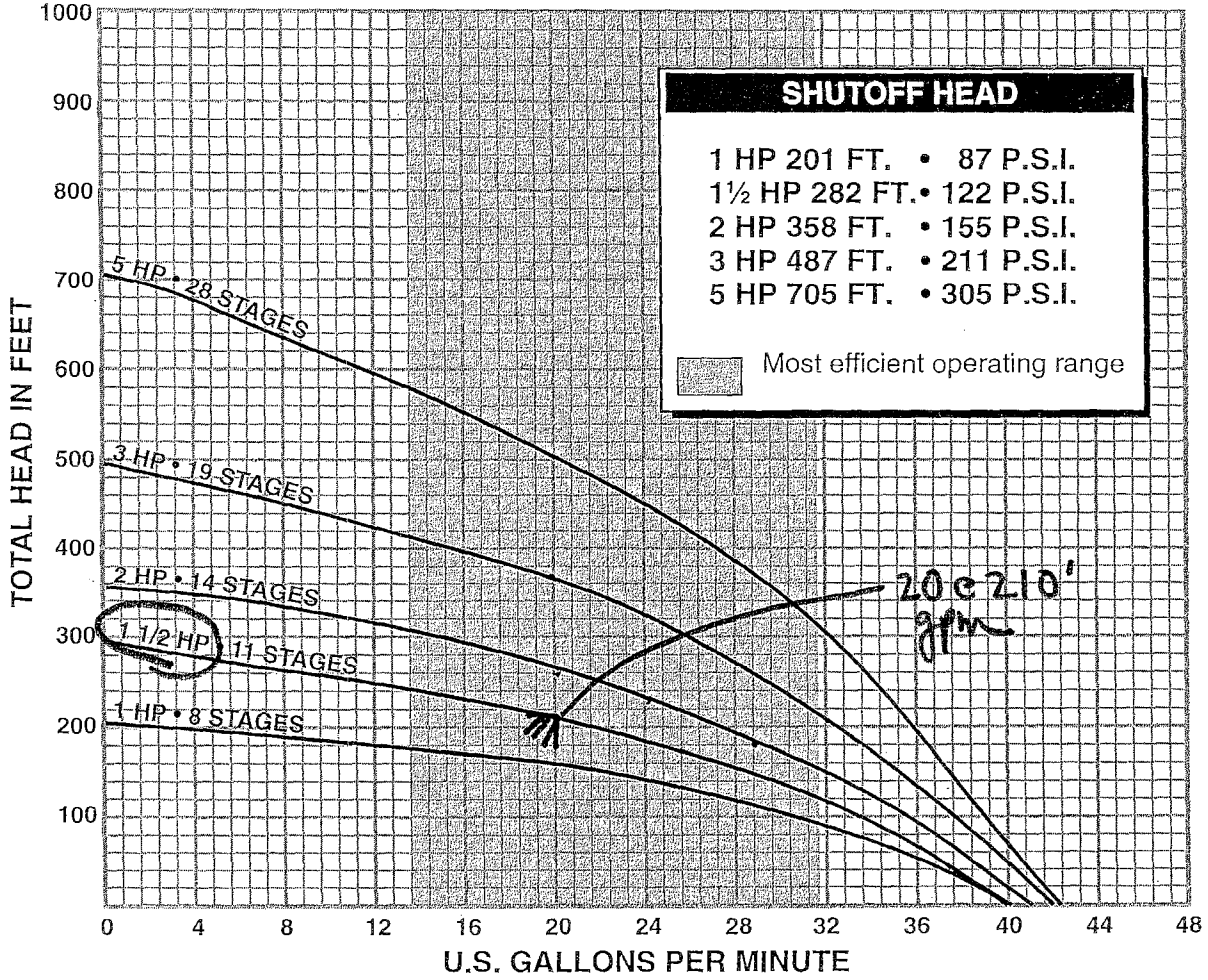
MODEL NO.	HP	STAGES	VOLT	PHASE
21100M2	1	8	230	1
21150M2	1 1/2	11	230	1

3 Wire

MODEL NO.	HP	STAGES	VOLT	PHASE
21100M3	1	8	230	1
21150M3	1 1/2	11	230	1
21150M3Z	1 1/2	11	230	3
21150M3Y	1 1/2	11	460	3
21200M3	2	14	230	1
21200M3Z	2	14	230	3
21200M3Y	2	14	460	3
21300M3	3	19	230	1
21300M3Z	3	19	230	3
21300M3Y	3	19	460	3
21500M3	5	28	230	1
21500M3Z	5	28	230	3
21500M3Y	5	28	460	3

All M Series pumps have 1 1/4" discharge on external check valve.

5 HP pumps are supplied with 100" leads.



Smaller HP pumps also available with 3 phase motors, including 200 volt (575V 1 1/2 HP and larger).
Pump ends only available. Specify first six digits of model number. Example: 21100M

OUTPUT IN GALLONS PER HOUR • 1 HP

DISCHARGE PRESSURE 0 P.S.I.

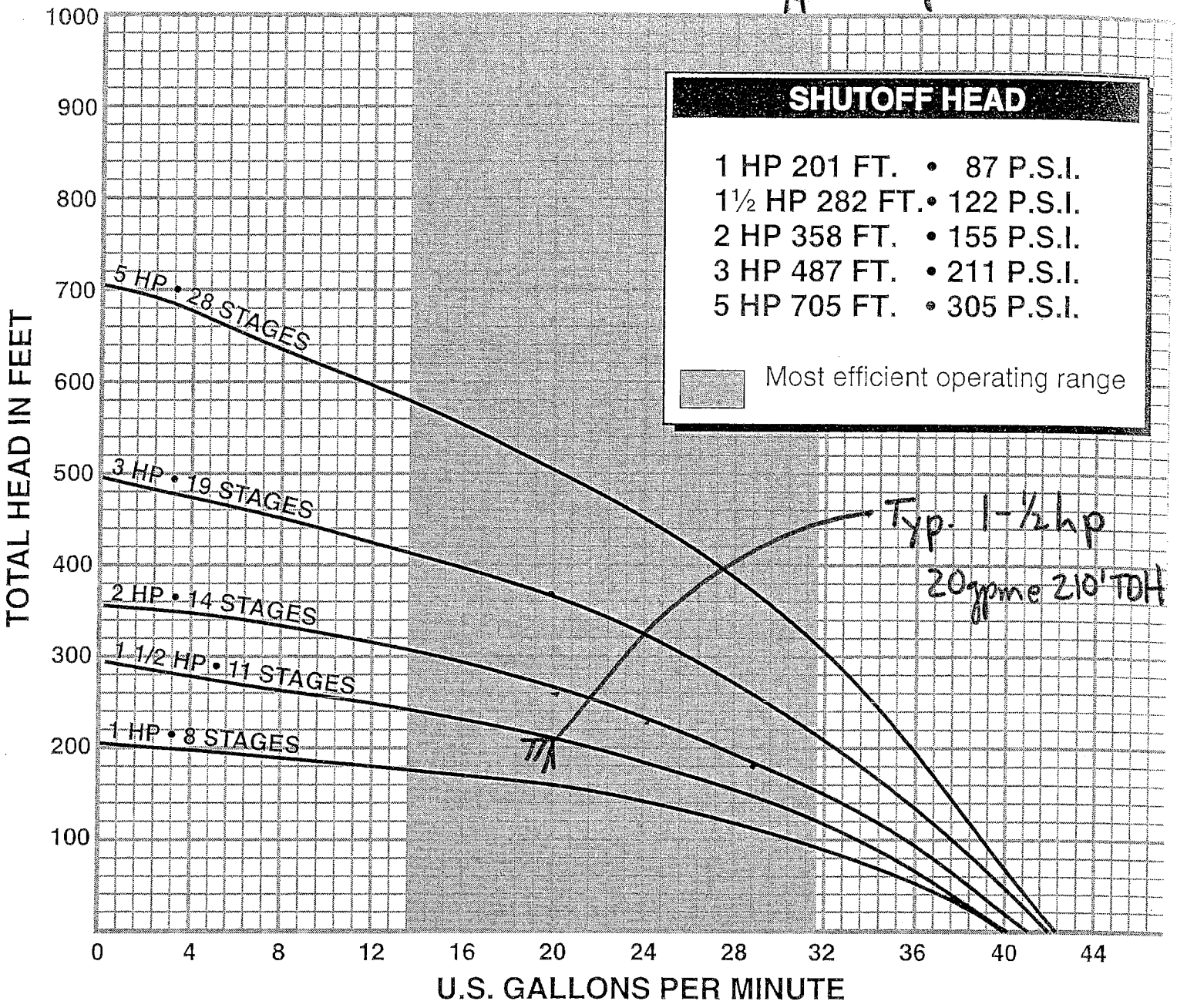
DEPTH	25'	50'	75'	100'	125'	150'	175'	200'	225'	250'	275'	300'	325'	350'	375'	400'	425'	450'	475'
1 HP	2290	2110	1930	1740	1500	1152	720												

DISCHARGE PRESSURE 30 P.S.I.

DEPTH	25'	50'	75'	100'	125'	150'	175'	200'	225'	250'	275'	300'	325'	350'	375'	400'	425'	450'	475'
1 HP	1778	1540	1194	785															

Model 21150M3
230V-1Ø

Wells 1&2- Typ. Pump Curve



se motors, including 200 volt (575V 1 1/2 HP and larger).
ligits of model number. Example: 21100M

OUR • 1 HP

125'	150'	175'	200'	225'	250'	275'	300'	325'	350'	375'	400'	425'	450'	475
1500	1152	720												

125'	150'	175'	200'	225'	250'	275'	300'	325'	350'	375'	400'	425'	450'	475

1" Well Meters

PRODUCT SHEET

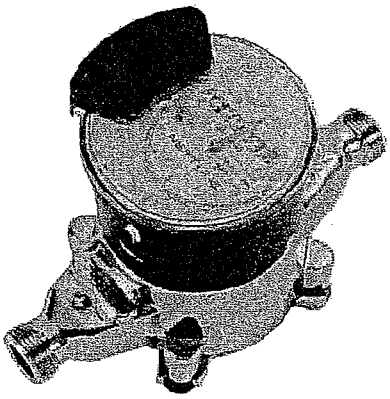
ARB® UTILITY MANAGEMENT SYSTEMS™

MEAS.: GALLONS

NEPTUNE TECHNOLOGY GROUP

T-10 METER

SIZES: 5/8", 3/4", and 1"



T-10 water meters are warranted for performance, materials, and workmanship.

Every T-10 water meter meets or exceeds the latest AWWA C700 Standard. Its nutating disc, positive displacement principle is time-proven for accuracy and dependability since 1892, ensuring maximum utility revenue.

CONSTRUCTION

The T-10 water meter consists of three major assemblies: a register, a no-lead high copper alloy maincase, and a nutating disc measuring chamber.

The T-10 meter is available with a variety of register types. For reading convenience, the register can be mounted in one of four positions on the meter.

The corrosion-resistant no-lead high copper alloy maincase will withstand most service conditions: internal water pressure, rough handling, and in-line piping stress.

The innovative floating chamber design of the nutating disc measuring element protects the chamber from frost damage while the unique chamber seal extends the low flow accuracy by sealing the chamber outlet port to the maincase outlet port. The nutating disc measuring element utilizes corrosion-resistant materials throughout and a thrust roller to minimize wear.

WARRANTY

Neptune provides a limited warranty with respect to its T-10 water meters for performance, materials and workmanship.

When desired, maintenance is easily accomplished either by replacement of major assemblies or individual components.

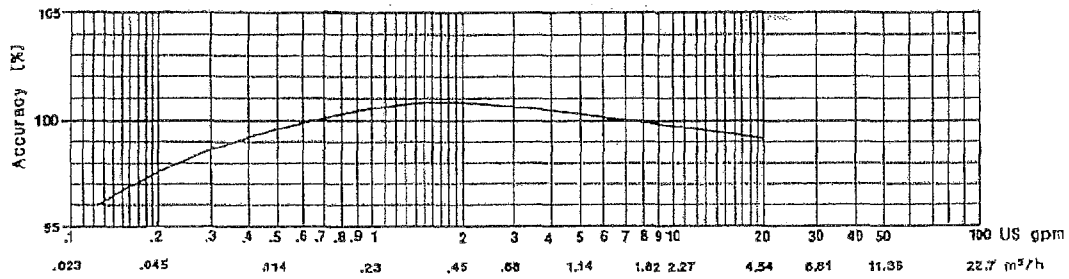
KEY FEATURES

- Register
  - Magnetic drive, low torque registration ensures accuracy
  - Impact-resistant register
  - High resolution, low flow leak detection
  - Bayonet style register mount allows in-line serviceability
  - Tamperproof seal pin deters theft
  - Date of manufacture, size, and model stamped on dial face
- No-Lead Maincase
  - Made from no-lead high copper alloy
  - ANSI/NSF 61 Certified
  - Lifetime guarantee
  - Resists internal pressure stresses and external damage
  - Handles in-line piping variations and stresses
  - No-lead high copper alloy provides residual value vs. plastic
  - Electrical grounding continuity
- Nutating Disc Measuring Chamber
  - Positive displacement
  - Widest effective flow range for maximum revenue
  - Proprietary polymer materials maximize long term accuracy
  - Floating chamber design is unaffected by meter position or in-line piping stresses

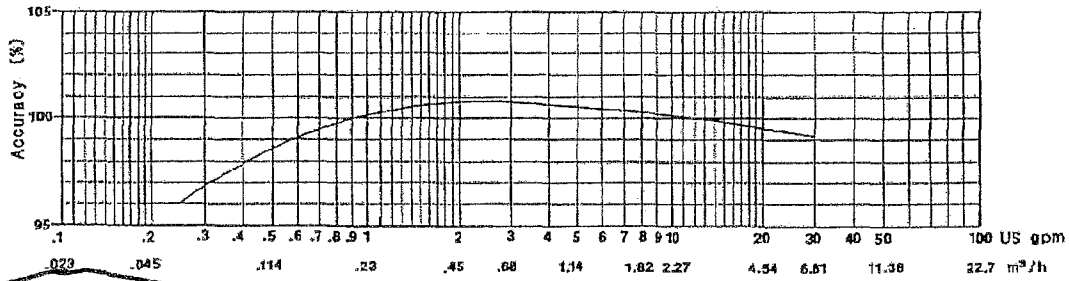
SYSTEMS COMPATIBILITY

Adaptability to all present and future systems for flexibility is available only with Neptune's ARB® Utility Management Systems™.

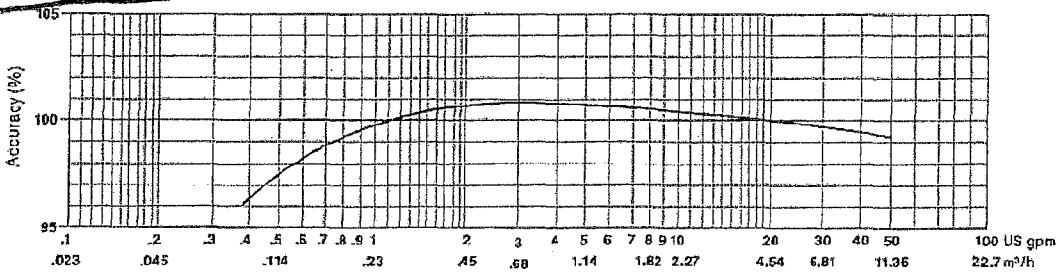
5/8" ACCURACY



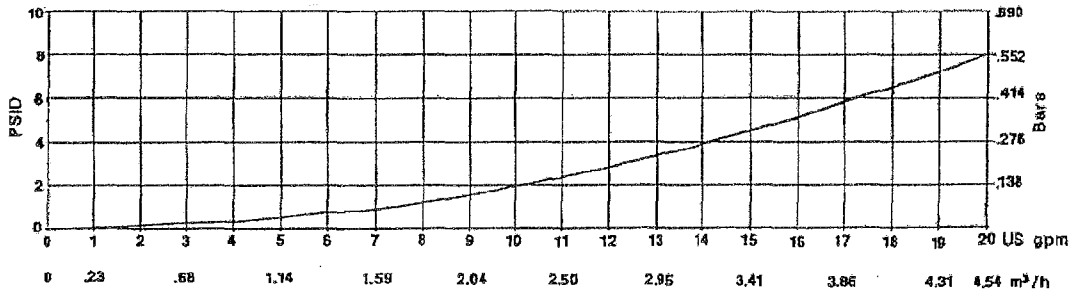
3/4" ACCURACY



1" ACCURACY

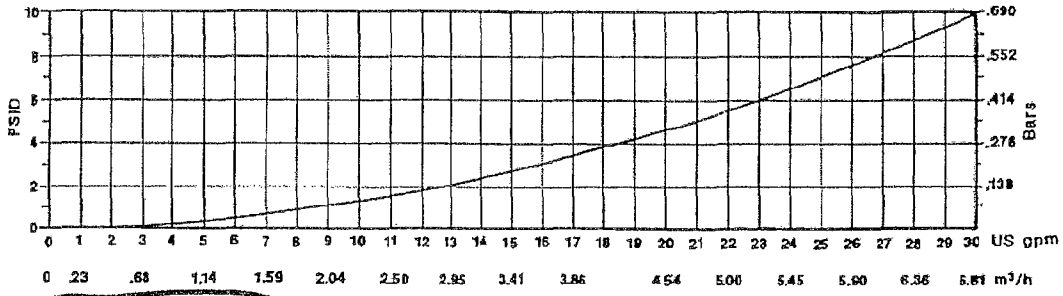


5/8" PRESSURE LOSS

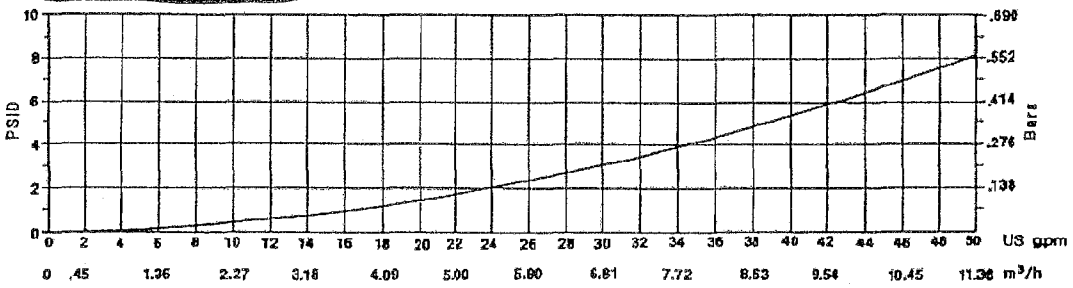


These charts show typical meter performance. Individual results may vary.

3/4" PRESSURE LOSS



1" PRESSURE LOSS

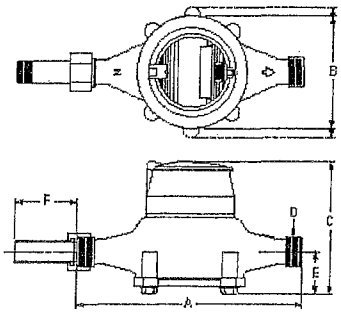


OPERATING CHARACTERISTICS

Meter Size	Normal Operating Range @100% Accuracy (±1.5%)	AWWA Standard	Low Flow @ 95% Accuracy
5/8"	1/2 to 20 US gpm 0.11 to 4.55 m3/h	1 to 20 US gpm 0.23 to 4.5 m3/h	1/8 US gpm 0.03 m3/h
3/4"	3/4 to 30 US gpm 0.17 to 6.82 m3/h	2 to 30 US gpm 0.45 to 6.8 m3/h	1/4 US gpm 0.06 m3/h
* 1" Gallons	1 to 50 US gpm 0.23 to 11.36 m3/h	3 to 50 US gpm 0.68 to 11.4 m3/h	3/8 US gpm 0.09 m3/h

DIMENSIONS

Meter Size	A in/mm	B in/mm	C-Std. in/mm	C-ARB in/mm	D-Threads per inch	D-OD in/mm	E in/mm	F in/mm	Weight lbs/kg
5/8"	7 1/2 191	3 5/8 92	4 7/8 124	5 3/8 137	14	1.030 26	1 5/8 41	2 1/2 64	3 3/4 1.7
5/8" x 3/4"	7 1/2 191	3 5/8 92	4 7/8 124	5 3/8 137	11 1/2	1.290 33	1 5/8 41	2 5/8 67	4 1.8
3/4"	9 229	4 3/8 111	5 1/2 140	5 13/16 148	11 1/2	1.290 33	1 7/8 48	2 5/8 67	6 2.7
3/4"SL	7 1/2 911	4 3/8 111	5 1/2 140	5 13/16 148	11 1/2	1.290 33	1 7/8 48	2 5/8 67	5 1/2 2.5
3/4"x1"	9 229	4 3/8 111	5 1/2 140	5 13/16 148	11 1/2	1.626 41	1 7/8 48	2 3/4 70	6 1/2 2.9
* 1"	10 3/4 273	6 1/2 165	6 3/8 162	6 5/8 168	11 1/2	1.626 41	2 1/8 54	2 3/4 70	9 3/4 4.4
1"x1 1/4"	10 3/4 273	6 1/2 165	6 3/8 162	6 5/8 168	11 1/2	1.865 47	2 1/8 54	2 13/16 71	10 1/4 4.6



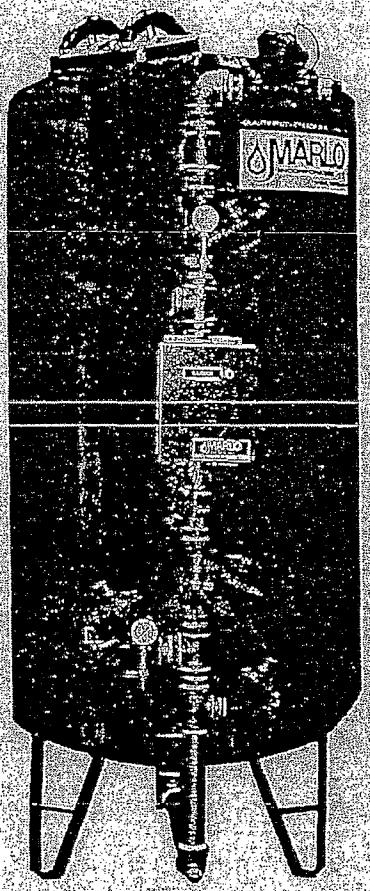
Water Treatment

AUTUMN HILLS DESIGN & SPECS.

MARLO INCORPORATED ®

MFS - Filter System

Installation, Operating, and Maintenance Manual



Model No: MGA-48 TWIN FILTER SYSTEM

U.I.N: CS-050093 Job Number: CS-050093

Installation Name:

Location:

1. TANK CONSTRUCTION

a) ELECTRIC WELDED LOW CARBON :

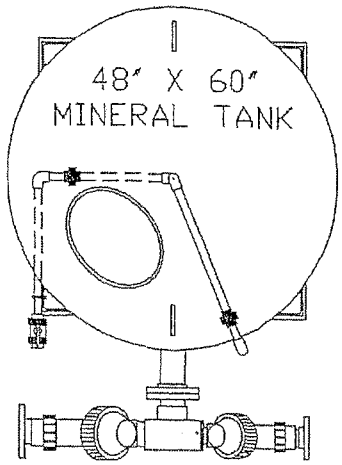
b) WORKING PRESSURE: 100 PSIG

c) TEST PRESSURE: 130 PSIG

d) INTERIOR OF TANK TO BE LINED OF TNEMEC SERIES 20 POTA-POX 175.300 FDA REQUIREMENTS FOR I POLYMERIC COATINGS. INTERIOR SANDBLASTED PER SSPC-SP10 AN PER THE MANUFACTURES INSTRUC

e) EXTERIOR OF TANK TO BE COMME CLEAN PER SSPC-SPC AND APPLY DFT OF MARLO SAFTY BLUE EPOXY.

f) INTERNAL PIPE DISTRIBUTORS TO MANUFACTURED OF SCH 80 PVC. WILL MEET ASTM D2467, SCH 80 TO MEET ASTM D-1784.



2. EXTERIOR PIPING

a) ALL PIPING 0.25" AND LARGER TI

b) ALL FITTINGS 0.25" AND LARGER SOCKET WELD.

c) ALL FLANGES TO BE SCH 80 PVI

3. FLOW VALVES

a) ALL FLOW VALVES 1" AND LARG AQUA-MATIC SERIES 53 PLASTIC, WYE-PATTERN GLOBE VALVES WITH POSITION INDICATOR.

4. ELECTRICAL CABINENT

a) ALL ELECTRICAL CABINENTS TO AND RATED AT NEMA 12.

b) ALL VALVES TO BE PRE-TUBED ELECTRICAL CABINET USING 0.25 POLYETHYLENE TUBING. (BLACK

5. FILTER MEDIA/TANK

a) TOP LAYER: 16 CU. RT NO. 1 ANT

b) BOTTOM LAYER: 18 CU. RT MANGA

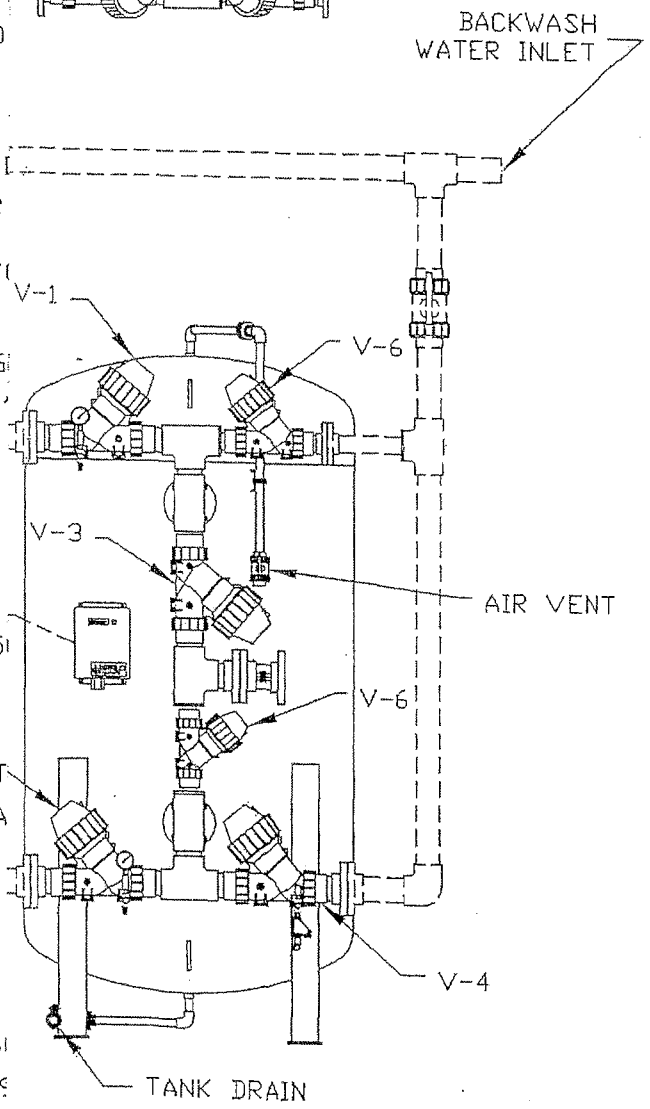
6. SUPPORT MEDIA/TANK

a) QUANTITY OF SUPPORT MEDIA:

b) DEPTH: 1" + HEAD DEPTH

7. WEIGHTS

a)	TANKS & PIPING:	2,6
b)	MEDIA:	7,0
c)	OPERATIONAL:	18,5



MARLO INCORPORATED

LEWIS BUILDERS DEVEL.
ATKINSON, NH

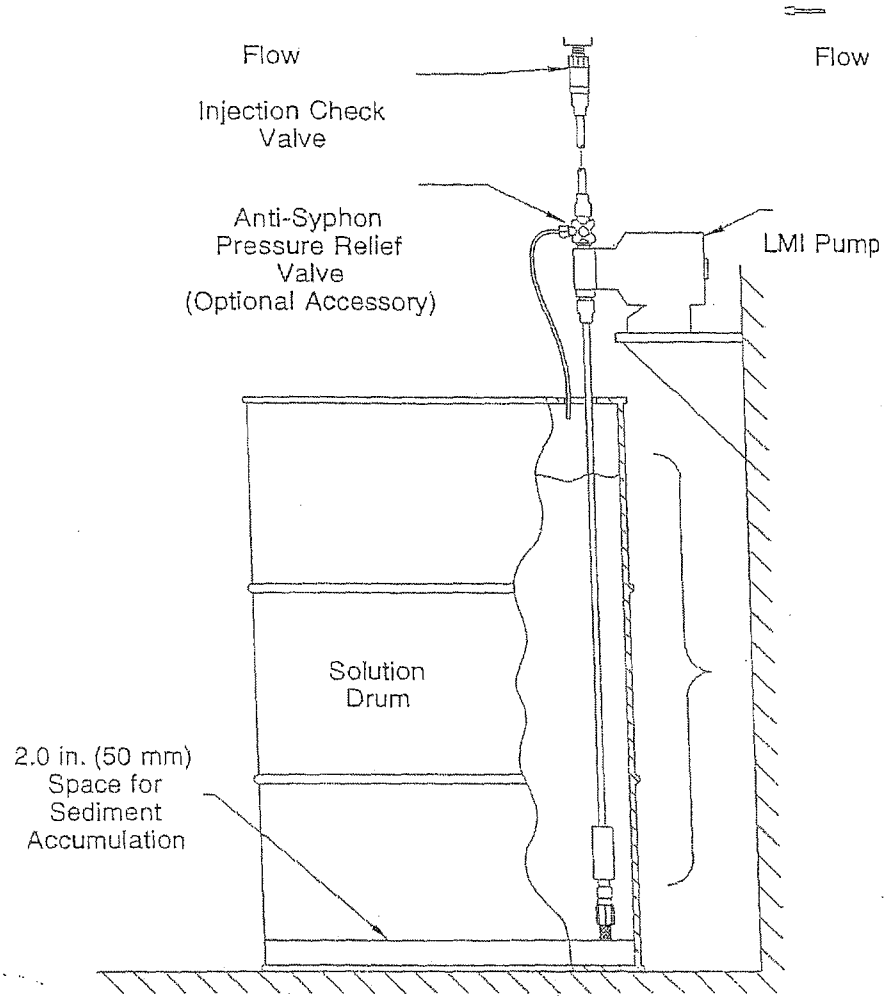
MGA-48 TW GREENSAND FILTER
GENERAL ARRANGEMENT

FRAC.±	DEC.±	FILE ID.	CS05-0093-03-01
DRN.	RMM	SCALE	1:24
APP'D.		SHEET	1 OF 1
DATE	6-8-05	DRAWING NO.	CS05-0093-03-01
		REV.	A

MODEL	MGA-48 Twin
SPECIFICATIONS	
Design Temperature	35–100°F
Design Pressure	40–120 psig
Power Requirements	120 VAC 60 Hz
Service Flow Rate per Tank	
Excellent 50 gpm High 75 gpm Utility	100 gpm
Backwash Rate	100 gpm
MINERAL TANK	
Mineral Tank Size	48" dia. X 60" ss
Media Quantity per Tank	
Anthracite (Top)	16 cu. Ft.
Manganese Greensand (Middle)	18 cu. Ft.
Gravel (Bottom)	900 # (9 cu. Ft.)
CONNECTIONS	
Inlet / Outlet	3 inch inlet / outlet
Drain Size	3 inch

4.2.4 Suction Lift - Shelf Mount

The pump may be mounted on a shelf (customer supplied) maintaining a suction lift of less than 5 ft (1.5 m). An LMI mounting kit (part number 10461) is available for securing the pump to a shelf.



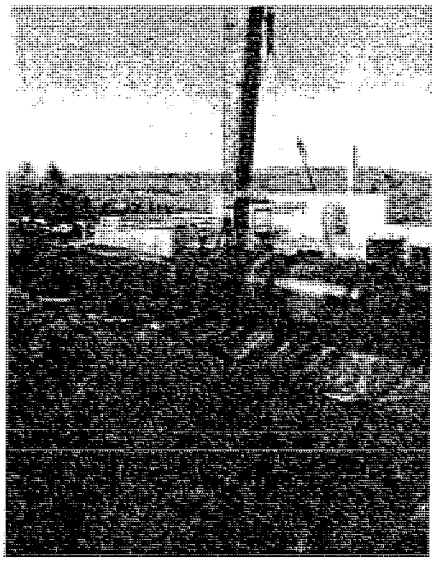
Water Storage Tanks

Potable Water Storage Tanks

10,000 Gallon Buried Water Storage Tank

Reliable Solutions for Clean Water Storage

Highland Tank



Potable Water Storage Tanks & Chlorine Contact Tanks

Since 1955, Highland Tank has been the premiere manufacturer of steel storage tanks in the United States. Thousands of customers have relied on Highland's team of professionals to design, fabricate, and deliver, high-quality steel storage tanks.

Highland storage tanks are ideal for your aboveground and underground potable water storage requirements. Ranging in size from 500 to 50,000 gallons, Highland Tanks are the right choice for dependable, cost-effective potable water storage.

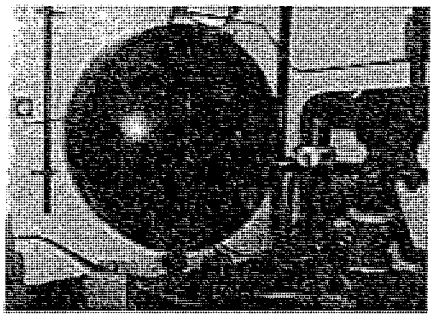
Whether your project requires cold-water storage, hot water storage, or chlorine contact mixing, Highland can manufacture a tank to meet your needs. Our's is the most comprehensive line of quality steel tanks in the industry.

Highland offers atmospheric tanks (flat or dished heads) and pressure rated tanks meeting ASME Section VIII Division I requirements, to satisfy your specific water srorage needs.

Our factory applied coatings form a superior, inert barrier for both the interior and exterior surfaces of the tank. External corrosion protection systems using high grade self reinforcing polyurethane are available with a 30-year limited warranty. Your choice of certified NSF internal liners are applied under modern plant- controlled conditions and thermally cured to assure long-lasting performance.

Typical Potable Water Tank Applications

- Schools Hospitals
- Residential Cisterns
- Emergency Water Supplies
- Industrial Water Needs
- Campgrounds
- Rural Developments
- Resorts
- Livestock feeding stations
- Rest areas



Options:

- Stainless Steel Construction
- Butt Welding
- External Water Stop
- Interior Steam or Electric Immersion Heaters
- Customized Manways with Penetrations
- Insulation
- Pump Station Mounts

Additional information available at:

NFPA — National Fire Protection Association
www.nfpa.org

UL — Underwriters Laboratories, Inc.
www.ul.com

NSF — NSF International
www.nsf.org

ASME — American Society of Mechanical Engineers
www.asme.org

Please visit us at www.highlandtank.com

One Highland Road	99 West Elizabethtown Road	958 19th Street	2700 Patterson Street	2225 Chestnut Street	1510 Stoystown Road
Stoystown, PA 15563	Manheim, PA 17545	Watervliet, NY 12189	Greensboro, NC 27407	Lebanon, PA 17042	Friedens, PA 15541
814-893-5701	717-664-0600	518-273-0801	336-218-0801	717-664-0602	814-443-6800
FAX 893-6126	FAX 664-0617	FAX 273-1365	FAX 218-1292	FAX 664-0631	FAX 444-8662

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NOTE: ALL RIGHTS RESERVED. THIS DRAWING MUST NOT BE REPRODUCED IN ANY FORM WITHOUT THE WRITTEN PERMISSION OF HIGLAND TANK HIGHLAND TANK SHALL BE RESPONSIBLE ONLY FOR ITEMS INDICATED ON THIS FABRICATION DRAWING UNLESS OTHER-WISE NOTED. CUSTOMER IS RESPONSIBLE FOR VERIFYING CORRECTNESS OF SIZE AND LOCATION OF FITTINGS, ACCESSORIES, AND COATINGS SHOWN ON THIS DRAWING.

MATERIAL – 304 SS

SIZE – TO FIT ALL INFORMATION

TYPESET – STD HTM

MFG'D BY – HIGHLAND TANK & MFG CO

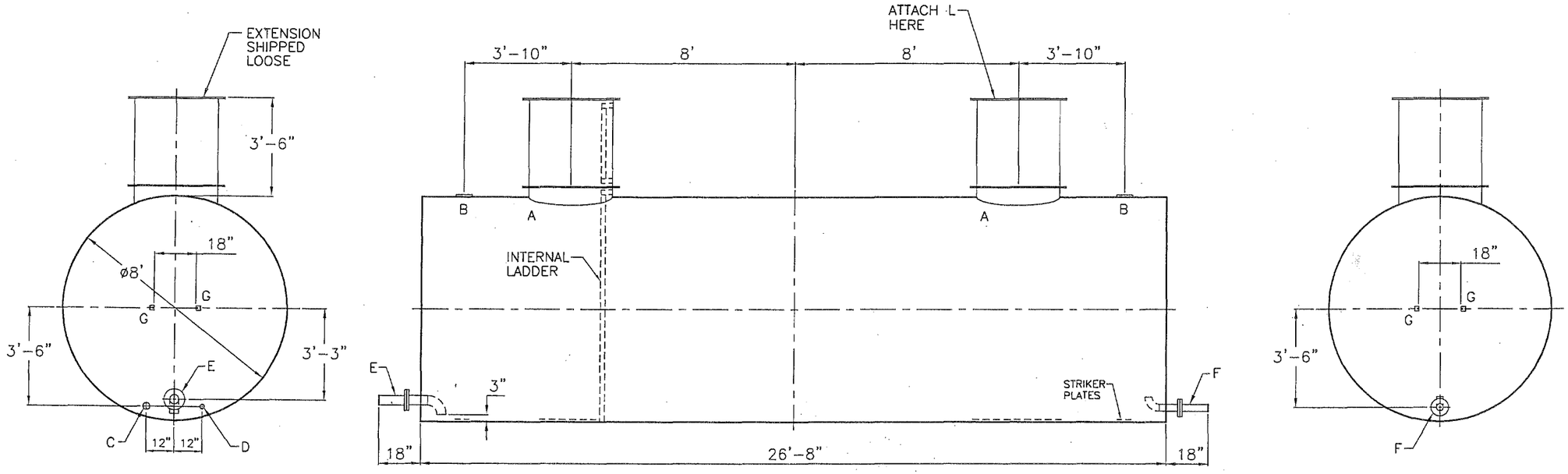
PH – 717-664-0600

CAPACITY – 10,000 GALLONS

DIM – 8'-0" D X 26'-8" L

MFG'D – _____

DETAIL L



NOTE:
STRIKER PLATES ARE ROLLED AND SEAL WELDED TO TANK BOTTOM

SPECIFICATIONS

- CAPACITY – 10,000 GAL
- TANK MATERIAL – MILD CARBON STEEL
  THICKNESS – HEADS– 5/16"
  THICKNESS – SHELL– 1/4"
- CONSTRUCTION – LAP WELD INSIDE & OUTSIDE
- TANK TEST – 5 PSIG
- INT. FINISH – SP10 BLAST, CHEMTHANE 4200
- EXT. FINISH – SP6 BLAST, CHEMTHANE 2240
- LABEL – UL 58

FITTING LEGEND

A	36" X 1/4" PLATE TIGHT BOLT MANWAY WITH 1/8" THICK NEO-CORK GASKET AND EXTENSION AS SHOWN, BOLTS AND GASKET INCLUDED – EXTENSION SHIPPED LOOSE	F	3" 150# RFSO FLANGE WITH BOLTED BLIND FOR TESTING, WITH INTERNAL 90° LR WELD ELBOW AS SHOWN, SHIP LOOSE BOLTED FLANGE WITH PLAIN END EXTENSION
B	6" FITTING	G	L2 ANGLE CLIP WITH 1/2" DIA HOLE ON CENTERED ON PROJECTING LEG
C	2" HALF COUPLING		
D	1" HALF COUPLING		
E	4" 150# RFSO FLANGE WITH BOLTED BLIND FOR TESTING, WITH INTERNAL 90° LR WELD ELBOW AS SHOWN, SHIP LOOSE BOLTED FLANGE WITH PLAIN END EXTENSION		

Highland Tank

10,000 GAL 8'ø UG TANK

CUSTOMER: NORTHEASTERN PETROLEUM SERVICE & SUPPLY

PROJECT: WELLS VILLAGE CWS – SANDOWN, NH

QUOTE: –

SCALE	DATE	DRAWN BY	DRAWING NUMBER
1/4" = 12"	10/05/06	006	50779

UL 1746 Parts II + IV - Exterior Tank Coating

CHEMLINE

CHEMTHANE 2240

POLYURETHANE CORROSION COATING
100% SOLIDS, SINGLE COAT, FAST CURE

REVISION: 1-01

PRODUCT DESCRIPTION

CHEMTHANE 2240 is a solvent free, tar-free, two component polyurethane corrosion coating (1:1 spray ratio by volume). This product has a very short reaction time and is therefore spray applied using plural component spray equipment. ***This coating has been approved by Underwriters Laboratories for the application of underground steel tanks under UL 1746 Parts II and IV.*** Application of this product is made directly to surface prepared steel. Primers are not necessary. Unlimited film builds may be achieved in a single coat multi-pass application. Cured films are free of pores.

This coating demonstrates an excellent balance of flexibility, impact strength, abrasion resistance and corrosion resistance which will ensure that cured films that are between 15 and 70+ mils in thickness will provide permanent and fully effective corrosion protection for many years.

TYPICAL PROPERTIES

Solids, by Volume 100%
VOC None
Components 2
Curing Mechanism Chemical reaction
Color Availability Unlimited
Weight per mixed gallon 9.5 lbs/gallon
Theoretical Coverage 1604 sq ft per gal per mil
Cure to Touch 6-8 minutes (substrate - 75 F)
Cure to Handle 30-45 minutes (75 F)
Recoat 1 Hr+ of initial appl. @ 15 mils (75 F)
Application Temperature Range 35 F to 120 F

Primer requirement None required
Hardness (ASTM D 2240) 78 (Shore D)
Tensile Strength (ASTM D 638) 4000 psi+
Elongation (ASTM D 638) 10%
Flexibility (ASTM D 522) 180 bend over 1" mandrel @ 15 mils
Impact Strength (ASTM G 14) 80+ in lbs
Abrasion Resistance (ASTM D 4060) 80 mg loss (CI7, 1kg, 1000 cycles)
Chemical Resistance (ASTM D 543) See Chemical Resistance Chart

PACKAGING, STORAGE AND SHELF LIFE

CHEMTHANE 2240 is supplied in two 55-gallon tight top drums.

Keep drums tightly sealed until ready for use to prevent atmospheric moisture from contaminating material. Store material at temperatures between 50-80 F in a dry well ventilated area. **Ensure that material does not freeze.**

Material has a shelf life of 12 months after the date of manufacture if properly stored.

SAFETY PRECAUTIONS

CHEMTHANE 2240 IS FOR INDUSTRIAL USE ONLY. Avoid contact with eyes, and skin; do not inhale or ingest. When working with this material wear goggles, rubber gloves and a respirator. When spraying in a confined area, also wear a fresh air hood and make provision for forced ventilation. Refer to MSDS regarding individual components.

CHEMLINE

CHEMTHANE 2240

APPLICATION GUIDELINES

Consult with a CHEMLINE Representative for complete and detailed application instructions for application of this product under UL 1746 or other. For best results, **The substrate must be dry and free from dust, oil and grease.** The substrate surface temperature should be a minimum of 5 degreed F above the dew point of ambient air. Use steel grit or sand to blast the substrate surface. **Steel surfaces should be cleaned to a *minimum* of a commercial blast with a minimum angular profile of 1.5 mils.**

CHEMTHANE 2240 is applied using a plural component, high-pressure, airless spray unit with in-line heaters. Material supply should be agitated and heated prior to application. Vent material supply containers with nitrogen or desiccant.

Unlimited film builds may be achieved in a single-coat multipass application. Do not apply coating after the recoat window has been exceeded. Consult CHEMLINE representative for recoat information. The recoat window will diminish as the ambient temperature and/or the film thickness increase. If recoat window has been exceeded, brush blast the original coat and create a 2.5 mil profile in the original coating; then topcoat.

WARRANTY

CHEMLINE warrants this product to be free of defects in material and workmanship. CHEMLINE's sole obligation and Buyer's exclusive remedy in connection with the products shall be limited, at CHEMLINE's option, to either replace the products not conforming to this Warranty or credit to Buyer's account in the invoiced amount of the nonconforming products. Any claim under this Warranty must be made by the Buyer to CHEMLINE in writing within (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the delivery date, which ever is earlier. Buyer's failure to notify CHEMLINE of such nonconformance as required herein shall bar Buyer from recovery under this Warranty.

CHEMLINE makes no other warranties whether express, implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply. In no event shall CHEMLINE be liable for consequential or incidental damages.

Any recommendations or Suggestion relating to the use of the products made by CHEMLINE, whether in its technical literature, or in response to specific inquiry, or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by buyers having requisite skill and know-how in the industry, and therefore it is for Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, at its sole discretion and risk. Variation in environment changes in procedures of use, or extrapolation of data may cause unsatisfactory results.

LIMITATION OF LIABILITY

CHEMLINE's liability on any claim of any kind, including claims based upon CHEMLINE's negligence or strict liability, for any loss or damage arising out of, connected with, or resulting from the use of the products, shall in no case exceed the purchase price allocable to the products or part thereof which give rise to the claim. In no event shall CHEMLINE be liable for consequential or incidental damages.

NSF-61 Interior

CHEMTHANE 4200 PW

POLYURETHANE LINING, NSF/ANSI 61 - Potable Water
100% SOLIDS, SINGLE COAT, FAST CURE

ANSI/NSF 61
DRINKING WATER SYSTEM COMPONENTS
16ZP
Barrier Material
Maximum use temperature: 23°C
Maximum use level: 22.5cm²

DESCRIPTION

CHEMTHANE 4200 is a solvent-free, two component polyurethane lining (1:1 spray ratio by volume). ***This product has been approved by Underwriter's Laboratories to comply with the NSF/ANSI 61 standard for potable water.*** This product has a very short reaction time and is therefore spray applied using plural component spray equipment. Application of this product is made directly to surface prepared steel or ductile iron. Primers are not necessary. Unlimited film builds may be achieved in a single coat multi-pass application.

This product cures to form a hard polymer film that demonstrates excellent adhesion. In addition, it is very resistant to abrasion, chemical attack, and cathodic disbondment. This product will chalk and discolor when exposed to ultra-violet light.

TYPICAL PROPERTIES

Solids, by volume	100%
VOC (supplied and sprayable)	Zero
Components	Two
Curing Mechanism	Chemical Reaction
Mix Ratio, by volume	1:1
Weight per mixed gallon	9.6 lbs/gallon (4.3 kg/gallon)
Color Availability	Unlimited
Theoretical Coverage	1604 sq. ft. per gallon per mil (149 sq. m/gal per mil)
Primer Requirement	None Required
Application Temperature Range	35°F - 120°F (2°C - 49°C)
Adhesion to Steel	2000 +/- 200 psi (SP10;2.5 mil)
Hardness	77 Shore D (ASTM D 638)
Tensile Strength	5500 psi (38mpa) (ASTM D 638)
Flexibility	180 bend over 1î mandrel @ 15 mils (ASTM D 522)
Impact Strength	>30 in lbs (ASTM G 14)
Abrasion Resistance	60 mg loss (C17, 1 kg, 1000 cycles) (ASTM D 4060)
Chemical Resistance	See Chemical Resistance Chart (ASTM D 543)
Cathodic Disbondment	<8mm rad.

CURE TIMES

Cure to the Touch	3-5 minutes @ 77°F (25°C)
Cure to Handle	15-20 minutes @ 77°F (25°C)
Time to Recoat	10-20 minutes @ 75°F (24°C)

PACKAGING, STORAGE & SHELF LIFE

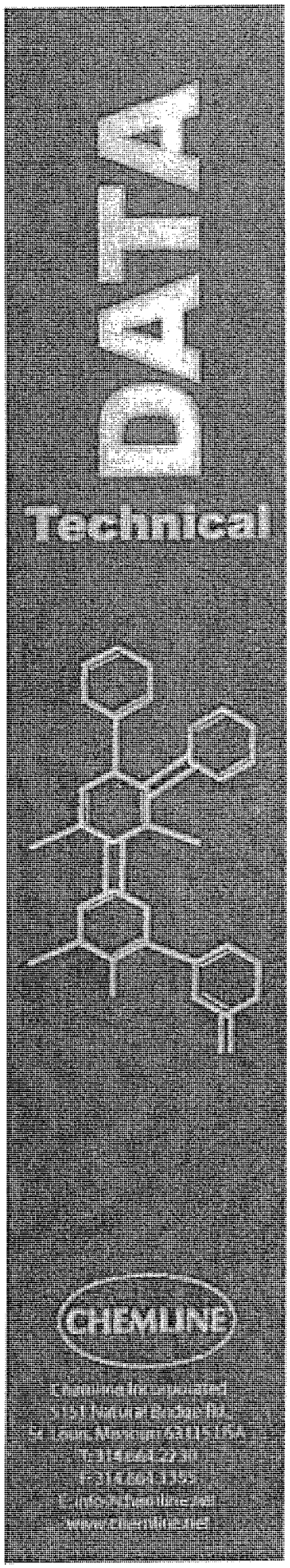
CHEMTHANE 4200 is supplied in two 55-gallon tight top drums.

Keep drums tightly sealed until ready for use to prevent atmospheric moisture from contaminating material. Store material at temperatures between 50-80°F (10-27°C) in a dry well ventilated area. **Ensure that material does not freeze.**

Material has a minimum shelf life of 12 months after the date of manufacture if properly stored.

SAFETY PRECUATIONS

CHEMTHANE 4200 IS FOR INDUSTRIAL USE ONLY. Avoid contact with eyes, and skin; do not inhale or ingest. When working with this material wear goggles, rubber gloves and a respirator. When spraying in a confined area, also wear a fresh air hood and make provision for forced ventilation. Refer to MSDS regarding individual components.



revised: 3-01

CHEMTHANE 4200 PW

revised: 3-01

APPLICATION GUIDELINES

Consult with a CHEMLINE Representative for complete and detailed application instructions. For best results, The substrate must be dry and free from dust, oil and grease. The substrate surface temperature should be a minimum of 5°F (-15°C) above the dew point of ambient air. Use steel grit or sand to blast the substrate surface. Steel surfaces should be cleaned to a minimum of a near white metal finish with a minimum angular profile of 2.5 mils (Ref. SSPC-SP10; Nace 2).

CHEMTHANE 4200 is applied using a plural component, high-pressure, airless spray unit with in-line heaters. Material supply should be agitated and heated prior to application. Vent material supply containers with nitrogen or desiccant.

Unlimited film builds may be achieved in a single-coat multipass application. Do not apply coating after the recoat window has been exceeded. If recoat window has been exceeded, brush blast the original coat and create a 2.5 mil profile in the original coating; then topcoat.

WARRANTY

CHEMLINE warrants this product to be free of defects in material and workmanship. CHEMLINEís sole obligation and Buyerís exclusive remedy in connection with the products shall be limited, at CHEMLINEís option, to either replace the products not conforming to this Warranty or credit to Buyerís account in the invoiced amount of the nonconforming products. Any claim under this Warranty must be made by the Buyer to CHEMLINE in writing within (5) days of Buyerís discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the delivery date, whichever is earlier. Buyerís failure to notify CHEMLINE of such nonconformance as required herein shall bar Buyer from recovery under this Warranty.

CHEMLINE makes no other warranties whether express, implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply. In no event shall CHEMLINE be liable for consequential or incidental damages.

Any recommendations or suggestion relating to the use of the products made by CHEMLINE, whether in its technical literature, or in response to specific inquiry, or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by buyers having requisite skill and know-how in the industry, and therefore it is for Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, at its sole discretion and risk. Variation in environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results.

LIMITATION OF LIABILITY

CHEMLINEís liability on any claim of any kind, including claims based upon CHEMLINEís negligence or strict liability, for any loss or damage arising out of, connected with, or resulting from the use of the products, shall in no case exceed the purchase price allocable to the products or part thereof which give rise to the claim. In no event shall CHEMLINE be liable for consequential or incidental damages.

CHEMLINE INCORPORATED
5151 NATURAL BRIDGE ROAD
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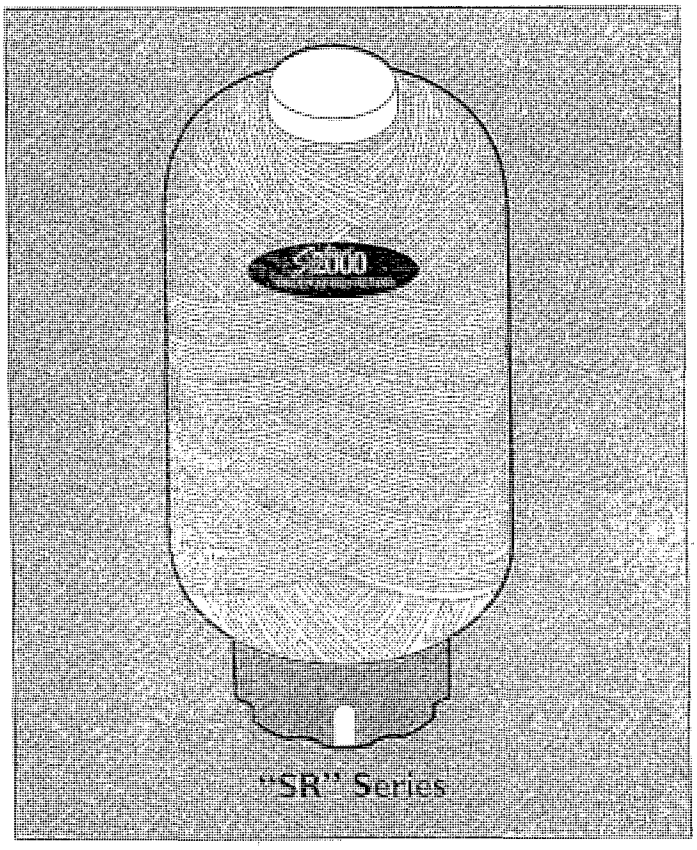
AUTUMN HILLS DESIGN & SPECS.

Signature 2000

293 Wright Street, Delavan, WI 53115

OWNER'S MANUAL

Pressurized Water Tanks



Installation/Operation/Parts

For further operating, installation, or maintenance assistance:

Call 1-262-728-9181

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5394 (Rev. 1/15/02)

System Hydraulic Calculations

Hydraulic Calculations
For
Town Houses at Wells Village
Community Water System

1. The finish floor elevation of the proposed pump house will be USGS elevation 334 +/- feet. Normal pumping station discharge pressure will be 55-60 +/- psi.

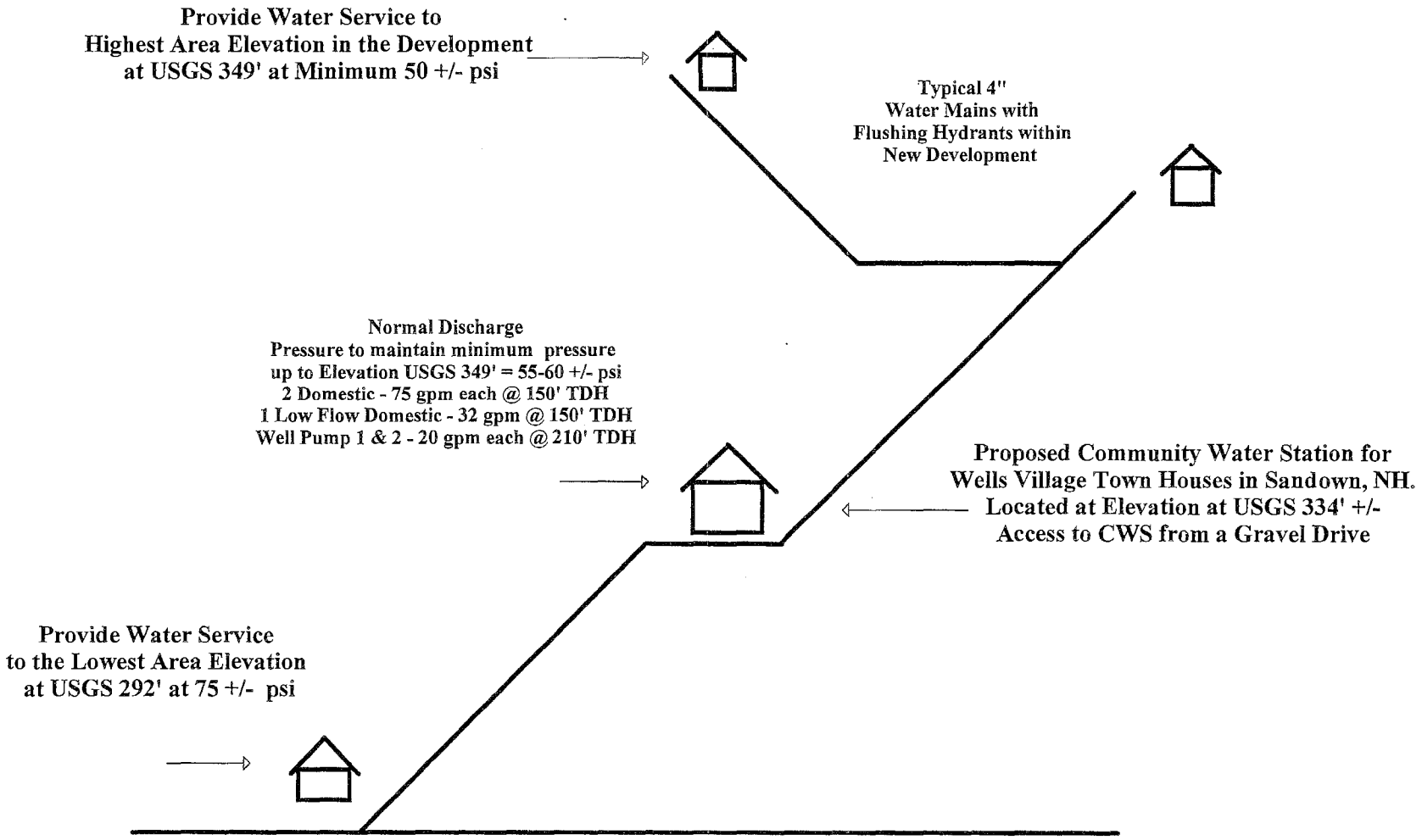
2. The highest service elevation in the development occurs at Units 19 – 21 at USGS 349 +/- feet. The pressure at this elevation will be maintained at a minimum 50 +/- psi. Including consideration for miscellaneous friction loss, this will be the lowest anticipated system pressure.

3. The lowest service elevation in the development occurs at the Club House at USGS 292 +/- psi. The pressure at this elevation will be maintained at a minimum 75 +/- psi. This will be the highest anticipated pressure in the system.

Hydraulic Diagram for
Town Houses at Wells Village
Community Water Station
Sandown, NH

Lewis Engineering, PLLC - Litchfield, NH
September 2006

Summary: 10,000 Gallon Buried Atmospheric Water Storage and
14' x 22' Pump House serving 52-2 bedroom Adult Housing Residential Units.

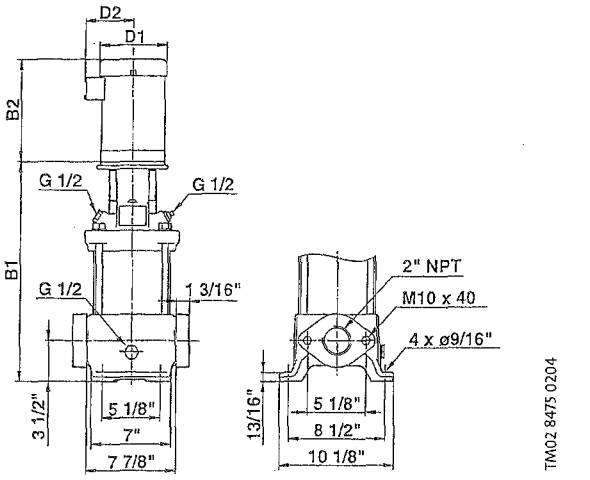


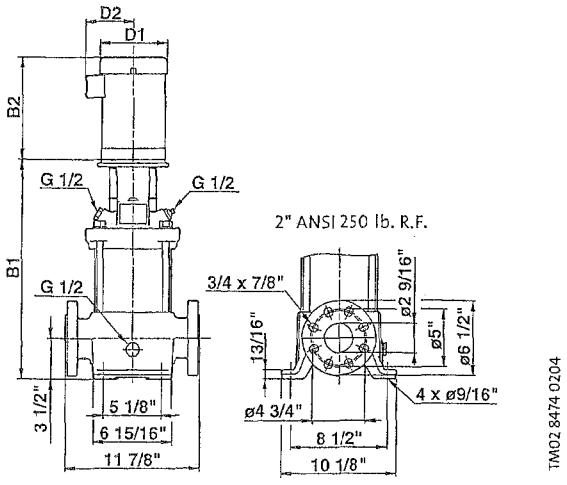
Booster Pump Data

Technical data

Two 5 h.p. Water Booster Pumps CR(E)15-3
75 gpm @ 150' TDH

Dimensional sketches





Dimensions and weights

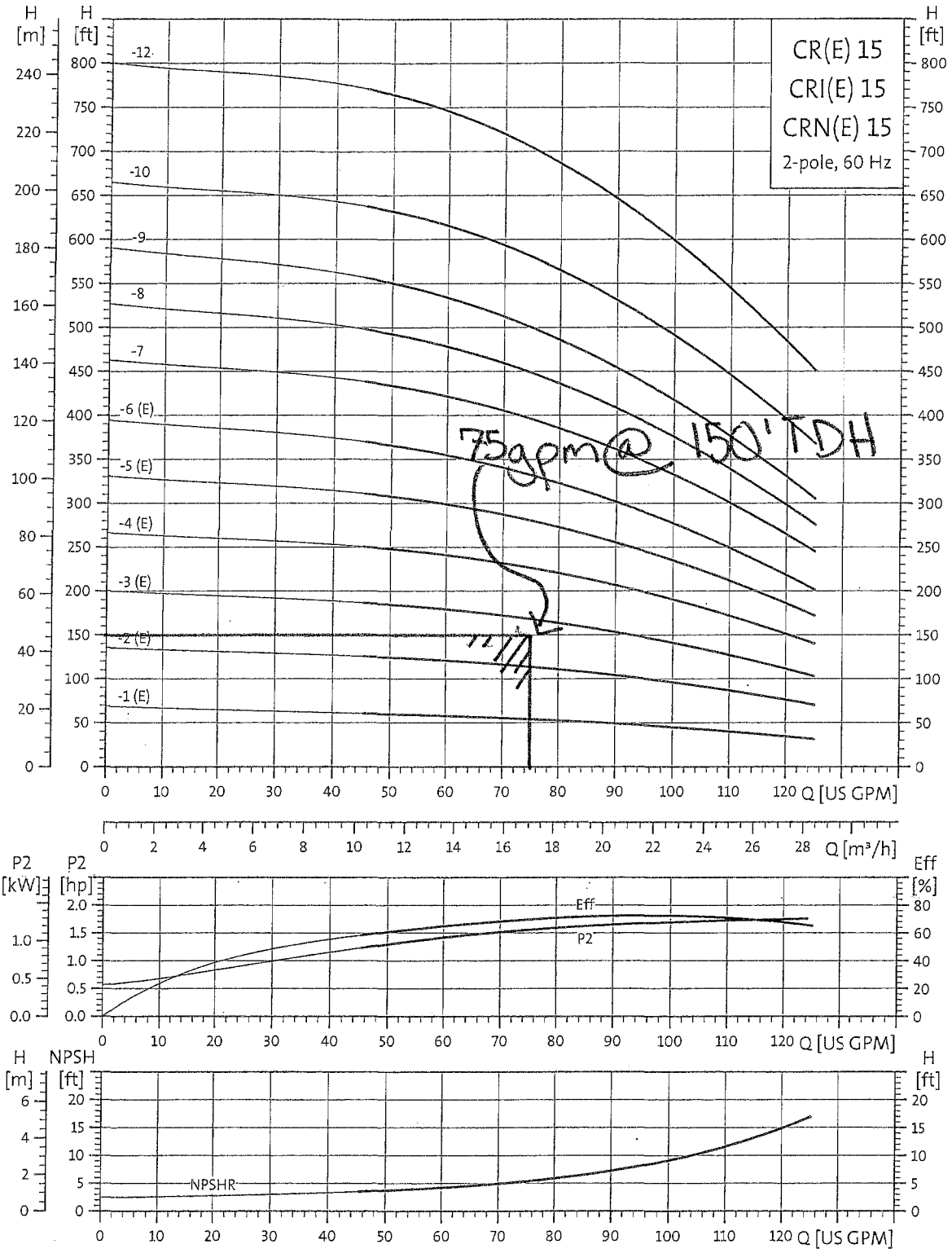
Pump type	Hp	Ph	Voltage	NEMA Frame size	Oval B1	ANSI B1	ODP D1	ODP D2	TEFC D1	TEFC D2	Oval ODP B1+B2	Oval TEFC B1+B2	ANSI ODP B1+B2	ANSI TEFC B1+B2	Oval Ship Wt.[1] [lbs.]	ANSI Ship Wt.[1] [lbs.]	MLE D1	MLE D2	Oval MLE B1+B2	ANSI MLE B1+B2	Oval Ship Wt.[1] [lbs.]	ANSI Ship Wt.[1] [lbs.]
CR(E) 15-1	2	1	115/208-230*	56C	16 1/2	16 1/2	7 1/4	5 5/8	7 1/4	5 3/4	28 1/4	29 1/8	28 1/4	29 1/8	134	136	-	-	-	-	-	-
		3	208-230/460	-	16 1/2	16 1/2	7 1/4	5 5/8	7 1/4	5 3/4	27 1/4	28 1/4	27 1/4	28 1/4	121	123	7 7/8	6 5/8	28	28	135	137
CR(E) 15-2	5	1	208-230	182TC	17 1/4	17 1/4	10 5/8	7 3/8	10 5/8	7 1/2	32 5/8	32 5/8	32 5/8	32 5/8	191	194	-	-	-	-	-	-
		3	208-230/460	-	17 1/4	17 1/4	7 1/4	5 5/8	8 1/2	6	31 3/8	33 1/4	31 3/8	33 1/4	167	169	8 3/4	7 1/2	32 5/8	32 5/8	190	192
CR(E) 15-3	5	1	208-230	182TC	19	19	10 5/8	7 3/8	10 5/8	7 1/2	34 3/8	34 3/8	34 3/8	34 3/8	194	196	-	-	-	-	-	-
		3	208-230/460	-	19	19	7 1/4	5 5/8	8 1/2	6	33 1/8	35	33 1/8	35	172	174	8 3/4	7 1/2	34 1/2	34 1/2	195	197
CR(E) 15-4	7½	1	208-230	213TC	21 1/8	21 1/8	10 3/8	8 1/8	10 1/4	7 1/2	36 1/2	36 1/2	36 1/2	36 1/2	216	218	-	-	-	-	-	-
		3	208-230/460	-	21 1/8	21 1/8	10 3/8	8 1/8	10 1/4	8 1/8	36 1/2	36 1/2	36 1/2	36 1/2	194	196	8 3/4	7 1/2	36 5/8	36 5/8	224	226
CR(E) 15-5	10	1	230	213TC	22 7/8	22 7/8	10 5/8	7 1/2	10 1/4	10 3/8	39 3/8	38 3/4	39 3/8	38 3/4	244	246	-	-	-	-	-	-
		3	208-230/460	-	22 7/8	22 7/8	10 5/8	7 3/8	10 3/8	7 1/2	38 1/4	38 1/4	38 1/4	38 1/4	211	213	8 3/4	7 1/2	38 3/8	38 3/8	235	237
CR(E) 15-6	10	1	230	213TC	-	24 5/8	10 5/8	7 1/2	10 1/4	10 3/8	-	-	41 1/8	40 1/2	-	249	-	-	-	-	-	-
		3	208-230/460	-	-	24 5/8	10 5/8	7 3/8	10 3/8	7 1/2	-	-	40	40	-	218	8 3/4	7 1/2	-	40 1/8	-	242
CR 15-7	15	3	208-230/460	254TC	-	29	10 5/8	7 3/8	10 3/8	8 3/4	-	-	45 1/8	45 5/8	-	257	-	-	-	-	-	-
CR 15-8	15	3	208-230/460	254TC	-	30 3/4	10 5/8	7 3/8	10 3/8	8 3/4	-	-	46 7/8	47 3/8	-	262	-	-	-	-	-	-
CR 15-9	15	3	208-230/460	254TC	-	32 1/2	10 5/8	7 3/8	10 3/8	8 3/4	-	-	48 5/8	49 1/8	-	354	-	-	-	-	-	-
CR 15-10	20	3	230/460	254TC	-	34 1/4	11 1/2	9	10 3/8	8 3/4	-	-	52 1/4	50 5/8	-	407	-	-	-	-	-	-
CR 15-12	25	3	230/460	284TSC	-	37 1/4	11 1/2	9	13	9 1/2	-	-	58 1/4	57	-	498	-	-	-	-	-	-

* TEFC voltage is 115/230

[1] Weights based on pump with ODP motor (see price list for individual weights)

All dimensions in inches unless otherwise noted.

Performance curves



TM02 7222 2803

Technical data

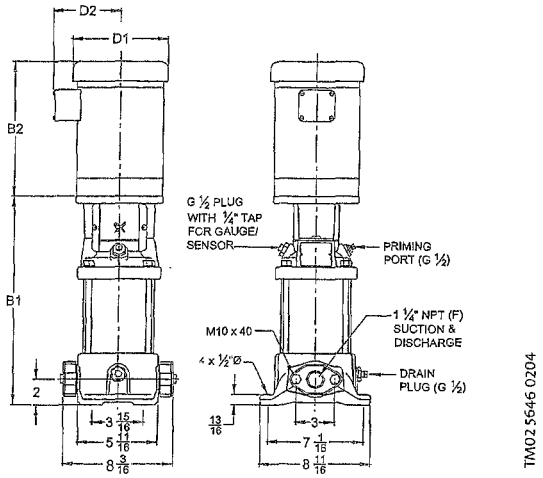
One 2 h.p. Low Flow Water Booster Pump

32gpm @ 150' TDH

CR(E) 5-7

3-phase

Dimensional sketches



Dimensions and weights

Pump type	Hp	Ph	Voltage	NEMA Frame size	Oval B1	ANSI B1	ODP D1	ODP D2	TEFC D1	TEFC D2	Oval ODP B1+B2	Oval TEFC B1+B2	ANSI ODP B1+B2	ANSI TEFC B1+B2	Oval Ship Wt.[1] [lbs.]	ANSI Ship Wt.[1] [lbs.]	MLE D1	MLE D2	Oval MLE B1+B2	ANSI MLE B1+B2	Oval Ship Wt.[1] [lbs.]	ANSI Ship Wt.[1] [lbs.]
CR(E) 5-2	3/4	1	115/208-230	56C	11	12	6 1/4	4 7/8	6 1/4	5	22	21	23	22	54	63	5 1/2	5 1/2	18 1/2	19 1/2	55	64
		3	208-230/460	56C	11	12	6 1/4	4 1/2	6 1/4	5	20 1/2	20 3/8	21 1/2	21 3/8	54	63	-	-	-	-	-	-
CR(E) 5-3	1	1	115/208-230*	56C	12 1/8	13 1/8	7 1/4	5 5/8	7 1/4	5 3/4	23 3/8	23 3/8	24 3/8	24 3/8	57	66	5 1/2	5 1/2	21 1/4	22 1/4	59	68
		3	208-230/460	56C	12 1/8	13 1/8	7 1/4	5 5/8	7 1/4	5 3/4	21 5/8	22 3/8	22 5/8	23 3/8	57	66	7	6 5/8	23 5/8	24 5/8	72	81
CR 5-4	1 1/2	1	115/208-230	56C	13 1/8	14 1/8	7 1/4	5 5/8	7 1/4	5 3/4	24 7/8	24 7/8	25 7/8	25 7/8	64	73	-	-	-	-	-	-
		3	208-230/460	56C	13 1/8	14 1/8	7 1/4	5 5/8	7 1/4	5 3/4	23 7/8	23 7/8	24 7/8	24 7/8	64	73	-	-	-	-	-	-
CR(E) 5-5	1 1/2	1	115/208-230	56C	14 1/4	15 1/4	7 1/4	5 5/8	7 1/4	5 3/4	26	26	27	27	66	76	5 1/2	5 1/2	23 3/8	24 3/8	66	77
		3	208-230/460	56C	14 1/4	15 1/4	7 1/4	5 5/8	7 1/4	5 3/4	25	25	26	26	66	76	7	6 5/8	25 3/4	26 3/4	78	88
CR 5-6	2	1	115/208-230*	56C	15 1/4	16 1/4	7 1/4	5 5/8	7 1/4	5 3/4	27	27 7/8	28	28 7/8	73	83	-	-	-	-	-	-
		3	208-230/460	56C	15 1/4	16 1/4	7 1/4	5 5/8	7 1/4	5 3/4	26	27	27	28	73	83	-	-	-	-	-	-
* CR(E) 5-7	2	1	115/208-230*	56C	16 3/8	17 3/8	7 1/4	5 5/8	7 1/4	5 3/4	28 1/8	29	29 1/8	30	76	85	-	-	-	-	-	-
		3	208-230/460	56C	16 3/8	17 3/8	7 1/4	5 5/8	7 1/4	5 3/4	27 1/8	28 1/8	28 1/8	29 1/8	76	85	7 7/8	6 5/8	27 7/8	28 7/8	97	106
CR 5-8	3	1	115/208-230	182TC	18 1/2	19 1/2	8 1/2	6 3/4	8 5/8	6 7/8	33	33	34	34	94	103	-	-	-	-	-	-
		3	208-230/460	182TC	18 1/2	19 1/2	7 1/4	5 5/8	8 5/8	6 7/8	29 7/8	31	30 7/8	32	94	103	-	-	-	-	-	-
CR 5-9	3	1	115/208-230	182TC	19 1/2	20 1/2	8 1/2	6 3/4	8 5/8	6 7/8	34	34	35	35	95	104	-	-	-	-	-	-
		3	208-230/460	182TC	19 1/2	20 1/2	7 1/4	5 5/8	8 5/8	6 7/8	30 7/8	32	31 7/8	33	95	104	-	-	-	-	-	-
CR(E) 5-10	3	1	115/208-230	182TC	20 5/8	21 5/8	8 1/2	6 3/4	8 5/8	6 7/8	35 1/8	35 1/8	36 1/8	36 1/8	96	105	-	-	-	-	-	-
		3	208-230/460	182TC	20 5/8	21 5/8	7 1/4	5 5/8	8 5/8	6 7/8	32	33 1/8	33	34 1/8	96	105	7 7/8	6 5/8	34	35	111	120
CR 5-11	5	1	208-230	182TC	21 5/8	22 5/8	10 5/8	7 3/8	10 5/8	7 1/2	37	37	38	38	103	112	-	-	-	-	-	-
		3	208-230/460	182TC	21 5/8	22 5/8	7 1/4	5 5/8	8 1/2	6	35 3/4	37 5/8	36 3/4	38 5/8	103	112	-	-	-	-	-	-
CR 5-12	5	1	208-230	182TC	22 3/4	23 3/4	10 5/8	7 3/8	10 5/8	7 1/2	38 1/8	38 1/8	39 1/8	39 1/8	104	113	-	-	-	-	-	-
		3	208-230/460	182TC	22 3/4	23 3/4	7 1/4	5 5/8	8 1/2	6	36 7/8	38 3/4	37 7/8	39 3/4	104	113	-	-	-	-	-	-
CR(E) 5-13	5	1	208-230	182TC	23 3/4	24 3/4	10 5/8	7 3/8	10 5/8	7 1/2	39 1/8	39 1/8	40 1/8	40 1/8	105	115	-	-	-	-	-	-
		3	208-230/460	182TC	23 3/4	24 3/4	7 1/4	5 5/8	8 1/2	6	37 7/8	39 3/4	38 7/8	40 3/4	105	115	8 3/4	7 1/2	39 1/4	40 1/4	146	156
CR 5-14	5	1	208-230	182TC	24 7/8	25 7/8	10 5/8	7 3/8	10 5/8	7 1/2	40 1/4	40 1/4	41 1/4	41 1/4	107	116	-	-	-	-	-	-
		3	208-230/460	182TC	24 7/8	25 7/8	7 1/4	5 5/8	8 1/2	6	39	40 7/8	40	41 7/8	107	116	-	-	-	-	-	-
CR 5-15	5	1	208-230	182TC	25 7/8	26 7/8	10 5/8	7 3/8	10 5/8	7 1/2	41 1/4	41 1/4	42 1/4	42 1/4	109	118	-	-	-	-	-	-
		3	208-230/460	182TC	25 7/8	26 7/8	7 1/4	5 5/8	8 1/2	6	40	41 7/8	41	42 7/8	109	118	-	-	-	-	-	-
CR(E) 5-16	5	1	208-230	182TC	27	28	10 5/8	7 3/8	10 5/8	7 1/2	42 3/8	42 3/8	43 3/8	43 3/8	110	119	-	-	-	-	-	-
		3	208-230/460	182TC	27	28	7 1/4	5 5/8	8 1/2	6	41 1/8	43	42 1/8	44	110	119	8 3/4	7 1/2	42 1/2	43 1/2	151	160
CR 5-18	7 1/2	1	208-230	213TC	-	30 1/2	10 3/8	8 1/8	10 1/4	7 1/2	-	-	45 7/8	45 7/8	-	152	-	-	-	-	-	-
		3	208-230/460	213TC	-	30 1/2	10 3/8	8 1/8	10 1/4	8 1/8	-	-	45 7/8	45 7/8	-	152	-	-	-	-	-	-
CR(E) 5-20	7 1/2	1	208-230	213TC	-	32 5/8	10 3/8	8 1/8	10 1/4	7 1/2	-	-	48	48	-	154	-	-	-	-	-	-
		3	208-230/460	213TC	-	32 5/8	10 3/8	8 1/8	10 1/4	8 1/8	-	-	48	48	-	154	8 3/4	7 1/2	-	48 1/8	-	173
CR 5-22	7 1/2	1	208-230	213TC	-	34 3/4	10 3/8	8 1/8	10 1/4	7 1/2	-	-	50 1/8	50 1/8	-	157	-	-	-	-	-	-
		3	208-230/460	213TC	-	34 3/4	10 3/8	8 1/8	10 1/4	8 1/8	-	-	50 1/8	50 1/8	-	157	-	-	-	-	-	-
CR(E) 5-24	7 1/2	1	208-230	213TC	-	36 7/8	10 3/8	8 1/8	10 1/4	7 1/2	-	-	52 1/4	52 1/4	-	161	-	-	-	-	-	-
		3	208-230/460	213TC	-	36 7/8	10 3/8	8 1/8	10 1/4	8 1/8	-	-	52 1/4	52 1/4	-	161	8 3/4	7 1/2	-	52 3/8	-	180

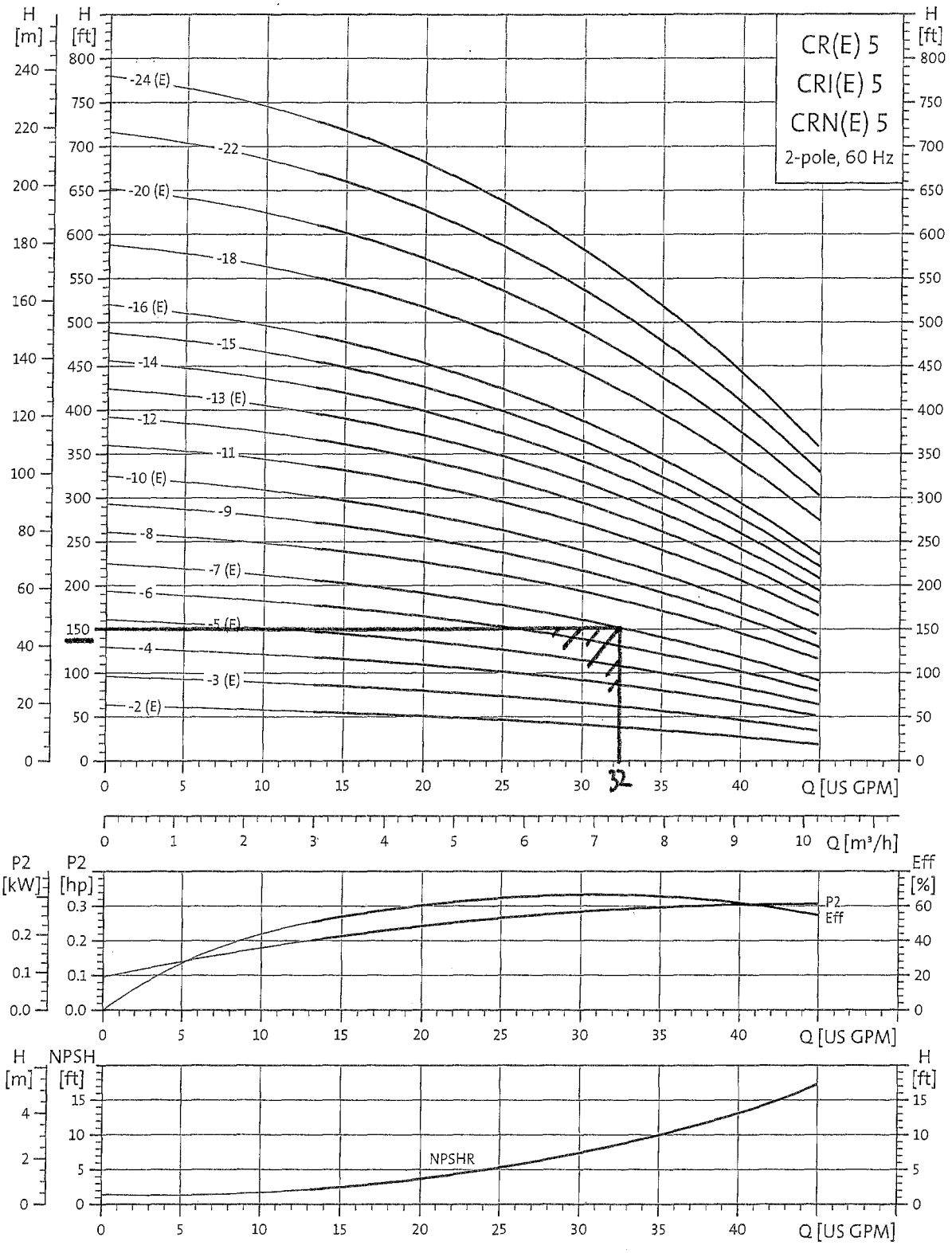
* TEFC voltage is 115/230

[1] Weights based on pump with ODP motor (see price list for individual weights)

All dimensions in inches unless otherwise noted.

Performance curves

One 2 h.p. Low Flow
Water Booster Pump
32 gpm @ 150' TDH



TM02 4085 1303

4" Station Turbine Style Meter

PRODUCT SHEET

ARB® UTILITY MANAGEMENT SYSTEMS™

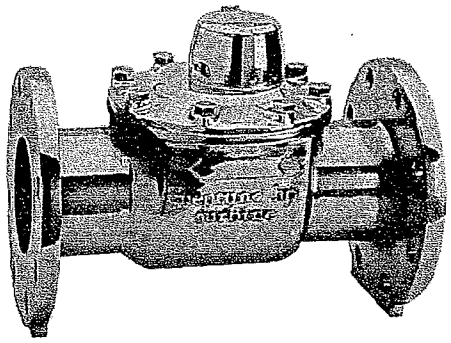
w/ Tri.Corr E Head

HIGH PERFORMANCE TURBINE METER

NEPTUNE TECHNOLOGY GROUP

SIZES: 1-1/2", 2", 3", (4") 6", 8", and 10"

Meas: GALLONS



High Performance Turbine water meters offer some of the widest flow ranges of any turbine meters on the market.

HP Turbine water meters offer some of the widest flow ranges of any turbine meters on the market. All HP Turbine water meters meet or exceed the latest performance and accuracy requirements of AWWA C701 and maximum continuous flow rates may be exceeded by as much as 25% for intermittent periods.

CONSTRUCTION

Each HP Turbine consists of a rugged no-lead high copper alloy maincase, an AWWA Class II turbine measuring element, and a roll-sealed register.

The maincase is corrosion resistant, lightweight, and compact. Inlet and outlet connections are flanged. Strainers are available to prevent debris from entering the meter and to reduce the effects of uneven water flow due to upstream piping variations.

The Unitized Measuring Element (UME) allows for quick, easy, in-line interchangeability. Water volume is measured accurately at all flows by a specially designed assembly. The hydrodynamically balanced thrust compensated rotor relieves pressure on the thrust bearings to minimize wear and provide sustained accuracy over an extended operating life. Direct coupling of the rotor to the gear train eliminates revenue loss due to slippage during fast starts and line surges. A calibration vane allows in-field calibration of the UME to lengthen service life and to ensure accurate registration.

The roll-sealed register eliminates leaking and fogging. A magnetic drive couples the register with the measuring element.

APPLICATION

The HP Turbine water meter is designed for applications where flow rates are consistently moderate to high.

SYSTEMS COMPATIBILITY

Adaptability to all present and future systems for flexibility.

KEY FEATURES

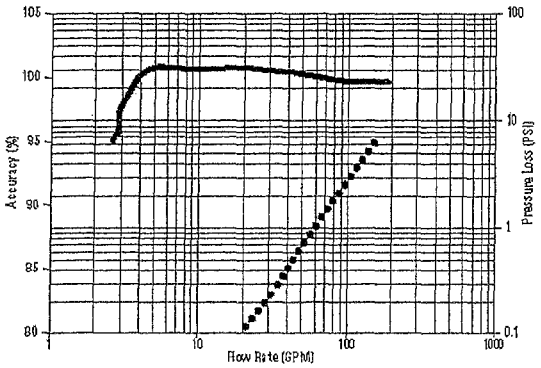
- Roll-Sealed Register
  - Magnetic drive, low torque registration ensures accuracy
  - Impact-resistant register design with flat glass for readability
  - 1:1 ratio, low flow indicator identifies leaks
  - Bayonet mount allows in-line serviceability
  - Tamperproof seal pin deters theft
  - Date of manufacture, size, and model stamped on dial face
- No-Lead Maincase
  - Made from no-lead high copper alloy
  - ANSI/NSF 61 certified
  - Compact design is lightweight and easy to handle
  - Sturdy, durable, corrosion resistant
  - Resists internal pressure stresses and external damage
  - Residual value
- Turbine Measuring Element
  - Excellent low flow sensitivity and wide flow ranges available at 98.5%–101.5% accuracy
  - Direct coupling of rotor to gear train prevents slippage and ensures accurate registration
  - Interchangeable measuring element allows for in-line service
  - Hydrodynamically balanced rotor
  - Reusable O-ring gasket on 3"–10" sizes

WARRANTY

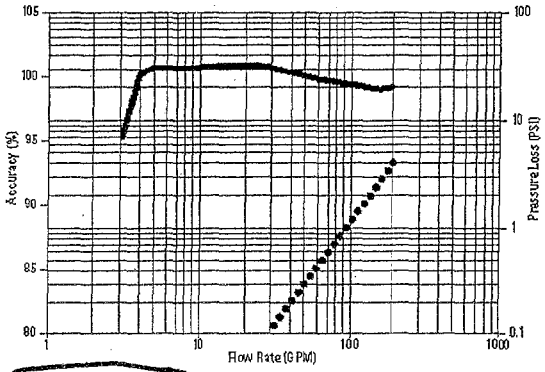
Neptune provides a limited warranty with respect to its HP Turbine water meters for performance, materials, and workmanship.

When desired, owner maintenance is easily accomplished by in-line replacement of major components.

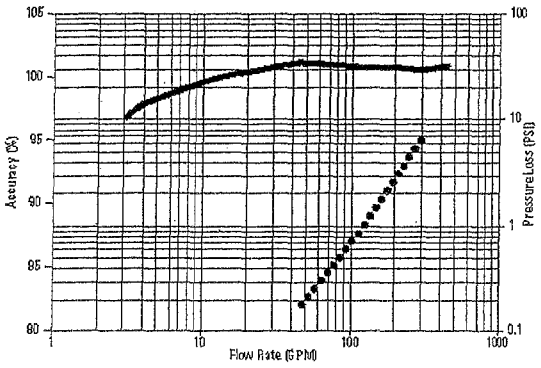
1-1/2" ACCURACY



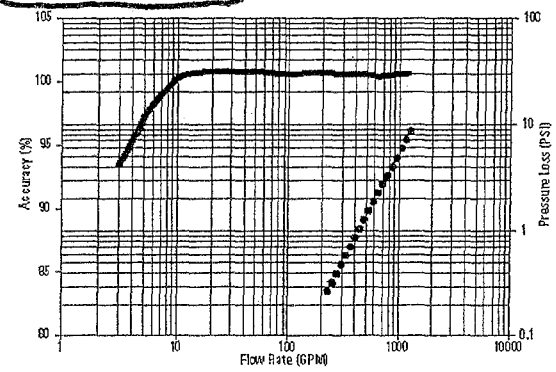
2" ACCURACY



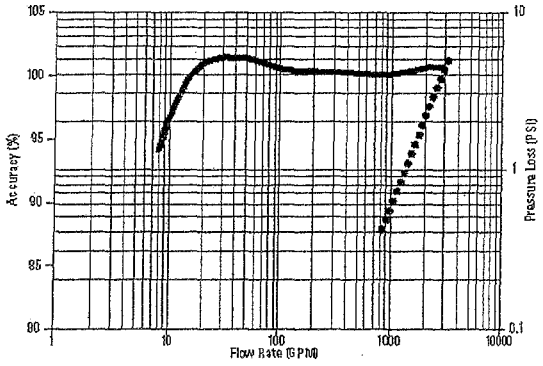
3" ACCURACY



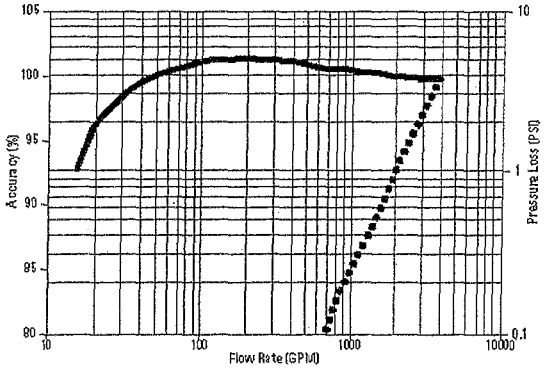
4" ACCURACY



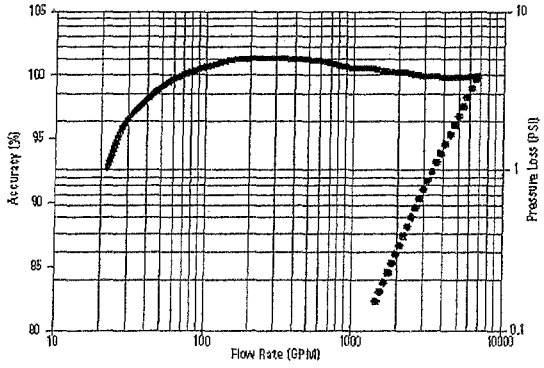
6" ACCURACY



8" ACCURACY



10" ACCURACY



Accuracy

Head Loss

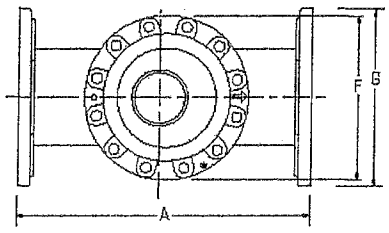
These charts show typical meter performance. Individual results may vary.

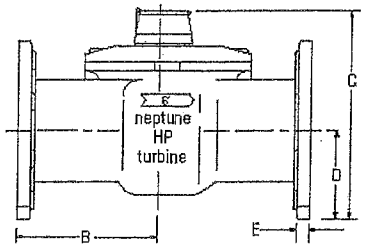
OPERATING CHARACTERISTICS

Meter Size	Normal Operating Range @100% Accuracy (±1.5%)	Maximum Intermittent Flow	AWWA Standard
1 1/2"	4 to 160 US gpm 0.91 to 36.3 m³/h	200 US gpm 45.4 m³/h	N/A
2"	4 to 200 US gpm 0.91 to 45.4 m³/h	250 US gpm 56.8 m³/h	4 to 160 US gpm 0.91 to 36.3 m³/h
3"	5 to 450 US gpm 1.14 to 102.2 m³/h	560 US gpm 127.2 m³/h	8 to 350 US gpm 1.8 to 79.5 m³/h
4"	10 to 1200 US gpm 2.27 to 272.5 m³/h	1500 US gpm 340.7 m³/h	15 to 630 US gpm 3.4 to 143.0 m³/h
6"	20 to 2500 US gpm 4.55 to 567.8 m³/h	3100 US gpm 704.1 m³/h	30 to 1400 US gpm 6.8 to 317.9 m³/h
8"	35 to 4000 US gpm 7.95 to 908.5 m³/h	5000 US gpm 1135.6 m³/h	50 to 2400 US gpm 11.4 to 545 m³/h
10"	50 to 6500 US gpm 11.36 to 1476.3 m³/h	8000 US gpm 1817 m³/h	75 to 3800 US gpm 17.0 to 863 m³/h

DIMENSIONS

Meter Size	A in/mm	B in/mm	C in/mm	D in/mm	E in/mm	F in/mm	G in/mm	Weight lbs/kg
1 1/2"	10 (254)	6 1/2 (165)	7 1/8 (181)	1 3/4 (44)	3/4 (19)	4 1/2 (114)	5 3/8 (137)	19 (8.6)
2"	10 (254)	6 1/2 (165)	7 5/8 (194)	2 1/8 (54)	13/16 (21)	4 1/2 (114)	5 3/8 (137)	20 (9.1)
3"	12 (305)	6 (152)	10 (254)	3 3/4 (95)	5/8 (16)	8 1/4 (159)	7 1/2 (191)	40 (18.1)
4"	14 (356)	6 1/2 (165)	10 7/8 (276)	4 1/2 (114)	3/4 (19)	8 1/8 (206)	9 (229)	52 (23.6)
6"	18 (457)	8 5/8 (219)	13 (330)	5 1/2 (140)	1 (25)	10 1/4 (260)	11 (279)	115 (52.2)
8"	20 (508)	9 5/8 (244)	15 1/2 (394)	6 3/4 (171)	1 1/8 (29)	10 1/4 (260)	13 1/2 (343)	195 (88.4)
10"	26 (660)	12 5/8 (321)	15 1/2 (394)	8 (203)	1 1/4 (32)	10 1/4 (260)	16 (406)	275 (124.7)





Tri Con-E Transmitter for 4" Turbine Meter

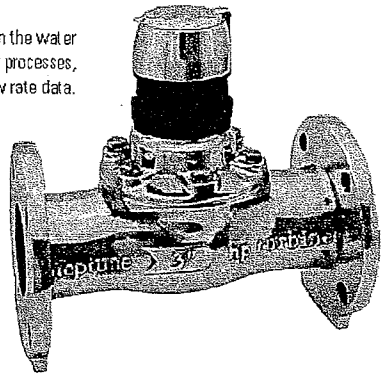
PRODUCT SHEET

ARB® UTILITY MANAGEMENT SYSTEMS™

NEPTUNE TECHNOLOGY GROUP

TRICON/E3® TRANSMITTER

TRICON/E3 transmitters provide an interface between the water meter and an electronic controller for batching processes, monitoring flow totalization, and/or flow rate data.



An electronic digital pulse output with the 4–20mA option is available for customers requiring both digital and analog outputs. Reverse flow indication is available with the high frequency forward/reverse pulse output option.

The TRICON/E3 transmitter mounts between the meter maincase and the register. The bayonet-type mount allows the TRICON/E3 to be easily retrofitted to many existing Neptune meters without interruption. Contact Neptune regarding compatibility.

The TRICON/E3 with the 4–20mA option provides an analog signal that is proportional to the flow. Together, the digital pulse signal and the 4–20mA output provide information on total consumption and flow rate for close monitoring of water usage.

The TRICON/E3 with the high frequency forward/reverse pulse output option can be used in applications where directional flow monitoring is required in addition to total consumption and flow information.

Every Neptune meter meets or exceeds the latest AWWA standards ensuring accurate, dependable performance.

Neptune TRICON/E3 units are ideally suited for monitoring/controlling total flow rate data such as:

- Instantaneous readout of customer consumption via remote instrumentation or computer
- Batch or continuous process
- Water softening regeneration
- Demineralization
- Reverse osmosis
- Chemical treatment/injection
- Filtration
- Boiler feed water make-up
- Cooling tower water make-up
- Irrigation
- High or low rate alarming
- Reverse flow alarming

Dual optical switches allow the TRICON/E3 to distinguish between forward and reverse rotation, eliminating false pulse generation under low or no flow conditions.

KEY FEATURES

- Electronic pulse output proportional to the meter's rate of flow
- Electronic pulse output available with 4–20mA output or high frequency forward/reverse pulse output
- Mounts between the meter and register – Direct Read, ARB®, or ProRead AutoDetect
- Utilizes dual optical switch type design which is more accurate and reliable than the older single optical switch designs
- Stainless steel ball bearings minimize torque
- Tamperproof seal pin to prevent unauthorized access
- In-line adaptability allows installation or service without interrupting the meter service

WARRANTY

Neptune provides a limited warranty with respect to its TRICON/E3 transmitters for performance, materials, and workmanship.

For 4" Turbine Meter

w/4-20 mA Signal

PERFORMANCE DATA

Meter Type & Size	Pulses/ US Gallons	Flow Rate @ 4 mA Output (US GPM)	Flow Rate Value @ 20 mA Output (US GPM)
T-10			
5/8"	578.1	0	20
3/4"	322.6	0	30
1"	150.8	0	50
1 1/2"	67.57	0	100
2"	37.3	0	150
Tru/Flo® Compound (Turbine Side) and HP Tru/Flo (Turbine Side)			
2" HP	6.095	0	200
3"	2.890	0	450
4"	1.590	0	1,000
6"	0.464	0	2,000
HP Turbine			
1 1/2"	6.095	0	160
2"	6.095	0	200
3"	11.20	0	450
4"	7.556	0	1,200
6"	0.7273	0	3,000
8"	0.7556	0	4,000
10"	0.7556	0	6,500
12"	0.7556	0	8,000
16"	0.07556	0	13,500
20"	0.07556	0	22,000
HP Protectus III®			
4"	7.556	0	1,200
6"	0.7556	0	2,888
8"	0.6095	0	4,959
10"	0.5333	0	9,209

ELECTRICAL CHARACTERISTICS (OVER 0-70°C OPERATING TEMPERATURE)

Parameter	Description	Min	Max	Units
HE and UP/DN Digital Pulse Model				
Vcc	Supply Voltage (DC)	11.5	26.5	Volts
Is	Supply Current	0.020	0.050	Amps
Vol	Low Output Voltage	0	0.4	Volts
Voh	High Output Voltage	8.5	12	Volts
Iol	Current at Vol		.010	Amps
Ioh	Current at Voh		.010	Amps
tr l-h	Output Rise Time		2*	µsec
tf h-l	Output Fall Time		2*	µsec
Measured with RL = 2.4 Kohms, CL = 50 pF				
4-20 ma Model				
Vcc	Supply Voltage (DC)	22.5	26.5	Volts
Is	Supply Current		0.1	Amps
RL	Loop Resistance	0	600	Ohms
Gain	Scaling Accuracy		0.5	%FS
Zero	Offset Accuracy		0.2	%FS
Note: initial calibration is 1% total				
Both Models (unless otherwise specified)				
	Operating Temperature	0	70	Degrees C
	Storage Temperature	-40	85	Degrees C
	Supply Voltage	-30	30	Volts
	Output Load (Pulse Output)	1200		Ohms
	Output Current (Pulse Output)		0.01	Amps

SPECIFICATIONS

- Sizes:
  - T-10 (5/8"–2")
  - HP Turbine (1 1/2"–20")
  - Tru/Flo Compound (2"–8"x8")
  - HP Fire Service Turbine (3"–10")
  - HP Protectus III (4"–10")
- Register Compatibility:
  - Direct Read
  - ARB®V
  - ProRead™ (ARB VI)
  - E-Coder™
  - E-Coder)R900*i*
- Connection Wire:
  - Distances up to 1000 feet – AWG
  - #22 twisted pair cable

Neptune engages in ongoing research and development to improve and enhance its products. Therefore, Neptune reserves the right to change product or system specifications without notice.

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NEPTUNE TECHNOLOGY GROUP

neptunetg.com

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Water Distribution System Notes

TOWN HOUSES AT WELLS VILLAGE COMMUNITY WATER SYSTEM
SANDOWN, NEW HAMPSHIRE
WATER DISTRIBUTION SYSTEM NOTES
Current Revision: September 2006

1. All distribution material including; mains, fittings, and valves to meet applicable New Hampshire Dept. of Environmental Services - Bureau of Water Supply Engineering, (NHDES-WSEB) and American Water Works Association (AWWA) standards.

2. All installation of material to conform to applicable NHDES-WSEB and AWWA standards and specifications for public water supply systems.

3. All valves, tees, bends, and their related joints to be properly restrained using approved "Grip-Ring", "Mega-Lug" or equal, retainer kits.

4. All water main and appurtenances to be an approved manufactured in accordance with current AWWA standards. All water main and appurtenances to be an approved AWWA C-900, 150 psi (min.) PVC water main. Pipe sizing shall be 6", 4", and 2" well lines as shown on plans approved by the Town Planning Board and NHDES-WSEB. All water main and service lines to be installed with a minimum of 60" of cover, and shall be properly sand bedded and backfilled with suitable material.

5. Gate valves shall be installed at locations shown on the Utility Plans. All gate valves shall be AWWA approved, epoxy coated, resilient wedge type, being OPEN LEFT (counter clockwise). Valve boxes shall be AWWA approved, slip type with 36" base, 36" top, and cover shall be a one-piece cast cover labeled "WATER".

6. Flushing Points and/or hydrants for flushing shall be installed at locations shown on the Project Plans. All flushing points shall be 2" connections and shall meet specifications for water distribution system flushing purposes, using approved flushing hydrants. Domestic services shall have service line sizing being 1" diameter, CTS, 200 psi, polyethylene tubing, with brass packed joint (PJ) service fittings, ball valve shut offs, adjustable Erie type curb boxes, and with corporation stops and saddles, as shown on Utility Plans into each of the buildings from the water main.

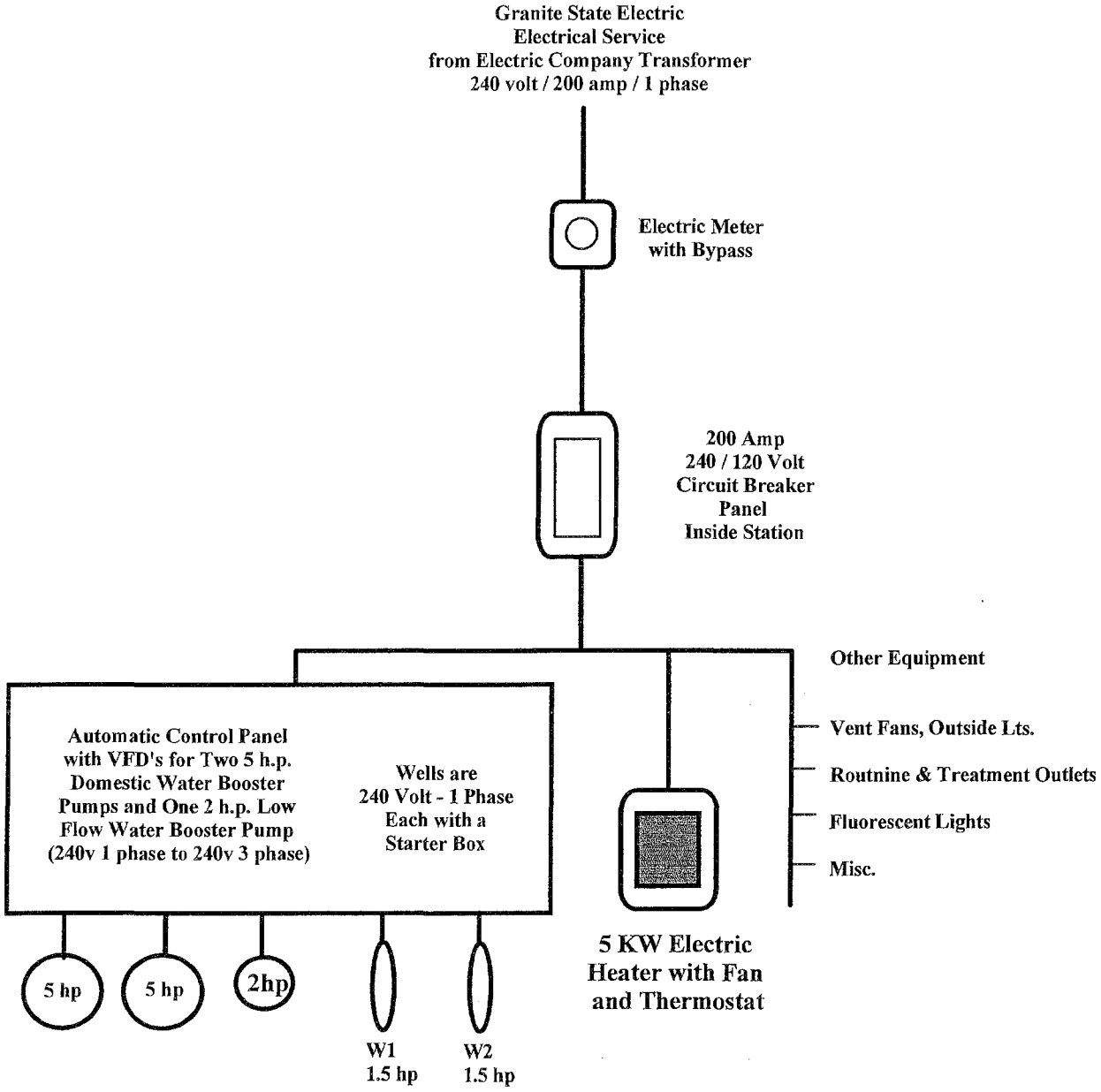
7. Separation of water mains and sewer shall be in accordance with WSEB standards. On parallel installation, water mains shall be laid at least ten feet horizontally from any existing or proposed sewer. If less than ten feet, water main shall be laid in a separate trench, or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer with at least three feet horizontal separation. At crossings there shall be a minimum vertical distance of 18 inches between the water main and sewer. Ductile iron pipe with a minimal laying length of 18 feet shall be used at all crossings, with both joints being located as far from the sewer as possible.

8. All water main to be, flushed, pressure tested, and disinfected, in accordance with the latest provisions of AWWA C-600 and C-651, prior to acceptance. Written certification of testing and bacteriological test results shall be provided.

9. A Record Drawing shall be provided following installation, in accordance with NHWSEB standards.

Electrical Components & Controls

One - Line Electrical Schematic
Town Houses at Wells Village
Community Water System
Sandown, New Hampshire
September 2006



Note: All wiring to meet National and Local Electrical Code. All wire to be run in PVC or EMT conduit. Liquid tight allowed between motors and conduit. All enclosures minimum NEMA I Fluorescent lighting to each be 4' as needed, twin tube, moisture resistant.

Lewis Engineering, PLLC
Litchfield, N.H. 03052
603-886-4985, fax 5149
E - lewis.h2o@worldnet.att.net

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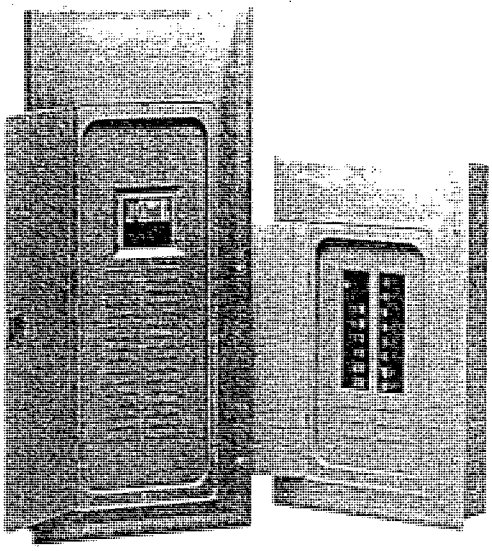
Typical Circuit Breaker Panel

Cutler-Hammer



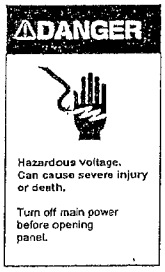
Installation Instructions for Cutler-Hammer Type CH and BR Loadcenters

Installation des tableaux de répartition Cutler-Hammer de type CH et BR

Instrucciones para la instalación de centros de carga tipos CH y BR de Cutler-Hammer

Congratulations!

You have purchased a Cutler-Hammer Loadcenter, which includes many features recommended by electrical contractors, resulting in a product that is easier to mount and wire.



⚠WARNING

Turn off or disconnect the power supplying this equipment before beginning work.

This may require that you contact your electric utility to disconnect power to an existing loadcenter. The line side of the main breaker is energized unless power is disconnected upstream. Cutler-Hammer will not assume responsibility for property damage or personal injury resulting from misuse of the information in this publication.

⚠WARNING

Cutler-Hammer strongly recommends that these products be installed by a qualified electrical professional.

IMPORTANT – INSTALL EQUIPMENT IN CONFORMANCE WITH CODES

This product must be installed in accordance with the National Electric Code (NEC) or the Canadian Electric Code (CEC) and any applicable local codes. Before installing equipment, check with your local electrical inspector for requirements and information. If you have questions or need assistance, contact a qualified electrical contractor.

Félicitations !

Vous venez d'acheter un tableau de répartition Cutler-Hammer, un produit facile à monter et à câbler grâce à ses nombreuses caractéristiques recommandées par les électriciens professionnels.

⚠AVERTISSEMENT !

Couper ou débrancher la source d'alimentation avant de démarrer les travaux.

Ceci peut nécessiter l'intervention du service public d'électricité local pour couper l'alimentation d'une station de distribution existante. Le côté secteur du disjoncteur principal reste sous tension jusqu'à coupure de l'alimentation en amont. Cutler-Hammer décline toute responsabilité en cas de dommages matériels ou corporels résultant d'une interprétation abusive des renseignements figurant dans cette publication.

⚠AVERTISSEMENT !

Cutler-Hammer recommande fortement de faire installer ces produits par un électricien professionnel qualifié.

IMPORTANT – INSTALLER TOUT LE MATÉRIEL EN CONFORMITÉ AVEC LA RÉGLEMENTATION EN VIGUEUR

Ce produit doit être installé en conformité avec le Code national de l'électricité (CNE) ou le Code canadien de l'électricité (CCE) et toute réglementation locale en vigueur. Avant l'installation, veiller à s'informer des exigences réglementaires et autres considérations pertinentes auprès de l'inspecteur en électricité local. Pour toute question ou demande d'assistance, contacter un électricien qualifié.

¡Felicidades!

Usted ha comprado un centro de carga manufacturado por Cutler-Hammer que incluye avances técnicos y que resultan en un producto fácil de montar y cablear.

⚠ ¡ ADVERTENCIA !

Antes de iniciar un trabajo dentro del tablero desconecte eléctrica.

Esto podría requerir que usted contactara a su empresa eléctrica para desconectar la energía eléctrica que alimenta a un centro de carga ya instalado. El lado de la línea de los interruptores principales estará activado salvo que la energía eléctrica le sea desconectada. Cutler-Hammer no asumirá responsabilidad alguna por los daños materiales causados ni por las lesiones personales que resulten como consecuencia del mal uso de la información que contiene este publicación.

⚠ ¡ ADVERTENCIA !

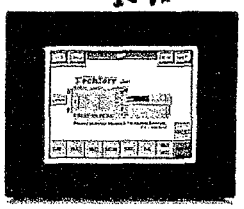
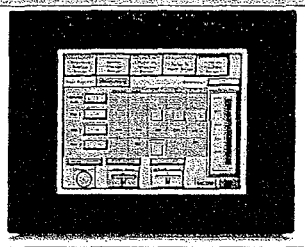
Cutler-Hammer recomienda que la instalación de estos productos sea realizada por un electricista profesional experto.

IMPORTANTE – INSTALE EL EQUIPO CUMPLIENDO CON LOS CÓDIGOS APLICABLES

Este producto debe instalarse de acuerdo con el Código Eléctrico Estadounidense (NEC) o el Código Eléctrico Canadiense (CEC) y todos los códigos locales aplicables. Antes de instalarlo, solicite a un inspector eléctrico local los requisitos e información necesarios para realizar dicha instalación. Si tiene preguntas o necesita ayuda, contacte a un contratista eléctrico calificado.

8" EZ-Touch OIU Screen ON CONTROL PANEL

EZTouch Selection Guide and Specifications

EZTouch Panel Specifications - NEMA 4, 4X (indoor)			
Part Number	EZ-S6C-F*	EZ-S8C-F*	EZ-T10C-F*
			
Price	<-->	<-->	<-->
Specification	6" color full feature	8" color, slim bezel, full feature	10" color, slim bezel, full feature
Enclosure	NEMA 4, 4X (indoor)		
Display Type	5.7" STN (128-color palette)	8.2" STN (128-color palette)	10.4" TFT (128-color palette)
Display Size (Viewing Area)	4.65"x3.5" (118.1x88.9mm)	6.65"x5.024" (168.9x127.61mm)	8.31"x6.22" (211.07x158mm)
Screen Pixels	320x240		640x480
Display Brightness	180 nits	90 nits	200 nits
Touch Screen	48 resistive touch cells (8x6)	192 resistive touch cells (16x12)	
CPU Type	Motorola Coldfire 32-bit CPU (40 MHz)		
Service Power	24VDC (20-30VDC operating range), 1.2A switching supply recommended		
Power Consumption	15 watts @ 24VDC	16 watts @ 24VDC	18 watts @ 24VDC
Agency Approval		UL, CUL, CE	
Operating Temperature	0 to 45°C (32 to 113°F)	0 to 40°C (32 to 104°F)	0 to 50°C (32 to 122°F)
Storage Temperature	-25 to 60°C (-13 to 140°F)	-20 to 60°C (-4 to 140°F)	-25 to 60°C (-13 to 140°F)
Humidity	10-95% RH, noncondensing		
Electrical Noise	NEMA ICS 2-230 showering arc ANSI C37.90a-1974 SWC Level C Chattering Relay Test		
Withstand Voltage	1000VDC (1 minute), between power supply input terminal and protective ground (FG)		
Insulation Resistance	Over 20 MΩ, between power supply input and terminal and protective ground (FG)		
Vibration	5 to 55Hz 2G for 2 hours in the X, Y, and Z axes		
Shock	10G for under 12ms in the X, Y, and Z axes		
User Memory	512KB System RAM memory		
	Expansion memory: 512KB option RAM card (EZ-RAM-1) or 1MB RAM card (EZ-RAM-2)		
	Backup/transferable memory: 512KB flash card (EZ-FLASH-1), 1MB flash card (EZ-FLASH-2), or 2MB flash card (EZ-FLASH-3)		
Number of Screens	Up to 999 limited by memory		
Real-time Clock	Built into panel (PLC clock is still accessible if available)		
Screen Saver	Backlight off		
Communications	PLC Port: RS-232C, RS-422A, RS-485A, 15-pin D-Sub (Female) Download/Program Port: RS-232/RS-422/RS-485A 9 pin D-sub (female)		
	DH+ Port: DH+ option board 25-pin connector (Female) *Direct*LOGIC Ethernet: (EZ-Ethernet)**	DH+ Port: DH+ option board 25-pin connector (Female) *Direct*LOGIC Ethernet: (EZ-Ethernet)**	DH+ Port: DH+ option board 25-pin connector (Female) *Direct*LOGIC Ethernet: (EZ-Ethernet)**
External Dimensions	7.30"x8.94"x2.29" (185.42x226.076x58.166mm)	8.50"x10.55"x2.44" (215.9x267.97x61.976mm)	10.60"x13.59"x2.60" (269.22x345.186x66.04mm)
Weight	1.4 lb	1.6 lb	3.8 lb

** denotes available with built-in Data Highway Plus interface card (add "H" to part number).*

*** Sold separately*

AUTUMN HILLS DESIGN & SPECS.

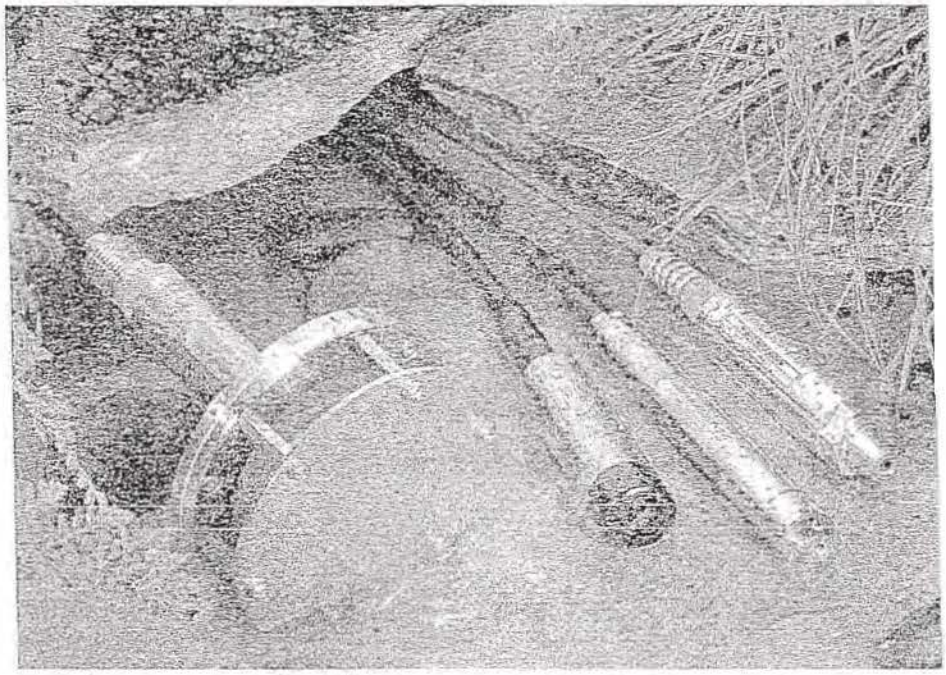
Atmospheric Tank Level & Control 0-5 psi:
Discharge Header Booster Pumps 0-150 psi:

PRESSURE SYSTEMS
An Esterline Company

KPSI™ Level and Pressure Transducers User's Manual

11th Edition

June 2005



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Miscellaneous Equipment

Typical Check Valves

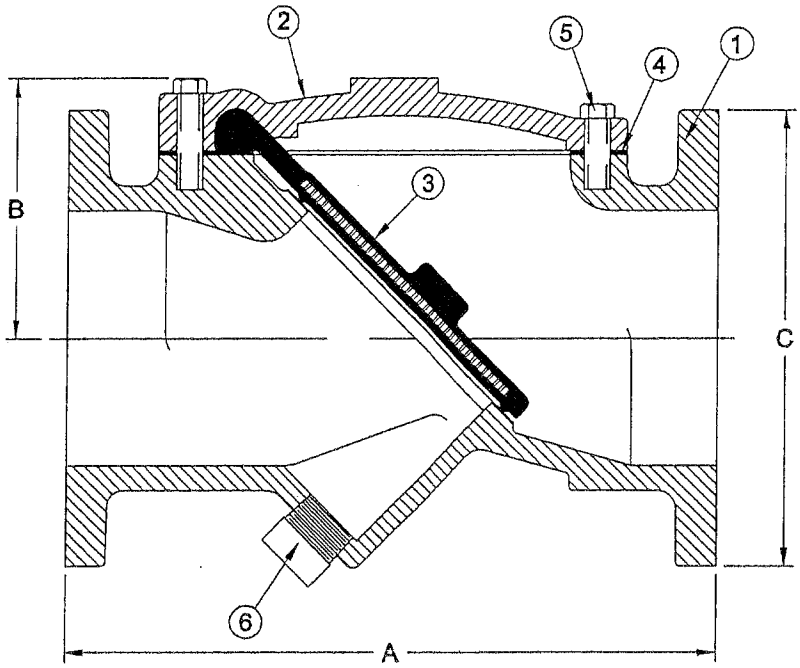
Swing Check Valve — 125 # Flange — Model 745

Sizes 2" Thru 24" / 50 mm Thru 600 mm

Danfoss Flomatic

Booster Pumps

Materials (Tilted Disc)



Item #	Qty	Description	Material	ASTM
1	1	Body	Ductile Iron	A536
2	1	Cover	Ductile Iron	A536
3	1	Disc*	Buna coated Steel	———
4	1	Gasket	Rubber	———
5	A/R	Cover Bolt	Steel	SAE Grade 5
6	1	Plug	Malleable Iron	———

* Optional EPDM or Viton Coated Steel

Dimensions

Size		Part #	A		B		C		Weight		Size		Part #	A		B		C		Weight	
Inch	mm		inch	mm	inch	mm	inch	mm	lbs	kg	inch	mm		inch	mm	inch	mm	inch	mm	lbs	kg
2	50	2380	8	203	3-3/8	86	6	152	27	12	10	250	2387	24-1/2	622	9-7/8	251	16	406	380	173
2-1/2	65	2381	8-1/2	216	3-3/8	86	7	178	35	16	12	300	2388	27-1/2	699	11-3/8	289	19	483	620	281
3	80	2382	9-1/2	241	3-7/8	98	7-1/2	191	40	18	14	350	2389	31	787	13-3/8	240	21	533	740	336
4	100	2383	11-1/2	292	4-5/8	117	9	229	68	31	16	400	2390	32	813	15-3/8	391	23-1/2	597	1035	470
5	125	2384	13-3/4	349	5-1/8	130	10	254	105	48	18	450	2391	36	914	17-1/8	435	25	635	1540	699
6	150	2385	15	381	5-7/8	149	11	279	128	58	20	500	2392	40	1016	19-1/8	486	27-1/2	699	1835	832
8	200	2386	19-1/2	495	7-5/8	194	13-1/2	343	235	107	24	600	2394	48	1219	22-3/4	578	32	813	2475	1123

Working Pressure: 250 psi / 17 Bar

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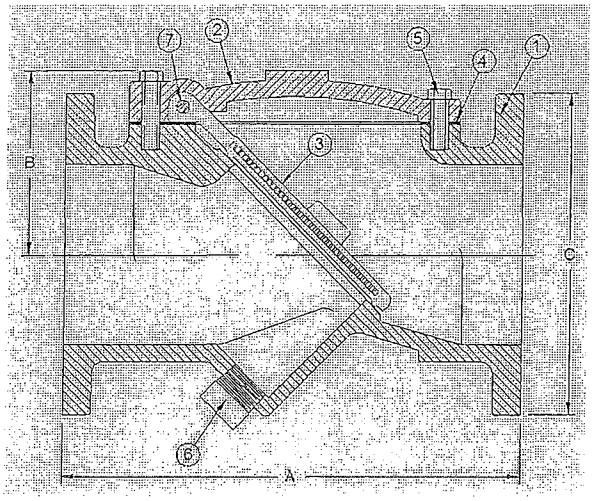
DANFOSS FLOMATIC CORP.
GLENS FALLS, N.Y. 12801
PHONE (518) 761-9797
FAX (518) 761-9798

January 30, 2004
Dwg No: S745 Rev: 0

FLOMATIC®

FLO-FLEX™ Swing Check Valves

The Danfoss Flomatic Model 745 is based on a simple, proven and reliable construction.



Materials of Construction

#	Part	Material Description
1	Valve Body	Ductile Iron ASTM A-536 grade 65-45-12
2	Cover	Ductile Iron ASTM A-536 grade 65-45-12
3	Valve Disc	NBR (EPDM optional) coated Carbon Steel Disc
4	Cover Gasket	NBR/EPDM
5	Cover Bolts	Carbon Steel ASTM A107 B
6	Drain Plug	Carbon Steel/Brass
7	Valve Disc Hinge	Stainless Steel AISI 420

Temp. Max: 140° F (60° C)
Pressure Max: 250 PSI (3"-12"), 150 PSI (14"-24")

Options:
The new heavy duty Model 745 is offered with optional backflow device (Model 745BF) and valve disc position indicator (Model 745PI) and valve disc proximity switch (Model 745PS).

Features / Benefits:

1. Fusion Epoxy coated inside/outside
2. Flanges to flange dimension according to AWWA C508-01
3. The 45° angle valve seat
4. Disc strokes 35° angle to minimize disc slam
5. Low Head Losses.
6. Long Rubber Disc life.
7. Easy In-Line Serviceability.
8. Can be installed in an up-flow or down-flow direction.
9. Precision molded valve disc of one piece construction, integral "o"-ring type sealing.
10. Can be used as pipe line cleanout.
11. Valve body flow area equal to nominal pipe area
12. Reinforced steel/ductile iron valve disc
13. Lower installation cost.

Other Flo-Flex Valves

Flo-Flex™ Models	Seal/Body Design	Size Range
Model 78	In line	2 ½" thru 14"
Model 78A	90° angle body design	2 ½" thru 14"
Model 745	45° slanted seat design	2" thru 24" ANSI/AWWA C508-01 lay length

Size	Part No.	Weight (lbs)	List Price*
2"	2380	70	$90.46
2 1/2"	2381	77	$128.89
3"	2382	82	$204.11
4"	2383	88	$281.20
5"	2384	95	$418.65
6"	2385	126	$492.48
8"	2386	230	$842.56
10"	2387	370	$1,238.91
12"	2388	605	$1,806.62
14"	2390	737	$2,423.30
16"	2391	1060	$3,352.67
18"	2392	1500	$4,486.15
20"	2393	1827	$5,253.52
24"	2394	2575	$7,678.14

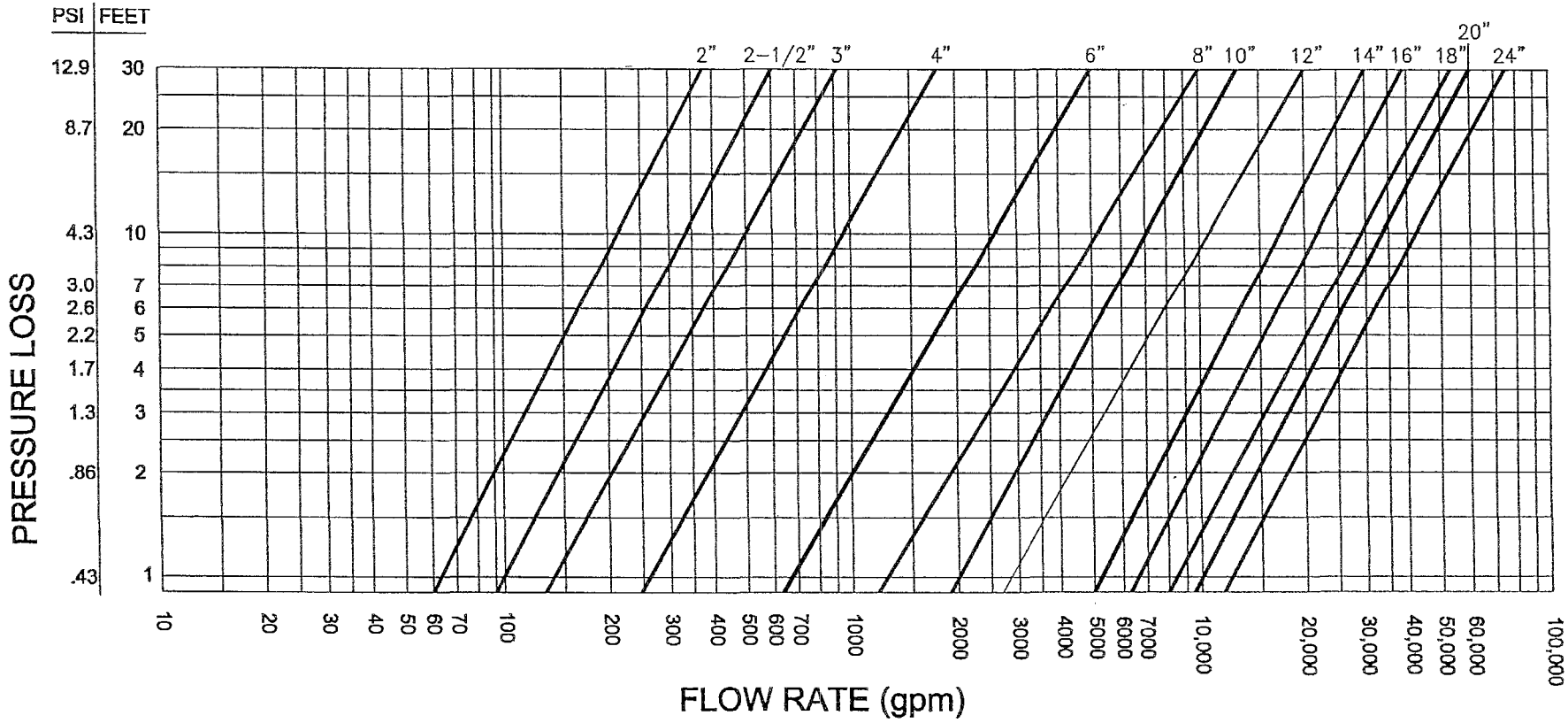
15 Pruyn's Island Drive, Glens Falls, New York 12801-4424
Phone: 1-800-833-2040 Fax: 518-791-9798
www.us.water.danfoss.com www.flomatic.com

High Quality Valves Built to Last . . .

Swing Check Valves — Headloss Chart — Model 745

Sizes 2" Thru 24" / 50mm Thru 600mm

Danfoss Flomatic



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August 20, 2004
Dwg No: S745HL Rev: A (2/05)

FLOMATIC®

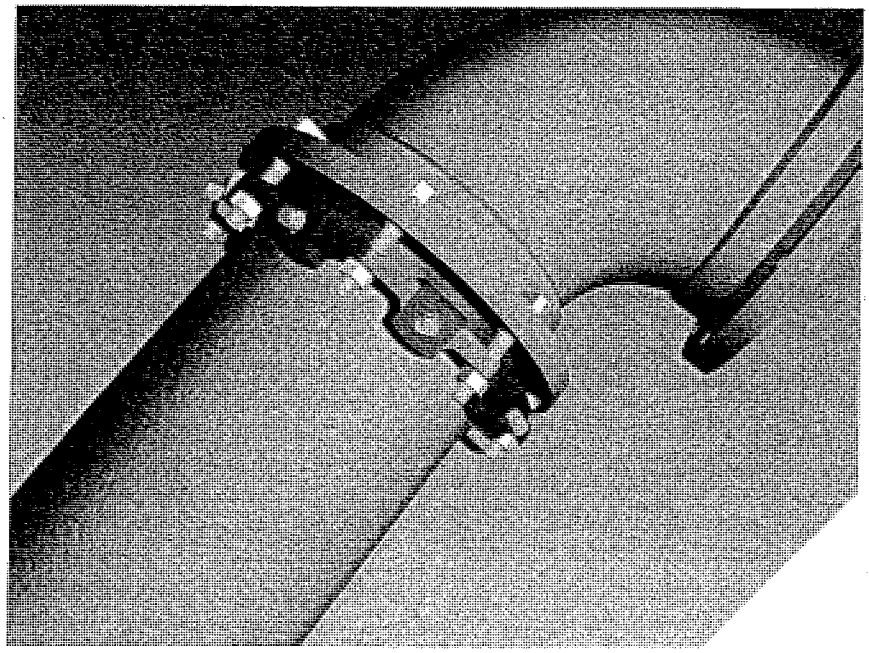
Typical

EBAA IRON INC

Your Connection to the Future™

MEGALUG SERIES 1100

Mechanical Joint Restraint For Ductile Iron Pipe



Series 1112, for 12" Mechanical Joint Restraint of Pipe or Fittings.

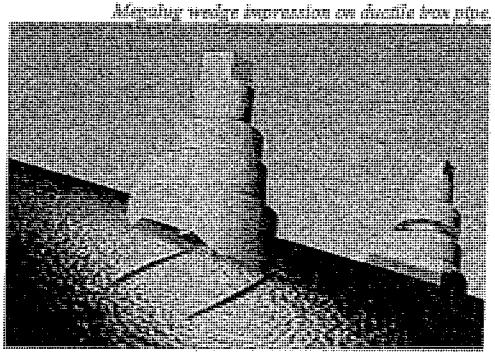
Features and Application:

- Sizes 3" through 48"
- Constructed of ASTM A536 Ductile Iron
- Torque limiting Twist-Off Nuts
- MEGA-BOND™ Restraint Coating System
  For more information on MEGA-BOND, refer to www. baa.com/products/mega-bond
- The Mechanical Joint follower gland is incorporated into the restraint.
- Heavy Duty thick wall design
- Support Products Available:
  - Split repair style available 3 inch through 48 inch.
    EBAA Series 1100SD
  - Solid restraint harness available for push-on pipe bells.
    EBAA Series 1700
  - Split restraint harness available for existing push-on bells
    EBAA Series 1100HD
- All MEGALUG and related restraint products can be furnished as packaged accessories complete with appropriate restraint, gasket, lubrication and bolting hardware.
- For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600 or ASTM D2774.

Nominal Pipe Size	Series Number	Shipping Weights	Deflection (Degrees)	Pressure Rating (psi)
3	1103	6.1	3°	350
4	1104	7.7	3°	350
6	1106	11.9	3°	350
8	1108	14.8	3°	350
10	1110	23.9	3°	350
12	1112	31.2	3°	350
14	1114	48.5	2°	350
16	1116	56.4	2°	350
18	1118	63.1	1½°	250
20	1120	72.3	1½°	250
24	1124	133.1	1½°	250
30	1130	194.6	1°	250
36	1136	234.0	1°	250
42	1142	536.0	1°	250
48	1148	653.0	1°	250

Note: For applications or pressures other than those shown, please contact EBAA for assistance.

Megalug wedge impression on ductile iron pipe.



Made In The U S A

U.S. Patent No. 4092036,
4627774, 4779900, 4896903, 5544922

0306-5-E

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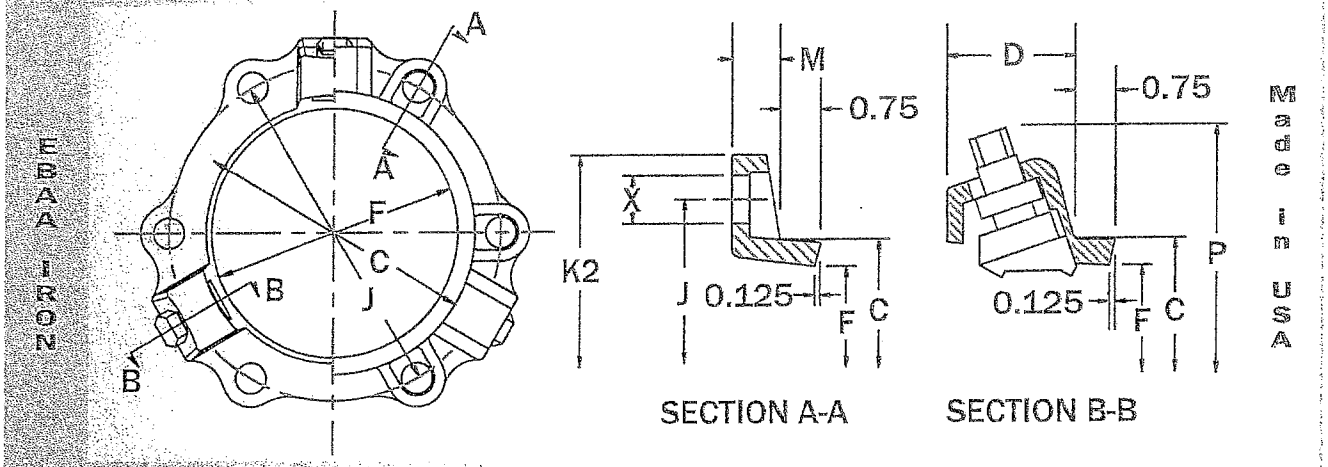
Series 1100 Submittal Reference Drawing



Nominal Pipe Size	Series Number	E	D	F	M	P Width Across Nuts Diameter	X	J	K2	Retainer Qty	Bolt Qty	Weight LBS	Pressure Ratings
3	1103	4.48	2.27	4.06	0.62	9.06	0.750	6.19	7.69	2	4	6.1	350
4	1104	5.92	2.27	4.90	0.75	9.90	0.875	7.50	9.12	2	4	7.6	350
6	1106	8.02	2.27	7.00	0.88	12.00	0.875	9.50	11.12	3	6	11.8	350
8	1108	10.17	2.31	9.15	1.00	14.15	0.875	11.75	13.37	4	6	14.9	350
10	1110	12.22	2.37	11.20	1.00	16.20	0.875	14.00	15.62	6	8	23.9	350
12	1112	14.32	2.37	13.30	1.25	18.30	0.875	16.25	17.88	8	8	31.2	350
14	1114	16.40	2.69	15.44	1.50	20.94	0.875	18.75	20.25	10	10	49.7	350
16	1116	18.50	2.69	17.54	1.56	22.90	0.875	21.00	22.50	12	12	56.4	350
18	1118	20.60	2.69	19.64	1.63	25.00	0.875	23.25	24.75	12	12	63.6	250
20	1120	22.70	2.69	21.74	1.69	27.10	0.875	25.50	27.00	14	14	71.0	250
24	1124	26.90	3.20	25.94	1.81	32.64	0.875	30.00	31.50	16	16	128.7	250
30	1130	33.29	3.20	32.17	2.25	38.87	1.125	36.88	39.12	20	20	190.7	250
36	1136	39.59	3.20	38.47	2.25	45.17	1.125	43.75	46.00	24	24	226.5	250
42	1142	45.79	4.56	44.67	3.88	55.57	1.375	50.62	53.48	28	28	518.9	250
48	1148	52.09	4.56	50.97	3.88	61.87	1.375	57.50	60.36	32	32	608.3	250

Note: Dimensions are in inches and are subject to change without notice.

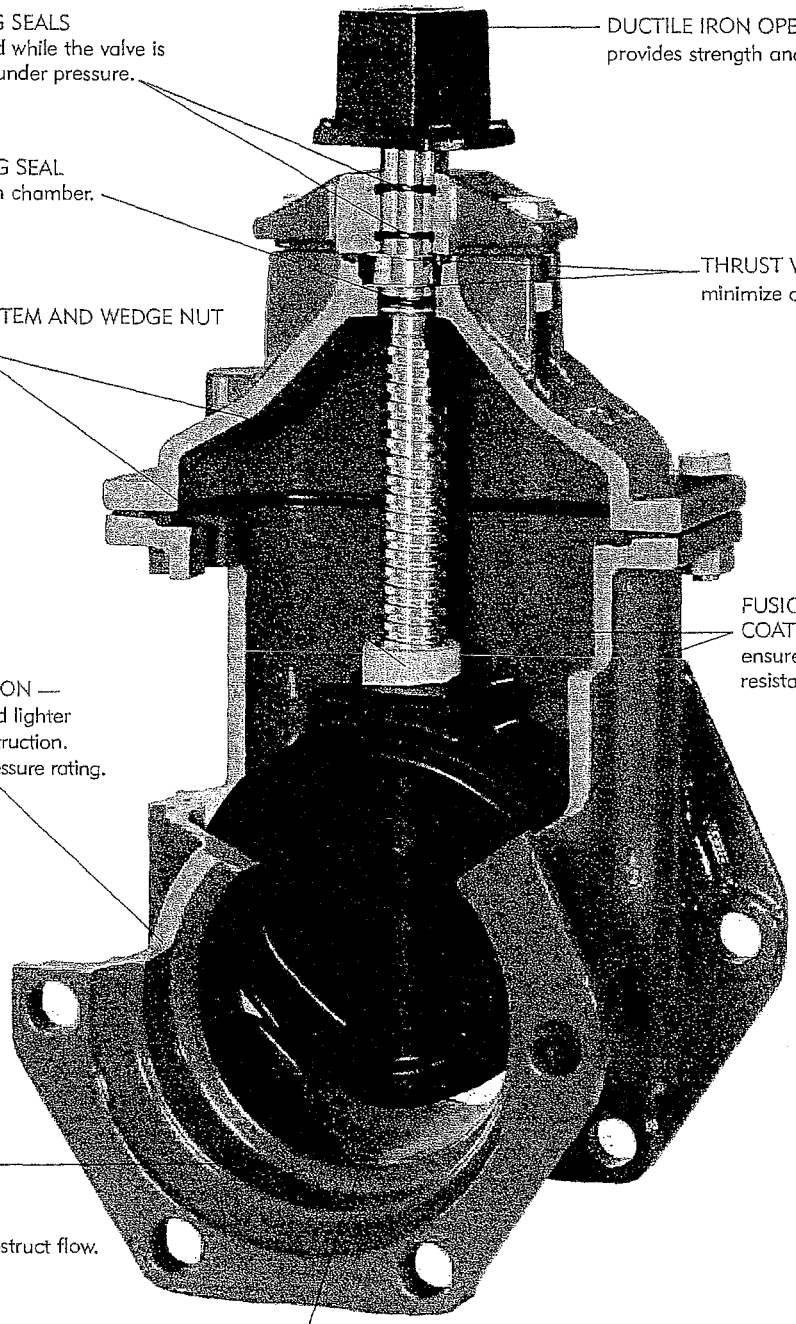
Important Notes

- The 1100 Series should not be used on plain end fittings.
- For test pressures above the rated pressures shown, contact EBAA for recommendations, such as tandem restraint for high pressure applications.
- If you experience the need to install the 1100 Series in an unconventional manner please consult our engineering department.
- The 1100 Series is intended for use on ductile iron pipe. The restraint can be used on grey iron pipe if the pipe is not severely corroded and is in sound condition and has an outside diameter that can be accommodated. For more information on the use of the MEGALUG restraint on grey iron pipe ask for Connections Bulletin DI-1.
- EBAA Seal Gaskets are provided with the 30" through 48" MEGALUG restraints. These are required on the above referenced sizes to accommodate the pressure ratings and safety factors shown.
- Extra length T-bolts are provided with the 42" and 48" sizes to facilitate easier assembly of the mechanical joint.
- All MEGALUG components are made of ductile iron. The wedges are heat treated to a hardness range of 370 to 470 BHN.
- LISTINGS AND APPROVALS Sizes 3" through 24" are listed by Underwriters Laboratories, Inc. Category HJKF "Fittings, Retainer Type," with a deflection angle of 5 degrees (3" through 12") and 2-1/2 degrees (14" through 24".) The listing file number is EX2836. Sizes 3" through 12" are Factory Mutual approved.

SERIES 2500 RESILIENT WEDGE GATE VALVE RWGV1

Typical Resilient Wedge Gate Valves

CONSTRUCTION



UPPER O-RING SEALS
can be replaced while the valve is fully open and under pressure.

LOWER O-RING SEAL
seals lubrication chamber.

HIGH-STRENGTH BRONZE STEM AND WEDGE NUT
resist corrosion and abuse.

DUCTILE IRON CONSTRUCTION —
Greater strength, durability, and lighter weight than cast gray iron construction.
250 p.s.i.g. AWWA UL & FM pressure rating.

SMOOTH WATERWAY CONSTRUCTION —
Oversize waterway.
No recesses to trap debris or obstruct flow.
Reduces pumping costs.

DUCTILE IRON OPERATING NUT
provides strength and durability.

THRUST WASHERS
minimize operating torque.

FUSION-BONDED-EPOXY COATING INSIDE AND OUT
ensures maximum corrosion resistance for long service life.

EPDM RUBBER-ENCAPSULATED DUCTILE IRON WEDGE
ensures drop tight seal every time with low stem torque.

FEATURES/BENEFITS/SPECIFICATIONS

FEATURES

The **Series 2500** Ductile Iron 250 p.s.i.g. AWWA Resilient Wedge Gate Valve is designed for use in drinking water, sewage, and fire protection systems as well as irrigation and backflow control systems.

Ductile Iron Construction

The ductile iron body, bonnet, and wedge provide strength and a pressure rating that meets or exceeds the requirements of AWWA C515. Strength more than doubles that provided by cast gray iron designs, and the pressure rating is 250 p.s.i.g. All this strength and higher pressure rating is provided in a compact, lightweight, and easy-to-handle ductile iron valve.

Fusion-Bonded Epoxy

The **Series 2500** valve is fully epoxy coated on the interior and the exterior. The fusion-bonded coating is applied prior to assembly so that even the bolt holes and body-to-bonnet flange surfaces are fully epoxy coated.

Triple O-Ring Stem Seals

This valve features triple O-Ring stem seals. Two O-Rings are located above, and one O-Ring is located below the thrust collar. The lower two O-Rings provide a permanently sealed lubrication chamber that will make the valve easier to operate over a longer period of time. The upper O-Ring ensures that sand, dirt, or grit cannot enter the valve to cause damage to the lower O-Rings. This is especially important for buried and sewage service applications.

Thrust Washers

Two thrust washers are used. One is located above, and one is located below the thrust collar. These thrust washers ensure easy operation at all times.

No Flat Gaskets

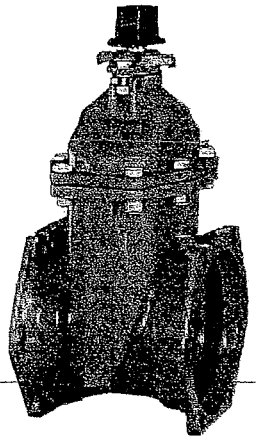
The body-to-bonnet and bonnet-to-bonnet cover seals are pressure-energized O-Rings. This eliminates the need for excessive bolt loading, which is required by designs that use flat gaskets. The O-Rings are reusable, which eliminates downtime during any needed repair.

The **Series 2500** Resilient Wedge Gate Valve is furnished in configurations that are Listed by Underwriters Laboratories, Inc. and Approved by Factory Mutual Research Corp.

BENEFITS

The **Series 2500 Ductile Iron Resilient Wedge Gate Valve** has these standard features:

- UL Listed-FM Approved
- Seat Tested at 500 p.s.i.g.
- Fusion-Bonded-Epoxy Coating Complies With ANSI/AWWA C550
- 250# Raised Face Flanges Available
- Ductile Iron Body, Bonnet, Wedge, Operating Nut, and Stuffing Box
- Shell Tested at 500 p.s.i.g.
- 250 p.s.i.g. AWWA UL and FM Pressure Rating
- Rubber-Encapsulated Wedge
- Triple O-Ring Stem Seals
- Thrust Washers
- Smooth (No Pocket) Waterway
- 100% Leak-Tight Closure
- NSF Standard 61 Certified
- Complies with AWWA C515



SPECIFICATIONS

Valves 2"-12" shall be resilient wedge type rated for 250 p.s.i.g. cold water working pressure. All ferrous components shall be ductile iron, ASTM A536. Valves 3"-12" shall be in full compliance with AWWA C515. The words "D.I." or "Ductile Iron" shall be cast on the valve. The wedge shall be ductile iron or bronze encapsulated with EPDM rubber.

The wedge shall be symmetrical and seal equally well with flow in either direction.

The gate valve stem and wedge nut shall be copper alloy in accordance with Section 4.4.5.1 of the AWWA C515 Standard. Stainless Steel stems are not acceptable. The NRS stem must have an integral thrust collar in accordance with Section 4.4.5.3 of AWWA C515 Standard. Two-piece stem collars are not acceptable. The wedge nut shall be independent of the wedge and held in place on three sides by the wedge to prevent possible misalignment.

Valves shall be certified by NSF to Standard 61.

Bolting materials shall develop the physical strength requirements of ASTM A307 and may have either regular square or hexagonal heads with dimensions conforming to ANSI B18.2.1. Metric size socket head cap screws, therefore, are not allowed.

The operating nut shall be constructed of ductile iron and shall have four flats at stem connection to ensure even input torque to the stem.

All gaskets shall be pressure-energized O-Rings.

Stem shall be sealed by three O-Rings. The top two O-Rings shall be replaceable with valve fully open and while subject to full rated working pressure. O-Rings set in a cartridge shall not be allowed.

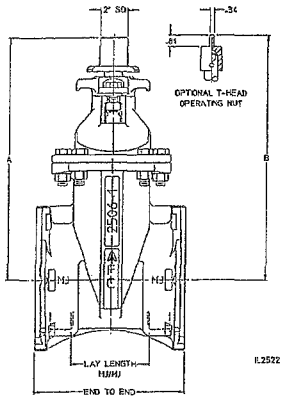
Valve shall have thrust washers located with (1) above and (1) below the thrust collar to ensure trouble-free operation of the valve.

All internal and external surfaces of the valve body and bonnet shall have a fusion-bonded-epoxy coating, complying with ANSI/AWWA C550, applied electrostatically prior to assembly.

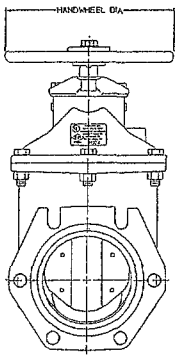
Valves shall be American Flow Control's **Series 2500 Ductile Iron Resilient Wedge Gate Valve.**

DRAWING/DIMENSIONS

SERIES 2500 – STANDARD NRS DIMENSIONS
2"-12" SIZES



SHOWN WITH 2" OPERATING NUT



SHOWN WITH OPTIONAL HANDWHEEL

SUBMITTAL DATA

QUANTITY							
2"	2-1/2"	3"	4"	6"	8"	10"	12"

❑ NRS with 2" Sq. Oper. Nut ❑ NRS with T-Head Oper. Nut
❑ NRS with Handwheel ❑ Post Indicator Valve (PIV)
❑ OS & Y

ACTUATOR (Check One)
❑ NRS with Enclosed Miter Gearing
❑ 2" Sq. Oper. Nut Parallel to Waterway
❑ 2" Sq. Oper. Nut Perpendicular to Waterway
❑ Handwheel Perpendicular to Waterway

Open Direction:	❑ Left (C.C.W.)	❑ Right (C.W.)
End Connections:		
Mechanical Joint Accessories:	❑ Yes	❑ No
UL Listed, FM Approved:	❑ Yes	❑ No
Other Requirements (List on a separate sheet):		

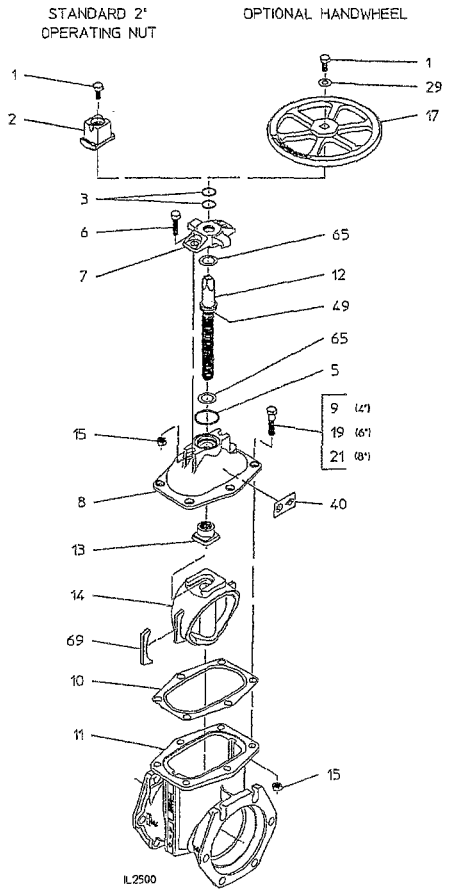
See notes at bottom of page.

DIMENSION	VALVE SIZE							
	Series 2500			Series 2500-1				
	2"	2-1/2"	3"	4"	6"	8"	10"	12"
A	9.25	11.03	11.84	13.91	17.12	20.47	24.06	27.59
B	10.22	12.00	N/A	N/A	N/A	N/A	N/A	N/A
End to End – MJ/MJ	8.25	N/A	8.62	10.00	10.50	11.50	12.50	13.50
Lay Length – MJ/MJ	3.25	N/A	3.62	5.00	5.50	6.50	7.50	8.50
End to End – FL/FL (Class 125)	7.00	7.50	8.00	9.00	10.50	11.50	13.00	14.00
End to End – FL/FL (Class 250)	N/A	N/A	11.12	12.00	15.88	16.50	18.00	19.75
End to End – TY/TY	N/A	N/A	N/A	13.00	15.88	17.50	18.75	19.75
End to End – FL/MJ (Class 125)	N/A	N/A	N/A	9.50	10.50	12.28	13.62	14.38
End to End – FL/TY (Class 125)	N/A	N/A	N/A	11.00	13.19	14.50	15.88	16.88
End to End – PVC/PVC	10.75	11.12	11.38	13.00	15.88	17.50	N/A	N/A
End to End – Threaded	6.25	7.38	7.38	N/A	N/A	N/A	N/A	N/A
Handwheel Diameter	8.06	8.00	8.00	10.00	12.00	14.00	15.50	15.50
No. of Turns to Open	9	11	13	14	20	26	32	38

1. 3" through 12" valves meet or exceed requirements of ANSI/AWWA C515.
2. 2-1/2" through 12" valves may be ordered in configurations which are UL Listed and/or FM Approved.
3. 2" through 12" valves have 250 p.s.i.g. AWWA rated working pressure.
4. 2-1/2" through 12" valves have 250 p.s.i.g. UL and FM rated working pressure.
5. Fusion-bonded-epoxy coating meets or exceeds requirements of ASME/AWWA C550.
6. Flanged ends are in accordance with ANSI/AWWA C110/A21.10 (ASME B16.1, Class 125).
7. Threaded ends are in accordance with ASME B16.4, Class 125.
8. Mechanical joint ends are in accordance with ANSI/AWWA C111/A21.11.
9. Tyton® ends and push-on ends are in accordance with ANSI/AWWA C111/A21.11 for use on cast iron (CI) size ductile iron pipe.
10. PVC ends are suitable for use on steel (IPS) sizes of PVC or steel pipe.
11. 4" through 36" valves are certified to ANSI/NSF Standard 61.
12. It is recommended that stems be vertical in raw sewage applications.

DRAWING/DIMENSIONS/PARTS LIST

Non-Rising Sten
4" – 8"



SERIES 2500-1 – STANDARD NRS PARTS LIST
4" – 8" SIZES

REFERENCE NUMBER	DESCRIPTION	MATERIAL	QTY Series 2500-1		
			4"	6"	8"
1	Hex Head Bolt, 5/8-11 x 1"	Stainless Steel	1	1	1
2	Operating Nut, 2" Square	Ductile Iron	1	1	1
3	O-Ring	Nitrile Rubber	2	2	2
5	Stuffing Box Gasket	Nitrile Rubber O-Ring	1	1	1
6	Hex Head Bolt, 5/8-11 x 1-3/4"	Stainless Steel	2	2	2
7	Stuffing Box	Ductile Iron	1	1	1
8	Bonnet	Ductile Iron	1	1	1
9	Hex Head Bolt, 5/8-11 x 2"	Stainless Steel	4	–	–
10	Bonnet Gasket	EPDM Rubber	1	1	1
11	Body	Ductile Iron	1	1	1
12	Stem	Manganese Bronze	1	1	1
13	Wedge Nut	Manganese Bronze	1	1	1
14	Resilient Wedge	Ductile Iron, Encapsulated with EPDM Rubber	1	1	1
15	Hex Nut, 5/8-11	Stainless Steel	6	8	10
17	Handwheel	Ductile Iron	1	1	1
19	Hex Head Bolt, 5/8-11 x 2-1/4"	Stainless Steel	–	6	–
21	Hex Head Bolt, 5/8-11 x 2-1/2"	Stainless Steel	–	–	8
29	Flat Washer, 5/8	Stainless Steel	1	1	1
40	UL/FM Label	Pressure-Sensitive Acrylic Film	1	1	1
49	O-Ring	Nitrile Rubber	1	1	1
65	Thrust Washer	Stainless Steel	2	2	2
69	Wedge Cover	Acetal	2	2	2

Outside Flood Lts.

LumaPro

Outdoor Lighting: Motion Sensors and Lampholder Kits

Passive infrared motion sensors constantly scan areas for changes in temperature or motions, turning lights on only when ambient light is below the set level and motion is detected. Lights stay on for a programmed length of time, then shut off to save energy. Sensors are weatherproof, with integrated circuit technology and large areas of coverage. UL Listed.

INCANDESCENT LIGHTING MOTION SENSORS

500W Incandescent Maximum Load
Photocell automatically deactivates during daylight to save energy. Sensor is adjustable, with multiple time and range settings. Polycarbonate, weatherproof sensor design.

1000W Incandescent Maximum Load
All metal, weatherproof design scans an area up to 23,000 square feet and offers a wide 270 degree field of view.

INCANDESCENT LIGHTING MOTION SENSOR/LAMPHOLDER KITS

300W maximum load with 2-levels of lighting, and multiple time and range settings. Adjustable to almost any situation. Metal lamp holders and polycarbonate, weatherproof sensor. Photocell automatically deactivates during daylight hours to save energy. Uses maximum 150W lamps, not included; use No. 3JK34.

INCANDESCENT PROFESSIONAL SERIES LIGHTING MOTION SENSOR KIT

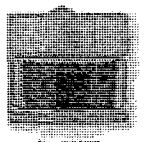
Part of the LumaPro "Professional Series", with a wide 270° field of view. All metal, heavy-duty weatherproof design. Multiple time and range setting makes this unit adjustable to most situations. Photocell automatically deactivates during daylight hours to save energy. Uses maximum 150W lamps, not included; use No. 3JK34.

QUARTZ LIGHTING MOTION SENSOR KIT

No. 4VW86 features 2-levels of lighting, and multiple time and range settings. Heavy-duty weatherproof design. Controls quartz lighting. Easy clip hinged door. Photocell automatically deactivates during daylight hours to save energy. Uses one, 500W quartz halogen lamp, included. For replacement; use No. 2V384.

QUARTZ PROFESSIONAL SERIES LIGHTING MOTION SENSOR KIT

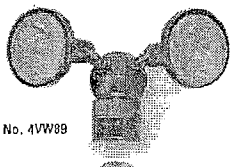
LumaPro "Professional Series", multiple time and range settings and an energy-saving photocell that automatically deactivates during daylight hours. All metal, heavy-duty weatherproof design. Uses two, 250W quartz halogen lamps, included. For replacement, use No. 1G982.


No. 4VW87


No. 4VW88


No. 4VW91


No. 4VW92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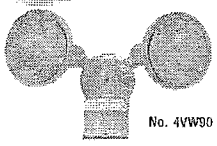
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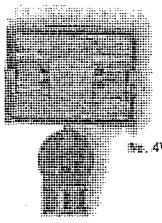
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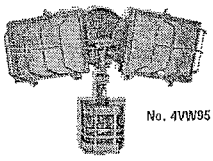
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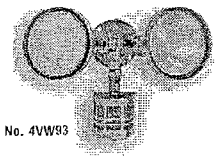
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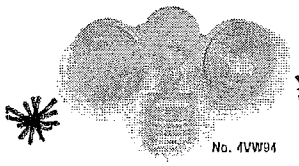
No. 4VW94

Maximum Load Watts	Scanning Area (Sq. Ft.)	Field of View (Degree)	Volts	Color	Stock No.	Shpg. Wt.
INCANDESCENT LIGHTING MOTION SENSORS						
500	21,000	240	120	Bronze	4VW87	0.5
500	21,000	240	120	White	4VW88	0.5
1000	23,000	270	120	Bronze	4VW91	2.9
1000	23,000	270	120	White	4VW92 ✓	2.9
INCANDESCENT LIGHTING MOTION SENSOR/LAMPHOLDER KITS						
300	21,000	240	120	Bronze	4VW89	2.5
300	21,000	240	120	White	4VW90	2.5
INCANDESCENT PROFESSIONAL SERIES LIGHTING MOTION SENSOR KIT						
300	23,500	270	120	Bronze	4VW93 ✓	7.3
★ 300	23,500	270	120	White	4VW94 ✓	7.2 ★
QUARTZ LIGHTING MOTION SENSOR KIT						
500	21,000	240	120	Bronze	4VW86	3.3
QUARTZ PROFESSIONAL SERIES LIGHTING MOTION SENSOR KIT						
500	23,500	270	120	Bronze	4VW95 ✓	7.8

■ = Shipped Directly from Manufacturer ✓ = Extended Warranty Available ★ = New Item

Emergency Exit Sign & Lts.

LITHONIA LIGHTING

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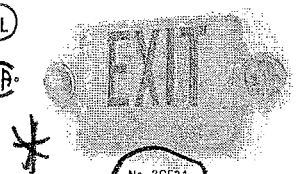
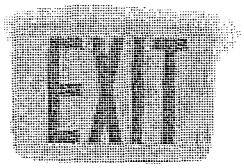


No. 3CE34

No. 4PH16



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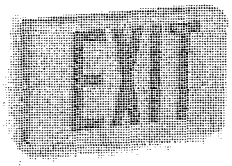

No. 3XE31

Quantum® Thermoplastic Exit Fixtures

Attractive LED Quick-Mount® exit signs consume less than one watt of energy and take only 3 minutes to install.

Housing: Engineering-grade white thermoplastic housing is corrosion-proof and impact and scratch resistant. Snaps together with no additional fasteners. UL94 V-O flame rating. UV-stable resin resists discoloration from natural and artificial light sources.

Exit Face Assembly: 6" high letters with 3/4" stroke are uniformly illuminated. Reinforced, impact-resistant color panels. Universal, directional chevron inserts are easy to remove and reinsert.

Installation: Easily removed mounting knockouts and universal J-box pattern on back panel.

Approvals/Ratings: UL Listed. Meets UL 924 NFPA 101, NEC and OSHA illumination standards.

Uses: For general commercial use in schools, hospitals, retirement facilities, offices, restaurants, theatres, hotels, and retail spaces.

COMBINATION

Streamlined emergency light and exit sign fits in limited over-the-door space. Side-mounted lamphead optics reduce glare and provide brighter illumination along the path of egress. Installation: LED units are top-, end- (remove one lamp), or back-mount. Incandescent units are top- or back-mount only.

Battery and Charger: Sealed, maintenance-free lead-calcium battery delivers 90 minutes of power to lamps, then automatically recharges. Test switch and status indicator to monitor system.

SELF-DIAGNOSTIC

Provides automatic testing for 5 minutes every 30 days, and 30 minutes every 6 months. Evaluates charging and battery condition, LED light source, and AC to DC transfer. Continuously monitors AC functionality. Features two-state constant-current charger, low-voltage disconnect, and brownout protection. Multichromatic status indicator displays two-state charging, test activation, and three-state diagnostic status. LEDs operate in normal (AC input) and emergency (DC input) modes. Interchangeable faceplate and back cover.

Battery: Maintenance-free, nickel-cadmium battery delivers 90-minute capacity to lamps.

- Test switch to manually monitor system operation
- Status indicator shows system is working properly
- Low energy consumption—less than one watt

EMERGENCY AND EXIT SIGNS

Top-, end-, or back-mount exit signs have interchangeable faceplate and back cover.

With Battery
Maintenance-free battery delivers 90-minute capacity to lamps. LED model has a nickel-cadmium battery; incandescent model has a lead-calcium battery.

Note: For accessories and replacement batteries, see page 770.

Input Volts	Watts	Lamp Type	Replacement Lamp	Dimensions (In.) L	W	D	Lithonia Model	Red (TR) Stock No.	Each	Green (TG) Stock No.	Each	Ship Wt.
COMBINATION EMERGENCY LIGHT AND EXIT SIGN (WITH BATTERY)												
120/277	3.3	LED	—	21.25	9.88	2.63	LHQMSW3*	3CE34 ✓		★ 3CE35 ✓		7.7
120/277	23	Incandescent	4V450	22.75	10.25	4	HQMSW3*	4PH15 ✓		4PH16 ✓		10.0
SELF-DIAGNOSTIC EMERGENCY EXIT SIGN (WITH BATTERY), SINGLE OR DOUBLE FACES												
120/277	0.92	LED	—	12.25	10	2.25	LQMSW3*120/277ELNSD	3XE31 ✓		3XE32		2.0
EMERGENCY EXIT SIGNS (WITH BATTERY), SINGLE OR DOUBLE FACES												
120/277	0.92	LED	—	12.25	7.5	2.25	LQMSW3*ELN	3BA32 ✓		3BA33 ✓		3.3
120/277	27	Incandescent	4V450	13	9.88	2.63	QMSW3REL	4PH06 ✓		—		7.2
EXIT SIGNS (WITHOUT BATTERIES), SINGLE OR DOUBLE FACES												
120/277	0.72	LED	—	12.25	7.5	2.25	LQMSW3*120/277	3BA31 ✓		1GC97 ✓		3.3
120	22.4	Incandescent	4V450	12.25	7.5	2.25	QMSW3*120	4PH18		3FB32		2.8
120	22.4	Red/Green Incandescent	4V450	12.25	7.5	2.25	QMSW3R/G120	4PH32		4PH32		3.2

= Shipped Directly from Manufacturer ✓= Extended Warranty Available ★= New Item

LITHONIA LIGHTING

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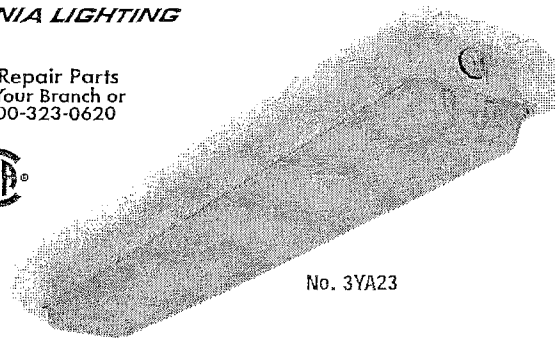
No. 3YA23

Wet Location, Dust-Resistant Fluorescent Fixtures

Rugged fixture withstands tough environments where dust, dirt, humidity, moisture, or corrosive elements are present. Completely enclosed, gasketed unit is designed to prevent entry of airborne contaminants that can reduce fixture performance. Impact-resistant fiberglass-reinforced polyester housing won't degrade or oxidize.

Impact-resistant acrylic diffuser is secured to housing with cam-action latches for a positive seal. Lamps not included.

Uses: Fabrication and machining areas, welding, grinding, or any nonhazardous environment. UL Listed for wet locations.

Lamp Qty.	Lamp Type	Suggested Lamp Stock No.	Lamp Watts	Voltage	Ambient Temp. (°F) Min.	Ambient Temp. (°F) Max.	Dimensions (In.) L	Dimensions (In.) W	Dimensions (In.) H	Footnotes	Lithonia Model	Stock No.	Shpg. Wt.
T8 ELECTRONIC BALLAST													
2	F32T8	4PL16	32	120	0	104	48	8⅛	5⅝		EGW232120GEB	1BP84	12.0
2	F32T8	4PL16	32	120/277	0	104	50	7⅝	4¾	—	DMW232MVGEB10IS	3YA23	12.6
2	F96T8	2D002	59	120/277	0	104	98	7⅝	5⅝	—	DMW296T8MVGEB10IS	3YA24	25.1
2	F96T8HO	2F964	86	120	-20	104	98	7⅝	5⅝	1	DMW296T8HO120CW20ACNS	3GY21	29.0
2	F96T8HO	2F694	86	277	-20	104	98	7⅝	5⅝	1	DMW296T8HO277CW20ACNS	3GY22	28.0
T12 MAGNETIC BALLAST													
2	F20T12	2V896	20	120	50	104	26	7	5	—	EGW220AR120	1NC58	10.6
2	F34T12	3V477	34	120	60	104	50	7⅝	4¾	—	DMW240120ES	3GY13	15.0
2	F34T12	3V477	34	277	60	104	50	7⅝	4¾	—	DMW240277ES	3GY14	15.9
2	F40T12	3V526	40	120	50	104	48	8⅛	5⅝	—	EGW240120ES	1BP83	12.0
2	F48T12HO	3V443	60	120	-20	95	50	7⅝	5⅝	1	DMW248HO120CW20	3GY15	23.0
2	F48T12HO	3V443	60	277	-20	95	50	7⅝	5⅝	1	DMW248HO277CW20	1NC47	23.2
2	F96T12	3V480	75	120	60	104	98	7⅝	5⅝	—	DMW296120ES	3GY16	21.0
2	F96T12	3V480	75	277	60	104	98	7⅝	5⅝	—	DMW296277ES	3GY17	28.0
2	F96T12HO	5V631	110	120	-20	95	98	7⅝	5⅝	1	DMW296HO120ESCW20	3GY18	37.0
2	F96T12HO	5V631	110	277	-20	95	98	7⅝	5⅝	1	DMW296HO277ESCW20	3GY19	21.0

(1) High Output.

Indoor Flscn. Lts.

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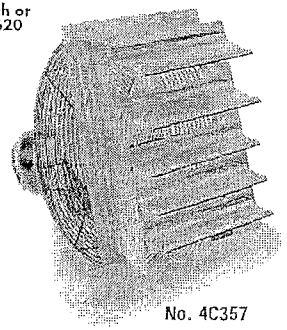
Guarding Complies with OSHA Regulations



No. 4C357

7 to 36" Shutter-Mounted Exhaust Fans

Easy-to-install, efficient exhaust fans have automatic shutters. Heavy-duty guards have gray polyester coating to resist corrosion. Mounting holes in shutter frame allow easier installation. Guards comply with OSHA regulations.

The 7 to 24" diameter fans have aluminum propellers; 30 and 36" fans have galvanized steel propellers.

Two-speed unit requires No. 2X605 two-speed switch.

Optional speed controls are sold separately.

Uses: Widely used for ventilating stores, offices, factories, shops, and farm buildings.

- Totally enclosed, sleeve or ball bearing 115V, 60 Hz motors
- Shipped completely assembled

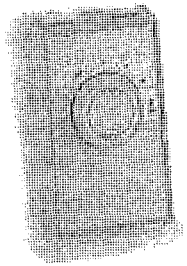
Dayton Electric Mfg. Co. certifies that the ventilators shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Propeller Dia. (In.)	CFM Air Delivery* 0.0" SP	0.125" SP	0.250" SP	Motor RPM	HP	Bearing Type	Full Load Amps	Sones** 5 Ft. 0" SP	Square Panel Size (In.)	Speed Control	Square Opening Required (In.)	Stock No.			Shpg Wt.
SPEED CONTROLLABLE															
7	140	—	—	1550	1/30	Sleeve	1.4	4.8	11⅛	4YC44	8½	2C634	✓		9.1
10	585	285	—	1550	1/30	Sleeve	1.4	6.6	13⅛	4YC44	10½	2C819	✓		10.0
12	800	470	—	1550	1/30	Sleeve	1.4	7.6	15⅛	4YC44	13	2C710	✓		12.0
16	1095	720	—	1550	1/20	Sleeve	1.5	8.0	19⅛	4YC44	17	2C713	✓	*	20.1
18	1860	850	—	1075	1/15	Sleeve	1.2	8.4	21⅛	4YC44	18½	2C708	✓		22.9
20	2830	2255	1235	1075	1/4	Sleeve	4.6	11.3	23⅛	4YC46	21	4YC97	✓		37.0
24	3240	2485	1110	1075	1/4	Ball	3.7	11.7	27⅛	4YC46	25	4C269	✓		38.1
SINGLE SPEED															
18	2590	2190	1705	1725	1/4	Sleeve	4.4	14.3	21⅛	—	19	4C357	✓		30.7
20	2955	2450	1960	1725	1/4	Sleeve	4.3	14.4	23⅛	—	21	2C342	✓		33.0
20	3635	3115	2760	1725	1/3	Sleeve	4.9	16.9	23⅛	—	21	2C785	✓		36.3
24	3270	2515	1205	1075	1/4	Sleeve	3.2	10.7	27⅛	—	25	4C358	✓		38.9
24	3970	3240	1900	1075	1/3	Sleeve	3.6	12.1	27⅛	—	25	4C359	✓		46.6
20	2985	2445	1965	1725	1/4	Ball	4.3	14.3	23⅛	—	21	4C268	✓		32.9
30	6075	4195	2150	825	1/3	Ball	4.4	13.5	33⅛	—	31	5C195	✓		66.0
36	8225	6480	2935	825	1/2	Ball	5.6	14.7	39⅛	—	37	5C196	✓		77.0
2-SPEED															
24	3985/3760	3255/2995	1950/1563	1075	1/3	Sleeve	3.7	11.8/11.3	27⅛	2X605	25	4C360	✓		41.7

(*) Performance shown is for installation type A, free inlet, free outlet. Speed (RPM) shown is nominal. Performance is based on actual speed of test. Performance ratings include the effects of guard and shutter in the airstream. (**) The sound ratings shown are loudness values in fan sones at 5 ft. (1.5mm) in a hemispherical-free field calculated per AMCA Standard 301. Values shown are for installation type A, free inlet fan sone levels.

General Vent Fan 16"

Columbus Electric®



Attic Fan Thermostat

Heavy-duty snap action switch has ivory color case.

Uses: For attic ventilators, fans, and dampers.

- Electrical Data: 3/4 HP @ 115VAC; 1½ HP @ 230VAC, 13.8 Amp Inductive
- Mounting: Standard 2 x 4" Vertical Box

Type	120VAC, Amps	240VAC, Amps
Full Load	13.8	10
Locked Rotor	82.8	60

Switch Type	Switch Action	Temp. Range (°F)	Fixed Diff. (°F)	Dimensions (In.) H	W	D	Stock No.	Shpg. Wt.
SPST	Close on Rise	90-130	15	4 9/16	2 13/16	2 1/8	2E340	0.7

= Shipped Directly from Manufacturer ✓= Extended Warranty Available ★= New Item

Thermostat
On: Temp. Rise

Air Inlet Louver

Dayton® Made in U.S.A.

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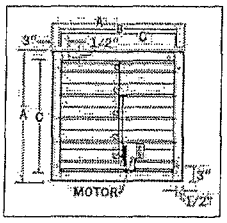

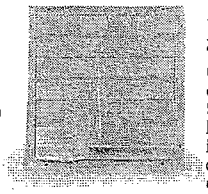
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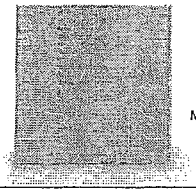
No. 3C188

Motorized Dampers

Stainless steel jamb seals virtually seal out light, air, and moisture. These dampers are for fans 16 to 60" in diameter. They feature center pivoting louvers for a full 90° opening. Can be mounted horizontally or vertically. Use for intake or exhaust applications. All dampers have welded-corner construction and feature factory-installed motors. Power on to open, spring return to close. Dampers have up to 3500 FPM maximum capacity.

Tie rod linkage is attached to louvers on the indoor side of the unit for proper installation, assuring dependable service. Welded-corner aluminum or G-90 galvanized steel frames are 2"D. Both frames have 1½" flange. Ample 9/32 x 1/2" oblong mounting holes. 16 to 48" units are single panel; 54 and 60" units are double panel.

EXTRUDED ALUMINUM

Heavy-duty dampers have extruded aluminum frame and blades. Power On to open; spring return to close. Frame is 0.125", louvers are 0.080".

GALVANIZED STEEL

For normal applications. Galvanized steel frame and blades. Power On to open; spring return to close. Frame is 14 gauge. Blades are 16 gauge.

For Fan Dia. (in.)	Volts, 60 Hz	Overall Square (in.) A	Square Opening Required (in.) B	Frame Less Flange (in.) C	Free Area (Sq.-Ft.)	Motor Bracket Extension (in.)†	Extruded Aluminum Dampers Stock No.	Extruded Aluminum Dampers Shpg. Wt.	Galvanized Steel Dampers Stock No.	Galvanized Steel Dampers Shpg. Wt.
SINGLE PANEL										
16	120/240	19	17	16	1.750	6¾	4C560	12.0	3C725	21.0
20	120/240	23	21	20	2.053	6¾	4C561	15.0	3C726	25.0
24	120/240	27	25	24	3.585	6¾	3C315	17.0	3C727	32.0
30	120/240	33	31	30	5.679	10¼	3C234	36.0	3C728	53.0
36	120/240	39	37	36	8.252	10¼	3C131	47.0	3C729	67.0
42	120/240	45	43	42	11.305	10¼	3C235	55.0	3C730	85.0
48	120/240	51	49	48	14.836	10¼	3C132	67.0	3C731	98.0
DOUBLE PANEL										
54	240	57	55	54	18.827	10¼	3C188	92.0	3C732	139.0
60	240	63	61	60	23.314	10¼	3C189	101.0	3C733	162.0

(†) From damper frame to end of bracket.

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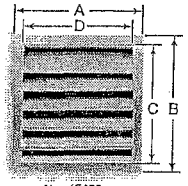
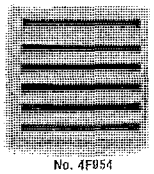


No. 4F422


No. 4F954

Adjustable Width Frame Intake Louvers

Flexible installation is provided by adjustable frame and fixed blade. Can be used for intake or exhaust applications. Tabbed louvers lock securely into frame providing smooth finish and clean appearance. Louvers have end-stop to help prevent pull-apart. Bird screen and screen fasteners provided. Prepunched 9/32 x 1/2" mounting holes. Blades are set at a 45° angle. Use multiple louvers when larger sizes are needed.

G90 GALVANIZED STEEL

For applications where moderate corrosion resistance is desired. G-90 galvanized steel frame with 2" mounting flange. Tog-L-Locked corners for superior strength.

PREMIUM ALUMINUM

For extra corrosion resistance in problem environments. 0.040" aluminum frame with 2" mounting flange. Riveted corners for superior strength.

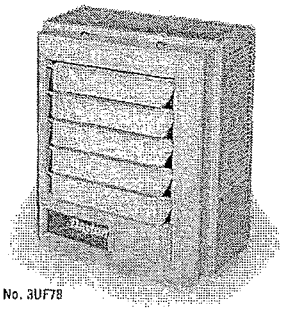
A Outside Width (in)	B Outside Height (in)	C Inside Height (in)	D Inside Width (in)	Min. Wall Opening Req'd (in)	Number of Blades*	Maximum Intake CFM	Maximum Exhaust CFM	Free Area (Sq Ft)	G90 Galvanized Steel Louvers Stock No.	G90 Galvanized Steel Louvers Shpg. Wt.	Premium Aluminum Louvers Stock No.	Premium Aluminum Louvers Shpg. Wt.
16 to 24	18	14	12 to 18	14H x 12W	1	616	875	0.36 to 0.55	4F421	11.0	4F951	4.7
22 to 28	22	18	18 to 24	18H x 18W	2	1050	1500	0.73 to 0.98	3C972	17.0	4F952	7.0
22 to 34	28	24	18 to 30	24H x 18W	3	1750	2500	1.14 to 1.95	3C973	26.0	4F953	10.0
25 to 40	34	30	21 to 36	30H x 21W	5	2625	3750	1.62 to 2.83	4F422	39.0	4F954	21.0
28 to 40	40	36	24 to 36	36H x 24W	6	3150	4500	2.35 to 3.57	3C974	43.0	4F955	19.0
40 to 52	40	36	36 to 48	36H x 36W	6	4200	6000	3.57 to 4.79	3C975	67.0	4F956	27.0
28 to 46	46	42	24 to 42	42H x 24W	7	4290	6125	3.16 to 5.61	4F423	55.0	4F957	31.0
28 to 40	52	48	24 to 36	48H x 24W	9	5200	6000	3.23 to 4.90	3C976	66.0	4F958	37.0
40 to 52	52	48	36 to 48	48H x 36W	9	5600	8000	4.90 to 6.57	3C977	73.0	4F959	40.0

(*) Not including integral top and bottom blades.

5kW Electric Back-up Heater

Dayton® c UL us

For Repair Parts Call Your Branch or 1-800-323-0620



No. 3UF78

Electric Unit Heaters

Advanced pull-through air flow design draws air across heating element for more even air distribution and cooler element operation. Automatic reset linear thermal protector provides protection over entire length of element area to disconnect heater if normal operating temperatures are exceeded. Specially designed venturi outlet with large dynamically balanced fan blade provides maximum air flow. Heavy-duty, totally enclosed motors. Aluminum-finned, copper-clad steel sheath heating element. Heavy-gauge neutral gray die-formed steel housing.

Heaters are 60 Hz and 3-phase models are phase balanced.

Some 5 through 15KW units are field convertible from single to three phase. 24V low voltage control circuit standard on all models except 3 and 5KW 208, 240/208 and 277V units (line voltage control on these models). All heaters have four top and four back threaded reinforced holes for field mounting with 5/16"-18 thread rods (not included). Optional vertical and horizontal mounting brackets available. Nos. 3UF78, 3UF75, 3UF77, 3UF82, 3UF79, and 3UF81 are wired for direct line voltage control. Nos. 3UF96, 3UF94, 3UF97, and 3UF98 are wired for single- or two-stage low voltage control. These units also contain two-speed motor for Hi-Lo fan selection.

Uses: Designed for auxiliary, supplemental, or primary heat source in factories, stores, garages, warehouses, public buildings, stock rooms, service stations, any large or exposed areas, or additions.

- Adjustable outlet louvers
- 60 Hz fan forced, ceiling or wall mounted
- Meet NEC and OSHA requirements

Note: Wall-mounted or unit-mounted thermostat (not included) must be used with these heaters. See page 3529.

KW	Btuh (1000's)	Heater Voltage	Phase	Maximum Amp Rating*	CFM at Outlet†	Air Rise At Outlet °F	Dimensions (In.) H	W	D	Maximum Mounting Ht. Horizontal (Ft.)	Horizontal Air Throw (Ft.)	Stock No.		Shpg Wt.
3.0	10.2	208	1	14.5	350	27	16	14	8½	8	12	3UF78	✓	30.4
3.0/2.2	10.2/7.5	240/208	1	12.5/11.0	350	27	16	14	8½	8	12	3UF75	✓	24.0
3.0	10.2	277	1	11.0	350	27	16	14	8½	8	12	3UF77	✓	24.9
3.0	10.2	480	3	3.6	350	27	16	14	8½	8	12	3UF76	✓	27.9
5.0	17.0	208	1-3	24.0	350	45	16	14	8½	8	12	3UF82	✓	24.0
5.0/3.7	17.0/12.6	240/208	1-3	21.0/18.0	350	45	16	14	8½	8	12	3UF79	✓	25.1
5.0	17.0	277	1	18.0	350	45	16	14	8½	8	12	3UF81	✓	24.0
5.0	17.0	480	3	6.0	350	45	16	14	8½	8	12	3UF80	✓	24.0
7.5	25.6	208	1-3	36.0	650	37	21¾	19	8½	9	18	3UF85	✓	36.7
7.5/5.6	25.6/19.1	240/208	1-3	31.3/27.0	650	37	21¾	19	8½	9	18	3UF83	✓	36.9
7.5	25.6	480	3	9.0	650	37	21¾	19	8½	9	18	3UF84	✓	37.2
10.0	34.1	208	1-3	48.0	650	49	21¾	19	8½	9	18	3UF88	✓	37.1
10.0/7.5	34.1/25.6	240/208	1-3	42.0/36.0	650	49	21¾	19	8½	9	18	3UF86	✓	37.0
10.0	34.1	480	3	12.0	650	49	21¾	19	8½	9	18	3UF87	✓	37.1
15.0	51.2	208	1-3	72.0	910	52	21¾	19	13¾	11	35	3UF91	✓	55.5
15.0/11.2	51.2/38.2	240/208	3	36.1/31.3	910	52	21¾	19	13¾	11	35	3UF89	✓	52.6
15.0	51.2	480	3	18.0	910	52	21¾	19	13¾	11	35	3UF90	✓	51.6
20.0/15.0	68.2/51.2	240/208	3	48.0/41.2	1320	48	21¾	19	13¾	12	41	3UF92	✓	54.5
20.0	68.2	480	3	24.0	1320	48	21¾	19	13¾	12	41	3UF93	✓	54.5
30.0	102.3	208	3	84.0	2100/1800	45/53	30	26⅝	13¾	12	50	3UF96	✓	95.0
30.0/22.5	102/77	240/208	3	72.3/63.0	2100/1800	45/53	30	26⅝	13¾	12	50	3UF94	✓	91.0
30.0	102.3	480	3	36.0	2100/1800	45/53	30	26⅝	13¾	12	50	3UF95	✓	92.0
50.0/37.5	170/127	240/208	3	120.4/104.2	3000/2600	53/61	30	26⅝	18⅛	15	60	3UF97	✓	140.0
50.0	170.5	480	3	60.2	3000/2600	53/61	30	26⅝	18⅛	15	60	3UF98	✓	126.0

(*) Maximum amp rating reflects single phase on combination single/three phase units. To obtain amperage draw on three-phase power supply, divide single-phase rating by 1.73. (†) Air delivery data on dual voltage units reflects high voltage.

Mounting Brackets

Vertical mounting is desirable in high bay areas or where heater location does not interfere with plant operation. Horizontally mounted units should have air streams wipe the exposed walls without blowing at them. All heaters must be mounted at least 8 feet above the floor and are not intended for use in potentially explosive atmospheres. Where square footage is large and comfort is essential, both vertical and horizontal installations may be used.

Use on Heaters with KW Rating	Mount Bracket For Horizontal Throw Stock No.	Each	Shpg Wt.	Mount Bracket For Vertical Throw Stock No.	Shpg Wt.
3.0 thru 5.0	6X966	$62.55	6.5	3UG05	3.6
7.5 thru 10.0	6X966	62.55	6.5	3UG06	4.4
15.0 thru 20.0	6X967	75.05	7.9	3UG06	4.4
30.0	3UG64	86.90	12.1	3UG08	7.2
50.0	3UG65	101.30	38.9	3UG08	7.2

= Shipped Directly from Manufacturer ✓= Extended Warranty Available ★= New Item

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-8 **Witness: John Sullivan**

Re: Exhibit 13: Please provide the computation used to arrive at 88.76% CIAC.

Response:

See attached.

11/3/2016

HAWC
CIAC SCHEDULE
Wells Village

	Cost AMOUNT	RATE	CIAC Value
Franchises	0.00		0.00
Land & Land Rights	0.00	2.50%	0.00
Structures & Imp	108,600.00	2.50%	96,392.40
Wells	30,000.00	3.30%	26,627.74
Supply Mains	60,000.00	2.00%	53,255.47
Pumping Equipment	109,505.00	10.00%	97,195.67
Water Treatment	30,450.00	3.60%	27,027.15
Storage Tanks	38,250.00	2.20%	33,950.36
Trans. & Distr. Mains	48,000.00	2.00%	42,604.38
Service Lines	20,000.00	2.50%	17,751.82
Water Meters	17,500.00	4.50%	0.00
sub-total	**462,305.00**		**394,805.00**

Total Cost of Assets	462,305.00			
Less: Meters	(17,500.00)			
Less: Hookup Fee	(50,000.00)	$ 1,000	per hookup	50
CIAC	**394,805.00**			
CIAC %	**88.759119%**			

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown

Answers to Staff Data Requests Set 1

Date Request Received: 10/25/16 **Date of Response: 11/02/16**

Request No. Staff 1-9 **Witness: Charles Lanza**

Please comment on the potential for additional water customers from within or nearby the proposed franchise area, whether through future connection to the proposed water lines or by other means, including the extent to which any interest has been expressed in such service.

Response:

Please see the answer in 1-4 above. The Company will likely need to make upgrades in the future to service the entire area. The only known interest is for the parcel mentioned in 1-4 above.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown
Answers to Staff Data Requests Set 2

Date Request Received: 11/08/16 **Date of Response: 11/08/16**

Request No. Staff 2-1 **Witness: Harold J. Morse**

Follow-up to Staff 1-4: Would the company be willing to provide notice to all property owners in the proposed franchise area?

a. If yes, please provide a copy of the letter and a list of the property owners notified.
b. If no, please explain why not.

Response:

a. If so ordered the Company would comply. Otherwise no.

b. The Company feels that the Notice to the Town is suffice to protect whatever ever impact the franchise would have on the Town. The proposed franchise is authority to do business in the area, and does not impact the rights of the individual property owners. In fact, it enhances their property value by providing an alternative water source.

DW 16-825
Hampstead Area Water Company, Inc.
Petition for Approval ofFranchise Expansion – Wells Village, Sandown
Answers to Staff Data Requests Set 2

Date Request Received: 11/08/16 **Date of Response: 11/08/16**

Request No. Staff 2-2 **Witness: Charles Lanza**

Follow-up to Staff 1-7: The site map shows 52 units and a club house. Both the Filing and DES Approval detail 50 units with no mention of a club house. Please explain.

Response:

The design submittal had an earlier plan version. The revised plan is attached and included 50 units

WELLS VILLAGE ESTATES

PLAN NOTES

1. Owner and developer of record: Kasher Corporation, 36 Webb Brook Road, #1, Billerica, MA 01821.
2. Total area of site = 40.83 acres.
3. This plan serves to create a 50 unit Open Space Development for Multi family dwellings.
4. This site is to be served by an on-site community water system, septic systems, and, a Private roadway system.
5. Units shall be 2 & 3 Bedrooms
6. This site lies in the Residential Zone "A".
7. This site is not in a Flood Hazard Zone per F.I.R.M./ F.E.M.A. community panel #3301910365E dated May 17, 2005.
8. This proposal meets the Town of Sandown's Zoning Requirements for planned Open Space Development pursuant to Article III-Part D. This amended plan supersedes plan D-35202 recorded at R.C.R.D.
9. Building setbacks = 50' from perimeter, 30' from frontage, 15' side, 10' rear and 50' from wetlands. Also, perimeter buffer of 50' is required for open space developments.
10. Septic system setbacks = 10' from lot lines and 75' from wetlands.
11. All utilities to be installed underground in accordance with applicable requirements of individual public utility companies and applicable code.
12. High intensity soil & wetland mapping prepared by Timothy Ferwerda, CSS #003, in accordance with the 1987 Federal Manual for Identifying Jurisdictional Wetlands. Date of mapping is June 2003.
13. A Conditional Use Permit was granted by the Planning Board on September 1, 2015 to allow for wetlands impacts in the Wetland Conservation District per Article I-Part B-Section 3 of the Zoning Ordinance.
14. The owner/applicant is obligated to maintain the streets and related improvements
15. Pursuant to the authority of Article VIII of the Sandown Zoning Ordinance and Section 9.26 of the Sandown Land Subdivision Control Regulations, public capital facilities impact fees were assessed at the time of approval of this plat. Correspondingly, a public school impact fee of $[illegible] shall be collected by the Town of Sandown prior to issuance of certificates of occupancy for each future unit depicted on this plat.
16. The recreational requirements have been met by leaving 23.10 acres as open space which is accessible by each lot. Also, by creating a parking area at the trail head across Wells Village Road.
17. All transformers, utility risers and related improvements are to be installed at the outer limits of the platted right of way to avoid interference with routine roadway maintenance to the fullest extent possible.

Open space requirements:
total tract=40.83 acres
-one-third required to be open space=13.61 acres.
23.10 acres provided.
-one-half of the one-third to be free of wetland and slopes over 25%=6.8 ac. Provided =9.65 ac.
-23.10 ac. minus buffer area(7.51 ac.)=15.59 acres.
-15.59 acres minus wetland and slopes over 25 %=9.65 ac.

Reference Deeds:
Lot 13-1: Book 4153 Page 341

Reference Plans:

"Boundary Plan of Land as Drawn for Berge M. Nalbandian Haverhill and Pulpit Rock Road in Chester and Sandown, N.H. dated: May 15, 1995, by this office."

"Perimeter Plan of Land in Sandown, N.H. as Drawn for Peter Aldrich, dated: October 27, 1999, by this office."

"Plan of Land for Ward F. Porter in Sandown, N.H., on Wells Village Road, dated: April 1992, by Vernon Dingman III"

"Boundary Plan of Land Located in Sandown, N.H. as Drawn for Kasher Corporation, dated: October 12, 2003, by this office."

"Senior Housing Development to be known as Town Houses at Wells Village in Sandown, NH" for Kasher Corporation. Drawn by McKenzie Engineering Group, Inc. Recorded at R.C.R.D. as plan # D-35202.

Easement plan drawn by this office and recorded at R.C.R.D. as plan #D-33794.

ABUTTERS LIST

MAP-LOT	OWNER
13-1	Kasher Corporation 36 Webb Brook Road, #1 Billerica, MA 01821
MAP-LOT	SANDOWN ABUTTERS
13-4 & 13-2	Federal Investments PO Box 65 Nahant, MA 01908
13-3	Sandra & David Bishop Trustees Bishop Family Revoc Trust 92 Wells Village Road Sandown, NH 03873
13-20 & 9-16	Town of Sandown PO Box 1756 Sandown, NH 03873
9-14	Gary Barnes & Sons, LLC PO Box 527 Sandown, NH 03873
9-15-1-A & 9-15A	Patricia J. McLaughlin 1 Randy Lane Raymond, NH 03077
13-3-1	Kevin & Kathleen Sullivan 104 Wells Village Road Sandown, NH 03873
9-1	F.W.M. Investment Trust Frederick W. Jr. Trustee 527 South Broadway Salem, NH 03079
	CHESTER ABUTTER
5-6	Nalbandian Family Realty Trust Darlene Nalbandian Trustee PO Box 13 Salem, NH 03079
	ABUTTING TOWN
	Town of Chester PO Box 215 Chester, NH 03036
	CONSULTANTS
Surveyor	James M. Lavelle Associates 2 Starwood Drive Hampstead, NH 03841
Engineers	Civil Design Consultants 30 River Street Methuen, MA 01844
Soil Scientist	Timothy Ferwerda PO Box 118 Milford, NH 03055

OWNER OF RECORD: KASHER CORPORATION
DATE: _____

_____

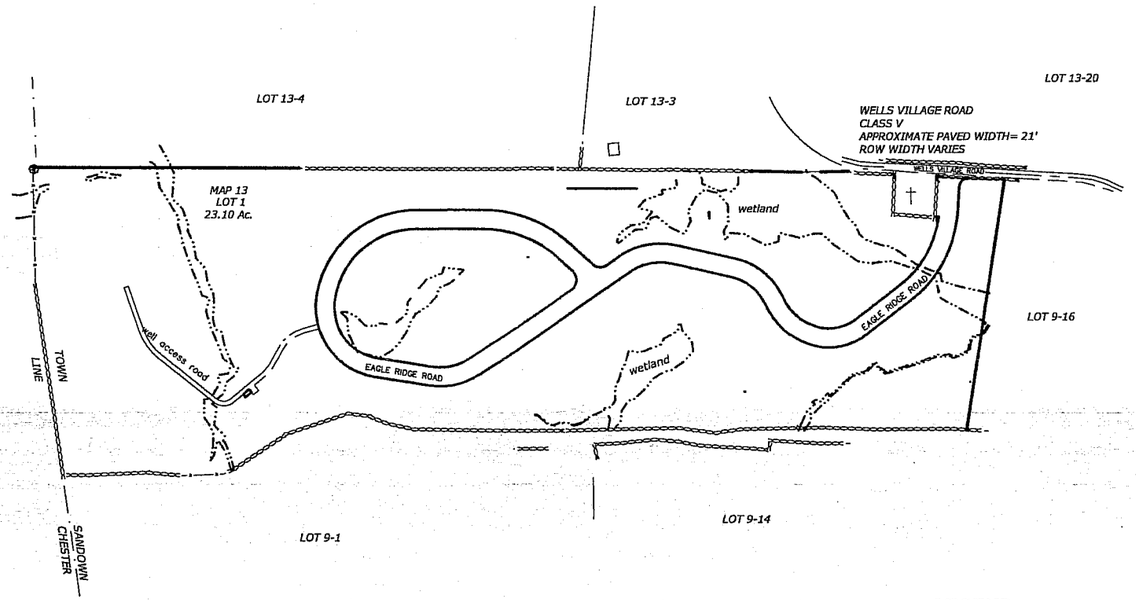
"I HEREBY CERTIFY THAT THE SURVEY FIELD WORK FOR THE PREPARATION OF THIS PLAN HAS AN ERROR OF CLOSURE NO LESS THAN 1 PART IN 10,000"

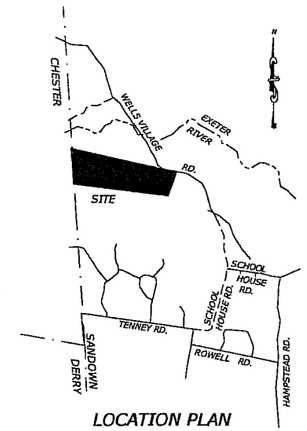
DATE: _____

_____

PREVIOUS STATE APPROVALS:

NHDES SUBDIVISION APPROVAL # SA2007007964
NHDES SITE SPECIFIC APPROVAL # WPS-7794
NHDES DREDGE & FILL PERMIT # 2006-02981
NHDES NONDOMESTIC WASTEWATER DISCHARGE REGISTRATION # DES#200612052
NHDES WATER SUPPLY APPROVAL (PROJECT# 997066)





LOCATION PLAN
1"=2000'

LEGEND

- EXIST. STONE WALL
- BUILDING SETBACK LINES
- WETLANDS
- PROP. EXIST. PAVEMENT
- EASEMENT
- TOWN LINE
- PROP. WELL ACCESS ROAD
- FENCE LINE

APPROVED BY THE TOWN OF SANDOWN PLANNING BOARD

CHAIRMAN: _____

_____

_____

DATE:

PLAN INDEX

REVISION	DATE	DESCRIPTION	BY	APPR

TAX MAP 13 LOT 1
SANDOWN, NH

OPEN SPACE DEVELOPMENT

OWNED BY
KASHER CORPORATION
36 WEBB BROOK ROAD#1
BILLERICA, MA 01821

SCALE: 1"=200' DATE: 3/14/2016

0' 100' 200' 400' 600' 800'

LAVELLE ASSOCIATES

STATE OF NEW HAMPSHIRE No. 493 JAMES M. LAVELLE LICENSED LAND SURVEYOR

PREPARED BY
JAMES M. LAVELLE, LLS
2 STARWOOD DRIVE
HAMPSTEAD, NH 03841

PROJ#010-2015
SHEET 1 OF 20

PROJECT NOTES:

1. SEE SHEET C-1 ENTITLED COVER SHEET FOR GENERAL PROJECT NOTES AND LEGEND.
2. SEE SHEET D-1 THROUGH D-3 FOR CONSTRUCTION DETAILS AND NOTES.
3. SEE SHEET 8 THROUGH 10 ENTITLED 'WELLS VILLAGE ESTATES' WOODFIED CROSSING CULVERT – POND VIEW DRIVE, SANDOWN, NH PREPARED BY GEI DATED SEPTEMBER 14, 2015 FOR APPROVED CROSSING DETAILS AND NOTES.
4. SEE SENIOR HOUSING DEVELOPMENT – TOWN HOUSES AT WELLS VILLAGE LOCATED ON WELLS VILLAGE ROAD IN SANDOWN, NEW HAMPSHIRE PREPARED BY MCKENZIE ENGINEERING GROUP, INC. DATED SEPTEMBER 24, 2004 THROUGH SEPTEMBER 11, 2007 FOR DRAINAGE DRAINAGE IMPROVEMENTS.

SEE SHEET C-3B FOR CONTINUATION

WETLAND

EX WQS & LS (SEE NOTE 4)

EX HEADWALL (TO REMAIN)

WELLS VILLAGE ROAD

PROP 8-FT WIDE PEDESTRIAN CROSSWALK

W11-2 PEDESTRIAN CROSSING AHEAD SIGN

EX DOUBLE CB (SEE NOTE 4)

PROP 4' WIDE WALKING LANE

4" WIDE SWL

EX TRAIL

PROP R1-1 & STREET SIGN

EX EOP

PROP 10' WIDE GENERAL HIGHWAY EASEMENT

PROP 4" LOAM & SEED (TYP)

PROP LOW (AREA:12.0-AC±)

APPROX LOC OF LEACHING FIELD

PROP CONC HEADWALL & WINGWALLS

PROP WETLAND IMPACTS

PROP 3-FT WIDE GRAVEL SHOULDER (TYP)

PROP BIT CONC BERM (TYP)

EX WELL

APPROX LOC OF LEACHING FIELD

WETLAND

SEE NOTE 3 FOR ADD INFO

WETLAND

SEE SHEET C-3B FOR CONTINUATION

PROP 12-FT WIDE ACCESS DRIVE TO WELLS

INSET PLAN (WELL ACCESS DRIVE)

HORIZONTAL SCALE

40 0 20 40 80 160

(IN FEET)

1"=40'

DATE	DESCRIPTION
REVISIONS	

OWNER/APPLICANT:

KASHER CORPORATION
36 WEBB BROOK ROAD
BILLERICA, MA 01821

PROJECT:

WELLS VILLAGE ESTATES
WELLS VILLAGE ROAD
(TAX MAP 13 / LOT 1)
SANDOWN, NH 03873

DATE ISSUED:	MARCH 14, 2016
PROJECT #:	15-2902
PREPARED BY:	JAMES E. HANLEY, PE

STATE OF NEW HAMPSHIRE – JAMES E. HANLEY No. 12082 – LICENSED PROFESSIONAL ENGINEER – 3-7-16

PROFESSIONAL ENGINEER FOR CIVIL DESIGN CONSULTANTS, INC.

PREPARED BY:

CIVIL DESIGN Consultants, Inc.

LAND PLANNING - DESIGN - PERMITTING - CONSTRUCTION ADMINISTRATION

P.O. Box 2237, Methuen, MA 01844-1097 Tel: (978) 416-0220 Fax: (978) 416-7865

DRAWING TITLE:

LAYOUT & MATERIALS PLAN

DRAWING #:

C-3A

SEE SHEET INSET PLAN ON SHEET C-3A FOR CONTINUATION

SEE SHEET C-3A FOR CONTINUATION

PROJECT NOTES:

1. SEE SHEET C-1 ENTITLED COVER SHEET FOR GENERAL PROJECT NOTES AND LEGEND
2. SEE SHEET D-1 THROUGH D-3 FOR CONSTRUCTION DETAILS AND NOTES
3. SEE SHEET 8 THROUGH 10 ENTITLED 'WELLS VILLAGE ESTATES' MODIFIED CROSSING CULVERT – POND VIEW DRIVE, SANDOWN, NH PREPARED BY GEI DATED SEPTEMBER 14, 2015 FOR APPROVED CROSSING DETAILS AND NOTES.
4. SEE SENIOR HOUSING DEVELOPMENT – TOWN HOUSES AT WELLS VILLAGE LOCATED ON WELLS VILLAGE ROAD IN SANDOWN, NEW HAMPSHIRE PREPARED BY MCKENZIE ENGINEERING GROUP, INC. DATED SEPTEMBER 24, 2004 THROUGH SEPTEMBER 11, 2007 FOR DRAINAGE DRAINAGE IMPROVEMENTS.

APPROX LOC OF LEACHING FIELD

PROP LOW (AREA:12.9-AC±)

50-FT SETBACK (TYP)

WETLAND

50-FT NO BUILD ZONE

EX STORMWATER BASIN (SEE NOTE 4)

EX WQS & LS (SEE NOTE 4)

EX DOUBLE CB (SEE NOTE 4)

ACCESS DRIVE TO TERMINATE AT EX DRIVEWAY

PROP EMERGENCY ACCESS DRIVE

EX RET WALL (TO REMAIN)

PROP EOP (TYP)

W11-2 PEDESTRIAN CROSSING AHEAD SIGN

PROP 6-FT WIDE PEDESTRIAN CROSSWALK

PROP BIT CONC BERM (TYP)

PROP. 4' WIDE WALKING LANE

4' WIDE SWL

PROP 4" LOAM & SEED (TYP)

STA. EQUATION: 21+88.71=0+00

STA. EQUATION: 13+14.86=31+63.97

HORIZONTAL SCALE

40 0 20 40 80 160

(IN FEET)
1"=40'

DATE	DESCRIPTION
REVISIONS	

OWNER/APPLICANT:

KASHER CORPORATION
36 WEBB BROOK ROAD
BILLERICA, MA 01821

PROJECT:

WELLS VILLAGE ESTATES
WELLS VILLAGE ROAD
(TAX MAP 13 / LOT 1)
SANDOWN, NH 03873

DATE ISSUED:	MARCH 14, 2016
PROJECT #:	15-2902
PREPARED BY:	JAMES E. HANLEY, PE

STATE OF NEW HAMPSHIRE – JAMES E. HANLEY No. 12092 – LICENSED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER FOR CIVIL DESIGN CONSULTANTS, INC.

PREPARED BY:

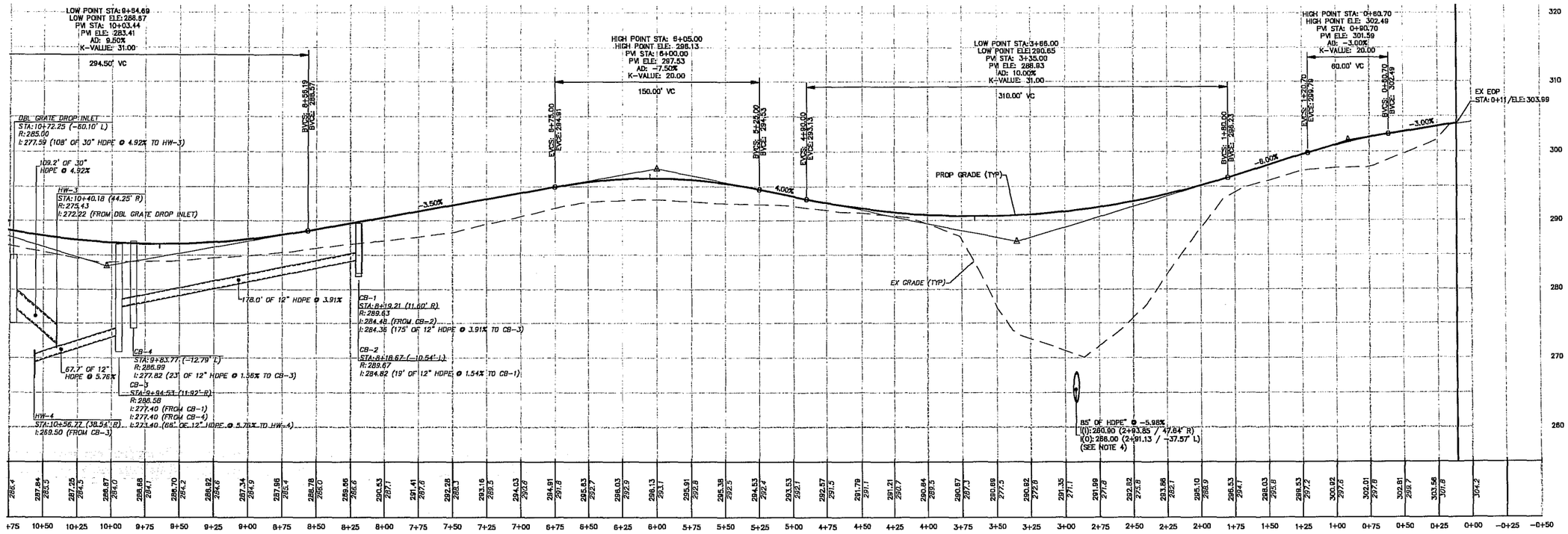
CIVIL DESIGN Consultants, Inc.
LAND PLANNING · DESIGN · PERMITTING · CONSTRUCTION ADMINISTRATION
P.O. Box 2237, Methuen, MA 01844-1097
Tel: (978) 416-0920
Fax: (978) 416-7865

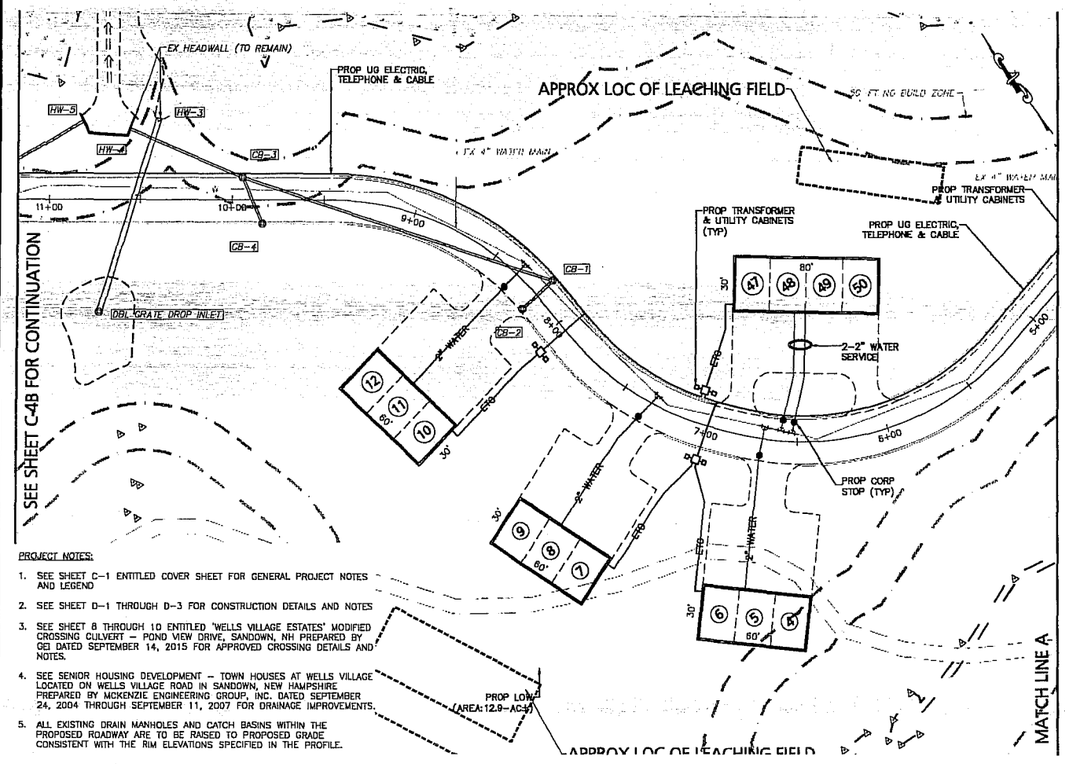
DRAWING TITLE:

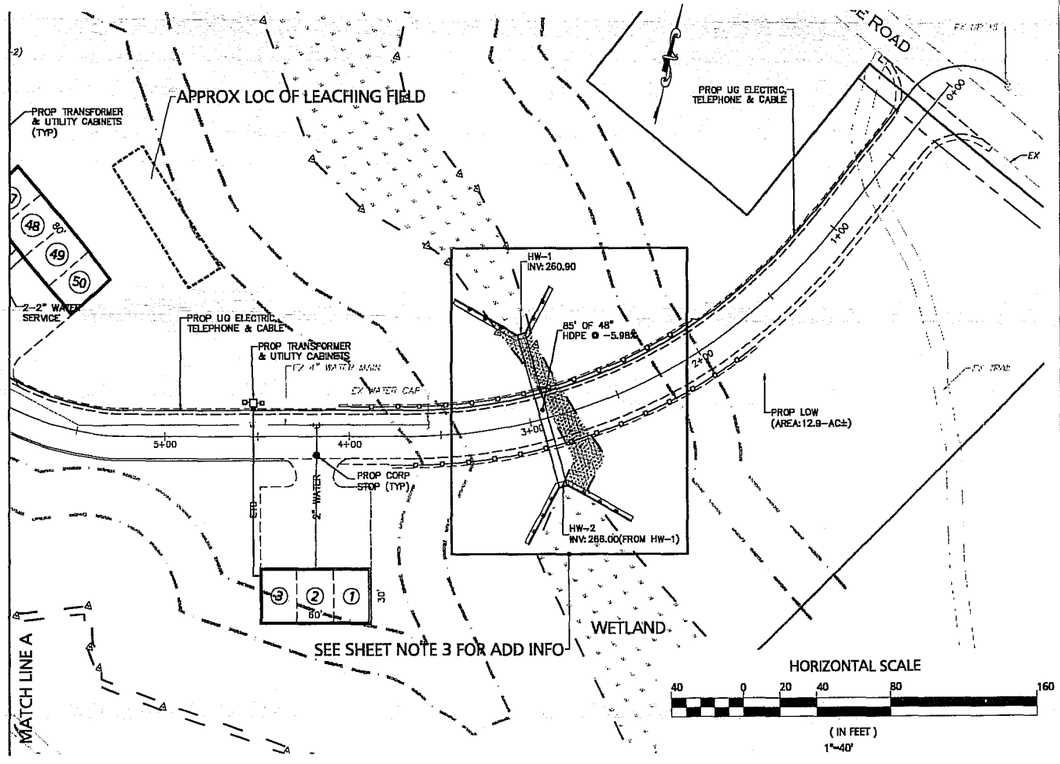
LAYOUT & MATERIALS PLAN

DRAWING #:

C-3B







PROJECT NOTES:

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3. SEE SHEET 8 THROUGH 10 ENTITLED 'WELLS VILLAGE ESTATES' MODIFIED CROSSING CULVERT – POND VIEW DRIVE, SANDOWN, NH PREPARED BY GEI DATED SEPTEMBER 14, 2015 FOR APPROVED CROSSING DETAILS AND NOTES.
4. SEE SENIOR HOUSING DEVELOPMENT – TOWN HOUSES AT WELLS VILLAGE LOCATED ON WELLS VILLAGE ROAD IN SANDOWN, NEW HAMPSHIRE PREPARED BY MCKENZIE ENGINEERING GROUP, INC. DATED SEPTEMBER 24, 2004 THROUGH SEPTEMBER 11, 2007 FOR DRAINAGE IMPROVEMENTS.
5. ALL EXISTING DRAIN MANHOLES AND CATCH BASINS WITHIN THE PROPOSED ROADWAY ARE TO BE RAISED TO PROPOSED GRADE CONSISTENT WITH THE RIM ELEVATIONS SPECIFIED IN THE PROFILE.

DATE	DESCRIPTION
REVISIONS	

OWNER/APPLICANT:

KASHER CORPORATION
36 WEBB BROOK ROAD
BILLERICA, MA 01821

PROJECT:

WELLS VILLAGE ESTATES
WELLS VILLAGE ROAD
(TAX MAP 13 / LOT 1)
SANDOWN, NH 03873

DATE ISSUED:	MARCH 14, 2016
PROJECT #:	15-2902
PREPARED BY:	JAMES E. HANLEY, PE

STATE OF NEW HAMPSHIRE — JAMES E HANLEY No. 12082 — LICENSED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER FOR CIVIL DESIGN CONSULTANTS, INC.

PREPARED BY:

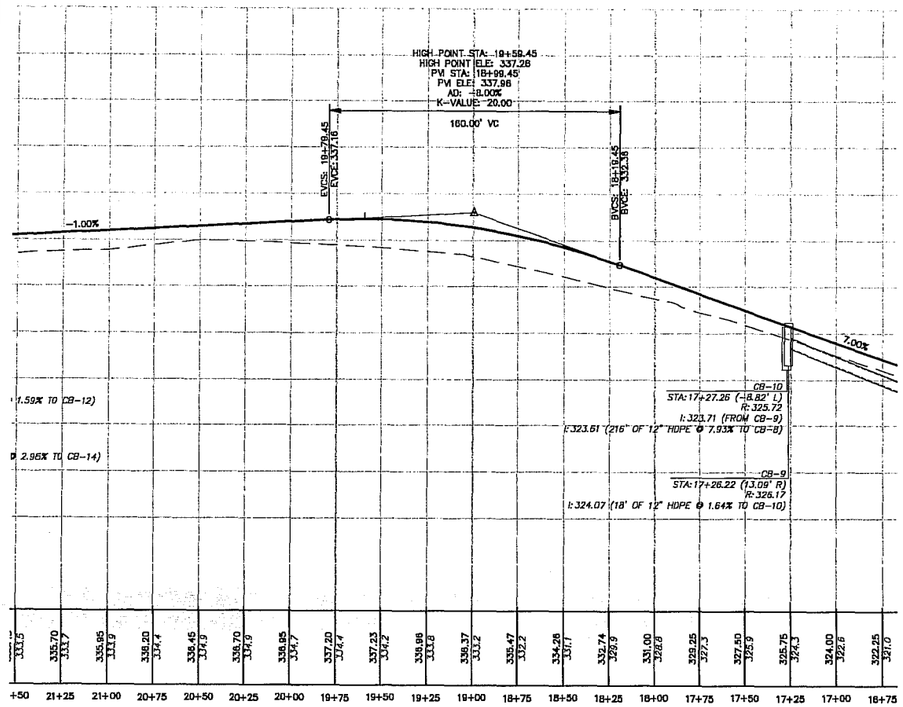
CIVIL DESIGN Consultants, Inc.
LAND PLANNING · DESIGN · PERMITTING · CONSTRUCTION ADMINISTRATION
P.O. Box 2237, Methuen, MA 01844-1097
Tel: (978) 416-0928
Fax: (978) 416-7865

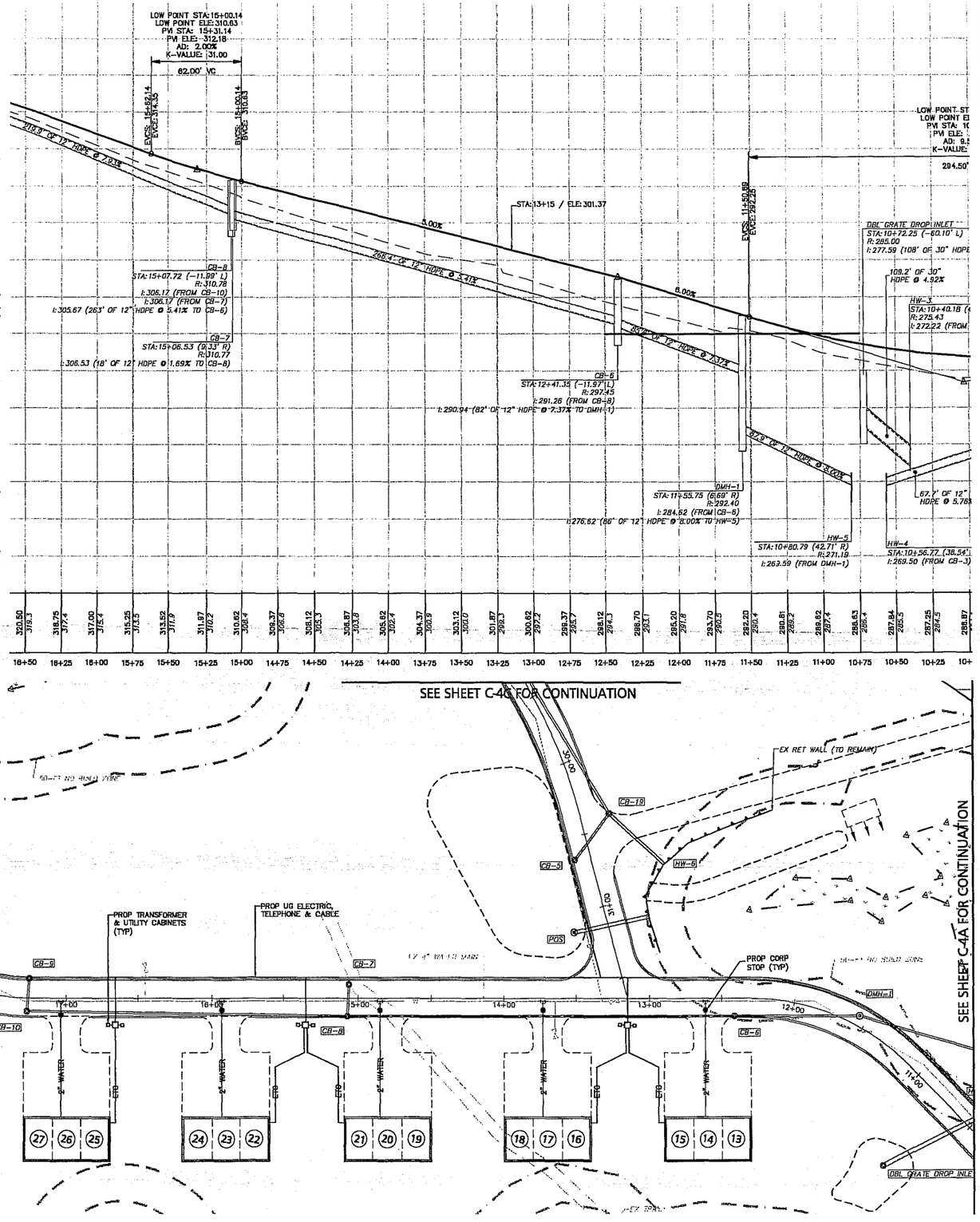
DRAWING TITLE:

ROADWAY PLAN AND CL PROFILE

DRAWING #:

C-4A





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(IN FEET)

1"=40'

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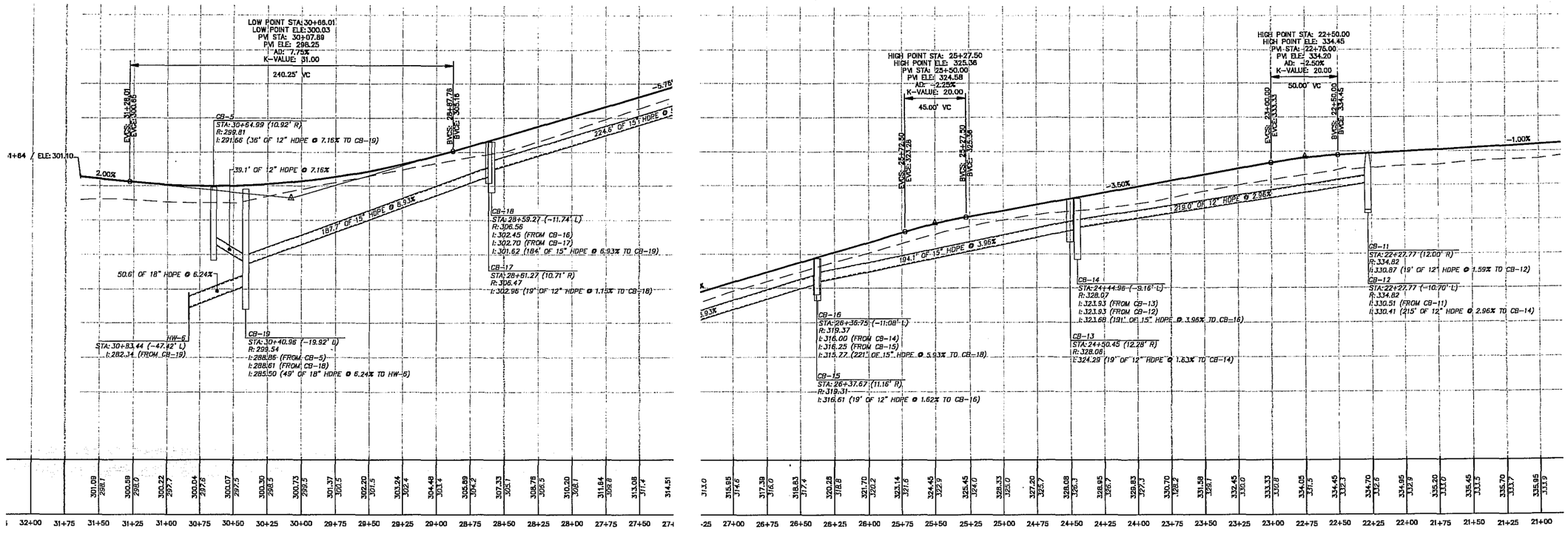

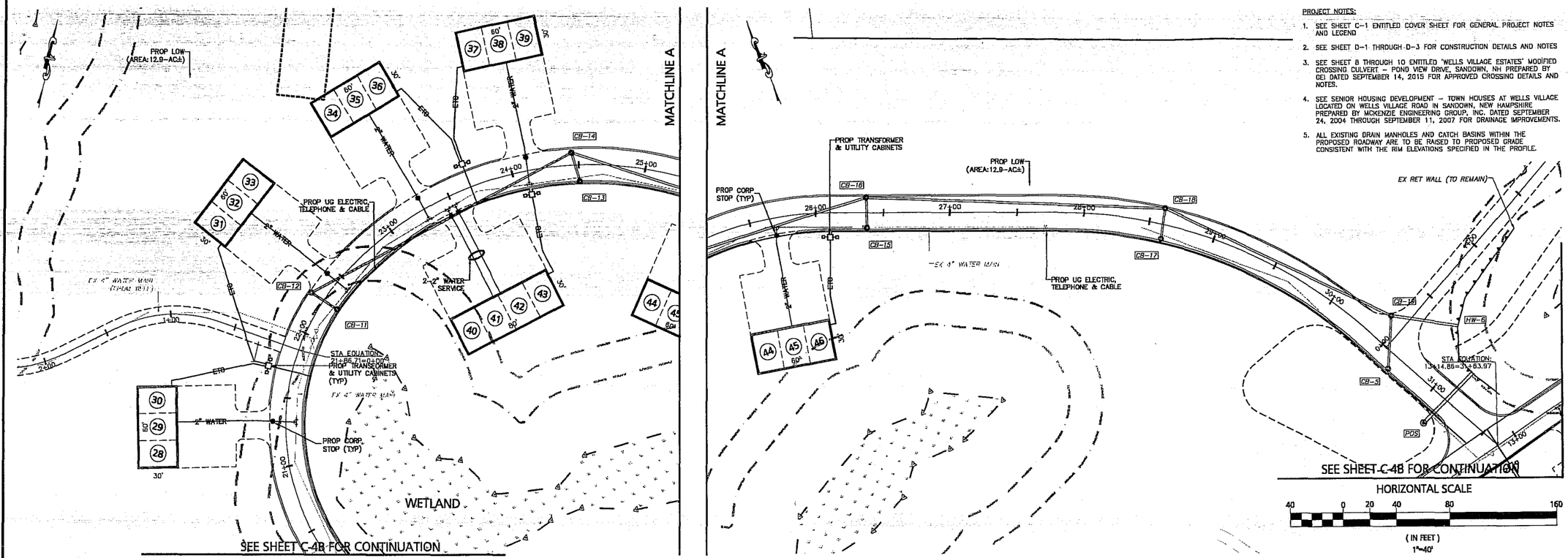

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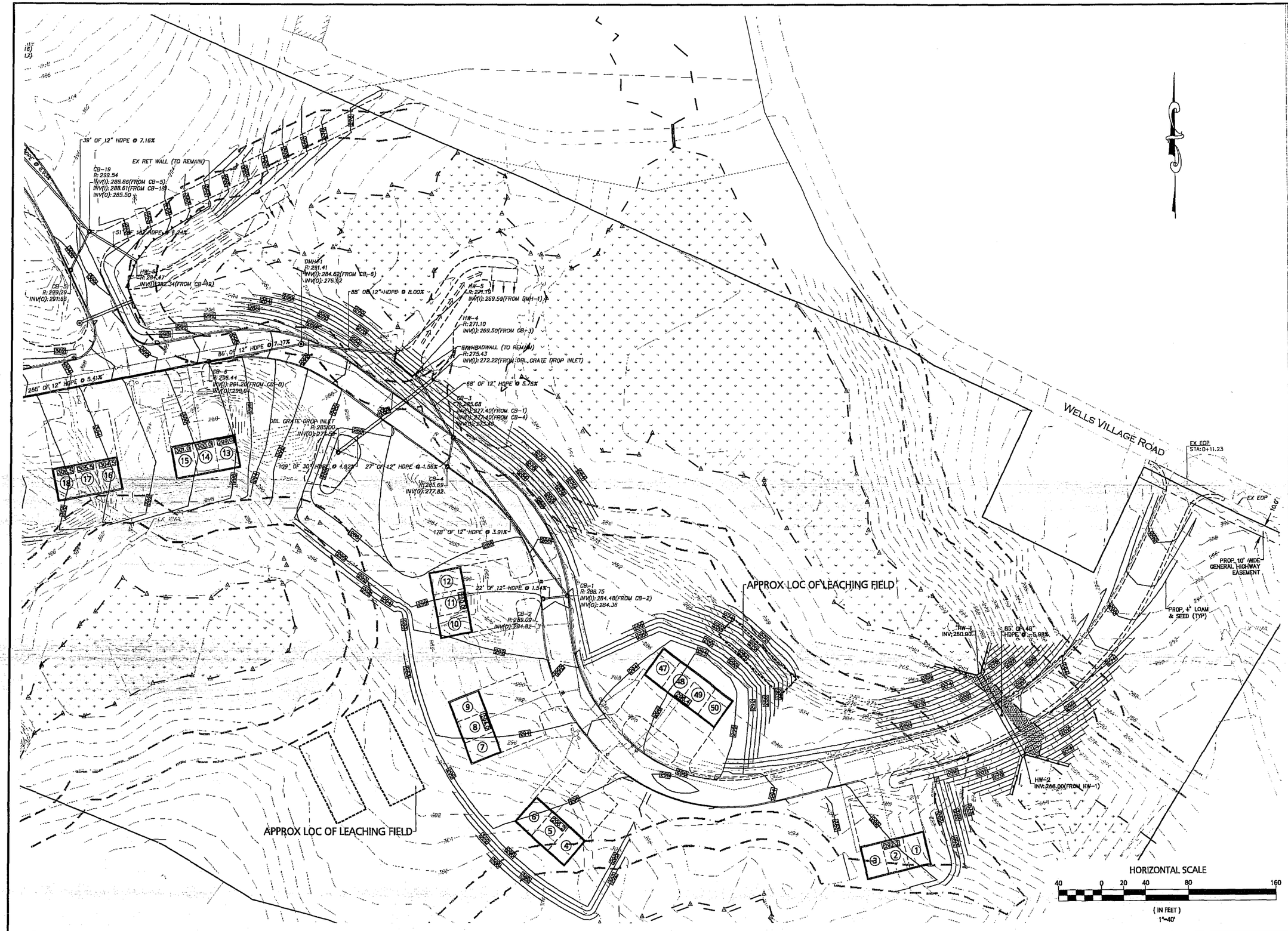

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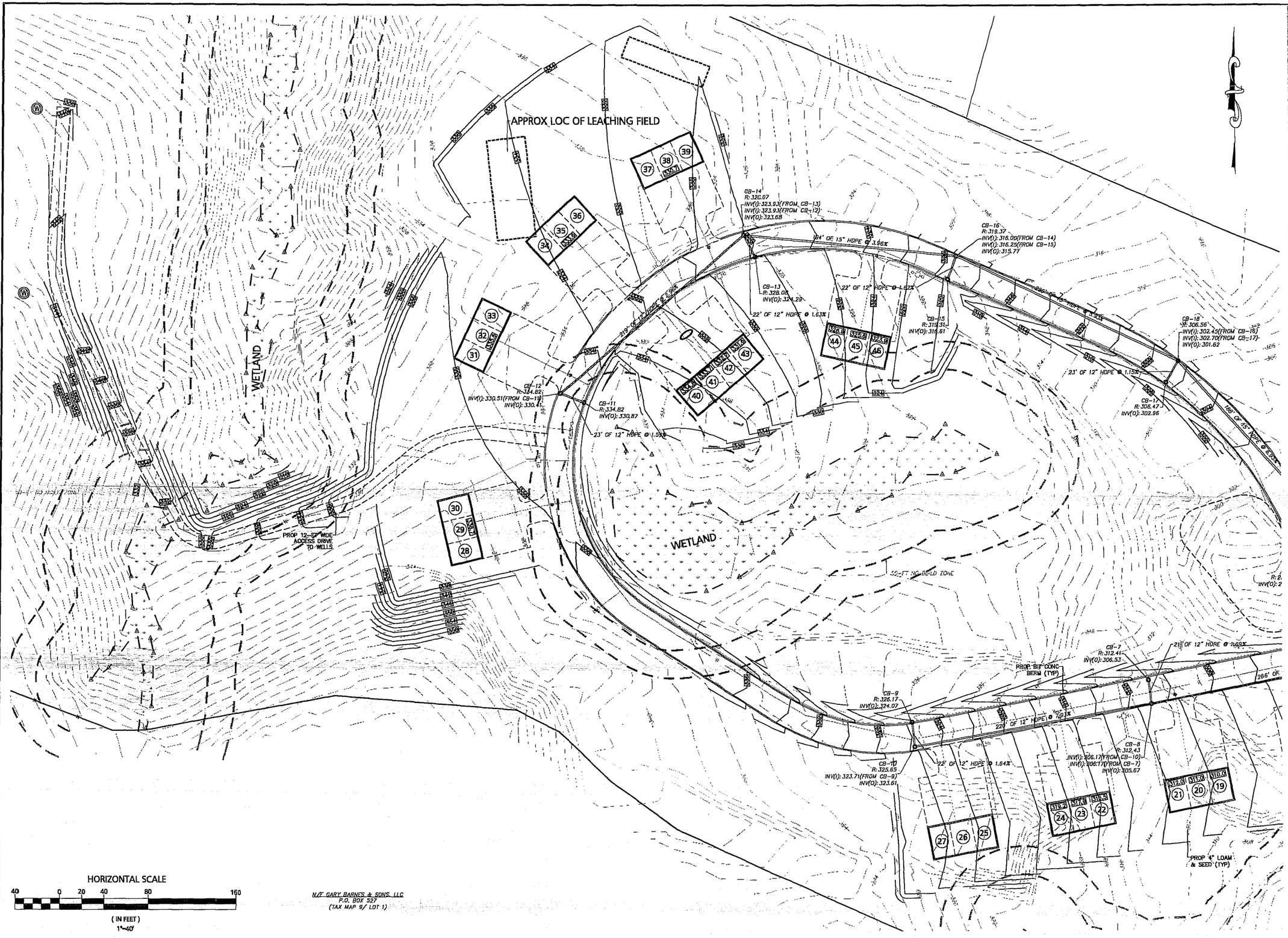
GRADING & DRAINAGE PLAN

DRAWING #:

C-5A



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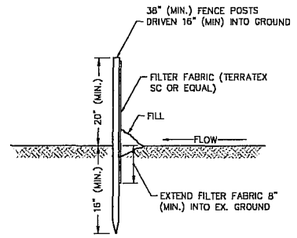
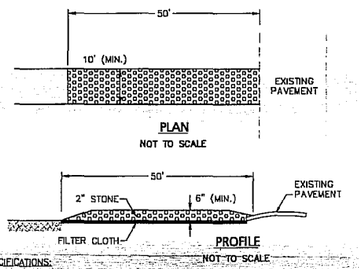


NOTES:
1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

FILTER FABRIC SILT FENCE DETAIL

NOT TO SCALE



PLAN

NOT TO SCALE

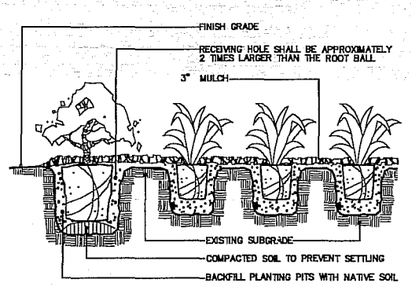
PROFILE

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS:
1. USE 2" DIAMETER STONE OR RECLAIMED/RECYCLED CONCRETE EQUIVALENT.
2. RECOMMENDED LENGTH GREATER THAN 50 FEET WHERE PRACTICAL.
3. THICKNESS NOT LESS THAN 6 INCHES.
4. 10 FOOT MINIMUM WIDTH, BUT NOT LESS THAN FULL WIDTH AT POINTS WHERE INGRESS AND EGRESS OCCUR.
5. FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WILL BE PERMITTED.
7. ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED BY THE CONTRACTOR.
9. REMOVE STABILIZED CONSTRUCTION ENTRANCE PRIOR TO PLACEMENT OF BITUMINOUS CONCRETE PAVEMENT.

STABILIZED CONSTRUCTION ENTRANCE

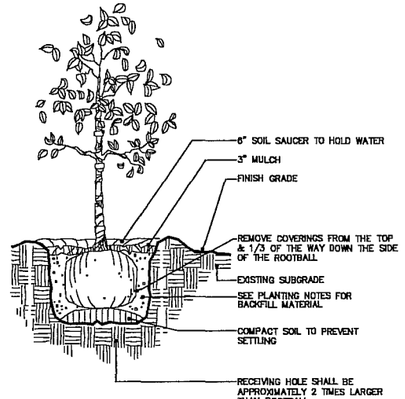
NOT TO SCALE



NOTE: SHRUBS SHALL BE PLANTED A MINIMUM OF 1" & NO MORE THAN 2" ABOV FINISH GRADE, DEPENDING UPON SITE CONDITIONS.

SHRUB/GROUND COVER PLANTING DETAIL

N.T.S.



SMALL TREE PLANTING/STAKING DETAIL

(TREES WITH 3" CAL. & SMALLER)
N.T.S.

PERMANENT SEEDING MIXTURE

SEED MIXTURE BASED ON SOIL TYPE

USE	MIX	SOIL DRAINAGE: DROUGHTY	WELL DRAINED	MOD. WELL DRAINED	POORLY DRAINED
STEEP CUTS & FILLS	A	FAIR	GOOD	GOOD	FAIR
BORROW & DISPOSAL AREAS	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	FAIR	GOOD	EXCELLENT
	E	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, & OTHER CHANNELS W/ FLOWING WATER	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
	D	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, & LOW INTENSITY USE RECREATIONAL SITES	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
	D	FAIR	GOOD	GOOD	EXCELLENT
PLAY AREAS & ATHLETIC FIELDS (TOPSOIL IS ESSENTIAL FOR GOOD TURF)	F	FAIR	EXCELLENT	EXCELLENT	(SEE NOTE 2)
	G	FAIR	EXCELLENT	EXCELLENT	(SEE NOTE 2)
GRAVEL PITS		SEE SOURCE DOCUMENTS FOR RECOMMENDATION, OR CONSULT W/ USDA NATURAL HERITAGE RESOURCE CONSERVATION SERVICE.			

SEED MIXTURE FOR PERMANENT VEGETATION

MIXTURE	SPECIES	POUND/ACRE	POUND / 1000-SF
A	TALL FESCUE	20	0.45
	CREEPING RED FESCUE	20	0.45
	REDTOP	2	0.05
	TOTAL	42	0.95
B(3)	TALL FESCUE	15	0.35
	CREEPING RED FESCUE	10	0.25
	CROWN VETCH OR FLATPEA	15 30	0.35 0.75
	TOTAL	40 OR 55	0.95 OR 1.35
C(3)	TALL FESCUE	20	0.45
	CREEPING RED FESCUE	20	0.45
	BIRDSFOOT TREFOIL	8	0.20
	TOTAL	48	1.10
D(3)	BIRDSFOOT TREFOIL	10	0.25
	REDTOP	5	0.10
	REED CANARYGRASS(1)	15	0.35
	TOTAL	30	0.70
E	TALL FESCUE	20	0.45
	FLATPEA	30	0.75
	TOTAL	50	1.20
F	CREEPING RED FESCUE(2)	50	1.15
	KENTUCKY BLUEGRASS(2)	50	1.15
	TOTAL	100	2.30
G	TALL FESCUE(2)	150	3.80

NOTES:
1. REED CANARYGRASS IS ON THE INVASIVE SPECIES WATCH LIST DUE TO ITS RAPID, AGGRESIVE GROWTH AND ITS ABILITY TO MOVE INTO WETLANDS AND OUT-COMPETE OTHER DESIRABLE WETLAND PLANTS. CAUTION SHOULD BE USED WHEN PLANTED NEAR WETLANDS.
2. FOR HEAVY USE ATHLETIC FIELDS, CONSULT THE UNH COOP. EXTENSION TURF SPECIALIST FO CURRENT VARIETIES AND SEEDING RATES.
3. THE UNH COOP. EXTENSION RECOMMENDS RED CLOVER TO SUBSTITUTE FOR CROWN VETCH OR BIRDSFOOT TREFOIL IF THEY ARE GOING TO BE MOWED TO A HEIGHT OF 4" OR LESS. RED CLOVER *ALISKE VARIETY) SHOULD BE SEEDED AT A RATE OF 10 POUNDS PER ACRE.

MAINTENANCE REQUIREMENTS:
1. PERMANENT SEEDED AREAS SHOULD BE INSPECTED AT LEAST MONTHLY DURING THE COURSE OF CONSTRUCTION. INSPECTIONS, MAINTENANCE, AND CORRECTIVE ACTIONS SHOULD CONTINUE UNTIL THE OWNER ASSUMES PERMANENT OPERATION OF THE SITE.
2. SEEDED AREAS SHOULD BE MOWED AS REQUIRED TO MAINTAIN A HEALTHY STAND OF VEGETATION, WITH MOWING HEIGHT AND FREQUENCY DEPENDENT ON TYPE OF GRASS COVER.
3. BASED ON INSPECTION, AREAS SHOULD BE RESEEDED TO ACHIEVE FULL STABILIZATION OF EXPOSED SOILS.
4. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION.
5. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHOULD BE MADE AND AREAS SHOULD BE RESEEDED, WITH OTHER TEMPORARY MEASURES (E.G., MULCH) USED TO PROVIDE EROSION PROTECTION DURING THE PERIOD OF VEGETATION ESTABLISHMENT.

SITE PREPARATION:
1. INSTALL NEEDED EROSION AND SEDIMENT CONTROL MEASURES SUCH AS SILTATION BARRIERS, DIVERSIONS, AND SEDIMENT TRAPS.
2. GRADE AS NEEDED FOR THE ACCESS OF EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION, AND MULCH ANCHORING.
3. RUNOFF SHOULD BE DIVERTED FROM THE SEEDED AREA.
4. ON SLOPES 4:1 OR STEEPER, THE FINAL PREPARATION SHOULD INCLUDE CREATING HORIZONTAL GROOVES PERPENDICULAR TO THE DIRECTION OF THE SLOPE TO CATCH SEED AND REDUCE RUNOFF.

SEEDBED PREPARATION:
1. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRING TOOTH HARROW OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLY UNIFORM, FINE SEEDBED IS PREPARED. ALL BUT CLAY OR SILTY SOILS AND COARSE SANDS SHOULD BE ROLLED TO FIRM THE SEEDBED WHEREVER FEASIBLE.
2. REMOVE FROM THE SURFACE ALL STONES 2 INCHES OR LARGER IN ANY DIMENSION.
3. REMOVE ALL OTHER DEBRIS, SUCH AS WIRE, CABLE, TREE ROOTS, CONCRETE, CLODS, LUMPS, TRASH OR OTHER UNSUITABLE MATERIAL.
4. INSPECT SEEDBED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT THE SOIL COMPACTED; THE AREA MUST BE TILLED AND FIRMED AS ABOVE.
5. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF 2 INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED.
6. IF APPLICABLE, FERTILIZER AND ORGANIC SOIL AMENDMENTS SHOULD BE APPLIED DURING THE GROWING SEASON.
   6.1. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 600 POUNDS PER ACRE OR 13.8 POUNDS PER 1,000 SQUARE FEET OF LOW PHOSPHATE FERTILIZER1 (N-P205-K20) OR EQUIVALENT. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE (138 LB. PER 1,000 SQUARE FEET).
   6.2. FERTILIZER SHOULD BE RESTRICTED TO A LOW PHOSPHATE, SLOW DORELEASE2 NITROGEN FERTILIZER WHEN APPLIED TO AREAS BETWEEN 25 FEET AND 250 FEET FROM A SURFACE WATER BODY. NO FERTILIZER EXCEPT LIMESTONE SHOULD BE APPLIED WITHIN 25 FEET OF THE SURFACE WATER. THESE LIMITATIONS ARE REQUIREMENTS FOR ANY WATER BODY PROTECTED BY THE COMPREHENSIVE SHORELAND PROTECTION ACT.

SEEDING:
1. SELECT A SEED MIXTURE IN TABLE 4-2 THAT IS APPROPRIATE FOR THE SOIL TYPE AND MOISTURE CONTENT AS FOUND AT THE SITE. FOR THE AMOUNT OF SUN EXPOSURE AND FOR LEVEL OF USE. SELECT SEED FROM RECOMMENDATIONS IN TABLE 4-3.
2. INOCULATE ALL LEGUME SEED WITH THE CORRECT TYPE AND AMOUNT OF INOCULANT.
3. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). NORMAL SEEDING DEPTH IS FROM ¼ TO ½ INCH. HYDROSEEDING THAT INCLUDES MULCH MAY BE LEFT ON SOIL SURFACE. SEEDING OPERATIONS SHOULD BE ON THE CONTOUR.
4. WHERE FEASIBLE, EXCEPT WHERE EITHER A CULTIPACKER TYPE SEEDER OR HYDROSEEDER IS USED, THE SEEDBED SHOULD BE FIRMED FOLLOWING SEEDING OPERATIONS WITH A ROLLER, OR LIGHT DRAG.
5. SPRING SEEDING USUALLY GIVES THE BEST RESULTS FOR ALL SEED MIXES OR WITH LEGUMES. PERMANENT SEEDING SHOULD BE COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST. WHEN CROWN VETCH IS SEEDED IN LATER SUMMER, AT LEAST 35% OF THE SEED SHOULD BE HARD SEED (UNSCARIFIED). IF SEEDING CANNOT BE DONE WITHIN THE SPECIFIED SEEDING DATES, MULCH ACCORDING TO THE "TEMPORARY AND PERMANENT MULCHING PRACTICE,"AND DELAY SEEDING UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.
   5.1. TEMPORARY SEEDING SHOULD TYPICALLY OCCUR PRIOR TO OOSEPTEMBER 15TH.
   5.2. AREAS SEEDED BETWEEN MAY 15TH AND AUGUST 15TH SHOULD OOBE COVERED WITH HAY OR STRAW MULCH, ACCORDING TO THE "TEMPORARY AND PERMANENT MULCHING"PRACTICE.
6. VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED AREA SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH. IF THIS CONDITION IS NOT ACHIEVED, IMPLEMENT TEMPORARY STABILIZATION MEASURES FOR OVERWINTER PROTECTION, AND COMPLETE PERMANENT SEED STABILIZATION DURING THE NEXT GROWING SEASON.

HYDROSEEDING:
1. WHEN HYDROSEEDING (HYDRAULIC APPLICATION), PREPARE THE SEEDBED AS SPECIFIED ABOVE OR BY HAND RAKING TO LOOSEN AND SMOOTH THE SOIL AND TO REMOVE SURFACE STONES LARGER THAN 2 INCHES IN DIAMETER.
2. SLOPES MUST BE NO STEEPER THAN 2 TO 1 (2 FEET HORIZONTALLY TO 1 "FOOT VERTICALLY).
3. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. THE USE OF FIBER MULCH ON CRITICAL AREAS IS NOT RECOMMENDED (UNLESS IT IS USED TO HOLD STRAW OR HAY). BETTER PROTECTION IS GAINED BY USING STRAW MULCH AND HOLDING IT WITH ADHESIVE MATERIALS OR 500 POUNDS PER ACRE OF WOOD FIBER MULCH.
4. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING."

VEGETATION MANAGEMENT NOTES:
1. THIS CONSTRUCTION PROJECT SHALL BE MANAGED TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.
2. THE CONTRACTOR SHOULD BE AWARE THAT MANY TEMPORARY AND PERMANENT EROSION CONTROLS INCLUDING MULCHING, SEEDING AND PERIMETER CONTROLS CONTAIN A VARIETY OF SEEDS SOME OF WHICH MAY BE INVASIVE PLANTS SUCH AS REED CANARY GRASS, PHRAGMITES AND PURPLE LOOSESTRIFE. THE CONTRACTOR SHALL CONFIRM ALL MATERIAL AND EQUIPMENT BROUGHT ON SITE IS FREE OF ANY INVASIVE SOIL, SEED OR PLANT LIFE.
3. THE CONTRACTOR IS EXPECTED TO MAKE ALL REASONABLE EFFORTS TO AVOID DISTURBING ANY INVASIVE VEGETATIVE SPECIFIES TO THE MAXIMUM EXTENT PRACTICAL.
4. IN THE EVENT DISTURBANCE OF ANY INVASIVE SPECIES IS UNAVOIDABLE, MANUAL CUTTING OF THE TARGETED SPECIES IS PREFERRED.
5. IF, DUE TO THE SIZE OR LOCATION OF THE DISTURBANCE, MANUAL CUTTING IS REQUIRED, THE FOLLOWING PROCEDURE SHALL BE IMPLEMENTED:
   5.1. LIMIT THE AMOUNT OF WITHIN THE INVASIVE SPECIES TO THE SMALLEST AREA PRACTICAL.
   5.2. PRIOR TO REMOVING ANY EQUIPMENT FROM THE SITE, INSPECT THE EQUIPMENT FOR FOREIGN PLANT MATTER (STEMS, FLOWERS, ROOTS, ETC.) AND SOIL EMBEDDED IN THE TRACKS OR WHEELS.
   5.3. IF FOREIGN PLANT MATTER/SOIL IS PRESENT, THE OPERATOR SHALL REMOVE THE PLANT MATERIAL AND SOIL FROM THE MACHINE USING HAND TOOLS.
   5.4. IF IT IS DETERMINED THAT ADDITIONAL CLEANING MEASURES ARE REQUIRED, THE MACHINE SHALL BE EITHER PRESSURE WASHED BEFORE CROSSING ANOTHER ROAD OR TRANSPORTED TO A WASH FACILITY IMMEDIATELY.

GENERAL EROSION CONTROL NOTES
1. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICE AS SHOWN ON THE PLAN. ALL EROSION CONTROL DEVICES SHALL BE MAINTAINED IN EFFECTIVE CONDITION DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH THE TERMS AND CONDITIONS OF THE CONSTRUCTION GENERAL PERMIT ISSUED BY THE EPA AND THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) SUBMITTED WITH THE PERMIT DOCUMENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE TIMELY INSTALLATION, INSPECTION, MAINTENANCE, AND/OR REPLACEMENT OF ALL TEMPORARY AND PERMANENT EROSION CONTROL DEVICES TO ENSURE PROPER OPERATION THROUGHOUT THE LIFE OF THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF PERMANENT MEASURES UNTIL CONSTRUCTION OF THE PROJECT IS COMPLETED OR UNTIL IT IS ACCEPTED BY THE OWNER. THE OWNER IS RESPONSIBLE THEREAFTER.
3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CLEAN ROADS, CONTROL DUST, AND TAKE ALL NECESSARY MEASURES TO ENSURE THAT THE SITE AND ALL ROADS BE MAINTAINED IN A MUD AND DUST-FREE CONDITION AT ALL TIMES THROUGHOUT THE LIFE OF THE CONTRACT. DUST CONTROL SHALL INCLUDE, BUT IS NOT LIMITED TO, WATER, CALCIUM CHLORIDE, AND/OR CRUSHED STONE OR COARSE GRAVEL.
4. ALL PROPOSED CONSTRUCTION ENTRANCES SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS AND DETAILS. ALL VEHICLE TRAFFIC ENTERING OR EXITING THE WORK AREA SHALL PASS OVER THE CONSTRUCTION ENTRANCES TO REDUCE THE TRACKING OR FLOWING OF SEDIMENT ONTO THE SURROUNDING ROADWAYS.
5. THE CONTRACTOR SHALL INSTALL ALL PERIMETER SEDIMENT CONTROL BARRIERS AS SHOWN ON THE SITE DEVELOPMENT PLANS. SILT FENCE SHALL ALSO BE INSTALLED AROUND ANY SOIL STOCKPILE AREAS.
6. THE CONTRACTOR SHALL RESTORE DISTURBED AREAS AS CLOSELY AS POSSIBLE. AREAS DAMAGED DURING CONSTRUCTION SHALL BE RESODDED, RESEEDED, OR OTHERWISE RESTORED TO THEIR ORIGINAL STATE. TREES AND OTHER EXISTING VEGETATION SHALL BE RETAINED WHEREVER FEASIBLE.
7. TEMPORARY VEGETATIVE COVER SHALL BE APPLIED TO ANY DISTURBED AREAS (INCLUDING SOIL STOCKPILE AREAS) THAT HAVE NOT YET REACHED FINISHED GRADE AS SOON AS POSSIBLE, BUT NOT MORE THAN FOURTEEN (14) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY CEASED, UNLESS THE ACTIVITY IS TO RESUME WITHIN TWENTY-ONE (21) DAYS. THE RECOMMENDED TEMPORARY SEEDING DATES ARE MARCH 1 TO JUNE 15 AND AUGUST 15 TO OCTOBER 1.
8. PERMANENT VEGETATIVE COVER SHALL BE APPLIED TO ALL DISTURBED AREAS THAT HAVE REACHED FINISHED GRADE AS SOON AS POSSIBLE, BUT NOT MORE THAN FOURTEEN (14) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS PERMANENTLY CEASED. THE RECOMMENDED PERMANENT SEEDING DATES ARE APRIL 1 TO JUNE 15 AND AUGUST 15 TO OCTOBER 1.
9. AREAS WHICH HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDED SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING IN ADDITION TO AREAS WHICH CANNOT BE SEEDED WITHIN THE RECOMMENDED SEEDING DATES AND ANY SOIL STOCKPILE AREAS. TEMPORARY MULCHING SHOULD BE PERFORMED AS SOON AS POSSIBLE, BUT NOT MORE THAN FOURTEEN (14) DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY CEASED UNLESS THE ACTIVITY IS TO RESUME WITHIN TWENTY-ONE (21) DAYS.
10. STRAW OR HAY MULCH, WOOD FIBER MULCH, AND HYDROMULCH ARE RECOMMENDED. THE MATERIALS USED IN MULCHING SHALL CONFORM TO THE REQUIREMENTS LISTED IN SECTION M6.04.0 OF THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES.
11. IF SEEDING CANNOT BE COMPLETED IMMEDIATELY OR WITHIN THE RECOMMENDED SEEDING DATES, USE THE TEMPORARY MULCHING MEASURE TO PROTECT THE SITE AND DELAY SEEDING UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.
12. ANY EXISTING OR PROPOSED CATCH BASINS THAT MAY BE SUBJECT TO SEDIMENTATION PROCESSES SHALL HAVE SILT SACKS INSTALLED TO PREVENT SEDIMENT FROM ENTERING THE PROPOSED STORM DRAINAGE SYSTEM PRIOR TO PERMANENT STABILIZATION OF THE DISTURBED SITE. THE PROPER INLET PROTECTION DEVICES SHALL BE INSTALLED WHERE STORM DRAIN INLETS ARE TO BE MADE OPERATIONAL BEFORE PERMANENT STABILIZATION OF ANY DISTURBED DRAINAGE AREA.
13. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED IN ACCORDANCE WITH THE MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES AND VOLUME TWO OF THE MASSACHUSETTS STORM WATER MANAGEMENT HANDBOOK.
14. WASTE DISPOSAL: MATERIALS WHICH COULD BE A POTENTIAL SOURCE OF STORM WATER POLLUTION SUCH AS GASOLINE, DIESEL FUEL, HYDRAULIC OIL, ETC., SHALL BE STORED AT THE END OF EACH DAY IN A STORAGE TRAILER OR COVERED LOCATION AND TAKEN OFF-SITE AND PROPERLY DISPOSED OF. ALL TYPES OF WASTE GENERATED AT THIS SITE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH STATE LAW AND/OR REGULATIONS.
15. GOOD HOUSEKEEPING: THE PROJECT SITE SHALL PROVIDE FOR THE MINIMIZATION OF EXPOSURE OF CONSTRUCTION DEBRIS (INCLUDING, BUT NOT LIMITED TO, INSULATION, WRING, PAINTS AND PAINT CANS, SOLVENTS, WALL BOARD, ETC.) TO PRECIPITATION BY MEANS OF DISPOSAL AND/OR PROPER SHELTER OR COVER. IN ADDITION, CONSTRUCTION WASTE MUST BE PROPERLY DISPOSED OF IN ORDER TO AVOID EXPOSURE TO PRECIPITATION AT THE END OF EACH WORKING DAY.
16. NO DUST WILL BE ALLOWED ON OR OFF WORK SITE. CONTRACTOR MUST CONDUCT CONTINUOUS EFFORT TO CONTROL DUST. LACK OF DUST CONTROL COULD CAUSE THE PROJECT TO BE STOPPED UNTIL ISSUES ARE RESOLVED.
17. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTROL DUST AND TAKE ALL NECESSARY MEASURES TO ENSURE ALL ROADS ARE MAINTAINED IN A DUST FREE CONDITION AT ALL TIMES THROUGHOUT THE LIFE OF THE CONTRACT. REPETITIVE TREATMENTS SHOULD BE APPLIED AS NECESSARY.
18. REPAIRS OR REPLACEMENT OF DRAINAGE STRUCTURES, RIP RAP CHANNELS, OR OTHER ELEMENTS OF THE FACILITY SHOULD BE DONE WITHIN 14 DAYS OF DEFICIENCY REPORTS. IF AN EMERGENCY SITUATION IS IMMINENT THEN REPAIR/REPLACEMENT MUST BE DONE IMMEDIATELY TO AVERT FAILURE OR DANGER TO NEARBY RESIDENTS.
19. IMMEDIATELY PRIOR TO THE END OF CONSTRUCTION OR ACCEPTANCE BY THE OWNER, THE CONTRACTOR SHALL INSPECT ALL ON-SITE STORMWATER MANAGEMENT FACILITIES AND CLEAN AND FLUSH AS NECESSARY.
20. THE GENERAL CONTRACTOR OR NOMINEE WILL BE THE PARTY RESPONSIBLE FOR THE INSPECTION, MAINTENANCE, AND REQUIRED DOCUMENTATION OF ALL STORM WATER STRUCTURES AS OUTLINED WITHIN.

LANDSCAPE NOTES
1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING AND LANDOSCAPING WORK.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON THE DRAWINDS.
3. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
4. PLANTS FURNISHED IN CONTAINERS SHALL HAVE THE ROOTS WELL ESTABLISHED IN THE SOIL MASS AND SHALL HAVE AT LEAST ONE (1) GROWING SEASON. ROOT-BOUND PLANTS OR INADEQUATELY SIZED CONTAINERS TO SUPPORT THE PLANT, MAY BE DEEMED UNACCEPTABLE.
5. NO PLANT SHALL RE PUT IN THE GROUND BEFORE GRADING HAS BEEN FINISHED.
6. ALL PLANTS SHALL BE INSTALLED AS DETAILED.
7. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24-HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY OR MORE OFTEN, IF NECESSARY DURING THE FIRST GROWNG SEASON.
8. FIELD ADJUST ALL PLANTINGS AS NECESSARY TO AVOID CONFLICT WITH UTILITIES.

DATE	DESCRIPTION
REVISIONS	

OWNER/APPLICANT:

KASHER CORPORATION
36 WEBB BROOK ROAD
BILLERICA, MA 01821

PROJECT:

WELLS VILLAGE ESTATES
WELLS VILLAGE ROAD
(TAX MAP 13 / LOT 1)
SANDOWN, NH 03873

DATE ISSUED:	MARCH 14, 2016
PROJECT #:	15-2902
PREPARED BY:	JAMES E. HANLEY, PE

STATE OF NEW HAMPSHIRE
JAMES E. HANLEY
No. 12082
LICENSED
PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER FOR CIVIL DESIGN CONSULTANTS, INC.

PREPARED BY:

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P.O. Box 2237, Methuen, MA 01844-1057
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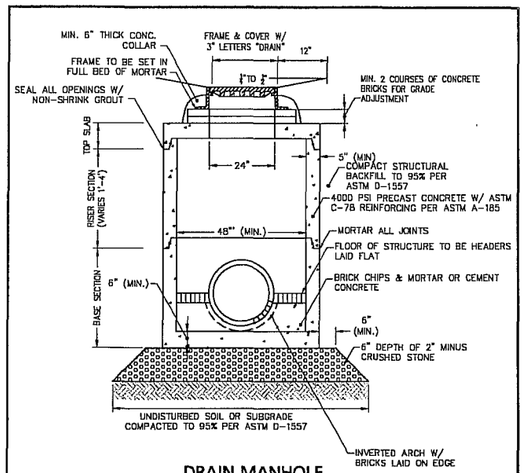
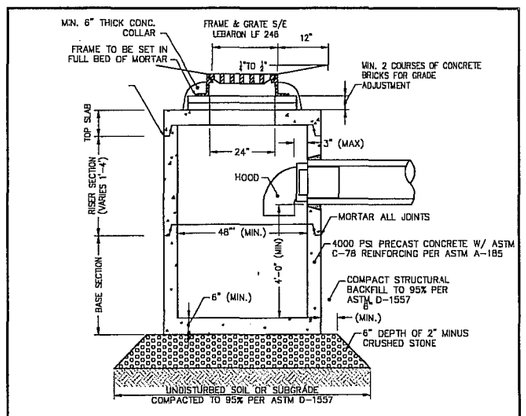
DRAWING TITLE:
CONSTRUCTION DETAILS

DRAWING #:
D-1



DRAIN MANHOLE

NOT TO SCALE



TYPICAL CATCH BASIN

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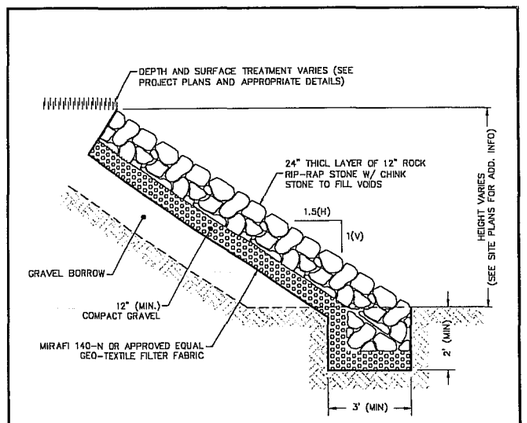

TYPICAL ROCK RIP-RAP SLOPE DETAIL

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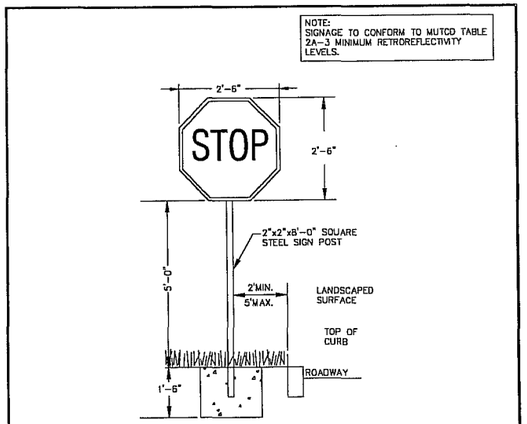

TYPICAL SIGN DETAIL

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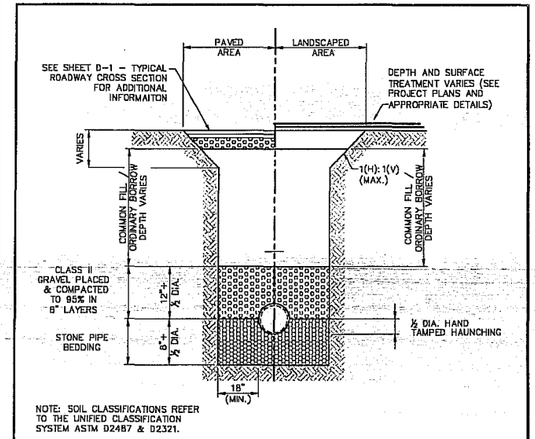

NOTE: SOIL CLASSIFICATIONS REFER TO THE UNIFIED CLASSIFICATION SYSTEM ASTM D2487 & D2321.

TYPICAL DRAIN TRENCH DETAIL

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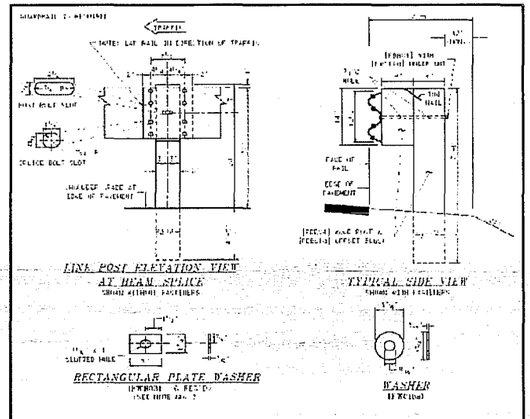
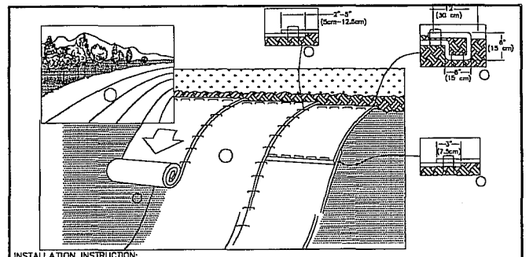


BEAM GUARDRAIL WITH WOOD POST

NOT TO SCALE

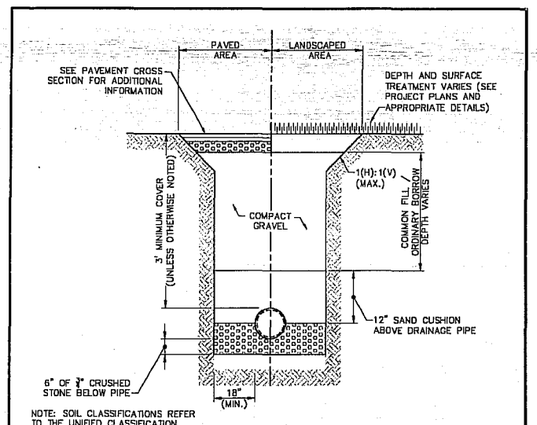


INSTALLATION INSTRUCTION:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECPS) TYPE P300 PERMANENT TURF REINFORCING MAT BY NORTH AMERICAN GREEN OR APPROVED EQUAL INCLUDING ANY NECESSARY- APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPS IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECPS EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECPS WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECPS BACK OVER SEED AND COMPACTED SOIL. SECURE RECPS OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECPS.
3. ROLL THE RECPS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECPS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECPS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECPS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" OVERLAP DEPENDING ON RECP'S TYPE.
5. CONSECUTIVE RECPS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECP'S WIDTH.

REINFORCED SLOPE DETAIL

NOT TO SCALE



NOTE: SOIL CLASSIFICATIONS REFER TO THE UNIFIED CLASSIFICATION SYSTEM ASTM D2487 & D2321.

TYPICAL UTILITY TRENCH DETAIL

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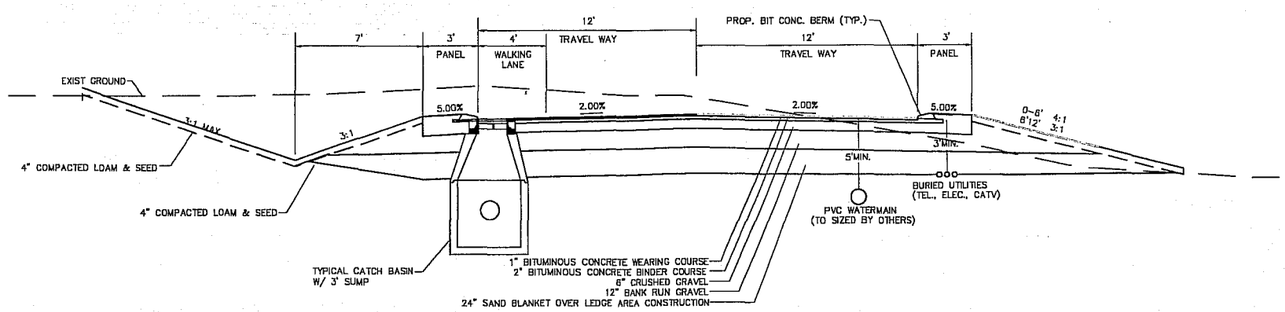

TYPICAL ROADWAY SECTION

SCALE: N.T.S.

DATE	DESCRIPTION
REVISIONS	

OWNER/APPLICANT:

KASHER CORPORATION
36 WEBB BROOK ROAD
BILLERICA, MA 01821

PROJECT:

WELLS VILLAGE ESTATES
WELLS VILLAGE ROAD
(TAX MAP 13 / LOT 1)
SANDOWN, NH 03873

DATE ISSUED:	MARCH 14, 2016
PROJECT #:	15-2902
PREPARED BY:	JAMES E. HANLEY, PE

STATE OF NEW HAMPSHIRE — JAMES E. HANLEY No. 12985 LICENSED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER FOR CIVIL DESIGN CONSULTANTS, INC.

PREPARED BY:

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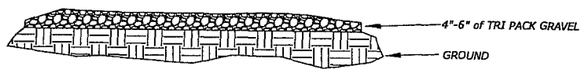
DRAWING TITLE:
CONSTRUCTION DETAILS

DRAWING #:

D-2

NOTE: REMOVE ALL ORGANICS BEFORE PLACING GRAVEL.



PROPOSED GRAVEL DETAIL

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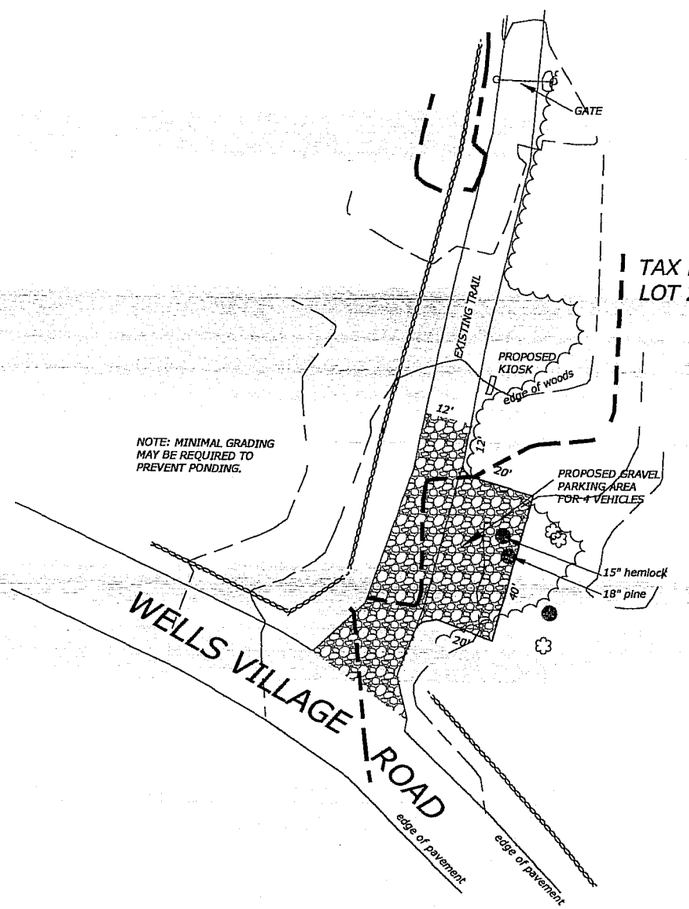


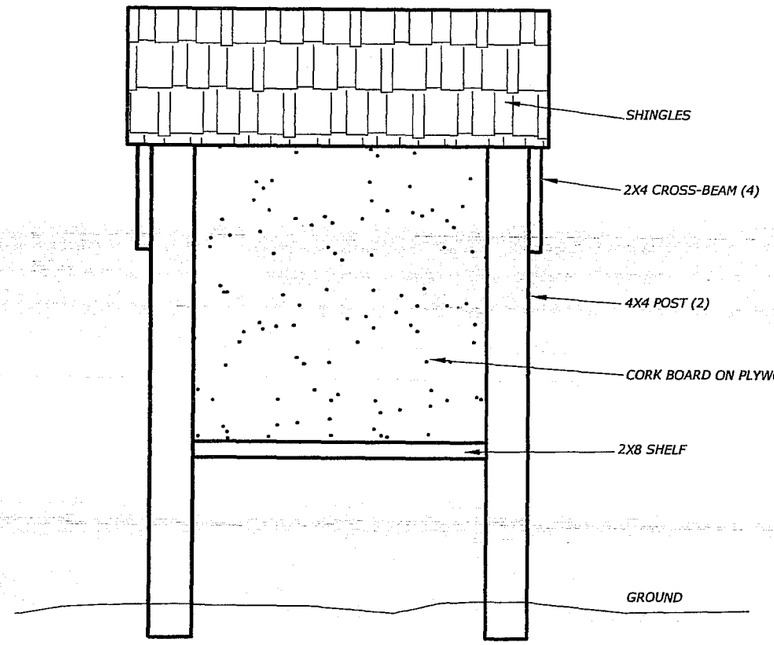
TAX MAP 13
LOT 20

PROPOSED PARKING AREA

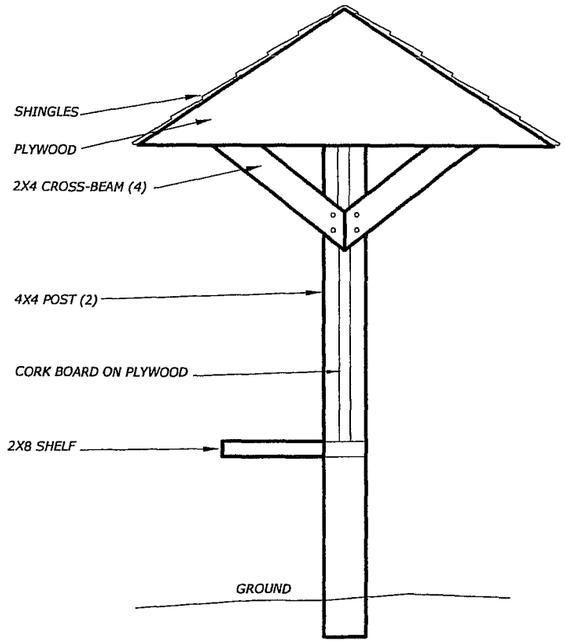
SCALE:1"=20'

PROPOSED KIOSK DETAIL

NOT TO SCALE



FRONT ELEVATION



CROSS-SECTION

TAX MAP 13 LOT 1
SANDOWN, NH

OFF-SITE RECREATION PLAN

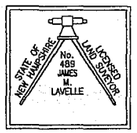
Wells Village Road

OWNED BY
KASHER CORPORATION
36 WEBB BROOK ROAD#1
BILLERICA, MA 01821

SCALE: 1"=50' DATE: 9/1/2015

0' 25' 50' 100' 150' 200'

LAVELLE ASSOCIATES



PREPARED BY
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PROJ#010-2015
addendum