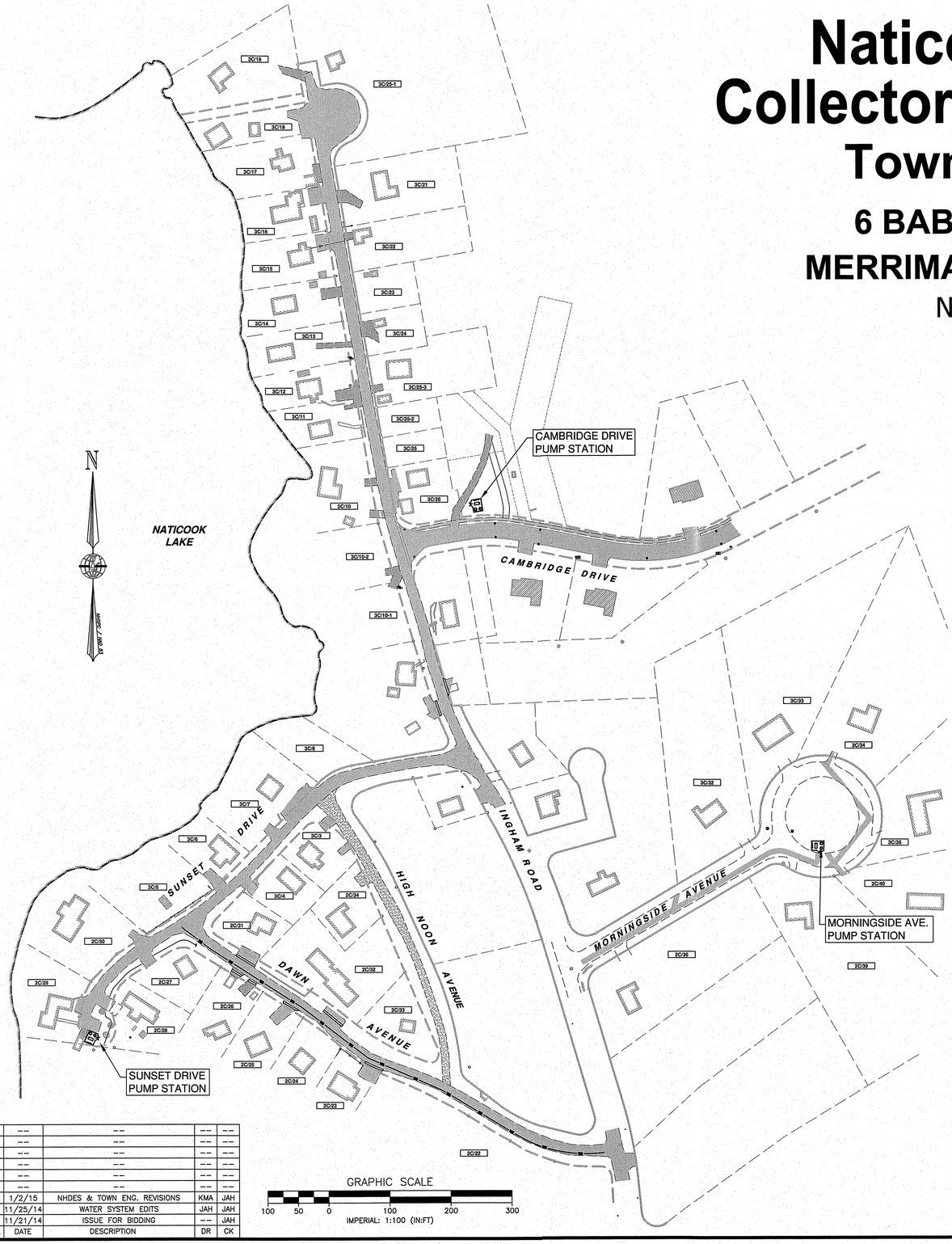
Naticook Lake East Collector Sewer Extension

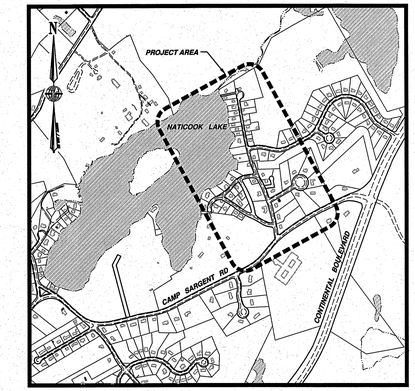
Town of Merrimack

6 BABOOSIC LAKE ROAD

MERRIMACK, NEW HAMPSHIRE

NOVEMBER 21, 2014





LOCUS MAP SCALE: 1"=1000'±

ABUTTERS:

2C 022
NASHUA YMCA
17 PROSPECT ST
NASHUA, NH 03060

2C 023
SHAW PAUL J
12 DAWN AVE
MERRIMACK, NH 03054

2C 024
ABAID, ROSE A REVOCABLE TRUST
171 BABOOSIC LAKE RD
MERRIMACK, NH 03054

2C 025
DONOHUE PAUL J & EIKELBOOM PAMELA
16 DAWN AVENUE
MERRIMACK, NH 03054

2C 026
CARRINGTON MICHELLE
18 DAWN AV
MERRIMACK, NH 03054

2C 027
DELLIDE ROBERT C
20 DAWN AVE
MERRIMACK, NH 03054

2C 028
COLLETTE FAMILY REVOCABLE TRUST
COLLETTE, MURRAY R & DENISE M
TRUSTEES
15 SUNSET DR
MERRIMACK, NH 03054

2C 029
COLLETTE FAMILY REVOCABLE TRUST
COLLETTE, MURRAY R & DENISE M
TRUSTEES
15 SUNSET DR
MERRIMACK, NH 03054

2C 030
COLLETTE WAYNE M & JAYMIE L
11 SUNSET DR
MERRIMACK, NH 03054

2C 031
SWAFFORD MARTIN H
19 DAWN AV
MERRIMACK, NH 03054

2C 032
KOROMA PAUL
17 DAWN AV
MERRIMACK, NH 03054

2C 033
WARE PEARL C/O ANITA STEVENS
19 ASHLEY DRIVE
MILFORD, NH 03055-3450

2C 034
JAYNES STEVEN A & LAURA K
6 HIGHNOON AVE
MERRIMACK, NH 03054

2C 036
CROSS GLEN E & KATHLEEN
5 INGHAM RD
MERRIMACK, NH 03054

2C 039
FERRINI KATHRYN L & TROIAINI MICAHEL
2 MORNINGSIDE AVE
MERRIMACK, NH 03054

2C 040
WEGIEL ELIZABETH M & KAUSCH
WINFRED R JR
3 MORNINGSIDE AVE
MERRIMACK, NH 03054

3C 005
LAKE NATICOOK ASSOC. % JAYNES,
6 HIGHNOON AVE.
MERRIMACK, NH 03054

3C 006
GOODWIN, ROBERT BETTY G
7 SUNSET DRIVE
MERRIMACK, NH 03054

3C 007
EISENBERG YIFTACH
3018 PORTER ST NW APT#204
WASHINGTON, DC 20008

3C 008
BOSSE, LEO REVOC TRUST BOSSE, LEO
TRUSTEE C/O JANET PEARSON
21 JOEY RD
MERRIMACK, NH 03054

3C 010
HOKONSON, CHARLES L., JR.
24 INGHAM RD
MERRIMACK, NH 03054

3C 010 1
WHITE CARROLL W/JUNE L REV TR
WHITE CARROLL W/JUNE L TRUSTEES
22 LAMSON DRIVE
MERRIMACK, NH 03054

3C 010 2
CACCIVIO, JAMES C JR & CACCIVIO,
GREGORY M & CACCIVIO, ADAM C
65 MAOLIS RD
NAHANT, MA 01908

3C 011
ESTONA THOMAS M & ELIZABETH A
26 INGHAM RD
MERRIMACK, NH 03054

3C 012
ALDRICH EARL R & MARIE D
28 INGHAM ROAD
MERRIMACK, NH 03054

3C 013
GOCI, ANN E LIVING TR 11/16/99 GOCI,
MICHAEL J & ANN E TRUSTEES
36 SOUHEGAN STREET
MILFORD, NH 03055-1128

3C 014
RICHARD, ROLAND R. VALERIE A
32 INGHAM RD
MERRIMACK, NH 03054

3C 015
FRASER, ROBERT A SANDRA
34 INGHAM RD.
MERRIMACK, NH 03054

3C 016
BROBST SUSAN
36 INGHAM ROAD
MERRIMACK, NH 03054-4203

3C 017
FREDERICK LAWRENCE C & CAROLYN
38 INGHAM RD
MERRIMACK, NH 03054

3C 018
KENDALL MATHEW ALAN
40 INGHAM ROAD
MERRIMACK, NH 03054

3C 019
BANKS PETER & BEVERLY REVOCABLE
TRUST BANKS PETER & BEVERLY
TRUSTEES
42 INGHAM RD
MERRIMACK, NH 03054

3C 021
PROVENCHER, ROBERT N. CATHER
35 INGHAM RD
MERRIMACK, NH 03054

3C 022
FRASER, ROBERT A SANDRA
34 INGHAM RD.
MERRIMACK, NH 03054

3C 023
RICHARD, ROLAND R. VALERIE A
32 INGHAM RD
MERRIMACK, NH 03054

3C 024
GOCI, ANN E LIVING TR 11/16/99 GOCI,
MICHAEL J & ANN E TRUSTEES
36 SOUHEGAN STREET
MILFORD, NH 03055-1128

3C 025
MURRAY, DENNIS P JANE P
7 DOUGLAS ST
NASHUA, NH 03060

3C 025 1
ALDRICH, EARL R REV TR 04-21-1998
ALDRICH, EARL R TRUSTEE
28 INGHAM ROAD
MERRIMACK, NH 03054

3C 025 2
ESTONA THOMAS M & ELIZABETH A
26 INGHAM RD
MERRIMACK, NH 03054

3C 025 3
ALDRICH, EARL R REV TR 04-21-1998
ALDRICH, EARL R TRUSTEE
28 INGHAM ROAD
MERRIMACK, NH 03054

3C 026
ALDRICH, EARL R REV TR 04-21-1998
ALDRICH, EARL R TRUSTEE
28 INGHAM ROAD
MERRIMACK, NH 03054

3C 032
TRADER GARY & PAULINE
7 MORNINGSIDE AVENUE
MERRIMACK, NH 03054

3C 033
RYAN, MICHAEL JR. SHARON
6 MORNINGSIDE AVE.
MERRIMACK, NH 03054

3C 034
DOBENS CHRISTOPHER J & MARIANNE
5 MORNINGSIDE AVE
MERRIMACK, NH 03054

3C 035
BRETON, KENNETH R. DENISE A.
4 MORNINGSIDE AVE.
MERRIMACK, NH 03054

3C 038 20
WOJCICKI WOJCIECH S & MARY ANN
41 CAMBRIDGE DR
MERRIMACK, NH 03054

3C 038 21
BEYGELMAN MICHAEL & GAIL S
46 CAMBRIDGE DR
MERRIMACK, NH 03054

3C 038 22
JACOBY BLAKELY KENT & EVERETT
SHELLY LYNN
44 CAMBRIDGE DR
MERRIMACK, NH 03054

SHEET INDEX:

PAGE	SHEET	TITLE
1		COVER
2	P-1.1	INGHAM ROAD PLAN AND PROFILE 1 OF 2
3	P-1.2	INGHAM ROAD PLAN AND PROFILE 2 OF 2
4	SP-1.1	INGHAM ROAD IMPROVEMENTS PLAN 1 OF 2
5	SP-1.2	INGHAM ROAD IMPROVEMENTS PLAN 2 OF 2
6	SP-1.3	CAMBRIDGE DRIVE PUMP STATION
7	P-2.1	SUNSET DRIVE PLAN AND PROFILE
8	P-2.2	DAWN AVE. PLAN AND PROFILE
9	SP-2.1	SUNSET DRIVE ROAD IMPROVEMENTS PLAN 1 OF 2
10	SP-2.2	SUNSET DRIVE ROAD IMPROVEMENTS PLAN 2 OF 2
11	SP-2.3	DAWN AVE. ROAD IMPROVEMENTS PLAN
12	SP-2.4	SUNSET DRIVE PUMP STATION
13	P-3.1	MORNINGSIDE AVE. PLAN AND PROFILE
14	SP-3.1	MORNINGSIDE AVE. PUMP STATION
15	D-1	SITE AND DRAINAGE DETAILS
16	D-2	WATER AND SEWER DETAILS
17	D-3	EROSION CONTROL NOTES AND DETAILS

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7995
LICENSED
PROFESSIONAL ENGINEER
1/2/15
PE

DIG SAFE
1-888-344-7233
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

REV.	DATE	DESCRIPTION	DR	CK
I	--	--	--	--
H	--	--	--	--
G	--	--	--	--
F	--	--	--	--
E	--	--	--	--
D	--	--	--	--
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	--	JAH

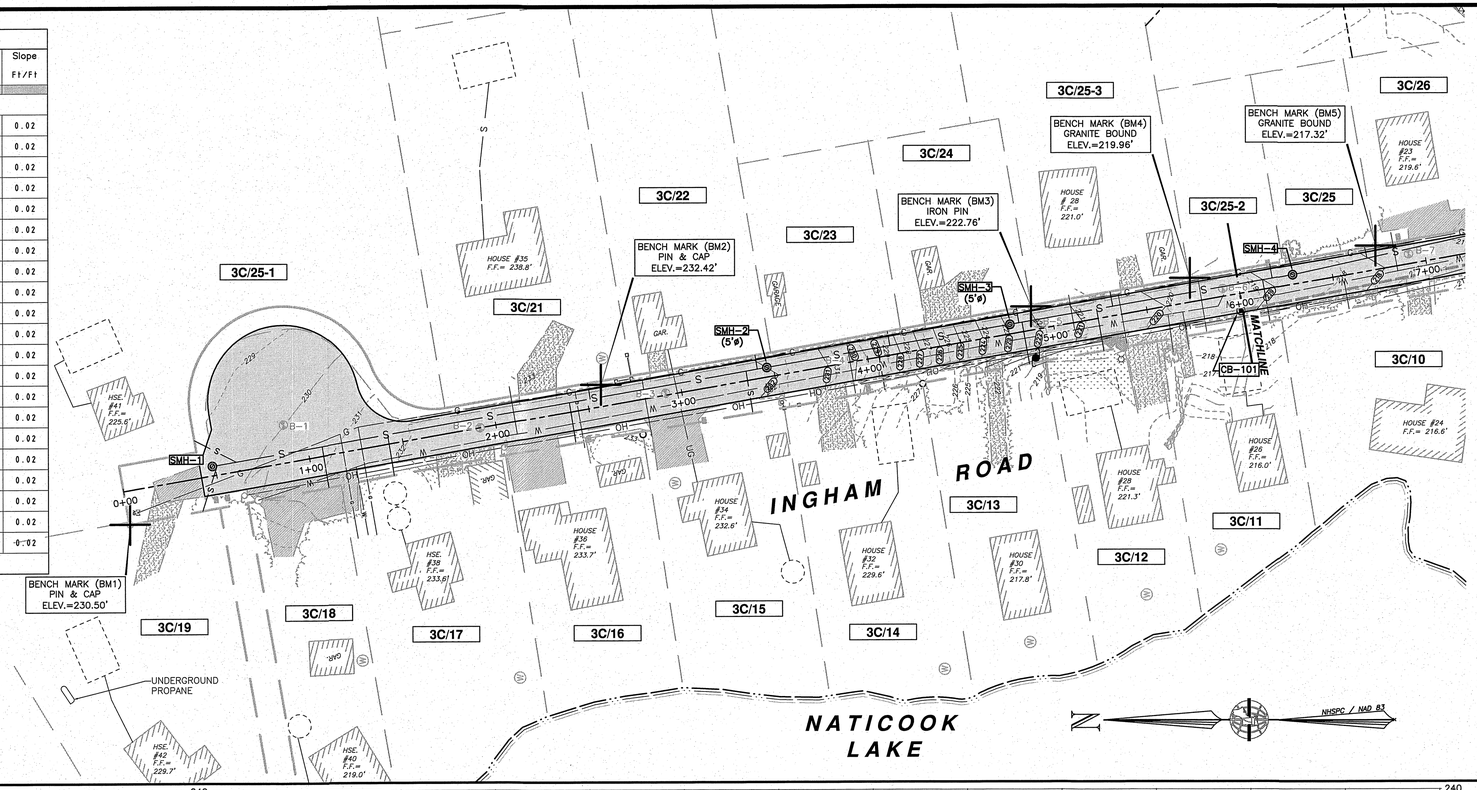
MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031 TEL. 603-673-1441
MERIDIANLANDSERVICES.COM FAX 603-673-1584

FILE:2661E02C.dwg | PROJECT NO. 2661.02 | SHEET NO. 1 OF 17

Plotted: 1/2/2015 3:17 PM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg

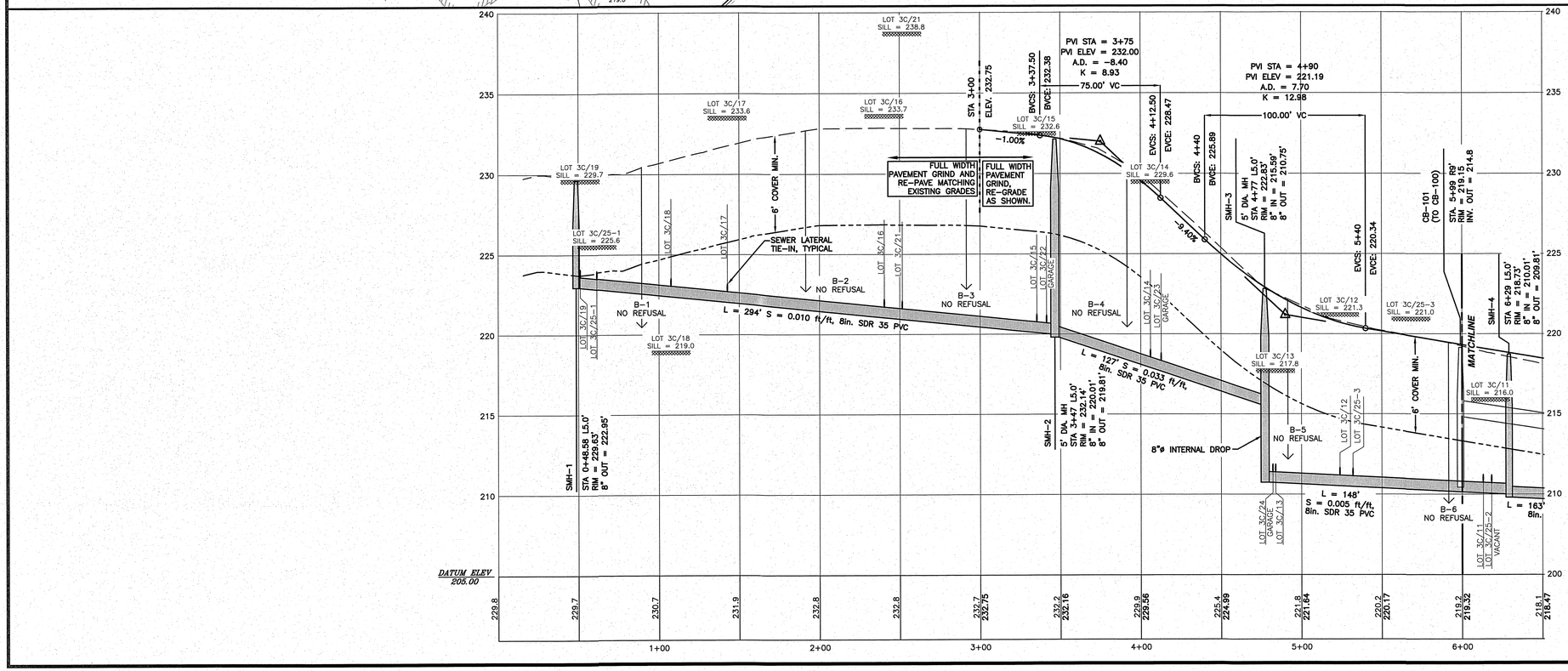
PROPOSED SEWER LATERAL SCHEDULE (INGHAM ROAD)							
FROM				Pipe		Length	Slope
Parcel	Station	Inv. at Main	Inv. at ROW	Dia(in)	Material	Feet	Ft/Ft
3C/9	--	EXISTING CONNECTION TO SEWER					
3C/10	7+31	209.97	210.50	6	PVC	26.6	0.02
3C/10-1	8+72	210.74	211.21	6	PVC	23.4	0.02
3C/10-2	7+68	209.78	210.32	6	PVC	27.0	0.02
3C/11	6+13	210.74	211.19	6	PVC	22.4	0.02
3C/12	5+23	211.19	211.63	6	PVC	22.2	0.02
3C/13	4+83	211.39	211.83	6	PVC	22.2	0.02
3C/14	4+06	218.55	219.00	6	PVC	22.4	0.02
3C/15	3+35	220.77	221.22	6	PVC	22.4	0.02
3C/16	2+40	221.72	222.15	6	PVC	21.6	0.02
3C/17	1+42	222.69	223.12	6	PVC	21.7	0.02
3C/18	1+07	223.04	223.48	6	PVC	22.0	0.02
3C/19	0+51	223.61	224.12	6	PVC	25.3	0.02
3C/21	2+51	221.60	221.77	6	PVC	8.4	0.02
3C/22	3+41	220.71	220.86	6	PVC	7.5	0.02
3C/23	4+12	218.33	218.48	6	PVC	7.6	0.02
3C/24	4+82	211.40	211.56	6	PVC	7.8	0.02
3C/25	6+69	210.28	210.40	6	PVC	5.8	0.02
3C/25-1	0+61	223.51	224.01	6	PVC	24.9	0.02
3C/25-2	6+18	210.72	210.87	6	PVC	7.6	0.02
3C/25-3	5+32	211.15	210.16	6	PVC	7.8	0.02
3C/26	7+25	210.00	210.25	6	PVC	12.4	0.02
3C/27	--	EXISTING CONNECTION TO SEWER					

PARCEL 3C/18 WILL REQUIRE A PUMP TO CONNECT TO THE SEWER LATERAL



SHEET P-1.1 PLAN NOTES:

1. SEE SHEET P-1.2 FOR CONTINUATION OF SEWER DESIGN.
2. SEE SHEET SP-1.1 & SP-1.2 FOR ROAD IMPROVEMENTS, GRADING AND DRAINAGE SCHEDULE.
3. SEE SHEET SP-1.3 FOR PUMP STATION DESIGN.



SEE SHEET P-1.2 FOR CONTINUATION OF INGHAM ROAD SEWER DESIGN

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
TEL. 603-673-1441
FAX 603-673-1584
MERIDIANLANDSERVICES.COM

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES No. 7995
LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
I	---	---	---	---
H	---	---	---	---
G	---	---	---	---
F	---	---	---	---
E	---	---	---	---
D	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH

SEWER EXTENSION
INGHAM ROAD
PLAN AND PROFILE
STA 0+00 to 6+00 1 OF 2

NOVEMBER 21, 2014

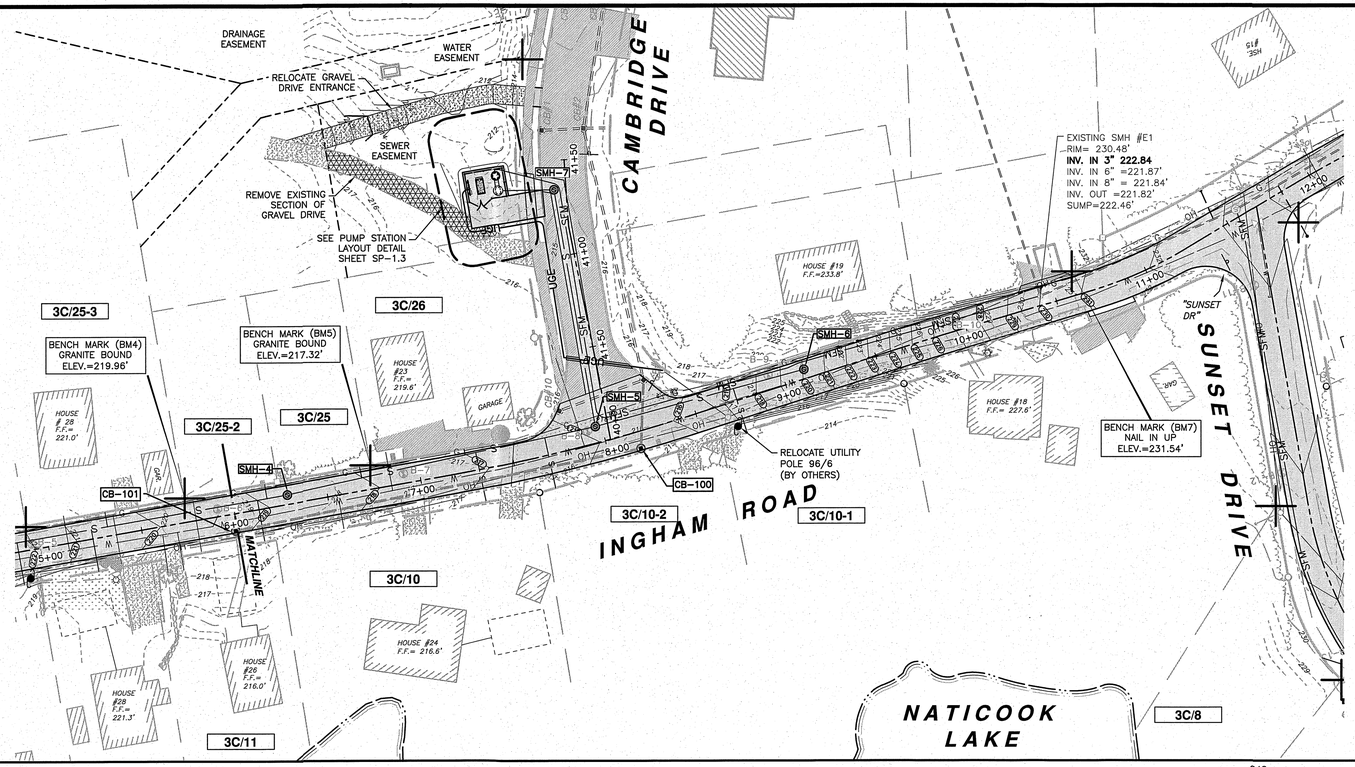
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 40' HORIZ / 4' VERT.

P-1.1
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 2 OF 17

Plotted: 1/2/2015 11:43 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg



SHEET P-1.2 PLAN NOTES:

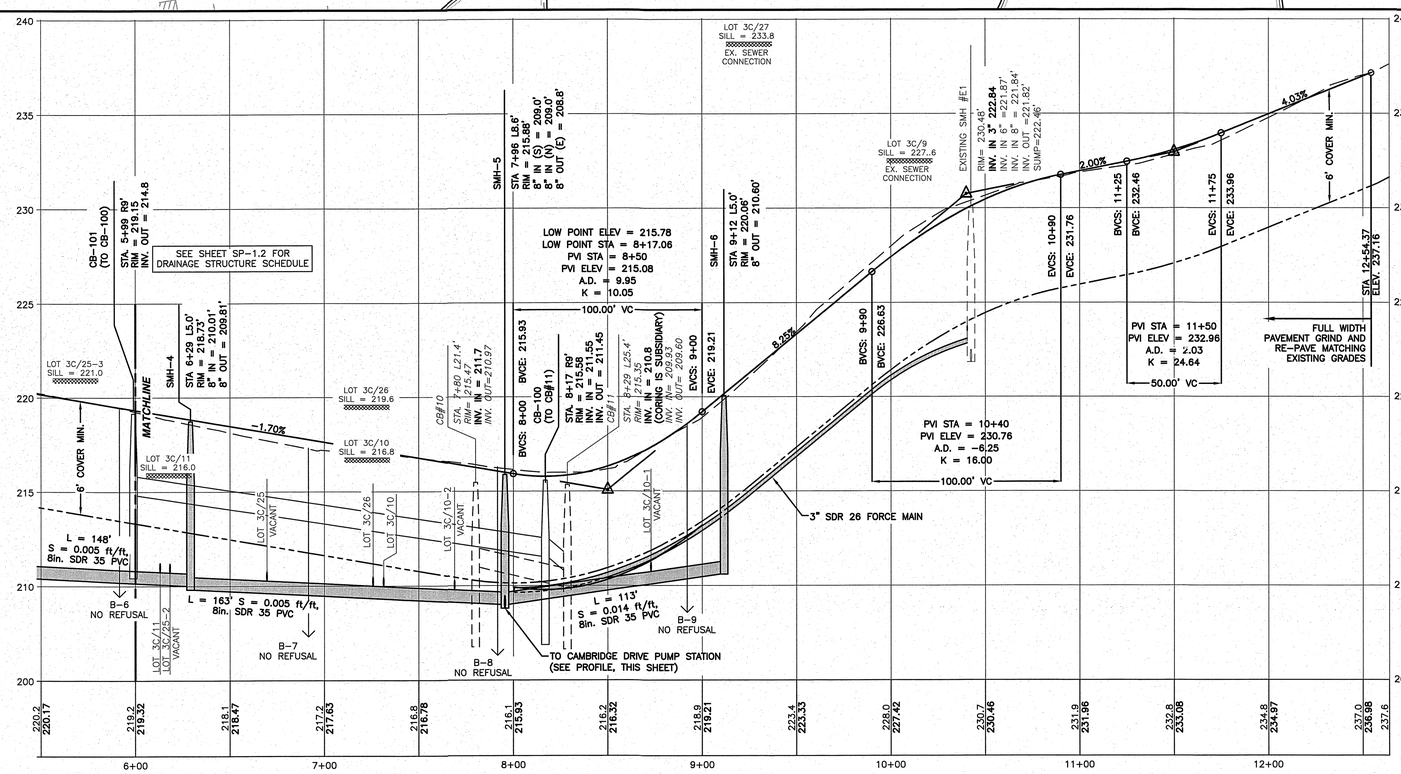
1. SEE SHEET P-1.1 FOR CONTINUATION OF DESIGN AND SEWER LATERAL SCHEDULE.
2. SEE SHEET SP-1.1 & SP-1.2 FOR ROAD IMPROVEMENTS, GRADING AND DRAINAGE SCHEDULE.
3. SEE SHEET SP-1.3 FOR PUMP STATION DESIGN.

NHSPC / NAD 83

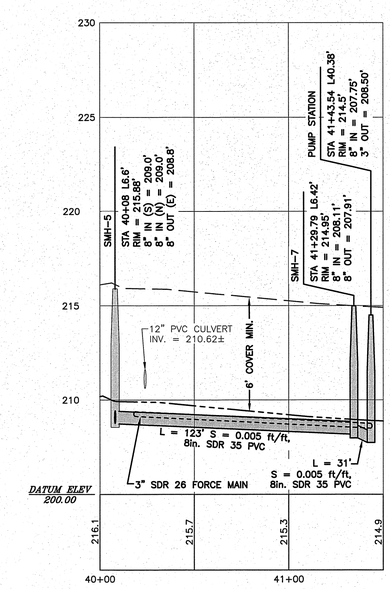
GRAPHIC SCALE

HORZ.: 1:40 (IN:FT)

VERT.: 1:40 (IN:FT)



INGHAM ROAD PROFILE



CAMBRIDGE DRIVE PROFILE

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES No. 7995
LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION		
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH
			DR	CK

SEWER EXTENSION
INGHAM ROAD
PLAN AND PROFILE
STA 6+00 to 12+00 2 OF 2

NOVEMBER 21, 2014

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 40' HORIZ / 4' VERT.

P-1.2
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 3 OF 17

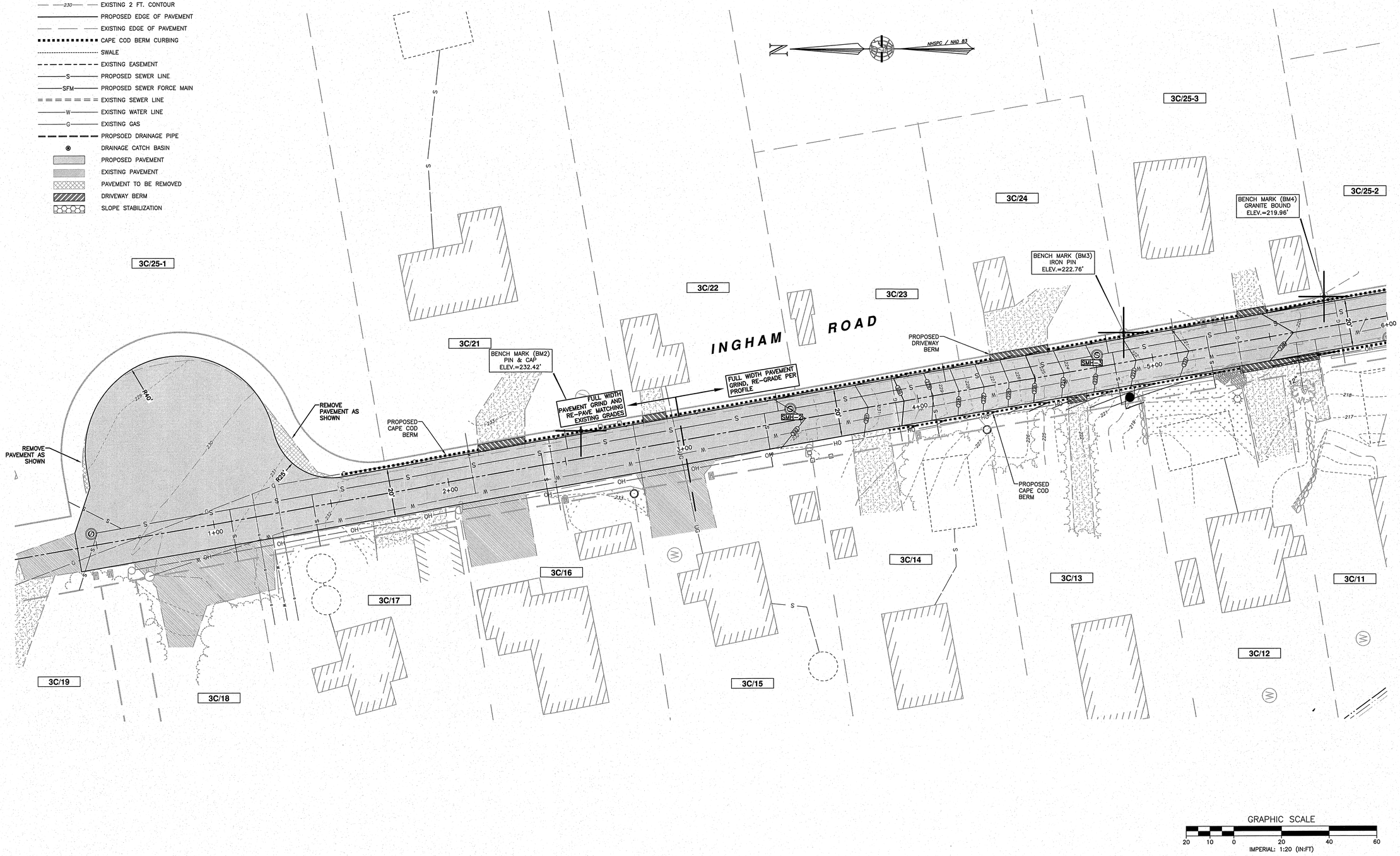
Plotted: 1/2/2015 11:43 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg

PROPOSED FEATURES LEGEND

- PROPOSED 1 FT. CONTOUR
- PROPOSED 5 FT. CONTOUR
- EXISTING 1 FT. CONTOUR
- EXISTING 2 FT. CONTOUR
- PROPOSED EDGE OF PAVEMENT
- EXISTING EDGE OF PAVEMENT
- CAPE COD BERM CURBING
- SWALE
- EXISTING EASEMENT
- PROPOSED SEWER LINE
- PROPOSED SEWER FORCE MAIN
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING GAS
- PROPSOED DRAINAGE PIPE
- DRAINAGE CATCH BASIN
- PROPOSED PAVEMENT
- EXISTING PAVEMENT
- PAVEMENT TO BE REMOVED
- DRIVEWAY BERM
- SLOPE STABILIZATION

SHEET P-1.2 PLAN NOTES:

1. SEE SHEET P-1.1 & P-1.2 FOR SEWER DESIGN
2. SEE SHEET SP-1.2 FOR DRAINAGE SCHEDULE



GRAPHIC SCALE

20 10 0 20 40 60

IMPERIAL: 1:20 (IN:FT)

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7996
LICENSED
PROFESSIONAL ENGINEER

1/2/15

REV.	DATE	DESCRIPTION	DR	CK
I	---	---	---	---
H	---	---	---	---
G	---	---	---	---
F	---	---	---	---
E	---	---	---	---
D	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH

INGHAM ROAD IMPROVEMENTS

STA 0+00 - 6+00

NOVEMBER 21, 2014

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 20'

SP-1.1

SHEET

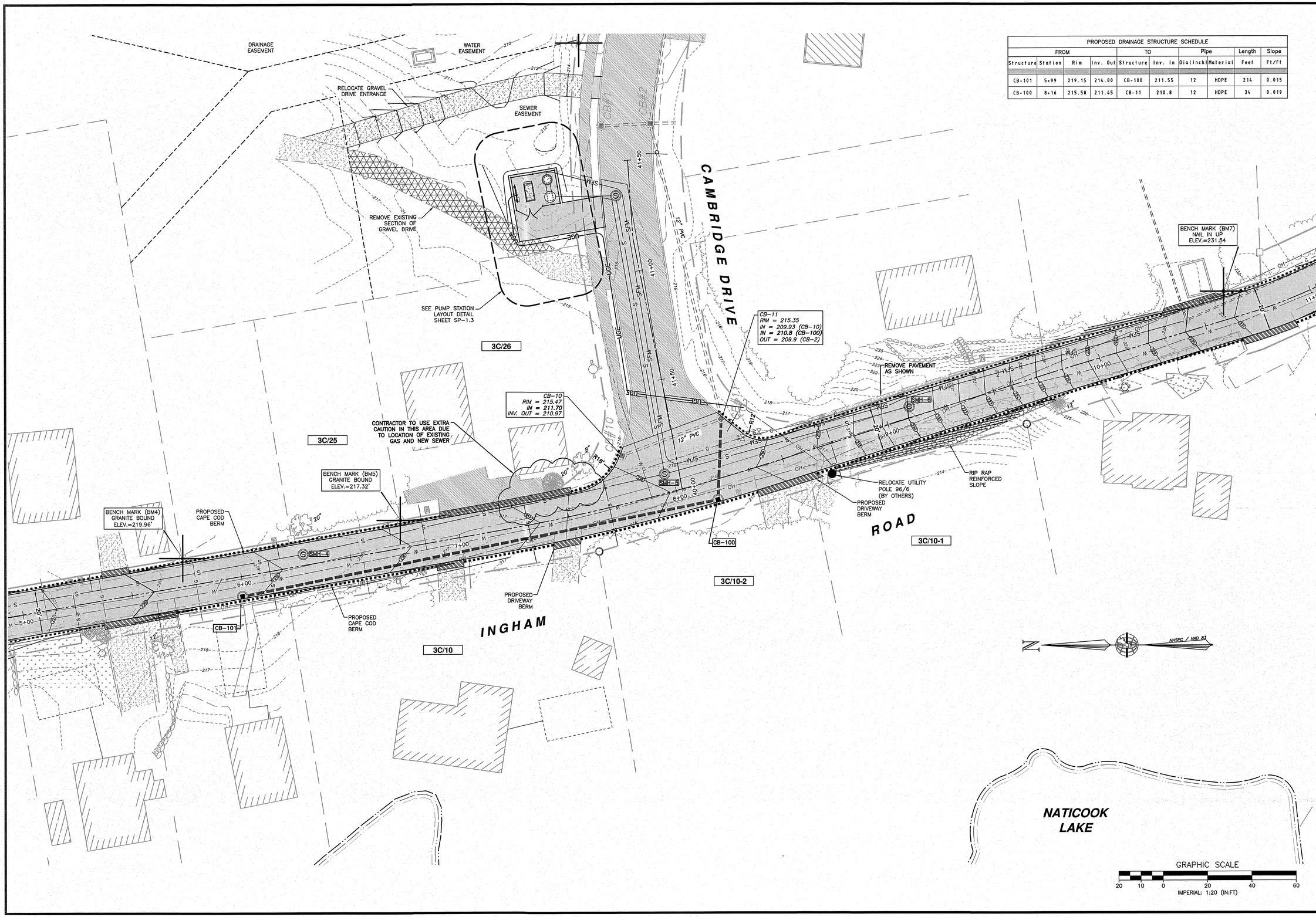
FILE: 2661E02C.dwg

PROJECT 2661.02

SHEET NO. 4 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg

PROPOSED DRAINAGE STRUCTURE SCHEDULE									
FROM				TO		Pipe		Length	Slope
Structure	Station	Rim	Inv. Out	Structure	Inv. In	Dia(inch)	Material	Feet	Ft/Ft
CB-101	5+99	219.15	214.80	CB-100	211.55	12	HDPE	214	0.015
CB-100	8+16	215.58	211.45	CB-11	210.8	12	HDPE	34	0.019



MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7935
LICENSED
PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION		
I	--	--	--	--
H	--	--	--	--
G	--	--	--	--
F	--	--	--	--
E	--	--	--	--
D	--	--	--	--
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	--	JAH
			DR	CK

INGHAM ROAD IMPROVEMENTS

STA 5+00 - 10+00

NOVEMBER 21, 2014

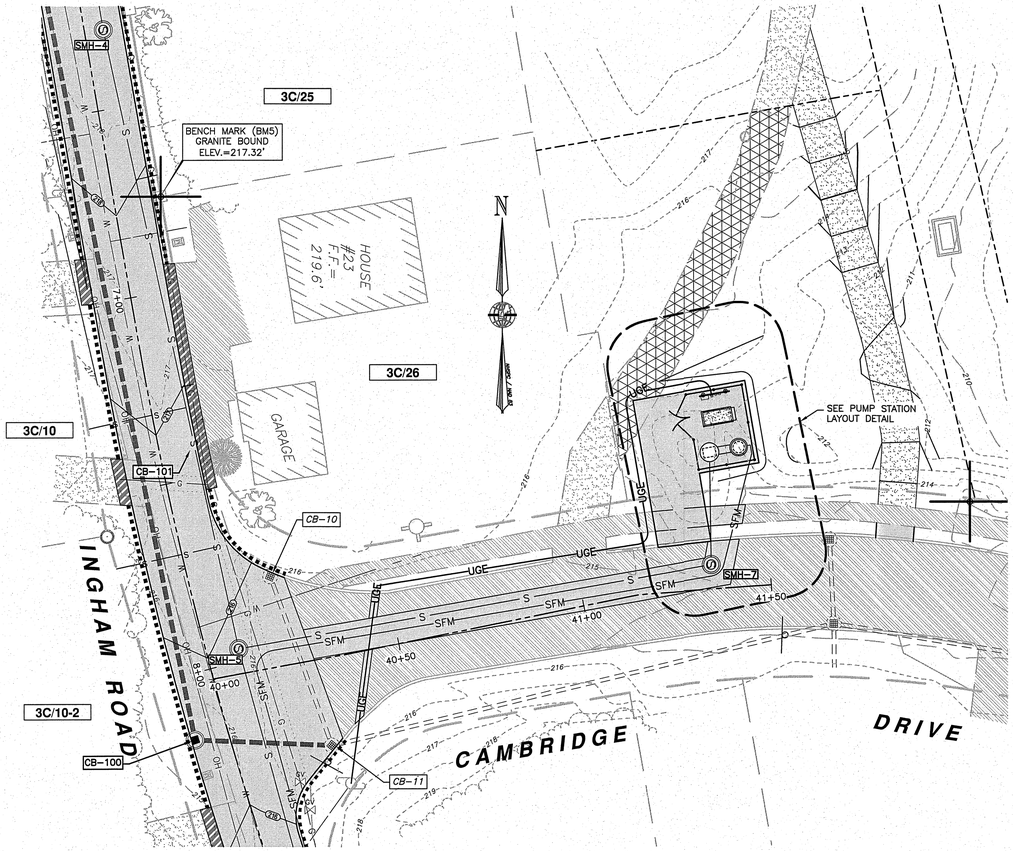
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 20'

SP-1.2
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 5 OF 17

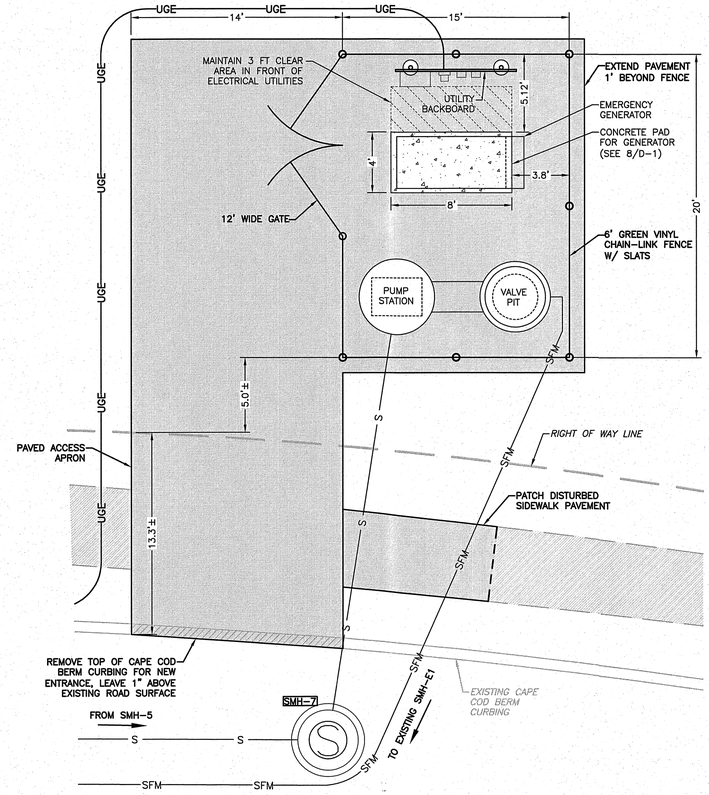
Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\0266\2661.02\0_Drawings\Engineering\2661E02C.dwg



GRAPHIC SCALE

20 10 0 20 40 60

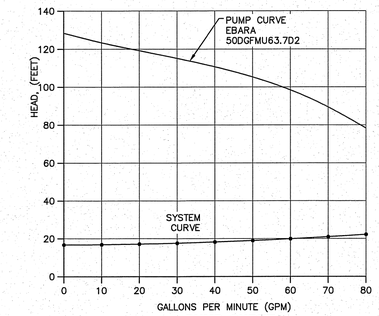
IMPERIAL: 1:20 (IN:FT)



CAMBRIDGE DRIVE PUMP STATION LAYOUT

PLAN VIEW

SCALE: 1" = 5'



PUMP CURVE

EMERGENCY GENERATOR:

KOHLER POWER SYSTEMS MODEL 30REZG-4Q7

DUPLEX PUMP STATION NOTES:

FURNISH AND INSTALL THE FOLLOWING:

ONE (1) JACKEL, INC. FIBERGLASS CUSTOM BASIN, 5'ø x 10', WITH:
- ANTI-FLOATATION BASE
- STAINLESS STEEL HINGED AND LOCKABLE COVER
- FREEFLO RAIL SYSTEMS WITH LIFTING CHAINS FOR DUPLEX PUMPING SYSTEM
- INDIVIDUAL DISCHARGE LINES FOR EACH PUMP

EACH PUMP LEG SHALL CONSIST OF:
- ONE (2) EBARA SUBMERSIBLE GRINDER PUMP, 50DGFMU63.7S2
- ONE (2) JACKEL, INC. 3" VERTICAL PUMP BRASS DISCONNECT

ALTERNATING DUPLEX PUMP CONTROLLER, NEMA PANEL AND WIRING, CONTROLLER WITH AUDIBLE AND VISUAL ALARMS MOUNTED TO UTILITY PANEL. PROVISION SHALL BE PROVIDED TO CONNECT TO ONSITE AUTOMATIC GENERATOR.

ALL BASIN PENETRATIONS SHALL BE IN ACCORDANCE WITH BASIN MANUFACTURER AND SHALL UTILIZE INLET HUBS WHERE NECESSARY FOR PIPE PENETRATIONS.

BUOYANCY CALCULATIONS:

PUMP STATION:

WATER DISPLACED BY FIBERGLASS BASIN = πr^2 x BASIN HEIGHT
π 2.5^2 x 10' = 196 CF
HYDRO LIFT = 196 CF x 62.4 LBS/CF = 12,230 LBS

DOWN FORCE
CONCRETE RING = $\pi 4^2 - \pi 2.5^2$ x 2 FT x 150 LBS/CF = 9,189 LBS
STONE ABOVE RING = $\pi 4^2 - \pi 2.5^2$ x 8 FT x 55 LBS/CF = 13,477 LBS
TOTAL DOWN FORCE = 22,666 LBS

BUOYANCY CHECK, DOWN FORCE > HYDRO LIFT

22,666 LBS − 12,230 LBS = 10,436 LBS

VALVE PIT:

WATER DISPLACED BY VALVE PIT = πr^2 x HEIGHT
π 2.5'^{2} x 11.5' = 225.4 CF
HYDRO LIFT = 225.4 CF x 62.4 LBS/CF = 14,065 LBS

DOWN FORCE (SUBTRACT 1 FOOT FOR FRAME AND COVER)
4'ø ID ECCENTRIC CONE 4' HIGH = 3,425 LBS
6'ø ID BASE 5' HIGH = 6,060 LBS
3' OF CONCRETE IN-FILL
$\pi 2^2$ x 3 FT x 150 LBS/CF = 5,670 LBS
TOTAL DOWN FORCE = 15,155 LBS

BUOYANCY CHECK, DOWN FORCE > HYDRO LIFT

15,155 LBS − 14,065 LBS = 1,090 LBS

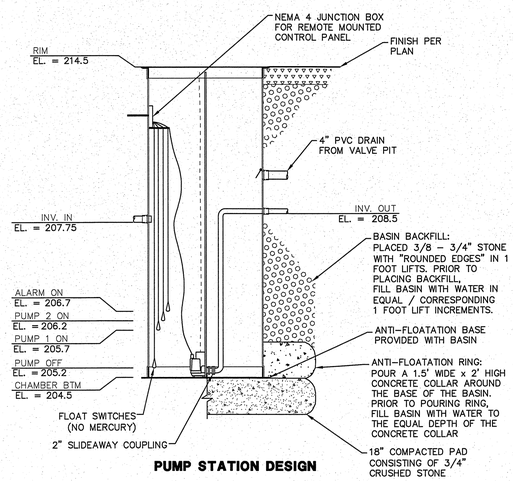
SEWER PUMP STATION

SYSTEM

FORCE MAIN	3"
LENGTH	293 FEET
DESIGN FLOW	3,103 GPD

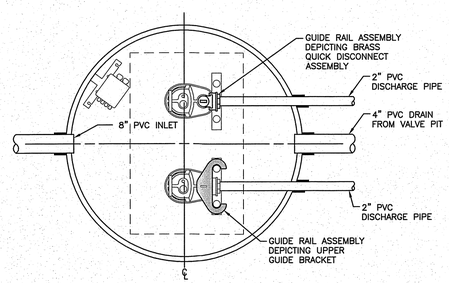
PUMP

QUANTITY	2
PUMP MODEL	50DGFMU63.7S2



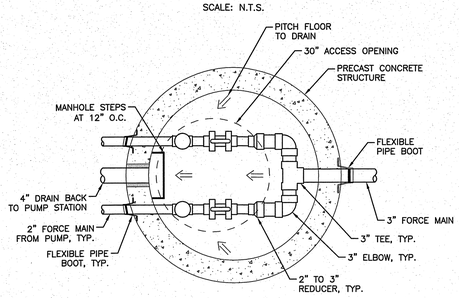
PUMP STATION DESIGN

SCALE: N.T.S.



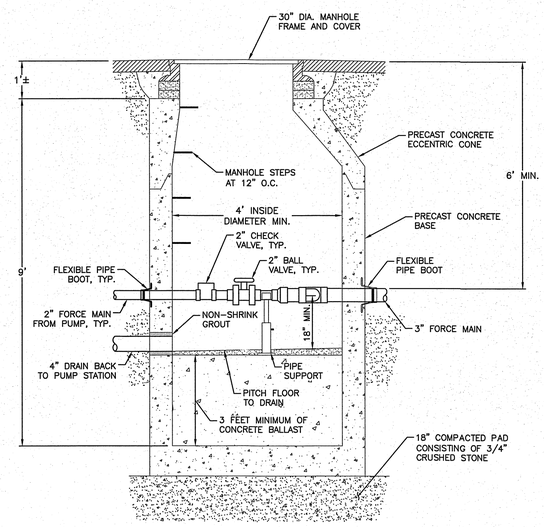
PUMP STATION PLAN VIEW

SCALE: N.T.S.



VALVE PIT PLAN VIEW

SCALE: N.T.S.



VALVE PIT SECTION VIEW

SCALE: N.T.S.

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7895
LICENSED
PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	CK
A	11/21/14	ISSUE FOR BIDDING	---
B	11/25/14	WATER SYSTEM EDITS	JAH
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA
D	---	---	---
E	---	---	---
F	---	---	---
G	---	---	---
H	---	---	---
I	---	---	---

SEWER PUMP STATION DESIGN

CAMBRIDGE DRIVE
PUMP STATION

NOVEMBER 21, 2014

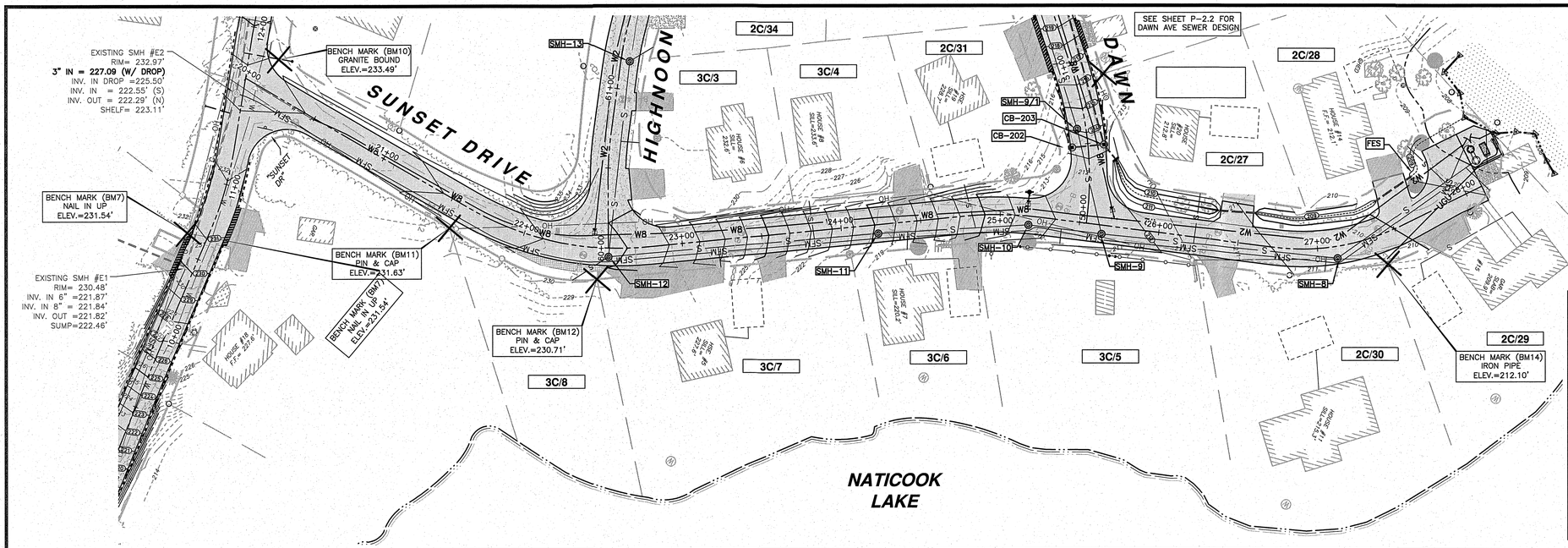
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: AS NOTED

SP-1.3
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 6 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\2661\2661.02\0_Drawings\Engineering\2661E02C.dwg

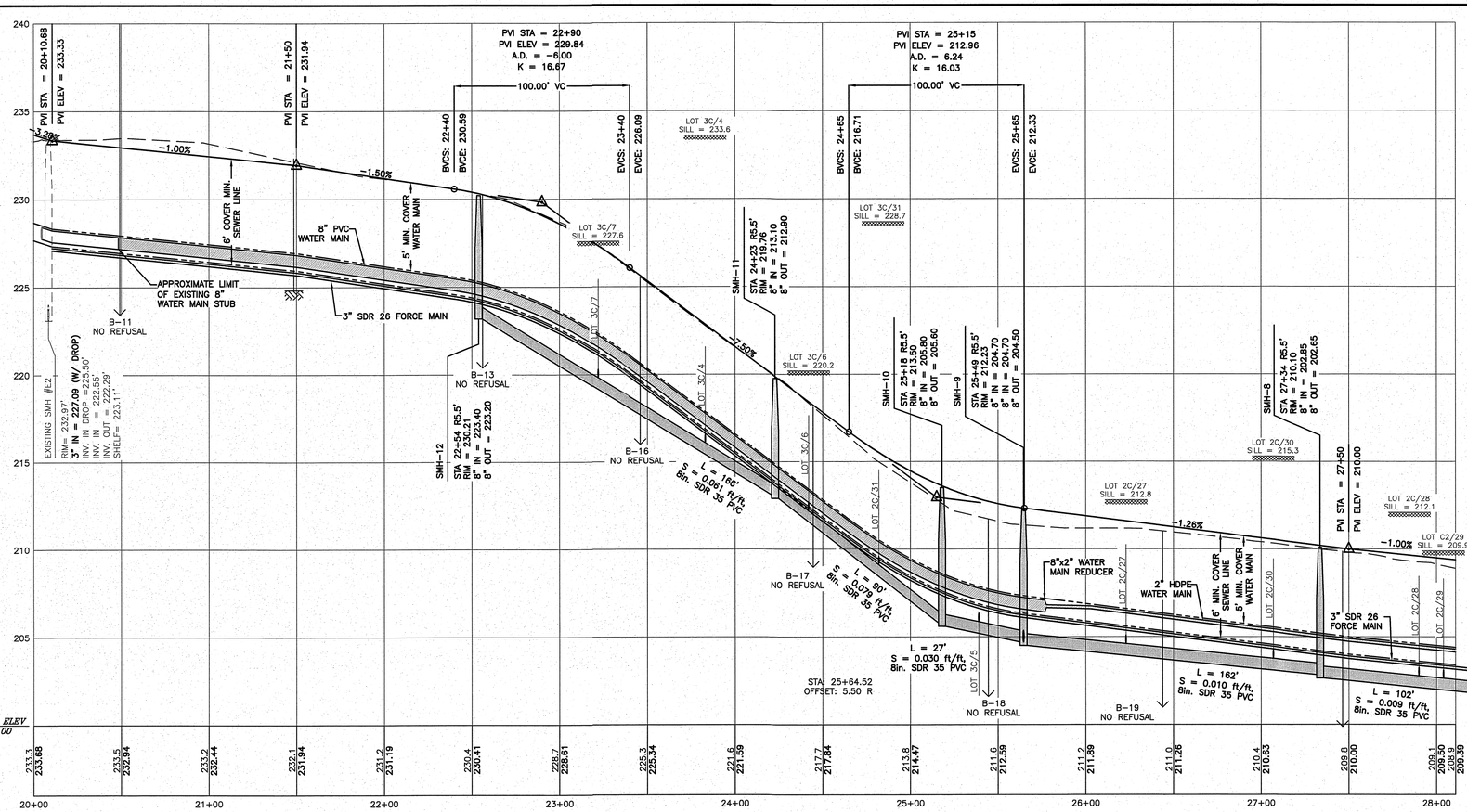


SHEET P-2.1 PLAN NOTES:

1. SEE SHEET P-2.2 FOR CONTINUATION OF SEWER DESIGN (DAWN AVE).
2. SEE SHEET SP-2.1, SP-2.2 & SP-2.3 FOR ROAD IMPROVEMENTS, GRADING AND DRAINAGE SCHEDULE.
3. SEE SHEET SP-2.4 FOR PUMP STATION DESIGN.

PROPOSED SEWER LATERAL SCHEDULE (SUNSET DRIVE)

FROM				Pipe		Length	Slope
Parcel	Station	Inv. at Main	Inv. at ROW	Dia(in)	Material	Feet	Ft/Ft
2C/27	26+23	204.57	205.20	6	PVC	31.2	0.02
2C/28	27+90	202.77	203.43	6	PVC	32.8	0.02
2C/29	28+04	202.63	203.42	6	PVC	20.6	0.02
2C/30	27+07	203.75	203.93	6	PVC	9.0	0.02
2C/31	24+82	209.11	209.47	6	PVC	17.8	0.02
2C/34	61+18	224.73	225.03	6	PVC	15.2	0.02
3C/4	23+83	216.08	216.56	6	PVC	23.9	0.02
3C/5	25+39	205.90	206.08	6	PVC	9.0	0.02
3C/6	24+82	209.11	209.33	6	PVC	10.8	0.02
3C/7	23+22	219.82	220.07	6	PVC	12.6	0.02
3C/8	22+54	224.32	224.85	6	PVC	26.6	0.02

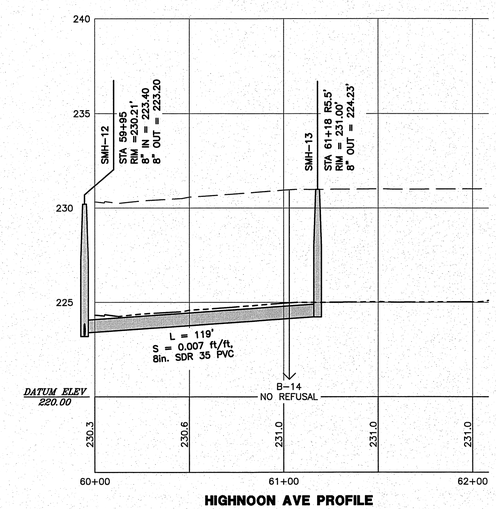


SUNSET DRIVE PROFILE

GRAPHIC SCALE

HORZ.: 1:40 (IN:FT)

VERT.: 1:40 (IN:FT)



HIGHNOON AVE PROFILE

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7995
LICENSED
PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
A	11/21/14	ISSUE FOR BIDDING	---	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
D	---	---	---	---
E	---	---	---	---
F	---	---	---	---
G	---	---	---	---
H	---	---	---	---
I	---	---	---	---

SEWER EXTENSION
SUNSET DRIVE
PLAN AND PROFILE
STA 10+00 to 18+22.13

NOVEMBER 21, 2014

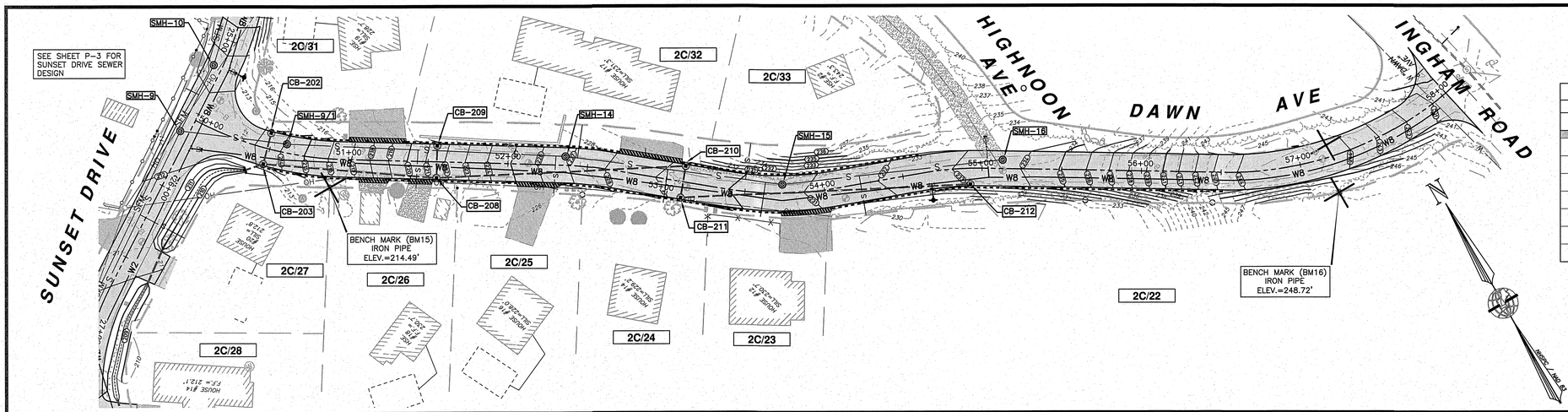
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 40' HORIZ. / 4' VERT.

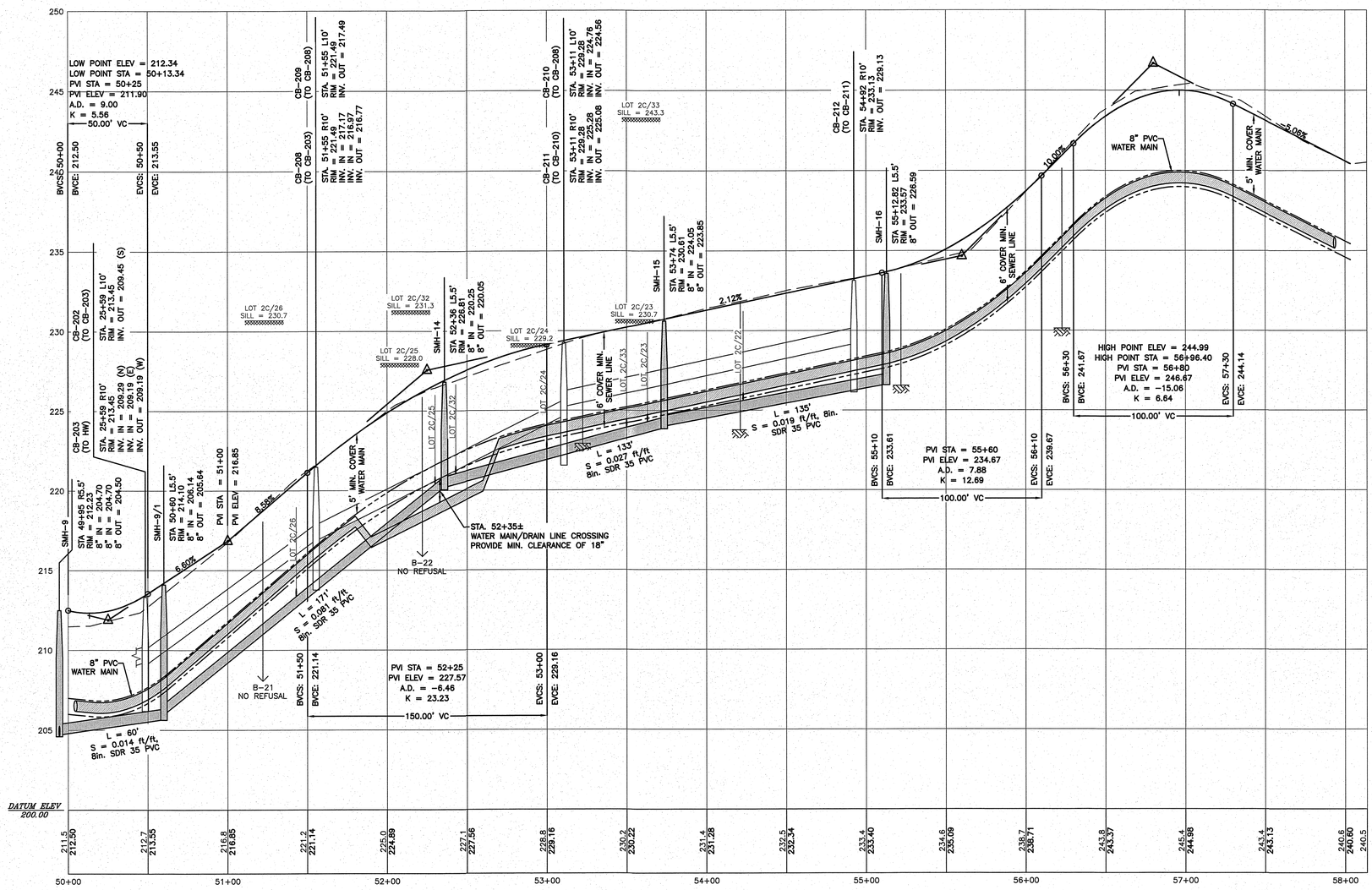
P-2.1
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 7 OF 17

Plotted: 1/2/2015 11:43 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg



PROPOSED SEWER LATERAL SCHEDULE (DAWN AVE)							
FROM				Pipe		Length	Slope
Parcel	Station	Inv. at Main	Inv. at ROW	Dia(inch)	Material	Feet	Ft/Ft
2C/22	54+23	225.61	226.10	6	PVC	24.5	0.02
2C/23	53+63	221.05	221.47	6	PVC	21	0.02
2C/24	53+00	223.94	224.40	6	PVC	22.8	0.02
2C/25	52+30	225.61	226.13	6	PVC	25.9	0.02
2C/26	51+43	228.81	229.30	6	PVC	24.4	0.02
2C/32	52+43	229.22	229.71	6	PVC	24.6	0.02
2C/33	53+50	236.21	236.79	6	PVC	28.9	0.02



SHEET P-2.2 PLAN NOTES:

1. SEE SHEET P-2.1 FOR CONTINUATION OF SEWER DESIGN (SUNSET DRIVE).
2. SEE SHEET SP-2.1, SP-2.2 & SP-2.3 FOR ROAD IMPROVEMENTS, GRADING AND DRAINAGE SCHEDULE.
3. SEE SHEET SP-2.4 FOR PUMP STATION DESIGN.

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1364

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES No. 7995
LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
A	11/21/14	ISSUE FOR BIDDING	---	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
D	---	---	---	---
E	---	---	---	---
F	---	---	---	---
G	---	---	---	---
H	---	---	---	---
I	---	---	---	---

SEWER EXTENSION
DAWN AVENUE
PLAN AND PROFILE
STA 20+00 to 26+70

NOVEMBER 21, 2014

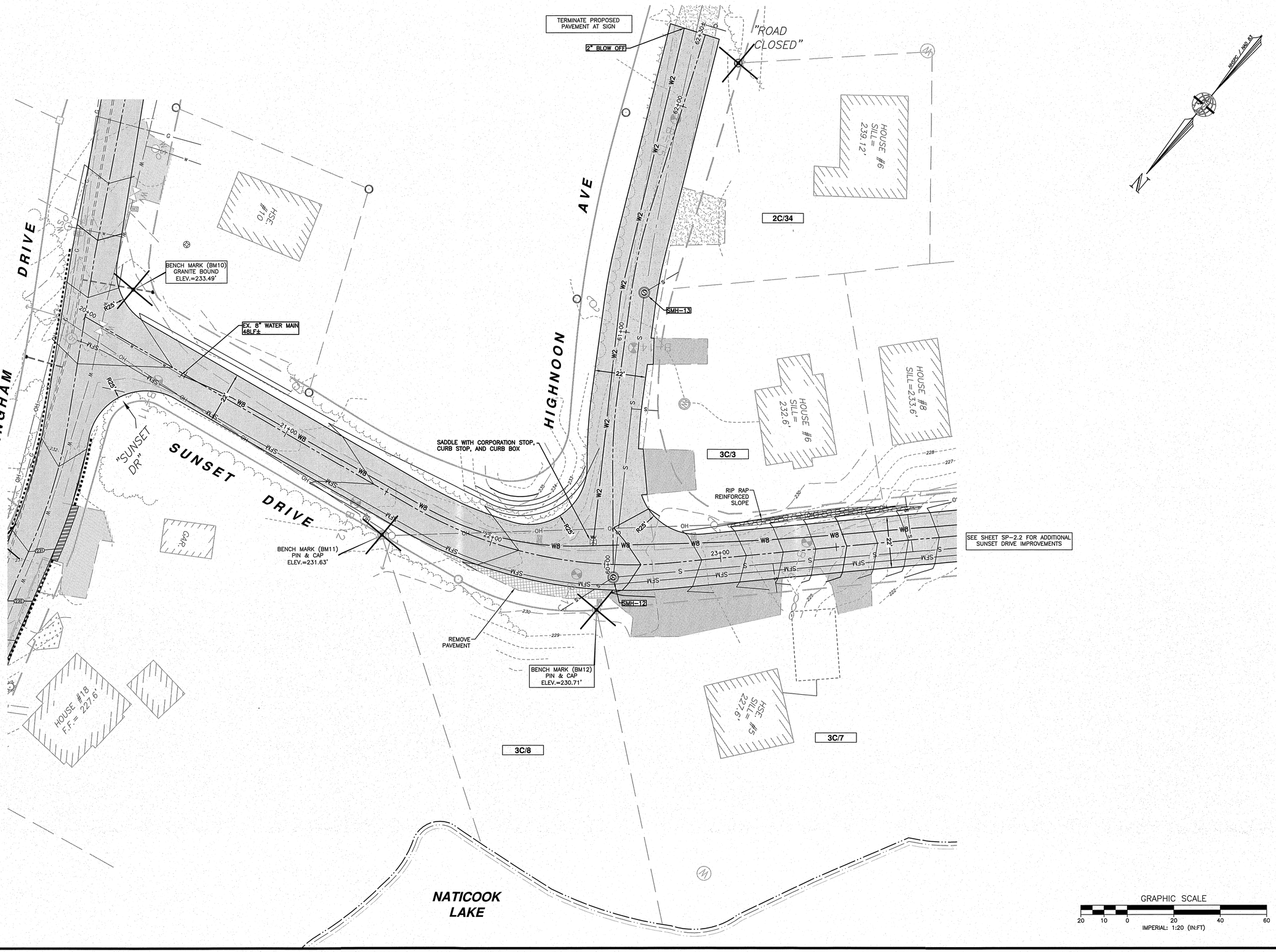
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 40' HORIZ / 4' VERT.

P-2.2
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 8 OF 17

Plotted: 1/2/2015 11:43 AM By: JAH
H:\mls\0266\2661.02\0_Drawings\Engineering\2661E02C.dwg



MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL. 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7995
LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	
A	11/21/14	ISSUE FOR BIDDING	DR
B	11/25/14	WATER SYSTEM EDITS	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA
D	---	---	---
E	---	---	---
F	---	---	---
G	---	---	---
H	---	---	---
I	---	---	---

SUNSET DRIVE IMPROVEMENTS 1 OF 2

NOVEMBER 21, 2014

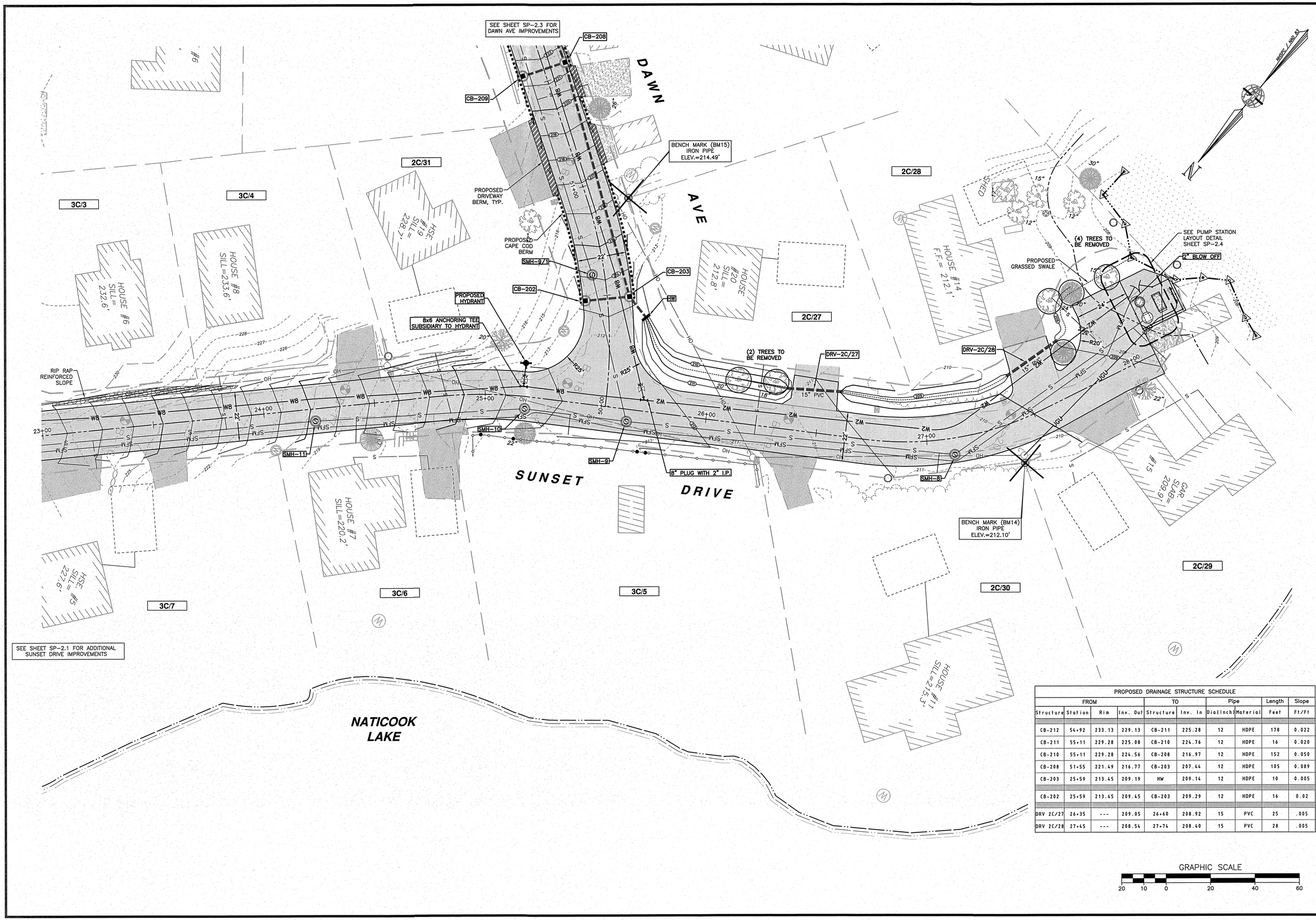
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: 1" = 20'

SP-2.1
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 9 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg



PROPOSED DRAINAGE STRUCTURE SCHEDULE								
FROM				TO		Pipe		Length	Slope
Structure	Station	Rim	Inv. Out	Structure	Inv. In	Dia(inch)	Material	Feet	Ft/Ft
CB-212	54+92	233.13	229.13	CB-211	225.28	12	HDPE	178	0.022
CB-211	55+11	229.28	225.08	CB-210	224.76	12	HDPE	16	0.020
CB-210	55+11	229.28	224.56	CB-208	216.97	12	HDPE	152	0.050
CB-208	51+55	221.49	216.77	CB-203	207.44	12	HDPE	105	0.089
CB-203	25+59	213.45	209.19	HW	209.14	12	HDPE	10	0.005
CB-202	25+59	213.45	209.45	CB-203	209.29	12	HDPE	16	0.02
DRV 2C/27	26+35	---	209.05	26+60	208.92	15	PVC	25	.005
DRV 2C/28	27+45	---	208.54	27+74	208.40	15	PVC	28	.005

GRAPHIC SCALE
20 10 0 20 40 60

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
TEL. 603-673-1441
FAX 603-673-1584
MERIDIANLANDSERVICES.COM

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES No. 7995
LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
I	---	---	---	---
H	---	---	---	---
G	---	---	---	---
F	---	---	---	---
E	---	---	---	---
D	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH

SUNSET DRIVE IMPROVEMENTS 2 OF 2

NOVEMBER 21, 2014

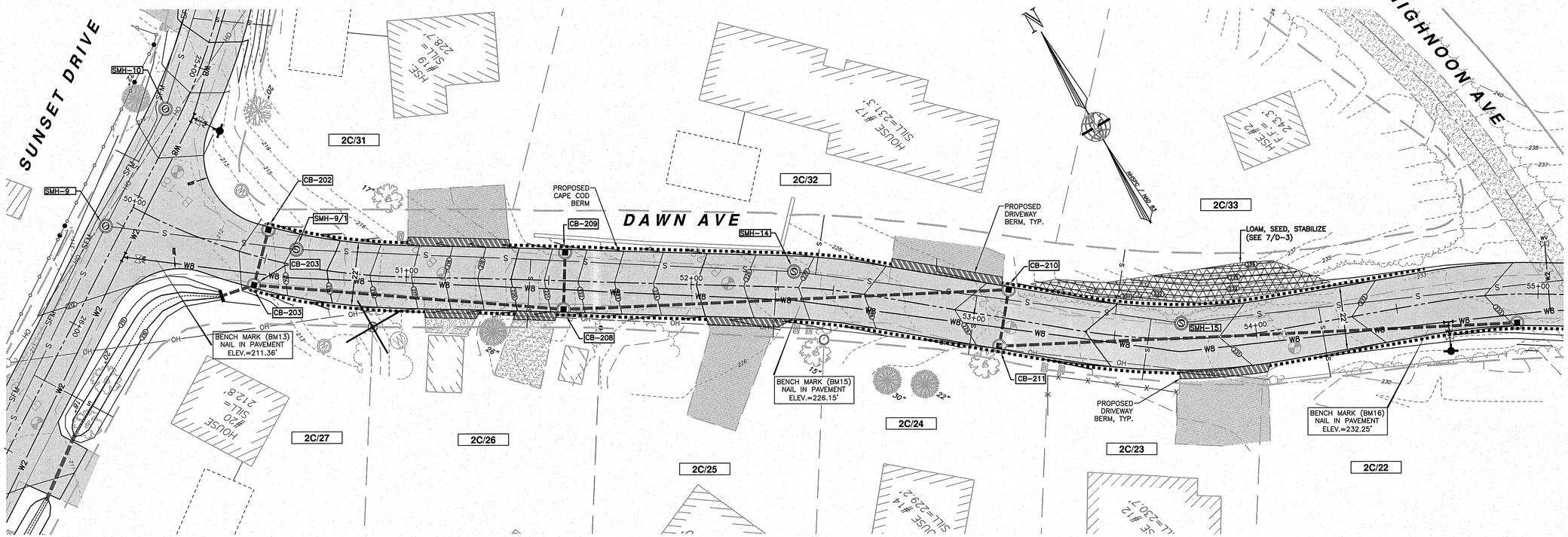
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

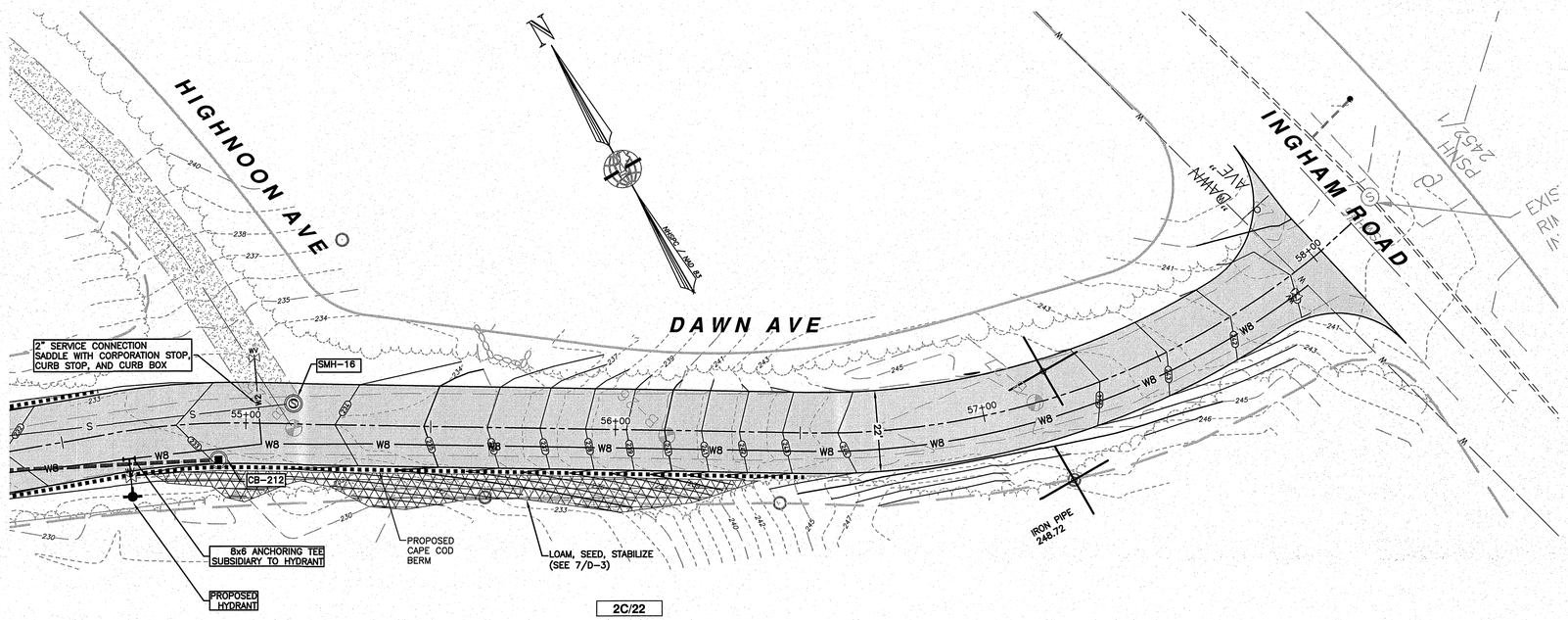
SCALE: 1" = 20'

SP-2.2
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 10 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg





GRAPHIC SCALE

20 10 0 20 40 60

IMPERIAL: 1:20 (IN:FT)

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7995
LICENSED
PROFESSIONAL ENGINEER

11/2/15

REV.	DATE	DESCRIPTION	DR	CK
A	11/21/14	ISSUE FOR BIDDING	---	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
D	---	---	---	---
E	---	---	---	---
F	---	---	---	---
G	---	---	---	---
H	---	---	---	---
I	---	---	---	---

DAWN AVE IMPROVEMENTS

NOVEMBER 21, 2014

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

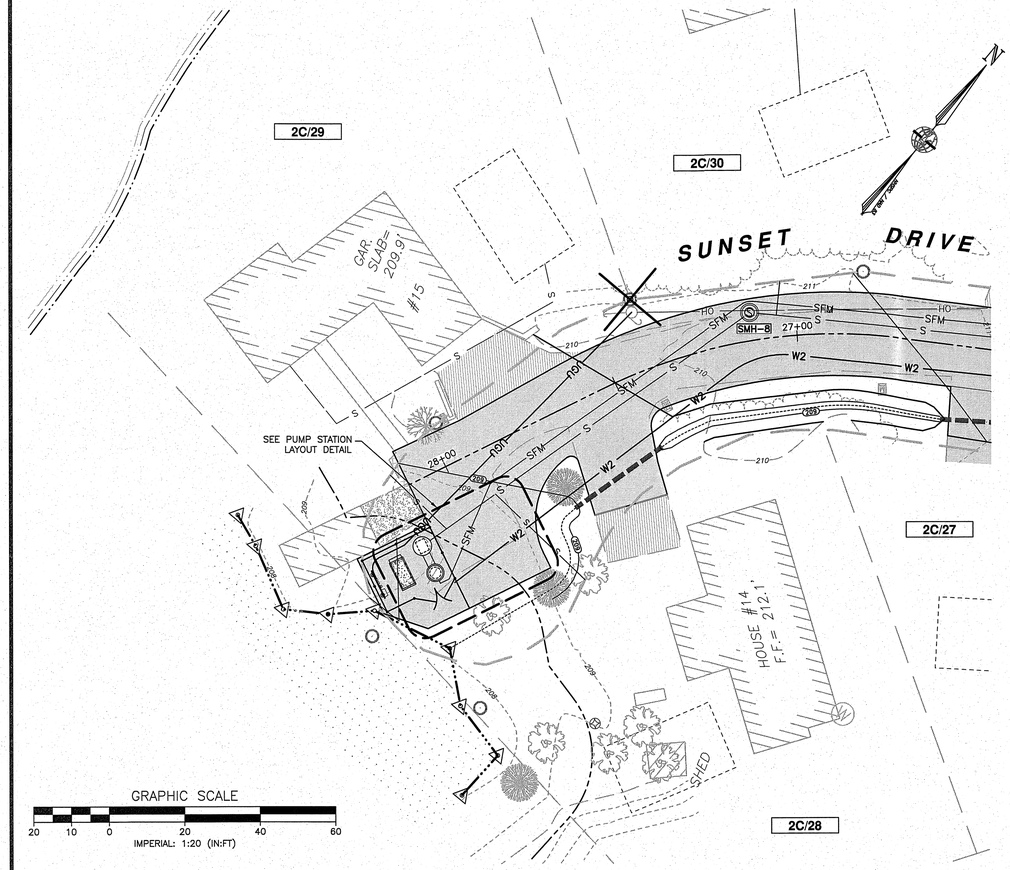
SCALE: 1" = 20'

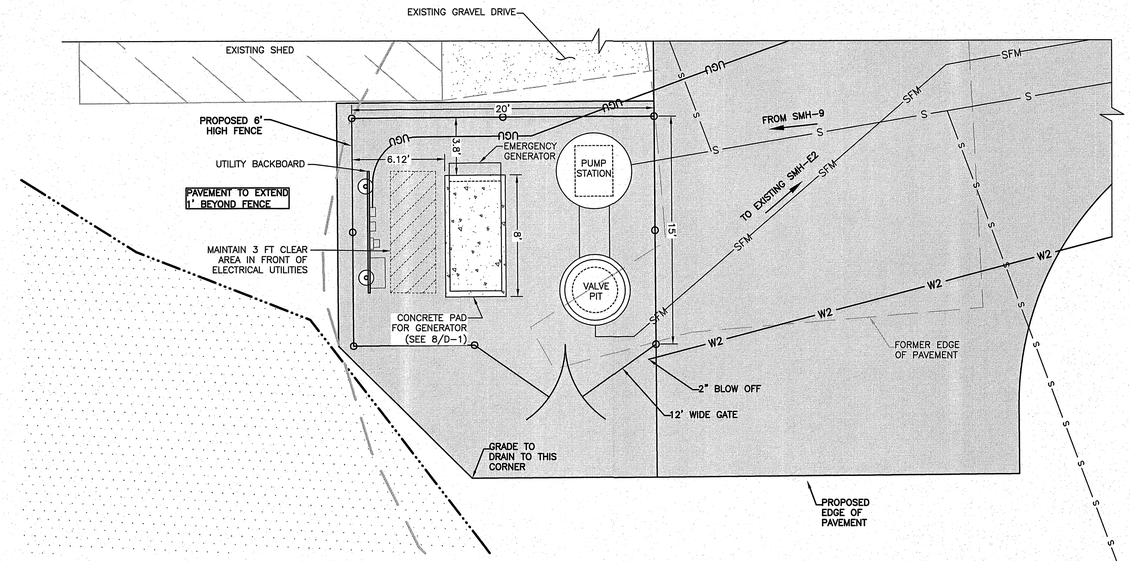
SP-2.3
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 11 OF 17

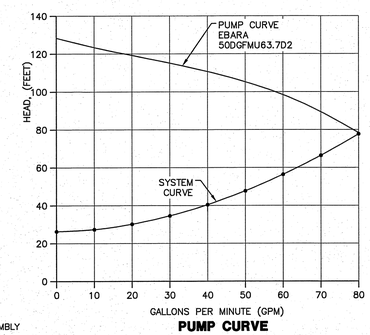
Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg

SCALE: N.T.S.





SUNSET DRIVE PUMP STATION LAYOUT
PLAN VIEW



PUMP CURVE

EMERGENCY GENERATOR:

KOHLER POWER SYSTEMS MODEL 30REZG-4Q7

DUPLEX PUMP STATION NOTES:

FURNISH AND INSTALL THE FOLLOWING:

ONE (1) JACKEL, INC. FIBERGLASS CUSTOM BASIN, 5'ø x 10', WITH:
- ANTI-FLOATATION BASE
- STAINLESS STEEL HINGED AND LOCKABLE COVER
- FREEFLO RAIL SYSTEMS WITH LIFTING CHAINS FOR DUPLEX PUMPING SYSTEM
- INDIVIDUAL DISCHARGE LINES FOR EACH PUMP

EACH PUMP LEG SHALL CONSIST OF:
- ONE (2) EBARA SUBMERSIBLE GRINDER PUMP, 50DGFMU63.7S2
- ONE (2) JACKEL, INC. 3" VERTICAL PUMP BRASS DISCONNECT

ALTERNATING DUPLEX PUMP CONTROLLER, NEMA PANEL AND WIRING, CONTROLLER WITH AUDIBLE AND VISUAL ALARMS MOUNTED TO UTILITY PANEL. PROVISION SHALL BE PROVIDED TO CONNECT TO ONSITE AUTOMATIC GENERATOR.

ALL BASIN PENETRATIONS SHALL BE IN ACCORDANCE WITH BASIN MANUFACTURER AND SHALL UTILIZE INLET HUBS WHERE NECESSARY FOR PIPE PENETRATIONS.

BUOYANCY CALCULATIONS:

PUMP STATION:

WATER DISPLACED BY FIBERGLASS BASIN = πr^2 x BASIN HEIGHT
π 2.5^2 x 10' = 196 CF
HYDRO LIFT = 196 CF x 62.4 LBS/CF = 12,230 LBS

DOWN FORCE
CONCRETE RING = $\pi 4^2 - \pi 2.5^2$ x 2 FT x 150 LBS/CF = 9,189 LBS
STONE ABOVE RING = $\pi 4^2 - \pi 2.5^2$ x 8 FT x 55 LBS/CF = 13,477 LBS
TOTAL DOWN FORCE = 22,666 LBS

BUOYANCY CHECK, DOWN FORCE > HYDRO LIFT

22,666 LBS − 12,230 LBS = 10,436 LBS

VALVE PIT:

WATER DISPLACED BY VALVE PIT = πr^2 x HEIGHT
π 2.5^2 x 11.5' = 225.4 CF
HYDRO LIFT = 225.4 CF x 62.4 LBS/CF = 14,065 LBS

DOWN FORCE (SUBTRACT 1 FOOT FOR FRAME AND COVER)
4'ø ID ECCENTRIC CONE 4' HIGH = 3,425 LBS
6'ø ID BASE 5' HIGH = 6,060 LBS
3' OF CONCRETE IN-FILL
$\pi 2^2$ x 3 FT x 150 LBS/CF = 5,670 LBS
TOTAL DOWN FORCE = 15,155 LBS

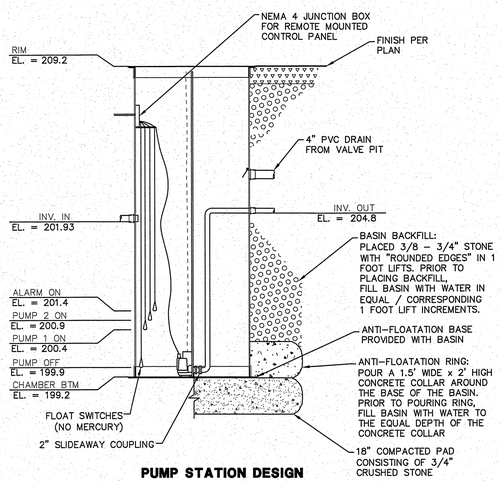
BUOYANCY CHECK, DOWN FORCE > HYDRO LIFT

15,155 LBS − 14,065 LBS = 1,090 LBS

SEWER PUMP STATION

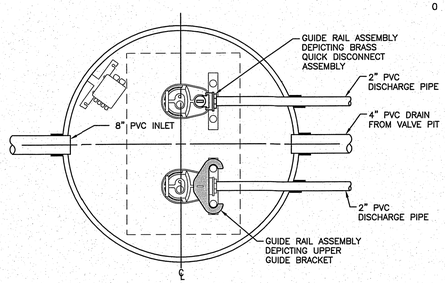
SYSTEM
FORCE MAIN 3"
LENGTH 293 FEET
DESIGN FLOW 3,103 GPD

PUMP
QUANTITY 2
PUMP MODEL 50DGFMU63.7S2



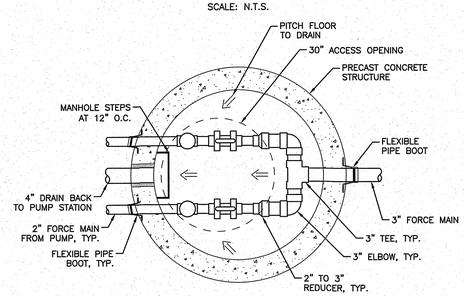
PUMP STATION DESIGN

SCALE: N.T.S.

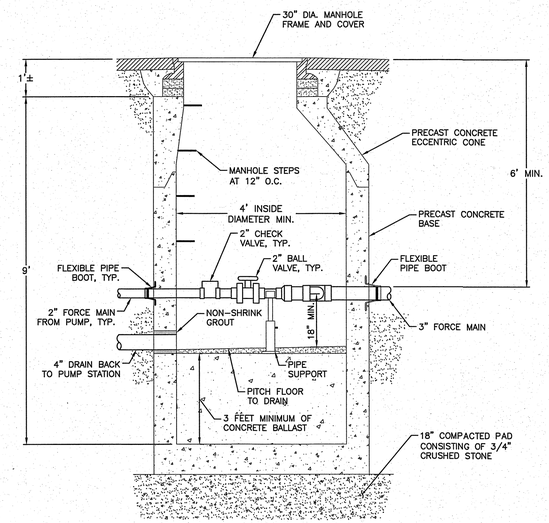


PUMP STATION PLAN VIEW

SCALE: N.T.S.



VALVE PIT PLAN VIEW



VALVE PIT PLAN VIEW

SCALE: N.T.S.

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
TEL. 603-673-1441
FAX 603-673-1584
MERIDIANLANDSERVICES.COM

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7905
LICENSED
PROFESSIONAL ENGINEER
11/2/15

REV.	DATE	DESCRIPTION	DR	CK
A	11/21/14	ISSUE FOR BIDDING	---	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
D	---	---	---	---
E	---	---	---	---
F	---	---	---	---
G	---	---	---	---
H	---	---	---	---
I	---	---	---	---

SEWER PUMP STATION DESIGN
SUNSET DRIVE

NOVEMBER 21, 2014

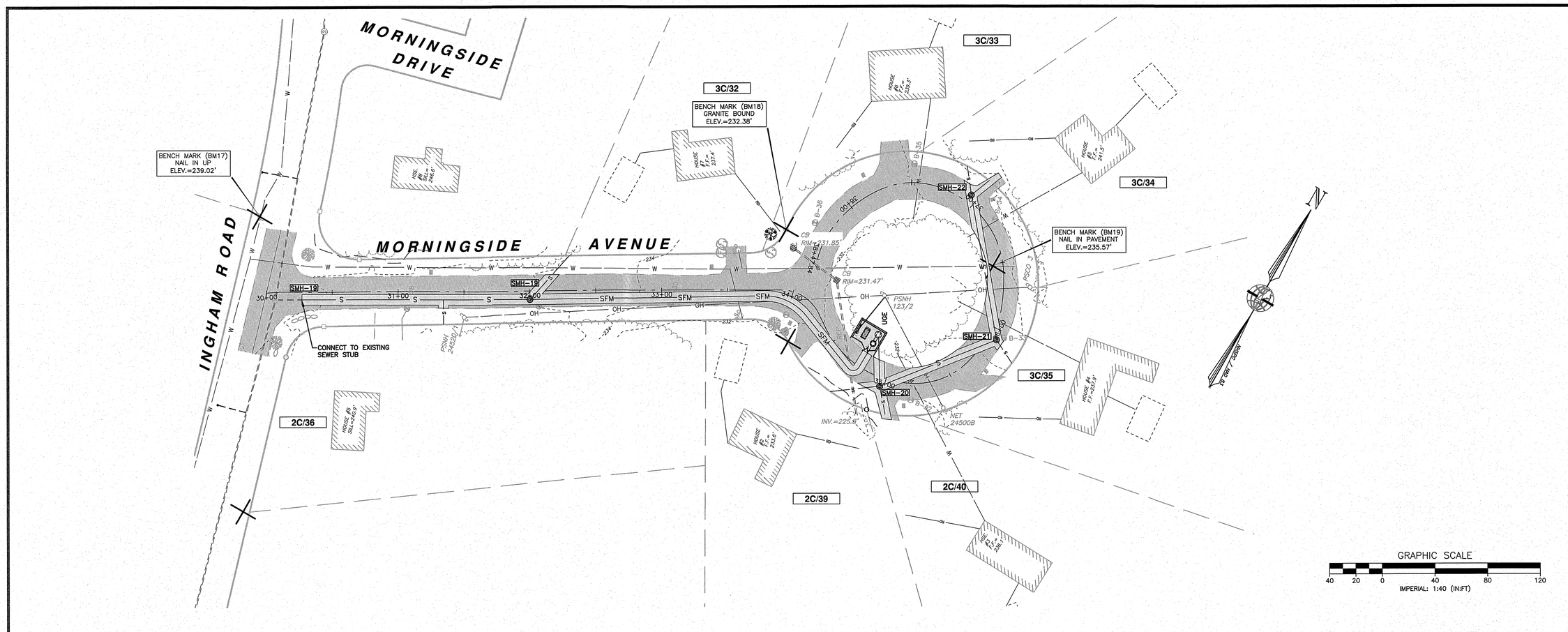
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

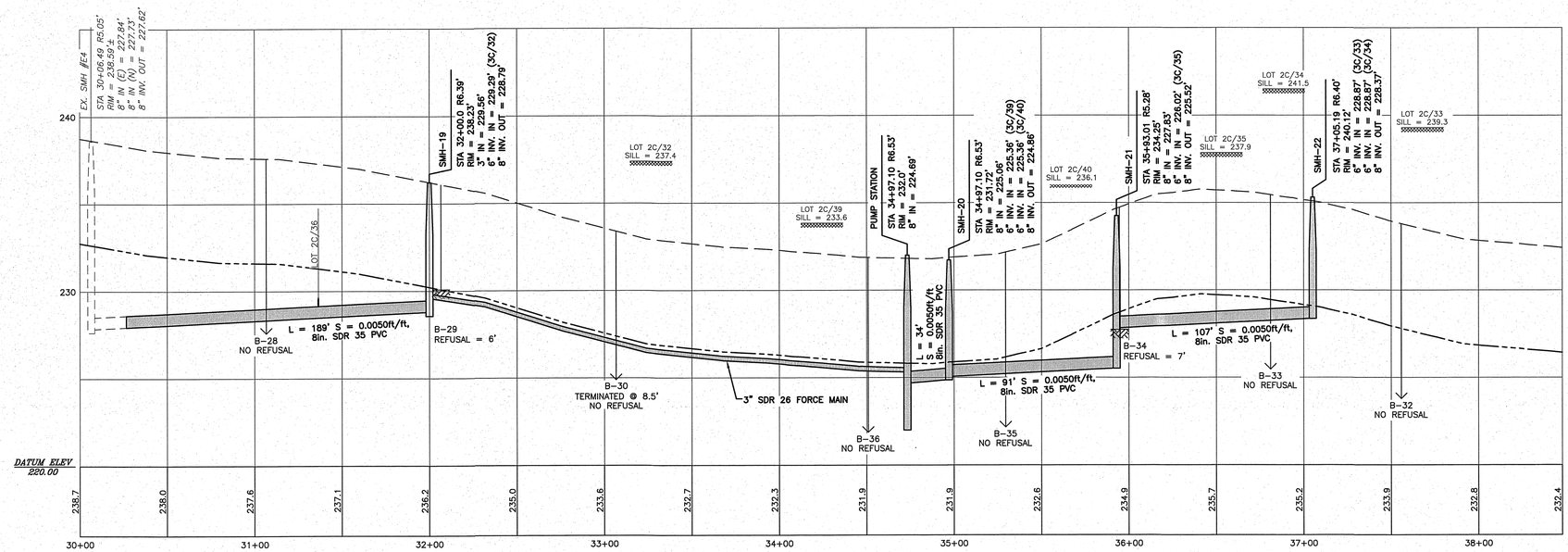
SCALE: AS NOTED

SP-2.4
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 12 OF 17

Plotted: 1/2/2015 12:47 PM By: JAH
H:\mls\0266\\2661.02\0_Drawings\Engineering\2661E02C.dwg





MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL. 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES No. 7995
LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
I	---	---	---	---
H	---	---	---	---
G	---	---	---	---
F	---	---	---	---
E	---	---	---	---
D	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH

SEWER EXTENSION MORNINGSIDE AVENUE PLAN AND PROFILE STA 30+00 to 38+36.45

NOVEMBER 21, 2014

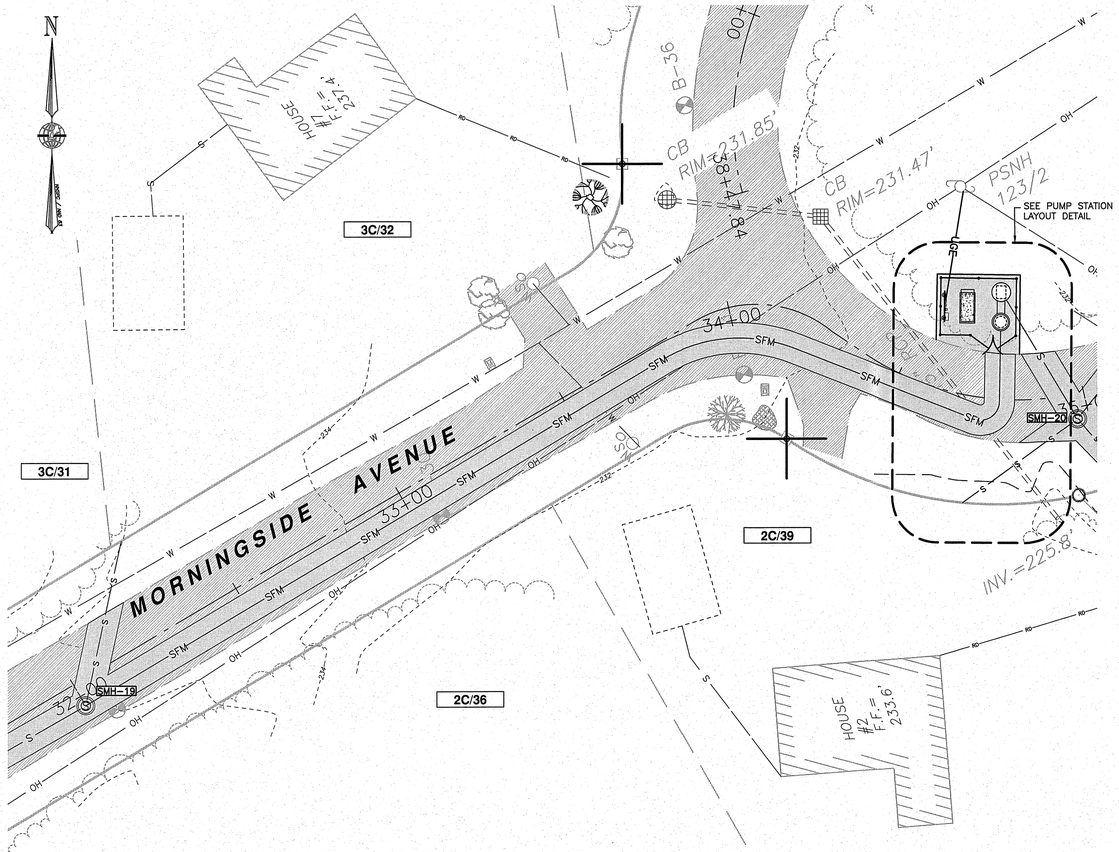
TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

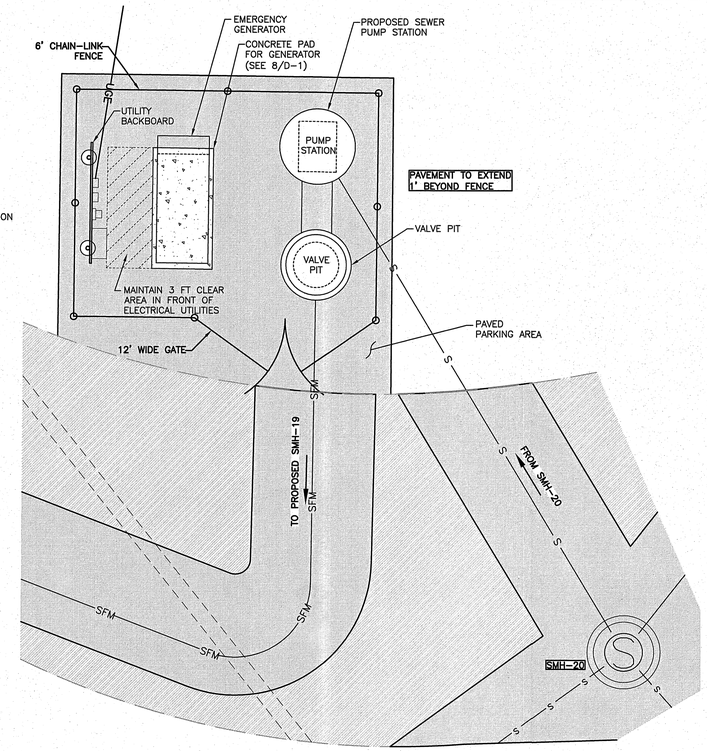
SCALE: 1" = 40' HORIZ / 4' VERT.

P-3.1
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 13 OF 17

Plotted: 1/2/2015 11:43 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg

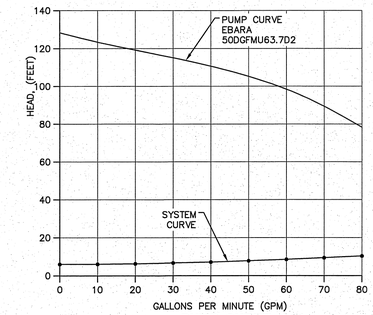




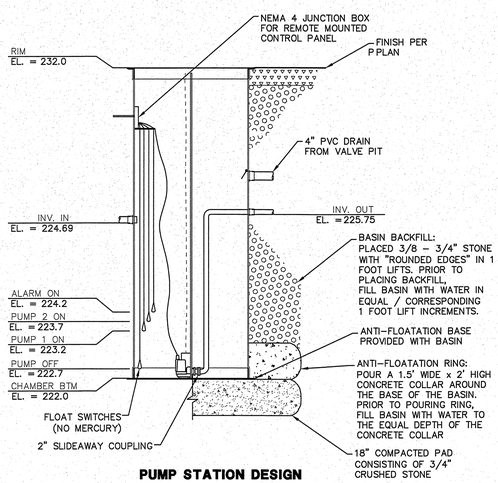
MORNINGSIDE AVENUE PUMP STATION LAYOUT

PLAN VIEW

SCALE: 1" = 5'

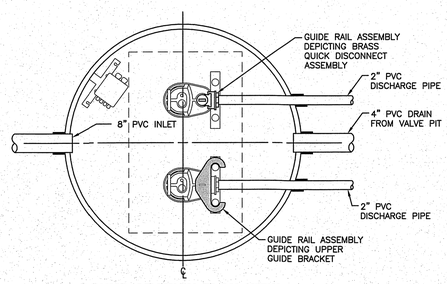


PUMP CURVE



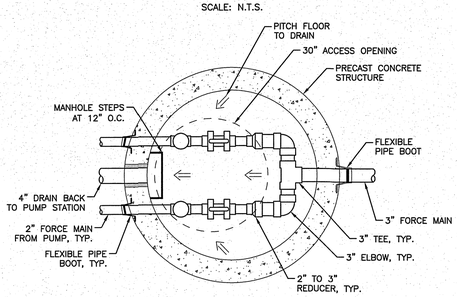
PUMP STATION DESIGN

SCALE: N.T.S.



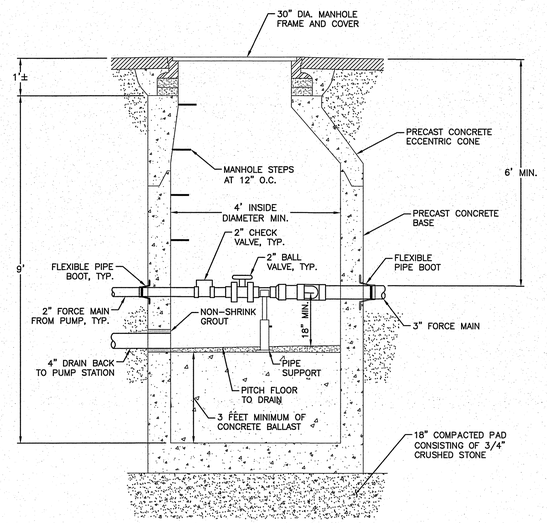
PUMP STATION PLAN VIEW

SCALE: N.T.S.



VALVE PIT PLAN VIEW

SCALE: N.T.S.



VALVE PIT SECTION VIEW

SCALE: N.T.S.

EMERGENCY GENERATOR:

KOHLER POWER SYSTEMS MODEL 30REZG–4Q7

DUPLEX PUMP STATION NOTES:

FURNISH AND INSTALL THE FOLLOWING:

ONE (1) JACKEL, INC. FIBERGLASS CUSTOM BASIN, 5'ø x 10', WITH:
- ANTI–FLOATATION BASE
- STAINLESS STEEL HINGED AND LOCKABLE COVER
- FREEFLO RAIL SYSTEMS WITH LIFTING CHAINS FOR DUPLEX PUMPING SYSTEM
- INDIVIDUAL DISCHARGE LINES FOR EACH PUMP

EACH PUMP LEG SHALL CONSIST OF:
- ONE (2) EBARA SUBMERSIBLE GRINDER PUMP, 50DGFMU63.7S2
- ONE (2) JACKEL, INC. 3" VERTICAL PUMP BRASS DISCONNECT

ALTERNATING DUPLEX PUMP CONTROLLER, NEMA PANEL AND WIRING, CONTROLLER WITH AUDIBLE AND VISUAL ALARMS MOUNTED TO UTILITY PANEL. PROVISION SHALL BE PROVIDED TO CONNECT TO ONSITE AUTOMATIC GENERATOR.

ALL BASIN PENETRATIONS SHALL BE IN ACCORDANCE WITH BASIN MANUFACTURER AND SHALL UTILIZE INLET HUBS WHERE NECESSARY FOR PIPE PENETRATIONS.

BUOYANCY CALCULATIONS:

PUMP STATION:

WATER DISPLACED BY FIBERGLASS BASIN =	πr^2 x BASIN HEIGHT	
	π 2.5'^{2} x 10'	= 196 CF
HYDRO LIFT = 196 CF x 62.4 LBS/CF		= 12,230 LBS
DOWN FORCE		
CONCRETE RING = $\pi 4^2 - \pi 2.5^2$ x 2 FT x 150 LBS/CF		= 9,189 LBS
STONE ABOVE RING = $\pi 4^2 - \pi 2.5^2$ x 8 FT x 55 LBS/CF		= 13,477 LBS
TOTAL DOWN FORCE		= 22,666 LBS

BUOYANCY CHECK, DOWN FORCE > HYDRO LIFT

22,666 LBS – 12,230 LBS = 10,436 LBS

VALVE PIT:

WATER DISPLACED BY VALVE PIT =	πr^2 x HEIGHT	
	π 2.5'^{2} x 11.5'	= 225.4 CF
HYDRO LIFT = 225.4 CF x 62.4 LBS/CF		= 14,065 LBS
DOWN FORCE (SUBTRACT 1 FOOT FOR FRAME AND COVER)		
4'ø ID ECCENTRIC CONE 4' HIGH		= 3,425 LBS
6'ø ID BASE 5' HIGH		= 6,060 LBS
3' OF CONCRETE IN–FILL		
$\pi 2^2$ x 3 FT x 150 LBS/CF		= 5,670 LBS
TOTAL DOWN FORCE		= 15,155 LBS

BUOYANCY CHECK, DOWN FORCE > HYDRO LIFT

15,155 LBS – 14,065 LBS = 1,090 LBS

SEWER PUMP STATION

SYSTEM	
FORCE MAIN	3"
LENGTH	293 FEET
DESIGN FLOW	3,103 GPD
PUMP	
QUANTITY	2
PUMP MODEL	50DGFMU63.7S2

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL. 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES No. 7995 LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION		
A	11/21/14	ISSUE FOR BIDDING	---	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
D	---	---	---	---
E	---	---	---	---
F	---	---	---	---
G	---	---	---	---
H	---	---	---	---
I	---	---	---	---

SEWER PUMP STATION DESIGN

MORNINGSIDE AVENUE

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

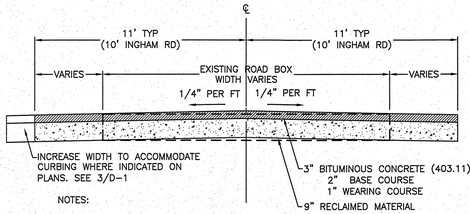
NOVEMBER 21, 2014

SCALE: AS NOTED

SP-3.1
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 14 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg



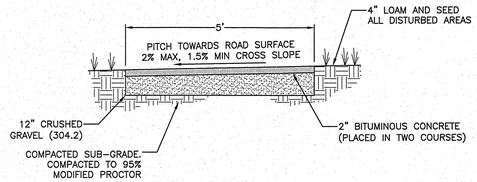
NOTES:

1. RECLAIM EXISTING ROAD TO 12" DEPTH.
2. USE RECLAIMED MATERIAL TO PROVIDE A 9" THICK SUBGRADE FOR THE NEW ROADWAY WIDTH

RECLAIMED ROADWAY TYPICAL SECTION

1 / D-1

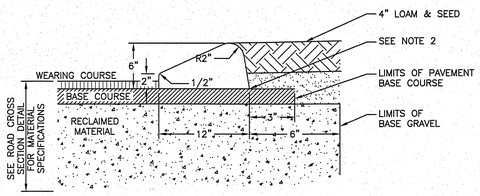
NOV. 17, 2014
SCALE: NONE



PAVED PEDESTRIAN PATH

2 / D-1

JULY 27, 2011
SCALE: NONE



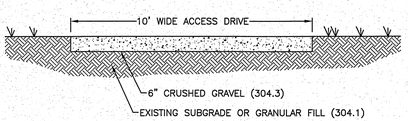
NOTES:

1. CURB FORM SHALL BE MILLER #1144 OR EQUAL
2. APPLY TACK COAT PRIOR TO PLACEMENT OF CURB
3. BITUMINOUS CURB MATERIAL SHALL MEET THE REQUIREMENTS OF NHDOT SECTION 609
4. CAPE COD BERM DIMENSIONS SHALL MATCH THOSE GIVEN IN THIS DETAIL
5. TO BE USED WHERE CURB DOES NOT ABUT SIDEWALK

TYPICAL CAPE COD BERM

3 / D-1

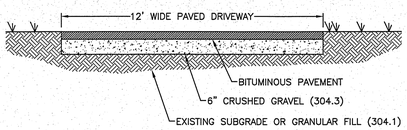
NOV. 21, 2014
SCALE: NONE



ACCESS ROAD

4 / D-1

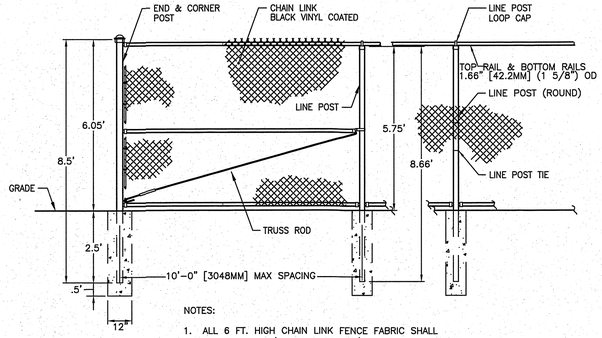
(NHDOT ITEM NO.)
FEB. 03, 2011
SCALE: NONE



PAVED DRIVEWAY APRON

5 / D-1

(NHDOT ITEM NO.)
JUNE 28, 2001
SCALE: NONE



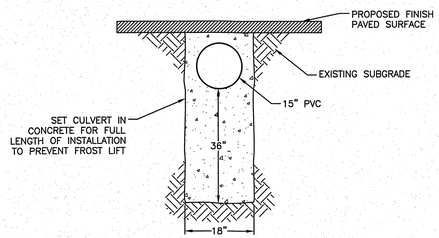
NOTES:

1. ALL 6 FT. HIGH CHAIN LINK FENCE FABRIC SHALL BE KNUCKLED (TOP AND BOTTOM)
2. CONCRETE FOOTINGS SHALL BE FOUR (4) x THE POST DIAMETER.

CHAIN LINK FENCE

6 / D-1

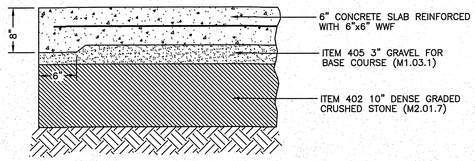
SCALE: NONE



DRIVEWAY CULVERT - CONCRETE ENCASED
LOTS 2C-27 & 2C-28

7 / D-1

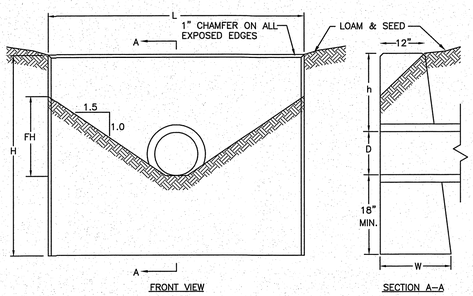
NOV. 10, 2014
SCALE: NONE



CONCRETE PAD - GENERATOR

8 / D-1

(NHDOT ITEM NO.)
APRIL 11, 2011
SCALE: NONE

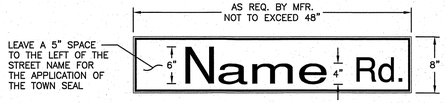


CULVERT DIAM.	HEADWALL LENGTH	HEADWALL HEIGHT	FILL HEIGHT	PIPE COVER	HEADWALL BOTTOM
D	L	H	FH	h	WIDTH W
INCHES	FEET & INCHES				
12	4'-2"	3'-9"	1'-3"	1'-3"	1'-11"

HEADWALL - PRECAST CONCRETE

9 / D-1

OCT. 12, 2009
SCALE: NONE



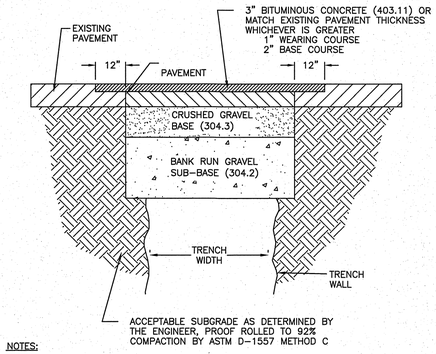
STREET SIGN NOTES:

1. STREET SIGNS SHALL CONFORM TO THE LATEST EDITION OF THE MUTCD SIGN TYPE D3-1, GREEN IN COLOR UNLESS OTHERWISE SPECIFIED BY THE TOWN.
2. STREET SIGN SHALL CONFORM TO THE LATEST EDITION OF THE MUTCD IN SIGN LOCATION, MOUNTING HEIGHT, SIGN HEIGHT AND WIDTH AND TEXT HEIGHT AND STYLE.
3. LETTERING ON POST-MOUNTED STREET NAMES SIGNS SHOULD BE COMPOSED OF INITIAL UPPER-CSE LETTERS AT LEAST 6 INCHES IN HEIGHT AND LOWER CASE LETTERS AT LEAST 4.5 INCHES IN HEIGHT.
4. STREET NAME SIGN SHALL BE RETROREFLECTIVE TO SHOW THE SAME SHAPE AND COLOR BOTH DAY AND NIGHT. NAME AND BORDER SHALL CONTRAST WITH THE BACKGROUND COLOR.
5. SIGN HEIGHT SHALL BE 8" IN HEIGHT WITH A WIDTH NOT TO EXCEED 48"
6. SIGN SHALL BE AN EXTRUDED ALUMINUM PANEL

STREET SIGN

10 / D-1

NOV. 2014
SCALE: NONE



NOTES:

THE BINDER COURSE SHALL BE PLACED IMMEDIATELY AFTER THE TRENCH CONSTRUCTION AND ALLOWED TO STAND FOR A MINIMUM OF 90 DAYS. A LEVELING COURSE SHALL BE APPLIED OVER THE TRENCH AFTER 90 DAYS.

TRENCH RESTORATION WILL CONFORM TO THE REQUIREMENTS OF THE TOWN OF MERRIMACK.

ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO 95% MODIFIED PROCTOR.

PAVEMENT TRENCH RESTORATION

11 / D-1

NOV. 12, 2013
SCALE: NONE

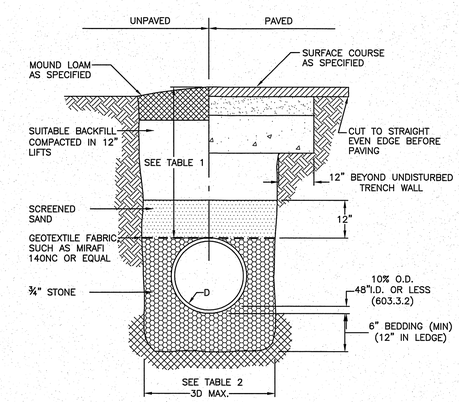


TABLE 1		
LOCATION	PIPE MATERIAL	MINIMUM COVER
PAVED ROADS	ALL	3 FT.
UNPAVED ROADS	ALL	3 FT.
DRIVEWAYS	ALL	1 FT.
UNPAVED AREAS	ALL	2 FT.

TABLE 2 (206.4.1.2)	
INSIDE DIAMETER	TOTAL WIDTH
12" TO 24" OVER 24"	I.D. + 24" 2 x I.D.

SMOOTH INTERIOR CORRUGATED POLYETHELENE PIPE TYPICAL DRAINAGE TRENCH

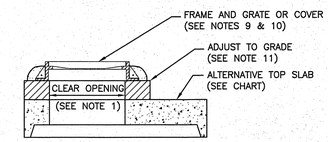
12 / D-1

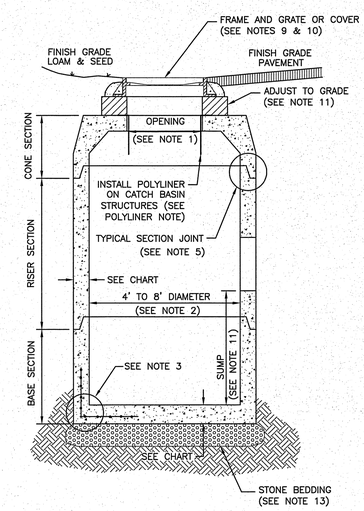
(NHDOT ITEM NO.)
SEPT 30, 2002
SCALE: NONE

GENERAL NOTES

1. CATCH BASIN STRUCTURES SHALL HAVE A CLEAR OPENING OF 24". MANHOLE STRUCTURES SHALL HAVE A CLEAR OPENING OF 30"
2. FOR STRUCTURES WITH DIAMETERS GREATER THAN 4', THE DIAMETER MAY BE CONSTANT FROM TOP TO BOTTOM WITH A FLAT SLAB TOP, OR A RISER SECTION THAT TRANSITIONS FROM A STANDARD 4' CONE SECTION TO THE LARGER DIAMETER RISER OR BASE SECTION.
3. REINFORCING STEEL SHALL CONFORM TO THE LATEST ASTM SPECIFICATION: 0.12 SQ.IN./LINEAR FT. AND 0.12 SQ.IN. (BOTH WAYS) BASE BOTTOM.
4. CONCRETE COMPRESSIVE STRENGTH – 4000 PSI MINIMUM.
5. TYPICAL SECTION JOINT SHALL BE SEALED WITH BUTYL RUBBER AND SHALL CONFORM TO ASTM C443 SPEC. AND FED SPEC. SS-S-210A.
6. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO THE LATEST ASTM C478 SPEC. FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS".
7. ALL PIPING SHALL BE SEALED WITH NON SHRINK GROUT.
8. ALTERNATIVE TOP SLAB IS TO BE STEEL REINFORCED TO MEET OR EXCEED H-20 LOADING.
9. CATCH BASIN INLET GRATE AND FRAME SHALL BE NHDOT TYPE 'B', UNLESS OTHERWISE NOTED.
10. CATCH BASIN AND MANHOLE FRAMES ARE TO BE ADJUSTED TO GRADE WITH A MINIMUM OF TWO (2) COURSES OF BRICK OR ONE SOLID CONCRETE RING AND GROUT. SEALED IN PLACE CLASS AA CONCRETE TO 2" BELOW TOP OF GRATE OR COVER.
11. TO PROVIDE STORM WATER PRE-TREATMENT ALL CATCH BASINS SHALL PROVIDE A 4' DEEP SUMP.
12. DRAINAGE STRUCTURES ARE TO BE SET ON 6" OF 3/4" STONE BEDDING.
13. ALL DRAINAGE STRUCTURES SHALL CONFORM TO NHDOT STANDARDS.

STRUCTURE THICKNESS CHART				
DIAMETER (FEET)	WALL THICKNESS MIN. (INCHES)	FLOOR THICKNESS MIN. (INCHES)	SLAB TOP THICKNESS MIN. (INCHES)	
4	5	6	8	
5	6	8	8	
6	7	8	12	
8	9	10	12	





DRAINAGE STRUCTURES

13 / D-1

AUG. 29, 2013
SCALE: NONE

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
TEL 603-673-1441
FAX 603-673-1584
MERIDIANLANDSERVICES.COM

STATE OF NEW HAMPSHIRE
JOHN A. HEAVISIDES
No. 7995
LICENSED
PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
I	---	---	---	---
H	---	---	---	---
G	---	---	---	---
F	---	---	---	---
E	---	---	---	---
D	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH

SITE AND DRAINAGE DETAILS

NOVEMBER 21, 2014

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: AS NOTED

D-1
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 15 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\0266I\2661.02\0_Drawings\Engineering\2661E02C.dwg

WATER MAIN NOTES:

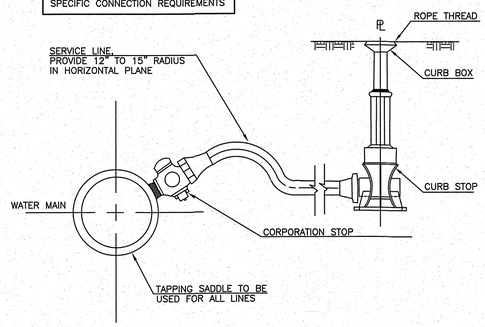
1. ALL MATERIALS USED AND INSTALLATION PROCEDURES SHALL MEET THE MERRIMACK VILLAGE DISTRICT SPECIFICATIONS.
2. ALL WATER MAINS SHALL BE AWWA C151, MINIMUM THICKNESS CLASS 52, CEMENT LINED, DUCTILE IRON PIPE. ALL WATER MAIN CONSTRUCTION SHALL BE:
   - A. PRESSURE TREATED FOR ONE HOUR AT 150 PSI
   - B. PASS A LEAKAGE TEST IN ACCORDANCE WITH THE SPECIFICATIONS FOR THE INSTALLATION OF CAST IRON WATER MAINS AWWA C600
   - C. DISINFECTED AND FLUSHED IN ACCORDANCE WITH AWWA SPECIFICATIONS FOR DISINFECTING WATER MAINS – C601 AND
   - D. SHALL BE INSTALLED WITH A MINIMUM DEPTH OF 5 FEET OF COVER OVER THE PIPE.
3. ALL FITTINGS SHALL BE DUCTILE IRON, 350 PSI RATED AND SHALL CONFORM TO AWWA C110 FOR MECHANICAL JOINTS AND AWWA C111 FOR JOINTS AND GASKET INSTALLATIONS. JOINTS SHALL BE FITTED WITH MEGALUG RETAINER GLANDS.
4. THRUST BLOCK AND RETAINER GLANDS SHALL BE USED AT ALL HYDRANT INSTALLATIONS AND AT ALL DIRECTION CHANGES IN LINES.
5. ALL VALVES FROM 4 TO 12 INCHES SHALL BE METROPOLITAN PATTERN, OPEN RIGHT, MECHANICAL JOINT, AWWA APPROVED GATE VALVES, AS MANUFACTURED BY DRESSER, M&H, OR A.P. SMITH OR APPROVED EQUAL.
6. FOR NEW ROAD INSTALLATIONS, THE ROAD RIGHT OF WAY SHALL BE FILLED TO THE SUBGRADE ELEVATION PRIOR TO THE INSTALLATION OF THE WATER MAIN.
7. WATER MAINS SHALL BE LOCATED ALONG THE NORTH AND WEST SIDE OF ROADS, 8 FEET OFF CENTERLINE, WHENEVER POSSIBLE.

WATER MAIN NOTES (1 / D-2)

SCALE: NONE

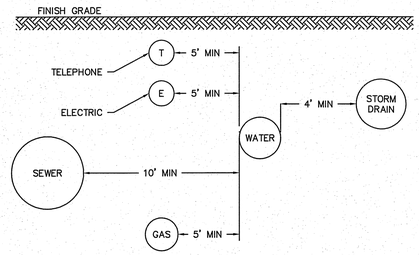
APPROVED WATER MAIN ALTERNATE:

JM EAGLE, BLUE BRUTE TYPE DR-18, 235 PSI, PVC WATER MAIN. CONSULT INSTALLATION MANUAL FOR SPECIFIC CONNECTION REQUIREMENTS



SERVICE CONNECTION 3/4" THRU 2" (4 / D-2)

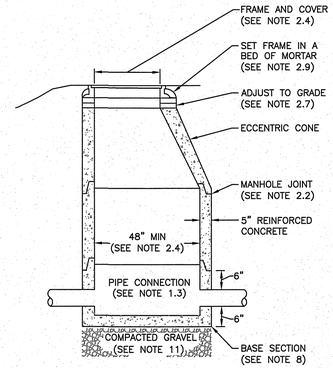
SCALE: NONE



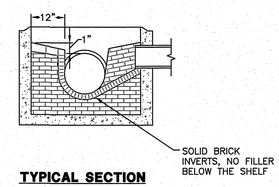
NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO MERRIMACK VILLAGE DISTRICT SPECIFICATIONS.
2. ALL WATER MAIN SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. SEE DETAIL 4/D-1 FOR EXACT DEPTH AND LOCATION.

TYPICAL UTILITY HORIZONTAL SEPARATION TO WATER LINE (6 / D-2)

SCALE: NONE



TYPICAL MANHOLE



TYPICAL SECTION

MANHOLE CONNECTIONS

1.1 ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.
1.2 FOR BITUMASTIC TYPE JOINTS, THE AMOUNT OF SEALANT SHALL BE OF SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY. APPROVED BITUMASTIC SEALANTS: RAM-NEK; KENT SEAL NO. 2.
1.3 PIPE TO MANHOLE JOINTS SHALL BE AS FOLLOWS:
   - a. ELASTOMERIC, RUBBER, SLEEVE WITH WATERTIGHT JOINTS AT MANHOLE OPENINGS AND PIPE SURFACES.
   - b. JOINTS AT THE MANHOLE MAY BE CAST INTO WALL OR SECURED WITH STAINLESS CLAMPS. JOINTS AT THE PIPE SHALL BE SECURED WITH STAINLESS STEEL CLAMPS.
   - c. ELASTOMERIC SEALING RING CAST IN THE MANHOLE OPENING WITH SEAL FORMED ON THE SURFACE OF THE PIPE BY COMPRESSION OF THE RING.
   - d. NON-SHRINK GROUTED JOINTS WHERE WATERTIGHT BONDING TO THE MANHOLE AND PIPE CAN BE OBTAINED.

MANHOLE STRUCTURES

2.1 MANHOLE STRUCTURES SHALL BE DESIGNED TO WITHSTAND H-20 LOADING AND SHALL NOT LEAK IN EXCESS OF ONE GPD PER VERTICAL FOOT OF MANHOLE FOR THE LIFE OF THE STRUCTURE.
2.2 HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF AN OVERLAPPING TYPE, SEALED FOR WATER-TIGHTNESS USING A DOUBLE ROW OF AN ELASTOMERIC OR MASTIC-LIKE SEALANT.
2.3 MANHOLE CONE SECTIONS SHALL BE ECCENTRIC IN SHAPE.
2.4 ALL MANHOLES RECEIVING PIPES 16" IN DIAMETER OR LESS SHALL HAVE AN INSIDE DIAMETER OF 48". MANHOLES RECEIVING PIPES UP TO 36" SHALL HAVE AN INSIDE DIAMETER OF 60" AND HAVE A 30" CLEAR OPENING FRAME AND COVER.. ALL MANHOLES GREATER THAN 14 FEET IN DEPTH SHALL HAVE A MINIMUM INSIDE DIAMETER OF 60 INCHES, WITH 36" DIAMETER MANHOLE FRAME AND COVER SET ON MORTAR. NO INDIA COVERS.
2.5 ALL MANHOLE STRUCTURES SHALL HAVE A 30" CLEAR OPENING FRAME AND COVER.
2.6 PER TOWN OF MERRIMACK CONSTRUCTION STANDARD S4-07, MANHOLES SHALL BE PRECAST CONCRETE SECTIONS WITH A CONFINED O-RING RUBBER GASKET JOINTS PER ASTMC-478 AND ASTM C-443 WITH EITHER A PRECAST BASE OR A CAST IN PLACE BASE MAKE FROM A 3,000 PSI STRUCTURAL CONCRETE. ALL STRUCTURES SHALL BE REINFORCED CONCRETE.
2.7 ADJUST FRAME TO GRADE WITH MINIMUM OF 2 COURSES OF BRICK. MAXIMUM HEIGHT OF 12.
2.8 BASE SECTION TO BE FULL WALL THICKNESS AND MONOLITHIC TO A POINT 6" ABOVE THE PIPE CROWN.
2.9 MORTAR USED SHALL BE COMPOSED OF ONE PART CEMENT TO TWO PARTS OF SAND.
2.10 INSIDE DROP STRUCTURES SHALL BE CONSTRUCTED OF ASTM D3034, SDR 35 PIPE AND FITTINGS.
2.11 SET STRUCTURE ON A 6" COMPACTED LAYER OF 3/4" WASHED STONE.

MANHOLE INVERTS AND SHELVES

3.1 MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW.
3.2 AT CHANGES IN DIRECTION, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES.
3.3 SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL.
3.4 CARE SHALL BE TAKEN TO ENSURE THAT THE BRICK INVERT CHANNEL IS A SMOOTH CONTINUATION OF THE PIPE INVERT. INVERT BRICKS SHALL BE LAID ON EDGE.
3.5 UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.
3.6 INVERTS AND SHELVES SHALL BE PLACED AFTER TESTING.

ALL MATERIALS AND INSTALLATION PROCEDURES SHALL CONFORM TO NH DES AND TOWN OF MERRIMACK CONSTRUCTION SPECIFICATIONS.

SEWER MANHOLE DETAILS (8 / D-2)

NOV. 21, 2014
SCALE: NONE

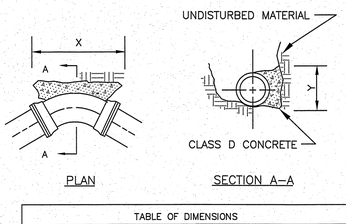


TABLE OF DIMENSIONS										
PIPE SIZE	90° BEND		45° BEND		22½° BEND		11¼° BEND		TEE&PLUG	
	X	Y	X	Y	X	Y	X	Y	X	Y
6"	33"	21"	18"	21"	12"	18"	9"	12"	21"	24"
8"	45"	27"	24"	27"	18"	21"	12"	15"	27"	33"
10"	60"	36"	36"	36"	24"	30"	18"	21"	36"	42"
12"	66"	39"	36"	42"	24"	30"	18"	21"	39"	45"
14"	72"	45"	42"	48"	27"	36"	18"	27"	45"	54"

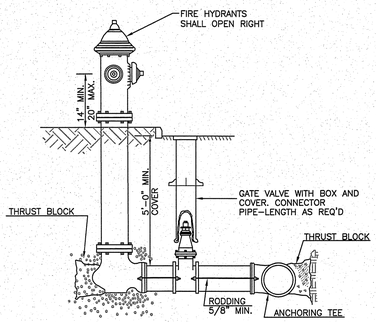
HORIZONTAL BEND

THRUST BLOCKS - WATER MAINS (2 / D-2)

SCALE: NONE

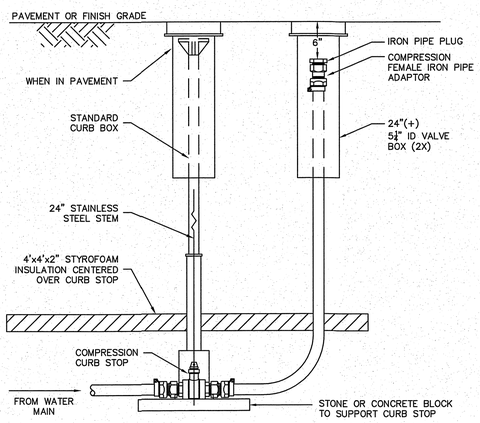
TRENCH NOTES:

1. EXCAVATE UNSUITABLE MATERIAL AND BACKFILL WITH BEDDING MATERIAL.
2. W = MAXIMUM TRENCH WIDTH TO A PLANE 12" ABOVE THE PIPE. FOR PIPES 15 INCHES IN DIAMETER OR LESS, W SHALL BE NO MORE THAN 36" WIDE. FOR PIPE GREATER THAN 15 INCHES IN DIAMETER, W SHALL BE 24 INCHES PLUS THE PIPE DIAMETER.
3. FOR CROSS COUNTRY CONSTRUCTION, MOUND TO A HEIGHT OF 6" (MIN.) ABOVE ORIGINAL GROUND SURFACE.
4. MINIMUM OF 5 FEET OF COVER OVER WATER MAIN. MINIMUM COVER OF 6 FEET OVER SEWER MAIN. 4 FEET OF COVER FOR A SEWER MAIN IN CROSS COUNTRY AREAS.



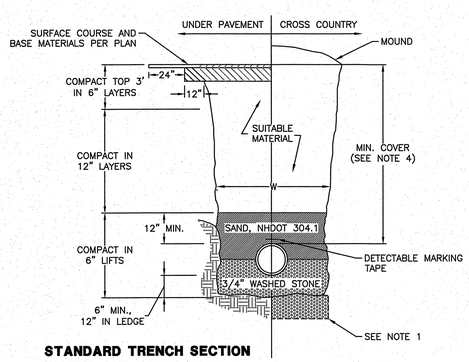
HYDRANT DETAIL (3 / D-2)

SCALE: NONE



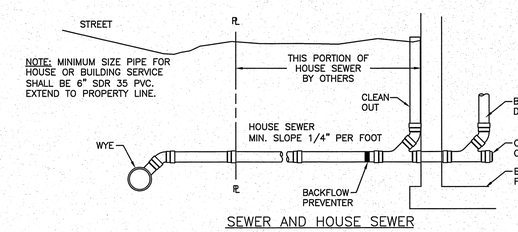
BLOW OFF - 1", 2" (5 / D-2)

SCALE: NONE

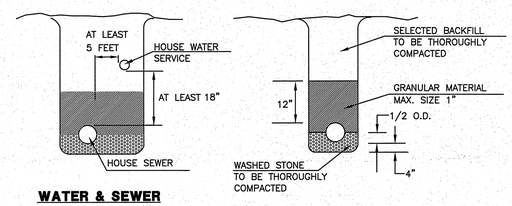


STANDARD TRENCH SECTION WATER AND SEWER MAIN (7 / D-2)

SCALE: NONE



SEWER AND HOUSE SEWER



WATER & SEWER IN SAME TRENCH — **TRENCH CROSS SECTION**

HOUSE SEWER DETAILS (9 / D-2)

NOV. 21, 2014
SCALE: NONE

MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
MERIDIANLANDSERVICES.COM
TEL 603-673-1441
FAX 603-673-1584

STATE OF NEW HAMPSHIRE — JOHN A. HEAVISIDES No. 7995 — LICENSED PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION		
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
---	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH
			DR	CK

WATER AND SEWER DETAILS

NOVEMBER 21, 2014

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE, HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: AS NOTED

D-2
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 16 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\xmls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg

DURING CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED:

1. INSTALLATION OF SILT SOCKS AND SILTATION FENCE WHERE INDICATED SHALL BE COMPLETED PRIOR TO THE START OF SITE WORK IN ANY GIVEN AREA.
2. SILT SOCKS AND SILTATION FENCES SHALL BE KEPT CLEAN DURING CONSTRUCTION AND REMOVED WHEN ALL DISTURBED AREAS HAVE A HEALTHY STAND OF VEGETATIVE COVER. EROSION CONTROL MEASURES SHALL BE INSPECTED AT LEAST ONCE A WEEK AND AFTER EVERY 0.5" OR GREATER RAINFALL.
3. EXISTING VEGETATION IS TO REMAIN UNDISTURBED WHEREVER POSSIBLE.
4. PER THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES, THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION. THE TOTAL AREA OF ACTIVE DISTURBANCE, INCLUDING LOT DISTURBANCES, SHALL NOT EXCEED 5 ACRES.
5. THE DURATION OF TIME THAT AN AREA IS DISTURBED SHALL BE MINIMIZED. ALL NON-ACTIVE DISTURBED AREAS (ie: CLEARED FOR CONSTRUCTION BUT NOT PRESENTLY UNDERGOING CONSTRUCTION) SHALL BE STABILIZED WITHIN 28 DAYS OF DISTURBANCE. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 72 HOURS AFTER FINAL GRADING.
6. ALL DITCHES, SWALES AND DETENTION BASINS SHALL BE CONSTRUCTED DURING THE INTIAL PHASE OF CONSTRUCTION AND SHALL BE STABILIZED PRIOR TO DIRECTING STORM WATER FLOW TO THEM.
7. AN AREA MAY BE CONSIDERED STABILIZED WHEN ONE OF THE FOLLOWING HAS OCCURED:
   A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
   B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
   C. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
8. ALL DISTURBED AREAS SHALL BE COVERED WITH A MINIMUM OF 4" OF LOAM. LOAM SHALL BE COVERED WITH THE APPROPRIATE SEED MIXTURE AS INDICATED BELOW.

   THE SEED MIXTURE SHALL BE APPLIED AT A RATE OF 2.5 POUNDS PER 1,000 SQ. FT. AND SHALL BE MIXED AS FOLLOWS:

TYPICAL LAWN SEED		SLOPE SEED	
CREEPING RED FESCUE	0.87 LBS.	CREEPING RED FESCUE	1.01 LBS.
KENTUCKY BLUEGRASS	0.71 LBS.	RYE GRASS	0.75 LBS.
RYE GRASS	0.58 LBS.	RED TOP	0.18 LBS.
RED TOP	0.14 LBS.	ALSIKE CLOVER	0.18 LBS.
		BIRDSFOOT TREFOIL	0.18 LBS.

9. 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 FERTILIZER (N-P205-K20) OR EQUIVALENT (LOW PHOSPHORUS FERTILIZER IS DEFINED BY THE COMPREHENSIVE SHORELAND PROTECTION ACT AS LESS THAN 2% PHOSPHORUS). 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).

   FERTILIZER SHOULD BE RESTRICTED TO A LOW PHOSPHATE, SLOW RELEASE NITROGEN FERTILIZER WHEN APPLIED TO AREAS BETWEEN 25 FEET AND 250 FEET FROM A SURFACE WATER BODY AS SPECIFIED BY THE COMPREHENSIVE SHORELAND PROTECTION ACT (SLOW RELEASE FERTILIZERS MUST BE AT LEAST 50% SLOW RELEASE NITROGEN COMPONENT). NO FERTILIZER EXCEPT LIMESTONE SHOULD BE APPLIED WITHIN 25 FEET OF THE SURFACE WATER. THESE LIMITATIONS ARE REQUIREMENTS.
10. PERMANENT OR TEMPORARY COVER MUST BE IN PLACE BEFORE THE GROWING SEASON ENDS. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 10 TO SEPTEMBER 15. NO DISTURBED AREA SHALL BE LEFT EXPOSED DURING THE WINTER MONTHS.
11. THE SITE CONTRACTOR SHALL MAINTAIN A VIGOROUS DUST CONTROL PROGRAM THROUGHOUT THE CONSTRUCTION PROCESS. EXPOSED EARTH SHALL BE KEPT MOIST OR MULCHED AT ALL TIMES TO PREVENT DUST FORMATION. SPECIAL ATTENTION SHALL BE PAID TO HIGH TRAFFIC AREAS.

EROSION CONTROL

1 / D-3

OCT. 12, 2009
SCALE: NONE

1. ALL POST-DEVELOPMENT VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATED GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE PLACEMENT OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATED GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED WITH STONE RIPRAP OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITION.
3. AFTER NOVEMBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT.

WINTER CONSTRUCTION

2 / D-3

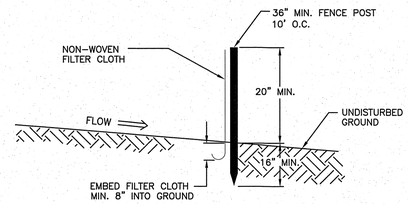
OCT. 12, 2009
SCALE: NONE

1. ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REQUIREMENTS AND SPECIFICATIONS FROM THE CURRENT EDITION OF "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" – STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, THE TOWN OF MERRIMACK DEPARTMENT OF PUBLIC WORKS REQUIREMENTS, AND SUBDIVISION & SITE PLAN REGULATIONS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THESE PLANS AND SHALL VERIFY THAT ALL THE INFORMATION SHOWN HEREON IS CONSISTENT, COMPLETE, ACCURATE, AND CAN BE CONSTRUCTED PRIOR TO AND/OR DURING CONSTRUCTION. MERIDIAN LAND SERVICES, INC., AS DESIGN ENGINEER, SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES, ERRORS, OMISSIONS, OR EXISTING UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION SO THAT REMEDIAL ACTION MAY BE TAKEN BEFORE PROCEEDING WITH THE WORK.
3. THE OWNER AND/OR CONTRACTOR SHALL VERIFY ALL ZONING REQUIREMENTS FOR CONFORMANCE PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR SHALL CONTACT "DIGSAFE" 72 HOURS PRIOR TO THE START OF CONSTRUCTION (1-800-255-4977 IN NH, 1-888-344-7233 IN MA).
5. COMPLIANCE WITH ALL APPLICABLE REGULATIONS AND SPECIAL CONDITIONS OF TOWN/CITY AGENCIES, SUCH AS THE PLANNING BOARD, CONSERVATION COMMISSION, AND OTHERS, IS MANDATORY AND IS THE RESPONSIBILITY OF THE OWNER.
6. ANY ALTERATION OF THIS DESIGN OR CHANGE DURING CONSTRUCTION MAY REQUIRE APPROVAL OF VARIOUS TOWN BOARDS OR AGENCIES AND SHALL BE DISCUSSED WITH THE OWNER AND MERIDIAN LAND SERVICES, INC. PRIOR TO CONSTRUCTION.
7. ALL DRAINAGE STRUCTURES SHALL CONFORM TO NHDOT STANDARDS.
8. ALL SEWER CONSTRUCTION SHALL COMPLY WITH NHDES AND THE TOWN OF MERRIMACKS REQUIREMENTS.
9. ALL WATER LINE CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF THE MERRIMACK VILLAGE DISTRICT WATER DEPARTMENT.
10. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE APPROPRIATE TOWN DEPARTMENT PRIOR TO CONSTRUCTION TO ARRANGE FOR INSPECTIONS OF THE CONSTRUCTION.
11. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ACCURATE AS-BUILT INFORMATION OF ALL WORK, ESPECIALLY UNDERGROUND CONSTRUCTION OF UTILITY LINES, SERVICES, CONNECTIONS, ETC. AND APPROPRIATE TIES TO ABOVE GROUND PERMANENT STRUCTURES, FIELD SURVEY COORDINATES, OR SOME OTHER METHOD OF ESTABLISHING THE AS-BUILT CONDITION OF ALL CONSTRUCTION.

CONSTRUCTION NOTES

3 / D-3

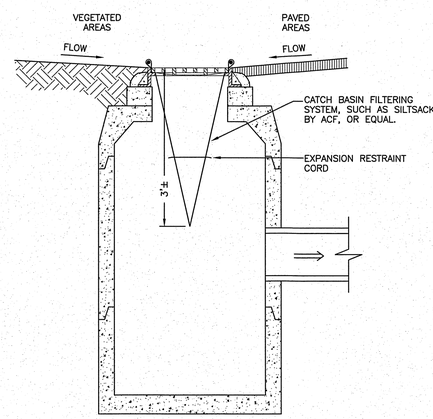
APRIL 16, 2008
SCALE: NONE



SILTATION FENCE

4 / D-3

DEC. 22, 1995
SCALE: NONE

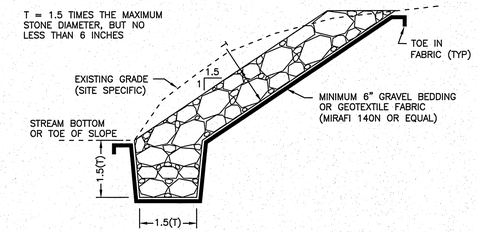


1. INSTALL AND MAINTAIN SACKS IN ALL CATCH BASINS.
2. TO INSTALL SACK, REMOVE CATCH BASIN GRATE AND PLACE SACK IN OPENING. HOLD OUT APPROXIMATELY SIX INCHES OF THE SACK OUTSIDE THE FRAME FOR THE LIFTING STRAPS. REPLACE THE GRATE TO HOLD THE SACK IN PLACE.
3. THE SACK SHOULD BE INSPECTED AFTER EVERY STORM, OR ONCE EVERY TWO WEEKS, WHICH EVER OCCURS FIRST.
4. THE RESTRAINT CORD SHOULD BE VISIBLE AT ALL TIMES. IF THE CORD IS COVERED WITH SEDIMENT, THE SACK SHOULD BE EMPTIED. EMPTY THE SACK AWAY FROM THE CATCH BASIN TO PREVENT SEDIMENT FROM RE-ENTERING THE CATCH BASIN. EMPTY THE SACK PER THE MANUFACTURES RECOMMENDATIONS.
5. REPLACE THE SACK IN THE CATCH BASIN AFTER THE SACK HAS BEEN EMPTIED. ONCE CONSTRUCTION IS COMPLETE AND ALL DISTURBED AREAS HAVE BEEN STABILIZED BY PAVING OR A HEALTHY VEGETATIVE COVER, REMOVE THE SACK FROM THE CATCH BASINS.

CATCH BASIN SEDIMENT FILTER

5 / D-3

NOV. 6, 2000
SCALE: NONE

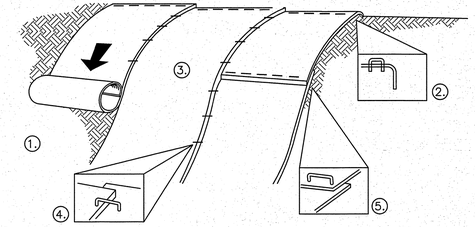


1. MEDIAN STONE SIZE (d_{50}) SHALL BE DETERMINED PER CHAPTER 7, SECTION "ROCK RIPRAP" OF THE "STORMWATER MANAGEMENT AND EROSION CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE, DATED AUGUST 1992 AS REVISED.
2. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, OR RIPRAP SHALL BE CLEARED AND GRUBBED TO REMOVE ALL ROOTS, VEGETATION, AND OTHER DEBRIS AND PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS (LESS THE STONE THICKNESS).
3. THE ROCK AND/OR GRAVEL USED FOR THE FILTER AND RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
4. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING PLACEMENT OF THE ROCK RIPRAP BY PLACING A CUSHION OF SAND AND GRAVEL OVER THE FABRIC. ALL OVERLAPS SHALL BE A MINIMUM OF 12 INCHES.
5. STONE FOR RIPRAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER TO PREVENT DISPLACEMENT OF THE UNDERLYING MATERIALS. HAND PLACEMENT MAY BE REQUIRED.
6. STONES FOR RIPRAP SHALL BE ANGULAR AND SUB. THE STONES SHOULD BE SHAPED SO THAT THE LEAST DIMENSION OF STONE FRAGMENT SHALL BE NOT LESS THAN 1/3 OF THE GREATEST DIMENSION OF FRAGMENT. FLAT ROCKS SHALL NOT BE USED FOR RIPRAP.
7. VOIDS IN THE RIP RAP MAY BE FILLED WITH SPALLS AND SMALLER ROCKS.

RIPRAP SLOPE

6 / D-3

APRIL 2, 2009
SCALE: NONE



STRAW/COCONUT FIBER EROSION CONTROL TURF REINFORCEMENT MAT SUCH AS NORTH AMERICAN GREEN SC150 OR EQUAL.

THE EROSION CONTROL MATERIAL(S) SHALL BE ANCHORED WITH "U" SHAPED 11 GAUGE WIRE STAPLES OR WOODEN STAKES WITH A MINIMUM TOP WIDTH OF 1 IN AND LENGTH OF 6 IN.

CONSTRUCTION REQUIREMENTS, SLOPE APPLICATIONS:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.

2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP- SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES OR 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 BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.

3. ROLL THE BLANKETS DOWN THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES OR STAKES IN APPROPRIATE LOCATIONS. REFER TO MANUFACTURERS STAPLE GUIDE FOR CORRECT STAPLE PATTERN.

4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" OVERLAP DEPENDING ON BLANKET TYPE.

5. CONSECUTIVE BLANKETS 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 BLANKET WIDTH.

NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

THE CONTRACTOR SHALL MAINTAIN THE BLANKET UNTIL ALL WORK ON THE CONTRACT HAS BEEN COMPLETED AND ACCEPTED. MAINTENANCE SHALL CONSIST OF THE REPAIR OF AREAS WHERE DAMAGED BY ANY CAUSE. ALL DAMAGED AREAS SHALL BE REPAIRED TO REESTABLISH THE CONDITIONS AND GRADE OF THE SOIL PRIOR TO APPLICATION OF THE COVERING AND SHALL BE REFERTILIZED, RESEEDED, AND REMULCHED AS DIRECTED.

SLOPE STABILIZATION TURF REINFORCEMENT MAT

7 / D-3

AUG.. 2, 2002
SCALE: NONE

MERIDIAN
LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031
TEL 603-673-1441
FAX 603-673-1584
MERIDIANLANDSERVICES.COM

STATE OF NEW HAMPSHIRE
JOHN A. HEAWISIDES
No. 7995
LICENSED
PROFESSIONAL ENGINEER
1/2/15

REV.	DATE	DESCRIPTION	DR	CK
I	---	---	---	---
H	---	---	---	---
G	---	---	---	---
F	---	---	---	---
E	---	---	---	---
D	---	---	---	---
C	1/2/15	NHDES & TOWN ENG. REVISIONS	KMA	JAH
B	11/25/14	WATER SYSTEM EDITS	JAH	JAH
A	11/21/14	ISSUE FOR BIDDING	---	JAH

EROSION CONTROL
NOTES AND DETAILS

NOVEMBER 21, 2014

TOWN OF MERRIMACK DPW
INGHAM RD, SUNSET DR, DAWN AVE,
HIGHNOON AVE + MORNINGSIDE AVE
MERRIMACK, NEW HAMPSHIRE

SCALE: AS NOTED

D-3
SHEET

FILE: 2661E02C.dwg
PROJECT 2661.02
SHEET NO. 17 OF 17

Plotted: 1/2/2015 11:41 AM By: JAH
H:\mls\02661\2661.02\0_Drawings\Engineering\2661E02C.dwg