







**BOHLER ENGINEERING**

SITE CIVIL AND CONSTRUCTION SERVICES  
 LAND SURVEYING PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE  
 SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

BOSTON, MA  
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 NEW YORK, NY  
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 RICHMOND, VA  
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 TAMPA, FL  
 WASHINGTON, DC

FALL RIVER, MA  
 HARTFORD, CT  
 HONOLULU, HI  
 KANSAS CITY, MO  
 LOS ANGELES, CA  
 MEMPHIS, TN  
 MIAMI, FL  
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| REVISIONS |          |                      |     |
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| REV       | DATE     | COMMENT              | BY  |
| 1         | 11/17/16 | FOR NOTICE OF INTENT | CEM |
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**PERMIT SET**

PROJECT No.: W161041  
 DRAWN BY: CEM  
 CHECKED BY: WDG/MJD  
 DATE: 10/14/16  
 SCALE: AS NOTED  
 CAD I.D.: W161041\_SS3-WATER

**OFF-SITE WATER LINE PLANS**

FOR  
**TOLL BROS., INC.**

LOCATION OF SITE  
 ORCHARD STREET  
 TOWN OF MILLIS  
 NORFOLK COUNTY,  
 MASSACHUSETTS

**BOHLER ENGINEERING**

352 TURNPIKE ROAD  
 SOUTHBOROUGH, MA 01772  
 Phone: (508) 480-6900  
 Fax: (508) 480-6080  
[www.BohlerEngineering.com](http://www.BohlerEngineering.com)

**W.D. GOEBEL**

WILLIAM D. GOEBEL  
 PROFESSIONAL CIVIL ENGINEER  
 LICENSE NO. 10280  
 NEW YORK LICENSE NO. 021284-1  
 FLORIDA LICENSE NO. 66202

SHEET TITLE:

**INDEX PLAN**

SHEET NUMBER:

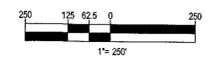
**3**  
OF 14

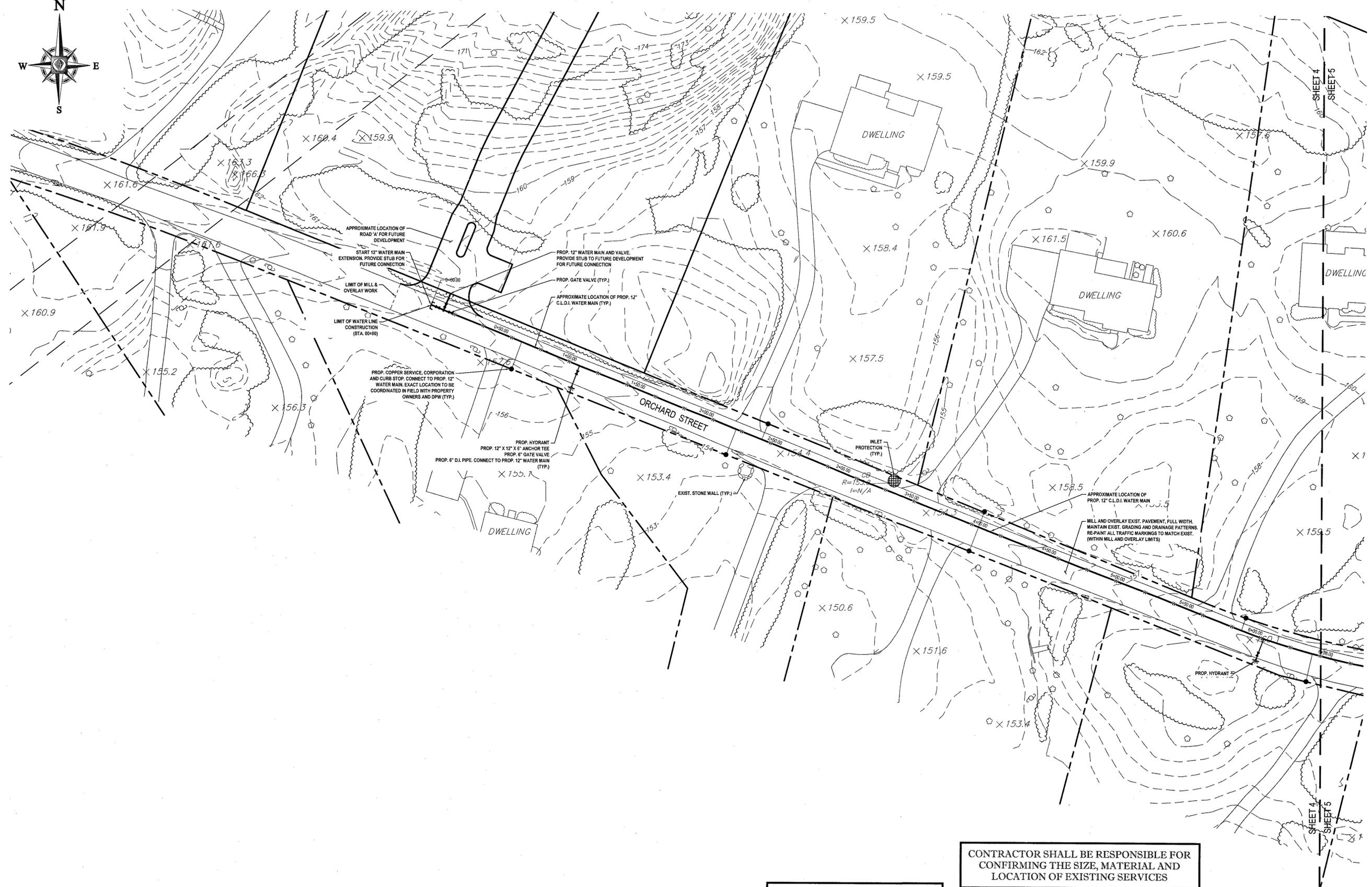
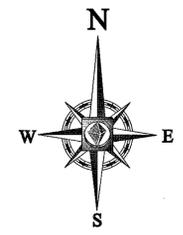
SS 2 - 10/14/2016

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**811**

Know what's below.  
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SITE CIVIL AND CONSULTING ENGINEERING  
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 CONSTRUCTION ADMINISTRATION  
 SOUTH BOROUGHS, MA  
 CHARLOTTE, NC  
 ATLANTA, GEORGIA  
 RICHMOND BEACH, DE  
 SOUTHEASTERN, PA  
 SOUTHERN MARYLAND  
 NORTHERN VIRGINIA  
 NEW JERSEY, NJ  
 NEW YORK, NY  
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| REVISIONS |          |                      |     |
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| CAD I.D.:    | W161041 SS3 - WATER |

PROJECT:  
**OFF-SITE WATER LINE PLANS**  
 FOR  
**TOLL BROS., INC.**  
 LOCATION OF SITE  
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**W.D. GOEBEL**

PROFESSIONAL ENGINEER  
 MASSACHUSETTS LICENSE NO. 4124-C  
 NEW JERSEY LICENSE NO. 120290  
 NEW YORK LICENSE NO. 071284-1  
 FLORIDA LICENSE NO. 52220

SHEET TITLE:  
**ORCHARD ST. WATER MAIN LAYOUT PLAN**  
 SHEET NUMBER:  
**4**  
 OF 14  
 SS2 - 10/14/2016



DUE TO PRIVATE PROPERTY ACCESS RESTRICTIONS, WETLAND RESOURCE AREA BOUNDARIES ARE APPROXIMATED BASED ON FIELD OBSERVATIONS FROM ROADWAYS AND REVIEW OF MAPPING RESOURCES.

ALL WORK TO BE COORDINATED WITH THE TOWN OF MILLIS DPW

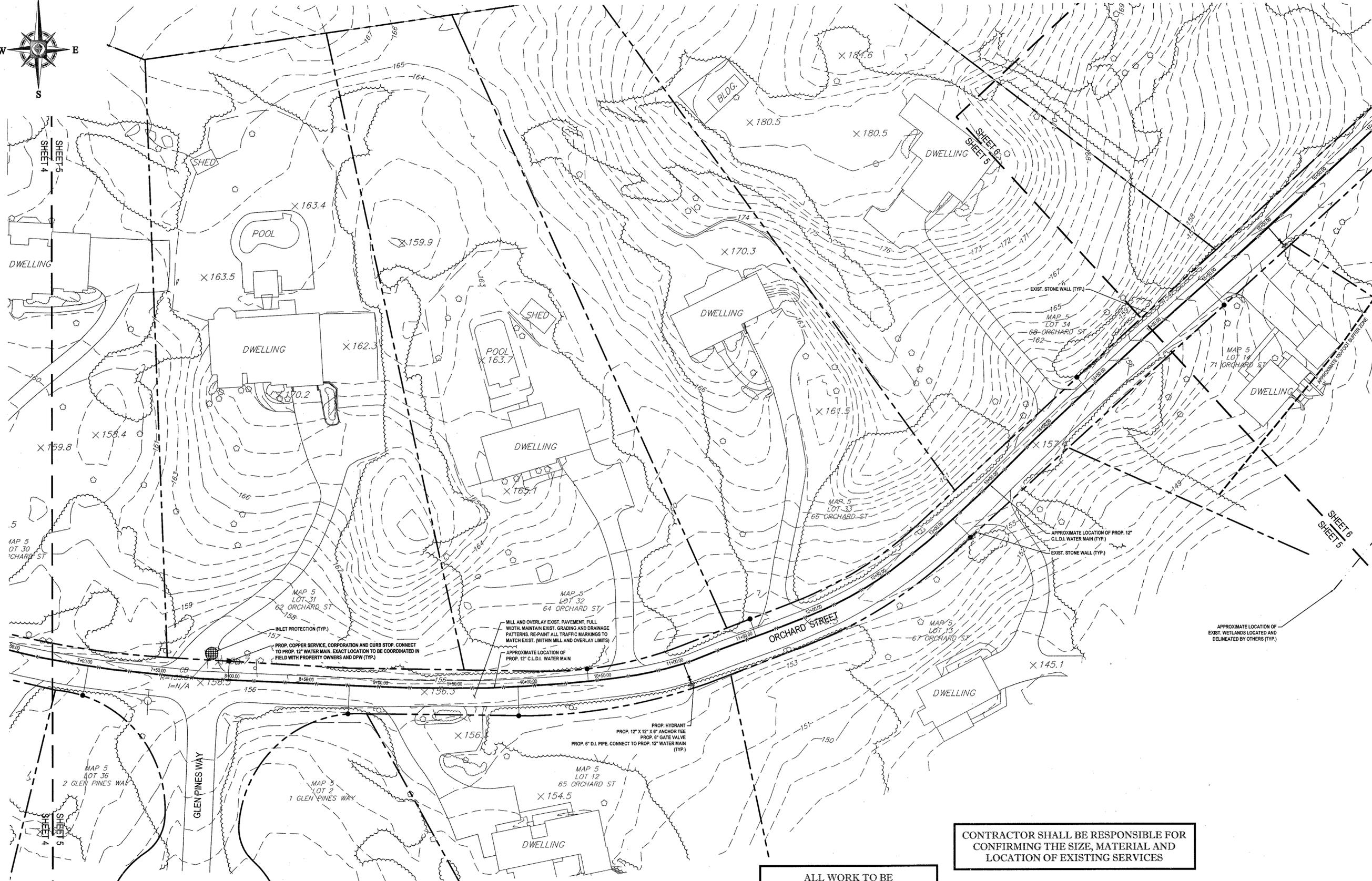
ALL PROPOSED SERVICES SHALL BE LOCATED WITH MINIMUM IMPACT TO EXISTING STONE WALLS AND TREES.

CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THE SIZE, MATERIAL AND LOCATION OF EXISTING SERVICES

LOCATE EXISTING INFRASTRUCTURE AND WATER SERVICES, AND REPLACE AND CONNECT TO NEW WATER MAIN. IF EXISTING INFRASTRUCTURE AND SERVICES DO NOT EXIST, PROVIDE NEW INFRASTRUCTURE AND SERVICES TO NEW WATER MAIN



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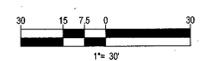
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 SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

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**REVISIONS**

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**PERMIT SET**

PROJECT No.: W161041  
 DRAWN BY: CEM  
 CHECKED BY: WJG/JMD  
 DATE: 10/14/16  
 SCALE: AS NOTED  
 CAD I.D.: W161041\_S33 - WATER

**OFF-SITE WATER LINE PLANS**

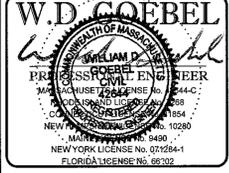
FOR

**TOLL BROS., INC.**

LOCATION OF SITE  
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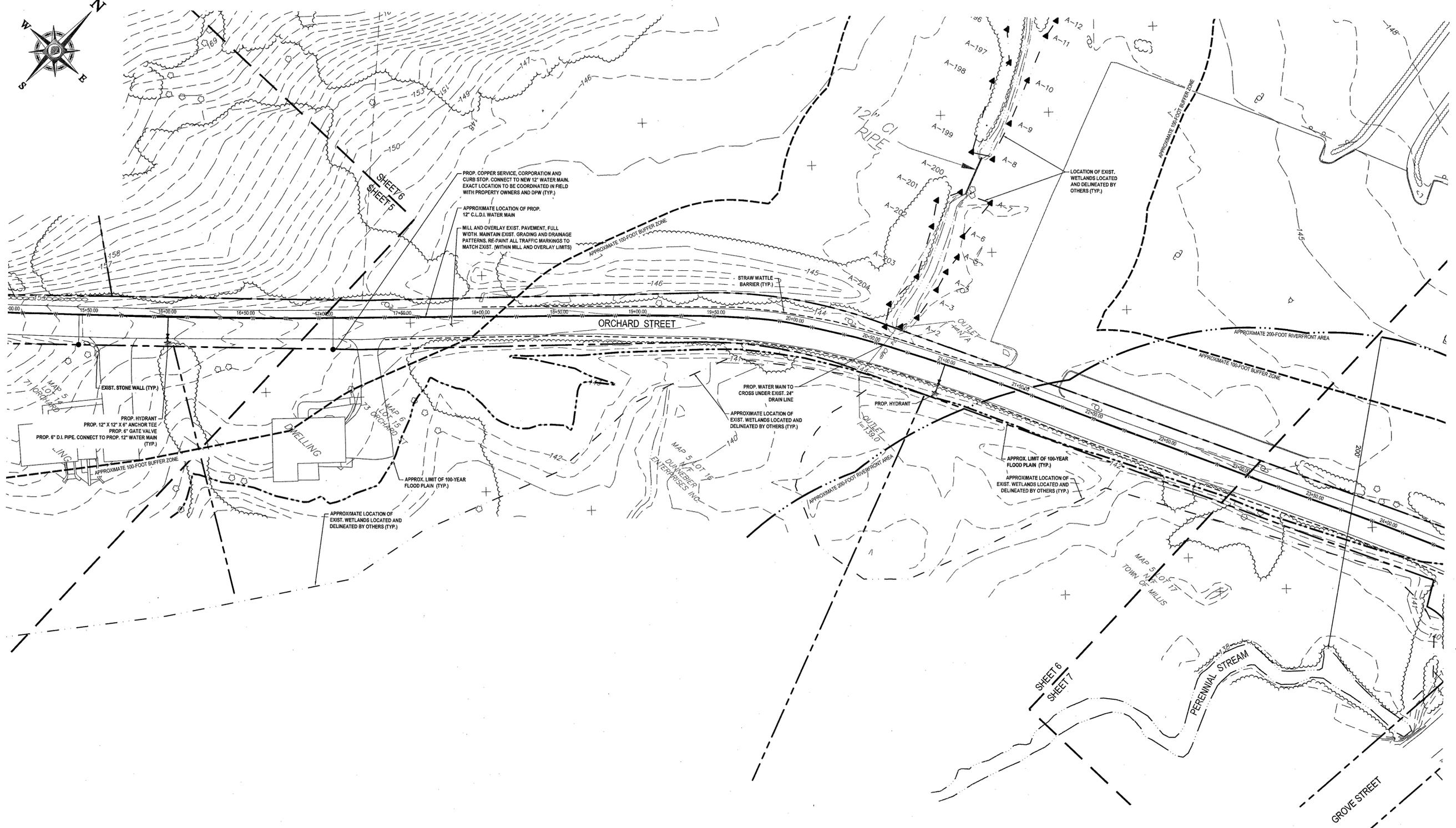


**ORCHARD ST. WATER MAIN LAYOUT PLAN**

SHEET NUMBER: **5**  
 OF 14

SS 2 - 10/14/2016

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 CHECKED BY: WDC/MLD  
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 SCALE: AS NOTED  
 CAD I.D.: W161041-SS3-WATER

**OFF-SITE WATER LINE PLANS**

FOR  
**TOLL BROS., INC.**

LOCATION OF SITE  
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 TOWN OF MILLIS  
 NORFOLK COUNTY,  
 MASSACHUSETTS

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**W.D. GOEBEL**

PROFESSIONAL SEAL  
 WILLIAM D. GOEBEL  
 LICENSED PROFESSIONAL ENGINEER  
 NO. 12345  
 STATE OF MASSACHUSETTS  
 NEW YORK LICENSE NO. 021254-1  
 FLORIDA LICENSE NO. 68202

SHEET TITLE:  
**ORCHARD ST. WATER MAIN LAYOUT PLAN**

SHEET NUMBER:  
**6**  
 OF 14

SS 2 - 10/14/2016

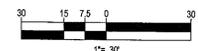
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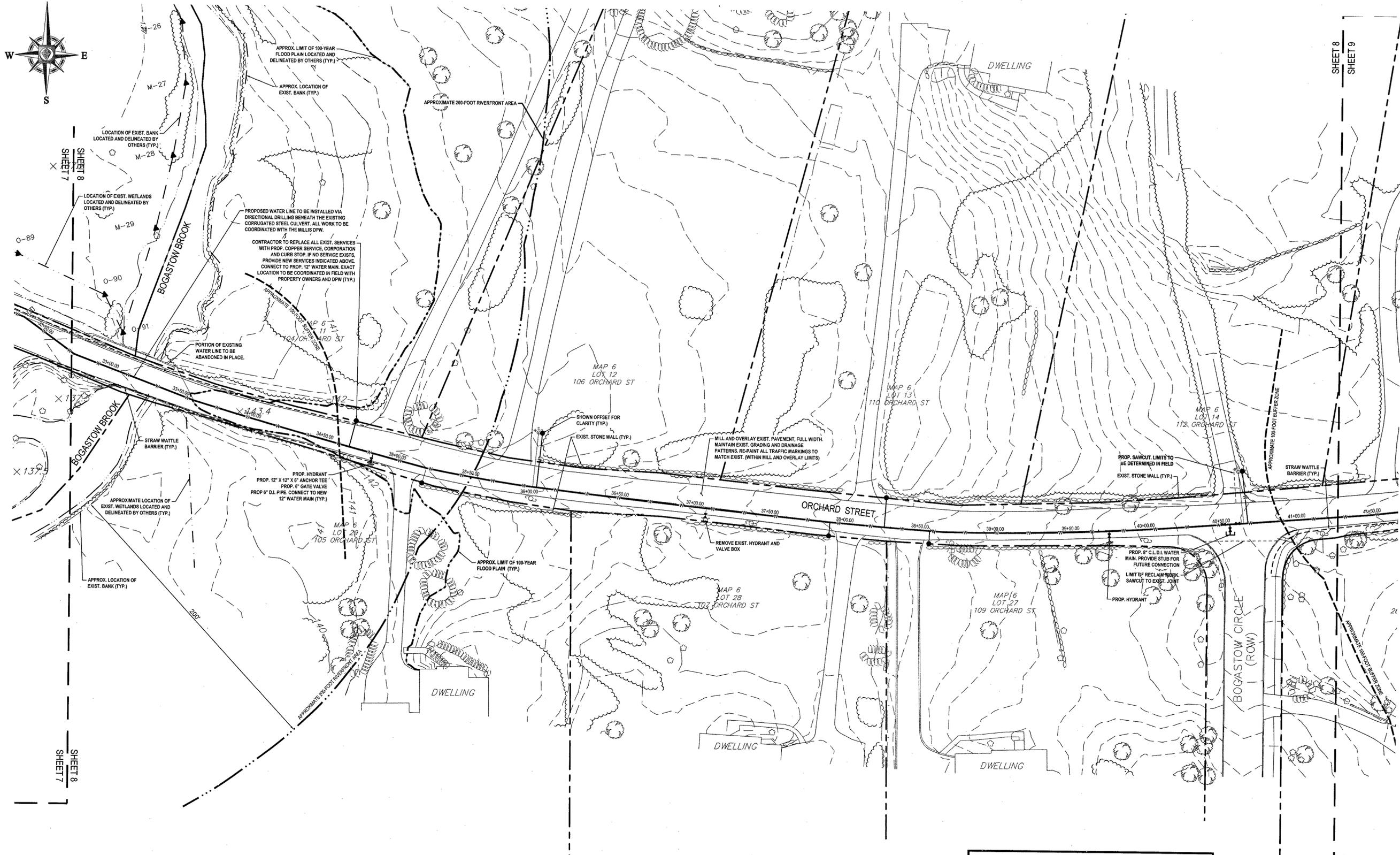
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**BOHLER ENGINEERING**

SITE SURVEY AND CONSULTING ENGINEERING ARCHITECTURE  
 LAND SURVEYING PROGRAM MANAGER PERMITTING SERVICES  
 SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

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 EDINBURGH, VA  
 NEW HAVEN, CT  
 BOSTON, MA  
 NEW YORK, NY  
 NEW JERSEY, NJ  
 FORT WORTH, TX  
 CHARLOTTE, NC  
 ATLANTA, GA  
 TAMPA, FL  
 MIAMI, FL  
 NORTHERN VIRGINIA  
 WASHINGTON, DC

**REVISIONS**

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 CHECKED BY: WOODLID  
 DATE: 10/14/16  
 SCALE: AS NOTED  
 CAD ID: W161041-SS3-WATER

**OFF-SITE WATER LINE PLANS**

FOR

**TOLL BROS., INC.**

LOCATION OF SITE  
 ORCHARD STREET  
 TOWN OF MILLIS  
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 MASSACHUSETTS

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**W.D. GOEBEL**

PROFESSIONAL ENGINEER  
 MASSACHUSETTS REG. NO. 12780  
 CONTRACT NO. 2016-0001  
 NEW JERSEY REG. NO. 271294-1  
 FLORIDA LICENSE NO. 66202

SHEET TITLE:  
**ORCHARD ST. WATER MAIN LAYOUT PLAN**

SHEET NUMBER:  
**8**  
 OF 14

SS 2 - 10/14/2016

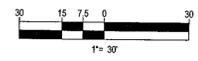
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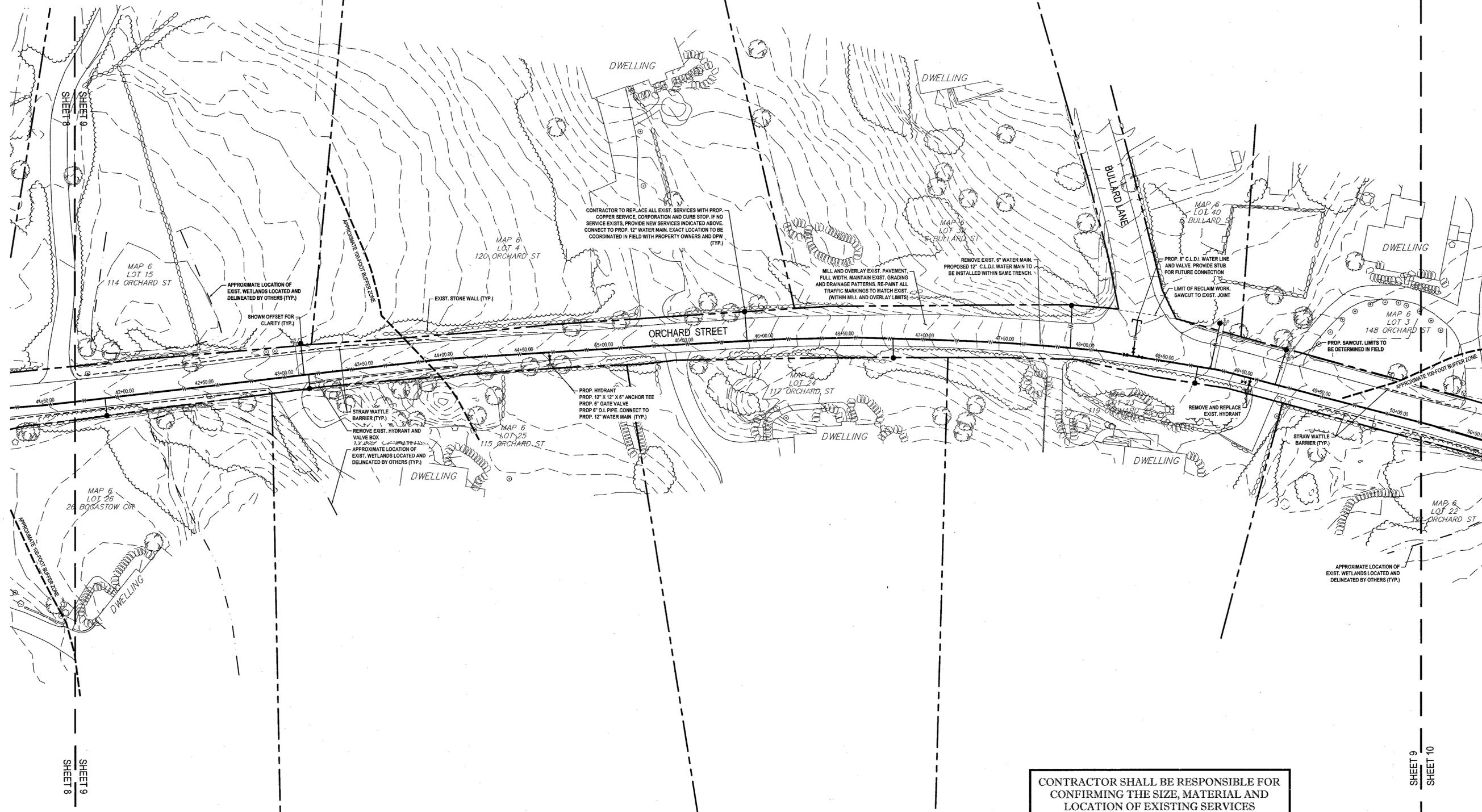
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**811**

Know what's below.  
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 SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

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 SOUTHWESTERN OFFICE: PHOENIX, AZ; DENVER, CO; SALT LAKE CITY, UT

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**OFF-SITE WATER LINE PLANS**

FOR

**TOLL BROS., INC.**

LOCATION OF SITE  
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 NEW YORK LICENSE NO. 021284-1  
 FLORIDA LICENSE NO. 66202

SHEET TITLE:  
**ORCHARD ST. WATER MAIN LAYOUT PLAN**

SHEET NUMBER:  
**9**  
 OF 14

SS 2 - 10/14/2016

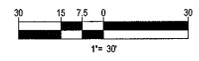
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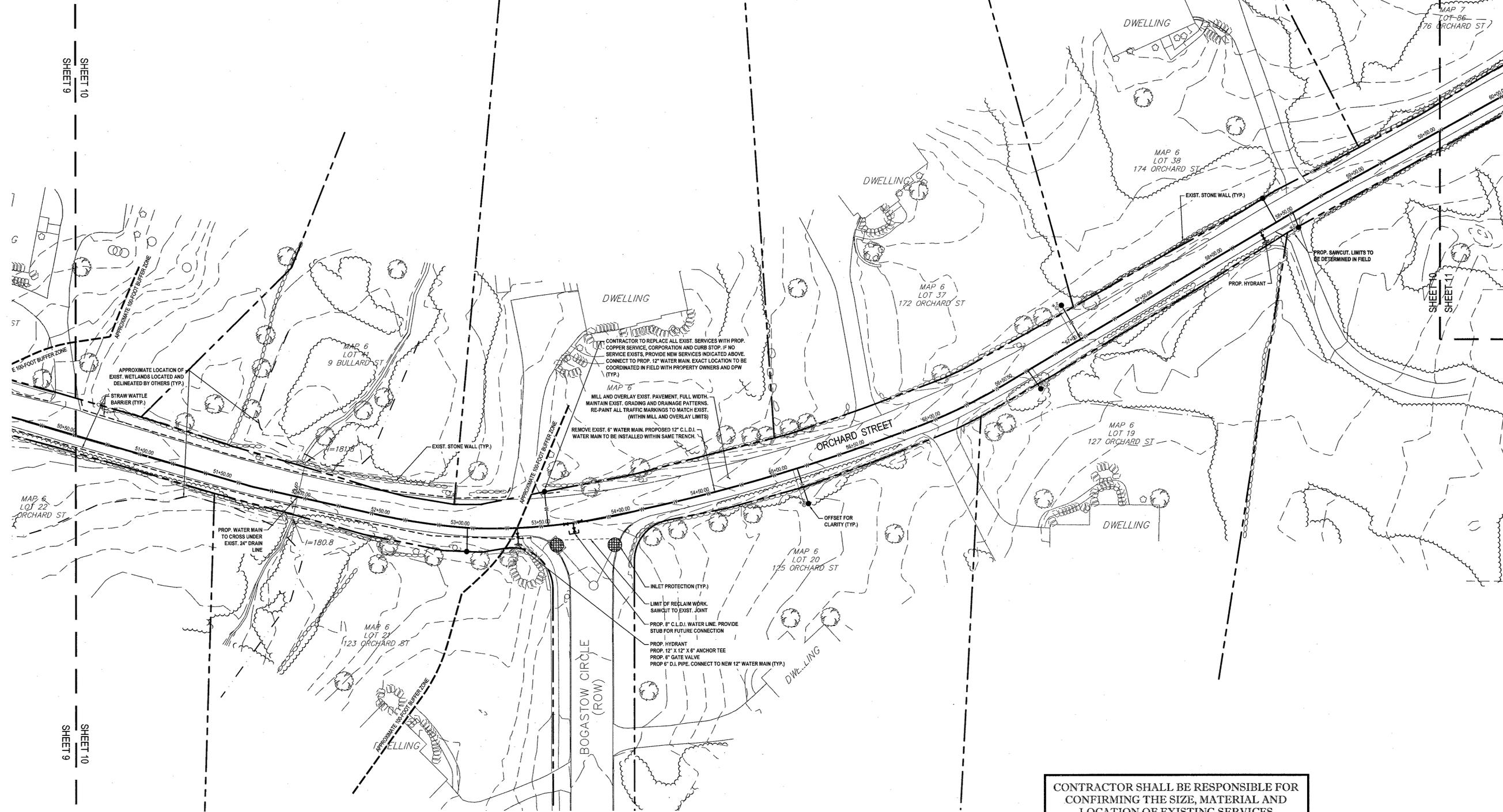
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SHEET 10

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SHEET 10

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 LAND SURVEYING PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE  
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OUR OFFICES:  
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 NEW YORK, NY  
 PHILADELPHIA, PA  
 CHARLOTTE, NC  
 FAYETTEVILLE, NC  
 REHOBOTH BEACH, DE  
 SOUTHERN MARYLAND  
 CENTRAL VIRGINIA

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**OFF-SITE WATER LINE PLANS**

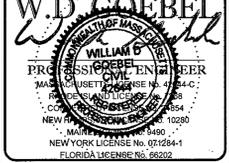
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SHEET TITLE:  
**ORCHARD ST. WATER MAIN LAYOUT PLAN**

SHEET NUMBER:  
**10**  
 OF 14

SS 2 - 10/14/2016

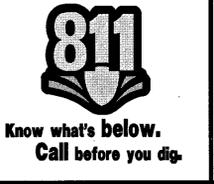
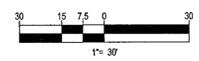
DUE TO PRIVATE PROPERTY ACCESS RESTRICTIONS, WETLAND RESOURCE AREA BOUNDARIES ARE APPROXIMATED BASED ON FIELD OBSERVATIONS FROM ROADWAYS AND REVIEW OF MAPPING RESOURCES.

ALL WORK TO BE COORDINATED WITH THE TOWN OF MILLIS DPW

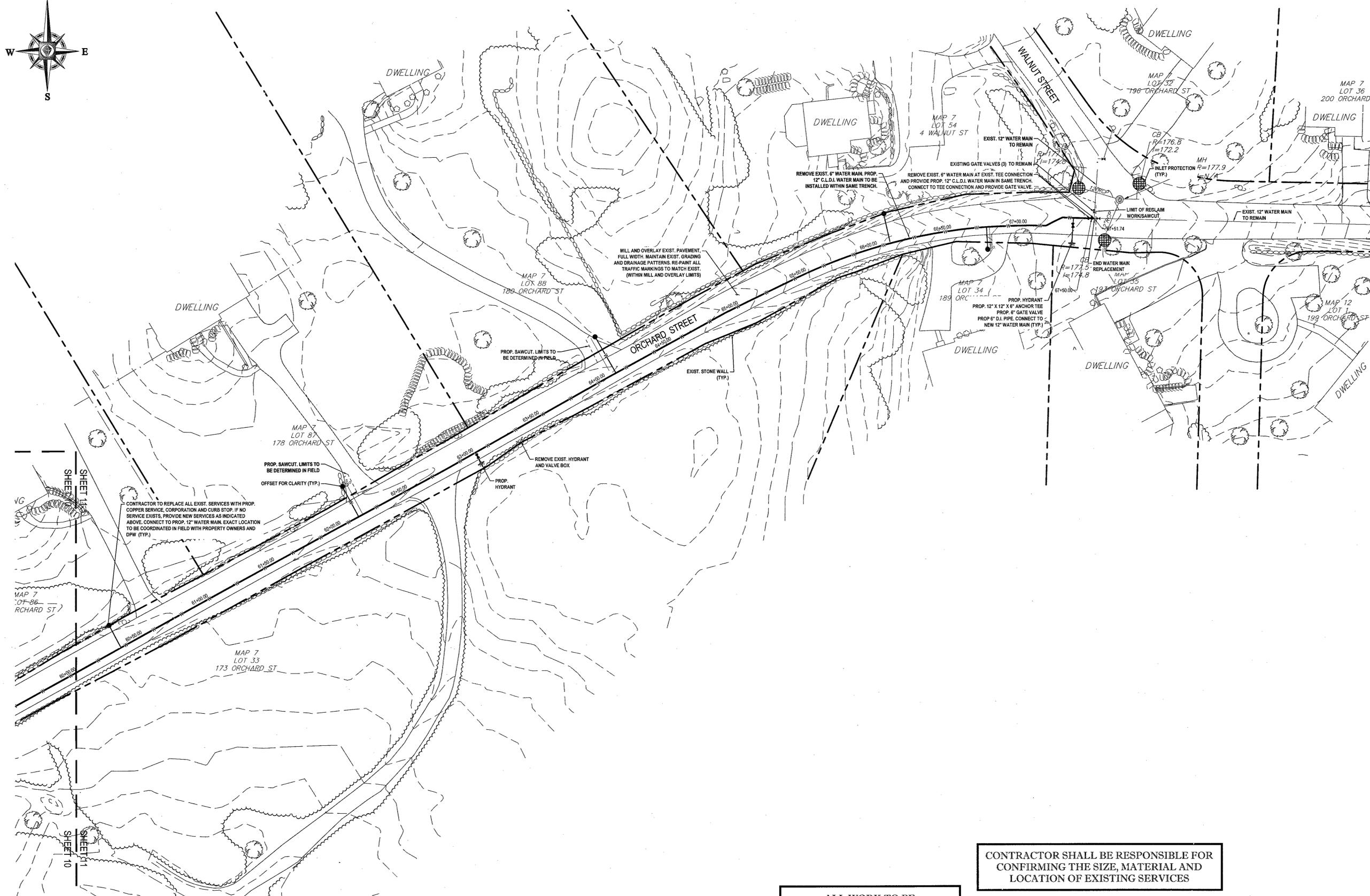
ALL PROPOSED SERVICES SHALL BE LOCATED WITH MINIMUM IMPACT TO EXISTING STONE WALLS AND TREES.

CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THE SIZE, MATERIAL AND LOCATION OF EXISTING SERVICES

LOCATE EXISTING INFRASTRUCTURE AND WATER SERVICES, AND REPLACE AND CONNECT TO NEW WATER MAIN. IF EXISTING INFRASTRUCTURE AND SERVICES DO NOT EXIST, PROVIDE NEW INFRASTRUCTURE AND SERVICES TO NEW WATER MAIN



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CONTRACTOR TO REPLACE ALL EXIST. SERVICES WITH PROP. COPPER SERVICE, COPROBATION AND CURB STOP. IF NO SERVICE EXISTS, PROVIDE NEW SERVICES AS INDICATED ABOVE. CONNECT TO PROP. 12" WATER MAIN. EXACT LOCATION TO BE COORDINATED IN FIELD WITH PROPERTY OWNERS AND DPW (TYP.)

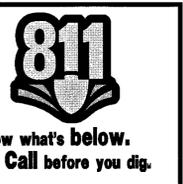
DUE TO PRIVATE PROPERTY ACCESS RESTRICTIONS, WETLAND RESOURCE AREA BOUNDARIES ARE APPROXIMATED BASED ON FIELD OBSERVATIONS FROM ROADWAYS AND REVIEW OF MAPPING RESOURCES.

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**REVISIONS**

| REV | DATE     | COMMENT              | BY  |
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| 1   | 11/17/16 | FOR NOTICE OF INTENT | CEM |
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**PERMIT SET**

PROJECT No.: W161041  
 DRAWN BY: CEM  
 CHECKED BY: WDJ/MJD  
 DATE: 10/14/16  
 SCALE: AS NOTED  
 CAD I.D.: W161041\_S33 - WATER

**OFF-SITE WATER LINE PLANS**

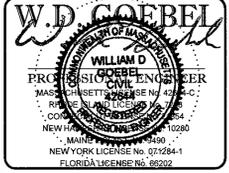
FOR

**TOLL BROS., INC.**

LOCATION OF SITE  
 ORCHARD STREET  
 TOWN OF MILLIS  
 NORFOLK COUNTY,  
 MASSACHUSETTS

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**W.D. GOEBEL**

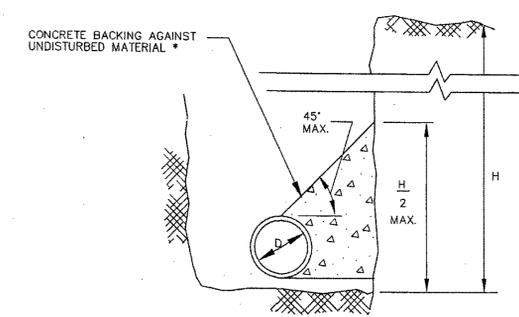
PROFESSIONAL ENGINEER  
 STATE OF MASSACHUSETTS  
 LICENSE NO. 10290

SHEET TITLE:  
**ORCHARD ST. WATER MAIN LAYOUT PLAN**

SHEET NUMBER:  
**11**  
 OF 14

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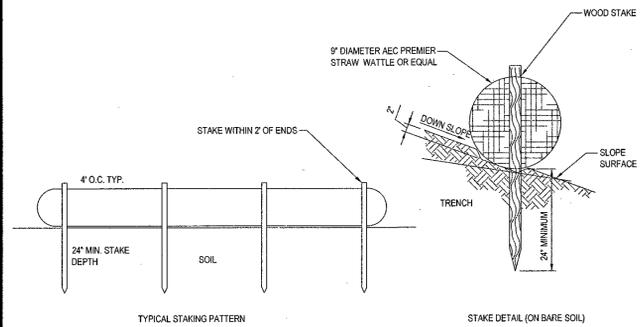


\* SEE TABLE ON THRUST BLOCK BEARING AREAS FOR THE AREA OF CONCRETE REQUIRED.

DETAIL SHOWN REFERS TO STANDARD TOWN OF MILLIS CONSTRUCTION DETAIL

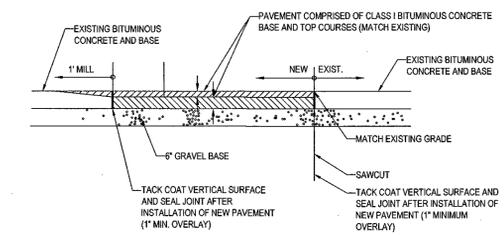
TYPICAL WATER MAIN THRUST BLOCK SECTION DETAIL

N.T.S.



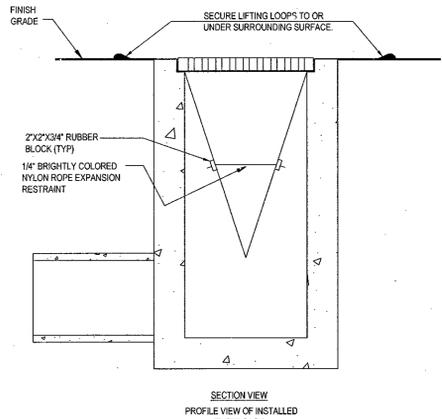
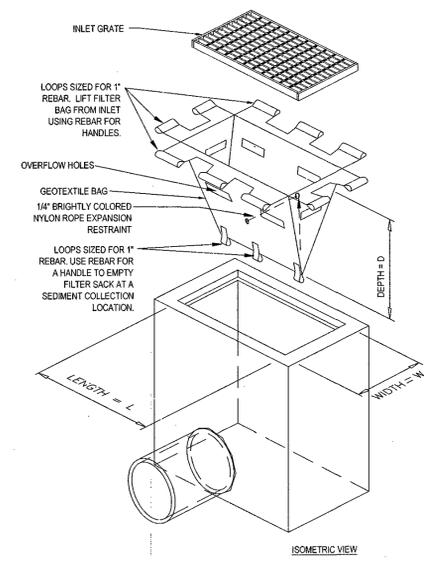
STRAW WATTLES

N.T.S.



ROADWAY PATCHING DETAIL

N.T.S.



INLET PROTECTION (GRADED INLETS)

N.T.S.

| LOW TO MODERATE FLOW GEOTEXTILE FABRIC SPECIFICATION TABLE |             |                  |
|--|-------------|------------------|
| PROPERTIES   | TEST METHOD | UNITS            |
| GRAB TENSILE STRENGTH                                      | ASTM D-4632 | 300 LBS          |
| GRAB TENSILE ELONGATION                                    | ASTM D-4632 | 20%              |
| PUNCTURE   | ASTM D-4833 | 120 LBS          |
| MULLEN BURST   | ASTM D-3786 | 800 PSI          |
| TRAPEZOID TEAR   | ASTM D-4533 | 120 LBS          |
| UV RESISTANCE  | ASTM D-4355 | 80%              |
| APPARENT OPENING SIZE                                      | ASTM D-4751 | 40 US SIEVE      |
| FLOW RATE  | ASTM D-4491 | 40 GAL/MIN/SQ FT |
| PERMITTIVITY   | ASTM D-4491 | 0.55 SEC -1      |

| MODERATE TO HIGH FLOW GEOTEXTILE FABRIC SPECIFICATION TABLE |             |                   |
|---|-------------|-------------------|
| PROPERTIES  | TEST METHOD | UNITS             |
| GRAB TENSILE STRENGTH                                       | ASTM D-4632 | 395 LBS           |
| GRAB TENSILE ELONGATION                                     | ASTM D-4632 | 20%               |
| PUNCTURE  | ASTM D-4833 | 135 LBS           |
| MULLEN BURST  | ASTM D-3786 | 430 PSI           |
| TRAPEZOID TEAR  | ASTM D-4533 | 45 LBS            |
| UV RESISTANCE   | ASTM D-4355 | 90%               |
| APPARENT OPENING SIZE                                       | ASTM D-4751 | 20 US SIEVE       |
| FLOW RATE   | ASTM D-4491 | 200 GAL/MIN/SQ FT |
| PERMITTIVITY  | ASTM D-4491 | 1.5 SEC -1        |

- REMOVE TRAPPED SEDIMENT WHEN BRIGHTLY COLORED EXPANSION RESTRAINT CAN NO LONGER BE SEEN.
- GEOTEXTILE SHALL BE A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS REQUIREMENTS IN THE SPECIFICATIONS TABLE.
- PLACE AN OIL ADSORBENT PAD OR PILLOW OVER INLET GRATE WHEN OIL SPILLS ARE A CONCERN.
- INSPECT PER REGULATORY REQUIREMENTS.
- THE WIDTH, "W", OF THE FILTER SACK SHALL MATCH THE INSIDE WIDTH OF THE GRATED INLET BOX.
- THE DEPTH, "D", OF THE FILTER SACK SHALL BE BETWEEN 18 INCHES AND 36 INCHES.
- THE LENGTH, "L", OF THE FILTER SACK SHALL MATCH THE INSIDE LENGTH OF THE GRATED INLET BOX.

DO NOT USE IN PAVED AREAS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.  
TO BE USED IN EXISTING RIGHT OF WAY

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| REVISIONS |          |                      |     |
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| REV       | DATE     | COMMENT              | BY  |
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PROJECT No.: W161041  
DRAWN BY: CEM  
CHECKED BY: WDG/MD  
DATE: 10/14/16  
SCALE: AS NOTED  
CAD I.D.: W161041\_S33 - WATER DET

OFF-SITE WATER LINE PLANS

FOR TOLL BROS., INC.

LOCATION OF SITE  
ORCHARD STREET  
TOWN OF MILLIS  
NORFOLK COUNTY,  
MASSACHUSETTS

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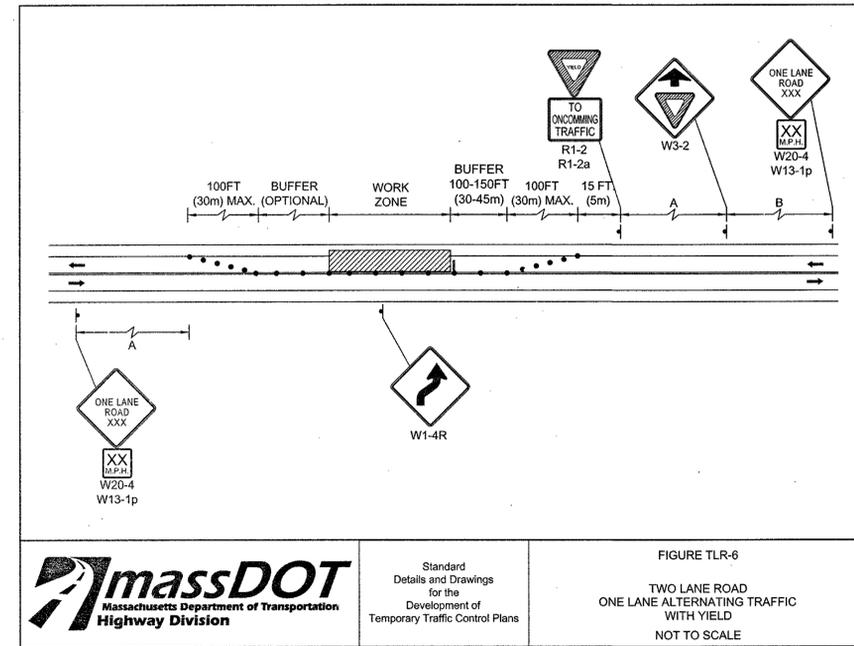
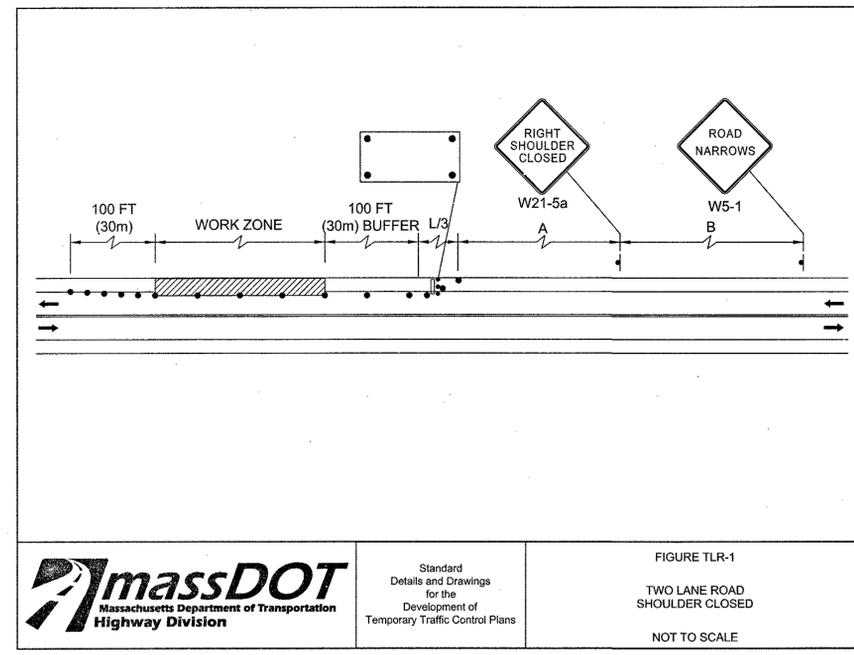
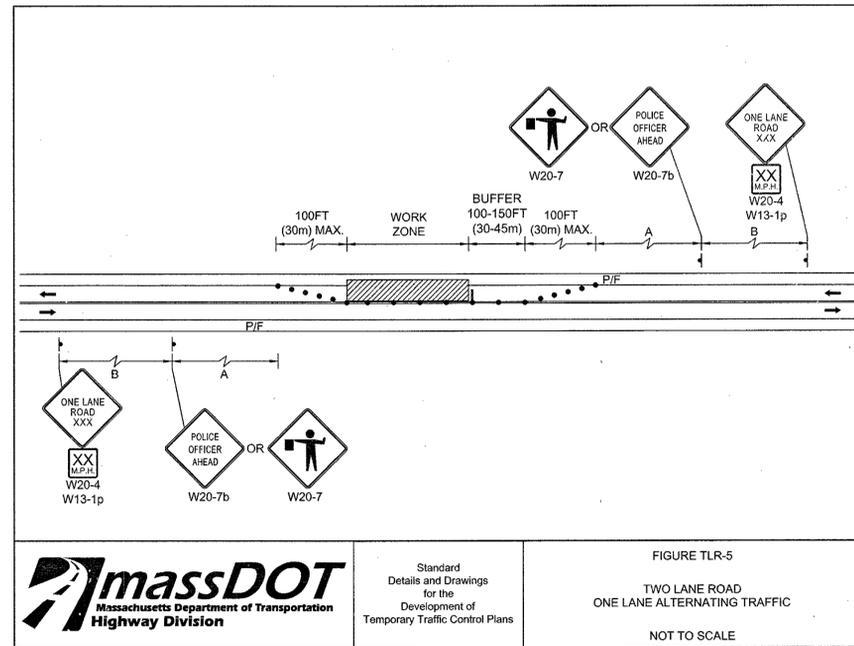
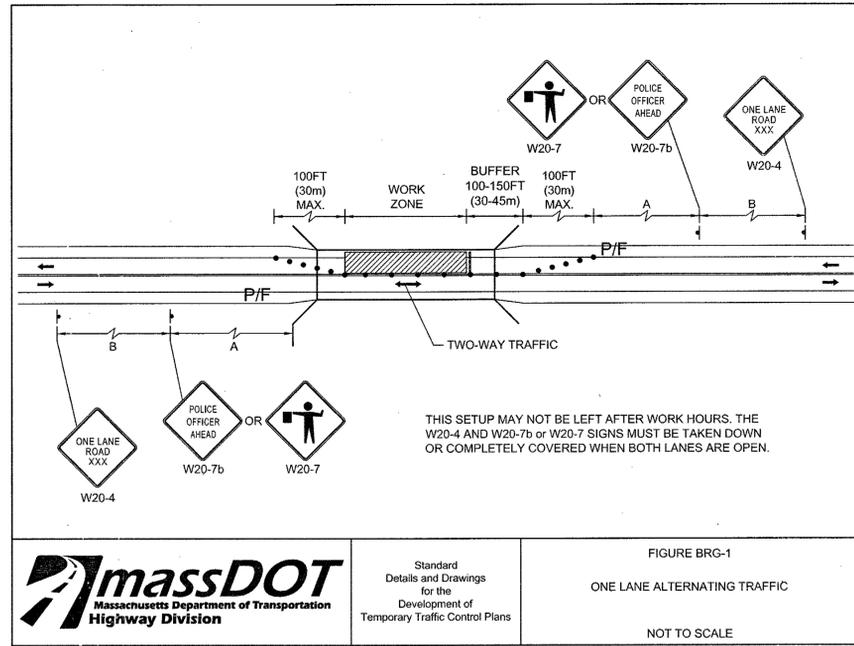
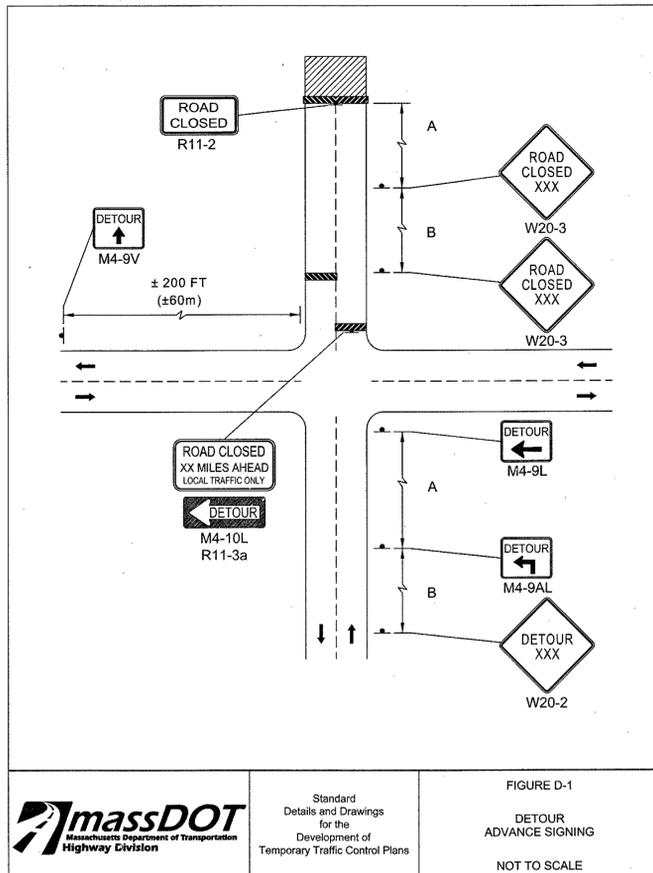
**W.D. GOEBEL**

PROFESSIONAL ENGINEER  
MASSACHUSETTS  
LICENSE NO. 10080  
NEW YORK LICENSE NO. 025264-1  
FLORIDA LICENSE NO. 66320

CONSTRUCTION DETAIL SHEET

SHEET NUMBER: 13 OF 14

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**REVISIONS**

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**PERMIT SET**

PROJECT No.: W161041  
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SCALE: AS NOTED  
CAD I.D.: W161041\_S33 - WATER DET

**OFF-SITE WATER LINE PLANS**

FOR

**TOLL BROS., INC.**

LOCATION OF SITE  
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TOWN OF MILLIS  
NORFOLK COUNTY,  
MASSACHUSETTS

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SHEET TITLE:  
**TYPICAL TRAFFIC CONTROL DETAILS**

SHEET NUMBER:  
**14**  
OF 14

SS 2 - 10/14/2016

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**811**

Know what's below.  
Call before you dig.

TRAFFIC CONTROL MEASURES  
TO BE COORDINATED WITH  
THE TOWN OF MILLIS DPW  
AND EMERGENCY SERVICES