North Fork Farmers Ditch

Slope Stability Project 2015

Funded by the Colorado Water Conservation Board

Water Supply Reserve Account Grant No. POGG112015-266

Final Report – June 3, 2015

Bidding

Competitive bids were obtained from three local contractors. A pre-bid meeting was held at the site on Thursday April 2, 2015. Bids were submitted on Monday April 6th and a contractor was selected on the same day. The selected low bid Contractor was McCollum Excavating located in Hotchkiss, Colorado. The approved bid price was $34,250.

Construction

Construction began on April 9th, 2015 immediately after the notice to proceed was received. Excess material was hauled offsite to a nearby location. The toe of the slope was then exposed for construction of the groundwater drain. During excavation it was discovered that groundwater was present in the lower portion of the slope which made excavation of the toe difficult. The engineer from Applegate Group was on site and determined that due to the unexpected groundwater the drain line was modified to drain to a central point along the alignment rather than draining from one end to the other. This allowed the excavation depth to be reduced on the east end of the drain thereby saving some costs. However, this also required the drain pipe to be installed across a private driveway which increased the overall costs. After this change was made the drain was installed quickly and backfill operations were able to proceed as planned. Testing performed by Lambert and Associates confirmed that the backfill was adequately compacted. The regarded slope was reseeded and reclaimed as shown in the original design. The only other significant change increased the length of ditch pipe from 40 to 60 feet to better accommodate the grading of the ditch bank. Construction was completed on May 12, 2015.

The final cost including changes to account for actual field quantities and design changes made in the field was $36,088.00

As-Built Plans

The As-built plans are attached to this report as well as the compaction test results from Lambert and Associates.

Photo 1 – Drain Install

Photo 2 – Drain Install

Photo 3 Drain Backfill and Compaction

NORTH FORK FARMERS DITCH EXTENSION

SLOPE REHABILITATION
CONSTRUCTION PLANS
DELTA COUNTY, COLORADO
MARCH, 2015

As-Builts
5-12-15

1. GENERAL
   - 1.1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS TO PERFORM THE WORK SHOWN ON THESE PLANS.
   - 1.2. LOCATION OF EXISTING UTILITIES IS SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE. TYPE, SIZE, LOCATION, AND NUMBER OF UTILITIES ARE APPROXIMATE WHEN SHOWN ON THE DRAWINGS. EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
   - 1.3. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL CONTACT ALL UTILITIES TO COORDINATE SCHEDULING. SHOULD ANY CONFLICTS OR CONSTRUCTION RELOCATIONS OR OTHER INTERRUPTIONS IN SERVICE BE REQUIRED THE CONTRACTOR SHALL COORDINATE UTILITY SCHEDULING WITH HIS WORK
   - 1.4. THE OWNER WILL PROVIDE CONSTRUCTION STAKING AND GEOTECHNICAL TESTING FOR THIS WORK.
   - 1.5. ACCESS FOR THE PRIVATE LANDOWNER SHALL NOT BE RESTRICTED WITHOUT PRIOR CONSENT FROM THEM AND PROPER NOTIFICATION.
2. MATERIALS
   - 2.1. DRAIN PIPE SHALL BE DUAL WALL, CORRUGATED OUTSIDE, SMOOTH INSIDE, SLOTTED HDPE PIPE WITH A CARRIFF DRAIN SLEEVE OR EQUAL AROUND THE PIPE.
   - 2.2. DITCH PIPE SHALL BE LOW HEAD DUAL WALL HDPE IN ORDER TO MATCH THE EXISTING PIPE.
3. EXCAVATION AND PLACEMENT
   - 3.1. DURING CONSTRUCTION EXCAVATED SLOPES HIGHER THAN 3 FEET SHALL NOT EXCEED 1H:1V.
   - 3.2. CONSTRUCTION DEBRIS, TREES, BRUSH, AND OTHER MATERIALS SHALL NOT BE PLACED IN THE FILL AND SHALL BE DISPOSED OF PROPERLY.
   - 3.3. EXCESS EXCAVATED MATERIALS SHALL BE HAULED TO A SITE(S) DESIGNATED BY THE OWNER.
   - 3.4. DRAIN SAND SHALL GRADATION SHALL CONFORM TO THAT SPECIFIED BY ASTM C-33 FINE AGGREGATE.
   - 3.5. DRAIN SAND SHALL BE COMPACTED IN 8 INCH LOOSE LIFTS WITH A MINIMUM OF TWO PASSES WITH A VIBRATORY PLATE COMPACTOR.
   - 3.6. SLOPE BACKFILL SHALL BE PLACED IN HORIZONTAL 8 INCH THICK LOOSE LIFTS AND COMPACTED TO 95% STANDARD PROCTOR WITH A MOISTURE CONTENT WITHIN +/- 2% OF OPTIMUM.
   - 3.7. OWNER WILL PROVIDE COMPACTION TESTING.
   - 3.8. COMPACTION TESTING WILL BE PERFORMED ON THE FIRST DAY OF FILL PLACEMENT AND ANY ADDITIONAL DAYS IT IS DEEMED NECESSARY BY THE ENGINEER.
   - 3.9. CONTRACTOR SHALL NOTIFY THE OWNER 48 HOURS IN ADVANCE OF INITIAL FILL PLACEMENT IN ORDER TO SCHEDULE TESTING.
   - 3.10. CONTRACTOR TO MAINTAIN A SAFE DISTANCE FROM STRUCTURES TO AVOID DAMAGE.
4. SEEDING AND RECLAMATION
   - 4.1. THE FINAL GRADE OF ALL SLOPES SHALL BE TRAVELED WITH A TRACKED MACHINE IN A DIRECTION PARALLEL WITH THE SLOPE PRIOR TO SEEDING
   - 4.2. A NATIVE GRASS MIX SHALL BE APPLIED AT A MINIMUM RATE OF 8 LBS OF PURE LIVE SEED PER ACRE.
   - 4.3. EROSION CONTROL MATTING SHALL BE INSTALLED ON SLOPES GREATER THAN A 3H:1V SLOPE AND SHALL BE ANCHORED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS
   - 4.4. EROSION CONTROL MATTING SHALL BE SUITABLE FOR SLOPES UP TO 1.5H:1V.
5. SUBMITTALS
   - 5.1. CONTRACTOR SHALL SUBMIT A SIMPLE WRITTEN WORK PLAN DETAILING THE PROPOSED CONSTRUCTION SEQUENCING OF THE PROJECT.
   - 5.2. CONTRACTOR SHALL SUBMIT THE GRADATION OF THE PROPOSED SAND TO THE ENGINEER FOR APPROVAL.
   - 5.3. CONTRACTOR SHALL SUBMIT A MANUFACTURER'S CUT SHEET FOR THE PROPOSED DRAIN SOCK MATERIAL TO THE ENGINEER FOR APPROVAL.
   - 5.4. CONTRACTOR SHALL SUBMIT THE PROPOSED SEED MIX TO THE ENGINEER FOR APPROVAL.
   - 5.5. CONTRACTOR SHALL SUBMIT A MANUFACTURER'S CUT SHEET FOR THE PROPOSED EROSION CONTROL MATTING TO THE ENGINEER FOR APPROVAL.

VICINITY MAP
SCALE 1" = 2000'

SHEET INDEX

OWNER: NORTH FORK FARMERS DITCH
10605 3500 ROAD
PAONIA, CO 81428
HOTCHKISS, CO 81419

ENGINEER: APPLEGATE GROUP, INC.
1490 W. 121st AVENUE
SUITE 100
DENVER, CO 80234
(303) 452-6611

SURVEYOR: WILMORE SURVEYING
406 GRAND AVENUE
PAONIA, CO 81428

GEOTECH: LAMBERT AND ASSOCIATES
P.O. BOX 45
MONTROSE, CO 81402

COLORADO 811

I hereby certify that these plans for the North Fork Farmers Ditch Extension were prepared by me or under my direct supervision for the owners thereof.

COLORADO REGISTERED 38551 PROFESSIONAL ENGINEER
Colo. PE No. 38551
3/31/15

Applegate Group, Inc.

SLOPE REHABILITATION
COVER SHEET

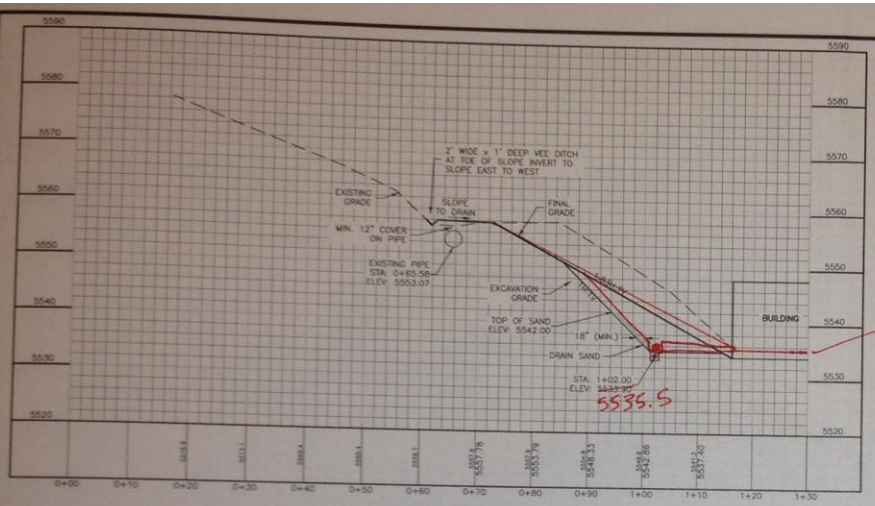
NORTH FORK FARMER DITCH EXTENSION

NO.	DATE	BY	CHK'D	DESCRIPTION

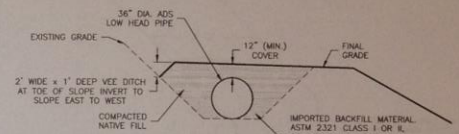
Date: 03/31/15
Job No.: 15-106
Drawn: SE
Design: CMU/TD
Checked:
Scale: As Noted

Sheet 1

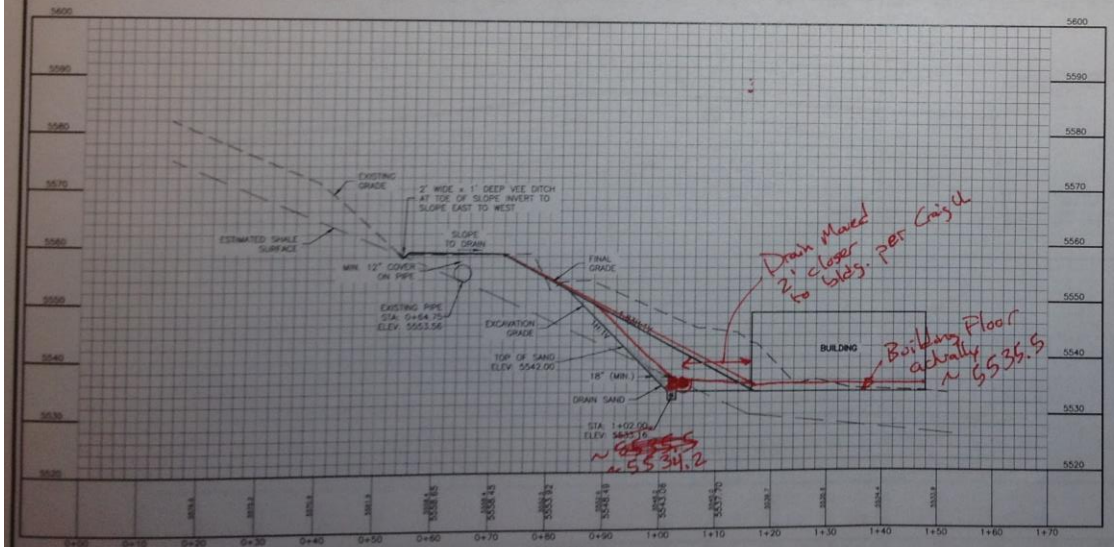
NORTH FORK
FARMER DITCH
EXTENSION
SLOPE REHABILITATION
SLOPE STABILITY SECTION
LOCATIONS
Applegate Group, Inc.
Water Resource Advisors for the West
Sheet 2
REVISIONS
DESCRIPTION
DATE
BY
CHK'D
Date: 03/31/15
Scale: 1" = 10'
Design: DW
Drawn: DW
Checked: DW
Job: 10
Cleaned
Backfilled w/ Roadbase
BOREHOLE #1
BOREHOLE #2
SECTION 1
SECTION 2
SECTION 3
CAMAS PARK (PRIVATE)
UNDER BUILT GARAGE/SHOP
36" CORRUGATED PLASTIC PIPE
11.25° ELBOW
STA = 0+68.83
STA = 1+38.98
5" DIA. SCH 80 DUAL WALL HDPE PIPE
AW-5554.4'
AW-5554.8'
5530
5540
5550
5555



SECTION 1
SCALE 1" = 10'



TYPICAL DITCH PIPE INSTALLATION DETAIL
SCALE 1" = 4'



SECTION 2
SCALE 1" = 10'

from 1' x 10' 1' CONTOUR INTERVAL

10 5 0 10 20 30

SCALE IN FEET

Applegate Group, Inc.
Water Resource Advisors for the West
1490 West 121st Ave., Suite 100
Denver, CO 80234
(303) 252-5611
Fax: (303) 452-2759
email: info@applegategroup.com Website: www.applegategroup.com

SLOPE REHABILITATION

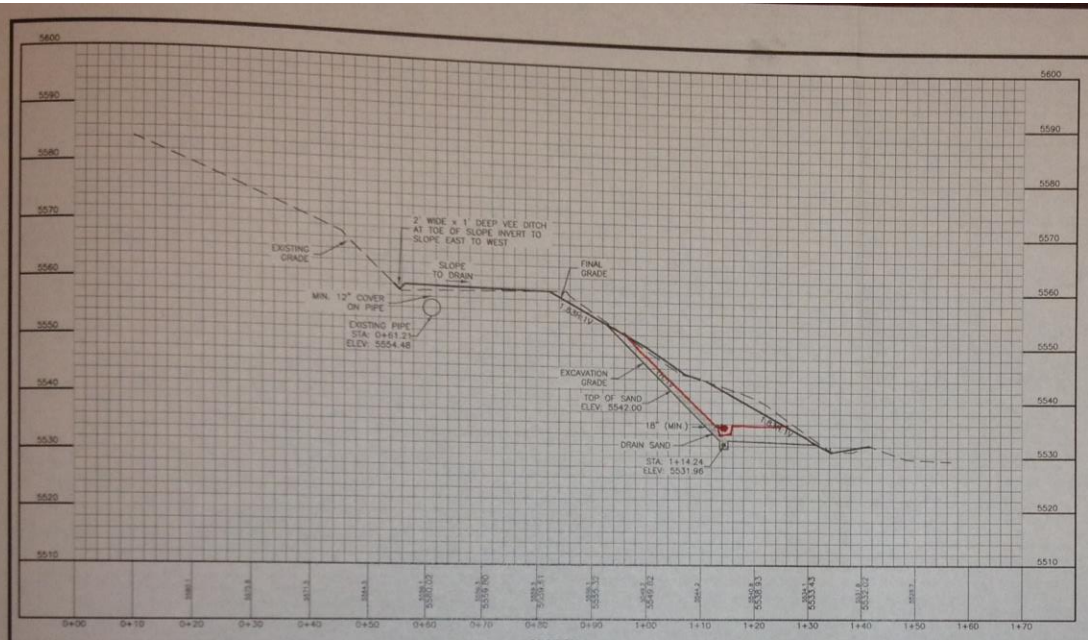
SLOPE STABILITY SECTIONS

NORTH FORK FARMER DITCH EXTENSION

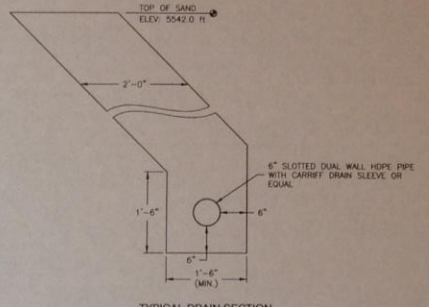
NO	DATE	BY	CHKD	REVISIONS DESCRIPTION

Date: 03/31/10
Job No: 15-105
Drawn: LD
Design: CMU/TD
Checked:
Scale: 1" = 10'

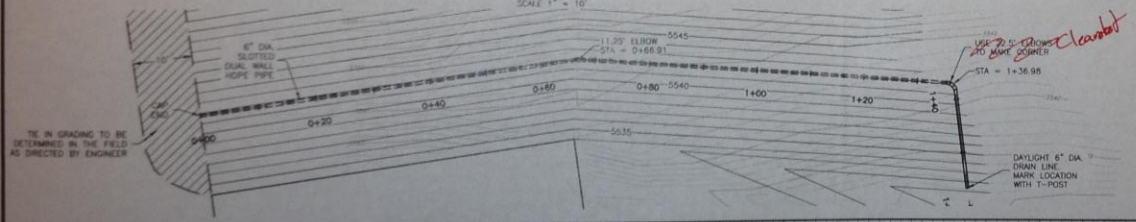
Sheet: 3
OF

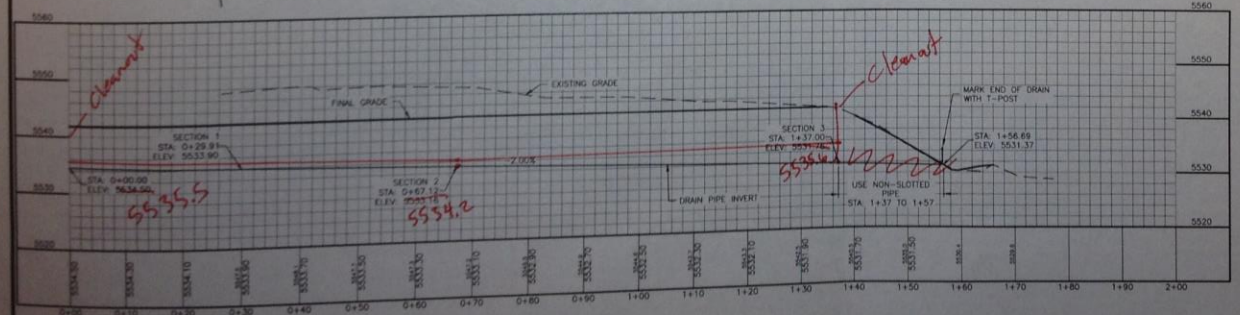


SECTION 3
SCALE 1" = 10'



TYPICAL DRAIN SECTION
SCALE 1" = 4'





6" DIA. DRAIN LINE
SCALE 1" = 10'

Applegate Group, Inc.
Water Resource Advisors for the West
(303) 443-2709

SLOPE REHABILITATION

SLOPE STABILITY SECTIONS

NORTH FORK FARMER DITCH EXTENSION

NO	DATE	BY	CHK'D	DESCRIPTION

REVISIONS

Date: 03/31/15
Job No: 15-105
Owner:
Design: CMD/TD
Checked:
Scale: 1" = 10'

Sheet: 4

Lambert and Associates

CONSULTING GEOTECHNICAL ENGINEERS AND MATERIAL TESTING

DAILY FIELD REPORT - FIELD DENSITY TESTS

Date: *Thursday,,4/23/2015*	Arrive Time: *9:15 AM* Depart Time:
Project Name: *Farmers Ditch*	Weather: *Clear*
Project Number: *M15041MT*	Temp:
Client: *Applegate Group*	Client Representative:
General Contractor:	Supervisor:
Specialty Contractor:	Specialty Superintendent or Foreman: *Steve*
Source of Fill Material: *Existing material on site*	Plans and Specs: Prepared by: Dated:

Contractor's Equipment Used: *Backhoe, excavator, vibratory sheepsfoot compactor*

Lambert and Associates Equipment Used - Manufacturer: *CPN* Serial Number or Unit Number: *18*

Test Results were Verbally Given On-Site to: *Steve*

Expected Conditions Observed: *yes*

Unexpected Conditions Observed: *No*

Unusual Conditions Observed:

If yes, who was contacted?

Follow-up from Prior Visit: Retests Performed:

Concerns for Next Visit: Retests Needed: *No*

Other personnel contacted on-site: name/firm

Notes:

I performed nuclear field density tests as requested by Craig Ullmann of material being placed for fill between the building and the toe of the slope Craig Ullmann showed the technician the area that was prepared and ready for testing. Lambert and Associates technician chose the test locations within the area that was ready for testing. Please refer to the these results sheets for approximate test locations and test results. The test results indicate only the relative compaction and soil moisture content of the material tested at the elevation and location tested at the time of our site visit.

Lambert and Associates Technician: *Hayes*

RELATIVE COMPACTION TEST RESULTS

PROJECT: Farmers Ditch

LOCATION: Paonia, CO

CLIENT: Applegate Group

PROJECT NO: M15041MT

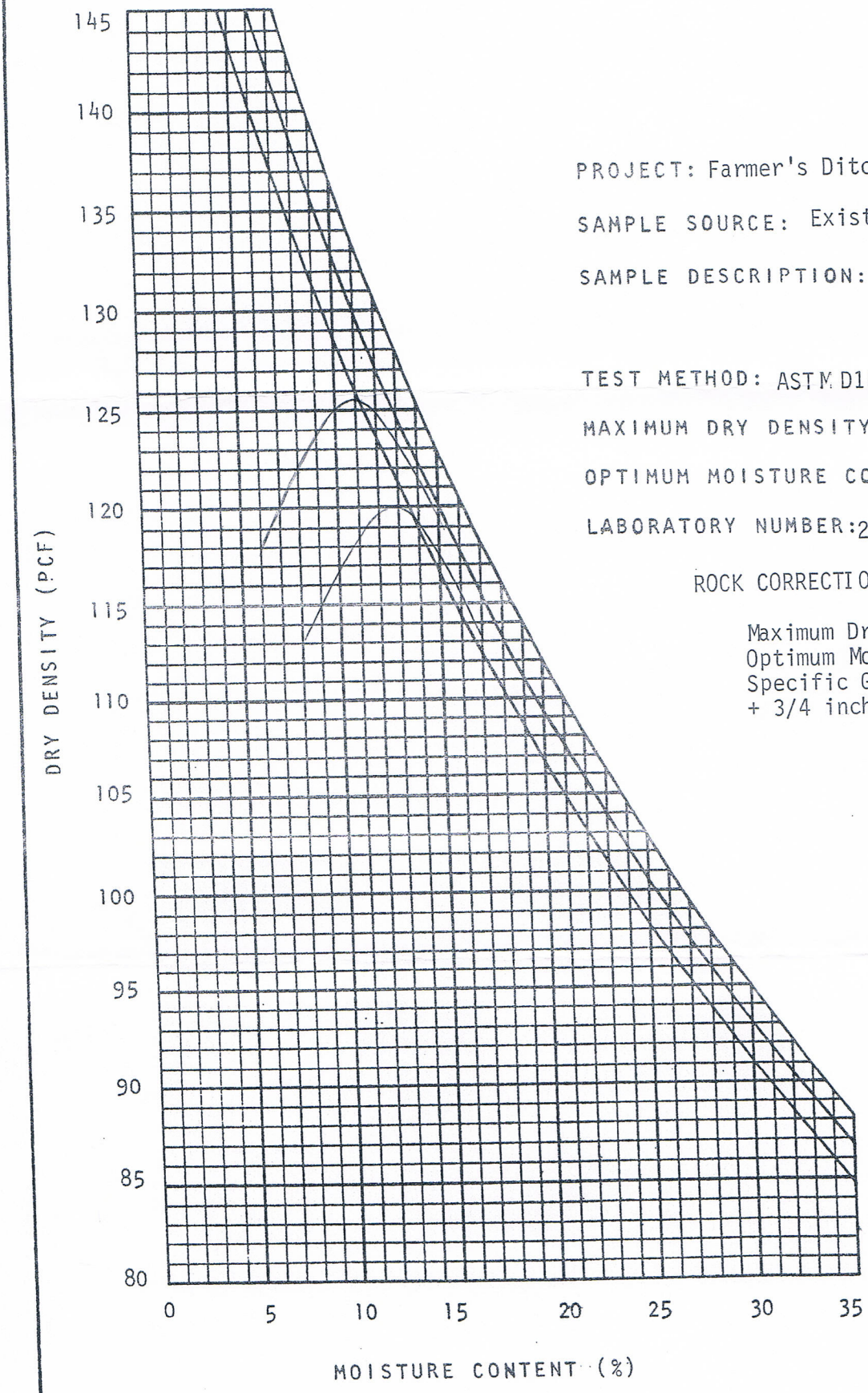
ENGINEERING TECHNICIAN: Hayes

NUCLEAR GAUGE USED: 18

DATE: Thursday, Apr/23/15

	TEST LOCATION	DEPTH OR ELEVATION	PROBE DEPTH (IN)	LABORATORY PROCTOR DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION (%)	SOIL TYPE
	Fill Area								
1	Sta. 0+29.91	At 3' above slab	8	125.5	11.0	125.9	8.2	100	Clay, sand, gravel, brown
2	25ft. east of the building	"	8	125.5	11.0	119.8	9.0	95	" "
3	70 ft. east of the building	"	8	125.5	11.0	132.4	8.0	100	" "

REMARKS: The test results indicate only the density and moisture content for the location and elevation tested only.



PROJECT: Farmer's Ditch

SAMPLE SOURCE: Existing material on site

SAMPLE DESCRIPTION: Clay, sand, gravel, brown

TEST METHOD: ASTM D1557C

MAXIMUM DRY DENSITY: 120.0 pcf

OPTIMUM MOISTURE CONTENT: 13.0%

LABORATORY NUMBER:2905

ROCK CORRECTION:

Maximum Dry Dentisy: 125.5 pcf
Optimum Moisture Content: 11.0%
Specific Gravity: 2.54
+ 3/4 inch = 17.7% of Total Weight

Lambert and Associates

Project No.:	M15041MT
Date:	4/14/15
Figure:	