



# BLAST REPORT

SOUTHWEST ENERGY LLC  
2040 W GARDNER LANE  
TUCSON, ARIZONA 85705-2208  
(520) 696-9495

Date: 5/8/17 Customer: Martin Marietta Materials, Inc Location: Red Canyon  
Shot Fired: 12:57 PM Permit No: 0405136 Pit: Main Pit Level: 7

|                      |                                                                        |                       |                        |
|----------------------|------------------------------------------------------------------------|-----------------------|------------------------|
| Shot Number:         | RCQ 2017 2 SW 3                                                        | Shot Coordinates:     | N38°36'22" W104°56'31" |
| Rock Type:           | Limestone/Granite                                                      | Rock Density:         | 149 lbs/cu ft          |
| Shot Classification: | Production                                                             | Mats Used:            | No                     |
| Sky Conditions:      | Partly Cloudy                                                          | Temperature:          | 70 °F                  |
| Wind Direction:      | N                                                                      | Wind Speed:           | 10 mph                 |
| Hole Diameter:       | 4.5 in                                                                 | Avg Stem Height:      | 10 ft                  |
| Burden-Spacing:      | 13 x 15 ft                                                             | Avg Hole Depth:       | 47 ft                  |
| Holes:               | 67                                                                     | Sub-Drilling:         | 3 ft                   |
| Total Holes:         | 67                                                                     | Shot Tons:            | 42,827                 |
| Total Lbs Explo:     | <del>47,841</del> 17,571                                               | Powder Factor:        | 0.42 lbs/ton           |
| Max Lbs/Delay:       | 340                                                                    | Max Holes/Delay:      | 1                      |
| Stemming Type:       | Crushed Stone                                                          | Shot Duration:        | 629 ms                 |
| Contract Blaster:    | Phil Melick                                                            | License No:           | 1-998-06332            |
| Blast Crew:          | Miller, Weidler, Melick, Castens, Atwood, Norm, Rathbun, Taylor, Smith |                       |                        |
| Note:                | UNITronic Initiation                                                   |                       |                        |
| Safety Meeting:      | Yes                                                                    | Workplace Inspection: | Yes                    |

Monday, May 08, 2017

Contract Blaster:



SOUTHWEST ENERGY LLC  
2040 WEST GARDNER LANE  
TUCSON, ARIZONA 85705-2208  
(520) 696-9495

# DAILY BLAST REPORT

Monday, May 08, 2017

Red Canyon

| PRODUCT DESCRIPTION                     | HOLES | QUANTITY | UNIT  |
|-----------------------------------------|-------|----------|-------|
| Shot # RCQ 2017 2 SW 3 Main Pit 7 Holes | 67    |          |       |
| 502 (Fortis Control)                    |       | 16,730   | Lbs   |
| Amex ANFO 50Lb Bag                      |       | 4        | Ea    |
| i-kon Duplex Harness Wire 400m          |       | 1        | Spool |
| Orica Fortel Plus 4" x 20Lb             |       | 27       | Case  |
| Pentex DP 12 (340)                      |       | 135      | Ea    |
| Unitronic 600 15M 50'                   |       | 67       | Ea    |
| Unitronic 600 20M 65'                   |       | 68       | Ea    |
| Totals for 5/8/17                       | 67    |          |       |
| Total Holes                             |       |          |       |
| 502 (Fortis Control)                    |       | 16,730   | Lbs   |
| Amex ANFO 50Lb Bag                      |       | 4        | Ea    |
| i-kon Duplex Harness Wire 400m          |       | 1        | Spool |
| Orica Fortel Plus 4" x 20Lb             |       | 27       | Case  |
| Pentex DP 12 (340)                      |       | 135      | Ea    |
| Unitronic 600 15M 50'                   |       | 67       | Ea    |
| Unitronic 600 20M 65'                   |       | 68       | Ea    |

# Seismic Analysis

## Velocity Waveform Analysis

Serial Number: 9835  
 Firmware Version: 0C-06.05  
 Event Date: 05/08/2017 12:57:46 (UTC -06:00)  
 Event number: 10  
 Recording Time: 5 s  
 Client: Martin Marietta  
 Operation: Red Canyon Quarry  
 Location: North Hill Side  
 Distance:  
 Operator: Vibra Tech  
 Comment: Pueblo, Colorado  
 Seismic Trigger: 0.02 in/s  
 Sound Trigger: 133 dB

### Additional Info:

j-GEO-16060  
 N38 36 22 W104 56 31

### Summary Data

|             | L     | T     | V     |
|-------------|-------|-------|-------|
| PPV (in/s): | 0.093 | 0.065 | 0.075 |
| FREQ (HZ):  | 17.2  | 13.5  | 15.2  |
| PD (.001"): | 1.18  | 0.6   | 0.71  |
| PPA (g):    | 0.046 | 0.039 | 0.052 |

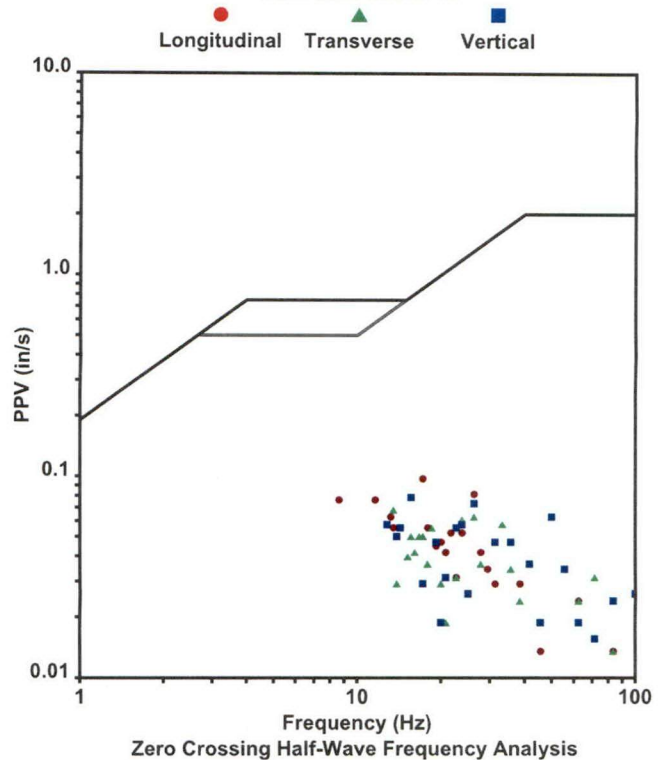
Peak Vector Sum: 0.095 in/s  
 Peak Air Pressure: 117 dB  
 0.0021 psi @ 4.3 HZ

### Shaketable Calibrated

On: 10/21/2016 (UTC -06:00)  
 By: Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40203 U.S.A.

### USBM Safe Blasting Levels

SSN: 9835 Event: 10

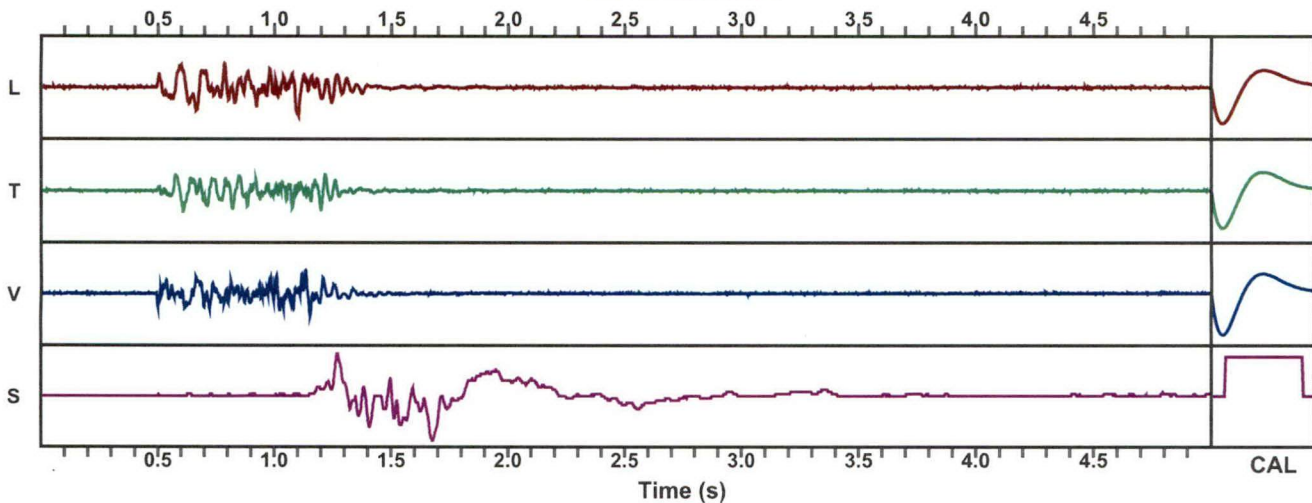


### Waveform Graph Scale

Time Scale: 0.1 s  
 Seismic Scale: +/- 0.16 in/s  
 Sound Scale: +/- 0.0023 psi

### Velocity Waveform

SSN: 9835 Event: 10



# Seismic Analysis

## Velocity Waveform Analysis

Serial Number: 10696  
 Firmware Version: 0C-06.05  
 Event Date: 05/08/2017 12:57:48 (UTC -06:00)  
 Event number: 3  
 Recording Time: 5 s  
 Client: Martin Marietta  
 Operation: Red Canyon Quarry  
 Location: Front Entrance  
 Distance:  
 Operator: Vibra Tech  
 Comment:  
 Seismic Trigger: 0.02 in/s  
 Sound Trigger: 133 dB

### Additional Info:

j-GEO-16222  
 N38 36 04 W104 56 59

### Summary Data

|             | L     | T     | V     |
|-------------|-------|-------|-------|
| PPV (in/s): | 0.023 | 0.018 | 0.01  |
| FREQ (HZ):  | 7.4   | 8.8   | 5.1   |
| PD (.001"): | 0.5   | 0.38  | 0.19  |
| PPA (g):    | 0.013 | 0.013 | 0.013 |

Peak Vector Sum: 0.028 in/s  
 Peak Air Pressure: 118 dB  
 0.0022 psi @ 7.7 HZ

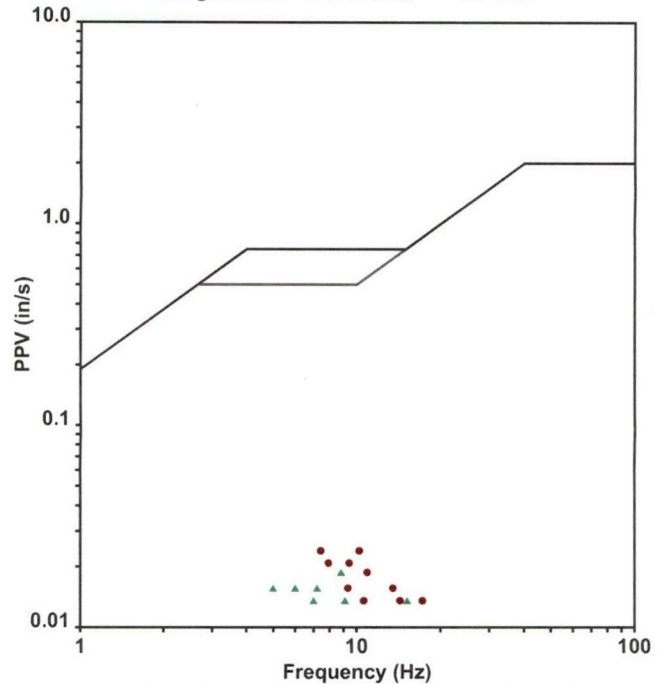
### Shaketable Calibrated

On: 04/13/2017 (UTC -06:00)  
 By: Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40203 U.S.A.

### USBM Safe Blasting Levels

SSN: 10696 Event: 3

● Longitudinal    ▲ Transverse    ■ Vertical

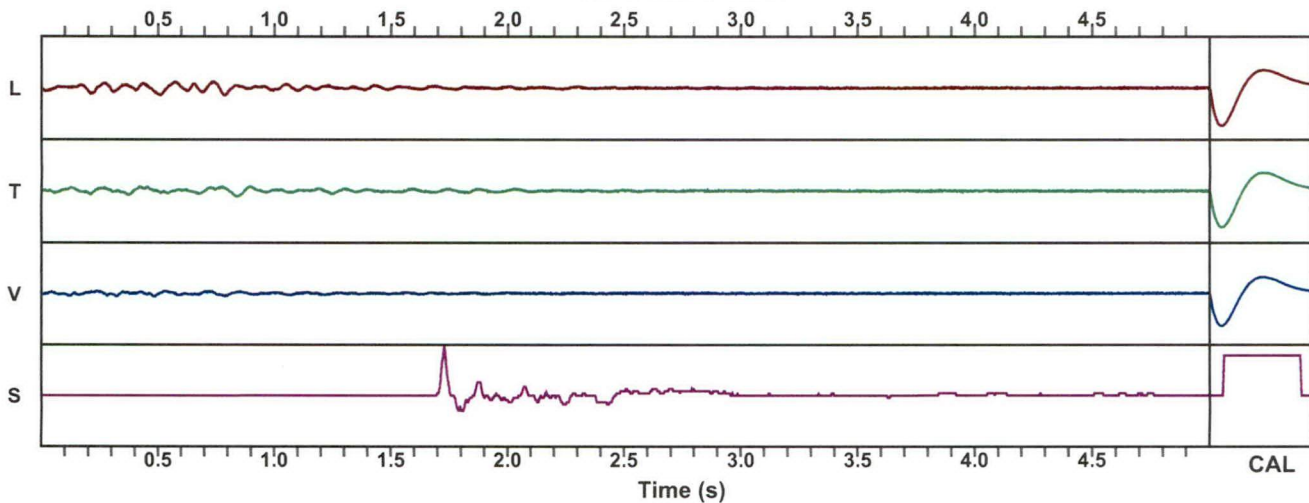


### Waveform Graph Scale

Time Scale: 0.1 s  
 Seismic Scale: +/- 0.16 in/s  
 Sound Scale: +/- 0.0023 psi

### Velocity Waveform

SSN: 10696 Event: 3



# Blasting Job Task Safety Checklist and JSA

Page 1 of 3

Date: MAY 8, 2017 Time: \_\_\_\_\_ Shot #: # 2-17 SWE #3

Plant Supervision: WAYNE STOUTEN

Blasting Company Supervision: PHIL MELICK

Description of Job Task: RCC SHOT #2 LEVEL 7

BLASTING (SWE #3)

Job Task Started: 7:00 AM Job Task Completed: \_\_\_\_\_

Why are you/we working safe? SO EVERYONE CAN GO HOME SAFE

1. Is there any SOP or JSA for this job task and has it been reviewed with all Employees associated with this task?

Yes

☒

No

☐

If not, why:

2. Are all employees properly task trained on the MM Blasting Rules and Regulations, (Orange Book)?

Yes

☐

No

☒

If not, why:

NEW HIRE PERSONEL

3. Are all employees properly task trained to do this job?

Yes

☒

No

☐

If not, why:

4. Do all employees have the proper PPE?

Yes

☒

No

☐

If not, why:

5. Do all employees have the proper tools for this job?

Yes

☒

No

☐

If not, why:

6. Have the potential safety hazards been identified and discussed?

Yes

☒

No

☐

If not, why:

## Blasting Job Task Safety Checklist and JSA

Page 2 of 3

7. Was the Job completed successfully?

Yes

☒

No

☐

If not, why:

8. Was the job task completed without any employee Injuries?

Yes

☒

No

☐

If not, why:

9. Were all the tools, blasting rubbish and excess explosives picked up and/or properly disposed of?

Yes

☒

No

☐

If not, why:

### Task Steps

- 1 Sign in/out at the office/scale house and with MM Leadsman Blaster's Diary.
- 2 Post Blasting Signs.
- 3 Correct stemming to be on blast site.
- 4 Perform tail gate meeting, review shot plan and Blasting Protocol for the site.
- 5 Head Blaster is to insure everyone has proper PPE.
- 6 Head Blaster is to insure everyone is following Blasting Protocol during all blasting procedures, reference "MM Orange Book".
- 7 Head Blaster to insure post shot House Keeping is done.
- 8 Head Blaster and Company Representative to have Post Shot Meeting.
- 9 All Blasting agent to be weighed in and out at the scales and recorded.
- 10 LOAD HOLES TO PROPER STEM HEIGHT
- 11 TIE IN AND FIRE THE SHOT
- 12 \_\_\_\_\_

### Identifying Hazards

- 1 Identify all slips, trips, and fall potential and eliminate.
- 2 Identify lack of explosives material housekeeping and correct as needed.
- 3 Identify chemicals used and insure SDS are available for use.
- 4 Identify and insure steps are followed to eliminate Fly Rock and Misfires.
- 5 Identify and correct lack of communication issues.
- 6 Eliminate all horse play.
- 7 THREE OPEN FACES
- 8 BE AWARE OF SURROUNDINGS
- 9 \_\_\_\_\_
- 10 \_\_\_\_\_
- 11 \_\_\_\_\_
- 12 \_\_\_\_\_

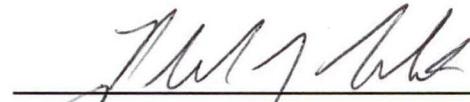
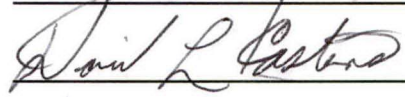
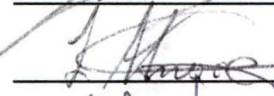
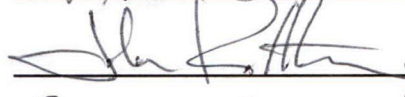
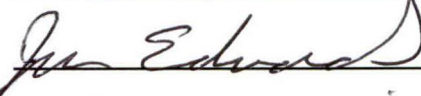
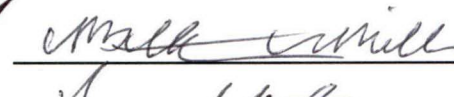
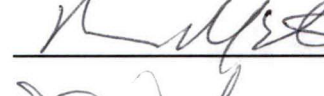
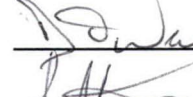
# Blasting Job Task Safety Checklist and JSA

Page 3 of 3

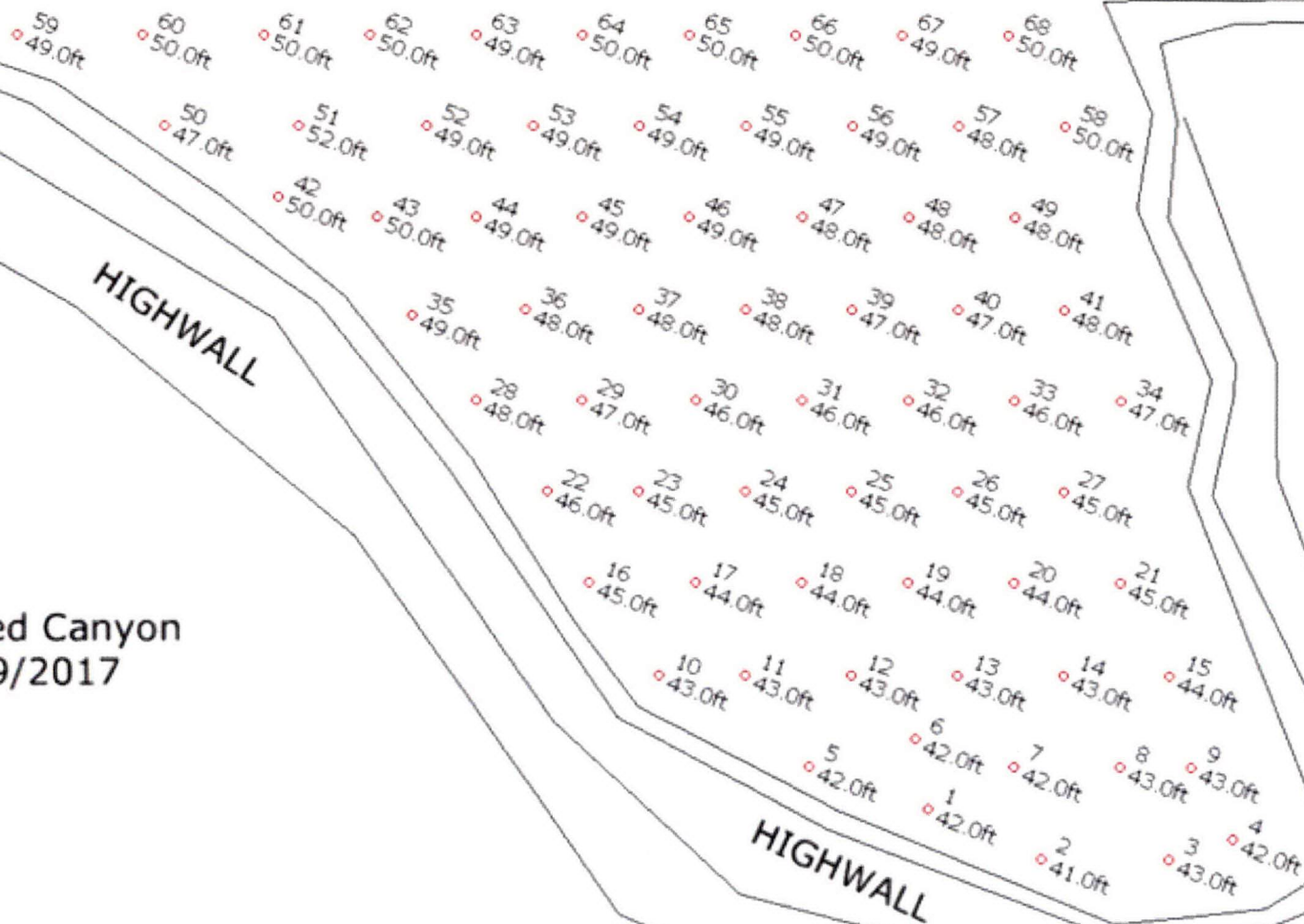
Hazard  
Control and  
Communicate

- 1 Proper use of communication devices.
- 2 Proper use of All PPE.
- 3 Proper use of Signage.
- 4 Proper House Keeping
- 5 Proper use of MM Orange Book.
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_
- 8 \_\_\_\_\_
- 9 \_\_\_\_\_
- 10 \_\_\_\_\_
- 11 \_\_\_\_\_
- 12 \_\_\_\_\_

Signatures:

|                                                                                     |                |
|-------------------------------------------------------------------------------------|----------------|
|    | PHIL MELICK    |
|   | DAVE CASTONS   |
|   | BOBBY SMITH    |
|  | TRAVIS TAYLOR  |
|  | JOHN RATHBUN   |
|  | JOHN EDWARDS   |
|  | MATT MILLER    |
|  | NORM MCKITRICK |
|  | DUSTY WIDELER  |
|  | LINCOLN ATWOOD |
| _____                                                                               | _____          |

HARD



RAMP

HIGHWALL

HIGHWALL

Martin Marietta - Red Canyon  
Level 7 - 04/19/2017

HARD

HIGHWALL

RAMP

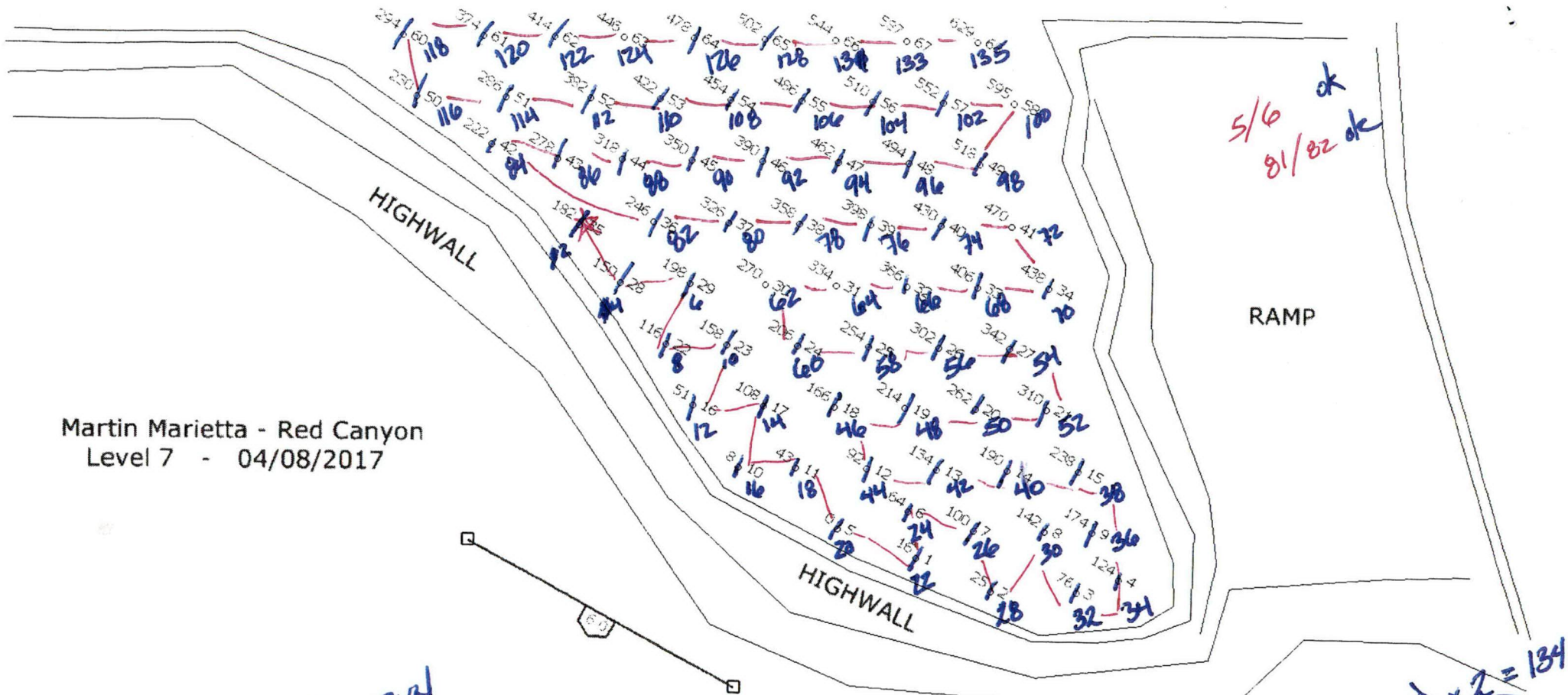
Martin Marietta - Red Canyon  
Level 7 - 04/08/2017

Logging: RATHBURN  
MELICK

HIGHWALL

TOTAL DETS:  $(68 \text{ HOLES} - 1 \text{ HOLE}) \times 2 = 134$   
 ERRORS: 0  
 LEAKAGE: 2.5 mA  
 135

5/6 dk  
81/82 dk



| ID | Length (ft)      | Stem (ft)        | Actual Stem (ft) | Load (lbs) | Actual Load (lbs) |
|----|------------------|------------------|------------------|------------|-------------------|
| 1  | 42               | 21               | 21               | 174        | 165               |
| 2  | 42               | 26               | 25               | 132        | 151               |
| 3  | 47               | 28               | 26               | 157        | 148               |
| 4  | 43               | 20               | 21               | 190        | 125               |
| 5  | 43               | 16               | 15               | 223        | 206               |
| 6  | 44               | 9                | 9                | 290        | 242               |
| 7  | 44               | 9                | 10               | 290        | 239               |
| 8  | 44               | 9                | 8*               | 290        | 297               |
| 9  | 45               | 15               | 16               | 248        | 230               |
| 10 | 45               | 23               | 21               | 182        | 152               |
| 11 | 44               | 9                | 9                | 290        | 289               |
| 12 | 44               | 9                | 8                | 290        | 304               |
| 13 | 45               | 9                | 9                | 298        | 295               |
| 14 | 45               | 9                | 10               | 298        | 292               |
| 15 | 45               | 15               | 14               | 248        | 195               |
| 16 | 45               | 20               | 21               | 207        | 200               |
| 17 | 45               | 9                | 16               | 298        | 265               |
| 18 | 40               | 9                | 9                | 256        | 238               |
| 19 | 45               | 9                | 9                | 298        | 305               |
| 20 | 46               | 9                | 9                | 306        | 307               |
| 21 | 48               | 15               | 15               | 273        | 263               |
| 22 | 45               | 24               | 24               | 174        | 175               |
| 23 | 47               | 9                | 9                | 314        | 164 + 120         |
| 24 | 46               | 9                | 10               | 306        | 282               |
| 25 | 46               | 9                | 9                | 306        | 318               |
| 26 | 47               | 9                | 7*               | 314        | 290               |
| 27 | 47               | 11               | 11               | 298        | 300               |
| 28 | 50               | 29               | 29               | 174        | 155               |
| 29 | 47               | 9                | 10               | 314        | 85 + 122          |
| 30 | 46               | 9                | 9                | 306        | 268               |
| 31 | <del>46</del> 35 | 9                | 9                | 83         | 81 + 102          |
| 32 | 47               | 9                | 9                | 314        | 189               |
| 33 | 46               | 9                | 10               | 306        | 253               |
| 34 | 47               | 15               | 15               | 265        | 194               |
| 35 | 48               | 32               | 32               | 132        | 85                |
| 36 | 50               | 9                | 9                | 339        | 221               |
| 37 | 49               | 9                | 10               | 331        | 293               |
| 38 | 47               | 9                | 9                | 314        | 222               |
| 39 | 49               | 9                | 7*               | 331        | 320               |
| 40 | 47               | 9                | 9                | 314        | 311               |
| 41 | 49               | 15               | 15               | 281        | 148               |
| 42 | 43               | 30               | 30               | 108        | 102               |
| 43 | 50               | <del>30</del> 12 | 13               | 339        | 280               |
| 44 | 50               | 9                | 9                | 339        | 107 + 67 + 160    |
| 45 | 44               | 9                | 9                | 290        | 251               |
| 46 | 48               | 9                | 12               | 323        | 327               |

\* ok

\* ok

\* ok

\*

\* ok  
\* ok

| ID | Length (ft) | Stem (ft) | Actual Stem (ft) | Load (lbs) | Actual Load (lbs)  |
|----|-------------|-----------|------------------|------------|--------------------|
| 47 | 50          | 9         | 9                | 339        | 318                |
| 48 | 49          | 9         | 9                | 331        | <del>299</del> 299 |
| 49 | 50          | 11        | 10               | 323        | 339                |
| 50 | 45          | 23        | 23               | 182        | 180                |
| 51 | 47          | 9         | 11               | 314        | 315                |
| 52 | 48          | 9         | 9                | 323        | 240                |
| 53 | 28          | 9         | 8' Plus          | 157        | —                  |
| 54 | 49          | 9         | 8                | 331        | 332                |
| 55 | 50          | 9         | 9                | 339        | 280                |
| 56 | 47          | 9         | 9                | 314        | 180                |
| 57 | 50          | 9         | 10               | 339        | 340                |
| 58 | 50          | 15        | 14               | 290        | 327                |
| 60 | 44          | 11        | 11               | 273        | 270                |
| 61 | 48          | 11        | <del>10</del> 13 | 306        | 300                |
| 62 | 49          | 11        | 11               | 314        | 313                |
| 63 | 51          | 11        | 11               | 331        | 280                |
| 64 | 49          | 11        | <del>10</del> 11 | 314        | 219 + 86           |
| 65 | 44          | 11        | 11               | 273        | 253                |
| 66 | 51          | 11        | 10               | 331        | 183                |
| 67 | 50          | 11        | 10               | 323        | 302                |
| 68 | 50          | 11        | 10               | 323        | 312                |

Total +10%:

20,378

lb.

Additional Notes:

USED 250 lbs/min → Too Fast

200 lbs/min → works well w/ 1" Hose.

\* AUTO 4x  
CWB 2x

\* EAPY  
CWB

\* ok

| Hole ID | Comment            | Penetration Rate (ft/s) |     |    |         |     |    |         |     |    |         |     |    |
|---------|--------------------|-------------------------|-----|----|---------|-----|----|---------|-----|----|---------|-----|----|
|         |                    | Steel 1                 |     |    | Steel 2 |     |    | Steel 3 |     |    | Steel 4 |     |    |
|         |                    | 3-4                     | 5-7 | 8+ | 3-4     | 5-7 | 8+ | 3-4     | 5-7 | 8+ | 3-4     | 5-7 | 8+ |
| #1      | 2' off FROM DRILL  |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #2      | 2' off FROM DRILL  |                         | X   |    |         | X   |    | X       |     |    | 2-3     |     |    |
| #3      | 2' off FROM DRILL  |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #4      | 2.5 off FROM DRILL |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #5      | 4' FT              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #6      | 1' FT              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #7      | 6" IN              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #8      | 1' FT              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #9      | 2' FT              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #10     | 6" IN              | X                       |     |    | X       |     |    | X       |     |    | X       |     |    |
| #11     | 1' FT              | X                       |     |    | X       |     |    | X       |     |    | X       |     |    |
| #12     | 4" IN              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #13     | 5" IN              |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #14     | 1 FT               |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #15     | 0.0 UN MONET       |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #16     | 0.0 ON TAE MONET   |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #17     | CHANGED TO DRILL   |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #18     | 2.5' off           |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #19     | 0.0                | X                       |     |    |         | X   |    | X       |     |    | X       |     |    |
| #20     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #21     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #22     | 3' off             |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #23     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #24     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #25     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #26     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #27     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #28     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #29     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #30     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #31     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #32     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #33     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #34     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #35     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #36     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #37     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #38     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #39     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #40     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #41     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #42     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #43     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #44     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #45     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #46     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #47     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #48     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #49     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #50     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #51     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #52     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #53     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #54     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #55     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #56     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #57     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #58     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #59     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #60     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #61     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #62     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #63     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #64     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #65     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #66     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #67     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #68     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #69     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #70     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #71     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #72     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #73     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #74     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #75     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #76     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #77     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #78     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #79     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #80     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #81     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #82     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #83     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #84     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #85     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #86     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #87     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #88     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #89     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #90     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #91     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #92     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #93     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #94     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #95     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #96     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #97     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #98     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #99     | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |
| #100    | 0.0                |                         | X   |    |         | X   |    | X       |     |    | X       |     |    |

43.35'  
 44.38'  
 44.78'  
 44.99'  
 45.48'  
 46.18'  
 46.34'  
 47.11'  
 46.48'  
 47.29'  
 45.35'  
 46.31'  
 46.48'  
 48.11'  
 48.15'  
 48.29'  
 49.35'  
 49.16'  
 49.75'  
 50.81'  
 51.85'  
 50.17'  
 50.16'  
 50.11'  
 50.46'  
 50.98'  
 47.84'  
 49.38'  
 50.31'  
 51.08'  
 51.85'  
 49.37'  
 50.27'  
 50.70'  
 50.93'  
 44.72'  
 45.94'  
 44.95'  
 43.67'  
 44.70'  
 45.43'  
 46.04'  
 46.37'  
 45.30'  
 46.31'  
 47.59'  
 45.52'

Steel 15

3704  
 3705  
 3706  
 3707  
 3708  
 3709  
 3710  
 3711  
 3712  
 3713  
 3714  
 3715  
 3716  
 3717  
 3718  
 3719  
 3720  
 3721  
 3722  
 3723  
 3724  
 3725  
 3726  
 3727  
 3728  
 3729  
 3730  
 3731  
 3732  
 3733  
 3734  
 3735  
 3736  
 3737  
 3738  
 3739  
 3740  
 3741  
 3742  
 3743  
 3744  
 3745  
 3746  
 3747  
 3748  
 3749  
 3750  
 3751  
 3752  
 3753  
 3754  
 3755  
 3756  
 3757  
 3758  
 3759  
 3760  
 3761  
 3762  
 3763  
 3764  
 3765  
 3766  
 3767  
 3768  
 3769  
 3770  
 3771  
 3772  
 3773  
 3774  
 3775  
 3776  
 3777  
 3778  
 3779  
 3780  
 3781  
 3782  
 3783  
 3784  
 3785  
 3786  
 3787  
 3788  
 3789  
 3790  
 3791  
 3792  
 3793  
 3794  
 3795  
 3796  
 3797  
 3798  
 3799  
 3800

Steel 15

| Hole ID    | Comment   | Penetration Rate (ft/s) |     |    |         |           |    |         |     |    |         |     |    |
|------------|-----------|-------------------------|-----|----|---------|-----------|----|---------|-----|----|---------|-----|----|
|            |           | Steel 1                 |     |    | Steel 2 |           |    | Steel 3 |     |    | Steel 4 |     |    |
|            |           | 3-4                     | 5-7 | 8+ | 3-4     | 5-7       | 8+ | 3-4     | 5-7 | 8+ | 3-4     | 5-7 | 8+ |
| 47.69' #29 |           |                         | X   |    |         | X         |    |         | 3-6 |    | 2-4     |     |    |
| 49.13' #37 |           |                         | 3-7 |    | 2-5     |           |    | 2-4     |     |    | 2-5     |     |    |
| 49.86' #28 | 2' off    | 3-5                     |     |    | 3-5     |           |    | 2-5     |     |    | 2-5     |     |    |
| 50.24' #36 | 6" off    |                         | X   |    | 2-4     |           |    | 2-4     |     |    | 2-5     |     |    |
| 50.52' #45 |           |                         | 3-7 |    | 2-5     | Water No. |    | 2-5     |     |    | 2-5     |     |    |
| 49.95' #35 | 3' off    | 2-5                     |     |    | 2-5     |           |    | 2-7     |     |    | 2-5     |     |    |
| 50.45' #44 | 0.0       |                         |     | X  |         | 3-6       |    | 2-6     |     |    | 2-5     |     |    |
| 50.37' #53 |           | 2-6                     |     |    | 2-4     |           |    | 2-4     |     |    | 2-4     |     |    |
| 49.76' #43 |           | 2-10                    |     |    | 2-4     |           |    | 2-4     |     |    | 2-4     |     |    |
| 50.79' #52 | 0.0       |                         | X   |    | 2-4     |           |    | 2-4     |     |    | 2-4     |     |    |
| 50.58' #63 |           |                         |     | X  | 2-5     |           |    | 2-5     |     |    | 2-7     |     |    |
| 47.47' #42 |           |                         | X   |    |         | X         |    |         | 3-6 |    | 2-5     |     |    |
| 47.40' #50 | 2' Ft off |                         | X   |    |         | X         |    |         | X   |    |         | X   |    |
| 48.44' #51 |           |                         | 4-7 |    | 3-5     |           |    |         | 2-6 |    |         |     |    |
| 49.91' #62 |           | 2-5                     |     |    | 2-5     |           |    |         | 2-6 |    |         |     |    |
| 47.48' #60 |           |                         | X   |    |         | X         |    |         | 3-7 |    |         | X   |    |
| 48.89' #61 |           | 2-5                     |     |    | 2-5     |           |    | 2-4     |     |    | 2-4     |     |    |
| 47.22' #59 | 4' off    | V                       | X   |    |         | X         |    | 2-7     |     |    | 2-7     |     |    |

Steel 5

2-4  
2-5  
2-5  
2-5  
2-5  
2-5  
2-5  
2-5  
2-4  
2-4