



BLAST REPORT

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

Date: 10/18/16 Customer: Martin Marietta Materials, Inc Location: Martin Marietta - Red Can
Shot Fired: 2:28 AM Permit No: 0405136 Pit: Main Pit Level: 6

Shot Number:	9-1	Shot Coordinates:	N 38°36'23.59" W 104°56'
Rock Type:	Limestone/Granite	Rock Density:	149 lbs/cu ft
Shot Classification:	Production	Mats Used:	No
Sky Conditions:	Clear	Temperature:	60 °F
Wind Direction:	N	Wind Speed:	10 mph
Hole Diameter:	4.5 in	Avg Stem Height:	9 ft
Burden-Spacing:	13 x 15 ft	Avg Hole Depth:	45 ft
Holes:	22	Sub-Drilling:	3 ft
Burden-Spacing:	19 x 15 ft	Avg Hole Depth:	45 ft
Holes:	17	Sub-Drilling:	3 ft
Total Holes:	39	Shot Tons:	28,583
Total Lbs Explo:	10,138	Powder Factor:	0.35 lbs/ton
Max Lbs/Delay:	313	Max Holes/Delay:	1
Stemming Type:	Crushed Stone	Shot Duration:	372 ms
Contract Blaster:	Jim Santhuff	License No:	1-998-09915
Blast Crew:	Blakley, Melick, Santhuff		
Note:	UNITronic 600 Initiation, Fortis Control emulsion		
Safety Meeting:	Yes	Workplace Inspection:	Yes

Friday, October 21, 2016

Contract Blaster: _____



Martin Marietta Materials
-Red Canyon-
Level 6 – SWE Shot 1

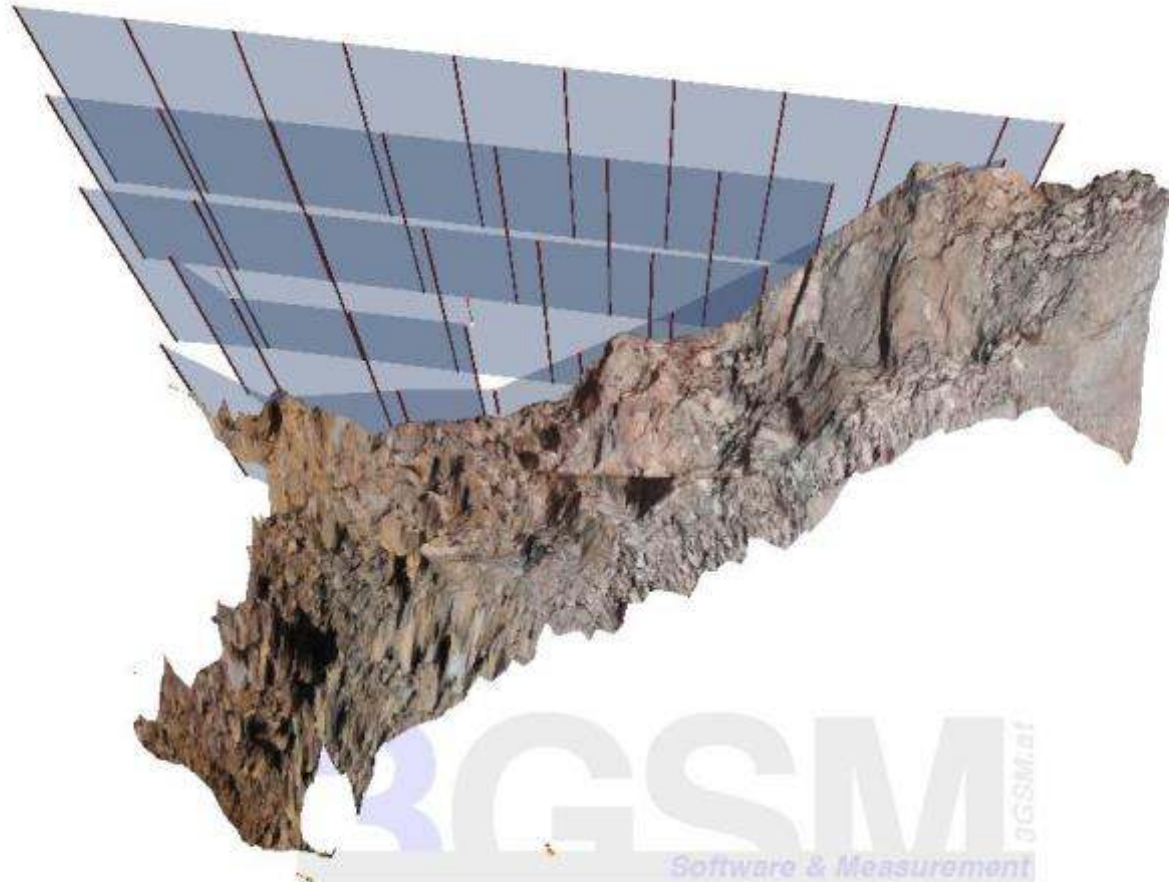


3D Profile of Face





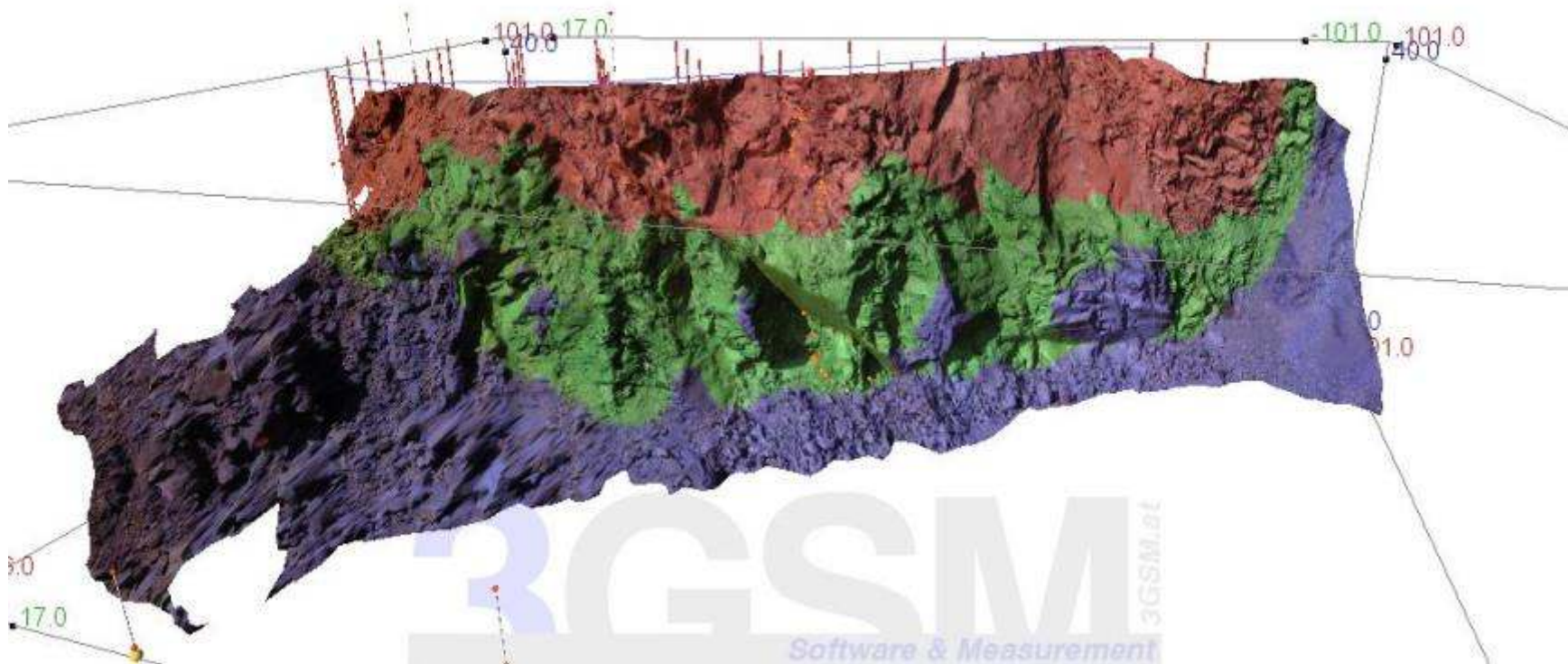
3D Profile of Face





ShapeMetrix - Minimum Burden

ShapeMetrix allows the user to specify a Minimum Burden, as well as allowable limits. The program then color coordinates areas using the given restraints.

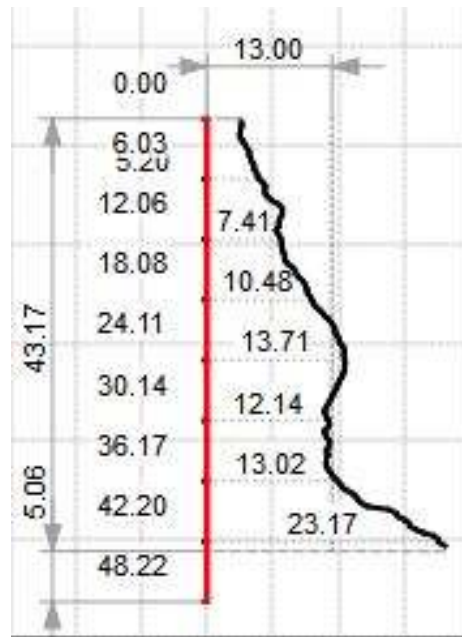
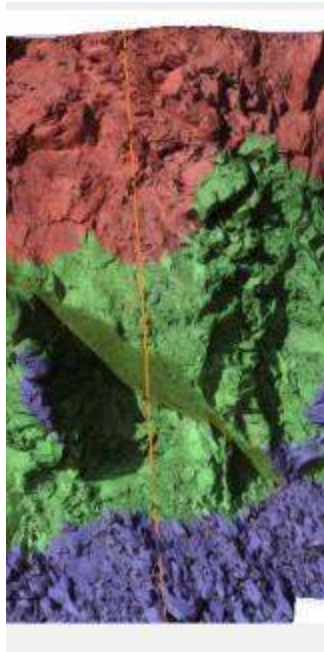


In this case, the Minimum Burden was specified to be 13' with an allowable limit of 2'. Therefore, the colors on the rendering are as follows:

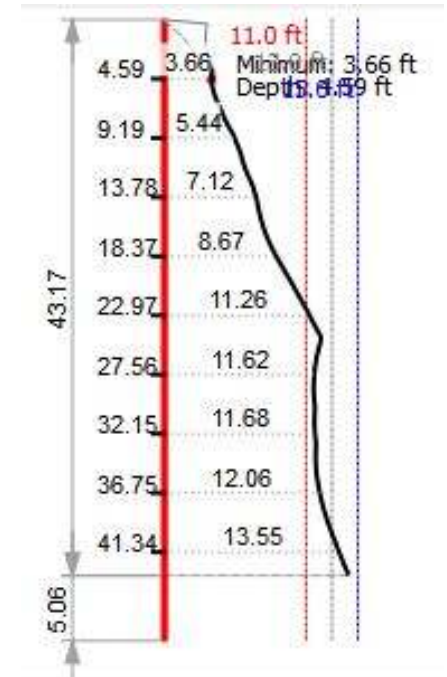
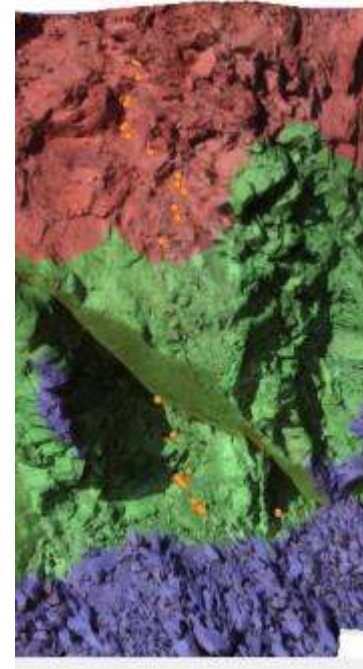
Blue Areas > 15', 15' > Green Areas > 11', Red Areas < 11'



Profile vs Minimum Burden



Profile



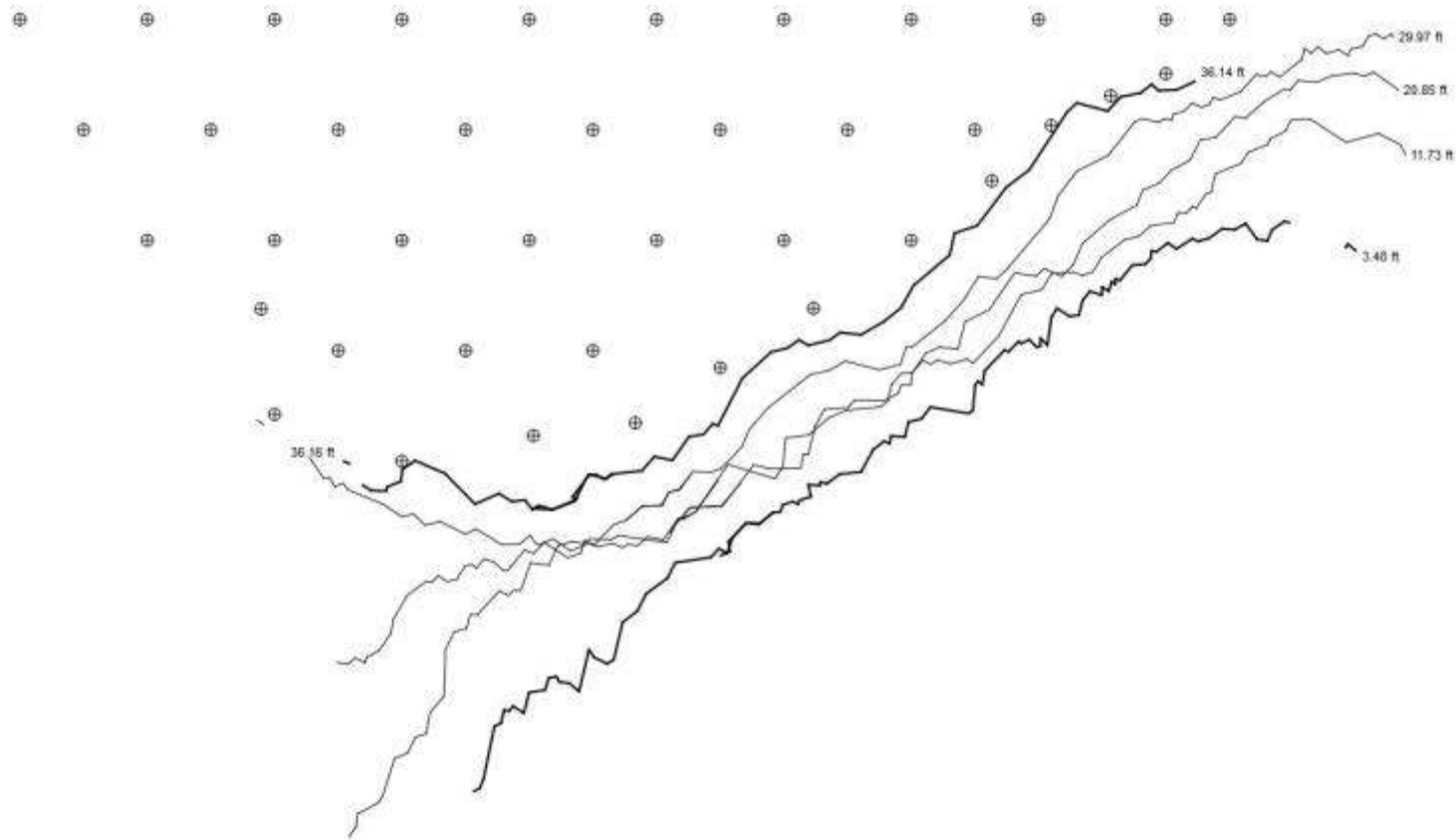
Minimum Burden

Although the Profile and Minimum Burden above look quite different, they are in-fact the same hole. Due to the ability of the Minimum Burden to view all space radially from the selected borehole as opposed to only perpendicular, this is the method in which patterns are designed.



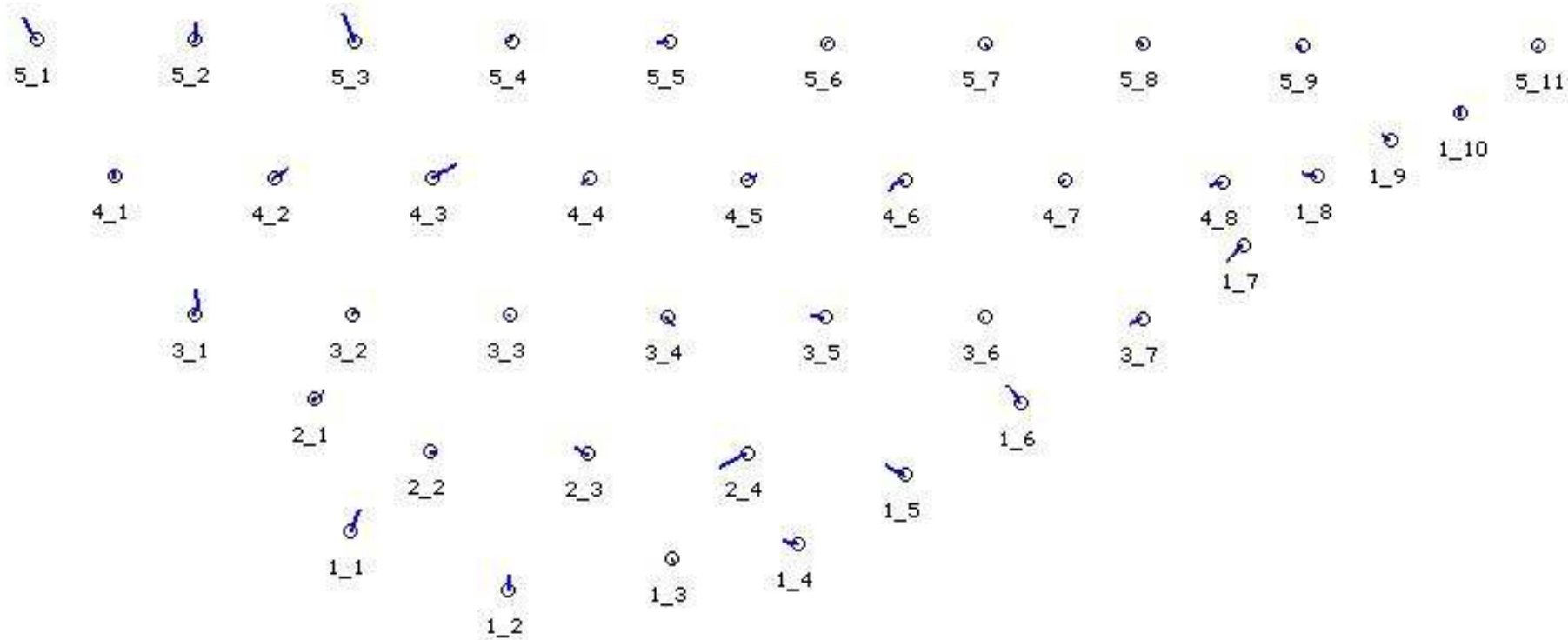
Plan View

Using the method of Minimum Burden, the following pattern was created.



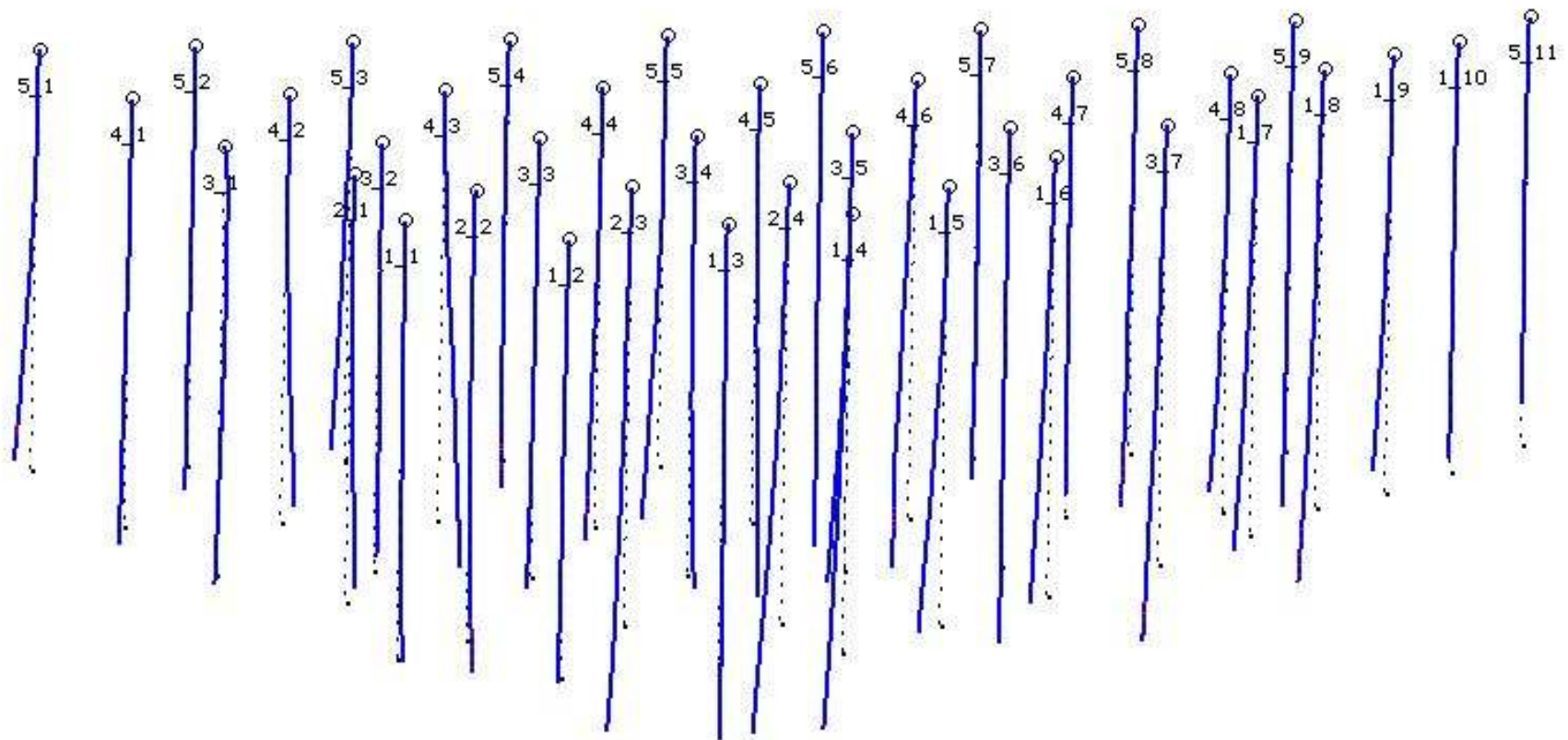


BoreTrak 3D - ShotPlus



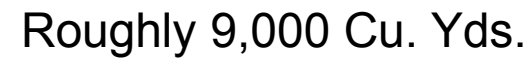


BoreTrak 3D - ShotPlus



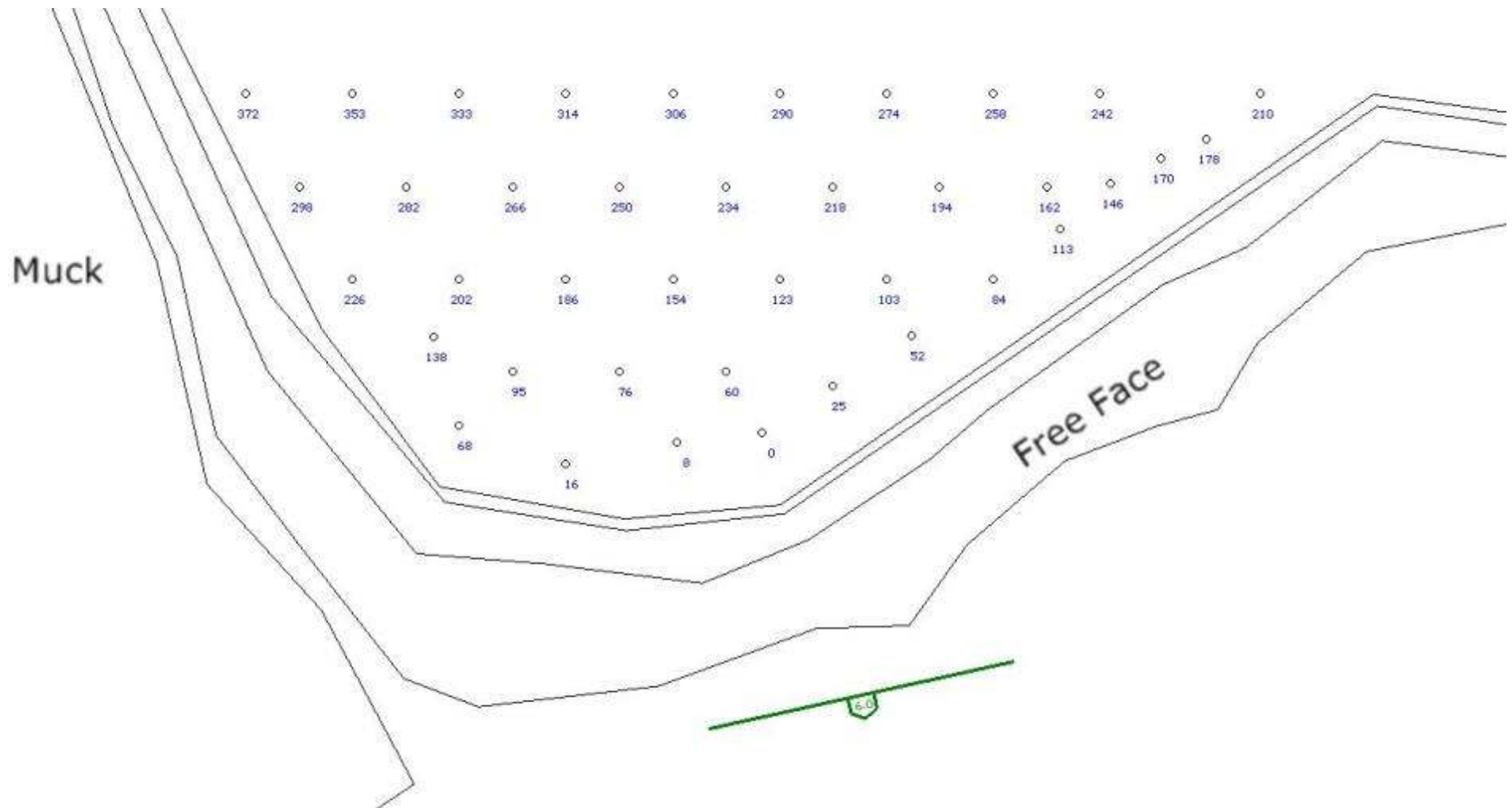


After a design is created in ShapeMetrix and the appropriate depths were determined, the design can be imported into ShotPlus for layout and timing designs.



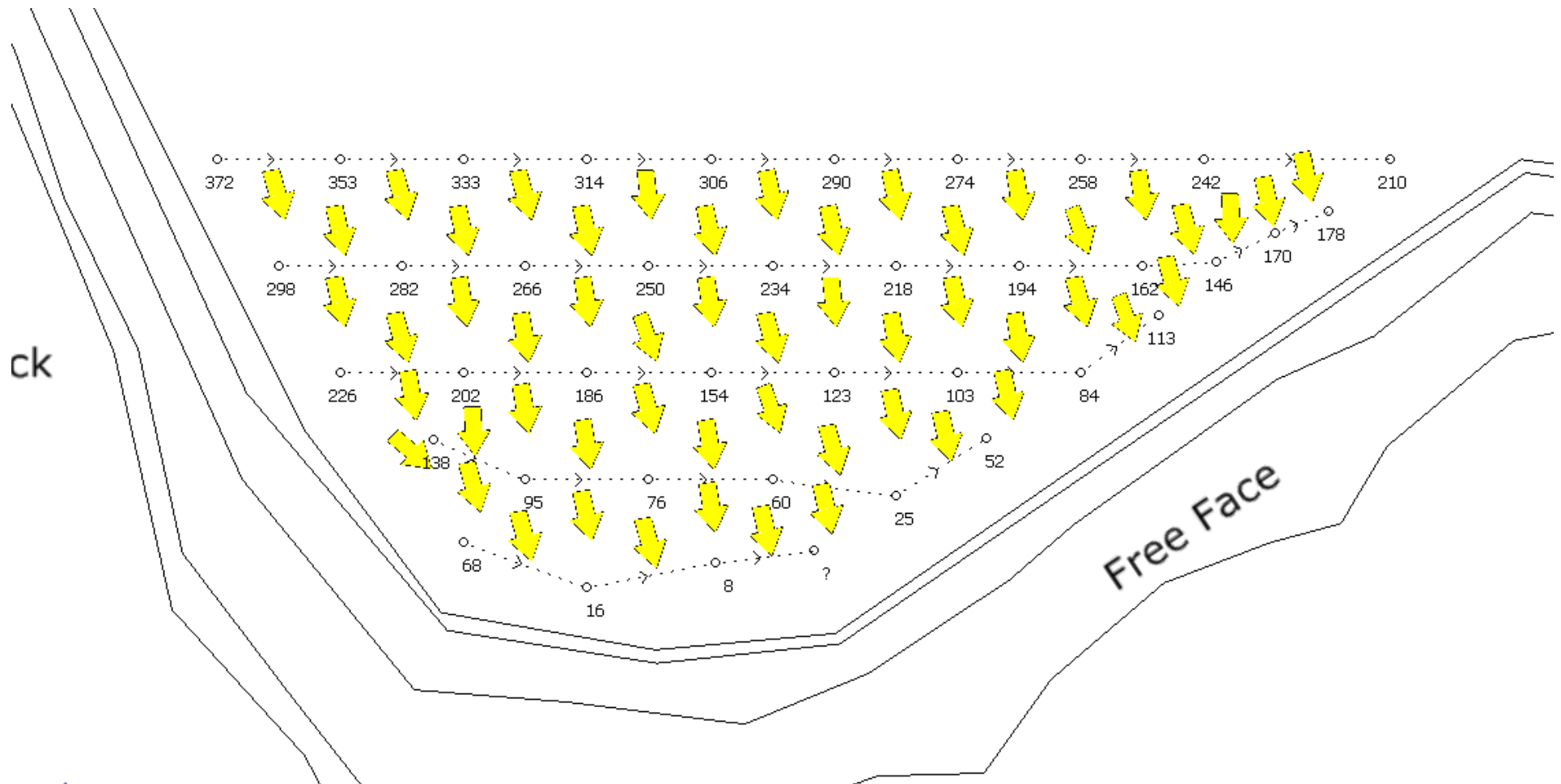


ShotPlus Design - Timing





ShotPlus Design - Timing





DBL – Hole Details



Hole Details

Mine: Martin Marietta - Red Cany
Pit: Main Pit
Level: 6
Shot: 9

Date: 10/19/16

Hole#	Diameter	Depth	Stem	Water	Sleeve	Type	Prod 1	Lbs	Prod 2	Lbs
1	4.5	45	26	0	0	Prod	502	139	None	0
2	4.5	44	30	0	0	Prod	502	105	None	0
3	4.5	42	30	0	0	Prod	502	103	None	0
4	4.5	45	28	0	0	Prod	502	179	None	0
5	4.5	43	24	0	0	Prod	502	165	None	0
6	4.5	45	24	0	0	Prod	502	181	None	0
7	4.5	43	25	0	0	Prod	502	152	None	0
8	4.5	45	21	0	0	Prod	502	207	None	0
9	4.5	44	18	0	0	Prod	502	226	None	0
10	4.5	44	16	0	0	Prod	502	264	None	0
12	4.5	45	17	0	0	Prod	502	242	None	0
13	4.5	43	20	0	0	Prod	502	186	None	0
15	4.5	40	20	0	0	Prod	502	174	None	0
16	4.5	37	14	0	0	Prod	502	196	None	0
18	4.5	45	11	0	0	Prod	502	272	None	0
19	4.5	45	11	0	0	Prod	502	285	None	0
20	4.5	43	9	0	0	Prod	502	259	None	0
21	4.5	45	9	0	0	Prod	502	307	None	0
22	4.5	45	11	0	0	Prod	502	274	None	0
23	4.5	45	9	0	0	Prod	502	294	None	0
24	4.5	42	9	0	0	Prod	502	260	None	0
25	4.5	44	9	0	0	Prod	502	299	None	0



Up Close





A new perspective...

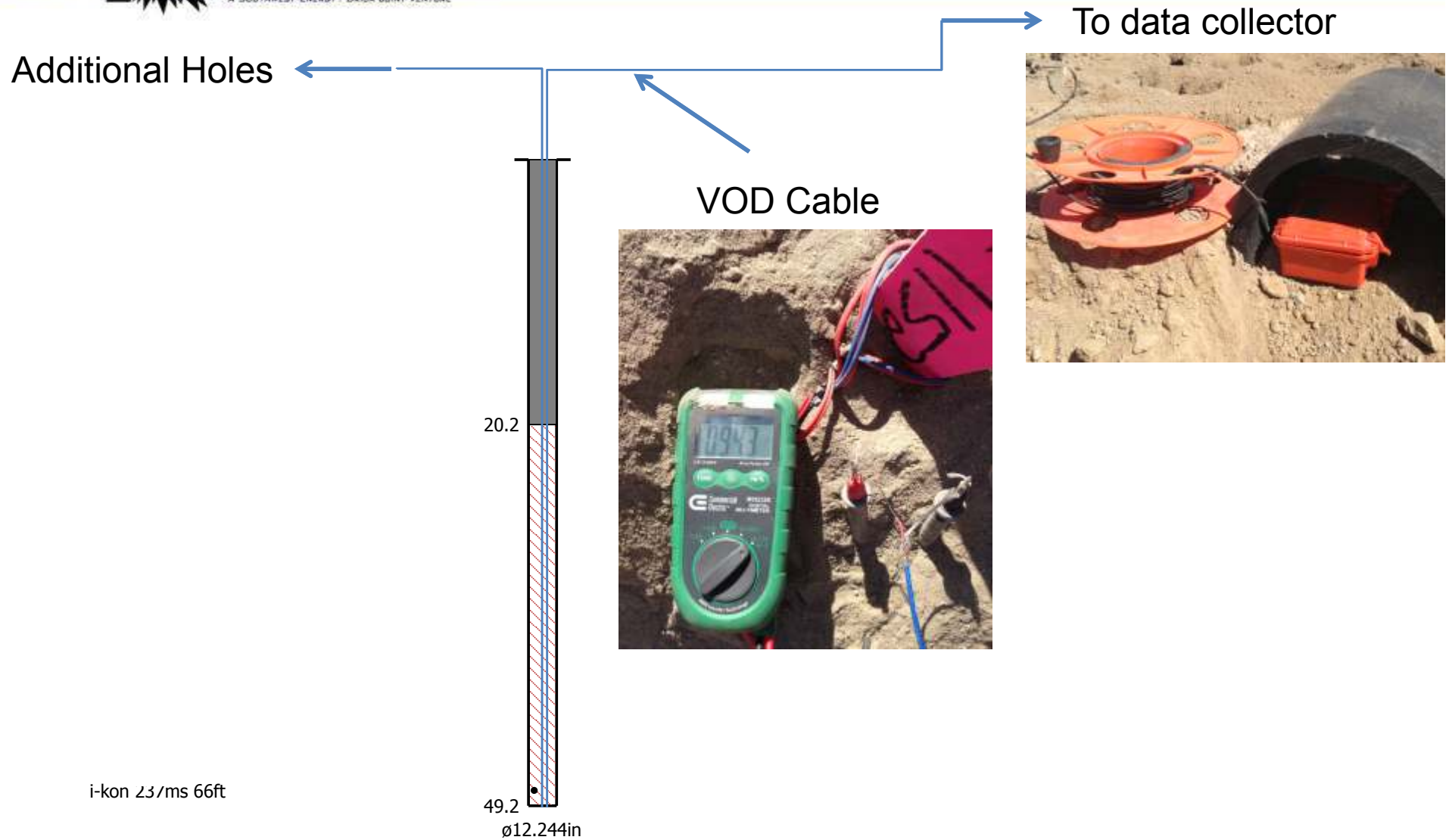




High Speed Video



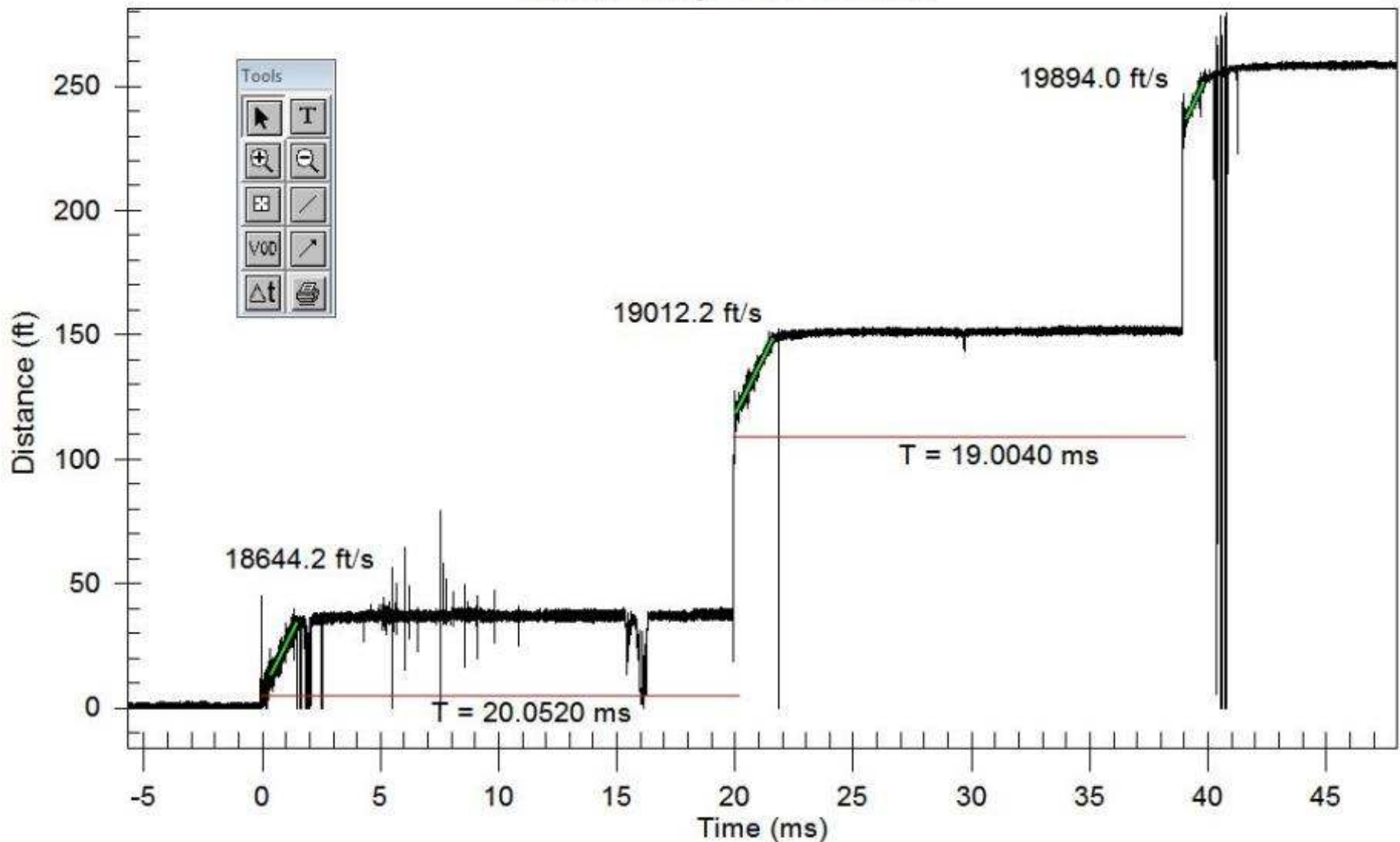
VOD -Test Setup





VOD & Timing Analysis

MicroTrap VOD Data



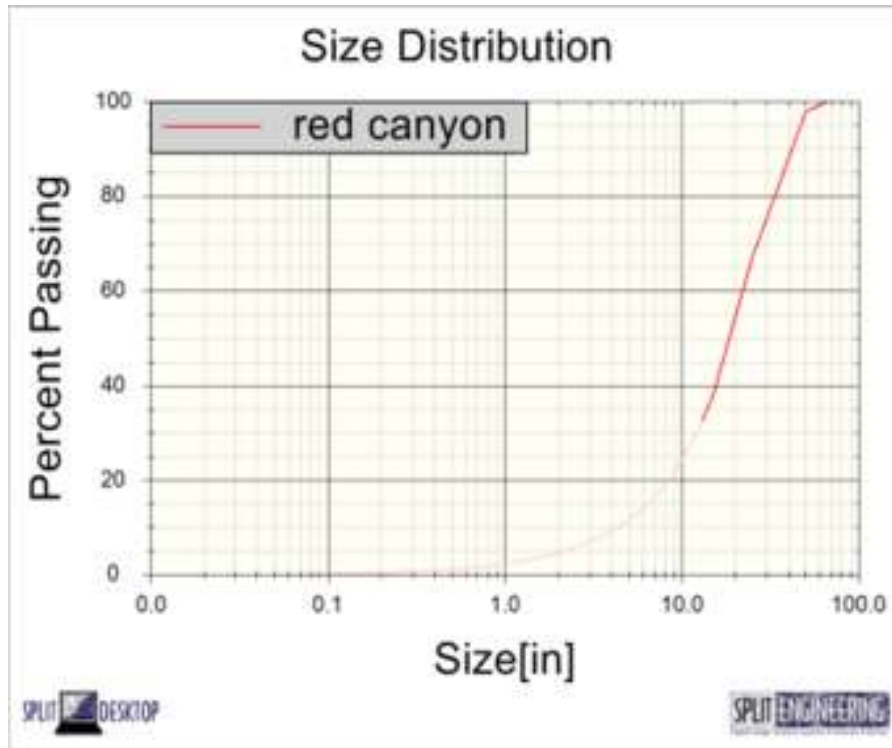


Fragmentation Analysis





Fragmentation Analysis



	Average	Image 1	Image 2
% Passing	Size[in]	Size[in]	Size[in]
F10	4.32	2.94	7.2
F20	8.34	6.29	11.43
F30	12.11	9.81	15.02
F40	15.8	13.5	18.18
F50	19.15	17.25	21.03
F60	22.49	20.98	23.97
F70	26.16	25.05	27.29
F80	30.75	30.07	31.41
F90	37.78	37.81	37.74
Topsize (99.95%)	66.24	67.39	62.69

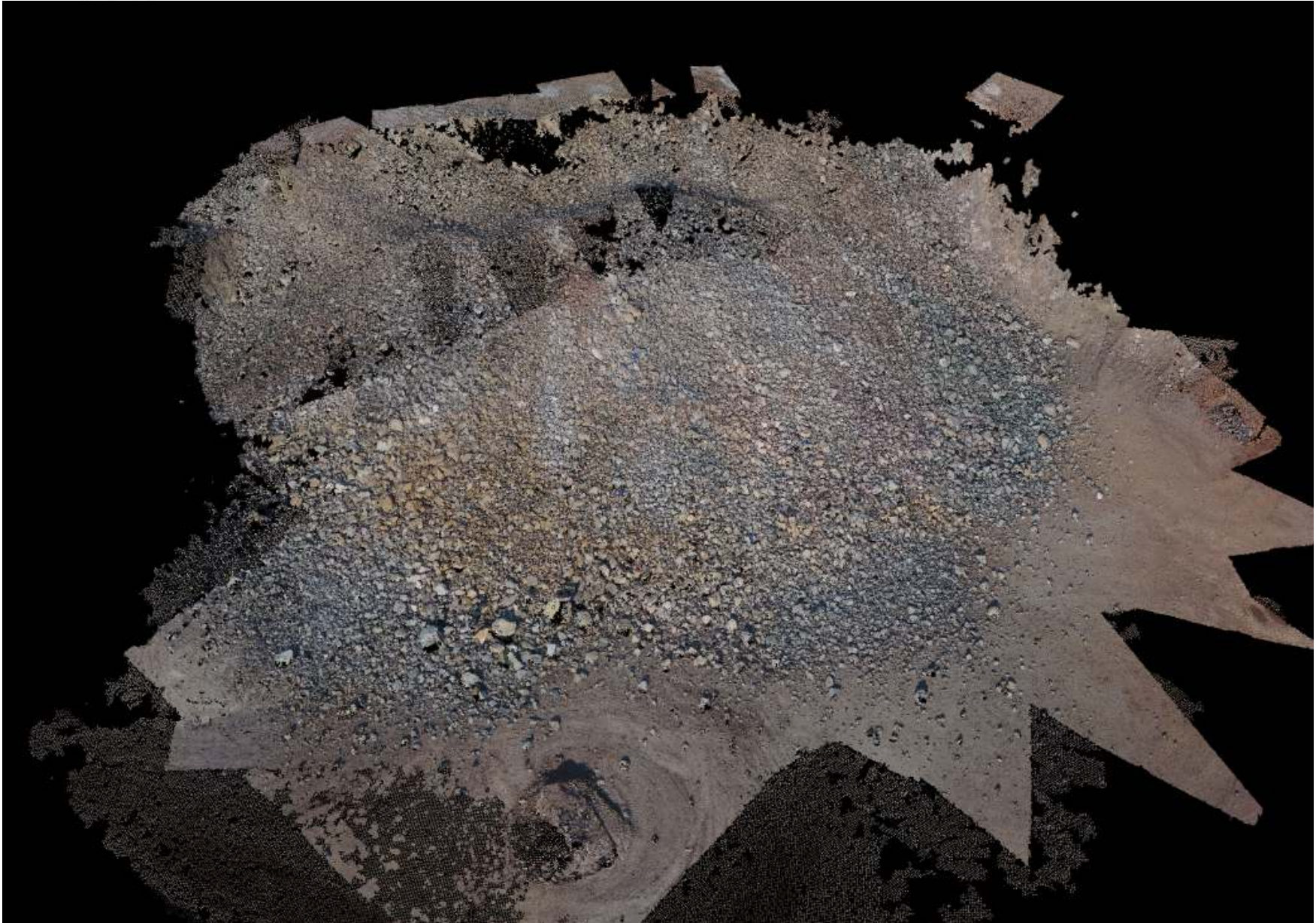


Drone Survey





Drone Survey



- Questions?
- Plan for shot #2