

Perkins&Will

STONEHAM HIGH SCHOOL

Neighborhood Meeting

07.20.2022

SCHOOL COMMITTEE MEMBERS

Marie Christie	Co-Chair	Jeanne Craigie	Town Moderator
David Bois	Co-Chair	Lisa Gallagher	Middle School Admin.
Raymie Parker	Chair Select Board	Kevin Yianacopolus	High School Facilities
Nicole Nial	School Committee Member	April Lanni	Town Procurement Officer
Cory Mashburn	Finance and Advisory Board	Douglas Gove	Community Member
Dennis Sheehan	Town Administrator	Stephen O'Neill	Community Member
John Macero	Superintendent of Schools	Josephine Thomson	Community Member
Bryan Lombardi	High School Principal	Sharon Iovanni	Community Member
David Pignone	Athletic Director	Paul Ryder	Community Member
Brian McNeil	Town Facilities Director		

ARCHITECT

Perkins&Will

OPM

Symmes Maini and McKee Associates

CONSTRUCTION MANAGER

Consigli Construction Co.

Perkins&Will

SMMA

Project Management



CONSIGLI

Est. 1905

AGENDA

1\ Introduction

2\ Project Construction Plan and Timeline

3\ Ledge and Rock Removal Procedures



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Site Design

Neighborhood Meeting

Stoneham High School

Site Plan

1. TENNIS
2. SOFTBALL
3. BASEBALL
4. SOCCER
5. SPARTAN STADIUM
6. WETLAND
7. PARKING
8. FIELD HOCKEY
9. PICKLEBALL
10. HOME BLEACHERS
11. PRE-K PLAY
12. SPARTAN PLAZA
13. LANDSCAPED PATH
14. OUTDOOR CLASSROOM
15. GEOTHERMAL WELL FIELD

-  PV ARRAY
-  EXISTING HIGH SCHOOL



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Project Construction Plan and Timeline

Neighborhood Meeting

Project Schedule

Construction Start

Summer 2022

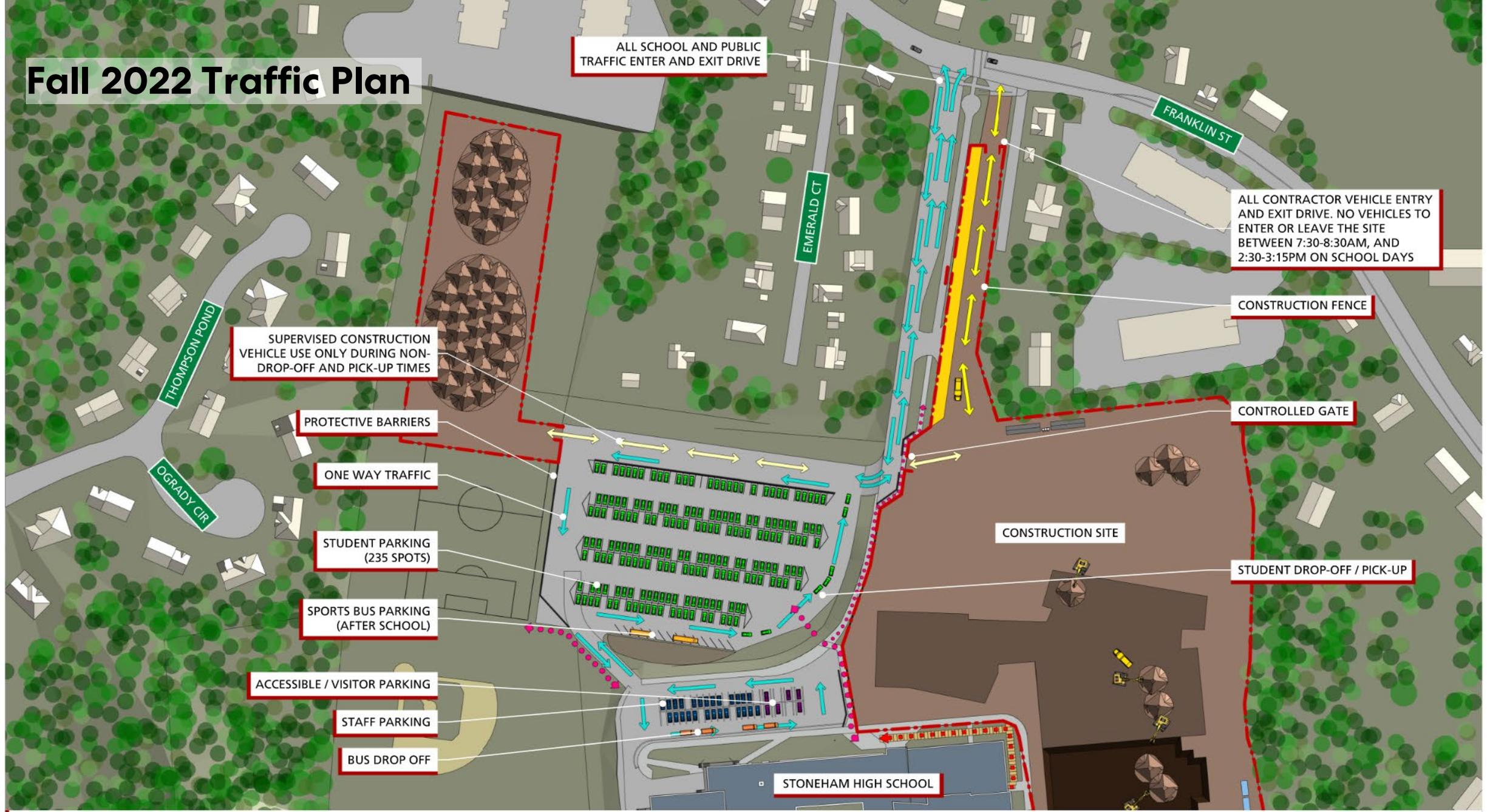
School Building Completion

Summer 2024

Demolition / Playfields / Parking

Late 2024 / Early 2025

Fall 2022 Traffic Plan



Construction Vehicles



School and Public Vehicles



Student Drop Off / Pick-Up



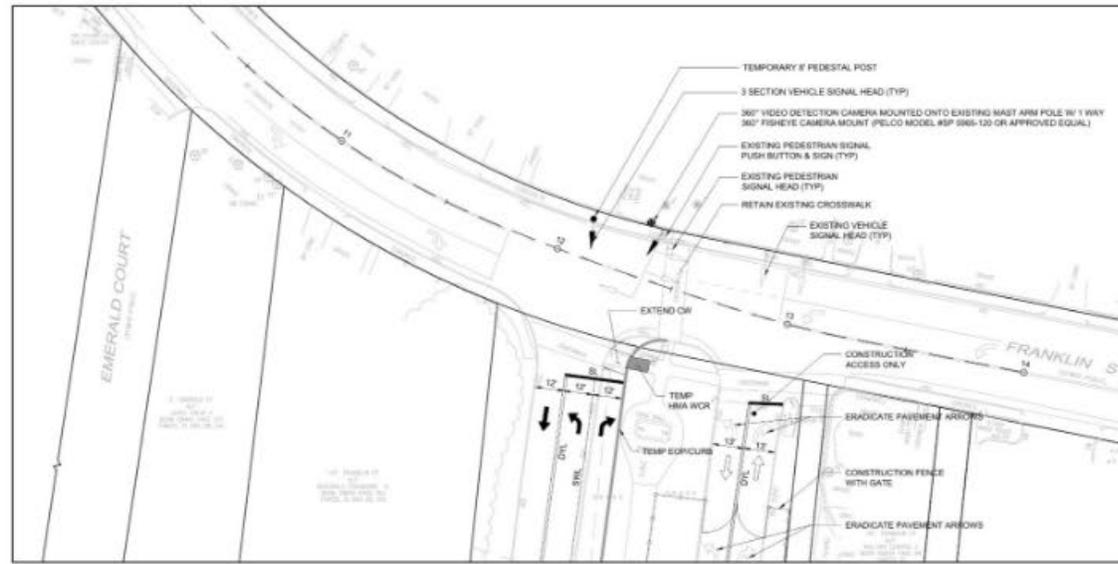
Bus Drop-Off



Pedestrian Route

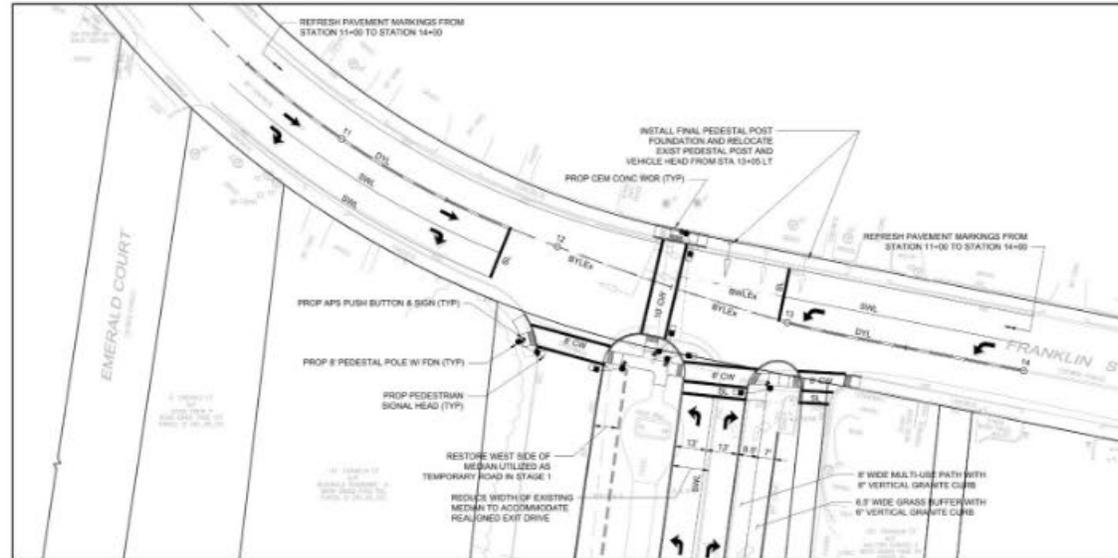
Stoneham High School

Phasing Plan



- TEMP SIGNAL NOTES:
 1. INSTALLATION TO OCCUR IN SUMMER 2022. COMPLETE BY AUGUST 15, 2022
 2. ALL 4 APPROACHES COVERED BY VIDEO DETECTION

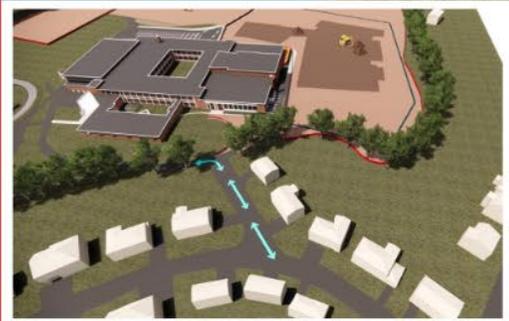
Stage 1



- STAGE 2 NOTES:
 1. STAGE 2 INSTALLATION TO OCCUR IN SUMMER OF 2023. COMPLETE BY AUGUST 15, 2023
 2. STAGE 2 TO BE IN EFFECT SEPTEMBER 2023 THROUGH JUNE 2024
 3. CONSTRUCT ALL IMMEDIATELY PEDESTAL BASES & MAST ARM FOUNDATIONS PER FINAL SIGNAL DESIGN

Stage 2





BOXWOOD SUMMER 2022: HS STAFF ACCESS ONLY

PROTECT WETLANDS BEYOND THIS POINT

PROTECT EXISTING CULVERT

STOCKPILE OF UNSUITABLE SITE CUTS

EXISTING STONEHAM HIGH SCHOOL

RELOCATE DUMPSTERS

RELOCATE FLAG POLE

EXPAND ENTRY PLAZA

BOXWOOD RD

FIELDSTONE DR

PROTECT WETLANDS BEYOND THIS POINT

CONSTRUCTION VEHICLE ACCESS THRU PARKING LOT

INSTALL SITE FENCING AT TOP OF SLOPE

RELOCATE EXISTING UTILITIES

EMERALD CT

CONTRACTOR PARKING

NEW FIRE WATER SERVICE

STRIP TOPSOIL AND REMOVE OFF SITE

FRANKLIN ST

NEW TEMP TRAFFIC LIGHT

LEGEND

-  Pedestrian Route
-  Emergency Egress Route
-  Site Fence w/ Scrim
-  Site Trailers w / PortaJohns + Handwashing Stations
-  Primary Construction Route
-  Shared School Route
-  Pre-K Drop Off Route
-  Gate Identification Number
-  Emergency Access Gate

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Ledge and Rock Removal Procedures

Neighborhood Meeting

Introduction



- **Presenter: Andy Dufore / MDB Division Manager**
- **Maine Drilling & Blasting (MDB) - 56 years experience
– in business since 1966**
- **Office is located in Milford, Ma**

Presentation Topics

- **Blasting Schedule**
- **Comparable Project**
- **Blasting Safety and Pre-Blast Planning**
- **Measuring Ground and Air Response, Human Perception, What Research Has Revealed**

Blasting Schedule



- **Project Schedule**
 - **Pre-Blast Surveys 07/25 – 08/19/22**
 - **On Site Blasting/Ledge Removal – Starts 8/22/22**
 - **Production Blasting ongoing daily**
- **Typical day**
 - **2 blasts per day, M-F**
 - **MDB will aim for blasts to occur at a consistent, regular time daily between 10 AM – 3 PM.**

Comparable Project



**Mindess Elementary School
Located in Ashland, MA**

**Work Performed from:
January 20, 2022– February 11, 2022**

8,500 Cubic Yards of Rock Blasted

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SMMA

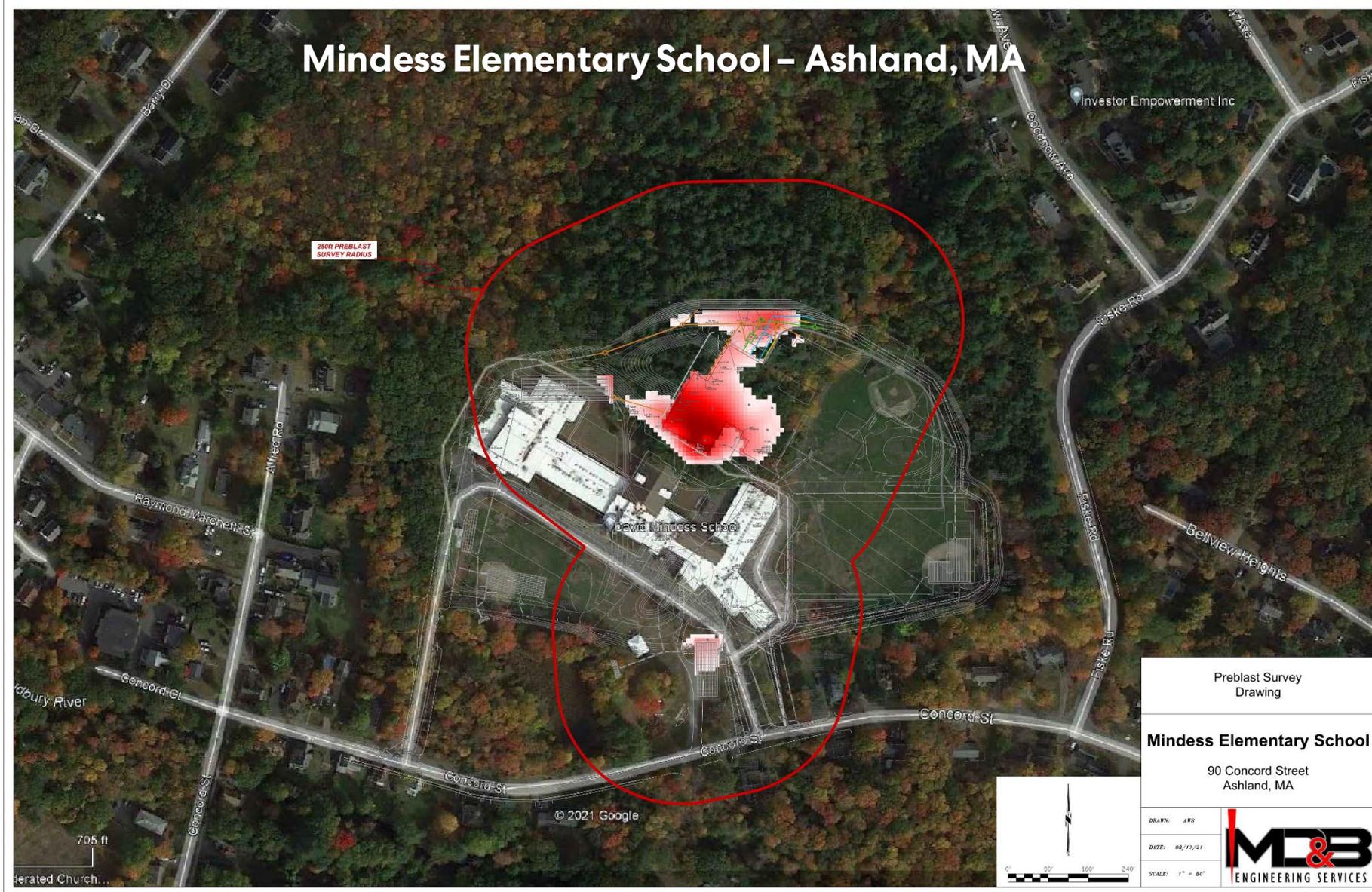
Project Management



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Comparable Project



Pre-Blast Planning Hazard Assessment

Our most important responsibility in working on any jobsite is to **identify potential hazards** before the project starts.



Pre-Blast Planning

Pre-Blast Condition Survey

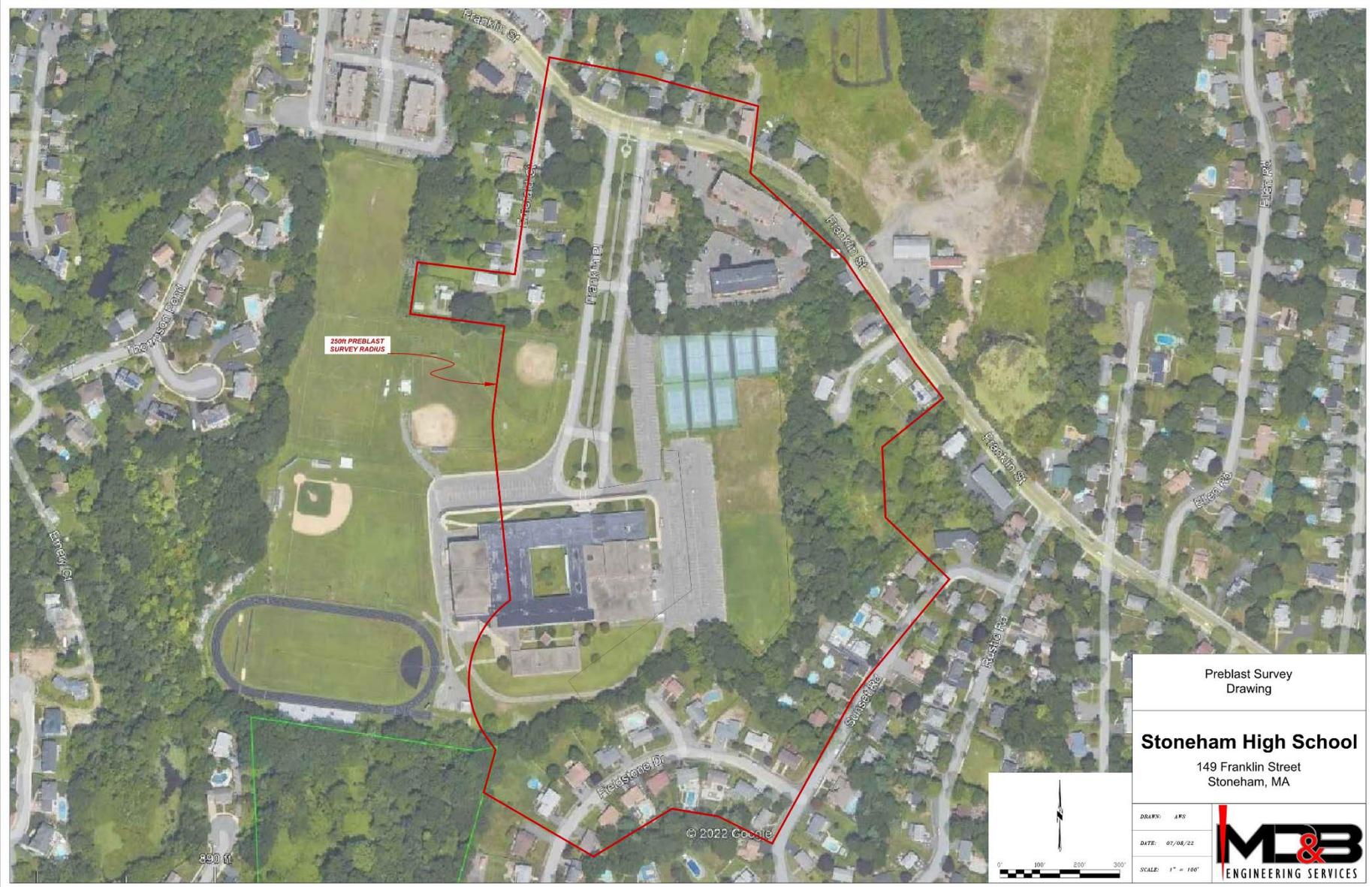


Pre-Blast Planning

527 CMR 1.00 dictates homes within 250' require a pre-blast survey.

65.9.15.1 The intent of a preblast survey is to provide documentation of the existing physical condition of buildings and structures within the blasting area with the dimensions of each observed defect clearly noted. When blasting within 250 feet of a structure, as measured from the closest borehole to the structure, or structures, not owned or controlled by the project, a pre blast inspection survey shall be offered. It shall be the responsibility of the blaster to notify structure owners of the survey.

Pre-Blast Planning



Pre-Blast Condition Survey

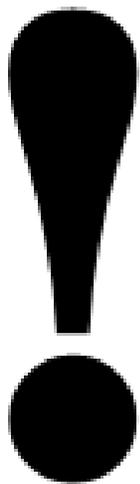


- **Vibration can be perceived at levels as low as 1/100th of the safe level for residential structure.**
- **When vibration generated from a new blasting operation is initially felt, the natural response of a homeowner will often be a focused inspection of his or her home that will reveal pre-existing but unnoticed cracks (generated by natural environmental forces).**
- **These pre-existing defects will not be attributed to the project if they are pre-identified in a survey.**
- **The inspection also identifies surrounding activity, operation or process that the proposed work may need coordination with.**
- **30 minutes until blast - All abutters and others, if desired, can be notified with text, call, or email notification prior to blast. If you would like to be added to this notification list, please call Esta, in our office, at 508-478-0273.**

Section 65.9.18 Blasting Regulatory Review

If a property owner thinks that damage occurred as a result of blasting, they should file a regulatory review form with the fire department within 30 days of the blasting.

A Few Things To Remember



If a blasting project is planned near your property, take a close look at your home or business. You may be surprised at how many cracks in walls, floors, and ceilings already exist just from seasonal changes in humidity, age, and normal wear and tear. Most property owners don't notice these cracks until after blasting has started and mistake them for blasting damage.

Per MA DFS Facts About Blasting

Blasting Regulatory Review Form (FP-296) is available from the SFD and on the DFS website under Fire Prevention Forms

Pre-Blast Planning

Mathematical Blast Design:

Blast Location

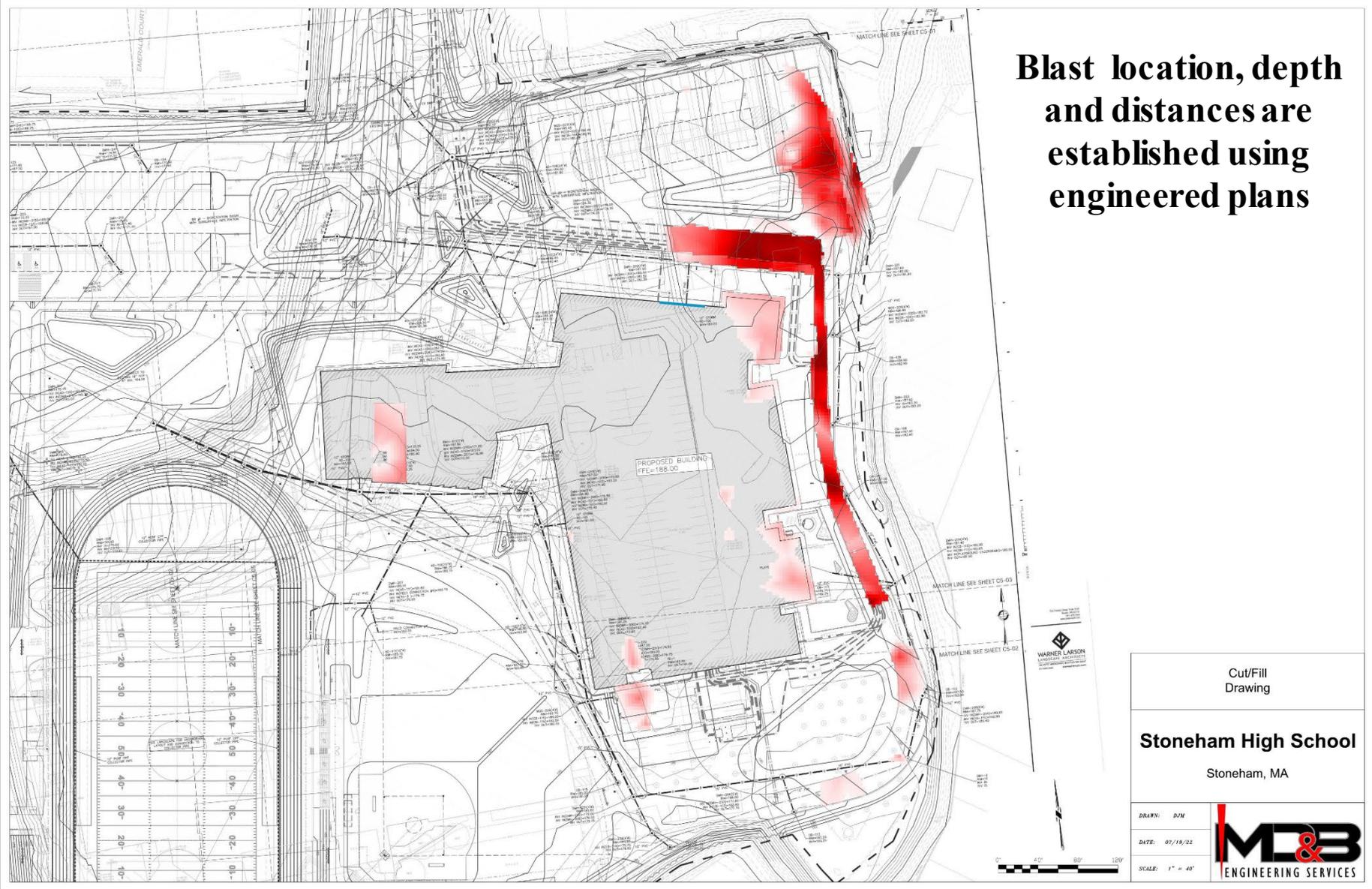
Distance to Structures

Geology

Vibration Estimate Calculations



Pre-Blast Planning



Pre-Blast Planning

Pre-Blast Design Analysis is used to scale the blast geometry and charge, based on proximity to structure and safe vibration limits.

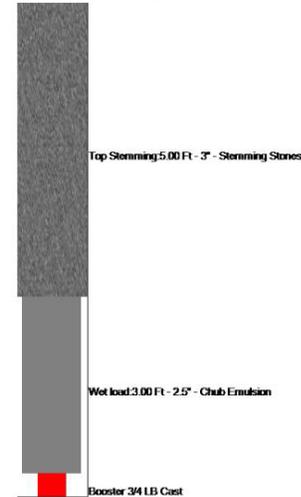


Loaded Hole-Blast Design for: **Job** Stoneham Highschool Project
Owner/Site Stoneham, MA **Division:** North
Location: Stoneham, MA **Customer** Marois Bros., Inc
Author adufore On:5/19/2022 Updated By adufore On: 7/18/2022
Blast Plan Description: Rock Cuts Less than 6 Feet Deep
 7/18/2022 11:22 AM

APPENDIX A. - Blast Design Plan:

Est. Number Of Holes:	25
Hole Depth:	8.00 Ft
Hole Diameter:	3 in
Burden:	4.00 Ft
Spacing:	5.00 Ft
Holes per Delay:	1
Pounds Per Delay:	7.52 Lbs
Pounds Per Hole:	7.52 Lbs
Total est. Pounds:	188.00 Lbs
Powder Factor:	1.27 Lbs/Cy
Decks:	0

Loaded Hole Depth - Diameter - Product



Blast Plan Notes:

Vibration Prediction (formula based on Dupont Handbook)

Site Factor (k) :	160 Ground Constant based on Site/Rock Conidtions
Distance Ft (d)	75 Distance to Structure
Lbs per Delay (w)	7.52 Lbs explosives per 8 millisecond delay
Scaled Distance (sd)	27.35 (sd = d/ square root of w)
Estimated PPV	0.80 (ppv = k * sd ^ -1.6)

Typical for Production work consistent with holes 8 Ft deep at 75 from a structure utilizing 3' In diameter at a 4 Ft by 5 Ft pattern.

Plan View/Timing Design (please see attached timing diagram)

Pre-Blast Planning

After the Blast Plan is finalized a pattern of holes is drilled into the ledge. Explosive charges are loaded into the drilled holes. The final step in preparing the blast involves the setting of mats to prevent debris from leaving the immediate blast area.



Pre-Blast Planning

Warning Signals

The warning signal sequence will be:

3 Audible Signal Pulses - 5 Minutes to Blast

2 Audible Signal Pulses - 1 Minute to Blast

1 Audible Signal pulse - All Clear

65.9.8.4.2 Blast signals shall be clearly audible for a distance of 250 ft. (76.2 m) of the blast site.

Pre-Blast Planning

Through out the entire project safety is the first and foremost priority.

Each blast is closely coordinated with local officials and job site management personnel.

People, equipment and traffic on adjacent roadways are monitored and controlled at the time of the blast, if necessary, to ensure the absolute safety of all.



Site Security

Measuring Ground & Air Response

Ground Response

When an explosive is detonated in rock, energy is released. Some of that energy is absorbed by the rock and transmitted through the ground in the form of a seismic wave.

As the seismic wave travels outward from its source, ground particles respond. These particles move back and forth ever so slightly, quickly returning back to their original rest position after the seismic wave passes. We sense this oscillation as vibration.

Air Response (AIR OVERPRESSURE)

An airborne pressure pulse resulting from the detonation of explosives. Air blast may be caused by the displacement of the material being blasted or the release of expanding gas into the air.

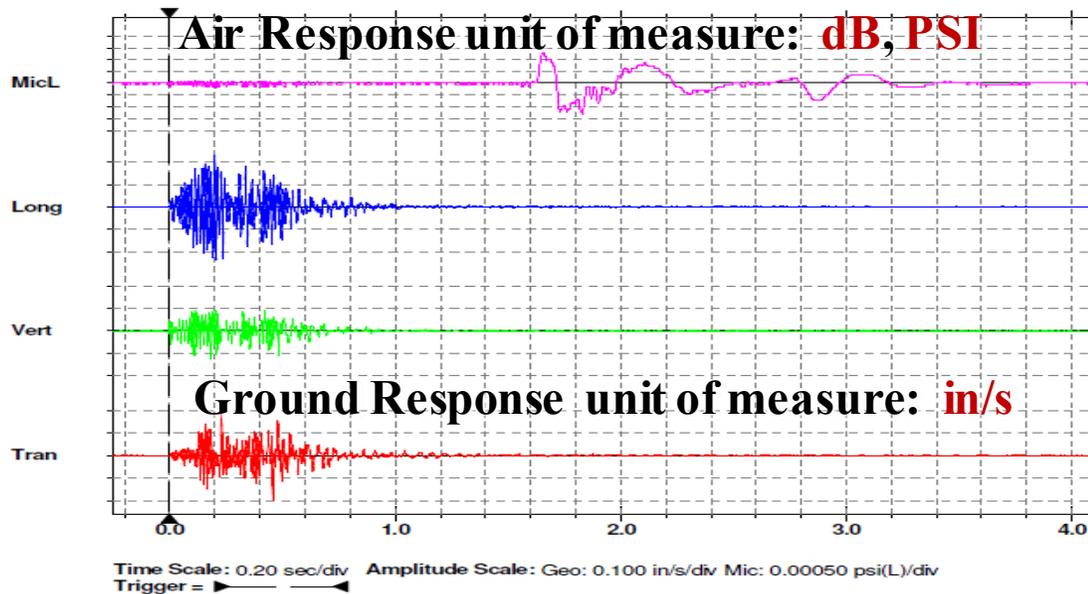
Can best be described as distant thunder.

Measuring Ground & Air Response



Seismograph Monitoring

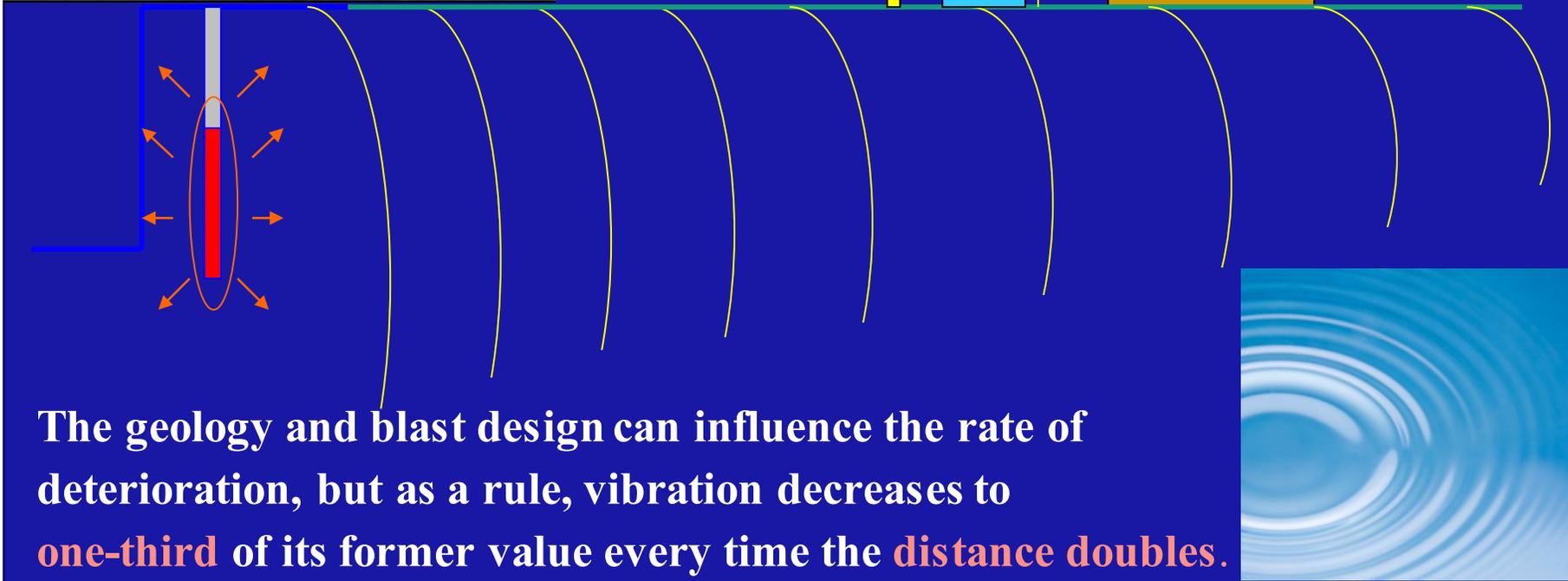
Provides a permanent
record documenting air
and ground response



Measuring Ground & Air Response



Waves radiate from the energy source and decay in intensity with distance



The geology and blast design can influence the rate of deterioration, but as a rule, vibration decreases to **one-third** of its former value every time the **distance doubles**.

Measuring Ground & Air Response

USBM research established safe ground response limits that involve three components of vibration:

Particle Velocity:

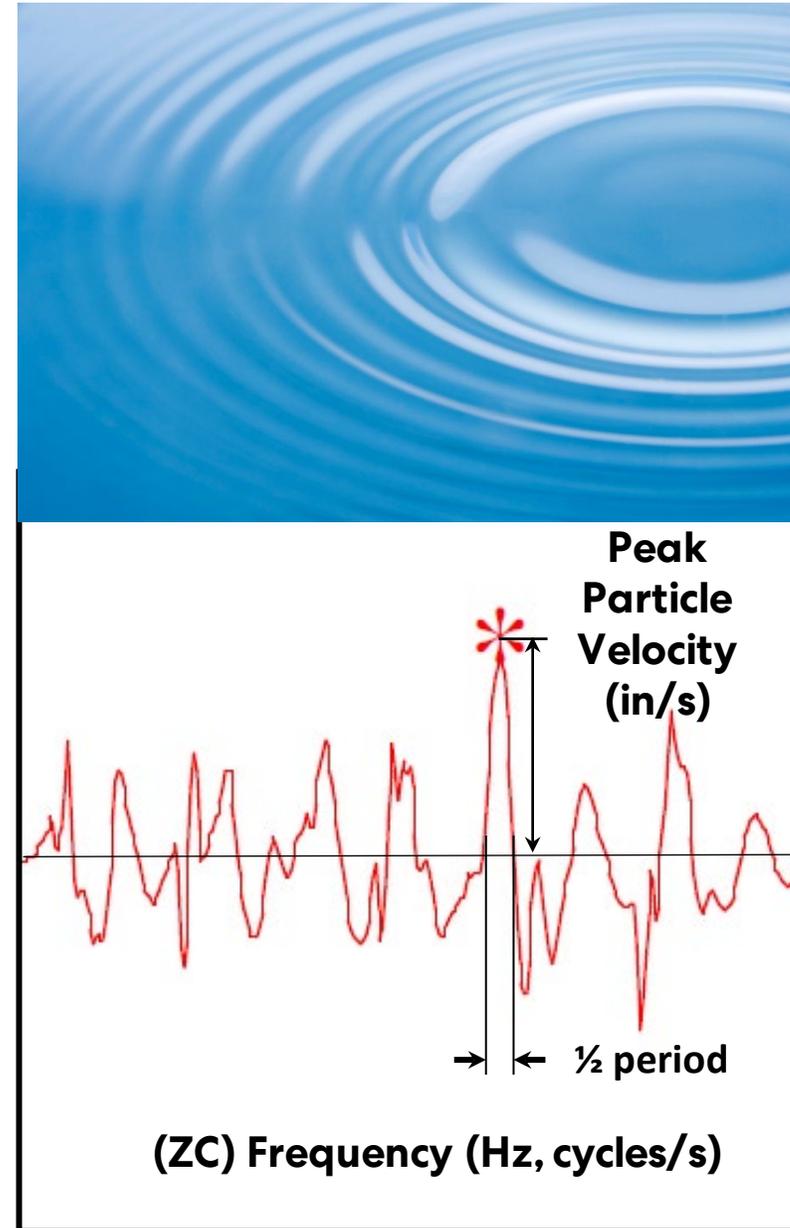
The speed in inches per second the ground is displaced.

Frequency:

The number of times the ground moves back and forth in one second.

Displacement:

The elastic distance in inches the ground moves from its rest position.



What Research Has Revealed

About Air Response

- Unlike the “Safe Limit” for ground response the USBM research recommended a **133 dB Air Response limit** based on **annoyance level**
- 133 dB = to a 27-28 mph wind (Sutherland 1968)
- Actual **safe limit 140 dB** (40mph wind)

What Research Has Revealed

About Ground Response

- “Safe Limit” 2 IPS (above 40HZ)
- Damage does not occur at 2.1 IPS
- Most homes can tolerate level of 5.0 IPS or more at high frequency

What Research Has Revealed

About Natural and Human Induced Forces on Structure

- Temperature change can exert forces greater than 3 IPS on a home
- Humidity change can exert forces greater than 2 IPS on a home
- Wind can exert forces greater than 6 IPS on a home

Natural and Human-Induced Vibrations in Homes

by David E. Siskind

Equivalent vibration velocities based on measurements of house wall responses and/or strains (various sources, in/sec):

From USBM fatigue study test-house in Indiana (RI 8896, Stagg, et al., 1984)	
Slamming of front door	0.15 - 1.9
Jumping on the floor & walking	0.10 - 0.50
Humidity change inside (10 pct)	1.0 - 2.4
Temperature change inside ($\Delta 10^{\circ}\text{F}$)	1.0 - 3.2
Wind	0.6 - 2.6
From five homes in Penna (Fang, 1976)	
Temp. and humidity over 7 days	1.75 - 3.1
Auto traffic	0.04 - 0.20
Pushing on the wall	0.025-0.36
From UK studies at Leeds University (White, et al., 1993)	
Outside temperature changes ($\Delta 18^{\circ}\text{F}$)	>0.34
Pushing on wall near doorway	0.6 - 1.2
Pushing on wall next to window	2.4
Heel drop and jumping	0.15 - 0.9
From ISEE paper by Simms, et al., 1994	
Closing door	0.3 - 0.45
From Sutherland, et al., 1968	
Wind (50 mph)	1.1 - 6.7
From ISEE paper by Siskind, et al., 1996	
Temperature outside ($\Delta 10^{\circ}\text{F}$)	0.5 - 1.7
From Dowding, 1996	
Temperature and humidity	0.75 - 2.6

References

Dowding, C. H., 1996. Construction Vibrations. Prentice Hall, 910 pp.

Fang, H. Y., 1976. Field Studies of Structural Response to Blasting Vibrations and Environmental Effects. Lehigh University.

Simms, D. R., 1994. "A Good Neighbors Policy", the Evolution O & G Industries, Inc.'s Public Relations Policy Working with Local Towns. Proc. 12th Annual Conf. on Explosives and Blasting Techniques. Society of Explosives Engineers, Austin, TX. pp 467-478

Siskind, D. E., M. S. Stagg, W. E. Pierce and S. V. Grum, 1996. Low-Frequency Blast Vibrations at a High Water Table Site. Proc. 12th Annual Symp on Explosives and Blasting Research. Society of Explosives Engineers, Orlando, FL. pp 21-31

Stagg, M. S., D. E. Siskind, M. G. Stevens and C. H. Dowding, 1984. Effects of Repeated Blasting on a Wood Frame House. U. S. Bureau of Mines RI 8896, 82 pp.

Sutherland, L. C., 1968. Sonic and Vibration Environments for Ground Facilities... A Design Manual. Report for NASA, Contract NAS8-11217, 633 pp.

Thoenen, J. R. and S. L. Windes, 1942. Seismic Effects of Quarry Blasting. U.S. Bureau of Mines Bulletin 442, 83 pp.

White, T., R. Farnfield and M. Kelly, 1993a. The Effect of Low Level Blast Vibrations and the Environment on a Domestic Building. Proc. 9th Annual Symp. on Explosives and Blasting Research, Society of Explosives Engineers, San Diego, CA, pp 71-81

White, T., R. Farnfield and M. Kelly, 1993b. The Effects of Surface Mine Blasting on Buildings. Proc. 4th International Symp. On Rock Fragmentation by Blasting (Fragblast 4), Vienna, Austria, pp 105-111

September/October 1997 The Journal of Explosives Engineering 35

Notification List



All abutters and others, if desired, can be notified with text, call, or email notification prior to blast. If you would like to be added to this notification list, please call Esta, in our office, at 508-478-0273.

Questions

Perkins&Will

Thank You

Neighborhood Meeting