Luminant

Comanche Peak Units 3 & 4
COLA

NRC Status Meeting

RCTS Testing

February 4, 2008

Explanation

As-Built Investigations

Type

- Boring
- CPT
- Monitoring Well
- APAR1000

N

0 100 200 ft

0 50 m

Sources: Building Footprint from WGI DWG file 7/6/07
Aerial photograph - USGS DOQQ false color composite, 1994 - 1997

Projection: NAD83 Texas North Central State Plane Feet

TXU Comanche Peak

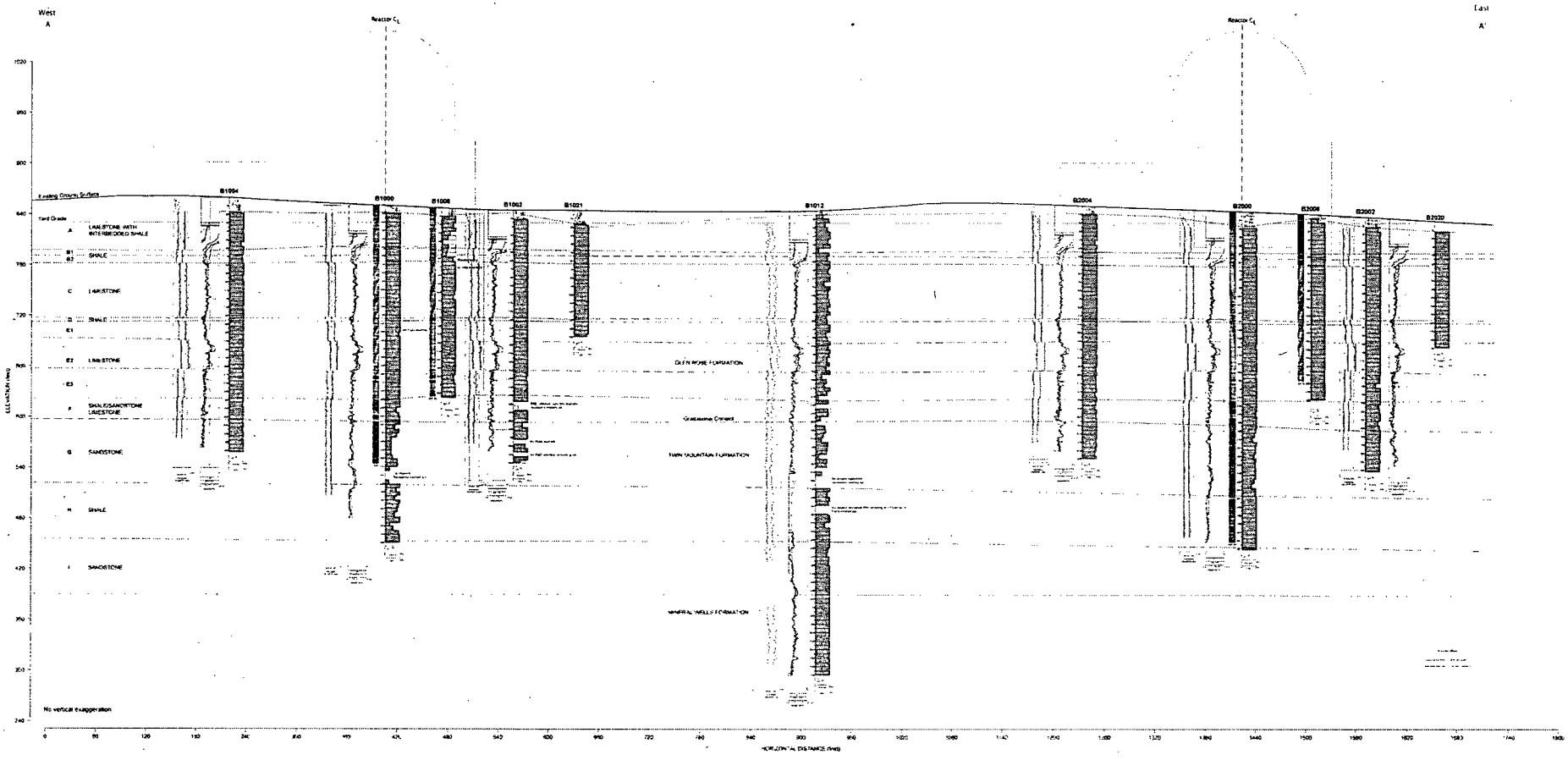
As-Built Investigation Locations

WLA Willow Lake & Associates, Inc.

Figure 1

Subsurface Conditions

- Presence of a Shale Unit between 800-790 (776-786) MSL
- Thick (~65), Competent Foundation Bearing Unit at ~ 782 MSL
- Uniform Stratigraphy
  - Flat uniform thickness and lithology laterally
  - Alternating limestone, shale and sandstone sequences
- High RQD Values and % Recoveries
- Limited discontinuities (joints and fractures)
- Few zones of noted dissolution
- Soft Rock Site
  - Vs (3200-6200 ft/sec)

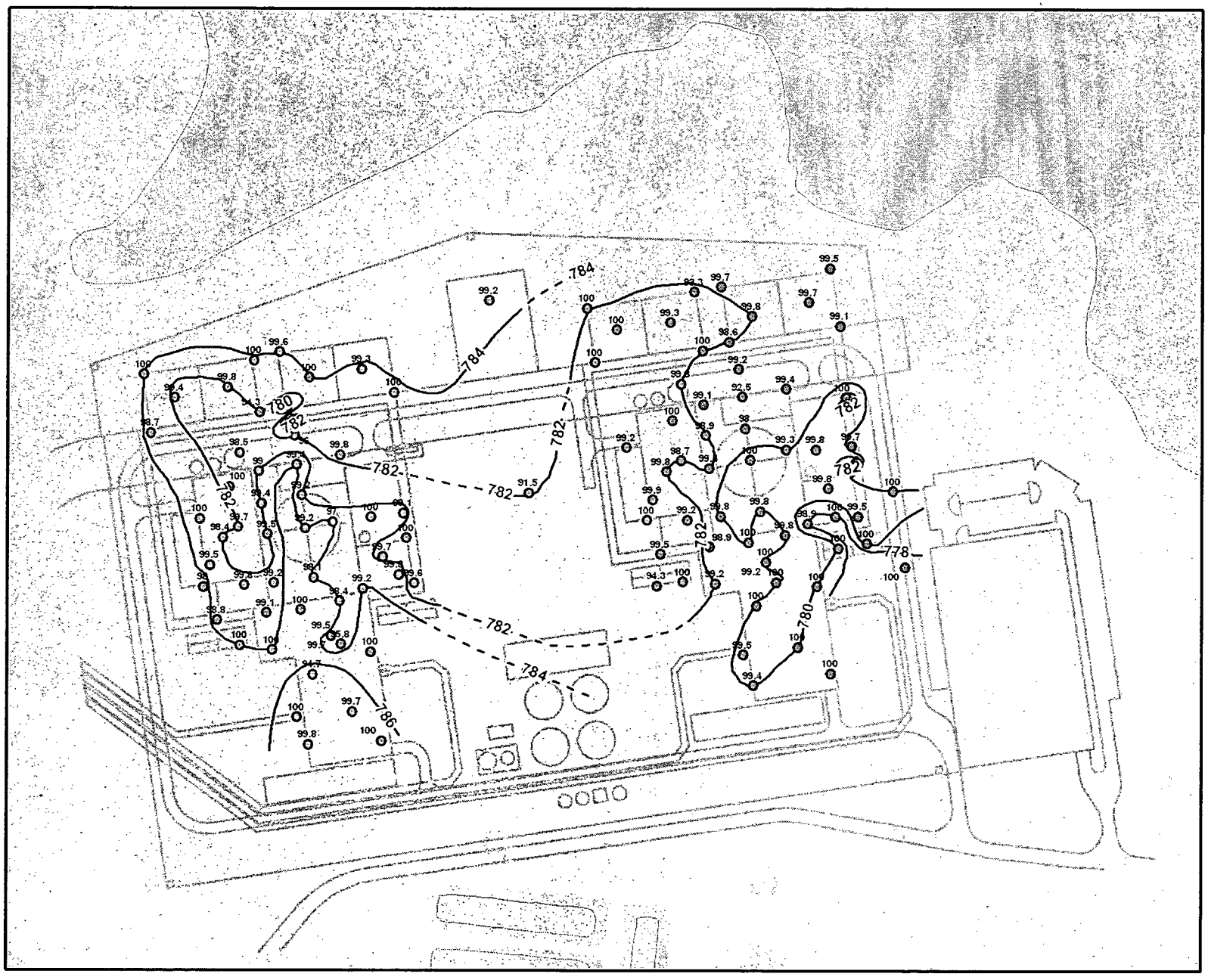


DRAFT

Units 3 and 4 East West
Engineering Cross Section A-A'
Plan A

Engineering Layers

		Top Elevations (MSL, ft)			
Layer	Mean Thickness (ft)	Mean	Max	Min	Std Dev
A	35	834	858	887	12.0
B1	8	798	802	794	1.8
B2	8	790	794	786	1.8
C	65	782	786	716	1.9
D	4	717	722	713	1.4
E1	23	714	719	710	1.6
E2	35	690	692	688	1.0
E3	33	656	658	654	0.9
F	30	622	626	618	2.1
G	80	593	598	584	4.0
H	63	513	517	507	3.5
I		451	455	446	3.3



Explanation

- Borings
- Top of Eng Unit C Contour
- 2ft Contours
- Contour
- Inferred
- AP1000
- Water

N

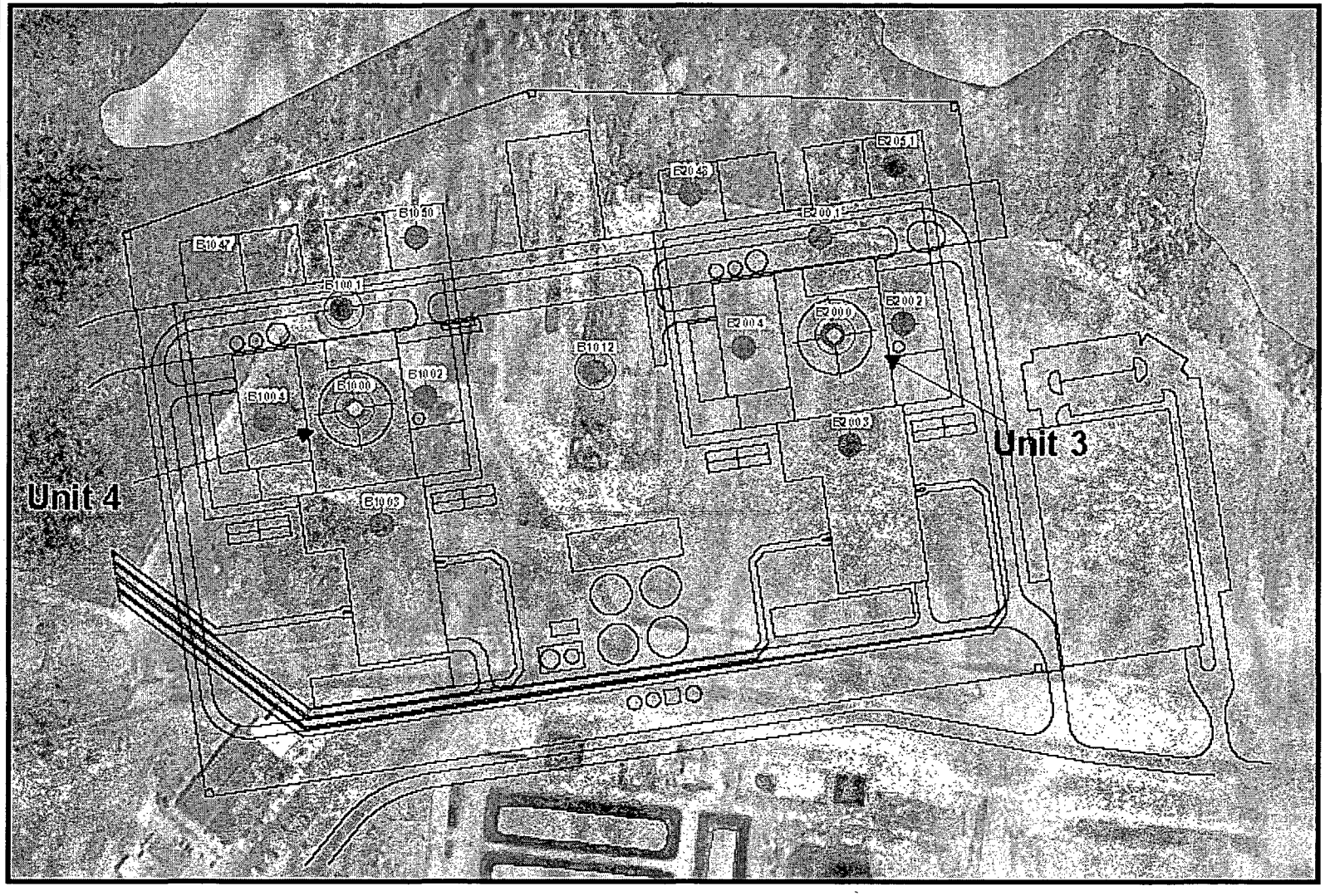
0 100 200 300 400 ft

0 50 100 m

WLA

Engineering Unit C Contours

CLIENT NAME



Explanation

- Downhole
- Suspension
- SASW
- ARWR1000

N

0 100 200 ft

0 50 m

Sources: Building Footprint from WGI DWG file 7/6/07
Aerial photograph - USGS DOQQ false color composite, 1994 - 1997

Projection: NAD83 Texas North Central State Plane Feet

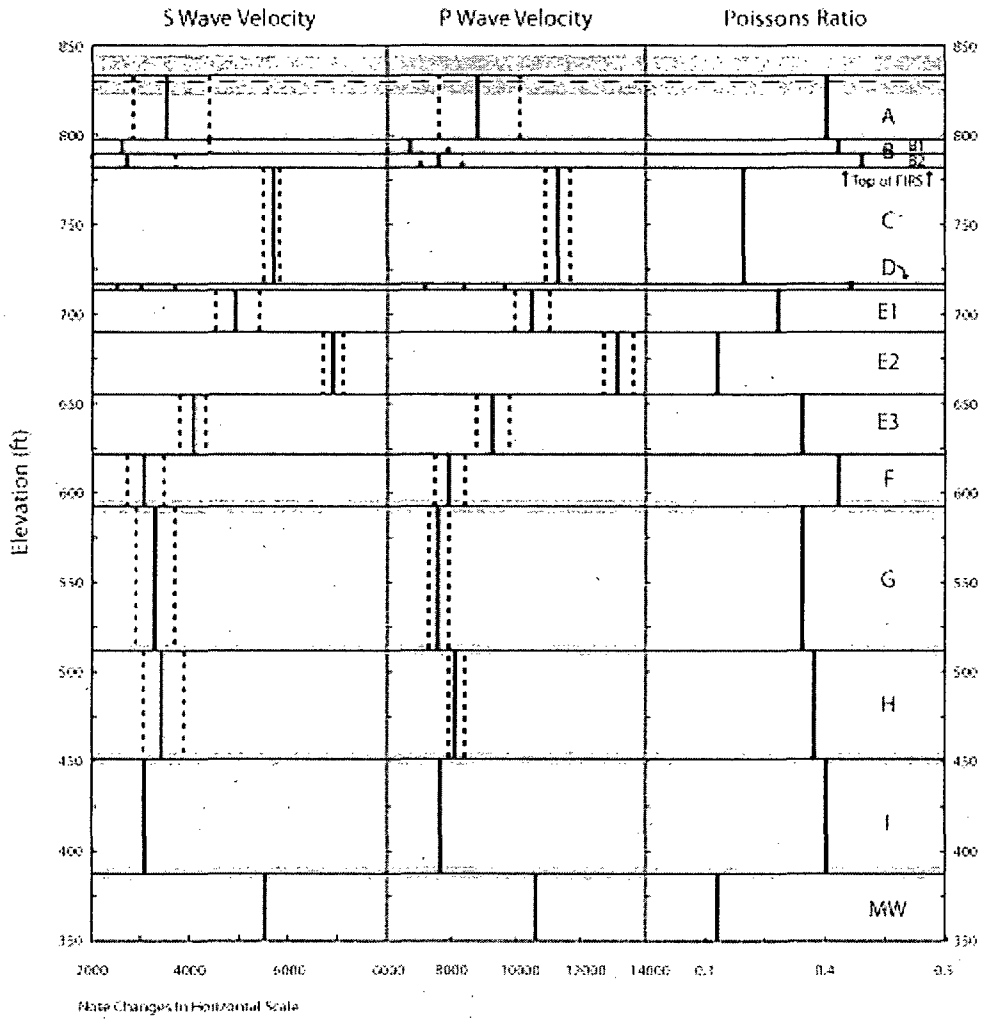
TXU Comanche Peak

Suspension, Downhole, & SASW Log Locations

WLA — Willow Lake & Associates, Inc.

Figure 6

Integrated Velocity Profile -- Regression

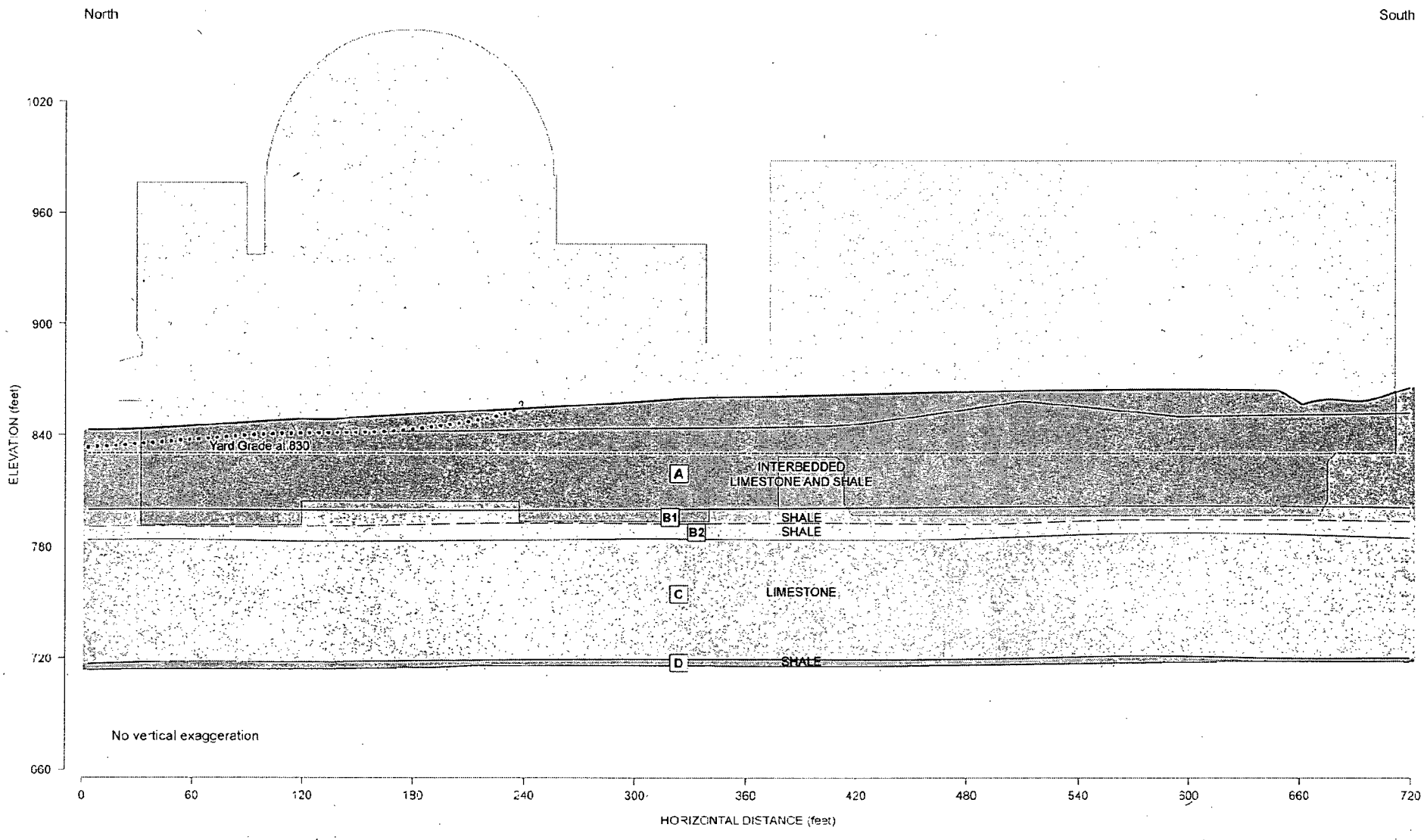


Mean velocity and 2σ

Unit top and standard deviation

Elevation of Yard Grade

A Layer symbol


North
South
1020
960
900
840
780
720
660
ELEVATION (feet)
Yard Grade at 830
A
INTERBEDDED
LIMESTONE AND SHALE
B1
SHALE
B2
SHALE
C
LIMESTONE
D
SHALE
No vertical exaggeration
0
60
120
180
240
300
360
420
480
540
600
660
720
HORIZONTAL DISTANCE (feet)

Foundation Interfaces

- Foundation Bearing Unit (Layer C)
  - Limestone
    - ~65 feet thick, flat lying, std dev <2 feet
    - No major joints, fractures or dissolution features
    - RQD and Recovery >90%
    - Vs Mean ~5600 ft/sec
    - Unit Weight (total) 135-167 pcf
    - UCS Mean 290 tsf
  - Fill concrete as needed (Vs Min 6300 ft/sec)
- Structure FIRS
    - Reactor Building FIRS 1/GMRS
    - Ultimate Heat Sink FIRS 1/GMRS
    - Turbine Building FIRS 1/GMRS
    - Auxiliary Building FIRS 1/GMRS
    - Emergency Water Pipeline Corridor FIRS 1/GMRS
    - Emergency Power Supply Fuel Tanks FIRS 1/GMRS
    - East and West Power Supply Buildings FIRS 2
    - Electrical Duct Banks FIRS 4

Foundation Interfaces

- All Category 1 Structures (Exclude Duct Banks) founded on Layer C at elev 782
- Category 1 Electrical Duct Banks
  - Backfill Material Specifications:
    - < 30 percent fines (passing US No. 200 sieve)
    - Well graded grain size distribution
    - Max particle size 3 inches
    - Expansion Index <20 (expansive material unacceptable)
    - Plasticity Index <12, Liquid Limit <40
  - Backfill Placement Specifications
    - Lifts 8 inches or less (loose)
    - Moisture conditioned to at least 2 percent of the Optimum
    - Compaction 95 percent or greater (modified)

Structural Backfill

Only applies to Category 1 Electrical Duct Banks

- COLA to specify material properties and placement criteria
- COLA to include a Commitment to verify a borrow source meeting the above.
  - Proposed use of excavated material
    - May require processing/segregation
  - RCTS testing program of borrow material
    - Bulk samples of borrow source to verify range of material properties
    - Number of samples to represent statistical basis to be selected
    - Non-linear degradation of shear modulus (G/Gmax) and damping vs. shear strain will be compared to EPRI 1993 curves for saturated granular material

Site Response Analysis

- Ground Motion Response Spectra
  - Defined at the mean top of Layer C (elev 782)
  - Backfill concrete included in SSI analysis
- Foundation Input Response Spectra
  - FIRS 1 and GMRS (outcrop motion at 782)
  - FIRS 2 (includes concrete beneath E/WPSB)
  - FIRS 3 (outcrop motion at yard grade)
  - FIRS 4 (outcrop motion at top of structural fill)

FIRS 4 (Category 1 Duct Banks)

- Fill to extend from top of Layer C to yard grade (~40 feet thick)
- FIRS Properties
  - 0-3' Vs 650 ft/sec (Var +/- 50%)
  - 3-20 Vs 800 ft/sec (Var +/- 50%)
  - 20-40 Vs 1000 ft/sec (Var +/- 50%)
  - EPRI 1993 Curves for Granular Fill
- COLA Commitment to verify above
  - Dynamic Properties of Borrow Source Material Prior to Placement (RCTS Testing Program)
  - In-situ Placement Verification of Velocity Profile