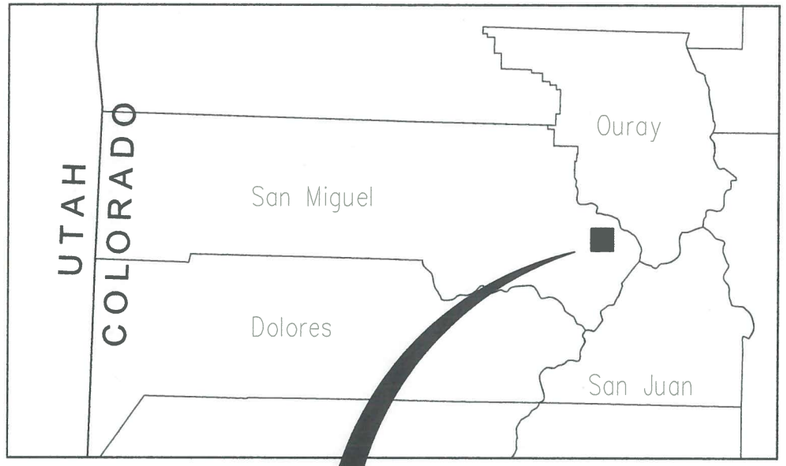
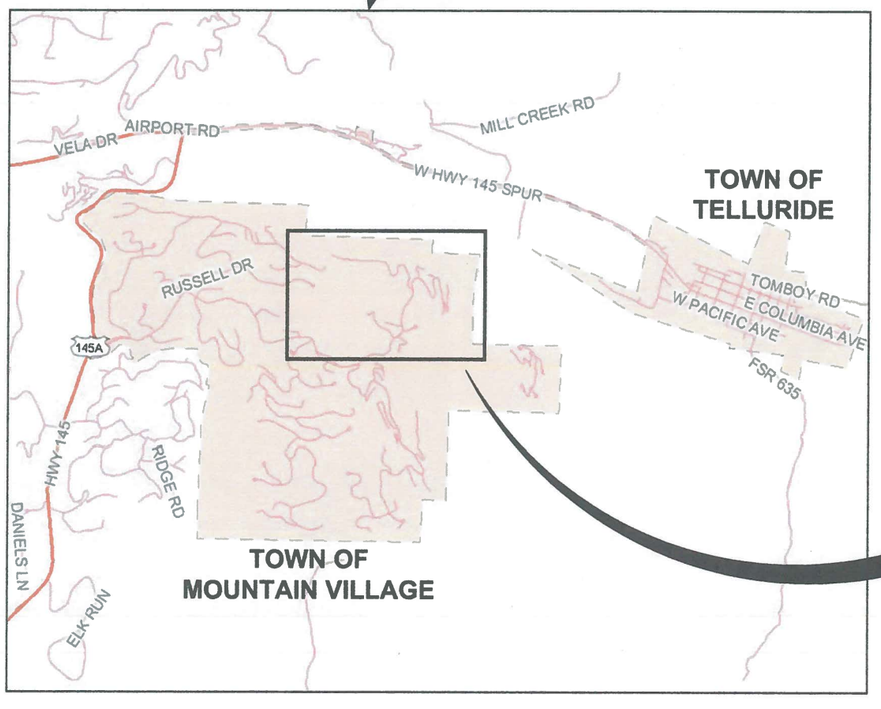
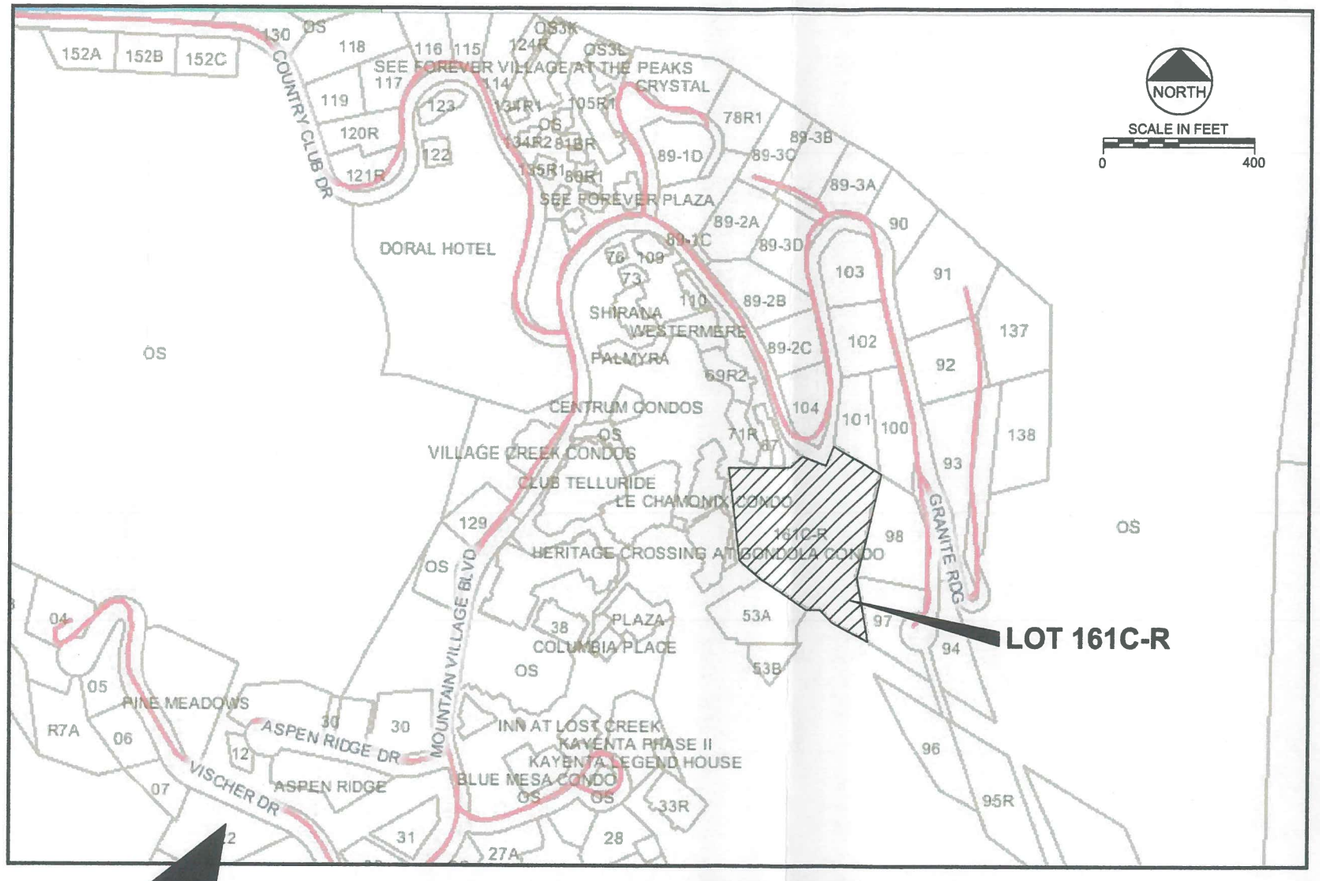






MOUNTAIN VILLAGE CORE VICINITY MAP

FIGURE 3-1
LOT 161C-R MOUNTAIN VILLAGE, CO
SITE VICINITY MAP

MFG, Inc.
consulting scientists and engineers

Date:	OCTOBER 2006
Project:	181308
File:	VICINITY-01.DWG

E:\181308\Dvicinity-01.dwg

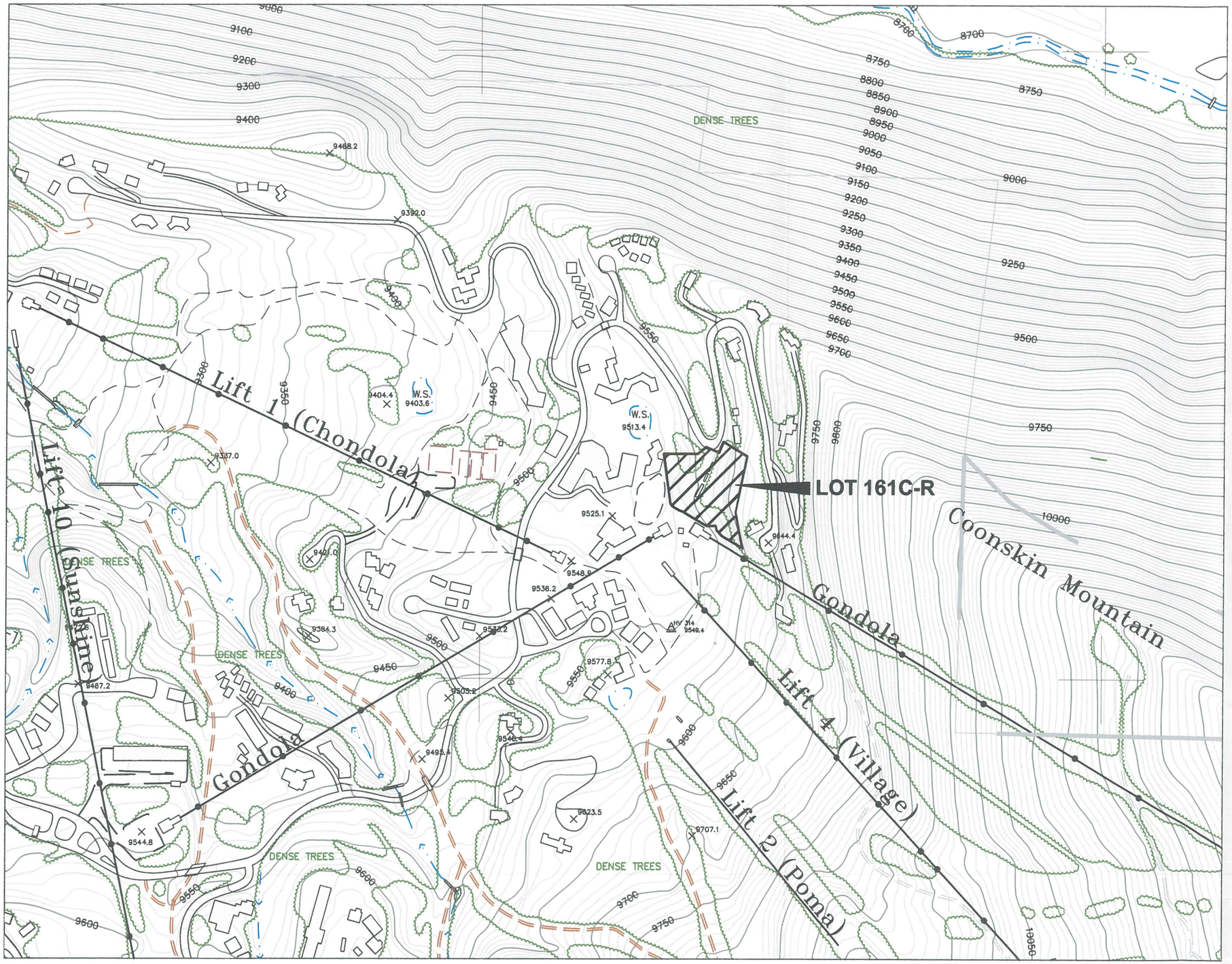
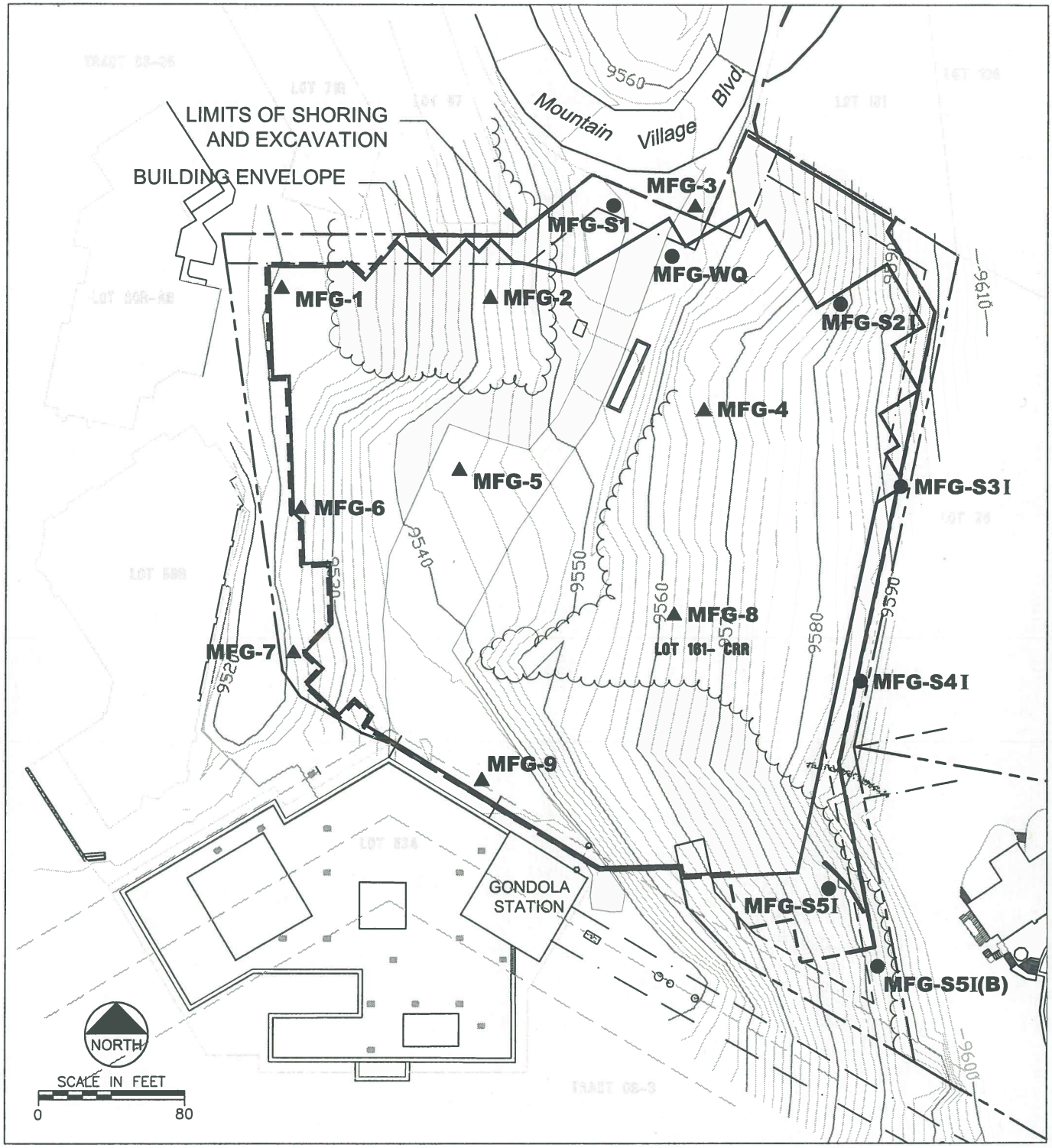


FIGURE 3-2
LOT 161C-R LOCAL TOPOGRAPHY

MFG, Inc.
consulting scientists and engineers

Date:	NOVEMBER 2006
Project:	181308
File:	TOPO-LOCAL.DWG

E:\181308\TOPO-LOCAL.dwg



LEGEND

- ● SHORING INVESTIGATION BORING LOCATION
- ▲ FOUNDATION BORING LOCATION

NOTES:

1. AN "I" AFTER THE BOREHOLE DESIGNATION INDICATES THAT AN INCLINOMETER WAS INSTALLED IN THAT BORING.
2. CONTOURS ARE FROM TOPOGRAPHIC SURVEY PREPARED BY FOLEY ASSOCIATES, INC. (FINAL DRB EXISTING CONDITIONS, OCTOBER 3, 2006).

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 5-1

BORING LOCATION MAP

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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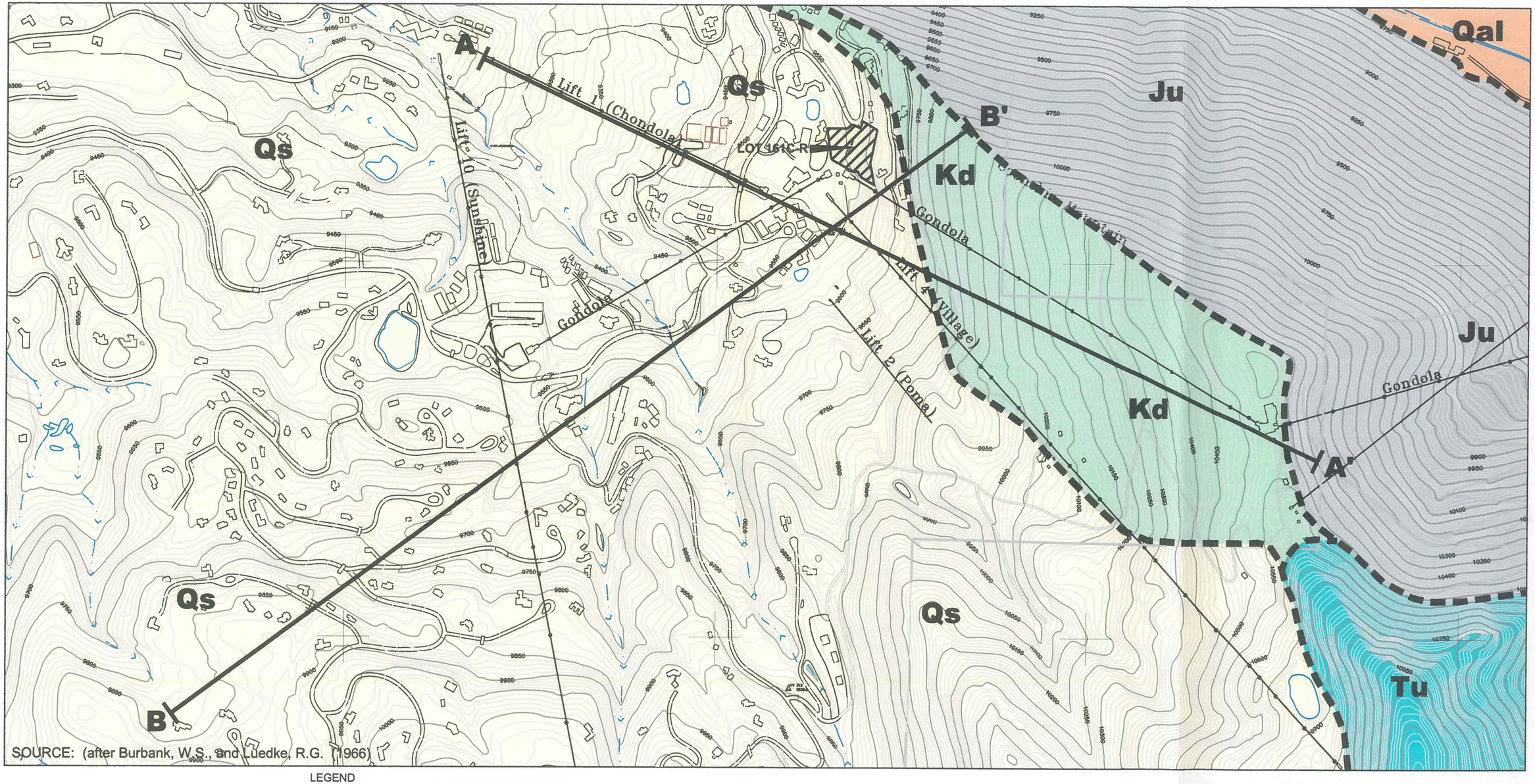


LEGEND

- **Qal** QUATERNARY ALLUVIUM
- **Qs** LANDSLIDE DEPOSITS: SANDY TO SILTY CLAY WITH SAND, GRAVEL AND CLAYSTONE FRAGMENTS
- **Tu** TERTIARY UNITS, UNDIFFERENTIATED
- **Kd** DAKOTA SANDSTONE: LOCALLY GRAY QUARTZITIC SANDSTONE WITH GRAY TO BLACK CARBONACEOUS SHALE AND MINOR, THIN, DISCONTINUOUS LOW GRADE COAL
- **Ju** JURASSIC UNITS, UNDIFFERENTIATED

CROSS SECTION LOCATION

GEOLOGICAL CONTACT

NORTH

SCALE IN FEET

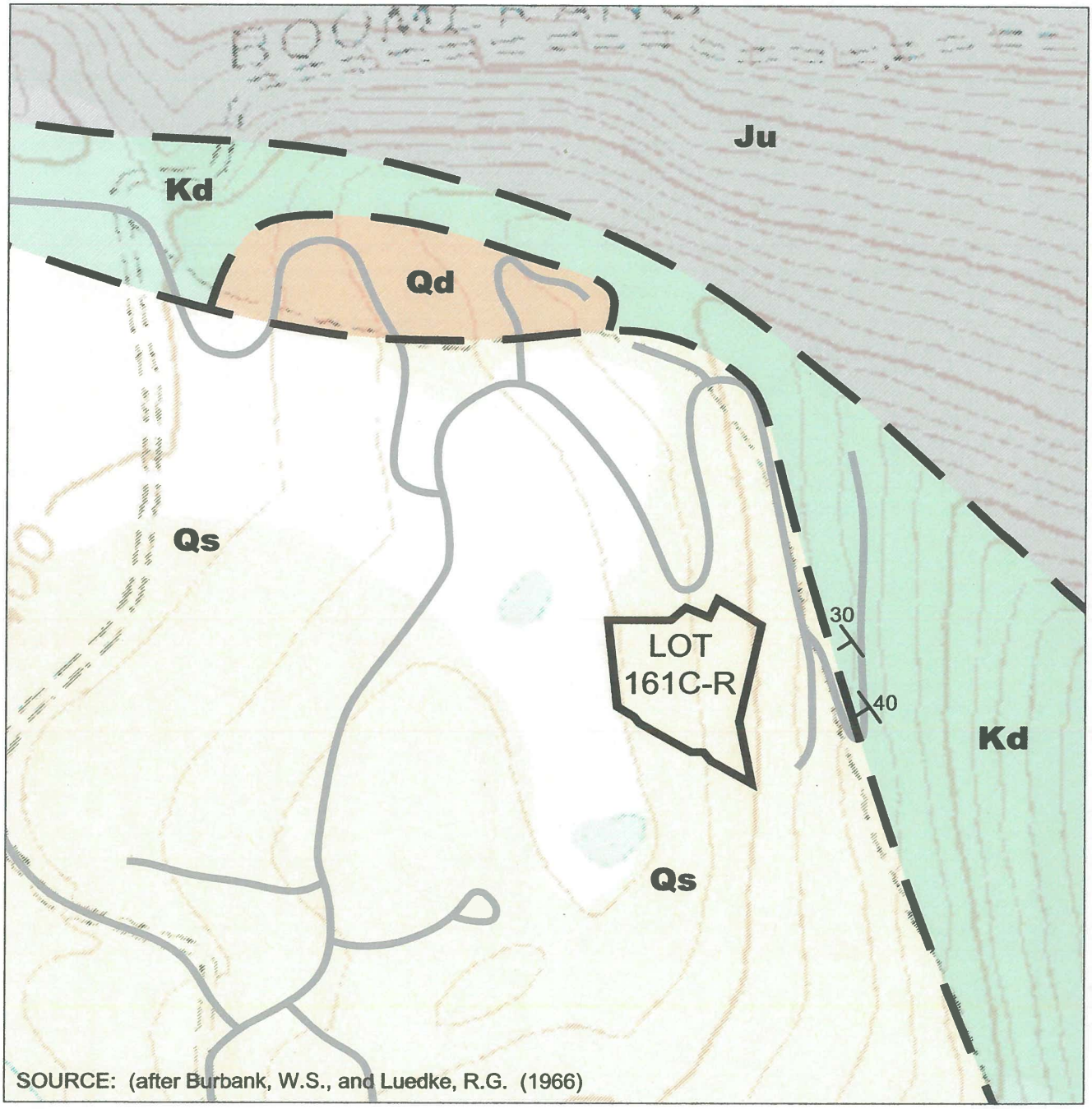
0 800

FIGURE 6-1
GEOLOGY AND TOPOGRAPHY

MFG, Inc.
consulting scientists and engineers

Date:	NOVEMBER 2006
Project:	181308
File:	GEOLOGY-TOPO.DWG

E:\181308\geology_topo.dwg



LEGEND

Qs	LANDSLIDE DEPOSITS: SANDY TO SILTY CLAY WITH SAND, GRAVEL AND CLAYSTONE FRAGMENTS
Qd	GLACIAL DRIFT: UNCONSOLIDATED AND UNSORTED BOULDER TO SILT SIZED ROCK FRAGMENTS IN A CLAY MATRIX
Kd	DAKOTA SANDSTONE: LOCALLY GRAY QUARTZITIC SANDSTONE WITH GRAY TO BLACK CARBONACEOUS SHALE AND MINOR, THIN, DISCONTINUOUS LOW GRADE COAL
Ju	JURASSIC UNITS, UNDIFFERENTIATED
⊤	INDICATES BEDROCK DIP AND STRIKE DIRECTION OBTAINED IN FIELD BY MFG

SCALE IN FEET
0 400

NORTH

LOT 161C-R
MOUNTAIN VILLAGE, CO

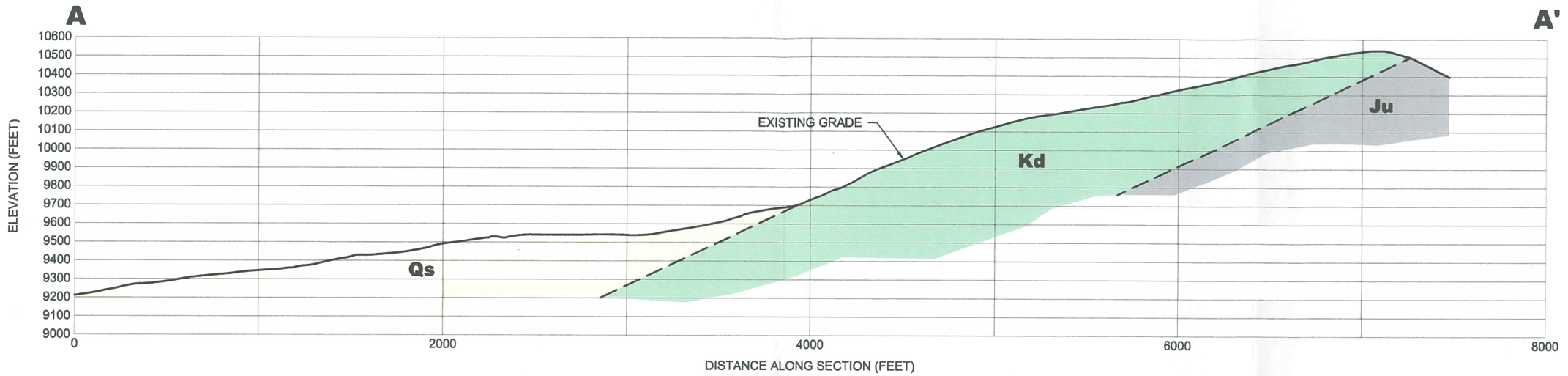
FIGURE 6-2

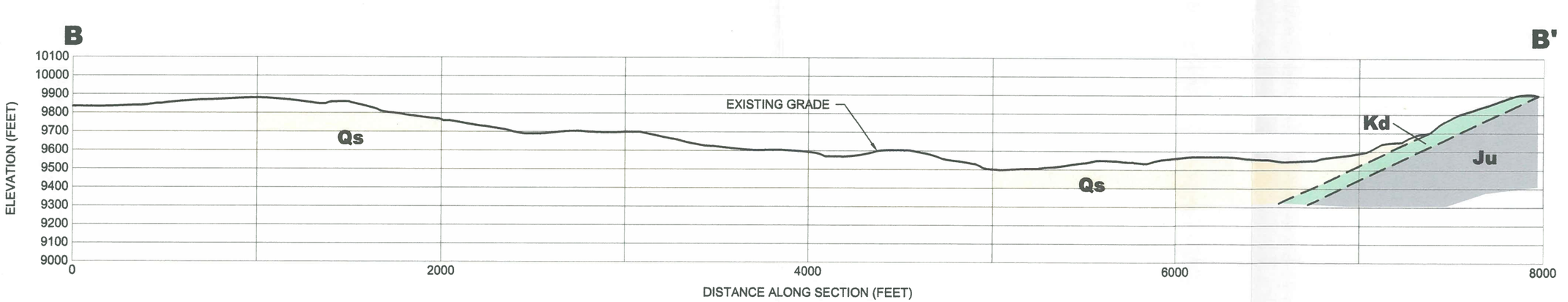
SITE GEOLOGY

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

E:\181308\...ogy-gen.dwg





LEGEND

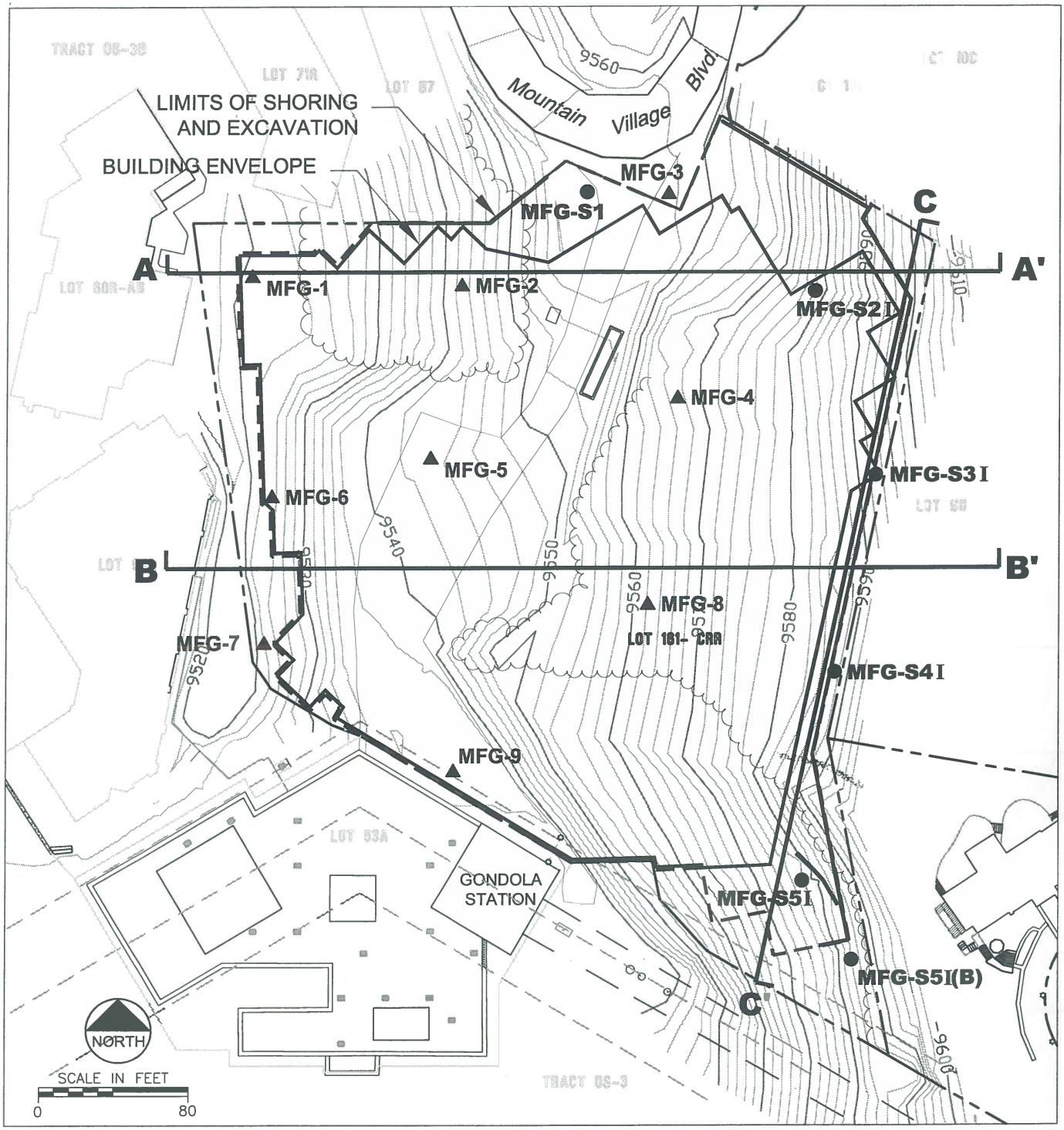
Qs	LANDSLIDE DEPOSITS: SANDY TO SILTY CLAY WITH SAND, GRAVEL AND CLAYSTONE FRAGMENTS
Kd	DAKOTA SANDSTONE: LOCALLY GRAY QUARTZITIC SANDSTONE WITH GRAY TO BLACK CARBONACEOUS SHALE AND MINOR, THIN, DISCONTINUOUS LOW GRADE COAL
Ju	JURASSIC UNITS, UNDIFFERENTIATED

FIGURE 6-3
GEOLOGIC CROSS SECTIONS

MFG, Inc.
consulting scientists and engineers

Date: NOVEMBER 2006
Project: 181308
File: GEOLOGY-TOPO.DWG

E:\181308\Geology-topo.dwg



LEGEND

MFG-S1 ● LOCATION OF EXPLORATORY BORING

1. AN "I" AFTER THE BOREHOLE DESIGNATION INDICATES THAT AN INCLINOMETER WAS INSTALLED IN THAT BORING.
2. CONTOURS ARE FROM TOPOGRAPHIC SURVEY PREPARED BY FOLEY ASSOCIATES, INC. (FINAL DRB EXISTING CONDITIONS, OCTOBER 3, 2006).

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 9-1

CROSS SECTION LOCATION MAP

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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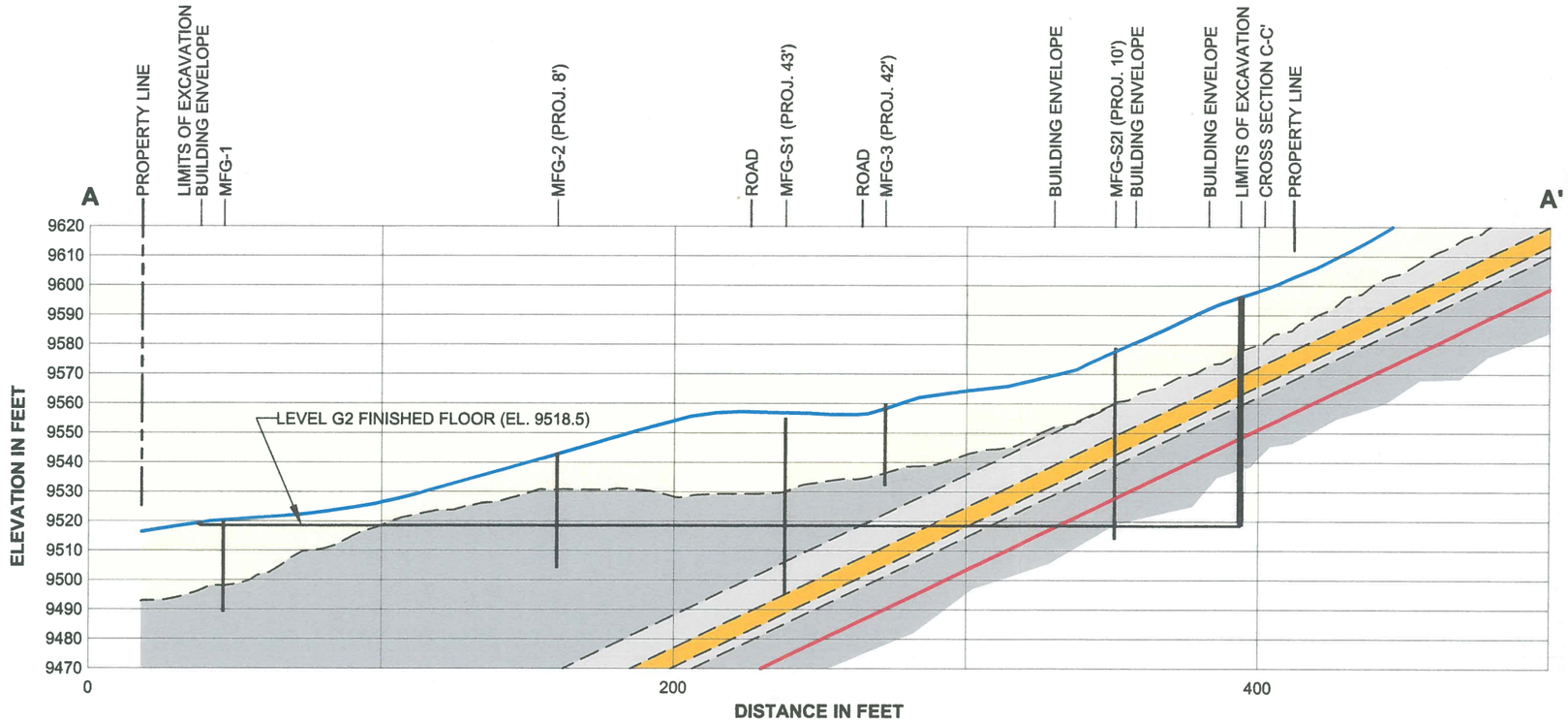

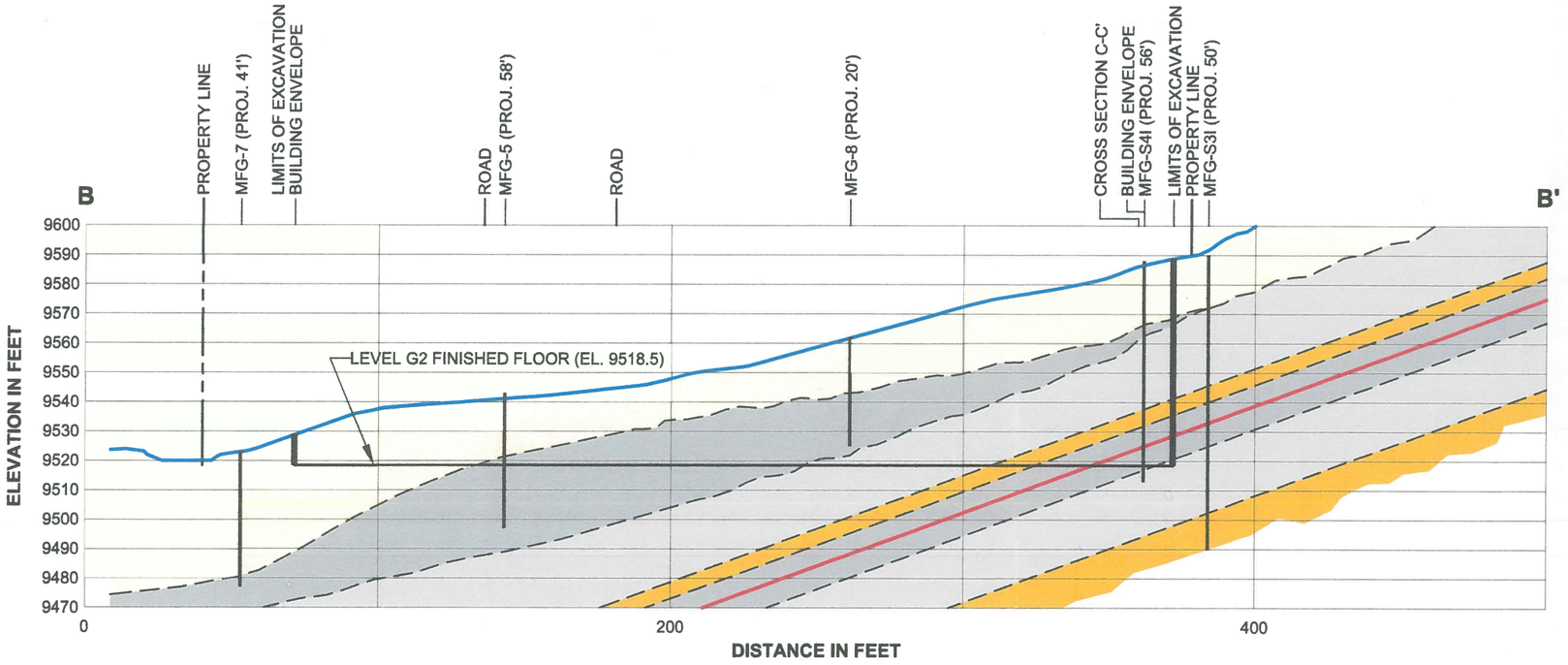

LEGEND:

- LANDSLIDE DEPOSIT
- SHALE
- INTERBEDDED SANDSTONE AND SHALE
- SANDSTONE
- COAL BED
- GEOLOGIC CONTACTS (DASHED WHERE APPROXIMATE)

NOTE:
THESE CROSS SECTIONS ARE BASED ON SUBJECTIVE INTERPRETATION OF BOREHOLE DATA AND GEOLOGIC MAPPING. THICKNESS AND ORIENTATION OF ROCK UNITS SHOULD BE CONSIDERED APPROXIMATE AND VARIABLE, PARTICULARLY WHERE PROJECTIONS ARE MADE BEYOND BOREHOLE LOCATIONS AND DEPTHS.

SCALE IN FEET
0 50'

LOT 161C-R
MOUNTAIN VILLAGE, CO
FIGURE 9-2
CROSS SECTIONS A-A' AND B-B'

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TC	CHECKED: MSA

MFG, Inc.
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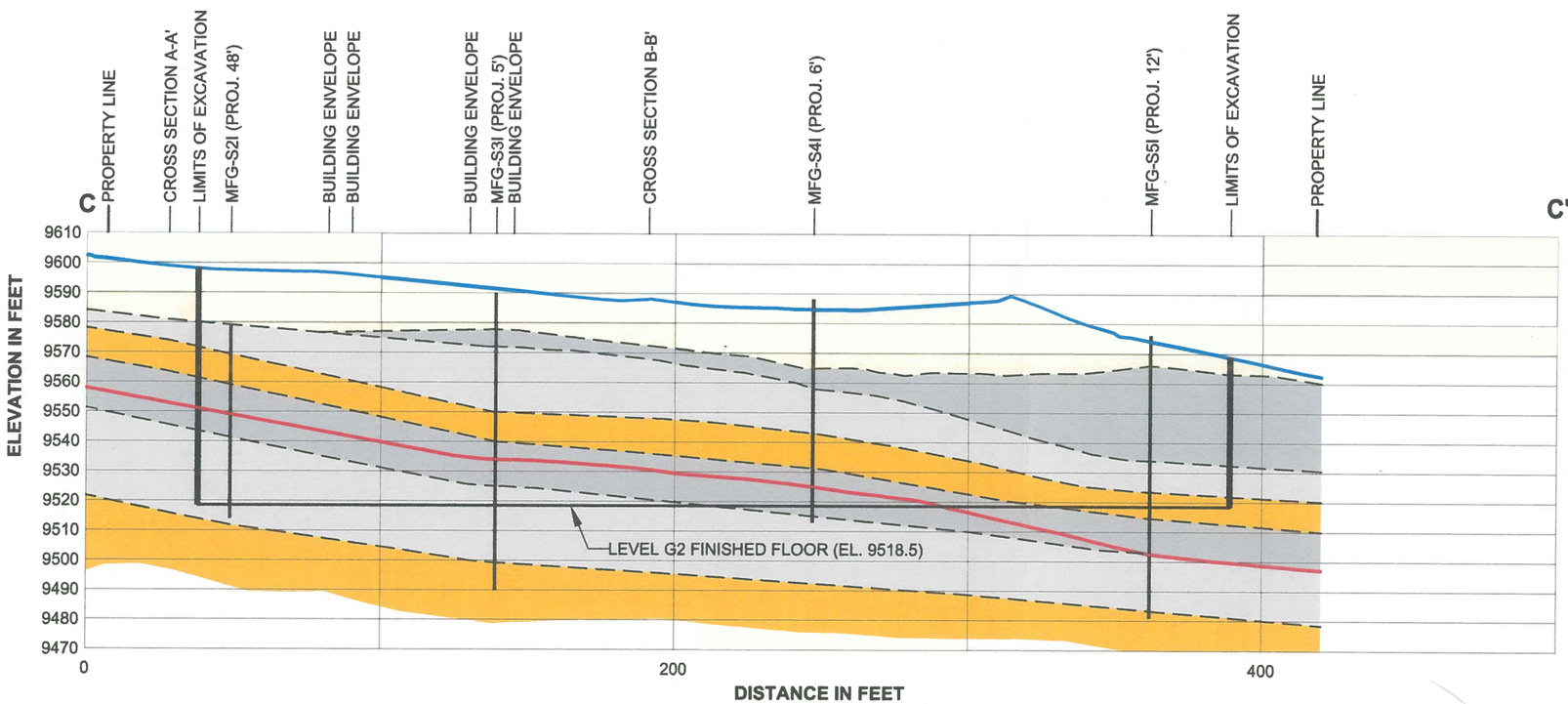

LEGEND:

- OVERBURDEN
- SHALE
- INTERBEDDED SANDSTONE AND SHALE
- SANDSTONE
- COAL BED

NOTE:
THESE CROSS SECTIONS ARE BASED ON SUBJECTIVE INTERPRETATION OF BOREHOLE DATA AND GEOLOGIC MAPPING. THICKNESS AND ORIENTATION OF ROCK UNITS SHOULD BE CONSIDERED APPROXIMATE AND VARIABLE, PARTICULARLY WHERE PROJECTIONS ARE MADE BEYOND BOREHOLE LOCATIONS AND DEPTHS.

SCALE IN FEET
0 50'

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 9-3

CROSS SECTION C-C'

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TC	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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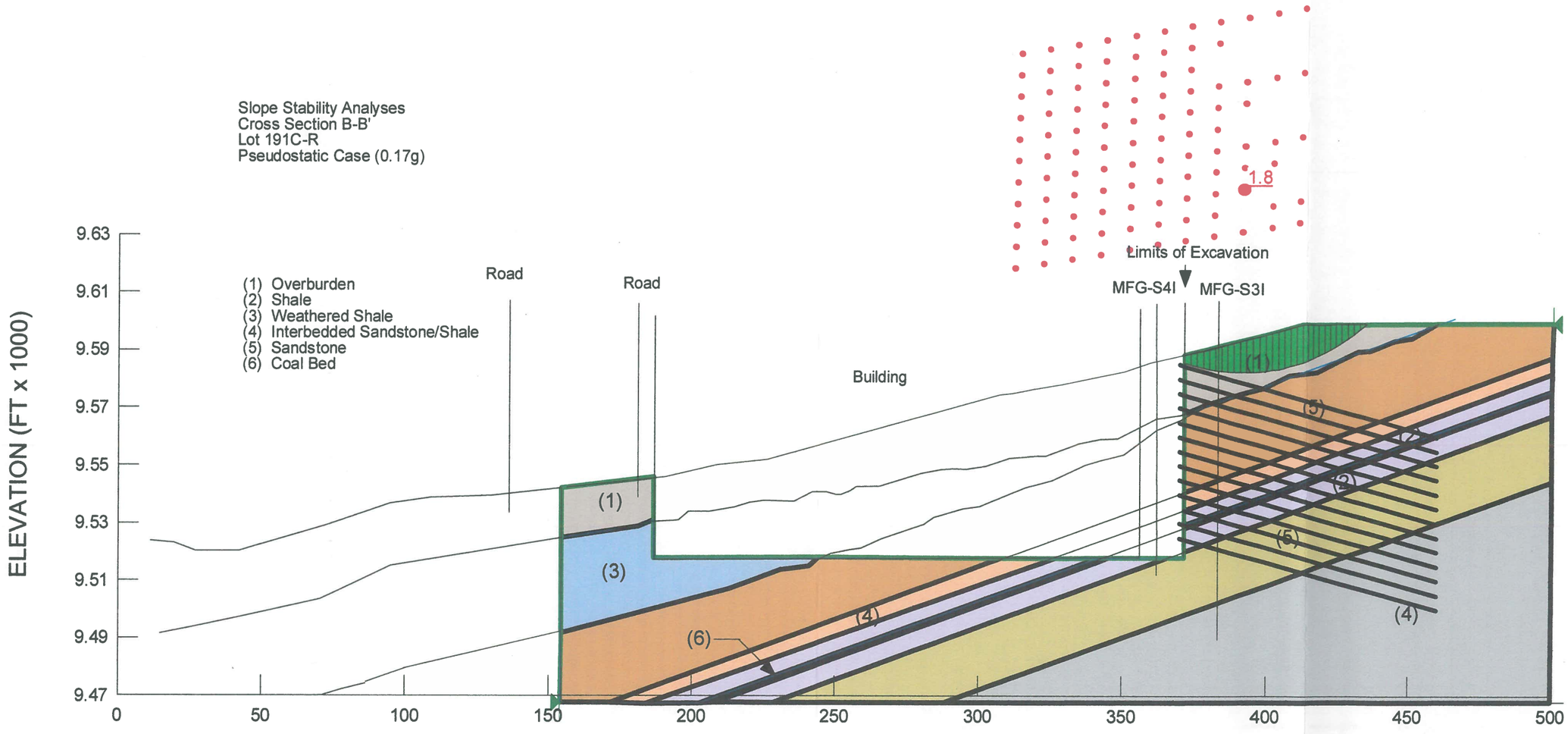
Slope Stability Analyses
Cross Section B-B'
Lot 191C-R
Pseudostatic Case (0.17g)



Name: Scenario 3.gsz
Date: 11/9/2006

FIGURE 9-4
CROSS SECTION B-B'
SLOPE STABILITY SCENARIO 3

MFG, Inc.
consulting scientists and engineers

Date:	NOVEMBER 2006
Project:	181308
File:	SL-STA-3-7.dwg

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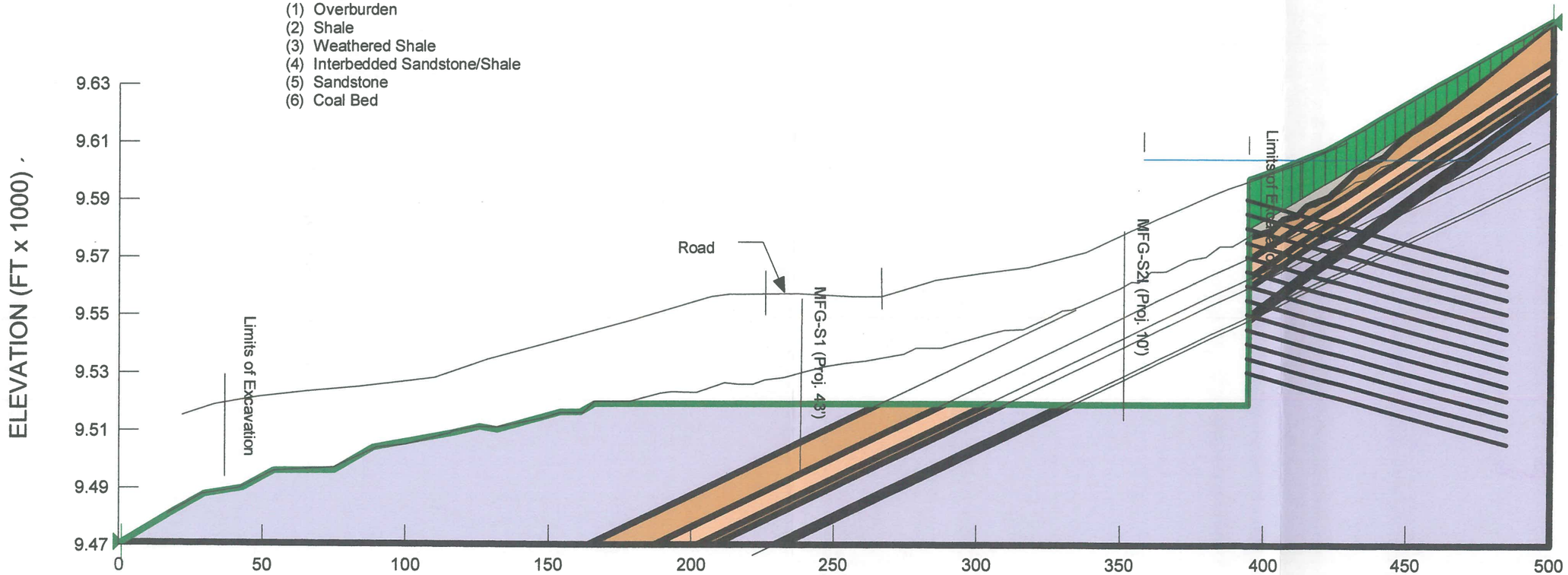
Slope Stability Analyses
Cross Section A-A'
Lot 191C-R

2.729

(1) Overburden
(2) Shale
(3) Weathered Shale
(4) Interbedded Sandstone/Shale
(5) Sandstone
(6) Coal Bed



Name: Scenario 7.gsz
Date: 11/9/2006

FIGURE 9-5
CROSS SECTION A-A'
SLOPE STABILITY SCENARIO 7

MFG, Inc.
consulting scientists and engineers

Date:	NOVEMBER 2006
Project:	181308
File:	SL-STA-3-7.dwg

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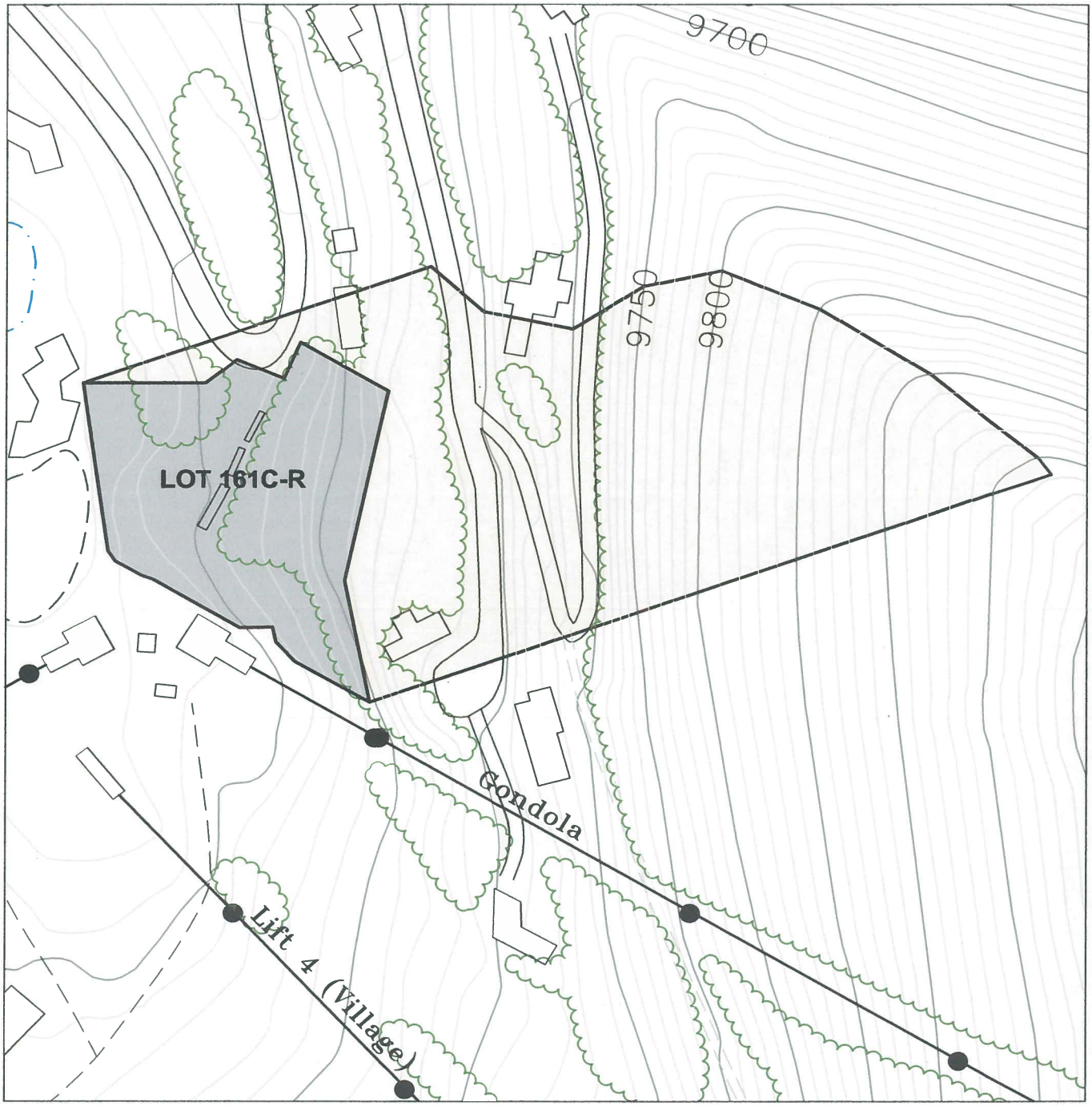

LEGEND

ESTIMATED UPGRADIENT EXTENT OF THE STORAGE BASIN (BASED ON A DIP ANGLE OF 26 DEGREES)

NOTE:
STORAGE BASIN AREA IS APPROXIMATELY 9.1 ACRES.

NORTH

SCALE IN FEET

0 200

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 11-1

ESTIMATED UPGRADIENT EXTENT OF CONFINED GROUNDWATER SYSTEM

PROJECT: 181308	DATE: JANUARY 2007	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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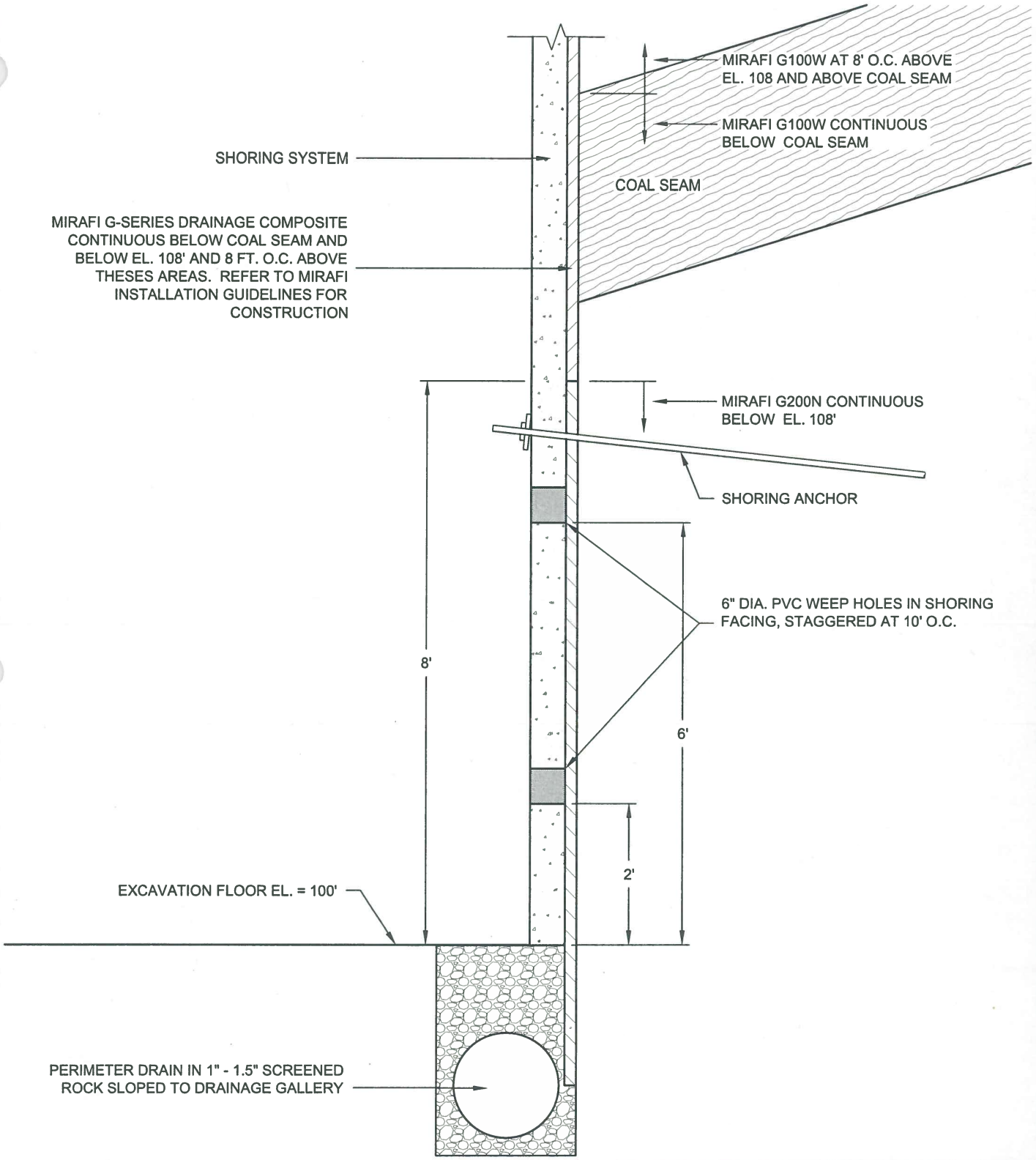

NOTE:

THE ACTUAL SHORING DRAINAGE DESIGN MUST ENSURE THAT EFFICIENT DRAINAGE BEHIND THE WALL IS MAINTAINED FOR THE SERVICE LIFE OF THE STRUCTURE. THE PERMANENT SHORING DRAINAGE SYSTEM SHOULD BE DESIGNED BY A PROFESSIONAL ENGINEER.

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 11-2

CONCEPTUAL SHORING DRAINAGE DETAIL

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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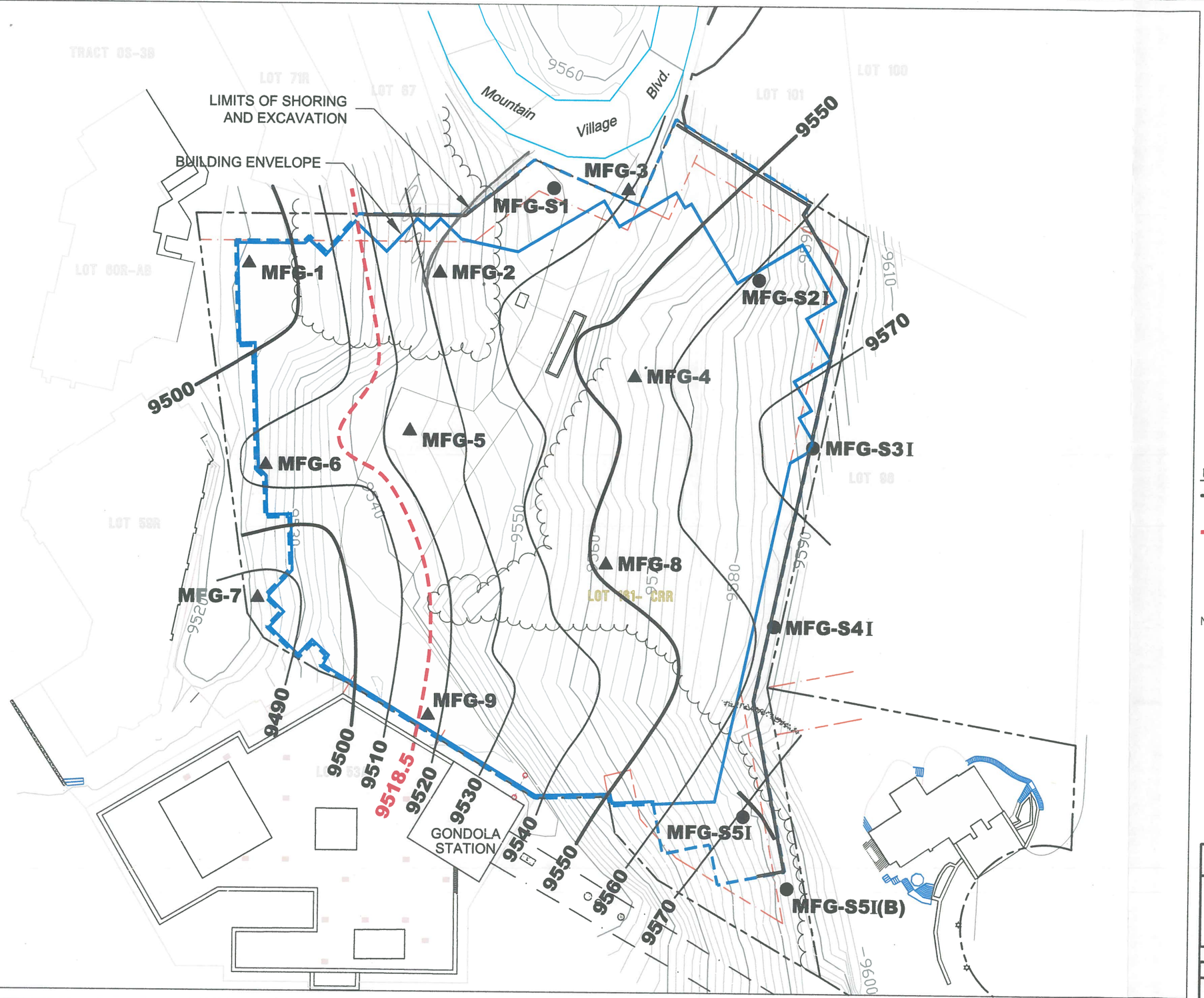

LEGEND

- ESTIMATED BEDROCK SURFACE ELEVATION CONTOURS
- APPROXIMATE LIMIT OF BEDROCK AT THE EXCAVATED FLOOR (ELEVATION 9518.5 FT.)
- SHORING INVESTIGATION BORING LOCATION
- FOUNDATION BORING LOCATION

NOTES:

1. BEDROCK ELEVATION CONTOURS WERE INTERPRETED FROM THE DEPTH TO BEDROCK IN OUR BORINGS AND TOPOGRAPHIC SURVEY PREPARED BY FOLEY ASSOCIATES, INC. (FINAL DRB EXISTING CONDITIONS, OCTOBER 3, 2006).

NORTH

SCALE IN FEET

0 60

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 12-1

ESTIMATED BEDROCK SURFACE ELEVATION CONTOURS

PROJECT: 181308	DATE: JANUARY 2007	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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LEGEND

- APPROXIMATE LIMIT OF BEDROCK AT THE EXCAVATED FLOOR (ELEVATION 9518.5 FT.)
- AREA WHERE BEDROCK WILL BE EXPOSED IN EXCAVATION FLOOR
- AREA WHERE BEDROCK SURFACE DIPS BELOW ELEVATION 9518.5 FT. FOUNDATION PIERS WILL PASS THROUGH OVERBURDEN SOILS

NORTH

SCALE IN FEET
0 60

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 12-2
INTERPRETIVE MAP OF EXCAVATION FLOOR AT G2 LEVEL (ELEVATION 9518.5)

PROJECT: 181308	DATE: FEBRUARY 2007
REV:	BY: TGB CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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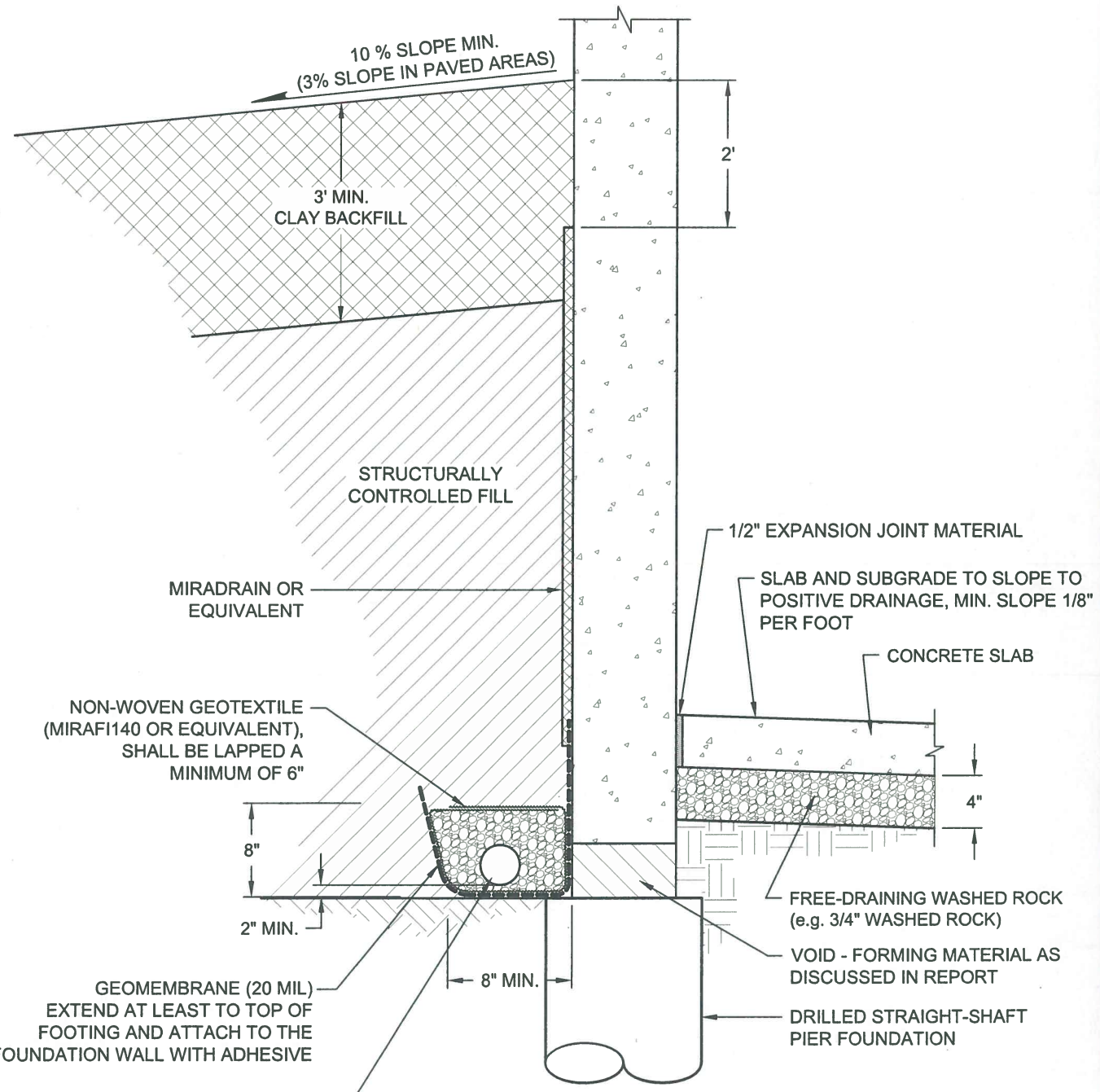

NOT TO SCALE

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 12-3

CONCEPTUAL DRILLED PIER FOUNDATION EXTERIOR PERIMETER DRAIN DETAIL

PROJECT: 181308	DATE: FEBRUARY 2007	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

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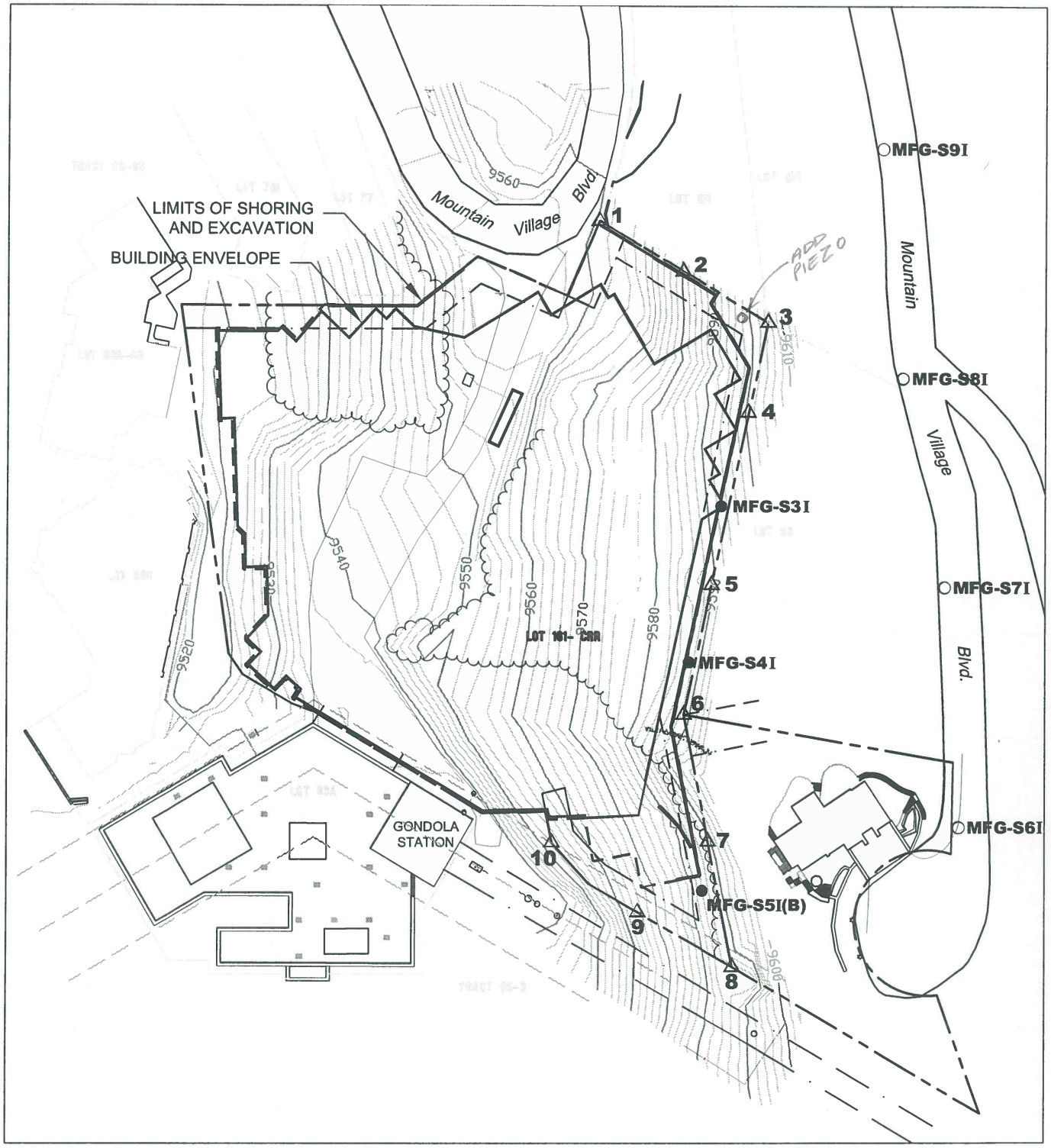

NORTH

SCALE IN FEET

0 100

LEGEND

- ● EXISTING INCLINOMETER LOCATION
- ○ PROPOSED INCLINOMETER
- △ PROPOSED SURVEY MONUMENT

SURVEY MONUMENTS

ID	EASTING	NORTHING
1	324671.5	471531.8
2	324729.3	471497.4
3	324787.2	471463.1
4	324773.9	471402.0
5	324749.2	471284.3
6	324730.4	471196.0
7	324747.1	471110.1
8	324763.8	471024.2
9	324699.0	471061.9
10	324639.9	471109.4

LOT 161C-R
MOUNTAIN VILLAGE, CO

FIGURE 14-1

SLOPE MONITORING PROGRAM SURVEY MONUMENT LOCATION

PROJECT: 181308	DATE: NOVEMBER 2006	
REV:	BY: TGB	CHECKED: MSA

MFG, Inc.
consulting scientists and engineers

E:\181308\SURV-01.dwg