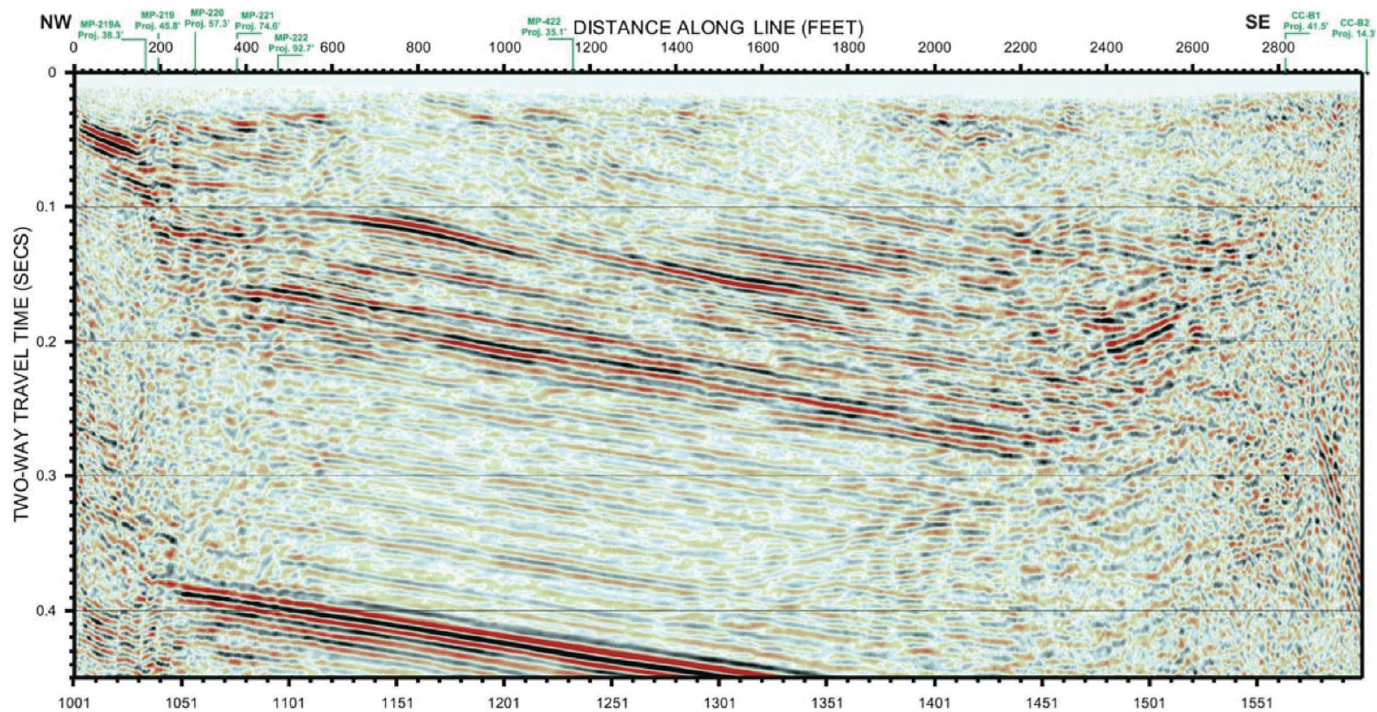


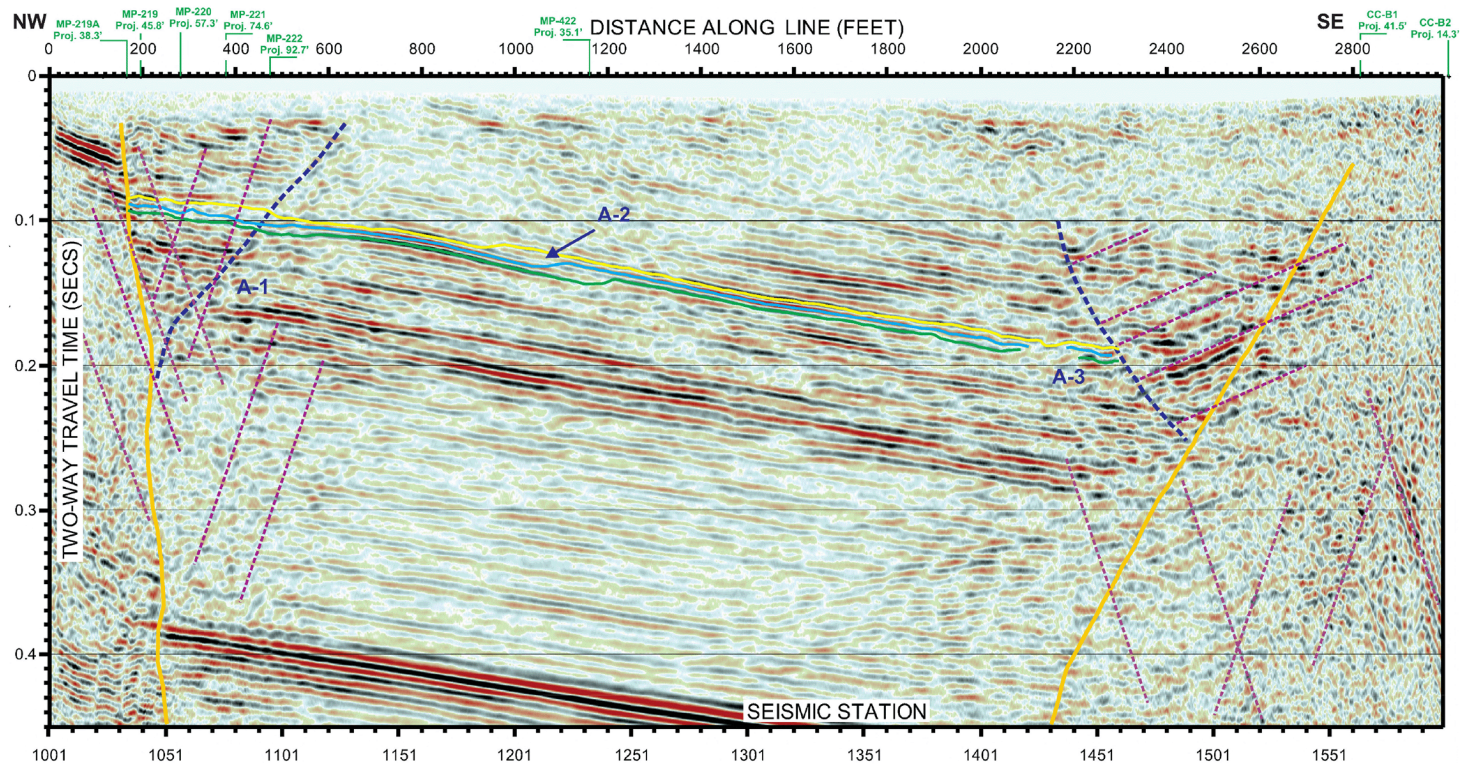
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Notes: Seismic reflection profile SRL-1 ([Reference 2.5.1-214](#)).

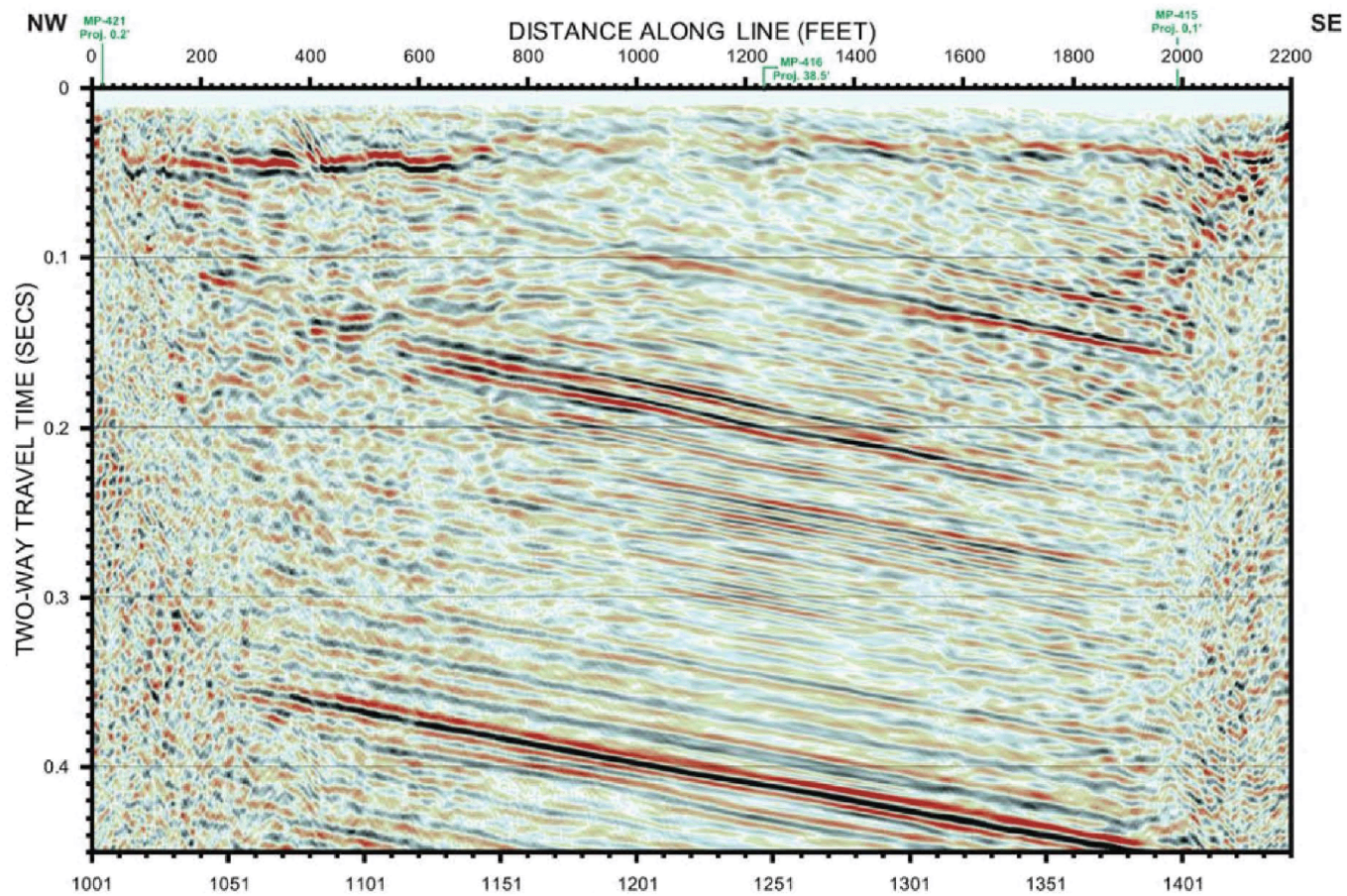
Figure 2.5.1-36. (Sheet 1 of 5) Seismic Reflection SRL-1—Without Interpretation

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Notes: Seismic reflection profile SRL-1 (Reference 2.5.1-214).

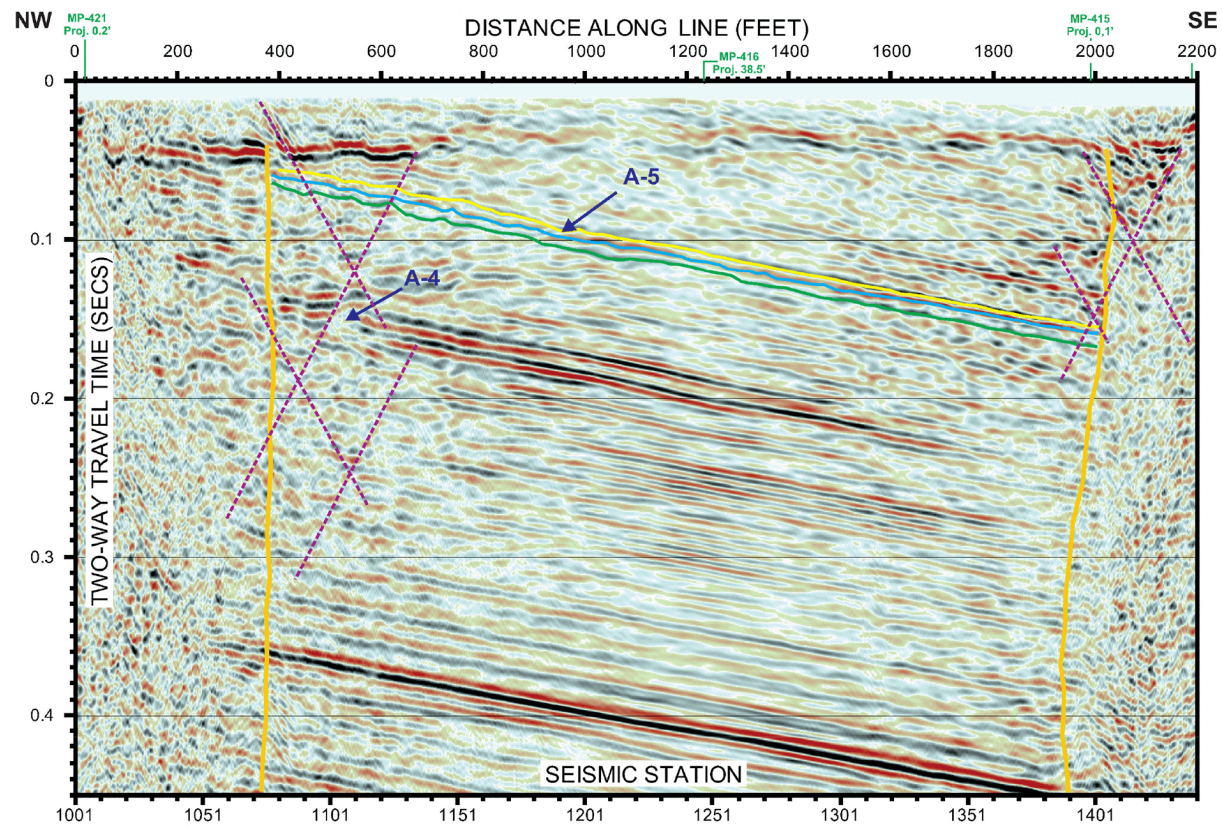
Figure 2.5.1-36. (Sheet 2 of 5) Seismic Reflection SRL-1—With Interpretation



Note: Seismic reflection profile SRL-2 ([Reference 2.5.1-214](#)).

Figure 2.5.1-36. (Sheet 3 of 5) Seismic Reflection SRL-2—Without Interpretation






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Note: Seismic reflection profile SRL-2 (Reference 2.5.1-214).

Figure 2.5.1-36. (Sheet 4 of 5) Seismic Reflection SRL-2—With Interpretation

Explanation for Annotated Seismic Reflection Lines

	Borehole Location
	Interpreted Knox Group Horizon
	Anomalous Zone
	Non-Interpretable Boundary
	Example Artifacts

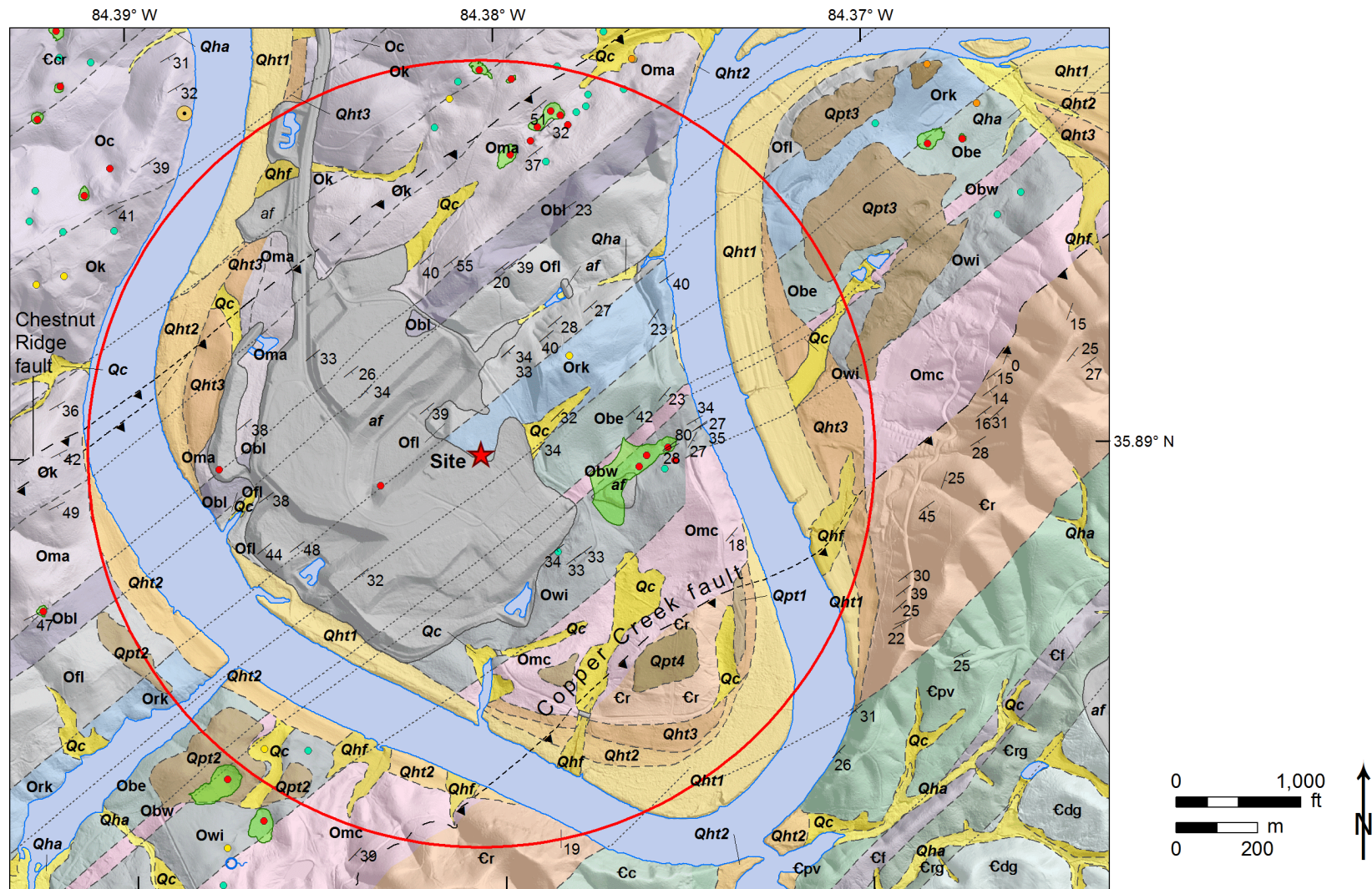
Notes:

Borehole locations are presented if projected less than 100 ft from the line unless noted.

Explanation for seismic reflection lines ([Reference 2.5.1-214](#))

Figure 2.5.1-36. (Sheet 5 of 5) Explanation for Seismic Line Figures

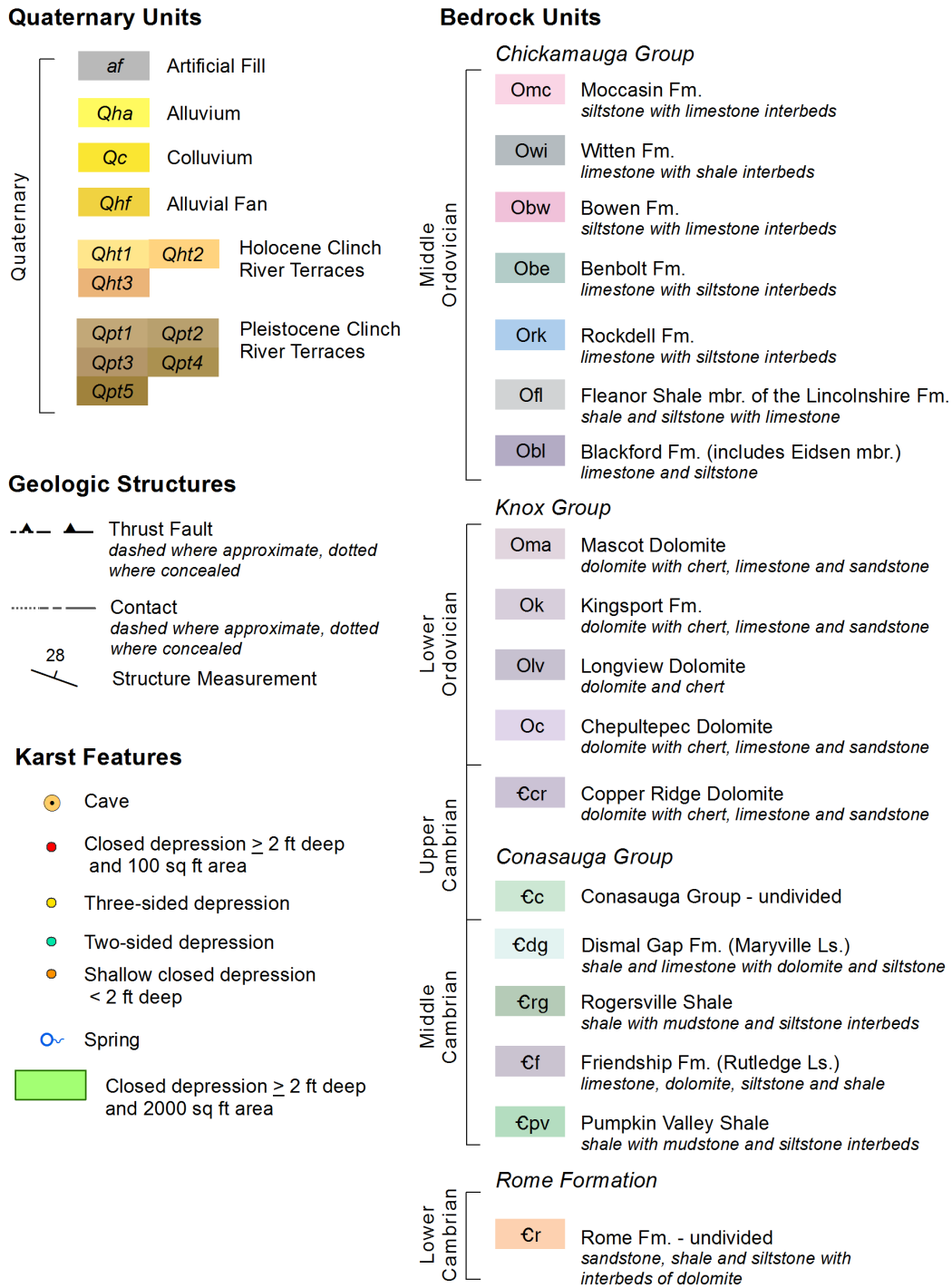
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Note: Simplified geologic map of the Clinch River Nuclear site area.

Figure 2.5.1-37. (Sheet 1 of 2) Site Location Geologic Map

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Note: Explanation for geologic map shown in (A) (Reference 2.5.1-214)

Figure 2.5.1-37. (Sheet 2 of 2) Site Location Geologic Map

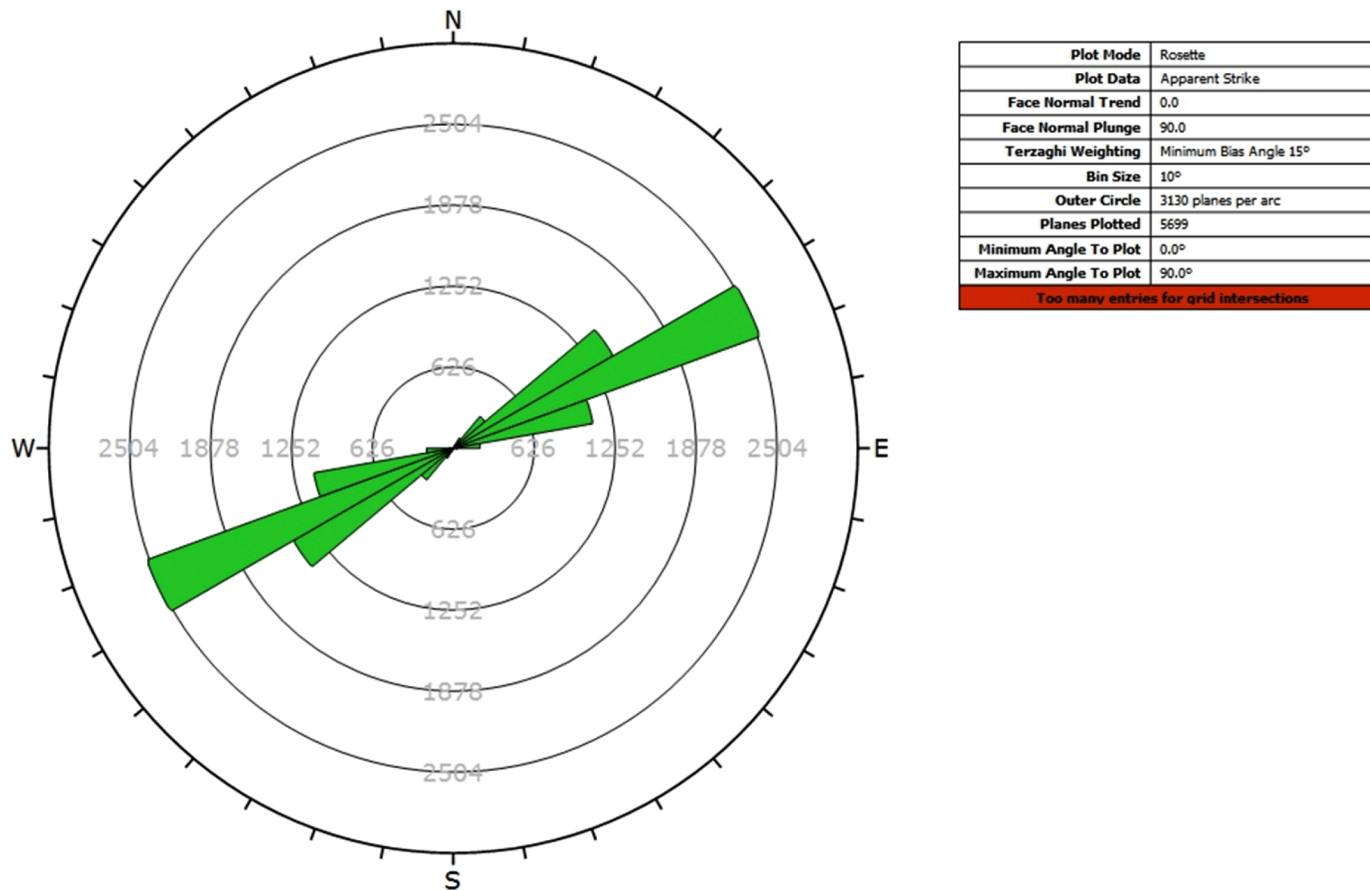


Figure 2.5.1-38. (Sheet 1 of 11) Acoustic Televiewer Data and Outcrop Mapping—Strike of Bedding

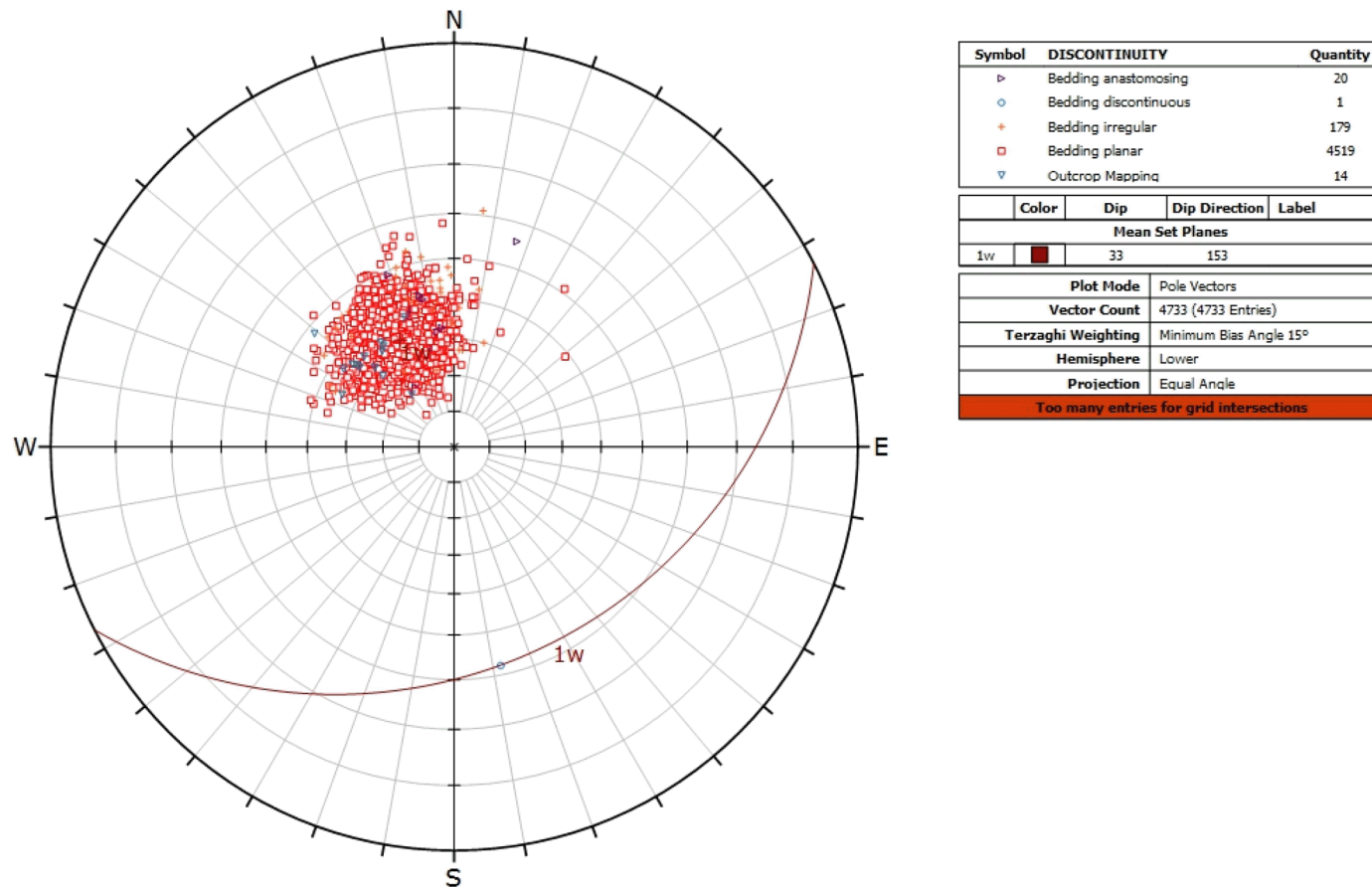


Figure 2.5.1-38. (Sheet 2 of 11) Acoustic Televiewer Data and Outcrop Mapping—Strike and Dip of Bedding Planes

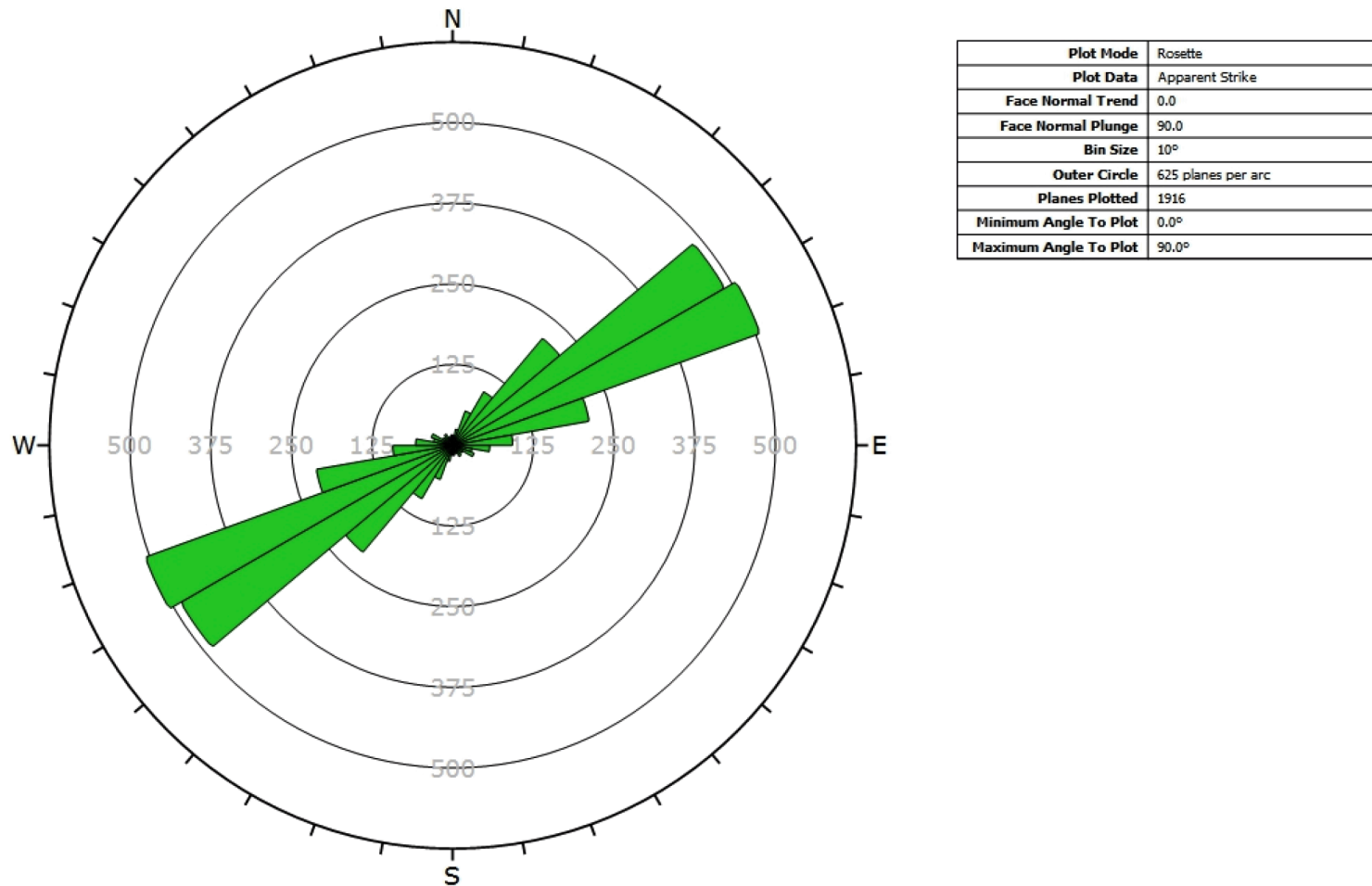


Figure 2.5.1-38. (Sheet 3 of 11) Acoustic Televiewer Data and Outcrop Mapping—Strike of Fractures

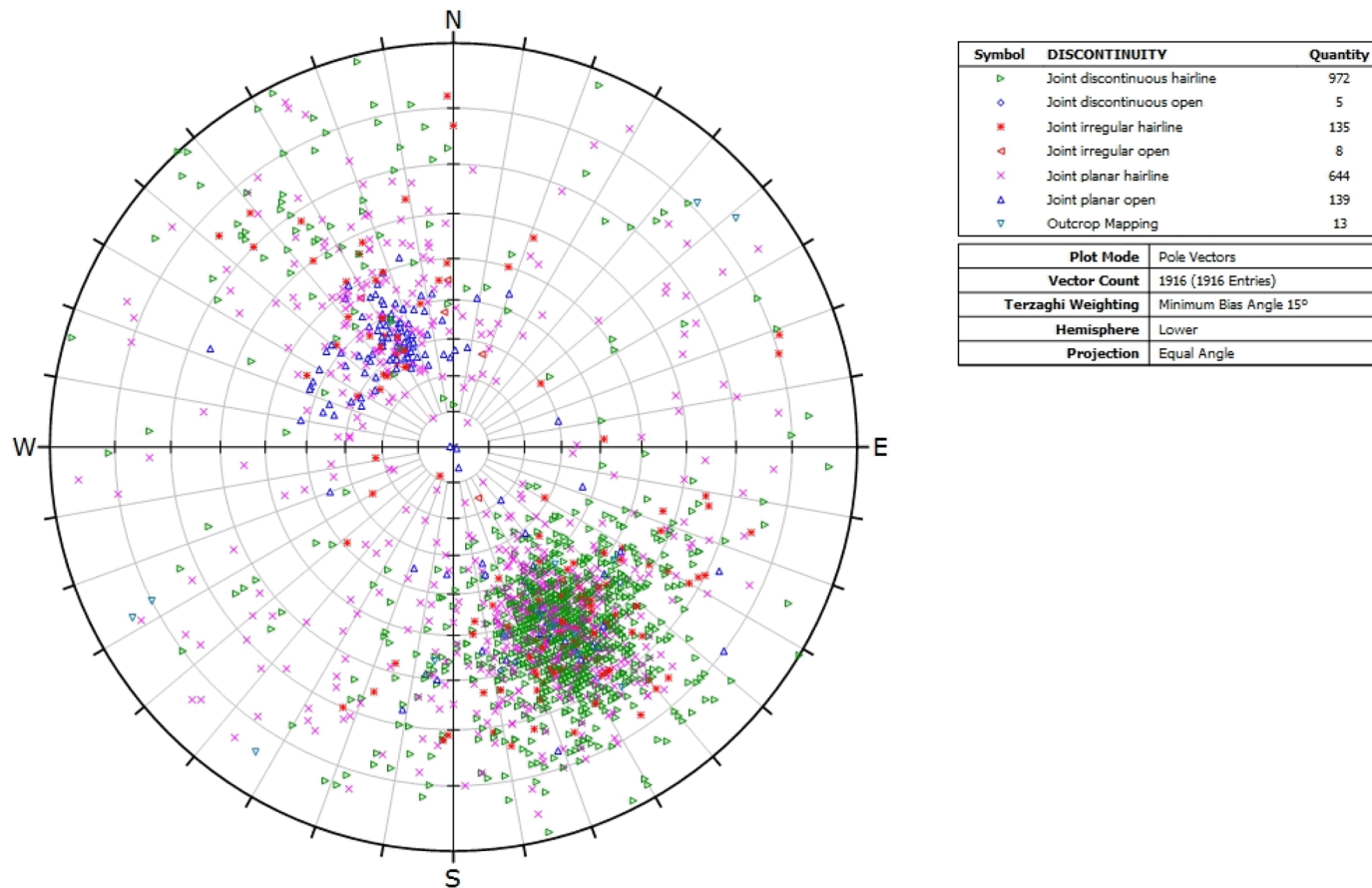


Figure 2.5.1-38. (Sheet 4 of 11) Acoustic Televiewer Data and Outcrop Mapping—Orientation of all Fractures

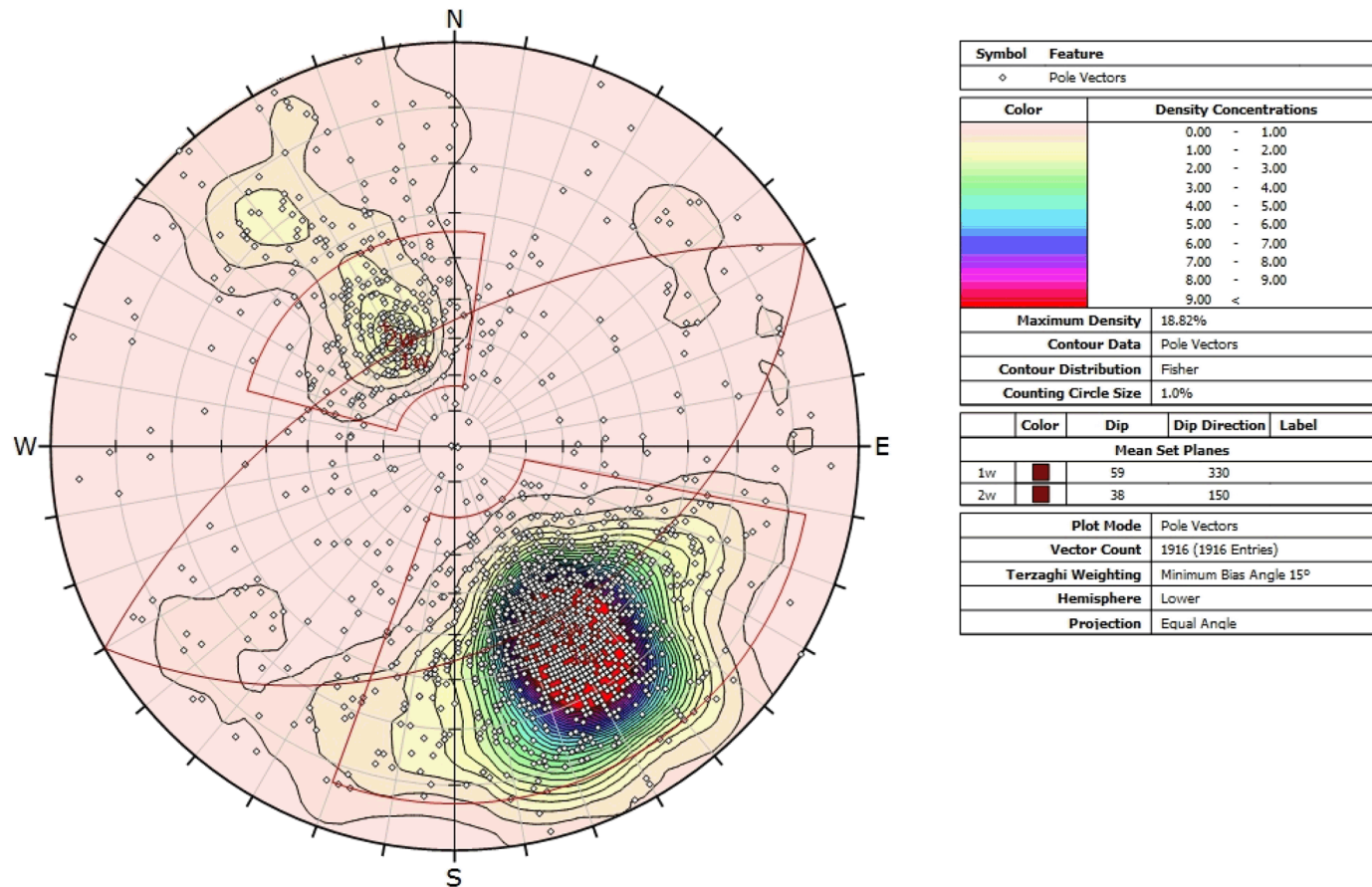


Figure 2.5.1-38. (Sheet 5 of 11) Acoustic Televiwer Data and Outcrop Mapping—Strike and Dip of Primary Fracture Sets

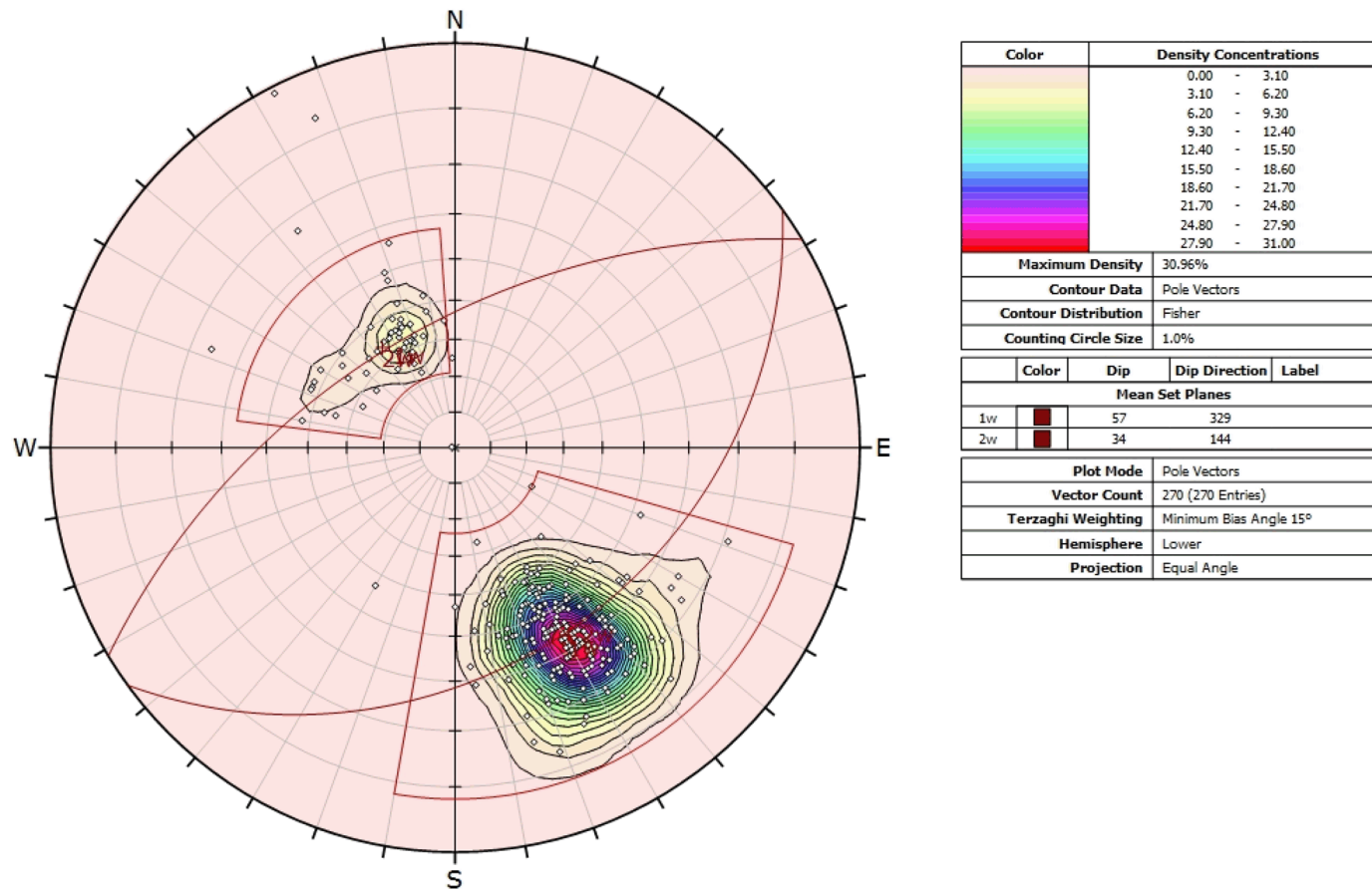


Figure 2.5.1-38. (Sheet 6 of 11) Acoustic Televiwer Data and Outcrop Mapping—Orientation of Fractures in the Benbolt Formation

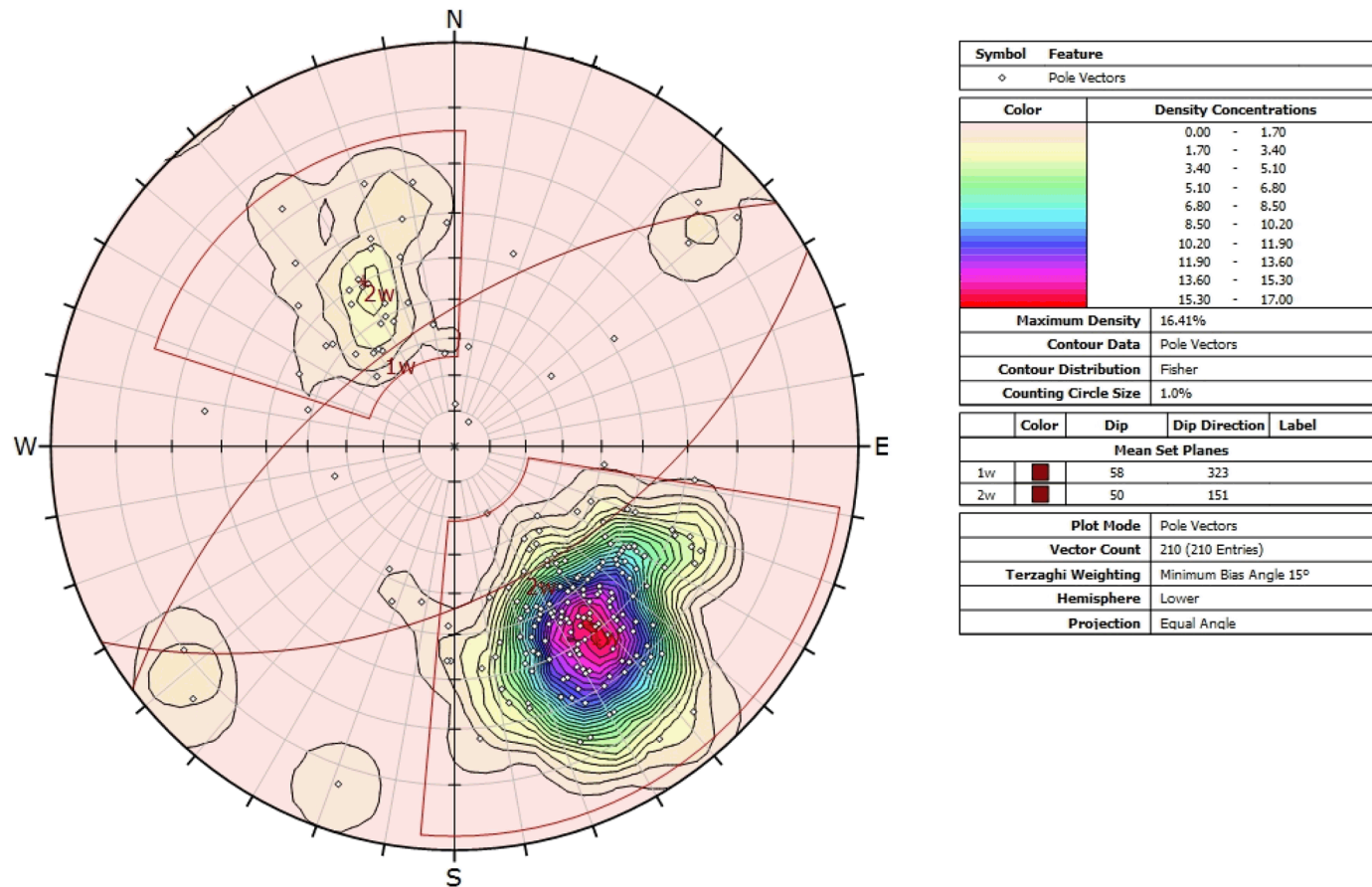


Figure 2.5.1-38. (Sheet 7 of 11) Acoustic Televiewer and Outcrop Mapping—Orientation of Fractures in the Blackford Formation

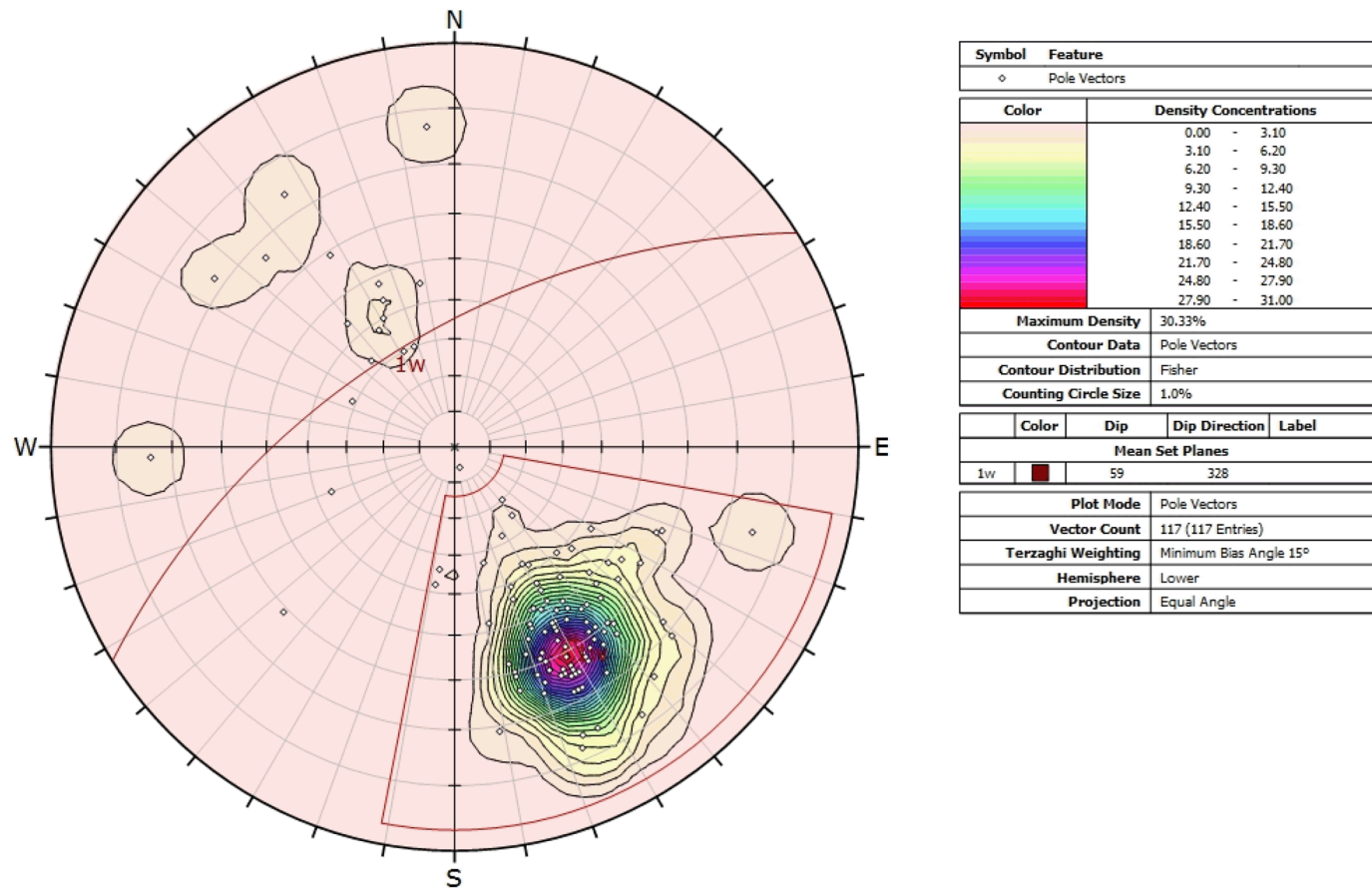


Figure 2.5.1-38. (Sheet 8 of 11) Acoustic Televiwer Data and Outcrop Mapping—Orientation of Fractures in the Eidson Formation

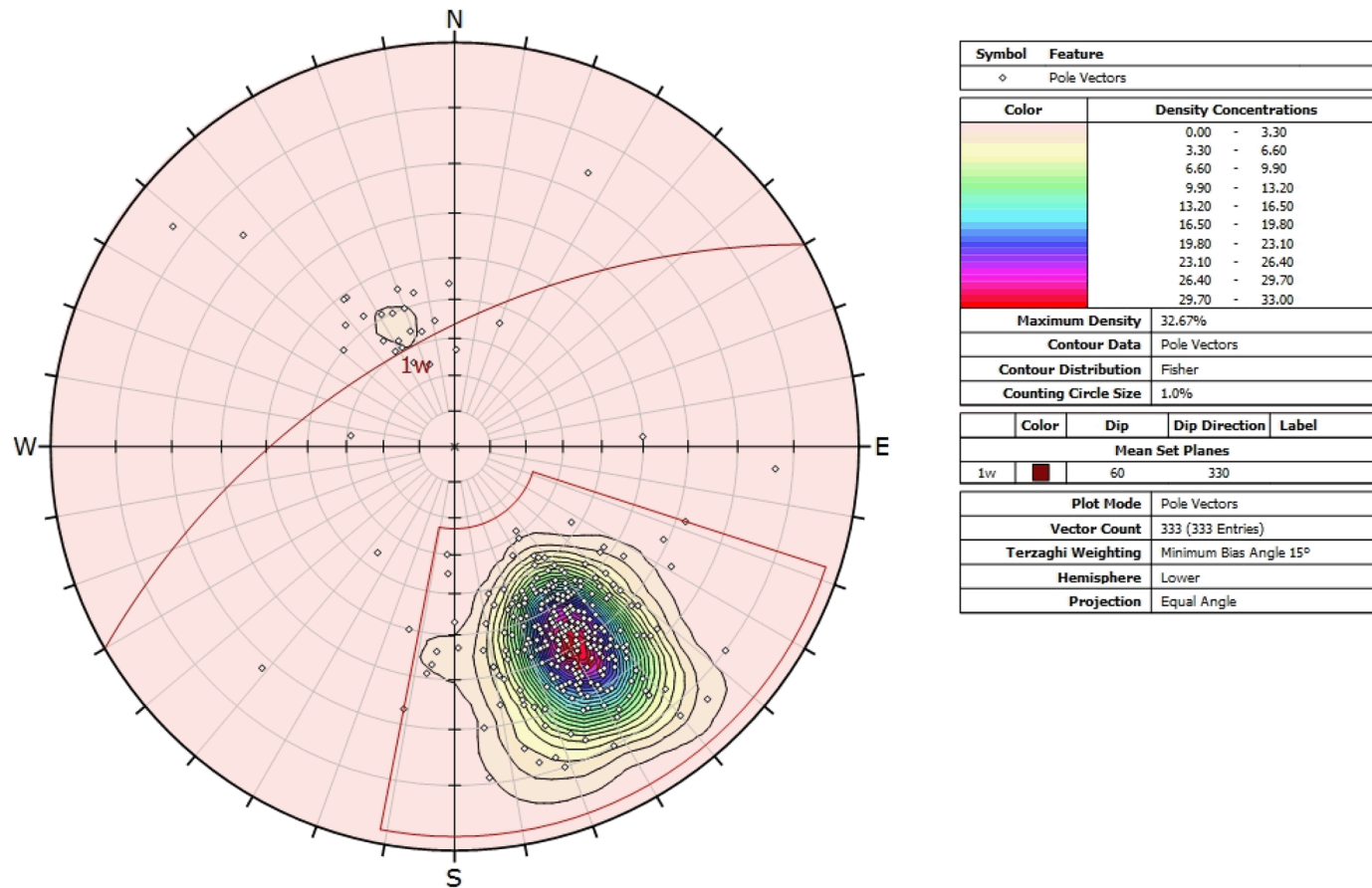


Figure 2.5.1-38. (Sheet 9 of 11) Acoustic Televiewer Data and Outcrop Mapping—Orientation of Fractures in the Fleanor Shale

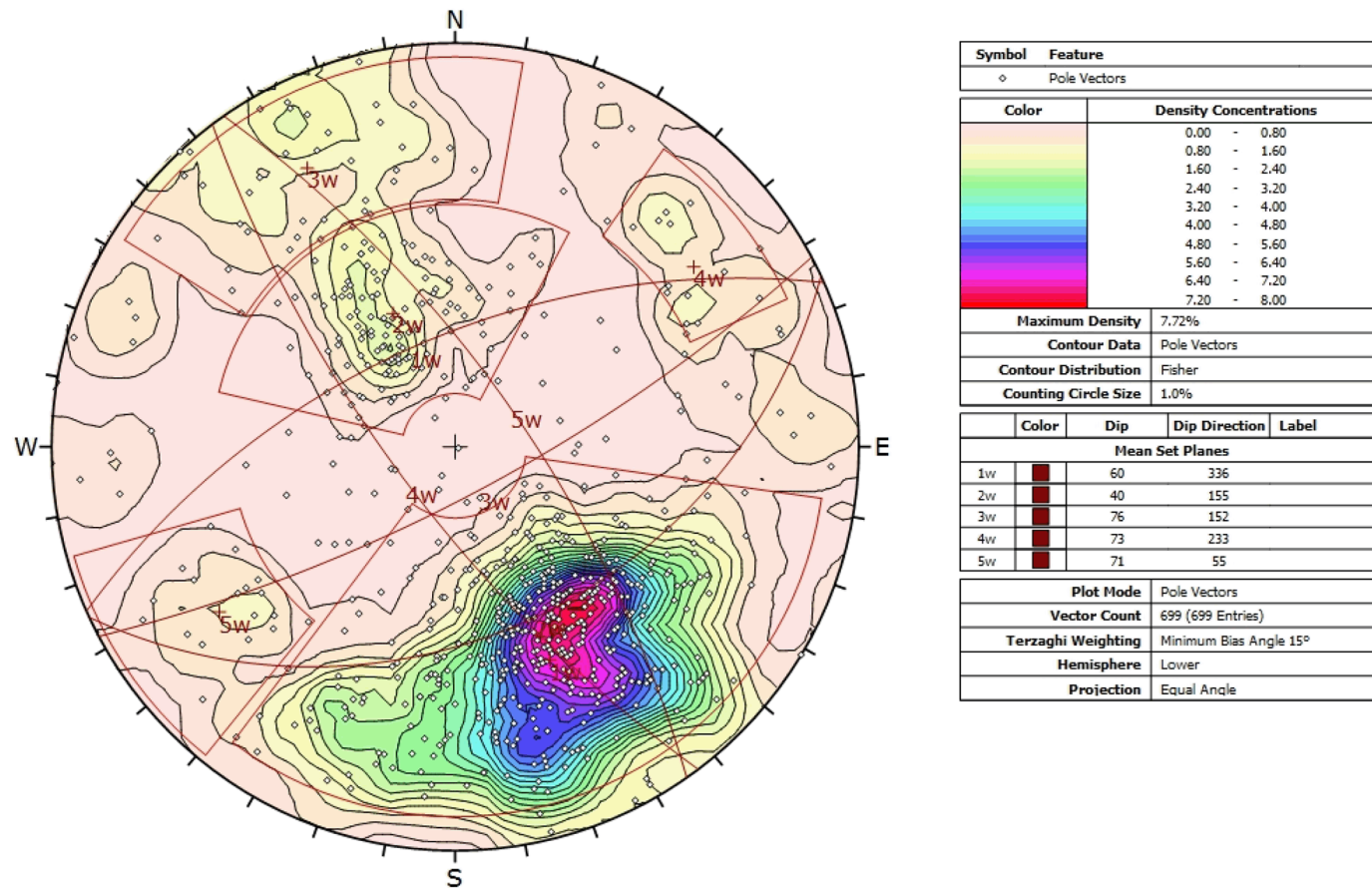


Figure 2.5.1-38. (Sheet 10 of 11) Acoustic Televiewer Data and Outcrop Mapping—Orientation of Fractures in the Newala Limestone

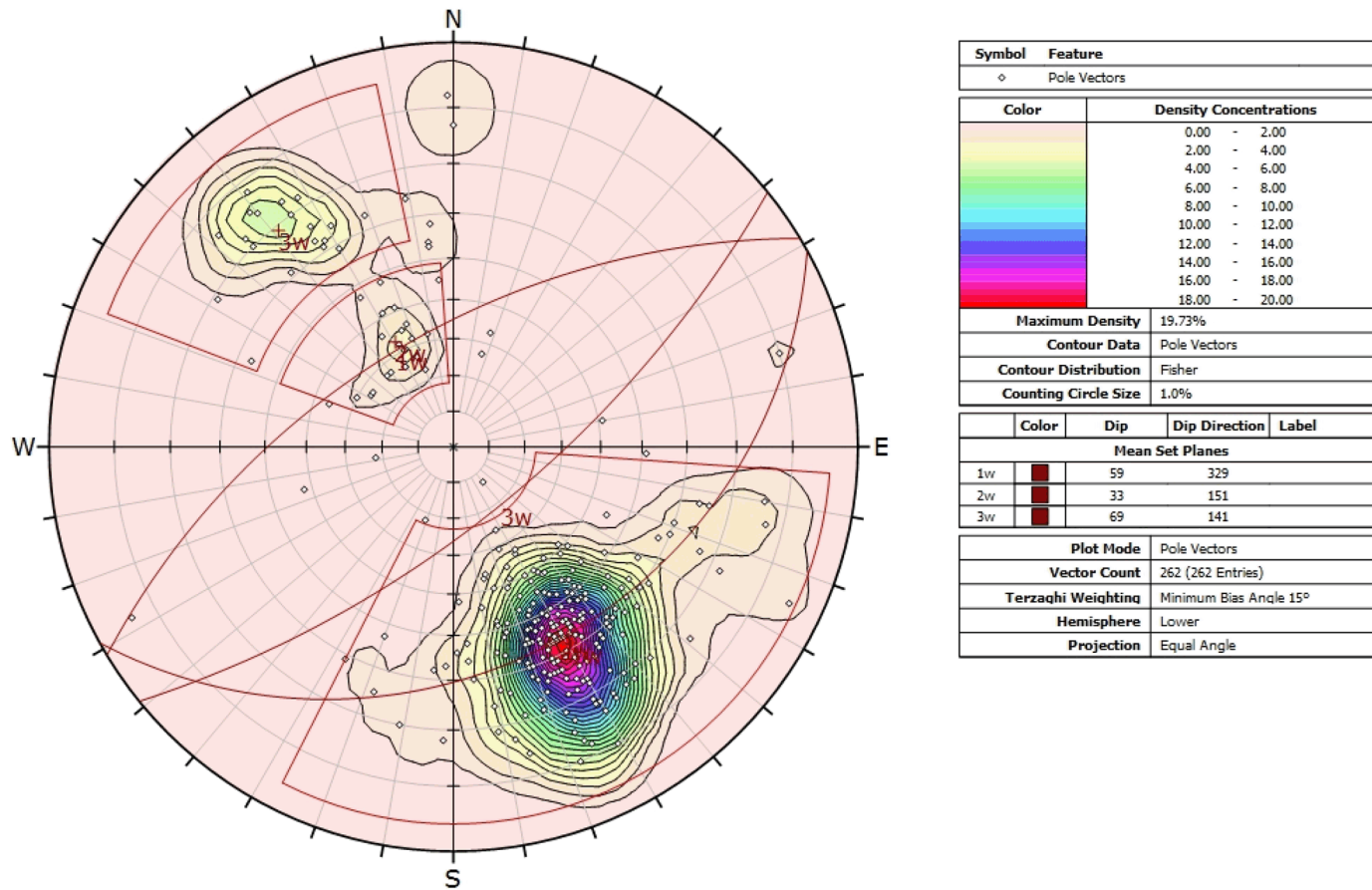
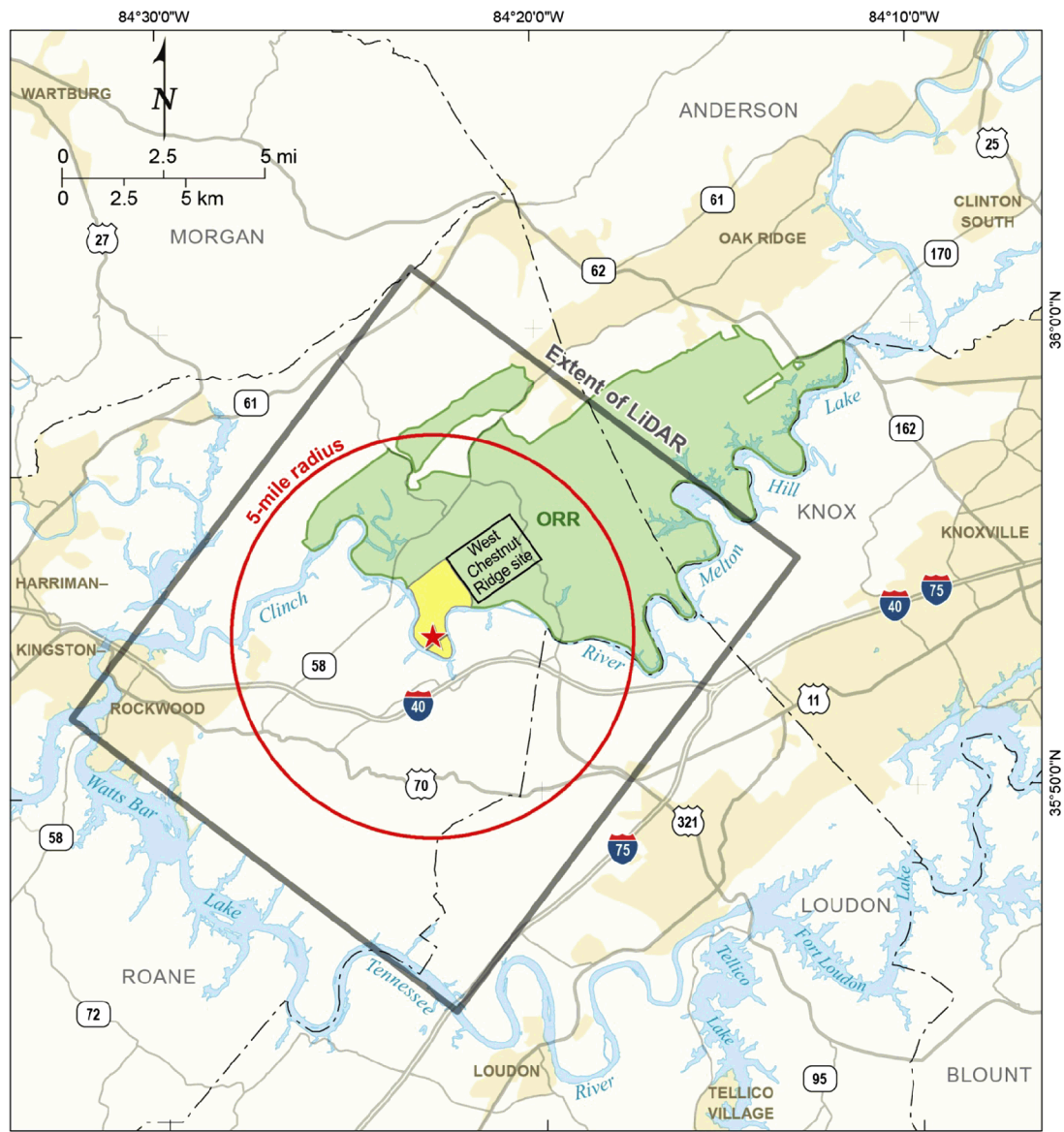


Figure 2.5.1-38. (Sheet 11 of 11) Acoustic Televiewer Data and Outcrop Mapping—Orientation of Fractures in the Rockdell Formation

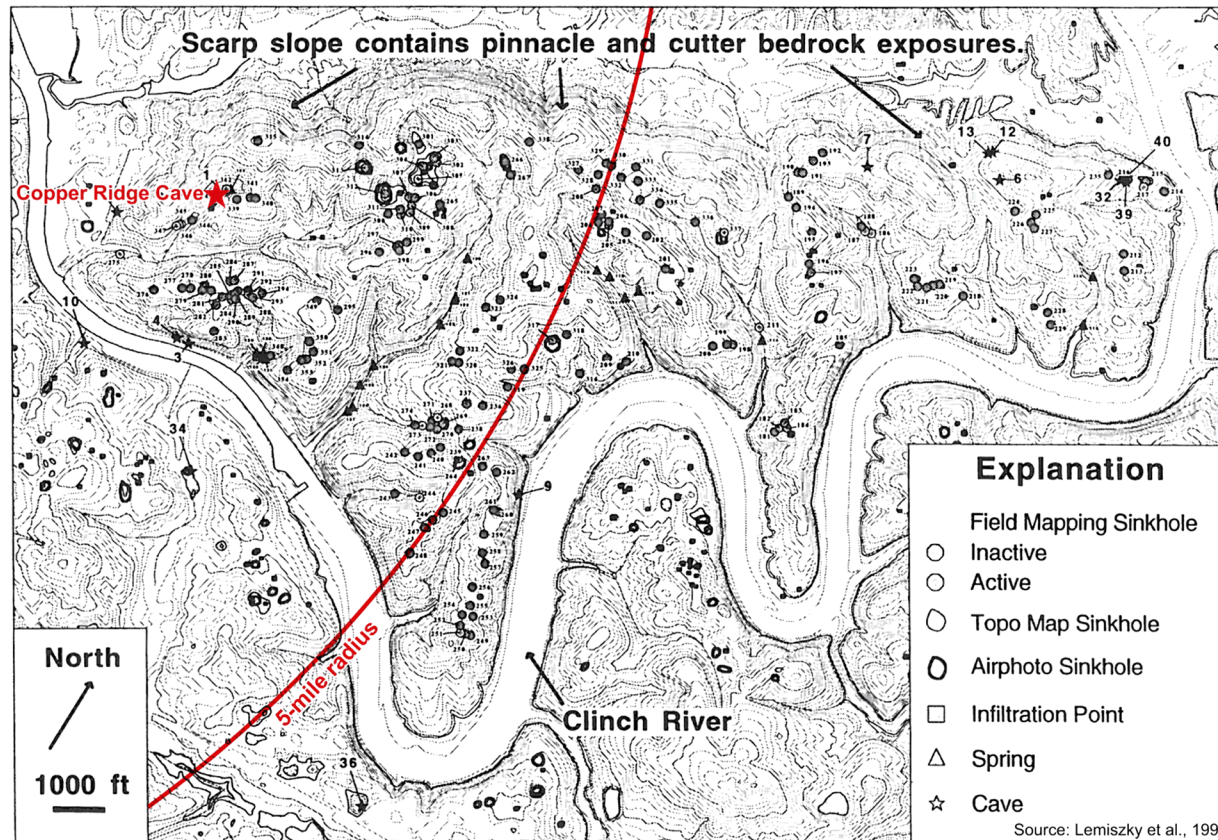
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Explanation

- Current DOE Oak Ridge Reservation (ORR)
- TVA Clinch River property
- CRN site centerpoint

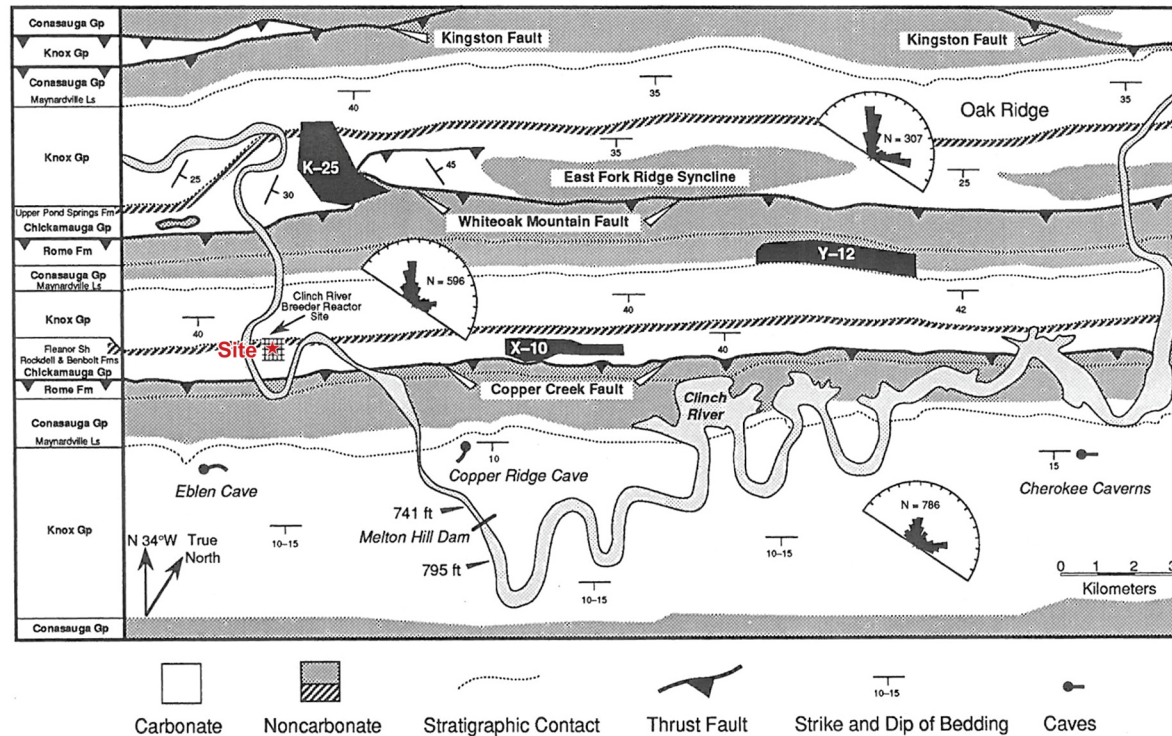
Figure 2.5.1-39. Site Area Map



Source: Reference 2.5.1-239

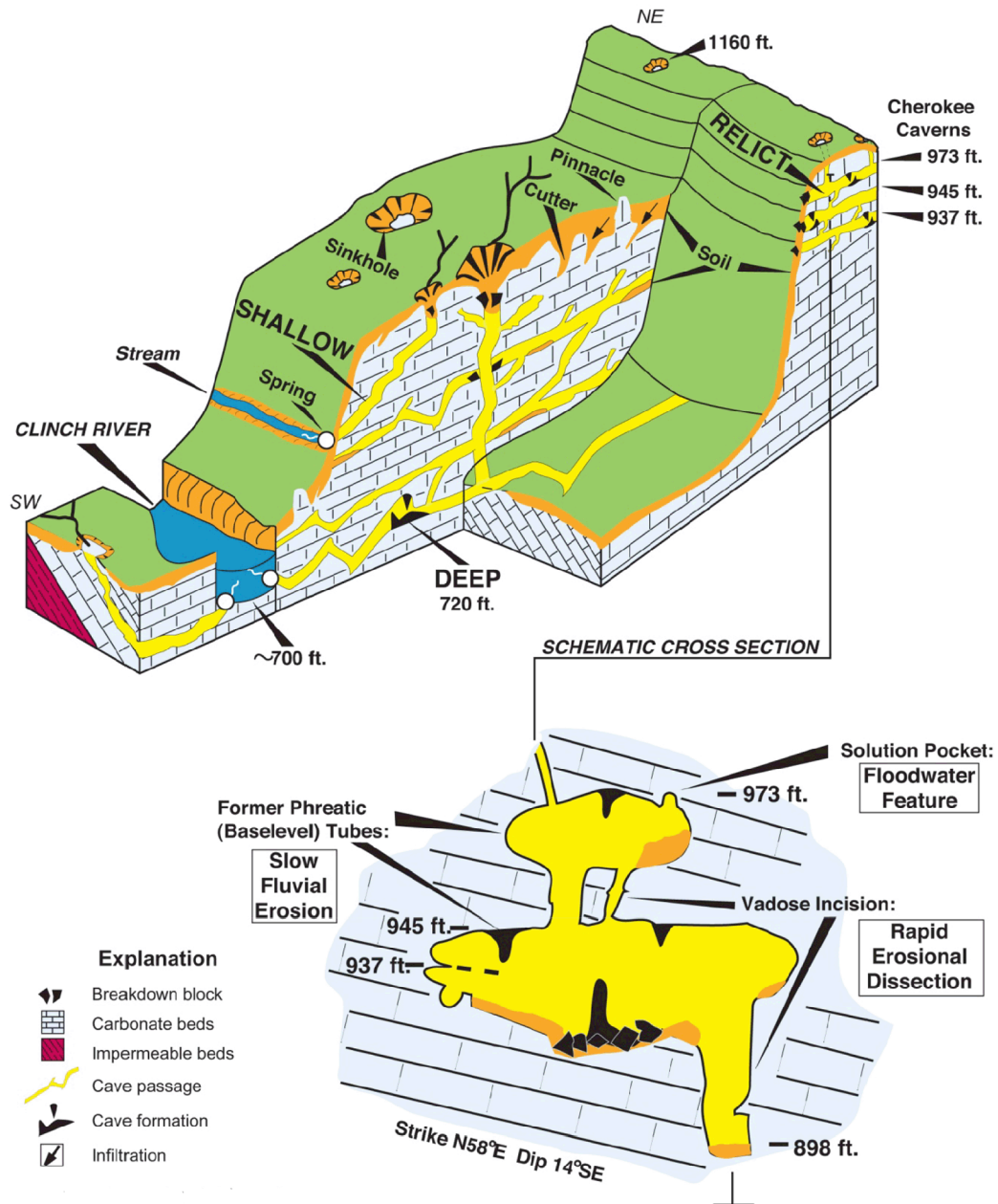
Figure 2.5.1-40. Karst Features near Copper Ridge Cave

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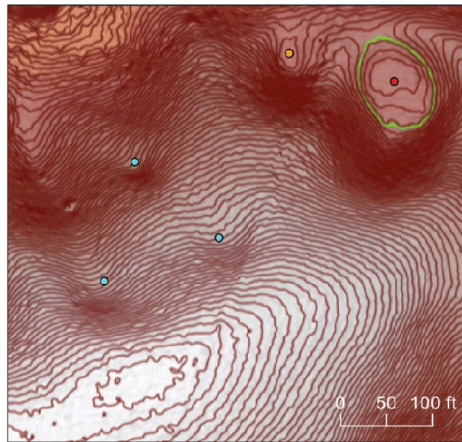
Source: Reference 2.5.1-240

Figure 2.5.1-41. Generalized Geologic Map of the Oak Ridge Area

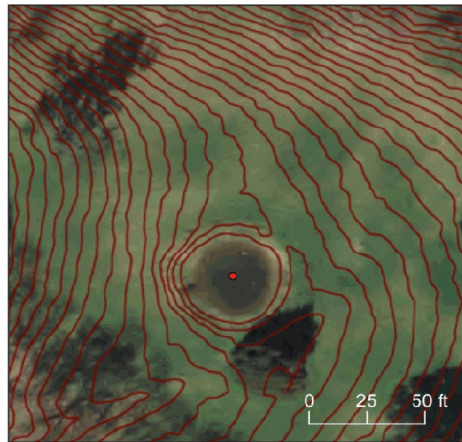


Source: Reference 2.5.1-240

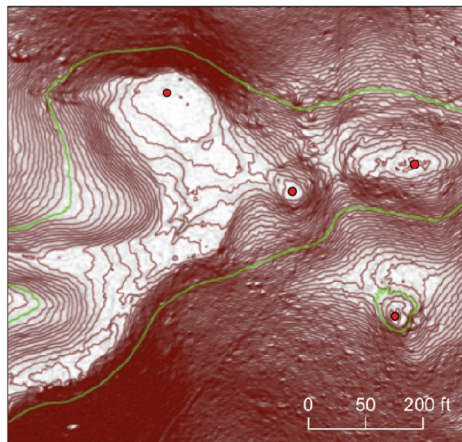
Figure 2.5.1-42. Conceptual Model for Karst Systems in the Oak Ridge Area



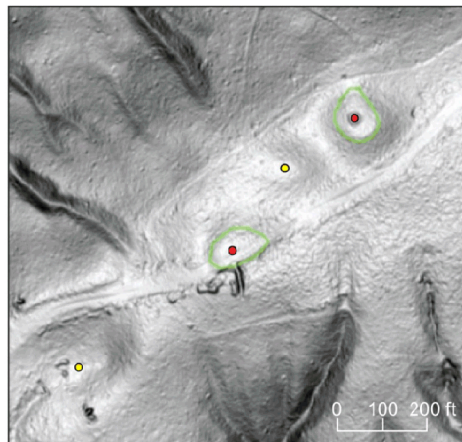
A. Karst depressions on a hillside with 1-foot contours and color ramp DEM



B. Water-filled sinkhole in an open field with 1-foot contours on 2013 aerial photography



C. Multiple sinks within a larger closed depression with 1-foot contours



D. Depressions on ridge top, hillshade DEM

Explanation

- | | |
|---|--|
| <ul style="list-style-type: none"> ● Center of closed depressions 2-foot depth and 100-square-foot area ○ Extent of closed depression | <ul style="list-style-type: none"> ● Two-sided depression ● Three-sided depression ● Shallow depression |
|---|--|

Figure 2.5.1-43. Examples of Karst Depressions Mapped from LiDAR Data

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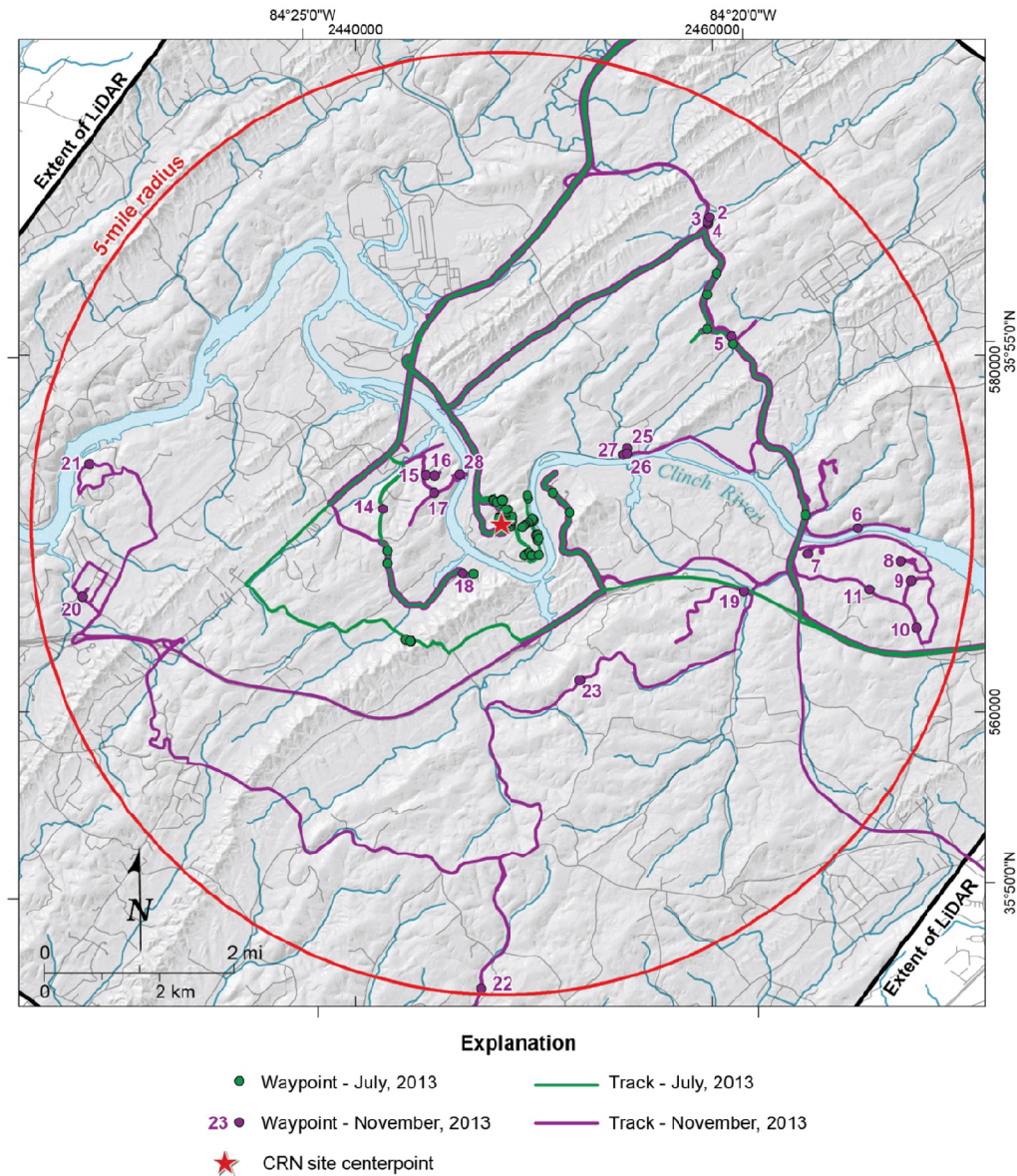


Figure 2.5.1-44. Location of Karst Field Reconnaissance



A. Pond in depression, Knox Group



B. Gentle depression, Knox Group



C. Active swallet, Witten Formation



D. Flat floor of depression, Witten Formation

Figure 2.5.1-45. Field Photographs of Karst Depressions

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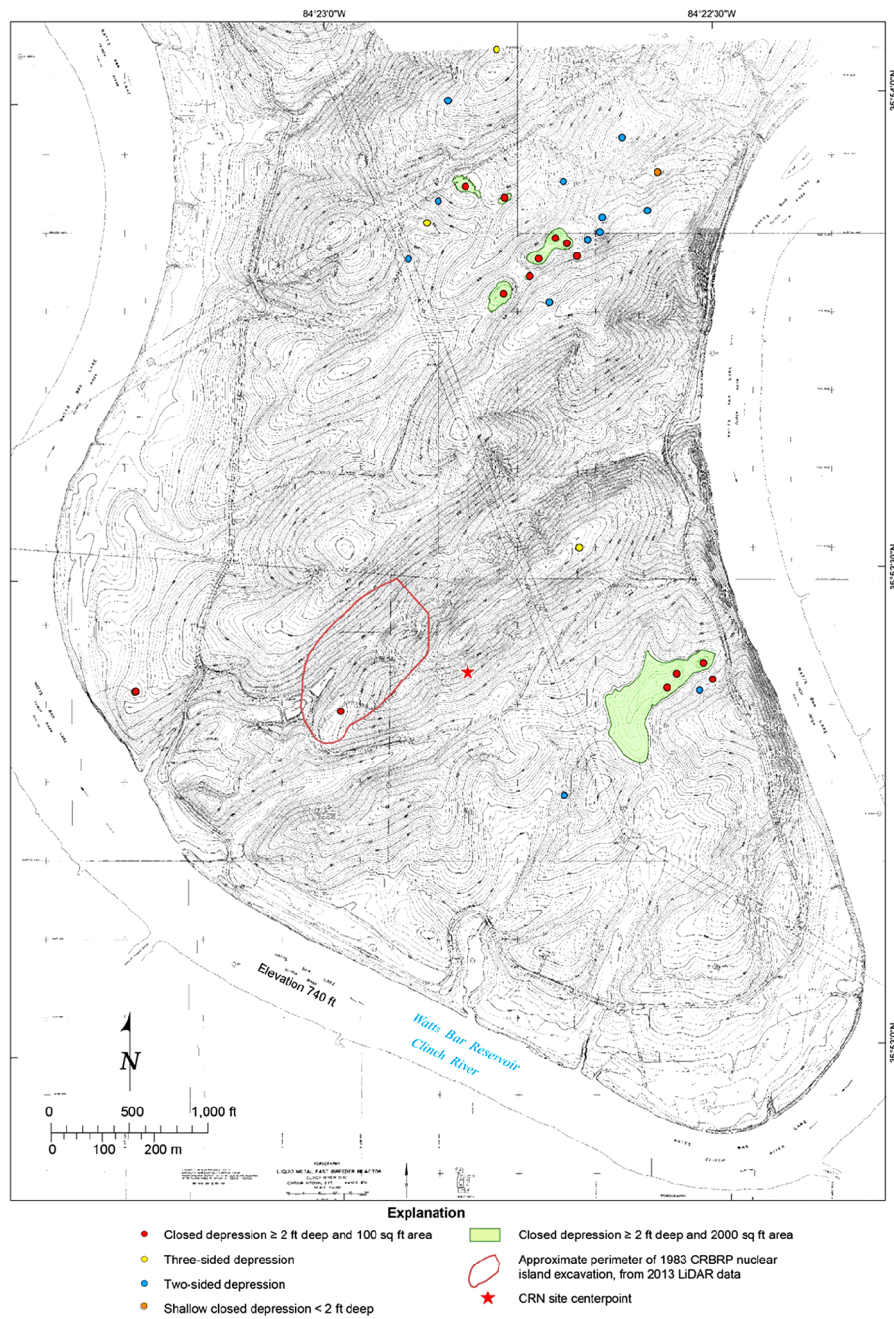


Figure 2.5.1-46. Surface Karst Features and Site Topography Associated with CRBRP Investigations (1973)

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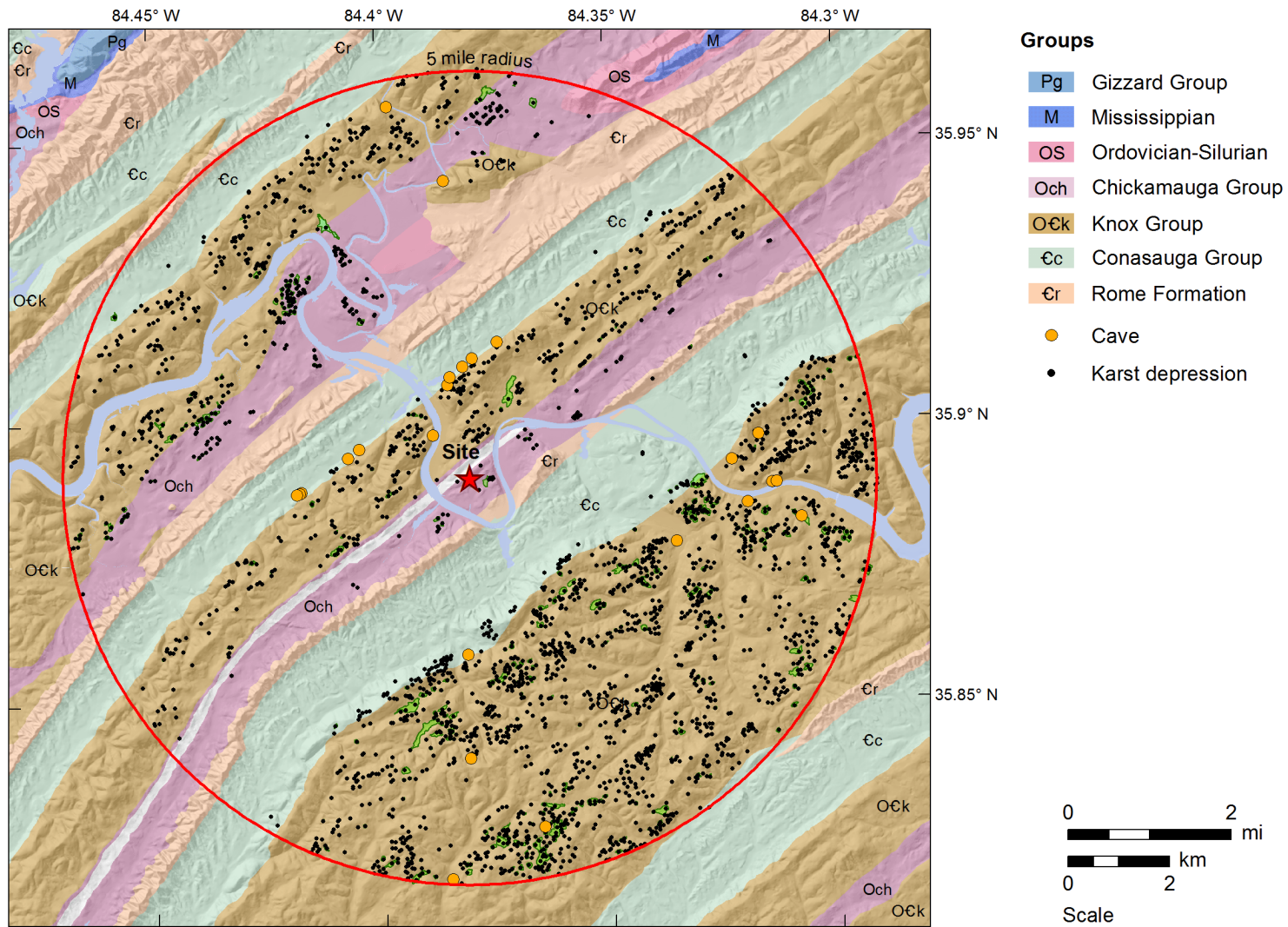


Figure 2.5.1-47. Distribution of Mapped Karst Features in the Site Area



A. Small stream passage, 3 ft-high, with alluvial deposits on floor



B. Large stream passage, 16 ft-wide, following bedding dip



C. Solution enlargement at the intersection of joint and bedding plane



D. Ceiling collapse along bedding plane.

Figure 2.5.1-48. Field Photographs of Cave Features

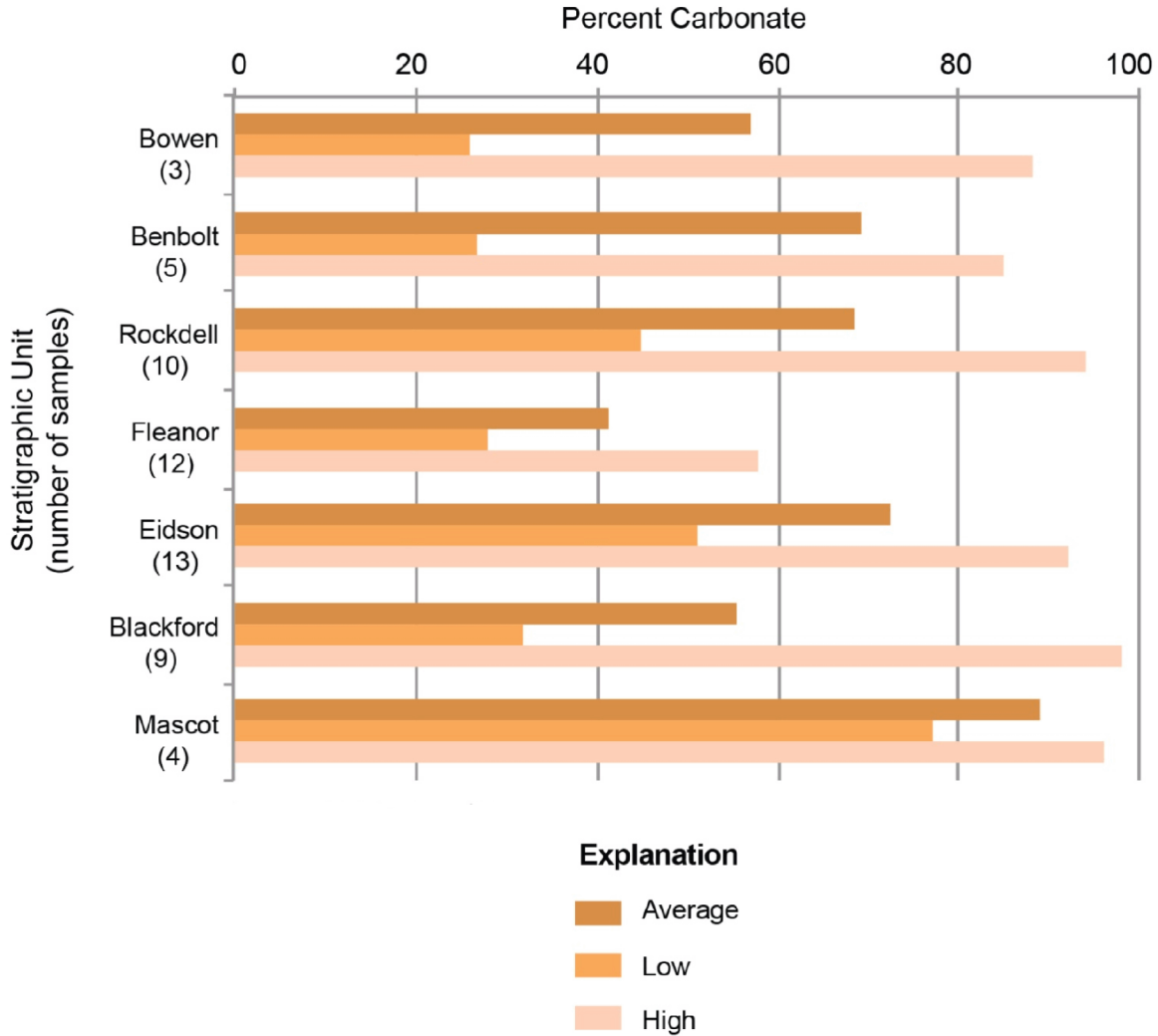
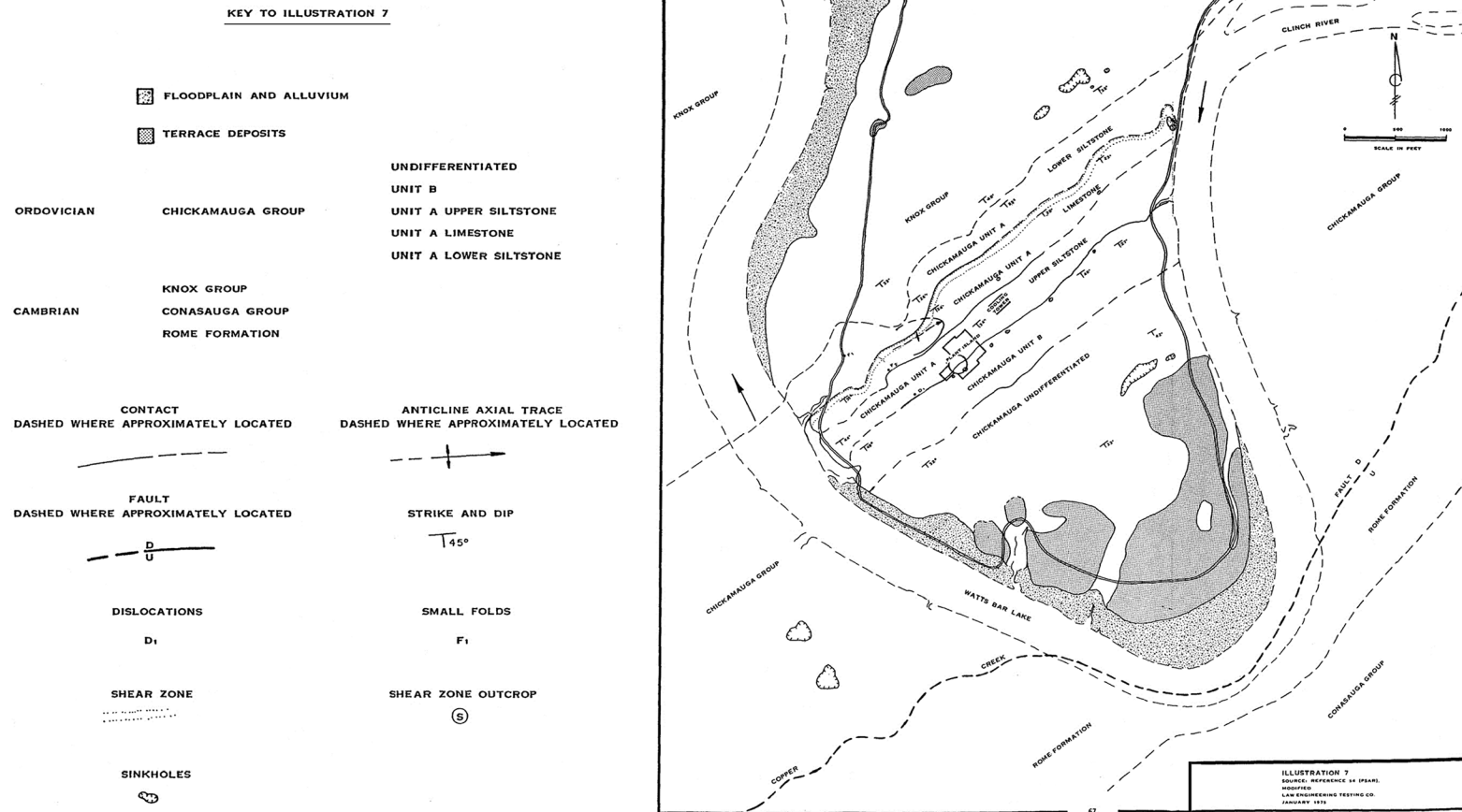


Figure 2.5.1-49. Carbonate Content of Rock Core Samples by Stratigraphic Unit

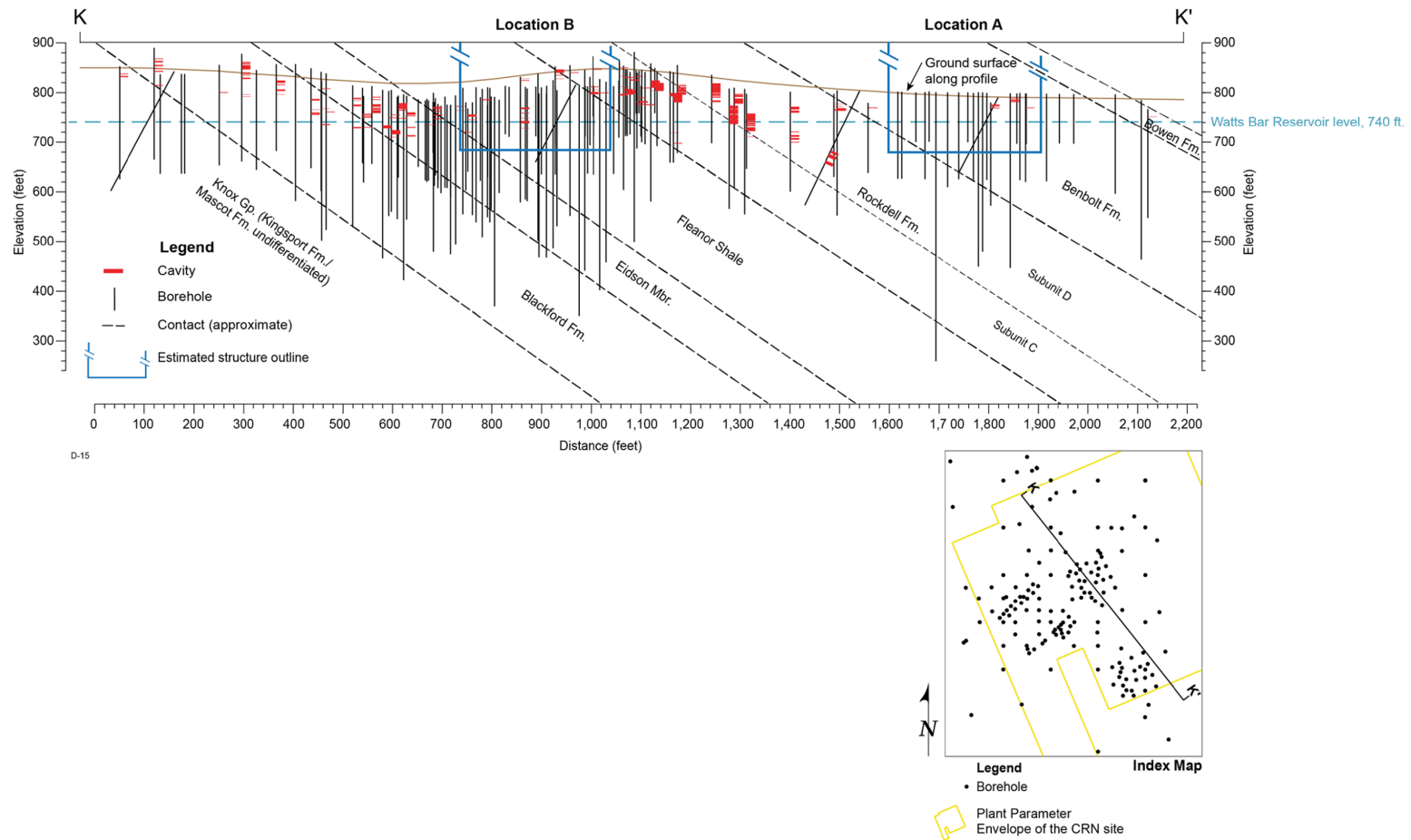
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Source: Page 216 of [Reference 2.5.1-238](#)

Figure 2.5.1-50. Clinch River Breeder Reactor Project Geologic Map

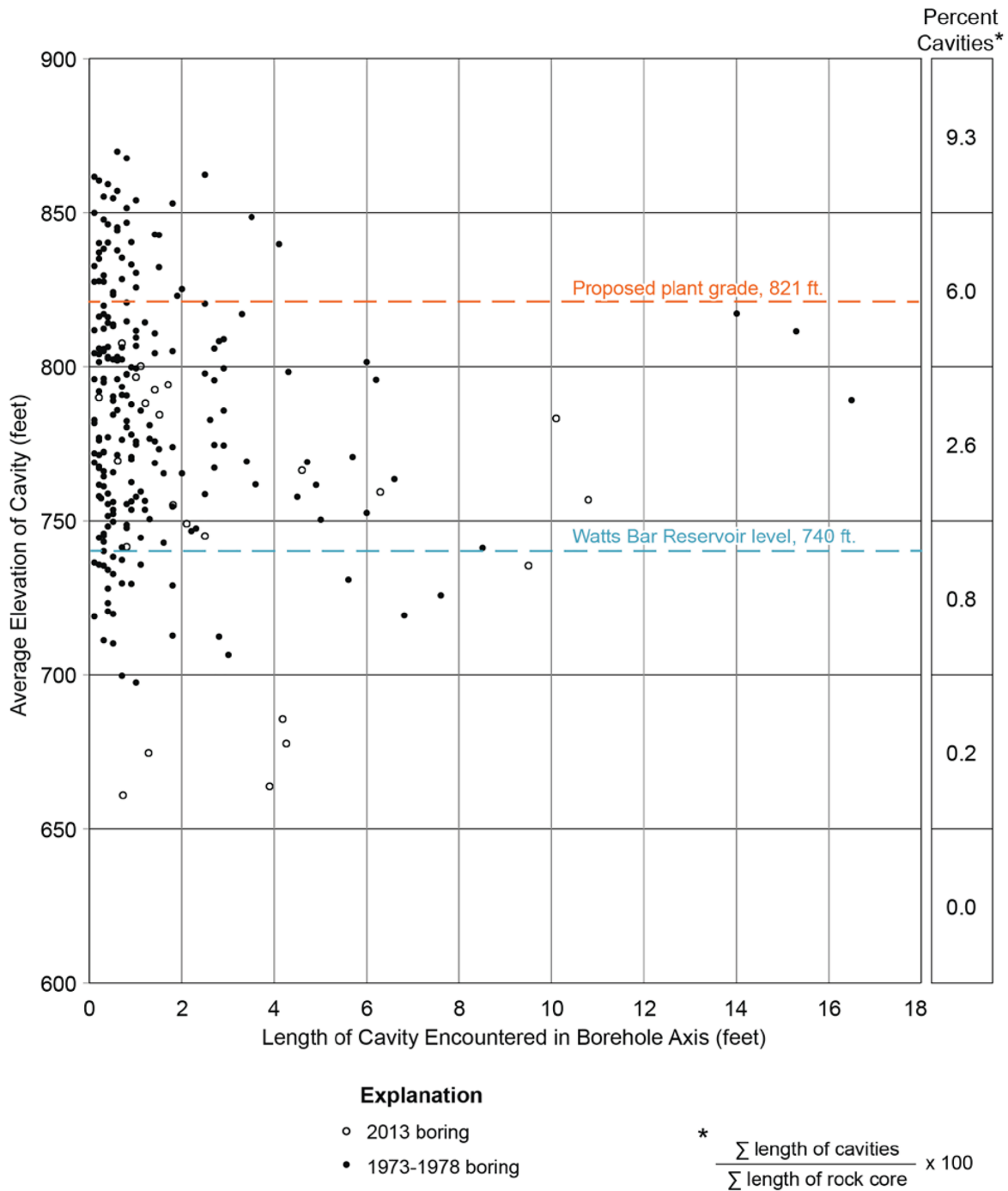
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Notes:

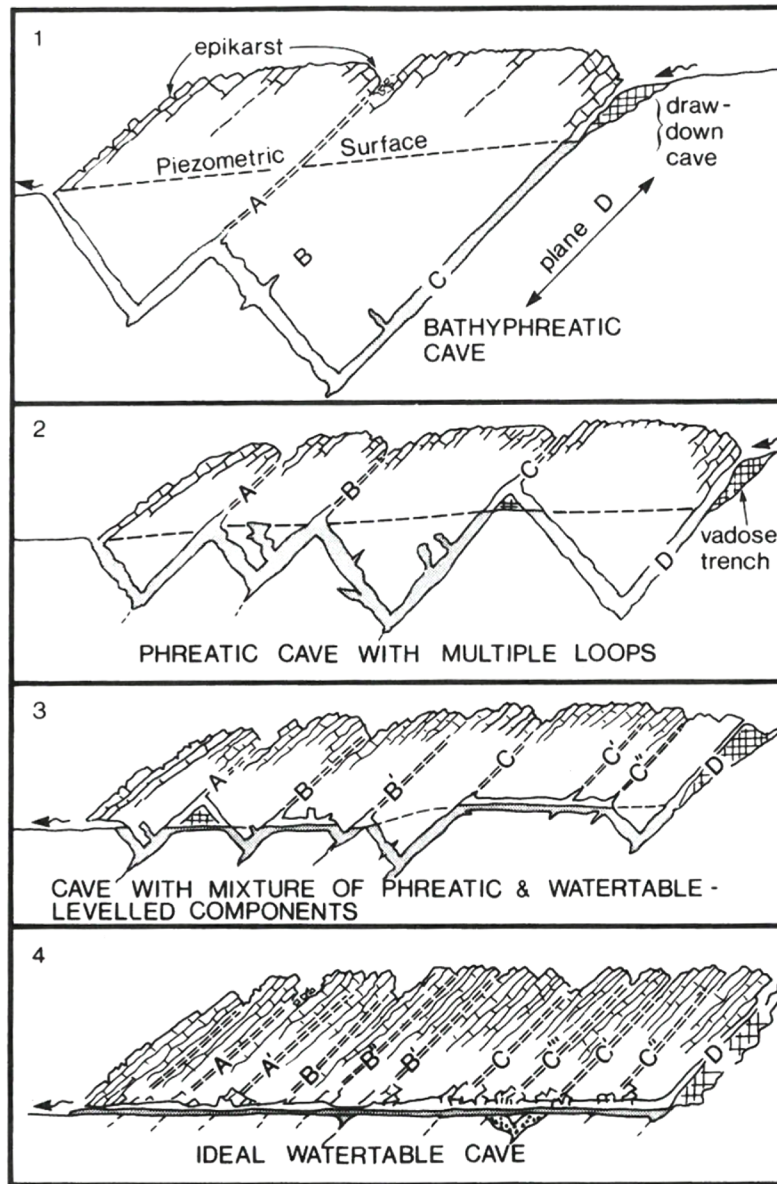
1. Boreholes are projected on to a vertical plane oriented perpendicular to bedding strike of N52°E.
2. Borehole data are compiled from the CRBRP (Reference 2.5.1-100) and the CRN investigation (Reference 2.5.1-214).

Figure 2.5.1-51. Cross-Section Distribution of Cavities in Rock Core



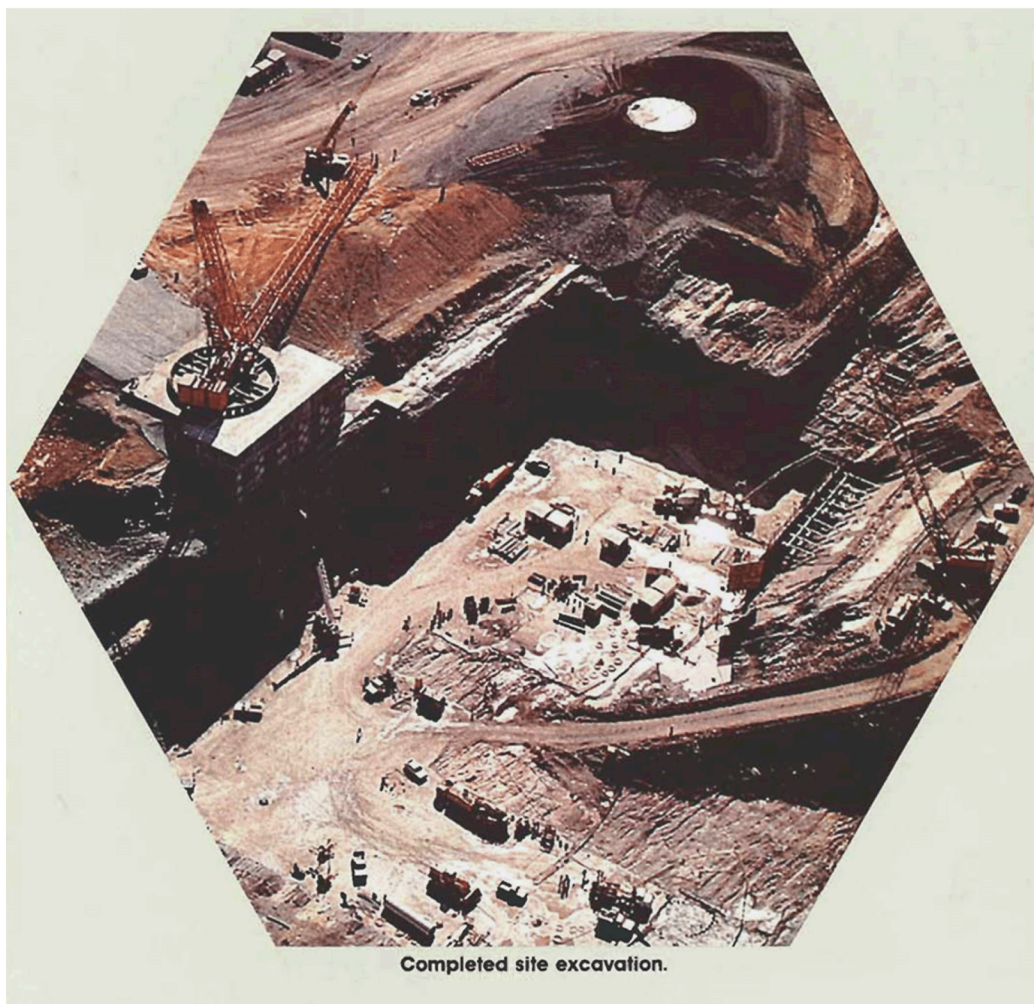
Sources: [Reference 2.5.1-100](#), [Reference 2.5.1-214](#)

Figure 2.5.1-52. Cavity Size and Elevation in Borings



Source: Reference 2.5.1-7

Figure 2.5.1-53. Model Showing Types of Phreatic and Water Table Caves



Source: [Reference 2.5.1-246](#)
Oblique view south.

Figure 2.5.1-54. Photograph of Completed Clinch River Breeder Reactor Project Excavation, 1983



Figure 2.5.1-55. Dissolution of Limestone Interbeds in the Blackford Formation

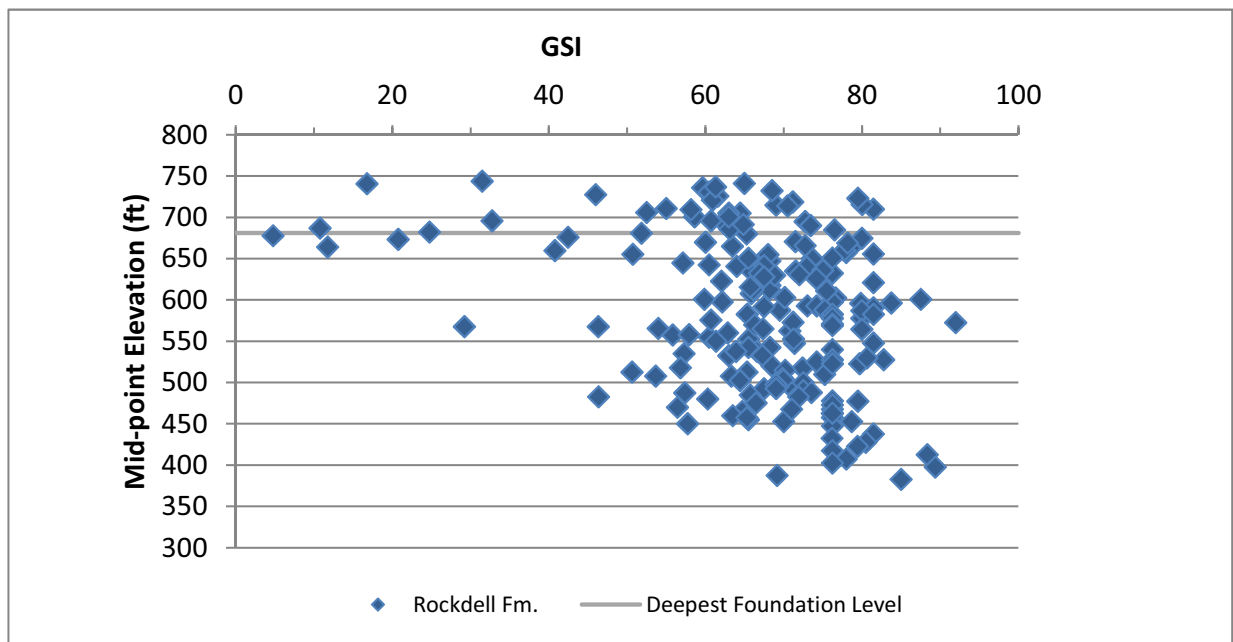
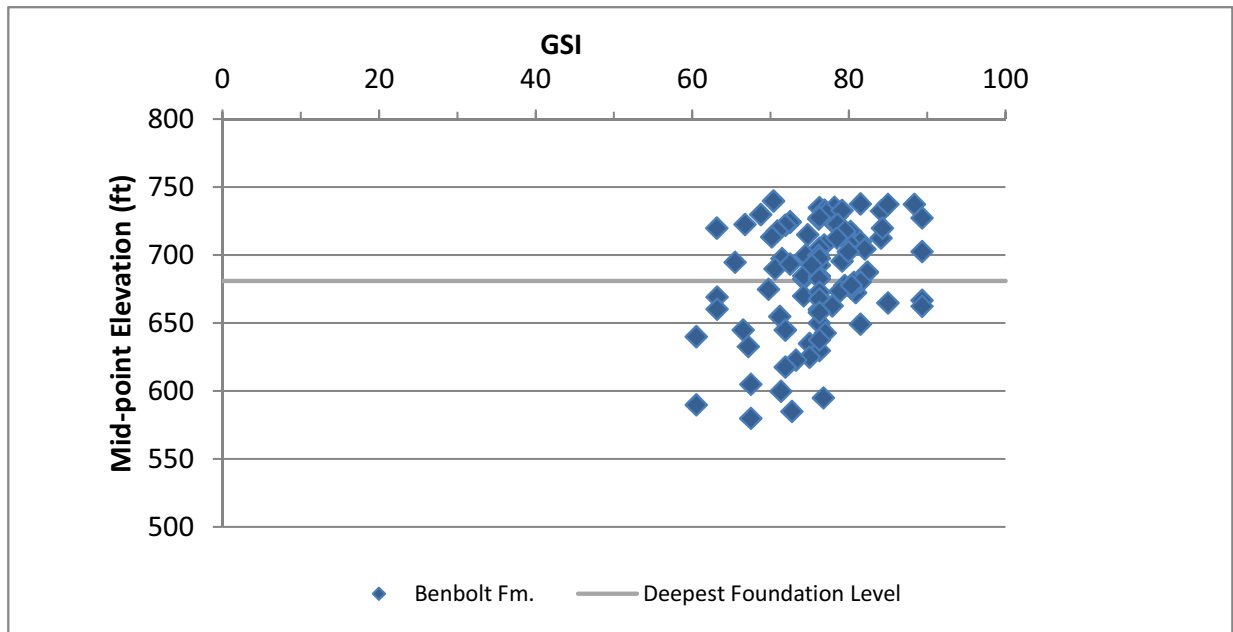


Figure 2.5.1-56. (Sheet 1 of 3) Scatter Plots of Geological Strength Index per Bedrock Unit

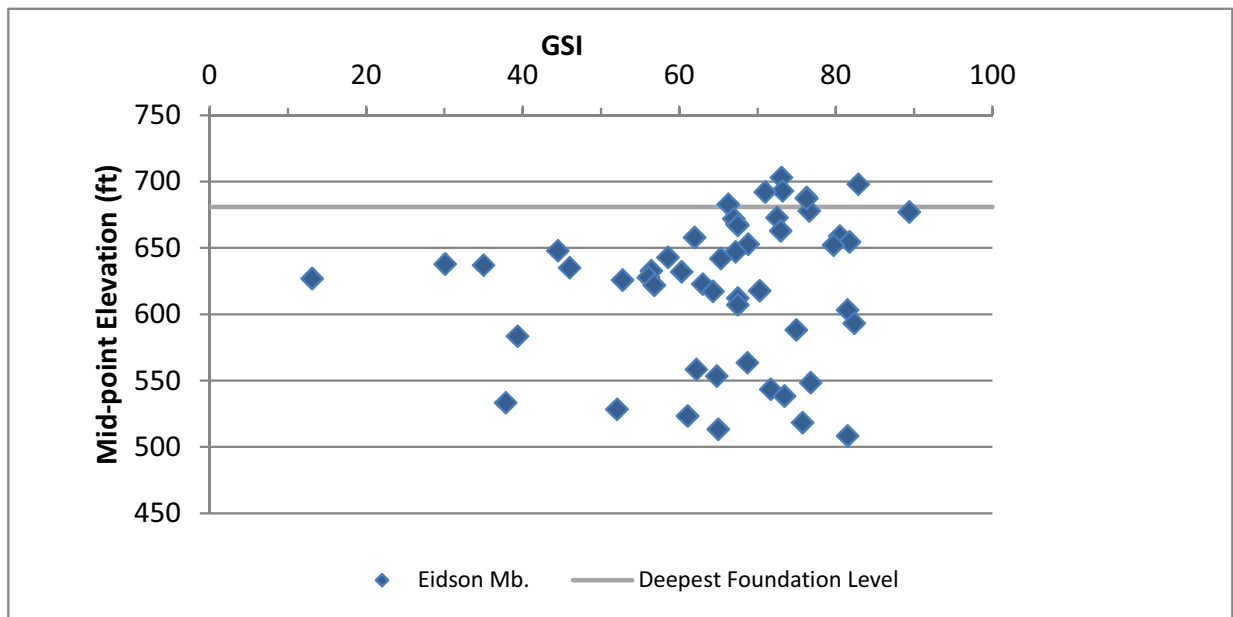
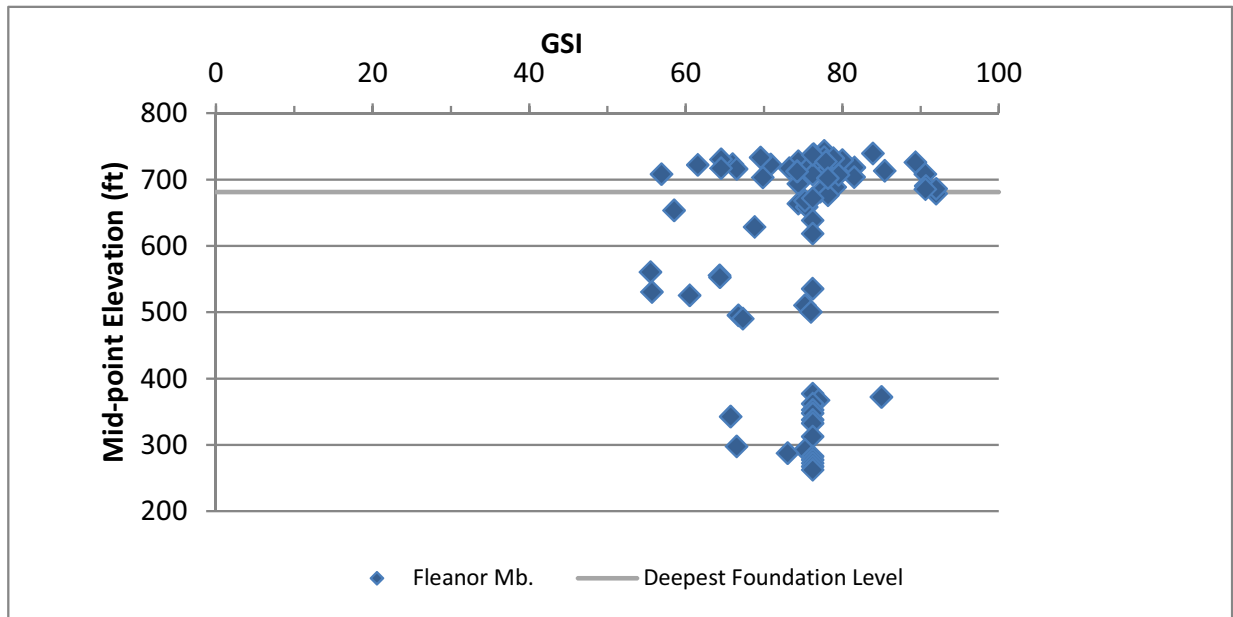


Figure 2.5.1-56. (Sheet 2 of 3) Scatter plots of Geological Strength Index per Bedrock Unit

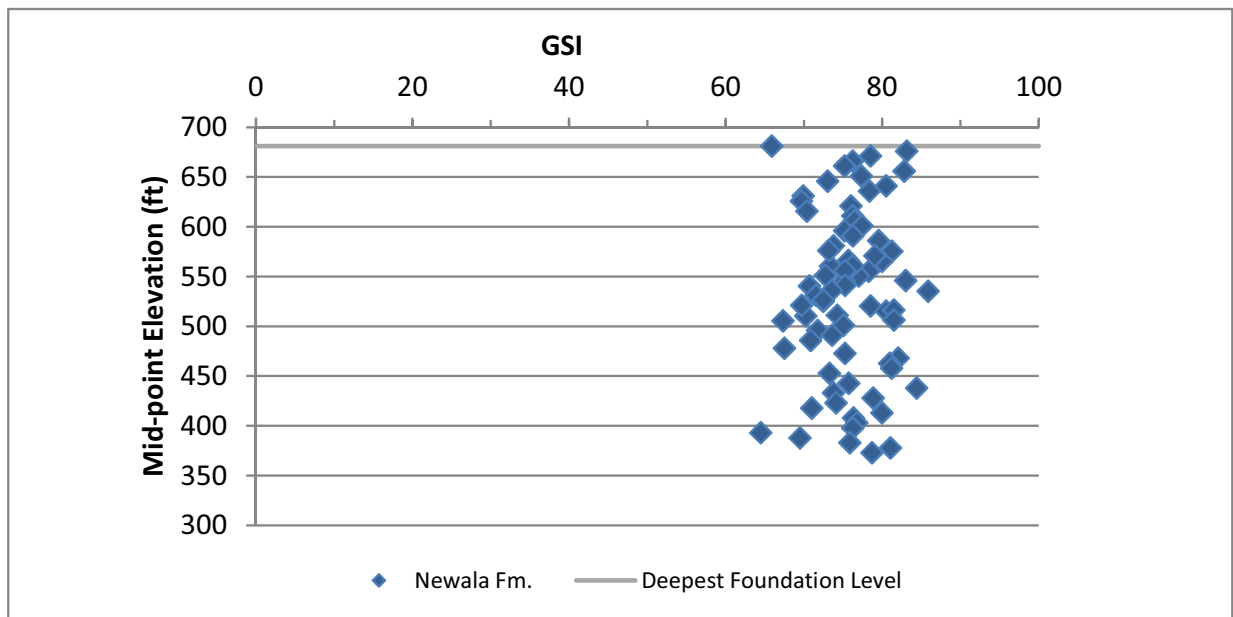
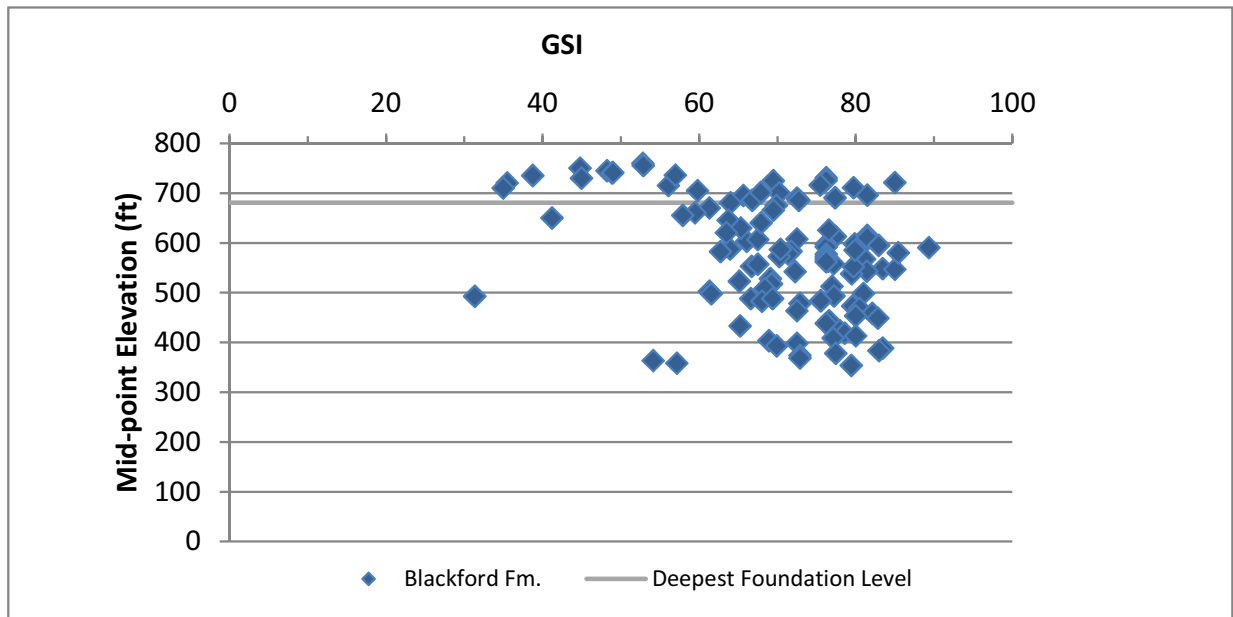
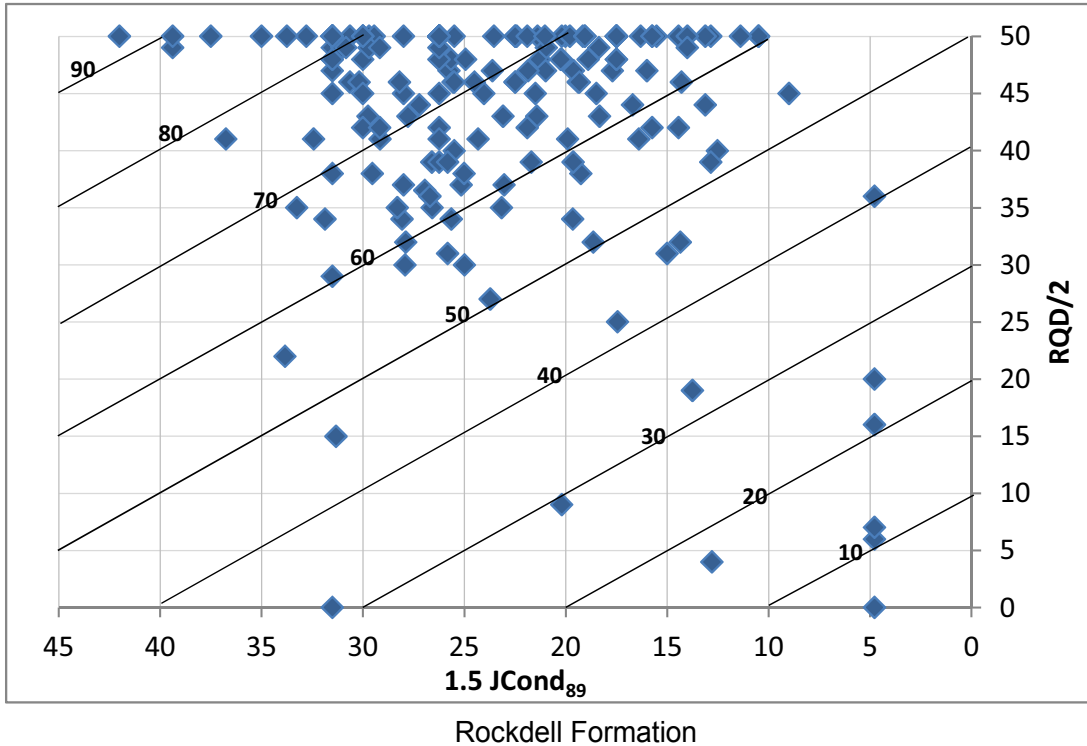
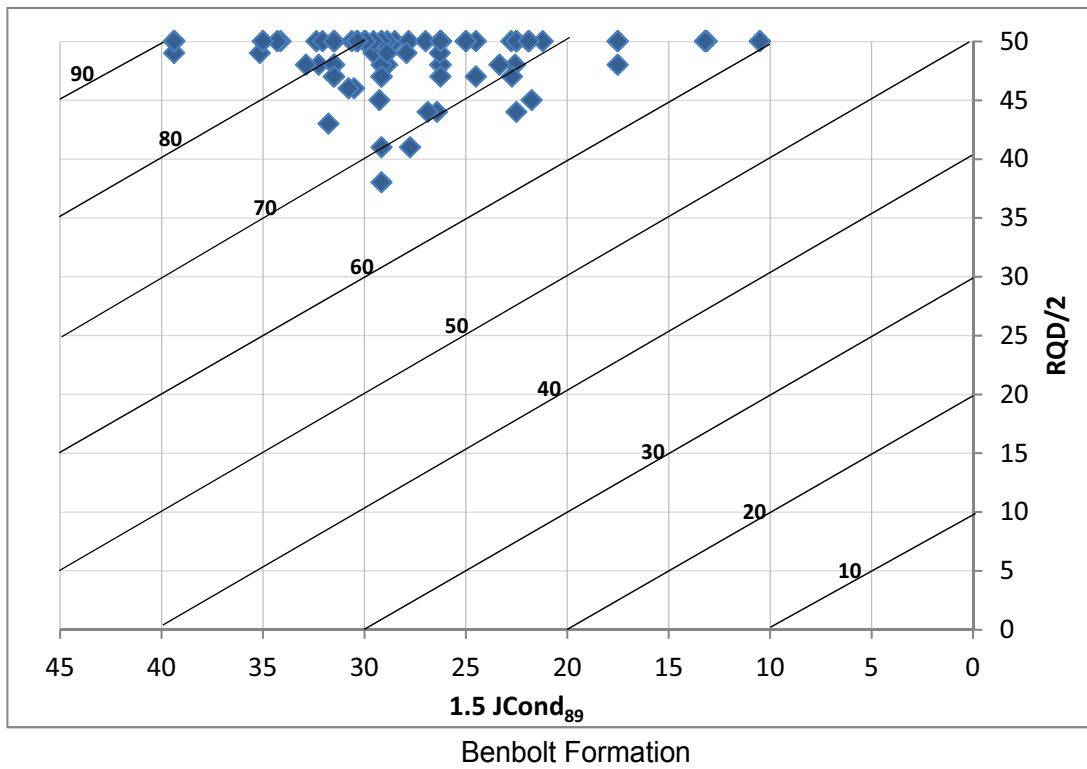


Figure 2.5.1-56. (Sheet 3 of 3) Scatter Plots of Geological Strength Index per Bedrock Unit



Note: JCond₈₉ = Joint Condition Rating; GSI = Geological Strength Index; RQD = Rock Quality Designation

Figure 2.5.1-57. (Sheet 1 of 3) Portion of GSI Chart Showing 1.5 JCond₈₉ Against RQD/2 and GSI per Bedrock Unit (Extended to Show RQD/2 > 40)

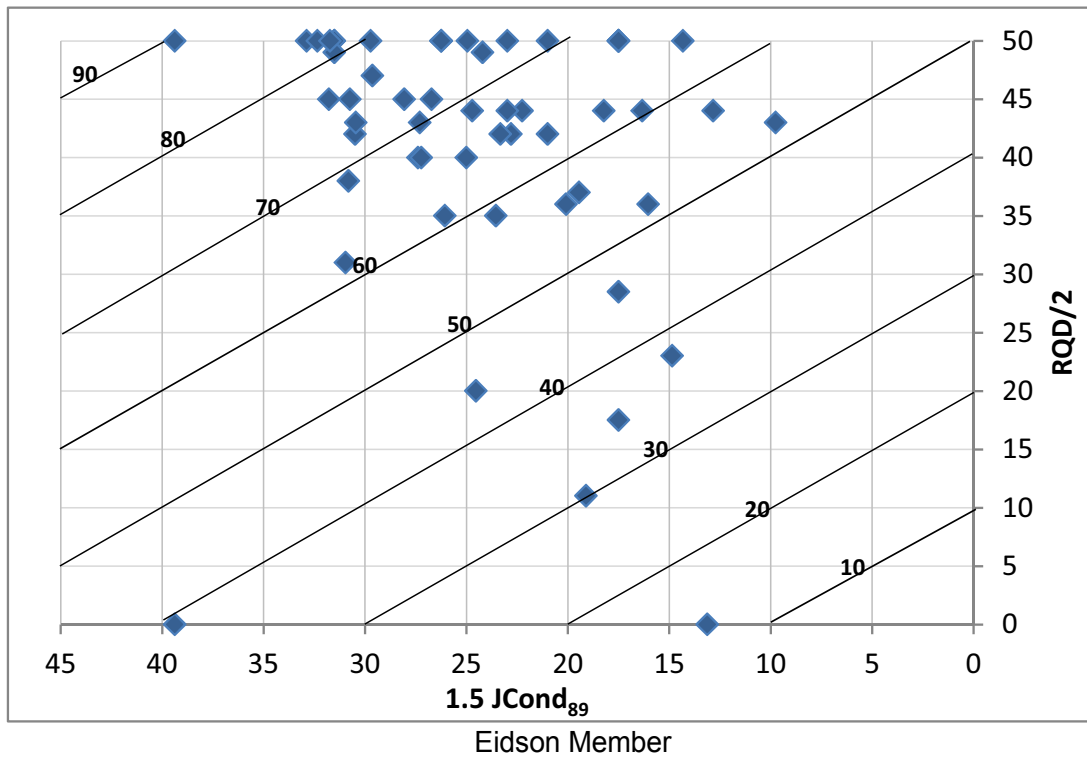
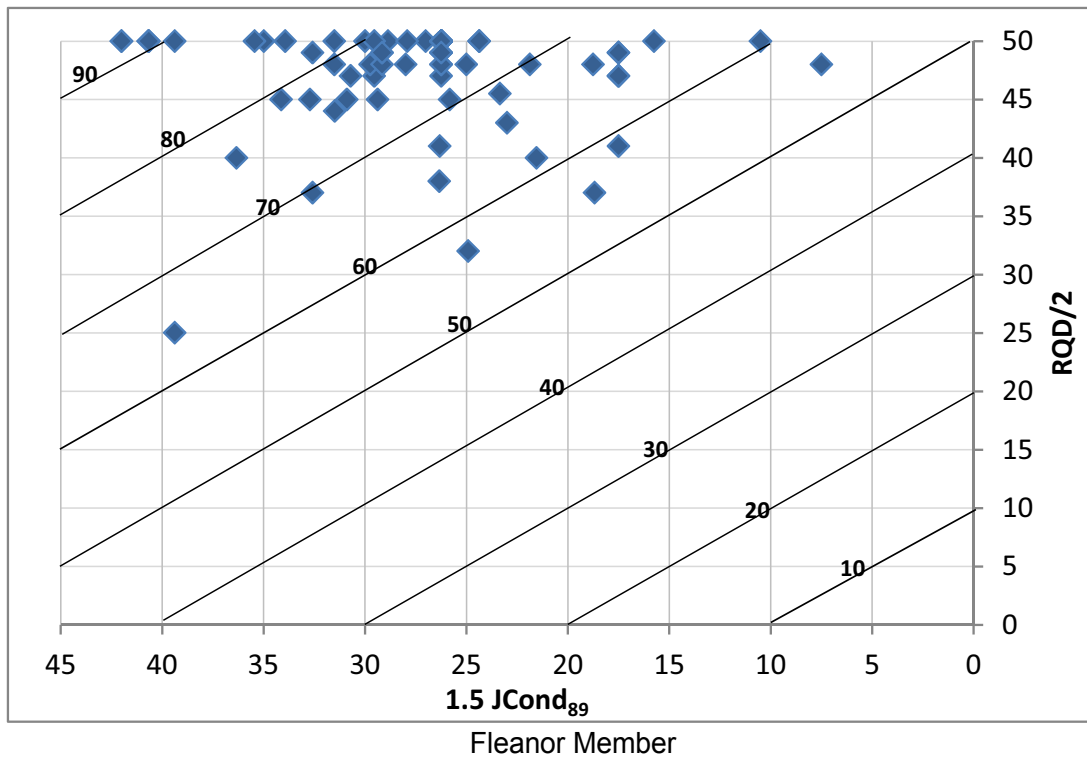


Figure 2.5.1-57. (Sheet 2 of 3) Portion of GSI Chart Showing $1.5 JCond_{89}$ Against $RQD/2$ and GSI per Bedrock Unit (Extended to Show $RQD/2 > 40$)

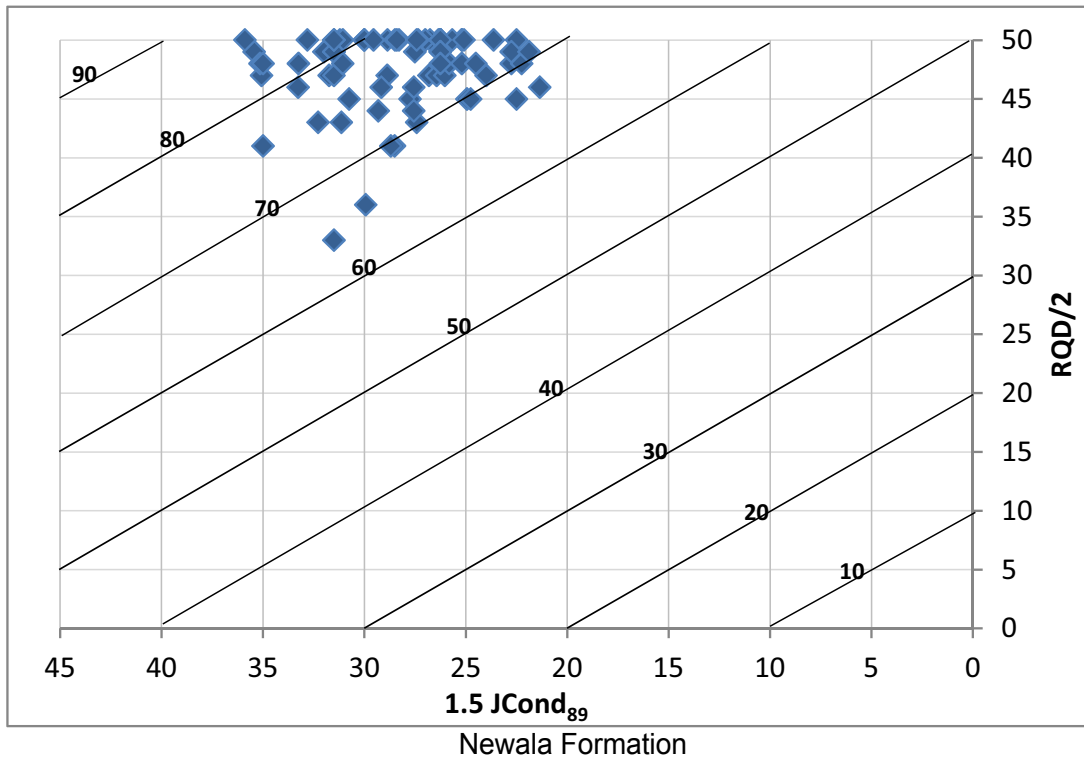
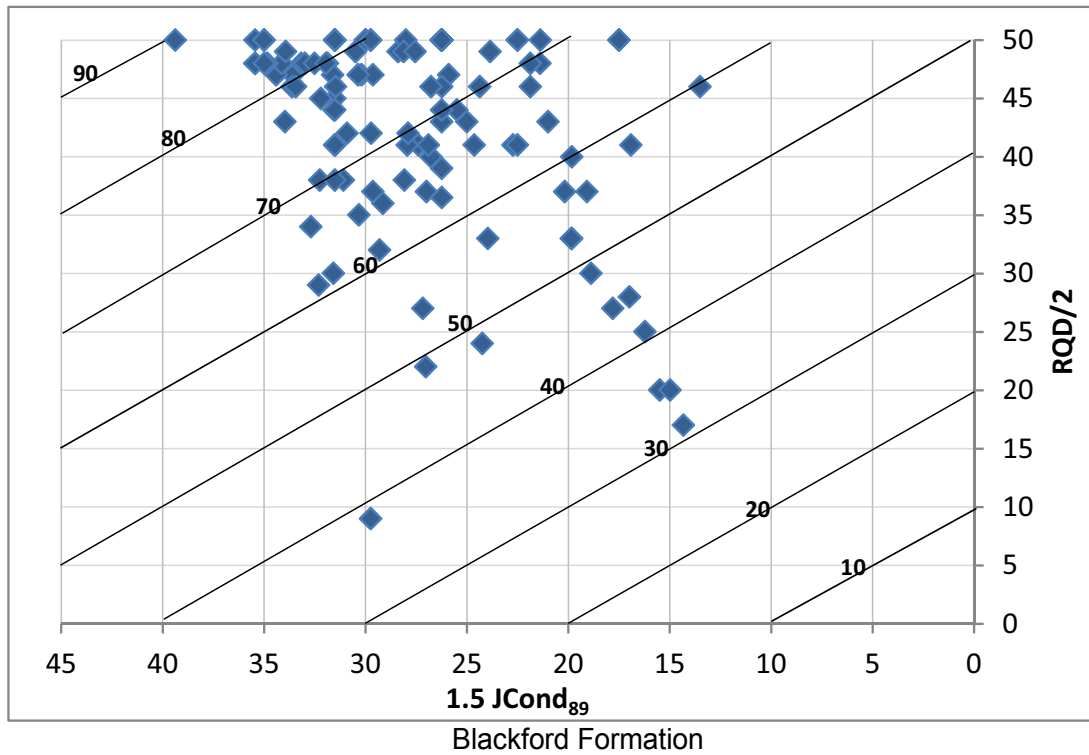
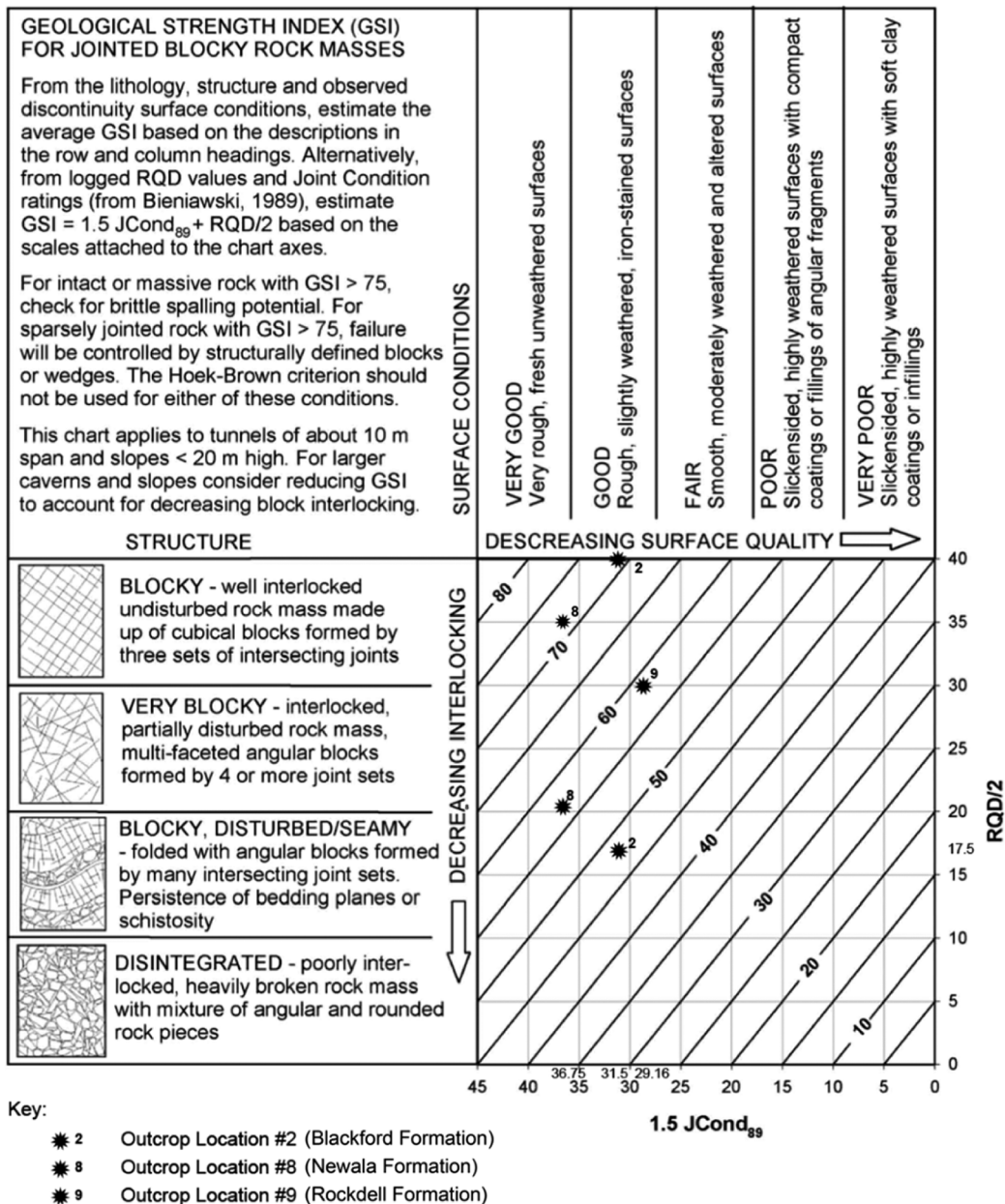


Figure 2.5.1-57. (Sheet 3 of 3) Portion of GSI Chart Showing $1.5 JCond_{89}$ Against $RQD/2$ and GSI per Bedrock Unit (Extended to Show $RQD/2 > 40$)



Note: JCond₈₉ = Joint Condition Rating; RQD = Rock Quality Designation

Source: [Reference 2.5.1-265](#)

Figure 2.5.1-58. Estimates of Geological Strength Index at Outcrop Locations 2, 8, and 9

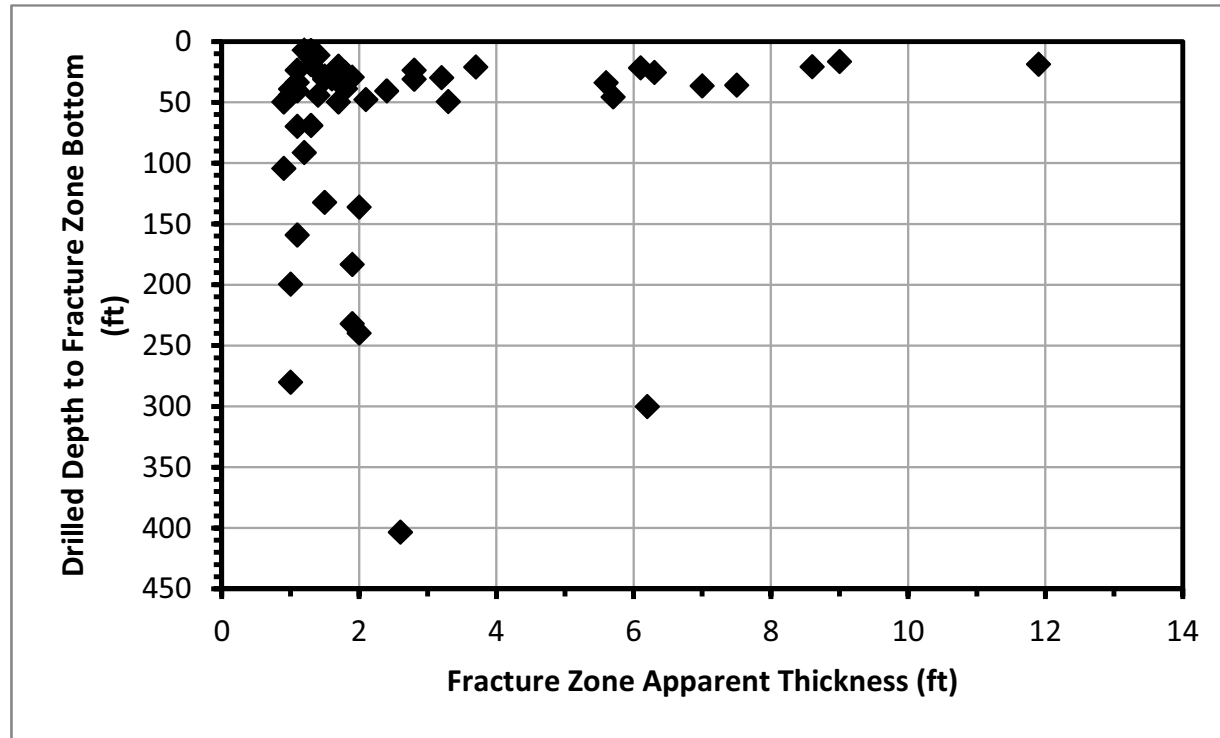


Figure 2.5.1-59. (Sheet 1 of 2) Scatter Plot of Fracture Zone Apparent Thickness—Against Drilled Depth to Fracture Zone Bottom
(Using the 100- and 200-Series Borings)

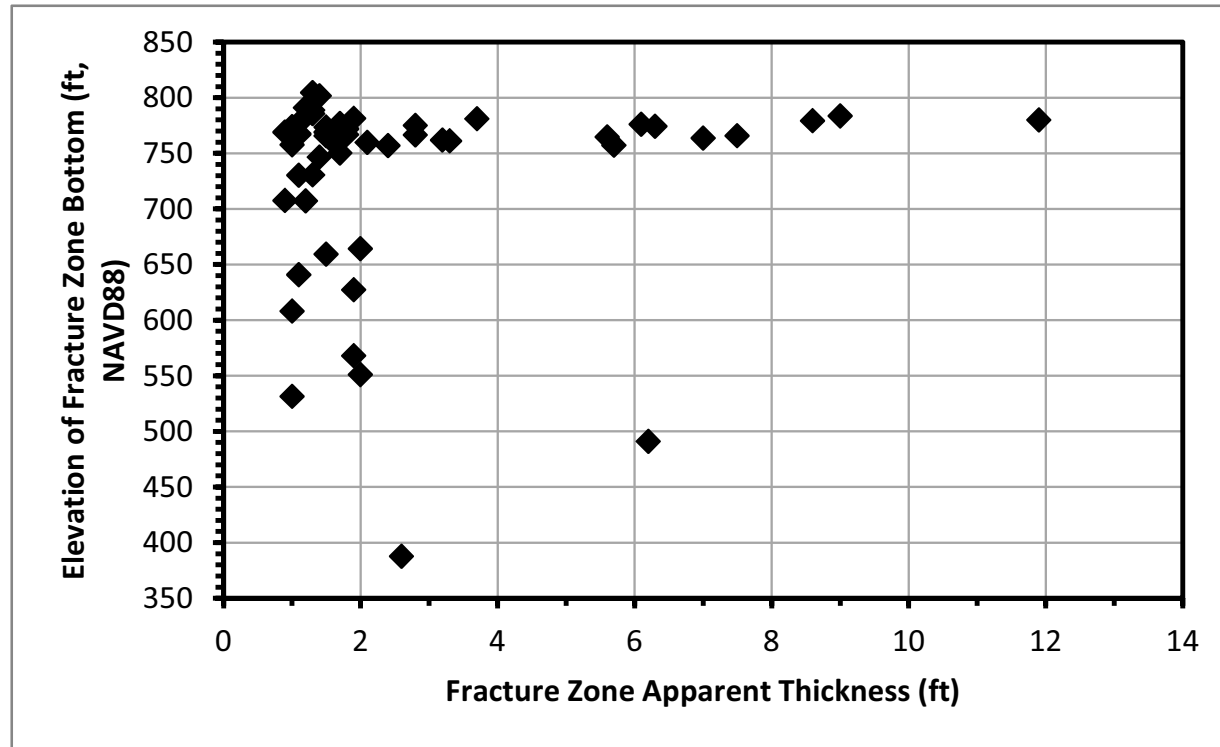


Figure 2.5.1-59. (Sheet 2 of 2) Scatter Plot of Fracture Zone Apparent Thickness—Against Elevation of Fracture Zone Bottom (Using the 100- and 200-Series Borings)

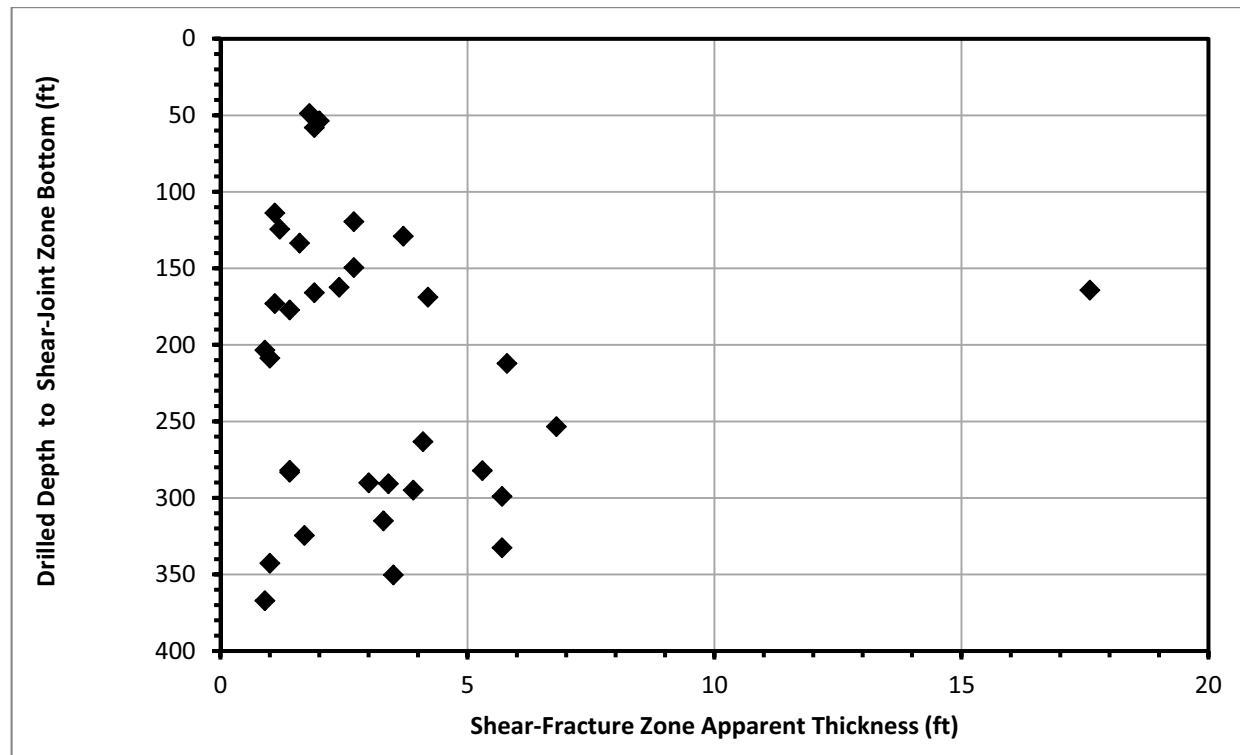


Figure 2.5.1-60. (Sheet 1 of 2) Scatter Plot of Shear-Fracture Zone Apparent Thickness—Against Drilled Depth to Shear-Fracture Zone Bottom (Using 100- and 200-Series Borings)

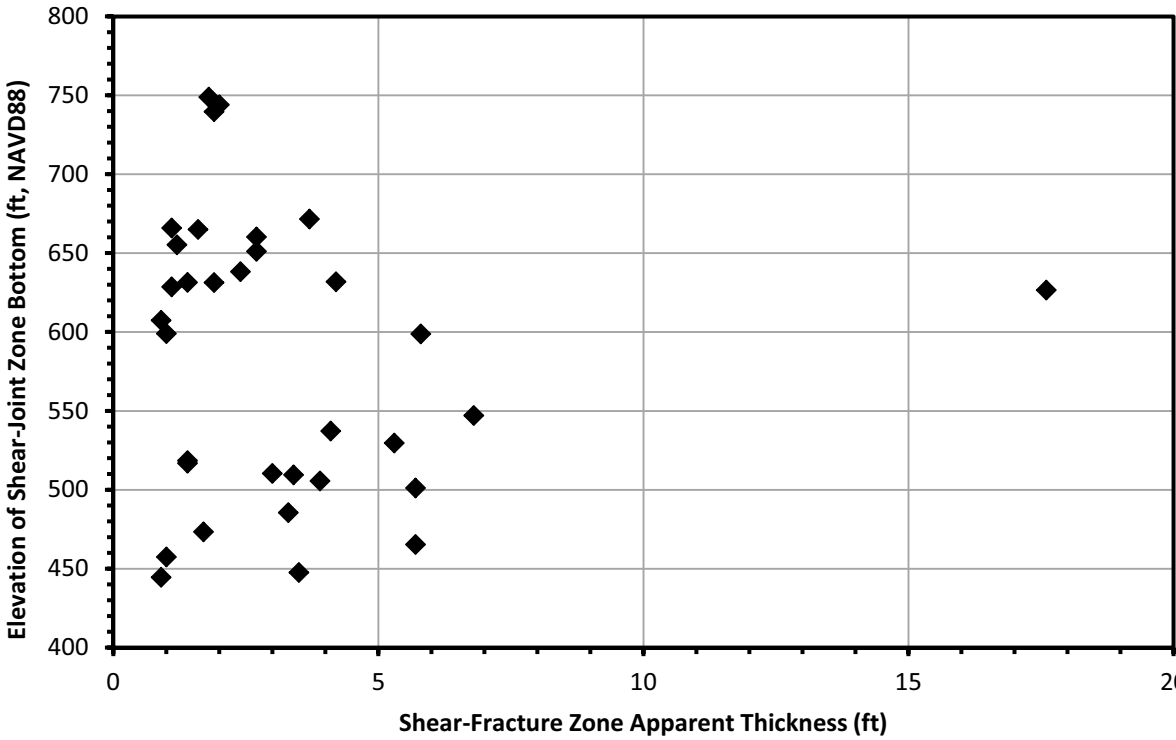
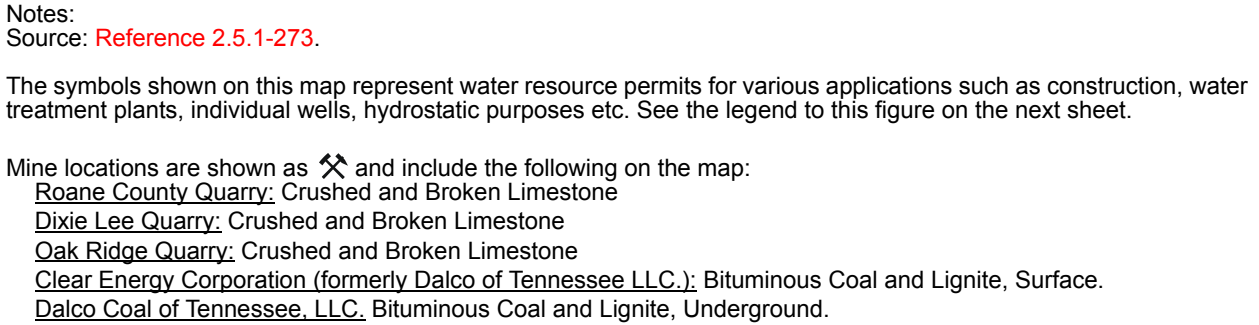
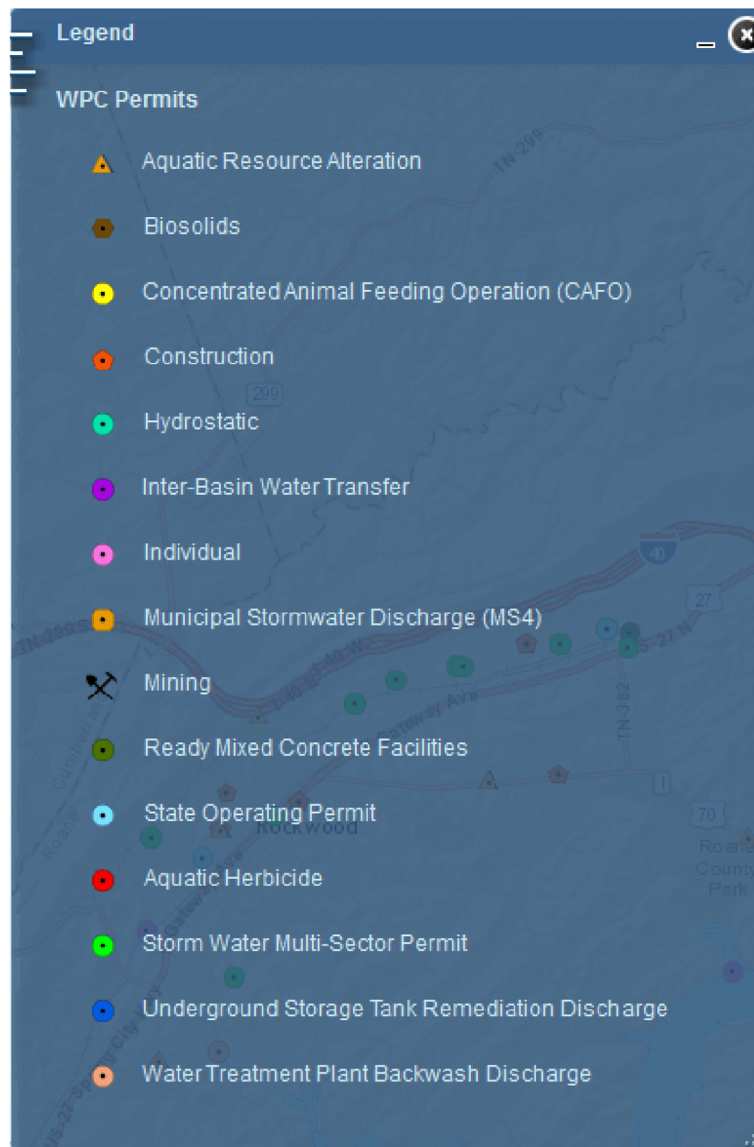


Figure 2.5.1-60. (Sheet 2 of 2) Scatter Plot of Shear-Fracture Zone Apparent Thickness—Against Elevation of Shear-Fracture Zone Bottom (Using 100- and 200-Series Borings)

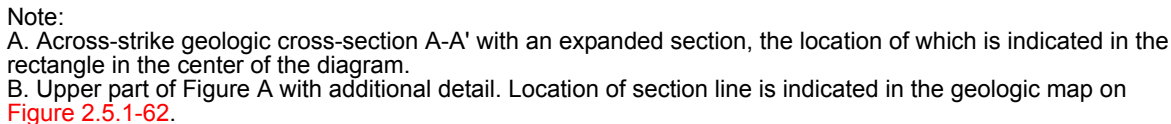




Notes:
Source: [Reference 2.5.1-273](#).

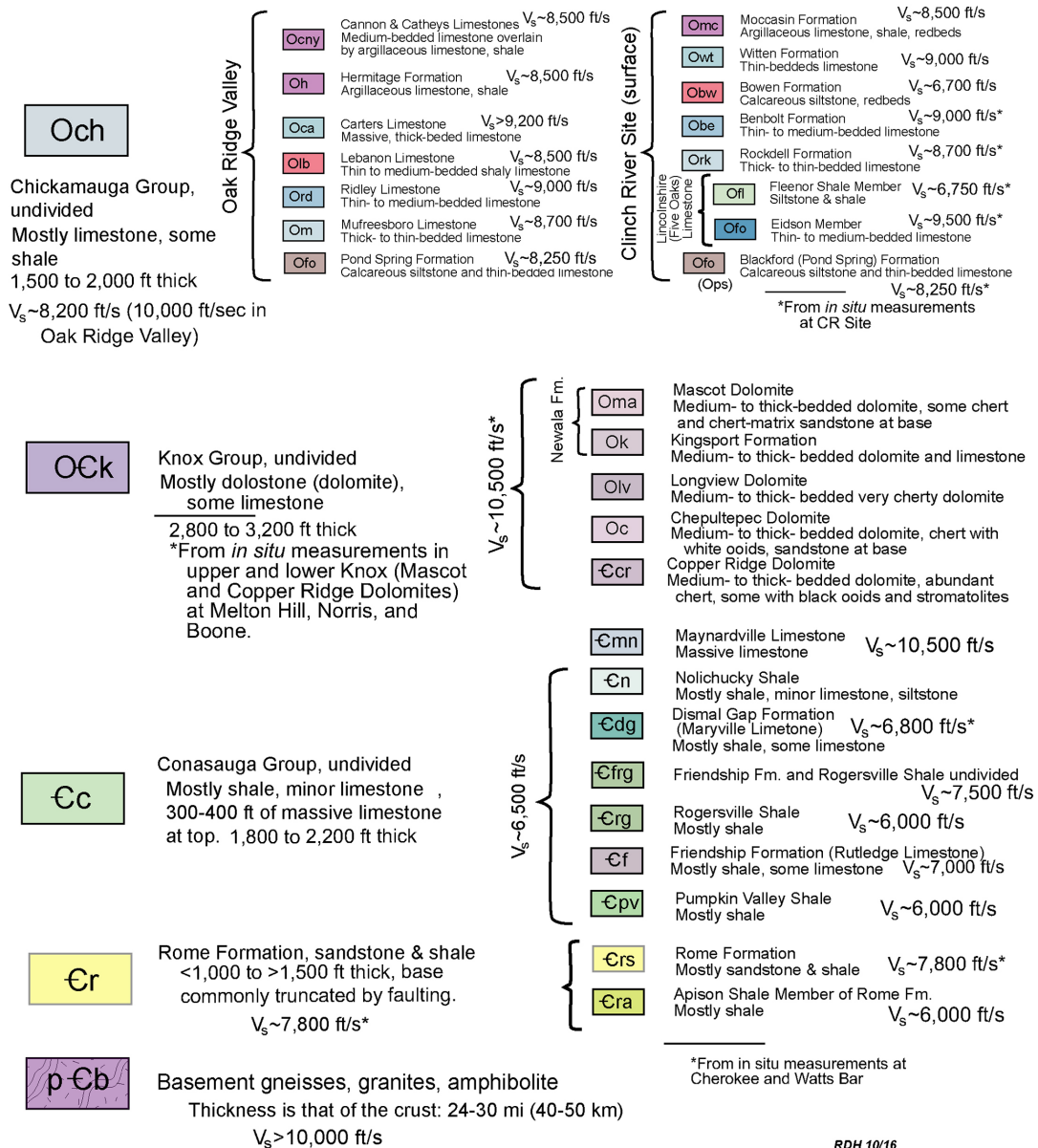
Figure 2.5.1-61. (Sheet 2 of 2) Map Showing the Water Resource Permit Application Sites Within Approximately 10 Miles of the Clinch River Nuclear Site





2.5.1-257 Revision 1

CRN Cross Sections Explanation



Note: Explanation of symbols used to identify the different geologic units in Figures 2.5.1-62 and 2.5.1-63.

Figure 2.5.1-63. (Sheet 2 of 2) Geologic Cross-Section A-A' Ground Surface to Basement