Rock Outcrop of the Maquoketa
Graf Section and Highway D-17 Section, Iowa
Lower Scales and Neda Formations

G-032009-1A

2009

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Graf Section:

Location:
This outcrop is approximately 500 feet long and is exposed on the northwest side of Graf Road just southwest of Graf Iowa. GPS location is North 42.4889 by 90.8760 West (see Figure 1). The base of the outcrop (road level) is approximately 770 feet above mean sea level (MSL). Beds 3 to 9 are the most accessible.

Significance:
This is perhaps the best exposure of the base of the *Scales Formation* in Iowa. Here it is a brown dolostone interbedded with gray to brown shale. Perhaps the most intriguing thing about the outcrop is the abundance of small cephalopods called nautiloids within the dolostone. Witzke in 1987 did and excellent fossil description of the Graf Section (Figure 2 is based on his stratigraphic column on p.28 in Guidebook 63).

The dolostone interbedded with shale is referred to as the *Elgin Member* in Iowa. The *Elgin* at Graf seems to be the eastern most extent of a tongue that pinches out at les than a half mile to the east but thickens as you head west until it replaces the shales of the *Scales*. It is roughly time equivalent to the basal dolostone facies of the *Scales Formation* in Northeastern Illinois, although the two are not the same geologic unit (they are separated by 75 miles at their closest). In Iowa the Maquoketa is given formation status, as where in Illinois it is a group. The *Elgin* and the basal dolostone in Illinois are lithologically very different. The *Elgin* at the Graf Section in Iowa is a brown micritic to fine crystalline dolostone with abundant fossils. The fossils are very well preserved (mostly nautiloids a type of cephalopod) and in places take up more than 40% of the rock. The lower dolostone in Illinois is light gray to light yellow brown, coarse grained, vesicular to vuggy, isolated small white anhydrite lenses, and contains much less shale. Fossils are far more rare in Illinois but they tend to be much larger. The Graf Section cephalopods rarely reach six inches in length and are typically two to three inches long. As where the cephalopods in Illinois (at Elmer-Larson Quarry) are one to two feet long! At the Graf Section red-brown small nodules of phosphorite are common. In the lower dolostone facies in Illinois, phosphorite is almost totally absent.

The most common fossils for collecting at the Graf section are as follows (Figures 3 and 4):

Brachiopoda-Inarticulata-*Leptobolus occidentalis*
Mollusca-Cephalopoda-*Isorthoceras sociale*
Mollusca-Cephalopoda-*Hyolithes parviusculus*
Hemichordata-Graptolithina-*Climacograptus typicalis putillus*

Figure 3 shows the Graf Section outcrop in detail. The stratigraphic standard for Illinois is used and the Maquoketa is treated as a group in Figure 3.

FIGURE 1

Graf Section
Southwest of Graf, IA

SITE LOCATION MAP

Date Studied: 2/25/2009

Location: Approximately 0.20 miles southwest of Graf Iowa on Graf Road. Northwest side of the road.

GPS location:
N: 42.4889
W: 90.8760
Elevation of Graf Road: 770 feet above MSL

N

Contour Interval = 10 feet

= 1200 feet

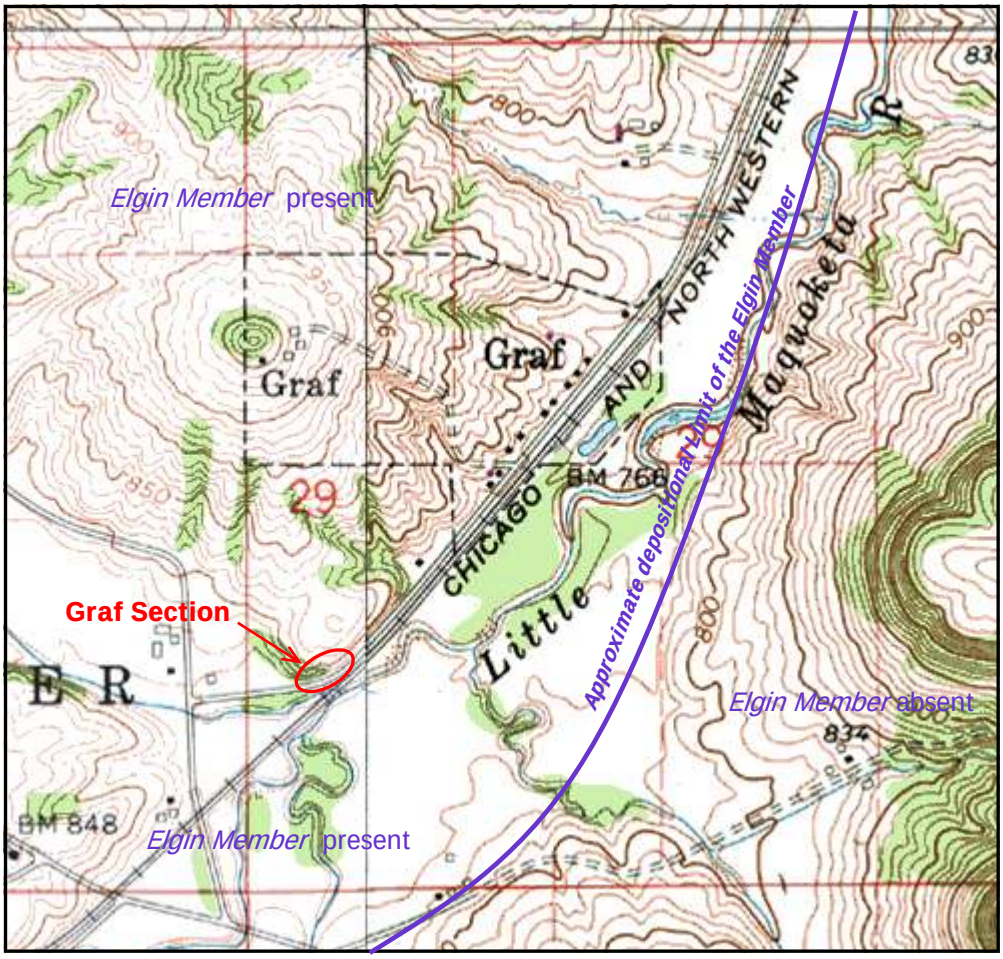


FIGURE 2: Stratigraphic Column at Graf Section

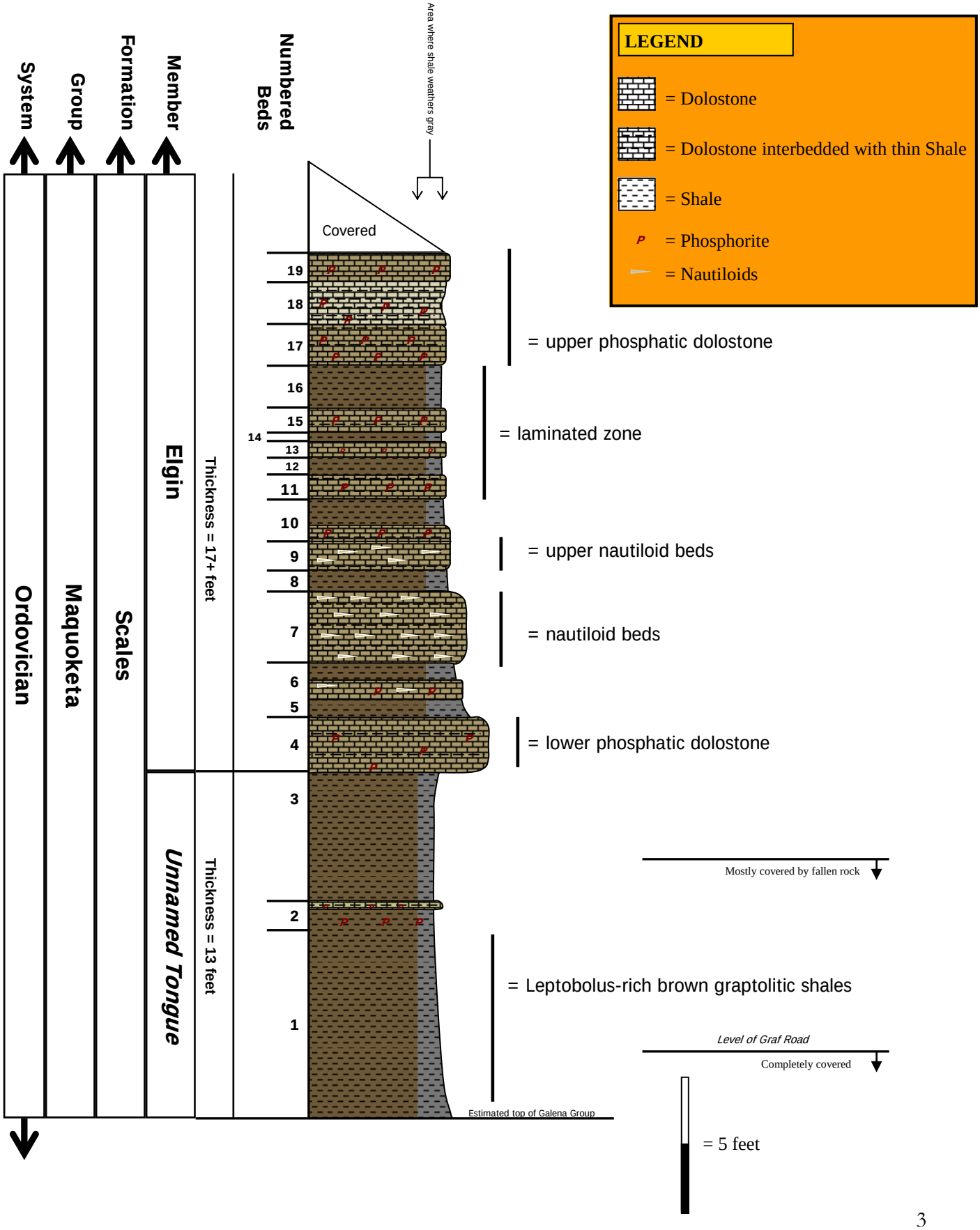
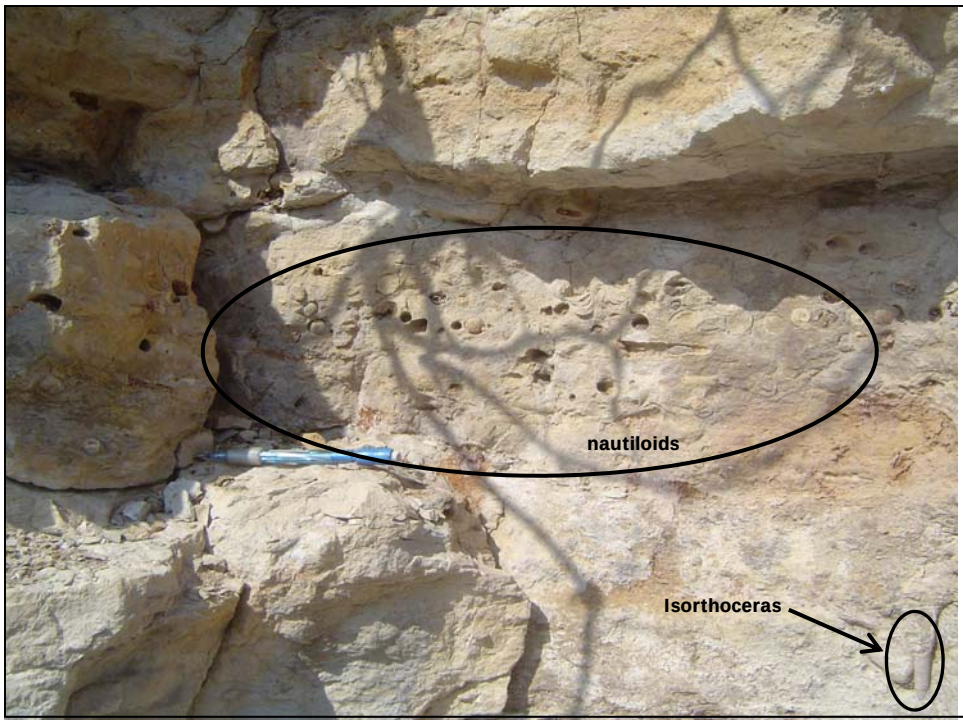
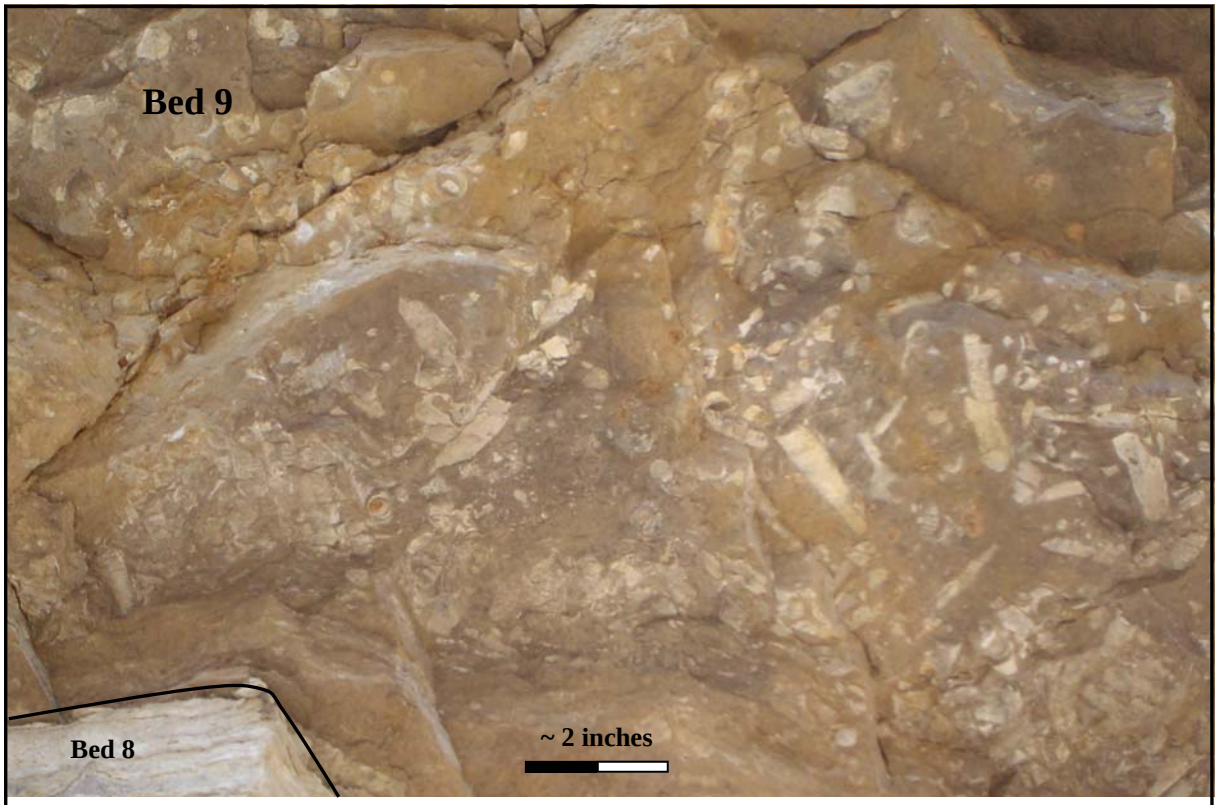


FIGURE 3: Fossils in Place at the Graf Section



Graf Section, Bed 7 (Nautiloid Bed):

Looking west
Pencil for Scale



Graf Section, Bed 9 (Upper Nautiloid Bed):

Looking up and west, showing the abundant fossils on the underside of Bed 9.

FIGURE 4: Fossils Collected at the Graf Section

Graf Section, Bed 7
(Nautiloid Bed):

These specimens were taken from Bed 7. All specimens are Isorthoceras.
Actual Size

Highway D-17 Section:

Location:
This outcrop is extensive along County Road D-17 (see Figure 5). Only a small spot was studied on February 25th, 2009. The roadcut is approximately 2.25 miles due north of Graf Iowa. GPS location is North 42.52522 by 90.88551 West. The base of the outcrop (road level) is approximately 1030 feet above mean sea level (msl).

Significance:
This area is the only place in Eastern Iowa where the *Neda Formation* (*Neda Member* in Iowa) crops out. We have gone from the oldest Maquoketa rocks at Graf to the youngest at D-17. The Neda is present throughought this road cut. However, it is either covered or is barely exposed at the base of the Silurian rocks (*Tete des Morts Formation*). Sometimes you have to dig in order to find it.

At the spot studied a one foot hole was dug in order to expose the *Neda*. No fossils are present in either the Silurian or in the *Neda*. The upper 4 inches of the *Neda* is a yellow (weathers pink) thin laminated dolomitic shale similar to the dolomitic shale present at the middle facies of the Neda in Kankakee River State Park in Illinois. Figure 6 shows the outcrop in detail. The *Neda* is in the area but rarely exposed. None of the oolites typical of the formation were observed, although others have documented their presence in the area.

Between the Graf Road Section and the D-17 Section the Maquoketa is near its thickest within a 75 mile radius at 250 feet thick.

The underlying *Brainard Formation/Member* is present below the *Neda* just 500 feet to the south along D-17 and forms most of the low lying hills in the area.

The *Fort Atkinson*, which is consistent throughout Northern Illinois (and is below the *Brainard*) is totally absent in the area and tends to be absent within 30 miles of the Mississippi River on either side.

FIGURE 5

D-17 Section
2.25 miles north of Graf, IA

SITE LOCATION MAP

Date Studied: 2/25/2009

Location: Approximately 2.25 miles north of Graf Iowa on Highway D-17. Southwest side of the road.

GPS location:
N: 42.52522
W: 90.88551
Elevation of Graf Road: 1030 feet above MSL

N

Contour Interval = 10 feet

= 1200 feet

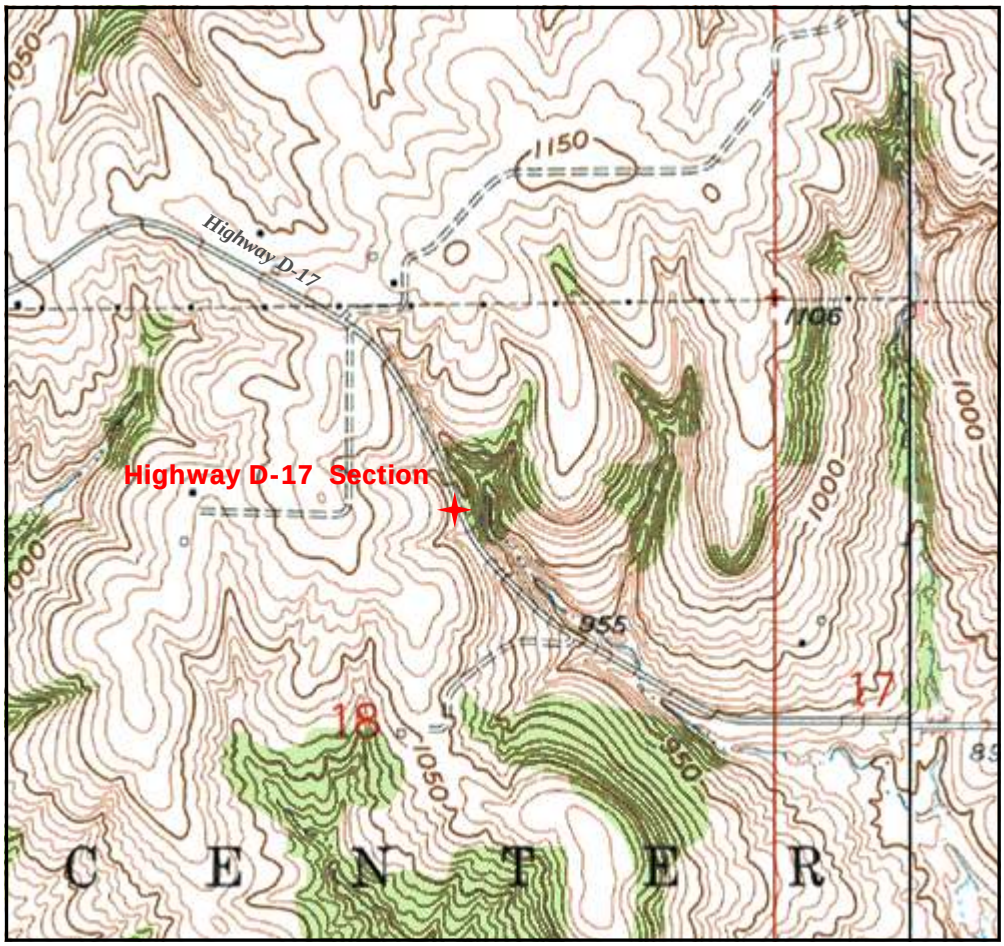
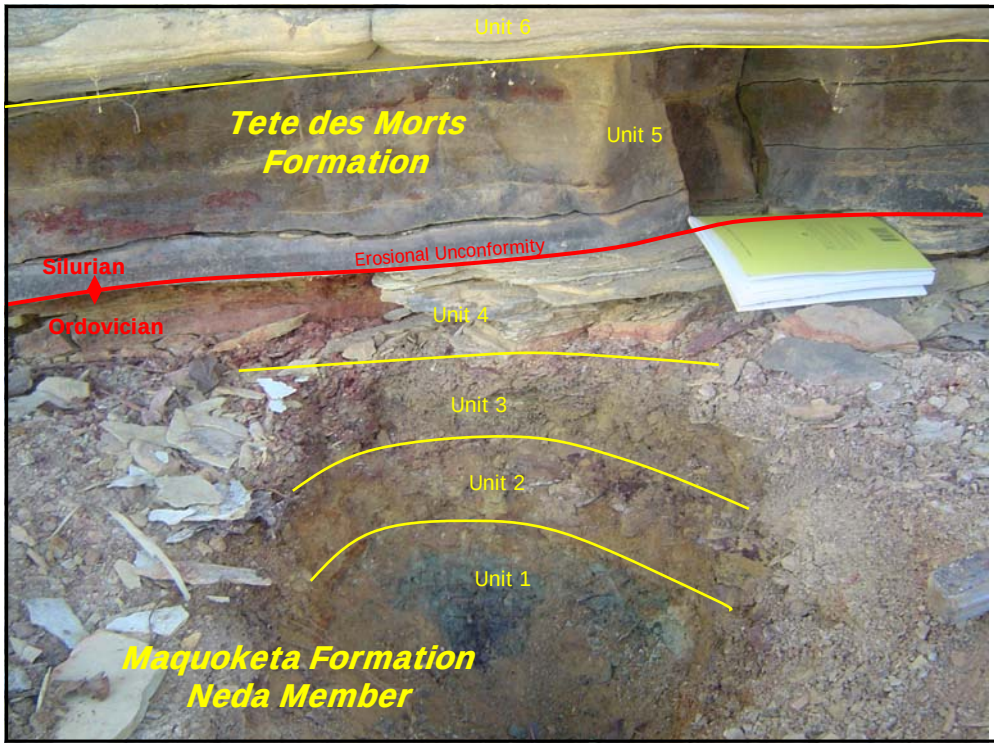


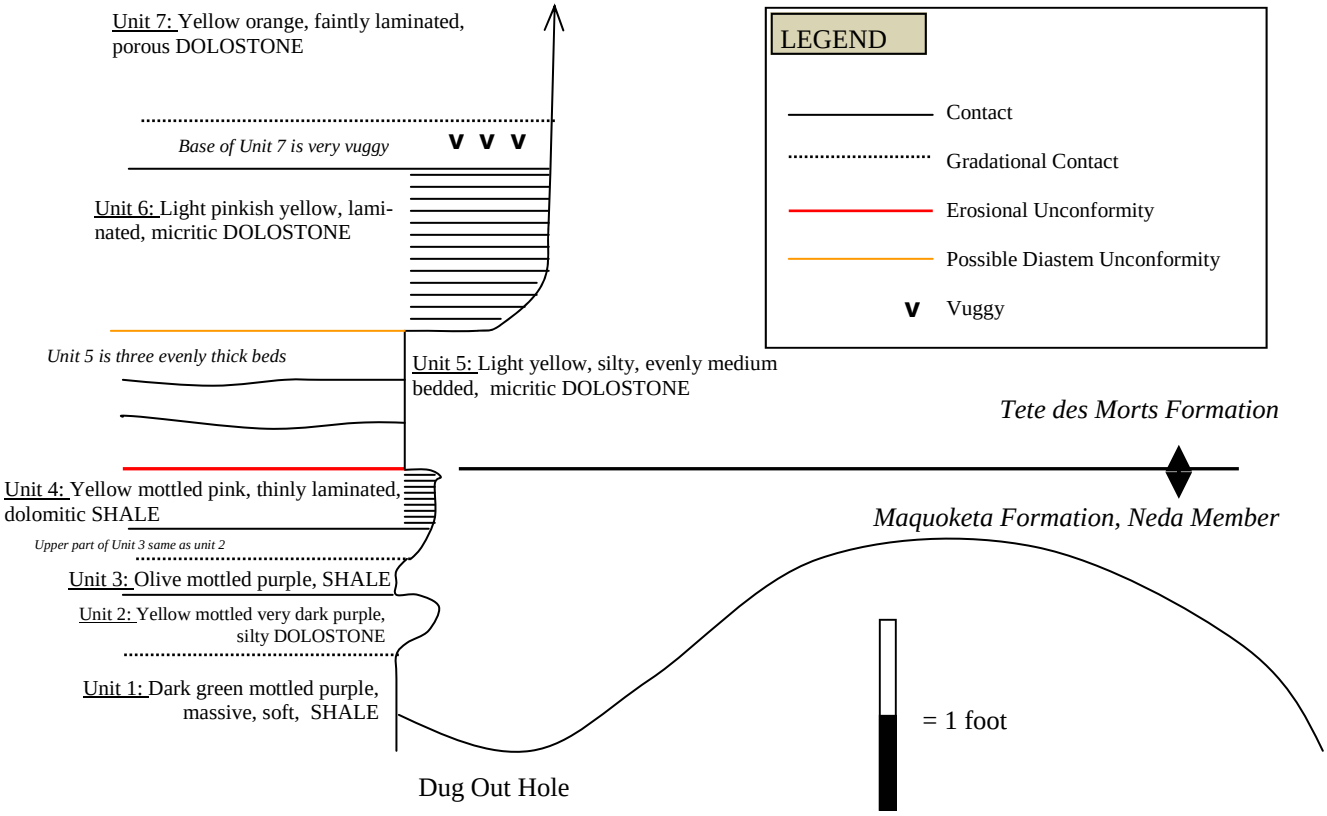
FIGURE 6: Highway D-17 Road Cut



Highway D-17 Road Cut:

Looking southwest
Notebook for Scale

Stratigraphic Column of Above Picture



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