

# San Francisco Coastal Geology Field Class – GEOL 21A

## FIELD DAY 1 EXERCISES

### RODEO BEACH OBSERVATION DATA SHEET

For each site, complete the following data table with observations of the beach, its sand, and the surrounding rocks. Also collect and label a sample.

SITE OBSERVER:				
DATE and time				
Temperature	Relative Humidity	Wind Speed	Wind direction (from?)	Clouds/clarity
Estimated tidal height (from tide tables):				
Estimated tidal current (circle): Flood   High Tide   Ebb   Low Tide				
Maximum wave height (estimate)		Direction waves are coming from (circle):      North   South   Variable		
Estimated longshore current direction: North   South   Variable				
Beach sand composition (estimate %) – listed in order from most to least resistant: Quartz   Chert   Magnetite   Feldspar   Shells   Granite   Black nonmagnetic   Plastic/Debris				
Beach sand size (estimate %): Mud (<1/16 mm)   Fine Sand   Medium Sand   Coarse Sand   Gravel (>2 mm)				
From the above compositional data only, does this sand appear to have been transported a great distance?		From the above size data only, does this sand appear to have been transported a great distance?		
Back of beach material: Sand Dunes   Cliff   Lagoon   Other – describe:				
Rocks in cliff (circle): Mudstones   Sandstones   Serpentinite   Chert   Basalt   Granite   Other – describe:				
What do the rocks in the cliff say about the past environment (be sure to look for rock type AND fossils, if possible)?				
Using all <b>above data</b> as evidence, indicate source of this beach sand.				
Local sources	Longshore transport from rivers	Local biologic reef	Other (describe below):	
%	%	%	%	
CHALLENGE: Can you find any Carnelian on the beach today? Jade? Both are semi-precious gem stones commonly found on this beach.		CHALLENGE: Can you find evidence of past landslides on this beach? How? Where? What was the likely cause?		

# RODEO BEACH QUARRY WORKSHEET

## MARIN HEADLANDS RIBBON CHERT

In the cliff face in front of you, observe (with a handlens – close up – and from a distance) the two different rock types found. Name and describe them below.

Find a fold structure in the rocks and a fracture. Pick one and sketch it below. Show textures, fractures, etc. Label each rock type and feature. DON'T FORGET SCALE.

The youngest ribbon chert in the Marin Headlands is 100 Ma – the oldest is 200 Ma. Can you tell which layers in the cliff face are the oldest and which the youngest? Why or why not?

Observe the sediment produced at the base of the cliff. How does the chert sediment differ from the shale sediment? (Describe below – texture, size, etc.)

What hypothesis can you develop about the relative resistance to weathering of these two rock types in this particular climate?

# BAKER BEACH OBSERVATION DATA SHEET

For each site, complete the following data table with observations of the beach, its sand, and the surrounding rocks. Also collect and label a sample.

SITE OBSERVER:				
DATE and time				
Temperature	Relative Humidity	Wind Speed	Wind direction (from?)	Clouds/clarity
Estimated tidal height (from tide tables):				
Estimated tidal current (circle): Flood   High Tide   Ebb   Low Tide				
Maximum wave height (estimate)		Direction waves are coming from (circle): North   South   Variable		
Estimated longshore current direction: North   South   Variable				
Beach sand composition (estimate %) - listed in order from most to least resistant: Quartz   Chert   Magnetite   Feldspar   Shells   Granite   Black nonmagnetic   Plastic/Debris				
Beach sand size (estimate %): Mud (<1/16 mm)   Fine Sand   Medium Sand   Coarse Sand   Gravel (>2 mm)				
From the above compositional data only, does this sand appear to have been transported a great distance?		From the above size data only, does this sand appear to have been transported a great distance?		
Back of beach material: Sand Dunes   Cliff   Lagoon   Other - describe:				
Rocks in cliff (circle): Mudstones   Sandstones   Serpentinite   Chert   Basalt   Granite   Other - describe:				
What do the rocks in the cliff say about the past environment (be sure to look for rock type AND fossils, if possible)?				
Using all <b>above data</b> as evidence, indicate source of this beach sand.				
Local sources	Longshore transport from rivers	Local biologic reef	Other (describe below):	
%	%	%	%	
CHALLENGE: Can you find evidence here of the sand dunes that covered San Francisco before we built a city atop them? What is that evidence?				

# LAND'S END WORKSHEET

## LANDS END - Trail in the middle of the landslide behind Sutro Baths

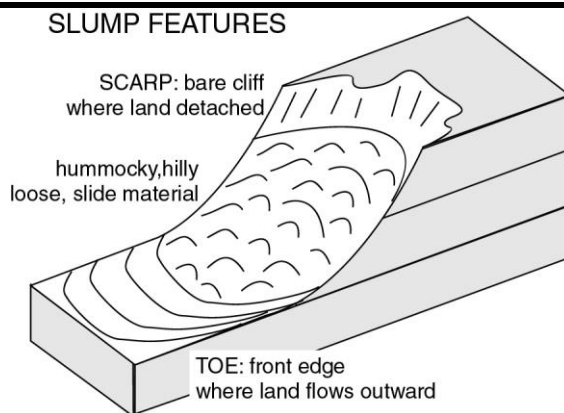
**CHALLENGE:** Describe the serpentinite soil: Grain size, texture, color, and other observations. Compare with fresh samples. How long did it take the fresh, exposed serpentinite to change into the soil before you? What does that mean for using this serpentinite as a possible building material?

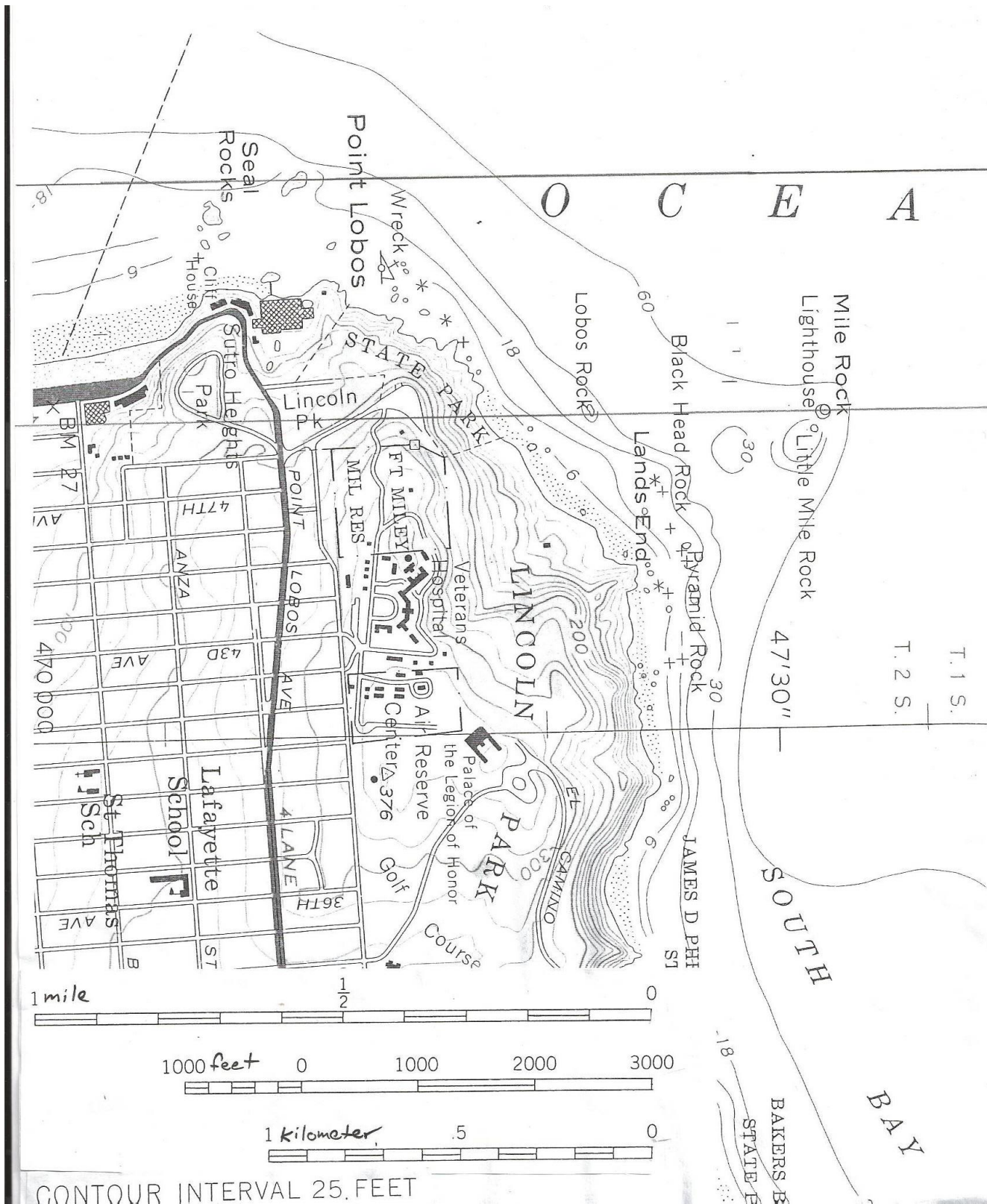
## Landslide overlook (under golf course access road)

As we walk along the coastal trail through the City College mélange, we are also walking across a massive landslide, right under the Veterans Hospital, behind the Legion of Honor. The landslide was caused by wave action undercutting the City College mélange. In the early 1880s, a rail line used this same route to take people between downtown and the Cliff House. It was abandoned because of the huge maintenance costs resulting from the unstable roadbed.

**CHALLENGE:** What is the approximate size of this landslide (height, width, depth)?

Hint: take something you know – like a football field length or a city block – and compare it with the magnitude of the depth, height, and width. Which is the largest number? Smallest? – Estimating distances in the field is a tough skill. Be patient!





# OCEAN BEACH OBSERVATION DATA SHEET

For each site, complete the following data table with observations of the beach, its sand, and the surrounding rocks. Also collect and label a sample.

SITE OBSERVER:				
DATE and time				
Temperature	Relative Humidity	Wind Speed	Wind direction (from?)	Clouds/clarity
Estimated tidal height (from tide tables):				
Estimated tidal current (circle): Flood   High Tide   Ebb   Low Tide				
Maximum wave height (estimate)			Direction waves are coming from (circle): North   South   Variable	
Estimated longshore current direction: North   South   Variable				
Beach sand composition (estimate %) - listed in order from most to least resistant: Quartz   Chert   Magnetite   Feldspar   Shells   Granite   Black nonmagnetic   Plastic/Debris				
Beach sand size (estimate %): Mud (<1/16 mm)   Fine Sand   Medium Sand   Coarse Sand   Gravel (>2 mm)				
From the above compositional data only, does this sand appear to have been transported a great distance?			From the above size data only, does this sand appear to have been transported a great distance?	
Back of beach material: Sand Dunes   Cliff   Lagoon   Other - describe:				
Rocks in cliff (circle): Mudstones   Sandstones   Serpentine   Chert   Basalt   Granite   Other - describe:				
What do the rocks in the cliff say about the past environment (be sure to look for rock type AND fossils, if possible)?				
Using all <b>above data</b> as evidence, indicate source of this beach sand.				
Local sources	Longshore transport from rivers	Local biologic reef	Other (describe below):	
%	%	%	%	