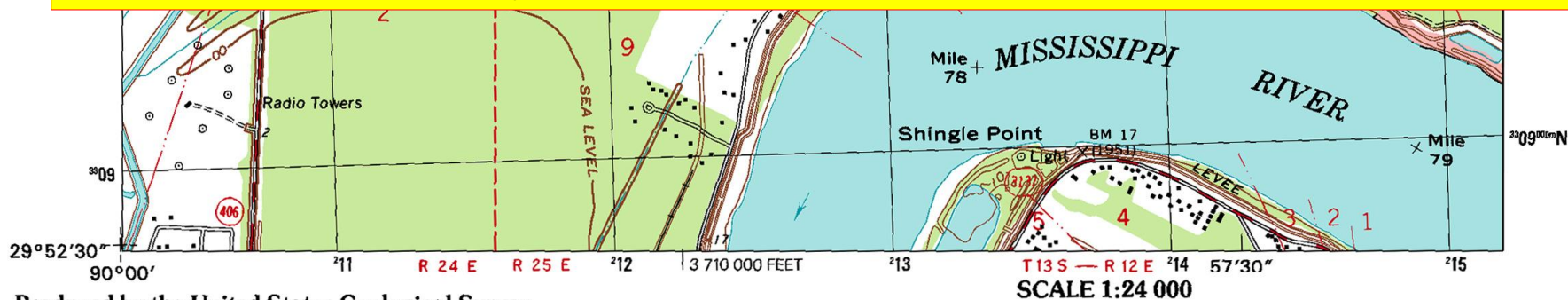


# US National Grid Training Map

## How to Read and Use Grid Coordinates Federal Geographic Data Committee US National Grid (FGDC-STD-011-2001)

- Tom Terry

neri.terry@usmc.mil , (703) 695-3118



Produced by the United States Geological Survey

Topography compiled 1964. Planimetry derived from imagery taken 1998 and other sources. Public Land Survey System and survey control current as of 1967

North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 16  
10 000-foot ticks: Louisiana Coordinate System of 1983 (south zone)

North American Datum of 1927 (NAD 27) is shown by dashed corner ticks. The values of the shift between NAD 83 and NAD 27 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software

There may be private inholdings within the boundaries of the National or State reservations shown on this map

City of New Orleans and Orleans Parish are coextensive

This quadrangle covers a subsidence area

Landmark buildings verified 1967



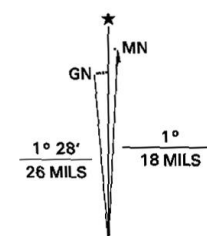
1	2	3
4		5
6	7	8

ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

- 1 Spanish Fort
- 2 Little Woods
- 3 Chef Menteur
- 4 New Orleans East
- 5 Martello Castle
- 6 Bertrandville
- 7 Belle Chasse
- 8 Delacroix

CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929  
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048

U.S. National Grid  
100,000-m Square ID  
**BU**  
Grid Zone Designation  
**16R**



UTM GRID AND 2000 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

# Review and relevance: Map Accuracy

- National Map Accuracy Standard (NMAS)
- NMAS =  $>1:20,000$  = 90% of well defined features will be within  $1/50$  inch on map of true position.
- USGS 1:24,000 series topo maps = NMAS.
  - @ 1:24,000, 90% of well defined mapped features will be within 12.19-m of true position on the ground.
  - @ 1:24,000, 12-m = 0.5-mm...  
...or dot from 0.5-mm pencil lead = ·

# Review and relevance: GPS Accuracy

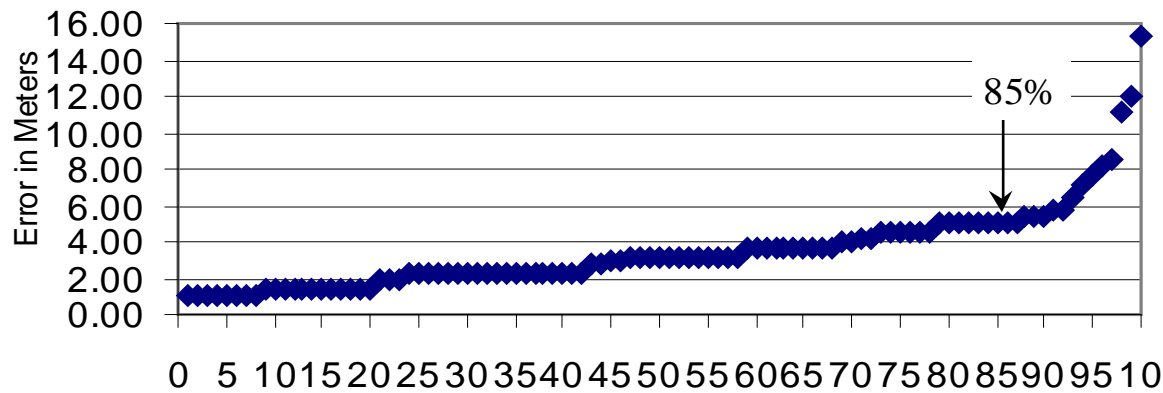


Figure 37. Samples listed by distance errors.

This chart depicts the 100 sample locations over a period of 100 minutes from a consumer GPS receiver, listed by miss distance. Y values represent the error (miss distance) between what the GPS receiver displayed and the true position of the receiver at horizontal control station GPS112 on the GMU campus.

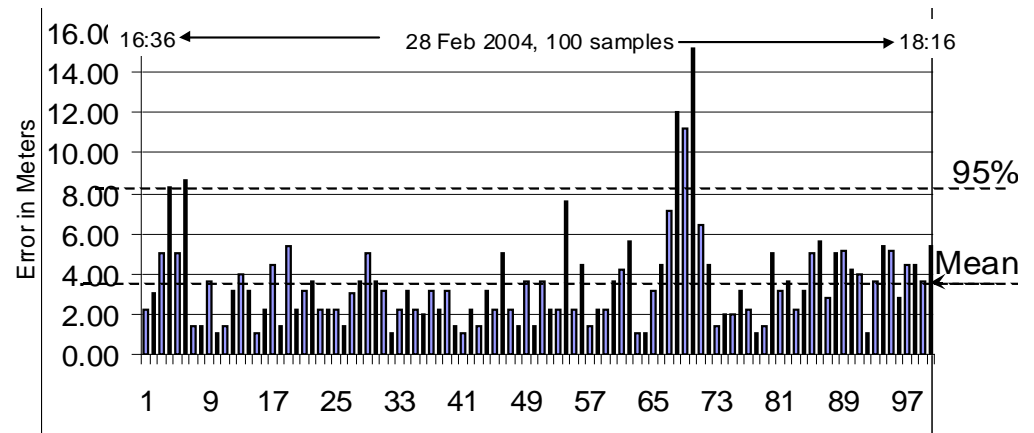
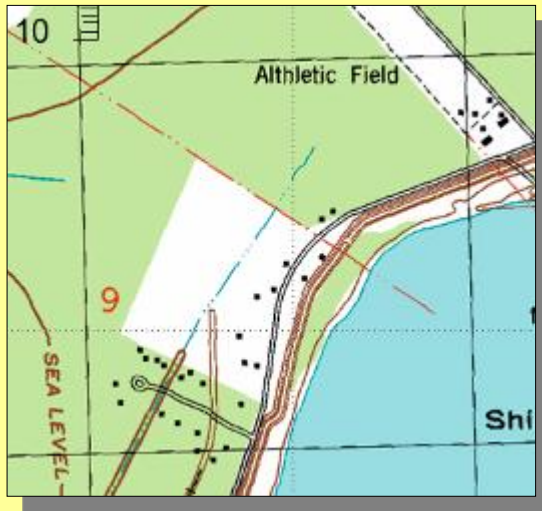


Figure 38. Location samples in temporal sequence.

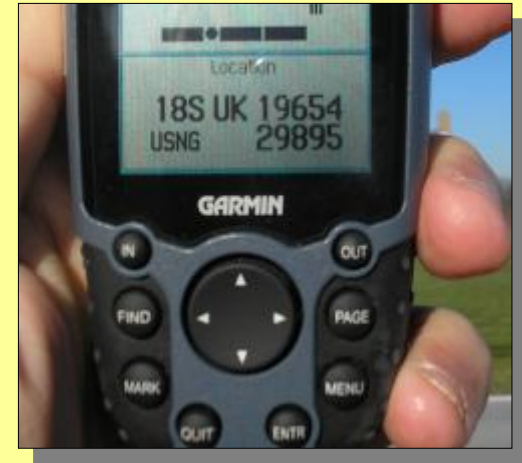
This chart depicts a temporal sequence of the 100 position samples taken at 1min intervals from a consumer GPS receiver. Y values represent the error (miss distance) between what the GPS receiver displayed and the true position of the receiver at horizontal control station GPS112 on the GMU campus. The average error was only 3.5-m, and 95% were within 8.2-m, an amazing capability given the cost and reliability of these consumer devices. Note the outlier excursion out to 15-m beginning at ~67 minutes.

In other words...



matches GPS...

...in accuracy.



*It is worth noting, this accuracy was achieved at no trivial cost to the US Treasury over the last century.*

The lessons: 1) Do not point at position with your finger.  
2) Attention to detail when working.

*Attention to detail* when working.

# Orientation to the US National Grid format:

Water Tank at grid: 16R BU 1028 0976

100,000-m Square ID

USNG format: 16R BU 1028 0976

Grid Zone Designation (GZD)  
(6° lat x 8° longitude quad)

Easting Northing  
Grid Coordinates

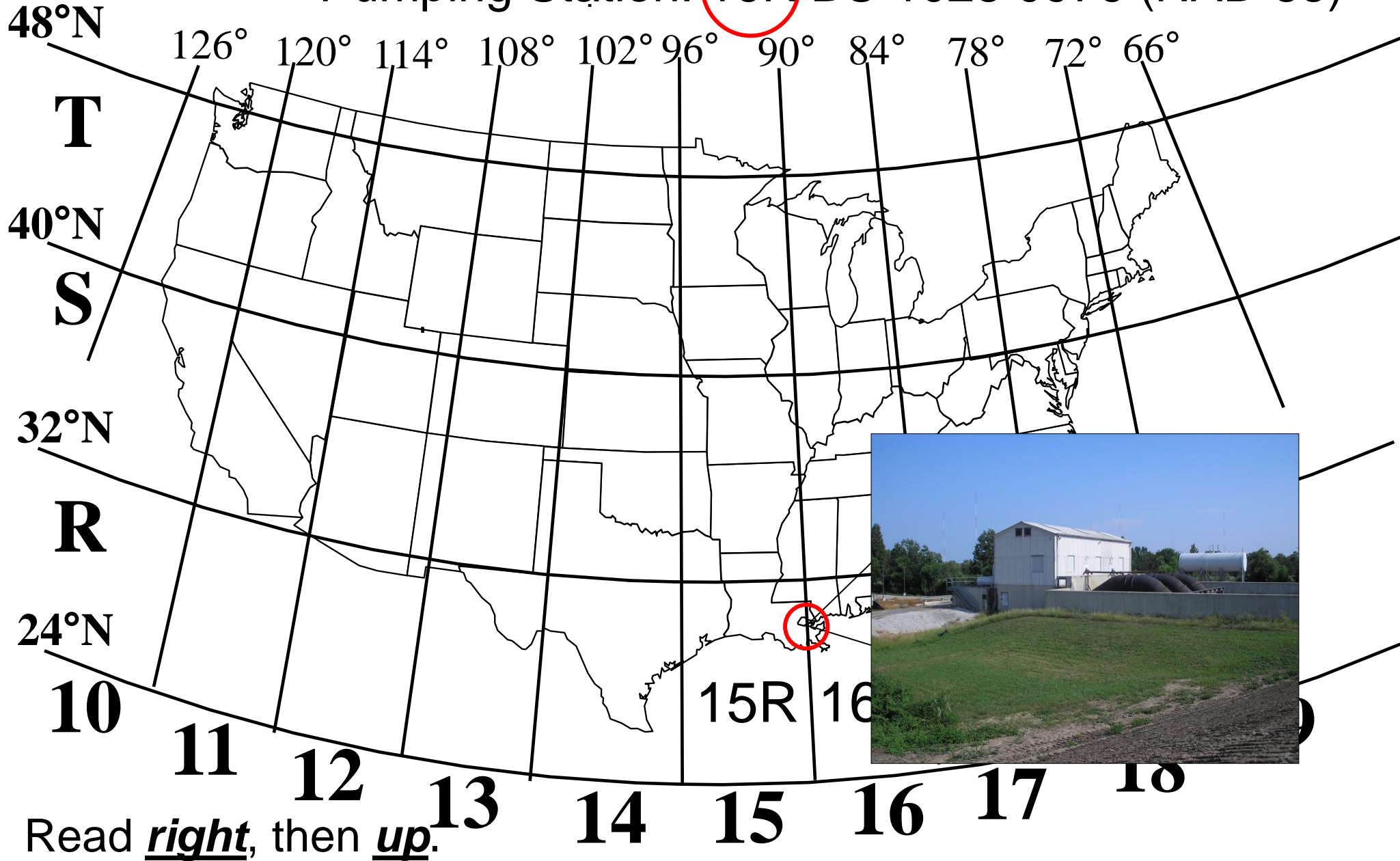
Read right, and up.↑

UTM format: 16R, 210280mE, 2309760mN  
(Well suited for surveying / distance and direction calculations  
and a component of the US National Grid.)

How to read the USNG...

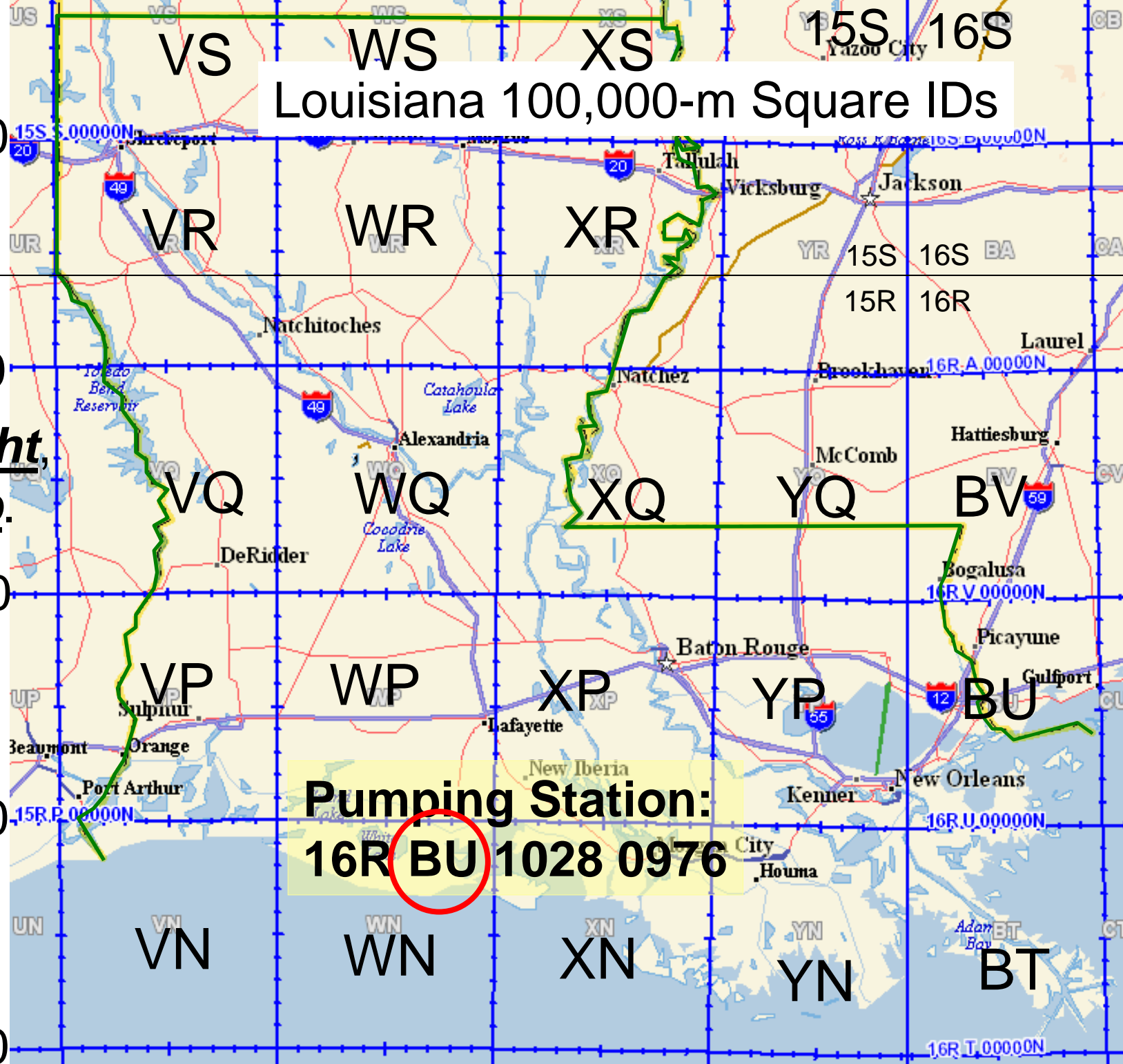
# U T M/USNG Grid Zone Designations

Pumping Station: 16R BU 1028 0976 (NAD 83)



# Louisiana 100,000-m Square IDs

Read right,  
then up.



**Pumping Station:**  
**16R BU 1028 0976**

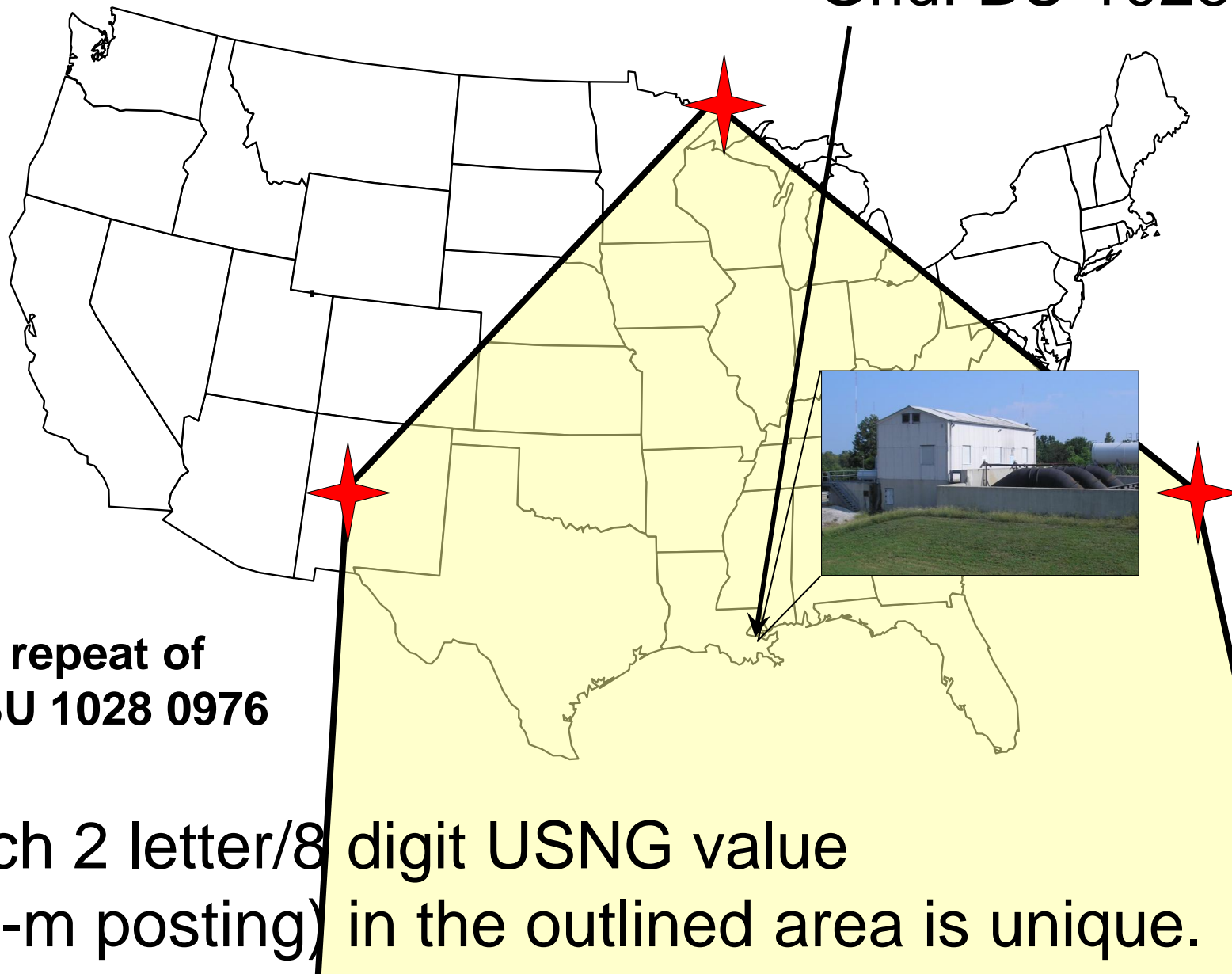
Scale  
~1:2,700,000

See:  
[www.fgdc.gov/usng](http://www.fgdc.gov/usng)

# The Power of Truncated USNG Values

Pumping Station: 16R BU 1028 0976

Grid: BU 1028 0976



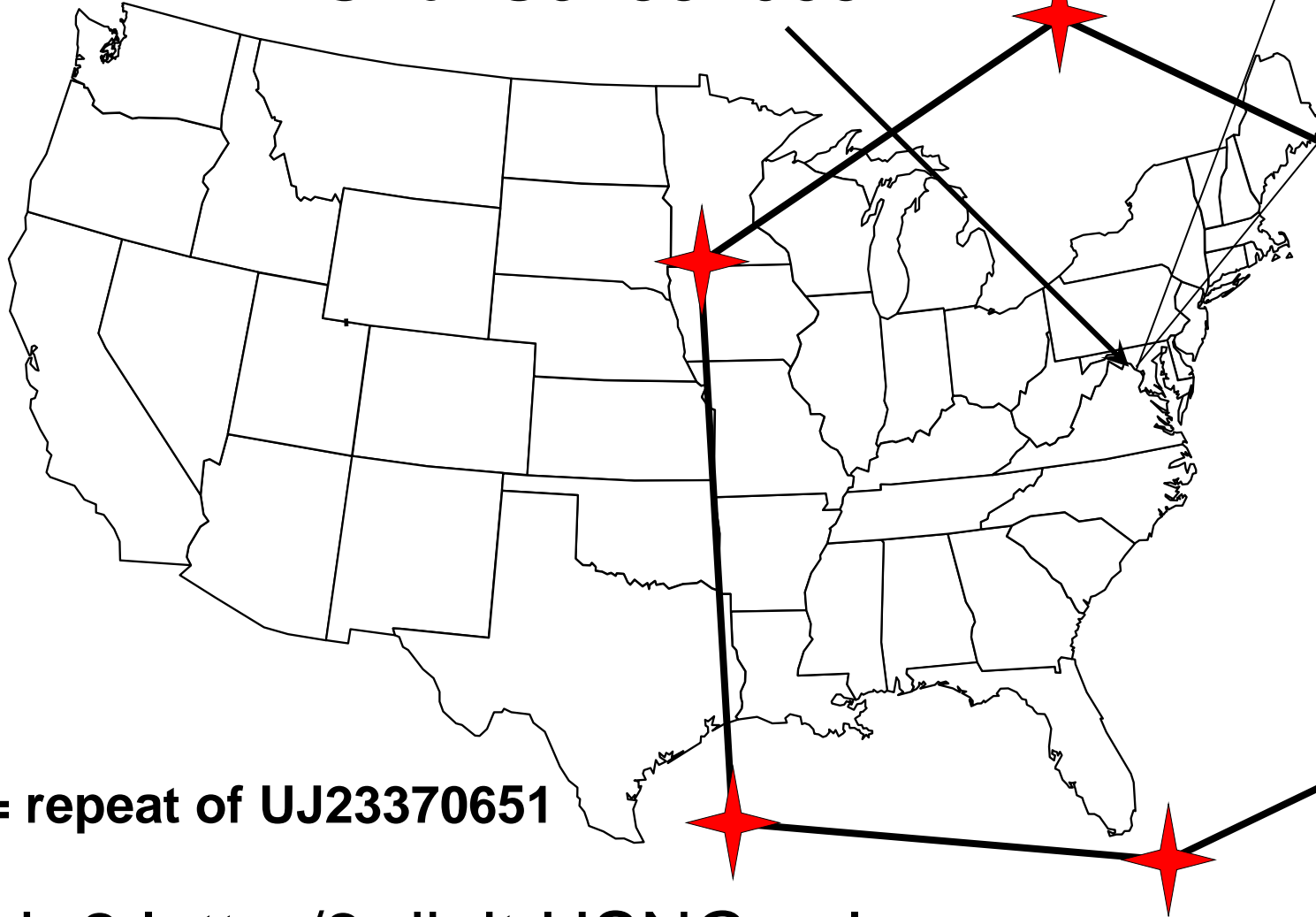
 = repeat of  
BU 1028 0976

Each 2 letter/8 digit USNG value  
(10-m posting) in the outlined area is unique.

# The Power of Truncated USNG Values

Jefferson Pier, Washington, DC

Grid: UJ23370651



★ = repeat of UJ23370651

Each 2 letter/8 digit USNG value  
(10-m posting) in the outlined area is unique.

# Reading USNG Grid Coordinates

Water tank located at  
grid: 16R BU **1249 1084**

Read **RIGHT** to grid line **12**

Then measure right another  
480-meters.

Water Tank at  
grid: 12491084

(think 1249 / 1084)

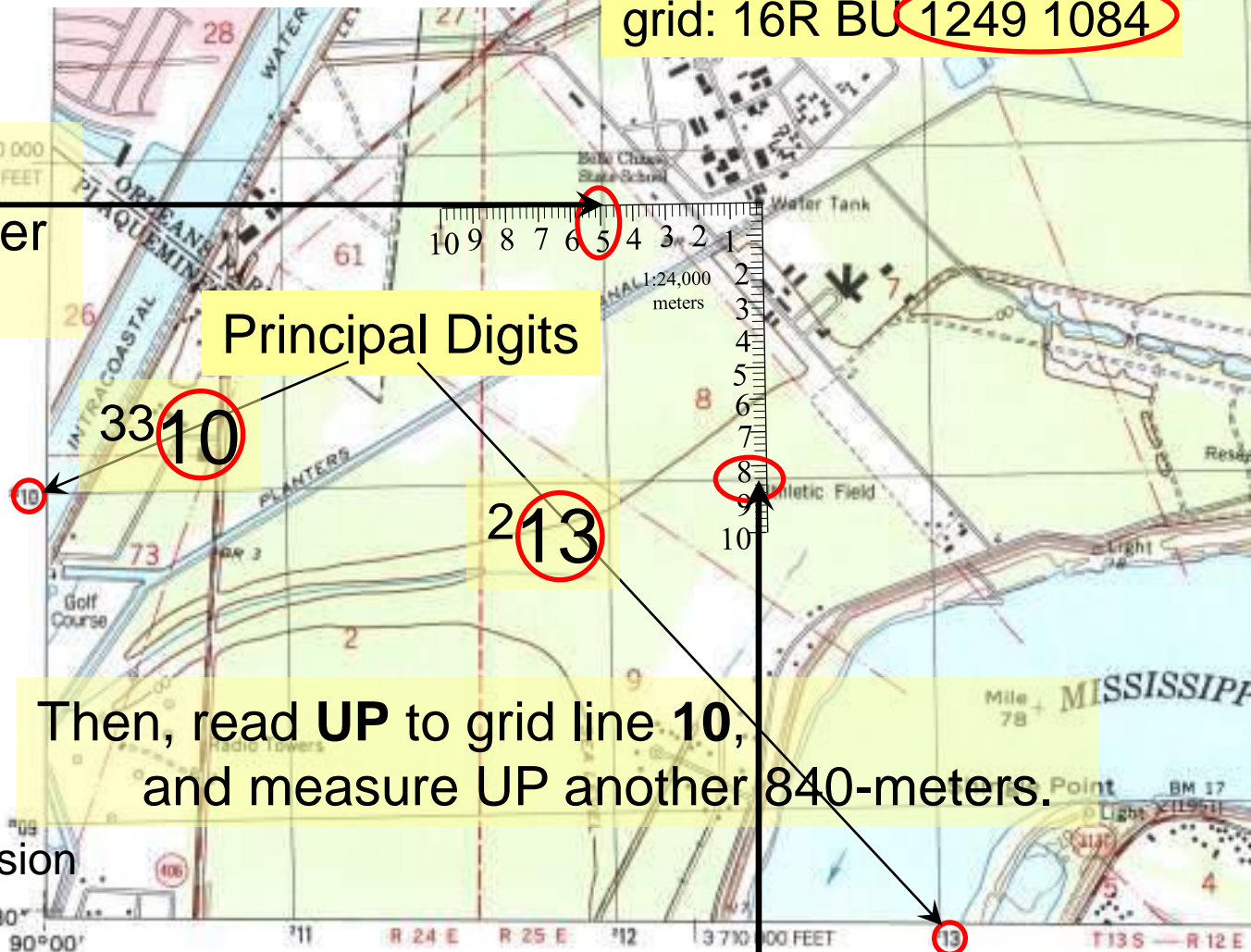
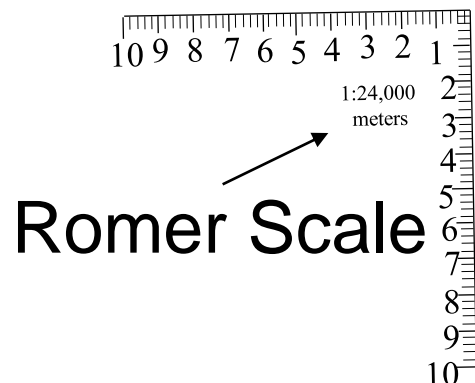
4-digit: 12 10 = 1,000m

6-digit: 124 108 = 100m

8-digit: 1249 1084 = 10m

10-digit: 12490 10840 = 1m precision

Read **Right**, Then **Up**.



Produced by the United States Geological Survey

Topography compiled 1964. Planimetry derived from imagery taken 1998 and other sources. Public Land Survey System and survey control current as of 1967

North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 16  
10 000-foot ticks: Louisiana Coordinate System of 1983 (south zone)

North American Datum of 1927 (NAD 27) is shown by dashed corner ticks. The values of the shift between NAD 83 and NAD 27 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software

There may be private inholdings within the boundaries of the National or State reservations shown on this map

City of New Orleans and Orleans Parish are coextensive

This quadrangle covers a subsidence area

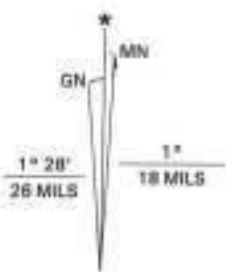
Landmark buildings verified 1967

U.S. National Grid

100,000-m Square ID

BU

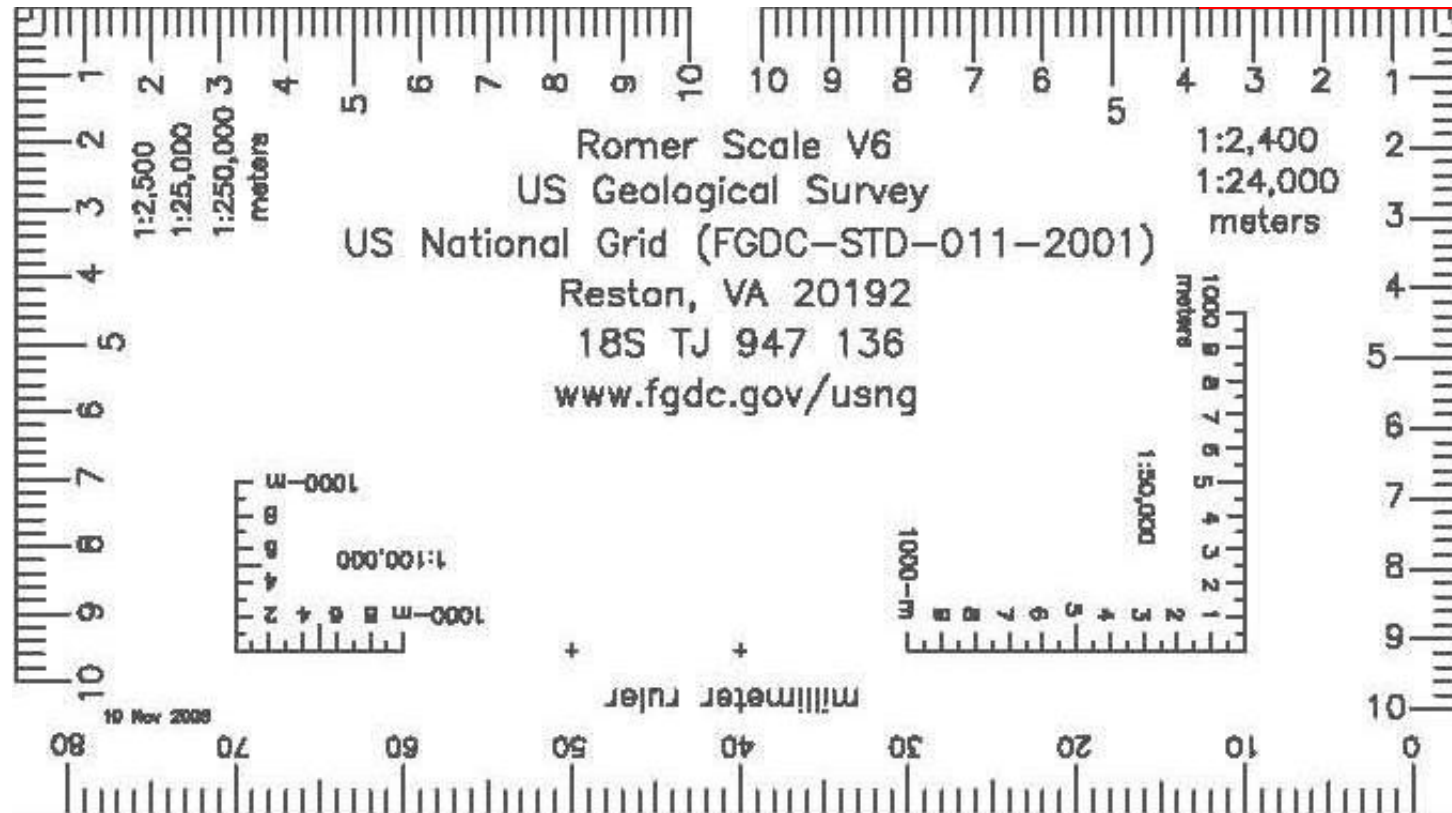
Grid Zone Designation  
16R



UTM GRID AND 2000 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

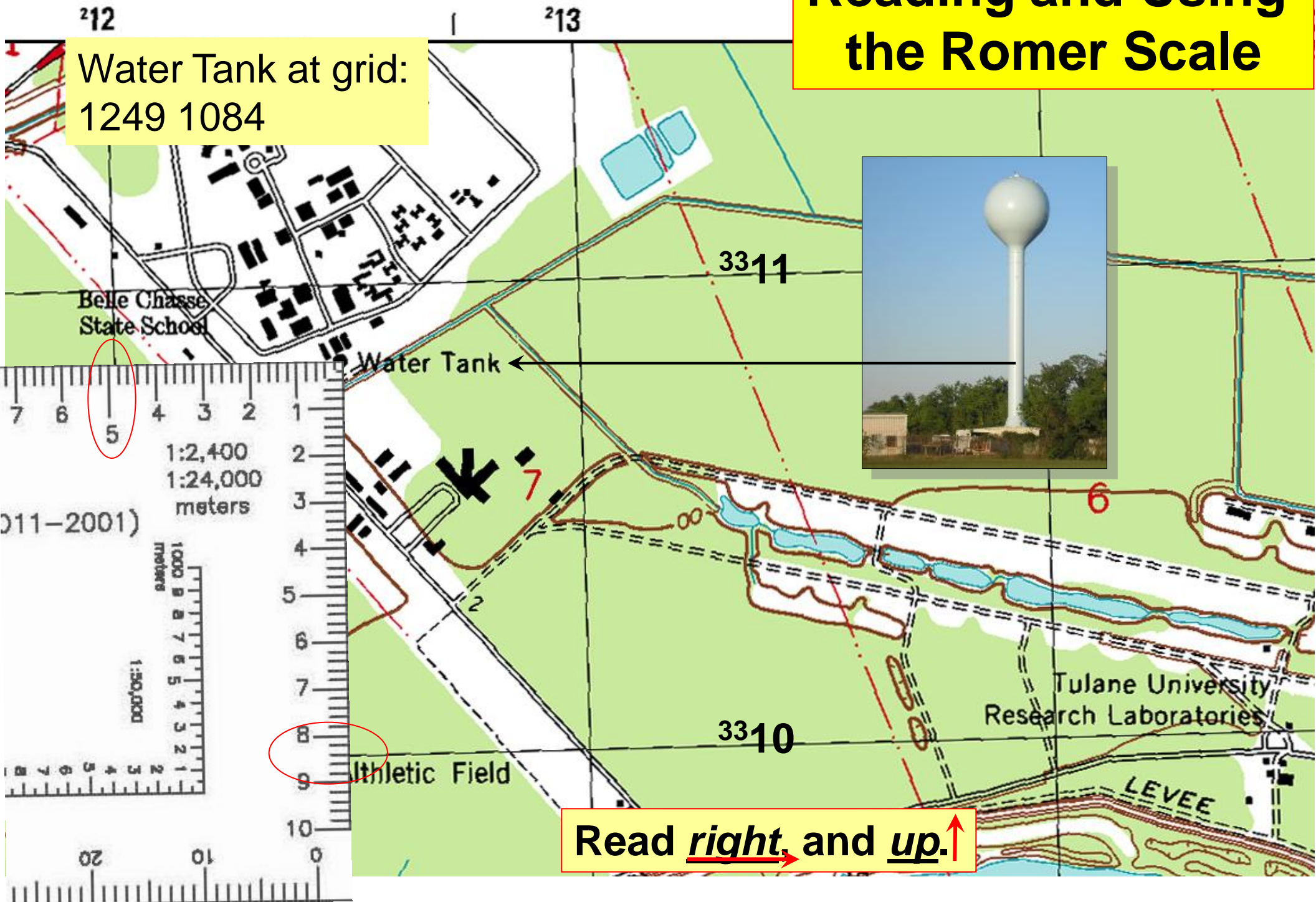
CHALMETTE, LA

# Orientation on the Romer Scale



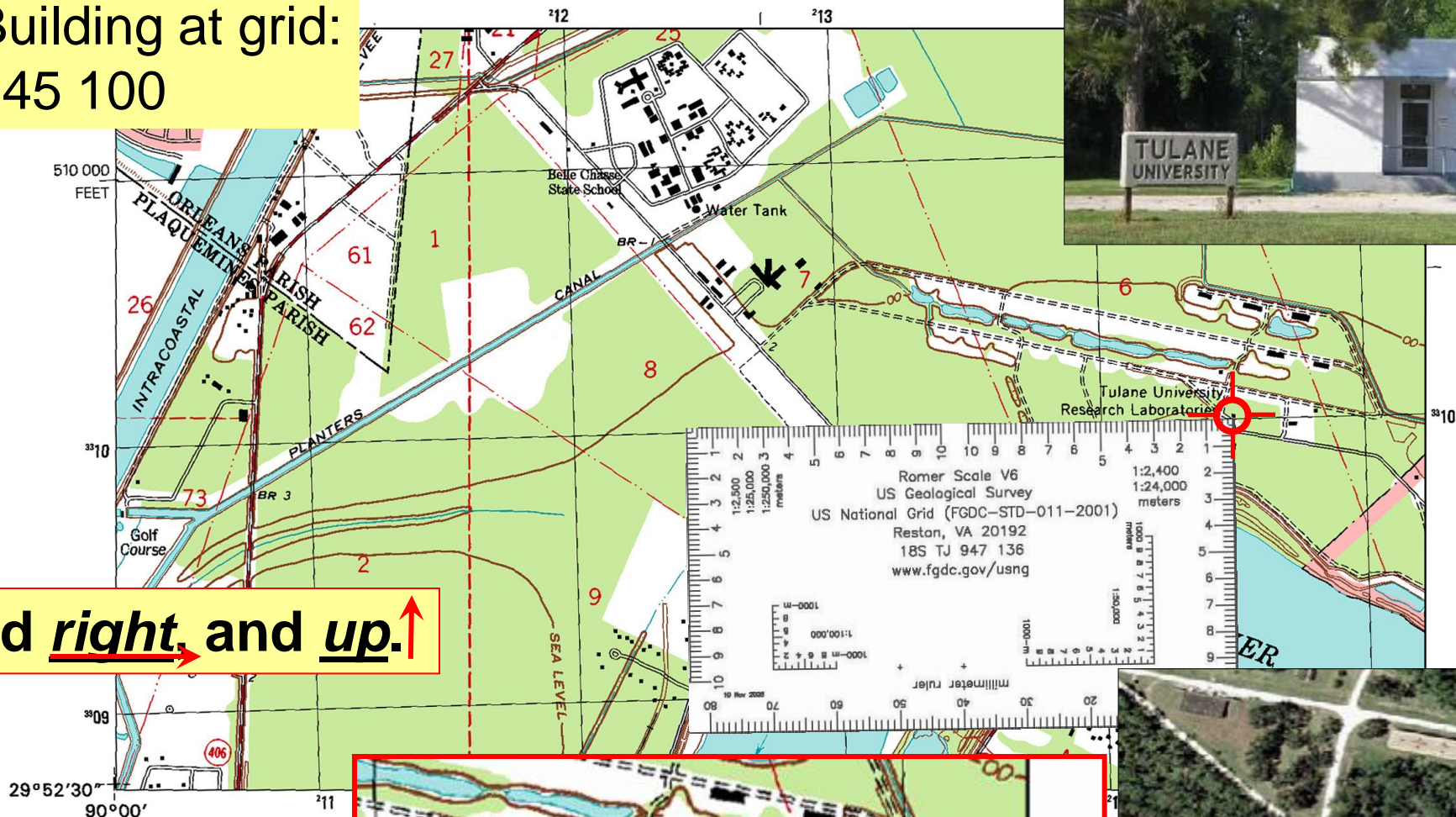
# Reading and Using the Romer Scale

Water Tank at grid:  
1249 1084



# US National Grid Training Map

Building at grid:  
145 100



Building at grid:  
1282 1122



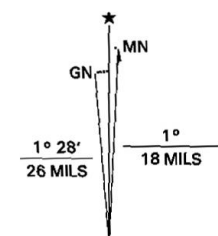
1	2	3
4		5
6	7	8

- 1 Spanish Fort
- 2 Little Woods
- 3 Chef Menteur
- 4 New Orleans East
- 5 Martello Castle
- 6 Bertrاندville
- 7 Belle Chasse
- 8 Delacroix

**U.S. National Grid**  
100,000-m Square ID  
**BU**  

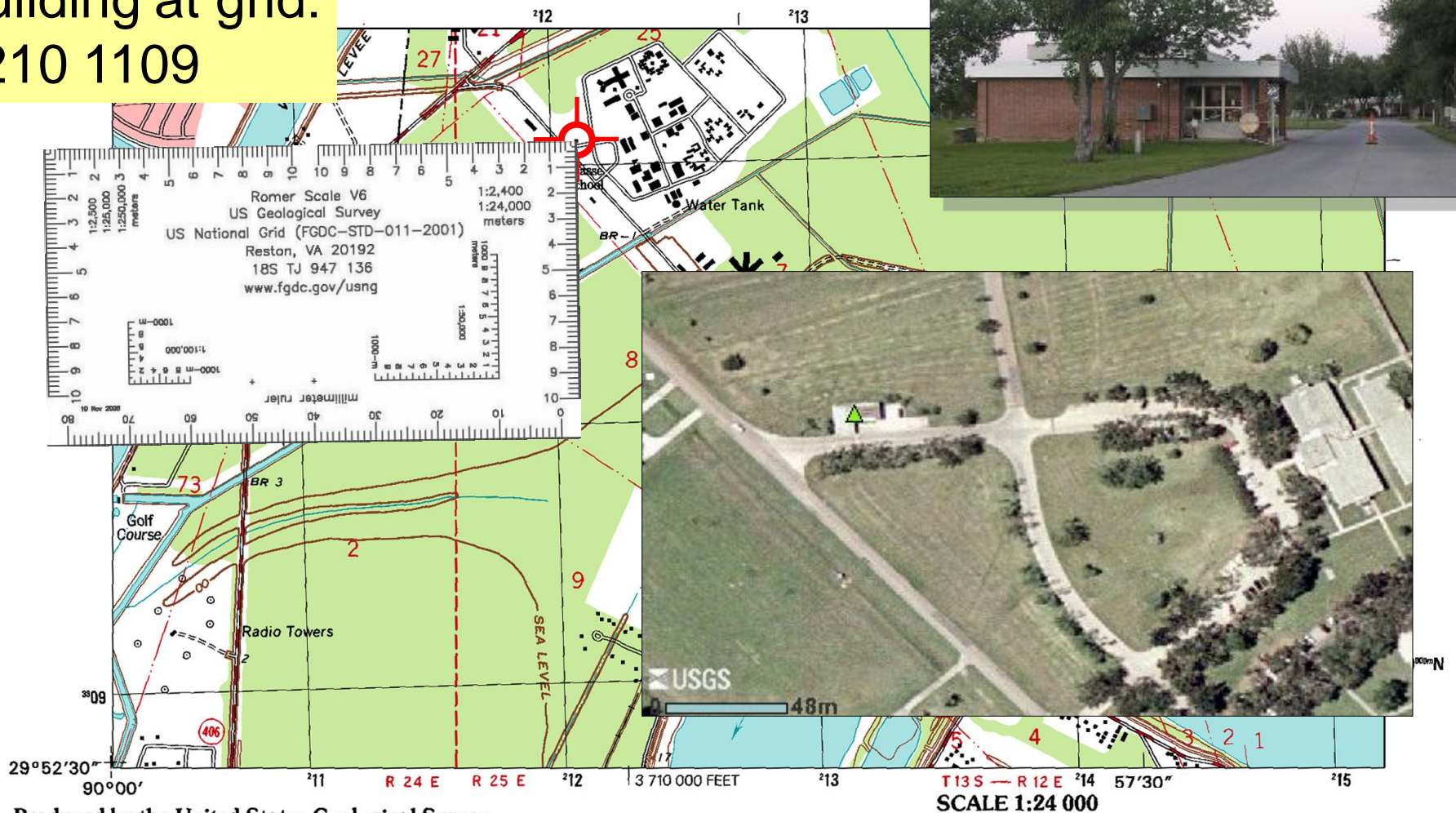
---

**Grid Zone Designation**  
**16R**



UTM GRID AND 2000 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

## Ex 1



Produced by the United States Geological Survey

**Topography compiled 1964. Planimetry derived from imagery taken 1998 and other sources. Public Land Survey System and survey control current as of 1967**

North American Datum of 1983 (NAD 83). Projection and

Read right and up.

National Geodetic Survey NADCON software

**There may be private inholdings within the boundaries of the National or State reservations shown on this map**

**City of New Orleans and Orleans Parish are coextensive**

**This quadrangle covers a subsidence area**

**Landmark buildings verified 1967**



### QUADRANGLE LOCATION

1	2	3	1 Spanish Fort 2 Little Woods 3 Chef Menteur
4		5	4 New Orleans East 5 Martello Castle 6 Bertrandville
6	7	8	7 Belle Chasse 8 Delacroix

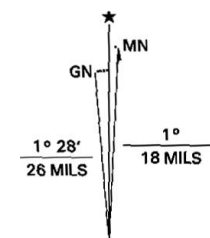
ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929  
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048

**U.S. National Grid**  
100,000-m Square ID  
**BU**  

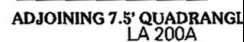
---

Grid Zone Designation  
**16R**



**UTM GRID AND 2000 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET**

## An aerial photograph showing a property with a green triangle marker. The property includes a baseball field, several buildings, and a large body of water (likely a river or lake) to the right. The marker is located on a road or path near the buildings.

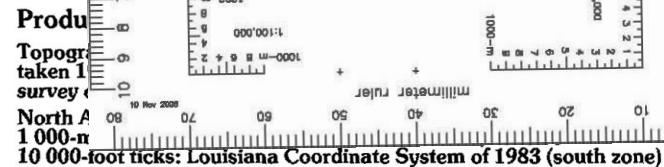


DDI

Building at grid:  
1448 0992



Building at grid:  
1215 0924



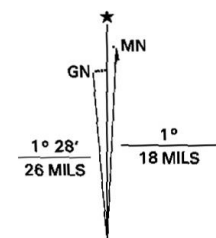
There may be private inholdings within the boundaries of the National or State reservations shown on this map  
City of New Orleans and Orleans Parish are coextensive  
This quadrangle covers a subsidence area  
Landmark buildings verified 1967



### QUADRANGLE LOCATION

1	2	3	1 Spanish Fort 2 Little Woods 3 Chef Menteur
4		5	4 New Orleans East 5 Martello Castle 6 Bertrandville
6	7	8	7 Belle Chasse 8 Delacroix

ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

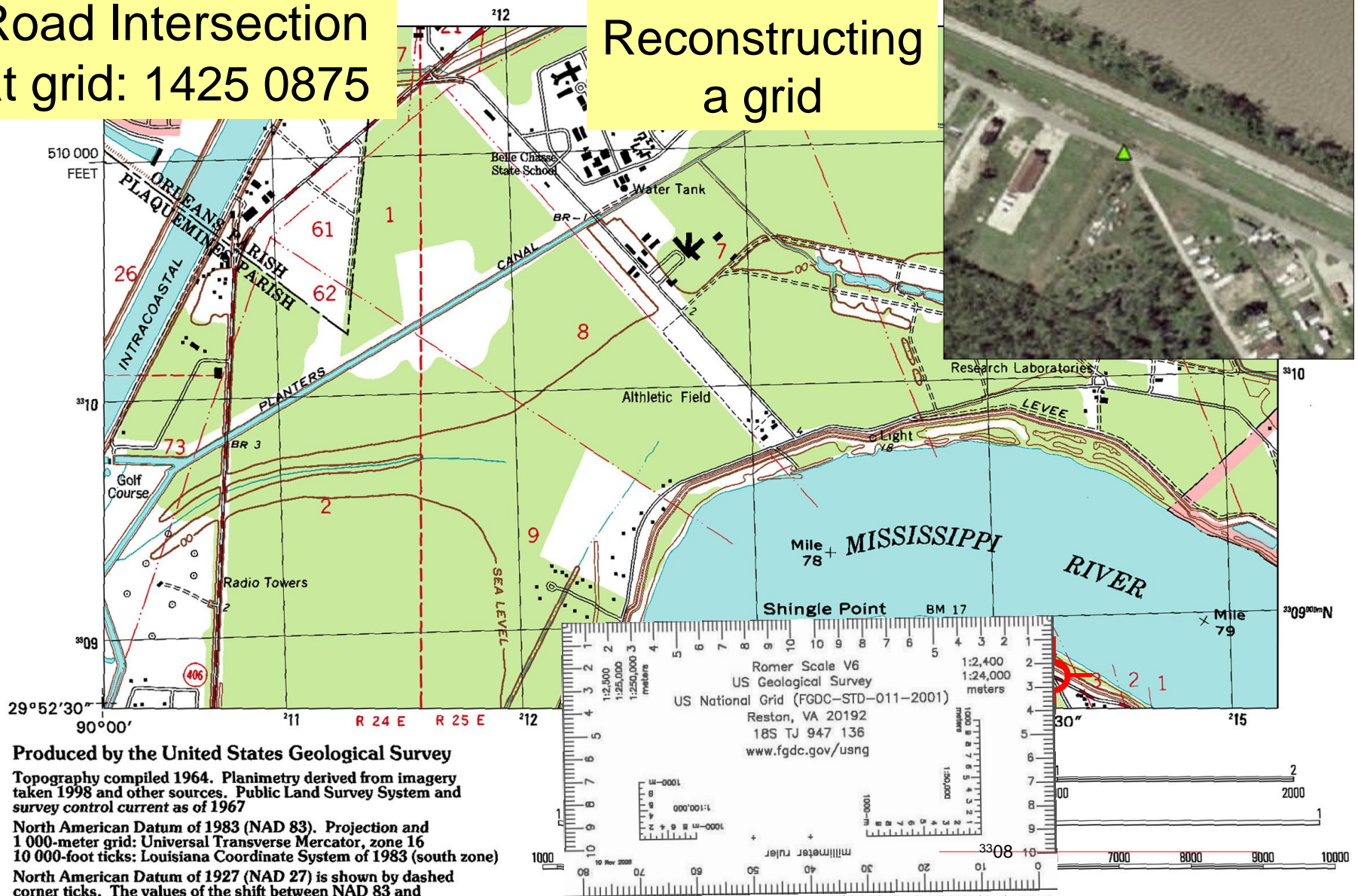


UTM GRID AND 2000 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

# Road Intersection at grid: 1425 0875

## US National Grid Training Map

# Reconstructing a grid



Produced by the United States Geological Survey

Topography compiled 1964. Planimetry derived from imagery taken 1998 and other sources. Public Land Survey System and survey control current as of 1967

North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 16 10 000-foot ticks: Louisiana Coordinate System of 1983 (south zone)

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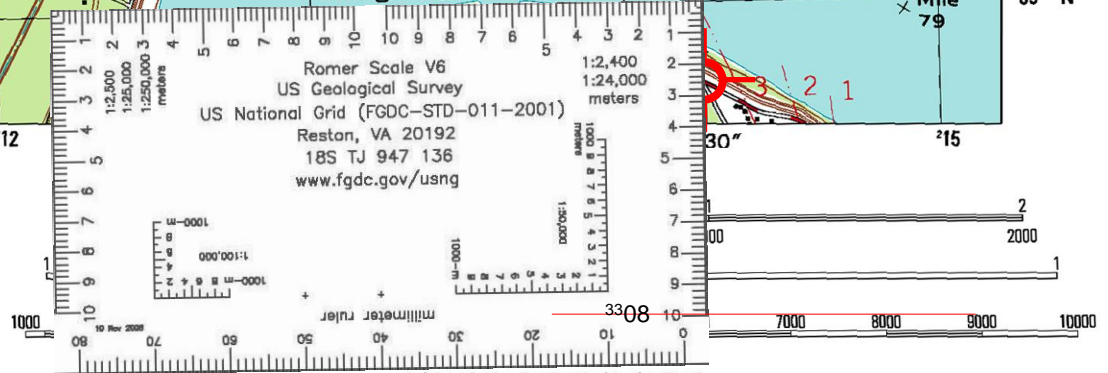
City of New Orleans and Orleans Parish are coextensive

This quadrangle covers a subsidence area

Landmark buildings verified 1967



QUADRANGLE LOCATION



CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929  
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048

1	2	3
4		5
6	7	8

ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

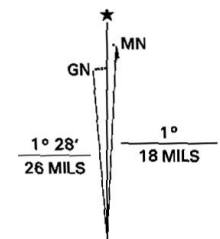
### U.S. National Grid

100,000-m Square ID

BU

Grid Zone Designation

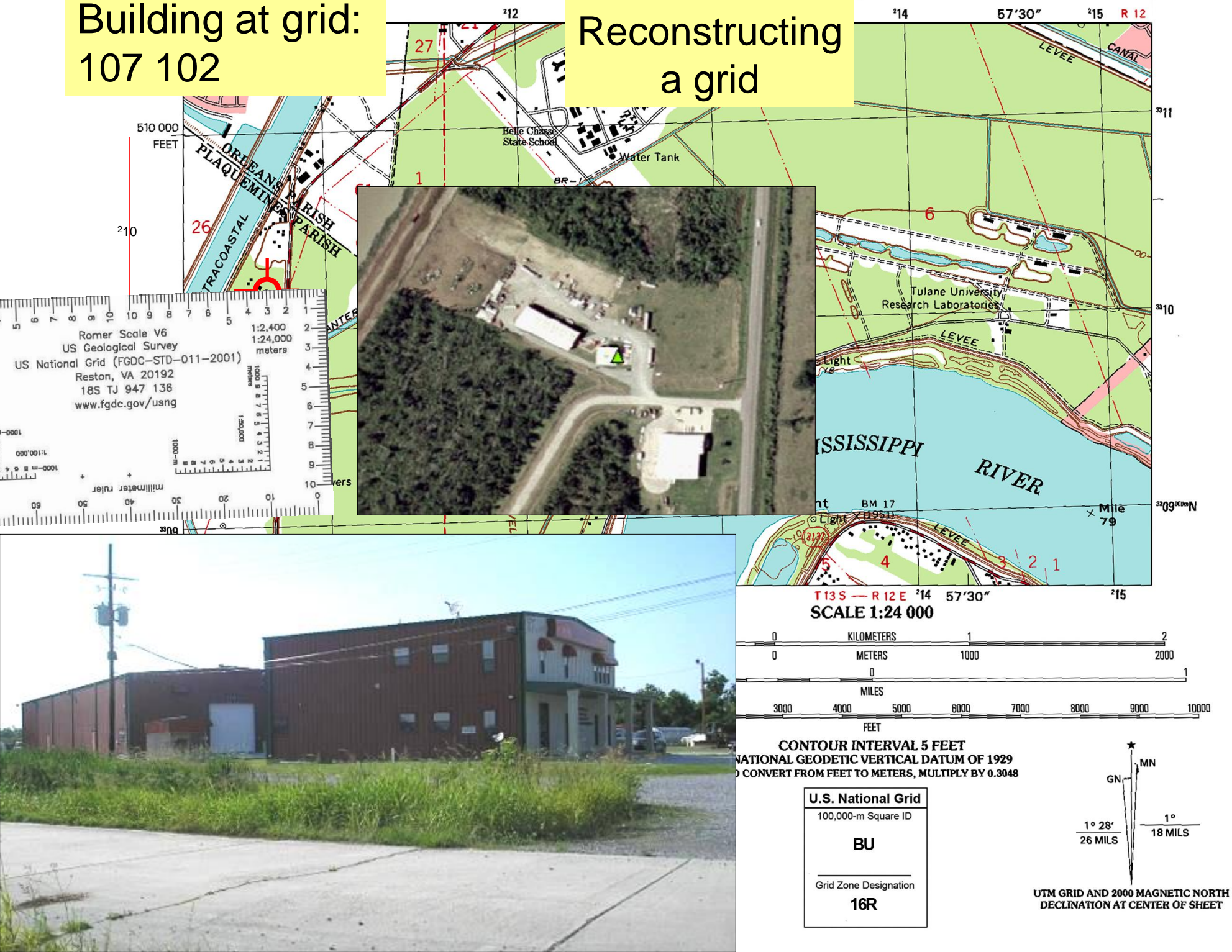
16R



UTM GRID AND 2000 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

Building at grid:  
107 102

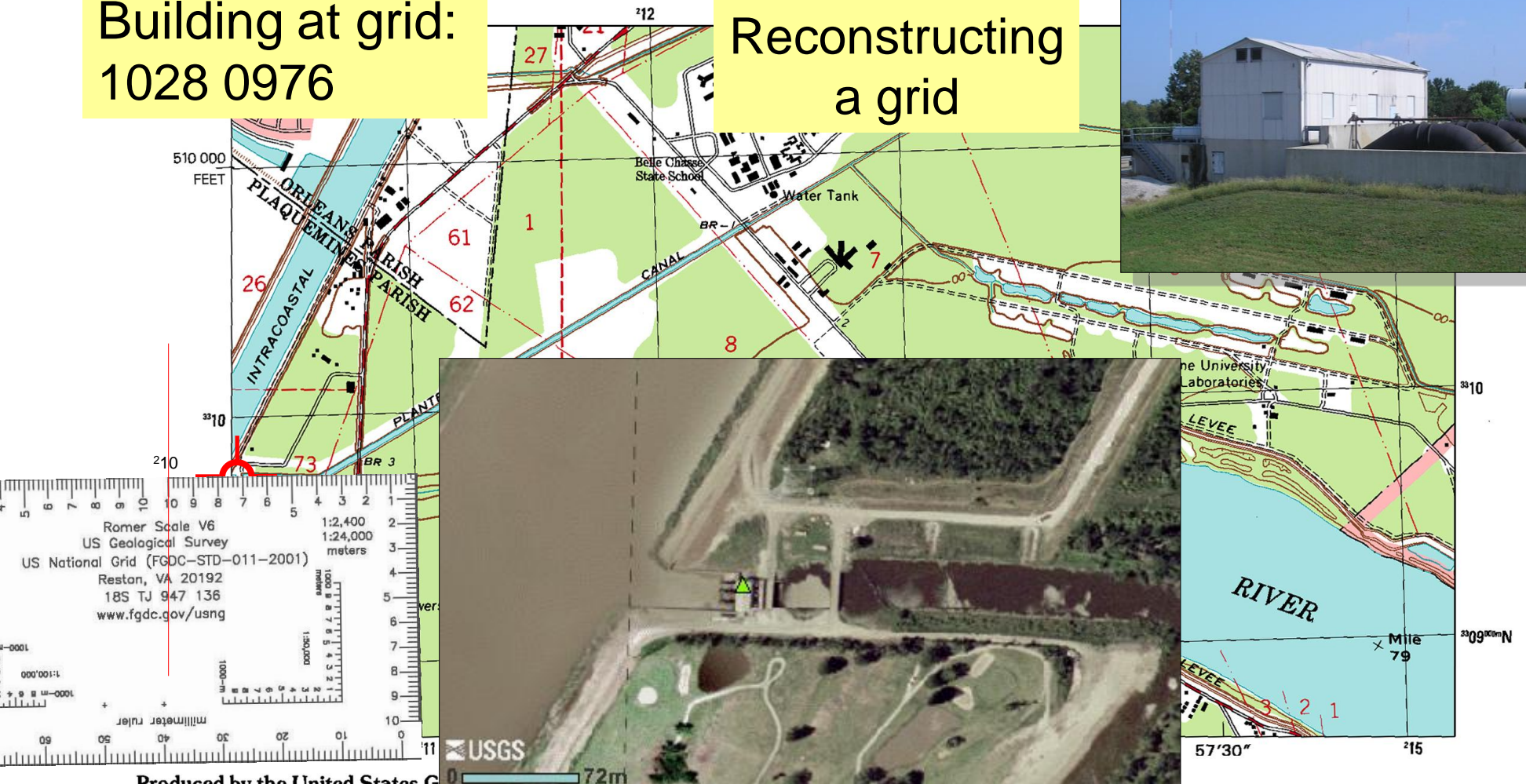
# Reconstructing a grid



# US National Grid Training Map

Building at grid:  
1028 0976

Reconstructing  
a grid



Produced by the United States Geological Survey  
Topography compiled 1964. Planimetry derived from imagery taken 1998 and other sources. Public Land Survey System and survey control current as of 1967

North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 16  
10 000-foot ticks: Louisiana Coordinate System of 1983 (south zone)

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Landmark buildings verified 1967



QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

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- 4 New Orleans East
- 5 Martello Castle
- 6 Bertrandville
- 7 Belle Chasse
- 8 Delacroix

CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929  
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048

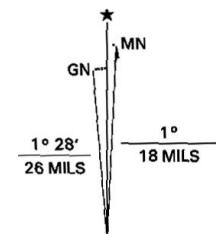
U.S. National Grid

100,000-m Square ID

BU

Grid Zone Designation

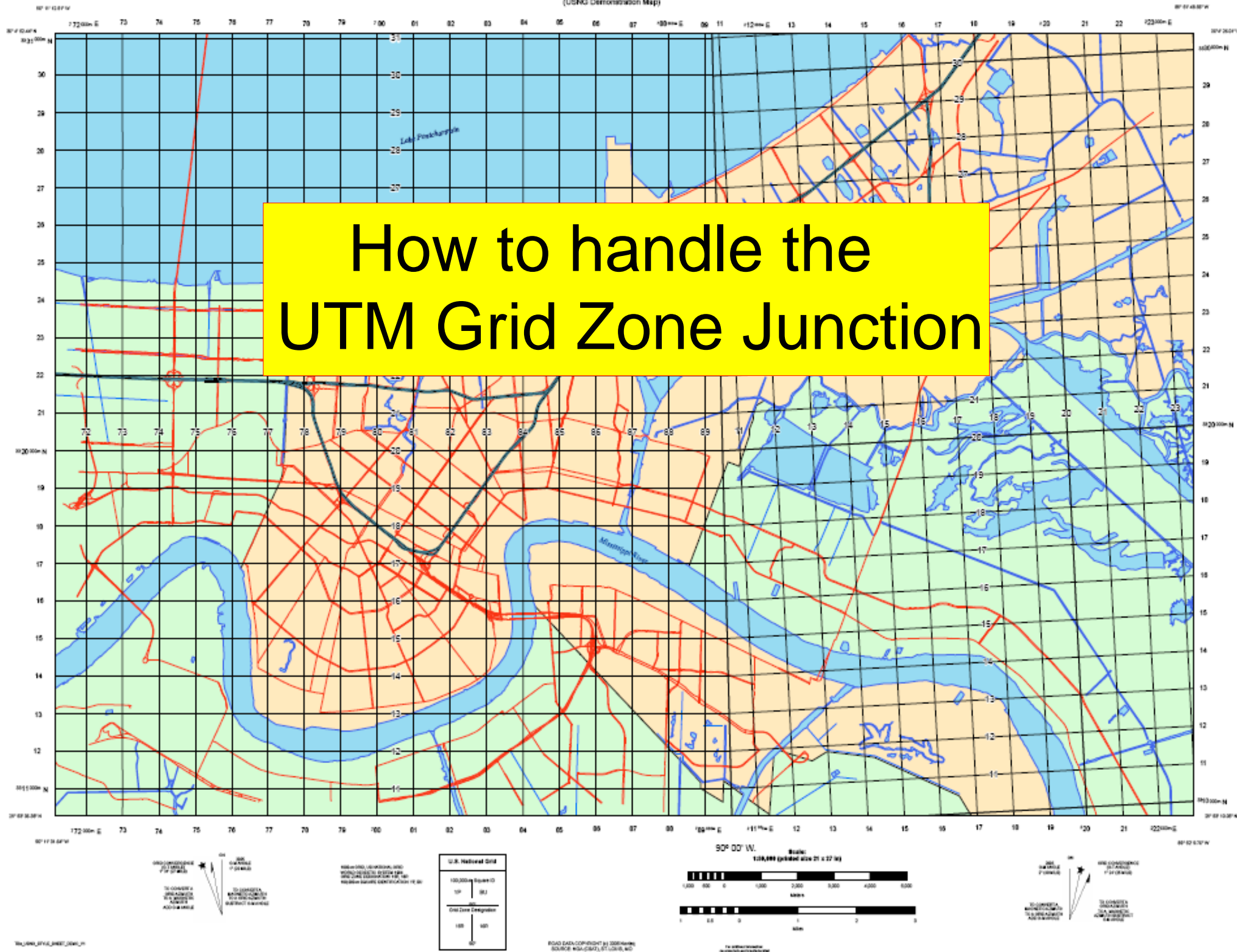
16R



UTM GRID AND 2000 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

NEW ORLEANS, LA  
(USNG Demonstration Map)

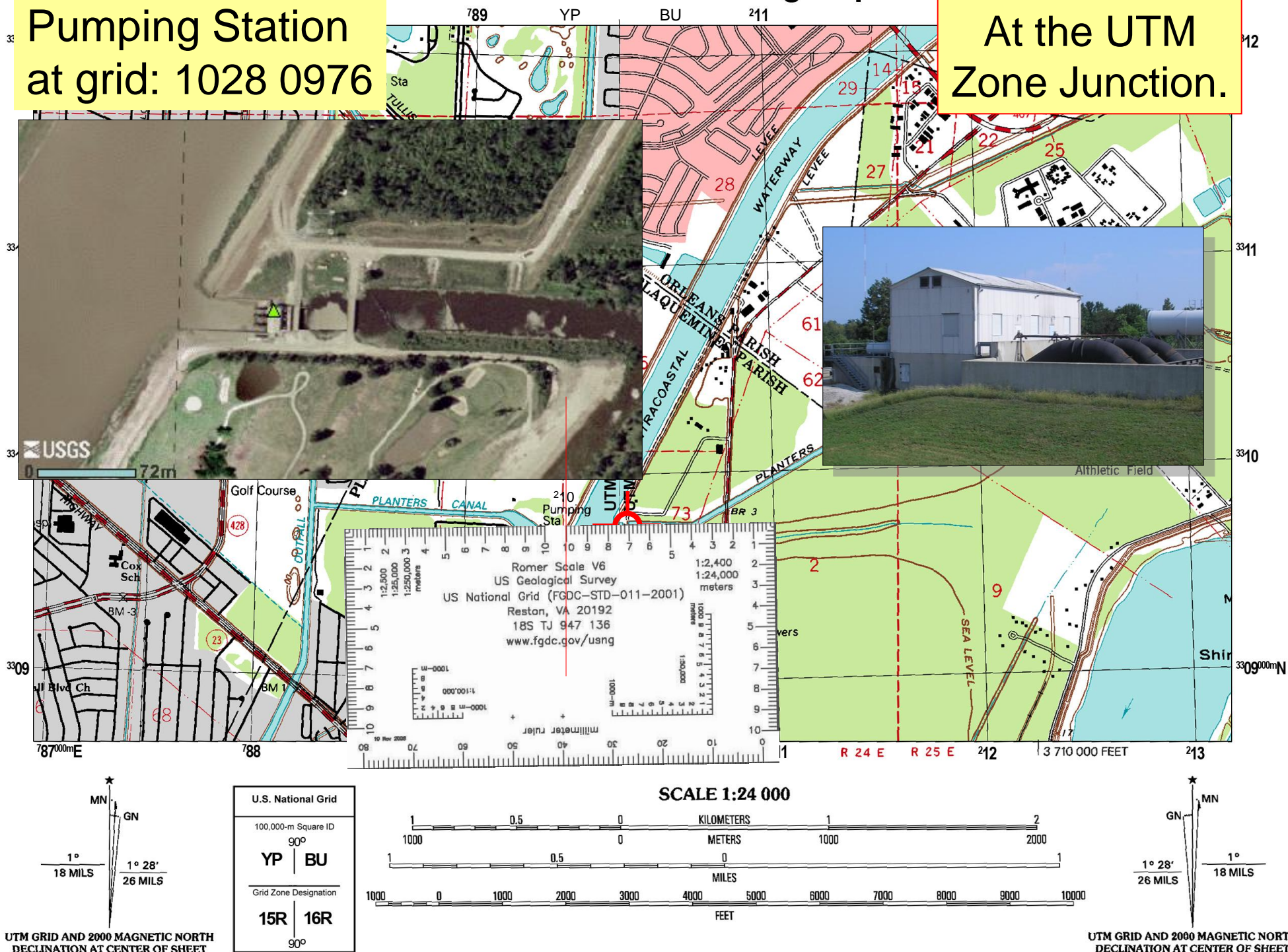
# How to handle the UTM Grid Zone Junction



# US National Grid Training Map

Pumping Station  
at grid: 1028 0976

At the UTM  
Zone Junction.



# US National Grid Training Map

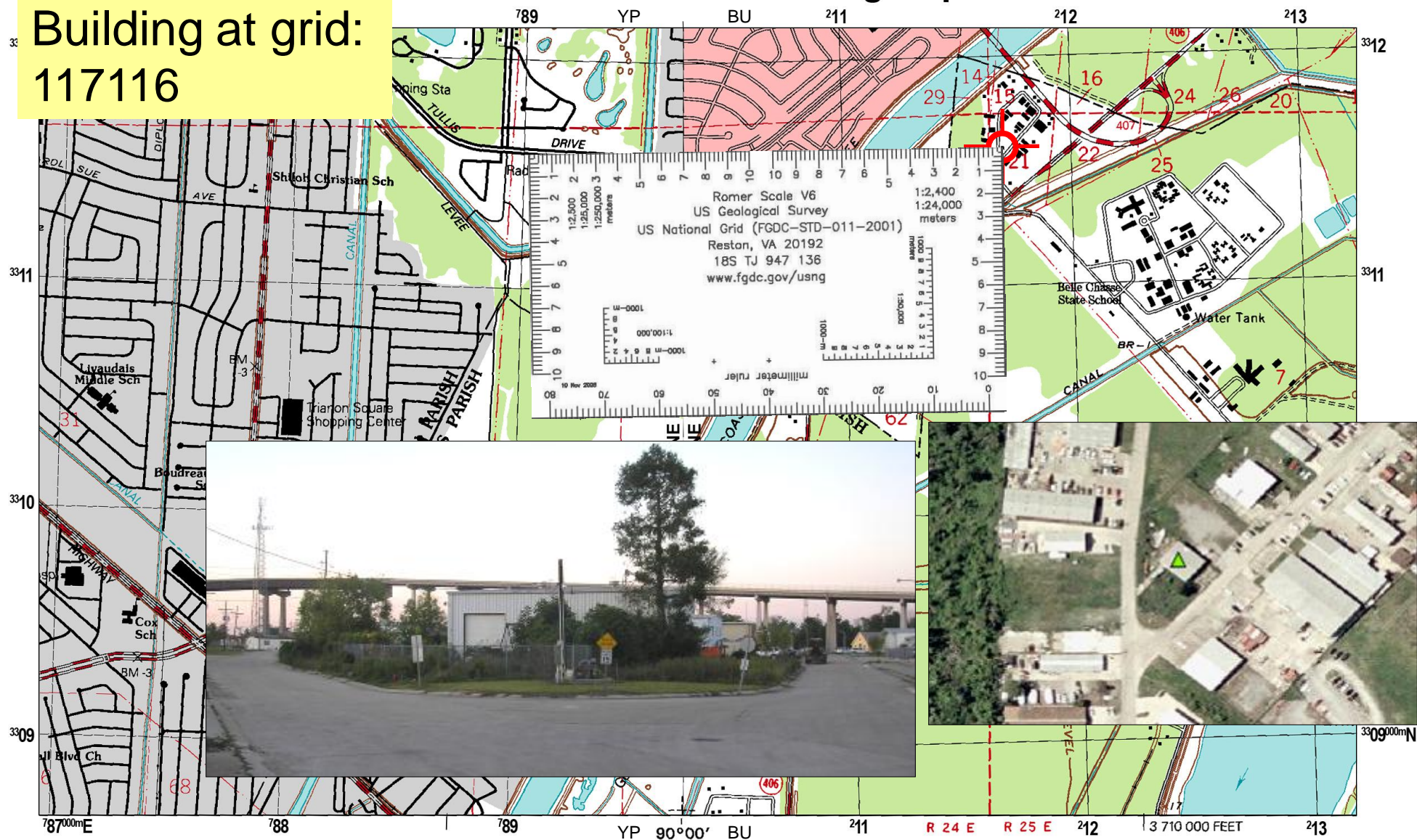
Building (CM SW Wing)  
at grid: 8967 1149

At the UTM  
Zone Junction.



# US National Grid Training Map

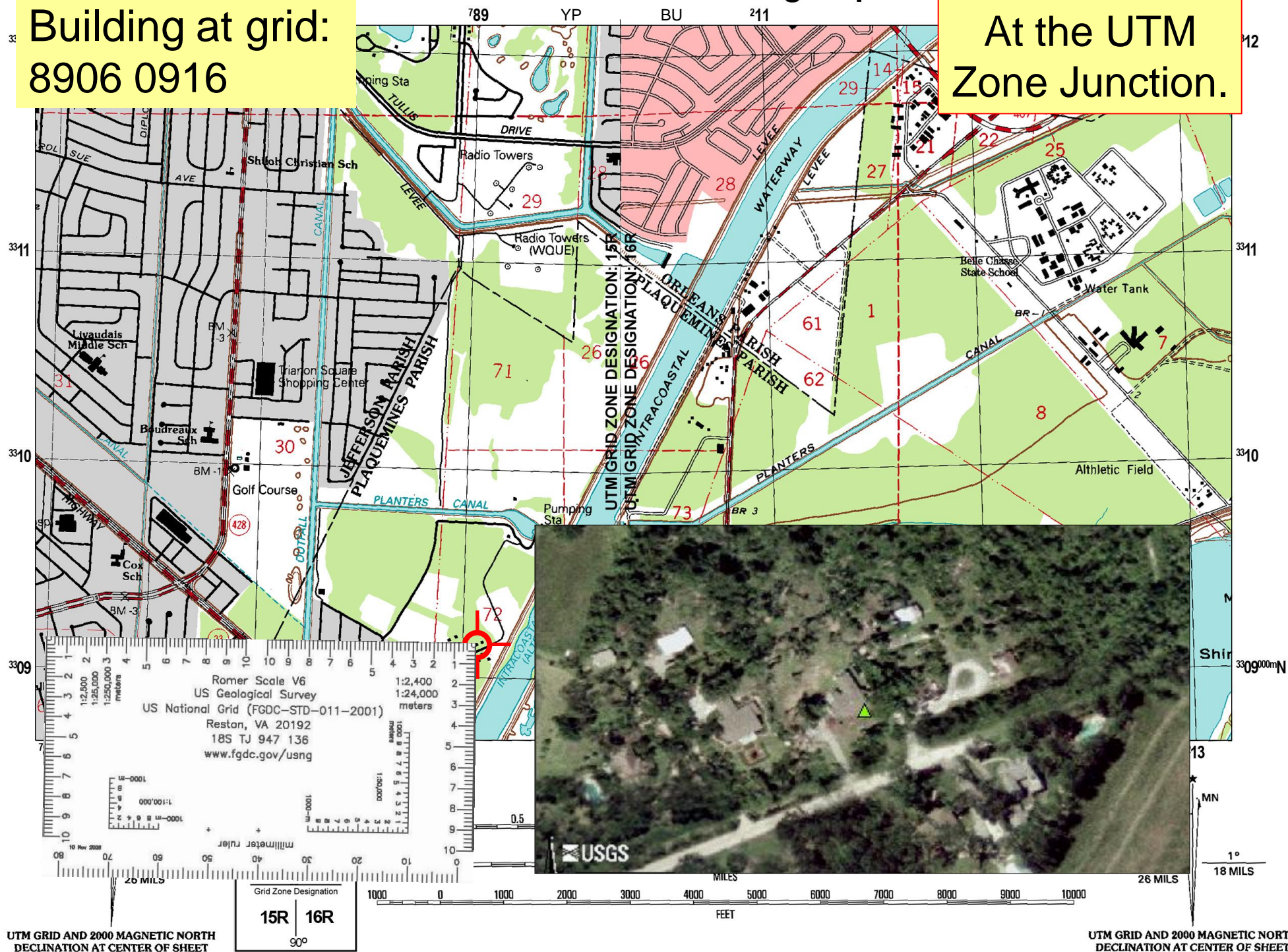
Building at grid:  
117116



# US National Grid Training Map

Building at grid:  
8906 0916

At the UTM  
Zone Junction.

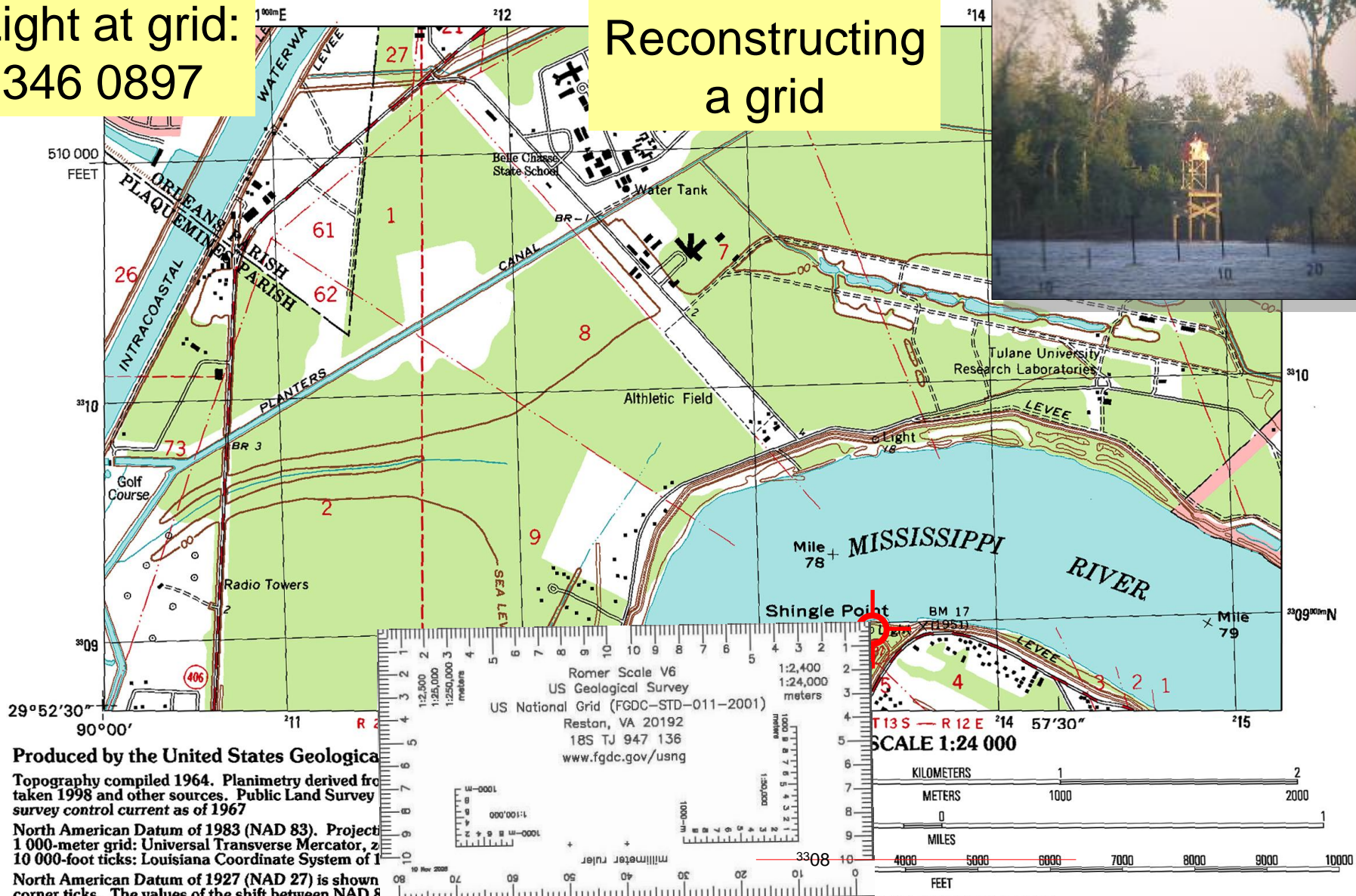


**Back Up Slides**

# US National Grid Training Map

Light at grid:  
1346 0897

Reconstructing  
a grid



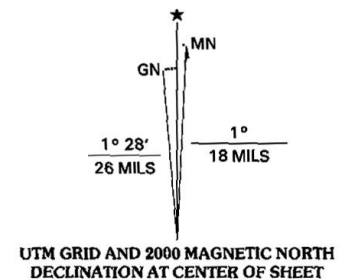
Ex 10



1	2	3
4		5
6	7	8

ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

1 Spanish Fort  
2 Little Woods  
3 Chef Menteur  
4 New Orleans East  
5 Martello Castle  
6 Bertrandville  
7 Belle Chasse  
8 Delacroix



Building at grid:  
1441 0986

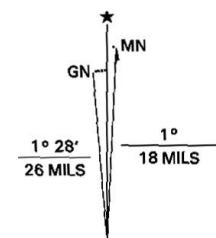


**Landmark buildings verified 1967**



ADJOINING 7.5' QUADRANGLE NAMES  
LA 200A

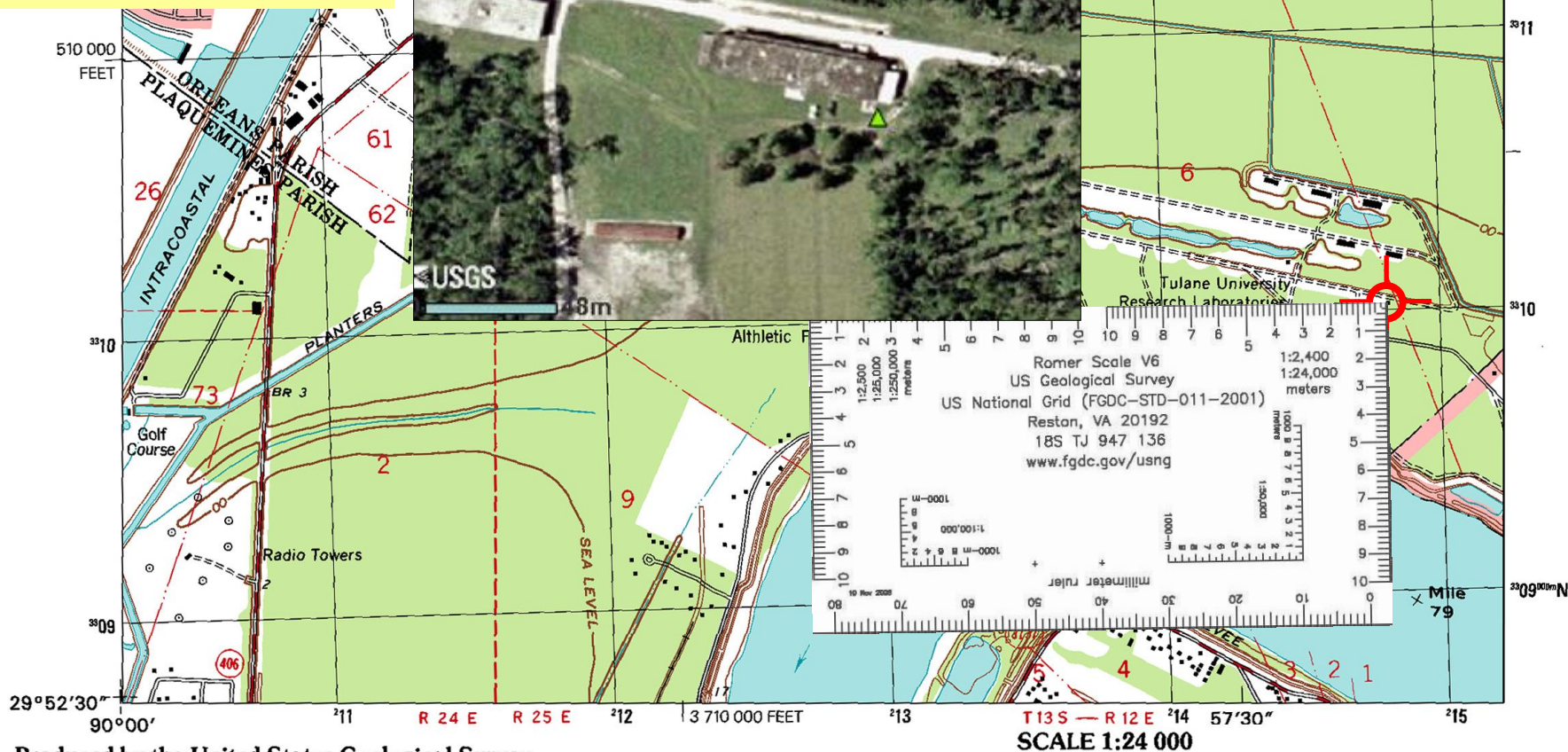
16R



UTM GRID AND 2000 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



Building at grid:  
1481 1002



**Read right, and up.**

National Geodetic Survey NADCON software

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Landmark buildings verified 1967



QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

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U.S. National Grid

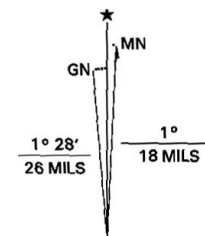
100,000-m Square ID

BU

Grid Zone Designation

16R

CONTOUR INTERVAL 5 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929  
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048



UTM GRID AND 2000 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET