Design and Construction Surveying for ADA Projects

March 17th, 2015

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Key Messages

- We need both elevation and horizontal accuracy for design surveys.
- Correct location of surface utilities.
- Sidewalk profiles and adjacent right of way tie-ins in your plans.
- New survey technologies.

Levels of Detail

Level 1	Level 2	Level 3
• Curb ramps line up with inplace sidewalks • Contractor builds according to standard plans with a tabulation • Surveys not required	• When ramp layouts differ from standard plans and for all signalized intersections • 20-scale detail provided in plan • Ramp slope ranges and working points provided	• When slopes are non-compliant or there's a tie-in point (such as a doorway) • 20-scale detail provided in plan • Specific ramp slopes if non compliant and working points provided

Level 1 (Standard Plan) Ramps

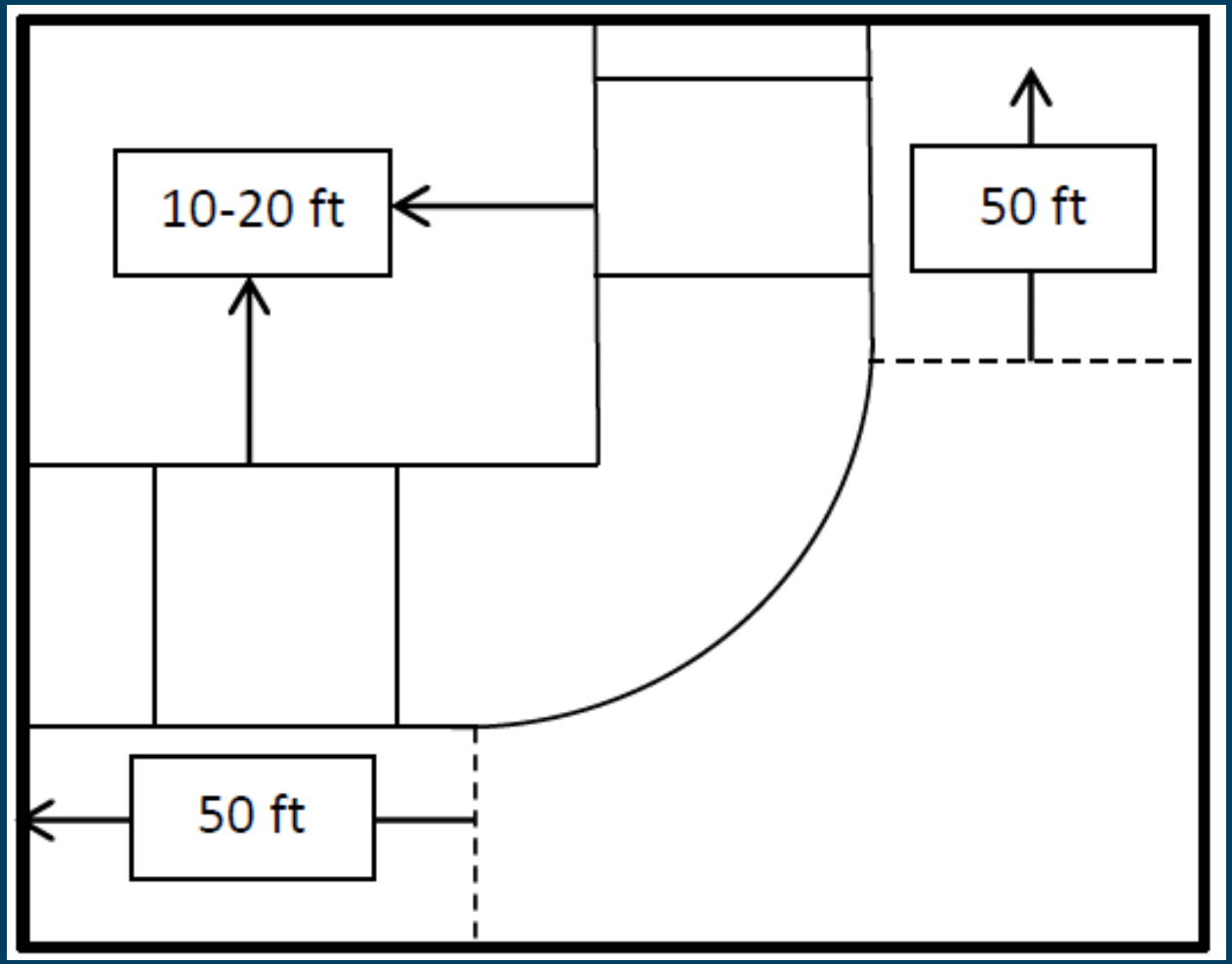
Level 2 Ramps

Level 3 Ramps

Surveyed Intersections

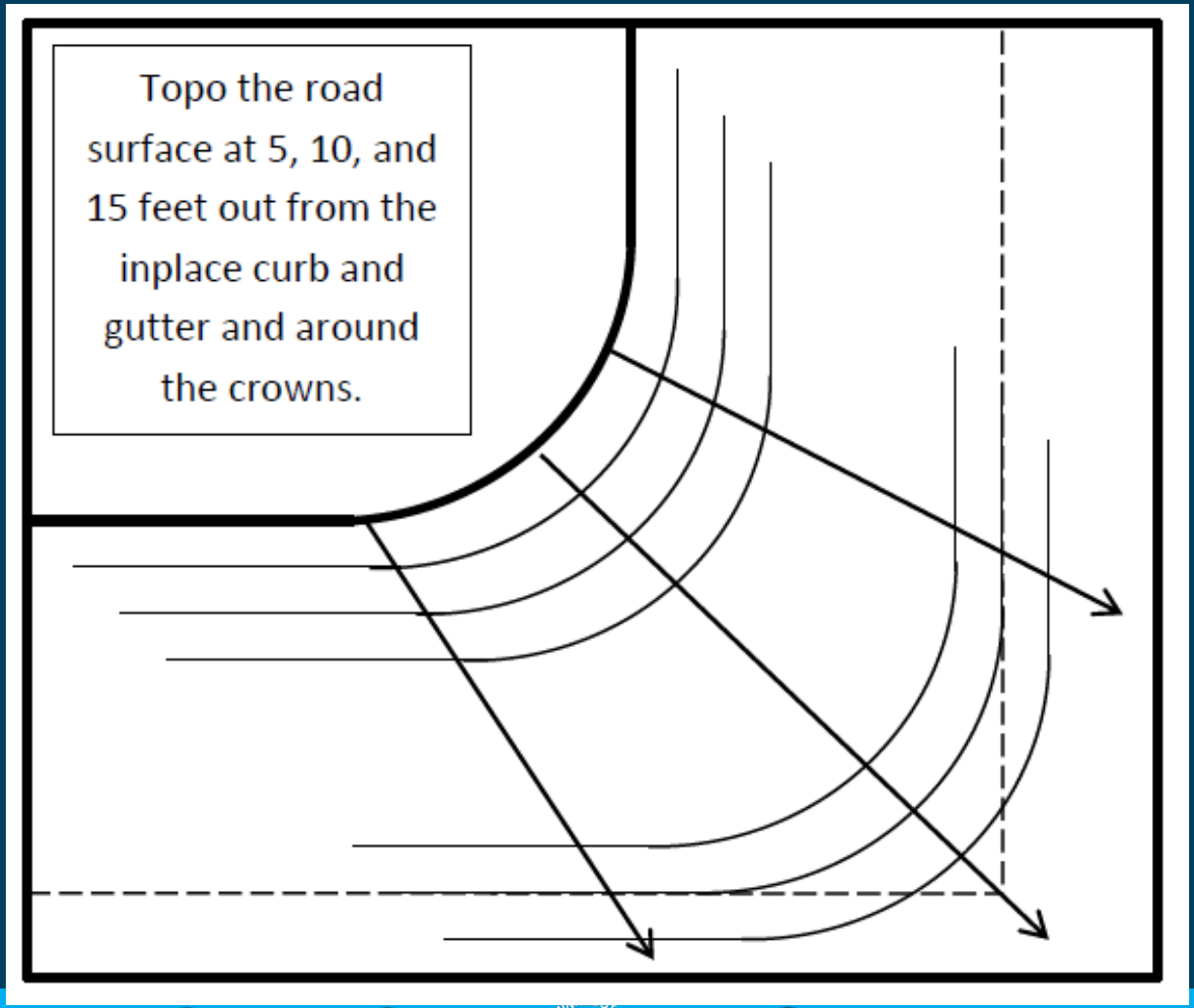
- Site may contain numerous features
- Surveys should locate:
  - All utilities including handholes, manholes, hydrants, gate valves, drainage structures, signal poles/cabinets, light poles, loop detectors, telephone/cable boxes, fiber optic vaults, and irrigation/sprinkler heads or services
  - Buildings and doorways, other permanent features in sidewalk areas such as landscaping, retaining walls, benches, sign posts, etc.,
  - Crosswalk striping, curb and gutter, sidewalk edges 30' in both directions(mainline and side street), Median locations
  - ROW in areas where the construction limits may fall close to or outside existing ROW

Base ADA Topo Survey – Level 2&3



A surveyed distance of approximately 50 ft from the PT is usually sufficient. Distance needed from back of walk depends on the environment (generally 10 ft urban; 20 ft suburban or rural).

Level 3 Roadway Survey needed for all critical tie-ins (doorways, steps etc.), curb line changes, and all medians and porkchops.

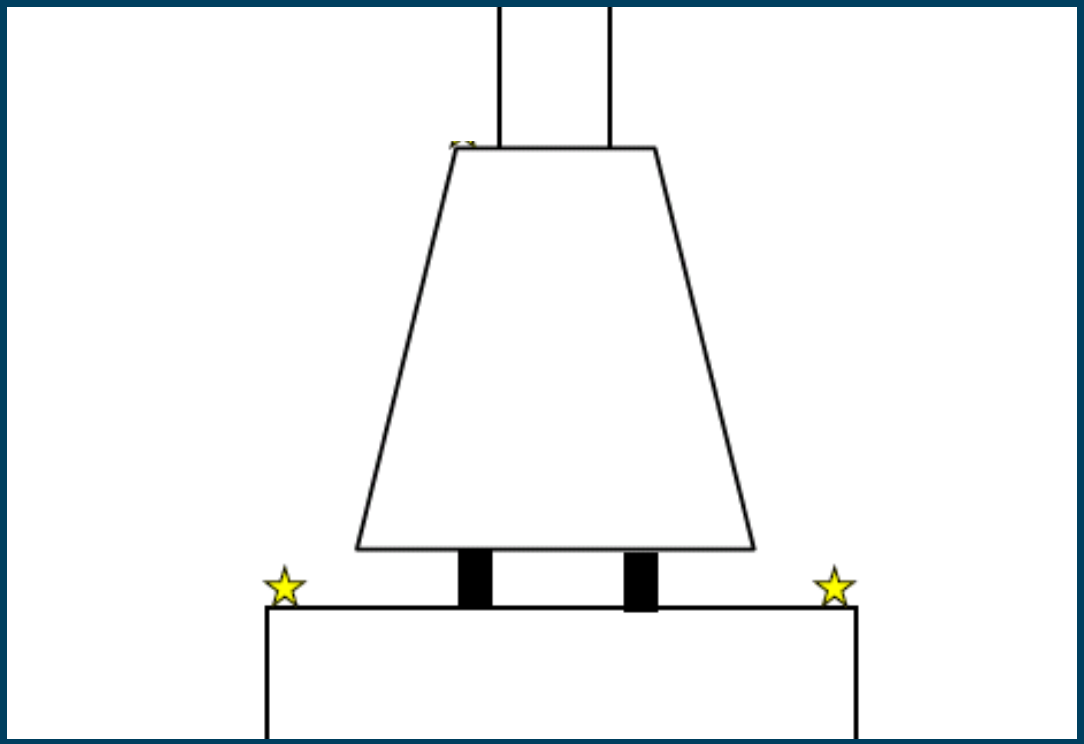


ADA Topos: Utilities

- Always shoot the center of unobstructed structures such as hand holes and the corners on structures such as cabinets, cabinet bases and vaults.
- *Accuracy is key!*

ADA Topos: Signal Bases

- Additional signal base shots needed obtain exact signal and pedestal locations



ADA Topos: Doorways

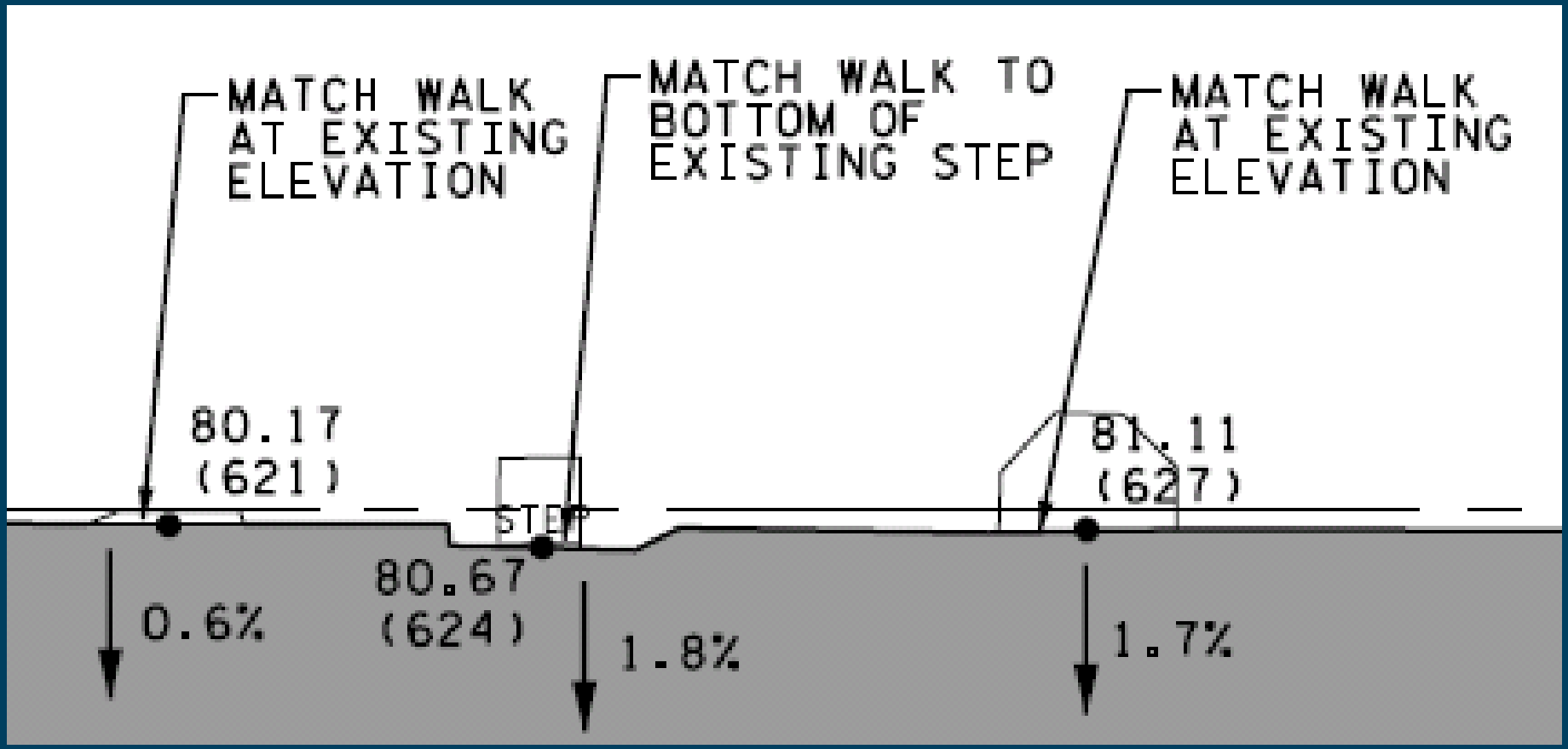
★ Tie-in elevations at entrance

★ Height and tread width of bottom step

Matching Stoops/Doorways

Matching Steps Example

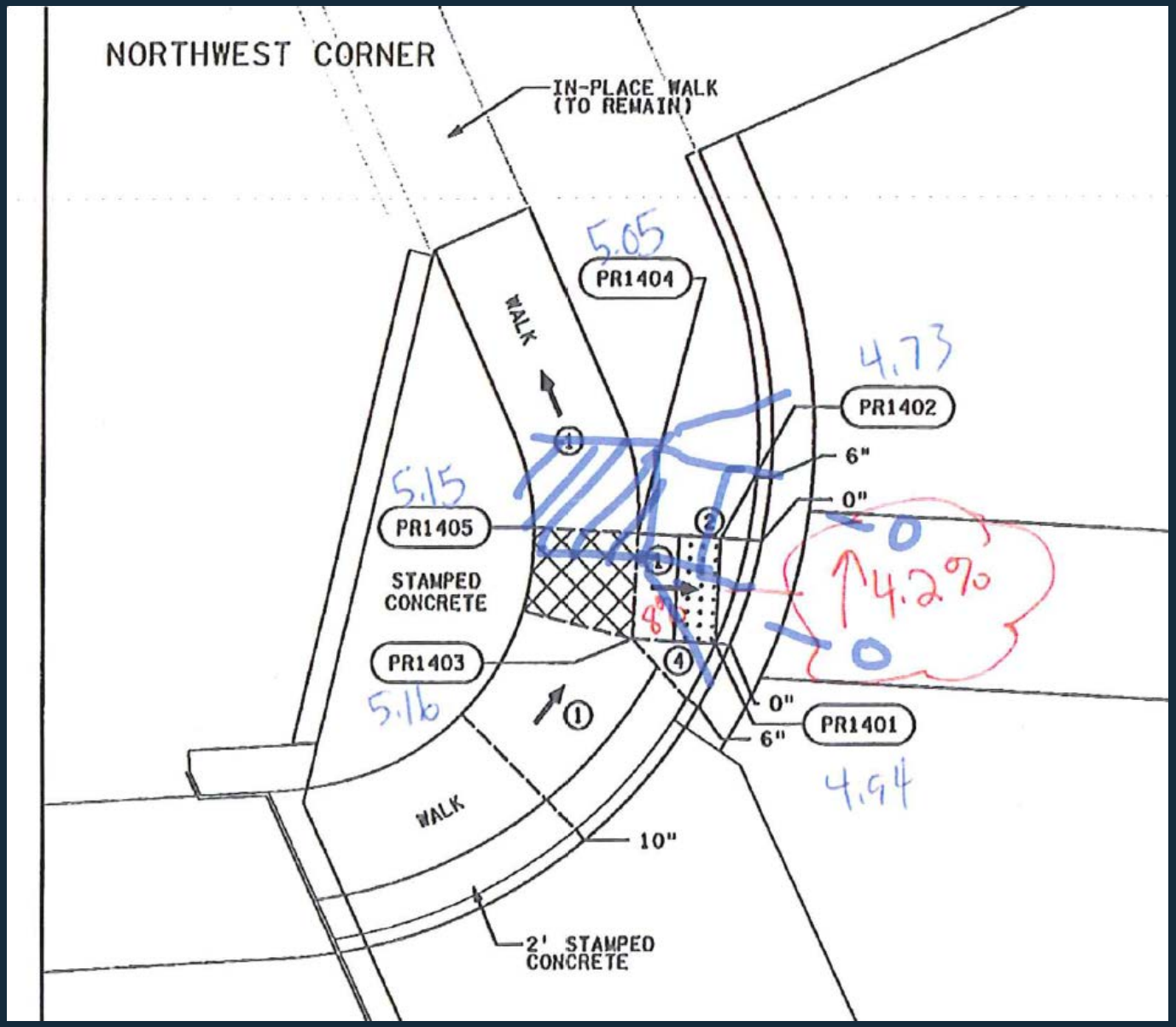
Construction Plans: Doorways



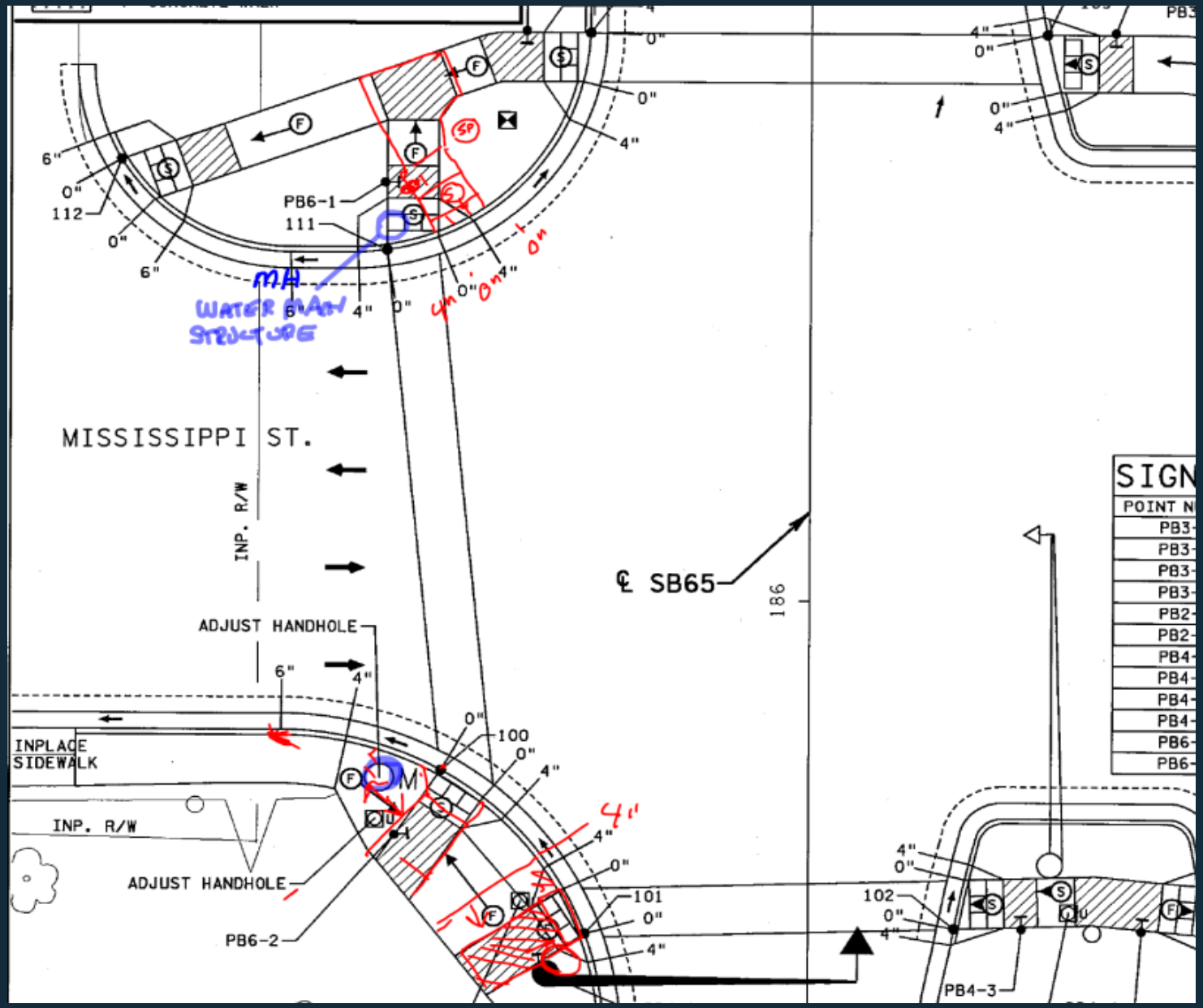

SMART TOOL


Minnesota
CJG 411

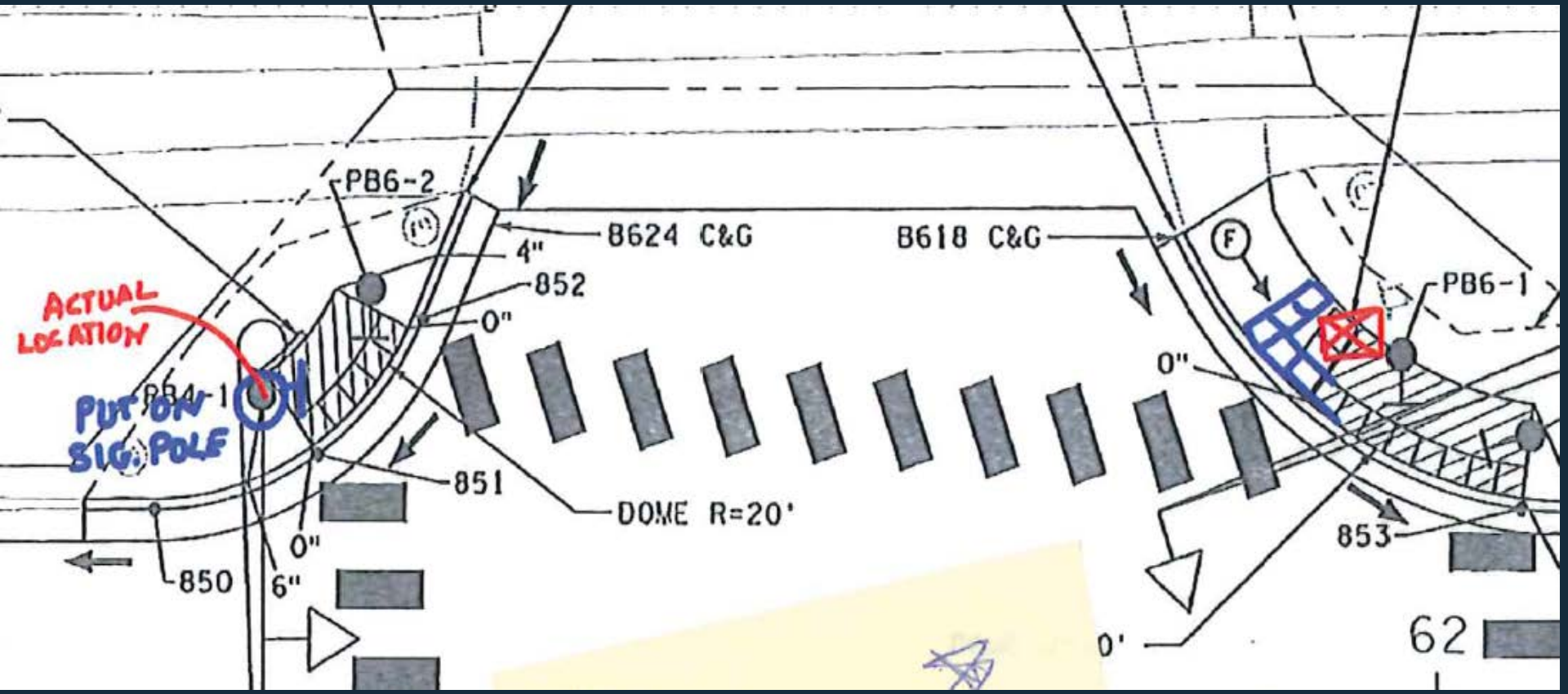
Elevations


NORTHWEST CORNER
IN-PLACE WALK
(TO REMAIN)
5.05
PR1404
WALK
4.73
PR1402
6"
0"
5.15
PR1405
STAMPED
CONCRETE
4.2%
PR1403
5.16
0"
6"
PR1401
4.94
WALK
10"
2' STAMPED
CONCRETE

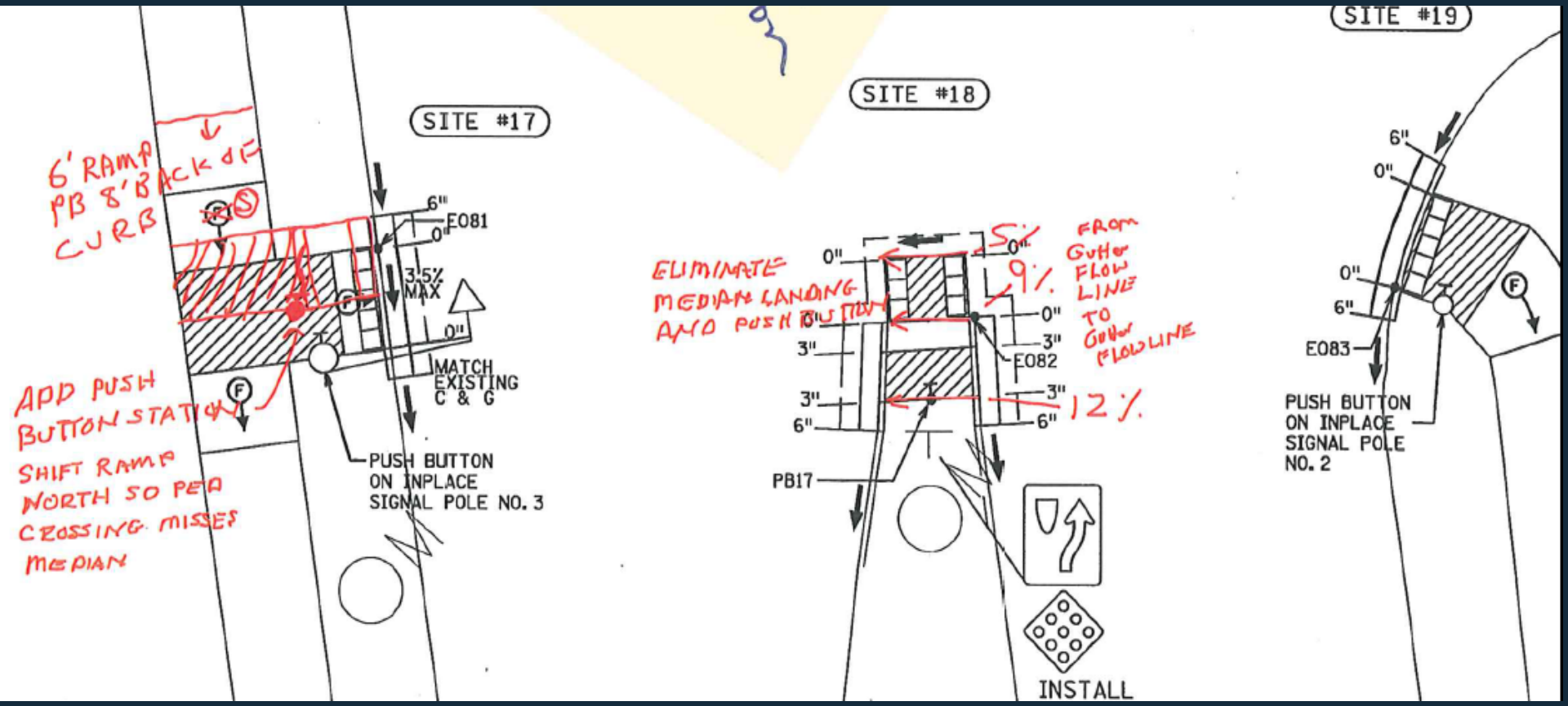
Utilities


MISSISSIPPI ST.
INP. R/W
ADJUST HANDHOLE
INPLACE SIDEWALK
INP. R/W
ADJUST HANDHOLE
PB6-1
PB6-2
111
112
100
101
102
℄ SB65
186
PB4-3
SIGN
POINT N
PB3-
PB3-
PB3-
PB3-
PB2-
PB2-
PB4-
PB4-
PB4-
PB4-
PB6-
PB6-
MH
WATER MAIN STRUCTURE

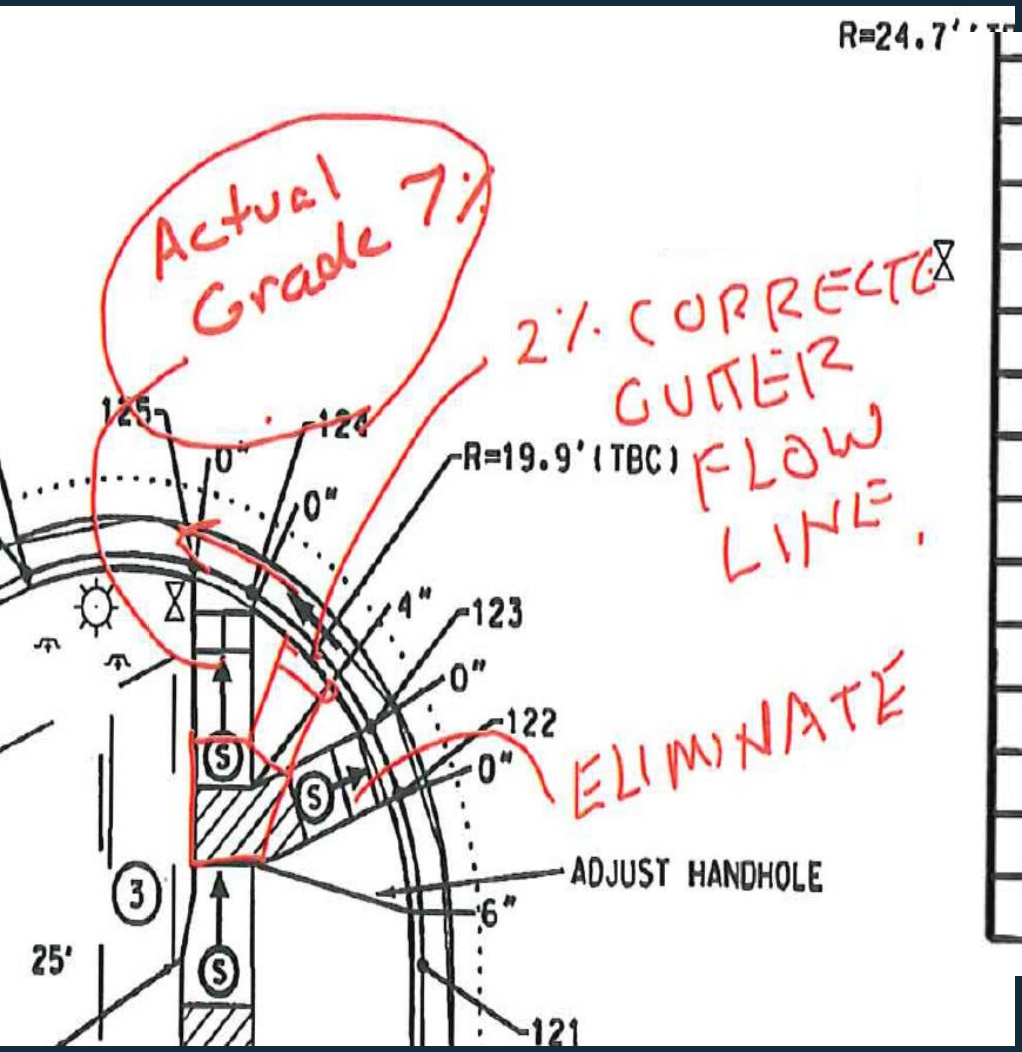
Utilities


PB6-2
B624 C&G
B618 C&G
4"
852
0"
ACTUAL LOCATION
PUT ON SIG. POLE
B64-1
851
DOME R=20'
0"
850
6"
0"
PB6-1
853
62
0'

Elevations

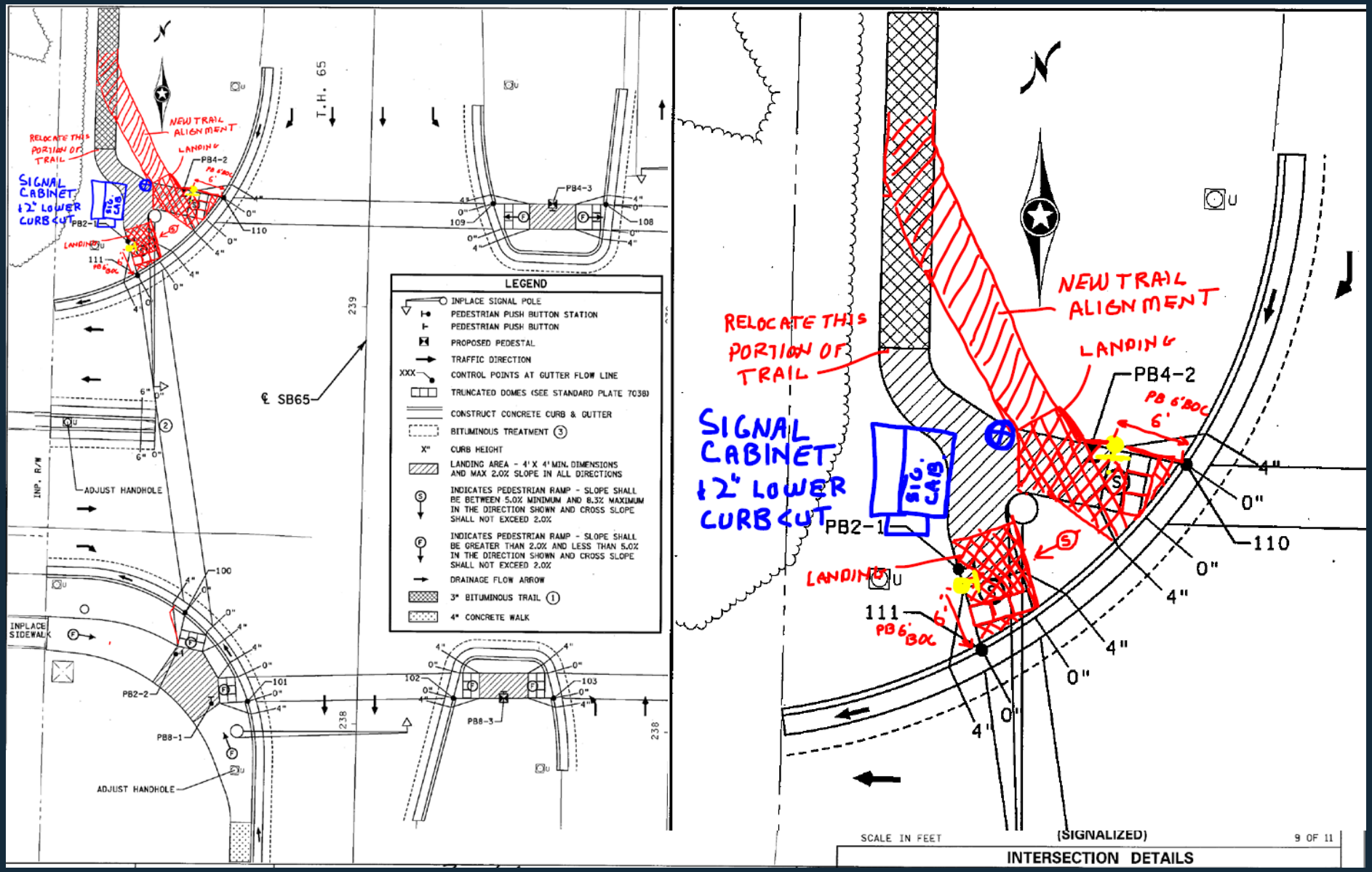

SITE #17
6' RAMP
PB 8' BACK OF
CURB
6"
0"
E081
3.5%
MAX
0"
MATCH
EXISTING
C & G
ADD PUSH
BUTTON STATION
SHIFT RAMP
NORTH SO PED
CROSSING MISSES
MEDIAN
PUSH BUTTON
ON INPLACE
SIGNAL POLE NO. 3
SITE #18
ELIMINATE
MEDIAN LANDING
AND PUSH BUTTON
0"
5%
FROM
GUTTER
FLOW
LINE
9%
TO
GUTTER
FLOWLINE
0"
3"
E082
3"
3"
6"
6"
12%
PB17
INSTALL
SITE #19
6"
0"
0"
6"
E083
PUSH BUTTON
ON INPLACE
SIGNAL POLE
NO. 2

Elevations



POINT NUMBER	ELEVATION
120	1324.11
121	1324.04
122	1323.79
123	1323.73
124	1323.49
125	1323.43
126	1322.28
127	1322.99
128	1322.86
129	1322.80
130	1322.39
131	1322.33
132	1321.71

Elevations and Utilities



ADA Survey Accuracy

Methodology	Vertical	Horizontal
Total Station	0.03	0.04
Terrestrial LIDAR	0.04–0.05	0.10
Mobile LIDAR	0.05–0.06	0.10
VRS	0.20	0.10
Mapping	0.30–0.50	0.50

Total station equipment and LIDAR are the only acceptable survey methods.

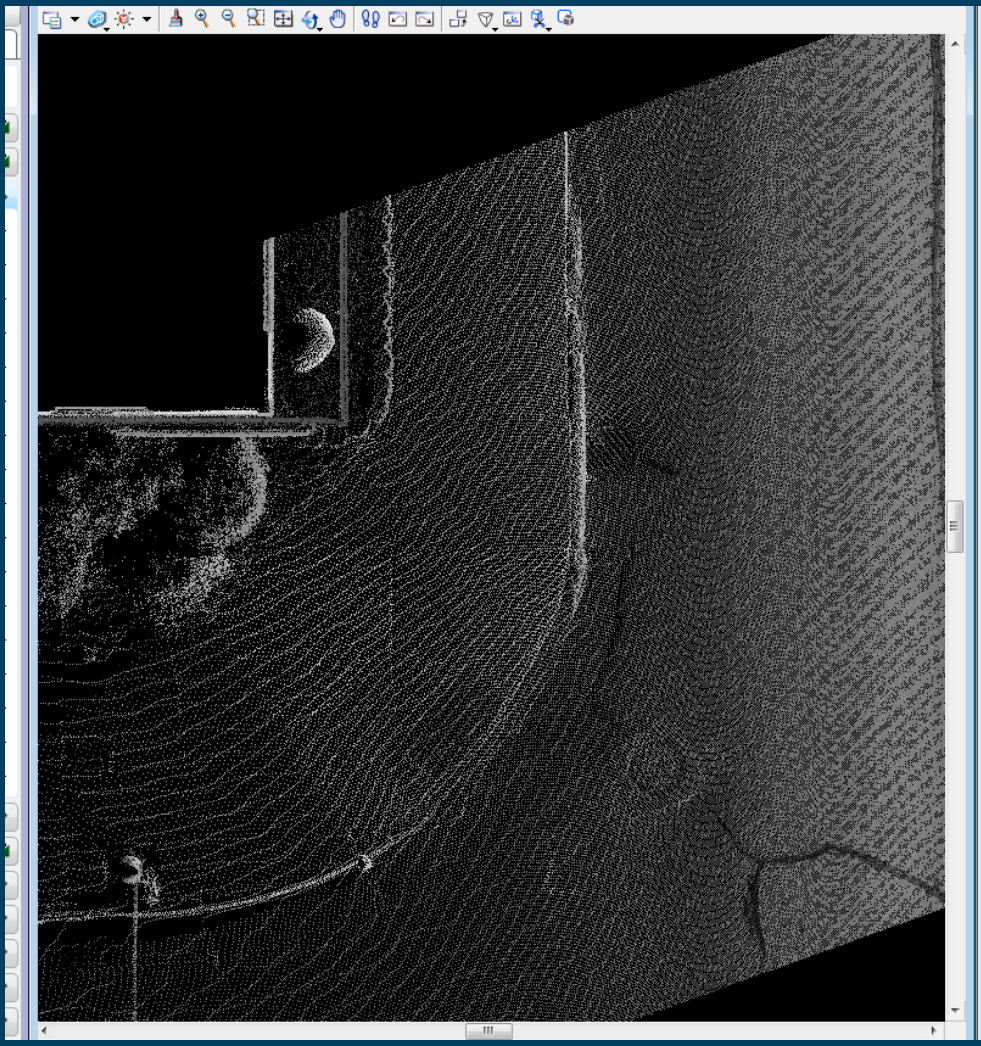
A 6 ft length ramp designed at 7.5% could very well be non-compliant using VRS or mapping.

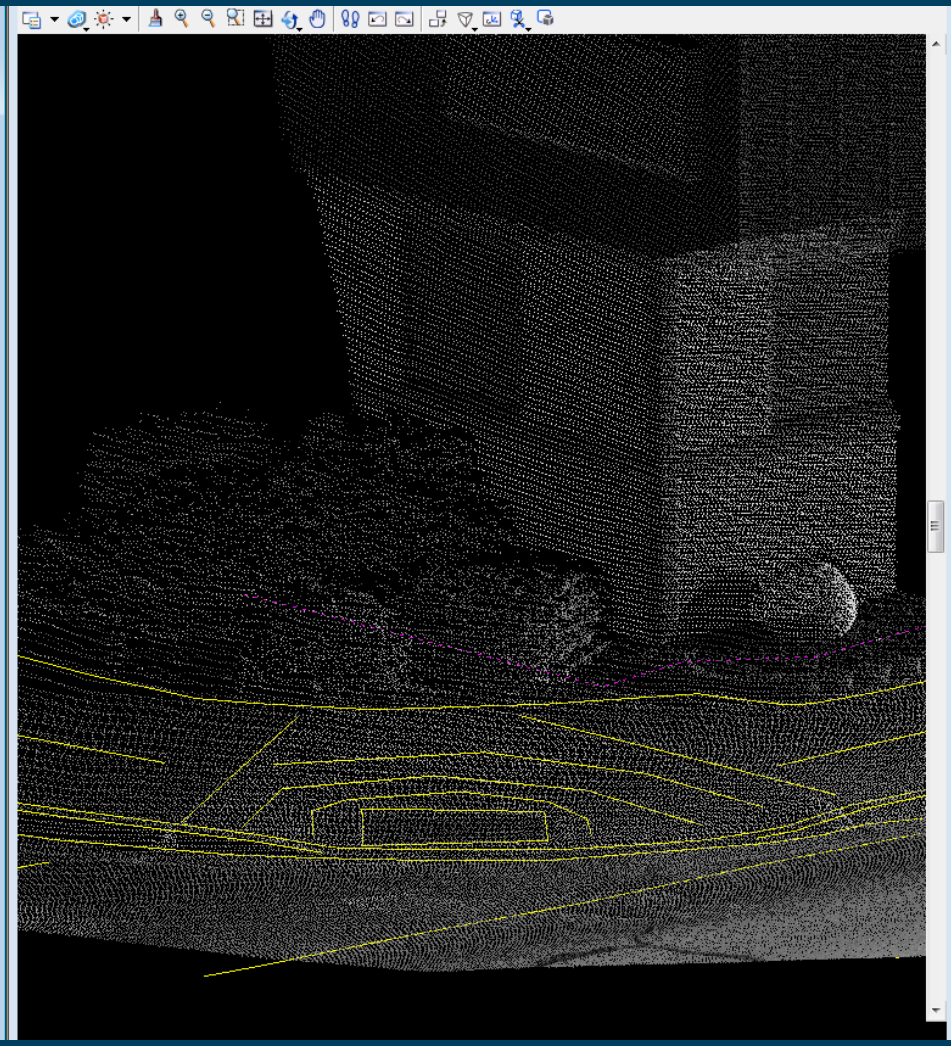
ADA Survey Accuracy

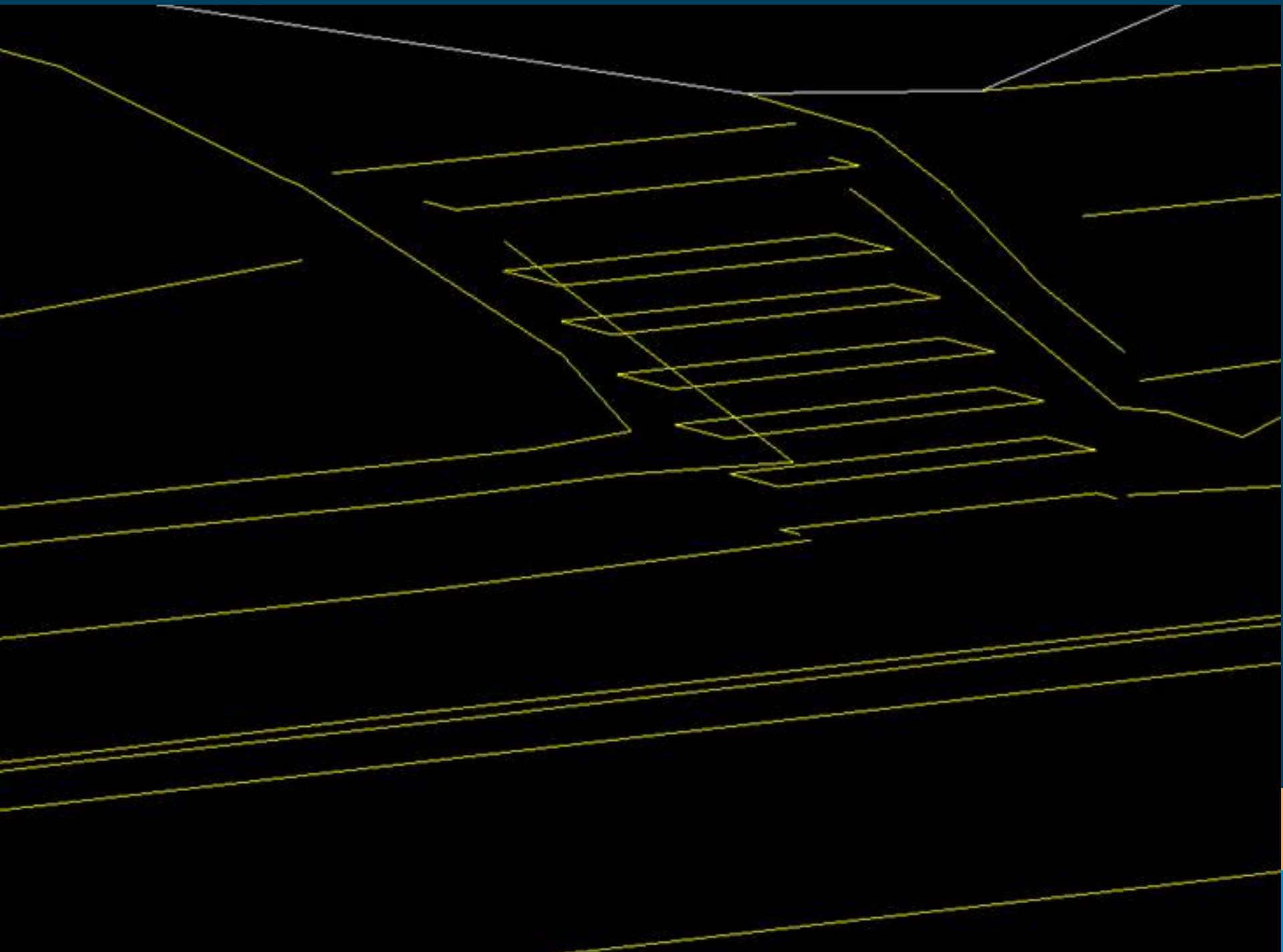
- The survey technology is only as good as the accuracy of the project control
- Relative accuracy within a project is what's needed for desired results (not absolute MSL)
- Designers need to know and document
  - Method of collection used
  - Stated vertical and horizontal accuracy
  - Date of collection (year and time of season)
- Pros and Cons for all surveying methods such as cost, project schedule, personnel hours, worker's safety

ADA Survey Accuracy

- Terrestrial scanning needs multiple setups to get backsides of medians, pork chops and shaded areas.
- Mobile scanning needs free rights and side streets.
- Both may need to be augmented with total station.
- Working with automation users group to determine ADA best practices. (i.e. scaling, symbols and data collection methods).





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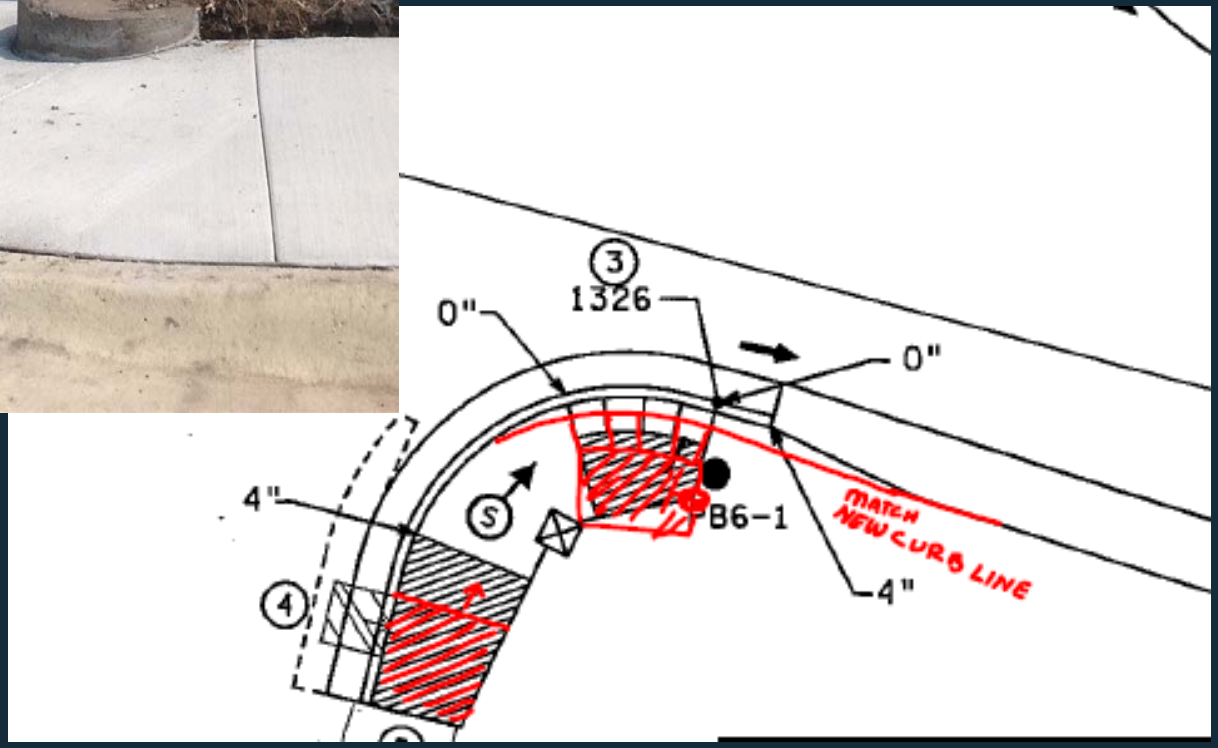
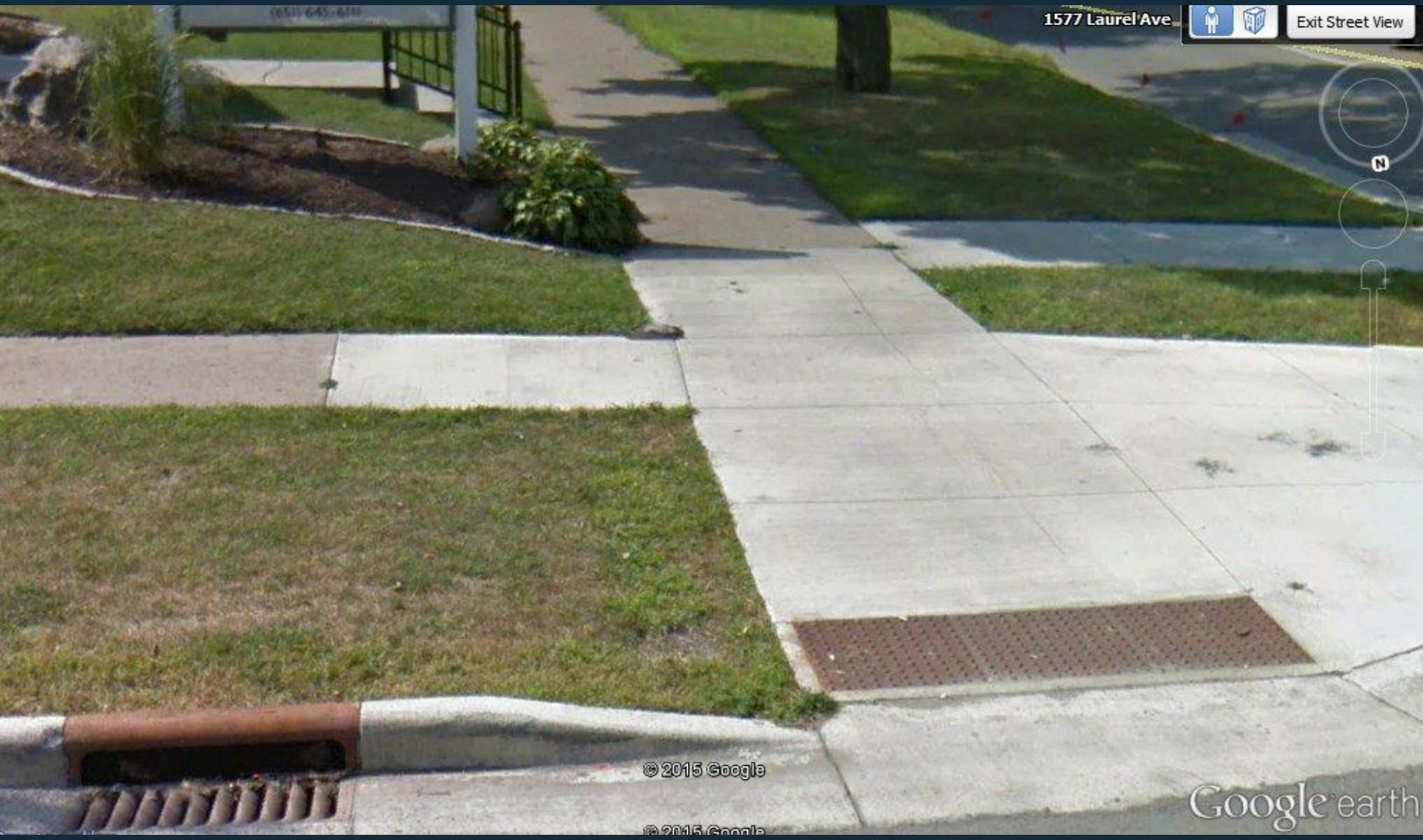
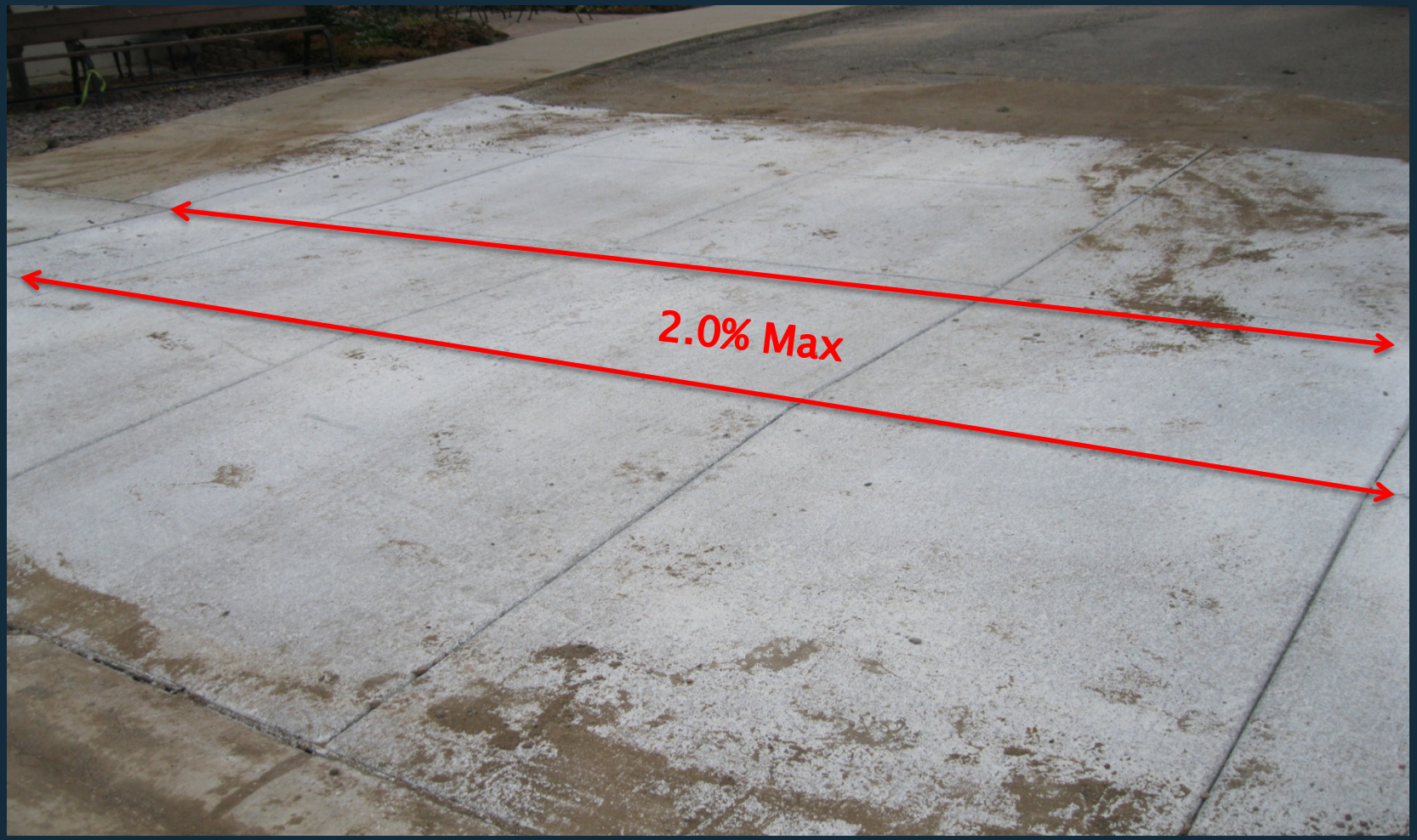

3
1326
0"
0"
4"
S
B6-1
MATCH NEW CURB LINE
4"
4

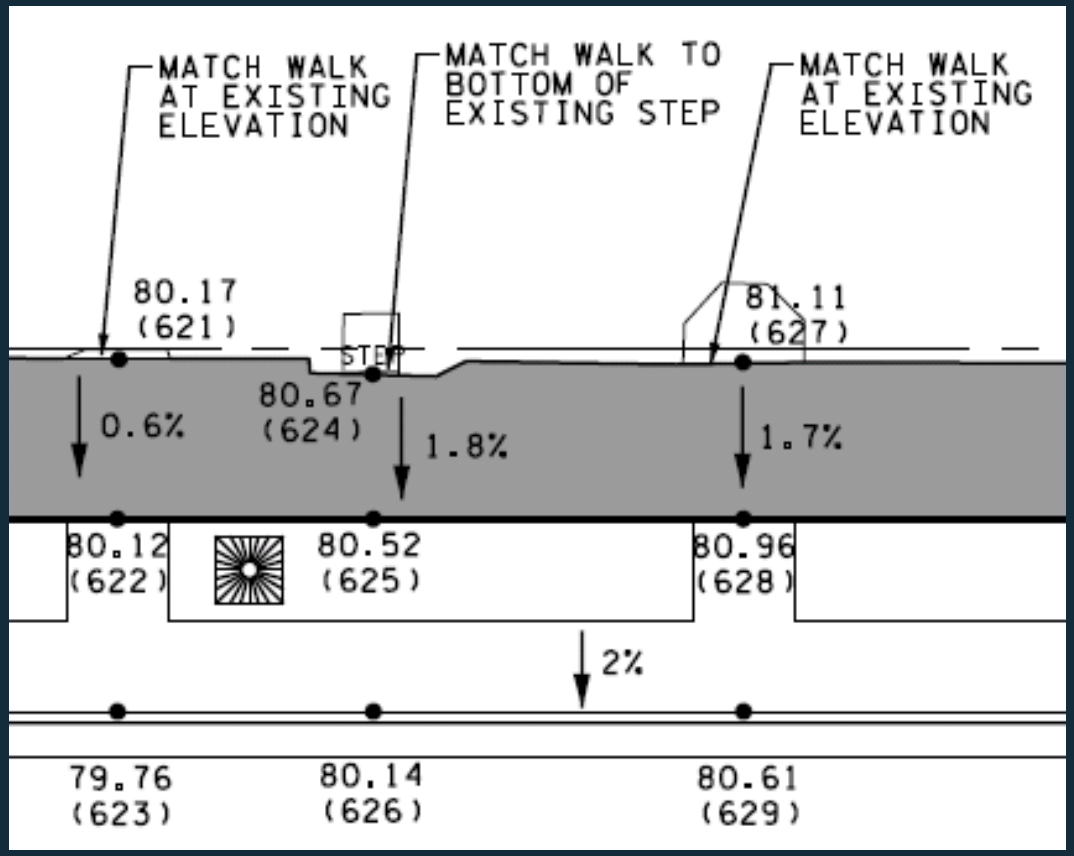

1577 Laurel Ave
Exit Street View
N
© 2015 Google
Google earth

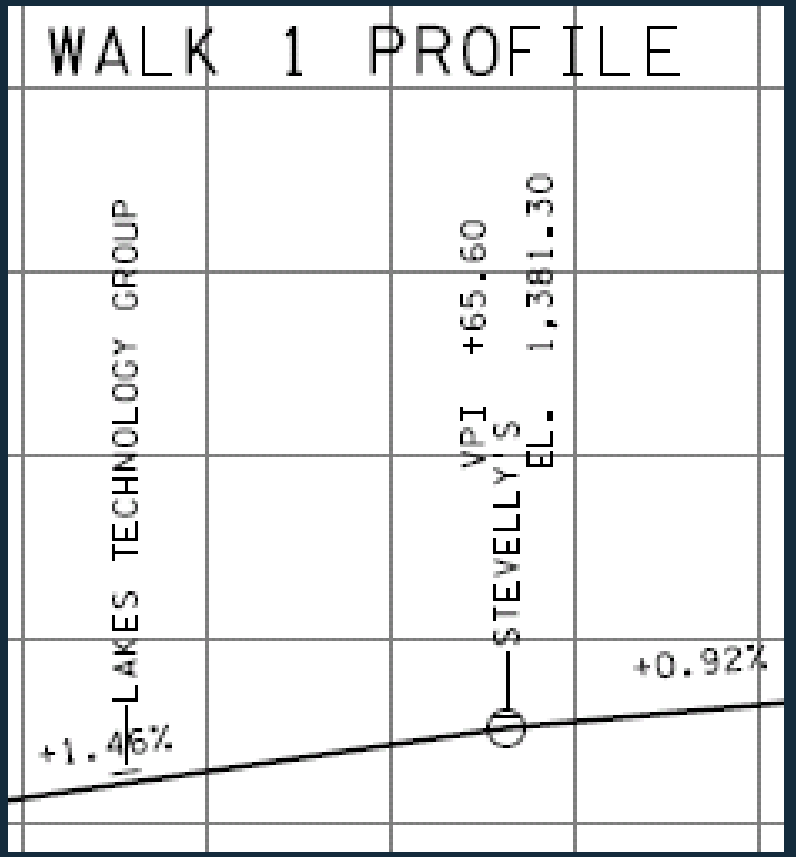
Construction Staking: PAR

Construction Staking: PAR



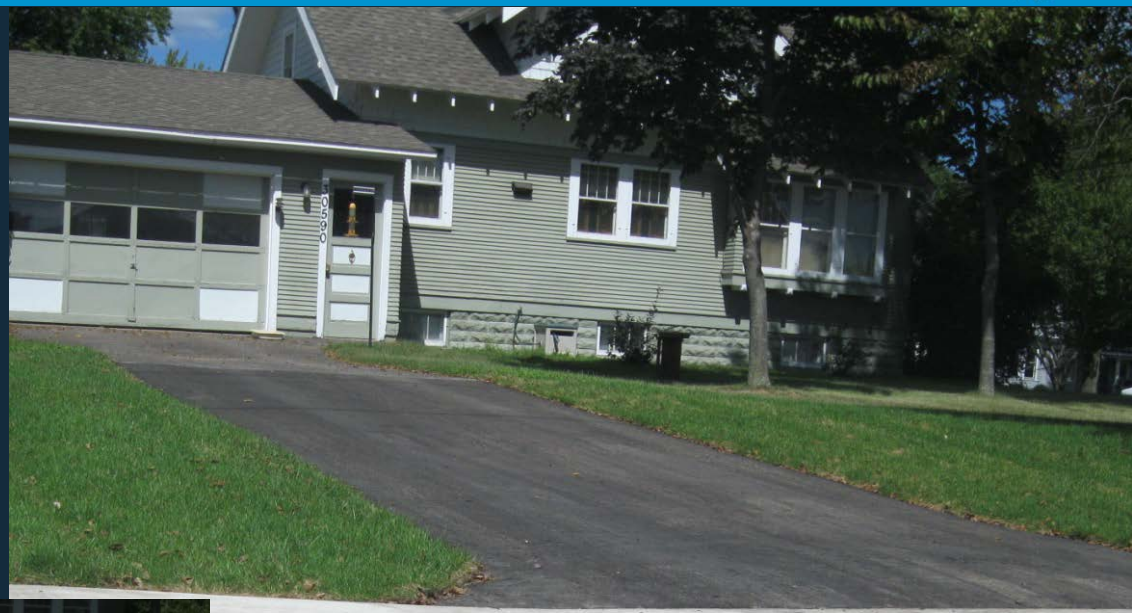
Sidewalk Profiles





Sidewalk Profiles

Entrance Tie-ins



Questions?

Your Destination...Our Priority