

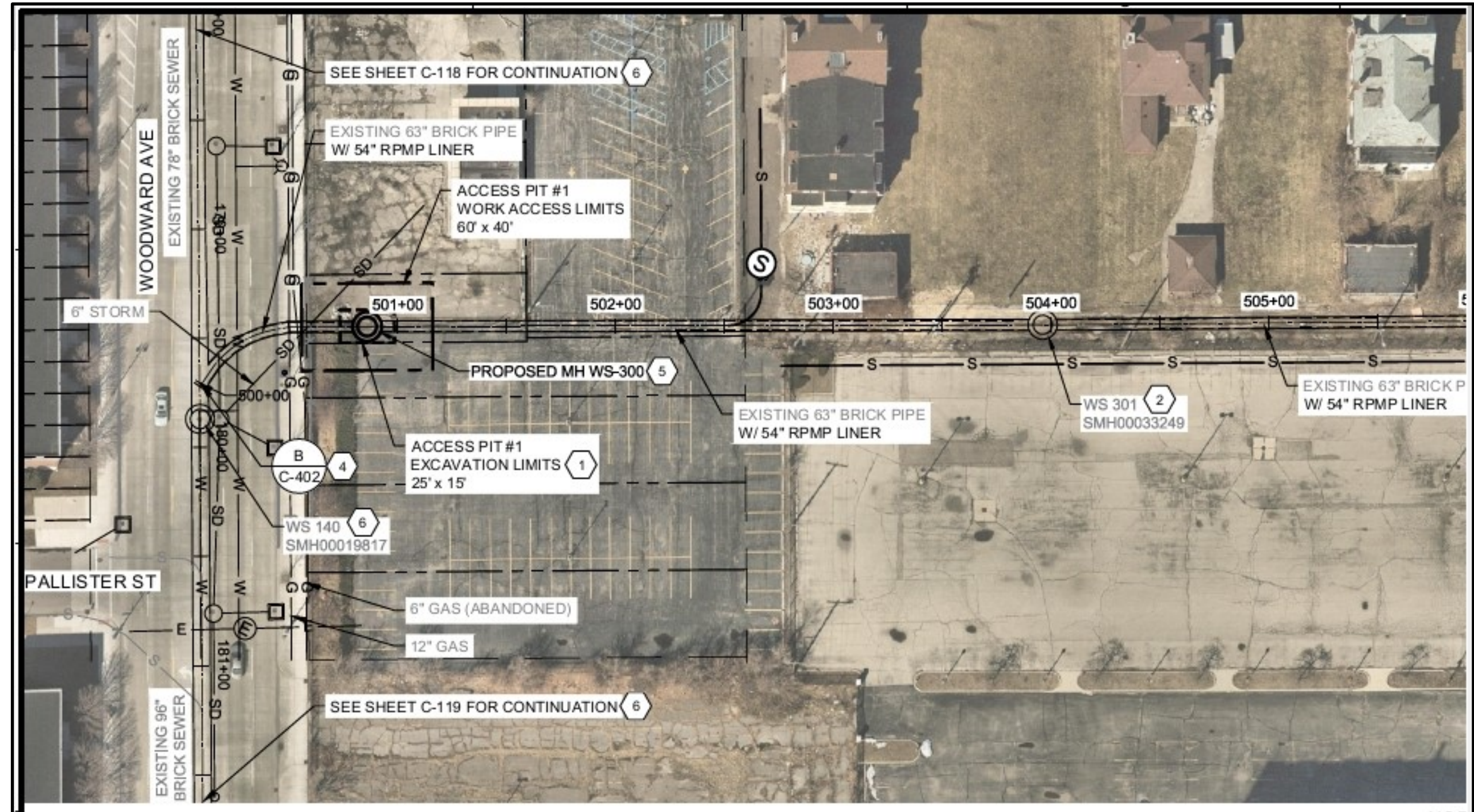
Detroit, MI – Woodward Rehab

Woodward Sewer Rehab

Size & Bend Analysis &
Geolocation

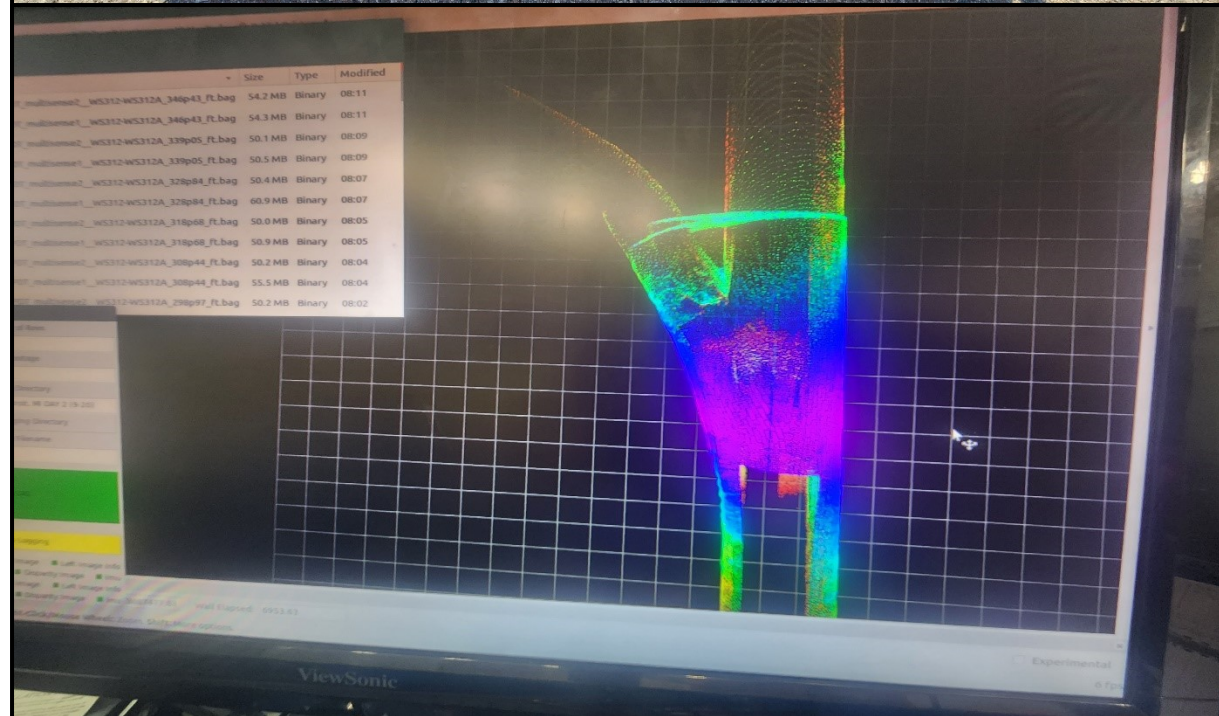
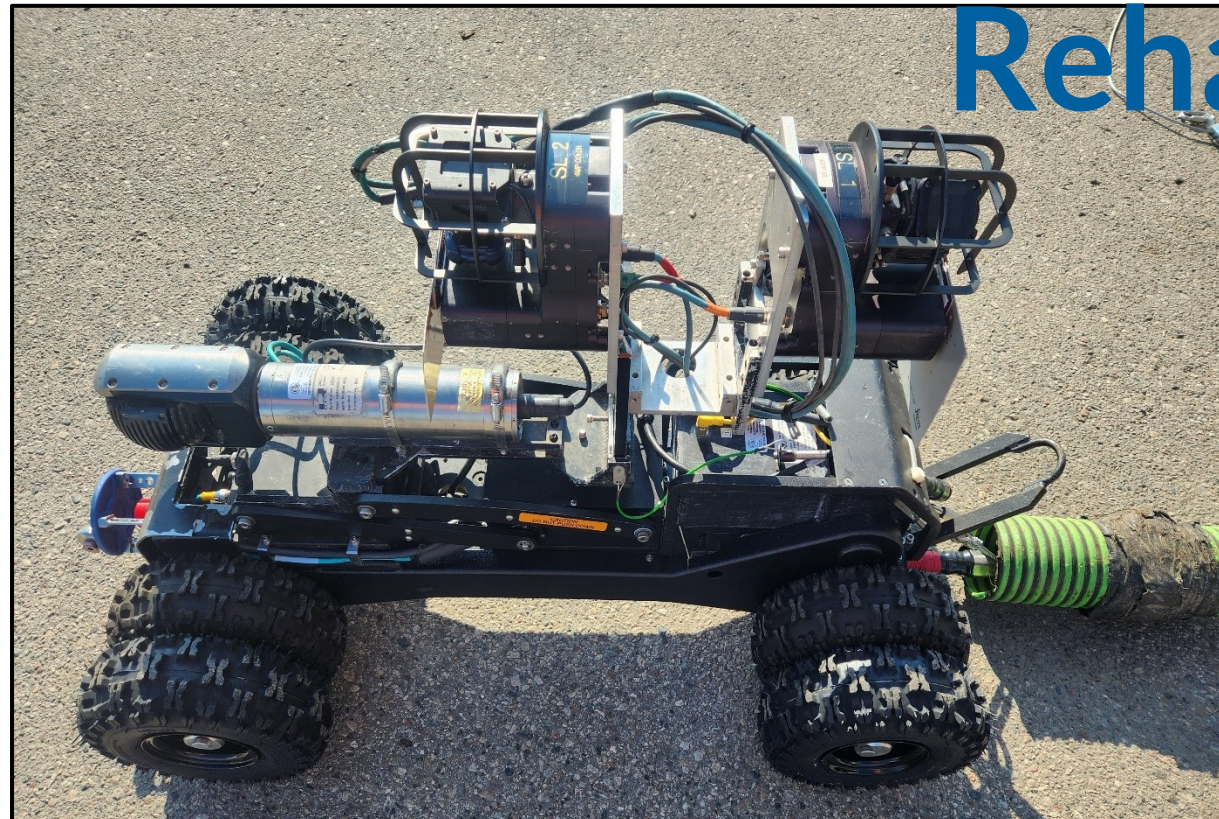
CIRC SHAPED PIPE
FIELD WORK - SEPT 2022

What is the geometry of the 90-deg bend at Woodward Ave.?



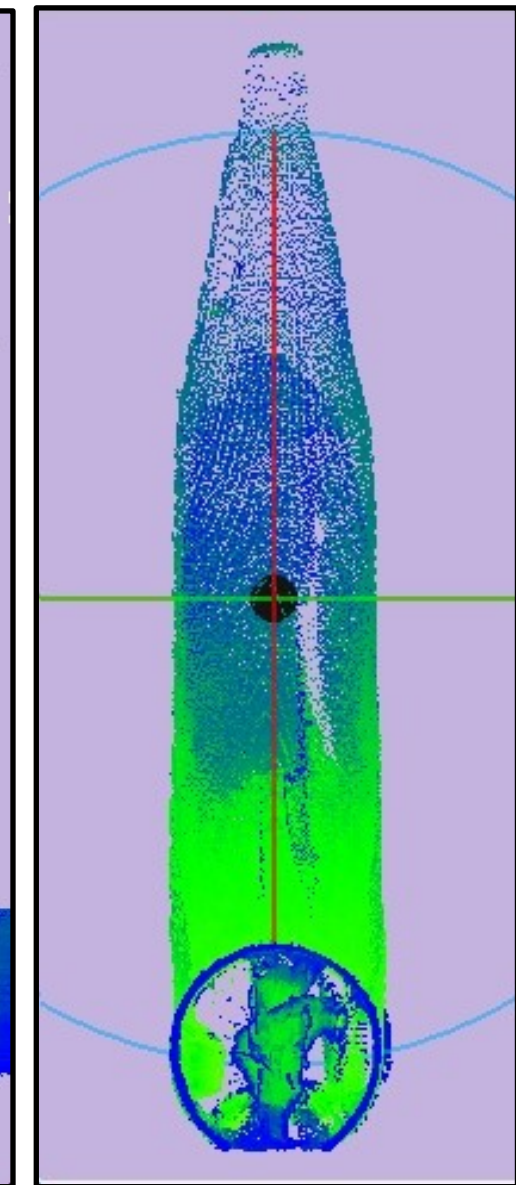
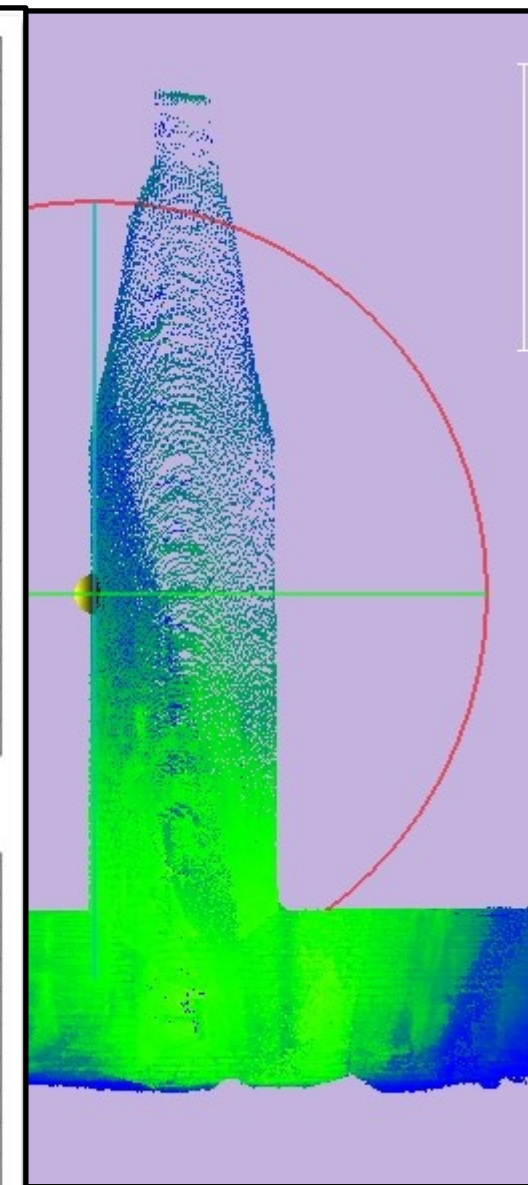
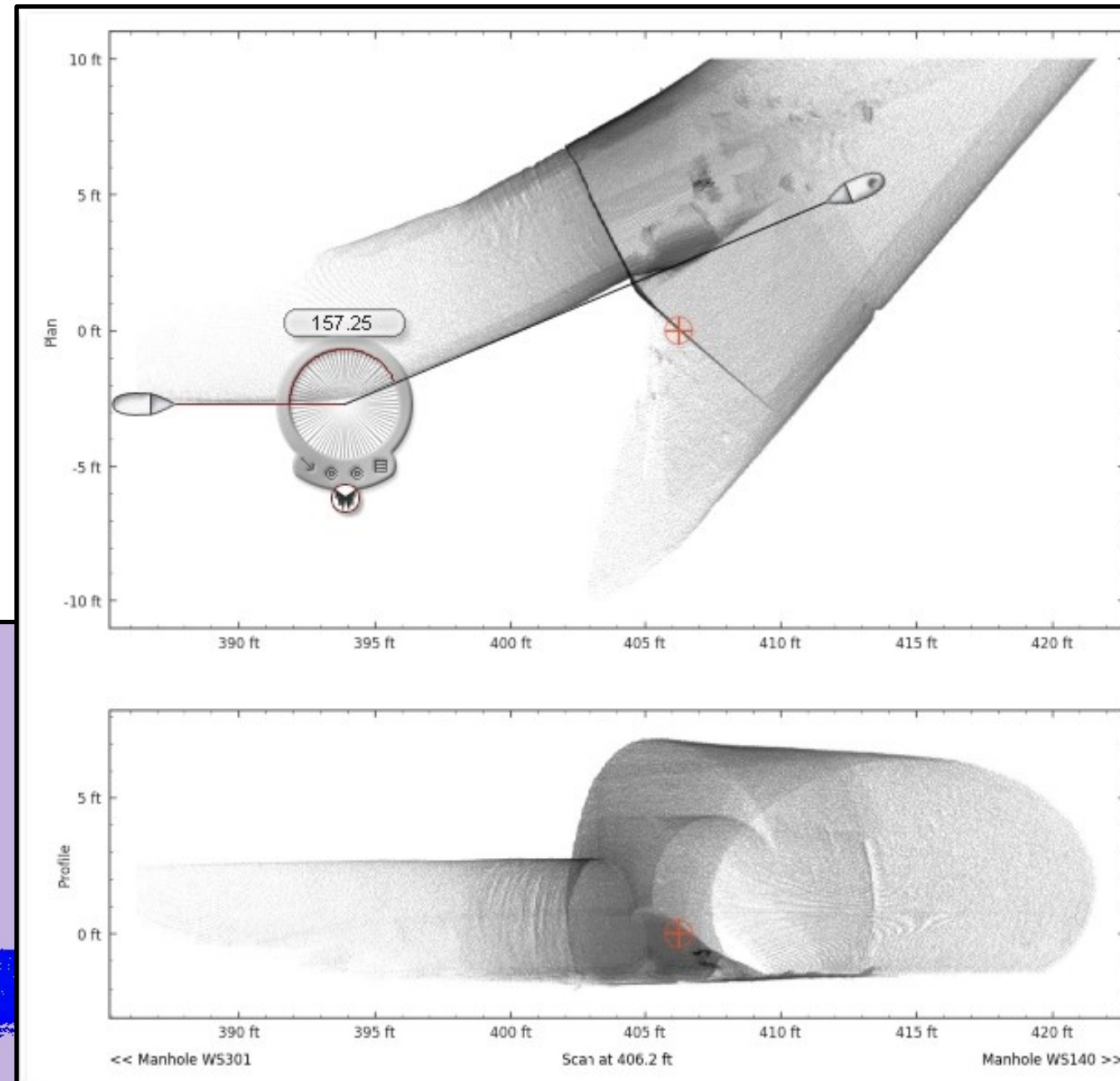
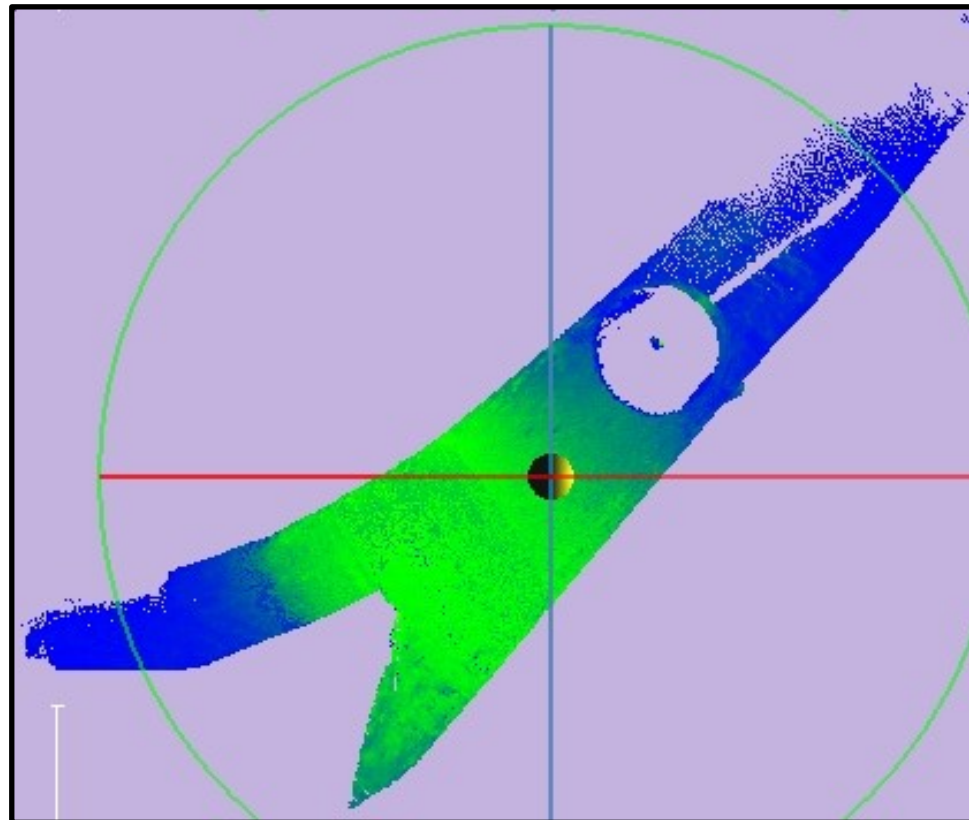
Detroit, MI – Woodward

Rehab

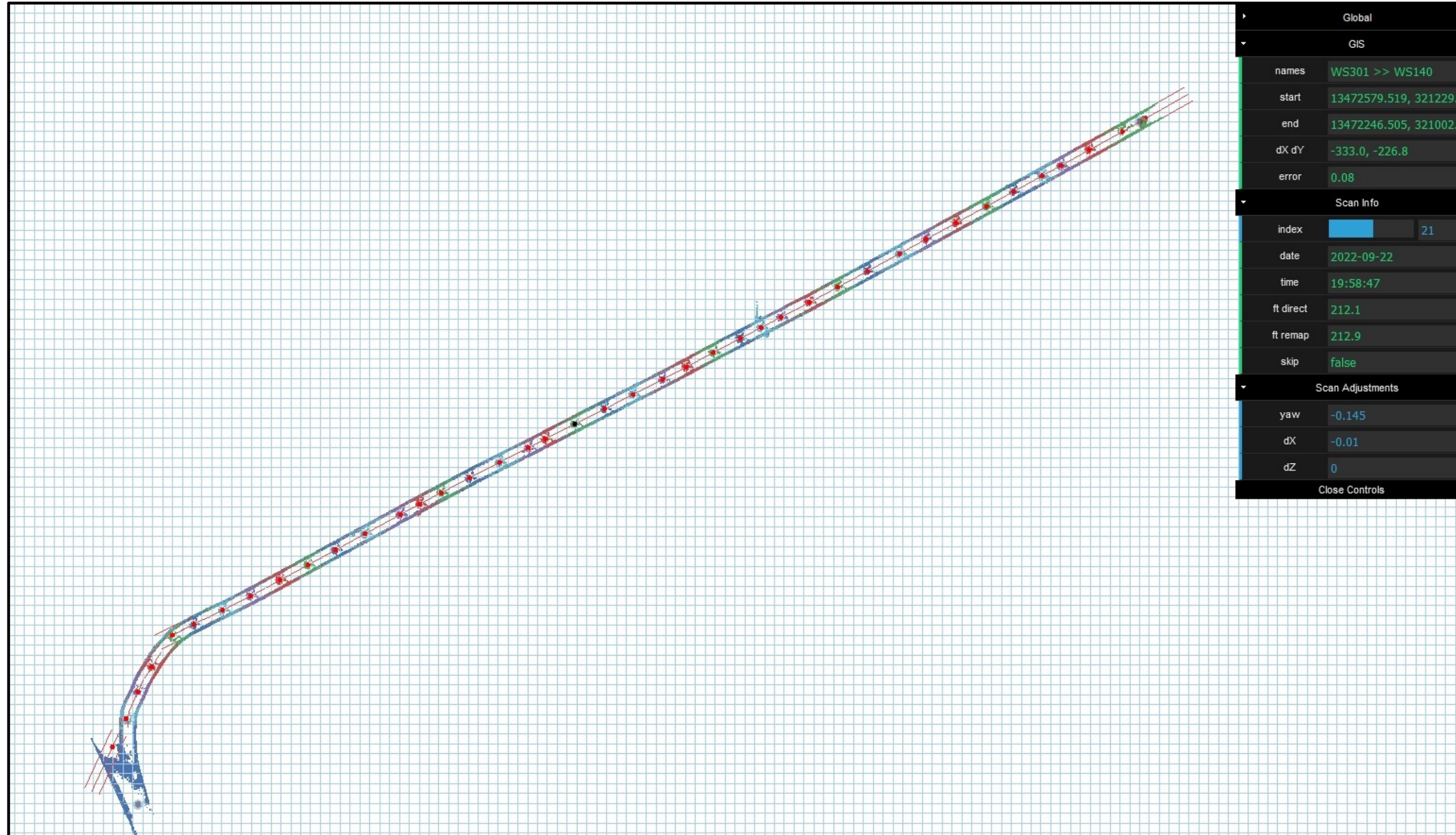


Detroit, MI – Woodward Rehab

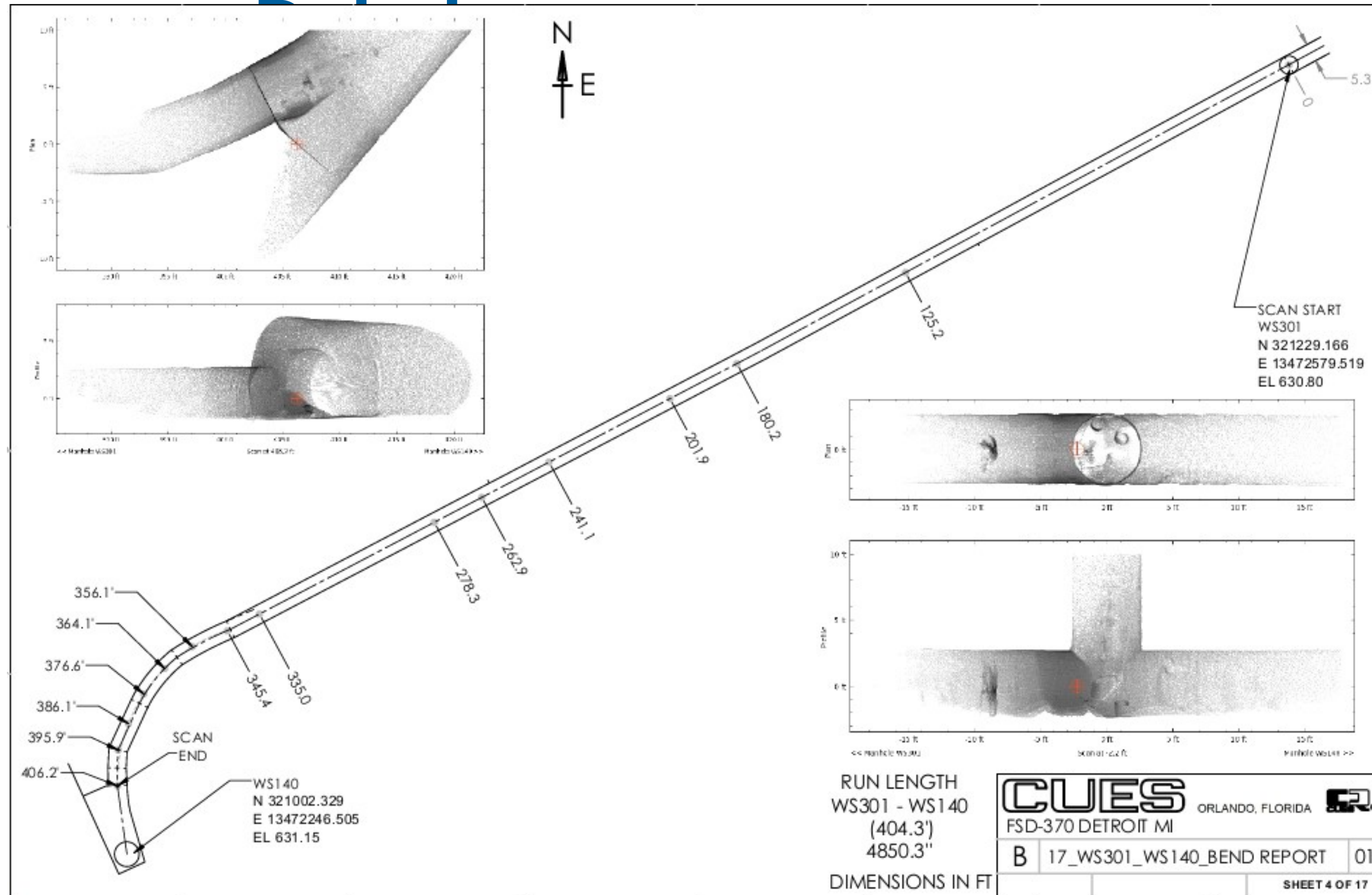
CIRC - WS301 TO WS140 (Woodward Ave.)



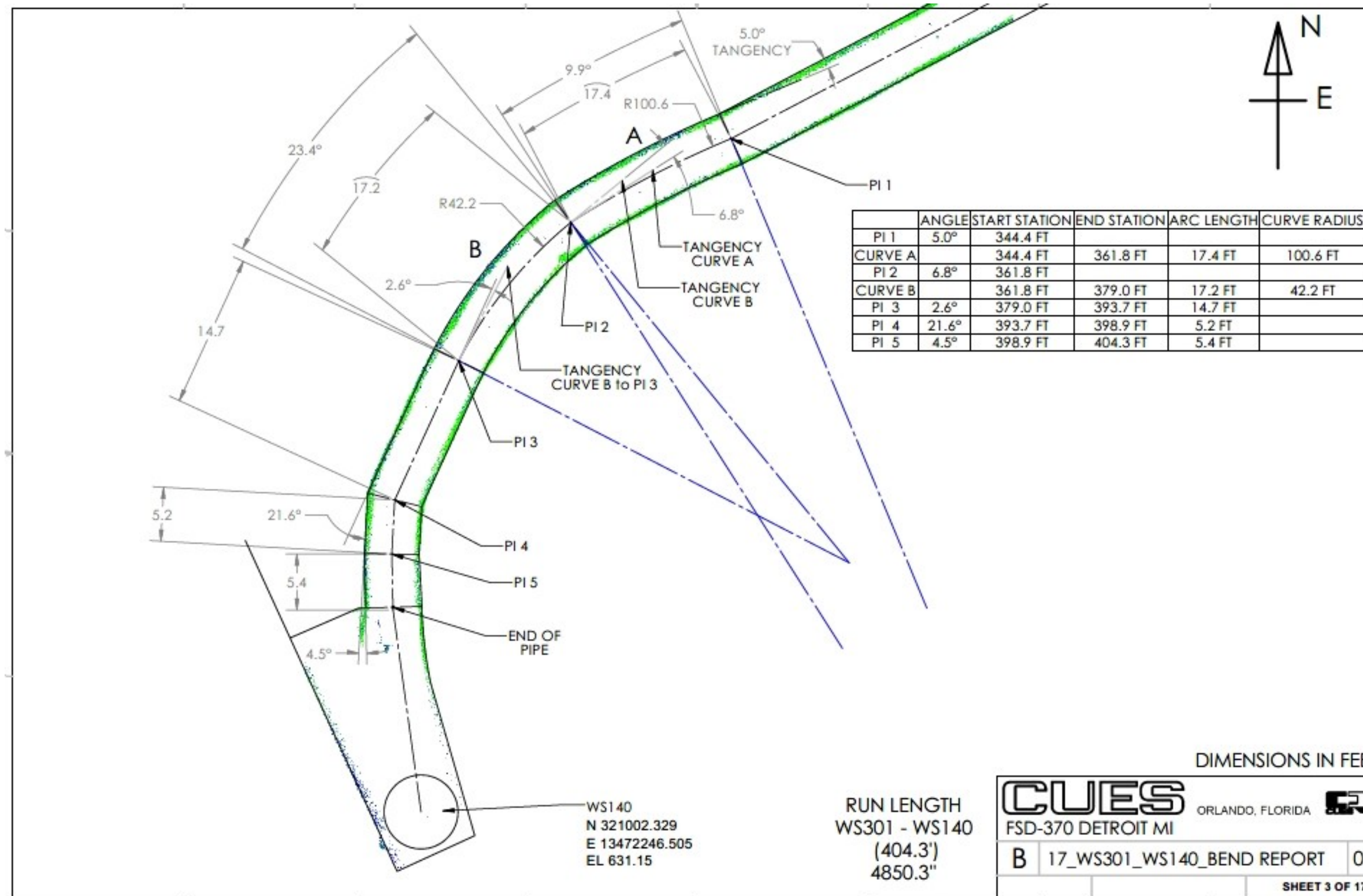
Detroit, MI – Woodward



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Detroit, MI – Woodward



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Woodward Rehab

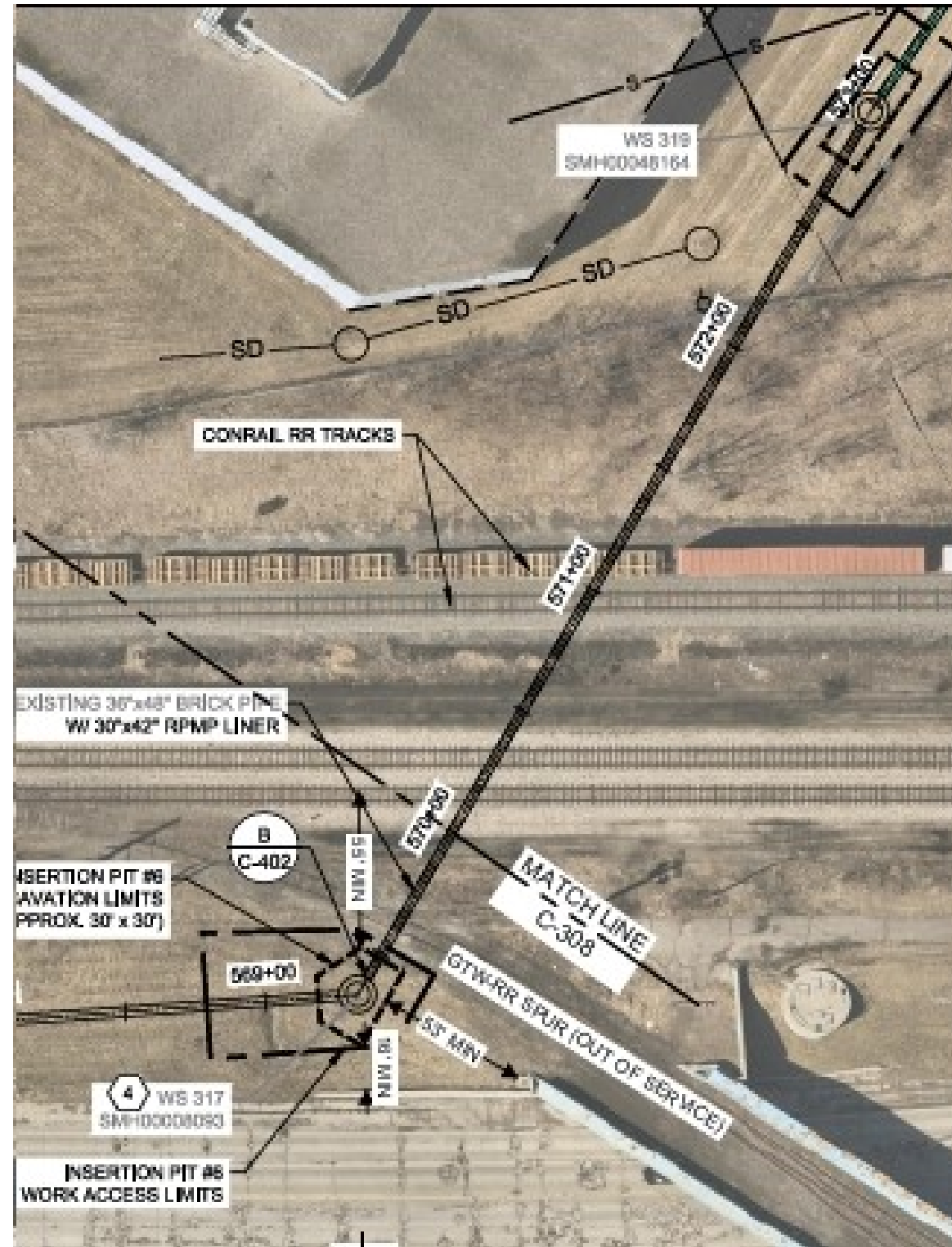
Size & Bend Analysis &

Geo-location

EGG SHAPED PIPE

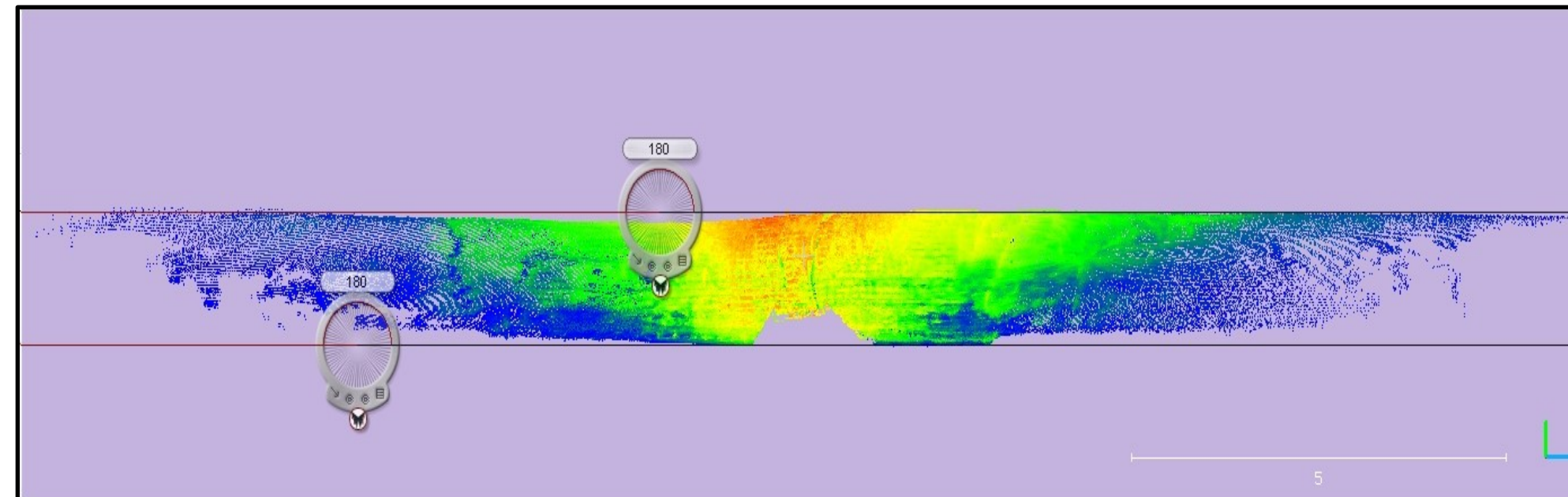
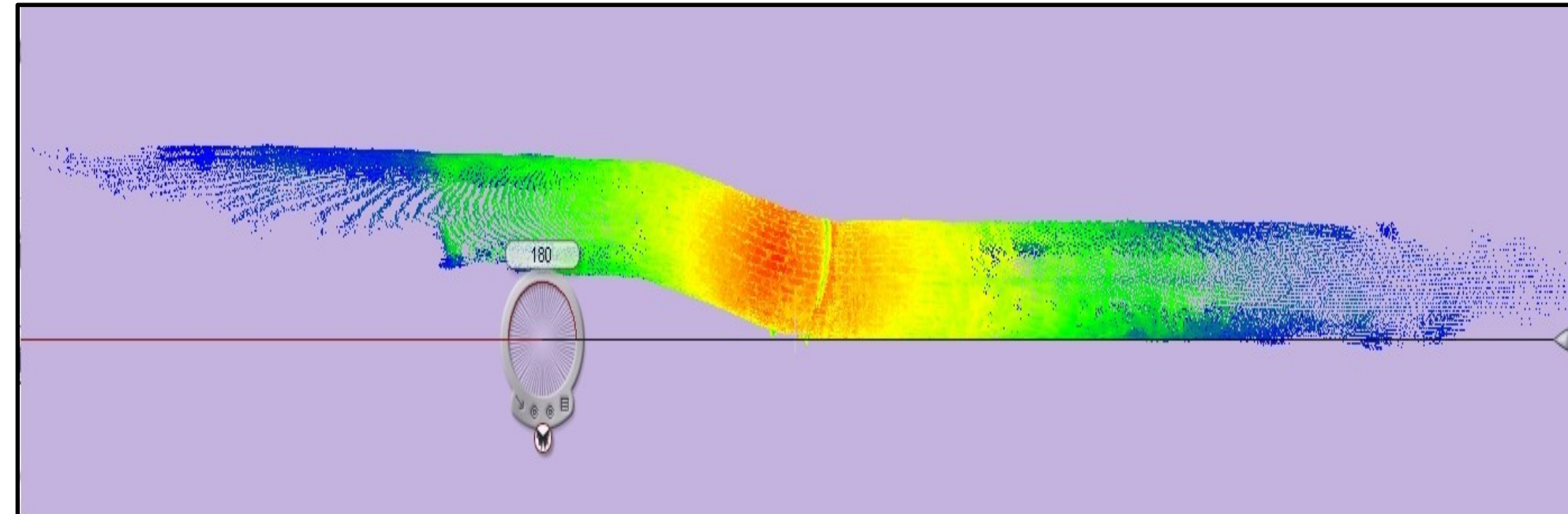
FIELD WORK - SEPT 2022

What are the angles of the bends?
 What stick lengths will pass through the bends?

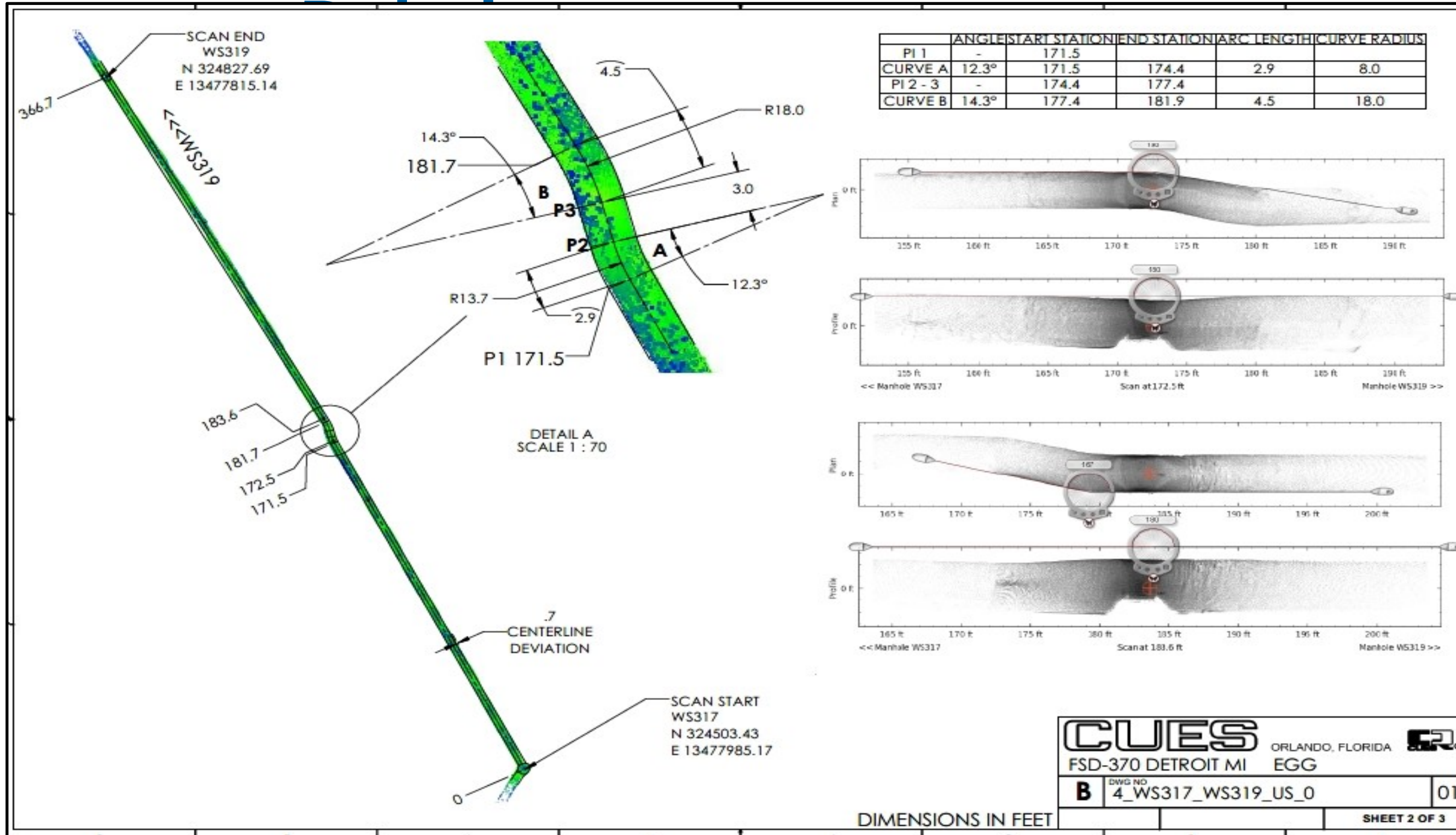


Detroit, MI – Woodward Rehab

CIRC - WS317 TO WS319



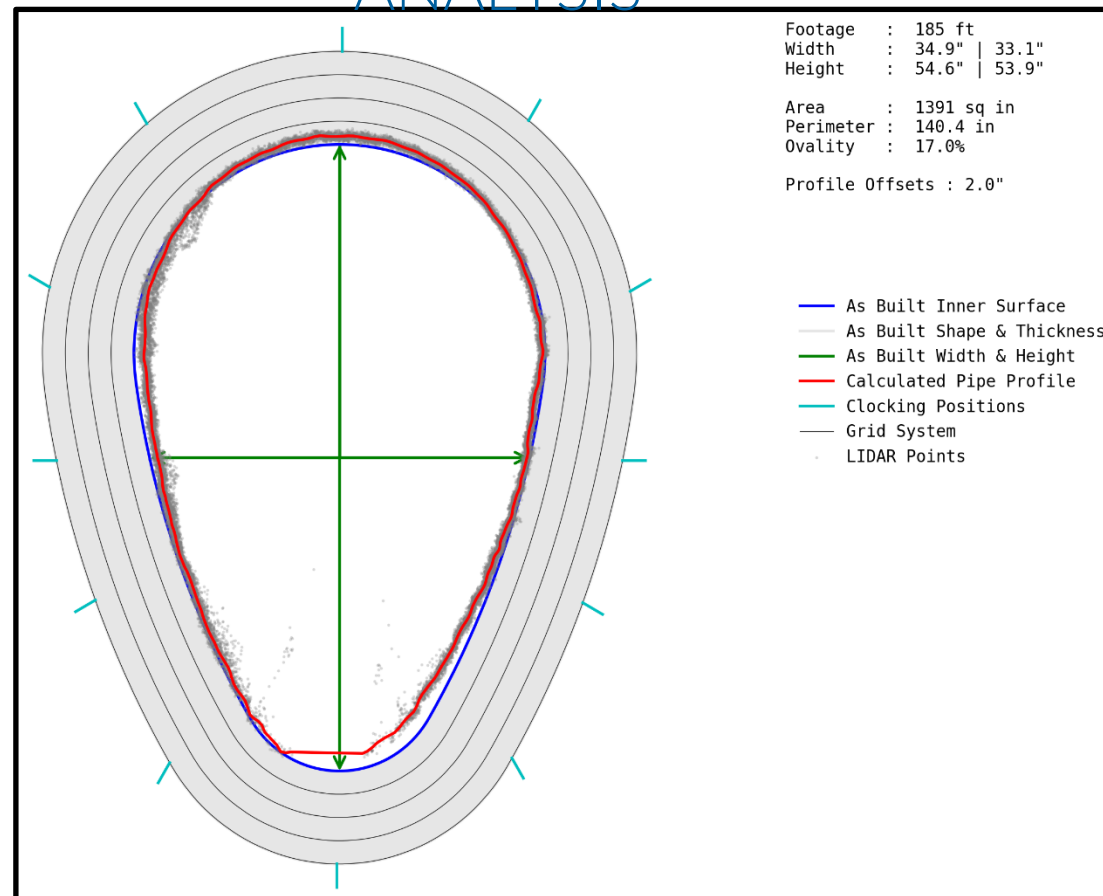
Detroit, MI - Woodward



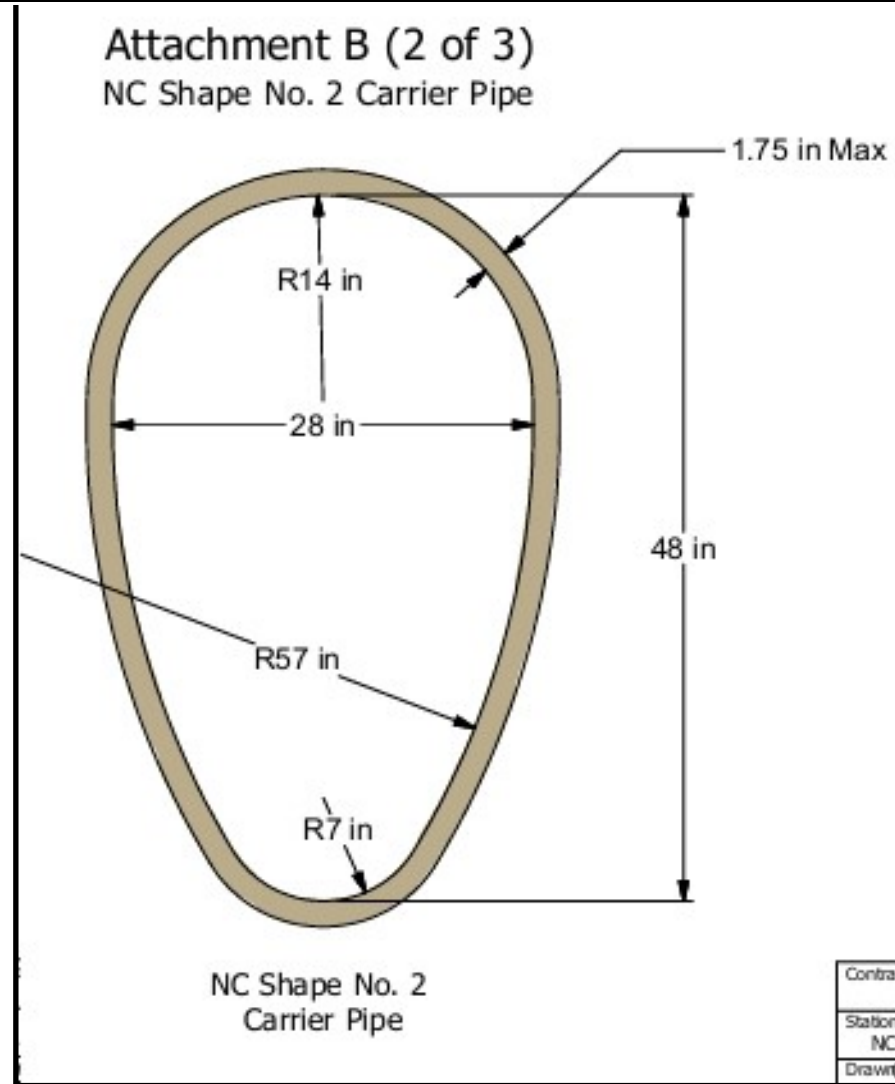
Detroit, MI – Woodward

In summary, the 3D LIDAR inspection and virtual mandrel analysis for RUN #4, indicate the approximate real shape of the brick egg pipe is as shown in Figure 23 below. Furthermore, the proposed Shape No. 2 NC Carrier Pipe may be too large for the host pipe. Areas of minimum width and height of concern for slip lining have been investigated and understood. If another NC Carrier Shape is defined, we can insert that new shape into the cross sectioning tool and show the new annulus space that results.

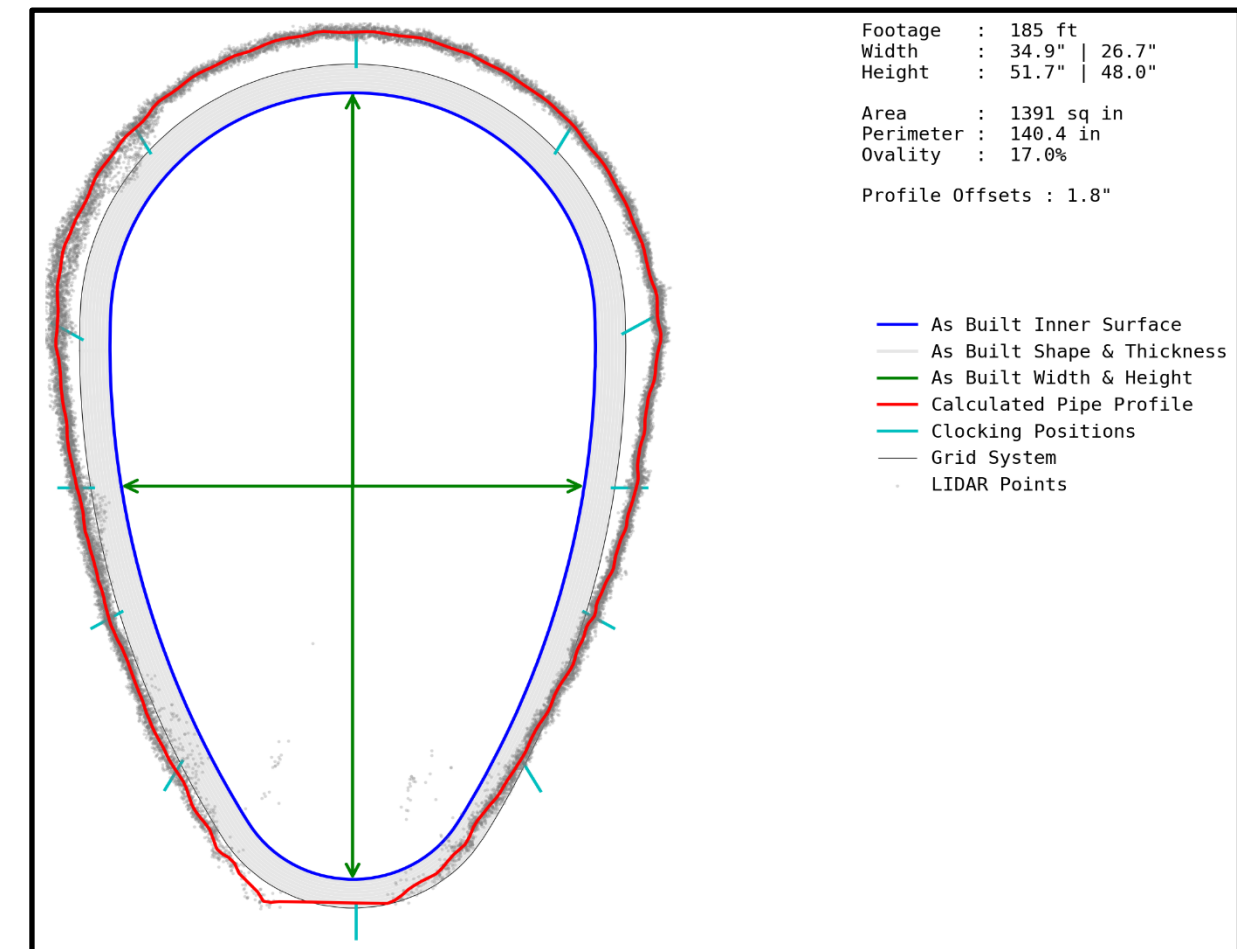
CROSS SECTION ANALYSIS



LIDAR vs. AS-BUILT SHAPE

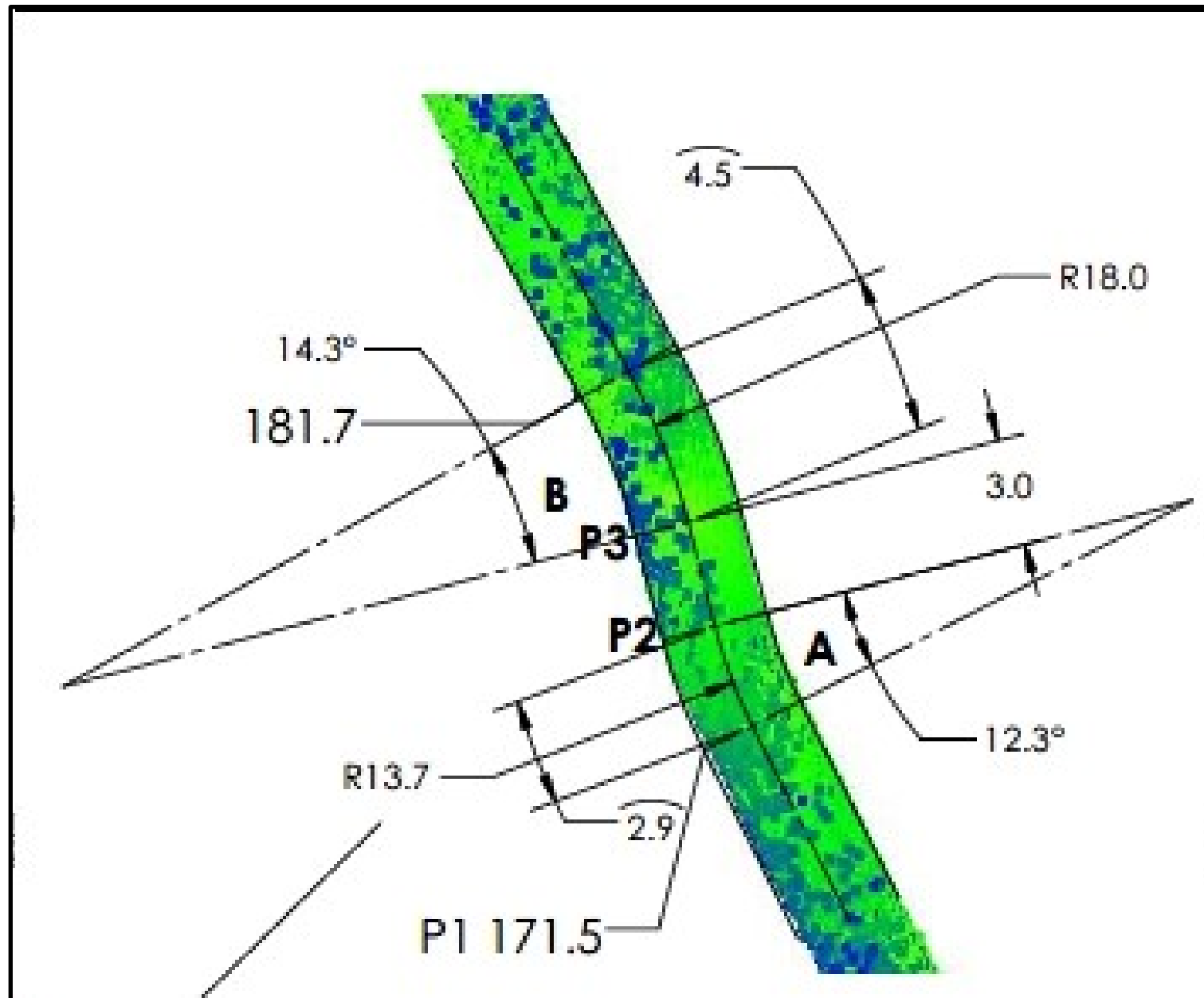


PROPOSED CARRIER PIPE (LINER)



CARRIER vs. LIDAR

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VIRTUAL MANDREL ANALYSIS

MAX STICK LENGTH THROUGH RUN #4 BENDS = 3 FT

MAX STICK LENGTH FOR RUN #4 STRAIGHTS = 8 FT