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1. Typical cross sections at a minimum of every half mile on the tangents and for curves at the beginning, middle and end of curve. For spiral curves, cross section beginning and end of the spiral and middle of central curve. The cross section should be taken from R/W to R/W. For longer curves, additional cross sections should be taken at the quarter deltas.

2. When railroad crossings are encountered on a surfacing project, a complete inventory of crossing conditions and district recommendations as to improvements is required. See 90-1 manual, section 18-2.6 for instructions.

3. Complete data for “Urban Sections”. See 90-1 manual section 18-2.7 for instructions. Collect data for surface utilities and topographic data for curb ramps. Be sure to show rutting locations when cross sectioning.

3. Locate all mail boxes along rural highways. Show the location with a station and offset left or right, size of mail box(s), post(s) type, and if post(s) is/are holding multiple mail boxes. See 90-1 manual, section 18-2.9 for instructions. Complete the SFN 51099 form "*Mail Box Inventory*".

4. Identify all private drives, median crossovers and section line approaches by the plan stationing. Determine the slope ratio (to the nearest tenth of a foot) of the side slopes for each drive. If the approach requires pipe or pipe extensions, calculate the pay length for each pipe where the slope is steeper than 6:1. See 90-1 manual, page 18-14 for instructions and page 18-15 on procedures for the calculation of the pay length. Complete the SFN 16488 form *“Approaches”*.

If there is no approach pipe within 60 feet of the centerline, measure the approach slope at 32 feet from the centerline, or just beyond the radius formed by the bottom of the mainline fore-slope and the approach slope (whichever is greater), in order to calculate the approach slope ratio. Be sure to note the distance from the centerline where the cross section was taken. See 90-1 manual, page 18-16 for an example.

5. Identify the location, type, size and lateral distance from the roadway centerline to the opening for all cattle or stock passes and for **all centerline culverts**. Indicate if the cattle pass is still in use. Get the invert elevations of centerline culverts. Note the condition of flared end sections, and if culvert needs to be cleaned out. Cross sections are to be taken over the top of the culverts, stock passes, box culverts, etc. Also take a cross section at 100 feet back of, and 100 feet ahead of these structures. On four lane projects, continue the cross sections over the other lane. See 90-1 manual, page 18-17 for instructions. Complete the SFN 16489 form *"Centerline Culverts".*

6. Identify the location and fore-slope ratio (calculated to the nearest tenth of a foot) for all ditch blocks. Any ditch blocks having side slopes steeper than 8:1 should be identified by location and direction. Complete the SFN 16490 form "*Ditch Block*".

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7. Identify all box culvert locations, size and lateral distance from centerline of roadway to outside of curb headwall. Complete the SFN 16491 form *"Box Culvert".*

8. Identify all guardrail locations including the length, height, type, post spacing, type of post, type of end treatment condition of the guardrail including the number of damaged rail sections, and lateral distances from the roadway centerline to the face of the guardrail. Where appropriate, show the type of obstruction including the length, width and lateral distance from the roadway centerline. Show the distance from the obstruction to the beginning of the guardrail. Vertical measurements of the guardrail should be taken every 25 feet. Digital photos are required showing the end treatments. Identify the manufacturer and model of the end terminals. Use old plans to determine guardrail lengths and guardrail offset. When hardware does not meet NCHRP 230, only collect field data related to obstruction (offset to obstruction, width and length of obstruction). Complete the SFN 16492 form *"Guardrail"*.

9. At all bridge locations, show the same guardrail information as above plus the type of bridge end connection and the length and alignment of any approach curbs. Indicate locations where no guardrail or curbs are in place. Take bridge curb and rail measurements. Digital photos of all bridge connections are required. Identify the manufacturer and model of the end terminals. Use old plans to determine guardrail lengths and guardrail offset. Field data for SFN 16943 is not needed if hardware does not meet NCHRP 230. Complete the SFN 16493 form *"Bridge"* and the SFN 16494 form *“Bridge Curb Length”*.

10. Identify riprap locations, length, width and lateral distance(s) from centerline.

Complete the SFN 16495 form *"Rip-Rap".*

11. Show the location, size and the lateral clearance from the roadway centerline, for all trees, fences, large rocks or any other objects which may be considered a hazard that are located within the required clear zone. On Interstate projects show the Interstate fences.

12. Show the location, the lateral clearance from the roadway centerline, and the dimensions (include the depths) of all water hazards more than 2 feet deep. A distance measurement is needed at the water’s edge and the point where the water is 2 feet deep.

13. All light standards that are not breakaway should be identified by location and a digital photo. On proposed recycling and mine and blend projects **all signs and sign supports** shall be identified by location and a photo. Complete the SFN 50455 form *“Sign Inventory”*. See 90-1 manual, page 18-18 item #11, for instructions.

14. On all two lane-two way and four-lane divided roadways, show location and lateral clearance to closet edge of signs that are less than 6 feet from the edge of the roadway.

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15. Provide the project number and date of the reference plans used

16. Show all bridge clearance dimensions for every overpass.

Complete the appropriate form SFN 17387 “*Vertical Clearance* - *Single span*", or

SFN 17388 “*Vertical Clearance* *4 – Lane”*.

17. For "CPR" surveys see 90-1 manual, section 18-3 for instructions. Complete the SFN 16513 form "*Concrete Pavement Repair*".

18. Take digital photos (2 - 4 mp in size) include date stamp on photos. Take photos of all items that require filling out an SFN form. It is not necessary to take a photo of every crack of a CPR or of every Right of Way Marker. Photograph guard rails, bridge abutments, hazard areas, centerline culverts, box culverts, signs etc. A photo log should be included or add reference to a photo number on the SFN form.

19. **Fill out the SFN forms completely and legible. Include the date the survey was taken.**

**Place a north arrow on each SFN form as applicable.**

**Use only the SFN forms in the 90-1 manual. The most updated revisions of SFN’s can be found on the Internet at *www.dot.nd.gov* select “Forms”. *Some of the revision dates noted in the 90-1 manual are NOT the current version that should be used.***

**Include a check list (cover sheet) when returning survey.**

**Please take note of 90-1 manual page 18-21.**