DESIGN MEMORANDUM NO. 12-89

TO: Chief District Engineers
Design Engineers
Active Consultants

FROM: Charles Raymer, Director
Division of Design

C. S. Raymer

DATE: December 20, 1989

SUBJECT: Drainage Inspection Report

Effective immediately, the person(s) responsible for writing the Final Inspection Report for a project shall also be responsible for writing the Drainage Inspection Report. The Drainage Report will preferably be directly a part of the Final Inspection Report. Drainage comments shall follow all Final Inspection comments as shown in the attached example. All drainage structures shall be addressed in the report. Those individuals responsible for the review of the drainage, both in the District Office and in Central Office, shall review and provide necessary comments to the inspection. It shall be the responsibility of the District Preconstruction Engineer and the Central Office Location Engineer to see that the Drainage Engineer's endorsement of the comments are included with the report.

When a separate Drainage Inspection has been held or when otherwise deemed appropriate by the District Preconstruction Engineer, a separate Drainage Inspection Report may be written.

CSR:JBS::mlp

Attachment

DRAINAGE COMMENTS

TO FOLLOW

FINAL INSPECTION COMMENTS

The preliminary drainage design was presented for situations listed below and the recommendations and comments of the Drainage Section are as follows:

General Comments:

1. Note width of channel changes throughout project.

2. Need profile notes for median drainage on applicable sheets.

3. Note widened roadway ditch in profile.

4. Add "Removal" to all applicable existing structures.

5. Show names of all known streams.

6. Show size and type of all existing structures, especially those which will be left in place and will continue to have an effect on the proposed drainage systems.

7. Include computer runs for non-situation size pipes in the Final Folder.

Specific Comments:

1. 479+50 to 492+15: 14' wide channel change (1100') & 9' channel change (165')
   a. Run the calculations in a manner similar to the "Ditch Program", i.e., check the 14' portion of the .005 ft/ft slope amd "carry-over" the discharge to the 9' portion on the 0.340 ft/ft slope; use this method to check the depth of flow in the 9' portion of the channel change
   b. Combine the proposed and existing channel change sketches.

2. 482+00: 100'-30" pipe at 0 degree skew with side tapered inlet.
   a. Outlet controls. Side tapered inlet not permitted.
   b. Use 36" pipe at 0 degree skew.

3. 488+50: 104'-30" pipe at 0 degree skew.
   a. O.K. as presented.

4. 497+40: 68'-30" pipe at 0 degree skew.
   Drop Box Inlet Type 2
   60'-30" pipe at 0 degree skew.
   a. O.K. as presented.

5. Station 500+07: 338'-8 x 8 RCBC at 60 degree skew left.
   a. Re-size this structure. 100 year discharge tops proposed roadway.

6. Station 501+78 to 503+60 (Rt.): 14' wide channel change.
   a. Check to see if this channel change is adequate when previous RCBC is re-sized.
   b. Combine proposed and existing channel change section sketches.

7. Station 11+20 (Rt. Sta. 504+25): 117' - 8 x 8 RCBC at 0 degree skew.
   a. Re-size this structure as above.

8. Lt. Sta. 11+25 to 14+50 (Rt. M.L. 504+25): 5' wide channel change.
   a. Adequate as presented.
   b. Combine existing and proposed channel section sketches.

9. 14+00 (Rt. Sta. 504+25): 48'-18" pipe at 0 degree skew.
   DBI Type 1 (H = 2.62)
   a. Adequate as presented.

10. 504+92.5 to 506+55 (Rt.): 14' wide channel change
    a. Check to see if this width is adequate due to upstream structure size increases.
    b. Combine existing and proposed channel section sketches.

11. 507+50: 9 x 9 RCBC at 45 degrees skew Rt.
    a. Resize this structure due to upstream structure size increases.

12. 508+49 to 511+50 (Lt.): 14' wide channel change

a. Check width to see if it is adequate in accordance with upstream structure size increases.

13. 515+12.85: Extend existing 9 x 9 RCBC to 307' (210.85' extension)
    a. Check size in relation to upstream structure size increases. Replaces entire structure if necessary.
    b. Highwater information (5 year resident) is not adequate information for basis of design of this extension plus previous three box culverts.

14. Increases in the sizes of the previous four box culverts (plus channel changes) may warrant another cost comparison to be initiated between these four culverts and a single channel change with two structures.

15. 516+10 to 519+20: 15' wide channel change
    a. Check to see if width is adequate because of upstream structure size increase.
    b. Combine proposed and existing channel change section sketches.

16. 519+50: 112'-30" pipe at 15 degrees Rt.
    a. Adequate as presented.

17. 524+00: 112'-24" pipe at 0 degree skew.
    a. Adequate as presented.

18. 528+00 to 531+00 (Rt.): 14' wide channel change.
    a. Check to see if width adequate due to upstream structure size increases.

19. 51+75 (Rt. 532+00): 25' - 12 x 9 RCBC at 0 degree skew
    a. Structure summary discharges do not agree with open channel discharges.
    b. Headwater elevations higher than controlling elevation (745.0 - "Design Control Summary").
    c. Allowable headwater used in computer run is too high. Should have been about 9 feet.
    d. Check this size in relation to upstream structure size changes.

20. 532+50 to 539+50 (Rt.): 14' wide channel change.
    a. Check this width relative to upstream structure size changes.
    b. Combine proposed and existing channel change section changes.

21. Sta. 533+50: 176'-48" pipe at 0 degree skew.
    a. Size adequate as presented.

22. 544+25: 164'-36" pipe w/side tapered inlet at 0 degree skew.
    a. Metal alternate outlet control governs, use 48" conventional design.

23. 551+00 to 555+00 (Rt.): 20' wide channel change
    a. Change 5.09 AC in open channel summary to 5.09 sq. mi.
    b. Check width relative to upstream structure size changes.
    c. Combine sections as previously noted.

24. 553+50 136'-30" pipe at 0 degree skew.
    a. Size adequate as presented.

25. 565+65 to 570+50 (Rt.): 20' wide channel change.
    a. Check width relative to upstream structure.
    b. Combine size increases sections as previously noted.

26. 570+25: Double 12' x 12' at 20 degree skew Lt.
    a. Use 11' allowable headwater, 1/2 discharge values for computer runs. This will account for extra wetted perimeter caused by center dividing wall, whereas running a 24 x 12 structure will not.
    b. Change flood evaluation values from Q 25 to Q 50.
    c. Even though the existing double 12 x 12 RCBC has never been topped, the addition of higher roadway fills will tend to increase the headwater caused by a similar proposed double 12 x 12. This fact must be considered in the size selection. Will the effective headwater increae due to roadway fill cause enough confinement of normal water flow to predictably cause any upstream (or downstream) damage?

27. 53+50 (Rt. 574+00): 136'-60" pipe w/side-tapered inlet at 25 degree Lt.
    a. Size adequate as presented
    b. Show improved inlet in plan view (P & P Sheet)

28. 578+50: 144' - 60" pipe at 0 degree skew.
    a. Size adequate as presented.

29. 586+50: 128'-18" pipe at 0 degree skew w/DBI Type 1
    a. Size adequate as presented

30. 590+50: 112'-18" pipe at 0 degree skew w/DBI Type 1
    a. Size adequate as presented.

31. 593+75: 108'-24" pipe at 0 degree skew
    a. Size adequate as presented.

32. 602+00: 200'-36" pipe w/side tapered inlet at 0 degree skew.
    a. Outlet controls. Use 42" conventional design.

33. Inlet spacing is adequate as presented.
    (Nice Presentation)

34. Ditch calculations adequate as presented.
    (Nice Presentation)

HTH:jc

cc: T. R. Layman
    E. V. Hilton
    Brighton Engineering Co.