August 20, 2018

Whipple Consulting Engineers, Inc.

City of Spokane Valley
11707 E. Sprague Ave, Ste. 106
Spokane Valley, WA 99206

Attn: Henry M. Allen, PE, Development Engineer

Re: PAINTED HILLS FLOODPLAIN REVIEW #2
City Project No.: SUB-2015-0001
Review Comment Responses for Submittal #2

Dear Mr. Allen:

Since the submittal and city comments, the concept of Levee protection from flood has been rejected by the City of Spokane Valley. This plan set has changed dramatically to a CLOMR-F concept of protection, where the lower areas below the BFE are filled. Additionally, while the capture and disposal of floodwater remained the same, the ultimate disposal shifted from solely a gravel gallery disposal to an infiltration Pond Storage and gravel gallery disposal. As comments no longer apply or have been changed the response this letter tries to resolve any concerns.

Enclosed are our responses to City of Spokane Valley comments provided January 4, 2017 with regards to the Painted Hills PRD Floodplain/CLOMR second submittal. Our response is shown in ***bold*** following your comment.

Note: SVSS = Spokane Valley Street Standards, SRSM = Spokane Regional Stormwater Manual, ROW = Right of Way

General

1. Prior to construction permit release, the following needs to be accomplished:
    a. Copy of CLOMR from FEMA
    b. Plan approval

We acknowledge that the items listed in a. through b. need to be accomplished for construction permit release.

2. Prior to construction acceptance, the following needs to be accomplished:
    a. Copies of the Department of Ecology (DOE) drywell registrations for all new drywells (submitted with construction certification)
    b. Record drawings showing as-built condition
    c. Revisions to HEC-RAS model and reassessment of the freeboard if construction has altered the channels from that depicted in the model
    d. Letter from design engineers certifying project constructed according to approved plans and specifications
    e. Levee certifications (44 CFR 65.10 (e))

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Civil, Structural, Traffic, Survey, Landscape Architecture and Entitlements

f. Construction Certification Package

We acknowledge that the items listed in a. through f. need to be accomplished for construction acceptance.

Flood Control Development Narrative

3. General – please address the requirement for an overflow path for the 100-year storm mentioned in SRSM chapter 2.2.4, paragraph on Infiltration Facilities.

We appreciate that the SRSM has this requirement, but as with all standards, requirements are written to cover the majority of situations. There are always exceptions that need to be looked at differently which this site falls into. Since our site is the regional low point designated as compensatory storage, with any possible overflow route blocked by prior development, a requirement for an overflow route is setting us up for failure. The facilities in this submittal are for the relocation of the compensatory storage of floodwaters. Stormwater overflow disposal will be addressed with submittal of plans for each specific subdivision.

4. Background
    a. Page 1 paragraph 1 – change ... when no flood events occurred ... to ... when no significant flood events occurred ...

Paragraph revised to include "significant."

    b. Page 2 – since 40th is an east-west oriented street should references to "east of 40th Avenue" be changed to "north (or south) of 40th Avenue"?

The portion of 40th Ave adjacent to Storage Area 6 runs northwest to southeast so we have revised the reference to "northeast of".

    c. Change references to "Spokane Rathdrum" aquifer to "Spokane Valley Rathdrum Prairie" aquifer.

Aquifer references have been revised.

5. Main Flow Across Thorpe Road
    a. Proposed Design
        i. Box Culvert/Open Channel – the text refers to 2-10" culverts but our records say that they are 18". Please check pipe size.

We have checked the culverts in the field and there are 3-15" CMP culverts. Text revised.

ii. Pipe Mainline – text mentions that along Madison are manholes with sumps but, per WSDOT details, these structures are called catch basins. Please revise.

Manhole has been revised to WSDOT Type II catch basin.

iii. Gravel Gallery System –

1. Paragraph 1 - please include the design outflow rates of the drywells and the pipe crosses (may need to provide calcs).

The outflow rate of 162.64 cfs has been documented with the new gallery design. These calculations are provided in the flood control narrative appendix.

2. Paragraph 2 – The design flow of 64 cfs was at Thorpe, please revise the design flow to what it is at the gravel gallery system.

The design flow rate for storage area 1 has been revised to 118 cfs as documented in the flood control narrative.

iv. Infiltration Rate –

1. Paragraph 1 – why is this paragraph included in that TP-29 is at the south end of the site by Thorpe whereas the gravel galleries are at the north end?

The paragraph has been deleted.

2. Paragraph 2 – please show how the 1.8×10^{-3} cfs/sf design flow rate was derived.

See IPEC addendum report dated 8-22-17

6. Secondary Flow Across Madison Road
   a. Paragraph 1
      i. Second sentence – mention that the flow from the most northerly culvert ends up going into culvert at 30+42.

Sentence revised to state flows goes to the south.

ii. Third sentence – check that the culvert stations listed match those in the table below paragraph 3.

Stations revised to match table.

7. Attachments –

a. Provide outflow rate calculations for the HDPE crosses. If the head required to achieve the outflow rate is significant then check this water surface elevation as a downstream condition in the channel and pipe hydraulic calcs.

After consultation with the Geotech, the crosses have been eliminated and 12" perforated pipe will be installed the entire length of the gravel gallery.

b. Open channel calcs – the Q may be a little bit more than 64 cfs when the flow from the two pipes at the upstream end of the channel are included.

The open Channel has been revised since the last submittal. The revised open channel occurs between the box culvert and headwall of the two – 48" concrete pipes. The design flow has been based upon the 103 cfs 100 yr flood assuming that the channel to the south has been breached just before Thorpe Road. The flow from the roadside swales are anticipated to occur prior to the 100 yr flood, as they have a different time of concentration.

c. Pipe System calcs –
    i. Hydraflow is not on FEMA's list of approved software programs. We recommend that before submitting the study you check with FEMA to see if they will accept this software.

So noted Hydroflow calculations are no longer included in the analysis.

    ii. Include the two-foot-high level spreader at the downstream end of the system.

A 1-foot high spreader, has been called out per the design of the hydraulic engineer (West Consultants)

d. Gravel gallery –
    i. Confirm source of the infiltration rate.

See IPEC addendum report dated 8-22-17

    ii. Check totals for the sidewall area and bottom area columns.

The gravel gallery calculations have been revised with the change to the design.

e. Bio-filtration swale design – the Manning's n of 0.2 is for shallow flow conditions. What depth does King County consider to be "shallow"? The depth calculated in the analysis is over 4 feet. Use a Manning's n applicable to a 4-foot flow depth.

The manning's n-value has been revised per the Open Channel Hydraulics book by Ven te Chow, specifically Curves for A table on Page 182. Please see the appendix of the Flood Control narrative for a copy of the referenced material.

Biological Evaluation

8. Section 4.3, paragraph 1 – can a vegetative cover be greater than 100% (top of page 9)?

See Biology Soil and Water, Inc. letter dated June 8, 2017.

9. Section 5.3, paragraph 2 – confirm that the items mentioned (work in channel only when dry, BMP's, spill protocols, minimal peripheral impacts, construction fences) are adequately provided in the construction documents.

Notes have been added to plans covering these items.

10. Section 5.4 – confirm that the items mentioned (BMP's, FEMA specifications) are adequately provided in the construction documents.

Notes have been added to plans covering these items.

11. Section 6.2, page 26 – because the levees at the small bridges need to be raised, more than 200' of levee needs to be raised.

See Biology Soil and Water, Inc. letter dated June 8, 2017.

12. Section 6.7, paragraph 1, all of the 1% flood is being infiltrated.

See Biology Soil and Water, Inc. letter dated June 8, 2017.

Operations and Maintenance Plan

13. General:
    a. This manual needs to be incorporated into the overall O&M Manual for the whole site.

Noted. This manual will be incorporated into an overall O&M Manual at the time of its development.

    b. Include the levee O&M manual from the Geotech Levee Evaluation and Certification report as an appendix.

As the City of Spokane Valley has formally rejected the Levee design, all levee design and documentation has been removed.

c. Per CFR 65.6(a)(12) mention that the City Manager or designee will be the community official responsible for assuring maintenance activities are accomplished.

Responsible official statement has been added on page 1.

14. Page 1:
    a. Top –
        i. Spell out what a PRD is.

Abbreviations section has been added on page 1.

        ii. State the party who is responsible for O&M until the HOA is formed.

Responsible party section has been revised to add Black Reality as the responsible party until the HOA is formed.

    b. Middle, bullet list – add bullet stating HOA is responsible for:
    Providing annual report each October to Spokane Valley Public Works describing the general status of sinking fund account and also specific inspections, findings and maintenance performed.

Bullet items have been added with regards to reporting.

    c. Last paragraph before next section (1.00) – Change to say: The parties mentioned above are primarily responsible for all operations and maintenance of ...

Paragraph has been revised to refer to the parties mentioned above.

15. Section 2.00, Drainage Facilities (page 2), paragraph 1 –
    a. Second line – remove "possibly" and "that has historically flowed into the property and"

Paragraph has been revised per the comment.

    b. Provide FEMA panel number and effective date.

FEMA panel number and effective date have been added.

Mainline manhole callout has been revised to WSDOT catch basins.

16. 3.00 Maintenance Requirements and Schedules:

a. Right after this section heading include: All inspections and repairs are to be performed by or directly overseen by a qualified professional per this schedule and following major events. Maintenance tasks are to be performed soon after the need is identified and before facility is to perform unless otherwise agreed to by the City. Repairs or replacements are to be completed immediately upon their identification unless otherwise agreed to by the City. Only qualified individuals may enter confined spaces.

The above paragraph has been added.

b. First paragraph, last line – change "recommended" to "minimum required"

Recommended has been revised to "minimum required."

<u>Box Culvert</u>. A table has been added identifying location and agency having jurisdiction.

c. Chester Creek and Levee -
    i. Reference the levee O&M manual from the Geotech Levee Evaluation and Certification and include in the appendix.

Reference to the O&M manual has been added to this section and the manual added as Appendix B.

    ii. Paragraph 1 -
        1. 3rd sentence – add to the end: … of the creek and along the north side of Dishman-Mica to Wilbur Road.

This sentence has been revised to include additional language.

        2. 4th sentence, revise to say: … maintained to ensure flood carrying capacity is maintained and flood flows are …

This sentence has been revised to include additional language.

        3. Last sentence, revise to say: "Maintenance of the channel and levee and obtaining permits to perform the maintenance shall be …"

This sentence has been revised to include additional language.

    iii. Paragraph 2, Maintenance Items –
        1. 1st bullet – Geotech O&M says grass should be 3" high or taller. Include that grass should not be taller than 12" (per the Biological Evaluation)

This sentence has been revised to include additional language.

2. 3rd bullet – at end include that only native grasses are to be on the levee.

A sentence has been added to allow only native grasses.

3. 5th bullet – after this bullet add the following bullet:
   * Filling out the levee checklist and include it in the annual report to the City.

This sentence has been added.

d. Concrete Channel, first bullet – add to the end of the sentence: … and repair or replace damaged portions.

This sentence has been revised to include additional language.

Pipe lengths updated to current plan under Storm Drain Mainline section.

e. Manholes and Catch Basins
   i. 1st sentence – revise to say … mainline pipe system has catch basins at pipe junctions and …

Sentence has been revised to replace manholes with WSDOT Type II catch basins and reference to manholes deleted in heading and throughout section. Catch basin "lids" added to annual inspection.

<u>Cross Culverts</u>. Reference to manholes revised to WSDOT Type II catch basins and TV inspections revised to three years.

f. Bio-infiltration Swale Maintenance –
   i. Include mowing?

The bio-infiltration swale is not to be mowed.

   ii. Include removal of accumulated sediments.

A sentence has been added for removal of accumulated sediment.

g. Drywells/Gravel Gallery Infiltration Field –include that every X years the pipe and crosses are inspected by camera for clogging and debris.

A sentence has been added for camera inspection every three years.

Fencing. Signs have been added to the twice a year visual inspection.

17. 4.00 Sinking Fund

Direction has been added to update the fund calculations per contracted costs and to update each time new contracts are obtained.

a. Regular O&M costs –
    i. Confirm that the annual quantities represent "A comprehensive visual inspection of the complete flood control drainage facilities should be conducted twice a year." e.g. Drywell cleaning is 2x/year so annual quantity should be 24.

A cost has been added to cover two comprehensive system inspections. This removes the inspection element from the maintenance tasks. Therefore, drywell cleaning annually is a quantity of 12.

    ii. Mowing – mention which facilities are to be mowed

Mowing description has been revised to include levee embankments.

    iii. Debris removal – mention which facilities are to have removal

Debris removal description has been revised to include those facilities anticipated to need debris removal.

    iv. Pipeline TV inspection – mention which facilities are to be TV'd

Pipeline TV inspection has been revised to include the facilities to be TV'd.

    v. Manhole inspection – are these the Catch Basins on the trunkline along Madison?

Catch basin has been added to the manhole inspection description.

    vi. Include -
        1. Levee inspection and maintenance

Levee inspection is included in comprehensive system inspection. Levee maintenance is included in the mowing line item.

        2. Madison cross-culvert inspection and maintenance

Culverts has been added to debris removal and pipeline inspection descriptions.

3. Swale reseeding and noxious weed removal

A line item has been added for swale reseeding and noxious weed removal.

4. Fencing, access roads, parking pads, signs inspection and maintenance

A line item has been added for fencing, access roads, parking pads, signs inspection and maintenance.

5. Cost to prepare annual report

A line item has been added for cost to prepare annual report.

A line item has been added at 20% of total annual costs for contingencies to cover unexpected costs.

b. Replacement Costs –
   i. in the first line the manholes are catch basins per WSDOT,

Table has been revised adding line items to break out each type of manhole, catch basin, etc..

   ii. include trunkline along Madison and trash racks

Table has been revised adding line items to break out each pipe size including trunkline, culverts and infiltration field. A line item has been added for trash racks.

A line item has been added for signs.

Preliminary Geotechnical Evaluation, Phase 1

18. Analysis and Preliminary Recommendations – paragraph 2 says that soils good for gravel galleries are in the south part of the site. So, the soils in the north part of the site are not good for gravel galleries?

No, the first paragraph states that the site soils are suitable for subsurface infiltration. The second paragraph points out that in the southern portion of site where the alluvial soils are deeper, it may be advantageous to use gravel galleries as opposed to drywells. Supplemental geotechnical work including borings and a drywell test at the north end of the site demonstrate that infiltration is feasible. It is important to consider all of the available reports, and geotechnical information.

Full-scale Drywell Testing

19. Figure 1 – show where the test occurred.
See IPEC revised report dated 8-21-17.

Flood Control Plans

General

20. Please include the following City project numbers on all plan sheets:
    a. SUB-2015-0001 (Subdivision)

Number has been added to all sheets.

    b. EGR-2016-0066 (Engineered Grading Permit)

Number has been added to all sheets.

    c. FDP-2016-0007 (Floodplain Development Permit)

Number has been added to all sheets.

21. All ROW dedications and easements shall be recorded prior to the use of the frontage improvements and flood control elements. Dedications for flood control elements need to be recorded prior to LOMR submittal with their file numbers entered on the plans.

    We have received and reviewed (comments sent December 15, 2016) the following for flood control elements:
    a. an access easement and a drainage easement for the flood control bioswale and infiltration areas,
    b. a temporary drainage easement (initially called a temporary construction easement) for the storm drain pipe along Madison Road, and
    c. a drainage easement along Thorpe Road.

As per our discussions, these easements and dedications will be completed following CLOMR review prior to LOMR submittal.

    Please provide draft legal descriptions and exhibits for the following for flood control elements:
    a. Border Easements along Dishman-Mica that involve a levee,

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

b. Slope easements along levee slopes not covered by a border easement,

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

c. Access easements along levees that are outside the border easement.

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

Please provide draft legal descriptions and exhibits for the following (non-flood control elements):

a. ROW dedication at the NE corner of Thorpe and Dishman-Mica,

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

b. ROW dedication at the NW corner of Thorpe and Madison,

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

c. ROW dedication to the BCR's of Roads A through D on Madison,

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

d. ROW dedication to the BCR's of Road E and the multi-family driveway approach on Dishman-Mica,

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

e. Border Easements along Dishman-Mica that don't involve a levee,

As a levee is no longer part of the flood control design the need for an additional easement is being assessed. As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

f. Border Easements along Thorpe and Madison,

As a levee is no longer part of the flood control design the need for an additional easement is being assessed. As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

g. Access easement for Dishman-Mica sidewalk that meanders into site.

As per our discussions, these easements and dedications will be submitted for review and completed following CLOMR review prior to LOMR submittal.

22. Based on the street classification and project soil types, a pavement design shall be required for Dishman-Mica, Thorpe and Madison per SVSS Chapter 8.

A pavement design has been provided in IPEC report dated June 26, 2017. See flood control narrative for referenced report.

23. Please submit a striping and signage plan for Dishman-Mica Road. Coordinate with the Traffic Impact Analysis for required left turn lanes and two-way left turn lanes. Show how the two-way left turn lane will taper at the Chester Creek crossing where the pavement section narrows.

Signage and striping plans for Dishman-Mica Road, Thorpe Road, and Madison Road have been provided on sheets C10.0, C10.1, & C10.2

24. Please provide a Design Deviation Request for the following:
    a. Two driveway approaches for Dishman-Mica Road (SVSS 7.8.2.b)

25. For proposed utility adjustments and relocations, the applicant/engineer is required to contact each utility purveyor impacted by the required utility relocations and –
    a. Discuss with the purveyor the proposed work including relocations and adjustments as well as the costs for these activities,

So Noted, with the revised plans coordination with the water and sewer purveyors will be completed.

    b. Obtain from the purveyor a written statement that they acknowledge and concur with or have alternatives for the needed work, and

So noted,

    c. Forward a copy of the statement to Spokane Valley Development Engineering. Receipt of statements will be required prior to civil plan approval.

So Noted,

d. Show the location of any relocated utilities.

Relocated utilities are shown on the Water and Sewer plans.

26. Please submit a drainage report for the roadside swales. Include curb inlet and non-flooded roadway width calculations.

A drainage report has been prepared for the roadway frontage.

27. Confirm there is maintenance access to all stormwater and levee facilities (SRSM 11.1.6) and provide approaches where accesses connect to a road.

Maintenance access has been provided for storm and flood control facilities.

28. If flood flows varied from those modeled and they ended up exceeding system design, for instance at the infiltration/gravel gallery area, will there be any time for response between the exceedance occurring and properties being inundated?

As Flood Events occur over a period of days and weeks there is time to manage the flood control facilities if need be. The proposed flood control facility is designed to handle the 100-year flood event, with additional design capacity as a part of the design safety factor. In addition, a surge protection at the open channel and headwall is included that will take the surge into the lowered park area. This additional storage would eventually be channeled back into the flood system via a catch basin and pipe to the west 48" pipe.

For any Flood event beyond the 100-year event the proposed finish floor of the residences and the commercial buildings are graded above the BFE, so any flooding would be maintained in the streets, with minimal incursion into the structures.

See Flood Control Narrative for specific design information.

29. Incorporate into the design the recommendations mentioned in:
    a. The Biological Evaluation in sections 5.3 (e.g. best management practices, construction fences around minimized work areas, restoration of impacts) and 6.5 (signs).

As the Levees are no longer part of the flood control system it is proposed that the implementation of the biological evaluation and management plan be prepared after the completion and survey of the completed fill, otherwise an approved plan would have to be modified once the fill is surveyed.

b. O&M Manual, Drainage Facilities section (signs).

Signs are proposed to be placed upon fences.

Sheet C0.0

30. In the 'Dev. Const. Insp.' contact information section, please revise the phone number to 599-6306 and the contact name to Ken Van Dyk. In the 'Roadways' section, please change the phone number to 720-5008 and remove the contact name. Applies to Sheet C9.0 as well.

Contacts have been revised on sheets C0.0 and C9.0.

31. Make sure all sheet titles match the titles in the Sheet Index.

Sheet titles and/or sheet index have been revised to match.

Sheet C0.1 (General Notes)

32. SV Note #6 – change should to shall.

Note revised to read "shall."

Sheet C0.2 (Dishman-Mica Road Sections)

33. For the Dishman-Mica Road Widening Calculations:
    a. Provide a column that depicts the existing super-elevated cross-slopes and adjust the proposed cross-slopes to match. The minimum proposed cross-slopes shall be 2%,

The widening calculations have been revised and the cross slope has been matched.

    b. Check the Proposed Curb Elevations.

The proposed curb elevations are based upon the varying cross slope and have been checked accordingly.

34. For Sections 1 - 3, please:
    a. Label the street centerline,

The centerline has been labeled.

    b. Revise the cross-slope of the pavement widening to match the existing super-elevated cross-slopes and provide the range of cross-slopes,

The cross slopes have been revised to match the existing cross slope.

c. Verify the pavement section with a pavement design,

See IPEC Geotechnical Evaluation dated June 26, 2017.

d. Specify PG 70-28 for the HMA pavement.

The HMA pavement type has been added.

35. For Section 1, please:
    a. Revise the planter strip width to 7' per SVSS 7.5.10,

The planter strip width has been revised.

b. Extend the border easement to the toe of the slope or provide a separate slope easement,

The border easement has been extended to encompass the toe of slope

c. Reference SVSS Standard Plan R-103 for the 6' sidewalk.

The Standard Plan has been referenced.

36. For Section 2, please:
    a. List the range of pavement widths,

The range of pavement widths does not vary within the cross section. The pavement width does change at the bridge crossing and becomes 19' wide.

b. Remove the 10' border easement.

Border easement has been revised to 15'

37. For Section 3, please:
    a. Verify the need for the roadside swale,

The roadside swale along Dishman Mica Road has been reduced in size, and will capture any project flow and receive plowed snow from the road surface.

b. Extend the border easement to the toe of the levee slope or provide a separate slope easement,

The border easement has been revised.

c. List the range of pavement widths,

The range of pavement widths are shown. See previous response.

d. Adjust the 34' and 64' dimension strings to end at the ROW,

Dimension strings have been adjusted.

e. For the 8' asphalt path: locate the construction line location and specify the pavement section and a cross-slope. If maintenance vehicles will utilize the asphalt path, verify the width and pavement section.

The asphalt path width and cross section have been revised to a 10-foot path with 1-foot shoulders. An alignment has been added and will act as the construction line.

Sheet C0.3 (Thorpe and Madison Road Sections)

38. For Section 4, please:

a. Provide applicable stationing for this section,

Stationing has been added to the section.

b. Reference SVSS Standard Plans R-102 for the curb and gutter and R-103 for the sidewalk,

The standard plans have been referenced.

c. Verify the pavement section with a pavement design.

See IPEC Geotechnical Evaluation dated June 26, 2017.

39. Provide a separate cross section of Thorpe Road that includes the concrete channel.

For clarity and simplification, the cross section of Thorpe Road and the channel/box culvert has been provided on Sheet C5.1. A note has been added to this affect.

40. For Section 5, please:

a. Provide applicable stationing for this section,

Stationing has been added to the section.

b. Provide a pavement and gravel section for the meandering path, note that this path will be used by a vactor truck to clean out drainage facilities,

A pavement section has been provided.

c. Label the range of cross-slopes for the widening per the widening calculations,

The slope has been revised to be 3.00%

d. Adjust the border easement width to account for the meandering path,

The boarder easement has been revised to the width of the proposed tract.

e. Label the varying swale widths to account for the meandering path,

The swale width is uniform, the cross section has been revised to reflect the uniform width with a note listing the range of widths from swale to path.

f. Label the dimension from the ROW to the centerline of the 60" storm pipe,

This dimension has been added to the 2- 48" pipes.

g. Verify the pavement section with a pavement design.

See IPEC Geotechnical Evaluation dated June 26, 2017.

41. For Sections 4 and 5 and the roadside swales, include the following or provide a separate swale section:
    a. 3:1 maximum side slopes,

The slope has been labeled on a typical section.

b. 12" treatment soil zone,

The treatment soil has been called out on a typical section.

c. If the following treatment soils are installed, the City of Spokane Valley does not require soil testing per SRSM: *"For swales and ponds, the top 12 inches of soil shall consist of a thoroughly blended mix of 50% compost with 50% native soils."*

So noted. A note has been added to the typical swale section.

d. Note requiring swale bottoms and side slops shall be lined with sod/hydroseed,

A note for hydro seeding has been added with a seeding note on Sheet C4.1.

e. Typical bottom dimensions and depth,

A typical cross section has been provided with the elements of items a through f.

f. Show a typical drywell or catch basin section with the 6" treatment depth and minimum depth from rim to flowline.

A typical catch basin has been shown with call outs of 0.5' bottom to rim and 0.8' bottom to flowline.

Sheet C1.3 (Site Element Plan)

42. Coordinate the 'Madison Rd Easement Plan' section with Sheet C0.3.

The plan and section have been coordinated.

43. Plan view calls out 2-10" culverts under Thorpe but our records say that they are 18". Please check pipe size.

We have checked and measured the culverts in the field and there are 3-15" CMP culverts. The text has been revised.

Sheets C3.00 – C3.23

44. Reference intersection detail sheet at all applicable intersections.

The intersection detail sheet was referenced with the centerline-centerline callout in the plan view.

45. Make sure all proposed and existing ROW and all easements are labelled.
    a. Where levee is outside the ROW and Border Easements provide access and slope easements.

The ROW and easements have been labeled.

Sheet C3.00 (Dishman-Mica Road P&P)

46. For the sidewalk that extends from Dishman-Mica Road to onsite:
    a. Provide the station and radius of the curve,

A reference is made to see sheet C3.03. Sheet C3.03 has a plan and profile for the sidewalk.

    b. Provide a plan view that shows the entire alignment of the onsite sidewalk.

Plan view has been added on sheet C3.03.

    c. Provide finish grade spot elevations that comply with ADA guidelines and include a cross-slope for drainage.

Profile has been added on sheet C3.03.Cross slope callouts have been added on sheet C3.03.

d. Show and label the access easement for all portions of the sidewalk located onsite.

Access easement has been added on sheet C3.03.

47. Please identify the existing hydrant near STA 22+40 and the power pole and telephone pedestal near STA 22+60. Determine if relocations are required.

The existing fire hydrant has been called out. There is no relocation necessary.

48. For the new guardrail it will need to extend farther to the south than indicated on the plan due to the posted speed limit and slopes. The curb and gutter does not provide an adequate barrier in this situation. Verify the required length of the guardrail and the clear zone requirements with AASHTO Roadside Design Guide.

New guardrail has been called out two feet behind the curb at the location of the existing guardrail.

49. For Construction Note #10, specify the start STA for the guardrail and reference new guardrail only.

Stationing for new guardrail has been added. See construction note 9.

50. For Construction Note #11, specify the start and end stations of the pavement taper. The required taper length shall be calculated per L = ws, where 'w' is the widening width and 's' is the posted speed limit of 45 mph.

The pavement taper south of the Dishman-Mica Rd box culvert and at the north end of the property has been calculated by L=WS and the start and end stations have been called out. The taper just north of the Dishman-Mica Rd box culvert has been widened per the meeting on 6/12/17.

51. The Traffic Impact Analysis mentions street lights along Dishman-Mica. Please show the light locations and specify that the lights will be installed with the plat. Specify necessary conduit sleeves to be installed with the frontage improvements.

Street lights have been called out at public intersections.

52. In the profile, adjust the Top of Curb elevations to match the existing super-elevated cross-slopes and the revised Road Widening Calculations from Sheet C0.2.

The TBC has been revised to match the existing super-elevated cross-slopes.

Sheet C3.01 (Dishman-Mica Road P&P)

53. For Construction Note #2, please reference Sheet C0.2.

Sheet C0.2 has been referenced in construction note 2.

54. For Construction Note #3, please reference a 'spill' curb, similar to Sheet C3.00.

Spill curb is now referenced in construction note 3.

55. For Construction Note #4, reference the appropriate plan sheet and detail for the asphalt path details. The City does not have specific standards for asphalt pathways.

Sheet and detail are now referenced in construction note 4.

56. Since the 8' pathway will be driven on, provide adequate turning radii around the approaches.

With the removal of the levee the path will no longer be driven upon.

57. Verify Construction Note #5 for this sheet.

Note 5 has been revised to reference a different construction item.

58. For the pedestrian ramps at Road 'E', provide sidewalks on each side of the Road 'E' to down to the ramps or provide sidewalks from the top of the levees down to the pedestrian ramps. Short sections of adjacent sidewalk at the ramps will be acceptable.

Sidewalks and ramps are now provided at Sundown Road (road E).

59. Road E – show how stormwater flowing down/along Road E is captured before it gets to Dishman-Mica and is disposed of.

Plan has been revised to direct stormwater off Sundown Rd via under Type 2 curb inlets into roadside swales behind the sidewalk/curb. See sheet C3.03 for details.

60. For Construction Note #10 please verify the Standard Plan R-113 reference, as it is intended for adjacent sidewalks.

Note has been revised to reference Std Plan R-111.

61. For Construction Note #12, please verify the sheet reference.

Note has been revised to reference sheet C4.2.

62. For Construction Note #15, specify the start and end stations of the pavement taper. The required taper length shall be calculated per L = ws, where 'w' is the widening width and 's' is the posted speed limit of 45 mph.

Taper stations have been added. Per meeting at the City, the taper length has been shortened to provide full width widening at the driveway approach.

63. For the approach at STA 35+25, show the curb returns and provide pedestrian ramps. Provide sidewalks down to the ramps.

This is outside the match line and shows on sheet C3.02

64. Provide Type III barricades per SVSS Standard Plans R-142 at each approach and Road 'E' until they are operational.

Construction note 13 added to provide for barricades.

65. Please provide centerline stations for the driveway approaches at STA 28+75 and 35+25.

Centerline stations have been added.

66. In the profile, adjust the Top of Curb elevations to match the existing super-elevated cross-slopes and the revised Road Widening Calculations from Sheet C0.2.

The TBC elevations have been revised to match the super-elevated cross-slopes.

Sheet C3.02 (Dishman-Mica Road P&P)

67. See all applicable review comments from Sheet C3.01 for this sheet.

(53)For Construction Note #2, please reference Sheet C0.2.

Sheet C0.2 has been referenced in construction note 2.

(54)For Construction Note #3, please reference a 'spill' curb, similar to Sheet C3.00.

Spill curb is now referenced in construction note 3.

(55)For Construction Note #4, reference the appropriate plan sheet and detail for the asphalt path details. The City does not have specific standards for asphalt pathways.

Sheet and detail are now referenced in construction note 4.

(56)Since the 8' pathway will be driven on, provide adequate turning radii around the approaches.

With the removal of the levee the path will no longer be driven upon.

(57)Verify Construction Note #5 for this sheet.

Note 5 has been revised to reference a different construction item.

(63)For the approach at STA 35+25, show the curb returns and provide pedestrian ramps. Provide sidewalks down to the ramps.

The plan has been revised.

(65)Please provide centerline stations for the driveway approaches at STA 28+75 and 35+25.

Centerline stations have been added.

(66)In the profile, adjust the Top of Curb elevations to match the existing super-elevated cross-slopes and the revised Road Widening Calculations from Sheet C0.2.

The TBC has been revised to match the super-elevated cross-slopes.

68. Please remove the extraneous hextag #1 near STA 39+75.

The Hex tag has been removed.

69. For levee and 8' path to be installed on church property from STA 35+82 to 39+80:
    a. Please provide evidence of granted permission from the church to build on their property.

With the removal of the Levee from the flood control system the levee on the church property has also been removed

    b. Provide access, slope and construction easements.

A slope and construction easement has been shown. See sheet C4.0.

70. For Construction Note #9, specify the start and end stations of the pavement taper. The required taper length shall be calculated per L = ws, where 'w' is the widening width and 's' is the posted speed limit of 45 mph.

Stations have been added.

71. Any relocated utilities shall be located outside of the clear zone.

Construction note 7 required relocations to be outside the clear zone. Additional utility items have had hextags added.

72. For Construction Note #10 please verify the Standard Plan R-113 reference, as it is intended for adjacent sidewalks.

Note has been revised to reference Std Plan R-111.

73. Provide Type III barricade per SVSS Standard Plans R-142 at the approach until it is operational.

Construction note 11 added to provide for barricades.

Sheet C3.10 (Thorpe Road P&P)

74. In the Left Top of Curb Profile, show all text for the vertical curves.

Profile adjusted to show all text.

75. In the profiles, the minimum 'k' value for sag vertical curves is 50 per SVSS Table 7.1.

As requested in the 6/12/17 meeting the difference in elevation between a VC with K=50 and a VC with a K=40 has been calculated. The difference is 0.59'. Due to the lack of room to lengthen the existing VC the grades had to be changed to calculate the VC with K=50.

76. In the profiles, the minimum 'k' value for crest vertical curves is 30 per SVSS Table 7.1.

The length of room provided in this area of Thorpe allowed for the VC to be lengthened and meet the K value of 30.

77. For Construction Note #2, please reference Detail 4 on Sheet C0.3.

Reference revised to Detail 4 on sheet C0.3.

78. For Construction Note #6, reference the roadside swale section in the detail sheets, in addition to S-130.

Reference has been revised to Detail A on sheet C0.3 and Std Plan S-130.

79. Label existing sidewalk to remain between STA's 15+00 and 17+00.

Label with stations has been added.

80. Construction Note #7 at STA 11+53.78 should reference a driveway approach with a separated sidewalk. See Standard Plans R-110 through R-112.

Construction note 19 added to reference Std Plan R-110.

81. Identify hextag #10 at each end of the existing sidewalk near STA 15+00 and 17+00.

Hextag 10 added with stationing.

82. For the change in direction of the sidewalks near STA's 13+90, 14+75, and 16+75, please limit the maximum angle of change to 30 degrees.

The angle has been revised to 30 degrees.

83. For Construction Note #17, please locate the drywell near the low point. Maintain 5' of horizontal clearance from the nearest curb inlet. Verify that the drywell rim will be 0.25'minimum below the adjacent flowline elevation.

The Catch Basin has been moved to the lowest pond level.

84. Please provide stationing for all curb inlets. Limit maximum spacing of curb inlets to 100', or less depending on curb inlet calculations. Locate the curb inlets to maximize swale treatment.

Curb inlet location table added to sheet C3.11 per note on this sheet. Spacing has been revised per 100 ft maximum and/or to maximize treatment.

85. Roadside swales are considered flat for volume calculations where the swale bottom slope is 1% or less. Address all roadside swales where the street grades exceed 1%.

Check dams have been added where slope exceeds 1%. See sheet C0.3 for check dam detail.

<u>Sheet C3.11 (Thorpe Road P&P)</u>

86. See all applicable review comments from Sheet C3.10 for this sheet.

(77)For Construction Note #2, please reference Detail 4 on Sheet C0.3.

Reference revised to Detail 4 on sheet C0.3.

(78)For Construction Note #6, reference the roadside swale section in the detail sheets, in addition to S-130.

Reference has been revised to Detail A on sheet C0.3 and Std Plan S-130.

87. Please provide a Construction Note for the 6' wide sidewalk at the box culvert.

Construction note 18 added for 6 ft sidewalk

88. Drainage easement to be labeled as permanent.

Easement label has been revised.

89. How will large debris lodged in the middle of the concrete channel get removed (say, at station 9+00)? Will equipment need to get down into the channel? If so, how? Provide access road and easement (include file number) along full length of channel?

With the revised design, large debris that fits through the box culvert would flow strait through the open channel and would be pushed against the angled trash racks of the headwall as flood waters rise the debris would float/rise up the trash rack, thus clearing the inlet of debris. Additionally, a maintenance road and gate are placed above the headwall. With a mini-excavator any piled debris can be removed safely. See sheet C5.1 for more detail. Per previous discussions, easements will be recorded and file numbers added after the CLOMR is received.

90. Please provide a curb inlet at low point STA 19+56.36 and near STA 22+75. Provide stationing for all curb inlets. Limit maximum spacing of curb inlets to 100', or less depending on curb inlet calculations. Locate the curb inlets to maximize swale treatment.

Inlets have been added. Curb inlet location table added to sheet C3.11. Spacing has been revised per 100 ft maximum and/or to maximize treatment.

91. For Construction Note #14 and the existing drywell to be abandoned, please specify that decommissioning drywells shall comply with WAC 173-218-120 and WSDOT Specs 7-05.3(2) Abandon Existing Manholes. The following is required:
    a. Remove any structure within three feet of the land surface,
    b. Backfill up to three feet below the land surface with material that is uncontaminated, chemically and biologically inert, and that drains equal to or more slowly than the native material surrounding the UIC well, and
    c. Fill the remaining three feet directly below the land surface with native soil or other structurally sound material common with current engineering practices.

Construction note revised and decommissioning notes added to sheet C3.11.

92. For Construction Note #16, please provide Thorpe Road stationing and offsets for each catch basin for construction clarity.

Construction note directs to sheet C5.1 for location info.

93. In the Centerline/Sawcut Profile, please provide the missing grade break elevations for STA's 23+35.57 and 23+55.57.

Grade break elevations have been added.

Sheet C3.12 (Chester Creek Culvert Extension)

94. Please revise the sheet title and Section 'A' title to match the Sheet Index on Sheet C0.0.

Titles have been revised to match.

95. Please label Thorpe Road.

Thorpe Road has been labeled.

96. For Section 1,

a. Verify the ROW/easement dimensions. Sheet C0.3 shows a ROW width of 55'.

ROW width revised to show 55 feet.

b. Reference Std. Plan R-102 for the curb and gutter,

Reference added to Std. Plan R-102.

c. Reference Std. Plan R-103 for the sidewalk,

Reference added to Std. Plan R-103.

d. Specify how the curb and gutter will be secured to the precast panels,

Curb and gutter will be doweled to the precast culvert sections.

e. Set the top of sidewalk flush with the top of curb and gutter,

Top of sidewalk revised to be flush with top of curb.

f. The 4" HMA is the minimum thickness, it will need to vary to get the cross-slope.

Note revised for 4" min thickness and thickness varies to achieve cross slope.

g. Specify a tack coat shall be applied to the precast panel decking prior to placing the asphalt paving,

Note added to tack coat prior to paving.

h. Provide a guardrail at the north end of the box culvert extension.

A guardrail has been called out on the north end of the box culvert extension.

97. For Section 2,
    a. Provide construction details for the precast panel and footings,
        i. How will precast panel be secured to the existing culvert?

The panel has been revised to a precast box culvert and the details are provided on sheet C5.21. Shop drawings to be provided at time of construction.

ii. Footings need to be at or below elevation of existing culvert footings.

Note added to install new footing at or below existing footings.

b. Why is the FG@CL lower than the top of the precast panel?

Section revised to show FG above culvert deck.

Sheet C3.20 – C3.23 (Madison Road P&P)

98. In public meetings, street lights were promised along Madison Road. Please show the light locations and specify that the lights will be installed with the plat. Specify necessary conduit sleeves to be installed with the frontage improvements.

Street lights have been added at the future street intersections. See construction note 19.

Sheet C3.20 (Madison Road P&P)

99. See all applicable review comments from Sheet C3.11 for this sheet.

(78)For Construction Note #6, reference the roadside swale section in the detail sheets, in addition to S-130.

Reference has been revised to Detail A on sheet C0.3 and Std Plan S-130.

100. Please provide stationing for all curb inlets. Limit maximum spacing of curb inlets to 100', or less depending on curb inlet calculations. Locate the curb inlets to maximize swale treatment.

Curb inlet location table added to sheet C3.20. Spacing has been revised per 100 ft maximum and/or to maximize treatment.

101. Roadside swales are considered flat for volume calculations where the swale bottom slope is 1% or less. Address all roadside swales where the street grades exceed 1%.

Check dams have been added where slope exceeds 1%. See sheet C0.3 for check dam detail.

102. For Construction Note #9, utilities shall not be located in sidewalks per SVSS 6.2.2 & 6.2.3.

Construction note9 has been revised to have utilities relocated outside of sidewalk. Relocation to be coordinated with utility company.

103. Construction Note #14 – channel access may need to be shown for the full length of the channel.

With the design change, channel access has been relocated to another sheet

104. Construction Note #16 at STA 10+75 should reference a driveway approach with a separated sidewalk. See Standard Plans R-110 through R-112.

With the design change the driveway has been removed.

Sheet C3.21 (Madison Road P&P)

105. See all applicable review comments from Sheet C3.20 for this sheet.

(78)For Construction Note #6, reference the roadside swale section in the detail sheets, in addition to S-130.

Reference has been revised to Detail A on sheet C0.3 and Std Plan S-130.

(100)Please provide stationing for all curb inlets. Limit maximum spacing of curb inlets to 100', or less depending on curb inlet calculations. Locate the curb inlets to maximize swale treatment.

Curb inlet location table added to sheet C3.20 per note on this sheet. Spacing has been revised per 100 ft maximum and/or to maximize treatment.

(101)Roadside swales are considered flat for volume calculations where the swale bottom slope is 1% or less. Address all roadside swales where the street grades exceed 1%.

Not applicable on this section of Madison Rd as grades do not exceed 1%.

(102)For Construction Note #9, utilities shall not be located in sidewalks per SVSS 6.2.2 & 6.2.3.

Construction note9 has been revised to have utilities relocated outside of sidewalk. Relocation to be coordinated with utility company.

Sheet C3.22 (Madison Road P&P)

106. See all applicable review comments from Sheet C3.21 for this sheet.

(78)For Construction Note #6, reference the roadside swale section in the detail sheets, in addition to S-130.

Reference has been revised to Detail A on sheet C0.3 and Std Plan S-130.

(100)Please provide stationing for all curb inlets. Limit maximum spacing of curb inlets to 100', or less depending on curb inlet calculations. Locate the curb inlets to maximize swale treatment.

Curb inlet location table added to sheet C3.20 per note on this sheet. Spacing has been revised per 100 ft maximum and/or to maximize treatment.

(101)Roadside swales are considered flat for volume calculations where the swale bottom slope is 1% or less. Address all roadside swales where the street grades exceed 1%.

Not applicable on this section of Madison Rd.

(102)For Construction Note #9, utilities shall not be located in sidewalks per SVSS 6.2.2 & 6.2.3.

Construction note9 has been revised to have utilities relocated outside of sidewalk. Relocation to be coordinated with utility company.

Sheet C3.23 (Madison Road P&P)

107. See all applicable review comments from Sheet C3.22 for this sheet.

(78)For Construction Note #6, reference the roadside swale section in the detail sheets, in addition to S-130.

Reference has been revised to Detail A on sheet C0.3 and Std Plan S-130.

(100)Please provide stationing for all curb inlets. Limit maximum spacing of curb inlets to 100', or less depending on curb inlet calculations. Locate the curb inlets to maximize swale treatment.

Curb inlet location table added to sheet C3.20 per note on this sheet. Spacing has been revised per 100 ft maximum and/or to maximize treatment.

(101)Roadside swales are considered flat for volume calculations where the swale bottom slope is 1% or less. Address all roadside swales where the street grades exceed 1%.

Not applicable on this section of Madison Rd.

(102)For Construction Note #9, utilities shall not be located in sidewalks per SVSS 6.2.2 & 6.2.3.

Construction note9 has been revised to have utilities relocated outside of sidewalk. Relocation to be coordinated with utility company.

108. In public meetings, it was mentioned that the project sidewalk would extend and connect to the sidewalk by the school to the north. Please investigate.

The sidewalk has been shown and called out to extend to the existing sidewalk to the north approximately 300'. The meandering path ends at the property line. A 5' walk has been called out per construction note 21.

109. For the pedestrian ramp at the southwest corner of Madison Road and Road 'C', please connect the ramp to the 10' asphalt path.

Ramp has been revised to connect to path

<u>Sheet C3.24 (Madison Road Storm Pipe Crossings)</u>

110. For Sections 'A' & 'C', provide a 0.10' min. drop through the catch basin per SRSM 8.5.2.

A 0.1' drop has been added to the catch basins.

111. For Sections 'C' & 'D', the soil cover over the culvert appears to be less than 1'. SRSM 8.4.2 requires culverts with soil cover less than 2' to be ductile iron. Soil cover is measured from top of pipe to bottom of asphalt pavement. Increase the soil cover to 1' and provide pipe data supporting the shallow soil cover for a CMP material.

The pipe has been revised to call out DI.

112. Please specify the type of CMP.

A note specifying the CMP has been added. WSDOT STD. 9-05.1(2).

113. Provide trash racks at the inlets of all the cross-culverts since the outlet of the 60" pipe has a trash rack.

Trash racks have been added. See sheet C3.24 for details.

114. Structures at the 60" RCP should be catch basins not manholes (per the narrative). Please show the sump.

Manholes have been revised to catch basins with sumps. See construction note 3 on sheet C5.3.

115. Please revise the sheet title to match the Sheet Index on Sheet C0.0.

The sheet title has been coordinated with the sheet index.

Sheet C3.30 (Intersection Details)

116. For all details, label existing and proposed ROW's.

Existing and proposed ROWs have been labeled.

117. For the Curve Table, please specify that the data is taken at the back of curb.

A note has been added to this affect.

118. For Detail 1:
    a. Provide a widened border easement per SVMC 20.20.090,

The border easements have been revised

    b. Provide curve data and spot elevations for the south edge of pavement,

A radius length and spot elevations have been added.

    c. Adjust the separated sidewalk location to the back of the ramp,

The sidewalk has been revised to meet the back of the ramp.

    d. Label the gutter slope at the base of the ramp.

The gutter slope has been labeled.

119. For Detail 2:
    a. Rename 'Dishman-Mica Road' to 'Madison Road',

The road name has been revised.

    b. Provide a widened border easement per SVMC 20.20.090,

The border easements have been revised

    c. Revise the BCR top of curb spot elevation on Thorpe Rd to match the profile,

The BCR has been revised to match the road profile.

    d. Verify that the gutter slope at the base of the pedestrian ramp is 2% or less.

The gutter slope has been labeled and a max of 2% slope in front of the pedestrian ramp has been called out.

120. For Details 3-6:
    a. Revise the BCR top of curb spot elevations on Madison Rd to match the profile,

The BCRs have been revised to match the profile.

    b. Verify that the gutter slopes at the base of the pedestrian ramps and the cross-slope along the crosswalk are 2% or less,

The gutter slope has been labeled and a max of 2% slope in front of the pedestrian ramp has been called out.

    c. The longitudinal slope of Madison Rd at each intersection is less than 0.8%. Adjust the Madison Rd BCR top of curb spot elevations to create a 0.80% minimum longitudinal slope without a cross gutter or a 0.50% minimum longitudinal slope with a cross gutter (SVSS 7.5.4) or lower the BCR spot elevations on Roads 'A' – 'D' so the intersections slope to the west.

The elevations have been kept so that water flows around the intersections to the east and will enter the roadside swales for treatment.

121. For Detail 7:
    a. Verify that the gutter slope at the base of the pedestrian ramps and along the cross walk are 2% or less,

The gutter slope has been labeled and a max of 2% slope in front of the pedestrian ramp has been called out.

b. Provide the future design of Road 'E', provide curb inlets on Road 'E' at the east BCR's.

See sheet C3.03 for the plan and profile of Sundown Rd (Road E). Type 2 curb inlets have been called out on the east BCRs.

For Items 122 to 146 the Levee has been removed from the flood control plan including the referenced sheets

Sheet C4.0 – C4.2 (Proposed and Existing Levees)

122. To prevent unauthorized vehicular access, provide gates/bollards/etc. at the ends of the levees and where the levees cross approaches.

123. At points along all project levees call out BFE and max required freeboard (44 CFR 65.10 (b)(1)).

Sheet C4.0 (Proposed Levee P&P)

124. Show construction line along levee alignment. Include data to locate the construction line in space when it leaves the road alignment.

125. Call out easements.

126. Profile:
   a. Label profile.
   b. Profile should be along top of levee.

127. For Construction Note #1, reference the appropriate plan sheet and detail for the asphalt path details. The City does not have specific standards for asphalt pathways.

128. Approach at 28+80 – there is concern that pedestrians crossing the approach on the levee may not be seen by drivers pulling into the approach. Please look into providing pedestrian crossing of the approach near the road.

129. For portions of the levee that cross the driveways and Road 'E', specify a 2% maximum cross-slope for pedestrians and a thicker pavement section for traffic.

Sheet C4.1 (Proposed Levee P&P)

130. See all applicable review comments from Sheet C4.0 for this sheet.

(124) Show construction line along levee alignment. Include data to locate the construction line in space when it leaves the road alignment.

(125) Call out easements.

(126) Profile:

a. Label profile.
b. Profile should be along top of levee.

(127) For Construction Note #1, reference the appropriate plan sheet and detail for the asphalt path details. The City does not have specific standards for asphalt pathways

131. In Section 'A':
   a. show the finish grade being flush with the top of path and cross-slope,
   b. specify the depth of HMA and what standard it should be compacted to,
   c. Should the elevation per plan arrow point to the top of asphalt?

132. Levee Construction Notes:
   a. Note 1 – recompact to what standard?
   b. Notes 2 and 5 – provide titles that match those of the documents being provided.

133. Seeding Note –
   a. % doesn't add up to 100%, please check.
   b. Confirm that this seed mix is approved by FEMA (see Biological Evaluation sections 5.4 & 6.2)

Sheet C4.2 (Existing Levee P&P)

134. See all applicable review comments from Sheet C4.0 for this sheet.
(124) Show construction line along levee alignment. Include data to locate the construction line in space when it leaves the road alignment.
(125) Call out easements.
(126) Profile:

a. Label profile.
b. Profile should be along top of levee.

(127) For Construction Note #1, reference the appropriate plan sheet and detail for the asphalt path details. The City does not have specific standards for asphalt pathways
(128) Approach at 28+80 – there is concern that pedestrians crossing the approach on the levee may not be seen by drivers pulling into the approach. Please look into providing pedestrian crossing of the approach near the road.

135. Include a note requiring all non-compliant vegetation be removed per Biological Evaluation section 6.2.

136. Plan View:
    a. It is anticipated that the whole length of the existing levee will need to be used by vehicles for maintenance. With this:
        i. Confirm that the 5.5' wide asphalt pathway has adequate width,
        ii. Verify the turn radii and pavement section for its entire length,
        iii. At the south end provide a turn-around or continue the path up to the parking lot.

    b. Move the beginning of the levee alignment to be contiguous with the alignment of the new levee. Identify where 0+00 is located.

    c. Please revise section references of C4.5 to C4.4.

    d. Use BFE values per the effective flood insurance study,

    e. Per CFR 65.10(b)(1) there needs to be an additional foot of freeboard at the bridges. Please confirm that this is provided,

    f. Incorporate Geotech recommendations from section 3.4 (Embankment Protection) of the Levee Evaluation and Certification report, revised August 29, 2016.

137. Profile:
    a. Label profile,
    b. Levee elevation from 5+00 to 5+80 seems too low. Please check.

138. Construction Note 7 – in note for required minimum freeboard check the stations.

139. Levee Construction Notes 2 and 5 – provide titles that match those of the documents being provided.

140. In Sections 1 and 2,
    a. Provide station limits,
    b. Locate the construction line location on the levee,
    c. Call out a cross slope,
    d. Specify a crushed gravel base beneath the asphalt path and compaction standard.
    e.

141. If any existing onsite bridges will experience vehicular traffic, please provide a bridge load rating.

Sheet C4.3 (Proposed Levee Cross Sections)

142. General –

a. Identify where 0 is located,
b. Locate pathway on all sections.

143. Section SL-1 – check stations and elevations.

144. Section SL-4 – check elevations.

145. Section SL-9 - please revise road name to Road 'E'.

Sheet C4.4 (Existing Levee Cross Sections)

146. General – Identify where 0 is located,

Sheet C5.0 (Storm System Overview)

147. Include titles for profiles.

Titles have been added to the profiles.

148. For upper profile provide stations for all structures.

Stationing has been added for structures.

149. Construction Notes:
a. Provide all applicable details sheets for all notes.

The brief construction notes have been removed since the sheet is intended as an overview of the flood system. Detailed construction notes are on the storm sheets following C5.0.

b. Note 5 – "manhole" should be "catch basin". Revise standard plan callout and specify depth of sump. Check spelling of "labelled".

The construction notes have been removed but where this item shows up on other sheets, the notes have been revised to indicate WSDOT catch basins with 2 foot sumps.

Sheet C5.1 (Concrete Channel P&P)

150. Plan View:
a. Invert elevation of pipe from SD-CB #1 at the channel wall doesn't match the elevation in C5.2. Please verify the pipe slope from SD-CB#1 to the concrete channel.

IE's have been verified.

b. Include the 100-year stormflow in the system calcs from the pipes originating from SD-CB #1 and SD-CB #2.

The peak for the flow through the catch basins will occur much sooner than the peak for the channel flow, therefore, the catch basin flows have not been included.

c. Show the fence located north of the channel in cross section A.

The fence has been added.

151. Construction Notes:
   a. Note I – include C5.21

Note revised to include C5.21.

b. Note 4 – include S-121

Note revised to include C-121.

152. Profile –
   a. Include slope down to culvert inlet.

See revised slope callout on sheet C5.1

b. Check stationing on axis.

Stationing has been verified.

153. Please provide structural calculations and details for the fence, retaining walls and footings in Section 'A' (loads, dimensions, reinforcing, connections, etc.).

See sheet C6.0 and C6.1 for structural details for retaining walls and footings. See separate package for calculations.

<u>Sheet C5.2 (Box Culvert and Channel Details)</u>

154. Box Culvert Detail:
   a. General - Provide design details for box culvert and wing wall (design loading, dimensions, elevations, thickness, reinforcing, connections, etc.)

See note 2. The contractor will supply shop drawings and design calculations when they pick a supplier of the pre-cast structure.

b. Plan View –
   i. Drainage easement is permanent not temporary,

The note has been revised.

ii. For culvert alignment line provide a bearing and a station equation where this alignment crosses the Thorpe alignment,

See sheet C5.1 for bearing and station equation.

iii. Check stationing of wing walls.

Stationing of wing walls are from the culvert alignment and not Thorpe Rd and have been verified.

c. Section 1 -
   i. Label the ROW,

The ROW has been labeled.

ii. Reference Std. Plan R-102 for the curb and gutter,

Standard plan R-102 has been referenced.

iii. Reference Std. Plan R-103 for the sidewalk,

Standard plan R-103 has been referenced.

iv. Specify how the north curb and the south curb and gutter will be secured to the precast panels,

The curb and gutter will be cast onto the deck with dowels epoxied into the deck. The curb will be cast into the box section per the detail on C5.10.

v. Set the top of sidewalk flush with the top of curb and gutter,

The top of sidewalk has been set flush with the top of curb and gutter.

vi. Specify a tack coat shall be applied to the precast panel decking prior to placing the asphalt paving,

A note specifying a tack coat shall be applied has been added.

vii. Provide guardrails at both ends of the box culvert.

A guardrail at the south end of the box culvert has been provided. On the north end of the culvert there is a 7.5' sidewalk and there will also be a 6' chain-link fence for channel access control. There is no room to place a guardrail with these limitations.

viii. Adjust the 12' dimension to start at the face of the 6" curb.

The dimension has been revised to 14.5 feet to accommodate standard precast box sections..

ix. Verify the precast panel deck thickness with Section 2.

The thickness has been revised so sections 1 and 2 match at 1.5 feet.

x. The 4" HMA is the minimum thickness, it will need to vary to get the cross-slope.

A note has been added specifying a varying thickness.

xi. For slope down into the culvert inlet –
    1. What is the stormwater velocity?

Per the Capacity calculation of the box culvert, at a depth of 2 feet and an area of 56.66 sf the velocity of 216.4 cfs (which is twice the 100-year storm rate) has a projected velocity of 3.82 ft per second. Per Open Channel Hydraulics, Chow section 7-9 The Maximum Permissible Velocity Figure 7-3 of the U.S.S.R. Data shows that a 200 mm or 8" particle or rock surface can withstand a velocity of 13 ft per second +/- before scour occurs.

    2. Is erosion protection needed?

Erosion protection has been added. 1'-2' angular rip-rap 3' deep has been called out. The erosion protection extends up the slope to the right-of-way. Based upon the information of item 1 with the erosion protection there is <u>no</u> scour anticipated.

d. Section 2 – bottom of box is alluvial bed. Calculate scour and set footings below scour.

The bottom of the box is rocked as well as the approach within the ROW. See response above.

155. Channel and Pipe Connection:
    a. General - Provide design details for channel and trash rack (loads, dimensions, reinforcing, connections, etc.)

Structural details have been provided on sheet C6.0 and C6.1. Trash rack details have been provided on sheet C5.6.

b. Plan View –
    i. There are two set of lines where the channel turns, remove lines that do not represent the channel geometry

The line has been removed and the channel has been hatched to more clearly show where the channel bottom is.

ii. Provide channel alignment details and location of pipe inlet.

The alignment location in the channel bottom is centered

iii. Drainage easement is permanent not temporary,

The drainage easement label has been revised.

Sheet C5.3 (Madison Pipe P&P)

156. Construction Notes:
   a. Note 3 - Structures at the 60" RCP should be catch basins not manholes (per the narrative). Call out standard plan for catch basins and specify depth of sump.

Note revised to catch basins with 2 ft sump.

   b. Note 5 – is the concrete outlet a pad or slab (see C5.4)?

Construction note 4 on sheet C5.3 revised to pad.

   c. Note 7 – specify frame and grate type and include S-121 reference.

Construction note 7 has been revised to include Type 1 Frame and Grate and to reference SVSS S-121.

157. Plan view:
   a. Make sure all structures are accessible for cleaning and have a construction note,

Meandering path to be used for access.

   b. In 60" pipe why is there a structure at 22+45?

The pipes and structures have been revised.

158. Profile:
   a. Provide stations for all structures on concrete pipe,

Stationing has been provided for all structures.

   b. Make sure all pipes have length and slope information,

Pipe information has been verified for all pipes.

c. Provide offset at 60" pipe outlet.

A station and offset from Madison Rd has been provided.

159. For the culverts under Madison Road, Spokane County GIS shows that there may be a 24" pipe near station 23+50. Please check.

All Madison Rd culverts have been surveyed and verified with no evidence of a 24" culvert.

160. Include the 100-year stormflow in the system calcs from the pipe originating from SD-CB #6.

The 100-year flood has been added, please see the flood control narrative

Sheet C5.4 (Bioswale P&P)

161. Include a short wall at the downstream end of the bioswale as a last trap for sediment.

The design has been revised to include a 1' deep settling pond at the bottom of the bioswale, with a 20' wide rock weir overflow into a 2' deep infiltration pond with a field of drywells set at 1' above the pond surface. This is the design that prevents sediment from entering the gravel gallery.

162. Plan View:

a. Clean up overlapping info,

Labels have been revised.

b. Provide dimensions/alignment/geometry information for fence, channel and pipes to locate them in space.

Station and offset has been provided to Madison Rd to give reference of location in space.

c. Confirm all structures can be accessed for maintenance.

An access maintenance road has been provided.

d. Provide all dimensions for hammerhead turn around.

Dimensions have been provided.

e. Provide file number for easement.

Space has been provided for inserting file number once easement is recorded after receipt of CLOMR-F comments prior to LOMR submittal per our discussions.

163. Construction Notes:
   a. Make sure all notes have pertinent detail sheets referenced.

Verified.

   b. Note 3 – gate should be wider than road.

Double swing gate width has been revised and is called out to be 16'.

   c. Note 9 – specify frame and grate type and include S-121.

Construction note 9 has been revised to include Type 1 Frame and Grate and to reference SVSS S-121.

   d. Include note for infiltration head wall.

The infiltration headwall has been removed from the design

164. Bioswale Inlet Cross Section:
   a. Provide design details (dimensions, elevations, thickness, reinforcing, connections, etc.).

See sheet C6.0 and C6.1 for structural details.

   b. Provide details for trash rack.

See sheet C5.3 for trash rack details.

   c. In upper drawing check the orientation of the section arrows.

Revised.

   d. Include the concrete level spreader in the hydraulic calcs.

The level spreader has been added to the west consultants' calculations.

165. Typical Bioswale Section A
   a. Call out minimum depth of section.

The minimum7 foot depth of the section has been added.

b. The O&M manual says the side slopes are 3:1, please correct.

Manual has been revised to 2:1 side slopes.

166. Narrative says bioswale will be seeded not sodded, please revise.

Note revised to seed the bio-swale.

167. Profile – show proposed grade.

The proposed grade of 1.00% has been added.

168. Include the 100-year stormflow in the system calcs from the pipe originating from SD-CB #7.

The peak for the flow through the catch basin will occur much sooner than the peak for the mainline flow, therefore, the catch basin flow has not been included.

Sheet C5.5 (Infiltration P&P)

169. Plan View:

a. Provide alignment information for pipes and structures to locate them in space.

Station and offset of Madison Rd has been provided at corners to locate them in space.

b. Confirm all structures –

i. Have rim and inlet elevations and that elevations match those in profile.

Rim and invert elevations have revised and verified.

ii. Can be accessed for maintenance (especially by Vactor per the project narrative).

Distance has been verified.

c. Provide structure numbers to relate structures to those in the profile.

Structure numbers have been provided in plan and profile views.

d. Provide file number for easement.

Space has been provided for inserting file number once easement is recorded after receipt of CLOMR-F comments prior to LOMR submittal per our discussions.

170. Profile:
    a. Provide stations at structures.

Stationing has been provided for structures.

    b. Show proposed grade.

The proposed grade matches existing grade.

171. Construction Notes:
    a. Make sure all notes have pertinent detail sheets and standard plans referenced.

Verified.

    b. Note 7 – specify drywell type.

The drywells are per City of Spokane Valley standards with additional barrels to achieve added depth.

    c. Note 8 – specify fabric class.

The fabric class has been specified.

    d. Note 9 – provide standard plan.

Note 9 has been revised.

    e. Include note for infiltration head wall.

The infiltration headwall has been removed from the design.

Sheet C5.6 (Infiltration Headwall Details)

172. Provide design details for headwall, channel and trash rack (loads, dimensions, elevations, thickness, reinforcing, connections, angles, etc.).

173. Call out spacing between pipes.

174. Provide stations at end of channel and at pipe inverts.

The infiltration Headwall has been removed from the design.

Sheet C5.7 (Infiltration Headwall Details)

175. Drain field cross section – provide complete spec reference.

176. 24" HDPE Cross Detail – specify filter fabric and how it is attached to pipe.

The design has been revised.

Sheet C9.0 (SWPPP Cover)

177. Legend – there isn't a storm drain pond, please revise.

"Pond" revised to "facility" as we don't want washout at the bio-swale.

178. Provide protection at infiltration headwall.

Protection at the infiltration headwall has been added.

CLOMR Application

The CLOMR Application has been revised since the City's rejection of the Levee Design. A CLOMR-F application has been provided.

Narrative

179. Page 9 & page 14 paragraph 1 – mentions that the infiltration facility maximum design flow is 84 cfs. Where was that flow rate obtained?

180. Page 13, end of 2nd paragraph – may want to also reference the Geotech investigation for the latest drywell design which is the document titled "Full-Scale Drywell Testing ...".

181. Please include page numbers for all the narrative's pages.

HEC-RAS model

182. Proposed Madison concrete pipe is initially 4 feet in diameter then goes to 5 feet in diameter but the second pipe in the model is 6 feet in diameter, please revise and update the text in the narrative.

183. At the outlet of the 5-foot pipe include the concrete level spreader (sheet C5.4).

Forms

184. Riverine Structures Form - does the new culvert under Thorpe need to be included in one of the C. BRIDGE/CULVERT sections?

If you have any questions, please don't hesitate to contact our office at 893-2617. We are also available to meet with either CSV and/or SCE staff to discuss these responses further.

Sincerely,
WHIPPLE CONSULTING ENGINEERS, INC.

Ben Doshna For

Todd R. Whipple, P.E.

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