DESIGN MEMO

Thomas Creek Bridge #642 Flood Repair

RC 1769
UPI# 15-0500-1

Snohomish County
Public Works
Engineering Services
DESIGN MEMO

Thomas Creek Bridge #642 Flood Repair
RC1769, UPI# 15-0500-1

APPROVED BY:  
Douglas W. McCormick  
Douglas W. McCormick, P.E.
Snohomish County Engineer  
7/23/2020

RECOMMENDED BY:  
Janice L Fahning  
Digitally signed by Janice L Fahning  
Janice Fahning, P.E.
Director of Engineering Services  
Date: 2020.07.22 11:45:45 -07'00''

PREPARED BY:  
Larry Brewer, P.E.  
Larry Brewer  
Project Manager  
7/21/2020
Fact Sheet: Thomas Creek Bridge #642 Flood Repair

Project Proposal
Snohomish County Public Works proposes to repair the west bridge embankment of Thomas Creek Bridge #642. The bridge embankment was damaged during the declared emergency event in February 2020 by high flows in Thomas Creek. The repair consists of replacing the toe of the west embankment with a rock buttress to strengthen the embankment and resist future scour. Additional work includes site restoration. The project is scheduled for advertisement in July 2020 with construction completed in October 2020.

The bridge carries Cathcart Way over Thomas Creek with an average daily traffic count of 16,000 vehicles. Cathcart Way is a FHWA designated county road and classified as a principal arterial. The project has been approved for FHWA Emergency Relief funds at an 86.5% reimbursement rate.

Project Benefits
- Repair bridge embankment to maintain bridge condition
- Improve resistance to future scour or embankment erosion

Project Cost

<table>
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<tr>
<th>30% Cost Estimate Summary</th>
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</thead>
<tbody>
<tr>
<td>Construction Sub-Total</td>
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<tr>
<td>Right of Way</td>
</tr>
<tr>
<td>Design Eng.</td>
</tr>
<tr>
<td>Construction Eng.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</table>

Required Permits
- Land Disturbing Activity Permit
- Hydraulic Project Approval (Washington Department of Fish and Wildlife)
- National Environmental Policy Act (NEPA) Documented Categorical Exclusion

This project is exempt from SEPA per WAC197-11-880.

Project Contacts
Larry Brewer, P.E., Project Manager
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**1. EXECUTIVE SUMMARY**

On and around February 2020 the south Snohomish County area experienced periods of intense rainfall which contributed to higher than normal storm flows in Thomas Creek, and at Bridge 642 on Cathcart Way. The toe of the west abutment embankment slope is coincident with the westerly bank of the creek. The high flows eroded the embankment and washed away sandy soils. The bridge abutments are supported on spread footings 19 feet above the creek; the footings bear on sandy soil. The recent event removed 20 to 30 cubic yards of soil at the toe of the westerly abutment. The exposed area extends for approximately 40 feet along the creek. The exposed face has moved laterally about 6 feet closer to the abutment and spread footings.

Snohomish County Public Works proposes to repair the westerly abutment of Bridge 642 to maintain the structural integrity of the bridge. Structural integrity will be maintained by constructing a rock buttress underneath the bridge. This buttress will be constructed of heavy loose rip rap material, quarry spalls, and railroad ballast and will extend for a length of approximately 100 feet on the westerly bank. This bank protection will extend below the current stream grade to resist scour and approximately 19 feet upward to the base of the bridge abutment, but the materials will be placed landward of the stream’s ordinary high water mark that existed prior to the damage event. Additional work includes site restoration. The project is scheduled for advertisement in July 2020 with construction completed in October 2020.

The bridge carries Cathcart Way over Thomas Creek with an average daily traffic count of 16,000 vehicles. Cathcart Way is a FHWA designated county road and classified as a principal arterial. A detailed damage inspection report (DDIR) was completed and submitted to WSDOT and FHWA. This bridge is approved to be reimbursed by the FHWA Emergency Relief (FHWA-ER) program. The permanent repairs will be reimbursed at an 86.5% rate.

A temporary easement and a permanent easement are required to construct the buttress and to maintain it.

A Land Disturbing Activity (LDA) permit is required for this repair work. The timing of the permit shall comply with Snohomish County Code 30.63B.380 (Emergency land disturbing activities and required permits). This design memo serves as the LDA application.
2. INTRODUCTION

The 127-foot long bridge over Thomas Creek was constructed by a developer in 2000. It was dedicated to Snohomish County and Public Works has maintained it since. The bridge supports 5 travel lanes and sidewalks and carries 16,000 vehicles each day. The bridge is supported by spread footings that are located above Thomas Creek.

There was a declared weather emergency in February of 2020. This event produced several high flows in Thomas Creek that scoured and eroded a portion of the west embankment supporting Bridge #642. It was recommended that the west abutment be repaired before the next winter.

See Appendix A for Vicinity Map and site locations.

3. EXISTING CONDITIONS

Thomas Creek is a perennial stream that varies in width through the project site between 10 feet to 18 feet.

The toe of the west abutment embankment slope is coincident with the westerly bank of the creek. The high flows eroded the embankment and washed away sandy soils. The bridge abutments are supported on spread footings 19 feet above the creek; the footings bear on sandy soil. The recent event removed 20 to 30 cubic yards of soil at the toe of the westerly abutment. The exposed area extends for approximately 40 feet along the creek. The exposed face has moved laterally about 6 feet closer to the abutment and spread footings.

![Figure 3-1. Looking west under Bridge 642 (3/2020)](image-url)
4. PROPOSED IMPROVEMENTS

The proposed repair of the west embankment includes replacing a portion of the embankment with a rock buttress. The rock buttress will resist scour from Thomas Creek and strengthen the embankment. The proposed rock buttress will be placed outside of the creek, or behind the ordinary high water. Between 400 cubic yards to 600 cubic yards of rock will be required for the buttress. The plan view area of the buttress is approximately 2500 square feet. About 2100 square feet of the buttress area is under the existing bridge deck, and 400 square feet is not covered.

Up to 100 cubic yards of excavated soil may be placed on the east embankment under the cover of the bridge deck.

Access under the bridge will be from a temporary access path to be constructed at the southwest quadrant of the bridge. This path will be 10 feet wide and approximately 150 feet long. The path will be surfaced with quarry spalls, hog fuel (wood chips) or similar material. This temporary feature will be removed and restored when the repair work is complete.

Other required work includes site restoration. After the buttress is constructed 5 to 10 pieces of wood will be installed along the creek to satisfy HPA permit conditions. Disturbed areas will also be planted with shrubs, live stakes, and seeding.
5. **TRAFFIC**

Cathcart Way is a principal arterial that supports 16,000 vehicles per day. This repair project will not permanently alter traffic conditions.

A temporary traffic control plan will be developed for this repair project. During construction this project proposes to close one east bound lane adjacent to the sidewalk for up to 6 weeks to facilitate access to the work area.

6. **ENVIRONMENTAL AND REQUIRED PERMITS**

Environmental Services has documented that this emergency repair is exempt from SEPA and Critical Area Regulation requirements. See Appendix B for SEPA and CAR exemption form.

A National Environmental Policy Act (NEPA) Documented Categorical Exclusion (Doc-CE) was prepared for this project, including a no effect determination for ESA listed species. This is required to satisfy FHWA funding requirements.

A Land Disturbing Activity (LDA) permit is required for this project. The timing of the permit shall comply with Snohomish County Code 30.63B.380 (Emergency land disturbing activities and required permits). This design memo serves as the LDA application.

Washington Department of Fish and Wildlife requires a Hydraulic Project Approval (HPA) for this repair work. Work within Thomas Creek (between the ordinary high water) will likely be limited to July 1 to September 30 unless otherwise approved by WDFW. The HPA application was submitted June 25, 2020.

An Army Corps of Engineers permit is not required since the proposed buttress will be placed landward of the creek’s OHWM, which meets the criteria for a maintenance exemption.

7. **SOILS**

County staff prepared geotech memos for this project addressing existing soils and the recommended repair. (J.Jones November 2019 and June 2020).

County staff will also review and prepare a memo to address critical area regulations in SCC 30.62B (GEOLOGICALLY HAZARDOUS AREAS) and 30.62C (CRITICAL AQUIFER RECHARGE AREAS).
8. PUBLIC INVOLVEMENT

Public notice for the LDA application is required. Environmental Services will coordinate the public notice.

Information associated with the notice will be available on a project website:

https://www.snohomishcountywa.gov/5651/Storm-Damage-Repair

9. DRAINAGE

The proposed repair will not alter the existing storm system that collects, treats, detains, and releases runoff from Cathcart Way. No new flows will be added to the existing Cathcart Way storm sewer.

Most of the buttress (about 2100 square feet) will be constructed under the existing bridge deck and be shielded from direct rainfall. A northerly portion of the buttress (about 400 square feet) will not be covered by the bridge.

There will be no new impervious surfaces. There will be no new pollution generating surfaces. The proposed work is not new development.

This project is exempt from all Minimum Requirements except for Minimum Requirement 2; a Stormwater Pollution Prevention Plan (SWPPP). County staff will prepare a SWPPP for the construction documents. The contractor’s Certified Erosion and Sedimentation Control Lead (CESCL) will implement the SWPPP in the project site.
10. RIGHT OF WAY

The existing right of way for Cathcart Way is 100 feet wide centered on the road.

Temporary easements and a permanent easement are required for this repair.

The temporary easements (one upstream of the bridge and one downstream) will provide access for the contractor to get under the bridge, install erosion control measures, construct the proposed rock buttress, and restore the site.

The permanent easement is required for a portion of the proposed buttress that extends northerly beyond the existing right of way.

See Appendix C for Preliminary Plan with parcel needing acquisition highlighted.

11. UTILITIES

There are numerous utilities supported by the bridge. It is not anticipated that the proposed buttress construction will disturb the utilities.

12. FUNDING AND CONSTRUCTION COSTS

A preliminary funding was estimate prepared for the DDIR provided to WSDOT and FHWA. The DDIR is included in Appendix E.

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APPENDIX A: Vicinity Map
Snohomish County disclaims any warranty of merchantability or warranty of fitness of this map for any particular purpose, either express or implied. Any user of this map assumes all responsibility for use thereof, and further agrees to hold Snohomish County harmless from and against any damage, loss, or liability arising from any use of this map.
APPENDIX B: SEPA and CAR Exemption Form
MEMORANDUM

Date: May 14, 2020
To: Nolan Anderson, P.E., Engineering Services Flood Response Engineer
From: Stephanie Cotton, Senior Planner
Subject: SEPA Review

<table>
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<tr>
<td>6725 Rivershore Road</td>
<td>RC1765</td>
<td>Engineering Services</td>
<td>200 feet of embankment repair</td>
</tr>
<tr>
<td>Fontal Rd, East of 21605</td>
<td>RC1766</td>
<td>Engineering Services</td>
<td>Guardrail and shoulder repair</td>
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<tr>
<td>Mtn Loop Hwy MP 46.5 at Goodnman Creek Culvert</td>
<td>RC1767</td>
<td>SWM</td>
<td>Culvert, embankment and subgrade repair</td>
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<tr>
<td>Pioneer Highway MP 1.34 - 2.11</td>
<td>RC1768</td>
<td>Program Planning</td>
<td>Subgrade repair</td>
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<td>Engineering Services</td>
<td>Repair embankment erosion under bridge at west abutment</td>
</tr>
<tr>
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<td>RC1770</td>
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<td>RC1771</td>
<td>Engineering Services</td>
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</tr>
<tr>
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<td>RC1772</td>
<td>Engineering Services</td>
<td>Pavement and embankment repair</td>
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<tr>
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<td>RM1022</td>
<td>Geotech</td>
<td>Slide, ditch, road, and guardrail repair</td>
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<tr>
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<td>RM1024</td>
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<td>26800 Stanwood Bryant Road</td>
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<td>Geotech</td>
<td>Shoulder repair</td>
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This memo documents Public Works’ SEPA review and analysis conducted on the above proposed projects. Based on a review of the proposed emergency repairs, archaeological screening results, environmental/regulatory/interested party information, and site visits conducted in January and February 2020 by multiple ENVS staff including myself, Mary Auld and Troy Fields, ENVS has determined that the proposals are categorically exempt from SEPA under WAC 197-11-880.

If ENVS is informed by the project proponent subsequent to this Memorandum that the design or scope of the project or non-project action has changed, ENVS shall review the nature of such changes and document whether or not new or additional SEPA documentation is appropriate for compliance with all applicable SEPA regulations.

Stephanie Cotton, Senior Planner

Attachments: Emergency Proclamation
Project Location Map
**MEMORANDUM**

Date: May 14, 2020  
To: Nolan Anderson, P.E., Engineering Services Flood Engineer  
From: Stephanie Cotton, Senior Planner  
Subject: CAR Review

<table>
<thead>
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</table>
This memo documents Public Works’ CAR review and analysis conducted on the above proposed projects. Based on a review of the proposed emergency repairs, archaeological screening results, environmental/regulatory/interested party information, and site visits conducted in January and February 2020 by multiple ENVS staff including myself, Mary Auld and Troy Fields, ENVS has determined that the proposals are minor development activity exceptions under SCC 30.62A.510 (3)(a).

If ENVS is informed by the project proponent subsequent to this Memorandum that the design or scope of the project has changed, ENVS shall review the nature of such changes and document whether or not new or additional documentation is appropriate for compliance with all applicable regulations under SCC 30.62A.

Stephanie Cotton, Senior Planner
APPENDIX C: Preliminary Plans & Existing Bridge Plan
THOMAS CREEK BRIDGE #642
FLOOD REPAIR
UPI# 15-0500-1   RC1769
FED AID PROJECT ER-WA-20-03

Snohomish County Officials
DIRECTOR OF PUBLIC WORKS
KELLY SNYDER, MPA

COUNTY ENGINEER
DOUGLAS W. MCCORMICK, P.E.

EXECUTIVE
DAVE SOMERS

COUNCIL MEMBERS
NATE NEHRING – DIST. 1
MEGAN DUNN – DIST. 2
STEPHANIE WRIGHT – DIST. 3
JARED MEAD – DIST. 4
SAM LOW – DIST. 5

Sheet Index

<table>
<thead>
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<td>Cover Sheet</td>
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<td>Typical Sections</td>
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<td>Buttress Plan</td>
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<td>Restoration Plan</td>
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<td>Details 1</td>
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<td>Details 2</td>
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<tr>
<td>Traffic Control Plan</td>
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VICINITY MAP
N.T.S.
SECTION A
10'-06" - 10'-17"

SECTION B
10'-17" - 10'-50"

SECTION C
10'-30" - 11'-10"

MATERIALS:
1. 3" MAY ROCK
2. 1" MAY ROCK
3. STREAM BED MIX SPECIAL PROVISION 8-62 (1.0" TONG LAYS"
4. PERMEABLE BALLAST (0.5" TONG LAY"

NOTES:
1. NO CONCRETE PILE WILL BE USED.
2. BALLAST SHALL MEET THE REQUIREMENTS OR STANDARD SPECIFICATION 94-030-07 PERMEABLE BALLAST.
3. 3" MAY AND 1" MAY ROCK SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATION 8-107 ROCK FOR ROCK WALLS.
4. SEE SPECIAL PROVISION 8-62 FOR EXCAVATION REQUIREMENTS.
5. ROCK PLACEMENT SHALL CONFORM TO THE REQUIREMENTS OF STANDARD SPECIFICATIONS 8-107 ANCHOR ROCK 4" TO 8" SHALL BE PLACED BETWEEN THREE MAY ROCKS TO ALL HOURS GREATER THAN 8 RINGS.

DESIGN MEMO EXHIBIT - NOT FOR CONSTRUCTION
SECTION 35, T. 28 N, R. 5 E., W.M.

132 ND ST SE
ROAD LOG #93680

RESTORATION NOTES:
1. REMOVE WOOD OBSTRUCTIONS
2. REMOVE SURROUNDING TYPE 1 AND TERMINAL SECTION.
3. REMOVE TEMPORARY EMBANKMENT CARE AND RESTORE DISTURBED AREAS TO SPRING PROFILES.
4. REMOVE TEMPORARY STREAM CHANNEL AND RESTORE CHANNEL SIZE PER SPECIAL PROVISIONS.
5. REMOVE DISTURBED STREAM CHANNEL AND RESTORE DISTURBED AREAS TO SPRING PROFILES.
6. REMOVE WASHOUT LOSS AND WASHOUT LOSS WITH RETURNING SEE SPECIAL PROVISIONS.
7. REMOVE APPROPRIATE FOOTPRINT OF SOIL AREA SEE SPECIAL PROVISIONS.
8. REMOVE AND RESTORE CHANGED EMBANKMENT AREAS AS NEEDED SEE SPECIAL PROVISIONS.

LEGEND:
- AREA "A" (CUT TO SO. MT. 0.00 ACRES)
- AREA "B" (CUT TO SO. MT. 0.00 ACRES)
- WASHING LOG (SEE DETAIL SHEET 9 AND SPECIAL PROVISIONS)
- WASHING LOG WITH PROHIBIT (SEE DETAIL SHEET 9 AND SPECIAL PROVISIONS)
- EARTH ANCHOR (SEE TOP LOG ANCHOR DETAIL SHEET 9 AND SPECIAL PROVISIONS)

CONSTRUCTION NOTES:
1. SEE DETAIL SHEET NO. 10 FOR PLANTING DETAILS, CONTAINER AND LIVESTOCK.
2. CONSTRUCT BAGS ON WOOD CHIP WASH RINGS FOR ALL 1 AND 2 GALLON CONTAINER PLANTS.

PLANTING TABLE

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<th>COMMON NAME</th>
<th>SPECIFIC NAME</th>
<th>CONTAINER</th>
<th>SIZING</th>
<th>PLANTING QUANTITY</th>
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<td>SALISBURY</td>
<td>1 GALLON</td>
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<td>20</td>
<td>BETWEEN 5' ABOVE CHAIN TO TOP OF BANK</td>
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<tr>
<td>FASCICULATA</td>
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<td>6&quot; O.C.</td>
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<td>TOTAL PLANTED</td>
<td>60</td>
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| TOTAL LIVE STRIPES | 500 |

SCALE IN US SURVEY FEET

DESIGN MEMO EXHIBIT - NOT FOR CONSTRUCTION

PRELIMINARY PLANS
06/25/2020

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

THOMAS CREEK BRIDGE #642
FLOOD REPAIR
RESTORATION PLAN

SEASON NO. SHEET NO. REV.

FUNDING NO. PROJECT No.
000001

REVISION AND APPROVED FOR CONSTRUCTION

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS

DRAFT

SNOHOMISH COUNTY ENGINEER
APPENDIX D: Preliminary Estimate
### Snohomish County
#### Thomas Ck Br. 642 - Flood Repair
**Preliminary Opinion of Cost**
**Last Update: 05/28/2020**

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**Subtotal Construction Cost**

$260,400.00

**Subtotal**

$260,400.00

**Construction Contingency (15%)**

$39,060.00

**Total Construction Cost**

$299,460.00

---

**NOTES**

1 Construction costs are based on 2020 unit prices and do not include price escalation.
APPENDIX E: Detailed Damage Inspection Report (DDIR)
The bridge abutments are supported on spread footings 19 feet above the Creek; the footings bear on sandy soil. The recent event removed 20 to 30 cubic yards of soil at the toe of the westerly abutment. The exposed area is approximately 40 feet long along the creek. The exposed face has moved about 6 feet closer to the abutment and spread footings.

A breakdown of the cost estimate can be provided as a separate document attached to the DDIR. If the cost estimate (including preliminary and construction engineering) increases by 10% a revised DDIR must be approved by FHWA.

<table>
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<th>Temporary/Emergency Repair (work that is necessary to restore essential traffic, minimize the extent of damage, or protect the remaining facilities.)</th>
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<td>□ Revised Estimate</td>
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<th>Permanent Restoration (This work is eligible for Federal participation at the normal pro-rata share and is administered using normal Federal-aid procedures. Install a rock buttress at the base of the westerly abutment slope to support the bridge foundation, resist future scour and slope erosion. The decision is based on the geotechnical report attached hereto.</th>
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<td>Revised Total Estimated Cost</td>
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<td>Recommendation for Eligibility</td>
<td>Local Agency Representative</td>
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<td>--------------------------------</td>
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<td>Douglas W. McCormick</td>
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APPENDIX F: Drainage/LDA Flowchart for Engineering Services Projects
DRAINAGE/LDA FLOWCHART FOR ENGINEERING SERVICES PROJECTS – PAGE 1 of 4

Determine Minimum Requirement (MR) Triggers at Project Level:

1. Is project exempt from all Minimum Requirements?  
   - Yes: Continue to page 3 of 4 for MR 5 Requirement
   - No: Is project in a critical area?

2. Is project in a critical area?  
   - Yes: Abbreviated LDA required
   - No: No requirements of SCC 30.63A apply

3. Are more than 500 cubic yards of material graded onsite?  
   - Yes: Full SWPPP Required
   - No: Small Project SWPPP Required

4. Does the project result in or add 2,000 square feet or more of new, replaced or new plus replaced hard surface, OR include 7,000 square feet or more of land disturbing activity?  
   - Yes: MRs 1-5 apply to project new and replaced hard surfaces and all disturbed land
   - No: MRs 1-5 apply to replaced hard surfaces and other disturbed land

5. Does the project result in or add 5,000 square feet or more of new hard surfaces, OR convert ¾ acres or more of native vegetation to lawn or landscaped areas, OR convert 2.5 acres or more of native vegetation to pasture?  
   - Yes: TARGETED Drainage Report and Full SWPPP required
   - No: LDA Compliance Process Required

6. MRs 1-9 apply to new hard surfaces and converted vegetated areas
   - FULL Drainage Report and Full SWPPP required

7. Continue to page 2 of 4 for MR 5 Requirement
Determine MR 5 Requirements for Projects that ONLY Trigger MRs 1-5:

All lawn and landscaped areas shall implement BMP T5.13, Post-Construction Soil Quality and Depth.

Does the project drain to Flow Control Exempt Waters?

- No
  - Will you choose that the project meets the LID Performance Standard?
    - No
      - NO ADDITIONAL REQUIREMENTS
    - Yes
      - Project includes flow control for 8%-50% of the two-year peak flow.
  - Yes
    - Apply BMP T5.30 to all hard surfaces.

Is BMP T5.30, Full Dispersion, feasible on this site?

- No
  - Are either of these BMPs feasible on this site?
    - Yes
      - Apply either BMP T5.15, Permeable Pavement, BMP T5.14, Rain Gardens, BMP T7.30, Bioretention Cells, Swales, & Planter Boxes.
    - No
      - Documentation must be filed to demonstrate that none of the BMPs evaluated are feasible.
  - Yes
    - Apply either BMP T5.11 or T5.12 to all hard surfaces.

Are either of these BMPs feasible on this site?

- No
  - Are either of these BMPs feasible on this site?
    - Yes
      - Apply either BMP T5.11 or T5.12 to all hard surfaces.
    - No
      - Documentation must be filed to demonstrate that none of the BMPs evaluated are feasible.
  - Yes
    - Apply either BMP T5.15, T5.14, or T7.30 to all hard surfaces.

NO ADDITIONAL REQUIREMENTS
Determine MR 5 Requirements for Projects that Trigger MRs 1-9:

All lawn and landscaped areas shall implement BMP T5.13, Post-Construction Soil Quality and Depth\(^{12}\)

Does the project drain to Flow Control Exempt Waters\(^{13}\)?

- **No**
  - **Yes**
    - The project must meet the LID Performance Standard.\(^{14}\) If this is not possible, a modification or waiver must be obtained.\(^{22}\)

- **Yes**
  - Is the project site outside the UGA and larger than 5 acres?
    - **No**
      - Project includes flow control for 8%-50% of the two-year peak flow\(^{14}\)
    - **Yes**
      - Will you choose that the project meets the LID Performance Standard\(^{14}\)?
        - **Yes**
          - Apply BMP T5.30 to all hard surfaces.\(^{15}\)
        - **No**
          - Is BMP T5.15, Permeable Pavement, feasible on this site\(^{16}\)?
            - **Yes**
              - Apply BMP T5.15 to all hard surfaces.\(^{16}\)
            - **No**
              - Is BMP T7.30, Bioretention Cells, Swales, and Planter Boxes, feasible on this site\(^{18}\)?
                - **Yes**
                  - Apply T7.30 to all hard surfaces.\(^{18}\)
                - **No**
                  - Documentation must be filed\(^{21}\) to demonstrate that none of the BMPs evaluated are feasible.

Are either of these BMPs feasible on this site?
- BMP T5.11, Concentrated Flow Dispersion\(^{19}\)
- BMP T5.12, Sheet Flow Dispersion\(^{20}\)

**Yes**

**No**

Continue to page 4 of 4 for TDA-level analysis
DRAINAGE/LDA FLOWCHART FOR ENGINEERING SERVICES PROJECTS – PAGE 4 of 4

Determine Threshold Discharge Area (TDA) Level MR Triggers for EACH Separate TDA:

Note: MR 1-5 and 8-9 still apply to all TDAs. The flow chart below determines whether MR6 and/or 7 apply to the TDA and additional requirements apply to the project.

Does the project (in this TDA) result in or add 5,000 square feet or more of new effective\(^{23}\) pollution-generating hard surface, OR convert \(\frac{3}{4}\) acres or more of native vegetation to pollution-generating pervious surface, not including permeable pavement?

**Yes**

**MR 6 applies to new effective\(^{23}\) pollution generating impervious surface and converted vegetated areas\(^{24}\)**

**No**

**MR 6 does not apply to this TDA**

Does the project (in this TDA) result in or add 10,000 square feet or more of new effective\(^{23}\) impervious surface\(^{25}\), OR convert \(\frac{3}{4}\) acres or more of native vegetation to lawn or landscaped area OR convert 2.5 acres or more of native vegetation to pasture OR does the project result in an increase of 0.1 ft\(^3\)/s from existing to proposed conditions for the 100-year event\(^{26}\)?

**Yes**

**MR 7 applies to new impervious surface\(^{25}\) and converted vegetated areas unless discharging to an exempt water body\(^{13}\)**

**No**

**MR 7 does not apply to this TDA\(^{27}\)**

**Does MR 6 AND/OR MR 7 apply?**

**Yes**

**Additional Requirements at Project Level**

Which of the following describes the project: Road-related, re-development (The existing site have 35% or more existing impervious surface AND does the project otherwise meet the definition of redevelopment\(^{28}\)), or new-development (does not meet criteria for re-development)

- Road-related
- Re-development
- New-development

**Stop here.**

Does the project result in or add 5,000 square feet or more new hard surface AND total 50% or more of the existing hard surfaces within the project limits? **Note: Project limits are defined by the length of the project and the width of the right-of-way.**

**Yes**

**ADDITIONAL REQUIREMENT:** MRs 6 and/or 7 apply to new and replaced hard surfaces and converted vegetated areas within the TDA being analyzed.

**No**

**No additional requirements.**

(Rev. 5-20)
1. Projects that are likely to be exempt from all Minimum Requirements that Engineering Services would be likely to be involved with are shown below. The project must be outside of all critical areas, buffers, or setbacks, but could still be within floodplains or aquifer recharge areas. See SCC 30.63A.200 for further detail.
   - Repair or installation of underground or overhead facilities, or utility facility maintenance, performed by a utility.
   - Road maintenance activities: pothole and square cut patching, overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the coverage area, shoulder grading, reshaping and/or re-grading drainage systems, crack sealing, resurfacing with in-kind material without expanding the road prism and vegetation maintenance. Exceptions for road maintenance activities (see memorandum for detail).
   - Upgrading by resurfacing surfaces from gravel to bituminous surface treatment (BST or “chip seal”) without expanding the area of coverage.

2. Critical areas are defined in SCC 30.91C.340 and include: wetlands; areas with a critical recharging effect on aquifers used for potable water (sole source aquifers, group A well head protection areas, and critical aquifer recharge areas); fish and wildlife habitat conservation areas (streams, lakes, marine waters, and primary association areas for critical species); frequently flooded areas; and geologically hazardous areas (erosion hazard areas, landslide hazard areas, seismic hazard areas, mine hazard areas, volcanic hazard areas, and tsunami hazard areas).

3. If exemptions apply, a Targeted Drainage Report or Drainage Memo will still be required to document and justify the exemptions. This document must be kept in the project files. In addition, if the project is exempt, but in a critical area, an Abbreviated LDA is also required (see case 2 of LDA Documentation and Public Notice Requirements), which will require public notice (through ENVS).

4. Projects that are likely to be exempt from all Minimum Requirements except Minimum Requirement 2 that Engineering Services would be likely to be involved with are shown below. The project must be outside of all critical areas, buffers, or setbacks, but could still be within floodplains or aquifer recharge areas. See SCC 30.63A.200.
   - Utility facility maintenance and repairs performed by a utility that replace ground surfaces with in-kind materials, or do not add impervious surfaces
   - Development activities that result in less than 2,000 square feet of new, replaced or new plus replaced impervious surfaces, less than 7,000 sf of land disturbing activity, or less than 500 cy or material. See SCC 30.63A.810.

5. See SCC 30.63A.810(2)(h) for grading requirements triggering 500 cy threshold.

6. See SCC 30.63A.310. Also see SCC 30.63A.700 for definitions of pavement replacement.

7. Requires LDA Vesting Form, and either Full or Abbreviated SWPPP, per the Drainage Manual, Vol I, Appendix I-F [SCC 30.63A.445(2)&(3)]. Public notice is also required (through ENVS).

8. Project is vested by Design Report/Memo or LDA Vesting Form.
   - MR 1: Preparation of Stormwater Site Plan [Drainage Manual Vol I Ch 2.5.1]
   - MR 2: SWPPP [Drainage Manual Vol I Ch 2.5.2]
   - MR 3: Source Control of Pollution (probably not applicable to Engineering Services) [Drainage Manual Vol I Ch 2.5.3]
   - MR 5: On-site Stormwater Management [Drainage Manual Vol I Ch 2.5.5]

9. See SCC 30.63A.710 and 720 for drainage facility setback and access requirements, and SCC 30.63A.730-750 for conveyance requirements. (Conveyance sizing: for MRs 1-5 only, use 25-year event; for MRs 1-9, use 100-year event)

10. New impervious surfaces include pavement, shoulders, curbs, and sidewalks. Vested by Design Report or LDA Vesting Form.
    - MR 6: Runoff treatment (water quality treatment) – need to determine applicability per TDA [Drainage Manual Vol I Ch 2.5.6]
    - MR 7: Flow control – need to determine applicability per TDA [Drainage Manual Vol I Ch 2.5.7]
    - MR 8: Wetlands Protection [Drainage Manual Vol I Ch 2.5.8]
    - MR 9: Operation and Maintenance [Drainage Manual Vol I Ch 2.5.9]
11. Public notice and LDA certification of compliance are required (see case 4 and 5 of LDA Documentation and Public Notice Requirements).

12. See Drainage Manual 5.3 for BMP T5.13, Post-Construction Soil Quality and Depth.
   
   Notes: 1) This BMP is infeasible on till soils with slopes >33%. 2) Retain native duff and topsoil to maximum extent practicable. 3) If topsoil does not meet rigorous testing requirements, soil amendments are required. Amendments include a) scarifying soil to 1” depth, b) 3” compost tilled in 8” on planting beds and cover with 2-4” of mulch, and c) 2” compost tilled in 8” in turf areas.

13. A list of exempt water bodies can be found in the Drainage Manual in Volume I, Appendix E.

14. The LID Performance Standard requires that Stormwater discharges match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 8% of the 2-year peak flow to 50% of the 2-year peak flow. See Drainage Manual Vol I Ch 2.5.5 for further information.

15. See details and applicability of BMP T5.30, Full Dispersion (Drainage Manual Vol V Ch 5 & Vol I Ch 2).

16. See details and infeasibility criteria of BMP T5.15, Permeable Pavement (Drainage Manual Vol V Ch 5 & Vol I Ch 2).

17. See details and infeasibility criteria of BMP T5.14, Rain Gardens (Drainage Manual Vol V Ch 5 & Vol I Ch 2). For Public Work projects, BMP T7.30, Bioretention Cells, Swales, & Planter Boxes should be considered in lieu of Rain Gardens.


19. See details and infeasibility criteria of BMP T5.11, Concentrated Flow Dispersion (Drainage Manual Vol V Ch 5 & Vol I Ch 2).

20. See details and infeasibility criteria of BMP T5.12, Sheet Flow Dispersion (Drainage Manual Vol V Ch 5 & Vol I Ch 2).

21. If it can be demonstrated that none of the BMPs evaluated are feasible, the documentation of this evaluation satisfies the MR5 requirement. This document must be kept in the project files.

22. See SCC 30.63A.830(5)(c) and 30.63A.840(4)(c) for information on obtaining Modifications/Waivers.

23. Effective surfaces are defined as impervious areas from which runoff is not fully dispersed or infiltrated. See Drainage Manual Glossary and Notations at the end of Vol I for full definition.

24. Runoff treatment is required for all areas draining to the treatment facility. Within each TDA, the area draining to the facility needs only to be an area equivalent to the new pollution-generating surfaces—and can be located anywhere within the TDA. This area is determined by topography and placement of drainage structures. See SCC 30.63A.310(4) and Drainage Manual Vol I Ch 2.4.

25. Flow control is not required for some “hard” surfaces – only for “impervious surfaces”.

26. Calculations must be provided to demonstrate this ‘exemption’. Ineffective areas (areas that are infiltrated or dispersed through 100 linear feet of native vegetation) may be discounted from this flow calculation. However, note that infiltration also requires calculation, and must meet site suitability criteria.

27. Flow control compliant with the LID Performance Standard requirement of MR 5 is not equivalent to flow control per MR 7. MR 5 is applicable for flows between 8%- 50% of the 2-year peak flow, MR 7 pertains to flows between 50% of the 2-year peak flow and the 50-year peak flow. See Drainage Manual Vol I Ch 2.5.5 for MR 5 and Ch 2.5.7 for MR 7.

28. Per the definition located in the Glossary and Notations at the back of the Drainage Manual Vol I, “Redevelopment” means the following activities that take place on a site that already has 35 percent or more existing hard surface coverage: The creation of new hard surface(s); structural development including construction, installation, expansion or replacement of a building footprint or other structure; replacement of existing hard surface that is not maintenance; and land disturbing activity.