

# 2017-2019 Management Plan Development Division

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## **Hydraulics Section**

Hydraulics, Fish Passage,  
Hydrology and Stormwater  
Managers



**Washington State  
Department of Transportation**

## **Introduction**

The purpose of this Management Plan is to provide an overview of the expectations and communication methods used by the Hydraulics Section in execution of their roles and responsibilities in support of statewide project delivery.

## **Mission Statement**

The WSDOT headquarter hydraulics section provides technical support, training and policy in the fields of hydraulics, fish passage, hydrology and stormwater to ensure our roadways provide a safe, effective and efficient movement of people and goods while maintaining the natural movement and treatment of water throughout our watersheds and water bodies. In addition, the headquarter hydraulics section coordinates and provides technical guidance and policy for research in the fields of hydraulics, fish passage, hydrology and stormwater.

As technical experts, it is our responsibility to the public to assess how our infrastructure will affect the quantity and quality of our watersheds and water bodies now and into the future.

The Hydraulics Section offers technical assistance to project engineers, WSDOT consultants, other WSDOT Specialty Groups, Emergency Operations Center and Local Programs offices.

## **Primary Responsibilities and Technical Assistance:**

### **Hydraulics:**

The Hydraulics Design group has primary responsibility for the following:

- Hydraulic analysis of bridges, including hydraulic conveyance, floodplain impacts (zero rise), deck drainage and foundation scour using various 1D and 2D hydrologic models
- Conduct PS&E reviews
- Coordinate the inventory of all hydraulic features statewide: drainage culverts, fish passage structures, stormwater and CED features.
- Provide the overall rating of hydraulics features
- Serve as a subject matter expert for the Hydraulics Asset Management Plan
- Serve as the subject matter expert for WSDOT Major Drainage program projects
- Design of streambank stabilization and scour countermeasures
- Serve as subject matter experts on various floodplain regulations and perform backwater analyses for determining regulatory flood elevations for river channels and bridge openings.

- Serve as subject matter experts for other WSDOT specialty groups
- Serve as subject matter experts for WSDOT Emergency Operations Center
- Provide hydraulics training for WSDOT personnel
- Maintain and update the WSDOT Hydraulics Manual
- Design support of large span corrugated metal culverts
- Technical support for research efforts in hydraulics and river engineering
- Maintain and update WSDOT Standard Plans and Standard Specifications Book involving drainage related items, including conducting RAM approvals
- Serve as a participant on NCHRP panels as a national expert representing WSDOT on hydraulics research
- Serve as a participant on TRB panels as a national expert representing WSDOT on hydraulics related research
- Serve as a member of the AASHTO Technical Committee on Hydraulics and Hydrology

### **Fish Passage:**

The Fish Passage Design group has primary responsibility for the following:

- Hydraulic analysis of bridges, including hydraulic conveyance, and foundation scour for all fish passage projects
- Design the geometrics of a stream including, profile, channel shape, bed
- Analysis of riverine systems using various 1D and 2D hydrodynamic and sediment transport models
- Serve as the subject matter expert for WSDOT Fish Passage program projects
- Serve as subject matter experts for other WSDOT specialty groups
- Serve as subject matter experts for WSDOT Emergency Operations Center
- Serve as the subject matter expert for fish passage Design Build projects
- Provide fish passage inspection training for WSDOT construction personnel
- Provide onsite technical assistance during fish passage construction
- Maintain and update the WSDOT Hydraulics Fish Passage Design guidelines and policy chapters of the Hydraulics Manual.
- Maintain and update WSDOT Standard Plans and Standard Specifications Book involving fish passage or Large Wood Material related items
- Serve as a participant on NCHRP panels as a national expert representing WSDOT on fish passage design research
- Serve as a participant on TRB panels as a national expert representing WSDOT on fish passage design related research
- Serve as a member of the AASHTO Technical Committee on Hydraulics and Hydrology

## **Hydrology:**

The Hydrology group has primary responsibility for the following:

- Provide Reach Assessments of Chronic Environmental Deficiency (CED) program projects for WSDOT and Local Agency projects
- Serve as subject matter experts on floodplain regulations
- Provide long term monitoring of CED projects
- Design of habitat restoration components
- Analysis of riverine systems using various 1D hydrodynamic and sediment transport models in support of assessing watersheds
- Serve as the subject matter expert for WSDOT CED program projects
- Serve as subject matter experts on hydrology, fluvial geomorphology, coastal processes, and stream restoration for other WSDOT specialty groups
- Serve as subject matter experts for WSDOT Emergency Operations Center
- Provide hydrology training for WSDOT personnel
- Maintain and update the WSDOT Hydraulics Large Woody Material guidelines and policy chapter of the Hydraulics Manual.
- Technical support for research efforts in river engineering
- Serve as a participant on NCHRP panels as a national expert representing WSDOT on hydrology research
- Serve as a participant on TRB panels as a national expert representing WSDOT on hydrology related research
- Serve as a member of the AASHTO Technical Committee on Hydraulics and Hydrology

## **Stormwater:**

The Stormwater group has primary responsibility for the following:

- Serve as subject matter experts on floodplain regulations
- Serve as subject matter experts for other WSDOT specialty groups
- Serve as subject matter experts for WSDOT Emergency Operations Center
- Serve as the subject matter expert for WSDOT Stormwater Retrofit program projects
- Serve as the subject matter expert for Stormwater Design Build projects
- Provide Stormwater training for WSDOT personnel, local agencies, and consultants
- Conduct Hydraulic Report review Audits
- Provide onsite technical assistance during stormwater construction
- Maintain and update the WSDOT Highway Runoff Manual

- Maintain and update hydraulic and stormwater software including MGSFlood, StormShed3G, and WSDOT Excel Spreadsheets on the Hydraulics website
- Serve as the Facilitator and technical expert on the WSDOT/Ecology Demonstrative Approach Team (DAT) that approves stormwater deviations from the Highway Runoff Manual
- Serve as the Region Hydraulics Engineer delegate for Mega Projects, Sound Transit, Ferries, and the SR 509/167 program.
- Provide technical support and concurrence authority for Hydraulic Reports
- Technical support for research efforts in stormwater
- Provide technical assistance to complete the annual National Pollution Elimination Discharge System report
- Provides technical assistance to the Stormwater BMP Specifications (SWABS) program
- Maintain and update WSDOT Standard Plans and Standard Specifications Book involving stormwater water related items
- Serve as a participant on NCHRP panels as a national expert representing WSDOT on stormwater research
- Serve as a participant on TRB panels as a national expert representing WSDOT on stormwater related research
- Serve as a member of the AASHTO Technical Committee on Hydraulics and Hydrology

### **Design Standards and Polices**

In accordance with appropriate WSDOT standards and polices.

- Compliance with all appropriate AASHTO Drainage & Geometric Standards.
- Compatible with all FHWA Hydraulic Engineering Circulars.
- Participates in regular APWA Drainage Committee for standards and specification.
- Compliance with all appropriate Washington State Department of Ecology guidelines
- Compliance with current WSDOT Highway Runoff Manual
- Compliance with current WSDOT Hydraulics Manual
- Compatible with WDFW Water Crossing Design Guidelines

### **Regulatory Statues**

Comply with all Local, State and Federal statues, laws, and regulations.

- WAC 173-270 Highway Runoff Program.
- WAC 173-220 NPDES for Highway Stormwater.
- WAC 220-660 Hydraulic Code Rules.
- WAC 173-158 Floodplain Management Code.

- Compliance with all FHWA regulations regarding drainage and bridge scour.

### **Critical Success Factors.**

- Accurate and timely manual updates are tracked and scheduled.
- Project scopes are developed with comprehensive customer and stakeholder input and approval before moving forward with design.
- Projects get constructed as planned.
- Projects requesting Demonstrative Approach assistance are completed successfully and in a timely manner
- Provide support to ensure permits are obtained for in-water work in advance of the scheduled ad date.
- Projects designed and completed with sound engineering basis.
- Risk will be managed so possible unplanned conditions/situations are recognized and resolved to minimize or eliminate negative impacts to the project schedule, project design life, cost or construction quality.
- Providing training as scheduled and required
- Prioritizing and initiating research projects, in support of WSDOT strategic goals, by WSDOT and others, and ultimately completing and publishing the research