ACHD Section 8000 - Drainage and Stormwater Management

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ACHD

Committed to Service

Contents

8000 DRAINAGE AND STORMWATER MANAGEMENT

As an integral part of the Ada County Highway District's (ACHD) stormwater program, this Policy applies to all ACHD roadway projects and private developments impacting public right-of-ways.

8001 PURPOSE OF THIS POLICY

This Policy defines the requirements of stormwater systems within the jurisdiction of the ACHD. This Policy and the ACHD Stormwater Design Manual and Approved BMPs (Design Manual) seek to advance the management of stormwater in Ada County and to mitigate the impacts of urban stormwater runoff.

8002 ACHD STORMWATER DESIGN TOOLS AND APPROVED BMPS

The current edition of the Design Manual supplements this Policy. The Design Manual contains the standards and guidance to help the designer select and size permanent stormwater BMPs to meet the requirements of this Policy.

8003 MODIFICATIONS AND ADDENDA

The District may revise and update this Policy and the Design Manual as needed through approval by the ACHD Commission.

8004 DEFINITIONS

8004.1 BMPs

Best Management Practices.

8004.2 Capital Project

Capital Projects are initiated and administered by ACHD for design, right-of-way acquisition, and construction.

8004.3 Design Manual

ACHD Stormwater Design Manual and Approved BMPs, current edition.

8004.4 Detention Facilities

Detention facilities collect and release stormwater runoff at a controlled rate to downstream waters. These facilities may be allowed in areas where a defined pre-development discharge existed and the post project discharges are permitted by downstream owners and operators. The maximum outflow rate should not exceed the calculated pre-development flows unless otherwise approved in writing by ACHD and the downstream owner/operator.

See Section 8008 of this Policy for requirements to discharge to irrigation facilities.

8004.5 Development Project

A Development Project is initiated and administered by a developer in conjunction with a development application and/or permit. The project is designed by an engineer hired by a developer and is constructed by a developer's hired contractor.

8004.6 Discharge

Any addition or introduction of any pollutant, storm water, or any other substance whatsoever into the municipal storm sewer system (MS4), waters of the state, or into waters of the United States.

8004.7 Discharger

Any person who causes, allows, permits, or is otherwise responsible for, a discharge, including without limitation, any operator of a construction site or industrial facility.

8004.8 HEC-14, HEC-22

Hydraulic Engineering Circular

- No. 14, Hydraulic Design of Energy Dissipaters for Culverts and Channels, Federal Highway Administration, current edition.
- No. 22, Urban Drainage Design Manual, Federal Highway Administration, current edition.

8004.9 Home Owner's Association (HOA)

The Home Owner's Association hereafter referred to as HOA owns and manages the common areas in a subdivision which include stormwater facilities (such as ponds and swales). The term HOA shall also refer to a Property Owner's Association or similar organization for commercial subdivisions.

8004.10 IDWR

Idaho Department of Water Resources.

8004.11 Illicit Connection

Any physical connection to a publicly maintained storm drain system composed of non-stormwater which has not been permitted by the public entity responsible for the operation and maintenance of the system.

8004.12 Illicit Discharge

Any discharge to a storm drain that is not composed entirely of storm water except discharges pursuant to a NPDES permit.

8004.13 ISPWC

Idaho Standards for Public Works Construction, current edition and ACHD approved supplementals.

8004.14 Infiltration Facilities

Infiltration facilities are designed to collect and discharge stormwater by infiltrating it into soils. Examples of infiltration facilities include ponds, swales, and seepage beds.

8004.15 Inlet Protection

Temporary BMPs to capture sediment near the source, at the inlet.

8004.16 NPDES

National Pollutant Discharge Elimination System (NPDES)

8004.17 Policy

This ACHD Stormwater Policy, current edition.

8004.18 Pre & Post-Development Discharge

Pre-development discharge is the calculated stormwater discharge rate of runoff immediately prior to land disturbing activities.

Post-development discharge is the calculated discharge rate after the project is completed.

8004.19 Pretreatment, Pretreatment Facilities

Pretreatment facilities include an ACHD approved BMP sized to pre-treat the Water Quality Capture Volume (V_{WQ}) and bypass higher flows to a primary treatment/storage facility. Approved pretreatment BMPs are listed in Section 8200.

8004.20 Primary Treatment/Storage Facilities

Primary treatment and storage facilities provide additional treatment after pretreatment. Treatment is provided by residence time allowing sediment and pollutants to settle out, treatment through vegetation, and/or a sand filter. Approved primary treatment/storage BMPs are listed in Section 8200.

8004.21 Retention Facilities

Retention facilities are designed to store stormwater on-site without releasing it to downstream waters.

8004.22 Retrofit Project

Retrofit projects are improvements to existing roadways. When runoff from a retrofit project flows to existing stormwater facilities, those facilities shall be brought up to current standards if they are deficient, as determined by ACHD. This may include installing pretreatment BMPs and/or increasing the size of existing storage facilities.

8004.23 Riprap

Riprap is a permanent, erosion-resistant layer made of angular stones of a specified dimension. Riprap is placed at the end of a pipe to dissipate flow energy and protect from scour. Geotextile fabric is used to help stabilize the soil.

8004.24 Treatment Train

A treatment train is the combination of two or more separate BMPs. Treatment trains may include pretreatment and primary treatment facilities.

8004.25 Water Quality Capture Volume (V_{WQ})

The Water Quality Capture Volume (V_{WQ}) is the minimum volume of water that must be treated to the Maximum Extent Practicable (MEP).

8005 GENERAL STORMWATER MANAGEMENT INFORMATION

8005.1 How Local Conditions Affect Stormwater Management

In general, stormwater runoff from roadway projects should be retained within the project and not released downstream. The relatively flat and semi-arid climate of Ada County limits options to discharge stormwater to existing waterways. In addition, some irrigation and drainage district owner/operators do not accept stormwater discharges. These constraints require planners and designers to always look for other ways to manage and treat stormwater near the source.

8005.2 ACHD NPDES General Permits

The ACHD Phase 1 and Phase 2 NPDES General Permits can be viewed at: http://www.epa.gov/. For more information on permit coverage see the Policy.

8006 LEGAL AUTHORITY FOR STORMWATER MANAGEMENT

The District has the responsibility and the authority to manage stormwater in Ada County that is associated with roads under its jurisdiction based on Title 40 of Idaho Code. Title

40 gives the District exclusive and general supervision and jurisdiction over all highways within Ada County except for private streets and state highways owned and operated by the Idaho Transportation Department.

The District has authority to control all stormwater or other discharges into the public right-of-way or into any stormwater facilities within the public right-of-way through its jurisdiction.

8006.1 Legal Authority

8006.1.1 State Requirements

Idaho Code, Section 40-1415(1) (d), gives ACHD authority over drainage, where necessary, for motorist safety and right-of-way maintenance.

Section 40-1415(6) of Idaho Code requires all subdivision plats to be submitted to the District for acceptance and approval of drainage provisions and construction standards.

Idaho Administrative Procedures Act (IDAPA) 58.01.11, 2009, provides standards that prohibit discharge of contaminants into the environment in a manner that causes a groundwater standard to be exceeded, or is not in accordance with a permit or generally accepted management practice.

IDAPA 58.01.11, Stormwater discharges to ground water must comply with Idaho Groundwater Quality rules that state:

> "The implementation of water quality programs shall ensure that the quality of ground water that discharges to surface water does not impair the identified beneficial uses of the surface water and that surface water infiltration does not impair beneficial uses of ground water."

8006.1.2 NPDES Permits

The Clean Water Act (CWA) of 1987 and later amendments established the National Pollutant Discharge Elimination System (NPDES), and the 1987 amendments to the CWA required the U.S. Environmental Protection Agency (EPA) to develop a phased approach to regulating stormwater under NPDES.

In 1990, the EPA published implementing regulations for Phase 1 of the NPDES program. Phase 1 of the NPDES program regulates stormwater discharges from large and medium municipalities, Municipal Separate Storm Sewer Systems (MS4s), as defined by the EPA. These regulations, which apply within the city limits of Boise City and Garden City, require control of pollutants in urban stormwater discharges to surface waters and mandate an extensive permitting process for municipal stormwater systems. Phase 2 regulations covering smaller MS4s and construction activities of one acre or more, unless part of a common development, were signed into law in 1999. Designated

Phase 2 communities are required to meet requirements similar to Phase 1 with a less extensive permitting process.

ACHD holds an NPDES Phase 1 Permit for the MS4s in Boise City and Garden City. ACHD implements the Phase 1 Permit with co-permittees Boise City, Garden City, Ada County Drainage District #3, Idaho Transportation Department District #3 and Boise State University. The current Phase 1 NPDES Permit requires implementation of a Stormwater Management Program (SWMP) designed to limit the discharge of pollutants to the Maximum Extent Practicable (MEP).

ACHD also holds an NPDES Phase 2 Permit for the MS4s in Meridian, Eagle and urbanized Ada County. ACHD is the sole permittee for the Phase 2 Permit. The Phase 2 permit states that stormwater discharges "…that will cause, or have the reasonable potential to cause or contribute to, violations of water quality standards" are not permitted.

Construction Site Discharge Control Program requirements are included in ACHD Policy Section 8300.

To comply with these permit requirements, stormwater system design measures are necessary to improve water quality and adequately address pollutants of concern: sediment, phosphorus and bacteria.

8006.1.3 Clean Water Act

Section 303 of the CWA requires the development of Total Maximum Daily Loads (TMDLs) for impaired water bodies listed on the 303(d) list. The Snake River-Hells Canyon Total Maximum Daily Load (TMDL), revised June 2004, recommends reductions in phosphorus within the Snake River watershed. The "Lower Boise River Implementation Plan Total Phosphorus," December 2008, was developed by the Lower Boise Watershed Council and the Idaho Department of Environmental Quality. This plan outlines strategies to limit phosphorus in the lower Boise River.

8007 PERFORMANCE STANDARDS

To reduce adverse impacts of stormwater runoff, ACHD has developed performance standards that must be addressed at sites under ACHD management authority.

8007.1 Standard Number 1: Stormwater Infiltration

Infiltration of stormwater helps reduce the impacts of development on the hydrologic cycle by reducing or eliminating flows downstream.

Infiltration is the preferred method of stormwater management and treatment for public streets in Ada County.

8007.2 Standard Number 2: Pretreatment

A treatment train shall have an acceptable form of water quality pretreatment. Some BMPs are sized to treat the V_{WQ} and bypass higher flows.

8007.3 Standard Number 3: Primary Treatment

Primary treatment facilities provide final treatment and storage of the design volume. Structural BMPs shall remove at least 80% of the average annual post project total suspended solids load (TSS) and at least 50% of the average annual post project total phosphorous load. For the purposes of this Policy, it is presumed that a BMP treatment train complies with this performance standard if it meets all of the following requirements:

1. The BMP is included in the Design Manual;
2. Sized properly to capture and treat the prescribed V_{WQ};
3. Designed according to the criteria outlined in this Policy and the Design Manual;
4. Constructed properly, and
5. Maintained regularly.

8007.4 Standard Number 4: Water Quality Management

Water quality management includes Site Design, Source Control and Stormwater Treatment Measures to minimize adverse impacts to groundwater and the watershed. These principles are described below:

1. **Site Design Measures** are site planning techniques for pollution prevention and reduction in flow rates. Site design measures protect existing natural resources and minimize impervious surfaces. Site design measures are also referred to as Low Impact Design (LID) measures that accomplish these goals:

    - Minimize land disturbance and preserve high-quality open space.
    - Minimize the amount of impervious surface area.
    - Minimize impervious surfaces that are directly connected to the stormwater system (unless the connection includes stormwater treatment measures). Examples of "disconnecting" impervious surfaces include directing roof downspouts to splash blocks, "bubble-ups," or infiltration galleries in landscaped areas. Detached sidewalks are another example of disconnecting.

Examples of Site Design Measures include:

- Vegetated swales and buffer strips
- Flow-through planter boxes
- Cluster structures and paved surfaces
- Use of landscaping as a stormwater feature
- Pervious concrete/asphalt and pavers (in non-public street areas)

- Lot Grading

2. **Source Control Measures** consist of either structural project features or operational "good housekeeping" practices that prevent pollutant discharge and runoff at the source, such as keeping pollutants from coming into contact with stormwater.

Examples of Source Control Measures include:

- Street sweeping, regular inspection and cleaning of stormwater inlets
- Roofed trash enclosures
- Berms that control runoff from a potential pollutant source
- Indoor material/equipment wash racks that are connected to the sanitary sewer. (Note that any sanitary sewer connections must be approved by the local permitting authority.)
- Procedures to limit or prohibit the application of fertilizers, pesticide and insecticides adjacent to impervious surfaces and stormwater features in accordance with Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) standards.

3. **Stormwater Treatment Measures** include engineered systems that are designed to remove pollutants from stormwater to the Maximum Extent Practicable using processes such as infiltration, filtration and collection of sediment. Stormwater treatment measures are sized based on the V_{WQ}. Stormwater treatment measures can be categorized according to whether they are landscape-based or non-landscape-based. Landscape-based treatment measures are encouraged because they have generally been found to be more effective at removing pollutants than non-landscape based options.

   Some common examples of stormwater treatment measures include:

   - Sand filter
   - Seepage bed
   - Extended detention pond with forebay
   - Bioretention area
   - Pervious concrete/asphalt and pavers (in non-public street areas)

8007.5 Standard Number 5: Flow Controls

Management of stormwater flows involves the design and implementation of a flow control system to achieve the following objectives:

1. Minimize downstream impacts by not increasing flows from land development activities.
2. Accommodate historic flows from upstream land by providing adequate conveyance facilities through the project site.
3. Employ systems and practices that use or mimic natural processes to preserve and restore natural hydrology through:

- Infiltration, and/or
- Evapotranspiration

Examples of flow controls include:

1. Retention pond with forebay
2. Extended detention pond with forebay
3. Bioretention areas
4. Pervious concrete/asphalt and pavers (in non-public street areas)

8007.5.1 Runoff From Public Streets

Sheet flow from urban and rural streets shall be collected, conveyed and stored within the right-of-way and/or stormwater easement areas. Street rebuild and widening projects shall be designed such that sheet flow from the public street does not adversely impact private property.

Stormwater from public streets in developments shall be retained within the development unless provisions are made and written approval granted to discharge offsite.

8007.6 Standard Number 6: Operation & Maintenance (O&M) Plans

A plan for operation, maintenance, and repair of stormwater facilities shall be prepared and submitted to the District for approval for all stormwater facilities maintained by a HOA. O&M plans shall be made available to those who maintain the stormwater facility. For Development Projects, the O&M Plan shall be recorded with the CC&Rs.

Standard plans may be used but must be reviewed and approved by ACHD for each specific project. O&M plan templates are included in the Design Manual.

8008 IRRIGATION AND STORMWATER FACILITIES

Unless approved by ACHD, stormwater conveyance and storage facilities shall be separate and distinct from non-storm systems such as irrigation and irrigation return flows. Existing non-storm systems rerouted or piped through a project shall not be located in the public right-of-way except at approved street crossings. Where pressurized irrigation pipes cross the public right-of-way, the pressurized pipe shall be sleeved in accordance with Section 6000 and include valves on each side of the street.

When proposing to drain stormwater into facilities owned by irrigation or drainage districts, existing pipe connections shall be used whenever possible. All new discharges and new pipe connections (or changes to existing pipe connections) must receive the express written consent of the irrigation or drainage district. In general, post- project stormwater flows should not exceed the pre-development flows for the 25-, 50-, and 100-year storm events unless otherwise approved in writing by ACHD and the owner/operator.

8008.1 Ditch Abandonment, Ditch Perpetuation

Ditches are often proposed to be abandoned in urban areas after the land is no longer flood irrigated. For a ditch to be abandoned, the Engineer shall demonstrate that no historic discharges upstream must be conveyed through the project site and that no water rights exist downstream.

Provisions must be made for a ditch's continued operation and serviceability (perpetuation) for it to be used as an outfall for urban stormwater. This requires dedication of an easement to ACHD within the project limits for stormwater flows, maintenance and access.

The ability to enter property to maintain a ditch is protected by Idaho State Statute. Idaho State Statute Title 42-Irrigation and Drainage, Section 1204-Maintenance and Repair of Ditches, Prevention of Damage to Others, allows ditch owners and users to enter a property to maintain a ditch for drainage. Idaho Statute 40-1415(1)(d) gives ACHD authority to maintain culverts for street drainage.

8009 STORMWATER PLANNING AND PRELIMINARY BMP SELECTION

8009.1 Site Evaluation/Feasibility

The general characteristics of a site, such as soil type and slope, are major factors in selecting appropriate stormwater controls. The following factors shall be considered when evaluating the site:

1. Soil types and infiltration characteristics
2. Groundwater depth
3. Bedrock depth
4. Slope and geology of the site
5. Proposed drainage area and geometry. Right-of-way locations and pervious/impervious areas.
6. Proximity to surface water, groundwater and public drinking water supplies
7. Potential surface water discharge points
8. Site-specific factors such as previous and proposed land use

With this information, the technical aspects of storage, discharge control, and water quality management can be assessed. Generally, retention ponds, subsurface infiltration or similar facilities will be selected because of site limitations and discharge restrictions to downstream facilities.

8009.2 Infiltration Feasibility

Infiltration feasibility testing shall be conducted at the concept design stage. Initial testing involves digging multiple test pits or bore holes on the site to establish the initial soil profile, infiltration rate, water table, and/or depth to bedrock.

If the results of initial feasibility testing, as determined by a qualified professional, show that an infiltration rate of greater than 0.5-inch/hour is

probable, then at least one full scale soil boring and infiltration test should be completed at each proposed infiltration facility.

Following are requirements for infiltration facilities:

1. Bedrock, groundwater or impervious soils must be greater than 3-feet below the bottom of the infiltrating surface.
2. The infiltration system shall not be located in fill unless the fill is clean sand or gravel and the geotechnical report specifically addresses infiltration and slope stability.
3. Infiltration facilities are not permitted if the surface and underlying soil are SCS Hydrologic Group C or D, or the saturated infiltration rate is less than 0.5 inches per hour.
4. The design infiltration rate shall not exceed 8-inches per hour.
5. After construction, the area selected for the infiltration system shall be secured to prevent heavy equipment from compacting the underlying soils.
6. Infiltration basins should not be constructed in highly erodible soils, on slopes greater than 10-percent, or within fill soils unless these are specifically addressed in the geotechnical report and mitigated for in the design by the Engineer of Record.

8009.3 Groundwater

Groundwater must be separated a minimum of 3-feet from the stormwater storage medium unless separated by an impervious barrier. The elevation of the seasonal high groundwater table shall be determined to assess site suitability for stormwater storage. Monitoring shall be done for a minimum of one-year with monthly readings to determine the influence of streams and/or irrigation facilities on groundwater elevations (generally, spring for streams and late summer for irrigation facilities). Multiple observation wells shall be installed on the site to determine the groundwater profile for use in final design.

Alternatively, a site assessment of the area immediately around the proposed facility may be conducted. The site assessment shall include an evaluation of the soil-strata to at least 5-feet below the bottom of the infiltration medium to determine if the probable maximum high groundwater elevation meets separation requirements. Reports shall comment on the general weather conditions to identify drought, normal conditions, or above average rainfall. The influence of irrigation facilities, streams, and the Boise River should also be addressed.

The report shall be sealed by a qualified Professional Engineer or Professional Geologist registered in the State of Idaho and practicing in the field of geosciences or hydrogeology. A qualified Professional Engineer or professional whose work is sealed by a qualified Professional Engineer may also be accepted.

The groundwater elevation shall be shown on the design plans and referenced to a benchmark within the project.

If groundwater is encountered during construction of the facility at an elevation higher than that shown on the design plans, construction of the facility shall cease and the Engineer of Record shall be contacted immediately to redesign the facility to account for the higher elevation.

8009.4 Observation Wells

Observation wells are required at all stormwater storage facilities. Wells shall be installed during design and construction to verify the required 3-foot separation from storage media to groundwater is met. The location of the wells shall be shown on the design plans. When practical, observation wells shall be installed within the concrete sidewalk to help protect the well. Wells shall be constructed in accordance with the standard drawings for Observation Wells.

8009.5 Boise River & Surface Water Influences

Project sites close to the Boise River or other surface water shall be evaluated to consider the influence that changes in surface water flow rates and depths have on the storm system. The Engineer shall demonstrate that the storm system is free draining (no surcharge of pipes); including systems influenced by the Boise River, for river flow rates up to and including 7000 cfs.

8009.6 Bedrock

Bedrock must be separated a minimum of 3-feet from the stormwater storage medium.

If bedrock is encountered during construction of the facility at an elevation higher than that shown on the design plans, construction of the facility shall cease and the Engineer of Record shall be contacted immediately to redesign the facility to account for the higher elevation. An infiltration test shall be performed to verify the design infiltration rate is met.

8009.7 Design Life

Stormwater facilities shall be designed for at least a 50-year life with maintenance at 5 year intervals.

8009.8 Pipe Storage

Potential pond sites or other infiltration alternatives shall be considered if land is available instead of pipe storage. Pipe storage does not provide the same water quality benefits as a retention or detention facility. BMPs listed in the Design Manual should be considered as alternatives or used in conjunction with pipe storage to improve water quality treatment. In addition, large diameter pipes and associated manhole structures may interfere with sewer, water or other utilities and require special consideration during design. See Section 8012 for information on pipe sizing.

ACHD Maintenance and Stormwater Section representatives should be involved early during the concept design phase to examine how the system can

be cleaned and dirty water transported for disposal if pipe storage is proposed. If pipe storage is approved, the storage system shall be oversized by 15% to account for sediment.

8010 INFILTRATION REQUIREMENTS

8010.1 Requirements for Infiltration Facilities

Infiltration facilities discharge stormwater to groundwater through filter sand medium. The following standards apply for infiltration facility design.

8010.1.1 Idaho Department of Water Resources/Central District Health Department Requirements

Stormwater infiltration facilities shall conform to Title 42, Chapter 39, Idaho Code, and to the IDWR Rules for Waste Disposal and Injection Wells. Waste disposal systems less than 18-feet deep may be administered by Central District Health Department in cooperation with IDWR.

The design Engineer shall be required to provide notification to IDWR and/or Central District Health Department using the Shallow Injection Well-Notice of Construction inventory form (SIW-NOC), or such other notification as IDWR may require. A copy of the completed SIW-NOC form shall be submitted to ACHD.

8010.1.2 Setbacks and Horizontal Separation Distances

The following separation distances shall be maintained between stormwater infiltration facilities, measured near edge to near edge:

1. 100-feet from public or private drinking water wells
2. 50-feet from perennial and irrigation surface waters
3. 25-feet from basements
4. 10-feet from home foundations (without basement)

Storm mains and infiltration facilities shall have a minimum 10-foot horizontal separation from potable water mains. Facilities not meeting the separation requirement will require mitigation measures to prevent potential hydrocarbons in stormwater from coming into contact with PVC potable water pipe. Mitigation measures shall be approved by ACHD and the owner of the potable water facilities. These measures may include, but are not limited to, impervious barriers between PVC water mains and storm mains, impervious barriers at infiltration facilities, and alternate non-PVC pipes.

A minimum vertical separation of 1.5-feet is required for potable mains and storm crossings if the storm line is constructed with a water class pipe. Crossings having less than 1.5-feet of vertical separation shall be constructed in accordance with IDAPA 58.01.08 and IDAPA 58.01.16.

The bottom of the infiltration basin (bottom of pond or seepage bed drain rock) shall be separated by at least 3-feet vertically from the bedrock layer or seasonal high water table, as indicated by on-site geotechnical test results. The

bottom of the facility shall penetrate a minimum of 2-feet into free draining soil (defined as infiltration rate of min. 8-inches per hour) or into the soil layer the facility was designed for.

8010.1.3 Subsurface Infiltration Facilities

Subsurface infiltration facilities shall be located outside the roadway prism within a common lot encumbered by an ACHD stormwater easement. If a common lot is not available, it may be located in a planter strip or under the sidewalk. Infiltration facilities can only be installed under the roadway pavement section if approved in writing by ACHD.

Subsurface infiltration facilities without a manhole access at each end longitudinally require an ACHD Storm Drain Marker, per Detail 1 in the Design Manual.

8010.1.4 Infiltration Facilities

Acceptable soil types are those that have an infiltration rate of 0.5-inches per hour or greater, as initially determined from NRCS Soil Textural Classification and subsequently, confirmed by field geotechnical tests. The maximum design soil infiltration rate shall not exceed 8-inches per hour.

Infiltration Rate Table			
SCS Group and Type		Infiltration Rate (in/hr)	
A	Sand	8	Good
A	Loamy Sand	2	
B	Sandy Loam	1	
B	Loam	0.5	
C	Silt Loam	0.25	Not Allowed
C	Sandy Clay Loam	0.15	
D	Clay Loam & Silty Clay Loam	<0.09	
D	Clays	<0.05	

An infiltration test to verify the facility specific infiltration rate at the design depth is required during construction to verify the design infiltration rate. The above Infiltration Rate Table may be used to determine typical infiltration rates from the soil test results.

Runoff should be diverted away from the completed infiltration system during all phases of construction until the site is completely stabilized. Excessive sediment loading during construction can severely impact the long-term performance of infiltration systems.

Infiltration facilities shall be designed to infiltrate at least 90 percent of the design storm volume within 24-hours.

8010.1.5 Design & Construction Infiltration Rates

Design infiltration rates shall be based on in-situ tests that measure infiltration using an established and accepted method. A design infiltration rate for a project shall be provided by a qualified Professional Engineer or Professional Geologist licensed in the State of Idaho. A non-licensed but qualified individual working in the field of geosciences can provide a design infiltration rate under the seal of the Professional Engineer of Record. The soils report shall include the following backup information to help establish the design infiltration rate:

1. The test method used to measure infiltration
2. The measured infiltration rate (inches per hour)
3. The design infiltration rate (inches per hour)

During construction, an infiltration test is required at each infiltration facility once excavation is complete prior to backfilling. The ACHD Inspector will observe the infiltration test and provide a general acceptance of the design infiltration rate for the drainage facility.

8010.1.6 Alternative Procedure for Infiltration Testing

The following procedure is from the Boise City Stormwater Management Design Manual with some modifications. This process is recommended to establish a design infiltration rate. At least one test is required at each proposed infiltration facility.

Test Pit/Boring Requirements

1. Dig a standard soil boring to a minimum depth of 3-feet below the proposed filter medium.
2. Determine depth to seasonal high groundwater table upon initial digging or drilling.
3. Determine United States Department of Agriculture (USDA) or Unified Soil Classification (USC) system textures at the proposed bottom.
4. Determine depth to bedrock (if within 3-feet of proposed bottom).
5. The soil description should include all soil horizons, saturated and unsaturated zones.
6. The location of the boring shall correspond to the BMP location.

Infiltration Testing Requirements

1. Install a solid casing to a minimum of two-feet below the proposed bottom of filter sand layer.
2. Remove any smeared soiled surfaces and provide a natural soil interface where water may percolate. Remove all loose material from the casing. Upon the tester's discretion, a 2-inch layer of coarse sand or fine gravel may be placed to protect the bottom from scouring and sediment. Fill casing with clean water to a depth of 24-inches and allow to presoak for 24-hours.
3. 24-hours later, refill casing with another 24-inches of clean water and monitor water level (measured drop from the top of the casing for one-hour. Repeat this procedure (filling the casing each time) three additional times, for a total of four observations. Upon the tester's discretion, the

final field rate may either be the average of the four observations, or the value of the last observation. The final rate shall be reported in inches/hour.

4. The test location shall correspond to the BMP location.
5. Upon completion of the testing, the casings shall be immediately pulled.

Laboratory Testing

Grain size sieve analysis and hydrometer tests, where appropriate, may be used to determine USDA soils classification and textural analysis. Visual field inspection by a qualified professional may also be used, provided it is documented. The use of lab testing to establish infiltration rates is prohibited.

8010.2 Protection of Infiltration Facilities During Home Construction

Infiltration facilities in new developments shall be protected during building construction with temporary BMPs including, but not limited to, site design and source control measures, inlet protection, and capturing sediment with filter fabric prior to discharge to treatment and storage facilities.

8011 REQUIREMENTS FOR PONDS

Following are standards to be used in the design of stormwater ponds.

8011.1 Side Slopes

Side slopes should be 4:1 (horizontal: vertical), but no greater than 3:1 unless specifically approved by ACHD and the pond is fenced for safety.

8011.2 Freeboard

Facilities shall be designed to accommodate the runoff from a design storm with a 100-year return frequency. For facilities less than, or equal to, 3-feet in depth from invert to high water mark, a minimum freeboard of 0.5-feet shall be required. For facilities with a pool depth greater than 3-feet, a minimum freeboard of 1-foot shall be required.

8011.3 Outfall Pipe Armoring

Pipe outfalls shall be armored with riprap or an approved flow spreader for energy dissipation and erosion protection. Detail 2 in the Design Manual shows armoring options.

8011.4 Forebays & Primary Storage Basin

All ponds shall have a sediment forebay unless otherwise approved by ACHD. Exceptions for the forebay and high-flow bypass requirements may be made for ponds where the total bottom footprint is less than 1500 square feet.

A pretreatment BMP such as BMP 01 or similar system to capture sediment and floatables shall be placed prior to the forebay. Minimum forebay size shall be equal to the V_{WQ} plus 15% sediment storage.

The forebay shall be separated from the primary storage basin by an earthen berm barrier with side slopes no steeper than 3:1 unless specifically approved by ACHD. Forebays with a bottom footprint of greater than 1500 square feet shall be designed with a maintenance access ramp with not greater than 15% slope. For a 100-year design storm, stormwater in the forebay may spill over the berm into the primary basin.

The forebay shall have a minimum 3-foot separation to groundwater or an impervious liner. If an impervious liner is used, a 12-inch outlet pipe with removable plastic end cap with 3-inch minimum diameter hole shall be installed at the forebay invert to drain it (see Outlets for Detention Facilities). A sand filter with under drain similar to BMP 09 Sand Filter Extended Detention Pond may also be used.

Volumes in excess of the V_{WQ} shall bypass around the forebay to help prevent re-suspension of sediment. Water in the primary basin is not subject to the 3-foot separation to groundwater; however, the high groundwater elevation must be below the invert of the primary basin.

Stormwater ponds shall drain 90% of the design volume in 24-hours.

8011.5 Dams and Embankments

The Idaho Department of Water Resources (IDWR) may categorize a pond as a dam if the vertical distance between the high water mark and the downstream flow line exceeds 10-feet or the pond impounds more than 50 acre-feet of water. If a pond meets either criteria, then a permit may be required from the IDWR. Contact IDWR for more information.

An Anti-Seep Collar, per Detail 3 in the Design Manual, or other seepage control methods are to be installed around outlet pipes within embankments.

8011.6 Emergency Overflows/Flood Routing

Emergency overflows and flood routing to facilities that can accept flow without flooding private properties are encouraged.

8011.7 Design Requirements for Detention Ponds

Detention ponds shall be designed to lengthen the flow path, thereby increasing detention time from inlet to outlet. The recommended length to width ratio should be 3:1 or more. Shallow ponds with large surface areas also provide better removal efficiencies than small deep ponds.

The design of a detention facility requires designing the discharge to not adversely impact downstream areas and leave the hydrology the same as existed before development.

Balancing these requirements is done through the development of three items: an inflow hydrograph, a depth-storage relationship, and a depth-outflow relationship. These items are combined in a routing routine to determine the outflow rate, depth of stored water, and volume of storage at any specific time, as the flood passes through the detention facility. The inflow/storage/outflow relationships shall be based on a storm duration that identifies a peak detention pond volume for the storm interval required. The design considerations and procedures are discussed in the following sections.

8011.7.1 Maximum Outflow Rate for Detention Ponds

The maximum outflow rate should not exceed the pre-development flow rate. The receiving system must be shown to be capable of accommodating the design flow with written approval from the owner/operator of the facility.

8011.7.2 Outlets for Detention Facilities

1. To minimize the chance of clogging and to facilitate cleaning, outlet pipes shall be at least 12-inches in diameter. If riser pipes are used, they shall be at least 1-1/2 times the cross-sectional area of the outfall pipe. Trash racks and anti-vortex devices shall be required. All pipe joints are to be watertight.
2. Outflows shall be staged to not exceed pre-development discharge rates for the 2, 25, and 100-year design flows. Rectangular openings or V-notch weirs are preferred over small round orifices for maintenance purposes. If small orifices are used, the minimum orifice opening shall be 3-inches in diameter to help resist clogging.
3. Outlet structures shall be reinforced concrete. All construction joints are to be watertight.
4. Suitable slope protection approved by the District shall be placed upstream and downstream of principal outlets as necessary to prevent scour and erosion. High velocity discharges require energy dissipaters.

8011.8 General Landscape Guidelines for Stormwater Facilities

Vegetative buffer strips shall be established around the perimeter slopes of the pond for erosion control and pollutant removal. Landscaping is allowed in stormwater ponds but shall not be placed over sand infiltration areas.

Native grasses and drought tolerant plant species are recommended for use in stormwater facilities for slope stabilization and erosion control. A list of plant species and design guidelines is available from the Stormwater Section.

Ponds maintained by a Homeowner's Association are subject to ACHD review and approval of design and landscaping through plan review and approval of a License Agreement.

Ponds owned and maintained by ACHD shall be fenced with min. 4-foot tall black poly coated chain link fence with a top rail. Fence shall have 22 mil vinyl thickness and 12 gauge thickness for the steel.

Non-draining materials like rocks, cobbles, and sod are prohibited over infiltration areas.

Grass with an approved sandy topsoil mix is allowed over infiltration areas for shared use facilities like ball fields. The design should spread the stormwater out over a large area so the design storm water depth is shallow. ACHD must approve multi-use facilities through a License Agreement.

8011.9 License Agreement

As a condition of final plat or plan approval, the Developer is required to obtain a License Agreement for landscaping within ACHD right-of-way and easements. Because stormwater easements are exclusive to ACHD, a License Agreement is required to install landscaping within the exclusive easement (see ACHD Policy Section 4000 for more information).

Stormwater ponds can be shared use facilities as parks or ball fields with a License Agreement. Shared use facilities are encouraged as long as the primary use for stormwater storage, treatment, and maintenance access are not negatively impacted by the secondary use.

8011.10 Landscape Guidelines for Stormwater Ponds

Detail 8 in the Design Manual shows the standards for ACHD owned ponds. Ponds owned and maintained by a Homeowner's Association may be similar to these standards but may not require a fence.

8012 STORMWATER DESIGN METHODS AND COMPUTATIONS

8012.1 Accuracy of Calculations

The peak discharge rates determined by any method of calculation are approximations. Rarely will drainage works operate at the design discharge. Flow will always be more or less in actual practice as it rises and falls during a storm event. Thus, the engineer should not overemphasize the detailed accuracy of computed discharges but should emphasize the design of practical and hydraulically balanced works based on sound logic and engineering, as well as dependable hydrology. The use of more than three significant figures for estimating the flood magnitudes conveys a false sense of accuracy and should be avoided.

8012.2 Rational Method

ACHD has adopted the Rational Method as the preferred method for calculating both design storm runoff volume and flow controls (peak discharge). This policy includes a structured process to calculate volume and peak discharge so drainage calculations are prepared in a consistent manner.

The Rational Method is defined as follows:

Q = CiA

where:

Q = Discharge rate (cfs)

C = Coefficient of Runoff (dimensionless)

i = Rainfall intensity (in/hr) for a duration equal to the time of concentration (Tc) over the contributing area and for the design frequency.

A = Site area (acres)

Tc = Time of concentration (min).

The steps for finding these values are described below. Design storm runoff volume and peak flows can be calculated once these values are determined:

1. Calculate the contributing basin area (A) in acres. Use USGS topographic maps, field investigations, final grading contours, or other available data. The size of the drainage area shall include both on-site and off-site lands that contribute runoff to the measurement point
2. Determine the runoff coefficient (C). Typical "C" values are listed in this section. For subdivisions, the drainage contribution area shall include the areas that flow to the storm drain including the portions of the lot graded to the street or one-half of each lot area, whichever is greater.
3. Calculate the time of concentration (Tc) for post project conditions (also pre-development conditions for detention facilities). The time of concentration is defined as the time required for runoff to travel from the most distant point in the basin to the point of measurement. The Tc calculation shall include sheet flow, shallow concentrated flow, and open channel flow.
4. Determine the rainfall intensity from the intensity-duration-frequency curves provided in the ACHD Design Tools and Approved BMPs for the calculated Tc. At a minimum, the time of concentration shall be 10 minutes.

8012.2.1 Coefficients of Runoff

Following are coefficients of runoff for various surfaces and soil types.

Estimated Runoff Coefficients for Various Surfaces				
Type of Surface	**Runoff Coefficients "C"**			
Business				
Downtown areas	0.70 - 0.95			
Urban neighborhood areas	0.50 - 0.70			
Residential				
Single-family	0.35 - 0.50			
Multi-family	0.60 - 0.75			
Residential (rural)	0.25 - 0.40			
Apartment dwelling areas	0.70			
Industrial and Commercial				
Light areas	0.80			
Heavy areas	0.90			
Parks, cemeteries	0.10 - 0.25			
Playgrounds	0.20 - 0.35			
Railroad yard areas	0.20 - 0.40			
Unimproved areas	0.10 - 0.30			
Streets				
Asphalt	0.95			
Concrete	0.95			
Brick	0.85			
Roofs	0.95			
Fields: Sandy soil	Soil Type			
Slope	A	B	C	D
Flat 0-2%	0.04	0.07	0.11	0.15
Average 2-6%	0.09	0.12	0.15	0.20
Steep >6%	0.13	0.18	0.23	0.28
Adapted from ASCE				

8012.3 Volume and Peak Flow Calculations

Q flow rates for peak flows for conveyance are not used for finding volume. The Q for volume is based on a Time of Concentration (Tc) of 1-hour while Qpeak flows are a higher intensity storm based on the calculated Tc.

8012.3.1 ACHD Stormwater Design Spreadsheet

The ACHD Stormwater Design Spreadsheet shall be used to establish the minimum sizing requirements for conveyance and storage facilities.

8012.3.2 Design Storm Runoff Volume

The design storm runoff volume shall be calculated for sizing the storage component of the drainage system. Pretreatment facilities shall be sized for V_{WQ} and primary storage facilities sized for the remaining 100-year design storm plus allowance for sediment storage (see Section 8012.3.2).

For detention facilities, the volume of outflow is also deducted from the required storage volume.

Design storm runoff volumes shall be calculated as $V=CiAx3600 - V_{pre\text{-}development}$.

C	=	Coefficient of Runoff
i	=	100-year Intensity with Tc=60 from IDF Curve
A	=	Total area (acres)
3600	=	constant: 60 min x 60 sec/min
$V_{pre\text{-}dev}$	=	Volume Released by Detention (if discharge is approved)

Design storm runoff volumes shall be included on the design plans.

8012.3.3 Allowance for Sediment Storage

For ponds, the V_{WQ} shall be increased by 15% for sediment storage in the forebay.

For seepage beds and other subsurface facilities, the entire design storm runoff volume shall be adjusted for sediment storage as follows:

a. In-situ infiltration rates <8 in/hr, sediment factor is 15%.
b. In-situ infiltration rates >=8 in/hr, sediment factor is 0%.

8012.3.4 Flow Control (Peak Discharge) Calculations

The peak rate of discharge shall be determined for use in designing individual components of the drainage system and to examine pre and post-development peak flows.

Peak flow shall be calculated as $Q_{Peak}=CiA$.

C	=	Coefficient of Runoff
i	=	100-year Intensity based on calculated Tc from IDF Curve, See Section 8202.
A	=	Total area (acres)

Peak discharge rates for Q100 and Q25 shall be included on the design plans at each inlet with the total Q100 cumulative flow shown in the profile for conveyance pipes. For pressure flow, the plans shall also show the Hydraulic

Grade Line (HGL) in the profile or on a separate plan submittal if the HGL conflicts with other items in the profile view.

8012.3.5 Time of Concentration (Tc) Calculations

The time of concentration used to determine rainfall intensity for peak flows can be calculated using TR-55, NRCS method or HEC-22. A minimum Tc of 10 minutes shall be used for peak flows.

8012.3.6 Manning's Roughness Coefficients for Concentrated Flows

Typical Range of Manning's Coefficient (n) for Channels and Pipes.	
Conduit Material	Manning's n*
Closed Conduits	
Concrete pipe	0.010 - 0.015
CMP	0.011 - 0.037
Plastic pipe (smooth)	0.009 - 0.015
Plastic pipe (corrugated)	0.018 - 0.025
Pavement/gutter sections	0.012 - 0.016
Small Open Channels	
Concrete	0.011 - 0.015
Rubble or riprap	0.020 - 0.035
Vegetation	0.020 - 0.150
Bare Soil	0.016 - 0.025
Rock Cut	0.025 - 0.045
Natural channels (minor streams, top width at flood stage <30 m (100 ft))	
Fairly regular section	0.025 - 0.050
Irregular section with pools	0.040 - 0.150
*Lower values are usually for well-constructed and maintained (smoother) pipes and channels	

8012.4 Water Quality Capture Volume (V_{WQ}) & Peak Discharge Calculations

Stormwater shall be treated to the Maximum Extent Practicable (MEP) using Best Management Practices in accordance with this Policy. The calculations for finding the V_{WQ} are shown below. This volume shall be treated and additional volume can be bypassed to storage facilities.

8012.4.1 Water Quality Capture Volume V_{WQ}

Pretreatment facilities shall be sized for V_{WQ} plus allowance for sediment storage (see Section 8012.3.2). The V_{WQ} shall be calculated as shown below.

$V_{WQ} = Ci_{PS}Ax3600$

V_{WQ} = Water Quality Capture Volume (ft^3)

C	=	Coefficient of runoff
i_{PS}	=	Intensity of Percentile Storm (Currently 80th Percentile or 0.34-inches at the Boise Air Terminal)
A	=	Total Area (Acres)
3600	=	constant: 60 min x 60 sec/min

8012.4.2 Water Quality Flow Control Q_{WQ}

The water quality flow shall be calculated as shown below:

$$Q_{wq} = Ci_{PS}A$$

The coefficients are the same as for the V_{WQ} except:

i_{PS}	=	Intensity based on calculated Tc from IDF Curve, equates to approximately 2-year storm. See Section 8202.

8012.5 Other Methods to Calculate Volume and Flow

With pre-approval from the District, other methods of determining volume and peak discharge such as the Natural Resources Conservation Service (NRCS) Technical Release Number 55 (TR-55) for a 24-hour storm or other pre-approved methods based on sound engineering principles and with proven results may be acceptable upon written approval by ACHD.

8012.6 Conveyance

The primary conveyance system consists of catch basins, drop inlets, street gutters and pipe systems. The primary conveyance system should convey the design storm to the storage facilities with the maximum treatment and the minimum impact or inconvenience to the public.

The primary conveyance system shall be designed to accommodate the peak discharge of the 25-year storm event. Minor street flooding is allowed in accordance with Section 8012.6.2. Secondary conveyance shall route the 100-year design storm to receiving storage facilities.

8012.6.1 Catch Basins

Catch basin inlets shall be placed to accommodate the 100-year design flow with spread in conformance with this section.

8012.6.2 Typical Inlet Spacing

Street Classification	Depth of Ponding	Inlet Spacing
Local	No Curb Overtopping, ≤2" Depth at Crown	Max. 1,250-feet or calculate based on spread
Collector	No Curb Overtopping, min. one 10-ft lane dry	Max. 1,000-feet or calculate based on spread
Arterial	No Curb Overtopping, min. two 12-ft lanes dry	Max. 750-feet or calculate based on spread

If no curb exists, a borrow ditch sized to accommodate the 100-year design storm is required to convey runoff to a discharge point or infiltrate runoff within the ditch when no discharge point exists.

8012.6.3 Alternative Inlet Spacing

The Engineer may space inlets farther apart than the distances listed in the previous section if the topography, size of the contributing basin, and calculations support the spacing with allowable spread.

The following simplified equation assumes a conventional gutter pan with uniform cross slope as provided in Hydraulic Engineering Circular No. 22 (HEC-22).

$$T = [(Qn) / (K_u S_x^{1.67} S_L^{0.5})]^{0.375}$$

where:
Ku = 0.56 in English units
n = Manning's coefficient
Q = Flow rate (ft^3/s)
T = Width of flow (spread) (ft)
Sx = Cross slope (ft/ft)
SL = Longitudinal slope (ft/ft)

Equations for a composite gutter pan section may also be used to calculate the spread.

8012.6.4 Hydraulic Capacity and Pipe Size

Hydraulic capacity may be calculated by various acceptable methods for open channels and closed conduits, such as the Hazen-Williams Formula, Darcy-Weisbach Equation, and Manning Equation.

Pipe size shall be dictated by peak flow and hydraulic capacity. No pipe in the stormwater collection system shall be less than 12-inches or greater than 48-inches in diameter.

8012.6.5 Velocities

Velocities in open channels designed for conveyance at design shall be at least 2-feet per second (fps) and not greater than the velocity, determined from channel conditions, to erode or scour the channel lining; generally, 5-fps for an unlined channel. Super-critical velocities should be avoided.

Velocities in closed conduits at design flow shall be at least 3-fps and shall not exceed 15-fps.

8012.6.6 Energy Dissipaters

An energy dissipater shall be provided at stormwater pipe outfalls.

Inlet pipes to stormwater ponds shall have an Inlet Protection Apron and Flow Spreader per Detail 2 in the Design Manual.

Other outfalls shall have riprap or other treatment designed in accordance with HEC-14. If a different end treatment or energy dissipater is required by the owner/operator of a receiving facility, the more restrictive shall apply.

8012.6.7 End Sections, Wingwalls/Headwalls/Cutoff Walls

All pipe outfalls shall have a concrete or metal end section. Safety grates with bars spaced to pass a maximum size 4-inch sphere are required for stormwater pipe discharges.

Wingwalls, headwalls and cutoff walls are required for pipe diameters 30-inches and greater.

8012.6.8 Siphons

Siphons shall not be used for stormwater systems. All conveyance pipes shall be free draining unless a variance is specifically approved in writing.

8012.6.9 Street Grades

Street gutters will provide stormwater conveyance up to their hydraulic capacity. Beyond that limit, subsurface piping or flow routing will be required to facilitate proper drainage. The minimum longitudinal gutter grade for new streets shall be 0.4 percent. For retrofit projects, ACHD may allow 0.3 percent longitudinal grade. The maximum longitudinal gutter grade is 10 percent.

Water flowing down steep grades can be dangerous. Mean velocities in the gutter at peak flows shall not exceed 8-fps for new streets. Gutter velocity shall be controlled through diversion of runoff, catch basins, or redesign of the street.

8012.6.10 Cross Drains

Cross drain valley gutters are not allowed across collector and arterial streets.

8013 STORMWATER PLAN SUBMITTALS

This section provides the general requirements for stormwater plan reviews for all projects impacting existing and future ACHD facilities. Stormwater concept plan requirements differ between Capital Projects and Development Projects.

8013.1 Qualifications to Certify Design Plans & Related Submittals

All civil plans and related submittals shall be stamped and sealed by a qualified Idaho licensed Professional Engineer.

8013.2 Certification of Compliance with Design Standards, Variance Approval Process

The Engineer shall comply with ACHD Policy Section 3100 - Certification of Compliance with Design Standards. The following standard note shall be inserted on the title sheet of all plans submitted for ACHD review and approval:

The Engineer of Record certifies that the plans are prepared in substantial conformance with the ACHD Policy and standards in effect at the time of preparation. The Engineer acknowledges that ACHD assumes no liability for errors or deficiencies in the design. All variances from ACHD Policy shall be approved in writing. The following variances, listed by date and short description, were approved for this project: ____none____

8013.3 Stormwater Concept Plans (Capital Projects)

Capital Projects ½-mile or longer designed by a consultant require a stormwater concept plan submittal. The concept submittal shall meet the following minimum requirements:

1. Stormwater concept plan. May submit one roll plot rather than segmenting the project into individual plan sheets.
2. Survey shall show:
   - Topographic map of existing contours at 2-ft intervals.
   - Existing surface water features like wetlands, intermittent and perennial streams, natural/manmade lakes, reservoirs, canals, drainage ditches, etc.
   - Existing stormwater and irrigation conveyance systems within the project limits and 200-feet beyond.
   - Groundwater elevation shall be shown on the plans and referenced to a nearby benchmark (within 100-feet).
3. Master Stormwater Management Plan
   - Shall identify the location and type of proposed stormwater facilities.
   - Shall show the phasing of the project and identify any temporary facilities.
   - BMP selection narrative to consider water quality benefits and maintenance costs. The narrative shall evaluate at least three stormwater treatment and storage alternatives including, but not limited to:

- Identifying potential pond sites on undeveloped properties, preferably located away from major street intersections.
- Stormwater retention through infiltration. Retention is preferred over detention.
- Stormwater detention. Requires written approval for discharge from the owner/operator of the receiving facility.
- Low Impact Design (LID) options to reduce runoff volumes by "disconnecting" impervious surfaces directly connected to the stormwater system. Examples include eliminating or reducing hardscape in traffic islands, providing landscape buffers, storage/filtration in tree wells, or other approved methods.

- An installation and maintenance cost analysis using a 50-year design life assuming a 5-year maintenance cycle. This analysis is used for consideration in selection of a specific BMP. An example is provided in the Design Manual.

The stormwater concept must be approved by ACHD in writing prior to continuing with the design process.

ACHD internal design projects do not require a formal concept submittal since Stormwater staff are involved throughout the design process.

8013.4 Stormwater Concept & Master Plans (Development Projects)

The above requirements are waived for Development Projects. The design Engineer should coordinate with the Development Review Section to discuss the design prior to submitting preliminary plans. This is encouraged to help ensure water quality and maintenance needs are addressed early in design.

A Master Stormwater Management Plan is required for developments over 10-acres and should be discussed with Development Review staff prior to submittal of review plans. Approval of a master plan is not blanket approval for future development phases because stormwater policies may change. The general routing, pretreatment and storage facility sizing are subject to change if policies become more stringent. However, ACHD will make reasonable efforts to continue with an approved master plan.

8013.5 Temporary Stormwater Storage Facilities

No temporary ponds or other temporary storage facilities are allowed within a future roadway alignment.

Gutter flow length to temporary storage facilities shall not exceed 100-ft. Permanent structures, pipes and storage facilities are required if gutter flow length exceeds 100-ft to temporary stormwater facilities.

8013.6 Stormwater Preliminary Plan Submittal

The Preliminary Plan Submittal shall include the following items:

1. Plan sheets and associated details.
    - Plans shall include a typical section for storage facilities that includes top and bottom design elevations for each material. The typical section shall also Identify the high groundwater elevation, source of groundwater data, who prepared the soils report and date of final report. The design infiltration rate, if applicable, shall also be shown on the typical section.
2. Stormwater Report & Calculations:
    - General description of site features.
    - Basin area map using color and hatching to differentiate the subbasins. Sequentially number each basin and identify C factor.
    - Pre and post-development peak flow rates and runoff volume calculations using the Rational Method.
    - Flood routing of the 100-year storm to the ultimate stormwater system if secondary conveyance is not designed for the 100-year storm. All flows must be contained in the right-of-way without impacting private property.
3. Soils Report:
    - Bore logs and soils classification.
    - Infiltration rates in in/hr.
    - Establishment of probable seasonal high groundwater elevation through monitoring or a site assessment.
4. Draft Operation & Maintenance manuals for stormwater facilities for Development Projects. See Section 8013.15 for details regarding O&M Plans.

8013.7 Final Plan Deliverables

The following shall be included with the final plan submittal:

1. Final plan and detail sheets.
2. Final versions of all items listed in the Preliminary Plan Submittal section.
3. Copies of associated permits and discharge agreements if applicable.

8013.8 ACHD Acceptance of Final Plans, Reports & Associated Documents

Review and approval by the ACHD does not constitute a full engineering review of project plans and calculations. The plan review is for the purpose of ensuring general conformance to District policies and requirements. The submitting Design Engineer/Firm is solely responsible for the design. All stormwater plans and related submittals shall be stamped and signed by a qualified Professional Engineer registered in the State of Idaho. The Professional Engineer is responsible to ensure all systems are safe and that calculations, plans, specifications, construction, and record drawings comply with accepted engineering standards, this Policy, and other applicable local, state, and federal rules and regulations. Where any other law, ordinance, resolution, rule, or regulations of any kind also cover requirements in this document, the more restrictive shall govern.

8013.9 Plan Approval & Permitting by Other Regulatory Agencies

Other agencies may have review authority in addition to ACHD review and approval of project plans. It is the Engineer's responsibility to determine what agencies have regulatory authority over the project. Potential stakeholders may include:

- Irrigation and Drainage Districts: discharge and crossing agreements
- City: Lead agency for development plans, Floodplain review, water & sewer
- County: Lead agency for development plans, Floodplain review
- State: Idaho Department of Water Resources Stream Alteration Permit, IDEQ
- Federal: Army Corps of Engineers for placing fill in waters of the US and wetlands (404 Permit), NPDES Stormwater Pollution Prevention Plan (SWPPP) & filing a Notice of Intent (NOI) for construction disturbance greater than 1 acre.

This list is a guideline only and is not all inclusive.

8013.10 Maintenance Access and Easements

Plans and O&M manuals shall identify proposed maintenance access with associated easements.

8013.10.1 Access

Stormwater facilities shall be designed to allow heavy equipment access for maintenance and operation. Maintenance access roads shall be a minimum of 14-feet wide and have a minimum inside curve radius of 30-feet conforming to Detail 5 of the Design Manual, Access Roads and Turnarounds. Unless otherwise approved in writing, longitudinal slope shall not exceed 10% for access roads and 15% for ramps into ponds. At a minimum, 8-inches of compacted 3/4-inch Minus Crushed Aggregate shall be installed. The compacted subgrade shall be approved by the ACHD Inspector prior to placement of the gravel section.

Curb cut driveway approaches with min. 6-inch thick concrete per ISPWC standards shall be required for maintenance access on urban streets. A curb cut is required for both 3-inch rolled curb and 6-inch standard vertical curb.

8013.10.2 Easements

Stormwater easements shall be provided for access to stormwater facilities located on private property. The size of the easement shall be dictated by working needs. In general, the easement shall be 20-feet wide for pipes, offset 5-feet from center of the easement. Ponds and subsurface facilities require an easement over the area of the facility plus a minimum 10-foot perimeter. Easement areas shall remain free of all encroachments and obstructions, including fences, trees, and other landscaping features unless otherwise approved in a License Agreement.

Civil plans shall identify all stormwater easements. The Engineer/Surveyor shall provide metes & bounds descriptions, 8.5x11 plan sheets showing dimensioned easements and location, proof of ownership, name, address and title of signatory for ACHD to prepare easements for signature. ACHD shall record all stormwater easements not dedicated through recordation of a subdivision plat.

8013.11 Post-Construction Submissions

Record Drawing submittals shall include the following:

1. 11x17 Record Drawings.

2. One CD with a pdf of the final plans and CAD files showing the stormwater layer and street layout with survey control. Electronic files shall be submitted to the ACHD GIS Section to assist in mapping new stormwater facilities.

8013.12 Subdivisions, Multi-Lot Developments

Individual lot runoff in multi-lot developments can discharge to the public stormwater facilities located at the development site if the stormwater facilities are adequately sized for the flows with water quality treatment and storage measures provided within the development.

Stormwater conveyance facilities for residential subdivisions shall be located in the public right-of-way or a common lot with a blanket stormwater easement.

Stormwater ponds shall be located in a common lot maintained by the developer or HOA in perpetuity. Public street stormwater facilities are not allowed on any privately owned residential lot.

Public street stormwater facilities for commercial subdivisions shall be located in the public right-of-way within the subdivision, in a common area with blanket stormwater easement maintained by the developer or HOA in perpetuity. Public street stormwater facilities may be located on a privately owned commercial lot within the subdivision if provisions are made to protect the facilities.

Unless specifically authorized by ACHD in writing, private street stormwater shall be retained within the confines of the development site and shall not co-mingle with public street stormwater and shall not be allowed to discharge to the public stormwater facilities.

8013.13 Single-Lot Improvements

In general, all site-generated stormwater and surface water shall be retained on-site unless otherwise approved (for example as allowed for the Central Business District (CBD)).

8013.13.1 Single-Family Residential

Site-generated runoff may be discharged into the public right-of-way if the existing system meets District standards, has proven capacity, and meets water quality treatment and storage measures provided within the development. Capacity may be demonstrated by showing that the lot runoff was included in the overall stormwater design for the development or post-development flows do not exceed pre-development flows and system capacity is sufficient as determined by ACHD.

8013.13.2 Commercial

Public street stormwater storage facilities may be allowed on a privately owned commercial lot on a case-by-case basis. Assurances must be made to protect the stormwater system. Subsurface stormwater facilities should not be installed under parking lots or other hardscape. If allowed on a private commercial lot, a stormwater easement must be dedicated to ACHD.

8013.13.3 Central Business District (CBD)

Commercial developments within an established CBD may discharge stormwater into the public stormwater system if there is sufficient capacity in the existing facilities and there are no other viable alternatives. An approved pre-treatment facility with stormwater detention limiting discharge to pre-development flows shall be located on the development site, maintained by the development, and approved by the District.

8013.14 Roof Downspouts/Drains

In general, building downspouts should discharge through landscape areas and not directly onto impervious surfaces, such as driveways or sidewalks that drain to the public right-of-way.

In hillside terrain roof downspouts and foundation drains may discharge directly into an enclosed stormwater system if the system is designed to accommodate these flows. The connections to the street stormwater system shall be stubbed to properties when the street is constructed to avoid cutting new pavement. Discharges from downspouts into surface conveyances (i.e., gutters and ditches) are not permitted. Multiple lots shall collect and convey roof runoff in private facilities to connect to the public conveyance system at distinct points like a manhole or inlet structure.

8013.15 Home Owner's Association & Maintenance Responsibilities

Light maintenance of stormwater facilities shall be responsibility of the developer and/or HOA. Light maintenance is required on landscape based treatment/storage facilities like ponds and swales. ACHD maintains all catchment and conveyance facilities within the public right-of-way.

Light maintenance responsibilities of the HOA include:

1. Maintain infiltration facilities to ensure positive percolation of stormwater (defined as infiltrating 90% of the 100-year storm volume in 24-hours).
2. Keep landscaping well maintained and healthy.

Light Maintenance activities include: controlling irrigation flows (not over-watering), mowing and aerating grass, tilling and raking sand infiltration areas, applying fertilizers, pesticide and insecticides according to Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) standards.

Heavy Maintenance activities are the responsibility of ACHD and include: sediment removal and reconstruction of a stormwater facility if necessary, as determined by ACHD, after light maintenance duties have failed to correct a problem. A documented maintenance history is important to assess what action is needed to correct a failure.

The HOA shall maintain annual inspection records for stormwater facilities that shall be made available to ACHD upon request.

8013.16 Operation & Maintenance (O&M) Manual

A plan for operation, maintenance, and repair of stormwater facilities shall be prepared and submitted to the District for approval for all stormwater facilities located in common areas where light maintenance is performed by the HOA.

The manual shall include the design plans for the facility and a listing of periodic and post-rainfall maintenance activities. The plan shall describe the maintenance responsibilities of the HOA and property owners. The plan shall be provided to the parties responsible for maintenance and operation of the facility. The approved O&M manual shall be referenced on the project plans and recorded with the CC&Rs for subdivisions where applicable

The CC&Rs and O&M Manual shall include wording that:

1. Requires a dues paying organization to be established if on-site facilities are in common areas.
2. Gives ACHD the right to inspect storm facilities, and if necessary, promptly perform any required maintenance
3. Requires ACHD concurrence with any proposed changes in the previously approved documents; and
4. Allows ACHD to assess the costs of any required maintenance to properties within the development

Once ACHD provides written acceptance of the stormwater system, the developer and/or HOA shall be responsible for light maintenance and ACHD shall be responsible for heavy maintenance. Maintenance activities shall be documented. Example checklists are provided in the Design Manual.

8014 INSTALLATION OF POST CONSTRUCTION STORMWATER BMPS

For street improvements to be accepted by ACHD, the stormwater system is owned and shall be maintained by the roadway contractor (for Capital Projects) until the Notice of Construction Completion Letter is sent triggering the start of the warranty period. For Development Projects, the stormwater system is owned and shall be maintained by the

Developer until ACHD issues a written Acceptance for Maintenance Letter to trigger acceptance of the public street improvements and start of the warranty period.

8014.1 Inspection Procedures and Frequencies

ACHD shall inspect the construction of all stormwater facilities as needed in accordance with the ACHD Quality Control and Quality Assurance Manual for Inspection and Construction Services.

8014.2 Enforcement, Violations, and Penalties

Compliance with ACHD standards for the installation of stormwater structural BMPs is monitored through ACHD inspection and acceptance of the work. For ACHD capital construction projects, control is maintained through inspection and administration of the construction contract. For Development Projects a Temporary Highway Use Permit is required for all work in existing or future right-of-way and ACHD easements in accordance with Policy Section 6000. The terms of the permit, requirements for ACHD inspection, as well as bonding requirements to work in the right-of-way are means to ensure compliance with District Policies.

8015 MAINTENANCE CONSIDERATIONS

8015.1 Maintenance Access at Public Street Crossings

ACHD maintains all culvert and pipe crossings of the public right-of-way in accordance with Policy Section 9000. Open ditches piped at roadway crossings must have unobstructed maintenance access to the end of the pipe within 15-feet from face of curb or edge of shoulder.

A HS-25 traffic rated manhole is required on both sides of piped systems crossing the right-of-way. The center of structures shall offset no more than 15-feet from the face of curb or provide an approved access road. These structures shall be located in right-of-way or permanent easements.

8015.2 Manholes

Manholes shall be pre-cast or cast-in-place concrete and watertight.

8015.2.1 Manhole Spacing

Manholes shall be provided at all intersections of two or more pipes and at all locations where the pipe changes direction. Maximum manhole spacing shall be 400-feet.

8015.2.2 Pre-Cast Manhole Barrels, Cones, and Bases

Pre-cast manhole barrels, cones, and bases shall meet the requirements of the ISPWC, Section 600 Storm Drain.

8015.2.1 Steps

Steps mounted in the manhole sections are required when manhole height exceeds 4-feet.

8015.2.2 Manholes Frames and Covers

Manhole frames and covers shall meet the requirements of the ISPWC, Section 600 Storm Drain. They shall be suitable for HS-25 loading capacity. All stormwater manhole covers shall have the words "STORM DRAIN" or "SD" cast integrally in the top of the cover. The manhole cover shall be flush with the finished grade.

Concrete collars shall have steel or fiber reinforcement and shall be cast-in-place after paving is complete.

8015.3 Pipe

Stormwater pipe shall meet the requirements of the ISPWC, Section 600 Storm Drain. See Section 8012 for information on pipe sizing.

8015.4 Catch Basins, Frames & Grates

Catch basins shall be cast-in-place or precast concrete as specified in the ISPWC, Section 600 Storm Drain. Catch basins and frame and grates shall accommodate HS-25 loading with grate bars set at 90 degrees to curb face per the ISPWC.

Longitudinal slopes of 3% and greater shall require vaned grates for improve capture.

8016 STORMWATER BMP MAINTENANCE INSPECTION PROGRAM

8016.1 Inspection Procedures and Frequencies

ACHD owned stormwater facilities are inspected and cleaned on a periodic rotation based on maintenance zones or as needed. Subdivision stormwater facilities are normally maintained by a HOA and ACHD performs heavy maintenance duties as needed.

8016.2 Violations, Enforcement and Penalties

8016.2.1 Illicit Discharge Prohibited

Illicit discharge to any stormwater drain, including both the MS4, and any ACHD owned stormwater drain or facility is prohibited and a violation of this Ordinance unless:

The discharge is exempted as an allowed non-stormwater use of stormwater drains, such as: water line flushing and other discharges from potable water sources; landscape irrigation and lawn watering; diverted stream flows; rising ground waters; uncontaminated groundwater infiltration to storm drains; uncontaminated pumped ground water; foundation and footing drains; roof drains; water from crawl space pumps;

residential air condition condensation; springs; individual residential car washes; flows from riparian habitats and wetlands; de-chlorinated swimming pool discharges; or, flows from firefighting activities and training; or

The discharge is pursuant to an NPDES permit issued and administered by the EPA, provided that the discharger is in full compliance with all requirements of the permit and other applicable laws or regulations. Compliance with an applicable NPDES permit governing discharges into the MS4 shall be considered compliance with this Ordinance.

8016.2.2 Illicit Connections Prohibited

It is prohibited and a violation of this Ordinance to establish, use, maintain or continue illicit drainage connections to the MS4 or any ACHD owned stormwater drain or facility, or to commence or continue any illicit discharges to the MS4 or any ACHD owned stormwater drain or facility.

8016.2.3 Concealment

Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Ordinance shall constitute a violation of such provision.

8016.2.4 Continuing Violation

Unless otherwise provided, a person, firm, corporation or organization shall be deemed guilty of a separate offense for each and every day during any portion of which a violation of this Ordinance is committed, continued or permitted by the person, firm, corporation or organization and shall be punishable accordingly, as herein provided.

8016.2.5 Notification

ACHD will provide written notification of any violations impacting the public street stormwater system and indicate a deadline for corrective action.

8016.2.6 Enforcement

i. General. If violations are not adequately addressed within the specified timeframe, ACHD shall take measures to correct the violation and use any and all legal means available to recover the associated costs.

ii. Civil Enforcement. In addition to the penalties provided in this section, any violation may be enforced by civil action bought by ACHD. In any such action, ACHD may seek, and the Court shall grant, as appropriate, any or all of the following remedies:

A. A temporary and/or permanent injunction.

B. Assessment of the violator for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation, and for the reasonable costs of preparing and bringing legal action under this subsection.

C. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

D. Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life. Assessments under this subsection shall be paid to ACHD to be used exclusively for costs associated with monitoring and establishing stormwater control systems and/or implementing or enforcing the provisions of this Ordinance.

iii. Administrative Enforcement. In addition to the other enforcement powers and remedies established by this Ordinance, the Director or his designee has the authority to utilize the following administrative remedies:

A. Cease and Desist Orders. When the Director or his designee finds that a discharge, illicit discharge or illicit connection has taken place or is likely to take place in violation of this Ordinance, the Director or his designee may issue an order to cease and desist such discharge, or practice or operation likely to cause such discharge, illicit discharge or illicit connection and direct that those persons not complying shall: (a) comply with the requirement; (b) comply with the schedule for compliance, and/or (c) take appropriate remedial or preventative action to prevent the violation from recurring.

B. Notice to Clean. Whenever the Director or his designee finds any oil, earth dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, waste or any other materials of any kind, in or upon the sidewalk abutting or adjoining any parcel of land, or upon any parcel of land or grounds in close proximity to any drain or ditch, which may result in an increase in pollutants entering the stormwater drain facility or a non-stormwater discharge to the storm water drain facility, he may give notice to the owner of the subject property requesting the removal and lawful disposal of such material. The owner of the subject property shall undertake the activities as described in the notice within the time frames set forth therein.

In the event the owner of the subject property fails to conduct the activities as described in the notice within the frames set forth therein, the Director or his designee may cause such required activities as described in the notice to be performed, and the cost thereof shall be assessed and invoiced to the owner of the subject property.

iv. Nonexclusivity of Remedies. Remedies under this Ordinance are in addition to and do not supersede or limit any and all other remedies,

civil or criminal of ACHD or another jurisdiction. The remedies provided for herein shall be cumulative and not exclusive.

8016.3 Nuisance Water Control

With the availability of gravity and pressure irrigation, overwatering of landscape is a common problem in Ada County. Irrigation runoff from overwatering flows to the street and into the stormwater system where it saturates the system, creates mud and ponding in borrow ditches, swales and low spots, and decreases the capacity and efficiency of the system. It is the responsibility of property owners, HOAs and businesses to adjust their water use as needed to maintain landscaping, conserve water and not release flows to the public street and stormwater system.

ADOPTED BY THE ADA COUNTY HIGHWAY DISTRICT BOARD OF COMMISSIONERS THIS 12th day of March, 2014.

ADA COUNTY HIGHWAY DISTRICT
BOARD OF COMMISSIONERS

By:_____
John S. Franden, President

By:_____
Mitchell A. Jaurena, Vice President

By:_____
Rebecca W. Arnold, Commissioner

By: _____
Sara M. Baker, Commissioner

By:_____
Jim D. Hansen, Commissioner

ATTEST:

_____
Bruce S. Wong, Director