

CHAPTER 2 – BASIC REQUIREMENTS



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2.1 INTRODUCTION

This chapter introduces the eight Basic Requirements for stormwater management required for new development and redevelopment projects in Central Oregon jurisdictions that have adopted this manual or portions of it. The applicability of each requirement depends upon the type, size, and location of the project. The detailed design guidelines associated with each of the basic requirements are included in the remaining chapters of this manual.

The overview in this chapter is intended to assist project proponents in determining the scope of the stormwater management facilities that will be required for a particular site. It is the responsibility of the project proponent to become familiar with the Basic Requirements in order to determine when they are applicable. Flow charts are included in Appendix 2A to assist project proponents in determining which of the following basic requirements apply to a particular project:

- Basic Requirement #1 – Drainage Submittal;
- Basic Requirement #2 – Geotechnical Site Characterization;
- Basic Requirement #3 – Water Quality Treatment;
- Basic Requirement #4 – Flow Control;
- Basic Requirement #5 – Natural and Constructed Conveyance Systems;
- Basic Requirement #6 – Erosion and Sediment Control;
- Basic Requirement #7 – Source Control; and,
- Basic Requirement #8 – Operation and Maintenance

Appendix 2B also includes some general guidance tables to assist project proponents in selecting appropriate BMPs for sites with challenging physical constraints.

Project proponents are encouraged to reference the Site Design and Low Impact Development techniques in Chapter 11 early in the process when planning for new development and redevelopment projects. Effectively utilizing the site design principles and implementing LID stormwater management features can reduce the size and cost of the required stormwater mitigation facilities.

2.1.1 NEW DEVELOPMENT

New development is the conversion of previously undeveloped or permeable surfaces to impervious surfaces and managed landscape areas. New development occurs on vacant land or through expansion of partially developed sites. The new development thresholds apply to the total amount of impervious surfaces added at full build-out when all project phases are complete. The following basic requirements apply:

- All new development projects shall comply with Basic Requirement #5.

- All new development projects that *add 5,000 square feet or more of impervious surfaces or disturb one acre or more*, shall comply with Basic Requirements #1 and #4 through #8. Review Section 2.2.2 and 2.2.3 to determine if Basic Requirements #2 and #3 are applicable.
- All new development projects of any size that *propose a UIC facility* requiring DEQ registration, shall comply with Basic Requirements #1 through #8.

2.1.2 REDEVELOPMENT

Redevelopment is the replacement of impervious surfaces on a developed site. Redevelopment occurs when the existing facilities are demolished and rebuilt or substantially changed through reconstruction. When a redevelopment project adds or replaces 5,000 square feet or more impervious surface or proposes a new UIC facility, the Basic Requirements shall be applied to *all of the new and replaced impervious surfaces at the site*. The redevelopment thresholds apply to the total amount of impervious surfaces replaced and added at full build-out when all project phases (if applicable) are complete. The local jurisdiction may also apply the requirements to redevelopment sites when the site is converted to a more intense use.

Existing stormwater management facilities on redevelopment sites are not required to be retrofitted to meet the design standards of this Manual if the existing facilities remain hydraulically isolated from the redevelopment area. However, existing UIC facilities on redevelopment sites will need to meet DEQ requirements.

2.1.3 EXEMPTIONS

Projects in the following categories are generally exempt from all the Basic Requirements, *provided the project does not include an existing or proposed UIC facility*. Generally exempt categories include:

- Commercial agriculture practices involving working the land for production are generally exempt, except the construction of impervious surfaces as related to commercial agriculture or the construction of agricultural drains that are designed to act as UICs;
- Forest practices regulated under the Oregon Forest Practices Act (ORS 527.610-527.770, 527.990(1) and 527.992), except conversions from forest lands to other land uses;
- Actions by a public utility or any other governmental agency to remove or alleviate an emergency condition when the action does not alter the stormwater characteristics;
- Remodeling permits or tenant improvements that do not add 5,000 or more square feet of impervious surface;
- Change of use permits to less intense or similar uses;
- Records of survey, boundary (i.e. minor lot line) adjustments, and property aggregations, unless the action affects drainage tracts or easements;

- Minor land-disturbing activities that do not require a permit;
- Permits or applications for projects not physically disturbing the land;
- Municipal road and parking area preservation/maintenance projects such as:
 - Pothole and square cut patching;
 - Crack sealing;
 - Resurfacing with in-kind material without expanding the area of coverage;
 - Overlaying existing asphalt or concrete pavement with bituminous surface treatment (or chip seal), asphalt or concrete without expanding the area of coverage;
 - Shoulder grading;
 - Reshaping or regrading drainage systems; and
 - Vegetation maintenance.
- Operation and maintenance or repair of existing facilities.
- Landscaping and maintenance on residential lots by homeowners, including gardening, non-commercial agricultural activity, and minor grading as defined by each jurisdiction. (Note: this exemption does not apply to landscaping modifications to stormwater drainage or treatment swales.)

2.1.4 PARTIAL EXEMPTIONS

The practices below are generally exempt from all of the Basic Requirements except for Basic Requirement #6 – Erosion and Sediment Control. When required by the local jurisdiction, these practices must also comply with Basic Requirement #1 – Drainage Submittal:

- New development projects adding less than 5,000 square feet of impervious areas and disturbing less than one acre that do not propose UIC facilities requiring DEQ registration;
- Temporary use permits;
- Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics;
- Projects that improve roadway user safety without increasing traffic capacity. Certain safety improvement projects such as sidewalks, bike lanes, bus pullouts and other transit improvements shall be evaluated on a case-by-case basis to determine whether additional Basic Requirements apply;
- Maintenance projects that do not increase the traffic capacity of a roadway or parking area such as:
 - Removing and replacing a concrete or asphalt roadway to base course or subgrade or lower without expanding the impervious surfaces;

- Repairing the roadway base or subgrade;
- Overlaying existing gravel with BST, chip seal or asphalt or concrete without expanding the area of coverage, or overlaying BST with asphalt, without expanding the area of coverage. This partial exemption only applies if the overlaid surface continues to drain to the existing facilities or structures and if:
 - ◆ The road traffic surface will be subject to an Average Daily Traffic (ADT) volume of less than 7,500 on an urban road or an ADT volume of less than 15,000 vehicles on a rural road, freeway, or limited access control highway; or,
 - ◆ The parking area traffic surface will be subject to less than 40 trip ends per 1,000 square feet of building area or 100 total trip ends.

2.1.5 EXCEPTIONS

An exception may be granted by the local jurisdiction to approve design elements that do not conform to or are not explicitly addressed by this Manual. Design exceptions are at the sole discretion of the local jurisdiction. Contact the local jurisdiction for specific procedures for applying for design exceptions.

The requirements of this Manual represent the minimum criteria for the design of stormwater management systems within jurisdictions that have adopted the Manual or sections of it. Designs that offer a superior alternative to standard measures, or creative means not yet specified in the standards, are welcomed towards the goal of providing better stormwater management.

2.2 BASIC REQUIREMENTS

2.2.1 BASIC REQUIREMENT #1 – DRAINAGE SUBMITTAL

Objective

A drainage submittal is necessary in order to evaluate the potential adverse impacts of drainage patterns resulting from site alterations due to land development. It includes construction plans, a drainage report, and, other supporting documentation, as needed, to demonstrate the mitigation methods utilized in disposing of stormwater.

The local jurisdiction reviews the drainage submittal for compliance with this Manual and other applicable standards. The specific requirements for the drainage submittal are discussed in Chapter 3.

Applicability

The following land-actions, permits, or activities require a drainage submittal:

- All projects that propose to *add 5,000 square feet or more of impervious surfaces or disturb one acre or more*;
- Projects that propose a UIC facility;
- Manufactured and mobile home parks; and
- Other projects designated by the local jurisdiction as part of their review and permitting processes.

In addition, the following permits and other activities generally require a drainage submittal:

- Commercial building permits (including institutional, and multi-family residential projects) prior to issuance of the building or grading permits;
- Change of use permits to more intense uses;
- Conditional use permits;
- Grading permits (not in conjunction with building permits); and,
- Public or private road projects (not in conjunction with land-actions or permits).

The following activities are generally exempt from a drainage submittal:

- Individual single-family residential/duplex building permits without special plat conditions; and,
- Temporary use permits, unless the use could cause adverse water quality or other drainage related impacts.

2.2.2 BASIC REQUIREMENT #2 – GEOTECHNICAL SITE CHARACTERIZATION

Objective

A Geotechnical Site Characterization (GSC) is required to demonstrate suitability for stormwater disposal and to determine sub-level structure construction feasibility. A qualified Engineer shall perform the study in accordance with the criteria specified in Chapter 4. The following geotechnical studies, if required, can be performed at the same time as the GSC:

- Geohazard analysis;
- Pavement subgrade evaluation;
- Down-gradient analysis (reference Section 3.4.5 Downstream/Down-Gradient Analysis);
- Identification of seasonally high groundwater levels;

- Groundwater effects on impervious pond liners for evaporative or detention ponds; and,
- Embankment recommendations for disposal facilities which propose to impound stormwater (reference Chapter 7 for embankment criteria).

See the local jurisdiction standards for geohazardous areas and road surfacing requirements.

Applicability

A GSC will be required for any project where sufficient geotechnical data does not already exist. The scope and geographic extent of the investigation may vary depending upon the general location and setting of the site, the characteristics of the target soil deposits, and whether there are known or expected drainage or geohazardous problems within the vicinity of the site.

A GSC is required for:

- Projects proposing infiltration (drywells, detention facilities receiving credit for pond bottom infiltration, etc.);
- Projects proposing non-standard drainage systems;
- Projects located in Special Drainage Areas (SDA) as designated by a local jurisdiction;
- Projects with administrative conditions requiring a GSC; or,
- Projects with proposed sub-level structures (i.e. basements or underground parking structures), as required by the local jurisdiction.

All stormwater facilities that have infiltrative rate criteria are required to have post-construction testing performed that verifies these minimum rates. These test results shall be submitted to the local jurisdiction prior to construction certification to ensure adequate drainage. In addition, safety factors shall be applied to infiltration system outflow rates to account for confining layers and gradual plugging of the soils over time by stormwater sediment and debris. Safety factors are discussed further within Chapters 6 and 7.

2.2.3 BASIC REQUIREMENT #3 – WATER QUALITY TREATMENT

Objective

Water quality treatment is required to reduce pollutant loads and concentrations in stormwater and can be achieved using physical, biological, and chemical treatment. The most effective basic treatment Best Management Practices (BMPs) remove about 80 percent of the total suspended solids contained in the runoff treated and a much smaller percentage of the dissolved pollutants. If a project proponent will seek rule authorization for a UIC, they should review OAR 340-044-0028 regarding Rule Authorization, monitoring requirements, and minimum pollutants to address.

The total quantity of pollutants removed from the stormwater will vary greatly from site to site based on precipitation patterns, land use, site geology, effectiveness of source controls, and operation and maintenance of the treatment facilities. Pollutant removal can be improved when water quality treatment BMPs are installed in series (aka a “treatment train”). When treatment facilities are required, they shall be designed and sized according to the criteria specified in Chapter 6. The BMPs presented in this manual are intended to meet the treatment goals when designed, constructed, and maintained in accordance with this Manual.

Design Criteria

The 6 month National Resource Conservation Service (NRCS) Type I 24-hour storm event is the designated water quality design storm to be utilized for both volume-based and flow rate-based water quality BMPs. For sites without flow control systems, the 6 month storm peak discharge calculated using the Rational Method may be used to design flow based treatment facilities. In addition, volume based BMPs may be designed using simple volumetric approaches so long as they are at least as conservative as using the 6 month NRCS Type I 24-hour storm event (*for example*: using impervious surface area multiplied by runoff factor multiplied by storm depth).

Applicability

All projects (unless exempted by Section 2.1.3) that propose to *add 5,000 square feet or more impervious surface, or disturb one acre or more, or propose a UIC facility* are required to provide water quality treatment. The level of required treatment is based on the type of the proposed land use and the quantity of impervious surface. Water quality treatment falls into four categories: UIC, basic, oil control, and metals. Review the definitions below and the individual treatment category descriptions in Chapter 6 to determine the type of treatment required for each project site. A Water Quality Treatment Level Flow Chart is also provided in Appendix 2A to assist project proponents in determining the appropriate treatment category.

Any of the exemptions from treatment requirements are superseded by requirements set forth in a Total Maximum Daily Load (TMDL), water cleanup plan, groundwater cleanup plan, local Surface Water Management Plan (SWMP), Safe Drinking Water Act, UIC permit requirements, and OAR 340-040-0030. As of March 2010, no TMDLs existed for water bodies in Central Oregon, though TMDLs are scheduled for development in the Crooked and Deschutes Rivers.

Treatment facilities must be located within the ROW, within a border easement parallel to the road, or within an individual tract. Stormwater facilities may not be located within a drainage easement on private property; i.e. only border easements are acceptable. A stormwater facility, as defined for this section, is meant to imply a swale or pond. It is acceptable, for example, for a pipe to be in a drainage easement.

Definitions

Non-Pollutant Generating Surfaces (NPGS) – NPGS are considered to be insignificant or very low sources of pollutants in stormwater runoff. Non-metal or coated metal roofs that are subject only to atmospheric deposition or normal heating, ventilation, and air conditioning vents are considered NPGS. The following may also be considered NPGS: undeveloped areas, landscaped areas, paved bicycle pathways and pedestrian sidewalks that are separated from and not subject to drainage from roads for motor vehicles, fenced fire lanes, infrequently used maintenance access roads, and “in-slope” areas of roads. Sidewalks that are regularly treated with deicing chemicals are not considered NPGS.

Pollutant Generating Surfaces (PGS) – PGS are considered to be significant sources of pollutants in stormwater runoff. Such surfaces include those that are subject to vehicular use, industrial activities, or storage of erodible or leachable material that receive direct rainfall or run-on or blow-in of rainfall or snow. Metal roofs are considered PGS unless coated with an inert, non-leachable material. Roofs that are subject to venting of manufacturing, commercial or other indoor pollutants (including restaurant hood vents) are also considered PGS. A surface, whether paved or not, shall be considered PGS if it is regularly used by motor vehicles. The following are considered regularly used surfaces: roads, unvegetated road shoulders, bike lanes within the travel lane of a roadway, driveways, parking lots, unfenced fire lanes, vehicular equipment storage yards, and airport runways.

Average Daily Traffic (ADT) and Trip Ends – The expected number of vehicles using a roadway or parking area is represented by the projected ADT volume considered in designing the roadway or by the projected trip end counts for the parking area associated with a proposed land use. ADT and trip end counts must be estimated by using “Trip Generation” published by the Institute of Transportation Engineers. ADT and trip end counts shall be made for the design year or expected life of the project (the intent is for treatment facilities to be installed in the soonest period of disruptive construction). For project sites with seasonal or varied use, evaluate the highest period of expected traffic impacts.

UIC Pretreatment Applicability

UIC Pretreatment is required for all PGS and NPGS that discharge to a UIC. Pretreatment BMPs must address hydrocarbons, organics, bacteria, and metals associated with stormwater. Oil/water separators alone do not meet the pretreatment requirements. However, they may be included as part of a treatment train (two or more facilities installed in series to provide water quality treatment).

The state UIC guidelines also identify Large Category Development as those projects that have 1,000 or more ADT for an entire project area, based on the current ITE methodology. Large Category Developments are asked to provide a higher level of pretreatment, maintenance, and annual monitoring, and to submit reporting to DEQ.

Residential roof runoff that is not mixed with any other runoff source and that meets the definition in OAR 340-044-0018(2)(b)(F) is exempt from UIC Pretreatment requirements, provided that the UIC is not more than 5 feet deep and that adequate separation distance is provided. Minimum allowable separation distances between the bottom of the UIC and the seasonally high groundwater level are provided in Section 7.3.2.

Refer to Chapter 6 for applicable UIC Pretreatment BMPs.

Basic Treatment Applicability

Basic treatment provides removal of Total Suspended Solids (TSS). Basic treatment is required for all projects that add 5,000 square feet or more (PGS) unless the disposal method satisfies the requirement for full dispersion (see Chapter 7).

Where the PGS threshold is met, basic treatment is required for all discharges to surface waters of the state, including perennial and seasonal streams, lakes, and wetlands. Certain exemptions may exist for wetlands placed in the “development” category by a local jurisdiction’s Wetland Conservation Plan (see later “Wetlands” discussion). Project designers should also consider the possible impact of additional TSS loading from pervious areas at the project site on the long-term function of the treatment facility.

Refer to Chapter 6 for applicable Basic Treatment BMPs.

Oil Control Applicability

Oil control is required for sites that *add 5,000 square feet or more impervious surfaces* and where the proposed land use suggests that sufficient quantities of free oil are likely to be present such that the oil can be effectively removed with special treatment. The specific land use types requiring Oil Control are listed in Section 6.3.3. For qualifying land uses located within a larger project area, only the impervious area associated with the land use subject to oil control must apply the more stringent water quality treatment, but the flow from that area must be separated; otherwise the treatment controls must be sized for the entire project area.

Refer to Chapter 6 for applicable Oil Control BMPs.

Metals Treatment Applicability

Metals treatment is required for new development sites that *add 5,000 square feet or more impervious surfaces* and that propose one of the land uses listed in Section 6.3.4. As with Oil Control, the metals treatment BMPs must be applied to the portion of the site that contains the qualifying land use, assuming that flow from that area can be separated from the remainder of the site. All other portions of the site must have UIC Pretreatment or Basic Treatment, depending on the discharge location.

Refer to Chapter 6 for applicable Metals Treatment BMPs.

Wetlands

Some wetlands can be considered for use in stormwater treatment if they meet stringent state standards. A wetland may be considered for use as a stormwater treatment facility if the local jurisdiction has completed a Local Wetland Inventory (LWI) and developed a Wetland Conservation Plan (WCP) in accordance with OAR 141-086. Per OAR 141-120-0040, the WCP should place all wetlands into one of three categories: protection, conservation, or development. Wetlands in the development category can be used for biofiltration or other wetland water treatment systems as defined in OAR 141-120-0170. All stormwater activities proposed in wetlands must be approved by the Department of State Lands and other applicable local, state, and federal agencies.

2.2.4 BASIC REQUIREMENT #4 – FLOW CONTROL

Objective

Flow control facilities are necessary to mitigate potential adverse impacts on downstream properties and floodplains due to the increase in stormwater runoff caused by land development and for protecting in-stream morphology and habitat.

Unless specifically approved by the local jurisdiction, stormwater runoff from any proposed land development to any natural or constructed point of discharge downstream shall not exceed the pre-development peak rate of runoff. If a downstream/down-gradient analysis indicates that there will be no unacceptable impacts, then stormwater volume may be allowed to exceed the pre-developed condition.

In the event that stormwater runoff from any proposed land development discharges into a SDA as defined in Section 7.7.1 or other problem area as determined by the local jurisdiction, the volume of runoff leaving the site shall be restricted to that of the pre-developed condition.

Stormwater generated on private property and/or commercial/industrial sites shall be disposed of either onsite or in an offsite easement, but not in the public ROW unless the public facilities have been specifically designed to accommodate private property runoff and approval is provided by the local jurisdiction.

When site conditions allow, infiltration is the preferred method of flow control for urban runoff. All projects are encouraged to infiltrate stormwater runoff on site to the greatest extent possible if such infiltration will not have probable adverse impacts to down-gradient properties or improvements. Flow control facilities shall be designed and constructed according to the criteria in Chapters 5 and 7.

Design Criteria

The NRCS Type I 24-hour storm event is the design storm utilized for all flow control facilities regardless of whether they use surface or subsurface discharge.

Infiltration Facilities: For projects proposing infiltration, the facilities shall be capable of providing service for a 25-year, 24-hour design storm. All collected stormwater must drain from the facility within 72 hours. The design shall provide a safe overflow path with the capacity to convey the 100-year storm event. (Note that by infiltrating the 25-year storm, much of the 100-year storm will also be infiltrated. As such, the overflow path should convey the portion of the 100-year storm greater than a 25-year event.) The overflow path shall drain toward the natural discharge point of the contributing basin and not adversely impact downstream properties or structures.

Sites without a well defined natural discharge point should verify that the proposed infiltration facility will reduce the post development 100-year peak discharge and volume to match the pre-development 100-year discharge and volume.

Detention Facilities: For projects proposing to detain and release stormwater runoff, the facilities shall be designed such that the release rate does not exceed the pre-developed conditions for multiple storm events. The analysis of multiple design storms is needed to control and attenuate both low and high flow storm events.

The total post-developed discharge rate (including bypass flow) shall be limited to the pre-development rates outlined in Table 2-1. Bypass flow is the runoff that leaves the site without being conveyed through the detention facility. All collected stormwater must drain from the facility with 72 hours.

**TABLE 2-1
ALLOWABLE DISCHARGE RATES**

DESIGN FREQUENCY (24 HR STORM)	POST-DEVELOPED DISCHARGE RATE ¹
2-year	≤ 2-year pre-developed
25-year	≤ 25-year pre-developed
100-year	Provide safe overflow route ²

¹ Post-developed flow is equal to the release from detention facility plus the bypass flow

² The overflow route shall direct the 100-year post-developed flow safely towards the downstream conveyance system

Evaporation Facilities: For projects proposing to evaporate runoff as a means of stormwater disposal, the facilities shall be designed to control the mean annual precipitation. Design shall meet the criteria for either the Preferred or the Alternative Method as described in Chapter 5.

Applicability

All projects (unless exempted by Section 2.1.3) that *add 5,000 square feet or more of impervious surfaces or disturb one acre or more* shall comply with the Basic

Requirement for flow control. Projects are exempt from flow control if they discharge directly to:

- The Crooked or Deschutes River;
- A river or stream that is fifth order or greater as determined from a 1:24,000 scale map;
- A river or stream that is fourth order or greater as determined from a 1:100,000 scale map;
- A lake or reservoir with a contributing watershed area greater than 100 square miles; or
- A reservoir with outlet controls that are operated for varying discharges to the downstream reaches as for hydropower, flood control, irrigation or drinking water supplies (uncontrolled flow-through impoundments are not exempt).

Maps shall be standard USGS maps or GIS data sets derived from USGS base maps.

Floodplains

Land actions proposed in or around identified floodplains must conform to National Flood Insurance Program and the flood ordinance of the local jurisdiction. See Section 7.7.2 for specific requirements. Projects discharging to exempt water bodies must still comply with floodplain requirements.

Wetlands

Refer to Wetlands in Basic Requirement #3 for information relative to utilizing a wetland for stormwater management.

2.2.5 BASIC REQUIREMENT #5 – NATURAL AND CONSTRUCTED CONVEYANCE SYSTEMS

Objective

A conveyance system includes all natural or constructed components of a storm drain system that collects stormwater runoff and conveys it away from structures in a manner that adequately drains sites and roadways, minimizing the potential for flooding and erosion.

All engineered conveyance system elements for proposed projects must be analyzed, designed, and constructed to provide protection against un-controlled or diverted flows, flooding, erosion, and their associated damages to property and improvements.

Projects shall be designed to protect certain natural drainage features including floodplains, drainageways, and natural depressions that store and/or allow water to infiltrate into the ground. These features are collectively referred to as the Natural Location of Drainage Systems (NLDS). Preserving the NLDS will help ensure that stormwater runoff can continue to be conveyed and disposed of at its natural location. Preservation will also increase the opportunity and ability to utilize the more

predominant systems as regional stormwater facilities. For more information on NLDS, see Section 8.2.4.

Stormwater runoff shall be discharged in the same manner and at the same location as in the pre-developed condition, unless otherwise specifically accepted by the local jurisdiction. Consistent with Oregon drainage law, stormwater runoff may not be concentrated onto downstream properties where sheet flow previously existed and shall not be diverted to points not receiving stormwater runoff prior to development.

Applicability

All projects proposing drainage improvements, regardless of the quantity of created impervious area, shall comply with the Basic Requirement for conveyance systems.

Constructed Channels

Constructed channels shall be designed with sufficient capacity to convey and contain, at a minimum, the depth of the 50-year peak flow plus an additional 30 percent, assuming developed conditions for onsite tributary areas and existing conditions for any offsite tributary areas. Refer to Chapter 8 for additional criteria.

The design shall bypass storm events that exceed the above criteria and shall provide an overflow path, with the capacity to convey the 100-year storm event. The overflow path should drain toward the natural discharge point of the contributing basin, away from adjacent buildings, residences, etc.

Culverts

New culverts shall be designed with sufficient capacity to convey the 50-year design storm assuming developed conditions for the onsite basin and existing conditions for the offsite basin. Increase culvert size to pass the 100-year event if a safe overflow for flows above the 50-year event cannot be provided.

New culverts shall be designed with sufficient capacity to meet the headwater and tailwater requirements in Chapter 8.

Storm Drain Systems and Inlets

New enclosed systems and inlets shall be designed with sufficient capacity to convey peak flow rate for the 25-year design storm event with at least six-inches of freeboard between the water surface and the proposed ground surface. Enclosed systems may surcharge or overtop drainage structures for storm events that exceed the 25-year event, so long as an overflow path is provided. The overflow path must be capable of conveying the 100-year storm event and should drain toward the natural discharge point of the contributing basin, away from adjacent buildings, residences, etc.

Gutters

Gutter flows in roadways shall allow for the passing of vehicular traffic during the 25-year design storm event by providing non-flooded zones. For paved roadways, the

non flooding width requirement varies with the classification of the road. The design shall meet the criteria specified in Chapter 8.

Drainage Inlets

Drainage inlets shall be designed with sufficient capacity to convey the 25-year design storm assuming developed conditions for the contributing area.

2.2.6 BASIC REQUIREMENT #6 – EROSION AND SEDIMENT CONTROL (ESC)

Objective

During the construction phase, sediment-laden runoff can enter newly constructed or existing drainage facilities, thus reducing their infiltration and/or treatment capacity and lifetime of operation or increasing maintenance costs.

Controlling erosion and preventing sediment and other pollutants from leaving the project site during the construction phase is achievable through selection and implementation of BMPs that are appropriate both to the site and to the season during which construction activities take place.

The objectives of the ESC Plan are to:

- Protect and prevent damage to existing or proposed stormwater management infrastructure;
- Minimize erosion and sedimentation, and the impact of increased runoff, onto private property, public roads and right-of-ways, and water bodies caused by land-disturbing activities;
- Protect the health, safety and welfare of the general public but shall not be construed to establish any duties to protect or benefit any particular person or class of persons; and,
- Protect water quality.

Applicability

All projects, regardless of the quantity of created impervious area, are responsible for preventing erosion and preventing the discharge of sediment and other pollutants into surface waters, drainage facilities and/or adjacent properties. Projects (unless exempted by Section 2.1.3) that *add 5,000 square feet or more of impervious surfaces or disturb one acre or more* shall comply with the specific guidelines in this Basic Requirement.

All ESC plans must adhere to the minimum requirements specified in Chapter 9 of this Manual. The BMP descriptions in Chapter 9 include design storm information, sizing guidelines, and example calculations, when applicable. Examples and descriptions of the BMPs referenced in this Manual were developed from DEQ's

Erosion and Sediment Control Manual, with additional guidance from the *ODOT Erosion Control Manual*.

2.2.7 BASIC REQUIREMENT #7 – SOURCE CONTROL

Objective

The intent of Source Control BMPs is to prevent pollutants from coming into contact with stormwater. Source control BMPs are a cost-effective means of reducing pollutant loading and concentrations in stormwater and should be a first consideration in all projects.

Applicability

All projects that *add 5,000 square feet or more of impervious surfaces or disturb one acre or more* shall comply with this Basic Requirement, and therefore, are required to implement applicable source controls. The source control measures applicable to various site uses are outlined in Chapter 10. Following construction, projects shall apply all known, available and reasonable source control BMPs.

Considering opportunities for structural separation of surfaces exposed to pollutants and other source control alternatives during the project design stage may result in eliminating or reducing the size of facilities required under Basic Requirement #3 – Water Quality Treatment.

2.2.8 BASIC REQUIREMENT #8 – OPERATION AND MAINTENANCE

Objective

To ensure that stormwater control facilities are adequately maintained and properly operated, the Engineer is required to prepare documentation for the entity responsible for maintaining the stormwater system, which describes the appropriate preventive maintenance and details the recommended maintenance schedule.

For drainage ponds and other drainage facilities located outside of the public road rights-of-way, the project proponent shall provide the financial means and arrangements for the perpetual maintenance of the drainage facilities.

Proponents shall operate and maintain the facilities in accordance with an Operation and Maintenance plan that meets the criteria specified in Chapter 12. The Operation and Maintenance plan shall also include applicable source control BMPs as specified in Chapter 10.

Applicability

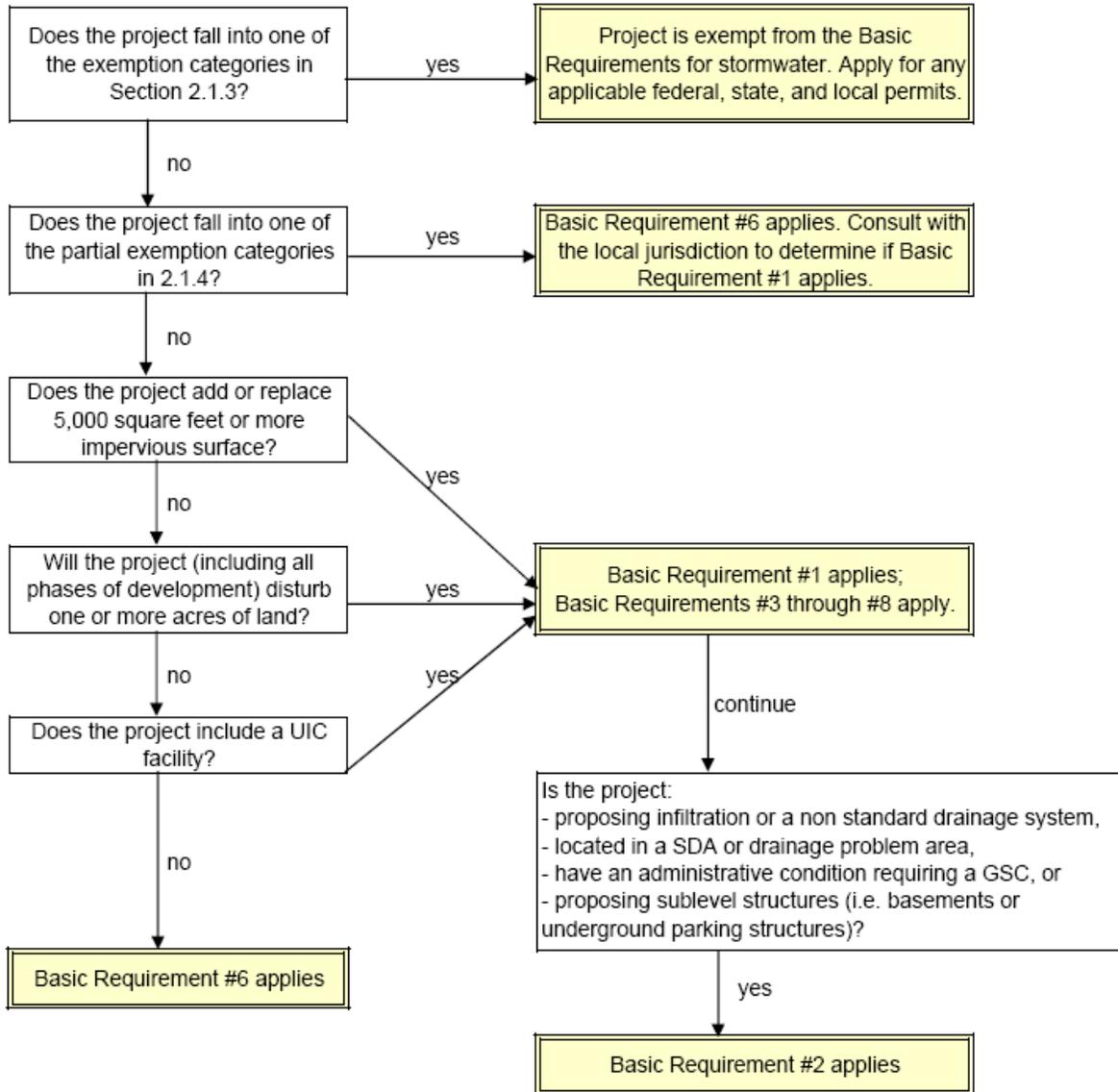
All projects that *add 5,000 square feet or more of impervious surfaces or disturb one acre or more*, and propose drainage facilities or structures, shall comply with this Basic Requirement.

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APPENDIX 2A – BASIC REQUIREMENTS FLOW CHARTS

The following flow charts are included to assist project proponents in determining which of the basic requirements apply to a given site. The definitions of terms used in the flow charts are included the text of Chapter 2.

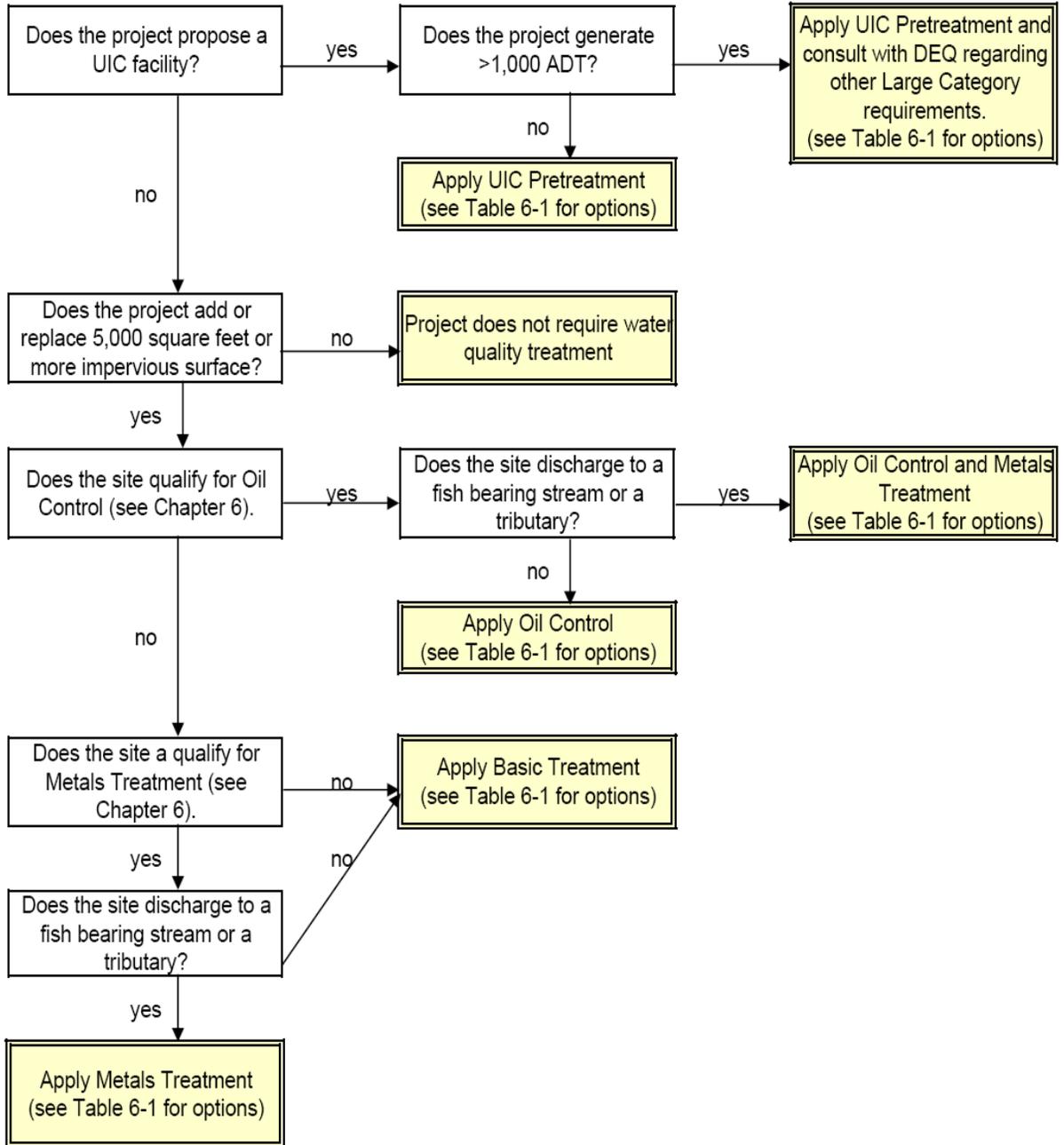
Basic Requirements Flow Chart



- Basic Requirements:**
- #1-Drainage Submittal (Ch 3)
 - #2-Geotechnical Site Characterization (Ch 4)
 - #3-Water Quality Treatment (Ch 6)
 - #4-Flow Control (Ch 7)
 - #5-Natural and Constructed Channels (Ch 8)
 - #6-Erosion and Sediment Control (Ch 9)
 - #7-Source Control (Ch 10)
 - #8-Operation and Maintenance (Ch 12)

Applicants are encouraged to incorporate appropriate Site Design and Low Impact Development measures from Chapter 11 into their development plans. Utilizing Chapter 11 techniques may reduce the basic requirements for a given project site.

Water Quality Treatment Level Flow Chart



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APPENDIX 2B – APPROPRIATE BMPS FOR CHALLENGING SITES

Physical site conditions can constrain options for stormwater management facilities in many areas of Central Oregon. In areas of High Groundwater, Natural Impermeability, and Fractured Bedrock/Minimal Soil Cover, and on Steep Slopes certain types of facilities are either physically infeasible or do not provide sufficient removal of pollutants to meet regulatory standards. The tables below provide guidance as to which water quality treatment, flow control, and low impact development BMPs are generally appropriate or inappropriate for these four types of challenging site conditions. The tables also identify BMPs that may be potentially appropriate depending on further analysis.

These tables are intended to be used as general guidance. It is the responsibility of the design engineer to evaluate specific site conditions and select the appropriate BMPs or combination of BMPs to meet the requirements of a particular project site.

HIGH GROUNDWATER AREAS

In a number of Central Oregon communities the depth to groundwater may be 5 feet or less. In these areas, stormwater BMPs that rely on infiltration may not be appropriate because they put untreated stormwater in close proximity to groundwater.

GENERALLY APPROPRIATE	POTENTIALLY APPROPRIATE	INAPPROPRIATE
Vegetated Filter Strips Oil Water Separator (in a treatment train) Wet Pond Grassy Swale (for conveyance) Sedimentation Manhole Buffer Strips Soil Amendments Green Roofs Roof Rainwater Collection Systems Downspout Disconnects Evaporation Pond Natural Dispersion	Infiltration Swales Bio-retention Pervious Pavement Detention Pond Extended Detention Dry Pond	Drywell Infiltration Trench Infiltration Pond

AREAS OF NATURAL IMPERMEABILITY

Impermeable volcanic tuffs underlie some portions of Central Oregon. In these areas, BMPs that rely on infiltration or dispersal of stormwater may not be feasible. BMPs that treat and/or store stormwater above the ground surface are preferable.

GENERALLY APPROPRIATE	POTENTIALLY APPROPRIATE	INAPPROPRIATE
Vegetated Filter Strips Oil Water Separator (in a treatment train) Wet Pond Grassy Swale (for conveyance) Sedimentation Manhole Buffer Strips Soil Amendments Green Roofs Roof Rainwater Collection Systems Detention Pond Extended Detention Dry Pond Evaporation Pond	Infiltration Swales Bio-retention Pervious Pavement Downspout Disconnects Natural Dispersion	Infiltration Pond Infiltration Trench Drywell

AREAS OF FRACTURED ROCK / MINIMAL SOIL COVER

In some areas of Central Oregon fractured rock is very close to the surface and soil depths are minimal. Fractured rock can also be created through blasting of bedrock. For these sites, stormwater managers must take great care not to let untreated stormwater discharge to groundwater.

GENERALLY APPROPRIATE	POTENTIALLY APPROPRIATE	INAPPROPRIATE
Vegetated Filter Strips Oil Water Separator (in a treatment train) Sedimentation Manhole Buffer Strips Pervious Pavement Soil Amendments Green Roofs Bio-retention Roof Rainwater Collection	Infiltration Swales Wet Pond Extended Detention Dry Pond Grassy Swale (for conveyance) Detention Pond Drywell (with proper pre-treatment) Infiltration Trench Infiltration Pond	

Systems Downspout Disconnects Natural Dispersion Evaporation Pond		
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STEEP SLOPES

On steep slopes there is often not enough level area to install facilities to store, infiltrate or appropriately disperse stormwater. Treating the stormwater near the source and using low impact development techniques to reduce stormwater runoff is preferable.

GENERALLY APPROPRIATE	POTENTIALLY APPROPRIATE	INAPPROPRIATE
Oil Water Separator (in a treatment train) Sedimentation Manhole Green Roofs Roof Rainwater Collection Systems	Infiltration Swales Grassy Swale (for conveyance) Vegetated Filter Strips Bio-retention Buffer Strips Pervious Pavement Soil Amendments	Wet Pond Detention Pond Extended Detention Dry Pond Downspout Disconnects Natural Dispersion Evaporation Pond Drywell Infiltration Trench Infiltration Pond

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